



# Maintenance and Service Guide

## HP ENVY 13 Laptop PC

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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 or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. Go to <http://www.microsoft.com> for details.

To access the latest user guides, go to <http://www.hp.com/support>, and follow the instructions to find your product. Then select **User Guides**.

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For any further information or to request a full refund of the price of the computer, please contact your seller.

## Safety warning notice

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 **CAUTION:** 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

**Table 1-1 Product components and their descriptions**

Category	Description
<b>Product Name</b>	<b>HP ENVY 13 Laptop PC</b> HP model number: 13-aq0xxx CTO model: 13t-aq000
<b>Processors</b>	<b>8th generation Intel® Core™ processor</b> i7-8565U 1.8 GHz (SC turbo up to 4.6 GHz) quad core processor (8 MB L3 cache, 2400 MHz FSB, 15 W) i5-8265U 1.6 GHz (SC turbo up to 3.9 GHz) quad core processor (6 MB L3 cache, 2400 MHz FSB, 15 W)
<b>Graphics</b>	<b>Internal graphics</b> Intel UHD Graphics 620 NVIDIA® GeForce® MX250 with 2048 MB of dedicated video memory
<b>Panel</b>	<b>13.3 in, WLED, UWVA, 72% NTSC, ultraslim (2.0 mm), narrow bezel</b> FHD (1920 × 1080) anti glare, eDP 1.3 + PSR, privacy, 700 nits FHD (1920 × 1080) BrightView, eDP 1.3 + PSR, 300 nits FHD (1920 × 1080) BrightView, eDP 1.4 + PSR2, low power, 400 nits UHD (3840 × 2160) BrightView, eDP 1.4 + PSR, 400 nits UHD (3840 × 2160) BrightView, eDP 1.4 + PSR2, 550 nits, HDR-400 Touch solution with flush glass or bezel, multi-touch enabled
<b>Memory</b>	Supports up to 16 GB on-board system memory; non-customer-accessible/non-upgradable DDR4-2400 dual channel support Supports the following configurations: <ul style="list-style-type: none"><li>• 16 GB</li><li>• 8 GB</li></ul>
<b>Solid-state drive</b>	<b>NGFF M.2 solid-state drive with SATA/PCIe co-layout port</b> 1 TB, NVMe, value 512 GB, PCIe, NVMe, TLC 512 GB, PCIe, NVMe, value 256 GB, PCIe, NVMe, TLC 256 GB, PCIe, NVMe, value 128 GB, SATA-3 32 GB Intel Optane™ Memory H10 with 512 GB QLC solid-state drive

**Table 1-1 Product components and their descriptions (continued)**

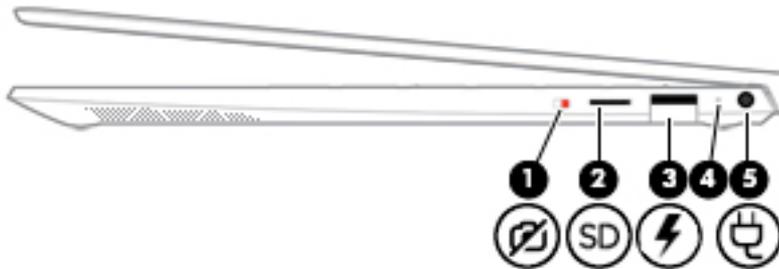
<b>Category</b>	<b>Description</b>
<b>Internal expansion</b>	One M.2 slot for solid-state drive
	One M.2 slot for WLAN
<b>Optical drive</b>	DVD+/-RW DL SuperMulti, 7.0 mm tray
<b>Audio and video</b>	<b>Audio brand:</b> Bang and Olufsen
	<b>Audio control panel:</b> Bang and Olufsen Audio Control
	HP Audio Boost 2.0 (with discrete amplifier)
	Quad speakers
	HP Wide Vision HD Camera - indicator LED, USB 2.0, HD BSI sensor, f2.0, WDR, 88° WFOV
	Support for Far Field Cortana
<b>Wireless</b>	<b>Wireless module with dual antennas (M.2/MIPI/BRI)</b>
	Intel Wireless-AC 9560 802.11ac 2 × 2 Wi-Fi + Bluetooth® 5.0 (non-vPro) (MU-MIMO, Gigabit WiFi speeds supported)
	Support for Miracast
	Support for Modern Standby (connected)
	Wi-Fi BIOS SAR
<b>Media card reader</b>	Supports microSD™/SDHC™/SDXC™
	Push-push insertion/removal
<b>Ports</b>	Headphone/microphone combo jack
	AC Smart Pin adapter plug
	USB 3.1 Gen 1 Type A ports (2); right side supports HP Sleep & Charge
	USB 3.1 Gen 1 Type-C port (supports data transfer, power delivery 3.0, DisplayPort 1.2 [4096 × 2160 at 60 Hz] through Type-C adapter, HDMI 2.0 through adapter, HDCP 2.2 through adapter)*
	*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)
<b>Keyboard/pointing devices</b>	<b>Keyboard</b> (island-style, backlit, with TouchPad)
	Natural silver
	Pale gold
	Nightfall black
	Privacy, natural silver
	Privacy, nightfall black
	<b>TouchPad</b>
	TouchPad with image sensor
	Multitouch gestures enabled
	Supports Precision TouchPad
	Supports Modern Trackpad Gestures

**Table 1-1 Product components and their descriptions (continued)**

<b>Category</b>	<b>Description</b>
	Taps enabled as default
<b>Power requirements</b>	<b>Battery</b>
	4-cell, 53 Whr, long life polymer battery
	Support for fast charge (50% in 45 minutes with 65 W adapter when off)
	<b>AC adapter</b>
	65 W, non-PFC, slim, 4.5 mm, straight
	65 W, non-PFC, slim, 4.5 mm, straight, for Argentina
	65 W, non-PFC, slim, 4.5 mm, straight, EM
	<b>Power cord</b>
	1.0 m
	1.0 m with adapter (for use in Japan)
<b>Security</b>	Fingerprint reader
	Trusted Platform Module (TPM) 2.0 - firmware
	Privacy camera kill switch
<b>Operating system</b>	Windows® 10 Home 64
	Windows 10 Home 64 Advanced
	Windows 10 Home 64 Advanced Single Language
	Windows 10 Home 64 Chinese Market CPPP
	Windows 10 Home 64 High-End Chinese Market CPPP
	Windows 10 Home 64 Plus
	Windows 10 Home 64 Plus Single Language
	Windows 10 Home 64 Plus Single Language Africa Market PPP
	Windows 10 Home 64 Plus Single Language APAC EM PPP
	Windows 10 Home 64 Plus Single Language India Market PPP
	Windows 10 Home 64 Plus Single Language Indonesia Market PPP
	Windows 10 Home 64 Single Language
	Windows 10 Home 64 Single Language Africa Market PPP
	Windows 10 Home 64 Single Language APAC EM PPP
	Windows 10 Home 64 Single Language India Market PPP
	Windows 10 Home 64 Single Language Indonesia Market PPP
	Windows 10 Pro 64

## 2 External component identification

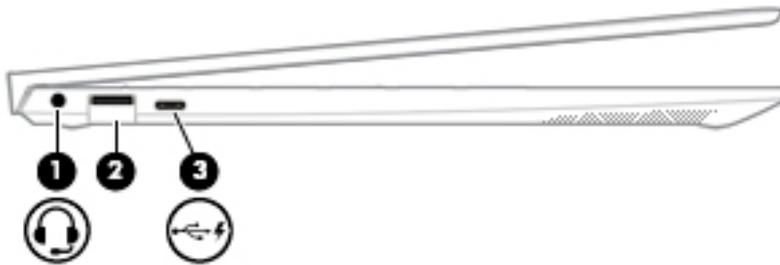
### Right side



**Table 2-1** Right-side components and their descriptions

Component	Description
(1) 	Camera privacy switch Turns the camera off and on.
(2) 	MicroSD memory card reader Reads optional memory cards that enable you to store, manage, share, or access information.  To insert a card: <ol style="list-style-type: none"><li>1. Hold the card label-side up, with connectors facing the computer.</li><li>2. Insert the card into the memory card reader, and then press in on the card until it is firmly seated.</li></ol> To remove a card: <ul style="list-style-type: none"><li>▲ Press in on the card, and then remove it from the memory card reader.</li></ul>
(3) 	USB port with HP Sleep and Charge Connects a USB device, provides data transfer, and even when the computer is off, charges most products such as a cell phone, camera, activity tracker, or smartwatch.
(4)	AC adapter and battery light <ul style="list-style-type: none"><li>• White: The AC adapter is connected and the battery is fully charged.</li><li>• Blinking white: The AC adapter is disconnected and the battery has reached a low battery level.</li><li>• Amber: The AC adapter is connected and the battery is charging.</li><li>• Off: The battery is not charging.</li></ul>
(5) 	Power connector Connects an AC adapter.

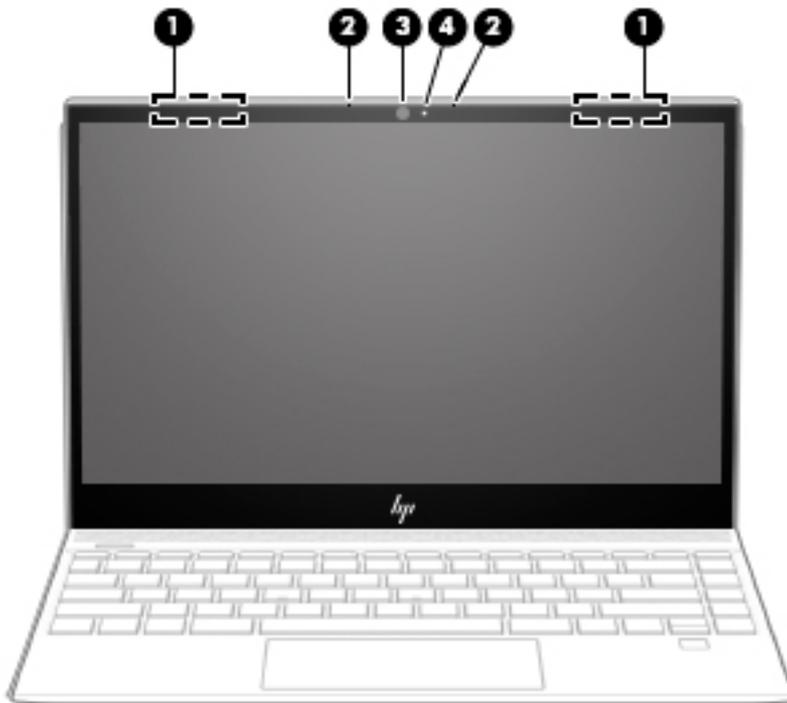
## Left side



**Table 2-2 Left-side components and their descriptions**

Component	Description
<b>(1)</b>  Audio-out (headphone)/Audio-in (microphone) combo jack	<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><b>WARNING!</b> 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"> <li>▲ Select the <b>Start</b> button, select <b>HP Help and Support</b>, and then select <b>HP Documentation</b>.</li> </ul> <p><b>NOTE:</b> When a device is connected to the jack, the computer speakers are disabled.</p>
<b>(2)</b> USB port	<p>Connects a USB device, such as a cell phone, camera, activity tracker, or smartwatch, and provides data transfer.</p>
<b>(3)</b>  USB Type-C port with HP Sleep and Charge	<p>Connects a USB device that has a Type-C connector, provides data transfer, and even when the computer is off, charges most products such as a cell phone, camera, activity tracker, or smartwatch.</p> <p>– and –</p> <p>Connects a display device that has a USB Type-C connector, providing DisplayPort output.</p> <p><b>NOTE:</b> Cables and/or adapters (purchased separately) may be required.</p>

# Display



**Table 2-3 Display components and their descriptions**

Component	Description
(1) Internal microphones	Record sound.
(2) Camera	Allows you to video chat, record video, and record still images. . <b>NOTE:</b> Camera functions vary depending on the camera hardware and software installed on your product.
(3) Camera light	On: One or more cameras are in use.
(4) WLAN antennas*	Send and receive wireless signals to communicate with wireless local area networks (WLANs).

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

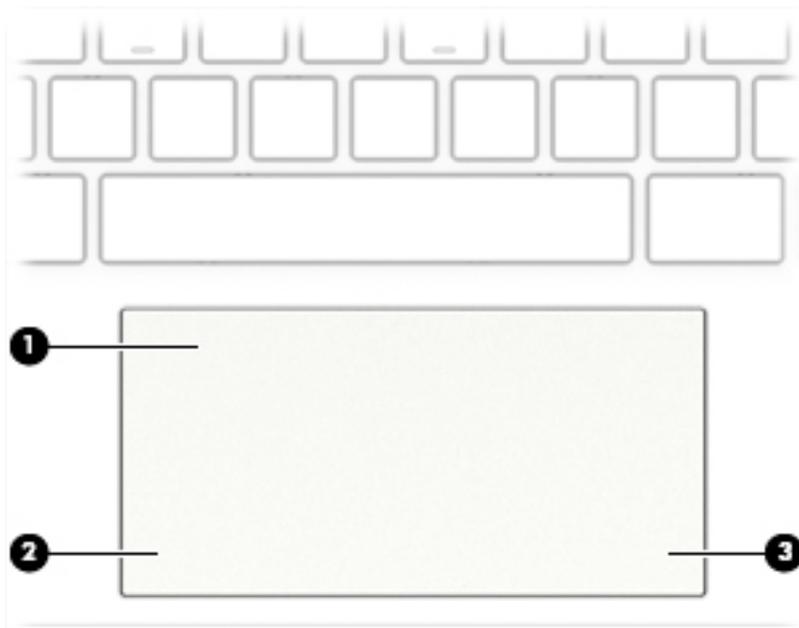
For wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region.

To access this guide:

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

# Keyboard area

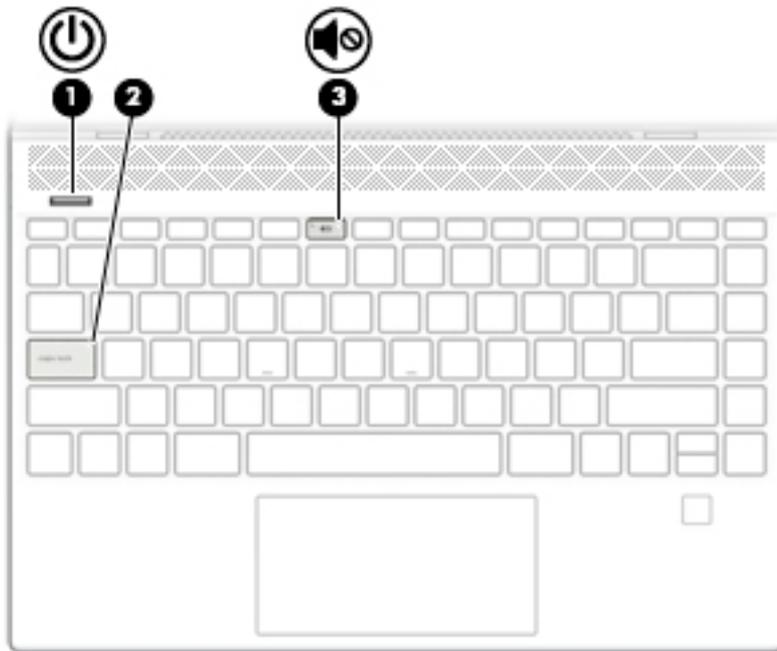
## TouchPad



**Table 2-4** TouchPad components and their descriptions

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.

