



HP ENVY 14 SPECTRE

Maintenance and Service Guide

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Safety warning notice

⚠ WARNING! To reduce the possibility of heat-related injuries or of overheating the device, do not place the device directly on your lap or obstruct the device air vents. Use the device only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The device and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950).

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1 Product description

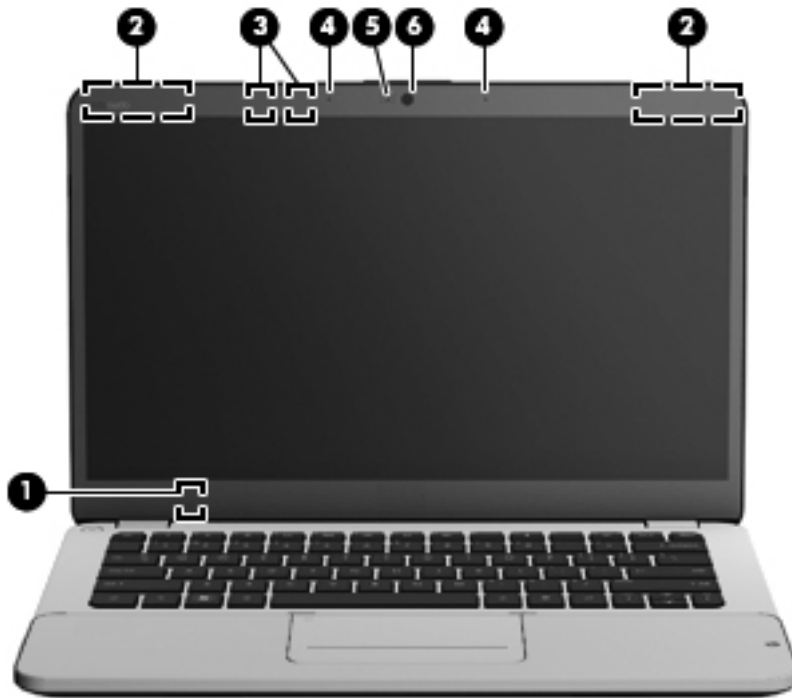
Category	Description
Product Name	HP ENVY 14 SPECTRE
Processors	<ul style="list-style-type: none">Intel® Core® i7-2677M 1.80-GHz processor (4.0-MB L3 cache, 17 W)Intel Core i5-2467M 1.60-GHz processor (3.0-MB L3 cache, 17 W) Processor is soldered to the system board
Chipset	Intel HM65 Express chipset
Graphics	Internal graphics: <ul style="list-style-type: none">Universal memory architecture (UMA) with shared video memoryIntel HD Graphics 3000 Supports HD decode, DX10, and HDMI
Panel	14.0-in, slim light-emitting diode (LED), WGA, HD+, AntiGlare (1600×900) display; typical brightness: 250 nits All display assemblies include 2 wireless local area network (WLAN) antenna cables Supports low voltage differential signalling (LVDS), LCD interface, flush glass panel cover support Lighted logo on top bezel
Memory	One customer-accessible/upgradable memory module slot DDR3-1333-MHz single channel support (DDR3-1333 and DDR3-1666 downgrade to DDR3-800/1066) Supports 8-GB (8192×1) or 4-GB (4096×1) of system RAM
Solid-state drives	Customer-accessible Supports 256-GB (128-GB×2) or 128-GB (128-GB×1)
Audio and video	Beats Signature audio profile applied to both the headphones and external speakers Supports wireless Beats audio via SMSC (not supported in Europe or Turkey) High-performance ENVY-branded speakers mounted in bass reflex enclosures Separate amplifiers for headphone

Category	Description
	HP TrueVision HD webcam (fixed, no tilt with activity LED; 3-element lens with fixed focus (50-cm), F/2.0, 1280×720 by 24 frames per second)
	Two omnidirectional, dual array, digital microphones with appropriate beam-forming, echo-cancellation, noise-reduction software
Ethernet	Integrated 10/100/1000
Wireless	Integrated wireless local area network (WLAN) options by way of wireless module
	Two WLAN antennas built into display assembly
	Support for the Intel Centrino Advanced-N 6230 WLAN module
	Support for NFC wireless data communication
External media cards	2-in-1 Digital Media Slot with push-push technology, supporting: <ul style="list-style-type: none"> • MultiMediaCard • Secure Digital (SD) Memory Card • Secure Digital High Capacity Memory Card Supports mini versions by use of an adapter (adapter is not included).
Ports	<ul style="list-style-type: none"> • AC power • Combination audio-out (stereo headphone)/audio-in (mono microphone) • HDMI 1.4a output supporting stereoscopic 3D • mini DisplayPort supporting 2560×1600 resolution • RJ-45 (Ethernet Gigabit support with LED indicators) • USB 3.0 (1 port), USB 2.0 (1 port) <p>NOTE: All USB ports support USB sleep and charge.</p>
Keyboard/pointing devices	Full-size (14.0-in.), Island-style, no numeric keypad
	Radiance backlight (f5 to toggle backlight on/off)
	Clickpad with imaging sensor, multi-touch gestures enabled
	Taps enabled by default
Power requirements	65W non-PFC (non-BFR/PV Free) AC adapter with localized cable plug support (3-wire plug with ground pin, supports 3-pin DC connector) ²
	Supports 4-cell, 58-Wh, 4.1-Ah, Li-ion battery (battery is not user-removable)
Security	Supports security cable lock
	Supports Intel AT-p ready

Category	Description
Operating system	Preinstalled: <ul style="list-style-type: none">• Windows® 7 Home Premium 64-bit• Windows 7 Home Professional 64-bit• Windows 7 Ultimate 64-bit
Serviceability	End-user replaceable part: AC adapter

2 External component identification

Display



Item	Component	Description
(1)	Internal display switch	Turns off the display and initiates Sleep if the display is closed while the power is on. NOTE: The internal display switch is not visible from the outside of the computer.
(2)	WLAN antennas (2)*	Send and receive wireless signals.
(3)	Proximity sensors (2)*	Detect your presence in front of the computer and turn on the radiance backlight keyboard feature.
(4)	Internal microphones (2)	Record audio, automatically reducing ambient noise and providing echo cancellation.

Item	Component	Description
(4)	Webcam	Records video and captures still photographs. To use the webcam, double-click the ArcSoft Camera Suite icon on the desktop, or select Start > All Programs > ArcSoft Camera Suite > Launch WebCam Companion .
(5)	Webcam light	On: The webcam is active.
(6)	HP TrueVision HD webcam	Records video and captures still photographs. To access the webcam, select Start > All Programs > CyberLink > CyberLink YouCam .

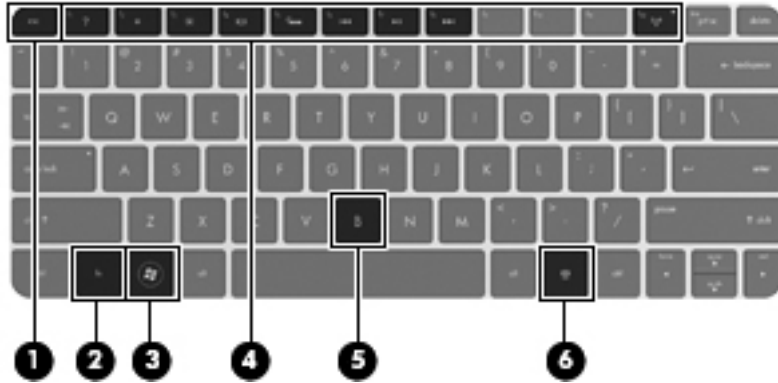
*The antennas and proximity sensors are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas and proximity sensors free from obstructions. For wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices*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

Button



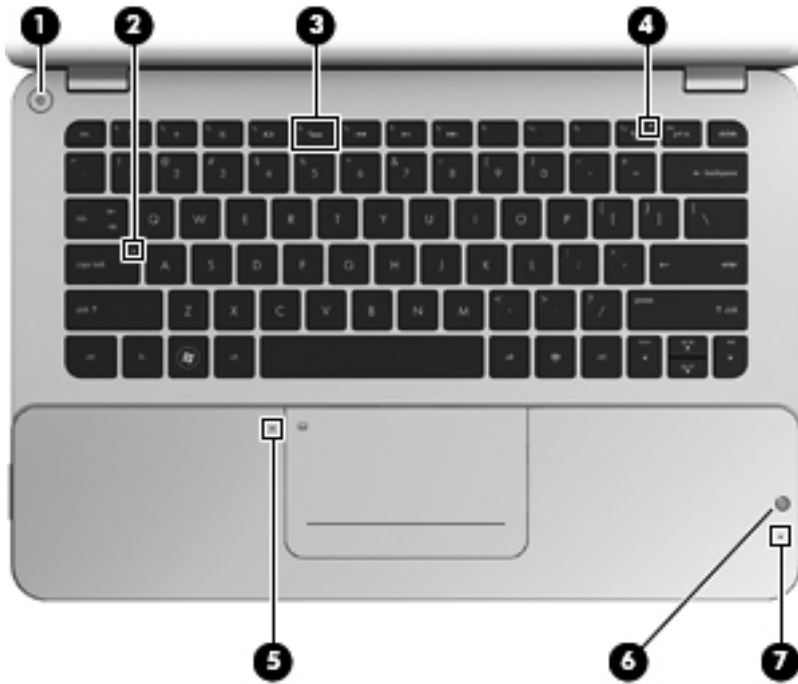
Component	Description
Power button	<ul style="list-style-type: none">• When the computer is off, press the button to turn on the computer.• When the computer is on, press the button briefly to initiate Sleep.• When the computer is in the Sleep state, press the button briefly to exit Sleep.• When the computer is in Hibernation, press the button briefly to exit Hibernation. <p>If the computer has stopped responding and Windows shutdown procedures are ineffective, simultaneously press and hold the power button and the mute button on the right side of the computer for at least 5 seconds to turn off the computer.</p> <p>To learn more about your power settings, select Start > Control Panel > System and Security > Power Options, or see the <i>HP Notebook Reference Guide</i>.</p>

Keys



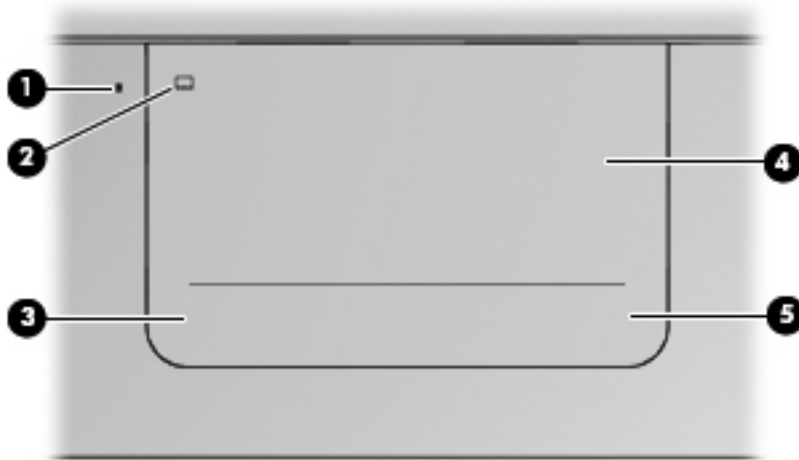
Item	Component	Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes the following functions: <ul style="list-style-type: none">• When the key is pressed in combination with the esc key, system information is displayed.• When the key is pressed in combination with the b key, Beats Audio is enabled or disabled.
(3)	Windows logo key	Displays the Windows Start menu.
(4)	Action keys	Execute frequently used system functions.
(5)	b key	Enables or disables Beats Audio when pressed in combination with the fn key.
(6)	Windows applications key	Displays a shortcut menu for items beneath the pointer.

Lights



Item	Component	Description
(1)	Power light	<ul style="list-style-type: none"> • White: The computer is on. • Blinking white: The computer is in the Sleep state. • Off: The computer is off or in Hibernation.
(2)	Caps lock light	<ul style="list-style-type: none"> • White: Caps lock is on. • Off: Caps lock is off.
(3)	Keyboard backlight light	<p>White: Identifies the keyboard backlight action key.</p> <p>Press the key to turn the keyboard backlight on or off.</p>
(4)	Wireless light	<ul style="list-style-type: none"> • White: An integrated wireless device, such as a WLAN device, is enabled. <p>NOTE: Wireless devices are enabled at the factory.</p> <ul style="list-style-type: none"> • Amber: All wireless devices are disabled.
(5)	Imagepad light	<ul style="list-style-type: none"> • Amber: The Imagepad is off. • Off: The Imagepad is on.
(6)	Beats Audio light	<ul style="list-style-type: none"> • Red: Beats Audio is enabled. • Off: Beats Audio is disabled.
(7)	Mute light	<ul style="list-style-type: none"> • Amber: Speaker sound is off. • Off: Speaker sound is on.

Imagepad



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

Left side



Item	Component	Description
(1)	DisplayPort	Connects an optional digital display device, such as a high-performance monitor or projector.
(2)	HDMI port	Connects an optional video or audio device, such as a highdefinition television, any compatible digital or audio component, or a high-speed HDMI 1.4 device.
(3)	RJ-45 (network) jack	Connects a network cable.
(4)	USB 3.0 charging port	Connects an optional USB 1.0, USB 2.0, or USB 3.0 device and provides enhanced USB power performance. The USB 3.0 charging port can also charge select models of cell phones and MP3 players, even when the computer is off.
(5)	USB 2.0 charging port	Connects an optional USB 1.0 or USB 2.0 device. The USB 2.0 charging port can also charge select models of cell phones and MP3 players, even when the computer is off.

NOTE: NOTE: If a USB device is charging while the computer is in the Sleep state, exiting Sleep through the USB 2.0 port is disabled at the factory. You must enable this feature in Setup Utility. For information on enabling features in Setup utility, see the “Setup Utility (BIOS) and System Diagnostics” chapter in the *HP Notebook Reference Guide*.

