



HP ENVY 17

Maintenance and Service Guide

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## Safety warning notice

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**⚠ WARNING!** To reduce the possibility of heat-related injuries or of overheating the device, do not place the device directly on your lap or obstruct the device air vents. Use the device 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 device 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 ENVY 17
<b>Processors</b>	Intel® Quad Core® i7-3820QM 2.70-GHz processor (SC turbo up to 3.70-GHz), 1600-MHz FSB, 8.0-MB L3 cache, 45 W
	Intel Quad Core i7-3720QM 2.60-GHz processor (SC turbo up to 3.60-GHz), 1600-MHz FSB, 6.0-MB L3 cache, 45 W
	Intel Quad Core i7-3612QM 2.10-GHz processor (SC turbo up to 3.10-GHz), 1600-MHz FSB, 6.0-MB L3 cache, 35 W
	Intel Quad Core i7-3610QM 2.30-GHz processor (SC turbo up to 3.30-GHz), 1600-MHz FSB, 6.0-MB L3 cache, 45 W
	Intel Quad Core i7-2860QM 2.50-GHz processor (SC turbo up to 3.60-GHz), 1600-MHz FSB, 8.0-MB L3 cache, 45 W
	Intel Quad Core i7-2760QM 2.40-GHz processor (SC turbo up to 3.50-GHz), 1600-MHz FSB, 6.0-MB L3 cache, 45 W
	Intel Quad Core i7-2670QM 2.40-GHz processor (SC turbo up to 3.50-GHz), 1600-MHz FSB, 6.0-MB L3 cache, 45 W
	Intel Quad Core i7-2640M 2.80-GHz processor (SC turbo up to 3.10-GHz), 1333-MHz FSB, 4.0-MB L3 cache, 35 W
	Intel Dual Core i5-3210M 2.50-GHz processor (SC turbo up to 3.10-GHz), 1600-MHz FSB, 3.0-MB L3 cache, 35 W
	Intel Dual Core i5-2450M 2.50-GHz processor (SC turbo up to 3.10-GHz), 1333-MHz FSB, 3.0-MB L3 cache, 35 W
	Intel Dual Core i5-2430M 2.40-GHz processor (SC turbo up to 3.00-GHz), 1333-MHz FSB, 3.0-MB L3 cache, 35 W
<b>Chipset</b>	Intel 7 series express chipset HM76 platform controller hub (PCH) Intel 6 series express chipset HM65 PCH
<b>Graphics</b>	<b>Intel graphics:</b> Intel HD Graphics  ATi Discrete PCI Express X8 graphics: AMD Radeon™ HD 7850M with 1024-MB of dedicated video memory (64-MB×32, GDDR5 × 4 PCs, 5GBPS), 128-bit package  ATi Discrete PCI Express X8 graphics: AMD Radeon HD 6770M with 1024-MB of dedicated video memory (64-MB×32, GDDR5 × 4 PCs, 5GBPS), 128-bit package

Category	Description
	Support for BD playback with switchable graphics, HD decode, Eyefinity, and DX11 on computer models equipped with a 3D display assembly
	Support for BD playback with PX5 muxless switchable graphics, HD decode, and DX11 on computer models equipped with a 2D display assembly
<b>Panel</b>	<ul style="list-style-type: none"> <li>17.3-in, 3D, full high-definition (FHD), light-emitting diode (LED), AntiGlare (1920×1080) WVA display; typical brightness: 400 nits at 72% color gamut</li> <li>17.3-in, FHD, LED, AntiGlare (1920×1080) WVA display; typical brightness: 300 nits at 72% color gamut</li> <li>17.3-in, high-definition+ (HD+), LED, AntiGlare (1600×900) WVA display; typical brightness: 200 nits at 60% color gamut</li> </ul>
	All display assemblies include 2 wireless local area network (WLAN) antenna cables
	Emitter controller chip for display blanking and shutter glass modulation
	3D display with 4-lane eDP interface
	Cyberlink 3D Player in PowerDVD
	Shutter glasses with integrated IR receiver (available with computer and as an option)
	Dot-free
	Supports 16:9 wide aspect ratio
	Supports flush glass panel cover support
	Lighted logo on display enclosure
<b>Memory</b>	2 customer-accessible/upgradable memory module slots
	DDR3-1333-MHz and DDR3-1600-MHz dual channel support
	Supports up to 16384-GB of system RAM @ 1333-MHz, supports up to 8192-GB of system RAM @ 1600-MHz,
	Supports the following configurations:
	<ul style="list-style-type: none"> <li>16384-MB total system memory (8192×2 @ 1600- and 1333-MHz)</li> <li>12288-MB total system memory (8192×1 + 4096×1 @ 1600- and 1333-MHz)</li> <li>8192-MB total system memory (8192×1 @ 1600- and 1333-MHz, or 4096×2 @ 1600- and 1333-MHz)</li> <li>6144-MB total system memory (4096×1 + 2048×1 @ 1600-MHz)</li> <li>4096-MB total system memory (4096×1 @ 1600- and 1333-MHz, or 2048×2 @ 1600-MHz)</li> </ul>
<b>Hard drives</b>	Supports <b>6.35-cm</b> (2.5-in) hard drives in <b>12.7-mm</b> (.50-in) and <b>9.5-mm</b> (.37-in) thicknesses
	Customer-accessible
	Serial ATA (SATA)
	Supports Accelerometer hard drive protection
	Supports a 128-GB or 80-GB mSATA drive

Category	Description
	Supports a <b>6.35-cm</b> (2.5-in) 300-GB or 160-GB solid-state drive (SSD) in <b>7.0-mm</b> (.28-in) thickness
	Supports the following hard drives: <ul style="list-style-type: none"> <li>• 1-TB, 5400-rpm, 12.7-mm</li> <li>• 750-GB, 7200-rpm, 9.5-mm</li> <li>• 750-GB, 7200-rpm, 9.5-mm hybrid</li> <li>• 500-GB, 7200-rpm, 9.5-mm</li> <li>• 320-GB, 7200-rpm, 9.5-mm</li> </ul>
	Supports the following hard drive/mSATA drive combination configurations: <ul style="list-style-type: none"> <li>• 1-TB, 5400-rpm, 12.7-mm hard drive × 2 + 128-GB mSATA drive</li> <li>• 750-GB, 7200-rpm, 9.5-mm hard drive × 1 + 80-GB mSATA drive</li> </ul>
	Supports the following dual hard drive/solid-state drive combination configurations: <p><b>NOTE:</b> Supports RAID-0 as default for all dual hard drive/solid-state drive combination configurations.</p> <ul style="list-style-type: none"> <li>• 1-TB, 5400-rpm, 12.7-mm hard drive × 2 + 300-GB solid-state drive</li> <li>• 1-TB, 5400-rpm, 12.7-mm hard drive × 2 + 160-GB solid-state drive</li> <li>• 750-GB, 7200-rpm, 9.5-mm hard drive × 2 + 300-GB solid-state drive</li> <li>• 750-GB, 7200-rpm, 9.5-mm hard drive × 2 + 160-GB solid-state drive</li> <li>• 500-GB, 7200-rpm, 9.5-mm hard drive × 2 + 300-GB solid-state drive</li> <li>• 500-GB, 7200-rpm, 9.5-mm hard drive × 2 + 160-GB solid-state drive</li> </ul>
	Supports the following single hard drive/solid-state drive combination configurations: <ul style="list-style-type: none"> <li>• 1-TB, 5400-rpm, 12.7-mm hard drive × 1 + 300-GB solid-state drive</li> <li>• 750-GB, 7200-rpm, 9.5-mm hard drive × 1 + 300-GB solid-state drive</li> <li>• 500-GB, 7200-rpm, 9.5-mm hard drive × 1 + 300-GB solid-state drive</li> <li>• 320-GB, 7200-rpm, 9.5-mm hard drive × 1 + 300-GB solid-state drive</li> </ul>
<b>Optical drive</b>	Fixed
	Eject button on keyboard
	SATA
	12.7-mm slot load (does not support 8-cm media)
	Supports the following optical drives: <ul style="list-style-type: none"> <li>• Blu-ray ROM DVD±RW Super Multi Double-Layer FX Drive</li> <li>• DVD±RW and CD-RW Super Multi Double-Layer FX Combo Drive</li> </ul>

Category	Description
<b>Audio and video</b>	2 omnidirectional, digital, dual-array microphones with appropriate beam-forming, echo-cancellation, noise-suppression software
	HD Audio (IDT92HD91B1)
	Supports Microsoft Premium requirements
	High performance Envy-branded speakers mounted in bass reflex enclosures
	Subwoofer
	Support wireless audio via SMSC
	Separate discrete amplifiers for headphone and speaker
	Beats signature audio profile applied to both headphones and external speakers
	Supports jog dial controls for volume and mute
	HP TrueVision high-definition webcam with activity light (fixed, no tilt, 1280×720 by 24 frames per second)
<b>Ethernet</b>	Integrated 10/100/1000 network interface controller (NIC) (AR8151)
<b>Wireless</b>	Integrated WLAN options by way of wireless module
	Two WLAN antennas built into display assembly
	Supports the following WLAN formats: <ul style="list-style-type: none"> <li>• Intel Centrino Advanced-N 6235 WLAN module</li> <li>• Intel Centrino Advanced-N 6230 WLAN module</li> <li>• Intel Centrino Ultimate-N 6300 WLAN module</li> </ul>
<b>External media card</b>	Push-push insertion/removal
	HP Multi-Format Digital Media Reader supports the following digital card formats: <ul style="list-style-type: none"> <li>• MultiMediaCard</li> <li>• Secure Digital (SD) Memory Card</li> <li>• Secure Digital High Capacity Memory Card</li> </ul>

Category	Description
<b>Ports</b>	<ul style="list-style-type: none"> <li>• 3-pin AC power</li> <li>• Audio-in (mono microphone)</li> <li>• Audio-out (stereo headphone, 2)</li> <li>• Audio-out (stereo headphone, Beats-branded in red)</li> <li>• DisplayPort supporting super high-definition external displays up to 2560×1600 resolution</li> </ul> <p><b>NOTE:</b> F4 incorporates all 3 video-out modes (HDMI, DP, and LCD). The DisplayPort and HDMI ports support 2 external displays in extend and mirror modes.</p> <ul style="list-style-type: none"> <li>• HDMI v1.4a supporting up to 1920×1200 @ 60-Hz with HDCP key</li> <li>• RJ-45 (Ethernet)</li> <li>• USB 3.0 and USB 2.0 ports (all USB ports support USB sleep and charge)</li> </ul> <p><b>NOTE:</b> HP ENVY 17 model numbers 17-3200 through 17-3299 are equipped only with USB 3.0 ports.</p>
<b>Keyboard/ pointing devices</b>	<p>Full-size Duracoat, island-style keyboard, in natural silver finish</p> <p>Radiance backlight, <b>f5</b> to toggle backlight on/off</p> <p>Imagepad with gesture support image sensor (HP-defined: scroll, pinch, zoom, rotate, 3-finger flick)</p> <p>Taps enabled as default</p>
<b>Power requirements</b>	<p>Supports a 120-W (PFC RC/V 3-wire) HP Smart AC adapter</p> <p>Supports a 9-cell, 91-Wh, 4.1-Ah, Li-ion battery</p>
<b>Security</b>	<p>Security cable slot</p>

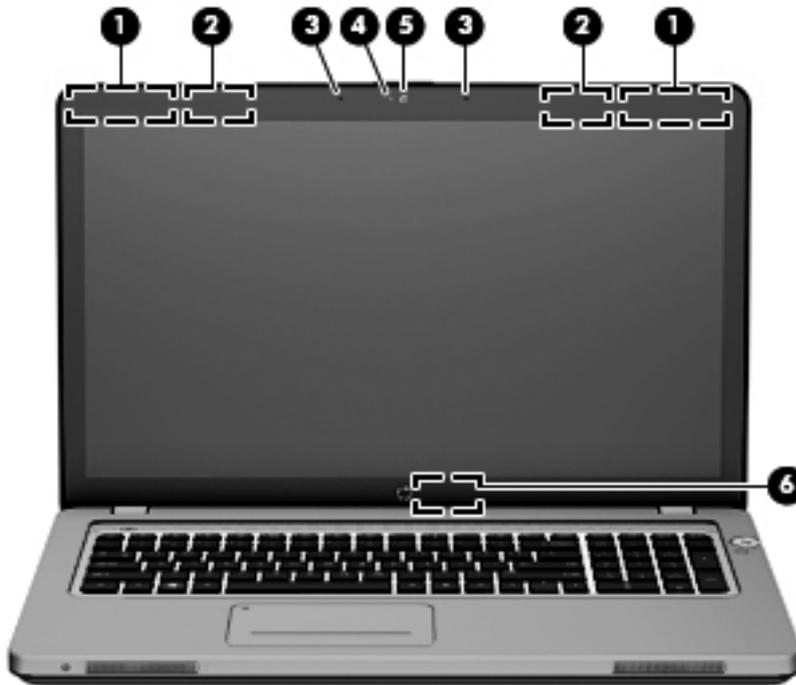
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<b>Category</b>	<b>Description</b>
<b>Operating system</b>	<b>Preinstalled:</b> <ul style="list-style-type: none"><li>• Windows 7 Home Premium (64-bit)</li><li>• Windows 7 Professional (64-bit)</li><li>• Windows 7 Ultimate (64-bit)</li></ul>
<b>Serviceability</b>	<b>End-user replaceable parts:</b> <ul style="list-style-type: none"><li>• AC adapter</li><li>• Hard drives (2)</li><li>• Memory modules (2)</li><li>• mSATA drive</li><li>• Optical drive</li><li>• Solid-state drive</li><li>• Subwoofer</li><li>• Wireless audio module</li><li>• WLAN module</li></ul>

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## 2 External component identification

### Display

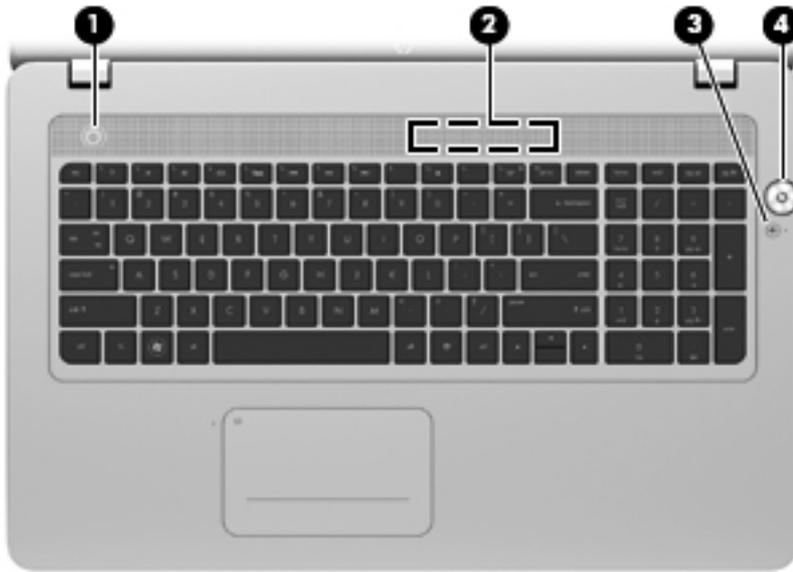


Item	Component	Description
(1)	WLAN antennas (2)*	Send and receive networking signals using up to 2 integrated antennas to a local wireless router or hub.
(2)	Proximity sensors (2) (select models only)	Detects your presence in front of the computer and turns the radiance backlight keyboard feature and the display off or on based on your proximity to the computer.  <b>NOTE:</b> To make sure that the display does not turn off while you are watching a movie or listening to music, the proximity sensors are disabled when you start PowerDVD, Windows Media Center, or Windows Media Player.
(3)	Internal microphones (2)	Record audio using the integrated microphones by specific programs. The microphones will automatically improve the audio to reduce ambient noise and provide echo cancellation.

Item	Component	Description
(4)	Webcam light	Turns on when the webcam is active.
(5)	HP TrueVision HD Webcam	Records video and captures still photographs.  To access the webcam, select <b>Start &gt; All Programs &gt; CyberLink &gt; CyberLink YouCam</b> .
(6)	Internal display switch	Turns off the display and initiates Sleep if the display is closed while the power is on.  <b>NOTE:</b> The internal display switch is not visible from the outside of the computer.

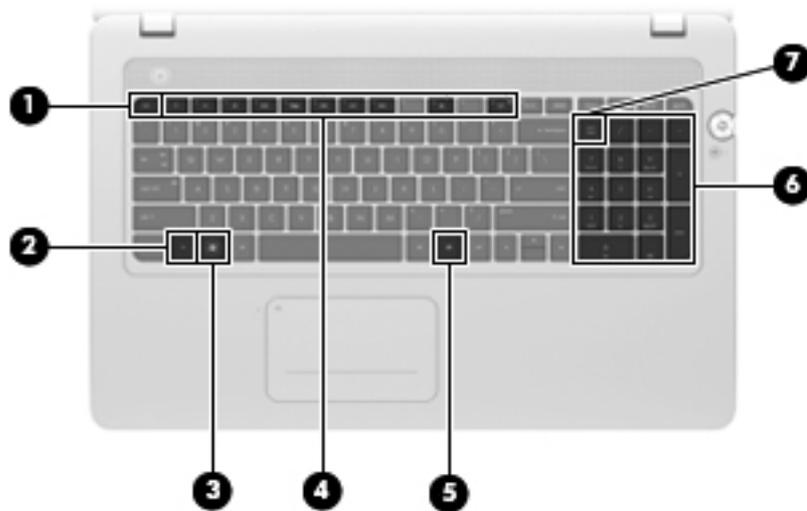
\*The antennas and IR emitters are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas and IR emitters free from obstructions. To see wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices*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

# Buttons and speakers



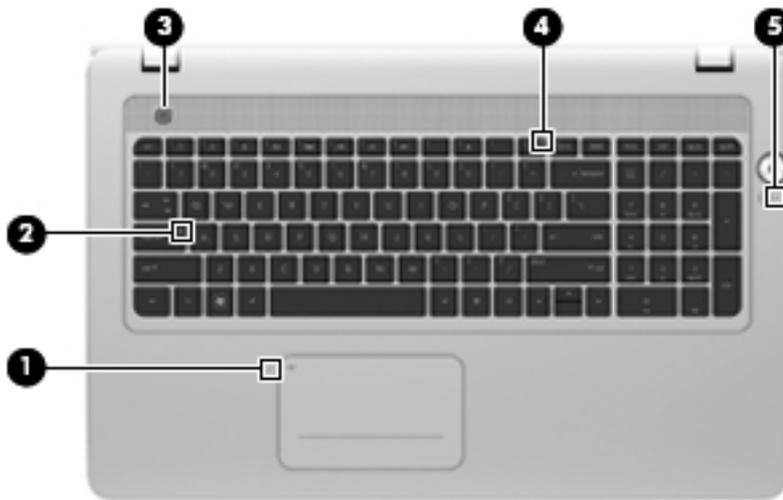
Item	Component	Description
(1)	Power button	<ul style="list-style-type: none"> <li>When the computer is off, press the button to turn on the computer.</li> <li>When the computer is on, press the button briefly to initiate Sleep.</li> <li>When the computer is in the Sleep state, press the button briefly 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, select <b>Start &gt; Control Panel &gt; System and Security &gt; Power Options</b>, or refer to the <i>HP Notebook Reference Guide</i>.</p>
(2)	Stereo speakers (2)	Produce sound with Beats Audio speakers.
(3)	Mute button	Mutes or restores speaker sound.
(4)	Beats Audio button	<p>Opens Beats Audio Control Panel, which allows you to view and control the audio and bass settings.</p> <p>Beats Audio is an enhanced audio feature that provides a deep, controlled bass while maintaining a clear sound.</p> <p><b>NOTE:</b> You can also open Beats Audio Control Panel by selecting <b>Start &gt; Control Panel &gt; Hardware and Sound &gt; Beats Audio Control Panel</b>.</p>

# Keys



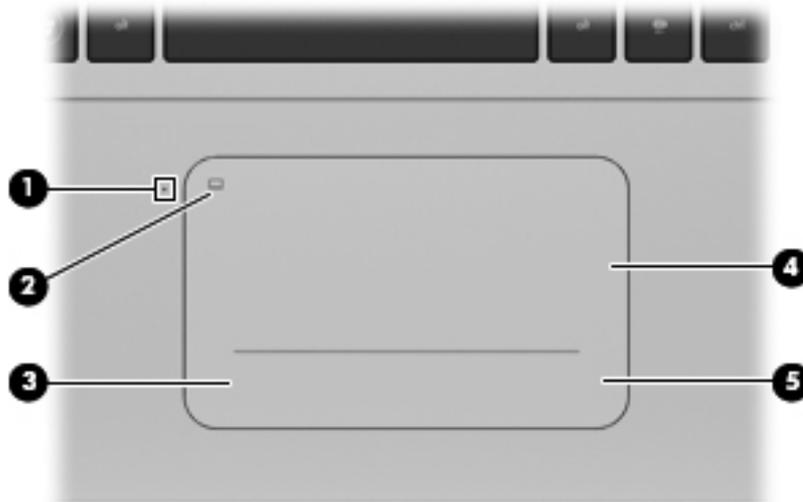
Item	Component	Description
(1)	<code>esc</code> key	Displays system information when pressed in combination with the <code>fn</code> key.
(2)	<code>fn</code> key	Executes the following functions: <ul style="list-style-type: none"> <li>When the key is pressed in combination with the <code>esc</code> key, system information is displayed.</li> <li>When the key is pressed in combination with the <code>b</code> key, Beats Audio is enabled or disabled.</li> </ul>
(3)	Windows logo key	Displays the Windows Start menu.
(4)	Action keys	Execute frequently used system functions.
(5)	<code>b</code> key	Enables or disables Beats Audio when pressed in combination with the <code>fn</code> key.
(6)	Windows applications key	Displays a shortcut menu for items beneath the pointer.
(7)	Integrated numeric keypad	Can be used like an external numeric keypad.
(8)	<code>num lock</code> key	Alternates between navigational and numeric functions of the integrated numeric keypad. <p><b>NOTE:</b> The keypad function that is active when the computer is turned off is reinstated when the computer is turned back on.</p>

