



HP HDX 18 Entertainment 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 |
|---------------------|--|
| Product name | HP HDX 18 Entertainment PC |
| Processors | <p>Intel® Core™2 Duo processors:</p> <ul style="list-style-type: none"> ■ QX9300 2.53-GHz processor, 12-MB L2 cache, 1066-MHz front side bus (FSB) ■ QX9100 2.26-GHz processor, 12-MB L2 cache, 1066-MHz FSB ■ QX9000 2.00-GHz processor, 12-MB L2 cache, 1066-MHz FSB ■ T9600 2.80-GHz processor, 6-MB L2 cache, 1066-MHz FSB ■ T9500 2.53-GHz processor, 6-MB L2 cache, 1066-MHz FSB ■ P8600 2.40-GHz processor, 3-MB L2 cache, 1066-MHz FSB ■ P8400 2.26-GHz processor, 3-MB L2 cache, 1066-MHz FSB |
| Chipset | <p>Northbridge: Intel PM45 Southbridge: Intel ICH9M</p> |
| Graphics | nVidia GeForce 9650M GT with 1024 MB or 512 MB of dedicated video memory |
| Panel | <p>18.4-inch dual-channel low-voltage differential signaling (LVDS), full high-definition (FHD), AntiGlare (1920×1080) display assembly with dual lamps 16:9 ultra wide aspect ratio Typical brightness: 250 nits Supports flush glass AntiGlare panel cover support Lighted logo on display enclosure All display assemblies include 2 wireless local area network (WLAN) antennae</p> |
| Memory | <p>2 customer-accessible/upgradable memory module slots Supports dual-channel memory Supports up to 8 GB of system RAM PC2-6400, 800-MHz, DDR2</p> <hr/> <p>Supports the following configurations:</p> <ul style="list-style-type: none"> ■ 8192-MB total system memory (4096 × 2, dual-channel) ■ 4096-MB total system memory (2048 × 2, dual-channel) ■ 3072-MB total system memory (2048 + 1024) ■ 2048-MB total system memory (1024 × 2, dual-channel) ■ 2048-MB total system memory (2048 × 1) ■ 1024-MB total system memory (1024 × 1) |

(Continued)

| Category | Description |
|-----------------------|--|
| Hard drives | <p>Supports 9.50-mm, 6.35-cm (2.50-inch) hard drives</p> <p>Supports second hard drive</p> <p>Supports HP 3D DriveGuard protection</p> <p>Customer-accessible</p> <p>Serial ATA</p> <hr/> <p>Supports the following hard drives:</p> <ul style="list-style-type: none"> ■ 500-GB, 5400-rpm ■ 400-GB, 5400-rpm ■ 320-GB, 7200-rpm ■ 320-GB, 5400-rpm ■ 250-GB, 7200-rpm ■ 250-GB, 5400-rpm ■ 160-GB, 7200-rpm ■ 160-GB, 5400-rpm ■ 80-GB, 5400-rpm <hr/> <p>Supports the following dual hard drive configurations:</p> <ul style="list-style-type: none"> ■ 1000-GB, 5400-rpm (500-GB × 2) ■ 800-GB, 5400-rpm (400-GB × 2) ■ 640-GB, 5400-rpm (320-GB × 2) ■ 500-GB, 5400-rpm (250-GB × 2) ■ 320-GB, 7200-rpm (160-GB × 2) ■ 320-GB, 5400-rpm (160-GB × 2) ■ 160-GB, 5400-rpm (80-GB × 2) |
| Optical drives | <p>12.7-mm tray load</p> <p>Serial ATA (SATA)</p> <p>Fixed (removal of 1 screw required)</p> <p>Customer-accessible</p> <p>Parallel ATA</p> <p>Supports no-optical-drive option</p> <hr/> <p>Supports the following drives:</p> <ul style="list-style-type: none"> ■ Blu-ray ROM DVD±RW SuperMulti DL Drive with LightScribe ■ Blu-ray ROM DVD±RW SuperMulti DL Drive ■ Blu-ray ROM DVD±RW SuperMulti Drive |
| Microphone | <p>2 omni-directional, dual-array digital microphones with beam-forming, echo-cancellation, noise-suppression software</p> |

(Continued)

| Category | Description |
|-----------------------------|--|
| Audio | High-definition audio Integrated subwoofer Supports Microsoft® premium requirements 2 Altec Lansing Pavilion-branded speakers |
| Webcam | Low-light VGA camera Fixed (no tilt) Activity LED 640 × 480 by 30 24 frames per second |
| Modem | 56K V.92 1.5-inch data/fax modem with digital line guard Modem cable is not included |
| Ethernet | Intel Realtek 8111C 10/100/1000 network interface card (NIC) Intel Realtek 8102E 10/100 NIC Ethernet cable included |
| Wireless | Integrated WLAN options by way of wireless module: 2 wireless antennae built into display assembly Supports no-WLAN option Support for the following WLAN formats: <ul style="list-style-type: none"> ■ Intel WiFi Link 5100 802.11a/b/g/n ■ Intel WiFi Link 5100 802.11a/b/g/n with Bluetooth® ■ Intel WiFi Link 5100 802.11a/b/g ■ Intel WiFi Link 5100 802.11a/b/g with Bluetooth ■ Atheros 802.11a/b/g/n ■ Atheros 802.11a/b/g/n with Bluetooth |
| TV tuner | DVB-T TV tuner module DVB-T/ANG TV tuner module NTSC/ATSC/ANG TV tuner module TV tuner antennae with F-PAL and PAL jacks |
| External media cards | One ExpressCard slot, supporting optional ExpressCard/54 cards Digital Media Slot supporting Memory Stick (MS), Memory Stick Pro (MSP), MultiMediaCard (MMC), Secure Digital (SD) Memory Card, and xD-Picture Card (XD) |

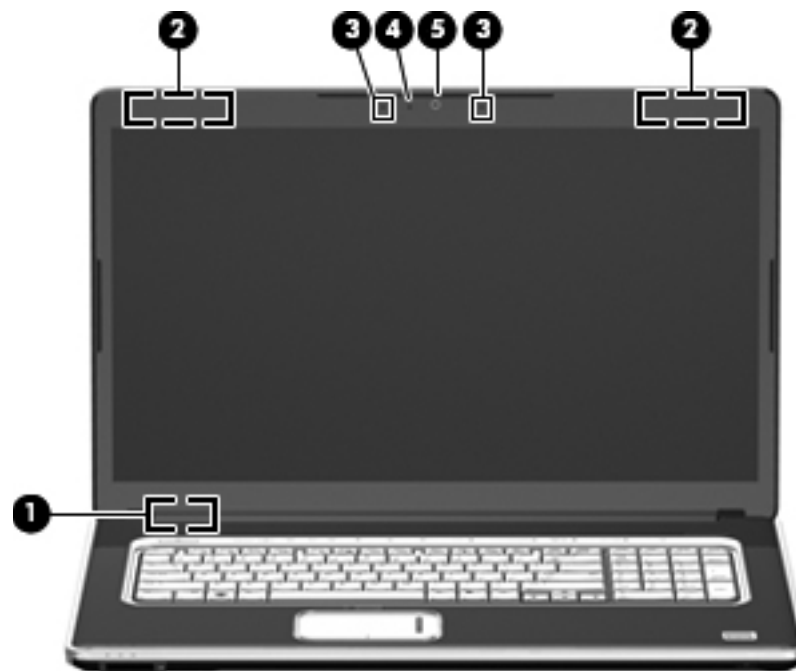
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| Category | Description |
|----------------------------------|---|
| Ports | 1394 Audio-in (mono microphone) Audio-out (stereo headphones, 2) Consumer infrared eSATA HDMI Multi-pin AC power RJ-45 (Ethernet, includes link and activity lights) TV tuner USB (3) VGA (Dsub 15-pin) supporting 1600 × 1200 external resolution at 75 GHz (hot plug/unplug with auto-detect) |
| Docking | Supports expansion port 3 docking connector |
| Keyboard/pointing devices | Spill-resistant keyboard TouchPad with 2 TouchPad buttons Supports 2-way scroll Taps enabled as default |
| Power requirements | 120-W AC adapter with localized and pointing stick cable plug support (3-wire plug with ground pin, supports 3-pin DC connector) 8-cell, 2.55-Ah (73-Wh) Li-ion battery |
| Security | Security cable slot Fingerprint reader with Digital Persona software support |
| Operating system | Preinstalled: Windows Vista® Ultimate (64 bit) Windows Vista Premium (32 and 64 bit) Windows Vista Home Basic (32 bit) FreeDOS RedFlag |
| Serviceability | End-user replaceable parts: AC adapter Battery (system) Hard drive Memory module Optical drive WLAN module |

External component identification

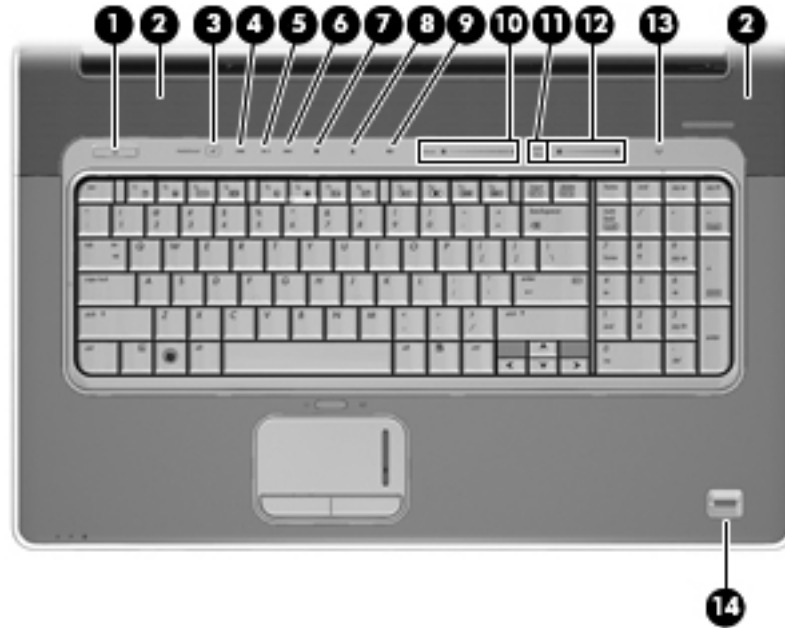
Top components


Display components




| Item | Component | Description |
|---|--|---|
| ❶ | Internal display switch | Turns off the display if the display is closed while the computer is on. |
| ❷ | Wireless antennae (2) | Send and receive wireless signals to communicate with WLANs.  The antennae are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennae free from obstructions. |
| ❸ | Internal digital dual-array microphones (2) | Record sound. |
| ❹ | Webcam light | On: The webcam is in use. |
| ❺ | Webcam | Records audio and video and captures still photographs. |
|  | To see wireless regulatory notices, refer to the section of the <i>Regulatory, Safety and Environmental Notices</i> that applies to your country or region. These notices are located in Help and Support. | |

Buttons, speakers, and fingerprint reader



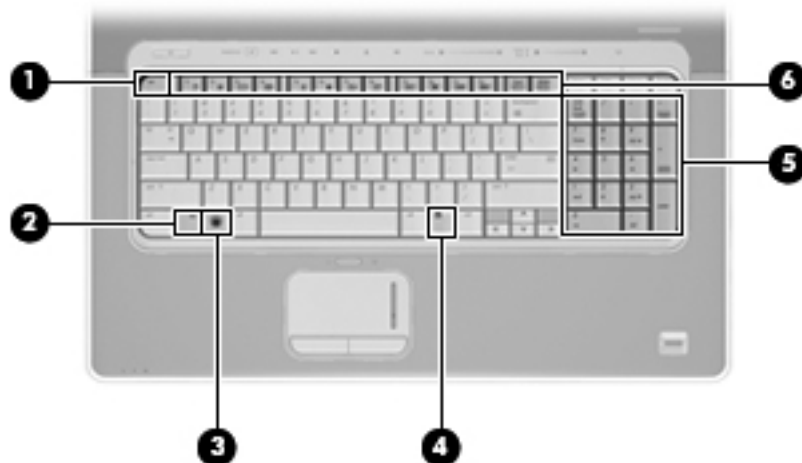
| Item | Component | Function |
|------|--------------------------|--|
| ❶ | Power button* | <ul style="list-style-type: none"> ■ When the computer is off, press the button to turn on the computer. ■ When the computer is on, briefly press the button to initiate Sleep. ■ When the computer is in the Sleep state, briefly press the button to exit Sleep. ■ When the computer is in Hibernation, briefly press the button 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 your power settings, select Start > Control Panel > System and Maintenance > Power Options.</p> |
| ❷ | Speakers (2) | Produce sound. |
| ❸ | Media button | <p>Starts the MediaSmart program from any power state.</p> <p> If the computer has been set up to require a logon password, you may be asked to log on to Windows. MediaSmart starts after you log on. For more information on using MediaSmart, select Start > Help and Support.</p> |
| ❹ | Previous/rewind button | <ul style="list-style-type: none"> ■ Plays the previous track or chapter when the button is pressed once. ■ Rewinds media when the button is pressed in combination with the fn key. |
| ❺ | Play/pause button | Plays or pauses media. |
| ❻ | Next/fast forward button | <ul style="list-style-type: none"> ■ Plays the next track or chapter when the button is pressed once. ■ Fast forwards media when pressed in combination with the fn key. |
| ❼ | Stop button | Stops playback. |
| ❽ | Optical drive button | Releases the media tray. |
| ❾ | Volume mute button | Mutes and restores speaker sound. |

(Continued)

| Item | Component | Function |
|------|----------------------------|---|
| 10 | Volume scroll zone | Adjusts speaker volume. To decrease volume, slide your finger to the left, or press and hold the minus (-) sign. You can also tap the minus sign. To increase volume, slide your finger to the right, or press and hold the plus (+) sign. You can also tap the plus sign. |
| 11 | Treble/bass button | Press the button to alternate between the treble and bass functions. |
| 12 | Treble or bass scroll zone | Adjusts treble or bass level in the audio. (Select treble or bass by pressing the treble/bass button.) To decrease the treble/bass level, slide your finger to the left, or press and hold the minus (-) sign. You can also tap the minus sign. To increase the treble/bass level, slide your finger to the right, or press and hold the plus (+) sign. You can also tap the plus sign. |
| 13 | 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 in order to establish a wireless connection. |
| 14 | Fingerprint reader | Allows a fingerprint logon to Windows, instead of a password logon. |

*This table describes factory settings. For information about changing factory settings, refer to the user guides located in Help and Support.

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 | Integrated 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. |

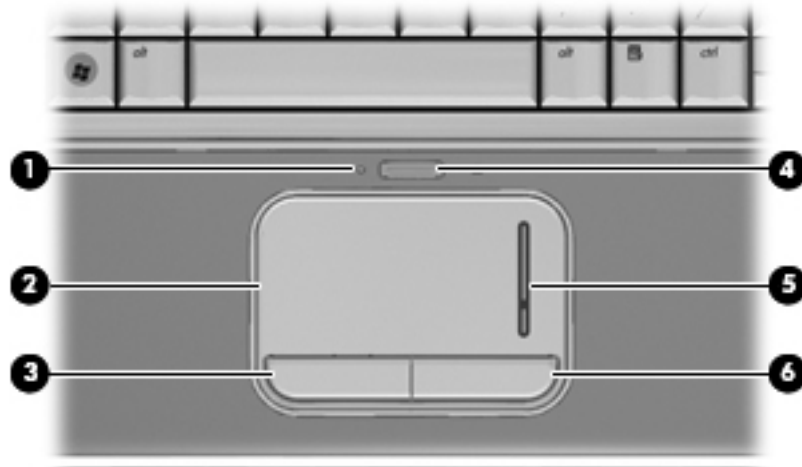
Lights



| Item | Component | Function |
|------|------------------------|---|
| ❶ | Power lights (2)* | <ul style="list-style-type: none"> ■ On: The computer is on. ■ Blinking: The computer is in the Sleep state. ■ Off: The computer is off or in Hibernation. |
| ❷ | Battery light | <ul style="list-style-type: none"> ■ On: A battery is charging. ■ Blinking: A battery that is the only available power source has reached a low battery level or a critical battery level. ■ Off: If the computer is plugged into an external power source, the light is turned 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 | Drive light | <ul style="list-style-type: none"> ■ Blinking: The hard drive or optical drive is being accessed. ■ Amber: HP ProtectSmart Hard Drive Protection has temporarily parked the internal hard drive. |
| ❹ | Caps lock light | On: Caps lock is on. |
| ❺ | Volume mute light | <ul style="list-style-type: none"> ■ White: Computer sound is on. ■ Amber: Computer sound is off. |
| ❻ | Volume down light | On: The volume scroll zone is being used to decrease speaker volume. |
| ❼ | Volume up light | On: The volume scroll zone is being used to increase speaker volume. |
| ❽ | Treble/bass down light | On: The treble or bass scroll zone is being used to decrease the level of treble or bass in the audio. |
| ❾ | Treble/bass up light | On: The treble or bass scroll zone is being used to increase the level of treble or bass in the audio. |
| ❿ | Wireless light | <ul style="list-style-type: none"> ■ Blue: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth device, is on. ■ Amber: All wireless devices are off. |
| ⓫ | Num lock light | On: Num lock is on or the embedded numeric keypad is enabled. |

*The 2 power lights display the same information. The light on the power button is visible only when the computer is open. The power light on the front of the computer is visible whether the computer is open or closed.

Pointing devices



| Item | Component | Function |
|------|------------------------|---|
| ① | TouchPad light | ■ White: TouchPad is enabled. ■ Amber: TouchPad is disabled. |
| ② | TouchPad* | Moves the pointer and selects or activates items on the screen. |
| ③ | Left TouchPad button* | Functions like the left button on an external mouse. |
| ④ | TouchPad on/off button | Enables/disables the TouchPad. |
| ⑤ | TouchPad scroll zone | Scrolls up or down. |
| ⑥ | Right TouchPad button* | Functions like the right button on an external mouse. |

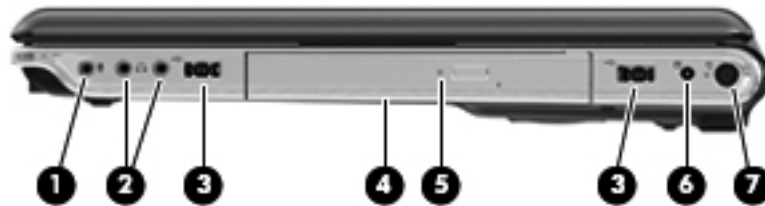
*This table describes factory settings. To view or change pointing device references, select **Start > Control Panel > Hardware and Sound > Mouse**.

Front components



| Item | Component | Function |
|------|--------------------------|--|
| ❶ | Digital Media Slot | Supports the following optional digital card formats: <ul style="list-style-type: none"> ■ Memory Stick (MS) ■ Memory Stick Pro (MSP) ■ MultiMediaCard (MMC) ■ Secure Digital (SD) Memory Card ■ xD-Picture Card (XD) |
| ❷ | Digital Media Slot light | On: A digital card is being accessed. |
| ❸ | Consumer infrared lens | Receives a signal from the HP Remote Control (select models only). |



Right-side components



| Item | Component | Function |
|------|--|--|
| ❶ | Audio-in (microphone) jack | Connects an optional computer headset microphone, stereo array microphone, or monaural microphone. |
| ❷ | Audio-out (headphone) jacks (2) | Produce sound when connected to optional powered stereo speakers, headphones, ear buds, headsets, or television audio. |
| ❸ | USB ports (2) | Connect optional USB devices. |
| ❹ | Optical drive | Reads optical discs and, on select models, also writes to optical discs. |
| ❺ | Optical drive light | Blinking: The optical drive is being accessed. |
| ❻ | TV antenna/cable jack (select models only) | Connects an optional TV antenna or an optional digital cable device that receives standard or high-definition TV broadcasts. |
| ❼ | Power connector | Connects an AC adapter. |


Left-side components



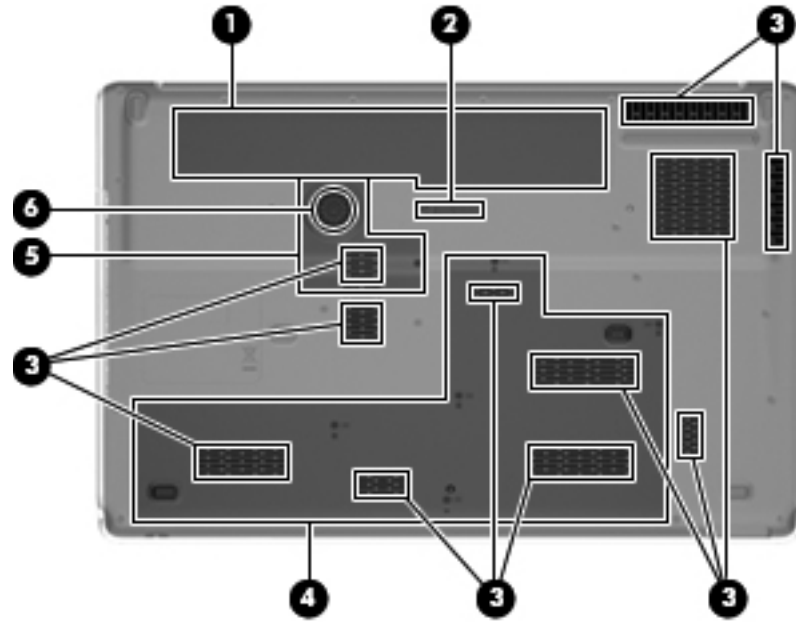
| Item | Component | Function |
|------|-----------------------|---|
| ① | Security cable slot | Attaches an optional security cable to the computer.  The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen. |
| ② | External monitor port | Connects an external VGA monitor or projector. |
| ③ | Expansion port 3 | Connects the computer to an optional docking device or optional expansion product.  The computer has only one expansion port. The term expansion port 3 describes the type of expansion port. |
| ④ | RJ-45 (network) jack | Connects a network cable. |
| ⑤ | HDMI port | Connects an optional video or audio device, such as a high-definition television, or any compatible digital or audio component. |
| ⑥ | eSATA/USB port | Connects an optional high-performance eSATA component, such as an eSATA external hard drive, or connects an optional USB device. |
| ⑦ | USB port | Connects an optional USB device. |
| ⑧ | 1394 port | Connects an optional IEEE 1394 or 1394a device, such as a camcorder. |
| ⑨ | ExpressCard slot | Supports optional ExpressCards. |



Rear component



| Component | Function |
|-----------|---|
| Vent | Enables airflow to cool internal components.  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. |

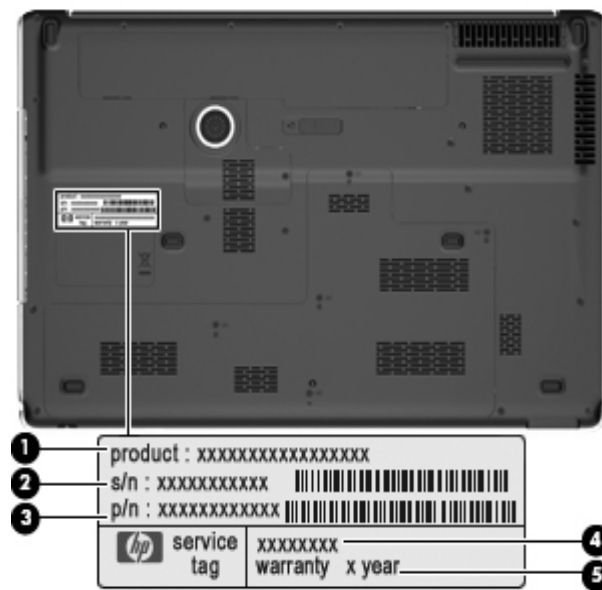
Bottom components



| Item | Component | Function |
|------|-------------------------|---|
| ① | Battery bay | Holds the battery. |
| ② | Battery release latch | Releases the battery from the battery bay. |
| ③ | Vents (11) | Enable airflow to cool internal components.  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. |
| ④ | Hard drive bay | Holds 1 or 2 hard drives (depending on the model), the TV tuner module (select models only), and the 2 memory module slots. |
| ⑤ | WLAN module compartment | Holds the WLAN module.  To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore computer functionality, and then contact technical support through Help and Support. |
| ⑥ | Subwoofer | Contains the subwoofer speaker. |

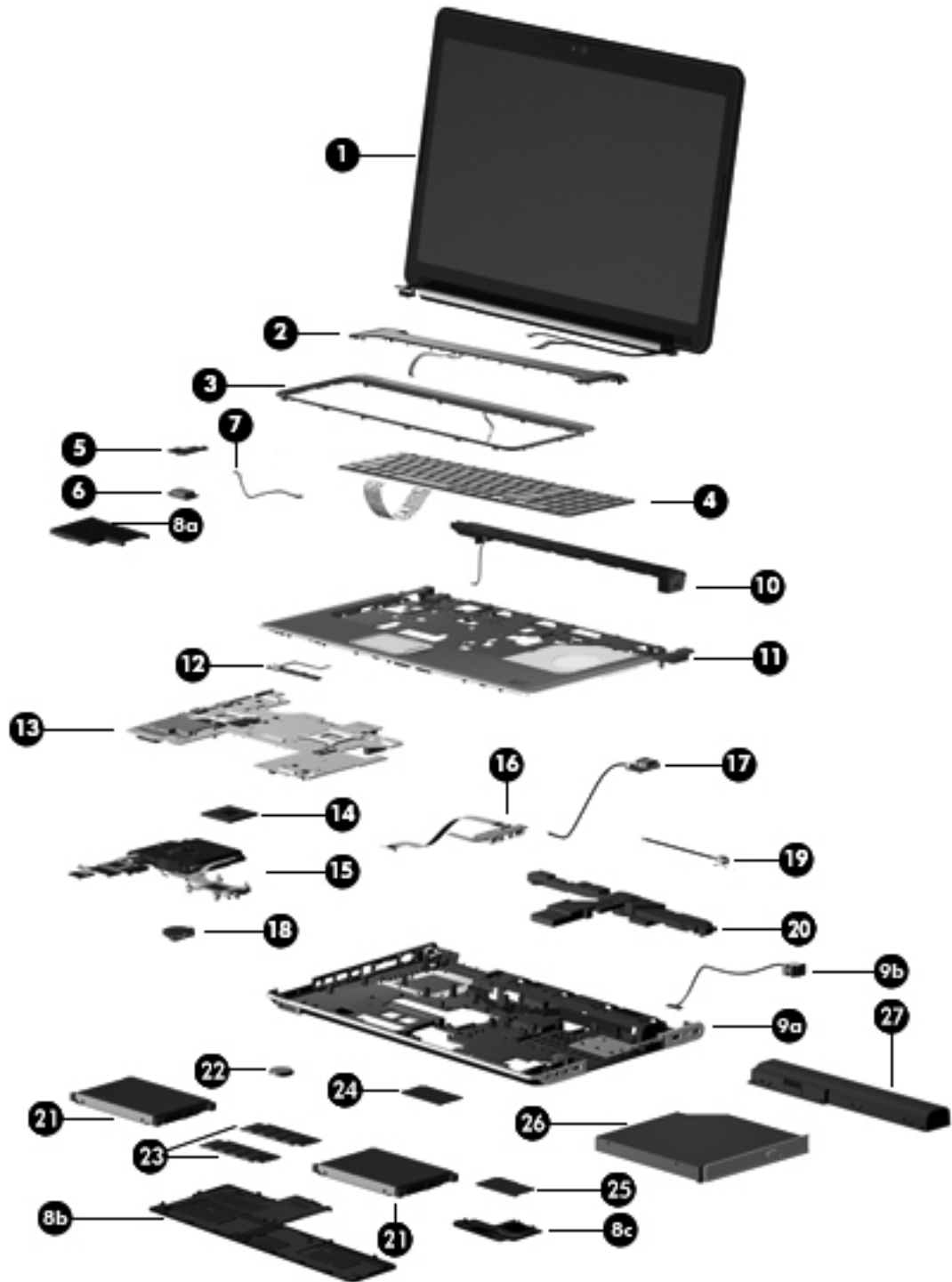
Service tag



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 your 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 you use to locate documents, drivers, and support for your computer. |
| ⑤ | Warranty period | This number describes the duration (in years) of the warranty period for this computer. |

