



HP Pavilion 14 Laptop PC

Maintenance and Service Guide
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Product notice

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

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

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

Safety warning notice


 **WARNING!** To reduce the possibility of heat-related injuries or of overheating the device, do not place the device directly on your lap or obstruct the device air vents. Use the device only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The device and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950-1).

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1 Product description

Category	Description	8th Gen, Discrete	7th Gen, UMA	7th Gen, Discrete
Product name	HP Pavilion 14 Laptop PC		✓	✓
	<i>* Model numbers: 14-bf000 – bf099</i>			
	<i>* Model numbers: 14-bf100 – bf199</i>	✓		
Processor	8th generation Intel® Core™ processors	✓		
	Intel Core i7-8550U (1.8-GHz, turbo up to 4.0 GHz, 2400 MHz/8-MB L3 cache, quad, 15W)	✓		
	Intel Core i5-8250U (1.6-GHz, turbo up to 3.4 GHz, 2400-MHz/6-MB L3 cache, quad, 15W)	✓		
	7th generation Intel Core processors		✓	✓
	Intel Core i7-7500U (2.7-GHz, turbo up to 3.5 GHz, 2133 MHz/4-MB L3 cache, dual, 15W)			✓
	Intel Core i5-7200U (2.5-GHz, turbo up to 3.1 GHz, 2133-MHz/3-MB L3 cache, dual, 15W)		✓	✓
	Intel Core i3-7100U (2.4-GHz, 2133-MHz/3-MB L3 cache, dual, 15W)		✓	
	Intel Pentium® processor		✓	✓
	Intel Pentium 4415U (2.3-GHz, 2133-MHz/2-MB L3 cache, dual, 15W)		✓	
Graphics	Internal graphics		✓	
	Intel HD Graphics 620		✓	
	Intel HD Graphics 610 (Pentium)		✓	
	Hybrid graphics			✓
	Nvidia N16S-GTR (GeForce 940MX) with up to 4096 MB of dedicated video memory	✓		
	Nvidia N16S-GTR (GeForce 940MX) with up to 2048 MB of dedicated video memory	✓		✓
	Supports HD Decode, DX12, and HDMI	✓	✓	✓
	Supports Optimus	✓		✓
	Supports GPS (GPU Performance Scaling)	✓		✓
Panel	16:9 Ultra Wide Aspect Ratio	✓	✓	✓
	35.6-cm (14.0-in), full high-definition (FHD), white light-emitting diode (WLED), UWVA, BrightView (1920×1080) display, slim-flat 3.0 mm, eDP, 45% color gamut; typical brightness: 250 nits, bridge to 220 nits	✓	✓	✓
Memory	Two non-accessible/non-upgradeable memory module slots	✓	✓	✓
	DDR4-2400 dual channel support	✓		

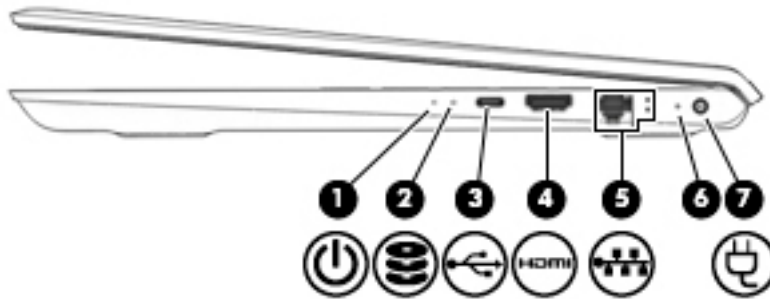
Category	Description	8th Gen, Discrete	7th Gen, UMA	7th Gen, Discrete
	DDR4-2133 dual channel support (DDR4-2400 downgrade to DDR4-2133)		✓	✓
	Supports up to 16 GB of system RAM in the following configurations:	✓	✓	✓
	• 16384-MB total system memory (8192×2)	✓	✓	✓
	• 12288-MB total system memory (8192×1) + (4096×1)	✓	✓	✓
	• 8192-MB total system memory (8192×1) or (4096×2)	✓	✓	✓
	• 6144-MB total system memory (4096×1) + (2048×1)	✓	✓	✓
	• 4096-MB total system memory (4096×1)	✓	✓	✓
Storage	Supports 6.35 cm (2.5 in) SATA hard drives in 9.5 mm (.37-in) and 7.0 mm/7.2 mm (.28-in) thicknesses	✓	✓	✓
	Support for SSD + HDD	✓	✓	✓
	Support for M.2 SATA SSD	✓	✓	✓
	Accelerometer/hard drive protection support	✓	✓	✓
	Single hard drive configurations:	✓	✓	✓
	• 2-TB, 5400 rpm, 7.0/7.2 mm	✓	✓	✓
	• 1-TB, 5400 rpm, 7.0/7.2 mm	✓	✓	✓
	• 500-GB, 5400 rpm, 7.0/7.2 mm	✓	✓	✓
	M.2 SATA-3 configurations (TLC):	✓	✓	✓
	• 512 GB	✓	✓	✓
	• 256 GB	✓	✓	✓
	• 128 GB		✓	✓
	Dual storage configurations:	✓	✓	✓
	• 256 GB SATA TLC SSD + 1 TB HDD	✓	✓	✓
	• 128 GB SATA TLC SSD + 2 TB HDD	✓	✓	✓
	• 128 GB SATA TLC SSD + 1 TB HDD	✓	✓	✓
	• 128 GB SATA TLC SSD + 500 GB HDD	✓	✓	✓
Camera	HP Wide Vision FHD IR Camera - indicator LED and 2x IR LEDs, USB2.0, FHD hybrid BSI sensor, f2.2, WDR, 88° WFOV	✓	✓	✓
	1080p by 30 frames per second	✓	✓	✓
	Supports Windows Hello	✓	✓	✓
	Dual array digital microphones with appropriate software - beam forming, echo cancellation, noise suppression	✓	✓	✓
	HP Wide Vision HD Camera - indicator LED, USB2.0, HD BSI sensor, f2.0, WDR, 88° WFOV	✓	✓	✓
	720p by 30 frames per second	✓	✓	✓






