



# **Maintenance and Service Guide**

HP Pavilion Widescreen Notebook zd7000

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

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Maintenance and Service Guide  
HP Pavilion Widescreen Notebook zd7000  
First Edition August 2003  
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# 1

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## Product Description

The HP Pavilion Widescreen Notebook zd7000 offers advanced modularity, Intel Mobile Pentium DT processors with 64-bit architecture, industry-leading NVIDIA graphics controllers, and extensive multimedia support.



*HP Pavilion Widescreen Notebook zd7000*

# 1.1 Models

Notebook model information is shown in Tables 1-1 and 1-2.

**Table 1-1  
HP Pavilion Widescreen Notebook zd7000  
Model Naming Conventions**

| Key |  |   |    |    |   |                                  |    |   |              |
|-----|--|---|----|----|---|----------------------------------|----|---|--------------|
| V   | P  | 320   | Y7 | 80 | Y | Gg                               | 10 | H | XXXXXXXX-XXX |
| 1   | 2  | 3   | 4  | 5  | 6 | 7                                | 8  | 9 | 10           |
| Key | Description                              | Options   |    |    |   |                                  |    |   |              |
| 1   | Brand/Series designator                  | V = Pavilion  |    |    |   |                                  |    |   |              |
| 2   | Processor type                           | P = Intel Pentium 4 DT  |    |    |   |                                  |    |   |              |
| 3   | Processor speed                          | 320 = 3.20 GHz<br>306 = 3.06 GHz                                    |    |    |   | 280 = 2.80 GHz<br>266 = 2.66 GHz |    |   |              |
| 4   | Display type/size/resolution             | Y = wide SXGA+<br>(1680 × 1050)<br>W = wide XGA<br>(1280 × 800)     |    |    |   | 7 = 17.1 in<br>5 = 15.4 in       |    |   |              |
| 5   | Hard drive size                          | 80 = 80 GB  |    |    |   | 60 = 60 GB                       |    |   |              |
| 6   | Optical drive designator                 | Y = DVD-RW  |    |    |   | W = DVD-ROM/<br>CD-RW combo      |    |   |              |
| 7   | Integrated communication/wireless device | G = combination modem + GB NIC<br>g = 802.11g Bluetooth<br>N = none |    |    |   |                                  |    |   |              |
| 8   | RAM                                      | 10 = 1024 MB<br>76 = 768 MB   |    |    |   | 51 = 512 MB                      |    |   |              |
| 9   | Operating system                         | H = Windows XP Home   |    |    |   |                                  |    |   |              |
| 10  | SKU#                                     |   |    |    |   |                                  |    |   |              |

**Table 1-2**  
**HP Pavilion Widescreen Notebook zd7000**

All HP Pavilion zd7000 models feature:

- TouchPad pointing device
- 12-cell, lithium ion (Li-Ion) battery pack
- 1-year warranty on parts and labor

|               |   |            |            |    |   |                |            |   |  |
|---------------|---|------------|------------|----|---|----------------|------------|---|--|
| V7999         | P | 320        | Y7         | 80 | Y | Gg             | 10         | H |  |
| United States |   | DP446U ABA |            |    |   |                |            |   |  |
| V7001         | P | 320        | Y7         | 80 | Y | Gg             | 76         | H |  |
| France        |   |            | DP353E ABF |    |   | Spain          | DP353E ABE |   |  |
| Germany       |   |            | DP763E ABD |    |   | Switzerland    | DP353E ABZ |   |  |
| Italy         |   |            | DP353E UUZ |    |   | United Kingdom | DP353E ABU |   |  |
| V7020         | P | 280        | Y7         | 80 | Y | Gg             | 51         | H |  |
| United States |   | DR089U ABA |            |    |   |                |            |   |  |
| V7030         | P | 306        | Y7         | 80 | Y | Gg             | 10         | H |  |
| United States |   | DM790A ABA |            |    |   |                |            |   |  |
| V7001         | P | 306        | Y7         | 80 | Y | GN             | 51         | H |  |
| United States |   | DM793A ABA |            |    |   |                |            |   |  |
| V7020         | P | 280        | Y7         | 80 | Y | Gg             | 51         | H |  |
| United States |   | DM794A ABA |            |    |   |                |            |   |  |
| V7005         | P | 280        | Y7         | 60 | Y | Gg             | 51         | H |  |
| United States |   | DP448U ABA |            |    |   |                |            |   |  |
| V7040         | P | 280        | Y7         | 60 | W | GN             | 51         | H |  |
| France        |   |            | DP761E ABF |    |   | Spain          | DP761E ABE |   |  |
| Germany       |   |            | DP762E ABD |    |   | Switzerland    | DP761E UUZ |   |  |
| Italy         |   |            | DP761E ABZ |    |   | United Kingdom | DP761E ABU |   |  |
| V7010         | P | 266        | Y7         | 60 | W | Gg             | 51         | H |  |
| United States |   | DM788A ABA |            |    |   |                |            |   |  |
| V7998         | P | 266        | W5         | 60 | W | Gg             | 51         | H |  |
| United States |   | DP447U ABA |            |    |   |                |            |   |  |

## 1.2 Features

- The following processors, all with 512-KB L2 cache, are available, varying by notebook model:
  - ❑ Intel Pentium 4 DT 3.2-GHz processor with Hyper-Threading front-side bus (FSB)
  - ❑ Intel Pentium 4 DT 3.2-, 3.0-, and 2.8-GHz processors with 800-MHz FSB
  - ❑ Intel Pentium 4 DT 3.06-, 2.8-, and 2.66-GHz processors with 533-MHz FSB
- 17.0- or 15.4-inch wide XGA (1490×900) TFT display with over 16.7 million colors, varying by notebook model
- NVIDIA GeForce FX Go5000 with 128-MB video memory, NVIDIA GeForce FX Go5000 with 64-MB video memory, or NVIDIA GeForce 4 440 Go with 64-MB video memory, varying by notebook model
- 80-, 60-, or 40-GB high-capacity hard drive, varying by notebook model
- 256-MB DDR Synchronous DRAM (SDRAM) at 333 MHz, expandable to 2.0 GB
- Microsoft Windows XP Home or XP Pro, varying by notebook model
- Full-size Windows 98 keyboard with integrated numeric keypad
- TouchPad pointing device with on/off button and dedicated vertical scroll up/down pad
- Integrated Secure Digital (SD) flash media slot
- Integrated 10/100BASE-T Ethernet local area network (LAN) network interface card (NIC) with RJ-45 connector
- Integrated wireless support for Mini PCI 802.11b/g and Bluetooth LAN devices

- Support for one Type II PC Card slot with support for both 32-bit (CardBus) and 16-bit PC Cards
- External 135-watt AC adapter with power cord
- 12-cell Li-Ion battery pack
- Harman/Kardon stereo speakers
- Support for the following optical drives:
  - 24X Max DVD/CD-RW combination drive
  - 8X Max DVD-RW drive
  - 24X Max CD-ROM drive
- Connectors:
  - SD Card
  - Infrared
  - 1 Type II PC Card slot
  - RJ-11 (modem)
  - RJ-45 (network interface card, [NIC])
  - 4 Universal Serial Bus (USB) v. 2.0
  - S-Video
  - Parallel
  - External monitor
  - DC power
  - Docking
  - IEEE 1394 digital
  - Microphone
  - Stereo speaker/headphone

## 1.3 Clearing a Password

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

1. Prepare the notebook for disassembly (refer to Section 5.3, “Preparing the Notebook for Disassembly,” for more information).
2. Remove the real time clock (RTC) battery (refer to Section 5.13, “RTC Battery”).
3. Wait approximately 5 minutes.
4. Replace the RTC battery and reassemble the notebook.
5. Connect AC power to the notebook. Do **not** reinsert any battery packs at this time.
6. Turn on the notebook.

All passwords and all CMOS settings have been cleared.

## 1.4 Power Management

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

- Standby
- Hibernation
- Setting customization by the user
- Hotkeys for setting the level of performance
- Battery calibration
- Lid switch Standby/resume
- Power/Standby button
- Advanced Configuration and Power Management (ACPM) compliance

## 1.5 External Components

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

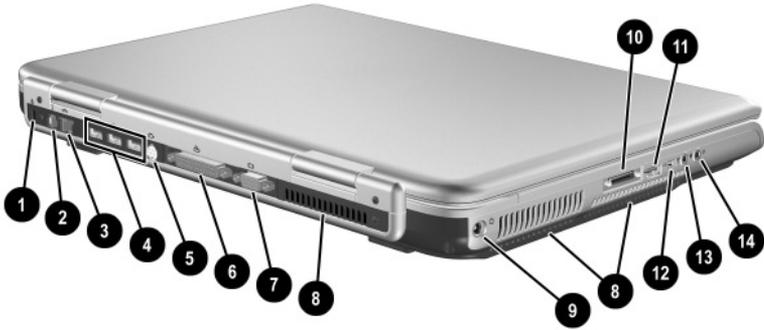


*Front Panel and Right-Side Components*

**Table 1-3**  
**Front and Right Side Components**

| <b>Item</b> | <b>Component</b>                               | <b>Function</b>  |
|-------------|--|--|
| 1           | Display release latch                          | Opens the notebook.  |
| 2           | Stereo speakers (2)                            | Produce stereo sound.  |
| 3           | Integrated Drive Electronics (IDE) drive light | On: The internal hard drive or optical drive is being accessed.  |
| 4           | Battery light                                  | <ul style="list-style-type: none"> <li>■ On: The notebook is receiving battery power.</li> <li>■ Amber: A battery pack is charging.</li> <li>■ Green: A battery pack is fully charged.</li> <li>■ Flashing: A battery pack is malfunctioning and might need to be replaced.</li> </ul> |
| 5           | AC power light                                 | On: The notebook is receiving AC power.  |
| 6           | Power/Standby light                            | On: Notebook is turned on.<br>Flashing: Notebook is in Standby.  |
| 7           | Digital Media slot                             | Supports SD, MMC, Memory Stick, and SmartMedia.  |
| 8           | Infrared port                                  | Provides wireless communication between the notebook and an optional IrDA-compliant device.  |
| 9           | Optical drive                                  | Supports an optical disc.  |
| 10          | PC Card eject button                           | Ejects an optional PC Card from the PC Card slot.  |
| 11          | PC Card slot                                   | Supports an optional Type I or Type II 32-bit (CardBus) or 16-bit PC Card.   |

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



Rear Panel and Left-Side Components

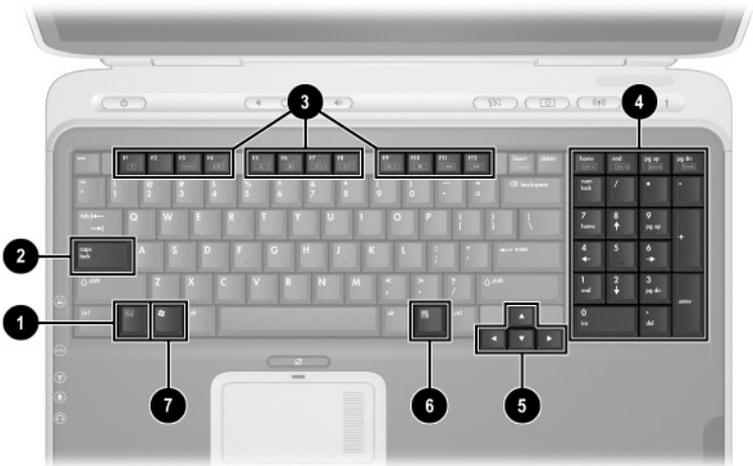
**Table 1-4**  
**Rear Panel and Left-Side Components**

| Item  | Component   | Function   |
|---|---|--|
| 1   | Security cable slot   | Attaches an optional security cable to the notebook.   |
|  | The purpose of security solutions is to act as a deterrent. These solutions do not prevent the product from being mishandled or stolen. |  |
| 2   | RJ-11 telephone jack  | Connects a modem cable.  |
| 3   | RJ-45 network jack  | Connects an Ethernet network cable.  |
| 4   | USB connectors (3)  | Connect optional 2.0-compliant USB devices.  |
| 5   | S-Video jack  | Connects an optional S-Video device, such as a television, VCR, camcorder, projector, or video capture card. |

**Table 1-4**  
**Rear Panel and Left-Side Components (Continued)**

| <b>Item</b>   | <b>Component</b>   | <b>Function</b>  |
|---|--|--|
| 6   | Parallel connector   | Connects an optional parallel device such as a printer.  |
| 7   | External monitor connector   | Connects an optional VGA external monitor or projector.  |
| 8   | Vents (3)  | Allow airflow to cool internal components.   |
|  | To prevent overheating, use the notebook only on hard surfaces that cannot obstruct the vents. Do not allow a soft surface, such as bedding, clothing, or a thick rug, to block airflow. |  |
| 9   | Power connector  | Connects an AC adapter cable.  |
| 10  | HP notebook expansion base connector   | Connects to an optional expansion base.  |
| 11  | USB connector  | Connects optional 2.0-compliant USB devices.   |
| 12  | 1394 connector   | Connects an optional 1394 device such as a camcorder or digital camera.  |
| 13  | Microphone jack  | Connects an optional monaural or stereo microphone.  |
| 14  | Audio line-out jack  | Connects optional headphone or powered stereo speakers. Also connects the audio function of an audio/video device such as a television or VCR. |

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

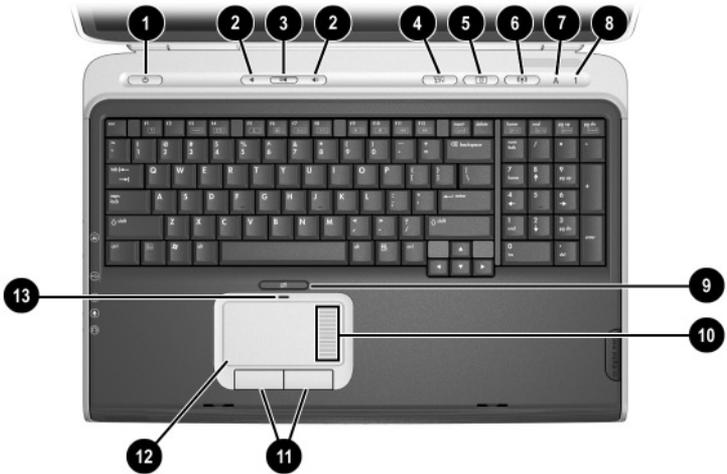


Keyboard Components

**Table 1-5**  
**Keyboard Components**

| <b>Item</b> | <b>Component</b>                           | <b>Function</b>   |
|-------------|--|---|
| 1           | <b>fn</b> key                              | Executes frequently used system functions when pressed in combination with another key.   |
| 2           | caps lock key                              | Enables caps lock and turns on the caps lock light.   |
| 3           | <b>f1</b> through <b>f12</b> function keys | Perform system and application tasks. When combined with the <b>fn</b> key, the function keys <b>f1</b> and <b>f3</b> through <b>f12</b> perform additional tasks as hotkeys. |
| 4           | Keypad keys (17)                           | Standard numeric keypad.  |
| 5           | Cursor control keys                        | Move the cursor around the screen.  |
| 6           | Applications key                           | Displays a shortcut menu for items beneath the pointer.   |
| 7           | Microsoft logo key                         | Displays the Windows Start menu.  |

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



Top Components

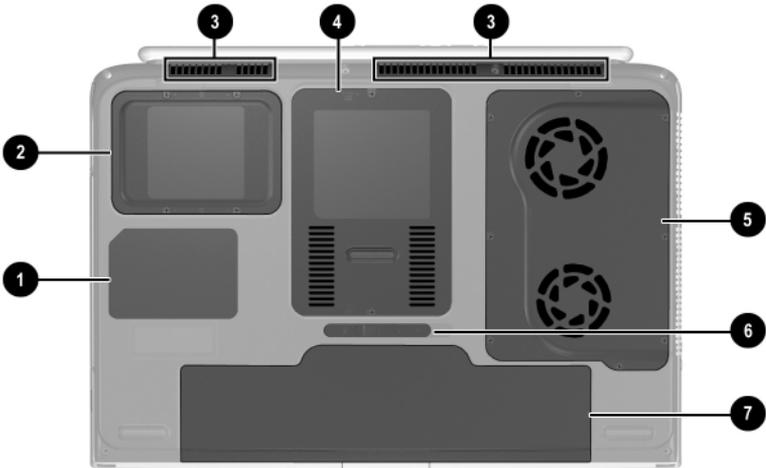
**Table 1-6  
Top Components**

| Item | Component                  | Function   |
|------|----------------------------|--|
| 1    | Power button               | When the notebook is: <ul style="list-style-type: none"> <li>■ Off, press to turn on the notebook.</li> <li>■ On, briefly press to initiate Hibernation.</li> <li>■ In Standby, briefly press to resume from Standby.</li> <li>■ In Hibernation, briefly press to restore from Hibernation.</li> </ul> |
|      | Power/Standby light        | <ul style="list-style-type: none"> <li>■ On: Notebook is turned on.</li> <li>■ Flashing: Notebook is in Standby.</li> </ul>  |
| 2    | Volume control buttons (2) | Increase or decrease system volume.  |

**Table 1-6**  
**Top Components (Continued)**

| <b>Item</b>   | <b>Component</b>   | <b>Function</b>   |
|---|--|---|
| 3   | Mute button  | Mutes or restores volume.                                       |
|   | Mute light   | On: Volume is muted.  |
| 4   | Media button   | Launches a multimedia application.                              |
| 5   | Picture button   | Launches a digital imaging application.                         |
|  | The settings for the media and picture buttons can be changed. Refer to the "Using Custom Assignments and Schemes" section in Chapter 3 of the Startup and Reference Guide for information on reassigning these buttons to other applications. |   |
| 6   | Wireless on/off button   | Turns the wireless network device on and off.                   |
|   | Wireless on/off light  | On: an integrated wireless device has been enabled.             |
| 7   | Caps lock light  | On: Caps lock is on.  |
| 8   | Num lock light   | On: Num lock is on.   |
| 9   | TouchPad on/off button   | Enables/disables the TouchPad.                                  |
| 10  | TouchPad scroll zone   | Scrolls upward or downward.                                     |
| 11  | Left and right TouchPad buttons  | Function like the left and right buttons on an external mouse.  |
| 12  | TouchPad   | Moves the pointer and selects or activates items on the screen. |
| 13  | TouchPad light   | On: TouchPad is enabled.  |

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



*Bottom Components*

**Table 1-7  
Bottom Components**

| <b>Item</b>   | <b>Component</b>   | <b>Function</b>   |
|---|--|---|
| 1   | Labels area  | Contains the notebook serial number and other applicable regulatory labels.   |
| 2   | Hard drive bay   | Holds the internal hard drive.  |
| 3   | Vents (3)  | Allow airflow to cool internal components.  |
|  | To prevent overheating, do not obstruct vents. Using the notebook on a soft surface, such as a pillow, blanket, rug, or thick clothing, can block airflow. |   |
| 4   | Memory expansion/Mini PCI communication compartment  | Contains two memory slots for optional 256-, 512-, or 1024-MB memory modules and one slot for a Mini PCI wireless card. |
| 5   | Fan compartment  | Contains the heat sink and the two system fans.   |
| 6   | Battery release latch  | Releases a battery pack from the battery bay.   |
| 7   | Battery bay  | Holds the battery pack.   |

## 1.6 Design Overview

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

The system board provides the following device connections:

- Memory expansion board
- Mini PCI communications devices
- Hard drive
- Display
- Keyboard and TouchPad
- Audio
- Intel Pentium 4 DT processors
- Fan
- PC Card

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



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

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# 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 and Diagnostics Utilities

The notebook features two system management utilities:

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

- **Diagnostics for Windows**—A system information and diagnostic utility that is used within the Windows operating system. Use this utility whenever possible to:
  - ❑ Display system information.
  - ❑ Test system components.
  - ❑ Troubleshoot a device configuration problem in Windows XP Professional or Windows XP Home.



It is not necessary to configure a device connected to a USB connector on the notebook or to an optional expansion base.

---

## Using Computer Setup

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

1. Turn on or restart the notebook. Press **f10** while the F10 = ROM-Based Setup message is displayed in the lower left corner of the screen.
  - ❑ To change the language, press **f2**.
  - ❑ To view navigation information, press **f1**.
  - ❑ To return to the Computer Setup menu, press **esc**.
2. Select the File, Security, or Advanced menu.
3. To close Computer Setup and restart the notebook:
  - ❑ Select File > Save Changes and Exit and press **enter**.
  - or-
  - ❑ Select File > Ignore Changes and Exit and press **enter**.
4. When you are prompted to confirm your action, press **f10**.

## Selecting from the File Menu

**Table 2-1  
File Menu**

| Select                  | To Do This  |
|-------------------------|---|
| System Information      | <ul style="list-style-type: none"> <li>■ View identification information about the notebook, an expansion base, and any battery packs in the system.</li> <li>■ View specification information about the processor, memory and cache size, and system ROM.</li> </ul> |
| Save to Floppy          | Save system configuration settings to a diskette.   |
| Restore from Floppy     | Restore system configuration settings from a diskette.  |
| Restore Defaults        | Replace configuration settings in Computer Setup with factory default settings. Identification information is retained.   |
| Ignore Changes and Exit | Cancel changes entered during the current session, then exit and restart the notebook.  |
| Save Changes and Exit   | Save changes entered during the current session, then exit and restart the notebook.  |

## Selecting from the Security Menu

**Table 2-2  
Security Menu**

| Select   | To Do This   |
|--|--|
| Setup Password   | Enter, change, or delete a Setup password. The Setup password is called an administrator password in Computer Security, a program accessed from the Windows Control Panel.   |
| Power-on Password  | Enter, change, or delete a power-on password.  |
| DriveLock Passwords  | <p>Enable/disable DriveLock; change a DriveLock User or Master password.</p> <p> DriveLock Settings are accessible only when you enter Computer Setup by turning on (not restarting) the notebook.</p>  |
| Password Options<br>(Password options can be selected only when a power-on password has been set.) | <p>Enable/disable:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> QuickLock</li> <li><input type="checkbox"/> QuickLock on Standby</li> <li><input type="checkbox"/> QuickBlank</li> </ul> <p> To enable QuickLock on Standby or QuickBlank, you must first enable QuickLock.</p>          |
| Device Security  | <p>Enable/disable:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ports or diskette drives*</li> <li><input type="checkbox"/> Diskette write*</li> <li><input type="checkbox"/> CD-ROM or diskette startup</li> </ul> <p> Settings for a DVD-ROM can be entered in the CD-ROM field.</p> |
| System IDs   | Enter identification numbers for the notebook, an expansion base, and all battery packs in the system.   |

\*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 Options   | <p>Enable/disable:</p> <ul style="list-style-type: none"> <li>■ QuickBoot, which starts the notebook more quickly by eliminating some startup tests. (If you suspect a memory failure and want to test memory automatically during startup, disable QuickBoot.)</li> <li>■ MultiBoot, which sets a startup sequence that can include most bootable devices and media in the system.</li> </ul>  |
| Device Options | <ul style="list-style-type: none"> <li>■ Enable/disable the embedded numeric keypad at startup.</li> <li>■ Enable/disable multiple standard pointing devices at startup. (To set the notebook to support only a single, usually nonstandard, pointing device at startup, select Disable.)</li> <li>■ Enable/disable USB legacy support for a USB keyboard. (When USB legacy support is enabled, the keyboard works even when a Windows operating system is not loaded.)</li> <li>■ Set an optional external monitor or overhead projector connected to a video card in an expansion base as the primary device. (When the notebook display is set as secondary, the notebook must be shut down before undocking from an expansion base.)</li> </ul> |

**Table 2-3**  
**Advanced Menu (*Continued*)**

| <b>Select</b>  | <b>To Do This</b>   |
|--|---|
| Device Options<br>( <i>continued</i> )   | <ul style="list-style-type: none"> <li>■ Change the parallel port mode from Enhanced Parallel Port (EPP, the default setting) to standard, bidirectional, EPP, or Enhanced Capabilities Port (ECP).</li> <li>■ Set video-out mode to NTSC (default), PAL, NTSC-J, or PAL-M.*</li> <li>■ Enable/disable all settings in the SpeedStep window. (When Disable is selected, the notebook runs in Battery Optimized mode.)</li> <li>■ Specify how the notebook recognizes multiple identical expansion bases that are identically equipped. Select Disable to recognize the expansion bases as a single expansion base; select Enable to recognize the expansion bases individually, by serial number.</li> <li>■ Enable/disable the reporting of the processor serial number by the processor to the software.</li> </ul> |
| HDD Self Test Options  | Run a quick comprehensive self test on hard drives in the system that support the test features.  |
| <p>*Video modes vary even within regions. However, NTSC is common in North America; PAL, in Europe, Africa, and the Middle East; NTSC-J, in Japan; and PAL-M, in Brazil. Other South and Central American regions can use NTSC, PAL, or PAL-M.</p> |   |

## 2.2 Using Diagnostics for Windows

When you access Diagnostics for Windows, a scan of all system components is displayed on the screen before the diagnostics window opens.

You can display more or less information from anywhere within Diagnostics for Windows by selecting Level on the menu bar.

Diagnostics for Windows is designed to test HP components. If non-HP components are tested, the results might be inconclusive.

