



HP Compaq 2230s Notebook PC

Maintenance and Service Guide

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

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Safety warning notice



WARNING: To reduce the possibility of heat-related injuries or of overheating the computer, do not place the computer directly on your lap or obstruct the computer air vents. Use the computer only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The computer and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950).

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Product description

| Category | Description | Models with GL40 system board | Models with GM45 system board |
|---------------------|--|-------------------------------------|-------------------------------------|
| Product name | HP Compaq 2230s Notebook PC | X | X |
| Processors | Intel® Core™2 Duo processors: | | |
| | ■ T9600 2.8-GHz processor, 6-MB L2 cache, 1066-MHz front side bus (FSB) | | X |
| | ■ T9400 2.53-GHz processor, 6-MB L2 cache, 1066-MHz FSB | | X |
| | ■ P9500 2.53-GHz processor, 6-MB L2 cache, 1066-MHz FSB | | X |
| | ■ P8700 2.53-GHz processor, 3-MB L2 cache, 1066-MHz FSB | | X |
| | ■ P8600 2.4-GHz, 3-MB L2 cache, 1066-MHz FSB | | X |
| | ■ P8400 2.26-GHz processor, 3-MB L2 cache, 1066-MHz FSB | | X |
| | ■ P7370 2.0-GHz processor, 3-MB L2 cache, 1066-MHz FSB (for use with Intel WLAN only) | | X |
| | Intel Core Duo processors: | | |
| | ■ P5870 2.0-GHz processor, 2-MB L2 cache, 800-MHz FSB (for use with no-WLAN option or Intel WLAN only) | | X |
| | ■ P5670 1.8-GHz processor, 2-MB L2 cache, 800-MHz FSB (for use with no-WLAN option or Intel WLAN only) | | X |
| | ■ T3400 2.16-GHz processor, 1-MB L2 cache, 667-MHz FSB | X | X |
| | ■ T3200 2.0-GHz processor, 1-MB L2 cache, 667-MHz FSB | X | X |
| | Intel Celeron®-M processors: | | |
| | ■ 585 2.16-GHz processor, 1-MB L2 cache, 667-MHz FSB | X | |
| | ■ 575 2.0-GHz processor, 1-MB L2 cache, 667-MHz FSB | X | |
| | Intel Celeron-T processors: | | |
| | ■ T1700 1.83-GHz processor, 1-MB L2 cache, 667-MHz FSB | X | |
| | ■ T1600 1.66-GHz processor, 1-MB cache, 667-MHz FSB | X | |
| Chipset | Northbridge: Intel GL40 | X | |
| | Northbridge: Intel GM45 | | X |
| | Southbridge: Intel ICH9M | X | X |

(Continued)

| Category | Description | Models with GL40 system board | Models with GM45 system board |
|--|---|-------------------------------|-------------------------------|
| Graphics | Intel Unified Memory Architecture (UMA) graphics subsystem integrated with shared system memory (dynamically allocated) | X | X |
| Panel | 12.1-inch WXGA panel (1280 × 800) | X | X |
| | 12.1-inch WXGA panel (1280 × 800) with integrated webcam | X | X |
| | 12.1-inch WXGA panel (1280 × 800) with BrightView | X | X |
| | 12.1-inch WXGA panel (1280 × 800) with BrightView and integrated webcam | X | X |
| | All display assemblies include 2 wireless local area network (WLAN) antennae | | |
| Memory | 2 customer-accessible/upgradable memory module slots | X | X |
| | Supports dual-channel memory | X | X |
| | Supports up to 4 GB of system RAM | X | X |
| | PC2-6400, 800-MHz, DDR2 | | |
| | Supports the following configurations: | | |
| | ■ 4096-MB total system memory (2048 × 2, dual-channel) | X | X |
| | ■ 3072-MB total system memory (2048 + 1024) | X | X |
| | ■ 2048-MB total system memory (1024 × 2, dual-channel) | X | X |
| ■ 2048-MB total system memory (2048 × 1) | X | X | |
| ■ 1024-MB total system memory (1024 × 1) | X | X | |
| Hard drives | Supports 9.5-mm, 2.5-inch hard drives | X | X |
| | Customer-accessible | X | X |
| | Serial ATA | X | X |
| | Supports the following drives: | | |
| | ■ 320-GB, 5400-rpm | X | X |
| | ■ 250-GB, 5400-rpm | X | X |
| | ■ 160-GB, 7200-rpm | X | X |
| | ■ 160-GB, 5400-rpm | X | X |
| ■ 120-GB, 5400-rpm | X | X | |
| Optical drives | Fixed (removal of 1 screw required) | X | X |
| | Customer-accessible | X | X |
| | Serial ATA | X | X |
| | Supports no-optical-drive option | X | X |
| | Supports the following drives: | | |
| | ■ DVD/CD-RW Combo Drive | X | X |
| | ■ DVD-ROM Drive | X | X |
| | ■ DVD±RW SuperMulti Double-Layer Drive with LightScribe | X | X |
| ■ Blu-ray ROM DVD±RW SuperMulti DL Drive | | X | |
| Diskette drive | Supports external USB diskette drive only | X | X |

(Continued)

| Category | Description | Models with GL40 system board | Models with GM45 system board |
|----------------------------------|---|-------------------------------|-------------------------------|
| Microphone | Integrated mono microphone | X | X |
| Audio | Azalia audio | X | X |
| | 2 speakers | X | X |
| Modem | 56K V.92 1.5-inch data/fax modem with digital line guard | X | X |
| | Modem cable is not included | | |
| Ethernet | Intel Broadcom 88E8072 10/100/1000 network interface card (NIC) | X | X |
| | Ethernet cable included | X | X |
| Wireless | Integrated WLAN options by way of wireless module: | | |
| | 2 wireless antennae built into display assembly | X | X |
| | Supports no-WLAN option | X | X |
| | Support for the following WLAN formats: | | |
| | ■ Broadcom 802.11a/b/g/n | X | X |
| | ■ Intel 802.11a/b/g/n | X | X |
| | ■ Broadcom 802.11b/g | X | X |
| | ■ Intel 802.11a/b/g | X | X |
| | Integrated personal area network (PAN) options by way of Bluetooth® module: | | |
| | Support for no-WPAN option | X | X |
| Broadcom Bluetooth | X | X | |
| External media card | One ExpressCard slot, supporting optional ExpressCard/34 cards | X | X |
| | Media Card Reader supporting MMC, SD, and SD High Capacity digital cards | X | X |
| Ports | Audio-in (mono microphone) | X | X |
| | Audio-out (stereo headphone) | X | X |
| | HDMI | X | X |
| | RJ-11 (modem) | X | X |
| | RJ-45 (Ethernet, includes link and activity lights) | X | X |
| | USB (3) | X | X |
| | VGA (Dsub 15-pin) supporting 1600 × 1200 external resolution at 75 GHz (hot plug/unplug with auto-detect) | X | X |
| | Multi-pin AC power | X | X |
| Docking | None | X | X |
| Keyboard/pointing devices | Spill-resistant full-size keyboard | X | X |
| | TouchPad with 2 TouchPad buttons | X | X |
| | Supports 2-way scroll | X | X |
| | Taps enabled as default | X | X |
| | Windows Vista® Hardware Start Button | X | X |

(Continued)

| Category | Description | Models with GL40 system board | Models with GM45 system board |
|---------------------------|---|--|--|
| Power requirements | 65-W AC adapter with localized and pointing stick cable plug support (3-wire plug with ground pin, supports 3-pin DC connector) | X | X |
| | 4-cell, 37-Wh Li-ion battery | X | X |
| | 8-cell, 73-Wh Li-ion battery | X | X |
| Security | Security cable slot | X | X |
| Operating system | Preinstalled: | | |
| | Windows Vista® Home Basic 32 | X | X |
| | Windows Vista Home Premium 32 | X | X |
| | Windows Vista Business 32 | X | X |
| | Windows Vista Business (with downgrade to Windows® XP Professional) | X | X |
| | FreeDOS | X | X |
| | Red Flag Linux | X | X |
| Serviceability | End-user replaceable parts: | | |
| | AC adapter | X | X |
| | Battery (system) | X | X |
| | Hard drive | X | X |
| | Memory module | X | X |
| | Optical drive | X | X |
| | WLAN module | X | X |

External component identification

Display components

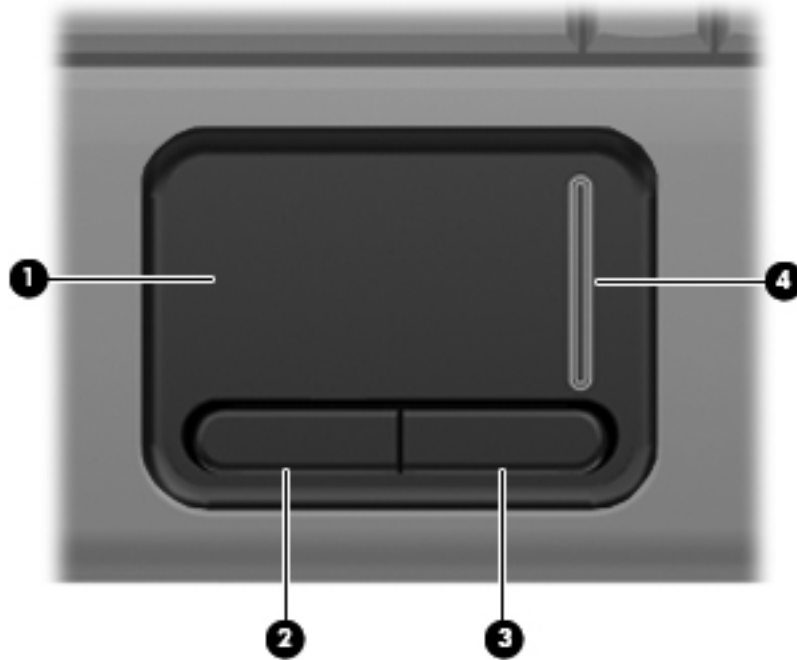


| Item | Component | Function |
|------|-----------------------------------|--|
| ❶ | Wireless antennae (2)* | Send and receive wireless signals to communicate with WLANs. |
| ❷ | Internal microphones (2) | Record sound. |
| ❸ | Webcam light (select models only) | On: The webcam is in use. |
| ❹ | Webcam (select models only) | Records audio and video and captures still photographs. |

*The antennae are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennae free from obstructions. To see wireless regulatory notices, refer to the section of the *Regulatory, Safety and Environmental Notices* that applies to your country or region. These notices are located in Help and Support.

Top components

Pointing devices

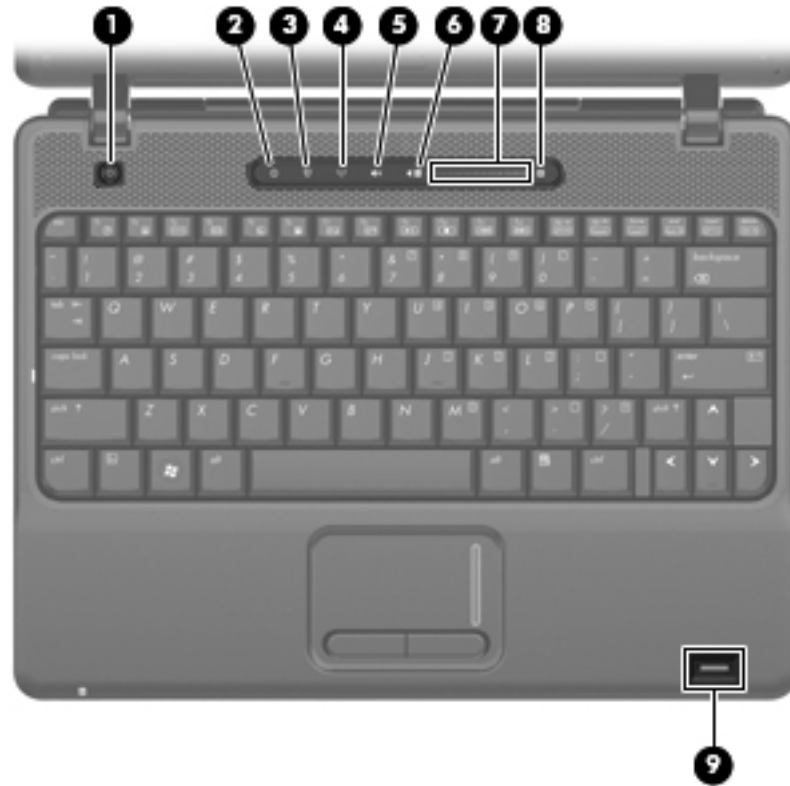


| Item | Component | Function |
|------|------------------------|---|
| ❶ | TouchPad* | Moves the pointer and selects or activates items on the screen. |
| ❷ | Left TouchPad button* | Functions like the left button on an external mouse. |
| ❸ | Right TouchPad button* | Functions like the right button on an external mouse. |
| ❹ | Vertical scroll zone | Scrolls up or down. |

*This table describes factory settings. View or change device preferences as follows:


- In Windows Vista, select **Start > Control Panel > Hardware and Sound > Mouse**.
- In Windows XP, select **Start > Control Panel > Printers and Other Hardware > Mouse**.

Buttons and fingerprint reader

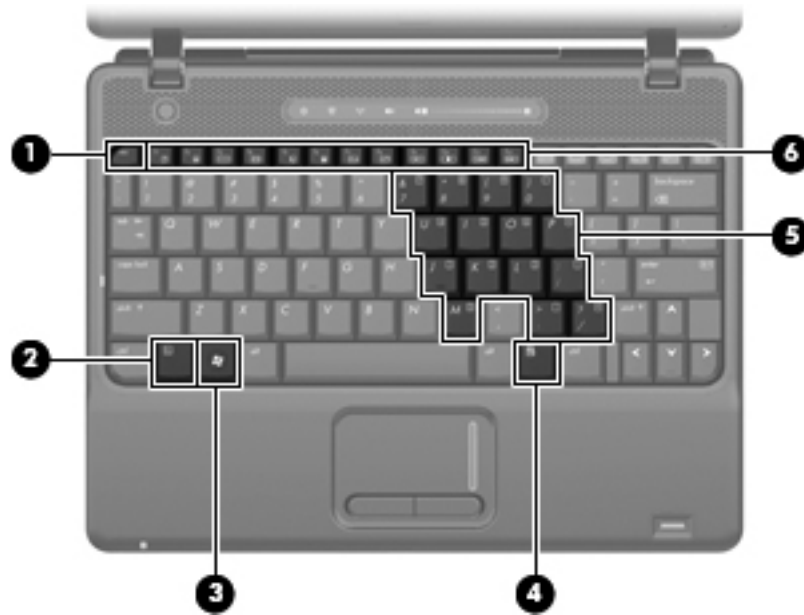


| Item | Component | Function |
|------|--------------|--|
| ❶ | Power button | <ul style="list-style-type: none"> ■ When the computer is off, press the button to turn on the computer. ■ When the computer is on, press the button to shut down the computer. ■ When the computer is in Standby or the Sleep state, press the button briefly to exit Standby or the Sleep state. ■ When the computer is in Hibernation, press the button briefly to exit Hibernation. <p>If the computer has stopped responding and Windows® shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer.</p> <p>To learn more about power settings, follow these steps:</p> <ul style="list-style-type: none"> ■ In Windows Vista, select Start > Control Panel > Mobile PC > Power Options. ■ In Windows XP, select Start > Control Panel > System and Maintenance > Power Options. |
| ❷ | Info button | <p>Launches Info Center, which provides shortcuts, such as the following:</p> <ul style="list-style-type: none"> ■ HP 3D DriveGuard—Controls settings for software that protects the hard drive by parking the drive when the computer is dropped or moved. ■ HP Software Setup—Installs preloaded applications to make them accessible to the user. |

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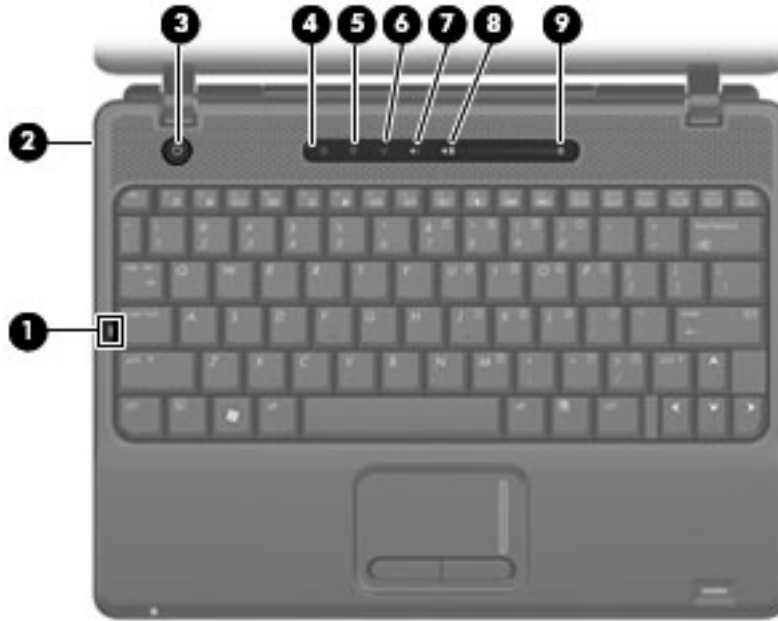
| Item | Component | Function |
|-------------|---------------------|---|
| ③ | Presentation button | Opens the Presentation Options window, where you can start a frequently used presentation, file, program, or Web site. You can also adjust display setting for optimum viewing. |
| ④ | Wireless button | Turns the wireless feature on or off, but does not establish a wireless connection.  You must set up or access a wireless network to establish a wireless connection. |
| ⑤ | Volume mute button | Mutes and restores speaker sound. |
| ⑥ | Volume down button | Decreases speaker volume. |
| ⑦ | Volume scroll zone | Adjusts speaker volume. Slide your finger to the left to decrease volume and to the right to increase volume. |
| ⑧ | Volume up button | Increases speaker volume. |
| ⑨ | Fingerprint reader | Allows a fingerprint logon to Windows, instead of a password logon. |

Keys



| Item | Component | Function |
|------|------------------------------|--|
| ❶ | esc key | Displays system information when pressed in combination with the fn key. |
| ❷ | fn key | Executes frequently used system functions when pressed in combination with a function key or the esc key. |
| ❸ | Windows logo key | Displays the Windows Start menu. |
| ❹ | Windows applications key | Displays a shortcut menu for items beneath the pointer. |
| ❺ | Embedded numeric keypad keys | Can be used like the keys on an external numeric keypad. |
| ❻ | Function keys | Execute frequently used system functions when pressed in combination with the fn key. |

Lights



| Item | Component | Function |
|------|--|--|
| ❶ | Caps lock light | On: Caps lock is on. |
| ❷ | Battery light (beside power connector) | <ul style="list-style-type: none"> ■ Amber: A battery is charging. ■ Green: A battery is close to full charge capacity. ■ Blinking amber: A battery that is the only available power source has reached a low battery level. When the battery reaches a critical battery level, the battery light begins blinking rapidly. ■ Off: If the computer is plugged into an external power source, the light turns off when all batteries in the computer are fully charged. If the computer is not plugged into an external power source, the light stays off until the battery reaches a low battery level. |
| ❸ | Power light | <ul style="list-style-type: none"> ■ On: The computer is on. ■ Blinking: The computer is in the Sleep state. ■ Blinking rapidly: An AC adapter with a higher power rating should be connected. ■ Off: The computer is off or in Hibernation. |
| ❹ | Info button light | <ul style="list-style-type: none"> ■ On: The Info Center is launched. |
| ❺ | Presentation button light | <ul style="list-style-type: none"> ■ On: Presentation Options is on. |
| ❻ | Wireless light | <ul style="list-style-type: none"> ■ Blue: An integrated wireless device, such as a wireless local area network (WLAN) device, an HP Mobile Broadband Module, and/or a Bluetooth® device, is on. ■ Amber: All wireless devices are off. |
| ❼ | Volume mute light | <ul style="list-style-type: none"> ■ Off: Computer sound is on. ■ On: Computer sound is off. |
| ❽ | Volume down light | Blinking: The volume scroll zone is being used to decrease speaker volume. |
| ❾ | Volume up | Blinking: The volume scroll zone is being used to increase speaker volume. |

Front components



| Item | Component | Function |
|------|----------------------------|---|
| ❶ | Drive light | <ul style="list-style-type: none"> ■ Blinking green: The hard drive or optical drive is being accessed. ■ Amber (select models only): HP 3D DriveGuard has temporarily parked the hard drive. |
| ❷ | Audio-in (microphone) jack | Connects an optional computer headset microphone, stereo array microphone, or monaural microphone. |
| ❸ | Audio-out (headphone) jack | Produces sound when connected to optional powered stereo speakers, headphones, ear buds, a headset, or television audio. |



Left-side components



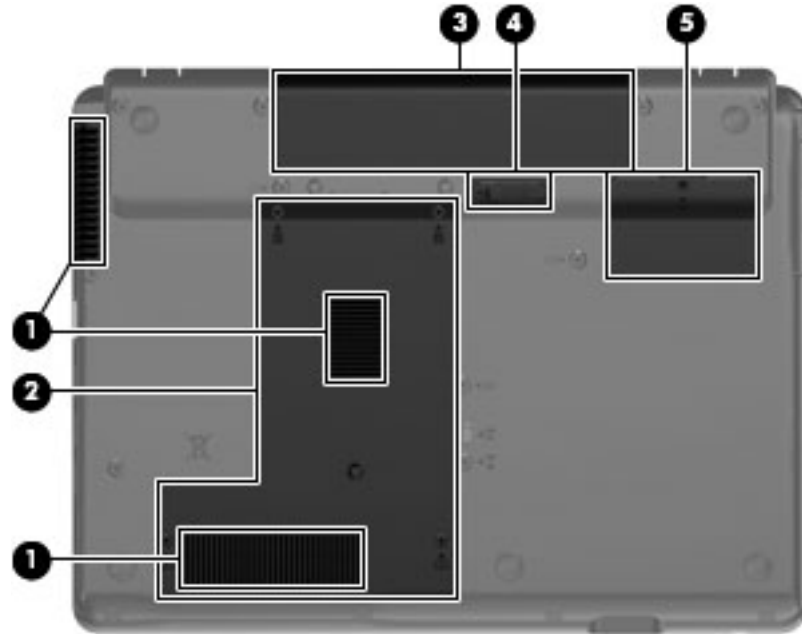
| Item | Component | Function |
|------|----------------------|--|
| ❶ | Battery light | <ul style="list-style-type: none"> ■ Amber: A battery is charging. ■ Turquoise: A battery is close to full charge capacity. ■ Blinking amber: A battery that is the only available power source has reached a low battery level. When the battery reaches a critical battery level, the battery light begins blinking rapidly. ■ Off: If the computer is plugged into an external power source, the light turns off when all batteries in the computer are fully charged. If the computer is not plugged into an external power source, the light stays off until the battery reaches a low battery level. |
| ❷ | Power connector | Connects an AC adapter. |
| ❸ | RJ-45 (network) jack | Connects a network cable. |
| ❹ | RJ-11 (modem) jack | Connects a modem cable. |
| ❺ | USB port | Connects an optional USB device. |
| ❻ | Optical drive | Reads optical discs and, on select models, also writes to optical discs. |



Right-side components



| Item | Component | Function |
|------|--|---|
| ❶ | ExpressCard slot | Supports optional ExpressCard/34 cards. |
| ❷ | Memory Card Reader (select models only) | Supports the following optional digital card formats: <ul style="list-style-type: none"> ■ MultiMediaCard ■ MultiMediaCard Plus ■ Secure Digital Memory Card ■ Secure Digital High Capacity Memory Card |
| ❸ | HDMI port (select models only) | Connects an optional video or audio device, such as a high-definition television or any compatible digital or audio component. |
| ❹ | USB ports (2) | Connects an optional USB device. |
| ❺ | External monitor port | Connects an external VGA monitor or projector. |
| ❻ | Vent | Enables airflow to cool internal components. <ul style="list-style-type: none">  The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation. |
| ❼ | Security cable slot | Attaches an optional security cable to the computer. <ul style="list-style-type: none">  The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen. |

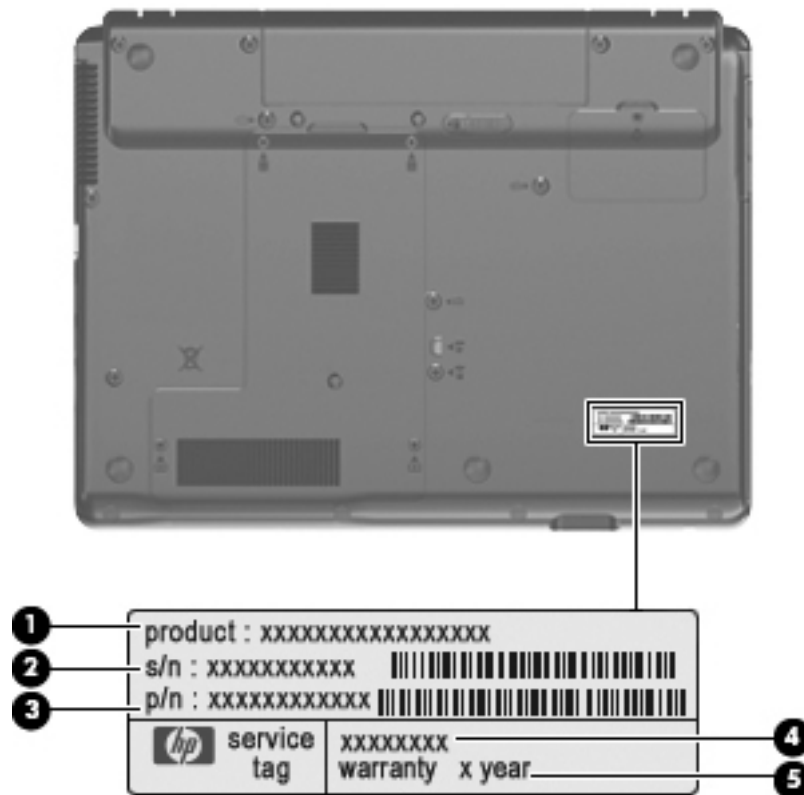
Bottom components



| Item | Component | Function |
|------|-----------------------------|---|
| ❶ | Vents (3) | Enables airflow to cool internal components. <p> The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.</p> |
| ❷ | Hard drive bay | Holds the hard drive and two memory module slots. |
| ❸ | Battery bay | Holds the battery. |
| ❹ | Battery release latch | Releases the battery from the battery bay. |
| ❺ | Wireless module compartment | Contains a WLAN module slot. <p> To prevent an unresponsive system, use only a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you install the module and then receive a warning message, remove the module to restore computer functionality, and then contact technical support through Help and Support.</p> |

