HP Envy Notebook PC (model numbers 13-ab001 through 13-ab099; CTO model number 13t-ab000)

Maintenance and Service Guide
IMPORTANT! This document is intended for
HP authorized service providers only.

Safety warning notice

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

Table of contents

1 Product description

Category	Description
Product Name	HP Envy Notebook PC (model numbers 13-ab001 through 13-ab099; CTO model number 13t-ab000)
Processors	• 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) • Intel Core i5-7200U 2.50-GHz (SC turbo up to 3.10-GHz) processor (2133-MHz FSB, 3.0-MB L3 cache, dual core, 15 W) • Intel Core i3-7100U 2.40-GHz processor (2133-MHz FSB, 3.0-MB L3 cache, dual core, 15 W)
Chipset	Integrated soldered-on-circuit (SoC)
Graphics	**Internal graphics**: Intel Graphics 620 Support for HD decode, DX12, and high-definition multimedia interface (HDMI)
Panel	• 13.3-in, RGBW, quad-high-definition+ (QHD+), white light-emitting diode (WLED), BrightView (BV; 3200×1800), ultraslim-flat (2.6-mm), UWVA, eDP 1.3 (DBTS) TouchScreen display, flush glass design, multitouch enabled, typical brightness 300 nits, 72% color gamut, 16:9 ultra wide aspect ratio • 13.3-in, RGBW, QHD+, WLED, BV (3200×1800), ultraslim-flat (2.6-mm), UWVA, eDP 1.3 (DBCG) non-TouchScreen display, flush glass design, typical brightness 300 nits, 72% color gamut, 16:9 ultra wide aspect ratio • 13.3-in, ultra-high-definition (UHD), WLED, BV (3840×2160), ultraslim-flat (2.0-mm), UWVA, eDP 1.3+PSR (DBCG) non-TouchScreen display, flush glass design, typical brightness 340 nits, 72% color gamut, 16:9 ultra wide aspect ratio • 13.3-in, full-high-definition+ (FHD), WLED, BV (1920×1080), ultraslim-flat (2.0-mm), UWVA, eDP 1.3+PSR (DBCG) non-TouchScreen display, flush glass design, multitouch enabled, typical brightness 300 nits, 72% color gamut, 16:9 ultra wide aspect ratio
Memory module	Support for LPDDR3-1866 dual channel Support for up to 16-GB maximum system memory in the following configurations: • 16384-MB: (256 MB × 32 × 4 FBGA178, 32 GB × 4 pieces) • 8192-MB: (256 MB × 16 × 4 FBGA178, 16 GB × 4 pieces) • 4096-MB: (128 MB × 32 × 2 FBGA178, 8 GB × 4 pieces)
Storage	Support for next-generation form factor (NGFF) M.2 solid-state drives with SATA/PCIe co-layout port Support for Accelerometer / Cool Sense Support for the following solid-state drives: • 1-TB, M.2 2280, PCIe, 3×4 SS NVMe solid-state drive supporting triple level cell (TLC) CN • 512-GB, M.2 2280, PCIe, 3×4 SS NVMe solid-state drive supporting TLC CN • 256-GB, M.2 2280, PCIe, 3×4 SS NVMe solid-state drive supporting TLC CN • 128-GB, M.2 2280, SATA-3 solid-state drive
Optical drive	HP external DVD±RW DL SuperMulti Drive
Audio and video	HP TrueVision HD webcam with indicator light, 720p by 30 frames per second, BSI sensor, f2.4

Category	Description
Audio and video *(continued)*	Support for Windows Hello
	Bang & Olufsen for Envy
	Dual speakers
	Support for HP Audio Boost (Smart Amp - Realtek 3258)
	Integrated dual-array microphones with appropriate beam-forming, echo-cancellation, and noise suppression software
	Support for HP Noise Cancellation
	Support for voice recognition
Ethernet	Integrated 10/100/1000 network interface controller (NIC)
Sensors	Accelerometer
Wireless	Integrated wireless local area network (WLAN) options by way of wireless module
	Two built-in M.2 / PCIe WLAN antennas
	Support for the Intel Dual Band Wireless-AC 8265 802.11 AC 2×2 WiFi + Bluetooth® 4.2 Combo Adapter (non-vPro) and Intel Dual Band Wireless-AC 7265 802.11 AC 2×2 WiFi + Bluetooth 4.2 Combo Adapter (non-vPRO) WLAN devices
	Compatible with MiraCast-certified devices
External media cards	Micro-Secure Digital (SD®) media reader slot
Ports	• Audio-in (mono microphone)/audio-out (stereo headphone) combination
	• AC Smart Pin adapter plug
	• HDMI v1.4 supporting up to 1920×1080 @ 60 Hz
	• USB 3.0 port with Type-A connector (2)
	• USB 3.0 port with Type-C connector
Keyboard/pointing devices	Full-size, backlit, island-style with keyboard
	TouchPad requirements:
	• ClickPad with image sensor
	• SecurePad with image sensor
	• Multitouch gestures enabled
	• Support for modern trackpad gestures
	• Taps enabled as default
Power requirements	Support for 65-W HP Smart AC adapter (EM, 4.5-mm) and 45-W HP Smart AC adapter (non-PFC, 4.5-mm, with mount) with C5 receptacle, 1.00-meter (3.28-feet) power cord
	Support for a 3-cell, 57-WHr, 5.02-AHr, Li-ion battery
Security	• Support for Trusted Platfom Module (TPM) 2.0 (firmware-based)
	• Support for security cable lock
	• Support for fingerprint reader
Operating system	**Preinstalled**: Windows 10 and Windows 10 Professional
	For developed market (ML): Windows 10 Home ML and Windows 10 Home High End ML
	For emerging market (EM/SL):

Category	Description
Operating system *(continued)*	• Windows 10 Home EM/SL
	• Windows 10 Home High End EM/SL
	• Windows 10 Home China Language Edition CPPP
	• Windows 10 Home High End China Language Edition CPPP
	• Windows 10 Home Single Language Edition SEAP
	• Windows 10 Home High End SEAP
Serviceability	**End user replaceable part**: AC adapter

2 External component identification

Locating hardware

To find out what hardware is installed on your computer:

▲ Type `device manager` in the taskbar search box, and then select the **Device Manager** app.

A list displays all the devices installed on your computer.

For information about system hardware components and the system BIOS version number, press fn+esc (select products only).

Locating software

To find out what software is installed on your computer:

▲ Select the **Start** button, and then select **All apps**.

– or –

Select the **Start** button.

– or –

Right-click the **Start** button, and then select **Programs and Features**.

Right side

Component		Description
(1)	USB 3.x port	Connects a USB device, such as a cell phone, camera, activity tracker, or smartwatch, and provides data transfer.
(2)	USB 3.x port with HP Sleep and Charge	Connects a USB device, provides high-speed data transfer, and even when the computer is off, charges products such as a cell phone, camera, activity tracker, or smartwatch.
(3)	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.
(4)	AC adapter and battery light	● White: The AC adapter is connected and the battery is fully charged. ● Blinking white: The AC adapter is disconnected and the battery has reached a low battery level. ● Amber: The AC adapter is connected and the battery is charging. ● Off: The battery is not charging.
(5)	Power connector	Connects an AC adapter.

Left side

Component		Description
(1)	🔒 Security cable slot	Attaches an optional security cable to the computer. **NOTE:** The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.
(2)	SD microSD memory card reader	Reads optional memory cards that enable you to store, manage, share, or access information. To insert a card: **1.** Hold the card label-side up, with connectors facing the computer. **2.** Insert the card into the memory card reader, and then press in on the card until it is firmly seated. To remove a card: ▲ Press in on the card, and then remove it from the memory card reader.
(3)	⚡ USB Type-C charging port	When the computer is on, connects and charges a USB device that has a Type-C connector, such as a cell phone, camera, activity tracker, or smartwatch, and provides data transfer.
(4)	🎧 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 standalone microphones. **WARNING!** To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the *Regulatory, Safety, and Environmental Notices*. To access this guide: ▲ Select the **Start** button, select **All apps** (required on some products), select **HP Help and Support**, and then select **HP Documentation**. **NOTE:** When a device is connected to the jack, the computer speakers are disabled.

Display
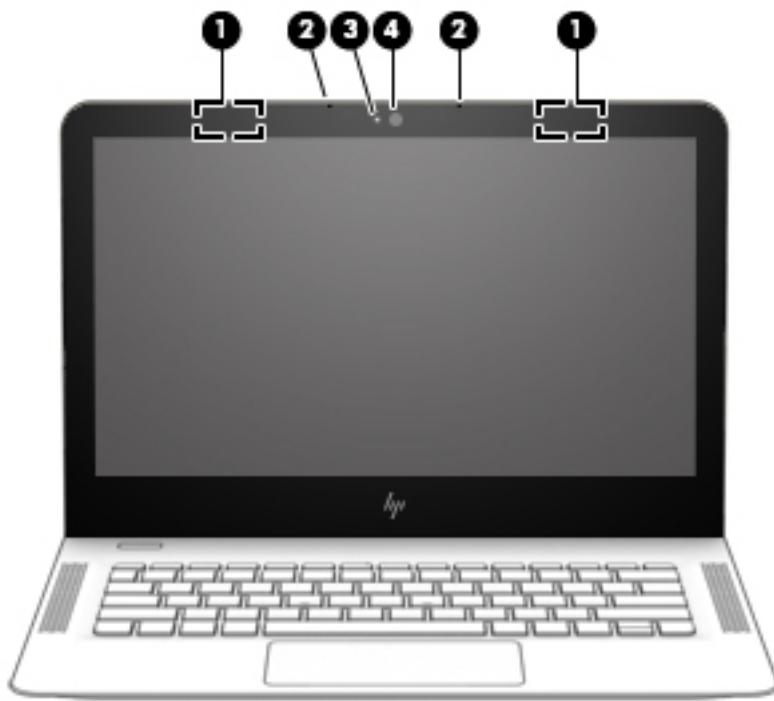
Component		Description
(1)	WLAN antennas*	Send and receive wireless signals to communicate with wireless local area networks (WLANs).
(2)	Internal microphones	Record sound.
(3)	Camera light	On: The camera is in use.
(4)	Camera	Allows you to video chat, record video, and record still images.

*The antennas are not visible from the outside of the computer, and antenna location varies. 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.

To access this guide:

▲ Select the **Start** button, select **All apps** (required on some products), select **HP Help and Support**, and then select **HP Documentation**.

Top

TouchPad
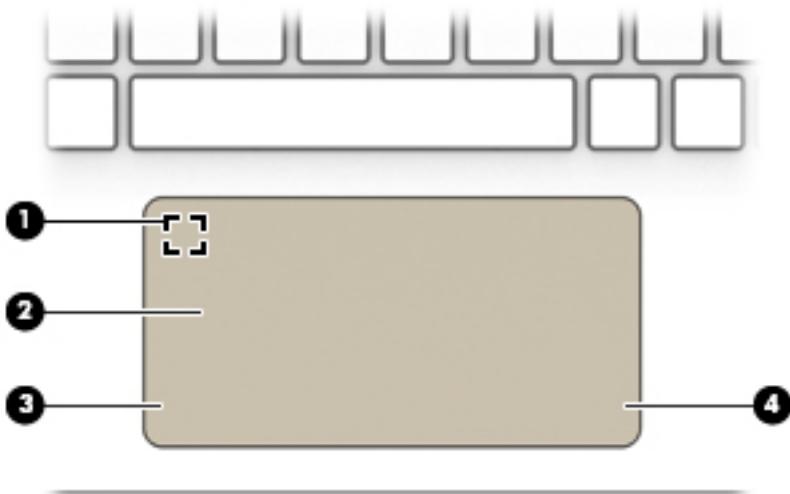
Component		Description
(1)	Fingerprint reader (select products only)	Allows a fingerprint logon to Windows, instead of a password logon.
		▲ To use the fingerprint reader, tap the upper-left corner of the TouchPad.
(2)	TouchPad zone	Reads your finger gestures to move the pointer or activate items on the screen.
(3)	Left TouchPad button	Functions like the left button on an external mouse.
(4)	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)		Mute light	● Amber: Computer sound is off.
			● Off: Computer sound is on.
(3)		Caps lock light	On: Caps lock is on, which switches the key input to all capital letters.
(4)		Fingerprint reader light (select products only)	On: The fingerprint reader is on.

