



HP ENVY dv7 Notebook PC

Maintenance and Service Guide

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Safety warning notice

⚠ 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
Product Name	HP ENVY dv7 Notebook PC	√	√
Processors	<ul style="list-style-type: none"> • AMD® A10-4600M 3.20-GHz processor (1600-MHz FSB, 4.0-MB L2 cache, DDR3, quad core, 35 W) • AMD A8-4500M 2.80-GHz processor (1600-MHz FSB, 4.0-MB L2 cache, DDR3, quad core, 35 W) • AMD A6-4400M 3.20-GHz processor (1600-MHz FSB, 1.0-MB L2 cache, DDR3, dual core, 35 W) • AMD A4-4300M 2.50-GHz processor (1600-MHz FSB, 1.0-MB L2 cache, DDR3, dual core, 35 W) 	√	
	<ul style="list-style-type: none"> • Intel Quad Core i7-3840QM 2.80-GHz processor (SC turbo up to 3.80-GHz; 1600-MHz FSB, 8.0-MB L3 cache, 45 W) • Intel Quad Core i7-3820QM 2.70-GHz processor (SC turbo up to 3.70-GHz; 1600-MHz FSB, 8.0-MB L3 cache, 45 W) • Intel Quad Core i7-3740QM 2.70-GHz processor (SC turbo up to 3.70-GHz; 1600-MHz FSB, 6.0-MB L3 cache, 45 W) • Intel Quad Core i7-3720QM 2.60-GHz processor (SC turbo up to 3.60-GHz, 1600-MHz FSB, 6.0-MB L3 cache, 45 W) 		√

Category	Description	Computer models equipped with an AMD processor	Computer models equipped with an Intel processor
Processors <i>(continued)</i>	<ul style="list-style-type: none"> <li data-bbox="501 275 927 401">• Intel Quad Core i7-3632QM 2.20-GHz processor (SC turbo up to 3.20-GHz; 1600-MHz FSB, 6.0-MB L3 cache, 35 W) <li data-bbox="501 422 927 548">• Intel Quad Core i7-3630QM 2.40-GHz processor (SC turbo up to 3.40-GHz; 1600-MHz FSB, 6.0-MB L3 cache, 45 W) <li data-bbox="501 569 927 695">• Intel Quad Core i7-3612QM 2.10-GHz processor (SC turbo up to 3.10-GHz, 1600-MHz FSB, 6.0-MB L3 cache, 35 W) <li data-bbox="501 716 927 842">• Intel Quad Core i7-3610QM 2.30-GHz processor (SC turbo up to 3.10-GHz, 1600-MHz FSB, 6.0-MB L3 cache, 45 W) <li data-bbox="501 863 927 989">• Intel Quad Core i7-2670QM 2.20-GHz processor (SC turbo up to 3.10-GHz; 1333-MHz FSB, 6.0-MB L3 cache, 45 W) <li data-bbox="501 1010 927 1136">• Intel Dual Core i5-3320M 2.60-GHz processor (SC turbo up to 3.30-GHz; 1600-MHz FSB, 3.0-MB L3 cache, 35 W) <li data-bbox="501 1157 927 1283">• Intel Dual Core i5-3230M 2.60-GHz processor (SC turbo up to 3.20-GHz; 1600-MHz FSB, 3.0-MB L3 cache, 35 W) <li data-bbox="501 1304 927 1430">• Intel Dual Core i5-3210M 2.50-GHz processor (SC turbo up to 3.10-GHz, 1600-MHz FSB, 3.0-MB L3 cache, 35 W) <li data-bbox="501 1451 927 1520">• Intel Dual Core i5-2450M 2.50-GHz processor (SC turbo up to 3.10-GHz, 1333-MHz FSB, 3.0-MB L3 cache, 35 W) 		√

Category	Description	Computer models equipped with an AMD processor	Computer models equipped with an Intel processor
Processors <i>(continued)</i>	<ul style="list-style-type: none"> Intel Dual Core i3-3130M 2.60-GHz processor (1333-MHz FSB, 3.0-MB L3 cache, 35 W) 713163-001 Intel Dual Core i3-3120M 2.50-GHz processor (1333-MHz FSB, 3.0-MB L3 cache, 35 W) Intel Dual Core i3-3110M 2.30-GHz processor (1333-MHz FSB, 3.0-MB L3 cache, 35 W) Intel Dual Core i3-2370M 2.40-GHz processor (1333-MHz FSB, 3.0-MB L3 cache, 35 W) Intel Core i3-2350M 2.30-GHz processor (1333-MHz FSB, 3.0-MB L3 cache, 35 W) Intel Core i3-2330M 2.20-GHz processor (1333-MHz FSB, 3.0-MB L3 cache, 35 W) 		√
Chipset	AMD A70M fusion controller hub (FCH)	√	
	Intel HM77 Express chipset		√
Graphics	<p>Supports dual graphics:</p> <ul style="list-style-type: none"> AMD RadeonT HD 7730M with 2048-MB of dedicated video memory (128-MB×16 DDR3 900-MHz×8 PCs); 128-bit M2 package AMD RadeonT HD 7670M with 2048-MB of dedicated video memory (128-MB×16 DDR3 900-MHz×8 PCs); 128-bit M2 package AMD RadeonT HD 7670M with 1024-MB of dedicated video memory (64-MB×16 DDR3 900-MHz×8 PCs); 128-bit M2 package <p>Support HD decode, DX11, and HDMI</p>	√	

Category	Description	Computer models equipped with an AMD processor	Computer models equipped with an Intel processor
Graphics <i>(continued)</i>	<p>Switchable discrete graphics:</p> <ul style="list-style-type: none"> • AMD Radeon HD 7670M and HD7660G dual graphics on computer models equipped with an AMD A10 processor • AMD Radeon HD 7670M and HD7640G dual graphics on computer models equipped with an AMD A8 processor • AMD Radeon HD 7670M and HD7520G dual graphics on computer models equipped with an AMD A6 processor 	√	
	<p>Internal graphics:</p> <ul style="list-style-type: none"> • Intel HD Graphics 4000 (on computer models equipped with an Intel Core i7/i5/i3 3000-series processor) • Intel HD Graphics 3000 (on computer models equipped with an Intel Core i7/i5/i3 2000-series processor) <p>Switchable discrete graphics:</p> <ul style="list-style-type: none"> • NVIDIAR GeForceR 630M with 1024-MB of dedicated video memory (64-MB×16 DDR3 900-MHz×8 PCs); 128-bit M2 29-mm×29-mm • NVIDIAR GeForceR 635M with 2048-MB of dedicated video memory (128-MB×16 DDR3 900-MHz×8 PCs); 128-bit M2 29-mm×29-mm • NVIDIAR GeForceR 650M with 2048-MB of dedicated video memory (64-MB×32 GDDR5×8 PCs, 5Gbps); 128-bit M2 29-mm×29-mm <p>Support HD decode, DX11, HDMI, and Optimus</p>		√

Category	Description	Computer models equipped with an AMD processor	Computer models equipped with an Intel processor
Panel	<ul style="list-style-type: none"> • 17.3-in, light-emitting diode (LED), UWVA, full high-definition (FHD), AntiGlare (1920×1080) display, 3.4-mm; typical brightness: 250 nits • 17.3-in, LED, SVA, HD, BrightView (1366×768) display; 3.8-mm; typical brightness: 200 nits <p>All display assemblies include 2 wireless local area network (WLAN) antenna cables</p> <p>16:9 Ultra Wide Aspect Ratio</p> <p>Lighted logo on top bezel</p>	√	√
Memory	<p>Two customer-accessible/upgradable memory module slots</p> <p>DDR3-1600-MHz dual channel support</p> <p>Supports up to 16384-MB system RAM</p> <p>Supports the following system RAM configurations:</p> <ul style="list-style-type: none"> • 16384-MB (8192-MB×2; not supported on computer models equipped with a 32-bit operating system) • 12288-MB (8192-MB×1 + 4096-MB×1; not supported on computer models equipped with a 32-bit operating system) • 8192-MB (8192-MB×1 or 4096-MB×2; not supported on computer models equipped with a 32-bit operating system) • 6144-MB (4096-MB×1 + 2048-MB×1; not supported on computer models equipped with a 32-bit operating system) • 4096-MB (4096-MB×1 or 2048-MB×2) • 2048-MB (2048-MB×1) 	√	√

Category	Description	Computer models equipped with an AMD processor	Computer models equipped with an Intel processor
Hard drive	<p>Supports 6.35-cm (2.5-in) hard drives in 12.7-mm (.50-in), 9.5-mm (.37-in), and 7.0-mm (.28-in) thicknesses (all hard drives use the same bracket)</p> <p>Customer-accessible</p> <p>Serial ATA</p> <p>Accelerometer protection support</p> <p>Supports the following hard drives:</p> <ul style="list-style-type: none"> • 1-TB, 5400-rpm, 12.7-mm • 750-GB, 7200-rpm and 5400-rpm, 9.5-mm • 640-GB, 5400-rpm, 9.5-mm • 500-GB, 7200-rpm and 5400-rpm, 9.5-mm • 320-GB, 7200-rpm and 5400-rpm, 9.5-mm and 7.0-mm 	√	√
Solid-state drives	Supports 180-GB or 160-GB drive	√	√
	Supports 32GB mSATA drive		√
Optical drive	<p>Fixed</p> <p>Serial ATA</p> <p>12.7-mm tray load</p> <p>Supports the following optical drives:</p> <ul style="list-style-type: none"> • Blu-ray Disc ROM with SuperMulti DVD ±R/RW Double-Layer Drive • Blu-ray Disc R/RW with SuperMulti Drive • DVD±RW Double-Layer with SuperMulti Drive 	√	√

Category	Description	Computer models equipped with an AMD processor	Computer models equipped with an Intel processor
Audio and video	HD audio	√	√
	Beats audio		
	Quad speakers		
	Subwoofer		
	Supports Microsoft Premium requirements		
	HP TrueVision HD webcam (fixed, no tilt with activity LED; 1280×720 by 30 frames per second)		
	Two dual array, digital microphones with appropriate beam-forming, echo-cancellation, noise-reduction software		
Ethernet	Integrated 10/100/1000 NIC	√	√
Wireless	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"> Atheros 9485GN 802.11b/g/n 1×1 WiFi and 3012 Bluetooth 4.0 Combo Adapter Atheros WB225 802.11b/g/n 1×1 Bluetooth Combo Adapter Broadcom 4313GN 802.11b/g/n 1×1 WiFi and 20702 Bluetooth 4.0 Combo Adapter Intel Centrino Advanced-N 6230 WLAN module Intel Centrino Advanced-N 6230 WLAN module Ralink RT5390R 802.11b/g/n 1×1 WiFi Adapter 		
	Ralink RT3290LE 802.11b/g/n 1×1 WiFi and Bluetooth 4.0 Combo Adapter		√
	Atheros AR9565 802.11b/g/n 1×1 WiFi + Bluetooth 4.0 Combo Adapter for use only on computer models equipped with an Intel processor		√

Category	Description	Computer models equipped with an AMD processor	Computer models equipped with an Intel processor
External media cards	<p>HP Multi-Format Digital Media Reader slot with push-push technology, supporting the following digital card formats:</p> <ul style="list-style-type: none"> Secure Digital (SD) Memory Card Secure Digital Extended Capacity (SDxC) Memory Card Secure Digital High Capacity (SDHC) Memory Card Ultra High Speed MultiMediaCard (UHS/MMC) 	√	√
Ports	<ul style="list-style-type: none"> AC power Combination audio-out (stereo headphone)/audio-in (mono microphone) HDMI 1.4a output supporting stereoscopic 3D VGA (Dsub 15 pin) supporting: 1920×1600 external resolution @ 60 Hz, hot plug and unplug and autodetection for correct output to wide-aspect vs. standard aspect video RJ-45 (Ethernet) USB 3.0 (3 ports), USB 2.0 (1 port) 	√	√
Keyboard/pointing devices	<p>Full-size (17.3-in.), Island-style, with numeric keypad</p> <p>Taps enabled by default</p>	√	√
Power requirements	<p>90-W HP Smart AC adapter (RC, V, PFC, 3-wire)</p> <p>65-W HP Smart AC adapter (RC, V, 3-wire)</p> <p>120-W slim AC adapter (RC, V, PFC, 3-wire)</p> <p>90-W HP Smart AC adapter (RC, V, PFC, EM, 3-wire)</p> <p>65-W HP Smart AC adapter (RC, V, EM, 3-wire)</p>	√	√
	<p>Supports the following batteries (battery is user-removable)</p> <ul style="list-style-type: none"> 9-cell, 100-Wh, 3.0-Ah, Li-ion battery 6-cell, 62-Wh, 2.8-Ah, Li-ion battery 	√	√

Category	Description	Computer models equipped with an AMD processor	Computer models equipped with an Intel processor
Security	Security cable lock	√	√
	Fingerprint reader with Digital Persona software support		
	Intel/VeriSign support		√
	Intel AT-p Ready support		
Operating system	Preinstalled:	√	√
	• Windows 8 Standard 64-bit		
	• Windows 8 Professional 64-bit		
Serviceability	End user replaceable parts:	√	√
	• AC adapter		
	• Battery		
	• Hard drive		
	• Memory module		
	• Optical drive		
	• WLAN module		

2 External component identification

Finding your hardware and software information

- ▲ Select **Start > Computer**.

A list displays all the devices installed in your computer, including optical drives, solid-state drives (SSDs), or a secondary hard drive.

To find out what software is included on your computer, select **Start > All Programs**.

Display



Item	Component	Description
(1)	WLAN antennas (2)*	Send and receive wireless signals to communicate with WLANs.
(2)	Internal microphones (2)	Record sound.
(3)	HP TrueVision HD webcam	Records video, captures still photographs, allows video conferences and online chat by means of streaming video. To use the webcam, select Start > All Programs > Communication and Chat > CyberLink YouCam .
(4)	Webcam light	On: The webcam is in use.
(5)	Speakers	Produce sound.

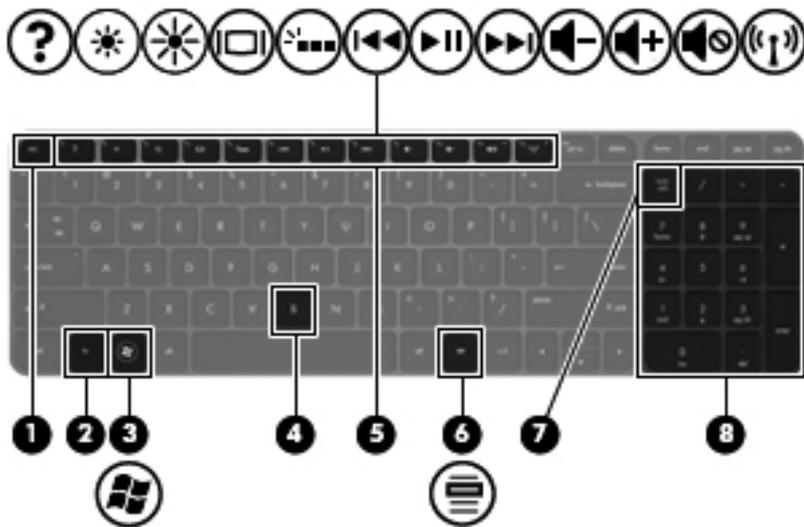
*The antennas are not visible from the outside of the computer. For optimal transmission, keep the area immediately around the antennas free from obstructions. For wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region.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

Buttons, speakers, and fingerprint reader



Item	Component	Description
(1)	Power button	<ul style="list-style-type: none">• When the computer is off, press the button to turn on the computer.• When the computer is on, press the button briefly to initiate Sleep.• When the computer is in the Sleep state, press the button briefly to exit Sleep.• When the computer is in Hibernation, press the button briefly to exit Hibernation. <p>CAUTION: Pressing and holding down the power button will result in the loss of unsaved information.</p> <p>If the computer has stopped responding and Microsoft Windows shutdown procedures are ineffective, press and hold down the power button for at least 5 seconds to turn off the computer.</p> <p>To learn more about your power settings, select Start > Control Panel > System and Security > Power Options.</p>
(2)	Speakers (2)	Produce sound.
(3)	Fingerprint reader	Allows a fingerprint logon to Windows, instead of a password logon.

Keys



Item	Component	Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes frequently used system functions when pressed in combination with the esc key or the b key.
(3)	Windows logo key	Displays the Windows Start menu.
(4)	b key	Enables or disables Beats Audio when pressed in combination with the fn key. Beats Audio is an enhanced audio feature that provides a deep, controlled bass while maintaining a clear sound. Beats Audio is enabled by default. Opens Beats Audio Control Panel, which allows you to view and control all audio settings. Beats Audio is an enhanced audio feature that provides a deep, controlled bass while maintaining a clear sound. NOTE: You can also open the Beats Audio Control Panel by selecting Start > Control Panel > Hardware and Sound > Beats Audio Control Panel .
(5)	Action keys	Execute frequently used system functions.
(6)	Windows applications key	Displays a shortcut menu for items beneath the pointer.

Item	Component	Description
(7)	num lock key	Controls the function of the integrated numeric keypad. Press the key to alternate between the standard numeric function of an external keypad (selected at the factory) and the navigational function (indicated by the directional arrows on the keys). NOTE: The keypad function that is active when the computer is turned off is reinstated when the computer is turned back on.
(8)	Integrated numeric keypad	Set at the factory to function like an external numeric keypad. To alternate between this numeric function and the navigational function (indicated by the directional arrows on the keys), press the num lock key.

TouchPad



Item	Component	Description
(1)	TouchPad on/off button	Turns the TouchPad on or off.
(2)	TouchPad light	<ul style="list-style-type: none"> On: The TouchPad is off. Off: The TouchPad is on.
(3)	TouchPad zone	Moves the on-screen 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.

Lights



Item	Component	Description
(1)	Power light	<ul style="list-style-type: none"> White: The computer is on. Blinking white: The computer is in the Sleep state, which is an energy-saving mode. The computer shuts off power to the display and other unneeded components. Off: The computer is off or in Hibernation. Hibernation is an energy-saving mode that uses the least amount of power. <p>NOTE: For select models, the Intel Rapid Start Technology feature is enabled at the factory. Rapid Start Technology allows your computer to resume quickly from inactivity.</p>
(2)	Mute light	<ul style="list-style-type: none"> Amber: Computer sound is off. Off: Computer sound is on.
(3)	Wireless light	<ul style="list-style-type: none"> White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth device, is on. Amber: All wireless devices are off.

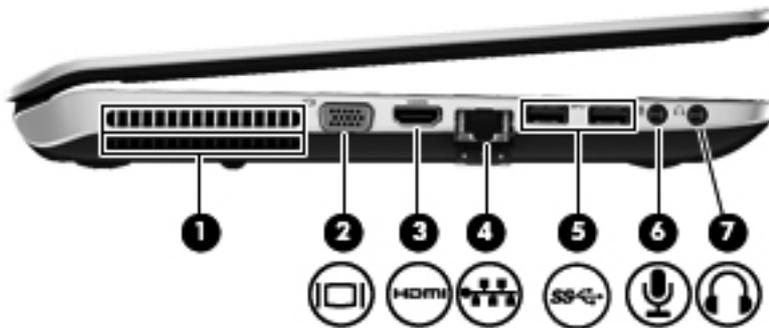
Item	Component	Description
(4)	Caps lock light	On: Caps lock is on, which switches the keys to all capital letters.
(5)	Fingerprint reader light	<ul style="list-style-type: none"> • White: The fingerprint was read. • Amber: The fingerprint was not read.

Front



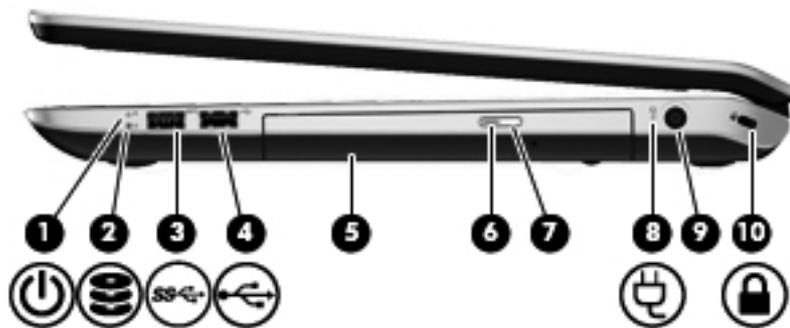
Component	Description
Digital Media slot	<p>Supports the following digital card formats:</p> <ul style="list-style-type: none"> • Secure Digital (SD) Memory Card • Secure Digital Extended Capacity (SDxC) Memory Card • Secure Digital High Capacity (SDHC) Memory Card • Ultra High Speed MultiMediaCard (UHS/MMC)

Left side



Item	Component	Description
(1)	Vent	Enables airflow to cool internal components. NOTE: 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.
(2)	External monitor port	Connects an external VGA monitor or projector.
(3)	HDMI port	Connects an optional video or audio device, such as a high-definition television, or any compatible digital or audio device.
(4)	RJ-45 (network) jack	Connects a network cable.
(5)	USB 3.0 ports (2)	Connect an optional USB 3.0 device and provide enhanced USB power performance.
(6)	Audio-in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.
(7)	Audio-out (headphone) jack	Connect optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. WARNING! To reduce the risk of personal injury, adjust the volume before using headphones, earbuds, or a headset. For additional safety information, see the Regulatory, Safety and Environmental Notices. NOTE: When a device is connected to a headphone jack, the computer speakers are disabled.

Right side



Item	Component	Description
(1)	Power light	<ul style="list-style-type: none"> White: The computer is on. Blinking white: The computer is in the Sleep state, which is an energy-saving mode. The computer shuts off power to the display and other unneeded components. Off: The computer is off or in Hibernation. Hibernation is an energy-saving mode that uses the least amount of power. <p>NOTE: For select models, the Intel Rapid Start Technology feature is enabled at the factory. Rapid Start Technology allows your computer to resume quickly from inactivity.</p>
(2)	Hard drive light	<ul style="list-style-type: none"> Blinking white: The hard drive is being accessed. Amber: HP 3D DriveGuard has temporarily parked the hard drive.
(3)	USB 3.0 port	Connects an optional USB 3.0 device and provides enhanced USB power performance.
(4)	USB 2.0 port	Connect optional USB devices.
(5)	Optical drive	Reads and writes (select models only) to an optical disc.
(6)	Optical drive light	<ul style="list-style-type: none"> Green: The optical drive is being accessed. Off: The optical drive is idle.
(7)	Optical drive eject button	Ejects the optical disc.
(8)	AC adapter light	<ul style="list-style-type: none"> White: The AC adapter is connected and the battery is charged. Amber: The AC adapter is connected and the battery is charging. Off: The computer is using DC power.

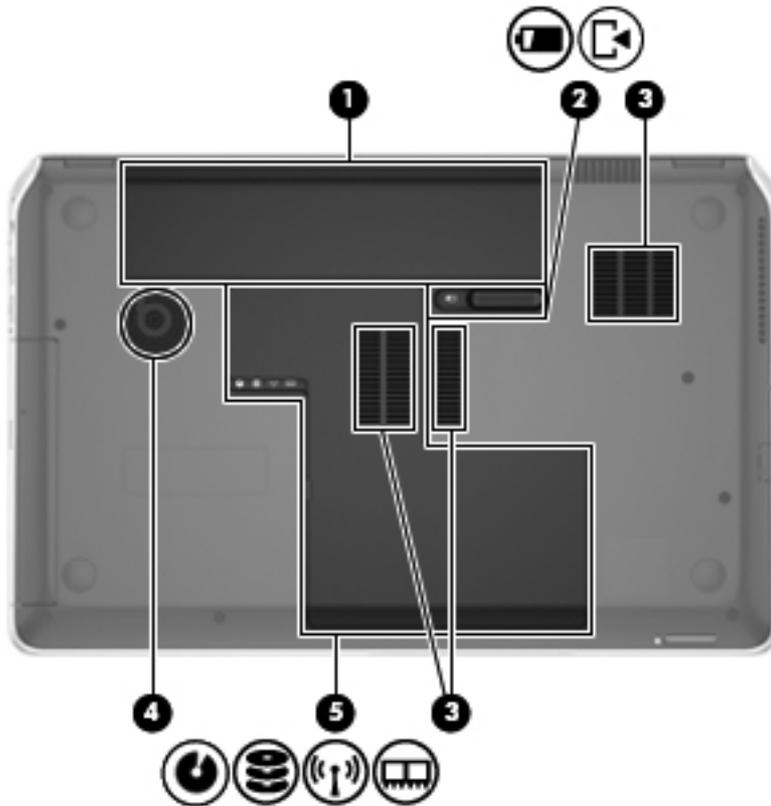
Item	Component	Description
(9)	Power connector	Connects an AC adapter.
(10)	Security cable slot	Attaches an optional security cable to the computer. NOTE: The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.