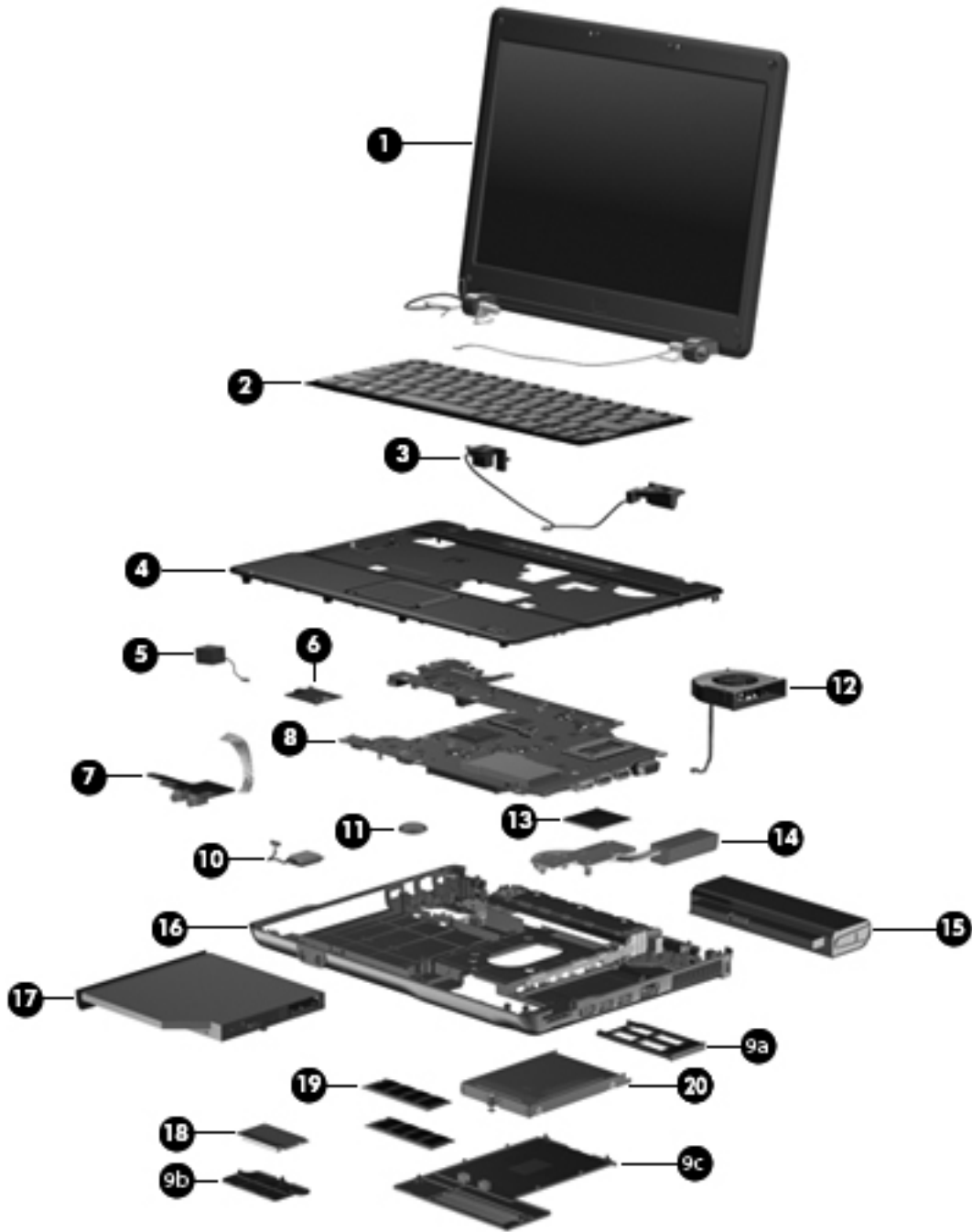
Serial number location

When ordering parts or requesting information, provide the computer serial number and model number located on the bottom of the computer. The service tag provides the following information.






| Item | Component | Description |
|------|----------------------------------|--|
| ❶ | Product name | This is the product name affixed to the front of the computer. |
| ❷ | Serial number (s/n) | This is an alphanumeric identifier that is unique to each product. |
| ❸ | Part number/Product number (p/n) | This number provides specific information about the product's hardware components. The part number helps a service technician to determine what components and parts are needed. |
| ❹ | Model description | This is the number used to locate documents, drivers, and support for the computer. |
| ❺ | Warranty period | This number describes the duration of the warranty period for the computer. |

Computer major components



| Item | Description | Spare Part Number |
|-------------|---|--------------------------|
| (1) | Display assembly (include 2 WLAN antenna transceivers and cables, nameplate, and logo) | |
| | 12.1-inch, WXGA display assembly | 493186-001 |
| | 12.1-inch, WXGA display assembly with integrated webcam | 501932-001 |
| | 12.1-inch, WXGA BrightView display assembly | 493187-001 |
| | 12.1-inch, WXGA BrightView display assembly with integrated webcam | 501933-001 |
| | Display internal components: | |
| | Webcam with cable | 492159-001 |
| | Display bezel | 495015-001 |
| | Display bezel with webcam | 501934-001 |
| | Display inverter | 493193-001 |
| | Display hinges | 493192-001 |
| | Display hinge covers | 495016-001 |
| | Display cables (includes display, microphone, and antenna cables) | 493189-001 |
| | Display nameplate | 493191-001 |
| | Display enclosure | 493188-001 |
| | Display Miscellaneous Kit (includes rubber feet, screw covers, and hinge cover) | 493190-001 |
| (2) | Keyboard (includes keyboard cable) | |
| | For use in Belgium | 493960-A41 |
| | For use in Canada | 493960-121 |
| | For use in the Czech Republic | 493690-221 |
| | For use in Denmark | 493960-081 |
| | For use in France | 493960-051 |
| | For use in Greece | 493960-DJ1 |
| | For use in Germany | 493960-041 |
| | For use in Hungary | 493960-211 |
| | For use in Iceland | 493960-DD1 |
| | For international use | 493960-B31 |
| | For use in Italy | 493960-061 |
| | For use in Israel | 493960-BB1 |
| | For use in Japan | 493960-291 |
| | For use in Latin America | 493960-161 |
| | For use in Norway | 493960-091 |
| | For use in Portugal | 493960-131 |
| | For use in Russia | 493960-251 |
| | For use in Saudi Arabia | 493960-171 |
| | For use in Slovakia | 493960-231 |
| | For use in Slovenia | 493960-BA1 |
| | For use in Spain | 493960-071 |
| | For use in Sweden and Finland | 493960-B71 |

(Continued)

| Item | Description | Spare Part Number |
|------|---|-------------------|
| | For use in Switzerland | 493960-BG1 |
| | For use in South Korea | 493960-AD1 |
| | For use in Taiwan | 493960-AB1 |
| | For use in Thailand | 493960-281 |
| | For use in Turkey | 493960-141 |
| | For use in the United Kingdom | 493960-031 |
| | For use in the United States | 493960-001 |
| (3) | Speaker assembly | 493273-001 |
| (4) | Top cover (includes TouchPad and cable, LED board and cable, and switch cover) | 493278-001 |
| (5) | Modem module cable (includes RJ-11 jack) | |
| |  The modem module cable is included in the Cable Kit, spare part number 493275-001. See “Cable Kit” on page 3-8 for more Cable Kit information. | |
| (6) | Modem module | |
| |  The modem module spare part kit does not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 493275-001. See “Cable Kit” on page 3-8 for more Cable Kit information. | |
| | For use in Australia and New Zealand | 461749-011 |
| | For use in all countries or regions except Australia and New Zealand | 461749-001 |
| (7) | Audio board | 493272-001 |
| (8) | System board | |
| | GM45 (includes RTC battery and replacement thermal material) | 493185-001 |
| | GL40 (includes RTC battery and replacement thermal material) | 504446-001 |
| | Plastics Kit (see “Plastics Kit” on page 3-9 for more Plastics Kit spare part information) | 493274-001 |
| (9a) | ExpressCard slot bezel | |
| (9b) | WLAN module compartment cover | |
| (9c) | Hard drive compartment cover | |
| (10) | Bluetooth module | 398393-002 |
| |  The Bluetooth module spare part kit does not include a Bluetooth module cable. The Bluetooth module cable is included in the Cable Kit, spare part number 493275-001. See “Cable Kit” on page 3-8 for more Cable Kit information. | |
| (11) | RTC battery | 449137-001 |
| (12) | Fan | 493269-001 |

(Continued)

| Item | Description | Spare Part Number |
|------|--|-------------------|
| (13) | Processor (includes replacement thermal material) | |
| | Intel Core2 Duo processors (6-MB L2 cache, 1066-MHz FSB): | |
| | ■ T9600 2.8-GHz processor | 486257-001 |
| | ■ T9400 2.53-GHz processor | 486256-001 |
| | ■ P9500 2.53-GHz processor | 496458-001 |
| | Intel Core2 Duo processors (3-MB L2 cache, 1066-MHz FSB): | |
| | ■ P8700 2.53-GHz processor | 512585-001 |
| | ■ P8600 2.4-GHz processor | 486255-001 |
| | ■ P8400 2.26-GHz processor | 486254-001 |
| | ■ P7370 2.0-GHz processor (for use with Intel WLAN only) | 507966-001 |
| | Intel Core Duo processors (2-MB L2 cache, 800-MHz FSB): | |
| | ■ P5870 2.0-GHz processor | 500771-001 |
| | ■ P5670 1.8-GHz processor | 500770-001 |
| | Intel Core Duo processors (1-MB L2 cache, 667-MHz FSB): | |
| | ■ T3400 2.16-GHz processor | 509061-001 |
| | ■ T3200 2.0-GHz processor | 509060-001 |
| | Intel Celeron-M processors (1-MB L2 cache, 667-MHz FSB): | |
| | ■ 585 2.16-GHz processor (for use with no WLAN support or Intel WLAN only) | 490337-001 |
| | ■ 575 2.0-GHz processor (for use with no WLAN support or Intel WLAN only) | 490336-001 |
| | Intel Celeron-T processor (1-MB L2 cache, 667-MHz FSB): | |
| | ■ T1700 1.83-GHz processor | 509059-001 |
| | ■ T1600 1.66-GHz processor | 509058-001 |
| (14) | Thermal module (includes heat sink and thermal material) | 493270-001 |
| (15) | Battery | |
| | 4-cell, 37-Wh | 493202-001 |
| | 8-cell, 73-Wh | 501935-001 |
| (16) | Base enclosure (includes rubber feet) | 493271-001 |
| | Rubber Kit (not illustrated, contains 5 computer feet) | 493276-001 |
| (17) | Optical drive (includes optical drive bezel and bracket) | |
| | DVD/CD-RW Combo Drive | 493200-001 |
| | DVD-ROM Drive | 493201-001 |
| | DVD±RW SuperMulti Double-Layer Drive with LightScribe | 493961-001 |
| | Blu-ray ROM DVD±RW SuperMulti DL Drive | 497536-001 |

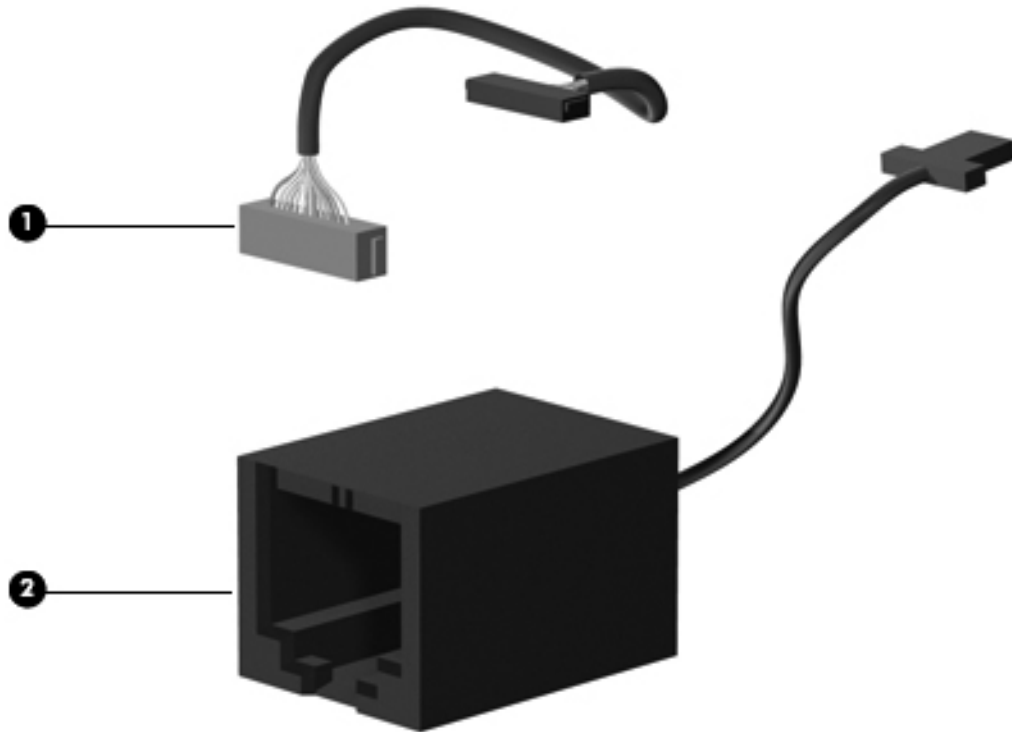
(Continued)

| Item | Description | Spare Part Number |
|------|---|-------------------|
| (18) | WLAN module | |
| | Broadcom 802.11a/b/g/n WLAN modules: | |
| | ■ For use in Canada, the Cayman Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and the United States | 487330-001 |
| | ■ For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome & Principe, Saudi Arabia, Senegal, Serbia and Montenegro, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts & Nevis, St. Lucia, St. Vincent & Grenada, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe | 487330-002 |
| | Broadcom 802.11b/g WLAN modules: | |
| | ■ For use in Canada, the Cayman Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and the United States | 459263-001 |
| | ■ For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome & Principe, Saudi Arabia, Senegal, Serbia and Montenegro, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts & Nevis, St. Lucia, St. Vincent & Grenada, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe | 459263-002 |

(Continued)

| Item | Description | Spare Part Number |
|-------------|--|--------------------------|
| | Intel 802.11a/b/g/n WLAN module: | |
| | ■ For use in Canada, the Cayman Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and the United States | 480985-001 |
| | Intel 802.11a/b/g WLAN module: | |
| | ■ For use in Pakistan, Russia, and Ukraine | 482957-001 |
| (19) | Memory modules | |
| | 2048-MB | 493195-001 |
| | 1024-MB | 493194-001 |
| (20) | Hard drive (includes hard drive bracket) | |
| | 320-GB, 5400-rpm | 493199-001 |
| | 250-GB, 5400-rpm | 493198-001 |
| | 160-GB, 7200-rpm | 513695-001 |
| | 160-GB, 5400-rpm | 493197-001 |
| | 120-GB, 5400-rpm | 493196-001 |
| | Cable Kit (not illustrated) | 493275-001 |

Cable Kit



| Item | Description | Spare part number |
|------|--|-------------------|
| | Cable Kit: | 493275-001 |
| ❶ | Bluetooth module cable | |
| ❷ | Modem module cable (includes RJ-11 jack) | |

Plastics Kit



| Item | Description | Spare part number |
|----------------------|---|-------------------|
| Plastics Kit: | | 493274-001 |
| ❶ | Hard drive compartment cover (includes one captive screw, secured by a C-clip) | |
| ❷ | Wireless module compartment cover (includes one captive screw, secured by a C-clip) | |
| ❸ | ExpressCard slot bezel | |
| ❹ | SD card bezel | |
| ❺ | Base enclosure screw covers (4 covers, 2 sizes) | |

Mass storage devices




| Item | Description | Spare part number |
|------|---|-------------------|
| ① | Optical drive (includes bezel) | |
| | 320-GB, 5400-rpm | 493199-001 |
| | 250-GB, 5400-rpm | 493198-001 |
| | 160-GB, 7200-rpm | 513695-001 |
| | 160-GB, 5400-rpm | 493197-001 |
| | 120-GB, 5400-rpm | 493196-001 |
| ② | Hard drive (includes bracket) | |
| | DVD/CD-RW Combo Drive | 493200-001 |
| | DVD-ROM Drive | 493201-001 |
| | DVD±RW SuperMulti Double-Layer Drive with LightScribe | 493961-001 |
| | Blu-ray ROM DVD±RW SuperMulti DL Drive | 497536-001 |

Miscellaneous parts

| Description | Spare part number |
|---|-------------------|
| 65-W AC adapter | 463958-001 |
| Power cords: | |
| For use in Argentina | 490371-D01 |
| For use in Denmark | 490371-081 |
| For use in Europe | 490371-021 |
| For use in Israel | 490371-BB1 |
| For use in North America | 490371-001 |
| For use in the United Kingdom and Singapore | 490371-031 |
| For use in the People's Republic of China | 490371-AA1 |
| For use in Australia | 490371-011 |
| For use in India | 490371-D61 |
| For use in Italy | 490371-061 |
| For use in Japan | 490371-291 |
| For use in South Africa | 490371-AR1 |
| For use in South Korea | 490371-AD1 |
| For use in Switzerland | 490371-111 |
| For use in Taiwan | 490371-AB1 |
| Screw Kit | 493277-001 |
| ■ Torx T8M2.5x6.0 screw (14) | |
| ■ Phillips M2.0x4.0 screw (5) | |
| ■ Phillips M2.5x5.0 screw (7) | |
| ■ Phillips M2.0x3.0 screw (3) | |
| ■ Phillips M2.5x2.5 screw (4) | |
| ■ Phillips M2.0x2.0 screw (3) | |

Sequential part number listing

| Spare part number | Description |
|-------------------|--|
| 398393-002 | Bluetooth module  The Bluetooth module spare part kit does not include a Bluetooth module cable. The Bluetooth module cable is included in the Cable Kit, spare part number 493275-001. |
| 449137-001 | RTC battery |
| 459263-001 | Broadcom 802.11a/b/g WLAN module for use in Canada, the Cayman Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and the United States |
| 459263-002 | Broadcom 802.11a/b/g WLAN module for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome & Principe, Saudi Arabia, Senegal, Serbia and Montenegro, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts & Nevis, St. Lucia, St. Vincent & Grenada, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe |
| 461749-001 | Modem module for use in all countries or regions except Australia and New Zealand |
| 461749-011 | Modem module for use in Australia and New Zealand |
| 463958-001 | 65-W AC adapter |
| 480985-001 | Intel 802.11a/b/g WLAN modules for use in Canada, the Cayman Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and the United States |
| 482957-001 | Intel 802.11a/b/g WLAN module for use in Pakistan, Russia, and Ukraine |
| 486254-001 | Intel Core2 Duo processor (3-MB L2 cache, 1066-MHz FSB), P8400 2.26-GHz (includes replacement thermal material) |
| 486255-001 | Intel Core2 Duo processor (3-MB L2 cache, 1066-MHz FSB), P8600 2.4-GHz (includes replacement thermal material) |
| 486256-001 | Intel Core2 Duo processor (6-MB L2 cache, 1066-MHz FSB), T9400 2.53-GHz (includes replacement thermal material) |
| 486257-001 | Intel Core2 Duo processor (6-MB L2 cache, 1066-MHz FSB), T9600 2.8-GHz (includes replacement thermal material) |
| 487330-001 | Intel 802.11a/b/g/n WLAN module for use in Canada, the Cayman Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and the United States |

(Continued)

| Spare part number | Description |
|-------------------|---|
| 487330-002 | Intel 802.11a/b/g/n WLAN module for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome & Principe, Saudi Arabia, Senegal, Serbia and Montenegro, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts & Nevis, St. Lucia, St. Vincent & Grenada, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe |
| 490336-001 | Intel Celeron-M processor (1-MB L2 cache, 667-MHz FSB), 575 2.0-GHz (includes replacement thermal material) |
| 490337-001 | Intel Celeron-M processor (1-MB L2 cache, 667-MHz FSB), 585 2.16-GHz (includes replacement thermal material) |
| 490371-001 | Power cord for use in North America |
| 490371-011 | Power cord for use in Australia |
| 490371-021 | Power cord for use in Europe |
| 490371-031 | Power cord for use in the United Kingdom and Singapore |
| 490371-061 | Power cord for use in Italy |
| 490371-081 | Power cord for use in Denmark |
| 490371-111 | Power cord for use in Switzerland |
| 490371-291 | Power cord for use in Japan |
| 490371-AA1 | Power cord for use in the People's Republic of China |
| 490371-AB1 | Power cord for use in Taiwan |
| 490371-AD1 | Power cord for use in South Korea |
| 490371-AR1 | Power cord for use in South Africa |
| 490371-BB1 | Power cord for use in Israel |
| 490371-D01 | Power cord for use in Argentina |
| 490371-D61 | Power cord for use in India |
| 492159-001 | Webcam with cable |
| 493185-001 | System board, GM45 (includes RTC battery and replacement thermal material) |
| 493186-001 | 12.1-inch, WXGA display assembly |
| 493187-001 | 12.1-inch, WXGA BrightView display assembly |
| 493188-001 | Display enclosure |

(Continued)

| Spare part number | Description |
|--------------------------|--|
| 493189-001 | Display cables (includes display, microphone, and antenna cables) |
| 493190-001 | Display Miscellaneous Kit (includes rubber feet, screw covers, and hinge cover) |
| 493191-001 | Display nameplate |
| 493192-001 | Display hinges |
| 493193-001 | Display inverter |
| 493194-001 | Memory module, 1024-MB |
| 493195-001 | Memory module, 2048-MB |
| 493196-001 | Hard drive, 120-GB, 5400-rpm |
| 493197-001 | Hard drive, 160-GB, 5400-rpm |
| 493198-001 | Hard drive, 250-GB, 5400-rpm |
| 493199-001 | Hard drive, 320-GB, 5400-rpm |
| 493200-001 | DVD/CD-RW Combo Drive (includes drive bezel and bracket) |
| 493201-001 | DVD-ROM Drive (includes drive bezel and bracket) |
| 493202-001 | Battery, 4-cell, 37-Wh |
| 493269-001 | Fan |
| 493270-001 | Thermal module (includes heat sink and thermal material) |
| 493271-001 | Base enclosure (includes rubber feet) |
| 493272-001 | Audio board |
| 493273-001 | Speaker assembly |
| 493274-001 | Plastics Kit (see “Plastics Kit” on page 3-9 for more Plastics Kit spare part information) |
| 493275-001 | Cable Kit (see “Cable Kit” on page 3-8 for more Cable Kit information) |
| 493276-001 | Rubber Kit (contains 5 computer feet) |
| 493277-001 | Screw Kit |
| 493278-001 | Top cover (includes TouchPad and cable, LED board and cable, and switch cover) |
| 493960-001 | Keyboard for use in the United States |
| 493960-031 | Keyboard for use in the United Kingdom |
| 493960-041 | Keyboard for use in Germany |
| 493960-051 | Keyboard for use in France |
| 493960-061 | Keyboard for use in Italy |
| 493960-071 | Keyboard for use in Spain |
| 493960-081 | Keyboard for use in Denmark |
| 493960-091 | Keyboard for use in Norway |
| 493960-121 | Keyboard for use in Canada |
| 493960-131 | Keyboard for use in Portugal |
| 493960-141 | Keyboard for use in Turkey |
| 493960-161 | Keyboard for use in Latin America |
| 493960-171 | Keyboard for use in Saudi Arabia |
| 493960-211 | Keyboard for use in Hungary |

(Continued)

| Spare part number | Description |
|--------------------------|---|
| 493960-221 | Keyboard for use in the Czech Republic |
| 493960-231 | Keyboard for use in Slovakia |
| 493960-251 | Keyboard for use in Russia |
| 493960-281 | Keyboard for use in Thailand |
| 493960-291 | Keyboard for use in Japan |
| 493960-A41 | Keyboard for use in Belgium |
| 493960-AB1 | Keyboard for use in Taiwan |
| 493960-AD1 | Keyboard for use in South Korea |
| 493960-B31 | Keyboard for international use |
| 493960-B71 | Keyboard for use in Sweden and Finland |
| 493960-BA1 | Keyboard for use in Slovenia |
| 493960-BB1 | Keyboard for use in Israel |
| 493960-BG1 | Keyboard for use in Switzerland |
| 493960-DD1 | Keyboard for use in Iceland |
| 493960-DJ1 | Keyboard for use in Greece |
| 493961-001 | DVD±RW SuperMulti Double-Layer Drive with LightScribe (includes drive bezel and bracket) |
| 495015-001 | Display bezel |
| 495016-001 | Display hinge covers |
| 496458-001 | Intel Core2 Duo processor (6-MB L2 cache, 1066-MHz FSB), P9500 2.53-GHz (includes replacement thermal material) |
| 497536-001 | Blu-ray ROM DVD±RW SuperMulti DL Drive (includes drive bezel and bracket) |
| 500770-001 | Intel Core Duo processor (2-MB L2 cache, 800-MHz FSB), P5670 1.8-GHz (includes replacement thermal material) |
| 500771-001 | Intel Core Duo processor (2-MB L2 cache, 800-MHz FSB), P5870 2.0-GHz (includes replacement thermal material) |
| 501932-001 | 12.1-inch, WXGA display assembly with integrated webcam |
| 501933-001 | 12.1-inch, WXGA BrightView display assembly with integrated webcam |
| 501934-001 | Display bezel with webcam |
| 501935-001 | Battery, 8-cell, 73-Wh |
| 504446-001 | System board, GL40 (includes RTC battery and replacement thermal material) |
| 507966-001 | Intel Core2 Duo processor (3-MB L2 cache, 1066-MHz FSB), P7370 2.0-GHz (includes replacement thermal material) |
| 509058-001 | Intel Celeron-T processor (1-MB L2 cache, 667-MHz FSB), T1600 1.66-GHz (includes replacement thermal material) |
| 509059-001 | Intel Celeron-T processor (1-MB L2 cache, 667-MHz FSB), T1700 1.83-GHz (includes replacement thermal material) |
| 509060-001 | Intel Core Duo processor (1-MB L2 cache, 667-MHz FSB), T3200 2.0-GHz (includes replacement thermal material) |
| 509061-001 | Intel Core Duo processor (1-MB L2 cache, 667-MHz FSB), T3400 2.16-GHz (includes replacement thermal material) |
| 512585-001 | Intel Core2 Duo processor (3-MB L2 cache, 1066-MHz FSB), P8700 2.53-GHz (includes replacement thermal material) |
| 513695-001 | Hard drive, 160-GB, 7200-rpm |

Removal and replacement procedures

Preliminary replacement requirements

Tools required

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

- Flat-bladed screwdriver
- Magnetic screwdriver
- Phillips P0 and P1 screwdrivers
- Torx T8 screwdriver

Service considerations

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



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

Plastic parts



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

Cables and connectors



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

Cables must be handled with extreme care to avoid damage. Apply only the tension required to unseat or seat the cables during removal and insertion. Handle cables by the connector whenever possible. In all cases, avoid bending, twisting, or tearing cables. Be sure 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.

Drive handling



CAUTION: Drives are fragile components that must be handled with care. To prevent damage to the computer, damage to a drive, or loss of information, observe these precautions:

- Before removing or inserting a hard drive, shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
- Before handling a drive, be sure that you are discharged of static electricity. While handling a drive, avoid touching the connector.
- Before removing a diskette drive or optical drive, be sure that a diskette or disc is not in the drive and be sure that the optical drive tray is closed.
- Handle drives on surfaces covered with at least one inch of shock-proof foam.
- Avoid dropping drives from any height onto any surface.
- After removing a hard drive, an optical drive, or a diskette drive, place it in a static-proof bag.
- Avoid exposing a hard drive to products that have magnetic fields, such as monitors or speakers.
- Avoid exposing a drive to temperature extremes or liquids.
- If a drive must be mailed, place the drive in a bubble pack mailer or other suitable form of protective packaging and label the package "FRAGILE."

