



# HP EliteBook 8760w Mobile Workstation

Maintenance and Service Guide

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First Edition: May 2011

Document Part number: 649165-001

## Safety warning notice

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 **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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# 1 Product description

Category	Description
<b>Product Name</b>	HP EliteBook 8740w Mobile Workstation
<b>Processors</b>	<p>2nd Generation Intel® Core™ i7 processors, (support Intel Turbo Boost Technology):</p> <ul style="list-style-type: none"><li>• i7-2620M, 2.7 GHz (turbo up to 3.4 GHz) dual-core processor, 4 MB L3 cache, 4 threads, 35W</li><li>• i7-2630QM 2.0 GHz (turbo up to 2.9 GHz) quad-core processor, 6 MB L3 cache, 8 threads, 45W</li><li>• i7-2720QM, 2.2 GHz (turbo up to 3.3 GHz) quad-core processor, 6 MB L3 cache, 8 threads, 45W</li><li>• i7-2820QM, 2.3 GHz (turbo up to 3.4 GHz) quad-core processor, 8 MB L3 cache, 8 threads, 45W</li><li>• i7-2920XM, 2.5 GHz (turbo up to 3.5 GHz) quad-core extreme processor, 8 MB L3 cache, 8 threads, 55W</li></ul> <p>2nd Generation Intel® Core™ i5 processors, (support Intel Turbo Boost Technology Technology):</p> <ul style="list-style-type: none"><li>• i5-2520M, 2.5 GHz (turbo up to 3.2 GHz) dual-core processor, 3 MB L3 cache, 4 threads, 35 W</li><li>• i5-2540M, 2.6 GHz (turbo up to 3.3 GHz) dual-core processor, 3 MB L3 cache, 4 threads, 35 W</li></ul>
<b>Chipset</b>	Mobile Intel QM67
<b>Graphics</b>	<p>Support for the following graphics subsystem graphics boards (all feature OpenGL driver support):</p> <ul style="list-style-type: none"><li>• AMD FirePro M5950 XT-GL 1GB GDDR5 (DP 1.2 and Eyefinity Plus support)</li><li>• NVIDIA Quadro 3000M, N12E-Q1 2 GB dedicated GDDR5 video memory</li><li>• NVIDIA Quadro 4000M, N12E-Q3 2 GB dedicated GDDR5 video memory</li><li>• NVIDIA Quadro 5010M, N12E-Q5 4 GB dedicated GDDR5 video memory</li></ul>
<b>Display</b>	<ul style="list-style-type: none"><li>• Display panel, <b>43.9 cm</b> (17.3 in), High Definition Plus (HD+) Anti-Glare (AG) LED WVA without webcam</li><li>• Display panel, <b>43.9 cm</b> (17.3 in), FHD AG LED WVA</li><li>• Display assembly, <b>43.9 cm</b> (17.3 in), FHD AG RGB LED UVVA Dream Color with webcam (not available with HP Mobile Broadband) (includes display panel cable, 3 WLAN antenna and cables, and 2 WWAN antenna and cables)</li><li>• Display assembly, <b>43.9 cm</b> (17.3 in), FHD AG RGB LED UVVA Dream Color without webcam (not available with HP Mobile Broadband) (includes display panel cable, 3 WLAN antenna and cables, and 2 WWAN antenna and cables)</li></ul> <p>Ambient light sensor</p>
<b>Memory</b>	<p>4 customer-accessible/upgradable memory module slots</p> <p>Supports dual-channel memory</p> <p>Supports up to 32,768 GB of system RAM</p> <p>DDR3 1333 MHz, PC3-10600 SODIMMS</p>

Category	Description
	<p>Supports the following configurations:</p> <ul style="list-style-type: none"> <li>• 2048 MB total system memory (2048 × 1)</li> <li>• 4096 MB total system memory (4096 × 1)</li> <li>• 4096 MB total system memory (2048 × 2)</li> <li>• 8192 MB total system memory (8192 × 1)</li> <li>• 8192 MB total system memory (4096 × 2)</li> <li>• 8192 MB total system memory (2048 × 4); only available on computer models equipped with a quad-core processor</li> <li>• 16384 MB total system memory (8192 × 2)</li> <li>• 16384 MB total system memory (4096 × 4); only available on computer models equipped with a quad-core processor</li> <li>• 32768 MB total system memory (8192 × 4); only available on computer models equipped with a quad-core processor</li> </ul>
<b>Primary and secondary storage</b>	<p>Supports <b>7.0 mm</b> (0.28 in), <b>9.5 mm</b> (0.37 in) or <b>12.7 mm</b> (0.5 in) hard drives and <b>6.35 cm</b> (2.5 in) solid-state drive for primary and secondary storage.</p> <p>Support for RAID 0/1/5</p> <p>Supports the following Serial ATA (SATA), 7200-rpm drives:</p> <ul style="list-style-type: none"> <li>• 750 GB</li> <li>• 500 GB</li> <li>• 320 GB</li> <li>• 320 GB self encrypting drive (SED)</li> </ul> <p>Supports the following <b>6.35 cm</b> (2.5 in), solid-state drives (SSD):</p> <ul style="list-style-type: none"> <li>• 256 GB</li> <li>• 128 GB</li> </ul>
<b>Upgrade bay</b>	<p>Supports the following <b>12.7 mm 6.35 cm</b> (0.5 in) tray load SATA optical drives:</p> <ul style="list-style-type: none"> <li>• Blu-ray R/RE DVD±RW SuperMulti Double-Layer (DL) Drive</li> <li>• ±RW SuperMulti Double-Layer Drive</li> <li>• DVD±RW SuperMulti Double-Layer Drive</li> <li>• DVD-ROM Drive (defeatured combo)</li> </ul> <p>Supports a <b>7.0 mm, 9.5 mm, or 12.7 mm</b> 500 GB hard drive, 7200 rpm</p> <p>Supports "No Drive" option</p>
<b>Audio and video</b>	<p>Integrated dual-array microphone</p> <p>High-definition (HD) audio with SRS premium sound</p> <p>2 stereo speakers</p> <p>Integrated 720p HD webcam</p>
<b>Modem</b>	56K V.92 data/fax modem

Category	Description
	Supports “no modem” option
	Modem cable not included
<b>Ethernet</b>	Intel® 82579LM Gigabit Network Connection
	S3/S4/S5 wake on LAN
	NIC power-down technology
	Ethernet cable not included
<b>Wireless</b>	<b>Integrated wireless local area network (WLAN) options by way of the following wireless modules:</b>
	<ul style="list-style-type: none"> <li>• Intel® Centrino™ Advanced-N 6205, 802.11a/b/g/n WLAN module</li> <li>• Intel Centrino Ultimate-N 6300, 802.11a/b/g/n WLAN module</li> <li>• Atheros HB112AGN 802.11a/b/g/n 3x3 WiFi Adapter</li> </ul>
	Three WLAN antennas (3) built into display assembly
	Support for “no WLAN” option
	<b>Integrated wireless wide area network (WWAN) options by way of the following wireless modules:</b> (not available on computer models with Dream Color displays)
	<ul style="list-style-type: none"> <li>• HP hs2340 HSPA+ Mobile Broadband Module</li> <li>• HP un2430 EV-DO/HSPA Mobile Broadband Module</li> </ul>
	WWAN antennas (2) built into display assembly (worldwide, 5-band)
	Support for “no WWAN” option
	Security provided by subscriber identify module (SIM) located inside battery bay
	<b>HP Integrated Module with Bluetooth 2.1+EDR Wireless Technology</b>
	Support for “no WPAN” option
<b>External media card</b>	One ExpressCard slot, supporting 16-bit and 32-bit (Cardbus) ExpressCard modules
	Digital Media Card reader, supporting the following formats:
	<ul style="list-style-type: none"> <li>• MultiMediaCard (MMC)</li> <li>• MultiMediaCard Plus (MMC+)</li> <li>• Secure Digital (SD) Memory Card</li> <li>• Secure Digital High-Capacity (SDHC) Memory Card</li> <li>• Secure Digital Extended Capacity (SDXC) Memory Card</li> </ul>

Category	Description
<b>Ports</b>	<ul style="list-style-type: none"> <li>• 1394a (1)</li> <li>• Multi-pin AC port</li> <li>• Audio in (mono microphone)</li> <li>• Microphone input (stereo)</li> <li>• Audio-out (stereo headphone)</li> <li>• Display port (1.1a for NVIDIA, 1.2 for AMD)</li> <li>• Docking connector</li> <li>• eSATA/USB 2.0 combo</li> <li>• RJ-11 (modem)</li> <li>• RJ-45 (Ethernet, includes link and activity lights)</li> <li>• USB 3.0 (2)</li> <li>• USB 2.0 (2) 1 port with USB charging support</li> <li>• VGA (Dsub 15-pin) supporting 1600 × 1200 external resolution at 75 GHz (hot plug/unplug with auto-detect)</li> <li>• Launch buttons (QuickWeb, WLAN on/off, Mute, Calculator)</li> </ul>
<b>Docking</b>	<p>Supports the following docking stations:</p> <ul style="list-style-type: none"> <li>• HP 230W Docking Station</li> <li>• HP 230W Advanced Docking Station</li> <li>• HP USB 2.0 Docking Station</li> <li>• HP Essential USB 2.0 Port Replicator</li> <li>• HP LAN and USB Travel Hub</li> </ul>
<b>Keyboard/pointing devices</b>	<p><b>36.5 cm</b> (14.4 in) full-size keyboard with separate numeric keypad, Dual Point (3 pointing stick buttons and 3 TouchPad buttons) without backlight</p> <hr/> <p><b>36.5 cm</b> (14.4 in) full-size keyboard with separate numeric keypad, Dual Point (3 pointing stick buttons and 3 TouchPad buttons) with backlight (not supported in Japan or Brazil)</p> <hr/> <p>Spill-resistant DuraKeys coating</p> <hr/> <p>Spill-resistant DuraPad coating on TouchPad</p> <hr/> <p>Gestures enabled by default - 2 finger scrolling, 2 finger zoom (pinch)</p> <hr/> <p>TouchPad supports vertical scroll zone</p> <hr/> <p>Taps enabled as default</p>
<b>Power requirements</b>	<p>Supports the following AC adapters with localized cable plug support:</p> <ul style="list-style-type: none"> <li>• 200W Slim Smart AC adapter</li> <li>• 230W Slim Smart AC adapter</li> <li>• 3-wire plug (with ground pin)</li> </ul>

Category	Description
	<p>Support for the following batteries:</p> <ul style="list-style-type: none"> <li>• 8-cell, 2.8 Ah (83 WHr) Li-ion battery</li> <li>• 8-cell, 2.8 Ah (75 WHr) Li-ion battery (available with 3 year warranty only)</li> <li>• Supports 9-cell (73 WHr) polymer, HP ST09 Extended Life Battery (does not support HP Fast Charge)</li> <li>• Supports 9-cell 3.0 Ah (100 WHr) cylindrical battery, HP BB09 Ultra-Capacity Extended Life Battery (does not support HP Fast Charge)</li> </ul>
	HP Fast Charge Technology
<b>Security</b>	<p>Integrated fingerprint reader</p> <p>Integrated Smart Card reader</p> <p>Preboot authentication (password, Smart Card)</p> <p>Supports security lock</p> <p>Trusted platform module (TPM) v.1.2 and TPM enhanced drive lock</p> <p>Full volume encryption</p>
<b>Operating system</b>	<p><b>Preinstalled operating systems:</b></p> <ul style="list-style-type: none"> <li>• Windows® 7 Home Premium 64 (select models only)</li> <li>• Windows 7 Professional 64 (select models only)</li> <li>• Windows 7 Professional 32 (select models only)</li> <li>• Windows Vista® Home Basic (Service Pack 2) (select models only)</li> <li>• FreeDOS</li> </ul> <p><b>Operating system and Microsoft® Office preinstalled</b> (not supported in Japan):</p> <ul style="list-style-type: none"> <li>• Windows 7 Professional 64 with Office 2010 Starter (select models only)</li> <li>• Windows 7 Professional 32 with Office 2010 Starter (select models only)</li> </ul> <p><b>Restore media:</b></p> <ul style="list-style-type: none"> <li>• Windows 7 Professional 64 (select models only)</li> <li>• Windows 7 Professional 32 (select models only)</li> <li>• Windows 7 Home Premium 64 (select models only)</li> <li>• Windows 7 DRDVD (select models only)</li> <li>• Windows XP Professional 64 (service only)</li> <li>• Windows Vista Home Basic 32 (service only)</li> <li>• DRDVD Windows Vista (service only)</li> </ul> <p><b>Certified:</b></p> <ul style="list-style-type: none"> <li>• Microsoft WHQL</li> <li>• Novell</li> <li>• SuSE Linux</li> </ul>

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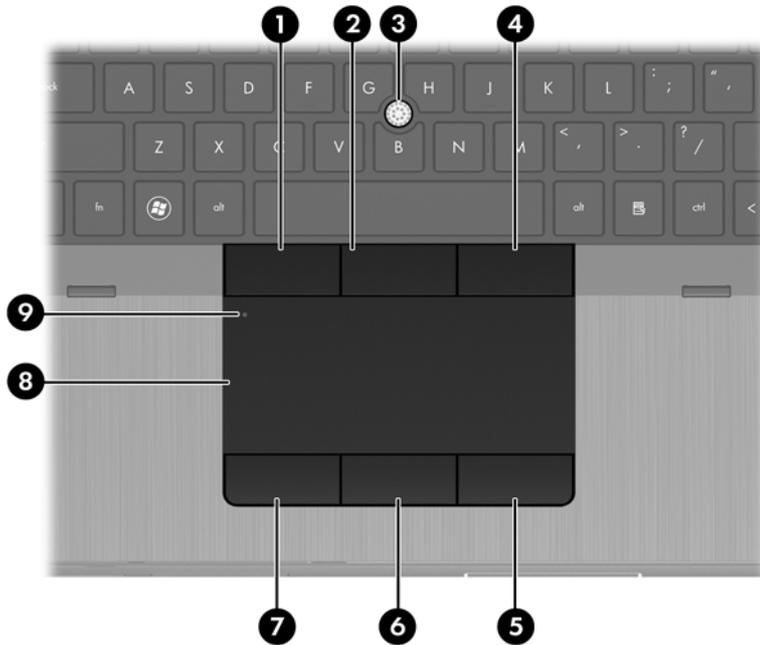
Category	Description
	<b>Web-only support:</b> <ul style="list-style-type: none"><li>• Windows Vista Business 64 (select models only)</li><li>• Windows Vista Business 32 (select models only)</li><li>• Windows Vista Enterprise 64 (select models only)</li><li>• Windows Vista Enterprise 32 (select models only)</li><li>• Windows XP Professional 64 (select models only)</li><li>• Windows XP Professional 32 (select models only)</li><li>• Windows 7 Ultimate 64 (select models only)</li><li>• Windows 7 Ultimate 32 (select models only)</li><li>• Windows 7 Enterprise 64 (select models only)</li><li>• Windows 7 Enterprise 32 (select models only)</li></ul>
<b>Serviceability</b>	End-user replaceable parts: <ul style="list-style-type: none"><li>• Hard drive</li><li>• Memory module</li><li>• Optical drive</li><li>• SIM</li><li>• WLAN module</li><li>• WWAN module</li></ul>

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## 2 External component identification

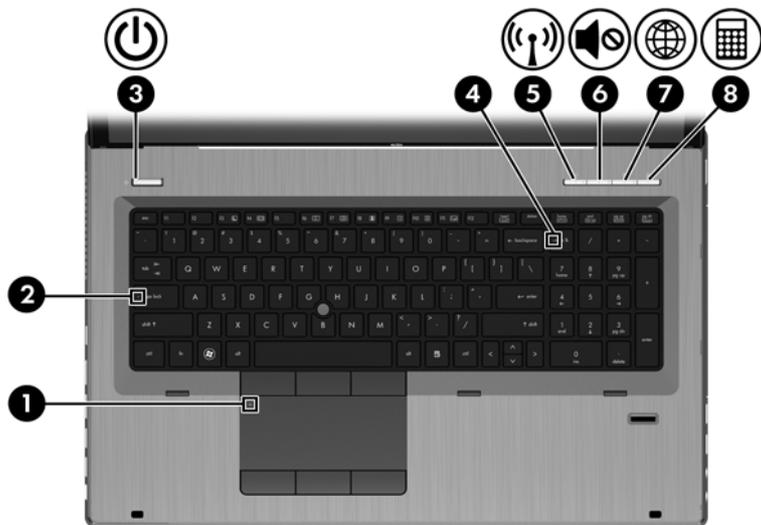
### Top

#### TouchPad



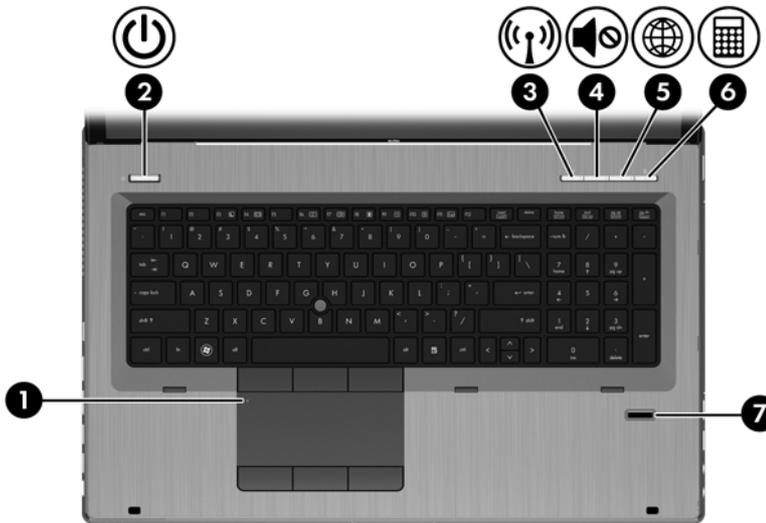
Component	Description	
(1)	Left pointing stick button	Can be used with the pointing stick and functions like the left button on an external mouse.
(2)	Center pointing stick button	Can be used with the pointing stick and functions like the center button on an external mouse.
(3)	Pointing stick	Moves the pointer and selects or activates items on the screen.
(4)	Right pointing stick button	Can be used with the pointing stick and functions like the right button on an external mouse.
(5)	Right TouchPad button	Functions like the right button on an external mouse.
(6)	Center TouchPad button	Functions like the center button on an external mouse.
(7)	Left TouchPad button	Functions like the left button on an external mouse.
(8)	TouchPad	Moves the pointer and selects or activates items on the screen.
(9)	TouchPad on/off button	Turns the TouchPad on and off.

## Lights



Component	Description
(1) TouchPad on/off light	<ul style="list-style-type: none"> <li>Off: The TouchPad is on.</li> <li>Amber: The TouchPad is off.</li> </ul>
(2) Caps lock light	On: Caps lock is on.
(3)  Power light	<ul style="list-style-type: none"> <li>On: The computer is on.</li> <li>Blinking: The computer is in the Sleep state.</li> <li>Off: The computer is off or in Hibernation.</li> </ul>
(4) Num lock light	On: Num lock is on.
(5)  Wireless light	<ul style="list-style-type: none"> <li>White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on.</li> <li>Amber: All wireless devices are off.</li> </ul>
(6)  Mute light	<ul style="list-style-type: none"> <li>Amber: Computer sound is off.</li> <li>White: Computer sound is on.</li> </ul>
(7)  QuickWeb light	<ul style="list-style-type: none"> <li>On: The computer is on.</li> <li>Off: The computer is off or in Hibernation.</li> </ul> <p><b>NOTE:</b> For more information, refer to “HP QuickWeb” in this guide and to the HP QuickWeb software Help.</p>
(8)  Calculator light	<ul style="list-style-type: none"> <li>On: The Windows® calculator function is on.</li> <li>Blinking: When the Calculator button is pressed, the light blinks 4 times, and then the Windows calculator opens.</li> </ul>

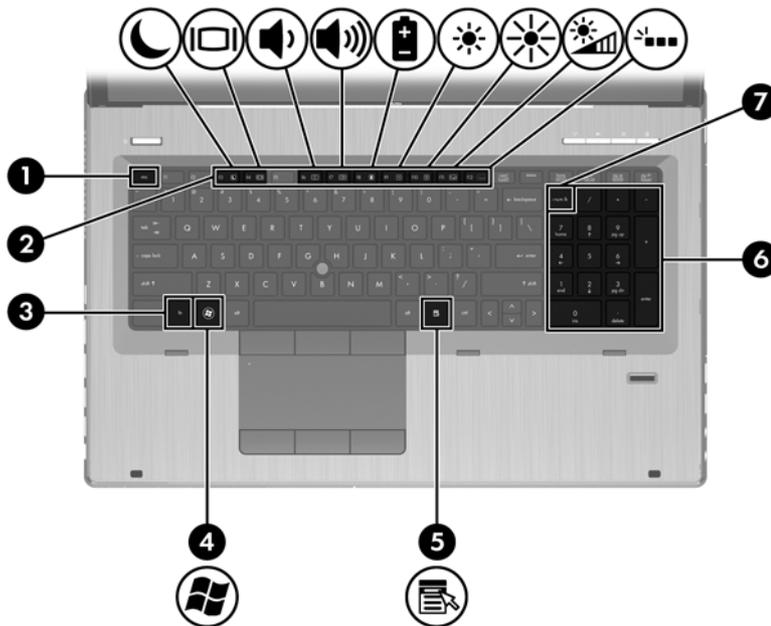
## Buttons and fingerprint reader



Component	Description
(1) 	Turns the TouchPad on and off.
(2) 	<ul style="list-style-type: none"> <li>• When the computer is off, press the button to turn on the computer.</li> <li>• When the computer is on, press the button briefly to initiate Sleep.</li> <li>• When the computer is in the Sleep state, press the button briefly to exit Sleep.</li> <li>• When the computer is in Hibernation, press the button briefly to exit Hibernation.</li> </ul> <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:</p> <ul style="list-style-type: none"> <li>• <b>Windows 7</b>—Select <b>Start &gt; Control Panel &gt; System and Security &gt; Power Options</b>.</li> <li>• <b>Windows Vista</b>—Select <b>Start &gt; Control Panel &gt; System and Maintenance &gt; Power Options</b></li> <li>• Or refer to the <i>HP Notebook Reference Guide</i>.</li> </ul>
(3) 	Turns the wireless feature on or off but does not establish a wireless connection.
(4) 	Mutes and restores speaker sound.

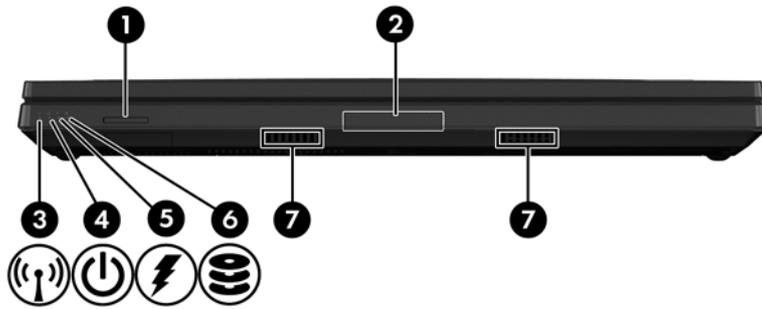
Component	Description
(5)  QuickWeb button	<ul style="list-style-type: none"> <li>• When the computer is off or in Hibernation, press the button to open HP QuickWeb.</li> <li>• When the computer is in Microsoft Windows, press the button to open the default Web browser.</li> <li>• When the computer is in HP QuickWeb, press the button to open the default Web browser.</li> </ul> <p><b>NOTE:</b> For more information, refer to “HP QuickWeb” in this guide and to the HP QuickWeb software Help. If your computer does not have HP QuickWeb software, the button does not perform any action or function.</p>
(6)  Calculator button	Opens the Windows calculator function.
(7) Fingerprint reader	Allows a fingerprint logon to Windows, instead of a password logon.

## Keys



Component	Description
(1) <code>esc</code> key	Displays system information when pressed in coMBination with the <code>fn</code> key.
(2) Function keys	Execute frequently used system functions when pressed in coMBination with the <code>fn</code> key.
(3) <code>fn</code> key	Executes frequently used system functions when pressed in coMBination with a function key or the <code>esc</code> key.
(4)  Windows logo key	Displays the Windows Start menu.
(5)  Windows applications key	Displays a shortcut menu for items beneath the pointer.
(6) Integrated numeric keypad	When the keypad has been enabled, the keys can be used like an external numeric keypad.
(7) <code>num lk</code> key	Enables/disables the integrated numeric keypad when pressed.

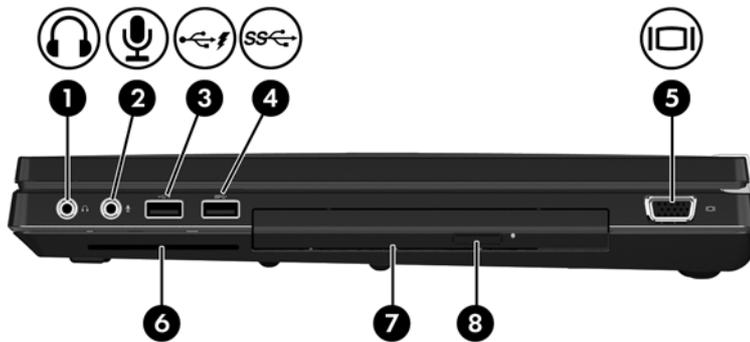
# Front



Component	Description
(1) Media Card reader	<p>Supports the following digital card formats:</p> <ul style="list-style-type: none"> <li>Secure Digital (SD) Card</li> <li>Secure Digital HC (SDHC) Card</li> <li>Secure Digital XC (SDXC) Card</li> <li>MultiMediaCard (MMC)</li> <li>MultiMediaCardplus (MMC+)</li> </ul>
(2) Display release latch	Opens the computer.
(3) Wireless light	<ul style="list-style-type: none"> <li>White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on.</li> <li>Amber: All wireless devices are off.</li> </ul>
(4) Power light	<ul style="list-style-type: none"> <li>On: The computer is on.</li> <li>Blinking: The computer is in the Sleep state.</li> <li>Off: The computer is off or in Hibernation.</li> </ul>
(5) Battery light	<ul style="list-style-type: none"> <li>Amber: The computer is connected to external power and the battery is charged from 0 – 90%.</li> <li>White: The computer is connected to external power and the battery is charged from 90 – 99%.</li> <li>Blinking Amber: A battery that is the only available power source has reached a low battery level. When the battery reaches a critical battery level, the battery light begins blinking rapidly.</li> <li>Off: The battery is fully charged.</li> </ul>
(6) Hard drive light	On: The hard drive is being accessed.
(7) Speakers (2)	Produce sound.

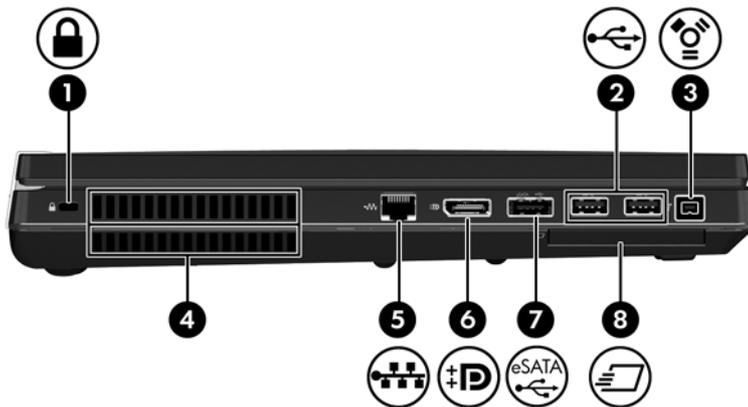
**NOTE:** To use the SRS Premium Sound software, select **Start > All Programs > SRS Premium Sound**.

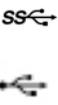
## Right



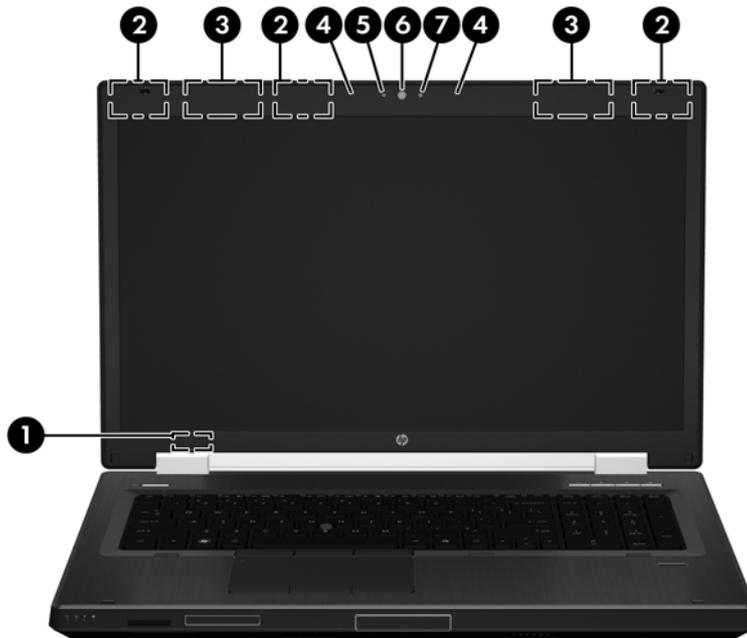
Component	Description
(1)  Audio-out (headphone) jack	<p>Produces sound when connected to optional powered stereo speakers, headphones, ear buds, a headset, or television audio.</p> <p><b>WARNING!</b> To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the <i>Regulatory, Safety and Environmental Notices</i>.</p> <p><b>NOTE:</b> When a device is connected to the headphone jack, the computer speakers are disabled.</p>
(2)  Audio in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.
(3)  USB charging port	Connects an optional USB device.
(4)  USB 2.0 port 	Connects optional USB devices.
(5)  External monitor port	Connects an external VGA monitor or projector.
(6) Smart Card reader	Supports optional Smart Cards.
(7) Upgrade bay (optical drive shown)	<p>Reads and writes (select models only) to an optical disc.</p> <p><b>NOTE:</b> The upgrade bay can hold either a hard drive, an optical drive or supports a weight saver option.</p>
(8) Optical drive eject button	Ejects the optical drive.

## Left



Component	Description
(1) 	Security cable slot Attaches an optional security cable to the computer. <b>NOTE:</b> The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.
(2) 	USB 3.0 ports (2) Connects optional USB devices.
(3) 	1394 port Connects an optional IEEE 1394 or 1394a device, such as a camcorder.
(4)	Vents (2) Enable airflow to cool internal components. <b>NOTE:</b> 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.
(5) 	RJ-45 (network) jack Connects a network cable.
(6) 	DisplayPort Connects an optional digital display device, such as a high-performance monitor or projector.
(7) 	eSATA/USB 2.0 combo port Connects a high-performance eSATA component, such as an eSATA external hard drive, or connects an optional USB device.
(8) 	ExpressCard slot Supports optional ExpressCards.

# Display



Component	Description
(1) Internal display switch	Turns off the display and initiates Sleep if the display is closed while the power is on.  <b>NOTE:</b> The display switch is not visible from the outside of the computer.
(2) WLAN antennas (3)*	Send and receive wireless signals to communicate with wireless local area networks (WLAN).
(3) WWAN antennas (2)*	Send and receive wireless signals to communicate with wireless wide-area networks (WWAN).
(4) Internal microphones (2)	Record sound.
(5) Webcam light (select models only)	On: The webcam is in use.
(6) Webcam (select models only)	Records video and captures still photographs.  To use the webcam, select <b>Start &gt; All Programs &gt; HP &gt; HP Webcam</b> .
(7) ambient light sensor	The ambient light sensor automatically adjusts the display brightness based on the lighting conditions in your environment.

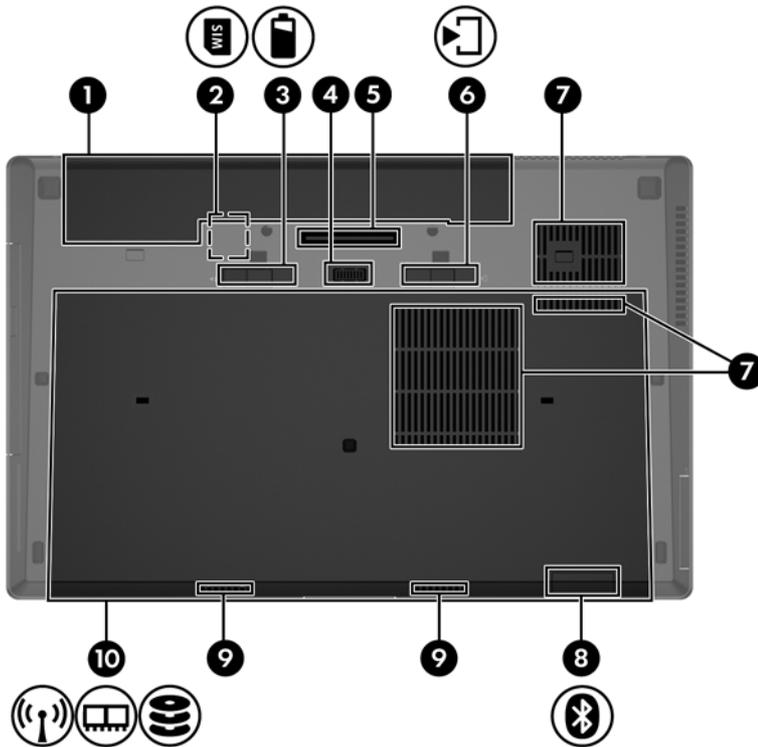
\*The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions. To see wireless regulatory notices, refer to the section of the *Regulatory, Safety and Environmental Notices* that applies to your country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

## Rear



Component	Description
(1)  RJ-11 (modem) jack (select models only)	Connects a modem cable.
(2) Vents (2)	Enable airflow to cool internal components. <b>NOTE:</b> 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.
(3)  Power connector	Connects an AC adapter.