Computer major components



| Item | Description | Spare Part Number |
|-------------|--|--|
| (1) | 18.4-inch, AntiGlare, dual-lamp, display assembly (includes 2 WLAN antenna transceivers and cables, webcam, microphones, and logo)  See “Display assembly components” on page 3-7 for information on display assembly spare part numbers. | 498166-001 |
| (2) | Switch cover | 496882-001 |
| (3) | Keyboard cover (includes LED board and cable) | 496883-001 |
| (4) | Keyboard (includes cable) For use in Belgium For use in Brazil For use in the Czech Republic For use in Denmark, Finland, and Norway For use in France For use in French Canada For use in Germany For use in Greece For use in Italy For use in Japan For use in Latin America For use in the Netherlands For use in Portugal For use in Russia For use in Saudi Arabia For use in South Korea For use in Spain For use in Switzerland For use in Taiwan For use in Thailand For use in Turkey For use in the United Kingdom For use in the United States | 496878-A41 496878-201 496878-221 509474-DH1 496878-051 509474-121 496878-041 496878-DJ1 496878-061 509474-291 496878-161 496878-B31 496878-131 496878-251 509474-171 509474-AD1 496878-071 496878-111 496878-AB1 509474-281 496878-141 496878-031 496878-001 |
| (5) | Power button board (includes cable) | 498325-001 |
| (6) | Bluetooth module  The Bluetooth module spare part kit does not include a Bluetooth module cable. The Bluetooth module cable is available using spare part number 496872-001. | 483113-001 |
| (7) | Bluetooth module cable Plastics Kit (see “Plastics Kit” on page 3-9 for more Plastics Kit spare part information) | 496872-001 496888-001 |
| (8a) | ExpressCard slot bezel | |
| (8b) | Hard drive cover | |
| (8c) | WLAN module compartment cover | |


(Continued)

| Item | Description | Spare Part Number |
|-------------|--|--------------------------|
| (9a) | Base enclosure , includes: | 496880-001 |
| (9b) | Power connector cable | |
| | Power connector cable bracket (not illustrated) | |
| | 7 rubber feet (not illustrated) | |
| | Rubber Feet Kit (not illustrated, includes 7 rubber feet) | 496889-001 |
| (10) | Speaker assembly | 496887-001 |
| (11) | Top cover (includes fingerprint reader board, fingerprint reader board cable, TouchPad, and TouchPad cables) | 496881-001 |
| (12) | TouchPad on/off button board (includes cable) | 500506-001 |
| (13) | System board (includes replacement thermal material) | |
| | For use only with computer models equipped with the Intel Core2 Duo QX9300, 2.53-GHz processor, includes 512 MB of graphics subsystem memory | 506494-001 |
| | For use with computer models equipped with all processors except the Intel Core2 Duo QX9300, 2.53-GHz processor | |
| | Includes 1024 MB of graphics subsystem memory | 506495-001 |
| | Includes 512 MB of graphics subsystem memory | 496871-001 |
| (14) | Processor (includes replacement thermal material) | |
| | Intel Core2 Duo QX9300 2.53-GHz processor with 12-MB L2 cache and 1066-MHz FSB | 500606-001 |
| | Intel Core2 Duo Q9100 2.26-GHz processor with 12-MB L2 cache and 1066-MHz FSB | 510398-001 |
| | Intel Core2 Duo Q9000 2.00-GHz processor with 12-MB L2 cache and 1066-MHz FSB | 510399-001 |
| | Intel Core2 Duo T9600 2.80-GHz processor with 6-MB L2 cache and 1066-MHz FSB | 500604-001 |
| | Intel Core2 Duo T9500 2.53-GHz processor with 6-MB L2 cache and 1066-MHz FSB | 500603-001 |
| | Intel Core2 Duo T8600 2.40-GHz processor with 3-MB L2 cache and 1066-MHz FSB | 500601-001 |
| | Intel Core2 Duo T8400 2.26-GHz processor with 3-MB L2 cache and 1066-MHz FSB | 500600-001 |
| (15) | Fan/heat sink assembly (includes replacement thermal material) | |
| | For use only with computer models equipped with the Intel Core2 Duo QX9300, 2.53-GHz processor | 512184-001 |
| | For use with computer models equipped with all processors except the Intel Core2 Duo QX9300, 2.53-GHz processor | 496894-001 |
| (16) | Audio/infrared board (includes cable) | 496892-001 |
| (17) | USB board (includes cable) | 497706-001 |
| (18) | Fan | 514290-001 |
| | Cable Kit , includes: | 496891-001 |
| (19) | TV tuner module cable | |
| (20) | Subwoofer (includes 3 mounting grommets) | 496893-001 |

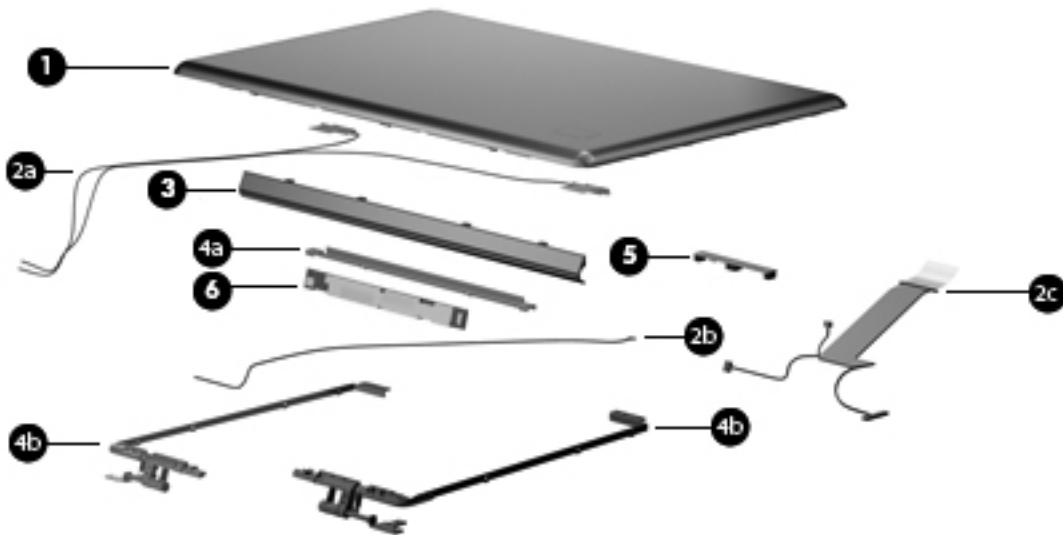
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| Item | Description | Spare Part Number |
|-------------|---|--------------------------|
| (21) | Hard drive (includes left and right hard drive brackets, Mylar sleeve, connector, and isolators) | |
| | 500-GB, 5400-rpm | 501911-001 |
| | 400-GB, 5400-rpm | 501912-001 |
| | 320-GB, 7200-rpm | 507553-001 |
| | 320-GB, 5400-rpm | 503485-001 |
| | 250-GB, 7200-rpm | 507552-001 |
| | 250-GB, 5400-rpm | 503484-001 |
| | 160-GB, 7200-rpm | 503486-001 |
| | 160-GB, 5400-rpm | 503393-001 |
| | 80-GB, 5400-rpm | 500607-001 |
| (22) | RTC battery | 449729-001 |
| (23) | Memory modules | |
| | 667-MHz, PC3-8500, 1-DIMM | |
| | 4096-MB | 510402-001 |
| | 2048-MB | 510401-001 |
| | 1024-MB | 510400-001 |
| | 667-MHz, PC2-6400, 1-DIMM | |
| | 4096-MB | 506591-001 |
| | 2048-MB | 497693-001 |
| | 1024-MB | 497692-001 |

(Continued)

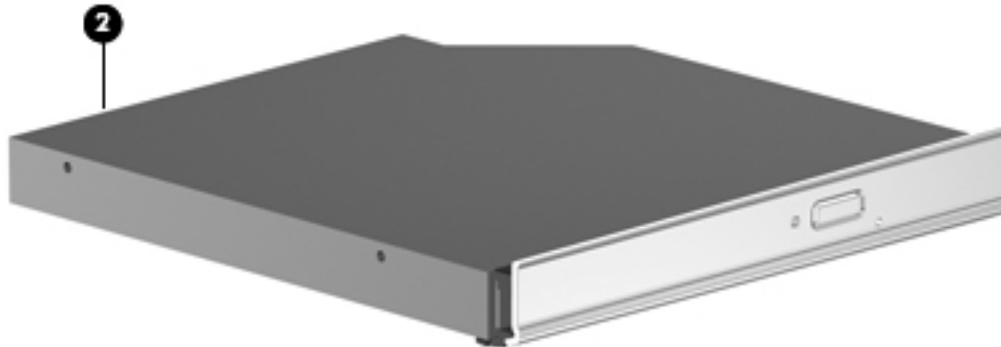
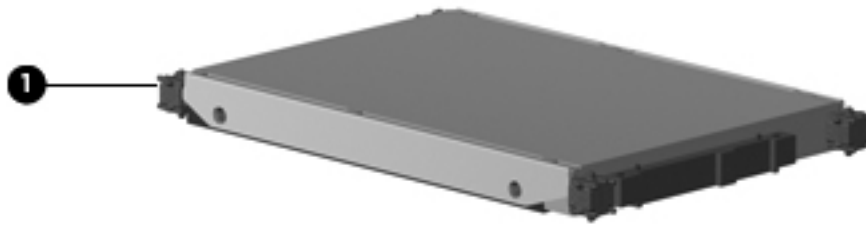
| Item | Description | Spare Part Number |
|------|--|-------------------|
| (24) | WLAN module: | |
| | ■ Atheros AR9280 802.11a/b/g/n WLAN module for use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States | 482260-001 |
| | ■ Atheros AR9280 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, the 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-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, 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 and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, 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 | 482260-002 |
| | ■ Intel Wi-Fi Link 5100 802.11a/b/g/n WLAN module for use in all countries and regions except Pakistan, Russia, and the Ukraine | 480985-001 |
| | ■ Intel Wi-Fi Link 5100 802.11a/b/g WLAN module for use only in Pakistan, Russia, and the Ukraine | 482957-001 |
| (25) | TV tuner module | |
| |  The TV tuner module spare part kit does not include a TV tuner module cable. The TV tuner module cable is included in the Cable Kit, spare part number 496891-001. | |
| | DVB-T TV tuner module | 482899-003 |
| | DVB-T/ANG TV tuner module | 482899-002 |
| | NTSC/ATSC/ANG TV tuner module | 482899-001 |
| | TV tuner external antenna cable (not illustrated) | |
| | With F-PAL jack | 482900-002 |
| | With PAL jack | 482900-001 |
| (26) | Optical drive (includes bezel and optical drive bracket) | |
| | Blu-ray ROM DVD±RW SuperMulti DL Drive with LightScribe | 503489-001 |
| | Blu-ray ROM DVD±RW SuperMulti DL Drive | 503488-001 |
| | Blu-ray ROM DVD±RW SuperMulti Drive | 503487-001 |
| (27) | Battery | |
| | 8-cell, 73-Wh, 2.55-Ah Li-ion battery for use in all countries and regions except Germany | 497705-001 |
| | 8-cell, 73-Wh, 2.55-Ah Li-ion battery for use only in Germany | 497705-002 |

Display assembly components



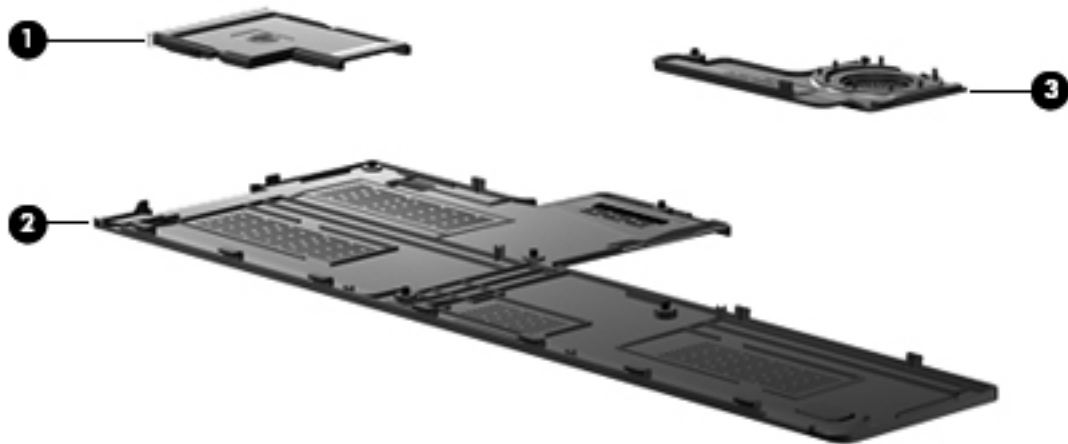
| Item | Description | Spare part number |
|------|--|-------------------|
| (1) | Display enclosure | 496873-001 |
| | Display Cable Kit, includes: | 496876-001 |
| (2a) | Wireless antenna transceivers and cables | |
| (2b) | Webcam/microphone module cable | |
| (2c) | Display panel cable | |
| (3) | Display hinge cover | 496875-001 |
| | Display Hinge Kit, includes: | 496874-001 |
| (4a) | Display hinge bracket | |
| (4b) | Display left and right hinges | |
| (5) | Webcam/microphone module | 499242-001 |
| (6) | Display inverter | 498324-001 |

Mass storage devices



| Item | Description | Spare part number |
|----------|---|-------------------|
| 1 | Hard drives (include left and right hard drive brackets, Mylar sleeve, connector, and isolators) | |
| | 500-GB, 5400-rpm | 501911-001 |
| | 400-GB, 5400-rpm | 501912-001 |
| | 320-GB, 5400-rpm | 503485-001 |
| | 320-GB, 7200-rpm | 507553-001 |
| | 250-GB, 7200-rpm | 507552-001 |
| | 250-GB, 5400-rpm | 503484-001 |
| | 160-GB, 7200-rpm | 503486-001 |
| | 160-GB, 5400-rpm | 503393-001 |
| | 80-GB, 5400-rpm | 500607-001 |
| 2 | Optical drives (include bezel and optical drive bracket) | |
| | Blu-ray ROM DVD±RW SuperMulti DL Drive with LightScribe | 503489-001 |
| | Blu-ray ROM DVD±RW SuperMulti DL Drive | 503488-001 |
| | Blu-ray ROM DVD±RW Drive | 503487-001 |

Plastics Kit






| Item | Description | Spare part number |
|------|---|-------------------|
| | Plastics Kit | 496888-001 |
| ❶ | ExpressCard slot bezel | |
| ❷ | Hard drive cover (includes five captive screws, secured by C-clips) | |
| ❸ | WLAN module compartment cover (includes one captive screw, secured by a C-clip) | |

Miscellaneous parts

| Description | Spare part number |
|--|-------------------|
| AC adapter | |
| 120-W AC adapter for use in all countries and regions except Germany | 463953-001 |
| 120-W AC adapter for use only in Germany | 513117-001 |
| Bluetooth laser mouse | |
| | 455916-002 |
| Power cords | |
| For use in Argentina | 490371-D01 |
| For use in Australia | 490371-011 |
| For use in Brazil | 490371-201 |
| For use in Denmark | 490371-081 |
| For use in Europe, the Middle East, and Africa | 490371-021 |
| For use in India | 490371-D61 |
| For use in Italy | 490371-061 |
| For use in Japan | 490371-291 |
| For use in the People's Republic of China | 490371-AA1 |
| For use in South Korea | 490371-AD1 |
| For use in Taiwan | 490371-AB1 |
| For use in the United Kingdom and Singapore | 490371-031 |
| For use in Canada, Mexico, and the United States | 490371-001 |
| Remote controls | |
| Full function remote control with teletext | 465541-001 |
| Full function remote control without teletext | 465540-001 |
| Screw Kit, includes: | |
| ■ Phillips PM3.0×4.0 screws | 496890-001 |
| ■ Phillips PM2.5×11.0 captive screws | |
| ■ Phillips PM2.5×7.0 screws | |
| ■ Phillips PM2.5×6.0 captive screws | |
| ■ Phillips PM2.5×5.0 captive screws | |
| ■ Phillips PM2.5×5.0 broadhead screws | |
| ■ Phillips PM2.0×4.0 screws | |
| Wired headset with volume control | 371693-001 |



Sequential part number listing

| Spare part number | Description |
|-------------------|--|
| 371693-001 | Wired headset with volume control |
| 449729-001 | RTC battery |
| 455916-002 | Bluetooth laser mouse |
| 463953-001 | 120-W AC adapter for use in all countries and regions except Germany |
| 465540-001 | Full function remote control without teletext |
| 465541-002 | Full function remote control with teletext |
| 480985-001 | Intel Wi-Fi Link 5100 802.11a/b/g/n WLAN module for use in all countries and regions except Pakistan, Russia, and the Ukraine |
| 482260-001 | Atheros AR9280 802.11a/b/g/n WLAN module for use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States |
| 482260-002 | Atheros AR9280 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, the 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-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, 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 and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, 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 |
| 482899-001 | NTSC/ATSC/ANG TV tuner module  The TV tuner module spare part kit does not include a TV tuner module cable. The TV tuner module cable is included in the Cable Kit, spare part number 496891-001. |
| 482899-002 | DVB-T/ANG TV tuner module  The TV tuner module spare part kit does not include a TV tuner module cable. The TV tuner module cable is included in the Cable Kit, spare part number 496891-001. |
| 482899-003 | DVB-T TV tuner module  The TV tuner module spare part kit does not include a TV tuner module cable. The TV tuner module cable is included in the Cable Kit, spare part number 496891-001. |
| 482900-001 | TV tuner external antenna cable with PAL jack |
| 482900-002 | TV tuner external antenna cable with F-PAL jack |
| 482957-001 | Intel Wi-Fi Link 5100 802.11a/b/g WLAN module for use only in Pakistan, Russia, and the Ukraine |

(Continued)

| Spare part number | Description |
|--------------------------|--|
| 483113-001 | Bluetooth module  The Bluetooth module spare part kit does not include a Bluetooth module cable. The Bluetooth module cable is available using spare part number 496872-001. |
| 490371-001 | Power cord for use in Canada, Mexico, and the United States |
| 490371-011 | Power cord for use in Australia |
| 490371-021 | Power cord for use in Europe, the Middle East, and Africa |
| 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 |
| 490371-201 | Power cord for use in Brazil |
| 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-D01 | Power cord for use in Argentina |
| 490371-D61 | Power cord for use in India |
| 496871-001 | System board with 512 MB of graphics subsystem memory for use with computer models equipped with all processors except the Intel Core2 Duo QX9300, 2.53-GHz processor (includes replacement thermal material) |
| 496872-001 | Bluetooth module cable |
| 496873-001 | Display enclosure |
| 496874-001 | Display Hinge Kit (includes display hinge bracket and display left and right hinges) |
| 496875-001 | Display hinge cover |
| 496876-001 | Display Cable Kit (includes wireless antenna transceivers and cables, webcam/microphone module cable, and display panel cable) |
| 496878-001 | Keyboard for use in the United States |
| 496878-031 | Keyboard for use in the United Kingdom |
| 496878-041 | Keyboard for use in Germany |
| 496878-051 | Keyboard for use in France |
| 496878-061 | Keyboard for use in Italy |
| 496878-071 | Keyboard for use in Spain |
| 496878-111 | Keyboard for use in Switzerland |
| 496878-131 | Keyboard for use in Portugal |
| 496878-141 | Keyboard for use in Turkey |
| 496878-161 | Keyboard for use in Latin America |
| 496878-201 | Keyboard for use in Brazil |
| 496878-221 | Keyboard for use in the Czech Republic |
| 496878-251 | Keyboard for use in Russia |
| 496878-A41 | Keyboard for use in Belgium |
| 496878-AB1 | Keyboard for use in Taiwan |

(Continued)

| Spare part number | Description |
|-------------------|---|
| 496878-B31 | Keyboard for use in the Netherlands |
| 496878-DJ1 | Keyboard for use in Greece |
| 496880-001 | Base enclosure (includes power connector cable, power connector cable bracket, and 7 rubber feet) |
| 496881-001 | Top cover (includes fingerprint reader board, fingerprint reader board cable, TouchPad, and TouchPad cable) |
| 496882-001 | Switch cover |
| 496883-001 | Keyboard cover (includes LED board and cable) |
| 496887-001 | Speaker assembly |
| 496888-001 | Plastics Kit  See “Plastics Kit” on page 3-9 for more Plastics Kit spare part information. |
| 496889-001 | Rubber Feet Kit (includes 7 rubber feet) |
| 496890-001 | Screw Kit |
| 496891-001 | Cable Kit |
| 496892-001 | Audio/infrared board (includes cable) |
| 496893-001 | Subwoofer (includes 3 mounting grommets) |
| 496894-001 | Fan/heat sink assembly for use with all processors except the Intel Core2 Duo QX9300, 2.53-GHz processor (includes replacement thermal material) |
| 497692-001 | 1024-MB memory module (667-MHz, PC2-6400, 1-DIMM) |
| 497693-001 | 2048-MB memory module (667-MHz, PC2-6400, 1-DIMM) |
| 497705-001 | 8-cell, 73-Wh, 2.55-Ah Li-ion battery for use in all countries and regions except Germany |
| 497705-002 | 8-cell, 73-Wh, 2.55-Ah Li-ion battery for use only in Germany |
| 497706-001 | USB board (includes cable) |
| 498166-001 | 18.4-inch, AntiGlare, dual-lamp, display assembly (includes 2 WLAN antenna transceivers and cables, webcam, microphones, and logo)  See “Display assembly components” on page 3-7 for information on display assembly spare part numbers. |
| 498324-001 | Display inverter |
| 498325-001 | Power button board (includes cable) |
| 499242-001 | Webcam/microphone module |
| 500506-001 | TouchPad on/off button board (includes cable) |
| 500600-001 | Intel Core2 Duo T8400 2.26-GHz processor with 3-MB L2 cache and 1066-MHz FSB (includes replacement thermal material) |
| 500601-001 | Intel Core2 Duo T8600 2.40-GHz processor with 3-MB L2 cache and 1066-MHz FSB (includes replacement thermal material) |
| 500603-001 | Intel Core2 Duo T9500 2.53-GHz processor with 6-MB L2 cache and 1066-MHz FSB (includes replacement thermal material) |
| 500604-001 | Intel Core2 Duo T9600 2.80-GHz processor with 6-MB L2 cache and 1066-MHz FSB (includes replacement thermal material) |
| 500606-001 | Intel Core2 Duo QX9300 2.53-GHz processor with 12-MB L2 cache and 1066-MHz FSB (includes replacement thermal material) |
| 500607-001 | 80-GB, 5400-rpm hard drive (includes left and right hard drive brackets, Mylar sleeve, connector, and isolators) |

(Continued)

| Spare part number | Description |
|--------------------------|--|
| 501911-001 | 500-GB, 5400-rpm hard drive (includes left and right hard drive brackets, Mylar sleeve, connector, and isolators) |
| 501912-001 | 400-GB, 5400-rpm hard drive (includes left and right hard drive brackets, Mylar sleeve, connector, and isolators) |
| 503393-001 | 160-GB, 5400-rpm hard drive (includes left and right hard drive brackets, Mylar sleeve, connector, and isolators) |
| 503484-001 | 250-GB, 5400-rpm hard drive (includes left and right hard drive brackets, Mylar sleeve, connector, and isolators) |
| 503485-001 | 320-GB, 5400-rpm hard drive (includes left and right hard drive brackets, Mylar sleeve, connector, and isolators) |
| 503486-001 | 160-GB, 7200-rpm hard drive (includes left and right hard drive brackets, Mylar sleeve, connector, and isolators) |
| 503487-001 | Blu-ray ROM DVD±RW Drive (includes bezel and optical drive bracket) |
| 503488-001 | Blu-ray ROM DVD±RW SuperMulti DL Drive (includes bezel and optical drive bracket) |
| 503489-001 | Blu-ray ROM DVD±RW SuperMulti DL Drive with LightScribe (includes bezel and optical drive bracket) |
| 506494-001 | System board with 512 MB of graphics subsystem memory for use only with computer models equipped with the Intel Core2 Duo QX9300, 2.53-GHz processor |
| 506495-001 | System board with 1024 MB of graphics subsystem memory for use with computer models equipped with all processors except the Intel Core2 Duo QX9300, 2.53-GHz processor |
| 506591-001 | 4096-MB memory module (667-MHz, PC2-6400, 1-DIMM) |
| 507552-001 | 250-GB, 7200-rpm hard drive (includes left and right hard drive brackets, Mylar sleeve, connector, and isolators) |
| 507553-001 | 320-GB, 7200-rpm hard drive (includes left and right hard drive brackets, Mylar sleeve, connector, and isolators) |
| 509474-121 | Keyboard for use in French Canada |
| 509474-DH1 | Keyboard for use in Denmark, Finland, and Norway |
| 509474-171 | Keyboard for use in Saudi Arabia |
| 509474-281 | Keyboard for use in Thailand |
| 509474-291 | Keyboard for use in Japan |
| 509474-AD1 | Keyboard for use in South Korea |
| 510398-001 | Intel Core2 Duo Q9100 2.26-GHz processor with 12-MB L2 cache and 1066-MHz FSB (includes replacement thermal material) |
| 510399-001 | Intel Core2 Duo Q9000 2.00-GHz processor with 12-MB L2 cache and 1066-MHz FSB (includes replacement thermal material) |
| 510400-001 | 1024-MB memory module (833-MHz, PC3-8500, 1-DIMM) |
| 510401-001 | 2048-MB memory module (833-MHz, PC3-8500, 1-DIMM) |
| 510402-001 | 4096-MB memory module (833-MHz, PC3-8500, 1-DIMM) |
| 512184-001 | Fan/heat sink assembly for use only with the Intel Core2 Duo QX9300, 2.53-GHz processor (includes replacement thermal material) |
| 513117-001 | 120-W AC adapter for use only in Germany |
| 514290-001 | Fan |

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

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 4-8](#)).
5. Remove the real-time clock (RTC) battery (see [“RTC battery” on page 4-14](#)).
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.

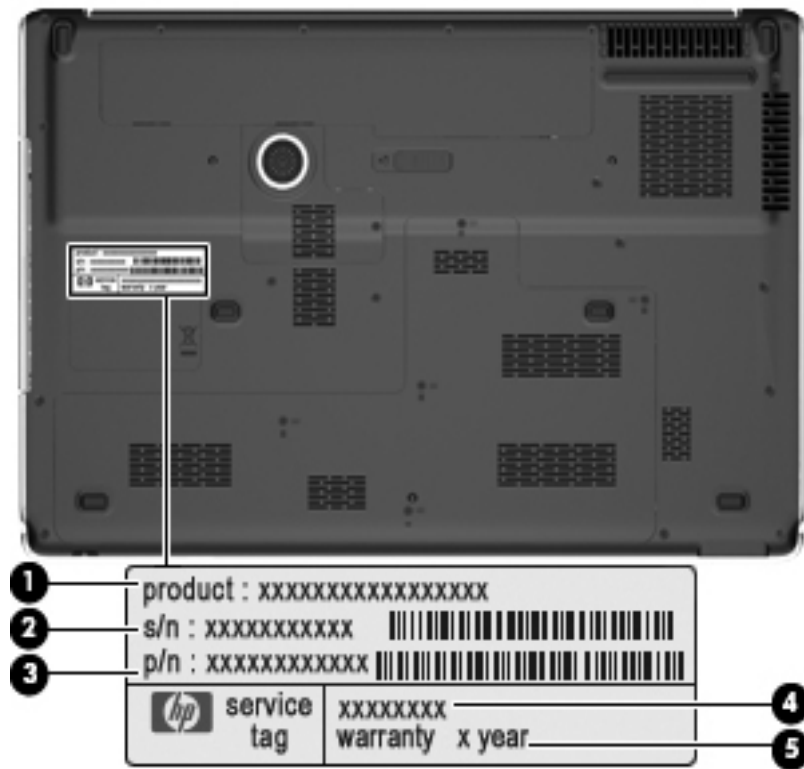
Component replacement procedures

This chapter provides removal and replacement procedures.

There are as many as 95 screws, in 8 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.

