



HP Spectre Notebook PC

*** Model numbers 13-v000 through 13-v099**

Maintenance and Service Guide

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Product notice

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

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

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For any further information or to request a full refund of the computer, please contact your local point of sale (the seller).

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 60950-1).

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1 Product description

Category	Description
Product Name	HP Spectre Notebook PC (model numbers 13-v000 – 13-v099)
Processors	6th generation Intel® Core™ i7 Processor Intel Core i7-6500U 2.50-GHz (SC turbo up to 3.10-GHz) processor (1866-MHz FSB, 4.0-MB L3 cache, dual core, 15-W [dynamic PL1 to 8.5-10 W]) Intel Core i5-6200U 2.30-GHz (SC turbo up to 2.80-GHz) processor (1866-MHz FSB, 3.0-MB L3 cache, dual core, 15-W [dynamic PL1 to 8.5-10 W])
Chipset	Integrated soldered-on-circuit (SOC)
Graphics	Internal graphics Intel HD Graphics 520 Support for HD Decode, DX12, and DisplayPort 1.2
Panel	16:9 Ultra Wide Aspect Ratio 13.3-in, full high-definition (FHD), WLED, BrightView (1920×1080), uslim-flat (2.0-mm panel, 2.2 mm panel PCA), UWVA display panel; eDP+PSR; typical brightness: 300 nits Flush glass panel cover with direct bonding
Memory	On-board system memory Support for LPDDR3-1866 dual channel support Support for 8192-MB maximum system RAM
Storage	Support for PCIe NVMe TLC M.2, 2280-S3 solid-state drives in the following configurations: <ul style="list-style-type: none">• 512-GB• 256-GB
Camera and microphone	HP TrueVision HD webcam – indicator LED, USB 2.0, BSI sensor, f2.4 1280×720 by 30 frames per second Integrated dual-array digital microphones with appropriate beam-forming, echo-cancellation, noise-reduction software Enable HP Noise Cancellation with automatic speech recognition (ASR)
Audio	Bang & Olufsen Quad speakers Supports Smart Amp functionality
Wireless	Integrated Wireless options with dual antennas (LGA/PCIe 1216) Support for the following WLAN module: Intel Dual band wireless-AC 8260 802.11ac 2x2 WiFi + BT 4.2 Combo Adaptor (non-vPro) Intel WiDi support Compatible with Miracast-certified devices

Category	Description
Internal card expansion	One M.2 slot for solid-state drive
Ports	<p>Hot plug/unplug and auto detect for correct output to wide-aspect vs. standard aspect video (auto adjust panel resolution to fit embedded panel and external monitor connected)</p> <p>Headphone/microphone combo</p> <p>USB Type-C ports on unit:</p> <ul style="list-style-type: none"> • (2) USB 3.1 Gen 2 with Thunderbolt™ Gen 3 technology - rear, middle • (1) USB 3.1 Gen 1 (i.e. USB 3.0) - rear • Intel Alpine Ridge DP design • All ports support data transfer, power delivery, Display Port 1.2 out up to 4096×2304 (60Hz) and HDMI 1.4 out through dongle • All ports support USB Boost
Keyboard/pointing devices	<p>Full-size, backlit, island-style keyboard</p> <p>TouchPad requirements:</p> <ul style="list-style-type: none"> • Image sensor ClickPad with glass surface • MultiTouch gestures enabled • Support for modern TrackPad gestures • Taps enabled as default
Power requirements	<p>AC adapter</p> <p>Support for 45-W USB Type-C straight type adapter</p> <p>Duck head power cord</p> <p>1.8-meter (6-foot) power cord</p> <p>Battery</p> <p>Support for 4-cell, 38-Wh, 4.95-Ah, li-ion battery</p>
Security	Support for Trusted Platform Module (TPM) 2.0
Operating system	<p>Preinstalled</p> <p>Windows 10</p> <p>Windows 10 Professional</p> <p>For Developed Market (ML)</p> <p>Windows 10 Home High End ML</p> <p>For Emerging Market (EM/SL)</p> <p>Windows 10 Home High End EM/SL</p> <p>CPPP Windows 10 Home China Language Edition</p> <p>SEAP Windows 10 Home High End EM/SL</p>
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 –

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

Display



Component	Description
(1) WLAN antennas*	Send and receive wireless signals to communicate with wireless local area networks (WLANs).
(2) Internal microphones (2)	Record sound.
(3) Webcam light	On: The webcam is in use.
(4) Webcam	Records video and captures photographs. Some products allow you to video conference and chat online using streaming video. To use a webcam (integrated camera): <ul style="list-style-type: none">▲ Type <code>camera</code> in the taskbar search box, and then select Camera.

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

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

To access this guide:

- ▲ Select the **Start** button, select **All apps**, select **HP Help and Support**, and then select **HP Documentation**.

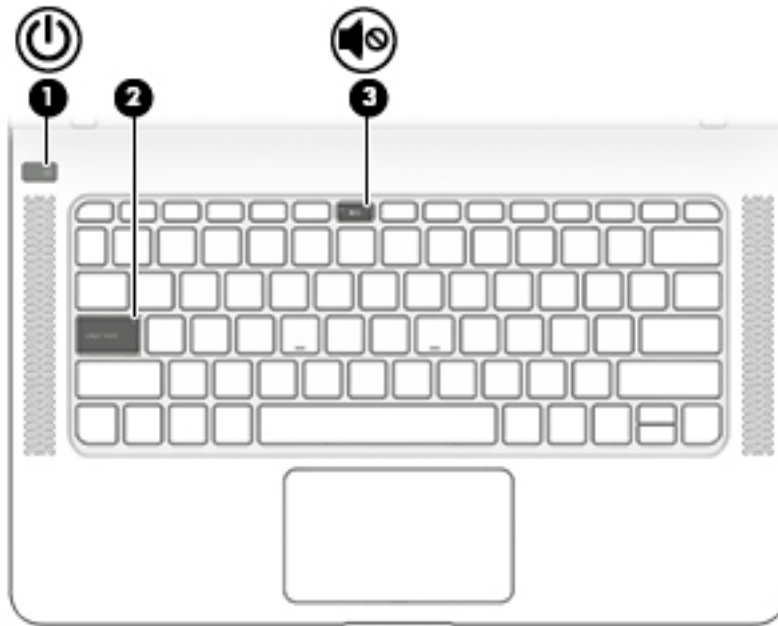
Top



TouchPad



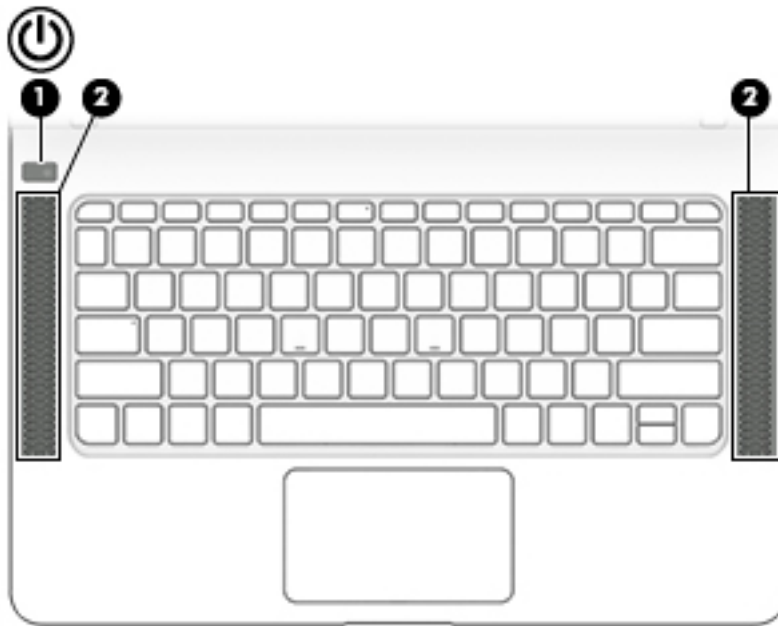
Component		Description
(1)	TouchPad zone	Reads your finger gestures to move the pointer or activate items on the screen.
(2)	Left TouchPad button	Functions like the left button on an external mouse.
(3)	Right TouchPad button	Functions like the right button on an external mouse.