Grounding guidelines

Electrostatic discharge damage

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, ESD contains enough power to alter device parameters or melt silicon junctions.

A discharge of static electricity from a finger or other conductor can destroy static-sensitive devices or microcircuitry. Even if the spark is neither felt nor heard, damage may have occurred.

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



CAUTION: To prevent damage to the computer when you are removing or installing internal components, observe these precautions:

- Keep components in their electrostatic-safe containers until you are ready to install them.
- Use nonmagnetic tools.
- Before touching an electronic component, discharge static electricity by using the guidelines described in this section.
- Avoid touching pins, leads, and circuitry. Handle electronic components as little as possible.
- If you remove a component, place it in an electrostatic-safe container.

The following table shows how humidity affects the electrostatic voltage levels generated by different activities.



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

| 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 |

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe tubes, bags, or boxes.
- Protect ESD-sensitive parts and assemblies with conductive or approved containers or packaging.
- Keep ESD-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 component or assembly.
- Store reusable ESD-sensitive parts from assemblies in protective packaging or nonconductive foam.
- Use transporters and conveyors made of antistatic belts and roller bushings. Be sure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

Workstation guidelines

Follow these grounding workstation guidelines:

- Cover the workstation with approved static-shielding material.
- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.
- Use conductive field service tools, such as cutters, screwdrivers, and vacuums.
- When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and Styrofoam.
- Handle ESD-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.

Equipment guidelines

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.

The following grounding equipment is recommended to prevent electrostatic damage:

- 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

The following table lists the shielding protection provided by antistatic bags and floor mats.

| 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 |

Unknown user password

If the computer you are servicing has an unknown user password, follow these steps to clear the password:



These steps also clear CMOS.

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [“Battery” on page 4-7](#)).
5. Remove the real-time clock (RTC) battery (see [“RTC battery” on page 4-36](#)).
6. Wait approximately 5 minutes.
7. Replace the RTC battery and reassemble the computer.

8. Connect AC power to the computer. Do not reinsert any batteries at this time.
9. Turn on the computer.

All passwords and all CMOS settings have been cleared.

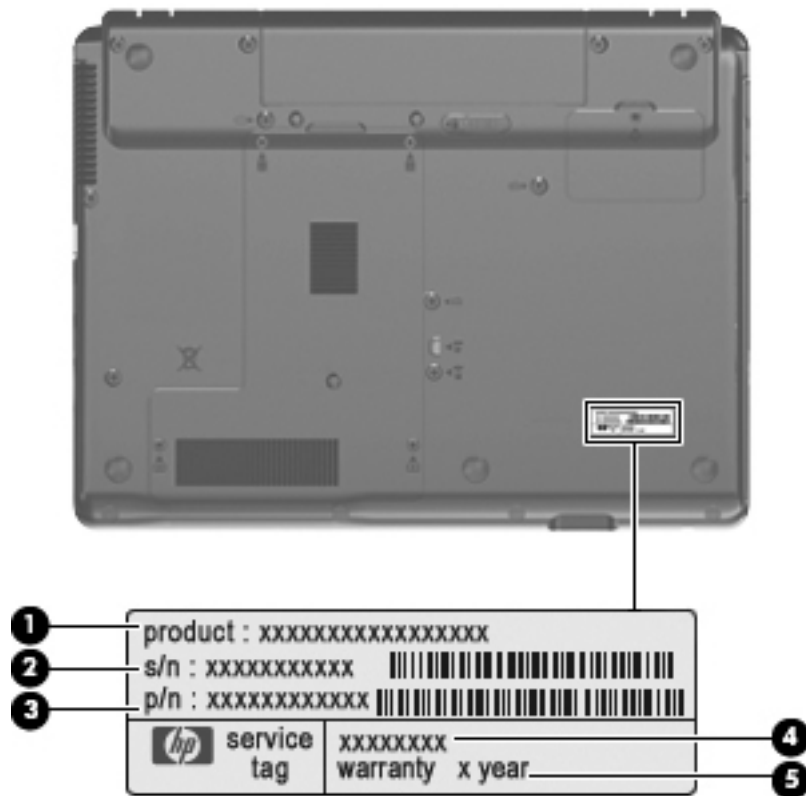
Component replacement procedures

This chapter provides removal and replacement procedures.

There are as many as 71 screws, in 14 different sizes, that must be removed, replaced, or loosened when servicing the computer. Make special note of each screw size and location during removal and replacement.

Serial number

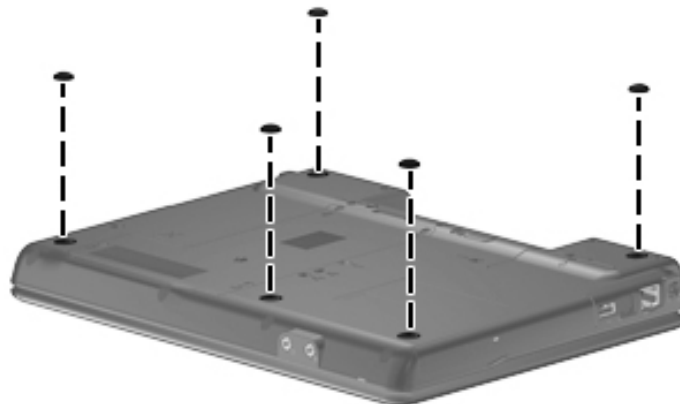
When ordering parts or requesting information, provide the computer serial number and model description provided on the service tag.



| Item | Component | Description |
|------|----------------------------------|--|
| ① | Product name | This is the product name affixed to the front of the computer. |
| ② | Serial number (s/n) | This is an alphanumeric identifier that is unique to each product. |
| ③ | Part number/Product number (p/n) | This number provides specific information about the product's hardware components. The part number helps a service technician to determine what components and parts are needed. |
| ④ | Model description | This is the number used to locate documents, drivers, and support for the computer. |
| ⑤ | Warranty period | This number describes the duration of the warranty period for the computer. |

Computer feet

The computer feet are adhesive-backed rubber pads. The feet are included in the Plastics Kit, spare part number 493274-001. There are 5 rubber feet that attach to the base enclosure in the locations illustrated below.



Battery

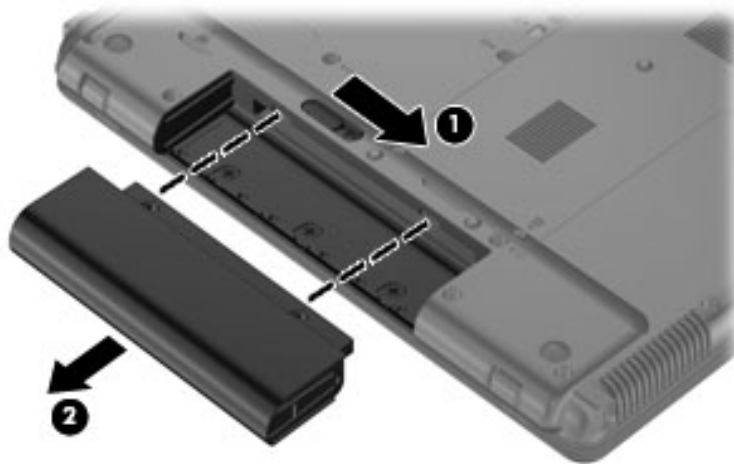
| Description | Spare part number |
|----------------------|-------------------|
| 4-cell, 37-Wh Li-ion | 493202-001 |
| 8-cell, 73-Wh Li-ion | 501935-001 |

Before disassembling the computer, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

Remove the battery:

1. Turn the computer upside down on a flat surface, with the battery bay toward you.
2. Slide the battery release latch **1** to release the battery.
3. Remove the battery **2** from the computer.



Install the battery by inserting it into the battery bay until you hear a click.

Hard drive



The hard drive spare part kit includes a hard drive bracket.

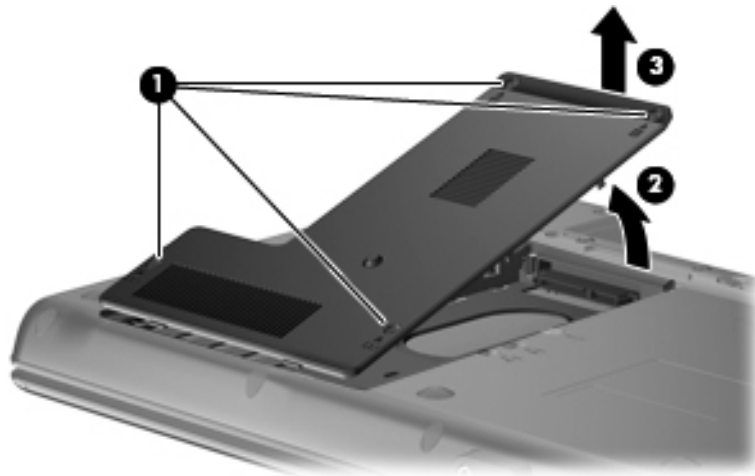
| Description | Spare part number |
|------------------|-------------------|
| 320-GB, 5400-rpm | 493199-001 |
| 250-GB, 5400-rpm | 493198-001 |
| 160-GB, 7200-rpm | 513695-001 |
| 160-GB, 5400-rpm | 493197-001 |
| 120-GB, 5400-rpm | 493196-001 |

Before removing the hard drive, follow these steps:

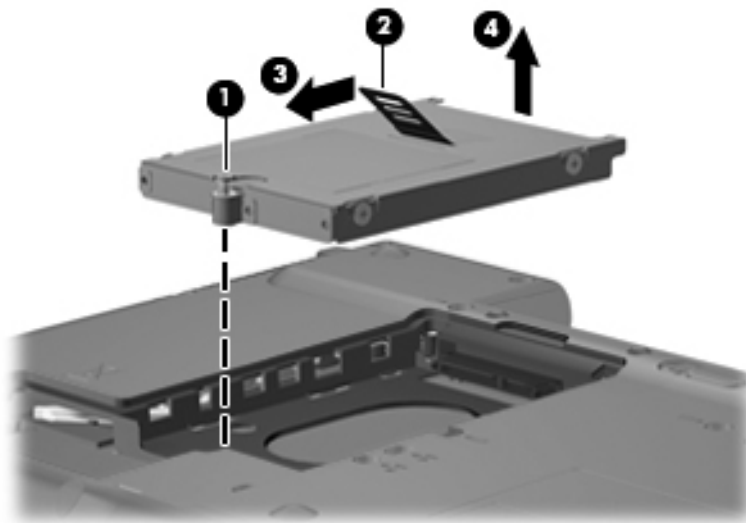
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [“Battery” on page 4-7](#)).

Remove the hard drive:

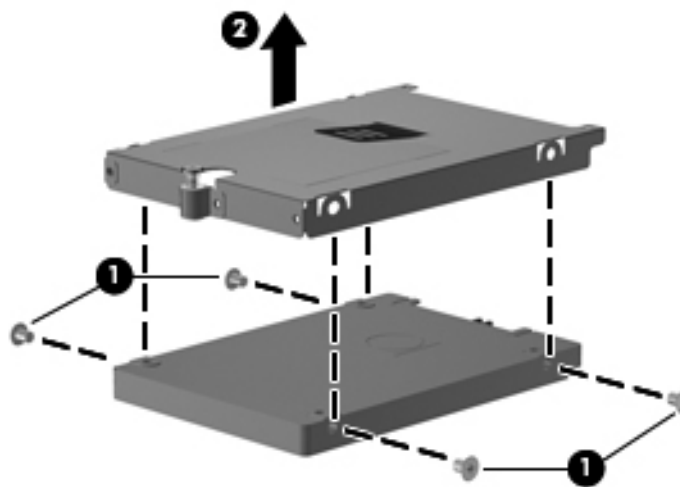
1. Position the computer with the front toward you.
2. Loosen the four Phillips PM2.0×5.0 captive screws ❶ that secure the hard drive cover to the computer.
3. Place your finger in the tab area ❷ on the rear edge of the hard drive cover and lift it up and forward ❸ to remove the cover. The hard drive cover is included in the Plastics Kit, spare part number 493274-001.



4. Loosen the Phillips PM2.5×10.0 captive screw ❶ that secures the hard drive to the computer.
5. Grasp the Mylar tab ❷ on the hard drive and slide the hard drive ❸ away from the hard drive connector.
6. Remove the hard drive ❹ from the hard drive bay.



7. If it is necessary to replace the hard drive bracket
 - a. Remove the two Phillips PM3.0×3.0 hard drive bracket screws ❶ from each side of the hard drive.
 - b. Lift the bracket ❷ straight up to remove it from the hard drive.



Reverse this procedure to reassemble and install the hard drive.

Memory module

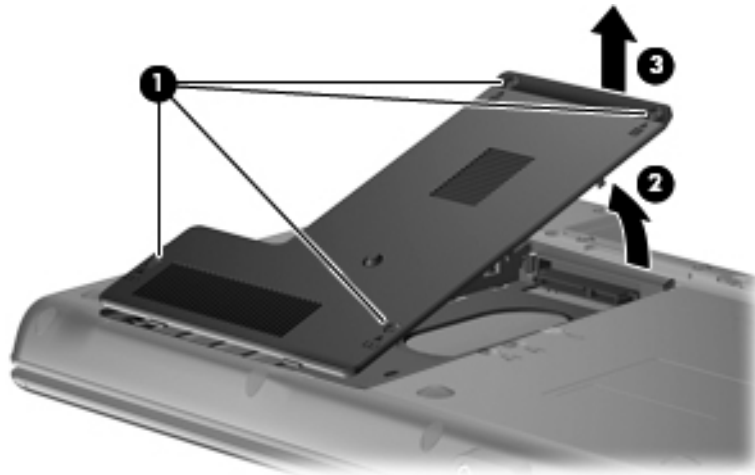
| Description | Spare part number |
|-----------------------------------|-------------------|
| 2048-MB (PC2-5300, 667-MHz, DDR2) | 493195-001 |
| 1024-MB (PC2-5300, 667-MHz, DDR2) | 493194-001 |

Before removing the memory module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see “Battery” on page 4-7).

Remove the memory module:

1. Position the computer with the front toward you.
2. Loosen the four Phillips PM2.0×5.0 captive screws ❶ that secure the cover to the computer.
3. Place your finger in the tab area ❷ on the rear edge of the hard drive cover and lift it up and forward ❸ to remove the cover. The memory module cover is included in the Plastics Kit, spare part number 493274-001.



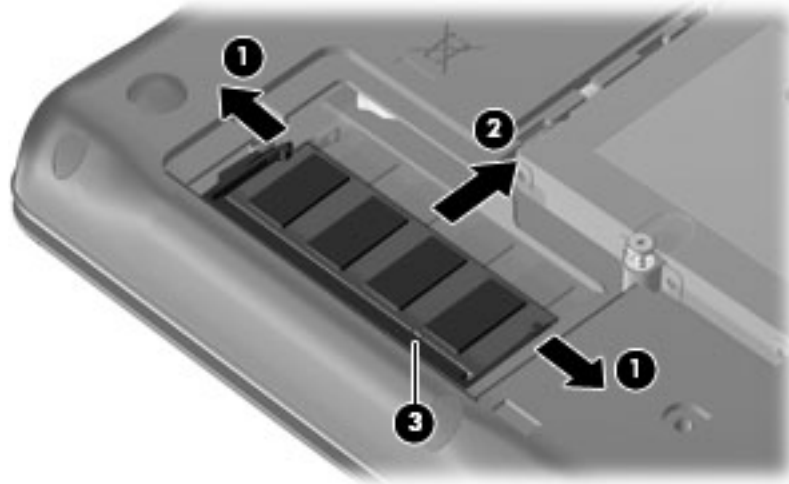


The top memory module slot is for extension memory and the bottom slot is for primary memory.

4. Spread the retaining tabs **1** on each side of the memory module to release the memory module. (The edge of the module opposite the slot rises away from the computer.)
5. Remove the memory module **2** by pulling the module away from the slot at an angle.



Memory modules are designed with a notch **3** to prevent incorrect insertion into the memory module slot.



Reverse this procedure to install a memory module.

WLAN module



CAUTION: The WLAN module and the WWAN module are not interchangeable.

| Description | Spare part number |
|---|-------------------|
| Broadcom 802.11a/b/g/n WLAN modules: | |
| ■ For use in Canada, the Cayman Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and the United States | 487330-001 |
| ■ For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome & Principe, Saudi Arabia, Senegal, Serbia and Montenegro, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts & Nevis, St. Lucia, St. Vincent & Grenada, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe | 487330-002 |

(Continued)

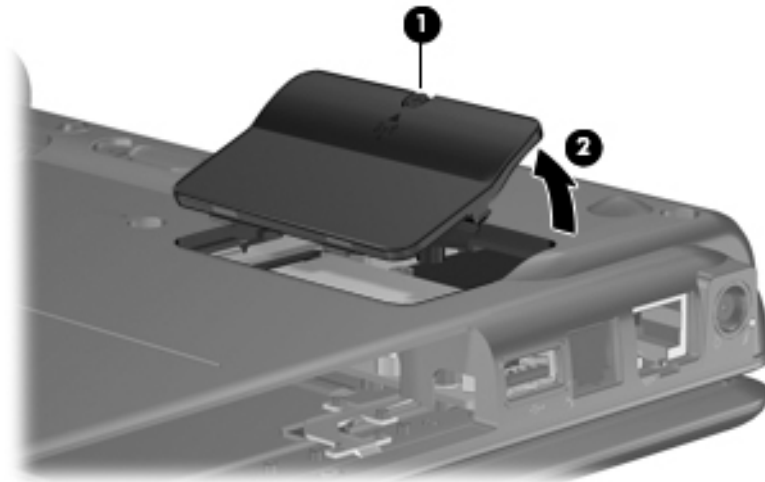
| Description | Spare part number |
|---|-------------------|
| Broadcom 802.11b/g WLAN modules: | |
| ■ For use in Canada, the Cayman Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and the United States | 459263-001 |
| ■ For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome & Principe, Saudi Arabia, Senegal, Serbia and Montenegro, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts & Nevis, St. Lucia, St. Vincent & Grenada, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe | 459263-002 |
| Intel 802.11a/b/g/n WLAN module: | |
| ■ For use in Canada, the Cayman Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and the United States | 480985-001 |
| Intel 802.11a/b/g WLAN module: | |
| ■ For use in Pakistan, Russia, and Ukraine | 482957-001 |

Before removing the WLAN module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [“Battery” on page 4-7](#)).

Remove the WLAN module:

1. Position the computer with the front toward you.
2. Loosen the Phillips PM2.0×5.0 captive screw ❶ that secures the WLAN module compartment cover to the computer. The screw is identified by the wireless icon.
3. Lift the right side of the cover ❷ and remove the cover.



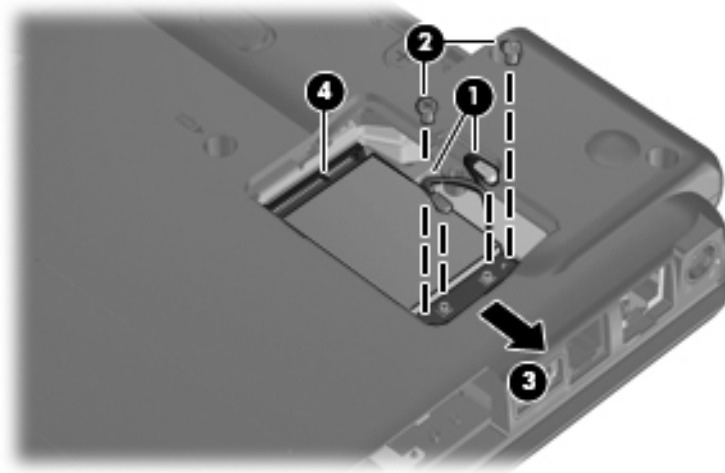
4. Disconnect the WLAN antenna cables ❶ from the terminals on the WLAN module.

✎ The black WLAN antenna cable is connected to the WLAN module “Main” terminal. The white WLAN antenna cable is connected to the WLAN module “Aux” terminal.

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

6. Remove the WLAN module ❸ by pulling the module away from the slot at an angle.

✎ WLAN modules are designed with a notch ❹ to prevent incorrect insertion.



Reverse this procedure to install the WLAN module.

Optical drive



The optical drive spare part kit includes an optical drive bezel.

| Description | Spare part number |
|---|-------------------|
| DVD/CD-RW Combo Drive | 493200-001 |
| DVD-ROM Drive | 493201-001 |
| DVD±RW SuperMulti Double-Layer Drive with LightScribe | 493961-001 |
| Blu-ray ROM DVD±RW SuperMulti DL Drive | 497536-001 |

Before removing the optical drive, follow these steps:

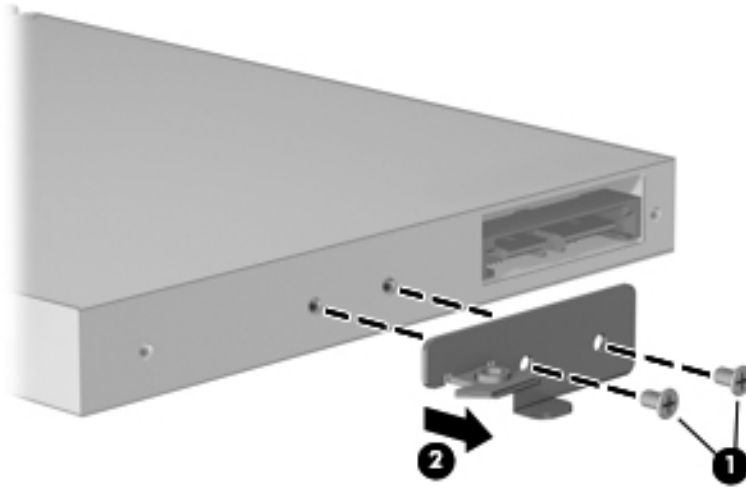
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [“Battery” on page 4-7](#)).

Remove the optical drive:

1. Position the computer with the right side toward you.
2. Remove the Torx T8M2.5×6.0 slotted screw ❶ that secures the optical drive to the computer.
3. Insert a flat-bladed screwdriver or similar tool into the optical drive tab access ❷ and push the tab forward to release the optical drive from the computer.
4. Remove the optical drive ❸ from the computer.



5. If it is necessary to replace the optical drive bracket:
 - a. Position the optical drive with the rear toward you.
 - b. Remove the two Phillips PM1.5×3.0 screws ❶ that secure the optical drive bracket to the optical drive.
 - c. Remove the optical drive bracket ❷.



Reverse this procedure to reassemble and install an optical drive.

Keyboard

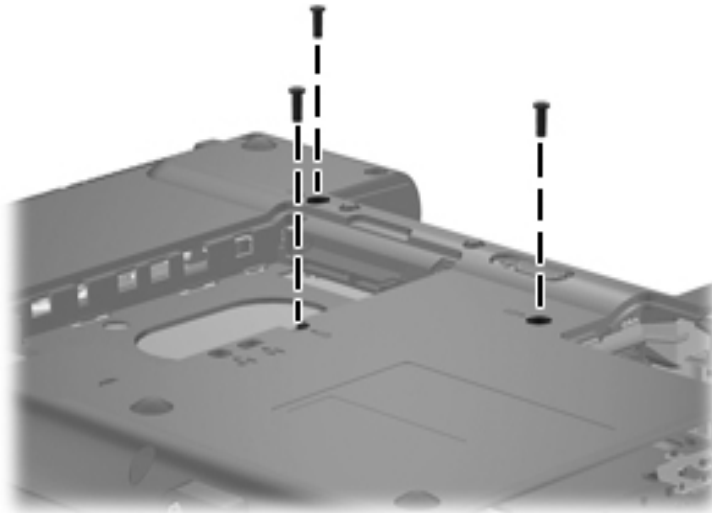
| Description | Spare part number |
|-------------------------------|-------------------|
| For use in Belgium | 493960-A41 |
| For use in Canada | 493960-121 |
| For use in the Czech Republic | 493690-221 |
| For use in Denmark | 493960-081 |
| For use in France | 493960-051 |
| For use in Greece | 493960-DJ1 |
| For use in Germany | 493960-041 |
| For use in Hungary | 493960-211 |
| For use in Iceland | 493960-DD1 |
| For international use | 493960-B31 |
| For use in Italy | 493960-061 |
| For use in Israel | 493960-BB1 |
| For use in Japan | 493960-291 |
| For use in Latin America | 493960-161 |
| For use in Norway | 493960-091 |
| For use in Portugal | 493960-131 |
| For use in Russia | 493960-251 |
| For use in Saudi Arabia | 493960-171 |
| For use in Slovakia | 493960-231 |
| For use in Slovenia | 493960-BA1 |
| For use in Spain | 493960-071 |
| For use in Sweden and Finland | 493960-B71 |
| For use in Switzerland | 493960-BG1 |
| For use in South Korea | 493960-AD1 |
| For use in Taiwan | 493960-AB1 |
| For use in Thailand | 493960-281 |
| For use in Turkey | 493960-141 |
| For use in the United Kingdom | 493960-031 |
| For use in the United States | 493960-001 |

Before removing the keyboard, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [“Battery” on page 4-7](#)).
5. Remove the following components:
 - a. Hard drive (see [“Hard drive” on page 4-8](#))
 - b. Memory module (see [“Memory module” on page 4-10](#))
 - c. WLAN module (see [“WLAN module” on page 4-12](#))
 - d. Optical drive (see [“Optical drive” on page 4-16](#))

Remove the keyboard:

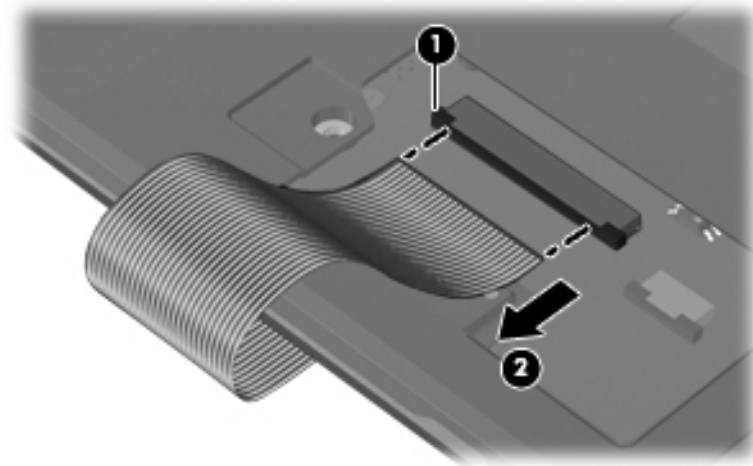
1. Turn the computer upside down, with the front toward you.
2. Remove the three Torx T8M2.5×6.0 slotted screws that secure the keyboard to the computer.



3. Turn the computer display-side up, and open the computer.
4. Lift the rear edge of the keyboard **1** and rotate the keyboard toward you **2** until it rests upside down on the top cover.