Rear



Component	Description
Vent	Enable airflow to cool internal components. NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.

Bottom

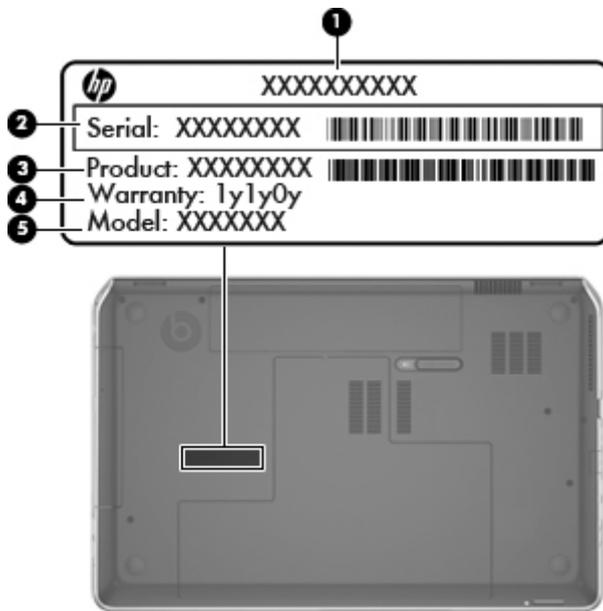


Item	Component	Description
(1)	Integrated subwoofer	Provides superior bass sound.
(2)	Battery bay	Holds the battery.
(3)	Battery release latch	Releases the service cover, and releases the battery from the battery bay.
(4)	Vents (3)	Enable airflow to cool internal components. NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(5)	Service cover	The service cover provides access to the hard drive bay, wireless module compartment, and memory module compartment. 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 computer functionality, and then contact customer support through Help and Support.

3 Illustrated parts catalog

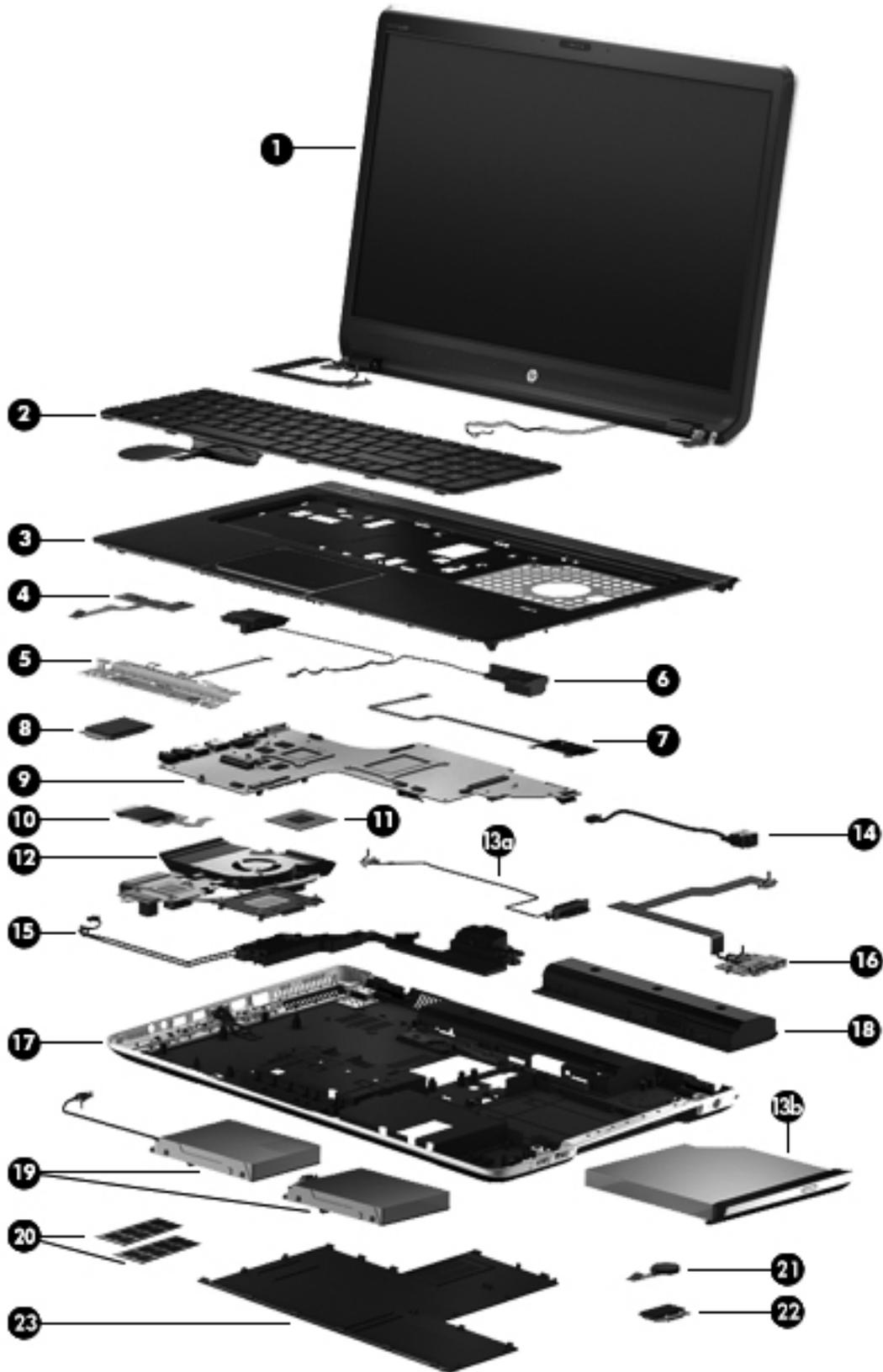
Service tag

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



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

Computer major components



Item	Component	Spare part number
(1)	17.3-in, LED display assembly (includes display panel cable, 2 WLAN antenna transceivers and cables, and webcamera/microphone module and cable)	
	For use on all computer models:	
	FHD, AntiGlare display assembly for use only on computer models equipped with a graphics subsystem with UMA memory	698778-001
	HD, BrightView display assembly for use only on computer models equipped with a graphics subsystem with UMA memory	698777-001
	For use only with computer models equipped with an Intel processor:	
	FHD, AntiGlare display assembly in midnight black finish for use only on computer models equipped with a graphics subsystem with discrete memory	698780-001
	HD, BrightView display assembly in midnight black finish for use only on computer models equipped with a graphics subsystem with discrete memory	698779-001
	FHD, AntiGlare display assembly in natural silver finish for use only on computer models equipped with a graphics subsystem with UMA memory	699338-001
	HD, BrightView display assembly in natural silver finish for use only on computer models equipped with a graphics subsystem with UMA memory	699337-001
	NOTE: For more display assembly spare part information, see Display assembly subcomponents on page 29 .	
(2)	Keyboard with backlight (includes backlight cable and keyboard cable):	
	In midnight black finish:	
	For use only on computer models equipped with an Intel processor in Belgium	698782-A41
	For use only on computer models equipped with an Intel processor in the Czech Republic and Slovakia	698782-FL1
	For use only on computer models equipped with an Intel processor in Denmark, Finland, and Norway	698782-DH1
	For use only on computer models equipped with an Intel processor in the Netherlands	698782-B31
	For use only on computer models equipped with an Intel processor in Portugal	698782-131
	For use only on computer models equipped with an Intel processor in Saudi Arabia	698782-171
	For use only on computer models equipped with an Intel processor in Switzerland	698782-BG1
	For use only on computer models equipped with an Intel processor in Turkey	698782-141
	For use on all computer models in the United States	698782-001
	In natural silver finish:	
	For use only on computer models equipped with an Intel processor in Canada	698783-DB1
	For use only on computer models equipped with an Intel processor in the United States	698782-001
	Keyboard without backlight in midnight black finish:	
	For use on all computer models in Canada	681980-DB1
	For use only on computer models equipped with an Intel processor in France	681980-051

Item	Component	Spare part number
	For use only on computer models equipped with an Intel processor in Germany	681980-041
	For use only on computer models equipped with an Intel processor in Italy	681980-061
	For use only on computer models equipped with an Intel processor in Japan	681980-291
	For use only on computer models equipped with an Intel processor in the Netherlands	681980-B31
	For use only on computer models equipped with an Intel processor in Russia	681980-251
	For use only on computer models equipped with an Intel processor in Slovenia	681980-BA1
	For use only on computer models equipped with an Intel processor in South Korea	681980-AD1
	For use only on computer models equipped with an Intel processor in Spain	681980-071
	For use only on computer models equipped with an Intel processor in Taiwan	681980-AB1
	For use only on computer models equipped with an Intel processor in Thailand	681980-281
	For use only on computer models equipped with an Intel processor in the United Kingdom	681980-031
	For use on all computer models in the United States	681980-001
(3)	Top cover (includes TouchPad and cable)	
	In midnight black finish	708009-001
	In natural silver finish	708012-001
(4)	Power button board (includes cable)	681985-001
(5)	TouchPad button board (includes cable and bracket)	681987-001
(6)	Front speakers (include speaker cables)	681995-001
(7)	Fingerprint reader board (includes bracket and cable)	681975-001
(8)	Solid-state drive:	
	180-GB solid-state drive for use on all computer models	699330-001
	160-GB solid-state drive for use on all computer models	681997-001
	32-GB mSATA solid-state drive for use only on computer models equipped with an Intel processor	682099-001
(9)	System board (includes replacement thermal material):	
	For use only on computer models equipped with an AMD processor	682220-501
	For use only on computer models equipped with an Intel quad core processor, the NVIDIA GeForceR 650M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Professional operating system	682040-601
	For use only on computer models equipped with an Intel quad core processor, the NVIDIA GeForceR 650M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Standard operating system	682040-501
	For use only on computer models equipped with an Intel 45-W processor, the NVIDIA GeForceR 635M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Professional operating system	711508-601

Item	Component	Spare part number
	For use only on computer models equipped with an Intel 45-W processor, the NVIDIA GeForce 635M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Standard operating system	711508-501
	For use only on computer models equipped with an Intel 35-W processor, the NVIDIA GeForce 635M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Professional operating system	711509-601
	For use only on computer models equipped with an Intel 35-W processor, the NVIDIA GeForce 635M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Standard operating system	711509-501
	For use only on computer models equipped with an Intel 35-W processor, the NVIDIA GeForce 635M graphics subsystem with 1-GB of discrete memory, and the Windows 8 Professional operating system	711507-601
	For use only on computer models equipped with an Intel 35-W processor, the NVIDIA GeForce 635M graphics subsystem with 1-GB of discrete memory, and the Windows 8 Standard operating system	711507-501
	For use only on computer models equipped with an Intel quad core processor, the NVIDIA GeForce 630M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Professional operating system	682016-601
	For use only on computer models equipped with an Intel quad core processor, the NVIDIA GeForce 630M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Standard operating system	682016-501
	For use only on computer models equipped with an Intel dual core processor, the NVIDIA GeForce 630M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Professional operating system	682037-601
	For use only on computer models equipped with an Intel dual core processor, the NVIDIA GeForce 630M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Standard operating system	682037-501
	For use only on computer models equipped with an Intel quad core processor, the NVIDIA GeForce 630M graphics subsystem with 1-GB of discrete memory, and the Windows 8 Professional operating system	681999-601
	For use only on computer models equipped with an Intel quad core processor, the NVIDIA GeForce 630M graphics subsystem with 1-GB of discrete memory, and the Windows 8 Standard operating system	681999-501
	For use only on computer models equipped with an Intel dual core processor, the NVIDIA GeForce 630M graphics subsystem with 1-GB of discrete memory, and the Windows 8 Professional operating system	682000-601
	For use only on computer models equipped with an Intel dual core processor, the NVIDIA GeForce 630M graphics subsystem with 1-GB of discrete memory, and the Windows 8 Standard operating system	682000-501
	For use only on computer models equipped with an Intel quad core processor, a graphics subsystem with UMA memory, and the Windows 8 Professional operating system	682042-601
	For use only on computer models equipped with an Intel quad core processor, a graphics subsystem with UMA memory, and the Windows 8 Standard operating system	682042-501

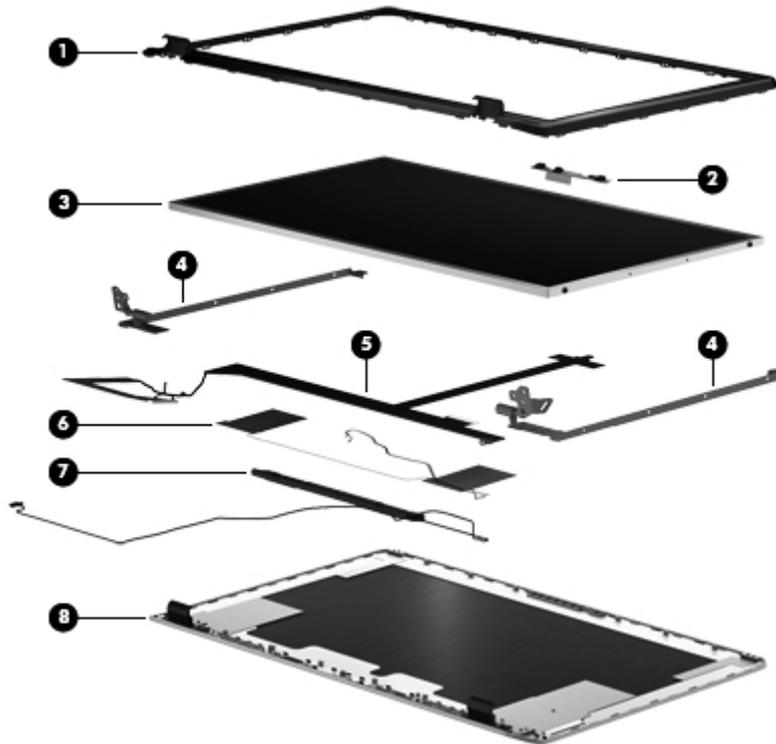
Item	Component	Spare part number
	For use only on computer models equipped with an Intel dual core processor, a graphics subsystem with UMA memory, and the Windows 8 Professional operating system	682043-601
	For use only on computer models equipped with an Intel dual core processor, a graphics subsystem with UMA memory, and the Windows 8 Standard operating system	682043-501
	Thermal Pad Kit for use only on computer models equipped with an Intel processor (not illustrated, includes replacement thermal pads)	682100-001
	NOTE: Computer models equipped with an AMD processor use only thermal paste and do not require replacement thermal pads.	
(10)	Card Reader board (includes cable)	681988-001
(11)	Processor (includes replacement thermal material):	
	AMD A10-4600M 3.20-GHz processor (1600-MHz FSB, 4.0-MB L2 cache, DDR3, quad core, 35 W)	683046-001
	AMD A8-4500M 2.80-GHz processor (1600-MHz FSB, 4.0-MB L2 cache, DDR3, quad core, 35 W)	683048-001
	AMD A6-4400M 3.20-GHz processor (1600-MHz FSB, 1.0-MB L2 cache, DDR3, dual core, 35 W)	683047-001
	AMD A4-4300M 2.50-GHz processor (1600-MHz FSB, 1.0-MB L2 cache, DDR3, dual core, 35 W)	685990-001
	Intel Quad Core i7-3840QM 2.80-GHz processor (SC turbo up to 3.80-GHz; 1600-MHz FSB, 8.0-MB L3 cache, 45 W)	703266-001
	Intel Quad Core i7-3820QM 2.70-GHz processor (SC turbo up to 3.70-GHz; 1600-MHz FSB, 8.0-MB L3 cache, 45 W)	681284-001
	Intel Quad Core i7-3740QM 2.70-GHz processor (SC turbo up to 3.70-GHz; 1600-MHz FSB, 6.0-MB L3 cache, 45 W)	702840-001
	Intel Quad Core i7-3720QM 2.60-GHz processor (SC turbo up to 3.60-GHz, 1600-MHz FSB, 6.0-MB L3 cache, 45 W)	681283-001
	Intel Quad Core i7-3632QM 2.20-GHz processor (SC turbo up to 3.20-GHz; 1600-MHz FSB, 6.0-MB L3 cache, 35 W)	701658-001
	Intel Quad Core i7-3630QM 2.40-GHz processor (SC turbo up to 3.40-GHz; 1600-MHz FSB, 6.0-MB L3 cache, 45 W)	702081-001
	Intel Quad Core i7-3612QM 2.10-GHz processor (SC turbo up to 3.10-GHz, 1600-MHz FSB, 6.0-MB L3 cache, 35 W)	680647-001
	Intel Quad Core i7-3610QM 2.30-GHz processor (SC turbo up to 3.10-GHz, 1600-MHz FSB, 6.0-MB L3 cache, 45 W)	680646-001
	Intel Quad Core i7-2670QM 2.20-GHz processor (SC turbo up to 3.10-GHz; 1333-MHz FSB, 6.0-MB L3 cache, 45 W)	665116-001
	Intel Dual Core i5-3320M 2.60-GHz processor (SC turbo up to 3.30-GHz; 1600-MHz FSB, 3.0-MB L3 cache, 35 W)	681952-001

Item	Component	Spare part number
	Intel Dual Core i5-3230M 2.60-GHz processor (SC turbo up to 3.20-GHz; 1600-MHz FSB, 3.0-MB L3 cache, 35 W)	711903-001
	Intel Dual Core i5-3210M 2.50-GHz processor (SC turbo up to 3.10-GHz, 1600-MHz FSB, 3.0-MB L3 cache, 35 W)	680645-001
	Intel Dual Core i5-2450M 2.50-GHz processor (SC turbo up to 3.10-GHz, 1333-MHz FSB, 3.0-MB L3 cache, 35 W)	676359-001
	Intel Dual Core i3-3130M 2.60-GHz processor (1333-MHz FSB, 3.0-MB L3 cache, 35 W)	713163-001
	Intel Dual Core i3-3120M 2.50-GHz processor (1333-MHz FSB, 3.0-MB L3 cache, 35 W)	700627-001
	Intel Dual Core i3-3110M 2.30-GHz processor (1333-MHz FSB, 3.0-MB L3 cache, 35 W)	682417-001
	Intel Dual Core i3-2370M 2.40-GHz processor (1333-MHz FSB, 3.0-MB L3 cache, 35 W)	677152-001
	Intel Core i3-2350M 2.30-GHz processor (1333-MHz FSB, 3.0-MB L3 cache, 35 W)	653340-001
	Intel Core i3-2330M 2.20-GHz processor (1333-MHz FSB, 3.0-MB L3 cache, 35 W)	653339-001
(12)	Fan/heat sink assembly (includes replacement thermal material):	
	For use only on computer models equipped with an AMD processor	682178-001
	For use only on computer models equipped with an Intel processor and a graphics subsystem with discrete memory	682061-001
	For use only on computer models equipped with an Intel processor and a graphics subsystem with UMA memory	682060-001
(13a)	Optical drive connector cable (included in the optical drive spare part kit)	
(13b)	Optical drive (includes bezel and bracket):	
	Blu-ray Disc ROM with SuperMulti DVD±R/RW Double-Layer Drive	681983-001
	Blu-ray Disc R/RW with SuperMulti Drive	681984-001
	DVD±RW Double-Layer with SuperMulti Drive	681982-001
(14)	Power connector cable (includes bracket):	
	For use only on computer models equipped with an AMD processor	681973-001
	For use only on computer models equipped with an Intel processor	681974-001
(15)	Subwoofer (includes subwoofer cable, top speaker passthru cable, and 2 rubber isolators)	681996-001
(16)	USB board (includes cable)	681986-001
(17)	Base enclosure (includes battery release latch assembly)	
	For use in all countries and regions except Japan	681968-001
	For use only on computer models equipped with an Intel processor in Japan	707999-291
(18)	Battery:	

Item	Component	Spare part number
	9-cell, 100-Wh, 3.0-Ah, Li-ion battery	672412-001
	6-cell, 62-Wh, 2.8-Ah, Li-ion battery	671731-001
(19)	Hard drives (2, do not include the primary or secondary hard drive connector cables, hard drive brackets, or screws):	
	For use on all computer models:	
	1-TB, 5400-rpm, 9.5-mm	676521-001
	750-GB, 7200-rpm, 9.5-mm	633252-001
	750-GB, 5400-rpm, 9.5-mm	634250-001
	640-GB, 5400-rpm, 9.5-mm	669300-001
	500-GB, 7200-rpm, 9.5-mm	634925-001
	500-GB, 5400-rpm, 9.5-mm	669299-001
	320-GB, 7200-rpm, 9.5-mm	641672-001
	320-GB, 5400-rpm, 9.5-mm	622643-001
	750-GB, 7200-rpm, 9.5-mm, for use only on computer models equipped with an Intel processor	684506-001
	Hard Drive Hardware Kit (not illustrated, includes hard drive bracket, primary hard drive connector cable, secondary hard drive connector cable, and screws)	681976-001
(20)	Memory modules (2, PC3, 12800, 1600-MHz):	
	8-GB memory module	670034-001
	4-GB memory module	641369-001
	2-GB memory module	652972-001
(21)	RTC battery (includes cable and double-sided tape)	682091-001
(22)	WLAN module:	
	For use on all computer models:	
	Atheros 9485GN 802.11b/g/n 1×1 WiFi and 3012 Bluetooth 4.0 Combo Adapter	655795-001
	Atheros WB225 802.11b/g/n 1×1 Bluetooth Combo Adapter	675794-001
	Broadcom 4313GN 802.11b/g/n 1×1 WiFi and 20702 Bluetooth 4.0 Combo Adapter	657325-001
	Intel Centrino Advanced-N 6230 WLAN module	670691-001
	Intel Centrino Advanced-N 6230 WLAN module 670691-001 Ralink RT5390R 802.11b/g/n 1×1 WiFi Adapter	691415-001
	Ralink RT3290LE 802.11b/g/n 1×1 WiFi and Bluetooth 4.0 Combo Adapter	690020-001
	Atheros AR9565 802.11b/g/n 1×1 WiFi + Bluetooth 4.0 Combo Adapter for use only on computer models equipped with an Intel processor	690019-001

Item	Component	Spare part number
	Intel Centrino Advanced-N 6235 WLAN module for use only on computer models equipped with an Intel processor in Japan	670290-001
(23)	Service cover (includes speaker grilles and front rubber feet)	681989-001