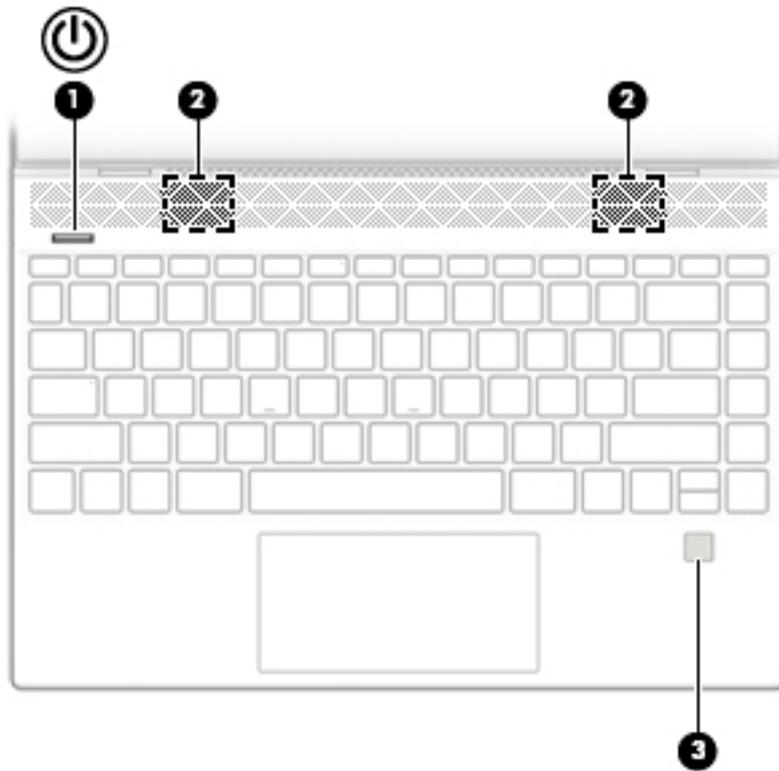
## Lights



**Table 2-5** Lights and their descriptions

Component	Description
(1)  Power light	<ul style="list-style-type: none"><li>• On: The computer is on.</li><li>• Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components.</li><li>• Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.</li></ul>
(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"><li>• On: Computer sound is off.</li><li>• Off: Computer sound is on.</li></ul>

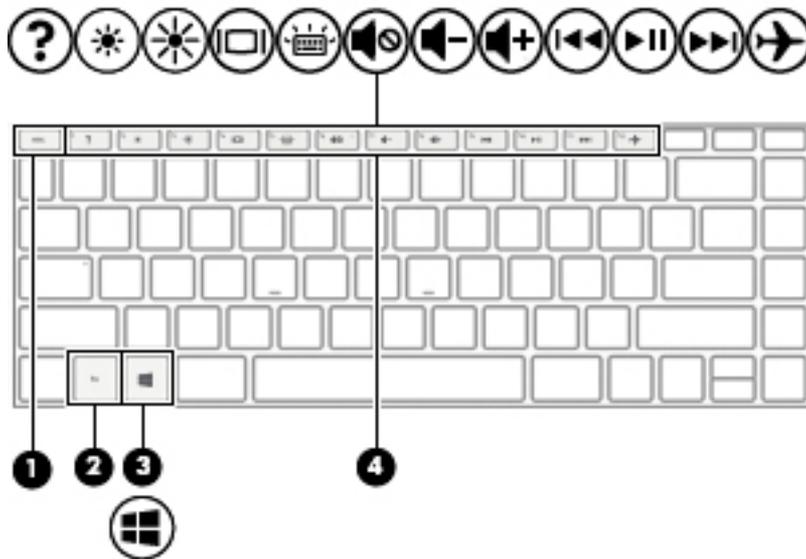
## Buttons, speakers, and fingerprint reader



**Table 2-6 Buttons, speakers, and fingerprint reader and their descriptions**

Component	Description
<p>(1)  Power button</p>	<ul style="list-style-type: none"> <li>• When the computer is off, press the button to turn on the computer.</li> <li>• When the computer is on, press the button briefly to initiate Sleep.</li> <li>• When the computer is in the Sleep state, press the button briefly to exit Sleep.</li> <li>• When the computer is in Hibernation, press the button briefly to exit Hibernation.</li> </ul> <p><b>CAUTION:</b> 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> <ul style="list-style-type: none"> <li>▲ Right-click the <b>Power</b> icon , and then select <b>Power Options</b>.</li> </ul>
(2) Speakers	Produce sound.
(3) Fingerprint reader	<p>Allows a fingerprint logon to Windows, instead of a password logon.</p> <ul style="list-style-type: none"> <li>▲ To use the fingerprint reader, place your finger on the fingerprint reader until it reads your fingerprint.</li> </ul> <p><b>IMPORTANT:</b> To prevent fingerprint logon issues, make sure when you register your fingerprint that all sides of your finger are registered by the fingerprint reader.</p>

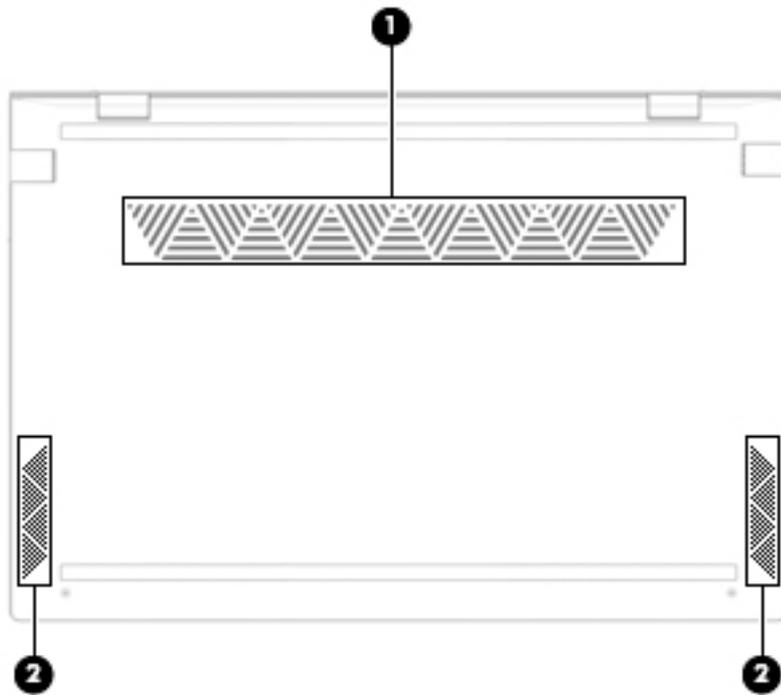
## Special keys



**Table 2-7** Special keys and their descriptions

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 specific functions when pressed in combination with another key.
(3)  Windows key	Opens the <b>Start</b> menu. <b>NOTE:</b> Pressing the Windows key again will close the <b>Start</b> menu.
(4) Action keys	Execute frequently used system functions. <b>NOTE:</b> On select products, the <code>f5</code> action key turns the keyboard backlight feature off or on.

# Bottom



**Table 2-8** Bottom components and their descriptions

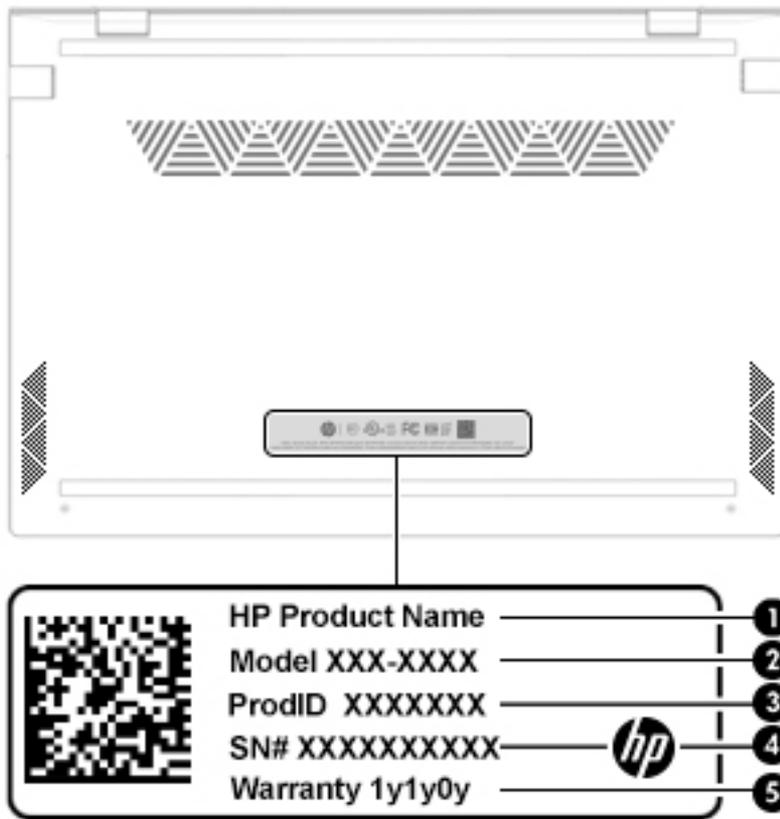
Component	Description
Vent	Enables airflow to cool internal components. <b>NOTE:</b> The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.

# Labels

The labels affixed to the computer provide information you may need when you troubleshoot system problems or travel internationally with the computer. Labels may be in paper form or imprinted on the product.

**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, on the back of the display, or on the bottom of a tablet kickstand.

- Service label—Provides important information to identify your computer. When contacting support, you may be asked for the serial number, the product number, or the model number. Locate this information before you contact support.



**Table 2-9** Service label components

Component	
(1)	HP product name
(2)	Model number
(3)	Product ID
(4)	Serial number
(5)	Warranty period

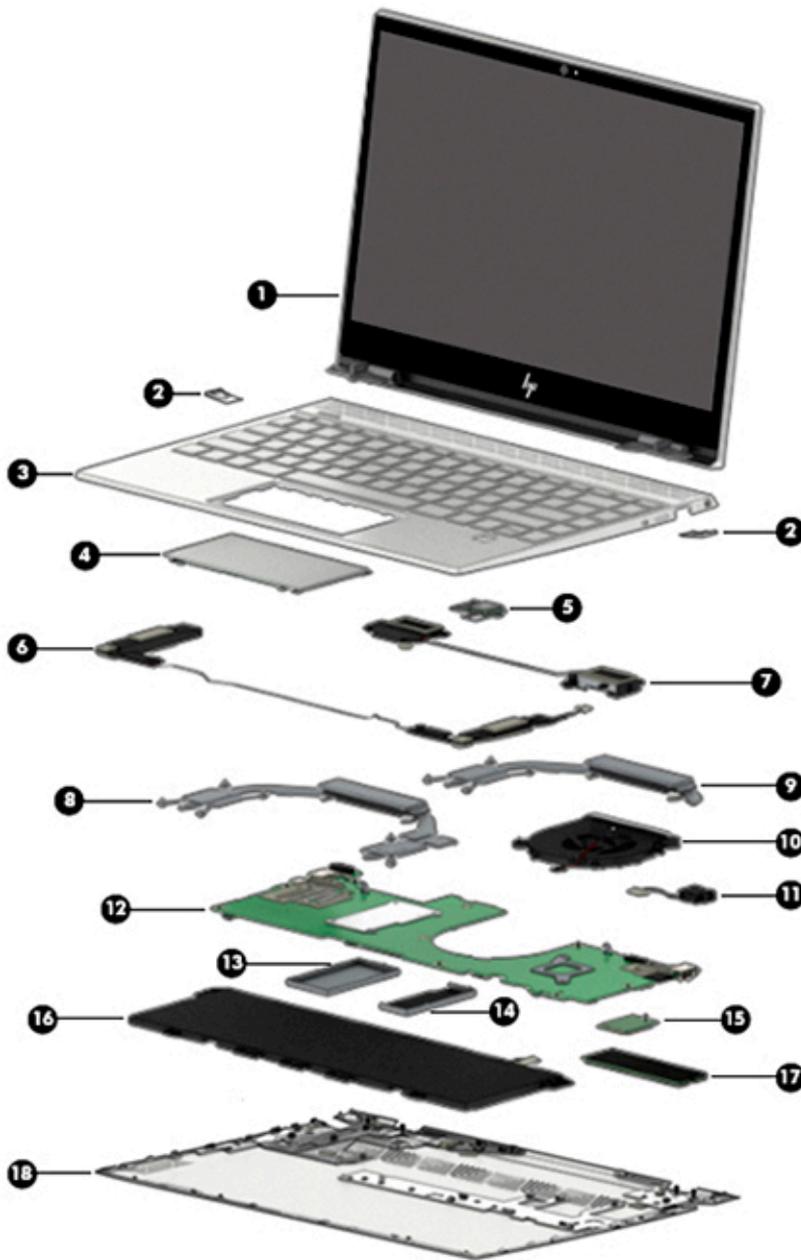
- Regulatory label(s)—Provide(s) regulatory information about the computer.
- Wireless certification label(s)—Provide(s) information about optional wireless devices and the approval markings for the countries or regions in which the devices have been approved for use.

# 3 Illustrated parts catalog

## Computer major components

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

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



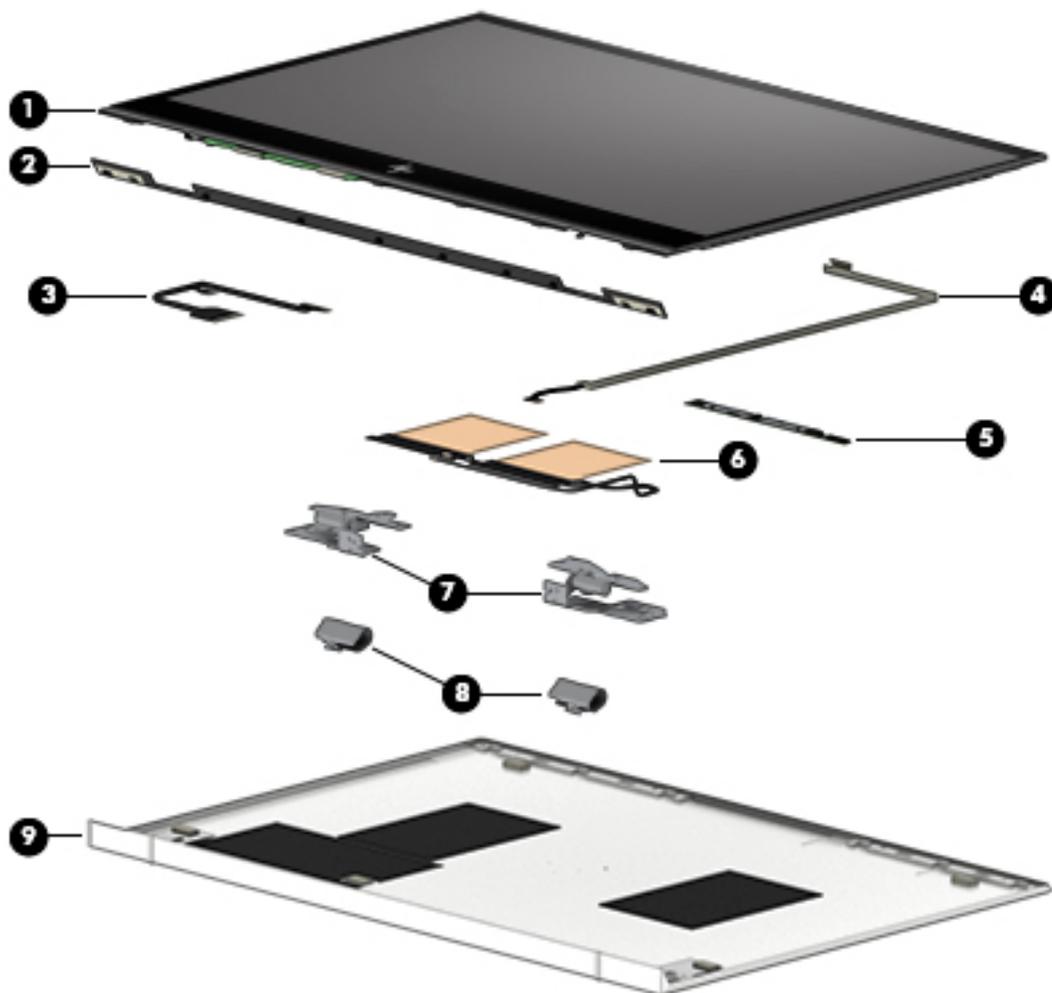
**Table 3-1 Computer major components and their descriptions**