5. Release the zero insertion force (ZIF) connector **1** to which the keyboard cable is attached, and disconnect the keyboard cable **2** from the system board.



6. Remove the keyboard.
- Reverse this procedure to install the keyboard.

Top cover

| Description | Spare part number |
|--|-------------------|
| Top cover (includes caps lock light, capacitive board, fingerprint reader board and cable, TouchPad, and TouchPad cable) | 493278-001 |

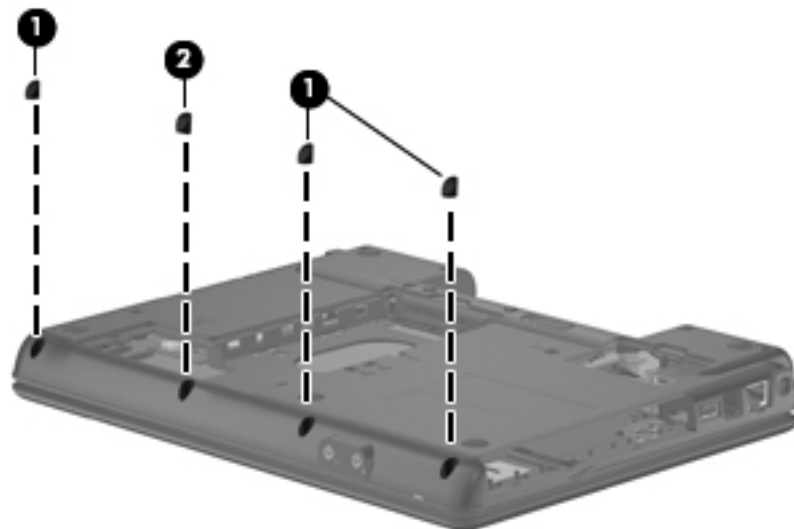
Before removing the top cover, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [“Battery” on page 4-7](#)).
5. Remove the following components:
 - a. Hard drive (see [“Hard drive” on page 4-8](#))
 - b. Memory module (see [“Memory module” on page 4-10](#))
 - c. WLAN module (see [“WLAN module” on page 4-12](#))
 - d. Optical drive (see [“Optical drive” on page 4-16](#))
 - e. Keyboard (see [“Keyboard” on page 4-18](#))

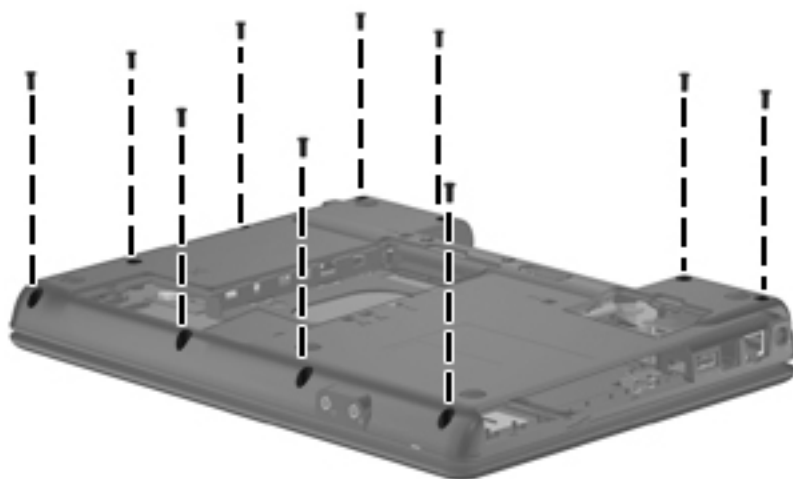
Remove the top cover:

1. Close the computer and turn it upside down, with the front toward you.
2. Remove the following:

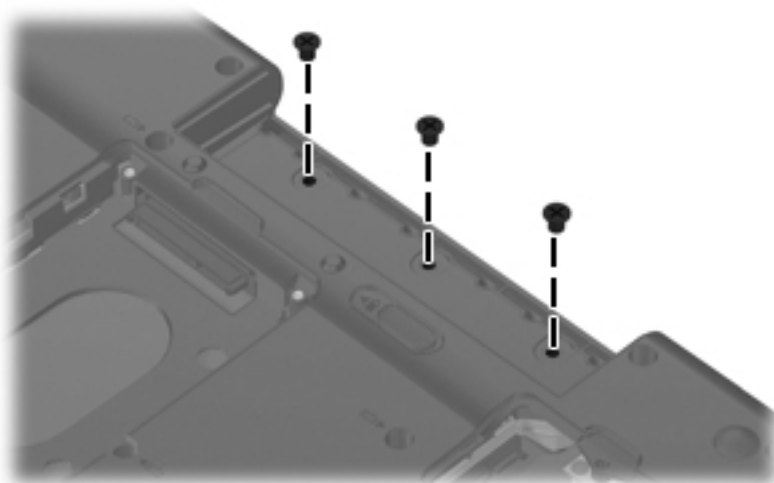
Remove the four rubber screw covers on the front of the computer. Note that three of the screw covers are the same ❶ and one screw cover ❷ is different. The rubber screw covers are included in the Plastics Kit, spare part number 493274-001.



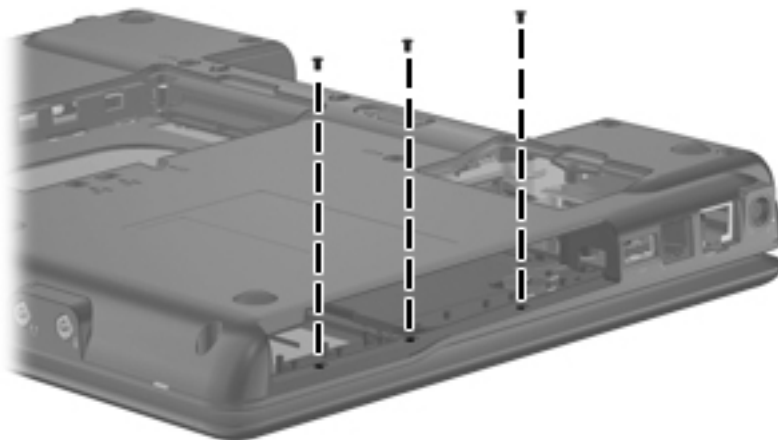
3. Remove the ten Torx T8M2.5×6.0 slotted screws.



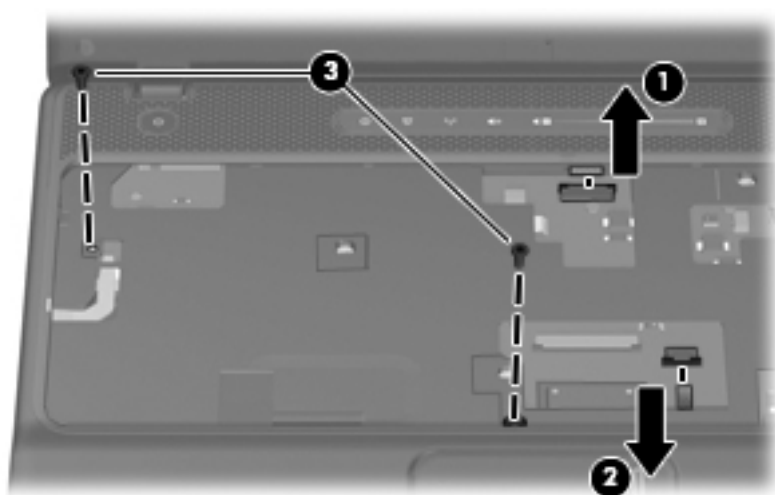
4. Remove the three Phillips PM2.0×2.0BH screws in the battery bay.



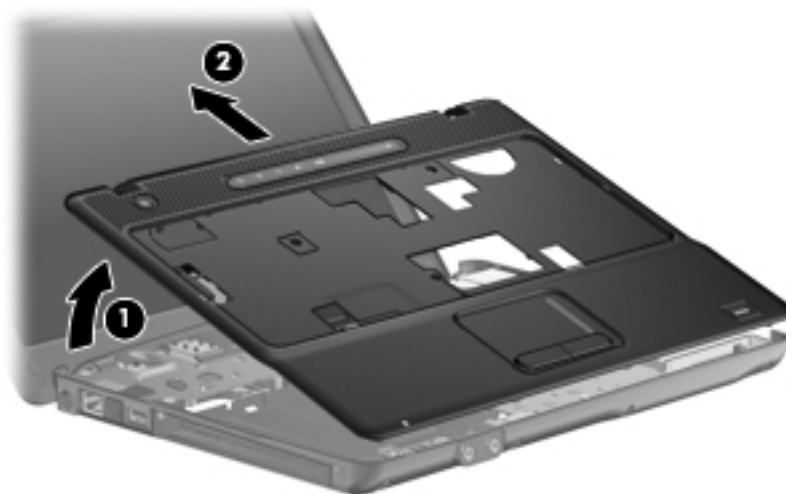
5. Remove the three Phillips PM2.0×3.0 screws in the optical drive bay.



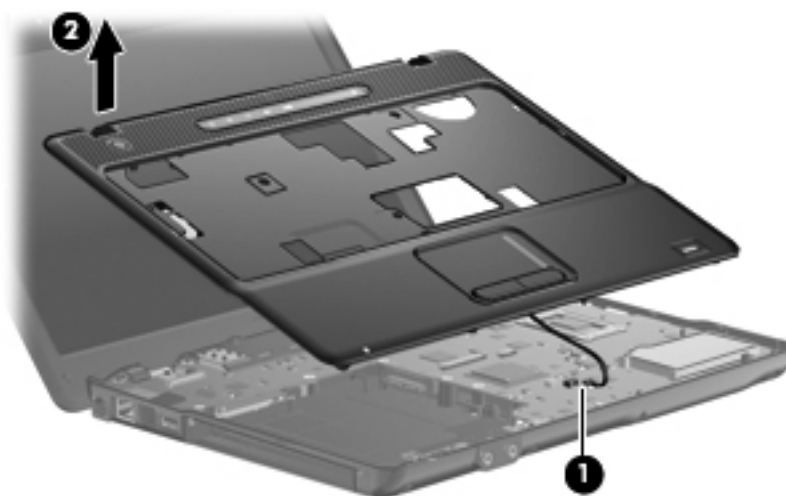
6. Turn the computer right-side up, with the front toward you.
7. Open the LED board cable ZIF connector ❶, and then disconnect the cable.
8. Open the TouchPad cable ZIF connector ❷, and then disconnect the cable.
9. Remove the two Torx T8M2.5×6.0 slotted screws ❸ that attach the top cover to the base enclosure.



10. Lift the rear edge and sides of the top cover ❶ to release it. Move the top cover backward ❷ and hold it.



11. Disconnect the fingerprint reader cable ❶ and remove the top cover ❷.



Reverse this procedure to install the top cover.

Speaker assembly

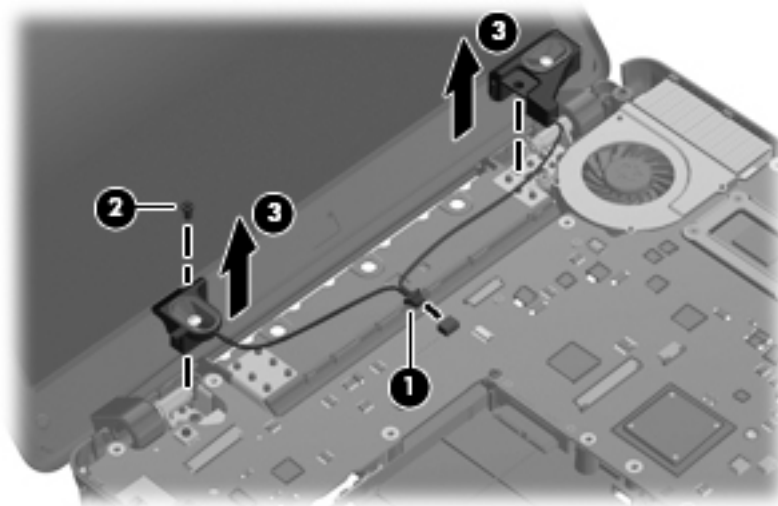
| Description | Spare part number |
|------------------|-------------------|
| Speaker assembly | 493273-001 |

Before removing the speaker assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [“Battery” on page 4-7](#)).
5. Remove the following components:
 - a. Hard drive (see [“Hard drive” on page 4-8](#))
 - b. Memory module (see [“Memory module” on page 4-10](#))
 - c. WLAN module (see [“WLAN module” on page 4-12](#))
 - d. Optical drive (see [“Optical drive” on page 4-16](#))
 - e. Keyboard (see [“Keyboard” on page 4-18](#))
 - f. Top cover (see [“Top cover” on page 4-21](#))

Remove the speaker assembly:

1. Disconnect the speaker assembly cable ❶ from the system board.
2. Remove the Phillips PM3.0×4.0 screw ❷ that attaches the left speaker to the base enclosure.
3. Remove the speaker cables from the clips on the system board, and then remove the speaker assembly ❸ from the base enclosure.



Reverse this procedure to install the speaker assembly.

Display assembly

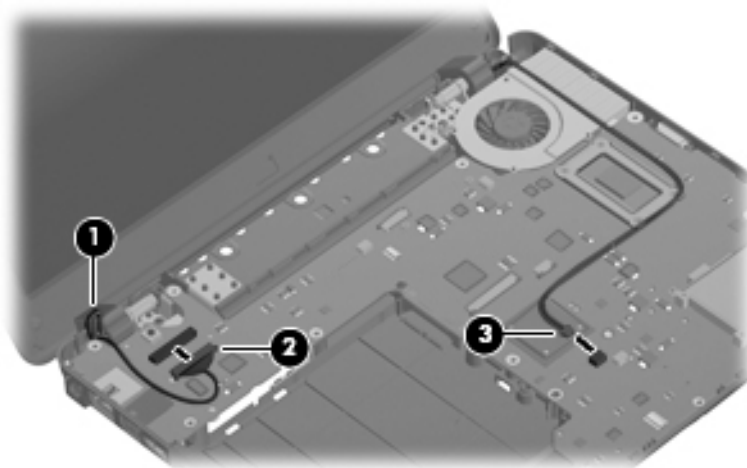
| Description | Spare part number |
|---|-------------------|
| 12.1-inch, WXGA | 493186-001 |
| 12.1-inch WXGA (with integrated webcam) | 501932-001 |
| 12.1-inch, WXGA BrightView | 493187-001 |
| 12.1-inch, WXGA BrightView (with integrated webcam) | 501933-001 |

Before removing the display assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [“Battery” on page 4-7](#)).
5. Remove the following components:
 - a. Hard drive (see [“Hard drive” on page 4-8](#))
 - b. Memory module (see [“Memory module” on page 4-10](#))
 - c. WLAN module (see [“WLAN module” on page 4-12](#))
 - d. Optical drive (see [“Optical drive” on page 4-16](#))
 - e. Keyboard (see [“Keyboard” on page 4-18](#))
 - f. Top cover (see [“Top cover” on page 4-21](#))
 - g. Speaker assembly (see [“Speaker assembly” on page 4-25](#))

Remove the display assembly:

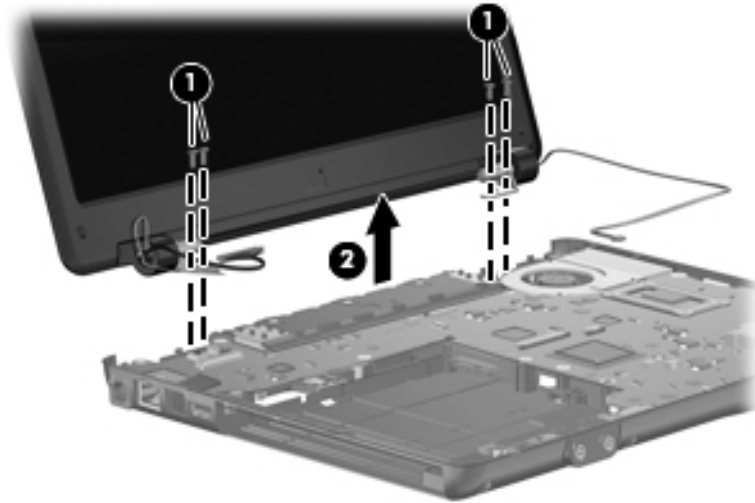
1. Open the computer as far as possible.
2. Disconnect the display panel cable ❶ from the system board.
3. Remove the WLAN antenna cable ❷ from the opening in the base enclosure.
4. Disconnect the microphone cable ❸ from the system board. Remove any tape that may be used to secure the cable to the system board.





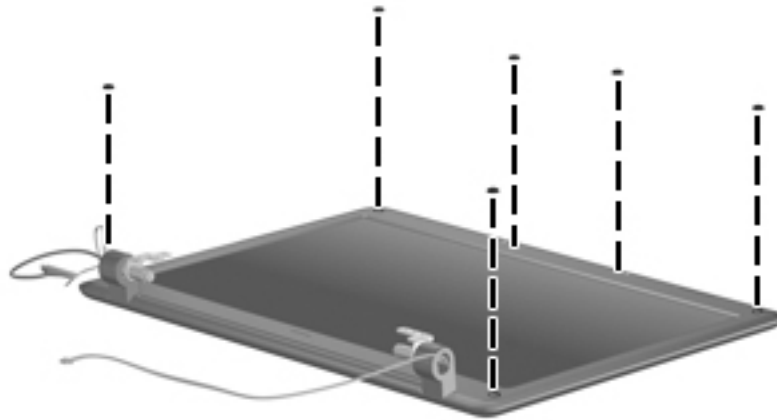
CAUTION: Support the display assembly when removing the following screws. Failure to support the display assembly can result in damage to the display assembly and other computer components.

5. Remove the four Torx T8M2.5×6.0 slotted screws ❶ that secure the display assembly to the computer.
6. Lift the display assembly ❷ straight up and remove it.

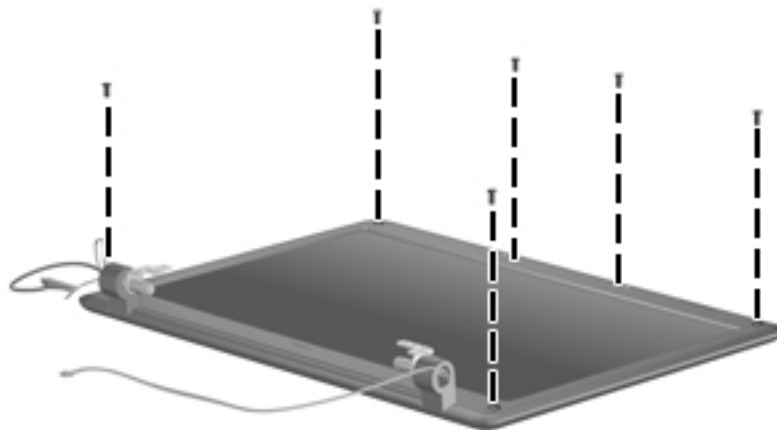


Perform the following steps in sequence to remove or replace the display bezel or the display assembly internal components.

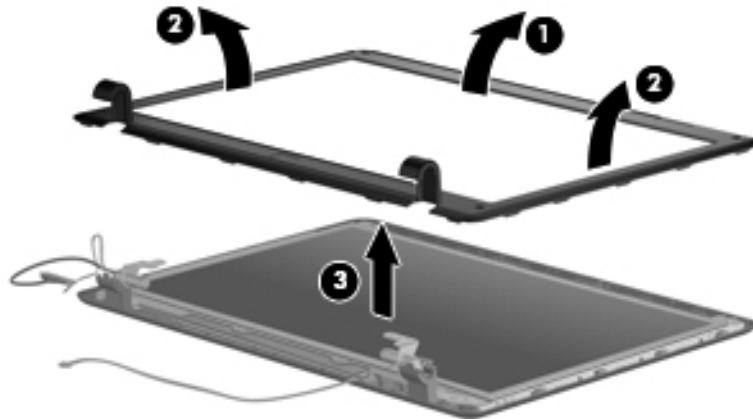
1. If it is necessary to remove the display bezel:
 - a. Remove the six rubber screw covers in the display bezel.



- b. Remove the six PM2.0×5.0 screws that secure the display bezel to the display enclosure.

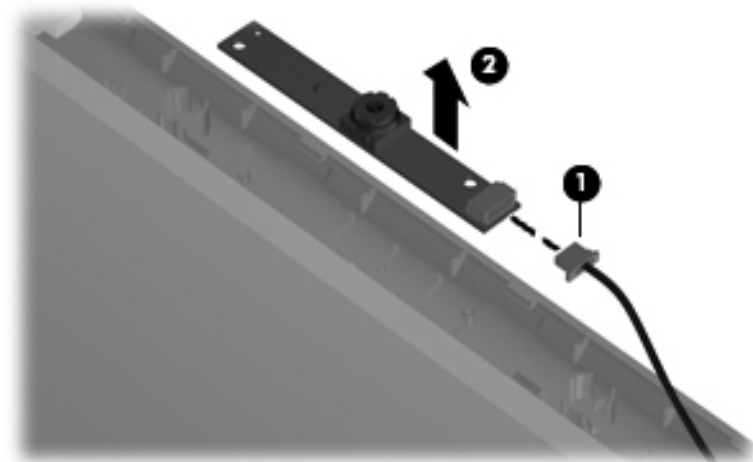


- c. Lift the inside edge of the top side of the bezel ❶ to disengage it from the clips, and then lift the left and right sides ❷ until the bezel disengages from the display enclosure.
- d. Remove the display bezel ❸. The display bezel is available using spare part number 495015-001.



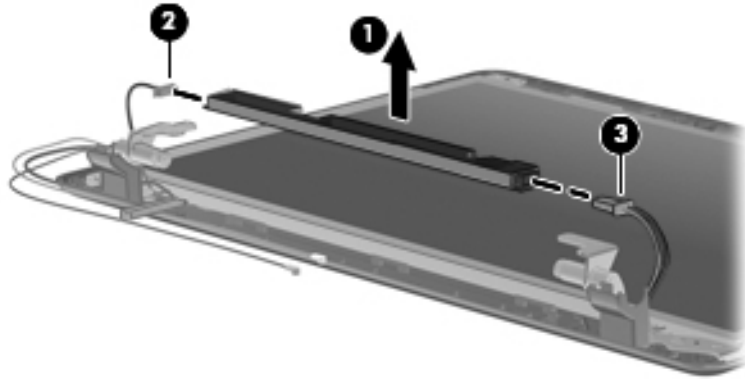
Reverse this procedure to install the display bezel. Be careful to route the cables through the side openings in the hinge covers and avoid pinching the cables between the bezel and display enclosure.

2. If it is necessary to remove the webcam module:
 - a. Disconnect the webcam cable ❶ from the computer.
 - b. Remove the webcam module ❷ from the display enclosure. (The webcam is secured with double-sided tape.) The webcam can also be ordered separately and is available using spare part number 492159-001.



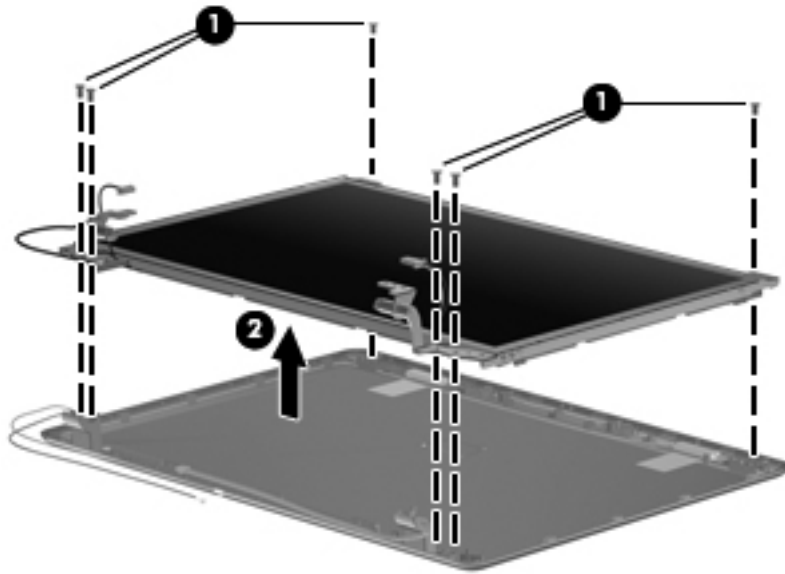
3. If it is necessary to remove the display inverter:

- a. Use a flat bladed screwdriver to release the inverter ❶, which is secured with double-sided tape.
- b. Disconnect the backlight cable ❷ and the display panel cable ❸ from the display inverter. The display inverter is available using spare part number 493193-001.

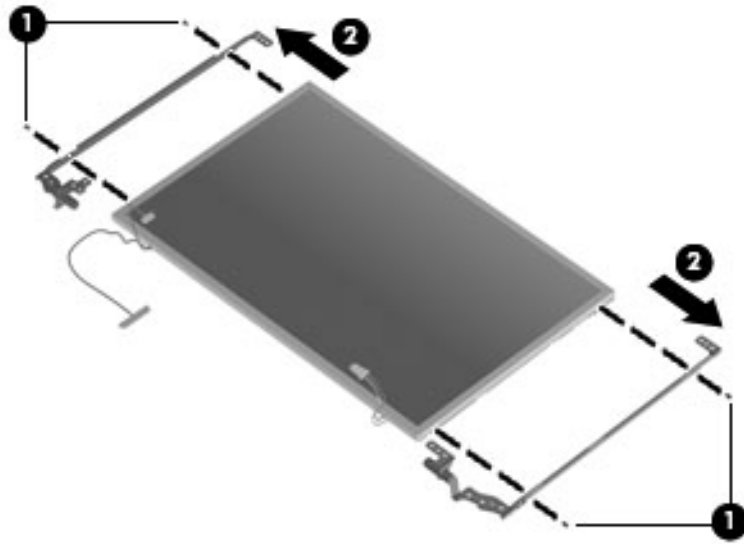


4. If it is necessary to remove the display panel:


- a. Remove the six Phillips PM2.0×5.0 screws ❶ that secure the display panel to the display enclosure.
- b. Remove the display panel ❷ from the display enclosure.



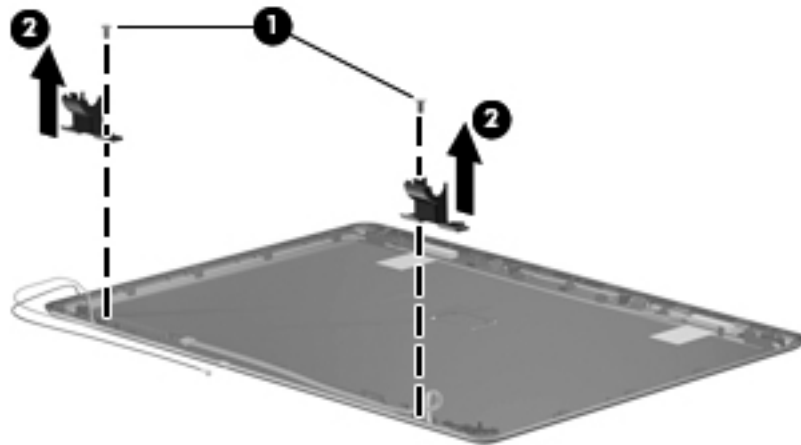
- c. Remove the four Phillips PM1.5×3.0 screws ❶ that secure the hinges to the display panel.
- d. Remove the display hinges ❷ from the display panel. The display hinges are available using spare part number 493192-001.