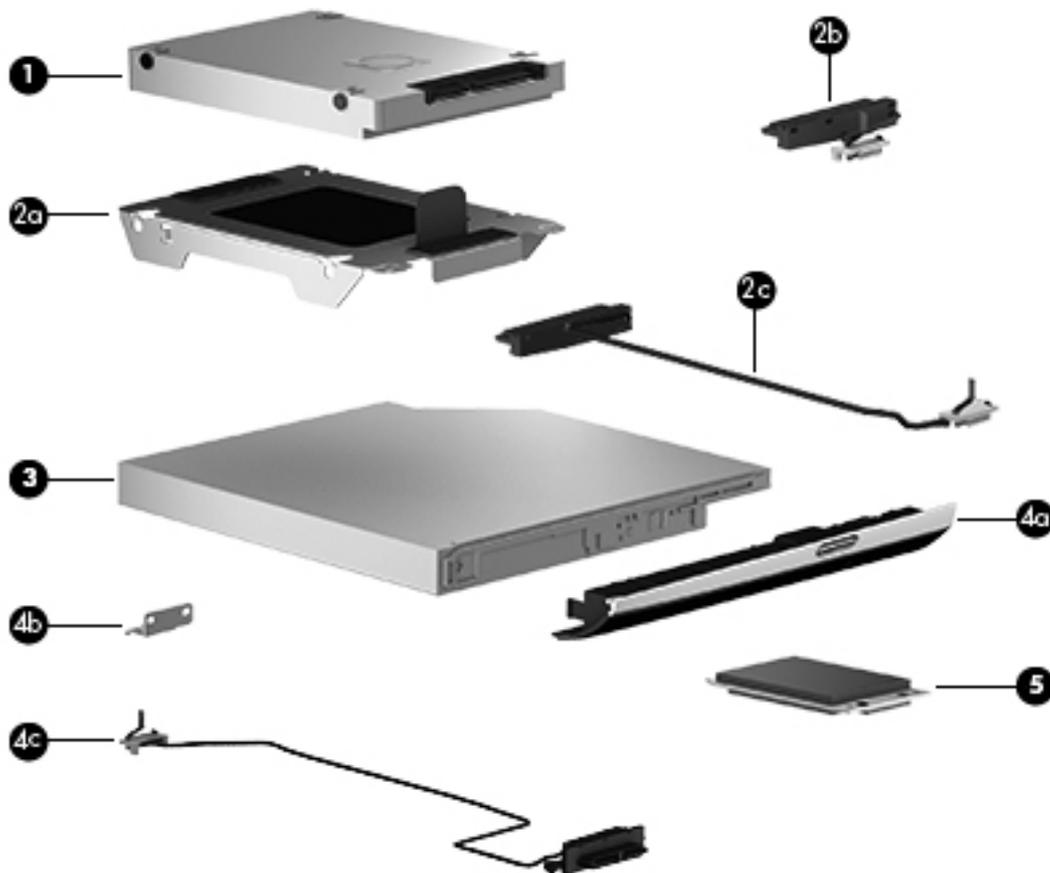
Display assembly subcomponents



Item	Component	Spare part number
(1)	Display bezel	698775-001
(2)	Webcamera/microphone module	682045-001
(3)	Display panel:	
	17.3-in, AntiGlare, FHD display panel	681991-001
	17.3-in, BrightView, HD display panel	681990-001
(4)	Display Hinge Kit (includes left and right hinges and brackets)	681977-001
(5)	Display panel cable:	
	Display panel cable for use only on computer models equipped with an Intel processor, an FHD display assembly, and a graphics subsystem with discrete memory	682226-001

Item	Component	Spare part number
	Display panel cable for use only on computer models equipped with an FHD display assembly and a graphics subsystem with UMA memory	681972-001
(6)	Antenna Kit (includes left and right wireless antenna cables and transceivers)	681968-001
(7)	Display speakers (include speaker cables)	681994-001
(8)	Display enclosure	
	In midnight black finish	681969-001
	In natural silver finish	693702-001
	Display Screw Kit	681993-001

Mass storage devices



Item	Component	Spare part number
(1)	Hard drive (does not include the hard drive bracket, primary or secondary hard drive connector cables, or screws)	
	For use on all computer models:	

Item	Component	Spare part number
	1-TB, 5400-rpm, 9.5-mm	676521-001
	750-GB, 7200-rpm, 9.5-mm	633252-001
	750-GB, 5400-rpm, 9.5-mm	634250-001
	640-GB, 5400-rpm, 9.5-mm	669300-001
	500-GB, 7200-rpm, 9.5-mm	634925-001
	500-GB, 5400-rpm, 9.5-mm	669299-001
	320-GB, 7200-rpm, 9.5-mm	641672-001
	320-GB, 5400-rpm, 9.5-mm	622643-001
	750-GB, 7200-rpm, 9.5-mm, for use only on computer models equipped with an Intel processor	684506-001
	Hard Drive Hardware Kit , includes:	681976-001
(2a)	Hard drive bracket	
(2b)	Primary hard drive connector cable	
(2c)	Secondary hard drive connector cable	
	Screws (not illustrated)	
(3)	Optical drive:	
	Blu-ray Disc ROM with SuperMulti DVD±R/RW Double-Layer Drive	681983-001
	Blu-ray Disc R/RW with SuperMulti Drive	681984-001
	DVD±RW Double-Layer with SuperMulti Drive	681982-001
	Includes:	
(4a)	Optical drive bezel	
(4b)	Optical drive bracket	
(4c)	Optical drive connector cable	
(5)	Solid-state drive	
	180-GB solid-state drive for use on all computer models	699330-001
	160-GB solid-state drive for use on all computer models	681997-001
	32-GB mSATA solid-state drive for use only on computer models equipped with an Intel processor	682099-001

Miscellaneous parts

Component	Spare part number
AC adapter:	
65-W HP Smart AC adapter for use on all computer models (non-PFC, 3-wire)	693711-001
120-W HP Slim AC adapter for use only on computer models equipped with an Intel processor (PFC, 3-wire)	693709-001
90-W HP Smart AC adapter for use only on computer models equipped with an Intel processor (PFC, 3-wire)	693712-001
90-W HP Smart AC adapter for use only on computer models equipped with an Intel processor (PFC, EM, 3-wire)	693713-001
65-W HP Smart AC adapter for use only on computer models equipped with an Intel processor (RC/V, EM, 3-wire)	693710-001
Power cord (3-pin, black, 1.83-m):	
For use on all computer models in North America	490371-001
For use only on computer models equipped with an Intel processor:	
For use in Australia	490371-011
For use in Denmark	490371-081
For use in Europe	490371-021
For use in India	490371-D61
For use in Israel	490371-BB1
For use in Japan	490371-291
For use in South Africa	490371-AR1
For use in South Korea	490371-AD1
For use in Switzerland	490371-111
For use in Taiwan	490371-AB1
For use in Thailand	490371-201
For use in the United Kingdom and Singapore	490371-031
Screw Kit	681992-001

Sequential part number listing

Spare part number	Description
490371-001	Power cord for use on all computer models in North America (3-pin, black, 1.83-m)
490371-011	Power cord for use only on computer models equipped with an Intel processor in Australia (3-pin, black, 1.83-m)
490371-021	Power cord for use only on computer models equipped with an Intel processor in Europe (3-pin, black, 1.83-m)
490371-031	Power cord for use only on computer models equipped with an Intel processor in the United Kingdom and Singapore (3-pin, black, 1.83-m)
490371-081	Power cord for use only on computer models equipped with an Intel processor in Denmark (3-pin, black, 1.83-m)
490371-111	Power cord for use only on computer models equipped with an Intel processor in Switzerland (3-pin, black, 1.83-m)
490371-201	Power cord for use only on computer models equipped with an Intel processor in Thailand (3-pin, black, 1.83-m)
490371-291	Power cord for use only on computer models equipped with an Intel processor in Japan (3-pin, black, 1.83-m)
490371-AB1	Power cord for use only on computer models equipped with an Intel processor in Taiwan (3-pin, black, 1.83-m)
490371-AD1	Power cord for use only on computer models equipped with an Intel processor in South Korea (3-pin, black, 1.83-m)
490371-AR1	Power cord for use only on computer models equipped with an Intel processor in South Africa (3-pin, black, 1.83-m)
490371-BB1	Power cord for use only on computer models equipped with an Intel processor in Israel (3-pin, black, 1.83-m)
490371-D61	Power cord for use only on computer models equipped with an Intel processor in India (3-pin, black, 1.83-m)
622643-001	320-GB, 5400-rpm hard hard for use only on computer models equipped with an Intel processor (SATA, 9.5-mm, does not include hard drive connector cable, hard drive bracket, or screws) NOTE: The primary and secondary hard drive connector cable, hard drive bracket, and screws are included in the Hard Drive Hardware Kit, spare part number 681976-001.
633252-001	750-GB, 7200-rpm hard hard for use on all computer models (SATA, 9.5-mm, does not include hard drive connector cable, hard drive bracket, or screws) NOTE: The primary and secondary hard drive connector cable, hard drive bracket, and screws are included in the Hard Drive Hardware Kit, spare part number 681976-001.
634250-001	750-GB, 5400-rpm hard hard for use on all computer models (SATA, 9.5-mm, does not include hard drive connector cable, hard drive bracket, or screws) NOTE: The primary and secondary hard drive connector cable, hard drive bracket, and screws are included in the Hard Drive Hardware Kit, spare part number 681976-001.

Spare part number	Description
634925-001	500-GB, 7200-rpm hard hard for use on all computer models (SATA, 9.5-mm, does not include hard drive connector cable, hard drive bracket, or screws) NOTE: The primary and secondary hard drive connector cable, hard drive bracket, and screws are included in the Hard Drive Hardware Kit, spare part number 681976-001.
641369-001	4-GB memory module (PC3, 12800, 1600-MHz)
641672-001	320-GB, 7200-rpm hard hard for use on all computer models (SATA, 9.5-mm, does not include hard drive connector cable, hard drive bracket, or screws) NOTE: The primary and secondary hard drive connector cable, hard drive bracket, and screws are included in the Hard Drive Hardware Kit, spare part number 681976-001.
652972-001	2-GB memory module (PC3, 12800, 1600-MHz)
653339-001	Intel Core i3-2330M 2.20-GHz processor (3.0-MB L3 cache, 35 W; includes replacement thermal material)
653340-001	Intel Core i3-2350M 2.30-GHz processor (3.0-MB L3 cache, 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 on all computer models
657325-001	Broadcom 4313GN 802.11b/g/n 1×1 WiFi and 20702 Bluetooth 4.0 Combo Adapter for use on all computer models
665116-001	Intel Core i7-2670QM 2.20-GHz processor (6.0-MB L3 cache, 45 W; includes replacement thermal material)
669299-001	500-GB, 5400-rpm hard hard for use on all computer models (SATA, 9.5-mm, does not include hard drive connector cable, hard drive bracket, or screws) NOTE: The primary and secondary hard drive connector cable, hard drive bracket, and screws are included in the Hard Drive Hardware Kit, spare part number 681976-001.
669300-001	640-GB, 5400-rpm hard hard for use on all computer models (SATA, 9.5-mm, does not include hard drive connector cable, hard drive bracket, or screws) NOTE: The primary and secondary hard drive connector cable, hard drive bracket, and screws are included in the Hard Drive Hardware Kit, spare part number 681976-001.
670034-001	8-GB memory module (PC3, 12800, 1600-MHz)
670290-001	Intel Centrino Advanced-N 6235 WLAN module for use only on computer models equipped with an Intel processor in Japan
670691-001	Intel Centrino Advanced-N 6230 WLAN module for use on all computer models
671731-001	6-cell, 62-Wh, 2.8-Ah, Li-ion battery
672412-001	9-cell, 100-Wh, 3.0-Ah, Li-ion battery
675794-001	Atheros WB225 802.11b/g/n 1×1 Bluetooth Combo Adapter for use on all computer models
676359-001	Intel Core i5-2450M 2.50-GHz processor (3.0-MB L3 cache, 35 W; includes replacement thermal material)

Spare part number	Description
676521-001	1-TB, 5400-rpm hard hard for use on all computer models (SATA, 12.7-mm, does not include hard drive connector cable, hard drive bracket, or screws) NOTE: The primary and secondary hard drive connector cable, hard drive bracket, and screws are included in the Hard Drive Hardware Kit, spare part number 681976-001.
677152-001	Intel Core i3-2370M 2.40-GHz processor (3.0-MB L3 cache, 35 W; includes replacement thermal material)
680645-001	Intel Core i5-3210M 2.50-GHz processor (3.0-MB L3 cache, 35 W; includes replacement thermal material)
680646-001	Intel Core i7-3610QM 2.30-GHz processor (6.0-MB L3 cache, 45 W; includes replacement thermal material)
680647-001	Intel Core i7-3612QM 2.10-GHz processor (6.0-MB L3 cache, 35 W; includes replacement thermal material)
681283-001	Intel Core i7-3720QM 2.60-GHz processor (6.0-MB L3 cache, 45 W; includes replacement thermal material)
681284-001	Intel Core i7-3820QM 2.70-GHz processor (8.0-MB L3 cache, 45 W; includes replacement thermal material)
681952-001	Intel Core i5-3320M 2.60-GHz processor (3.0-MB L3 cache, 35 W; includes replacement thermal material)
681968-001	Wireless Antenna Kit (includes left and right wireless antenna transceivers and cables)
681969-001	Display enclosure
681972-001	Display panel cable for use only on computer models equipped with an FHD display assembly and a graphics subsystem with UMA memory
681973-001	Power connector cable for use only with computer models equipped with an AMD processor
681974-001	Power connector cable for use only with computer models equipped with an Intel processor
681975-001	Fingerprint reader board (includes bracket and cable)
681976-001	Hard Drive Hardware Kit (includes hard drive bracket, primary hard drive connector cable, secondary hard drive connector cable, and screws)
681977-001	Display Hinge Kit (includes left and right display hinges and brackets)
681982-001	DVD±RW Double-Layer with SuperMulti Drive
681983-001	Blu-ray Disc ROM with SuperMulti DVD±R/RW Double-Layer Drive
681984-001	Blu-ray Disc R/RW with SuperMulti Drive
681985-001	Power button board (includes cable)
681986-001	USB board (includes cable)
681987-001	TouchPad button board (includes bracket and cable)
681988-001	Card Reader board (includes cable)
681989-001	Service cover
681990-001	17.3-in, LED, HD, BrightView display panel

Spare part number	Description
681991-001	17.3-in, LED, FHD, AntiGlare display panel
681992-001	Screw Kit
681993-001	Display Screw Kit (includes display bezel screw covers)
681994-001	Display speakers
681995-001	Front speakers
681996-001	Subwoofer
681997-001	160-GB solid-state drive for use on all computer models
681999-501	System board for use only on computer models equipped with an Intel quad core processor, the NVIDIA GeForce 630M graphics subsystem with 1-GB of discrete memory, and the Windows 8 Standard operating system (includes replacement thermal material)
681999-601	System board for use only on computer models equipped with an Intel quad core processor, the NVIDIA GeForce 630M graphics subsystem with 1-GB of discrete memory, and the Windows 8 Professional operating system (includes replacement thermal material)
682000-501	System board for use only on computer models equipped with an Intel dual core processor, the NVIDIA GeForce 630M graphics subsystem with 1-GB of discrete memory, and the Windows 8 Standard operating system (includes replacement thermal material)
682000-601	System board for use only on computer models equipped with an Intel dual core processor, the NVIDIA GeForce 630M graphics subsystem with 1-GB of discrete memory, and the Windows 8 Professional operating system (includes replacement thermal material)
682016-501	System board for use only on computer models equipped with an Intel quad core processor, the NVIDIA GeForce 630M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Standard operating system (includes replacement thermal material)
682016-601	System board for use only on computer models equipped with an Intel quad core processor, the NVIDIA GeForce 630M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Professional operating system (includes replacement thermal material)
682037-501	System board for use only on computer models equipped with an Intel dual core processor, the NVIDIA GeForce 630M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Standard operating system (includes replacement thermal material)
682037-601	System board for use only on computer models equipped with an Intel dual core processor, the NVIDIA GeForce 630M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Professional operating system (includes replacement thermal material)
682040-501	System board for use only on computer models equipped with an Intel quad core processor, the NVIDIA GeForce 650M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Standard operating system (includes replacement thermal material)
682040-601	System board for use only on computer models equipped with an Intel quad core processor, the NVIDIA GeForce 650M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Professional operating system (includes replacement thermal material)
682042-501	System board for use only on computer models equipped with an Intel quad core processor, a graphics subsystem with UMA memory, and the Windows 8 Standard operating system (includes replacement thermal material)
682042-601	System board for use only on computer models equipped with an Intel quad core processor, a graphics subsystem with UMA memory, and the Windows 8 Professional operating system (includes replacement thermal material)

Spare part number	Description
682043-501	System board for use only on computer models equipped with an Intel dual core processor, a graphics subsystem with UMA memory, and the Windows 8 Standard operating system (includes replacement thermal material)
682043-601	System board for use only on computer models equipped with an Intel dual core processor, a graphics subsystem with UMA memory, and the Windows 8 Professional operating system (includes replacement thermal material)
682045-001	Webcamera/microphone module (includes double-sided mounting tape)
682060-001	Fan/heat sink assembly for use only on computer models equipped with an Intel processor and a graphics subsystem with UMA memory (includes replacement thermal material)
682061-001	Fan/heat sink assembly for use only on computer models equipped with an Intel processor and a graphics subsystem with discrete memory (includes replacement thermal material)
682091-001	RTC battery (includes cable and double-sided tape)
682099-001	32-GB mSATA solid-state drive for use only on computer models equipped with an Intel processor
682100-001	Thermal Pad Kit (for use only on computer models equipped with an Intel processor, includes replacement thermal pads)
	NOTE: Computer models equipped with an AMD processor use only thermal paste and do not require replacement thermal pads.
682178-001	Fan/heat sink assembly for use only on computer models equipped with an AMD processor and a graphics subsystem with UMA memory (includes replacement thermal material)
682220-501	System board for use only on computer models equipped with an AMD processor (includes replacement thermal material)
682226-001	Display panel cable for use only on computer models equipped with an Intel processor and an FHD display assembly
682417-001	Intel Core i3-3110M 2.30-GHz processor (3.0-MB L3 cache, 35 W; includes replacement thermal material)
683046-001	AMD quad core A10-4600M 3.2-GHz/2.3-GHz processor (4.0-MB L2 cache, 1600-MHz DDR3, 35 W; includes replacement thermal material)
683047-001	AMD quad core A6-4400M 3.2-GHz/2.7-GHz processor (1.0-MB L2 cache, 1600-MHz DDR3, 35 W; includes replacement thermal material)
683048-001	AMD quad core A8-4500M 2.8-GHz/1.9-GHz processor (4.0-MB L2 cache, 1600-MHz DDR3, 35 W; includes replacement thermal material)
684506-001	750-GB, 7200-rpm hard hard for use only computer models equipped with an Intel processor (SATA, 9.5-mm, does not include hard drive connector cable, hard drive bracket, or screws)
	NOTE: The primary and secondary hard drive connector cable, hard drive bracket, and screws are included in the Hard Drive Hardware Kit, spare part number 681976-001.
685990-001	AMD A4-4300M 2.50-GHz processor (1600-MHz FSB, 1.0-MB L2 cache, DDR3, dual core, 35 W; includes replacement thermal material)
690019-001	Atheros AR9565 802.11b/g/n 1x1 WiFi + Bluetooth 4.0 Combo Adapter for use only on computer models equipped with an Intel processor
690020-001	Ralink RT3290LE 802.11b/g/n 1x1 WiFi and Bluetooth 4.0 Combo Adapter for use on all computer models

Spare part number	Description
691415-001	Ralink RT5390R 802.11b/g/n 1x1 WiFi Adapter for use on all computer models
693702-001	Display enclosure
693709-001	120-W HP Slim AC adapter for use only on computer models equipped with an Intel processor (PFC, 3-wire)
693710-001	65-W HP Smart AC adapter for use only on computer models equipped with an Intel processor (RC/V, EM, 3-wire)
693711-001	65-W HP Smart AC adapter for use on all computer models (non-PFC, 3-wire)
693712-001	90-W HP Smart AC adapter for use only on computer models equipped with an Intel processor (PFC, 3-wire)
693713-001	90-W HP Smart AC adapter for use only on computer models equipped with an Intel processor (PFC, EM, 3-wire)
698775-001	Display bezel
698777-001	17.3-in, LED, HD, BrightView display assembly for use on all computer models (includes display panel cable, 2 WLAN antenna transceivers and cables, and webcam/microphone module and cable)
698778-001	17.3-in, LED, FHD, AntiGlare display assembly for use on all computer models (includes display panel cable, 2 WLAN antenna transceivers and cables, and webcam/microphone module and cable)
698779-001	17.3-in, LED, HD, BrightView display assembly in midnight black finish for use only on computer models equipped with an Intel processor and a graphics subsystem with discrete memory (includes display panel cable, 2 WLAN antenna transceivers and cables, and webcam/microphone module and cable)
698780-001	17.3-in, LED, FHD, AntiGlare display assembly in midnight black finish for use only on computer models equipped with an Intel processor and a graphics subsystem with discrete memory (includes display panel cable, 2 WLAN antenna transceivers and cables, and webcam/microphone module and cable)
698781-001	Keyboard without backlight in midnight black finish for use on all computer models in the United States (includes keyboard cable)
698781-031	Keyboard without backlight for use only on computer models equipped with an Intel processor in the United Kingdom (includes keyboard cable)
698781-041	Keyboard without backlight for use only on computer models equipped with an Intel processor in Germany (includes keyboard cable)
698781-051	Keyboard without backlight for use only on computer models equipped with an Intel processor in France (includes keyboard cable)
698781-061	Keyboard without backlight for use only on computer models equipped with an Intel processor in Italy (includes keyboard cable)
698781-071	Keyboard without backlight for use only on computer models equipped with an Intel processor in Spain (includes keyboard cable)
698781-251	Keyboard without backlight for use only on computer models equipped with an Intel processor in Russia (includes keyboard cable)
698781-281	Keyboard without backlight for use only on computer models equipped with an Intel processor in Thailand (includes keyboard cable)

Spare part number	Description
698781-291	Keyboard without backlight for use only on computer models equipped with an Intel processor in Japan (includes keyboard cable)
698781-AB1	Keyboard without backlight for use only on computer models equipped with an Intel processor in Taiwan (includes keyboard cable)
698781-AD1	Keyboard without backlight for use only on computer models equipped with an Intel processor in South Korea (includes keyboard cable)
698781-B31	Keyboard without backlight for use only on computer models equipped with an Intel processor in the Netherlands (includes keyboard cable)
698781-BA1	Keyboard without backlight for use only on computer models equipped with an Intel processor in Slovenia (includes keyboard cable)
698781-DB1	Keyboard without backlight for use on all computer models in Canada (includes keyboard cable)
698782-001	Keyboard with backlight in midnight black finish for use on all computer models in the United States (includes keyboard cable and keyboard backlight cable)
698782-131	Keyboard with backlight in midnight black for use only on computer models equipped with an Intel processor in Portugal (includes keyboard cable and keyboard backlight cable)
698782-141	Keyboard with backlight in midnight black for use only on computer models equipped with an Intel processor in Turkey (includes keyboard cable and keyboard backlight cable)
698782-171	Keyboard with backlight in midnight black for use only on computer models equipped with an Intel processor in Saudi Arabia (includes keyboard cable and keyboard backlight cable)
698782-A41	Keyboard with backlight in midnight black for use only on computer models equipped with an Intel processor in Belgium (includes keyboard cable and keyboard backlight cable)
698782-B31	Keyboard with backlight in midnight black for use only on computer models equipped with an Intel processor in the Netherlands (includes keyboard cable and keyboard backlight cable)
698782-BG1	Keyboard with backlight in midnight black for use only on computer models equipped with an Intel processor in Switzerland (includes keyboard cable and keyboard backlight cable)
698782-DH1	Keyboard with backlight in midnight black for use only on computer models equipped with an Intel processor in Denmark, Finland, and Norway (includes keyboard cable and keyboard backlight cable)
698782-FL1	Keyboard with backlight in midnight black for use only on computer models equipped with an Intel processor in the Czech Republic and Slovakia (includes keyboard cable and keyboard backlight cable)
698783-001	Keyboard with backlight in midnight black and natural silver finish for use only on computer models equipped with an Intel processor in the United States (includes keyboard cable and keyboard backlight cable)
698783-DB1	Keyboard with backlight in midnight black and natural silver finish for use only on computer models equipped with an Intel processor in Canada (includes keyboard cable and keyboard backlight cable)
699330-001	180-GB solid-state drive for use on all computer models
699337-001	17.3-in, LED, HD, BrightView display assembly in natural silver finish for use only on computer models equipped with an Intel processor and a graphics subsystem with UMA memory (includes display panel cable, 2 WLAN antenna transceivers and cables, and webcam/microphone module and cable)

Spare part number	Description
699338-001	17.3-in, LED, FHD, AntiGlare display assembly in natural silver finish for use only on computer models equipped with an Intel processor and a graphics subsystem with UMA memory (includes display panel cable, 2 WLAN antenna transceivers and cables, and webcam/microphone module and cable)
700627-001	Intel Dual Core i3-3120M 2.50-GHz processor (1333-MHz FSB, 3.0-MB L3 cache, 35 W; includes replacement thermal material)
701658-001	Intel Quad Core i7-3632QM 2.20-GHz processor (SC turbo up to 3.20-GHz; 1600-MHz FSB, 6.0-MB L3 cache, 35 W; includes replacement thermal material)
702081-001	Intel Quad Core i7-3630QM 2.40-GHz processor (SC turbo up to 3.40-GHz; 1600-MHz FSB, 6.0-MB L3 cache, 45 W; includes replacement thermal material)
702840-001	Intel Quad Core i7-3740QM 2.70-GHz processor (SC turbo up to 3.70-GHz; 1600-MHz FSB, 6.0-MB L3 cache, 45 W; includes replacement thermal material)
703266-001	Intel Quad Core i7-3840QM 2.80-GHz processor (SC turbo up to 3.80-GHz; 1600-MHz FSB, 8.0-MB L3 cache, 45 W; includes replacement thermal material)
707999-001	Base enclosure for use on computer models in all countries and regions except Japan
707999-291	Base enclosure for use only on computer models equipped with an Intel processor in Japan
708009-001	Top cover in midnight black finish (includes TouchPad)
708012-001	Top cover in natural silver finish (includes TouchPad)
711507-501	System board for use only on computer models equipped with an Intel 35-W processor, the NVIDIA GeForce 635M graphics subsystem with 1-GB of discrete memory, and the Windows 8 Standard operating system (includes replacement thermal material)
711507-601	System board for use only on computer models equipped with an Intel 35-W processor, the NVIDIA GeForce 635M graphics subsystem with 1-GB of discrete memory, and the Windows 8 Professional operating system (includes replacement thermal material)
711508-501	System board for use only on computer models equipped with an Intel 45-W processor, the NVIDIA GeForce 635M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Standard operating system (includes replacement thermal material)
711508-601	System board for use only on computer models equipped with an Intel 45-W processor, the NVIDIA GeForce 635M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Professional operating system (includes replacement thermal material)
711509-501	System board for use only on computer models equipped with an Intel 35-W processor, the NVIDIA GeForce 635M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Standard operating system (includes replacement thermal material)
711509-601	System board for use only on computer models equipped with an Intel 35-W processor, the NVIDIA GeForce 635M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Professional operating system (includes replacement thermal material)
711903-001	Intel Dual Core i5-3230M 2.60-GHz processor (SC turbo up to 3.20-GHz; 1600-MHz FSB, 3.0-MB L3 cache, 35 W; includes replacement thermal material)
713163-001	Intel Dual Core i3-3130M 2.60-GHz processor (1333-MHz FSB, 3.0-MB L3 cache, 35 W; includes replacement thermal material)

4 Removal and replacement procedures

Preliminary replacement requirements

Tools required

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

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

Service considerations

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

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

Plastic parts

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

Cables and connectors

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

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

Drive handling

⚠ 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."