Button 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.
		To learn more about your power settings, see your power options.
		▲ Type `power` in the taskbar search box, and then select **Power & sleep settings**.
		– or –
		Right-click the **Start** button, and then select **Power Options**.
(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 specific functions when pressed in combination with the esc key.
(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 products, the f5 action key turns the keyboard backlight feature off or on.

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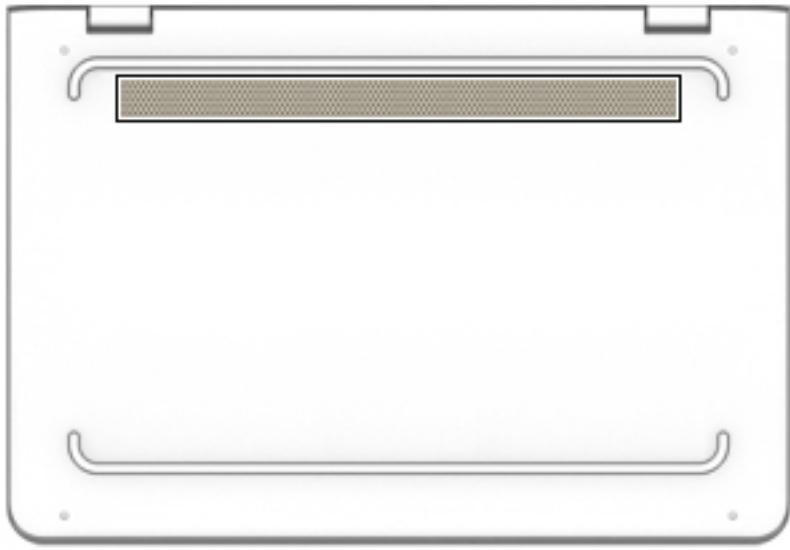
Component	Description
Vent	Enables airflow to cool internal components.
	NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.

3   Illustrated parts catalog

📝 **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.

Service label

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

📝 **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.

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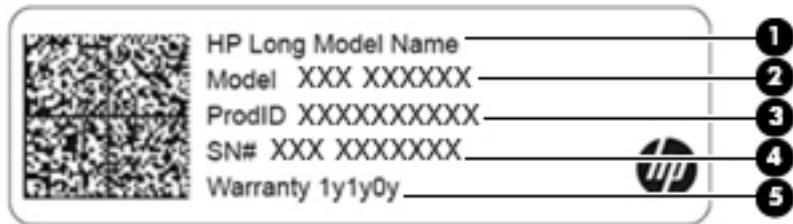
Component	
(1)	HP product name (select products only)
(2)	Model name (select products only)
(3)	Product number
(4)	Serial number
(5)	Warranty period

- 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.

Computer major components
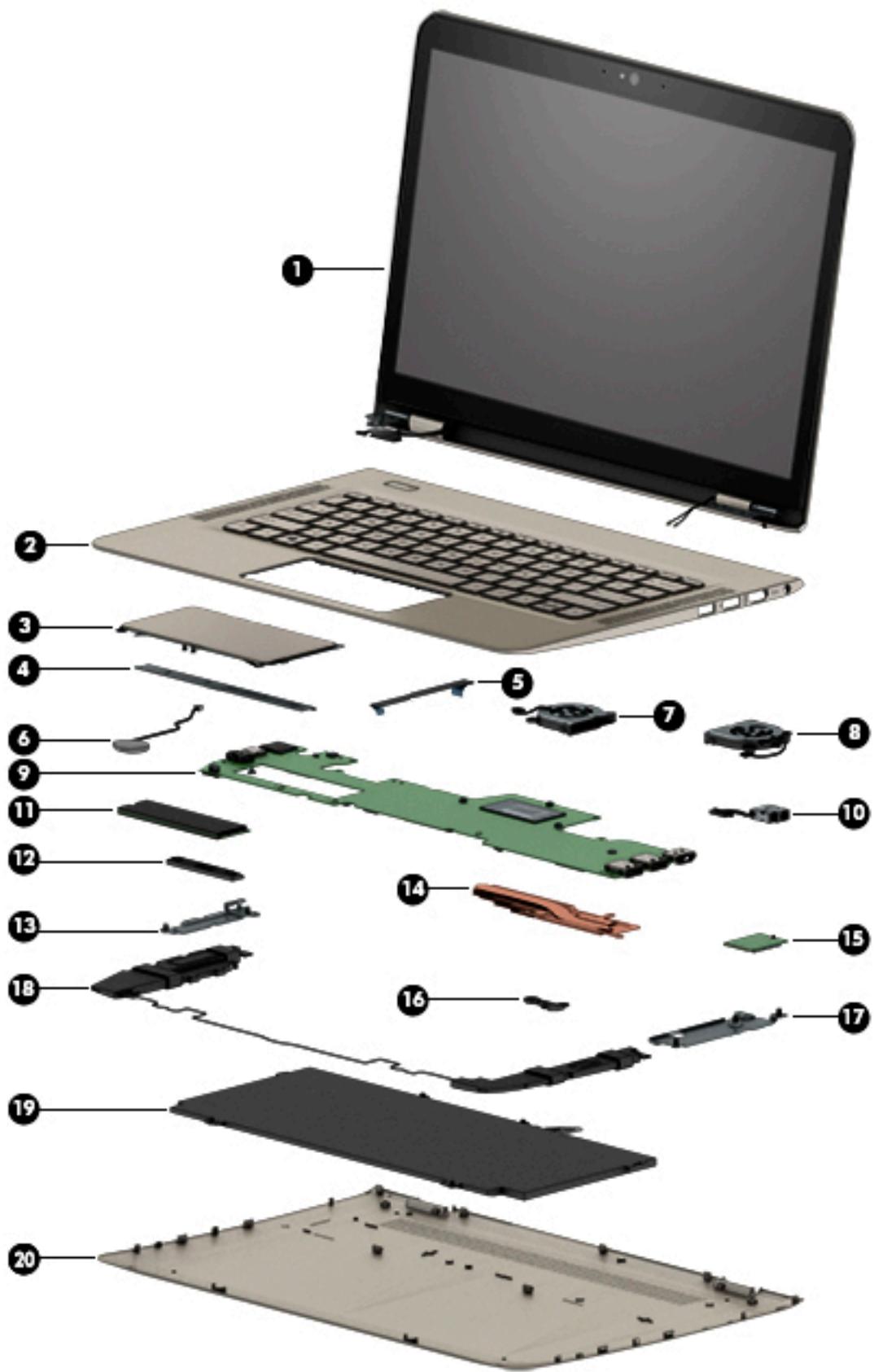
Item	Component	Spare part number
(1)	**Display assembly**: The display assembly is spared at the subcomponent level only. For more display assembly spare part information, see Display components on page 19.	
(2)	**Keyboard/top cover** (includes backlight cable and keyboard cable):	
	For use in Belgium	909620-A41
	For use in Canada	909620-DB1
	For use in the Czech Republic and Slovakia	909620-FL1
	For use in Denmark, Finland, and Norway	909620-DH1
	For use in France	909620-051
	For use in Germany	909620-041
	For use in Greece	909620-151
	For use in Israel	909620-BB1
	For use in Italy	909620-061
	For use in Latin America	909620-161
	For use in the Netherlands	909620-B31
	For use in Portugal	909620-131
	For use in Russia	909620-251
	For use in Saudi Arabia	909620-171
	For use in Slovenia	909620-E31
	For use in South Korea	909620-AD1
	For use in Spain	909620-071
	For use in Switzerland	909620-BG1
	For use in Taiwan	909620-AB1
	For use in Thailand	909620-281
	For use in Turkey	909620-141
	For use in the United Kingdom	909620-031
	For use in the United States	909620-001
(3)	**TouchPad** (includes TouchPad bracket, item 4)	
	NOTE: The TouchPad spare part kits do not include the TouchPad cable. The TouchPad cable is available using spare part numbers 912751-001 (on computer models equipped with an "fSP" TouchPad) and 909639-001 (on computer models equipped with a "non-fSP" TouchPad).	
	For use only on computer models equipped with a SecurePad TouchPad	912752-001
	For use only on computer models not equipped with a SecurePad TouchPad	909628-001
(4)	**TouchPad bracket** (included in the TouchPad spare part kit, spare part number 909639-001)	
(5)	**TouchPad cable** (includes double-sided adhesive)	
	For use only on computer models equipped with a SecurePad TouchPad	912751-001

Item	Component	Spare part number
	For use only on computer models not equipped with a SecurePad TouchPad	909639-001
(6)	**RTC battery** (includes cable and double-sided adhesive)	909636-001
(7)	**Fan, left** (includes cable)	909629-001
(8)	**Fan, right** (includes cable)	909630-001
(9)	**System board** (includes processor, a graphics subsystem with UMA memory, and replacement thermal material):	
	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), 16-GB of system memory, and the Windows 10 operating system	909253-601
	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), 16-GB of system memory, and a non-Windows operating system	909253-001
	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), 8-GB of system memory, and the Windows 10 operating system	909254-601
	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), 8-GB of system memory, and a non-Windows operating system	909254-001
	Equipped with an Intel Core i5-7200U 2.50-GHz (SC turbo up to 3.10-GHz) processor (2133-MHz FSB, 3.0-MB L3 cache, dual core, 15 W), 8-GB of system memory, and the Windows 10 operating system	909252-601
	Equipped with an Intel Core i5-7200U 2.50-GHz (SC turbo up to 3.10-GHz) processor (2133-MHz FSB, 3.0-MB L3 cache, dual core, 15 W), 8-GB of system memory, and a non-Windows operating system	909252-001
	Equipped with an Intel Core i5-7200U 2.50-GHz (SC turbo up to 3.10-GHz) processor (2133-MHz FSB, 3.0-MB L3 cache, dual core, 15 W), 4-GB of system memory, and the Windows 10 operating system	909251-601
	Equipped with an Intel Core i5-7200U 2.50-GHz (SC turbo up to 3.10-GHz) processor (2133-MHz FSB, 3.0-MB L3 cache, dual core, 15 W), 4-GB of system memory, and a non-Windows operating system	909251-001
	Equipped with an Intel Core i3-7100U 2.40-GHz processor (2133-MHz FSB, 3.0-MB L3 cache, dual core, 15 W), 4-GB of system memory, and the Windows 10 Professional operating system	909250-601
	Equipped with an Intel Core i3-7100U 2.40-GHz processor (2133-MHz FSB, 3.0-MB L3 cache, dual core, 15 W), 4-GB of system memory, and a non-Windows operating system	909250-001
(10)	**Power connector cable**	808155-017
(11)	**Solid-state drive:**	
	1-TB, M.2 2280, PCIE, 3×4 SS NVMe solid-state drive supporting TLC CN	865697-003
	512-GB, M.2 2280, PCIE, 3×4 SS NVMe solid-state drive supporting TLC CN	847110-011
	256-GB, M.2 2280, PCIE, 3×4 SS NVMe solid-state drive supporting TLC CN	847109-013
	128-GB, M.2 2280, SATA-3 solid-state drive	827560-029
(12)	**System board spacer** (included in the Plastics Kit, spare part number 909633-001)	
(13)	**USB bracket** (not spared separately, spared only with computer)	
(14)	**Heat sink** (includes replacement thermal material)	909744-001