Category	Description	8th Gen, Discrete	7th Gen, UMA	7th Gen, Discrete
	Dual array digital microphones with appropriate software – beam forming, echo cancellation, noise suppression	√	√	√
	Supports WDR (Wide Dynamic Range)	√	√	√
Audio	Audio brand: B&O Play	√	√	√
	Supports HP Audio Boost	√	√	√
	Dual speakers	√	√	√
Ethernet	Integrated 10/100/1000 network interface card (NIC)	√	√	√
Sensors	Accelerometer	√	√	√
Wireless Network	Integrated wireless options with single antenna (M.2/PCIe):	√	√	√
	Compatible with Miracast-certified devices	√	√	√
	Support for the following WLAN formats:	√	√	√
	<ul style="list-style-type: none"> Realtek RTL8723DE 802.11 bgn 1x1 WiFi + Bluetooth 4.2 Combo Adapter 	√	√	√
	<ul style="list-style-type: none"> Realtek RTL8723BE-VB 802.11b/g/n 1x1 Wi-Fi + Bluetooth 4.0 Combo Adapter 	√	√	√
	Integrated wireless options with dual antennas (M.2/PCIe):	√	√	√
	Compatible with Miracast-certified devices	√	√	√
	Support for the following WLAN formats:	√	√	√
	<ul style="list-style-type: none"> Intel Dual Band Wireless-AC 3168 802.11ac 1x1 WiFi + Bluetooth 4.2 Combo (non-vPro) 	√	√	√
	<ul style="list-style-type: none"> Intel Dual Band Wireless-AC 7265 802.11ac 2x2 WiFi + Bluetooth 4.2 Combo Adapter (non-vPro) 	√	√	√
External media card	HP Multi-Format Digital Media Reader	√	√	√
	Supports SD/SDHC/SDXC	√	√	√
	Push-push insertion/removal	√	√	√
Internal Card Expansion	One M.2 slot for solid-state drive	√	√	√
	One M.2 slot for WLAN	√	√	√
Ports	HDMI v1.4b supporting up to 1920×1080 @ 60Hz	√	√	√
	RJ-45 (Ethernet)	√	√	√
	USB 3.0 (2)	√	√	√
	USB 3.1 Gen 1 Type-C port (supports data transfer)	√	√	√
	AC Smart Pin adapter plug	√	√	√
	Headphone/line out and microphone/line in combo jack	√	√	√
Keyboard/ pointing devices	Keyboard	√	√	√
	Full-sized, textured, island style keyboard	√	√	√
	Full sized, backlit, 3-coat paint, island-style keyboard	√	√	√

Category	Description	8th Gen, Discrete	7th Gen, UMA	7th Gen, Discrete
	TouchPad	✓	✓	✓
	Image sensor	✓	✓	✓
	Multi-touch gestures enabled	✓	✓	✓
	Taps enabled by default	✓	✓	✓
	Supports Modern Trackpad Gestures	✓	✓	✓
Power	AC adapters	✓	✓	✓
	45-W		✓	
	65-W EM			✓
	90-W	✓		
	Power cord	✓	✓	✓
	1 meter conventional power cord with sticker label (C5)	✓	✓	✓
	Battery	✓	✓	✓
	3-cell, Prismatic battery, 41-Whr, 3610 mAh	✓	✓	✓
	Supports battery fast charge	✓	✓	✓
	Supports battery life enhancement	✓	✓	✓
Security	TPM 2.0	✓	✓	✓
	Kensington Security Lock	✓	✓	✓
Operating system	Preinstalled	✓	✓	✓
	Windows 10	✓	✓	✓
	Windows 10 Professional	✓	✓	✓
	For Developed Market (ML):	✓	✓	✓
	Windows 10 Home ML	✓	✓	✓
	Windows 10 Home Plus ML	✓	✓	✓
	For Emerging Market (EM/SL):	✓	✓	✓
	Windows 10 Home EM/SL	✓	✓	✓
	Windows 10 Home Plus EM/SL	✓	✓	✓
	For China Market:	✓	✓	✓
	CPPP Windows 10 Home High End China Language Edition	✓	✓	✓
	CPPP Windows 10 Home China Language Edition	✓	✓	✓
	FreeDOS 2.0	✓	✓	✓
Service	End-user replaceable parts	✓	✓	✓
	AC adapter	✓	✓	✓

