HP Envy Notebook 17 (model numbers 17-s100 through 17-s199 and 17-s000 through 17-s099)

Maintenance and Service Guide

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Product notice

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This guide describes features that are common to most models. Some features may not be available on your computer.

Not all features are available in all editions of Windows 10. This computer may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 10 functionality. See http://www.microsoft.com for details.

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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	HP Envy Notebook 17 (model numbers 17-s100 through 17-s199)	HP Envy Notebook 17 (model numbers 17-s000 through 17-s099)
Product Name	HP Envy Notebook 17 (model numbers 17-s100 through 17-s199)	√	
	HP Envy Notebook 17 (model numbers 17-s000 through 17-s099)		√
Processors	• Intel® Core™ i7-7500U 2.70-GHz (SC turbo up to 3.50-GHz) processor (2133-MHz front-side bus (FSB), 4.0-MB L3 cache, dual core, 15-W)	√	
	• Intel Core i7-6700HQ 2.60-GHz (SC turbo up to 3.50-GHz) processor (1600-MHz FSB, 6.0-MB L3 cache, dual core, 45 W (cTDP to 35 W) • Intel Core i7-6500U 2.50-GHz (SC turbo up to 3.10-GHz) processor (1600-MHz FSB, 4.0-MB L3 cache, dual core, 15 W) • Intel Core i5-6200U 2.30-GHz (SC turbo up to 2.80-GHz) processor (1600-MHz FSB, 3.0-MB L3 cache, quad core, 15 W)	√	√
Chipset	Intel HM170 integrated soldered-on-circuit (SoC)	√	√
Graphics	**Internal Graphics:** • Intel HD Graphics 620 on computer models equipped with an Intel Core i7-7500U processor	√	
	• Intel HD Graphics 530 on computer models equipped with an Intel Core i7-6700HQ processor • Intel HD Graphics 520 on computer models equipped with an Intel Core i7-6500U or Intel Core i5-6200U processor	√	√

Category	Description	HP Envy Notebook 17 (model numbers 17-s100 through 17-s199)	HP Envy Notebook 17 (model numbers 17-s000 through 17-s099)
Graphics *(continued)*	**Switchable discrete graphics:** NVIDIA N16S-GT (GeForce 940M) with up to 4096-MB or 2048-MB of dedicated video memory (256MB×16 DDR3 900MHz × 4 PCs, 1-GHz bridge to 900 MHz) Supports HD Decode, DX12, and HDMI	√	√
Panel	17.3-in, full high-definition (FHD), AntiGlare (1920×1080), white light-emitting diode (WLED), SVA, flat (4.0-mm), UWVA, eDP, 16:9 ultra wide aspect ratio, TouchScreen, MultiTouch-enabled Supports LVDS (co-layout with eDP1.3+PSR) Non-touch screen with flush glass Supports LVDS (co-layout with eDP1.3+PSR)	√	√
Memory module	Two memory slots, non-accessible Support for DDR3L-1600 Dual Channel Support for up to 16-GB maximum on-board system memory • 16384 MB (8192 MB × 2) • 12288 MB (8192 MB + 4096 MB) • 8192 MB (8192 MB × 1) • 8192 MB (4096 MB × 2)	√	√
Hard drive	Support for **6.35-cm** (2.5-in) SATA hard drives in **9.5 mm** (.37 in) and **7.0 mm** (.28 in) thicknesses Accelerometer / HDD protection support **Single hard drive configurations:** • 2 TB, 5400-rpm, 9.5-mm • 1 TB, 7400-rpm, 9.5-mm • 1 TB, 5400-rpm, 9.5-mm **Hybrid hard drive configurations:** 1 TB, 5400-rpm,	√	√

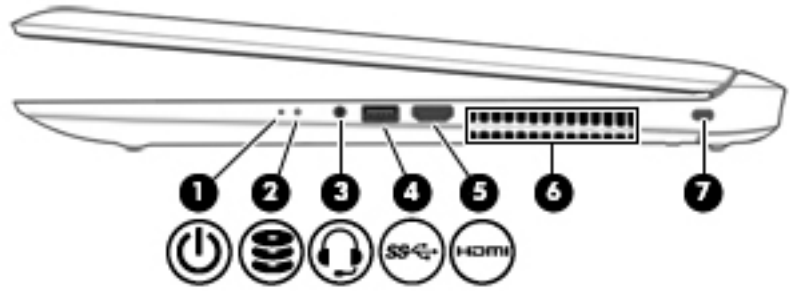
Category	Description	HP Envy Notebook 17 (model numbers 17-s100 through 17-s199)	HP Envy Notebook 17 (model numbers 17-s000 through 17-s099)
Hard drive *(continued)*	9.5-mm solid-state hard drive with 8-GB NAND	√	√
Optical drive	Fixed, serial SATA, 9.5-mm tray load	√	√
	DVD±RW Double-Layer SuperMulti		
	Support for zero power optical drive		
	Support for M-disc		
	External USB SATA, optical drive		
Audio and video	HP TrueVision HD: HD camera (fixed, no tilt with activity LED, 1280×720 by 30 frames per second)	√	√
	Dual array digital microphone with appropriate beam-forming, echo-cancellation, noise-suppression software		
	Dual speakers		
	Enable HP Noise Cancellation		
	HD audio		
	Bang & Olufsen		
	Supports Voice Recognition		
Sensors	Accelerometer	√	√
	Gyroscope		
	Digital Compass		
	Ambient Light Sensor		
Ethernet	Integrated 10/100 network interface card (NIC)	√	√
Wireless	Support for the following WLAN devices:	√	
	Intel Dual Band Wireless-AC 7265 802.11 ac 2×2 WiFi + Bluetooth® 4.2 Combo Adapter (non-vPro)		
	Intel Dual Band Wireless-AC 3165 802.11 ac 1x1 WiFi + Bluetooth 4.0 Combo Adapter	√	√
	Integrated wireless options with dual M.2/PCIe antenna		
	Compatible with Miracast-certified devices		
	Intel WiDi support		

Category	Description	HP Envy Notebook 17 (model numbers 17-s100 through 17-s199)	HP Envy Notebook 17 (model numbers 17-s000 through 17-s099)
External media cards	HP Multi-Format Digital Media Card Reader Support SD®/SDHC/SDXC Push-Push Insertion/Removal SIM slot (populated with WWAN; tool-less user accessible)	√	√
Ports	HDMI version 1.4 supporting up to 1920×1080 @ 60Hz Hot Plug/unplug and auto detect for correct output to wide-aspect vs. standard aspect video RJ-45 (Ethernet, includes link and activity lights) USB 3.0 (1 on left side, 1 on right side) USB 2.0 (1 on left side) AC Smart Pin adapter plug Headphone jack Microphone jack **USB 2.0/3.0 Allocation:** • 3 for unit (2*3.0, 1*2.0) • 1 for camera (2.0) • 1 for WLAN (BT) (2.0) • 1 for touch screen (2.0) • RJ-45/Ethernet • AC Smart Pin adapter plug	√	√
Keyboard/pointing devices	Full-size standard three-coat paint island-style backlit keyboard with numeric keypad ClickPad with multi-touch gestures, 2-finger scrolling, and pinch-zoom enabled Taps enabled by default Supports modern trackpad gestures Stylus writing support	√	√
Battery requirements	4-cell, 41-WHr, 2.8-AHr, Li-ion battery	√	√
Power requirements	65-W, HP Smart, non-PFC, 4.5-mm 45-W, HP Smart, non-PFC, non-slim	√	√

Category	Description	HP Envy Notebook 17 (model numbers 17-s100 through 17-s199)	HP Envy Notebook 17 (model numbers 17-s000 through 17-s099)
Security	Security Lock	√	√
Operating system	**Preinstalled:** Windows 10 and Windows 10 Home High End ML	√	√
Serviceability	**End-user replaceable parts:** • AC adapter • Battery • Optical drive	√	√

2 External component identification

Right side



Component			Description
(1)		Power light	• On: The computer is on. • Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components. • Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.
(2)		Hard drive light	• Blinking white: The hard drive is being accessed.
(3)		Audio-out (headphone)/Audio-in (microphone) combo jack	Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional microphone-only devices. **NOTE:** When a device is connected to the jack, the computer speakers are disabled. **NOTE:** Be sure that the device cable has a 4–conductor connector that supports both audio-out (headphone) and audio-in (microphone).
(4)		USB 3.0 port	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.
(5)		HDMI port	Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed High-Definition Multimedia Interface (HDMI) device.
(6)		Vent	Enables airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(7)		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.

Display

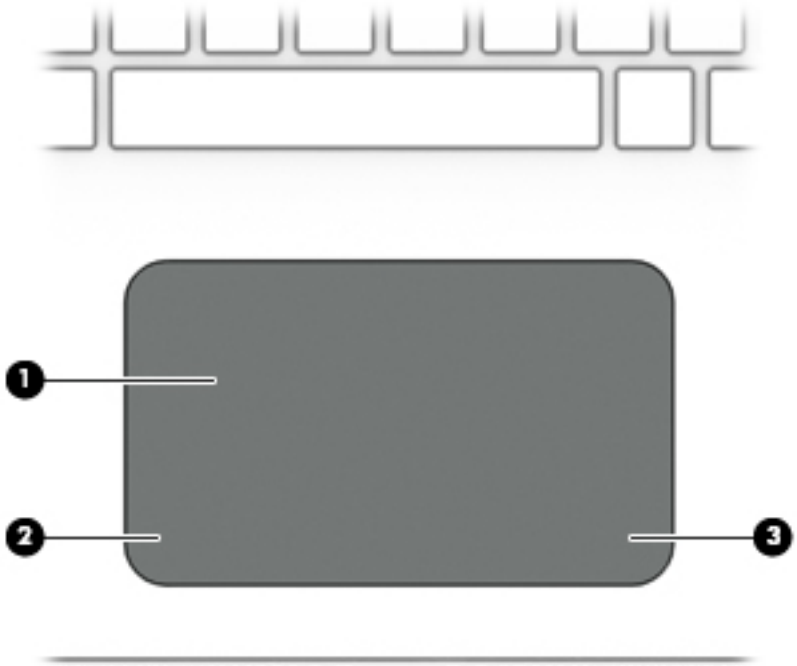
Component		Description
(1)	Internal display switch	Turns off the display and initiates Sleep if the display is closed while the power is on. **NOTE:** The internal display switch is not visible from the outside of the computer.
(2)	Internal microphones (2)	Records sound.
(3)	Webcam light	On: The webcam is in use.
(4)	Webcam	Records video and captures photographs. Some models allow you to video conference and chat online using streaming video.
(5)	WLAN antennas* (2)	Sends and receives wireless signals to communicate with wireless local area networks (WLANs).

*The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions.

For wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region.

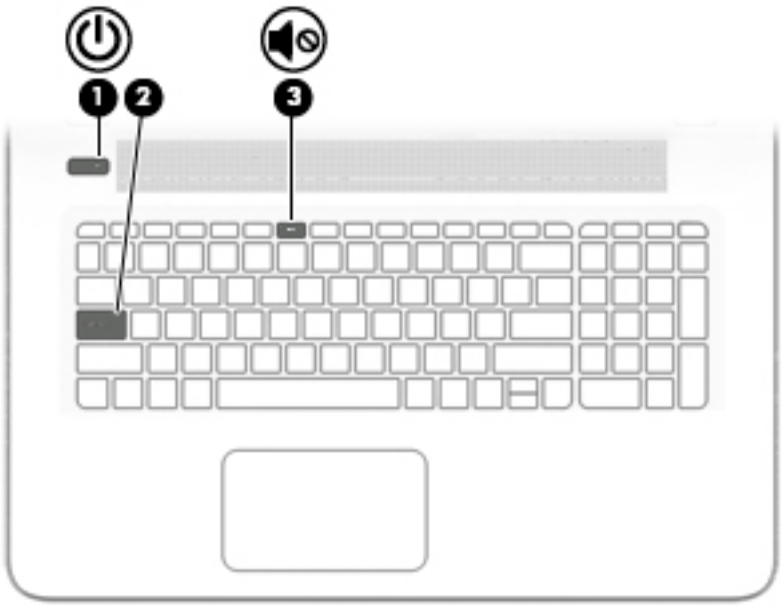
Top

TouchPad



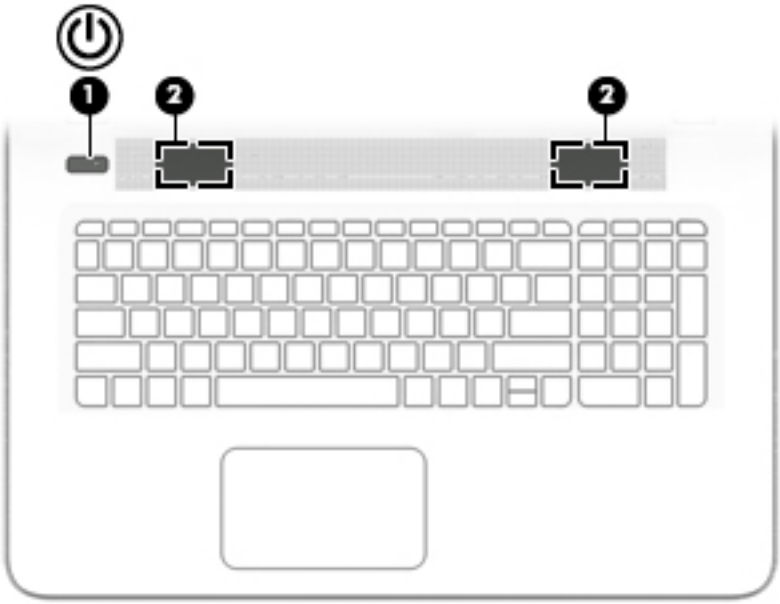
Component		Description
(1)	TouchPad zone	Reads your finger gestures to move the pointer or activate items on the screen.
(2)	Left TouchPad button	Functions like the left button on an external mouse.
(3)	Right TouchPad button	Functions like the right button on an external mouse.

Lights



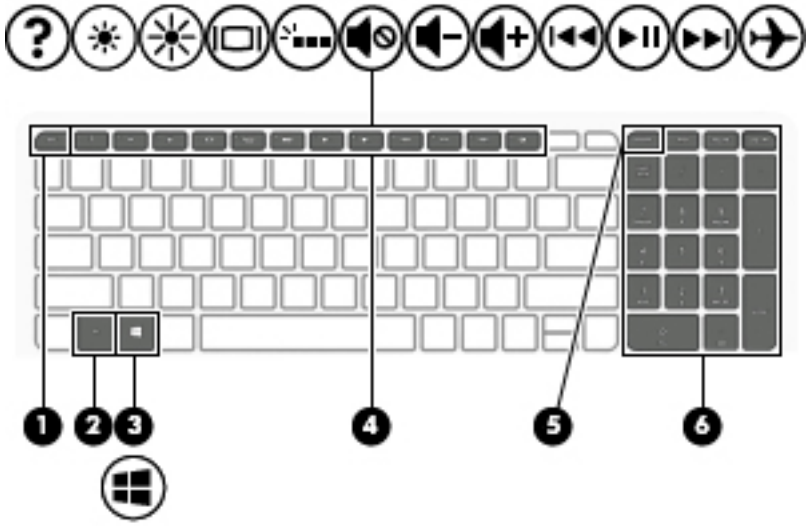
Component			Description
(1)		Power light	• On: The computer is on. • Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components. • Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.
(2)		Caps lock light	On: Caps lock is on, which switches the key input to all capital letters.
(3)		Mute light	• Amber: Computer sound is off. • Off: Computer sound is on.

