HP Pavilion dm4 Entertainment PC

Maintenance and Service Guide

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).

Table of contents

1   Product description

Category	Description
Product Name	HP Pavilion dm4 Entertainment PC
Processors	Intel® Core® i7-3612QM 2.1-GHz processor (SC turbo up to 3.1-GHz), 6.0-MB L3 cache, 1600-MHz, quad core, 35W
	Intel Core i7-3520M 2.9-GHz processor (SC turbo up to 3.6-GHz), 4.0-MB L3 cache, 1600-MHz, dual core, 35W
	Intel Core i7-2640M 2.80-GHz processor (SC turbo up to 3.40-GHz), 4.0-MB L3 cache, 1333-MHz FSB, dual core, 35 W)
	Intel Core i5-3320M 2.6-GHz processor (SC turbo up to 3.3-GHz), 3.0-MB L3 cache, 1600-MHz, dual core, 35W
	Intel Core i5-3210M 2.5-GHz processor (SC turbo up to 3.1-GHz), 3.0-MB L3 cache, 1600-MHz, dual core, 35W
	Intel Core i5-2540M 2.60-GHz processor (SC turbo up to 3.30-GHz), 3.0-MB L3 cache, 1333-MHz FSB, dual core, 35 W
	Intel Core i5-2520M 2.50-GHz processor (SC turbo up to 3.20-GHz), 3.0-MB L3 cache, 1333-MHz FSB, dual core, 35 W
	Intel Core i5-2430M 2.40-GHz processor (SC turbo up to 3.00-GHz), 3.0-MB L3 cache, 1333-MHz FSB, dual core, 35 W
	Intel Core i3-2350M TJ85 2.30-GHz processor, 3.0-MB L3 cache, 1333-MHz FSB, dual core, 35 W
Chipset	Intel express chipset HM77
	Intel 6 series express chipset HM67 platform controller hub (PCH)
Graphics	**Intel graphics**: ● Intel HD Graphics 4000 ● Intel HD Graphics 3000
	Switchable discrete graphics: ● ATi XT Radeon HD7470 package with 1024-MB of graphics subsystem discrete memory (64-MB × 32 GDDR5 × 4 PCs, 5GBPS), muxless ● ATi Thames Pro AMD Radeon HD7570 package with 1024-MB of graphics subsystem discrete memory (64-MB × 32 1.5 v GDDR5 × 4 PCs, 5GBPS), muxless
	Support for BD playback with switchable graphics, BACO, HD decode, and DX11
Panel	● 14.0-in, high-definition+ (HD+), light-emitting diode (LED), AntiGlare (1600×900) SVA display; typical brightness: 200 nits ● 14.0-in, high-definition (HD), light-emitting diode (LED), BrightView (1366×768) SVA display; typical brightness: 200 nits
	All display assemblies include 2 wireless local area network (WLAN) antenna cables
	Supports 16:9 wide aspect ratio

Category	Description
	Lighted logo on display enclosure
Memory	2 customer-accessible/upgradable memory module slots
	DDR3-1600-MHz dual channel support
	DDR3-1333-MHz support
	Supports up to 16384-GB of system RAM @ 1600-MHz and 1300-MHz
	Supports the following configurations: ● 16384-MB total system memory (8192 × 2 @ 1600-MHz, not supported with 32-bit operating system, available only in the United States) ● 16384-MB total system memory (8192 × 2 @ 1333-MHz, not supported with 32-bit operating system, available only in the United States) ● 12288-MB total system memory (8192 + 4096 @ 1333-MHz, not supported with 32-bit operating system, available only in the United States) ● 12288-MB total system memory (8192 + 4096 @ 1600-MHz, not supported with 32-bit operating system, available only in the United States) ● 8192-MB total system memory (8192×1 @ 1333-MHz, not supported with 32-bit operating system, available only in the United States) ● 8192-MB total system memory (4096×2 @ 1600-MHz, not supported with 32-bit operating system) ● 8192-MB total system memory (4096×2 @ 1333-MHz, not supported with 32-bit operating system) ● 6144-MB total system memory (4096 + 2048 @ 1600-MHz, not supported with 32-bit operating system) ● 6144-MB total system memory (4096 + 2048 @ 1333-MHz, not supported with 32-bit operating system) ● 4096-MB total system memory (4096×1 @ 1600-MHz, 2048×2 @ 1333-MHz) ● 4096-MB total system memory (4096×1 @ 1333-MHz, 2048×2 @ 1333-MHz) ● 2048-MB total system memory (2048×1 @ 1600-MHz) ● 2048-MB total system memory (2048×1 @ 1333-MHz)
Hard drives	Supports **6.35-cm** (2.5-in) hard drives in **9.5-mm** (.37-in) and **7.0-mm** (.28-in) thicknesses
	Customer-accessible
	Serial ATA (SATA)
	Supports Accelerometer hard drive protection
	Supports Intel Smart Response Technology (for use on systems with memory up to 8 GB only)
	Supports 160-GB solid state drive (SSD) (no support for mSATA combination; no support for 12GB or 16GB memory)
	Supports a 32-GB mSATA solid-state drive
	Supports a 20-GB mSATA solid-state drive

Category	Description
	Supports the following hard drives:
	● 1-TB, 5400-rpm, 9.5-mm
	● 750-GB, 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
	Supports either a 750-GB, 5400-rpm, 9.5-mm hard drive + 20-GB mSATA solid-state drive combination configuration or a 500-GB, 7200-rpm, 9.5-mm hard drive + 20-GB mSATA solid-state drive combination configuration
Optical drive	Fixed
	SATA
	9.5-mm slot load
	Supports DVD±RW Double-Layer FX SuperMulti Drive
	Supports zero-power
Audio and video	2 digital, dual-array microphones with appropriate beam-forming, echo-cancellation, noise-suppression software
	Supports Microsoft Premium requirements
	Subwoofer
	Beats signature audio profile applied to both headphones and external speakers
	HP TrueVision high-definition webcam with activity light (fixed, no tilt, 1280×720 by 30 frames per second)
	HP TrueVision high-definition webcam with activity light (fixed, no tilt, 1280×720 by 24 frames per second)
Ethernet	Integrated 10/100/1000 network interface controller (NIC)
Wireless	Integrated WLAN options by way of wireless module
	Two WLAN antennas built into display assembly
	Supports the following WLAN formats:
	● Atheros 9485GN 802.11b/g/n 1×1 WiFi and 3012 Bluetooth 4.0 Combo Adapter
	● Broadcom 4313 802.11b/g/n 1×1 WiFi and 2070 Bluetooth 2.1+EDR Combo adapter (BT3.0+HS ready) for use only in Brazil
	● 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 Ultimate-N 6300 WLAN module
	● Intel Centrino Wireless-N 2230 WLAN module
	● Intel Centrino Wireless-N + WiMAX 6150 WLAN module
External media card	Push-push insertion/removal

Category	Description
	HP Multi-Format Digital Media Reader (push/push insertion and removal) supports the following digital card formats: ● Secure Digital (SD) Memory Card ● Secure Digital Extended Capacity (SDxC) Memory Card ● Secure Digital High Capacity (SDHC) Memory Card ● MultiMediaCard (MMC) ● Ultra High Speed MultiMediaCard (UHS/MMC)
Ports	● 3-pin AC power ● Audio-in (mono microphone) ● Audio-out (stereo headphone) ● VGA (Dsub 15 pin) supporting 2048×1536 external resolution @ 75 Hz, hot plug and unplug and auto-detection for correct output to wide-aspect vs. standard aspect video ● HDMI v1.4 supporting up to 1080p, 1920×1200 @ 60-Hz, DVI mode ● RJ-45 (Ethernet) ● USB 3.0 and USB 2.0 ports (3 ports, two USB 3.0 ports on the left side of the computer, one USB 2.0 port on the right side of the computer)
Keyboard/pointing devices	Full-size Duracoat, island-style keyboard, in black finish (available only on non-Beats Edition computer models)
	Full-size Duracoat, backlit, island-style keyboard, in black finish (available only in the United States)
	Full-size Duracoat, backlit, island-style keyboard, in red finish (available only on Beats Edition computer models)
	TouchPad with image sensor
	TouchPad with gesture support enabled (HP-defined: scroll and pinch,)
	Taps enabled as default
Power requirements	Supports the following AC adapters: ● 90-W HP Smart AC adapter (PFC/RC/V/EM 3-wire) ● 90-W HP Smart AC adapter (PFC/RC/V 3-wire) ● 65-W HP Smart AC adapter (RC/V/EM 3-wire) ● 65-W HP Smart AC adapter (RC/V 3-wire)
	Supports the following batteries: ● 9-cell, 100-Wh, 3.00-Ah, Li-ion battery ● 6-cell, 62-Wh, 2.80-Ah, Li-ion battery ● 6-cell, 55-Wh, 2.55-Ah, Li-ion battery
Security	● Fingerprint reader ● Intel AT-p Ready support ● HP SimplePass ● OTP (VeriSign) support ● Security cable slot

Category	Description
Operating system	**Preinstalled:** ● Windows 7 Home Basic 64-bit **NOTE:** All Windows 7 64-bit operating systems require 2 GB of system memory. ● Windows 7 Home Premium 64-bit ● Windows 7 Professional 64-bit ● Windows 7 Starter 64-bit (available only on computer models equipped with a 320-GB hard drive)
Serviceability	**End-user replaceable parts:** ● AC adapter ● Battery ● Hard drive ● Memory modules (2) ● Solid-state drive ● Optical drive ● WLAN module

2 External component identification

Display

Item	Component	Description
(1)	WLAN antennas (2)*	Send and receive wireless signals to communicate with wireless local area networks (WLANs).
(2)	Internal microphones (2)	Record sound.
(3)	Webcam light	On: The webcam is in use.
(4)	Webcam	Records video and captures still photographs. To use the webcam, select **Start > All Programs > Communication and Chat > CyberLink YouCam**.

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

Buttons and fingerprint reader

Item	Component	Description
(1)	Power button	● 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.
		If the computer has stopped responding and Windows shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer.
		To learn more about your power settings, select **Start** > **Control Panel** > **System and Security** > **Power Options**, or refer to the *HP Notebook Reference Guide*.

Item	Component	Description
(2)	QuickWeb button	Opens QuickWeb (select models only).
		● When the computer is off or in Hibernation, press the button to open HP QuickWeb.
		● When the computer is in Microsoft Windows, press the button to open the default Web browser.
		● When the computer is in HP QuickWeb, press the button to open the Web browser.
		QuickWeb allows you to browse the Internet, communicate with Skype, and explore other HP QuickWeb programs. When the computer is off or in Hibernation, you can press the QuickWeb button to access these features without waiting for the operating system to start.
		NOTE: For more information, refer to the HP QuickWeb software Help. If your computer does not have HP QuickWeb software, the button opens the Web browser.
(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 b key or the esc key.
(3)	Windows logo key	Displays the Windows Start menu.
(4)	b key	Enables or disables the Beats Audio bass settings (select models only) when pressed in combination with the fn key. Beats Audio is an enhanced audio profile that provides a deep, controlled bass while maintaining a clear sound. Beats Audio is enabled by default. You can view and control the bass settings through the Windows operating system. To view and control the bass properties: Select **Start > Control Panel > Hardware and Sound > Beats Audio Control Panel**.
(5)	Windows applications key	Displays a shortcut menu for items beneath the pointer.
(6)	Action keys	Execute frequently used system functions.

Lights
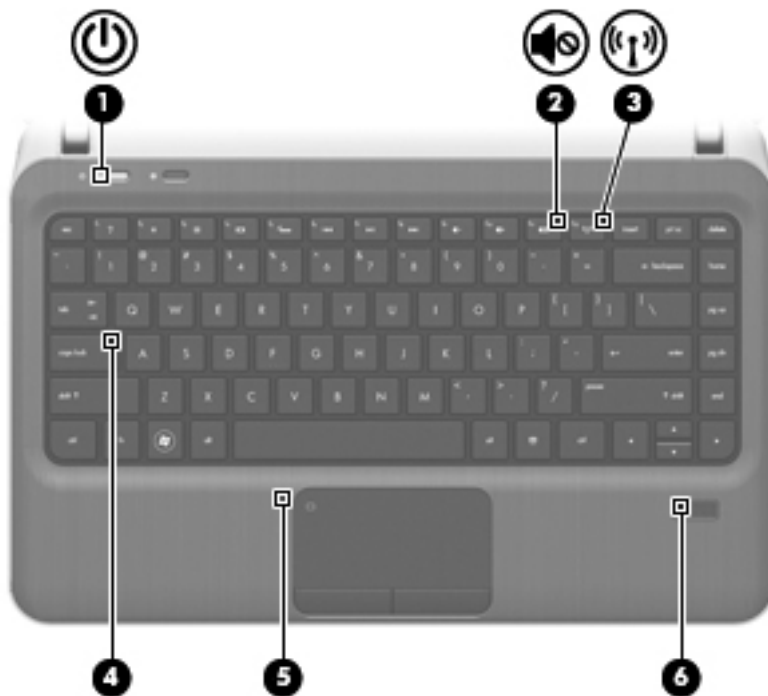
Item	Component	Description
(1)	Power light	• White: The computer is on. • Blinking white: The computer is in the Sleep state. • Off: The computer is off or in Hibernation.
(2)	Mute light	• Amber: Computer sound is off. • Off: Computer sound is on.
(3)	Wireless light	• White: An integrated wireless device, such as a WLAN device and/or a Bluetooth device, is on. • Amber: All wireless devices are disabled.
(4)	Caps lock light	On: Caps lock is on.
(5)	TouchPad light	• On: The TouchPad is off. • Off: The TouchPad is on.
(6)	Fingerprint reader light	• White: The fingerprint was read. • Amber: The fingerprint was not read.

TouchPad

Item	Component	Description
(1)	TouchPad light	- On: The TouchPad is off. - Off: The TouchPad is on.
(2)	TouchPad on/off button	Turns the TouchPad on or off.
(3)	TouchPad zone	Moves the pointer and selects or activates items on the screen.
(4)	Left TouchPad button	Functions like the left button on an external mouse.
(5)	Right TouchPad button	Functions like the right button on an external mouse.

Front

Item	Component	Description
(1)	Digital Media Slot	Supports the following digital card formats:
		● 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)
(2)	Speakers (2)	Produce sound.

Left side
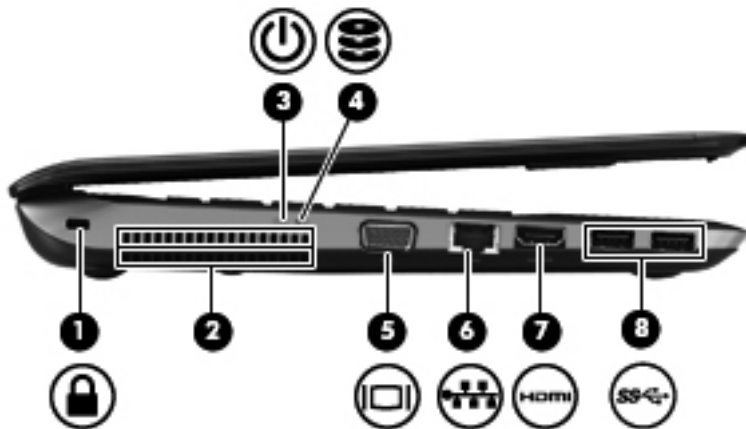
Item	Component	Description
(1)	Security cable slot	Attaches an optional security cable to the computer.
		NOTE: The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.
(2)	Vent	Enables airflow to cool internal components.
		NOTE: The 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.
(3)	Power light	● White: The computer is on.
		● Blinking white: The computer is in the Sleep state.
		● Off: The computer is off or in Hibernation.
(4)	Hard drive light	● Blinking white: The hard drive is being accessed.
		● Amber: HP 3D DriveGuard has temporarily parked the hard drive.
		NOTE: For information on HP ProtectSmart Hard Drive Protection, refer to the *HP Notebook Reference Guide*.
(5)	External monitor port	Connects an external VGA monitor or projector.
(6)	RJ-45 (network) jack	Connects a network cable.
(7)	HDMI port	Connects an optional video or audio device, such as a high-definition television, or any compatible digital or audio device.
(8)	USB 3.0 ports (2)	Connect optional USB 3.0 devices and provide enhanced USB power performance.
		NOTE: The USB 3.0 ports are also compatible with USB 1.0 and 2.0 devices.

Right side

| Item	Component	Description
(1)	Optical drive	Reads and writes (select models only) to an optical disc.
(2)	Optical drive eject button	Ejects the optical disc.
(3)	Audio-out (headphone) jack/audio-in (microphone) jack	Connects optional powered stereo speakers, headphones, earbuds, a headset, or television audio. Also connects an optional headset microphone.
		WARNING! To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the *Regulatory, Safety, and Environmental Notices*.
		NOTE: When a device is connected to the jack, the computer speakers are disabled.
		NOTE: The microphone function is operational only when used with a headphone/microphone unit that has a 4-conductor audio connector.
(4)	USB 2.0 port	Connects an optional USB device.
(5)	Power connector	Connects an AC adapter.
(6)	Battery light	● White: The computer is connected to external power and the battery is fully charged.
		● Amber: A battery is charging.
		● Blinking white: The battery charge level is 12% or less (recharge the battery as soon as possible).
		● Off: The computer is not connected to external power.

Bottom
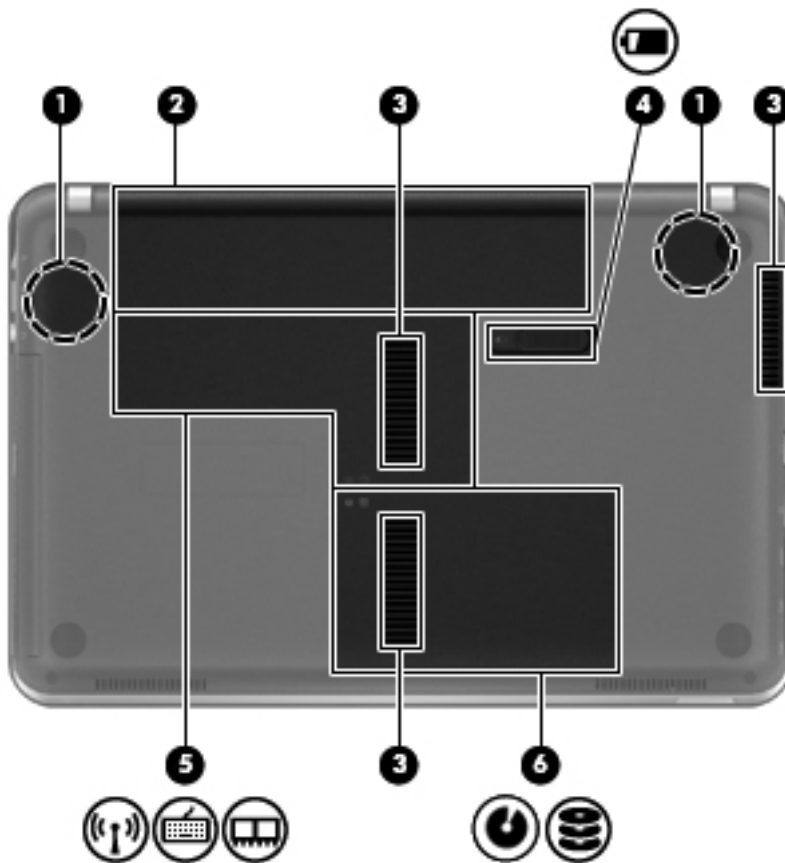
| Item	Component	Description
(1)	HP Triple Bass Reflex Subwoofers	Provide superior bass sound.
(2)	Battery bay	Holds the battery.
(3)	Vents (3)	Enable airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(4)	Battery release latch	Releases the battery from the battery .
(5)	Memory module compartment	Contains the memory module slots, the WLAN module, and the mSATA solid-state drive (select models only).
(6)	Hard drive bay	Holds the hard drive.