### Obtaining, Saving, or Printing Configuration Information

1. Access Diagnostics for Windows by selecting Start > Settings > Control Panel > Diagnostics for Windows.
2. Select Categories, then select a category from the drop-down list.
  - ❑ To save the information, select File > Save As.
  - ❑ To print the information, select File > Print.
3. To close Diagnostics for Windows, select File > Exit.

## Obtaining, Saving, or Printing Diagnostic Test Information

1. Access Diagnostics for Windows by selecting Start > Settings > Control Panel > Diagnostics for Windows.
2. Select the Test tab.
3. In the scroll box, select the category or device you want to test.
4. Select a test type:
  - ❑ **Quick Test**—Runs a quick, general test on each device in a selected category.
  - ❑ **Complete Test**—Performs maximum testing on each device in a selected category.
  - ❑ **Custom Test**—Performs maximum testing on a selected device.
    - ◆ To run all tests for your selected device, select the Check All button.
    - ◆ To run only the tests you select, select the Uncheck All button, then select the check box for each test you want to run.
5. Select a test mode:
  - ❑ **Interactive Mode**—Provides maximum control over the testing process. You determine whether the test was passed or failed. You might be prompted to insert or remove devices.
  - ❑ **Unattended Mode**—Does not display prompts. If errors are found, they are displayed when testing is complete.

6. Select the Begin Testing button.
7. Select a tab to view a test report:
  - ❑ **Status tab**—Summarizes the tests run, passed, and failed during the current testing session.
  - ❑ **Log tab**—Lists tests run on the system, the number of times each test has run, the number of errors found on each test, and the total run time of each test.
  - ❑ **Error tab**—Lists all errors found in the notebook with the corresponding error codes.
8. Select a tab to save the report:
  - ❑ **Log tab**—Select the Log tab Save button.
  - ❑ **Error tab**—Select the Error tab Save button.
9. Select a tab to print the report:
  - ❑ **Log tab**—Select File > Save As, then print the file from your folder.

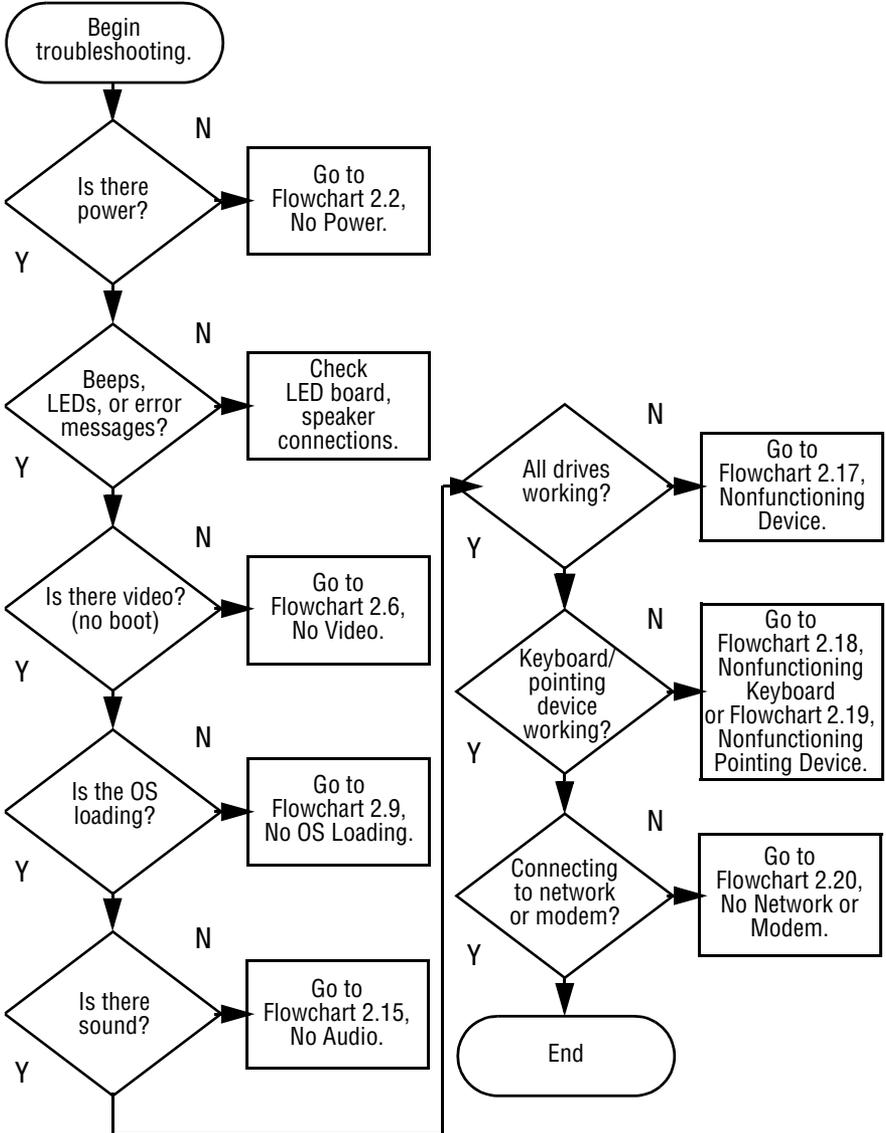
## 2.3 Troubleshooting Flowcharts

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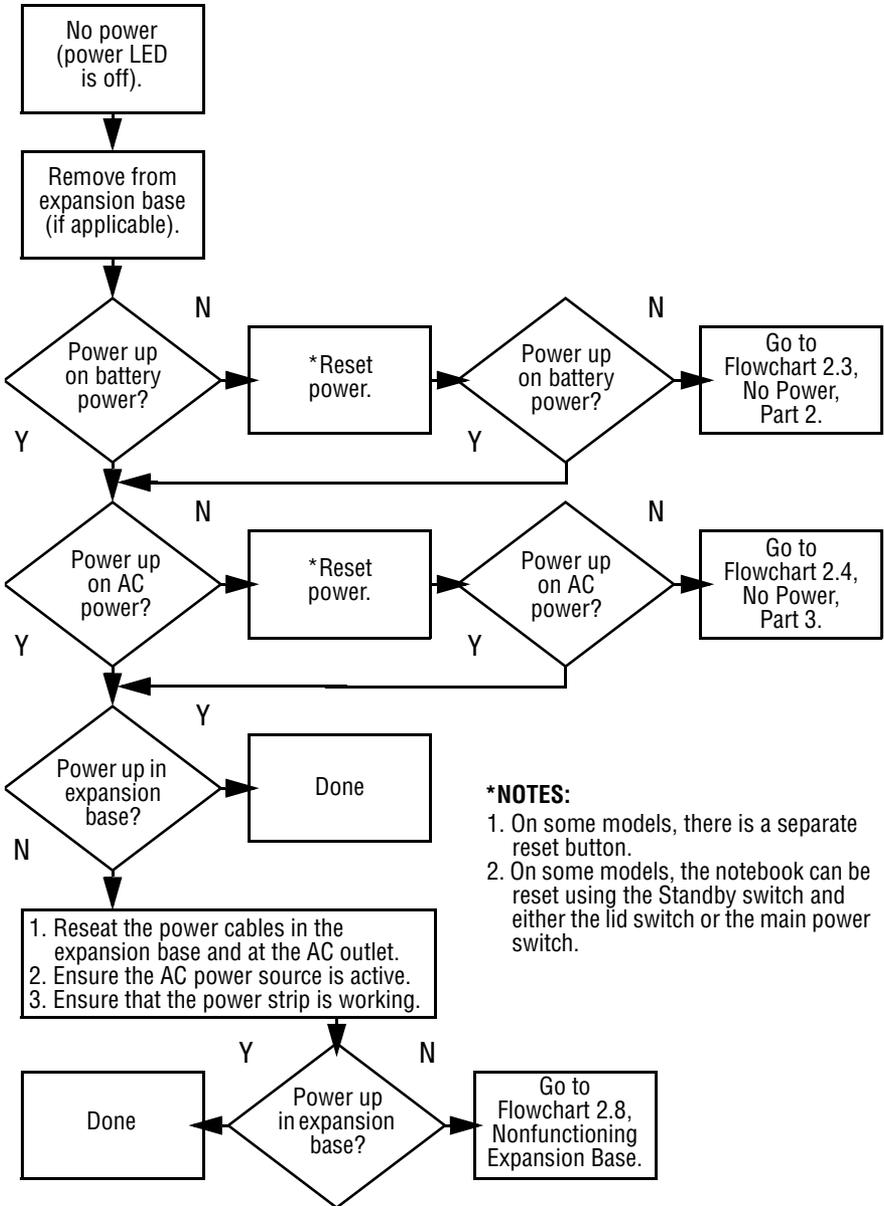
**Table 2-4**  
**Troubleshooting Flowcharts Overview**

| <b>Flowchart</b> | <b>Description</b>                      |
|------------------|---|
| 2.1              | Initial troubleshooting                 |
| 2.2              | No power, part 1                        |
| 2.3              | No power, part 2                        |
| 2.4              | No power, part 3                        |
| 2.5              | No power, part 4                        |
| 2.6              | No video, part 1                        |
| 2.7              | No video, part 2                        |
| 2.8              | Nonfunctioning expansion base           |
| 2.9              | No operating system (OS) loading        |
| 2.10             | No OS loading from hard drive, part 1   |
| 2.11             | No OS loading from hard drive, part 2   |
| 2.12             | No OS loading from hard drive, part 3   |
| 2.13             | No OS loading from diskette drive       |
| 2.14             | No OS loading from CD- or DVD-ROM drive |
| 2.15             | No audio, part 1                        |
| 2.16             | No audio, part 2                        |
| 2.17             | Nonfunctioning device                   |
| 2.18             | Nonfunctioning keyboard                 |
| 2.19             | Nonfunctioning pointing device          |
| 2.20             | No network or modem connection          |

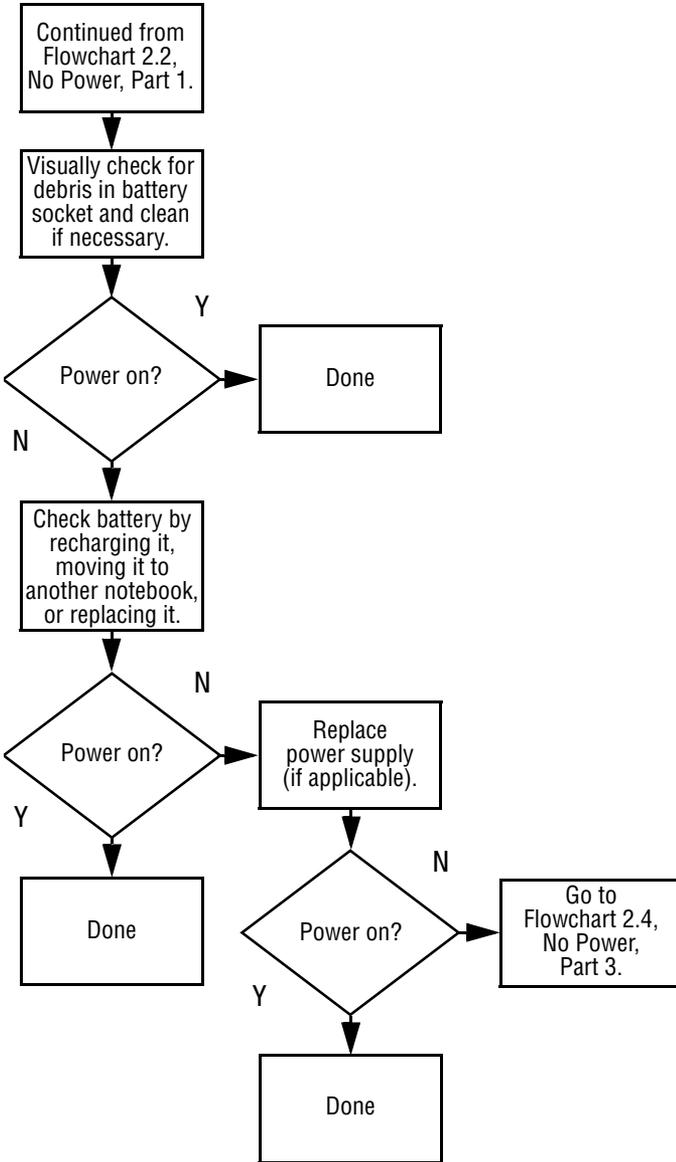
## Flowchart 2.1 – Initial Troubleshooting