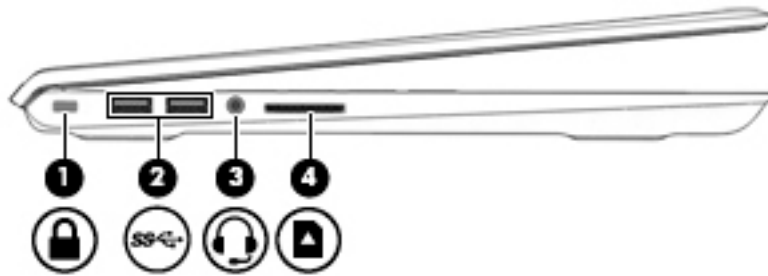
2 Getting to know your computer





Right side



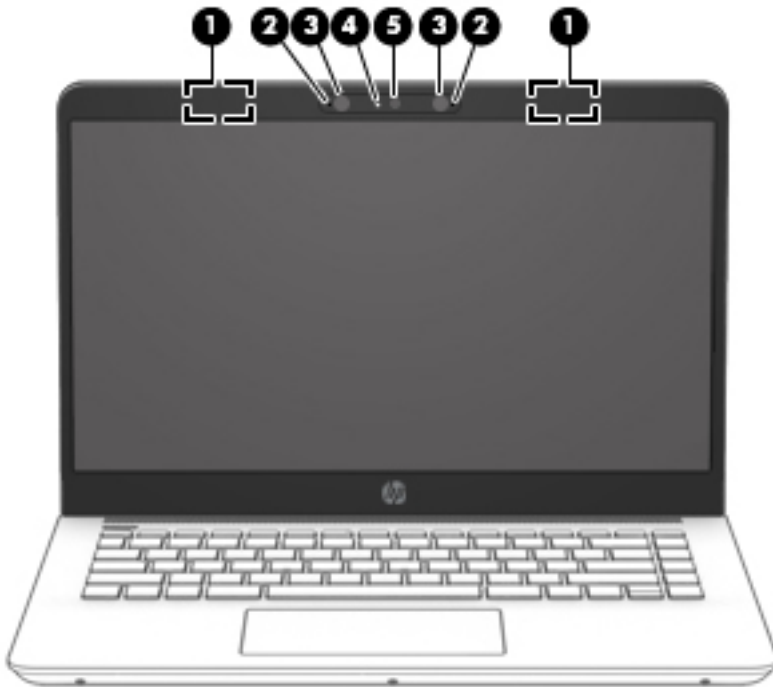
Component	Description
(1) 	<p>Power light</p> <ul style="list-style-type: none"> On: The computer is on. Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components. Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.
(2) 	<p>Drive light (select products only)</p> <ul style="list-style-type: none"> Blinking white: The hard drive is being accessed. Amber: HP 3D DriveGuard has temporarily parked the hard drive.
(3) 	<p>USB Type-C 3.x charging port (select products only)</p> <p>When the computer is on, connects and charges a USB device that has a Type-C connector, such as a cell phone, camera, activity tracker, or smartwatch, and provides high-speed data transfer.</p> <p>– or –</p> <p>Connects to various USB, video, HDMI, and LAN devices.</p> <p>NOTE: Cables and/or adapters (purchased separately) may be required.</p>
(4) 	<p>HDMI port</p> <p>Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed High-Definition Multimedia Interface (HDMI) device.</p>
(5) 	<p>RJ-45 (network) jack/status lights</p> <p>Connects a network cable.</p> <ul style="list-style-type: none"> White: The network is connected. Amber: Activity is occurring on the network.
(6)	<p>AC adapter and battery light</p> <ul style="list-style-type: none"> White: The AC adapter is connected and the battery is fully charged. Blinking white: The AC adapter is disconnected and the battery has reached a low battery level. Amber: The AC adapter is connected and the battery is charging. Off: The battery is not charging.
(7)	<p>Power connector</p> <p>Connects an AC adapter.</p>

Left side



Component	Description
(1) 	<p>Security cable slot</p> <p>Attaches an optional security cable to the computer.</p> <p>NOTE: The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.</p>
(2) 	<p>USB 3.x SuperSpeed ports (2)</p> <p>Connect a USB device, such as a cell phone, camera, activity tracker, or smartwatch, and provides high-speed data transfer.</p>
(3) 	<p>Audio-out (headphone)/ Audio-in (microphone) combo jack</p> <p>Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional standalone microphones.</p> <p>WARNING! To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, see the <i>Regulatory, Safety, and Environmental Notices</i>.</p> <p>To access this guide:</p> <ul style="list-style-type: none">▲ Select the Start button, select HP Help and Support, and then select HP Documentation. <p>NOTE: When a device is connected to the jack, the computer speakers are disabled.</p>
(4) 	<p>Memory card reader (select products only)</p> <p>Reads optional memory cards that enable you to store, manage, share, or access information.</p> <p>To insert a card:</p> <ol style="list-style-type: none">1. Hold the card label-side up, with connectors facing the computer.2. Insert the card into the memory card reader, and then press in on the card until it is firmly seated. <p>To remove a card:</p> <ul style="list-style-type: none">▲ Press in on the card, and then remove it from the memory card reader.

Display



Component	Description
(1) WLAN antennas* (1 or 2)	Send and receive wireless signals to communicate with wireless local area networks (WLANs).
(2) Internal microphones (1 or 2)	Record sound.
(3) Infrared camera lights (select models only)	On: The infrared camera is in use.
(4) Camera lights	On: One or more cameras are in use.
(5) Camera(s)	Allow you to video chat, record video, and record still images. Some cameras also allow a facial recognition logon to Windows instead of a password logon. NOTE: Camera functions vary depending on the camera hardware and software installed on your product.