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.
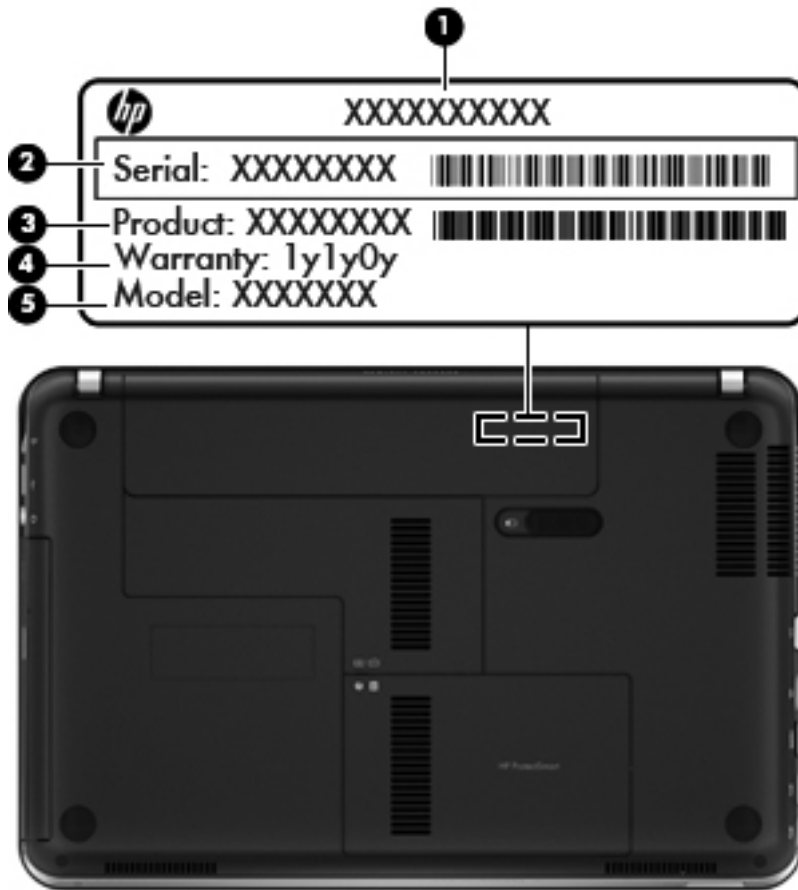
Item	Description	Function
(1)	Product name	This is the product name affixed to the front of the computer.
(2)	Serial number (s/n)	This is an alphanumeric identifier that is unique to each product.
(3)	Part number/Product number (p/n)	This number provides specific information about the product's hardware 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
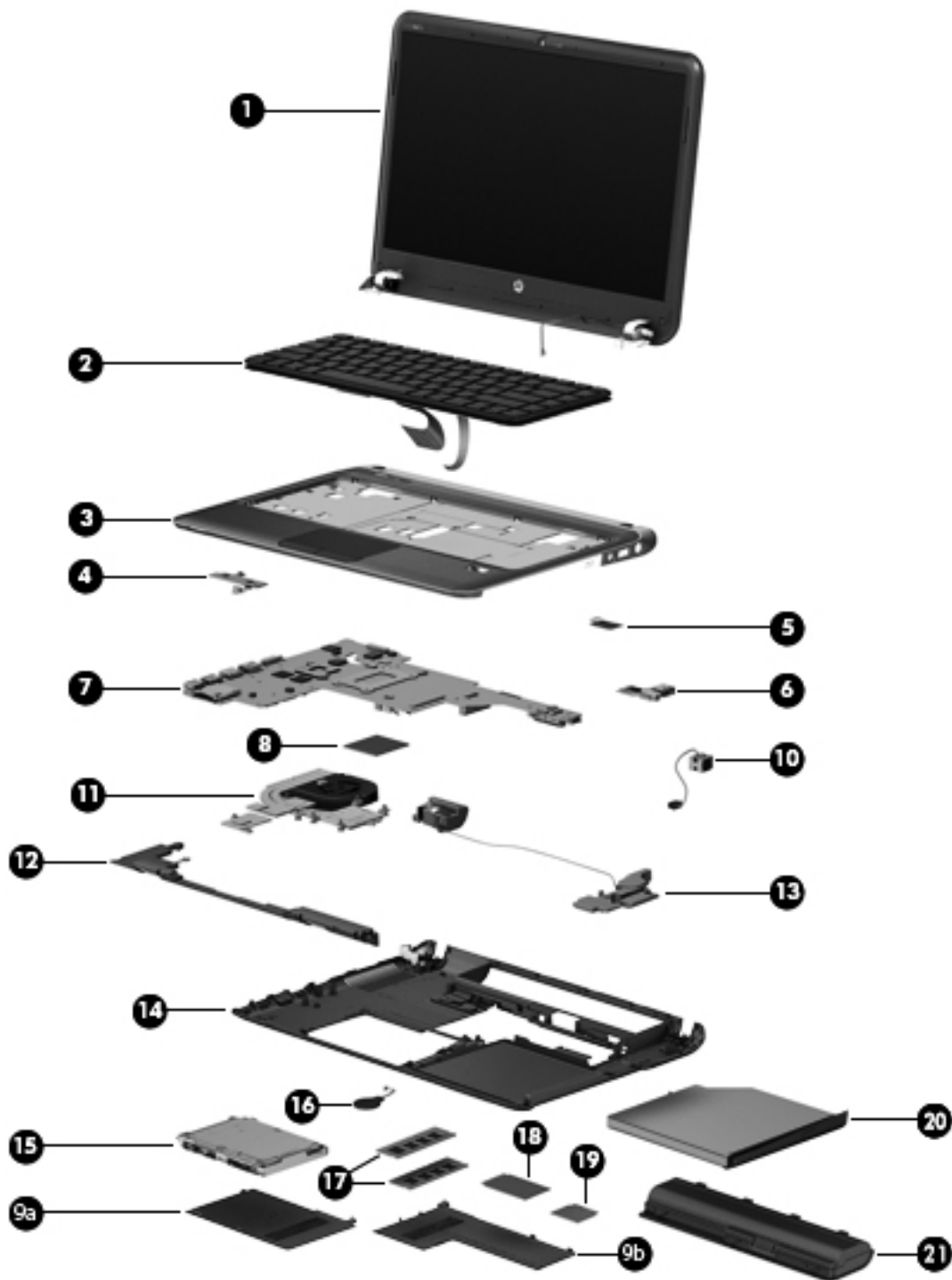
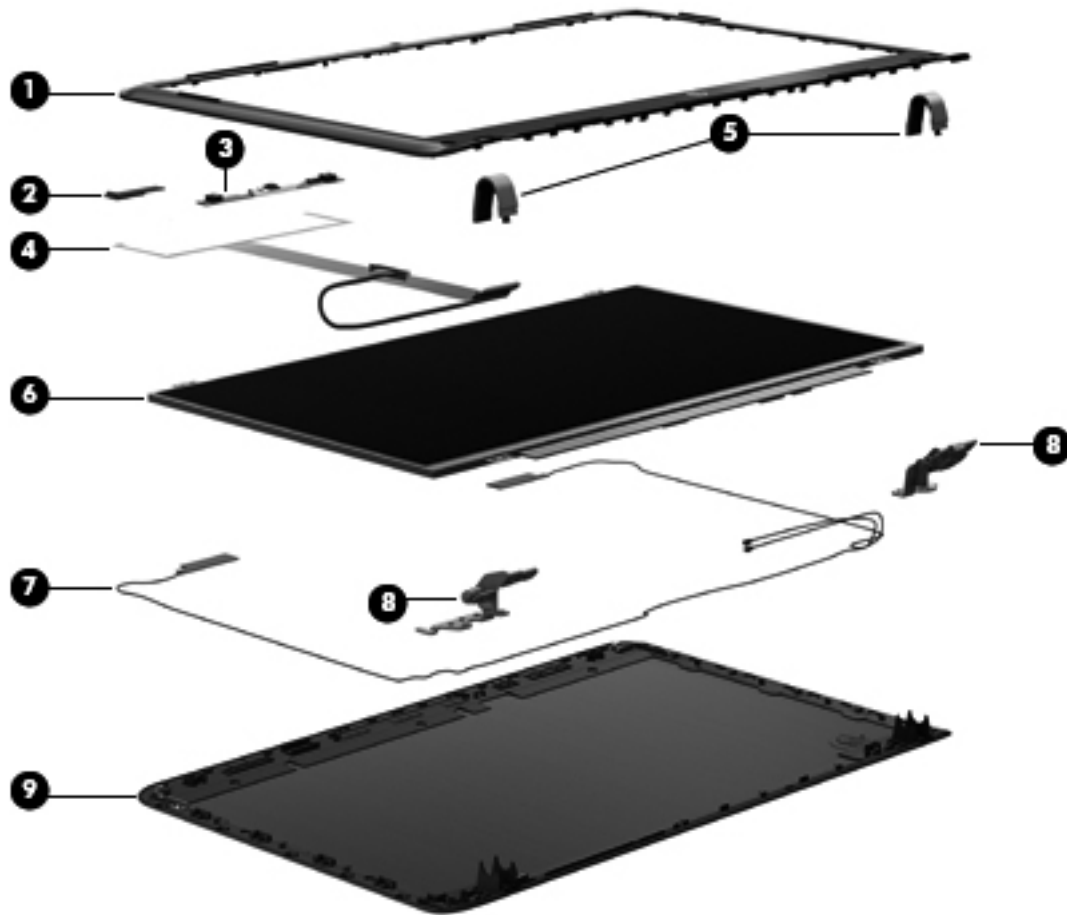| Item	Component	Spare part number
(1)	**Display assembly**: The display assembly is spared at the subcomponent level only. For more display assembly spare part information, see Display assembly subcomponents on page 22.	
(2)	**Keyboard** (includes keyboard cable):	

Item	Component	Spare part number
	For use only with Beats Edition computer models:	
	For use in Brazil	669069-201
	For use in Canada	669069-121
	For use in India	669069-D61
	For use in Japan	669069-291
	For use in Latin America	669069-161
	For use in South Korea	669069-AD1
	For use in Taiwan	669069-AB1
	For use in Thailand	669069-281
	For use in the United States	669069-001
	Keyboard without backlight for use only on non-Beat Edition computer models	669070-001
	Keyboard with backlight (includes backlight):	
	For use in Belgium	671180-A41
	For use in Brazil	671180-201
	For use in Canada	671180-121
	For use in Denmark, Finland, Norway	671180-DH1
	For use in France	671180-051
	For use in Germany	671180-041
	For use in Italy	671180-061
	For use in Latin America	671180-161
	For use in the Netherlands	671180-B31
	For use in Portugal	671180-131
	For use in Russia	671180-251
	For use in Saudi Arabia	671180-171
	For use in South Korea	671180-AD1
	For use in Spain	671180-071
	For use in Switzerland	671180-BG1
	For use in Taiwan	671180-AB1
	For use in Turkey	671180-141
	For use in the United Kingdom and Singapore	671180-031
	For use in the United States	671180-001
(3)	**Top cover** (includes TouchPad, but does not include TouchPad cables):	
	NOTE: The TouchPad cables are included in the Cable Kit, spare part number 669062-001.	
	For use only with Beats Edition computer models	669932-001

Item	Component	Spare part number
	In dark umber finish	669930-001
	In steel gray finish	669931-001
(4)	**Power button board** (includes cable)	669072-001
(5)	**Fingerprint reader board** (includes bracket, does not include cable) **NOTE:** The fingerprint reader board cable is included in the Cable Kit, spare part number 669062-001.	669064-001
(6)	**Audio/USB board** (does not include cable) **NOTE:** The audio/USB board is included in the Cable Kit, spare part number 669062-001.	669073-001
(7)	**System board** (includes processor and replacement thermal material):	
	For use only with computer models equipped with the Intel 7570 chipset and a graphics subsystem with discrete memory	676577-001
	For use only with computer models equipped with the Intel 6490 chipset and a graphics subsystem with discrete memory	669084-001
	For use only with computer models equipped with the Intel HM77 Express chipset and a graphics subsystem with UMA memory	681853-001
	For use only with computer models equipped with a graphics subsystem with UMA memory	669085-001
	Thermal Material Kit (not illustrated, includes replacement thermal paste and thermal pads)	669929-001
(8)	**Intel Core processor** (includes replacement thermal material):	
	Intel Core i7-3612QM 2.1GHz processor (SC turbo up to 3.1GHz), 6-MB L3 cache, 1600MHz, quad core, 35W	680647-001
	Intel Core i7-3520M 2.9GHz processor (SC turbo up to 3.6GHz), 4-MB L3 cache, 1600MHz, dual core, 35W	681954-001
	Intel Core i7-2640M 2.80-GHz processor (SC turbo up to 3.40-GHz), 4.0-MB L3 cache, 1333-MHz FSB, dual core, 35 W	666173-001
	Intel Core i5-3320M 2.6-GHz processor (SC turbo up to 3.3GHz), 3-MB L3 cache, 1600-MHz, dual core, 35W	681952-001
	Intel Core i5-3210M 2.5-GHz processor (SC turbo up to 3.1GHz), 3-MB L3 cache, 1600-MHz, dual core, 35W	680645-001
	Intel Core i5-2540M 2.60-GHz processor (SC turbo up to 3.30-GHz), 3.0-MB L3 cache, 1333-MHz FSB, dual core, 35 W)	631255-001
	Intel Core i5-2520M 2.50-GHz processor (SC turbo up to 3.20-GHz), 3.0-MB L3 cache, 1333-MHz FSB, dual core, 35 W)	631253-001
	Intel Core i5-2430M 2.40-GHz processor (SC turbo up to 3.00-GHz), 3.0-MB L3 cache, 1333-MHz FSB, dual core, 35 W)	653341-001
	Intel Core i3-2350M TJ85 2.30-GHz processor (3.0-MB L3 cache, 1333-MHz FSB, dual core, 35 W)	653340-001
	Plastics Kit **NOTE:** See Plastics Kit on page 24 for more Plastics Kit spare part information.	
	For use only with Beats Edition computer models	671170-001

Item	Component	Spare part number
	For use only with non-Beats Edition computer models	669075-001
	Includes:	
(9a)	Hard drive cover (includes one captive screw, secured by a C-clip)	
(9b)	Memory module/wireless module compartment cover (includes one captive screw, secured by a C-clip)	
(10)	**Power connector cable** (includes bracket)	669063-001
(11)	**Fan/heat sink assembly** (includes replacement thermal material)	
	For use only with computer models equipped with a graphics subsystem with discrete memory	669934-001
	For use only with computer models equipped with a graphics subsystem with UMA memory	669935-001
(12)	**Speakers** (include left and right speakers, cables, and rubber isolator)	669933-001
(13)	**Subwoofer** (includes cable and rubber isolators)	670733-001
(14)	**Base enclosure** (includes rubber feet):	
	For use only with Beats Edition computer models	670729-001
	For use only with non-Beats Edition computer models	669059-001
	Rubber Kit (includes base enclosure rubber feet and rubber screw covers)	669079-001
(15)	**Hard drive** (does not include hard drive bracket, cable, or screws):	
	NOTE: The hard drive bracket, cable, and screws are included in the Hard Drive Hardware Kit, spare part number 669066-001.	
	1-TB, 5400-rpm, 9.5-mm	676521-001
	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	634862-001
	320-GB, 7200-rpm, 7.0-mm	641672-001
	320-GB, 5400-rpm, 7.0-mm	645193-001
(16)	**RTC battery** (includes cable)	619451-001
(17)	**Memory modules** (2):	
	PC3, 10600, 1333-MHz	
	8 MB	634091-001
	4 GB	621569-001
	2 GB	621565-001
	PC3, 12800, 1600-MHz	
	8 MB	670034-001
	4 MB	641369-001

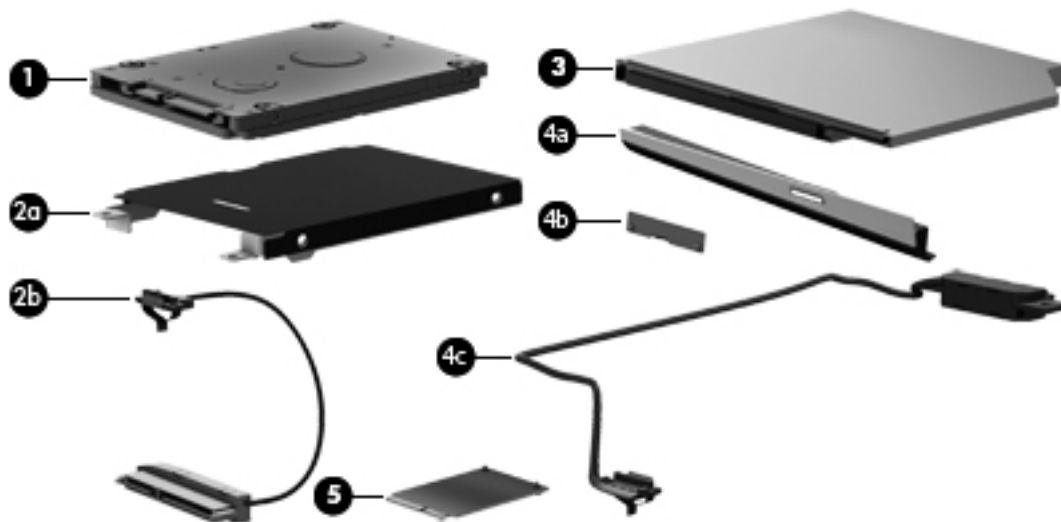| Item	Component	Spare part number
	2 MB	652972-001
(18)	**Solid-state drives**	
	32-GB mSATA	669083-001
	20-GB mSATA	669082-001
	160-GB solid-state drive	682678-001
(19)	**WLAN module:**	
	Atheros 9485GN 802.11b/g/n 1×1 WiFi and 3012 Bluetooth 4.0 Combo Adapter	655795-001
	Broadcom 4313 802.11b/g/n 1×1 WiFi and 2070 Bluetooth 2.1+EDR Combo adapter (BT3.0+HS ready) for use only in Brazil	600370-201
	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	631956-001
	Intel Centrino Wireless-N 2230 WLAN module	670290-001
	Intel Centrino Wireless-N + WiMAX 6150 WLAN module	633817-001
(20)	**DVD±RW Double-Layer FX SuperMulti Drive** (does not include bezel, bracket, cable, or screws) **NOTE:** The optical drive bezel, bracket, cable, and screws are included in the Optical Drive Hardware Kit, spare part numbers 670734-001 (for use only with Beats Edition computer models) and 670735-001 (for use only with non-Beats Edition computer models).	669071-001
(21)	**Battery:**	
	9-cell, 100-Wh, 3.00-Ah, Li-ion battery	636631-001
	6-cell, 62-Wh, 2.80-Ah, Li-ion battery	593562-001
	6-cell, 55-Wh, 2.55-Ah, Li-ion battery	593554-001

Display assembly subcomponents

Item	Component	Spare part number
(1)	**Display bezel:**	
	For use only with Beats Edition computer models	670730-001
	For use only with non-Beats Edition computer models	669060-001
(2)	**Bluetooth module**, 4.0 EDR	655792-001
(3)	**Webcamera/microphone module**	669086-001
(4)	**Display panel cable** (includes Bluetooth module cable and webcamera module cable):	
	For use only with HD+, AntiGlare display panel, spare part number 669077-001	670397-001
	For use only with HD, BrightView display panel, spare part number 669076-001	669061-001
(5)	**Display hinge covers** (includes left and right hinge covers):	
	For use only with Beats Edition computer models	670732-001
	For use only with non-Beats Edition computer models	669068-001
(6)	**Display panel:**	
	14.0-in, HD+, LED, SVA AntiGlare display panel	669077-001
	14.0-in, HD, LED, SVA BrightView display panel	669076-001

Item	Component	Spare part number
(7)	**Wireless Antenna Kit** (includes left and right wireless antenna cables and transceivers)	669055-001
(8)	**Display Hinge Kit**	670731-001
(9)	**Display enclosure:**	
	For use only with Beats Edition computer models	669058-001
	In dark umber finish	669056-001
	In steel gray finish	669057-001
	Display Screw Kit (not illustrated)	669080-001

Mass storage devices

Item	Component	Spare part number
(1)	**Hard drive** (does not include hard drive bracket, cable, or screws):	
	1-TB, 5400-rpm, 9.5-mm	676521-001
	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	634862-001
	320-GB, 7200-rpm, 7.0-mm	641672-001
	320-GB, 5400-rpm, 7.0-mm	645193-001
	Hard Drive Hardware Kit, includes:	669066-001
(2a)	Hard drive bracket	

Item	Component	Spare part number
(2b)	Hard drive cable	
	Hard drive screws (not illustrated)	
(3)	**DVD±RW Double-Layer FX SuperMulti Drive** (does not include bezel, bracket, cable, or screws):	669071-001
	Optical Drive Hardware Kit:	
	For use only with Beats Edition computer models	670734-001
	For use only with non-Beats Edition computer models	670735-001
	Includes:	
(4a)	Optical drive bezel	
(4b)	Optical drive bracket	
(4c)	Optical drive connector cable	
	Optical drive screws (not illustrated)	
(5)	**Solid-state drives**	
	32-GB mSATA	669083-001
	20-GB mSATA	669082-001
	160-GB solid-state drive	682678-001

Plastics Kit

Item	Component	Spare part number
	Plastics Kit	
	For use only with Beats Edition computer models	671170-001
	For use only with non-Beats Edition computer models	669075-001

Item	Component	Spare part number
	Includes:	
(1)	Memory module/wireless module compartment cover (includes one captive screw, secured by a C-clip)	
(2)	Hard drive cover (includes one captive screw, secured by a C-clip)	