Item	Component	Spare part number
<b>(1)</b>	<b>Display assembly, non-touch</b> (full hinge-up)	
	FHD, anti glare, privacy, in natural silver finish	L53366-001
	FHD, BrightView, in natural silver finish	L53367-001
	FHD, BrightView, in pale gold finish	L53368-001
	FHD, BrightView, in nightfall black finish	L53369-001
	FHD, BrightView, low power, in natural silver finish	L53370-001
	FHD, BrightView, low power, in pale gold finish	L53371-001
	FHD, BrightView, low power, in nightfall black finish	L53372-001
	UHD, BrightView, in natural silver finish	L53373-001
	UHD, BrightView, in pale gold finish	L53374-001
	UHD, BrightView, in nightfall black	L53375-001
	<b>Display assembly, touch screen</b> (full hinge-up)	
	FHD, BrightView, in natural silver finish	L53376-001
	FHD, BrightView, in pale gold finish	L53377-001
	FHD BrightView, in nightfall black finish	L53378-001
	FHD, BrightView, low power, in natural silver finish	L53379-001
	FHD BrightView, low power, in pale gold finish	L53380-001
	FHD BrightView, low power, in nightfall black finish	L53381-001
	UHD BrightView, in natural silver finish	L53382-001
	UHD BrightView, in pale gold finish	L53383-001
	UHD BrightView, in nightfall black finish	L53384-001
<b>(2)</b>	<b>USB door</b>	
	Natural silver finish	L53395-001
	Pale gold finish	L53396-001
<b>(3)</b>	<b>Top cover with backlit keyboard</b>	
	For a detailed list of country codes, see <a href="#">Top cover with keyboard on page 54</a> .	
	Natural silver finish	L53415-xx1
	Natural silver finish with privacy filter	L53416-xx1
	Pale gold finish	L53417-xx1
<b>(4)</b>	<b>TouchPad</b>	
	<b>NOTE:</b> The TouchPad cable is available using spare part L53364-001.	
	Natural silver finish	L53393-001
	Pale gold finish	L53394-001

**Table 3-1 Computer major components and their descriptions (continued)**

Item	Component	Spare part number
<b>(5)</b>	<b>Fingerprint reader</b>	
	<b>NOTE:</b> The fingerprint reader cable is available using spare part L53363-001.	
	Natural silver finish	L52651-001
	Pale gold finish	L53389-001
<b>(6)</b>	<b>Front speaker</b>	L53402-001
<b>(7)</b>	<b>Rear speaker</b>	L19531-001
<b>(8)</b>	<b>Heat sink, discrete graphics</b>	L53388-001
<b>(9)</b>	<b>Heat sink, UMA graphics</b>	L53387-001
<b>(10)</b>	<b>Fan</b> (includes gasket)	L53386-001
<b>(11)</b>	<b>Power connector (DC-in) cable</b>	L53365-001
<b>(12)</b>	<b>System board</b> (includes integrated processor and system memory)	
	For use in models with 2 GB of discrete graphics memory:	
	<ul style="list-style-type: none"> <li>Intel Core i7-8565U processor and 16 GB of system memory</li> </ul>	L53414-601
	<ul style="list-style-type: none"> <li>Intel Core i7-8565U processor and 8 GB of system memory</li> </ul>	L53413-601
	<ul style="list-style-type: none"> <li>Intel Core i5-8265U processor and 8 GB of system memory</li> </ul>	L53412-601
	For use in models with UMA graphics memory:	
	<ul style="list-style-type: none"> <li>Intel Core i7-8565U processor and 8 GB of system memory</li> </ul>	L53411-601
	<ul style="list-style-type: none"> <li>Intel Core i5-8265U processor and 8 GB of system memory</li> </ul>	L53410-601
<b>(13)</b>	<b>Memory shield</b>	L53390-001
<b>(14)</b>	<b>MOS shield with mylar</b> (includes protective tape)	L53391-001
<b>(15)</b>	<b>WLAN module</b> (Intel Wireless-AC 9560 802.11ac 2 × 2 Wi-Fi + Bluetooth 5.0)	L22634-005
<b>(16)</b>	<b>Battery</b>	L08496-855
<b>(17)</b>	<b>Solid-state drive</b>	
	1 TB, PCIe, value	L53408-001
	512 GB, PCIe, with 32 GB Intel Optane Memory Module	L54312-001
	512 GB, PCIe, value	L53407-001
	512 GB, PCIe, TLC	L53405-001
	256 GB, PCIe, TLC	L53404-001
	256 GB, PCIe, value	L53406-001
	128 GB, SATA-3, TLC	L53403-001
<b>(18)</b>	<b>Bottom cover</b>	
	Natural silver finish	L53359-001
	Pale gold finish	L53360-001

## Display assembly subcomponents



**Table 3-2** Display components and their descriptions

Item	Component	Spare part number
(1)	<b>Display panel</b> (includes display panel adhesive)	L53385-001
(2)	<b>Display bottom bezel</b> (includes display panel adhesive)	L54124-001
(3)	<b>Display panel cable</b> (includes display panel adhesive)	L54119-001
(4)	<b>Webcam cable</b> (includes display panel adhesive)	L53362-001
(5)	<b>Webcam module</b> (includes microphone rubber, conductive tape, and display panel adhesive)	L54122-001
(6)	<b>Wireless antenna kit</b> (includes display panel adhesive)	L54118-001
(7)	<b>Left and right hinges</b> (includes display panel adhesive)	L54121-001
(8)	<b>Hinge covers</b> (left and right; includes display panel adhesive)	L54120-001
(9)	<b>Display back cover</b> (includes antenna cables and display adhesive)	L54117-001
	<b>Display panel adhesive</b> (not illustrated)	L54123-001

# Miscellaneous parts

**Table 3-3 Miscellaneous parts and their descriptions**

Component	Spare part number
<b>AC adapter:</b>	
65 W HP Smart AC adapter EM (non-PFC, 4.5 mm)	913691-850
65 W HP Smart AC adapter (non-PFC, slim barrel, 4.5 mm, 1.8 m; LA MECRO only)	L24008-001
65 W HP Smart AC adapter (non-PFC, USB-C, slim barrel, 4.5 mm)	L40713-001
<b>Rubber Foot Kit</b> (includes bottom cover rear feet):	
For use in natural silver models	L53398-001
For use in pale gold models	L53399-001
<b>Screw Kit</b>	L53401-001
<b>External DVD±RW DL SuperMulti Drive</b>	747080-001
<b>Thermal pads</b>	L53392-001
<b>HP USB-to-Gigabit RJ-45 Adapter</b>	829941-001
<b>HP USB-C-to-VGA Adapter</b>	831751-001
<b>USB-C-to-USB-A adapter</b>	833960-001
<b>HP USB-C-to-RJ-45 Adapter</b>	855560-001
<b>HP USB-C-to-USB-A Hub</b>	916838-001
<b>HP USB-C-to-Multi-Port Hub</b>	919666-001
<b>HP USB-C-to-HDMI 2.0 Adapter</b>	935325-001
<b>Power cord</b> (C5 connector, 1.0 m):	
For use in Argentina	L30811-001
For use in Australia	L22327-001
For use in Denmark	L22322-001
For use in Europe	L22321-001
For use in India	L22624-001
For use in Israel	L22323-001
For use in Italy	L30813-001
For use in Japan	L22330-001
For use in North America	L22319-001
For use in the People's Republic of China	L21930-001
For use in South Africa	L22325-001
For use in South Korea	L22328-001
For use in Switzerland	L22324-001
For use in Taiwan	L22329-001

**Table 3-3 Miscellaneous parts and their descriptions (continued)**

<b>Component</b>	<b>Spare part number</b>
For use in Thailand	L22326-001
For use in the United Kingdom	L22320-001
<b>Duck head power cord</b> (for use in Japan)	L33157-001

---

## 4 Removal and replacement procedures preliminary requirements

### Tools required

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

- Non-marking, non-conductive pry tool
- Phillips P0 and P1 screwdrivers
- Torx T5 screwdriver
- Heating tool (for display panel)
- Suction cup (for display panel)

### Service considerations

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

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

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### Plastic parts

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 **IMPORTANT:** Using excessive force during disassembly and reassembly can damage plastic parts.

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### Cables and connectors

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 **IMPORTANT:** 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



**IMPORTANT:** 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 an optical drive, be sure that a disc is not in the drive and be sure that the optical drive tray is closed.

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

Avoid dropping drives from any height onto any surface.

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

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

Avoid exposing a drive to temperature extremes or liquids.

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

## 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.

## Electrostatic discharge information

A sudden discharge of static electricity from your finger or other conductor can destroy static-sensitive devices or microcircuitry. Often the spark is neither felt nor heard, but damage occurs. An electronic device exposed to electrostatic discharge (ESD) may not appear to be affected at all and can work perfectly throughout a normal cycle. The device may function normally for a while, but it has been degraded in the internal layers, reducing its life expectancy.

Networks built into many integrated circuits provide some protection, but in many cases, the discharge contains enough power to alter device parameters or melt silicon junctions.



**IMPORTANT:** To prevent damage to the device 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.

## Generating static electricity

Note the following:

- Different activities generate different amounts of static electricity.
- Static electricity increases as humidity decreases.

**Table 4-1 Static electricity occurrence based on activity and humidity**

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

Electronic components are multi-packaged inside plastic tubes, trays, or Styrofoam.



**NOTE:** As little as 700 volts can degrade a product.

## Preventing electrostatic damage to equipment

Many electronic components are sensitive to ESD. Circuitry design and structure determine the degree of sensitivity. The following packaging and grounding precautions are necessary to prevent static electricity damage to electronic components.

- To avoid hand contact, transport products in static-safe containers such as tubes, bags, or boxes.
- Protect all electrostatic parts and assemblies with conductive or approved containers or packaging.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Place items on a grounded surface before removing them from their container.
- Always be properly grounded when touching a sensitive component or assembly.

- Avoid contact with pins, leads, or circuitry.
- Place reusable electrostatic-sensitive parts from assemblies in protective packaging or conductive foam.

## Personal grounding methods and equipment

Use the following equipment to prevent static electricity damage to electronic components:

- **Wrist straps** are flexible straps with a maximum of one-megohm  $\pm$  10% resistance in the ground cords. To provide proper ground, a strap must be worn snug against bare skin. The ground cord must be connected and fit snugly into the banana plug connector on the grounding mat or workstation.
- **Heel straps/Toe straps/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 them on both feet with a maximum of one-megohm  $\pm$  10% resistance between the operator and ground.

**Table 4-2 Static shielding protection levels**

Static shielding protection levels	
Method	Voltage
Antistatic plastic	1,500
Carbon-loaded plastic	7,500
Metallized laminate	15,000

## Grounding the work area

To prevent static damage at the work area, use the following precautions:

- Cover the work surface with approved static-dissipative material. Provide a wrist strap connected to the work surface and properly grounded tools and equipment.
- Use static-dissipative mats, foot straps, or air ionizers to give added protection.
- Handle electrostatic sensitive components, parts, and assemblies by the case or PCB laminate. Handle them only at static-free work areas.
- Turn off power and input signals before inserting and removing connectors or test equipment.
- Use fixtures made of static-safe materials when fixtures must directly contact dissipative surfaces.
- Keep work area free of nonconductive materials such as ordinary plastic assembly aids and Styrofoam.
- Use field service tools, such as cutters, screwdrivers, and vacuums, that are conductive.

## Recommended materials and equipment

Materials and equipment that are recommended for use in preventing static electricity include:

- Antistatic tape
- Antistatic smocks, aprons, or sleeve protectors
- Conductive bins and other assembly or soldering aids
- Conductive foam
- Conductive tabletop workstations with ground cord of one-megohm  $\pm$  10% resistance
- Static-dissipative table or floor mats with hard tie to ground

- Field service kits
- Static awareness labels
- Wrist straps and footwear straps providing one-megohm +/- 10% resistance
- Material handling packages
- Conductive plastic bags
- Conductive plastic tubes
- Conductive tote boxes
- Opaque shielding bags
- Transparent metallized shielding bags
- Transparent shielding tubes

## 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.

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# 5 Removal and replacement procedures for authorized service provider parts

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

**CAUTION:** This computer does not have user-replaceable parts. Only HP authorized service providers should perform the removal and replacement procedures described here. Accessing the internal part could damage the computer or void the warranty.

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## Component replacement procedures

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

 **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.

---

There are as many as 47 screws that must be removed, replaced, and/or loosened when servicing the parts described in this chapter. Make special note of each screw size and location during removal and replacement.

## Preparation for disassembly

See [Removal and replacement procedures preliminary requirements on page 19](#) for initial safety procedures.

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.

## Bottom cover

**Table 5-1 Bottom cover descriptions and part numbers**

Description	Spare part number
Bottom cover for use in natural silver models	L53359-001
Bottom cover for use in pale gold	L53360-001

Before removing the bottom cover, follow these steps:

- ▲ Prepare the computer for disassembly ([Preparation for disassembly on page 24](#)).

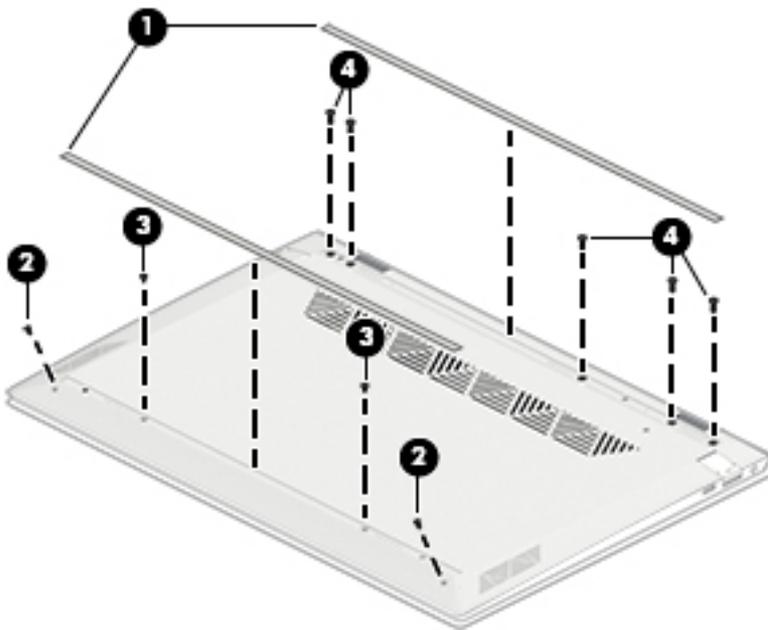
Remove the bottom cover:

1. Remove the rubber feet from the bottom of the computer **(1)**.



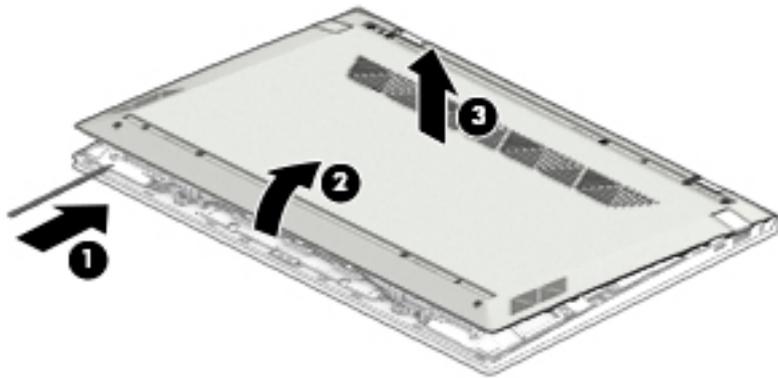
**NOTE:** The rubber feet are available using spare part number L53398-001 for natural silver models and L53399-001 for pale gold models.

2. Remove the two Torx T5 2.0 × 4.0 screws **(2)** and the two Phillips M2.0 × 3.0 screws **(3)** that secure the bottom cover to the computer.
3. Remove the five Phillips M2.5 × 6.0 screws **(4)** that secure the bottom cover to the computer.



4. Use a non-marking, non-conductive tool to loosen the bottom cover from the computer **(1)**.

5. Rotate the bottom of the cover upward **(2)**, and then remove the bottom cover from the computer **(3)**.



Reverse this procedure to install the bottom cover.