# Bottom



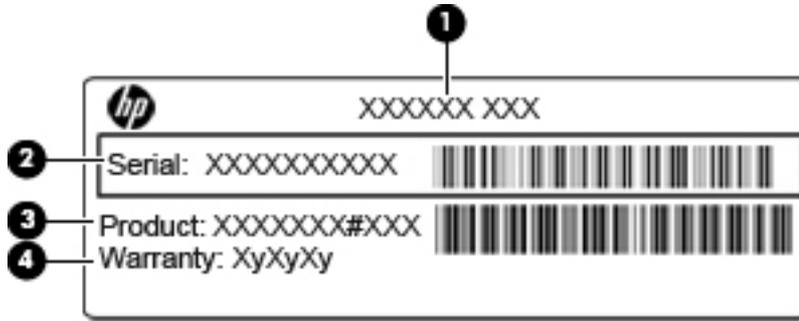
Component	Description
(1)	Battery bay Holds the battery.
(2) 	SIM slot Supports a wireless subscriber identity module (SIM). The SIM slot is located inside the battery bay.
(3) 	Battery release latch Releases the battery from the battery bay.
(4)	Accessory battery connector Connects an optional accessory battery.
(5)	Docking connector Connects an optional docking device.
(6) 	Bottom cover release latch Releases or locks the bottom cover.
(7)	Vents (3) Enable airflow to cool internal components. <b>NOTE:</b> 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.
(8) 	Bluetooth compartment Contains a Bluetooth device (select models only).

Component	Description
(9) Speakers (2)	Produce sound.  <b>NOTE:</b> To use the SRS Premium Sound software, select <b>Start &gt; All Programs &gt; SRS Premium Sound</b> .
(10)  Wireless and memory module compartments and hard drive bay	Holds an HP Mobile Broadband Module, HP WLAN Module, the memory modules, and the hard drive.  <b>NOTE:</b> 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.

# 3 Illustrated parts catalog

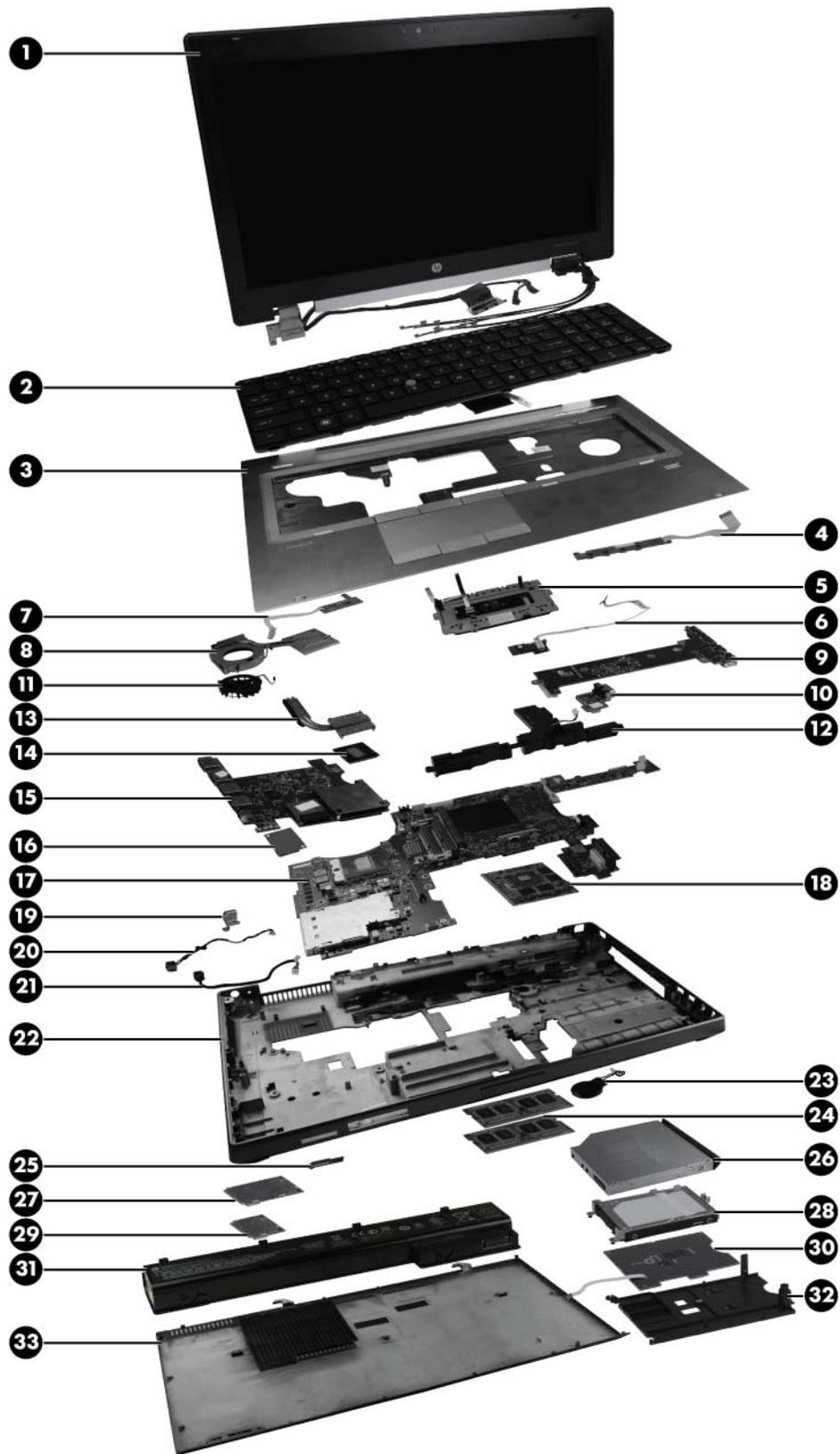
## Service tag

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



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

# Computer major components



Item	Description	Spare part number
<b>(1)</b>	<b>Display</b>	
	Display panel, <b>43.9 cm</b> (17.3 in), High Definition Plus (HD+) Anti-Glare (AG) WVA	652520-001
	Display panel, <b>43.9 cm</b> (17.3 in), FHD AG LED WVA	652521-001
	Display assembly, <b>43.9 cm</b> (17.3 in), FHD AG RGB LED UVVA Dream Color with webcam (not available with HP Mobile Broadband) (includes display panel cable, 3 WLAN antenna and cables, and 2 WWAN antenna and cables)	652519-001
	Display assembly, <b>43.9 cm</b> (17.3 in), FHD AG RGB LED UVVA Dream Color without webcam (not available with HP Mobile Broadband) (includes display panel cable, 3 WLAN antenna and cables, and 2 WWAN antenna and cables)	652518-001
	<b>NOTE:</b> See <a href="#">Display components on page 27</a> for more display component information and spare part numbers.	
<b>(2)</b>	<b>Keyboard</b> (includes keyboard cable, pointing stick and pointing stick cable):	
	Without backlight, for use in Belgium	652553-A41
	With backlight, for use in Belgium	652554-A41
	Without backlight, for use in Brazil	652553-201
	Without backlight, for use in Bulgaria	652553-261
	With backlight, for use in Bulgaria	652554-261
	Without backlight, for use in the Czech Republic and Slovakia	652553-A81
	With backlight, for use in the Czech Republic and Slovakia	652554-A81
	Without backlight, for use in Denmark	652553-081
	With backlight, for use in Denmark	652554-081
	Without backlight, for use in Finland and Sweden	652553-B71
	With backlight, for use in Finland and Sweden	652554-B71
	Without backlight, for use in France	652553-051
	With backlight, for use in France	652554-051
	Without backlight, for use in French Canada	652553-121
	With backlight, for use in French Canada	652554-121
	Without backlight, for use in Germany	652553-041
	With backlight, for use in Germany	652554-041
	Without backlight, for use in Greece	652553-DJ1
	With backlight, for use in Greece	652554-DJ1
	Without backlight, for use in Hungary	652553-211
	With backlight, for use in Hungary	652554-211
	Without backlight, for use in Iceland	652553-DD1
	With backlight, for use in Iceland	652554-DD1
	Without backlight, for use in Israel	652553-BB1
	With backlight, for use in Israel	652554-BB1

<b>Item</b>	<b>Description</b>	<b>Spare part number</b>
	Without backlight, for use in Italy	652553-061
	With backlight, for use in Italy	652554-061
	Without backlight, for use in Japan	652553-291
	Without backlight, for use in Latin America	652553-161
	With backlight, for use in Latin America	652554-161
	Without backlight, for international use	652553-B31
	With backlight, for international use	652554-B31
	Without backlight, for use in Northwest Africa	652553-DW1
	With backlight, for use in Northwest Africa	652554-DW1
	Without backlight, for use in Norway	652553-091
	With backlight, for use in Norway	652554-091
	Without backlight, for use in Portugal	652553-131
	With backlight, for use in Portugal	652554-131
	Without backlight, for use in Russia	652553-251
	With backlight, for use in Russia	652554-251
	Without backlight, for use in Saudi Arabia	652553-171
	With backlight, for use in Saudi Arabia	652554-171
	Without backlight, for use in Slovenia	652553-BA1
	With backlight, for use in Slovenia	652554-BA1
	Without backlight, for use in South Korea	652553-AD1
	With backlight, for use in South Korea	652554-AD1
	Without backlight, for use in Spain	652553-071
	With backlight, for use in Spain	652554-071
	Without backlight, for use in Switzerland	652553-BG1
	With backlight, for use in Switzerland	652554-BG1
	Without backlight, for use in Taiwan	652553-AB1
	With backlight, for use in Taiwan	652554-AB1
	Without backlight, for use in Thailand	652553-281
	With backlight, for use in Thailand	652554-281
	Without backlight, for use in Turkey	652553-141
	With backlight, for use in Turkey	652554-141
	Without backlight, for use in the United Kingdom and Singapore	652553-031
	With backlight, for use in the United Kingdom and Singapore	652554-031
	Without backlight, for use in the United States	652553-001

Item	Description	Spare part number
	With backlight, for use in the United States	652554-001
(3)	<b>Top cover</b> (includes TouchPad)	652536-001
(4)	<b>Application button board</b>	652516-001
(5)	<b>TouchPad</b> (included with top cover)	
(6)	<b>Fingerprint reader</b>	655545-001
(7)	<b>Power button board</b>	652515-001
(8)	<b>Fan/graphics board heat sink assembly</b> (includes replacement thermal material):	
	For use with ATI graphics subsystem	652543-001
	For use with NVIDIA graphics subsystem	652544-001
(9)	<b>Audio/USB 2.0 board</b>	652517-001
(10)	CRT board	655543-001
(11)	<b>Fan</b>	652541-001
(12)	<b>Speaker assembly</b>	652540-001
(13)	<b>Processor heat sink</b>	
	For use only with computer models equipped with quad-core processors	653629-001
	For use only with computer models equipped with dual-core processors	652542-001
(14)	<b>Processor</b> (includes replacement thermal material):	
	<b>2nd Generation Intel® Core™ processors</b> (support Intel Turbo Boost Technology):	
	i7-2620M, 2.7 GHz (turbo up to 3.4 GHz) dual-core processor, 4 MB L3 cache, 4 threads, 35W	657844-001
	i7-2630QM 2.0 GHz (turbo up to 2.9 GHz) quad-core processor, 6 MB L3 cache, 8 threads, 45W	657849-001
	i7-2720QM, 2.2 GHz (turbo up to 3.3 GHz) quad-core processor, 6 MB L3 cache, 8 threads, 45W	657846-001
	i7-2820QM, 2.3 GHz (turbo up to 3.4 GHz) quad-core processor, 8 MB L3 cache, 8 threads, 45W	657848-001
	i7-2920XM, 2.5 GHz (turbo up to 3.5 GHz) quad-core extreme processor, 8 MB L3 cache, 8 threads, 55W	657850-001
	<b>2nd Generation Intel® Core™ i5 processors</b> (support Intel Turbo Boost Technology):	
	i5-2520M, 2.5 GHz (turbo up to 3.2 GHz) dual-core processor, 3 MB L3 cache, 4 threads, 35W	657845-001
	i5-2540M, 2.6 GHz (turbo up to 3.3 GHz) dual-core processor, 3 MB L3 cache, 4 threads, 35W	657847-001
(15)	USB 3.0 board	652514-001
(16)	<b>Modem module</b> 56K V.92 data/fax modem	628824-001
	<b>NOTE:</b> The modem module spare part kit does not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 652545-001.	
(17)	<b>System board</b> (includes replacement thermal material)	

Item	Description	Spare part number
	For use in all countries and regions except the People's Republic of China and Russia:	
	<ul style="list-style-type: none"> <li>For use with computer models equipped with Intel quad-core processors</li> </ul>	652509-001
	<ul style="list-style-type: none"> <li>For use with computer models equipped with Intel dual-core processors</li> </ul>	652508-001
	For use only in the People's Republic of China and Russia:	
	<ul style="list-style-type: none"> <li>For use with computer models equipped with Intel quad-core processors</li> </ul>	655025-001
	<ul style="list-style-type: none"> <li>For use with computer models equipped with Intel dual-core processors</li> </ul>	655024-001
<b>(18)</b>	<b>Graphics board</b> (includes replacement thermal material):	
	AMD FirePro M5950 XT-GL 1GB GDDR5 (DP 1.2 and Eyefinity Plus support)	647176-001
	NVIDIA Quadro 3000M, N12E-Q1 2 GB dedicated GDDR5 video memory	647177-001
	NVIDIA Quadro 4000M, N12E-Q3 2 GB dedicated GDDR5 video memory	647178-001
	NVIDIA Quadro 5010M, N12E-Q5 4 GB dedicated GDDR5 video memory	647179-001
<b>(19)</b>	<b>Security lock</b>	
	<b>NOTE:</b> The security lock is included with the base enclosure assembly, spare part number 652535-001.	
<b>(20)</b>	<b>Power connector cable</b>	
	<b>NOTE:</b> The power connector cable is included in the Cable Kit, spare part number 652545-001.	
<b>(21)</b>	<b>Network cable</b> (includes RJ-45 jack)	
	<b>NOTE:</b> The network cable is included in the Cable Kit, spare part number 652545-001.	
<b>(22)</b>	<b>Base enclosure</b> (includes computer feet)	652535-001
<b>(23)</b>	<b>RTC battery</b>	651948-001
<b>(24)</b>	<b>Memory modules</b> (PC3-10600, 1333 MHz, shared):	
	2 GB	621565-001
	4 GB	621569-001
	8 GB	634091-001
<b>(25)</b>	<b>Bluetooth module</b>	537921-001
	<b>NOTE:</b> The Bluetooth module spare part kit does not include a Bluetooth module cable. The Bluetooth module cable is included in the Cable Kit, spare part number 652545-001.	
<b>(26)</b>	<b>Optical drive</b> (includes bezel and bracket) supported in upgrade bay	
	Blu-ray R/RE DVD±RW SuperMulti Double-Layer Drive	652551-001
	Blu-ray ROM DVD±RW SuperMulti Double-Layer Drive	652550-001
	DVD±RW SuperMulti Double-Layer Drive	652549-001
	DVD-ROM Drive	652548-001
	Also supported in upgrade bay:	
	500 GB, 7200 rpm hard drive	652552-001
<b>(27)</b>	<b>WLAN module:</b>	

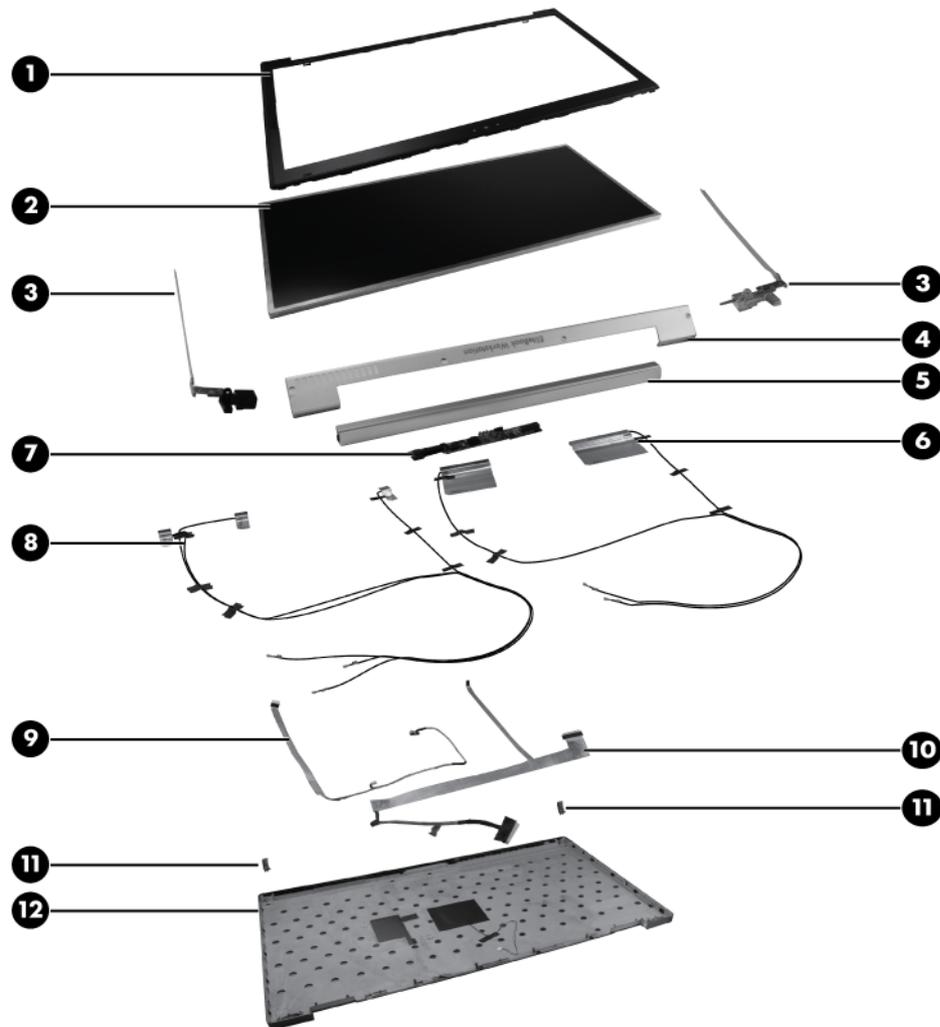
Item	Description	Spare part number
	Intel® Centrino™ Advanced-N 6205, 802.11a/b/g/n WLAN module	631954-001
	Intel Centrino Ultimate-N 6300, 802.11a/b/g/n WLAN module	572511-001
	Atheros HB112AGN 802.11a/b/g/n 3x3 WiFi Adapter	630435-001
<b>(28)</b>	<b>Mass storage device</b>	
	Supports <b>7.0 mm</b> (0.28 in), <b>9.5 mm</b> (0.37 in) or <b>12.7 mm</b> (0.5 in) hard drives and <b>6.35 cm</b> (2.5 in) solid-state drive for primary and secondary storage:	
	<b>NOTE:</b> The hard drive bracket and screws are included in the Hard Drive Hardware Kit, spare part number 642774-001.	
	<ul style="list-style-type: none"> <li>750 GB, SATA, 7200-rpm</li> </ul>	633252-001
	<ul style="list-style-type: none"> <li>500 GB, SATA, 7200-rpm</li> </ul>	634925-001
	<ul style="list-style-type: none"> <li>320 GB, SATA, 7200-rpm</li> </ul>	641672-001
	<ul style="list-style-type: none"> <li>320 GB SATA SED (Self-Encrypting Drive), 7200-rpm</li> </ul>	626978-001
	<b>Solid-state drive</b> (includes bracket and screws)	
	<ul style="list-style-type: none"> <li>256 GB solid-state drive</li> </ul>	655027-001
	<ul style="list-style-type: none"> <li>128 GB solid-state drive</li> </ul>	655026-001
<b>(29)</b>	<b>WWAN module:</b>	
	HP un2430 EV-DO/HSPA Mobile Broadband Module	634400-001
	HP hs2340 HSPA+ Mobile Broadband Module	632155-001
<b>(30)</b>	<b>Smart Card reader</b>	655544-001
<b>(31)</b>	<b>Battery:</b>	
	8-cell, Li-ion, 2.8 Ah (75 WHr)	632425-001
	8-cell, Li-ion, 2.8 Ah (83 WHr)	632427-001
<b>(32)</b>	<b>Smart Card reader cover</b>	652546-001
<b>(33)</b>	<b>Service access cover</b>	652537-001

## Cable Kit



Item	Description	Spare part number
	<b>Cable Kit</b>	652545-001
(1)	Power connector cable	
(2)	Network cable (includes RJ-45 jack)	
(3)	Modem module cable (includes RJ-11 jack)	
(4)	Bluetooth module cable	

# Display components



Item	Description	Spare part number
(1)	<b>Display bezel</b>	
	For use only with computer models with a webcam	652522-001
	For use only with computer models without a webcam	652523-001
(2)	<b>Display</b>	
	Display panel, <b>43.9 cm</b> (17.3 in), FHD AG WVA	652521-001
	Display panel, <b>43.9 cm</b> (17.3 in), HD+ AG WVA	652520-001
	Display assembly, <b>43.9 cm</b> (17.3 in), FHD AG RGB LED UVWA Dream Color without webcam (not available with HP Mobile Broadband) (includes display panel cable, 3 WLAN antenna and cables, and 2 WWAN antenna and cables)	652518-001
	Display assembly, <b>43.9 cm</b> (17.3 in), FHD AG RGB LED UVWA Dream Color with webcam (not available with HP Mobile Broadband) (includes display panel cable, 3 WLAN antenna and cables, and 2 WWAN antenna and cables)	652519-001
(3)	<b>Display Hinge Kit</b> (includes left and right hinges and brackets)	652528-001

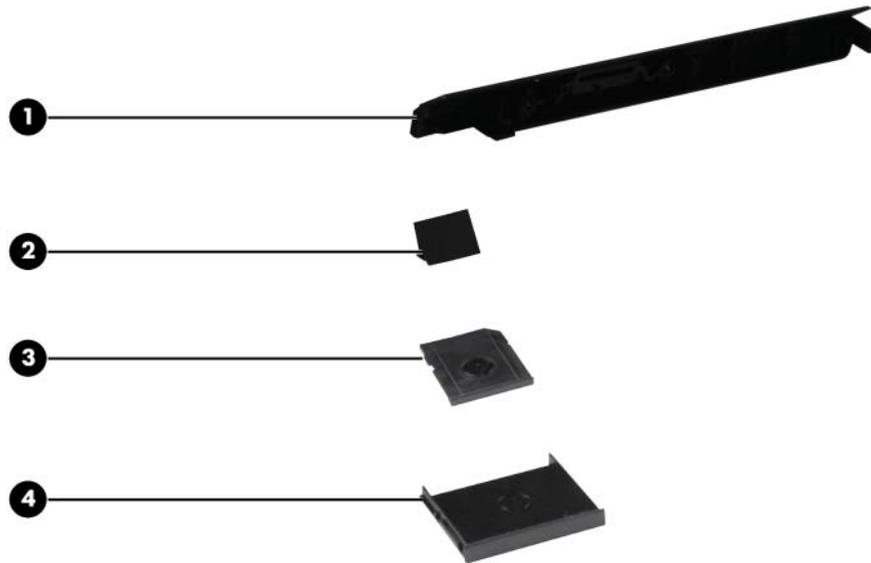
<b>Item</b>	<b>Description</b>	<b>Spare part number</b>
(4)	<b>Display hinge covers</b>	652529-001
(5)	<b>Cable routing tray</b>	
(6)	<b>WWAN antenna and cables</b> (included in the Antenna Kit, spare part number 652530-001)	
(7)	<b>Webcam module with microphone</b>	642795-001
(8)	<b>WLAN antenna and cables</b> (included in the Antenna Kit, spare part number 652530-001)	
(9)	<b>Webcam cable</b>	652527-001
(10)	<b>Display panel cable</b> (includes webcam module cable and ambient light sensor board cable)	652525-001
(11)	<b>Display latch (2)</b>	
(12)	<b>Display enclosure</b>	652524-001
	<b>Ambient light sensor board</b> (not illustrated)	655028-001
	<b>Display Rubber Kit</b> (not illustrated, includes 2 bezel rubber bumpers and 8 rubber screw covers)	652532-001
	<b>Display Miscellaneous Kit</b> (not illustrated)	652533-001
	<b>Display Screw Kit</b> (not illustrated)	652531-001
	<b>Antenna Kit</b> (includes WLAN and WWAN antennas) (not illustrated)	652530-001
	<b>Display Panel Support Kit</b> (includes display back cover, WWAN and WLAN antenna cables, and webcam cable) (not illustrated)	658265-001
	Microphone (not illustrated)	655312-001
	CRT board (not illustrated)	655543-001

## Mass storage devices



Item	Description	Spare part number
(1)	<b>7.0 mm (0.28 in), 9.5 mm (0.37 in), or 12.7 mm (0.5 in) hard drive:</b> <b>NOTE:</b> The hard drive bracket is included in the Hard Drive Hardware Kit, spare part number 642774-001.	
	• 750 GB, 7200-rpm	633252-001
	• 500 GB, 7200-rpm	634925-001
	• 320 GB, 7200-rpm	641672-001
	• 320 GB, 7200-rpm SATA SED (Self-Encrypting Drive)	626978-001
(2)	<b>6.35 cm (2.50 in) solid-state drive</b> (includes bracket):	
	256 GB solid-state drive	655027-001
	128 GB solid-state drive	655026-001
(4)	<b>Optical drive</b> (includes bezel and bracket)	
	Blu-ray R/RE DVD±RW SuperMulti Double-Layer Drive	652551-001
	DVD±RW SuperMulti Double-Layer Drive	652549-001
	Blu-ray ROM DVD±RW SuperMulti Double-Layer Drive	652550-001
	DVD-ROM Drive	652548-001
(4)	<b>Optical drive bracket</b> (included with optical drive)	
(5)	<b>Hard drive bracket</b> (included only with solid-state drives)	

# Plastics Kit



Item	Description	Spare part number
	<b>Plastics Kit:</b>	655546-001
(1)	Optical drive compartment cover	
(2)	RJ-11 (modem) jack cover	
(3)	SD Card cover	
(4)	ExpressCard slot cover	

## Miscellaneous parts

Description	Spare part number
<b>AC Adapter</b>	
230W RC/V Slim AC Smart Adapter	611533-001
200W RC/V Slim AC Smart Adapter	645154-001
<b>Power cord (3 conductor, black, 1.83 m):</b>	
For use in Argentina	491683-D01
For use in Australia	491683-011
For use in Brazil	491683-202
For use in Denmark	491683-081
For use in Europe, the Middle East, and Africa	491683-021
For use in India	491683-D61
For use in Israel	491683-BB1
For use in Italy	491683-061
For use in Japan	491683-291
For use in North America	491683-001
For use in the People's Republic of China	491683-AA1
For use in South Africa	491683-AR1
For use in South Korea	491683-AD1
For use in Switzerland	491683-111
For use in Taiwan	491683-AB1
For use in Thailand	491683-201
For use in the United Kingdom and Singapore	491683-031
<b>Hard Drive Hardware Kit (includes hard drive bracket and screws)</b>	642774-001
<b>Hard drive upgrade bay</b>	655547-001
<b>Screw Kit</b>	652539-001
ExpressCard socket	652547-001

## Sequential part number listing

Spare part number	Description
491683-001	Power cord for use in North America (3 conductor, black, <b>1.83 m</b> )
491683-011	Power cord for use in Australia (3 conductor, black, <b>1.83 m</b> )
491683-021	Power cord for use in Europe, the Middle East, and Africa (3 conductor, black, <b>1.83 m</b> )
491683-031	Power cord for use in Singapore and the United Kingdom (3 conductor, black, <b>1.83 m</b> )
491683-061	Power cord for use in Italy (3 conductor, black, <b>1.83 m</b> )
491683-081	Power cord for use in Denmark (3 conductor, black, <b>1.83 m</b> )
491683-111	Power cord for use in Switzerland (3 conductor, black, <b>1.83 m</b> )
491683-201	Power cord for use in Thailand (3 conductor, black, <b>1.83 m</b> )
491683-202	Power cord for use in Brazil (3 conductor, black, <b>1.83 m</b> )
491683-291	Power cord for use in Japan (3 conductor, black, <b>1.83 m</b> )
491683-AA1	Power cord for use in the People's Republic of China (3 conductor, black, <b>1.83 m</b> )
491683-AB1	Power cord for use in Taiwan (3 conductor, black, <b>1.83 m</b> )
491683-AD1	Power cord for use in South Korea (3 conductor, black, <b>1.83 m</b> )
491683-AR1	Power cord for use in South Africa (3 conductor, black, <b>1.83 m</b> )
491683-BB1	Power cord for use in Israel (3 conductor, black, <b>1.83 m</b> )
491683-D01	Power cord for use in Argentina (3 conductor, black, <b>1.83 m</b> )
491683-D61	Power cord for use in India (3 conductor, black, <b>1.83 m</b> )
537921-001	Bluetooth module, HP Integrated Module with Bluetooth 2.1+EDR Wireless Technology <b>NOTE:</b> The Bluetooth module spare part kit does not include a Bluetooth module cable. The Bluetooth module cable is included in the Cable Kit, spare part number 652545-001.
572511-001	WLAN, Intel Centrino Ultimate-N 6300 802.11 a/b/g/n
611533-001	AC adapter, 230 W RC/V Slim AC Smart adapter
621565-001	Memory module, 2 GB (PC3-10600, 1333 MHz)
621569-001	Memory module, 4 GB (PC3-10600, 1333 MHz)
626978-001	Hard drive, 320 GB, 7200-rpm SATA SED (Self-Encrypting Drive)
628824-001	Modem, 56K V.92 data/fax modem
630435-001	WLAN, Atheros HB112AGN 802.11a/b/g/n WiFi Adapter
631954-001	WLAN, Intel® Centrino™ Advanced-N 6205, 802.11a/b/g/n
632155-001	WWAN, HP hs2340 HSPA+ Mobile Broadband Module
632425-001	Battery, 8-cell, Li-ion, 2.8 Ah (75 WHr)
632427-001	Battery, 8-cell, Li-ion, 2.8 Ah (83 WHr)
633252-001	Hard drive, 750 GB, 7200-rpm SATA
634091-001	Memory module, 8 GB (PC3-10600, 1333 MHz)

Spare part number	Description
634400-001	WWAN, HP un2430 EV-DO/HSPA Mobile Broadband Module
634925-001	Hard drive, 500 GB, 7200-rpm SATA
641672-001	Hard drive, 320 GB, 7200-rpm SATA
642774-001	Hard Drive Hardware Kit (includes hard drive bracket and screws)
642795-001	Webcam module with microphone
645154-001	AC adapter, 200 W RC/V Slim AC Smart Adapter
647176-001	Graphics board, AMD FirePro M5950 XT-GL 1 GB GDDR5 (DP 1.2 and Eyefinity Plus support)
647177-001	Graphics board, NVIDIA Quadro 3000M, N12E-Q1 2 GB dedicated GDDR5 video memory
647178-001	Graphics board, NVIDIA Quadro 4000M, N12E-Q3 2 GB dedicated GDDR5 video memory
647179-001	Graphics board, NVIDIA Quadro 5010M, N12E-Q5 4 GB dedicated GDDR5 video memory
651948-001	RTC battery
652508-001	System board for use with computer models equipped with Intel dual-core processors in all countries and regions except the People's Republic of China and Russia (includes replacement thermal material)
652509-001	System board for use with computer models equipped with Intel quad-core processors in all countries and regions except the People's Republic of China and Russia (includes replacement thermal material)
652514-001	USB 3.0 board (includes cable)
652515-001	Power button board
652516-001	Application button board
652517-001	Audio/USB 2.0 board
652518-001	Display assembly, <b>43.9 cm</b> (17.3 in), FHD AG RGB LED UVVA Dream Color without webcam (not available with HP Mobile Broadband) (includes display panel cable, 3 WLAN antenna and cables, and 2 WWAN antenna and cables)
652519-001	Display assembly, <b>43.9 cm</b> (17.3 in), FHD AG RGB LED UVVA Dream Color with webcam (not available with HP Mobile Broadband) (includes display panel cable, 3 WLAN antenna and cables, and 2 WWAN antenna and cables)
652520-001	Display panel, <b>43.9 cm</b> (17.3 in), HD+ AG WVA
652521-001	Display panel, <b>43.9 cm</b> (17.3 in), FHD AG WVA
652522-001	Display bezel, for use only with computer models with a webcam
652523-001	Display bezel, for use only with computer models without a webcam
652524-001	Top cover (includes TouchPad)
652525-001	Display panel cable (includes webcam module cable and ambient light sensor board cable)
652527-001	Webcam cable
652528-001	Display Hinge Kit (includes left and right hinges and brackets)
652529-001	Display hinge covers
652530-001	Antenna Kit (includes WLAN antenna and cables and WWAN antenna and cables)
652531-001	Display Screw Kit