Miscellaneous parts

Component	Spare part number
AC adapter:	
90-W HP Smart AC adapter (PFC/RC/V/EM 3-wire)	609947-001
90-W HP Smart AC adapter (PFC/RC/V 3-wire)	609940-001
65-W HP Smart AC adapter (RC/V/EM 3-wire)	609948-001
65-W HP Smart AC adapter (RC/V 3-wire)	609939-001
14-in. Beats Edition protective cover	667666-001
Power cord (3-pin, black, 1.83-m):	
For use in Argentina	490371-D01
For use in Australia	490371-011
For use in Brazil	490371-202
For use in Denmark	490371-081
For use in Europe	490371-021
For use in India	490371-D61
For use in Italy	490371-061
For use in Japan	490371-291
For use in North America	490371-001
For use in the People's Republic of China	490371-AA1
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	669081-001

Sequential part number listing

Spare part number	Description
490371-001	Power cord for use in North America (3-pin, black, 1.83-m)
490371-011	Power cord for use in Australia (3-pin, black, 1.83-m)
490371-021	Power cord for use in Europe (3-pin, black, 1.83-m)
490371-031	Power cord for use in the United Kingdom and Singapore (3-pin, black, 1.83-m)
490371-061	Power cord for use in Italy (3-pin, black, 1.83-m)
490371-081	Power cord for use in Denmark (3-pin, black, 1.83-m)
490371-111	Power cord for use in Switzerland (3-pin, black, 1.83-m)
490371-201	Power cord for use in Thailand (3-pin, black, 1.83-m)
490371-202	Power cord for use in Brazil (3-pin, black, 1.83-m)
490371-291	Power cord for use in Japan (3-pin, black, 1.83-m)
490371-AA1	Power cord for use in the People's Republic of China (3-pin, black, 1.83-m)
490371-AB1	Power cord for use in Taiwan (3-pin, black, 1.83-m)
490371-AD1	Power cord for use in South Korea (3-pin, black, 1.83-m)
490371-D01	Power cord for use in Argentina (3-pin, black, 1.83-m)
490371-D61	Power cord for use in India (3-pin, black, 1.83-m)
593554-001	6-cell, 55-Wh, 2.55-Ah, Li-ion battery
593562-001	6-cell, 62-Wh, 2.80-Ah, Li-ion battery
600370-201	Broadcom 4313 802.11b/g/n 1×1 WiFi and 2070 Bluetooth 2.1+EDR Combo adapter (BT3.0+HS ready) for use only in Brazil
609939-001	65-W HP Smart AC adapter (RC/V 3-wire)
609940-001	90-W HP Smart AC adapter (PFC/RC/V 3-wire)
609947-001	90-W HP Smart AC adapter (PFC/RC/V/EM 3-wire)
609948-001	65-W HP Smart AC adapter (RC/V/EM 3-wire)
619451-001	RTC battery
621565-001	2-GB memory module (PC3, 10600, 1333-MHz)
621569-001	4-GB memory module (PC3, 10600, 1333-MHz)
631253-001	Intel Core i5-2520M 2.50-GHz processor (SC turbo up to 3.20-GHz), 3.0-MB L3 cache, 1333-MHz FSB, dual core, 35 W (includes replacement thermal material)
631255-001	Intel Core i5-2540M 2.60-GHz processor (SC turbo up to 3.30-GHz), 3.0-MB L3 cache, 1333-MHz FSB, dual core, 35 W (includes replacement thermal material)
631956-001	Intel Centrino Advanced-N 6230 WLAN module
633817-001	Intel Centrino Wireless-N + WiMAX 6150 WLAN module
634091-001	8-GB memory module (PC3, 10600, 1333-MHz)

Spare part number	Description
634250-001	750-GB, 5400-rpm, 9.5-mm hard drive (does not include bracket, cable, or screws) **NOTE:** The hard drive bracket, cable, and screws are included in the Hard Drive Hardware Kit, spare part number 669066-001.
634862-001	320-GB, 7200-rpm, 9.5-mm hard drive (does not include bracket, cable, or screws) **NOTE:** The hard drive bracket, cable, and screws are included in the Hard Drive Hardware Kit, spare part number 669066-001.
634925-001	500-GB, 7200-rpm, 9.5-mm hard drive (does not include bracket, cable, or screws) **NOTE:** The hard drive bracket, cable, and screws are included in the Hard Drive Hardware Kit, spare part number 669066-001.
636631-001	9-cell, 100-Wh, 3.00-Ah, Li-ion battery
641369-001	4-GB memory module (PC3, 12800, 1600-MHz)
641672-001	320-GB, 7200-rpm, 7.0-mm hard drive (does not include bracket, cable, or screws) **NOTE:** The hard drive bracket, cable, and screws are included in the Hard Drive Hardware Kit, spare part number 669066-001.
645193-001	320-GB, 5400-rpm, 7.0-mm hard drive (does not include bracket, cable, or screws) **NOTE:** The hard drive bracket, cable, and screws are included in the Hard Drive Hardware Kit, spare part number 669066-001.
652972-001	2-GB memory module (PC3, 12800, 1600-MHz)
653340-001	Intel Core i3-2350M TJ85 2.30-GHz processor (3.0-MB L3 cache, 1333-MHz FSB, dual core, 35 W; includes replacement thermal material)
653341-001	Intel Core i5-2430M 2.40-GHz processor (SC turbo up to 3.00-GHz), 3.0-MB L3 cache, 1333-MHz FSB, dual core, 35 W; includes replacement thermal material)
655792-001	Bluetooth module, 4.0 EDR
655795-001	Atheros 9485GN 802.11b/g/n 1×1 WiFi and 3012 Bluetooth 4.0 Combo Adapter
657325-001	Broadcom 4313GN 802.11b/g/n 1×1 WiFi and 20702 Bluetooth 4.0 Combo Adapter
666173-001	Intel Core i7-2640M 2.80-GHz processor (SC turbo up to 3.40-GHz), 4.0-MB L3 cache, 1333-MHz FSB, dual core, 35 W; includes replacement thermal material)
667666-001	HP Beats Edition 14-in protective cover
669055-001	Wireless Antenna Kit (includes left and right wireless antenna cables and transceivers)
669056-001	Display enclosure in dark umber finish
669057-001	Display enclosure in steel gray finish
669058-001	Display enclosure for use only with Beats Edition computer models
669059-001	Base enclosure for use only with non-Beats Edition computer models
669060-001	Display bezel for use only with non-Beats Edition computer models
669061-001	Display Cable Kit for use only with HD, BrightView display panel, spare part number 669076-001 (includes Bluetooth module cable and webcamera cable)
669062-001	Cable Kit (includes audio/USB board cable, fingerprint reader board cable, and TouchPad board cables)
669063-001	Power connector cable (includes bracket)

Spare part number	Description
669064-001	Fingerprint reader board (includes bracket, does not include cable) **NOTE:** The fingerprint reader board spare part kit does not include the fingerprint reader board cable. The fingerprint reader board cable is included in the Cable Kit, spare part number 669062-001.
669066-001	Hard Drive Hardware Kit (includes bracket, cable, and screws)
669068-001	Display hinge covers for use only with non-Beats Edition computer models (includes left and right hinge covers)
669069-001	Keyboard for use with Beats Edition computer models in the United States (includes keyboard cable and keyboard backlight cable)
669069-031	Keyboard for use with Beats Edition computer models in the United Kingdom and Singapore (includes keyboard cable)
669069-121	Keyboard for use with Beats Edition computer models in Canada (includes keyboard cable)
669069-141	Keyboard for use with Beats Edition computer models in Turkey (includes keyboard cable)
669069-161	Keyboard for use with Beats Edition computer models in Latin America (includes keyboard cable)
669069-201	Keyboard for use with Beats Edition computer models in Brazil (includes keyboard cable)
669069-281	Keyboard for use with Beats Edition computer models in Thailand (includes keyboard cable)
669069-291	Keyboard for use with Beats Edition computer models in Japan (includes keyboard cable)
669069-AB1	Keyboard for use with Beats Edition computer models in Taiwan (includes keyboard cable)
669069-AD1	Keyboard for use with Beats Edition computer models in South Korea (includes keyboard cable)
669069-BG1	Keyboard for use with Beats Edition computer models in Switzerland (includes keyboard cable)
669069-D61	Keyboard for use with Beats Edition computer models in India (includes keyboard cable)
669070-001	Keyboard without backlight for use only with non-Beats Edition computer models in the United States (includes keyboard cable and keyboard backlight cable)
669071-001	DVD±RW Double-Layer FX SuperMulti Drive (does not include bezel, bracket, or screws)
669072-001	Power button board (includes cable)
669073-001	Audio/USB board (does not include cable) **NOTE:** The audio/USB board spare part kit does not include the audio/USB board cable. The audio/USB board cable is included in the Cable Kit, spare part number 669062-001.
669075-001	Plastics Kit for use only with non-Beats Edition computer models (includes hard drive cover and memory module/wireless module compartment cover)
669076-001	14.0-in, HD, LED, SVA BrightView display panel
669077-001	14.0-in, HD+, LED, SVA AntiGlare display panel
669079-001	Rubber Kit (includes base enclosure rubber feet and rubber screw covers)
669080-001	Display Screw Kit
669081-001	Screw Kit
669083-001	32-GB mSATA solid-state drive
669084-001	System board for use only with computer models equipped with the Intel 6490 chipset and a graphics subsystem with discrete memory (includes replacement thermal material)

Spare part number	Description
669085-001	System board for use only with computer models equipped with a graphics subsystem with UMA memory (includes replacement thermal material)
669086-001	Webcamera/microphone module
669299-001	500-GB, 5400-rpm, 7.0-mm hard drive (does not include bracket, cable, or screws) **NOTE:** The hard drive bracket, cable, and screws are included in the Hard Drive Hardware Kit, spare part number 669066-001.
669300-001	640-GB, 5400-rpm, 9.5-mm hard drive (does not include bracket, cable, or screws) **NOTE:** The hard drive bracket, cable, and screws are included in the Hard Drive Hardware Kit, spare part number 669066-001.
669929-001	Thermal Material Kit (includes replacement thermal pads and paste)
669930-001	Top cover in dark umber finish (includes TouchPad, but does not include TouchPad cables) **NOTE:** The top cover spare part kit does not include the TouchPad cables. The TouchPad cables are included in the Cable Kit, spare part number 669062-001.
669931-001	Top cover in steel gray finish (includes TouchPad, but does not include TouchPad cables) **NOTE:** The top cover spare part kit does not include the TouchPad cables. The TouchPad cables are included in the Cable Kit, spare part number 669062-001.
669932-001	Top cover for use only with Beats Edition computer models (includes TouchPad, but does not include TouchPad cables) **NOTE:** The top cover spare part kit does not include the TouchPad cables. The TouchPad cables are included in the Cable Kit, spare part number 669062-001.
669933-001	Speakers (include left and right speakers and cables)
669934-001	Fan/heat sink assembly for use only with computer models equipped with a graphics subsystem with discrete memory (includes replacement thermal material)
669935-001	Fan/heat sink assembly for use only with computer models equipped with a graphics subsystem with UMA memory (includes replacement thermal material)
670034-001	8-GB memory module (PC3, 12800, 1600-MHz)
670290-001	Intel Centrino Wireless-N 2230 WLAN module
670397-001	Display Cable Kit for use only with HD+, AntiGlare display panel, spare part number 669077-001 (includes Bluetooth module cable and webcamera cable)
670729-001	Base enclosure for use only with Beats Edition computer models
670730-001	Display bezel for use only with Beats Edition computer models
670731-001	Display Hinge Kit (includes left and right display hinges and brackets)
670732-001	Display hinge covers for use only with Beats Edition computer models (includes left and right hinge covers)
670733-001	Subwoofer (includes cable and rubber isolators)
670734-001	Optical Drive Hardware Kit for use only with non-Beats Edition computer models (includes optical drive bezel, bracket, connector cable, and screws)
670735-001	Optical Drive Hardware Kit for use only with Beats Edition computer models (includes optical drive bezel, bracket, connector cable, and screws)

Spare part number	Description
671170-001	Plastics Kit for use only with Beats Edition computer models (includes hard drive cover and memory module/wireless module compartment cover)
671180-001	Keyboard with backlight for use in the United States (includes keyboard cable and keyboard backlight cable)
671180-031	Keyboard with backlight for use in the United Kingdom and Singapore (includes keyboard cable and keyboard backlight cable)
671180-041	Keyboard with backlight for use in Germany (includes keyboard cable and keyboard backlight cable)
671180-051	Keyboard with backlight for use in France (includes keyboard cable and keyboard backlight cable)
671180-061	Keyboard with backlight for use in Italy (includes keyboard cable and keyboard backlight cable)
671180-071	Keyboard with backlight for use in Spain (includes keyboard cable and keyboard backlight cable)
671180-121	Keyboard with backlight for use in Canada (includes keyboard cable and keyboard backlight cable)
671180-131	Keyboard with backlight for use in Portugal (includes keyboard cable and keyboard backlight cable)
671180-141	Keyboard with backlight for use in Turkey (includes keyboard cable and keyboard backlight cable)
671180-161	Keyboard with backlight for use in Latin America (includes keyboard cable and keyboard backlight cable)
671180-171	Keyboard with backlight for use in Saudi Arabia (includes keyboard cable and keyboard backlight cable)
671180-201	Keyboard with backlight for use in Brazil (includes keyboard cable and keyboard backlight cable)
671180-251	Keyboard with backlight for use in Russia (includes keyboard cable and keyboard backlight cable)
671180-AB1	Keyboard with backlight for use in Taiwan (includes keyboard cable and keyboard backlight cable)
671180-AD1	Keyboard with backlight for use in South Korea (includes keyboard cable and keyboard backlight cable)
671180-A41	Keyboard with backlight for use in Belgium (includes keyboard cable and keyboard backlight cable)
671180-B31	Keyboard with backlight for use in the Netherlands (includes keyboard cable and keyboard backlight cable)
671180-BG1	Keyboard with backlight for use in Switzerland (includes keyboard cable and keyboard backlight cable)
671180-DH1	Keyboard with backlight for use in Denmark, Finland, and Norway (includes keyboard cable and keyboard backlight cable)
676521-001	1-TB, 5400-rpm, 9.5-mm hard drive (does not include bracket, cable, or screws) NOTE: The hard drive bracket, cable, and screws are included in the Hard Drive Hardware Kit, spare part number 669066-001.
676577-001	System board for use only with computer models equipped with the Intel 7570 chipset and a graphics subsystem with discrete memory (includes replacement thermal material)
680645-001	Intel Core i5-3210M 2.5-GHz processor (SC turbo up to 3.1GHz), 3.0-MB L3 cache, 1600-MHz, dual core, 35W (includes replacement thermal material)
680647-001	Intel Core i7-3612QM 2.1-GHz processor (SC turbo up to 3.1GHz), 6.0-MB L3 cache, 1600-MHz, quad core, 35W (includes replacement thermal material)
681853-001	System board for use only with computer models equipped with the Intel HM77 Express chipset and a graphics subsystem with UMA memory (includes replacement thermal material)
681952-001	Intel Core i5-3320M 2.6-GHz processor (SC turbo up to 3.3GHz), 3.0-MB L3 cache, 1600-MHz, dual core, 35W (includes replacement thermal material)

Spare part number	Description
681954-001	Intel Core i7-3520M 2.9-GHz processor (SC turbo up to 3.6GHz), 4.0-MB L3 cache, 1600-MHz, dual core, 35W (includes replacement thermal material)
682678-001	160-GB solid state drive

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			
	Relative humidity		
Event	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 ±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 61 screws that must be removed, replaced, or loosened when servicing the computer. Make special note of each screw size and location during removal and replacement.

Service tag

When ordering parts or requesting information, provide the computer serial number and model number provided on the service tag. The battery must be removed to access the service tag. See Battery on page 37 for battery removal procedures.
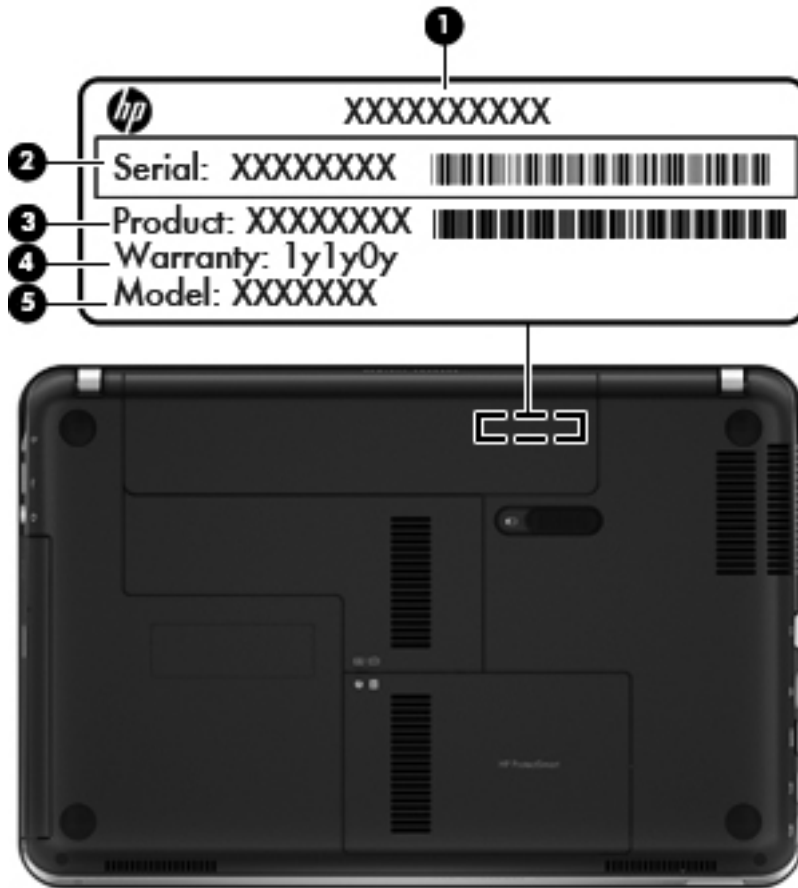
Item	Component	Description
(1)	Product name	This is the product name affixed to the front of the computer.
(2)	Serial number (s/n)	This is an alphanumeric identifier that is unique to each product.
(3)	Part number/Product number (p/n)	This number provides specific information about the product's hardware components. The part number helps a service technician determine what components and parts are needed.

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

Battery

Description	Spare part number
9-cell, 100-Wh, 3.00-Ah, Li-ion battery	636631-001
6-cell, 62-Wh, 2.80-Ah, Li-ion battery	593562-001
6-cell, 55-Wh, 2.55-Ah, Li-ion battery	593554-001

Before disassembling the computer, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

Remove the battery:

CAUTION: Removing a battery that is the sole power source for the computer can cause loss of information. To prevent loss of information, save your work and initiate Hibernation or shut down the computer through Windows before removing the battery.

1. Turn the computer upside down on a flat surface.

2. Slide the battery release latch **(1)** to release the battery.

NOTE: The battery release latch automatically returns to its original position.

3. Pivot the battery **(2)** upward and remove it from the computer.
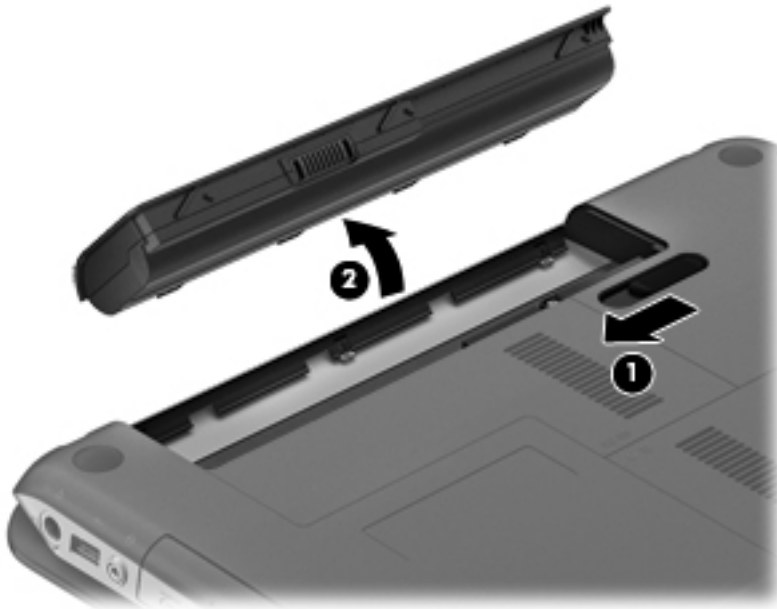
To insert the battery:

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.)

WLAN module

Description	Spare part number
Atheros 9485GN 802.11b/g/n 1×1 WiFi and 3012 Bluetooth 4.0 Combo Adapter	655795-001
Broadcom 4313 802.11b/g/n 1×1 WiFi and 2070 Bluetooth 2.1+EDR Combo adapter (BT3.0+HS ready) for use only in Brazil	600370-201
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	631956-001
Intel Centrino Wireless-N 2230 WLAN module	670290-001
Intel Centrino Wireless-N + WiMAX 6150 WLAN module	633817-001

⚠ **CAUTION:** To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore device functionality, and then contact technical support.

Before removing the WLAN module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 37).