## Battery

**Table 5-2 Battery description and part number**

Description	Spare Part Number
Battery	L08496-855

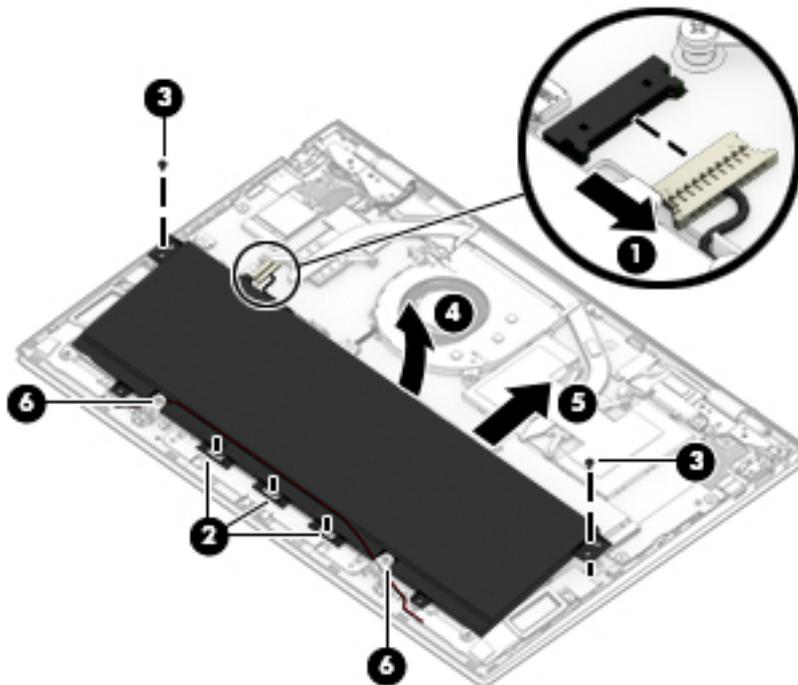
Before removing the battery, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 24](#)).
2. Remove the bottom cover (see [Bottom cover on page 25](#)).

**⚠ WARNING!** To reduce potential safety issues, use only the user-replaceable battery provided with the computer, a replacement battery provided by HP, or a compatible battery purchased from HP.

Remove the battery:

1. Disconnect the battery cable from the system board **(1)**.
2. Remove the speaker cable from the clips on the bottom of the battery **(2)**.
3. Remove the two Phillips M2.0 × 3.5 screws **(3)** that secure the battery to the computer.
4. Rotate the top of the battery upward **(4)**, and then pull the battery toward the top of the computer **(5)** and out from under from the clips **(6)** that hold it in place.



Reverse this procedure to install the battery.

## Solid-state drive

**Table 5-3 Solid-state drive descriptions and part numbers**

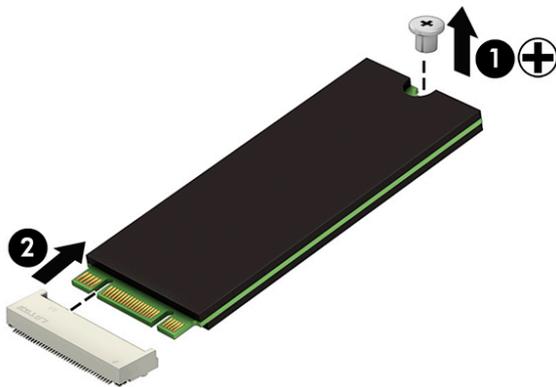
Description	Spare part number
1 TB, PCIe, value	L53408-001
512 GB, PCIe, with 32 GB Intel Optane Memory Module	L54312-001
512 GB, PCIe, value	L53407-001
512 GB, PCIe, TLC	L53405-001
256 GB, PCIe, TLC	L53404-001
256 GB, PCIe, value	L53406-001
128 GB, SATA-3, TLC	L53403-001

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

1. Prepare the computer for disassembly ([Preparation for disassembly on page 24](#)).
2. Remove the bottom cover (see [Bottom cover on page 25](#)).
3. Disconnect the battery (see [Battery on page 27](#)).

Remove the solid-state drive module:

- ▲ Remove the Phillips M2.0 × 3.0 screw **(1)**, and then pull the solid-state drive module from the socket **(2)**.



Reverse this procedure to install the solid-state drive.

## WLAN module

**Table 5-4 WLAN module description and part number**

Description	Spare part number
Intel Wireless-AC 9560 802.11ac 2 x 2 Wi-Fi + Bluetooth 5.0	L22634-005

**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:

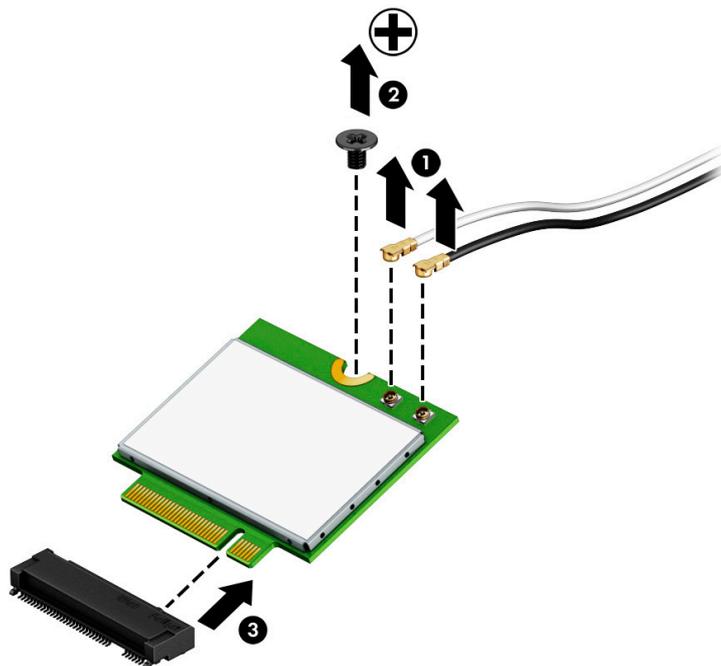
1. Prepare the computer for disassembly ([Preparation for disassembly on page 24](#)).
2. Remove the bottom cover (see [Bottom cover on page 25](#)).
3. Disconnect the battery (see [Battery on page 27](#)).

Remove the WLAN module:

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

**NOTE:** Models have either one or two WLAN antennas. On models with two antennas, the #1/white WLAN antenna cable connects to the WLAN module #1/Main terminal. The #2/black WLAN antenna cable connects to the WLAN module #1/Aux terminal.

2. Remove the Phillips M2.0 × 3.0 screw (**2**) that secures the WLAN module to the bottom cover. (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 WLAN antenna is not connected to the terminal on the WLAN module, a protective sleeve must be installed on the antenna connector, as shown in the following illustration.

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Reverse this procedure to install the WLAN module.

# TouchPad

**Table 5-5 TouchPad and cable descriptions and part numbers**

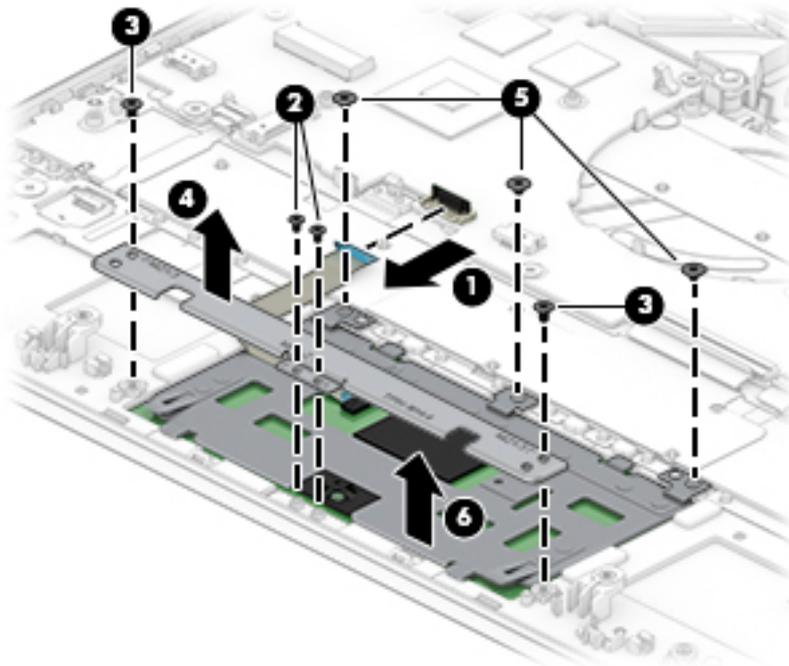
Description	Spare part number
TouchPad in natural silver finish	L53393-001
TouchPad in pale gold finish	L53394-001
TouchPad cable	L53364-001

Before removing the TouchPad, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 24](#)).
2. Remove the bottom cover (see [Bottom cover on page 25](#)).
3. Disconnect the battery (see [Battery on page 27](#)).

Remove the TouchPad:

1. Disconnect the TouchPad cable from the ZIF connector on the system board (**1**).
2. Remove the two Phillips M1.6 × 2.5 screws (**2**) and the two Phillips M2.0 × 3.0 screws (**3**) that secure the TouchPad bracket to the computer, and then remove the bracket (**4**).
3. Remove the three Phillips M2.0 × 2.0 screws (**5**) that secure the TouchPad to the computer, and then remove the TouchPad (**6**).



Reverse this procedure to install the TouchPad.

## Front speakers

**Table 5-6 Front speaker description and part number**

Description	Spare part number
Front speaker kit	L53402-001

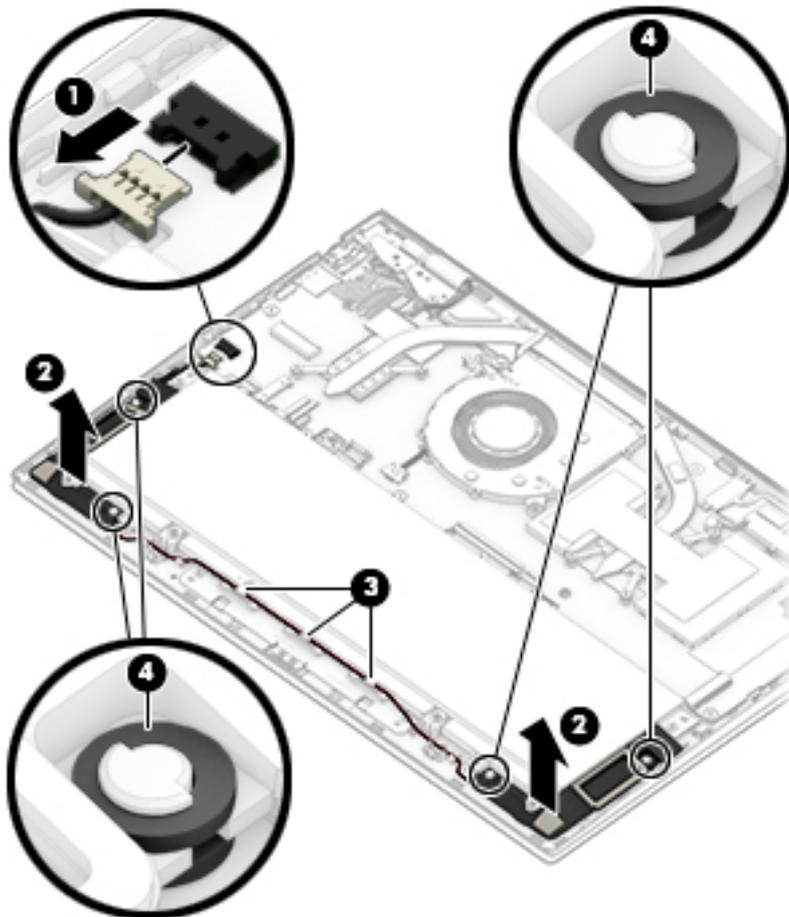
Before removing the front speakers, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 24](#)).
2. Remove the bottom cover (see [Bottom cover on page 25](#)).
3. Disconnect the battery (see [Battery on page 27](#)).

Remove the front speakers:

1. Disconnect the speaker cable from the system board **(1)**.
2. Lift both speakers up **(2)**, and then remove the speaker wire from the clips in the computer **(3)**.

 **TIP:** Make sure the rubber gaskets are installed in the holes in the speakers **(4)** when installing the speakers in the computer.



Reverse this procedure to install the front speakers.

## Fingerprint reader

**Table 5-7 Fingerprint reader and cable descriptions and part numbers**

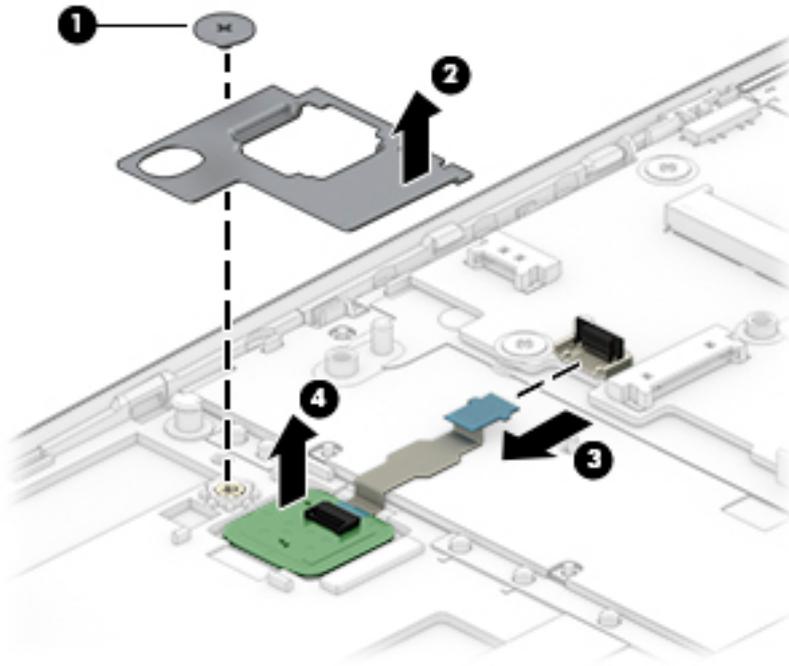
Description	Spare part number
Fingerprint reader for use in natural silver models	L52651-001
Fingerprint reader for use in pale gold models	L53389-001
Fingerprint reader cable	L53363-001

Before removing the fingerprint reader, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 24](#)).
2. Remove the bottom cover (see [Bottom cover on page 25](#)).
3. Remove the battery (see [Battery on page 27](#)).

Remove the fingerprint reader:

1. Remove the Phillips M2.0 × 2.0 screw **(1)** that secures the fingerprint reader bracket, and then remove the bracket **(2)**.
2. Disconnect the fingerprint reader cable from the ZIF connector on the system board **(3)**.
3. Remove the fingerprint reader **(4)**.



Reverse this procedure to install the fingerprint reader.

## Heat sink

**Table 5-8 Heat sink and thermal pad descriptions and part numbers**

Description	Spare part number
Heat sink for use in model with UMA graphics	L53387-001
Heat sink for use in models with discrete graphics	L53388-001
Thermal pads	L53392-001

Before removing the heat sink, follow these steps:

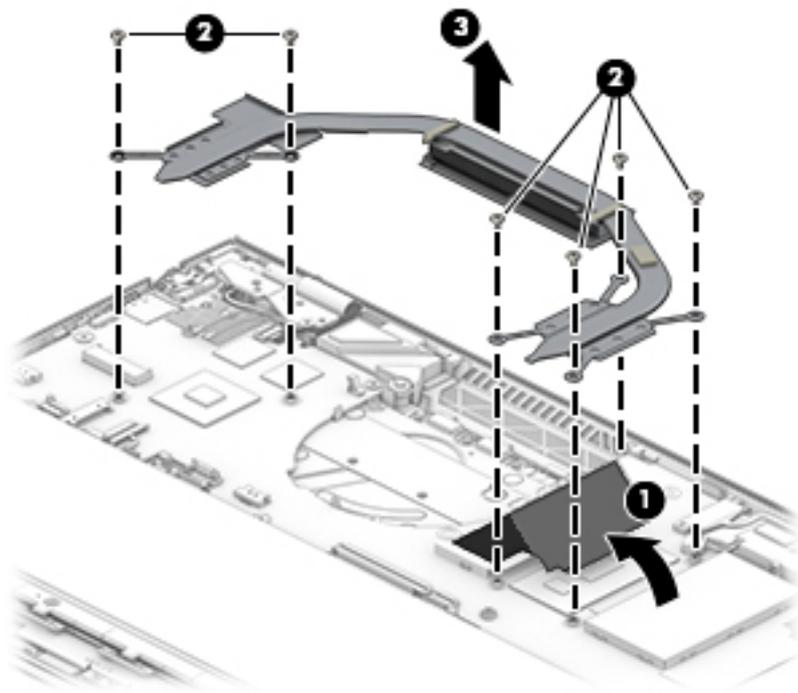
1. Prepare the computer for disassembly ([Preparation for disassembly on page 24](#)).
2. Remove the bottom cover (see [Bottom cover on page 25](#)).
3. Remove the battery (see [Battery on page 27](#)).
4. Remove the fan (see [Fan on page 39](#)).