Grounding guidelines

Electrostatic discharge damage

Electronic components are sensitive to electrostatic discharge (ESD). Circuitry design and structure determine the degree of sensitivity. Networks built into many integrated circuits provide some protection, but in many cases, ESD contains enough power to alter device parameters or melt silicon junctions.

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

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

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

Keep components in their electrostatic-safe containers until you are ready to install them.

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

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

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

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

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

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

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

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

Workstation guidelines

Follow these grounding workstation guidelines:

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

Equipment guidelines

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

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

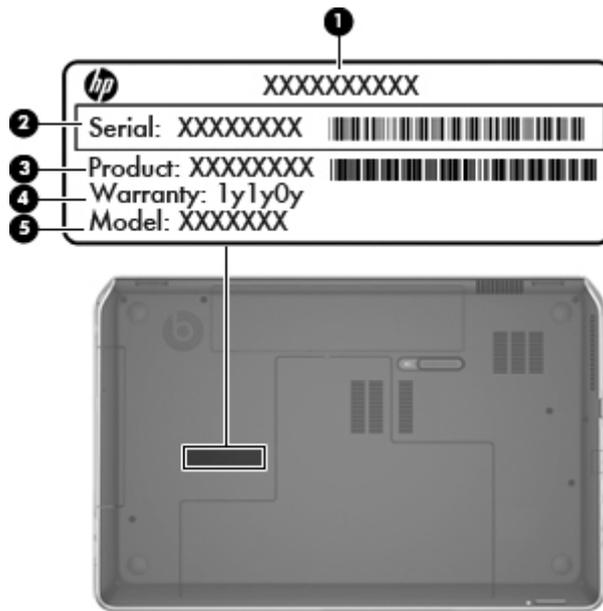
Component replacement procedures

This chapter provides removal and replacement procedures.

There are as many as 76 screws that must be removed, replaced, and/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. It is necessary to remove the battery to obtain these numbers. See [Battery on page 47](#) for battery removal instructions.



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

Battery

Description	Spare part number
9-cell, 100-Wh, 3.0-Ah, Li-ion battery	672412-001
6-cell, 62-Wh, 2.8-Ah, Li-ion battery	671731-001

Before disassembling the computer, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.

Remove the battery:

1. Turn the computer upside down on a flat surface.
2. Slide the battery release latch **(1)** to release the battery.
3. Pivot the front edge of the battery **(2)** up and back.
4. 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.)

Hard drive



NOTE: The hard drive spare part kit does not include the hard drive connector cable, hard drive bracket, or screws. These components are included in the Hard Drive Hardware Kit, spare part number 681976-001.

Description	Spare part number
For use on all computer models:	
1-TB, 5400-rpm, 9.5-mm	676521-001
750-GB, 7200-rpm, 9.5-mm	633252-001
750-GB, 5400-rpm, 9.5-mm	634250-001
640-GB, 5400-rpm, 9.5-mm	669300-001
500-GB, 7200-rpm, 9.5-mm	634925-001
500-GB, 5400-rpm, 9.5-mm	669299-001
320-GB, 7200-rpm, 9.5-mm	641672-001
320-GB, 5400-rpm, 9.5-mm	622643-001
750-GB, 7200-rpm, 9.5-mm For use only on computer models equipped with an Intel processor:	684506-001

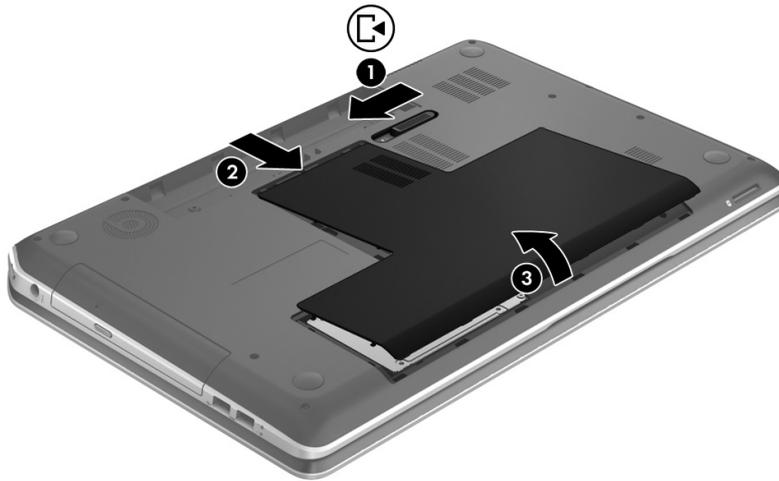
Before removing the hard drive, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 47](#)).

Remove the hard drive:

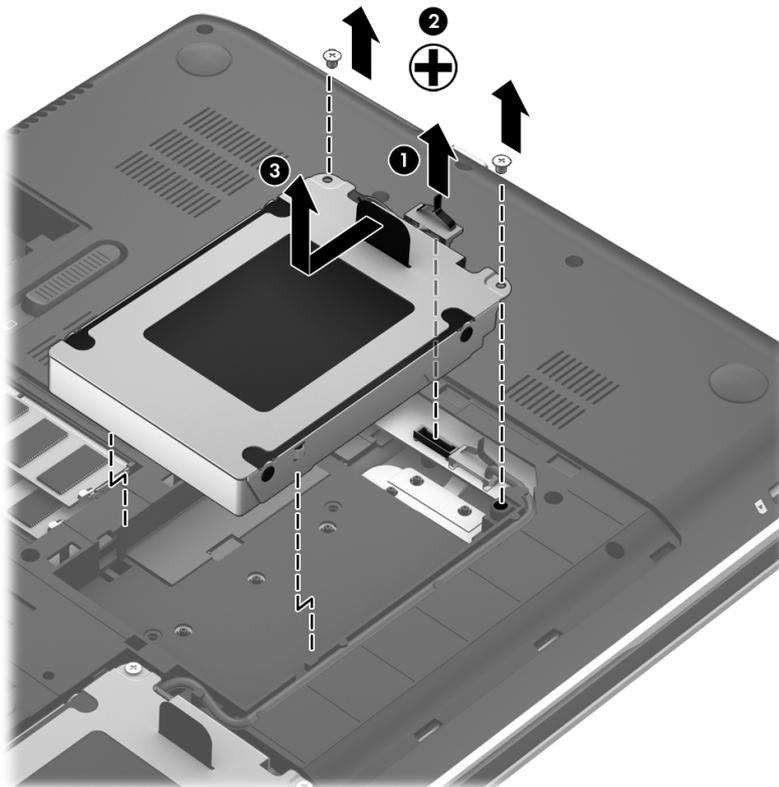
1. Slide the battery release latch **(1)** to release the service cover.
2. Slide the service cover **(2)** toward the front of the computer.

3. Remove the service cover **(3)**. The service cover is available using spare part number 682088-001.



4. Disconnect the primary hard drive connector cable **(1)** from the system board.
5. Remove the two Phillips PM2.5x5.5 screws **(2)** that secure the primary hard drive to the computer.
6. Use the tab to slide the primary hard drive **(3)** to the left, and then remove the primary hard drive.

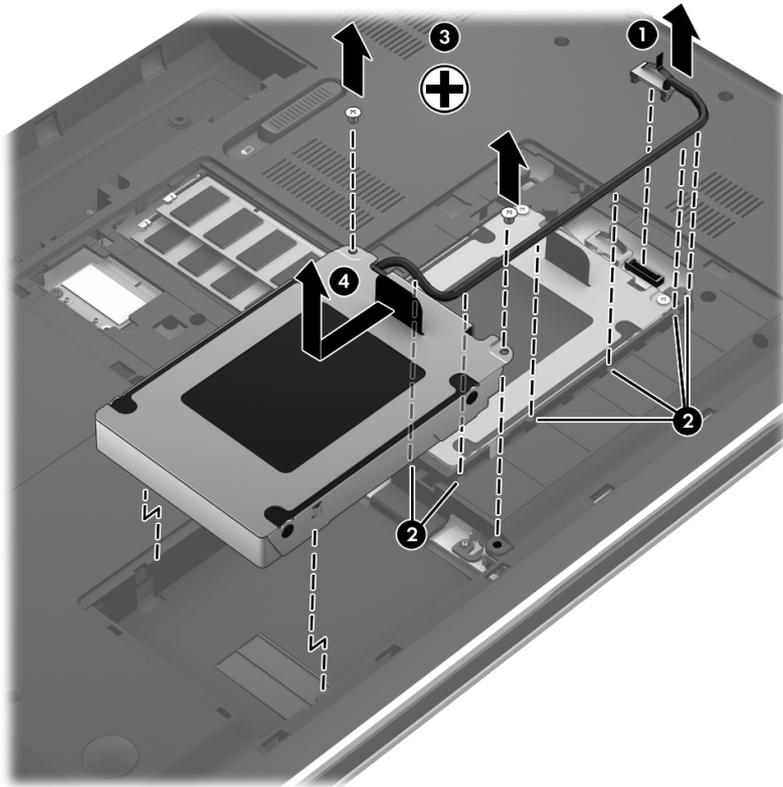
 **NOTE:** The following image shows the removal of the primary hard drive.



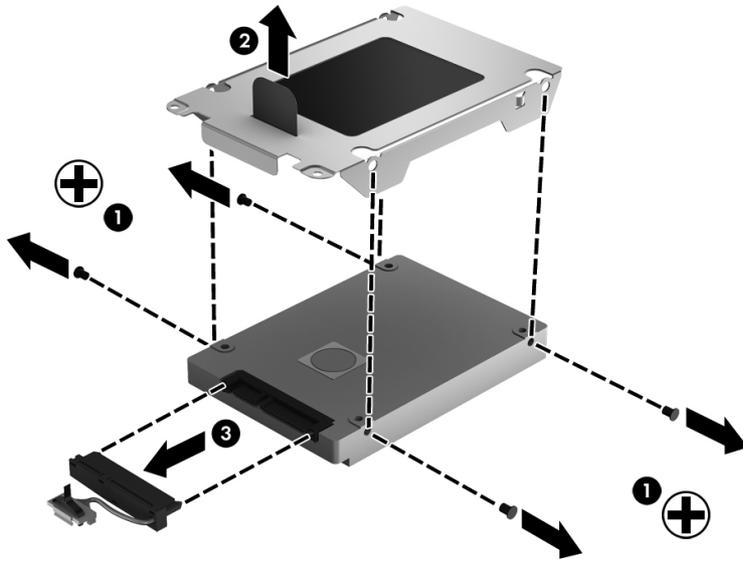
7. Disconnect the secondary hard drive connector cable **(1)** from the system board.

8. Release the secondary hard drive connector cable from the clips **(2)** and routing channel built into the base enclosure.
9. Remove the two Phillips PM2.5×8.5 screws **(3)** that secure the secondary hard drive to the computer.
10. Use the tab to slide the secondary hard drive **(4)** to the left, and then remove the secondary hard drive.

 **NOTE:** The following image shows the removal of the secondary hard drive.



- 11.** If it is necessary to replace the hard drive screws **(1)**, hard drive bracket **(2)**, or hard drive connector cable **(3)**, remove and replace the components. The hard drive screws, hard drive bracket, primary hard drive connector cable, and secondary hard drive connector cable are available in the Hard Drive Hardware Kit, spare part number 681976-001.



Reverse this procedure to reassemble and install the hard drive.

RTC battery

Description	Spare part number
RTC battery (includes cable and double-sided tape)	682091-001

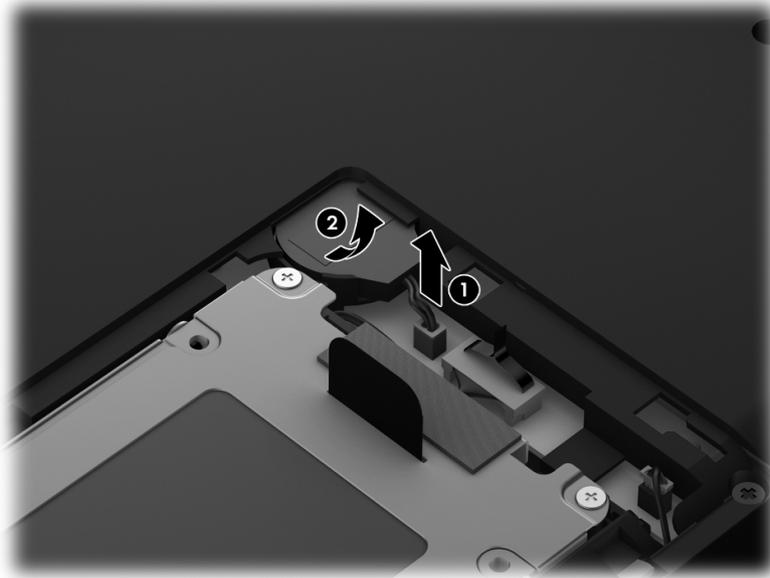
Before removing the RTC battery, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 47](#)).
5. Remove the service cover (see [Hard drive on page 48](#)).

Remove the RTC battery:

1. Disconnect the RTC battery cable **(1)** from the system board.
2. Release the RTC battery **(2)** from the cavity in the base enclosure.

 **NOTE:** The RTC battery is attached to the base enclosure with double-sided tape. Firm pressure may be required to release the RTC battery from the base enclosure.



3. Remove the RTC battery.

Reverse this procedure to install the RTC battery.

Optical drive



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

Description	Spare part number
Blu-ray Disc ROM with SuperMulti DVD±R/RW Double-Layer Drive	681983-001
Blu-ray Disc R/RW with SuperMulti Drive	681984-001
DVD±RW Double-Layer with SuperMulti Drive	681982-001

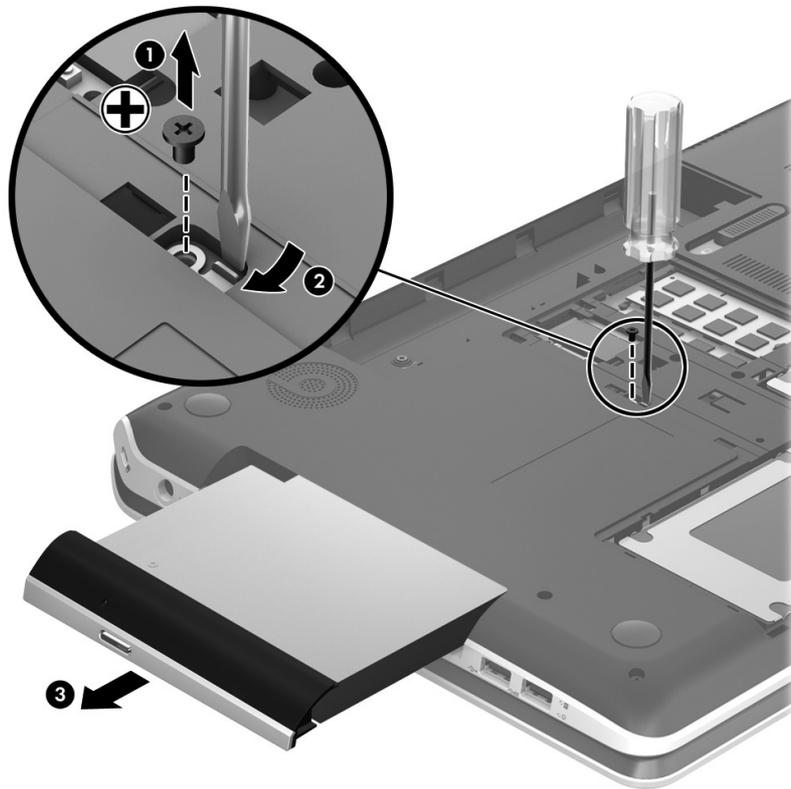
Before removing the optical drive, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 47](#)).
5. Remove the service cover (see [Hard drive on page 48](#)).

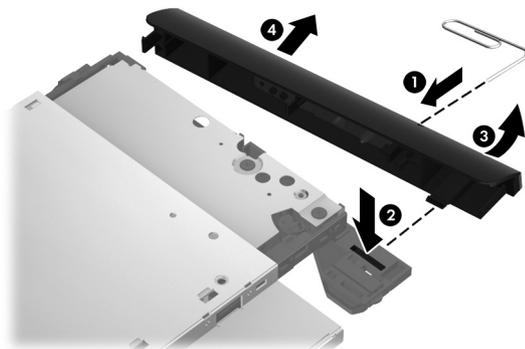
Remove the optical drive:

1. Remove the Phillips PM2.5×4.0 screw **(1)** that secures the optical drive to the computer.
2. Use a flat-blade screw drive or similar tool to press on the optical drive bracket tab **(2)** to release the optical drive.

3. Remove the optical drive **(3)** from the computer.

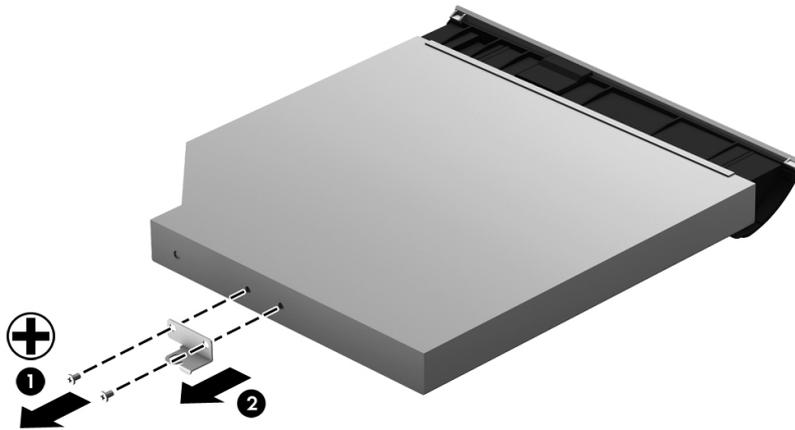


4. If it is necessary to replace the optical drive bezel, use a thin tool or an unbent paper clip **(1)** to release the optical drive tray.
5. Use a flat-blade screw driver or similar tool to press on the optical drive bezel tab **(2)** to release the optical drive bezel.
6. Release the left side of the optical drive bezel **(3)**.
7. Remove the optical drive bezel **(4)**.



8. If it is necessary to replace the optical drive bracket, position the optical drive with the rear panel toward you.

9. Remove the two Phillips PM2.0×3.6 screws **(1)** that secure the optical drive bracket to the optical drive.
10. Remove the optical drive bracket **(2)**.



Reverse this procedure to reassemble and install the optical drive.

Memory module

Description	Spare part number
8-GB memory module (PC3, 12800, 1600-MHz)	670034-001
4-GB memory module (PC3, 12800, 1600-MHz)	641369-001
2-GB memory module (PC3, 12800, 1600-MHz)	652972-001

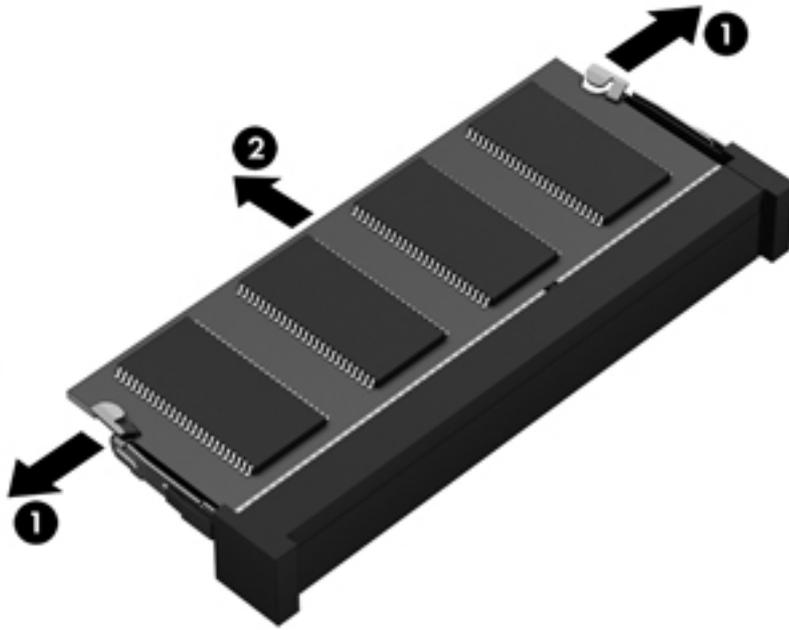
Before removing the memory module, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 47](#)).
5. Remove the service cover (see [Hard drive on page 48](#)).

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.



Reverse this procedure to install the memory module.

WLAN module

Description	Spare part number
For use on all computer models:	
Atheros 9485GN 802.11b/g/n 1×1 WiFi and 3012 Bluetooth 4.0 Combo Adapter	655795-001
Atheros WB225 802.11b/g/n 1×1 Bluetooth Combo Adapter	675794-001
Broadcom 4313GN 802.11b/g/n 1×1 WiFi and 20702 Bluetooth 4.0 Combo Adapter	657325-001
Intel Centrino Advanced-N 6230 WLAN module	670691-001
Intel Centrino Advanced-N 6230 WLAN module 670691-001 Ralink RT5390R 802.11b/g/n 1×1 WiFi Adapter	691415-001
Ralink RT3290LE 802.11b/g/n 1×1 WiFi and Bluetooth 4.0 Combo Adapter	690020-001
Atheros AR9565 802.11b/g/n 1×1 WiFi + Bluetooth 4.0 Combo Adapter for use only on computer models equipped with an Intel processor	690019-001
Intel Centrino Advanced-N 6235 WLAN module for use only on computer models equipped with an Intel processor in Japan	670290-001

⚠ 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. Turn off 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 the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 47](#)).
5. Remove the service cover (see [Hard drive on page 48](#)).