Item	Component	Description
(6)	Audio-out (headphone) jack/ Audio-in (microphone) jack	<p data-bbox="924 226 1458 338">Produces sound when connected to optional powered stereo speakers, headphones, earbuds, a headset, or television audio. Also connects an optional headset microphone.</p> <p data-bbox="924 369 1458 506">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.</p> <p data-bbox="924 537 1458 592">NOTE: When a device is connected to the jack, the computer speakers are disabled.</p> <p data-bbox="924 623 1458 701">NOTE: Be sure that the device cable has a 4-conductor connector that supports both audio-out (headphone) and audio-in (microphone).</p>
(7)	Digital Media slot	<p data-bbox="924 730 1458 758">Supports the following digital card formats:</p> <ul data-bbox="924 783 1458 911" style="list-style-type: none"> <li data-bbox="924 783 1458 810">• MultiMediaCard <li data-bbox="924 835 1458 863">• Secure Digital (SD) Memory Card <li data-bbox="924 888 1458 915">• Secure Digital High Capacity Memory Card

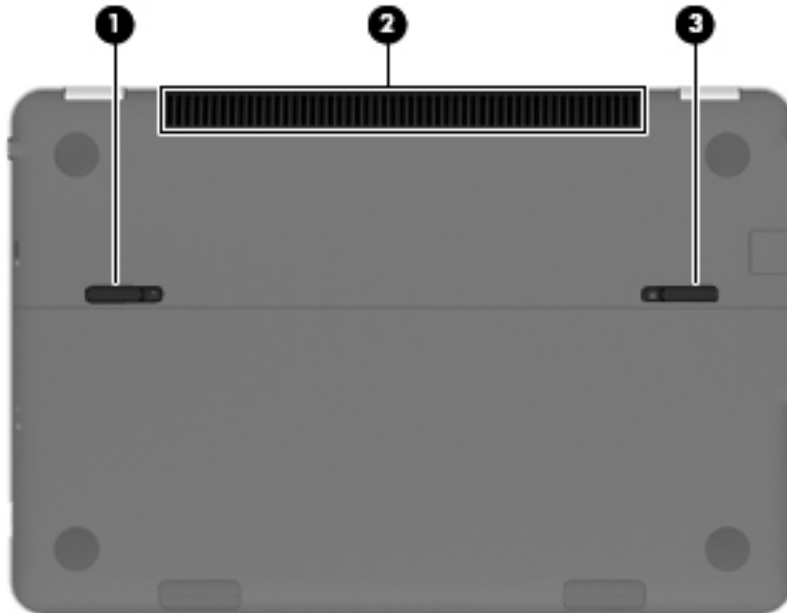
Right side



Item	Component	Description
(1)	Mute button	Mutes or restores speaker sound.
(2)	Volume dial	Adjusts the speaker volume. To increase the volume, rotate the dial clockwise. To decrease the volume, rotate the dial counter-clockwise.
(3)	Beats Audio button	Opens Beats Audio Control Panel, which allows you to view and control all audio settings. Beats Audio is an enhanced audio feature that provides a deep, controlled bass while maintaining a clear sound. NOTE: You can also open the Beats Audio Control Panel by selecting Start > Control Panel > Hardware and Sound > Beats Audio Control Panel .
(4)	Hard drive light	<ul style="list-style-type: none"> Blinking white: The hard drive is being accessed. Amber: HP ProtectSmart Hard Drive Protection has temporarily parked the hard drive. NOTE: For information about HP ProtectSmart Hard Drive Protection, see the <i>HP Notebook Reference Guide</i> .
(5)	Power light	<ul style="list-style-type: none"> White: The computer is on. Blinking white: The computer is in the Sleep state. Off: The computer is off or in Hibernation.
(6)	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.

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

Bottom

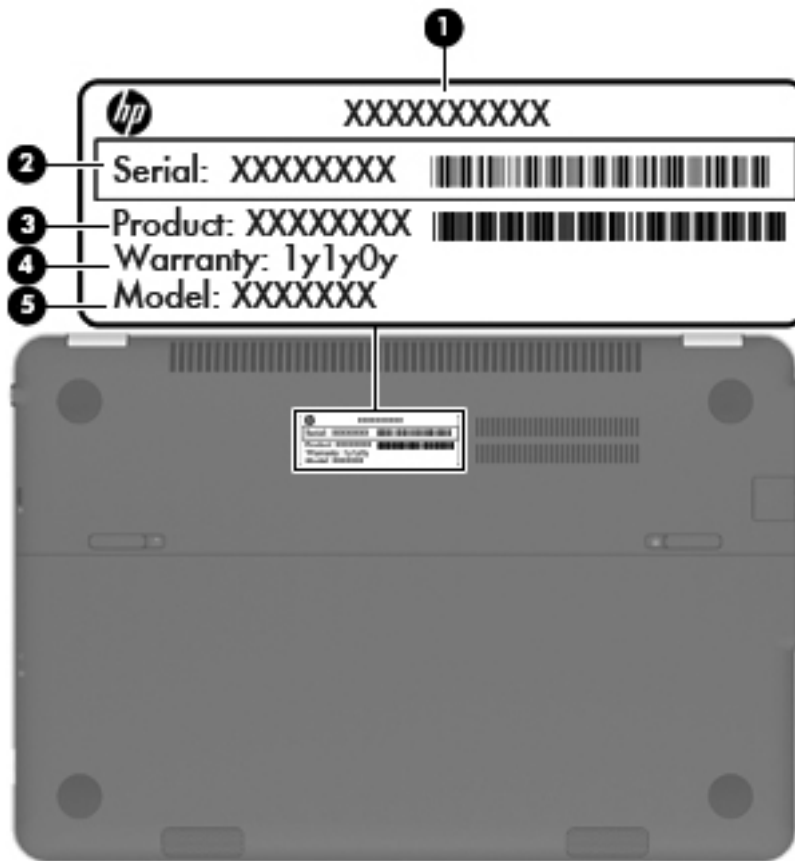


Item	Component	Description
(1)	Battery cover release latch	Releases the battery cover.
(2)	Vent	<p>Enables airflow to cool internal components.</p> <p>NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.</p>
(3)	Battery cover lock latch	Locks the battery cover into place.

3 Illustrated parts catalog

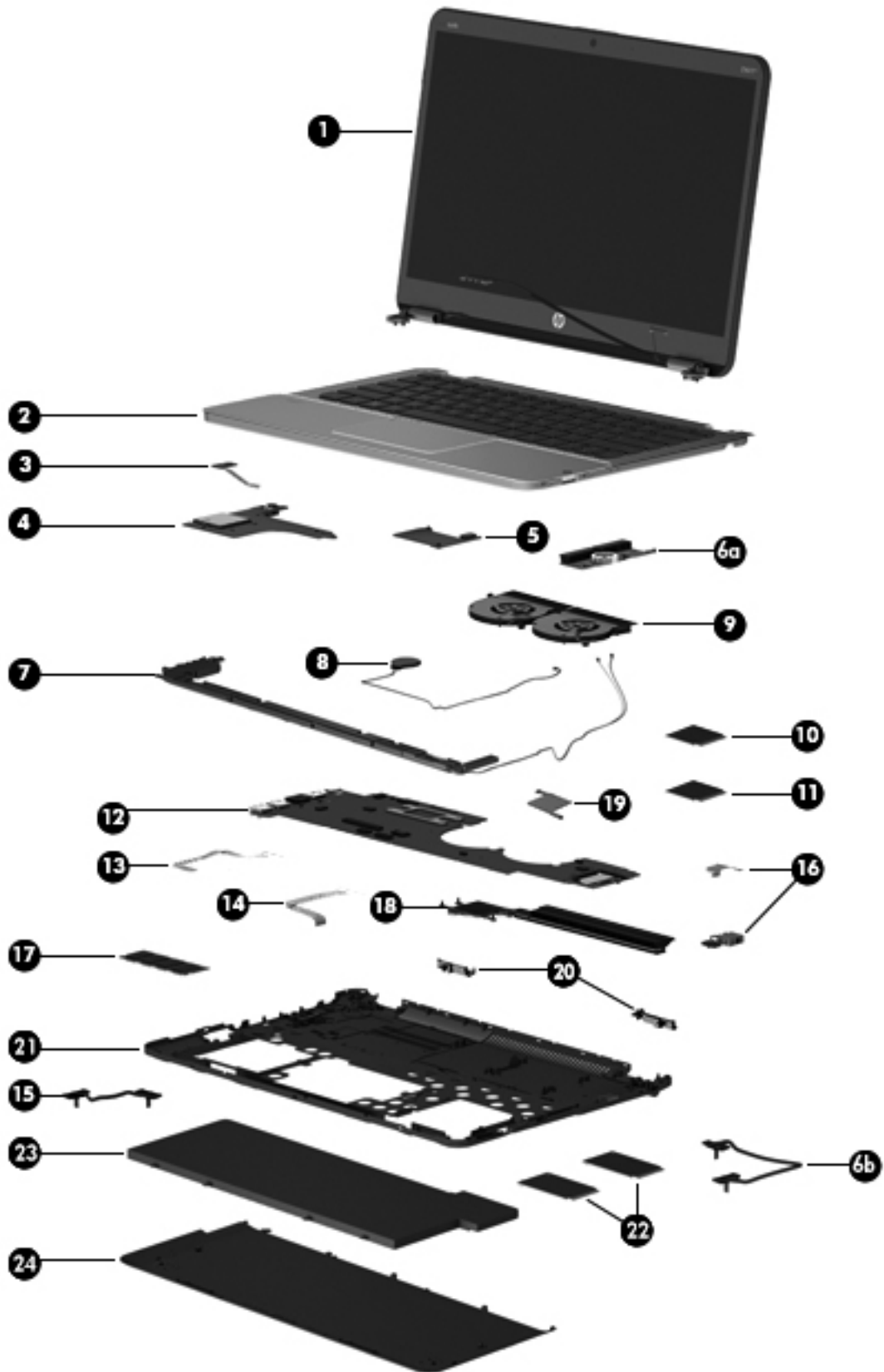
Service tag

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.

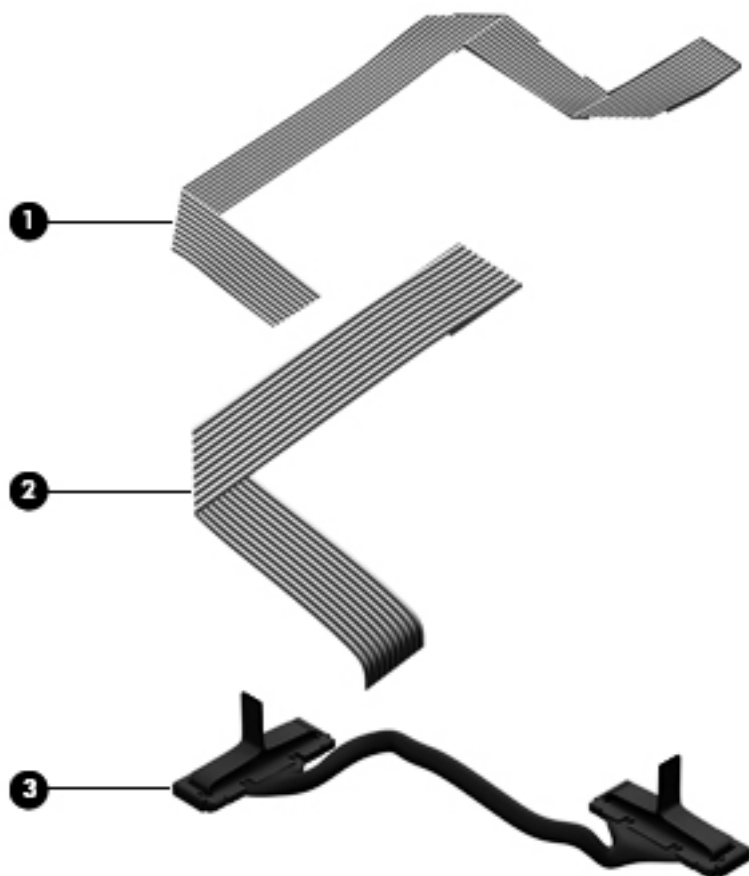
Computer major components



Item	Component	Spare part number
(1)	Display assembly , 14.0-in, AntiGlare, high-definition (includes display panel cable, 2 WLAN antenna transceivers and cables, and webcam/microphone module and cable)	675507-001
(2)	Top cover with keyboard (includes keyboard cable, TouchPad, and TouchPad button board and cable)	
	For use in Belgium	671536-A41
	For use in Canada	671536-121
	For use in Denmark, Finland, and Norway	671536-DH1
	For use in France	671536-051
	For use in Germany	671536-041
	For use in India	671536-D61
	For use in Italy	671536-061
	For use in Latin America	671536-161
	For use in the Netherlands	671536-B31
	For use in Russia	671536-251
	For use in Saudi Arabia	671536-171
	For use in Spain	671536-071
	For use in Switzerland	671536-BG1
	For use in Taiwan	671536-AB1
	For use in Thailand	671536-281
	For use in Turkey	671536-141
	For use in the United Kingdom	671536-031
	For use in the United States	671536-001
(3)	Power button board (includes cable)	672010-001
(4)	Card Reader board	675511-001
	NOTE: The Card Reader board spare part kit does not include the Card Reader board cable. The Card Reader board cable is included in the Cable Kit, spare part number 672006-001.	
(5)	NFC board	675510-001
	NOTE: The NFC board spare part kit does not include the NFC board cable. The NFC board cable is included in the Cable Kit, spare part number 672006-001.	
(6a)	Solid-state drive connector board , includes:	675509-001
(6b)	Solid-state drive connector board cable	
(7)	Speakers (include speaker cables and wireless audio module antenna cables)	672015-001
(8)	RTC battery (includes double-sided tape and cable)	672013-001