Lights



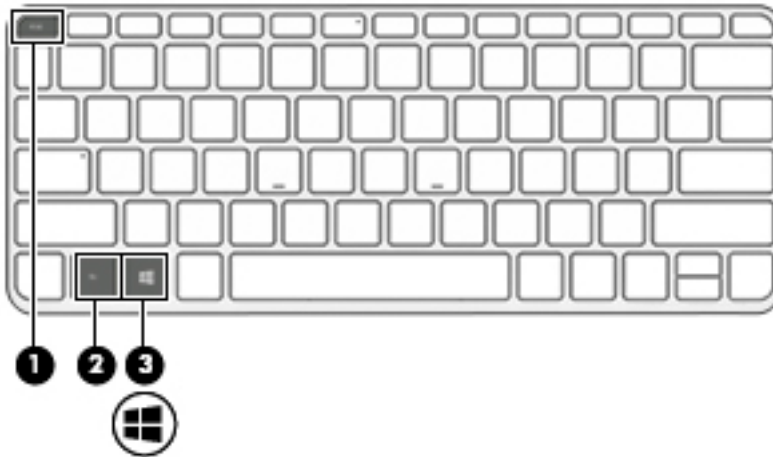
Component	Description
(1)  Power light	<ul style="list-style-type: none">• On: The computer is on.• Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components.• Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.
(2) Caps lock light	On: Caps lock is on, which switches the key input to all capital letters.
(3)  Mute light	<ul style="list-style-type: none">• Amber: Computer sound is off.• Off: Computer sound is on.


Button and speakers



Component	Description
(1)  Power button	<ul style="list-style-type: none">• When the computer is off, press the button to turn on the computer.• When the computer is on, press the button briefly to initiate Sleep.• When the computer is in the Sleep state, press the button briefly to exit Sleep.• When the computer is in Hibernation, press the button briefly to exit Hibernation. <p>CAUTION: Pressing and holding down the power button results in the loss of unsaved information.</p> <p>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.</p> <p>To learn more about your power settings, see your power options.</p> <p>▲ Type <code>power</code> in the taskbar search box, and then select Power and sleep settings.</p> <p>– or –</p> <p>Right-click the Start button, and then select Power Options.</p>
(2) Speakers (4)	Produce sound.












Keys



Component	Description
(1) <code>esc</code> key	Displays system information when pressed in combination with the <code>fn</code> key.
(2) <code>fn</code> key	Executes frequently used system functions when pressed in combination with the <code>esc</code> key or one of the action keys.
(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 <code>f5</code> action key turns the keyboard backlight feature off or on.





Using the action keys

- An action key performs an assigned function.
- The icon on each action key illustrates the function for that key.
- To use an action key, press and hold the key.

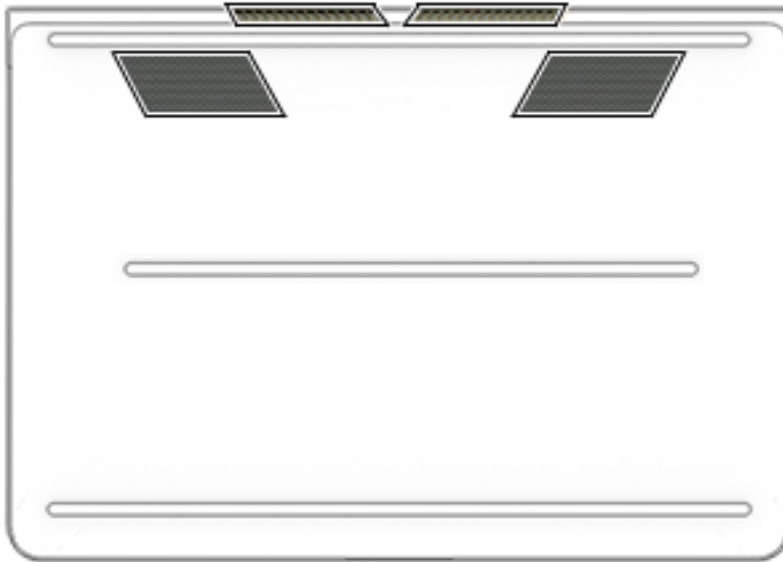
Icon	Description
	Decreases the screen brightness incrementally as long as you hold down the key.
	Increases the screen brightness incrementally as long as you hold down the key.
	Switches the screen image between display devices connected to the system. For example, if a monitor is connected to the computer, repeatedly pressing this key alternates the screen image from the computer display to the monitor display to a simultaneous display on both the computer and the monitor.
	Turns the keyboard backlight off or on. NOTE: To conserve battery power, turn off this feature.
	Plays the previous track.
	Starts, pauses, or resumes playback.
	Plays the next track.
	Decreases speaker volume incrementally while you hold down the key.
	Increases speaker volume incrementally while you hold down the key.
	Mutes or restores speaker sound.
	Turns the airplane mode and wireless feature on or off. NOTE: The airplane mode key is also referred to as the wireless button. NOTE: A wireless network must be set up before a wireless connection is possible.

Rear side



Component	Description
<p>(1)  AC adapter and battery light</p>	<ul style="list-style-type: none"> • 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.
<p>(2)  USB Type-C power connector and charging port</p>	<p>Connects a USB device with a Type-C connector to an AC adapter to provide power to the computer and can provide video output. This port can also charge products such as cell phones, laptops, tablets, and MP3 players, even when the computer is off.</p> <p>NOTE: Adapters (purchased separately) may be required.</p>
<p>(3)  USB Type-C power connector and Thunderbolt ports (2)</p>	<p>Connect USB devices with a Type-C connector to an AC adapter to provide power to the computer and can provide video or high-resolution display output. These ports can also charge products such as cell phones, laptops, tablets, and MP3 players, even when the computer is off.</p> <p>NOTE: Your computer may also support a Thunderbolt docking station.</p> <p>NOTE: Adapters (purchased separately) may be required.</p>
<p>(4)  Audio-out (headphone)/Audio-in (microphone) combo jack</p>	<p>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.</p> <p>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 <i>Regulatory, Safety, and Environmental Notices</i>.</p> <p>To access this guide:</p> <ul style="list-style-type: none"> ▲ Select the Start button, select All apps, select HP Help and Support, and then select HP Documentation. <p>NOTE: When a device is connected to the jack, the computer speakers are disabled.</p>