Remove the WLAN module:

1. Loosen the captive screw **(1)** that secures the memory module/wireless module compartment cover to the computer.

2. Slide the memory module/wireless module compartment cover toward the back of the computer **(2)**, and then remove the cover **(3)**. The memory module/wireless module compartment cover is available in the Plastics Kit, spare part numbers 671170-001 (for use only with Beats Edition computer models) and 669075-001 (for use only with non-Beats Edition computer models).
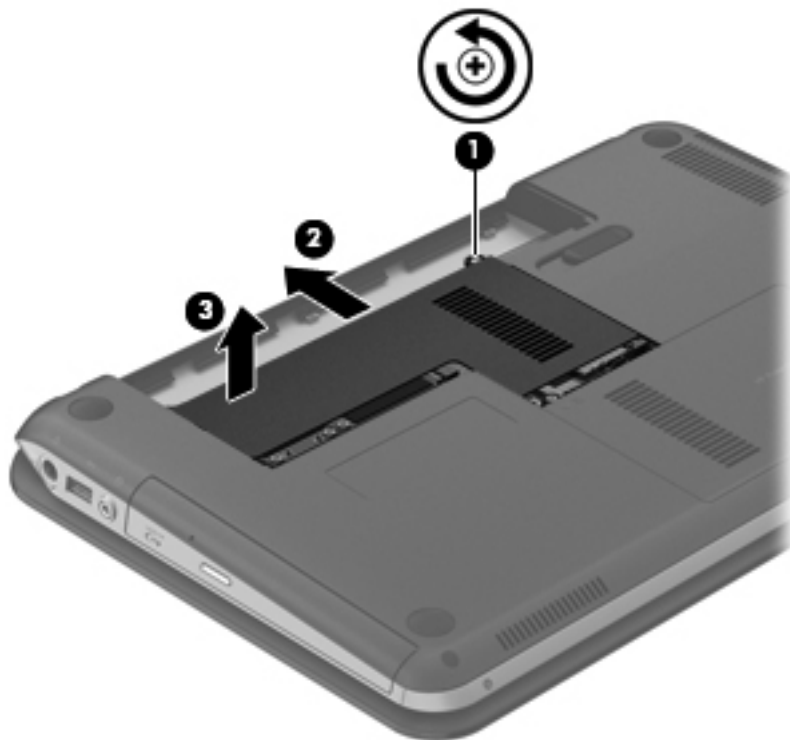
3. Disconnect the WLAN antenna cables from the terminals on the WLAN module.

> **NOTE:** The "1" WLAN antenna cable is connected to the WLAN module 1/Main terminal. The "2" WLAN antenna cable is connected to the WLAN module 2/Aux terminal. If a third antenna cable is present, it is connected to the WLAN module middle terminal.
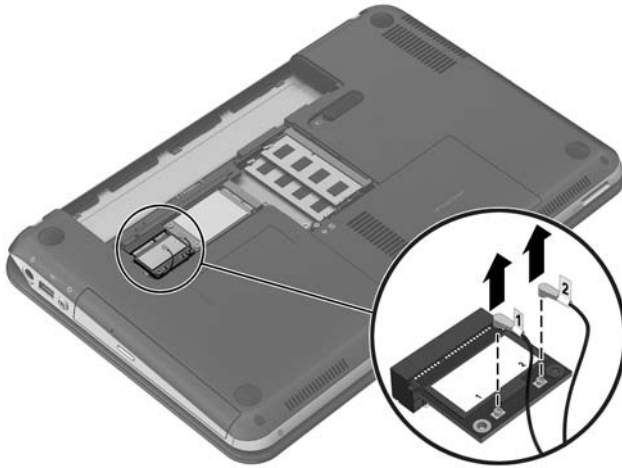
4. Remove the two Phillips PM2.5×3.7 screws that secure the WLAN module to the system board. (The WLAN module tilts up.)
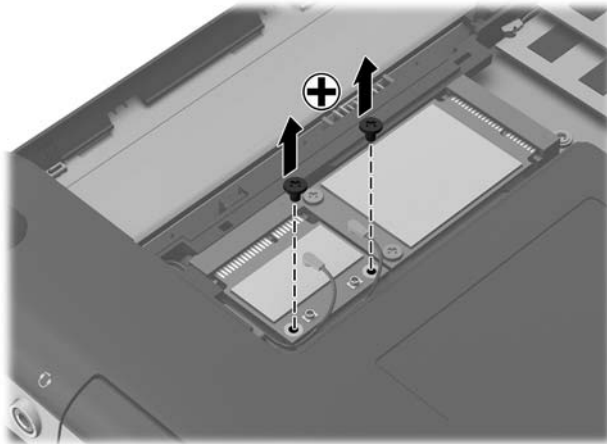
5. Remove the WLAN module by pulling the module away from the slot at an angle.
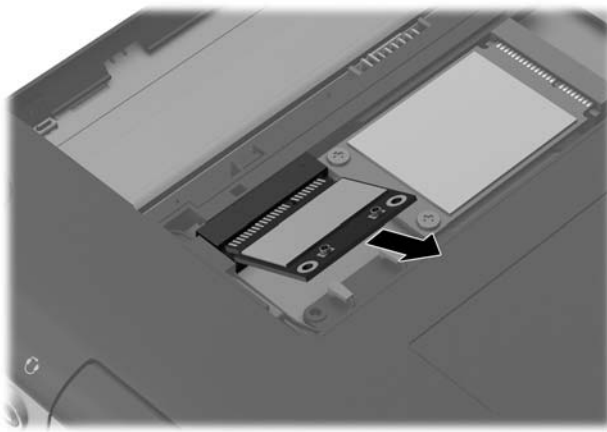
NOTE: If a WLAN antenna cable is not connected to a terminal on the WLAN module, a protective sleeve must be installed on the antenna connector, as shown in the following illustration.
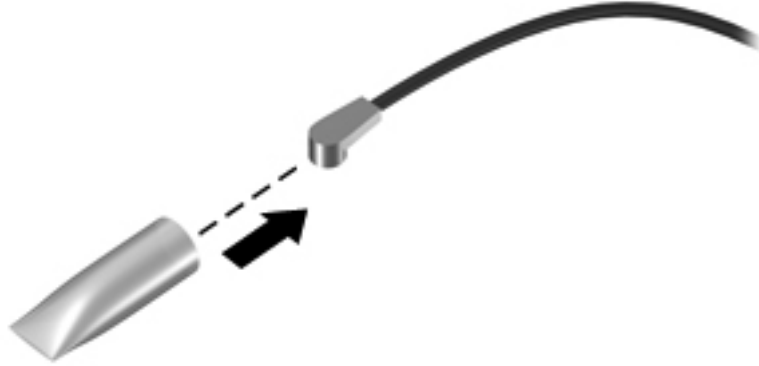
Reverse this procedure to install the WLAN module.

NOTE: When connecting the WLAN antenna cables, make sure the "1" WLAN antenna cable is connected to the WLAN module 1/Main terminal and the "2" WLAN antenna cable is connected to the WLAN module 2/Aux terminal. If a third antenna cable is present, it is connected to the WLAN module middle terminal. The WLAN antenna cable numbers are located on the antenna cables, and the Main and Aux terminal names are located on the WLAN module.

Solid-state drive

Description	Spare part number
32-GB mSATA solid-state drive	669083-001
160-GB solid-state drive	682678-001

Before removing the subwoofer, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 37).

5. Remove the memory module/wireless module compartment cover (see WLAN module on page 38).

Remove the solid-state drive:

1. Remove the two Phillips PM2.5×3.7 screws that secure the mSATA solid-state drive to the system board. (The mSATA solid-state drive tilts up.)
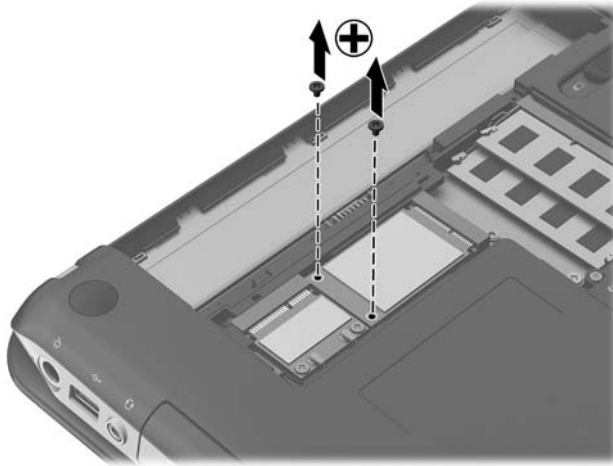
2. Remove the solid-state drive by pulling the drive away from the slot at an angle.
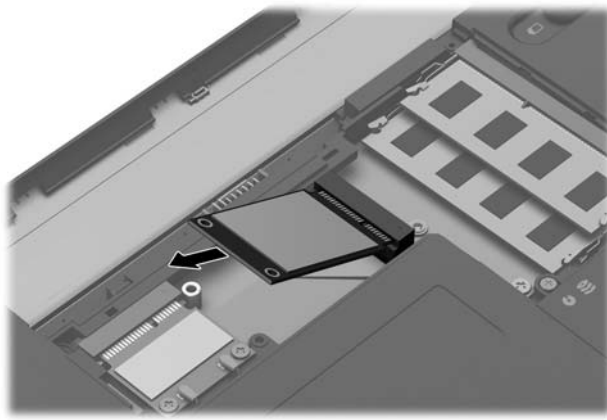
Reverse this procedure to install the solid-state drive.

Memory module

Description	Spare part number
PC3, 10600, 1333-MHz	
8 MB	634091-001
4 GB	621569-001
2 GB	621565-001
PC3, 12800, 1600-MHz	
8 MB	670034-001
4 MB	641369-001
2 MB	652972-001

Before removing a memory module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 37).

5. Remove the memory module/wireless module compartment cover (see WLAN module on page 38).

Remove the memory module:

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

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

2. Remove the memory module **(2)** by pulling it away from the slot at an angle.
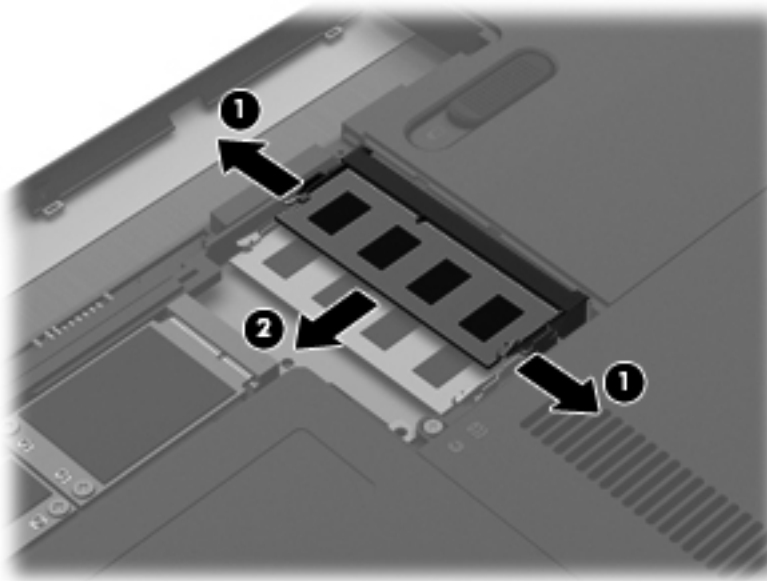
Reverse this procedure to install a memory module.

Optical drive

Description	Spare part number
DVD±RW Double-Layer FX SuperMulti Drive (does not include bezel, bracket, cable, or screws)	669071-001

NOTE: The optical drive bezel, bracket, connector cable, and screws are included in the Optical Drive Hardware Kit, spare part numbers 670734-001 (for use only with Beats Edition computer models) and 670735-001 (for use only with non-Beats Edition computer models).

Before removing the optical drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 37).

5. Remove the memory module/wireless module compartment cover (see WLAN module on page 38).

Remove the optical drive:

1. Remove the Phillips PM2.5×4.5 screw that secures the optical drive to the computer.
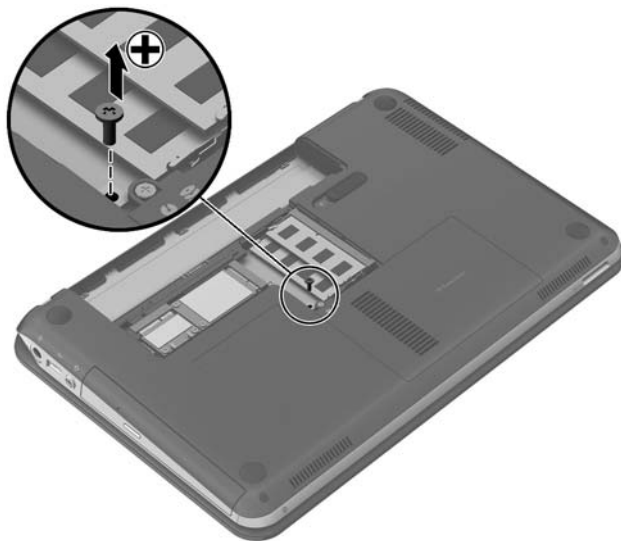
2. Use a flat-bladed screwdriver or similar tool to press on the optical drive bracket **(1)** to release the optical drive.

3. Remove the optical drive **(2)**.
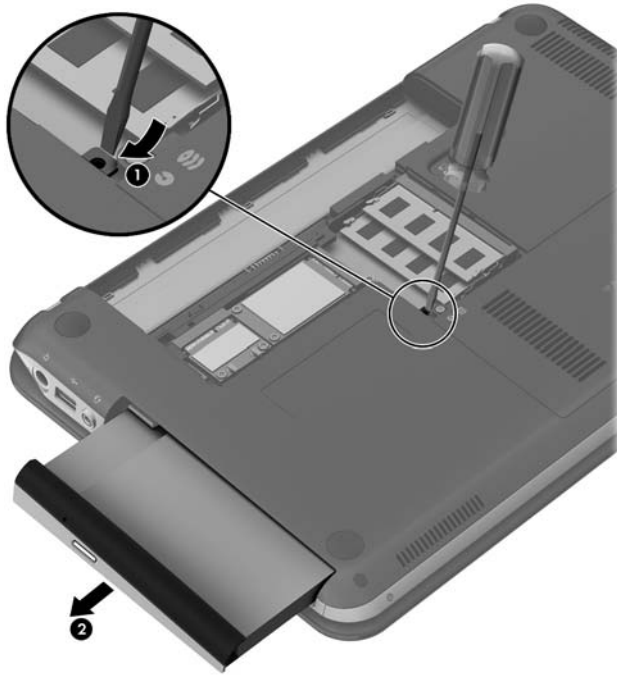
4. If it is necessary to replace the optical drive bezel, pivot the left side of the bezel **(1)** off of the optical drive, and then remove the bezel **(2)**. The optical drive bezel is included in the Optical Drive Hardware Kit, spare part numbers 670734-001 (for use only with Beats Edition computer models) and 670735-001 (for use only with non-Beats Edition computer models).

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

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

7. Remove the optical drive bracket **(2)**. The optical drive bracket is included in the Optical Drive Hardware Kit, spare part numbers 670734-001 (for use only with Beats Edition computer models) and 670735-001 (for use only with non-Beats Edition computer models).
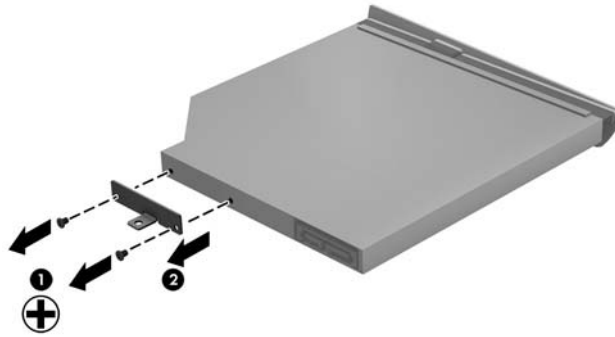
Reverse this procedure to reassemble and install the optical drive.

Hard drive

> **NOTE:** The hard drive spare part kit does not include the hard drive bracket, cable, or screws. These components are included in the Hard Drive Hardware Kit, spare part number 669066-001.

Description	Spare part number
1-TB, 5400-rpm, 9.5-mm	676521-001
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	634862-001
320-GB, 7200-rpm, 7.0-mm	641672-001
320-GB, 5400-rpm, 7.0-mm	645193-001

Before removing the hard drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 37).

5. Remove the memory module/wireless module compartment cover (see WLAN module on page 38).

Remove the hard drive:

1. Loosen the captive screw **(1)** that secures the hard drive cover to the computer.

2. Remove the hard drive cover **(2)**. The hard drive cover is available in the Plastics Kit, spare part numbers 671170-001 (for use only with Beats Edition computer models) and 669075-001 (for use only with non-Beats Edition computer models).
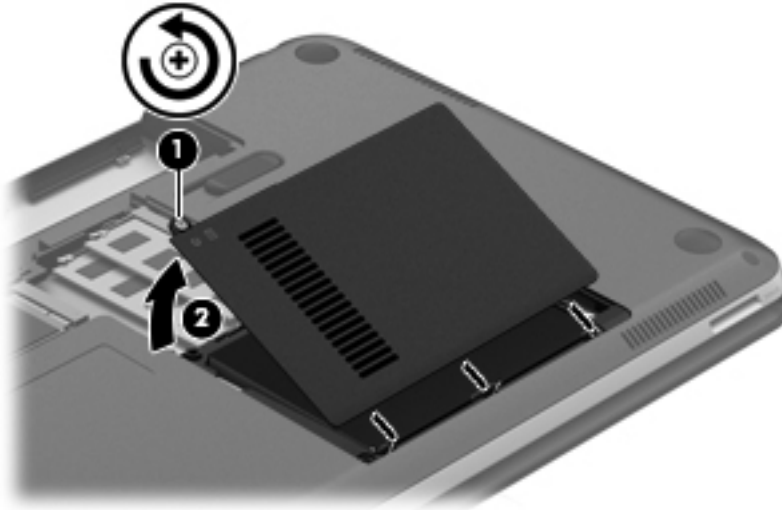
3. Remove the two Phillips PM2.5×6.6 screws **(1)** and the Phillips PM2.5×4.5 screw **(2)** that secure the hard drive to the computer.

4. Disconnect the hard drive cable **(3)** from the system board.

5. Use the tab **(4)** on the hard drive bracket to remove the hard drive from the hard drive bay.
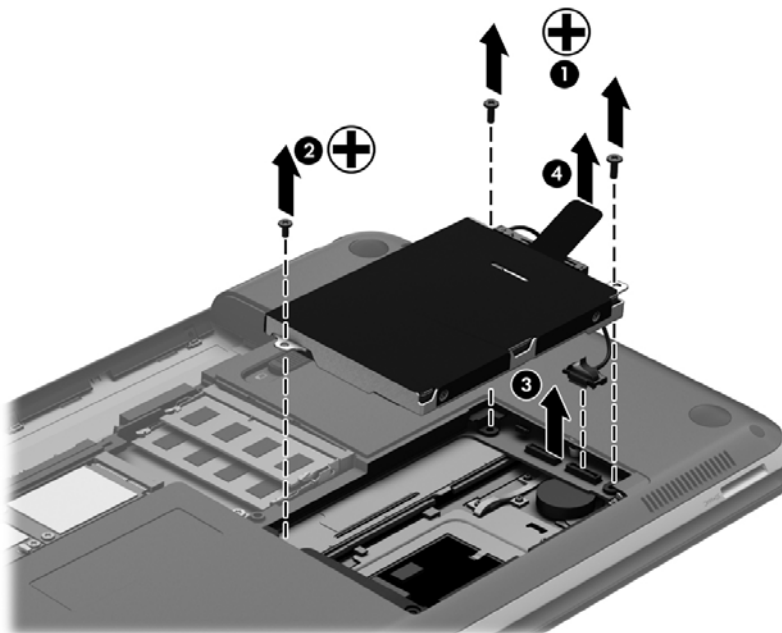
6. If it is necessary to replace the hard drive cable **(1)**, screws **(2)**, or bracket **(3)**, remove and replace the components. The bracket, cable, and screws are available in the Hard Drive Hardware Kit, spare part number 669066-001.
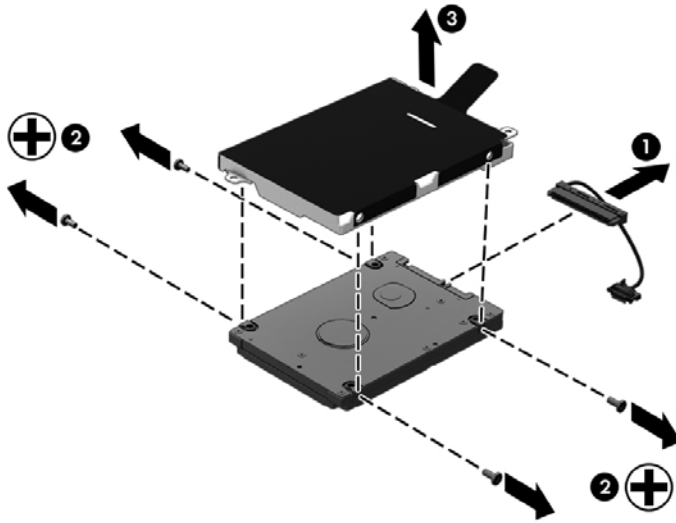
Reverse this procedure to reassemble and install the hard drive.