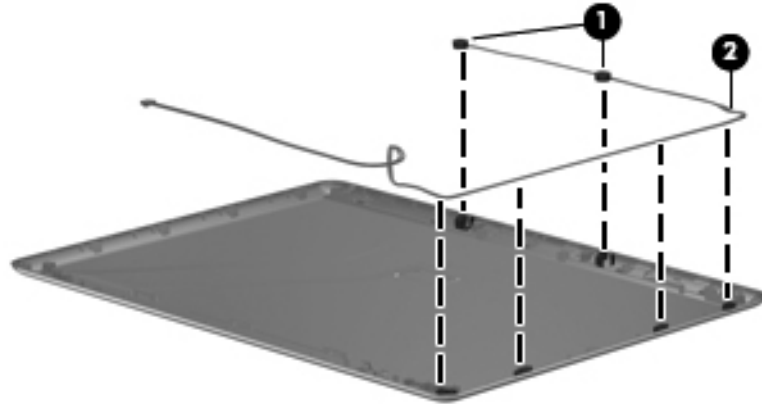
5. If it is necessary to remove the microphone cable or WLAN transceivers and cable:

 The microphone, WLAN antenna cable, and the LCD module cable are included in the Cable Kit, spare part number 493275-001.

- a. Remove the two Phillips PM2.0×6.0 screws ❶ and display hinge covers ❷.

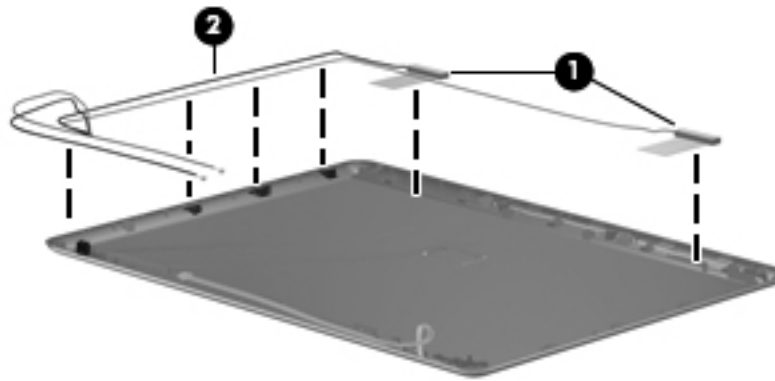


- b. Remove the two microphone receivers **1** from the display enclosure, and then release the microphone cable **2** from the clips in the display enclosure.



Reverse this procedure to install the microphone.

- c. Remove the adhesive tape from the WLAN transceivers **1**, and then release the WLAN cables **2** from the clips in the display enclosure.



Reverse this procedure to install the WLAN transceivers and cable.

Audio board

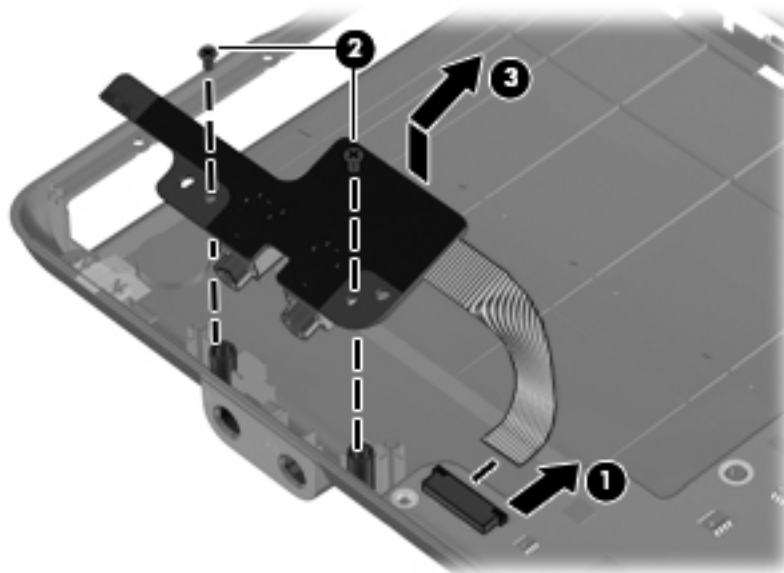
| Description | Spare part number |
|-------------|-------------------|
| Audio board | 493272-001 |

Before removing the audio board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [“Battery” on page 4-7](#)).
5. Remove the following components:
 - a. Hard drive (see [“Hard drive” on page 4-8](#))
 - b. Memory module (see [“Memory module” on page 4-10](#))
 - c. WLAN module (see [“WLAN module” on page 4-12](#))
 - d. Optical drive (see [“Optical drive” on page 4-16](#))
 - e. Keyboard (see [“Keyboard” on page 4-18](#))
 - f. Top cover (see [“Top cover” on page 4-21](#))

Remove the audio board and cable:

1. Open the audio board cable ZIF connector ❶, and then remove the cable from the system board.
2. Remove the two Phillips PM2.0×3.0 screws ❷ that secure the audio board to the system board.
3. Lift and move the audio board backward ❸ so that the external audio connectors slide out of the openings in the base enclosure.



Reverse this procedure to install the audio board.

Fan

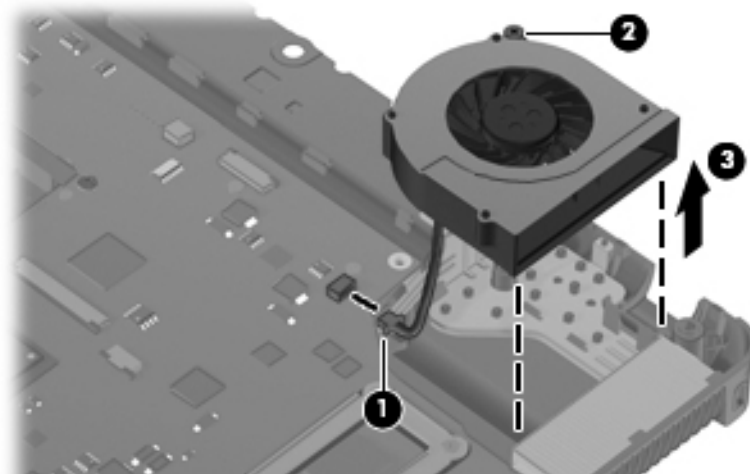
| Description | Spare part number |
|-------------|-------------------|
| Fan | 493269-001 |

Before removing the fan, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see “[Battery](#)” on page 4-7).
5. Remove the following components:
 - a. Hard drive (see “[Hard drive](#)” on page 4-8)
 - b. Memory module (see “[Memory module](#)” on page 4-10)
 - c. WLAN module (see “[WLAN module](#)” on page 4-12)
 - d. Optical drive (see “[Optical drive](#)” on page 4-16)
 - e. Keyboard (see “[Keyboard](#)” on page 4-18)
 - f. Top cover (see “[Top cover](#)” on page 4-21)

Remove the fan:

1. Disconnect the fan cable ❶ from the system board.
2. Loosen the captive Phillips PM2.0×7.0 screw ❷ that secures the fan to the base enclosure, and then remove the fan ❸ from the heat sink.



Reverse this procedure to install the fan.



To properly ventilate the computer, allow at least a 7.6-cm (3-inch) clearance on the left side of the computer.

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

System board

| Description | Spare part number |
|--|-------------------|
| GM45 (includes RTC battery and replacement thermal material) | 493185-001 |
| GL40 (includes RTC battery and replacement thermal material) | 504446-001 |

Before removing the system board, follow these steps:

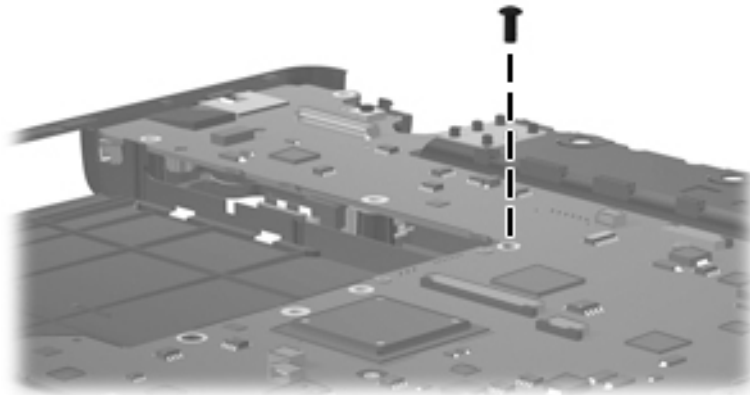
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [“Battery” on page 4-7](#)).
5. Remove the following components:
 - a. Hard drive (see [“Hard drive” on page 4-8](#))
 - b. Memory module (see [“Memory module” on page 4-10](#))
 - c. WLAN module (see [“WLAN module” on page 4-12](#))
 - d. Optical drive (see [“Optical drive” on page 4-16](#))
 - e. Keyboard (see [“Keyboard” on page 4-18](#))
 - f. Top cover (see [“Top cover” on page 4-21](#))
 - g. Audio board (see [“Audio board” on page 4-32](#))
 - h. Fan (see [“Fan” on page 4-33](#))

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

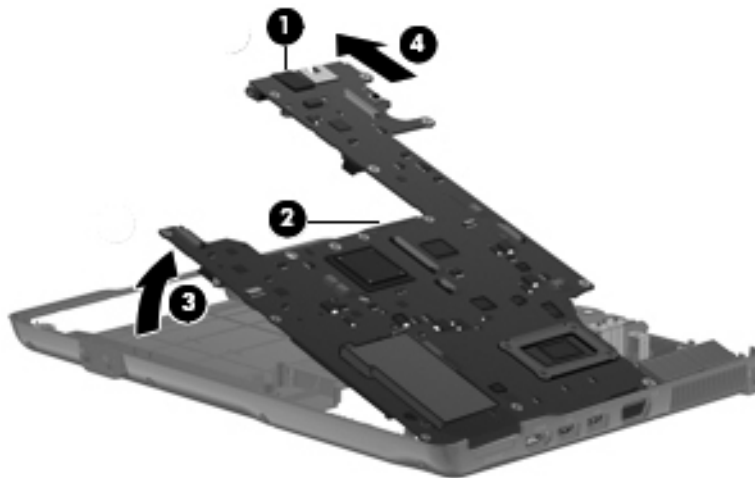
- RTC battery (see [“RTC battery” on page 4-36](#))
- Modem module (see [“Modem module” on page 4-37](#))
- Bluetooth module (see [“Bluetooth module” on page 4-39](#))
- Heat sink (see [“Heat sink” on page 4-41](#))
- Processor (see [“Processor” on page 4-43](#))

Remove the system board:

1. Remove the Torx T8M2.5×6.0 slotted screw that secures the system board to the base enclosure. The screw is located by the optical drive connector,



2. Flex the left side of the base enclosure until the USB, RJ-45, and RJ-11 jacks ❶ clear the openings in the base enclosure.
3. Use the optical drive connector ❷ to lift the left side of the system board ❸ until it rests at an angle.
4. Remove the system board from the base enclosure by pulling it away at an angle ❹.



Reverse this procedure to install the system board.

RTC battery



Removing the RTC battery and leaving it uninstalled for 5 or more minutes causes all passwords and CMOS settings to be cleared.

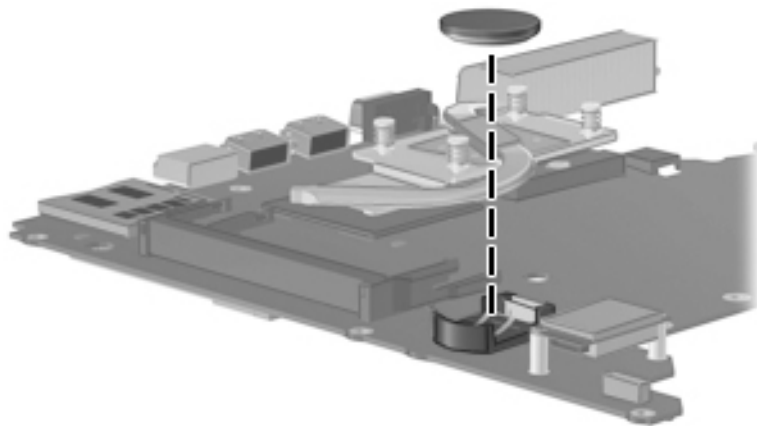
| Description | Spare part number |
|-------------|-------------------|
| RTC battery | 449137-001 |

Before removing the RTC battery, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [“Battery” on page 4-7](#)).
5. Remove the following components:
 - a. Hard drive (see [“Hard drive” on page 4-8](#))
 - b. Memory module (see [“Memory module” on page 4-10](#))
 - c. WLAN module (see [“WLAN module” on page 4-12](#))
 - d. Optical drive (see [“Optical drive” on page 4-16](#))
 - e. Keyboard (see [“Keyboard” on page 4-18](#))
 - f. Top cover (see [“Top cover” on page 4-21](#))
 - g. Audio board (see [“Audio board” on page 4-32](#))
 - h. Fan (see [“Fan” on page 4-33](#))
 - i. System board (see [“System board” on page 4-34](#))

Remove the RTC battery:

1. Turn the system board upside down with the front toward you.
2. Lift the RTC battery from the socket.



Reverse this procedure to install the RTC battery.

Modem module



The modem module spare part kit does not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 493275-001. See [“Cable Kit” on page 3-8](#) for more Cable Kit information.

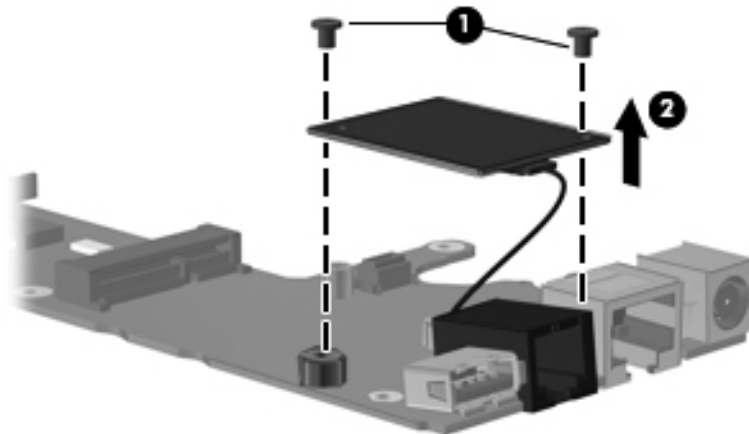
| Description | Spare part number |
|--|-------------------|
| For use in Australia and New Zealand | 461749-011 |
| For use in all countries or regions except Australia and New Zealand | 461749-001 |

Before removing the modem module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [“Battery” on page 4-7](#)).
5. Remove the following components:
 - a. Hard drive (see [“Hard drive” on page 4-8](#))
 - b. Memory module (see [“Memory module” on page 4-10](#))
 - c. WLAN module (see [“WLAN module” on page 4-12](#))
 - d. Optical drive (see [“Optical drive” on page 4-16](#))
 - e. Keyboard (see [“Keyboard” on page 4-18](#))
 - f. Top cover (see [“Top cover” on page 4-21](#))
 - g. Audio board (see [“Audio board” on page 4-32](#))
 - h. Fan (see [“Fan” on page 4-33](#))
 - i. System board (see [“System board” on page 4-34](#))
 - j. Heat sink (see [“Heat sink” on page 4-41](#))

Remove the modem module:

1. Turn the system board upside down with the rear edge toward you.
2. Remove the two Phillips PM2.0×3.0 screws ❶ that secure the modem module to the system board.
3. Disconnect the modem module ❷ from the system board by lifting it straight up.



4. Remove the modem module, cable, adhesive tape, and RJ-II port.

Reverse this procedure to install the modem module and modem module cable.

Bluetooth module



The Bluetooth module spare part kit does not include a Bluetooth module cable. The Bluetooth module cable is included in the Cable Kit, spare part number 493275-001. See [“Cable Kit” on page 3-8](#) for more Cable Kit information.

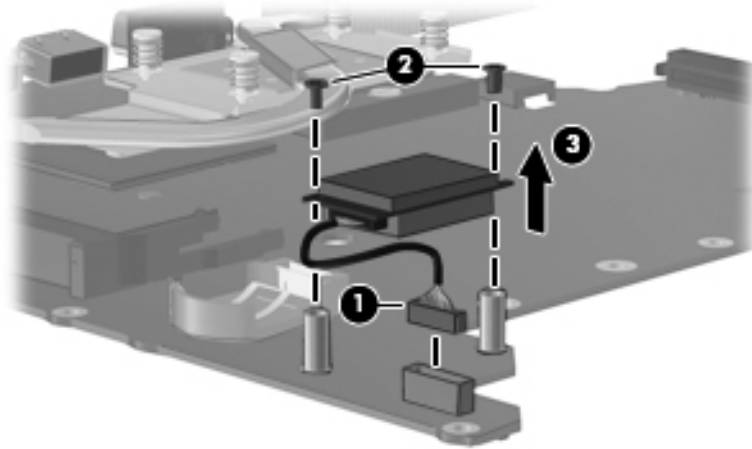
| Description | Spare part number |
|-------------------------|-------------------|
| Bluetooth module | 398393-002 |

Before removing the Bluetooth module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [“Battery” on page 4-7](#)).
5. Remove the following components:
 - a. Hard drive (see [“Hard drive” on page 4-8](#))
 - b. Memory module (see [“Memory module” on page 4-10](#))
 - c. WLAN module (see [“WLAN module” on page 4-12](#))
 - d. Optical drive (see [“Optical drive” on page 4-16](#))
 - e. Keyboard (see [“Keyboard” on page 4-18](#))
 - f. Top cover (see [“Top cover” on page 4-21](#))
 - g. Audio board (see [“Audio board” on page 4-32](#))
 - h. Fan (see [“Fan” on page 4-33](#))
 - i. System board (see [“System board” on page 4-34](#))

Remove the Bluetooth module:

1. Turn the system board upside down with the front toward you.
2. Disconnect the Bluetooth module cable ❶ from the system board.
3. Remove the two Phillips PM1.5×3.0 screws ❷ that secure the Bluetooth module to the system board.
4. Remove the module ❸.



Reverse this procedure to install the Bluetooth module.

Heat sink

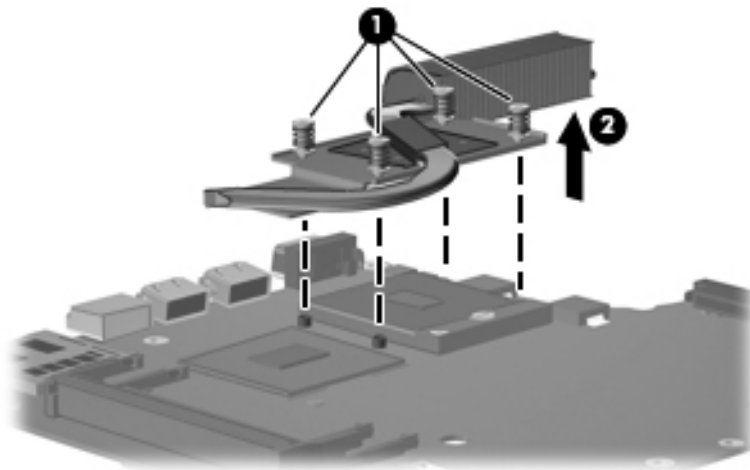
| Description | Spare part number |
|---|-------------------|
| Thermal module (includes heat sink and thermal material) | 493270-001 |

Before removing the heat sink, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [“Battery” on page 4-7](#)).
5. Remove the following components:
 - a. Hard drive (see [“Hard drive” on page 4-8](#))
 - b. Memory module (see [“Memory module” on page 4-10](#))
 - c. WLAN module (see [“WLAN module” on page 4-12](#))
 - d. Optical drive (see [“Optical drive” on page 4-16](#))
 - e. Keyboard (see [“Keyboard” on page 4-18](#))
 - f. Top cover (see [“Top cover” on page 4-21](#))
 - g. Audio board (see [“Audio board” on page 4-32](#))
 - h. Fan (see [“Fan” on page 4-33](#))
 - i. System board (see [“System board” on page 4-34](#))

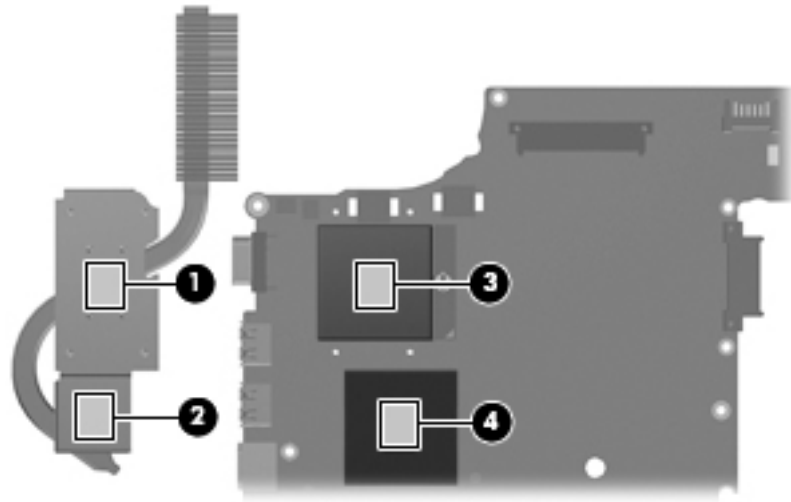
Remove the heat sink:

1. Loosen the four Phillips PM2.0×10.0 captive screws ❶ that secure the heat sink to the system board.
2. Remove the heat sink ❷ by lifting it straight up.





The thermal material must be thoroughly cleaned from the surfaces of the heat sink ❶ and ❸, the processor ❷, and graphics subsystem component ❹ on the system board each time the heat sink is removed. Thermal material is included with all System Board, Heat Sink, and Processor Spare Part Kits.



Reverse this procedure to install the heat sink.

Processor



The processor spare part kit includes replacement thermal material.

| Description | Spare part number |
|---|-------------------|
| Intel Core2 Duo processors (6-MB L2 cache, 1066-MHz FSB): | |
| ■ T9600 2.8-GHz processor | 486257-001 |
| ■ T9400 2.53-GHz processor | 486256-001 |
| ■ P9500 2.53-GHz processor | 496458-001 |
| Intel Core2 Duo processors (3-MB L2 cache, 1066-MHz FSB): | |
| ■ P8700 2.53-GHz processor | 512585-001 |
| ■ P8600 2.4-GHz processor | 486255-001 |
| ■ P8400 2.26-GHz processor | 486254-001 |
| ■ P7370 2.0-GHz processor (for use with Intel WLAN only) | 507966-001 |
| Intel Core Duo processors (2-MB L2 cache, 800-MHz FSB): | |
| ■ P5870 2.0-GHz processor (for use with no WLAN support or Intel WLAN only) | 500771-001 |
| ■ P5670 1.8-GHz processor (for use with no WLAN support or Intel WLAN only) | 500770-001 |
| Intel Core Duo processors (1-MB L2 cache, 667-MHz FSB): | |
| ■ T3400 2.16-GHz processor | 509061-001 |
| ■ T3200 2.0-GHz processor | 509060-001 |
| Intel Celeron-M processors (1-MB L2 cache, 667-MHz FSB): | |
| ■ 585 2.16-GHz processor | 490337-001 |
| ■ 575 2.0-GHz processor | 490336-001 |
| Intel Celeron-T processors (1-MB L2 cache, 667-MHz FSB): | |
| ■ T1700 1.83-GHz processor | 509059-001 |
| ■ T1600 1.66-GHz processor | 509058-001 |

Before removing the processor, follow these steps:

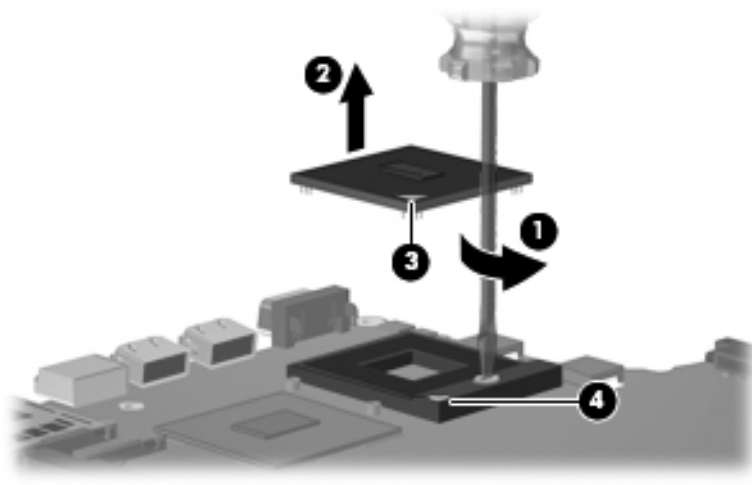
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [“Battery” on page 4-7](#)).
5. Remove the following components:
 - a. Hard drive (see [“Hard drive” on page 4-8](#))
 - b. Memory module (see [“Memory module” on page 4-10](#))
 - c. WLAN module (see [“WLAN module” on page 4-12](#))
 - d. Optical drive (see [“Optical drive” on page 4-16](#))
 - e. Keyboard (see [“Keyboard” on page 4-18](#))
 - f. Top cover (see [“Top cover” on page 4-21](#))
 - g. Audio board (see [“Audio board” on page 4-32](#))
 - h. Fan (see [“Fan” on page 4-33](#))
 - i. System board (see [“System board” on page 4-34](#))
 - j. Heat sink (see [“Heat sink” on page 4-41](#))

Remove the processor:

1. Use a flat-bladed screwdriver to turn the processor locking screw ❶ one-half turn counterclockwise until you hear a click.
2. Lift the processor ❷ straight up and remove it.



When you install the processor, the gold triangle ❸ on the processor must be aligned with the triangle ❹ embossed on the processor slot.



Reverse this procedure to install the processor.

Starting Computer Setup

Computer Setup is a preinstalled, ROM-based utility that can be used even when the operating system is not working or will not load.



Some of the Computer Setup menu items listed in this guide may not be supported by your computer.



An external keyboard or mouse connected to a USB port can be used with Computer Setup only if USB legacy support is enabled.

To start Computer Setup, follow these steps:

1. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press **f10** to enter BIOS Setup.

Navigating and selecting in Computer Setup

The information and settings in Computer Setup are accessed from the File, Security, Diagnostics, and System Configuration menus.

To navigate and select in Computer Setup, follow these steps:

1. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
 - To select a menu or a menu item, use the keyboard arrow keys and then press **enter**, or use a pointing device to click the item.
 - To scroll up and down, click the up arrow or the down arrow in the upper-right corner of the screen.
 - To close open dialog boxes and return to the main Computer Setup screen, press **esc**, and then follow the on-screen instructions.



You can use either a pointing device (TouchPad, pointing stick, or USB mouse) or the keyboard to navigate and make selections in Computer Setup.