Buttons and speakers



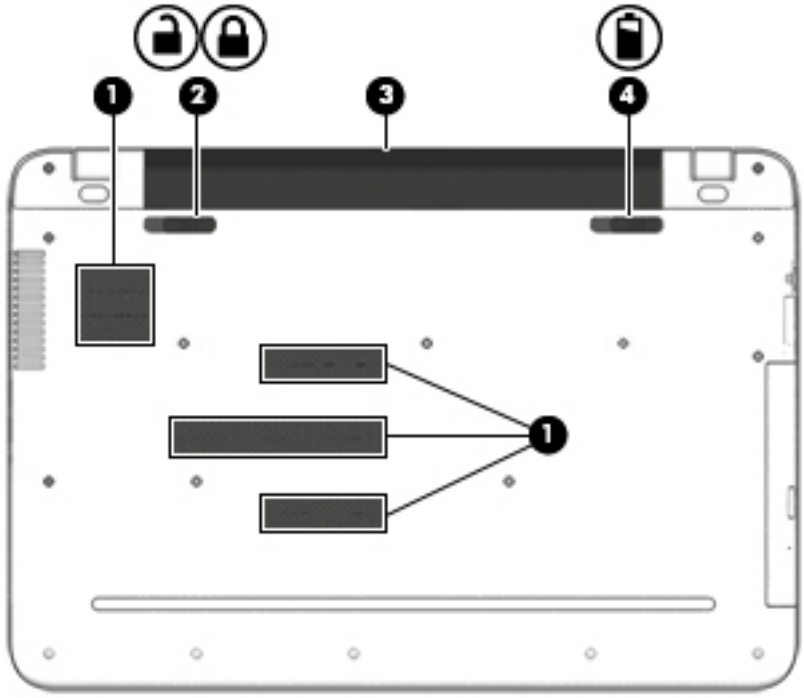
Component		Description
(1)	Power button	• When the computer is off, press the button to turn on the computer. • When the computer is on, press the button briefly to initiate Sleep. • When the computer is in the Sleep state, press the button briefly to exit Sleep. • When the computer is in Hibernation, press the button briefly to exit Hibernation. **CAUTION:** Pressing and holding down the power button results in the loss of unsaved information. If the computer has stopped responding and shutdown procedures are ineffective, press and hold the power button down for at least 5 seconds to turn off the computer.
(2)	Speakers (2)	Produce sound.

Keys



Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes frequently used system functions when pressed in combination with the esc key, action keys, or the spacebar.
(3)	Windows key	Opens the **Start** menu. **NOTE:** Pressing the Windows key again will close the **Start** menu.
(4)	Action keys	Execute frequently used system functions. **NOTE:** On select models, the f5 action key turns the backlight keyboard feature off or on.
(5)	num lock key	Alternates between the navigational and numeric functions on the integrated numeric keypad.
(6)	Integrated numeric keypad	When num lock is on, the keypad can be used like an external numeric keypad.

Bottom



Component		Description
(1)	Vents (4)	Enable airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(2)	Battery lock	Locks the battery in the battery bay.
(3)	Battery bay	Holds the battery.
(4)	Battery release latch	Releases the battery.

Labels

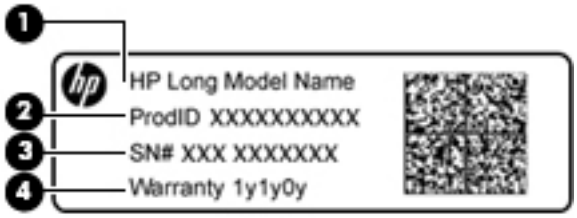
The labels affixed to the computer provide information you may need when you troubleshoot system problems or travel internationally with the computer.

IMPORTANT: Check the following locations for the labels described in this section: the bottom of the computer, inside the battery bay, under the service door, or on the back of the display.

- Service label—Provides important information to identify your computer. When contacting support, you will probably be asked for the serial number, and possibly for the product number or the model number. Locate these numbers before you contact support.

  Your service label will resemble one of the examples shown below. Refer to the illustration that most closely matches the service label on your computer.

Component	
(1)	Serial number
(2)	Product number
(3)	Warranty period
(4)	Model number (select products only)



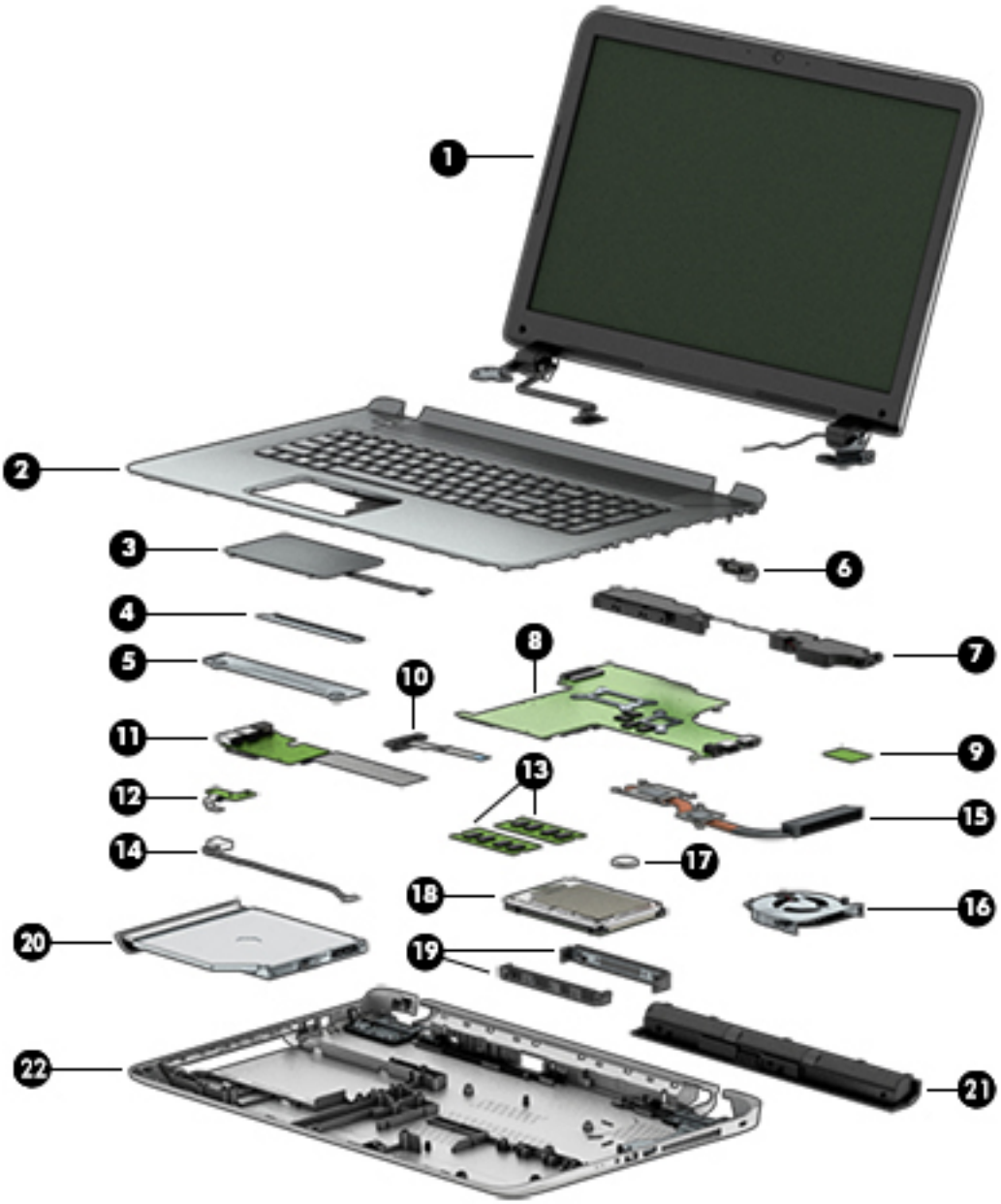
Component	
(1)	Model name (select products only)
(2)	Product number
(3)	Serial Number
(4)	Warranty period

- Regulatory label(s)—Provide(s) regulatory information about the computer.
- Wireless certification label(s)—Provide(s) information about optional wireless devices and the approval markings for the countries or regions in which the devices have been approved for use.

3 Illustrated parts catalog

Computer major components

NOTE: HP continually improves and changes product parts. For complete and current information on supported parts for your computer, go to http://partsurfer.hp.com, select your country or region, and then follow the on-screen instructions.

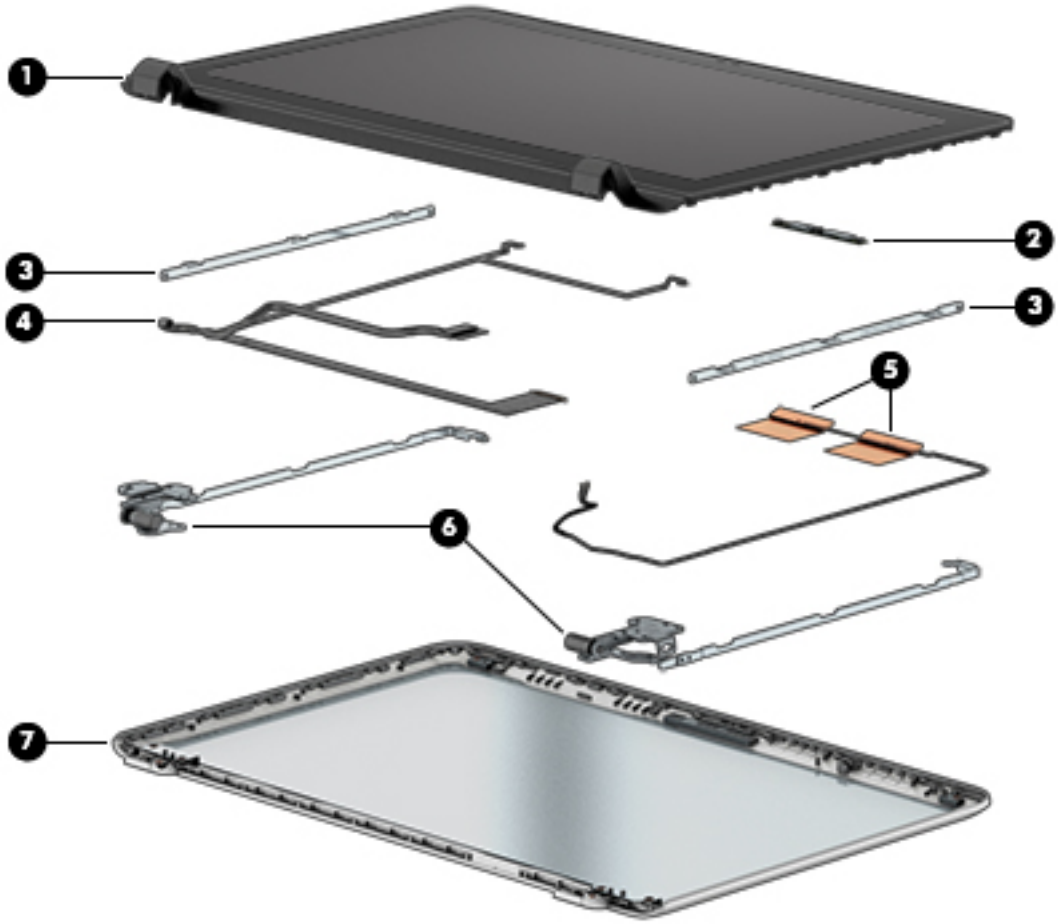


Item	Component	Spare part number
(1)	**Display assembly** **NOTE:** The display assembly is spared only at the subcomponent level. For display assembly subcomponent spare part information, see Display assembly subcomponents on page 18.	
(2)	**Keyboard/top cover** with backlight (includes backlight cable and keyboard cable)	
	For use in Canada	835867-DB1
	For use in the United States	835867-001
	Keyboard/top cover (includes keyboard cable)	
	For use in Canada	835866-DB1
	For use in the United States	835866-001
(3)	**TouchPad** (includes TouchPad front and rear brackets and TouchPad cable)	811552-001
(4)	**TouchPad rear bracket** (included with TouchPad spare part kit)	
(5)	**TouchPad front bracket** (included with TouchPad spare part kit)	
(6)	**Battery cable** (included in the Cable Kit, spare part number 810928-001)	
(7)	**Speakers** (includes left and right speakers and cable)	809316-001
(8)	**System board** (includes processor and replacement thermal material):	
	For use only on computer models with model numbers 17-s100 through 17-s199:	
	Equipped with an Intel Core i7-7500U 2.70-GHz (SC turbo up to 3.50-GHz) processor (2133-MHz FSB, 4.0-MB L3 cache, dual core, 15 W), an NVIDIA N16S-GT (GeForce 940M) graphics subsystem with 4-GB of dedicated video memory, and the Window 10 operating system	904360-601
	Equipped with an Intel Core i7-7500U 2.70-GHz (SC turbo up to 3.50-GHz) processor (2133-MHz FSB, 4.0-MB L3 cache, dual core, 15 W), an NVIDIA N16S-GT (GeForce 940M) graphics subsystem with 4-GB of dedicated video memory, and a non-Window 10 operating system	904360-001
	Equipped with an Intel Core i7-7500U 2.70-GHz (SC turbo up to 3.50-GHz) processor (2133-MHz FSB, 4.0-MB L3 cache, dual core, 15 W), an NVIDIA N16S-GT (GeForce 940M) graphics subsystem with 2-GB of dedicated video memory, and the Window 10 operating system	904359-601
	Equipped with an Intel Core i7-7500U 2.70-GHz (SC turbo up to 3.50-GHz) processor (2133-MHz FSB, 4.0-MB L3 cache, dual core, 15 W), an NVIDIA N16S-GT (GeForce 940M) graphics subsystem with 2-GB of dedicated video memory, and a non-Window 10 operating system	904359-001
	For use on all computer models:	
	Equipped with an Intel Core i7-6500U 2.50-GHz (SC turbo up to 3.10-GHz) processor (1600-MHz FSB, 4.0-MB L3 cache, dual core, 15 W), an NVIDIA N16S-GT (GeForce 940M) graphics subsystem with 4-GB of dedicated video memory, and the Window 10 operating system	838262-601
	Equipped with an Intel Core i7-6500U 2.50-GHz (SC turbo up to 3.10-GHz) processor (1600-MHz FSB, 4.0-MB L3 cache, dual core, 15 W), an NVIDIA N16S-GT (GeForce 940M) graphics subsystem with 4-GB of dedicated video memory, and a non-Window 10 operating system	838262-001
	Equipped with an Intel Core i7-6500U 2.50-GHz (SC turbo up to 3.10-GHz) processor (1600-MHz FSB, 4.0-MB L3 cache, dual core, 15 W), an NVIDIA N16S-GT (GeForce 940M) graphics subsystem with 2-GB of dedicated video memory, and the Window 10 operating system	838261-601
	Equipped with an Intel Core i7-6500U 2.50-GHz (SC turbo up to 3.10-GHz) processor (1600-MHz FSB, 4.0-MB L3 cache, dual core, 15 W), an NVIDIA N16S-GT (GeForce 940M) graphics subsystem with 2-GB of dedicated video memory, and a non-Window 10 operating system	838261-001

