



# HP Pavilion g7 Notebook PC

## 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	Computer models equipped with an AMD processor	Computer models equipped with an Intel processor
<b>Product Name</b>	HP Pavilion g7 Notebook PC	√	√
<b>Processors</b>	AMD A8-3520M 2.50 GHz processor (1.6 GHz Front-Side Bus (FSB), 1333 MHz/4.0 MB L2 cache, quad core, 35 W)	√	
	AMD A6-3420M 2.40 GHz processor (1.5 GHz FSB, 1333 MHz/4.0 MB L2 cache, quad core, 35 W)	√	
	AMD A4-3320M 2.60 GHz processor (2.0 GHz FSB, 1333 MHz/2.0 MB L2 cache, dual core, 35 W)	√	
	AMD A4-3305M 2.50 GHz processor (1.9 GHz FSB, 1333 MHz/2.0 MB L2 cache, dual core, 35 W)	√	
	AMD E2-3000M 2.40 GHz processor (1.8 GHz FSB, 1333 MHz/1.0 MB L2 cache, dual core, 35 W)	√	
	Intel® Core™ i7-2640M 2.80 GHz (SC turbo up to 3.50 GHz), Pin Grid Array (PGA) processor (4.0 MB L3 cache, dual core, 35 W)		√
	Intel Core i5-2540M 2.60 GHz (SC turbo up to 3.30 GHz), PGA processor (3.0 MB L3 cache, dual core, 35 W)		√
	Intel Core i5-2520M 2.50 GHz (SC turbo up to 3.20 GHz), PGA processor (3.0 MB L3 cache, dual core, 35 W)		√
	Intel Core i5-2450M 2.50 GHz (SC turbo up to 3.10 GHz), PGA processor (3.0 MB L3 cache, dual core, 35 W)		√
	Intel Core i5-2430M 2.40 GHz (SC turbo up to 3.00 GHz), PGA processor (3.0 MB L3 cache, dual core, 35 W)		√
	Intel Core i3-2370M TJ85 2.40 GHz, PGA processor (3.0 MB L3 cache, dual core, 35 W)		√
	Intel Core i3-2350M TJ85 2.30 GHz, PGA processor (3.0 MB L3 cache, dual core, 35 W)		√
	Intel Core i3-2330M TJ85 2.20 GHz, PGA processor (3.0 MB L3 cache, dual core, 35 W)		√

Category	Description	Computer models equipped with an AMD processor	Computer models equipped with an Intel processor
	Intel Pentium® B970 TJ85 2.30 GHz, PGA processor (2.0 MB cache, dual core 35 W)		√
	Intel Pentium B960 TJ85 2.20 GHz, PGA processor (2.0 MB L3 cache, dual core 35 W)		√
	Intel Pentium B950 TJ85 2.10 GHz, PGA processor (2.0 MB L3 cache, dual core 35 W)		√
<b>Chipset</b>	AMD A60M Fusion Controller Hub (FCH)	√	
	Intel HM65 Express Chipset		√
<b>Graphics</b>	<b>Internal graphics:</b>	√	
	<ul style="list-style-type: none"> <li>• AMD Radeon HD 6620G graphics supporting HD decode, DX11, and HDMI on computer models equipped with an AMD A8-3520M processor</li> <li>• AMD Radeon HD 6520G graphics supporting HD decode, DX11, and HDMI on computer models equipped with an AMD A6-3420M processor</li> <li>• AMD Radeon HD 6480G graphics supporting HD decode, DX11, and HDMI on computer models equipped with an AMD A4-3305M or A4-3320M processor</li> <li>• AMD Radeon HD 6380G graphics supporting HD decode, DX11 and HDMI on computer models equipped with an AMD E2-3000M processor</li> </ul>		
	<p><b>Internal graphics:</b></p> <ul style="list-style-type: none"> <li>• Intel HD Graphics 3000, on computer models equipped with an Intel Core i7, Intel Core i5, or Intel Core i3 processor; supports DX10</li> <li>• Intel HD Graphics, on computer models equipped with an Intel Pentium processor; supports DX10</li> </ul>		√
	<b>Switchable discrete graphics:</b>	√	
	<ul style="list-style-type: none"> <li>• AMD Radeon HD 7450M with 1024 MB of dedicated video memory (128 MB × 16 DDR3 @ 900 MHz × 4 PCs), 64 bit S3 package, muxless switchable, supports HD Decode, DX11, HDMI. and Bus Alive/Chip Off (BACO)</li> <li>• AMD Radeon HD 7450M with 512 MB of dedicated video memory (64 MB × 16 DDR3 @ 900 MHz × 4 PCs), 64 bit S3 package, muxless switchable, supports HD Decode, DX11, HDMI, and BACO</li> </ul>		

Category	Description	Computer models equipped with an AMD processor	Computer models equipped with an Intel processor
	<p><b>Switchable discrete graphics:</b></p> <ul style="list-style-type: none"> <li>ATI Mobility Radeon HD 7450M with 1024 MB of discrete video memory (128 MB × 16 DDR3 @ 900 MHz × 4 PCs), 64 bit S3 package, muxless switchable, supports HD Decode, DX11, HDMI, and BACO</li> <li>ATI Mobility Radeon HD 7450M with 512 MB of discrete video memory (64 MB × 16 DDR3 @ 900 MHz × 4 PCs), 64 bit S3 package, muxless switchable, supports HD Decode, DX11, HDMI, and BACO</li> </ul>		√
	<p><b>Dual graphics:</b></p> <ul style="list-style-type: none"> <li>AMD Radeon HD 6620G+7450M Dual Graphics for computer models equipped with an AMD Radeon HD 7450M graphics card and an AMD A8-3520M processor</li> <li>AMD Radeon HD 6520G+7450M Dual Graphics for computer models equipped with an AMD Radeon HD 7450M graphics card and an AMD A6-3420M processor</li> <li>AMD Radeon HD 6480G+7450M Dual Graphics for computer models equipped with an AMD Radeon HD 7450M graphics card and an AMD A4-3320M or AMD A4-3305 processor</li> </ul>	√	
<b>Panel</b>	<p>43.9 cm (17.3 in), high-definition+ (HD+), LED, SVA BrightView (1600×900) display; typical brightness: 200 cd/m<sup>2</sup></p> <p>All display assemblies include 2 wireless local area network (WLAN) antenna cables</p> <p>Supports 16:9 wide aspect ratio</p>	√	√
<b>Memory</b>	<p>2 customer-accessible/upgradable memory module slots</p>	√	√
	Supports dual-channel memory	√	√
	Supports up to 8192 MB of system RAM	√	√
	DDR3/1333 MHz (DDR3-1600 (1 GB / 2 GB / 4 GB / 8 GB) memory modules supported as an alternative source for DDR3-1333 )	√	√

Category	Description	Computer models equipped with an AMD processor	Computer models equipped with an Intel processor
	Supports: <ul style="list-style-type: none"> <li>Supports 8192 MB total system memory (4096×2)</li> <li>6144 MB total system memory (4096×1 + 2048×1)</li> <li>5120 MB total system memory (4096×1 + 1024×2)</li> <li>4096 MB total system memory (4096×1 or 2048×2)</li> <li>2048 MB total system memory (2048×1)</li> </ul>	√	√
<b>Hard drives</b>	Supports <b>6.35 cm</b> (2.5 in) hard drives in <b>9.5 mm</b> (.37 in), and <b>7.0 mm</b> (.28 in) thicknesses	√	√
	Customer-accessible	√	√
	Serial ATA	√	√
	Supports the following configurations: <ul style="list-style-type: none"> <li>750 GB, 5400 rpm (9.5 mm)</li> <li>640 GB, 5400 rpm (9.5 mm)</li> <li>500 GB, 7200 rpm and 5400 rpm (9.5 mm)</li> <li>320 GB, 7200 rpm and 5400 rpm (both 7.0 mm and 9.5 mm)</li> <li>160 GB solid-state drive (SSD), 6.35 cm (2.5 in)</li> </ul>	√	√
<b>Optical drive</b>	Fixed	√	√
	Serial ATA	√	√
	12.7 mm tray load	√	√
	Blu-ray Disc (BD) ROM DVD±R/RW Super Multi Double-Layer Drive	√	√
	DVD±RW and CD-RW Super Multi Double-Layer Combo Drive	√	√
<b>Audio and video</b>	Single digital microphone	√	√
	HD audio	√	√
	HP-branded Altec/Lansing speakers	√	√
	Supports Microsoft® Premium requirements	√	√
	HP VGA webcam (fixed, no tilt with activity LED, 640×480 by 24 frames per second)	√	√
<b>Ethernet</b>	Integrated 10/100 network interface card (NIC)	√	√

Category	Description	Computer models equipped with an AMD processor	Computer models equipped with an Intel processor
<b>Wireless</b>	Integrated wireless local area network (WLAN) options by way of wireless module	√	√
	Two WLAN antennas built into display assembly	√	√
	Support for the following WLAN formats:	√	√
	<ul style="list-style-type: none"> <li>Atheros 9485GN 802.11b/g/n 1×1 WiFi and 3012 Bluetooth 4.0 Combo Adapter (select models with Intel processors)</li> <li>Broadcom 4313 802.11b/g/n 1×1 WiFi and 2070 Bluetooth 2.1+EDR Combo adapter (BT3.0+HS ready) (select models with AMD processors)</li> <li>Ralink 5390GN 802.11b/g/n 1×1 WiFi Adapter, Sound Blaster half-mini card (select models with AMD processors)</li> <li>Realtek 8188GN 802.11b/g/n 1x1 WiFi Adapter, Sound Blaster half-mini card (select models with Intel processors)</li> </ul>		
	Support for the following WLAN formats:		√
<ul style="list-style-type: none"> <li>Intel Centrino Wireless-N 1030 WLAN module, 802.11b/g/n and Bluetooth Combo Adapter</li> </ul>			
<b>External media card</b>	HP Multi-Format Digital Media Reader supports the following digital card formats:	√	√
	<ul style="list-style-type: none"> <li>Secure Digital (SD) Memory Card</li> <li>Secure Digital High Capacity (SDHC) Memory Card</li> <li>Secure Digital Extended Capacity (SDXC) Memory Card</li> <li>MultiMediaCard (MMC)</li> </ul>		

Category	Description	Computer models equipped with an AMD processor	Computer models equipped with an Intel processor
<b>Ports</b>	<ul style="list-style-type: none"> <li>• Smart-Pin AC power adapter</li> <li>• Audio-in (mono microphone)</li> <li>• Audio-out (stereo headphone)</li> <li>• HDMI version 1.4 supporting up to 1080p, 1920 ×1200 @ 60Hz and 1920 ×1200 @ 60Hz in DVI mode</li> <li>• RJ-45 (Ethernet, includes link and activity lights)</li> <li>• USB 2.0 (3 ports)</li> <li>• VGA (Dsub 15 pin) supporting: <ul style="list-style-type: none"> <li>◦ 2048×1536 external resolution @ 75 Hz (on computer models equipped with an Intel processor)</li> <li>◦ 1920×1600 external resolution @ 60 Hz (on computer models equipped with an AMD processor)</li> <li>◦ Hot plug and unplug and auto-detection for correct output to wide-aspect vs. standard aspect video</li> </ul> </li> </ul>	√	√
<b>Keyboard/pointing devices</b>	Full-size textured pocket keyboard with full numeric keypad	√	√
	TouchPad with multi-touch gestures, 2-finger scrolling, and pinch-zoom enabled	√	√
	Taps enabled by default	√	√
<b>Power requirements</b>	90 W AC adapter with localized cable plug support (3-wire plug with ground pin, supports 3-pin DC connector), for use only with computer models equipped with a graphics subsystem with discrete video memory	√	√
	65 W AC adapter with localized cable plug support (3-wire plug with ground pin, supports 3-pin DC connector), for use only with computer models equipped with a graphics subsystem with Uniform Memory Access (UMA) video memory		
	<b>Support for the following batteries:</b> <ul style="list-style-type: none"> <li>• 6-cell, 55 Whr, 2.55 Ah Li-ion battery for use with select computer models only</li> <li>• 6-cell, 47 Whr, 2.20 Ah Li-ion battery</li> </ul>	√	√
<b>Security</b>	Security cable slot	√	√

Category	Description	Computer models equipped with an AMD processor	Computer models equipped with an Intel processor
Operating system	<b>Preinstalled:</b> <ul style="list-style-type: none"> <li>• Microsoft Windows® 7 Home Basic 64 bit</li> <li>• Windows 7 Home Premium 64 bit</li> <li>• FreeDOS</li> </ul>	√	√
	<b>Preinstalled:</b> <ul style="list-style-type: none"> <li>• Windows 7 Home Professional 64 bit</li> </ul>		√
Serviceability	<b>End-user replaceable parts:</b> <ul style="list-style-type: none"> <li>• AC adapter</li> <li>• Battery</li> <li>• Hard drive or SSD</li> <li>• Memory modules (2)</li> <li>• Optical drive</li> <li>• WLAN module</li> </ul>	√	√


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## 2 External component identification

### Top Button



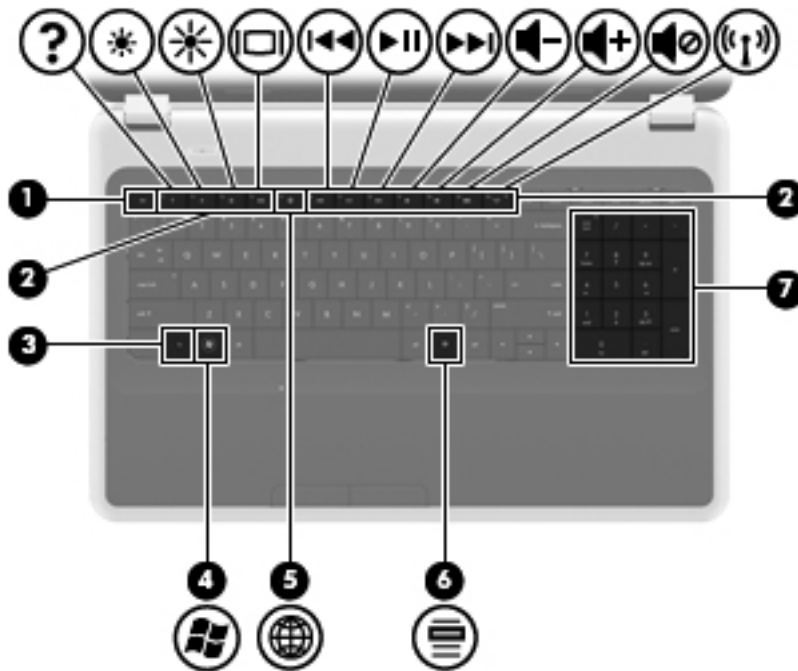
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Component		Description
Power button		<ul style="list-style-type: none"><li>• When the computer is off, press the button to turn on the computer.</li><li>• When the computer is on, press the button briefly to initiate Sleep.</li><li>• When the computer 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>

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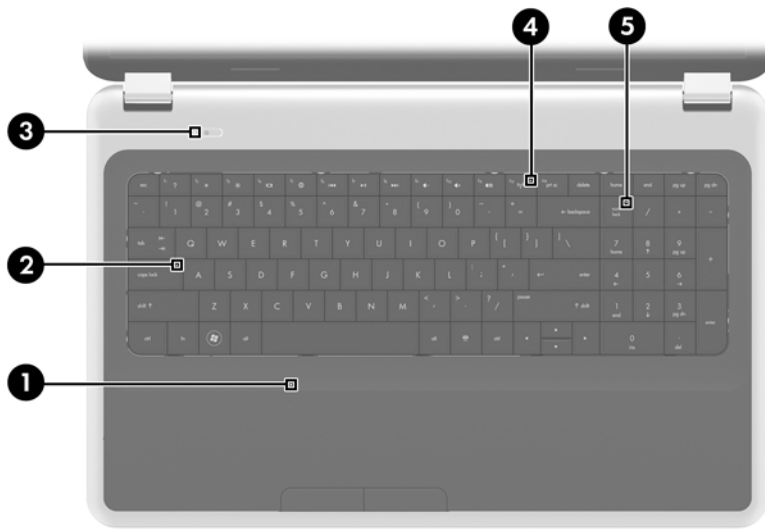


## Keys



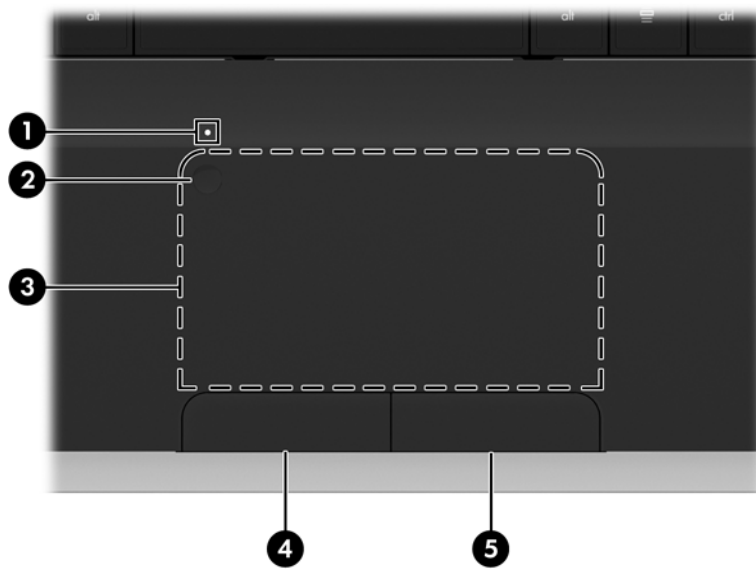
Item	Component	Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	Action keys	Execute frequently used system functions.
(3)	fn key	Displays system information when pressed in combination with the esc key.
(4)	 Windows logo key	Displays the Windows Start menu.
(5)	 QuickWeb key	<ul style="list-style-type: none"> <li>When the computer is off or in Hibernation mode, press the button to open HP QuickWeb.</li> <li>When the computer is in Windows press the button to open the default Web browser.</li> <li>When the computer is in HP QuickWeb, press the button to open the default Web browser.</li> </ul>
(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.

## Lights



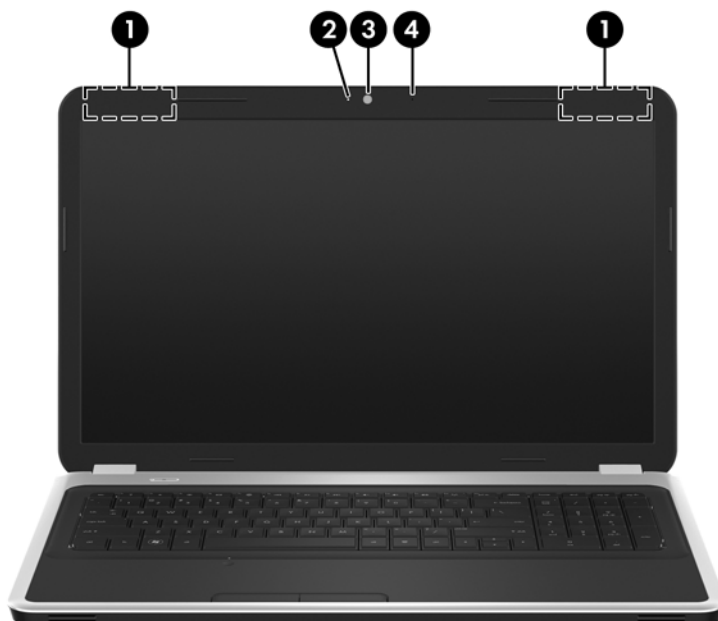
Item	Component	Description
(1)	TouchPad light	<ul style="list-style-type: none"> <li>Amber: the TouchPad is off.</li> <li>Off: the TouchPad is on.</li> </ul>
(2)	Caps lock light	<ul style="list-style-type: none"> <li>White: Caps lock is on.</li> <li>Off: Caps lock is off.</li> </ul>
(3)	Power light	<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 WLAN device and/or a Bluetooth device, is on.</li> <li>Amber: All wireless devices are off.</li> </ul>
(5)	Num lock light	<ul style="list-style-type: none"> <li>White: The numeric functions on the integrated numeric keypad are active.</li> <li>Off: The navigational functions on the integrated numeric keypad are active.</li> </ul>

## TouchPad



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

## Display



Item	Component	Description
(1)	WLAN antennas (2)*	Send and receive wireless signals to communicate with WLANs.
(2)	Webcam light	On: The webcam is in use.
(3)	Webcam	Records video and captures still photographs. To use the webcam, select <b>Start &gt; All Programs &gt; CyberLink YouCam</b> .
(4)	Internal microphone	Records sound.

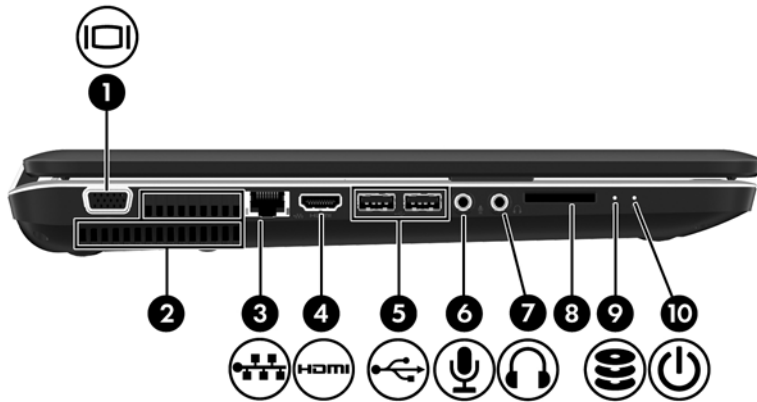
\*The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions. To see wireless regulatory notices, refer to the section of the *Regulatory, Safety and Environmental Notices* that applies to your country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







## Front





Component	Description
Speakers (2)	Produce sound.