Item	Component	Spare part number
(15)	**WLAN module:**	
	Intel Dual Band Wireless-AC 8265 802.11 AC 2×2 WiFi + Bluetooth 4.2 Combo Adapter (non-vPRO)	910264-855
	Intel Dual Band Wireless-AC 7265 802.11 AC 2×2 WiFi + Bluetooth 4.2 Combo Adapter (non-vPRO)	793840-005
(16)	**Battery spacer** (included in the Plastics Kit, spare part number 909633-001)	
(17)	**Power connector cable bracket** (not spared separately, spared only with computer)	
(18)	**Speakers** (includes cables and left and right speakers)	909638-001
(19)	**3-cell, 57-WHr, 5.02-AHr, Li-ion battery** (includes cable)	901345-855
(20)	**Bottom cover** (includes rubber feet strips, shielding, and vents)	909624-001
	Rubber Kit (not illustrated, includes bottom cover rubber feet)	909635-001

Display components
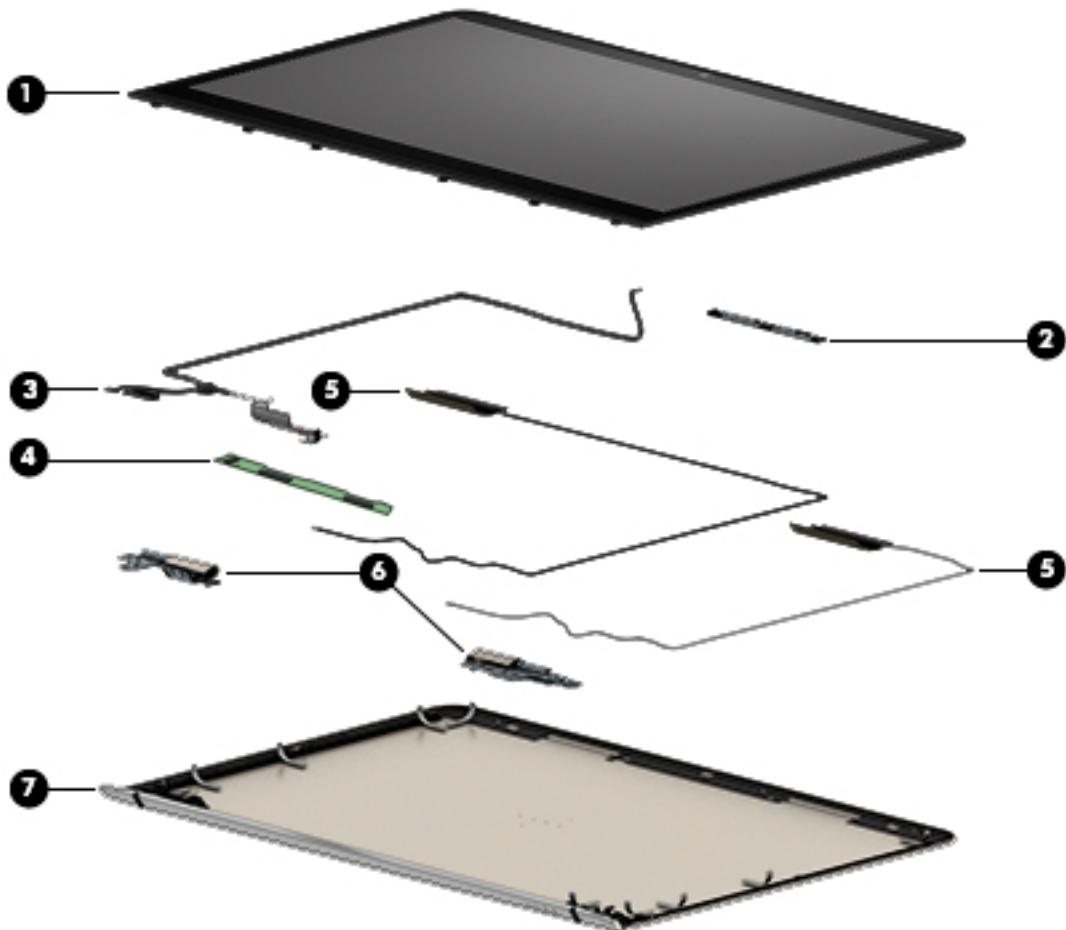
Item	Component	Spare part number
(1)	**Display panel assembly** (includes display bezel, display panel, and 3 display panel support brackets):	
	13.3-in, QHD+, BrightView, UWVA, TouchScreen display panel assembly	909632-001
	13.3-in, QHD+, BrightView, UWVA, non-TouchScreen display panel assembly	912753-001
	13.3-in, UHD, BrightView, UWVA, non-TouchScreen display panel assembly	912755-001
	13.3-in, FHD, BrightView, UWVA, non-TouchScreen display panel assembly	912754-001
	13.3-in, FHD, BrightView, UWVA, non-TouchScreen display panel assembly with bezel	913673-001
(2)	**Webcam/microphone module** (includes double-sided adhesive):	912982-001
(3)	**Display panel cable** (includes TouchScreen board cable, webcam/microphone module cable, adhesive support strip, and double-sided adhesive):	
	For use only with QHD+ TouchScreen display panel assembly with spare part number 909632-001	909626-001
	For use only with QHD+ non-TouchScreen display panel assembly with spare part number 912753-001	909625-001
	For use only with UHD non-TouchScreen display panel assembly with spare part number 912755-001	912319-001

Item	Component	Spare part number
	For use only with FHD non-TouchScreen display panel assembly with spare part number 912754-001	909627-001
	For use only with FHD non-TouchScreen display panel assembly with spare part number 913673-001	913674-001
(4)	**TouchScreen board** (includes double-sided adhesive)	909745-001
(5)	**Wireless antenna** (2, includes auxiliary and main cables, transceivers, and double-sided adhesive)	
	For use only with display panel assemblies with spare part numbers 909632-001, 912753-001, 912754-001, and 912755-001	913617-001
	For use only with FHD non-TouchScreen display panel assembly with spare part number 912673-001	914164-001
(6)	**Display hinges** (2)	909631-001
	Display hinge cover, top left (not illustrated)	913287-001
	Display hinge cover, top right (not illustrated)	913288-001
	Display hinge cover (not illustrated)	913289-001
(7)	**Display back cover** (includes shielding)	909623-001

Miscellaneous parts

Component	Spare part number
AC adapter:	
65-W HP Smart AC adapter (EM, 4.5-mm)	714635-850
45-W HP Smart AC adapter (non-PFC, 4.5-mm, with mount)	854116-850
HP adapters:	
HP duck head adapter for use in South Korea	854703-001
HP duck head adapter for use in the United States	854702-001
HP HDMI–to–VGA adapter	701943-001
HP USB–to–Gigabit RJ45 adapter	829941-001
HP external DVD±RW DL SuperMulti Drive	747080-001
HP USB-A–to–USB-C adapter	833960-001
Power cord (C5, 1.00-m):	
For use in Australia	213356-013
For use in Denmark	213353-013
For use in Europe	213350-014
For use in India	404827-003
For use in Israel	398063-008
For use in Italy	213352-013
For use in North America	213349-015
For use in the People's Republic of China	286497-008
For use in South Africa	361240-007
For use in Switzerland	213354-013
For use in Taiwan	393313-007
For use in Thailand	285096-012
For use in the United Kingdom and Singapore	213351-013
Rubber Kit	909635-001
Screw Kit	909637-001

4 Removal and replacement preliminary requirements

Tools required

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

- Flat-bladed screw driver
- Magnetic screw driver
- Phillips P0 screw driver
- Torx5 screw driver

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 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 drive, place it in a static-proof bag.

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

Avoid exposing a drive to temperature extremes or liquids.

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

Grounding guidelines

Electrostatic discharge damage

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

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

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

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

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

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

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

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

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

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

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

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe tubes, bags, or boxes.

- Protect ESD-sensitive parts and assemblies with conductive or approved containers or packaging.

- Keep ESD-sensitive parts in their containers until the parts arrive at static-free workstations.

- Place items on a grounded surface before removing items from their containers.

- Always be properly grounded when touching a component or assembly.

- Store reusable ESD-sensitive parts from assemblies in protective packaging or nonconductive foam.

- Use transporters and conveyors made of antistatic belts and roller bushings. Be sure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

Workstation guidelines

Follow these grounding workstation guidelines:

- Cover the workstation with approved static-shielding material.

- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.

- Use conductive field service tools, such as cutters, screw drivers, 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 computerop 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

⚠ **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.

Component replacement procedures

📝 **NOTE:** Details about the computer, including model, serial number, product key, and length of warranty, are on the service tag on the back of the computer. See Service label on page 13 for details.

This chapter provides removal and replacement procedures.

There are as many as 53 screws that must be removed, replaced, and/or loosened when servicing the computer. Make special note of each screw size and location during removal and replacement.

Bottom cover

Description	Spare part number
Bottom cover (includes rubber feet strips, shielding, and vents)	909624-001

Before disassembling the computer, follow these steps:

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

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

Remove the bottom cover:

1. Close the computer.

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

3. Remove the two Torx5 M2.0×3.3 screws **(1)** and the two Torx5 M2.0×6.3 screws **(2)** that secure the bottom cover to the computer.
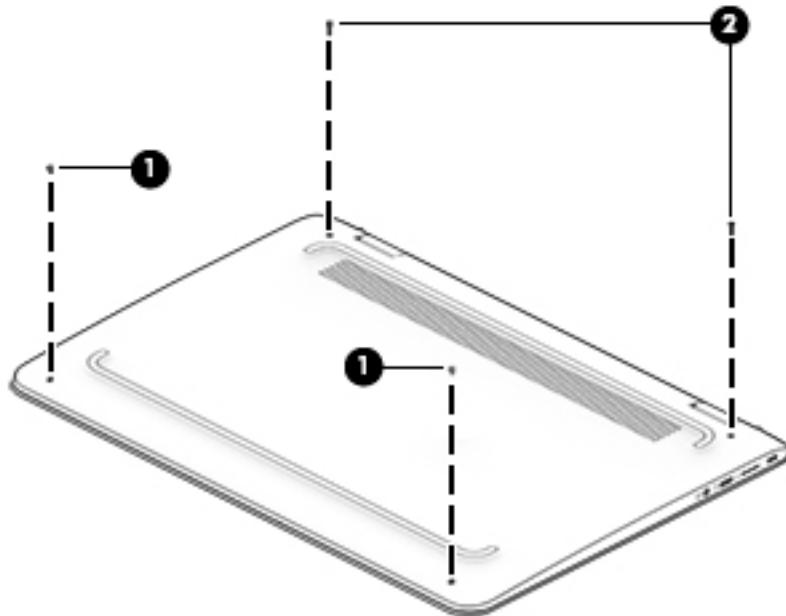
4. Insert a case utility tool **(1)** or similar plastic, flat-edged tool between the bottom cover and the computer near the display hinge area.

5. Release the rear edge of the bottom cover **(2)** and swing it up and forward until it releases.

6. Remove the bottom cover **(3)**.
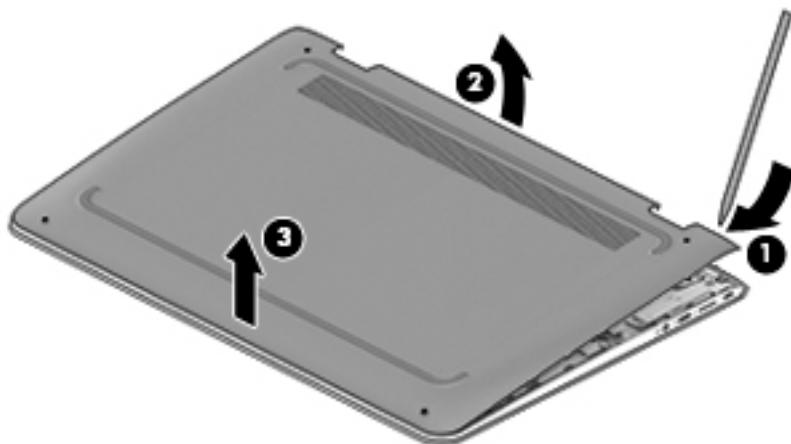
Reverse this procedure to install the bottom cover.