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

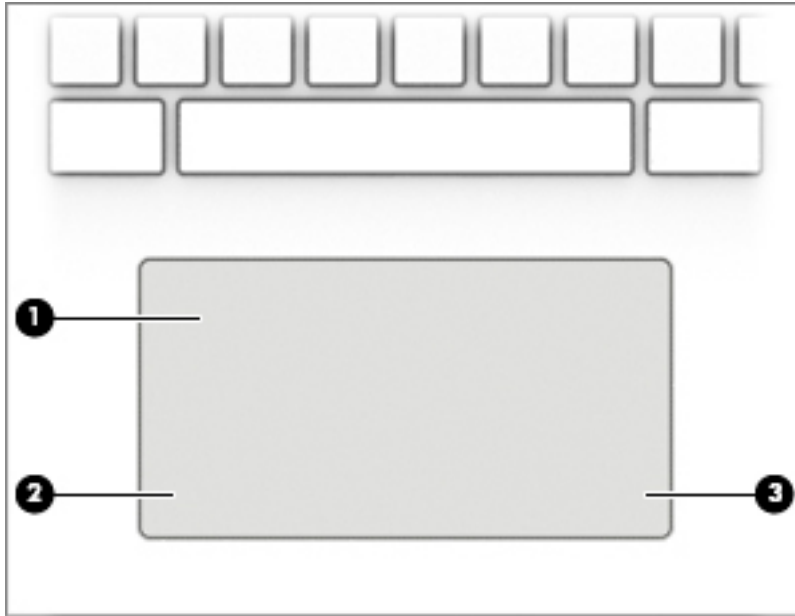
For wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region.

To access this guide:

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

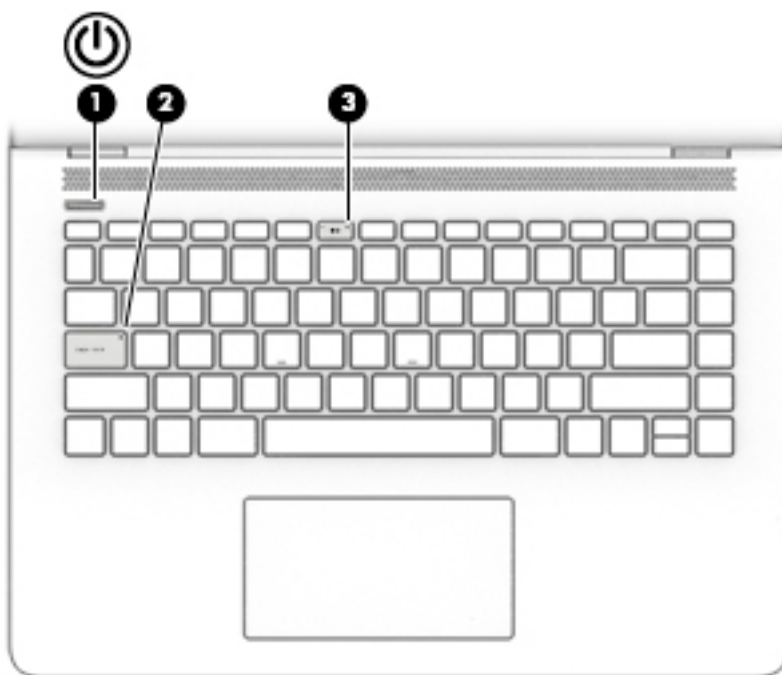
Keyboard area



TouchPad



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

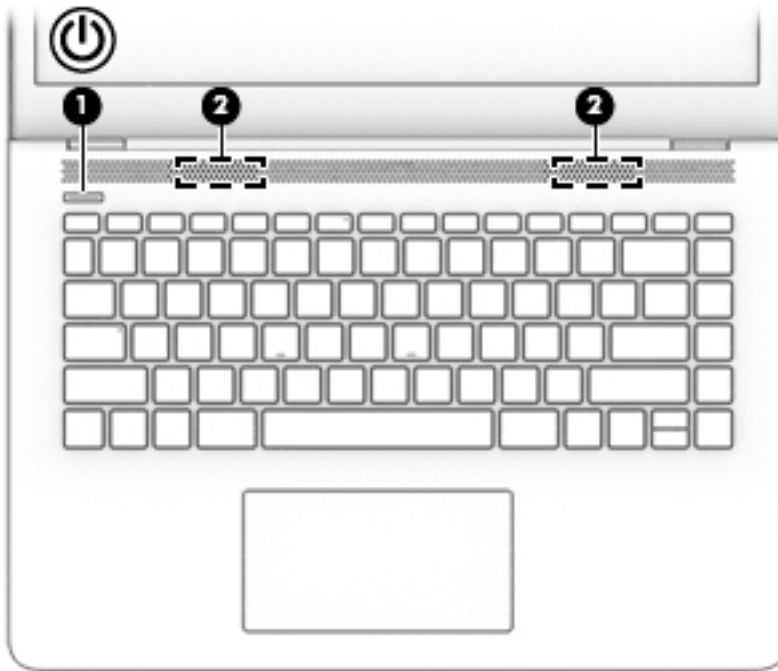
Lights





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

Button and speakers

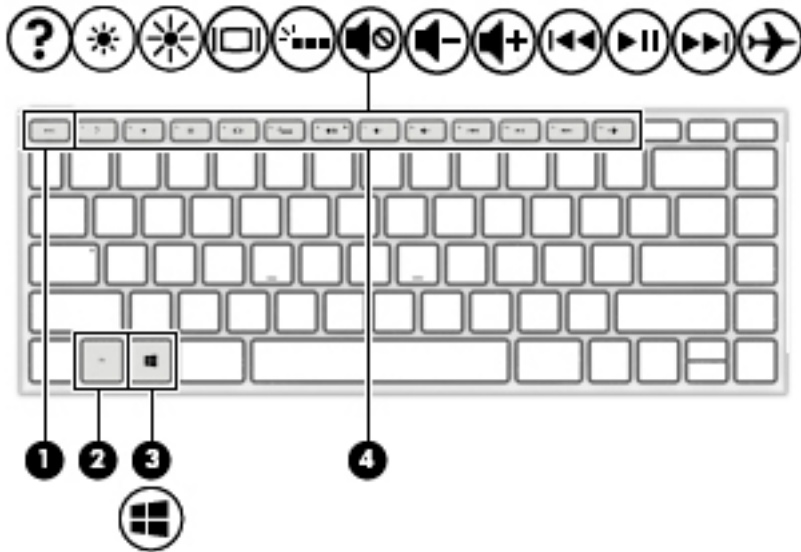
 **NOTE:** Refer to the illustration that most closely matches your computer.




Component	Description
<p>(1)  Power button</p>	<ul style="list-style-type: none">• When the computer is off, press the button to turn on the computer.• When the computer is on, press the button briefly to initiate Sleep.• When the computer is in the Sleep state, press the button briefly to exit Sleep.• When the computer is in Hibernation, press the button briefly to exit Hibernation. <p>CAUTION: Pressing and holding down the power button results in the loss of unsaved information.</p> <p>If the computer has stopped responding and shutdown procedures are ineffective, press and hold the power button down for at least 5 seconds to turn off the computer.</p> <p>To learn more about your power settings and power options:</p> <ul style="list-style-type: none">▲ Right-click the Power icon , and then select Power Options.
<p>(2) Speakers</p>	<p>Produce sound.</p>

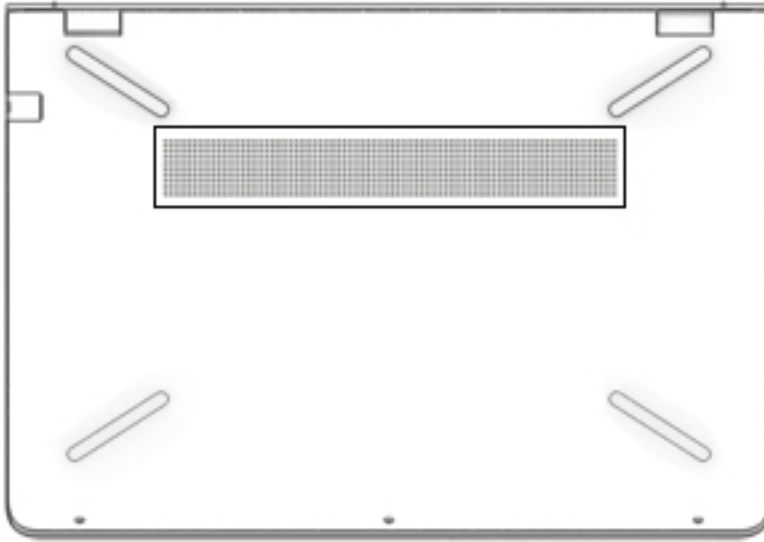
Special keys

 **NOTE:** Refer to the illustration that most closely matches your computer.



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 Start menu. NOTE: Pressing the Windows key again will close the Start menu.
(4) Action keys	Execute frequently used system functions. NOTE: On select products, the <code>f5</code> action key turns the keyboard backlight feature off or on.

Bottom



Component	Description
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Vent

Enables airflow to cool internal components.