# Lights



Item	Component	Description
(1)	Imagepad light	<ul style="list-style-type: none"><li>• Amber: The Imagepad is off.</li><li>• Off: The Imagepad is on.</li></ul>
(2)	Caps lock light	<ul style="list-style-type: none"><li>• White: Caps lock is on.</li><li>• Off: Caps lock is off.</li></ul>
(3)	Power light	<ul style="list-style-type: none"><li>• White: The computer is on.</li><li>• Blinking white: The computer is in the Sleep state.</li><li>• Off: The computer is off or in Hibernation.</li></ul>
(4)	Wireless light	<ul style="list-style-type: none"><li>• White: An integrated wireless device, such as a wireless local area network (WLAN) device, is enabled.</li><li>• Amber: All wireless devices are disabled.</li></ul>
(5)	Mute light	<ul style="list-style-type: none"><li>• Amber: Speaker sound is off.</li><li>• Off: Speaker sound is on.</li></ul>

# Imagepad



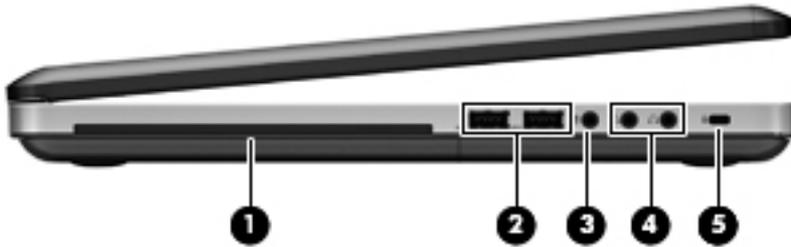
Item	Component	Description
(1)	Imagepad light	<ul style="list-style-type: none"><li>• Amber: The Imagepad is off.</li><li>• Off: The Imagepad is on.</li></ul>
(2)	Imagepad on/off button	Quickly double-tap this button to turn the Imagepad off or on.
(3)	Left Imagepad button	The bottom left corner of the Imagepad functions like the left button on an external mouse.
(4)	Imagepad zone	Moves the pointer and selects or activates items on the screen.
(5)	Right Imagepad button	The bottom right corner of the Imagepad functions like the right button on an external mouse

# Front



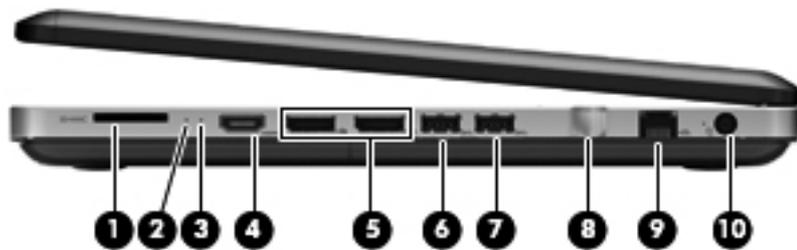
Component	Description
Stereo speakers (4)	Produce sound with Beats Audio speakers.

## Left side



Item	Component	Description
(1)	Optical drive	Reads and writes to an optical disc. <b>CAUTION:</b> To reduce the risk of damaging the computer, do not insert smaller (8 cm diameter) optical discs into the drive.
(2)	USB 3.0 ports (2)	Connect optional USB 3.0 devices and provide enhanced USB power performance. <b>NOTE:</b> The USB 3.0 ports are also compatible with USB 1.0 and 2.0 devices.
(3)	Audio-in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.
(4)	Audio-out (headphone) jacks (4)	Produce sound when connected to optional powered stereo speakers, headphones, ear buds, a headset, or television audio. <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> . <b>NOTE:</b> When a device is connected to the jack, the computer speakers are disabled.
(5)	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.

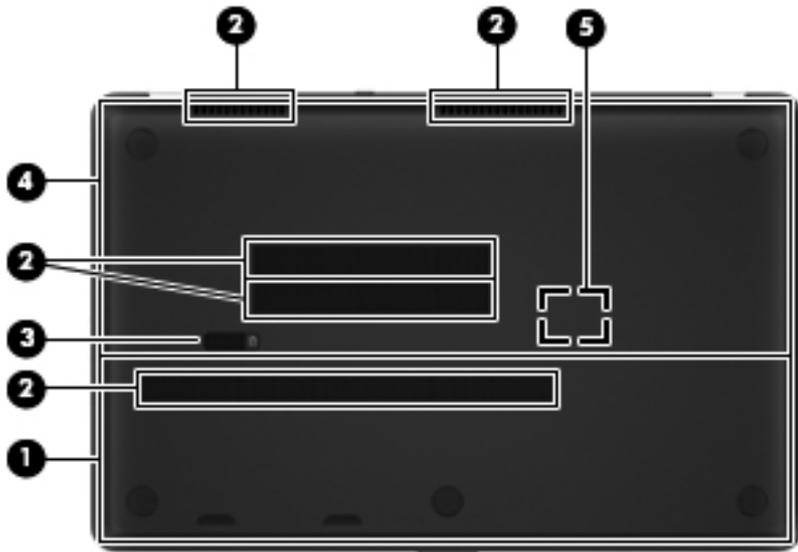
## Right side



Item	Component	Description
(1)	Digital Media Slot	<p>Supports the following digital card formats:</p> <ul style="list-style-type: none"> <li>• MultiMediaCard</li> <li>• Secure Digital (SD) Memory Card</li> <li>• Secure Digital High Capacity Memory Card</li> </ul>
(2)	Hard drive light	<ul style="list-style-type: none"> <li>• Blinking white: The hard drive is being accessed.</li> <li>• Amber: HP ProtectSmart Hard Drive Protection has temporarily parked the hard drive.</li> </ul> <p><b>NOTE:</b> For information on HP ProtectSmart Hard Drive Protection, refer to the <i>HP Notebook Reference Guide</i>.</p>
(3)	Power light	<ul style="list-style-type: none"> <li>• White: The computer is on.</li> <li>• Blinking white: The computer is in the Sleep state.</li> <li>• Off: The computer is off or in Hibernation.</li> </ul>
(4)	HDMI port (select models only)	Connects an optional video or audio device, such as a highdefinition television, any compatible digital or audio component, or a high-speed HDMI 1.4 device.
(5)	DisplayPorts (2)	Connect optional digital display devices, such as highperformance monitors or projectors.
(6)	USB 3.0 port	<p>Connect optional USB 3.0 devices and provide enhanced USB power performance.</p> <p><b>NOTE:</b> The USB 3.0 ports are also compatible with USB 1.0 and 2.0 devices.</p>
(7)	USB 2.0 port	Connect an optional USB device.
(8)	Volume dial	<p>Adjusts the speaker volume.</p> <p>Rotate the dial clockwise to increase the volume or rotate the dial counter-clockwise to decrease the volume.</p>
(9)	RJ-45 (network) jack	Connects a network cable.

<b>Item</b>	<b>Component</b>	<b>Description</b>
<b>(10)</b>	AC adapter light	<ul style="list-style-type: none"><li>• White: The computer is connected to external power, and the battery is fully charged.</li><li>• Amber: The computer is connected to external power, and the battery is charging.</li><li>• Blinking amber: The computer is connected to external power, and there is a battery error or the battery has reached a low or critical battery level.</li><li>• Off: The computer is running on battery power.</li></ul>
<b>(11)</b>	Power connector	Connects an AC adapter.

# Bottom



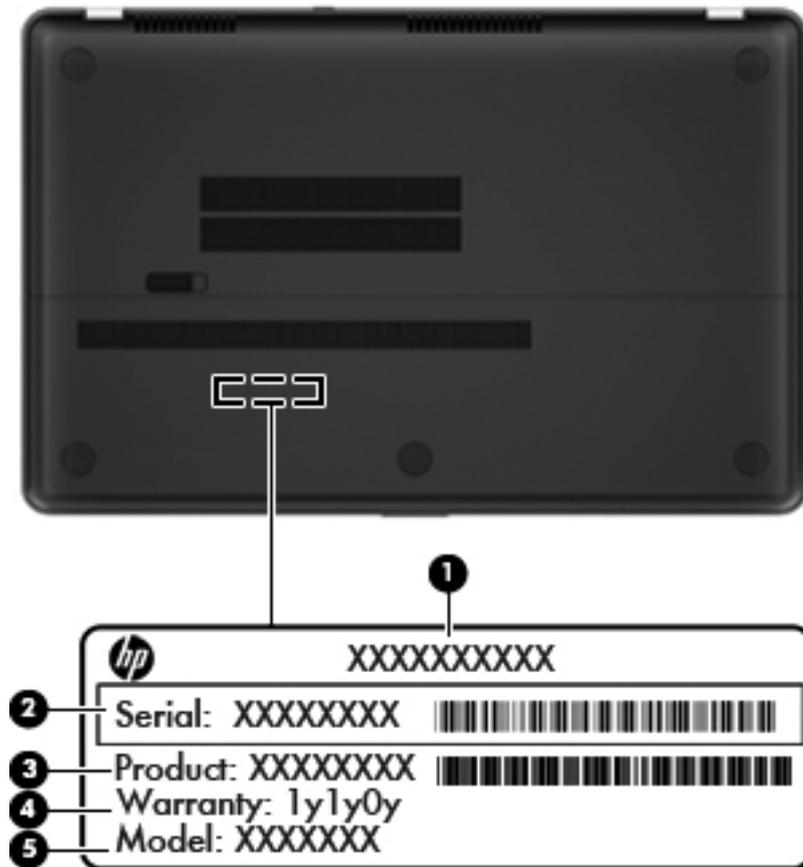
Item	Component	Description
(1)	Battery/hard drive cover	Provides access to the following components: <ul style="list-style-type: none"> <li>• battery</li> <li>• primary hard drive</li> <li>• secondary hard drive</li> <li>• wireless audio module</li> </ul>
(2)	Vent	Enables airflow to cool internal components.  <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)	Release latch	Releases the battery/hard drive cover.
(4)	Service access cover	Provides access to the following components: <ul style="list-style-type: none"> <li>• Memory modules</li> <li>• mSATA drive</li> <li>• Optical drive</li> <li>• RTC battery</li> <li>• Subwoofer</li> <li>• WLAN module</li> </ul>
(5)	HP Triple Bass Reflex Subwoofer	Provides superior bass sound.

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# 3 Illustrated parts catalog

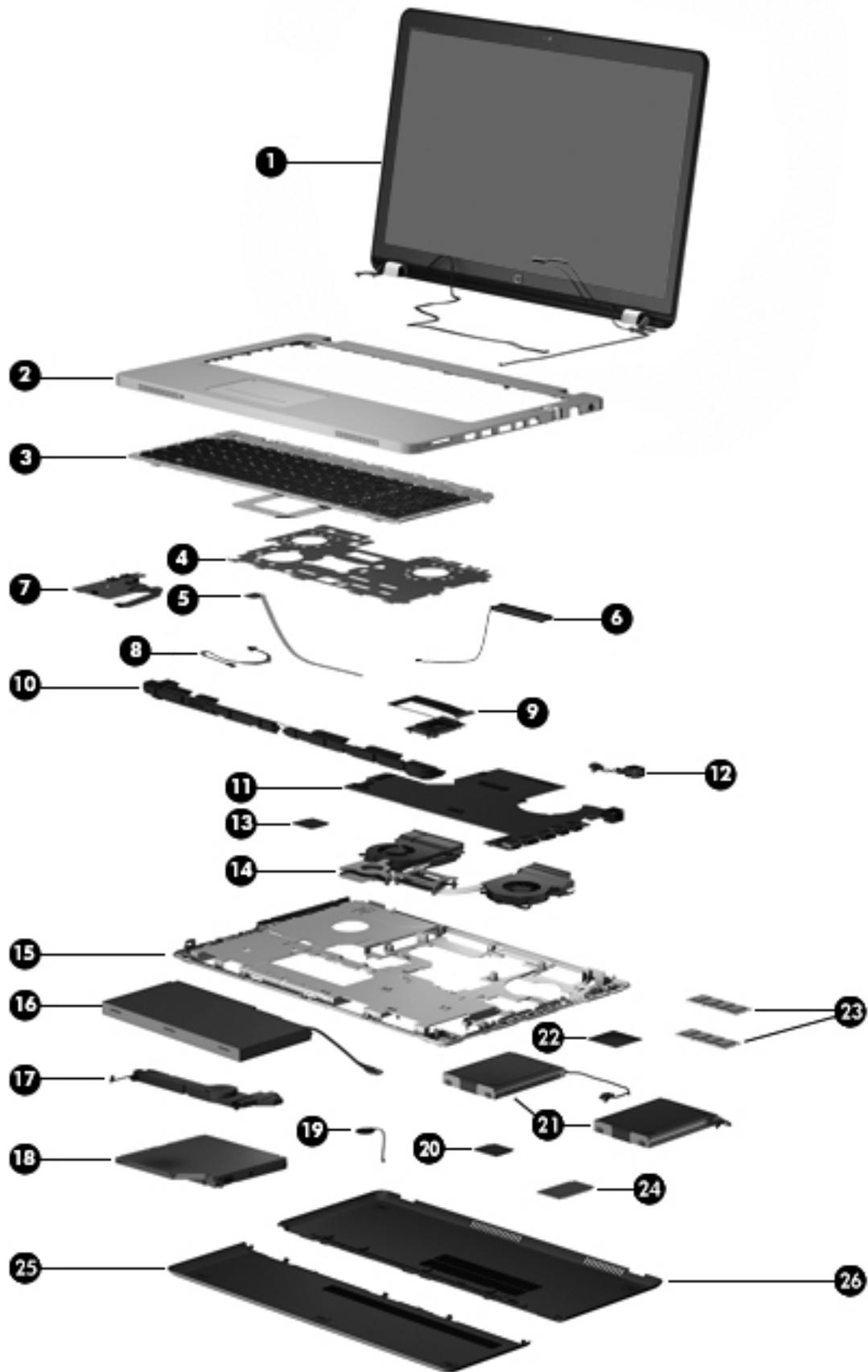
## Service tag

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



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

# Computer major components



<b>Item</b>	<b>Component</b>	<b>Spare part number</b>
<b>(1)</b>	<b>Display assembly</b> (includes display panel cable, webcamera/microphone module and cable, and 2 wireless antenna cables and transceivers):	
	17.3-in, FHD, AG, LED, FG, 3D display assembly in natural silver finish	665913-001
	17.3-in, FHD, AG, LED, FG, 3D display assembly in natural silver finish with Bluetooth module (includes Bluetooth module and cable)	668995-001
	17.3-in, FHD, AG, LED, FG, 2D display assembly in natural silver finish	665912-001
	17.3-in, FHD, AG, LED, FG, 2D display assembly in natural silver finish with Bluetooth module (includes Bluetooth module and cable)	668994-001
	17.3-in, HD, AG, LED, FG, 2D display assembly in natural silver finish	665911-001
	17.3-in, HD, AG, LED, FG, 2D display assembly in natural silver finish with Bluetooth module (includes Bluetooth module and cable)	668993-001
<b>(2)</b>	<b>Top cover</b> (includes TouchPad and cable):	
	For use only on computer models with USB 3.0 capability	690000-001
	For use only on computer models with USB 2.0 capability	665935-001
<b>(3)</b>	<b>Keyboard in natural silver finish</b> (includes keyboard cable and keyboard light cable):	
	For use in Belgium	665917-A41
	For use in Brazil	665917-201
	For use in Canada	665917-121
	For use in Denmark, Finland, Norway	665917-DH1
	For use in France	665917-051
	For use in Germany	665917-041
	For use in Italy	665917-061
	For use in Latin America	665917-161
	For use in the Netherlands	665917-B31
	For use in Portugal	665917-131
	For use in Russia	665917-251
	For use in Saudi Arabia	665917-171
	For use in Spain	665917-071
	For use in Switzerland	665917-BG1
	For use in Turkey	665917-141
	For use in the United Kingdom and Singapore	665917-031
	For use in the United States	665917-001
<b>(4)</b>	<b>Keyboard bracket:</b>	
	For use only on computer models with USB 3.0 capability	689994-001

Item	Component	Spare part number
	For use only on computer models with USB 2.0 capability	665910-001
(5)	<b>Power button board</b> (includes cable)	665921-001
(6)	<b>Top speaker</b> (includes cable)	665927-001
(7)	<b>Audio/USB board</b> (includes cable):	
	For use only on computer models with USB 3.0 capability	689997-001
	For use only on computer models with USB 2.0 capability	685720-001
(8)	<b>TouchPad LED board</b> (includes cable)	665922-001
(9)	<b>Card Reader board</b> (includes cable):	
	For use only on computer models with USB 3.0 capability	689995-001
	For use only on computer models with USB 2.0 capability	665923-001
(10)	<b>Front speakers</b> (include left and right front speakers, cables, and rubber isolators)	665926-001
(11)	<b>System board</b> (includes 1 GB of discrete graphics subsystem memory and replacement thermal material):	
	Equipped with the Intel HM76 chipset and 7850M graphics subsystem for use only on computer models equipped with a 3D display assembly	689999-001
	Equipped with the Intel HM76 chipset and 7850M graphics subsystem for use only on computer models equipped with a 2D display assembly	689998-001
	Equipped with the Intel HM65 chipset and 6770M graphics subsystem for use only on computer models equipped with a 3D display assembly	665934-001
	Equipped with the Intel HM65 chipset and 6770M graphics subsystem for use only on computer models equipped with a 2D display assembly	665933-001
	<b>Thermal Material Kit</b> (includes replacement thermal paste and thermal pads)	634366-001
(12)	<b>Power connector cable</b>	665907-001
(13)	<b>Intel Core processor</b> (includes replacement thermal material):	
	Intel Quad Core i7-3820QM 2.70-GHz processor (SC turbo up to 3.70-GHz; 1600-MHz FSB, 8.0-MB L3 cache, 45 W)	681284-001
	Intel Quad Core i7-3720QM 2.60-GHz processor (SC turbo up to 3.60-GHz; 1600-MHz FSB, 6.0-MB L3 cache, 45 W)	681283-001
	Intel Quad Core i7-3612QM 2.10-GHz processor (SC turbo up to 3.10-GHz; 1600-MHz FSB, 6.0-MB L3 cache, 35 W)	680647-001
	Intel Quad Core i7-3610QM 2.30-GHz processor (SC turbo up to 3.30-GHz; 1600-MHz FSB, 6.0-MB L3 cache, 45 W)	680646-001
	Intel Quad Core i7-2860QM 2.50-GHz processor (SC turbo up to 3.60-GHz), 8.0-MB L3 cache, 1600-MHz FSB, 45 W)	666175-001
	Intel Quad Core i7-2760QM 2.40-GHz processor (SC turbo up to 3.50-GHz), 6.0-MB L3 cache, 1600-MHz FSB, 45 W)	666174-001
	Intel Quad Core i7-2670QM 2.40-GHz processor (SC turbo up to 3.50-GHz), 6.0-MB L3 cache, 1600-MHz FSB, 45 W)	665116-001

<b>Item</b>	<b>Component</b>	<b>Spare part number</b>
	Intel Quad Core i7-2640M 2.80-GHz processor (SC turbo up to 3.10-GHz), 4.0-MB L3 cache, 1333-MHz FSB, 35 W)	666173-001
	Intel Dual Core i5-3210M 2.50-GHz processor (SC turbo up to 3.10-GHz; 1600-MHz FSB, 3.0-MB L3 cache, 35 W)	680645-001
	Intel Dual Core i5-2450M 2.50-GHz processor (SC turbo up to 3.10-GHz), 3.0-MB L3 cache, 1333-MHz FSB, 35 W)	676359-001
	Intel Dual Core i5-2430M 2.40-GHz processor (SC turbo up to 3.00-GHz), 3.0-MB L3 cache, 1333-MHz FSB, 35 W)	653341-001
<b>(14)</b>	<b>Fan/heat sink assembly</b> (includes replacement thermal material):	
	For use only on computer models with USB 3.0 capability	689993-001
	For use only on computer models with USB 2.0 capability	665908-001
<b>(15)</b>	<b>Base enclosure</b> (includes 5 rubber feet)	665903-001
<b>(16)</b>	<b>Battery</b> (9-cell, 91-Wh, 4.1-Ah, Li-ion)	657503-001
<b>(17)</b>	<b>Subwoofer</b> (includes cable and rubber isolators)	665928-001
<b>(18)</b>	<b>Optical drive</b> (includes left and right mounting brackets, connector board, connector cable, and screws):	
	Blu-ray ROM DVD±RW Super Multi Double-Layer FX Drive	665919-001
	DVD±RW and CD-RW Super Multi Double-Layer FX Combo Drive	665918-001
<b>(19)</b>	<b>RTC battery</b> (includes cable)	651948-001
<b>(20)</b>	<b>WLAN module:</b>	
	Intel Centrino Advanced-N 6235 WLAN module	670292-001
	Intel Centrino Advanced-N 6230 WLAN module	636672-001
	Intel Centrino Ultimate-N 6300 WLAN module	572511-001
<b>(21)</b>	<b>Hard drive</b> (2, do not include the hard drive bracket, connector cables, or screws. These components are included in the Hard Drive Hardware Kit, spare part number 665909-001):	
	1-TB, 5400-rpm, 12.7-mm	638974-001
	750-GB, 7200-rpm, 9.5-mm	633252-001
	750-GB, 7200-rpm, 9.5-mm hybrid	684506-001
	500-GB, 7200-rpm, 9.5-mm	634925-001
	320-GB, 7200-rpm, 9.5-mm	641672-001
	<b>Solid-state drive</b> (not illustrated, does not include bracket, cable, or screws):	
	300-GB solid-state drive	665930-001
	256-GB solid-state drive	689223-001
	160-GB solid-state drive	665929-001
<b>(22)</b>	<b>Wireless audio module</b>	668115-001