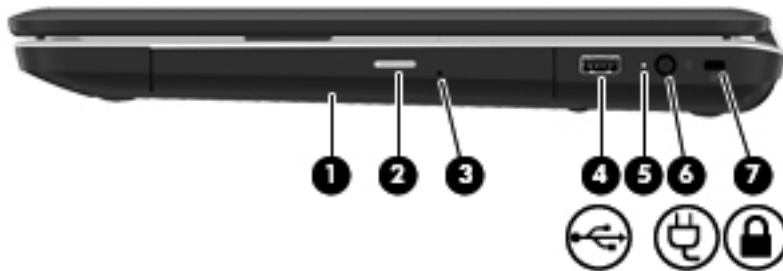
## Left side






Item	Component	Description
(1)	 External monitor port	Connects an external VGA monitor or projector.
(2)	Vents (2)	Enable airflow to cool internal components. <b>NOTE:</b> The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(3)	 RJ-45 (network) jack	Connects a network cable.
(4)	 HDMI port	Connects an optional video or audio device, such as a high-definition television, or any compatible digital or audio component.
(5)	 USB ports (2)	Connect optional USB devices.
(6)	 Audio-in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.
(7)	 Audio-out (headphone) jacks (2)	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> .
(8)	Digital Media Slot	Supports the following digital card formats: <ul style="list-style-type: none"> <li>Secure Digital (SD) Memory Card</li> <li>Secure Digital High Capacity (SDHC) Memory Card</li> <li>Secure Digital Extended Capacity (SDXC) Memory Card</li> <li>MultiMediaCard</li> </ul>

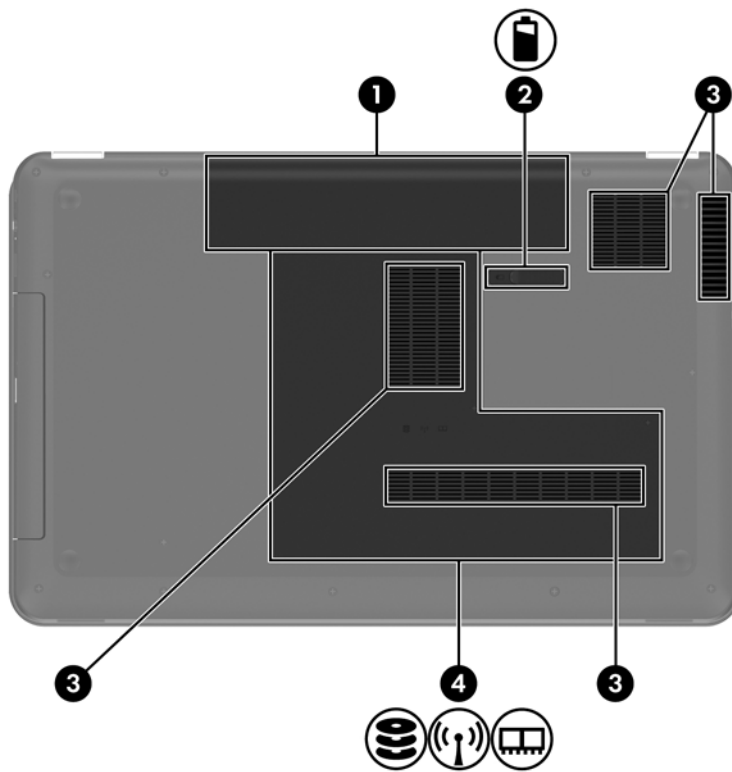
Item	Component	Description
(9)	 Drive light	Blinking white: the hard drive is being accessed.
(10)	 Power light	<ul style="list-style-type: none"> <li>White: The computer is on.</li> <li>Blinking white: The computer is in the Sleep state.</li> <li>Off: The computer is off or in Hibernation.</li> </ul>



## Right side



Item	Component	Description
(1)	Optical drive	Reads and writes to an optical disc.
(2)	Optical drive light	Blinking: The optical drive is being accessed.
(3)	Optical drive eject button	Opens the optical drive.
(4)	 USB port	Connects an optional USB device.
(5)	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>Blinking white: The battery has reached a low battery level.</li> <li>Amber: A battery is charging.</li> </ul>
(6)	 Power connector	Connects an AC adapter.
(7)	 Security cable slot	Connects an optional security cable. <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.

# Bottom

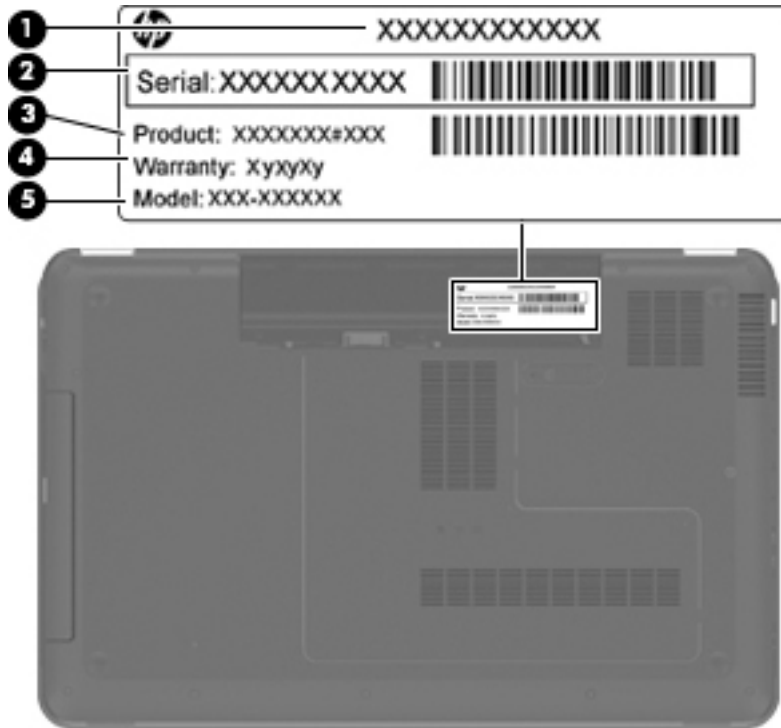


Item	Component	Description
(1)	Battery bay	Holds the battery.
(2)	 Battery release latch	Releases the battery from the battery bay.
(3)	Vents (4)	Enable airflow to cool internal components. <b>NOTE:</b> The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(4)	 Hard drive bay	Holds the hard drive, the WLAN module, and the memory module slots. <b>CAUTION:</b> To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore computer functionality, and then contact technical support through Help and Support.

# 3 Illustrated parts catalog

## Service tag

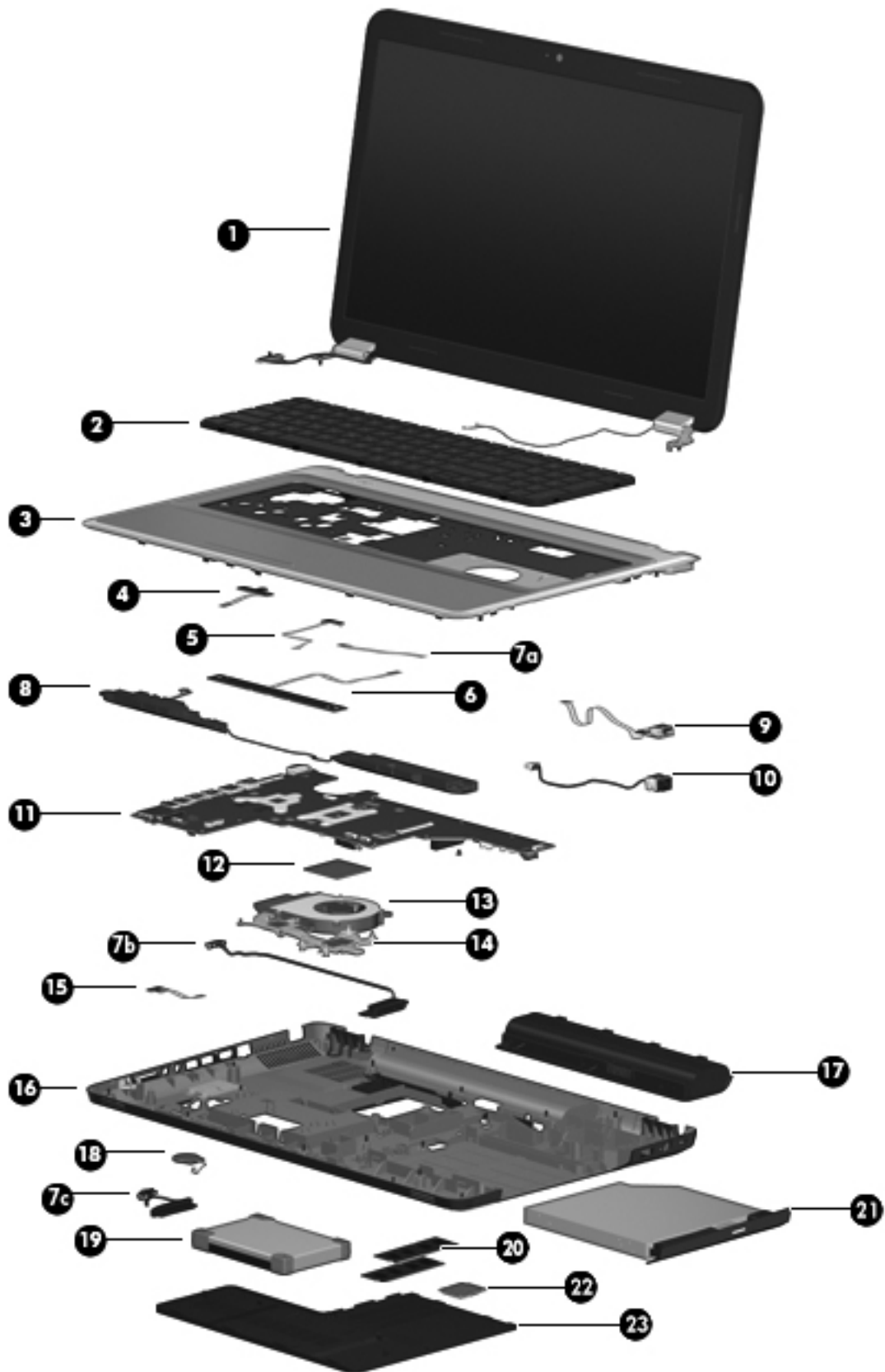
When ordering parts or requesting information, provide the computer serial number and model number provided on the service tag.



Item	Description	Function
(1)	Product name	This is the model name for the computer.
(2)	Serial number	This alphanumeric identifier is unique to each product.
(3)	Product number	This is the alphanumeric identifier needed to locate documents, drivers, and support for the computer. The product number helps a service technician determine what components and parts are needed.
(4)	Warranty period	This number describes the duration of the warranty period for the computer.
(5)	Model number	This is the alphanumeric identifier needed to locate documents, drivers, and support for the computer.



# Computer major components



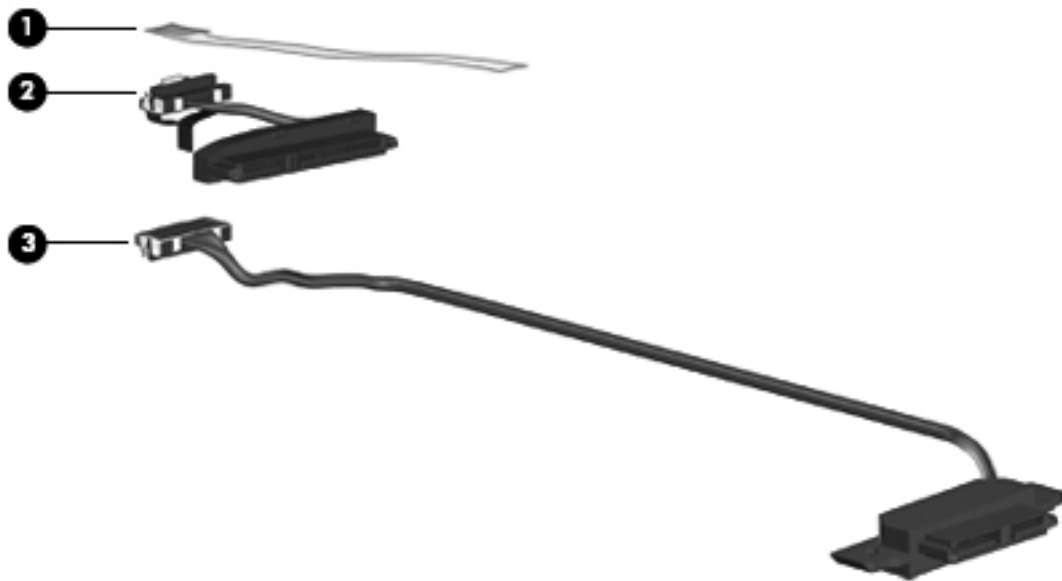
Item	Component	Spare part number
(1)	<b>43.9 mm (17.3 in), high definition (HD), light-emitting diode (LED), BrightView display assembly</b> (includes webcam, two microphones, and wireless antenna transceivers and cables)	
	Butter gold	640223-001
	Charcoal gray	640226-001
	Pewter	640227-001
	<b>NOTE:</b> For more display assembly spare part information, see <a href="#">Display assembly subcomponents on page 23</a> .	
(2)	<b>Keyboard</b> , black (includes keyboard cable):	
	For use in Belgium	640208-A41
	For use in Bulgaria (for use only with computer models equipped with an Intel processor)	640208-261
	For use in Canada	640208-121
	For use in the Czech Republic (for use only with computer models equipped with an AMD processor)	640208-221
	For use in Denmark, Finland, and Norway	640208-DH1
	For use in France	640208-051
	For use in Germany	640208-041
	For use in Greece	640208-DJ1
	For use in Hungary	640208-211
	For use internationally	640208-B31
	For use in Israel	640208-BB1
	For use in Italy	640208-061
	For use in Portugal	640208-131
	For use in Russia	640208-251
	For use in Saudi Arabia	640208-171
	For use in Slovenia	640208-BA1
	For use in Spain	640208-071
	For use in Switzerland	640208-BG1
	For use in Turkey	640208-141
	For use in the United Kingdom	640208-031
	For use in the United States	640208-001
(3)	<b>Top cover</b> (includes TouchPad and TouchPad cable):	
	Butter gold	641401-001
	Charcoal gray	641404-001
	Pewter	641405-001
(4)	<b>Power button board</b> (includes cable)	640212-001

Item	Component	Spare part number
(5)	<b>TouchPad LED board</b> (includes cable)	640213-001
(6)	<b>TouchPad button board</b> (includes cable)	640214-001
	<b>Cable Kit</b> , includes:	640206-001
(7a)	TouchPad cable	
(7b)	Optical drive cable	
(7c)	Hard drive connector cable	
	<b>NOTE:</b> See <a href="#">Cable Kit on page 22</a> for more Cable Kit spare part information.	
(8)	<b>Speaker Kit</b> (includes left and right speakers and cable)	641396-001
(9)	<b>USB board</b> (includes cable)	640211-001
(10)	<b>Power connector cable</b>	641394-001
(11)	<b>System board</b> (includes replacement thermal material):	
	<b>AMD processor:</b>	
	For use only with computer models equipped with the AMD A60M chipset and a graphics subsystem with 1024 MB of discrete video memory, supports BACO	649950-001
	For use only with computer models equipped with the AMD A60M chipset and a graphics subsystem with 512 MB of discrete video memory, supports BACO	649949-001
	For use only with computer models equipped with the AMD A60M chipset and a graphics subsystem with UMA video memory	649948-001
	<b>Intel processor:</b>	
	For use only with computer models equipped with the Intel HM65 chipset and a graphics subsystem with 1024 MB of discrete video memory and supports BACO	650199-001
	For use only with computer models equipped with the Intel HM65 chipset and a graphics subsystem with 512 MB of discrete video memory and supports BACO	650198-001
	For use only with computer models equipped with the HM65 chipset and a graphics subsystem with UMA video memory	636373-001
	<b>Thermal Material Kit</b> (includes replacement thermal paste and pads)	634433-001
(12)	<b>Processor</b> (includes replacement thermal material)	
	AMD A8-3520M 2.50 GHz processor (1.6 GHz FSB, 4.0 MB L2 cache, quad core, 35 W)	669690-001
	AMD A6-3420M 2.40 GHz processor (1.5 GHz FSB, 4.0 MB L2 cache, quad core, 35 W)	669688-001
	AMD A4-3320M 2.60 GHz processor (2.0 GHz FSB, 2.0 MB L2 cache, dual core, 35 W)	669686-001
	AMD A4-3305M 2.50 GHz processor (1.9 GHz FSB, 2.0 MB L2 cache, dual core, 35 W)	672093-001
	AMD E2-3000M 2.40 GHz processor (1.8 GHz FSB, 1.0 MB L2 cache, dual core, 35 W)	677628-001
	Intel Core i7-2640M 2.80 GHz (SC turbo up to 3.50 GHz), PGA processor (4.0 MB L3 cache, dual core, 35 W)	666173-001

Item	Component	Spare part number
	Intel Core i5-2540M 2.60 GHz (SC turbo up to 3.30 GHz), PGA processor (3.0 MB L3 cache, dual core, 35 W)	631255-001
	Intel Core i5-2520M 2.50 GHz (SC turbo up to 3.20 GHz), PGA processor (3.0 MB L3 cache, dual core, 35 W)	631253-001
	Intel Core i5-2450M 2.50 GHz (SC turbo up to 3.10 GHz), PGA processor (3.0 MB L3 cache, dual core, 35 W)	676359-001
	Intel Core i5-2430M 2.40 GHz (SC turbo up to 3.00 GHz), PGA processor (3.0 MB L3 cache, dual core, 35 W)	653341-001
	Intel Core i3-2370M TJ85, 2.40 GHz, PGA processor (3.0 MB L3 cache, dual core, 35 W)	677152-001
	Intel Core i3-2350M TJ85, 2.30 GHz, PGA processor (3.0 MB L3 cache, dual core, 35 W)	653340-001
	Intel Core i3-2330M TJ85, 2.20 GHz, PGA processor (3.0 MB L3 cache, dual core, 35 W)	653339-001
	Intel Pentium B970 TJ85 2.30 GHz, PGA processor (2.0 MB L3 cache, dual core, 35 W)	676785-001
	Intel Pentium B960 TJ85 2.20 GHz, PGA, processor (2.0 MB L3 cache, dual core, 35 W)	664662-001
	Intel Pentium B950 TJ85 2.10 GHz, PGA, processor (2.0 MB L3 cache, dual core 35 W)	653338-001
(13)	<b>Fan</b> (includes replacement thermal material)	639460-001
(14)	<b>Heat sink</b> (includes replacement thermal material)	
	<b>AMD processor:</b>	
	For use only with computer models equipped with the AMD A60M chipset and a graphics subsystem with discrete video memory	649953-001
	For use only with computer models equipped with the AMD A60M chipset and a graphics subsystem with UMA video memory	649954-001
	<b>Intel processor:</b>	
	For use only with computer models equipped with the HM65 chipset and a graphics subsystem with discrete video memory	641141-001
	For use only with computer models equipped with the HM65 chipset and a graphics subsystem with UMA video memory	641140-001
(15)	<b>LED board</b> (includes cable)	640215-001
(16)	<b>Base enclosure</b> (includes battery release latch, heat sink, replacement thermal material, and 4 rubber feet)	640203-001
	<b>Rubber Feet Kit</b> (not illustrated, includes 4 rubber feet)	639455-001
(17)	<b>Battery:</b>	
	6-cell, 55 Whr, 2.55 Ah Li-ion battery, for use with select computer models only	593554-001
	6-cell, 47 Whr, 2.20 Ah Li-ion battery	593553-001
(18)	<b>RTC battery</b> (includes cable and double-sided tape)	637193-001