Remove the heat sink on models with **discrete graphics**:

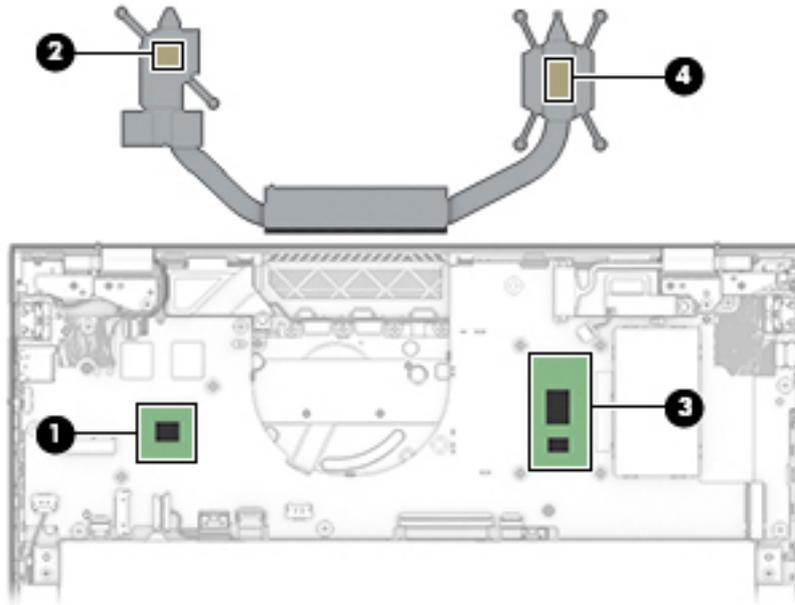


**NOTE:** The heat sink can be removed without removing the system board.

1. Remove the conductive tape from the memory cover and the top of the heat sink **(1)**. You do not have to remove the tape from both covers to remove the heat sink.
2. Remove the six Phillips M2.0 × 3.0 screws **(2)** that secure the heat sink, and then remove the heat sink from the system board **(3)**.

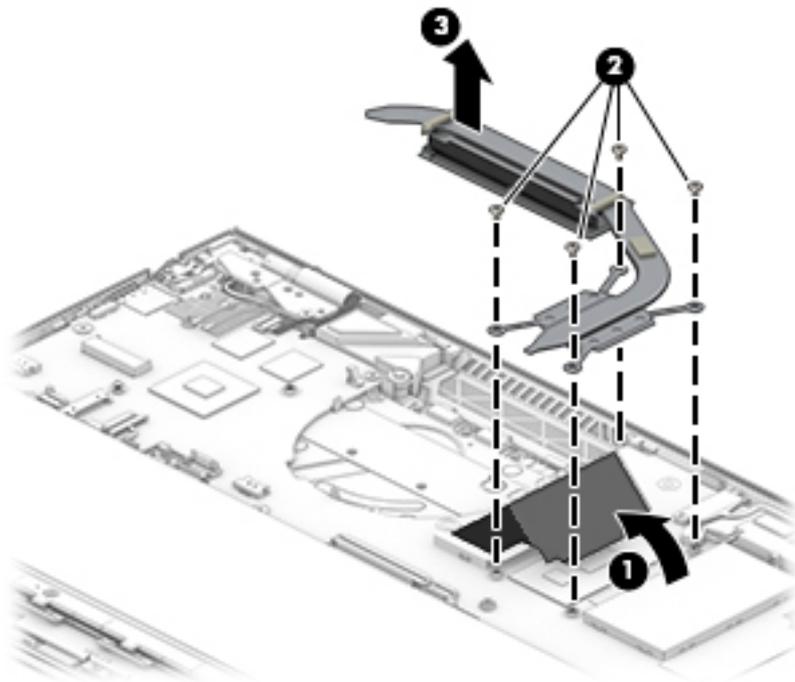


3. Clean and reapply thermal material from the surfaces of the system board components **(1) (3)** and the heat sink **(2) (4)** each time the heat sink is removed.

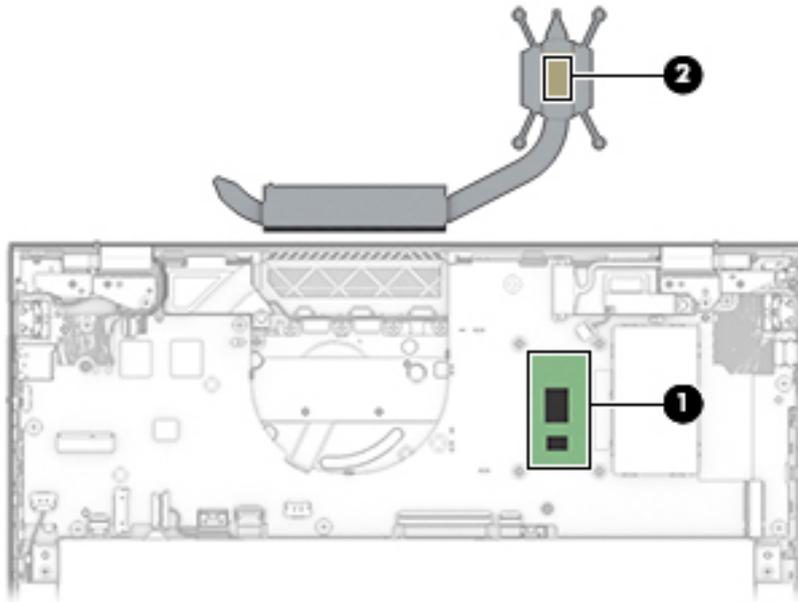


Remove the heat sink on models with **UMA graphics**:

1. Remove the conductive tape from the memory cover and the top of the heat sink **(1)**. You do not have to remove the tape from both covers to remove the heat sink.
2. Remove the four Phillips M2.0 × 3.0 screws **(2)** that secure the heat sink, and then remove the heat sink from the system board **(3)**.



3. Clean and reapply thermal material from the surfaces of the system board component **(1)** and the heat sink **(2)** each time the heat sink is removed.



Reverse this procedure to install the heat sink.

## System board covers (memory cover and MOS cover)

**Table 5-9** System board cover descriptions and part numbers

Description	Spare part number
Memory cover	L53390-001
MOS cover (includes protective tape)	L53391-001

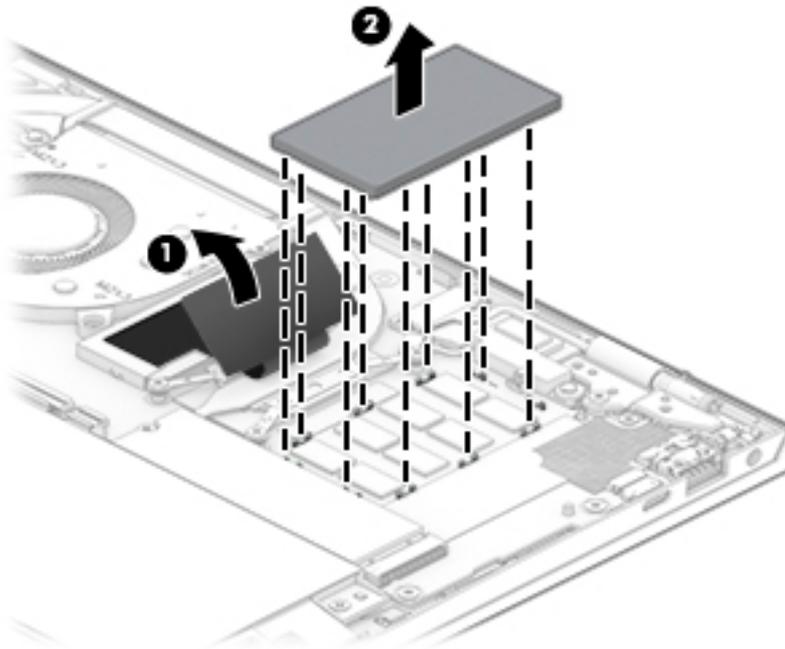
Before removing the system board covers, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 24](#)).
2. Remove the bottom cover (see [Bottom cover on page 25](#)).
3. Disconnect the battery (see [Battery on page 27](#)).
4. Remove the heat sink (see [Heat sink on page 34](#)).

Remove the system board covers:

1. **Memory cover:** Remove the conductive tape from on top of the memory cover **(1)**.
2. Lift the cover off the system board **(2)**.

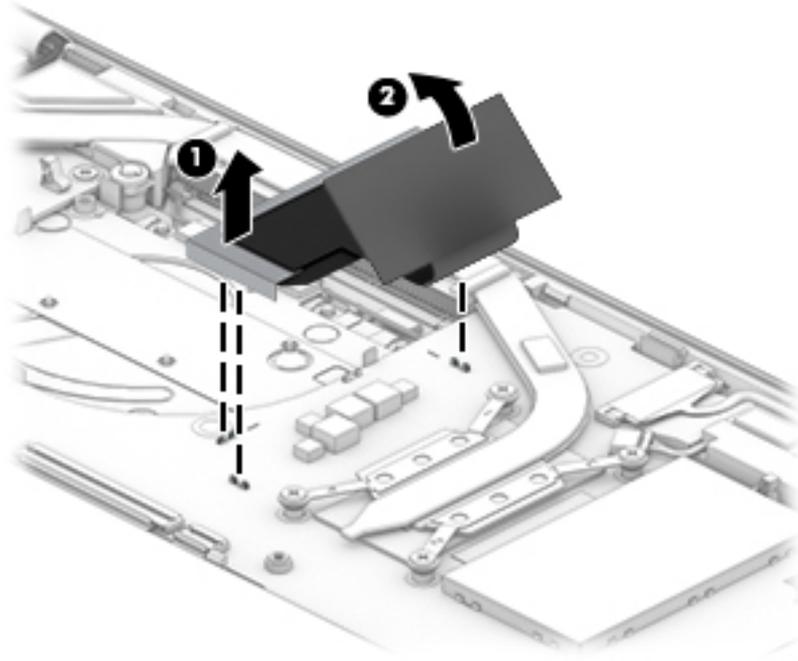
 **TIP:** The cover is held in place by small clips on the system board. Be sure to insert the edges of the cover into the clips when installing the cover.



3. **MOS cover:** Lift the cover off the system board **(1)**

4. Peel the conductive tape from on top of the memory cover (if still installed) and heat sink **(2)**.

 **TIP:** The cover is held in place by small clips on the system board. Be sure to insert the edges of the cover into the clips when installing the cover.



Reverse this procedure to install the system board covers.

# Fan

**Table 5-10 Fan description and part number**

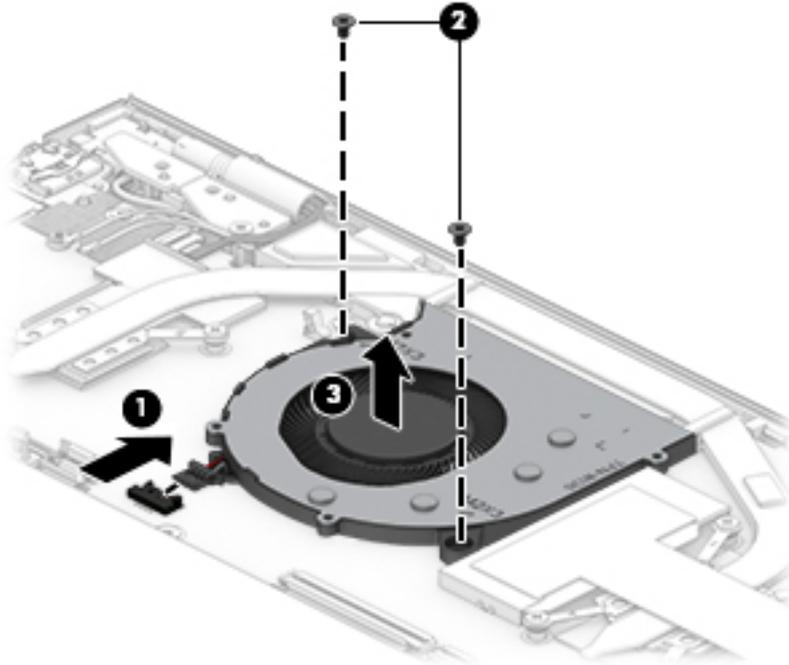
Description	Spare part number
Fan (includes gasket)	L53386-001

Before removing the fan, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 24](#)).
2. Remove the bottom cover (see [Bottom cover on page 25](#)).
3. Disconnect the battery (see [Battery on page 27](#)).

Remove the fan:

1. Disconnect the fan cable from the system board **(1)**.
2. Remove the two Phillips 2.0 × 3.0 screws **(2)** that secure the fan to the computer, and then remove the fan **(3)**.



Reverse this procedure to install the fan.

## USB door

**Table 5-11 USB door descriptions and part numbers**

Description	Spare part number
USB door for use in natural silver models	L53395-001
USB door for use in pale gold models	L53396-001

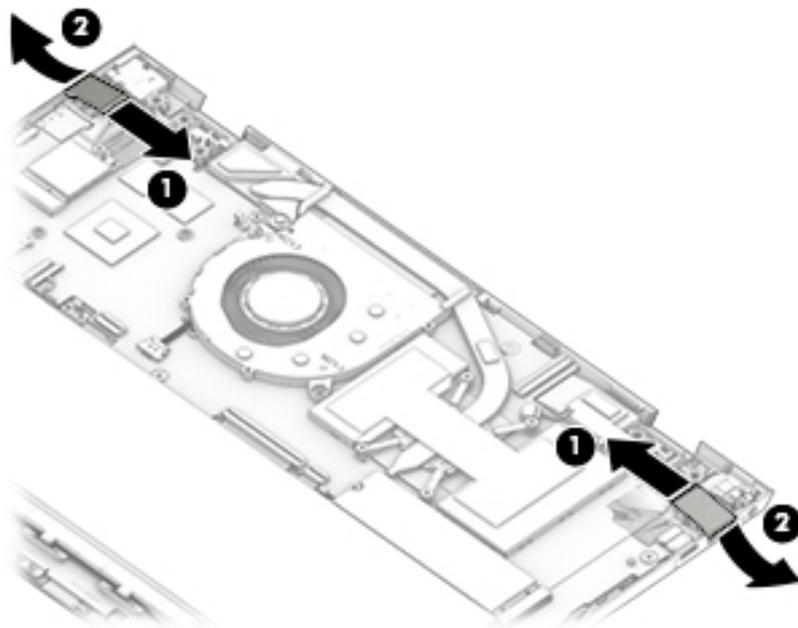
Before removing the USB door, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 24](#)).
2. Remove the bottom cover (see [Bottom cover on page 25](#)).

Remove the USB door:

- ▲ Push the USB door into the computer **(1)**, and then pull it away from the computer to remove it **(2)**.

 **TIP:** A clip on the bottom of the USB door attaches to the top of the USB port.



Reverse this procedure to install the USB doors.

 **TIP:** When installing the USB door, align the door over the USB port and gently push it into the computer so the clip on the bottom of the door catches the top of the USB port.