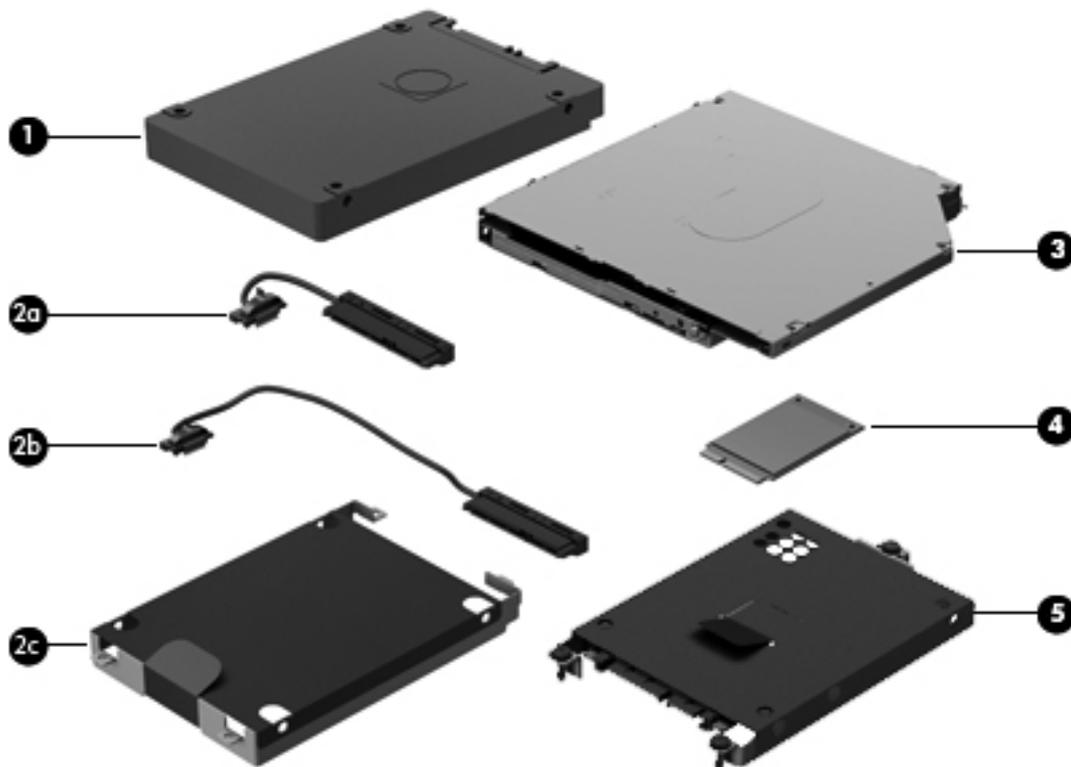
<b>Item</b>	<b>Component</b>	<b>Spare part number</b>
<b>(23)</b>	<b>Memory modules (2):</b>	
	PC3, 12800, 1666-MHz	
	8 GB	670034-001
	4 GB	641369-001
	2 GB	652972-001
	PC3, 10600, 1333-MHz	
	8 GB	634091-001
	4 GB	621569-001
<b>(24)</b>	<b>mSATA drive:</b>	
	128-GB mSATA drive	665931-001
	80-GB mSATA drive	665932-001
	<b>Accessory Cover Kit</b> , includes:	665924-001
<b>(25)</b>	Battery/hard drive cover (includes 3 rubber feet)	
<b>(26)</b>	Service access cover (includes 2 rubber feet and battery/hard drive cover release mechanism)	

## Accessory Cover Kit



Item	Component	Spare part number
	<b>Accessory Cover Kit</b> includes:	665924-001
(1)	Battery/hard drive cover (includes 3 rubber feet)	
(2)	Service access cover (includes 2 rubber feet and battery/hard drive cover release mechanism)	

# Mass storage devices



Item	Component	Spare part number
(1)	<b>Hard drive</b> (does not include hard drive bracket, cables, or screws):	
	1-TB, 5400-rpm, 12.7-mm	638974-001
	750-GB, 7200-rpm, 9.5-mm	633252-001
	750-GB, 7200-rpm, 9.5-mm hybrid	684506-001
	500-GB, 7200-rpm, 9.5-mm	634925-001
	320-GB, 7200-rpm, 9.5-mm	641672-001
	<b>Hard Drive Hardware Kit</b> , includes:	665909-001
(2a)	Primary hard drive cable	
(2b)	Secondary hard drive cable	
(2c)	Hard drive bracket	
	Hard drive screws (not illustrated)	
(3)	<b>Optical drive</b>	
	Blu-ray ROM DVD±RW Super Multi Double-Layer FX Drive (includes left and right mounting brackets, connector board, connector cable, and screws)	665919-001
	DVD±RW and CD-RW Super Multi Double-Layer FX Combo Drive (includes left and right mounting brackets, connector board, connector cable, and screws)	665918-001

Item	Component	Spare part number
<b>(4)</b>	<b>mSATA drive:</b>	
	128-GB mSATA drive	665931-001
	80-GB mSATA drive	665932-001
<b>(5)</b>	<b>Solid-state drive</b> (does not include bracket, cable, or screws):	
	300-GB solid-state drive	665930-001
	256-GB solid-state drive	689223-001
	160-GB solid-state drive	665929-001

## Miscellaneous parts

Component	Spare part number
<b>120-W HP Smart AC adapter (PFC RC/V 3-wire)</b>	645156-001
<b>Bluetooth module</b> 4.0 EDR (where is Bluetooth module cable spared??)	655792-001
<b>17-in. protective cover</b>	665906-001
<b>3D glasses</b> with extra nose pieces	622779-001
<b>HDMI-to-VGA adapter</b>	530607-001
<b>Power cord</b> (3-pin, black, 1.83-m):	
For use in Brazil	490371-202
For use in Europe	490371-021
For use in Italy	490371-061
For use in North America	490371-001
For use in Switzerland	490371-111
For use in the United Kingdom and Singapore	490371-031
<b>Protective cover</b> for 3D glasses	622778-001
<b>Screw Kit</b>	665925-001
<b>Tote bag with zipper</b>	675458-001

## Sequential part number listing

Spare part number	Description
490371-001	Power cord for use in North America (3-pin, black, 1.83-m)
490371-021	Power cord for use in Europe (3-pin, black, 1.83-m)
490371-031	Power cord for use in the United Kingdom and Singapore (3-pin, black, 1.83-m)
490371-061	Power cord for use in Italy (3-pin, black, 1.83-m)
490371-111	Power cord for use in Switzerland (3-pin, black, 1.83-m)
490371-202	Power cord for use in Brazil (3-pin, black, 1.83-m)
530607-001	HDMI-to-VGA adapter
572511-001	Intel Centrino Ultimate-N 6300 WLAN module
621569-001	4-GB memory module (PC3, 10600, 1333-MHz)
622778-001	Protective cover for 3D glasses
622779-001	3D glasses with extra nose pieces
633252-001	750-GB, 7200-rpm, 9.5-mm hard drive (does not include hard drive bracket, cables, or screws)
634091-001	8-GB memory module (PC3, 10600, 1333-MHz)
634366-001	Thermal Material Kit (includes thermal paste and thermal pads)
634925-001	500-GB, 7200-rpm, 9.5-mm hard drive (does not include hard drive bracket, cables, or screws)
636672-001	Intel Centrino Advanced-N 6230 WLAN module
638974-001	1-TB, 5400-rpm, 12.7-mm hard drive (does not include hard drive bracket, cables, or screws)
641369-001	4-GB memory module (PC3, 12800, 1600-MHz)
641672-001	320-GB, 7200-rpm, 9.5-mm hard drive (does not include hard drive bracket, cables, or screws)
645156-001	120-W HP Smart AC adapter (PFC RC/V 3-wire)
651948-001	RTC battery (includes cable)
652972-001	2-GB memory module (PC3, 12800, 1600-MHz)
653341-001	Intel Dual Core i5-2430M 2.40-GHz processor (SC turbo up to 3.00-GHz), 3.0-MB L3 cache, 1333-MHz FSB, 35 W (includes replacement thermal material)
655792-001	Bluetooth module 4.0 EDR (where is Bluetooth module cable spared??)
657503-001	9-cell, 91-Wh, 4.1-Ah, Li-ion battery
665116-001	Intel Quad Core i7-2670QM 2.40-GHz processor (SC turbo up to 3.50-GHz), 6.0-MB L3 cache, 1600-MHz FSB, 45 W (includes replacement thermal material)
665903-001	Base enclosure (includes 5 rubber feet)
665906-001	17-in. protective cover
665907-001	Power connector cable

<b>Spare part number</b>	<b>Description</b>
665908-001	Fan/heat sink assembly for use on computer models equipped with USB 2.0 capability (includes replacement thermal material)
665909-001	Hard Drive Hardware Kit (includes hard drive bracket, primary hard drive cable, secondary hard drive cable, and screws)  <b>NOTE:</b> See <a href="#">Mass storage devices on page 25</a> for more Hard Drive Hardware Kit component information.
665910-001	Keyboard bracket for use on computer models equipped with USB 2.0 capability
665911-001	17.3-in, HD, AG, LED, FG, 2D display assembly in natural silver finish (includes display panel cable, webcam/microphone module and cable, and 2 wireless antenna cables and transceivers)
665912-001	17.3-in, FHD, AG, LED, FG, 2D display assembly in natural silver finish (includes display panel cable, webcam/microphone module and cable, and 2 wireless antenna cables and transceivers)
665913-001	17.3-in, FHD, AG, LED, FG, 3D display assembly in natural silver finish (includes display panel cable, webcam/microphone module and cable, and 2 wireless antenna cables and transceivers)
665917-001	Keyboard in natural silver finish for use in the United States (includes keyboard cable and keyboard light cable)
665917-031	Keyboard in natural silver finish for use in the United Kingdom (includes keyboard cable and keyboard light cable)
665917-041	Keyboard in natural silver finish for use in Germany (includes keyboard cable and keyboard light cable)
665917-051	Keyboard in natural silver finish for use in France (includes keyboard cable and keyboard light cable)
665917-061	Keyboard in natural silver finish for use in Italy (includes keyboard cable and keyboard light cable)
665917-071	Keyboard in natural silver finish for use in Spain (includes keyboard cable and keyboard light cable)
665917-121	Keyboard in natural silver finish for use in Canada (includes keyboard cable and keyboard light cable)
665917-131	Keyboard in natural silver finish for use in Portugal (includes keyboard cable and keyboard light cable)
665917-141	Keyboard in natural silver finish for use in Turkey (includes keyboard cable and keyboard light cable)
665917-161	Keyboard in natural silver finish for use in Latin America (includes keyboard cable and keyboard light cable)
665917-171	Keyboard in natural silver finish for use in Saudi Arabia (includes keyboard cable and keyboard light cable)
665917-201	Keyboard in natural silver finish for use in Brazil (includes keyboard cable and keyboard light cable)
665917-251	Keyboard in natural silver finish for use in Russia (includes keyboard cable and keyboard light cable)

Spare part number	Description
665917-A41	Keyboard in natural silver finish for use in Belgium (includes keyboard cable and keyboard light cable)
665917-B31	Keyboard in natural silver finish for use in the Netherlands (includes keyboard cable and keyboard light cable)
665917-BG1	Keyboard in natural silver finish for use in Switzerland (includes keyboard cable and keyboard light cable)
665917-DH1	Keyboard in natural silver finish for use in Denmark, Finland, and Norway (includes keyboard cable and keyboard light cable)
665918-001	DVD±RW and CD-RW Super Multi Double-Layer FX Combo Drive (includes left and right mounting brackets, connector board, connector cable, and screws)
665919-001	Blu-ray ROM DVD±RW Super Multi Double-Layer FX Drive (includes left and right mounting brackets, connector board, connector cable, and screws)
665921-001	Power button board (includes cable)
665922-001	TouchPad LED board (includes cable)
665923-001	Card Reader board for use on computer models equipped with USB 2.0 capability (includes cable)
665924-001	Accessory Cover Kit (includes the battery/hard drive cover and the service access cover)
	<b>NOTE:</b> See <a href="#">Accessory Cover Kit on page 24</a> for more Accessory Cover Kit component information.
665925-001	Screw Kit
665926-001	Front speakers (include left and right front speakers, cables, and rubber isolators)
665927-001	Top speaker (includes cable)
665928-001	Subwoofer (includes cable and rubber isolators)
665929-001	160-GB solid-state drive (does not include bracket, cable, or screws)
665930-001	300-GB solid-state drive (does not include bracket, cable, or screws)
665931-001	128-GB mSATA drive
665932-001	80-GB mSATA drive
665933-001	System board equipped with the Intel HM65 chipset and 6770M graphics subsystem for use only on computer models equipped with a 2D display assembly (includes 1 GB of discrete graphics subsystem memory and replacement thermal material)
665934-001	System board equipped with the Intel HM65 chipset and 6770M graphics subsystem for use only on computer models equipped with a 3D display assembly (includes 1 GB of discrete graphics subsystem memory and replacement thermal material)
665935-001	Top cover for use on computer models equipped with USB 2.0 capability (includes TouchPad and cable)
666173-001	Intel Quad Core i7-2640M 2.80-GHz processor (SC turbo up to 3.10-GHz), 4.0-MB L3 cache, 1333-MHz FSB, 35 W (includes replacement thermal material)
666174-001	Intel Quad Core i7-2760QM 2.40-GHz processor (SC turbo up to 3.50-GHz), 6.0-MB L3 cache, 1600-MHz FSB, 45 W (includes replacement thermal material)

<b>Spare part number</b>	<b>Description</b>
666175-001	Intel Quad Core i7-2860QM 2.50-GHz processor (SC turbo up to 3.60-GHz), 8.0-MB L3 cache, 1600-MHz FSB, 45 W (includes replacement thermal material)
668115-001	Wireless audio module
668993-001	17.3-in, HD, AG, LED, FG, 2D display assembly in natural silver finish with Bluetooth module (includes Bluetooth module and cable, display panel cable, webcam/microphone module and cable, and 2 wireless antenna cables and transceivers)
668994-001	17.3-in, FHD, AG, LED, FG, 2D display assembly in natural silver finish with Bluetooth module (includes Bluetooth module and cable, display panel cable, webcam/microphone module and cable, and 2 wireless antenna cables and transceivers)
668995-001	17.3-in, FHD, AG, LED, FG, 3D display assembly in natural silver finish with Bluetooth module (includes Bluetooth module and cable, display panel cable, webcam/microphone module and cable, and 2 wireless antenna cables and transceivers)
670034-001	8-GB memory module (PC3, 12800, 1600-MHz)
670292-001	Intel Centrino Advanced-N 6235 WLAN module
675458-001	Tote bag with zipper
676359-001	Intel Dual Core i5-2450M 2.50-GHz processor (SC turbo up to 3.10-GHz), 3.0-MB L3 cache, 1333-MHz FSB, 35 W (includes replacement thermal material)
680645-001	Intel Dual Core i5-3210M 2.50-GHz processor (SC turbo up to 3.10-GHz; 1600-MHz FSB, 3.0-MB L3 cache, 35 W; includes replacement thermal material)
680646-001	Intel Quad Core i7-3610QM 2.30-GHz processor (SC turbo up to 3.30-GHz; 1600-MHz FSB, 6.0-MB L3 cache, 45 W; includes replacement thermal material)
680647-001	Intel Quad Core i7-3612QM 2.10-GHz processor (SC turbo up to 3.10-GHz; 1600-MHz FSB, 6.0-MB L3 cache, 35 W; includes replacement thermal material)
681283-001	Intel Quad Core i7-3720QM 2.60-GHz processor (SC turbo up to 3.60-GHz; 1600-MHz FSB, 6.0-MB L3 cache, 45 W; includes replacement thermal material)
681284-001	Intel Quad Core i7-3820QM 2.70-GHz processor (SC turbo up to 3.70-GHz; 1600-MHz FSB, 8.0-MB L3 cache, 45 W; includes replacement thermal material)
684506-001	750-GB, 7200-rpm, 9.5-mm hybrid hard drive (does not include hard drive bracket, connector cable, or screws)
685720-001	Audio/USB board for use on computer models equipped with USB 2.0 capability (includes 2 cables)
689223-001	256-GB solid-state drive (does not include bracket, cable, or screws)
689993-001	Fan/heat sink assembly for use on computer models equipped with USB 3.0 capability (includes replacement thermal material)
689994-001	Keyboard bracket for use on computer models equipped with USB 3.0 capability
689995-001	Card Reader board for use on computer models equipped with USB 3.0 capability (includes cable)
689997-001	Audio/USB board for use on computer models equipped with USB 3.0 capability (includes 2 cables)
689998-001	System board equipped with the Intel HM76 chipset and 7850M graphics subsystem for use only on computer models equipped with a 2D display assembly (includes 1 GB of discrete graphics subsystem memory and replacement thermal material)

---

<b>Spare part number</b>	<b>Description</b>
689999-001	System board equipped with the Intel HM76 chipset and 7850M graphics subsystem for use only on computer models equipped with a 3D display assembly (includes 1 GB of discrete graphics subsystem memory and replacement thermal material)
690000-001	Top cover for use on computer models equipped with USB 3.0 capability (includes TouchPad button board and cable and TouchPad and 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

### Service considerations

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

---

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

---

### Plastic parts

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

---

### Cables and connectors

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

---

Cables must be handled with extreme care to avoid damage. Apply only the tension required to unseat or seat the cables during removal and insertion. Handle cables by the connector whenever possible. In all cases, avoid bending, twisting, or tearing cables. Be sure that cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced. Handle flex cables with extreme care; these cables tear easily.

## Drive handling

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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 an internal 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 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 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.

Before touching an electronic component, discharge static electricity by using the guidelines described in this section.

Avoid touching pins, leads, and circuitry. Handle electronic components as little as possible.

If you remove a component, place it in an electrostatic-safe container.

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

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

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

## Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe tubes, bags, or boxes.
- Protect ESD-sensitive parts and assemblies with conductive or approved containers or packaging.
- Keep ESD-sensitive parts in their containers until the parts arrive at static-free workstations.
- Place items on a grounded surface before removing items from their containers.
- Always be properly grounded when touching a component or assembly.
- Store reusable ESD-sensitive parts from assemblies in protective packaging or nonconductive foam.
- Use transporters and conveyors made of antistatic belts and roller bushings. Be sure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

## Workstation guidelines

Follow these grounding workstation guidelines:

- Cover the workstation with approved static-shielding material.
- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.
- Use conductive field service tools, such as cutters, screwdrivers, and vacuums.
- When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and Styrofoam.
- Handle ESD-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.

## Equipment guidelines

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

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megohm  $\pm 10\%$  resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, use alligator clips to connect a wrist strap.
- When standing, use foot straps and a grounded floor mat. Foot straps (heel, toe, or boot straps) can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use foot straps on both feet with a minimum of one megohm resistance between the operator and ground. To be effective, the conductive must be worn in contact with the skin.