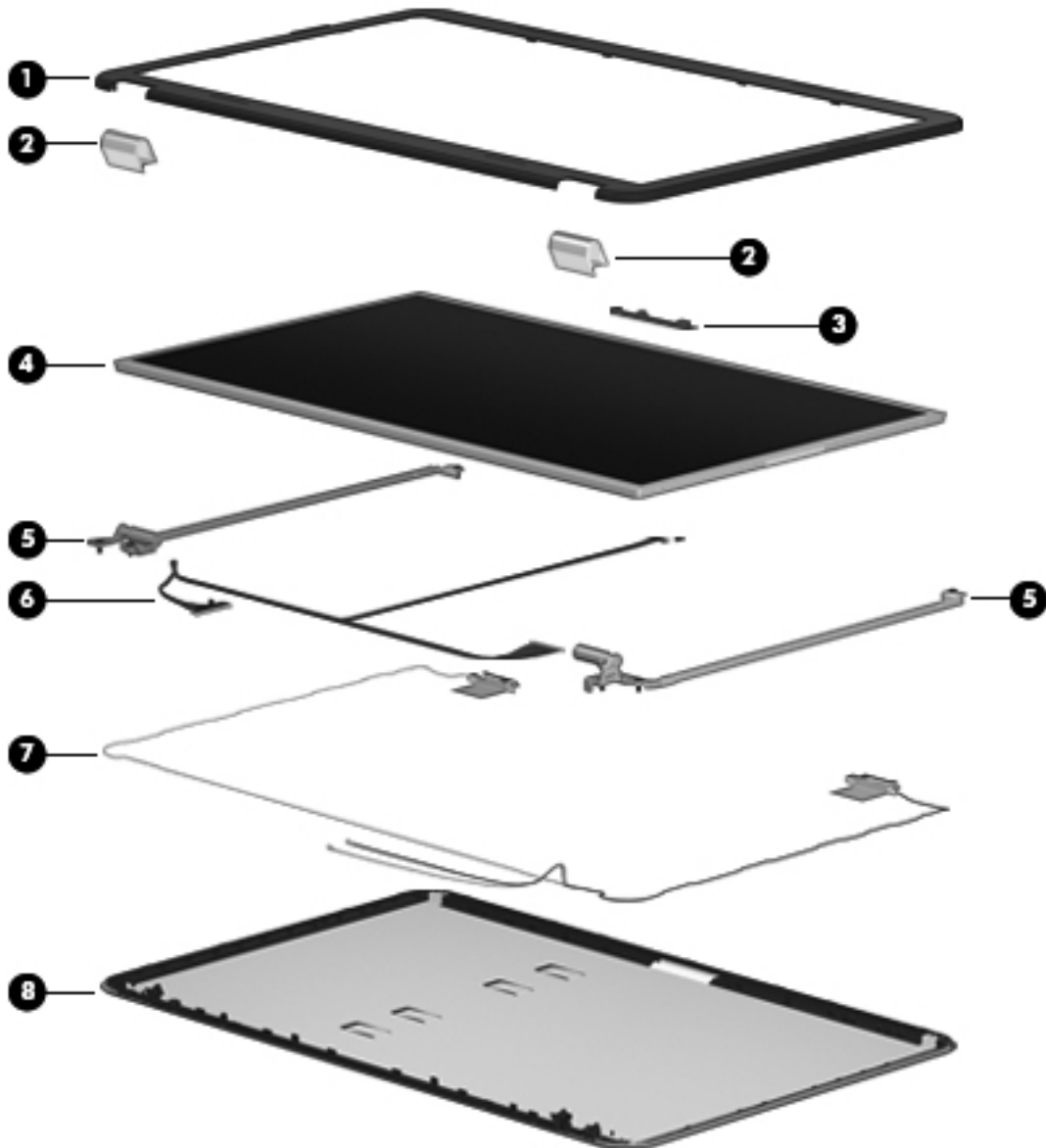
Item	Component	Spare part number
<b>(19)</b>	<b>Hard drive</b> SATA, does not include hard drive connector cable, isolators, or shield):	
	For use with all computer models:	
	750 GB, 5400 rpm, 9.5 mm (0.37 in) × 6.35 cm (2.50 in)	644351-001
	640 GB, 5400 rpm, 9.5 mm (0.37 in) × 6.35 cm (2.50 in)	637312-001
	500 GB, 7200 rpm, 9.5 mm (0.37 in) × 6.35 cm (2.50 in)	644685-001
	320 GB, 7200 rpm, 7.0 mm (0.28 in) × 6.35 cm (2.50 in)	645089-001
	160 GB SSD, 6.35 cm (2.50 in)	682589-001
	<b>Hard Drive Hardware Kit</b> (not illustrated, includes front and rear isolators and shield)	639444-001
<b>(20)</b>	<b>Memory modules</b> (2, DDR3, 10600, 1333 MHz):	
	4 GB	621569-001
	2 GB	621565-001
<b>(21)</b>	<b>Optical drive</b> (includes bezel and bracket):	
	BD ROM DVD±R/RW Super Multi Double-Layer Drive	659878-001
	DVD±RW and CD-RW Super Multi Double-Layer Combo Drive	659877-001
<b>(22)</b>	<b>WLAN module:</b>	
	Atheros 9485GN 802.11b/g/n 1×1 WiFi and 3012 Bluetooth 4.0 Combo Adapter, for use with computer models equipped with an AMD processor or select models equipped with an Intel processor	655795-001
	Broadcom 4313GN 802.11b/g/n 1×1 WiFi and 20702 Bluetooth 4.0 Combo Adapter, for use with computer models equipped with an Intel processor or select models equipped with an AMD processor	657325-001
	Intel Centrino Advanced-N 6230, for use only with computer models equipped with an Intel processor	631956-001
	Ralink 5390GN 802.11b/g/n 1×1 WiFi Adapter, for use with computer models equipped with an Intel processor or select models equipped with an AMD processor	630703-001
	Realtek RTL8191SE 802.11b/g/n 1×1 WiFi Adapter, for use with computer models equipped with an AMD processor or select models equipped with an Intel processor	640926-001
<b>(23)</b>	<b>Service door</b> (includes 2 captive screws, secured by C-clips) — available in the Plastics Kit, spare part number 640216-001)	

## Cable Kit



Item	Component	Spare part number
	<b>Cable Kit, includes:</b>	640206-001
(1)	TouchPad cable	
(2)	Hard drive connector cable	
(3)	Optical drive cable	

## Display assembly subcomponents

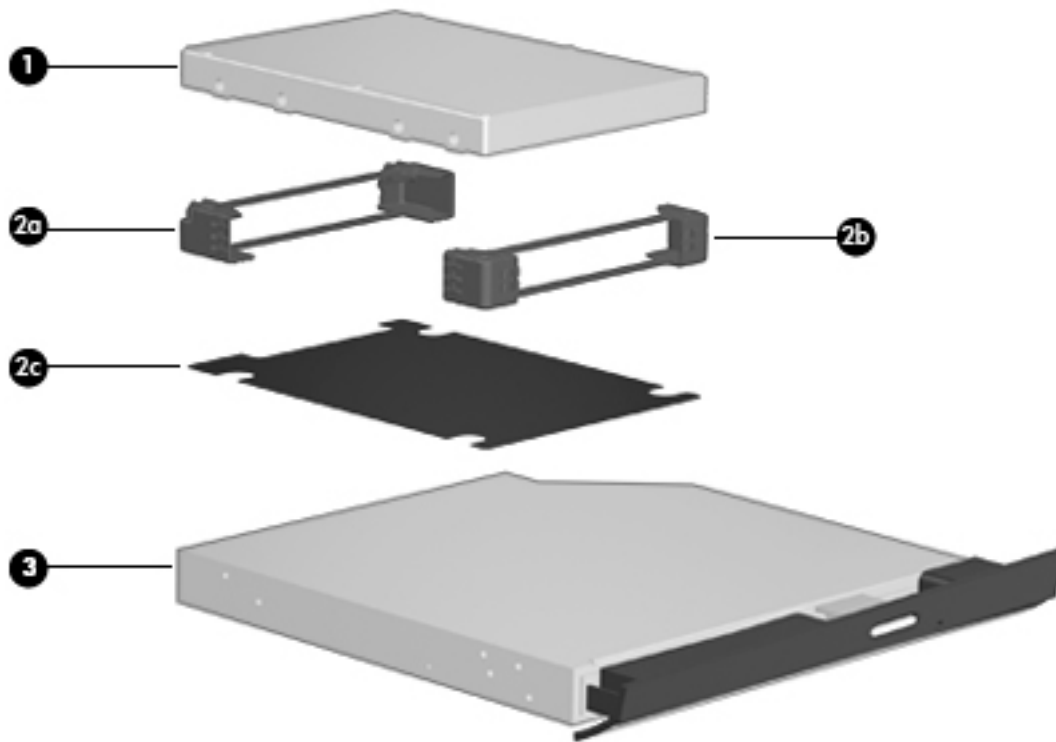


Item	Component	Spare part number
(1)	Display bezel	640204-001
(2)	Display hinge covers (2)	643698-001
(3)	Webcam/microphone module	637197-001
(4)	43.9 cm (17.3 in) HD, LED, BrightView display panel	641395-001
(5)	Display Hinge Kit (includes left and right display hinges and brackets)	640207-001
(6)	Display Cable Kit (includes display panel cable and webcam/microphone module cable)	640205-001
(7)	Antenna Kit (includes left and right wireless antenna cables and transceivers)	640192-001
(8)	Display enclosure:	

<b>Item</b>	<b>Component</b>	<b>Spare part number</b>
	Butter gold	640197-001
	Charcoal gray	640200-001
	Pewter	640201-001
	<b>Display Screw Kit</b> (not illustrated)	640218-001



## Mass storage devices



Item	Component	Spare part number
(1)	<b>Hard drive</b> (7.0 mm (2.5 in), SATA, does not include hard drive connector cable, isolators, or shield): For use with all computer models:	
	750 GB, 5400 rpm, 9.5 mm (0.37 in) × 6.35 cm (2.50 in)	644351-001
	640 GB, 5400 rpm, 9.5 mm (0.37 in) × 6.35 cm (2.50 in)	637312-001
	500 GB, 7200 rpm, 9.5 mm (0.37 in) × 6.35 cm (2.50 in)	644685-001
	320 GB, 7200 rpm, 7.0 mm (0.28 in) × 6.35 cm (2.50 in)	645089-001
	160 GB SSD, 6.35 cm (2.50 in)	682589-001
	<b>Hard Drive Hardware Kit</b> , includes:	639444-001
(2a)	Hard drive front isolator	
(2b)	Hard drive rear isolator	
(2c)	Hard drive shield	
(3)	<b>Optical drive</b> (includes bezel and bracket):	
	BD ROM DVD±R/RW Super Multi Double-Layer Drive	659878-001
	DVD±RW and CD-RW Super Multi Double-Layer Combo Drive	659877-001

## Miscellaneous parts

Component	Spare part number
<b>HP Smart AC adapter</b>	
90 W PFC RC V HP Smart AC adapter, for use only with computer models equipped with a graphics subsystem with discrete video memory	609940-001
65 W RC V HP Smart AC adapter, for use only with computer models equipped with a graphics subsystem with UMA video memory	609939-001
<b>Power cord (3-pin, black, 1.83-m):</b>	
For use in Denmark	490371-081
For use in Europe	490371-021
For use in Israel	490371-BB1
For use in Italy	490371-061
For use in North America	490371-001
For use in South Africa	490371-AR1
For use in Switzerland	490371-111
For use in the United Kingdom and Singapore	490371-031
<b>Screw Kit</b>	640217-001

## 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 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)
490371-081	Power cord for use in Denmark (3-pin, black, 1.83-m)
490371-111	Power cord for use in Switzerland (3-pin, black, 1.83-m)
490371-AR1	Power cord for use in South Africa (3-pin, black, 1.83-m)
490371-BB1	Power cord for use in Israel (3-pin, black, 1.83-m)
593553-001	6-cell, 47 Whr, 2.20 Ah Li-ion battery
593554-001	6-cell, 55 Whr, 2.55 Ah Li-ion battery, for use with select computer models only
609939-001	65 W RC V HP Smart AC adapter for use only with computer models equipped with a graphics subsystem with UMA video memory
609940-001	90 W PFC RC V HP Smart AC adapter for use only with computer models equipped with a graphics subsystem with discrete video memory
621565-001	2 GB memory module (DDR3, 10600, 1333 MHz)

Spare part number	Description
621569-001	4 GB memory module (DDR3, 10600, 1333 MHz)
630703-001	Ralink 5390GN 802.11b/g/n 1×1 WiFi Adapter for use only on computer models equipped with an Intel processor or select models equipped with an AMD processor
631253-001	Intel i5-2520M 2.50 GHz (SC turbo up to 3.20 GHz) processor (3.0 MB L3 cache, dual core, 35 W; includes replacement thermal material)
631255-001	Intel i5-2540M 2.60 GHz (SC turbo up to 3.30 GHz) processor (3.0 MB L3 cache, dual core, 35 W; includes replacement thermal material)
631956-001	Intel Centrino Advanced-N 6230 WLAN module for use only on computer models equipped with an Intel processor
634433-001	Thermal Material Kit (includes replacement thermal paste and pads)
636373-001	System board for use only with computer models equipped with an Intel processor, HM65 chipset, and a graphics subsystem with UMA video memory (includes replacement thermal material)
637193-001	RTC battery (includes cable and double-sided tape)
637197-001	Webcam/microphone module
637312-001	640 GB, 5400 rpm hard drive, 9.5 mm (0.37 in) × 6.35 cm (2.50 in), SATA, does not include isolators or shield)
639444-001	Hard Drive Hardware Kit (includes front and rear isolators and shield)
639455-001	Rubber Feet Kit (includes 4 rubber feet)
639460-001	Fan (includes replacement thermal material)
640192-001	Antenna Kit (includes left and right wireless antenna cables and transceivers)
640197-001	Display enclosure, butter gold
640200-001	Display enclosure, charcoal gray
640201-001	Display enclosure, pewter
640203-001	Base enclosure (includes battery release latch, heat sink, replacement thermal material, and 4 rubber feet)
640204-001	Display bezel
640205-001	Display Cable Kit (includes display panel cable and webcam/microphone module cable)
640206-001	Cable Kit (includes hard drive connector cable, optical drive cable, and TouchPad cable)
	<b>NOTE:</b> See <a href="#">Cable Kit on page 22</a> for more Cable Kit spare part information.
640207-001	Display Hinge Kit (includes left and right display hinges and brackets)
640208-001	Keyboard, black, for use in the United States (includes keyboard cable)
640208-031	Keyboard, black, for use in the United Kingdom and Singapore (includes keyboard cable)
640208-041	Keyboard, black, for use in Germany (includes keyboard cable)
640208-051	Keyboard, black, for use in France (includes keyboard cable)
640208-061	Keyboard, black, for use in Italy (includes keyboard cable)
640208-071	Keyboard, black, for use in Spain (includes keyboard cable)
640208-121	Keyboard, black, for use in Canada (includes keyboard cable)

Spare part number	Description
640208-131	Keyboard, black, for use in Portugal (includes keyboard cable)
640208-141	Keyboard, black, for use in Turkey (includes keyboard cable)
640208-171	Keyboard, black, for use in Saudi Arabia (includes keyboard cable)
640208-211	Keyboard, black, for use in Hungary (includes keyboard cable)
640208-221	Keyboard, black, for use in the Czech Republic, for use only with computer models equipped with an AMD processor (includes keyboard cable)
640208-251	Keyboard, black, for use in Russia (includes keyboard cable)
640208-261	Keyboard, black, for use in Bulgaria (for use only with computer models equipped with an Intel processor; includes keyboard cable)
640208-A41	Keyboard, black, for use in Belgium (includes keyboard cable)
640208-B31	Keyboard, black, for use internationally (includes keyboard cable)
640208-BA1	Keyboard, black, for use in Slovenia (includes keyboard cable)
640208-BB1	Keyboard, black, for use in Israel (includes keyboard cable)
640208-BG1	Keyboard, black, for use in Switzerland (includes keyboard cable)
640208-DH1	Keyboard, black, for use in Denmark, Finland, and Norway (includes keyboard cable)
640208-DJ1	Keyboard, black, for use in Greece (includes keyboard cable)
640211-001	USB board (includes cable)
640212-001	Power button board (includes cable)
640213-001	TouchPad LED board (includes cable)
640214-001	TouchPad button board (includes cable)
640215-001	LED board (includes cable)
640216-001	Plastics Kit (includes the service door)
640217-001	Screw Kit
640218-001	Display Screw Kit
640223-001	43.9 cm (17.3 in), HD, LED, BrightView display assembly in butter gold (includes webcam, two microphones, and wireless antenna transceivers and cables)
640226-001	43.9 cm (17.3 in), HD, LED, BrightView display assembly in charcoal gray (includes webcam, two microphones, and wireless antenna transceivers and cables)
640227-001	43.9 cm (17.3 in), HD, LED, BrightView display assembly in pewter (includes webcam, two microphones, and wireless antenna transceivers and cables)
640926-001	Realtek RTL8191SE 802.11b/g/n 1×1 WiFi Adapter for use only with computer models equipped with an AMD processor or select models equipped with an Intel processor
641140-001	Heat sink for use only with computer models equipped with an Intel processor, the HM65 chipset, and a graphics subsystem with UMA video memory (includes replacement thermal material)
641141-001	Heat sink for use only with computer models equipped with an Intel processor, the HM65 chipset, and a graphics subsystem with discrete video memory (includes replacement thermal material)
641394-001	Power connector cable

Spare part number	Description
641395-001	43.9 cm (17.3 in), HD, LED, BrightView display panel
641396-001	Speaker Kit (includes left and right speakers and cable)
641401-001	Top cover, butter gold (includes TouchPad and TouchPad cable)
641404-001	Top cover, charcoal gray (includes TouchPad and TouchPad cable)
641405-001	Top cover, pewter (includes TouchPad and TouchPad cable)
643698-001	Display hinge covers
644351-001	750 GB, 5400 rpm hard drive 9.5 mm (0.37 in) × 6.35 cm (2.50 in), SATA, does not include hard drive connector cable, isolators, or shield
644685-001	500 GB, 7200 rpm hard drive, 9.5 mm (0.37 in) × 6.35 cm (2.50 in), SATA, does not include hard drive connector cable, isolators, or shield
645089-001	320 GB, 7200 rpm hard drive, 7.0 mm (0.28 in) × 6.35 cm (2.50 in), SATA, does not include hard drive connector cable, isolators, or shield
649948-001	System board for use only with computer models equipped with the AMD A60M chipset, an AMD processor, and a graphics subsystem with UMA video memory (includes replacement thermal material)
649949-001	System board for use only with computer models equipped with the AMD A60M chipset, an AMD processor, and a graphics subsystem with 512 MB of discrete video memory, supports BACO (includes replacement thermal material)
649950-001	System board for use only with computer models equipped with the AMD A60M chipset, an AMD processor, and a graphics subsystem with 1024 MB of discrete video memory, supports BACO (includes replacement thermal material)
649953-001	Heat sink for use only with computer models equipped with the AMD A60M chipset, an AMD processor, and a graphics subsystem with discrete video memory (includes replacement thermal material)
649954-001	Heat sink for use only with computer models equipped with the AMD A60M chipset, an AMD processor, and a graphics subsystem with UMA video memory (includes replacement thermal material)
650198-001	System board for use only with computer models equipped with the Intel HM65 chipset, an Intel processor, and a graphics subsystem with 512 MB of discrete video memory and supports BACO, includes replacement thermal material
650199-001	System board for use only with computer models equipped with the Intel HM65 chipset, an Intel processor, and a graphics subsystem with 1024 MB of discrete video memory and supports BACO, includes replacement thermal material)
653338-001	Intel Pentium B950 TJ85 2.10 GHz, PGA processor (2.0 MB L3 cache, dual core 35 W; includes replacement thermal material)
653339-001	Intel Core i3-2330M TJ85, 2.20 GHz, PGA processor (1333 MHz FSB, 3.0 MB L3 cache, dual core, 35 W; includes replacement thermal material)
653340-001	Intel Core i3-2350M TJ85, 2.30 GHz, PGA processor (1333 MHz FSB, 3.0 MB L3 cache, dual core, 35 W; includes replacement thermal material)
653341-001	Intel Core i5-2430M 2.40 GHz, PGA processor (turbo up to 3.00 GHz; 1333 MHz, 3.0 MB L3 cache, dual core, 35 W; includes replacement thermal material)
655795-001	Atheros 9485GN 802.11b/g/n 1×1 WiFi and 3012 Bluetooth 4.0 Combo Adapter, for use with computer models equipped with an AMD processor or select models equipped with an Intel processor

<b>Spare part number</b>	<b>Description</b>
657325-001	Broadcom 4313GN 802.11b/g/n 1×1 WiFi and 20702 Bluetooth 4.0 Combo Adapter, for use with computer models equipped with an Intel processor or select models equipped with an AMD processor
659877-001	DVD±RW and CD-RW Super Multi Double-Layer Combo Drive
659878-001	BD ROM DVD±R/RW Super Multi Double-Layer Drive
664662-001	Intel Pentium B960 TJ85 2.20-GHz, PGA, processor (2.0 MB L3 cache, dual core, 35 W; includes replacement thermal material)
666173-001	Intel Core i7-2640M 2.80 GHz (SC turbo up to 3.50 GHz), PGA processor (4.0 MB L3 cache, dual core, 35 W; includes replacement thermal material)
669686-001	AMD A4-3320M 2.60 GHz processor (2.0 GHz FSB, 2.0 MB L2 cache, dual core, 35 W; includes replacement thermal material)
669688-001	AMD A6-3420M 2.40 GHz processor (1.5 GHz FSB, 4.0 MB L2 cache, quad core, 35 W; includes replacement thermal material)
669690-001	AMD A8-3520M 2.50 GHz processor (1.6 GHz FSB, 4.0 MB L2 cache, quad core, 35 W; includes replacement thermal material)
672093-001	AMD A4-3305M 2.50 GHz processor (1.9 GHz FSB, 2.0 MB L2 cache, quad core, 35 W; includes replacement thermal material)
676359-001	Intel Core i5-2450M 2.50 GHz (SC turbo up to 3.10 GHz), PGA processor (3.0 MB L3 cache, dual core, 35 W); includes replacement thermal material)
676785-001	Intel Pentium B970 TJ85 2.30 GHz, PGA, processor (2.0 MB cache, dual core 35 W); includes replacement thermal material)
677152-001	Intel Core i3-2370M TJ85 2.40 GHz, PGA processor (3.0 MB L3 cache, dual core, 35 W); includes replacement thermal material)
677628-001	AMD E2-3000M 2.40 GHz processor (1.8 GHz FSB, 1.0 MB L2 cache, dual core, 35 W; includes replacement thermal material)
682589-001	160 GB SSD, 6.35 cm (2.50 in)

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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.


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

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### Plastic parts


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 **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.

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### Cables and connectors

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

---

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.

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

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**Typical electrostatic voltage levels**

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<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.

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

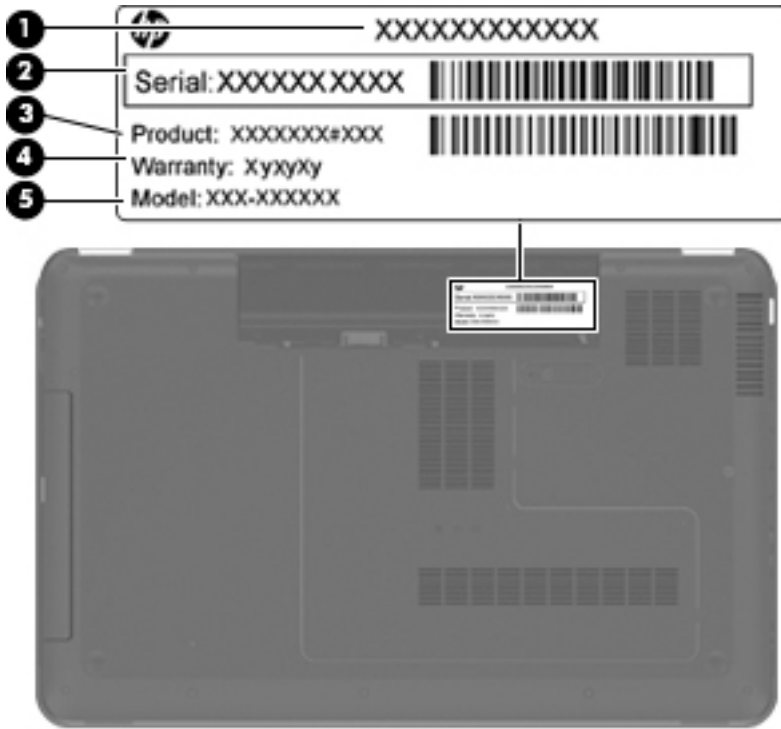
# Component replacement procedures

This section provides removal and replacement procedures.