Battery

Description	Spare part number
3-cell, 57-WHr, 5.02-AHr, Li-ion battery (includes cable)	901345-855

Before removing the battery, follow these steps:

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

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the bottom cover (see).

Remove the battery:

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

2. Remove the four Phillips M2.0×3.7 screws **(2)** that secure the battery to the keyboard/top cover.

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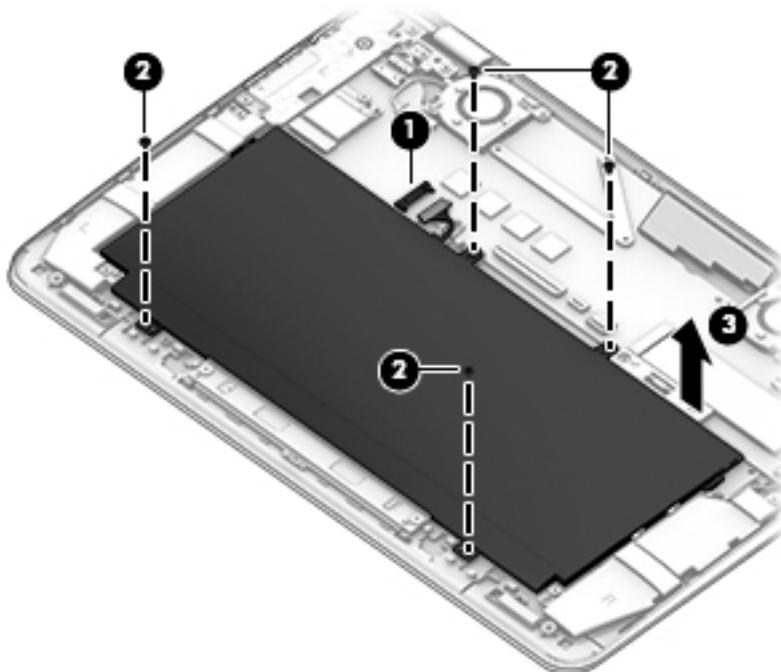
Reverse this procedure to install the battery.

Speakers

Description	Spare part number
Speakers (includes cables and left and right speakers)	909638-001

Before removing the speakers, follow these steps:

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

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the bottom cover (see Bottom cover on page 27).

5. Disconnect the battery cable from the system board (see Battery on page 29).

Remove the speakers:

1. Disconnect the speaker cable **(1)** from the system board.

2. Release the RTC battery cable from the routing channel **(2)** built into the left speaker.

3. Release the speaker cable from the retention clips **(3)** and routing channel built into the keyboard/ top cover.
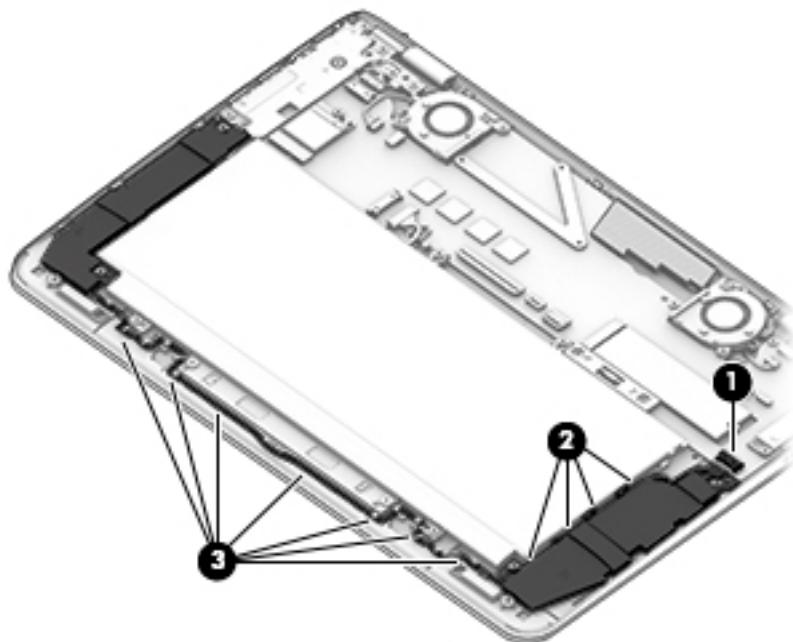
4. Remove the four Phillips PM2.0×3.2 screws **(1)** that secure the speakers to the keyboard/top cover.

5. Remove the speakers **(2)**.
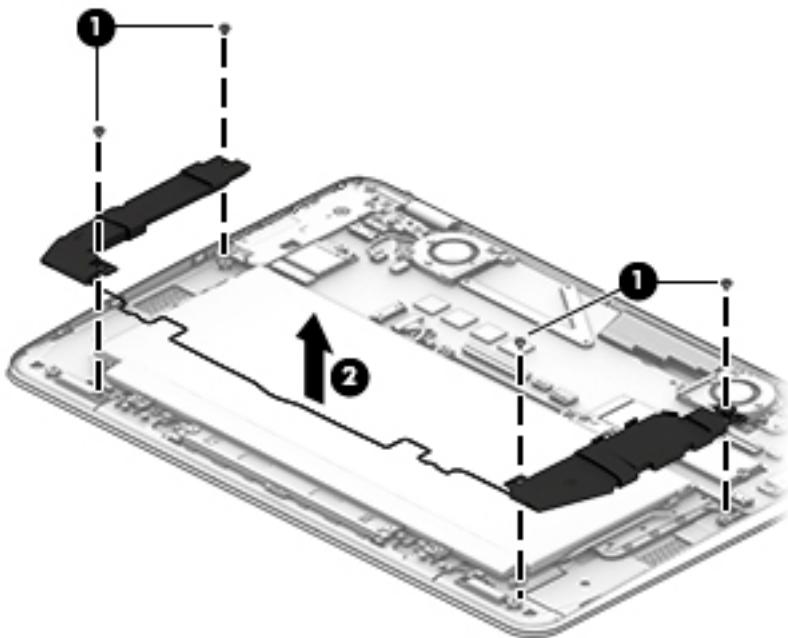
Reverse this procedure to install the speakers.

WLAN module

| Description	Spare part number
Intel Dual Band Wireless-AC 8265 802.11 AC 2×2 WiFi + Bluetooth 4.2 Combo Adapter (non-vPRO)	910264-855
Intel Dual Band Wireless-AC 7265 802.11 AC 2×2 WiFi + Bluetooth 4.2 Combo Adapter (non-vPRO)	793840-005

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

Before removing the WLAN module, follow these steps:

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

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the bottom cover (see Bottom cover on page 27).

5. Disconnect the battery cable from the system board (see Battery on page 29).

Remove the WLAN module:

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

NOTE: The wireless antenna cable labeled "1/MAIN" connects to the WLAN module "Main" terminal. The wireless antenna cable labeled "2/AUX" connects to the WLAN module "Aux" terminal.

2. Remove the Phillips PM2.0×3.2 screw **(2)** that secures the WLAN module to the computer. (The WLAN module tilts up.)

3. Remove the WLAN module **(3)** by pulling the module away from the slot at an angle.
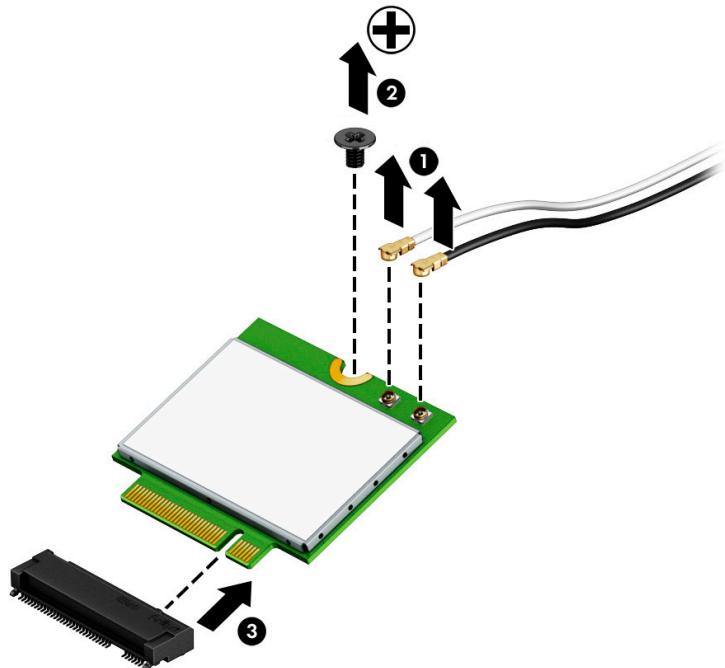
NOTE: If the wireless antenna cables are not connected to the WLAN module terminal, the protective sleeves should be installed on the antenna connectors, as shown in the following illustration.
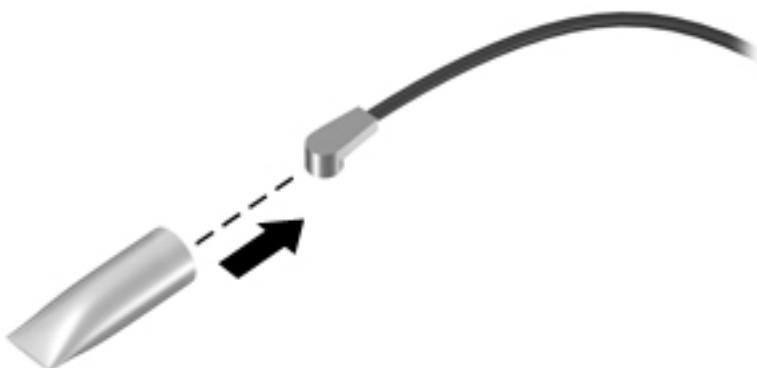
Reverse this procedure to install the WLAN module.

Solid-state drive

Description	Spare part number
1-TB, M.2 2280, PCIE, 3×4 SS NVMe solid-state drive supporting TLC CN	865697-003
512-GB, M.2 2280, PCIE, 3×4 SS NVMe solid-state drive supporting TLC CN	847110-011
256-GB, M.2 2280, PCIE, 3×4 SS NVMe solid-state drive supporting TLC CN	847109-013
128-GB, M.2 2280, SATA-3 solid-state drive	827560-029

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

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

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the bottom cover (see Bottom cover on page 27).

5. Disconnect the battery cable from the system board (see Battery on page 29).

Remove the solid-state drive:

1. Remove the Phillips PM2.0×3.2 screw **(1)** that secures the solid-state drive to the computer. (The solid-state drive tilts up.)

2. Remove the solid-state drive **(2)** by pulling the drive away from the slot at an angle.
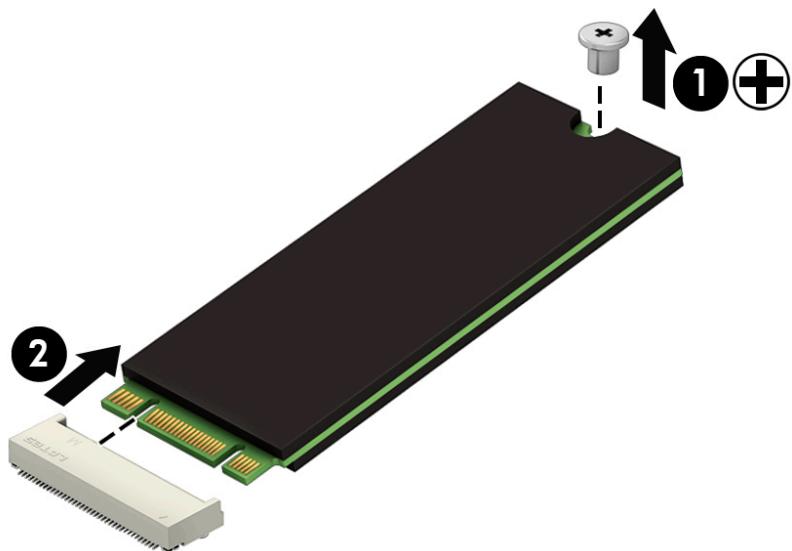
Reverse this procedure to install the solid-state drive.