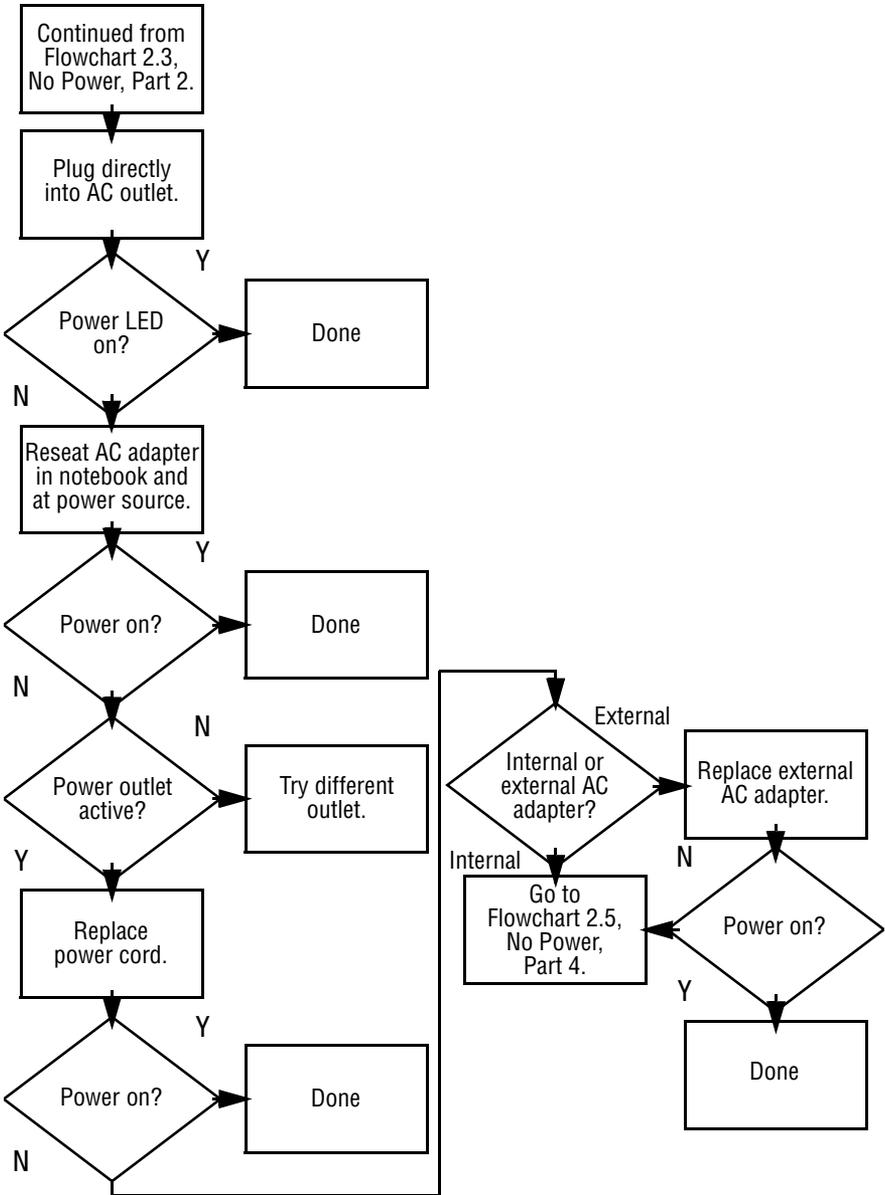
## Flowchart 2.2—No Power, Part 1



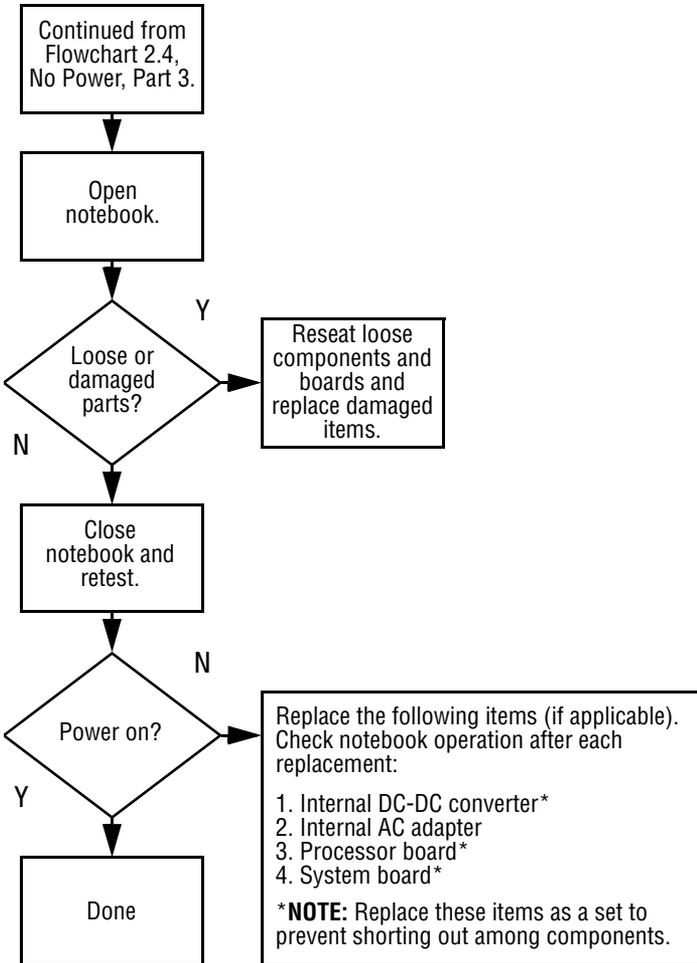
## Flowchart 2.3—No Power, Part 2



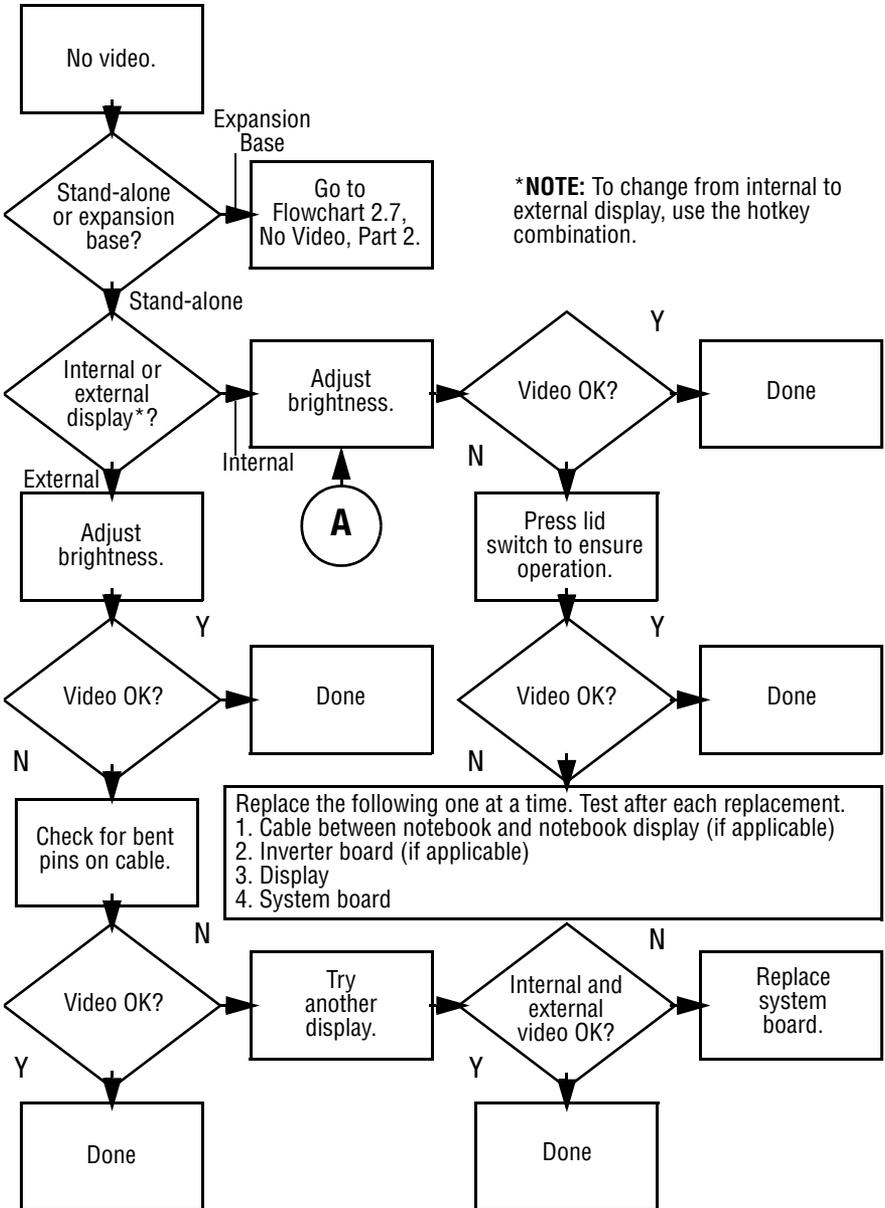
### Flowchart 2.4—No Power, Part 3



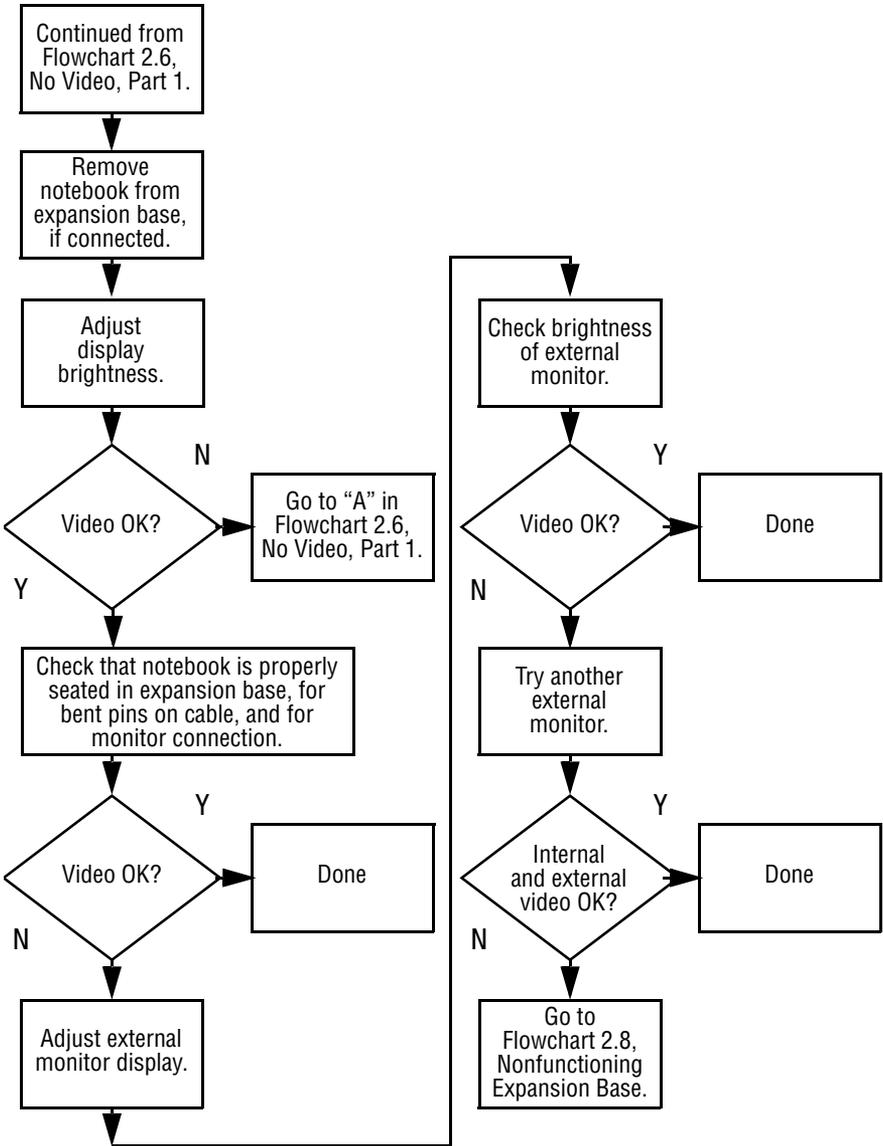
## Flowchart 2.5—No Power, Part 4



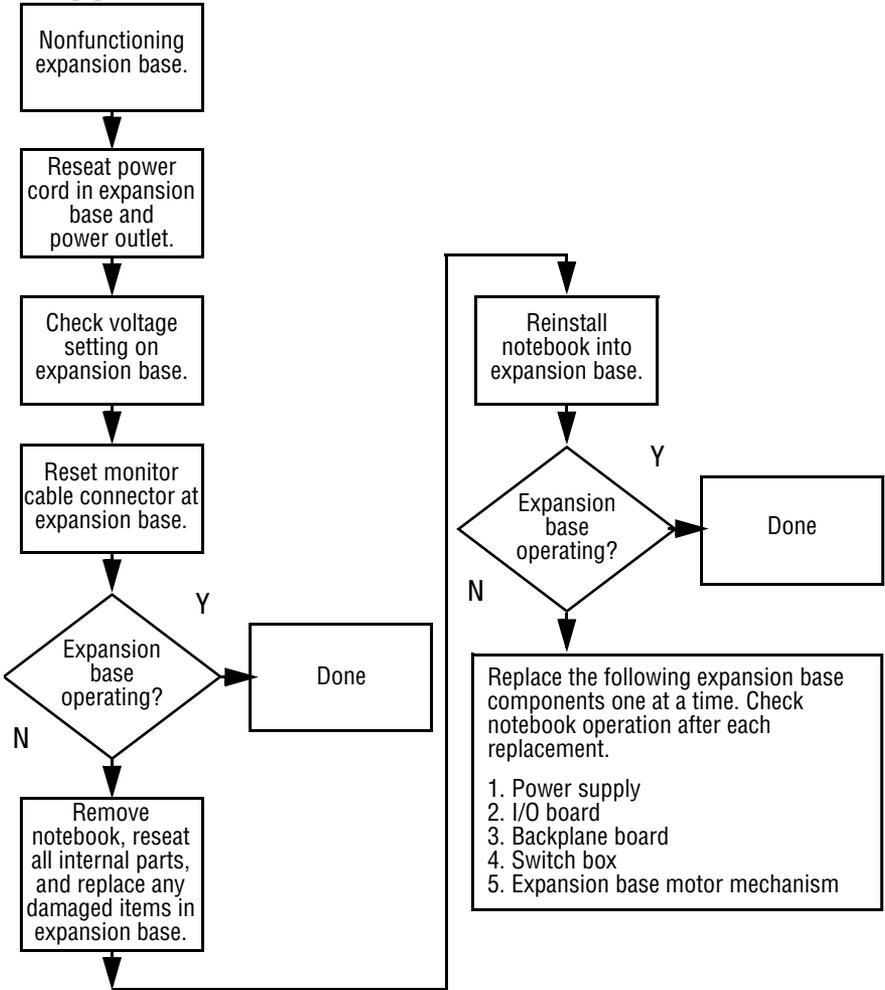
## Flowchart 2.6—No Video, Part 1



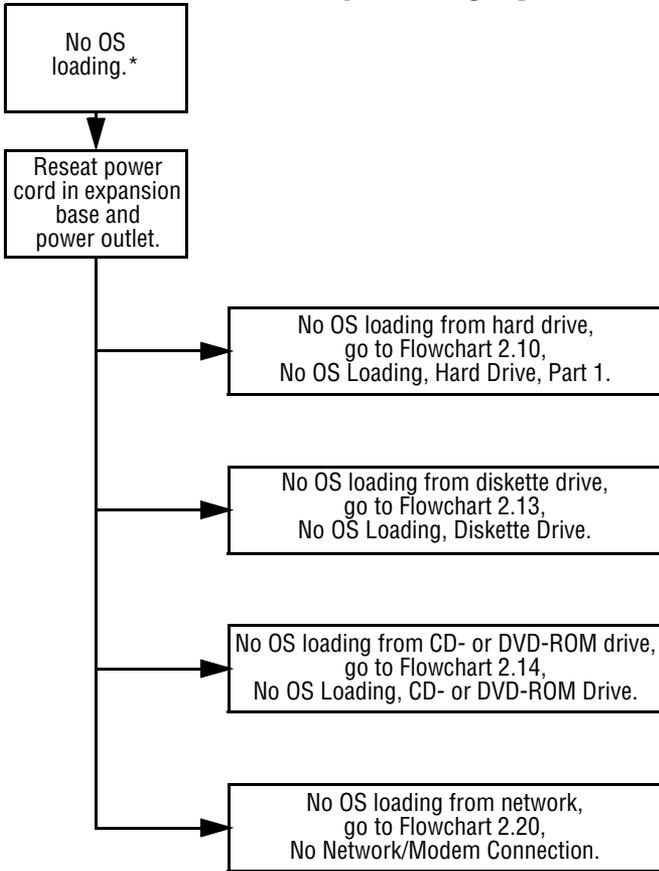
## Flowchart 2.7—No Video, Part 2



## Flowchart 2.8—Nonfunctioning Expansion Base (if applicable)

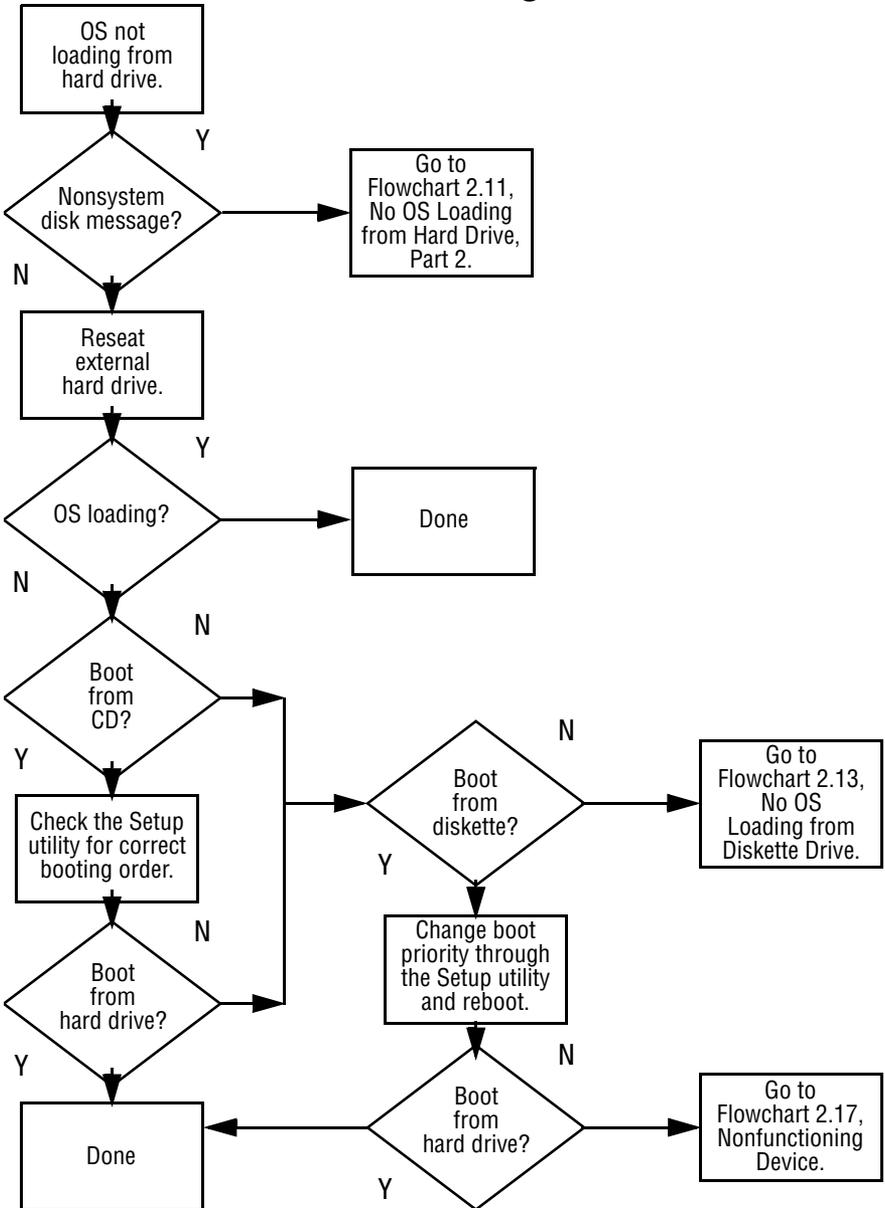


## Flowchart 2.9—No Operating System (OS) Loading

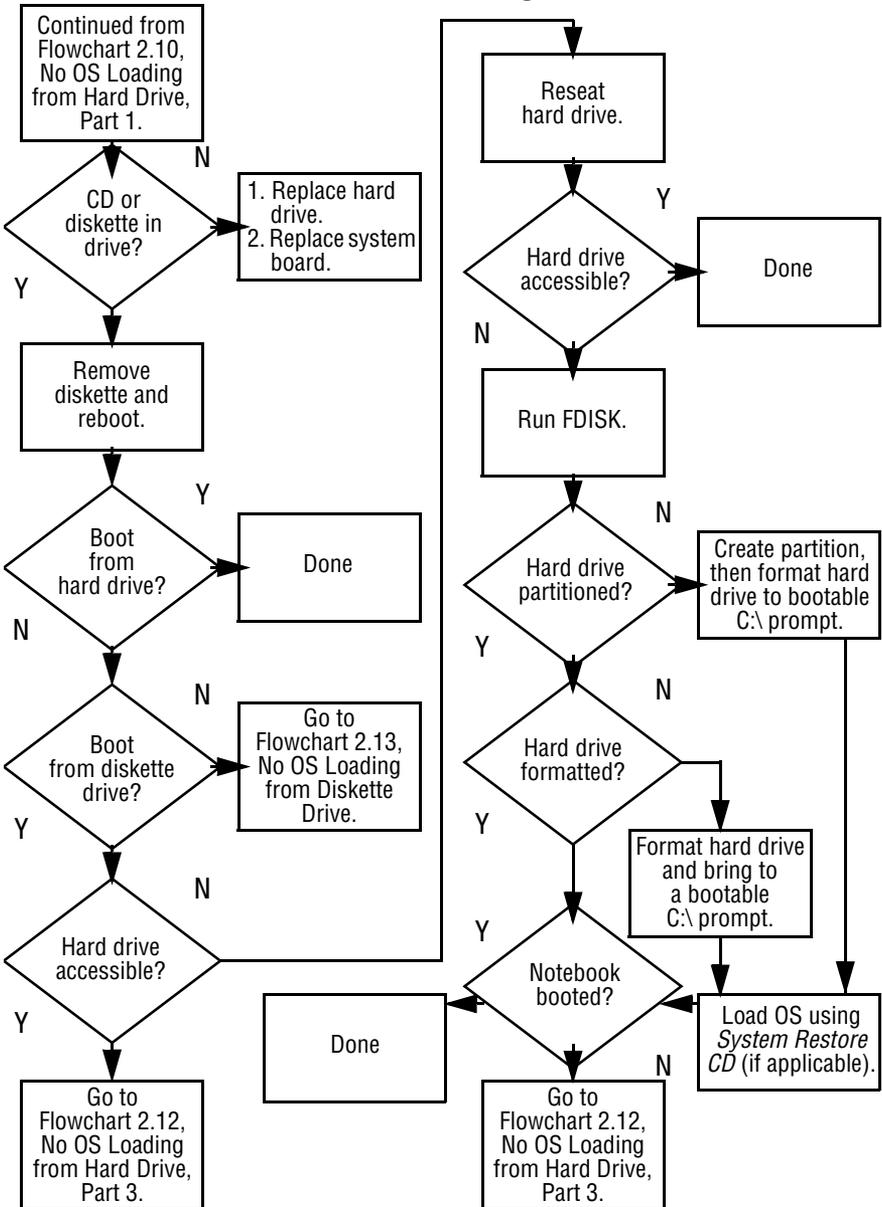


**\*NOTE:** Before beginning troubleshooting, always check cable connections, cable ends, and drives for bent or damaged pins.

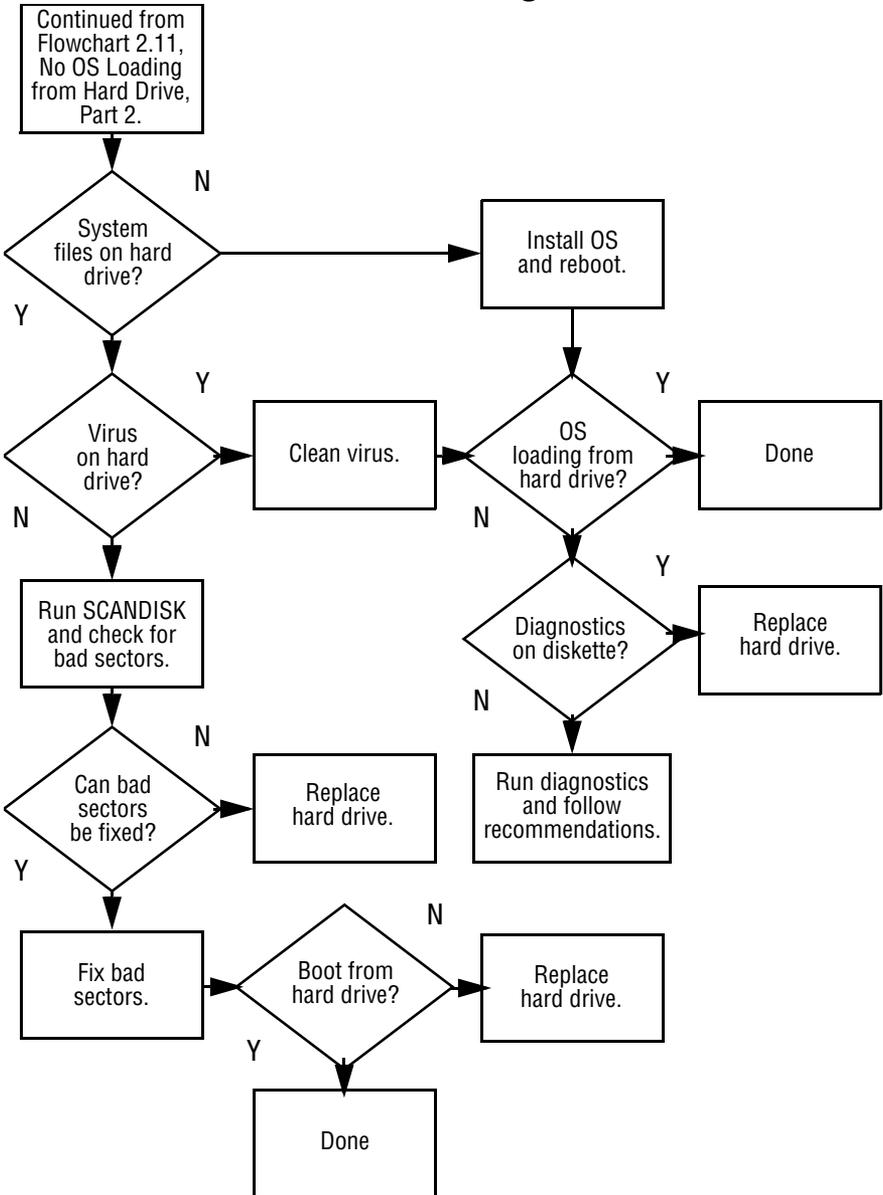
### Flowchart 2.10—No OS Loading, Hard Drive, Part 1



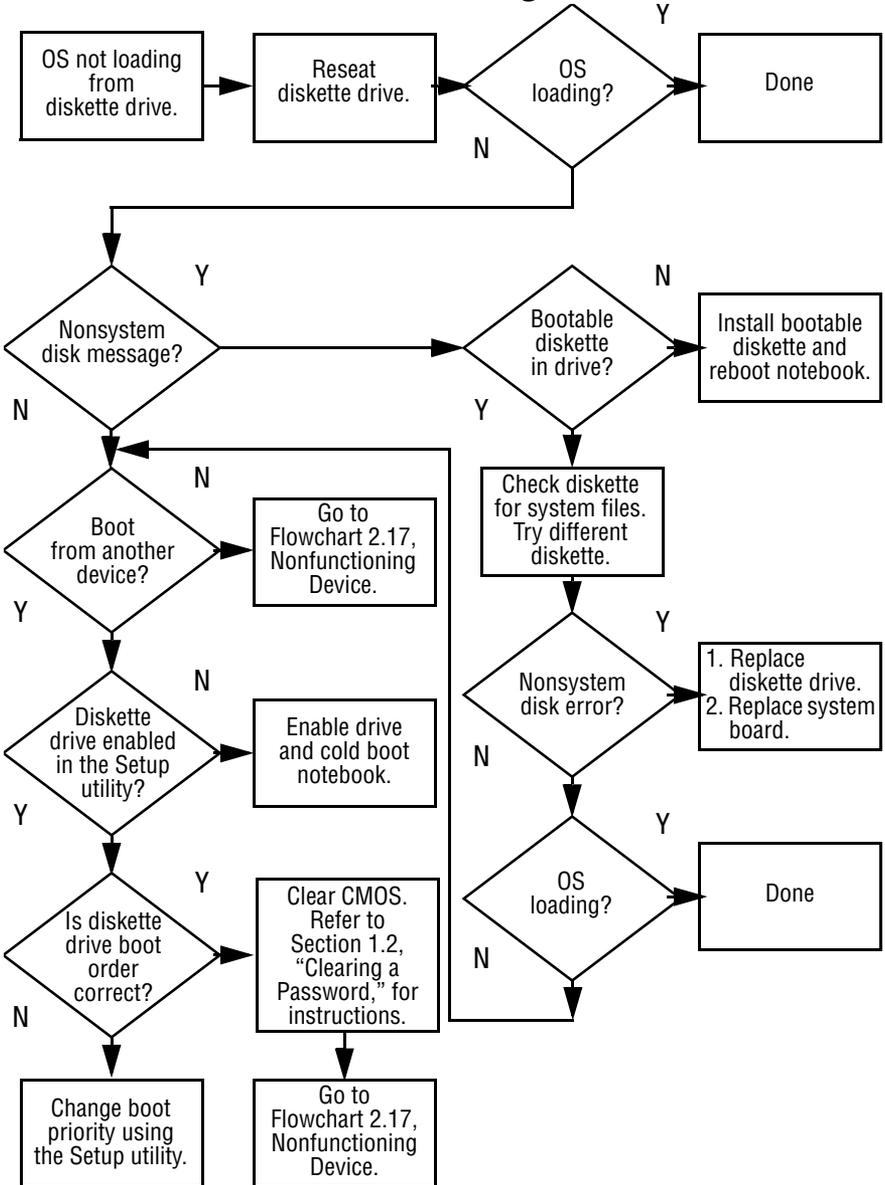
**Flowchart 2.11 – No OS Loading, Hard Drive, Part 2**



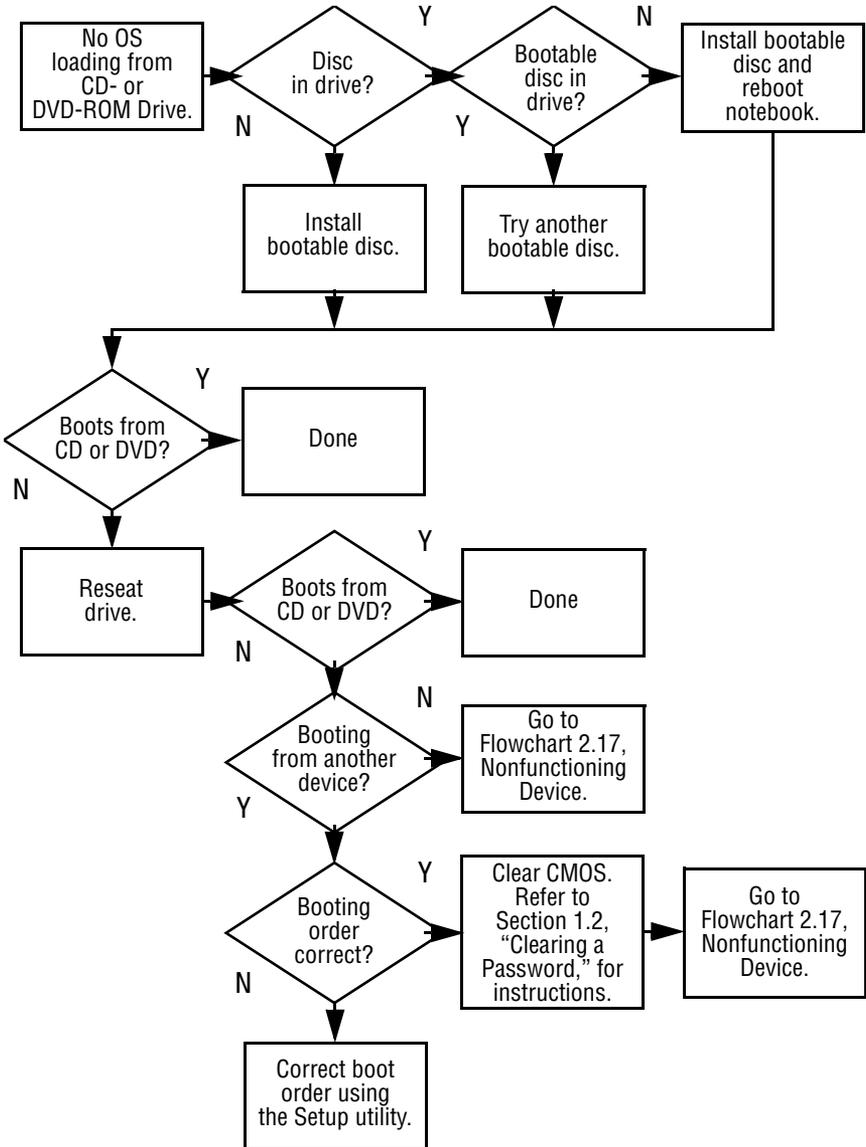
### Flowchart 2.12—No OS Loading, Hard Drive, Part 3



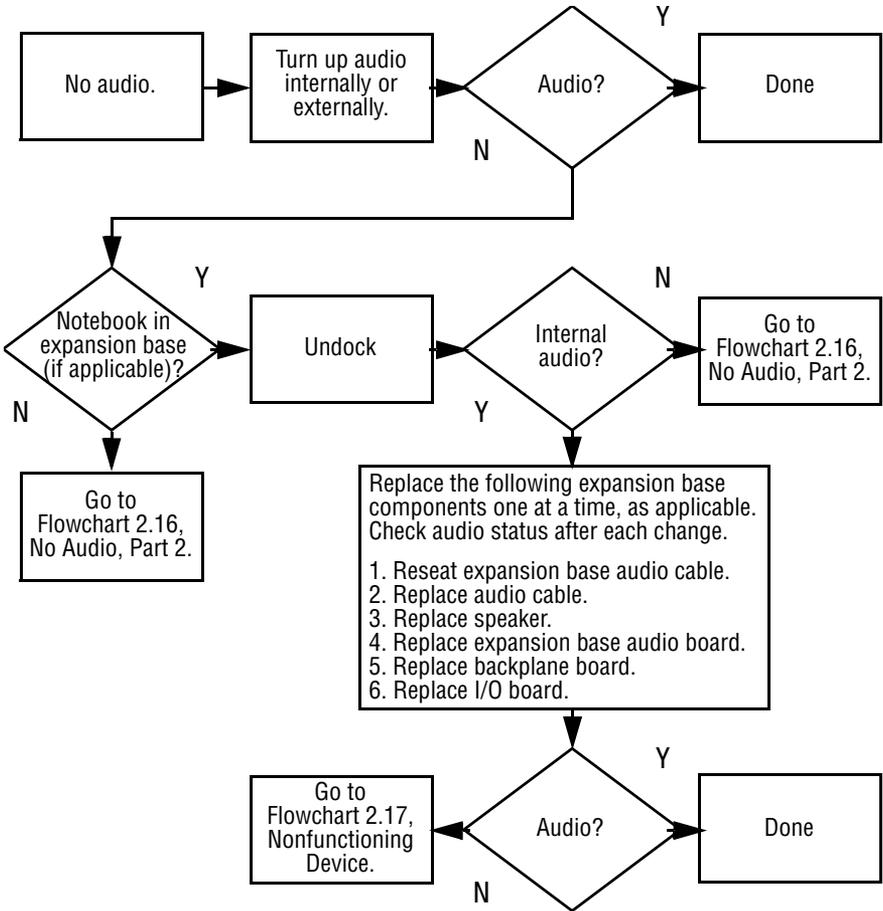
**Flowchart 2.13—No OS Loading, Diskette Drive**



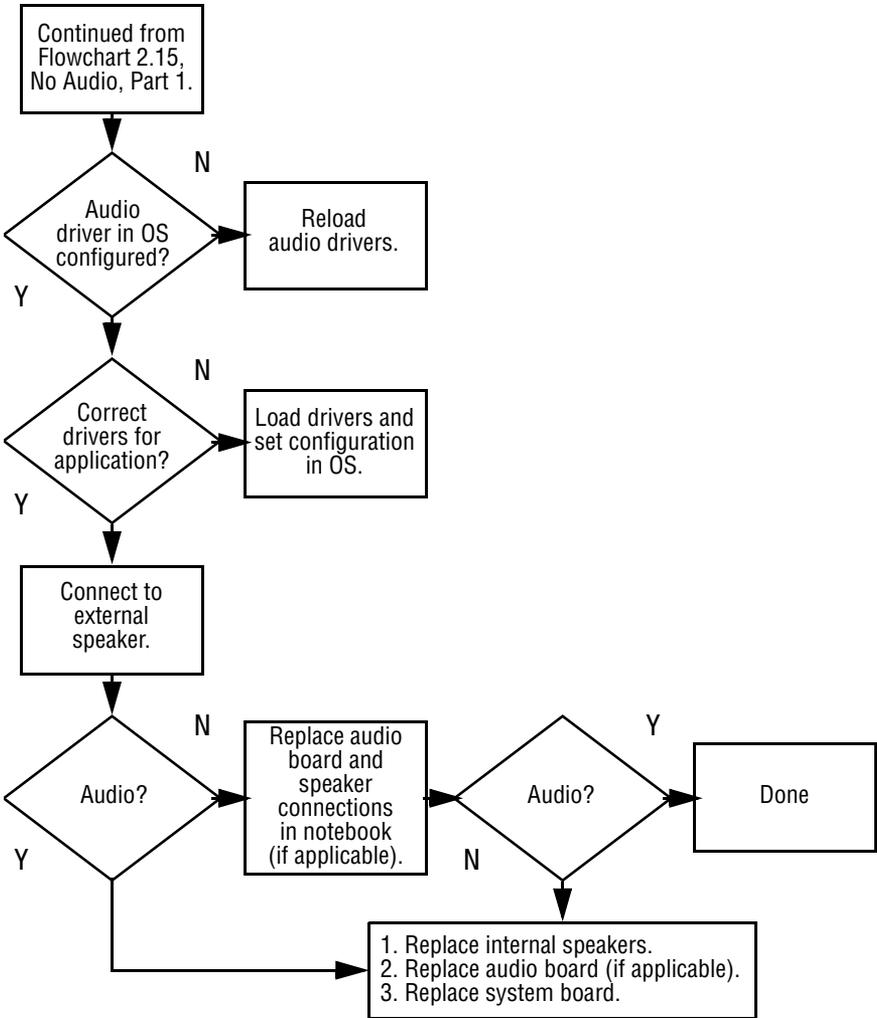
**Flowchart 2.14—No OS Loading, CD- or DVD-ROM Drive**