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

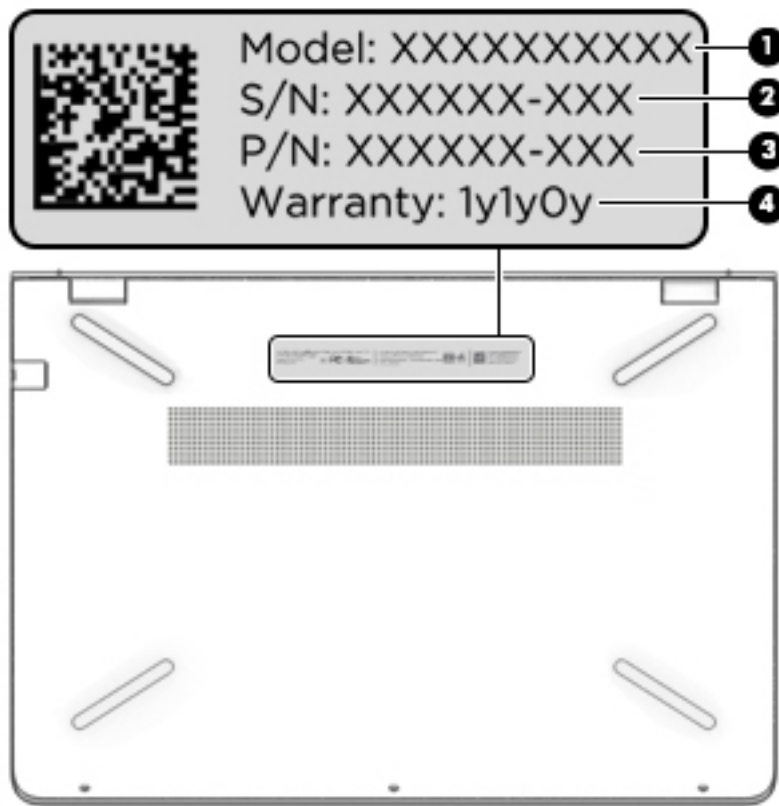
Labels

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

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

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

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



Component

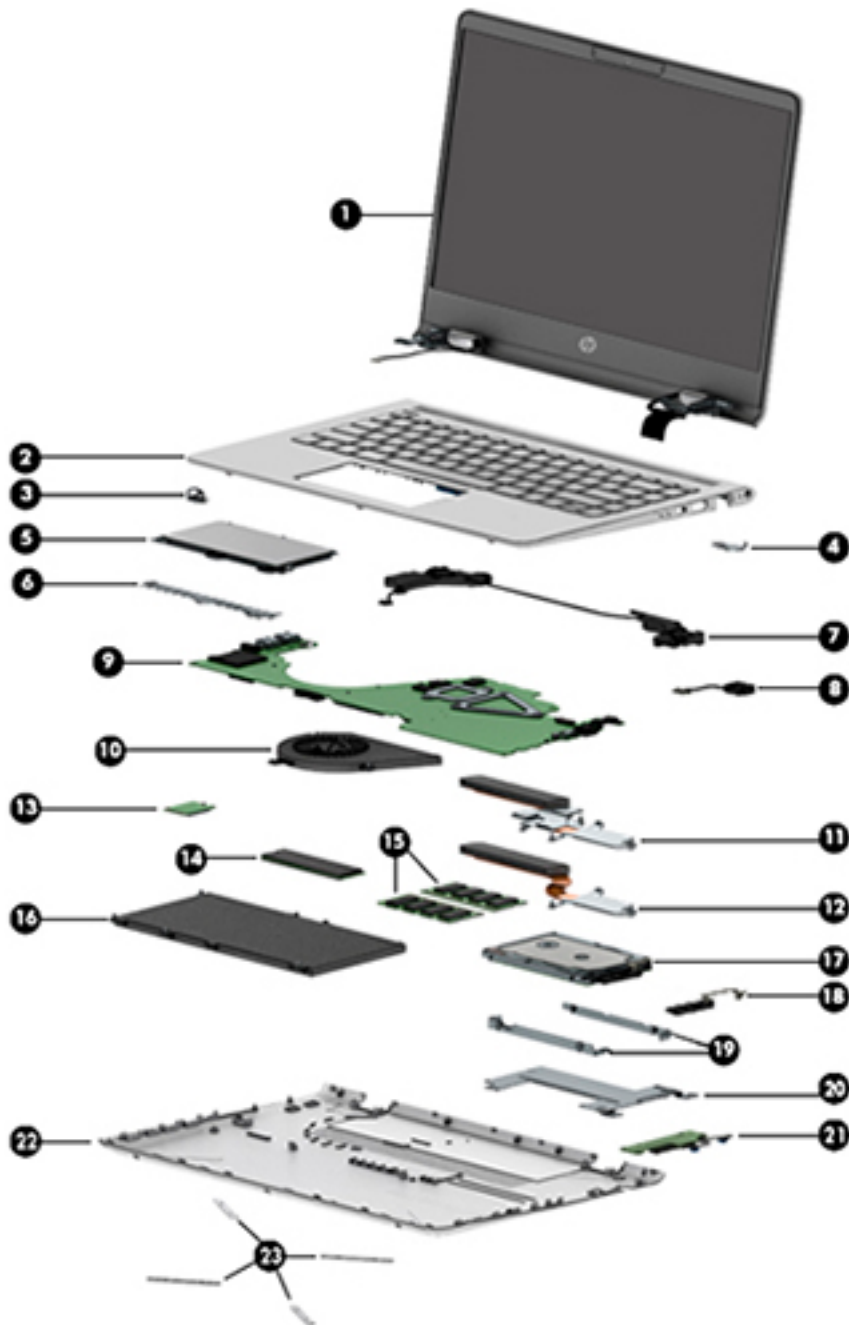
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- | | |
|-----|-----------------|
| (1) | Model name |
| (2) | Serial number |
| (3) | Part number |
| (4) | Warranty period |
-