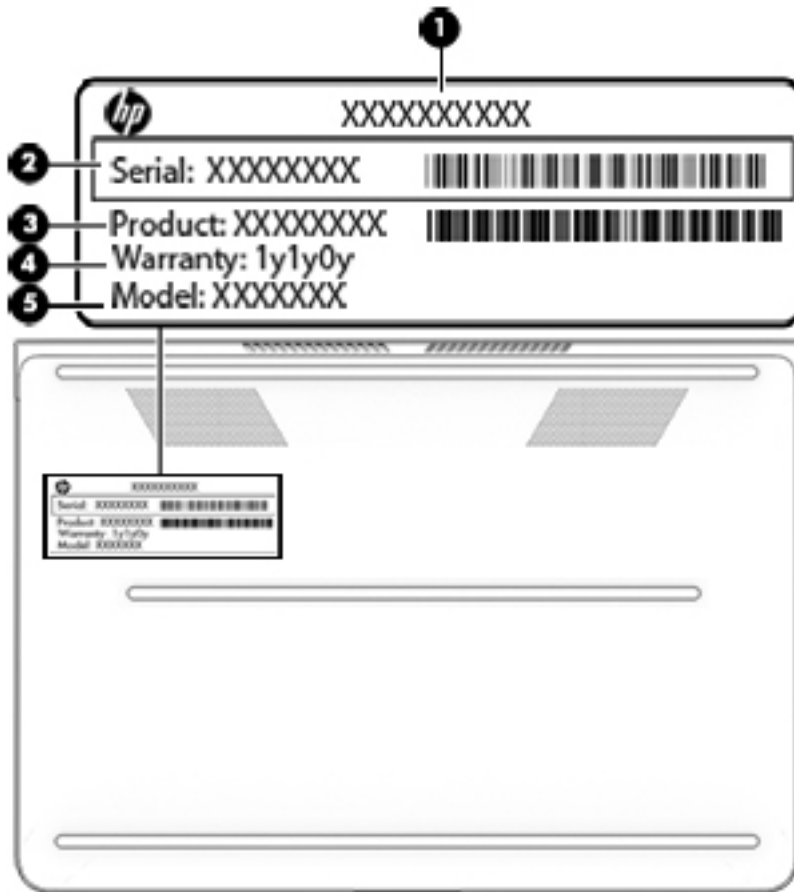
Bottom



Component	Description
Vents (4)	Enable airflow to cool internal components. NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.

Service tag

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

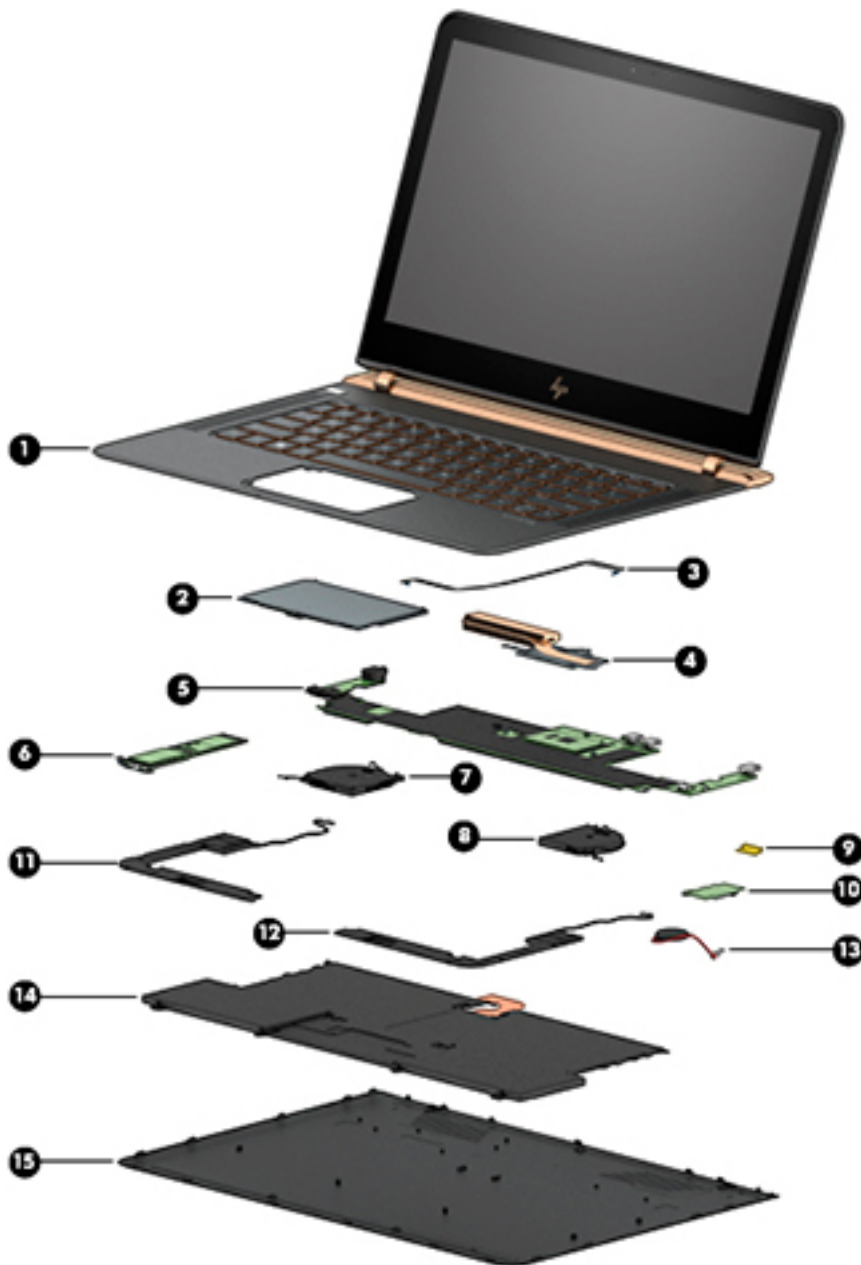


Item	Description	Function
(1)	Product name	This is the product name affixed to the front of the computer.
(2)	Serial number (s/n)	This is an alphanumeric identifier that is unique to each product.
(3)	Part number/Product number (p/n)	This number provides specific information about the product's hardware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

3 Illustrated parts catalog

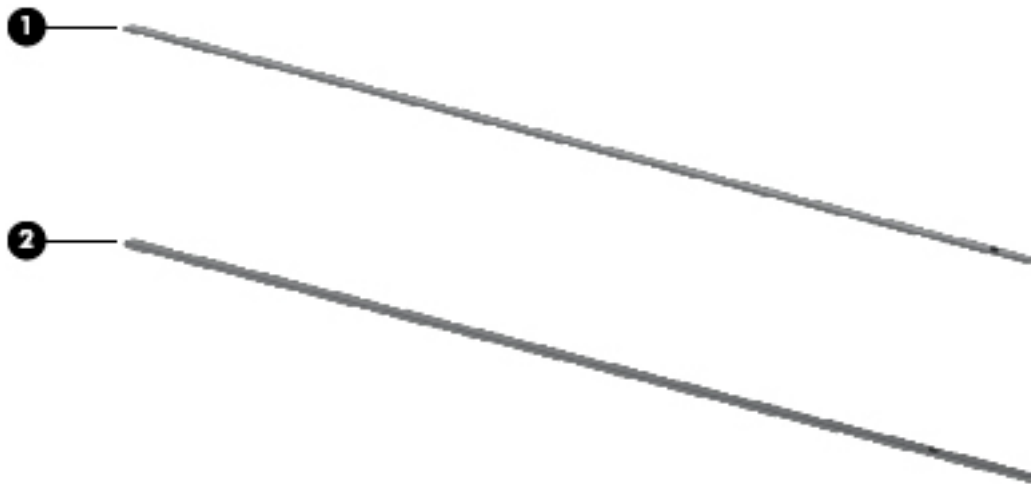
 **NOTE:** HP continually improves and changes product parts. For complete and current information on supported parts for your computer, go to <http://partsurfer.hp.com>, select your country or region, and then follow the on-screen instructions.