2. Press **f10** to enter BIOS Setup.
3. Select the **File, Security, Diagnostics, or System Configuration** menu.

To exit Computer Setup menus, choose one of the following methods:

- To exit Computer Setup menus without saving your changes, click the **Exit** icon in the lower-left corner of the screen, and then follow the on-screen instructions.
 - or –
 - Use the arrow keys to select **File > Ignore changes and exit**, and then press **enter**.
- To save your changes and exit Computer Setup menus, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.
 - or –
 - Use the arrow keys to select **File > Save changes and exit**, and then press **enter**.

Your changes go into effect when the computer restarts.

Restoring factory settings in Computer Setup



Restoring defaults will not change the hard drive mode.

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

1. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press **f10** to enter BIOS Setup.
3. Use a pointing device or the arrow keys to select **File > Restore defaults**.
4. Follow the on-screen instructions.
5. To save your changes and exit, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the arrow keys to select **File > Save changes and exit**, and then press **enter**.

Your changes go into effect when the computer restarts.



Your password settings and security settings are not changed when you restore the factory settings.

Computer Setup menus

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



Some of the Computer Setup menu items listed in this chapter may not be supported by your computer.



File menu

| Select | To do this |
|--------------------------|---|
| System information | <ul style="list-style-type: none">■ View identification information for the computer and the batteries in the system.■ View specification information for the processor, cache and memory size, system ROM, video revision, and keyboard controller version. |
| Set System Date and Time | Set or change the date and time on the computer. |
| Restore defaults | Replace the configuration settings in Computer Setup with the original factory settings. (Hard drive mode, password settings, and security settings are not changed when you restore the factory settings.) |
| Ignore changes and exit | Cancel any changes entered during the current session. Then exit and restart the computer. |
| Save changes and exit | Save any changes entered during the current session. Then exit and restart the computer. Your changes go into effect when the computer restarts. |

Security menu



Some of the menu items listed in this section may not be supported by your computer.

| Select | To do this |
|--|---|
| Setup BIOS Administrator Password | Set up a BIOS administrator password. |
| User Management (requires a BIOS administrator password) | <ul style="list-style-type: none">■ Create a new BIOS user account.■ View a list of ProtectTools users. |
| Password Policy (requires a BIOS administrator password) | Revise password policy criteria. |
| HP SpareKey | Enable/disable HP SpareKey (enabled by default). |
| Always Prompt for HP SpareKey Enrollment | Enable/disable HP SpareKey enrollment (enabled by default). |
| Fingerprint Reset on Reboot (If Present) | Enable/disable the fingerprint reader (select models only; disabled by default). |
| Allow reset of HP ProtectTools security keys | Enable/disable reset of HP ProtectTools security keys |
| Change Password | Enter, change, or delete a BIOS administrator password. |
| HP SpareKey Enrollment | Enroll or reset HP SpareKey, which is a set of security questions and answers used if you forget your password. |
| DriveLock Passwords | <ul style="list-style-type: none">■ Enable/disable DriveLock on any computer hard drive (enabled by default).■ Change a DriveLock user password or master password. <p> DriveLock settings are accessible only when you enter Computer Setup by turning on (not restarting) the computer.</p> |
| Automatic DriveLock | Enable/disable Automatic DriveLock support. |
| Disk Sanitizer | Run Disk Sanitizer to destroy all existing data on the primary hard drive or the drive in the upgrade bay.  If you run Disk Sanitizer, the data on the selected drive is destroyed permanently. |
| System IDs | Enter a user-defined computer asset tracking number and ownership tag. |
| Always Prompt for HP SpareKey Enrollment | Enable/disable a prompt for HP SpareKey enrollment. |


Diagnostics menu

| Select | To do this |
|-------------------------|--|
| System Diagnostics menu | <ul style="list-style-type: none">■ F1 System Information—Displays the following information:<ul style="list-style-type: none"><input type="checkbox"/> Identification information for the computer and the batteries in the system.<input type="checkbox"/> Specification information for the processor, cache and memory size, system ROM, video revision, and keyboard controller version.■ F2 Start-up Test—Verifies the system components needed for starting the computer.■ F3 Run-In Test—Runs a comprehensive check on system memory.■ F4 Hard Disk Test—Runs a comprehensive self-test on any hard drive in the system. |



System Configuration menu



Some of the listed System Configuration options in this section may not be supported by your computer.

| Select | To do this |
|-----------------------|---|
| Language | Change the Computer Setup language. |
| Boot Options | <ul style="list-style-type: none">■ Set a Startup Menu delay (in seconds).■ Enable/disable Custom Logo (disabled by default).■ Enable/disable Display Diagnostic URL (enabled by default).■ Enable/disable CD-ROM boot (enabled by default).■ Enable/disable SD Card boot (enabled by default).■ Enable/disable floppy boot (enabled by default).■ Enable/disable PXE Internal NIC boot (enabled by default).■ Set the Express Boot Popup delay in seconds.■ Set the boot order. |
| Device Configurations | <ul style="list-style-type: none">■ Enable/disable USB legacy support (enabled by default). When enabled, USB legacy support allows the following:<ul style="list-style-type: none"><input type="checkbox"/> Use of a USB keyboard in Computer Setup even when a Windows® operating system is not running.<input type="checkbox"/> Startup from bootable USB devices, including a hard drive, diskette drive, or optical drive connected by a USB port to the computer.■ Select a parallel port mode: ECP (Enhanced Capabilities Port), standard, bidirectional, or EPP (Enhanced Parallel Port).■ Enable/disable fan always on while connected to an AC outlet (enabled by default).■ Enable/disable LAN Power Save (select models only). When enabled, saves power by turning off the LAN when not in use (enabled by default).■ Enable/disable Data Execution Prevention. When enabled, the processor can disable some virus code execution, which helps to improve computer security.■ SATA (Serial Advanced Technology Attachment) device mode. The following options are available:<ul style="list-style-type: none"><input type="checkbox"/> AHCI (Advanced Host Controller Interface)<input type="checkbox"/> IDE (Integrated Drive Electronics)<input type="checkbox"/> RAID (select models only) <p> Availability of the options above varies by computer model.</p> <ul style="list-style-type: none">■ Enable/disable secondary battery fast charge (enabled by default).■ Enable/disable HP QuickLook 2 (enabled by default).■ Enable/disable Virtualization Technology (select models only; disabled by default).■ Enable/disable TXT (Intel® Trusted Execution Technology) (select models only; disabled by default).■ Enable/disable Dual Core CPU (select models only; enabled by default).■ Enable/Disable Unified Extensible Firmware Interface (UEFI) mode (disabled by default). |

(Continued)

| Select | To do this |
|---|---|
| Built-In Device Options | <ul style="list-style-type: none"> ■ Enable/disable the wireless button state (enabled by default). ■ Enable/disable embedded WWAN device radio (select models only; enabled by default). ■ Enable/disable embedded Bluetooth® device radio (enabled by default). ■ Enable/disable the Network Interface Controller (LAN) (enabled by default). ■ Set the wake on LAN state. Options include the following: <ul style="list-style-type: none"> <input type="checkbox"/> Disabled <input type="checkbox"/> Boot to Network (set by default) <input type="checkbox"/> Follow Boot Order ■ Enable/disable the fingerprint device (enabled by default). ■ Enable/disable a modem device (enabled by default). ■ Enable/disable the embedded WLAN device (enabled by default). ■ Enable/disable LAN/WLAN switching (disabled by default). ■ Enable the ambient light sensor (enabled by default). ■ Enable/disable the Notebook Multibay device (enabled by default). ■ Enable/disable the integrated camera (select models only; enabled by default). |
| Port Options (all are enabled by default) | <p> All port options are enabled by default.</p> <ul style="list-style-type: none"> ■ Enable/disable the Smart Card slot. ■ Enable/disable the ExpressCard slot. ■ Enable/disable the serial port. ■ Enable/disable the parallel port. ■ Enable/disable the flash media reader. ■ Enable/disable the USB port. <p> Disabling the USB port also disables MultiBay devices and ExpressCard devices on the advanced port replicator.</p> <ul style="list-style-type: none"> ■ Enable/disable the 1394 port. |
| Set Security Level | Change, view, or hide security levels for all BIOS menu items. |
| Restore Security Defaults | Restore the default security settings. |

Specifications

Computer specifications

| | Metric | U.S. |
|--|---|---------------------|
| Dimensions | | |
| Length | 22.6 cm | 8.9 in |
| Width | 29.4 cm | 11.7 in |
| Height (front to rear) | 2.8 to 3.6 cm | 1.10 to 1.42 in |
| Weight | | |
| Equipped with 4-cell battery and optical drive | 1.85 kg | 4.07 lbs |
| Input power | | |
| Operating voltage | 19.0 V dc @ 4.74 A - 65 W | |
| Operating current | 4.74 A | |
| Temperature | | |
| Operating (not writing to optical disc) | 0°C to 35°C | 32°F to 95°F |
| Operating (writing to optical disc) | 5°C to 35°C | 41°F to 95°F |
| Nonoperating | -20°C to 60°C | -4°F to 140°F |
| Relative humidity | | |
| Operating | 10% to 90% | |
| Nonoperating | 5% to 95% | |
| Maximum altitude (unpressurized) | | |
| Operating | -15 m to 3,048 m | -50 ft to 10,000 ft |
| Nonoperating | -15 m to 12,192 m | -50 ft to 40,000 ft |
| Shock | | |
| Operating | 125 g, 2 ms, half-sine | |
| Nonoperating | 200 g, 2 ms, half-sine | |
| Random vibration | | |
| Operating | 0.75 g zero-to-peak, 10 Hz to 500 Hz, 0.25 oct/min sweep rate | |
| Nonoperating | 1.50 g zero-to-peak, 10 Hz to 500 Hz, 0.5 oct/min sweep rate | |



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

12.1-inch, WXGA display specifications

| | Metric | U.S. |
|--------------------------------|---|---------|
| Dimensions | | |
| Height | 16.9 cm | 6.7 in |
| Width | 26.2 cm | 10.3 in |
| Diagonal | 30.8 cm | 12.1 in |
| Number of colors | Up to 16.8 million | |
| Contrast ratio | 250:1 (typical) | |
| Brightness | 180 nits (typical) | |
| Pixel resolution | | |
| Pitch | 0.279 × 0.279 mm | |
| Format | 1280 × 800 | |
| Configuration | RGB vertical stripe | |
| Backlight | Edge lit | |
| Character display | 80 × 25 | |
| Total power consumption | 4.0 W | |
| Viewing angle | +/-40° horizontal, +120/-40° vertical (typical) | |

Hard drive specifications

| | 320-GB* | 250-GB* | 160-GB* | 120-GB* |
|---|-----------------------------|--------------|--------------|--------------|
| Dimensions | | | | |
| Height | 9.5 mm | 9.5 mm | 9.5 mm | 9.5 mm |
| Width | 70 mm | 70 mm | 70 mm | 70 mm |
| Weight | 101 g | 101 g | 101 g | 101 g |
| Interface type | SATA | SATA | SATA | SATA |
| Transfer rate | 100 MB/sec | 100 MB/sec | 100 MB/sec | 100 MB/sec |
| Security | ATA security | ATA security | ATA security | ATA security |
| Seek times (typical read, including setting) | | | | |
| Single track | 3 ms | 3 ms | 3 ms | 3 ms |
| Average | 13 ms | 13 ms | 13 ms | 13 ms |
| Maximum | 24 ms | 24 ms | 24 ms | 24 ms |
| Logical blocks | 625,142,448 | 488,397,168 | 312,581,808 | 234,441,648 |
| Disc rotational speed | 5400 rpm | 5400 rpm | 5400 rpm | 5400 rpm |
| Operating temperature | 5°C to 55°C (41°F to 131°F) | | | |

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



Certain restrictions and exclusions apply. Contact technical support for details.

DVD/CD-RW Combo Drive specifications

| Applicable disc | Read: | Write: |
|--------------------|--|----------------|
| | CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM | CD-R and CD-RW |
| Access time | CD | DVD |
| Random | < 190 ms | < 180 ms |
| Cache buffer | 2 MB | |
| Data transfer rate | | |
| 16X CD-ROM | 2,400 KB/sec | |
| 8X DVD | 2,400 KB/sec | |
| 16X CD-R | 2,400 KB/sec | |
| 16X CD-RW | 2,400 KB/sec | |
| Transfer mode | Multiword DMA mode 2 | |

Blu-ray ROM DVD±RW SuperMulti DL Drive specifications

| Applicable disc | Read: | Write: |
|--------------------|--|--|
| | BD-ROM, BD-ROM-DL, BD-R, BD-R-DL, BD-RE, BD-RE-DL, DVD-ROM, DVD+R, DVD+R-DL, DVD+RW, DVD-R, DVD-R-DL, DVD-RW, DVD-RAM (Ver.2), CD-DA, CD-ROM (Mode 1 and mode 2), CD-ROM XA (Mode 2, form 1 and form 2), Photo CD (Single and multiple sessions), CD Extra, CD-R, CD-RW, and CD-TEXT | DVD-RAM (Ver.2), DVD+R, DVD-R, CD-R, and CD-RW |
| Access time | BD | DVD |
| Random | < 230 ms | < 180 ms |
| Cache buffer | 4.5 MB | |
| Data transfer rate | | |
| 2X BD-RAM | 9 MB/sec | |
| 8X DVD | 2,400 KB/sec | |
| 16X CD-R | 2,400 KB/sec | |
| 16X CD-RW | 2,400 KB/sec | |

DVD±RW SuperMulti Double-Layer Drive specifications

| Applicable disc | Read: | Write: |
|---------------------------|---------------|--|
| | | CD-ROM, CD-R, CD-RW, High Speed CD-RW, Ultra & Ultra+ Speed CD-RW, DVD, DVD±R/RW, DVD±R, DVD-RAM |
| Access time | CD | DVD |
| Random | < 130 ms | < 150 ms |
| Cache buffer | 2 MB | |
| Data transfer rate | | |
| 5X DVD-RAM | 6,750 KB/sec | |
| 8X DVD±RW | 10,800 KB/sec | |
| 8X DVD±R | 10,800 KB/sec | |
| 16X CD-R | 3,600 KB/sec | |
| 16X CD-RW (High Speed) | 1,500 KB/sec | |

DVD-ROM Drive

| Applicable disc | DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18, CD-ROM (Mode 1 and 2), CD Digital Audio, CD-XA ready (Mode 2, Form 1 and Form 2), CD-I (Mode 2, Form 1 and Form 2), CD-R, CD-RW, Photo CD (single and multisession), CD-Bridge | |
|---------------------------|--|----------|
| Access time | CD | DVD |
| Random | < 100 ms | < 125 ms |
| Full stroke | < 175 ms | < 225 ms |
| Cache buffer | 512 KB | |
| Data transfer rate | | |
| CD-R (24X) | 3600 KB/s (150 KB/s at 1X CD rate) | |
| CD-RW (10X) | 1500 KB/s (150 KB/s at 1X CD rate) | |
| CD-ROM (24X) | 3600 KB/s (150 KB/s at 1X CD rate) | |
| DVD (8X) | 10,800 KB/s (1,352 KB/s at 1X DVD rate) | |
| Multiword DMA mode 2 | 16.6 MB/s | |

System DMA specifications


| Hardware | DMA System function |
|----------|---------------------------------|
| DMA0 | Not applicable |
| DMA1* | Not applicable |
| DMA2* | Not applicable |
| DMA3 | Not applicable |
| DMA4 | Direct memory access controller |
| DMA5* | Not applicable |
| DMA6 | Not assigned |
| DMA7 | Not assigned |


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

System interrupt specifications

| Hardware IRQ | System function |
|--------------|--|
| IRQ0 | System timer |
| IRQ1 | Standard 101-/102-Key or Microsoft® Natural Keyboard |
| IRQ8 | System CMOS/real-time clock |
| IRQ12 | Synaptics PS/2 TouchPad |
| IRQ13 | Numeric data processor |
| IRQ16 | Intel ICH9 Family USB universal Host Controller 2937 Mobile Intel 4 Series Express Chipset Family |
| IRQ17 | High Definition Audio Controller Intel ICH9 Family USB universal Host Controller 2938 Marvell Yukon 88E8072 PCIE-Gigabit Ethernet Controller |
| IRQ18 | Intel ICH9 Family USB universal Host Controller 2939 Intel ICH9 Family USB universal Host Controller 2936 |
| IRQ19 | Intel ICH9 Family USB2 Enhanced Controller 293C |
| IRQ20 | Intel ICH9 Family USB2 Enhanced Controller 293A Intel ICH9 Family USB universal Host Controller 2934 |
| IRQ21 | Intel ICH9M-E/M SATA AHCI Controller |
| IRQ22 | Intel ICH9 Family USB universal Host Controller 2935 |

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

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

 For operating systems after Windows 2000, APIC (advanced programming interrupt controller) is used.

System I/O address specifications

| I/O address (hex) | System function (shipping configuration) |
|-------------------|---|
| 000 - 01F | DMA controller |
| 020 - 021 | Program interrupt controller |
| 024 - 025 | Program interrupt controller |
| 028 - 029 | Program interrupt controller |
| 02C - 03D | Program interrupt controller |
| 02E - 02F | Motherboard resource |
| 030 - 031 | Program interrupt controller |
| 034 - 035 | Program interrupt controller |
| 038 - 039 | Program interrupt controller |
| 03C- 03D | Program interrupt controller |
| 040 - 043 | System timer |
| 04E-04F | Motherboard resource |
| 050-053 | System timer |
| 060 | Standard 101-/102-key or Microsoft Natural Keyboard |
| 061 | Motherboard resource |
| 062 | Microsoft ACPI-Compliant Embedded Controller |
| 063 | Motherboard resource |
| 064 | Standard 101-/102-key or Microsoft Natural Keyboard |
| 065 | Motherboard resources |
| 066 | Microsoft ACPI-Compliant Embedded Controller |
| 067 | Motherboard resources |
| 070 | Motherboard resources |
| 071-077 | System CMOS/real time clock |
| 080 | Motherboard resources |
| 081-091 | Direct memory access controller |
| 092 | Motherboard resources |
| 093-09F | Direct memory access controller |
| 0A0-0A1 | Program interrupt controller |
| 0A4-0A5 | Program interrupt controller |
| 0A8-0A9 | Program interrupt controller |
| 0AC-0AD | Program interrupt controller |
| 0B0-0B1 | Program interrupt controller |
| 0B2-0B3 | Motherboard resources |
| 0B4- 0B5 | Program interrupt controller |
| 0B8-0B9 | Program interrupt controller |
| 0BC- 0BD | Program interrupt controller |

(Continued)

| I/O address (hex) | System function (shipping configuration) |
|--------------------------|---|
| 0C0-0DF | Direct memory access controller |
| 0F0-0F0 | Numeric data processor |
| 0200-027F | Motherboard resource |
| 3B0-3BB | Mobile Intel® 4 Series Express Chipset Family |
| 3C0-3DF | Mobile Intel® 4 Series Express Chipset Family |
| 400-47F | Motherboard resource |
| 4D0-4D1 | Programmable interrupt controller |
| 500-57F | Motherboard resources |
| 1000-1003 | Motherboard resources |
| 1010-101F | Motherboard resources |
| 2000-20FF | Marvell Yukon 88E8072 PCI-E Gigabit Ethernet Controller |
| 2000-2FFF | ICH9 Family PCI Express Root Port6-294A |
| 3000-4FFF | ICH9 Family PCI Express Root Port5-2948 |
| 5000-6FFF | ICH9 Family PCI Express Root Port3-2944 |
| 7000-701F | ICH9M-E/M SATA AHCI Controller |
| 7020-703F | ICH9 Family USB Universal Host Controller-2936 |
| 7040-705F | ICH9 Family USB Universal Host Controller-2935 |
| 7060-707F | ICH9 Family USB Universal Host Controller-2934 |
| 7080-709F | ICH9 Family USB Universal Host Controller-2939 |
| 70A0-70BF | ICH9 Family USB Universal Host Controller-2938 |
| 70C0-70DF | ICH9 Family USB Universal Host Controller-2937 |
| 70E0-70E7 | ICH9M-E/M SATA AHCI Controller |
| 70E8-70EF | ICH9M-E/M SATA AHCI Controller |
| 70F0-70F7 | Mobile Intel(R) 4 Series Express Chipset Family |
| 70F8-70FB | ICH9M-E/M SATA AHCI Controller |
| 70FC-70FF | ICH9M-E/M SATA AHCI Controller |
| EF80-EF9F | Motherboard resources |
| FE00-FE0F | Motherboard resources |
| FE80-EF8F | Motherboard resources |
| FFFF | Motherboard resources |

System memory map specifications

| Size | Memory address | System function |
|--------|--------------------------|---|
| 640 KB | 00000000-0009FFFF | Base memory |
| 128 KB | 000A0000-000BFFFF | Video memory |
| 64 KB | 000C0000-000CFFFF | Video BIOS |
| 64 KB | 000E8000-000FFFFF | System BIOS |
| | 00100000- XFFFFFFF | Extended memory (based on memory installed) |
| | (X+1)00000000-FEDFFFFFFF | PCI bus |
| | FED00000-FED003FF | High precision event timer |
| | FEE01000-FFFFFFF | PCI bus |

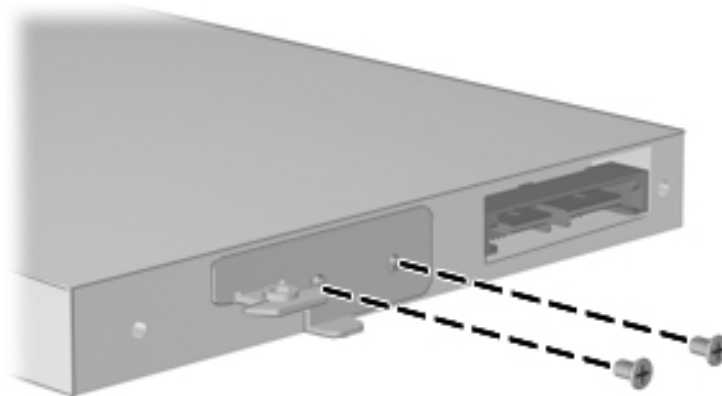
Screw listing

This section provides specification and reference information for the screws used in the computer. Some screws listed in this section are available in the Screw Kit, spare part number 493277-001.

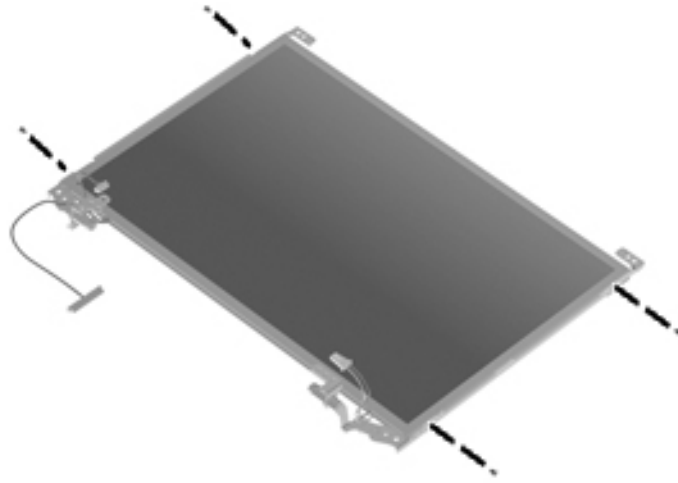
Phillips PM1.5×3.0 screw



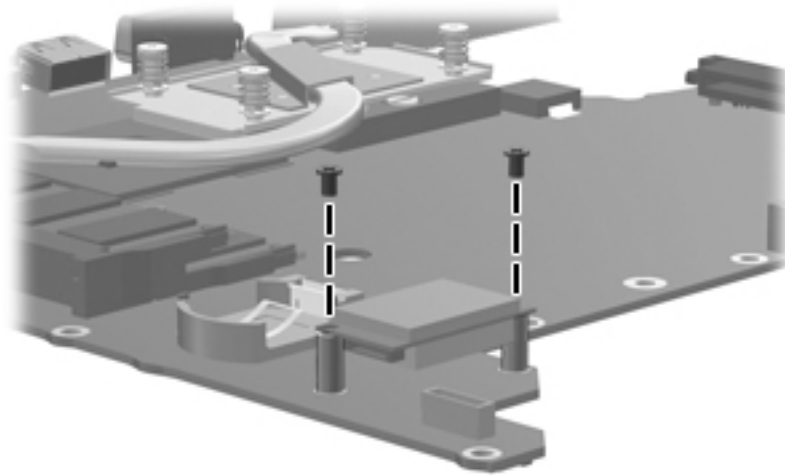
| Color | Quantity | Length | Thread | Head diameter |
|--------|----------|--------|--------|---------------|
| Silver | 8 | 3.0 mm | 1.5 mm | 3.0 mm |



Where used: 2 screws that secure the optical drive bracket to the optical drive

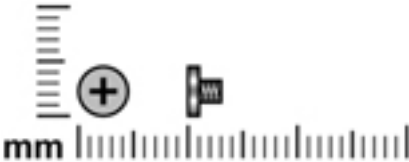


Where used: 4 screws that secure the display hinges to the display panel

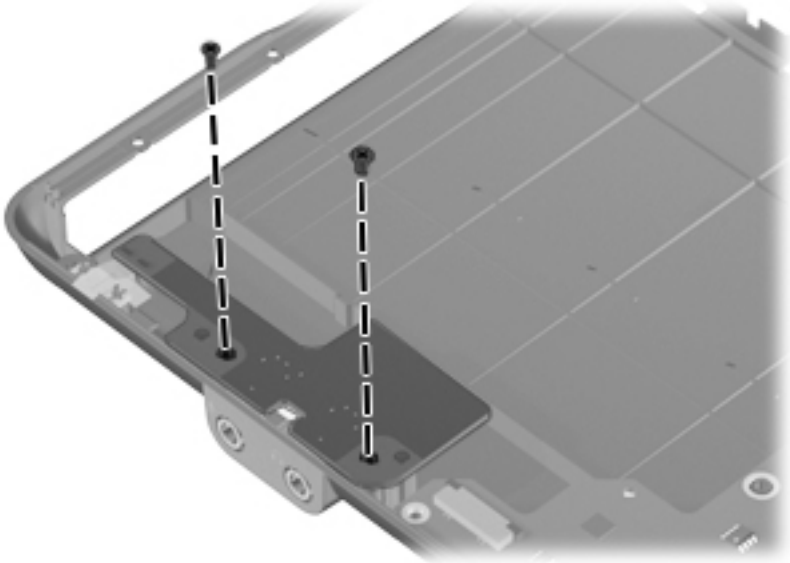


Where used: 2 screws that secure the Bluetooth module to the system board

Phillips PM2.0×3.0 screw

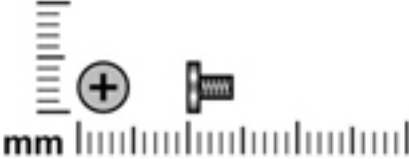


| Color | Quantity | Length | Thread | Head diameter |
|--------|----------|--------|--------|---------------|
| Silver | 2 | 3.0 mm | 2.0 mm | 3.0 mm |