Item	Component	Spare part number
	Equipped with an Intel Core i7-6700HQ 2.60-GHz (SC turbo up to 3.50-GHz) processor (1600-MHz FSB, 6.0-MB L3 cache, dual core, 45 W (cTDP to 35 W)), a graphics subsystem with UMA memory, and the Window 10 operating system	835869-601
	Equipped with an Intel Core i7-6700HQ 2.60-GHz (SC turbo up to 3.50-GHz) processor (1600-MHz FSB, 6.0-MB L3 cache, dual core, 45 W (cTDP to 35 W)), a graphics subsystem with UMA memory, and a non-Window 10 operating system	835869-001
	Equipped with an Intel Core i7-6500U 2.50-GHz (SC turbo up to 3.10-GHz) processor (1600-MHz FSB, 4.0-MB L3 cache, dual core, 15 W), a graphics subsystem with UMA memory, and the Window 10 operating system	841040-601
	Equipped with an Intel Core i7-6500U 2.50-GHz (SC turbo up to 3.10-GHz) processor (1600-MHz FSB, 4.0-MB L3 cache, dual core, 15 W), a graphics subsystem with UMA memory, and a non-Window 10 operating system	841040-001
	Equipped with an Intel Core i5-6200U 2.30-GHz (SC turbo up to 2.80-GHz) processor (1600-MHz FSB, 3.0-MB L3 cache, quad core, 15 W), a graphics subsystem with UMA memory, and the Window 10 operating system	838260-601
	Equipped with an Intel Core i5-6200U 2.30-GHz (SC turbo up to 2.80-GHz) processor (1600-MHz FSB, 3.0-MB L3 cache, quad core, 15 W), a graphics subsystem with UMA memory, and a non-Window 10 operating system	838260-001
(9)	**WLAN module:**	
	Intel Dual Band Wireless-AC 7265 802.11 ac 2×2 WiFi + Bluetooth 4.2 Combo Adapter (non-vPro) for use only on computer models with model numbers 17-s100 through 17-s199	793840-005
	Intel Dual Band Wireless-AC 3165 802.11 ac 1x1 WiFi + Bluetooth 4.0 Combo Adapter for use on all computer models	806723-005
(10)	**Optical drive cable** (included in the Cable Kit, spare part number 810928-001)	
(11)	**USB/audio board** (includes cable)	844489-001
	USB/audio board cable (not illustrated)	844490-001
(12)	**Power button board** (includes cable)	809310-001
(13)	**Memory modules** (2; PC3L, 12800, 1600-MHz):	
	8 GB	693374-005
	4 GB	691740-005
(14)	**Power connector cable**	809295-001
(15)	**Heat sink** (includes replacement thermal materials):	
	For use only on computer models equipped with graphic subsystems with dedicated video memory	806827-001
	For use only on computer models equipped with a graphics subsystem with UMA memory and an Intel Core i7-6700HQ processor	828817-001
	For use only on computer models equipped with a graphics subsystem with UMA memory and an Intel Core i7-6500U or Intel Core i5-6200U processor	806826-001
(16)	**Fan** (includes cable)	806747-001
(17)	**RTC battery**	811080-001
(18)	**Hard drive** (does not include hard drive brackets or hard drive cable):	
	For use only on computer models with model numbers 17-s100 through 17-s199:	

Item	Component	Spare part number
	1-TB, 7200-rpm, SATA, 9.5-mm	766644-005
	For use on all computer models:	
	2-TB, 5400-rpm, SATA, 9.5-mm	801808-005
	1-TB, 5400-rpm, SATA, 9.5-mm	778192-005
	1-TB, 5400-rpm, 8-GB hybrid, 9.5-mm	731999-005
(19)	**Hard drive brackets** (2; included in the Hard Drive Hardware Kit, spare part number 809296-001)	
(20)	**DVD±RW Double-Layer SuperMulti Drive**	809304-001
(21)	**Battery** (4-cell, 41 WHr, 2.8-AHr, Li-ion)	800049-005
(22)	**Bottom cover**	843589-001
	Bottom cover hinge caps (not illustrated; includes left and right caps)	809312-001
	Rubber Kit (not illustrated, includes bottom cover screw covers)	809314-001

Display assembly subcomponents



Item	Component	Spare part number
(1)	**Display panel assembly:**	
	17.3-in, Antiglare, FHD+, TouchScreen	835868-001
	17.3-in, Antiglare, FHD+, non-TouchScreen	846890-001
(2)	**Webcam/microphone module** (includes double-sided adhesive)	810961-001
(3)	**Display panel cable** (includes TouchScreen board cable and webcam/microphone module cable):	
	For use on computer models equipped with a TouchScreen display	809294-001
	For use on computer models equipped with a non-TouchScreen display	847874-001
(4)	**Display hinges** (2; includes left and right)	809299-001
(5)	**Antenna** (include antenna cables and transceivers)	843588-001
(6)	**Display back cover**	835865-001

Miscellaneous parts

Component	Spare part number
AC adapter:	
65-W, HP Smart, non-PFC, 4.5-mm	710412-001
45-W, HP Smart, non-PFC, non-slim	741727-001
Power cord:	
C5 receptacle, 1.0-m power cord for use only on computer models with model numbers 17-s100 through 17-s199 in North America	213349-009
3-pin, black, 1.0-m power cord for use only on computer models with model numbers 17-s000 through 17-s099 in North America	755530-001
Rubber Kit (includes front and rear feet)	809314-001
Screw Kit	843590-001
HDMI-to-VGA adapter	701943-001

4 Removal and replacement procedures preliminary requirements

Tools required

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

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

Service considerations

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

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

Plastic parts

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

Cables and connectors

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

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

Drive handling

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

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

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

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

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

Avoid dropping drives from any height onto any surface.

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

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

Avoid exposing a drive to temperature extremes or liquids.

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

Grounding guidelines

Electrostatic discharge damage

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

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

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

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

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

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

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

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

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

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

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

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

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

Workstation guidelines

Follow these grounding workstation guidelines:

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

Equipment guidelines

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

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

The following grounding equipment is recommended to prevent electrostatic damage:

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

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

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

5 Removal and replacement procedures for Customer Self-Repair parts

CAUTION: The Customer Self-Repair program is not available in all locations. Installing a part not supported by the Customer Self-Repair program may void your warranty. Check your warranty to determine if Customer Self-Repair is supported in your location.

NOTE: HP continually improves and changes product parts. For complete and current information on supported parts for your computer, go to http://partsurfer.hp.com, select your country or region, and then follow the on-screen instructions.

Component replacement procedures

NOTE: Please read and follow the procedures described here to access and replace Customer Self-Repair parts successfully.

NOTE: Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer.

This chapter provides removal and replacement procedures for Customer Self-Repair parts.

There are many screws that must be removed, replaced, or loosened when servicing Customer Self- Repair parts. Make special note of each screw size and location during removal and replacement.

Battery

Description	Spare part number
4-cell, 41-WHr, 2.8-AHr, Li-ion battery	800049-005

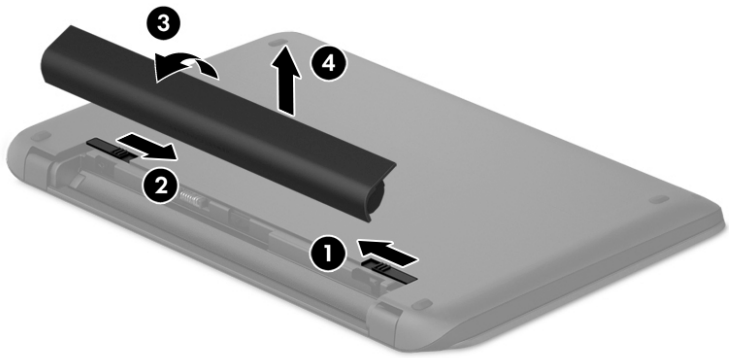
Before disassembling the computer, follow these steps:

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

Remove the battery:

1. Position the computer upside down on a flat surface.
2. Slide the battery lock latch **(1)**, and then slide the battery release latch **(2)** to release the battery.

3. Rotate the battery upward **(3)**, and then remove the battery from the computer **(4)**.



Reverse this procedure to install the battery.

Optical drive

Description	Spare part number
Optical drive (DVD±RW Double-Layer SuperMulti)	809304-001

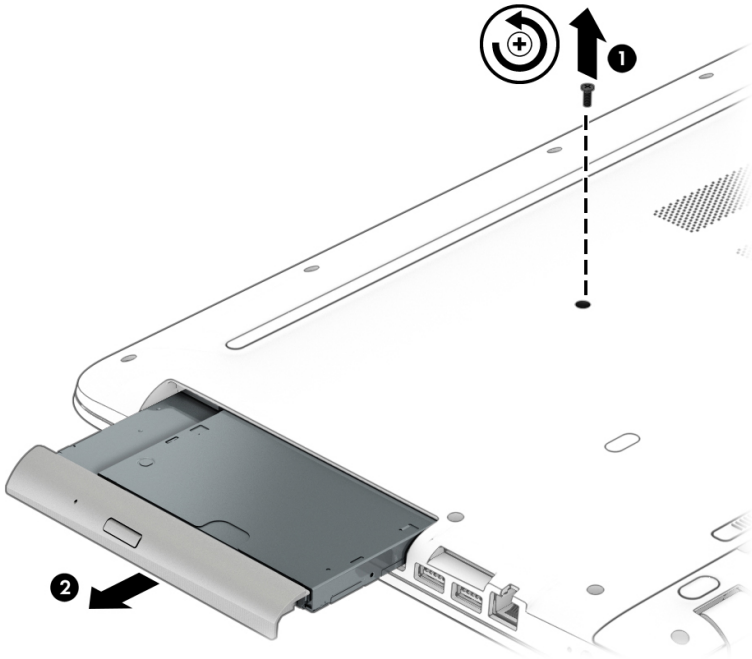
Before removing the optical drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 24).

Remove the optical drive:

1. Remove the Phillips PM2.5×7.0 screw **(1)** that secures the optical drive to the computer.

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



Reverse this procedure to install the optical drive.

6 Removal and replacement procedures for Authorized Service Provider parts

CAUTION: Components described in this chapter should only be accessed by an authorized service provider. Accessing these parts can damage the computer or void the warranty.

NOTE: HP continually improves and changes product parts. For complete and current information on supported parts for your computer, go to http://partsurfer.hp.com, select your country or region, and then follow the on-screen instructions.

Component replacement procedures

NOTE: Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer.

This chapter provides removal and replacement procedures for Authorized Service Provider only parts.

There are as many as 58 screws that must be removed, replaced, or loosened when servicing Authorized Service Provider only parts. Make special note of each screw size and location during removal and replacement.

Bottom cover

Description	Spare part number
Bottom cover	843589-001
Bottom cover hinge caps (includes left and right caps)	809312-001
Rubber Kit (includes bottom cover screw covers)	809314-001
Keyboard/top cover with backlight (includes backlight cable and keyboard cable)	
For use in Canada	835867-DB1
For use in the United States	835867-001
Keyboard/top cover (includes keyboard cable)	
For use in Canada	835866-DB1
For use in the United States	835866-001

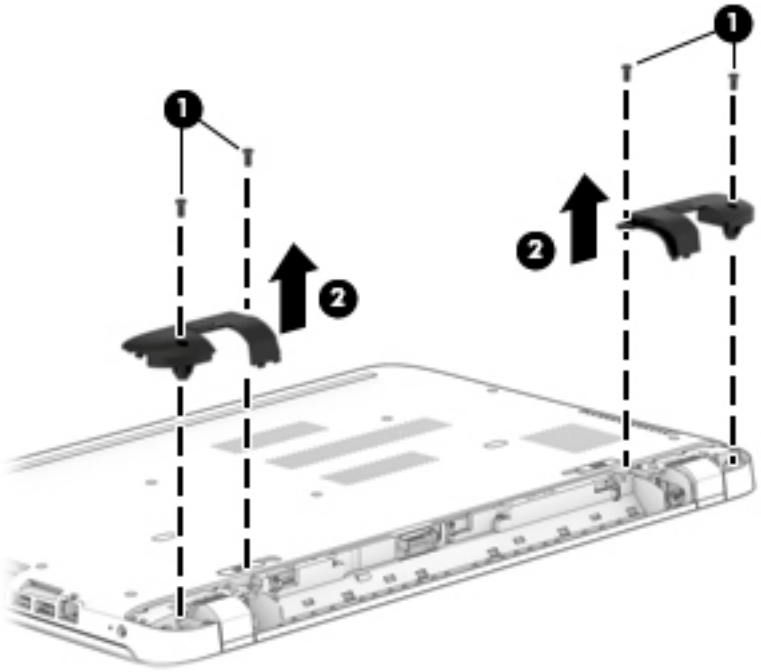
Before removing the bottom cover, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 24).
5. Remove the optical drive (see Optical drive on page 25).

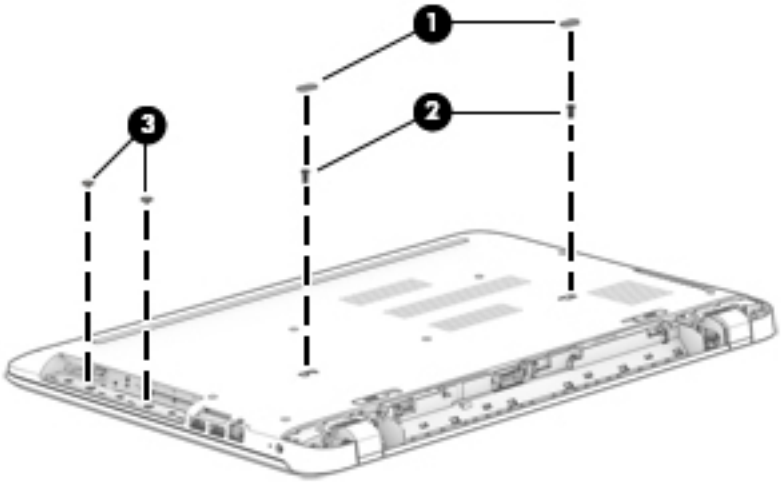
Remove the bottom cover:

1. Position the computer upside down with the rear toward you.
2. Remove the four Phillips PM2.5×12.0 screws **(1)** that secure the hinge covers to the computer.