Fans

Description	Spare part number
Fan, left (includes cable)	909629-001
Fan, right (includes cable)	856230-001

Before removing either of the fans, follow these steps:

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

2.   Disconnect the power from the computer by unplugging the power cord from the computer.

3.   Disconnect all external devices from the computer.

4.   Remove the bottom cover (see Bottom cover on page 27).

5.   Disconnect the battery cable from the system board (see Battery on page 29).

Remove the fans:

1.   Disconnect the fan cables **(1)** from the system board.

2.   Release the wireless antenna cables and the display panel cable from the retention clips **(2)** and the routing channels **(3)** built into the fans.

3.   Remove the four Phillips PM2.0×4.5 screws **(4)** that secure the fans to the keyboard/top cover.

4.   Remove the fans **(5)**.
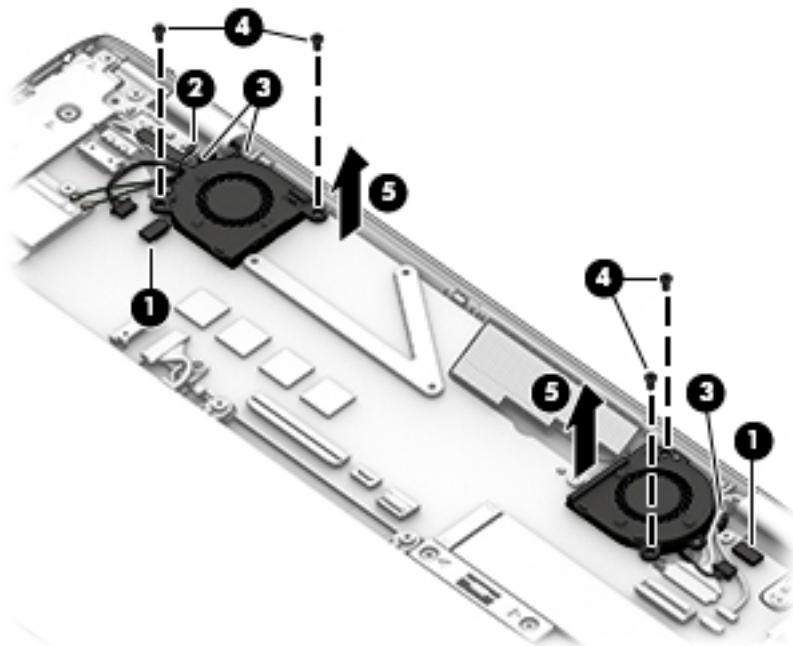
Reverse this procedure to install the fans.

Power connector cable

Description	Spare part number
Power connector cable	808155-017

Before removing the power connector cable, follow these steps:

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

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the bottom cover (see Bottom cover on page 27).

5. Disconnect the battery cable from the system board (see Battery on page 29).

Remove the power connector cable:

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

2. Remove the three Phillips PM2.5×4.1 screws **(2)** that secure the power connector cable bracket to the keyboard/top cover.

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

    The power connector cable bracket is not spared separately.

4. Remove the power connector cable **(4)**.

Reverse this procedure to install the power connector cable.

Display assembly

Before removing the display assembly, follow these steps:

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

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the bottom cover (see Bottom cover on page 27).

5. Disconnect the battery cable from the system board (see Battery on page 29).

Remove the display assembly:

1. Remove the three Phillips PM2.5×4.1 screws **(1)** that secure the power connector cable bracket to the keyboard/top cover.

2. Remove the power connector cable bracket **(2)**.

    The power connector cable bracket is not spared separately.

3. Remove the two Phillips PM2.5×4.1 screws **(3)** that secure the USB bracket to the keyboard/top cover.

4. Remove the USB bracket **(4)**.

   The USB bracket is not spared separately.
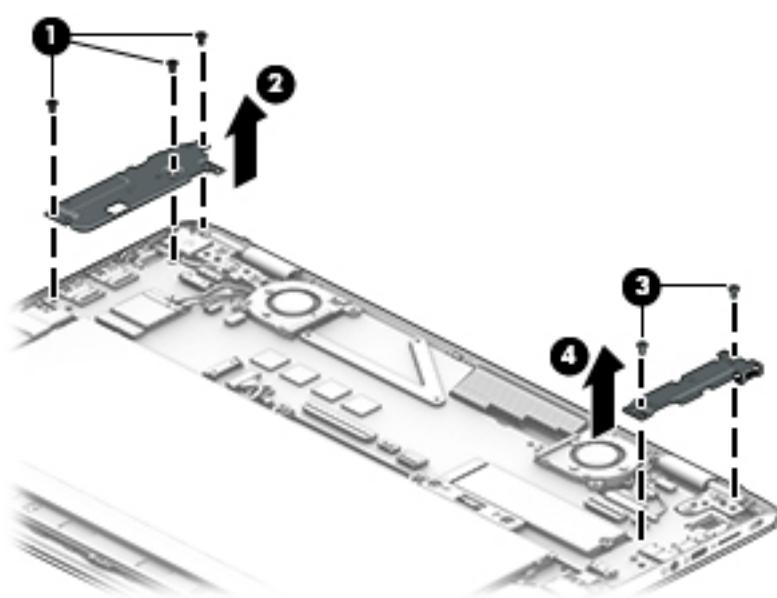
5. Release the zero insertion force (ZIF) connector **(1)** to which the display panel cable is connected, and then disconnect the display panel cable from the system board.

6. Disconnect the webcam/microphone module cable **(2)** from the system board.

7. Remove the five Phillips PM2.5×4.1 screws **(3)** that secure the display assembly to the keyboard/top cover.
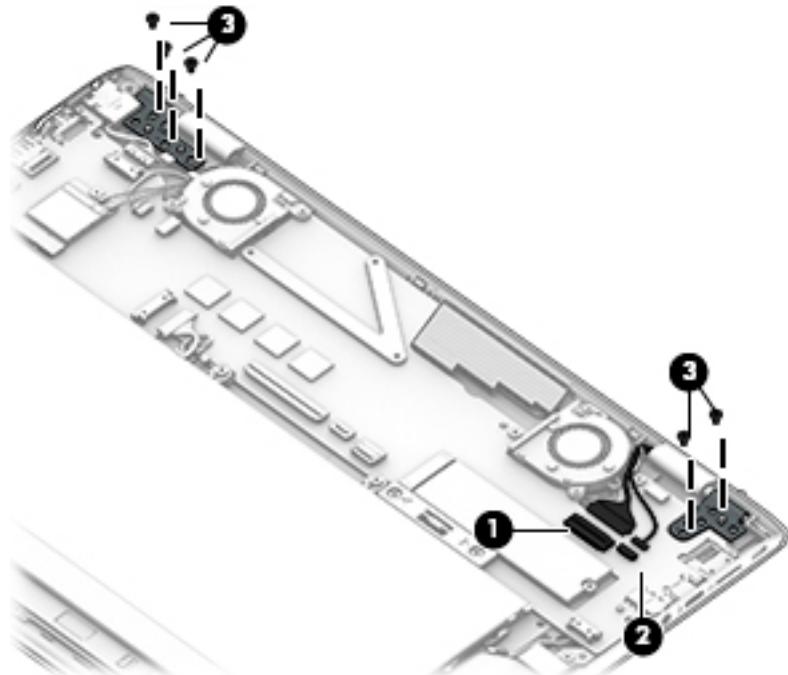
8. Release the display hinges **(1)** by swinging them up and back as far as they will go.

9. Swing the front edge of the keyboard/top cover **(2)** up and back until it rests at an angle.

10. Slide the keyboard/top cover **(3)** forward and separate it from the display assembly.
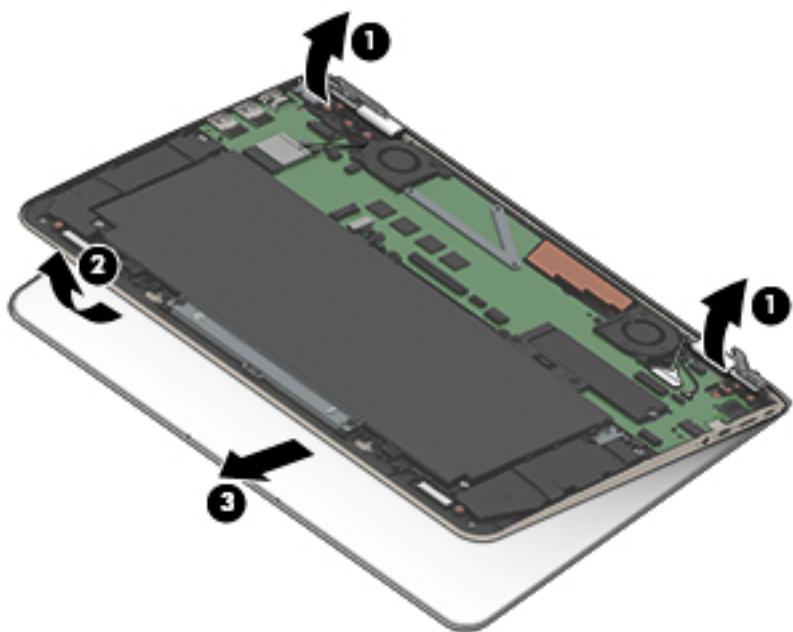
11. If it is necessary to replace the display panel assembly or any of the display assembly subcomponents:

  a. Use a case utility tool **(1)** or similar plastic, flat-edged tool to separate the top edge of the display panel assembly **(2)** from the display back cover.

b. Release the display panel assembly **(3)** by sliding it up and away from the display hinges.
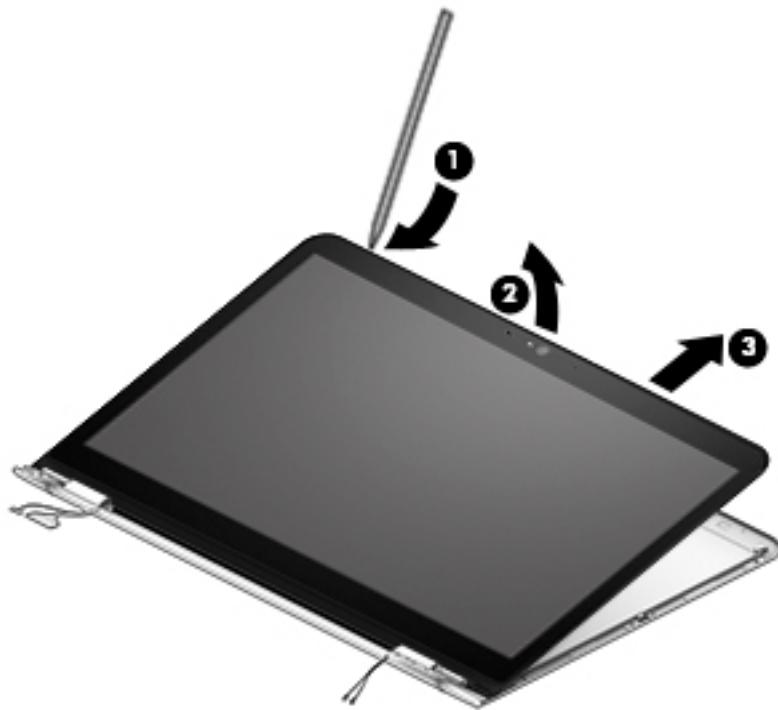
⚠️ **CAUTION:** Before turning the display panel assembly upside down, make sure the work surface is clear of tools, screws, and any other foreign objects. Failure to follow this caution can result in damage to the display panel assembly.