Service tag

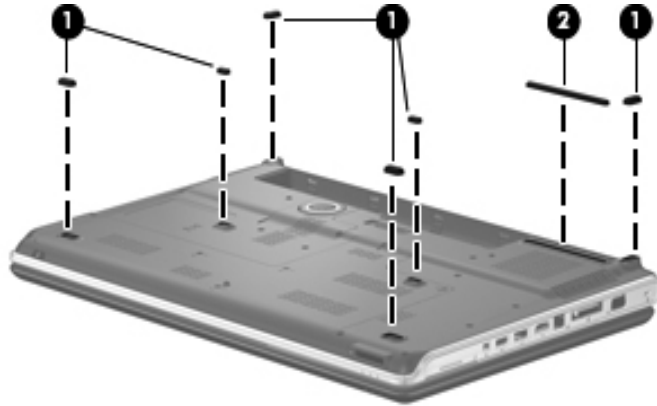
When ordering parts or requesting information, provide the computer serial number and model description provided on the service tag.



| Item | Component | Description |
|------|----------------------------------|--|
| ❶ | Product name | This is the product name affixed to the front of your 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 you use to locate documents, drivers, and support for your computer. |
| ❺ | Warranty period | This number describes the duration (in years) of the warranty period for this computer. |

Computer feet

The computer feet are adhesive-backed rubber pads. The feet are included in the Rubber Feet Kit, spare part number 496889-001. There are 7 rubber feet, in two different sizes (❶ and ❷), that attach to the base enclosure in the locations illustrated below.



Battery

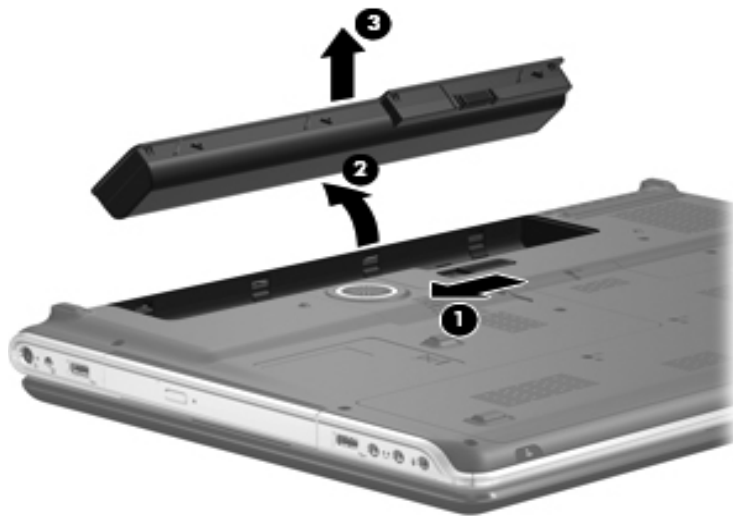
| Description | Spare part number |
|---|-------------------|
| 8-cell, 73-Wh, 2.55-Ah Li-ion battery for use in all countries and regions except Germany | 497705-001 |
| 8-cell, 73-Wh, 2.55-Ah Li-ion battery for use only in Germany | 497705-002 |

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 front toward you.
2. Slide the battery release latch **1** to release the battery.
3. Pivot the battery **2** upward and remove it **3** from the computer.



To insert the battery, insert the rear edge of the battery into the battery bay and pivot the front edge of the battery downward until it is seated. The battery release latch automatically locks the battery into place.

Optical drive



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

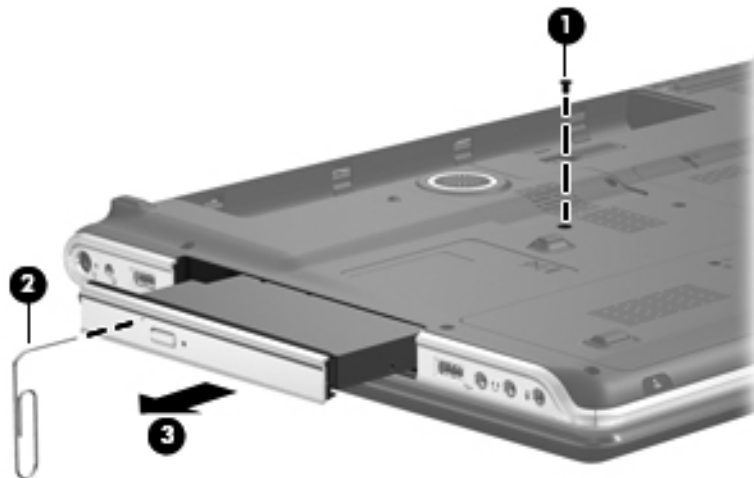
| Description | Spare part number |
|---|-------------------|
| Blu-ray ROM DVD±RW SuperMulti DL Drive with LightScribe | 503489-001 |
| Blu-ray ROM DVD±RW SuperMulti DL Drive | 503488-001 |
| Blu-ray ROM DVD±RW SuperMulti Drive | 503487-001 |

Before removing the optical drive, follow these steps:

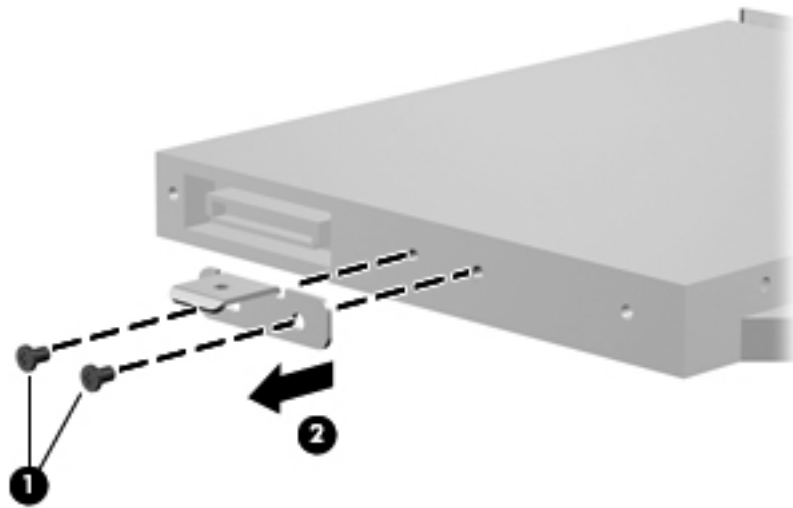
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see “[Battery](#)” on page 4-8).

Remove the optical drive:

1. Position the computer with the left side toward you.
2. Remove the Phillips PM2.5×7.0 screw ❶ that secures the optical drive to the computer.
3. Insert a paper clip 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 PM2.0×4.0 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.

Hard drive



The hard drive spare part kit includes a left and right bracket, Mylar sleeve, connector, and four isolators.

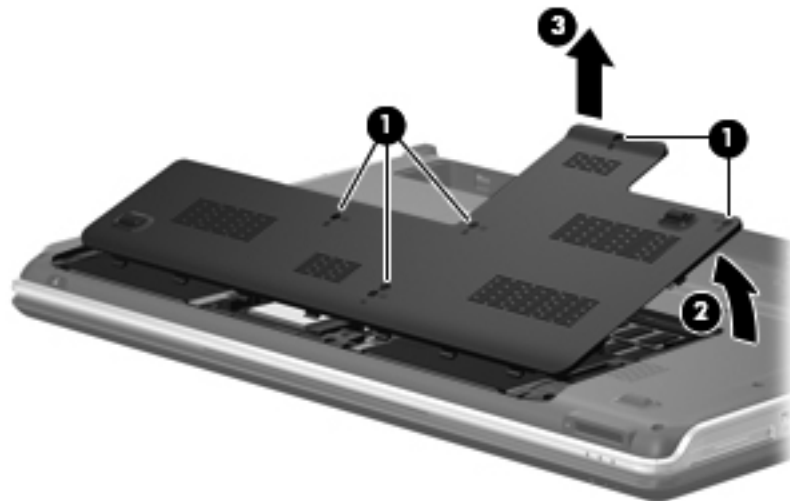
| Description | Spare part number |
|------------------|-------------------|
| 500-GB, 5400-rpm | 501911-001 |
| 400-GB, 5400-rpm | 501912-001 |
| 320-GB, 7200-rpm | 507553-001 |
| 320-GB, 5400-rpm | 503485-001 |
| 250-GB, 7200-rpm | 507552-001 |
| 250-GB, 5400-rpm | 503484-001 |
| 160-GB, 7200-rpm | 503486-001 |
| 160-GB, 5400-rpm | 503393-001 |
| 80-GB, 5400-rpm | 500607-001 |

Before removing the hard drive, follow these steps:

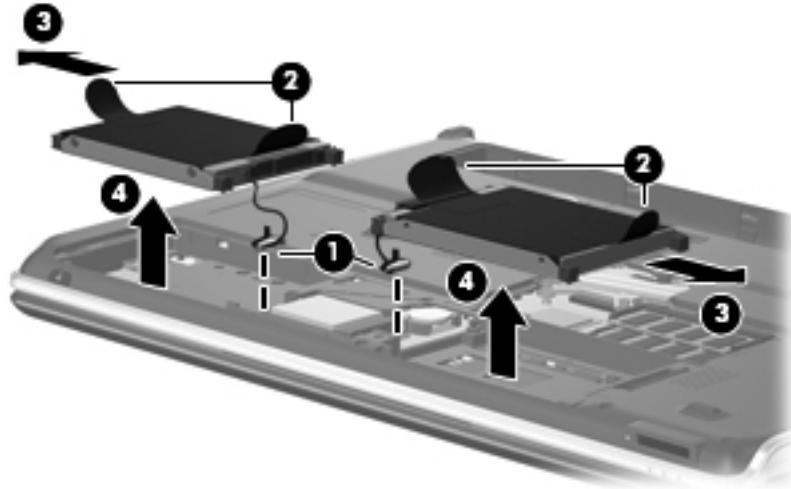
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [“Battery” on page 4-8](#)).

Remove the hard drive:

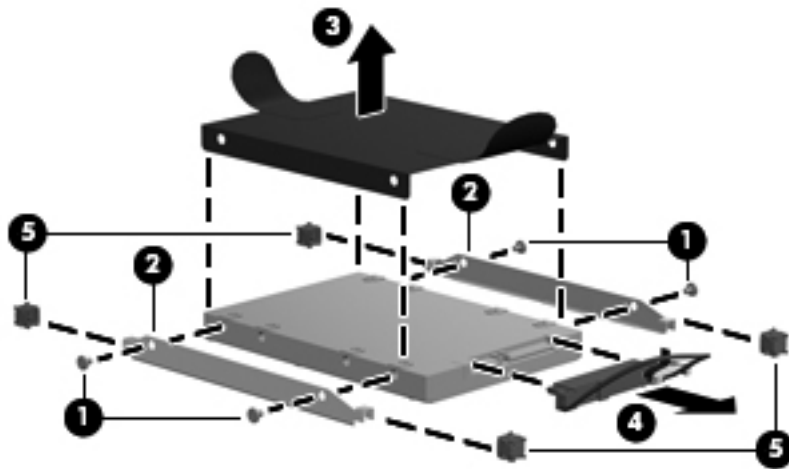
1. Loosen the five Phillips PM2.5×6.0 captive screws ❶ that secure the hard drive cover to the computer.
2. Lift the rear edge of the hard drive cover ❷, swing it up and forward, and then remove the cover ❸. The hard drive cover is included in the Plastics Kit, spare part number 496888-001.



3. Disconnect the hard drive cable ❶ from the system board.
4. Grasp the Mylar tabs ❷ on the hard drive and slide the hard drive ❸ away from the hard drive connector.
5. Remove the hard drive ❹ from the hard drive bay.



6. If it is necessary to replace the left and right hard drive brackets, Mylar sleeve, connector, and isolators:
 - a. Remove the two Phillips PM3.0×4.0 hard drive bracket screws ❶ from each side of the hard drive.
 - b. Remove the left and right hard drive brackets ❷.
 - c. Lift the Mylar sleeve ❸ straight up to remove it from the hard drive.
 - d. Remove the hard drive connector ❹.
 - e. Remove the four isolators ❺.



Reverse this procedure to reassemble and install the hard drives.

TV tuner module

| Description | Spare part number |
|-------------------------------|-------------------|
| DVB-T TV tuner module | 482899-003 |
| DVB-T/ANG TV tuner module | 482899-002 |
| NTSC/ATSC/ANG TV tuner module | 482899-001 |

Before removing the TV tuner module, follow these steps:

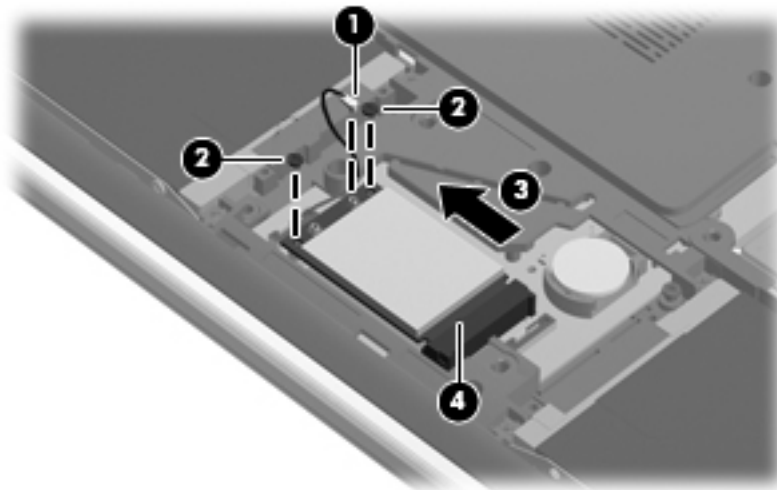
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see “Battery” on page 4-8).
5. Remove the hard drive cover (see “Hard drive” on page 4-11).

Remove the TV tuner module:

1. Disconnect the TV tuner module antenna cable ❶ from the terminal on the TV tuner module.
2. Remove the two Phillips PM2.0×4.0 screws ❷ that secure the TV tuner module to the computer. (The edge of the module opposite the slot rises away from the computer.)
3. Remove the TV tuner module ❸ by pulling the module away from the slot at an angle.



The TV tuner module is designed with a notch ❹ to prevent incorrect insertion into the TV tuner module slot.



Reverse this procedure to install the TV tuner module.

RTC battery



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

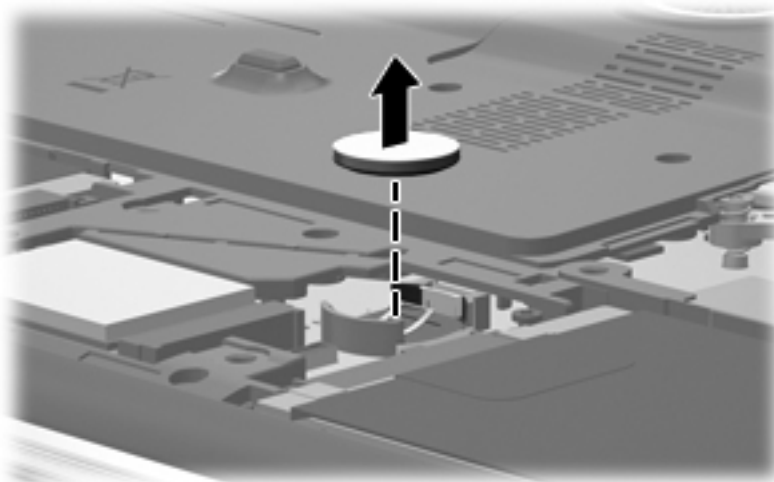
| Description | Spare part number |
|-------------|-------------------|
| RTC battery | 449729-001 |

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 4-8](#)).
5. Remove the hard drive cover (see [“Hard drive” on page 4-11](#)).

Remove the RTC battery:

- » Lift the RTC battery from the socket.



Reverse this procedure to install the RTC battery.

Memory module

| Description | Spare part number |
|-------------------------------------|-------------------|
| 4096-MB (667-MHz, PC3-8500, 1-DIMM) | 510402-001 |
| 2048-MB (667-MHz, PC3-8500, 1-DIMM) | 510401-001 |
| 1024-MB (667-MHz, PC3-8500, 1-DIMM) | 510400-001 |
| 4096-MB (667-MHz, PC2-6400, 1-DIMM) | 506591-001 |
| 2048-MB (667-MHz, PC2-6400, 1-DIMM) | 497693-001 |
| 1024-MB (667-MHz, PC2-6400, 1-DIMM) | 497692-001 |

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 4-8](#)).
5. Remove the hard drive cover (see [“Hard drive” on page 4-11](#)).

Remove the memory module:

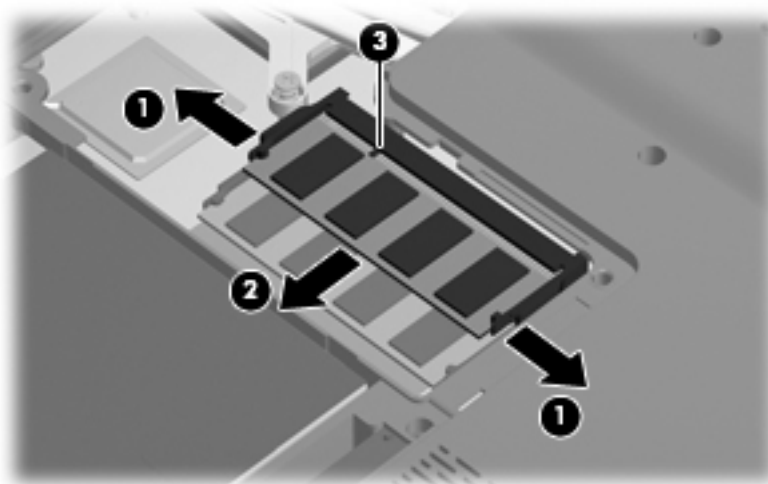


The top memory module slot contains the expansion memory module. The bottom slot contains the primary memory module.

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



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



Reverse this procedure to install a memory module.

WLAN module

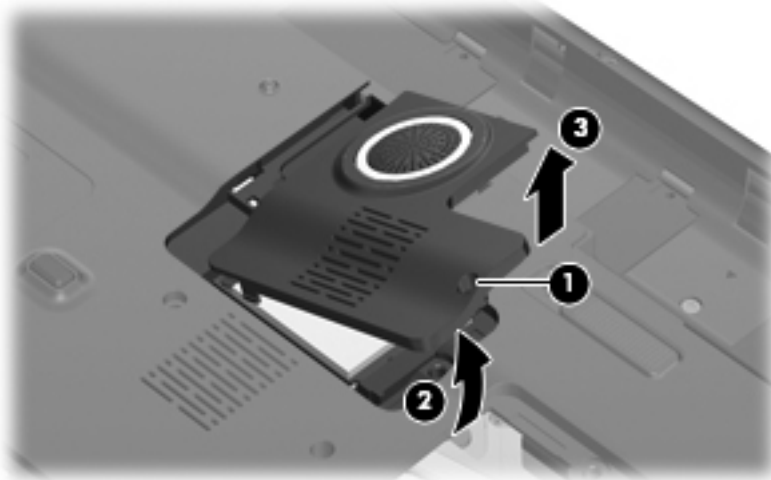
| Description | Spare part number |
|--|-------------------|
| Atheros AR9280 802.11a/b/g/n WLAN module | |
| ■ for use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States | 482260-001 |
| Atheros AR9280 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, the 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-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, 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 and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, 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 | 482260-002 |
| Intel Wi-Fi Link 5100 802.11a/b/g/n WLAN module | |
| ■ for use in all countries and regions except Pakistan, Russia, and the Ukraine | 480985-001 |
| Intel Wi-Fi Link 5100 802.11a/b/g WLAN module | |
| ■ for use only in Pakistan, Russia, and the Ukraine | 482957-001 |



Before removing the WLAN module, follow these steps:

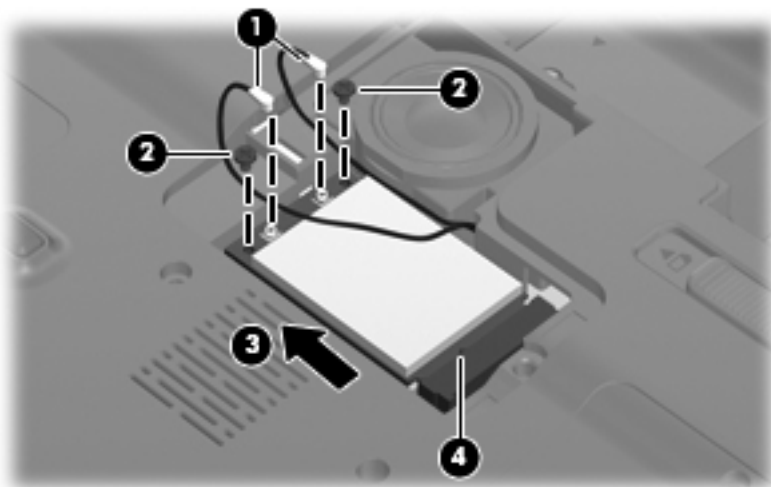
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [“Battery” on page 4-8](#)).

Remove the WLAN module:

1. Loosen the Phillips PM2.5×6.0 captive screw ❶ that secures the WLAN module compartment cover to the computer.
2. Lift the right side of the WLAN module compartment cover ❷, swing it up and to the left, and then remove the cover ❸. The WLAN module compartment cover is included in the Plastics Kit, spare part number 496888-001.



3. 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.
4. Remove the two Phillips PM2.0×4.0 screws ❷ that secure the WLAN module to the computer. (The edge of the module opposite the slot rises away from the computer.)
5. 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 into the WLAN module slot.



Reverse this procedure to install the WLAN module.

Switch cover

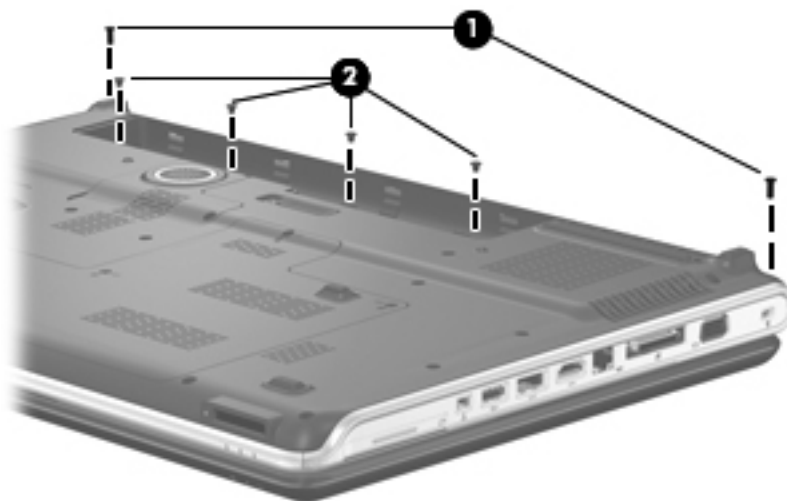
| Description | Spare part number |
|--------------|-------------------|
| Switch cover | 496882-001 |

Before removing the switch 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 4-8](#)).

Remove the switch cover:

1. Remove the two Phillips PM2.5×7.0 screws ❶ that secure the switch cover to the computer.
2. Remove the four Phillips PM2.0×4.0 screws ❷ that secure the switch cover to the computer.



3. Turn the computer display-side up, with the front toward you.
4. Open the computer as far as possible.
5. Lift the right side of the switch cover **1** until it detaches from the computer.
6. Remove the switch cover **2** by lifting it straight up.



Reverse this procedure to install the switch cover.

Keyboard cover

| Description | Spare part number |
|---|-------------------|
| Keyboard cover (includes LED board and cable) | 496883-001 |

Before removing the keyboard 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 4-8](#)).
5. Remove the switch cover (see [“Switch cover” on page 4-18](#)).

Remove the keyboard cover:

1. Release the keyboard cover ❶ by lifting the front edge until it rests at an angle.
2. Lift the keyboard cover ❷ as far as the power button board cable allows.



3. Disconnect the LED board cable from the LED board.



4. Remove the keyboard cover.

Reverse this procedure to install the keyboard cover.

Power button board

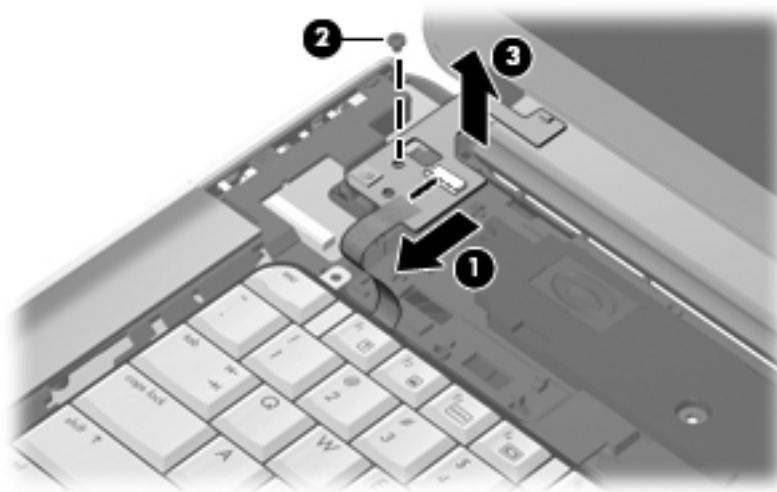
| Description | Spare part number |
|-------------------------------------|-------------------|
| Power button board (includes cable) | 498325-001 |

Before removing the power button 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 4-8](#)).
5. Remove the switch cover (see [“Switch cover” on page 4-18](#)).
6. Remove the switch cover (see [“Keyboard cover” on page 4-20](#)).

Remove the power button board:

1. Disconnect the power button board cable ❶ from the low insertion force (LIF) connector on the power button board.
2. Remove the Phillips PM2.0×4.0 screw ❷ that secures the power button board to the computer.
3. Remove the power button board ❸.



Reverse this procedure to install the power button board.

Bluetooth module



The Bluetooth module spare part kit does not include a Bluetooth module cable. The Bluetooth module cable is available using spare part number 496872-001. See [“Bluetooth module cable” on page 4-28](#) for Bluetooth module cable removal information.

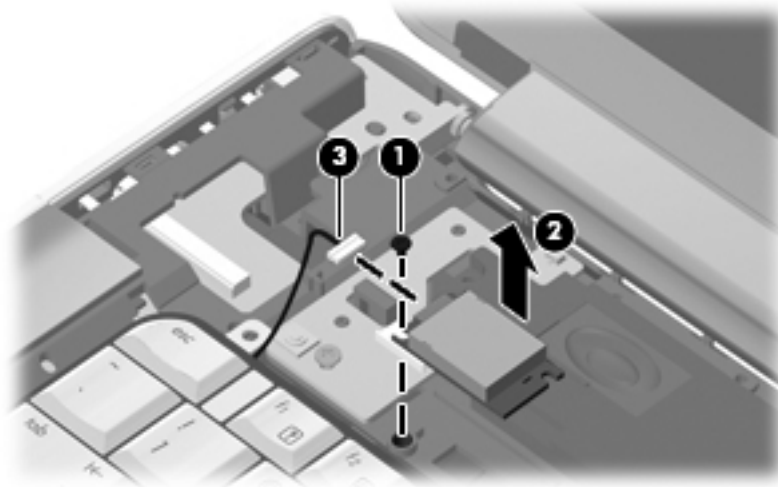
| Description | Spare part number |
|------------------|-------------------|
| Bluetooth module | 483113-001 |

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 4-8](#)).
5. Remove the following components:
 - a. Switch cover (see [“Switch cover” on page 4-18](#))
 - b. Keyboard cover (see [“Keyboard cover” on page 4-20](#))
 - c. Power button board (see [“Power button board” on page 4-22](#))

Remove the Bluetooth module:

1. Remove the Phillips PM2.0×4.0 screw **1** that secures the Bluetooth module to the top cover.
2. Release the Bluetooth module **2** as far as the Bluetooth module cable allows.
3. Disconnect the Bluetooth module cable **3** from the Bluetooth module.



Reverse this procedure to install the Bluetooth module.