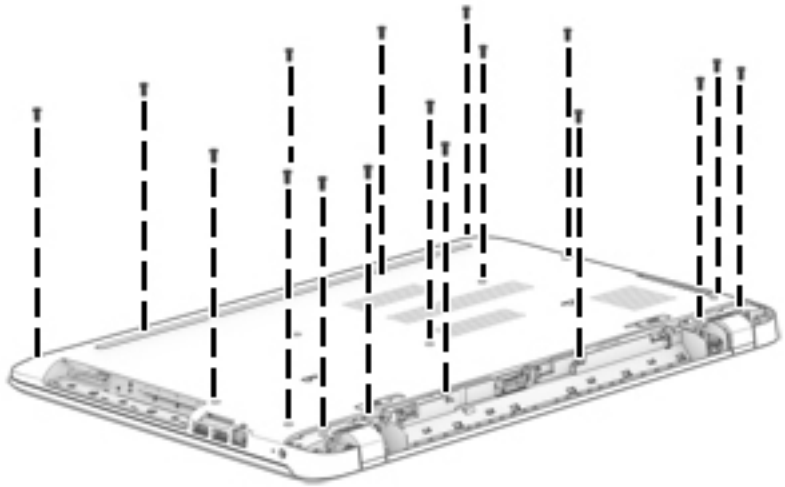
3. Remove the hinge covers **(2)**.



4. Remove the two screw covers **(1)**.
5. Remove the two Phillips PM2.5×6.5 screws **(2)**.
6. Remove the two Phillips PM2.0×2.0 broad head screws from the optical drive bay **(3)**.

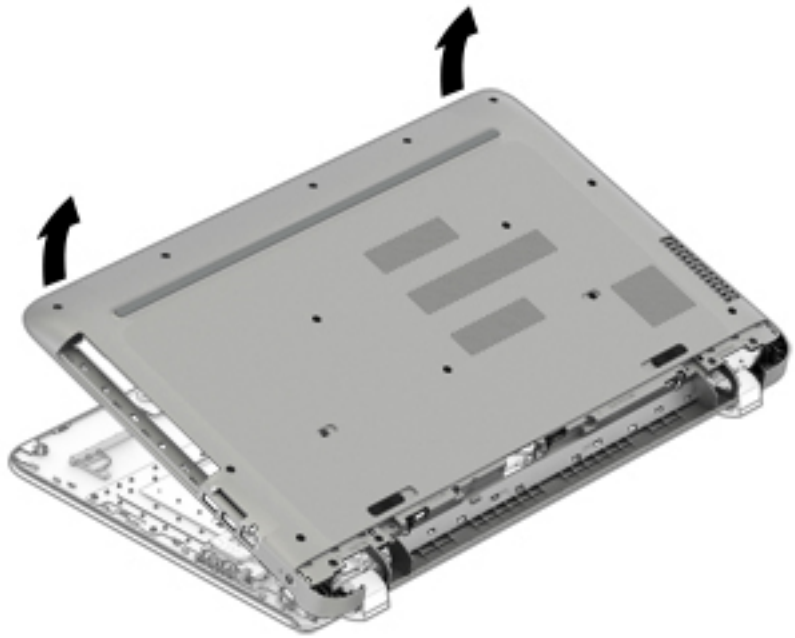


7. Remove the seventeen Phillips PM screws that secure the top cover to the computer.



⚠ **CAUTION:** To avoid damaging the bottom cover, do not apply force to the bottom cover near the optical drive bay.

8. Use a case utility tool to disengage the bottom cover from the computer. Work around the edges on all sides of the computer.



Reverse this procedure to install the bottom cover.

Hard drive

NOTE: The hard drive spare part kit does not include the hard drive brackets or the hard drive cable. The hard drive brackets and the hard drive cable are included in the Hard Drive Hardware Kit, spare part number 809296-001.

Description	Spare part number
For use only on computer models with model numbers 17-s100 through 17-s199:	
1-TB, 7200-rpm, SATA, 9.5-mm	766644-005
For use on all computer models:	
2-TB, 5400-rpm, SATA, 9.5-mm	801808-005
1-TB, 5400-rpm, SATA, 9.5-mm	778192-005
1-TB, 5400-rpm, 8-GB hybrid, 7.0-mm	731999-005

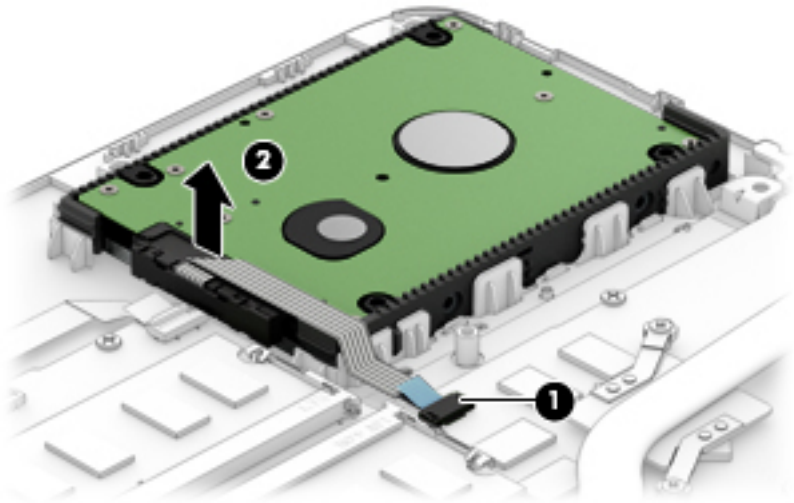
Before removing the hard drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 24).
5. Remove the optical drive (see Optical drive on page 25).
6. Remove the bottom cover (see Bottom cover on page 28).

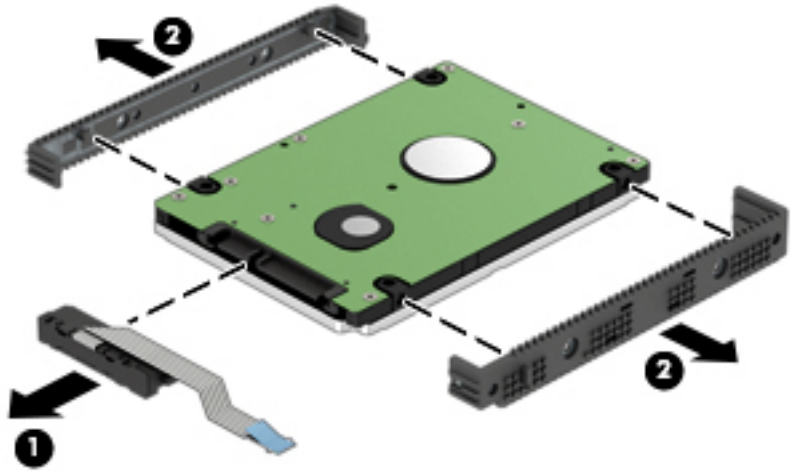
Remove the hard drive:

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

2. Remove the hard drive **(2)**.



3. If it is necessary to disassemble the hard drive, detach the hard drive cable **(1)** from the hard drive.
4. Remove the brackets from each side of the hard drive **(2)**.



Reverse this procedure to reassemble and install the hard drive.

WLAN module

Description	Spare part number
Intel Dual Band Wireless-AC 3165 802.11 ac 1x1 WiFi + Bluetooth 4.0 Combo Adapter for Windows 10	806723-005

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 support.

Before removing the WLAN module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 24).
5. Remove the optical drive (see Optical drive on page 25).
6. Remove the bottom cover (see Bottom cover on page 28).

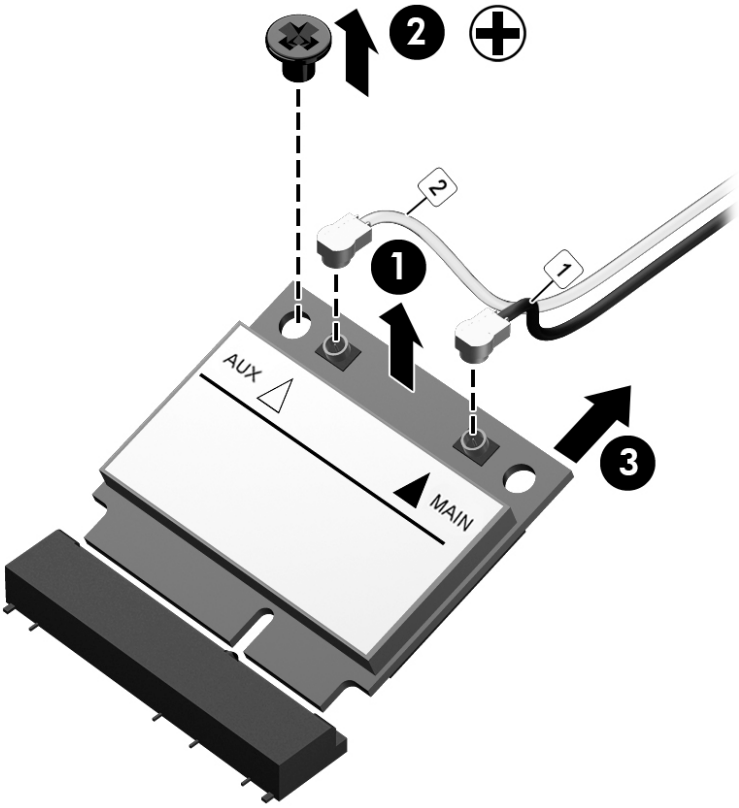
Remove the WLAN module:

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

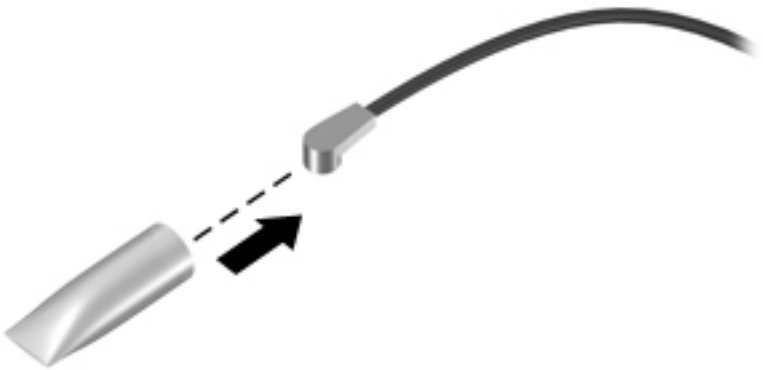
NOTE: The #1 WLAN antenna cable is connected to the WLAN module Main terminal. The #2 WLAN antenna cable is connected to the WLAN module Aux terminal.

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

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



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



Reverse this procedure to install the WLAN module.

RTC battery

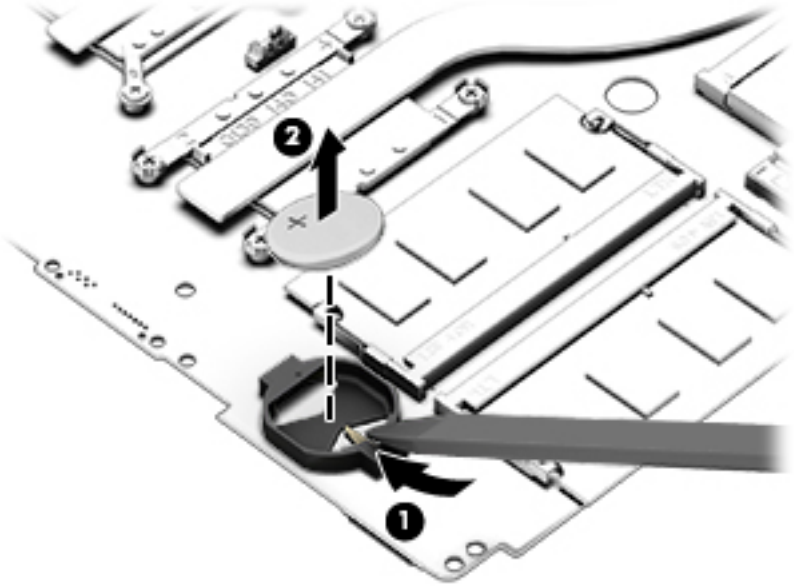
Description	Spare part number
RTC battery	811080-001

Before removing the RTC battery, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 24).
5. Remove the optical drive (see Optical drive on page 25).
6. Remove the bottom cover (see Bottom cover on page 28).

Remove the RTC battery:

1. Position the system board upside down.
2. Use a thin, plastic tool to disengage the battery from the socket **(1)**, and then remove the battery **(2)**.



Reverse this procedure to install the RTC battery.

Memory module

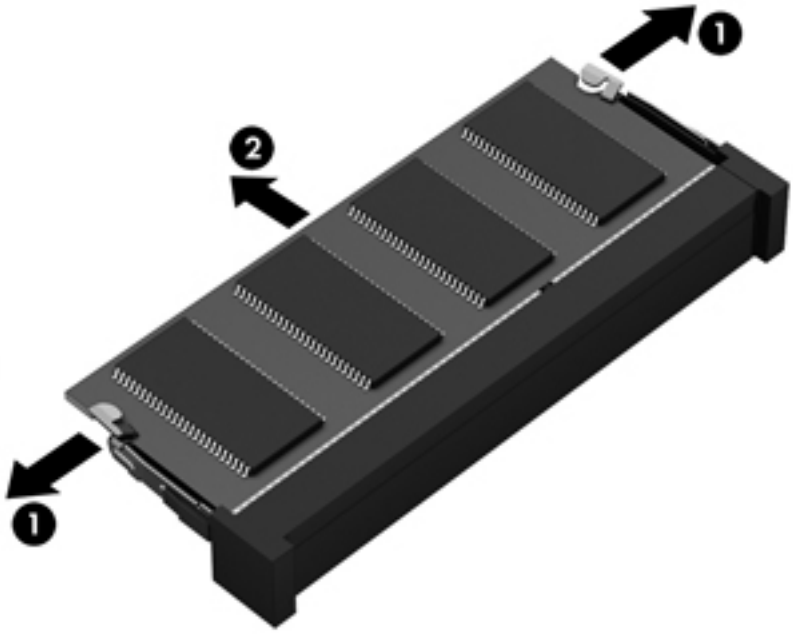
Description	Spare part number
8-GB (PC3L, 12800, 1600-MHz)	693374-005
4-GB (PC3L, 12800, 1600-MHz)	691740-005

Before removing a memory module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 24).
5. Remove the optical drive (see Optical drive on page 25).
6. Remove the bottom cover (see Bottom cover on page 28).

Remove a memory module:

1. Spread the retaining tabs **(1)** on each side of the memory module slot to release the memory module. (The memory module tilts up.)
2. Remove the memory module **(2)** by pulling it away from the slot at an angle.



Reverse this procedure to install a memory module.

Fan

NOTE: The fan spare part kit includes replacement thermal materials.

Description	Spare part number
Fan (includes cable)	806747-001

NOTE: To properly ventilate the computer, allow at least **7.6 cm** (3.0 in) of clearance on the left side of the computer. The computer uses an electric fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software requirements. Exhaust air is displaced through the ventilation grill located on the left side of the computer.