The following grounding equipment is recommended to prevent electrostatic damage:

- Antistatic tape
- Antistatic smocks, aprons, and sleeve protectors
- Conductive bins and other assembly or soldering aids
- Nonconductive foam
- Conductive tabletop workstations with ground cords of one megohm resistance
- Static-dissipative tables or floor mats with hard ties to the ground
- Field service kits
- Static awareness labels
- Material-handling packages
- Nonconductive plastic bags, tubes, or boxes
- Metal tote boxes
- Electrostatic voltage levels and protective materials

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

<b>Material</b>	<b>Use</b>	<b>Voltage protection level</b>
Antistatic plastics	Bags	1,500 V
Carbon-loaded plastic	Floor mats	7,500 V
Metallized laminate	Floor mats	5,000 V

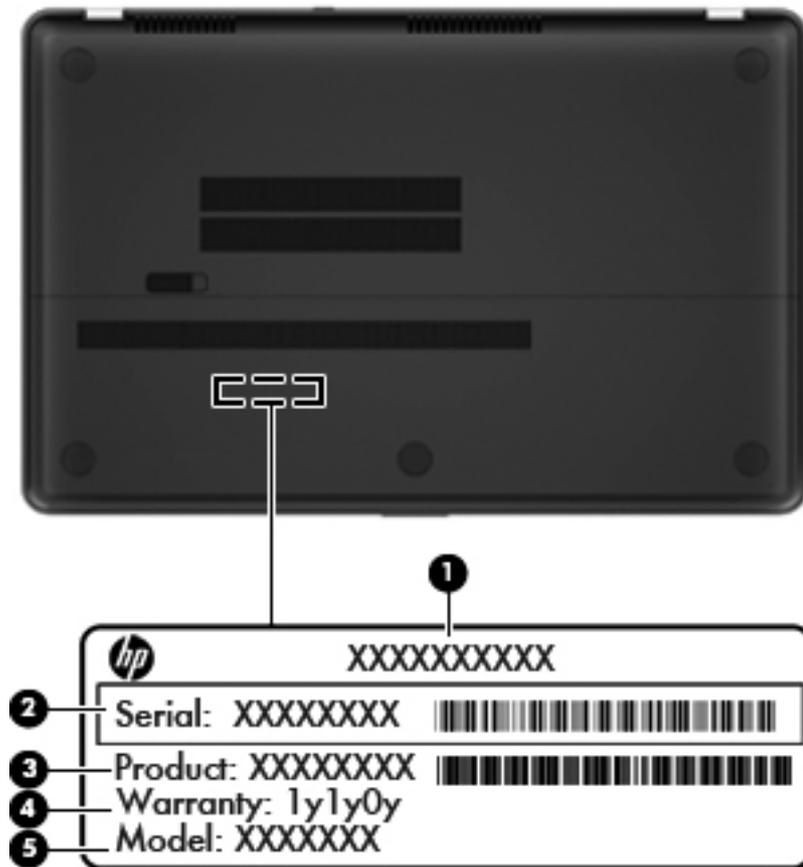
# Component replacement procedures

This chapter provides removal and replacement procedures.

There are as many as 96 screws that must be removed, replaced, or loosened when servicing the computer. Make special note of each screw size and location during removal and replacement.

## Service tag

When ordering parts or requesting information, provide the computer serial number and model number provided on the service tag. The battery must be removed to access the service tag. See [Battery](#) on page 39 for battery removal procedures.



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.

Item	Component	Description
(4)	Warranty period	This number describes the duration of the warranty period for the computer.
(5)	Model description	This is the alphanumeric identifier used to locate documents, drivers, and support for the computer.

## Battery

Description	Spare part number
(9-cell, 91-Wh, 4.1-Ah, Li-ion) battery	657503-001

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.

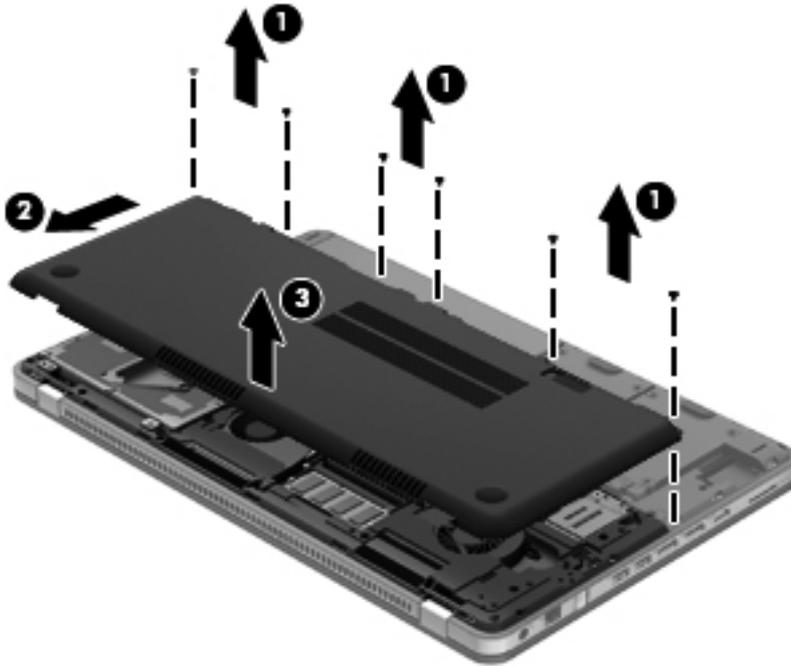
Remove the battery:

1. Slide the release latch **(1)**, and then remove the battery/hard drive cover **(2)**. The battery/hard drive cover is included in the Accessory Cover Kit, spare part number 665924-001.



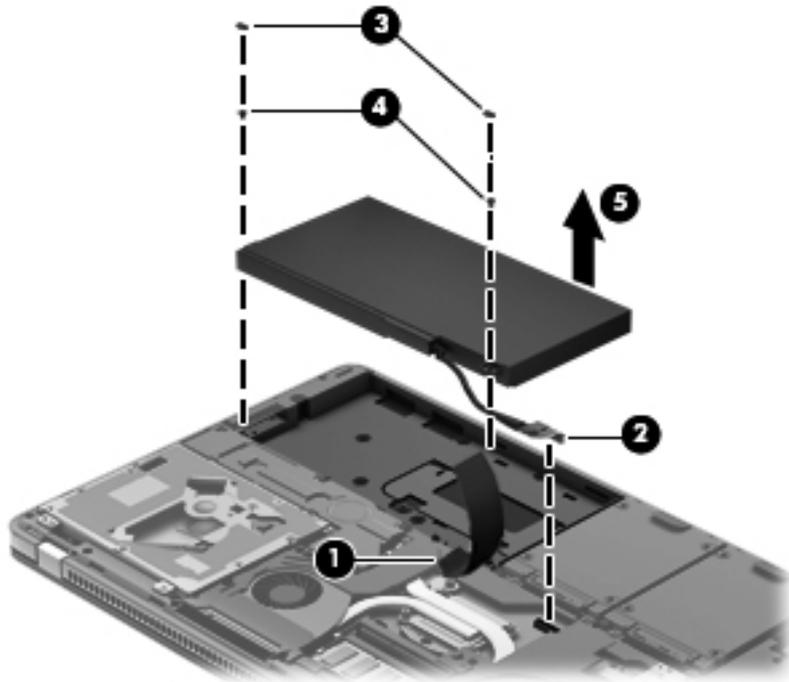
2. Remove the six Phillips PM2.0×3.7 screws **(1)** that secure the service access cover to the computer.
3. Release the service access cover **(2)** by sliding it toward the back of the computer.

4. Remove the service access cover **(3)**. The service access cover is included in the Accessory Cover Kit, spare part number 665924-001.



5. Release the shielding **(1)** that covers the battery cable and connector. (The shielding is attached to the base enclosure with double-sided adhesive.)
6. Disconnect the battery cable **(2)** from the system board.
7. Remove the screw covers **(3)** that protect the battery retention screws.
8. Remove the two Torx T8M2.5×3.8 screws **(4)** that secure the battery to the computer.

9. Remove battery **(5)**.



Reverse this procedure to install the battery.

## Subwoofer

Description	Spare part number
Subwoofer (includes cable and rubber isolators)	665928-001

Before removing the subwoofer, follow these steps:

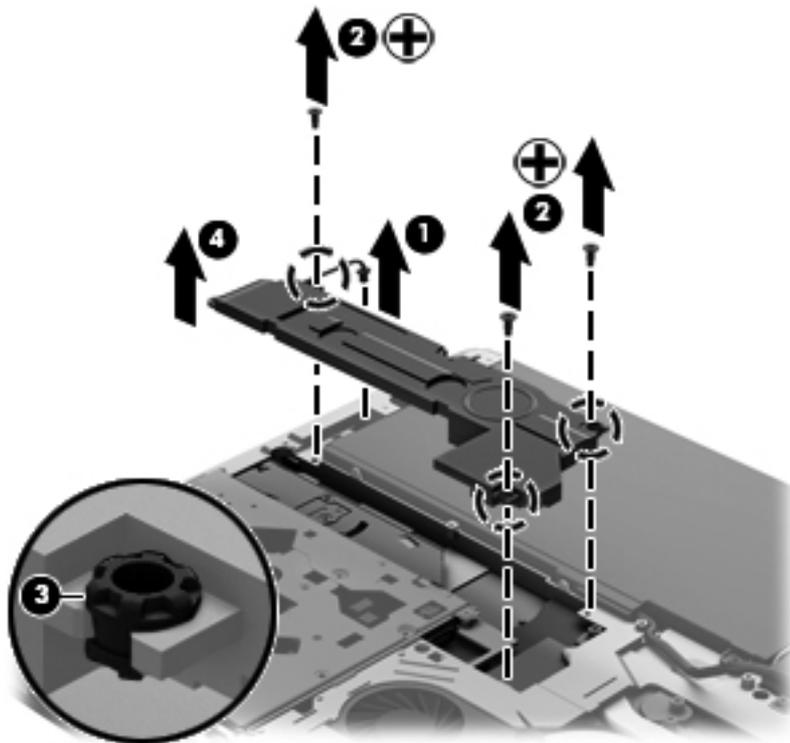
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Disconnect the battery cable from the system board (see [Battery on page 39](#)).

Remove the subwoofer:

1. Disconnect the subwoofer cable **(1)** from the system board.
2. Remove the three Phillips PM2.5×6.5 shoulder screws **(2)** that secure the subwoofer to the computer.

 **NOTE:** When removing the front speakers, make note of the location of the three isolators **(3)** that are installed in the screw holes.

3. Remove the subwoofer (4).



Reverse this procedure to install the subwoofer.

## Optical drive

 **NOTE:** The optical drive spare part kit includes the left and right mounting brackets, the connector board, the connector cable, and screws.

Description	Spare part number
Blu-ray ROM DVD±RW Super Multi Double-Layer FX Drive	665919-001
DVD±RW and CD-RW Super Multi Double-Layer FX Combo Drive	665918-001

Before removing the optical drive, follow these steps:

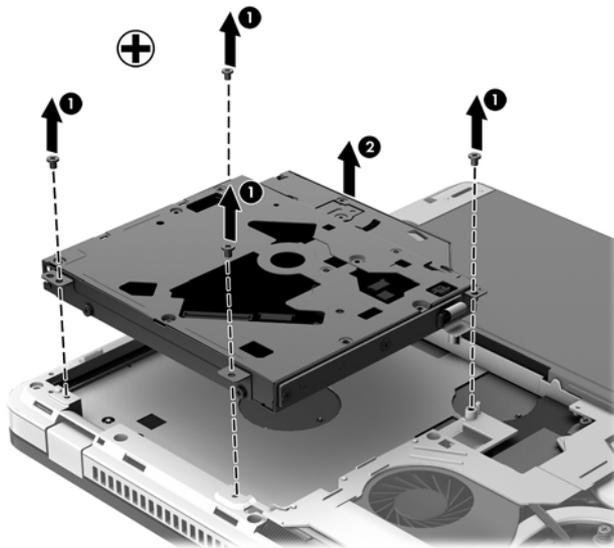
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Disconnect the battery cable from the system board (see [Battery on page 39](#)).

Remove the optical drive:

1. Release the zero insertion force (ZIF) connector **(1)** to which the optical drive connector cable is connected, and then disconnect the cable **(2)** from the connector.



2. Remove the four Phillips PM2.5×3.7 screws **(1)** that secure the optical drive to the computer.
3. Remove the optical drive **(2)**.



Reverse this procedure to install the optical drive.

## Memory module

Description	Spare part number
PC3, 12800, 1666-MHz	
8 MB	670034-001
4 GB	641369-001
2 GB	652972-001
PC3, 10600, 1333-MHz	
8 GB	634091-001
4 GB	621569-001

Before removing a memory module, follow these steps:

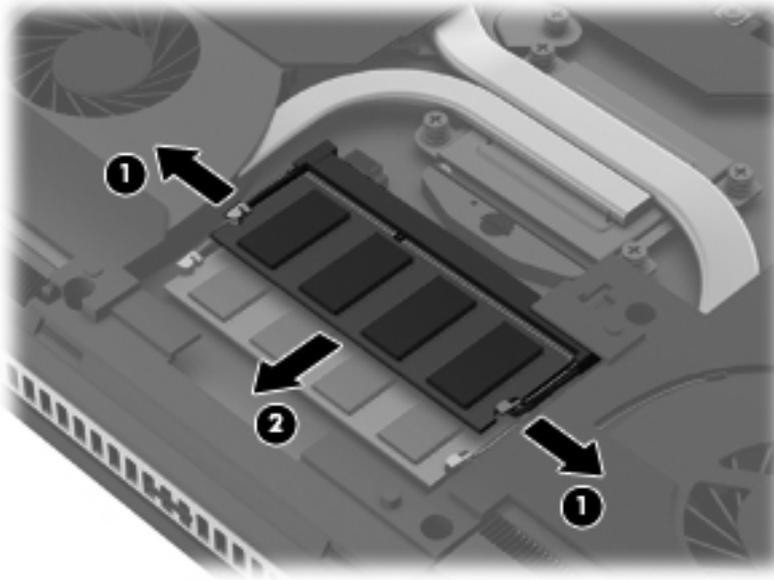
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Disconnect the battery cable from the system board (see [Battery on page 39](#)).

Remove the memory module:

1. Spread the retaining tabs **(1)** on each side of the memory module slot to release the memory module. (The memory module tilts up.)

 **CAUTION:** To prevent damage to the memory module, hold it by the edges only. Do not touch the components on the memory module.

2. Remove the memory module **(2)** by pulling it away from the slot at an angle.



Reverse this procedure to install a memory module.

## RTC battery

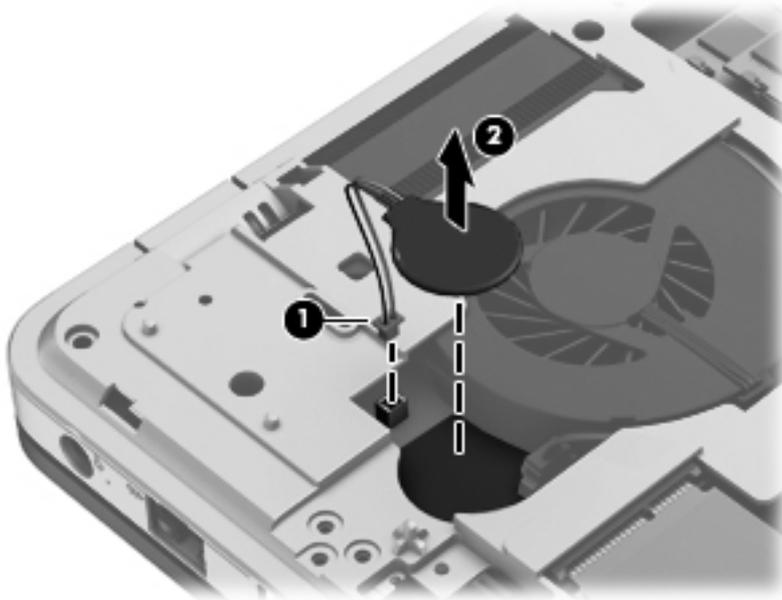
Description	Spare part number
RTC battery (includes cable)	651948-001

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. Disconnect the battery cable from the system board (see [Battery on page 39](#)).

Remove the RTC battery:

1. Disconnect the RTC battery cable **(1)** from the system board.
2. Remove the RTC battery **(2)**. (The RTC battery is attached to the system board with double-sided tape.)



Reverse this procedure to install the RTC battery.

## mSATA drive

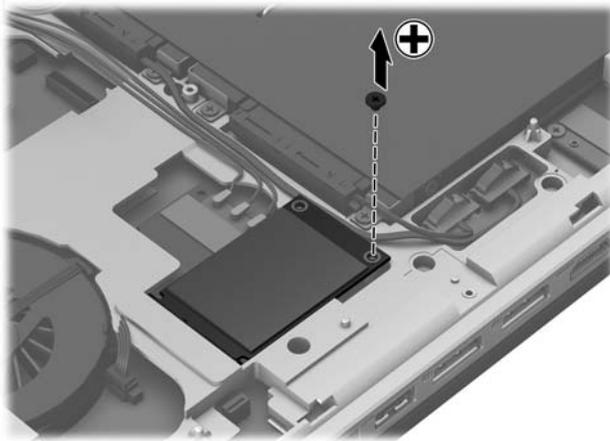
Description	Spare part number
128-GB mSATA drive	665931-001
80-GB mSATA drive	665932-001

Before removing the mSATA drive, follow these steps:

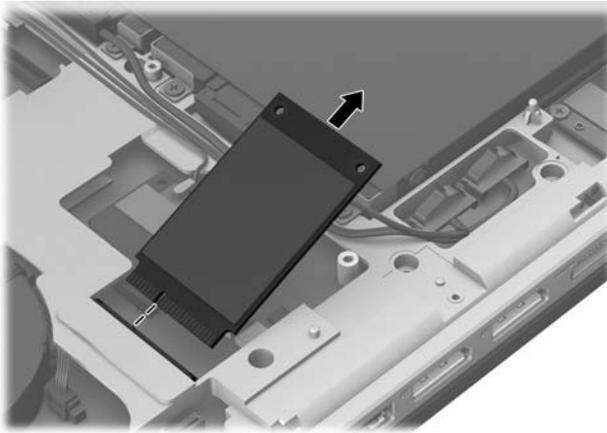
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Disconnect the battery cable from the system board (see [Battery on page 39](#)).

Remove the mSATA drive:

1. Remove the Phillips PM2.0×2.8 screw that secures the mSATA drive to the computer.



2. Remove the mSATA drive by pulling it away from the slot at an angle.



Reverse this procedure to install the mSATA drive.

## WLAN module

Description	Spare part number
Intel Centrino Advanced-N 6235 WLAN module	670292-001
Intel Centrino Advanced-N 6230 WLAN module	636672-001
Intel Centrino Ultimate-N 6300 WLAN module	572511-001

**CAUTION:** 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.

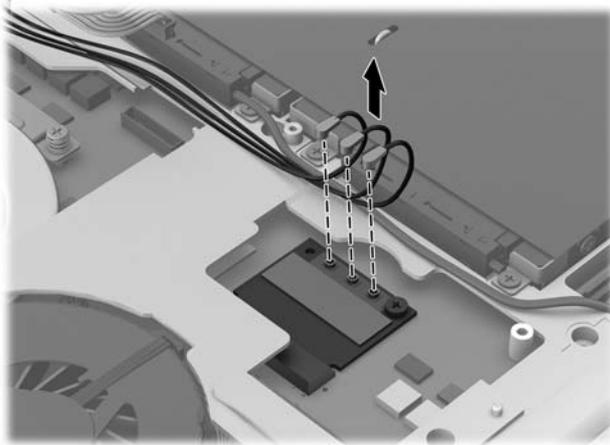
Before removing the WLAN module, follow these steps:

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. Disconnect the battery cable from the system board (see [Battery on page 39](#)).

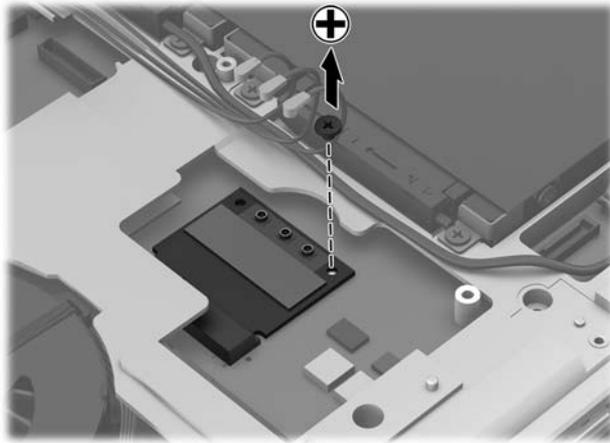
Remove the WLAN module:

1. Disconnect the WLAN antenna cables from the terminals on the WLAN module.

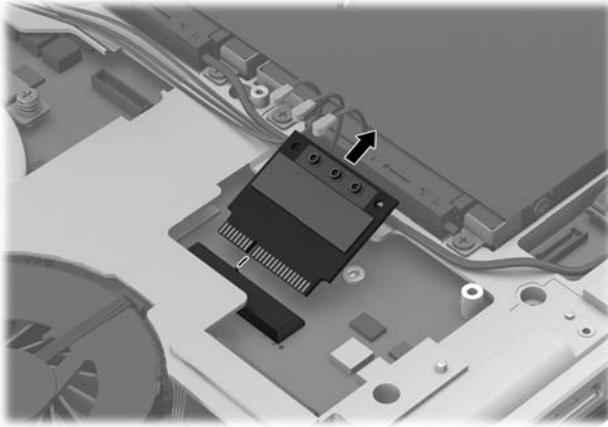
 **NOTE:** The 1/black WLAN antenna cable is connected to the WLAN module 1/Main terminal. The 2/gray WLAN antenna cable is connected to the WLAN module 2/Aux terminal. If a third antenna cable is present, it is connected to the WLAN module middle terminal.



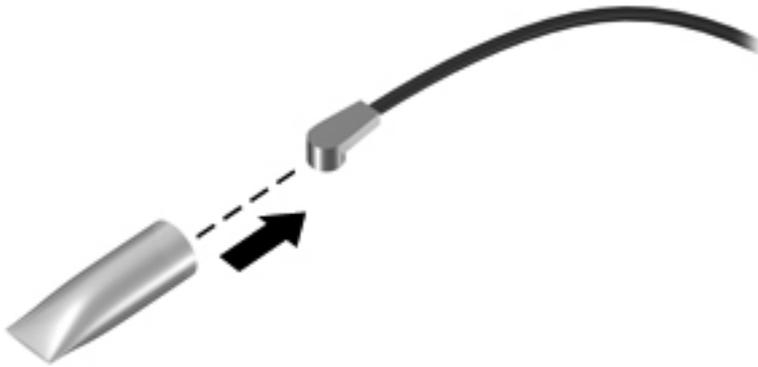
2. Remove the Phillips PM2.0×2.8 screw that secures the WLAN module to the system board. (The WLAN module tilts up.)