c. Lift the top edge of the display panel assembly **(1)** and swing the assembly up and forward until it rests upside down in front of the display back cover.

d. Release the adhesive support strip **(2)** that secures the display panel cable to the display panel.

e. Disconnect the display panel cable **(3)** from the display panel.

f. Disconnect the TouchScreen board cable **(4)** from the TouchScreen board.
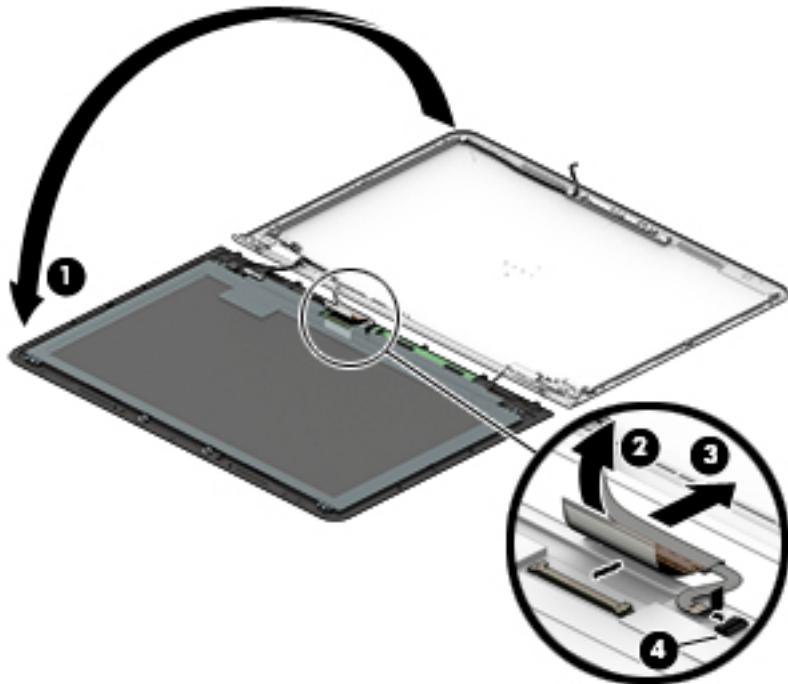
g. Remove the display panel assembly.

The display panel assembly is available using the following spare part numbers:

- 909632-001 – 13.3-in, QHD+, BrightView, UWVA, TouchScreen display panel assembly
- 912753-001 – 13.3-in, QHD+, BrightView, UWVA, non-TouchScreen display panel assembly
- 912755-001 – 13.3-in, UHD, BrightView, UWVA, non-TouchScreen display panel assembly
- 912754-001 – 13.3-in, FHD, BrightView, UWVA, non-TouchScreen display panel assembly
- 913673-001 – 13.3-in, FHD, BrightView, UWVA, non-TouchScreen display panel assembly with bezel

12. If it is necessary to replace the TouchScreen board:

a. Remove the display panel assembly.

⚠ **CAUTION:** Before turning the display panel 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 assembly.

b. Turn the display panel assembly upside down with the bottom toward you.

c. Release the two ZIF connectors **(1)** and **(2)** to which the TouchScreen board cables are connected, and then disconnect the TouchScreen board cables from the TouchScreen board.

d. Detach the TouchScreen board **(3)** from the display panel assembly. (The TouchScreen board is secured to the display back cover with double-sided adhesive.)
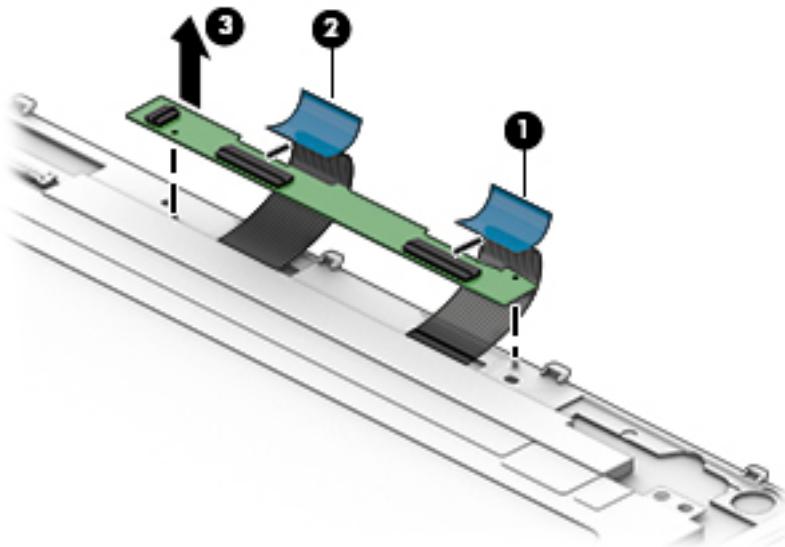
e. Remove the TouchScreen board.

The TouchScreen board is available using spare part number 909745-001.

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

a. Remove the display panel assembly.

b. Detach the webcam/microphone module **(1)** from the display back cover. (The webcam/microphone module is attached to the display back cover with double-sided adhesive.)

c. Disconnect the webcam/microphone module cable **(2)** from the webcam/microphone module.
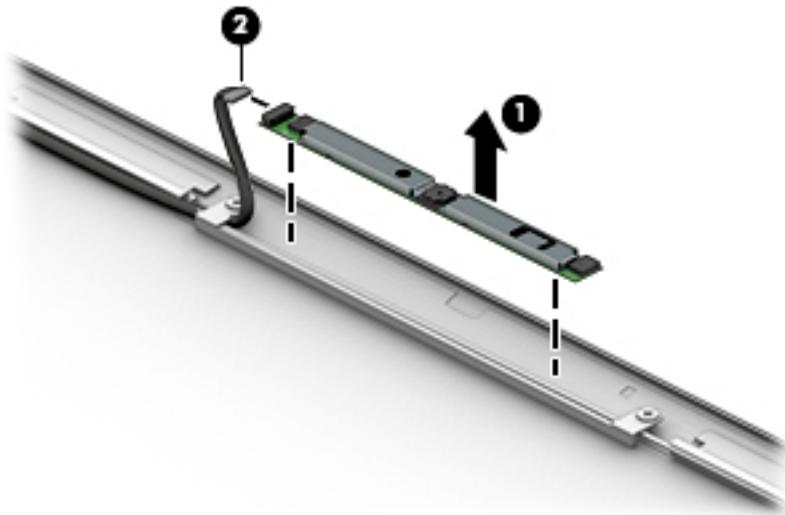
d. Remove the webcam/microphone module.

The webcam/microphone module is available using spare part number 912982-001.

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

a. Remove the display panel assembly.

b. Remove the six Phillips PM2.0×2.4 broad head screws **(1)** that secure the display hinges to the display back cover.

c. Release the display panel cable and the webcam/microphone module cable from the opening **(2)** in the display left hinge.

d. Release the wireless antenna cables from the opening **(3)** in the display right hinge.

e. Remove the display hinges **(4)**.

The display hinges are available using spare part number 909631-001.
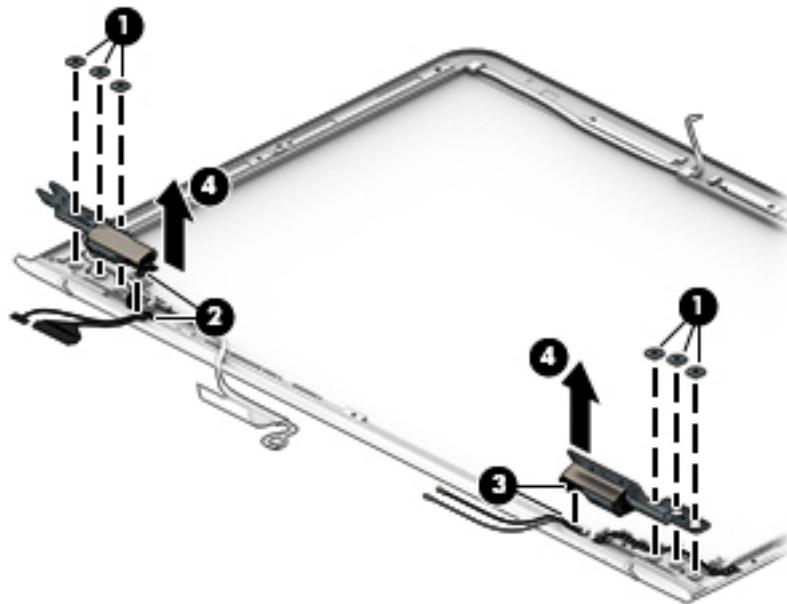
15. If it is necessary to replace the wireless auxiliary antenna cable and transceiver:

a. Remove the display panel assembly.

b. Remove the display right hinge.

c. Remove the Phillips PM1.5×2.4 screw **(1)** that secures the vertical support bracket to the display back cover.

d. Release the retention tape **(2)** that secures the vertical support bracket and the wireless auxiliary antenna cable to the display back cover.

e. Remove the vertical support bracket **(3)**.

f. Detach the wireless auxiliary antenna transceiver **(4)** from the display back cover. (The wireless auxiliary antenna transceiver is attached to the display back cover with double-sided adhesive.)

g. Release the wireless auxiliary antenna cable from the retention clips **(5)** and routing channel built into the top, right, and bottom edges of the display back cover.

**h.** Remove the wireless auxiliary antenna cable and transceiver **(6)**.

The wireless auxiliary antenna cable and transceiver are available using spare part numbers 913617-001 (for use only with display panel assemblies with spare part numbers 909632-001, 912753-001, 912754-001, and 912755-001) and 914164-001 (for use only with FHD non-TouchScreen display panel assembly with spare part number 912673-001).
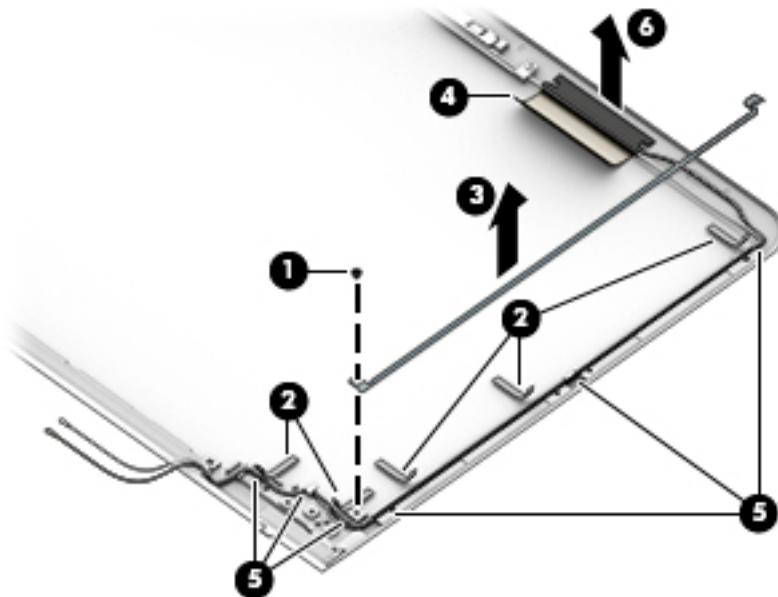

16. If it is necessary to replace the wireless main antenna cable and transceiver:

a. Remove the display panel assembly.

b. Remove the wireless auxiliary antenna cable and transceiver.

c. Remove the two Phillips PM1.5×2.4 screws **(1)** that secure the horizontal support bracket to the display back cover.

d. Remove the horizontal support bracket **(2)**.

e. Detach the wireless main antenna transceiver **(3)** from the display back cover. (The wireless main antenna transceiver is attached to the display back cover with double-sided adhesive.)

f. Release the wireless main antenna cable from the retention clips **(4)** and routing channel built into the top, right, and bottom edges of the display back cover.

g. Remove the wireless main antenna cable and transceiver **(5)**.