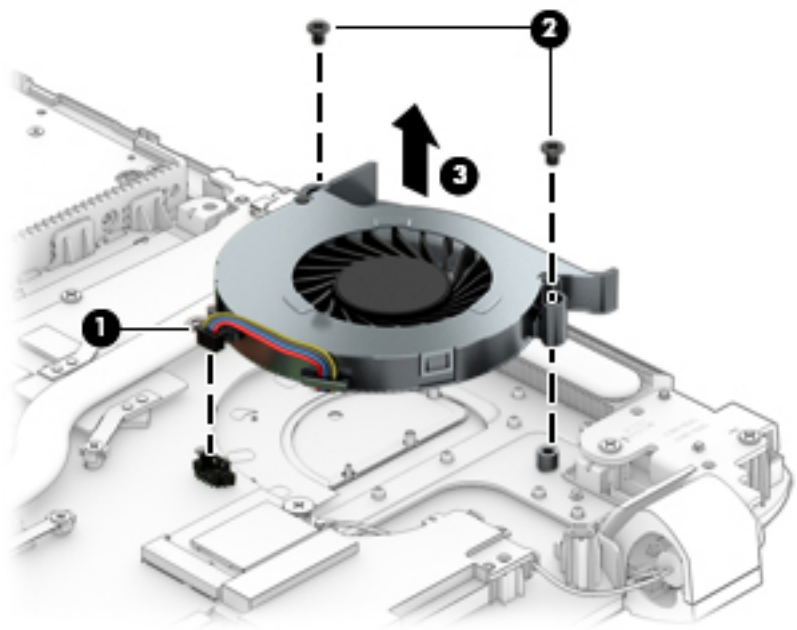
Before removing the fan/heat sink, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 24).
5. Remove the optical drive (see Optical drive on page 25).
6. Remove the bottom cover (see Bottom cover on page 28).

Remove the fan:

1. Disconnect the fan cable **(1)** from the system board.
2. Remove the two Phillips PM3.0×3.0 screws **(2)** that secure the fan to the computer.

3. Remove the fan **(3)**.



Reverse this procedure to install the fan.

Optical drive cable

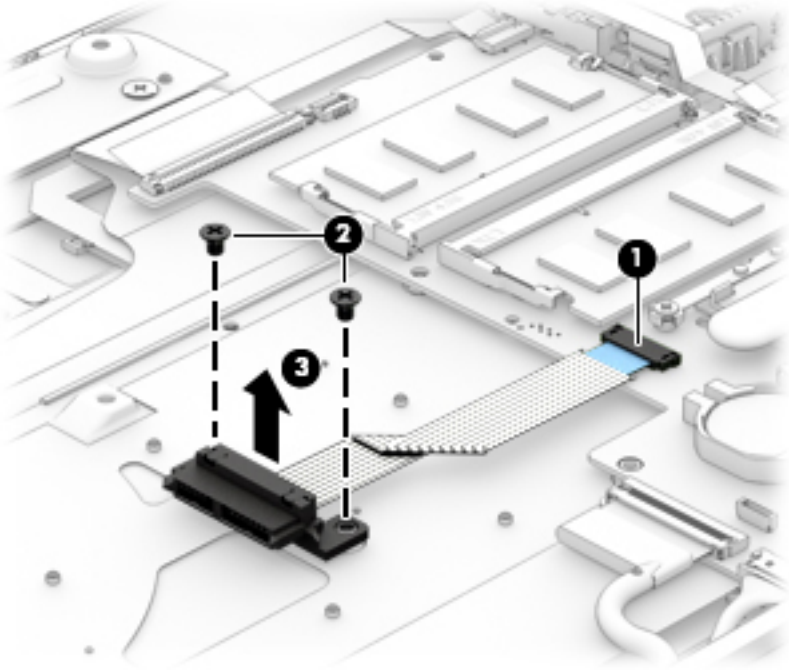
NOTE: The optical drive cable is included in the Cable Kit, spare part number 810928-001.

Before removing the optical drive cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 24).
5. Remove the optical drive (see Optical drive on page 25).
6. Remove the bottom cover (see Bottom cover on page 28).

Remove the optical drive cable:

1. Release the ZIF connector **(1)** to which the optical drive cable is connected, and then disconnect the optical drive cable from the system board.
2. Remove the two Phillips PM2.5×3.0 screws **(2)** that secure the optical drive cable to the computer.
3. Remove the optical drive cable **(3)**.



Reverse this procedure to install the optical drive cable.

System board

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

Description	Spare part number
For use only on computer models with model numbers 17-s100 through 17-s199:	
Equipped with an Intel Core i7-7500U 2.70-GHz (SC turbo up to 3.50-GHz) processor (2133-MHz FSB, 4.0-MB L3 cache, dual core, 15 W), an NVIDIA N16S-GT (GeForce 940M) graphics subsystem with 4-GB of dedicated video memory, and the Window 10 operating system	904360-601
Equipped with an Intel Core i7-7500U 2.70-GHz (SC turbo up to 3.50-GHz) processor (2133-MHz FSB, 4.0-MB L3 cache, dual core, 15 W), an NVIDIA N16S-GT (GeForce 940M) graphics subsystem with 4-GB of dedicated video memory, and a non-Window 10 operating system	904360-001
Equipped with an Intel Core i7-7500U 2.70-GHz (SC turbo up to 3.50-GHz) processor (2133-MHz FSB, 4.0-MB L3 cache, dual core, 15 W), an NVIDIA N16S-GT (GeForce 940M) graphics subsystem with 2-GB of dedicated video memory, and the Window 10 operating system	904359-601
Equipped with an Intel Core i7-7500U 2.70-GHz (SC turbo up to 3.50-GHz) processor (2133-MHz FSB, 4.0-MB L3 cache, dual core, 15 W), an NVIDIA N16S-GT (GeForce 940M) graphics subsystem with 2-GB of dedicated video memory, and a non-Window 10 operating system	904359-001
For use on all computer models:	
Equipped with an Intel Core i7-6500U 2.50-GHz (SC turbo up to 3.10-GHz) processor (1600-MHz FSB, 4.0-MB L3 cache, dual core, 15 W), an NVIDIA N16S-GT (GeForce 940M) graphics subsystem with 4-GB of dedicated video memory, and the Window 10 operating system	838262-601
Equipped with an Intel Core i7-6500U 2.50-GHz (SC turbo up to 3.10-GHz) processor (1600-MHz FSB, 4.0-MB L3 cache, dual core, 15 W), an NVIDIA N16S-GT (GeForce 940M) graphics subsystem with 4-GB of dedicated video memory, and a non-Window 10 operating system	838262-001
Equipped with an Intel Core i7-6500U 2.50-GHz (SC turbo up to 3.10-GHz) processor (1600-MHz FSB, 4.0-MB L3 cache, dual core, 15 W), an NVIDIA N16S-GT (GeForce 940M) graphics subsystem with 2-GB of dedicated video memory, and the Window 10 operating system	838261-601
Equipped with an Intel Core i7-6500U 2.50-GHz (SC turbo up to 3.10-GHz) processor (1600-MHz FSB, 4.0-MB L3 cache, dual core, 15 W), an NVIDIA N16S-GT (GeForce 940M) graphics subsystem with 2-GB of dedicated video memory, and a non-Window 10 operating system	838261-001
Equipped with an Intel Core i7-6700HQ 2.60-GHz (SC turbo up to 3.50-GHz) processor (1600-MHz FSB, 6.0-MB L3 cache, dual core, 45 W (cTDP to 35 W)), a graphics subsystem with UMA memory, and the Window 10 operating system	835869-601
Equipped with an Intel Core i7-6700HQ 2.60-GHz (SC turbo up to 3.50-GHz) processor (1600-MHz FSB, 6.0-MB L3 cache, dual core, 45 W (cTDP to 35 W)), a graphics subsystem with UMA memory, and a non-Window 10 operating system	835869-001
Equipped with an Intel Core i7-6500U 2.50-GHz (SC turbo up to 3.10-GHz) processor (1600-MHz FSB, 4.0-MB L3 cache, dual core, 15 W), a graphics subsystem with UMA memory, and the Window 10 operating system	841040-601
Equipped with an Intel Core i7-6500U 2.50-GHz (SC turbo up to 3.10-GHz) processor (1600-MHz FSB, 4.0-MB L3 cache, dual core, 15 W), a graphics subsystem with UMA memory, and a non-Window 10 operating system	841040-001
Equipped with an Intel Core i5-6200U 2.30-GHz (SC turbo up to 2.80-GHz) processor (1600-MHz FSB, 3.0-MB L3 cache, quad core, 15 W), a graphics subsystem with UMA memory, and the Window 10 operating system	838260-601
Equipped with an Intel Core i5-6200U 2.30-GHz (SC turbo up to 2.80-GHz) processor (1600-MHz FSB, 3.0-MB L3 cache, quad core, 15 W), a graphics subsystem with UMA memory, and a non-Window 10 operating system	838260-001

Before removing the system board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 24).
5. Remove the optical drive (see Optical drive on page 25).
6. Remove the bottom cover (see Bottom cover on page 28).

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

- Memory modules (see Memory module on page 36)
- WLAN module (see WLAN module on page 33)
- Heat sink (see Heat sink on page 43)
- Fan (see Fan on page 37)

Remove the system board:

1. Position the computer upright, and then disconnect the following cables from the system board:

   (1) ClickPad cable

   (2) TouchPad cable

   (3) Hard drive cable

   (4) Optical drive cable

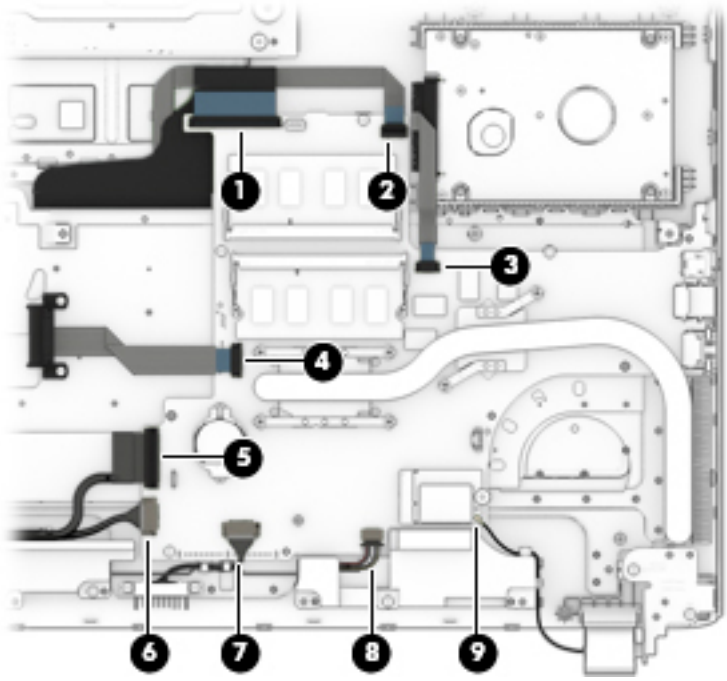
   (5) Keyboard cable

   (6) Power connector cable

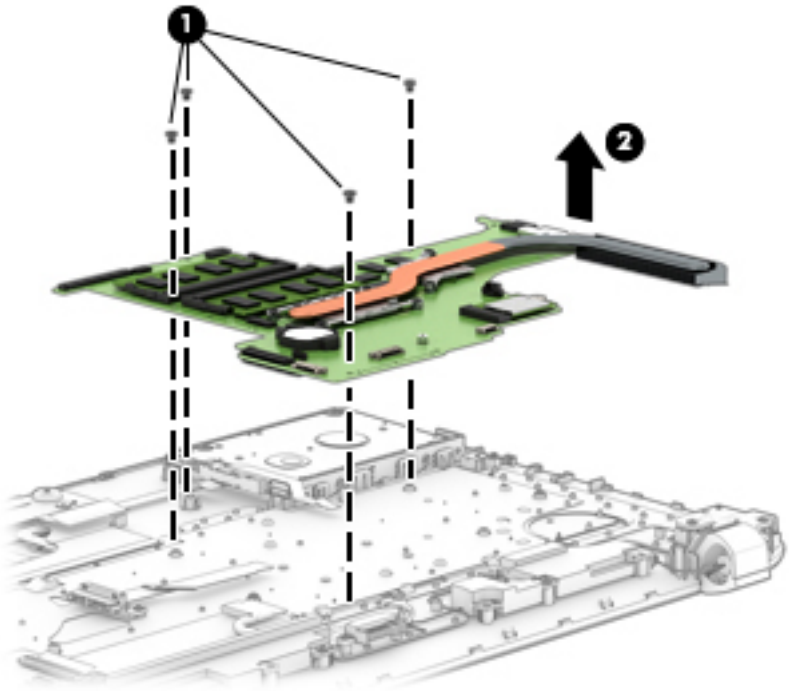
   (7) Display cable

   (8) Speaker cable

   (9) Power button board



2. Remove the four Phillips PM2.0×3.0 screws **(1)** that secure the system board to the computer.
3. Lift the right side of the system board **(2)** until the USB/audio board cable and connector are accessible.



4. Disconnect the USB/audio board cable from the connector under the system board. See USB/audio board on page 46 for cable removal instructions.
5. Remove the system board.

Reverse this procedure to install the system board.

Heat sink

NOTE: The heat sink spare part kit includes replacement thermal material.

Description	Spare part number
For use only on computer models equipped with a graphics subsystem with dedicated video memory	806827-001
For use only on computer models equipped with a graphics subsystem with UMA memory and an Intel Core i7-6700HQ processor	806826-001
For use only on computer models equipped with a graphics subsystem with UMA memory and an Intel Core i7-6500U or Intel Core i5-6200U processor	828817-001

NOTE: To properly ventilate the computer, allow at least **7.6 cm** (3.0 in) of clearance on the left side of the computer. The computer uses an electric fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software requirements. Exhaust air is displaced through the ventilation grill located on the left side of the computer.

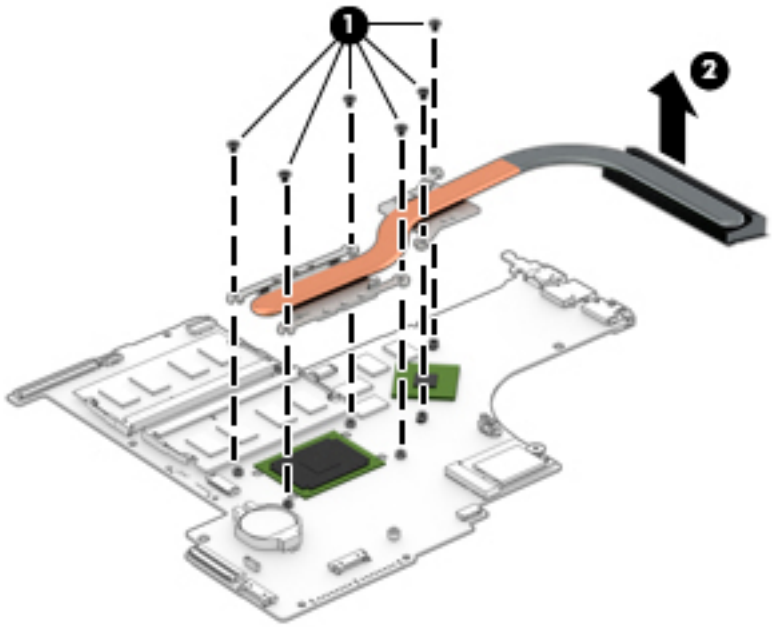
Before removing the heat sink, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 24).
5. Remove the optical drive (see Optical drive on page 25).
6. Remove the bottom cover (see Bottom cover on page 28).
7. Remove the fan (see Fan on page 37).
8. Remove the system board (see System board on page 40).