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



 **NOTE:** If a WLAN antenna cable is not connected to a terminal on the WLAN module, a protective sleeve must be installed on the antenna connector, as shown in the following illustration.



Reverse this procedure to install the WLAN module.

## Hard drive



**NOTE:** The hard drive spare part kit does not include the hard drive bracket, cables, or screws. These components are included in the Hard Drive Hardware Kit, spare part number 665909-001.

Description	Spare part number
1-TB, 5400-rpm, 12.7-mm	638974-001
750-GB, 7200-rpm, 9.5-mm	633252-001
750-GB, 7200-rpm, 9.5-mm hybrid	684506-001
500-GB, 7200-rpm, 9.5-mm	634925-001
320-GB, 7200-rpm, 9.5-mm	641672-001

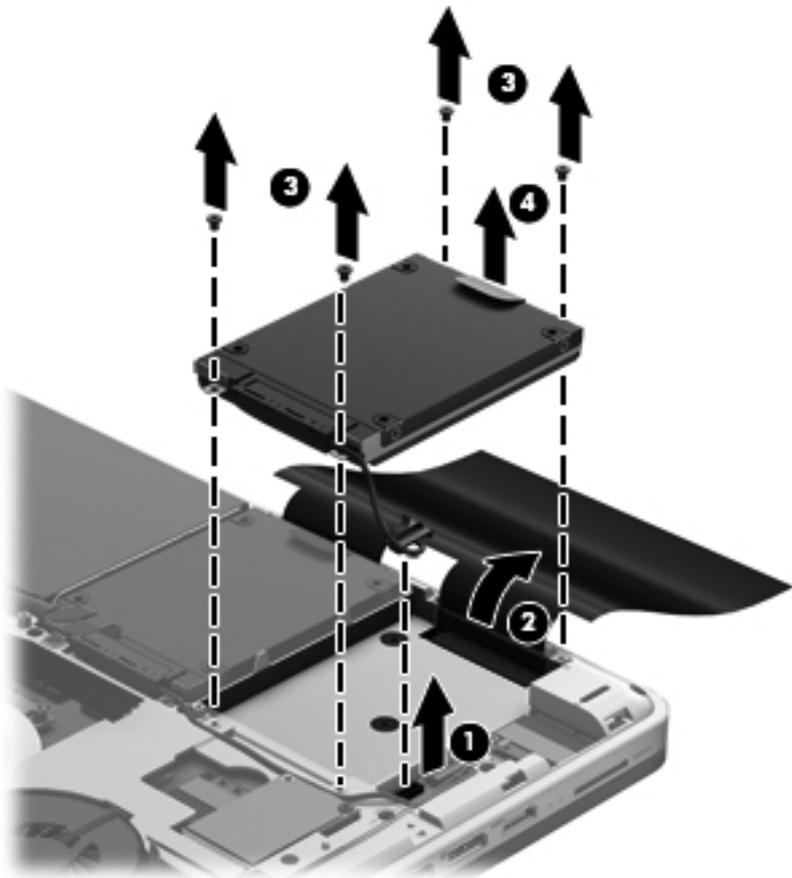
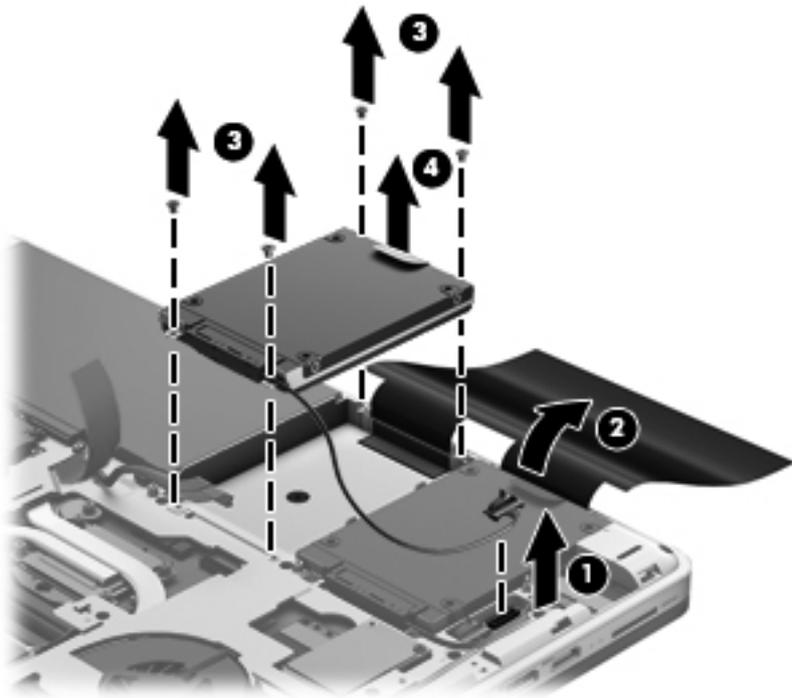
Before removing the hard drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Disconnect the battery cable from the system board (see [Battery on page 39](#)).

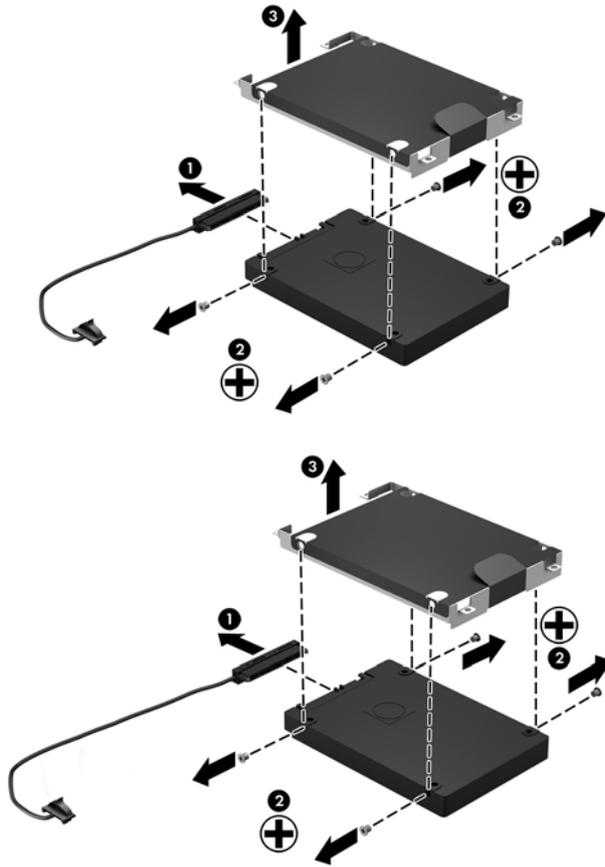
Remove the hard drive:

1. Disconnect the hard drive cable **(1)** from the system board.
2. Release the hard drive shield **(2)**.
3. Remove the four Phillips PM2.5×3.7 screws **(3)** that secure the hard drive to the computer.

4. Use the tab **(4)** on the hard drive bracket to remove the hard drive from the hard drive bay.



5. If it is necessary to replace the hard drive cable (1), screws (2), or bracket (3), remove and replace the components. The bracket, cable, and screws are available in the Hard Drive Hardware Kit, spare part number 665909-001.



Reverse this procedure to reassemble and install the hard drive.

## Wireless audio module

Description	Spare part number
Wireless audio module	668115-001

Before removing the wireless audio 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. Disconnect the battery cable from the system board (see [Battery on page 39](#)).
5. Remove the hard drive (see [Hard drive on page 51](#)).

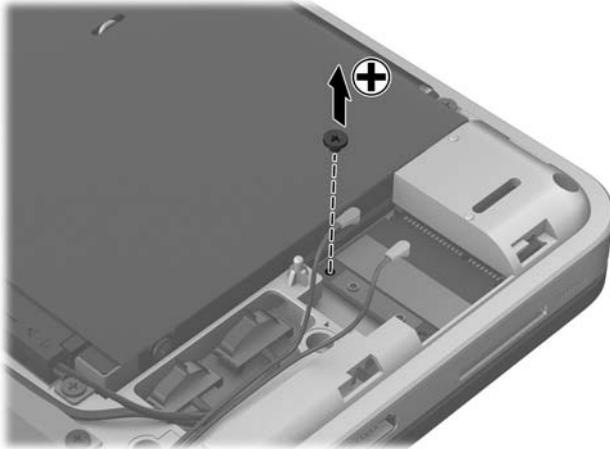
Remove the wireless audio module:

1. Disconnect the wireless audio module antenna cables from the terminals on the wireless audio module.

 **NOTE:** The 7/Main/purple wireless audio module antenna cable is connected to the wireless audio module "1" terminal. The 8/Aux/yellow wireless audio module antenna cable is connected to the wireless audio module "2" terminal.



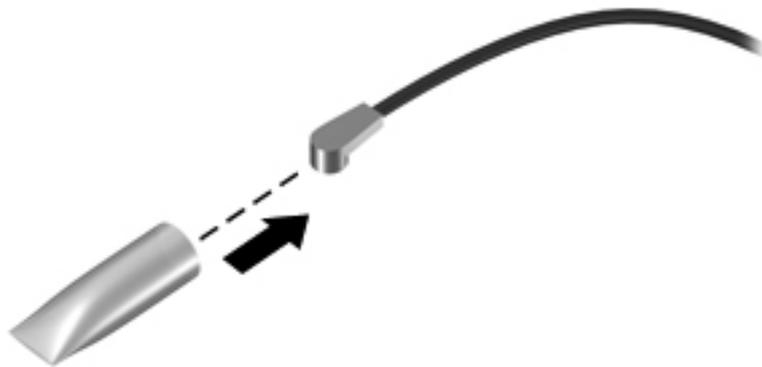
2. Remove the Phillips PM2.0×2.8 screw that secures the wireless audio module to the system board. (The wireless audio module tilts up.)



3. Remove the wireless audio module by pulling the module away from the slot at an angle.



 **NOTE:** If the wireless audio module antenna cables are not connected to the terminals on the wireless audio module, protective sleeves must be installed on the antenna connectors, as shown in the following illustration.



Reverse this procedure to install the wireless antenna module.

## Top cover



**NOTE:** The top cover spare part kit includes the TouchPad and TouchPad cable.

Description	Spare part number
For use only on computer models with USB 3.0 capability	690000-001
For use only on computer models with USB 2.0 capability	665935-001

Before removing the top cover, follow these steps:

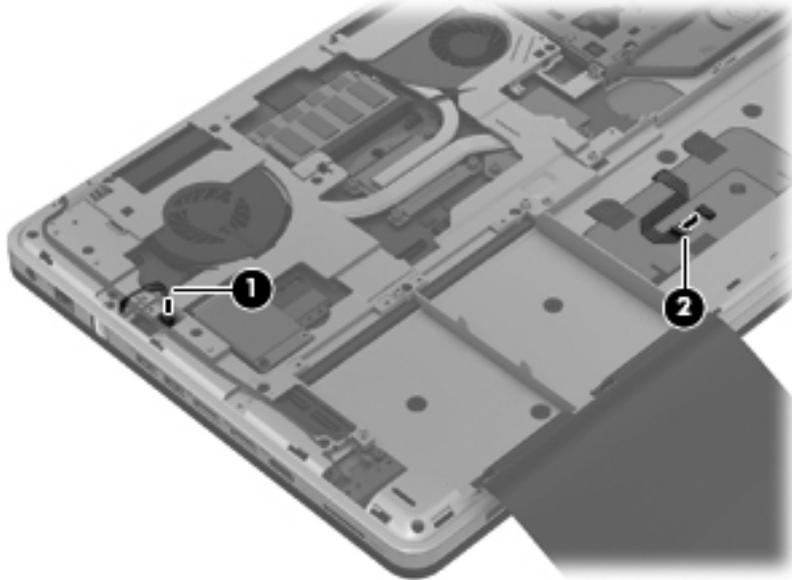
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 39](#)).
5. Remove the subwoofer (see [Subwoofer on page 41](#)).
6. Remove the hard drive (see [Hard drive on page 51](#)).

When replacing the top cover, be sure that the keyboard and keyboard bracket (see [Keyboard on page 59](#)) are removed from the defective top cover and installed on the replacement top cover.

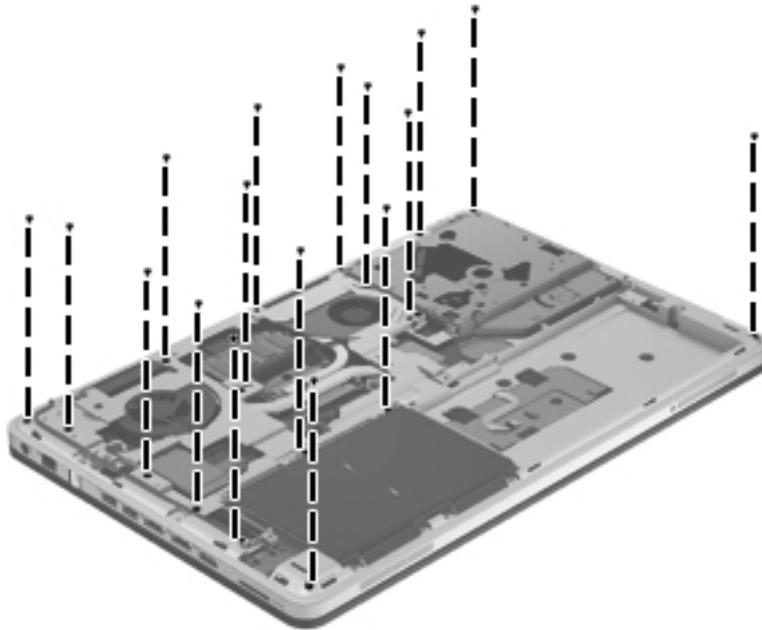
Remove the top cover:

1. Release the ZIF connector to which the integrated volume dial cable **(1)** is attached, and then disconnect the cable from the system board.

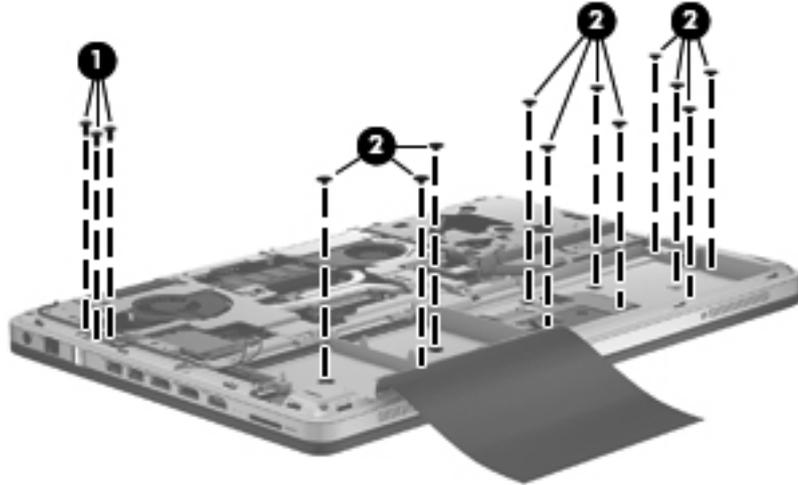
2. Release the ZIF connector to which the TouchPad cable **(2)** is attached, and then disconnect the cable from the system board.



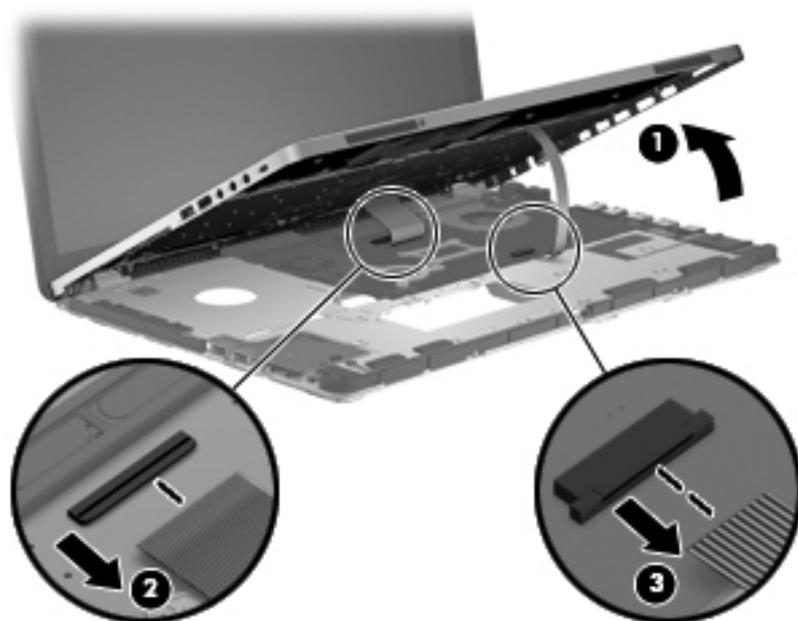
3. Remove the eighteen Phillips PM2.5×6.6 screws that secure the top cover to the computer.



4. Remove the three Phillips PM2.0×3.6 screws **(1)** and the eleven Phillips PM2.5×3.2 broad head screws **(2)** that secure the top cover to the computer.



5. Turn the computer display-side up, with the front toward you.
6. Open the computer as far as it will open.
7. Lift the front edge of the top cover **(1)** until the keyboard cable connector and keyboard light cable connector are accessible.
8. Release the ZIF connector to which the keyboard cable **(2)** is attached, and then disconnect the cable from the system board.
9. Release the ZIF connector to which the keyboard light cable **(3)** is attached, and then disconnect the cable from the system board.



10. Remove the top cover.

Reverse this procedure to install the top cover.

## Keyboard



**NOTE:** The keyboard spare part kit includes a keyboard cable and a keyboard light cable.

For use in country or region:	Spare part number:	For use in country or region:	Spare part number:
Keyboard in natural silver finish:		For use in the Netherlands	665917-B31
For use in Belgium	665917-A41	For use in Portugal	665917-131
For use in Brazil	665917-201	For use in Russia	665917-251
For use in Canada	665917-121	For use in Saudi Arabia	665917-171
For use in Denmark, Finland, Norway	665917-DH1	For use in Spain	665917-071
For use in France	665917-051	For use in Switzerland	665917-BG1
For use in Germany	665917-041	For use in Turkey	665917-141
For use in Italy	665917-061	For use in the United Kingdom and Singapore	665917-031
For use in Latin America	665917-161	For use in the United States	665917-001

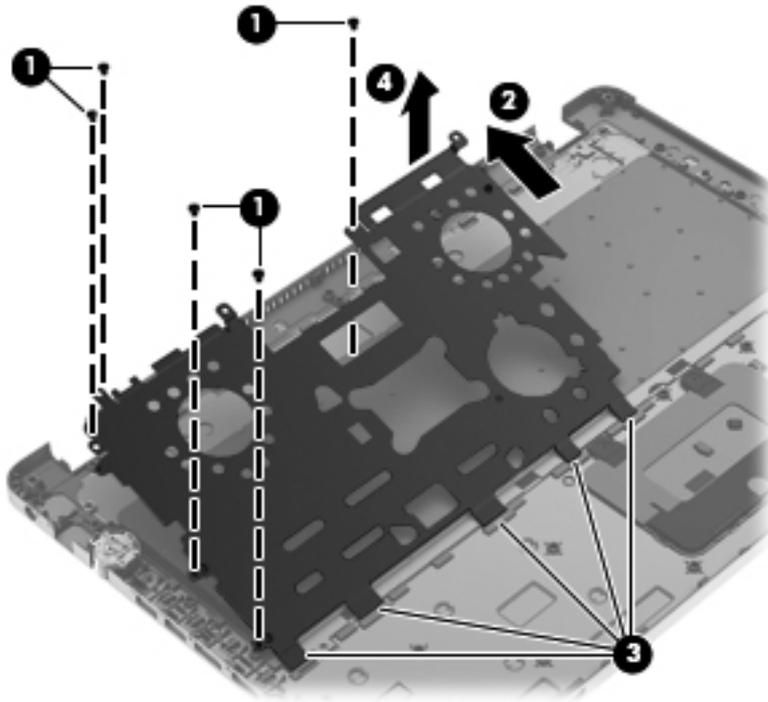
Before removing the keyboard, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 39](#)), and then remove the following components:
  - a. Subwoofer (see [Subwoofer on page 41](#))
  - b. Hard drive (see [Hard drive on page 51](#))
  - c. Top Cover (see [Top cover on page 56](#))

Remove the keyboard:

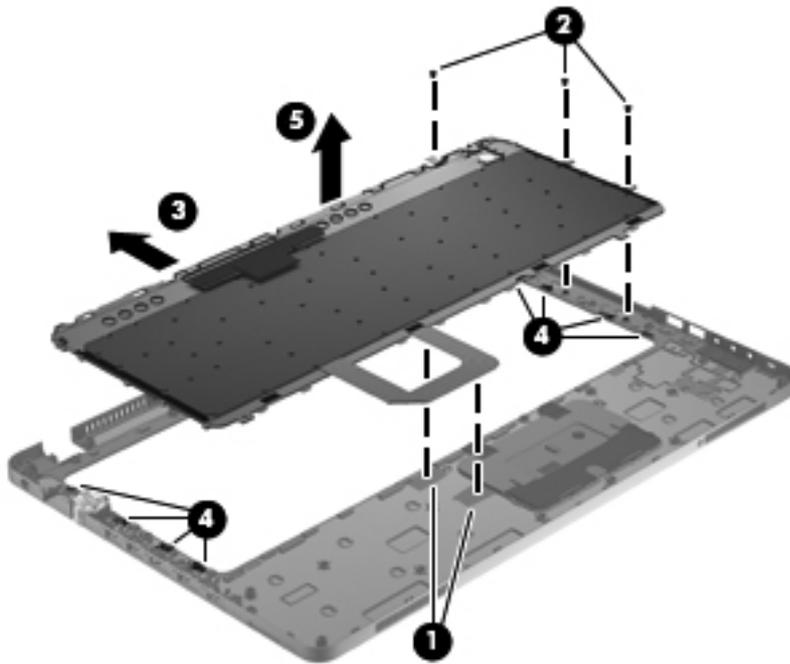
1. Turn the top cover upside down, with the front toward you.
2. Remove the five Phillips PM2.5×3.6 screws **(1)** that secure the keyboard bracket to the top cover.
3. Slide the keyboard bracket **(2)** toward the top edge of the top cover until the five tabs **(3)** on the bottom edge of the bracket disengage from the top cover.