There are as many as 51 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

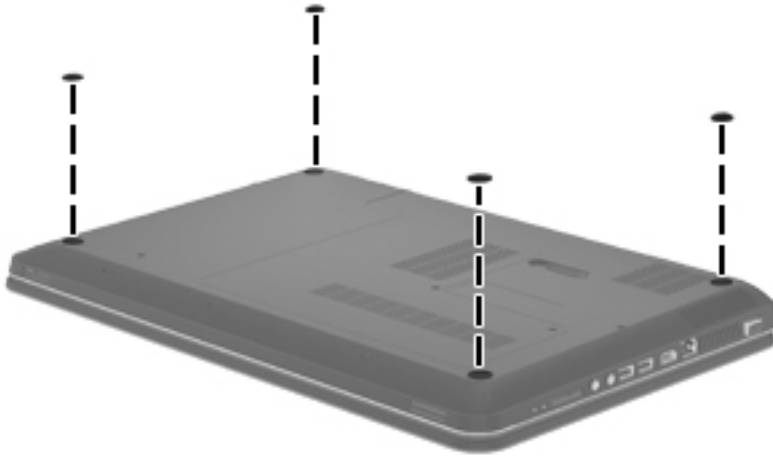
When ordering parts or requesting information, provide the computer serial number and model number provided on the service tag.



Item	Description	Function
(1)	Product name	This is the model name for this computer.
(2)	Serial number	This is an alphanumeric identifier that is unique to each product.
(3)	Product number	This is the alphanumeric identifier needed to locate documents, drivers, and support for the computer. The product number helps a service technician determine what components and parts are needed.
(4)	Warranty period	This number describes the duration of the warranty period for the computer.
(5)	Model number	This is the alphanumeric identifier needed to locate documents, drivers, and support for the computer.

## Computer feet

The computer feet are adhesive-backed rubber pads. The feet are included in the Rubber Feet Kit, spare part number 639455-001. There are 4 rubber feet that attach to the base enclosure in the locations illustrated below.



## Battery

Description	Spare part number
6-cell, 55 Whr, 2.55 Ah Li-ion battery, for use with select computer models only	593554-001
6-cell, 47 Whr, 2.20 Ah Li-ion battery	593553-001

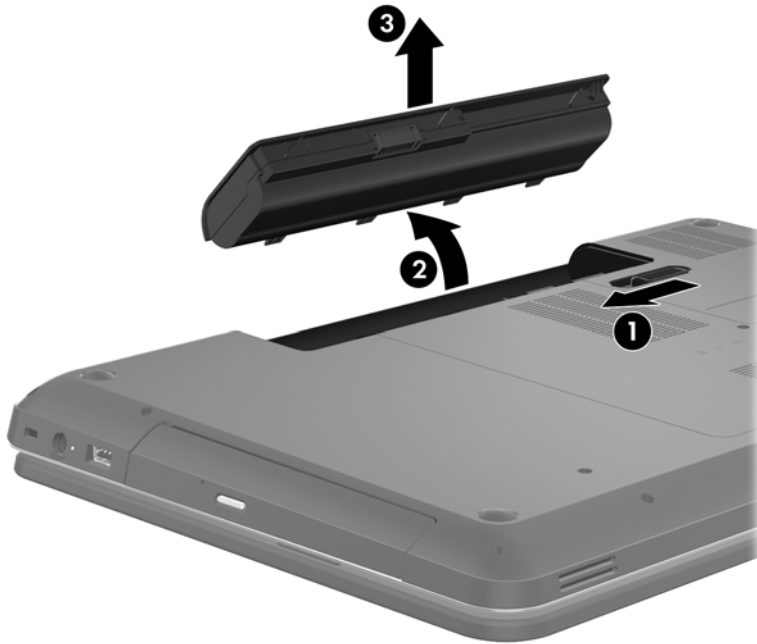
Before disassembling the computer, follow these steps:

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 battery release latch **(1)** to release the battery.
2. Pivot the front edge of the battery **(2)** up and back.


3. Remove the battery (3) from the computer.



To insert the battery:

1. Align the tabs on the rear edge of the battery with the notches on the rear edge of the battery bay.
2. Pivot the front edge of the battery down into the battery bay until it is seated. (The battery release latch will automatically lock into place.)

## Optical drive

 **NOTE:** The optical drive spare part kit includes a bezel and bracket.

Description	Spare part number
BD ROM DVD±R/RW Super Multi Double-Layer Drive	659878-001
DVD±RW and CD-RW Super Multi Double-Layer Combo Drive	659877-001

Before removing the optical drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 37](#)).

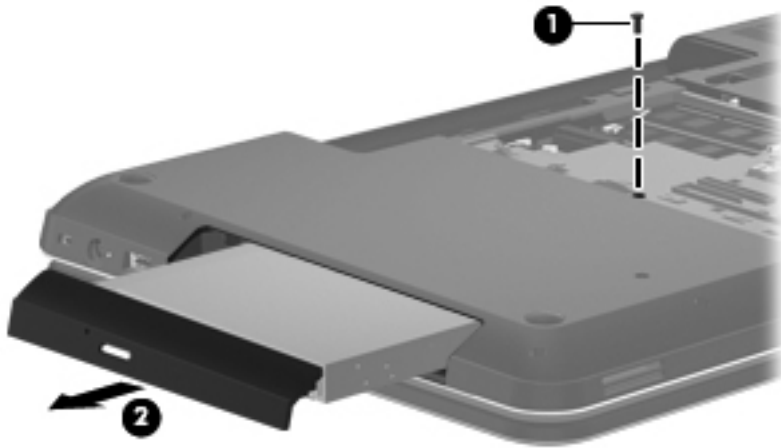
Remove the optical drive:

1. Loosen the two captive screws (1) that secure the service door to the computer.
2. Lift the rear edge of the service door (2) up and forward until it rests at an angle.

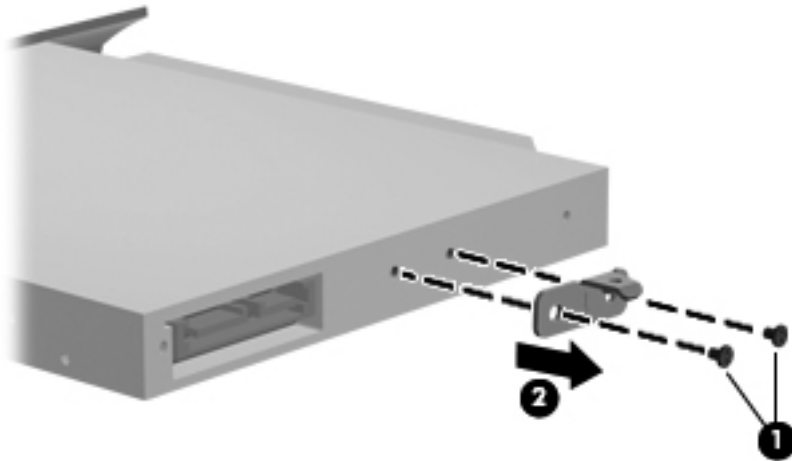


3. Remove the service door. The service door is available in the Plastics Kit, spare part number 640216-001.
4. Remove the Phillips M2.5×4.0 screw (1) that secures the optical drive to the computer.

5. Remove the optical drive **(2)** by sliding it out of the optical drive bay.




6. If it is necessary to replace the optical drive bracket, position the optical drive with the rear panel toward you.
7. Remove the two Phillips M2.0×3.0 screws **(1)** that secure the bracket to the optical drive.
8. Remove the optical drive bracket **(2)**.



Reverse this procedure to reassemble and install the optical drive.



## Hard drive or SSD

 **NOTE:** The hard drive spare part kit does not include the hard drive connector cable, isolators, or shield. The hard drive connector cable, isolators, and shield are included in the Hard Drive Hardware Kit, spare part number 639444-001. The hard drive connector cable is included in the Cable Kit, spare part number 640206-001.

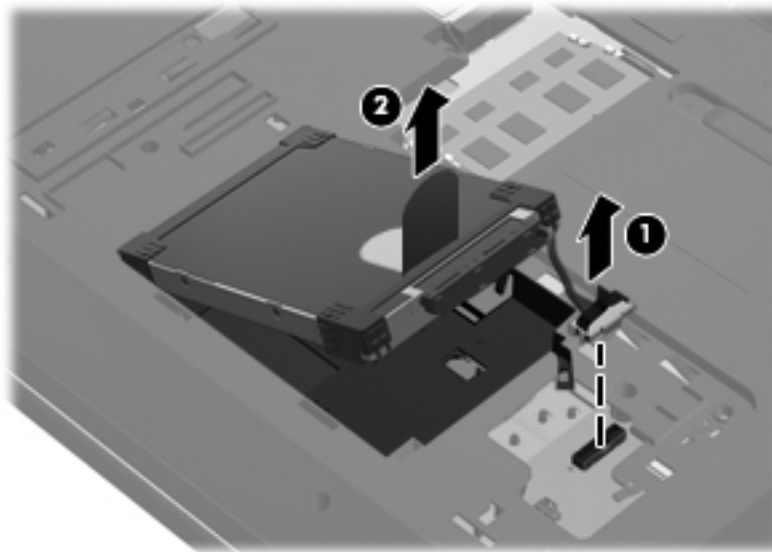
Description	Spare part number
For use with all computer models:	
750 GB, 5400 rpm, 9.5 mm (0.37 in) × 6.35 cm (2.50 in),	644351-001
640 GB, 5400 rpm, 9.5 mm (0.37 in) × 6.35 cm (2.50 in)	637312-001
500 GB, 7200 rpm, 9.5 mm (0.37 in) × 6.35 cm (2.50 in)	644685-001
320 GB, 7200 rpm, 7.0 mm (0.28 in) × 6.35 cm (2.50 in)	645089-001
160 GB SSD, 6.35 cm (2.50 in)	682589-001

Before removing the hard drive or SSD, follow these steps:

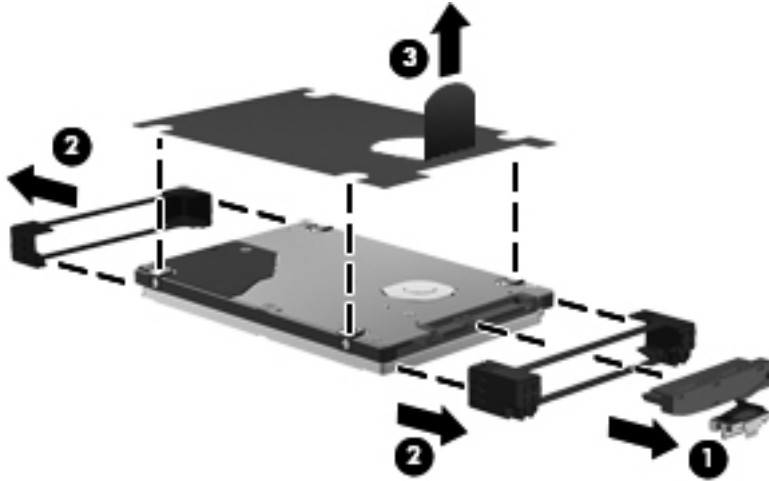
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 37](#)).
5. Remove the service door (see [Optical drive on page 39](#)).

Remove the hard drive or SSD:

1. Disconnect the drive connector cable (1) from the system board.
2. Lift the front edge of the drive (2) until it rests at an angle.



3. Remove the drive.
4. Remove the drive connector cable (1) and the drive isolators (2). If it is necessary to replace the components, the drive connector cable is included in the Cable Kit, spare part number 640206-001. The drive isolators are included in the Hard Drive Hardware Kit, spare part number 639444-001.
5. Remove the drive shield (3). If it is necessary to replace the drive shield, it is included in the Hard Drive Hardware Kit, spare part number 639444-001



Reverse this procedure to reassemble and install the mass storage device.

## RTC battery

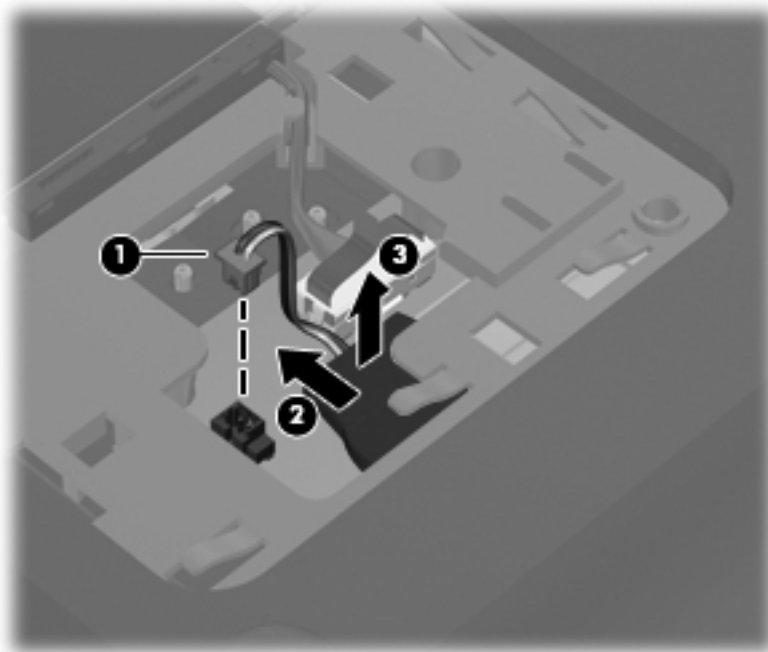
Description	Spare part number
RTC battery (includes cable and double-sided tape)	637193-001

Before removing the RTC battery, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 37](#)).
5. Remove the service door (see [Optical drive on page 39](#)).

Remove the RTC battery:

1. Disconnect the RTC battery cable (1) from the system board.
2. Slide the RTC battery (2) out from under the surface of the base enclosure.
3. Remove the RTC battery (3) from the system board. (The RTC battery is attached to the system board with double-sided tape.)



Reverse this procedure to install the RTC battery.

## Memory module


Description	Spare part number
4 GB (DDR3, 10600, 1333 MHz)	621569-001
2 GB (DDR3, 10600, 1333 MHz)	621565-001

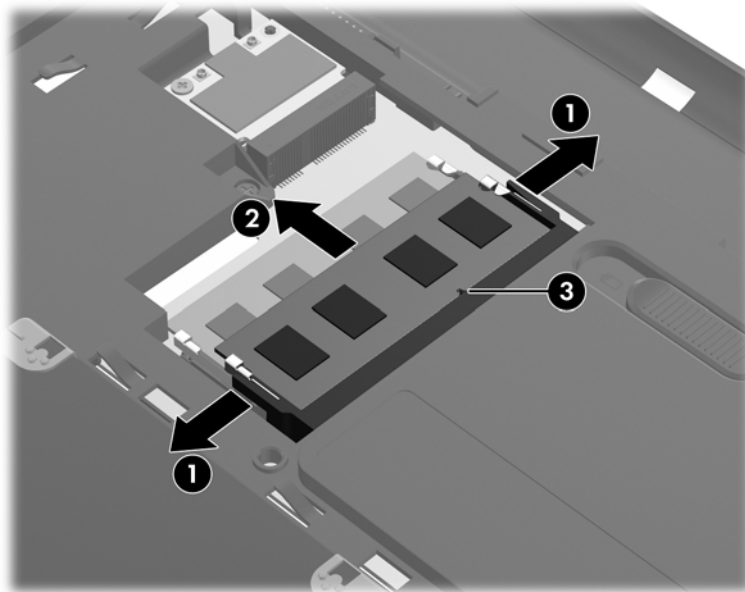
Before removing a memory module, follow these steps:

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. Remove the battery (see [Battery on page 37](#)).
5. Remove the service door (see [Optical drive 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.)
2. Remove the memory module **(2)** by pulling it away from the slot at an angle.


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



Reverse this procedure to install a memory module.

## WLAN module

Description	Spare part number
Atheros 9485GN 802.11b/g/n 1×1 WiFi and 3012 Bluetooth 4.0 Combo Adapter, for use with computer models equipped with an AMD processor or select models equipped with an Intel processor	655795-001
Broadcom 4313GN 802.11b/g/n 1×1 WiFi and 20702 Bluetooth 4.0 Combo Adapter, for use with computer models equipped with an Intel processor or select models equipped with an AMD processor	657325-001
Intel Centrino Advanced-N 6230, for use only with computer models equipped with an Intel processor	631956-001
Ralink 5390GN 802.11b/g/n 1×1 WiFi Adapter, for use with computer models equipped with an Intel processor or select models equipped with an AMD processor	630703-001
Realtek RTL8191SE 802.11b/g/n 1×1 WiFi Adapter, for use with computer models equipped with an AMD processor or select models equipped with an Intel processor	640926-001

 **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. Remove the battery (see [Battery on page 37](#)).
5. Remove the service door (see [Optical drive on page 39](#)).

Remove the WLAN module:


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

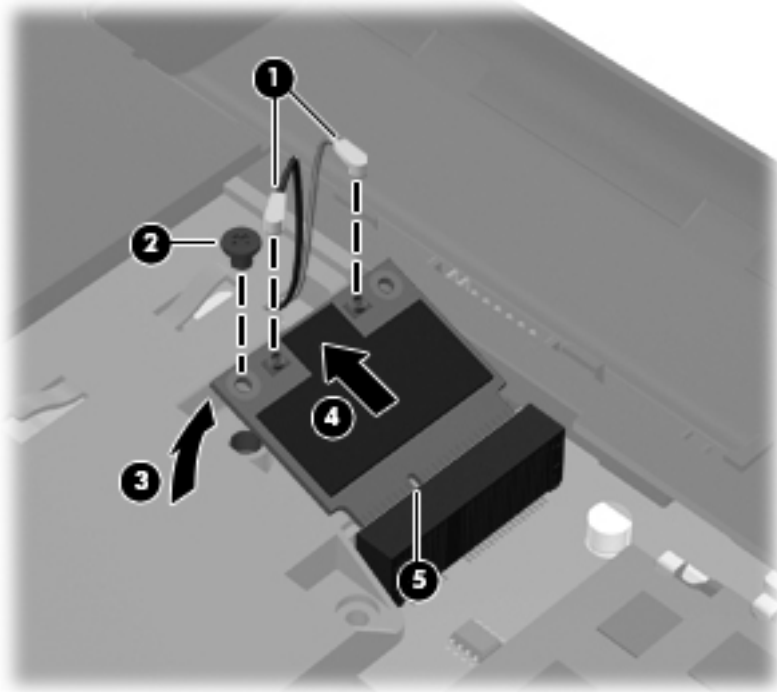



**NOTE:** The 1/black WLAN antenna cable is connected to the WLAN module 1/Main terminal. The 2/gray WLAN antenna cable is connected to the WLAN module 2/Aux terminal.

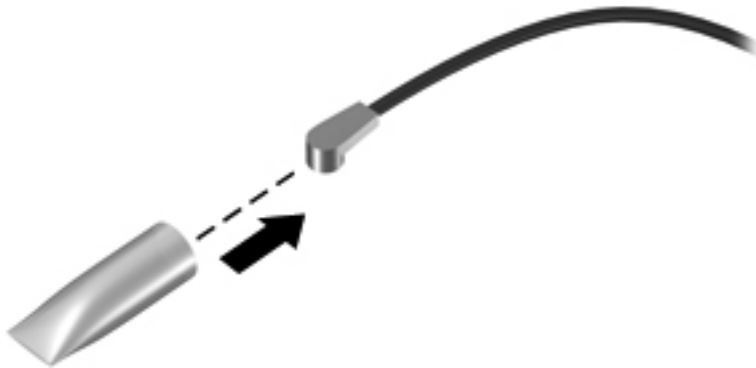
2. Remove the Phillips M2.5×5.0 screw **(2)** that secures the WLAN module to the system board. (The WLAN module tilts up **(3)**.)

3. Remove the WLAN module by pulling the module away from the slot at an angle (4).

 **NOTE:** The WLAN module is designed with a notch (5) to prevent incorrect installation into the WLAN module socket.





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



Reverse this procedure to install the WLAN module.

## Keyboard

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

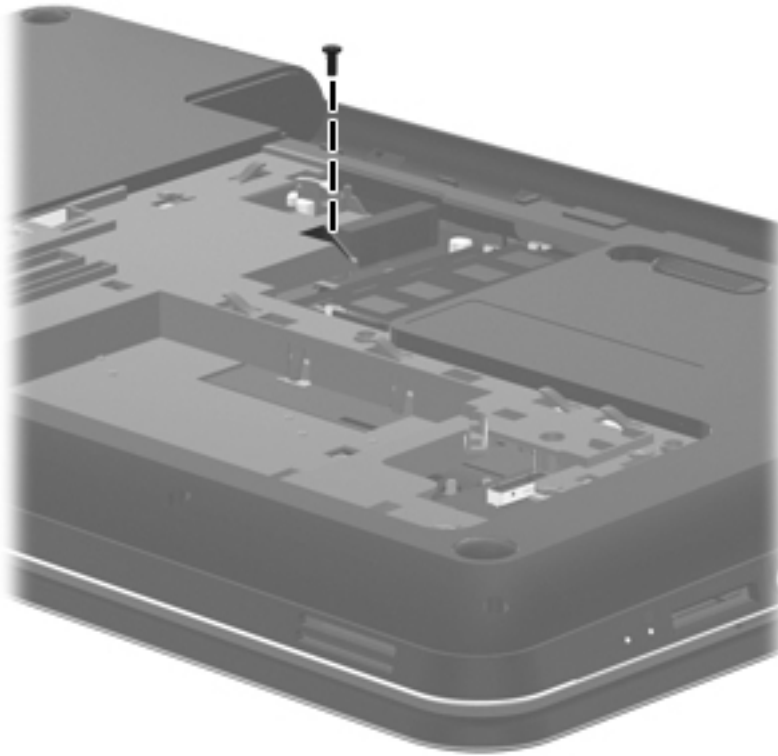
 **NOTE:** For the complete list of available keyboards, see [Computer major components on page 17](#).