RTC battery

| Description	Spare part number
RTC battery (includes cable)	619451-001

Before removing the RTC battery, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 37).

5. Remove the memory module/wireless module compartment cover (see WLAN module on page 38).

6. Remove the hard drive (see Hard drive on page 46).

Remove the RTC battery:

1. Disconnect the RTC battery cable **(1)** from the system board.

2. Slide the RTC battery **(2)** out of the cavity in the hard drive bay.
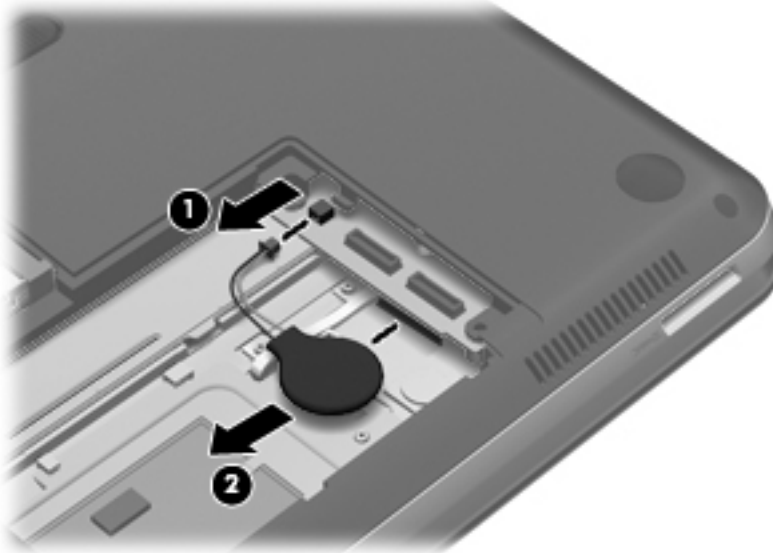
3. Remove the RTC battery.

Reverse this procedure to install the RTC battery.

Bluetooth module

Description	Spare part number
Bluetooth module, 4.0 EDR	655792-001

Before removing the Bluetooth module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 37).

Remove the Bluetooth module:

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

2. Open the computer as far as it will open.

3. Rest the computer on the display enclosure.

4. Remove the rubber screw covers **(1)** and the two Phillips PM2.5×4.3 screws **(2)** that secure the display bezel to the display assembly.
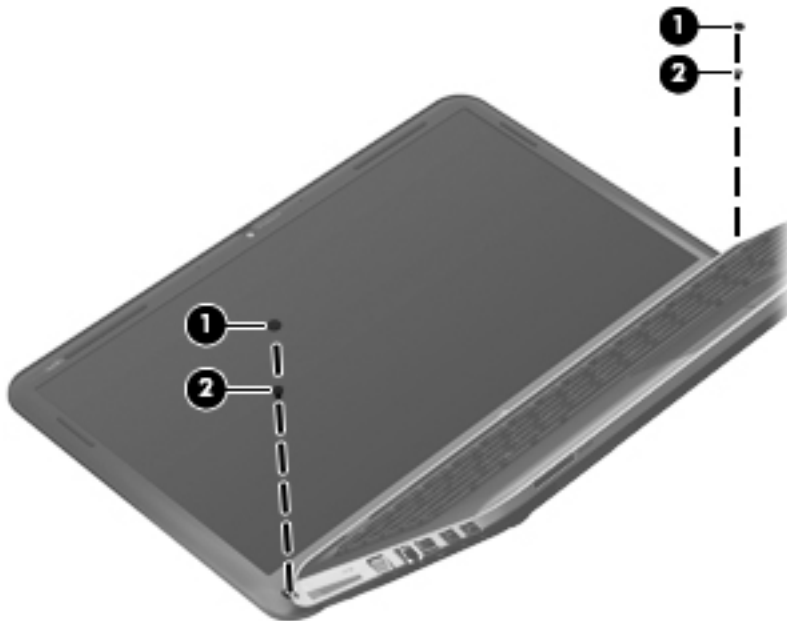
5. Flex the inside edges of the top edge **(1)**, the left and right sides **(2)**, and the bottom edge **(3)** of the display bezel until the bezel disengages from the display enclosure.

6. Remove the display bezel **(4)**. The display bezel is available using spare part numbers 670730-001 (for use only with Beats Edition computer models) and 669060-001 (for use only with non-Beats Edition computer models).
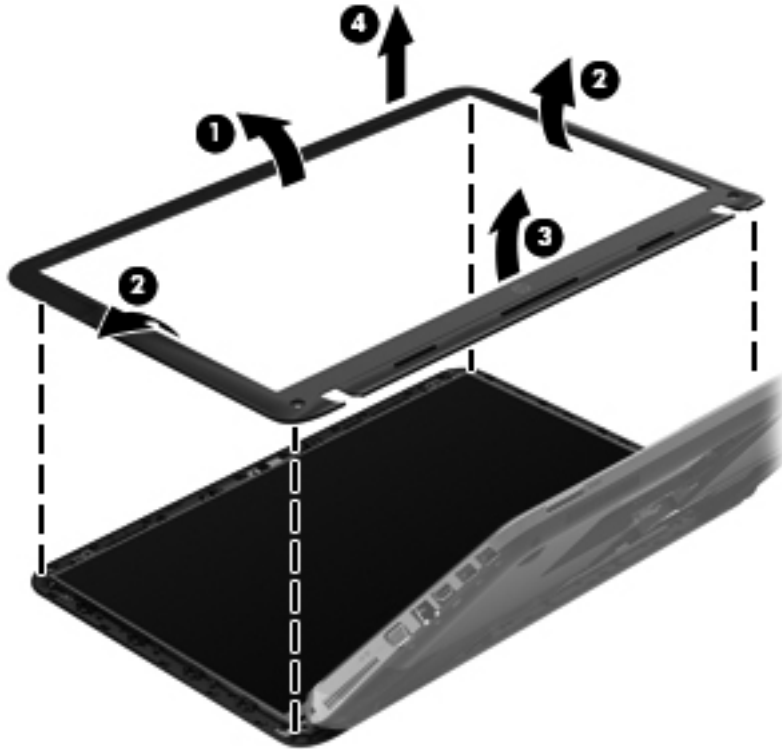
7. Release the Bluetooth module **(1)** as far as the Bluetooth module cable allows.

8. Disconnect the Bluetooth module cable **(2)** from the Bluetooth module.
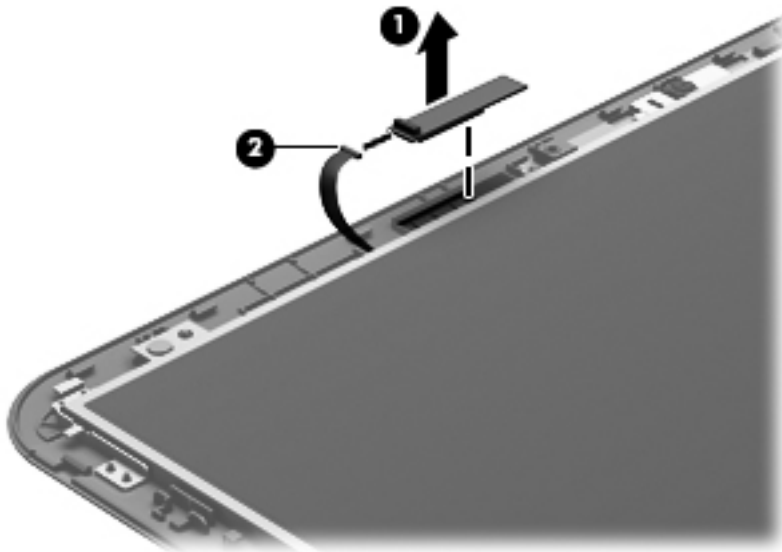
9. Remove the Bluetooth module.

Reverse this procedure to install the Bluetooth module.

Webcamera/microphone module

Description	Spare part number
Webcamera/microphone module	669086-001

Before removing the webcamera/microphone module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 37).

5. Remove the display bezel (see Bluetooth module on page 50).

Remove the webcamera/microphone module:

1. Release the webcamera/microphone module **(1)** as far as the webcamera/microphone module cable allows.

2. Disconnect the webcamera/microphone module cable **(2)** from the webcamera/microphone module.
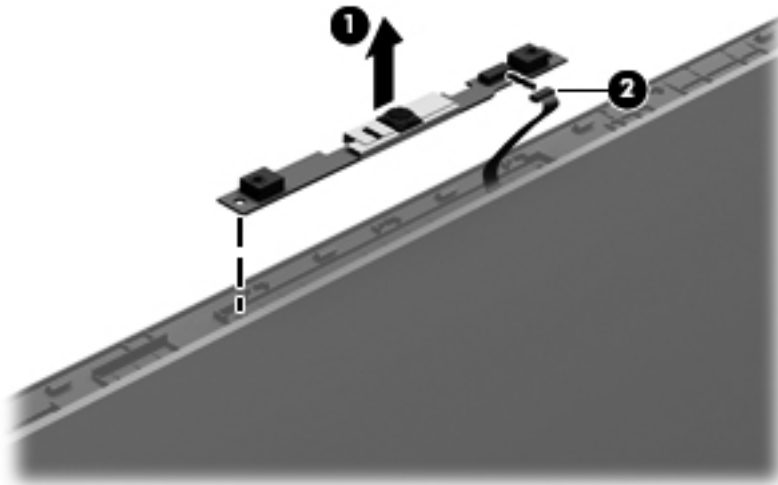
3. Remove the webcamera/microphone module.

Reverse this procedure to install the webcamera/microphone module.

Display panel

Description	Spare part number
14.0-in, HD+, LED, SVA AntiGlare display panel	669077-001
14.0-in, HD, LED, SVA BrightView display panel	669076-001

Before removing the display panel, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 37).

5. Remove the display bezel (see Bluetooth module on page 50).

Remove the display panel:

1. Remove the four Phillips PM2.0×3.6 screws that secure the display panel to the display enclosure.
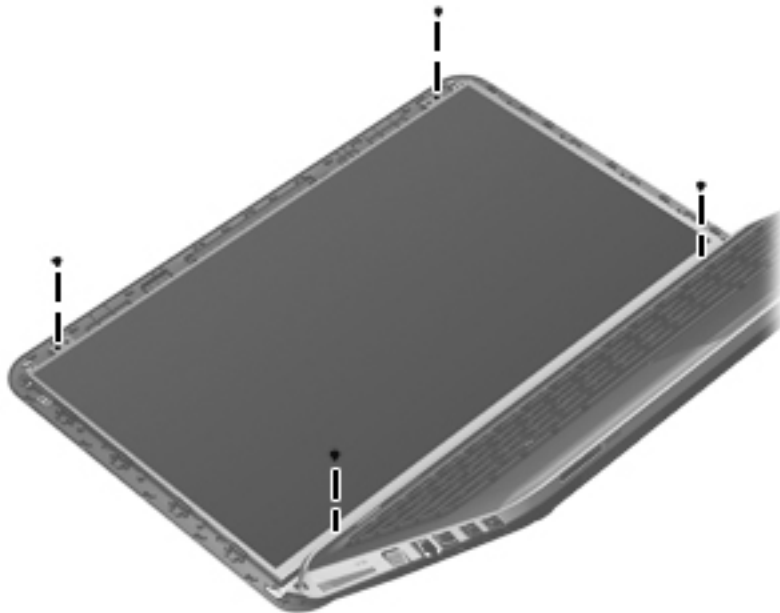
2. Swing the top edge of the display panel **(1)** forward until it rests on the keyboard and the display panel connector **(2)** is accessible.
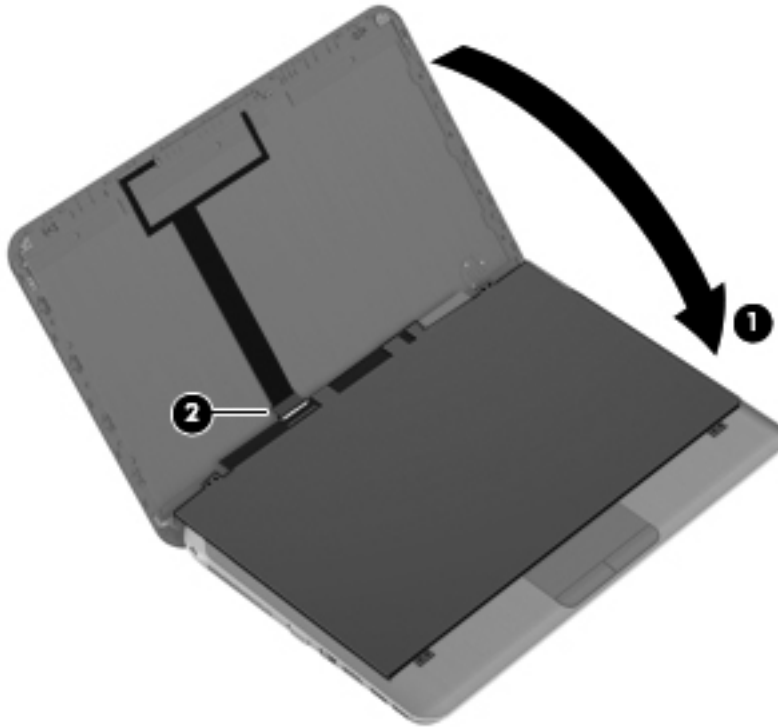
3. Release the adhesive strip **(1)** that secures the display panel cable to the display panel, and then disconnect the display panel cable **(2)** from the display panel.
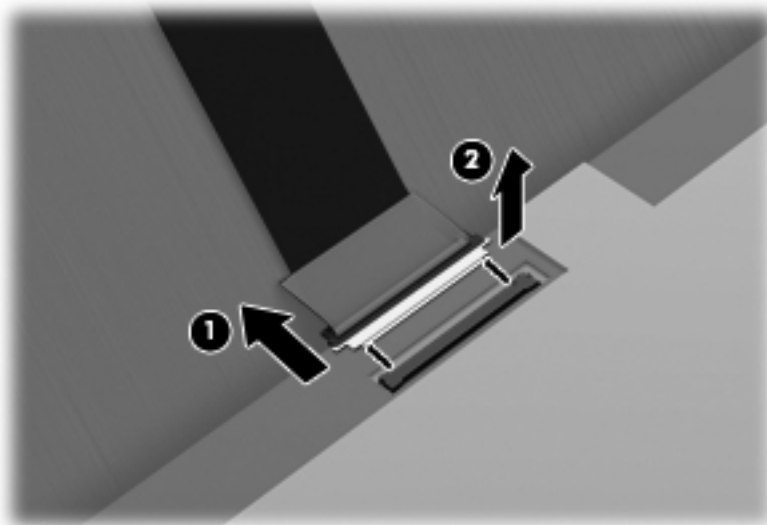
4. Remove the display panel.

Reverse this procedure to install the display panel.

Keyboard

For use in country or region:	Spare part number:	For use in country or region:	Spare part number:
For use only with Beats Edition computer models:		For use in Latin America	669069-161
For use in Brazil	669069-201	For use in South Korea	669069-AD1
For use in Canada	669069-121	For use in Taiwan	669069-AB1
For use in India	669069-D61	For use in Thailand	669069-281
For use in Japan	669069-291	For use in the United States	669069-001
Keyboard without backlight for use only on non-Beat Edition computer models			669070-001
Keyboard with backlight (includes backlight):			
For use in Belgium	671180-A41	For use in Portugal	671180-131
For use in Brazil	671180-201	For use in Russia	671180-251
For use in Canada	671180-121	For use in Saudi Arabia	671180-171
For use in Denmark, Finland, Norway	671180-DH1	For use in South Korea	671180-AD1
For use in France	671180-051	For use in Spain	671180-071
For use in Germany	671180-041	For use in Switzerland	671180-BG1
For use in Italy	671180-061	For use in Taiwan	671180-AB1
For use in Japan	671180-291	For use in Turkey	671180-141
For use in Latin America	671180-161	For use in the United Kingdom and Singapore	671180-031
For use in the Netherlands	671180-B31	For use in the United States	671180-001

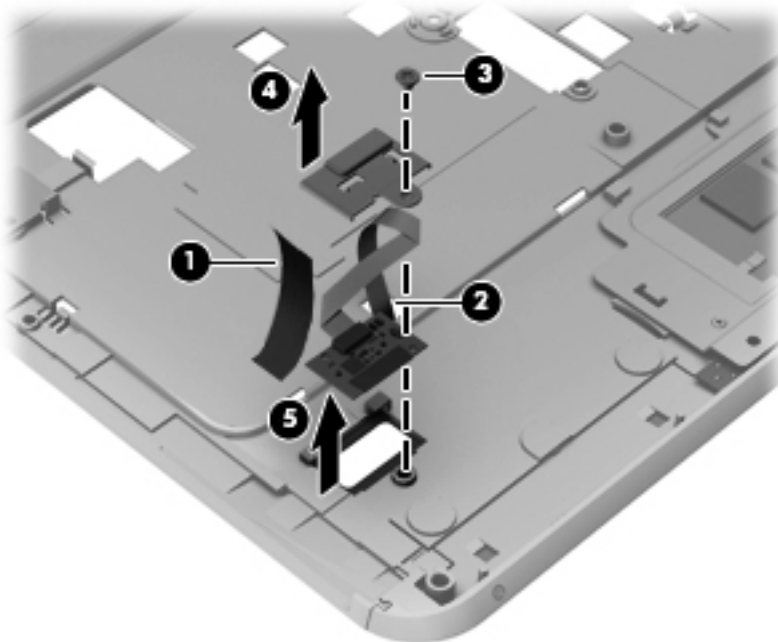Before removing the keyboard, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 37).

5. Remove the memory module/wireless module compartment cover (see WLAN module on page 38).

Remove the keyboard:

1. Turn the computer upside down, with the front toward you.

2. Remove the Phillips PM2.5×4.3 screw that secures the keyboard to the computer.
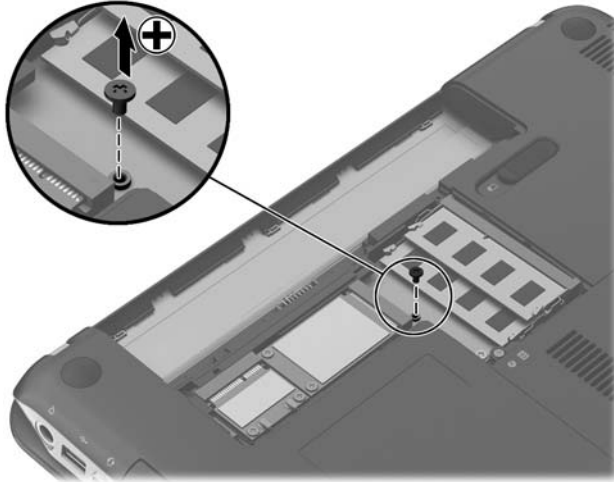
3. Support the computer and open the computer as far as it will open.

4. Use a flat-bladed screwdriver or similar tool to release the two keyboard tabs.

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

6. Lift the rear edge of the keyboard **(1)** until the keyboard cable connector and the keyboard backlight cable connector are accessible.

7. Release the zero insertion force (ZIF) connector **(2)** to which the keyboard cable is connector, and then disconnect the keyboard cable **(3)** from the connector.

> **NOTE:** Step 8 applies only to computer models equipped with a keyboard with a backlight.

8. Release the ZIF connector **(4)** to which the keyboard backlight cable is connector, and then disconnect the keyboard backlight cable **(5)** from the connector.
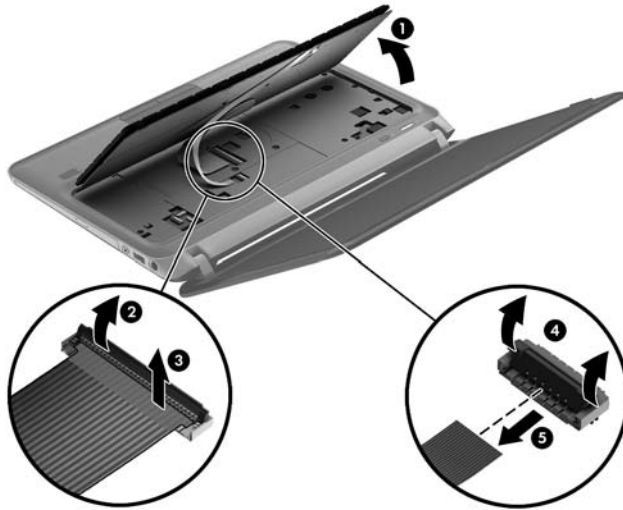
9. Remove the keyboard.