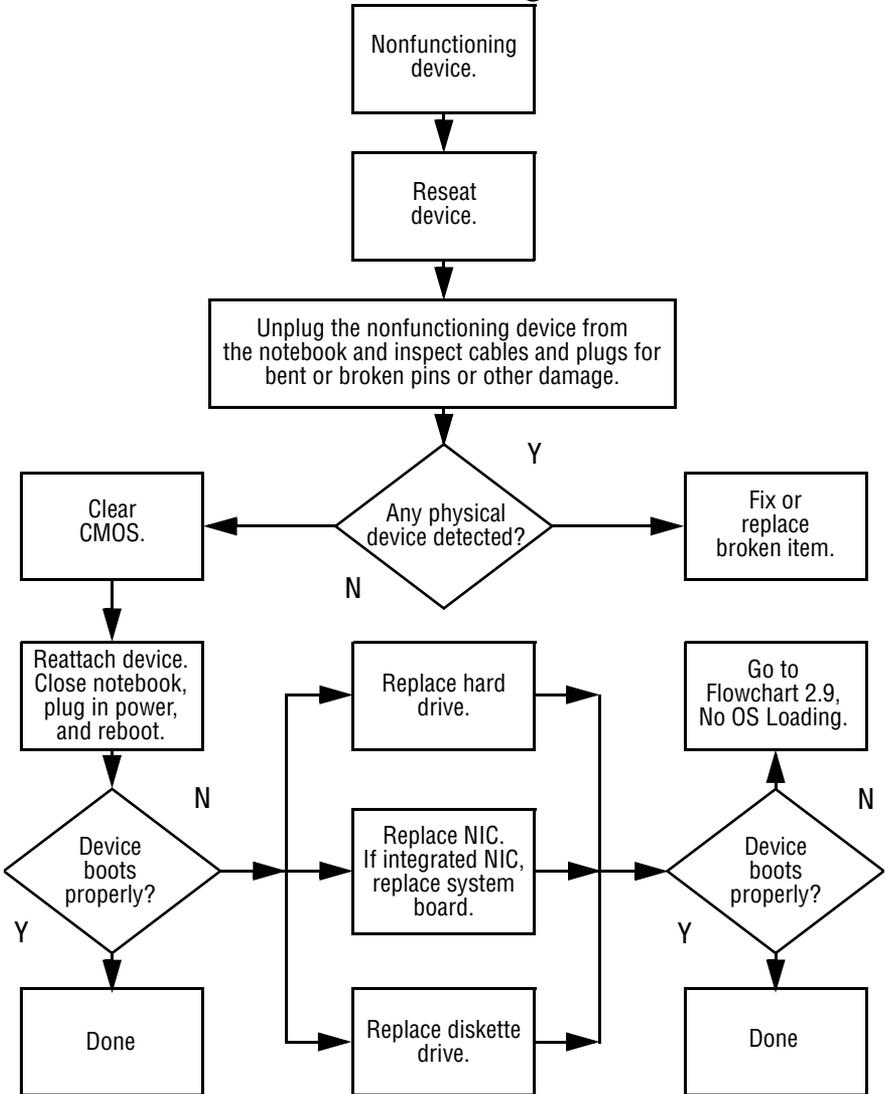
## Flowchart 2.15—No Audio, Part 1



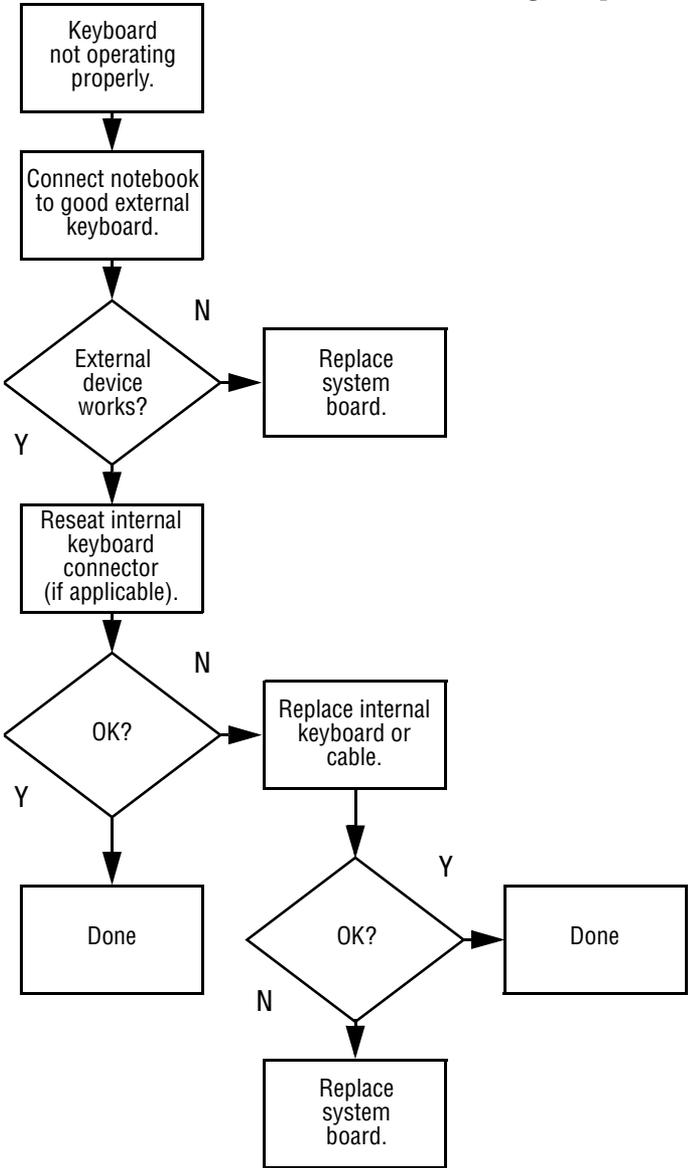
## Flowchart 2.16—No Audio, Part 2



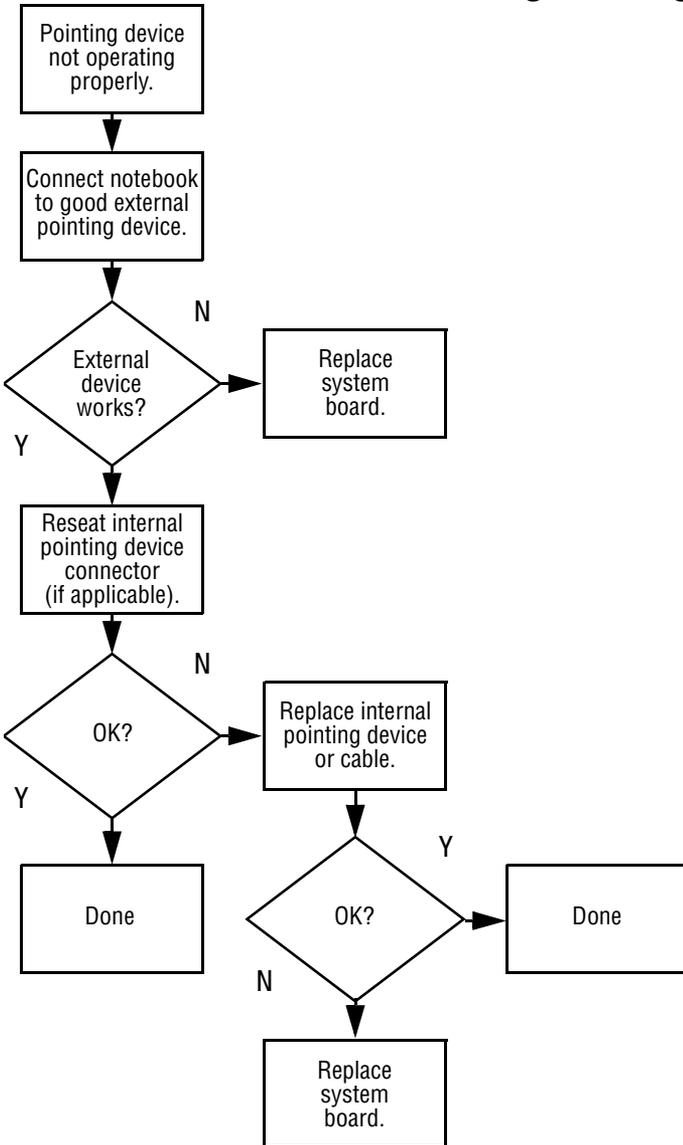
**Flowchart 2.17—Nonfunctioning Device**



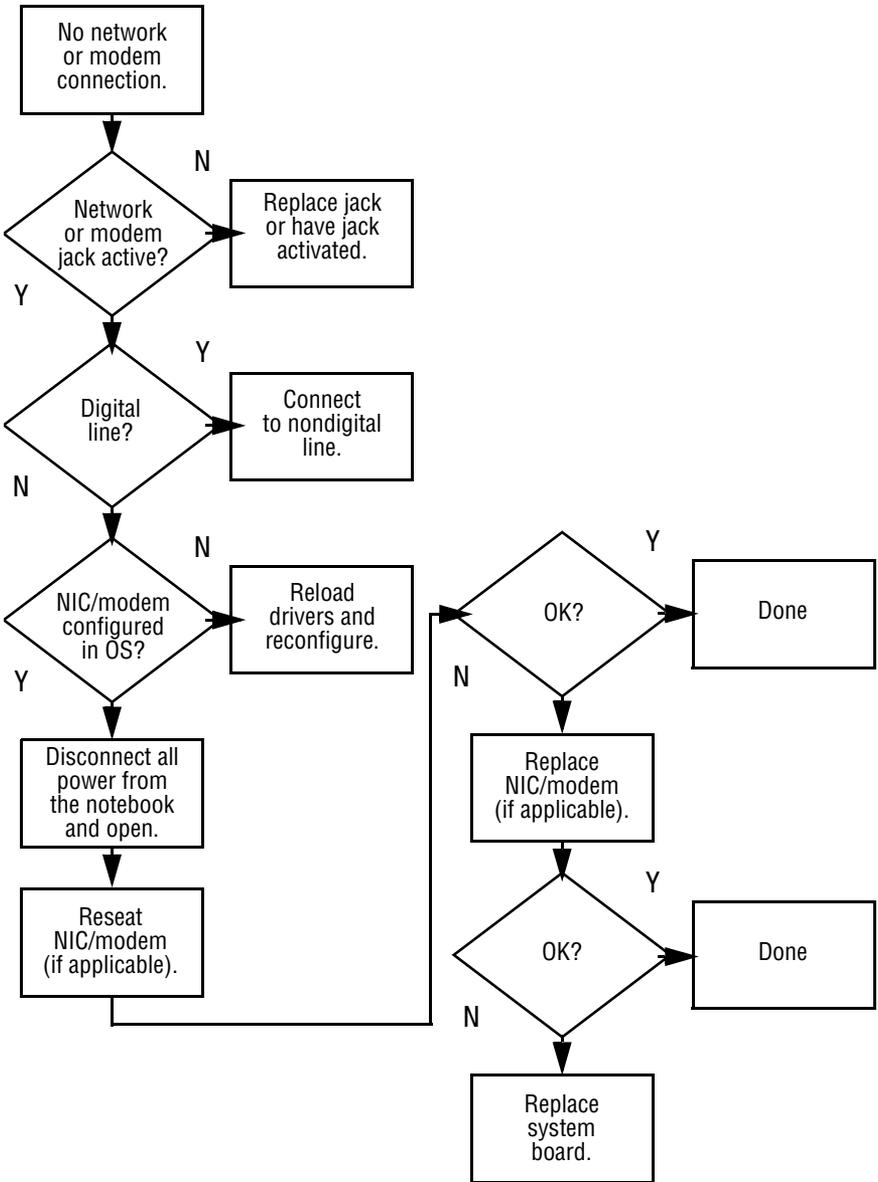
### Flowchart 2.18—Nonfunctioning Keyboard



**Flowchart 2.19—Nonfunctioning Pointing Device**



## Flowchart 2.20—No Network/Modem Connection



# 3

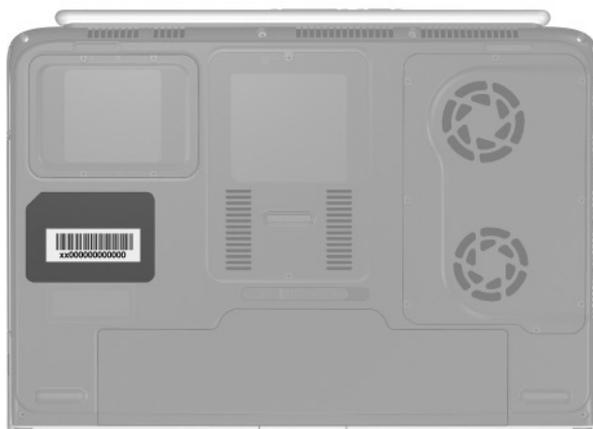
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## Illustrated Parts Catalog

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

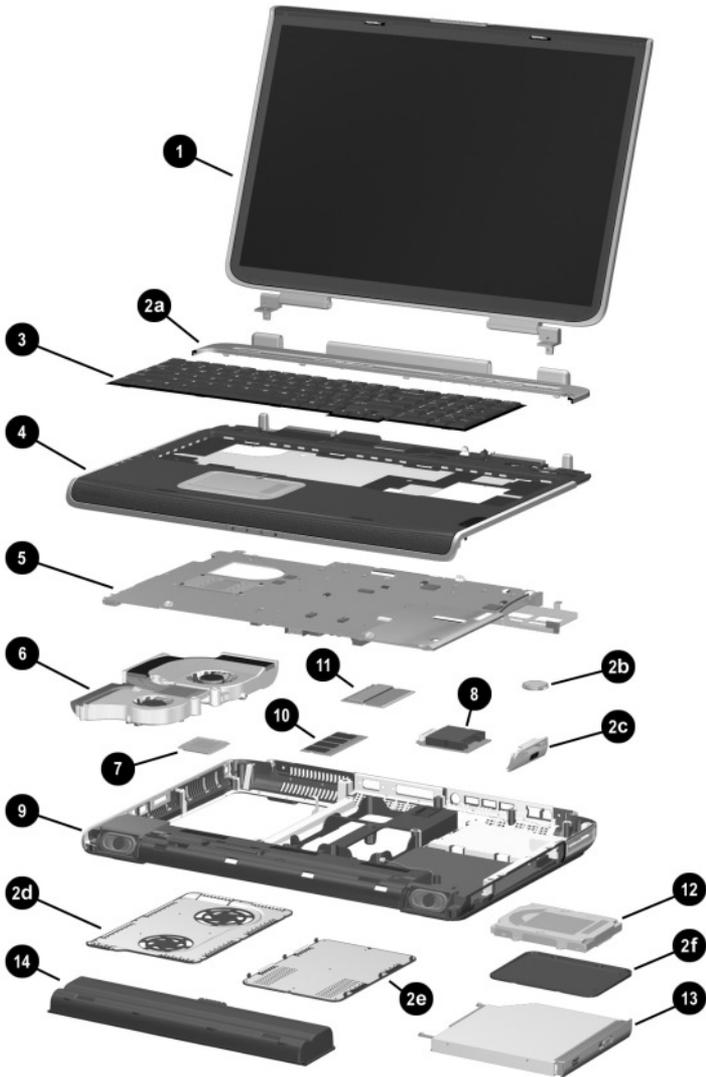
### 3.1 Serial Number Location

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



*Serial Number Location*

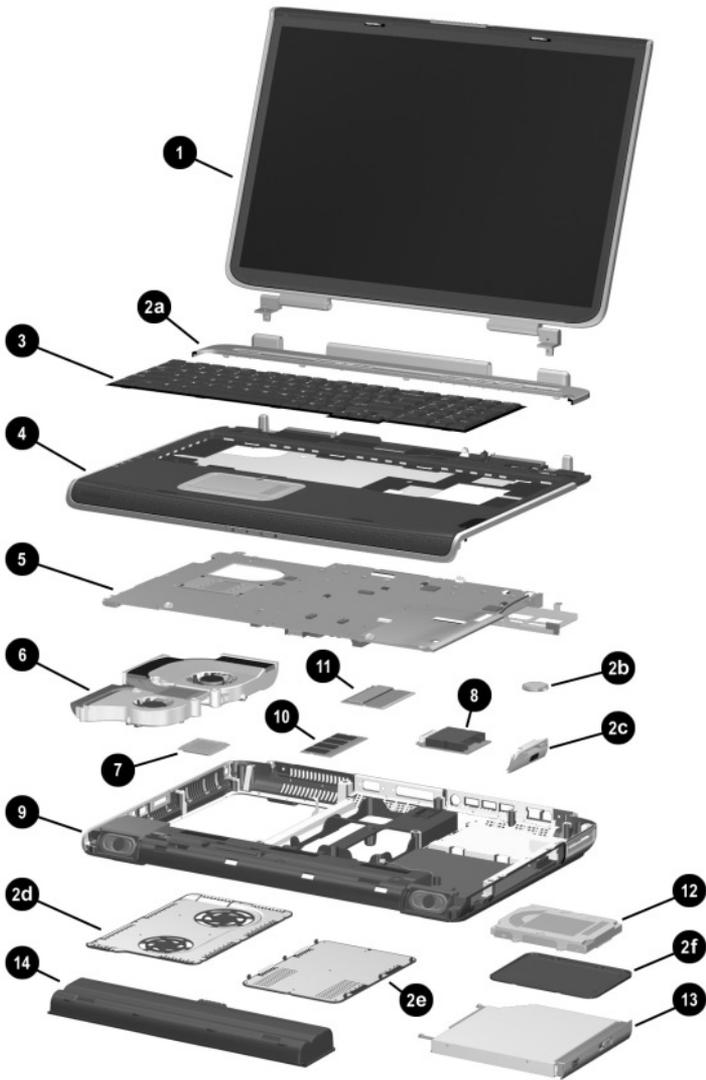
## 3.2 Notebook Major Components



*Notebook Major Components*

**Table 3-1**  
**Spare Parts: Notebook Major Components**

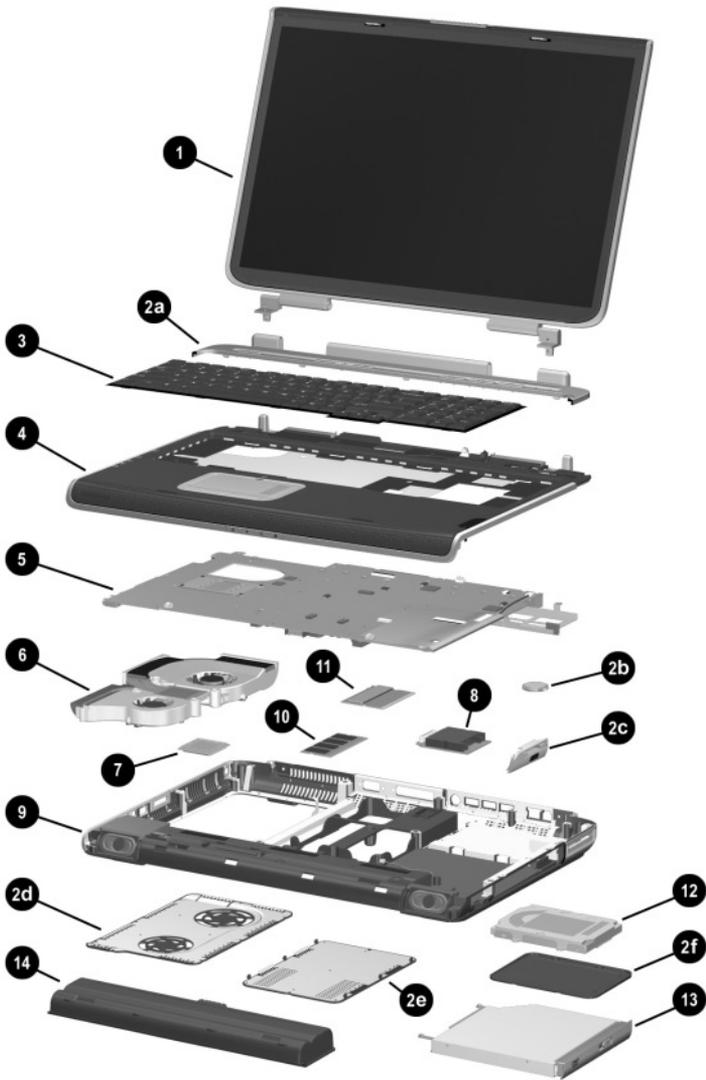
| <b>Item</b> | <b>Description</b>  | <b>Spare Part Number</b> |
|-------------|---|--------------------------|
| <b>1</b>    | <b>Display assemblies</b>   |                          |
|             | 17.0-inch, WXGA   | 344894-001               |
|             | 15.4-inch, WXGA   | 344893-001               |
|             | <b>Miscellaneous Plastics Kit</b> , includes:                                   | 344852-001               |
| 2a          | Keyboard cover  |                          |
| 2b          | RTC battery   |                          |
| 2c          | SD Card slot/infrared module bezel  |                          |
| 2d          | Fan cover   |                          |
| 2e          | Memory expansion/Mini PCI compartment cover                                     |                          |
| 2f          | Hard drive cover  |                          |
|             | Notebook feet (not illustrated)   |                          |
| <b>3</b>    | <b>Keyboards</b>  |                          |
|             | France  | 344898-051               |
|             | French  | 344898-121               |
|             | Canada  |                          |
|             | Germany   | 344898-041               |
|             | Italy   | 344898-061               |
|             | Spain   | 344898-071               |
|             | Switzerland   | 344898-111               |
|             | United Kingdom  | 344898-031               |
|             | United States and Canada  | 344898-001               |
| <b>4</b>    | <b>Top cover</b>  | 344876-001               |
| <b>5</b>    | <b>System boards</b> (include the following video controllers and video memory) |                          |
|             | NVIDIA GeForce FX Go5000 with 128-MB video memory                               | 344879-001               |
|             | NVIDIA GeForce FX Go5000 with 64-MB video memory                                | 344878-001               |
|             | NVIDIA GeForce 4 440 Go with 64-MB video memory                                 | 344877-001               |
| <b>6</b>    | <b>Heat sink</b> (includes large and small fans and thermal paste)              | 344872-001               |
|             | <b>Thermal Paste Kit</b>  | 346178-001               |



*Notebook Major Components*

**Table 3-1**  
**Spare Parts: Notebook Major Components (Continued)**

| <b>Item</b> | <b>Description</b>  | <b>Spare Part Number</b> |
|-------------|---|--------------------------|
| 7           | <b>Processors</b> (includes thermal paste)                        |                          |
|             | Intel Pentium 4 DT with Hyper-Threading Technology FSB<br>3.2-GHz | 344890-001               |
|             | Intel Pentium 4 DT with 800-MHz FSB<br>3.2-GHz                    | 344889-001               |
|             | 3.0-GHz   | 344888-001               |
|             | 2.8-GHz   | 344887-001               |
|             | Intel Pentium 4 DT with 533-MHz FSB<br>3.06-GHz                   | 344886-001               |
|             | 2.8-GHz   | 344885-001               |
|             | 2.66-GHz  | 344884-001               |
|             | <b>Thermal Paste Kit</b>  | 346178-001               |
| 8           | <b>SD Card slot/infrared module</b> (includes cable)              | 344880-001               |
| 9           | <b>Base enclosure</b> (includes right and left speakers)          | 344883-001               |
| 10          | <b>Memory expansion boards, 333-MHz</b>                           |                          |
|             | 1024-MB DDR   | 324702-001               |
|             | 512-MB DDR  | 324701-001               |
|             | 256-MB DDR  | 324700-001               |
| 11          | <b>Mini PCI communications boards</b>                             |                          |
|             | Mini PCI 802.11b wireless LAN                                     | 344864-001               |
|             | Mini PCI 802.11g wireless LAN                                     | 344863-001               |