 **IMPORTANT:** Using too much force when installing the USB door may break the clip on the bottom of the door.

## System board



**NOTE:** All system board spare part kits include an integrated processor.

**Table 5-12 System board descriptions and part numbers**

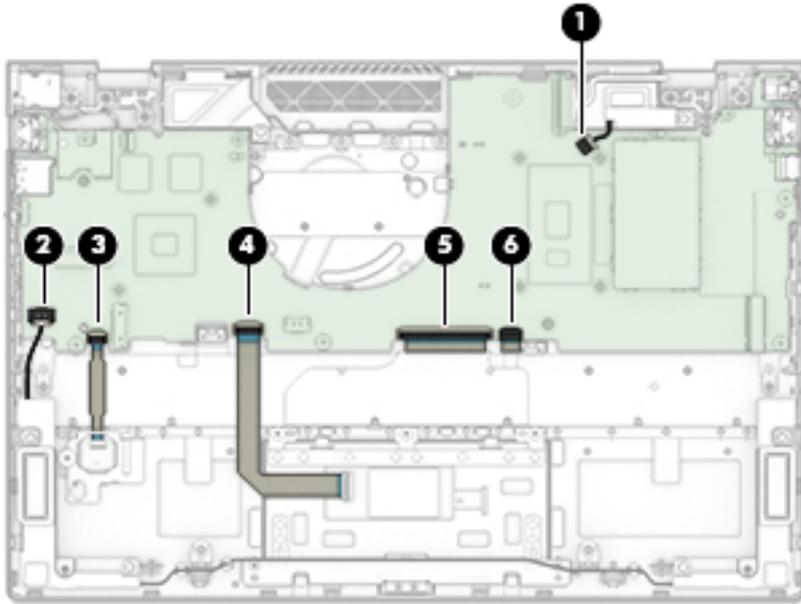
Description	Spare part number
System board for use in models with 2 GB of discrete graphics memory:	
• Intel Core i7-8565U processor and 16 GB of system memory	L53414-601
• Intel Core i7-8565U processor and 8 GB of system memory	L53413-601
• Intel Core i5-8265U processor and 8 GB of system memory	L53412-601
System board for use in models with UMA graphics memory:	
• Intel Core i7-8565U processor and 8 GB of system memory	L53411-601
• Intel Core i5-8265U processor and 8 GB of system memory	L53410-601

Before removing the system board, follow these steps:

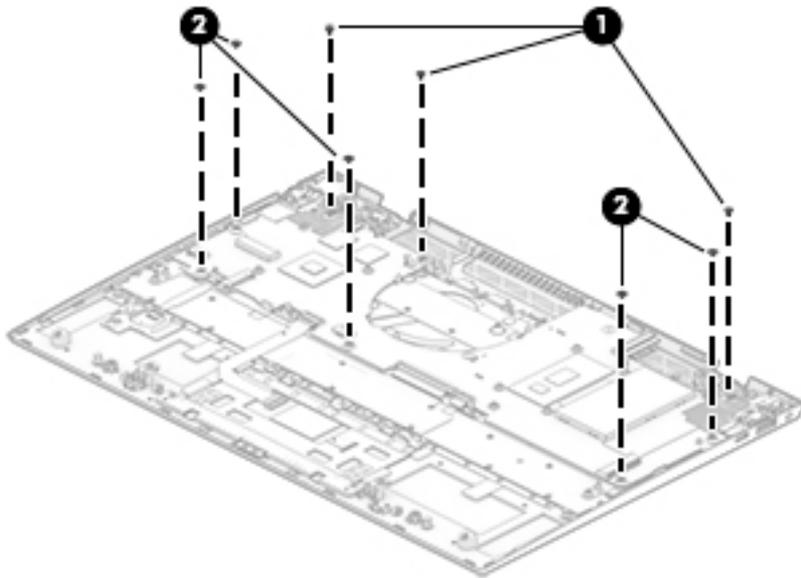
1. Prepare the computer for disassembly ([Preparation for disassembly on page 24](#)).
2. Remove the bottom cover (see [Bottom cover on page 25](#)).
3. Disconnect the battery (see [Battery on page 27](#)).
4. Remove the solid-state drive (see [Solid-state drive on page 28](#)).
5. Remove the WLAN module (see [WLAN module on page 29](#)).
6. Remove the fan (see [Fan on page 39](#)).

Remove the system board:

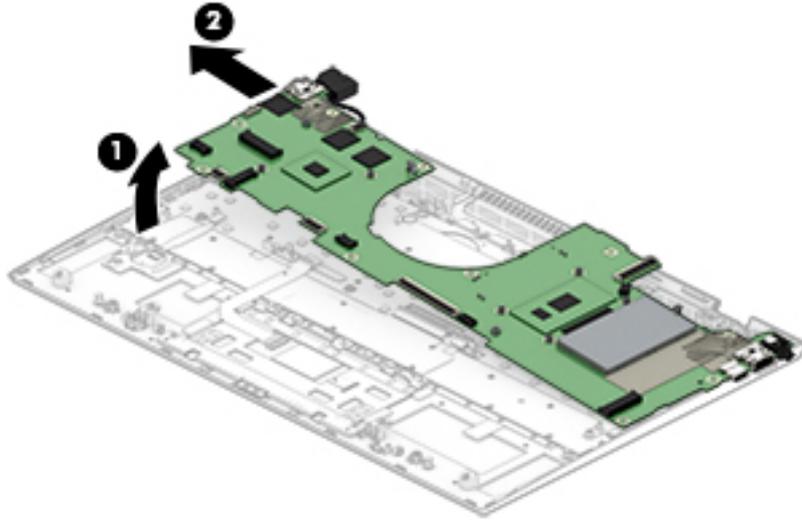
1. Disconnect the following cables:
  - (1) Rear speaker cable
  - (2) Front speaker cable
  - (3) Fingerprint reader cable
  - (4) TouchPad cable
  - (5) Keyboard cable
  - (6) Backlight cable



2. Remove the three Phillips M2.0 × 3.0 screws **(1)** and the five Phillips M2.0 × 2.0 screws **(2)** that secure the system board to the computer.



3. Lift the left side of the system board (1), and then pull the system board up and toward the left to remove it from the computer (2).



Reverse this process to install the system board.

## Rear speakers

**Table 5-13** Rear speaker description and part number

Description	Spare part number
Rear speaker kit	L19531-001

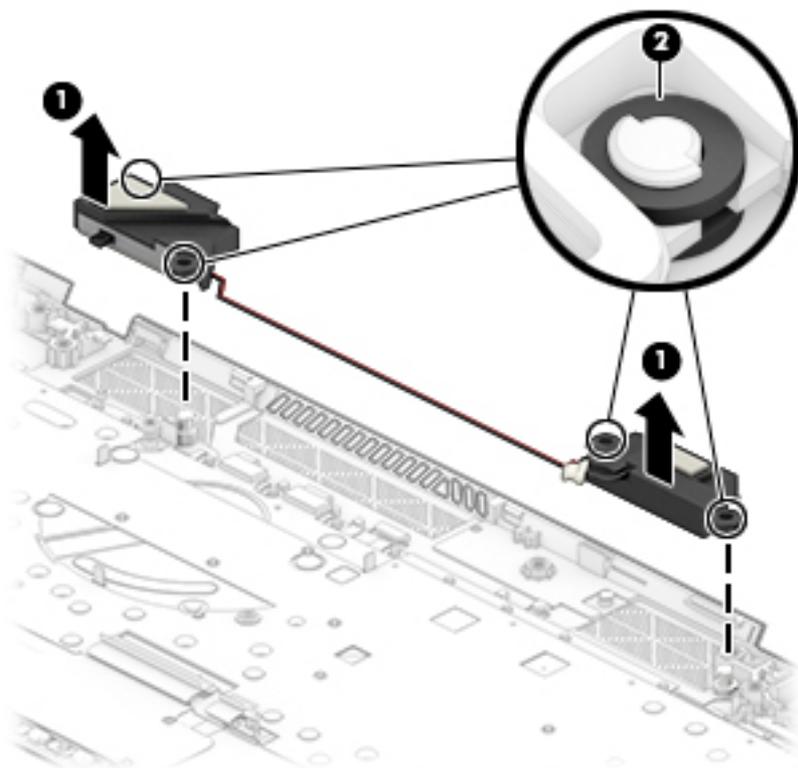
Before removing the rear speakers, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 24](#)).
2. Remove the bottom cover (see [Bottom cover on page 25](#)).
3. Disconnect the battery (see [Battery on page 27](#)).
4. Remove the solid-state drive (see [Solid-state drive on page 28](#)).
5. Remove the WLAN module (see [WLAN module on page 29](#)).
6. Remove the fan (see [Fan on page 39](#)).
7. Remove the system board (see [System board on page 41](#))

Remove the rear speakers:

- ▲ Lift the rear speakers out of the computer **(1)**.

 **TIP:** Make sure the rubber gaskets are installed in the holes in the speakers **(2)** when installing the speakers in the computer.



Reverse this procedure to install the rear speakers.

## Power connector

**Table 5-14 Power connector description and part number**

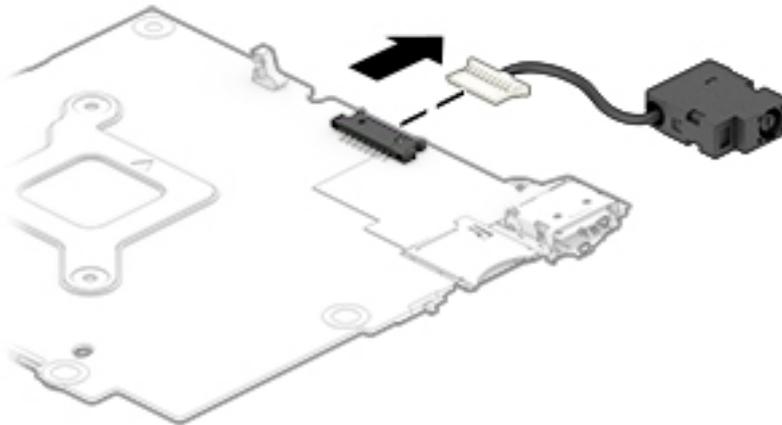
Description	Spare part number
Power connector	L53365-001

Before removing the power connector, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 24](#)).
2. Remove the bottom cover (see [Bottom cover on page 25](#)).
3. Remove the battery (see [Battery on page 27](#)).
4. Remove the solid-state drive (see [Solid-state drive on page 28](#)).
5. Remove the WLAN module (see [WLAN module on page 29](#)).
6. Remove the fan (see [Fan on page 39](#)).
7. Remove the system board (see [System board on page 41](#)).

Remove the power connector cable:

- ▲ Disconnect the power connector cable from the system board.



Reverse this procedure to install the power connector cable.

## Display assembly

**Table 5-15 Display assembly descriptions and numbers**

Description	Spare part number
Display assembly, non-touch (full hinge-up):	
• FHD, anti glare, privacy, in natural silver finish	L53366-001
• FHD, BrightView, in natural silver finish	L53367-001
• FHD, BrightView, in pale gold finish	L53368-001
• FHD, BrightView, in nightfall black finish	L53369-001
• FHD, BrightView, low power, in natural silver finish	L53370-001
• FHD, BrightView, low power, in pale gold finish	L53371-001
• FHD, BrightView, low power, in nightfall black finish	L53372-001
• UHD, BrightView, in natural silver finish	L53373-001
• UHD, BrightView, in pale gold finish	L53374-001
• UHD, BrightView, in nightfall black	L53375-001
Display assembly, touch display (full hinge-up):	
• FHD, BrightView, in natural silver finish	L53376-001
• FHD, BrightView, in pale gold finish	L53377-001
• FHD, BrightView, in nightfall black finish	L53378-001
• FHD, BrightView, low power, in natural silver finish	L53379-001
• FHD, BrightView, low power, in pale gold finish	L53380-001
• FHD, BrightView, low power, in nightfall black finish	L53381-001
• UHD, BrightView, in natural silver finish	L53382-001
• UHD, BrightView, in pale gold finish	L53383-001
• UHD, BrightView, in nightfall black finish	L53384-001

The display assembly is spared both as an entire hinge-up (direct bond display) and at the subcomponent level (non-glass display).

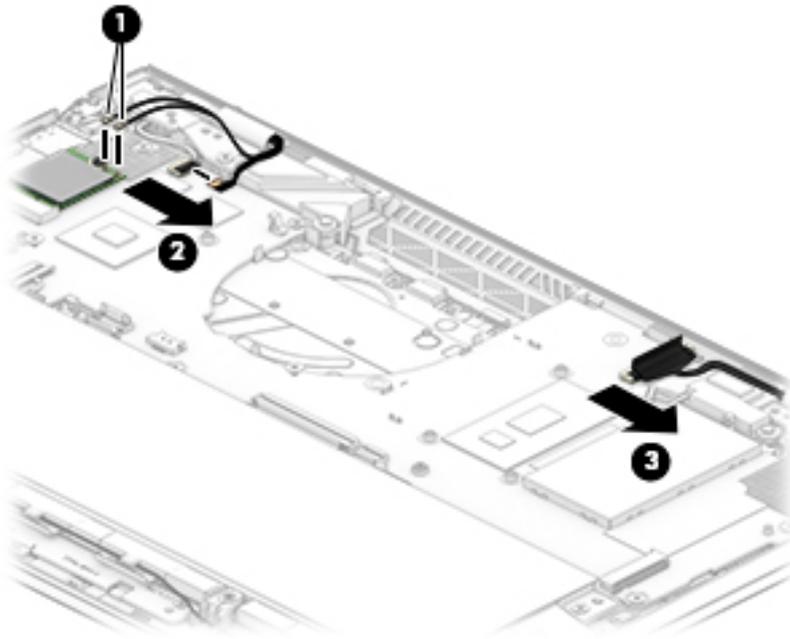
Before removing and disassembling the display assembly, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 24](#)).
2. Remove the bottom cover (see [Bottom cover on page 25](#)).
3. Disconnect the battery (see [Battery on page 27](#)).

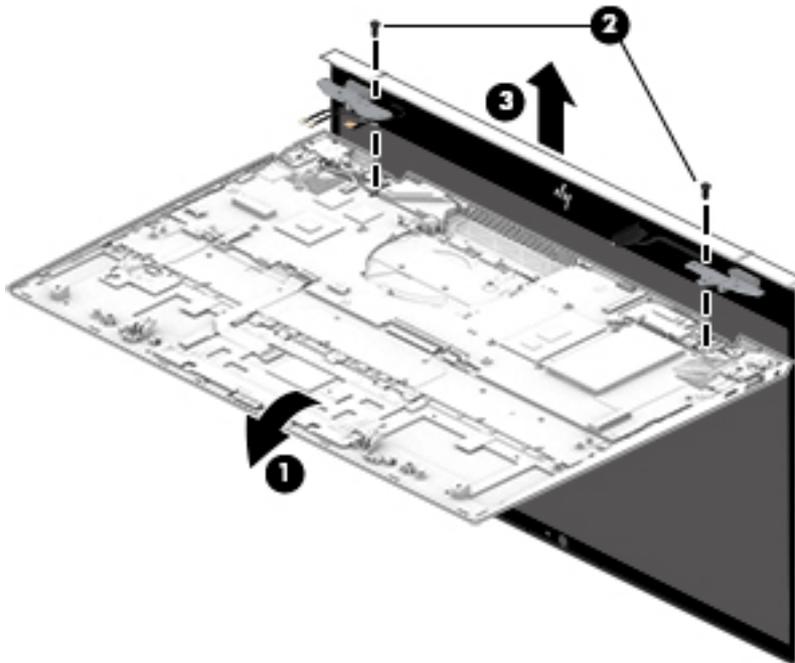
Remove the display assembly:

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

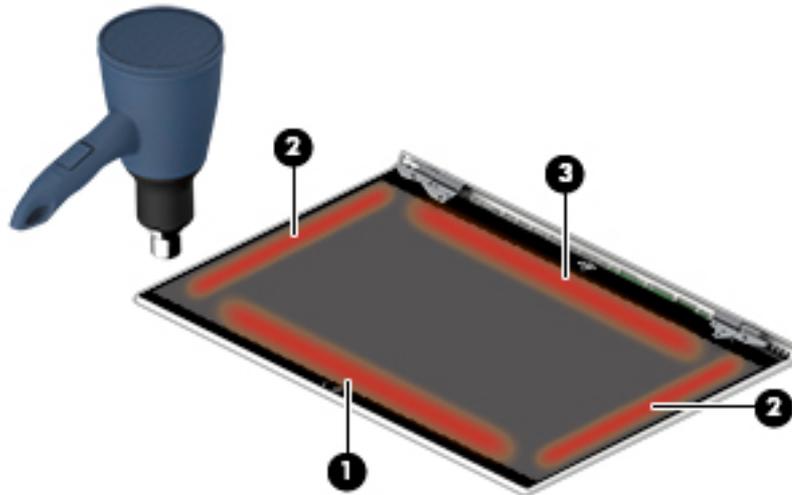
2. Disconnect the webcam cable from the ZIF connector on the system board **(2)**, and then disconnect the display cable from the ZIF connector on the system board **(3)**.



3. Open the display **(1)**, remove the two Phillips 2.5 × 6.0 screws **(2)**, and then detach the display panel **(3)**.