Item	Component	Spare part number
(9)	Fans (2, include cable and tape)	672008-001
(10)	Wireless audio module	672011-001
(11)	Intel Centrino Advanced-N 6230 WLAN module	636672-005
(12)	System board (includes processor and replacement thermal material):	
	Equipped with Intel HM65 chipset and Intel Core i7-2677M 1.80-GHz processor (4.0-MB L3 cache, 17 W)	675516-001
	Equipped with Intel HM65 chipset and Intel Core i5-2467M 1.60-GHz processor (3.0-MB L3 cache, 17 W)	675517-001
	Thermal Material Kit (not illustrated, includes replacement thermal material)	675515-001
	Cable Kit , includes:	672006-001
(13)	NFC board cable	
(14)	TouchPad cable	
(15)	Card Reader board cable	
(16)	Power connector cable (includes bracket)	672014-001
(17)	4-GB memory module (PC3, 12800, 1333-MHz):	641369-005
	Heat sink (includes replacement thermal material):	
(18)	Processor heat sink	675514-001
(19)	Post controller hub heat sink	685662-001
(20)	Display hinge covers (includes left and right hinge covers)	672009-001
(21)	Base enclosure (includes battery cover lock latch, battery cover release latch, power connector barrel, and RJ45 cover)	675513-001
	Rubber Feet Kit (not illustrated, includes front and rear rubber feet)	672016-001
(22)	128-GB solid-state drive (up to 2)	675508-001
(23)	4-cell, 58-Wh, 4.1-Ah, Li-ion battery	665460-001
(24)	Battery cover (includes speaker grilles and front rubber feet)	672012-001

Cable Kit



Item	Component	Spare part number
	Cable Kit , includes:	672006-001
(1)	TouchPad cable	
(2)	NFC board cable	
(3)	Card Reader board cable	

Miscellaneous parts

Component	Spare part number
65-W travel AC adapter (non-PFC, 3-wire)	677154-001
HDMI-to-VGA adapter	530607-001
HP 14.0-in protective cover	674766-001
USB external DVD±RW DL SuperMulti Drive	659940-001
Power cord (3-pin, black, 1.83-m):	
For use in Australia	490371-011
For use in Europe	490371-021
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	490371-281
For use in the United Kingdom and Singapore	490371-031
Screw Kit	672007-001

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)
490371-111	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)
490371-291	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)
530607-001	HDMI-to-VGA adapter
636672-005	Intel Centrino Advanced-N 6230 WLAN module
641369-005	4-GB memory module (PC3, 12800, 1600-MHz)
659940-001	USB external DVD±RW DL SuperMulti Drive
665460-001	4-cell, 58-Wh, 4.1-Ah, Li-ion battery
671536-001	Top cover with keyboard for use in the United States (includes keyboard cable, TouchPad, and TouchPad button board and cable)
671536-031	Top cover with keyboard for use in the United Kingdom (includes keyboard cable, TouchPad, and TouchPad button board and cable)
671536-041	Top cover with keyboard for use in Germany (includes keyboard cable, TouchPad, and TouchPad button board and cable)
671536-051	Top cover with keyboard for use in France (includes keyboard cable, TouchPad, and TouchPad button board and cable)
671536-061	Top cover with keyboard for use in Italy (includes keyboard cable, TouchPad, and TouchPad button board and cable)
671536-071	Top cover with keyboard for use in Spain (includes keyboard cable, TouchPad, and TouchPad button board and cable)
671536-121	Top cover with keyboard for use in French Canada (includes keyboard cable, TouchPad, and TouchPad button board and cable)
671536-141	Top cover with keyboard for use in Turkey (includes keyboard cable, TouchPad, and TouchPad button board and cable)
671536-161	Top cover with keyboard for use in Latin America (includes keyboard cable, TouchPad, and TouchPad button board and cable)

Spare part number	Description
671536-171	Top cover with keyboard for use in Saudi Arabia (includes keyboard cable, TouchPad, and TouchPad button board and cable)
671536-251	Top cover with keyboard for use in Russia (includes keyboard cable, TouchPad, and TouchPad button board and cable)
671536-281	Top cover with keyboard for use in Thailand (includes keyboard cable, TouchPad, and TouchPad button board and cable)
671536-A41	Top cover with keyboard for use in Belgium (includes keyboard cable, TouchPad, and TouchPad button board and cable)
671536-AB1	Top cover with keyboard for use in Taiwan (includes keyboard cable, TouchPad, and TouchPad button board and cable)
671536-B31	Top cover with keyboard for use in the Netherlands (includes keyboard cable, TouchPad, and TouchPad button board and cable)
671536-BG1	Top cover with keyboard for use in Switzerland (includes keyboard cable, TouchPad, and TouchPad button board and cable)
671536-D61	Top cover with keyboard for use in India (includes keyboard cable, TouchPad, and TouchPad button board and cable)
671536-DH1	Top cover with keyboard for use in Denmark, Finland, and Norway (includes keyboard cable, TouchPad, and TouchPad button board and cable)
672006-001	Cable Kit (includes the NFC board cable, the TouchPad cable, and the Card Reader board cable)
672007-001	Screw Kit
672008-001	Fan (includes cable and tape)
672009-001	Display hinge covers (includes left and right hinges covers)
672010-001	Power button board (includes cable)
672011-001	Wireless audio module
672012-001	Battery cover (includes speaker grilles and front rubber feet)
672013-001	RTC battery (includes double-sided tape and cable)
672014-001	Power connector cable (includes bracket)
672015-001	Speakers (include speaker cables and wireless audio module antenna cables)
672016-001	Rubber Feet Kit (includes front and rear rubber feet)
674766-001	HP 14.0-in protective cover
675507-001	14.0-in, AntiGlare, high-definition display assembly (includes display panel cable, 2 WLAN antenna transceivers and cables, and webcam/microphone module and cable)
675508-001	128-GB solid-state drive
675509-001	Solid-state drive connector board (includes cable)
675510-001	NFC board

NOTE: The NFC board spare part kit does not include the NFC board cable. The NFC board cable is included in the Cable Kit, spare part number 672006-001.

Spare part number	Description
675511-001	Card Reader board NOTE: The Card Reader board spare part kit does not include the Card Reader board cable. The Card Reader board cable is included in the Cable Kit, spare part number 672006-001.
675513-001	Base enclosure (includes battery cover lock latch, battery cover release latch, power connector barrel, and RJ45 cover)
675514-001	Processor heat sink (includes replacement thermal material)
675515-001	Thermal Material Kit (includes replacement thermal material)
675516-001	System board equipped with Intel HM65 chipset and Intel Core i7-2677M 1.80-GHz processor (4.0-MB L3 cache, 17 W; includes replacement thermal material)
675517-001	System board equipped with Intel HM65 chipset and Intel Core i5-2467M 1.60-GHz processor (3.0-MB L3 cache, 17 W; includes replacement thermal material)
677154-001	65-W travel AC adapter (non-PFC, 3-wire)
685662-001	Post controller hub heat sink (includes replacement thermal material)

4 Removal and replacement procedures

Preliminary replacement requirements

Tools required

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

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

Service considerations

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



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

Plastic parts



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

Cables and connectors



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

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

Drive handling

⚠ CAUTION: Drives are fragile components that must be handled with care. To prevent damage to the computer, damage to a drive, or loss of information, observe these precautions:

Before removing or inserting a hard drive, shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

Before handling a drive, be sure that you are discharged of static electricity. While handling a drive, avoid touching the connector.

Before removing a diskette drive or optical drive, be sure that a diskette or disc is not in the drive and be sure that the optical drive tray is closed.

Handle drives on surfaces covered with at least one inch of shock-proof foam.

Avoid dropping drives from any height onto any surface.

After removing a hard drive, an optical drive, or a diskette drive, place it in a static-proof bag.

Avoid exposing an internal hard drive to products that have magnetic fields, such as monitors or speakers.

Avoid exposing a drive to temperature extremes or liquids.

If a drive must be mailed, place the drive in a bubble pack mailer or other suitable form of protective packaging and label the package "FRAGILE."

Grounding guidelines

Electrostatic discharge damage

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

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

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

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

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

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

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

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

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

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

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

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

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

Workstation guidelines

Follow these grounding workstation guidelines:

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

Equipment guidelines

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

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

The following grounding equipment is recommended to prevent electrostatic damage:

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

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

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

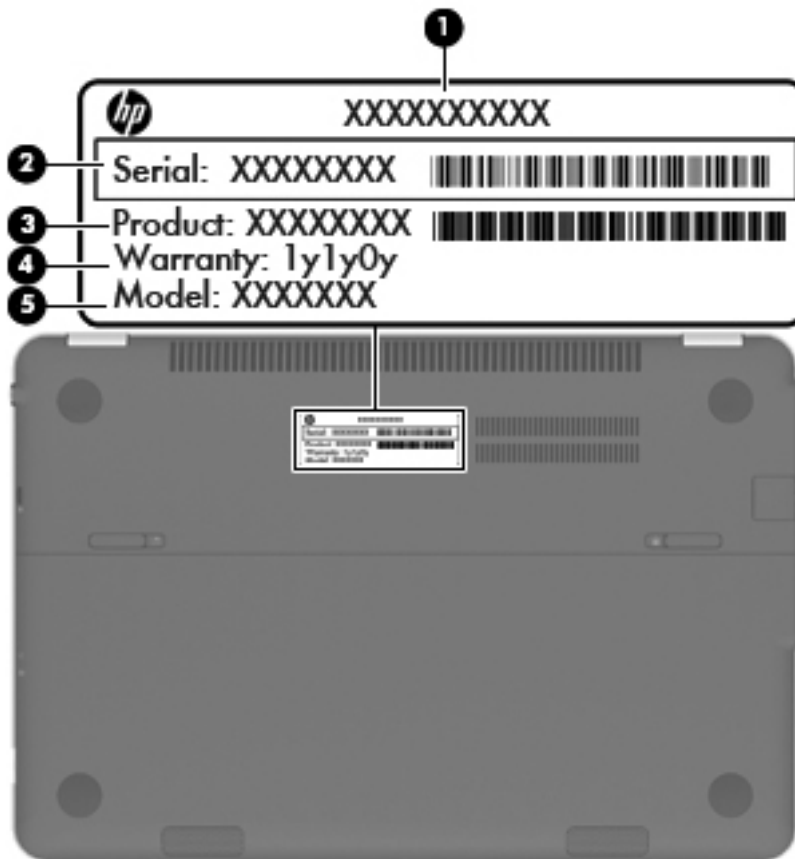
Component replacement procedures

This chapter provides removal and replacement procedures.

There are as many as 57 screws that must be removed, replaced, and/or loosened when servicing the computer. Make special note of each screw size and location during removal and replacement.

Service tag

When ordering parts or requesting information, provide the computer serial number and model number provided on the service tag. It is necessary to remove the battery to obtain these numbers. See [Battery on page 31](#) for battery removal instructions.

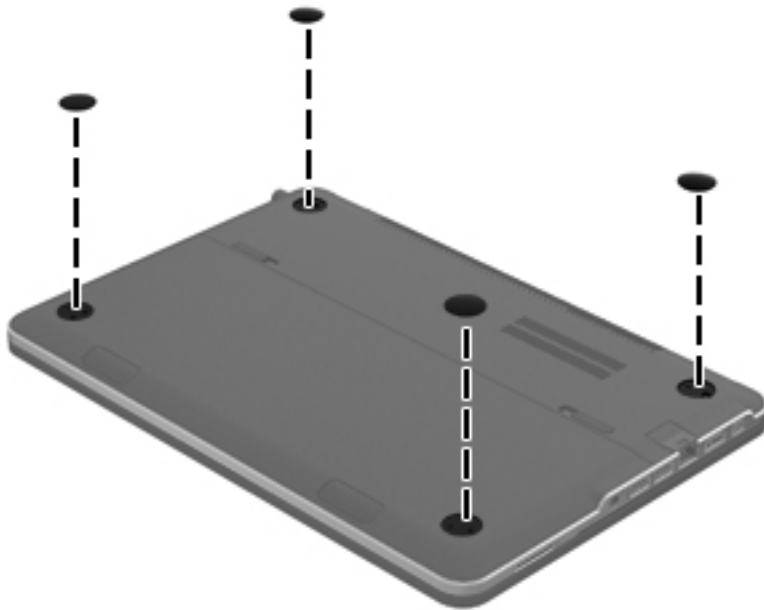


Item	Component	Description
(1)	Product name	This is the product name affixed to the front of the computer.
(2)	Serial number (s/n)	This is an alphanumeric identifier that is unique to each product.
(3)	Part number/Product number (p/n)	This number provides specific information about the product's hardware 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.

Computer feet

The computer feet are adhesive-backed rubber pads. There are 2 rubber feet that attach to the battery cover, and 2 rubber feet that attach to the base enclosure, as indicated in the illustration below. These rubber feet are available in the Rubber Feet Kit, spare part number 672016-001.



Battery

Description	Spare part number
4-cell, 58-Wh, 4.1-Ah, Li-ion battery	665460-001

Before disassembling the computer, follow these steps:

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

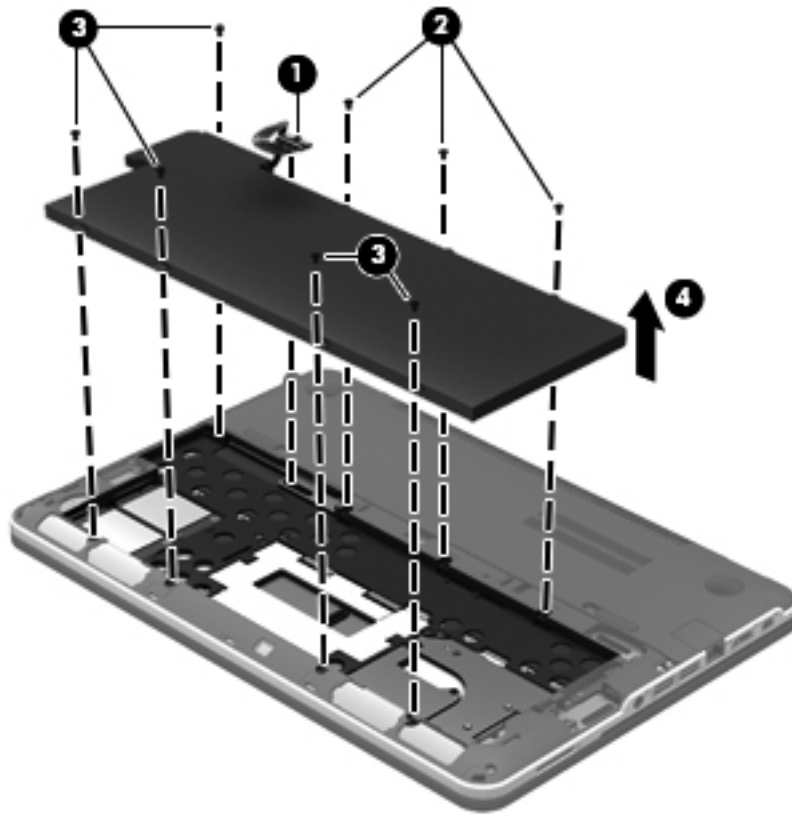
Remove the battery:

1. Turn the computer upside down on a flat surface.
2. Slide the battery cover lock latch to the left **(1)** to unlock the batter cover.
3. Firmly slide the battery cover release latch to the right **(2)** to release the battery cover.
4. Slide the battery cover **(3)** away from the computer.