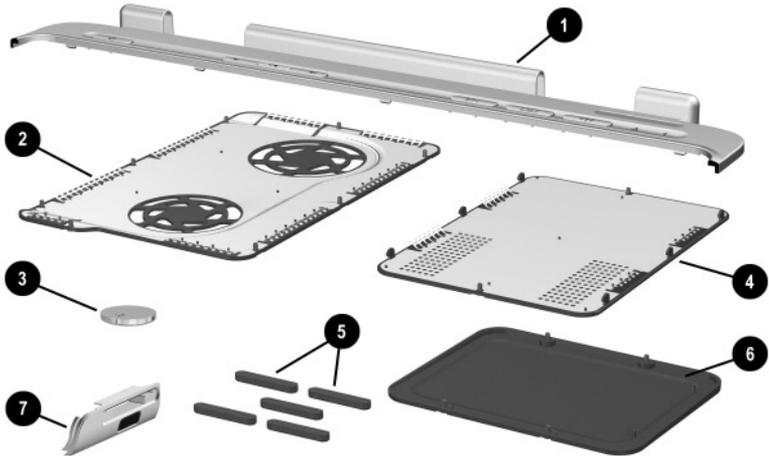


*Notebook Major Components*

**Table 3-1**  
**Spare Parts: Notebook Major Components (Continued)**

| <b>Item</b> | <b>Description</b>  | <b>Spare Part Number</b> |
|-------------|---|--------------------------|
| 12          | <b>Hard drives</b>  |                          |
|             | 80-GB (5400-rpm)  | 344858-001               |
|             | 80-GB (4200-rpm)  | 344856-001               |
|             | 60-GB (5400-rpm)  | 344857-001               |
|             | 60-GB (4200-rpm)  | 344855-001               |
|             | 40-GB (4200-rpm)  | 344854-001               |
| 13          | <b>Optical drives</b>                                       |                          |
|             | 8X Max DVD-ROM/CD-RW combination drive                      | 344860-001               |
|             | 8X Max DVD-ROM drive  | 344859-001               |
|             | 24X Max DVD+RW drive  | 344861-001               |
| 14          | <b>Battery pack, 12-cell, 14.8-volt</b>                     | 342661-001               |
|             | <b>Wireless LAN antennae</b> (not illustrated)              | 344875-001               |
|             | <b>Miscellaneous Cable Kit</b> (not illustrated), includes: | 344851-001               |
|             | SD Card slot/infrared module cable                          |                          |
|             | Display cable   |                          |
|             | LED board cable   |                          |

### 3.3 Miscellaneous Plastics Kit Components

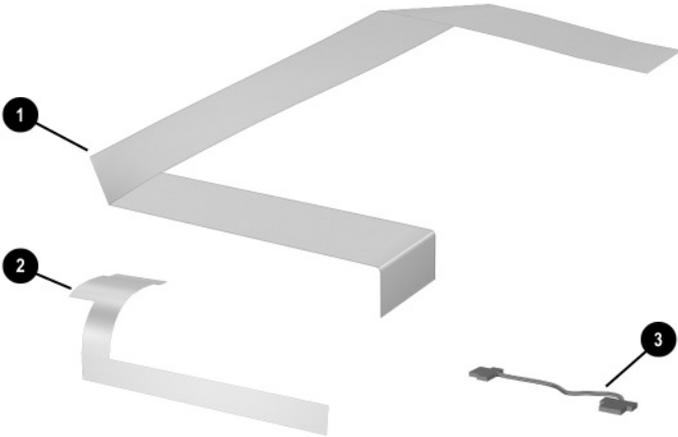


Miscellaneous Plastics Kit Components

**Table 3-2**  
**Miscellaneous Plastics Kit Components**  
**Spare Part Number 344852-001**

| Item | Description                                 |
|------|---|
| 1    | Keyboard cover                              |
| 2    | Fan cover                                   |
| 3    | RTC battery                                 |
| 4    | Memory expansion/Mini PCI compartment cover |
| 5    | Feet (5)                                    |
| 6    | Hard drive cover                            |
| 7    | SD Card slot/infrared module bezel          |

### 3.4 Miscellaneous Cable Kit Components

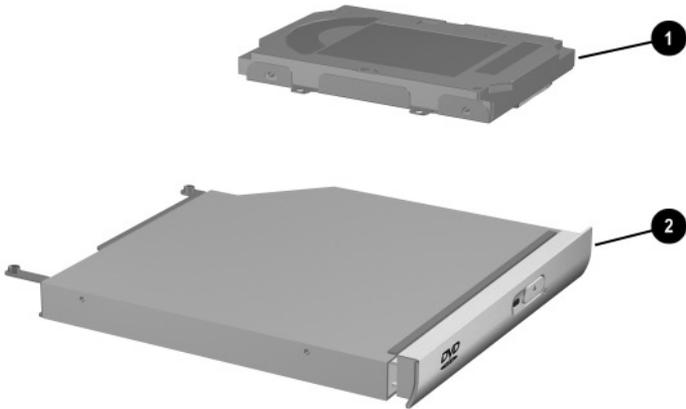


*Miscellaneous Cable Kit Components*

**Table 3-3  
Miscellaneous Cable Kit Components  
Spare Part Number 344851-001**

| Item | Description                        |
|------|------------------------------------|
| 1    | SD Card slot/infrared module cable |
| 2    | Display cable                      |
| 3    | LED board cable                    |

### 3.5 Mass Storage Devices



Mass Storage Devices

**Table 3-4  
Mass Storage Devices  
Spare Part Number Information**

| Item | Description   | Spare Part Number |
|------|---|-------------------|
| 1    | <b>Hard drives</b> (include hard drive bezel and frame) |                   |
|      | 80-GB (5400-rpm)  | 344858-001        |
|      | 80-GB (4200-rpm)  | 344856-001        |
|      | 60-GB (5400-rpm)  | 344857-001        |
|      | 60-GB (4200-rpm)  | 344855-001        |
|      | 40-GB (4200-rpm)  | 344854-001        |
| 2    | <b>Optical drives</b>                                   |                   |
|      | 8X Max DVD-ROM/CD-RW combination drive                  | 344860-001        |
|      | 8X Max DVD-ROM drive                                    | 344859-001        |
|      | 24X Max DVD+RW drive                                    | 344861-001        |
|      | <b>USB v.1.1 diskette drive</b> (not illustrated)       | 344897-001        |

## 3.6 Miscellaneous

**Table 3-5  
Spare Parts: Miscellaneous (not illustrated)**

| Description   | Spare Part Number                         |
|---|---|
| <b>Logo Kit</b>   | 347990-001                                |
| <b>120-watt AC adapter with power cord</b> (for use in Canada, French Canada, and United States)  | 344895-001                                |
| <b>135-watt AC adapter</b> (for use in France, Germany, Italy, Spain, Switzerland, and United Kingdom with the following power cords)           | 346958-001                                |
| <b>Power cords</b> (for use in the following countries with the 135 W AC adapter listed above)  |   |
| France  | 344895-051                                |
| Germany   | 344895-041                                |
| Italy   | 344895-061                                |
| Spain   | 344895-071                                |
| Switzerland   | 344895-111                                |
| United Kingdom  | 344895-031                                |
| <b>Screw Kit</b> (includes the following screws; refer to Appendix C, "Screw Listing," for more information on screw specifications and usage.) | 344850-001                                |
| ■ PM2.5×8.0 screw   | ■ Slotted M1.5×10.0 shoulder screw        |
| ■ PM2.5×5.0 screw   | ■ HM5.0×9.0 standoffs                     |
| ■ PM2.5×4.0 screw   | ■ PM1.5×12.0 spring-loaded shoulder screw |
| ■ PM1.5×4.0 screw   |   |

---

## Removal and Replacement Preliminaries

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

### 4.1 Tools Required

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

- Magnetic screwdriver
- Phillips P0 screwdriver
- 5.0-mm socket for system board standoffs
- Flat-bladed screwdriver
- Tool kit (includes connector removal tool, loopback plugs, and case utility tool)

## 4.2 Service Considerations

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



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

---

### Plastic Parts

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

### Cables and Connectors

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.



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

---

## 4.3 Preventing Damage to Removable Drives

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

- Before removing or inserting a hard drive, shut down the notebook. If you are unsure whether the notebook is off or in Hibernation, turn the notebook on, then shut it down.
- Before removing a diskette drive or optical drive, ensure that a diskette or disc is not in the drive. 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 that have at least one inch of shock-proof foam.
- Avoid dropping drives from any height onto any surface.
- After removing a hard drive, CD-ROM drive, or a diskette drive, place it in a static-proof bag.
- Avoid exposing a hard drive to products that have magnetic fields, such as monitors or speakers.
- Avoid exposing a drive to temperature extremes or liquids.
- If a drive must be mailed, place the drive in a bubble pack mailer or other suitable form of protective packaging and label the package, "Fragile: Handle With Care."

## 4.4 Preventing Electrostatic Damage

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

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

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

## 4.5 Packaging and Transporting Precautions

Use the following grounding precautions when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe containers, such as tubes, bags, or boxes.
- Protect all electrostatic-sensitive parts and assemblies with conductive or approved containers or packaging.
- Keep electrostatic-sensitive parts in their containers until the parts arrive at static-free workstations.
- Place items on a grounded surface before removing items from their containers.
- Always be properly grounded when touching a sensitive component or assembly.

- Store reusable electrostatic-sensitive parts from assemblies in protective packaging or nonconductive foam.
- Use transporters and conveyors made of antistatic belts and roller bushings. Ensure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

## **4.6 Workstation Precautions**

Use the following grounding precautions at workstations:

- Cover the workstation with approved static-shielding material (refer to Table 4-2).
- 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 using fixtures that must directly contact dissipative surfaces, only use fixtures made of static-safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and Styrofoam.
- Handle electrostatic-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.

## 4.7 Grounding Equipment and Methods

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

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megohm  $\pm 10\%$  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**

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



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

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

**Table 4-2  
Static-Shielding Materials**

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

# 5

---

## Removal and Replacement Procedures

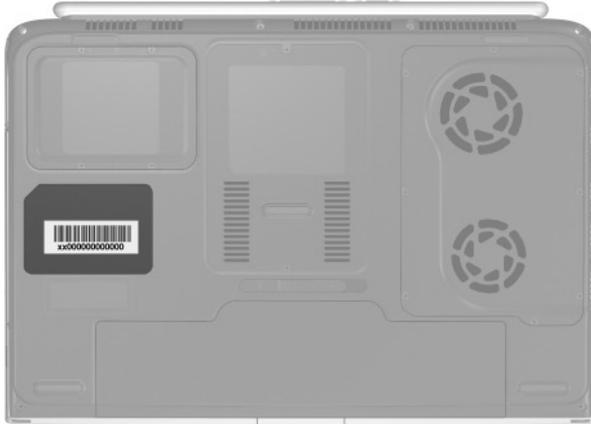
This chapter provides removal and replacement procedures.

There are 66 screws and standoffs, in seven different sizes, that must be removed, replaced, and loosened when servicing the notebook. Make special note of each screw size and location during removal and replacement.

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

## 5.1 Serial Number

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



*Serial Number Location*

## 5.2 Disassembly Sequence Chart

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

**Disassembly Sequence Chart**

| <b>Section</b> | <b>Description</b>                     | <b># of Screws Removed</b>                         |
|----------------|--|--|
| 5.3            | Preparing the notebook for disassembly |  |
|                | Battery pack                           | 0  |
|                | Hard drive                             | 4 loosened   |
| 5.4            | Notebook feet                          | 0  |
| 5.5            | Memory expansion board                 | 2 loosened   |
| 5.6            | Mini PCI communications board          | 2 loosened   |
| 5.7            | Optical drive                          | 2  |
| 5.8            | Keyboard                               | 8 loosened on fan cover,<br>2 removed for keyboard |
| 5.9            | Keyboard cover                         | 6  |
| 5.10           | Display assembly                       | 4  |
| 5.11           | Top cover                              | 13   |
| 5.12           | System board                           | 5 screws,<br>4 standoffs                           |
| 5.13           | RTC battery                            | 0  |
| 5.14           | Heat sink                              | 4 loosened   |
|                | Fans                                   | 6 removed  |
| 5.15           | Processor                              | 0  |
| 5.16           | SD Card slot/infrared module           | 3  |
| 5.17           | Speakers                               | 3  |

## 5.3 Preparing the Notebook for Disassembly

Perform the following steps before disassembling the notebook:

1. Turn off the notebook.
2. Disconnect the AC adapter and all external devices.

---

### Spare Part Number Information

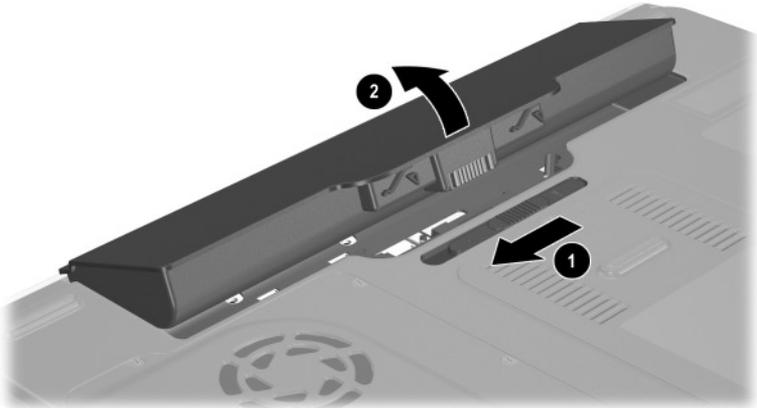
---

Battery pack, 12-cell, 14.8-volt

342661-001

---

3. Remove the battery pack by following these steps:
  - a. Turn the notebook upside down with the rear panel facing you.
  - b. Slide and hold the battery release latch **1** to the left. The rear edge of the battery pack releases from the notebook.
  - c. Lift the rear edge of the battery pack up and swing it forward **2**.
  - d. Remove the battery pack.



#### *Removing the Battery Pack*

Reverse the above procedure to install the battery pack.

---

## Spare Part Number Information

---

### Hard drives

|                  |            |
|------------------|------------|
| 80-GB (5400-rpm) | 344858-001 |
| 80-GB (4200-rpm) | 344856-001 |
| 60-GB (5400-rpm) | 344857-001 |
| 60-GB (4200-rpm) | 344855-001 |
| 40-GB (4200-rpm) | 344854-001 |

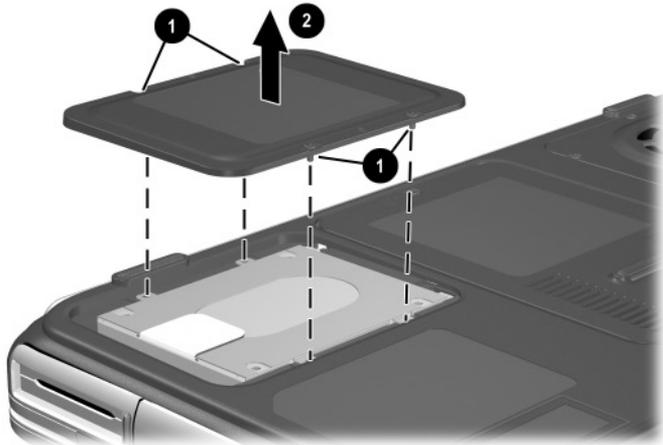
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4. Remove the hard drive by following these steps:
  - a. Turn the notebook upside down with the rear panel facing you.
  - b. Loosen the four PM2.5×4.0 screws ❶ that secure the hard drive cover to the notebook.
  - c. Lift the cover straight up ❷ to remove it from the notebook.



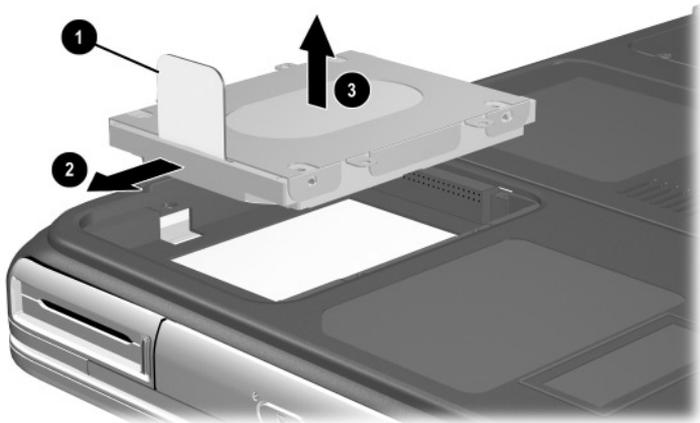
The hard drive cover is included in the Miscellaneous Plastics Kit, spare part number 344852-001.

---



*Removing the Hard Drive Cover*

- d. Use the Mylar tab ❶ to slide the hard drive to the right ❷ to disconnect it from the system board.
- e. Lift the hard drive straight up ❸.
- f. Remove the hard drive.

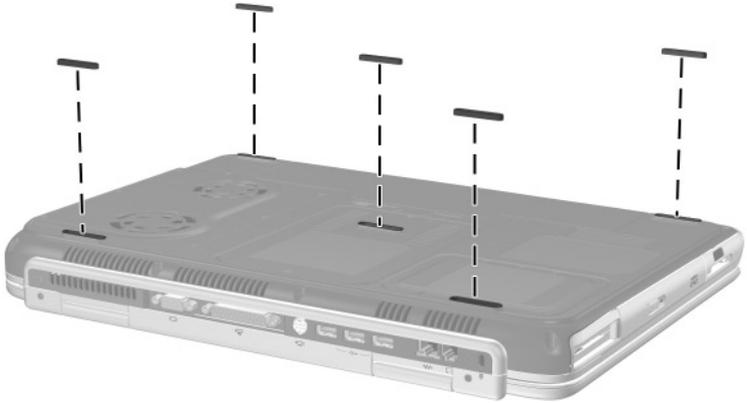


*Removing the Hard Drive*

Reverse the above procedure to install the hard drive.

## 5.4 Notebook Feet

The notebook feet are adhesive-backed rubber pads. The feet are included in the Miscellaneous Plastics Kit, spare part number 344852-001. The feet attach to the base enclosure as illustrated below.



*Replacing the Notebook Feet*

## 5.5 Memory Expansion Board

### Spare Part Number Information

---

|                      |            |
|----------------------|------------|
| 1024-MB DDR, 333-MHz | 324702-001 |
| 512-MB DDR, 333-MHz  | 324701-001 |
| 256-MB DDR, 333-MHz  | 324700-001 |

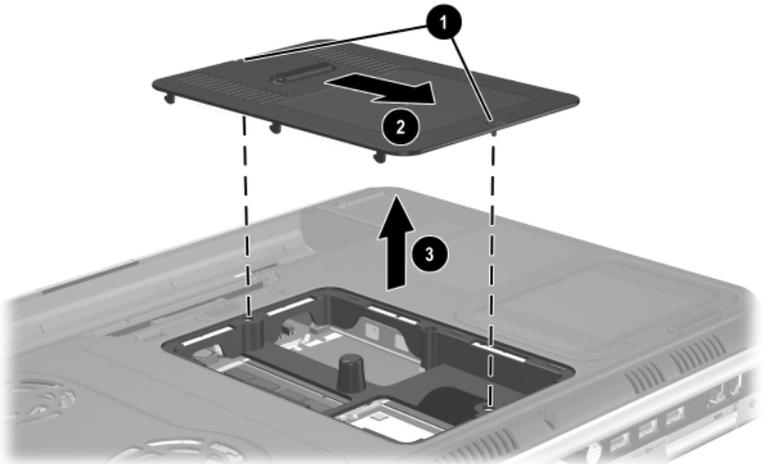
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1. Prepare the notebook for disassembly (refer to Section 5.3).
2. Turn the notebook upside down with the rear panel facing you.
3. Loosen the two PM2.5×4.0 screws ❶ that secure the memory expansion/Mini PCI compartment cover to the notebook.
4. Slide the cover forward ❷, then lift the cover up ❸.
5. Remove the cover.



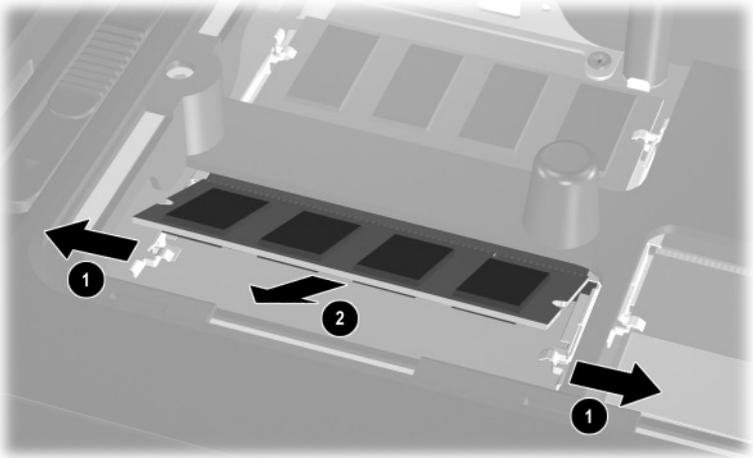
The memory expansion/Mini PCI compartment cover is included in the Miscellaneous Plastics Kit, spare part number 344852-001.

---



*Removing the Memory Expansion/Mini PCI Compartment Cover*

6. Spread the retaining tabs ❶ that secure the memory expansion board to the socket. The board rises up.
7. Pull the board away from the socket at a 45-degree angle ❷.



*Removing a Memory Expansion Board*

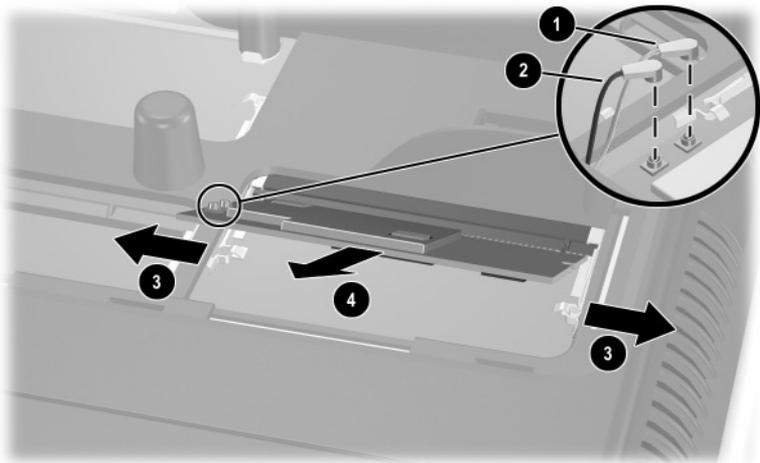
Reverse the above procedure to install a memory expansion board.

## 5.6 Mini PCI Communications Board

### Spare Part Number Information

|                               |            |
|-------------------------------|------------|
| Mini PCI 802.11b wireless LAN | 344864-001 |
| Mini PCI 802.11g wireless LAN | 344863-001 |

1. Prepare the notebook for disassembly (Section 5.3).
2. Remove the memory expansion/Mini PCI communications compartment cover (Section 5.5).
3. Disconnect the two antenna cables **1** and **2** from the Mini PCI communications board.
4. Spread the retaining tabs **3** that secure the Mini PCI communications board to the socket. The board rises up.
5. Pull the board away from the socket at a 45-degree angle **4**.



#### *Removing a Mini PCI Communications Board*

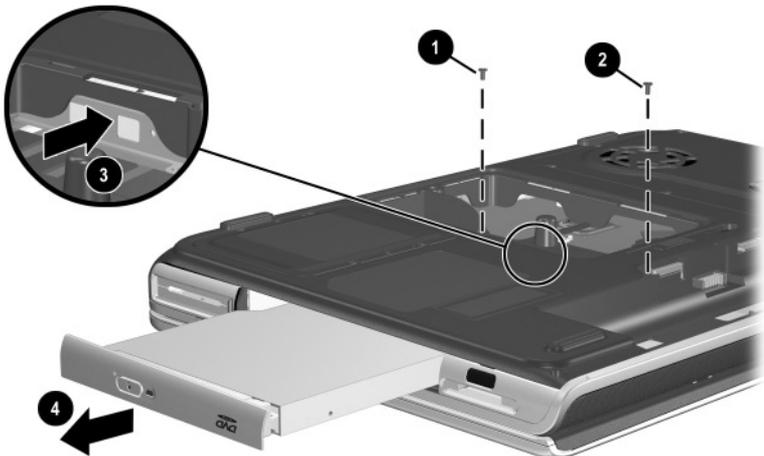
Reverse the above procedure to install a Mini PCI communications board.

## 5.7 Optical Drive

### Spare Part Number Information

|  |            |
|--|------------|
| 8X Max DVD-ROM/CD-RW combination drive | 344860-001 |
| 8X Max DVD-ROM drive                   | 344859-001 |
| 24X Max DVD+RW drive                   | 344861-001 |

1. Prepare the notebook for disassembly (Section 5.3).
2. Remove the memory expansion/Mini PCI compartment cover (Section 5.5).
3. Position the notebook so the front panel faces you.
4. Remove the PM2.5×5.0 screw ❶ that secures the optical drive in the memory expansion/Mini PCI compartment.
5. Remove the PM2.5×8.0 screw ❷ that secures the optical drive in the battery bay.
6. Push on the back of the optical drive ❸ through the opening on the left side of the memory expansion/Mini PCI compartment.
7. Remove the optical drive ❹.



*Removing the Optical Drive*

Reverse the above procedure to install an optical drive.