Reverse this procedure to install the keyboard.

Top cover

📝 **NOTE:** The top cover spare part kit includes the TouchPad, but does not include the TouchPad cables. The TouchPad cables are included in the Cable Kit, spare part number 669062-001.

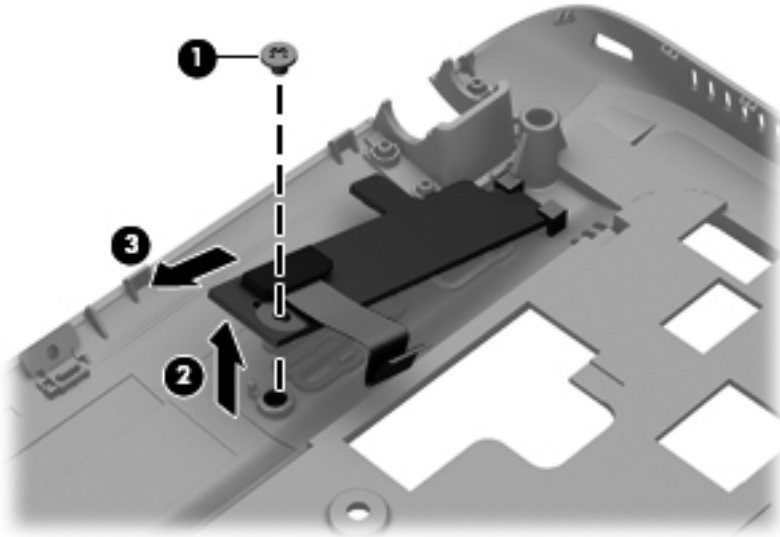| Description	Spare part number
For use only with Beats Edition computer models	669932-001
In dark umber finish	669930-001
In steel gray finish	669931-001

Before removing the top cover, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 37), and then remove the following components:

   a. Optical drive (see Optical drive on page 44)

   b. Hard drive (see Hard drive on page 46)

   c. Keyboard (see Keyboard on page 55)

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

1. Fingerprint reader board (see Fingerprint reader board on page 61)

2. Audio/USB board (see Audio/USB board on page 63)

3. Power button board (see Power button board on page 64)

Remove the top cover:

1. Close the computer.

2. Turn the computer upside down, with the front toward you.

3. Remove the following:

   (1) Two rubber screw covers from the front corners of the computer

   (2) Two rubber feet from the rear corners of the computer

   (3) Five Phillips PM2.5×6.6 screws that secure the top cover to the computer
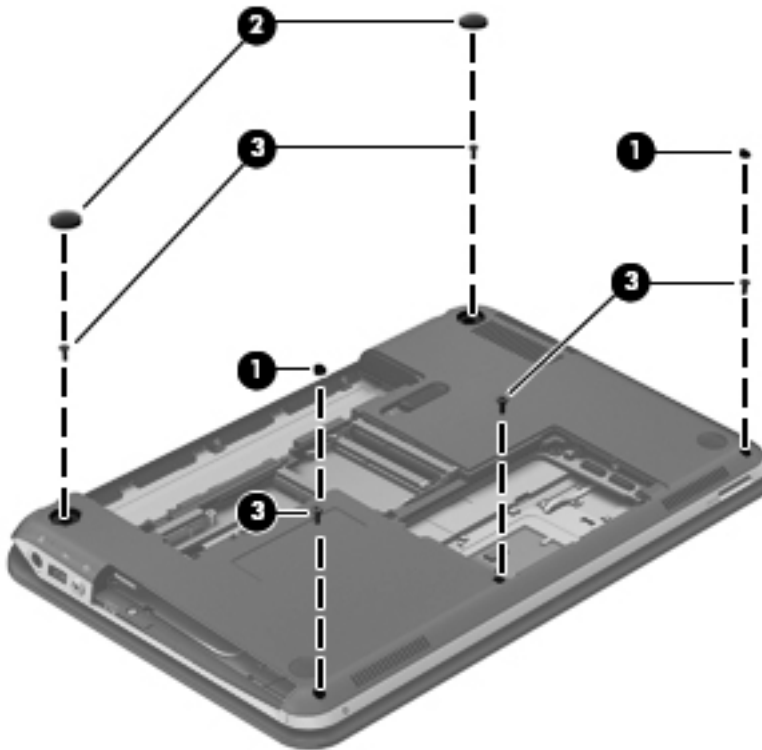
4. Remove the three Phillips PM2.0×3.0 screws **(1)** from the battery bay that secure the top cover to the computer.

5. Remove the Phillips PM2.0×3.6 screw **(2)** from the optical drive bay that secures the top cover to the computer.
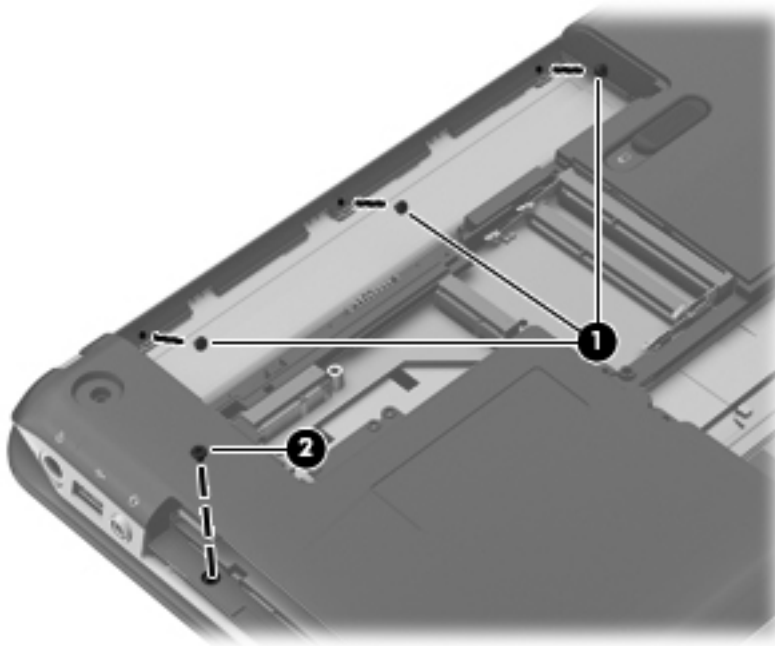
6. Turn the computer display-side up, with the front toward you.

7. Open the computer as far as it will open.

8. Disconnect the following ribbon cables from the corresponding ZIF connectors:

   (1) Power button board cable (included with the power button board spare part kit)

   (2) TouchPad board cable

   (3) Audio/USB board cable

   (4) Fingerprint reader board cable

   NOTE: The TouchPad board cable, audio/USB board cable, and fingerprint reader board cable are included in the Cable Kit, spare part number 669062-001.
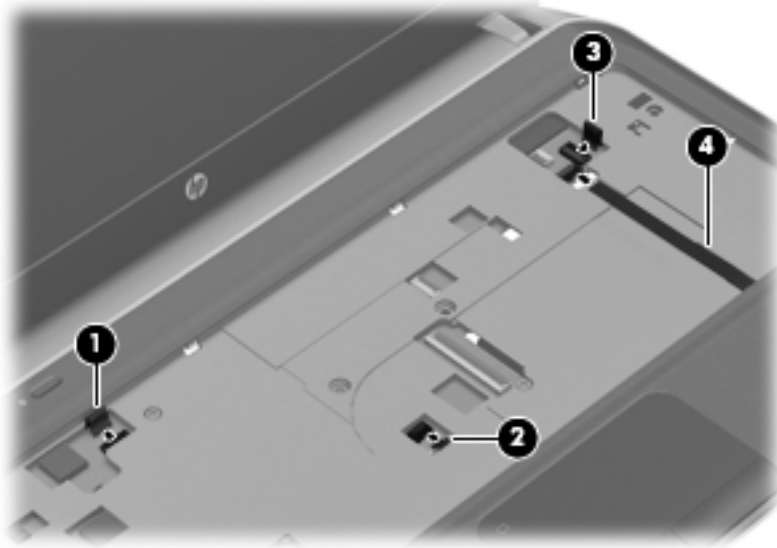
9. Remove the five Phillips PM2.5×6.6 screws that secure the top cover to the computer.
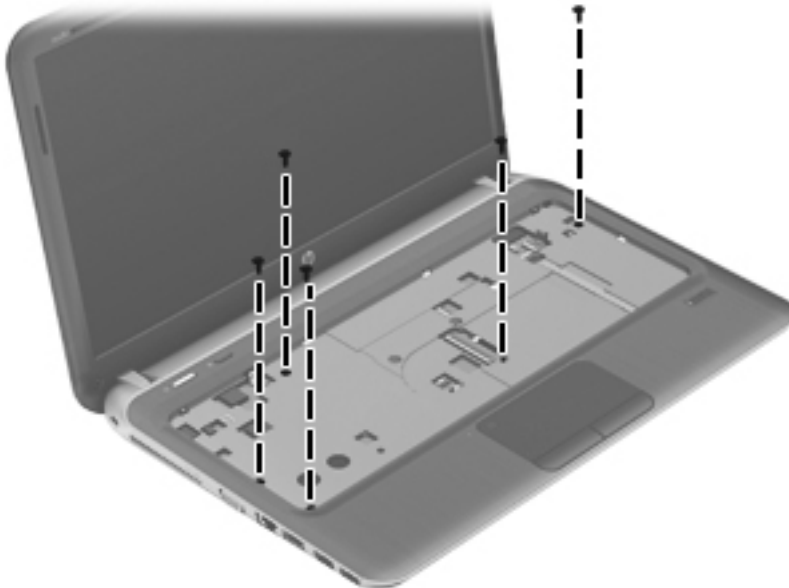
10. Lift the front edge of the top cover **(1)** until the left and right sides disengage from the base enclosure.

11. Remove the top cover **(2)**.
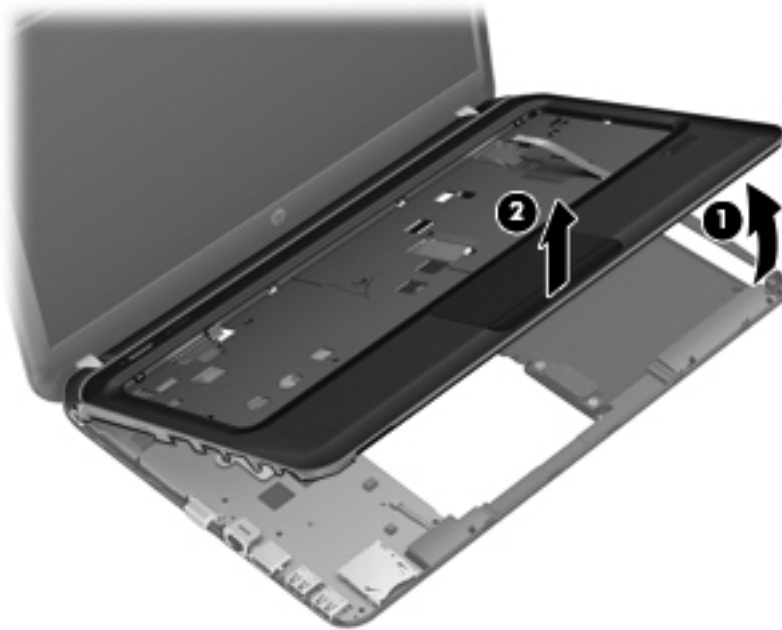
12. Remove the top cover.

Reverse this procedure to install the top cover.

Fingerprint reader board

Description	Spare part number
Fingerprint reader board (includes bracket, does not include cable)	669064-001

NOTE: The fingerprint reader board cable is included in the Cable Kit, spare part number 669062-001.

Before removing the fingerprint reader board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 37), and then remove the following components:

    a. Optical drive (see Optical drive on page 44)

    b. Hard drive (see Hard drive on page 46)

    c. Keyboard (see Keyboard on page 55)

   **d.** Top cover (see Top cover on page 57)

Remove the fingerprint reader board:

1. Release the fingerprint reader board cable from the top cover. (The fingerprint reader board cable is attached to the top cover with double-sided tape.)
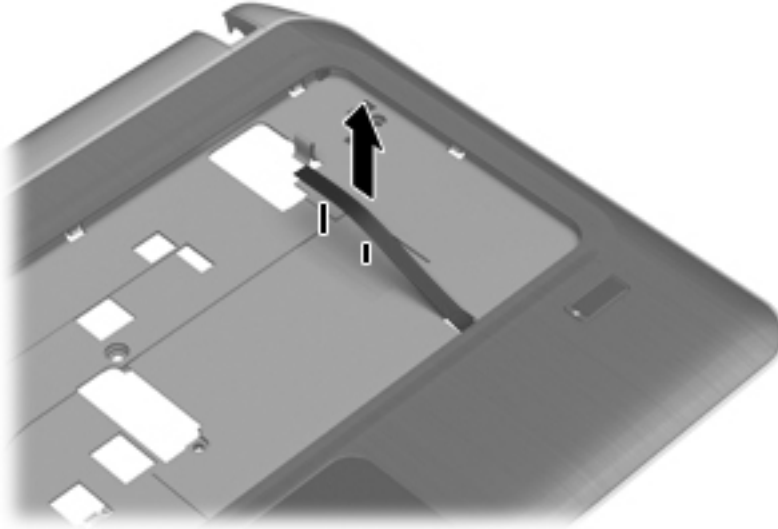
2. Turn the top cover upside down, with the front toward you.

3. Release the plastic tab **(1)** to access the fingerprint reader board cable.

4. Release the fingerprint reader board cable **(2)** through the opening in the top cover.

5. Remove the Phillips PM2.0×3.6 screw **(3)** that secures the fingerprint reader board and bracket to the top cover.

6. Slide the fingerprint reader board bracket **(4)** toward the back of the top cover, and then remove the bracket.

7. Remove the fingerprint reader board **(5)**.

Reverse this procedure to install the fingerprint reader board, bracket, and cable.

Audio/USB board

Description	Spare part number
Audio/USB board (does not include cable)	669073-001

NOTE: The audio/USB board is included in the Cable Kit, spare part number 669062-001.

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

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 37), and then remove the following components:

   a. Optical drive (see Optical drive on page 44)

   b. Hard drive (see Hard drive on page 46)

   c. Keyboard (see Keyboard on page 55)

   d. Top cover (see Top cover on page 57)

Remove the audio/USB board:

1. Turn the top cover upside down, with the front toward you.

2. Release the two clips **(1)** that secure the audio/USB board to the top cover.

3. Lift the right side of the audio/USB board **(2)** until it rests at an angle.

4. Remove the audio/USB board **(3)** by sliding it up and to the right at an angle.
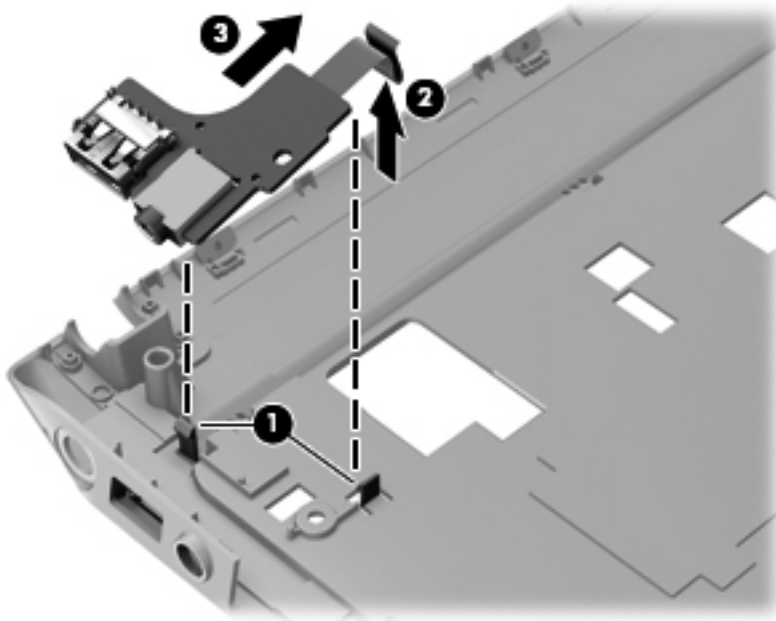
Reverse this procedure to install the audio/USB board and cable.

Power button board

Description	Spare part number
Power button board (includes cable)	669072-001

Before removing the power button board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see), and then remove the following components:

    a. Optical drive (see)

    b. Hard drive (see)

    c. Keyboard (see)

    d. Top cover (see)

Remove the power button board:

1. Turn the top cover upside down, with the front toward you.

2. Remove the Phillips PM2.0×3.6 screw **(1)** that secures the power button board to the top cover.

3. Lift the left side of the power button board **(2)** until it rests at an angle.

4. Remove the power button board **(3)** by sliding it up and to the left at an angle.

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

Power connector cable

Description	Spare part number
Power connector cable (includes bracket)	669063-001

Before removing the power connector cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 37), and then remove the following components:

    a. Optical drive (see Optical drive on page 44)

    b. Hard drive (see Hard drive on page 46)

    c. Keyboard (see Keyboard on page 55)

    d. Top cover (see Top cover on page 57)

Remove the power connector cable:

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

2. Remove the Phillips PM2.5×6.8 shoulder screw **(2)** and the Phillips PM2.5×4.5 screw **(3)** that secure the power connector and bracket to the base enclosure.

3. Remove the power connector bracket **(4)**.

4. Remove the power connector **(5)** from the clip built into the base enclosure.
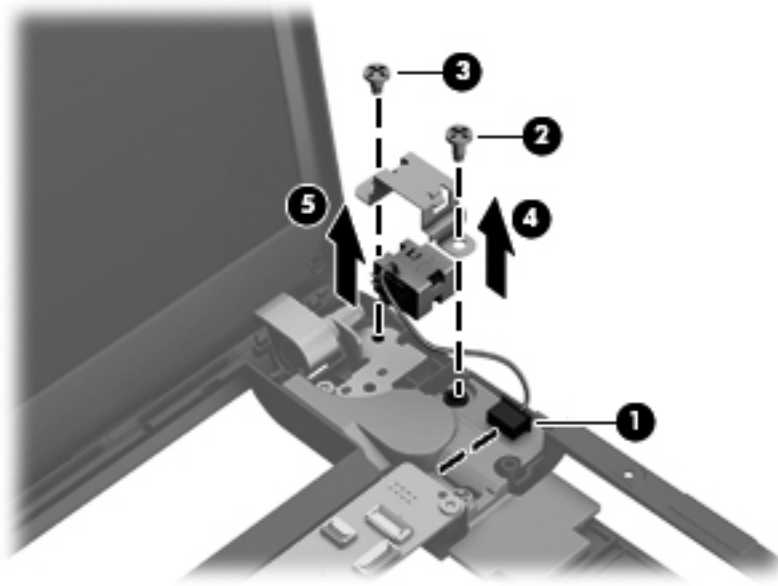
Reverse this procedure to install the power connector cable and bracket.

Display assembly

NOTE: The display assembly is spared at the subcomponent level only. For more display assembly spare part information, see the individual removal subsections.

Before removing the display assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 37).

5. Disconnect the wireless antenna cables from the WLAN module (see WLAN module on page 38).

6. Remove the following components:

    a. Optical drive (see Optical drive on page 44)

    b. Hard drive (see Hard drive on page 46)

    c. Keyboard (see Keyboard on page 55)

    d. Top cover (see Top cover on page 57)

    e. Power connector cable (see Power connector cable on page 65)

Remove the display assembly:

1. Disconnect the display panel cable **(1)** from the system board.

2. Release the wireless antenna cables **(2)** from the opening in the base enclosure.
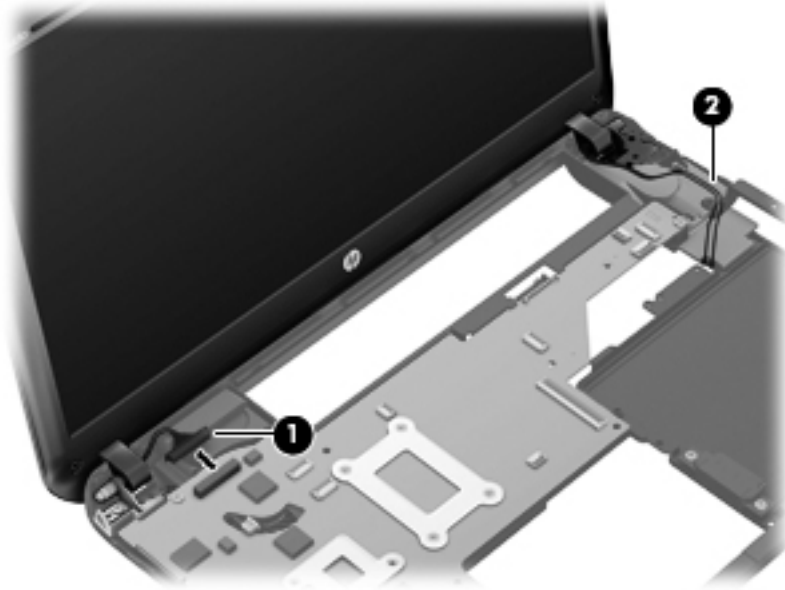
⚠ **CAUTION:** Support the display assembly when removing the following screws. Failure to support the display assembly can result in damage to the display assembly and other computer components.