4. Remove the keyboard bracket **(4)**. The keyboard bracket is available using the following spare part numbers:
- 689994-001 — For use only on computer models with USB 3.0 capability
  - 665910-001 — For use only on computer models with USB 2.0 capability



5. Release the keyboard light cable **(1)** from the top cover. (The keyboard light cable is attached to the top cover with double-sided adhesive.)
6. Remove the three Phillips PM2.5×3.6 screws **(2)** that secure the keyboard to the top cover.
7. Slide the keyboard **(3)** toward the top edge of the top cover until the tabs on the sides of the keyboard disengage from the slots built into the left and right sides of the top cover **(4)**.

8. Remove the keyboard (5).



Reverse this procedure to install the keyboard.

## Audio/USB board

 **NOTE:** The audio/USB board spare part kit includes the audio/USB board cable.

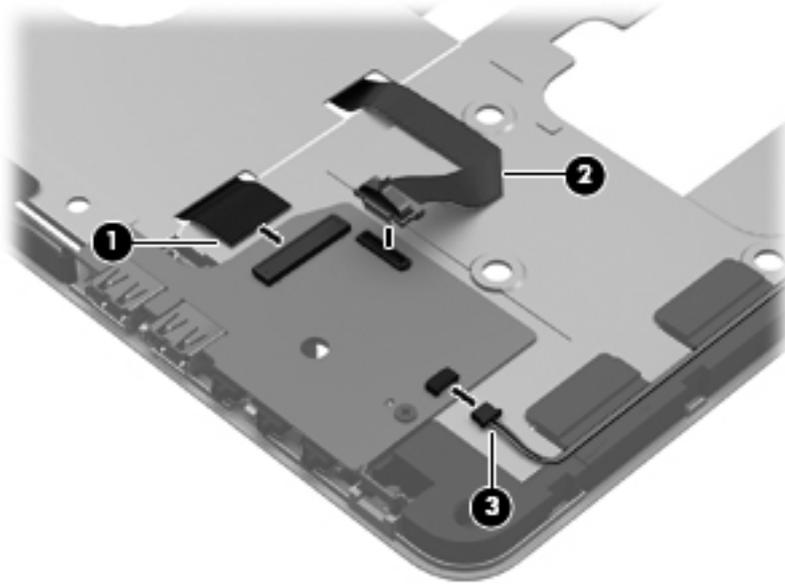
Description	Spare part number
For use only on computer models with USB 3.0 capability	689997-001
For use only on computer models with USB 2.0 capability	685720-001

Before removing the audio/USB board, follow these steps:

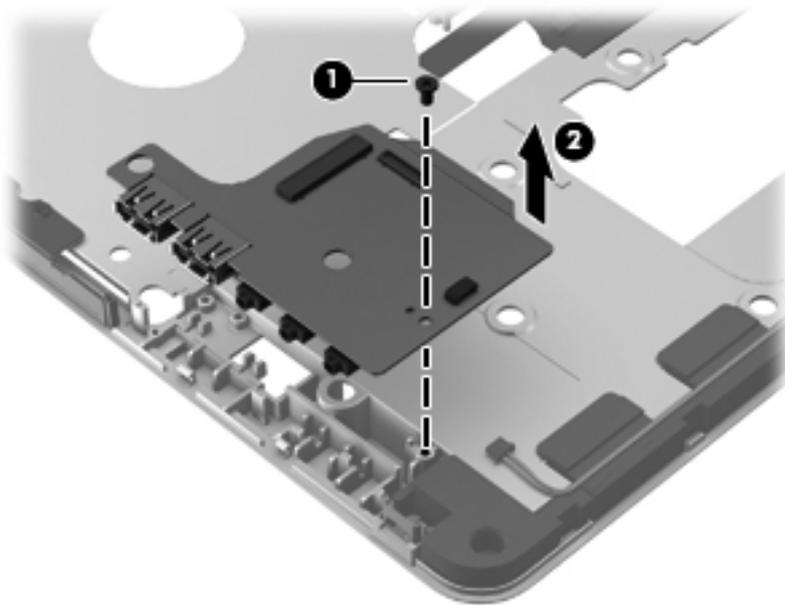
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 39](#)), and then remove the following components:
  - a. Subwoofer (see [Subwoofer on page 41](#))
  - b. Hard drive (see [Hard drive on page 51](#))
  - c. Top Cover (see [Top cover on page 56](#))

Remove the audio/USB board:

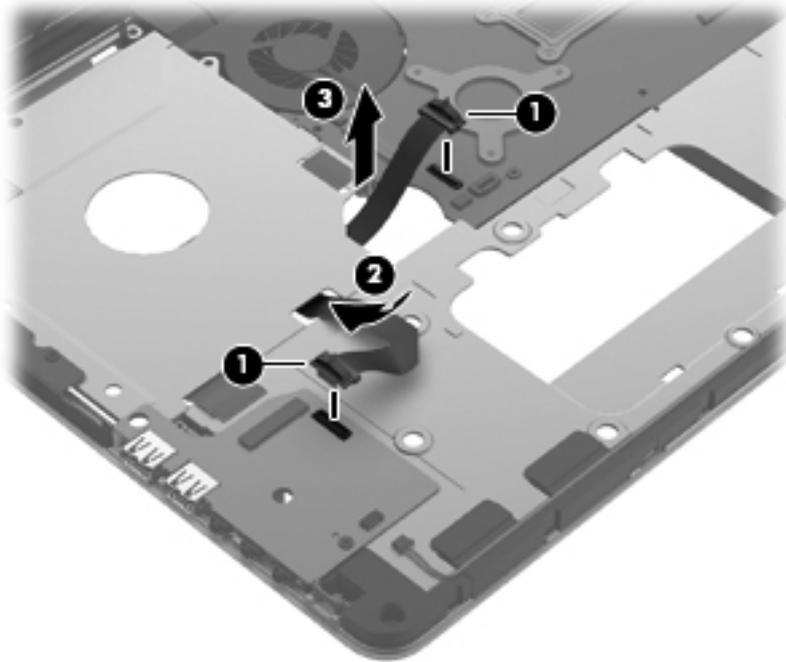
1. Disconnect the following the following cables from the audio/USB board:
  - (1) Audio/USB ZIF cable (included in the audio/USB board spare part kit)
  - (2) Audio/USB cable (included in the audio/USB board spare part kit)
  - (3) Front speaker cable



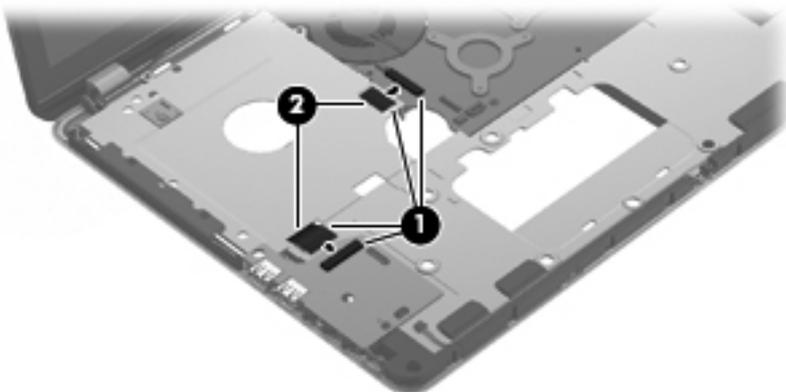
2. Remove the Phillips PM2.5×4.5 screw (1) that secures the audio/USB board to the base enclosure.
3. Remove the audio/USB board (2).



4. If it is necessary to replace the audio/USB board cable:
  - a. Disconnect the audio/USB board cable **(1)** from the audio/USB board and system board.
  - b. Release the audio/USB board cable through the opening **(2)** in the base enclosure.
  - c. Remove the audio/USB board cable by lifting the cable through the opening **(3)** between the base enclosure and the system board.



5. If it is necessary to replace the audio/USB board ZIF cable:
  - a. Disconnect the audio/USB board ZIF cable **(1)** from the ZIF connectors on the audio/USB board and system board.
  - b. Release the audio/USB board ZIF cable through the openings **(2)** in the base enclosure.
  - c. Remove the audio/USB board ZIF cable **(3)**.



Reverse this procedure to install the audio/USB board and cables.

## Card Reader board

Description	Spare part number
For use only on computer models with USB 3.0 capability	689995-001
For use only on computer models with USB 2.0 capability	665923-001

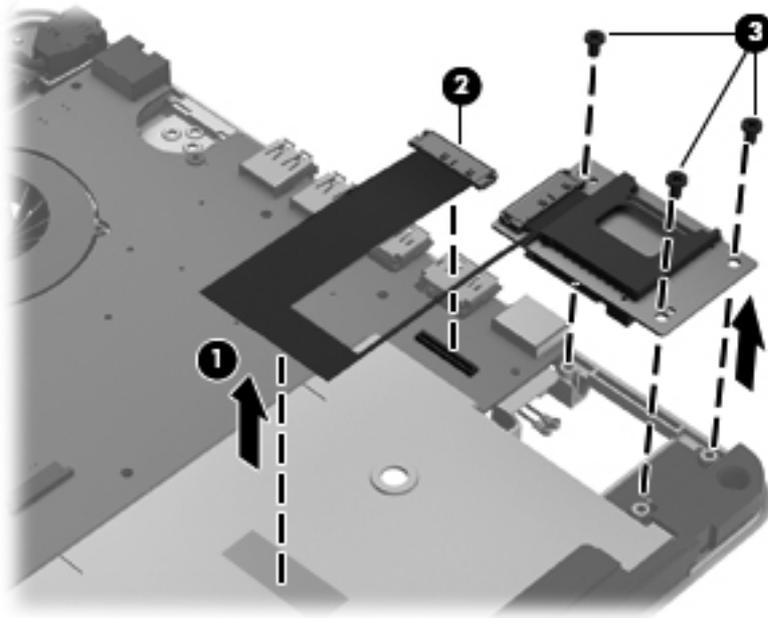
Before removing the Card Reader board, follow these steps:

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 39](#)), and then remove the following components:
  - a. Subwoofer (see [Subwoofer on page 41](#))
  - b. Hard drive (see [Hard drive on page 51](#))
  - c. Top Cover (see [Top cover on page 56](#))

Remove the Card Reader board:

1. Release the Card Reader board cable **(1)** from the base enclosure. (The Card Reader board cable is attached to the base enclosure with double-sided tape.)
2. Disconnect the Card Reader board cable **(2)** from the system board.
3. Remove the three Phillips PM2.5×4.5 screws **(3)** that secure the Card Reader board to the base enclosure.

4. Remove the Card Reader board (4).



Reverse this procedure to install the Card Reader board and cables.

## Front speakers

Description	Spare part number
Front speakers (include left and right front speakers, cables, and rubber isolators)	665926-001

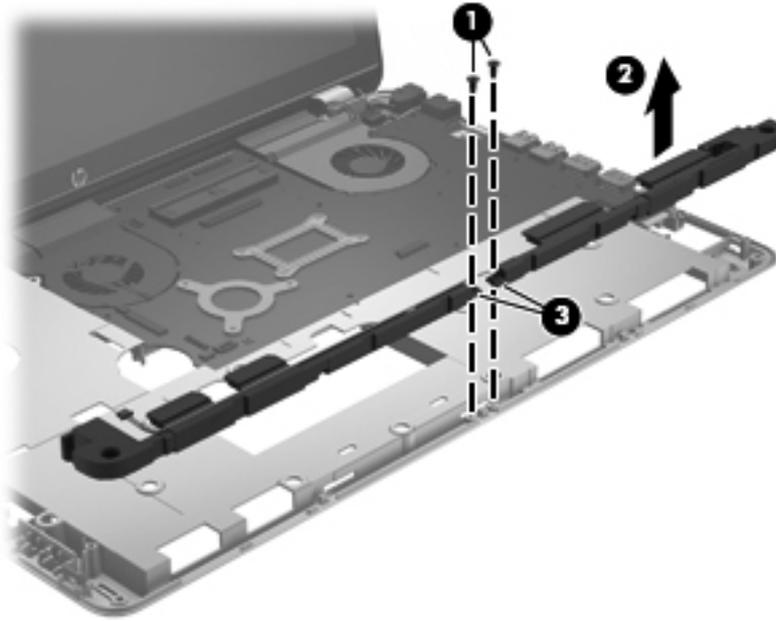
Before removing the front speakers, follow these steps:

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 39](#)), and then remove the following components:
  - a. Subwoofer (see [Subwoofer on page 41](#))
  - b. Hard drive (see [Hard drive on page 51](#))
  - c. Top Cover (see [Top cover on page 56](#))
  - d. Audio/USB board (see [Audio/USB board on page 61](#))
  - e. Card Reader board (see [Card Reader board on page 64](#))

Remove the Card Reader board:

1. Remove the two Phillips PM2.5×6.4 shoulder screws **(1)** that secure the front speakers to the base enclosure.
2. Remove the front speakers **(2)**.

 **NOTE:** When removing the front speakers, make note of the location of the two isolators **(3)** that are installed in the screw holes.



Reverse this procedure to install the front speakers.

## TouchPad LED board

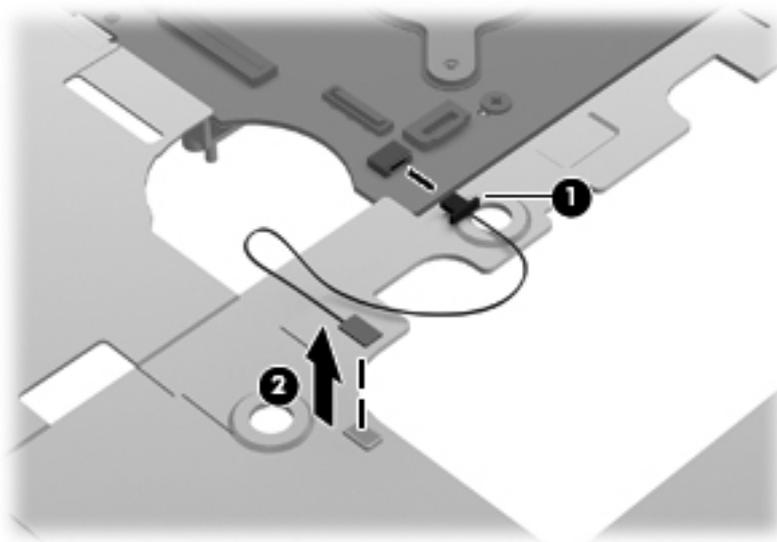
Description	Spare part number
TouchPad LED board (includes cable)	665922-001

Before removing the TouchPad LED 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 39](#)), and then remove the following components:
  - a. Subwoofer (see [Subwoofer on page 41](#))
  - b. Hard drive (see [Hard drive on page 51](#))
  - c. Top Cover (see [Top cover on page 56](#))

Remove the TouchPad LED board:

1. Disconnect the TouchPad LED board cable **(1)** from the system board.
2. Detach the TouchPad LED board **(2)** from the base enclosure. (The TouchPad LED board is attached to the base enclosure with double-sided adhesive.)



Reverse this procedure to install the TouchPad LED board.

## Power button board

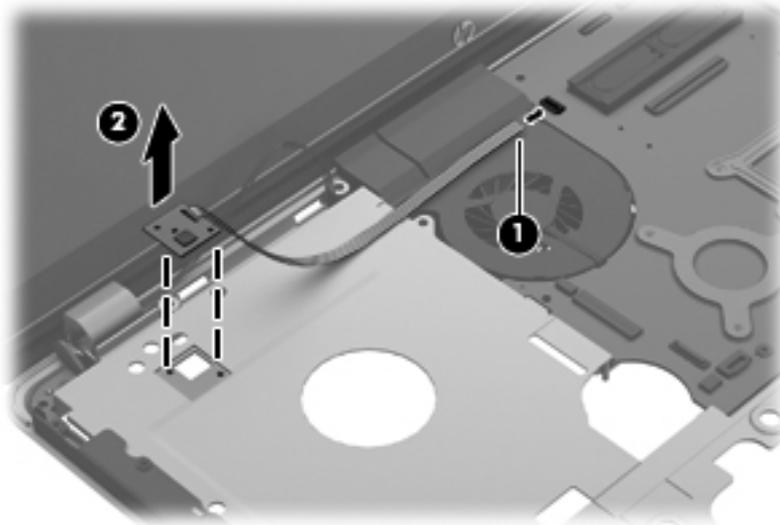
Description	Spare part number
Power button board (includes cable)	665921-001

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 39](#)), and then remove the following components:
  - a. Subwoofer (see [Subwoofer on page 41](#))
  - b. Hard drive (see [Hard drive on page 51](#))
  - c. Top Cover (see [Top cover on page 56](#))

Remove the power button board:

1. Disconnect the power button board cable **(1)** from the system board.
2. Detach the power button board **(2)** from the base enclosure. (The power button board is attached to the base enclosure with double-sided adhesive.)



Reverse this procedure to install the power button board.

## Top speaker

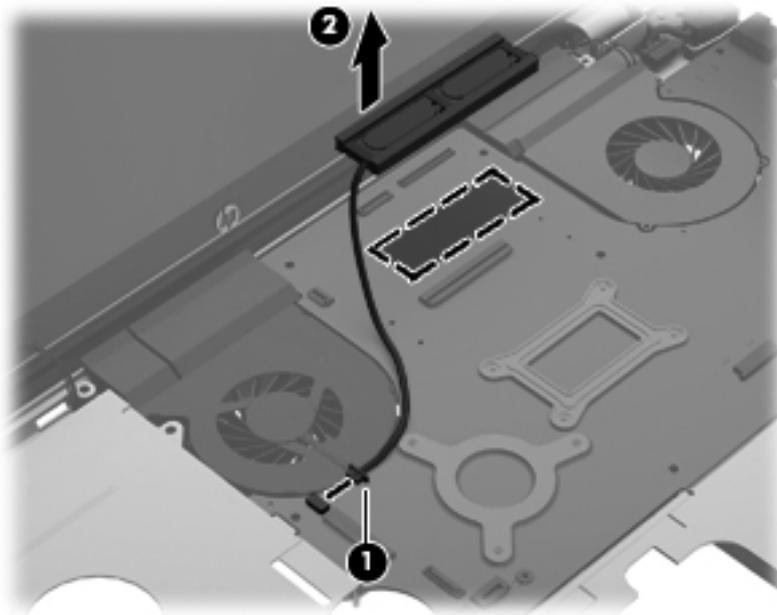
Description	Spare part number
Top speaker (includes cable)	665927-001

Before removing the top speaker, 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 39](#)), and then remove the following components:
  - a. Subwoofer (see [Subwoofer on page 41](#))
  - b. Hard drive (see [Hard drive on page 51](#))
  - c. Top Cover (see [Top cover on page 56](#))

Remove the top speaker:

1. Disconnect the top speaker cable **(1)** from the system board.
2. Detach the top speaker **(2)** from the system board. (The top speaker is attached to the system board with double-sided adhesive.)



Reverse this procedure to install the top speaker.

## System board



**NOTE:** The system board spare part kit includes includes 1 GB of discrete graphics subsystem memory and replacement thermal material. Replacement thermal material is also available in the Thermal Material Kit, spare part number 634366-001.

Description	Spare part number
Equipped with the Intel HM76 chipset and 7850M graphics subsystem for use only on computer models equipped with a 3D display assembly	689999-001
Equipped with the Intel HM76 chipset and 7850M graphics subsystem for use only on computer models equipped with a 2D display assembly	689998-001
Equipped with the Intel HM65 chipset and 6770M graphics subsystem for use only on computer models equipped with a 3D display assembly	665934-001
Equipped with the Intel HM65 chipset and 6770M graphics subsystem for use only on computer models equipped with a 2D display assembly	665933-001

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 39](#)).
5. Remove the subwoofer (see [Subwoofer on page 41](#)).
6. Disconnect the optical drive connector cable from the system board (see [Optical drive on page 42](#)).
7. Remove the hard drive (see [Hard drive on page 51](#)).
8. Remove the top cover (see [Top cover on page 56](#)).