<b>Spare part number</b>	<b>Description</b>
652532-001	Display Rubber Kit (includes 2 bezel rubber bumpers and 8 rubber screw covers)
652533-001	Display Miscellaneous Kit
652535-001	Base enclosure (includes computer feet)
652536-001	Top cover
652537-001	Service access cover
652539-001	Screw Kit
652540-001	Speaker assembly
652541-001	Fan
652542-001	Processor heat sink for use only with computer models equipped with dual-core processors (includes replacement thermal material)
652543-001	Fan/graphics board heat sink assembly for use only with computer models equipped with ATI graphics subsystems (includes replacement thermal material)
652544-001	Fan/graphics board heat sink assembly, for use only with computer models equipped with NVIDIA Quadro graphics subsystems (includes replacement thermal material)
652545-001	Cable Kit (includes DC-jack cable, RJ-45 cable, modem module cable, Bluetooth cable)
652546-001	Smart Card cover
652547-001	ExpressCard socket
652548-001	DVD-ROM Drive
652549-001	Optical drive, DVD±RW SuperMulti Double-Layer Drive
652550-001	Optical drive, Blu-ray ROM DVD±RW SuperMulti Double-Layer Drive
652551-001	Optical drive, Blu-ray R/RE DVD±RW SuperMulti Double-Layer Drive
652552-001	Upgrade bay hard drive, 500 GB, 7200 rpm hard drive
652553-001	Keyboard without backlight for use in the United States (includes keyboard cable, pointing stick and pointing stick cable)
652553-031	Keyboard without backlight for use in Singapore and the United Kingdom (includes keyboard cable, pointing stick and pointing stick cable)
652553-041	Keyboard without backlight for use in Germany (includes keyboard cable, pointing stick and pointing stick cable)
652553-051	Keyboard without backlight for use in France (includes keyboard cable, pointing stick and pointing stick cable)
652553-061	Keyboard without backlight for use in Italy (includes keyboard cable, pointing stick and pointing stick cable)
652553-071	Keyboard without backlight for use in Spain (includes keyboard cable, pointing stick and pointing stick cable)
652553-081	Keyboard without backlight for use in Denmark (includes keyboard cable, pointing stick and pointing stick cable)
652553-091	Keyboard without backlight for use in Norway (includes keyboard cable, pointing stick and pointing stick cable)
652553-121	Keyboard without backlight for use in French Canada (includes keyboard cable, pointing stick and pointing stick cable)

<b>Spare part number</b>	<b>Description</b>
652553-131	Keyboard without backlight for use in Portugal (includes keyboard cable, pointing stick and pointing stick cable)
652553-141	Keyboard without backlight for use in Turkey (includes keyboard cable, pointing stick and pointing stick cable)
652553-161	Keyboard without backlight for use in Latin America (includes keyboard cable, pointing stick and pointing stick cable)
652553-171	Keyboard without backlight for use in Saudi Arabia (includes keyboard cable, pointing stick and pointing stick cable)
652553-201	Keyboard without backlight for use in Brazil (includes keyboard cable, pointing stick and pointing stick cable)
652553-211	Keyboard without backlight for use in Hungary (includes keyboard cable, pointing stick and pointing stick cable)
652553-251	Keyboard without backlight for use in Russia (includes keyboard cable, pointing stick and pointing stick cable)
652553-261	Keyboard without backlight for use in Bulgaria (includes keyboard cable, pointing stick and pointing stick cable)
652553-281	Keyboard without backlight for use in Thailand (includes keyboard cable, pointing stick and pointing stick cable)
652553-291	Keyboard without backlight for use in Japan (includes keyboard cable, pointing stick and pointing stick cable)
652553-A41	Keyboard without backlight for use in Belgium (includes keyboard cable, pointing stick and pointing stick cable)
652553-A81	Keyboard without backlight for use in the Czech Republic and Slovakia (includes keyboard cable, pointing stick and pointing stick cable)
652553-AB1	Keyboard without backlight for use in Taiwan (includes keyboard cable, pointing stick and pointing stick cable)
652553-AD1	Keyboard without backlight for use in South Korea (includes keyboard cable, pointing stick and pointing stick cable)
652553-B31	Keyboard without backlight for international use (includes keyboard cable, pointing stick and pointing stick cable)
652553-B71	Keyboard without backlight for use in Finland and Sweden (includes keyboard cable, pointing stick and pointing stick cable)
652553-BA1	Keyboard without backlight for use in Slovenia (includes keyboard cable, pointing stick and pointing stick cable)
652553-BB1	Keyboard without backlight for use in Israel (includes keyboard cable, pointing stick and pointing stick cable)
652553-BG1	Keyboard without backlight for use in Switzerland (includes keyboard cable, pointing stick and pointing stick cable)
652553-DD1	Keyboard without backlight for use in Iceland (includes keyboard cable, pointing stick and pointing stick cable)
652553-DJ1	Keyboard without backlight for use in Greece (includes keyboard cable, pointing stick and pointing stick cable)
652553-DW1	Keyboard without backlight for use in Northwest Africa (includes keyboard cable, pointing stick and pointing stick cable)

<b>Spare part number</b>	<b>Description</b>
652554-001	Keyboard with backlight for use in the United States (includes keyboard cable, pointing stick and pointing stick cable)
652554-031	Keyboard with backlight for use in Singapore and the United Kingdom (includes keyboard cable, pointing stick and pointing stick cable)
652554-041	Keyboard with backlight for use in Germany (includes keyboard cable, pointing stick and pointing stick cable)
652554-051	Keyboard with backlight for use in France (includes keyboard cable, pointing stick and pointing stick cable)
652554-061	Keyboard with backlight for use in Italy (includes keyboard cable, pointing stick and pointing stick cable)
652554-071	Keyboard with backlight for use in Spain (includes keyboard cable, pointing stick and pointing stick cable)
652554-081	Keyboard with backlight for use in Denmark (includes keyboard cable, pointing stick and pointing stick cable)
652554-091	Keyboard with backlight for use in Norway (includes keyboard cable, pointing stick and pointing stick cable)
652554-121	Keyboard with backlight for use in French Canada (includes keyboard cable, pointing stick and pointing stick cable)
652554-131	Keyboard with backlight for use in Portugal (includes keyboard cable, pointing stick and pointing stick cable)
652554-141	Keyboard with backlight for use in Turkey (includes keyboard cable, pointing stick and pointing stick cable)
652554-161	Keyboard with backlight for use in Latin America (includes keyboard cable, pointing stick and pointing stick cable)
652554-171	Keyboard with backlight for use in Saudi Arabia (includes keyboard cable, pointing stick and pointing stick cable)
652554-211	Keyboard with backlight for use in Hungary (includes keyboard cable, pointing stick and pointing stick cable)
652554-251	Keyboard with backlight for use in Russia (includes keyboard cable, pointing stick and pointing stick cable)
652554-261	Keyboard with backlight for use in Bulgaria (includes keyboard cable, pointing stick and pointing stick cable)
652554-281	Keyboard with backlight for use in Thailand (includes keyboard cable, pointing stick and pointing stick cable)
652554-A41	Keyboard with backlight for use in Belgium (includes keyboard cable, pointing stick and pointing stick cable)
652554-A81	Keyboard with backlight for use in the Czech Republic and Slovakia (includes keyboard cable, pointing stick and pointing stick cable)
652554-AB1	Keyboard with backlight for use in Taiwan (includes keyboard cable, pointing stick and pointing stick cable)
652554-AD1	Keyboard with backlight for use in South Korea (includes keyboard cable, pointing stick and pointing stick cable)
652554-B31	Keyboard with backlight for international use (includes keyboard cable, pointing stick and pointing stick cable)
652554-B71	Keyboard with backlight for use in Finland and Sweden (includes keyboard cable, pointing stick and pointing stick cable)
652254-BA1	Keyboard with backlight for use in Slovenia (includes keyboard cable, pointing stick and pointing stick cable)
652554-BB1	Keyboard with backlight for use in Israel (includes keyboard cable, pointing stick and pointing stick cable)
652554-BG1	Keyboard with backlight for use in Switzerland (includes keyboard cable, pointing stick and pointing stick cable)

<b>Spare part number</b>	<b>Description</b>
652554-DD1	Keyboard with backlight for use in Iceland (includes keyboard cable, pointing stick and pointing stick cable)
652554-DJ1	Keyboard with backlight for use in Greece (includes keyboard cable, pointing stick and pointing stick cable)
652554-DW1	Keyboard with backlight for use in Northwest Africa (includes keyboard cable, pointing stick and pointing stick cable)
653629-001	Processor heat sink for use only with computer models equipped with quad-core processors (includes replacement thermal material)
655024-001	System board for use with computer models equipped with Intel dual-core processors only in the People's Republic of China and Russia (includes replacement thermal material)
655025-001	System board for use with computer models equipped with Intel quad-core processors only in the People's Republic of China and Russia (includes replacement thermal material)
655026-001	128 GB solid-state drive (includes bracket)
655027-001	256 GB solid-state drive (includes bracket)
655028-001	Ambient light sensor board
655312-001	Microphone
655543-001	CRT board
655544-001	Smart Card reader
655545-001	Fingerprint reader
655546-001	Plastics Kit (includes optical drive compartment cover, RJ-11 (modem) jack cover, SD Card cover, and Express Card slot cover)
655547-001	Hard drive upgrade bay
657844-001	Processor, 2nd Generation Intel® Core™ i7-2620M dual-core processor, 2.7 GHz (turbo up to 3.4 GHz), 4 MB L3 cache, 4 threads, 35W (supports Intel Turbo Boost Technology) (includes thermal material)
657845-001	Processor, 2nd Generation Intel® Core™ i5-2520M dual-core processor, 2.5 GHz (turbo up to 3.2 GHz), 3 MB L3 cache, 4 threads, 35W (supports Intel Turbo Boost Technology) (includes thermal material)
657846-001	Processor, 2nd Generation Intel® Core™ i7-2720QM quad-core processor, 2.2 GHz (turbo up to 3.3 GHz), 6 MB L3 cache, 8 threads, 45W (supports Intel Turbo Boost Technology) (includes thermal material)
657847-001	Processor, 2nd Generation Intel® Core™ i5-2540M dual-core processor, 2.6 GHz (turbo up to 3.3 GHz), 3 MB L3 cache, 4 threads, 35W (supports Intel Turbo Boost Technology) (includes thermal material)
657848-001	Processor, 2nd Generation Intel® Core™ i7-2820QM quad-core processor, 2.3 GHz (turbo up to 3.4 GHz), 8 MB L3 cache, 8 threads, 45W (supports Intel Turbo Boost Technology) (includes thermal material)
657849-001	Processor, 2nd Generation Intel® Core™ i7-2630QM quad-core processor, 2.0 GHz (turbo up to 2.9 GHz), 6-MB L3 cache, 8 threads, 45W (supports Intel Turbo Boost Technology) (includes thermal material)
657850-001	Processor, 2nd Generation Intel® Core™ i7-2920XM quad-core extreme, 2.5 GHz (turbo up to 2.9 GHz), 8-MB L3 cache, 8 threads, 55W (supports Intel Turbo Boost Technology) (includes thermal material)
658265-001	Display Panel Support Kit (includes display enclosure, WLAN antenna cables, WWAN antenna cables, and webcam cable)

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# 4 Removal and replacement procedures

## Preliminary replacement requirements

### Tools required

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

- Flat-bladed screwdriver
- Magnetic screwdriver
- Phillips P0 and P1 screwdrivers
- Torx T8 screwdriver
- 5.0 mm hex socket driver

### Service considerations

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



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

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### Plastic parts

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

## Cables and pointing stick connectors

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**⚠ 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.

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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

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**⚠ 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."

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## 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 and pointing stick 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 and pointing stick can work perfectly throughout a normal cycle. Or the device may function normally for a while, 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 pointing stick 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 and pointing stick contact, transport products in static-safe tubes, bags, or boxes.
- Protect ESD-sensitive parts and assemblies with conductive or approved and pointing stick 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 pointing stick 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 non conductive 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 and pointing stick 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 and pointing stick 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 and pointing stick 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
- Non conductive 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

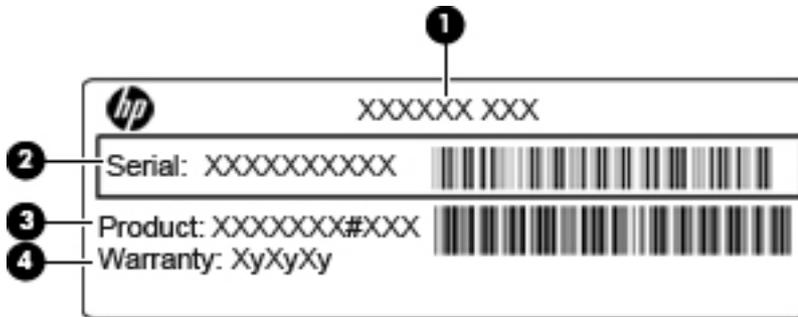
# Component replacement procedures

This chapter provides removal and replacement procedures.

There are as many as 98 screws and screw locks that must be removed, replaced, or loosened when servicing the computer. Make special note of each screw and screw lock size and location during removal and replacement.

## Service tag

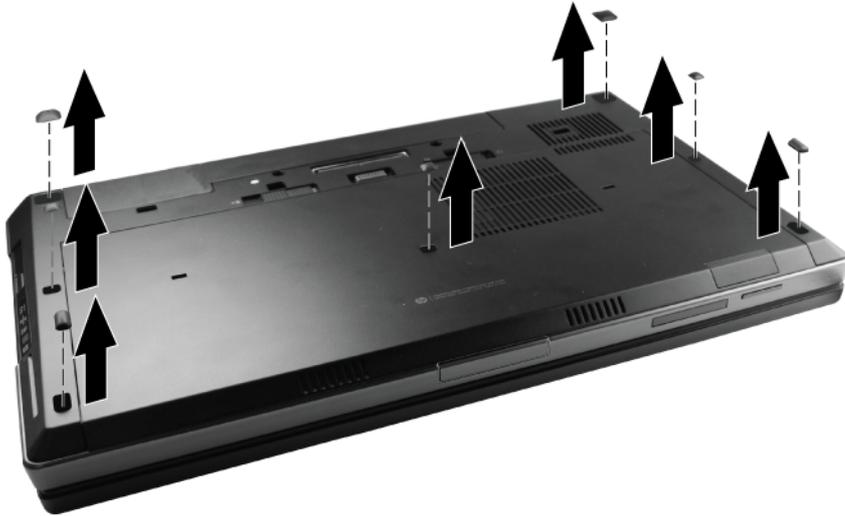
When ordering parts or requesting information, provide the computer serial number and model number provided on the service tag.



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

## Computer feet

The computer feet are adhesive-backed rubber pads. The feet are included in the base enclosure spare part kit, spare part number 652535-001. There are 7 rubber feet that attach to the base enclosure in the locations illustrated below.



## Battery

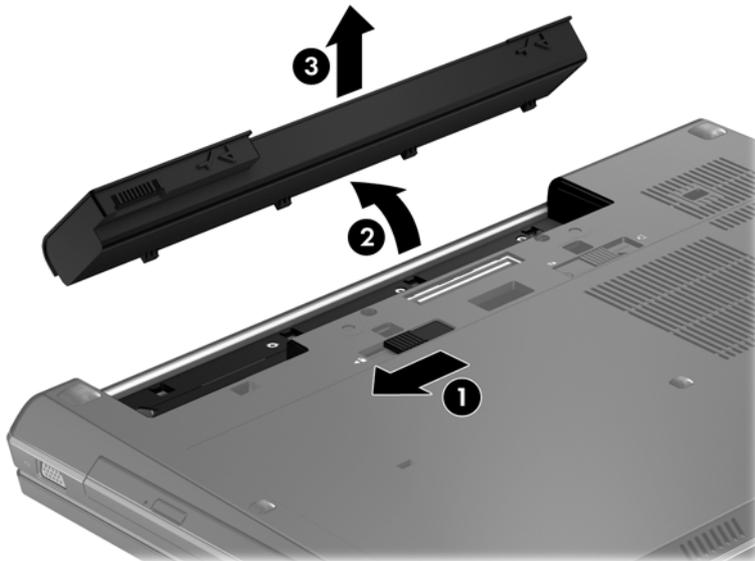
Description	Spare part number
8-cell, Li-ion 2.8 Ah (75 WHr)	632425-001
8-cell, Li-ion 2.8 Ah (83 WHr)	632427-001

Before disassembling the computer, follow these steps:

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

Remove the battery:

1. Position the computer upside down on a flat surface, with the front toward you.
2. Slide the battery release latch to the left **(1)** to release the battery.
3. Pivot the battery **(2)** upward and lift it out of the computer **(3)**.



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

## SIM

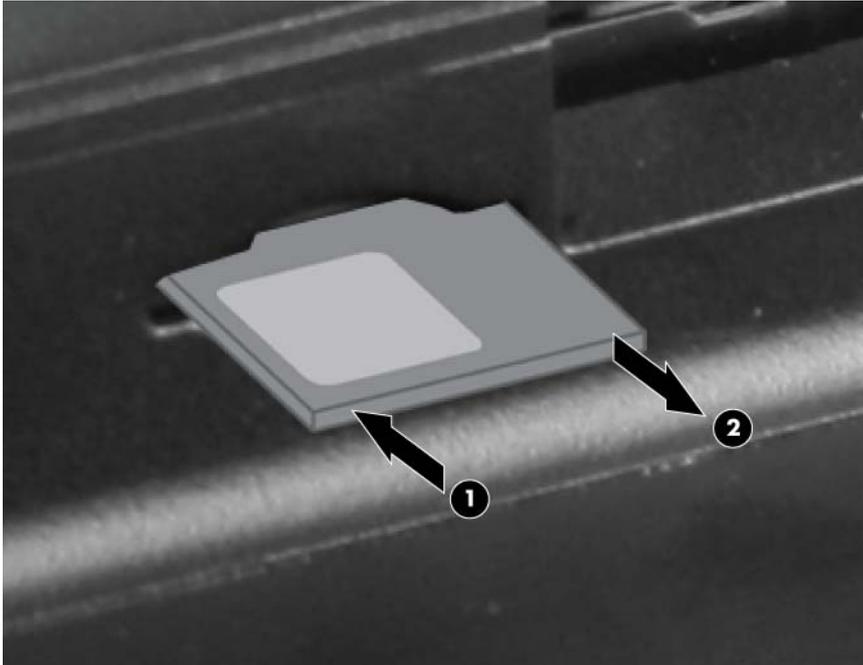
Before removing the SIM, follow these steps:

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 45](#)).

Remove the SIM:

1. Press in on the SIM (1) to release it from the SIM slot.
2. Remove the SIM (2) from the SIM slot.



Install the SIM by inserting it into the SIM slot until you hear a click.

## Service access cover

Description	Spare part number
Service access cover	652537-001

Before removing the service access 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 45](#)).

Remove the service access cover:

1. Position the computer upside down on a flat surface, with the front toward you.
2. Slide the service access cover release latch to the right (1) to release the service access cover.

- Slide the service access cover toward the front of the computer (2) and then remove the cover (3).



## Bluetooth module

 **NOTE:** The Bluetooth module spare part kit does not include a Bluetooth module cable. The Bluetooth module cable is included in the Cable Kit, spare part number 652545-001. See [Bluetooth module cable on page 104](#) for information on replacing the Bluetooth module cable.

Description	Spare part number
Bluetooth module	537921-001

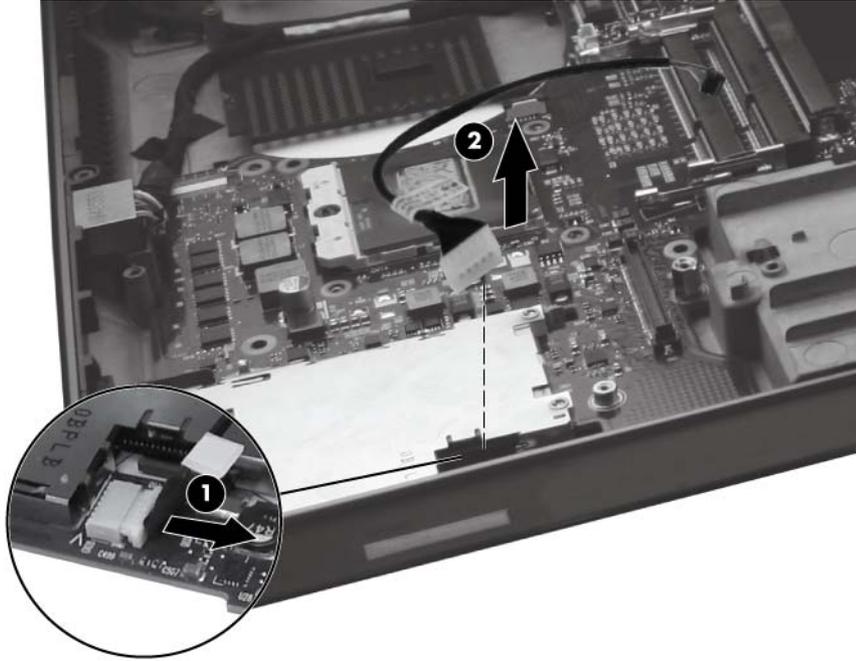
Before removing the Bluetooth module, follow these steps:

- 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.
- Disconnect all external devices connected to the computer.
- 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 (see [Battery on page 45](#)).
- Remove the service access cover (see [Service access cover on page 46](#)).

Remove the Bluetooth module:

- Gently pry the Bluetooth module away from the retaining clips in the base enclosure (1).
- Disconnect the Bluetooth module from the Bluetooth cable (2).

3. Remove the Bluetooth module (3).



Reverse this procedure to install the Bluetooth module.

## WLAN module

Description	Spare part number
Intel® Centrino™ Advanced-N 6205, 802.11a/b/g/n WLAN module	631954-001
Intel Centrino Ultimate-N 6300, 802.11a/b/g/n WLAN module	572511-001
Atheros HB112AGN 802.11a/b/g/n 3x3 WiFi Adapter	630435-001

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

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 device functionality, and then contact technical support.

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 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).

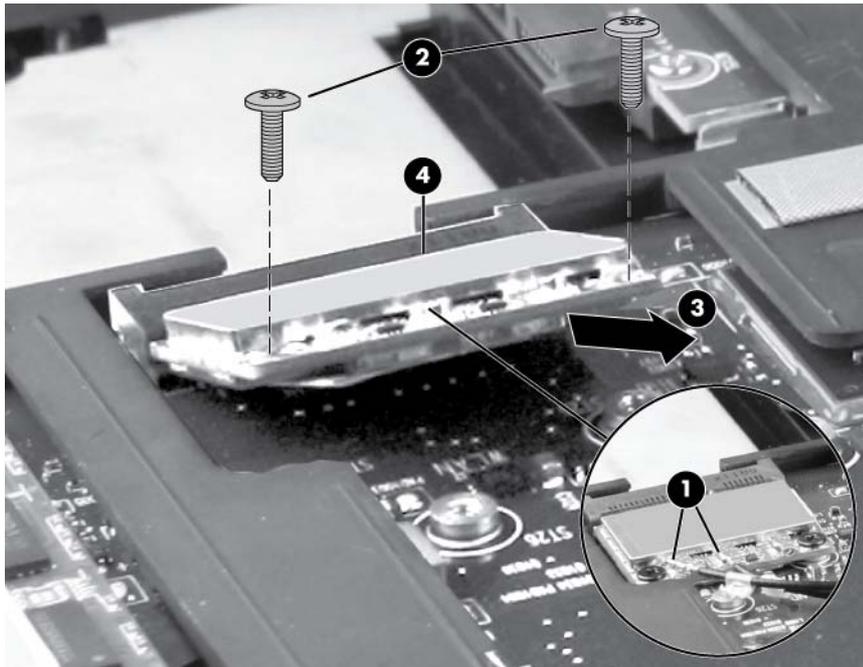
Remove the WLAN module:

1. Position the computer with the front toward you.
2. Disconnect the WLAN antenna cables (1) from the terminals on the WLAN module.

 **NOTE:** The WLAN antenna cables are numbered and connect from left to right on the WLAN module.

3. Remove the two Phillips M2.0×2.0 screws (2) that secure the WLAN module to the system board. (The WLAN module tilts up.)
4. Remove the WLAN module (3) by pulling the module away from the slot at an angle.

 **NOTE:** WLAN modules are designed with a notch (4) to prevent incorrect insertion of the WLAN module into the WLAN module slot.



Reverse this procedure to install the WLAN module.

## WWAN module

Description	Spare part number
HP un2430 EV-DO/HSPA Mobile Broadband Module	634400-001
HP hs2340 HSPA+ Mobile Broadband Module	632155-001

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

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 device functionality, and then contact technical support.

Before removing the WWAN 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 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).

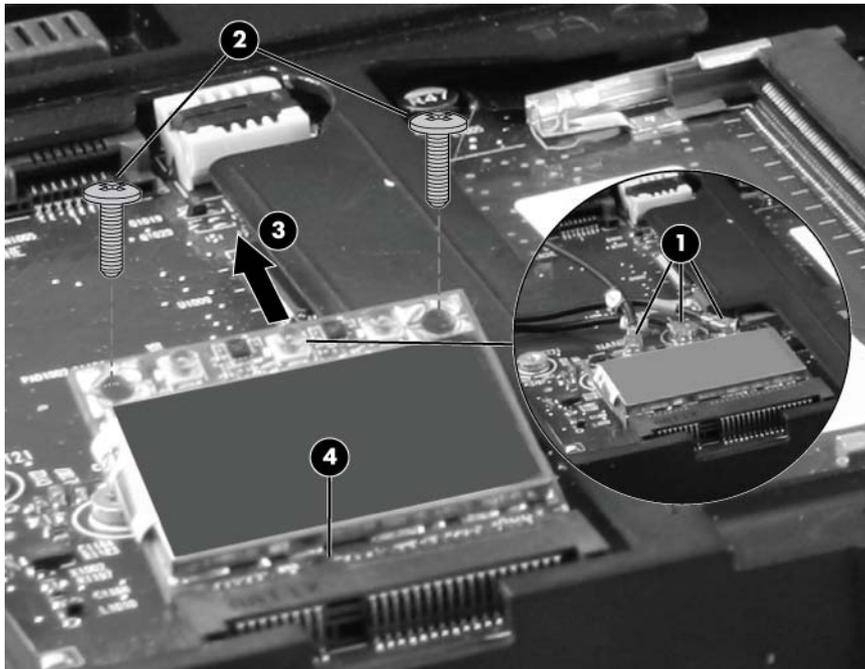
Remove the WWAN module:

1. Disconnect the WWAN antenna cables (1) from the terminals on the WWAN module.

 **NOTE:** The red WWAN antenna cable is connected to the WWAN module “Main” terminal. The blue WWAN antenna cable is connected to the WWAN module “Aux” terminal.

2. Remove the two Phillips M2.0×2.0 screws (2) that secure the WWAN module to the system board. (The WWAN module tilts up.)
3. Remove the WWAN module (3) by pulling the module away from the slot at an angle.

 **NOTE:** WWAN modules are designed with a notch (4) to prevent incorrect insertion of the WWAN module into the WWAN module slot.



Reverse this procedure to install the WWAN module.

## RTC battery

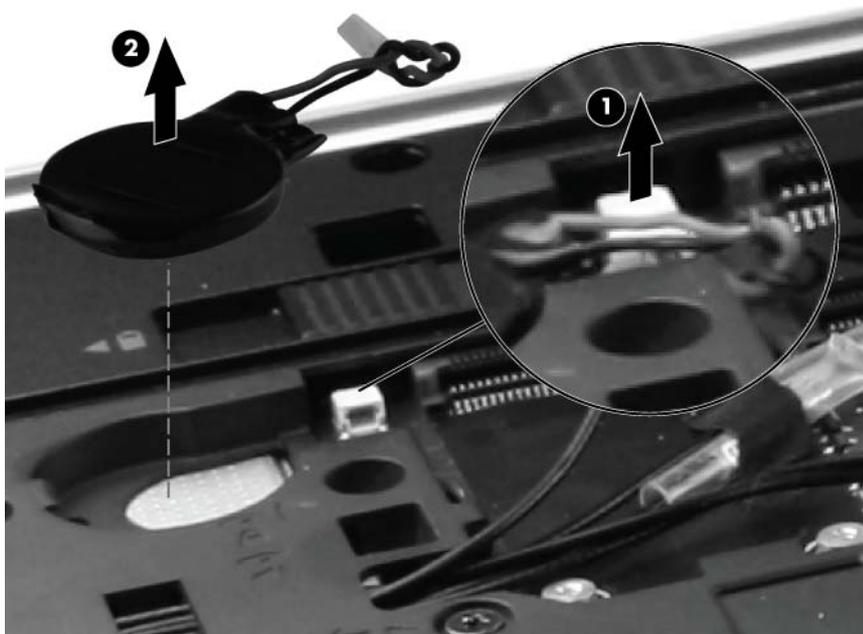
Description	Spare part number
RTC battery	651948-001

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 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).

Remove the RTC battery:

- ▲ Disconnect the RTC battery cable (1) from the system board and remove the RTC battery (2).



Reverse this procedure to install the RTC battery.

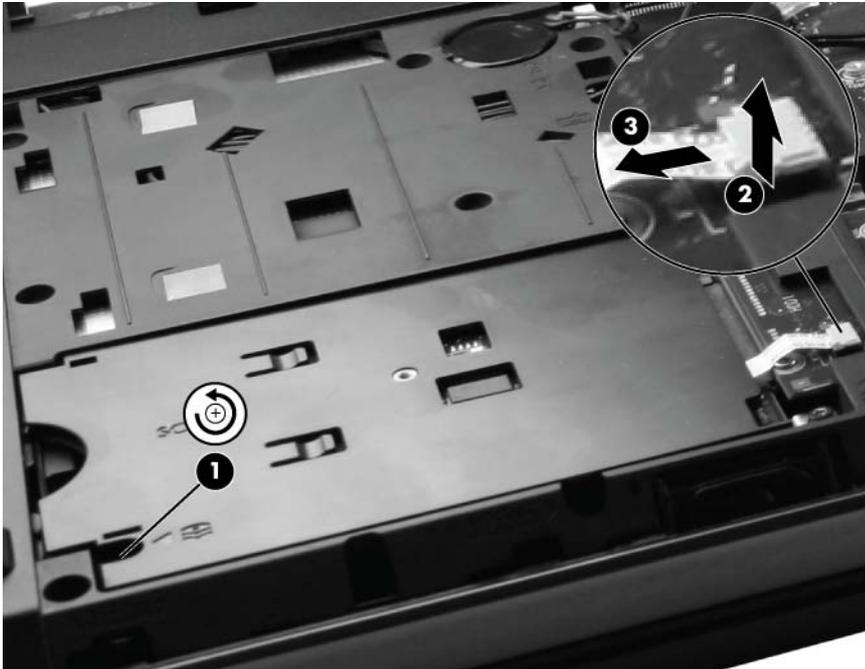
## Smart Card reader

Description	Spare part number
Smart Card reader	655544-001
Smart Card reader cover	652546-001

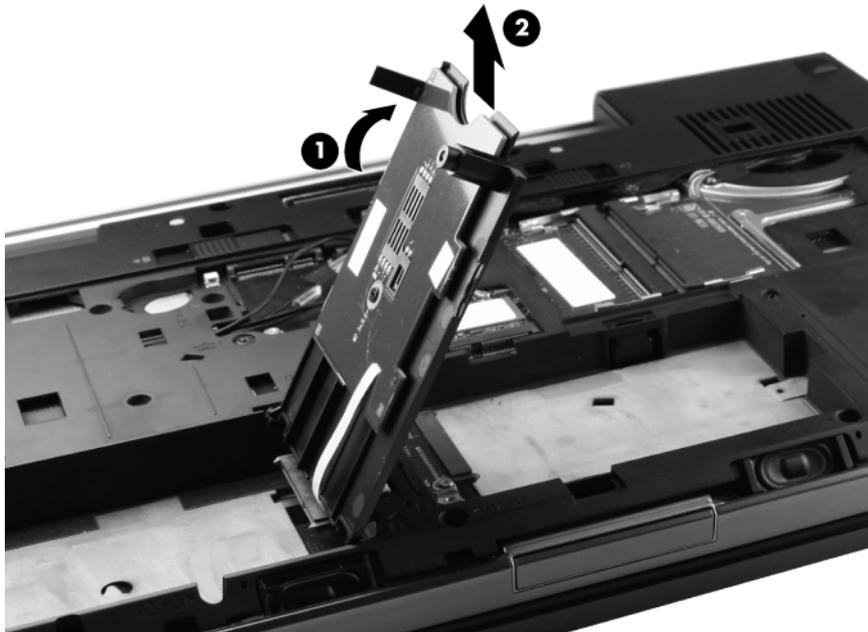
Before removing the Smart Card reader, follow these steps:

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.

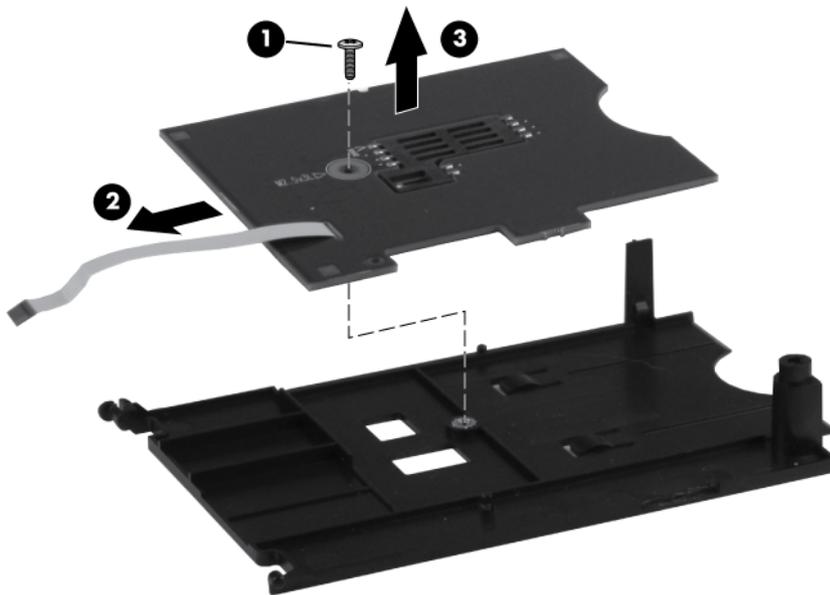
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).
6. Position the computer with the front toward you.
7. Loosen the captive screw (1) on the Smart Card reader cover.
8. Disconnect the zero insertion force (ZIF) connector (2) and remove the cable (3) from the system board.