Computer major components



Item	Component	Spare part number
(1)	Display assembly with keyboard and top cover NOTE: For a list of keyboard country codes, see Display assembly, top cover, keyboard on page 38 .	855641-xx1
(2)	TouchPad board	855632-001
(3)	TouchPad board cable	855627-001
(4)	Heat sink (includes replacement thermal material)	854752-001
(5)	System board (includes processor and replacement thermal material):	
	Equipped with an Intel Core i7-6500U processor, 8 GB of system RAM, and the Windows 10 Professional operating system	854753-601
	Equipped with an Intel Core i7-6500U 2.50-GHz processor, 8 GB of system RAM, and a non-Windows operating system	854753-001
	Equipped with an Intel Core i5-6200U 2.30-GHz processor, 8 GB of system RAM, and the Windows 10 Professional operating system	860825-601
	Equipped with an Intel Core i5-6200U 2.30-GHz processor, 8 GB of system RAM, and a non-Windows operating system	860825-001
	Equipped with an Intel Core i5-6200U 2.30-GHz processor, 4 GB of system RAM, and the Windows 10 Professional operating system	854754-601
	Equipped with an Intel Core i5-6200U 2.30-GHz processor, 4 GB of system RAM, and a non-Windows operating system	854754-001
(6)	Solid-state drive, M.2, 2280, TLC	
	512-GB, NVMe	855609-001
	256-GB, NVMe	855608-001
	128-GB, SATA-3	855607-001
	Fans (includes left and right fans)	855629-001
(7)	Left fan	
(8)	Right fan	
(9)	WLAN board cable	855628-001
(10)	WLAN module , Intel Dual band wireless-AC 8260 802.11ac 2x2 WiFi + BT 4.2 Combo Adaptor (non-vPro)	855631-001
	Speaker Kit	
(11)	Left speaker	855634-001
(12)	Right speaker	855633-001
(13)	3-cell, 45-Wh, 3.83-Ah, Li-ion battery (includes cable)	844199-855
(14)	Bottom cover	855626-001

Rubber Kit



Item	Component	Spare part number
	Rubber Kit	854832-001
(1)	Top rubber strip	
(2)	Bottom rubber strip	

Miscellaneous parts

Component	Spare part number
AC adapter	
45-W Smart adapter, wall mount, USB-C	848293-850
Adapter	
USB-C to VGA	831751-001
USB-C to HDMI	831752-001
USB-C to RJ-45 Gigabit	855560-001
Power cord (1.8-m):	
For use in Australia	213356-015
For use in Europe (Austria, Belgium, Finland, France, Germany, the Netherlands, Norway and Sweden)	213350-016
For use in Denmark	213353-015
For use in India	404827-010
For use in Israel	398063-010
For use in Japan	349756-008
For use in North America	213349-017
For use in the People's Republic of China	286497-015
For use in South Africa	361240-009
For use in Switzerland	213354-015
For use in Taiwan	393313-009
For use in Thailand	285096-014
For use in the United Kingdom	213351-015
Power cord, duckhead	
For use in the United States	854576-001
For use in South Korea	854822-001
Screw Kit	854833-001
Computer sleeve	862374-001

4 Removal and replacement procedures preliminary requirements

Tools required

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

- Case utility tool or similar plastic, flat-tipped tool
- Flat-bladed screwdriver
- Magnetic screwdriver
- Phillips P0 and P1 screwdrivers

Service considerations

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



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

Plastic parts



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

Cables and connectors

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

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

Drive handling

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

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

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

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

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

Avoid dropping drives from any height onto any surface.

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

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

Avoid exposing a drive to temperature extremes or liquids.

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

Grounding guidelines

Electrostatic discharge damage

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

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

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

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

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

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

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

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

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

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

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

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

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

Workstation guidelines

Follow these grounding workstation guidelines:

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

Equipment guidelines

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

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


The following grounding equipment is recommended to prevent electrostatic damage:


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

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


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

5 Removal and replacement procedures for Authorized Service Provider parts

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


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

Component replacement procedures

 **NOTE:** Details about the computer, including model, serial number, product key, and length of warranty, are on the service tag on the bottom of the computer. See [Service tag on page 12](#) for details.

There are as many as 61 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

 **NOTE:** The bottom cover spare part kit includes two rear rubber feet, one front rubber foot, speaker grilles, shielding, and retention brackets.

Description	Spare part number
Bottom cover	855626-001

Before disassembling the computer, follow these steps:

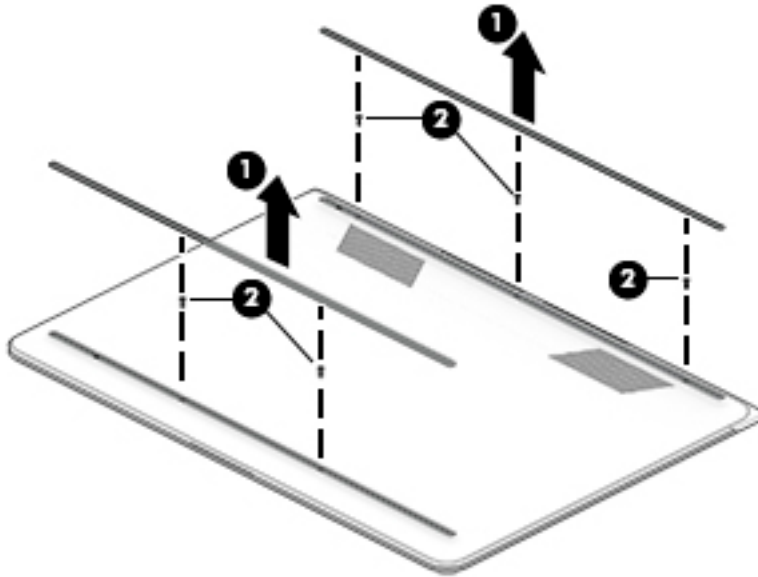
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.

Remove the bottom cover:

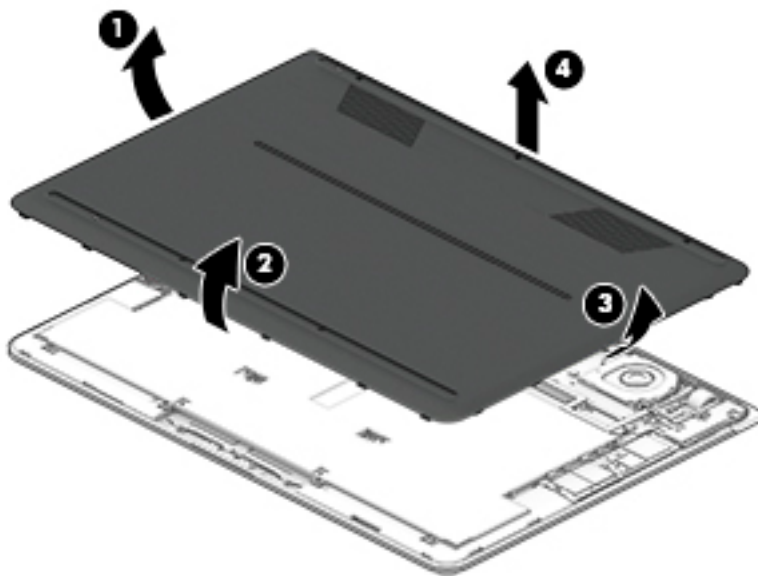
1. Position the computer upside down.
2. Remove the rubber strips from the bottom cover **(1)**.

The bottom cover rubber strips are available using spare part number 854832-001.

3. Remove the five Phillips PM2.0×5.0 screws (2) that secure the bottom cover to the computer.



4. Use a case utility tool or similar plastic, flat-tipped tool to separate the left edge of the bottom cover from keyboard/top cover (1).
5. Separate the front edge (2) and the right edge (3) of the bottom cover from keyboard/top cover.
6. Remove the bottom cover (4).



Reverse this procedure to install the bottom cover.