Remove the WLAN module:

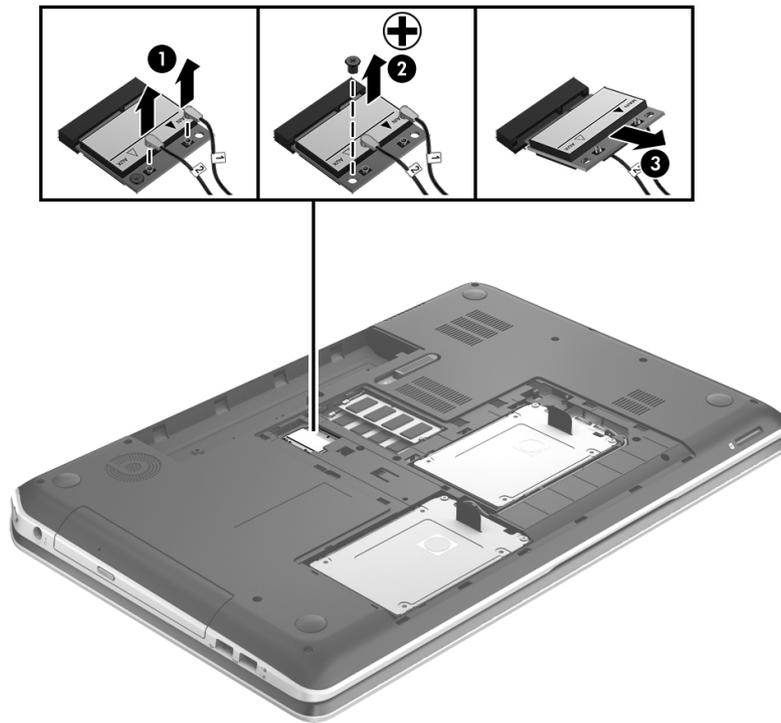
1. Disconnect the WLAN antenna cables **(1)** from the terminals on the WLAN module.



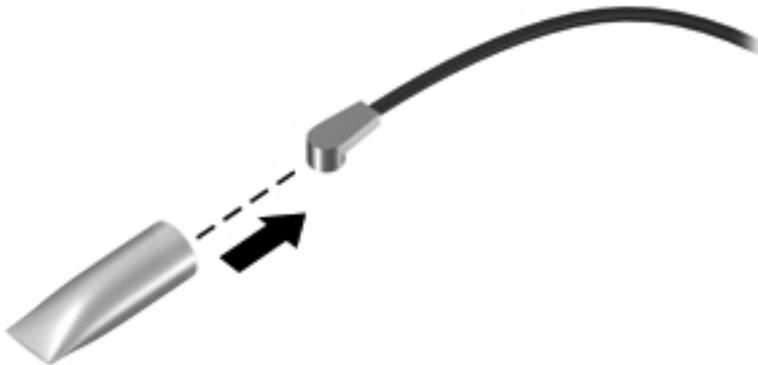
NOTE: The #1 WLAN antenna cable is connected to the WLAN module “Main” terminal. The #2 WLAN antenna cable is connected to the WLAN module “Aux” terminal.

2. Remove the Phillips PM2.0×3.0 screw **(2)** that secures the WLAN module to the system board. (The WLAN module tilts up.)

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



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



Reverse this procedure to install the WLAN module.

Keyboard

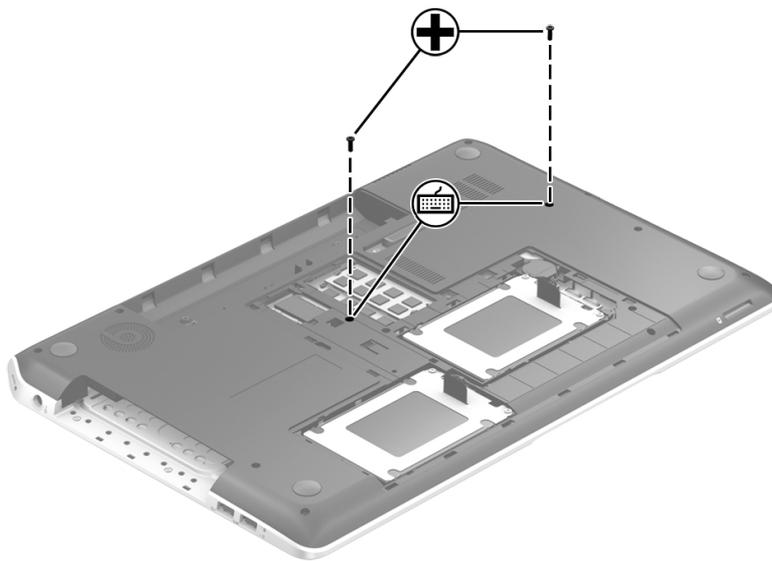
Description	Spare part number
Keyboard with backlight (includes backlight cable and keyboard cable):	
In midnight black finish:	
For use only on computer models equipped with an Intel processor in Belgium	698782-A41
For use only on computer models equipped with an Intel processor in the Czech Republic and Slovakia	698782-FL1
For use only on computer models equipped with an Intel processor in Denmark, Finland, and Norway	698782-DH1
For use only on computer models equipped with an Intel processor in the Netherlands	698782-B31
For use only on computer models equipped with an Intel processor in Portugal	698782-131
For use only on computer models equipped with an Intel processor in Saudi Arabia	698782-171
For use only on computer models equipped with an Intel processor in Switzerland	698782-BG1
For use only on computer models equipped with an Intel processor in Turkey	698782-141
For use on all computer models in the United States	698782-001
In natural silver finish:	
For use only on computer models equipped with an Intel processor in Canada	698783-DB1
For use only on computer models equipped with an Intel processor in the United States	698782-001
Keyboard without backlight in midnight black finish:	
For use on all computer models in Canada	681980-DB1
For use only on computer models equipped with an Intel processor in France	681980-051
For use only on computer models equipped with an Intel processor in Germany	681980-041
For use only on computer models equipped with an Intel processor in Italy	681980-061
For use only on computer models equipped with an Intel processor in Japan	681980-291
For use only on computer models equipped with an Intel processor in the Netherlands	681980-B31
For use only on computer models equipped with an Intel processor in Russia	681980-251
For use only on computer models equipped with an Intel processor in Slovenia	681980-BA1
For use only on computer models equipped with an Intel processor in South Korea	681980-AD1
For use only on computer models equipped with an Intel processor in Spain	681980-071
For use only on computer models equipped with an Intel processor in Taiwan	681980-AB1
For use only on computer models equipped with an Intel processor in Thailand	681980-281
For use only on computer models equipped with an Intel processor in the United Kingdom	681980-031
For use on all computer models in the United States	681980-001

Before removing the keyboard, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 47](#)).
5. Remove the service cover (see [Hard drive on page 48](#)).

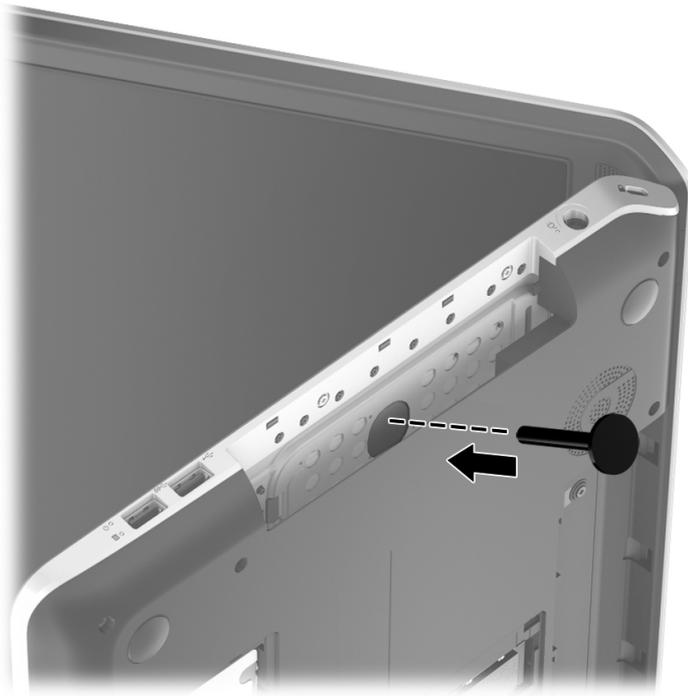
Remove the keyboard:

1. Remove the two Phillips PM2.5×8.5 screws that secure the keyboard to the computer.



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

4. Press on the back of the keyboard through the opening in the optical drive bay 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 **(1)**, and then swing the keyboard **(2)** 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 backlight cable is connected, and then disconnect the cable **(2)** from the system board.

8. Release the ZIF connector (3) to which the keyboard cable is connected, and then disconnect the cable (4) from the system board.
9. Remove the keyboard (5).



Reverse this procedure to install the keyboard.

Top cover

Description	Spare part number
In midnight black finish	708009-001
In natural silver finish	708012-001

Before removing the top cover, follow these steps:

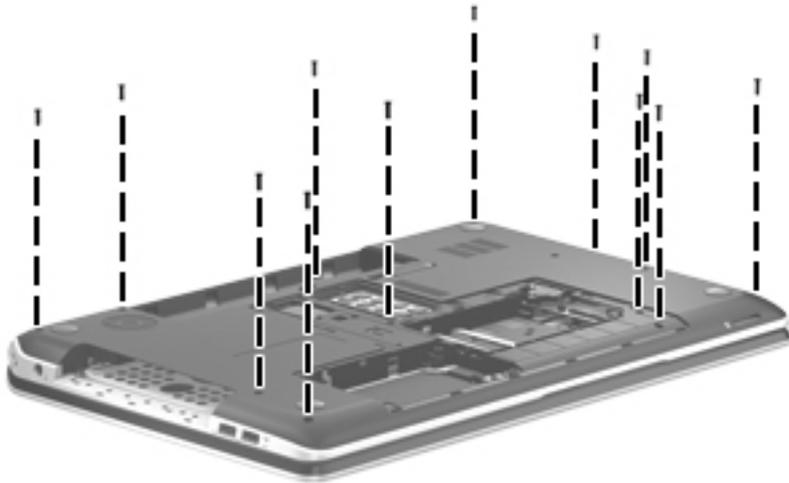
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 47](#)), and then remove the following components:
 - a. Hard drive (see [Hard drive on page 48](#))
 - b. Optical drive (see [Optical drive on page 53](#))
 - c. Keyboard (see [Keyboard on page 59](#))

 **NOTE:** When replacing the top cover, be sure to remove the following components from the defective top cover and install them on the replacement top cover:

- Front speakers (see [Front speakers on page 67](#))
- Power button board and cable (see [Power button board on page 68](#))
- Fingerprint reader board (see [Fingerprint reader board on page 69](#))
- TouchPad button board (see [TouchPad button board on page 70](#))

Remove the top cover:

1. Remove the twelve Phillips PM2.5×8.5 screws that secure the top cover to the computer.

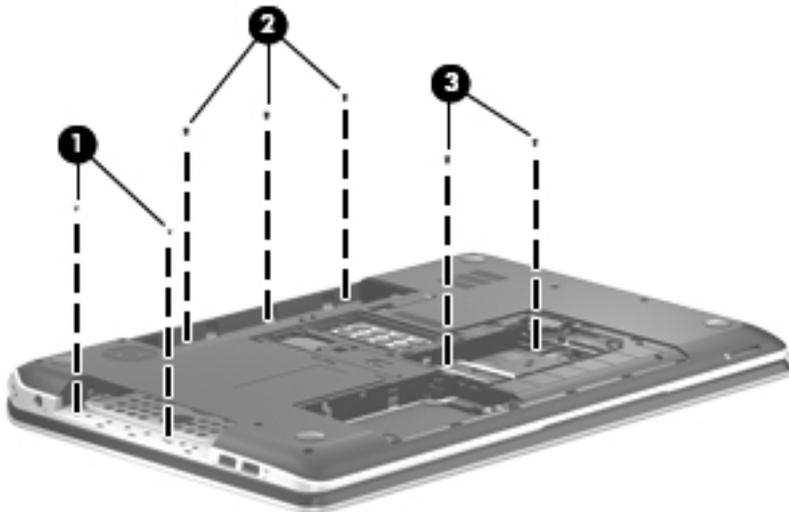


2. Remove the following screws that secure the top cover to the computer:

(1) Two Phillips PM2.0×3.0 screws in the optical drive bay

(2) Three Phillips PM2.0×2.5 screws in the battery bay

(3) Two Phillips PM2.5×4.0 screws in the hard drive bay

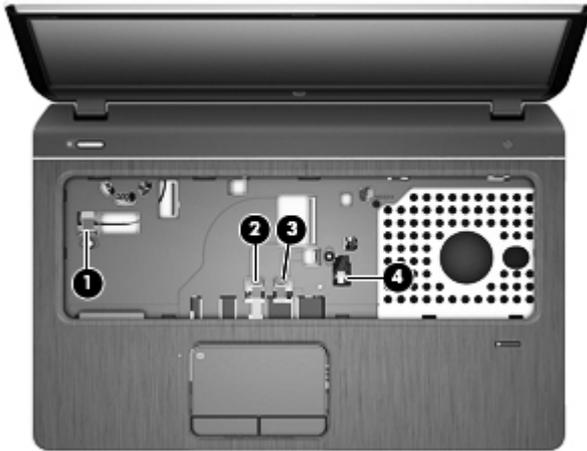


3. Turn the computer right side up, with the front toward you.

4. Open the computer.

5. Release the corresponding ZIF connectors, and then disconnect the following cables from the system board:

- (1) Power button board cable
- (2) TouchPad button board cable
- (3) Fingerprint reader board cable
- (4) Front speaker cable



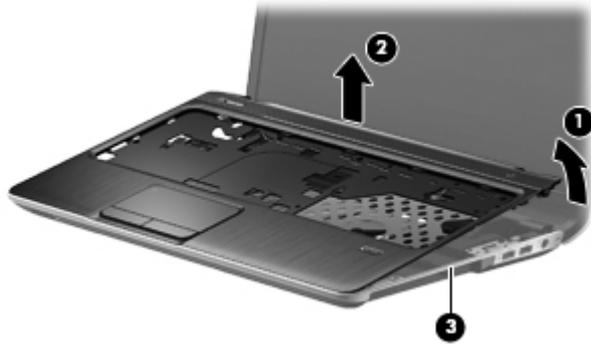
6. Remove the Phillips PM2.5×4.0 screw that secures the top cover to the computer.



7. Lift the rear edge of the top cover (1) until the left and right sides have disengaged from the base enclosure.

8. Remove the top cover (2).

⚠ CAUTION: Be careful not to damage the thin section of the base enclosure (3) around the optical drive bay when removing the top cover.



Reverse this procedure to install the top cover.

Front speakers

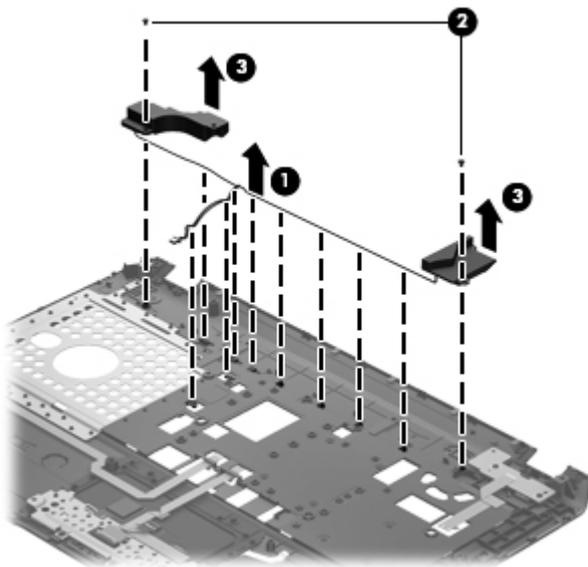
Description	Spare part number
Front speakers (include speaker cables)	681995-001

Before removing the front speakers, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 47](#)), and then remove the following components:
 - a. Hard drive (see [Hard drive on page 48](#))
 - b. Optical drive (see [Optical drive on page 53](#))
 - c. Keyboard (see [Keyboard on page 59](#))
 - d. Top cover (see [Top cover on page 63](#))

Remove the front speakers:

1. Turn the top cover upside down, with the front toward you.
2. Release the front speaker cables **(1)** from the clips and routing channel built into the top cover.
3. Remove the two Phillips PM2.5×4.0 screws **(2)** that secure the front speakers to the top cover.
4. Remove the front speakers **(3)**.



Reverse this procedure to install the front speakers.

Power button board

Description	Spare part number
Power button board (includes cable)	681985-001

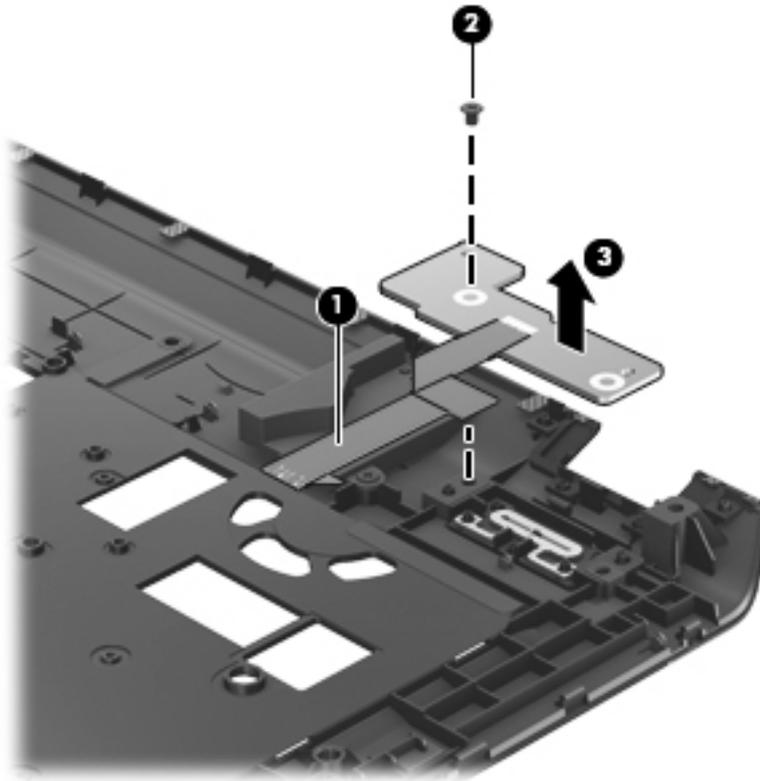
Before removing the power button board, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 47](#)), and then remove the following components:
 - a. Hard drive (see [Hard drive on page 48](#))
 - b. Optical drive (see [Optical drive on page 53](#))
 - c. Keyboard (see [Keyboard on page 59](#))
 - d. Top cover (see [Top cover on page 63](#))

Remove the power button board:

1. Turn the top cover upside down, with the front toward you.
2. Detach the power button board cable **(1)** from the top cover. (The power button board cable is attached to the top cover double-sided tape.)
3. Remove the Phillips PM2.0×4.0 screw **(2)** that secures the power button board to the top cover.

4. Remove the power button board **(3)** and cable.



Reverse this procedure to install the power button board.

Fingerprint reader board

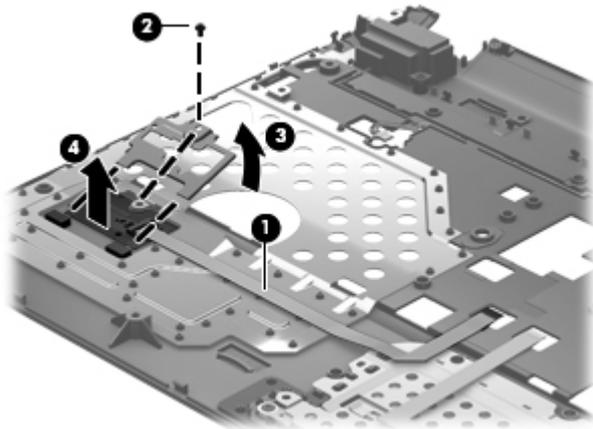
Description	Spare part number
Fingerprint reader board (includes cable and bracket)	681975-001

Before removing the fingerprint reader board, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 47](#)), and then remove the following components:
 - a. Hard drive (see [Hard drive on page 48](#))
 - b. Optical drive (see [Optical drive on page 53](#))
 - c. Keyboard (see [Keyboard on page 59](#))
 - d. Top cover (see [Top cover on page 63](#))

Remove the fingerprint reader board:

1. Turn the top cover upside down, with the front toward you.
2. Detach the fingerprint reader board cable from the top cover. (The fingerprint reader board cable is attached to the top cover with double-sided tape.)
3. Remove the Phillips PM2.5×3.0 screw **(2)** that secures the fingerprint reader board bracket to the top cover.
4. Slide the fingerprint reader board bracket **(3)** up and away from the top cover.
5. Remove the fingerprint reader board **(4)** and cable.



Reverse this procedure to install the fingerprint reader board.

TouchPad button board

Description	Spare part number
TouchPad button board (includes cable and bracket)	681987-001

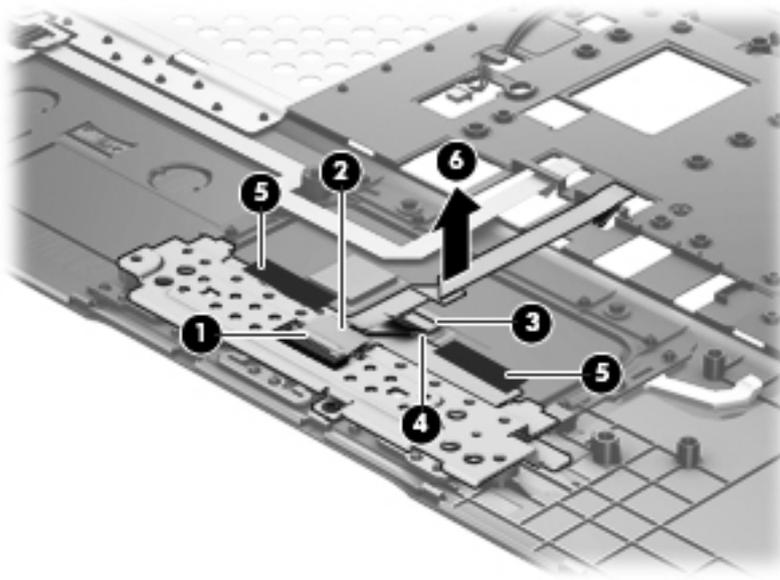
Before removing the TouchPad button board, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 47](#)), and then remove the following components:
 - a. Hard drive (see [Hard drive on page 48](#))
 - b. Optical drive (see [Optical drive on page 53](#))

- c. Keyboard (see [Keyboard on page 59](#))
- d. Top cover (see [Top cover on page 63](#))

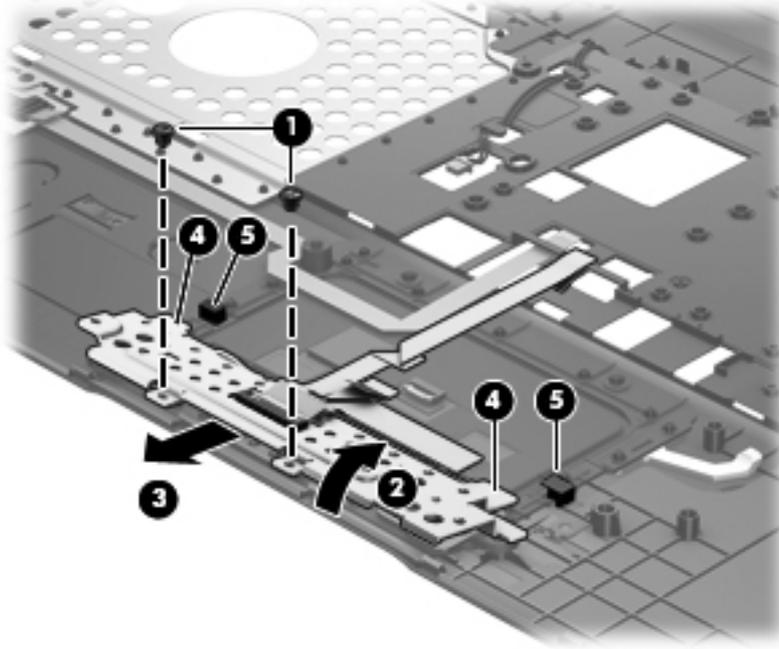
Remove the TouchPad button board:

1. Turn the top cover upside down, with the front toward you.
2. Release the TouchPad button board ZIF connector **(1)** to which the TouchPad button board cable is connected, and then disconnect the cable **(2)** from the TouchPad button board.
3. Release the TouchPad board ZIF connector **(3)** to which the TouchPad button board cable is connected, and then disconnect the cable **(4)** from the TouchPad board.
4. Release the two pieces of grounding tape **(5)** that attach the TouchPad button board to the TouchPad.
5. Remove the TouchPad button board cable **(6)**.