The wireless main antenna cable and transceiver are available using spare part numbers 913617-001 (for use only with display panel assemblies with spare part numbers 909632-001, 912753-001, 912754-001, and 912755-001) and 914164-001 (for use only with FHD non-TouchScreen display panel assembly with spare part number 912673-001).
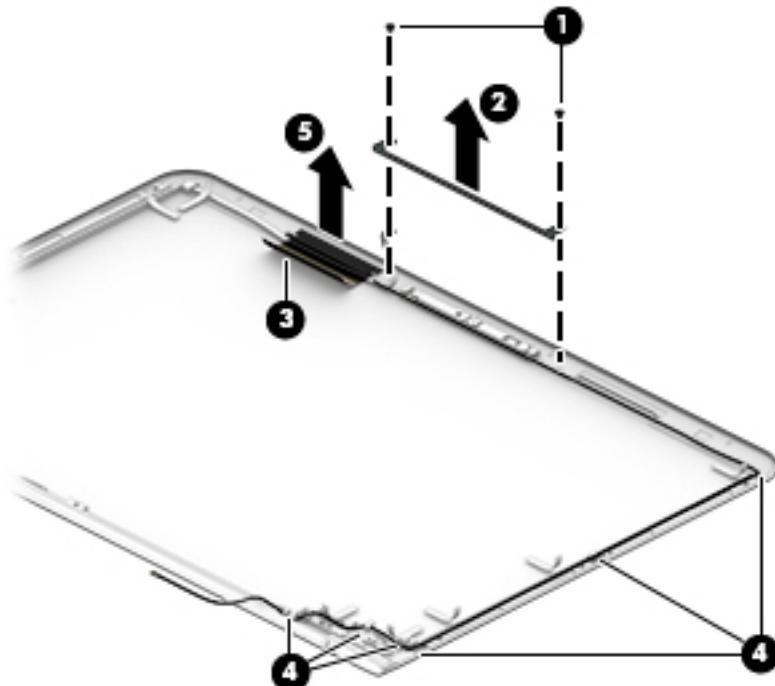
17. If it is necessary to replace the display panel cable:

    a. Remove the display panel assembly.

    b. Remove the display left hinge.

    c. Remove the three Phillips PM1.5×2.4 screws **(1)** that secure the horizontal support bracket and the vertical support bracket to the display back cover.

    d. Release the retention tape **(2)** that secures the vertical support bracket and the display panel cable to the display back cover.

    e. Remove the horizontal support bracket **(3)**.

    f. Remove the vertical support bracket **(4)**.

    g. Disconnect the webcam/microphone module cable **(5)** from the webcam/microphone module.

    h. Release the display panel cable from the retention clips **(6)** and routing channel built into the display back cover.

    i. Remove the display panel cable **(7)**.

    The display panel cable is available using the following spare part numbers:

       ● 909626-001 – For use only with QHD+ TouchScreen display panel assembly with spare part number 909632-001

       ● 909625-001 – For use only with QHD+ non-TouchScreen display panel assembly with spare part number 912753-001

- 912319-001 – For use only with UHD non-TouchScreen display panel assembly with spare part number 912755-001

- 909627-001 – For use only with FHD non-TouchScreen display panel assembly with spare part number 912754-001

- 913674-001 – For use only on computer models equipped with a FHD display panel
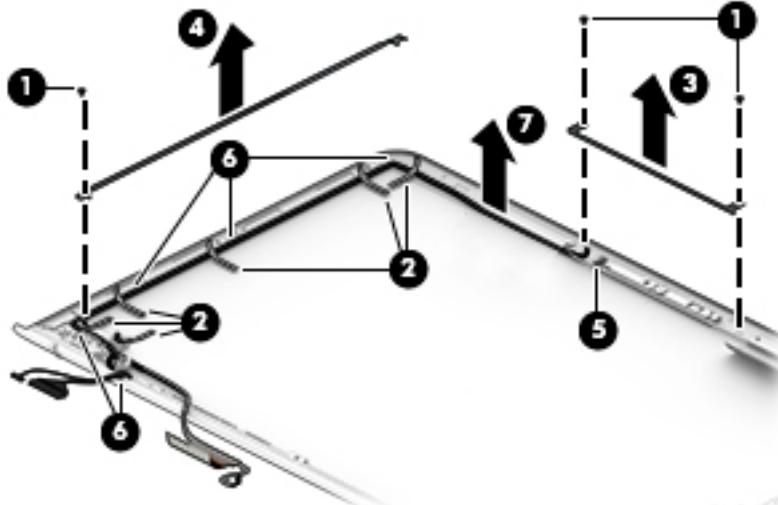
Reverse this procedure to reassemble and install the display assembly.

TouchPad cable

NOTE: The TouchPad cable spare part kit includes double-sided adhesive.

| Description	Spare part number
For use only on computer models equipped with a SecurePad TouchPad	912751-001
For use only on computer models not equipped with a SecurePad TouchPad	909628-001

Before removing the TouchPad cable, follow these steps:

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

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the bottom cover (see Bottom cover on page 27).

5. Remove the battery (see Battery on page 29).

Remove the TouchPad cable:

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

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

3. Detach the TouchPad cable **(3)** from the keyboard/top cover. (The TouchPad cable is secured to the keyboard/top cover at three locations with double-sided adhesive.)
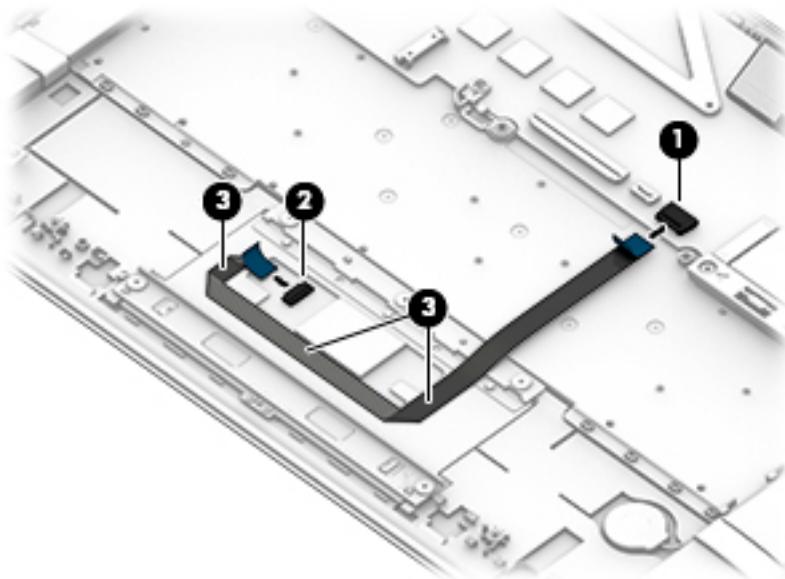
4. Remove the TouchPad cable.

Reverse this procedure to install the TouchPad cable.

TouchPad

| Description	Spare part number
For use only on computer models equipped with a SecurePad TouchPad	912752-001
For use only on computer models not equipped with a SecurePad TouchPad	909628-001

Before removing the TouchPad, follow these steps:

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

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the bottom cover (see Bottom cover on page 27).

5. Remove the battery (see Battery on page 29).

Remove the TouchPad:

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

2. Remove the five Phillips PM1.5×2.2 broad head screws **(2)** that secure the TouchPad and TouchPad bracket to the keyboard/top cover.

3. Remove the two Phillips PM1.5×2.4 screws **(3)** that secure the TouchPad to the keyboard/top cover.

4. Remove the TouchPad bracket **(4)**.

5. Remove the TouchPad **(5)**.
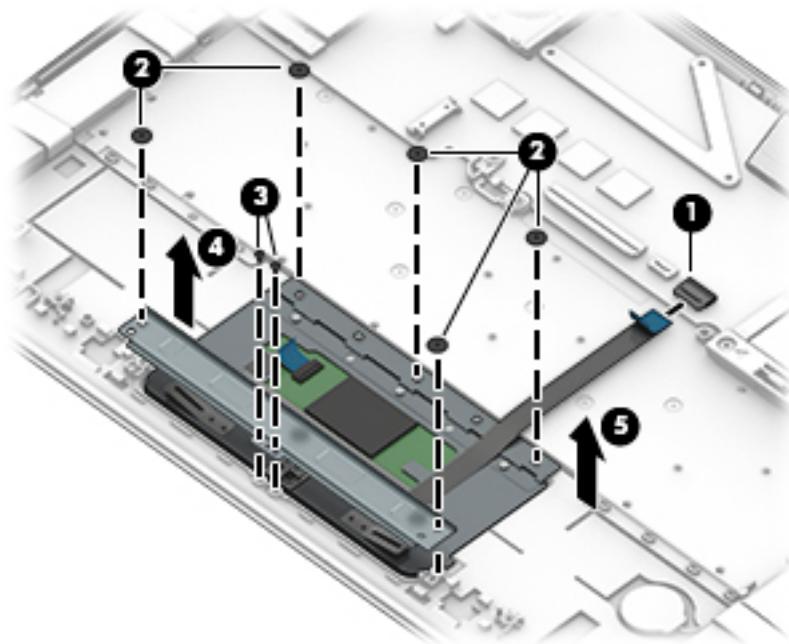
Reverse this procedure to install the TouchPad.

RTC battery

Description	Spare part number
RTC battery (includes cable and double-sided adhesive)	909636-001

Before removing the RTC battery, follow these steps:

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

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the bottom cover (see).

5. Remove the battery (see).

Remove the RTC battery:

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

2. Detach the RTC battery **(3)** from the keyboard/top cover. (The RTC battery is secured to the keyboard/top cover with double-sided adhesive.)
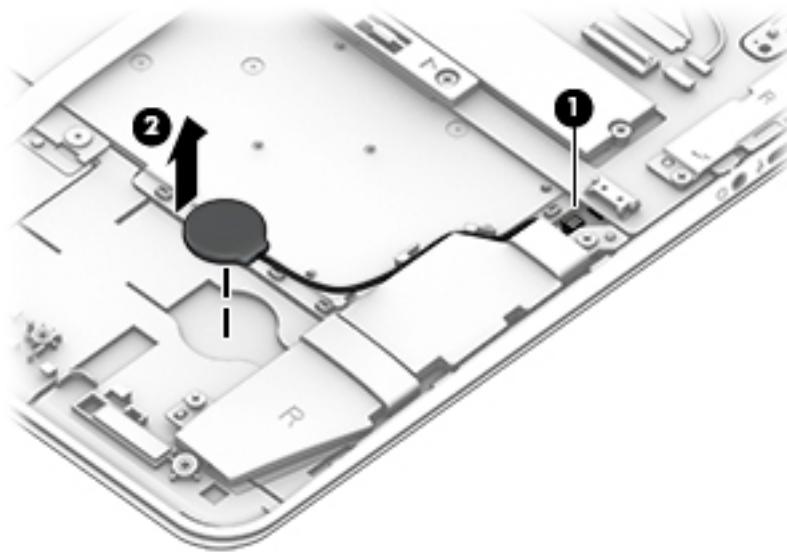
3. Remove the RTC battery.

Reverse this procedure to install the RTC battery.

System board

📝 **NOTE:** The system board spare part kit includes the processor, a graphics subsystem with UMA memory, and replacement thermal material.