5. Remove the battery cover. The battery cover is available using spare part number 672012-001.
6. Disconnect the battery cable **(1)** from the system board.
7. Remove the three Torx T8M2.0x5.4 screws **(2)** and the five Torx T8M2.0x3.6 screws **(3)** that secure the battery to the computer.

8. Remove the battery (4) from the computer.



Reverse this procedure to install the battery and battery cover.

Solid-state drive


Description	Spare part number
128-GB solid-state drive	675508-001

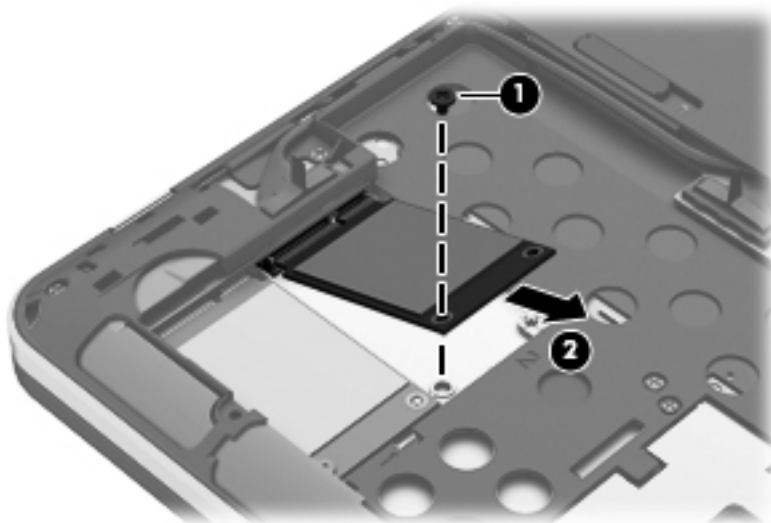
Before removing the solid-state drive and cable, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 31](#)).

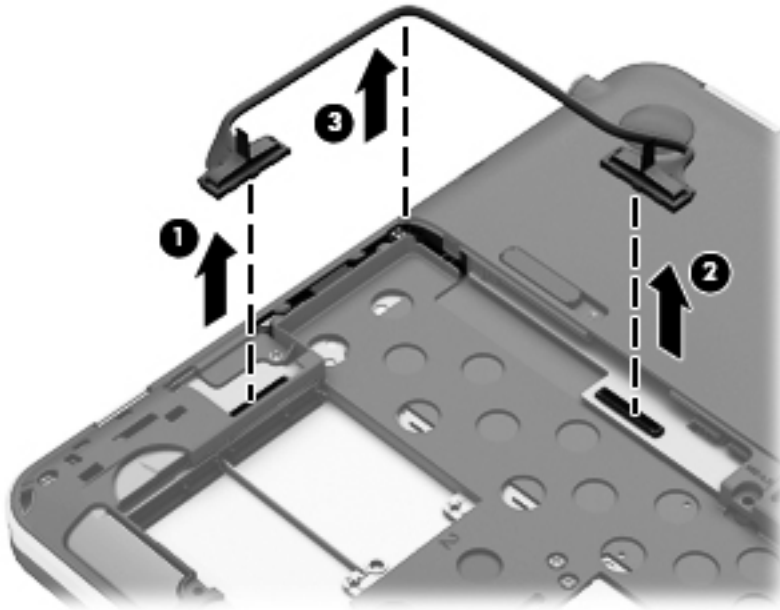
Remove the solid-state drive:

1. Remove the Phillips PM2.0×2.0 screw **(2)** that secures the solid-state drive to the system board. (The solid-state drive tilts up.)
2. Remove the solid-state drive by pulling the drive away from the slot at an angle **(2)**.

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




3. If it is necessary to replace the solid-state drive connector board cable, disconnect both ends of the cable **(1)** and **(2)** from the system board, and then release the cable from the clips **(3)** and channel built into the base enclosure. The solid-state drive connector board cable is included in the solid-state drive connector board spare part kit, spare part number 675509-001.



Reverse this procedure to install the solid-state drive and solid-state drive connector board cable.

Card Reader board cable

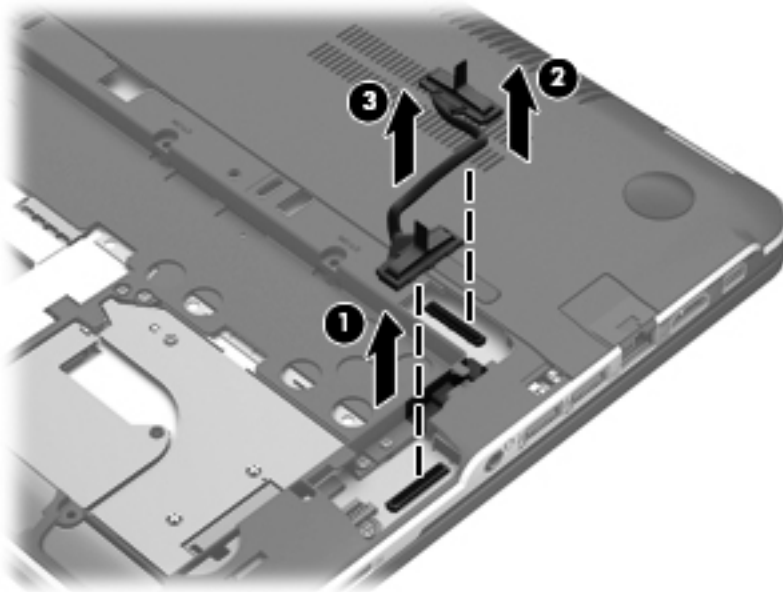
 **NOTE:** The Card Reader board cable is included in the Cable Kit, spare part number 672006-001.

Before removing the Card Reader board cable, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 31](#)).

Remove the Card Reader board cable:

- ▲ Disconnect both ends of the Card Reader board cable **(1)** and **(2)** from the system board, and then release the cable **(3)** from the clips and channel built into the base enclosure.



Reverse this procedure to install the Card Reader board cable.

NFC board

Description	Spare part number
NFC board	675510-001

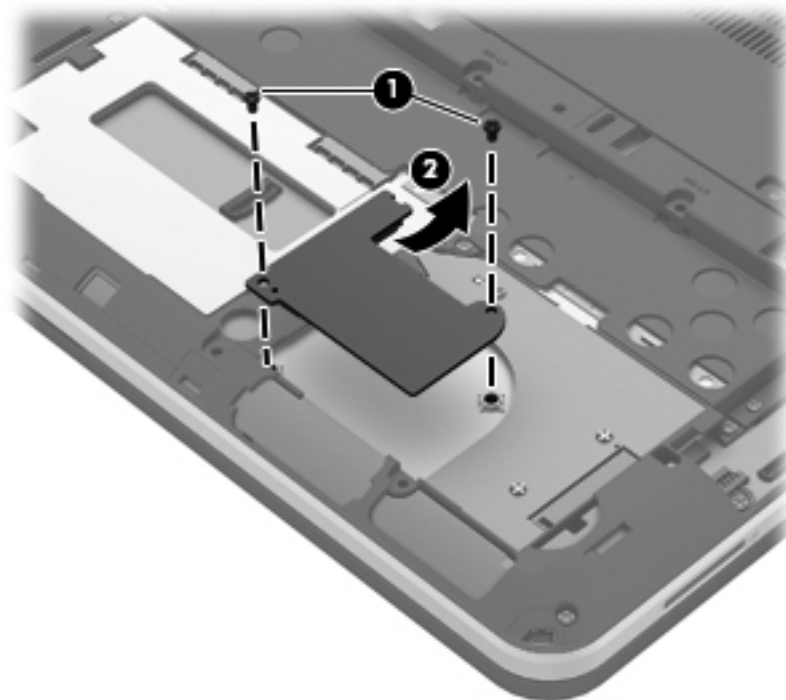
NOTE: The NFC board spare part kit does not include the NFC board cable. The NFC board cable is included in the Cable Kit, spare part number 672006-001.

Before removing the NFC board, follow these steps:

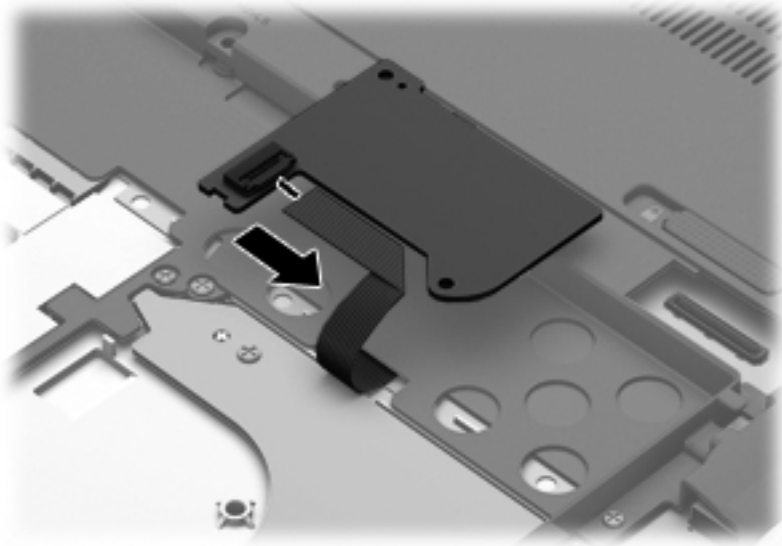
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 31](#)).

Remove the NFC board:

1. Remove the two Phillips PM2.0×3.0 screws **(1)** that secure the NFC board to the system board.
2. Turn the NFC board upside down, with the zero insertion force (ZIF) connector and cable toward you.



3. Release the ZIF connector to which the NFC board cable is attached, and then disconnect the NFC board cable from the system board.



4. Remove the NFC board.

Reverse this procedure to install the NFC board.

Top cover




NOTE: The top cover spare part kit includes the keyboard, the keyboard cable, the TouchPad board cable, and the TouchPad button board cable.

Description	Spare part number
For use in Belgium	671536-A41
For use in Canada	671536-121
For use in Denmark, Finland, and Norway	671536-DH1
For use in France	671536-051
For use in Germany	671536-041
For use in India	671536-D61
For use in Italy	671536-061
For use in Latin America	671536-161
For use in the Netherlands	671536-B31
For use in Russia	671536-251
For use in Saudi Arabia	671536-171
For use in Spain	671536-071
For use in Switzerland	671536-BG1
For use in Taiwan	671536-AB1
For use in Thailand	671536-281
For use in Turkey	671536-141
For use in the United Kingdom	671536-031
For use in the United States	671536-001

Before removing the top cover, follow these steps:

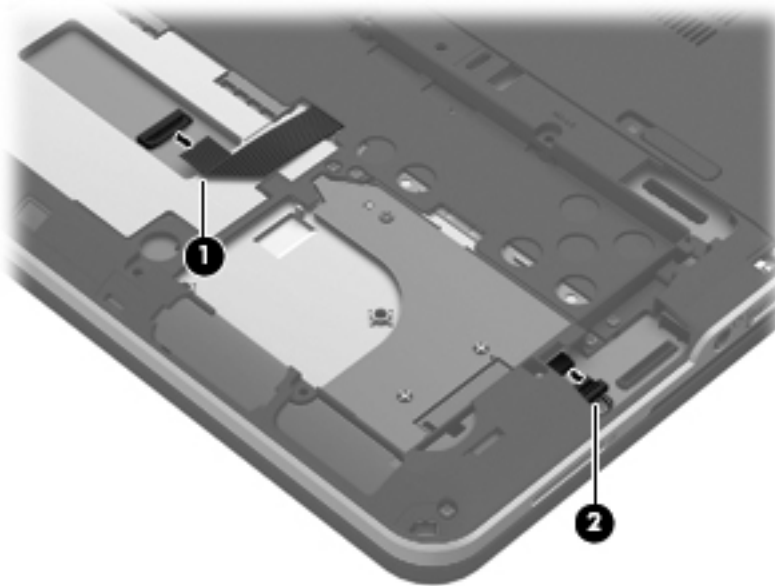
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 31](#)).
5. Remove the solid-state drive connector board cable (see [Solid-state drive on page 33](#)).
6. Remove the Card Reader board cable (see [Card Reader board cable on page 35](#)).

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

- NFC board (see [NFC board on page 36](#))
- Solid-state drive connector board (see [Card Reader board cable on page 35](#))
- Card Reader board (see [Card Reader board on page 43](#))
- Power button board (see [Power button board on page 44](#))

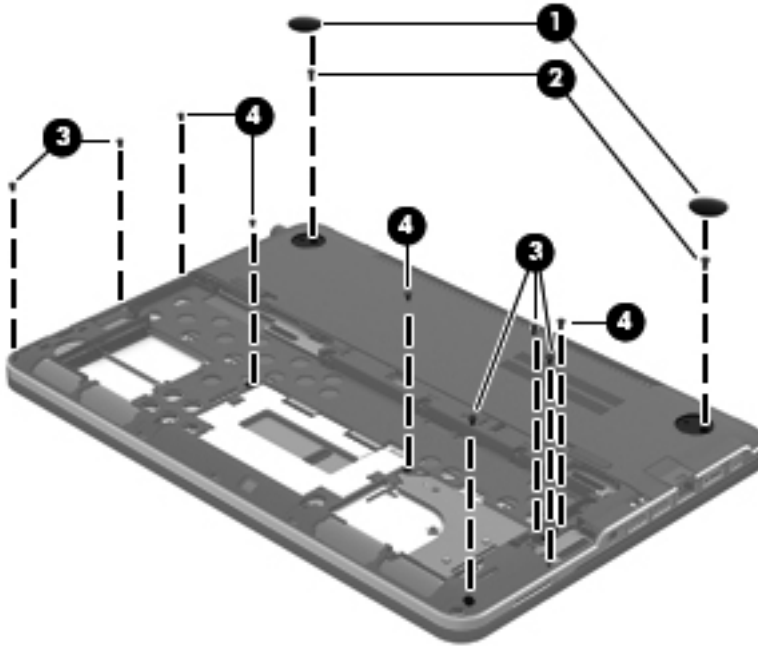
Remove the top cover:

1. Release the ZIF connector to which the TouchPad cable is connected, and then disconnect the TouchPad cable **(1)** from the TouchPad.
2. Disconnect the speaker cable **(2)** from the system board.