Battery

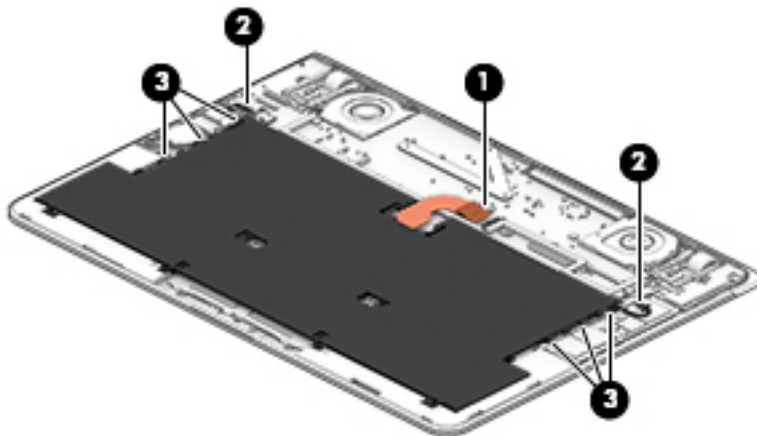
Description	Spare part number
3-cell, 45-Wh, 3.83-Ah, Li-ion battery	844199-855

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 [Bottom cover on page 22](#)).

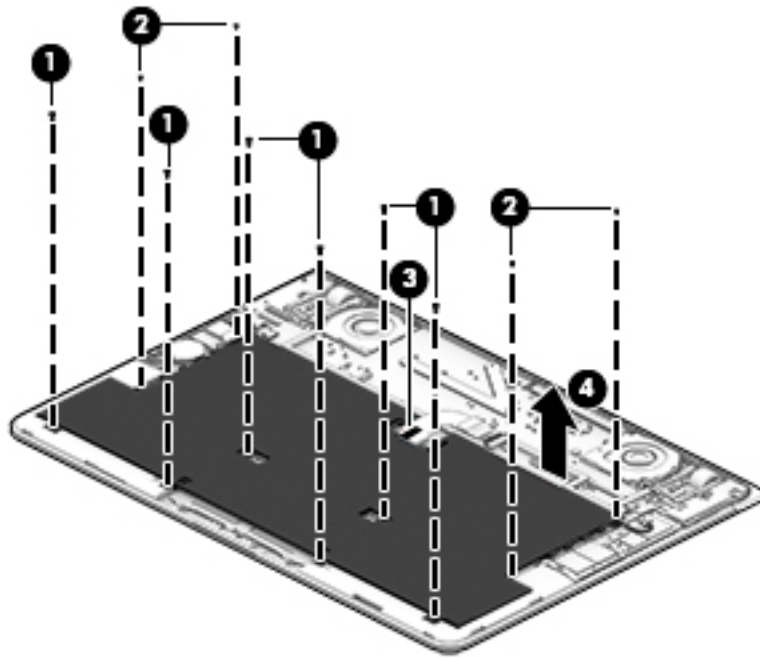
Remove the battery:

1. Disconnect the battery cable from the system board **(1)**.
2. Disconnect the speaker cables from the system board **(2)**, and then remove the speaker cables from the routing clips on the sides of the battery **(3)**.



3. Remove the six Phillips PM2.0×4.0 screws **(1)** that secure the battery to the computer.
4. Remove the four Phillips PM1.2×2.5 screws **(2)** that secure the battery to the computer.
5. Pull the black tab in the middle of the battery to disengage the double-sided tape that secures the middle of the battery to the computer **(3)**.

6. Remove the battery (4).



Reverse this procedure to install the battery.

Solid-state drive

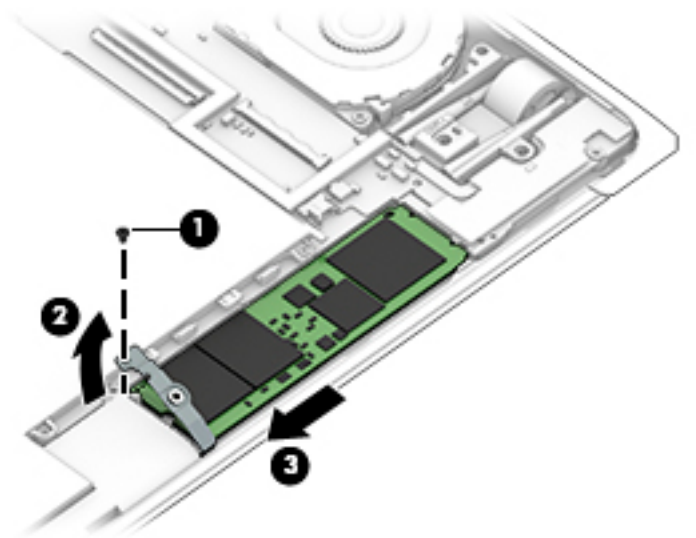
Description	Spare part number
512-GB, M.2, NVMe, supporting TLC	855609-001
256-GB, M.2, NVMe, supporting TLC	855608-001
128-GB, M.2, SATA-3, supporting TLC	855607-001

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 22](#)).
5. Disconnect the battery cable from the system board (see [Battery on page 24](#)).

Remove the solid-state drive:

1. Remove the Phillips PM1.0×2.5 screw **(1)** that secures the bracket to the computer.
2. Remove the bracket **(2)**.
3. Slide the solid-state drive away from the connector to remove the drive **(3)**.



Reverse this procedure to install the solid-state drive.

WLAN module

Description	Spare part number
Intel Dual band wireless-AC 8260 802.11ac 2x2 WiFi + BT 4.2 Combo Adaptor (non-vPro)	855631-001
WLAN board cable	855628-001

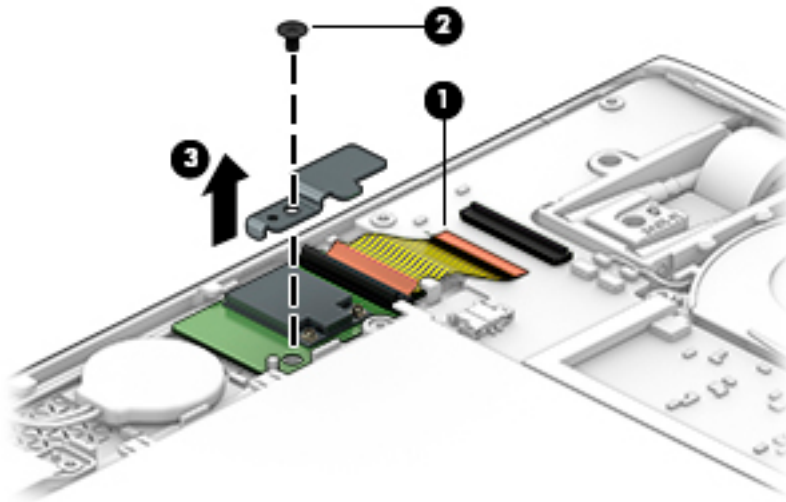
CAUTION: To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module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

Before removing the WLAN module, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the bottom cover (see [Bottom cover on page 22](#)).
5. Disconnect the battery cable from the system board (see [Battery on page 24](#)).

Remove the WLAN module:

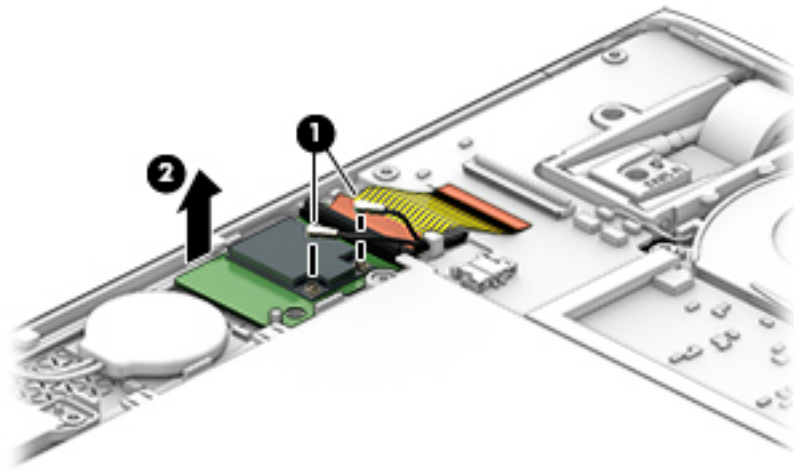
1. Disconnect the cable from the system board **(1)**.
2. Remove the Phillips PM1.0×2.5 screw **(2)** that secures the bracket to the computer.
3. Remove the bracket **(3)**.