## 5.8 Keyboard

### Spare Part Number Information

---

|               |            |                             |            |
|---------------|------------|-----------------------------|------------|
| France        | 344898-051 | Spain                       | 344898-071 |
| French Canada | 344898-121 | Switzerland                 | 344898-111 |
| Germany       | 344898-041 | United Kingdom              | 344898-031 |
| Italy         | 344898-061 | United States and<br>Canada | 344898-001 |

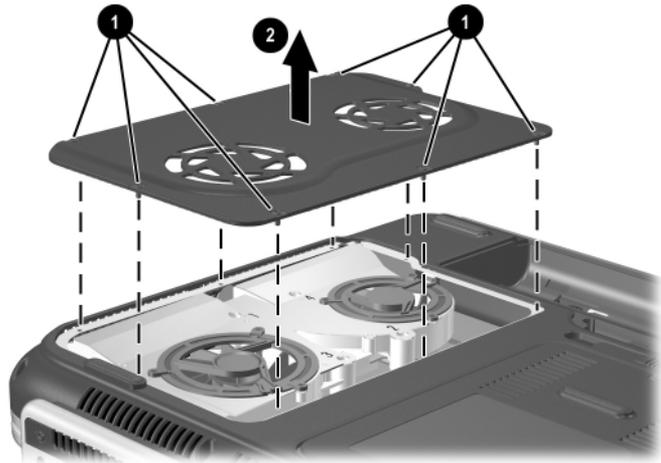
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1. Prepare the notebook for disassembly (Section 5.3).
2. Remove the memory expansion/Mini PCI compartment cover (Section 5.5).
3. Turn the notebook upside down with the rear panel facing you.
4. Loosen the eight PM2.5×5.0 screws ❶ that secure the fan cover to the notebook.
5. Remove the fan cover ❷.



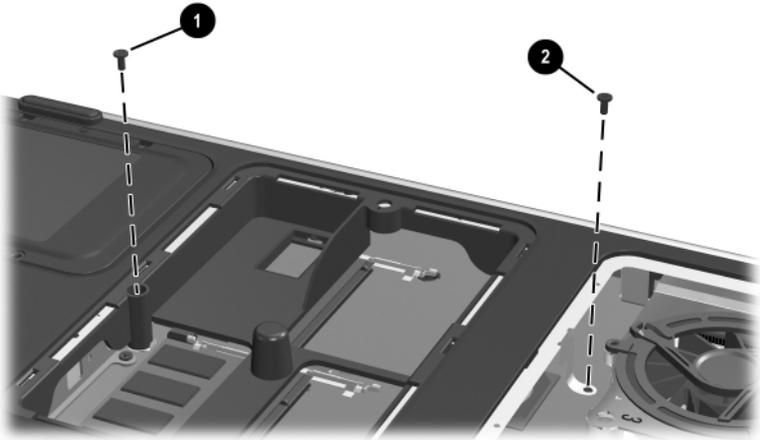
The fan cover is included in the Miscellaneous Plastics Kit, spare part number 344852-001.

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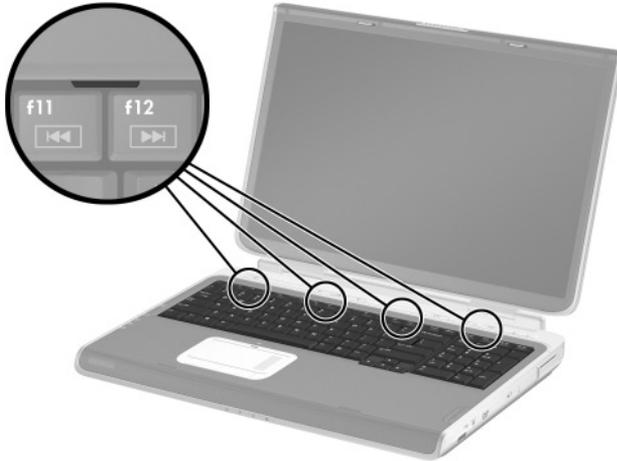
*Removing the Fan Cover*

6. Position the notebook so the front panel faces you.
7. Remove the PM2.5×8.0 screw ❶ that secures the keyboard in the memory expansion/Mini PCI compartment.
8. Remove the PM2.5×5.0 screw ❷ that secures the keyboard in the fan compartment.



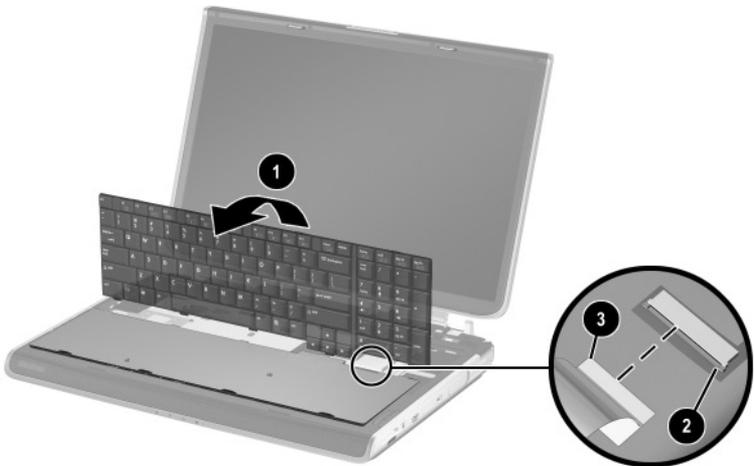
*Removing the Keyboard Screws*

9. Turn the notebook right-side up with the front facing you.
10. Open the computer.
11. Use a flat-bladed tool to pry forward on the four keyboard retaining tabs. The tabs are located above the **f1** and **f2** keys, above the **f6** and **f7** keys, above the **f11** and **f12** keys, and above the **end** and **pg up** keys.



*Releasing the Keyboard*

12. Lift up on the back of the keyboard and swing it forward **1** until it rests on the palm rest.
13. Release the zero insertion force (ZIF) connector **2** to which the keyboard cable is connected and disconnect the cable **3**.
14. Remove the keyboard.



### *Removing the Keyboard*

Reverse the above procedure to install the keyboard.

## 5.9 Keyboard Cover

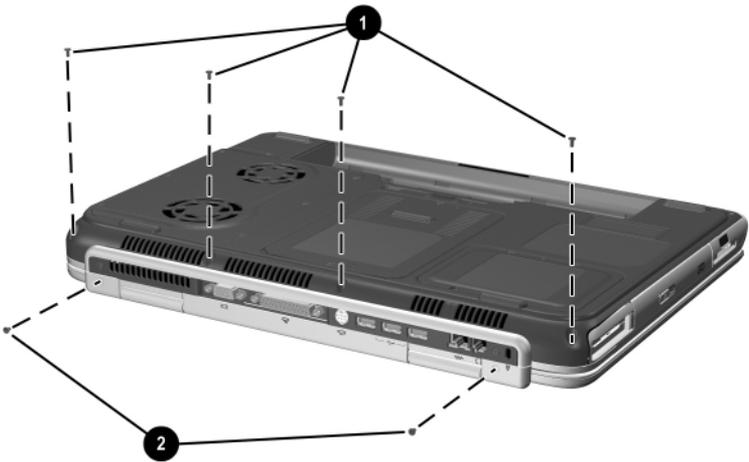
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The keyboard cover is included in the Miscellaneous Plastics Kit, spare part number 344852-001.

---

1. Prepare the notebook for disassembly (Section 5.3).
2. Remove the keyboard (Section 5.8).
3. Turn the notebook upside down with the rear panel facing you.
4. Remove the four PM2.5×8.0 screws **1** that secure the keyboard cover to the notebook.
5. Remove the two PM2.5×8.0 screws **2** that secure the keyboard cover to the notebook through the rear panel.



*Removing the Keyboard Cover Screws*

6. Turn the notebook right-side up with the front facing you.
7. Open the notebook as far as it will open.
8. Lift up on the left and right sides ❶ of the keyboard cover to detach it from the notebook.
9. Lift the keyboard cover up and swing it forward ❷ to remove it.



*Removing the Keyboard Cover*

Reverse the above procedure to install the keyboard cover.

## 5.10 Display Assembly

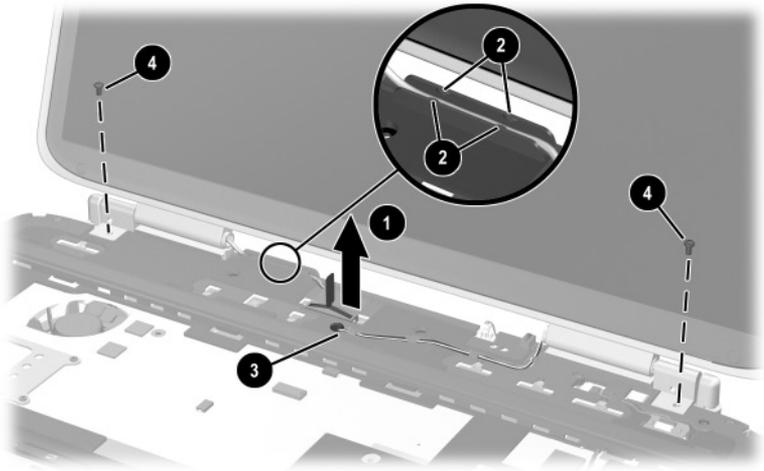
### Spare Part Number Information

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|                 |            |
|-----------------|------------|
| 17.0-inch, WXGA | 344894-001 |
| 15.4-inch, WXGA | 344893-001 |

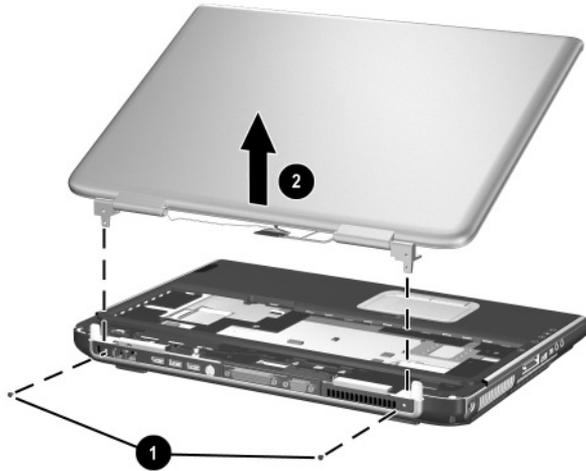
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1. Prepare the notebook for disassembly (Section 5.3).
2. Remove the keyboard (Section 5.8).
3. Remove the keyboard cover (Section 5.9).
4. Disconnect the display cable ❶ and remove it from the retaining clip ❷ in the top cover.
5. Remove the two antenna cables from the hole and routing channel in the top cover ❸.
6. Remove the two PM2.5×8.0 screws ❹ that secure the display assembly to the notebook.



Removing the Display Assembly Screws

7. Position the notebook so the rear panel faces you and the display is in an upright position.
8. Remove the two PM2.5×8.0 screws ❶ that secure the display assembly to the notebook through the rear panel.
9. Lift the display assembly straight up ❷ to remove it.



*Removing the Display Assembly*

Reverse the above procedure to install the display assembly.

## 5.11 Top Cover

### Spare Part Number Information

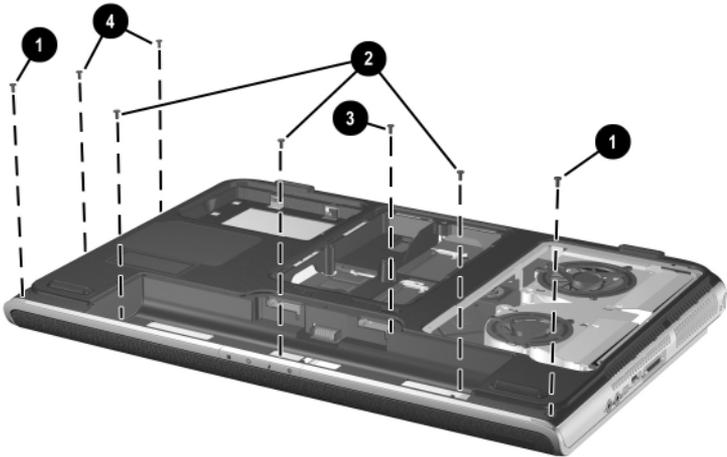
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Top cover

344876-001

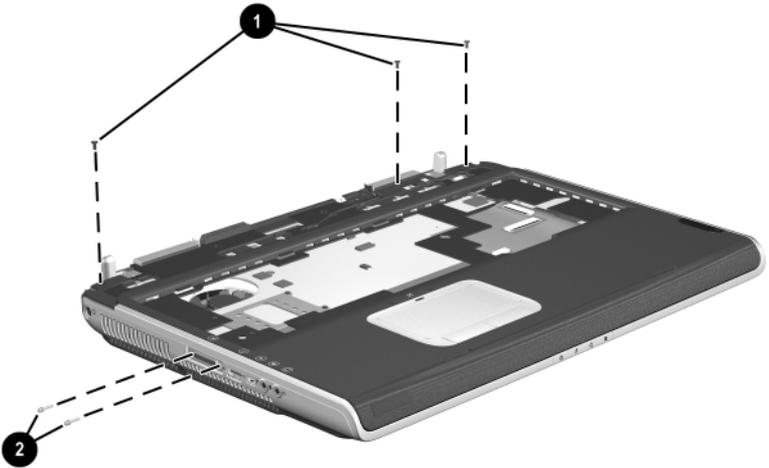
---

1. Prepare the notebook for disassembly (Section 5.3) and remove the following components:
  - ❑ Optical drive (Section 5.7)
  - ❑ Keyboard (Section 5.8)
  - ❑ Keyboard cover (Section 5.9)
  - ❑ Display assembly (Section 5.10)
2. Turn the notebook upside down with the front facing you.
3. Remove the following:
  - ❶ Two PM2.5×8.0 screws on the notebook front edge
  - ❷ Three PM2.5×5.0 screws in the battery bay
  - ❸ One PM2.5×8.0 screw in the rear/right corner of the battery bay
  - ❹ Two PM2.5×5.0 screws in the optical drive bay



*Removing the Top Cover Screws*

4. Turn the notebook right-side up with the front facing you.
5. Remove the three PM2.5×8.0 screws ❶ that secure the top cover to the notebook.
6. Remove the two slotted M1.5×10.0 shoulder screws ❷ that secure the top cover to the notebook on each side of the docking connector.



Removing the Top Cover Screws (continued)

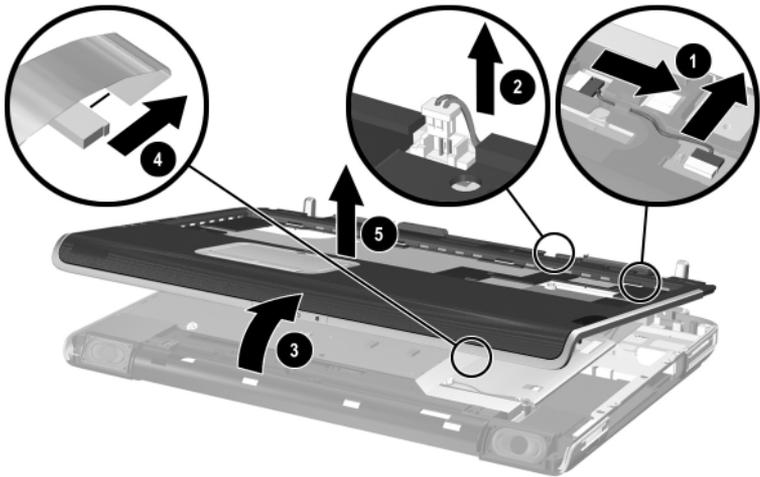
7. Disconnect the LED board cable ❶ from the system board and remove the cable from the clip in the top cover.



The LED board cable is included in the Miscellaneous Cable Kit, spare part number 344851-001. The LED board is included with the top cover.

---

8. Disconnect the display lid switch module cable ❷ from the display lid switch module.
9. Lift the front edge of the top cover ❸ until the TouchPad cable ❹ is accessible.
10. Disconnect the TouchPad cable from the low insertion force (LIF) connector on the system board.
11. Remove the top cover ❺.



### Removing the Top Cover

Reverse the above procedure to install the top cover.

## 5.12 System Board

### Spare Part Number Information

---

|   |            |
|---|------------|
| NVIDIA GeForce FX Go5000 with 128-MB video memory | 344879-001 |
| NVIDIA GeForce FX Go5000 with 64-MB video memory  | 344878-001 |
| NVIDIA GeForce 4 440 Go with 64-MB video memory   | 344877-001 |

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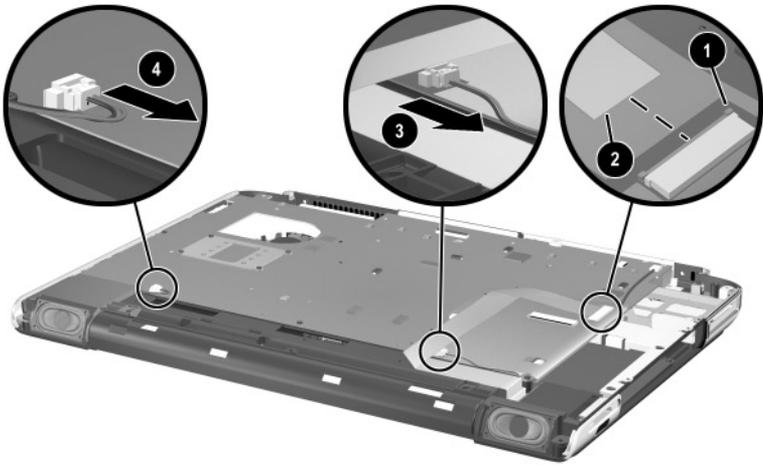


When replacing the system board, ensure that the following components are removed from the defective system board and installed on the replacement system board:

- Memory expansion boards (Section 5.5)
- Mini PCI communications board (Section 5.6)
- Real time clock battery (Section 5.13)
- Heat sink (Section 5.14)
- Processor (Section 5.15)

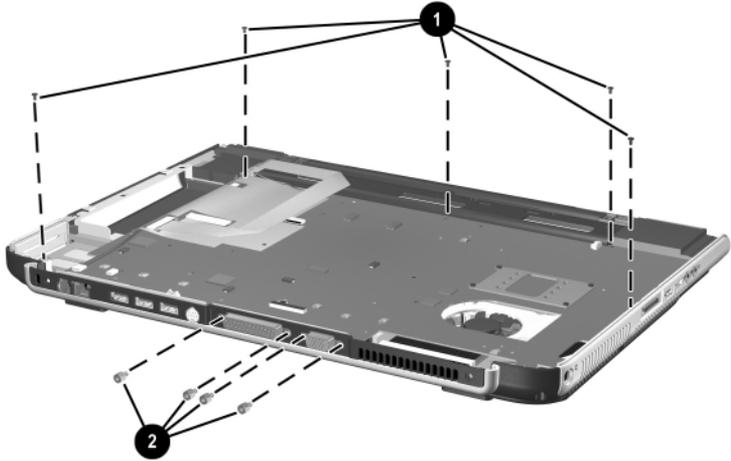
- 
1. Prepare the notebook for disassembly (Section 5.3) and remove the following components:
    - ❑ Optical drive (Section 5.7)
    - ❑ Keyboard (Section 5.8)
    - ❑ Keyboard cover (Section 5.9)
    - ❑ Display assembly (Section 5.10)
    - ❑ Top cover (Section 5.11)

2. Release the ZIF connector ❶ to which the SD Card slot/infrared module cable is attached and disconnect the cable ❷.
3. Disconnect the right ❸ and left ❹ speaker cables from the system board.



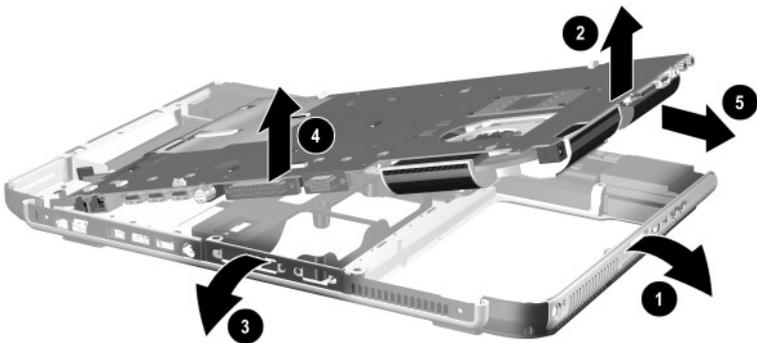
*Disconnecting the SD Card Slot/Infrared Module and Speaker Cables from the System Board*

4. Position the notebook so the rear panel faces you.
5. Remove the six PM2.5×8.0 screws ❶ that secure the system board to the notebook.
6. Use a 5.0-mm socket to remove the four HM5.0×9.0 standoffs ❷ that secure the system board to the notebook on each side of the parallel and external monitor connectors.



*Removing the System Board Screws and Standoffs*

7. Flex the right side of the base enclosure to the right ❶.
8. Lift the right side of the system board ❷ until the connectors on the right side of the board clear the base enclosure.
9. Flex the rear edge of the system board toward you ❸.
10. Lift the rear edge of the system board ❹ until the connectors on the rear panel of the board clear the base enclosure.
11. Slide the system board to the right at an angle ❺ and remove it.



*Removing the System Board*

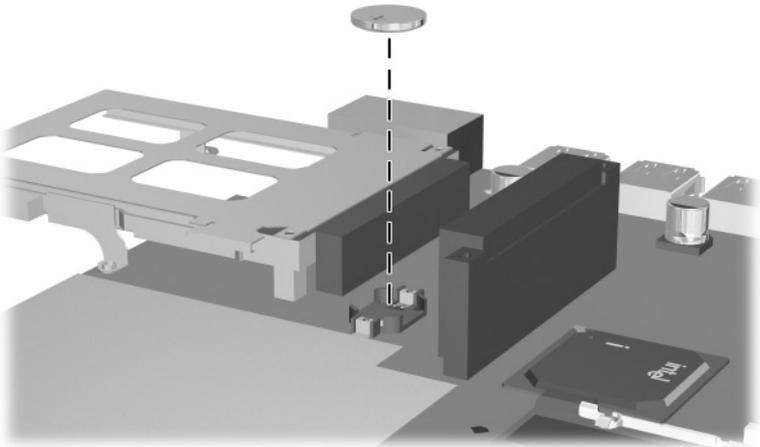
Reverse the above procedure to install the system board.

## 5.13 RTC Battery



The RTC battery is included in the Miscellaneous Plastics Kit, spare part number 344852-001.

1. Prepare the notebook for disassembly (Section 5.3) and remove the following components:
  - ❑ Optical drive (Section 5.7)
  - ❑ Keyboard (Section 5.8)
  - ❑ Keyboard cover (Section 5.9)
  - ❑ Display assembly (Section 5.10)
  - ❑ Top cover (Section 5.11)
  - ❑ System board (Section 5.12)
2. Turn the system board upside down with the rear panel facing you.
3. Remove the RTC battery from the socket.



*Removing the RTC Battery*

Reverse the above procedure to install the RTC battery.

## 5.14 Heat Sink

### Spare Part Number Information

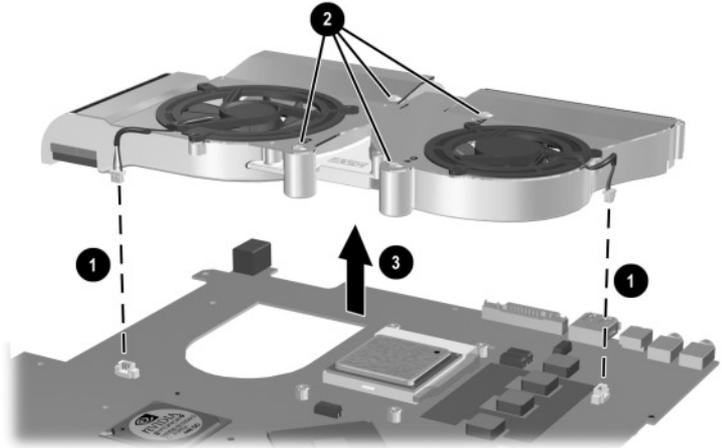
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|   |            |
|---|------------|
| Heat sink (includes large and small fans and thermal paste) | 344872-001 |
| Thermal Paste Kit   | 346178-001 |

---

1. Prepare the notebook for disassembly (Section 5.3) and remove the following components:
  - Optical drive (Section 5.7)
  - Keyboard (Section 5.8)
  - Keyboard cover (Section 5.9)
  - Display assembly (Section 5.10)
  - Top cover (Section 5.11)
  - System board (Section 5.12)
2. Turn the system board upside down with the rear panel facing you.

3. Disconnect the fan cables **1** from the system board.
4. Loosen the four heat sink screws **2**.
5. Remove the heat sink **3**.



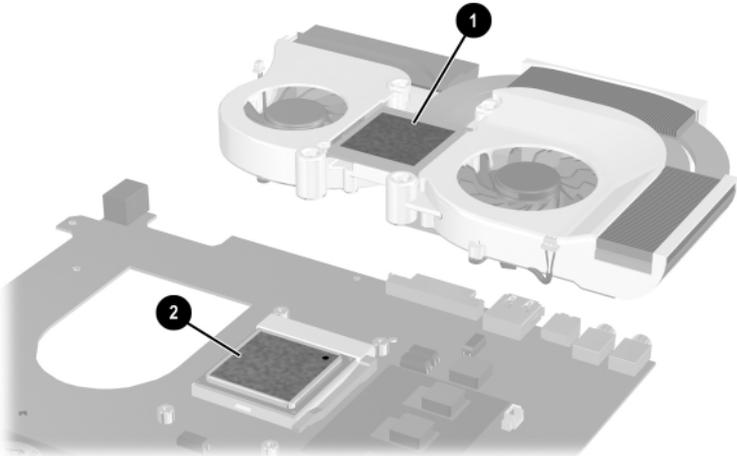
*Removing the Heat Sink*



Carefully clean any thermal paste residue from the heat sink **1** and processor surfaces **2** each time you remove the heat sink. Apply new thermal paste to both surfaces.