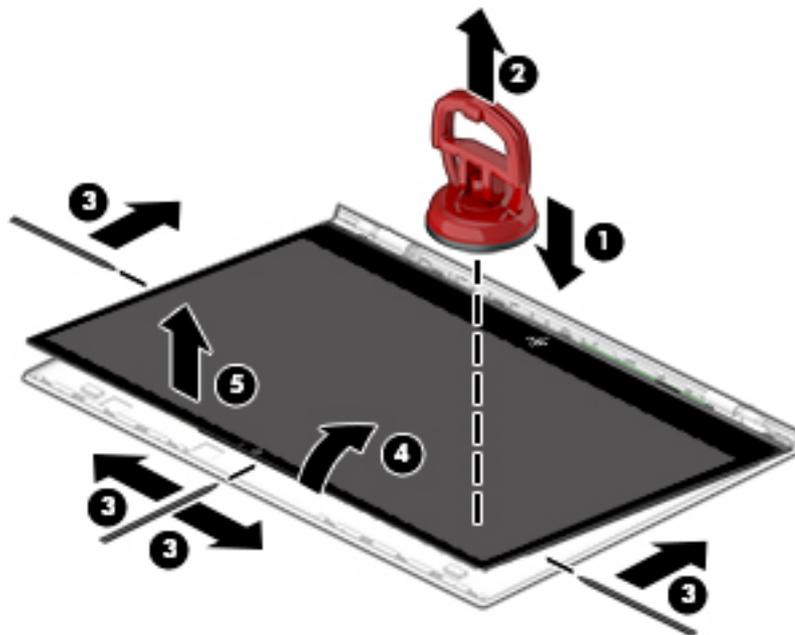


4. If it is necessary to remove the display panel (for non-glass display panel):
  - a. Heating the display panel makes the panel easier to remove. If you heat the panel, heat it along the top edge **(1)**, left and right sides **(2)**, and bottom edge **(3)**.



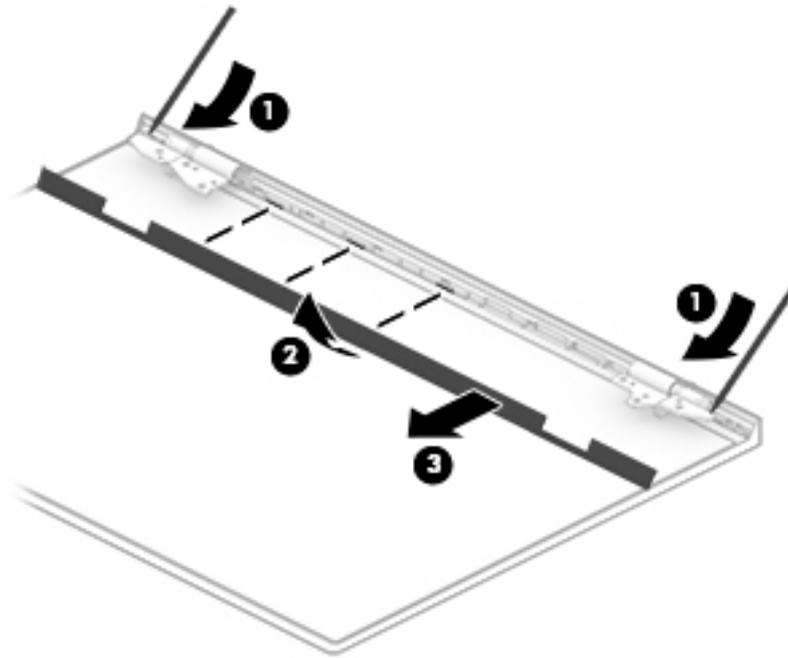
- b.** Attach a suction cup near a top corner of the display panel (1).
- c.** While pulling upward on the suction cup, use a non-marking, non-conductive tool to separate the panel from top and sides of the display enclosure (3).
- d.** Rotate the top of the panel upward (4), and then remove the panel from the display back cover (5).

Display panels are available using spare part number L53385-001.



- e. To remove the bottom bezel, use a non-marking, non-conductive tool to loosen the bezel from the display **(1)**, rotate the bezel away from the display **(2)**, and then remove the bezel **(3)**.

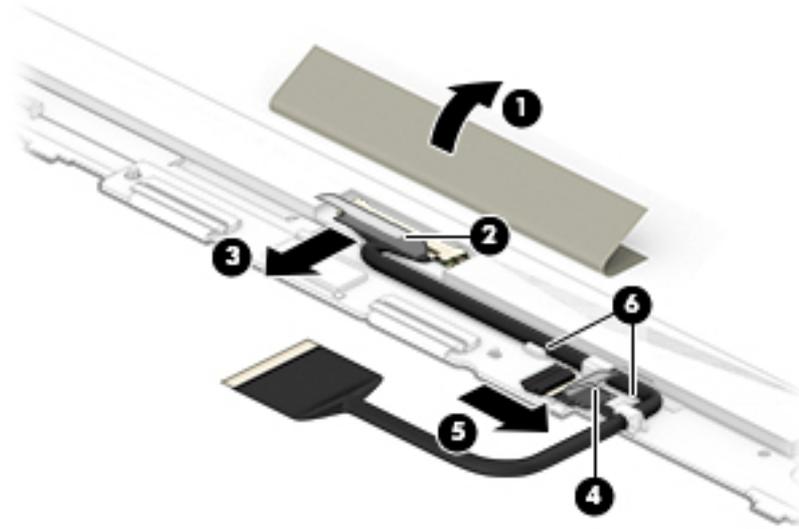
The bottom bezel is available using spare part number L54124-001.



- 5. If it is necessary to remove the display cable from the display panel:
  - a. Peel the large piece of tape that is installed over the display connector at the bottom of the panel **(1)**.
  - b. Peel the clear tape from the top of the display connector **(2)**.
  - c. Disconnect the cable from the display panel **(3)**.
  - d. (Touch screen models only) Remove the clear tape from the connector **(4)**, and then disconnect the cable from the touch control board **(5)**.

- e. Remove the cable from the clips in the display **(6)**.

The display cable is available using spare part number L54119-001.



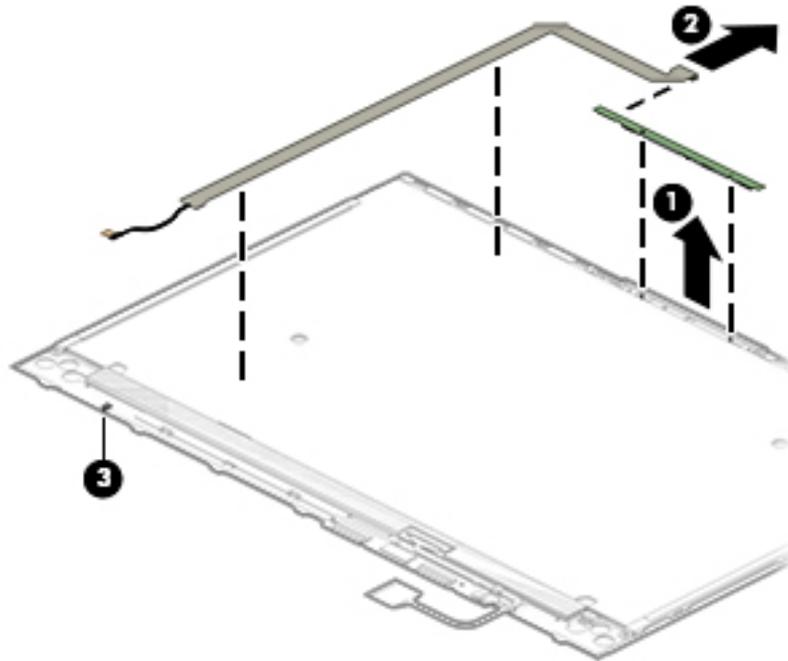
- 6. If it is necessary to replace the webcam module and/or webcam cable:
  - a. Lift evenly on both sides of the webcam module to detach the module from the display back cover **(1)**. The webcam module is attached to the display panel with adhesive.
  - b. Disconnect the cable **(2)** from the camera/microphone module.

- c. Lift the cable off the back of the display panel. The webcam cable is attached to the display panel with adhesive.

When installing the webcam cable, note clip alignment clip **(3)** at the bottom of the panel. Make sure you can install the thin part of the cable into the clip.

The webcam module is available using spare part number L54122-001.

The webcam cable is available using spare part number L53362-001.

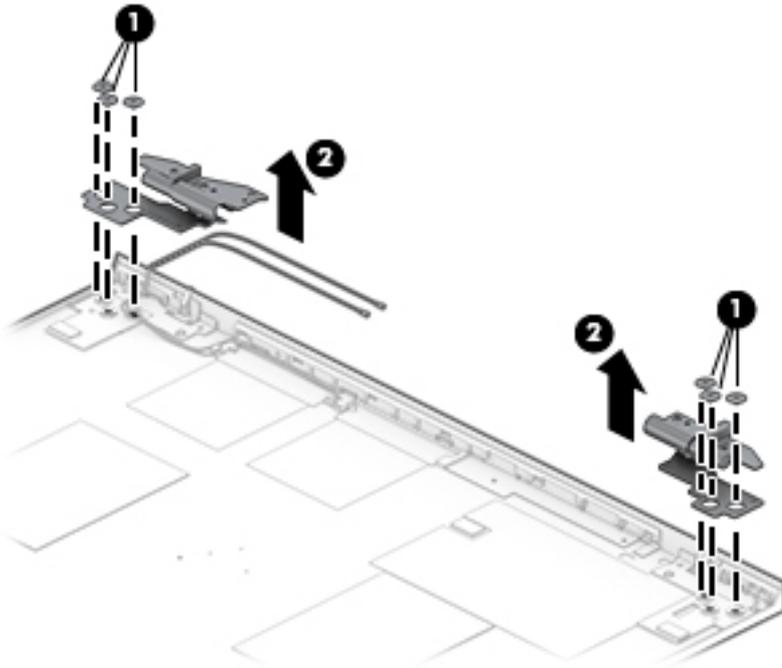


**7.** If it is necessary to replace the display hinges:

- a. Remove the three Phillips M2.0 × 2.3 screws **(1)** that secure each display hinge to the display back cover.

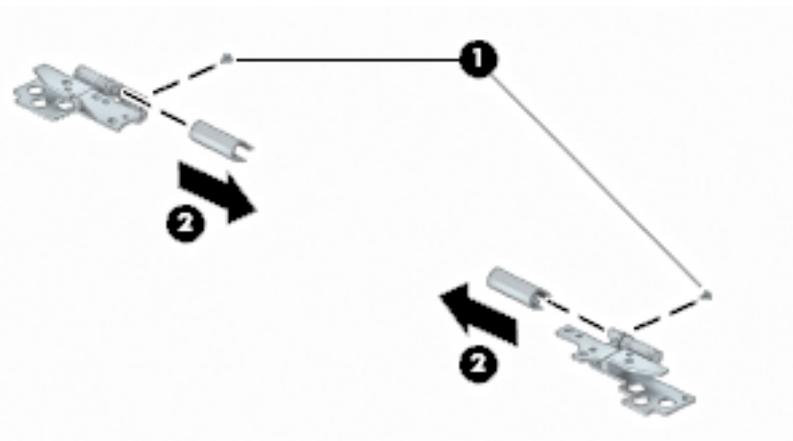
- b. Remove the display hinges (2).

The display hinges are available using spare part number L54121-001.



8. If it is necessary to remove the hinge covers from the hinges, remove the Phillips M1.6 × 2.5 screw from the inside of each hinge (1), and then slide the hinge covers off the hinges (2).

Hinge covers are available using spare part number L54120-001.



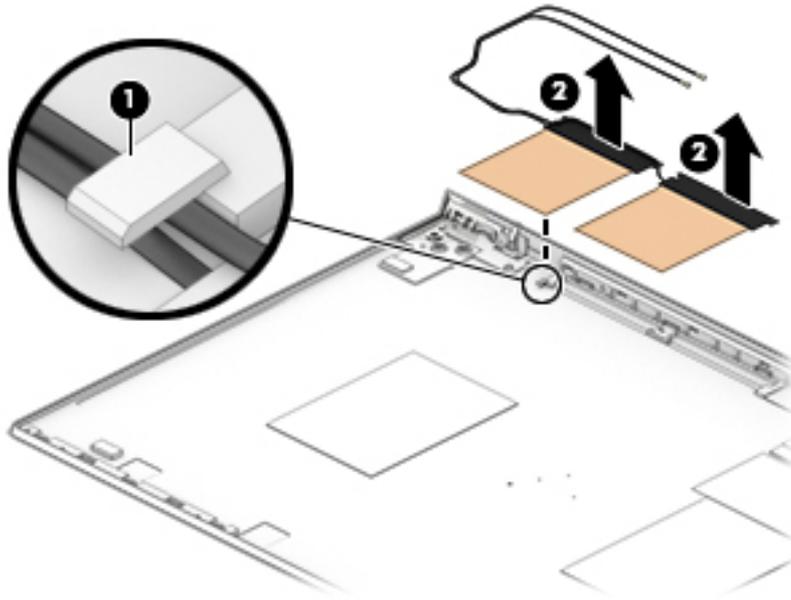
9. If it is necessary to replace the WLAN antennas and cables:

- a. Release the cables from the clip built into the bottom of the display back cover (1).

- b.** Peel the WLAN antennas (**2**) from the display back cover. (The antennas are attached to the display back cover with adhesive.)

The WLAN antennas and cables are available using spare part number L54118-001.

The display enclosure is available using spare part number L54117-001.



Reverse this procedure to replace the assembly.

## Top cover with keyboard

The top cover with keyboard remains after removing all other spared parts from the computer.

In this section, the first table provides the main spare part number for the keyboards. The second table provides the country codes.

**Table 5-16 Top cover with keyboard descriptions and part numbers**

Description	Spare part number
Top cover with keyboard, natural silver finish	L53415-xx1
Top cover with keyboard, natural silver finish with privacy filter	L53416-xx1
Top cover with keyboard, pale gold finish	L53417-xx1

**Table 5-17 Keyboard country codes**

For use in country or region	Spare part number	For use in country or region	Spare part number	For use in country or region	Spare part number
Belgium	-A41	Israel	-BB1	South Korea	-AD1
Bulgaria	-261	Italy	-061	Spain	-071
Czech Republic and Slovakia	-FL1	Latin America	-161	Switzerland	-BG1
Denmark, Finland, and Norway	-DH1	The Netherlands	-B31	Taiwan	-AB1
France	-051	Portugal	-131	Thailand	-281
French Canada	-DB1	Romania	-271	Turkey	-141
Germany	-041	Russia	-251	Ukraine	-BD1
Greece	-151	Saudi Arabia	-171	United Kingdom	-031
Hungary	-211	Slovenia	-BA1	United States	-001

---

# 6 Computer Setup (BIOS), TPM, and HP Sure Start

## Using Computer Setup

Computer Setup, 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). Computer Setup includes settings for the types of devices installed, the startup sequence of the computer, and the amount of system and extended memory.

---

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

---

## Starting Computer Setup

- ▲ Turn on or restart the computer, and when the HP logo appears, press **f10** to enter Computer Setup.

## Navigating and selecting in Computer Setup

- To select a menu or a menu item, use the **tab** key and the keyboard arrow keys and then press **enter**, or use a pointing device to select the item.
- To scroll up and down, select the up arrow or the down arrow in the upper-right corner of the screen, or use the up arrow key or the down arrow key on the keyboard.
- To close open dialog boxes and return to the main Computer Setup screen, press **esc**, and then follow the on-screen instructions.

To exit Computer Setup, choose one of the following methods:

- To exit Computer Setup menus without saving your changes, select **Main**, select **Ignore Changes and Exit**, and then select **Yes**.

---

 **NOTE:** If you are using arrow keys to highlight your choice, you must then press **enter**.

---

- To save your changes and exit Computer Setup menus, select **Main**, select **Save Changes and Exit**, and then select **Yes**.

---

 **NOTE:** If you are using arrow keys to highlight your choice, you must then press **enter**.

---

Your changes go into effect when the computer restarts.

## Restoring factory settings in Computer Setup

---

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

---

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

1. Start Computer Setup. See [Starting Computer Setup on page 55](#).
2. Select **Main**, select **Apply Factory Defaults and Exit**, and then select **Yes**.

---

 **NOTE:** If you are using arrow keys to highlight your choice, you must then press **enter**.

---

 **NOTE:** On select products, the selections may display **Restore Defaults** instead of **Apply Factory Defaults and Exit**.

---

Your changes go into effect when the computer restarts.

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

---

## Updating the BIOS

Updated versions of the 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 Computer Setup (BIOS), first determine the BIOS version on your computer.

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

1. Start Computer Setup. See [Starting Computer Setup on page 55](#).
2. Select **Main**, and then select **System Information**.
3. To exit Computer Setup menus without saving your changes, select **Main**, select **Ignore Changes and Exit**, and then select **Yes**.

 **NOTE:** If you are using arrow keys to highlight your choice, you must then press **enter**.

---

To check for later BIOS versions, see [Downloading a BIOS update on page 56](#).