Keyboard

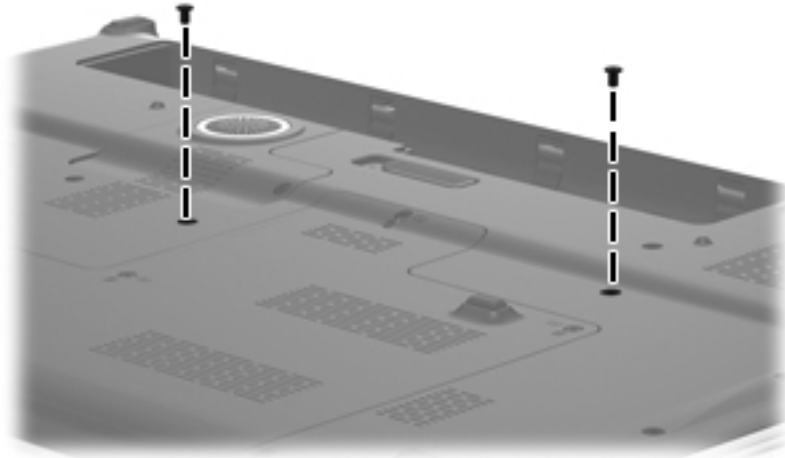
| Description | Spare part number |
|---|-------------------|
| For use in Belgium | 496878-A41 |
| For use in Brazil | 496878-201 |
| For use in the Czech Republic | 496878-221 |
| For use in Denmark, Finland, and Norway | 509474DH1 |
| For use in France | 496878-051 |
| For use in French Canada | 509474121 |
| For use in Germany | 496878-041 |
| For use in Greece | 496878-DJ1 |
| For use in Italy | 496878-061 |
| For use in Japan | 509474291 |
| For use in Latin America | 496878-161 |
| For use in the Netherlands | 496878-B31 |
| For use in Portugal | 496878-131 |
| For use in Russia | 496878-251 |
| For use in Saudi Arabia | 509474-171 |
| For use in South Korea | 509474-AD1 |
| For use in Spain | 496878-071 |
| For use in Switzerland | 496878-111 |
| For use in Taiwan | 496878-AB1 |
| For use in Thailand | 509474-281 |
| For use in Turkey | 496878-141 |
| For use in the United Kingdom | 496878-031 |
| For use in the United States | 496878-001 |

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 4-8](#)).
5. Remove the switch cover (see [“Switch cover” on page 4-18](#)).
6. Remove the keyboard cover (see [“Keyboard cover” on page 4-20](#)).

Remove the keyboard:

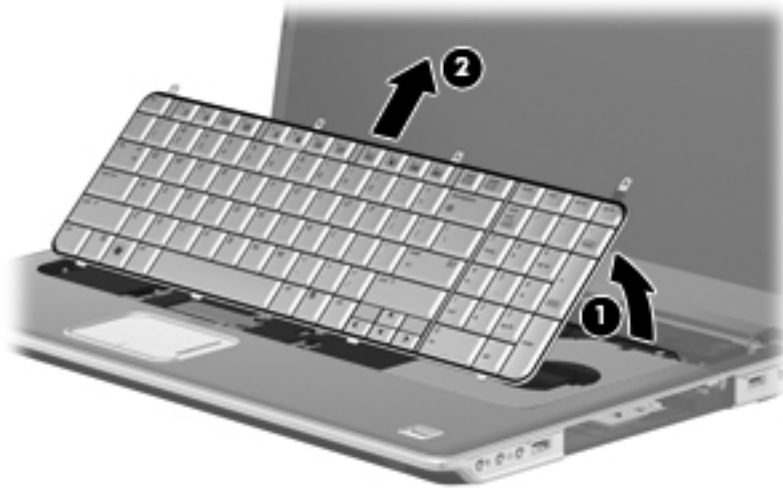
1. Turn the computer upside down, with the front toward you.
2. Remove the two Phillips PM2.5×7.0 screws that secure the keyboard to the computer.



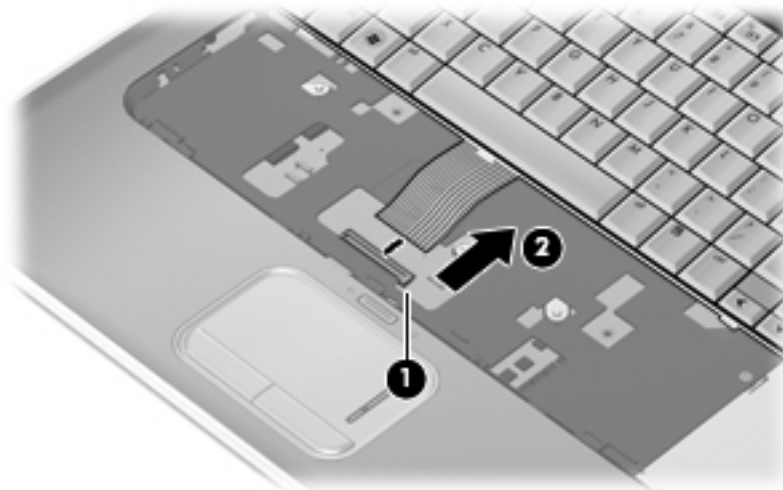
3. Turn the computer display-side up, with the front toward you.
4. Open the computer as far as possible.
5. Remove the four Phillips PM2.0×4.0 screws that secure the keyboard to the computer.



6. Lift the rear edge of the keyboard **1** until it rests at an angle.
7. Release the keyboard **2** by sliding it back to disengage the tabs on the front edge of the keyboard from the top cover and rest it on the display.



8. 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.



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

Power button board cable



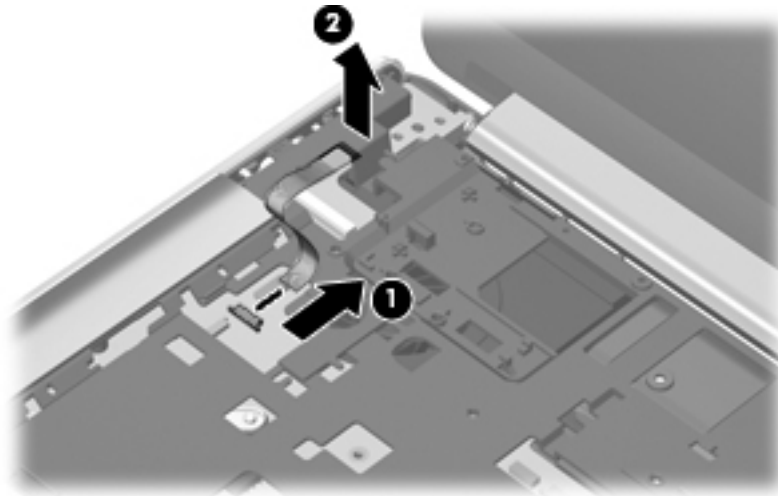
The power button board cable is included with the power button board, spare part number 498325-001.

Before removing the power button board cable, 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 4-8](#)).
5. Remove the following components:
 - a. Switch cover (see [“Switch cover” on page 4-18](#))
 - b. Keyboard cover (see [“Keyboard cover” on page 4-20](#))
 - c. Power button board (see [“Power button board” on page 4-22](#))
 - d. Keyboard (see [“Keyboard” on page 4-24](#))

Remove the power button board cable:

1. Disconnect the power button board cable ❶ from the LIF connector on the system board.
2. Remove the power button board cable ❷.



Reverse this procedure to install the power button board cable.

Bluetooth module cable

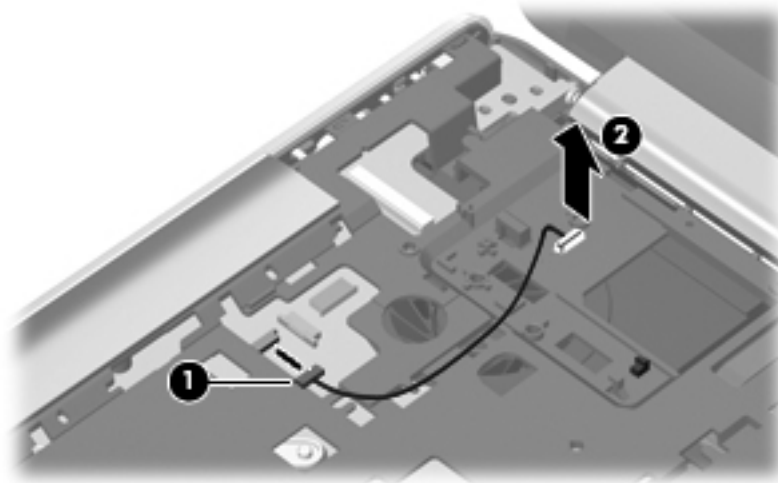
| Description | Spare part number |
|------------------------|-------------------|
| Bluetooth module cable | 496872-001 |

Before removing the Bluetooth module cable, 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 4-8](#)).
5. Remove the following components:
 - a. Switch cover (see [“Switch cover” on page 4-18](#))
 - b. Keyboard cover (see [“Keyboard cover” on page 4-20](#))
 - c. Power button board (see [“Power button board” on page 4-22](#))
 - d. Keyboard (see [“Keyboard” on page 4-24](#))

Remove the Bluetooth module cable:

1. Disconnect the Bluetooth module cable ❶ from the system board.
2. Remove the Bluetooth module cable ❷.



Reverse this procedure to install the Bluetooth module cable.

LED board cable



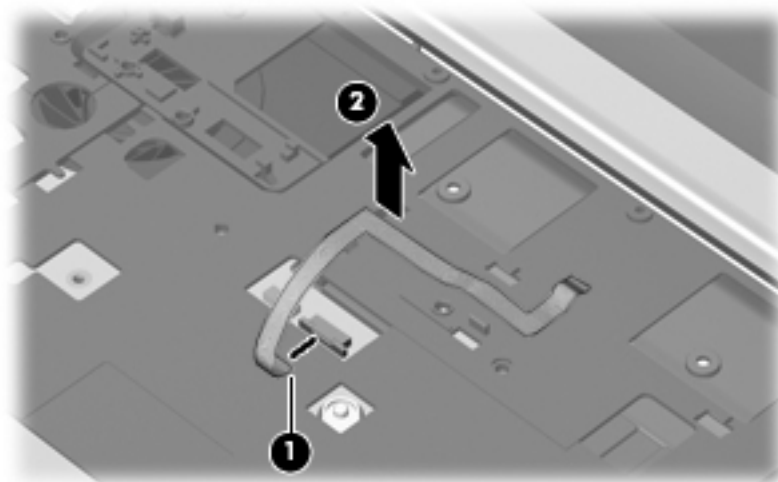
The LED board cable is included with the keyboard cover, spare part number 496883-001.

Before removing the LED board cable, 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 4-8](#)).
5. Remove the following components:
 - a. Switch cover (see [“Switch cover” on page 4-18](#))
 - b. Keyboard cover (see [“Keyboard cover” on page 4-20](#))
 - c. Keyboard (see [“Keyboard” on page 4-24](#))

Remove the LED board cable:

1. Release the ZIF connector **1** to which the LED board cable is attached and disconnect the LED board cable from the system board.
2. Remove the LED board cable **2**.



Reverse this procedure to install the LED board cable.

Speaker assembly

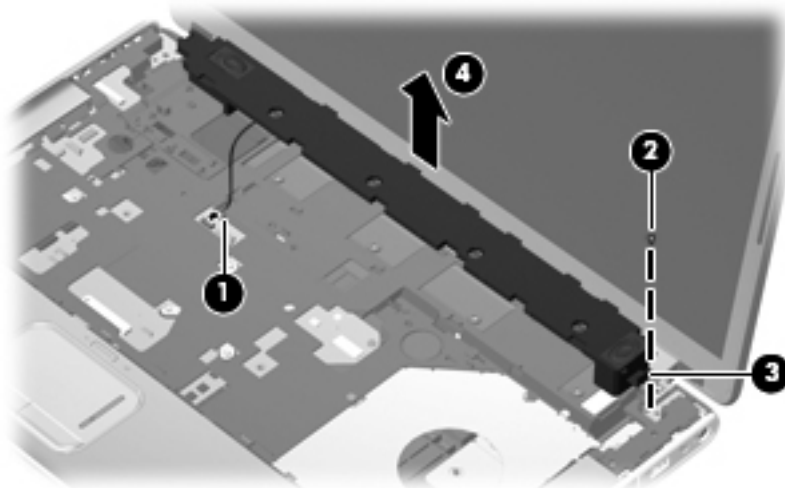
| Description | Spare part number |
|------------------|-------------------|
| Speaker assembly | 496887-001 |

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 4-8](#)).
5. Remove the following components:
 - a. Switch cover (see [“Switch cover” on page 4-18](#))
 - b. Keyboard cover (see [“Keyboard cover” on page 4-20](#))
 - c. Keyboard (see [“Keyboard” on page 4-24](#))

Remove the speaker assembly:

1. Disconnect the speaker assembly cable ❶ from the system board.
2. Remove the Phillips PM2.0×4.0 screw ❷ that attaches the speaker assembly to the top cover.
3. Release the wireless antenna cables from the routing channel ❸ built into the right side of the speaker assembly.
4. Remove the speaker assembly ❹.



Reverse this procedure to install the speaker assembly.

Display assembly

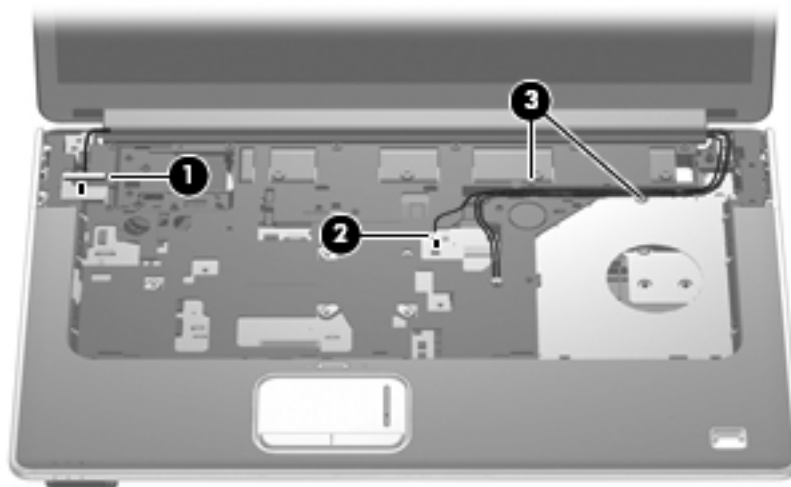
| Description | Spare part number |
|--|-------------------|
| 18.4-inch, AntiGlare, dual-lamp, display assembly (includes 2 WLAN antenna transceivers and cables, webcam, microphones, and logo) | 498166-001 |

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 4-8](#)).
5. Remove the following components:
 - a. Switch cover (see [“Switch cover” on page 4-18](#))
 - b. Keyboard cover (see [“Keyboard cover” on page 4-20](#))
 - c. Keyboard (see [“Keyboard” on page 4-24](#))
 - d. Speaker assembly (see [“Speaker assembly” on page 4-30](#))

Remove the display assembly:

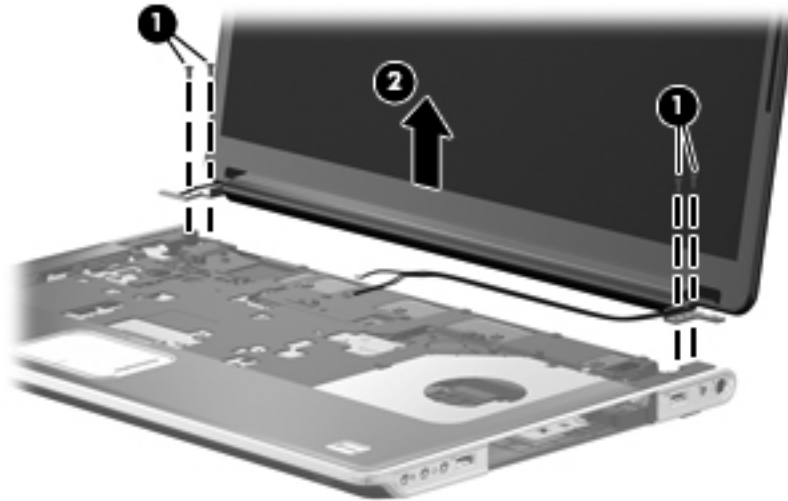
1. Open the computer as far as possible.
2. Disconnect the display panel cable ❶ from the system board.
3. Disconnect the webcam/microphone module cable ❷ from the system board.
4. Remove the WLAN antenna cable ❸ from the opening and the routing channel built into the top cover.



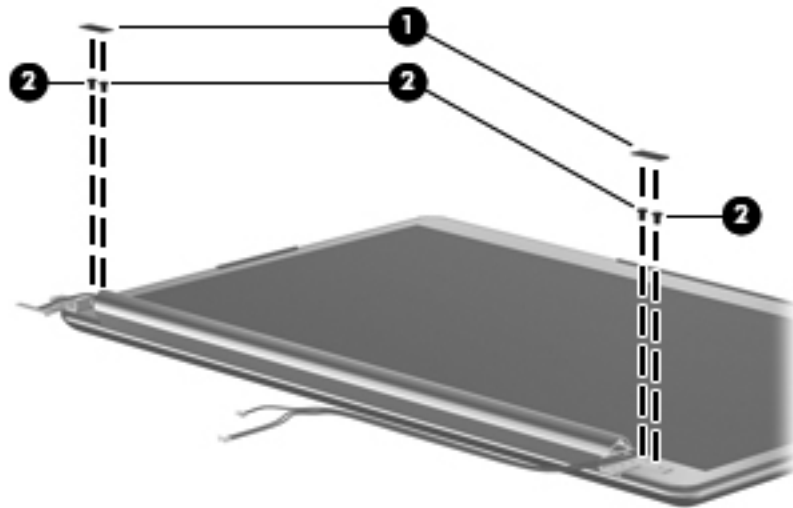


CAUTION: Support the display assembly when removing the following screws. Failure to support the display assembly can result in damage to the display assembly and other computer components.

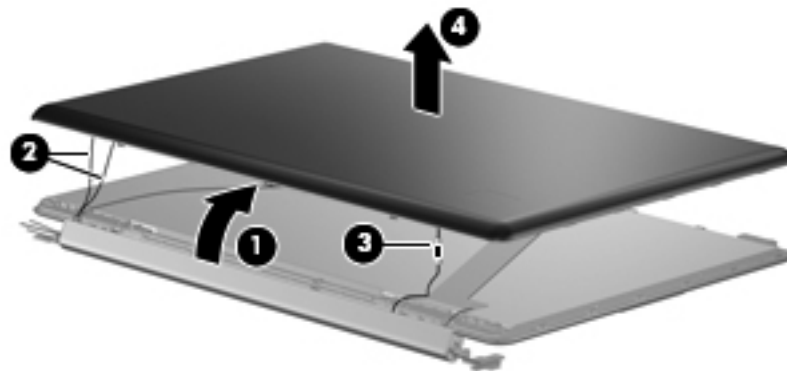
5. Remove the four Phillips PM2.5×7.0 screws ❶ that secure the display assembly to the computer. Be sure to hold the display before removing the last screw to prevent damage to the display.
6. Lift the display assembly ❷ straight up and remove it.



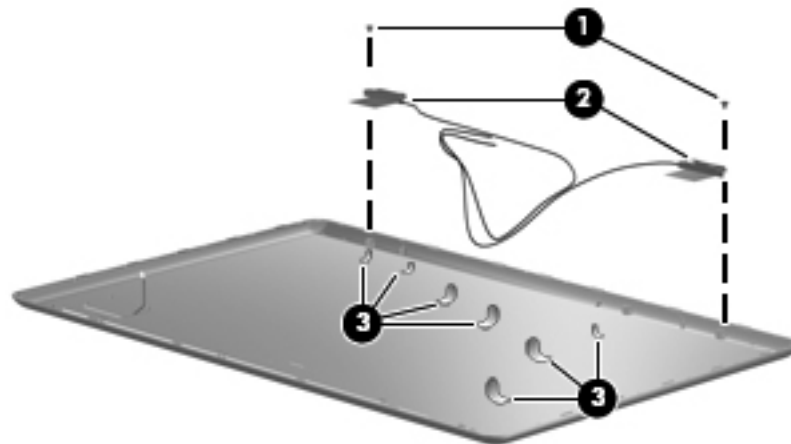
7. If it is necessary to replace the display enclosure or any of the display assembly internal components, remove the rubber screw covers ❶ and the four Phillips PM2.5×7.0 screws ❷ on the display bezel lower edge.



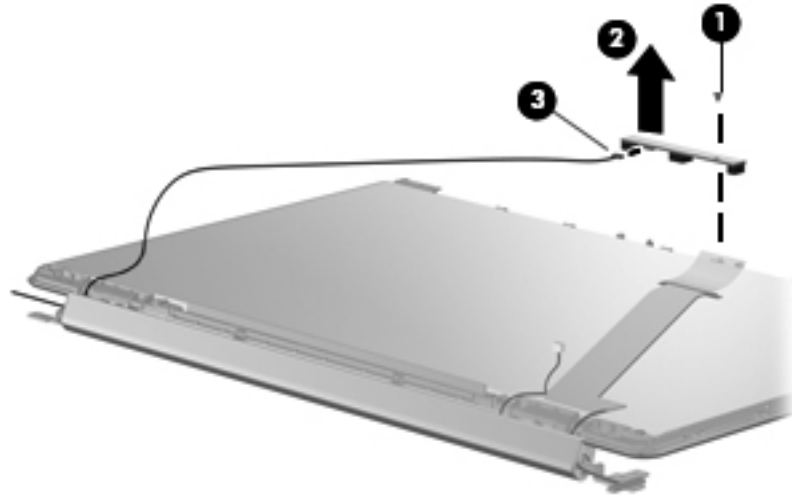
8. Turn the display assembly upside down, with the bottom edge toward you.
9. Release the display enclosure bottom edge ❶ as far as the wireless antenna cables and display logo LED cable allow.
10. Remove the wireless antenna cables ❷ from the slot built into the display hinge cover.
11. Disconnect the display logo LED cable ❸ from the display logo LED board.
12. Remove the display enclosure ❹. The display enclosure is available using spare part number 496873-001.



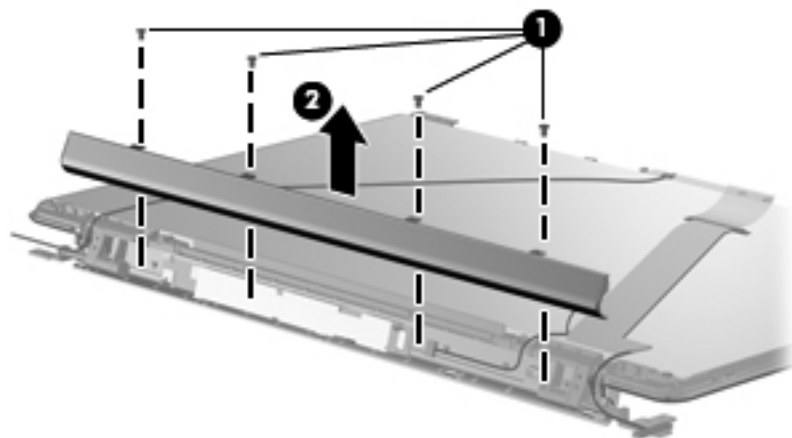
13. If it is necessary to replace the wireless antenna transceivers and cables, remove the Phillips PM2.0×4.0 screw ❶ that secures each transceiver to the display enclosure.
14. Detach the transceivers ❷ from the display enclosure.
15. Release the retention tabs ❸ built into the display enclosure and remove the wireless antenna cables from the tabs. The wireless antenna transceivers and cables are included in the Display Cable Kit, spare part number 496876-001.



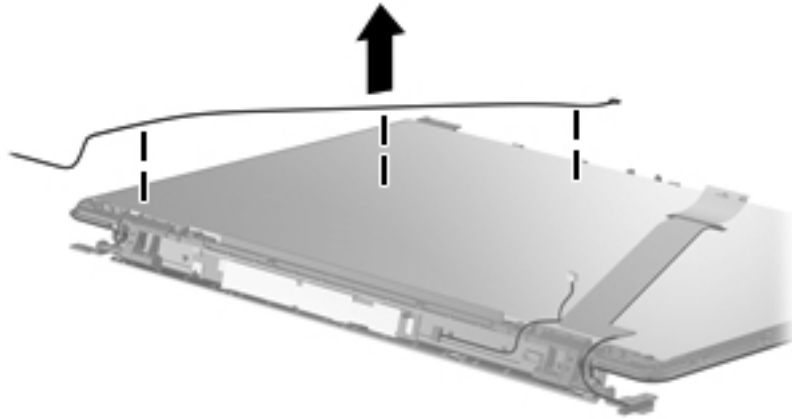
16. If it is necessary to replace the webcam/microphone module, remove the Phillips PM2.0×4.0 screw ❶ that secures the module to the display bezel.
17. Release the webcam/microphone module ❷ as far from the display bezel as the webcam/microphone module cable allows.
18. Disconnect the webcam/microphone module cable ❸ from the webcam/microphone module, and remove the webcam/microphone module. The webcam/microphone module is available using spare part number 499242-001.



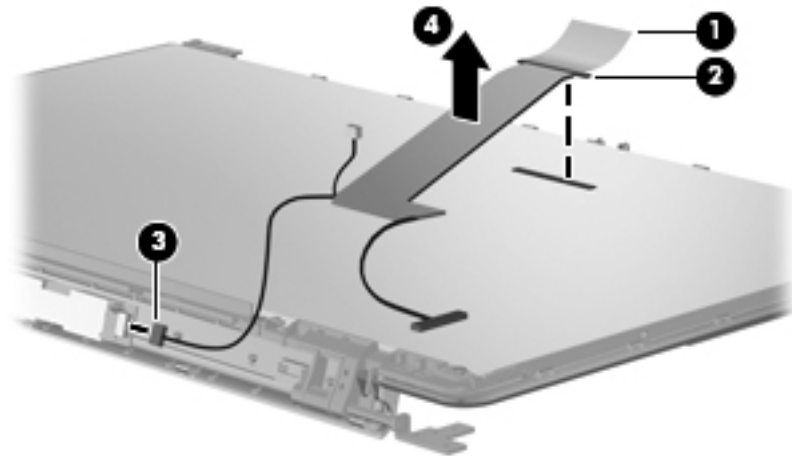
19. If it is necessary to replace the display hinge cover, display inverter, or webcam/microphone module cable, remove the four Phillips PM2.0×4.0 screws ❶ that secure the display hinge cover to the display bezel.
20. Remove the display hinge cover ❷ from the display bezel. The display hinge cover is available using spare part number 496875-001.



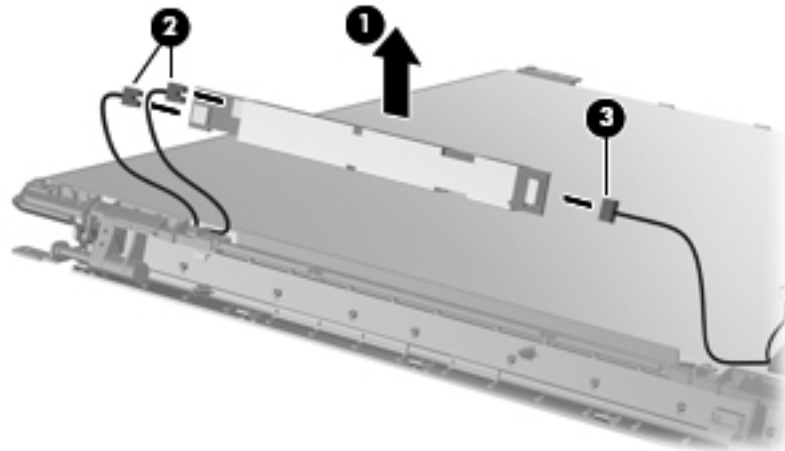
21. If it is necessary to replace the webcam/microphone module cable, remove the cable from the display panel.
The webcam/microphone module cable is included in the Display Cable Kit, spare part number 496876-001.



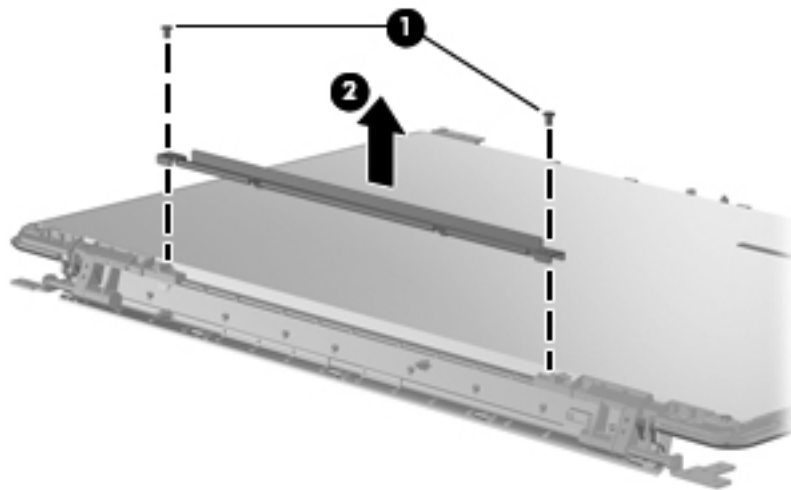
22. If it is necessary to replace the display panel cable, detach the adhesive reinforcement strip ❶ that secures the display panel cable to the display panel.
23. Disconnect the display panel cable ❷ from the display panel.
24. Disconnect the display panel cable from the display inverter ❸, and remove the display panel cable ❹.
The display panel cable is included in the Display Cable Kit, spare part number 496876-001.