Thermal paste is included with the replacement heat sink and is also available in the Thermal Paste Kit, spare part number 346178-001.

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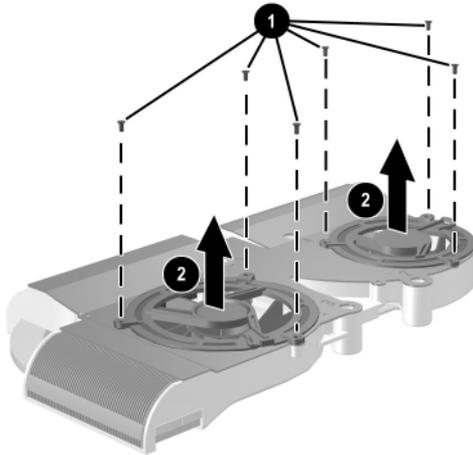


*Removing the Thermal Paste From the Heat Sink and Processor*

Reverse the above procedure to install the heat sink.

If it is necessary to remove one or both of the fans from the heat sink, follow these steps:

1. Remove the six PM1.5×4.0 screws ❶ that secure the fans to the heat sink.
2. Remove the fans ❷.



#### *Removing the Fans*

Reverse the above procedure to install the fans.

## 5.15 Processor

### Spare Part Number Information

---

|   |            |
|---|------------|
| Intel Pentium DT 3.20-GHz with Hyper-Threading Technology FSB | 344890-001 |
| Intel Pentium DT with 800-MHz FSB                             |            |
| 3.20-GHz  | 344889-001 |
| 3.00-GHz  | 344888-001 |
| 2.80-GHz  | 344887-001 |
| Intel Pentium DT with 533-MHz FSB                             |            |
| 3.06-GHz  | 344886-001 |
| 2.80-GHz  | 344885-001 |
| 2.66-GHz  | 344884-001 |
| Thermal Paste Kit   | 346178-001 |

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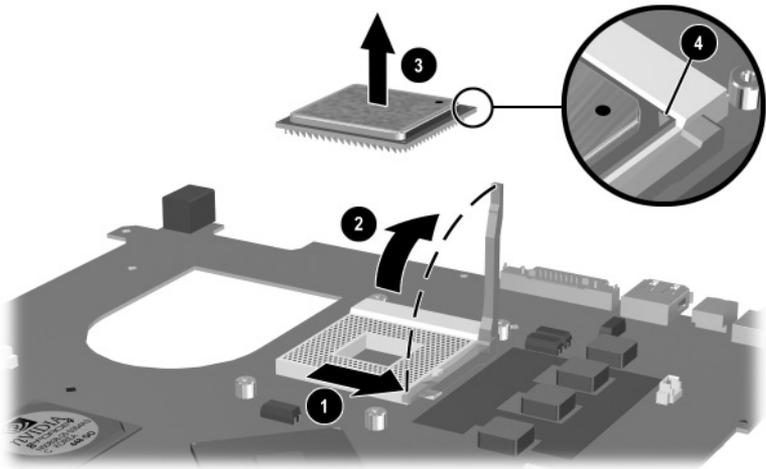
1. Prepare the notebook for disassembly (Section 5.3) and remove the following components:
  - ❑ Optical drive (Section 5.7)
  - ❑ Keyboard (Section 5.8)
  - ❑ Keyboard cover (Section 5.9)
  - ❑ Display assembly (Section 5.10)
  - ❑ Top cover (Section 5.11)
  - ❑ System board (Section 5.12)
  - ❑ Heat sink (Section 5.14)

2. Slide the processor release lever to the right **1** until it disengages from the clip on the back of the processor socket.
3. Lift the lever up and swing it to the back **2** until it is in an upright position.
4. Lift the processor straight up **3** to remove it.



Note that the gold triangle **4** on the processor should be aligned in the rear right corner when you install the processor.

---



#### *Removing the Processor*

Reverse the above procedure to install the processor.

## 5.16 SD Card Slot/Infrared Module

### Spare Part Number Information

---

SD Card slot/infrared module (includes cable)

344880-001

---



1. Prepare the notebook for disassembly (Section 5.3) and remove the following components:
  - Optical drive (Section 5.7)
  - Keyboard (Section 5.8)
  - Keyboard cover (Section 5.9)
  - Display assembly (Section 5.10)
  - Top cover (Section 5.11)
  - System board (Section 5.12)

2. Disconnect the SD Card slot/infrared module cable ❶ from the LIF connector on the module.



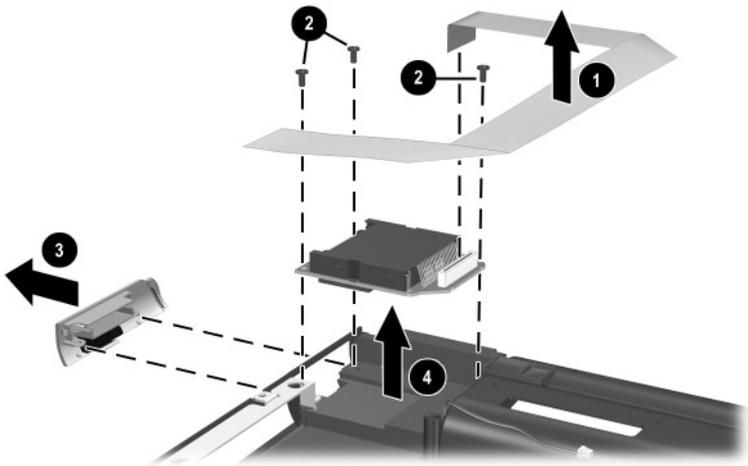
The SD Card slot/infrared module cable is included with the SD Card slot/infrared module. It is also included in the Miscellaneous Cable Kit, spare part number 344851-001.

3. Remove the three PM2.5×8.0 screws ❷ that secure the module to the notebook.
4. Remove the module bezel ❸.



The SD Card slot/infrared module bezel is included in the Miscellaneous Plastics Kit, spare part number 344852-001.

5. Remove the module ❹.



*Removing the SD Card Slot/Infrared Module*

Reverse the above procedure to install the SD Card slot/infrared module.

## 5.17 Speakers

---

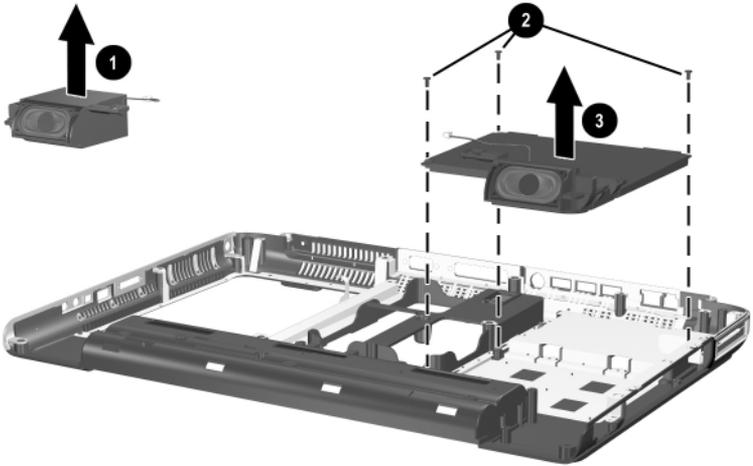


The left and right speakers are included with the base enclosure, spare part number 344883-001.

---

1. Prepare the notebook for disassembly (Section 5.3) and remove the following components:
  - ❑ Optical drive (Section 5.7)
  - ❑ Keyboard (Section 5.8)
  - ❑ Keyboard cover (Section 5.9)
  - ❑ Display assembly (Section 5.10)
  - ❑ Top cover (Section 5.11)
  - ❑ System board (Section 5.12)
  - ❑ SD Card slot/infrared module (Section 5.16)

2. Remove the left speaker from the notebook ❶.
3. Remove the three PM2.5×5.0 screws ❷ that secure the right speaker to the notebook.
4. Remove the right speaker ❸.



### *Removing the Speakers*

Reverse the above procedure to install the speakers.

# 6

## Specifications

This chapter provides physical and performance specifications.

**Table 6-1  
Notebook**

| <b>Dimensions</b>                        |  |               |
|--|--|---------------|
| Height                                   | 56.38 cm   | 1.85 in       |
| Width                                    | 333.45 cm  | 10.94 in      |
| Depth                                    | 477.62 cm  | 15.67 in      |
| <b>Weight</b> (varies by configuration)  |  |               |
|  | 4.22 kg  | 9.30 lbs      |
| <b>Stand-alone power requirements</b>    |  |               |
| Nominal operating voltage                | 14.4 VDC   |               |
| Average operating power                  | 15.8 W   |               |
| Peak operating power                     | 38.0 W   |               |
| Power in Standby mode                    | < 800 mW   |               |
| Power in Hibernation mode                | < 100 mW   |               |
| <b>Temperature</b>                       |  |               |
| Operating                                | 10°C to 35°C   | 50°F to 95°F  |
| Nonoperating                             | -10°C to 60°C  | 14°F to 140°F |
| <b>Relative humidity</b> (noncondensing) |  |               |
| Operating                                | 10% to 90%   |               |
| Nonoperating                             | 5% to 90%, 38.7°C (101.6°F) maximum wet bulb temperature |               |

**Table 6-1**  
**Notebook (Continued)**

---

**Altitude** (unpressurized)

|                                 |              |                |
|---------------------------------|--------------|----------------|
| Operating (14.7 to 10.1 psia)   | 0 to 3,048 m | 0 to 10,000 ft |
| Nonoperating (14.7 to 4.4 psia) | 0 to 9,144 m | 0 to 30,000 ft |

---

**Shock**

|              |                        |
|--------------|------------------------|
| Operating    | 10 G, 11 ms, half-sine |
| Nonoperating | 60 G, 11 ms, half-sine |

---

**Vibration**

|              |   |
|--------------|---|
| Operating    | 0.5 G zero-to-peak, 10 to 500 Hz, 0.25 oct/min sweep rate |
| Nonoperating | 1.0 G zero-to-peak, 10 to 500 Hz, 0.5 oct/min sweep rate  |

---



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

---

**Table 6-2**  
**15.4-inch, Wide SXGA+, TFT Display**

| <b>Dimensions</b>        |  |         |
|--------------------------|--|---------|
| Height                   | 20.7 cm                                    | 8.1 in  |
| Width                    | 33.1 cm                                    | 13.0 in |
| Diagonal                 | 39.1 cm                                    | 15.4 in |
| <b>Number of colors</b>  | up to 16.8 million                         |         |
| <b>Contrast ratio</b>    | 200:1                                      |         |
| <b>Brightness</b>        | 180 nits typical                           |         |
| <b>Pixel resolution</b>  |  |         |
| Pitch                    | 0.197 × 0.197 mm                           |         |
| Format                   | 1680 × 1050                                |         |
| Configuration            | RGB vertical stripe                        |         |
| <b>Backlight</b>         | Edge lit                                   |         |
| <b>Character display</b> | 80 × 25                                    |         |
| <b>Viewing angle</b>     | +/-65° horizontal, +/-50° vertical typical |         |

**Table 6-3**  
**15.4-inch, Wide XGA+, TFT Display**

---

|                   |         |         |
|-------------------|---------|---------|
| <b>Dimensions</b> |         |         |
| Height            | 20.7 cm | 8.1 in  |
| Width             | 33.1 cm | 13.0 in |
| Diagonal          | 39.1 cm | 15.4 in |

---

|                         |                    |
|-------------------------|--------------------|
| <b>Number of colors</b> | up to 16.8 million |
|-------------------------|--------------------|

---

|                       |       |
|-----------------------|-------|
| <b>Contrast ratio</b> | 200:1 |
|-----------------------|-------|

---

|                   |                  |
|-------------------|------------------|
| <b>Brightness</b> | 180 nits typical |
|-------------------|------------------|

---

|                         |                     |
|-------------------------|---------------------|
| <b>Pixel resolution</b> |                     |
| Pitch                   | 0.259 × 0.259 mm    |
| Format                  | 1280 × 800          |
| Configuration           | RGB vertical stripe |

---

|                  |          |
|------------------|----------|
| <b>Backlight</b> | Edge lit |
|------------------|----------|

---

|                          |         |
|--------------------------|---------|
| <b>Character display</b> | 80 × 25 |
|--------------------------|---------|

---

|                      |  |
|----------------------|--|
| <b>Viewing angle</b> | +/-65° horizontal, +/-50° vertical typical |
|----------------------|--|

---

**Table 6-4  
Hard Drives**

|   | <b>80-GB</b>                      | <b>60-GB<br/>(5400-<br/>rpm)</b>  | <b>60-GB<br/>(4200-<br/>rpm)</b>  | <b>40-GB</b>                      |
|---|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| <b>User capacity per drive<sup>1</sup></b>          | 80 GB                             | 60 GB                             | 40 GB                             | 30 GB                             |
| <b>Dimensions</b>                                   |                                   |                                   |                                   |                                   |
| Height  | 9.5 mm                            | 9.5 mm                            | 9.5 mm                            | 9.5 mm                            |
| Width   | 70 mm                             | 70 mm                             | 70 mm                             | 70 mm                             |
| Weight  | 99 g                              | 102 g                             | 99 g                              | 99g                               |
| <b>Interface type</b>                               | ATA-5                             | ATA-5                             | ATA-5                             | ATA-5                             |
| <b>Transfer rate</b>                                |                                   |                                   |                                   |                                   |
| Synchronous (maximum)                               | 100 MB/<br>sec                    | 100 MB/<br>sec                    | 100 MB/<br>sec                    | 100 MB/<br>sec                    |
| Security  | ATA security                      | ATA security                      | ATA security                      | ATA security                      |
| <b>Seek times (typical read, including setting)</b> |                                   |                                   |                                   |                                   |
| Single track  | 3 ms                              | 3 ms                              | 3 ms                              | 3 ms                              |
| Average   | 13 ms                             | 13 ms                             | 13 ms                             | 13 ms                             |
| Maximum   | 24 ms                             | 24 ms                             | 24 ms                             | 24 ms                             |
| <b>Logical blocks<sup>2</sup></b>                   | 156,301,488                       | 117,210,240                       | 78,140,160                        | 58,605,120                        |
| <b>Disk rotational speed</b>                        | 4200 rpm                          | 5400 rpm                          | 4200 rpm                          | 4200 rpm                          |
| <b>Operating temperature</b>                        | 5°C to 55°C<br>(41°F to<br>131°F) |

<sup>1</sup>1 GB = 1,073,741,824 bytes.

<sup>2</sup>Actual drive specifications may differ slightly.

Certain restrictions and exclusions apply. Consult the HP Customer Support Center for details.

**Table 6-5**  
**External AC Adapter**

|                     |                    |         |
|---------------------|--------------------|---------|
| <b>Weight</b>       | .304 kg            | 0.67 lb |
| <b>Power supply</b> |                    |         |
| Rated input voltage | 100 to 240 VAC RMS |         |
| Rated input current | 1.7 A RMS          |         |
| Rated frequency     | 47 to 63 Hz        |         |

**Table 6-6**  
**12-cell, Li-Ion Battery Pack**

|   |              |             |
|---|--------------|-------------|
| <b>Dimensions</b>                                 |              |             |
| Height  | 13.4 cm      | 5.25 in     |
| Width   | 9.2 cm       | 3.63 in     |
| Depth   | 1.9 cm       | .75 in      |
| Weight  | .43 kg       | .96 lb      |
| <b>Energy</b>                                     |              |             |
| Voltage   | 14.8 V       |             |
| Amp-hour capacity                                 | 4.4 Ah       |             |
| Watt-hour capacity                                | 64 Wh        |             |
| <b>Temperature</b>                                |              |             |
| Operating   | 0 to 60°C    | 32 to 140°F |
| Nonoperating                                      | -20 to 60°C  | -4 to 104°F |
| <b>Recharge time</b>                              |              |             |
| System in Standby mode                            | 2 to 3 hours |             |
| System on (depending on system power consumption) | 2 to 5 hours |             |

**Table 6-7**  
**24X DVD/CD-RW Drive**

|                             |  |                  |
|-----------------------------|--|------------------|
| <b>Applicable disk</b>      | DVD-5, DVD-9, DVD-10<br>CD-ROM (Mode 1 and 2)<br>CD Digital Audio<br>CD-XA ready (Mode 2, Form 1 and 2)<br>CD-I ready (Mode 2, Form 1 and 2)<br>CD-R (read only)<br>CD Plus<br>Photo CD (single/multisession)<br>CD-Bridge |                  |
| <b>Center hole diameter</b> | 1.5 cm   | 0.59 in          |
| <b>Disk diameter</b>        | 12 cm, 8 cm  | 4.72 in, 3.15 in |
| <b>Disk thickness</b>       | 1.2 mm   | 0.047 in         |
| <b>Track pitch</b>          | 0.74 $\mu$ m   |                  |
| <b>Access time</b>          |  |                  |
| Random                      | < 150 ms   |                  |
| Full stroke                 | < 225 ms   |                  |
| <b>Audio output level</b>   | Line-out, 0.7 Vrms   |                  |
| <b>Cache buffer</b>         | 128 KB/s   |                  |
| <b>Data transfer rate</b>   |  |                  |
| 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  |                  |
| <b>Startup time</b>         | < 15 seconds   |                  |
| <b>Stop time</b>            | < 6 seconds  |                  |

**Table 6-8**  
**24X CD-RW Drive**

|                             |  |                  |
|-----------------------------|--|------------------|
| <b>Applicable disk</b>      | DVD-5, DVD-9, DVD-10<br>CD-ROM (Mode 1 and 2)<br>CD Digital Audio<br>CD-XA ready (Mode 2, Form 1 and 2)<br>CD-I ready (Mode 2, Form 1 and 2)<br>CD-R (read only)<br>CD Plus<br>Photo CD (single/multisession)<br>CD-Bridge |                  |
| <b>Center hole diameter</b> | 1.5 cm   | 0.59 in          |
| <b>Disk diameter</b>        | 12 cm, 8 cm  | 4.72 in, 3.15 in |
| <b>Disk thickness</b>       | 1.2 mm   | 0.047 in         |
| <b>Track pitch</b>          | 0.74 $\mu$ m   |                  |
| <b>Access time</b>          |  |                  |
| Random                      | < 150 ms   |                  |
| Full stroke                 | < 225 ms   |                  |
| <b>Audio output level</b>   | Line-out, 0.7 Vrms   |                  |
| <b>Cache buffer</b>         | 128 KB/s   |                  |
| <b>Data transfer rate</b>   |  |                  |
| 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  |                  |
| <b>Startup time</b>         | < 15 seconds   |                  |
| <b>Stop time</b>            | < 6 seconds  |                  |

**Table 6-9**  
**8X DVD-ROM Drive**

|                             |  |                  |
|-----------------------------|--|------------------|
| <b>Applicable disk</b>      | DVD-5, DVD-9, DVD-10<br>CD-ROM (Mode 1 and 2)<br>CD Digital Audio<br>CD-XA ready (Mode 2, Form 1 and 2)<br>CD-I ready (Mode 2, Form 1 and 2)<br>CD-R (read only)<br>CD Plus<br>Photo CD (single/multisession)<br>CD-Bridge |                  |
| <b>Center hole diameter</b> | 1.5 cm   | 0.59 in          |
| <b>Disk diameter</b>        | 12 cm, 8 cm  | 4.72 in, 3.15 in |
| <b>Disk thickness</b>       | 1.2 mm   | 0.047 in         |
| <b>Track pitch</b>          | 0.74 $\mu$ m   |                  |
| <b>Access time</b>          |  |                  |
| Random DVD media            | < 150 ms   |                  |
| Full stroke DVD media       | < 225 ms   |                  |
| Random CD media             | < 110 ms   |                  |
| Full stroke CD media        | < 200 ms   |                  |
| <b>Audio output level</b>   | Line-out, 0.7 Vrms   |                  |
| <b>Cache buffer</b>         | 512 KB/s   |                  |
| <b>Data transfer rate</b>   |  |                  |
| Max 24X CD                  | 3600 KB/s (150 KB/s at 1X CD rate)   |                  |
| Max 8X DVD                  | 10,800 KB/s (1352 KB/s at 1X DVD rate)   |                  |
| Multiword DMA mode 2        | 16.6 MB/s  |                  |
| <b>Startup time</b>         | < 10 seconds   |                  |
| <b>Stop time</b>            | < 3 seconds  |                  |

**Table 6-10**  
**24X CD-ROM Drive**

|                             |  |                  |
|-----------------------------|--|------------------|
| <b>Applicable disk</b>      | DVD-5, DVD-9, DVD-10<br>CD-ROM (Mode 1 and 2)<br>CD Digital Audio<br>CD-XA ready (Mode 2, Form 1 and 2)<br>CD-I ready (Mode 2, Form 1 and 2)<br>CD-R (read only)<br>CD Plus<br>Photo CD (single/multisession)<br>CD-Bridge |                  |
| <b>Center hole diameter</b> | 1.5 cm   | 0.59 in          |
| <b>Disk diameter</b>        | 12 cm, 8 cm  | 4.72 in, 3.15 in |
| <b>Disk thickness</b>       | 1.2 mm   | 0.047 in         |
| <b>Track pitch</b>          | 1.6 $\mu$ m  |                  |
| <b>Access time</b>          |  |                  |
| Random                      | < 150 ms   |                  |
| Full stroke                 | < 300 ms   |                  |
| <b>Audio output level</b>   | Line-out, 0.7 Vrms   |                  |
| <b>Cache buffer</b>         | 128 KB/s   |                  |
| <b>Data transfer rate</b>   |  |                  |
| Sustained (16X)             | 2400 KB/s  |                  |
| Variable                    | 1500 to 3600 KB/s (10X to 24X)   |                  |
| Multiword DMA mode 2        | 16.6 MB/s  |                  |
| <b>Startup time</b>         | < 8 seconds  |                  |
| <b>Stop time</b>            | < 4 seconds  |                  |

**Table 6-11  
System DMA**

| <b>Hardware DMA</b> | <b>System Function</b>   |
|---------------------|--|
| DMA0                | Available for audio  |
| DMA1*               | Entertainment audio<br>(default; alternate = DMA0, DMA3, none) |
| DMA2*               | Diskette drive   |
| DMA3                | ECP parallel port LPT1<br>(default; alternate = DMA0, none)    |
| DMA4                | DMA controller cascading (not available)                       |
| DMA5*               | Available for PC Card  |
| DMA6                | Not assigned   |
| DMA7                | Not assigned   |

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

**Table 6-12**  
**System Interrupts**

| <b>Hardware IRQ</b>   | <b>System Function</b>  |
|---|---|
| IRQ0  | System timer  |
| IRQ1  | Keyboard controller   |
| IRQ2  | Cascaded  |
| IRQ3  | COM2  |
| IRQ4  | COM1  |
| IRQ5  | Audio (default)*  |
| IRQ6  | Diskette drive  |
| IRQ7  | Parallel port   |
| IRQ8  | Real time clock (RTC)   |
| IRQ9  | Infrared  |
| IRQ10   | System use  |
| IRQ11   | System use  |
| IRQ12   | Internal point stick or external mouse  |
| IRQ13   | Coprocessor (not available to any peripheral)   |
| IRQ14   | IDE interface (hard drive and optical drive)  |
| IRQ15   | System use  |
|          | 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. |
| *Default configuration; audio possible configurations are IRQ5, IRQ7, IRQ9, IRQ10, or none. |   |

**Table 6-13**  
**System I/O Addresses**

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

**Table 6-13**  
**System I/O Addresses (Continued)**

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

**Table 6-13**  
**System I/O Addresses (Continued)**

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

**Table 6-14**  
**System Memory Map**

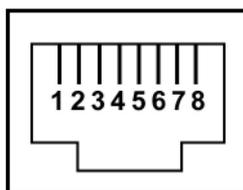
| <b>Size</b> | <b>Memory Address</b> | <b>System Function</b>       |
|-------------|-----------------------|------------------------------|
| 640 KB      | 00000000-0009FFFF     | Base memory                  |
| 128 KB      | 000A0000-000BFFFF     | Video memory                 |
| 48 KB       | 000C0000-000CBFFF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

# A

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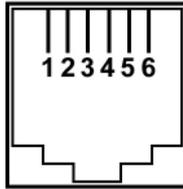
## Connector Pin Assignments

**Table A-1**  
**RJ-45 Network Interface**



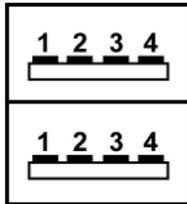
| <b>Pin</b> | <b>Signal</b> | <b>Pin</b> | <b>Signal</b> |
|------------|---------------|------------|---------------|
| 1          | Transmit +    | 5          | Unused        |
| 2          | Transmit -    | 6          | Receive -     |
| 3          | Receive +     | 7          | Unused        |
| 4          | Unused        | 8          | Unused        |

**Table A-2  
RJ-11 Modem**



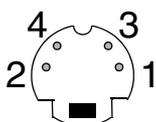
| Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|
| 1   | Unused | 4   | Unused |
| 2   | Tip    | 5   | Unused |
| 3   | Ring   | 6   | Unused |

**Table A-3  
Universal Serial Bus**



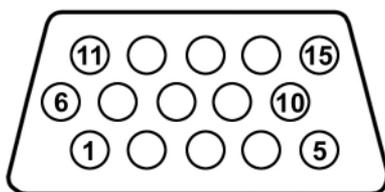
| Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|
| 1   | +5 VDC | 3   | Data + |
| 2   | Data - | 4   | Ground |

**Table A-4**  
**S-Video**



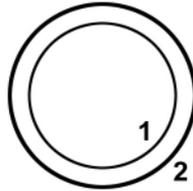
| Pin | Signal     | Pin | Signal                  |
|-----|------------|-----|-------------------------|
| 1   | Ground (Y) | 3   | Y-Luminance (Intensity) |
| 2   | Ground (C) | 4   | C-Chrominance (Color)   |

**Table A-5**  
**External Monitor**



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

**Table A-6  
Audio Line-Out**

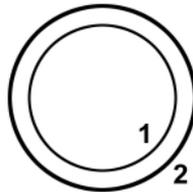


---

| <b>Pin</b> | <b>Signal</b> | <b>Pin</b> | <b>Signal</b> |
|------------|---------------|------------|---------------|
| 1          | Audio out     | 2          | Ground        |

---

**Table A-7  
Microphone**

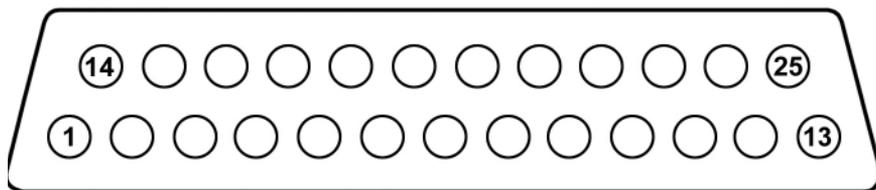


---

| <b>Pin</b> | <b>Signal</b> | <b>Pin</b> | <b>Signal</b> |
|------------|---------------|------------|---------------|
| 1          | Audio in      | 2          | Ground        |

---

**Table A-8**  
**Parallel**



| Pin | Signal      | Pin | Signal           |
|-----|-------------|-----|------------------|
| 1   | Strobe      | 14  | Auto linefeed    |
| 2   | Data bit 0  | 15  | Error            |
| 3   | Data bit 1  | 16  | Initialize paper |
| 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      |     |                  |

---

## Power Cord Set Requirements

### 3-Conductor Power Cord Set

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

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

Power cord sets for use in other countries must meet the requirements of the country where the notebook is used. For more information on power cord set requirements, contact an HP authorized reseller or service provider.