9. Lift the rear edge (1) of the Smart Card reader cover and remove the cover (2).



10. Remove the Phillips M3.0x2.5 screw (1) that secures the Smart Card reader to the Smart Card reader cover.
11. Slide the Smart Card reader (2) back toward the hinges on the Smart Card reader cover.
12. Remove the Smart Card reader (3) from the Smart Card reader cover.



Reverse this procedure to reassemble and install the Smart Card reader.

## Primary hard drive



**NOTE:** The hard drive bracket is included in the Hard Drive Hardware Kit, spare part number 642774-001.

Description	Spare part number
750 GB, 7200-rpm SATA hard drive	633252-001
500 GB, 7200-rpm SATA hard drive	634925-001
320 GB, 7200-rpm SATA hard drive	641672-001
320 GB, 7200-rpm SATA SED hard drive	626978-001
256 GB solid-state drive (includes bracket and screws)	655027-001
128 GB solid-state drive (includes bracket and screws)	655026-001

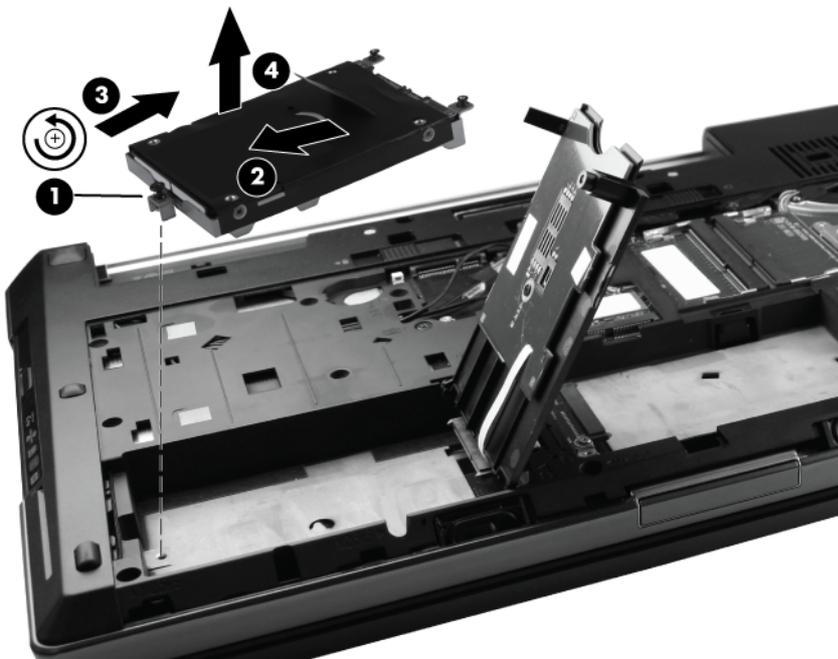
Before removing the primary hard drive, follow these steps:

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 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).
6. Position the computer with the front toward you.
7. Loosen the captive screw on the Smart Card reader cover **(1)**.
8. Loosen the two captive screws on the hard drive **(2)**.

9. Lift the Smart Card reader access cover to the upright position (3).

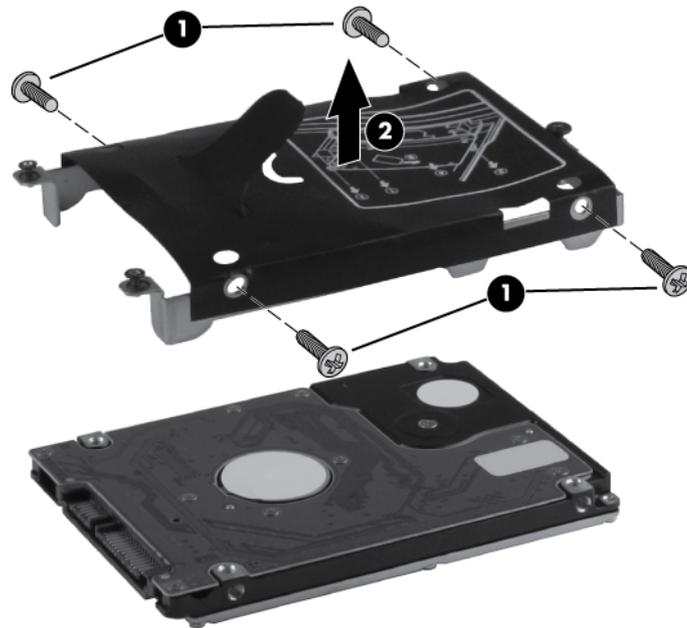


10. Loosen the Phillips M2.5x10.5 captive screw (1) that secures the hard drive to the computer.
11. Grasp the tab on the hard drive and slide the hard drive (2) to the right.
12. Lift the left side of the hard drive (3) and remove the hard drive (4) at an angle from the hard drive bay.



13. If it is necessary to replace the hard drive bracket, follow these steps:
  - a. Remove the four Phillips M3.0x3.0 screws (1) that secure the hard drive bracket to the hard drive.

- b. Lift the bracket (2) straight up to remove it from the hard drive.



Reverse this procedure to reassemble and install the hard drive.

## Secondary hard drive



**NOTE:** The hard drive bracket is included in the Hard Drive Hardware Kit, spare part number 642774-001.

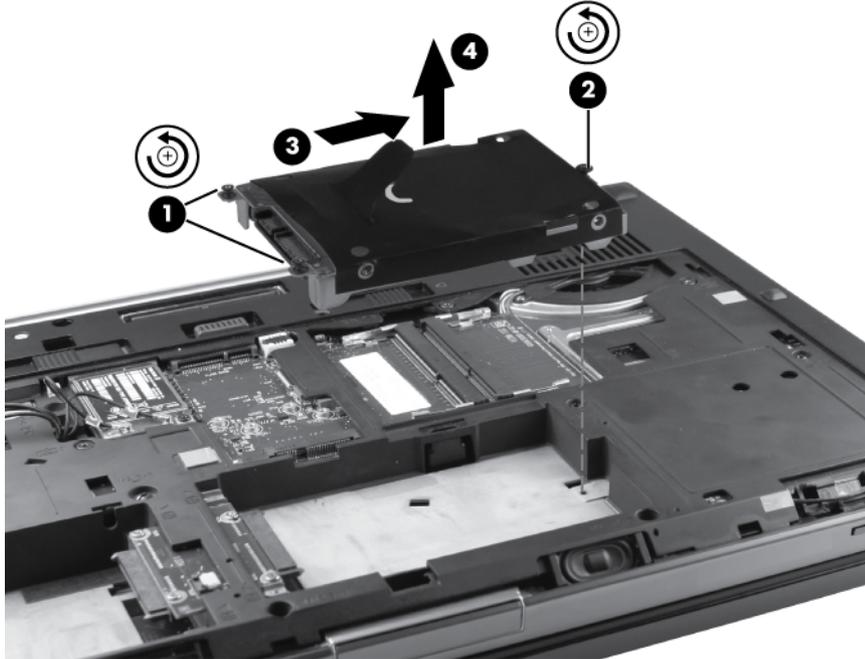
Description	Spare part number
750 GB, 7200-rpm SATA hard drive	633252-001
500 GB, 7200-rpm SATA hard drive	634925-001
320 GB, 7200-rpm SATA hard drive	641672-001
320 GB, 7200-rpm SATA SED hard drive	626978-001
256 GB solid-state drive (includes bracket and screws)	655027-001
128 GB solid-state drive (includes bracket and screws)	655026-001

Before removing the secondary 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 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).

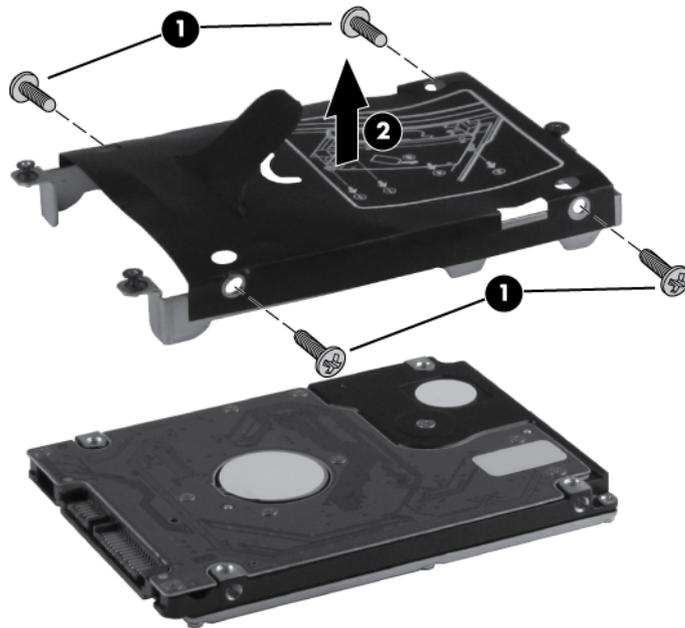
Remove the secondary hard drive:

1. Position the computer with the front toward you.
2. Loosen the two Phillips M2.5x10.5 captive screws (1) that secure the hard drive to the computer.
3. Loosen the Phillips M2.5x10.5 captive screw (2) that secures the hard drive to the computer.
4. Grasp the tab and slide the hard drive (3) to the right.
5. Lift the hard drive up (4) to remove it from the hard drive bay.



6. If it is necessary to replace the hard drive bracket, follow these steps:
  - a. Remove the four Phillips M3.0x3.0 screws (1) that secure the hard drive bracket to the hard drive.

- b. Lift the bracket (2) straight up to remove it.



Reverse this procedure to reassemble and install the primary hard drive.

## Optical drive

Description	Spare part number
Blu-ray R/RE DVD±RW SuperMulti Double-Layer Drive	652551-001
DVD±RW SuperMulti Double-Layer Drive	652549-001
Blu-ray ROM DVD±RW SuperMulti Double-Layer Drive	652550-001
DVD-ROM Drive	652548-001

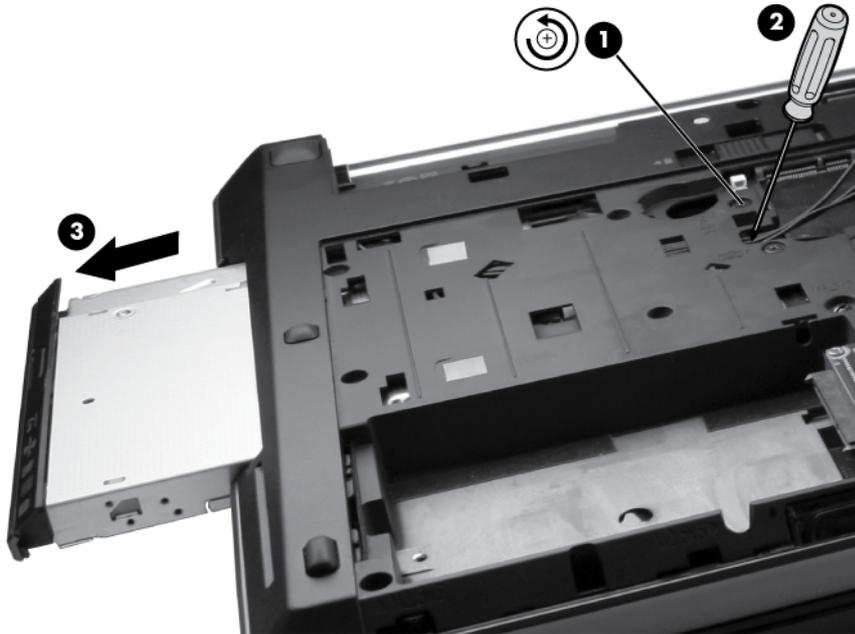
Before removing the optical drive, follow these steps:

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 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).

Remove the optical drive:

1. Position the computer with the front toward you.
2. Loosen the Phillips captive screw (1) that secures the optical drive to the computer.

3. Insert a flat-bladed screwdriver or similar tool into the optical drive tab access (2) and press the tab to the left to release the optical drive from the computer.
4. Remove the optical drive (3).



5. If it is necessary to replace the optical drive bracket:
  - a. Position the optical drive with the rear toward you.
  - b. Remove the three Phillips M2.0×3.0 screws (1) that secure the optical drive bracket to the optical drive.
  - c. Remove the optical drive bracket (2).

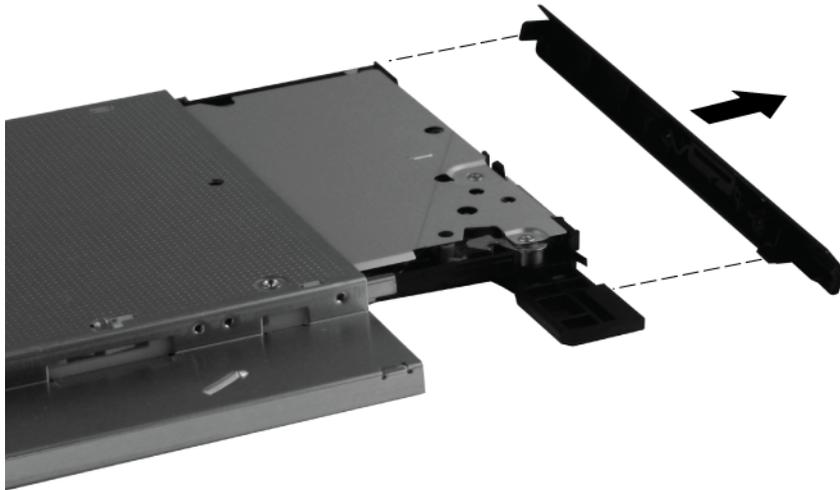


6. If it is necessary to remove the optical drive bezel:
  - a. Insert the end of a paper clip into the release access hole (1) in the optical drive bezel. Press in gently until the tray is released.

- b. Firmly pull outward on the open tray (2) until the optical drive slides out.



- c. Firmly pull outward on the bezel to remove the bezel from the optical drive tray.



Reverse this procedure to reassemble and install the optical drive.

## Upgrade bay hard drive



**NOTE:** The hard drive bracket is included in the Hard Drive Hardware Kit, spare part number 642774-001.

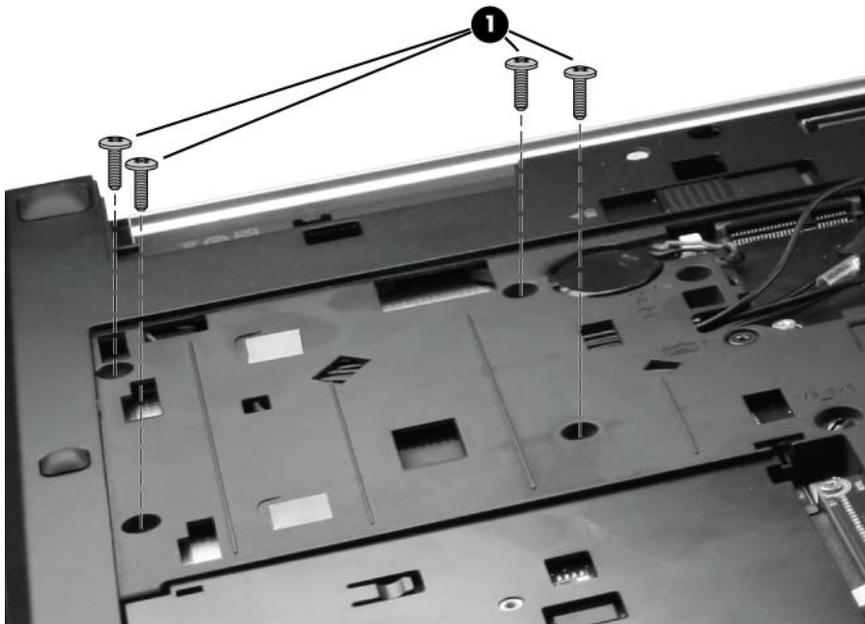
Description	Spare part number
7.0 mm, 9.5 mm, or 12.7 mm 500 GB hard drive, 7200 rpm	652552-001

Before removing the upgrade bay 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 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).

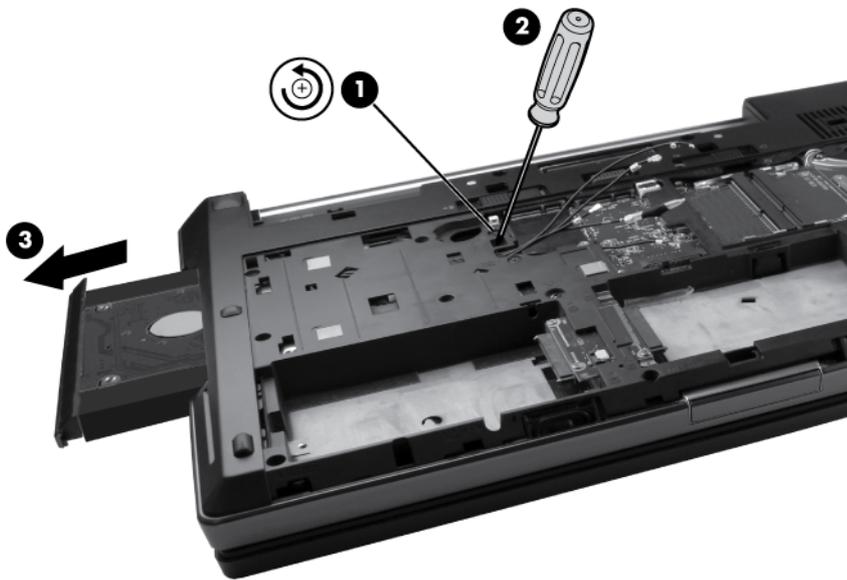
Remove the upgrade bay hard drive:

1. Position the computer with the front toward you.
2. Remove the four Phillips PM3.0×3.0 screws (1) that secure the upgrade bay hard drive carrier to the computer.



3. Loosen the Phillips captive screw (1) that secures the hard drive to the computer.
4. Insert a flat-bladed screwdriver or similar tool into the upgrade bay hard drive tab access (2) and press the tab to the left to release the upgrade bay hard drive from the computer.

5. Remove the upgrade bay hard drive (3).



Reverse this procedure to reassemble and install the upgrade bay hard drive and upgrade bay hard drive carrier.

## Primary memory module

 **NOTE:** Primary memory is installed under the keyboard.

A computer having a system board with spare part number 652508-001 or 655024-001 has two memory slots (primary memory slots). When adding or replacing memory modules, slot 1 must be populated before slot 2 is populated.

A computer having a system board with spare part number 652509-001 or 655025-001 has four memory slots (expansion memory slots) (on the bottom of the computer) and the primary memory slots (under the keyboard). Slot 2 cannot be populated if slot 1 is not populated.

Description	Spare part number
8192 MB memory module (PC3-10600, 1333 MHz, DDR3)	634091-001
4096 MB memory module (PC3-10600, 1333 MHz, DDR3)	621569-001
2048 MB memory module (PC3-10600, 1333 MHz, DDR3)	621565-001

 **NOTE:** A memory module must be installed in the bottom primary memory module slot before a memory module is installed in the top primary memory module slot.

Before removing a primary memory module, follow these steps:

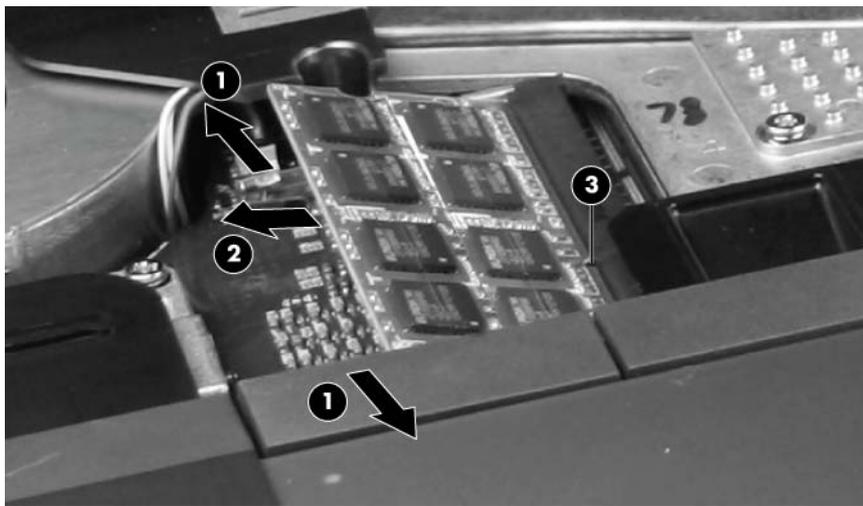
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord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

4. Remove the battery (see [Battery on page 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#))
6. Remove the hard drive (see [Primary hard drive on page 54](#)).
7. Remove the keyboard (see [Keyboard on page 65](#)).

Remove the primary memory module:

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

 **NOTE:** Memory modules are designed with a notch **(3)** to prevent incorrect installation into the primary memory module slots.



Reverse this procedure to install a primary memory module.

## Expansion memory module

 **NOTE:** Expansion memory slots are located in a compartment on the bottom of the computer.

A computer having a system board with spare part number 652508-001 or 655024-001 has two memory slots, which are called primary memory slots in this MSG. When you add or replace memory modules, slot 1 must be populated before slot 2 is populated.

A computer having a system board with spare part number 652509-001 or 655025-001 has four memory slots. On these computers, in both the expansion memory slots (on the bottom of the computer) and the primary memory slots (under the keyboard), slot 1 must be populated before slot 2 is populated.

Description	Spare part number
8192 MB memory module (PC3-10600, 1333 MHz, DDR3)	634091-001
4096 MB memory module (PC3-10600, 1333 MHz, DDR3)	621569-001
2048 MB memory module (PC3-10600, 1333 MHz, DDR3)	621565-001



**NOTE:** A memory module must be installed in the right expansion memory module slot before a memory module is installed in the left expansion memory module slot.

Before removing an expansion memory module, follow these steps:

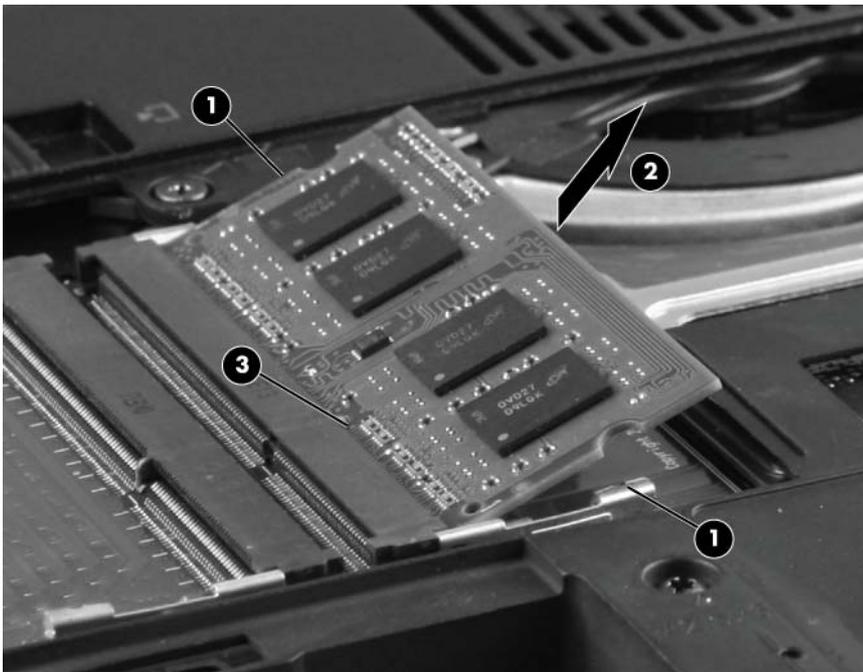
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).

Remove an expansion memory module:

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



**NOTE:** Memory modules are designed with a notch **(3)** to prevent incorrect installation into the expansion memory module slots.



Reverse this procedure to install an expansion memory module.

## Keyboard

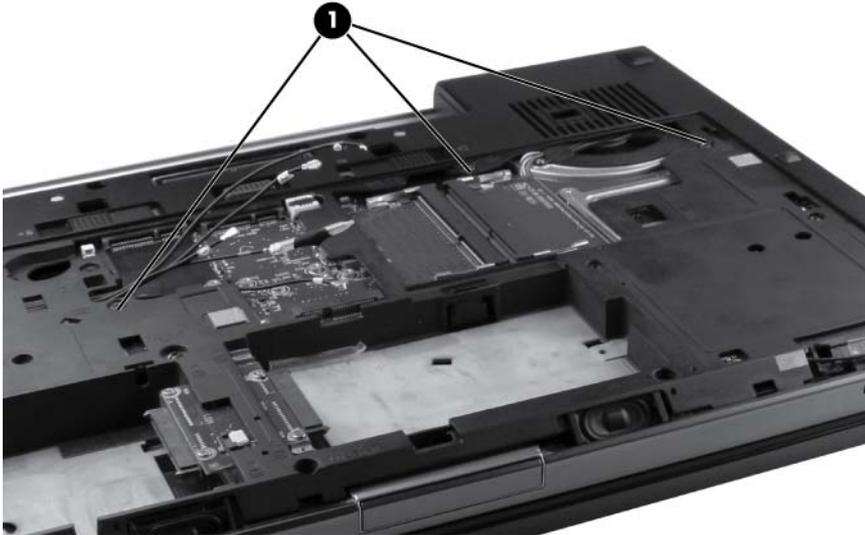
For use in:	Spare part number	For use in:	Spare part number
Keyboard with backlight (includes keyboard cable, pointing stick and pointing stick cable):			
Belgium	652554-A41	Northwest Africa	652554-DW1
Bulgaria	652554-261	Norway	652554-091
Czech Republic and Slovakia	652554-A81	Portugal	652554-131
Denmark	652554-081	Russia	652554-251
Finland and Sweden	652554-B71	Saudi Arabia	652554-171
France	652554-051	Slovenia	652554-BA1
French Canada	652554-121	South Korea	652554-AD1
Germany	652554-041	Spain	652554-071
Greece	652554-DJ1	Switzerland	652554-BG1
Hungary	652554-211	Taiwan	652554-AB1
Iceland	652554-DD1	Thailand	652554-281
Internationally	652554-B31	Turkey	652554-141
Israel	652554-BB1	The United Kingdom and Singapore	652554-031
Italy	652554-061	The United States	652554-001
Latin America	652554-161		
Keyboard without backlight (includes keyboard cable, pointing stick and pointing stick cable):			
Belgium	652553-A41	Northwest Africa	652553-DW1
Brazil	652553-201	Norway	652553-091
Bulgaria	652553-261	Portugal	652553-131
Czech Republic and Slovakia	652553-A81	Russia	652553-251
Denmark	652553-081	Saudi Arabia	652553-171
Finland and Sweden	652553-B71	Slovenia	652553-BA1
France	652553-051	South Korea	652553-AD1
French Canada	652553-121	Spain	652553-071
Germany	652553-041	Switzerland	652553-BG1
Greece	652553-DJ1	Taiwan	652553-AB1
Hungary	652553-211	Thailand	652553-281
Iceland	652553-DD1	Turkey	652553-141
Internationally	652553-B31	The United Kingdom and Singapore	652553-031
Israel	652553-BB1	The United States	652553-001
Italy	652553-061		
Japan	652553-291		

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 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).
6. Remove the optical drive (see [Optical drive on page 58](#)) or upgrade bay hard drive (see [Upgrade bay hard drive on page 60](#)).

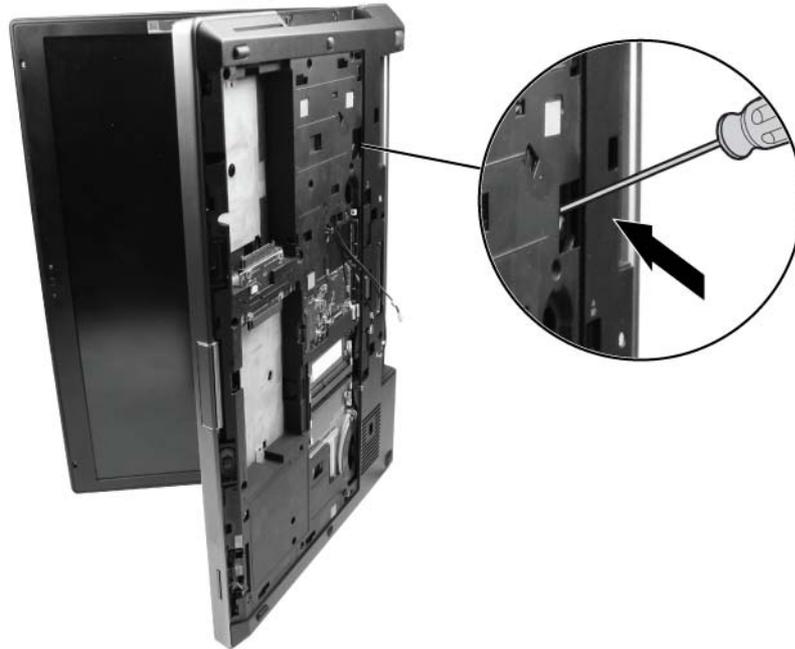
Remove the keyboard:

1. Position the computer with the front toward you.
2. Loosen the three Phillips captive screws (1) that secure the keyboard to the computer.



3. Position the computer on its side with the display open at a 90 degree angle.

4. Insert a small tool at an angle through the hole in the optical drive bay at an angle to push out the top edge of the keyboard.



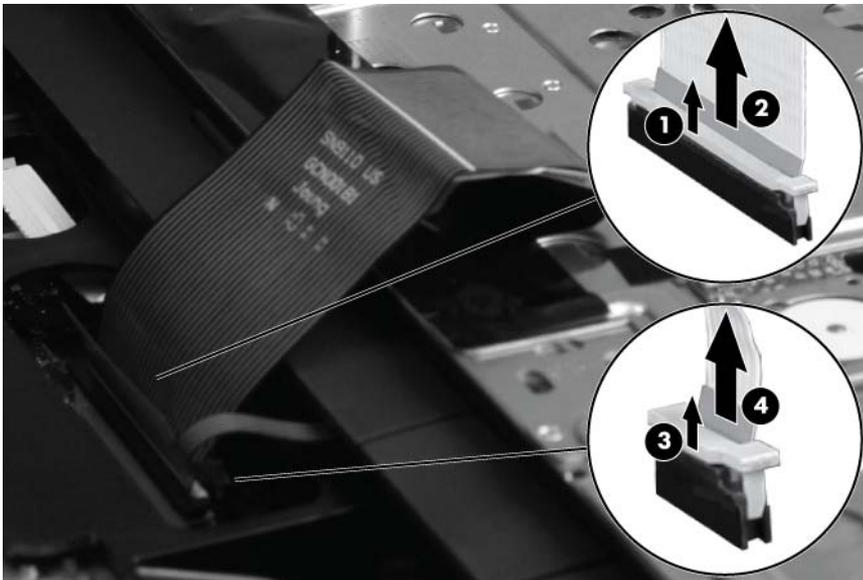
5. Turn the computer right-side up, with the front toward you.
6. Open the display as far as it will open.
7. Lift the rear edge (1) of the keyboard until it rests at an angle.
8. Slide the keyboard back toward the display (2).



- Turn the keyboard over to rest on the palm rest.



- Release the keyboard ZIF connector (1) and lift the keyboard cable (2) to release it.
- Release the pointing stick ZIF connector (3) and lift the cable (4) to release it.



Reverse this procedure to install the keyboard.

## Fan/graphics board heat sink assembly



**NOTE:** The fan/graphics board heat sink assemblies include replacement thermal material.

Description	Spare part number
For use only with computer models equipped with ATI graphics subsystems	652543-001
For use only with computer models equipped with NVIDIA graphics subsystems	652544-001



**NOTE:** 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 graphics board heat sink, follow these steps:

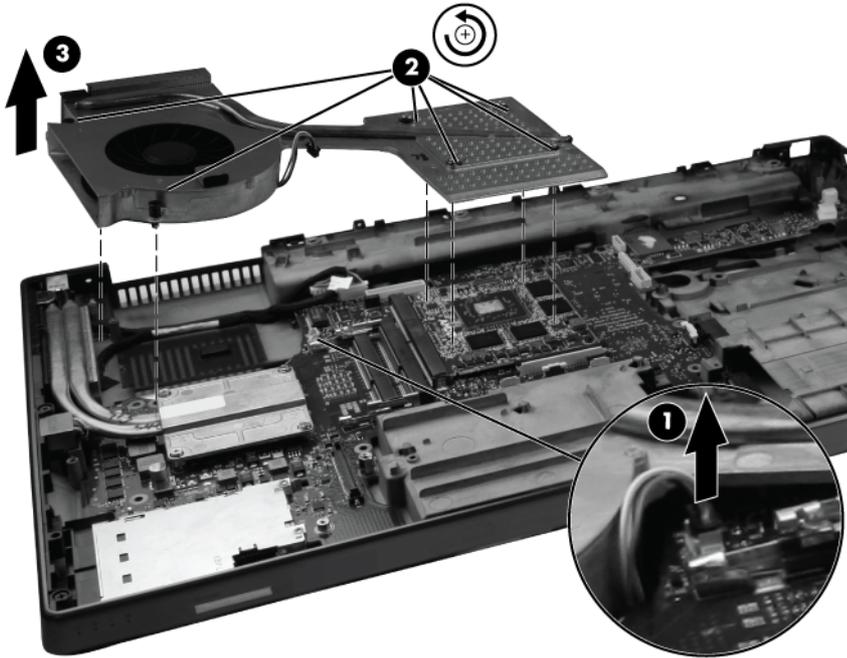
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 45](#)).
5. Remove the service access cover (see [Service access cover](#)).
6. Remove the optical drive (see [Optical drive on page 58](#)) or upgrade bay hard drive (see [Upgrade bay hard drive on page 60](#)).
7. Remove the keyboard (see [Keyboard on page 65](#)).
8. Remove the top cover (see [Top cover on page 81](#)).
9. Remove the display assembly (see [Display assembly on page 85](#)).