3. Remove the three Phillips PM2.5×4.4 screws **(1)** that secure the display assembly to the computer.

4. Remove the display assembly **(2)**.
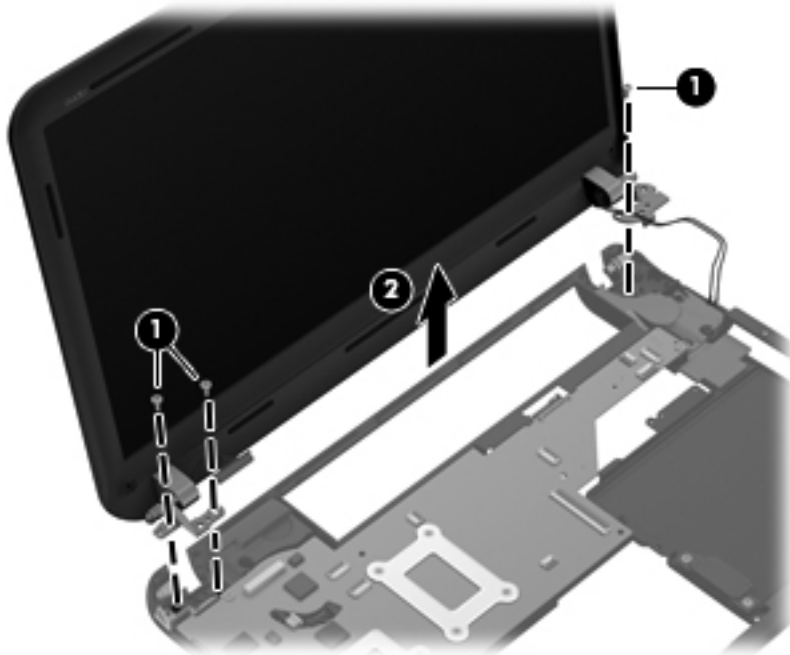
5. If it is necessary to replace the display hinge covers and hinges:

a. Remove the display bezel (see Bluetooth module on page 50).

b. Remove the two Phillips PM2.5×4.4 screws **(1)** that secure the hinge covers and hinges to the display enclosure.

c. Remove the display hinge covers **(2)**. The hinge covers are available using spare part numbers 670732-001 (for use only with Beats Edition computer models) and 669068-001 (for use only with non-Beats Edition computer models).

d. Remove the display hinges **(3)**. The hinges are available in the Display Hinge Kit, spare part number 670731-001.
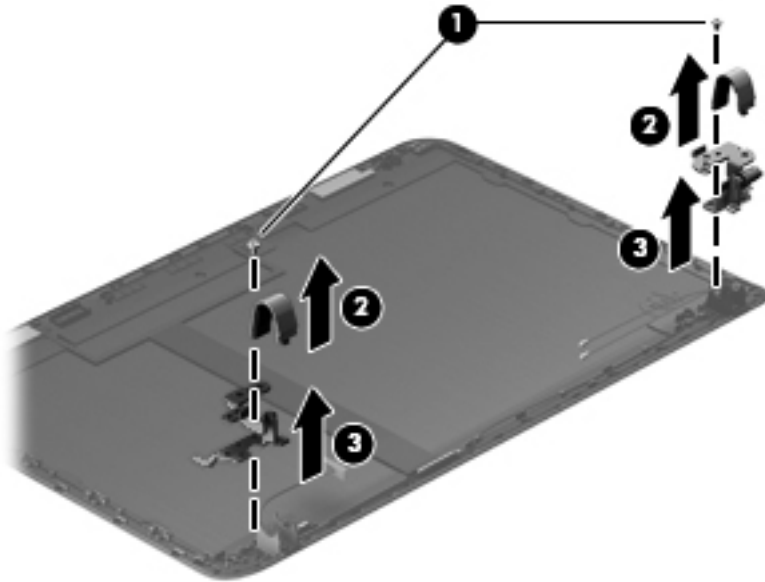
6. If it is necessary to replace the display panel cable:

a. Remove the display bezel (see Bluetooth module on page 50).

b. Remove the display panel (see Display panel on page 53).

c. Disconnect the Bluetooth module cable **(1)** from the Bluetooth module.

d. Disconnect the webcamera/microphone module cable **(2)** from the webcamera/microphone module.

e. Release the display panel cable from the clip **(3)** built into the display enclosure.

f. Remove the display panel cable **(4)**. The display panel cable is available using spare part numbers 670397-001 (for use only with HD+, AntiGlare display panel, spare part number 669077-001) and 669061-001 (for use only with HD, BrightView display panel, spare part number 669076-001).
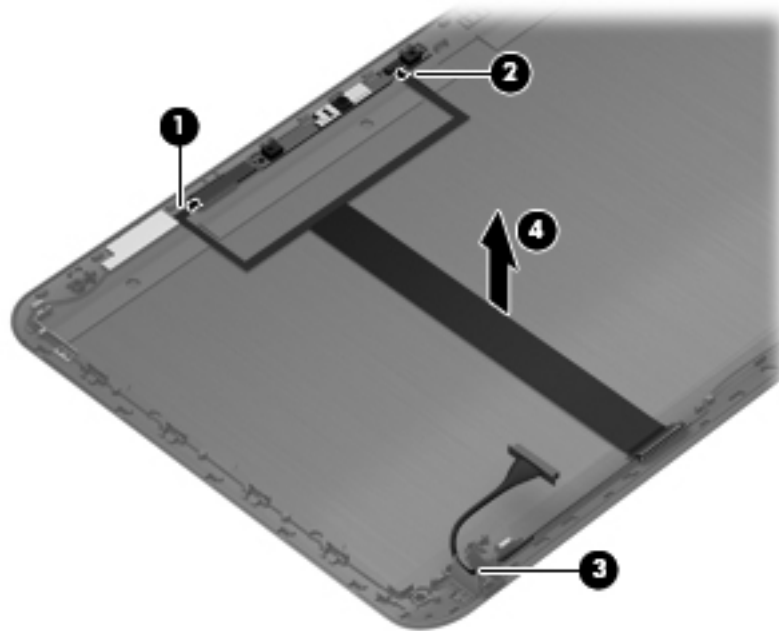
7. If it is necessary to replace the wireless antenna cables and transceivers:

   a. Remove the display bezel (see).

   b. Remove the display panel (see).

   c. Release the wireless antenna transceivers **(1)** from the display enclosure. (The wireless antenna transceivers are attached to the display enclosure with double-sided tape.)

d. Release the wireless antenna cables from the clips **(2)** built into the display enclosure.
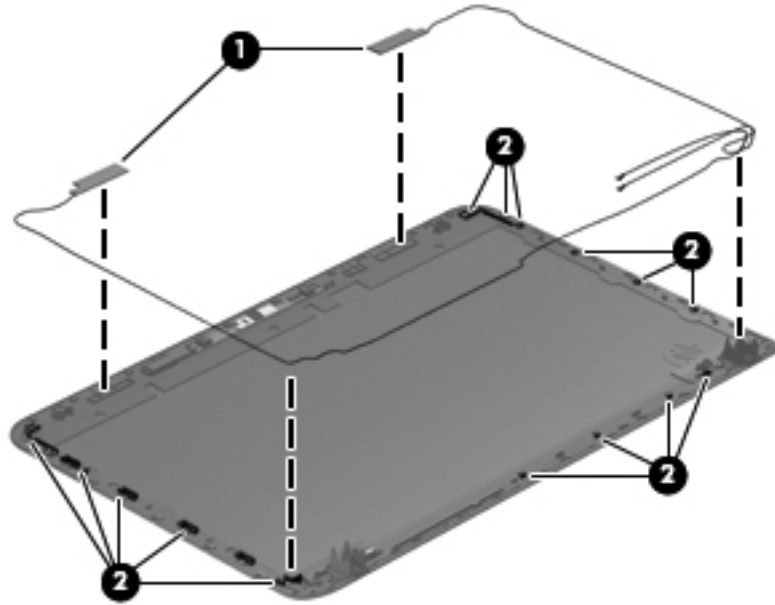
e. Remove the wireless antenna cables and transceivers. The wireless antenna cables and transceivers are available in the Wireless Antenna Kit, spare part number 669055-001.

Reverse this procedure to reassemble and install the display assembly.

System board

📝 **NOTE:** The system board spare part kit includes replacement thermal material. Replacement thermal material is also available in the Thermal Material Kit, spare part number 669929-001.

Description	Spare part number
For use only with computer models equipped with the Intel 7570 chipset and a graphics subsystem with discrete memory	676577-001
For use only with computer models equipped with the Intel 6490 chipset and a graphics subsystem with discrete memory	669084-001
For use only with computer models equipped with the Intel HM77 Express chipset and a graphics subsystem with UMA memory	681853-001
For use only with computer models equipped with a graphics subsystem with UMA memory	669085-001

Before removing the system board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 37), and then remove the following components:

   a. WLAN module (see WLAN module on page 38)

   b. mSATA solid-state drive (see Solid-state drive on page 41)

   c. Optical drive (see Optical drive on page 44)

   d. Hard drive (see Hard drive on page 46)

   e. Keyboard (see Keyboard on page 55)

   f. Top cover (see Top cover on page 57)

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 42)

● RTC battery (see RTC battery on page 49)

● Fan/heat sink assembly (see Fan/heat sink assembly on page 73)

● Processor (see Processor on page 76)

Remove the system board:

1. Close the computer.

2. Turn the computer upside down, with the front toward you.

3. Disconnect the optical drive connector cable from the system board.

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

5. Open the computer.

6. Disconnect the following cables from the system board:

    (1) Display panel cable

    (2) Rear speaker cable

    (3) Front speaker cable

    (4) Power connector cable
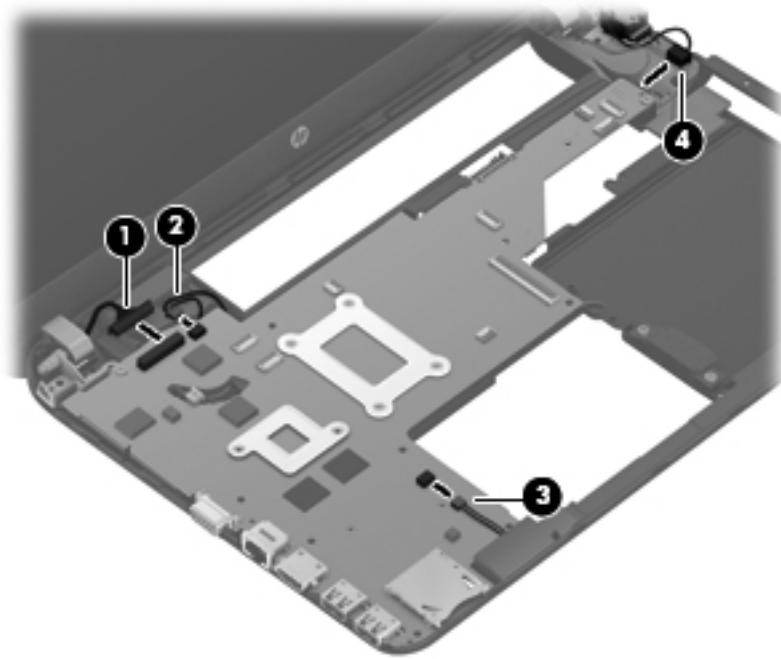
7. Remove the Phillips PM2.5×6.6 screw **(1)** and the Phillips PM2.0×3.6 screw **(2)** that secure the system board to the base enclosure.

8. Lift the front edge of the system board **(3)** until it rests at an angle.

9. Remove the system board **(4)** by sliding it up and forward at an angle.
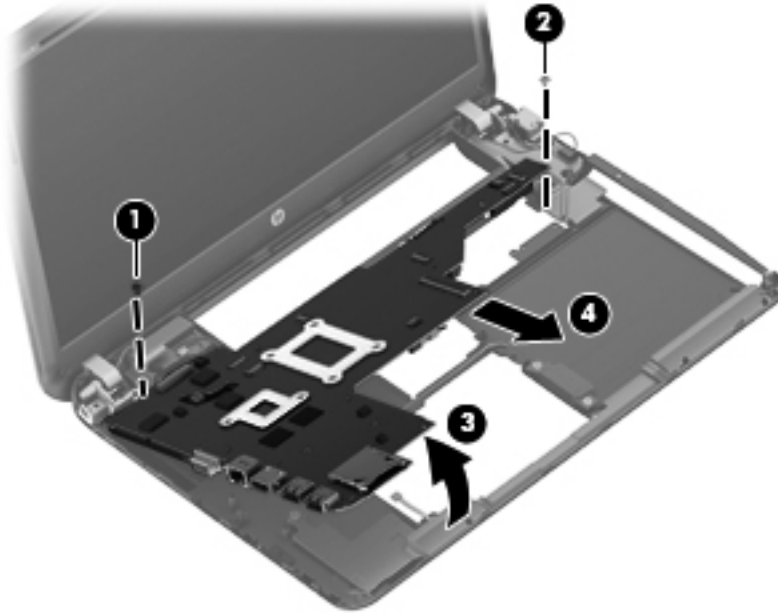
Reverse this procedure to install the system board.

Fan/heat sink assembly

📝 **NOTE:** The fan/heat sink assembly spare part kit includes replacement thermal material. Replacement thermal material is also available in the Thermal Material Kit, spare part number 669929-001.

Description	Spare part number
For use only with computer models equipped with a graphics subsystem with discrete memory	669934-001
For use only with computer models equipped with a graphics subsystem with UMA memory	669935-001

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

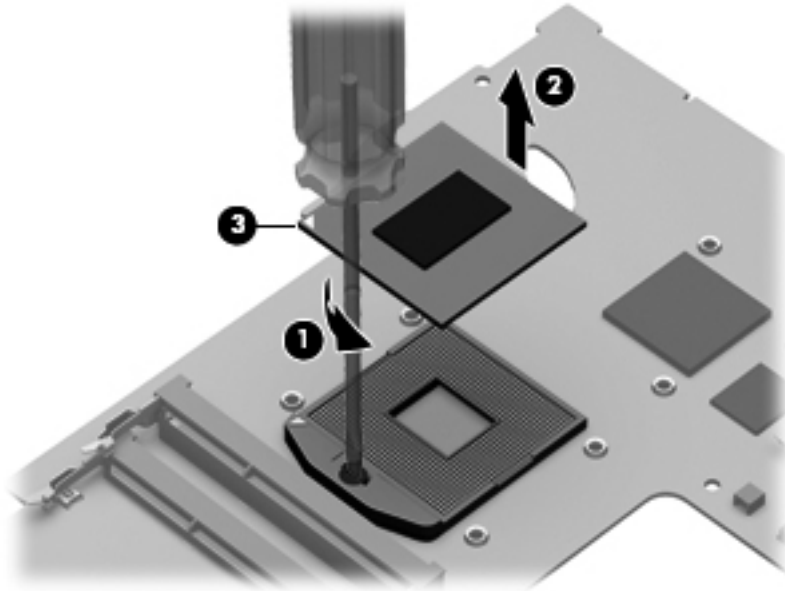Before removing the fan/heat sink assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
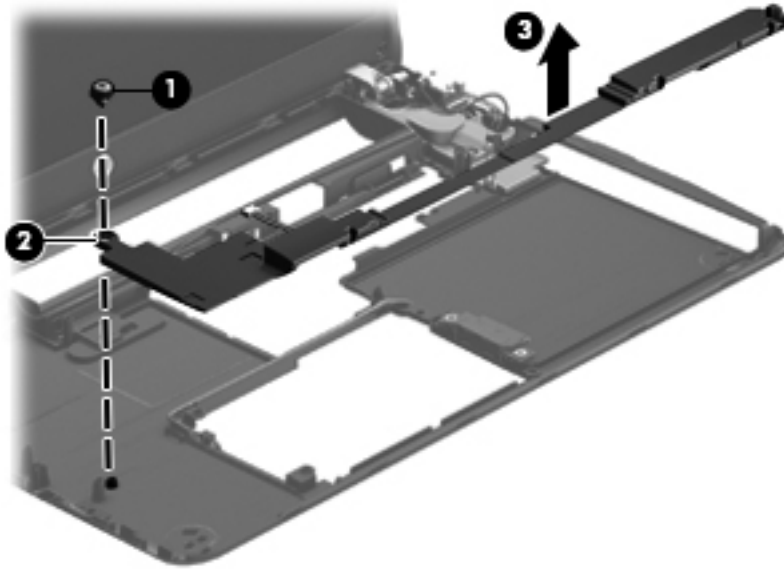
2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 37), and then remove the following components:

    a. Optical drive (see Optical drive on page 44)

    b. Hard drive (see Hard drive on page 46)

    c. Keyboard (see Keyboard on page 55)

    d. Top cover (see Top cover on page 57)

    e. System board (see System board on page 70)

Remove the fan/heat sink assembly:

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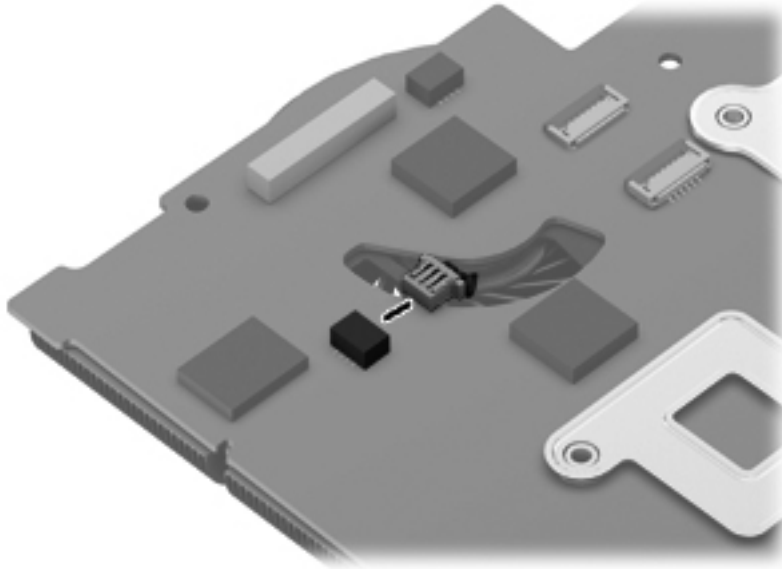
2. Turn the system board upside down, with the front toward you.

3. Following the **1** through **6** sequence stamped into the fan/heat sink assembly, loosen the six captive screws **(1)** that secure the fan/heat sink assembly to the system board.

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

4. Remove the fan/heat sink assembly **(2)**.
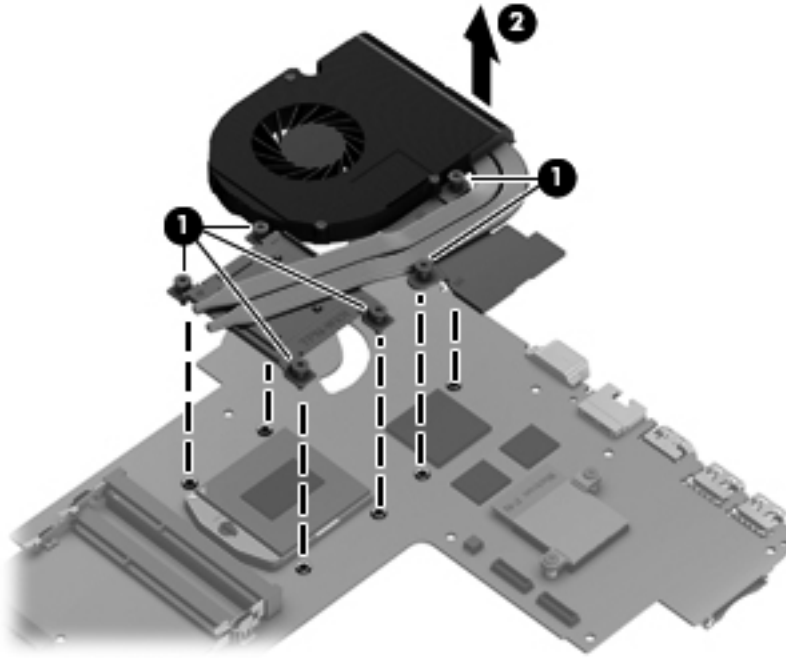
> **NOTE:** The thermal material must be thoroughly cleaned from the surfaces of the fan/heat sink assembly and the system board components each time the fan/heat sink assembly is removed. Replacement thermal material is included with the fan/heat sink assembly and system board spare part kits. The following illustration shows the replacement thermal material locations.

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

- Thermal paste is used on the graphics subsystem chip **(3)** and the heat sink section **(4)** that services it. This applies only to computer models equipped with a graphics subsystem with discrete memory.