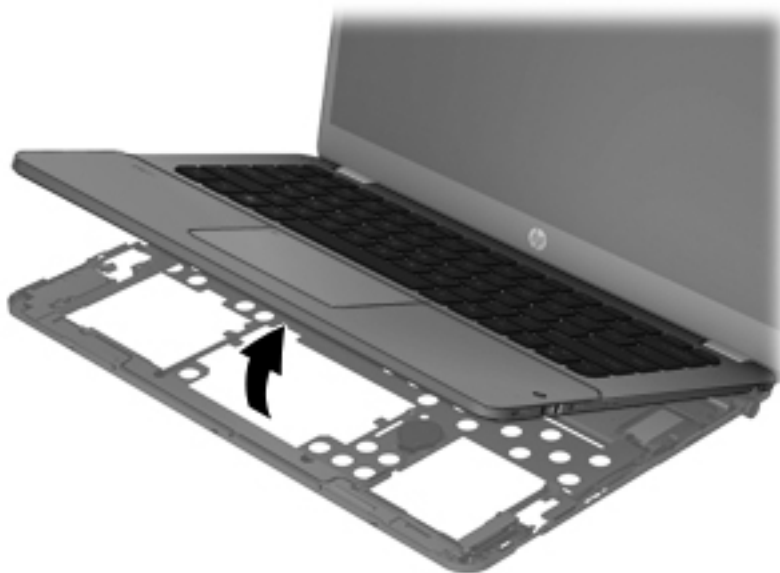


3. Remove the two rear rubber feet **(1)**.

4. Remove the following screws that secure the top cover to the base enclosure:
 - (2) Two Phillips PM2.0×5.5
 - (3) Five Phillips PM2.0×4.5
 - (4) Four Phillips PM2.0×4.0



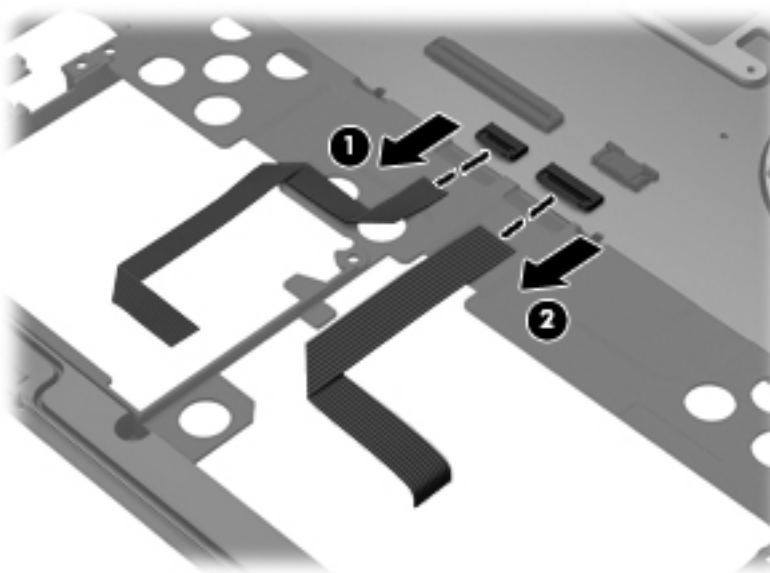
5. Turn the computer right side up, with the front toward you.
6. Open the computer.
7. Lift the front edge of the top cover slightly, until the power button board and keyboard cables are accessible.



8. Release the ZIF connector **(1)** to which the power button board cable is connected, and then disconnect the power button board cable **(2)** from the system board.
9. Release the ZIF connector **(3)** to which the keyboard cable is connected, and then disconnect the keyboard cable **(4)** from the system board.
10. Remove the top cover **(5)**.



NOTE: If it is necessary to replace the NFC board cable **(1)** or the TouchPad cable **(2)**, release the ZIF connector to which the respective cable is attached, and then disconnect the cable from the system board.



Reverse this procedure to install the top cover.

Solid-state drive connector board

Description	Spare part number
Solid-state drive connector board (includes cable)	675509-001

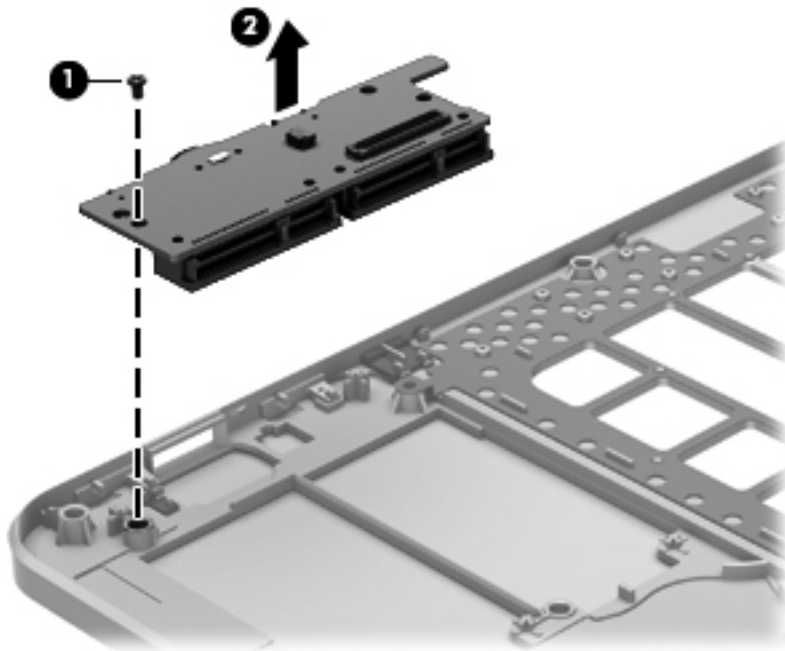
Before removing the solid-state drive connector board, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 31](#)), and then remove the following components:
 - a. Solid-state drive connector board cable (see [Solid-state drive on page 33](#))
 - b. Card Reader board cable (see [Card Reader board cable on page 35](#))
 - c. Top cover (see [Top cover on page 38](#))

Remove the solid-state drive connector 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 solid-state drive connector board to the top cover.

3. Remove the solid-state drive connector board **(2)**.



Reverse this procedure to install the solid-state drive connector board.

Card Reader board

Description	Spare part number
Card Reader board	675511-001

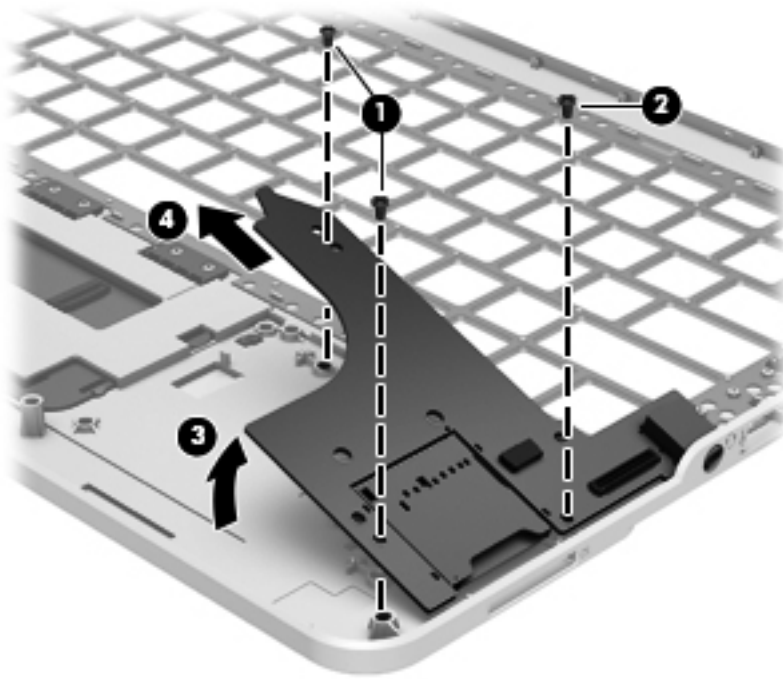
NOTE: The Card Reader board spare part kit does not include the Card Reader board cable. The Card Reader board cable is included in the Cable Kit, spare part number 672006-001.

Before removing the Card Reader board, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 31](#)), and then remove the following components:
 - a. Solid-state drive connector board cable (see [Solid-state drive on page 33](#))
 - b. Card Reader board cable (see [Card Reader board cable on page 35](#))
 - c. Top cover (see [Top cover on page 38](#))

Remove the Card Reader board:

1. Turn the top cover upside down, with the front toward you.
2. Remove the two Phillips PM2.0×3.6 screws **(1)** and the Phillips PM2.0×3.2 screw **(2)** that secure the Card Reader board to the top cover.
3. Lift the left side of the Card Reader board **(3)** until it rests at an angle.
4. Remove the Card Reader board **(4)** by sliding it up and to the left at an angle.



Reverse this procedure to install the Card Reader board.

Power button board

Description	Spare part number
Power button board (includes cable)	675510-001

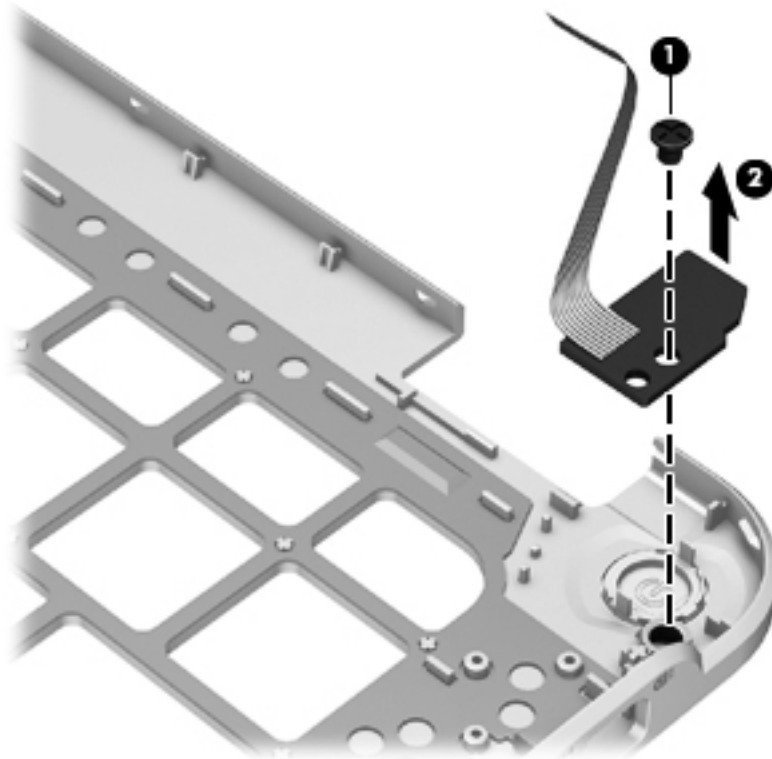
Before removing the power button board, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 31](#)), and then remove the following components:
 - a. Solid-state drive connector board cable (see [Solid-state drive on page 33](#))
 - b. Card Reader board cable (see [Card Reader board cable on page 35](#))
 - c. Top cover (see [Top cover on page 38](#))

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. Remove the power button board **(2)** and cable.



Reverse this procedure to install the power button board.

Speakers


Description	Spare part number
Speakers (include speaker cables and wireless audio module antenna cables)	672013-001

Before removing the speakers, follow these steps:

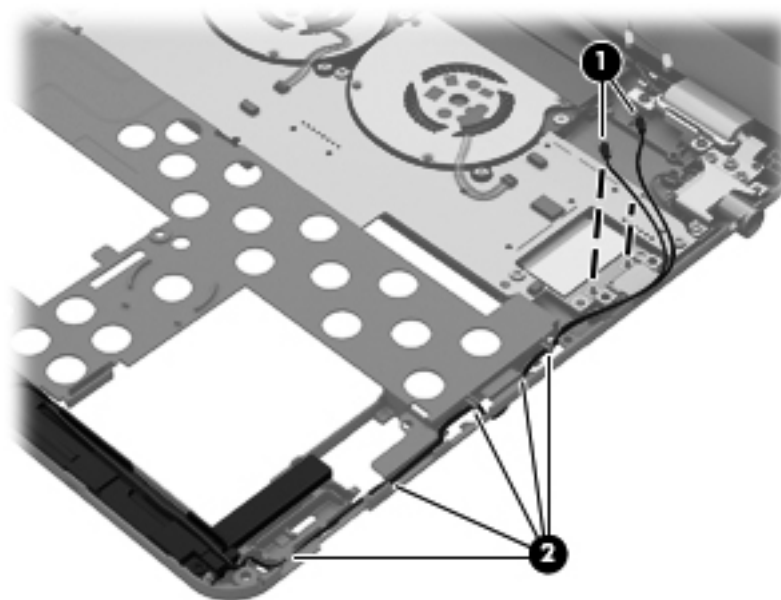
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 31](#)), and then remove the following components:
 - a. Solid-state drive connector board cable (see [Solid-state drive on page 33](#))
 - b. Card Reader board cable (see [Card Reader board cable on page 35](#))
 - c. Top cover (see [Top cover on page 38](#))

Remove the speakers:

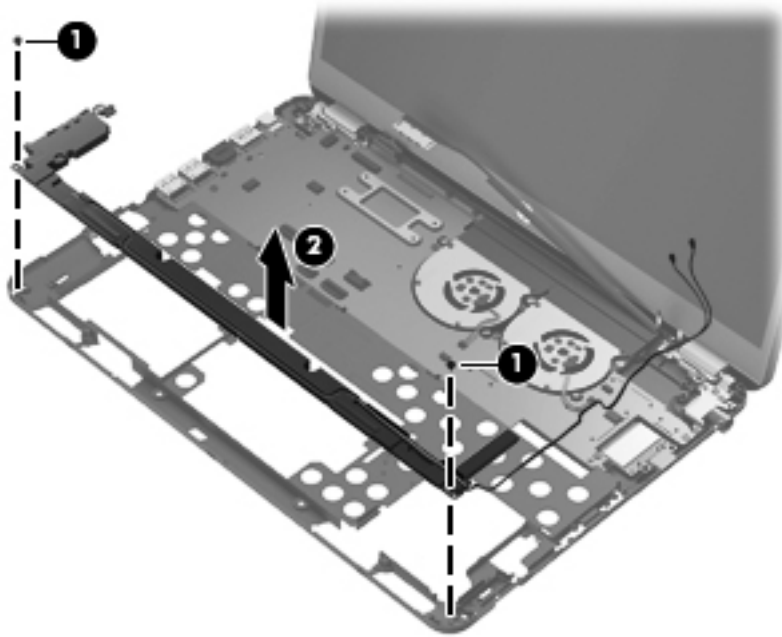
1. Disconnect the wireless audio module antenna cables **(1)** from the terminals on the wireless audio module.