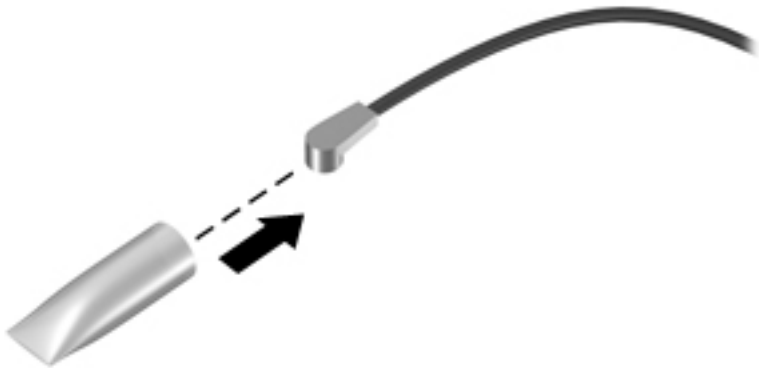
4. Disconnect the WLAN antenna cables **(1)** from the WLAN module terminals.

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

5. Lift the module out of the socket **(2)**.



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



Reverse this procedure to install the WLAN module.

Speakers

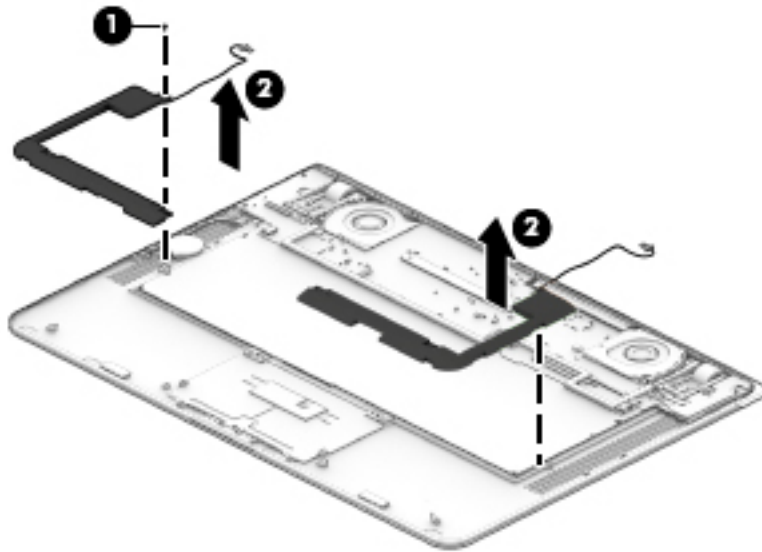
Description	Spare part number
Right speaker	855633-001
Left speaker	855634-001

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 22](#)).
5. Remove the battery (see [Battery on page 24](#)).

Remove the speakers:

1. Remove the Phillips PM2.0×3.0 screw **(1)** that secures the right speaker from the computer.
2. Remove the speakers **(2)** and cables.



Reverse this procedure to install the speakers.

TouchPad board

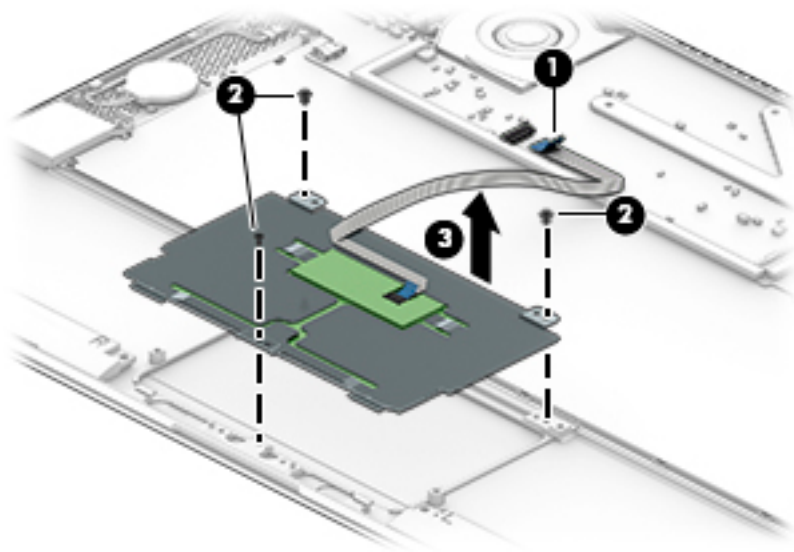
Description	Spare part number
TouchPad board	855632-001

Before removing the TouchPad 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 22](#)).
5. Remove the battery (see [Battery on page 24](#)).

Remove the TouchPad board:

1. Disconnect the TouchPad board cable from the system board **(1)**.
2. Remove the three Phillips PM2.0×3.0 screws **(2)** that secure the TouchPad board to the computer.
3. Remove the TouchPad board **(3)**.



Reverse this procedure to install the TouchPad board.

Fan

Description	Spare part number
Fans (includes left and right fans)	855629-001

Before removing the fans, follow these steps:

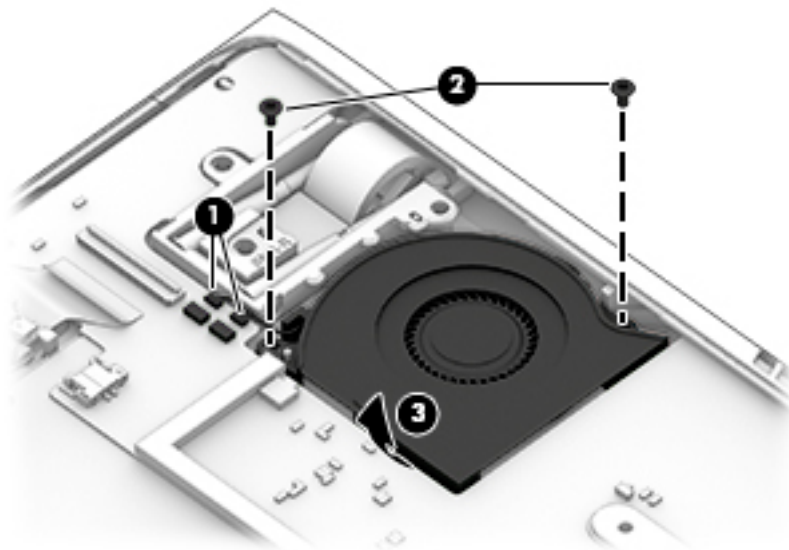
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the bottom cover (see [Bottom cover on page 22](#)).
5. Remove the battery (see [Battery on page 24](#)).

Remove the fans:

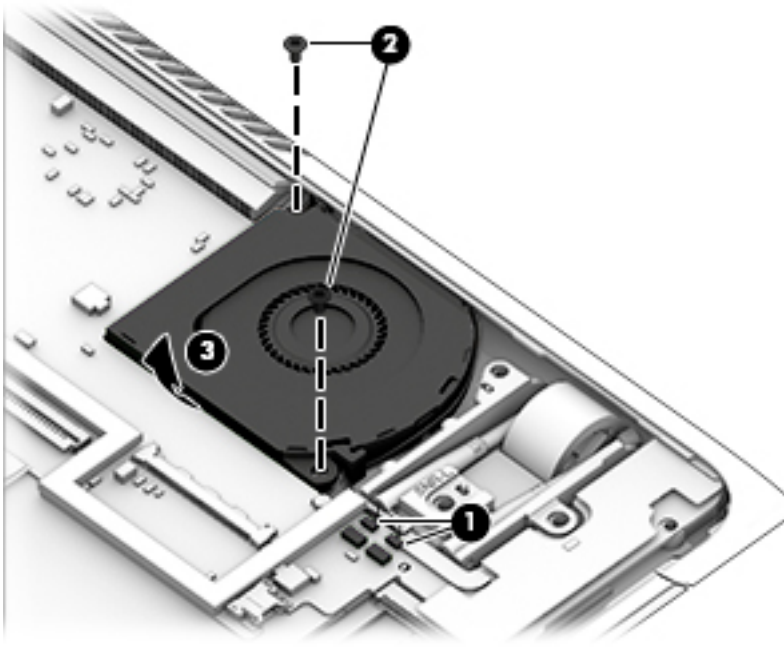
1. To remove the left fan, disconnect the fan cables from the system board **(1)**, remove the two Phillips PM2.0×3.0 screws **(2)**, and then lift the fan at an angle (approximately 45 degrees) and pull it out from under the edge of the computer **(3)**.