- Thermal pads are used on the system board capacitors **(5)** and the heat sink sections **(6)** that service them
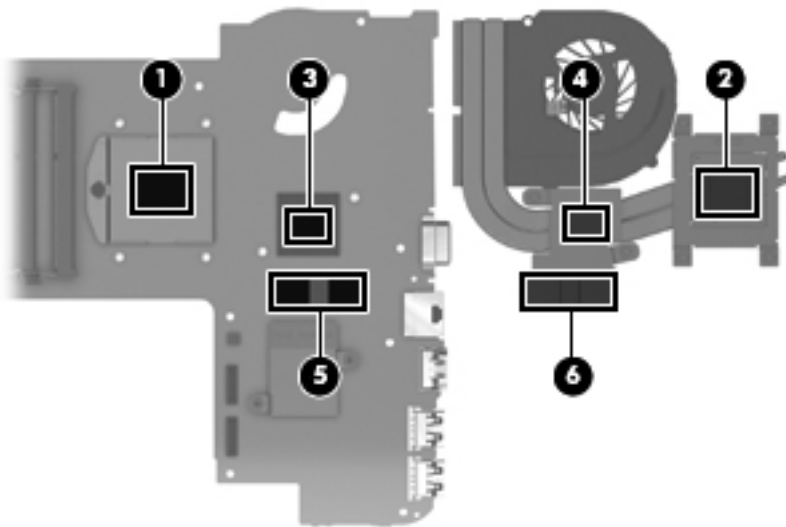
Reverse this procedure to install the fan/heat sink assembly.

Processor

NOTE: The processor spare part kit includes replacement thermal material. Replacement thermal material is also available in the Thermal Material Kit, spare part number 669929-001.

Description	Spare part number
Intel Core i7-3612QM 2.1-GHz processor (SC turbo up to 3.1-GHz), 6.0-MB L3 cache, 1600-MHz, quad core, 35W	680647-001
Intel Core i7-3520M 2.9-GHz processor (SC turbo up to 3.6-GHz), 4.0-MB L3 cache, 1600-MHz, dual core, 35W	681954-001
Intel Core i7-2640M 2.80-GHz processor (SC turbo up to 3.40-GHz), 4.0-MB L3 cache, 1333-MHz FSB, dual core, 35 W	666173-001
Intel Core i5-3320M 2.6-GHz processor (SC turbo up to 3.3GHz), 3.0-MB L3 cache, 1600-MHz, dual core, 35W	681952-001
Intel Core i5-3210M 2.5GHz processor (SC turbo up to 3.1GHz), 3.0-MB L3 cache, 1600-MHz, dual core, 35W	680645-001
Intel Core i5-2540M 2.60-GHz processor (SC turbo up to 3.30-GHz), 3.0-MB L3 cache, 1333-MHz FSB, dual core, 35 W)	631255-001
Intel Core i5-2520M 2.50-GHz processor (SC turbo up to 3.20-GHz), 3.0-MB L3 cache, 1333-MHz FSB, dual core, 35 W)	631253-001
Intel Core i5-2430M 2.40-GHz processor (SC turbo up to 3.00-GHz), 3.0-MB L3 cache, 1333-MHz FSB, dual core, 35 W)	653341-001
Intel Core i3-2350M TJ85 2.30-GHz processor (3.0-MB L3 cache, 1333-MHz FSB, dual core, 35 W)	653340-001

Before removing the processor, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 37), and then remove the following components:

   a. Optical drive (see Optical drive on page 44)

   b. Hard drive (see Hard drive on page 46)

   c. Keyboard (see Keyboard on page 55)

   d. Top cover (see Top cover on page 57)

   e. System board (see System board on page 70)

   f. Fan/heat assembly (see Fan/heat sink assembly on page 73)

Remove the processor:

1. Turn the processor locking screw **(1)** one-half turn counterclockwise, until you hear a click.

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

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

Reverse this procedure to install the processor.

Speakers

Description	Spare part number
Speakers (include left and right speakers and cables)	669933-001

Before removing the speakers, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 37), and then remove the following components:

   a. Optical drive (see Optical drive on page 44)

   b. Hard drive (see Hard drive on page 46)

   c. Keyboard (see Keyboard on page 55)

   d. Top cover (see Top cover on page 57)

   e. System board (see System board on page 70)

Remove the speakers:

1. Remove the Phillips PM2.5×6.0 shoulder screw **(1)** that secures the speakers to the base enclosure.

    📝 **NOTE:** When removing the front speakers, make note of the location of the rubber isolator **(2)** that is installed in the screw hole.

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

Reverse this procedure to install the speakers.

Optical drive connector cable

📝 **NOTE:** The optical drive connector cable is included in the Optical Drive Hardware Kit, spare part numbers 670734-001 (for use only with Beats Edition computer models) and 670735-001 (for use only with non-Beats Edition computer models).

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

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see), and then remove the following components:

    a. Optical drive (see)

    b. Hard drive (see)

    c. Keyboard (see)

    d. Top cover (see)

    e. System board (see)

Remove the optical drive connector cable:

1. Remove the two Phillips PM2.5×4.5 screws **(1)** that secure the optical drive connector to the base enclosure.

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

3. Remove the optical drive connector cable **(3)**.
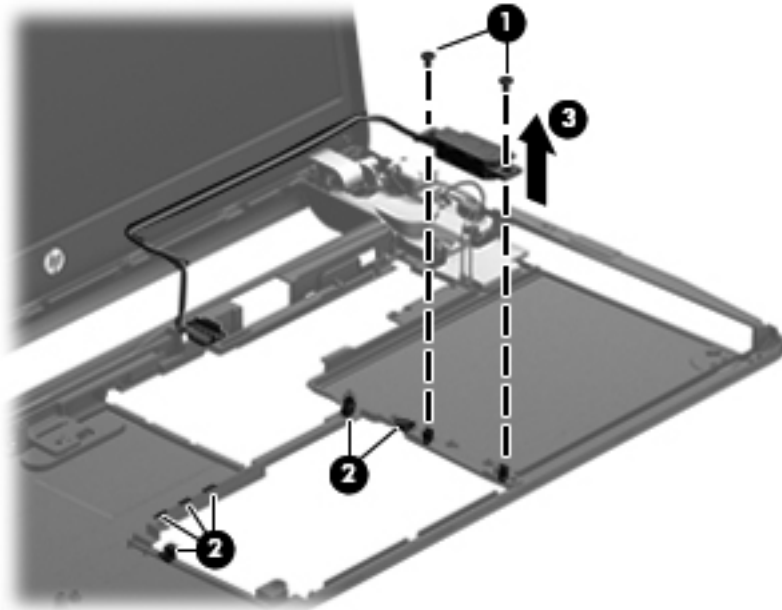
Reverse this procedure to install the optical drive connector cable.

Subwoofer

Description	Spare part number
Subwoofer (includes cable and rubber isolators)	670733-001

Before removing the subwoofer, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 37), and then remove the following components:

   a. Optical drive (see Optical drive on page 44)

   b. Hard drive (see Hard drive on page 46)

   c. Keyboard (see Keyboard on page 55)

   d. Top cover (see Top cover on page 57)

   e. System board (see System board on page 70)

Remove the subwoofer:

1. Remove the three Phillips PM2.5×6.0 shoulder screws **(1)** that secure the subwoofer to the base enclosure.

    NOTE: When removing the subwoofer, make note of the locations of the four rubber isolators **(2)** that are installed in the screw holes.

2. Remove the subwoofer **(3)**.
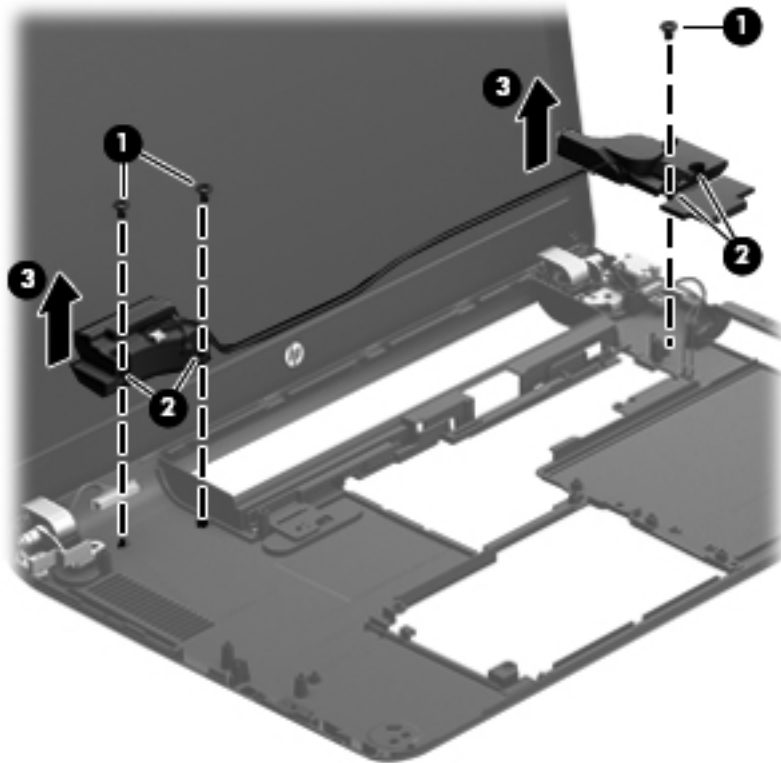
Reverse this procedure to install the subwoofer.

5 Setup Utility (BIOS) and System Diagnostics

Using Setup Utility

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

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

Starting Setup Utility

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

To start Setup Utility, follow these steps:

1. Turn on or restart the computer, and then press esc while the "Press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

2. Press f10 to enter Setup Utility.

Changing the language of Setup Utility

1. Start Setup Utility.

2. Use the arrow keys to select **System Configuration > Language**, and then press enter.

3. Use the arrow keys to select a language, and then press enter.

4. When a confirmation prompt with your language selected is displayed, press enter.

5. To save your change and exit Setup Utility, use the arrow keys to select **Exit > Exit Saving Changes**, and then press enter.

Your change takes effect immediately.

Navigating and selecting in Setup Utility

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

1. Turn on or restart the computer, and then press esc while the "Press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

   ● To select a menu or a menu item, use the tab key and the keyboard arrow keys and then press enter, or use a pointing device to click the item.

   ● To scroll up and down, click the up arrow or the down arrow in the upper-right corner of the screen, or use the up arrow key or the down arrow key.

   ● To close open dialog boxes and return to the main Setup Utility screen, press esc, and then follow the on-screen instructions.

2. Press f10 to enter Setup Utility.

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

● To exit Setup Utility menus without saving your changes, press the esc key, and then follow the on-screen instructions.

   – or –

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

● To save your changes and exit Setup Utility menus, press f10, and then follow the on-screen instructions.

   – or –

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

Your changes go into effect when the computer restarts.

Displaying system information

1. Start Setup Utility.

2. Select the **Main menu**. System information such as the system time and date, and identification information about the computer is displayed.

3. To exit Setup Utility without changing any settings, use the arrow keys to select **Exit > Exit Discarding Changes**, and then press enter.

Restoring factory settings in Setup Utility

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

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

1. Turn on or restart the computer, and then press esc while the "Press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

2. Press f10 to enter Setup Utility.

3. Use the arrow keys to select **Exit > Load Setup Defaults**.

4. Follow the on-screen instructions.

5. To save your changes and exit, press f10, and then follow the on-screen instructions.

   – or –

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

Your changes go into effect when the computer restarts.

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

Exiting Setup Utility

- To exit Setup Utility and save your changes from the current session:

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

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

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

Updating the BIOS

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

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

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

Determining the BIOS version

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

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

1. Start Setup Utility (BIOS).

2. Use the arrow keys to select **Main**.

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

Downloading a BIOS update

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

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

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

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

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

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

2. Follow the on-screen instructions to identify your computer and access the BIOS update you want to download.

3. At the download area, follow these steps:

   a. Identify the BIOS update that is later than the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.

   b. Follow the on-screen instructions to download your selection to the hard drive. Make a note of the path to the location on your hard drive where the BIOS update is downloaded. You will need to access this path when you are ready to install the update.

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

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

1. **Windows 7**—Open Windows Explorer by selecting **Start > Computer**.

   Windows XP—Open Windows Explorer by selecting Start > **My Computer**.

2. Double-click your hard drive designation. The hard drive designation is typically Local Disk (C:).

3. Using the hard drive path you recorded earlier, open the folder on your hard drive that contains the update.

4. Double-click the file that has an .exe extension (for example, *filename.exe*). The BIOS installation begins.

5. Complete the installation by following the on-screen instructions.

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

Using System Diagnostics

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

● Start-up test—This test analyzes the main computer components that are required to start the computer.

● Run-in test—This test repeats the start-up test and checks for intermittent problems that the start-up test does not detect.

● Hard disk test—This test analyzes the physical condition of the hard drive, and then checks all data in every sector of the hard drive. If the test detects a damaged sector, it attempts to move the data to a good sector.

● Memory test—This test analyzes the physical condition of the memory modules. If it reports an error, replace the memory modules immediately.

● Battery test—This test analyzes the condition of the battery. If the battery fails the test, contact HP support to report the issue and purchase a replacement battery.

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

To start System Diagnostics:

1. Turn on or restart the computer. While the "Press the ESC key for Startup Menu" message is displayed in the lower-left corner of the screen, press esc. When the Startup Menu is displayed, press f2.

2. Click the diagnostic test you want to run, and then follow the on-screen instructions.

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

6 Specifications

Computer specifications

	Metric	U.S.
Dimensions		
Width	**33.8 cm**	13.31 in
Depth	**22.5 cm**	8.86 in
Height (front to back)	**2.4 to 3.2 cm**	0.96 to 1.27 in
Weight	**1.99 kg**	4.40 lb
Input power		
Operating voltage and current	18.5 V dc @ 3.5 A - 65 W	
	18.5 V dc @ 3.5 A - 65 W, Slim Adapter	
	19.0 V dc @ 4.74 A - 90 W	
	19.0 V dc @ 4.74 A - 90 W Slim Adapter	
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
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.

14.0-in display specifications

	Metric	U.S.
Dimensions		
Height	**17.6 cm**	6.93 in
Width	**31.1 cm**	12.24 in
Diagonal	**35.7 cm**	14.06 in

	Metric	U.S.
Number of colors	Up to 16.8 million	
Contrast ratio	250:1 (typical)	
Brightness	200 nits (typical)	
Backlight	LED	
Character display	80 × 25	
Total power consumption	4.0 W	
Viewing angle	±40° horizontal, +120/-40° vertical (typical)	

Hard drive specifications

	*1-TB	**750-GB	**640-GB	**500-GB	**320-GB
Dimensions					
Height	9.5 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	1.1 GB/sec	1.1 GB/sec	1.1 GB/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	22 ms	22 ms	22 ms
Logical blocks	1,953,525,168	1,465,149,168	1,250,263,728	976,773,168	628,142,448
Disk rotational speed	5400 rpm	5400 rpm	5400 rpm	7200 rpm and 5400 rpm	7200 rpm 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   Backup and recovery

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

This chapter provides information on the following topics:

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

Restore

If the computer hard drive fails, you must use a set of recovery discs or a recovery flash drive to restore your system to its factory image. Ideally, you have already used HP Recovery Manager to create these tools immediately after software setup.

For issues other than hard drive failure, you can restore your system by using the HP Recovery partition, rather than by using recovery discs or a recovery flash drive. To check for the presence of a recovery partition, click **Start**, right-click **Computer**, click **Manage**, and then click **Disk Management**. If the recovery partition is present, a Recovery drive is listed in the window.

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

Creating restore media

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

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

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

Guidelines:

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

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

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

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

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

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

1. Select **Start > All Programs > Security and Protection > HP Recovery Manager > HP Recovery Media Creation**.

2. Follow the on-screen instructions.

Performing a system restore

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

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

Note the following when performing a system restore:

- You can restore only the system that you have previously backed up. HP recommends that you use HP Recovery Manager to create either a set of recovery discs or a recovery flash drive as soon as you set up the computer.

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

- HP Recovery Manager restores only software that was installed at the factory. For software not provided with this computer, you must either download the software from the manufacturer's Web site or reinstall the software from the disc provided by the manufacturer.

Using the dedicated recovery partition

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

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

1. Access HP Recovery Manager in either of the following ways:

   - Select **Start > All Programs > Security and Protection > HP Recovery Manager > HP Recovery Manager**.

     – or –

   - Turn on or restart the computer, and then press esc while the "Press the ESC key for Startup Menu" message is displayed at the bottom of the screen. Then, press f11 while the "F11 (System Recovery)" message is displayed on the screen.

2. Click **System Recovery** in the **HP Recovery Manager** window.

3. Follow the on-screen instructions.

Restoring using the restore media

1. If possible, back up all personal files.

2. Insert the first recovery disc into the optical drive on your computer or an optional external optical drive, and then restart the computer.

    – or –

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

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

3. Press f9 at system bootup.

4. Select the optical drive or the flash drive.

5. Follow the on-screen instructions.

Changing the computer boot order

To change the boot order for recovery discs:

1. Restart the computer.

2. Press esc while the computer is restarting, and then press f9 for boot options.

3. Select **Internal CD/DVD ROM Drive** from the boot options window.

To change the boot order for recovery flash drive:

1. Insert the flash drive into a USB port.

2. Restart the computer.

3. Press esc while the computer is restarting, and then press f9 for boot options.

4. Select the flash drive from the boot options window.

Backing up and recovering your information

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

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

NOTE: A recovery from your most recent backup needs to be performed if the computer has a virus attack or if any major system components fail. In order to correct computer issues, a recovery should first be attempted before a system restore is attempted.

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

● At regularly scheduled times

    TIP: Set reminders to back up your information periodically.

● Before the computer is repaired or restored

● Before you add or modify hardware or software

Guidelines:

- Create system restore points using the Windows System Restore feature, and periodically copy them to an optical disc or an external hard drive. For more information on using system restore points, see **Using Windows system restore points**.

- Store personal files in the Documents library and back up this folder periodically.

- Save customized settings in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time-saver if you have to re-enter your preferences.

To create a screen shot:

1. Display the screen you want to save.

2. Copy the screen image:

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

   To copy the entire screen, press prt sc.

3. Open a word-processing document, and then select **Edit > Paste**. The screen image is added to the document.

4. Save and print the document.

Using Windows Backup and Restore

Guidelines:

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

- Allow enough time to complete the backup process. Depending on file sizes, it may take over an hour.

To create a backup:

1. Select **Start > Control Panel > System and Security > Backup and Restore**.

2. Follow the on-screen instructions to schedule and create a backup.

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

Using Windows system restore points

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

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

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

When to create restore points

- Before you add or modify software or hardware

- Periodically, whenever the computer is functioning optimally

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

Create a system restore point

1. Select **Start > Control Panel > System and Security > System**.

2. In the left pane, click **System Protection**.

3. Click the **System Protection** tab.

4. Click **Create**, and then follow the on-screen instructions.

Restore to a previous date and time

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

1. Select **Start > Control Panel > System and Security > System**.

2. In the left pane, click **System Protection**.

3. Click the **System Protection** tab.

4. Click **System Restore**.

5. Follow the on-screen instructions.

8 Power cord set requirements

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

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

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

Requirements for all countries

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least **1.5 m** (5.0 ft) and no more than **2.0 m** (6.5 ft).

- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.

- The power cord sets must have a minimum current capacity of 10 A and a nominal voltage rating of 125 or 250 V ac, as required by the power system of each country or region.

- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions

Country/region	Accredited agency	Applicable note number
Argentina	IRAM	1
Australia	SAA	1
Austria	OVE	1
Belgium	CEBEC	1
Brazil	ABNT	1
Canada	CSA	2
Chile	IMQ	1
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
India	ISI	1
Israel	SII	1
Italy	IMQ	1

Country/region	Accredited agency	Applicable note number
Japan	JIS	3
The Netherlands	KEMA	1
New Zealand	SANZ	1
Norway	NEMKO	1
The People's Republic of China	CCC	4
Saudi Arabia	SASO	7
Singapore	PSB	1
South Africa	SABS	1
South Korea	KTL	5
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	6
Thailand	TISI	1
The United Kingdom	ASTA	1
The United States	UL	2

1. The flexible cord must be Type HO5VV-F, 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.

2. The flexible cord must be Type SVT/SJT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V ac) configuration. CSA or C-UL mark. UL file number must be on each element.

3. The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCTF, 3-conductor, 0.75-mm² or 1.25-mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) 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 CCC certification mark.

5. The flexible cord must be Type H05VV-F 3X0.75-mm² conductor size. KTL logo and individual approval number must be on each element. Corset approval number and logo must be printed on a flag label.

6. The flexible cord must be Type HVCTF 3×1.25-mm² conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.

7. For 127 V ac, the flexible cord must be Type SVT or SJT 3 x 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type H05VV-F 3×0.75-/1.00-mm² conductor size, with plug BS 1363/A with BSI or ASTA marks.

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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