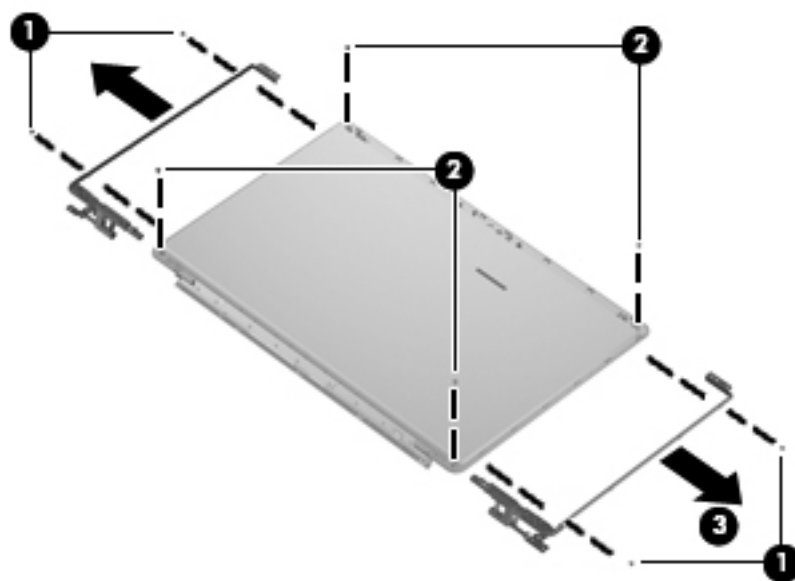
25. If it is necessary to replace the display inverter, release the display inverter **1** as far from the display bezel as the backlight cables and display panel cable allow.
26. Disconnect the two backlight cables **2** and the display panel cable **3** from the display inverter, and remove the display inverter. The display inverter is available using spare part number 498324-001.



27. If it is necessary to replace the display hinges, remove the two Phillips PM2.0x3.0 screws **1** that secure the display hinge bracket to the display bezel.
28. Remove the display hinge bracket **2**.



29. Remove the four Phillips PM2.0×4.0 screws ❶ that secure the display hinges to the display panel.
30. Remove the four Phillips PM2.5×7.0 screws ❷ that secure the display hinges to the display panel.
31. Remove the display hinges ❸. The display hinges and display hinge bracket are included in the Display Hinge Kit, spare part number 496874-001.



Reverse this procedure to reassemble and install the display assembly.

Top cover

| Description | Spare part number |
|--|-------------------|
| Top cover (includes fingerprint reader board, fingerprint reader board cable, TouchPad, and TouchPad cables) | 496881-001 |

Before removing the top cover, follow these steps:

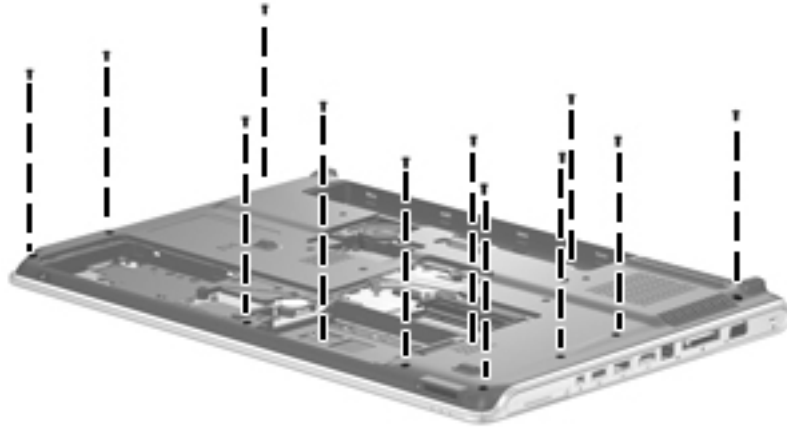
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [“Battery” on page 4-8](#)).
5. Remove the following components:
 - a. Optical drive (see [“Optical drive” on page 4-9](#))
 - b. Hard drive (see [“Hard drive” on page 4-11](#))
 - c. TV tuner module (see [“TV tuner module” on page 4-13](#))
 - d. Memory module (see [“Memory module” on page 4-15](#))
 - e. WLAN module (see [“WLAN module” on page 4-16](#))
 - f. Switch cover (see [“Switch cover” on page 4-18](#))
 - g. Keyboard cover (see [“Keyboard cover” on page 4-20](#))
 - h. Keyboard (see [“Keyboard” on page 4-24](#))
 - i. Speaker assembly (see [“Speaker assembly” on page 4-30](#))
 - j. Display assembly (see [“Display assembly” on page 4-31](#))

When replacing the top cover, be sure that the following components are removed from the defective top cover and installed on the replacement top cover:

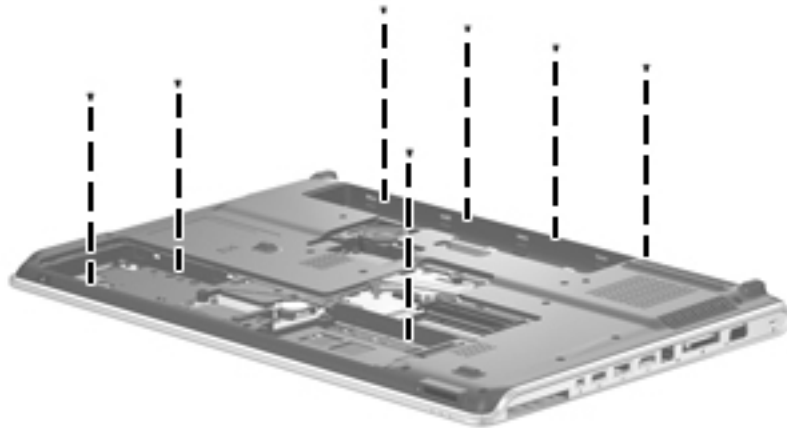
- Power button board (see [“Power button board” on page 4-22](#))
- Bluetooth module (see [“Bluetooth module” on page 4-23](#))
- Bluetooth module cable (see [“Bluetooth module cable” on page 4-28](#))

Remove the top cover:

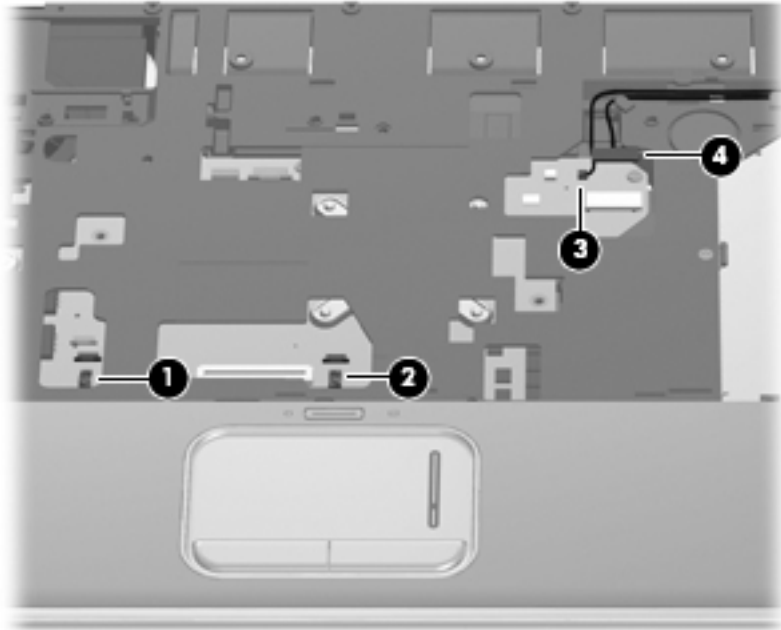
1. Turn the computer upside down, with the front toward you.
2. Remove the 12 Phillips PM2.5×7.0 screws that secure the top cover to the base enclosure.



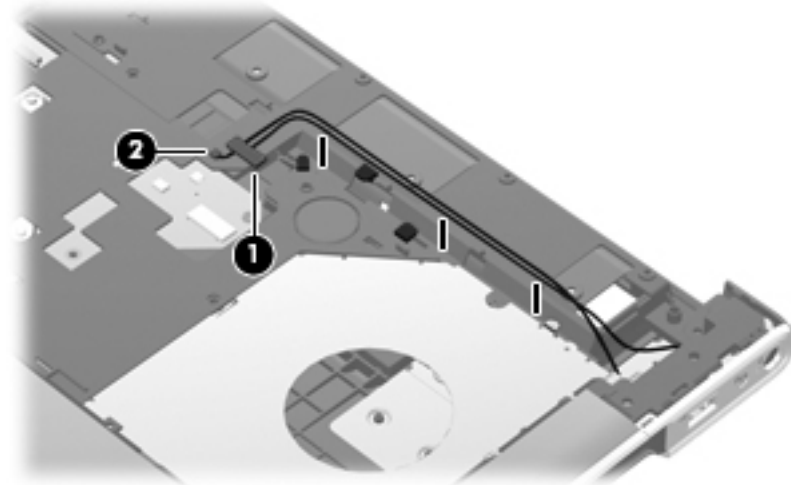
3. Remove the seven Phillips PM2.0×4.0 screws that secure the top cover to the base enclosure.



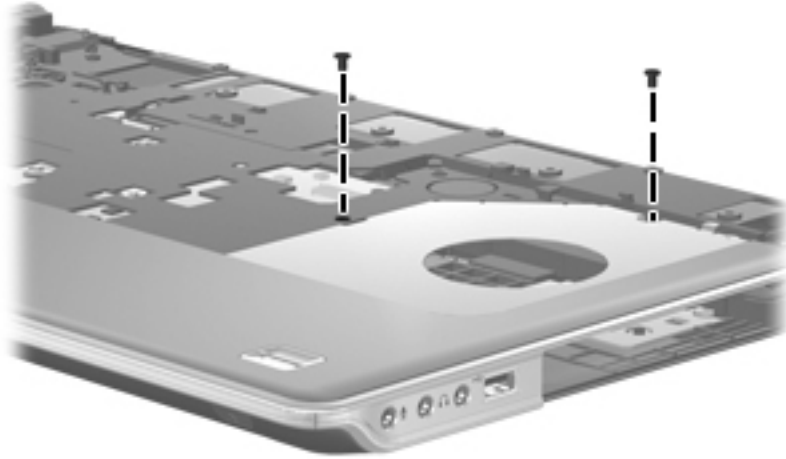
4. Turn the computer right-side up, with the front toward you.
5. Disconnect the following cables from the system board:
 - ❶ TouchPad board cable
 - ❷ TouchPad on/off button board cable
 - ❸ USB board cable
 - ❹ Power connector cable



6. Release the power connector cable ❶ and USB board cable ❷ from the clips and routing channel built into the top cover.

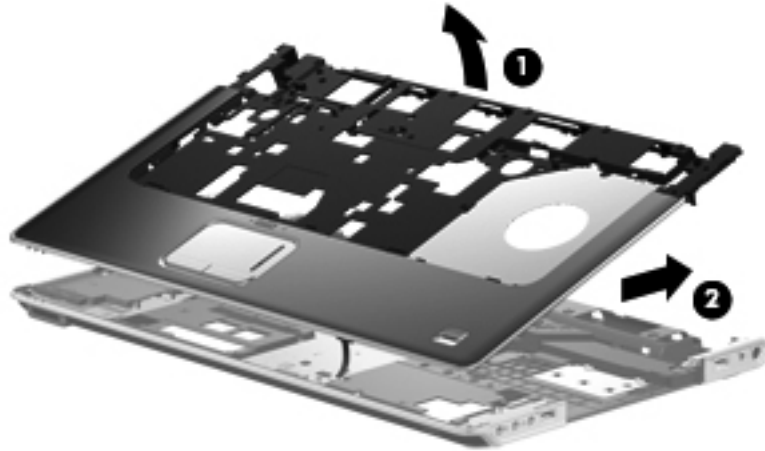


7. Remove the two Phillips PM2.5×7.0 screws that secure the top cover to the base enclosure.



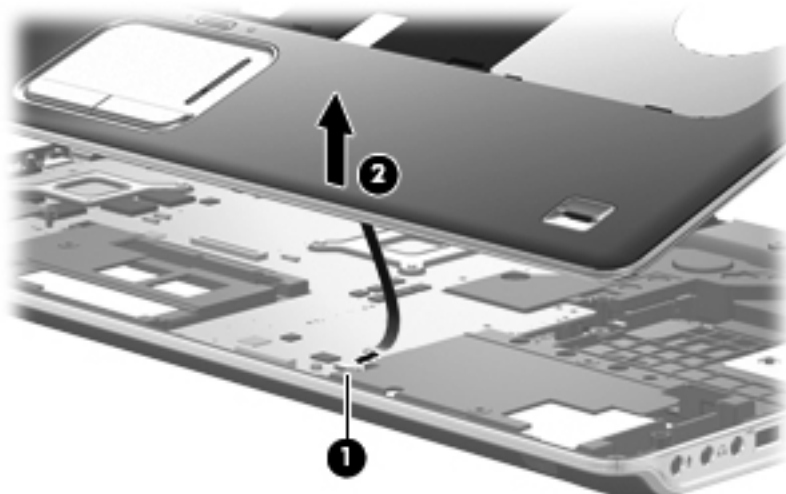
8. Lift the rear edge ❶ of the top cover until it rests at an angle.

9. Slide the top cover ❷ back until the fingerprint reader board cable is accessible.



10. Release the ZIF connector ❶ to which the fingerprint reader board cable is attached and disconnect the fingerprint reader board cable from the system board.

11. Remove the top cover ❷.



Reverse this procedure to install the top cover.

TouchPad on/off button board

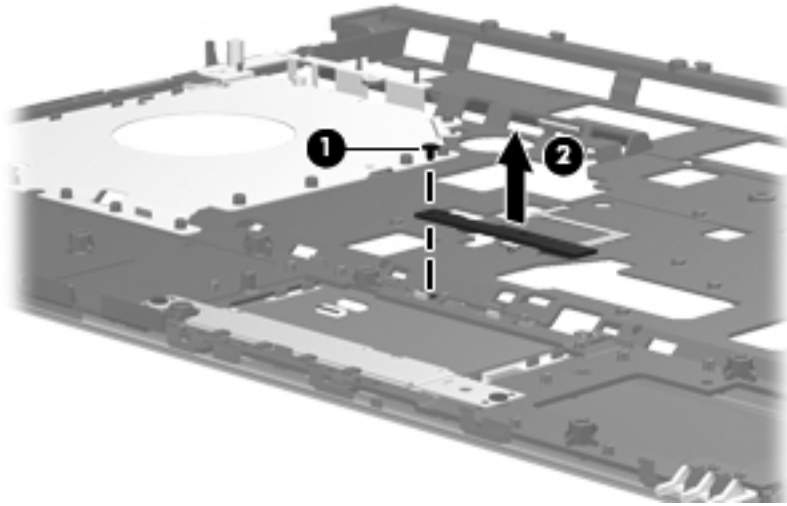
| Description | Spare part number |
|---|-------------------|
| TouchPad on/off button board (includes cable) | 500506-001 |

Before removing the TouchPad on/off button 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 4-8](#)).
5. Remove the following components:
 - a. Optical drive (see [“Optical drive” on page 4-9](#))
 - b. Hard drive (see [“Hard drive” on page 4-11](#))
 - c. TV tuner module (see [“TV tuner module” on page 4-13](#))
 - d. Memory module (see [“Memory module” on page 4-15](#))
 - e. WLAN module (see [“WLAN module” on page 4-16](#))
 - f. Switch cover (see [“Switch cover” on page 4-18](#))
 - g. Keyboard cover (see [“Keyboard cover” on page 4-20](#))
 - h. Keyboard (see [“Keyboard” on page 4-24](#))
 - i. Speaker assembly (see [“Speaker assembly” on page 4-30](#))
 - j. Display assembly (see [“Display assembly” on page 4-31](#))
 - k. Top cover (see [“Top cover” on page 4-38](#))

Remove the TouchPad on/off button board:

1. Turn the top cover upside down, with the front toward you.
2. Remove the Phillips PM2.0×4.0 screw ❶ that secures the TouchPad on/off button board to the top cover.
3. Remove the TouchPad on/off button board ❷.



Reverse this procedure to install the TouchPad on/off button board.

System board



The system board spare part kit includes replacement thermal material.

| Description | Spare part number |
|---|-------------------|
| Includes 1024-MB of graphics subsystem memory | 506495-001 |
| Includes 512-MB of graphics subsystem memory | 506494-001 |

Before removing the system board, follow these steps:

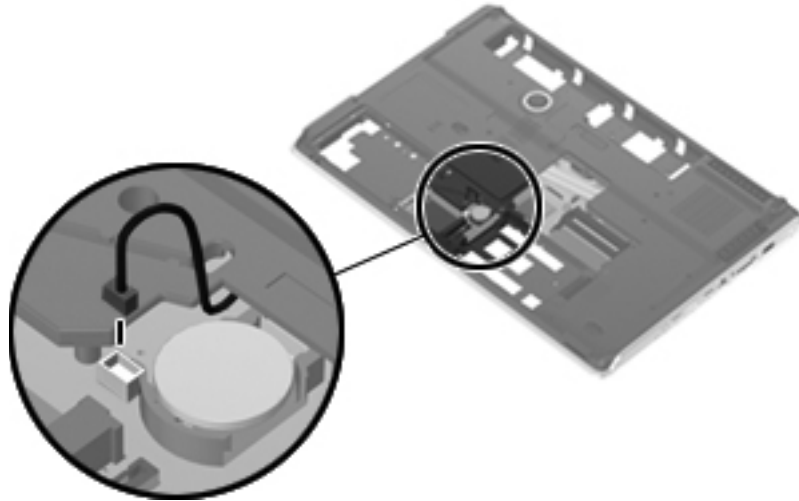
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [“Battery” on page 4-8](#)).
5. Remove the following components:
 - a. Optical drive (see [“Optical drive” on page 4-9](#))
 - b. Hard drive (see [“Hard drive” on page 4-11](#))
 - c. TV tuner module (see [“TV tuner module” on page 4-13](#))
 - d. Memory module (see [“Memory module” on page 4-15](#))
 - e. WLAN module (see [“WLAN module” on page 4-16](#))
 - f. Switch cover (see [“Switch cover” on page 4-18](#))
 - g. Keyboard cover (see [“Keyboard cover” on page 4-20](#))
 - h. Keyboard (see [“Keyboard” on page 4-24](#))
 - i. Speaker assembly (see [“Speaker assembly” on page 4-30](#))
 - j. Display assembly (see [“Display assembly” on page 4-31](#))
 - k. Top cover (see [“Top cover” on page 4-38](#))

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

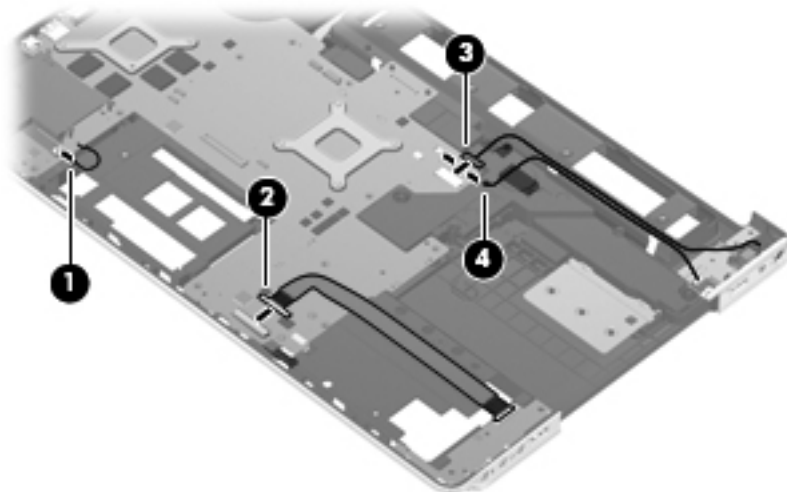
- RTC battery (see [“RTC battery” on page 4-14](#))
- Fan/heat sink assembly (see [“Fan/heat sink assembly” on page 4-54](#))
- Processor (see [“Processor” on page 4-56](#))

Remove the system board:

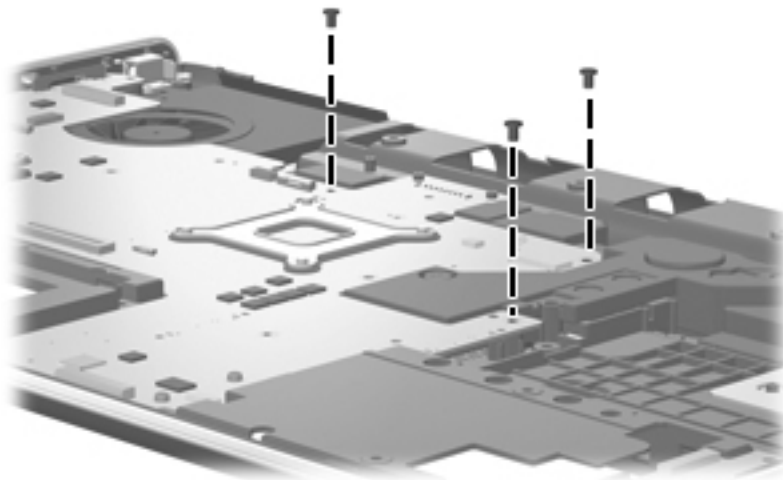
1. Turn the computer upside down, with the front toward you.
2. Disconnect the subwoofer cable from the system board.



3. Turn the computer right-side up, with the front toward you.
4. Disconnect the fan cable ❶ from the system board.
5. Release the ZIF connector to which the audio/infrared board cable ❷ is attached and disconnect the audio/infrared board cable from the system board.
6. Disconnect the USB board cable ❸ from the system board.
7. Disconnect the power connector cable ❹ from the system board.

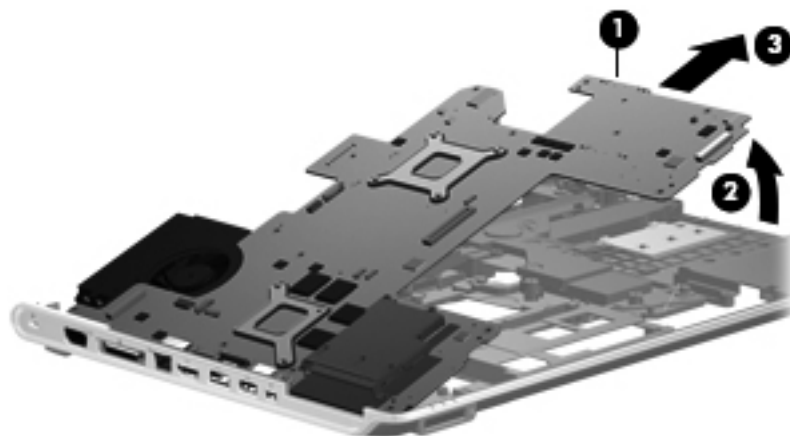


8. Remove the three Phillips PM2.5×7.0 screws that secure the system board to the base enclosure.



9. Use the optical drive connector ❶ to lift the system board ❷ until it rests at an angle.

10. Remove the system board ❸ by sliding it up and to the right.



Reverse this procedure to install the system board.

Fan

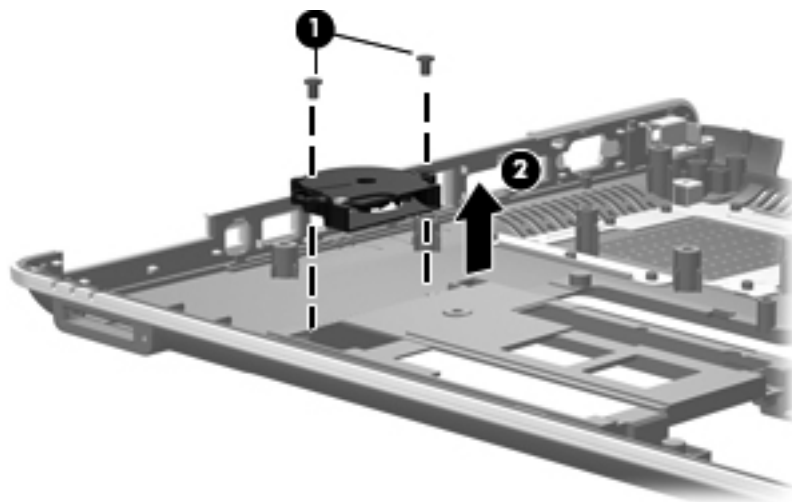
| Description | Spare part number |
|-------------|-------------------|
| Fan | 514290-001 |

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 4-8).
5. Remove the following components:
 - a. Optical drive (see [“Optical drive”](#) on page 4-9)
 - b. Hard drive (see [“Hard drive”](#) on page 4-11)
 - c. TV tuner module (see [“TV tuner module”](#) on page 4-13)
 - d. Memory module (see [“Memory module”](#) on page 4-15)
 - e. WLAN module (see [“WLAN module”](#) on page 4-16)
 - f. Switch cover (see [“Switch cover”](#) on page 4-18)
 - g. Keyboard cover (see [“Keyboard cover”](#) on page 4-20)
 - h. Keyboard (see [“Keyboard”](#) on page 4-24)
 - i. Speaker assembly (see [“Speaker assembly”](#) on page 4-30)
 - j. Display assembly (see [“Display assembly”](#) on page 4-31)
 - k. Top cover (see [“Top cover”](#) on page 4-38)
 - l. System board (see [“System board”](#) on page 4-44)

Remove the fan:

1. Remove the two Phillips PM2.0×4.0 screws ❶ that secure the fan to the base enclosure.
2. Remove the fan ❷ from the base enclosure.



Reverse this procedure to install the fan.

Subwoofer

| Description | Spare part number |
|--|-------------------|
| Subwoofer (includes 3 mounting grommets) | 496893-001 |

Before removing the subwoofer, follow these steps:

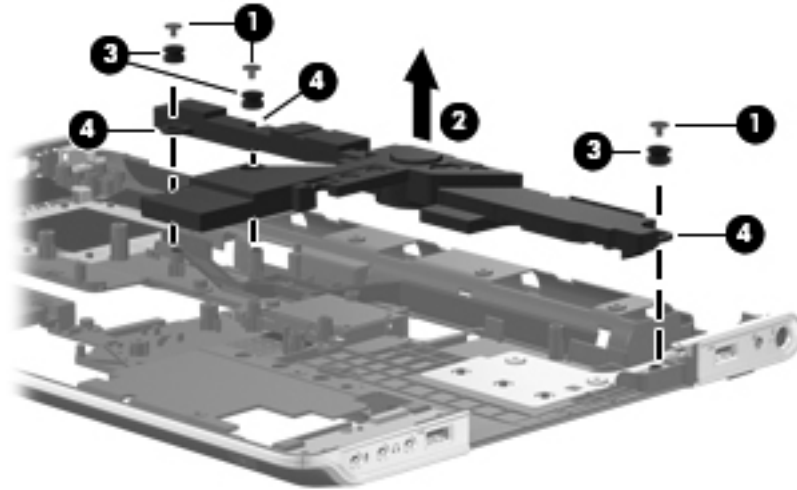
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [“Battery” on page 4-8](#)).
5. Remove the following components:
 - a. Optical drive (see [“Optical drive” on page 4-9](#))
 - b. Hard drive (see [“Hard drive” on page 4-11](#))
 - c. TV tuner module (see [“TV tuner module” on page 4-13](#))
 - d. Memory module (see [“Memory module” on page 4-15](#))
 - e. WLAN module (see [“WLAN module” on page 4-16](#))
 - f. Switch cover (see [“Switch cover” on page 4-18](#))
 - g. Keyboard cover (see [“Keyboard cover” on page 4-20](#))
 - h. Keyboard (see [“Keyboard” on page 4-24](#))
 - i. Speaker assembly (see [“Speaker assembly” on page 4-30](#))
 - j. Display assembly (see [“Display assembly” on page 4-31](#))
 - k. Top cover (see [“Top cover” on page 4-38](#))
 - l. System board (see [“System board” on page 4-44](#))

Remove the subwoofer:

1. Remove the three Phillips PM2.5×5.0 broadhead screws ❶ that secure the subwoofer to the base enclosure.
2. Remove the subwoofer ❷ by lifting it straight up.



The rubber grommets ❸ should be inspected and replaced in the correct locations ❹ on the subwoofer. These grommets are critical for satisfactory subwoofer performance.



Reverse this procedure to install the subwoofer.