6. Remove the two Phillips PM2.5×4.0 screws **(1)** that secure the TouchPad button board bracket to the top cover.
7. Lift the rear edge of the TouchPad button board bracket **(2)** until it rests at an angle.

- Slide the TouchPad button board bracket **(3)** up and away from the top cover until the tabs **(4)** on the front edge of the bracket disengage from the slots **(5)** on the top cover.



Reverse this procedure to install the TouchPad button board.

Solid-state drive

Description	Spare part number
180-GB solid-state drive for use on all computer models	699330-001
160-GB solid-state drive for use on all computer models	681997-001
32-GB mSATA solid-state drive for use only on computer models equipped with an Intel processor	682099-001

Before removing the solid-state drive, follow these steps:

- Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
- Disconnect the power from the computer by unplugging the power cord from the computer.
- Disconnect all external devices from the computer.
- Remove the battery (see [Battery on page 47](#)), and then remove the following components:
 - Hard drive (see [Hard drive on page 48](#))
 - Optical drive (see [Optical drive on page 53](#))

- c. Keyboard (see [Keyboard on page 59](#))
- d. Top cover (see [Top cover on page 63](#))

Remove the solid-state drive:

1. Remove the Phillips PM2.0×3.0 screw **(1)** that secures the solid-state drive to the system board. (The solid-state drive tilts up.)
2. Remove the solid-state drive by pulling the drive away from the slot at an angle **(2)**.

 **NOTE:** The solid-state drive is designed with a notch to prevent incorrect installation into the solid-state drive slot.



Reverse this procedure to install the solid-state drive.

USB board

Description	Spare part number
USB board (includes cable)	681986-001

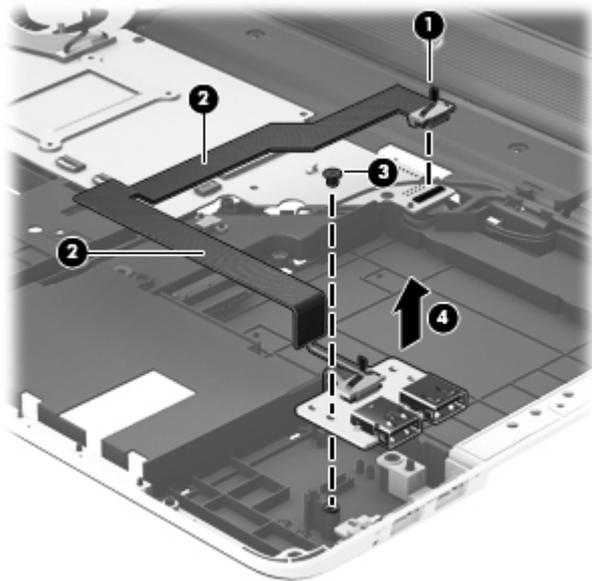
Before removing the USB board, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 47](#)), and then remove the following components:
 - a. Hard drive (see [Hard drive on page 48](#))
 - b. Optical drive (see [Optical drive on page 53](#))
 - c. Keyboard (see [Keyboard on page 59](#))
 - d. Top cover (see [Top cover on page 63](#))

Remove the USB board:

1. Disconnect the USB board cable **(1)** from the system board.
2. Detach the USB board cable **(2)** from the system board and base enclosure. (The USB board cable is attached to the system board and the base enclosure with double-sided tape.)
3. Remove the Phillips PM2.5×4.0 screw **(3)** that secures the USB board to the base enclosure.
4. Remove the USB board **(4)**.



Reverse this procedure to install the USB board.

Power connector cable

Description	Spare part number
For use only on computer models equipped with an AMD processor	681973-001
For use only on computer models equipped with an Intel processor	681974-001

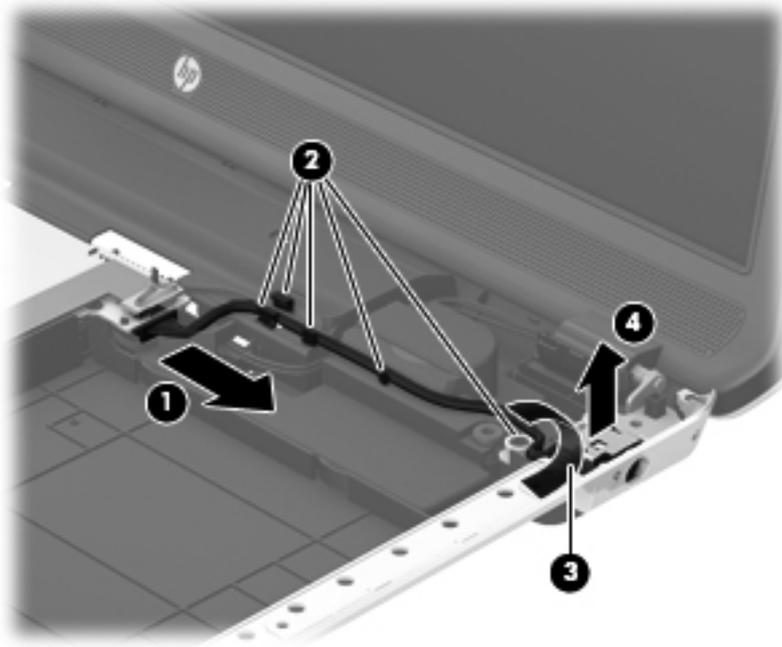
Before removing the power connector cable, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 47](#)), and then remove the following components:
 - a. Hard drive (see [Hard drive on page 48](#))
 - b. Optical drive (see [Optical drive on page 53](#))
 - c. Keyboard (see [Keyboard on page 59](#))
 - d. Top cover (see [Top cover on page 63](#))

Remove the power connector cable:

1. Disconnect the power connector cable **(1)** from the system board.
2. Release the power connector cable from the clips **(2)** and routing channel built into the base enclosure.
3. Release the tape that secures the power connector **(3)** to the base enclosure.

4. Release the power connector **(4)** from the clip 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.

Description	Spare part number
For use only on computer models equipped with an AMD processor	682220-501
For use only on computer models equipped with an Intel quad core processor, the NVIDIA GeForceR 650M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Professional operating system	682040-601
For use only on computer models equipped with an Intel quad core processor, the NVIDIA GeForceR 650M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Standard operating system	682040-501
For use only on computer models equipped with an Intel 45-W processor, the NVIDIA GeForceR 635M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Professional operating system	711508-601
For use only on computer models equipped with an Intel 45-W processor, the NVIDIA GeForceR 635M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Standard operating system	711508-501
For use only on computer models equipped with an Intel 35-W processor, the NVIDIA GeForceR 635M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Professional operating system	711509-601
For use only on computer models equipped with an Intel 35-W processor, the NVIDIA GeForceR 635M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Standard operating system	711509-501
For use only on computer models equipped with an Intel 35-W processor, the NVIDIA GeForceR 635M graphics subsystem with 1-GB of discrete memory, and the Windows 8 Professional operating system	711507-601
For use only on computer models equipped with an Intel 35-W processor, the NVIDIA GeForceR 635M graphics subsystem with 1-GB of discrete memory, and the Windows 8 Standard operating system	711507-501
For use only on computer models equipped with an Intel quad core processor, the NVIDIA GeForceR 630M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Professional operating system	682016-601
For use only on computer models equipped with an Intel quad core processor, the NVIDIA GeForceR 630M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Standard operating system	682016-501
For use only on computer models equipped with an Intel dual core processor, the NVIDIA GeForceR 630M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Professional operating system	682037-601
For use only on computer models equipped with an Intel dual core processor, the NVIDIA GeForceR 630M graphics subsystem with 2-GB of discrete memory, and the Windows 8 Standard operating system	682037-501
For use only on computer models equipped with an Intel quad core processor, the NVIDIA GeForceR 630M graphics subsystem with 1-GB of discrete memory, and the Windows 8 Professional operating system	681999-601

Description	Spare part number
For use only on computer models equipped with an Intel quad core processor, the NVIDIA GeForce 630M graphics subsystem with 1-GB of discrete memory, and the Windows 8 Standard operating system	681999-501
For use only on computer models equipped with an Intel dual core processor, the NVIDIA GeForce 630M graphics subsystem with 1-GB of discrete memory, and the Windows 8 Professional operating system	682000-601
For use only on computer models equipped with an Intel dual core processor, the NVIDIA GeForce 630M graphics subsystem with 1-GB of discrete memory, and the Windows 8 Standard operating system	682000-501
For use only on computer models equipped with an Intel quad core processor, a graphics subsystem with UMA memory, and the Windows 8 Professional operating system	682042-601
For use only on computer models equipped with an Intel quad core processor, a graphics subsystem with UMA memory, and the Windows 8 Standard operating system	682042-501
For use only on computer models equipped with an Intel dual core processor, a graphics subsystem with UMA memory, and the Windows 8 Professional operating system	682043-601
For use only on computer models equipped with an Intel dual core processor, a graphics subsystem with UMA memory, and the Windows 8 Standard operating system	682043-501
Thermal Pad Kit for use only on computer models equipped with an Intel processor (not illustrated, includes replacement thermal pads)	682100-001

NOTE: Computer models equipped with an AMD processor use only thermal paste and do not require replacement thermal pads.

Before removing the system board, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 47](#)), and then remove the following components:
 - a. Hard drive (see [Optical drive on page 53](#))
 - b. Optical drive (see [Optical drive on page 53](#))
 - c. Keyboard (see [Keyboard on page 59](#))
 - d. Top cover (see [Top cover on page 63](#))

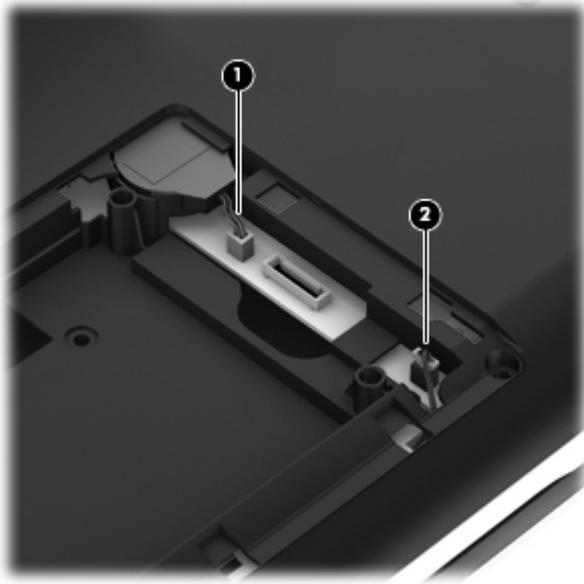
When replacing the system board, be sure that the following components are removed from the defective system board and installed on the replacement system board:

- Memory module (see [Memory module on page 55](#))
- WLAN module (see [WLAN module on page 57](#))
- Solid-state drive (see [Solid-state drive on page 72](#))

- Fan/heat sink assembly (see [Fan/heat sink assembly on page 81](#))
- Processor (see [Processor on page 85](#))

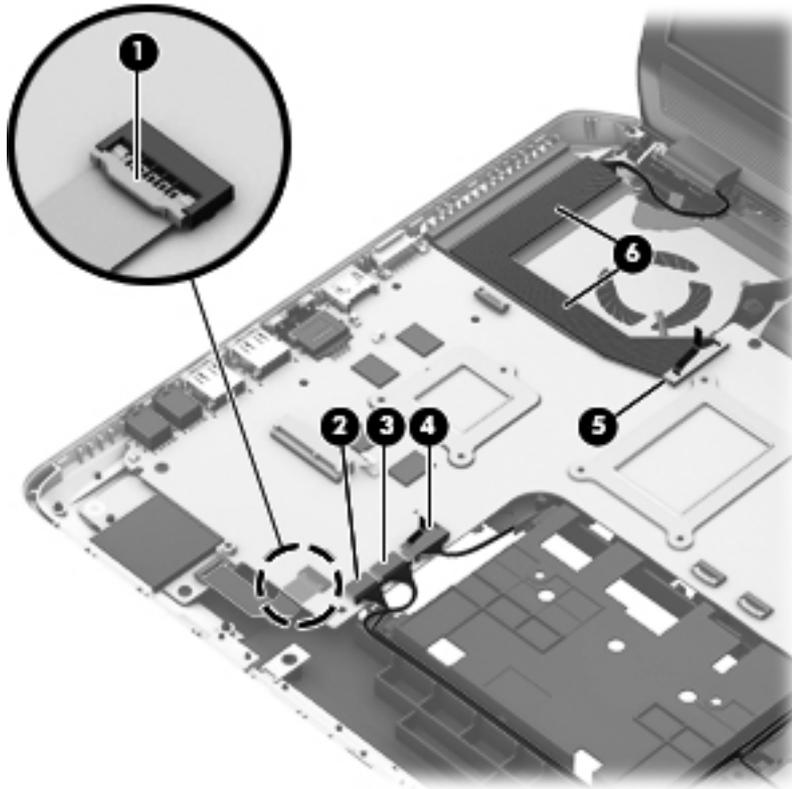
Remove the system board:

1. Close the computer.
2. Turn the computer upside down, with the front toward you.
3. Disconnect the RTC battery cable **(1)** from the system board.
4. Disconnect the subwoofer cable **(2)** from the system board.

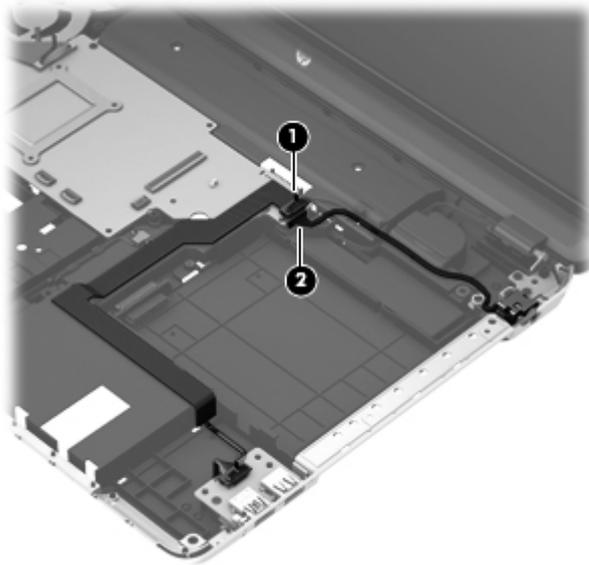


5. Turn the computer right side up, with the front toward you.
6. Open the computer.
7. Disconnect the following cables from the system board:
 - (1)** Card Reader board cable
 - (2)** Display speaker cable
 - (3)** Front speaker passthrough cable
 - (4)** Optical drive connector cable
 - (5)** Display panel cable

8. Detach the display panel cable (5) from the heat sink. (The display panel cable is attached to the heat sink with double-sided tape.)

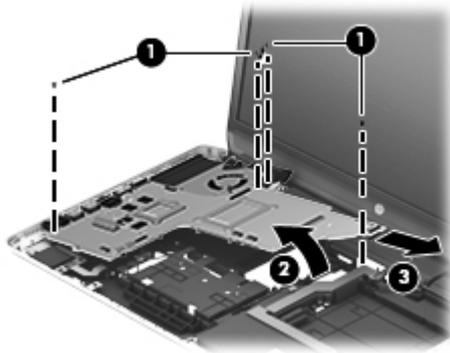


9. Disconnect the USB board cable (1) from the system board.
10. Disconnect the power connector cable (2) from the system board.



11. Remove the four Phillips PM2.5×6.0 screws (1) that secure the system board to the base enclosure.

12. Lift the right side of the system board (2) until it rests at an angle.
13. Remove the system board (3) by sliding it up and to the right at angle.



Reverse this procedure to install the system board.

Fan/heat sink assembly

 **NOTE:** The fan/heat sink assembly spare part kit includes replacement thermal material.

Description	Spare part number
For use only on computer models equipped with an AMD processor	682178-001
For use only on computer models equipped with an Intel processor and a graphics subsystem with discrete memory	682061-001
For use only on computer models equipped with an Intel processor and a graphics subsystem with UMA memory	682060-001

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

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

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 47](#)), and then remove the following components:
 - a. Hard drive (see [Hard drive on page 48](#))
 - b. Optical drive (see [Optical drive on page 53](#))

- c. Keyboard (see [Keyboard on page 59](#))
- d. Top cover (see [Top cover on page 63](#))
- e. System board (see [System board on page 77](#))

Remove the fan/heat sink assembly:

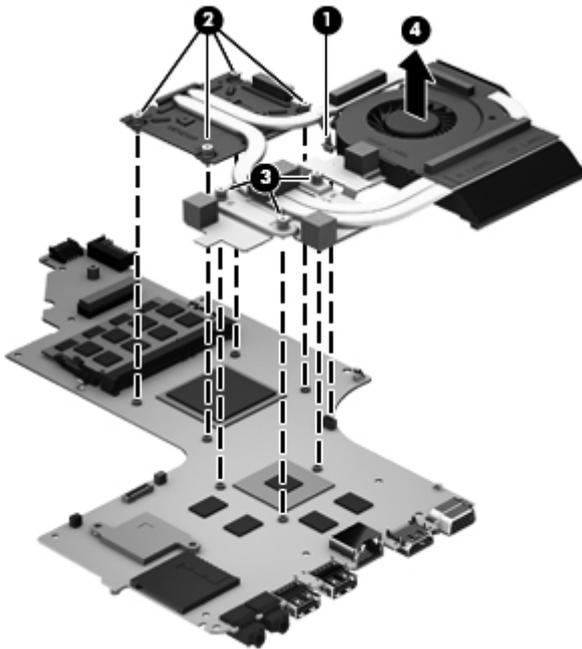
1. Turn the system board upside down, with the front toward you.

 **NOTE:** Steps 2 and 3 apply to computer models equipped with a graphics subsystem with discrete memory. See steps 4 and 5 for fan/heat sink assembly removal information for computer models equipped with a graphics subsystem with UMA memory.

2. Disconnect the fan cable **(1)** from the system board.
3. Following the 1, 2, 3, 4, 5, 6, 7 sequence stamped into the fan/heat sink assembly, loosen the seven captive Phillips screws **(2)** and **(3)** that secure the fan/heat sink assembly to the system board, and then remove the fan/heat sink assembly **(4)**.

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

 **NOTE:** The following illustration shows the fan/heat sink assembly removal process for a computer model equipped with an AMD processor. The process for removing the fan/heat sink assembly on a computer model equipped with an Intel processor is identical.



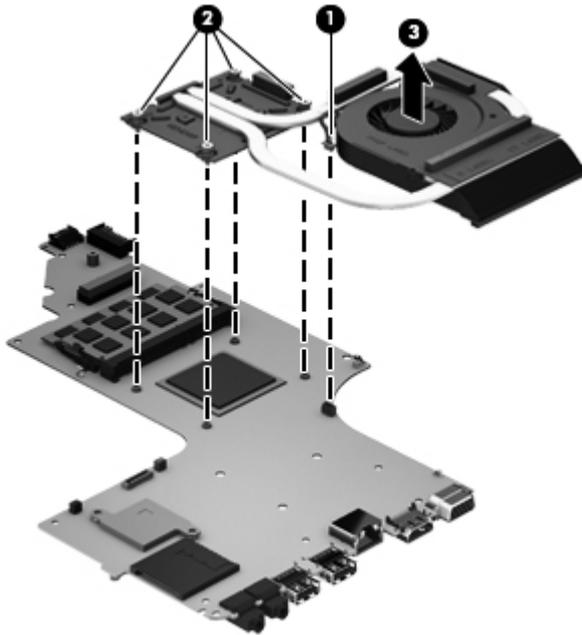
 **NOTE:** Steps 4 and 5 apply to computer models equipped with a graphics subsystem with UMA memory. See steps 2 and 3 for fan/heat sink assembly removal information for computer models equipped with a graphics subsystem with discrete memory.

4. Disconnect the fan cable **(1)** from the system board.

- Following the 1, 2, 3, 4 sequence stamped into the fan/heat sink assembly, loosen the four captive Phillips screws **(2)** that secure the fan/heat sink assembly to the system board, and then remove the fan/heat sink assembly **(3)**.

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

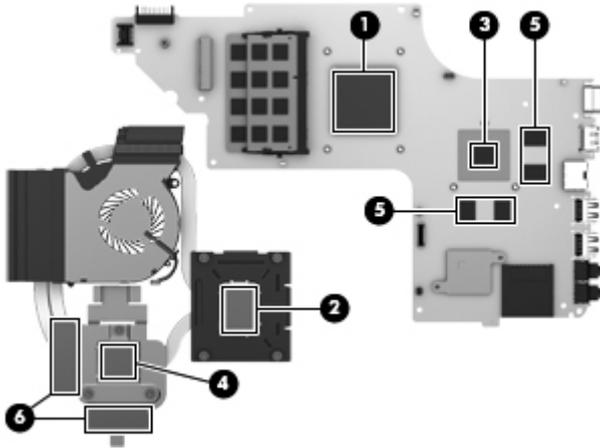
 **NOTE:** The following illustration shows the fan/heat sink assembly removal process for a computer model equipped with an AMD processor. The process for removing the fan/heat sink assembly on a computer model equipped with an Intel processor is identical.



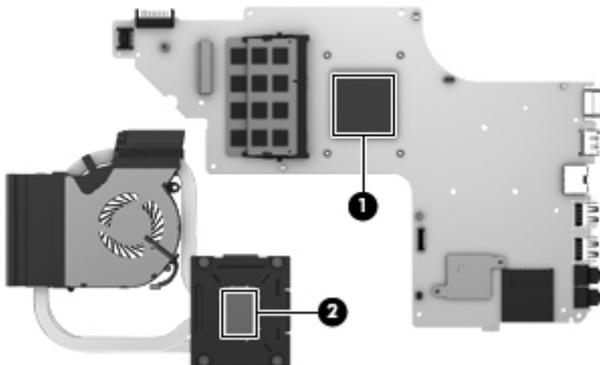
 **NOTE:** The thermal material must be thoroughly cleaned from the surfaces of the heat sink and the system board components each time the heat sink is removed. Replacement thermal material is included with the fan/heat sink assembly, processor, and system board spare part kits. Replacement thermal material is also available in the Thermal Material Kit, spare part numbers 685348-001 (for use on computer models equipped with an AMD processor) and 682100-001 (for use on computer models equipped with an Intel processor).

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

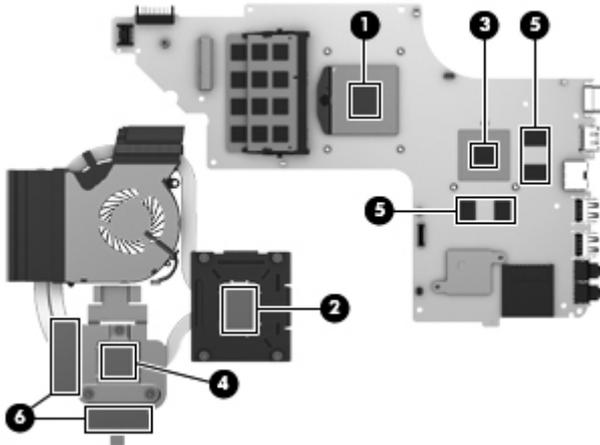


 **NOTE:** The following illustration shows the replacement thermal material locations on a computer model equipped with an AMD processor and a graphics subsystem with UMA memory. Thermal paste is used on the processor **(1)** and the heat sink section **(2)** that services it.