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 37](#)).
5. Remove the service door (see [Optical drive on page 39](#)).

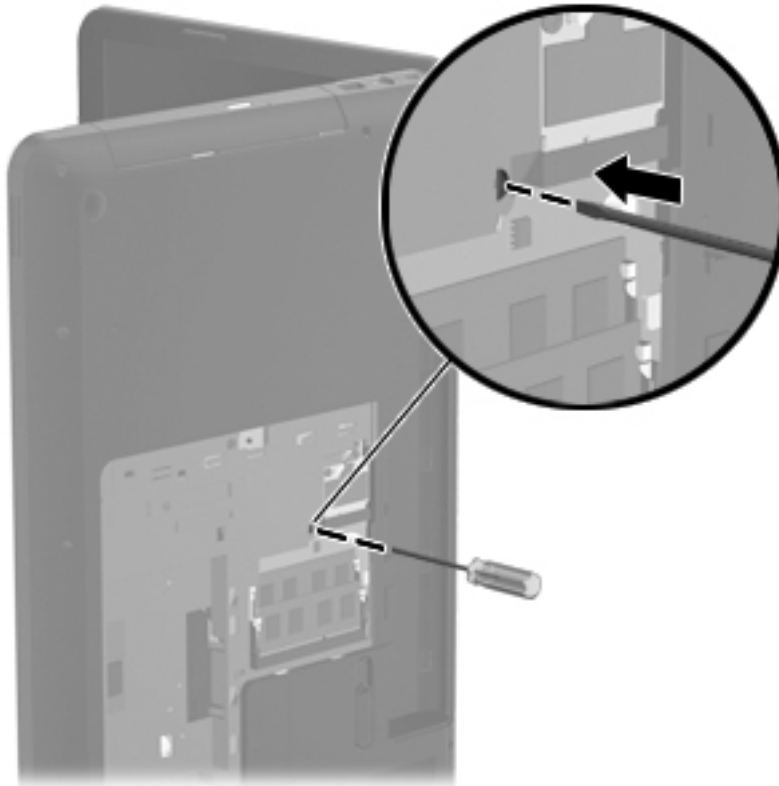
Remove the keyboard:

1. Remove the Phillips M2.5×7.0 screw that secures the keyboard to the computer.



2. Rest the computer on its left side.
3. Open the computer.

4. Insert a screw driver or similar thin tool into the keyboard screw hole, and then press on the back of the keyboard until the keyboard disengages from the computer.

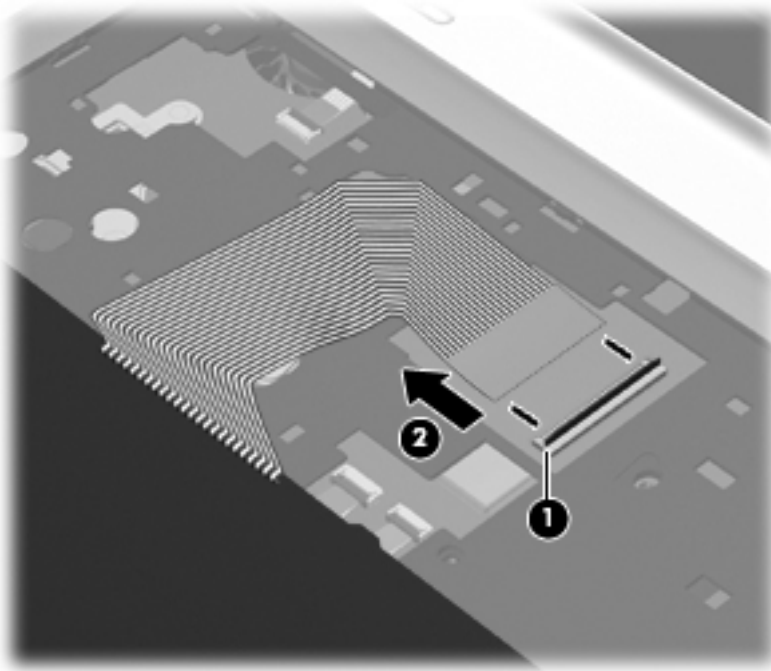


5. Turn the computer right-side up with the front toward you.
6. Lift the rear edge of the keyboard, and then swing the keyboard up and forward until it rests upside down on the palm rest.






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



8. Remove the keyboard.

Reverse this procedure to install the keyboard.

## Top cover

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

Description	Spare part number
Butter gold	641401-001
Charcoal gray	641404-001
Pewter	641405-001

Before removing the top cover, follow these steps:

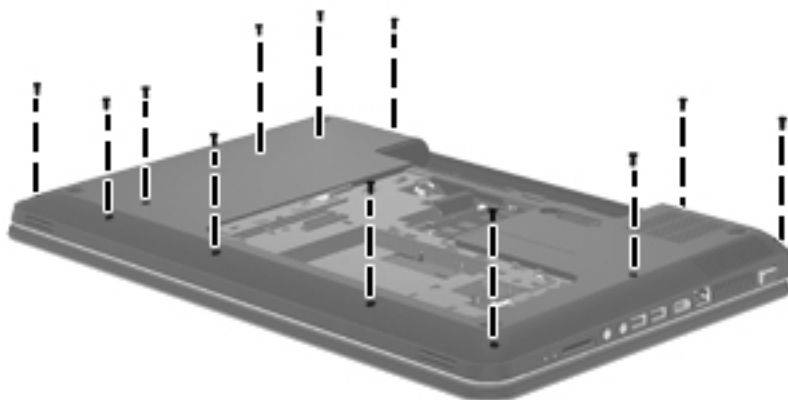
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 37](#)), and then remove the following components:
  - Optical drive (see [Optical drive on page 39](#))
  - Hard drive (see [Hard drive or SSD on page 41](#))
  - Keyboard (see [Keyboard on page 47](#))

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

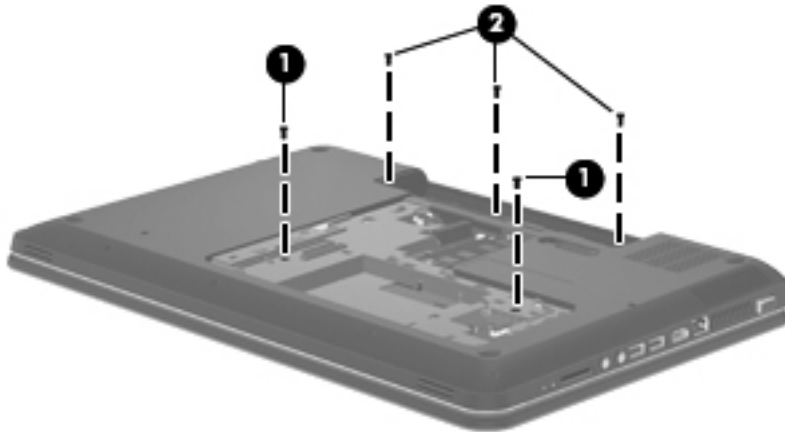
- Power button board and cable (see [Power button board on page 53](#))
- TouchPad button board and cable (see [TouchPad button board on page 54](#))
- TouchPad LED board and cable (see [TouchPad LED board on page 55](#))

Remove the top cover:

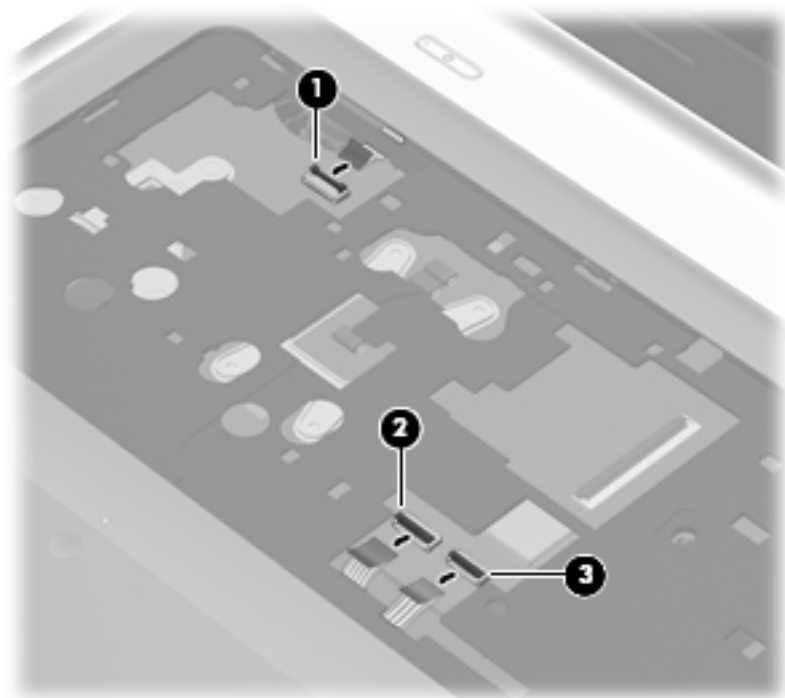
1. Close the computer.
2. Turn the computer upside down, with the front toward you.
3. Remove the 12 Phillips M2.5×7.0 screws that secure the top cover to the computer.



4. Remove the two Phillips M2.5×7.0 screws **(1)** in the hard drive bay and the three Phillips M2.5×5.0 screws **(2)** in the battery bay that secure the top cover to the computer.

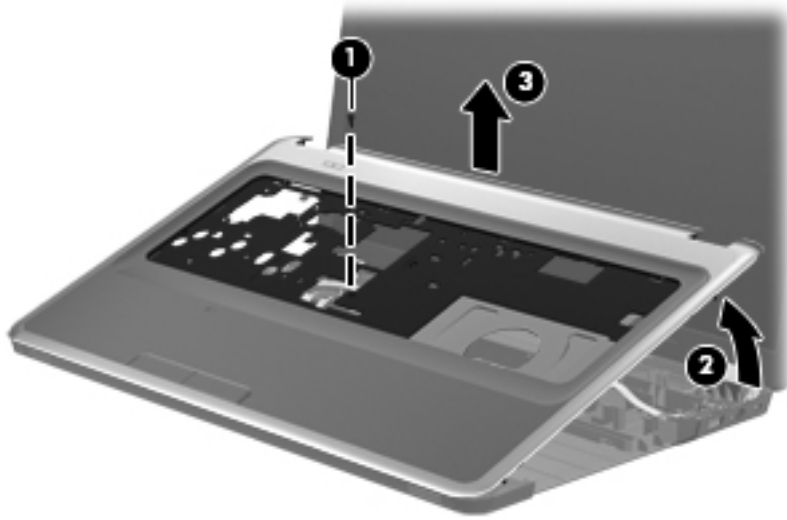


5. Turn the computer right-side up, with the front toward you.
6. Open the computer.
7. Release the ZIF connectors to which the following cables are attached, and then disconnect the cables from the system board:
  - Power button board cable **(1)** (included with the power button board spare part kit, spare part number 640212-001)
  - TouchPad cable **(2)** (included in the Cable Kit, spare part number 640206-001)
  - TouchPad button board cable **(3)** (included with the TouchPad button board spare part kit, spare part number 640214-001)



8. Remove the Phillips M2.5×5.0 screw **(1)** that secures the top cover to the computer.

9. Lift the rear edge of the top cover (2) until the left and right sides disengage from the base enclosure.
10. Remove the top cover (3).



Reverse this procedure to install the top cover.

## Power button board

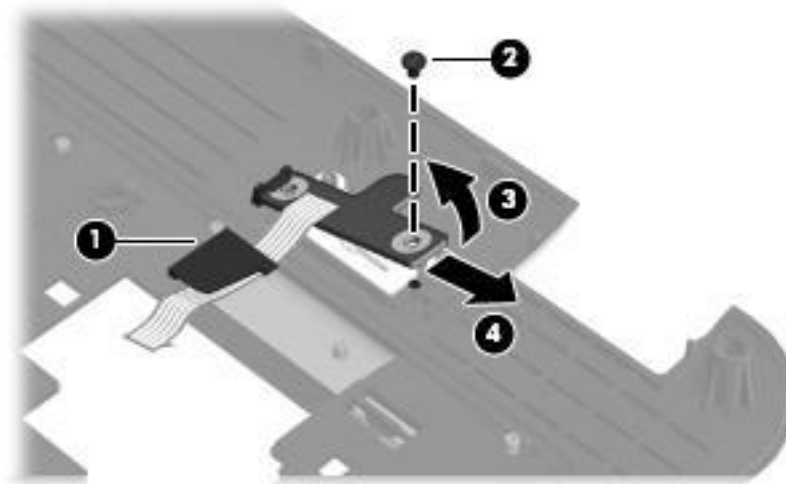
Description	Spare part number
Power button board (includes cable)	640212-001

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 37](#)), and then remove the following components:
  - Optical drive (see [Optical drive on page 39](#))
  - Hard drive (see [Hard drive or SSD on page 41](#))
  - Keyboard (see [Keyboard on page 47](#))
  - Top cover (see [Top cover on page 50](#))

Remove the power button board:

1. Turn the top cover upside down, with the front toward you.
2. Release the power button board cable from the clip (1) built into the top cover.
3. Remove the Phillips M2.5×3.0 screw (2) that secures the power button board to the top cover.
4. Lift the right side of the power button board (3) until it rests at an angle.
5. Remove the power button board and cable by sliding the board up and to the right at an angle (4).



Reverse this procedure to install the power button board and cable.

## TouchPad button board

Description	Spare part number
TouchPad button board (includes cable)	640214-001

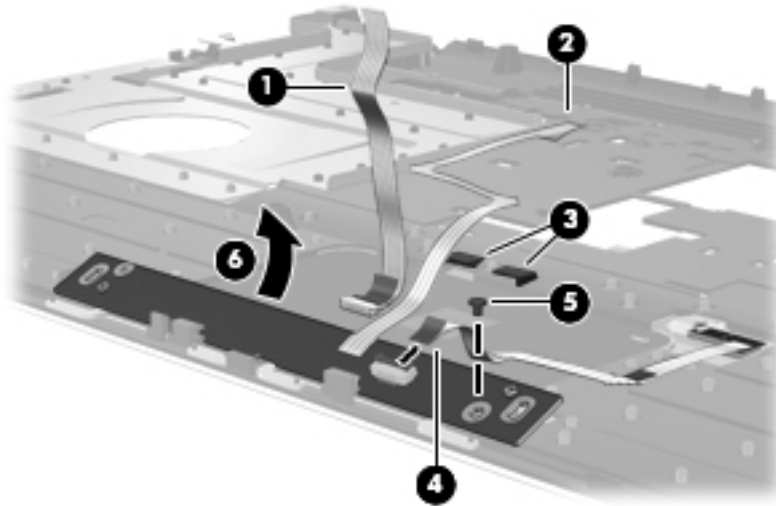
Before removing the TouchPad button board, follow these steps:

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 37](#)), and then remove the following components:
  - Optical drive (see [Optical drive on page 39](#))
  - Hard drive (see [Hard drive or SSD on page 41](#))
  - Keyboard (see [Keyboard on page 47](#))
  - Top cover (see [Top cover on page 50](#))

Remove the TouchPad button board and cable:

1. Turn the top cover upside down, with the front toward you.
2. Release the TouchPad board cable **(1)** and the TouchPad button board cable **(2)** from the clips **(3)** built into the top cover.
3. Release the ZIF connector to which the TouchPad LED board cable is connected, and then disconnect the TouchPad LED board cable **(4)** from the TouchPad button board.
4. Remove the Phillips M2.5×3.0 screw **(5)** that secures the TouchPad button board to the top cover.

5. Lift the rear edge of the TouchPad button board (6) until it is released from the clips built into the top cover.



6. Remove the TouchPad button board and cable.

Reverse this procedure to install the TouchPad button board and cable.

## TouchPad LED board

Description	Spare part number
TouchPad LED board (includes cable)	640213-001

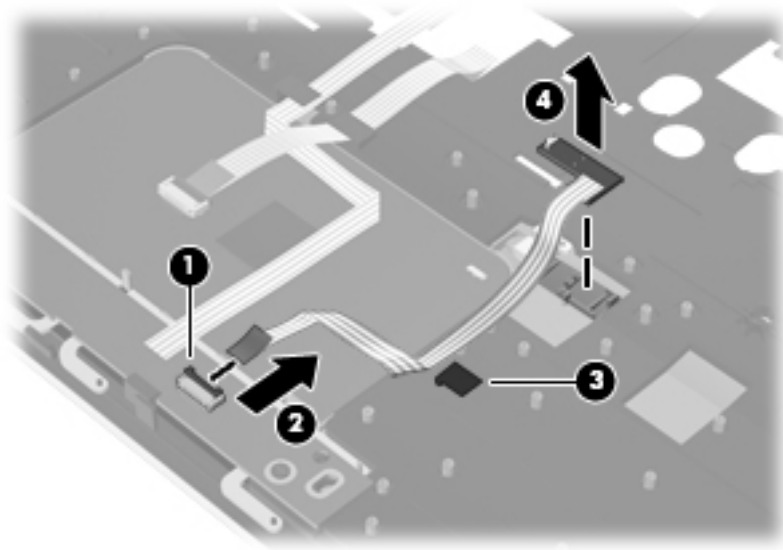
Before removing the TouchPad LED board, follow these steps:

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 37](#)), and then remove the following components:
  - Optical drive (see [Optical drive on page 39](#))
  - Hard drive (see [Hard drive or SSD on page 41](#))
  - Keyboard (see [Keyboard on page 47](#))
  - Top cover (see [Top cover on page 50](#))

Remove the TouchPad LED board and cable:

1. Turn the top cover upside down, with the front toward you.
2. Release the ZIF connector (1) to which the TouchPad LED board cable is connected, and then disconnect the TouchPad LED board cable (2) from the TouchPad button board.
3. Release the TouchPad LED board cable from the clip (3) built into the top cover.

4. Detach the TouchPad LED board (4) from the top cover. (The TouchPad LED board is attached to the top cover with double-sided tape.)



5. Remove the TouchPad LED board and cable.  
Reverse this procedure to install the TouchPad LED board and cable.



## Speakers

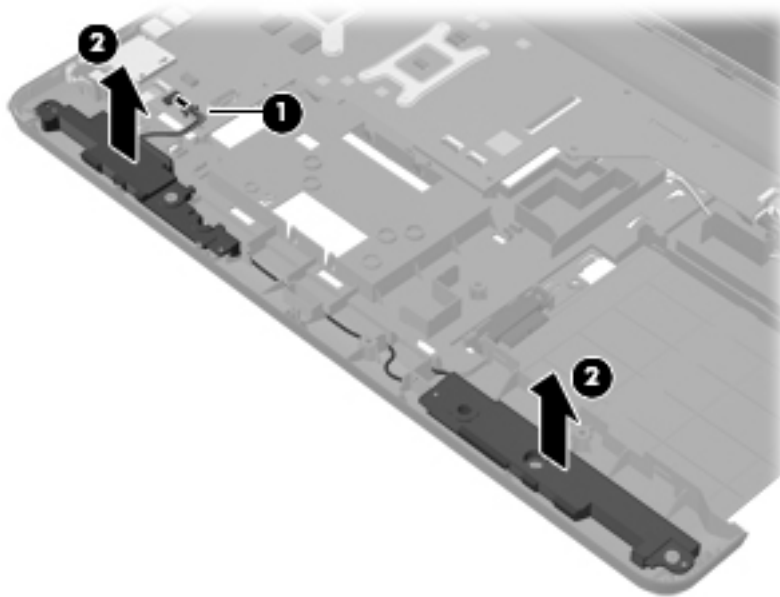
Description	Spare part number
Speaker Kit (includes left and right speakers and cable)	641396-001

Before removing the 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 37](#)), and then remove the following components:
  - Optical drive (see [Optical drive on page 39](#))
  - Hard drive (see [Hard drive or SSD on page 41](#))
  - Keyboard (see [Keyboard on page 47](#))
  - Top cover (see [Top cover on page 50](#))

Remove the TouchPad LED board and cable:

1. Disconnect the speaker cable (1) from the system board.
2. Remove the speakers (2).



Reverse this procedure to install the speakers.

## LED board

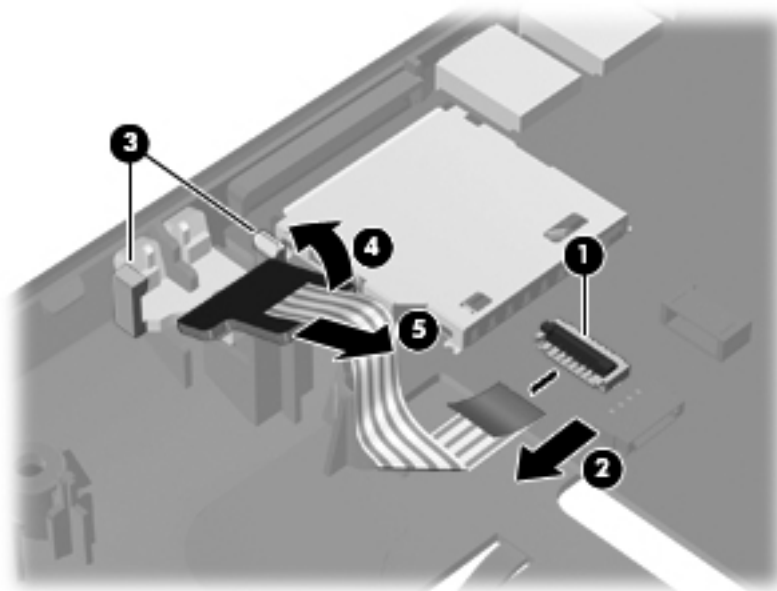
Description	Spare part number
LED board	640215-001

Before removing the 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 37](#)), and then remove the following components:
  - Optical drive (see [Optical drive on page 39](#))
  - Hard drive (see [Hard drive or SSD on page 41](#))
  - Keyboard (see [Keyboard on page 47](#))
  - Top cover (see [Top cover on page 50](#))

Remove the LED board:

1. Release the ZIF connector (1) to which the LED board cable is connected, and then disconnect the LED board cable (2) from the system board.
2. Release the clips (3) built into the base enclosure that secure the LED board.
3. Lift the right edge of the LED board (4) to release it from clips built into the base enclosure.
4. Remove the LED board and cable by sliding the board (5) up and to the right at an angle.