Remove the fan/graphics board heat sink assembly:

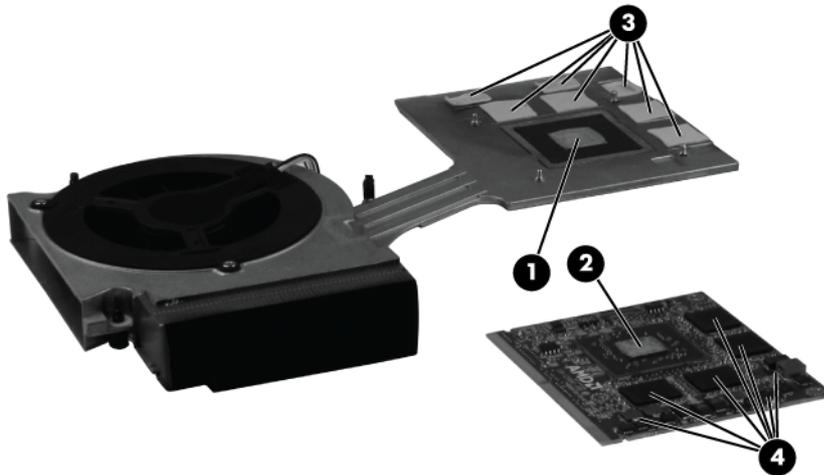
1. Disconnect the fan cable **(1)** from the system board.
2. Following the sequence stamped into the graphics board heat sink, loosen the six Phillips captive screws **(2)** that secure the graphics board heat sink/fan assembly to the system board.

3. Lift the heat sink/fan assembly **(3)** straight up to remove it.

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



 **NOTE:** The thermal material must be thoroughly cleaned from the surfaces of the graphics board heat sink and the graphics board each time the graphics board heat sink is removed: Thermal paste is used on the largest component **(1)** on the graphics board and the graphics board heat sink section **(2)** that services it. Thermal pads are used on the other graphics board components **(3)** and the graphics board heat sink sections **(4)** that service them.



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

## Fan

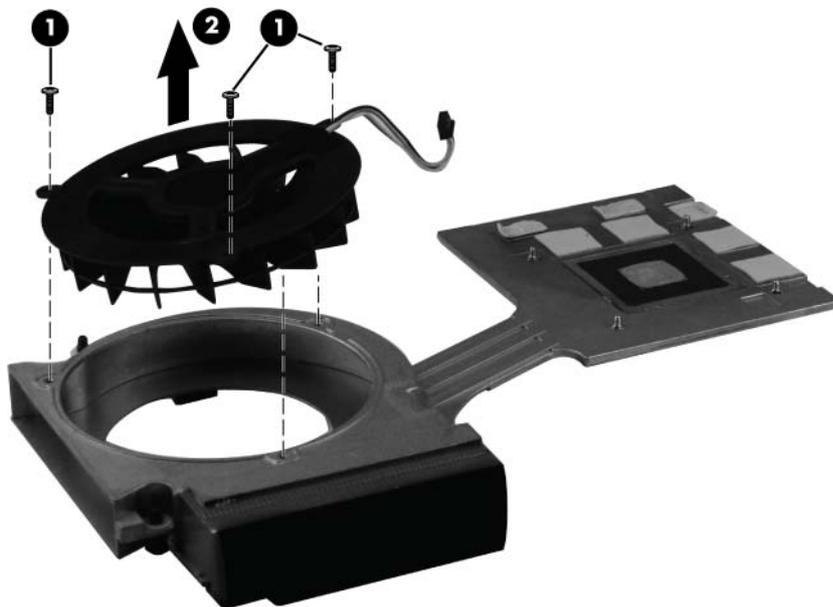
Description	Spare part number
Fan	652541-001

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 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).
6. Remove the optical drive (see [Optical drive on page 58](#)) or upgrade bay hard drive (see [Upgrade bay hard drive on page 60](#)).
7. Remove the keyboard (see [Keyboard on page 65](#)).
8. Remove the top cover (see [Top cover on page 81](#)).
9. Remove the fan/graphics board heat sink assembly (see [Fan/graphics board heat sink assembly on page 68](#)).

Remove the fan from the fan/graphics board heat sink assembly:

1. Remove the three Phillips PM2.0×3.0 screws (1) that secure the fan to the fan/graphics board heat sink assembly.
2. Remove the fan (2).



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

## Graphics board



**NOTE:** The graphics board spare part kit includes replacement thermal material.

Description	Spare part number
AMD FirePro M5950 XT-GL 1GB GDDR5 (DP 1.2 and Eyefinity Plus support)	647176-001
NVIDIA Quadro 5010M, N12E-Q5 4 GB dedicated GDDR5 video memory	647179-001
NVIDIA Quadro 4000M, N12E-Q3 2 GB dedicated GDDR5 video memory	647178-001
NVIDIA Quadro 3000M, N12E-Q1 2 GB dedicated GDDR5 video memory	647177-001

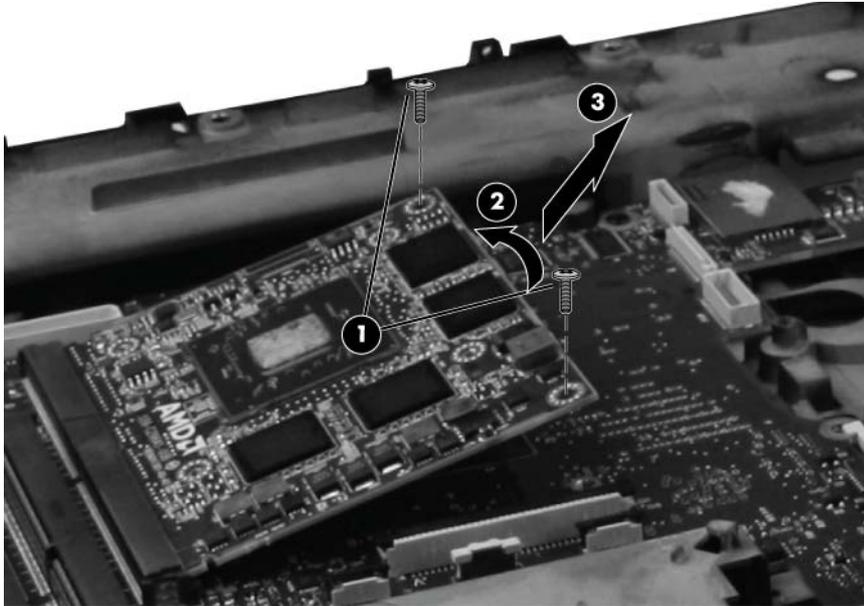
Before removing the graphics board, follow these steps:

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 45](#)),
5. Remove the service access cover (see [Service access cover on page 46](#)).
6. Remove the optical drive (see [Optical drive on page 58](#)) or upgrade bay hard drive (see [Upgrade bay hard drive on page 60](#)).
7. Remove the keyboard (see [Keyboard on page 65](#)).
8. Remove the top cover (see [Top cover on page 81](#)).
9. Remove the fan/graphics board heat sink assembly (see [Fan/graphics board heat sink assembly on page 68](#)).

Remove the graphics board:

1. Remove the two Phillips M2.5×3.0 screws **(1)** that secure the graphics board to the system board.
2. Lift the right edge of the graphics board **(2)** until it rests at an angle.

3. Remove the graphics board (3) out to the right.



Reverse this procedure to install the graphics board.

## Processor heat sink

Description	Spare part number
For use only with computer models equipped with quad-core processors	653629-001
For use only with computer models equipped with dual-core processors	652542-001

Before removing the processor heat sink, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 45](#))
5. Remove the service access cover (see [Service access cover on page 46](#)).
6. Remove the optical drive (see [Optical drive on page 58](#)) or upgrade bay hard drive (see [Upgrade bay hard drive on page 60](#)).
7. Remove the keyboard (see [Keyboard on page 65](#)).
8. Remove the top cover (see [Top cover on page 81](#)).
9. Remove the fan/graphics board heat sink assembly (see [Fan/graphics board heat sink assembly on page 68](#)).

Remove the processor heat sink:

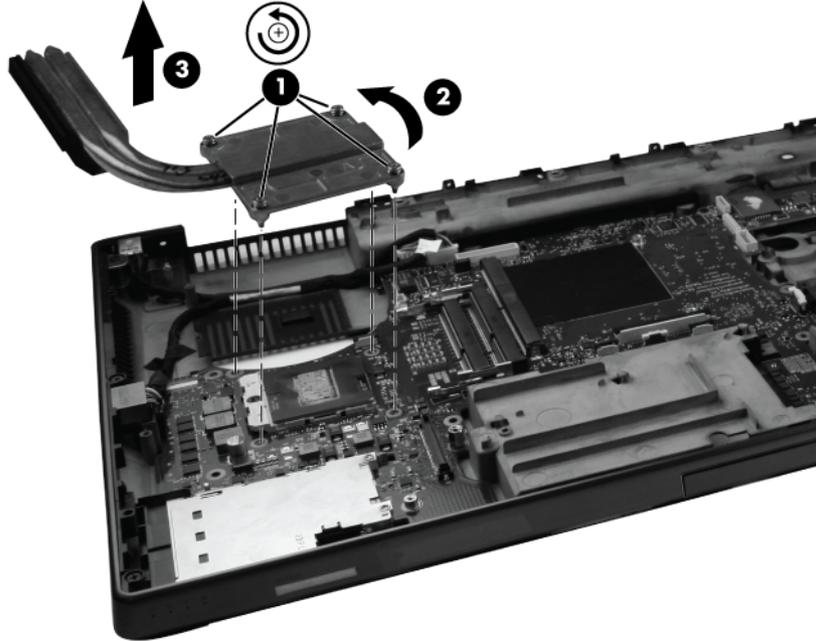
1. Following the sequence stamped into the processor heat sink, loosen the four Phillips captive screws **(1)** that secure the processor heat sink to the system board.



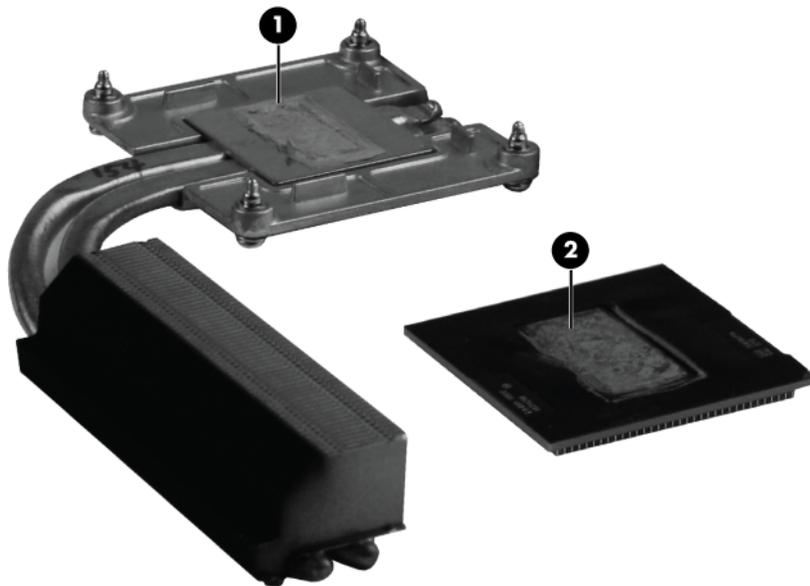
**NOTE:** Due to the adhesive quality of the thermal material located between the processor heat sink and the processor, it may be necessary to move the processor heat sink from side to side to detach it from the system board.

---

2. Lift the processor heat sink (2) up and to the right at an angle and remove it from the base enclosure (3).



 **NOTE:** Thermal paste located on the surfaces of the processor (1) and the processor heat sink (2) must be thoroughly removed and replaced each time the processor heat sink is removed. Replacement thermal paste is included in the processor heat sink and processor spare part kits.



Reverse this procedure to install the processor heat sink.

## Processor

 **NOTE:** The processor spare part kit includes replacement thermal material.

Description	Spare part number
<b>2nd Generation Intel® Core™ processors</b> , (support Intel Turbo Boost Technology) (includes replacement thermal material):	
i7-2620M, 2.7 GHz (turbo up to 3.4 GHz) dual-core processor, 4 MB L3 cache, 4 threads, 35W	657844-001
i7-2630QM 2.0 GHz (turbo up to 2.9 GHz) quad-core processor, 6 MB L3 cache, 8 threads, 45W	657849-001
i7-2720QM, 2.2 GHz (turbo up to 3.3 GHz) quad-core processor, 6 MB L3 cache, 8 threads, 45W	657846-001
i7-2820QM, 2.3 GHz (turbo up to 3.4 GHz) quad-core processor, 8 MB L3 cache, 8 threads, 45W	657848-001
i7-2920XM, 2.5 GHz (turbo up to 3.5 GHz) quad-core extreme processor, 8 MB L3 cache, 8 threads, 55W	657850-001
<b>2nd Generation Intel® Core™ i5 processors</b> , (support Intel Turbo Boost Technology) (includes replacement thermal material):	
i5-2520M, 2.5 GHz (turbo up to 3.2 GHz) dual-core processor, 3 MB L3 cache, 4 threads, 35W	657845-001
i5-2540M, 2.6 GHz (turbo up to 3.3 GHz) dual-core processor, 3 MB L3 cache, 4 threads, 35W	657847-001

Before removing the processor, follow these steps:

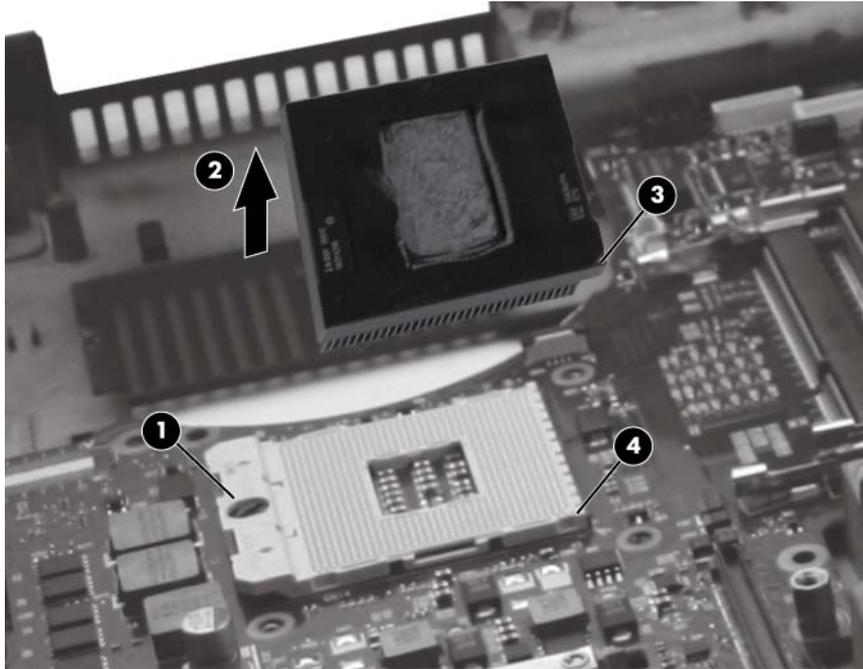
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 45](#))
5. Remove the service access cover (see [Service access cover on page 46](#)).
6. Remove the optical drive (see [Optical drive on page 58](#)) or upgrade bay hard drive (see [Upgrade bay hard drive on page 60](#)).
7. Remove the keyboard (see [Keyboard on page 65](#)).
8. Remove the top cover (see [Top cover on page 81](#)).
9. Remove the fan/graphics board heat sink assembly (see [Fan/graphics board heat sink assembly on page 68](#)).
10. Remove the processor heat sink (see [Processor heat sink on page 73](#)).

Remove the processor:

1. Use a flat-bladed screwdriver to 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.

 **NOTE:** When you install the processor, the gold triangle (3) on the processor must be aligned with the triangle (4) embossed on the processor socket.



Reverse this procedure to install the processor.

## Display bezel

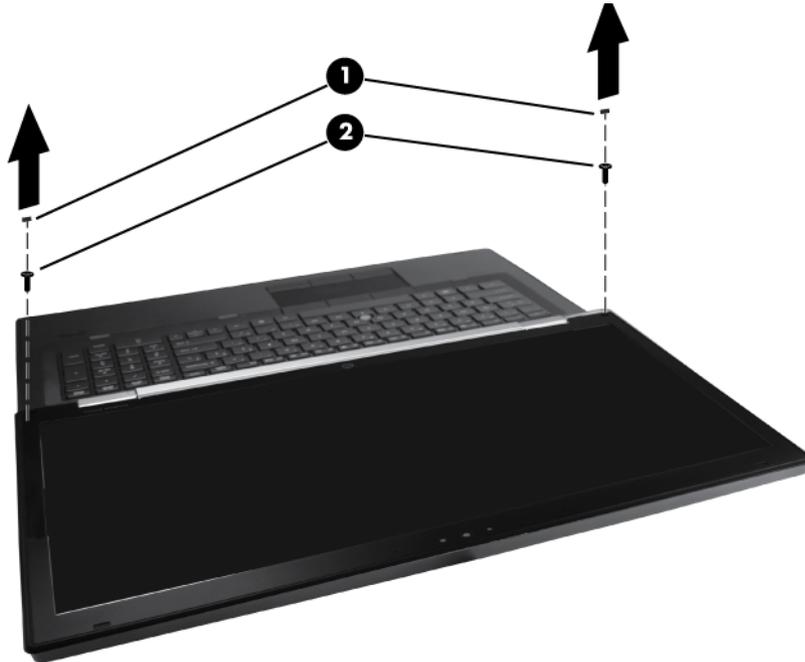
Description	Spare part number
Display bezel for use with computer models with a webcam	652522-001
Display bezel for use with computer models without a webcam	652523-001

Before removing the display bezel, follow these steps:

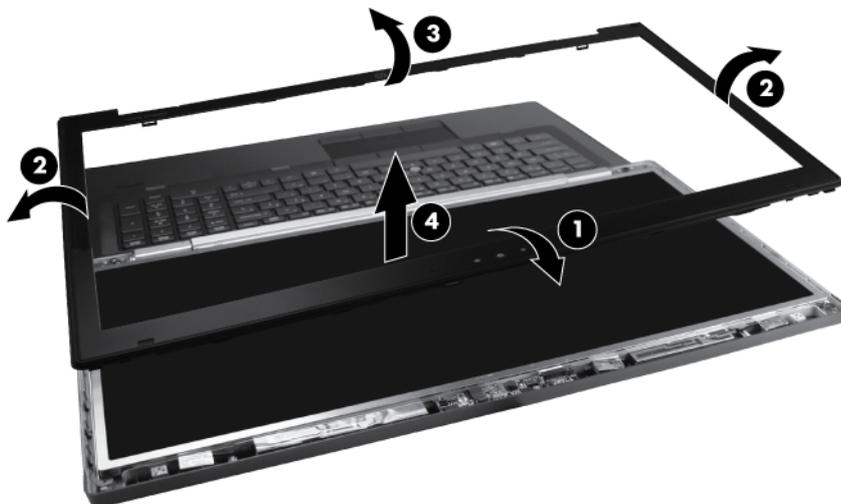
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord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

Remove the display bezel:

1. Remove the screw covers (1) and the two Torx M2.5x8.0 screws (2) that secure the display bezel to the display enclosure.



2. Flex the inside edges of the top edge (1), the left and right sides (2), and the bottom edge (3) of the display bezel until the bezel disengages from the display enclosure.
3. Remove the bezel from the display enclosure (4).



Reverse this procedure to install the display bezel.

## Display panel

Description	Spare part number
<b>43.9 cm</b> (17.3 in), HD+ AG LED WVA	652520-001
<b>43.9 cm</b> (17.3 in), FHD AG WVA	652521-001

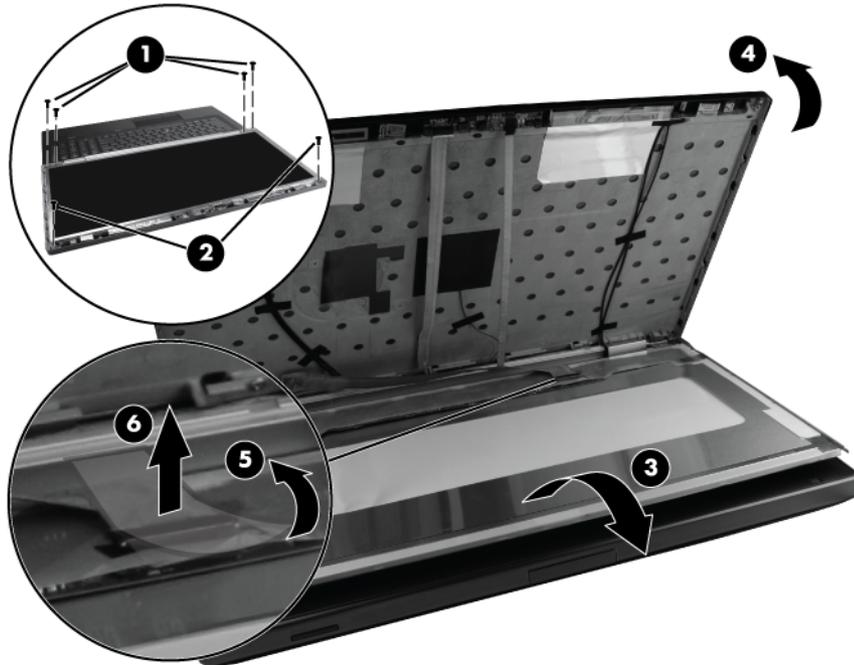
Before removing the display panel, follow these steps:

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 display bezel (see [Display bezel on page 77](#)).

Remove the display panel:

1. Position the computer display-side up with the front toward you. Open the display as far as possible.
2. Remove the four Torx M2.5x6.0 screws **(1)** that secure the bottom corners of the display brackets to the display enclosure.
3. Remove the two Phillips M2.5x2.5 screws **(2)** that secure the top corners of the display brackets to the display enclosure.
4. Position the display assembly down toward the keyboard **(3)**, almost closing the lid so the display panel hovers above the keyboard.
5. Lift the display enclosure **(4)** away from the display until the display cable is visible.
6. Remove the tape **(5)** that attaches the display cable to the display panel.

7. Disconnect the display cable (6) from the display panel



8. Remove the eight Phillips M2.0x3.0 screws (1) that secure the display panel brackets to the display panel.
9. Remove the display panel (2).



Reverse this procedure to reassemble and to install the display panel.

## Webcam module

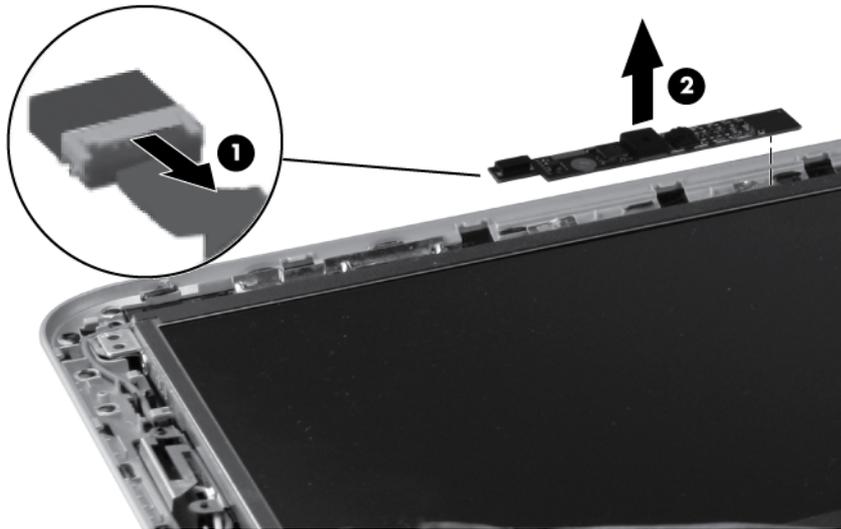
Description	Spare part number
Webcam module with microphone	642795-001

Before removing the webcam 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 display bezel (see [Display bezel on page 77](#)).

Remove the webcam module:

1. Disconnect the webcam cable (1) from the display enclosure.
2. Remove the webcam module from the display enclosure (2).



Reverse this procedure to install the webcam module.

## Top cover

Description	Spare part number
Top cover (includes TouchPad)	652536-001

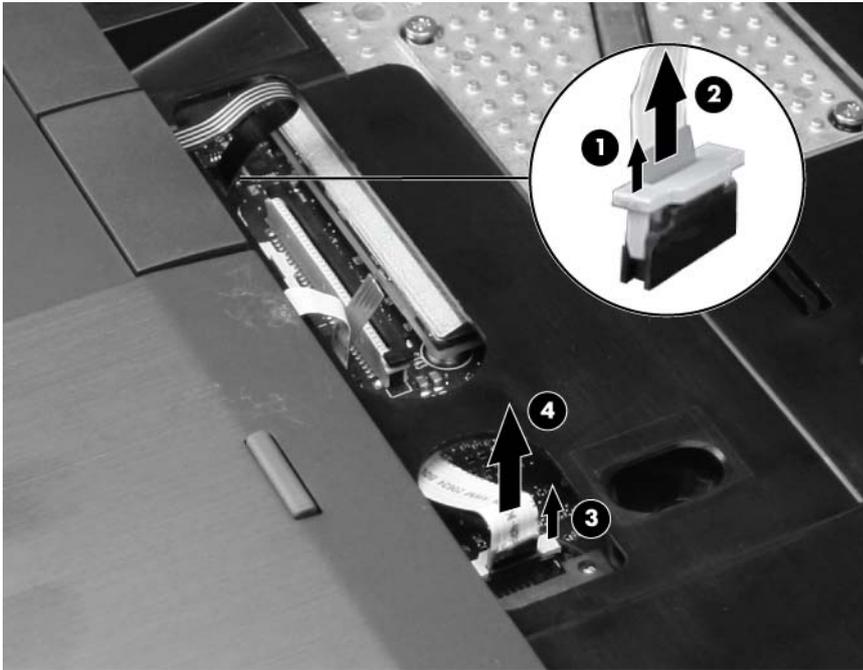
Before removing the top cover, follow these steps:

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 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).

6. Remove the optical drive (see [Optical drive on page 58](#)) or upgrade bay hard drive (see [Upgrade bay hard drive on page 60](#)).
7. Remove the keyboard (see [Keyboard on page 65](#)).

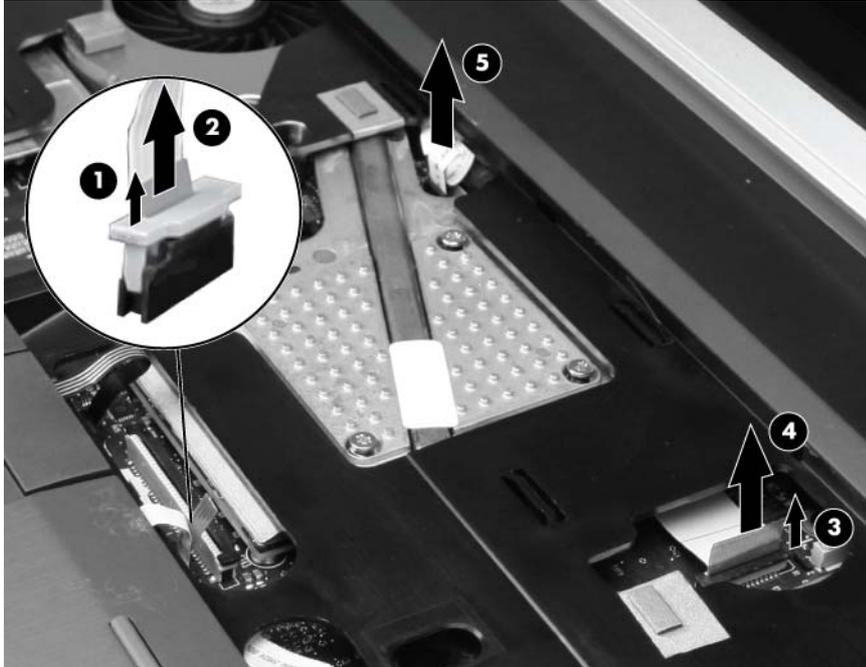
Remove the top cover:

1. Position the computer right-side up, with the front toward you.
2. Lift up the TouchPad ZIF connector (1) and remove the TouchPad cable (2).
3. Lift up the TouchPad button ZIF connector (3) and remove the TouchPad button cable (4).

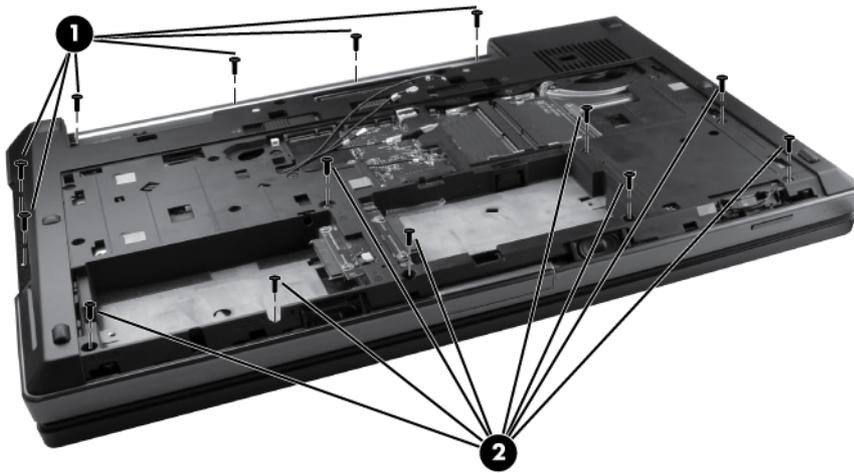


4. Lift up the fingerprint reader ZIF connector (1) and remove the fingerprint reader cable (2).
5. Lift up the application board ZIF connector (3) and remove the application board cable (4).

6. Remove the power button board cable (5).

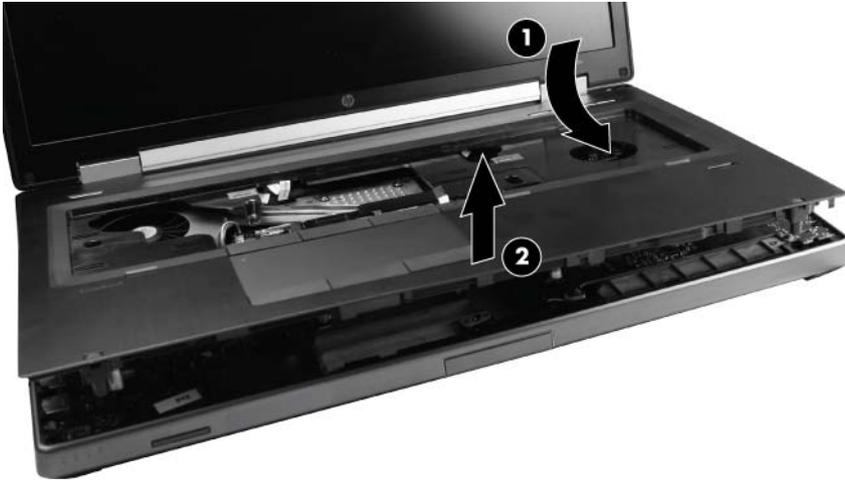


7. Position the computer upside down, with the front toward you.
8. Remove the four Phillips M2.5x4.0 screws inside the battery bay and the two Phillips M2.5x4.0 screws in the optical drive/upgrade drive bay (1).
9. Remove the eight Torx M2.5x6.0 screws (2) that secure the base enclosure to the top cover.



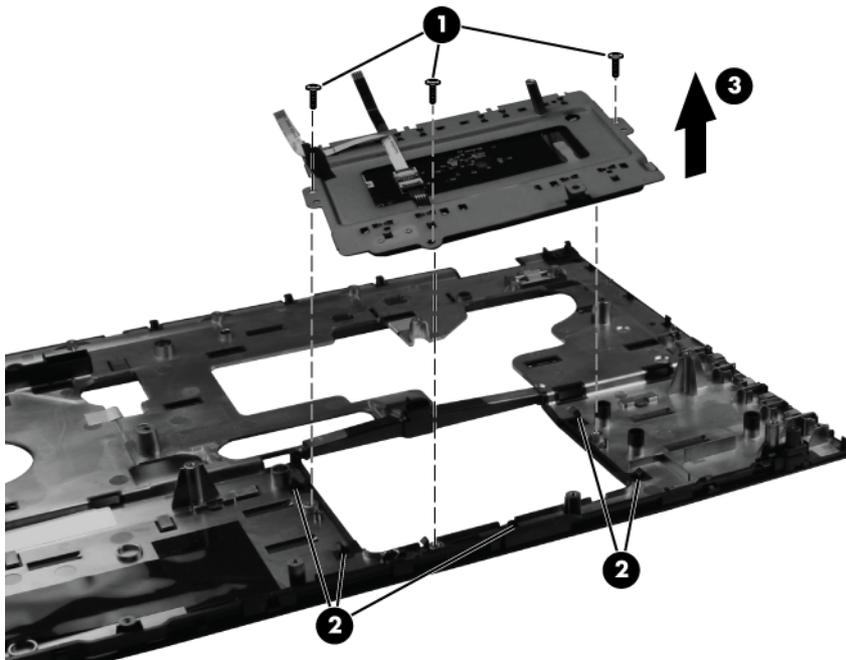
10. Position the computer right-side up.
11. Grasp the top cover by the hole in the optical disk drive/upgrade drive bay and lift up the front edge of the top cover (1).