## 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 on 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.

---

1. Type `support` in the taskbar search box, and then select the HP Support Assistant app.  
– or –  
Select the question mark icon in the taskbar.
2. Select **Updates**, and then select **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. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
- b. Follow the on-screen instructions to download your selection to the hard drive.

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

---

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

---

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

1. Type `file` in the taskbar search box, and then select **File Explorer**.
2. Select 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.

---

## Changing the boot order using the f9 prompt

To dynamically choose a boot device for the current startup sequence, follow these steps:

1. Access the Boot Device Options menu:
  - Turn on or restart the computer, and when the HP logo appears, press **f9** to enter the Boot Device Options menu.
2. Select a boot device, press **enter**, and then follow the on-screen instructions.

## TPM BIOS settings (select products only)

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 **IMPORTANT:** Before enabling Trusted Platform Module (TPM) functionality on this system, you must ensure that your intended use of TPM complies with relevant local laws, regulations and policies, and approvals or licenses must be obtained if applicable. For any compliance issues arising from your operation/usage of TPM which violates the above mentioned requirement, you shall bear all the liabilities wholly and solely. HP will not be responsible for any related liabilities.

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TPM provides additional security for your computer. You can modify the TPM settings in Computer Setup (BIOS).

---

 **NOTE:** If you change the TPM setting to Hidden, TPM is not visible in the operating system.

---

To access TPM settings in Computer Setup:

1. Start Computer Setup. See [Starting Computer Setup on page 55](#).
2. Select **Security**, select **TPM Embedded Security**, and then follow the on-screen instructions.

## Using HP Sure Start (select products only)

Select computer models are configured with HP Sure Start, a technology that monitors the computer's BIOS for attacks or corruption. If the BIOS becomes corrupted or is attacked, HP Sure Start automatically restores the BIOS to its previously safe state, without user intervention.

HP Sure Start is configured and already enabled so that most users can use the HP Sure Start default configuration. The default configuration can be customized by advanced users.

To access the latest documentation on HP Sure Start, go to <http://www.hp.com/support>. Select **Find your product**, and then follow the on-screen instructions.

---

# 7 Backing up, restoring, and recovering

This chapter provides information about the following processes, which are standard procedure for most products:

- **Backing up your personal information**—You can use Windows tools to back up your personal information (see [Using Windows tools on page 59](#)).
- **Creating a restore point**—You can use Windows tools to create a restore point (see [Using Windows tools on page 59](#)).
- **Creating recovery media** (select products only)—You can use the HP Cloud Recovery Download Tool (select products only) to create recovery media (see [Using the HP Cloud Recovery Download Tool to create recovery media \(select products only\) on page 59](#)).
- **Restoring and recovery**—Windows offers several options for restoring from backup, refreshing the computer, and resetting the computer to its original state (see [Using Windows tools on page 59](#)).

---

 **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 tablet to the keyboard base before beginning any recovery process.

---

## Backing up information and creating recovery media

### Using Windows tools

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 **IMPORTANT:** Windows is the only option that allows you to back up your personal information. Schedule regular backups to avoid information loss.

You can use Windows tools to back up personal information and create system restore points and recovery media.

---

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

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

1. Select the **Start** button, and then select the **Get Help** app.
2. Enter the task you want to perform.

---

 **NOTE:** You must be connected to the Internet to access the Get Help app.

---

### Using the HP Cloud Recovery Download Tool to create recovery media (select products only)

You can use the HP Cloud Recovery Download Tool to create HP Recovery media on a bootable USB flash drive.

To download the tool:

- ▲ Go to the Microsoft Store and search for HP Cloud Recovery.

For details, go to <http://www.hp.com/support>, search for HP Cloud Recovery, and then select "HP PCs – Using the Cloud Recovery Tool (Windows 10, 7)."



---

**NOTE:** If you cannot create recovery media yourself, contact support to obtain recovery discs. Go to <http://www.hp.com/support>, select your country or region, and then follow the on-screen instructions.

---

## Restoring and recovery

### Restoring, resetting, and refreshing using Windows tools

Windows offers several options for restoring, resetting, and refreshing the computer. For details, see [Using Windows tools on page 59](#).

### Recovering using HP Recovery media

HP Recovery media is used to recover the original operating system and software programs that were installed at the factory. On select products, it can be created on a bootable USB flash drive using the HP Cloud Recovery Download Tool. For details, see [Using the HP Cloud Recovery Download Tool to create recovery media \(select products only\) on page 59](#).



---

**NOTE:** If you cannot create recovery media yourself, contact support to obtain recovery discs. Go to <http://www.hp.com/support>, select your country or region, and then follow the on-screen instructions.

---

To recover your system:

- ▲ Insert the HP Recovery media, and then restart the computer.

### Changing the computer boot order

If your computer does not restart using the HP Recovery media, you can change the computer boot order. This 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, depending on the location of your HP Recovery media.

To change the boot order:



---

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

---

1. Insert the HP Recovery media.
2. Access the system **Startup** menu.

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, quickly hold down the volume up button, and then select **f9**.

– or –

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

3. Select the optical drive or USB flash drive from which you want to boot, and then follow the on-screen instructions.

# 8 Using HP PC Hardware Diagnostics

## Using HP PC Hardware Diagnostics Windows (select products only)

HP PC Hardware Diagnostics Windows is a Windows-based utility that allows you to run diagnostic tests to determine whether the computer hardware is functioning properly. The tool runs within the Windows operating system in order to diagnose hardware failures.

If HP PC Hardware Diagnostics Windows is not installed on your computer, first you must download and install it. To download HP PC Hardware Diagnostics Windows, see [Downloading HP PC Hardware Diagnostics Windows on page 61](#).

After HP PC Hardware Diagnostics Windows is installed, follow these steps to access it from HP Help and Support or HP Support Assistant.

1. To access HP PC Hardware Diagnostics Windows from HP Help and Support:
  - a. Select the **Start** button, and then select **HP Help and Support**.
  - b. Right-click **HP PC Hardware Diagnostics Windows**, select **More**, and then select **Run as administrator**.

– or –

To access HP PC Hardware Diagnostics Windows from HP Support Assistant:

- a. Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.
- or –
- a. Select the question mark icon in the taskbar.
  - b. Select **Troubleshooting and fixes**.
  - c. Select **Diagnostics**, and then select **HP PC Hardware Diagnostics Windows**.
2. When the 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 at any time, select **Cancel**.

When HP PC Hardware Diagnostics Windows detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. The screen displays one of the following options:

- A Failure ID link is displayed. Select the link and follow the on-screen instructions.
- A Quick Response (QR) code is displayed. With a mobile device, scan the code and then follow the on-screen instructions.
- Instructions for calling support are displayed. Follow those instructions.

## Downloading HP PC Hardware Diagnostics Windows

- The HP PC Hardware Diagnostics Windows download instructions are provided in English only.
- You must use a Windows computer to download this tool because only .exe files are provided.

## Downloading the latest HP PC Hardware Diagnostics Windows version

To download HP PC Hardware Diagnostics Windows, follow these steps:

1. Go to <http://www.hp.com/go/techcenter/pcdiags>. The HP PC Diagnostics home page is displayed.
2. Select **Download HP Diagnostics Windows**, and then select a location on your computer or a USB flash drive.

The tool is downloaded to the selected location.

## Downloading HP Hardware Diagnostics Windows by product name or number (select products only)

---

 **NOTE:** For some products, it may be necessary to download the software to a USB flash drive by using the product name or number.

---

To download HP PC Hardware Diagnostics Windows by product name or number, follow these steps:

1. Go to <http://www.hp.com/support>.
2. Select **Get software and drivers**, select your type of product, and then enter the product name or number in the search box that is displayed.
3. In the **Diagnostics** section, select **Download**, and then follow the on-screen instructions to select the specific Windows diagnostics version to be downloaded to your computer or USB flash drive.

The tool is downloaded to the selected location.

## Installing HP PC Hardware Diagnostics Windows

To install HP PC Hardware Diagnostics Windows, follow these steps:

- ▲ Navigate to the folder on your computer or the USB flash drive where the .exe file was downloaded, double-click the .exe file, and then follow the on-screen instructions.

## Using HP PC Hardware Diagnostics UEFI

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 **NOTE:** For Windows 10 S computers, you must use a Windows computer and a USB flash drive to download and create the HP UEFI support environment because only .exe files are provided. For more information, see [Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive on page 63](#).

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HP PC Hardware Diagnostics UEFI (Unified Extensible Firmware Interface) 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.

If your PC will not boot into Windows, you can use HP PC Hardware Diagnostics UEFI to diagnose hardware issues.

When HP PC Hardware Diagnostics Windows detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. For assistance in solving the problem:

- ▲ Select **Get Support**, and then use a mobile device to scan the QR code that displays on the next screen. The HP Customer Support - Service Center page displays, with your Failure ID and product number automatically filled in. Follow the on-screen instructions.

– or –

Contact support, and provide the Failure ID code.

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

 **NOTE:** If you need to stop a diagnostic test, press [esc](#).

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## Starting HP PC Hardware Diagnostics UEFI

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 flash drive

 **NOTE:** To download the HP PC Hardware Diagnostics UEFI tool to a USB flash drive, see [Downloading the latest HP PC Hardware Diagnostics UEFI version on page 63](#).

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- b. Hard drive

- c. BIOS

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

## Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive

Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive can be useful in the following situations:

- HP PC Hardware Diagnostics UEFI is not included in the preinstall image.
- HP PC Hardware Diagnostics UEFI is not included in the HP Tool partition.
- The hard drive is damaged.

 **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 provided.

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## Downloading the latest HP PC Hardware Diagnostics UEFI version

To download the latest HP PC Hardware Diagnostics UEFI version to a USB flash drive:

1. Go to <http://www.hp.com/go/techcenter/pcdiags>. The HP PC Diagnostics home page is displayed.
2. Select **Download HP Diagnostics UEFI**, and then select **Run**.

## Downloading HP PC Hardware Diagnostics UEFI by product name or number (select products only)

 **NOTE:** For some products, it may be necessary to download the software to a USB flash drive by using the product name or number.

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To download HP PC Hardware Diagnostics UEFI by product name or number (select products only) to a USB flash drive:

1. Go to <http://www.hp.com/support>.
2. Enter the product name or number, select your computer, and then select your operating system.
3. In the **Diagnostics** section, follow the on-screen instructions to select and download the specific UEFI Diagnostics version for your computer.

## Using Remote HP PC Hardware Diagnostics UEFI settings (select products only)

Remote HP PC Hardware Diagnostics UEFI is a firmware (BIOS) feature that downloads HP PC Hardware Diagnostics UEFI to your computer. It can then execute the diagnostics on your computer, and it may upload results to a preconfigured server. For more information about Remote HP PC Hardware Diagnostics UEFI, go to <http://www.hp.com/go/techcenter/pcdiags>, and then select **Find out more**.

### Downloading Remote HP PC Hardware Diagnostics UEFI



**NOTE:** HP Remote PC Hardware Diagnostics UEFI is also available as a Softpaq that can be downloaded to a server.

### Downloading the latest Remote HP PC Hardware Diagnostics UEFI version

To download the latest Remote HP PC Hardware Diagnostics UEFI version, follow these steps:

1. Go to <http://www.hp.com/go/techcenter/pcdiags>. The HP PC Diagnostics home page is displayed.
2. Select **Download Remote Diagnostics**, and then select **Run**.

### Downloading Remote HP PC Hardware Diagnostics UEFI by product name or number



**NOTE:** For some products, it may be necessary to download the software by using the product name or number.

To download HP Remote PC Hardware Diagnostics UEFI by product name or number, follow these steps:

1. Go to <http://www.hp.com/support>.
2. Select **Get software and drivers**, select your type of product, enter the product name or number in the search box that is displayed, select your computer, and then select your operating system.
3. In the **Diagnostics** section, follow the on-screen instructions to select and download the **Remote UEFI** version for the product.

## Customizing Remote HP PC Hardware Diagnostics UEFI settings

Using the Remote HP PC Hardware Diagnostics setting in Computer Setup (BIOS), you can perform the following customizations:

- Set a schedule for running diagnostics unattended. You can also start diagnostics immediately in interactive mode by selecting **Execute Remote HP PC Hardware Diagnostics**.
- Set the location for downloading the diagnostic tools. This feature provides access to the tools from the HP website or from a server that has been preconfigured for use. Your computer does not require the traditional local storage (such as a disk drive or USB flash drive) to run remote diagnostics.

- Set a location for storing the test results. You can also set the user name and password settings used for uploads.
- Display status information about the diagnostics run previously.

To customize Remote HP PC Hardware Diagnostics UEFI settings, follow these steps:

1. Turn on or restart the computer, and when the HP logo appears, press **f10** to enter Computer Setup.
2. Select **Advanced**, and then select **Settings**.
3. Make your customization selections.
4. Select **Main**, and then **Save Changes and Exit** to save your settings.

Your changes take effect when the computer restarts.

# 9 Specifications

## Computer specifications

**Table 9-1 Computer specifications**

	<b>Metric</b>	<b>U.S.</b>
<b>Dimensions</b>		
Width	<b>300.0 mm</b>	11.83 in
Depth	<b>210.8 mm</b>	8.30 in
Height	<b>14.7 mm</b>	0.58 in
<b>Weight</b> (varies by configuration)	<b>1200 g or 1280 g</b>	2.67 lb or 2.82 lb
<b>Input power</b>		
Operating voltage and current	19.5 V dc @ 3.33 A – 65 W	
<b>Temperature</b>		
Operating	<b>5°C to 35°C</b>	41°F to 95°F
Nonoperating	<b>-20°C to 60°C</b>	-4°F to 140°F
<b>Relative humidity</b> (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
<b>Maximum altitude</b> (unpressurized)		
Operating	<b>-15 m to 3,048 m</b>	-50 ft to 10,000 ft
Nonoperating	<b>-15 m to 12,192 m</b>	-50 ft to 40,000 ft
<b>NOTE:</b> Applicable product safety standards specify thermal limits for plastic surfaces. The device operates well within this range of temperatures.		

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# 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 V ac, or from 220 to 240 V 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 or regions must meet the requirements of the country and 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** (3.3 ft) and no more than **2.0 m** (6.5 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 A and a nominal voltage rating of 125 or 250 V ac, as required by the power system of each country or region.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

## Requirements for specific countries and regions

**Table 10-1 Power cord requirements for specific countries and regions**

Country/region	Accredited agency	Applicable note number
Argentina	IRAM	1
Australia	SAA	1
Austria	OVE	1
Belgium	CEBEC	1
Brazil	ABNT	1
Canada	CSA	2
Chile	IMQ	1
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
India	BIS	1
Israel	SII	1
Italy	IMQ	1
Japan	JIS	3
The Netherlands	KEMA	1
New Zealand	SANZ	1
Norway	NEMKO	1
The People's Republic of China	CCC	4
Saudi Arabia	SASO	7
Singapore	PSB	1
South Africa	SABS	1
South Korea	KTL	5
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	6
Thailand	TISI	1
The United Kingdom	ASTA	1
The United States	UL	2

1. The flexible cord must be Type H05VV-F, 3-conductor, 0.75 mm<sup>2</sup> 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.

**Table 10-1 Power cord requirements for specific countries and regions (continued)**

Country/region	Accredited agency	Applicable note number
		2. The flexible cord must be Type SVT/SJT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V ac) or NEMA 6-15P (15 A, 250 V ac) configuration. CSA or C-UL mark. UL file number must be on each element.
		3. The appliance coupler, flexible cord, and wall plug must bear a “T” mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCTF, 3-conductor, 0.75 mm <sup>2</sup> or 1.25 mm <sup>2</sup> conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration.
		4. The flexible cord must be Type RVV, 3-conductor, 0.75 mm <sup>2</sup> conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.
		5. The flexible cord must be Type H05VV-F 3-conductor, 0.75 mm <sup>2</sup> conductor size. KTL logo and individual approval number must be on each element. Corset approval number and logo must be printed on a flag label.
		6. The flexible cord must be Type HVCTF 3-conductor, 1.25 mm <sup>2</sup> conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.
		7. For 127 V ac, the flexible cord must be Type SVT or SJT 3-conductor, 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type H05VV-F 3-conductor, 0.75 mm <sup>2</sup> or 1.00 mm <sup>2</sup> conductor size, with plug BS 1363/A with BSI or ASTA marks.

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# 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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