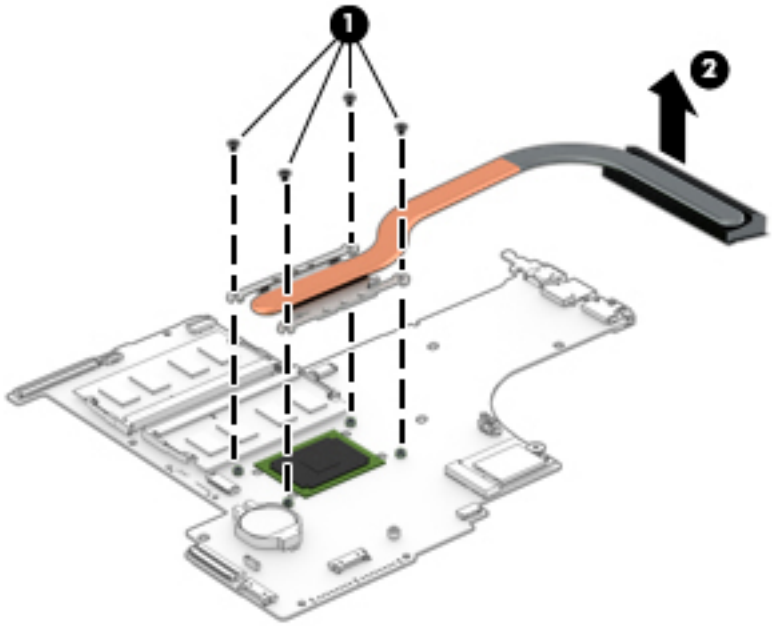
Remove the heat sink:

1. For computer models equipped with a graphics subsystem with discrete memory, in the order indicated, remove the six Phillips PM2.0×3.0 screws **(1)** that secure the heat sink to the system board.

2. Remove the heat sink **(2)**.

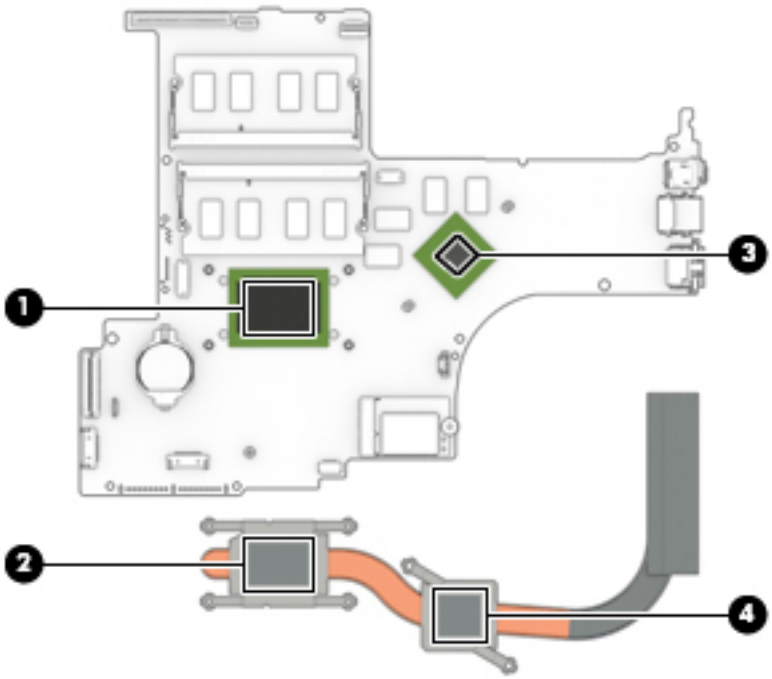


3. For computer models equipped with a graphics subsystem with UMA memory, in the order indicated on the screws, remove the four Phillips PM2.0×3.0 screws **(1)** that secure the heat sink to the system board.
4. Remove the heat sink **(2)**.

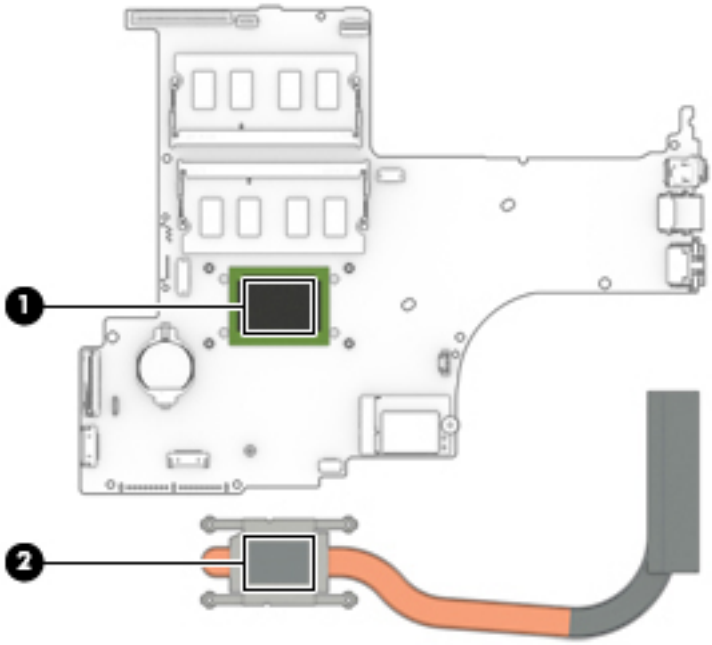


NOTE: The thermal material must be thoroughly cleaned from the surfaces of the heat sink and the system board each time the heat sink is removed.

Thermal paste is used on the processor **(1)** and the heat sink component **(2)** that services it. Thermal paste is also used on the graphics subsystem chip **(3)** and the heat sink component **(4)** that services it.



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



Reverse this procedure to reassemble and install the heat sink.

USB/audio board

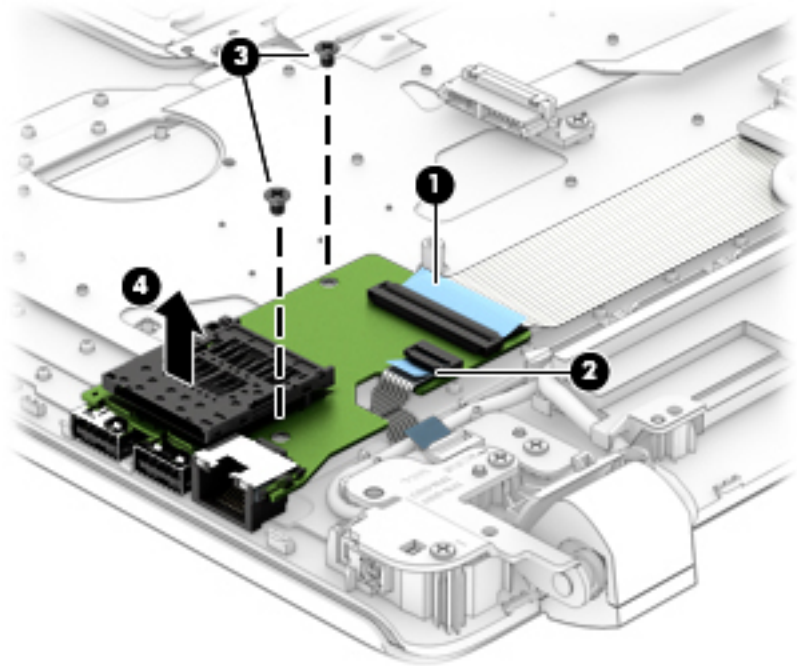
Description	Spare part number
USB/audio board (includes cable)	844489-001
USB/audio board cable	844490-001

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

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 24).
5. Remove the optical drive (see Optical drive on page 25).
6. Remove the bottom cover (see Bottom cover on page 28).

Remove the USB/audio board:

1. Release the ZIF connector **(1)** to which the USB/audio board cable is connected, and then disconnect the USB/audio board cable from the USB/audio board.
2. Release the ZIF connector **(2)** to which the power button board cable is connected, and then disconnect the power button board cable from the USB/audio board.
3. Remove the two Phillips PM2.5×3.0 screws **(3)** that secure the USB/audio board to the computer.
4. Remove the USB/audio board **(4)**.



Reverse this procedure to install the USB/audio board.

Speakers

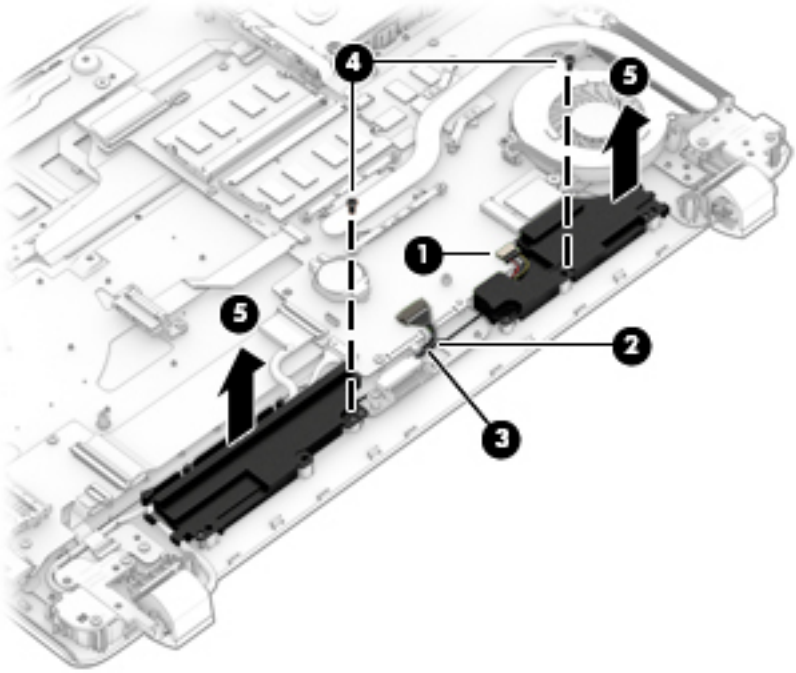
Description	Spare part number
Speakers (includes left and right speakers and cable)	809316-001

Before removing the speakers, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 24).
5. Remove the optical drive (see Optical drive on page 25).
6. Remove the bottom cover (see Bottom cover on page 28).
7. Remove the system board (see System board on page 40).

Remove the speakers:

1. Release the speaker cable from the clip built into the keyboard/top cover **(1)**.
2. Remove the display cable **(2)** from the channel **(3)** at the top of the left speaker.
3. Remove the two Phillips screws **(4)**
4. Remove the speakers **(5)**.



Reverse this procedure to install the speakers.

Power button board

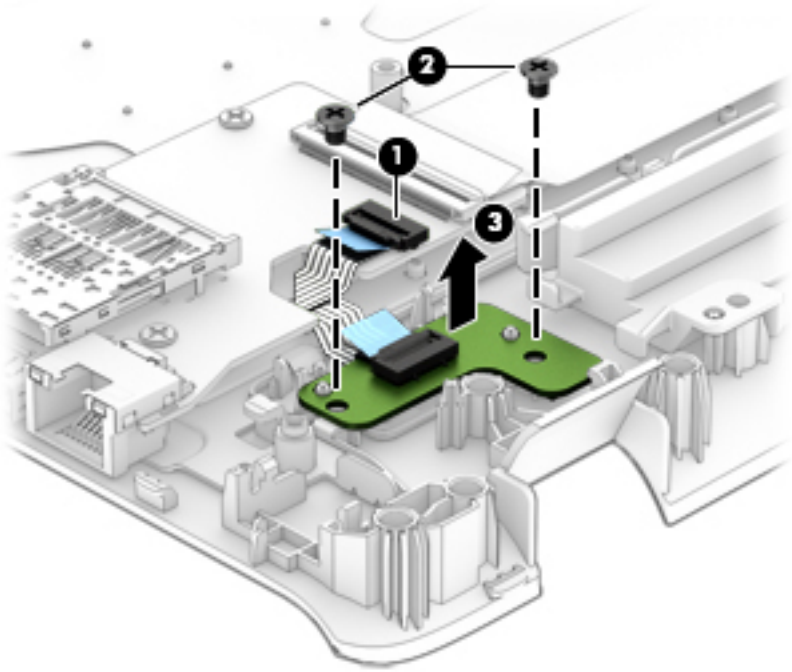
Description	Spare part number
Power button board (includes cable)	809310-001

Before removing the power button board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 24).
5. Remove the optical drive (see Optical drive on page 25).
6. Remove the bottom cover (see Bottom cover on page 28).
7. Remove the system board (see System board on page 40).

Remove the power button board:

1. Release the ZIF connector **(1)** to which the power button board cable is connected, and then disconnect the power button board cable from the USB/audio board.
2. Remove the two Phillips PM2.0×2.5 screws **(2)** that secure the power button board to the computer.
3. Remove the power button board **(3)**.



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

Power connector cable

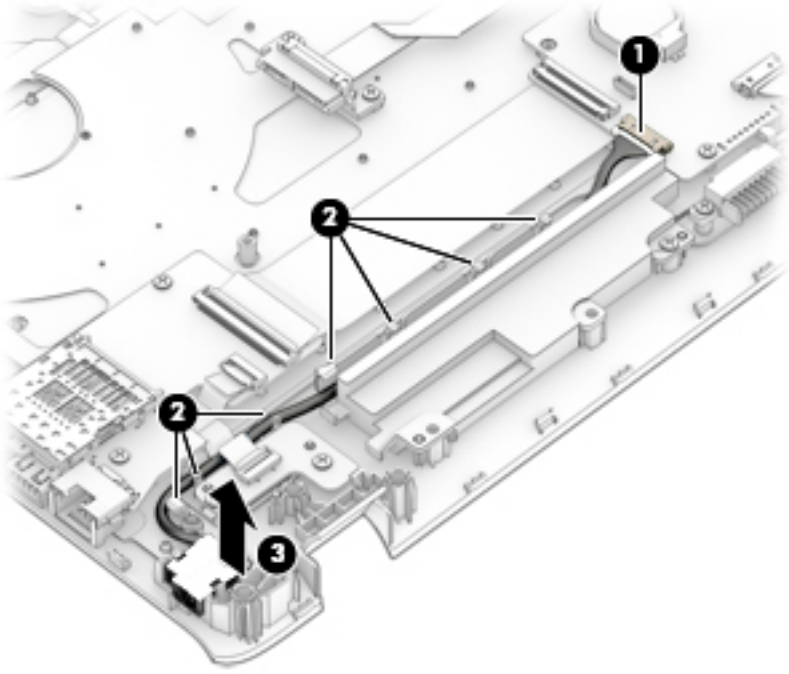
Description	Spare part number
Power connector cable	809295-001

Before removing the power connector cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 24).
5. Remove the optical drive (see Optical drive on page 25).
6. Remove the bottom cover (see Bottom cover on page 28).
7. Remove the system board (see System board on page 40).