12. Remove the top cover from the base enclosure (2).



13. If it is necessary to replace the TouchPad:

- a. Remove the three screws (1) securing the TouchPad to the top cover.
- b. Release the TouchPad from the clips (2) securing the TouchPad to the top cover.
- c. Remove the TouchPad (3) from the top cover.



Reverse this procedure to install the top cover and TouchPad.

## Display assembly



**NOTE:** The display assembly spare part kit includes the display panel cable, 3 WLAN antenna and cables, and 2 WWAN antenna and cables.

Description	Spare part number
<b>43.9 cm</b> (17.3 in), FHD AG RGB LED UVWA Dream Color with webcam (not available with HP Mobile Broadband)	652519-001
<b>43.9 cm</b> (17.3 in), FHD AG RGB LED UVWA Dream Color without webcam (not available with HP Mobile Broadband)	652518-001
Display Hinge Kit	652528-001
Display hinge covers	652529-001

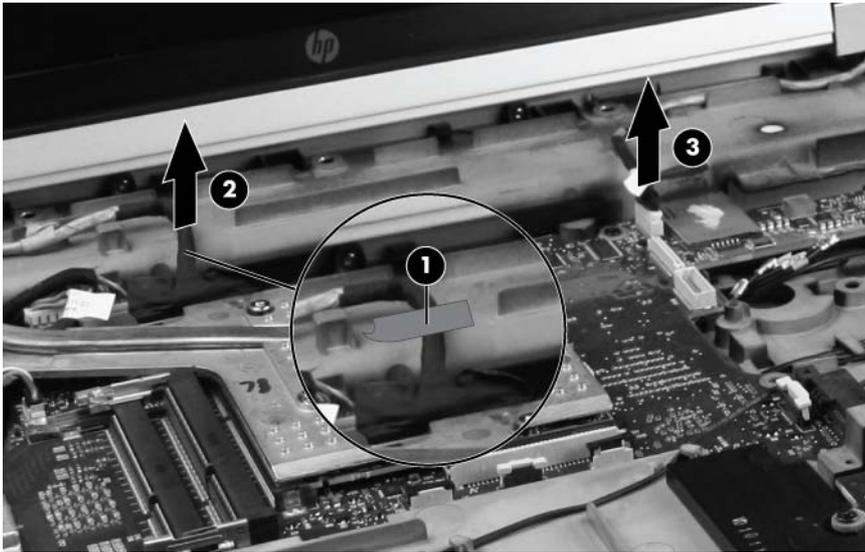
Before removing the display assembly, follow these steps:

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 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).
6. Remove the optical drive (see [Optical drive on page 58](#)) or upgrade bay hard drive (see [Upgrade bay hard drive on page 60](#)).
7. Remove the keyboard (see [Keyboard on page 65](#)).
8. Remove the top cover (see [Top cover on page 81](#)).
9. Remove the display bezel (see [Display bezel on page 77](#)).

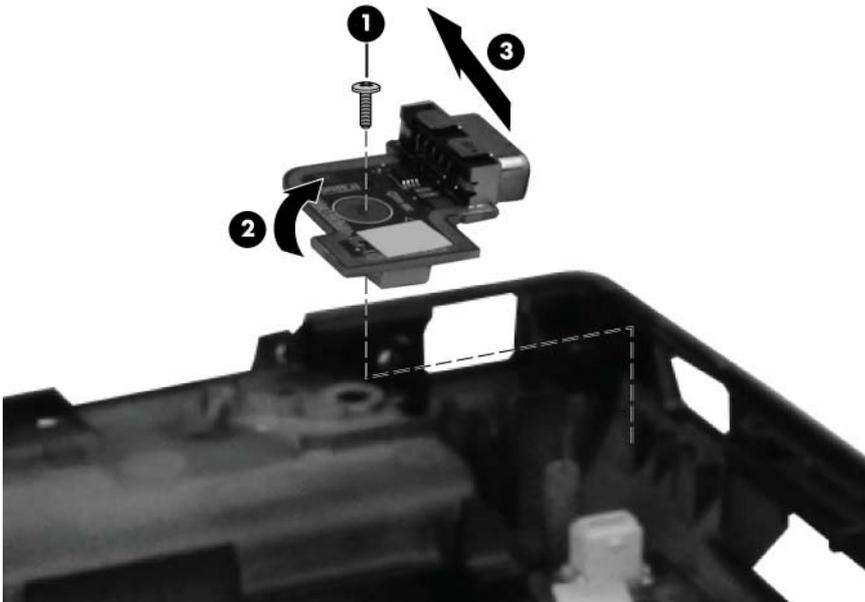
Remove the display assembly:

1. Position the computer right side up with the display open and the front toward you.

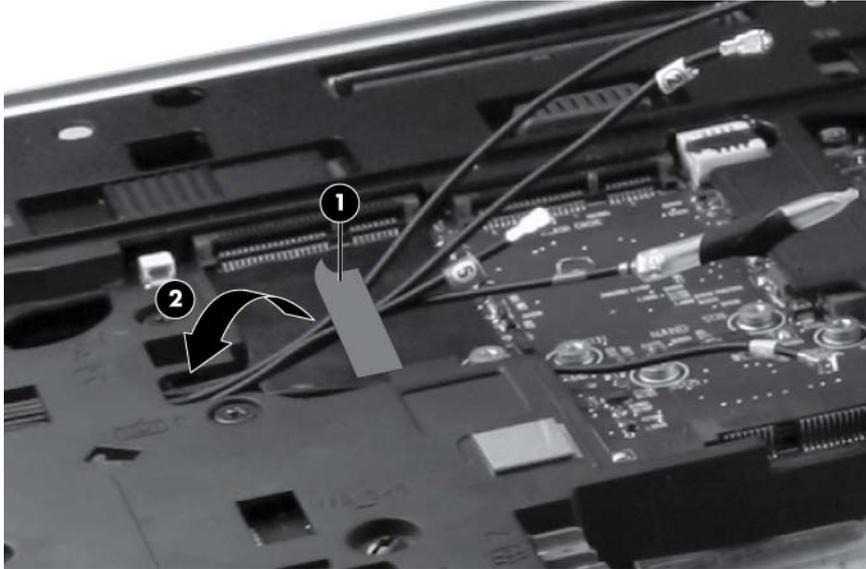
2. Remove the tape (1) that secures the display cable to the system board. Remove the display cable (2) from the system board. Remove the webcam module (3) from the system board.



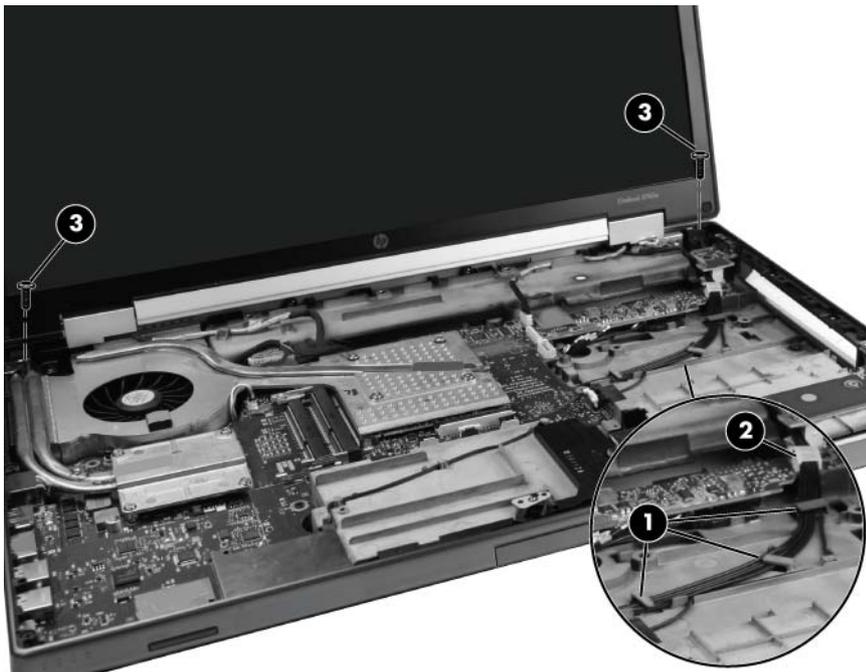
3. Remove the Phillips screw (1) that secures the VGA port to the base enclosure. Lift the port (2) up at an angle to remove it (3).



4. Position the computer upside down. Remove the tape (1) that secures the WLAN and WWAN cables to the system board. Feed the WLAN and WWAN cables through the hole next to the keyboard screw (2).



5. Position the computer right-side up. Remove the WLAN and WWAN cables (1) from the routing clips (2) in the base enclosure and the system board.
6. Remove the two interior Torx screws (3) that secure the hinge cover to the base enclosure.



7. Position the computer with the rear toward you.

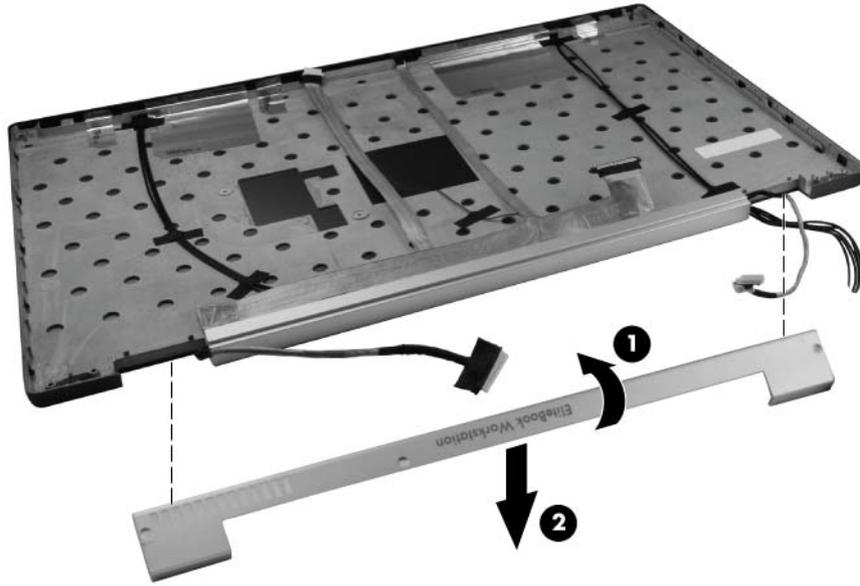
**CAUTION:** Support the display assembly when removing the display screws in the following steps. Failure to support the display assembly can result in damage to the assembly and other components.

- a. Remove the four Torx M2.5x7.0 screws (1) that secure the display hinges to the base enclosure.
- b. Remove the four Torx M2.5x3.0 screws (2) that secure the hinge cover to the base enclosure.
- c. Remove the display assembly (3) from the base enclosure.



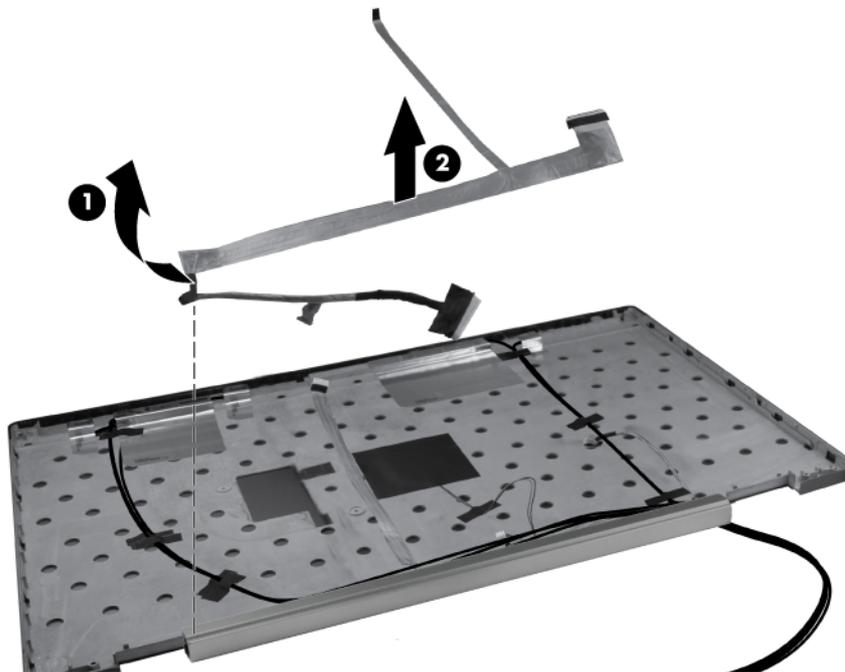
8. Remove the display panel (see [Display panel on page 79](#)).
9. If it is necessary to replace the display hinge cover:
  - a. Rotate the display hinge cover (1) around the display assembly cables.

- b. Remove the display hinge cover (2).



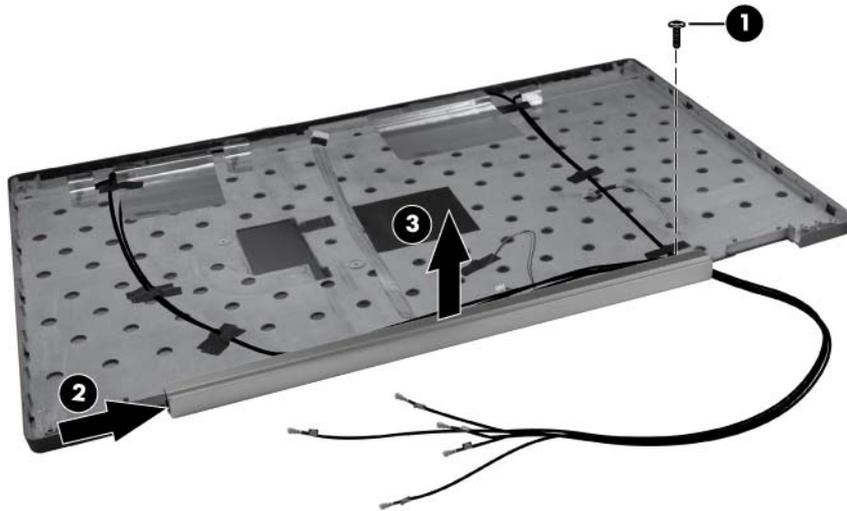
10. If it is necessary to replace the display cable:

- a. Remove the display cable from the left corner (1) of the display cable channel.
- b. Disconnect the display cable (2) from the light sensor in the webcam, and then remove the display cable.

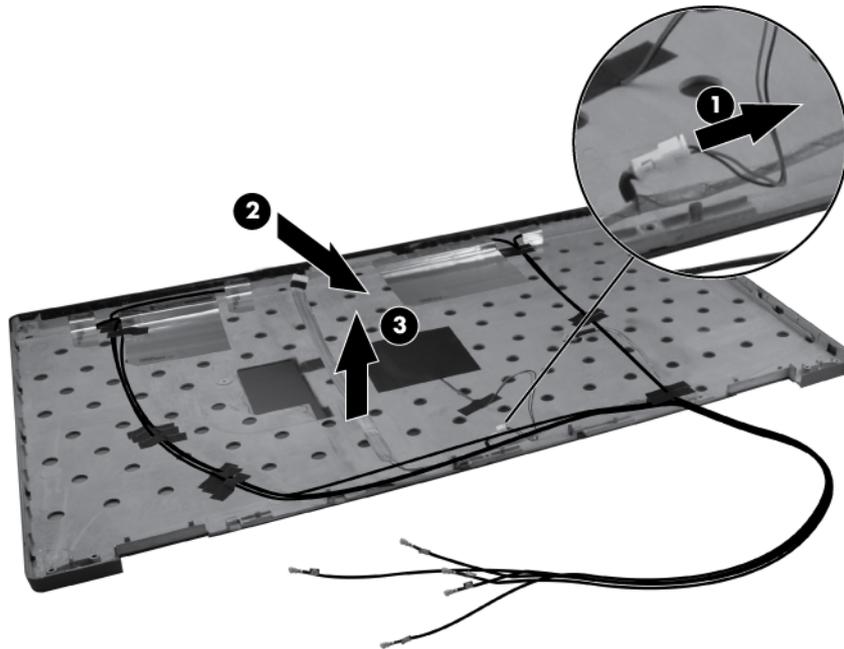


11. If it is necessary to replace the webcam cable:

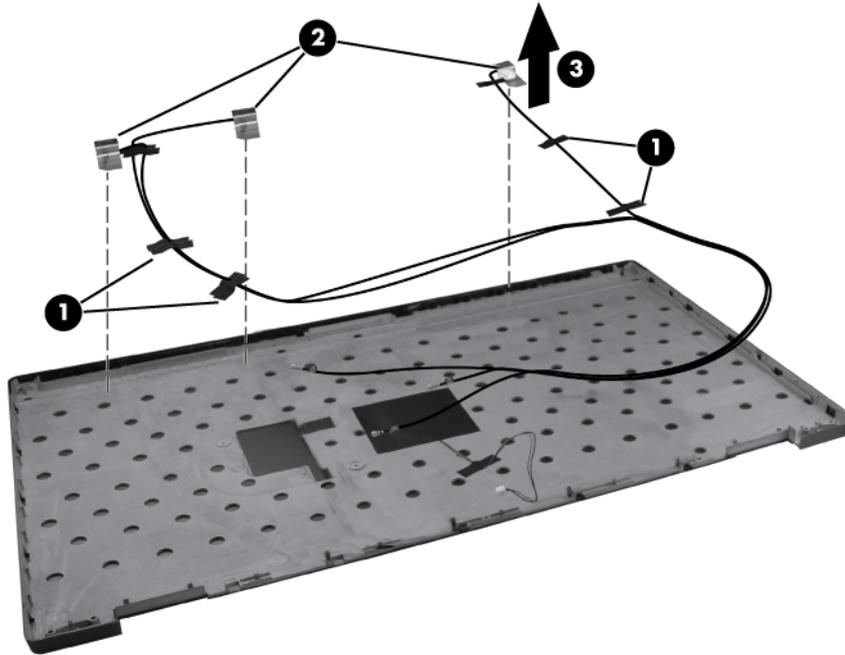
- a. Remove the Phillips screw (1) from the routing channel. Slide the routing channel to the right and lift up. Remove the webcam cable from the channel (2).



- b. Disconnect the webcam from the connector (1).
- c. Disconnect the webcam cable (2) from the webcam.
- d. Remove the webcam cable (3).

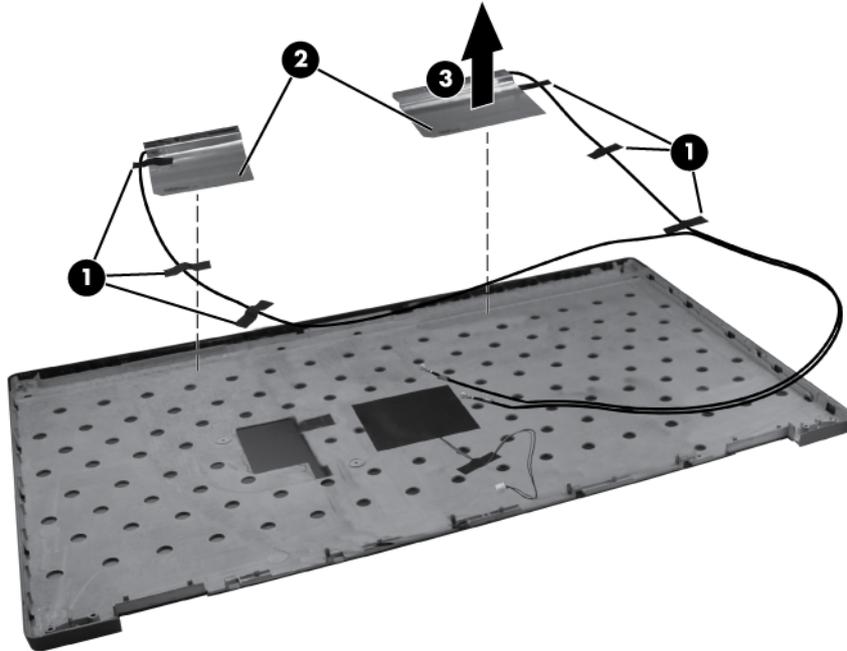


12. If it is necessary to replace the WLAN antennas and:
- Remove the WLAN antennas (1) from the display enclosure. The antennas are attached to the display enclosure with tape.
  - Remove the WLAN (2) from the display enclosure. They are attached to the display enclosure with tape.
  - Remove the WLAN antennas and (3) from the display enclosure.



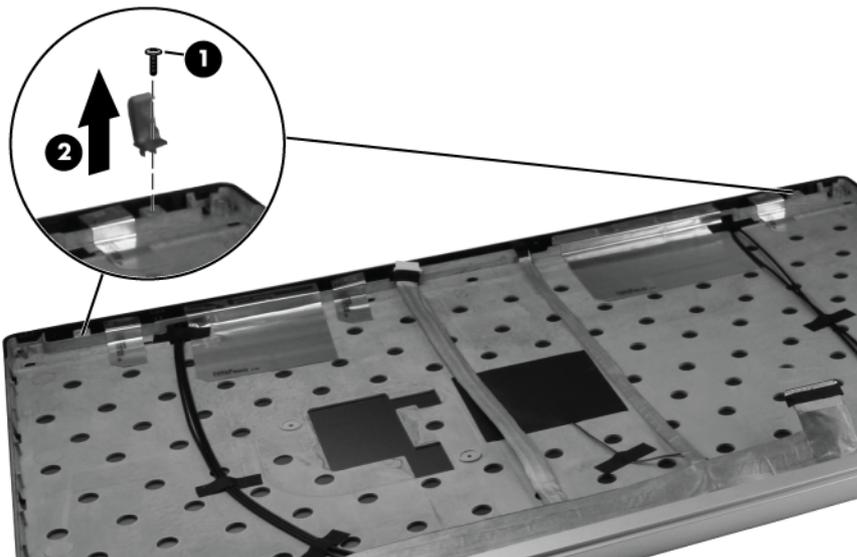
13. If it is necessary to replace the WWAN antennas and:
- Remove the WWAN antennas cables (1) from the display enclosure. The antennas are attached to the display enclosure with tape.
  - Remove the WWAN antennas (2) from the display enclosure. The antennas are attached to the display enclosure with tape.

- c. Remove the WWAN antennas assembly (3) from the display enclosure.



14. If it is necessary to replace the display latch hooks:

- a. Remove the two Phillips M2.0x3.0 screws (1) that secure the display latch hooks to the display enclosure.
- b. Remove the display latch hooks (2).



Reverse this procedure to reassemble and to install the display assembly.

## Power button board

Description	Spare part number
Power button board	652515-001

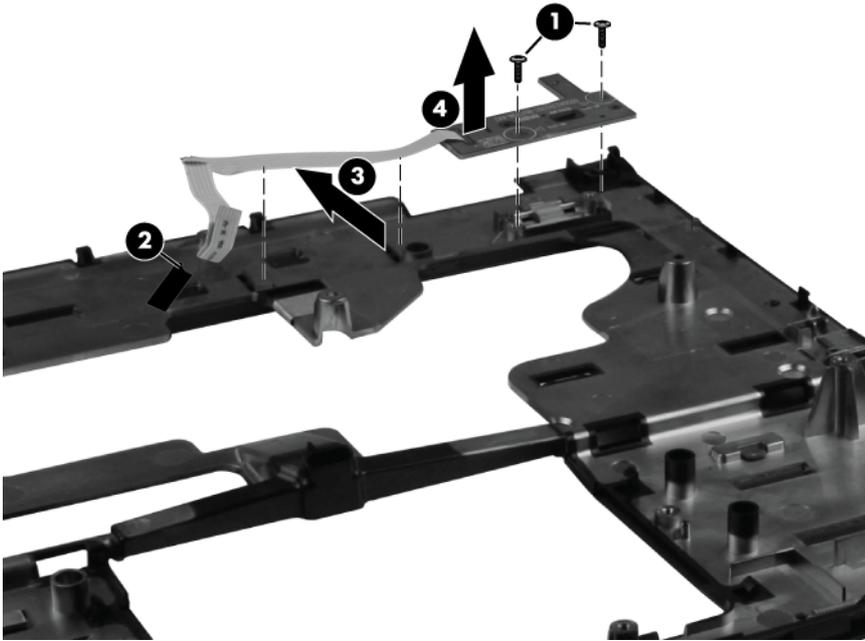
Before removing the power button board, follow these steps:

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 45](#))
5. Remove the service access cover (see [Service access cover on page 46](#)).
6. Remove the optical drive (see [Optical drive on page 58](#)) or upgrade bay hard drive (see [Upgrade bay hard drive on page 60](#)).
7. Remove the keyboard (see [Keyboard on page 65](#)).
8. Remove the top cover (see [Top cover on page 81](#)).

Remove the power button board:

1. Position the top cover upside down with the front toward you.
2. Remove the two Phillips M2.5x3.0 screws **(1)** that secure the power button board to the top cover.
3. Remove the tape **(2)** that secures the power button board cable to the top cover.
4. Slide the power button board cable **(3)** out from the clips in the top cover to remove it.

5. Lift the power button board (4) to remove it.



Reverse this procedure to install the power button board.

## Application button board

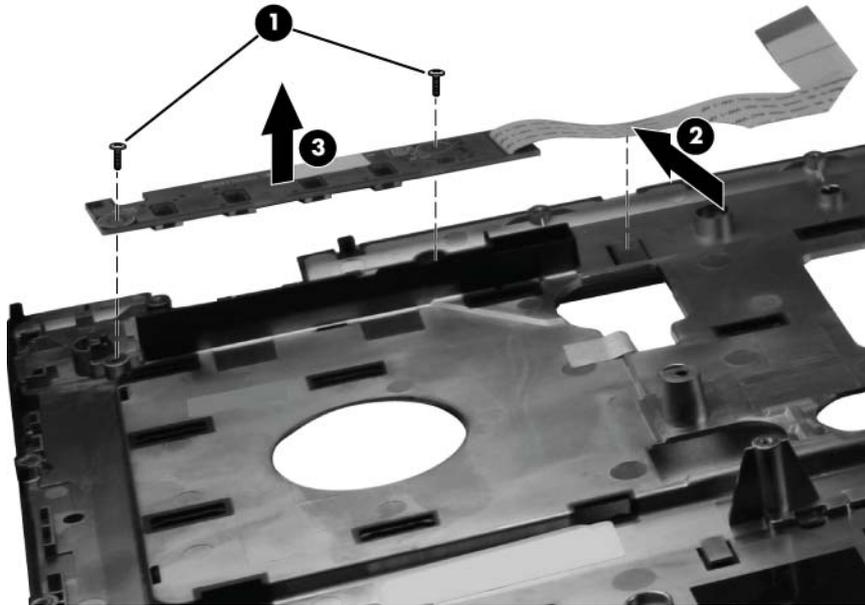
Description	Spare part number
Application button board	652516-001

Before removing the application 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 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).
6. Remove the optical drive (see [Optical drive on page 58](#)) or upgrade bay hard drive (see [Upgrade bay hard drive on page 60](#)).
7. Remove the keyboard (see [Keyboard on page 65](#)).
8. Remove the top cover (see [Top cover on page 81](#)).

Remove the application button board:

1. Position the top cover upside down with the front toward you.
2. Remove the two Phillips M2.5x3.0 screws (1) that secure the application button board to the top cover.
3. Slide the application button board cable (2) out from the clip in the top cover.
4. Remove the application button board (3).



Reverse this procedure to install the application button board.

## Fingerprint reader

Description	Spare part number
Fingerprint reader	655545-001

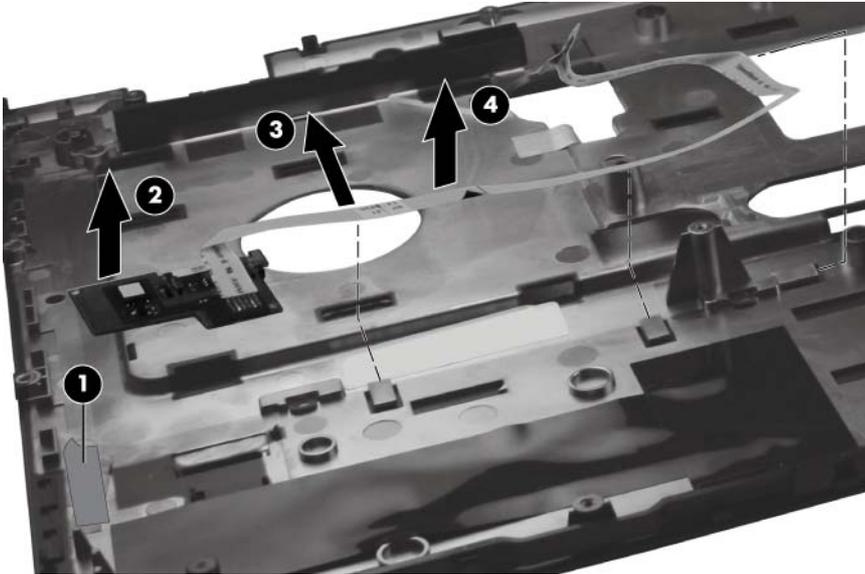
Before removing the fingerprint reader, follow these steps:

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 45](#))
5. Remove the service access cover (see [Service access cover on page 46](#)).
6. Remove the optical drive (see [Optical drive on page 58](#)) or upgrade bay hard drive (see [Upgrade bay hard drive on page 60](#)).

7. Remove the keyboard (see [Keyboard on page 65](#)).
8. Remove the top cover (see [Top cover on page 81](#)).

Remove the fingerprint reader:

1. Position the top cover upside down with the front toward you.
2. Peel off the tape (1) that secures the fingerprint reader to the top cover.
3. Lift the fingerprint reader (2) from the top cover.
4. Slide the fingerprint reader cable (3) out from the clips in the top cover.
5. Remove the fingerprint reader (4).



Reverse this procedure to install the fingerprint reader.

## Audio/USB 2.0 board

Description	Spare part number
Audio/USB 2.0 board	652517-001

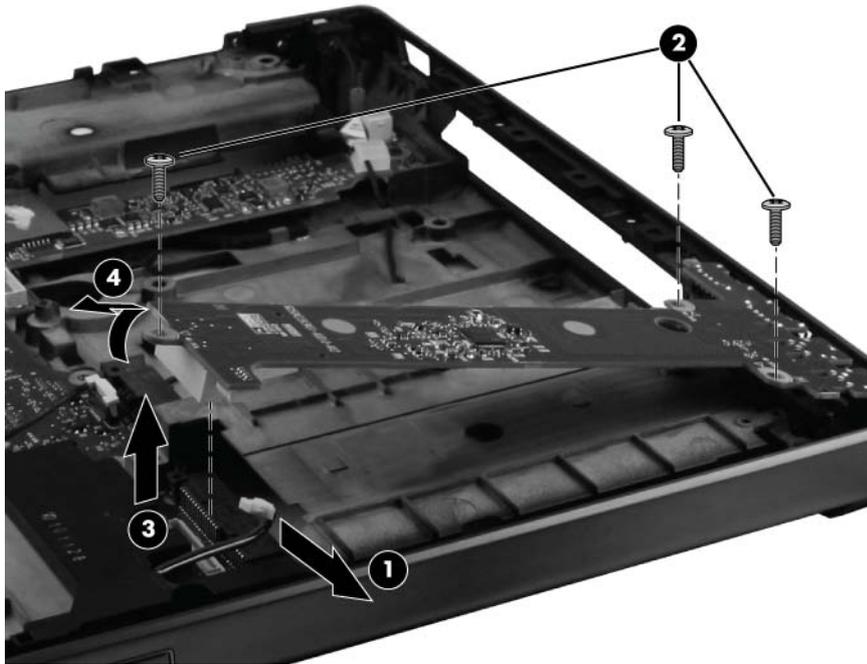
Before removing the Audio/USB 2.0 board, follow these steps:

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 45](#)),
5. Remove the service access cover (see [Service access cover on page 46](#)).
6. Remove the optical drive (see [Optical drive on page 58](#)) or upgrade bay hard drive (see [Upgrade bay hard drive on page 60](#)).

7. Remove the keyboard (see [Keyboard on page 65](#)).
8. Remove the top cover (see [Top cover on page 81](#)).

Remove the audio/USB 2.0 board:

1. Position the computer right-side up with the front toward you.
2. Disconnect the speaker cable (1) from the audio/USB 2.0 board.
3. Remove the three Phillips M2.5x3.0 screws (2) that secure the audio/USB 2.0 board to the base enclosure.
4. Lift the left edge (3) of the audio/USB 2.0 board to disconnect it from the system board.
5. Remove the audio/USB 2.0 board (4) at an angle to the left from the base enclosure.



Reverse this procedure to install the audio/USB 2.0 board.