Description	Spare part number
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), 16-GB of system memory, and the Windows 10 operating system	909253-601
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), 16-GB of system memory, and a non-Windows operating system	909253-001
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), 8-GB of system memory, and the Windows 10 operating system	909254-601
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), 8-GB of system memory, and a non-Windows operating system	909254-001
Equipped with an Intel Core i5-7200U 2.50-GHz (SC turbo up to 3.10-GHz) processor (2133-MHz FSB, 3.0-MB L3 cache, dual core, 15 W), 8-GB of system memory, and the Windows 10 operating system	909252-601
Equipped with an Intel Core i5-7200U 2.50-GHz (SC turbo up to 3.10-GHz) processor (2133-MHz FSB, 3.0-MB L3 cache, dual core, 15 W), 8-GB of system memory, and a non-Windows operating system	909252-001
Equipped with an Intel Core i5-7200U 2.50-GHz (SC turbo up to 3.10-GHz) processor (2133-MHz FSB, 3.0-MB L3 cache, dual core, 15 W), 4-GB of system memory, and the Windows 10 operating system	909251-601
Equipped with an Intel Core i5-7200U 2.50-GHz (SC turbo up to 3.10-GHz) processor (2133-MHz FSB, 3.0-MB L3 cache, dual core, 15 W), 4-GB of system memory, and a non-Windows operating system	909251-001

Description	Spare part number
Equipped with an Intel Core i3-7100U 2.40-GHz processor (2133-MHz FSB, 3.0-MB L3 cache, dual core, 15 W), 4-GB of system memory, and the Windows 10 Professional operating system	909250-601
Equipped with an Intel Core i3-7100U 2.40-GHz processor (2133-MHz FSB, 3.0-MB L3 cache, dual core, 15 W), 4-GB of system memory, and a non-Windows operating system	909250-001

Before removing the system board, follow these steps:

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

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the bottom cover (see Bottom cover on page 27), and then remove the following components:

   a. Battery (see Battery on page 29)

   b. Solid-state drive (see Solid-state drive on page 33)

   c. Left and right fans (see Fans on page 34)

📝 **NOTE:** When replacing the system board, be sure that the WLAN module (see WLAN module on page 31) and the heat sink (see Heat sink on page 50) are removed from the defective system board and installed on the replacement system board:

Remove the system board:

1. Disconnect the following cables from the system board:

   (1) Power connector cable

   (2) WLAN module antenna cables

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

   (6) Display panel ZIF connector cable

   (7) Webcam/microphone module cable

   (3) Keyboard ZIF connector cable

   (4) Backlight ZIF connector cable

   (5) TouchPad board ZIF connector cable

   (8) Speaker cable

   (9) RTC battery cable
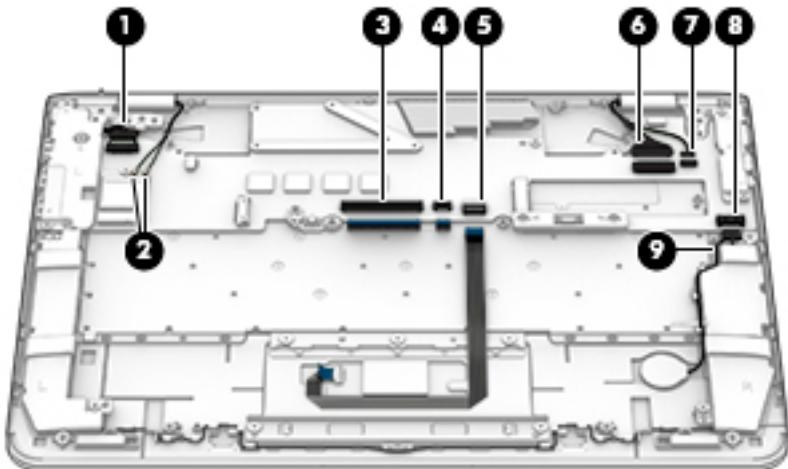
2. Remove the three Phillips PM2.5×4.1 screws **(1)** that secure the power connector cable bracket to the keyboard/top cover.

3. Remove the power connector cable bracket **(2)**.

4. Remove the Phillips PM2.0×3.2 screw **(3)** that secures the battery spacer to the keyboard/top cover.

5. Remove the battery spacer **(4)**.

    The battery spacer is included in the Plastics Kit, spare part number 909633-001.

6. Remove the two Phillips PM2.0×3.2 screws **(5)** that secure the system board spacer to the keyboard/top cover.

7. Remove the system board spacer **(6)**.

    The system board spacer is available in the Plastics Kit, spare part number 909633-001.

8. Remove the two Phillips PM2.5×4.1 screws **(7)** that secure the USB bracket to the keyboard/top cover.

9. Remove the USB bracket **(8)**.
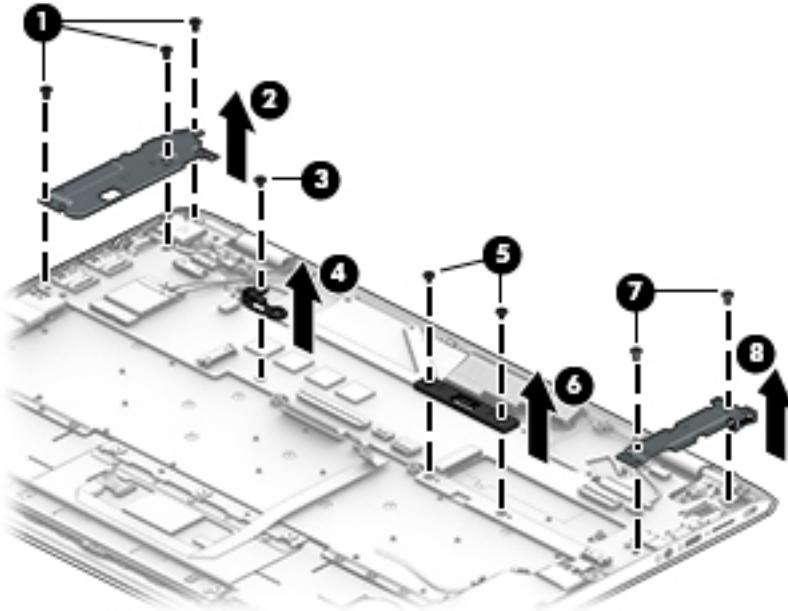
10. Remove the two Phillips PM2.0×3.2 screws **(1)** that secure the system board to the keyboard/top cover.

11. Lift the rear edge of the system board **(2)** until it rests at an angle.

12. Remove the system board **(3)** by sliding it up and back at an angle.
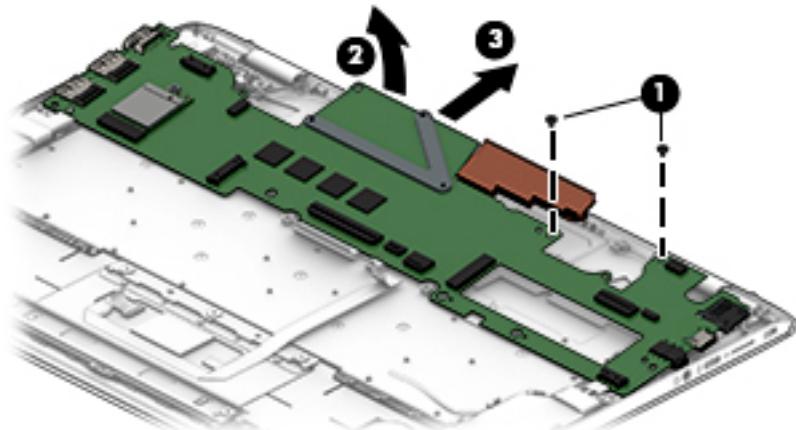
Reverse this procedure to install the system board.

Heat sink

Description	Spare part number
Heat sink (includes replacement thermal material)	909744-001

Before removing the heat sink, follow these steps:

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

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the bottom cover (see Bottom cover on page 27), and then remove the following components:

    a. Battery (see Battery on page 29)

    b. Solid-state drive (see Solid-state drive on page 33)

    c. Left and right fans (see Fans on page 34)

    d. System board (see System board on page 47)

Remove the heat sink:

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

2. Remove the three Phillips PM2.0×3.2 screws **(1)** that secure the heat sink to the system board.

3. Remove the heat sink **(2)**.
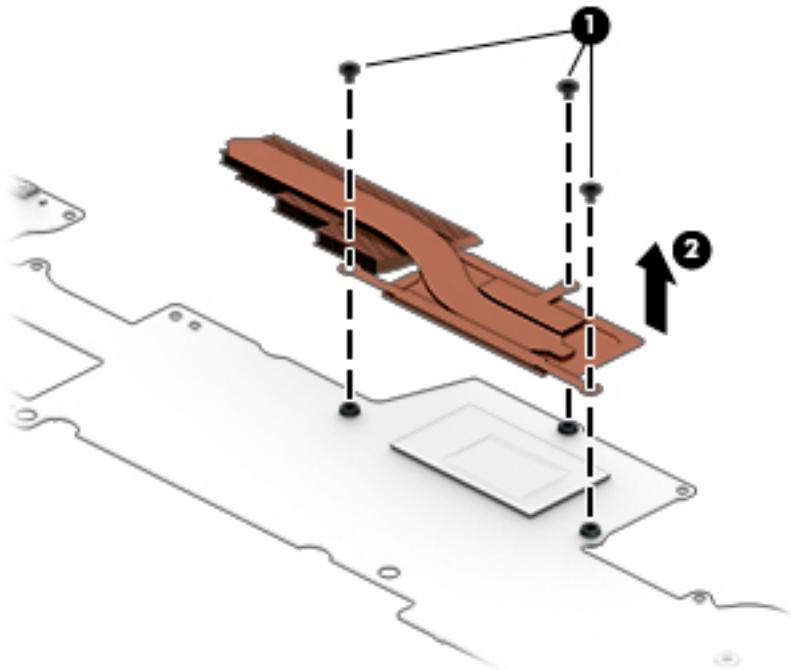
📝 **NOTE:** The thermal material must be thoroughly cleaned from the surfaces of the heat sink and the system board each time the heat sink is removed. Thermal paste is used on the processor **(1)** and the heat sink section **(2)** that services it.
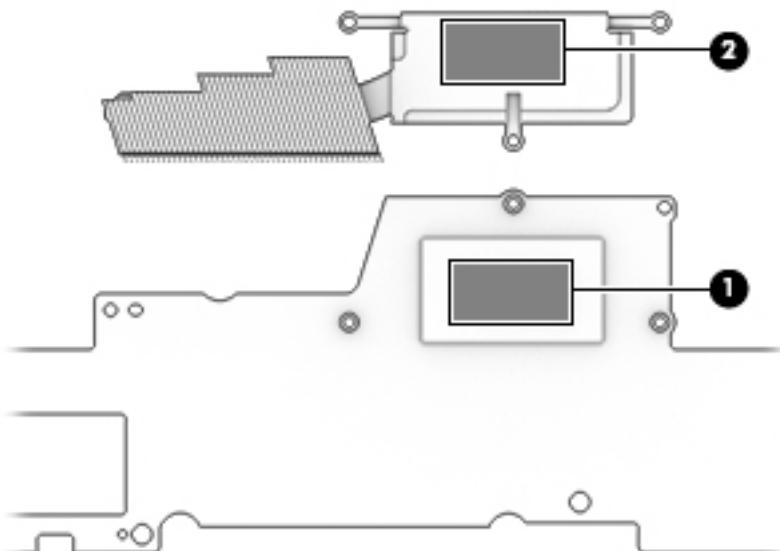
Reverse this procedure to install the heat sink.

6 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 52).
  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 53.

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.

7 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 54.

 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.

8   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	**32.6 cm**	12.84 in
Depth	**22.6 cm**	8.89 in
Height	**1.39 cm**	0.56 in
Weight (equipped with a TouchScreen display assembly)	**1.47 kg**	3.26 lbs
Weight (equipped with a non-TouchScreen display assembly)	**1.42 kg**	3.14 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.

9   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 58. For information on the recovery options that are available using the recovery media, see Using Windows tools on page 59.

- 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 60.

  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 .

● 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 .

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 60. If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 58.

- 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 60.

- 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 63.

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 58.

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 58.

- 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 58.

- 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 .

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 58.

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.

10 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.

11 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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