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

2. Release the wireless audio module antenna cables from the clips **(2)** and routing channels built into the base enclosure.



3. Remove the two Phillips PM2.0×3.8 screws **(1)** that secure the speakers to the base enclosure.
4. Remove the speakers **(2)**.



Reverse this procedure to install the speakers.

RTC battery

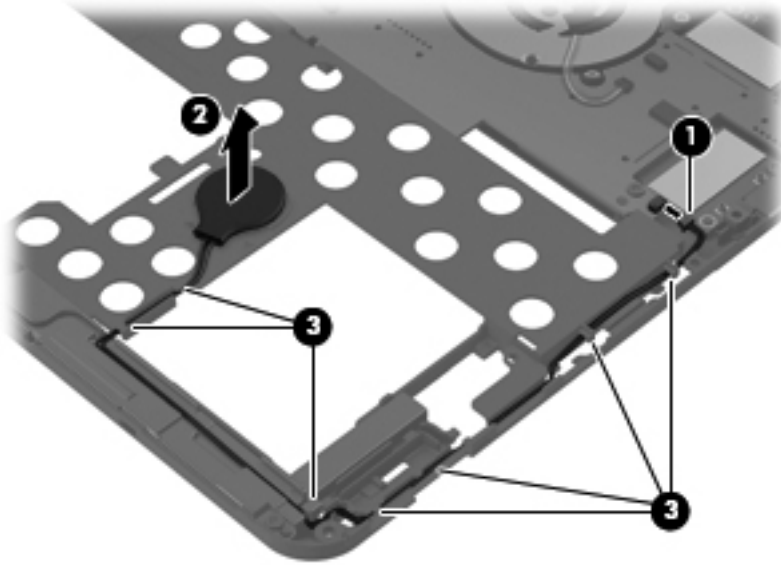
Description	Spare part number
RTC battery (double-sided tape and cable)	672013-001

Before removing the RTC battery, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 31](#)), and then remove the following components:
 - a. Solid-state drive connector board cable (see [Solid-state drive on page 33](#))
 - b. Card Reader board cable (see [Card Reader board cable on page 35](#))
 - c. Top cover (see [Top cover on page 38](#))
 - d. Speakers (see [Speakers on page 46](#))

Remove the RTC battery:

1. Disconnect the RTC battery cable **(1)** from the system board.
2. Detach the RTC battery **(2)** from the base enclosure. (The RTC battery is attached to the base enclosure with double-sided tape).
3. Release the RTC battery cable from the clips **(3)** and routing channel built into the base enclosure.



4. Remove the RTC battery and cable.

Reverse this procedure to install the RTC battery.

Wireless audio module

Description	Spare part number
Wireless audio module	672011-001

Before removing the wireless audio module, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 31](#)), and then remove the following components:
 - a. Solid-state drive connector board cable (see [Solid-state drive on page 33](#))
 - b. Card Reader board cable (see [Card Reader board cable on page 35](#))
 - c. Top cover (see [Top cover on page 38](#))

Remove the wireless audio module:


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

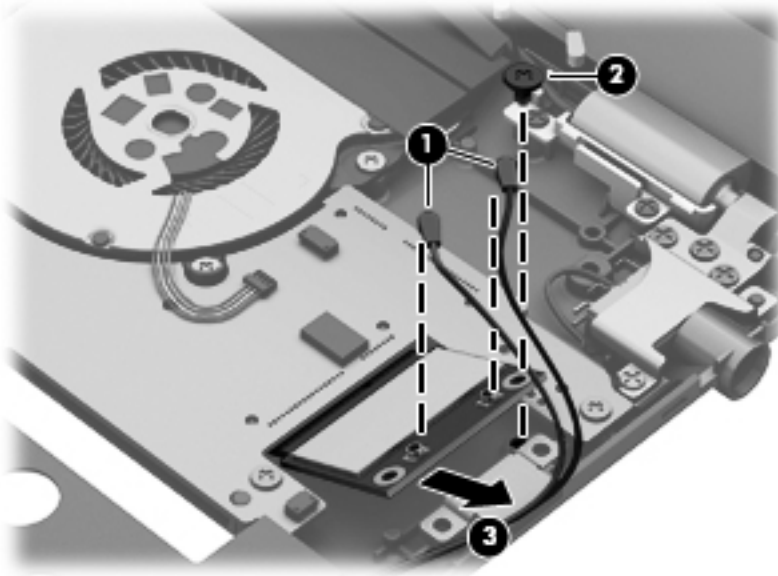



NOTE: The #7 wireless audio module antenna cable is connected to the wireless audio module "Main" terminal. The #8 wireless audio module antenna cable is connected to the wireless audio module "Aux" terminal.

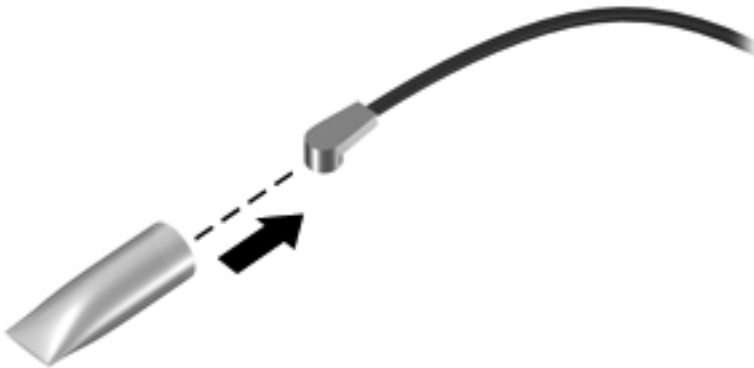
2. Remove the Phillips PM2.0×3.8 screw **(2)** that secures the wireless audio module to the system board. (The wireless audio module tilts up.)

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

 **NOTE:** The wireless audio module is designed with a notch to prevent incorrect installation into the wireless audio module slot.



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



Reverse this procedure to install the wireless audio module.

WLAN module

Description	Spare part number
Intel Centrino Advanced-N 6230 WLAN module	636672-005

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

Before removing the WLAN module, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 31](#)), and then remove the following components:
 - a. Solid-state drive connector board cable (see [Solid-state drive on page 33](#))
 - b. Card Reader board cable (see [Card Reader board cable on page 35](#))
 - c. Top cover (see [Top cover on page 38](#))


Remove the WLAN module:

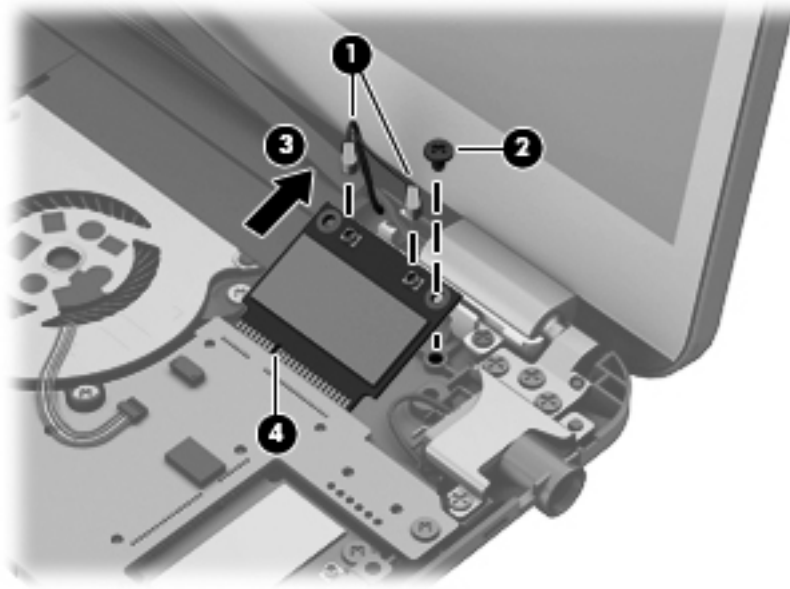
1. Disconnect the WLAN antenna cables **(1)** from the terminals on the WLAN module.


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

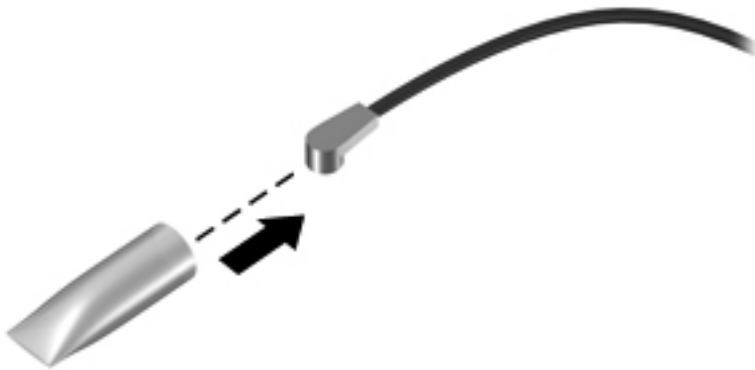
2. Remove the Phillips PM2.0×3.8 screw **(2)** that secures the WLAN module to the system board. (The WLAN module tilts up.)

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

 **NOTE:** The WLAN module is designed with a notch **(4)** to prevent incorrect installation into the WLAN module slot.




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



Reverse this procedure to install the WLAN module.

Fan


Description	Spare part number
Fan (includes cable)	672008-001

 **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 either of the fans, follow these steps:

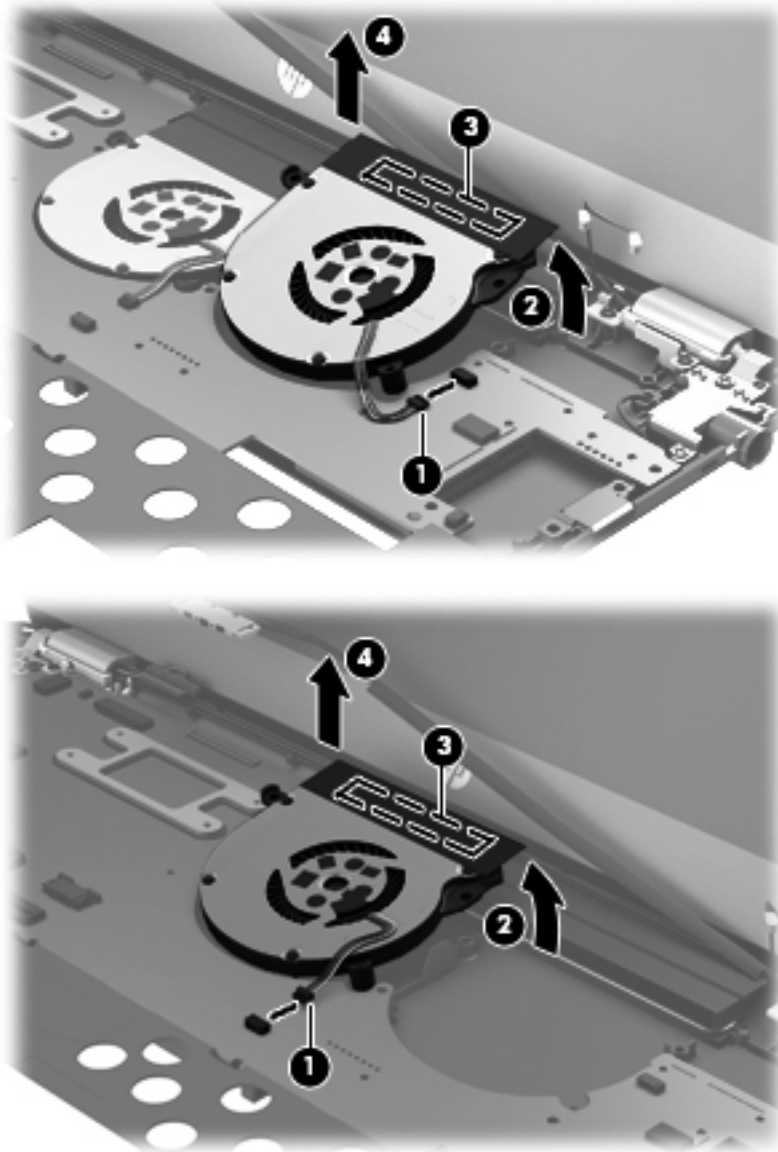
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 31](#)), and then remove the following components:
 - a. Solid-state drive connector board cable (see [Solid-state drive on page 33](#))
 - b. Card Reader board cable (see [Card Reader board cable on page 35](#))
 - c. Top cover (see [Top cover on page 38](#))

Remove the fan:

 **NOTE:** The right fan must be removed before the left fan.

1. Disconnect the fan cable **(1)** from the system board.
2. Lift the rear edge of the fan **(2)** until the tape **(3)** attaching the fan to the heat sink detaches.

3. Remove the fan (4).



Reverse this procedure to install the fan.