Audio/infrared board

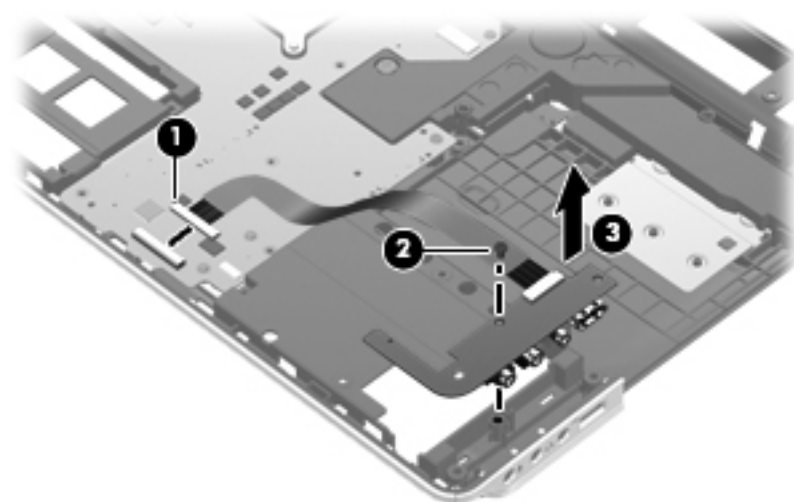
| Description | Spare part number |
|---------------------------------------|-------------------|
| Audio/infrared board (includes cable) | 496892-001 |

Before removing the audio/infrared 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 4-8).
5. Remove the following components:
 - a. Optical drive (see “[Optical drive](#)” on page 4-9)
 - b. Hard drive (see “[Hard drive](#)” on page 4-11)
 - c. TV tuner module (see “[TV tuner module](#)” on page 4-13)
 - d. Memory module (see “[Memory module](#)” on page 4-15)
 - e. WLAN module (see “[WLAN module](#)” on page 4-16)
 - f. Switch cover (see “[Switch cover](#)” on page 4-18)
 - g. Keyboard cover (see “[Keyboard cover](#)” on page 4-20)
 - h. Keyboard (see “[Keyboard](#)” on page 4-24)
 - i. Speaker assembly (see “[Speaker assembly](#)” on page 4-30)
 - j. Display assembly (see “[Display assembly](#)” on page 4-31)
 - k. Top cover (see “[Top cover](#)” on page 4-38)

Remove the audio/infrared board and cable:

1. Release the ZIF connector ❶ to which the audio/infrared board cable is attached and disconnect the audio/infrared board cable from the system board.
2. Remove the Phillips PM2.0×4.0 screw ❷ that secures the audio/infrared board to the base enclosure.
3. Remove the audio/infrared board ❸ by lifting it straight up.



Reverse this procedure to install the audio/infrared board.

USB board

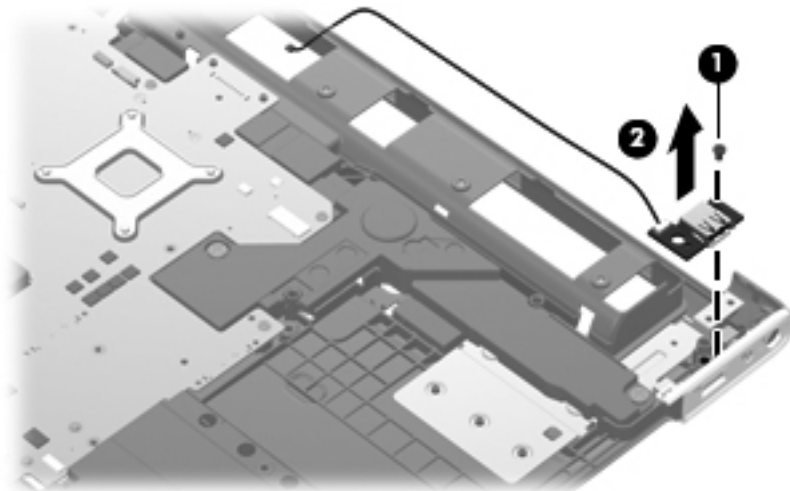
| Description | Spare part number |
|----------------------------|-------------------|
| USB board (includes cable) | 497706-001 |

Before removing the USB 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 4-8](#)).
5. Remove the following components:
 - a. Optical drive (see [“Optical drive” on page 4-9](#))
 - b. Hard drive (see [“Hard drive” on page 4-11](#))
 - c. TV tuner module (see [“TV tuner module” on page 4-13](#))
 - d. Memory module (see [“Memory module” on page 4-15](#))
 - e. WLAN module (see [“WLAN module” on page 4-16](#))
 - f. Switch cover (see [“Switch cover” on page 4-18](#))
 - g. Keyboard cover (see [“Keyboard cover” on page 4-20](#))
 - h. Keyboard (see [“Keyboard” on page 4-24](#))
 - i. Speaker assembly (see [“Speaker assembly” on page 4-30](#))
 - j. Display assembly (see [“Display assembly” on page 4-31](#))
 - k. Top cover (see [“Top cover” on page 4-38](#))

Remove the USB board and cable:

1. Remove the Phillips PM2.0×4.0 screw ❶ that secures the USB board to the base enclosure.
2. Remove the USB board and cable ❷ by lifting them straight up.



Reverse this procedure to install the USB board.

Power connector cable



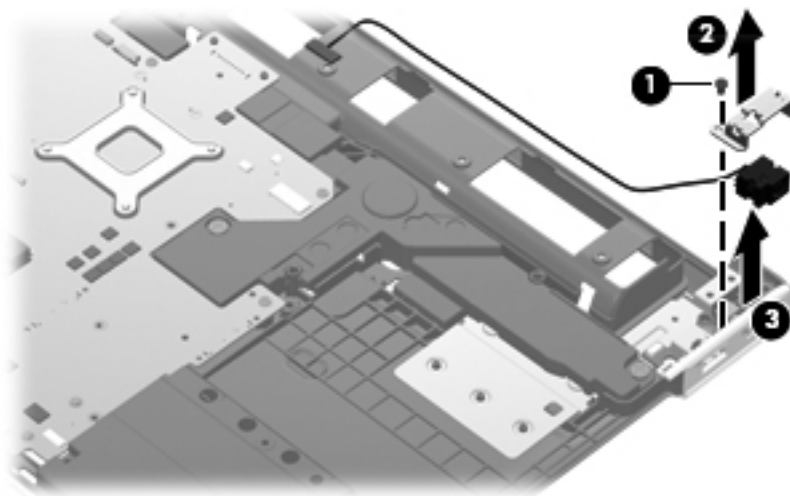
The power connector cable is included in the base enclosure spare part kit, spare part number 496880-001.

Before removing the power connector cable, 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 4-8).
5. Remove the following components:
 - a. Optical drive (see [“Optical drive”](#) on page 4-9)
 - b. Hard drive (see [“Hard drive”](#) on page 4-11)
 - c. TV tuner module (see [“TV tuner module”](#) on page 4-13)
 - d. Memory module (see [“Memory module”](#) on page 4-15)
 - e. WLAN module (see [“WLAN module”](#) on page 4-16)
 - f. Switch cover (see [“Switch cover”](#) on page 4-18)
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 - h. Keyboard (see [“Keyboard”](#) on page 4-24)
 - i. Speaker assembly (see [“Speaker assembly”](#) on page 4-30)
 - j. Display assembly (see [“Display assembly”](#) on page 4-31)
 - k. Top cover (see [“Top cover”](#) on page 4-38)

Remove the power connector cable:

1. Remove the Phillips PM2.0×4.0 screw ❶ that secures the power connector and bracket to the base enclosure.
2. Remove the power connector bracket ❷.
3. Remove the power connector and cable ❸.



Reverse this procedure to install the power connector cable.

TV tuner module cable



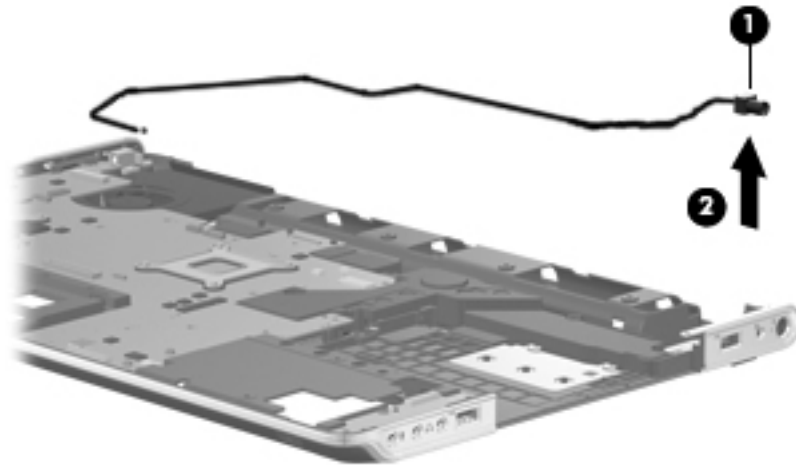
The TV tuner module cable is included in the Cable Kit, spare part number 496891-001.

Before removing the TV tuner module cable, 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 4-8).
5. Remove the following components:
 - a. Optical drive (see [“Optical drive”](#) on page 4-9)
 - b. Hard drive (see [“Hard drive”](#) on page 4-11)
 - c. TV tuner module (see [“TV tuner module”](#) on page 4-13)
 - d. Memory module (see [“Memory module”](#) on page 4-15)
 - e. WLAN module (see [“WLAN module”](#) on page 4-16)
 - f. Switch cover (see [“Switch cover”](#) on page 4-18)
 - g. Keyboard cover (see [“Keyboard cover”](#) on page 4-20)
 - h. Keyboard (see [“Keyboard”](#) on page 4-24)
 - i. Speaker assembly (see [“Speaker assembly”](#) on page 4-30)
 - j. Display assembly (see [“Display assembly”](#) on page 4-31)
 - k. Top cover (see [“Top cover”](#) on page 4-38)

Remove the TV tuner module cable:

1. Remove the TV tuner module cable connector ❶ from the clip in the base enclosure.
2. Remove the TV tuner module cable ❷.



Reverse this procedure to install the TV tuner module cable.

Fan/heat sink assembly

| Description | Spare part number |
|--|-------------------|
| Fan/heat sink assembly (includes replacement thermal material) | 496894-001 |



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.

Before removing the fan/heat sink 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 4-8](#)).
5. Remove the following components:
 - a. Optical drive (see [“Optical drive” on page 4-9](#))
 - b. Hard drive (see [“Hard drive” on page 4-11](#))
 - c. TV tuner module (see [“TV tuner module” on page 4-13](#))
 - d. Memory module (see [“Memory module” on page 4-15](#))
 - e. WLAN module (see [“WLAN module” on page 4-16](#))
 - f. Switch cover (see [“Switch cover” on page 4-18](#))
 - g. Keyboard cover (see [“Keyboard cover” on page 4-20](#))
 - h. Keyboard (see [“Keyboard” on page 4-24](#))
 - i. Speaker assembly (see [“Speaker assembly” on page 4-30](#))
 - j. Display assembly (see [“Display assembly” on page 4-31](#))
 - k. Top cover (see [“Top cover” on page 4-38](#))
 - l. System board (see [“System board” on page 4-44](#))

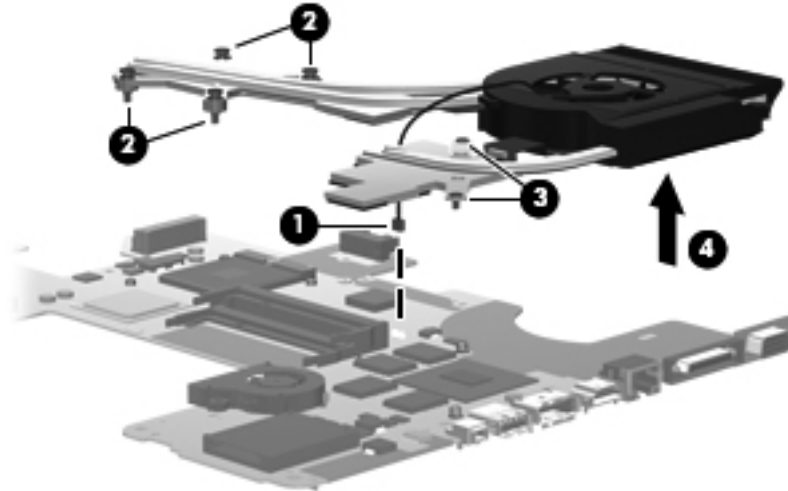
Remove the fan/heat sink assembly:

1. Disconnect the fan cable **1** from the system board.
2. Loosen the four Phillips PM2.0×10.0 captive screws **2** and the two Phillips PM2.5×5.0 captive screws **3** that secure the fan/heat sink assembly to the system board.



Due to the adhesive quality of the thermal material located between the fan/heat sink assembly and system board components, it may be necessary to move the fan/heat sink assembly from side to side to detach the assembly.

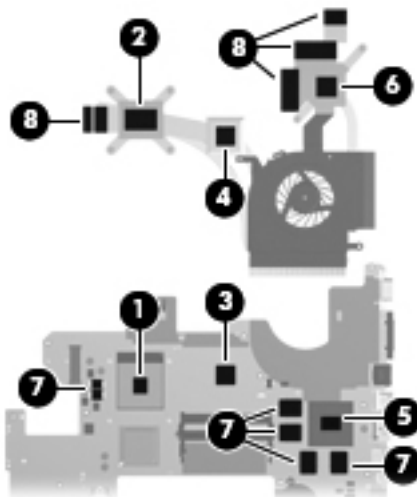
3. Remove the fan/heat sink assembly **4**.



The thermal material must be thoroughly cleaned from the surfaces of the fan/heat sink assembly and the system board each time the fan/heat sink assembly is removed:

- Thermal paste is used on the processor **1** and the heat sink section **2** that services it.
- Thermal pads are used on the Northbridge chip **3** and the heat sink section **4** that services it.
- Thermal pads are used on various other system board components **5** and **7**, and sections of the heat sink **6** and **8**.

Replacement thermal material is included with all fan/heat sink assembly, system board, and processor spare part kits.



Reverse this procedure to install the fan/heat sink assembly.

Processor



The processor spare part kit includes replacement thermal material.

| Description | Spare part number |
|---|-------------------|
| Intel Core2 Duo processors (12-MB L2 cache, 1066-MHz FSB): | |
| ■ QX9300 2.53-GHz processor | 500606-001 |
| ■ Q9100 2.26-GHz processor | 510398-001 |
| ■ Q9000 2.00-GHz processor | 510399-001 |
| Intel Core2 Duo processors (6-MB L2 cache and 1066-MHz FSB): | |
| ■ T9600 2.80-GHz processor | 500604-001 |
| ■ T9500 2.53-GHz processor | 500603-001 |
| Intel Core2 Duo processors (3-MB L2 cache and 1066-MHz FSB): | |
| ■ T8600 2.40-GHz processor | 500601-001 |
| ■ T8400 2.26-GHz processor | 500600-001 |

Before removing the processor, follow these steps:

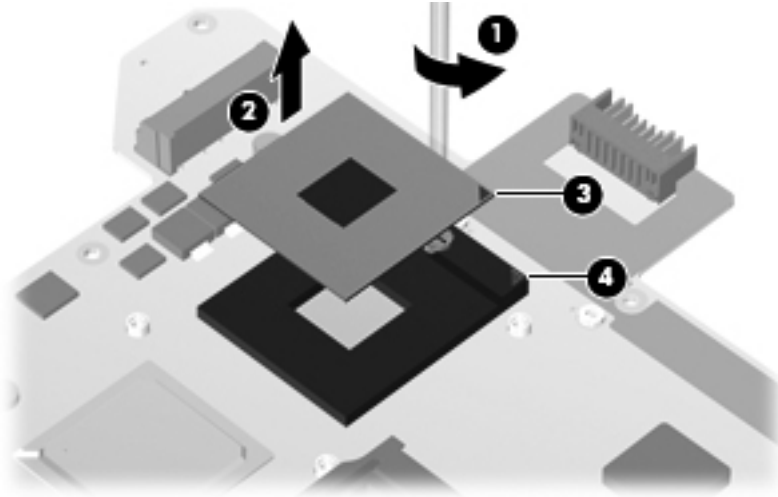
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [“Battery” on page 4-8](#)).
5. Remove the following components:
 - a. Optical drive (see [“Optical drive” on page 4-9](#))
 - b. Hard drive (see [“Hard drive” on page 4-11](#))
 - c. TV tuner module (see [“TV tuner module” on page 4-13](#))
 - d. Memory module (see [“Memory module” on page 4-15](#))
 - e. WLAN module (see [“WLAN module” on page 4-16](#))
 - f. Switch cover (see [“Switch cover” on page 4-18](#))
 - g. Keyboard cover (see [“Keyboard cover” on page 4-20](#))
 - h. Keyboard (see [“Keyboard” on page 4-24](#))
 - i. Speaker assembly (see [“Speaker assembly” on page 4-30](#))
 - j. Display assembly (see [“Display assembly” on page 4-31](#))
 - k. Top cover (see [“Top cover” on page 4-38](#))
 - l. System board (see [“System board” on page 4-44](#))
 - m. Fan/heat sink assembly (see [“Fan/heat sink assembly” on page 4-54](#))

Remove the processor:

1. Turn the processor locking screw **1** one-half turn counterclockwise until you hear a click.
2. Lift the processor **2** straight up and remove it.



The gold triangle **3** on the processor must be aligned with the triangle icon **4** embossed on the processor socket when you install the processor.



Reverse this procedure to install the processor.

Setup Utility

The Setup Utility is a ROM-based information and customization utility that can be used even when your Windows operating system is not working.

The utility reports information about the computer and provides settings for startup, security, and other preferences.



The fingerprint reader (select models only) does not work when accessing the Setup Utility.

Starting the Setup Utility

To start the Setup Utility:

1. Turn on or restart the computer.
2. Before Windows opens and while “Press <F10> to enter setup” is displayed in the lower-left corner of the screen, press **f10**.

Changing the language of the Setup Utility

The following procedure explains how to change the language of the Setup Utility. If the Setup Utility is not already running, begin at step 1. If the Setup Utility is already running, begin at step 2.

1. To start the Setup Utility, turn on or restart the computer, and then press **f10** while “Press <F10> to enter setup” is displayed in the lower-left corner of the screen.
2. Use the arrow keys to select **System Configuration > Language**, and then press **enter**.
3. Press **f5** or **f6** (or use the arrow keys) to select a language, and then press **enter** to select a language.
4. When a confirmation prompt with your preference selected is displayed, press **enter** to save your preference.
5. To set your preferences and exit the Setup Utility, press **f10** and then follow the instructions on the screen.

Your preferences go into effect when the computer restarts in Windows.

Navigating and selecting in the Setup Utility

Because the Setup Utility is not Windows-based, it does not support the TouchPad. Navigation and selection are by keystroke.

- To choose a menu or a menu item, use the arrow keys.
- To choose an item in a drop-down list or to toggle a field, for example an Enable/Disable field, use either the arrow keys or **f5** or **f6**.
- To select an item, press **enter**.
- To close a text box or return to the menu display, press **esc**.
- To display additional navigation and selection information while the Setup Utility is open, press **f1**.

Displaying system information

The following procedure explains how to display system information in the Setup Utility. If the Setup Utility is not open, begin at step 1. If the Setup Utility is open, begin at step 2.

1. To start the Setup Utility, turn on or restart the computer, and then press **f10** while “Press <F10> to enter setup” is displayed in the lower-left corner of the screen.
2. Access the system information by using the **Main** menu.
3. To exit the Setup Utility without changing any settings, use the arrow keys to select **Exit > Exit Discarding Changes**, and then press **enter**. (The computer restarts in Windows.)

Restoring default settings in the Setup Utility

The following procedure explains how to restore the Setup Utility default settings. If the Setup Utility is not already running, begin at step 1. If the Setup Utility is already running, begin at step 2.

1. To start the Setup Utility, turn on or restart the computer, and then press **f10** while “Press <F10> to enter setup” is displayed in the lower-left corner of the screen.
2. Select **Exit > Load Setup Defaults**, and then press **enter**.
3. When the Setup Confirmation is displayed, press **enter** to save your preferences.
4. To set your preferences and exit the Setup Utility, press **f10**, and then follow the instructions on the screen.

The Setup Utility default settings are set when you exit the Setup Utility and go into effect when the computer restarts.



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

Using advanced Setup Utility features

This guide describes the Setup Utility features recommended for all users. For more information about the Setup Utility features recommended for advanced users only, refer to Help and Support, which is accessible only when the computer is in Windows.

The Setup Utility features available for advanced users include a hard drive self-test, a Network Service Boot, and settings for boot order preferences.

The “<F12> to boot from LAN” message that is displayed in the lower-left corner of the screen each time the computer is started or restarted in Windows is the prompt for a Network Service Boot.

The “Press <F9> to change boot order” message that is displayed in the lower-left corner of the screen each time the computer is started or restarted in Windows is the prompt to change the boot order.

Closing the Setup Utility

You can close the Setup Utility with or without saving changes.

- To close the Setup Utility and save your changes from the current session, use either of the following procedures:
 - Press **f10**, and then follow the instructions on the screen.
 - or –
 - If the Setup Utility menus are not visible, press **esc** to return to the menu display. Then use the arrow keys to select **Exit > Exit Saving Changes**, and then press **enter**.

When you use the **f10** procedure, you are offered an option to return to the Setup Utility. When you use the Exit Saving Changes procedure, the Setup Utility closes when you press **enter**.

- To close the Setup Utility without saving your changes from the current session:

If the Setup Utility menus are not visible, press **esc** to return to the menu display. Then use the arrow keys to select **Exit > Exit Discarding Changes**, and then press **enter**.

After the Setup Utility closes, the computer restarts in Windows.

Setup Utility menus

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



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

Main menu

| Select | To do this |
|--------------------|---|
| System information | <ul style="list-style-type: none">■ View and change the system time and date.■ View identification information about the computer.■ View specification information about the processor, memory size, system BIOS, and keyboard controller version (select models only). |


Security menu

| Select | To do this |
|------------------------|--|
| Administrator password | Enter, change, or delete an administrator password. |
| Power-On | Password Enter, change, or delete a power-on password. |

System Configuration menu


| Select | To do this |
|-----------------------------------|--|
| Language Support | Change the Setup Utility language. |
| Boot Options | Set the following boot options: <ul style="list-style-type: none">■ f10 and f12 Delay (sec.)—Set the delay for the f10 and f12 functions of the Setup Utility in intervals of 5 seconds each (0, 5, 10, 15, 20).■ CD-ROM boot—Enable/disable boot from CD-ROM.■ Floppy boot—Enable/disable boot from Floppy.■ Internal Network Adapter boot—Enable/disable boot from Internal Network Adapter.■ Boot Order—Set the boot order for:<ul style="list-style-type: none"><input type="checkbox"/> USB Floppy<input type="checkbox"/> ATAPI CD-/DVD-ROM Drive<input type="checkbox"/> Hard drive<input type="checkbox"/> USB Diskette on Key<input type="checkbox"/> USB Hard drive<input type="checkbox"/> Network adapter |
| Button Sound (select models only) | Enable/disable the Quick Launch Button tapping sound. |
| Virtualization Technology | Enable/disable the processor Virtualization Technology. |
| Processor C4 State | Enable/disable the processor C4 sleep state. |

Diagnostics menu

| Select | To do this |
|--|---|
| Hard Disk Self Test | Run a comprehensive self-test on the hard drive.  On models with two hard drives, this menu option is called the Primary Hard Disk Self Test. |
| Secondary Hard Disk Self Test (select models only) | Run a comprehensive self-test on a secondary hard drive. |
| Memory Test | Run a diagnostic test on the system memory. |

Specifications

Computer specifications

| | Metric | U.S. |
|--|---------------------------|---------------------|
| Dimensions | | |
| Length | 28.6 cm | 11.26 in |
| Width | 43.6 cm | 17.17 in |
| Height (front to rear) | 3.4 to 4.4 cm | 1.34 to 1.73 in |
| Weight | | |
| | 4.0 kg | 8.83 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 |
|  Applicable product safety standards specify thermal limits for plastic surfaces. The computer operates well within this range of temperatures. | | |

18.4-inch display specifications

| | Metric | U.S. |
|--|---------------------|----------|
| Dimensions | | |
| Height | 23.0 cm | 9.06 in |
| Width | 39.9 cm | 15.71 in |
| Diagonal | 46.7 cm | 18.40 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 | 1920 × 1080 | |
| 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


| | 500-GB* | 400-GB* | 320-GB* |
|---|-----------------------------|--------------|--------------------------|
| Dimensions | | | |
| Height | 9.5 mm | 9.5 mm | 9.5 mm |
| Width | 70 mm | 70 mm | 70 mm |
| Weight | 101 g | 101 g | 101 g |
| Interface type | | | |
| | SATA | SATA | SATA |
| Transfer rate | | | |
| | 100 MB/sec | 100 MB/sec | 100 MB/sec |
| Security | | | |
| | ATA security | ATA security | ATA security |
| Seek times (typical read, including setting) | | | |
| Single track | 3 ms | 3 ms | 3 ms |
| Average | 13 ms | 13 ms | 13 ms |
| Maximum | 24 ms | 24 ms | 24 ms |
| Logical blocks | | | |
| | 976,809,728 | 781,446,402 | 625,127,124 |
| Disc rotational speed | | | |
| | 5400 rpm | 5400 rpm | 7200 rpm and 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.

(Continued)

| | 250-GB* | 160-GB* | 80-GB* |
|---|-----------------------------|--------------------------|--------------|
| Dimensions | | | |
| Height | 9.5 mm | 9.5 mm | 9.5 mm |
| Width | 70 mm | 70 mm | 70 mm |
| Weight | 101 g | 101 g | 101 g |
| Interface type | | | |
| | SATA | SATA | SATA |
| Transfer rate | | | |
| | 100 MB/sec | 100 MB/sec | 100 MB/sec |
| Security | | | |
| | ATA security | ATA security | ATA security |
| Seek times (typical read, including setting) | | | |
| Single track | 3 ms | 3 ms | 3 ms |
| Average | 13 ms | 13 ms | 13 ms |
| Maximum | 24 ms | 24 ms | 24 ms |
| Logical blocks | | | |
| | 488,397,168 | 312,581,808 | 234,441,648 |
| Disc rotational speed | | | |
| | 7200 rpm and 5400 rpm | 7200 rpm and 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. | | | |

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-ROM |
| 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 | |

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 |

*ExpressCard controller can use DMA 1, 2, or 5.


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 |

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 resources |
| 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 resources |
| 050-053 | System timer |
| 060 | Standard 101-/102-key or Microsoft Natural Keyboard |
| 061 | Motherboard resources |
| 062 | Microsoft ACPI-compliant embedded controller |
| 063 | Motherboard resources |
| 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 |

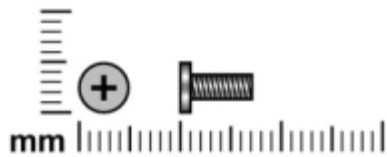
(Continued)

| I/O address (hex) | System function (shipping configuration) |
|--------------------------|---|
| 0C0-0DF | Direct memory access controller |
| 0F0-0F0 | Numeric data processor |
| 0200-027F | Motherboard resources |
| 3B0-3BB | Mobile Intel 4 Series Express Chipset Family |
| 3C0-3DF | Mobile Intel 4 Series Express Chipset Family |
| 400-47F | Motherboard resources |
| 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 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 |

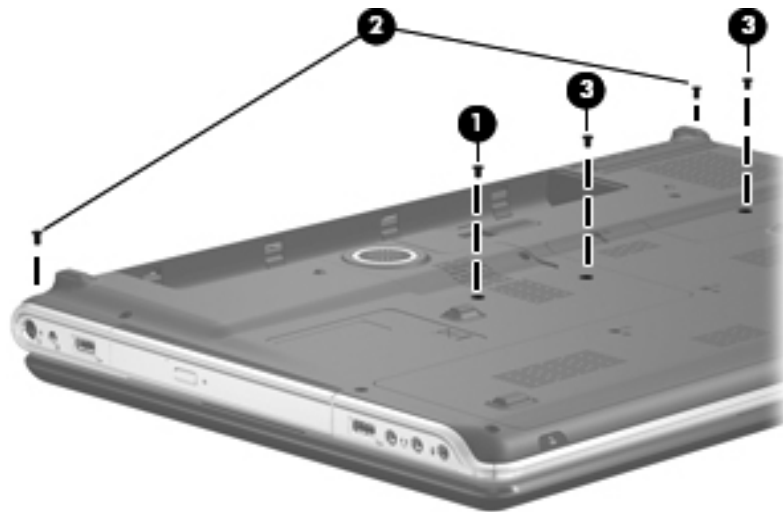
Screw listing

This section provides specification and reference information for the screws used in the computer. The screws listed in this section are available in the Screw Kit, spare part number 496890-001.