### General Requirements

The requirements listed below are applicable to all countries:

- The length of the power cord set must be at least 1.5 meters (5.00 feet) and a maximum of 2.0 meters (6.50 feet).
- 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 set must have a minimum current capacity of 10 amps and a nominal voltage rating of 125 or 250 volts AC, as required by each country's power system.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the notebook.

# Country-Specific Requirements

## 3-Conductor Power Cord Set Requirements

---

| <b>Country</b>  | <b>Accredited Agency</b> | <b>Applicable Note Number</b> |
|-----------------|--------------------------|-------------------------------|
| Australia       | EANSW                    | 1                             |
| Austria         | OVE                      | 1                             |
| Belgium         | CEBC                     | 1                             |
| Canada          | CSA                      | 2                             |
| Denmark         | DEMKO                    | 1                             |
| Finland         | FIMKO                    | 1                             |
| France          | UTE                      | 1                             |
| Germany         | VDE                      | 1                             |
| Italy           | IMQ                      | 1                             |
| Japan           | METI                     | 3                             |
| The Netherlands | KEMA                     | 1                             |
| Norway          | NEMKO                    | 1                             |
| Sweden          | SEMKO                    | 1                             |
| Switzerland     | SEV                      | 1                             |

---

---

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


---

| <b>Country</b> | <b>Accredited Agency</b> | <b>Applicable Note Number</b> |
|----------------|--------------------------|-------------------------------|
| United Kingdom | BSI                      | 1                             |
| United States  | UL                       | 2                             |

---

**Notes**

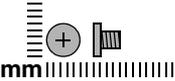
1. The flexible cord must be <HAR> Type HO5VV-F, 3-conductor, 1.0 mm<sup>2</sup> conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.
  2. The flexible cord must be Type SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a 2-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 mm<sup>2</sup> conductor size. The wall plug must be a 2-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) configuration.
-

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## Screw Listing

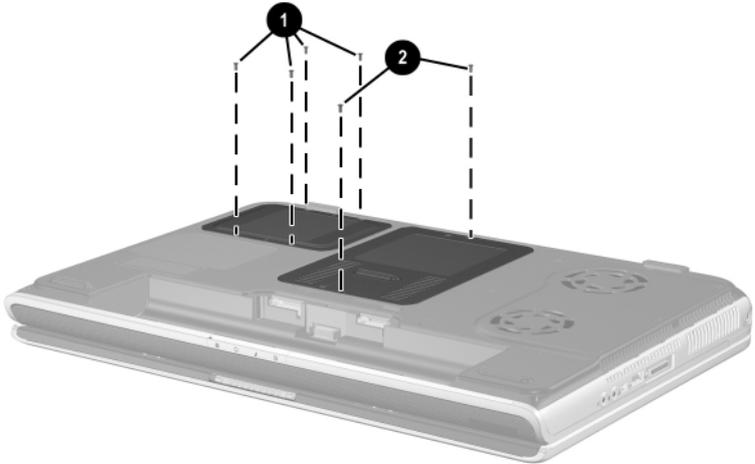
This appendix provides specification and reference information for the screws used in the notebook. All screws listed in this appendix are available in the Miscellaneous Screw Kit, spare part number 344850-001.

**Table C-1**  
**Phillips PM2.5×4.0 Screw**

|  mm | Color | Qty. | Length | Thread | Head Width |
|--|-------|------|--------|--------|------------|
|  | Black | 6    | 4.0 mm | 2.5 mm | 5.0 mm     |

**Where used:**

- ❶ Four screws that secure the hard drive cover to the notebook (documented in Section 5.3)
- ❷ Two screws that secure the memory expansion/Mini PCI compartment cover to the notebook (documented in Section 5.5)



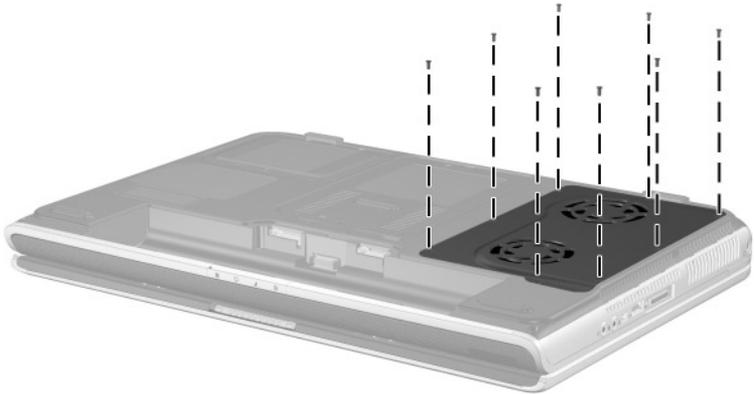
*Phillips M2.5×4.0 Screw Locations*

**Table C-2**  
**Phillips PM2.5×5.0 Screw**

| <br>mm  | Color | Qty. | Length | Thread | Head Width |
|---|-------|------|--------|--------|------------|
|   | Black | 18   | 5.0 mm | 2.5 mm | 5.0 mm     |

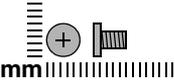
**Where used:**

Eight screws that secure the fan cover to the notebook  
 (documented in Section 5.8)



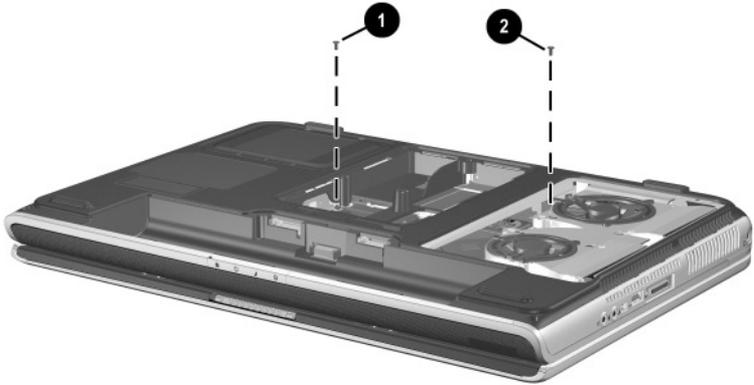
*Phillips M2.5×5.0 Screw Locations*

**Table C-2**  
**Phillips PM2.5×5.0 Screw (Continued)**

|  | Color | Qty. | Length | Thread | Head Width |
|---|-------|------|--------|--------|------------|
|   | Black | 18   | 5.0 mm | 2.5 mm | 5.0 mm     |

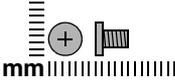
**Where used:**

- ❶ One screw that secures the optical drive to the notebook in the memory expansion/Mini PCI compartment (documented in Section 5.7)
- ❷ One screw that secures the keyboard to the notebook in the heat sink compartment (documented in Section 5.8)



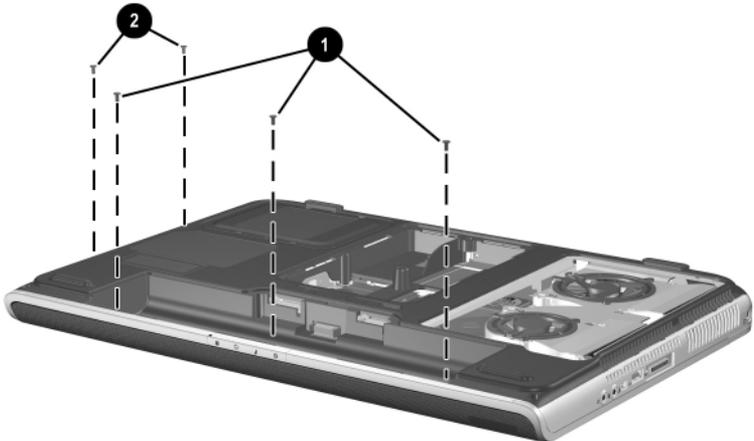
*Phillips M2.5×5.0 Screw Locations*

**Table C-2**  
**Phillips PM2.5×5.0 Screw (Continued)**

|  | Color | Qty. | Length | Thread | Head Width |
|---|-------|------|--------|--------|------------|
|   | Black | 18   | 5.0 mm | 2.5 mm | 5.0 mm     |

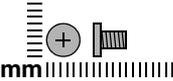
**Where used:**

- ❶ Three screws that secure the top cover to the notebook in the battery bay (documented in Section 5.11)
- ❷ Two screws that secure the top cover to the notebook in the optical drive bay (documented in Section 5.11)



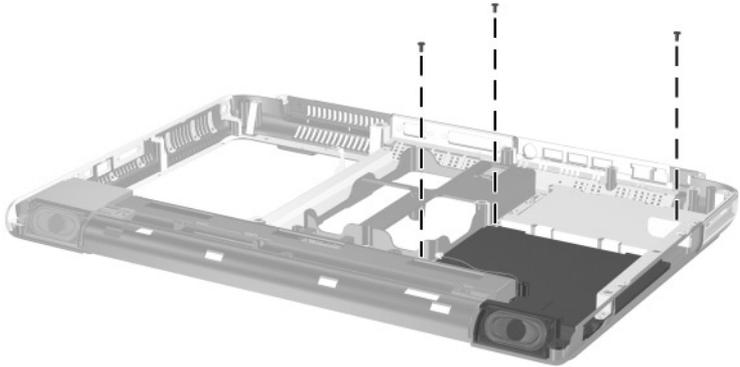
*Phillips M2.5×5.0 Screw Locations*

**Table C-2**  
**Phillips PM2.5×5.0 Screw (Continued)**

|  | Color | Qty. | Length | Thread | Head Width |
|---|-------|------|--------|--------|------------|
|   | Black | 18   | 5.0 mm | 2.5 mm | 5.0 mm     |

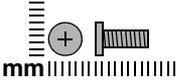
**Where used:**

Three screws that secure the right speaker to the notebook (documented in Section 5.17)



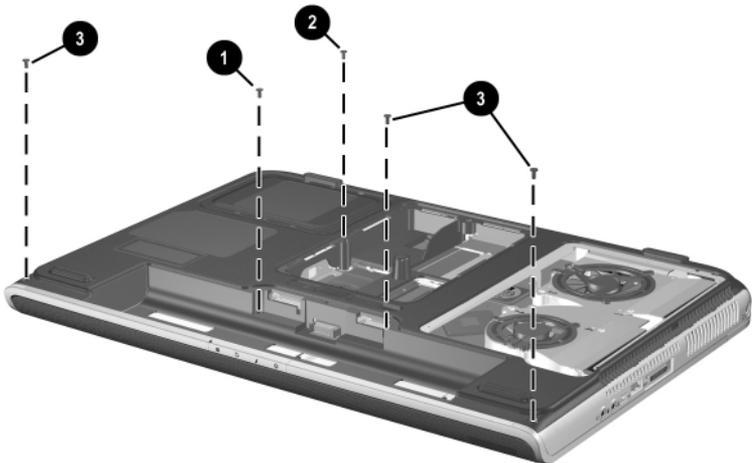
*Phillips M2.5×5.0 Screw Locations*

**Table C-3**  
**Phillips PM2.5×8.0 Screw**

|  | Color | Qty. | Length | Thread | Head Width |
|---|-------|------|--------|--------|------------|
|   | Black | 26   | 8.0 mm | 2.5 mm | 5.0 mm     |

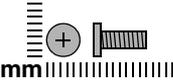
**Where used:**

- ❶ One screw that secures the optical drive to the notebook in the battery bay (documented in Section 5.7)
- ❷ One screw that secures the keyboard to the notebook in the memory expansion/Mini PCI compartment (documented in Section 5.8)
- ❸ Three screws that secure the top cover to the notebook (two on the front edge of the notebook, one in the battery bay (documented in Section 5.11))



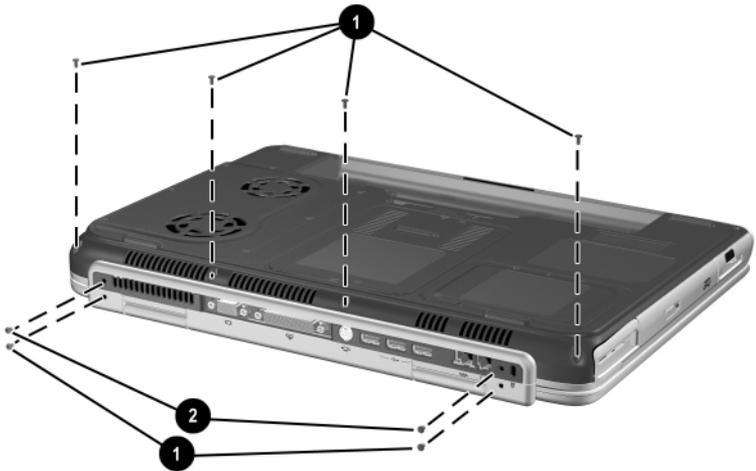
*Phillips M2.5×8.0 Screw Locations*

**Table C-3**  
**Phillips PM2.5×8.0 Screw (Continued)**

|  | Color | Qty. | Length | Thread | Head Width |
|---|-------|------|--------|--------|------------|
|   | Black | 26   | 8.0 mm | 2.5 mm | 5.0 mm     |

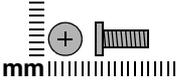
**Where used:**

- ❶ Six screws that secure the keyboard cover to the notebook (documented in Section 5.9)
- ❷ Two screws that secure the display assembly to the notebook (documented in Section 5.10)



*Phillips M2.5×8.0 Screw Locations*

**Table C-3**  
**Phillips PM2.5×8.0 Screw (Continued)**

|  | Color | Qty. | Length | Thread | Head Width |
|---|-------|------|--------|--------|------------|
|   | Black | 26   | 8.0 mm | 2.5 mm | 5.0 mm     |

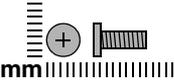
**Where used:**

Two screws that secure the display assembly to the notebook  
 (documented in Section 5.10)



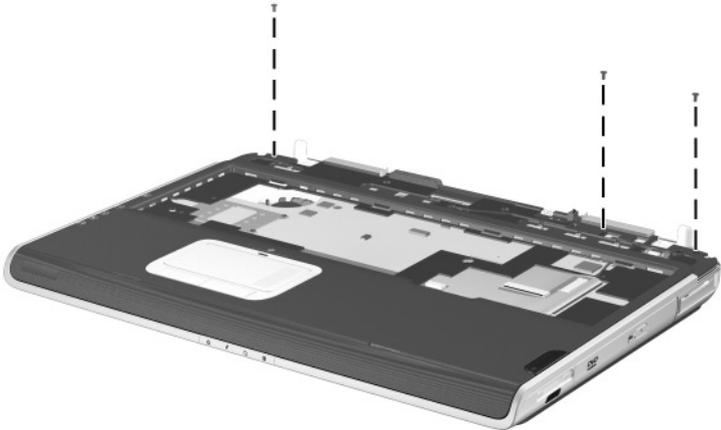
*Phillips M2.5×8.0 Screw Location*

**Table C-3**  
**Phillips PM2.5×8.0 Screw (Continued)**

|  | Color | Qty. | Length | Thread | Head Width |
|---|-------|------|--------|--------|------------|
|   | Black | 26   | 8.0 mm | 2.5 mm | 5.0 mm     |

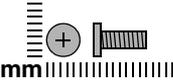
**Where used:**

Three screws that secure the top cover to the notebook (documented in Section 5.11)



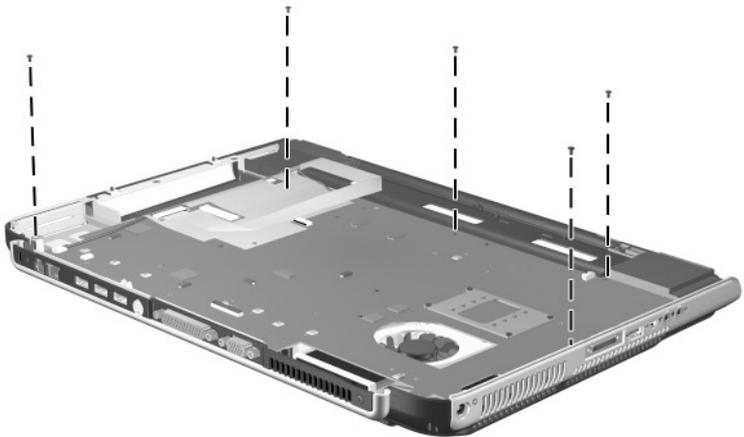
*Phillips M2.5×8.0 Screw Locations*

**Table C-3**  
**Phillips PM2.5×8.0 Screw (Continued)**

|  | Color | Qty. | Length | Thread | Head Width |
|---|-------|------|--------|--------|------------|
|   | Black | 26   | 8.0 mm | 2.5 mm | 5.0 mm     |

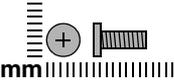
**Where used:**

Five screws that secure the system board to the notebook  
 (documented in Section 5.12)



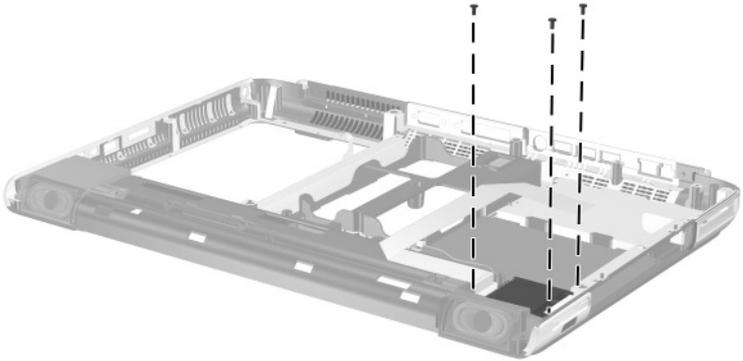
*Phillips M2.5×8.0 Screw Location*

**Table C-3**  
**Phillips PM2.5×8.0 Screw (Continued)**

|  | Color | Qty. | Length | Thread | Head Width |
|---|-------|------|--------|--------|------------|
|   | Black | 26   | 8.0 mm | 2.5 mm | 5.0 mm     |

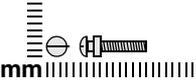
**Where used:**

Three screws that secure the SD Card slot/infrared module to the notebook (documented in Section 5.16)



*Phillips M2.5×8.0 Screw Locations*

**Table C-4**  
**Slotted M1.5×10.0 Shoulder Screw**

|  | Color  | Qty. | Length  | Thread | Head Width |
|---|--------|------|---------|--------|------------|
|   | Silver | 2    | 10.0 mm | 1.5 mm | 3.0 mm     |

**Where used:**

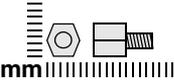
Two screws that secure the top cover to the notebook  
 (documented in Section 5.11)



*Slotted M1.5×10.0 Shoulder Screw Locations*

**Table C-5**  
**HM5.0×8.5 Standoff**

---

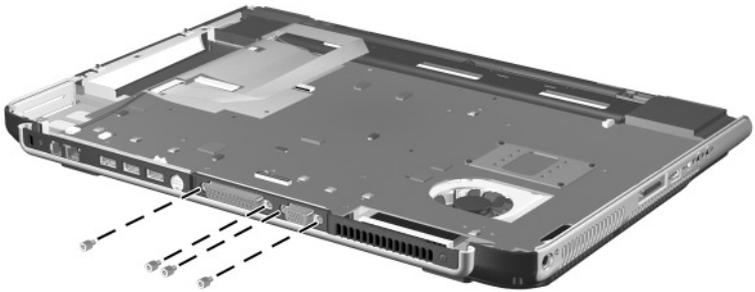
|  | <b>Color</b> | <b>Qty.</b> | <b>Length</b> | <b>Thread</b> | <b>Head Width</b> |
|---|--------------|-------------|---------------|---------------|-------------------|
|   | Silver       | 4           | 8.5 mm        | 2.5 mm        | 5.0 mm            |

---

**Where used:**

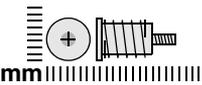
Four standoffs that secure the system board to the notebook  
(documented in Section 5.12)

---



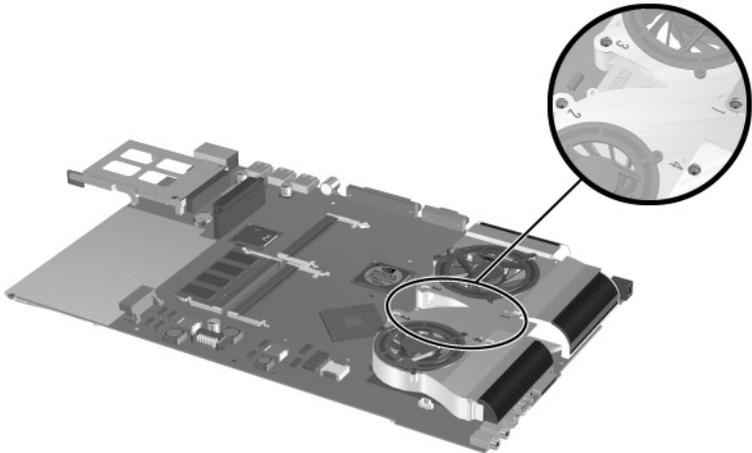
*Phillips M2.5×3.0 Screw Location*

**Table C-6**  
**PM1.5×12.0 Spring-Loaded Shoulder Screw**

|  | Color  | Qty. | Length  | Thread | Head Width |
|---|--------|------|---------|--------|------------|
|   | Silver | 4    | 12.0 mm | 1.5 mm | 6.5 mm     |

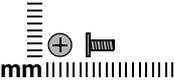
**Where used:**

Four screws that secure the heat sink to the system board  
 (documented in Section 5.14)



*Phillips M2.5×15.0 Screw Location*

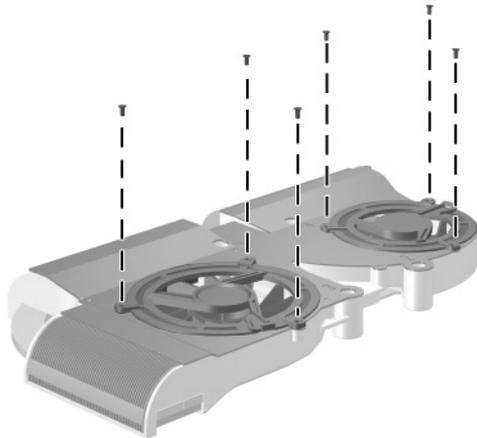
**Table C-7**  
**Phillips PM1.5×4.0 Screw**

|  mm | Color | Qty. | Length | Thread | Head Width |
|--|-------|------|--------|--------|------------|
|  | Black | 6    | 4.0 mm | 1.5 mm | 3.5 mm     |

**Where used:**

Six screws that secure the fans to the heat sink (documented in Section 5.14)

---



*Phillips M1.5×4.0 Screw Locations*

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