System board



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

Description	Spare part number
Equipped with Intel HM65 chipset and Intel Core i7-2677M 1.8-GHz processor (4.0-MB L3 cache, 17 W)	675516-001
Equipped with Intel HM65 chipset and Intel Core i5-2467M 1.60-GHz processor (3.0-MB L3 cache, 17 W)	675517-001
Thermal Material Kit (includes replacement thermal material)	675515-001

Before removing the system board, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 31](#)).
5. Remove the solid-state drive connector board cable (see [Solid-state drive on page 33](#)).
6. Remove the Card Reader board cable (see [Card Reader board cable on page 35](#)).
7. Remove the top cover (see [Top cover on page 38](#)).
8. Disconnect the RTC battery cable from the system board (see [RTC battery on page 47](#)).
9. Remove the wireless audio module (see [Wireless audio module on page 49](#)).
10. Remove the WLAN module (see [WLAN module on page 51](#)).

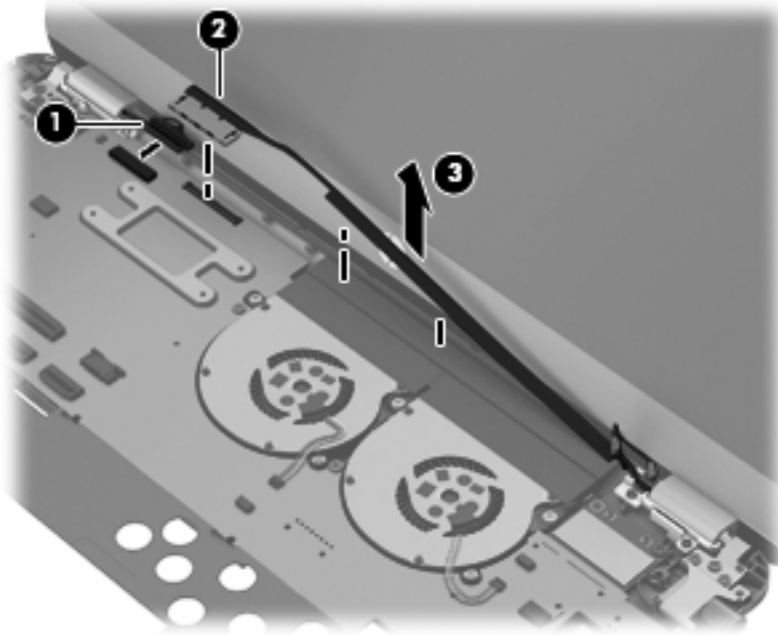
When replacing the system board, be sure that the following components are removed from the defective system board and installed on the replacement system board:

- Fans (see [Fan on page 53](#))
- Memory module (see [Memory module on page 57](#))
- Heat sink (see [Heat sink on page 58](#))

Remove the system board:

1. Disconnect the webcam/microphone module cable **(1)** from the system board.
2. Disconnect the display panel cable **(2)** from the system board.

3. Release the display panel cable **(3)** from the heat sink. (The display panel cable is attached to the heat sink with double-sided tape.)

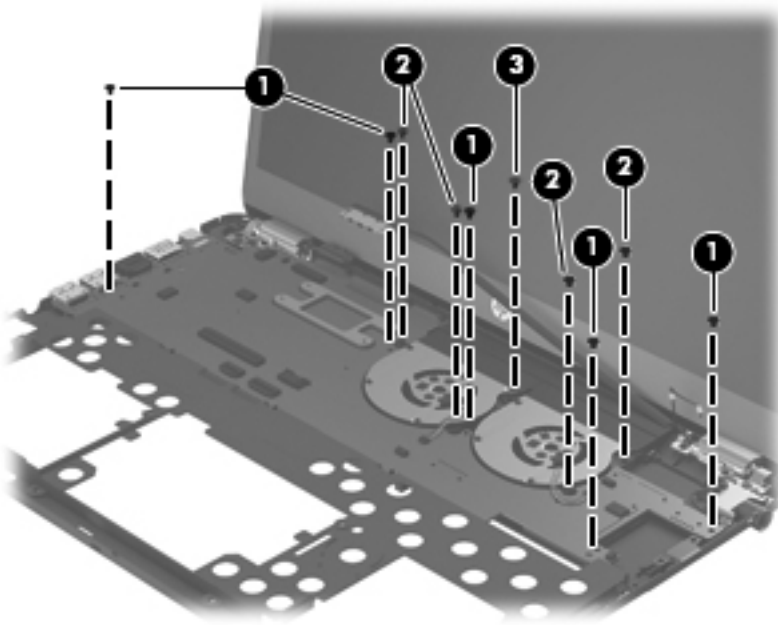


4. Remove the following screws that secure the system board to the base enclosure:

(1) Five Phillips PM2.0×3.8

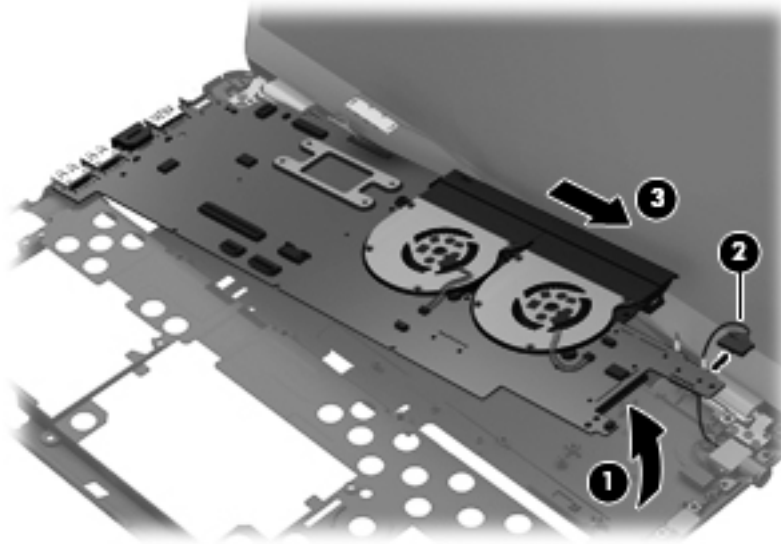
(2) Four Phillips PM2.0×4.6

(3) One Phillips PM2.0×5.7



5. Lift the right side of the system board **(1)** until it rests at an angle.

6. Disconnect the power connector cable **(2)** from the system board.
7. Remove the system board **(3)** by sliding it up and to the right at an angle.



Reverse this procedure to install the system board.

Memory module

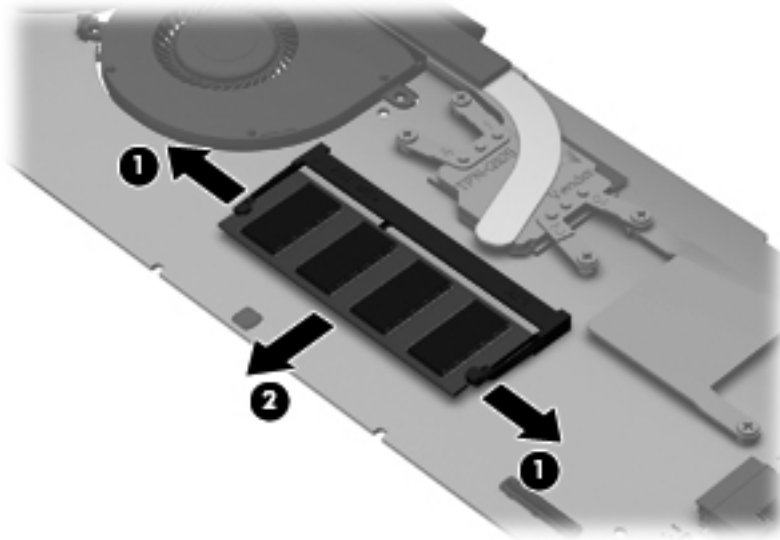
Description	Spare part number
4-GB memory module (PC3, 12800, 1333-MHz)	641369-005

Before removing the memory module, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 31](#)), and then remove the following components:
 - a. Solid-state drive connector board cable (see [Solid-state drive on page 33](#))
 - b. Card Reader board cable (see [Card Reader board cable on page 35](#))
 - c. Top cover (see [Top cover on page 38](#))
 - d. WLAN module (see [WLAN module on page 51](#))
 - e. Wireless audio module (see [Wireless audio module on page 49](#))
 - f. System board (see [System board on page 55](#))

Remove the memory module:

1. Turn the system board upside down, with the front toward you.
2. Spread the retaining tabs **(1)** on each side of the memory module slot to release the memory module. (The memory module tilts up.)
3. Remove the memory module **(2)** by pulling it away from the slot at an angle.



Reverse this procedure to install the memory module.

Heat sink


 **NOTE:** The heat sink spare part kits include replacement thermal material.

Description	Spare part number
Processor heat sink	675514-001
Post controller hub heat sink	685662-001
Thermal Material Kit (includes replacement thermal material)	675515-001

Before removing the heat sink, follow these steps:


1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.

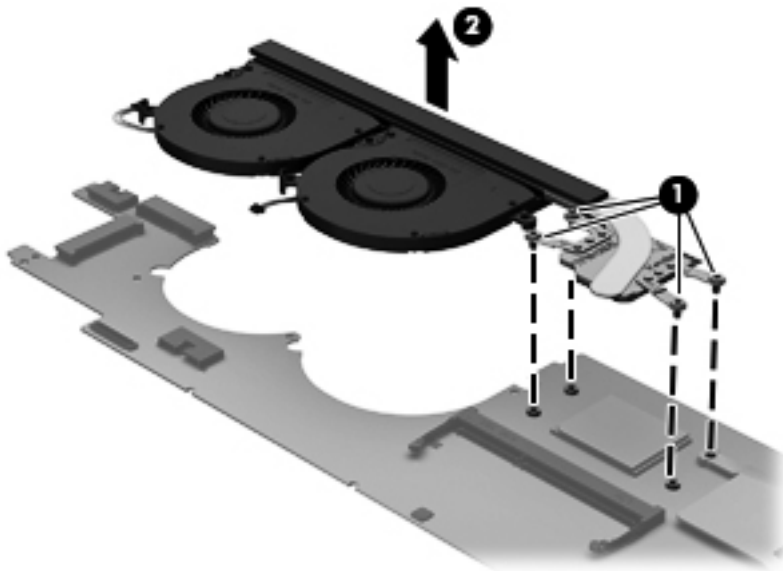
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 31](#)), and then remove the following components:
 - a. Solid-state drive connector board cable (see [Solid-state drive on page 33](#))
 - b. Card Reader board cable (see [Card Reader board cable on page 35](#))
 - c. Top cover (see [Top cover on page 38](#))
 - d. WLAN module (see [WLAN module on page 51](#))
 - e. Wireless audio module (see [Wireless audio module on page 49](#))
 - f. System board (see [System board on page 55](#))

 **NOTE:** When replacing the heat sink, be sure to remove the fans from the defective heat sink and replace them on the replacement heat sink. See [Fan on page 53](#) for fan removal and replacement instructions.


Remove the processor heat sink:

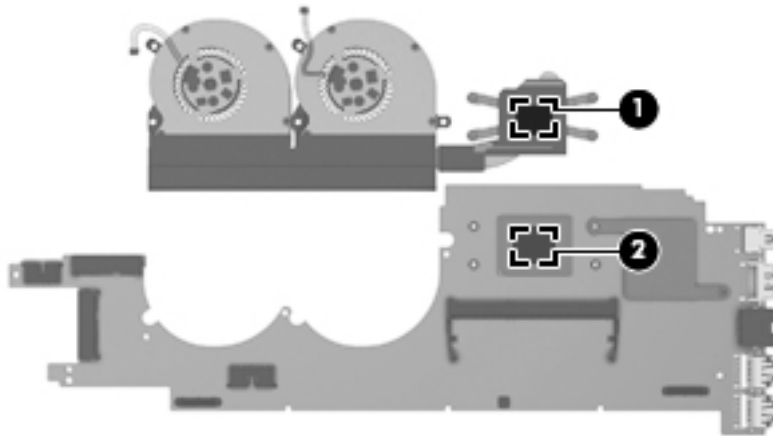
1. Following the 1, 2, 3, 4 sequence stamped into the processor heat sink, loosen the four captive Phillips screws **(1)** that secure the processor heat sink to the system board.
2. Remove the processor heat sink **(2)**.

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



The thermal material must be thoroughly cleaned from the surfaces of the processor heat sink and the processor each time the processor heat sink is removed. Replacement thermal material is included with the processor heat sink and system board spare part kits.


 **NOTE:** The following illustration shows the replacement thermal material locations. Thermal paste is used on the processor **(1)** and the processor heat sink section **(2)** that services it.

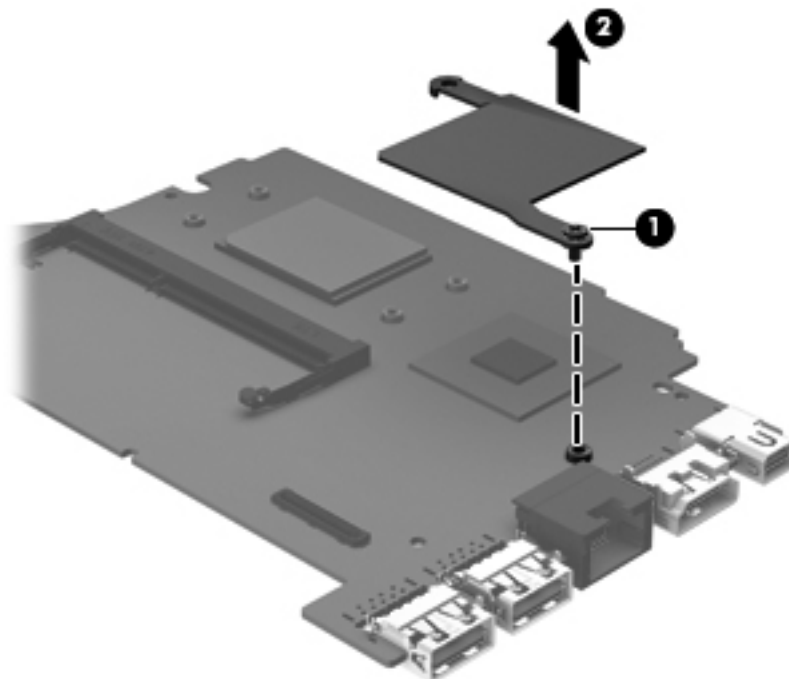


Reverse this procedure to install the processor heat sink.