Phillips PM2.5×7.0 screw



| Color | Quantity | Length | Thread | Head diameter |
|-------|----------|--------|--------|---------------|
| Black | 34 | 7.0 mm | 2.5 mm | 5.0 mm |

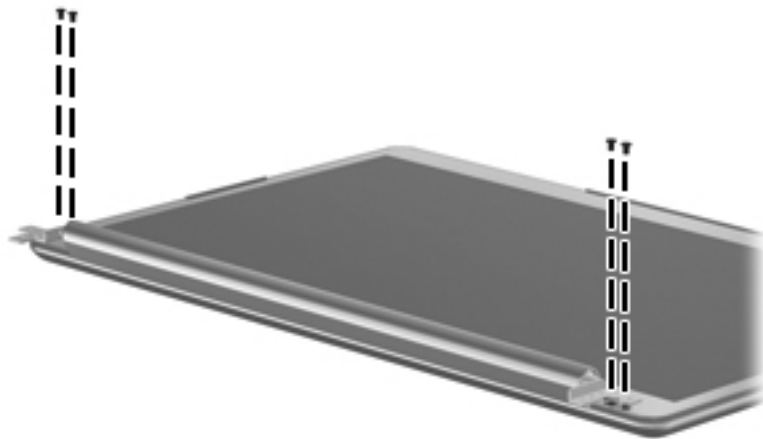


Where used:

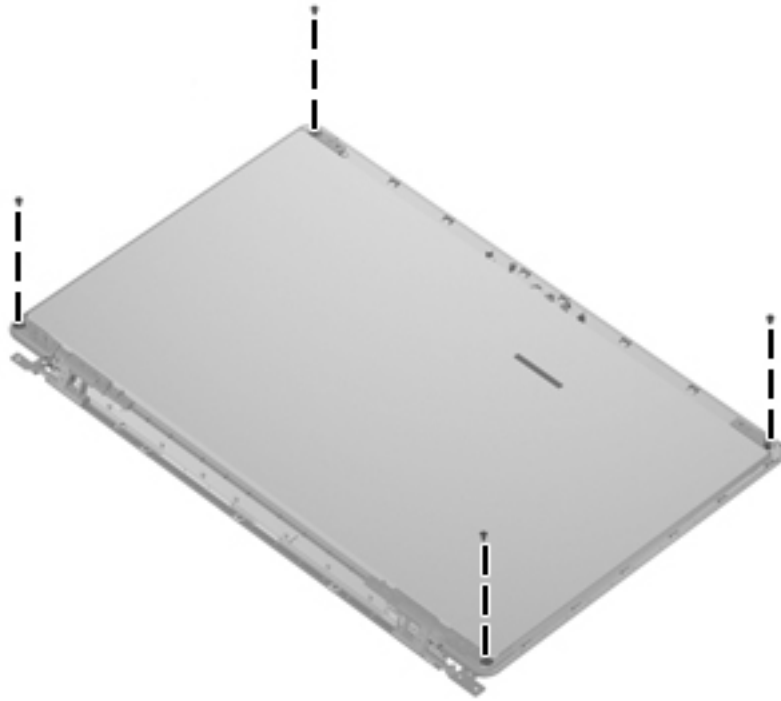
- ① One screw that secures the optical drive to the computer
- ② Two screws that secure the switch cover to the computer
- ③ Two screws that secure the keyboard to the computer



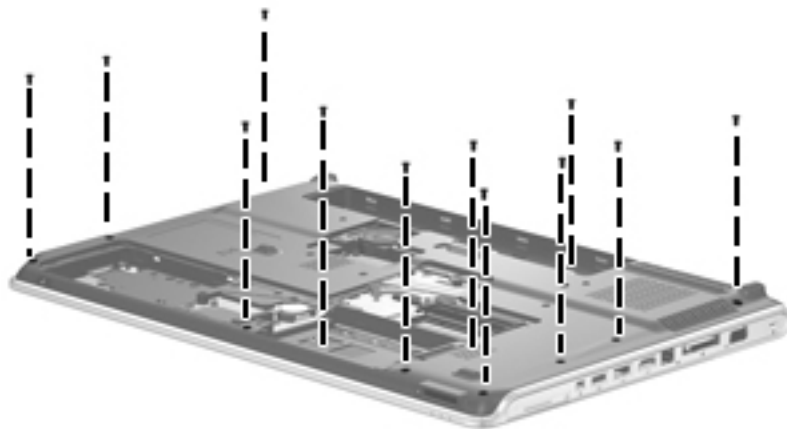
Where used: 4 screws that secure the display assembly to the computer



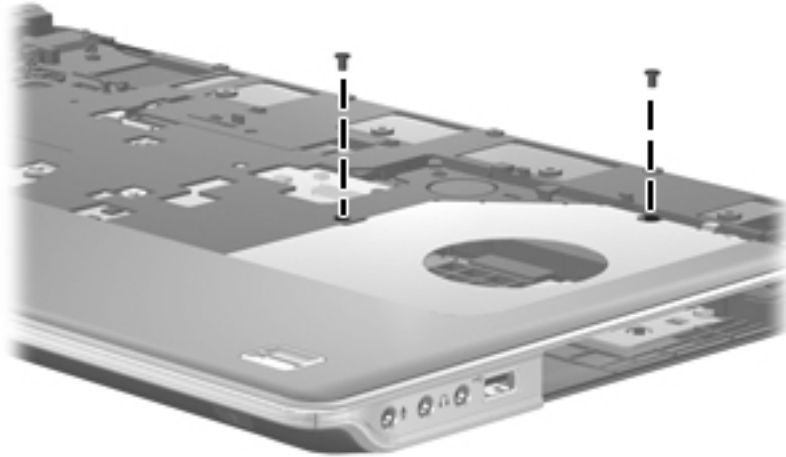
Where used: 4 screws that secure the display enclosure to the display assembly



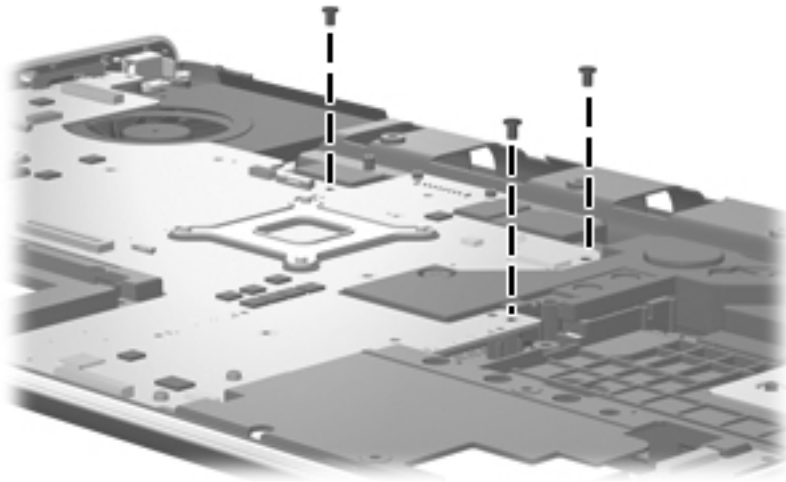
Where used: 4 screws that secure the display hinges to the display panel



Where used: 12 screws that secure the top cover to the base enclosure

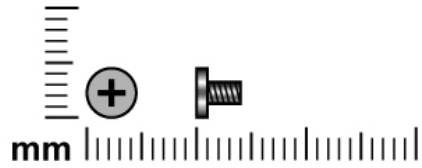


Where used: 2 screws that secure the top cover to the base enclosure

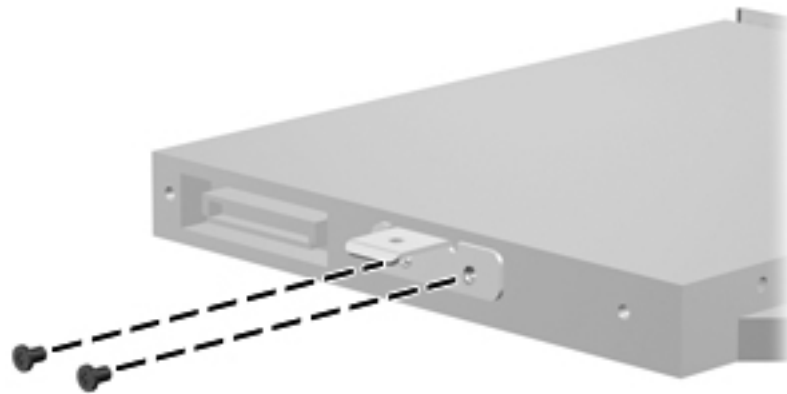


Where used: 3 screws that secure the system board to the base enclosure

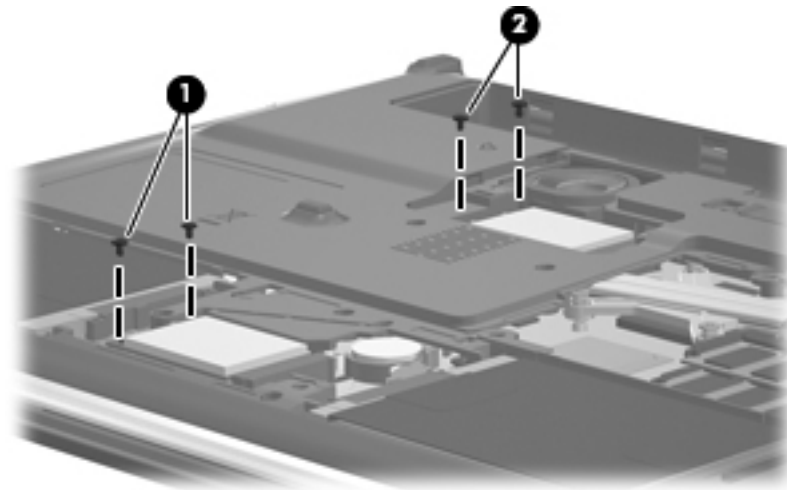
Phillips PM2.0×4.0 screw



| Color | Quantity | Length | Thread | Head diameter |
|-------|----------|--------|--------|---------------|
| Black | 41 | 4.0 mm | 2.0 mm | 4.5 mm |

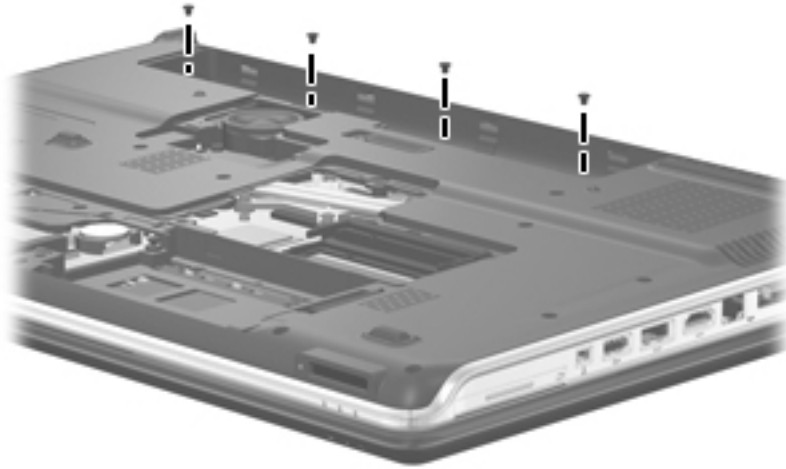


Where used: 2 screws that secure the optical drive bracket to the optical drive

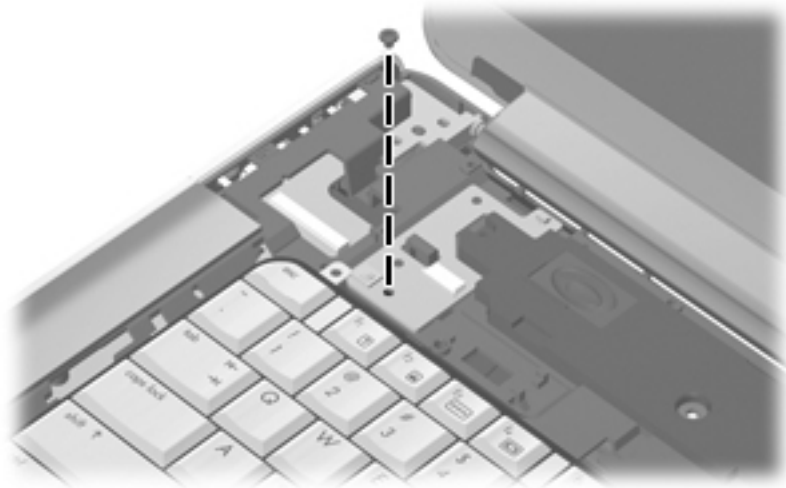


Where used:

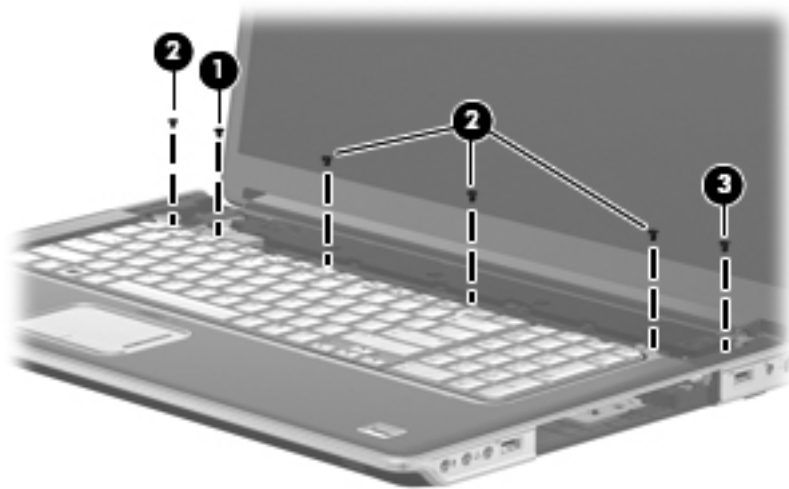
- ❶ Two screws that secure the TV tuner module to the system board
- ❷ Two screws that secure the WLAN module to the system board



Where used: 4 screws that secure the switch cover to the computer

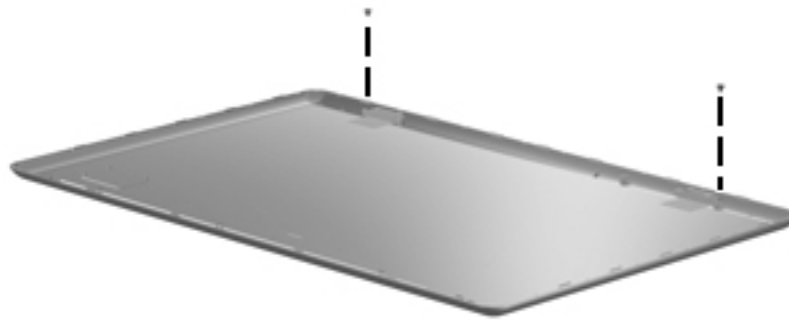


Where used: One screw that secures the power button board to the top cover

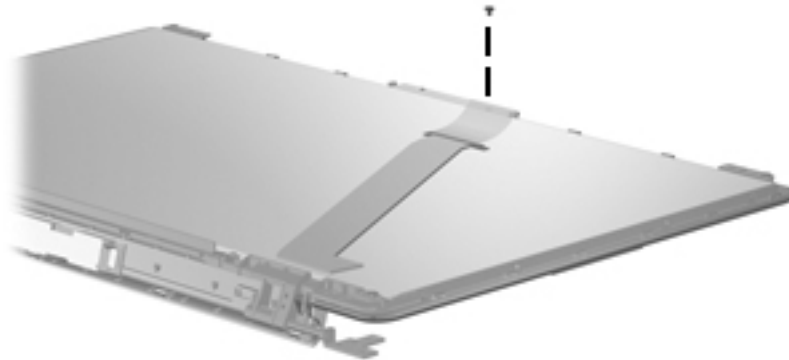


Where used:

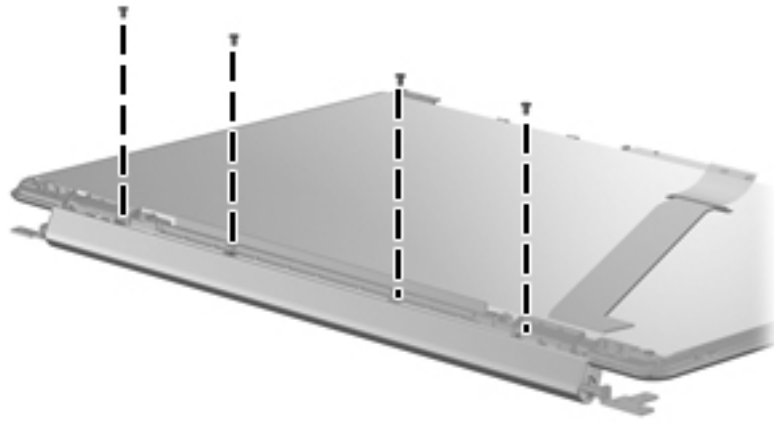
- ❶ One screw that secures the Bluetooth module to the top cover
- ❷ Four screws that secure the keyboard to the computer
- ❸ One screw that secures the speaker assembly to the computer



Where used: 2 screws that secure the wireless antenna transceivers to the display enclosure



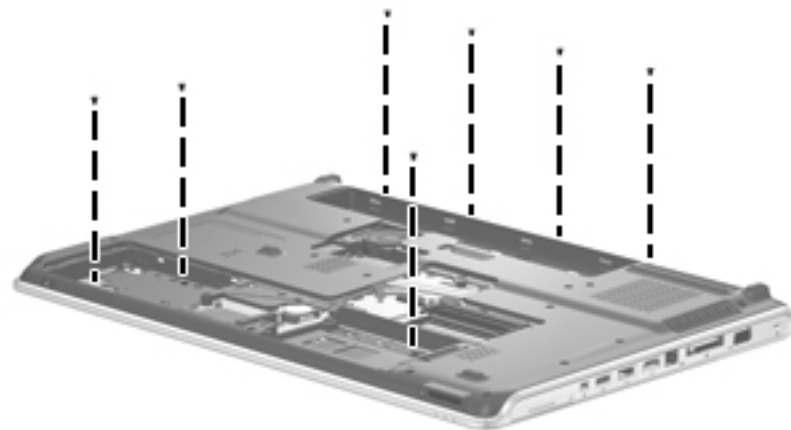
Where used: One screw that secures the webcam/microphone module to the display panel



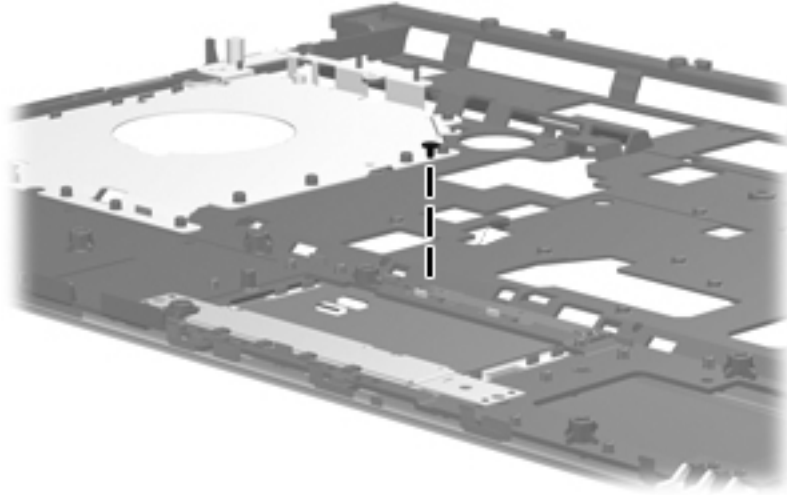
Where used: 4 screws that secure the display hinge cover to the display panel



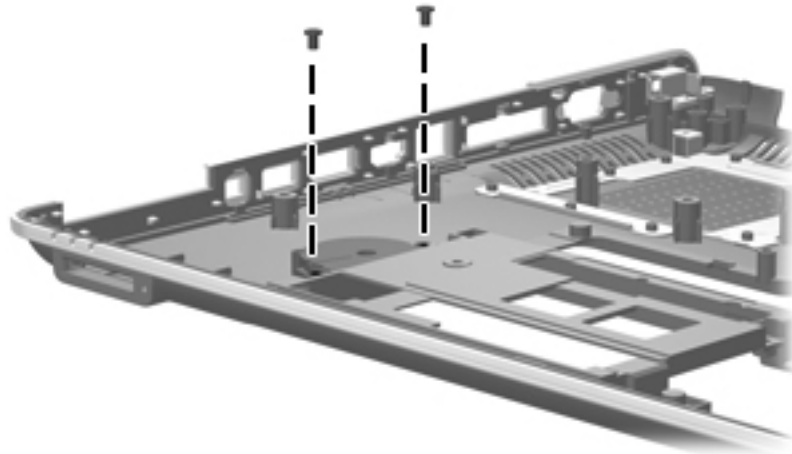
Where used: 4 screws that secure the display hinges to the display panel



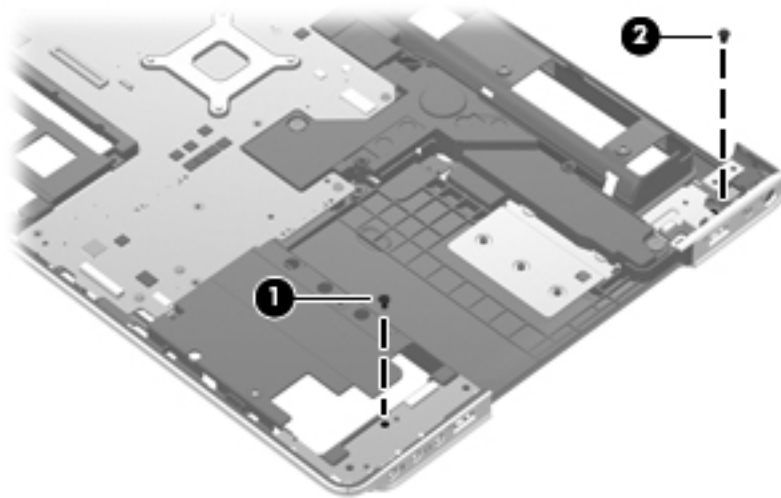
Where used: 7 screws that secure the top cover to the base enclosure



Where used: One screw that secures the TouchPad on/off button board to the top cover

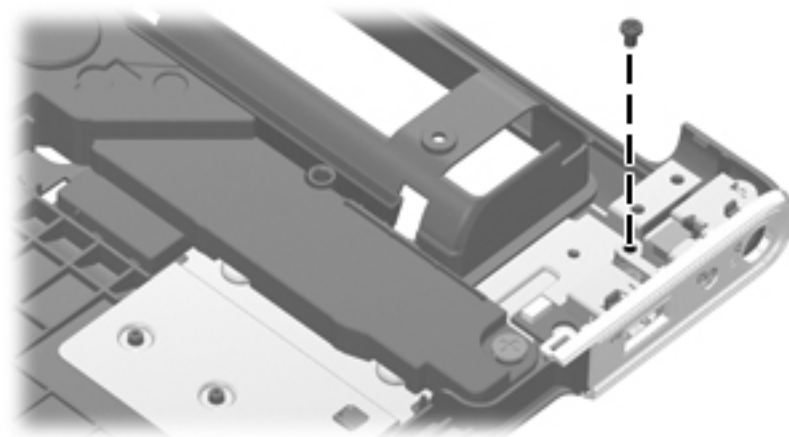


Where used: 2 screws that secure the fan to the base enclosure



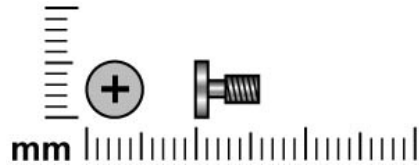
Where used:

- ❶ One screw that secures the audio/infrared board to the base enclosure
- ❷ One screw that secures the USB board to the base enclosure

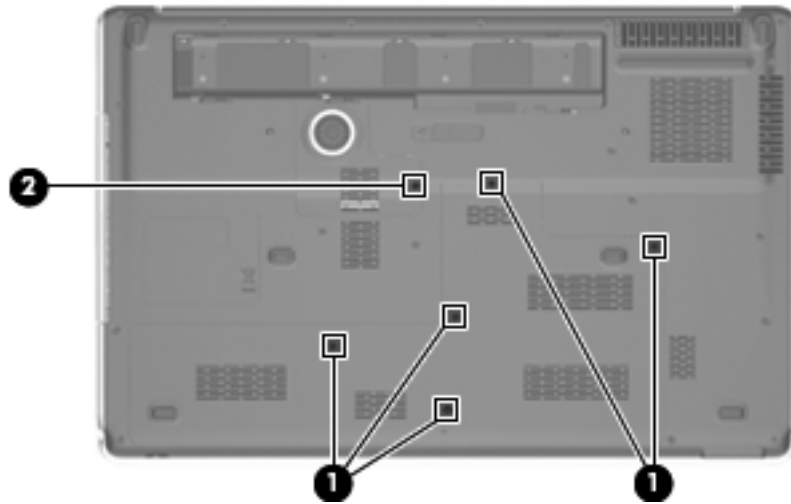


Where used: One screw that secures the power connector cable bracket to the base enclosure

Phillips PM2.5×6.0 captive screw



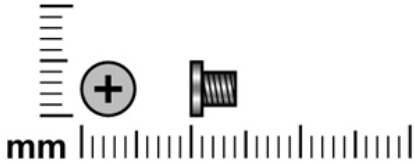
| Color | Quantity | Length | Thread | Head diameter |
|-------|----------|--------|--------|---------------|
| Black | 6 | 6.0 mm | 2.5 mm | 5.0 mm |



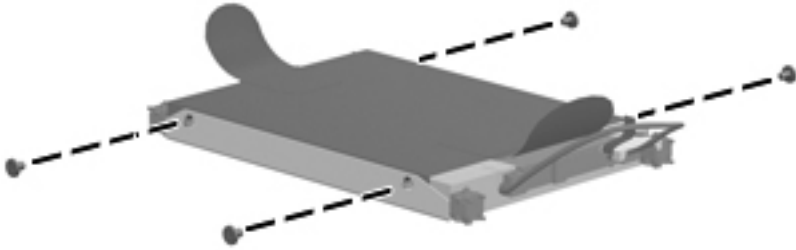
Where used:

- ❶ Five captive screws that secure the hard drive cover to the computer (screws are secured by C clips)
- ❷ One captive screw that secures the WLAN module compartment cover to the computer (screw is secured by a C clip)

Phillips PM3.0×4.0 screw

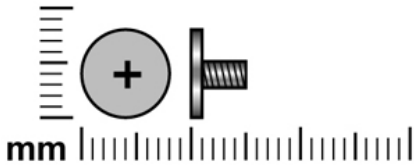


| Color | Quantity | Length | Thread | Head diameter |
|--------|----------|--------|--------|---------------|
| Silver | 4 | 4.0 mm | 3.0 mm | 5.0 mm |

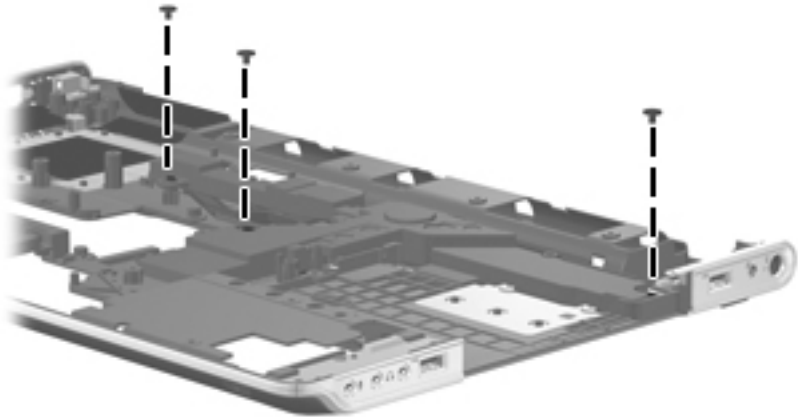


Where used: 4 screws that secure the hard drive left and right brackets to the hard drive