NOTE: You may need to route the left fan cable under the WLAN antenna cables.



2. To remove the right fan, disconnect the fan cables from the system board **(1)**, remove the two Phillips PM2.0×3.0 screws **(2)**, and then lift the fan at an angle (approximately 45 degrees) and pull it out from under the edge of the computer **(3)**.



Reverse this procedure to install the fans.

System board

Description	Spare part number
Equipped with an Intel Core i7-6500U 2.50-GHz processor, 8 GB of system RAM, and the Windows 10 Professional operating system	854753-601
Equipped with an Intel Core i7-6500U 2.50-GHz processor, 8 GB of system RAM, and a non-Windows operating system	854753-001
Equipped with an Intel Core i5-6200U 2.30-GHz processor, 8 GB of system RAM, and the Windows 10 Professional operating system	860825-601
Equipped with an Intel Core i5-6200U 2.30-GHz processor, 8 GB of system RAM, and a non-Windows operating system	860825-001
Equipped with an Intel Core i5-6200U 2.30-GHz processor, 4 GB of system RAM, and the Windows 10 Professional operating system	854754-601
Equipped with an Intel Core i5-6200U 2.30-GHz processor, 4 GB of system RAM, and a non-Windows operating system	854754-001

Before removing the system board, follow these steps:

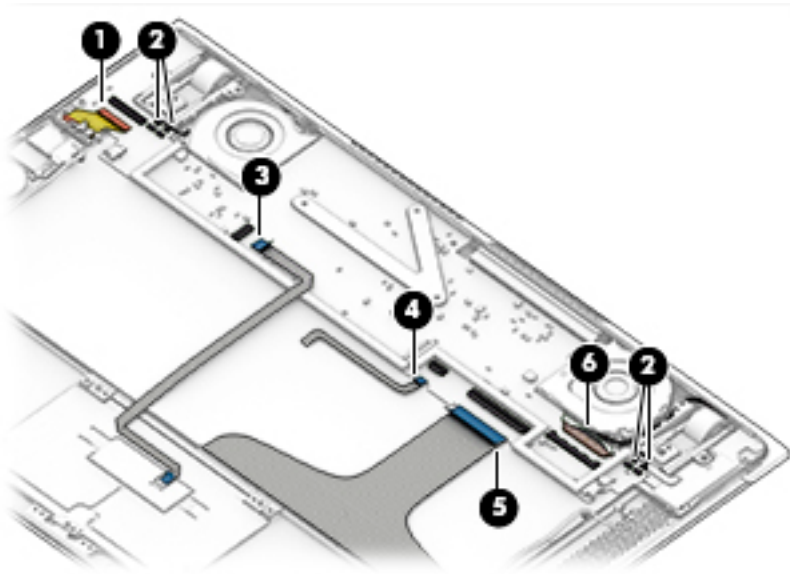
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the bottom cover (see [Bottom cover on page 22](#)), and then remove the following components:
 - a. Battery (see [Battery on page 24](#))
 - b. Solid-state drive (see [Solid-state drive on page 26](#))
 - c. WLAN module (see [WLAN module on page 27](#))



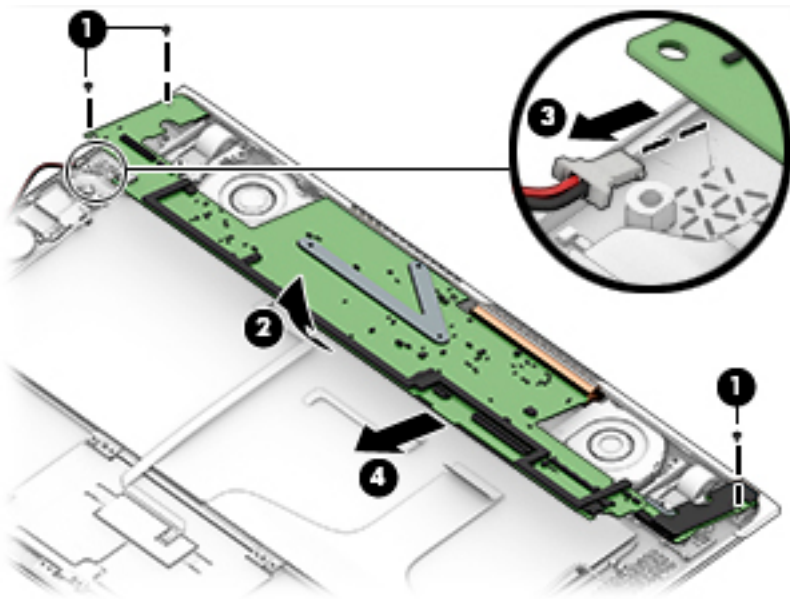
NOTE: When replacing the system board, be sure to install the solid-state drive, WLAN module, and heat sink ([Heat sink on page 35](#)) on the replacement system board.

Remove the system board:

1. Disconnect the following cables from the system board:
 - (1): WLAN module
 - (2): WLAN antennas
 - (3): TouchPad cable
 - (4): Keyboard backlight cable
 - (5): Keyboard cable
 - (6): Display panel cable



2. Remove the three Phillips PM2.0×3.0 screws **(1)** that secure the system board to the computer.
3. Swing the rear edge of the system board up and forward so you can access the RTC battery cable underneath **(2)**.
4. Disconnect the RTC battery cable **(3)** from the system board.
5. Remove the system board **(4)**.



Reverse this procedure to install the system board.

Heat sink


Description	Spare part number
Heat sink (includes replacement thermal material)	854752-001

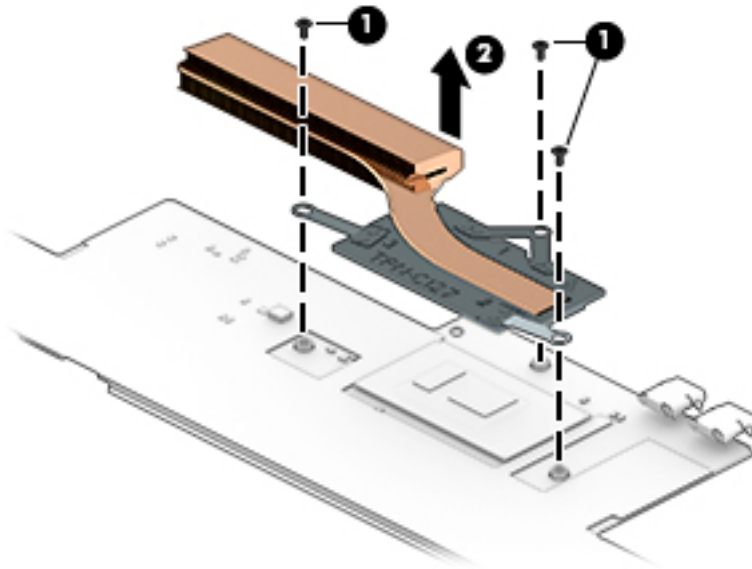
Before removing the heat sink, follow these steps:


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 22](#)), and then remove the following components:
 - a. Battery (see [Battery on page 24](#))
 - b. Solid-state drive (see [Solid-state drive on page 26](#))
 - c. WLAN module (see [WLAN module on page 27](#))
 - d. System board (see [System board on page 33](#))

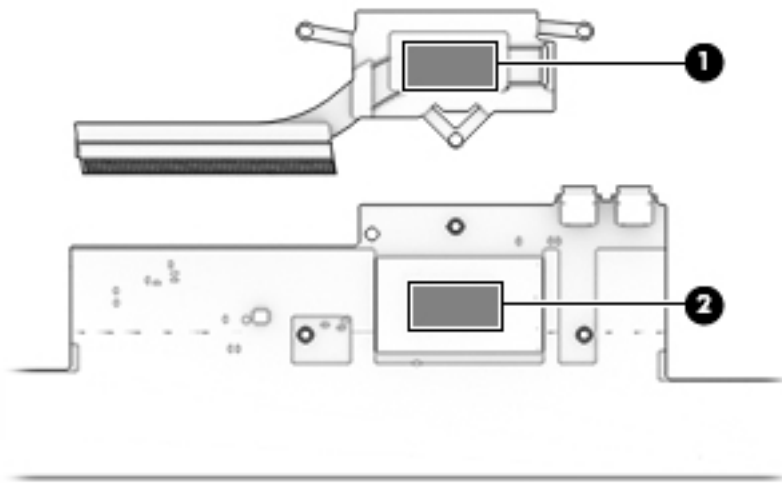
Remove the heat sink:

1. Following the 1, 2, 3 sequence stamped into the heat sink, remove the three Phillips PM2.0×3.0 screws **(1)** that secure the heat sink to the system board.
2. Remove the heat sink **(2)**.

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



 **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. Replacement thermal material is included with the heat sink and system board spare part kits. Thermal paste is used on the heat sink **(1)** and on the system board **(2)** as shown in the following image.



Reverse this procedure to install the heat sink.

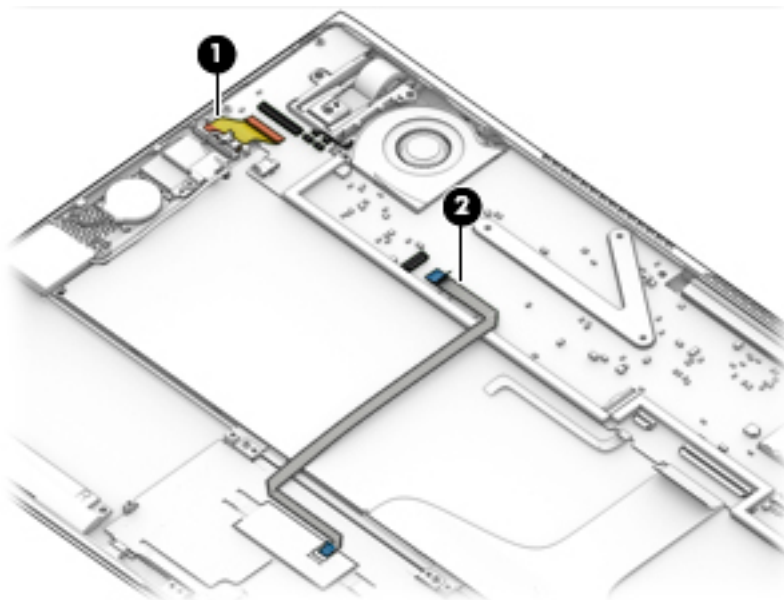
Cable locations

Description	Spare part number
TouchPad cable	855627-001
WLAN board cable	855628-001

Use the following image to determine proper cable routing.

(1): WLAN board cable

(2): TouchPad cable




Display assembly, top cover, keyboard

The display assembly is spared with the top cover and keyboard as one whole component. Individual display components are not spared.

Description	Spare part number
Display assembly and top cover with keyboard for use in Belgium	855641-A41
Display assembly and top cover with keyboard for use in Bulgaria	855641-261
Display assembly and top cover with keyboard for use in Canada (English/French)	855641-DB1
Display assembly and top cover with keyboard for use in the Czech Republic and Slovakia	855641-FL1
Display assembly and top cover with keyboard for use in France	855641-051
Display assembly and top cover with keyboard for use in Denmark, Finland, and Norway	855641-DH1
Display assembly and top cover with keyboard for use in Germany	855641-041
Display assembly and top cover with keyboard for use in Greece	855641-151
Display assembly and top cover with keyboard for use internationally	855641-B31
Display assembly and top cover with keyboard for use in Israel	855641-BB1
Display assembly and top cover with keyboard for use in Italy	855641-061
Display assembly and top cover with keyboard for use in Japan	855641-291
Display assembly and top cover with keyboard for use in Latin America	855641-161
Display assembly and top cover with keyboard for use in Portugal	855641-131
Display assembly and top cover with keyboard for use in Romania	855641-271
Display assembly and top cover with keyboard for use in Russia	855641-251
Display assembly and top cover with keyboard for use in Saudi Arabia	855641-171
Display assembly and top cover with keyboard for use in Slovakia	855641-BA1
Display assembly and top cover with keyboard for use in South Korea	855641-AD1
Display assembly and top cover with keyboard for use in Spain	855641-071
Display assembly and top cover with keyboard for use in Switzerland	855641-BG1
Display assembly and top cover with keyboard for use in Taiwan	855641-AB1
Display assembly and top cover with keyboard for use in Thailand	855641-281
Display assembly and top cover with keyboard for use in Turkey	855641-141
Display assembly and top cover with keyboard for use in the United Kingdom	855641-031
Display assembly and top cover with keyboard for use in the United States	855641-001

6 Using Setup Utility (BIOS) in Windows 10

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 39](#)).
 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 40](#).

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 41](#).

- 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 Backing up, restoring, and recovering in Windows 10

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 43](#). For information on the recovery options that are available using the recovery media, see [Using Windows tools on page 44](#).

- 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 45](#).

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

Creating HP Recovery media (select products only)

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

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

You can use Windows tools to create system restore points and create backups of personal information, see [Using Windows tools on page 44](#).

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

To create HP Recovery media:



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

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

If you ever need to recover the system, see [Recovering using HP Recovery Manager on page 45](#).

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 45](#). If you have not already created recovery media, see [Creating HP Recovery media \(select products only\) on page 43](#).
- 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 45](#).
- 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 47](#).

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 43](#).


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 43](#).
- 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 43](#).
- If your computer does not allow the creation of HP Recovery media or if the HP Recovery media does not work, you can obtain recovery media for your system from support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information from the HP

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

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

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

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


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

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

Using the HP Recovery partition (select products only)

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

To start HP Recovery Manager from the HP Recovery partition:

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

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

- or -

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

For tablets without keyboards:

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

- or -

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

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

Using HP Recovery media to recover

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

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


 **NOTE:** If the computer does not automatically restart in HP Recovery Manager, change the computer boot order. See [Changing the computer boot order on page 47](#).

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 43](#).

 **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.

9 Specifications

Computer specifications

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.

	Metric	U.S.
Dimensions		
Width	32.5 cm	12.80 in
Depth	22.9 cm	9.02 in
Height	1.0 cm	0.39 in
Weight	1.63 kg	3.59 lbs
Input power		
Operating voltage and current	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 @ 7.69 A – 150 W	
Temperature		
Operating	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F
Relative humidity (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating	-15 m to 3,048 m	-50 ft to 10,000 ft
Nonoperating	-15 m to 12,192 m	-50 ft to 40,000 ft
NOTE: Applicable product safety standards specify thermal limits for plastic surfaces. The device operates well within this range of temperatures.		

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 H05VV-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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