Reverse this procedure to install the LED board and cable.

## USB board

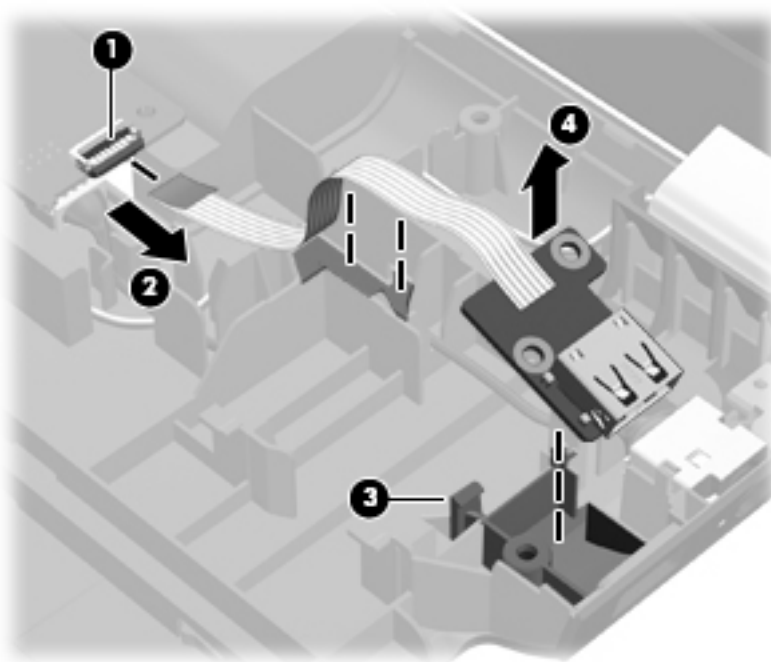
Description	Spare part number
USB board (includes cable)	640211-001

Before removing the USB board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 37](#)), and then remove the following components:
  - Optical drive (see [Optical drive on page 39](#))
  - Hard drive (see [Hard drive or SSD on page 41](#))
  - Keyboard (see [Keyboard on page 47](#))
  - Top cover (see [Top cover on page 50](#))

Remove the USB board:

1. Release the ZIF connector (1) to which the USB board cable is connected, and then disconnect the USB board cable (2) from the system board.
2. Release the clip (3) built into the base enclosure that secures the USB board to the base enclosure.
3. Remove the USB board (4) and cable.



Reverse this procedure to install the USB board.

## Power connector cable

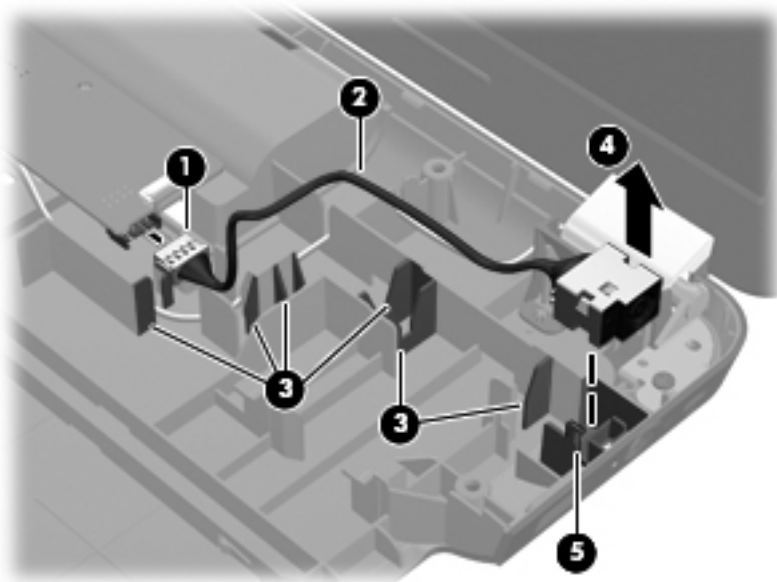
Description	Spare part number
Power connector cable	641394-001

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 37](#)), and then remove the following components:
  - Optical drive (see [Optical drive on page 39](#))
  - Hard drive (see [Hard drive or SSD on page 41](#))
  - Keyboard (see [Keyboard on page 47](#))
  - Top cover (see [Top cover on page 50](#))
  - USB board (see [USB board on page 59](#))

Remove the power connector cable:

1. Disconnect the power connector cable (1) from the system board.
2. Release the power connector cable (2) from the clips (3) built into the base enclosure.
3. Remove the power connector (4) from the clip (5) built into the base enclosure.



Reverse this procedure to install the power connector cable.

## System board



**NOTE:** The system board spare part kit includes replacement thermal material. Replacement thermal material is also available in the Thermal Material Kit, spare part number 634433-001.

Description	Spare part number
<b>AMD processor:</b>	
For use only with computer models equipped with the AMD A60M chipset and a graphics subsystem with 1024 MB of discrete video memory, supports BACO	649950-001
For use only with computer models equipped with the AMD A60M chipset and a graphics subsystem with 512 MB of discrete video memory, supports BACO	649949-001
For use only with computer models equipped with the AMD A60M chipset and a graphics subsystem with UMA video memory	649948-001
<b>Intel processor:</b>	
For use only with computer models equipped with the Intel HM65 chipset and a graphics subsystem with 1024 MB of discrete video memory, BACO	650199-001
For use only with computer models equipped with the Intel HM65 chipset and a graphics subsystem with 512 MB of discrete video memory, supports BACO	650198-001
For use only with computer models equipped with an HM65 chipset and a graphics subsystem with UMA video memory	636373-001

Before removing the system board, follow these steps:

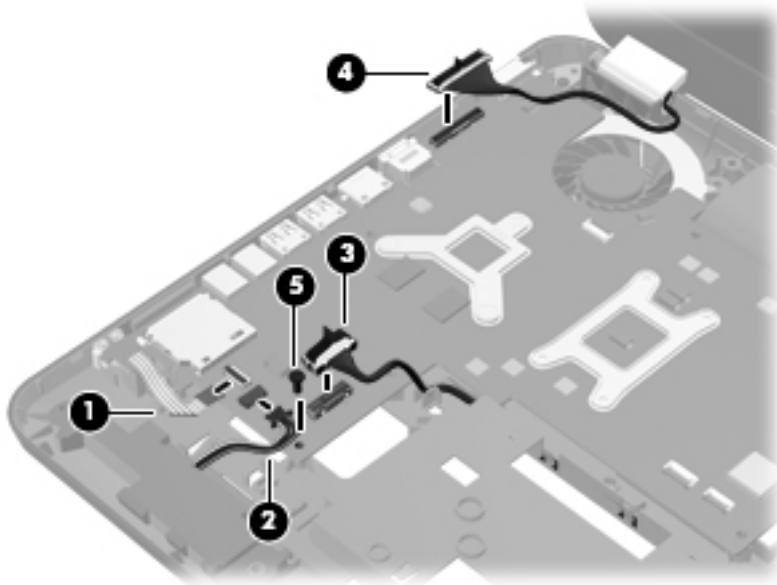
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 37](#)), and then remove the following components:
  - Optical drive (see [Optical drive on page 39](#))
  - Hard drive (see [Hard drive or SSD on page 41](#))
  - RTC battery (see [RTC battery on page 43](#))
  - WLAN module (see [WLAN module on page 45](#))
  - Keyboard (see [Keyboard on page 47](#))
  - Top cover (see [Top cover on page 50](#))

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:

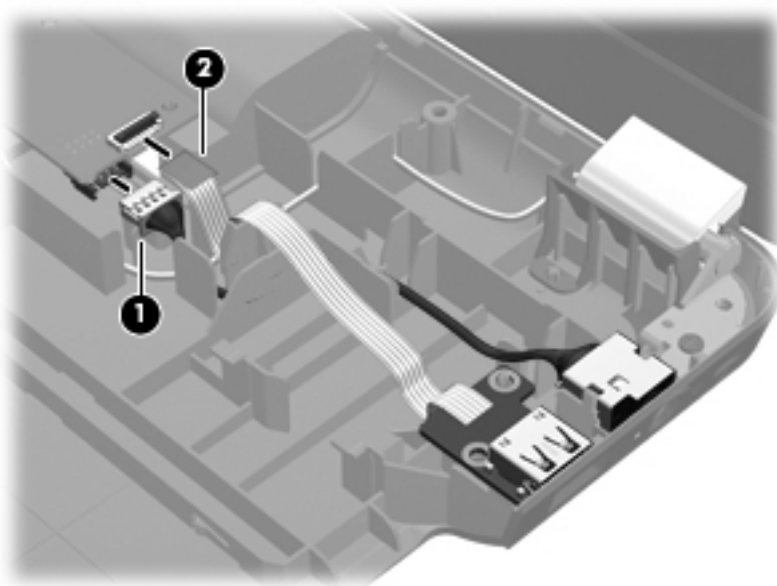
- Memory module (see [Memory module on page 44](#))
- Fan and heat sink (see [Fan and heat sink on page 65](#))
- Processor (see [Processor on page 72](#))

Remove the system board:

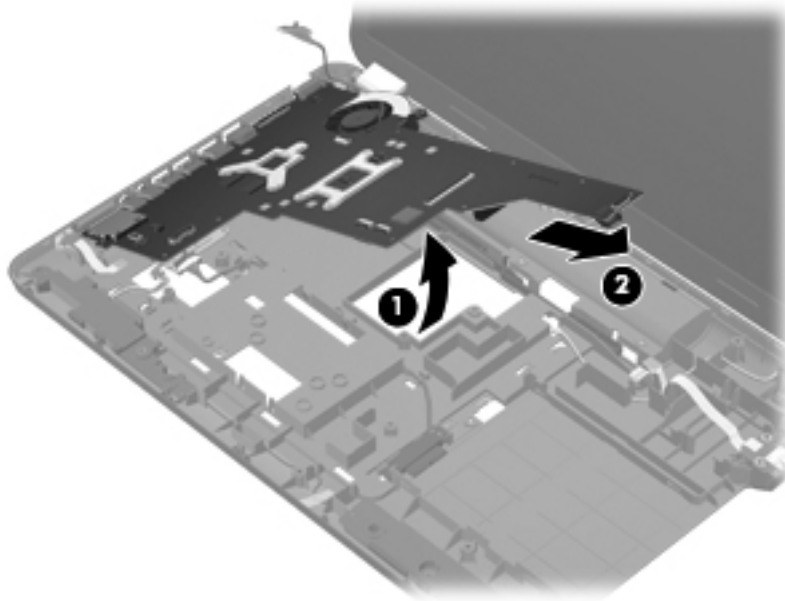
1. Disconnect the following cables from the system board:
  - LED board cable (1)
  - Speaker cable (2)
  - Optical drive cable (3)
  - Display panel cable (4)
2. Remove the Phillips M2.5×5.0 screw (5) that secures the system board to the base enclosure.



3. Disconnect the power connector cable (1) from the system board.
4. Release the ZIF connector to which the USB board cable is attached, and then disconnect the USB cable (2) from the system board.




5. Lift the right side of the system board **(1)** until it rests at an angle.
6. Remove the system board **(2)** by sliding it up and to the right at an angle.



Reverse this procedure to install the system board.

## Optical drive cable

 **NOTE:** The optical drive cable is included in the Cable Kit, spare part number 640206-001. The optical drive cable includes the optical drive connector.

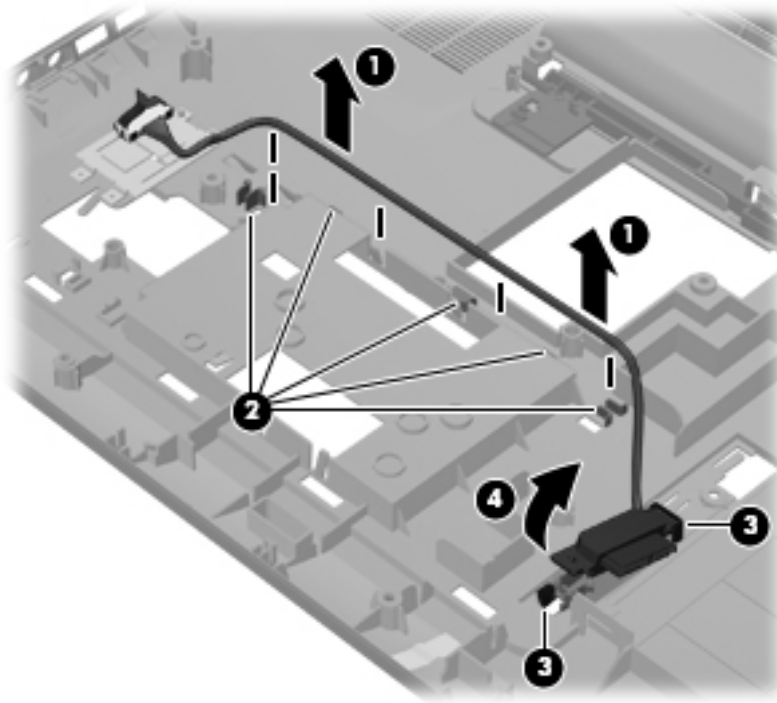
Before removing the optical drive cable, follow these steps:

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 37](#)), and then remove the following components:
  - Optical drive (see [Optical drive on page 39](#))
  - Hard drive (see [Hard drive or SSD on page 41](#))
  - Keyboard (see [Keyboard on page 47](#))
  - Top cover (see [Top cover on page 50](#))
  - System board (see [System board on page 61](#))

Remove the optical drive cable:

1. Release the optical drive cable **(1)** from the clips **(2)** built into the base enclosure.


2. Release the clips (3) built into the base enclosure that secure the optical drive connector, and then release the connector (4) from the clips.




3. Remove the optical drive connector and cable.  
Reverse this procedure to install the optical drive connector and cable.



## Fan and heat sink

 **NOTE:** The fan and heat sink spare part kits include replacement thermal material. Replacement thermal material is also available in the Thermal Material Kit, spare part number 634433-001.

Description	Spare part number
Fan	639460-001
Heat sink:	
<b>AMD processor:</b>	
For use only with computer models equipped with the AMD A60M chipset and a graphics subsystem with discrete video memory	649953-001
For use only with computer models equipped with the AMD A60M chipset and a graphics subsystem with UMA video memory	649954-001
<b>Intel processor:</b>	
For use only with computer models equipped with the HM65 chipset and a graphics subsystem with discrete video memory	641141-001
For use only with computer models equipped with the HM65 chipset and a graphics subsystem with UMA video memory	641140-001

 **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 and heat sink, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 37](#)), and then remove the following components:
  - Optical drive (see [Optical drive on page 39](#))
  - Hard drive (see [Hard drive or SSD on page 41](#))
  - WLAN module (see [WLAN module on page 45](#))
  - Keyboard (see [Keyboard on page 47](#))
  - Top cover (see [Top cover on page 50](#))
  - System board (see [System board on page 61](#))

Remove the fan and heat sink:

1. Turn the system board upside down, with the fan toward you.


---

 **NOTE:** Steps 2 through 5 apply only to computer models equipped with a graphics subsystem with discrete memory. See steps 6 through 8 for fan and heat sink removal information for computer models equipped with a graphics subsystem with UMA memory.

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2. Disconnect the fan cable **(1)** from the system board.
3. Loosen the screws **(2)** that secure the fan and heat sink to the system board. (Computer models equipped with an AMD processor have three screws. Computer models equipped with an Intel processor have four screws.)
4. Remove the three Phillips M2.5×6.0 screws **(3)** that secure the fan and heat sink to the system board.

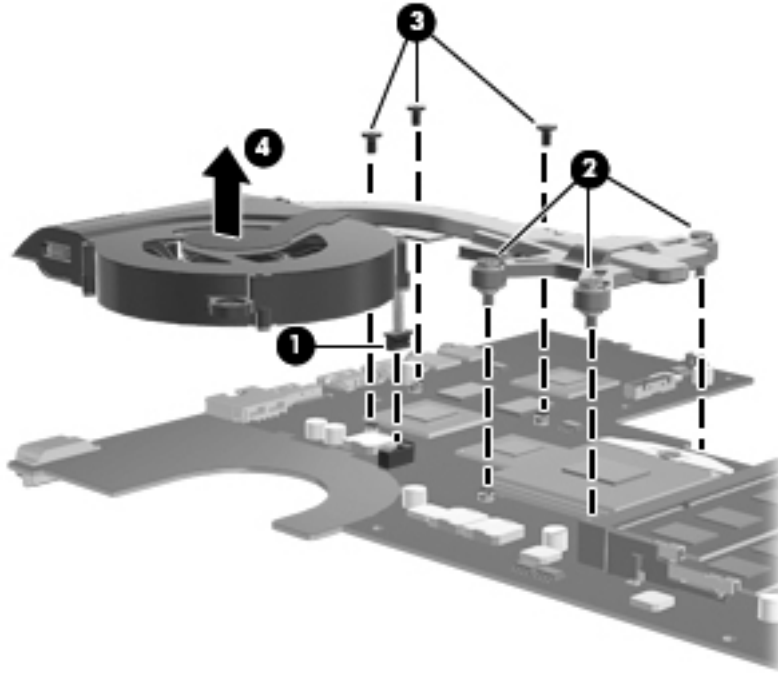
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 **NOTE:** Due to the adhesive quality of the thermal material located between the heat sink and system board components, it may be necessary to move the heat sink from side to side to detach it.

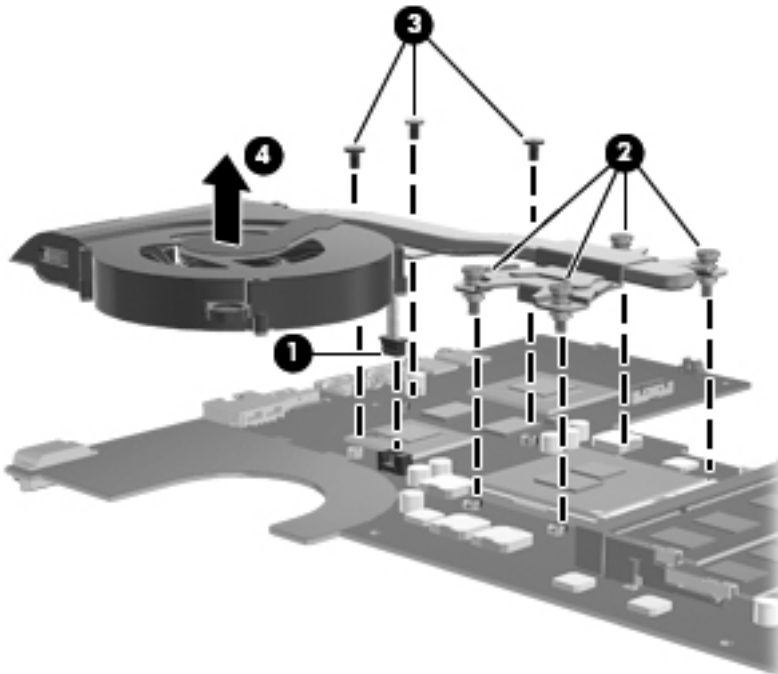
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5. Remove the fan and heat sink (4).

 **NOTE:** The following illustration shows the fan and heat sink being removed from a computer model equipped with an AMD processor and a graphics subsystem with discrete memory.




 **NOTE:** The following illustration shows the fan and heat sink being removed from a computer model equipped with an Intel processor and a graphics subsystem with discrete memory.




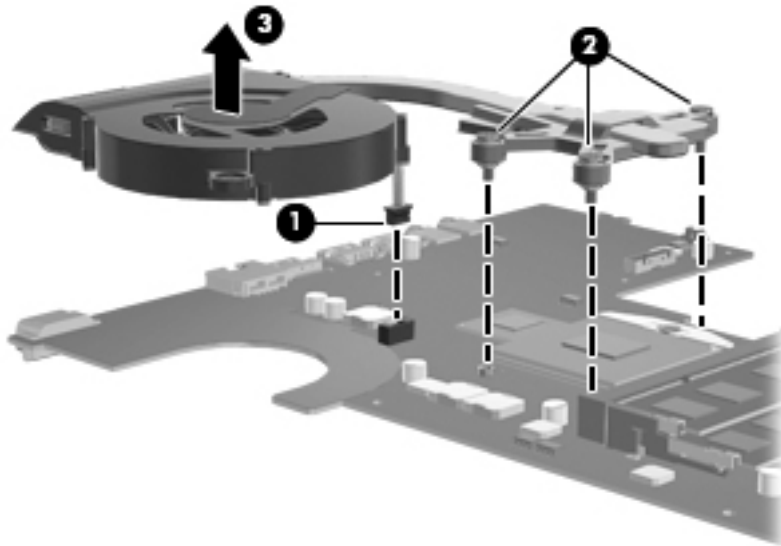
 **NOTE:** Steps 6 through 8 apply only to computer models equipped with a graphics subsystem with UMA memory. See steps 2 through 5 for fan and heat sink removal information for computer models equipped with a graphics subsystem with discrete memory.


6. Disconnect the fan cable (1) from the system board.
7. Loosen the screws (2) that secure the fan and heat sink to the system board. (Computer models equipped with an AMD processor have three screws. Computer models equipped with an Intel processor have four screws.)