Remove the power connector cable:

1. Disconnect the power connector cable **(1)** from the system board.
2. Release the power connector cable from the clips **(2)** and routing channel built into the keyboard/top cover.
3. Release the power connector **(3)** from the molded slot built into the keyboard/top cover.



4. Remove the power connector cable.

Reverse this procedure to install the power connector cable.

TouchPad

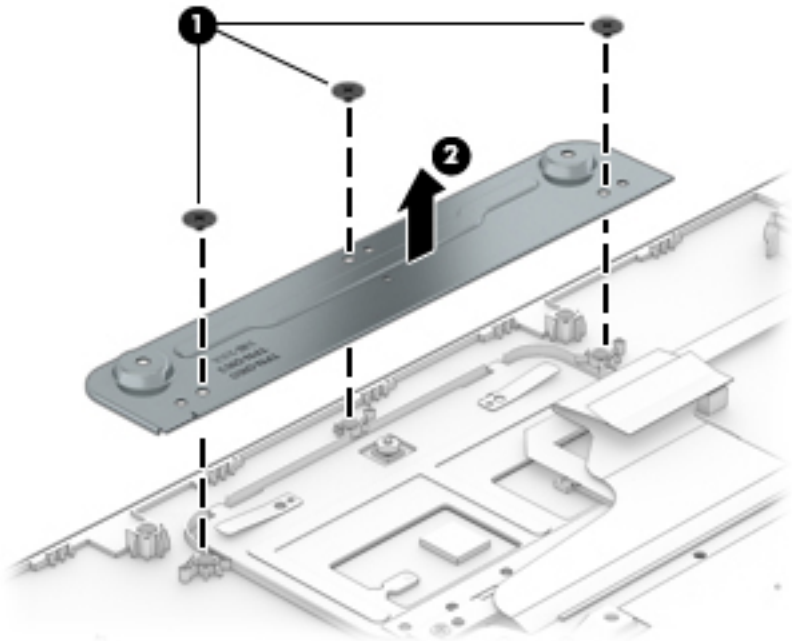
Description	Spare part number
TouchPad board (includes TouchPad front and rear brackets and TouchPad cable)	811552-001

Before removing the TouchPad, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 24).
5. Remove the optical drive (see Optical drive on page 25).
6. Remove the bottom cover (see Bottom cover on page 28).
7. Remove the system board (see System board on page 40).

Remove the TouchPad:

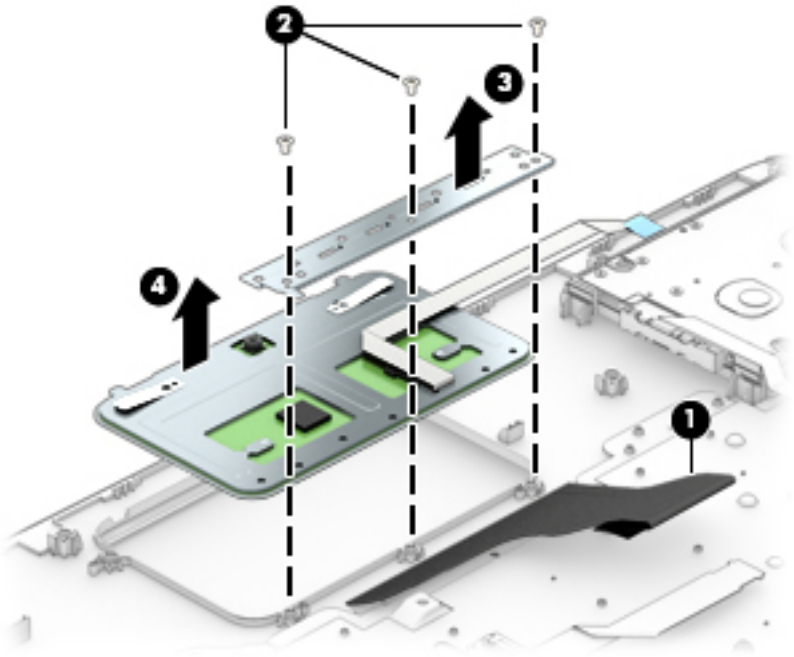
1. Remove the three Phillips PM2.5×3.0 screws **(1)** that secure the TouchPad front bracket to the computer.
2. Remove the TouchPad front bracket **(2)**.



3. Lift the keyboard cable **(1)** to gain access to the TouchPad screws.
4. Remove the three Phillips PM2.0×2.0 broad head screws **(2)** that secure the TouchPad rear bracket and the TouchPad to the computer.

5. Lift the rear edge of the TouchPad and the rear bracket, and then remove them **(3)**.

NOTE: When installing the TouchPad, note that the metal protrusion that extends from the TouchPad is installed under the keyboard shield **(4)**.



Reverse this procedure to install the TouchPad.

Display assembly

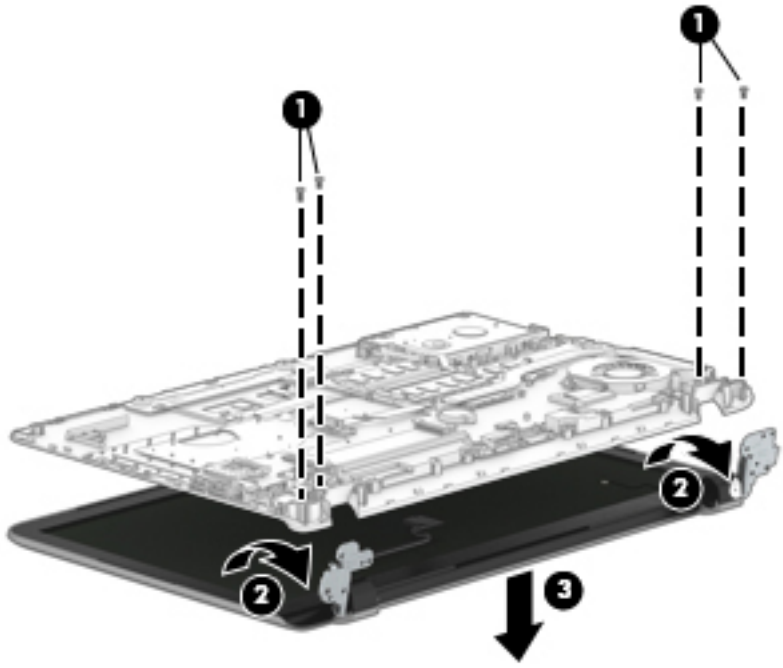
Before removing the display assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 24).
5. Remove the optical drive (see Optical drive on page 25).
6. Remove the bottom cover (see Bottom cover on page 28).

Remove the display assembly:

1. Remove the four Phillips PM2.5×5.0 screws **(1)** that secure the display assembly to the computer.
2. Rotate the display hinges **(2)** back to the fully released position.

3. Separate the computer **(3)** from the display assembly.



4. If it is necessary to replace the display back cover or any of the display assembly internal components:

NOTE: When replacing the display back cover, be sure that the display hinges and antenna are removed from the defective display back cover and installed in the replacement display back cover.

CAUTION: Before turning the display assembly upside down, make sure the work surface is clear of tools, screws, and any other foreign objects. Failure to follow this caution can result in damage to the display panel.

   a. Position the display assembly upside down.

   b. Pry up on each side of the display back cover to disengage the display back cover from the display panel assembly.

   c. Remove the display back cover.

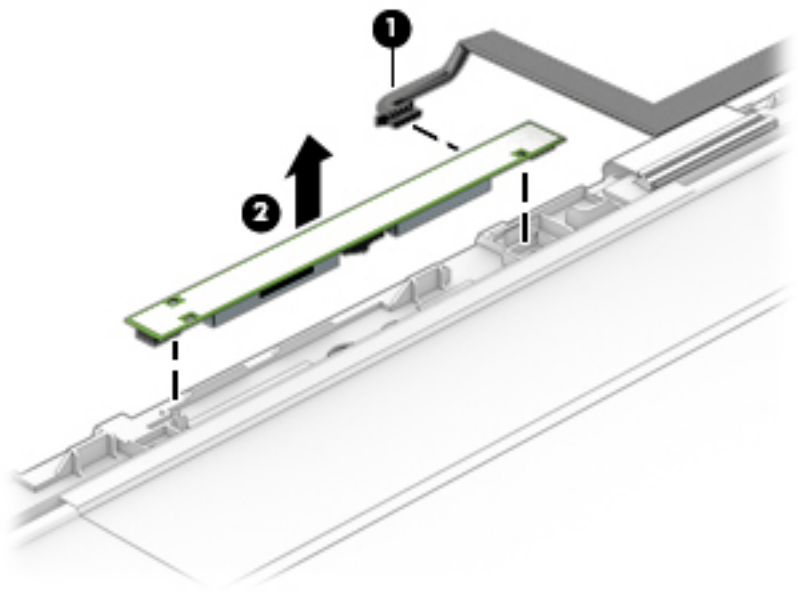
      The display back cover is available using spare part number 835865-001.

5. If it is necessary to replace the webcam/microphone module:

a. Remove the display back cover.

b. Disconnect the webcam/microphone module cable **(1)** from the webcam/microphone module.

c. Detach the webcam/microphone module **(2)** from the display panel assembly. (The webcam/microphone module is attached to the display panel assembly with double-sided adhesive.)



d. Remove the webcam/microphone module.

The webcam/microphone module is available using spare part number 810961-001.

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

a. Remove the display back cover.

b. Disconnect the webcam/microphone module cable **(1)** from the webcam/microphone module.

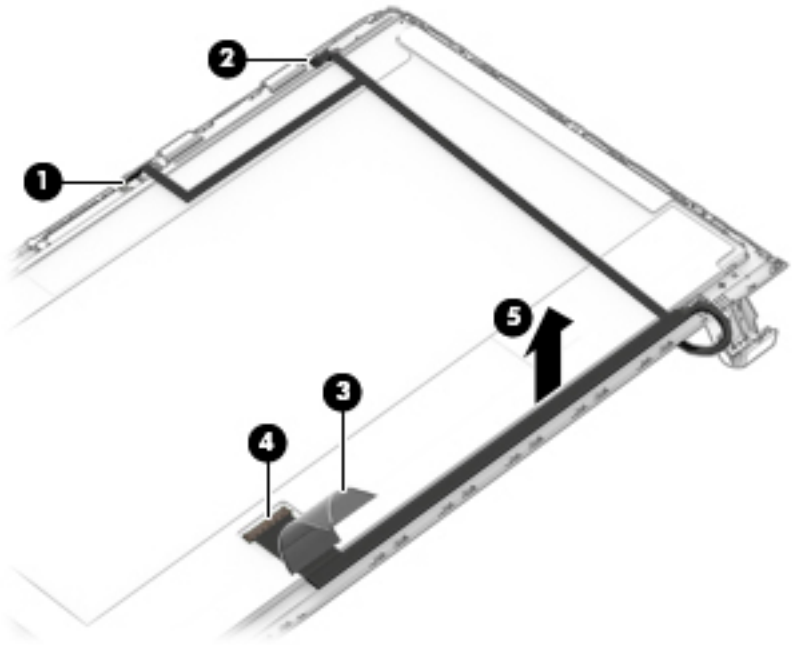
c. Disconnect the TouchScreen board cable **(2)** from the TouchScreen board (TouchScreen models only).

d. Release the adhesive strip **(3)** that secures the display panel cable connector to the display panel.

e. Disconnect the display panel cable **(4)** from the display panel.

f. Release the display panel cable **(5)** from the display panel. (The display panel cable is attached to the display panel with double-sided adhesive.)

The display panel cable includes the TouchScreen board cable and the webcam/microphone module cable and is available using spare part numbers 809294-001 (for use on computer models equipped with a TouchScreen display) and 847874-001 (for use on computer models equipped with a non-TouchScreen display).



7. If it is necessary to replace the display hinges:

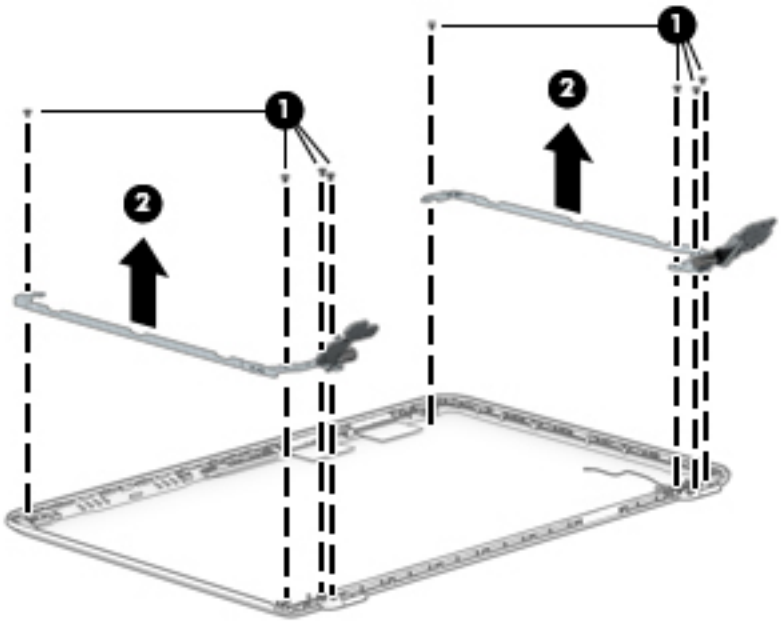
a. Remove the display back cover.

b. Turn the display back cover right side up.

c. Remove the six Phillips PM2.5×2.0 screws **(1)** and the two Phillips PM2.0×2.5 screws that secure the display hinges to the display back cover.

d. Remove the display hinges **(2)**.

The display hinges are available using spare part number 809299-001.

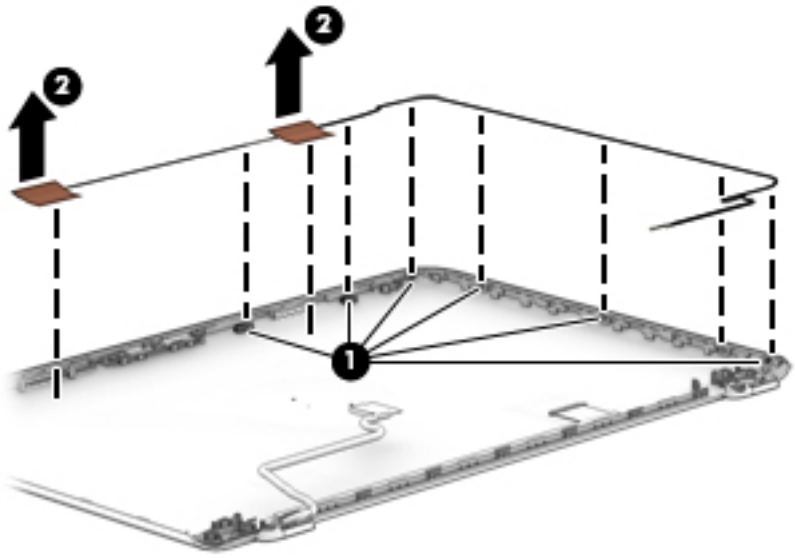


8. If it is necessary to replace the antenna:

a. Remove the display back cover.

b. Release the antenna cables from the retention clips **(1)** and routing channel built into the top and right edges of the display back cover.

c. Detach the antenna transceivers from the display back cover **(2)**. (The antenna transceivers are attached to the display back cover with double-sided adhesive.)



d. Remove the antenna.