Remove the post controller hub heat sink:

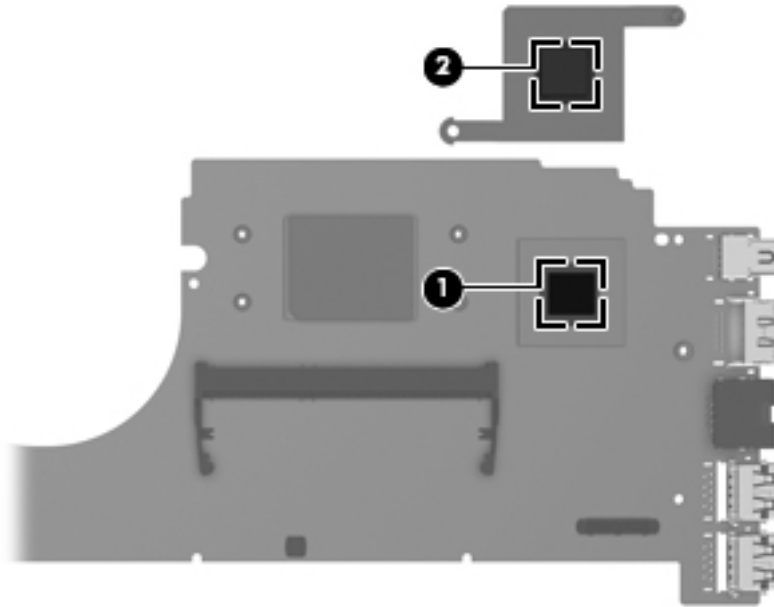
1. Loosen the captive Phillips screw **(1)** that secures the post controller hub heat sink to the system board.
2. Remove the post controller hub heat sink **(2)**.

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



The thermal material must be thoroughly cleaned from the surfaces of the post controller hub heat sink and the post controller hub each time the post controller hub heat sink is removed. Replacement thermal material is included with the post controller hub heat sink and system board spare part kits.

 **NOTE:** The following illustration shows the replacement thermal material locations. A thermal pad is used on the post controller hub **(1)** and the post controller hub heat sink **(2)**.



Reverse this procedure to install the post controller hub heat sink.

Hinge covers

Description	Spare part number
Hinge covers	672009-001

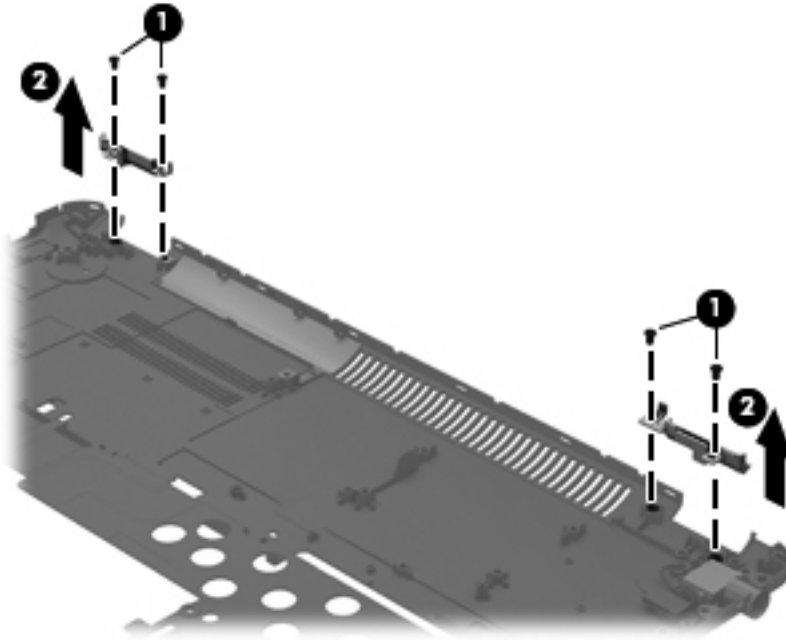
Before removing the hinge covers, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 31](#)), and then remove the following components:
 - a. Solid-state drive connector board cable (see [Solid-state drive on page 33](#))
 - b. Card Reader board cable (see [Card Reader board cable on page 35](#))
 - c. Top cover (see [Top cover on page 38](#))
 - d. WLAN module (see [WLAN module on page 51](#))
 - e. Wireless audio module (see [Wireless audio module on page 49](#))
 - f. System board (see [System board on page 55](#))

Remove the hinge covers:

1. Remove the four Phillips PM2.0×3.8 screws **(1)** that secure the hinge covers to the base enclosure.

2. Remove the hinge covers (2) from the base enclosure.



Reverse this procedure to install the hinge covers.

Display assembly

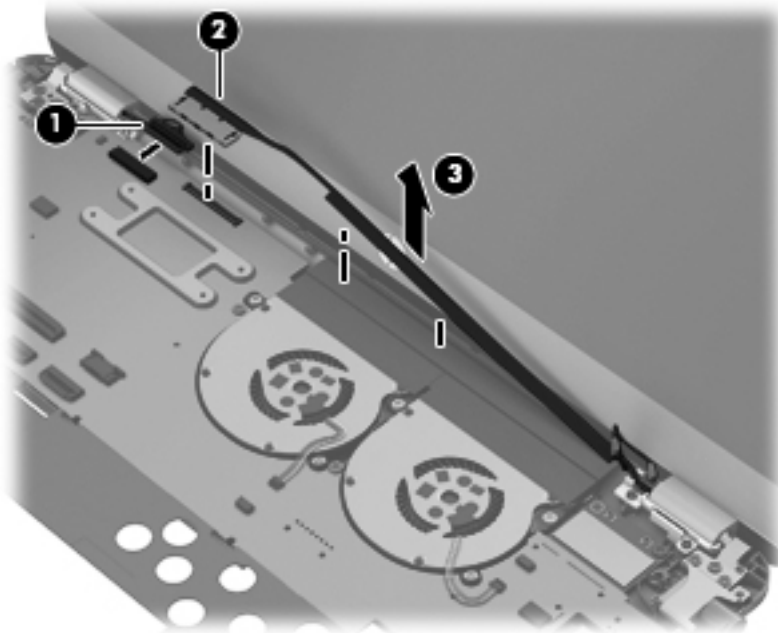
Description	Spare part number
Display assembly, 14.0-in, AntiGlare, high-definition (includes display panel cable, 2 WLAN antenna transceivers and cables, and webcam/microphone module and cable)	675507-001

Before removing the display assembly, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 31](#)).
5. Remove the solid-state drive connector board cable (see [Solid-state drive on page 33](#)).
6. Remove the Card Reader board cable (see [Card Reader board cable on page 35](#)).
7. Remove the top cover (see [Top cover on page 38](#)).
8. Disconnect the wireless antenna cables from the wireless audio module (see [Wireless audio module on page 49](#)).

Remove the display assembly:

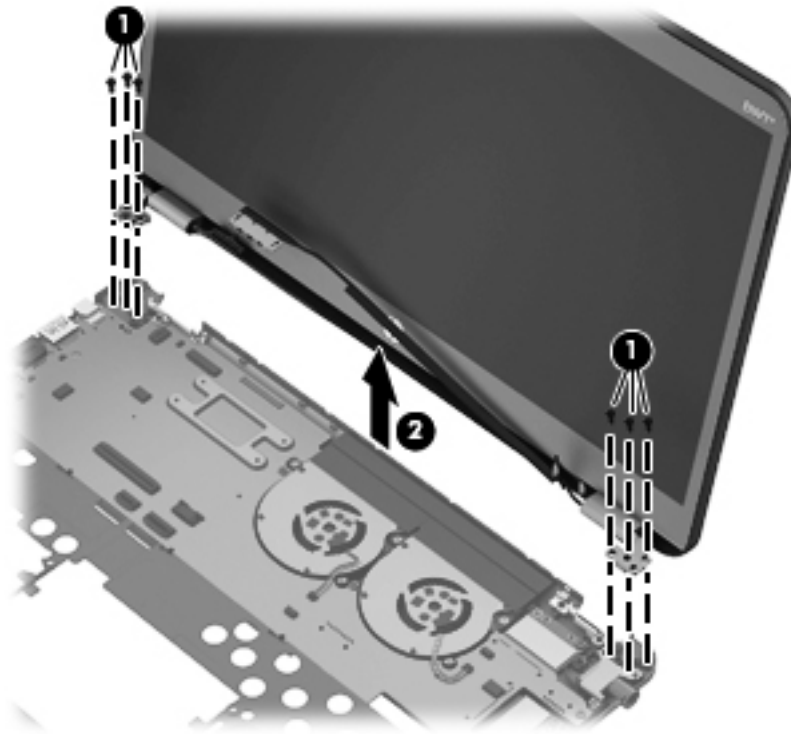
1. Disconnect the webcam/microphone module cable **(1)** from the system board.
2. Disconnect the display panel cable **(2)** from the system board.
3. Release the display panel cable **(3)** from the heat sink. (The display panel cable is attached to the heat sink with double-sided tape.)



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.

4. Remove the six Phillips PM2.5×5.6 screws **(1)** that secure the display assembly to the base enclosure.

5. Remove the display assembly **(2)**.



Reverse this procedure to install the display assembly.

Power connector cable

Description	Spare part number
Power connector cable	672014-001

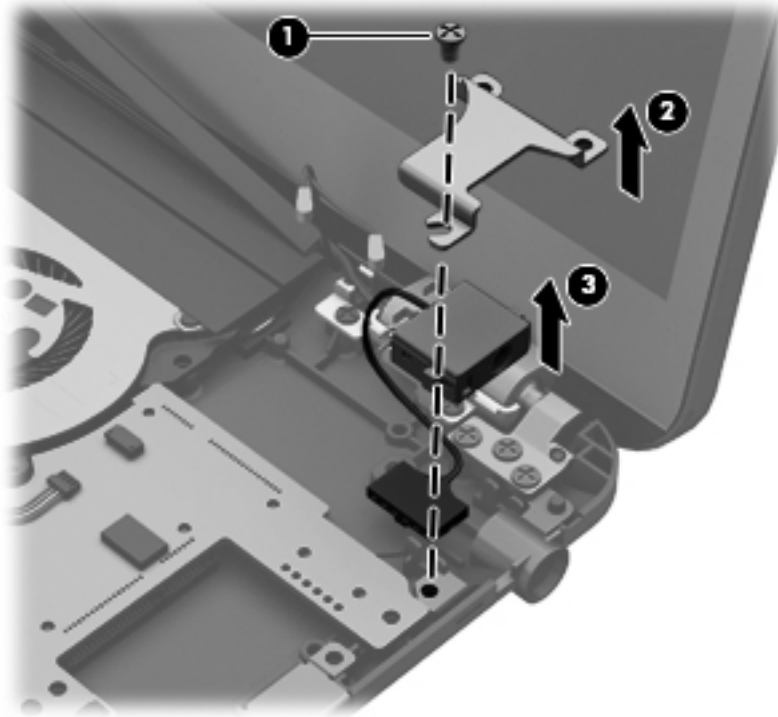
Before removing the power connector cable, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 31](#)), and then remove the following components:
 - a. Solid-state drive connector board cable (see [Solid-state drive on page 33](#))
 - b. Card Reader board cable (see [Card Reader board cable on page 35](#))
 - c. Top cover (see [Top cover on page 38](#))
 - d. WLAN module (see [WLAN module on page 51](#))
 - e. Wireless audio module (see [Wireless audio module on page 49](#))

- f. System board (see [System board on page 55](#))
- g. Display assembly (see [Display assembly on page 63](#))

Remove the power connector cable:

1. Remove the Phillips PM2.0×3.8 screw **(1)** that secures the power connector and bracket to the base enclosure.
2. Remove the power connector bracket **(2)**.
3. Remove the power connector cable **(3)**.




Reverse this procedure to install the power connector cable.


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	32.72 cm	12.88 in
Depth	22.10 cm	8.70 in
Height	2.05 cm	0.81 in
Weight	1.80 kg	3.97 lb
Input power		
Operating voltage and current	19.5 V dc @ 3.33 A - 65W	
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-inch WGA display specifications

	Metric	U.S.
Dimensions		
Height	17.4 cm	6.85 in
Width	31.3 cm	12.32 in
Diagonal	35.4 cm	13.94 in
Number of colors	262,144	
Contrast ratio	500:1 (typical)	
Brightness	250 nits (typical)	
Pixel resolution		
Pitch	0.2175 × 0.2088 mm	
Format	1600 × 900	
Configuration	RGB vertical stripe	
Backlight	LED	
Character display	80 × 25	
Total power consumption	3.46 W	
Viewing angle	±45° horizontal, +15/−35° vertical (typical)	

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 necessary.


This chapter provides information about the following topics:


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

Restore

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


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


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

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

Creating recovering media


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

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


 **NOTE:** If your computer does not include an integrated optical drive, you can use an optional external optical drive (purchased separately) to create recovery discs, or you can purchase recovery discs for your computer from the HP website. 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 it into the optical drive.


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

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

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

Performing a system restore

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

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

Note the following when performing a system restore:

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

Restoring using the dedicated recovery partition (select models only)

When using the dedicated recovery partition, you can back up pictures, music and other audio, videos and movies, recorded TV shows, documents, spreadsheets and presentations, email, and 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 > HP Help and Support > 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 recovery 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.

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 a recovery flash drive:

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

Backing up and recovering your information

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

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

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

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

- At regularly scheduled times

 **TIP:** 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 about using system restore points, see the “Using Windows system restore points” section.
- 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 reenter 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

- Connect the computer 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. For more information, see Help and Support.

Using Windows system restore points

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



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

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

When to create restore points

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

Create a system restore point

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

Restore to a previous date and time

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

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



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

8 Power cord set requirements

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

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

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

Requirements for all countries

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least **1.5 m** (5.0 ft) and no more than **2.0 m** (6.5 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 amps and a nominal voltage rating of 125 or 250 V AC, as required by the power system of each country or region.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions

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

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

9 Recycling

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

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

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