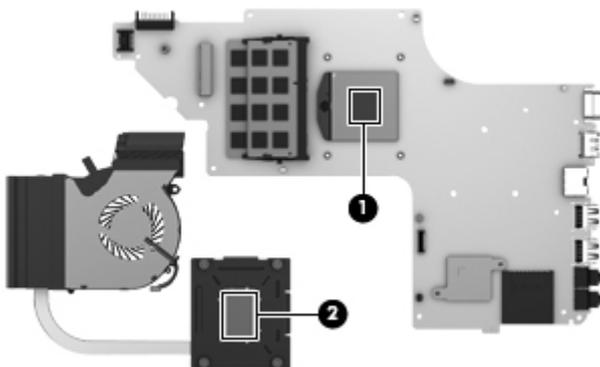


 **NOTE:** The following illustration shows the replacement thermal material locations on a computer model equipped with an Intel processor and a graphics subsystem with discrete memory.

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



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.



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

Processor

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

Description	Spare part number
AMD A10-4600M 3.20-GHz processor (1600-MHz FSB, 4.0-MB L2 cache, DDR3, quad core, 35 W)	683046-001
AMD A8-4500M 2.80-GHz processor (1600-MHz FSB, 4.0-MB L2 cache, DDR3, quad core, 35 W)	683048-001
AMD A6-4400M 3.20-GHz processor (1600-MHz FSB, 1.0-MB L2 cache, DDR3, dual core, 35 W)	683047-001
AMD A4-4300M 2.50-GHz processor (1600-MHz FSB, 1.0-MB L2 cache, DDR3, dual core, 35 W)	685990-001
Intel Quad Core i7-3840QM 2.80-GHz processor (SC turbo up to 3.80-GHz; 1600- MHz FSB, 8.0-MB L3 cache, 45 W)	703266-001
Intel Quad Core i7-3820QM 2.70-GHz processor (SC turbo up to 3.70-GHz; 1600- MHz FSB, 8.0-MB L3 cache, 45 W)	681284-001

Description	Spare part number
Intel Quad Core i7-3740QM 2.70-GHz processor (SC turbo up to 3.70-GHz; 1600- MHz FSB, 6.0-MB L3 cache, 45 W)	702840-001
Intel Quad Core i7-3720QM 2.60-GHz processor (SC turbo up to 3.60-GHz, 1600- MHz FSB, 6.0-MB L3 cache, 45 W)	681283-001
Intel Quad Core i7-3632QM 2.20-GHz processor (SC turbo up to 3.20-GHz; 1600- MHz FSB, 6.0-MB L3 cache, 35 W)	701658-001
Intel Quad Core i7-3630QM 2.40-GHz processor (SC turbo up to 3.40-GHz; 1600- MHz FSB, 6.0-MB L3 cache, 45 W)	702081-001
Intel Quad Core i7-3612QM 2.10-GHz processor (SC turbo up to 3.10-GHz, 1600- MHz FSB, 6.0-MB L3 cache, 35 W)	680647-001
Intel Quad Core i7-3610QM 2.30-GHz processor (SC turbo up to 3.10-GHz, 1600- MHz FSB, 6.0-MB L3 cache, 45 W)	680646-001
Intel Quad Core i7-2670QM 2.20-GHz processor (SC turbo up to 3.10-GHz; 1333- MHz FSB, 6.0-MB L3 cache, 45 W)	665116-001
Intel Dual Core i5-3320M 2.60-GHz processor (SC turbo up to 3.30-GHz; 1600- MHz FSB, 3.0- MB L3 cache, 35 W)	681952-001
Intel Dual Core i5-3230M 2.60-GHz processor (SC turbo up to 3.20-GHz; 1600- MHz FSB, 3.0- MB L3 cache, 35 W)	711903-001
Intel Dual Core i5-3210M 2.50-GHz processor (SC turbo up to 3.10-GHz, 1600- MHz FSB, 3.0- MB L3 cache, 35 W)	680645-001
Intel Dual Core i5-2450M 2.50-GHz processor (SC turbo up to 3.10-GHz, 1333- MHz FSB, 3.0- MB L3 cache, 35 W)	676359-001
Intel Dual Core i3-3130M 2.60-GHz processor (1333-MHz FSB, 3.0-MB L3 cache, 35 W)	713163-001
Intel Dual Core i3-3120M 2.50-GHz processor (1333-MHz FSB, 3.0-MB L3 cache, 35 W)	700627-001
Intel Dual Core i3-3110M 2.30-GHz processor (1333-MHz FSB, 3.0-MB L3 cache, 35 W)	682417-001
Intel Dual Core i3-2370M 2.40-GHz processor (1333-MHz FSB, 3.0-MB L3 cache, 35 W)	677152-001
Intel Core i3-2350M 2.30-GHz processor (1333-MHz FSB, 3.0-MB L3 cache, 35 W)	653340-001
Intel Core i3-2330M 2.20-GHz processor (1333-MHz FSB, 3.0-MB L3 cache, 35 W)	653339-001

Before removing the processor, follow these steps:

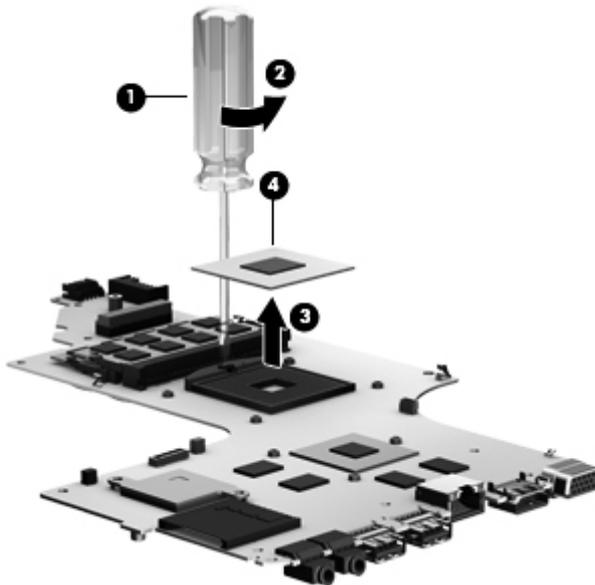
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 47](#)), and then remove the following components:
 - a. Hard drive (see [Hard drive on page 48](#))
 - b. Optical drive (see [Optical drive on page 53](#))

- c. Keyboard (see [Keyboard on page 59](#))
- d. Top cover (see [Top cover on page 63](#))
- e. System board (see [System board on page 77](#))
- f. Fan/heat sink assembly (see [Fan/heat sink assembly on page 81](#))

Remove the processor:

1. Turn the system board upside down, with the front toward you.
2. Use a flat-bladed screw driver **(1)** to turn the processor locking screw one-half turn counterclockwise **(2)**, until you hear a click.
3. 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.



Reverse this procedure to install the processor.

Card Reader board

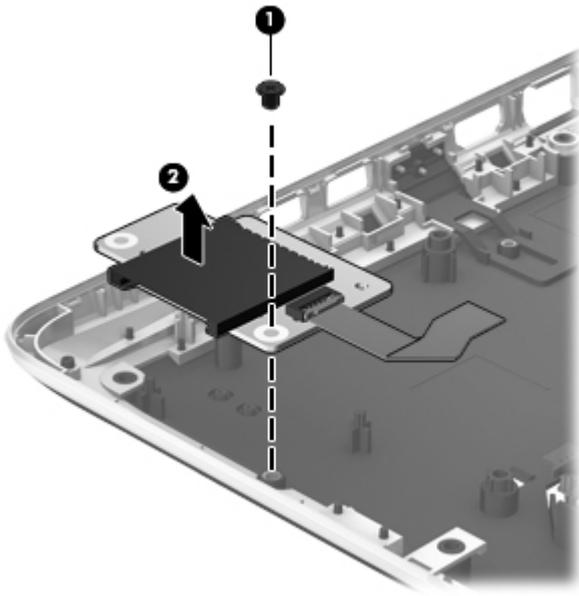
Description	Spare part number
Card Reader board (includes cable)	681988-001

Before removing the Card Reader board, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 47](#)), and then remove the following components:
 - a. Hard drive (see [Hard drive on page 48](#))
 - b. Optical drive (see [Optical drive on page 53](#))
 - c. Keyboard (see [Keyboard on page 59](#))
 - d. Top cover (see [Top cover on page 63](#))
 - e. System board (see [System board on page 77](#))

Remove the Card Reader board:

1. Remove the Phillips PM2.0×3.0 screw **(1)** that secures the Card Reader board to the system board.
2. Remove the Card Reader board **(2)**.



Reverse this procedure to install the Card Reader board.

Subwoofer

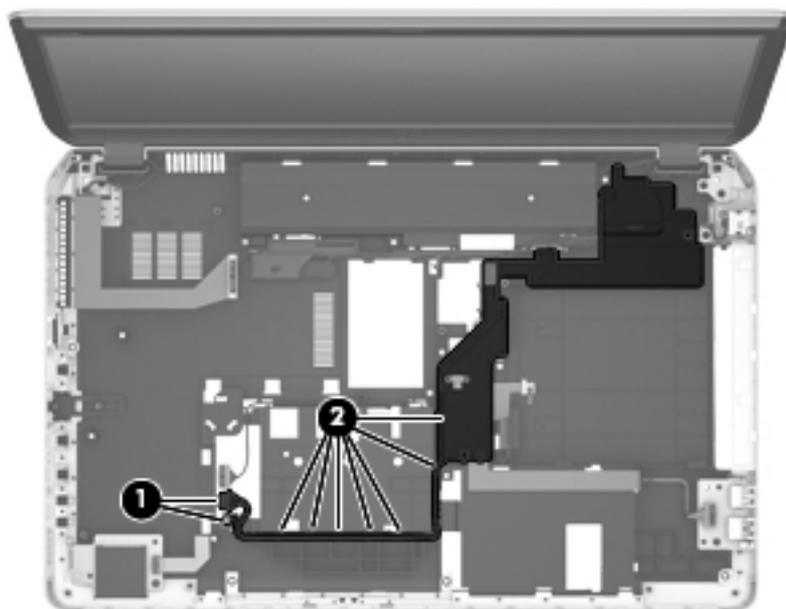
Description	Spare part number
Subwoofer (includes subwoofer cable, front speaker passthrough cable, and 2 rubber isolators)	681996-001

Before removing the subwoofer, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 47](#)), and then remove the following components:
 - a. Hard drive (see [Hard drive on page 48](#))
 - b. Optical drive (see [Optical drive on page 53](#))
 - c. Keyboard (see [Keyboard on page 59](#))
 - d. Top cover (see [Top cover on page 63](#))
 - e. System board (see [System board on page 77](#))

Remove the subwoofer:

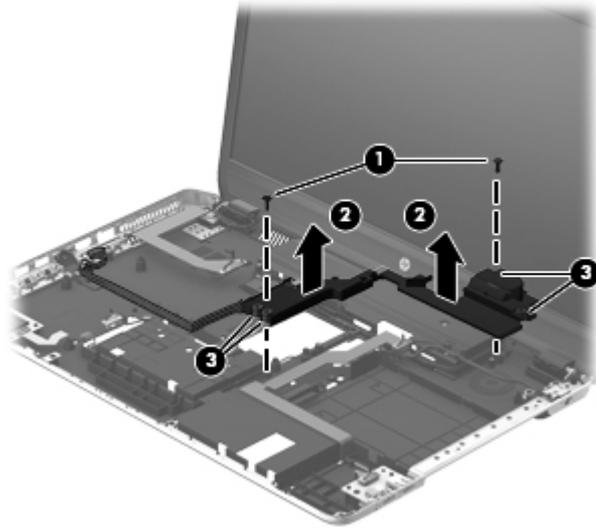
1. Release the subwoofer cables **(1)** from the clips **(2)** and routing channel built into the base enclosure.



2. Remove the two Phillips PM2.5×10.0 screws **(1)** that secure the subwoofer to the base enclosure.

3. Remove the subwoofer **(2)**.

 **NOTE:** The subwoofer includes four rubber isolators **(3)**. These isolators are crucial to the performance of the subwoofer.



Reverse this procedure to install the subwoofer.

Optical drive connector cable

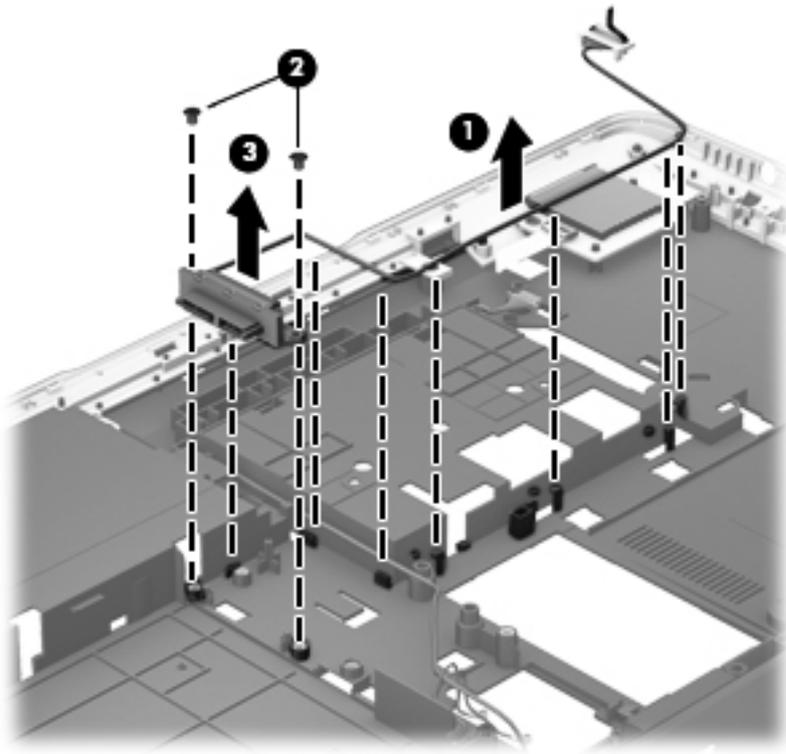
 **NOTE:** The optical drive connector cable is included in the optical drive spare part kit. See [Optical drive on page 53](#) for optical drive spare part number information.

Before removing the optical drive connector cable, follow these steps:

- 1.** Turn off 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 the power from the computer by unplugging the power cord from the computer.
- 3.** Disconnect all external devices from the computer.
- 4.** Remove the battery (see [Battery on page 47](#)), and then remove the following components:
 - a.** Hard drive (see [Hard drive on page 48](#))
 - b.** Optical drive (see [Optical drive on page 53](#))
 - c.** Keyboard (see [Keyboard on page 59](#))
 - d.** Top cover (see [Top cover on page 63](#))
 - e.** System board (see [System board on page 77](#))
 - f.** Subwoofer (see [Subwoofer on page 89](#))

Remove the optical drive connector cable:

1. Release the optical drive connector cable **(1)** from the clips and routing channel built into the base enclosure.
2. Remove the two Phillips PM2.0×4.0 screws **(2)** that secure the optical drive connector cable to the base enclosure.
3. Remove the optical drive connector **(3)**.



Reverse this procedure to install the optical drive connector cable.

Display assembly

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

Description	Spare part number
For use on all computer models:	
FHD, AntiGlare display assembly for use only on computer models equipped with a graphics subsystem with UMA memory	698778-001
HD, BrightView display assembly for use only on computer models equipped with a graphics subsystem with UMA memory	698777-001
For use only with computer models equipped with an Intel processor:	
FHD, AntiGlare display assembly in midnight black finish for use only on computer models equipped with a graphics subsystem with discrete memory	698780-001
HD, BrightView display assembly in midnight black finish for use only on computer models equipped with a graphics subsystem with discrete memory	698779-001
FHD, AntiGlare display assembly in natural silver finish for use only on computer models equipped with a graphics subsystem with UMA memory	699338-001
HD, BrightView display assembly in natural silver finish for use only on computer models equipped with a graphics subsystem with UMA memory	699337-001

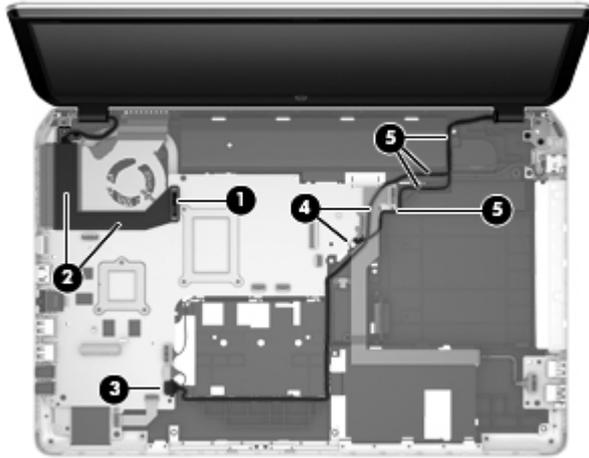
Before removing the display assembly, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 47](#)).
5. Remove the hard drive (see [Hard drive on page 48](#)).
6. Remove the optical drive (see [Optical drive on page 53](#)).
7. Disconnect the wireless antenna cables from the WLAN module (see [WLAN module on page 57](#)).
8. Remove the keyboard (see [Keyboard on page 59](#)).
9. Remove the top cover (see [Top cover on page 63](#)).

Remove the display assembly:

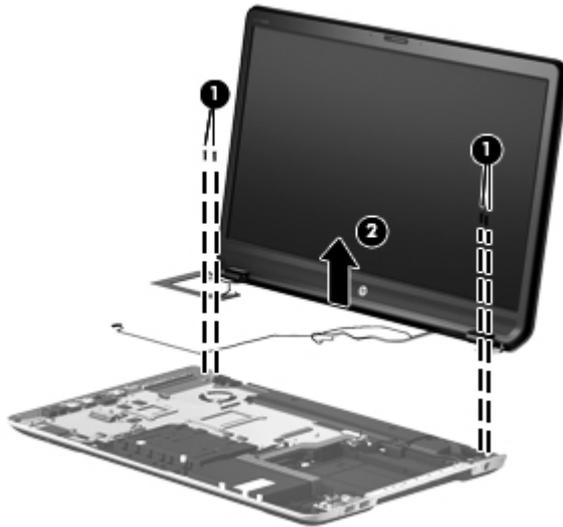
1. Disconnect the display panel cable **(1)** from the system board.
2. Release the display panel cable **(2)** from the heat sink. (The display panel cable is attached to the heat sink with double-sided tape.)
3. Disconnect the display speakers cable **(3)** from the system board.

4. Release the wireless antenna cables **(4)** from the clips **(5)** built into the base enclosure.



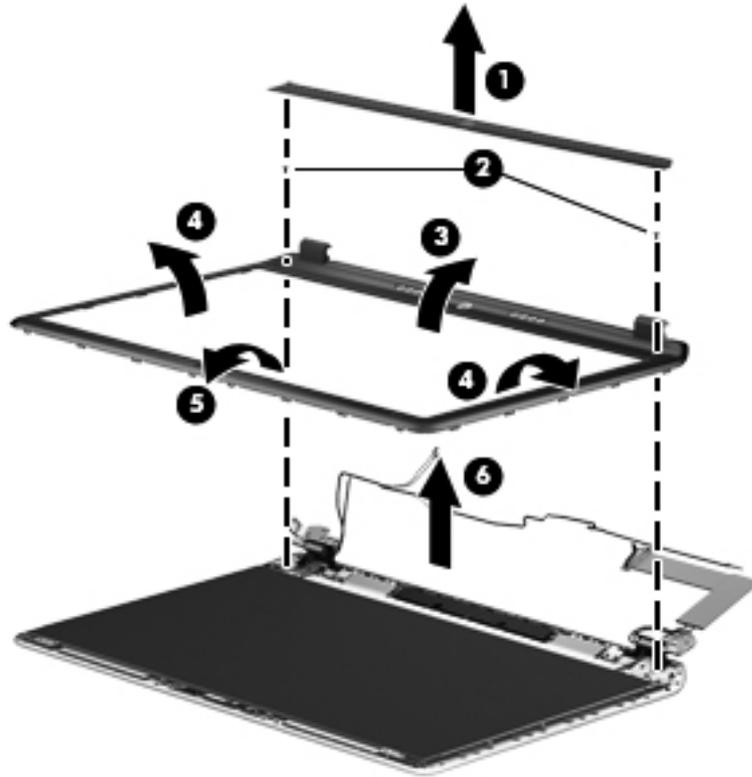
⚠ CAUTION: Support the display assembly when removing the following screws. Failure to support the display assembly can result in damage to the display assembly and other computer components.

5. Remove the four Phillips PM2.5×8.5 screws **(1)** that secure the display assembly to the base enclosure.
6. Remove the display assembly **(2)**.

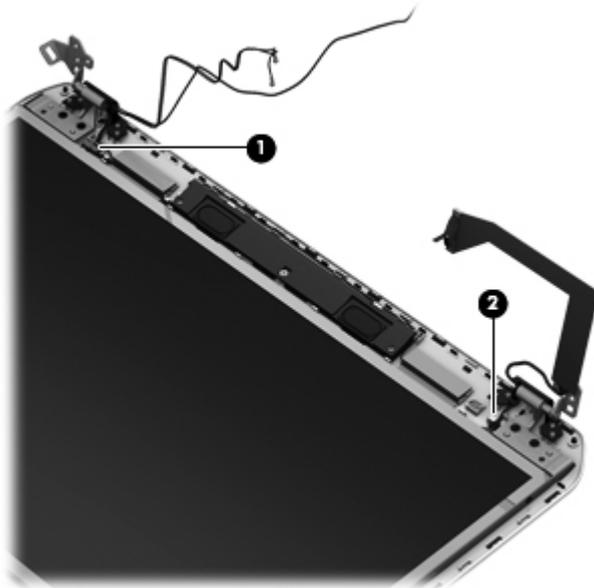


7. If it is necessary to replace the display bezel or any of the display assembly subcomponents:
 - a. Remove the display bezel screw cover strip **(1)** and the two Phillips PM2.5×5.0 screws **(2)** that secure the display bezel to the display assembly. The display bezel screw cover strip is available in the Display Screw Kit, spare part number 681993-001.
 - b. Flex the inside edges of the bottom edge **(3)**, the left and right sides **(4)**, and the top edge **(5)** of the display bezel until the bezel disengages from the display enclosure.

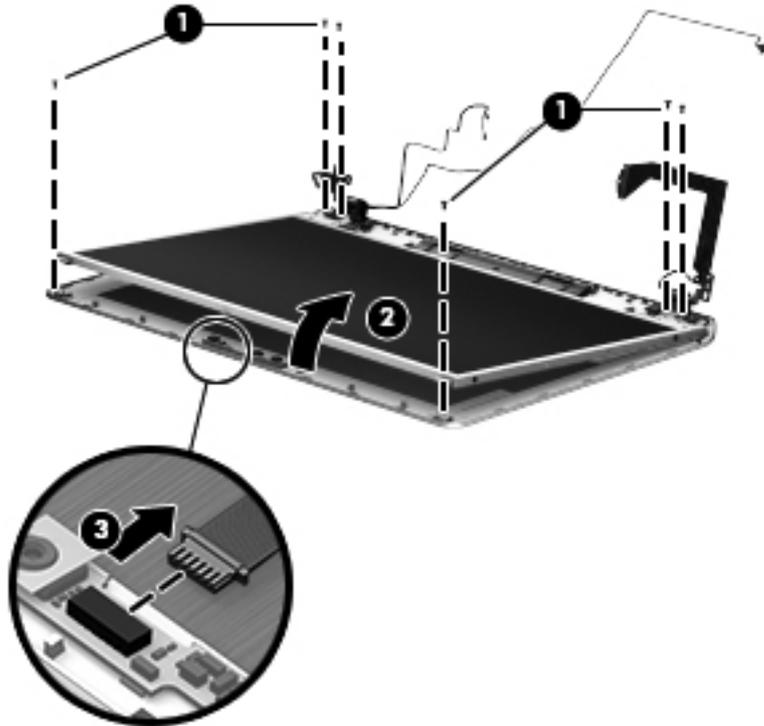
- c. Remove the display bezel **(6)**. The display bezel is available using spare part number 698775-001.