## Speaker assembly

Description	Spare part number
Speaker assembly	652540-001

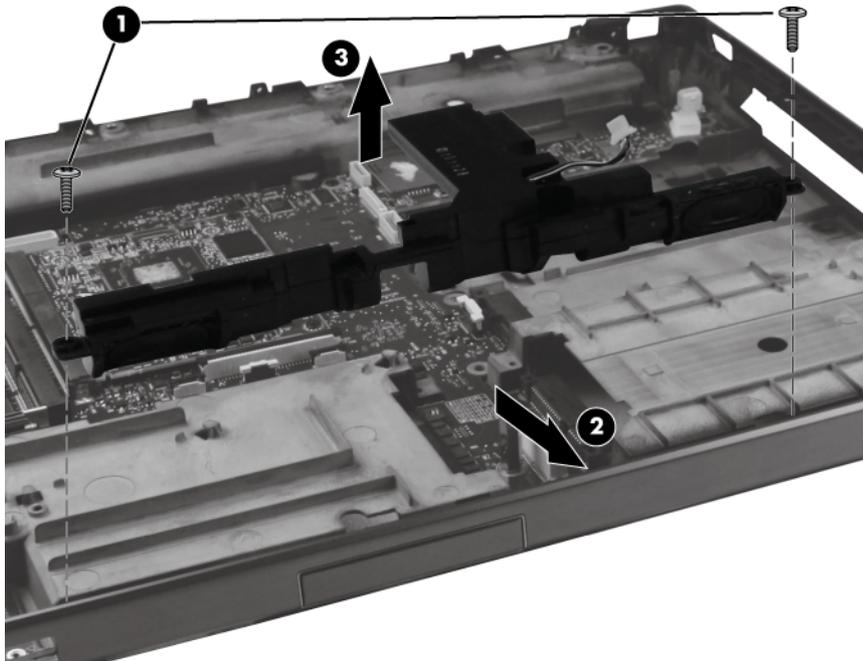
Before removing the speaker assembly, follow these steps:

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 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).
6. Remove the optical drive (see [Optical drive on page 58](#)) or upgrade bay hard drive (see [Upgrade bay hard drive on page 60](#)).
7. Remove the keyboard (see [Keyboard on page 65](#)).
8. Remove the top cover (see [Top cover on page 81](#)).
9. Remove the Smart Card reader (see [Smart Card reader on page 51](#)).
10. Remove the Audio/USB 2.0 board (see [Audio/USB 2.0 board on page 96](#)).

Remove the speaker assembly:

1. Remove the two Phillips M2.5x6.0 screws **(1)** that secure the speaker assembly to the base enclosure.
2. Gently flex the band on the base enclosure **(2)** next to the speaker assembly.

3. Remove the speaker assembly (3).



Reverse this procedure to install the speaker assembly.

## Modem module

 **NOTE:** The modem module spare part kit does not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 652545-001. See [Modem module cable on page 101](#) for information on replacing the modem module cable.

Description	Spare part number
56K V.92 1data/fax modem	628824-001

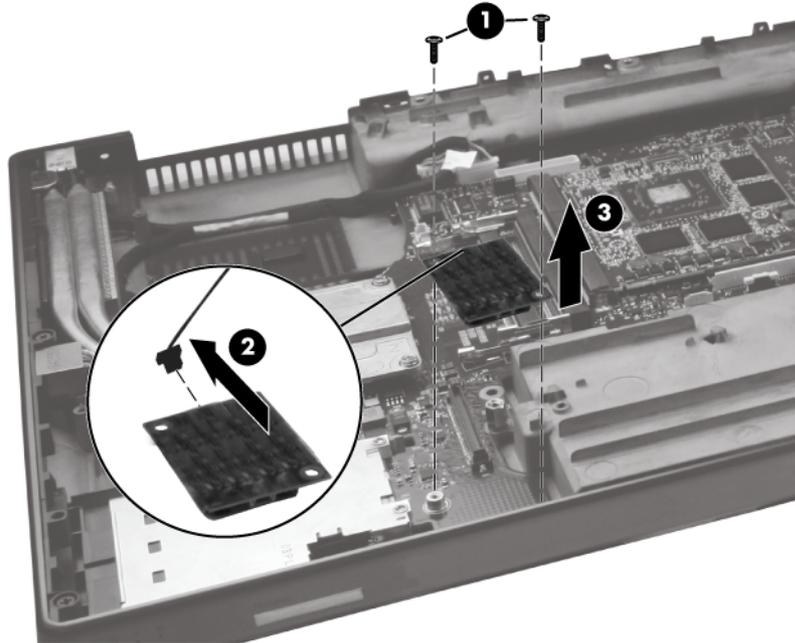
Before removing the modem module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).
6. Remove the optical drive (see [Optical drive on page 58](#)) or upgrade bay hard drive (see [Upgrade bay hard drive on page 60](#)).
7. Remove the keyboard (see [Keyboard on page 65](#)).
8. Remove the top cover (see [Top cover on page 81](#)).

9. Remove the Smart Card reader (see [Smart Card reader on page 51](#)).
10. Remove the Audio/USB 2.0 board (see [Audio/USB 2.0 board on page 96](#)).

Remove the modem module:

1. Position the computer right-side up with the front toward you.
2. Remove the two Phillips M2.0x3.0 screws (1) that secure the modem to the system board.
3. Disconnect the modem cable (2) from the modem.
4. Remove the modem (3) from the system board.



Reverse this procedure to install the modem module.

## Modem module cable



**NOTE:** The modem module cable is included in the Cable Kit, spare part number 652545-001.

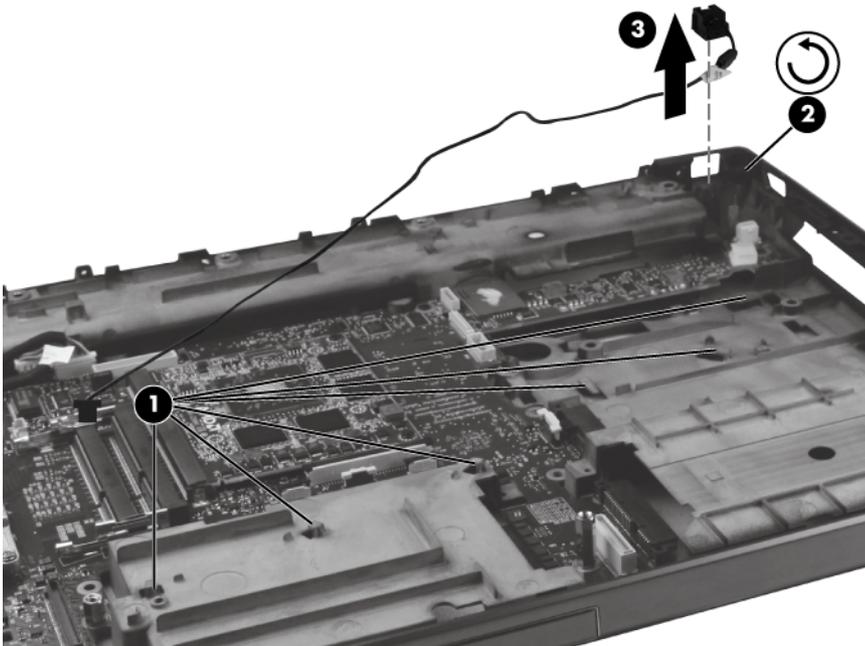
Before removing the modem module cable, follow these steps:

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 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).
6. Remove the optical drive (see [Optical drive on page 58](#)) or upgrade bay hard drive (see [Upgrade bay hard drive on page 60](#)).
7. Remove the keyboard (see [Keyboard on page 65](#)).
8. Remove the top cover (see [Top cover on page 81](#)).
9. Remove the Smart Card reader (see [Smart Card reader on page 51](#)).
10. Remove the Audio/USB 2.0 board (see [Audio/USB 2.0 board on page 96](#)).
11. Remove the modem module (see [Modem module on page 99](#)).

Remove the modem module cable:

1. Position the computer right side-up with the front toward you.
2. Remove the modem cable **(1)** from the routing clips in the base enclosure.
3. Loosen the Torx M2.0x3.0 screw **(2)**.

4. Gently pry the modem jack (3) out from the base enclosure.



Reverse this procedure to install the modem module cable.

## Card reader/USB 3.0 board

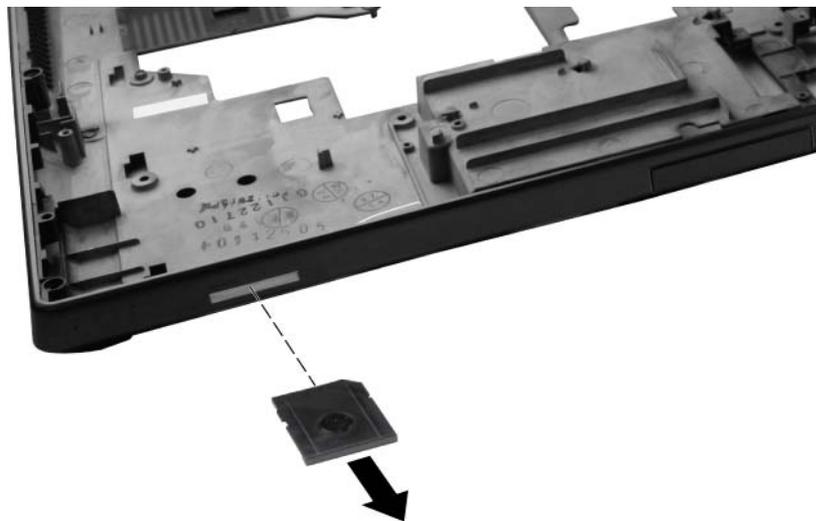
Description	Spare part number
Card reader/USB 3.0 board	652514-001

Before removing the card reader/USB 3.0 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 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).
6. Remove the optical drive (see [Optical drive on page 58](#)) or upgrade bay hard drive (see [Upgrade bay hard drive on page 60](#)).
7. Remove the keyboard (see [Keyboard on page 65](#)).
8. Remove the top cover (see [Top cover on page 81](#)).

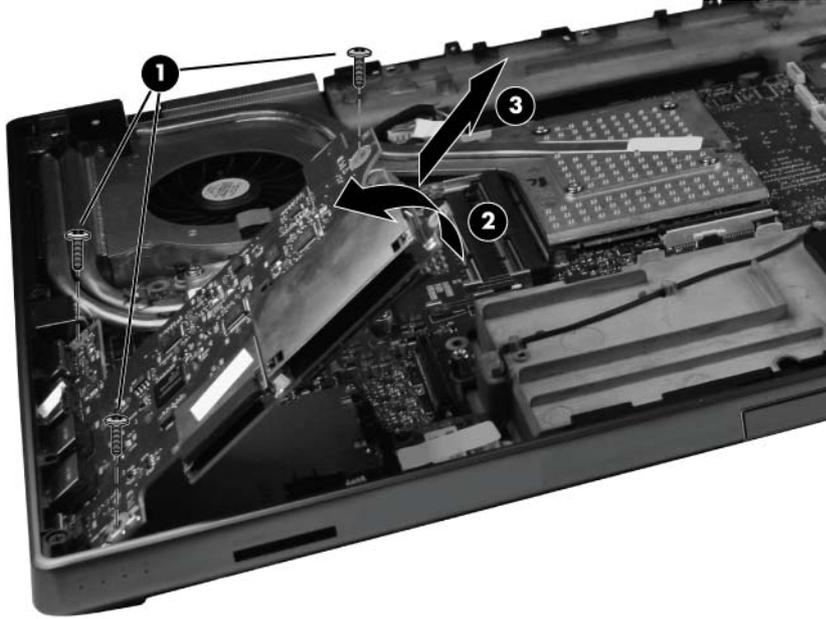
Remove the card reader/USB 3.0 board:

1. Position the computer right-side up with the front toward you.
2. Remove any plastic blanks in the card reader slots.



3. Remove the three Phillips M2.5x3.0 screws (1) that secure the card reader/USB 3.0 board to the base enclosure.
4. Lift the right side (2) of the card reader/USB 3.0 board to disconnect it from the system board.

5. Remove the card reader/USB 3.0 board (3) to the right away from the base enclosure.



Reverse this procedure to install the card reader/USB 3.0 board.

## Bluetooth module cable

 **NOTE:** The Bluetooth module cable is included in the Cable Kit, spare part number 652545-001.

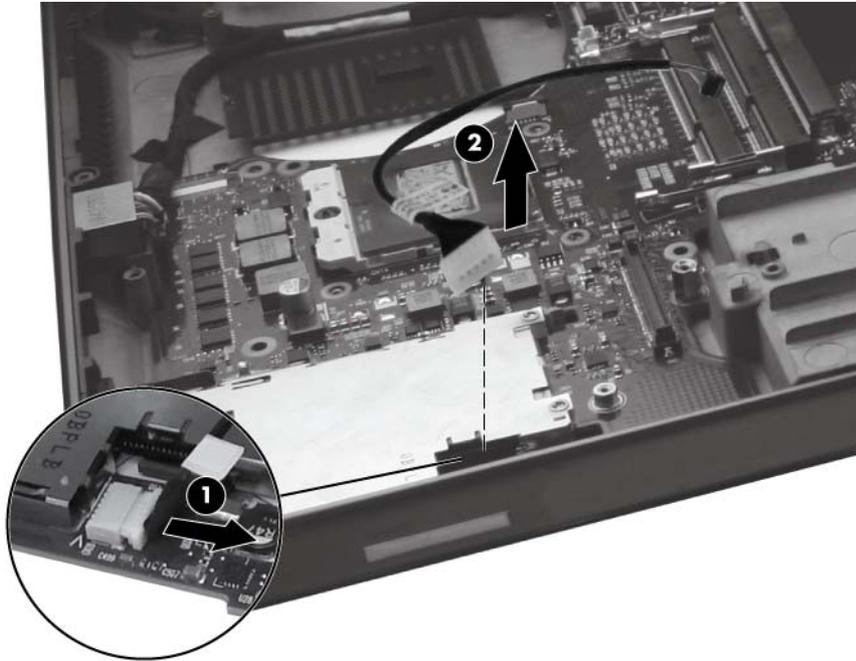
Before removing the Bluetooth module cable, follow these steps:

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 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).
6. Remove the optical drive (see [Optical drive on page 58](#)) or upgrade bay hard drive (see [Upgrade bay hard drive on page 60](#)).
7. Remove the keyboard (see [Keyboard on page 65](#)).
8. Remove the top cover (see [Top cover on page 81](#)).
9. Remove the card reader/USB 3.0 board (see [Card reader/USB 3.0 board on page 103](#)).

Remove the Bluetooth module cable:

1. Position the computer right-side up with the front toward you.
2. Disconnect the Bluetooth cable (1) from the system board.

3. Remove the Bluetooth cable (2).



Reverse this procedure to install the Bluetooth module cable.

## Network cable and jack



**NOTE:** The network cable is included in the Cable Kit, spare part number 652545-001.

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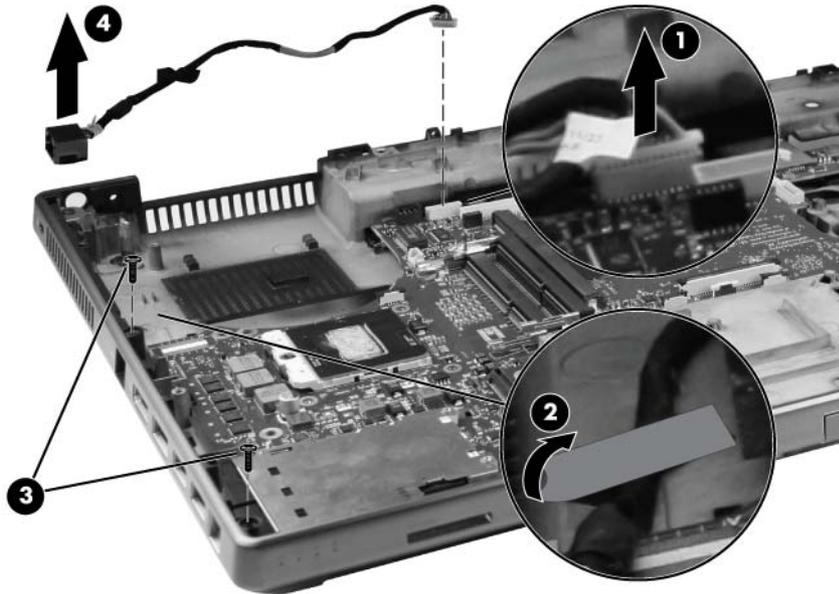
Before removing the network cable, follow these steps:

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 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).
6. Remove the optical drive (see [Optical drive on page 58](#)) or upgrade bay hard drive (see [Upgrade bay hard drive on page 60](#)).
7. Remove the keyboard (see [Keyboard on page 65](#)).
8. Remove the top cover (see [Top cover on page 81](#)).
9. Remove the display assembly (see [Display assembly on page 85](#)).
10. Remove the fan/graphics board heat sink (see [Fan/graphics board heat sink assembly on page 68](#)).
11. Remove the processor heat sink (see [Processor heat sink on page 73](#)).

Remove the network cable:

1. Disconnect the network cable **(1)** from the system board.
2. Flex the sideband **(2)**.
3. Remove the two Phillips M2.0x3.0 screws **(3)** that secure the sideband to the base enclosure.

4. Remove the network cable (4) from the base enclosure.



Reverse this procedure to install the network cable.

## Power connector cable

The power connector cable is included in the Cable Kit, spare part number 652545-001.

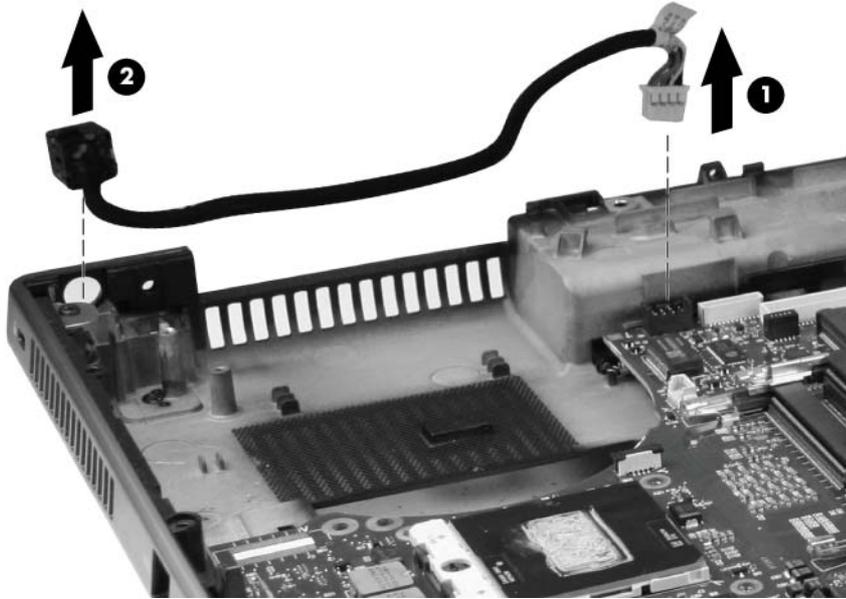
Before removing the power connector cable, follow these steps:

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 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).
6. Remove the optical drive (see [Optical drive on page 58](#)) or upgrade bay hard drive (see [Upgrade bay hard drive on page 60](#)).
7. Remove the keyboard (see [Keyboard on page 65](#)).
8. Remove the top cover (see [Top cover on page 81](#)).
9. Remove the display assembly (see [Display assembly on page 85](#)).
10. Remove the fan/graphics board heat sink (see [Fan/graphics board heat sink assembly on page 68](#)).
11. Remove the processor heat sink (see [Processor heat sink on page 73](#)).

Remove the power connector cable:

1. Disconnect the power connector cable (1) from the system board.

2. Remove the power connector cable jack (2) from the base enclosure.



Reverse this procedure to install the Power connector cable.

## System board

 **NOTE:** All system board spare part kits include replacement thermal material.

 **NOTE:** Models that support quad-core processors have four memory slots. Models that support dual-core processors have two memory slots.

Description	Spare part number
For use in all countries and regions except the People's Republic of China and Russia:	
<ul style="list-style-type: none"><li>• For use with computer models equipped with Intel quad-core processors</li></ul>	652509-001
<ul style="list-style-type: none"><li>• For use with computer models equipped with Intel dual-core processors</li></ul>	652508-001
For use only in the People's Republic of China and Russia:	
<ul style="list-style-type: none"><li>• For use with computer models equipped with Intel quad-core processors</li></ul>	655025-001
<ul style="list-style-type: none"><li>• For use with computer models equipped with Intel dual-core processors</li></ul>	655024-001

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 45](#)).

5. Remove the service access cover (see [Service access cover on page 46](#)).
6. Remove the optical drive (see [Optical drive on page 58](#)) or upgrade bay hard drive (see [Upgrade bay hard drive on page 60](#)).
7. Remove the keyboard (see [Keyboard on page 65](#)).
8. Remove the top cover (see [Top cover on page 81](#)).
9. Remove the display assembly (see [Display assembly on page 85](#)).
10. Remove the fan/graphics board heat sink (see [Fan/graphics board heat sink assembly on page 68](#)).
11. Remove the processor heat sink (see [Processor heat sink on page 73](#)).
12. Remove the Audio/USB 2.0 board (see [Audio/USB 2.0 board on page 96](#)).
13. Remove the speaker assembly (see [Speaker assembly on page 98](#)).
14. Remove the Card reader/USB 3.0 board (see [Card reader/USB 3.0 board on page 103](#)).

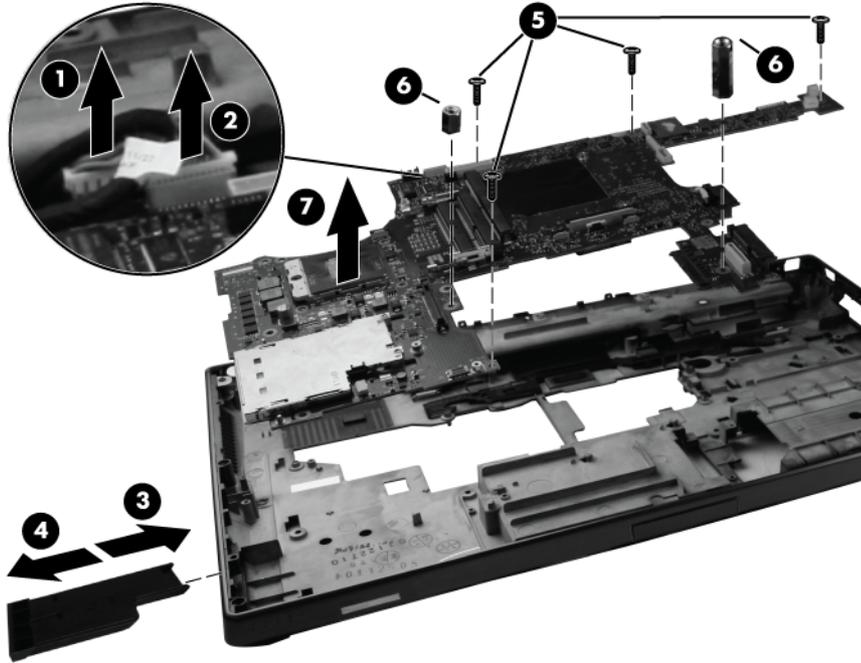
When replacing the system board, be sure that the following additional components are removed from the defective system board and installed on the replacement system board:

- SIM (see [SIM on page 45](#))
- Bluetooth module and cable (see [Bluetooth module on page 47](#) and [Bluetooth module cable on page 104](#))
- WLAN module (see [WLAN module on page 48](#))
- WWAN module (see [WWAN module on page 49](#))
- RTC battery (see [RTC battery on page 50](#))
- Primary memory modules (see [Primary memory module on page 62](#))
- Expansion memory modules (see [Expansion memory module on page 63](#))
- Graphics board (see [Graphics board on page 72](#))
- Processor heat sink (see [Processor heat sink on page 73](#))
- Processor (see [Processor on page 75](#))
- Modem module (see [Modem module on page 99](#))

Remove the system board:

1. Disconnect the network cable **(1)** from the system board.
2. Disconnect the power cable **(2)** from the system board.
3. Press in on the ExpressCard slot bezel **(3)** to release it from the ExpressCard slot.
4. Remove the ExpressCard slot bezel **(4)** from the ExpressCard slot.
5. Remove the four Phillips M2.5x3.0 screws **(5)** that secure the system board to the base enclosure.
6. Remove the two hex M2.5 screw locks **(6)** that secure the system board to the base enclosure.

7. Remove the system board (7) by lifting it straight up.



Reverse this procedure to install the system board.

## Security lock

The security lock is included with the base enclosure assembly, spare part number 652535-001.

Before removing the security lock, follow these steps:

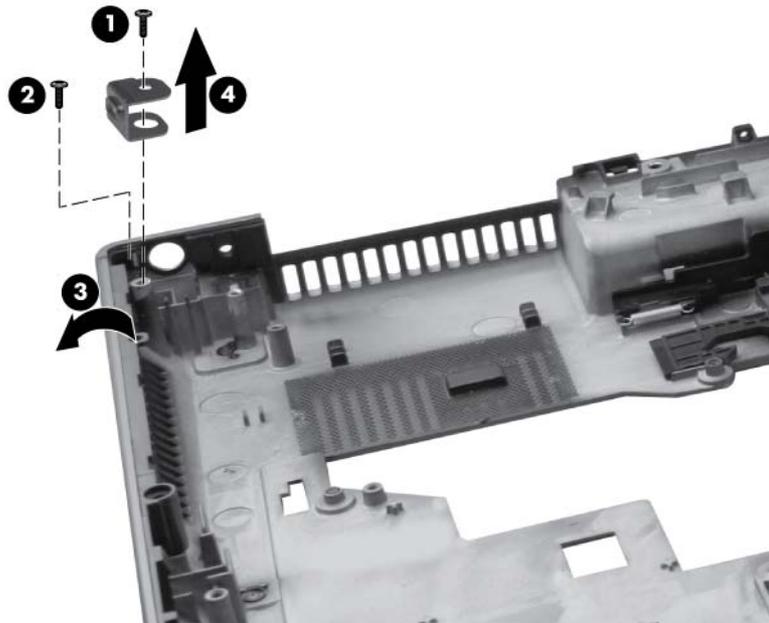
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 45](#)).
5. Remove the service access cover (see [Service access cover on page 46](#)).
6. Remove the optical drive (see [Optical drive on page 58](#)) or upgrade bay hard drive (see [Upgrade bay hard drive on page 60](#)).
7. Remove the keyboard (see [Keyboard on page 65](#)).
8. Remove the top cover (see [Top cover on page 81](#)).
9. Remove the display assembly (see [Display assembly on page 85](#)).
10. Remove the fan/graphics board heat sink (see [Fan/graphics board heat sink assembly on page 68](#)).
11. Remove the processor heat sink (see [Processor heat sink on page 73](#)).
12. Remove the Audio/USB 2.0 board (see [Audio/USB 2.0 board on page 96](#)).
13. Remove the speaker assembly (see [Speaker assembly on page 98](#)).

14. Remove the Card reader/USB 3.0 board (see [Card reader/USB 3.0 board on page 103](#)).

15. Remove the system board (see [System board on page 108](#)).

Remove the security lock:

1. Position the computer right-side up with the front toward you.
2. Remove the Torx T9M2.5×6.0 screw (1) that secures the security lock to the base enclosure.
3. Remove the screw (2) that secures the security lock to the base enclosure.
4. Rotate the the security lock (3) away from the base enclosure and remove the security lock from the base enclosure (4).



Reverse this procedure to install the security lock.

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# 5 Computer Setup

## Windows Vista and Windows 7

### Starting Computer Setup

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

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

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

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To start Computer Setup, follow these steps:

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

### Using Computer Setup

#### Navigating and selecting in Computer Setup

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

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

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

---

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

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

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

- To exit Computer Setup menus without saving your changes, click the **Exit** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the tab key and the arrow keys to select **File > Ignore changes and exit**, and then press [enter](#).

– or –

- To save your changes and exit Computer Setup menus, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the tab key and the arrow keys to select **File > Save changes and exit**, and then press [enter](#).

Your changes go into effect when the computer restarts.

## Restoring factory settings in Computer Setup



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**NOTE:** Restoring defaults will not change the hard drive mode.

---

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

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

– or –

Use the arrow keys to select **File > Save changes and exit**, and then press [enter](#).

Your changes go into effect when the computer restarts.



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

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## Computer Setup menus

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



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

### File menu

Select	To do this
System Information	<ul style="list-style-type: none"><li>• View identification information for the computer and the batteries in the system.</li><li>• View specification information for the processor, cache and memory size, system ROM, video revision, and keyboard controller version.</li></ul>
Set System Date and Time	Set or change the date and time on the computer.
System Diagnostics	Displays the following information: <ul style="list-style-type: none"><li>• System Information<ul style="list-style-type: none"><li>◦ Identification information for the computer and the batteries in the system.</li><li>◦ Specification information for the processor, cache and memory size, system ROM, video revision, and keyboard controller version.</li></ul></li><li>• Start-up Test—Verifies the system components needed for starting the computer.</li><li>• Run in Test—Runs a comprehensive check on system memory.</li><li>• Hard Disk Test—Runs a comprehensive self-test on any hard drive in the system.</li><li>• Memory Test—Runs a comprehensive test on any memory installed in the computer.</li><li>• Battery Test—Runs a comprehensive test on any batteries installed in the computer.</li><li>• Error Log—Displays a log file if any errors have occurred.</li></ul>
Restore defaults	Replace the configuration settings in Computer Setup with the original factory settings. (Hard drive mode, password settings, and security settings are not changed when you restore the factory settings.)
Reset BIOS security to factory default	Restore the BIOS security settings to the factory default.
Ignore changes and exit	Cancel any changes entered during the current session. Then exit and restart the computer.
Save changes and exit	Save any changes entered during the current session. Then exit and restart the computer. Your changes go into effect when the computer restarts.

## Security menu



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

Select	To do this
<b>Administrator Tools</b>	
Setup BIOS Administrator Password	Set up a BIOS administrator password
<b>User Management (requires a BIOS administrator password)</b>	
Create New BIOS User Account	<ul style="list-style-type: none"><li>• Select from a list of BIOS users.</li><li>• Select from a list of ProtectTools users.</li></ul>
Password Policy (requires a BIOS administrator password)	Revise password policy criteria.
HP SpareKey	Enable/disable HP SpareKey (enabled by default).
Fingerprint Reset on Reboot (If Present)	Reset/clear the fingerprint reader ownership (select models only; disabled by default).
<b>User Tools</b>	
Change Password	Enter, change, or delete a BIOS administrator password.
HP SpareKey Enrollment	Enroll or reset HP SpareKey, which is a set of security questions and answers used if you forget your password.
<b>Anti Theft</b>	
AT-P	Enable/disable Anti-Theft Protection.
DriveLock Passwords	<ul style="list-style-type: none"><li>• Enable/disable DriveLock on any computer hard drive (enabled by default).</li><li>• Change a DriveLock user password or master password.</li><li>• Enable/disable the prompt for the DriveLock user password prompts when restarting the computer.</li></ul> <p><b>NOTE:</b> DriveLock settings are accessible only when you enter Computer Setup by turning on (not restarting) the computer.</p>
Automatic DriveLock	Enable/disable Automatic DriveLock support.
TPM EMBEDded Security	Enable/disable support for Trusted Platform Module (TPM) Embedded Security, which protects the computer from unauthorized access to owner functions available in EMBEDded Security for ProtectTools. For more information, refer to the ProtectTools software
	<p><b>NOTE:</b> You must have a setup password to change this setting.</p>
Disk Sanitizer	Run Disk Sanitizer to destroy all existing data on the primary hard drive, secondary hard drive, or the drive in the upgrade bay.
	<p><b>CAUTION:</b> If you run Disk Sanitizer, the data on the selected drive is destroyed permanently.</p>
System IDs	Enter a user-defined computer asset tracking number and ownership tag.