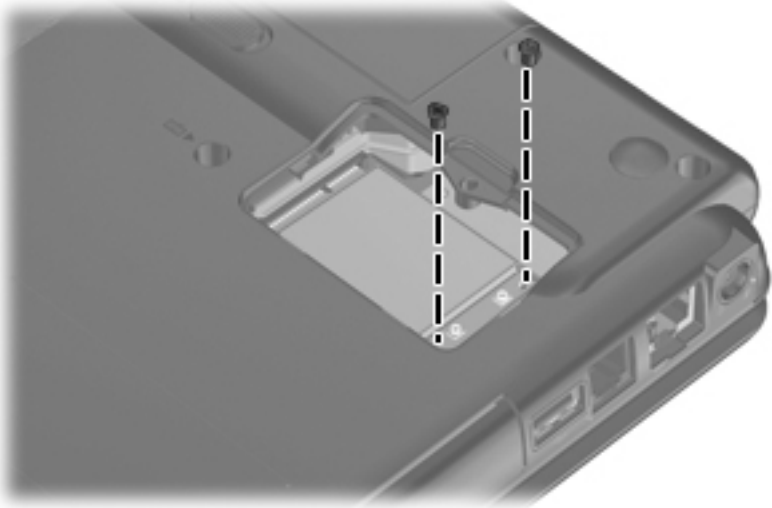


Where used: 2 screws that secure the audio board to the base enclosure

Phillips PM2.0×4.0 screw

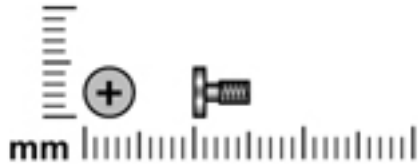


| Color | Quantity | Length | Thread | Head diameter |
|--------|----------|--------|--------|---------------|
| Silver | 2 | 4.0 mm | 2.0 | 3.5 mm |

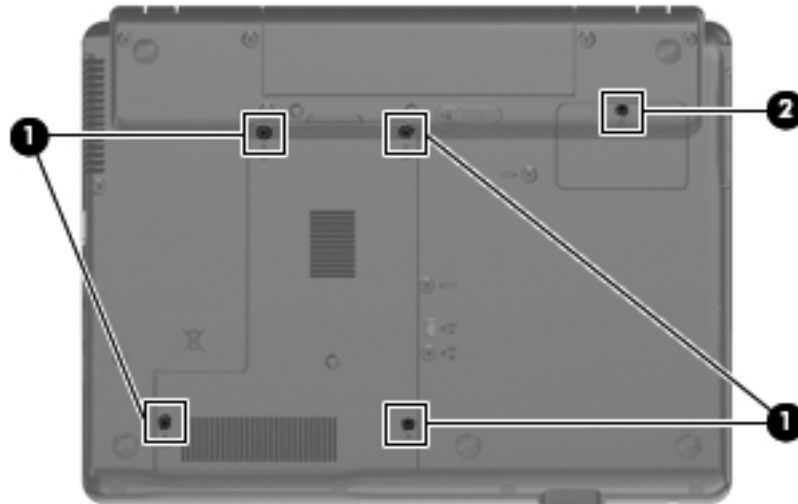


Where used: 2 screws that secure the WLAN module to the system board

Phillips PM2.0×5.0 captive screw

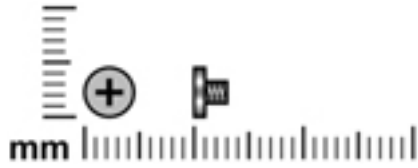


| Color | Quantity | Length | Thread | Head diameter |
|-------|----------|--------|--------|---------------|
| Black | 5 | 5.0 mm | 2.0 mm | 3.5 mm |

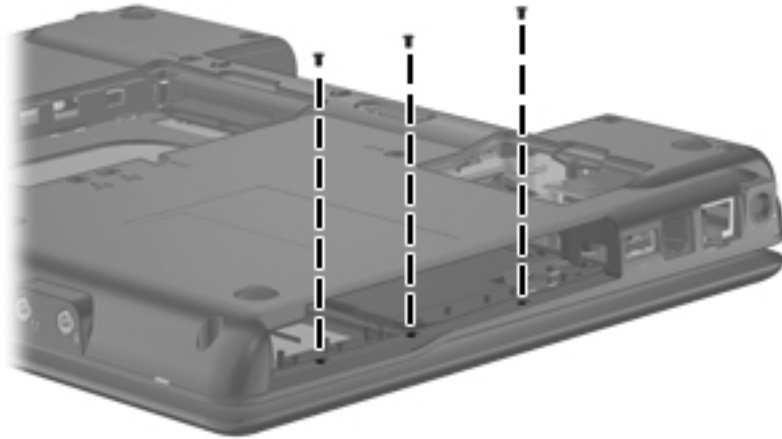


Where used: 4 captive screws ❶ that secure the hard drive cover to the computer and 1 captive screw ❷ that secures the wireless module compartment cover to the computer

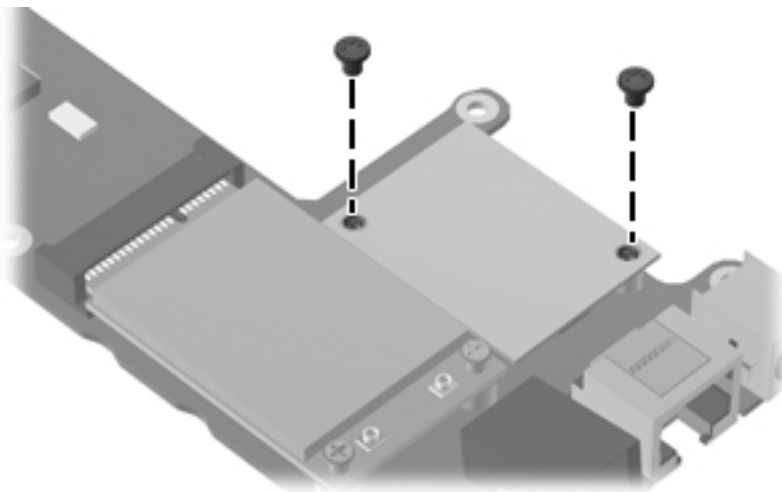
Phillips PM2.0×3.0 screw



| Color | Quantity | Length | Thread | Head diameter |
|-------|----------|--------|--------|---------------|
| Black | 5 | 3.0 mm | 2.0 mm | 4.0 mm |

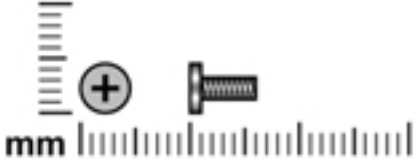


Where used: 3 screws (in optical drive bay) that secure the top cover to the computer



Where used: 2 screws that secure the modem module to the system board

Phillips PM2.0×6.0 screw

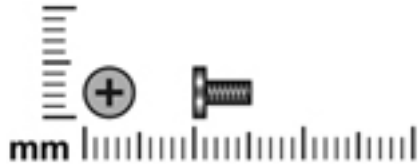


| Color | Quantity | Length | Thread | Head diameter |
|-------|----------|--------|--------|---------------|
| Black | 2 | 6.0 mm | 2.0 mm | 4.0 mm |

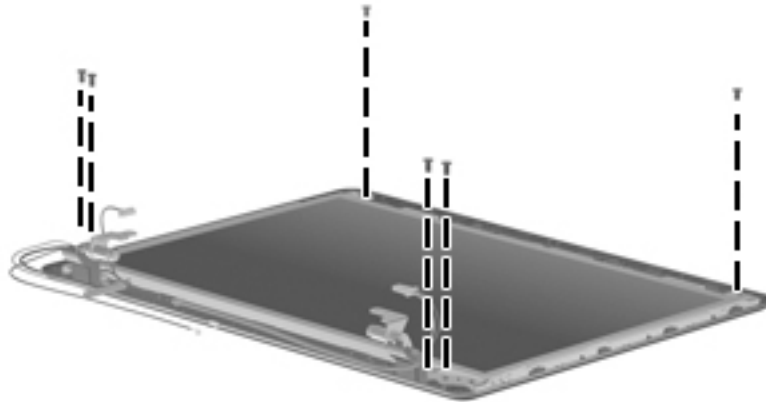


Where used: 2 screws that secure the display hinge covers to the display enclosure

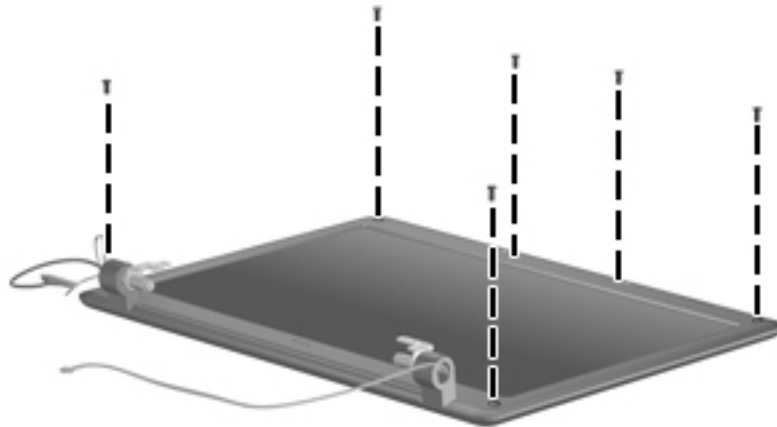
Phillips PM2.0×5.0 screw



| Color | Quantity | Length | Thread | Head diameter |
|--------|----------|--------|--------|---------------|
| Silver | 12 | 5.0 mm | 2.0 mm | 4.0 mm |

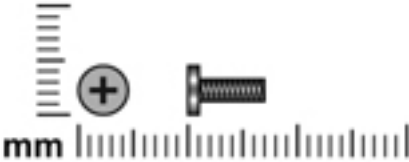


Where used: 6 screws that secure the display panel to the display enclosure

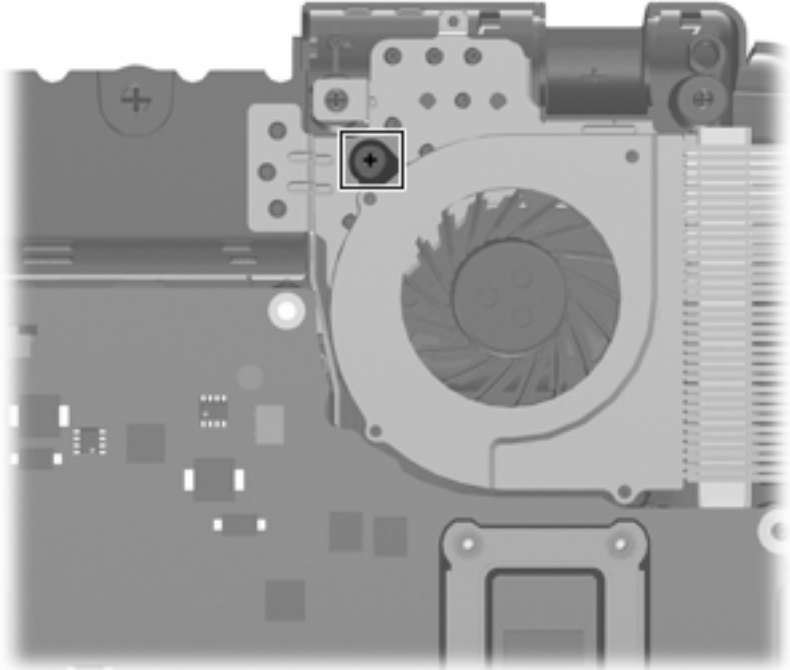


Where used: 6 screws that secure the display bezel to the display enclosure

Phillips PM2.0×7.0 captive screw

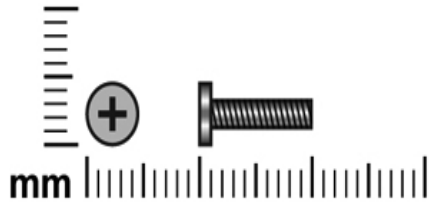


| Color | Quantity | Length | Thread | Head diameter |
|--------|----------|--------|--------|---------------|
| Silver | 1 | 7.0 mm | 2.0 mm | 4.0 mm |

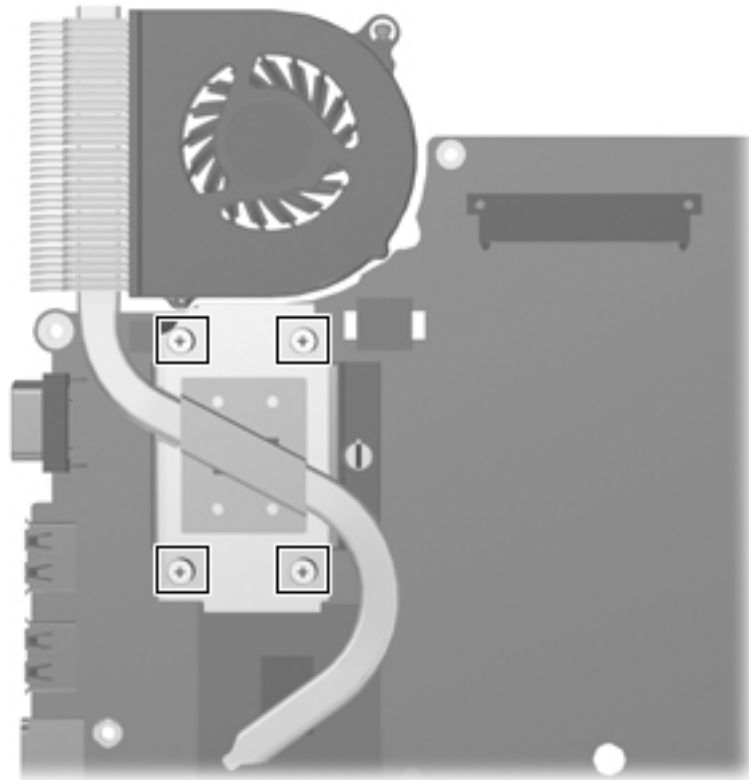


Where used: 1 captive screw that secures the fan to the base enclosure

Phillips PM2.0×10.0 captive screw

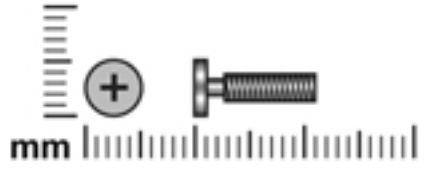


| Color | Quantity | Length | Thread | Head diameter |
|--------|----------|---------|--------|---------------|
| Silver | 4 | 10.0 mm | 2.0 | 5.0 mm |

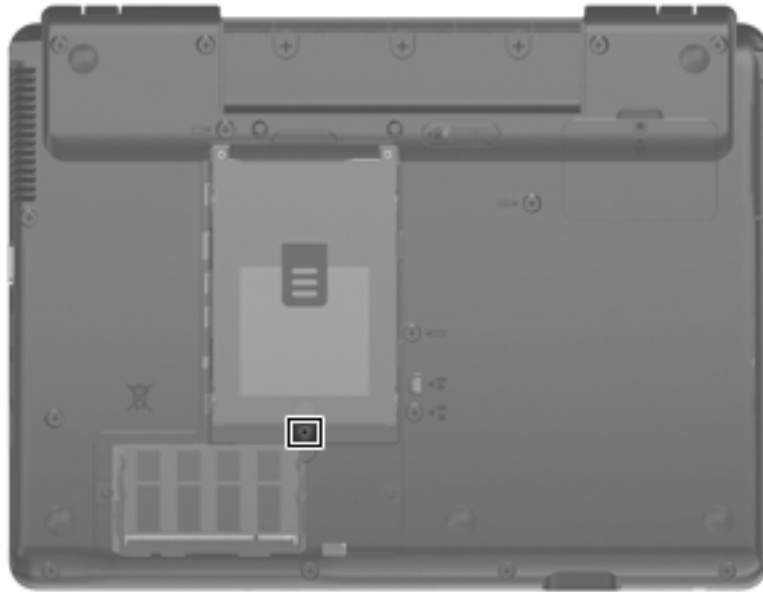


Where used: 4 captive screws that secure the heat sink to the system board

Phillips PM2.5×10.0 captive screw

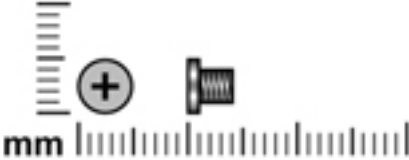


| Color | Quantity | Length | Thread | Head diameter |
|-------|----------|---------|--------|---------------|
| Black | 1 | 10.0 mm | 2.5 | 5.0 mm |



Where used: 1 captive screw that secures the hard drive to the computer

Phillips PM3.0×3.0 screw

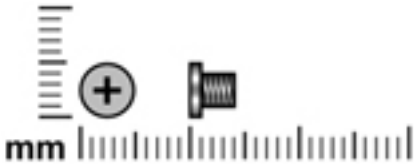


| Color | Quantity | Length | Thread | Head diameter |
|--------|----------|--------|--------|---------------|
| Silver | 4 | 3.0 mm | 3.0 | 4.5 mm |

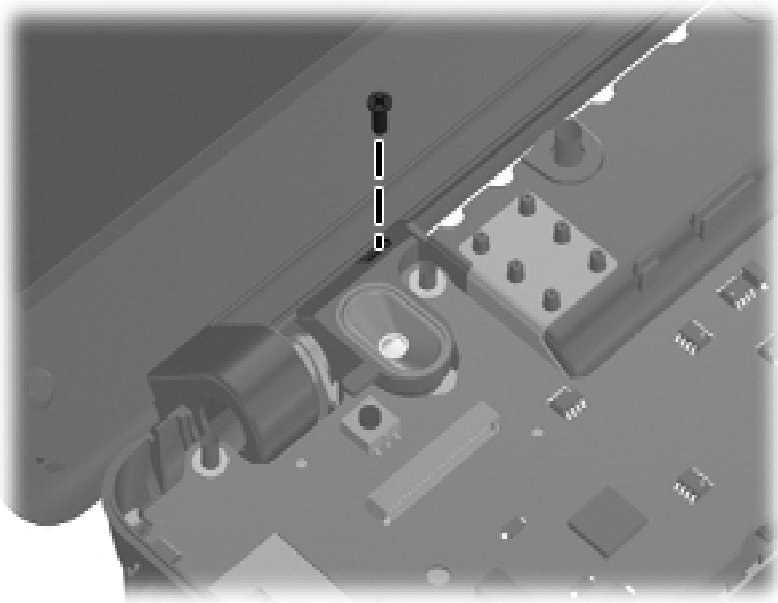


Where used: 4 screws that secure the hard drive bracket to the hard drive

Phillips PM3.0×4.0 screw



| Color | Quantity | Length | Thread | Head diameter |
|--------|----------|--------|--------|---------------|
| Silver | 1 | 4.0 mm | 3.0 | 4.5 mm |

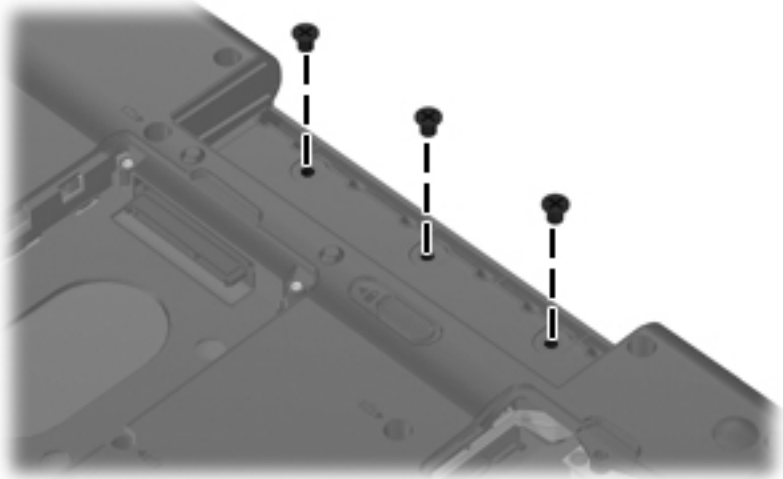


Where used: 1 screw that secures the speaker assembly to the base enclosure

Phillips T2.0×2.0BH screw

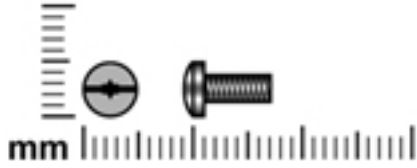


| Color | Quantity | Length | Thread | Head diameter |
|-------|----------|--------|--------|---------------|
| Black | 3 | 2.0 mm | 2.0 | 6.0 mm |



Where used: 3 screws (in the battery bay) that secure the top cover to the base enclosure

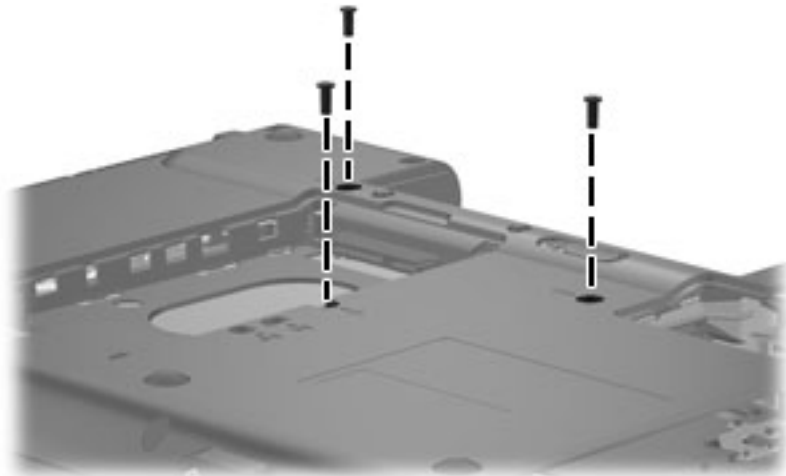
Torx T8M2.5×6.0 slotted screw



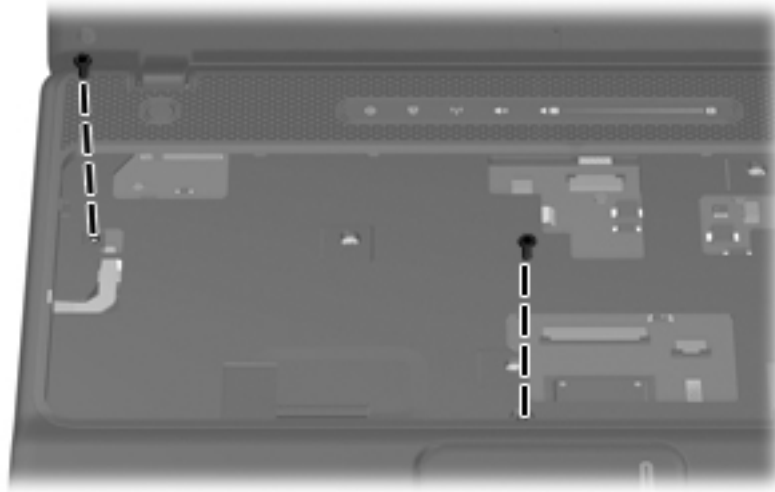
| Color | Quantity | Length | Thread | Head diameter |
|-------|----------|--------|--------|---------------|
| Black | 21 | 6.0 mm | 2.5 mm | 4.0 mm |



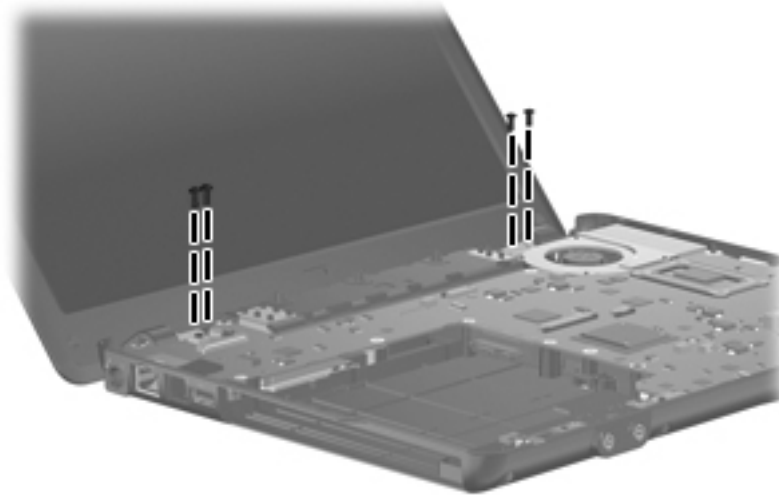
Where used: 1 screw that secures the optical drive to the computer



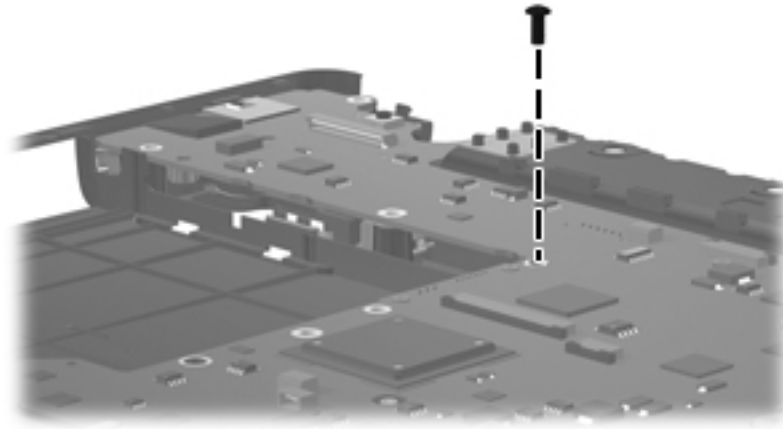
Where used: 3 screws that secure the keyboard to the computer



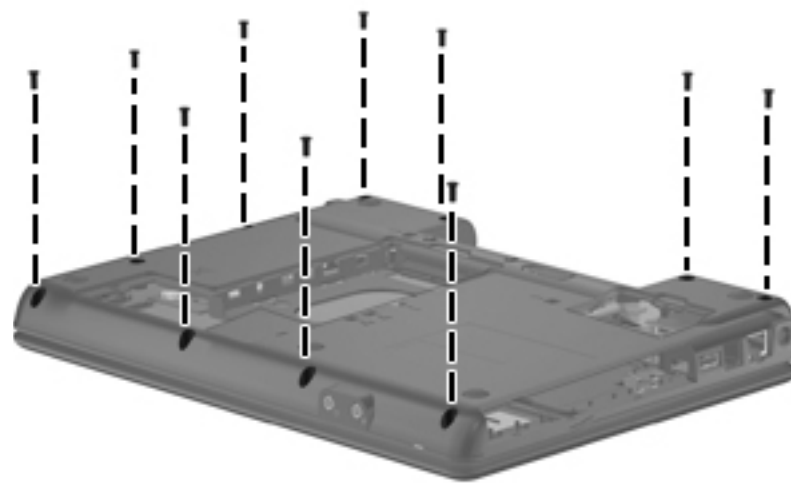
Where used: 2 screws that secure the top cover to the base enclosure (top)



Where used: 4 screws that secure the display assembly hinges to the computer



Where used: 1 screw that secures the system board to the base enclosure



Where used: 10 screws that secure the top cover to the base enclosure

Backup and recovery in Windows Vista

To protect your information, use the Backup and Restore Center to back up individual files and folders, back up your entire hard drive (select models only), or create system restore points. In case of system failure, you can use the backup files to restore the contents of your computer.