- 8. If it is necessary to replace the display panel:
 - a. Disconnect the logo light cable **(1)**.
 - b. Release the display panel cable from the clip **(2)** built into the display enclosure.



- c. Remove the six Phillips PM2.0×6.0 screws **(1)** that secure the display panel to the display enclosure.
- d. Lift the top edge of the display panel **(2)** until the webcam/microphone module connector is accessible.
- e. Disconnect the webcam/microphone module cable **(3)** from the webcam/microphone module.

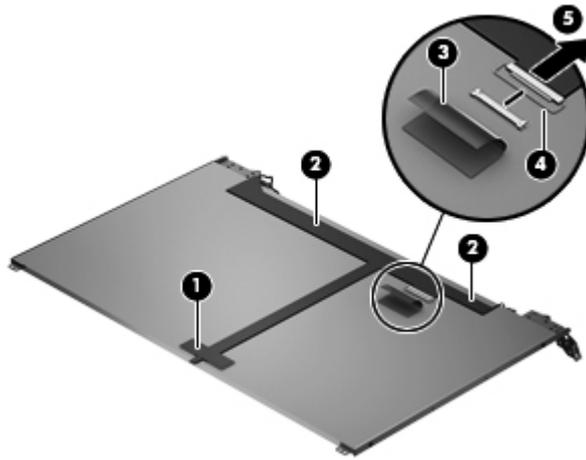


- f. Remove the display panel **(2)** from the display enclosure. The display panel is available using spare part numbers 681991-001 (for use only on computer models equipped with a 17.3-in, AntiGlare, FHD display panel) and 681990-001 (for use only on computer models equipped with a 17.3-in, BrightView, HD display panel).
9. If it is necessary to replace the display panel cable:

CAUTION: Be sure the work surface is clear of all tools, screws, and computer components before turning the display panel upside down on the work surface.

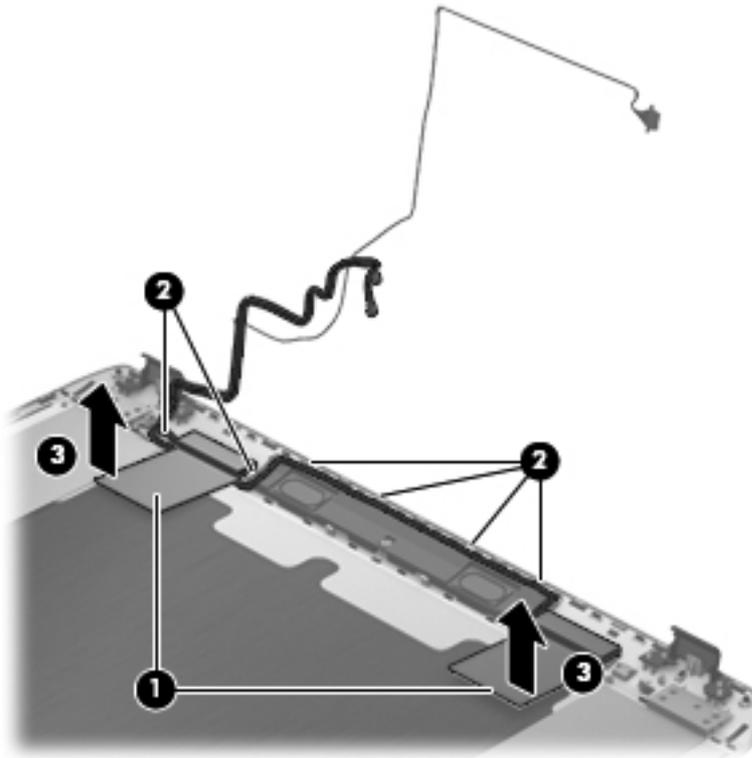
- a. Turn the display panel upside down, with the top edge toward you.
- b. Detach the webcam/microphone module cable **(1)** from the rear surface of the display panel. (The webcam/microphone module cable is attached to the display panel by double-sided tape.) Detach the display panel cable **(2)** from the rear surface of the display panel. (The display panel cable is attached to the display panel by double-sided tape.) Release the adhesive support strip **(3)** that secures the display panel cable connector to the display panel.
- c. Release the handle **(4)** that secures the display panel cable connector to the display panel.

- d.** Disconnect the display panel cable **(5)** from the display panel. The display panel cable is available using the following spare part numbers:
- 682226-001—Display panel cable for use only on computer models equipped with an Intel processor, an FHD display assembly, and a graphics subsystem with discrete memory
 - 681972-001—Display panel cable for use only on computer models equipped with an FHD display assembly and a graphics subsystem with UMA memory
 - 684140-001—Display panel cable for use only on computer models equipped with an Intel processor, an HD display assembly, and a graphics subsystem with discrete memory
 - 684139-001—Display panel cable for use only on computer models equipped with an Intel processor, an HD display assembly, and a graphics subsystem with UMA memory



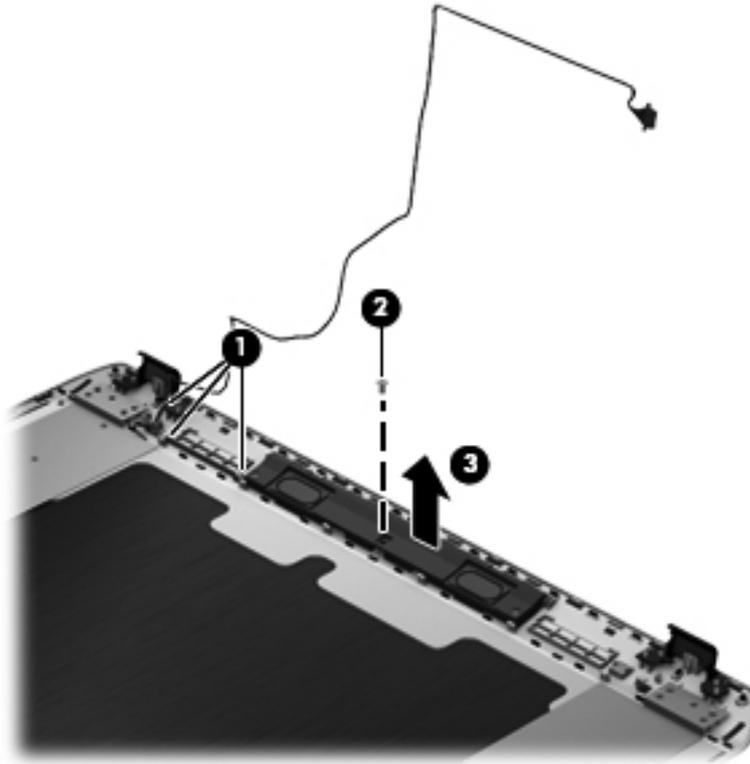
- 10.** If it is necessary to replace the webcam/microphone module:
- a.** Release the clips **(1)** that secure the webcam/microphone module to the display enclosure.

- 12.** If it is necessary to replace the wireless antenna cables and transceivers:
- a.** Release the wireless antenna transceivers **(1)** from the display enclosure. (The wireless antenna transceivers are attached to the display enclosure with double-sided tape.)
 - b.** 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 681968-001.



- 13.** If it is necessary to replace the display speakers:
- a.** Release the display speaker cables from the clips **(1)** and routing channels built into the display enclosure. Remove the Phillips PM2.0×3.0 screw **(1)** that secures the display speakers to the display enclosure.

- b.** Remove the display speakers **(2)** from the display enclosure. The display speakers are available using spare part number 681994-001.



Reverse this procedure to install the display assembly.

5 Using Setup Utility (BIOS) and System Diagnostics

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 (BIOS) includes settings for the types of devices installed, the startup sequence of the computer, and the amount of system and extended memory.

Starting Setup Utility (BIOS)

To start Setup Utility (BIOS), turn on or restart the computer, quickly press **esc**, and then press **f10**.

Information about how to navigate in Setup Utility (BIOS) is located at the bottom of the screen.

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

Updating the BIOS

Updated versions of the BIOS may be available on the HP website.

Most BIOS updates on the HP website 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 (BIOS).

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

Downloading a BIOS update

 **CAUTION:** 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.

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

1. From the Start screen, select the **HP Support Assistant** app.
2. Select **Updates and tune-ups**, and then select **Check for HP updates now**.
3. Follow the on-screen instructions.
4. At the download area, follow these steps:
 - a. Identify the most recent BIOS update and compare it to 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. From the Start screen, type *e*, and then select **File Explorer**.
2. 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.

To start System Diagnostics:

1. Turn on or restart the computer, quickly press `esc`, and then 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 diagnostic test while it is running, press `esc`.

6 Specifications

Computer specifications

	Metric	U.S.
Dimensions		
Width	41.6 cm	16.38 in
Depth	27.4 cm	10.79 in
Height (front to back)	3.15 to 3.52 cm	1.24 to 1.39 in
Weight		
Dual hard drive	3.15 kg	6.95 lb
Single hard drive	3.27 kg	7.21 lb
Input power		
Operating voltage and current	18.5 V dc @ 3.5 A – 65 W	
	19 V dc @ 4.74 A – 90 W	
	18.5 V dc @ 6.5 A – 120 W	
	19.5 V dc @ 3.33 A – 65 W	
	19.5 V dc @ 4.62 A – 90 W	
	19.5 V dc @ 6.15 A – 120 W	
Temperature		
Operating	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F
Relative humidity (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating	-15 m to 3,048 m	-50 ft to 10,000 ft

	Metric	U.S.
Nonoperating	-15 m to 12,192 m	-50 ft to 40,000 ft

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

17.3-inch display specifications

	Metric	U.S.
Dimensions		
Height	23.3 cm	9.17 in
Width	39.8 cm	15.67 in
Diagonal	43.9 cm	17.29 in
Number of colors	Up to 16.8 million	
Contrast ratio	200:1 (typical)	
Brightness	250 nits (typical: UWVA, FHD, AntiGlare) or 200 nits (typical: SVA, HD, BrightView)	
Pixel resolution		
Pitch	0.23868 × 0.23868 mm	
Format	1920×1080 (UWVA, FHD, AntiGlare) or 1366×768 (SVA, HD, BrightView)	
Configuration	RGB vertical stripe	
Backlight	LED	
Character display	80 × 25	
Total power consumption	2.0 W	
Viewing angle	±65° horizontal, ±50° vertical (typical)	

Hard drive specifications

	1-TB*	750-GB**	640-GB**	500-GB**	320-GB**
Dimensions					
Height	12.7 mm	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	100.4 mm
Width	69.9 mm	69.9 mm	69.9 mm	69.9 mm	69.9 mm
Weight	152 g	110 g	110 g	110 g	110 g
Interface type	SATA	SATA	SATA	SATA	SATA
Transfer rate					
Synchronous (maximum)	97 MB/sec	97 MB/sec	97 MB/sec	97 MB/sec	97 MB/sec
Security	ATA security	ATA security	ATA security	ATA security	ATA security
Seek times (typical read, including setting)					
Single track	2.0 ms	2.0 ms	1.5 ms	1.5 ms	1.5 ms
Average (read/write)	12/16 ms	12/16 ms	11/13 ms	11/13 ms	11/13 ms
Maximum	21 ms	22 ms	221 ms	22 ms	22 ms
Logical blocks	1,953,525,168	1,465,149,168	1,282,009,226	976,773,168	628,142,448
Disk rotational speed	5400 rpm	7200 and 5400 rpm	5400 rpm	7200 and 5400 rpm	7200 and 5400 rpm
Operating temperature	0°C to 60°C (32°F to 140°F)				
*1 TB = 1 trillion bytes when referring to hard drive storage capacity. Actual accessible capacity is less.					
**1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less.					
NOTE: Certain restrictions and exclusions apply. Contact technical support for details.					

7 Backing up, restoring, and recovering

Your computer includes tools provided by HP and the operating system to help you safeguard your information and retrieve it if you ever need to. These tools will help you return your computer to a proper working state or even back to the original factory state, all with simple steps.

This chapter provides information about the following processes:

- Creating recovery media and backups
- Restoring and recovering your system

 **NOTE:** This guide describes an overview of backing up, restoring and recovering options. For more details about the tools provided, see Help and Support. From the Start screen, type **h**, and then select **Help and Support**.

Creating recovery media and backups

Recovery after a system failure is only as good as your most recent backup.

1. After you successfully set up the computer, create HP Recovery media. This step creates a backup of the HP Recovery partition on the computer. The backup can be used to reinstall the original operating system in cases where the hard drive is corrupted or has been replaced.

HP Recovery media you create will provide the following recovery options:

- **System Recovery**—Reinstalls the original operating system and the programs that were installed at the factory.
- **Minimized Image Recovery**—Reinstalls the operating system and all hardware-related drivers and software, but not other software applications.
- **Factory Reset**—Restores the computer to the state its original factory state by deleting all information from the hard drive and re-creating the partitions. Then it reinstalls the operating system and the software that was installed at the factory.

See [Creating HP Recovery media on page 108](#).

2. As you add hardware and software programs, create system restore points. A system restore point is a snapshot of certain hard drive contents saved by Windows System Restore at a specific time. A system restore point contains information that Windows uses, such as registry settings. Windows creates a system restore point for you automatically during a Windows update and during other system maintenance (such as a software update, security scanning, or system diagnostics). You can also manually create a system restore point at any time. For more information and steps for creating specific system restore points, see Windows Help and Support. From the Start screen, type **h**, and then select **Help and Support**.
3. As you add photos, video, music, and other personal files, create a backup of your personal information. Windows File History can be set to regularly and automatically back up files from libraries, Desktop, contacts, and favorites. If files are accidentally deleted from the hard drive and they can no longer be restored from the Recycle Bin, or if files become corrupted, you can restore the files that you backed up using File History. Restoring files is also useful if you ever choose to reset the computer by reinstalling Windows or choose to recover using HP Recovery Manager.



NOTE: File History is not enabled by default, so you must turn it on.

For more information and steps for enabling Windows File History, see Windows Help and Support. From the Start screen, type **h**, and then select **Help and Support**.

Creating HP Recovery media

HP Recovery Manager is a software program that offers a way to create recovery media after you successfully set up the computer. HP Recovery media can be used to perform system recovery if the hard drive becomes corrupted. System recovery reinstalls the original operating system and the software programs installed at the factory, and then configures the settings for the programs. HP Recovery media can also be used to customize the system or aid in the replacement of a hard drive.

- Only one set of HP Recovery media can be created. Handle these recovery tools carefully, and keep them in a safe place.
- HP Recovery Manager examines the computer and determines the required storage capacity for the blank USB flash drive or the number of blank DVD discs that will be required.
- To create recovery discs, your computer must have an optical drive with DVD writer capability, and you must use only high-quality blank DVD-R, DVD+R, DVD-R DL, DVD+R DL discs. Do not use rewritable discs such as CD±RW, DVD±RW, double-layer DVD±RW, or BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software. Or instead you can use a high-quality blank USB flash drive.
- If your computer does not include an integrated optical drive with DVD writer capability, but you would like to create DVD recovery media, you can use an external optical drive (purchased separately) to create recovery discs, or you can obtain recovery discs for your computer from the HP website. For U.S. support, go to <http://www.hp.com/go/contactHP>. For worldwide support, go to http://welcome.hp.com/country/us/en/wwcontact_us.html. If you use an external optical drive, it must be connected directly to a USB port on the computer; the drive cannot be connected to a USB port on an external device, such as a USB hub.

- Be sure that the computer is connected to AC power before you begin creating the recovery media.
- The creation process can take up to an hour or more. Do not interrupt the creation process.
- If necessary, you can exit the program before you have finished creating all of the recovery DVDs. HP Recovery Manager will finish burning the current DVD. The next time you start HP Recovery Manager, you will be prompted to continue, and the remaining discs will be burned.

To create HP Recovery media:

1. From the Start screen, type `recovery`, and then select **HP Recovery Manager**.
2. Select **Recovery Media Creation**, and follow the on-screen instructions to continue.

If you ever need to recover the system, see [Recovering using HP Recovery Manager on page 111](#).

Restore and recovery

There are several options for recovering your system. Choose the method that best matches your situation and level of expertise:

- If you need to restore your personal files and data, you can use Windows File History to restore your information from the backups you created. For more information and steps for using File History, see Windows Help and Support. From the Start screen, type `h`, and then select **Help and Support**.
- If you need to correct a problem with a preinstalled application or driver, use the Drivers and Applications Reinstall option of HP Recovery Manager to reinstall the individual application or driver.

From the Start screen, type `recovery`, select **HP Recovery Manager**, and then select **Drivers and Applications Reinstall**, and follow the on-screen instructions.

- If you want to restore the system to a previous state without losing any personal information, Windows System Restore is an option. System Restore allows you to restore without the requirements of Windows Refresh or a reinstallation. Windows creates system restore points automatically during a Windows update and other system maintenance events. Even if you did not manually create a restore point, you can choose to restore to a previous point, automatically created. For more information and steps for using Windows System Restore, see Windows Help and Support. From the Start screen, type `h`, and then select **Help and Support**.
- If you want a quick and easy way to recover the system without losing your personal information, settings, or apps that came preinstalled on your computer or were purchased from the Windows Store, consider using Windows Refresh. This option does not require backing up data to another drive. See [Using Windows Refresh for quick and easy recovery on page 110](#).
- If you want to reset your computer to its original state, Windows provides an easy way to remove all personal data, apps, and settings, and reinstall Windows.

For more information, see [Remove everything and reinstall Windows on page 111](#).

- If you want to reset your computer using a minimized image, you can choose the HP Minimized Image Recovery option from the HP Recovery partition (select models only) or HP Recovery media.

Minimized Image Recovery installs only drivers and hardware-enabling applications. Other applications included in the image continue to be available for installation through the Drivers and Applications Reinstall option in HP Recovery Manager.

For more information, see [Recovering using HP Recovery Manager on page 111](#).

- If you want to recover the computer's original factory partitioning and content, you can choose the System Recovery option from the HP Recovery media. For more information, see [Recovering using HP Recovery Manager on page 111](#).
- If you have replaced the hard drive, you can use the Factory Reset option of HP Recovery media to restore the factory image to the replacement drive. For more information, see [Recovering using HP Recovery Manager on page 111](#).
- If you wish to remove the recovery partition to reclaim hard drive space, HP Recovery Manager offers the Remove Recovery Partition option.

For more information, see [Removing the HP Recovery partition on page 113](#).

Using Windows Refresh for quick and easy recovery

When your computer is not working properly and you need to regain system stability, the Windows Refresh option allows you to start fresh and keep what is important to you.

 **IMPORTANT:** Refresh removes any traditional applications that were not originally installed on the system at the factory.

 **NOTE:** During Refresh, a list of removed traditional applications will be saved so that you have a quick way to see what you might need to reinstall. See Help and Support for instructions on reinstalling traditional applications. From the Start screen, type **h**, and then select **Help and Support**.

 **NOTE:** You may be prompted for your permission or password when using Refresh. See Windows Help and Support for more information. From the Start screen, type **h**, and then select **Help and Support**.

To start Refresh:

1. On the Start screen, point to the far-right upper or lower corner of the screen to display the charms.
2. Click **Settings**.
3. Click **Change PC settings** in the bottom-right corner of the screen, and then select **General** from the PC settings screen.
4. Under **Refresh your PC without affecting your files**, select **Get started**, and follow the on-screen instructions.

Remove everything and reinstall Windows

Sometimes you want to perform detailed reformatting of your computer, or you want to remove personal information before you give away or recycle your computer. The process described in this section provides a speedy, simple way to return the computer to its original state. This option removes all personal data, apps, and settings from your computer, and reinstalls Windows.

 **IMPORTANT:** This option does not provide backups of your information. Before using this option, back up any personal information you wish to retain.

You can initiate this option by using the **f11** key or from the Start screen.

To use the **f11** key:

1. Press **f11** while the computer boots.
– or –
Press and hold **f11** as you press the power button.
2. Select **Troubleshoot** from the boot options menu.
3. Select **Reset your PC**, and follow the on-screen instructions.

To use the Start screen:

1. On the Start screen, point to the far-right upper or lower corner of the screen to display the charms.
2. Click **Settings**.
3. Click **Change PC settings** in the bottom-right corner of the screen, and then select **General** from the PC settings screen.
4. Under **Remove everything and reinstall Windows**, select **Get started**, and follow the on-screen instructions.

Recovering using HP Recovery Manager

HP Recovery Manager software allows you to recover the computer to its original factory state. Using the HP Recovery media you created, you can choose from one of the following recovery options:

- **System Recovery**—Reinstalls the original operating system, and then configures the settings for the programs that were installed at the factory.
- **Minimized Image Recovery**—Reinstalls the operating system and all hardware-related drivers and software, but not other software applications.
- **Factory Reset**—Restores the computer to the state its original factory state by deleting all information from the hard drive and re-creating the partitions. Then it reinstalls the operating system and the software that was installed at the factory.

The HP Recovery partition (select models only) allows Minimized Image Recovery.

What you need to know

- HP Recovery Manager recovers only software that was installed at the factory. For software not provided with this computer, you must either download the software from the manufacturer's website or reinstall the software from the media provided by the manufacturer.
- Recovery through HP Recovery Manager should be used as a final attempt to correct computer issues.
- HP Recovery media must be used if the computer hard drive fails.
- To use the Factory Reset or System Recovery options, you must use HP Recovery media.
- If the HP Recovery media do not work, you can obtain recovery media for your system from the HP website. For U.S. support, go to <http://www.hp.com/go/contactHP>. For worldwide support, go to http://welcome.hp.com/country/us/en/wwcontact_us.html.



IMPORTANT: HP Recovery Manager does not automatically provide backups of your personal data. Before beginning recovery, back up any personal data you wish to retain.

Using the HP Recovery partition to recover a minimized image (select models only)

The HP Recovery partition (select models only) allows you to perform a minimized image recovery without the need for recovery discs or a recovery USB flash drive. This type of recovery can only be used if the hard drive is still working.

To start HP Recovery Manager from the HP Recovery partition:

1. Press **f11** while the computer boots.
– or –
Press and hold **f11** as you press the power button.
2. Select **Troubleshoot** from the boot options menu.
3. Select **HP Recovery Manager**, and follow the on-screen instructions.

Using HP Recovery media to recover

You can use HP Recovery media to recover the original system. This method can be used if your system does not have an HP Recovery partition or if the hard drive is not working properly.

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

– or –

Insert the HP Recovery USB flash drive you created into a USB port on your computer, and then restart the computer.

 **NOTE:** If the computer does not automatically restart in HP Recovery Manager, change the computer boot order. See [Changing the computer boot order on page 113](#).

3. Follow the on-screen instructions.

Changing the computer boot order

If computer does not restart in HP Recovery Manager, you can change the computer boot order, which is the order of devices listed in BIOS where the computer looks for startup information. You can change the selection for an optical drive or a USB flash drive.

To change the boot order:

1. Insert the HP Recovery media you created.
2. Restart the computer.
3. Press and hold **esc** while the computer is restarting, and then press **f9** for boot options.
4. Select the optical drive or USB flash drive you want to boot from.
5. Follow the on-screen instructions.

Removing the HP Recovery partition

HP Recovery Manager software allows you to remove the HP Recovery partition to free up hard drive space.

 **IMPORTANT:** Removing the HP Recovery partition means you can no longer use Windows Refresh, the Windows Remove everything and reinstall Windows option, or the HP Recovery Manager option for minimized image recovery. Create HP Recovery media before removing the Recovery partition to ensure you have recovery options; see [Creating HP Recovery media on page 108](#).

Follow these steps to remove the HP Recovery partition:

1. From the Start screen, type `recovery`, and then select **HP Recovery Manager**.
2. Select **Remove Recovery Partition**, and follow the on-screen instructions to continue.

8 Power cord set requirements

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

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

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

Requirements for all countries

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least **1.0 m** (3.3 ft) and no more than **2.0 m** (6.5 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 amps and a nominal voltage rating of 125 or 250 V AC, as required by the power system of each country or region.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions

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

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

9 Recycling

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

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

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