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

3 Illustrated parts catalog

Computer major components

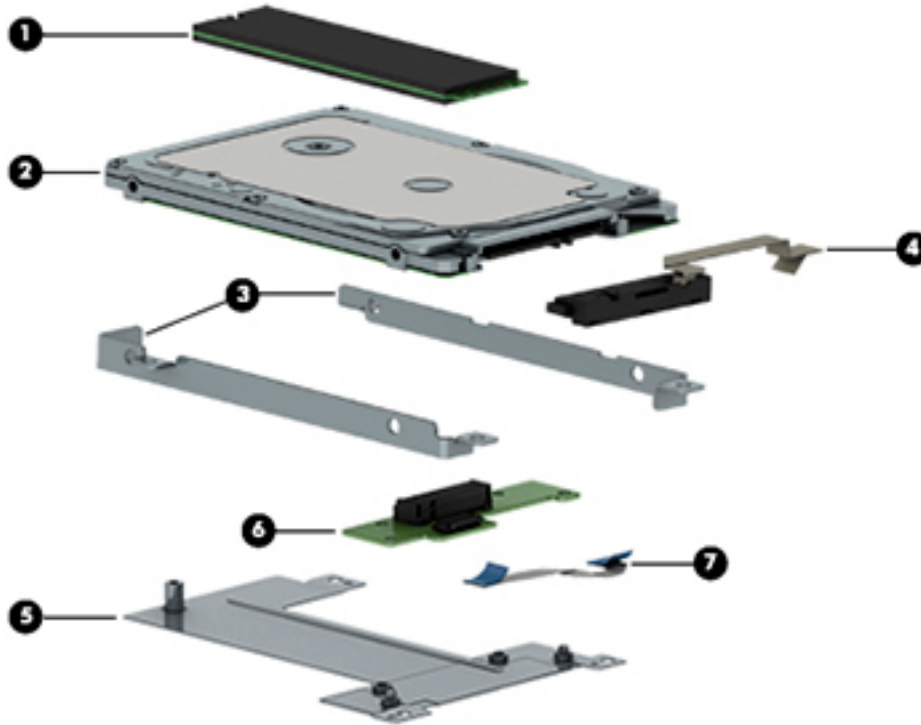
 **NOTE:** HP continually improves and changes product parts. For complete and current information on supported parts for your computer, go to <http://partsurfer.hp.com>, select your country or region, and then follow the on-screen instructions.



Item	Component	Spare part number
(1)	Display assembly NOTE: Display assemblies are spared at the subcomponent level only. For display assembly spare part information, see Display assembly subcomponents on page 19 .	
(2)	Top cover/keyboard NOTE: For a detailed list of keyboard country codes, see Top cover/keyboard on page 58 . Models with backlit keyboard: <ul style="list-style-type: none"> Mineral silver 933313-xx1 Silk gold 933315-xx1 Orchid pink 933317-xx1 Models without backlit keyboard: <ul style="list-style-type: none"> Mineral silver 933312-xx1 Silk gold 933314-xx1 Orchid pink 933316-xx1 	
(3)	Lock bracket	934986-001
(4)	Power connector bracket	934985-001
(5)	TouchPad board NOTE: The TouchPad cable is available using spare part number 930601-001.	930611-001
(6)	TouchPad bracket	934987-001
(7)	Speakers (includes left and right speakers and cable)	930614-001
(8)	Power connector cable	938151-001
(9)	System board (includes replacement thermal materials) All system boards use the following part numbers: xxxxxx-001: Non-Windows operating systems xxxxxx-601: Windows 10 operating system For use in models with discrete graphics memory: <ul style="list-style-type: none"> Intel Core i7-8550U processor and 4 GB of discrete graphics memory 940762-xx1 Intel Core i7-7500U processor and 2 GB of discrete graphics memory 930576-xx1 Intel Core i5-8250U processor and 4 GB of discrete graphics memory 940761-xx1 Intel Core i5-8250U processor and 2 GB of discrete graphics memory 940760-xx1 Intel Core i5-7200U processor and 2 GB of discrete graphics memory 930577-xx1 For use in models with UMA graphics memory: <ul style="list-style-type: none"> Intel Core i5-7200U processor 930574-xx1 Intel Core i3-7100U processor 930575-xx1 Intel Pentium 4415U processor 937742-xx1 	