## System Configuration menu



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

Select	To do this
Language	Change the Computer Setup language.
Boot Options	<ul style="list-style-type: none"><li>• Set a Startup Menu delay (in seconds).</li><li>• Set the MultiBook Express Boot Popup delay in seconds.</li><li>• Enable/disable Custom Logo.</li><li>• Enable/disable Display Diagnostic URL (enabled by default).</li><li>• Enable/disable CD-ROM boot (enabled by default).</li><li>• Enable/disable SD Card boot (enabled by default).</li><li>• Enable/disable floppy boot (enabled by default).</li><li>• Enable/disable PXE Internal NIC boot (enabled by default).</li><li>• Enable/disable Unified Extensible Firmware Interface (UEFI) Boot Mode (disabled by default).</li><li>• Set the Legacy Boot Order.</li></ul>
Device Configurations	<ul style="list-style-type: none"><li>• Enable/disable USB legacy support (enabled by default). When enabled, USB legacy support allows the following:<ul style="list-style-type: none"><li>◦ Use of a USB keyboard in Computer Setup even when a Windows operating system is not running</li><li>◦ Startup from bootable USB devices, including a hard drive, diskette drive, or optical drive connected by a USB port to the computer</li></ul></li><li>• Select a parallel port mode: ECP (Enhanced Capabilities Port), standard, bidirectional, or EPP (Enhanced Parallel Port).</li><li>• Enable/disable fan always on while connected to an AC outlet (enabled by default).</li><li>• Enable/disable Data Execution Prevention (select models only). When enabled, the processor can disable some virus code execution, which helps to improve computer security (enabled by default).</li><li>• SATA (Serial Advanced Technology Attachment) device mode. The following options are available:<ul style="list-style-type: none"><li>◦ AHCI (Advanced Host Controller Interface)</li><li>◦ IDE (Integrated Drive Electronics)</li><li>◦ RAID (select models only)</li></ul><p><b>NOTE:</b> Availability of these options varies by computer model.</p></li></ul>

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Select	To do this
Device Configurations ( <i>continued</i> )	<ul style="list-style-type: none"><li data-bbox="879 222 1461 275">• Enable/disable secondary battery fast charge (enabled by default).</li><li data-bbox="879 296 1461 348">• Enable/disable HP QuickLook (select models only) (enabled by default).</li><li data-bbox="879 369 1461 422">• Enable/disable Preboot Authentication on HP QuickLook Boot (enabled by default).</li><li data-bbox="879 443 1461 464">• Enable/disable HP QuickWeb (enabled by default).</li><li data-bbox="879 485 1461 537">• Enable/disable HP QuickWeb Write Protect (disabled by default).</li><li data-bbox="879 558 1461 611">• Enable/disable Virtualization Technology (select models only; disabled by default).</li><li data-bbox="879 632 1461 684">• Enable/disable TXT (Intel Trusted Execution Technology) (select models only; disabled by default).</li><li data-bbox="879 705 1461 726">• Multi Core CPU (enabled by default).</li><li data-bbox="879 747 1461 768">• Intel HT Technology (enabled by default).</li><li data-bbox="879 789 1461 810">• Enable/disable Wake on USB (enabled by default).</li><li data-bbox="879 831 1461 884">• Enable/disable Num lock state at boot (disabled by default).</li></ul>

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Select	To do this
Built in Device Options	<ul style="list-style-type: none"> <li>• Enable/disable the wireless button state (enabled by default).</li> <li>• Enable/disable eMBedded WLAN device radio (select models only; enabled by default).</li> <li>• Enable/disable the eMBedded Bluetooth device radio (enabled by default).</li> <li>• Enable/disable the LAN (enabled by default).</li> <li>• Enable/disable LAN/WLAN switching (disabled by default).</li> <li>• Set the wake on LAN state. Options include the following: <ul style="list-style-type: none"> <li>◦ Disabled</li> <li>◦ Boot to Network</li> <li>◦ Follow Boot Order</li> </ul> </li> <li>• Enable/disable the ambient Light Sensor.</li> <li>• Enable/disable the Notebook Upgrade bay device (enabled by default).</li> <li>• Enable/disable the fingerprint device (enabled by default).</li> <li>• Enable/disable the integrated camera (enabled by default).</li> <li>• Enable/disable the Power Monitor Circuit (enabled by default).</li> <li>• Enable/disable the audio device (enabled by default).</li> <li>• Enable/disable a modem device (enabled by default).</li> <li>• Enable/disable the microphone (enabled by default).</li> <li>• Enable/disable the speakers and headphones (enabled by default).</li> </ul>
Port Options	<p><b>NOTE:</b> NOTE: All port options are enabled by default.</p> <ul style="list-style-type: none"> <li>• Enable/disable the serial port.</li> <li>• Enable/disable the parallel port.</li> <li>• Enable/disable the flash media reader.</li> <li>• Enable/disable the USB port.</li> </ul> <p><b>CAUTION:</b> Disabling the USB port also disables MultiBay devices and ExpressCard devices on the advanced port replicator.</p> <ul style="list-style-type: none"> <li>• Enable/disable the 1394 port.</li> <li>• Enable/disable the ExpressCard slot.</li> <li>• Enable/disable the Smart Card slot.</li> <li>• Enable/disable the eSATA port.</li> </ul>

Select	To do this
AMT Options	<ul style="list-style-type: none"><li>• Enable/disable Firmware Verbosity.</li><li>• Enable/disable AMT Setup Prompt (Ctrl-P).</li><li>• Enable/disable USB Key Provisioning Support.</li><li>• Enable/disable Unconfigure AMT on next boot.</li><li>• Select Terminal Emulation Mode.<ul style="list-style-type: none"><li>◦ ANSI</li><li>◦ VT100</li></ul></li><li>• Enable/disable Firmware Progress Event Support.</li><li>• Enable/disable Initiate Intel CIRA.</li></ul>
Set Security Level	Change, view, or hide security levels for all BIOS menu items.
Restore Security Defaults	Restore the default security settings.

# 6 Specifications

## Computer specifications

	Metric	U.S.
<b>Dimensions</b>		
Width	<b>41.70 cm</b>	16.40 in
Depth	<b>27.20 cm</b>	10.70 in
Height (front to back)	<b>3.70 cm to 4.30 cm</b>	1.47 in to 1.68 in
<b>Weight</b>		
	<b>3.60 kg</b>	7.96 lbs
<b>Input power</b>		
Operating voltage	19.5 V dc @ 4.74 A – 120 W	
Operating current	4.74 A	
<b>Temperature</b>		
Operating	<b>5°C to 35°C</b>	41°F to 95°F
Nonoperating	<b>-20°C to 60°C</b>	-4°F to 140°F
<b>Relative humidity</b> (noncondensing)		
Operating	10% to 90%	10% to 90%
Nonoperating	5% to 95%	5% to 95%
<b>Maximum altitude</b> (unpressurized)		
Operating	<b>-15 m to 3,048 m</b>	-50 ft to 10,000 ft
Nonoperating	<b>-15 m to 12,192 m</b>	-50 ft to 40,000 ft
<b>Shock</b>		
Operating	125 g, 2 ms, half-sine	
Nonoperating	200 g, 2 ms, half-sine	
<b>Random vibration</b>		
Operating	0.75 g zero-to-peak, 10 Hz to 500 Hz, 0.25 oct/min sweep rate	
Nonoperating	1.50 g zero-to-peak, 10 Hz to 500 Hz, 0.5 oct/min sweep rate	

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

## 43.9 cm (17.3 in) WVA display specifications

	Metric	U.S.
<b>Dimensions</b>		
Width	24.4 cm	9.65 in
Depth	38.1 cm	15.0 in
Diagonal	43.9 cm	17.3 in
<b>Number of colors</b>	Up to 16.8 million	
<b>Contrast ratio</b>	200:1 (typical)	
<b>Brightness</b>	180 nits (typical)	
<b>Backlight</b>	LED	
<b>Character display</b>	80 × 25	
<b>Total power consumption</b>	6.0 W	
<b>Viewing angle</b>	+/-65 horizontal, +/-50° vertical (typical)	

## Hard drive specifications

	750 GB*	500 GB*	320 GB*
<b>Dimensions</b>			
Height	9.5 mm	9.5 mm	9.5 mm
Width	7.0 mm	7.0 mm	7.0 mm
Weight	101 g	101 g	101 g
<b>Interface type</b>	SATA	SATA	SATA
<b>Transfer rate</b>	100 MB/sec	100 MB/sec	100 MB/sec
<b>Security</b>	ATA security	ATA security	ATA security
<b>Seek times</b> (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
<b>Logical blocks</b>	1,250,242,867	976,752,240	625,121.433
<b>Disk rotational speed</b>	7200 rpm	7200 rpm	7200 rpm
<b>Operating temperature</b>	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.			
<b>NOTE:</b> Certain restrictions and exclusions apply. Contact technical support for details.			

## Blu-ray R/RE DVD±RW SuperMulti Double-Layer 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	

## Blu-ray ROM DVD±RW SuperMulti Double-Layer Drive specifications

Applicable disc	Read:	Write:	
	CD-DA, CD+(E)G, CD-MIDI, CDTEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVDROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM, HD-ROM (Single Layer), HD-ROM (Dual Layer), HD DVD-R, HD DVD-R for Dual Layer, HD DVD-RW	CD-R and CD-RW DVD+R, DVD+R(9), DVD+RW, DVD-R, DVD-R(9), DVD-RW, DVD-RAM	
Access time	CD	DVD	HD
Random	170 ms	170 ms	230 ms
Cache buffer	8 MB		
Data transfer rate			
24X CD-ROM	3,600 KB/sec		
8X DVD	10,800 KB/sec		

<b>Applicable disc</b>	<b>Read:</b>	<b>Write:</b>
24X CD-R	3,600 KB/sec	
16X CD-RW	2,400 KB/sec	
8X DVD+R	10,800 KB/sec	
4X DVD+RW	5,400 KB/sec	
8X DVD-R	10,800 KB/sec	
4X DVD-RW	5,400 KB/sec	
2.4X DVD+R(9)	2,700 KB/sec	
5X DVD-RAM	6,750 KB/sec	
1X BD-ROM	4,500 KB/sec	
1X BD-R read	4,500 KB/sec	
1X BD-RE read	4,500 KB/sec	
<b>Transfer mode</b>	Multiword DMA Mode	

## DVD±RW SuperMulti Double-Layer Drive specifications

<b>Applicable disc</b>	<b>Read:</b>	<b>Write:</b>
	CD-DA, CD+(E)G, CD mIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo cD, Video CD), Multisession CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM	CD-R and CD-RW DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM
<b>Access time</b>	<b>CD</b>	<b>DVD</b>
Random	< 175 ms	< 230 ms
<b>Cache buffer</b>	2.5 MB	
<b>Data transfer rate</b>		
24X CD-ROM	3,600 KB/sec	
8X DVD	10,800 KB/sec	
24X CD-R	3,600 KB/sec	
16X CD-RW	2,400 KB/sec	
8X DVD+R	10,800 KB/sec	
4X DVD+RW	5,400 KB/sec	
8X DVD-R	10,800 KB/sec	
4X DVD-RW	5,400 KB/sec	
2.4X DVD+R(9)	2,700 KB/sec	

<b>Applicable disc</b>	<b>Read:</b>	<b>Write:</b>
5X DVD-RAM	6,750 KB/sec	
<b>Transfer mode</b>	Multiword DMA Mode	

## DVD-ROM Drive specifications

<b>Applicable disc</b>	<b>Read:</b>	<b>Write:</b>
	CD-DA, CD+(E)G, CD mIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo cD, Video CD), Multisession CD (Photo cD, CDEXTRA, Portfolio, CD-R, CD-RW), CDR, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM	CD-R and CD-RW
<b>Access time</b>	<b>CD</b>	<b>DVD</b>
Random	< 110 ms	< 130 ms
<b>Cache buffer</b>	2 MB	
<b>Data transfer rate</b>		
24X CD-ROM	3,600 KB/sec	
8X DVD	10,800 KB/sec	
24X CD-R	3,600 KB/sec	
16X CD-RW	3,600 KB/sec	

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# 7 Backup and recovery

## Windows 7

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

Windows Backup and Restore provides the following options:

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

---

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

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

---

## Backing up your information

Recovery after a system failure is as complete as your most current backup. You should create system repair discs (select models only) and your initial backup immediately after software setup. As you add new software and data files, you should continue to back up your system on a regular basis to maintain a reasonably current backup. The system repair discs (select models only) are used to start up (boot) the computer and repair the operating system in case of system instability or failure. Your initial and subsequent backups allow you to restore your data and settings if a failure occurs.

You can back up your information to an optional external hard drive, a network drive, or discs.

Note the following when backing up:

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

To create a screen shot:

1. Display the screen you want to save.
2. Copy the screen image:

To copy only the active window, press **alt+fn+prt sc**.

To copy the entire screen, press **fn+prt sc**.

3. Open a word-processing document, and then select **Edit > Paste**.

The screen image is added to the document.

4. Save the document.
- When backing up to discs, use any of the following types of discs (purchased separately): CD-R, CD-RW, DVD+R, DVD+R DL, DVD-R, DVD-R DL, or DVD±RW. The discs you use will depend on the type of optical drive installed in your computer.

---

 **NOTE:** DVDs and DVDs with double-layer (DL) support store more information than CDs, so using them for backup reduces the number of recovery discs required.

---

- When backing up to discs, number each disc before inserting it into the optical drive of the computer.

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

---

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

---

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

---

1. Select **Start > All Programs > Maintenance > Backup and Restore**.
2. Follow the on-screen instructions to set up your backup, create a system image (select models only), or create a system repair disc (select models only).

---

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

---

## Performing a recovery

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

- Windows recovery tools: You can use Windows Backup and Restore to recover information you have previously backed up. You can also use Windows Startup Repair to fix problems that might prevent Windows from starting correctly.
- f11 recovery tools: You can use the f11 recovery tools to recover your original hard drive image. The image includes the Windows operating system and software programs installed at the factory.

---

 **NOTE:** If you are unable to boot (start up) your computer and you cannot use the system repair discs you previously created (select models only), you must purchase a Windows 7 operating system DVD to reboot the computer and repair the operating system. For additional information, refer to the “Using a Windows 7 operating system DVD (purchased separately)” section in this guide.

---

## Using the Windows recovery tools

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

1. Select **Start > All Programs > Maintenance > Backup and Restore**.
2. Follow the on-screen instructions to recover your system settings, your computer (select models only), or your files.

---

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

---

To recover your information using Startup Repair, follow these steps:

 **CAUTION:** Using Startup Repair completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. When reformatting is complete, the recovery process restores the operating system, as well as the drivers, software, and utilities from the backup used for recovery.

---

1. If possible, back up all personal files.
2. If possible, check for the presence of the Windows partition or the HP Recovery partition.

To check for the Windows partition, select **Start > Computer**.

To check for the HP Recovery partition, click **Start**, right click **Computer**, click **Manage**, and then click **Disk Management**.

---

 **NOTE:** If the Windows partition or the HP Recovery partition is not listed, you must recover your operating system and programs using the Windows 7 operating system DVD and the *Driver Recovery* disc (both purchased separately). For additional information, refer to the “Using a Windows 7 operating system DVD (purchased separately)” section.

---

3. If the Windows partition and the HP Recovery partition are listed, restart the computer, and then press **f8** before the Windows operating system loads.
4. Select **Startup Repair**.
5. Follow the on-screen instructions.

---

 **NOTE:** For additional information on recovering information using the Windows tools, perform a search for these topics in Help and Support.

---

## Using f11 recovery tools

---

 **CAUTION:** Using **f11** completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. The **f11** recovery tool reinstalls the operating system and HP programs and drivers that were installed at the factory. Software not installed at the factory must be reinstalled. Personal files must be restored from a backup.

---

To recover the original hard drive image using **f11**, follow these steps:

1. If possible, back up all personal files.
2. If possible, check for the presence of the HP Recovery partition: click **Start**, right click **Computer**, click **Manage**, and then click **Disk Management**.

---

 **NOTE:** If the HP Recovery partition is not listed, you must recover your operating system and programs using the Windows 7 operating system DVD and the *Driver Recovery* disc (both purchased separately). For additional information, refer to the “Using a Windows 7 operating system DVD (purchased separately)” section.

---

3. If the HP Recovery partition is listed, restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
4. Press **f11** while the “Press <F11> for recovery” message is displayed on the screen.
5. Follow the on-screen instructions.

## Using a Windows 7 operating system DVD (purchased separately)

If you are unable to boot (start up) your computer and you cannot use the system repair discs you previously created (select models only), you must purchase a Windows 7 operating system DVD to reboot the computer and repair the operating system. Be sure that your most recent backup (stored on discs or on an external drive) is easily accessible. To order a Windows 7 operating system DVD, go to <http://www.hp.com/support>, select your country or region, and follow the on-screen instructions. You can also order the DVD by calling technical support. For contact information, refer to the Worldwide Telephone numbers booklet included with the computer.

---

 **CAUTION:** Using a Windows 7 operating system DVD completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. When reformatting is complete, the recovery process helps you restore the operating system, as well as drivers, software, and utilities.

---

To initiate recovery using a Windows 7 operating system DVD, follow these steps:

---

 **NOTE:** This process takes several minutes.

---

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

# Windows Vista

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

The Backup and Restore Center provides the following options:

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



---

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



---

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

---

## Backing up your information

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

You can back up your information to an optional external hard drive, a network drive, or discs.

Note the following when backing up:

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

To create a screen shot:

1. Display the screen you want to save.
2. Copy the screen image:

To copy only the active window, press **alt+fn+prt sc**.

To copy the entire screen, press **fn+prt sc**.

3. Open a word-processing document, and then select **Edit > Paste**.

The screen image is added to the document.

4. Save the document.

- When backing up to discs, use any of the following types of discs (purchased separately): CD-R, CD-RW, DVD+R, DVD+R DL, DVD-R, DVD-R DL, or DVD±RW. The discs you use will depend on the type of optical drive installed in your computer.

---

 **NOTE:** DVDs and DVDs with double-layer (DL) support store more information than CDs, so using them for backup reduces the number of recovery discs required.

---

- When backing up to discs, number each disc before inserting it into the optical drive of the computer.

---

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

---

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

---

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

---

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

---

## Performing a recovery

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

- Windows recovery tools: You can use the Backup and Restore Center to recover information you have previously backed up. You can also use Windows Startup Repair to fix problems that might prevent Windows from starting correctly.
- f11 recovery tools: You can use the f11 recovery tools to recover your original hard drive image. The image includes the Windows operating system and software programs installed at the factory.

---

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

---

## Using the Windows recovery tools

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

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



---

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

---

To recover your information using Startup Repair, follow these steps:



---

**CAUTION:** Using Startup Repair completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. When reformatting is complete, the recovery process restores the operating system, as well as the drivers, software, and utilities from the backup used for recovery.

---

1. If possible, back up all personal files.
2. If possible, check for the presence of the Windows partition or the HP Recovery partition. To find the partitions, select **Start > Computer**.



---

**NOTE:** If the Windows partition and the HP Recovery partition have been deleted, you must recover your operating system and programs using the Windows Vista operating system DVD and the *Driver Recovery* disc (both purchased separately). For additional information, refer to the “Using a Windows Vista operating system DVD (purchased separately)” section.

---

3. Restart the computer, and then press **f8** before the Windows operating system loads.
4. Select **Repair your computer**.
5. Follow the on-screen instructions.



---

**NOTE:** For additional information on recovering information using the Windows tools, perform a search for these topics in Help and Support.

---

## Using f11 recovery tools

---

 **CAUTION:** Using **f11** completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. The **f11** recovery tool reinstalls the operating system and HP programs and drivers that were installed at the factory. Software not installed at the factory must be reinstalled. Personal files must be restored from a backup.

 **NOTE:** 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.

---

To recover the original hard drive image using **f11**, follow these steps:

1. If possible, back up all personal files.
2. If possible, check for the presence of the HP Recovery partition. To find the partition, select **Start > Computer**.

 **NOTE:** If the HP Recovery partition has been deleted, you must recover your operating system and programs using the Windows Vista operating system DVD and the *Driver Recovery* disc (both purchased separately). For additional information, refer to the “Using a Windows Vista operating system DVD (purchased separately)” section.

---

3. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
4. Press **f11** while the “Press <F11> for recovery” message is displayed on the screen.
5. Follow the on-screen instructions.

## Using a Windows Vista operating system DVD (purchased separately)

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

---

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

---

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

---

 **NOTE:** This process takes several minutes.

---

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

---

## 8 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

The following requirements 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	COC	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 mm<sup>2</sup> conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country 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 mm<sup>2</sup> 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 mm<sup>2</sup> conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
5. The flexible cord must be Type VCTF, 3 conductor, 0.75 mm<sup>2</sup> conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

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# 9 Recycling

## 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.

**📝 NOTE:** 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.eiai.org>.

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This section provides disassembly instructions for the display assembly. The display assembly must be disassembled to gain access to the backlight **(1)** and the liquid crystal display (LCD) panel **(2)**.



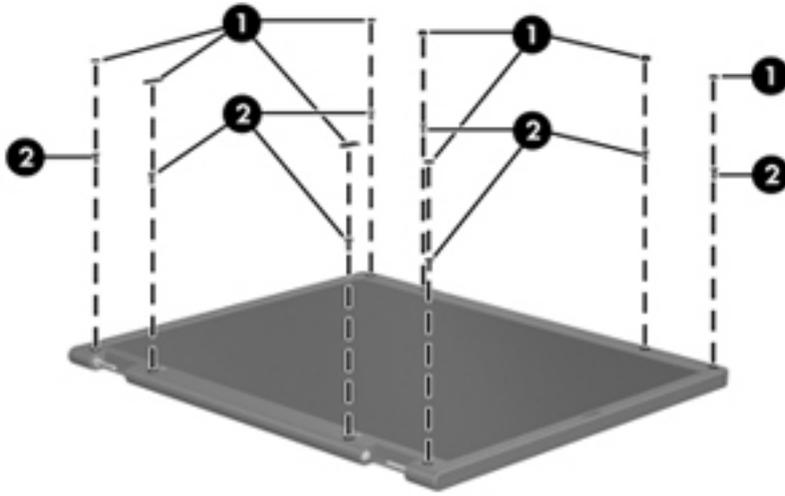
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**📝 NOTE:** The procedures provided in this chapter are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

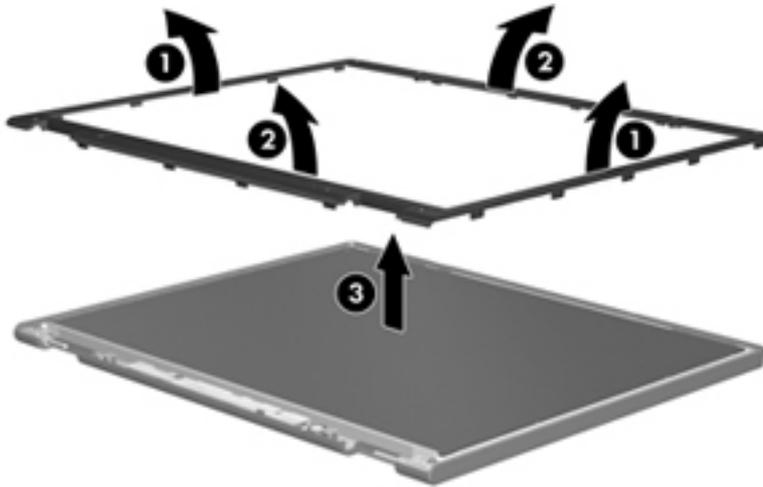
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Perform the following steps:

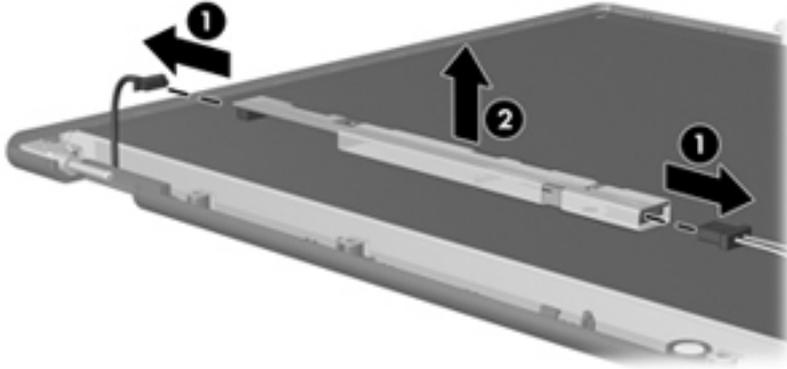
1. Remove all screw covers (1) and screws (2) that secure the display bezel to the display assembly.



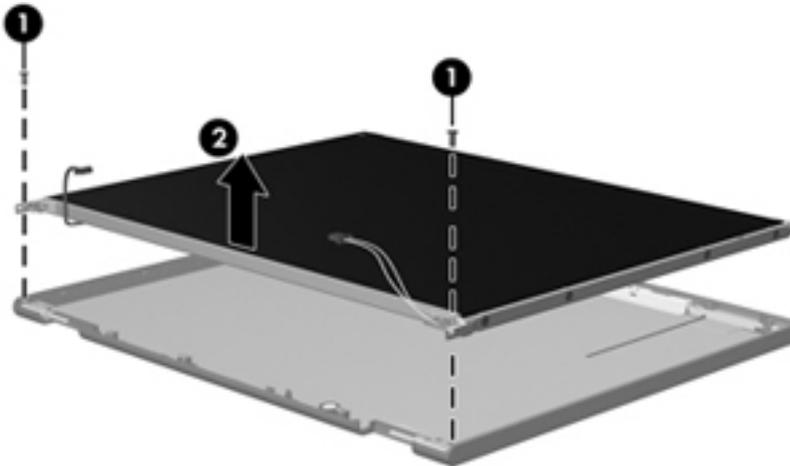
2. Lift up and out on the left and right inside edges (1) and the top and bottom inside edges (2) of the display bezel until the bezel disengages from the display assembly.
3. Remove the display bezel 3.



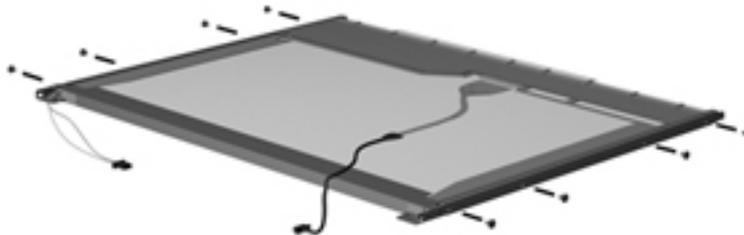
4. Disconnect all display panel cables (1) from the display inverter and remove the inverter 2.



5. Remove all screws (1) that secure the display panel assembly to the display enclosure.
6. Remove the display panel assembly (2) from the display enclosure.

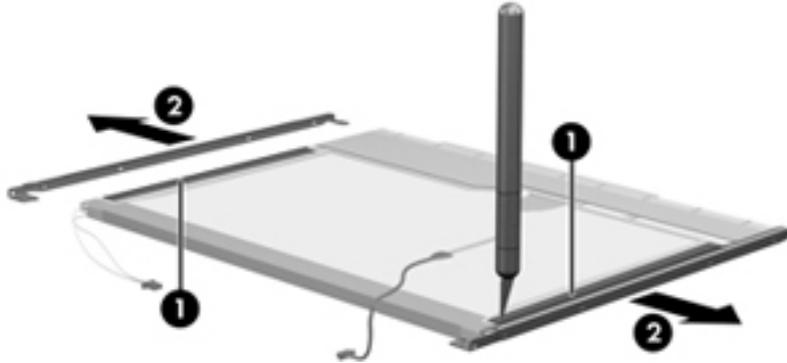


7. Turn the display panel assembly upside down.
8. Remove all screws that secure the display panel frame to the display panel.

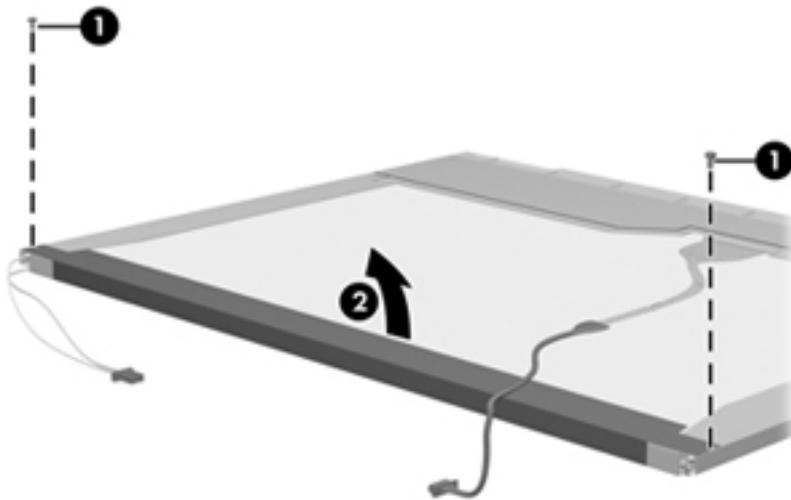


9. Use a sharp-edged tool to cut the tape (1) that secures the sides of the display panel to the display panel frame.

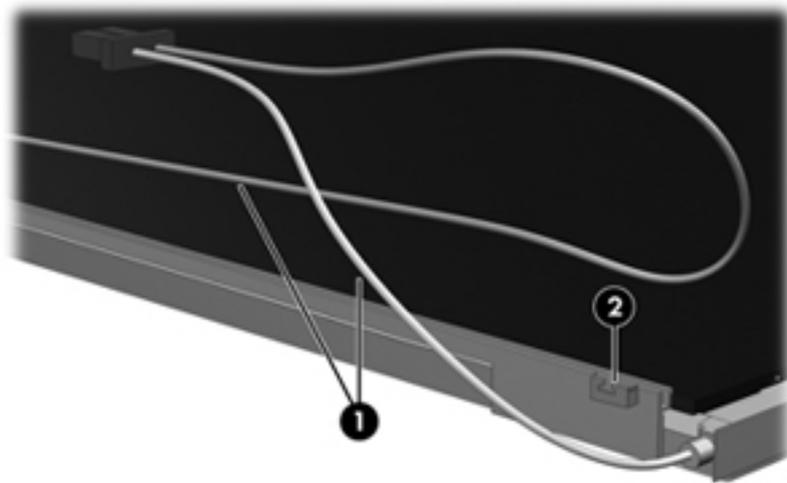
10. Remove the display panel frame (2) from the display panel.



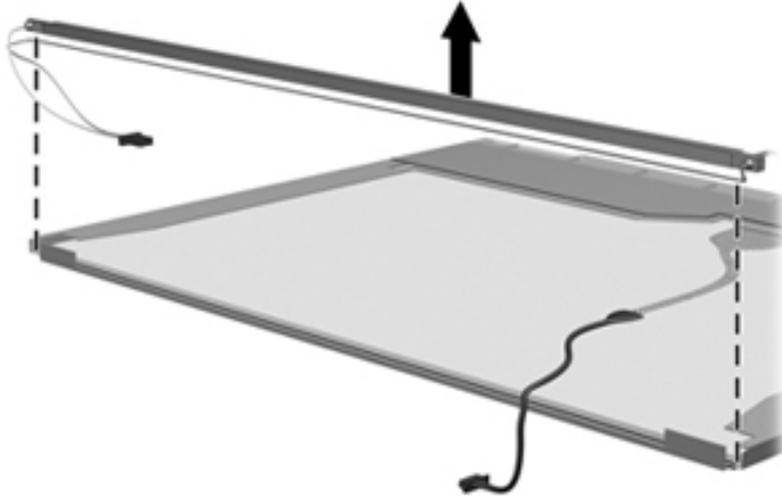
11. Remove the screws (1) that secure the backlight cover to the display panel.
12. Lift the top edge of the backlight cover (2) and swing it outward.



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

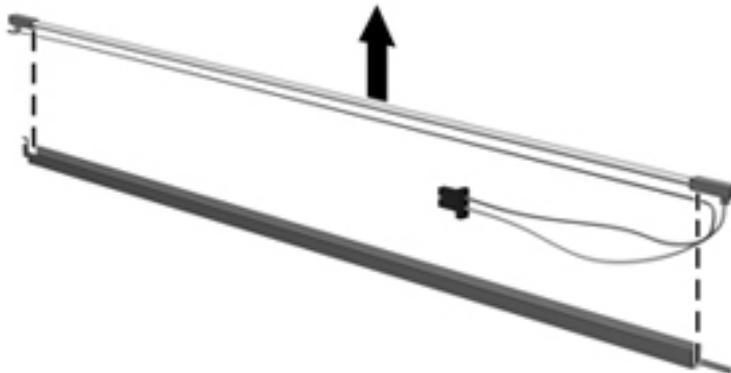


16. Turn the display panel upside down.
17. Remove the backlight frame from the display panel.



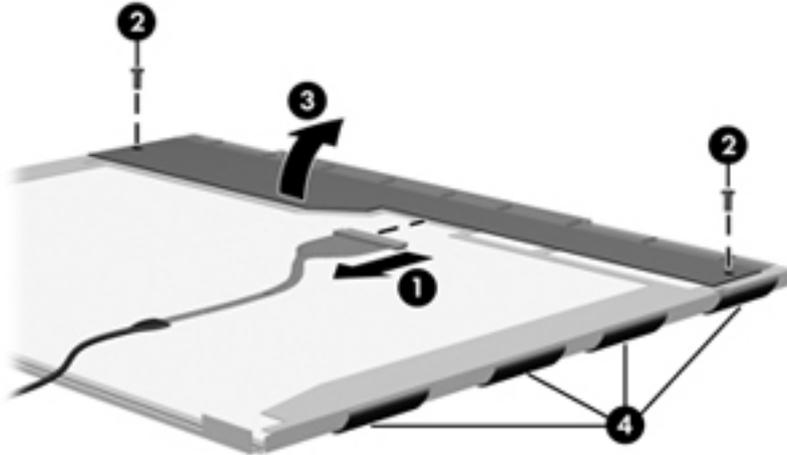
**⚠ WARNING!** The backlight contains mercury. Exercise caution when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.

18. Remove the backlight from the backlight frame.

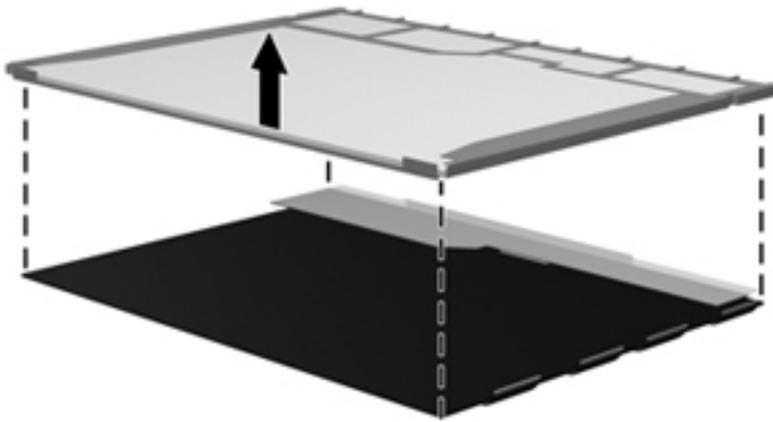


19. Disconnect the display cable (1) from the LCD panel.
20. Remove the screws (2) that secure the LCD panel to the display rear panel.
21. Release the LCD panel (3) from the display rear panel.

22. Release the tape (4) 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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