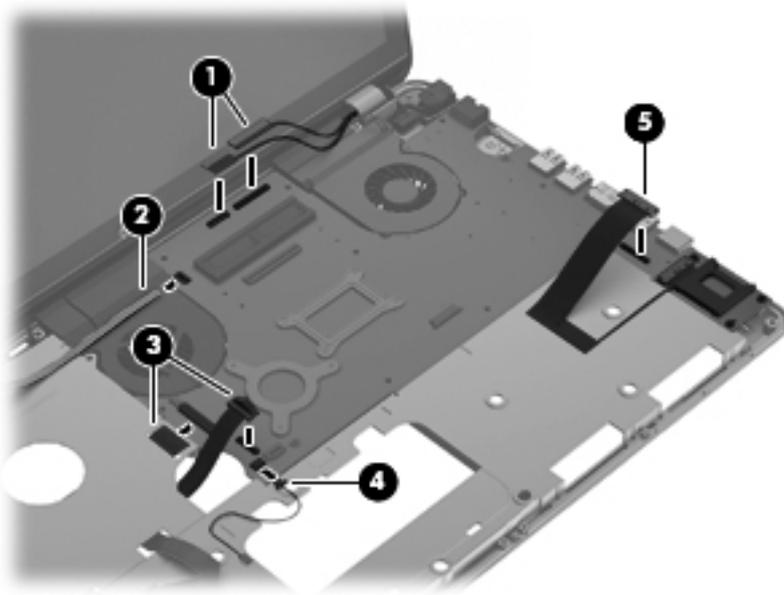
When replacing the system board, be sure that the following components are removed from the defective system board and installed on the replacement system board:

- Memory module (see [Memory module on page 44](#))
- RTC battery (see [RTC battery on page 46](#))
- mSATA drive (see [mSATA drive on page 47](#))
- WLAN module (see [WLAN module on page 48](#))
- Wireless audio module (see [Wireless audio module on page 54](#))
- Top speaker (see [Top speaker on page 69](#))

- Power connector cable (see [Power connector cable on page 73](#))
- Fan/heat sink assembly (see [Fan/heat sink assembly on page 74](#))
- Processor (see [Processor on page 77](#))

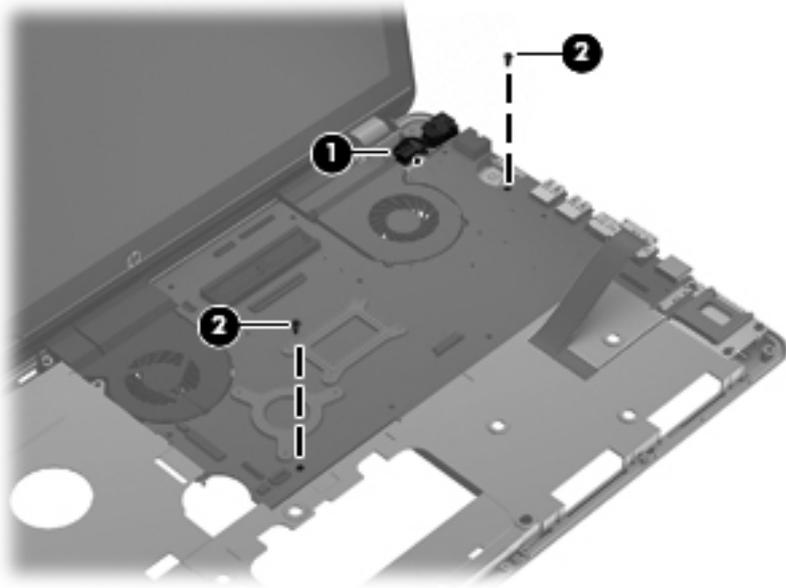
Remove the system board:

1. Disconnect the following cables from the system board:
  - (1) Display panel cable and display function cable
  - (2) Power button board cable
  - (3) Audio/USB board ZIF cable and audio/USB board cable
  - (4) TouchPad LED board cable
  - (5) Card Reader board cable

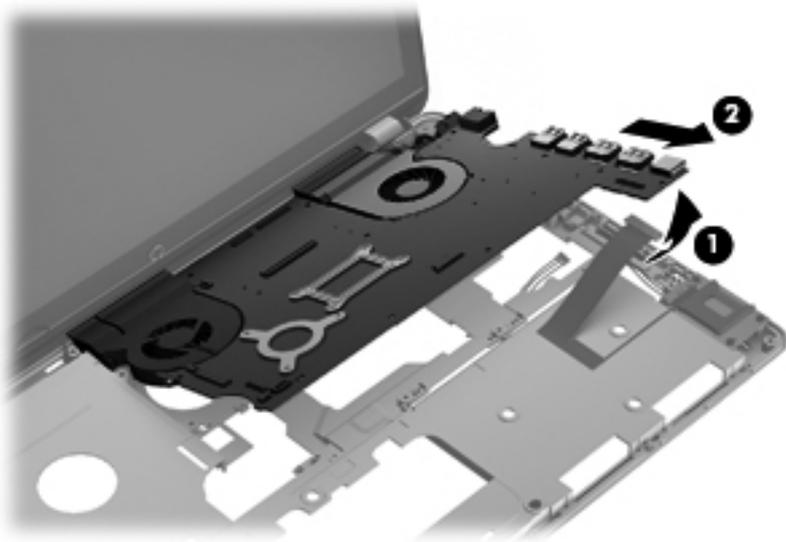


2. Release the power connector (1) from the clip built into the base enclosure.

3. Remove the two Phillips PM2.5×4.5 screws **(2)** that secure the system board to the base enclosure.



4. Lift the front edge of the system board **(1)** until it rests at an angle.
5. Remove the system board **(2)** by sliding it up and to the forward at an angle.



Reverse this procedure to install the system board.

## Power connector cable

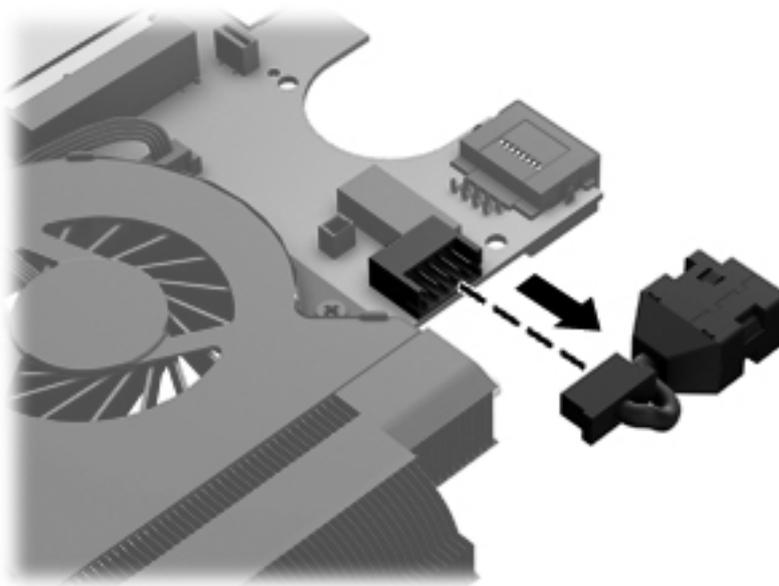
Description	Spare part number
Power connector cable	665907-001

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 39](#)), and then remove the following components:
  - a. Subwoofer (see [Subwoofer on page 41](#))
  - b. Hard drive (see [Hard drive on page 51](#))
  - c. Top cover (see [Top cover on page 56](#))
  - d. System board (see [System board on page 70](#))

Remove the power connector cable:

1. Turn the system board upside down, with the rear edge toward you.
2. Disconnect the power connector cable from the system board.



Reverse this procedure to install the power connector cable and bracket.

## Fan/heat sink assembly

 **NOTE:** The fan/heat sink assembly spare part kit includes replacement thermal material. Replacement thermal material is also available in the Thermal Material Kit, spare part number 634366-001.

Description	Spare part number
For use only on computer models with USB 3.0 capability	689993-001
For use only on computer models with USB 2.0 capability	665908-001

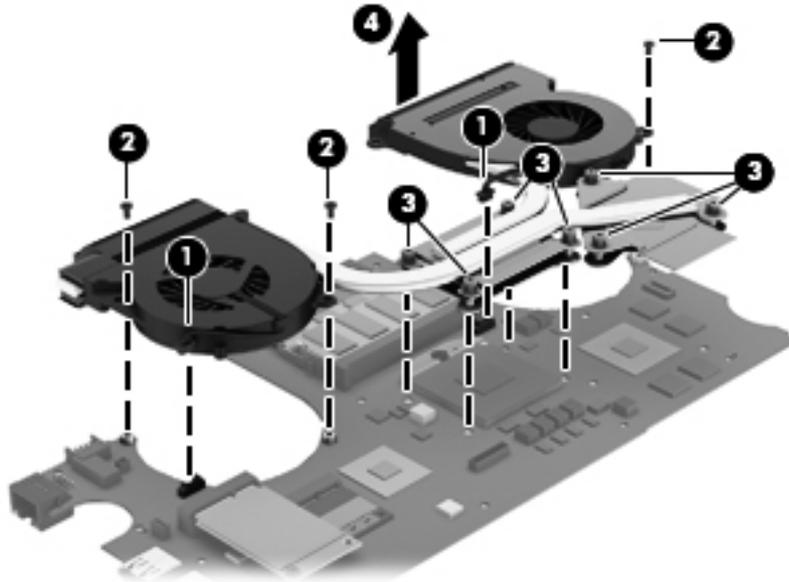
 **NOTE:** To properly ventilate the computer, allow at least 7.6 cm (3 in) of clearance on the left side of the computer. The computer uses an electric fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software requirements. Exhaust air is displaced through the ventilation grill located on the left side of the computer.

Before removing the fan/heat sink assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 39](#)), and then remove the following components:
  - a. Subwoofer (see [Subwoofer on page 41](#))
  - b. Hard drive (see [Hard drive on page 51](#))
  - c. Top cover (see [Top cover on page 56](#))
  - d. System board (see [System board on page 70](#))

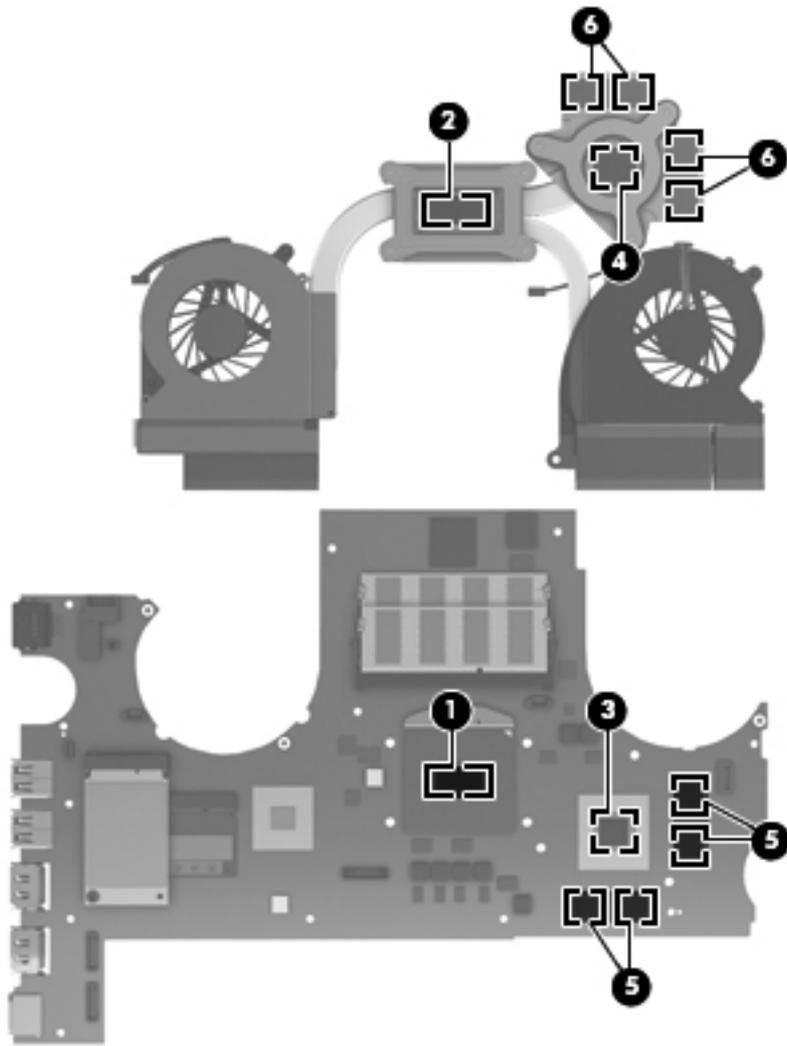
Remove the fan/heat sink assembly:

1. Turn the system board upside down, with the front toward you.
2. Disconnect the two fan cables **(1)** from the system board.
3. Remove the three Phillips PM2.5×4.5 screws **(2)** that secure the fan/heat sink assembly to the system board.
4. Following the **1** through **7** sequence stamped into the fan/heat sink assembly, loosen the seven captive screws **(3)** that secure the fan/heat sink assembly to the system board.
5. Remove the fan/heat sink assembly **(4)**.



 **NOTE:** The thermal material must be thoroughly cleaned from the surfaces of the fan/heat sink assembly and the system board components each time the fan/heat sink assembly is removed. Replacement thermal material is included with the fan/heat sink assembly and system board spare part kits. The following illustration shows the replacement thermal material locations.

- Thermal paste is used on the processor **(1)** and the heat sink section **(2)** that services it
- Thermal paste is used on the graphics subsystem chip **(3)** and the heat sink section **(4)** that services it
- Thermal pads are used on the system board capacitors **(5)** and the heat sink sections **(6)** that service them



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

## Processor



**NOTE:** The processor spare part kit includes replacement thermal material. Replacement thermal material is also available in the Thermal Material Kit, spare part number 634366-001.

Description	Spare part number
Intel Quad Core i7-3820QM 2.70-GHz processor (SC turbo up to 3.70-GHz; 1600-MHz FSB, 8.0-MB L3 cache, 45 W)	681284-001
Intel Quad Core i7-3720QM 2.60-GHz processor (SC turbo up to 3.60-GHz; 1600-MHz FSB, 6.0-MB L3 cache, 45 W)	681283-001
Intel Quad Core i7-3612QM 2.10-GHz processor (SC turbo up to 3.10-GHz; 1600-MHz FSB, 6.0-MB L3 cache, 35 W)	680647-001
Intel Quad Core i7-3610QM 2.30-GHz processor (SC turbo up to 3.30-GHz; 1600-MHz FSB, 6.0-MB L3 cache, 45 W)	680646-001
Intel Quad Core i7-2860QM 2.50-GHz processor (SC turbo up to 3.60-GHz), 8.0-MB L3 cache, 1600-MHz FSB, 45 W	666175-001
Intel Quad Core i7-2760QM 2.40-GHz processor (SC turbo up to 3.50-GHz), 6.0-MB L3 cache, 1600-MHz FSB, 45 W	666174-001
Intel Quad Core i7-2670QM 2.40-GHz processor (SC turbo up to 3.50-GHz), 6.0-MB L3 cache, 1600-MHz FSB, 45 W	665116-001
Intel Quad Core i7-2640M 2.80-GHz processor (SC turbo up to 3.10-GHz), 4.0-MB L3 cache, 1333-MHz FSB, 35 W	666173-001
Intel Dual Core i5-3210M 2.50-GHz processor (SC turbo up to 3.10-GHz; 1600-MHz FSB, 3.0-MB L3 cache, 35 W)	680645-001
Intel Dual Core i5-2450M 2.50-GHz processor (SC turbo up to 3.10-GHz), 3.0-MB L3 cache, 1333-MHz FSB, 35 W)	676359-001
Intel Dual Core i5-2430M 2.40-GHz processor (SC turbo up to 3.00-GHz), 3.0-MB L3 cache, 1333-MHz FSB, 35 W)	653341-001

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 39](#)), and then remove the following components:
  - a. Subwoofer (see [Subwoofer on page 41](#))
  - b. Hard drive (see [Hard drive on page 51](#))
  - c. Top cover (see [Top cover on page 56](#))

- d. System board (see [System board on page 70](#))
- e. Fan/heat sink assembly (see [Fan/heat sink assembly on page 74](#))

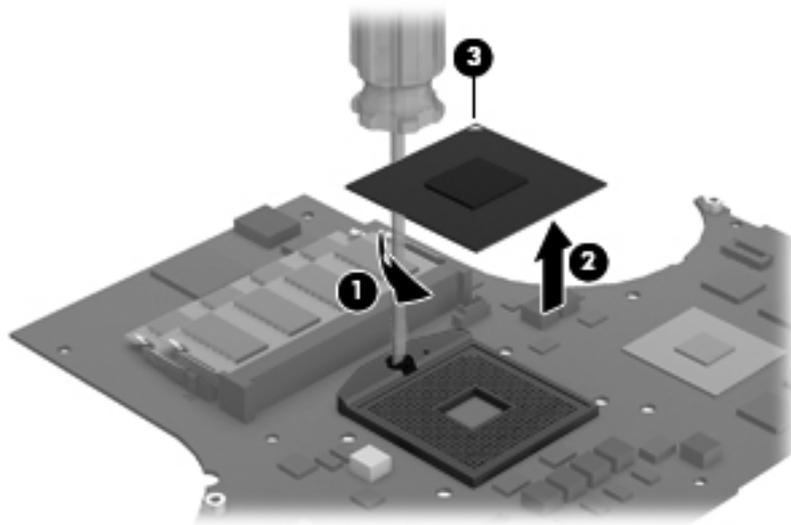
Remove the processor:

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

---

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

---



Reverse this procedure to install the processor.

## Display assembly



**NOTE:** The display assembly spare part kit includes the display panel cable, webcam/microphone module and cable, and 2 wireless antenna cables and transceivers.

Description	Spare part number
17.3-in, FHD, AG, LED, FG, 3D display assembly in natural silver finish	665913-001
17.3-in, FHD, AG, LED, FG, 3D display assembly in natural silver finish with Bluetooth module (includes Bluetooth module and cable)	668995-001
17.3-in, FHD, AG, LED, FG, 2D display assembly in natural silver finish	665912-001
17.3-in, FHD, AG, LED, FG, 2D display assembly in natural silver finish with Bluetooth module (includes Bluetooth module and cable)	668994-001
17.3-in, HD, AG, LED, FG, 2D display assembly in natural silver finish	665911-001
17.3-in, HD, AG, LED, FG, 2D display assembly in natural silver finish with Bluetooth module (includes Bluetooth module and cable)	668993-001

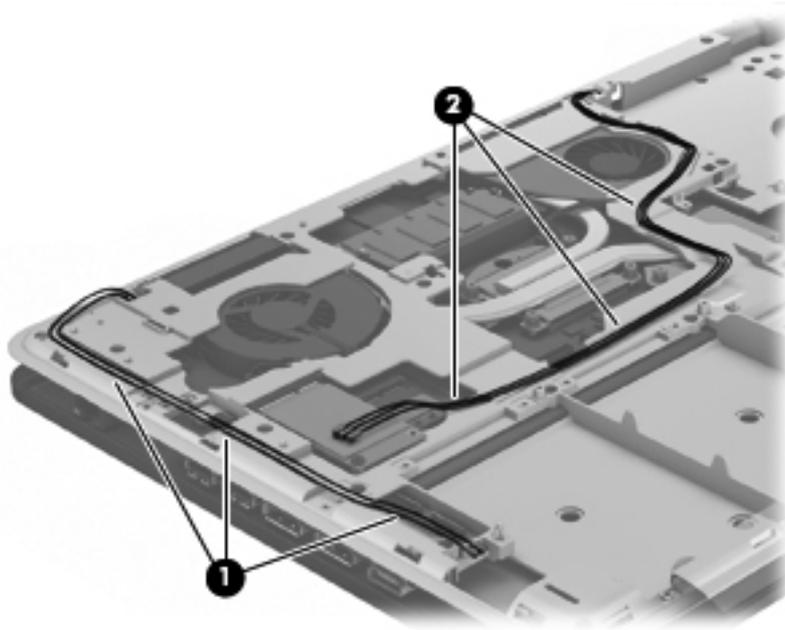
Before removing the display assembly, follow these steps:

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 39](#)).
5. Remove the subwoofer (see [Subwoofer on page 41](#)).
6. Disconnect the antenna cables from the WLAN module (see [WLAN module on page 48](#)).
7. Remove the hard drive (see [Hard drive on page 51](#)).
8. Disconnect the antenna cables from the wireless audio module (see [Wireless audio module on page 54](#)).
9. Remove the top cover (see [Top cover on page 56](#)).