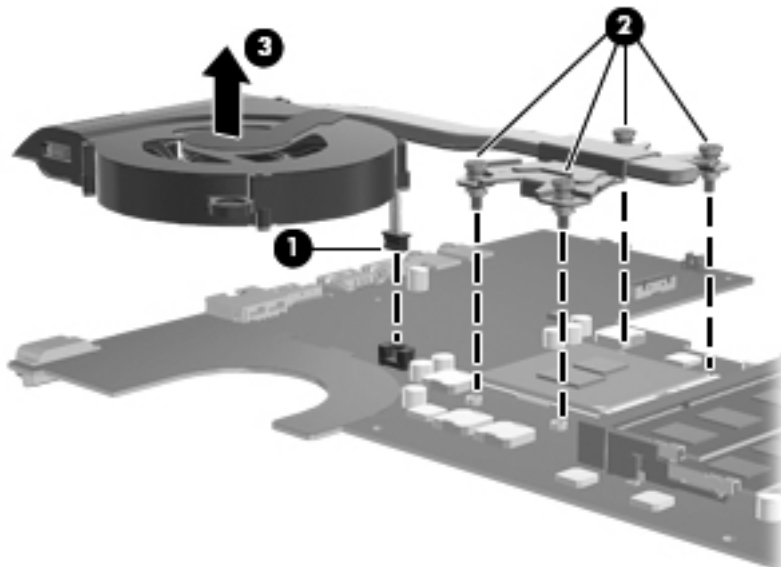
 **NOTE:** Due to the adhesive quality of the thermal material located between the heat sink and system board components, it may be necessary to move the heat sink from side to side to detach it.


8. Remove the fan and heat sink (3).


 **NOTE:** The following illustration shows the fan and heat sink removal process on a computer model equipped with an AMD processor and a graphics subsystem with UMA memory.



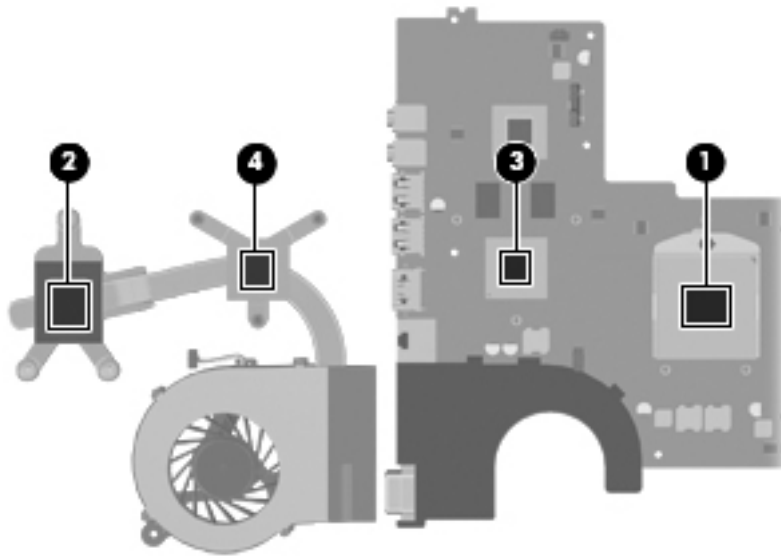
 **NOTE:** The following illustration shows the fan and heat sink removal process on a computer model equipped with an Intel processor and a graphics subsystem with UMA memory.




 **NOTE:** The thermal material must be thoroughly cleaned from the surfaces of the heat sink and the system board components each time the heat sink is removed. Replacement thermal material is included with the base enclosure, fan, heat sink, processor, and system board spare part kits. Replacement thermal material is also available in the Thermal Material Kit, spare part number 634433-001.

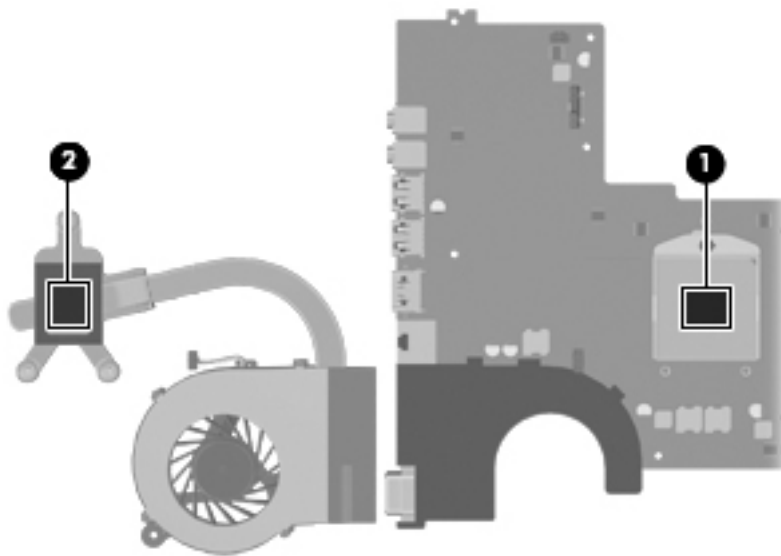
 **NOTE:** The following illustration shows the replacement thermal material locations on a computer model equipped with an AMD processor and a graphics subsystem with discrete memory.


- Thermal paste is used on the processor (1) and the heat sink section (2) that services it
- A thermal pad is used on the graphics subsystem chip (3) and the heat sink section (4) that services it



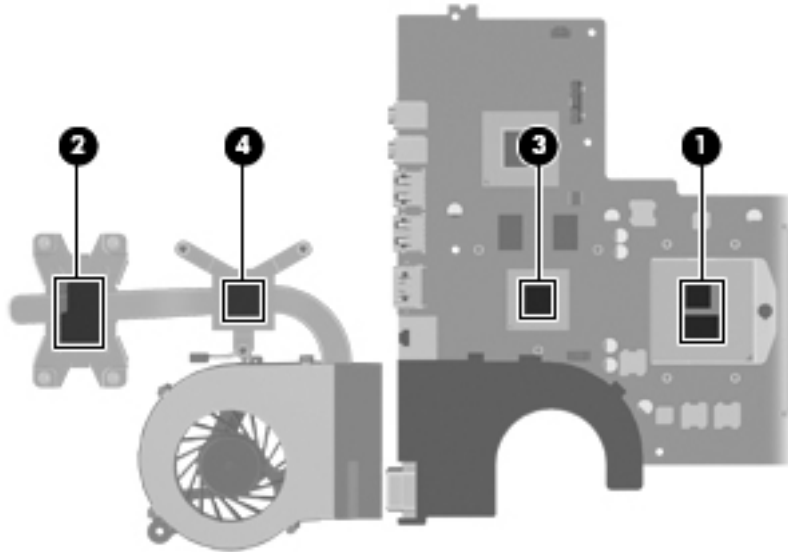
 **NOTE:** The following illustration shows the replacement thermal material locations on a computer model equipped with an AMD processor and a graphics subsystem with UMA memory.


- Thermal paste is used on the processor (1) and the heat sink section (2) that services it

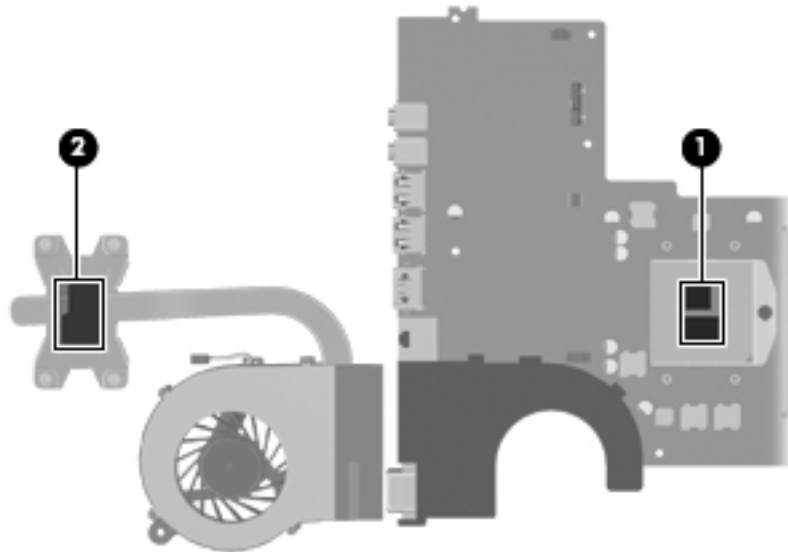


 **NOTE:** The following illustration shows the replacement thermal material locations on a computer model equipped with an Intel processor and a graphics subsystem with discrete memory.

- Thermal paste is used on the processor **(1)** and the heat sink section **(2)** that services it
- A thermal pad is used on the graphics subsystem chip **(3)** and the heat sink section **(4)** that services it

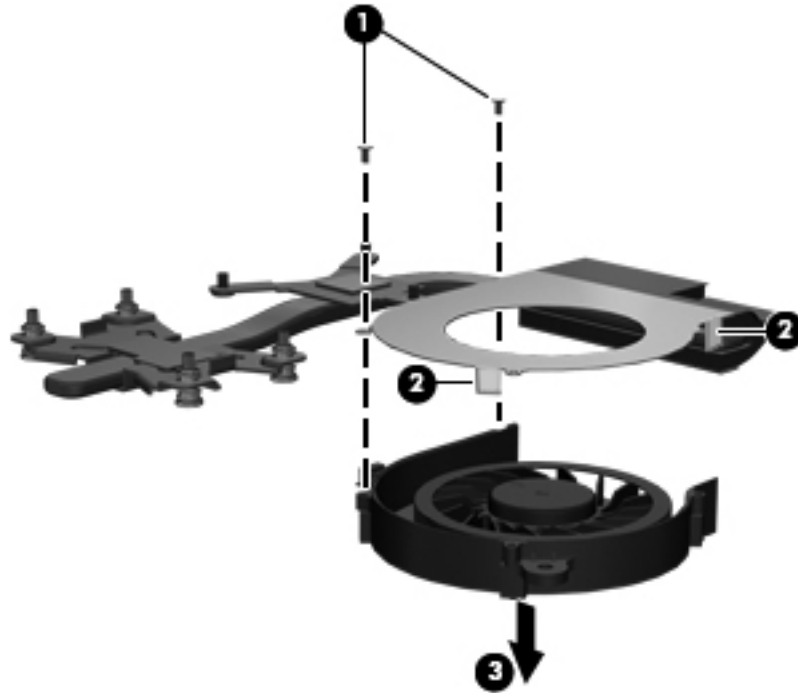


 **NOTE:** The following illustration shows the replacement thermal material locations on a computer model equipped with an Intel processor and a graphics subsystem with UMA memory. Thermal paste is used on the processor **(1)** and the heat sink section **(2)** that services it.



9. If it is necessary to replace the fan:
  - a. Remove the two Phillips M2.0×3.0 screws **(1)** that secure the fan to the heat sink.
  - b. Release the two clips **(2)** that secure the fan to the heat sink.

- c. Remove the fan (3) from the heat sink.



Reverse this procedure to reassemble and install the fan and heat sink.

## 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 634433-001.

Description	Spare part number
AMD A8-3520M 2.50 GHz processor (1.6 GHz FSB, 4.0 MB L2 cache, quad core, 35 W)	669690-001
AMD A6-3420M 2.40 GHz processor (1.5 GHz FSB, 4.0 MB L2 cache, quad core, 35 W)	669688-001
AMD A4-3320M 2.60 GHz processor (2.0 GHz FSB, 2.0 MB L2 cache, dual core, 35 W)	669686-001
AMD A4-3305M 2.50 GHz processor (1.9 GHz FSB, 2.0 MB L2 cache, dual core, 35 W)	672093-001
AMD E2-3000M 2.40 GHz processor (1.8 GHz FSB, 1.0 MB L2 cache, dual core, 35 W)	677628-001
Intel Core i7-2640M 2.80 GHz (SC turbo up to 3.50 GHz), PGA processor (4.0 MB L3 cache, dual core, 35 W)	666173-001
Intel Core i5-2540M 2.60 GHz (SC turbo up to 3.30 GHz), PGA processor (3.0 MB L3 cache, dual core, 35 W)	631255-001
Intel Core i5-2520M 2.50 GHz (SC turbo up to 3.20 GHz), PGA processor (3.0 MB L3 cache, dual core, 35 W)	631253-001
Intel Core i5-2450M 2.50 GHz (SC turbo up to 3.00 GHz), PGA processor (3.0 MB L3 cache, dual core, 35 W)	676359-001
Intel Core i5-2430M 2.40 GHz (SC turbo up to 3.00 GHz), PGA processor (3.0 MB L3 cache, dual core, 35 W)	653341-001
Intel Core i3-2370M TJ85, 2.40 GHz, PGA processor (3.0 MB L3 cache, dual core, 35 W)	677152-001
Intel Core i3-2350M TJ85, 2.30 GHz, PGA processor (3.0 MB L3 cache, dual core, 35 W)	653340-001
Intel Core i3-2330M TJ85, 2.20 GHz, PGA processor (3.0 MB L3 cache, dual core, 35 W)	653339-001
Intel Pentium B970 TJ85 2.30 GHz, PGA processor (2.0 MB L3 cache, dual core, 35 W)	676785-001
Intel Pentium B960 TJ85 2.20 GHz, PGA processor (2.0 MB L3 cache, dual core, 35 W)	664662-001
Intel Pentium B950 TJ85 2.10 GHz, PGA processor (2.0 MB L3 cache, dual core 35 W)	653338-001

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 37](#)), and then remove the following components:
  - Optical drive (see [Optical drive on page 39](#))
  - Hard drive (see [Hard drive or SSD on page 41](#))
  - WLAN module (see [WLAN module on page 45](#))
  - Keyboard (see [Keyboard on page 47](#))
  - Top cover (see [Top cover on page 50](#))





- System board (see [System board on page 61](#))
- Fan and heat sink (see [Fan and heat sink on page 65](#))

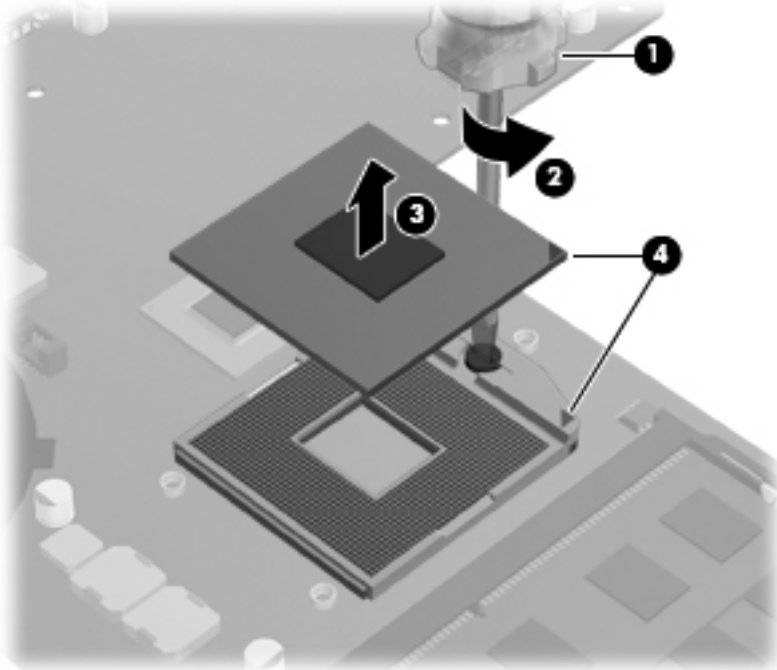
Remove the processor:


1. Use a flat-bladed screw driver **(1)** to turn the processor locking screw one-half turn counterclockwise **(2)**, until you hear a click.

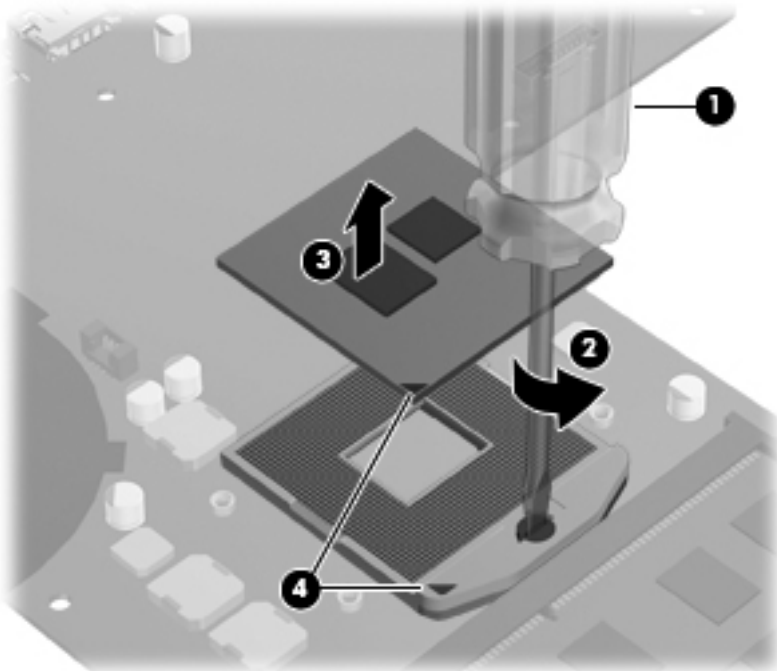
2. Lift the processor (3) straight up, and remove it.

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

 **NOTE:** The following illustration shows the processor removal process on a computer model equipped with an AMD processor.




 **NOTE:** The following illustration shows the processor removal process on a computer model equipped with an Intel processor.



Reverse this procedure to install the processor.

## Display assembly

 **NOTE:** The display assembly spare part kit includes webcam, two microphones, and wireless antenna transceivers and cables).


Description	Spare part number
43.9 cm (17.3 in), HD, LED, BrightView display assembly (includes webcam, two microphones, and wireless antenna transceivers and cables)	
Butter gold	640223-001
Charcoal gray	640226-001
Pewter	640227-001

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 37](#)), and then remove the following components:
  - Optical drive (see [Optical drive on page 39](#))
  - Hard drive (see [Hard drive or SSD on page 41](#))
  - WLAN module (see [WLAN module on page 45](#))
  - Keyboard (see [Keyboard on page 47](#))
  - Top cover (see [Top cover on page 50](#))

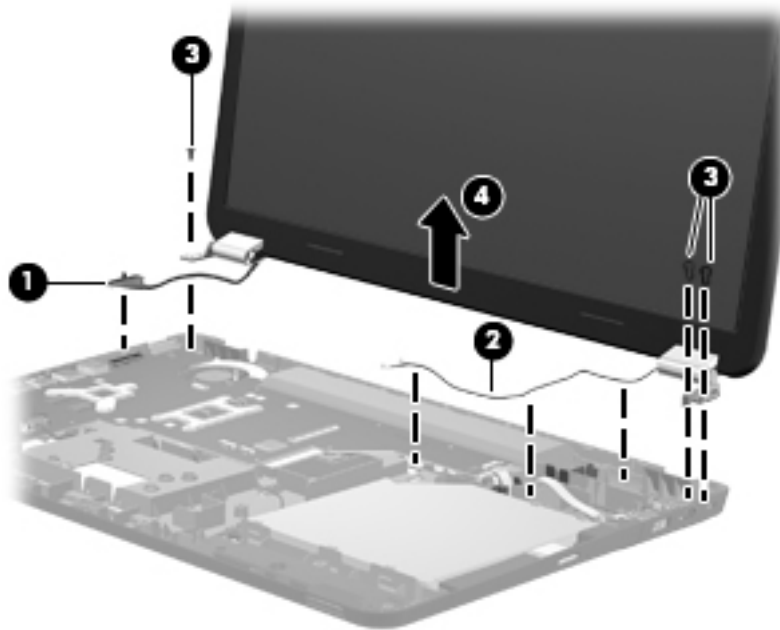
Remove the display assembly:

1. Disconnect the display panel cable **(1)** from the system board.
2. Release the wireless antenna cables **(2)** from the clips and the opening in the base enclosure.

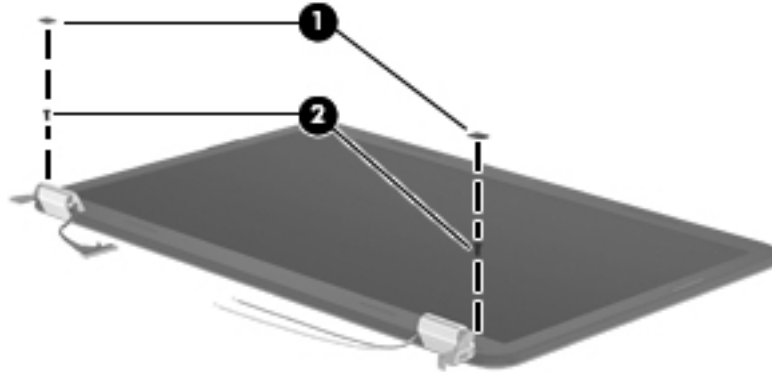
 **CAUTION:** Support the display assembly when removing the following screws. Failure to support the display assembly can result in damage to the display assembly and other computer components.

3. Remove the three Phillips M2.5×6.0 screws **(3)** that secure the display assembly to the computer.

4. Remove the display assembly (4).

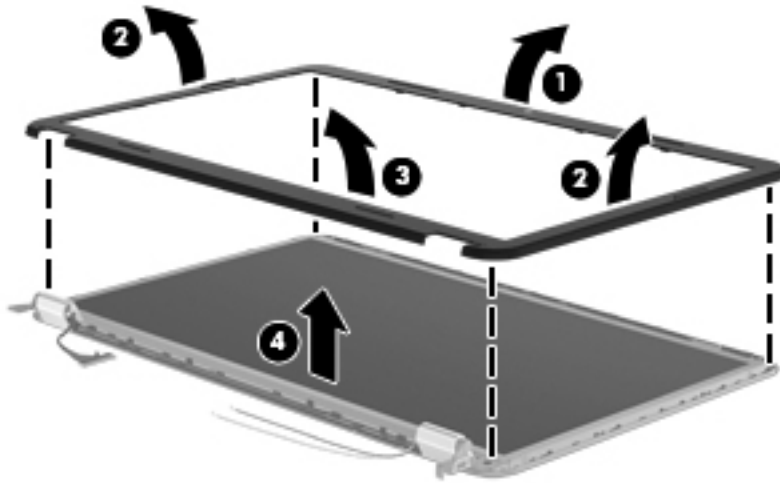


5. If it is necessary to replace the display bezel or any of the display assembly subcomponents:
  - a. Remove the two screw covers (1) and the two Phillips M2.5×6.0 screws (2) that secure the display bezel to the display assembly. The screw covers are available in the Display Screw Kit, spare part number 640218-001.