Windows Vista® provides the following advanced backup and recovery options:

- Backing up individual files and folders
- Backing up the entire hard drive (select models only)
- Scheduling automatic backups (select models only)
- Creating system restore points
- Recovering individual files
- Restoring the computer to a previous state
- Recovering information using recovery tools



For detailed instructions, perform a search for these topics in Help and Support.

Backup tips

- Connect the computer to AC power during the backup process.
- Store personal files in the Documents folder and back them up regularly.
- Back up templates that are stored in their associated programs.
- Save customized settings that appear in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time-saver if you have to reset your preferences.

To create a screen shot:

1. Display the screen you want to save.
2. Copy the screen image:
 - To copy only the active window, press **alt+fn+prt sc**.
 - To copy the entire screen, press **fn+prt sc**.
3. Open a word-processing document, and then select **Edit > Paste**.
 - The screen image is added to the document.
4. Save the document.

Backing up your information

Recovery after a system failure is as complete as your most current backup. You should create your initial backup immediately after software setup. As you add new software and data files, you should continue to back up your system on a regular basis to maintain a reasonably current backup.

To create a backup using Backup and Restore Center, follow these steps:

1. Select **Start > All Programs > Maintenance > Backup and Restore Center**.
2. Follow the on-screen instructions to back up your entire computer (select models only) or your files.



Windows includes the User Account Control feature to improve the security of your computer. You may be prompted for your permission or password for tasks such as installing software, running utilities, or changing Windows settings. Refer to Help and Support for more information.

Performing a recovery

In case of system failure, use the f11 recovery tool to recover your original hard drive image. The image includes the Windows operating system and software programs installed at the factory.



Windows Vista provides additional recovery tools through the operating system. For additional information, go to Help and Support.




If you are unable to boot (start up) your computer, you must purchase a Windows Vista operating system DVD to reboot the computer and repair the operating system. For additional information, refer to the “Recovering information using a Windows Vista operating system DVD (purchased separately)” section in this guide.

Recovering the hard drive using f11



CAUTION: Using **f11** will completely erase hard drive contents and reformat the hard drive. All files you have created and any software installed on the computer will be permanently removed. The **f11** recovery tool reinstalls the operating system and HP programs and drivers that were installed at the factory. Software not installed at the factory must be reinstalled.

To recover the original hard drive image, follow these steps:

1. If possible, back up all personal files.
2. If possible, check for the presence of the HP Recovery partition. To find the partition, select **Start > Computer**.
 -  If the HP Recovery partition has been deleted, you will need to recover your operating system and programs using the Windows Vista operating system DVD and the *Driver Recovery* disc (purchased separately). For additional information, refer to the “Recovering information using a Windows Vista operating system DVD (purchased separately)” section in this guide.
3. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
4. Press **f11** while the “Press <F11> for recovery” message is displayed on the screen.
5. Follow the on-screen instructions.

Recovering information using a Windows Vista operating system DVD (purchased separately)

If you are unable to boot (start up) your computer, you must purchase a Windows Vista operating system DVD to reboot the computer and repair the operating system. Make sure that your most recent backup (stored on discs or on an external drive) is easily accessible. To order a Windows Vista operating system DVD, go to <http://www.hp.com/support>, select your country or region, and follow the on-screen instructions. You can also order the DVD by calling technical support. For contact information, refer to the *Worldwide Telephone Numbers* booklet included with the computer.



CAUTION: Using a Windows Vista operating system DVD will completely erase hard drive contents and reformat the hard drive. All files you have created and any software installed on the computer will be permanently removed. When reformatting is complete, the recovery process will help you restore the operating system, as well as drivers, software, and utilities.

To initiate recovery using a Windows Vista operating system DVD, follow these steps:



This process will take several minutes.

1. If possible, back up all personal files.
2. Restart the computer, and then insert the Windows Vista operating system DVD into the optical drive before the Windows operating system loads.
3. When prompted, press any keyboard key.
4. Follow the on-screen instructions.
5. Click **Next**.
6. Select **Repair your computer**.
7. Follow the on-screen instructions.

Backup and recovery in Windows XP

To protect your information, use the Windows® Backup utility (select models only) to back up files and folders or create recovery points. In case of system failure, you can use the backup files to restore your computer.

Windows provides the following options:

- Backing up individual files and folders
- Backing up all files and folders
- Scheduling automatic backups
- Creating recovery points
- Recovering information



For detailed instructions, perform a search for these topics in Help and Support.



In case of system instability, HP recommends that you print the recovery procedures and save them for later use.

Backing up your information

Recovery after a system failure is as complete as your most current backup. You should create your initial backup immediately after software setup. As you add new software and data files, you should continue to back up your system on a regular basis to maintain a reasonably current backup.

You can back up individual files or folders to an optional external hard drive or to a network drive.

Note the following when backing up:

- Store personal files in the My Documents folder, and back it up periodically.
- Back up templates stored in their associated programs.
- Save customized settings that appear in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time-saver if you have to reset your preferences.

To copy the screen and paste it into a word-processing document:

1. Display the screen you want to save.
2. Copy the screen image:
 - To copy only the active window, press **alt+fn+prt sc**.
 - To copy the entire screen, press **fn+prt sc**.
3. Open a word-processing document, click **Edit > Paste**.
 - The screen image is added to the document.
4. Save the document.

To create a backup using the Windows Backup utility (select models only), follow these steps:



Be sure that the computer is connected to AC power before you start the backup process.



The backup process may take over an hour, depending on file size and the speed of the computer.

1. Click **Start > All Programs > Accessories > System Tools > Backup**.
2. Follow the on-screen instructions.

Performing a recovery

In case of system failure or instability, the computer provides the following tools to recover your files:

- Windows recovery tools (select models only): You can use the Windows Backup utility to recover information you have previously backed up.
- *Operating System and Driver Recovery* discs (included with your computer): You can use the discs to recover your operating system and programs installed at the factory.

Recovering your information

To recover information you previously backed up, follow these steps:

1. If possible, back up all personal files.
2. Click **Start > All Programs > Accessories > System Tools > Backup**.
The Backup or Restore Wizard opens.
3. Click **Restore files and settings**, and then click **Next**.
4. Follow the on-screen instructions.



For additional information on initiating a recovery in Windows, perform a search for this topic in Help and Support.

Recovering the operating system and programs



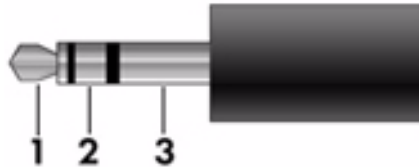
CAUTION: The recovery process reformats and completely erases the hard drive. All files you have created and any software installed on the computer are permanently removed. The recovery process reinstalls the original operating system, software, and drivers. Software, drivers, and updates not installed by HP must be manually reinstalled.

To recover your operating system and programs, follow these steps:

1. If possible, back up all personal files.
2. Insert the *Operating System* disc into the optical drive.
3. Shut down the computer.
4. Turn on the computer.
5. Follow the on-screen instructions to install the operating system.
6. After the operating system is installed, remove the *Operating System* disc and insert the *Driver Recovery* disc.
7. Follow the on-screen instructions to install the drivers and programs.

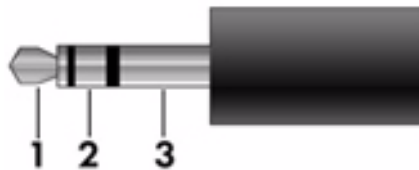
Connector pin assignments

Audio-in (microphone)



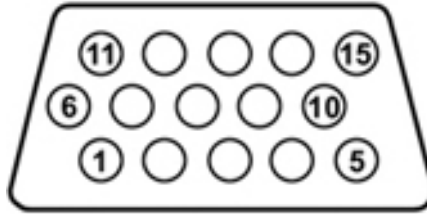
| Pin | Signal |
|-----|-----------------|
| 1 | Audio signal in |
| 2 | Audio signal in |
| 3 | Ground |

Audio-out (headphone)



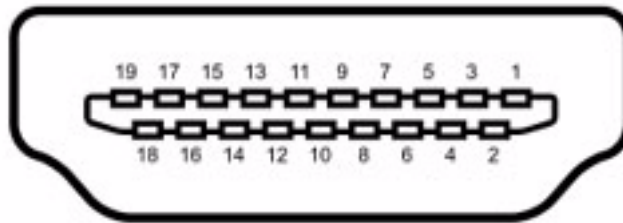
| Pin | Signal |
|-----|--------------------------|
| 1 | Audio out, left channel |
| 2 | Audio out, right channel |
| 3 | Ground |

External monitor



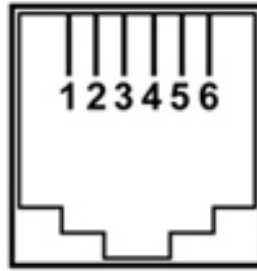
| Pin | Signal |
|-----|-----------------|
| 1 | Red analog |
| 2 | Green analog |
| 3 | Blue analog |
| 4 | Not connected |
| 5 | Ground |
| 6 | Ground analog |
| 7 | Ground analog |
| 8 | Ground analog |
| 9 | +5 VDC |
| 10 | Ground |
| 11 | Monitor detect |
| 12 | DDC 2B data |
| 13 | Horizontal sync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

HDMI



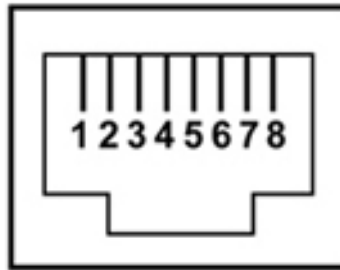
| Pin | Signal |
|-----|---|
| 1 | Transition minimized differential signal (TDMS) data 2+ |
| 2 | Transition minimized differential signal (TDMS) data 2 shield |
| 3 | Transition minimized differential signal (TDMS) data 2- |
| 4 | Transition minimized differential signal (TDMS) data 1+ |
| 5 | Transition minimized differential signal (TDMS) data 1 shield |
| 6 | Transition minimized differential signal (TDMS) data 1 shield |
| 7 | Transition minimized differential signal (TDMS) data 0+ |
| 8 | Transition minimized differential signal (TDMS) data 0 shield |
| 9 | Transition minimized differential signal (TDMS) data 0- |
| 10 | Transition minimized differential signal (TDMS) clock + |
| 11 | Transition minimized differential signal (TDMS) data clock shield |
| 12 | Transition minimized differential signal (TDMS) data clock- |
| 13 | Consumer electronics control (CEC) |
| 14 | Not connected |
| 15 | Display data channel (DDC) clock |
| 16 | Display data channel (DDC) data |
| 17 | Ground |
| 18 | +5V Power |
| 19 | Hot plug detect |

RJ-11 (modem)



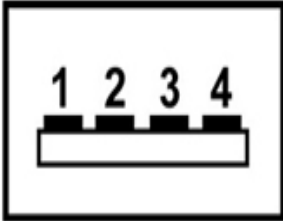
| Pin | Signal |
|-----|--------|
| 1 | Unused |
| 2 | Tip |
| 3 | Ring |
| 4 | Unused |
| 5 | Unused |
| 6 | Unused |

RJ-45 (network)



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

Universal Serial Bus



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

Power cord set requirements

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

The 3-conductor power cord set included with the computer meets the requirements for use in the country or region where the equipment is purchased.

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

Requirements for all countries and regions

The requirements listed below are applicable to all countries and regions:

- The length of the power cord set must be at least 1.5 m (5.0 ft) and no more than 2.0 m (6.5 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 amps and a nominal voltage rating of 125 or 250 V AC, as required by the power system of each country or region.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions


| Country/region | Accredited agency | Applicable note number |
|--------------------------------|-------------------|------------------------|
| Australia | EANSW | 1 |
| Austria | OVE | 1 |
| Belgium | CEBC | 1 |
| Canada | CSA | 2 |
| Denmark | DEMKO | 1 |
| Finland | FIMKO | 1 |
| France | UTE | 1 |
| Germany | VDE | 1 |
| Italy | IMQ | 1 |
| Japan | METI | 3 |
| The Netherlands | KEMA | 1 |
| Norway | NEMKO | 1 |
| The People's Republic of China | CCC | 5 |
| South Korea | EK | 4 |
| Sweden | SEMKO | 1 |
| Switzerland | SEV | 1 |
| Taiwan | BSMI | 4 |
| The United Kingdom | BSI | 1 |
| The United States | UL | 2 |


1. The flexible cord must be Type HO5VV-F, 3-conductor, 1.0-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
2. The flexible cord must be Type SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V) configuration.
3. The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 1.00-mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) configuration.
4. The flexible cord must be Type RVV, 3-conductor, 0.75-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
5. The flexible cord must be Type VCTF, 3-conductor, 0.75-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.


Battery

When a battery has reached the end of its useful life, do not dispose of the battery in general household waste. Follow the local laws and regulations in your area for computer battery disposal.

Display


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

 **CAUTION:** The procedures in this chapter can result in damage to display components. The only components intended for recycling purposes are the liquid crystal display (LCD) panel and the backlight. When you remove these components, handle them carefully.

 **Materials disposal.** This HP product contains mercury in the backlight in the display assembly that might require special handling at end-of-life. Disposal of mercury may be regulated because of environmental considerations. For disposal or recycling information, contact your local authorities, or see the Electronic Industries Alliance (EIA) Web site at <http://www.eiae.org>.

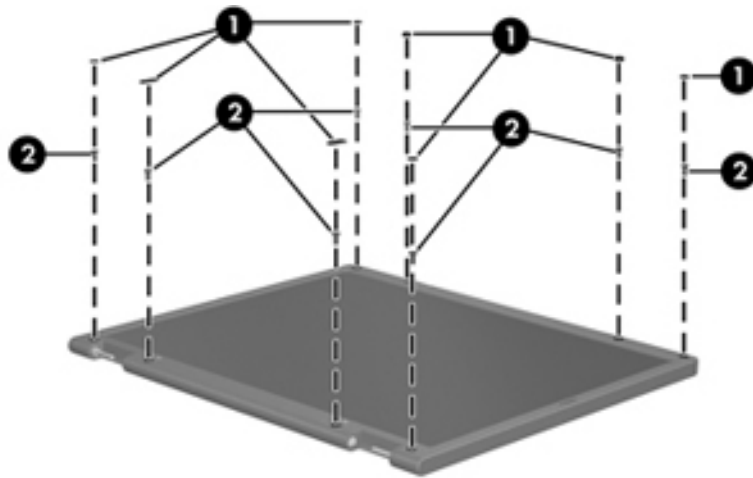
This section provides disassembly instructions for the display assembly. The display assembly must be disassembled to gain access to the backlight ❶ and the liquid crystal display (LCD) panel ❷.



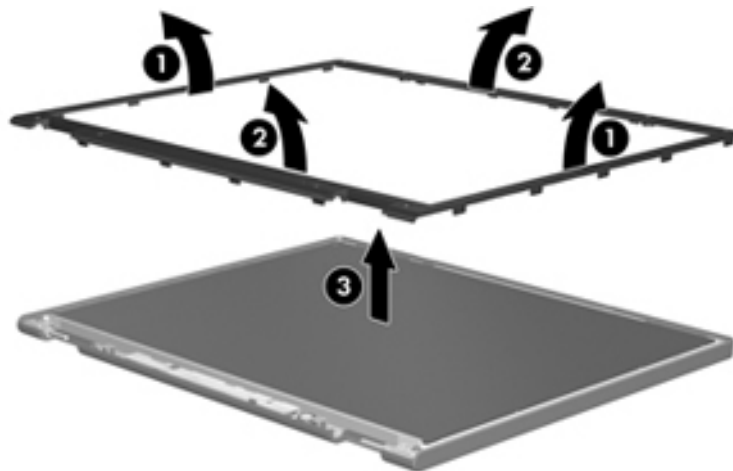
 The procedures provided in this chapter are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

Perform the following steps to disassemble the display assembly:

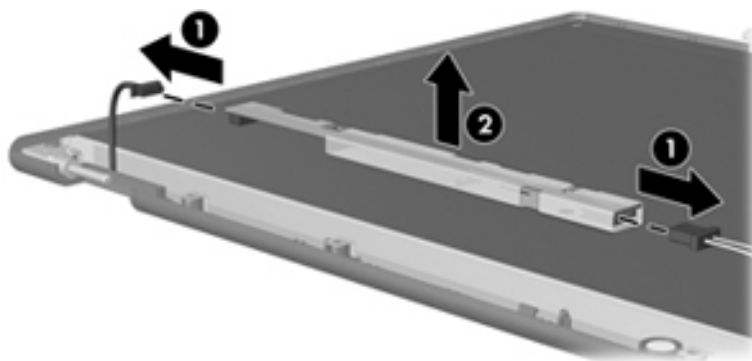
1. Remove all screw covers ① and screws ② that secure the display bezel to the display assembly.



2. Lift up and out on the left and right inside edges ① and the top and bottom inside edges ② of the display bezel until the bezel disengages from the display assembly.
3. Remove the display bezel ③.

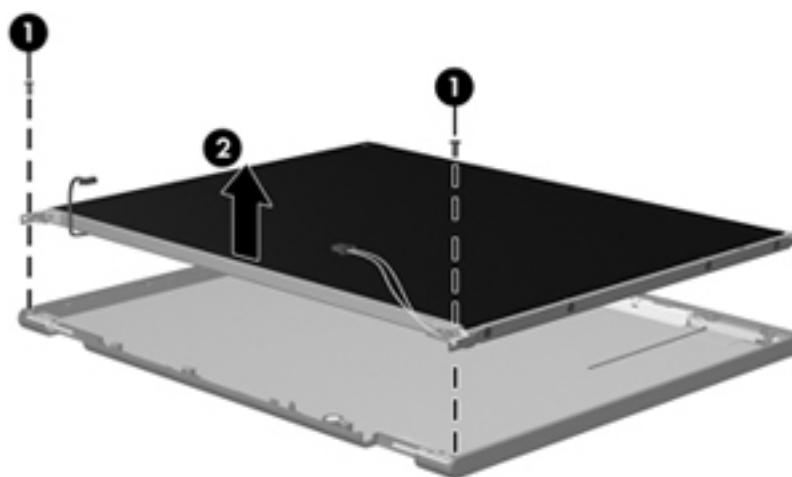


4. Disconnect all display panel cables ❶ from the display inverter and remove the inverter ❷.



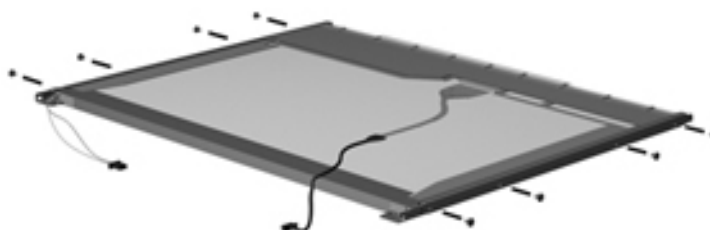
5. Remove all screws ❶ that secure the display panel assembly to the display enclosure.

6. Remove the display panel assembly ❷ from the display enclosure.

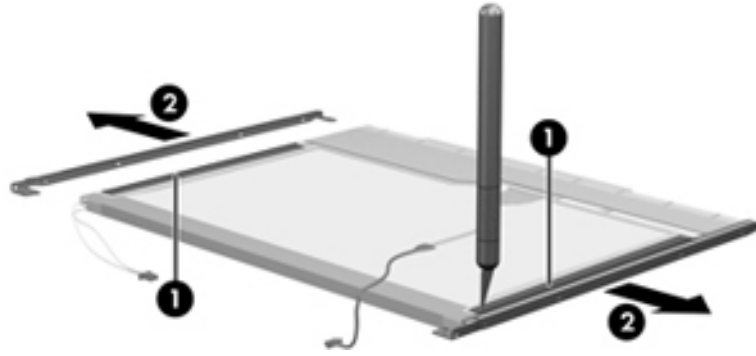


7. Turn the display panel assembly upside down.

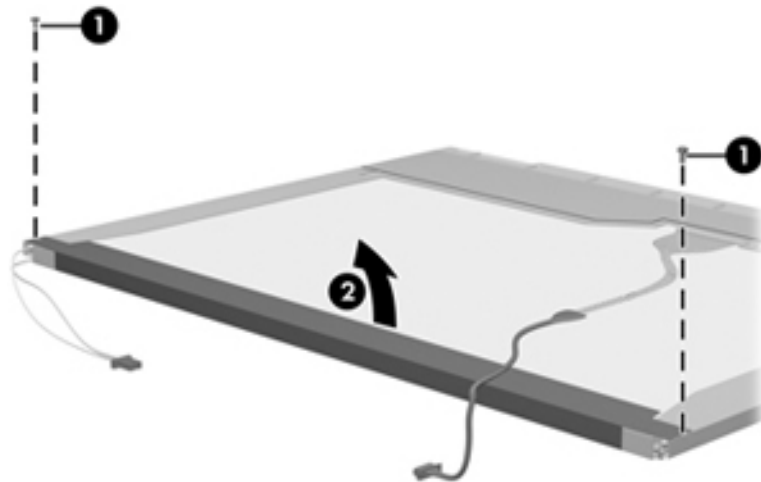
8. Remove all screws that secure the display panel frame to the display panel.



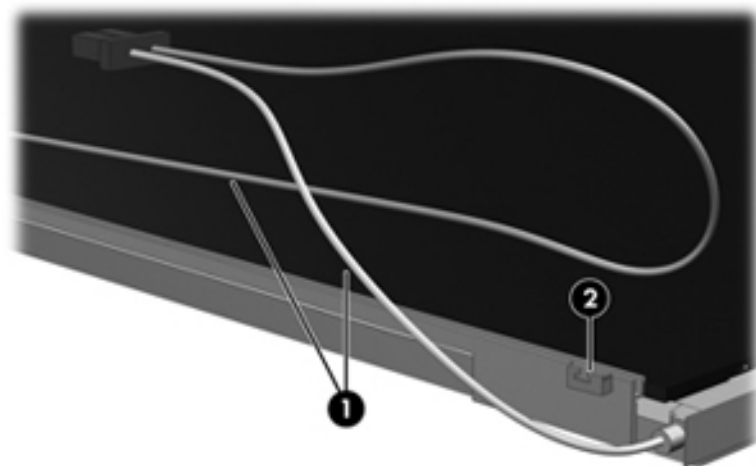
9. Use a sharp-edged tool to cut the tape ① that secures the sides of the display panel to the display panel frame.
10. Remove the display panel frame ② from the display panel.



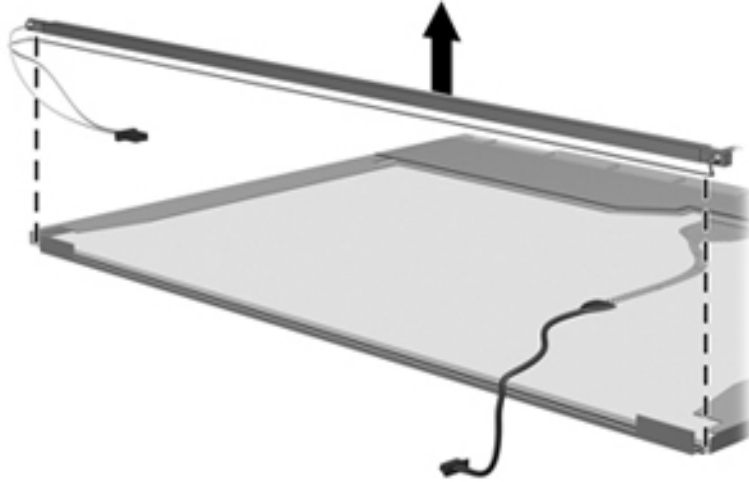
11. Remove the screws ① that secure the backlight cover to the display panel.
12. Lift the top edge of the backlight cover ② and swing it outward.




13. Remove the backlight cover.
14. Turn the display panel right-side up.
15. Remove the backlight cables ① from the clip ② in the display panel.

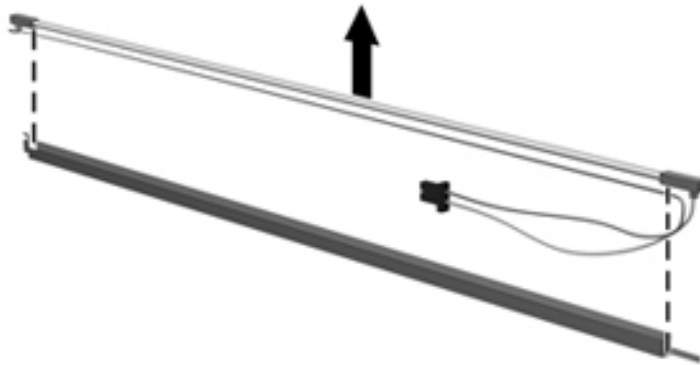


16. Turn the display panel upside down.
17. Remove the backlight frame from the display panel.

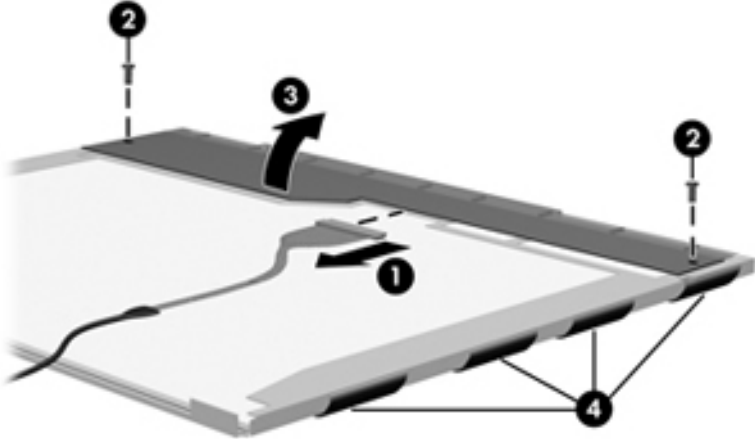


 **WARNING:** The backlight contains mercury. Exercise caution when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.

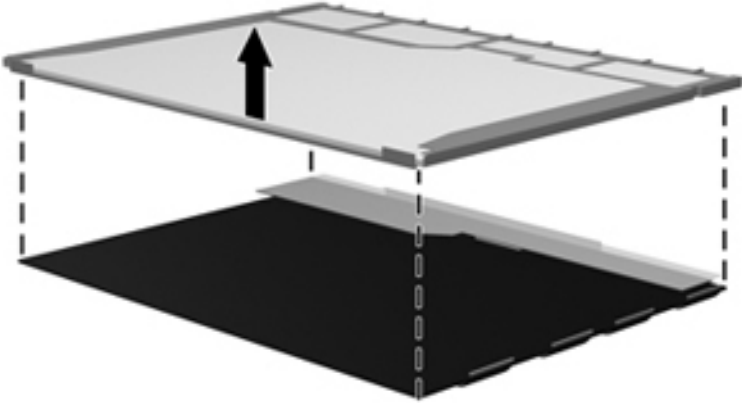
18. Remove the backlight from the backlight frame.



- 19. Disconnect the display cable ❶ from the LCD panel.
- 20. Remove the screws ❷ that secure the LCD panel to the display rear panel.
- 21. Release the LCD panel ❸ from the display rear panel.
- 22. Release the tape ❹ that secures the LCD panel to the display rear panel.



- 23. Remove the LCD panel.



- 24. Recycle the LCD panel and backlight.

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