Remove the display assembly:

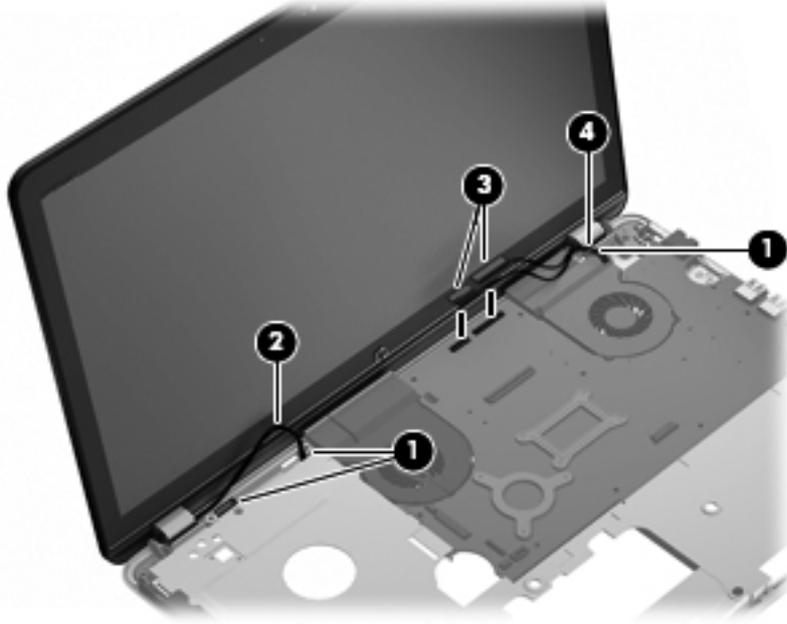
1. Close the computer.
2. Turn the computer upside down, with the front toward you.
3. Release the wireless audio module antenna cables **(1)** from the clips and routing channel built into the base enclosure.

4. Release the WLAN module antenna cables **(2)** from the clips and routing channel built into the base enclosure.

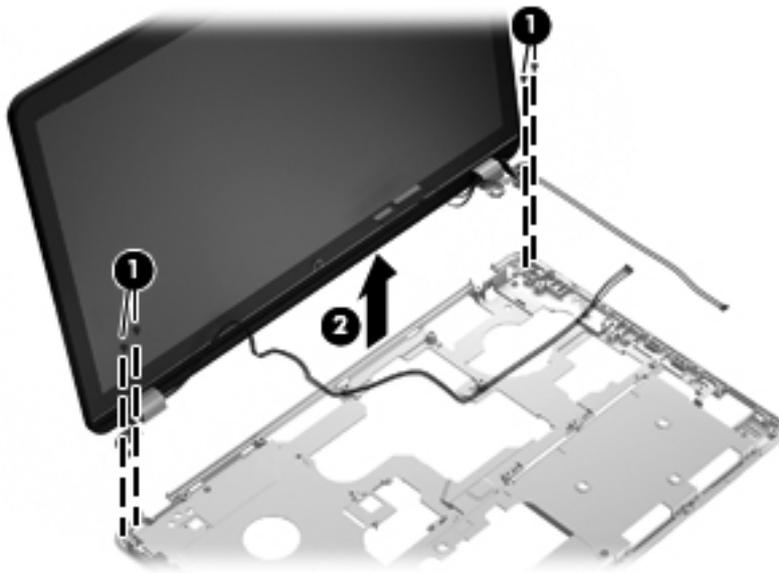


5. Turn the computer display side up, with the front toward you.
6. Open the computer as far as it will open.
7. Release the WLAN module antenna cables from the openings **(1)** built into the base enclosure, and then release the left-hinge cables from the clip **(2)** built into the base enclosure.
8. Disconnect the display panel cable **(3)** and display function cable from the system board.

9. Release the wireless audio module antenna cables **(4)** from the opening built into the base enclosure.



10. Remove the four Phillips PM2.5x4.5 screws **(1)** that secure the display assembly to the computer.
11. Remove the display assembly **(2)**.



Reverse this procedure to install the display assembly.



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# 5 Setup Utility (BIOS) and System Diagnostics

## Using Setup Utility

Setup Utility, or Basic Input/Output System (BIOS), controls communication between all the input and output devices on the system (such as disk drives, display, keyboard, mouse, and printer). Setup Utility includes settings for the types of peripherals installed, the startup sequence of the computer, and the amount of system and extended memory.

 **NOTE:** Use extreme care when making changes in Setup Utility. Errors can prevent the computer from operating properly.

---

## Starting Setup Utility

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

---

To start Setup Utility, 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 Setup Utility.

## Changing the language of Setup Utility

1. Start Setup Utility.
2. Use the arrow keys to select **System Configuration > Language**, and then press **enter**.
3. Use the arrow keys to select a language, and then press **enter**.
4. When a confirmation prompt with your language selected is displayed, press **enter**.
5. To save your change and exit Setup Utility, use the arrow keys to select **Exit > Exit Saving Changes**, and then press **enter**.

Your change takes effect immediately.

## Navigating and selecting in Setup Utility

To navigate and select in Setup Utility, 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 Setup Utility screen, press **esc**, and then follow the on-screen instructions.
2. Press **f10** to enter Setup Utility.

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

- To exit Setup Utility menus without saving your changes, press the **esc** key, and then follow the on-screen instructions.  
– or –  
Use the arrow keys to select **Exit > Exit Discarding Changes**, and then press **enter**.
- To save your changes and exit Setup Utility menus, press **f10**, and then follow the on-screen instructions.  
– or –  
Use the tab key and the arrow keys to select **Exit > Exit Saving Changes**, and then press **enter**.

Your changes go into effect when the computer restarts.

## Displaying system information

1. Start Setup Utility.
2. Select the **Main menu**. System information such as the system time and date, and identification information about the computer is displayed.
3. To exit Setup Utility without changing any settings, use the arrow keys to select **Exit > Exit Discarding Changes**, and then press **enter**.

## Restoring factory settings in Setup Utility

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

---

To return all settings in Setup Utility 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 Setup Utility.
3. Use the arrow keys to select **Exit > Load Setup Defaults**.
4. Follow the on-screen instructions.
5. To save your changes and exit, press **f10**, and then follow the on-screen instructions.

– or –

Use the arrow keys to select **Exit > Exit Saving Changes**, and then press **enter**.

Your changes go into effect when the computer restarts.

---

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

---

## Exiting Setup Utility

- To exit Setup Utility and save your changes from the current session:  
If the Setup Utility menus are not visible, press **esc** to return to the menu display. Then use the arrow keys to select **Exit > Exit Saving Changes**, and then press **enter**.
- To exit Setup Utility without saving your changes from the current session:  
If the Setup Utility menus are not visible, press **esc** to return to the menu display. Then use the arrow keys to select **Exit > Exit Discarding Changes**, and then press **enter**.

## Updating the BIOS

Updated versions of the BIOS may be available on the HP Web site.

Most BIOS updates on the HP Web site are packaged in compressed files called *SoftPaqs*.

Some download packages contain a file named *Readme.txt*, which contains information regarding installing and troubleshooting the file.

## Determining the BIOS version

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

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

1. Start Setup Utility (BIOS).
2. Use the arrow keys to select **Main**.
3. To exit Setup Utility (BIOS) without saving your changes, use the tab key and the arrow keys to select **Exit > Exit Discarding Changes**, and then press **enter**.

## Downloading a BIOS update

---

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

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

Do not shut down the computer or initiate Sleep or Hibernation.

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

---

1. **Windows 7**—Select **Start > Help and Support > Maintain**.

**Windows XP**—Select **Start > Help and Support**, and then select the software and drivers update.

2. Follow the on-screen instructions to identify your computer and access the BIOS update you want to download.
3. At the download area, follow these steps:
  - a. Identify the BIOS update that is later than the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
  - b. Follow the on-screen instructions to download your selection to the hard drive. Make a note of the path to the location on your hard drive where the BIOS update is downloaded. You will need to access this path when you are ready to install the update.

---

**NOTE:** If you connect your computer to a network, consult the network administrator before installing any software updates, especially system BIOS updates.

---

BIOS installation procedures vary. Follow any instructions that are displayed on the screen after the download is complete. If no instructions are displayed, follow these steps:

1. **Windows 7**—Open Windows Explorer by selecting **Start > Computer**.  
**Windows XP**—Open Windows Explorer by selecting Start > **My Computer**.
2. Double-click your hard drive designation. The hard drive designation is typically Local Disk (C:).
3. Using the hard drive path you recorded earlier, open the folder on your hard drive that contains the update.
4. Double-click the file that has an .exe extension (for example, *filename.exe*). The BIOS installation begins.
5. Complete the installation by following the on-screen instructions.

---

 **NOTE:** After a message on the screen reports a successful installation, you can delete the downloaded file from your hard drive.

---

## Using System Diagnostics

System Diagnostics allows you to run diagnostic tests to determine if the computer hardware is functioning properly. The following diagnostic tests are available in System Diagnostics:

- Start-up test—This test analyzes the main computer components that are required to start the computer.
- Run-in test—This test repeats the start-up test and checks for intermittent problems that the start-up test does not detect.
- Hard disk test—This test analyzes the physical condition of the hard drive, and then checks all data in every sector of the hard drive. If the test detects a damaged sector, it attempts to move the data to a good sector.
- Memory test—This test analyzes the physical condition of the memory modules. If it reports an error, replace the memory modules immediately.
- Battery test—This test analyzes the condition of the battery. If the battery fails the test, contact HP support to report the issue and purchase a replacement battery.

You can also view system information and error logs in the System Diagnostics window.

To start System Diagnostics:

1. Turn on or restart the computer. While the “Press the ESC key for Startup Menu” message is displayed in the lower-left corner of the screen, press **esc**. When the Startup Menu is displayed, press **f2**.
2. Click the diagnostic test you want to run, and then follow the on-screen instructions.

---

 **NOTE:** If you need to stop a diagnostics test while it is running, press **esc**.

---



# 6 Specifications

## Computer specifications

	Metric	U.S.
<b>Dimensions</b>		
Width	<b>41.60 cm</b>	16.38 in
Depth	<b>27.10 cm</b>	10.67 in
Height	<b>3.26 cm</b>	1.28 in
<b>Weight</b>	<b>3.40 kg</b>	7.5 lb
<b>Input power</b>		
Operating voltage and current	19.5 V dc @ 6.5 A - 120 W	
<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%	
Nonoperating	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>NOTE:</b> Applicable product safety standards specify thermal limits for plastic surfaces. The device operates well within this range of temperatures.		

## 17.3-in, LED, WVA AntiGlare display specifications

	<b>Metric</b>	<b>U.S.</b>
<b>Dimensions</b>		
Height	<b>24.83 cm</b>	9.78 in
Width	<b>38.77 cm</b>	15.26 in
Diagonal	<b>43.96 cm</b>	17.31 in
<b>Number of colors</b>		
17.3-in, LED, AntiGlare, 3D, FHD and 17.3-in, LED, AntiGlare, FHD	Up to 16.8 million	
17.3-in, LED, AntiGlare, FHD	72% color gamut	
17.3-in, LED, AntiGlare, HD+	60% color gamut	
<b>Contrast ratio</b>		
	200:1 (typical)	
<b>Brightness</b>		
17.3-in, LED, AntiGlare, 3D, FHD	400 nits (typical)	
17.3-in, LED, AntiGlare, FHD	300 nits (typical)	
17.3-in, LED, AntiGlare, HD+	200 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

	<b>*1-TB</b>	<b>**750-GB</b>	<b>**500-GB</b>	<b>**320-GB</b>
<b>Dimensions</b>				
Height	12.7 mm	9.5 mm	9.5 mm	9.5 mm
Length	100.2 mm	100.2 mm	100.4 mm	100.4 mm
Width	69.9 mm	69.9 mm	69.9 mm	69.9 mm
Weight	152 g	110 g	110 g	110 g
<b>Interface type</b>	SATA	SATA	SATA	SATA
<b>Transfer rate</b>				
Synchronous (maximum)	97 MB/sec	97 MB/sec	1.1 GB/sec	1.1 GB/sec
Security	ATA security	ATA security	ATA security	ATA security
<b>Seek times</b> (typical read, including setting)				
Single track	2.0 ms	2.0 ms	1.5 ms	1.5 ms
Average (read/write)	12/16 ms	12/16 ms	11/13 ms	11/13 ms
Maximum	21 ms	22 ms	22 ms	22 ms
<b>Logical blocks</b>	1,953,525,168	1,465,149,168	976,773,168	628,142,448
<b>Disk rotational speed</b>	5400 rpm	7200 rpm	7200 rpm	7200 rpm
<b>Operating temperature</b>	0°C to 60°C (32°F to 140°F)			
*1 TB = 1 trillion bytes when referring to hard drive storage capacity. Actual accessible capacity is less.				
**1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less.				
<b>NOTE:</b> Certain restrictions and exclusions apply. Contact technical support for details.				



---

# 7 Backup and recovery

Your computer includes tools provided by the operating system and HP to help you safeguard your information and restore it if ever needed.

This chapter provides information on the following topics:

- Creating a set of recovery discs or a recovery flash drive (Recovery Manager software feature)
- Performing a system restore (from the partition, recovery discs, or a recovery flash drive)
- Backing up your information
- Recovering a program or driver

## Restore

In the event of hard drive failure, to restore your system to its factory image you must use a set of recovery discs or a recovery flash drive that you have created using HP Recovery Manager. HP recommends that you use HP Recovery Manager immediately after software setup to create either a set of recovery discs or a recovery flash drive.

If you need to restore your system for some other reason than hard drive failure, you can use the HP Recovery partition (select models only), without the need for recovery discs or a recovery flash drive. To check for the presence of a recovery partition, click **Start**, right-click **Computer**, click **Manage**, and then click **Disk Management**. If the recovery partition is present, a Recovery drive is listed in the window.

---

 **CAUTION:** HP Recovery Manager (partition, or discs/flash drive) restores only software that was installed at the factory. Software not provided with this computer must be reinstalled manually.

 **NOTE:** Recovery discs have been included if your computer does not have a recovery partition.

---

# Creating restore media

HP recommends that you create either a set of recovery discs or a recovery flash drive to be sure that you can restore your computer to its original factory state if the hard drive fails, or if for any reason you cannot restore using the recovery partition tools. Create these discs or the flash drive after setting up the computer for the first time.

---

 **NOTE:** HP Recovery Manager allows the creation of only one set of recovery discs or one recovery flash drive. Handle these discs or flash drive carefully and keep them in a safe place.

 **NOTE:** If your computer does not include an integrated optical drive, you can use an optional external optical drive (purchased separately) to create recovery discs, or you can purchase recovery discs for your computer from the HP Web site. If you use an external optical drive, it must be connected directly to a USB port on the computer, not to a USB port on an external device, such as a USB hub.

---

Guidelines:

- Purchase high-quality DVD-R, DVD+R, DVD-R DL, or DVD+R DL discs.

---

 **NOTE:** Read-write discs, such as CD-RW, DVD±RW, double-layer DVD±RW, and BD-RE (rewritable Blu-ray) discs, are not compatible with the HP Recovery Manager software.

---

- The computer must be connected to AC power during this process.
- Only one set of recovery discs or one recovery flash drive can be created per computer.

---

 **NOTE:** If you are creating recovery discs, number each disc before inserting into the optical drive.

---

- If necessary, you can exit the program before you have finished creating the recovery discs or recovery flash drive. The next time you open HP Recovery Manager, you will be prompted to continue the backup creation process.

To create a set of recovery discs or a recovery flash drive:

1. Select **Start > All Programs > HP > HP Recovery Manager > HP Recovery Media Creation**.
2. Follow the on-screen instructions.

# Performing a system restore

HP Recovery Manager software allows you to repair or restore the computer to its original factory state. HP Recovery Manager works from recovery discs or a recovery flash drive, or from a dedicated recovery partition (select models only) on the hard drive.

 **NOTE:** A system restore must be performed if the computer hard drive has failed or if all attempts to correct any functional computer issues fail. A system restore should be used as a final attempt to correct computer issues.

Note the following when performing a system restore:

- You can restore only the system that you have previously backed up. HP recommends that you use HP Recovery Manager to create either a set of recovery discs or a recovery flash drive as soon as you set up the computer.
- Windows has its own built-in repair features, such as System Restore. If you have not already tried these features, try them before using HP Recovery Manager.
- HP Recovery Manager restores only software that was installed at the factory. Software not provided with this computer must be downloaded from the manufacturer's Web site or reinstalled from the disc provided by the manufacturer.

## Restoring using the dedicated recovery partition (select models only)

When using the dedicated recovery partition, there is an option to back up pictures, music and other audio, videos and movies, recorded TV shows, documents, spreadsheets and presentations, e-mails, and Internet favorites and settings during this process.

To restore the computer from the recovery partition, follow these steps:

1. Access Recovery Manager in either of the following ways:
  - Select **Start > All Programs > HP > HP Recovery Manager > HP Recovery Manager**.
  - or –
  - 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. Then, press **f11** while the “F11 (System Recovery)” message is displayed on the screen.
2. Click **System Recovery** in the HP Recovery Manager window.
3. Follow the on-screen instructions.

## Restoring using the restore media

1. If possible, back up all personal files.
2. Insert the first recovery disc into the optical drive on your computer or an optional external optical drive, and then restart the computer.

– or –

Insert the recovery flash drive into a USB port on your computer, and then restart the computer.



**NOTE:** If the computer does not automatically restart in HP Recovery Manager, the computer boot order must be changed.

3. Press **f9** at system bootup.
4. Select the optical drive or the flash drive.
5. Follow the on-screen instructions.

## Changing the computer boot order

To change the boot order for recovery discs:

1. Restart the computer.
2. Press **esc** while the computer is restarting, and then press **f9** for boot options.
3. Select **Internal CD/DVD ROM Drive** from the boot options window.

To change the boot order for recovery flash drive:

1. Insert the flash drive into a USB port.
2. Restart the computer.
3. Press **esc** while the computer is restarting, and then press **f9** for boot options.
4. Select the flash drive from the boot options window.

# Backing up and recovering your information

It is very important to back up your files and keep any new software in a safe place. As you add new software and data files, continue to create backups on a regular basis.

How completely you are able to recover your system depends on how recent your backup is.

---

 **NOTE:** A recovery from your most recent backup should be performed if the computer is attacked by a virus or if any major system components fail. In order to correct computer issues, attempt a recovery before you attempt a system restore.

---

You can back up your information to an optional external hard drive, a network drive, or discs. Back up your system at the following times:

- At regularly scheduled times

---

 **TIP:** Set reminders to back up your information periodically.

---

- Before the computer is repaired or restored
- Before you add or modify hardware or software

Guidelines:

- Create system restore points using the Windows System Restore feature, and periodically copy them to an optical disc or an external hard drive. For more information on using system restore points, see **Using Windows system restore points**.
- Store personal files in the Documents library and back up this folder periodically.
- Save customized settings in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time-saver if you have to re-enter 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+prt sc**.
  - To copy the entire screen, press **prt sc**.
3. Open a word-processing document, and then select **Edit > Paste**. The screen image is added to the document.
4. Save and print the document.

## Using Windows Backup and Restore

Guidelines:

- Be sure that the computer is connected to AC power before you start the backup process.
- Allow enough time to complete the backup process. Depending on file sizes, it may take over an hour.

To create a backup:

1. Select **Start > Control Panel > System and Security > Backup and Restore**.
2. Follow the on-screen instructions to schedule and create a backup.



---

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

---

## Using Windows system restore points

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



---

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

---

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

### When to create restore points

- Before you add or modify software or hardware
- Periodically, whenever the computer is functioning optimally

## Create a system restore point

1. Select **Start > Control Panel > System and Security > System**.
2. In the left pane, click **System protection**.
3. Click the **System Protection** tab.
4. Click **Create**.
5. Follow the on-screen instructions.

## Restore to a previous date and time

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

1. Select **Start > Control Panel > System and Security > System**.
2. In the left pane, click **System protection**.
3. Click the **System Protection** tab.
4. Click **System Restore**.
5. Follow the on-screen instructions.



---

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

---



# 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 A 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
Argentina	IRAM	1
Australia	SAA	1
Austria	OVE	1
Belgium	CEBEC	1
Brazil	ABNT	1
Canada	CSA	2
Chile	IMQ	1

<b>Country/region</b>	<b>Accredited agency</b>	<b>Applicable note number</b>
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
India	ISI	1
Israel	SII	1
Italy	IMQ	1
Japan	JIS	3
The Netherlands	KEMA	1
New Zealand	SANZ	1
Norway	NEMKO	1
The People's Republic of China	CCC	4
Saudi Arabia	SASO	7
Singapore	PSB	1
South Africa	SABS	1
South Korea	KTL	5
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	6
Thailand	TISI	1
The United Kingdom	ASTA	1

Country/region	Accredited agency	Applicable note number
The United States	UL	2
<ol style="list-style-type: none"> <li>1. The flexible cord must be Type HO5VV-F, 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.</li> <li>2. The flexible cord must be Type SVT/SJT 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 ac) configuration. CSA or C-UL mark. UL file number must be on each element.</li> <li>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 VCTF, 3-conductor, 0.75-mm<sup>2</sup> or 1.25-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 ac) configuration.</li> <li>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 CCC certification mark.</li> <li>5. The flexible cord must be Type HO5VV-F 3X0.75-mm<sup>2</sup> conductor size. KTL logo and individual approval number must be on each element. Corset approval number and logo must be printed on a flag label.</li> <li>6. The flexible cord must be Type HVCTF 3x1.25-mm<sup>2</sup> conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.</li> <li>7. For 127 V ac, the flexible cord must be Type SVT or SJT 3 x 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type HO5VV-F 3x0.75-/1.00-mm<sup>2</sup> conductor size, with plug BS 1363/A with BSI or ASTA marks.</li> </ol>		



---

## 9 Recycling

When a non-rechargeable or rechargeable 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 battery disposal.

HP encourages customers to recycle used electronic hardware, HP original print cartridges, and rechargeable batteries. For more information about recycling programs, see the HP Web site at <http://www.hp.com/recycle>.



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