Phillips PM2.5×5.0 broadhead screw

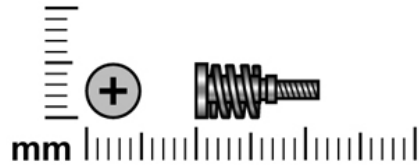


| Color | Quantity | Length | Thread | Head diameter |
|--------|----------|--------|--------|---------------|
| Silver | 3 | 5.0 mm | 2.5 mm | 8.0 mm |



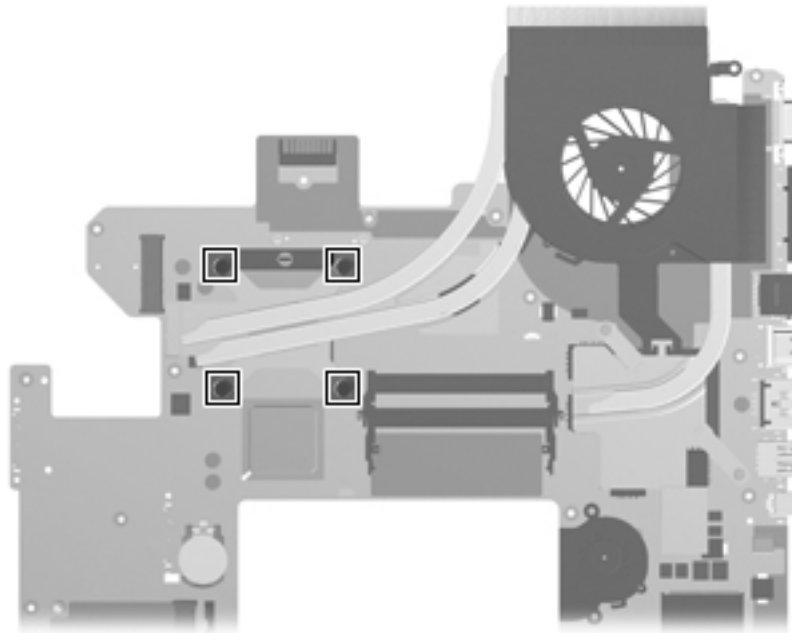
Where used: 3 screws that secure the subwoofer to the base enclosure

Phillips PM2.5×11.0 captive screw

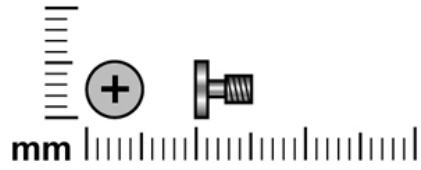


| Color | Quantity | Length | Thread | Head diameter |
|--------|----------|---------|--------|---------------|
| Silver | 4 | 11.0 mm | 2.5 mm | 6.0 mm |

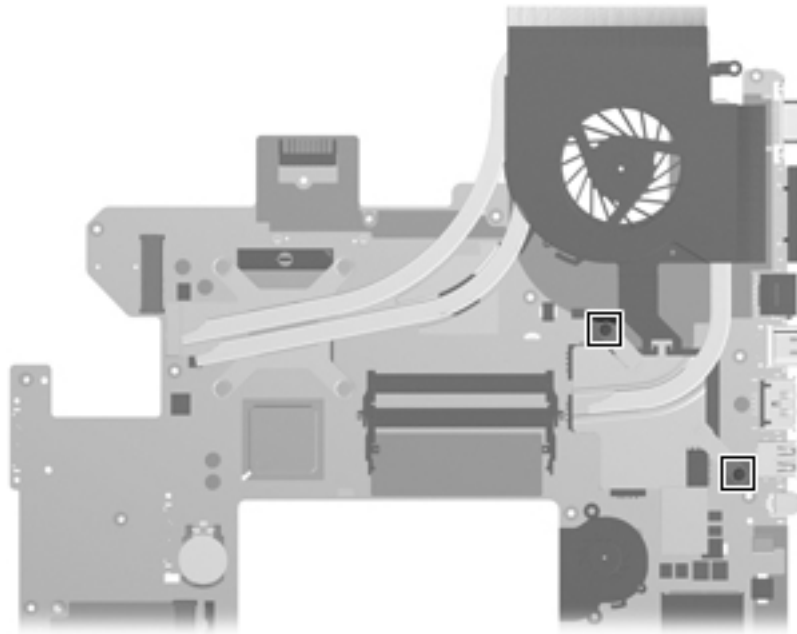
Where used: 4 captive screws that secure the fan/heat sink assembly to the system board (screws are secured by O rings)



Phillips PM2.5×5.0 captive screw



| Color | Quantity | Length | Thread | Head diameter |
|--------|----------|--------|--------|---------------|
| Silver | 2 | 5.0 mm | 2.5 mm | 5.0 mm |



Where used: 2 captive screws that secure the fan/heat sink assembly to the system board (screws are secured by O rings)

Backup and recovery

Recovering system information

Recovery after a system failure is as complete as your most current backup. HP recommends that you create recovery discs 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.

Tools provided by the operating system and Recovery Manager software are designed to help you with the following tasks for safeguarding your information and restoring it in case of a system failure:

- Creating a set of recovery discs (Recovery Manager software feature). Recovery discs are used to start up (boot) your computer and restore the operating system and software programs to factory settings in case of system failure or instability.
- Backing up your information regularly to protect your important system files.
- Creating system restore points (operating system feature). System restore points allow you to reverse undesirable changes to your computer by restoring the computer to an earlier state.
- Recovering a program or driver (Recovery Manager software feature). This feature helps you reinstall a program or driver without performing a full system recovery.
- Performing a full system recovery (Recovery Manager software feature). With Recovery Manager, you can recover your full factory image if you experience system failure or instability. Recovery Manager works from a dedicated recovery partition (select models only) on the hard drive or from recovery discs you create.

If your computer includes a solid-state drive (SSD), you may not have a recovery partition. Recovery discs have been included for computers that do not have a partition. Use these discs to recover your operating system and software. To check for the presence of a recovery partition, select **Start > Computer**. If the partition is present, an HP Recovery drive is listed in the Hard Disk Drives section of the window.

Creating recovery discs




HP recommends that you create recovery discs to be sure that you can restore your system to its original factory state if you experience serious system failure or instability. Create these discs after setting up the computer for the first time.



Handle these discs carefully and keep them in a safe place. The software allows the creation of only one set of recovery discs.

Note the following guidelines before creating recovery discs:

- You will need high quality DVD-R, DL DVD-R, DVD+R, DL DVD+R, BD-R (writable Blu-ray), or CD-R discs. All these discs are purchased separately. DVDs and BDs have a much higher capacity than CDs. If you use CDs, up to 20 discs may be required, whereas only a few DVDs or BDs are required.
 -  Read-write discs, such as CD-RW, DVD±RW, DL DVD±RW, and BD-RE (rewritable Blu-ray) discs, are not compatible with the Recovery Manager software.
- The computer must be connected to AC power during this process.
- Only one set of recovery discs can be created per computer.


- Number each disc before inserting it into the computer optical drive.
- If necessary, you can exit the program before you have finished creating the recovery discs. The next time you open Recovery Manager, you will be prompted to continue the disc creation process.

To create a set of recovery discs:

1. Select **Start > All Programs > Recovery Manager > Recovery Manager**.

Recovery Manager opens.


2. Click **Advanced Options**.

 If you are operating the computer on battery power, you will be prompted to connect to AC power before you can go to the next step.

3. Click **Recovery disc creation**, and then click **Next**.
4. Follow the on-screen instructions.

Backing up your information

When to back up

- On a regularly scheduled basis
 -  Set reminders to back up your information periodically.
- Before the computer is repaired or restored
- Before you add or modify hardware or software

Backup suggestions

- Create a set of recovery discs using Recovery Manager.
- Create system restore points using the Window System Restore feature, and periodically copy them to disc.
- Store personal files in the Documents folder and back up this folder periodically.
- Back up templates stored in their associated programs.
- Save customized settings 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, follow these steps:

- a. Display the screen.
- b. Copy the screen:
 - To copy only the active window, press **alt+fn+prt sc**.
 - To copy the entire screen, press **fn+prt sc**.
- c. Open a word-processing document, and then select **Edit > Paste**.

Using system restore points

When you back up your system, you are creating a system restore point. A system restore point allows you to save and name a snapshot of your hard drive at a specific point in time. You can then recover back to that point if you want to reverse subsequent changes made to your system.



Recovering to an earlier restore point does not affect data files saved or e-mails created since the last restore point.

You also can create additional restore points to provide increased protection for your system files and settings.

When to create restore points

- Before you add or extensively modify software or hardware
- Periodically, whenever the system is performing optimally



If you revert to a restore point and then change your mind, you can reverse the restoration.

Create a system restore point

1. Select **Start > Control Panel > System and Maintenance > System**.
2. In the left pane, click **System Protection**.
3. Click the **System Protection** tab.
4. Under **Automatic restore points**, select the disk for which you want to create a restore point.
5. Click **Create**.

The System Protection window opens.

6. Follow the on-screen instructions.

Restore to a previous date and time

To revert to a restore point (created at a previous date and time), when the computer was functioning optimally, follow these steps:

1. Select **Start > Control Panel > System and Maintenance > System**.
2. In the left pane, click **System protection**.
3. Click the **System Protection** tab.
4. Click the **System Restore** button, and then click **Next**.

The System Restore window opens.

5. Follow the on-screen instructions.

Performing a recovery



You can recover only files that you have previously backed up. HP recommends that you use Recovery Manager to create an entire drive backup as soon as you set up your computer.

Recovery Manager software allows you to repair or restore the system if you experience system failure or instability. Recovery Manager works from recovery discs that you create or from a dedicated recovery partition (select models only) on the hard drive. However, if your computer includes a solid-state drive (SSD), you may not have a recovery partition. If that is the case, recovery discs have been included with your computer. Use these discs to recover your operating system and software.



Windows has its own built-in repair features, such as System Restore and driver roll-back capabilities. If you have not already tried these features, try them before using Recovery Manager.



Recovery Manager recovers only software that was preinstalled at the factory. Software not provided with this computer must be downloaded from the manufacturer's Web site or reinstalled from the disc provided by the manufacturer.

Recovering from the recovery discs

To restore the system from the recovery discs:

1. Back up all personal files.
2. Insert the first recovery disc into the optical drive and restart the computer.
3. Follow the on-screen instructions.

Recovering from the dedicated recovery partition (select models only)



If your computer includes a solid-state drive (SSD), you may not have a recovery partition. You will not be able to recover using this procedure. Recovery discs have been included for computers that do not have a partition. Use these discs to recover your operating system and software.

On some models, you can perform a recovery from the partition on the hard drive from either the Start button or **f11**. This restores the computer to its factory condition.

To restore the system from the partition, follow these steps:

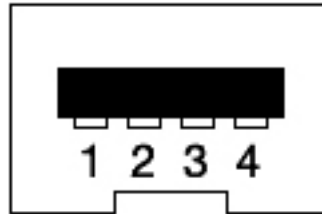
1. Access Recovery Manager in either of the following ways:
 - Select **Start > All Programs > Recovery Manager > Recovery Manager**.
 - or –
 - Restart the computer and press **f11** while the “Press <F11> for recovery” message is displayed on the screen. Then select **Recovery Manager**.

Recovery Manager opens.

2. Click **Advanced Options**.
3. Click **System recovery**, and then click **Next**.
4. Follow the on-screen instructions.

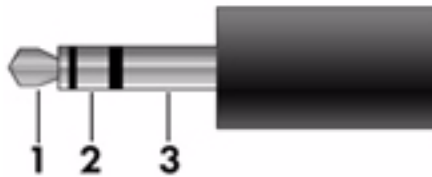
Connector pin assignments

1394



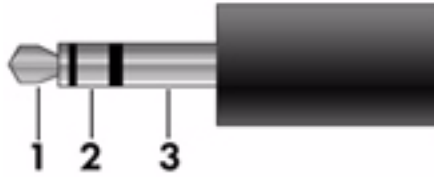
| Pin | Signal |
|-----|--------|
| 1 | TPB- |
| 2 | TPB+ |
| 3 | TPA- |
| 4 | TPA+ |

Audio-in (microphone)



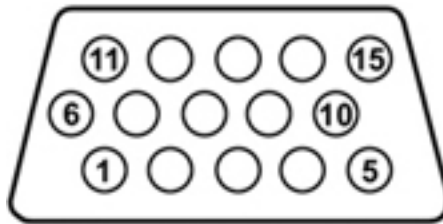
| Pin | Signal |
|-----|-----------------|
| 1 | Audio signal in |
| 2 | Audio signal in |
| 3 | Ground |

Audio-out (headphone)



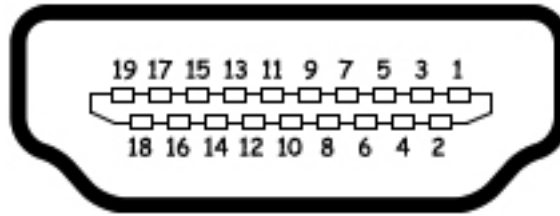
| Pin | Signal |
|-----|--------------------------|
| 1 | Audio out, left channel |
| 2 | Audio out, right channel |
| 3 | Ground |

External monitor



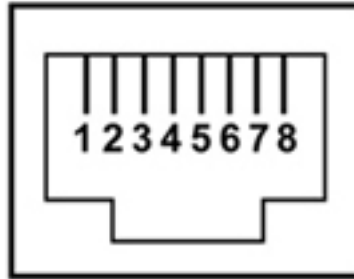
| Pin | Signal |
|-----|-----------------|
| 1 | Red analog |
| 2 | Green analog |
| 3 | Blue analog |
| 4 | Not connected |
| 5 | Ground |
| 6 | Ground analog |
| 7 | Ground analog |
| 8 | Ground analog |
| 9 | +5 VDC |
| 10 | Ground |
| 11 | Monitor detect |
| 12 | DDC 2B data |
| 13 | Horizontal sync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

HDMI



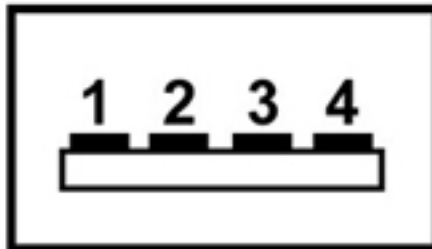
| Pin | Signal |
|-----|---|
| 1 | Transition minimized differential signal (TDMS) data 2+ |
| 2 | TDMS data 2 shield |
| 3 | TDMS data 2- |
| 4 | TDMS data 1+ |
| 5 | TDMS data 1 shield |
| 6 | TDMS data 1 shield |
| 7 | TDMS data 0+ |
| 8 | TDMS data 0 shield |
| 9 | TDMS data 0- |
| 10 | TDMS clock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

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>.

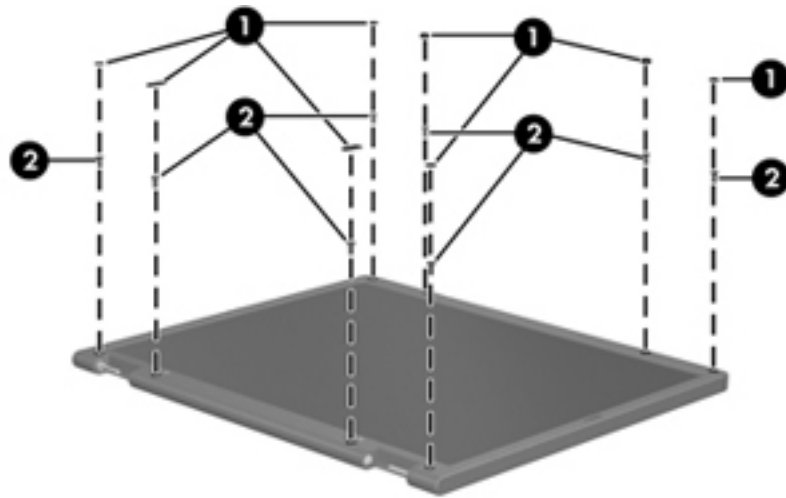
This section provides disassembly instructions for the display assembly. The display assembly must be disassembled to gain access to the backlight ❶ and the liquid crystal display (LCD) panel ❷.



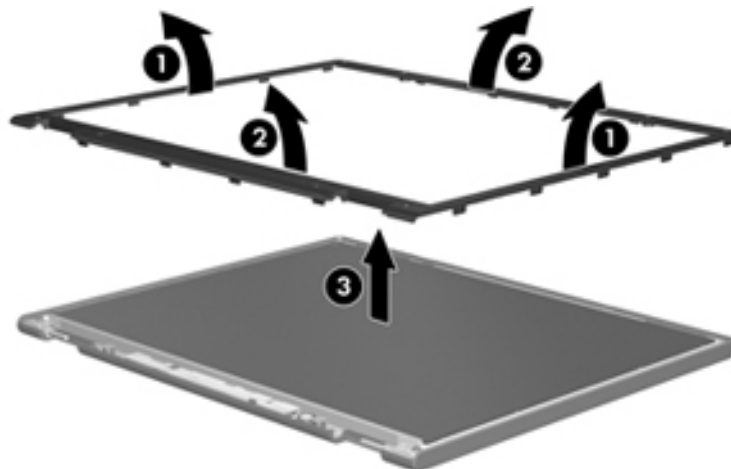
 The procedures provided in this chapter are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

Perform the following steps to disassemble the display assembly:

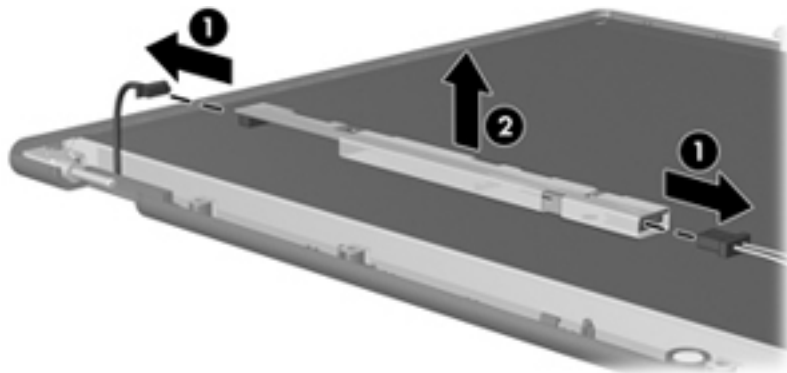
1. Remove all screw covers ① and screws ② that secure the display bezel to the display assembly.



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.

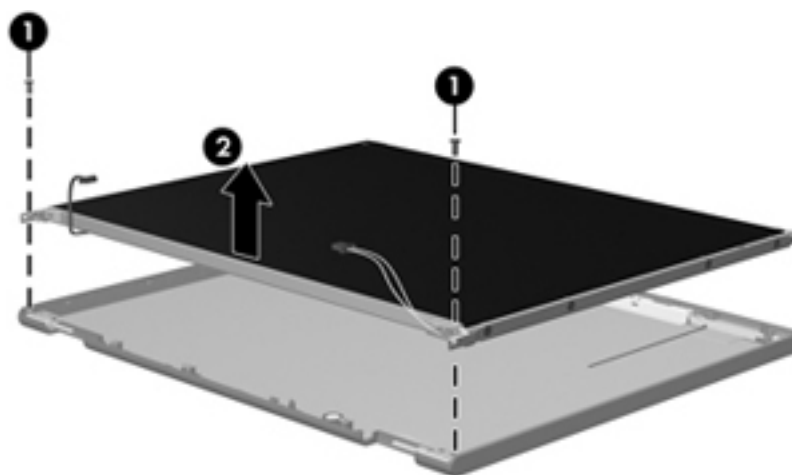


4. Disconnect all display panel cables ❶ from the display inverter and remove the inverter ❷.



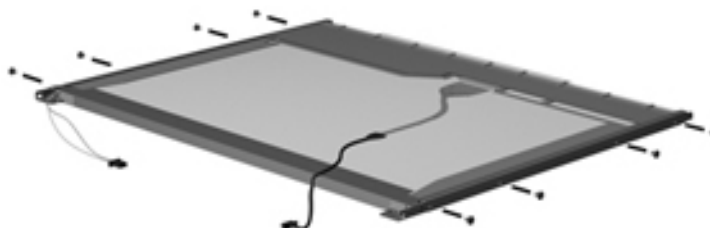
5. Remove all screws ❶ that secure the display panel assembly to the display enclosure.

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

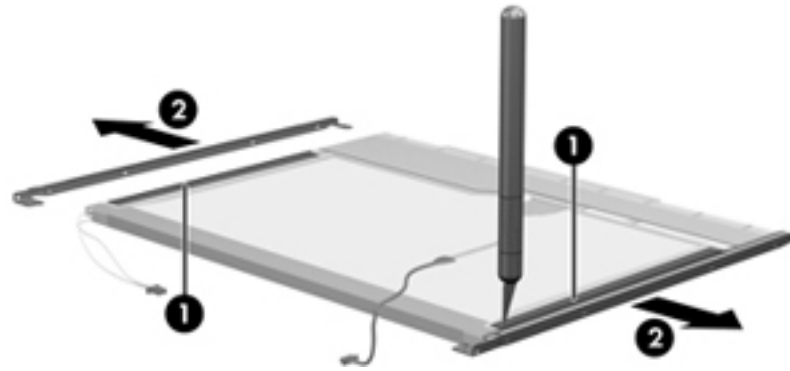


7. Turn the display panel assembly upside down.

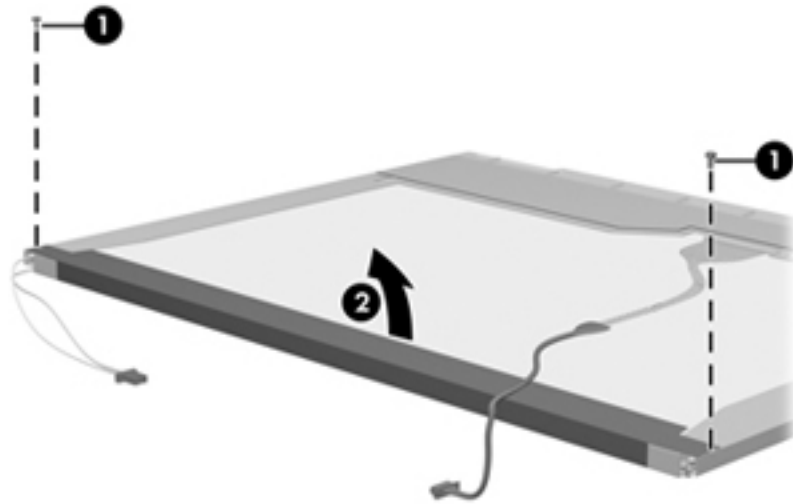
8. Remove all screws that secure the display panel frame to the display panel.



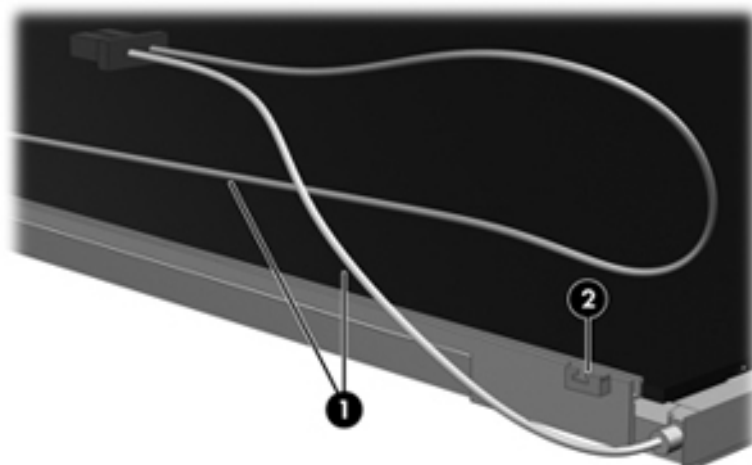
9. Use a sharp-edged tool to cut the tape ❶ that secures the sides of the display panel to the display panel frame.
10. Remove the display panel frame ❷ from the display panel.



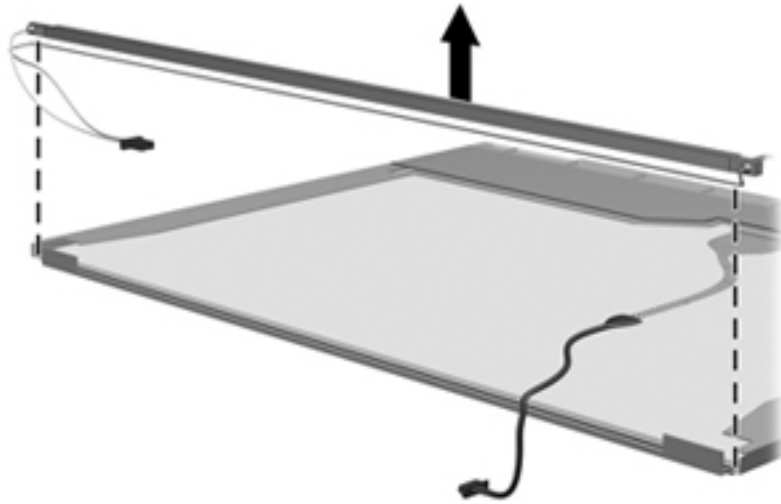
11. Remove the screws ❶ that secure the backlight cover to the display panel.
12. Lift the top edge of the backlight cover ❷ and swing it outward.




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

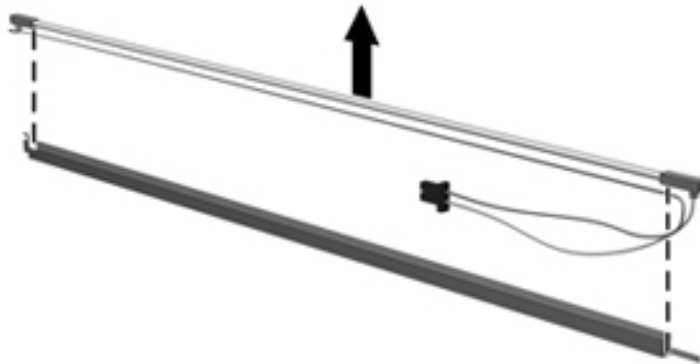


16. Turn the display panel upside down.
17. Remove the backlight frame from the display panel.

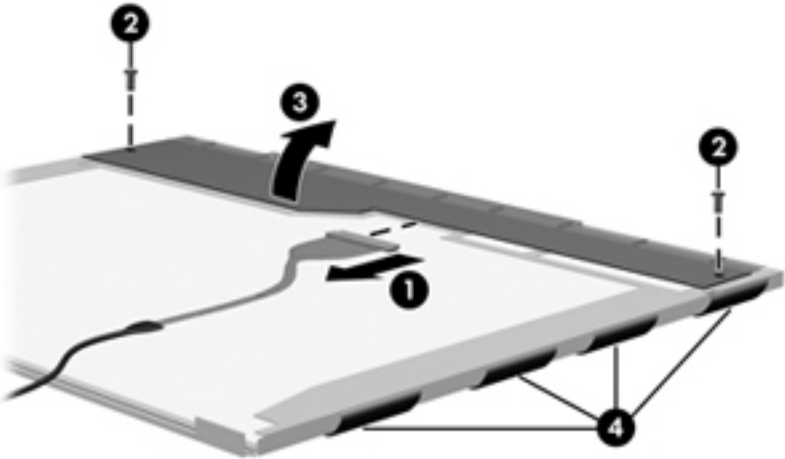


 **WARNING:** The backlight contains mercury. Exercise caution when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.

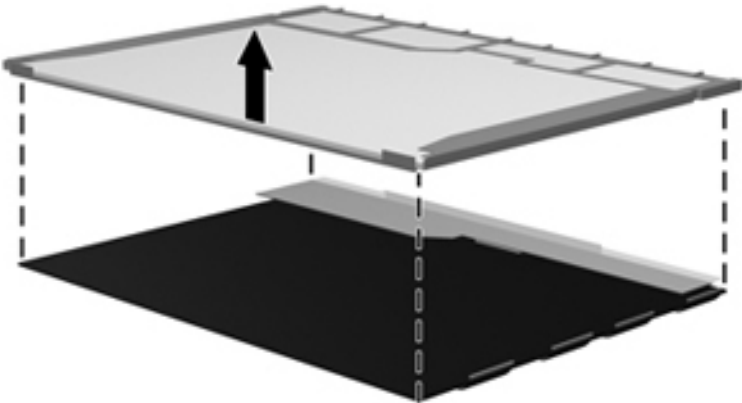
18. Remove the backlight from the backlight frame.



- 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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