The antenna are available using spare part number 843588-001.

Reverse this procedure to reassemble and install the display assembly.

7 Using Setup Utility (BIOS)

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

NOTE: To start Setup Utility on convertible computers, your computer must be in notebook mode and you must use the keyboard attached to your notebook.

Starting Setup Utility (BIOS)

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

▲ Turn on or restart the computer, quickly press esc, and then press f10.

Updating Setup Utility (BIOS)

Updated versions of Setup Utility (BIOS) may be available on the HP website.

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

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

Determining the BIOS version

To decide whether you need to update Setup Utility (BIOS), first determine the BIOS version on your computer.

To reveal the BIOS version information (also known as *ROM date* and *System BIOS*), use one of these options.

- HP Support Assistant
  1. Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.

     – or –

     Click the question mark icon in the taskbar.
  2. Select **My PC**, and then select **Specifications**.
- Setup Utility (BIOS)
  1. Start Setup Utility (BIOS) (see Starting Setup Utility (BIOS) on page 57).
  2. Select **Main**, select **System Information**, and then make note of the BIOS version.
  3. Select **Exit**, select **No**, and then follow the on-screen instructions.

To check for later BIOS versions, see Downloading a BIOS update on page 58.

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

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

1. Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.

   – or –

   Click the question mark icon in the taskbar.

2. Click **Updates**, and then click **Check for updates and messages**.
3. Follow the on-screen instructions.
4. At the download area, follow these steps:

   a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. If the update is more recent than your BIOS version, 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.

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

1. Type `file` in the taskbar search box, and then select **File Explorer**.
2. Click your hard drive designation. The hard drive designation is typically Local Disk (C:).
3. Using the hard drive path you recorded earlier, open the folder 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.

8 Using HP PC Hardware Diagnostics (UEFI)

HP PC Hardware Diagnostics is a Unified Extensible Firmware Interface (UEFI) that allows you to run diagnostic tests to determine whether the computer hardware is functioning properly. The tool runs outside the operating system so that it can isolate hardware failures from issues that are caused by the operating system or other software components.

When HP PC Hardware Diagnostics (UEFI) detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. This ID code can then be provided to support to help determine how to correct the problem.

NOTE: To start diagnostics on a convertible computer, your computer must be in notebook mode and you must use the keyboard attached.

To start HP PC Hardware Diagnostics (UEFI), follow these steps:

1. Turn on or restart the computer, and quickly press esc.
2. Press f2.

   The BIOS searches three places for the diagnostic tools, in the following order:

   a. Connected USB drive

      NOTE: To download the HP PC Hardware Diagnostics (UEFI) tool to a USB drive, see Downloading HP PC Hardware Diagnostics (UEFI) to a USB device on page 59.

   b. Hard drive

   c. BIOS
3. When the diagnostic tool opens, select the type of diagnostic test you want to run, and then follow the on-screen instructions.

NOTE: If you need to stop a diagnostic test, press esc.

Downloading HP PC Hardware Diagnostics (UEFI) to a USB device

NOTE: The HP PC Hardware Diagnostics (UEFI) download instructions are provided in English only, and you must use a Windows computer to download and create the HP UEFI support environment because only .exe files are offered.

There are two options to download HP PC Hardware Diagnostics to a USB device.

Download the latest UEFI version

1. Go to http://www.hp.com/go/techcenter/pcdiags. The HP PC Diagnostics home page is displayed.
2. In the HP PC Hardware Diagnostics section, select the **Download** link, and then select **Run**.

Download any version of UEFI for a specific product

1. Go to http://www.hp.com/support.
2. Select **Get software and drivers**.

3. Enter the product name or number.

   – or –

   Select **Identify now** to let HP automatically detect your product.

4. Select your computer, and then select your operating system.

5. In the **Diagnostic** section, follow the on-screen instructions to select and download the UEFI version you want.

9 Specifications

Computer specifications

The power information in this section may be helpful if you plan to travel internationally with the computer.

The computer operates on DC power, which can be supplied by an AC or a DC power source. The AC power source must be rated at 100–240 V, 50–60 Hz. Although the computer can be powered from a standalone DC power source, it should be powered only with an AC adapter or a DC power source that is supplied and approved by HP for use with this computer.

The computer can operate on DC power within the following specifications. Operating voltage and current varies by platform. The voltage and current for your computer is located on the regulatory label.

	Metric	U.S.
Dimensions		
Width	**38.0 cm**	14.96 in
Depth	**25.0 cm**	9.84 in
Height	**1.9 cm**	0.74 in
Weight (equipped with a hard drive)	**2.23 kg**	4.99 lbs
Weight (equipped with a solid-state drive)	**2.18 kg**	4.80 lbs
Input power		
Operating voltage and current	5 V dc @ 2 A / 12 V dc @ 3 A / 15 V dc @ 3 A – 45 W USB-C 5 V dc @ 3 A / 9 V dc @ 3 A / 10 V dc @ 3.75 A / 12 V dc @ 3.75 A / 15 V dc @ 3 A / 20 V dc @ 2.25 A - 45 W USB-C 5 V dc @ 3 A / 9 V dc @ 3 A / 10 V dc @ 5.0 A / 12 V dc @ 5.0 A / 15 V dc @ 4.33 A / 20 V dc @ 3.25 A - 65 W USB-C 5 V dc @ 3 A / 9 V dc @ 3 A / 10 V dc @ 5.0 A / 12 V dc @ 5.0 A / 15 V dc @ 5.0 A / 20 V dc @ 4.5 A - 90 W USB-C 19.5 V dc @ 2.31 A – 45 W 19.5 V dc @ 3.33 A – 65 W 19.5 V dc @ 4.62 A – 90 W 19.5 V dc @ 6.15 A – 120 W 19.5 V dc @ 7.70 A – 150 W 19.5 V dc @ 10.3 A – 200 W	
NOTE: This product is designed for IT power systems in Norway with phase-to-phase voltage not exceeding 240 V rms.		
Temperature		
Operating	**5°C to 35°C**	41°F to 95°F
Non-operating	**-20°C to 60°C**	-4°F to 140°F
Relative humidity (non-condensing)		

	Metric	U.S.
Operating	10% to 90%	
Non-operating	5% to 95%	
Maximum altitude (unpressurized)		
Operating	**-15 m to 3,048 m**	-50 ft to 10,000 ft
Non-operating	**-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.		

10 Backing up, restoring, and recovering

This chapter provides information about the following processes. The information in the chapter is standard procedure for most products.

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

For additional information, refer to the HP support assistant app.

▲ Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.

– or –

Click the question mark icon in the taskbar.

IMPORTANT: If you will be performing recovery procedures on a tablet, the tablet battery must be at least 70% charged before you start the recovery process.

IMPORTANT: For a tablet with a detachable keyboard, connect the keyboard to the keyboard dock before beginning any recovery process.

Creating recovery media and backups

The following methods of creating recovery media and backups are available on select products only. Choose the available method according to your computer model.

- Use HP Recovery Manager to create HP Recovery media after you successfully set up the computer. This step creates a backup of the HP Recovery partition on the computer. The backup can be used to reinstall the original operating system in cases where the hard drive is corrupted or has been replaced. For information on creating recovery media, see Creating HP Recovery media (select products only) on page 63. For information on the recovery options that are available using the recovery media, see Using Windows tools on page 64.
- Use Windows tools to create system restore points and create backups of personal information.

  For more information, see Recovering using HP Recovery Manager on page 65.

NOTE: If storage is 32 GB or less, Microsoft System Restore is disabled by default.

Creating HP Recovery media (select products only)

If possible, check for the presence of the Recovery partition and the Windows partition. From the **Start** menu, select **File Explorer**, and then select **This PC**.

- If your computer does not list the Windows partition and the Recovery partition, you can obtain recovery media for your system from support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information on the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.

You can use Windows tools to create system restore points and create backups of personal information, see Using Windows tools on page 64.

- If your computer does list the Recovery partition and the Windows partition, you can use HP Recovery Manager to create recovery media after you successfully set up the computer. HP Recovery media can be used to perform system recovery if the hard drive becomes corrupted. System recovery reinstalls the original operating system and software programs that were installed at the factory and then configures the settings for the programs. HP Recovery media can also be used to customize the system or restore the factory image if you replace the hard drive.
  - Only one set of recovery media can be created. Handle these recovery tools carefully, and keep them in a safe place.
  - HP Recovery Manager examines the computer and determines the required storage capacity for the media that will be required.
  - To create recovery discs, your computer must have an optical drive with DVD writer capability, and you must use only high-quality blank DVD-R, DVD+R, DVD-R DL, or DVD+R DL discs. Do not use rewritable discs such as CD±RW, DVD±RW, double-layer DVD±RW, or BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software. Or, instead, you can use a high-quality blank USB flash drive.
  - If your computer does not include an integrated optical drive with DVD writer capability, but you would like to create DVD recovery media, you can use an external optical drive (purchased separately) to create recovery discs. If you use an external optical drive, it must be connected directly to a USB port on the computer; the drive cannot be connected to a USB port on an external device, such as a USB hub. If you cannot create DVD media yourself, you can obtain recovery discs for your computer from HP. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information on the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.
  - Be sure that the computer is connected to AC power before you begin creating the recovery media.
  - The creation process can take an hour or more. Do not interrupt the creation process.
  - If necessary, you can exit the program before you have finished creating all of the recovery DVDs. HP Recovery Manager will finish burning the current DVD. The next time you start HP Recovery Manager, you will be prompted to continue.

To create HP Recovery media:

IMPORTANT: For a tablet with a detachable keyboard, connect the keyboard to the keyboard dock before beginning these steps.

1. Type `recovery` in the taskbar search box, and then select **HP Recovery Manager**.
2. Select **Create recovery media**, and then follow the on-screen instructions.

If you ever need to recover the system, see Recovering using HP Recovery Manager on page 65.

Using Windows tools

You can create recovery media, system restore points, and backups of personal information using Windows tools.

NOTE: If storage is 32 GB or less, Microsoft System Restore is disabled by default.

For more information and steps, see the Get started app.

- Select the **Start** button, and then select the **Get started** app.

Restore and recovery

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

IMPORTANT: Not all methods are available on all products.

- Windows offers several options for restoring from backup, refreshing the computer, and resetting the computer to its original state. For more information see the Get started app.

  ▲ Select the **Start** button, and then select the **Get started** app.

- If you need to correct a problem with a preinstalled application or driver, use the Reinstall drivers and/or applications option (select products only) of HP Recovery Manager to reinstall the individual application or driver.

  ▲ Type `recovery` in the taskbar search box, select **HP Recovery Manager**, select **Reinstall drivers and/or applications**, and then follow the on-screen instructions.

- If you want to recover the Windows partition to original factory content, you can choose the System Recovery option from the HP Recovery partition (select products only) or use the HP Recovery media. For more information, see Recovering using HP Recovery Manager on page 65. If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 63.

- On select products, if you want to recover the computer's original factory partition and content, or if you have replaced the hard drive, you can use the Factory Reset option of HP Recovery media. For more information, see Recovering using HP Recovery Manager on page 65.

- On select products, if you want to remove the recovery partition to reclaim hard drive space, HP Recovery Manager offers the Remove Recovery Partition option.

  For more information, see Removing the HP Recovery partition (select products only) on page 68.

Recovering using HP Recovery Manager

HP Recovery Manager software allows you to recover the computer to its original factory state by using the HP Recovery media that you either created or that you obtained from HP, or by using the HP Recovery partition (select products only). If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 63.

What you need to know before you get started

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

  IMPORTANT: Recovery through HP Recovery Manager should be used as a final attempt to correct computer issues.

- HP Recovery media must be used if the computer hard drive fails. If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 63.

- To use the Factory Reset option (select products only), you must use HP Recovery media. If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 63.

- If your computer does not allow the creation of HP Recovery media or if the HP Recovery media does not work, you can obtain recovery media for your system from support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information from the HP

website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.

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

Using HP Recovery media, you can choose from one of the following recovery options:

NOTE: Only the options available for your computer display when you start the recovery process.

- System Recovery—Reinstalls the original operating system, and then configures the settings for the programs that were installed at the factory.
- Factory Reset—Restores the computer to its original factory state by deleting all information from the hard drive and re-creating the partitions. Then it reinstalls the operating system and the software that was installed at the factory.

The HP Recovery partition (select products only) allows System Recovery only.

Using the HP Recovery partition (select products only)

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

To start HP Recovery Manager from the HP Recovery partition:

IMPORTANT: For a tablet with a detachable keyboard, connect the keyboard to the keyboard dock before beginning these steps (select products only).

1. Type `recovery` in the taskbar search box, select **Recovery Manager**, and then select **HP Recovery Environment**.

   - or-

   For computers or tablets with keyboards attached, press f11 while the computer boots, or press and hold f11 as you press the power button.

   For tablets without keyboards:

   Turn on or restart the tablet, and then quickly hold down the volume down button; then select f11.

   - or -

   Turn on or restart the tablet, and then quickly hold down the Windows button; then select f11.

2. Select **Troubleshoot** from the boot options menu.
3. Select **Recovery Manager**, and then follow the on-screen instructions.

Using HP Recovery media to recover

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

1. If possible, back up all personal files.
2. Insert the HP Recovery media, and then restart the computer.

   NOTE: If the computer does not automatically restart in HP Recovery Manager, change the computer boot order. See Changing the computer boot order on page 67.

3. Follow the on-screen instructions.

Changing the computer boot order

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

To change the boot order:

IMPORTANT: For a tablet with a detachable keyboard, connect the keyboard to the keyboard dock before beginning these steps.

1. Insert the HP Recovery media.
2. Access BIOS:

   For computers or tablets with keyboards attached:

   ▲ Turn on or restart the computer or tablet, quickly press esc, and then press f9 for boot options.

   For tablets without keyboards:

   ▲ Turn on or restart the tablet, and then quickly hold down the volume down button; then select **f9**.

   - or -

   Turn on or restart the tablet, and then quickly hold down the Windows button; then select **f9**.
3. Select the optical drive or USB flash drive from which you want to boot.
4. Follow the on-screen instructions.

Removing the HP Recovery partition (select products only)

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

IMPORTANT: After you remove the HP Recovery partition, you will not be able to perform System Recovery or create HP recovery media from the HP Recovery partition. So before you remove the Recovery partition, create HP Recovery media; see Creating HP Recovery media (select products only) on page 63.

NOTE: The Remove Recovery Partition option is only available on products that support this function.

Follow these steps to remove the HP Recovery partition:

1. Type `recovery` in the taskbar search box, and then select **HP Recovery Manager**.
2. Select **Remove Recovery Partition**, and then follow the on-screen instructions.

11 Power cord set requirements

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

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

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

Requirements for all countries

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least **1.0 m** (3.2 ft) and no more than **1.8 m** (6 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

Country/region	Accredited agency	Applicable note number
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.

12 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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