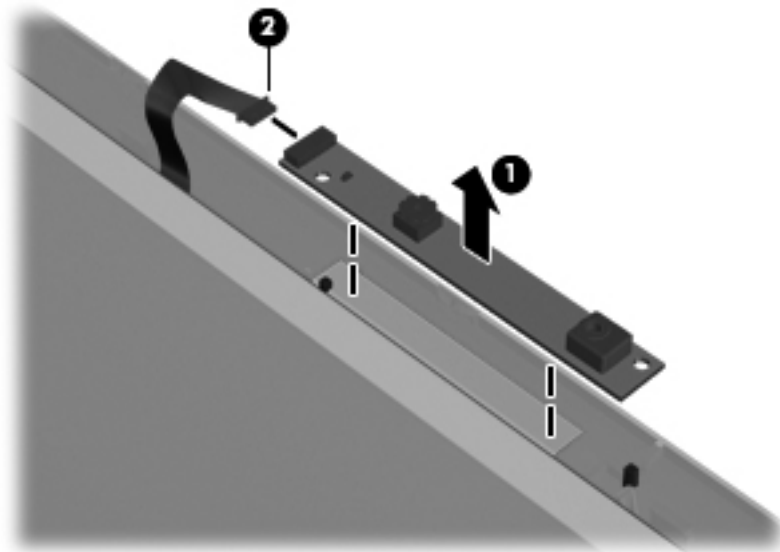


- b. Flex the inside edges of the top edge (1), the left and right sides (2), and the bottom edge (3) of the display bezel until the bezel disengages from the display enclosure.

- c. Remove the display bezel (4). The display bezel is available using spare part number 640204-001.

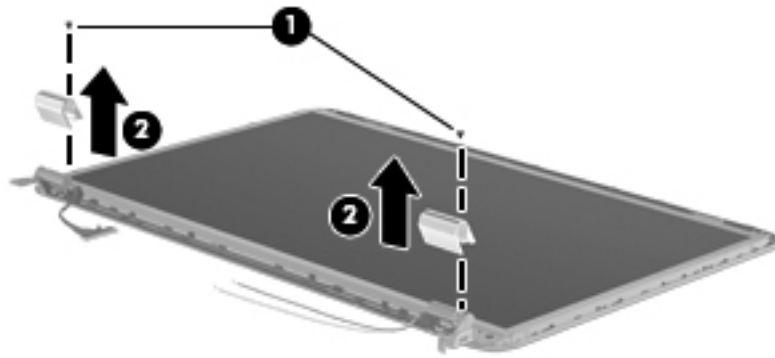


6. If it is necessary to replace the webcam/microphone module:
- Detach and release the webcam/microphone module (1) as far as the webcam/microphone module cable allows. (The webcam/microphone module is attached to the display enclosure with double-sided tape.)
  - Disconnect the webcam/microphone module (2) from the webcam/microphone module.



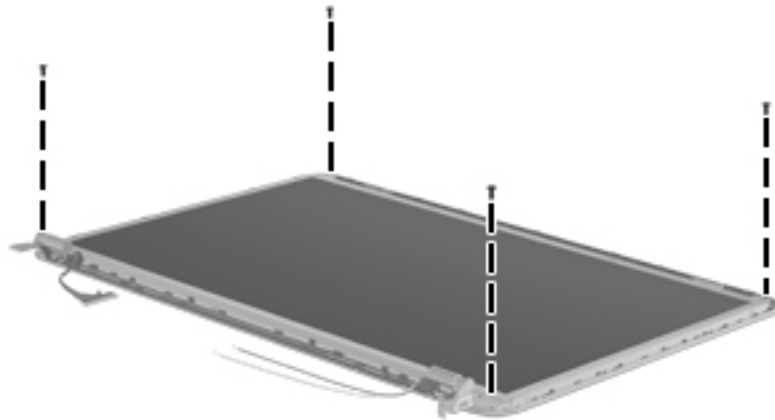
- c. Remove the webcam/microphone module. The webcam/microphone module is available using spare part number 637197-001.
7. If it is necessary to replace the hinge covers:
- Remove the two Phillips M2.5×5.0 (1) screws that secure the hinge covers to the display enclosure.

- b. Remove the hinge covers (2). The hinge covers are available using spare part number 643698-001.

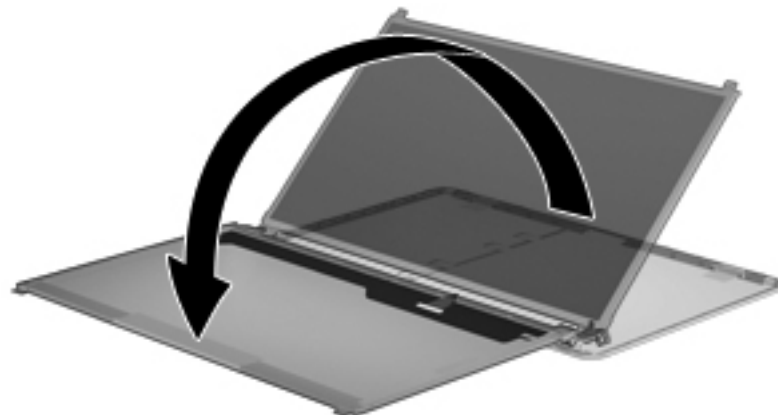


8. If it is necessary to replace the display panel:

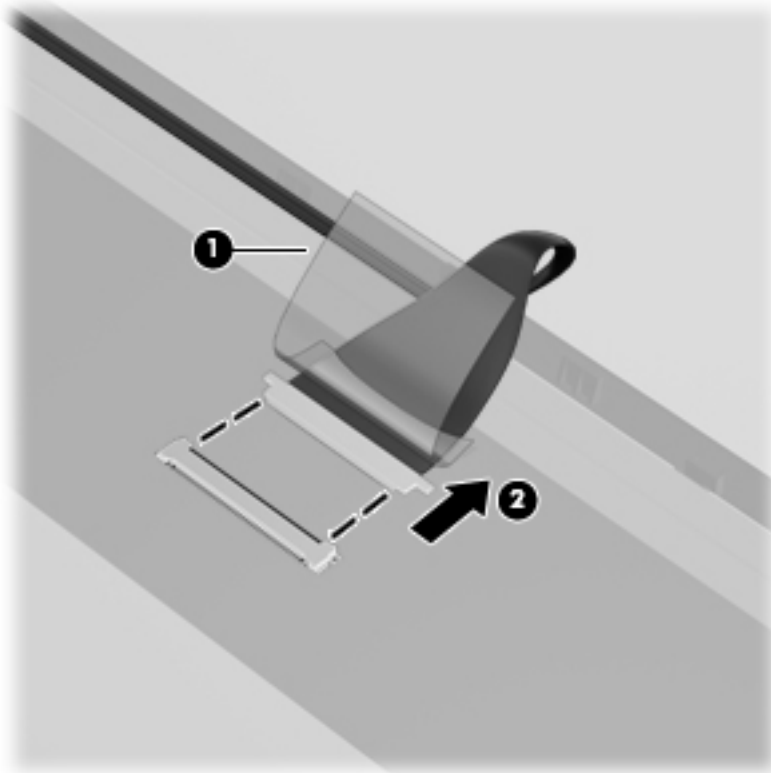
- a. Remove the four Phillips M2.5×6.0 screws that secure the display panel to the display enclosure.



- b. Lift the top edge of the display panel, and then swing it up and forward until it rests upside down in front of the display enclosure.

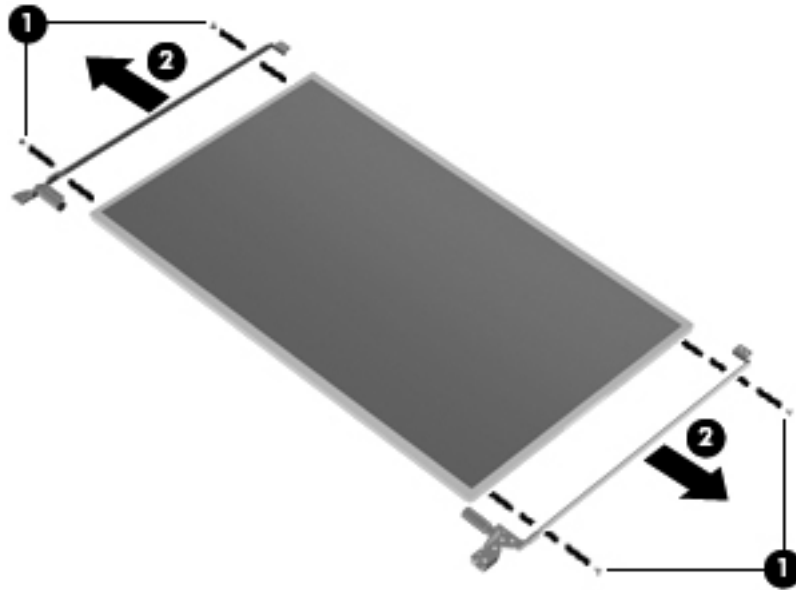


- c. Release the adhesive strip **(1)** that secures the display panel cable to the display panel, and then disconnect the display panel cable **(2)** from the display panel.



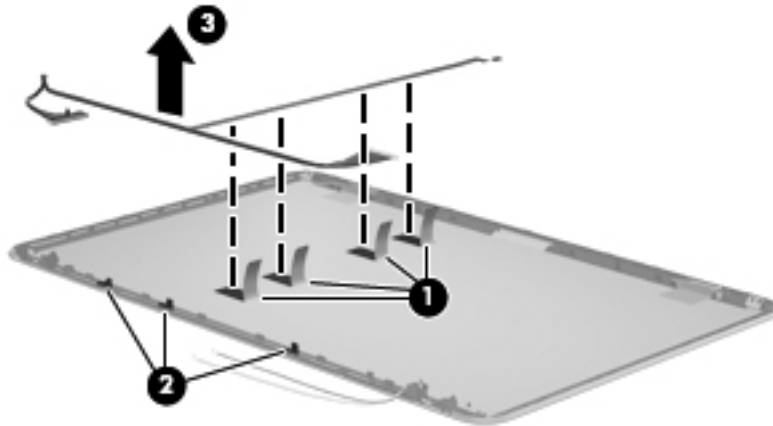
- d. Remove the display panel. The display panel is available using spare part number 641395-001.
- 9.** If it is necessary to replace the display hinges:
- a. Remove the four Phillips M2.0×3.0 screws **(1)** that secure the display hinges to the display panel.

- b. Remove the display hinges (2). The display hinges include the display hinges and brackets and are available using spare part number 640207-001.



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

- Release the tabs (1) built into the display enclosure shielding that secure the display panel cable to the display enclosure.
- Release the display panel cable from the clips (2) built into the display enclosure.
- Remove the display panel cable (3). The display panel cable includes the webcam/microphone module cable and is available in the Display Cable Kit, spare part number 640205-001.

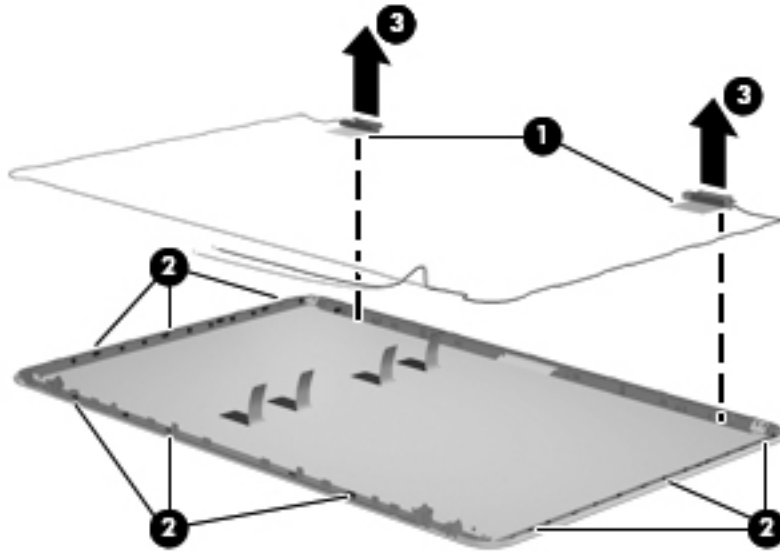


11. If it is necessary to replace the wireless antenna cables and transceivers:

- Release the wireless antenna transceivers (1) from the display enclosure. (The wireless antenna transceivers are attached to the display enclosure with double-sided tape.)
- Release the wireless antenna cables from the clips (2) built into the display enclosure.



- c. Remove the wireless antenna cables and transceivers (3). The wireless antenna cables and transceivers are available in the Antenna Kit, spare part number 640192-001.




Reverse this procedure to reassemble and install the display assembly.

---

# 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.



---

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

---

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, click the **Exit** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the tab key and the arrow keys to select **File > Ignore Changes and Exit**, and then press **enter**.
- To save your changes and exit Setup Utility menus, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the tab key and the arrow keys to select **File > Save Changes and Exit**, and then press **enter**.


Your changes go into effect when the computer restarts.

## 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

---

 **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 a pointing device or the arrow keys to select **File > Restore Defaults**.
4. Follow the on-screen instructions.
5. To save your changes and exit, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

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

Your changes go into effect when the computer restarts.

---

 **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.
2. Use a pointing device or the arrow keys to select **File > System Information**.
3. To exit Setup Utility without saving your changes, click the **Exit** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the tab key and the arrow keys to select **File > Ignore Changes and Exit**, and then press **enter**.

## 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. Select **Start > Help and Support > Maintain**.
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. Open Windows Explorer by selecting **Start > 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>		
Depth	26.8 cm	10.6 in
Width	41.2 cm	16.2 in
Height	3.1 to 3.7 cm	1.2 to 1.5 in
<b>Weight</b>	2.97 kg	6.55 lb
<b>Input power</b>		
Operating voltage	18.5 V dc @ 3.5 A -65 W or 19.0 V dc @ 4.74 A -90 W	
Operating current	3.5 or 4.74 A	
<b>Temperature</b>		
Operating	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F
<b>Relative humidity</b> (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
<b>Maximum altitude</b> (unpressurized)		
Operating	-15 m to 3,048 m	-50 ft to 10,000 ft
Nonoperating	-15 m to 12,192 m	-50 ft to 40,000 ft
<b>NOTE:</b> Applicable product safety standards specify thermal limits for plastic surfaces. The device operates well within this range of temperatures.		

## 43.9 cm (17.3 in) display specifications

	Metric	U.S.
<b>Dimensions</b>		
Height	21.7 cm	8.54 in
Width	38.4 cm	15.12 in
Diagonal	43.9 cm	17.29 in
<b>Number of colors</b>	Up to 16.8 million	
<b>Contrast ratio</b>	200:1 (typical)	
<b>Brightness</b>	200 cd/m <sup>2</sup> (typical)	
<b>Pixel resolution</b>		
Pitch	0.197 mm × 0.197 mm	
Format	1600 × 900	
Configuration	RGB vertical stripe	
<b>Backlight</b>	LED	
<b>Character display</b>	80 × 25	
<b>Total power consumption</b> (varies by display)	2.0 W	
<b>Viewing angle</b>	±65° horizontal, ±50° vertical (typical)	



## Hard drive specifications

	750 GB*	640 GB*	500 GB*	320 GB*
<b>Dimensions</b>				
Height	9.5 mm	9.5 mm	9.5 mm	9.5 mm and 7.0 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	110 g	98 g	110 g	110 g
<b>Interface type</b>	SATA (3 GB/sec)	SATA (3 GB/sec)	SATA	SATA
<b>Transfer rate</b>				
Synchronous (maximum)	97 MB/sec	106 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	1.5 ms	1.5 ms	1.5 ms
Average (read/write)	12/16 ms	12/13 ms	11/13 ms	11/13 ms
Maximum	21 ms	24 ms	22 ms	22 ms
<b>Logical blocks</b>	1,465,149,168	1,250,263,728	976,773,168	628,142,448
<b>Disk rotational speed</b>	5400 rpm	5400 rpm	7200 and 5400 rpm	7200 and 5400 rpm
<b>Operating temperature</b>	0°C to 60°C (32°F to 140°F)			
*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.				

# SSD specifications

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## Performance

Sequential read (maximum)	270 MB/s
Sequential write (maximum)	165 MB/s

## Characteristics

Interface	SATA revision 2.6
Flash type	Multi-Level Cell (MLC) NAND
Flash capacity	160 GB
Features	ATA Security; ATA8-ACS; SATA 2.6; Device Initiated Power Management (DIPM)

## Environmental specifications

Operating temperature	0°C to +70°C (32°F to 158°F)
Storage temperature	-55°C to +95°C (-67°F to 203°F)
Shock	1500 g
Vibration (operating)	2.17 GRMS (5-700 Hz) Max

## Physical specifications

Connector	7+15 pin SATA connector
Weight	< 88 g (3.1 oz)

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# DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive specifications

<b>Applicable disc</b>	
Read	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM
Write	CD-R and CD-RW, DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM
<b>Random access time</b>	
DVD	< 230 ms
CD	< 175 ms
<b>Cache buffer</b>	2 MB
<b>Data transfer rate</b>	
24X CD-ROM	3,600 KB/sec
8X DVD-ROM	10,800 KB/sec
24X CD-R	3,600 KB/sec
16X CD-RW	2,400 KB/sec
8X DVD+R	10,800 KB/sec
4X DVD+RW	5,400 KB/sec
8X DVD-R	10,800 KB/sec
4X DVD-RW	5,400 KB/sec
2.4X DVD+R(9)	2,700 KB/sec
5X DVD-RAM	6,750 KB/sec
<b>Transfer mode</b>	Multiword DMA Mode

# BD ROM and DVD±R/RW SuperMulti Double-Layer Drive specifications

<b>Applicable disc</b>	
Read	BD-ROM, BD-ROM-DL, BD-R, BD-R-DL, BD-RE, BD-RE-DL, DVD-ROM, DVD+R, DVD+R-DL, DVD+RW, DVD-R, DVD-R-DL, DVD-RW, DVD-RAM (Ver.2), CD-DA, CD-ROM (mode 1 and mode 2), CD-ROM XA (mode 2, form 1 and form 2), Photo CD (single and multiple sessions), CD Extra, CD-R, CD-RW, and CD-TEXT
Write	DVD-RAM (Ver.2), DVD+R, DVD-R, CD-R, and CD-ROM
<b>Random access time</b>	
BD	< 230 ms
DVD	< 180 ms
CD	< 180 ms
<b>Cache buffer</b>	4.5 MB
<b>Data transfer rate</b>	
24X CD-ROM	3,600 KB/sec
8X DVD-ROM	10,800 KB/sec
4X BD	18,000 KB/sec
24X CD-R	3,600 KB/sec
16X CD-RW	2,400 KB/sec
8X DVD+R	10,800 KB/sec
4X DVD+RW	5,400 KB/sec
8X DVD-R	10,800 KB/sec
4X DVD-RW	5,400 KB/sec
2.4X DVD+R(9)	2,700 KB/sec
5X DVD-RAM	6,750 KB/sec
1X BD-ROM	4,500 KB/sec
1X BD-R read	4,500 KB/sec
1X BD-RE read	4,500 KB/sec
<b>Transfer mode</b>	Multiword DMA Mode

---

# 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 will need a set of recovery discs or a recovery flash drive that you can create using HP Recovery Manager. HP recommends that you use this software to create either a set of recovery discs or a recovery flash drive immediately after software setup, because you cannot create recovery media after a hard drive failure.

If for some other reason you need to restore your system, this can be achieved using the HP Recovery partition, without the need for recovery discs or a recovery flash drive, provided the hard drive is still working. 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 preinstalled at the factory. Software not provided with this computer must be reinstalled manually.


---

## 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 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 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 > Recovery Manager > Recovery Media Creation**.
2. Follow the on-screen instructions.

## Performing a system restore

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



**NOTE:** A system restore needs to 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 Recovery Manager.
- Recovery Manager restores only software that was preinstalled at the factory. Software not provided with this computer must be downloaded from the manufacturer's Web site or reinstalled from the disc provided by the manufacturer.

### 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, 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 > Recovery Manager > 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 **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 the Recovery Manager, the computer boot order needs to 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 needs to be performed if the computer has a virus attack or if any major system components fail. In order to correct computer issues, a recovery should first be attempted before a system restore is attempted.

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, refer to **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+fn+prt sc**.  
To copy the entire screen, press **fn+prt sc**.
3. Open a word-processing document, and then select **Edit > Paste**. The screen image is added to the document.
4. Save 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. Refer to 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

---

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

---

## Create a system restore point

1. Select **Start > Control Panel > System and Security > System**.
2. In the left pane, click **System Protection**.
3. Click the **System Protection** tab.
4. 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.

---

## 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 V ac, or from 220 to 240 V 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 or regions must meet the requirements of the country and 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
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 ac) 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 H05VV-F 3-conductor, 0.75 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 3-conductor, 1.25 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-conductor, 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 H05VV-F 3-conductor, 0.75 mm<sup>2</sup> or 1.00 mm<sup>2</sup> conductor size, with plug BS 1363/A with BSI or ASTA marks.</li> </ol>		

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## 9 Recycling

When a battery has reached the end of its useful life, do not dispose of the battery in general household waste. Follow the local laws and regulations in your area for 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 website at [www.hp.com/recycle](http://www.hp.com/recycle).

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