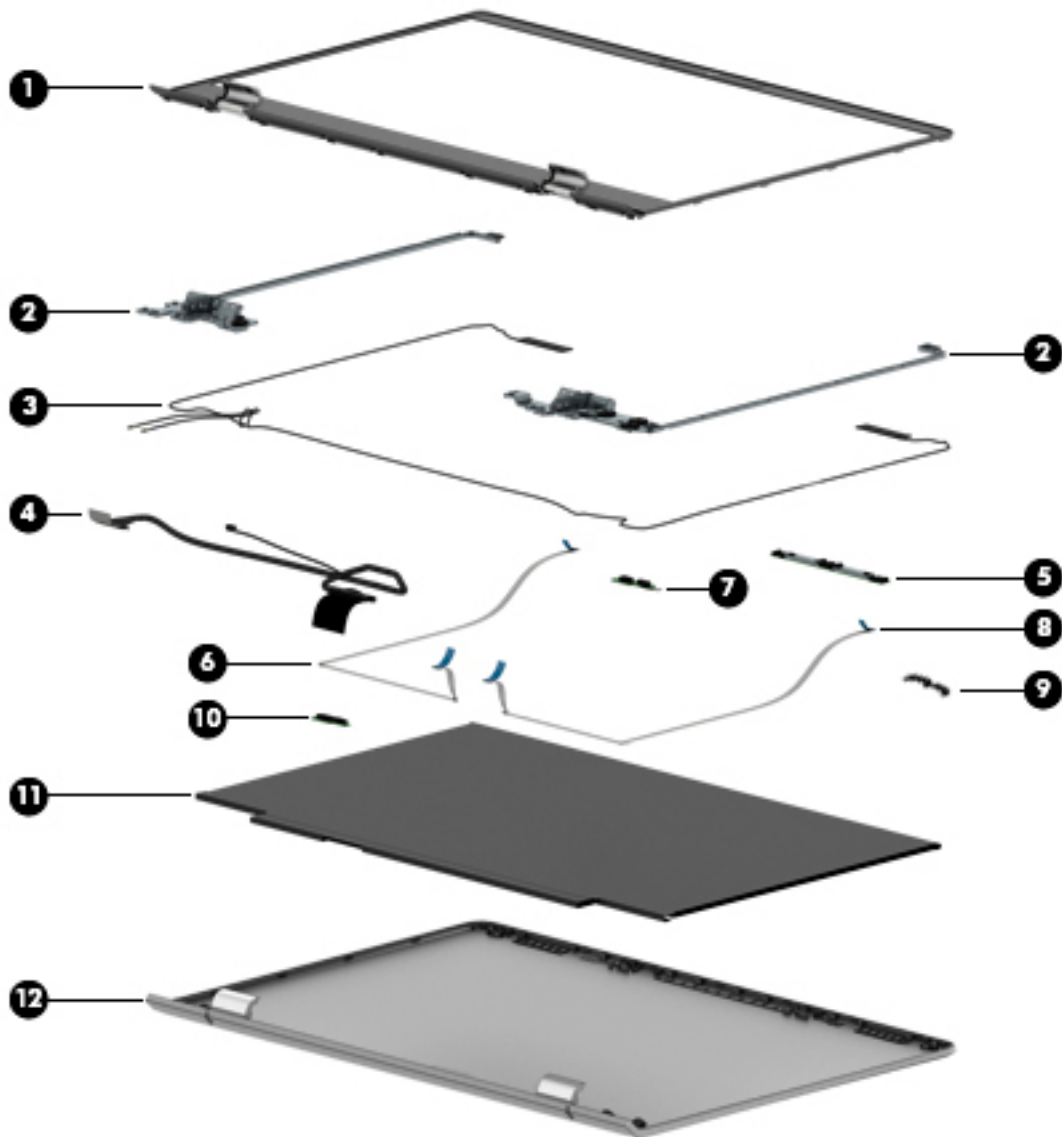
Item	Component	Spare part number
(10)	Fan	930603-001
	Heat sink assembly (includes replacement thermal materials)	
(11)	For use in models with discrete graphics	930605-001
(12)	For use in models with UMA graphics	930604-001
(13)	WLAN module	
	Intel Dual Band Wireless-AC 7265 802.11AC 2x2 WiFi + BT 4.2 Combo Adapter (non-vPro)	901229-855
	Realtek RTL8723DE 802.11 bgn 1x1 WiFi + BT 4.2 Combo Adapter	927230-855
	Intel Dual Band Wireless-AC 3168 802.11 ac 1x1 WiFi + BT 4.2 Combo Adapter	863934-855
(14)	Solid-state drive, M.2	
	512 GB	763008-022
	256 GB	760615-037
	128 GB	759848-015
(15)	Memory module (DDR4-2400)	
	8-GB	862398-855
	4 GB	862397-855
	2 GB	864271-855
(16)	Battery (4 cell, 70 Wh, 4.55 Ah)	920070-855
(17)	Hard drive, 7 mm (does not include bracket or cable)	
	NOTE: The hard drive cable is available using spare part number 930596-001.	
	2-TB, 5400-rpm	912487-855
	1-TB, 5400-rpm	762990-005
	500-GB, 5400-rpm	778186-005
(18)	Hard drive connector/cable	930596-001
(19)	Hard drive brackets	
	Left bracket	934983-001
	Right bracket	934984-001
(20)	Solid-state drive adapter bracket	L00160-001
(21)	Solid-state drive board	L00159-001
	The solid-state drive board cable is available using spare part number L01440-001.	
(22)	Bottom cover	930593-001
(23)	Rubber Kit	932299-001

Mass storage devices



Item	Component	Spare part number
(1)	Solid-state drive, M.2	
	512 GB	763008-022
	256 GB	760615-037
	128 GB	759848-015
(2)	Hard drive (7 mm, SATA; does not include brackets or cable):	
	2-TB, 5400-rpm	912487-855
	1-TB, 5400-rpm	762990-005
	500-GB, 5400-rpm	778186-005
(3)	Hard drive brackets	
	Left	934983-001
	Right	934984-001
(4)	Hard drive connector/cable (not illustrated)	930596-001
(5)	Solid-state drive adapter bracket	L00160-001
(6)	Solid-state drive adapter board	L00159-001
(7)	Solid-state drive board cable	L01440-001
(*)	External optical drive (not illustrated)	747080-001

Display assembly subcomponents



Item	Component	Spare part number
(1)	Display bezel	
	For use in models with an HD camera	930594-001
	For use in models with an FHD IR camera	930595-001
(2)	Hinge Kit (left and right)	930606-001
(3)	Antenna , dual (includes wireless antenna cable and transceiver)	930573-001
(4)	Display cable (includes display panel cable and camera/microphone cable)	
	For use in models with an HD camera	934978-001
	For use in models with an FHD IR camera	935540-001
(5)	Camera/microphone module	

Item	Component	Spare part number
	HD camera	932302-001
	FHD IR camera	932303-001
(6)	Transfer board cable (for use in models with an FHD IR camera and an HD camera) NOTE: HD camera models use one transfer board cable.	934976-001
(7)	Camera board	
	For use in models with HD and FHD/IR cameras	934979-001
	For use with FHD/IR cameras	934980-001
(8)	Transfer board cable (for use in models with HD and FHD/IR cameras) NOTE: HD camera models use one transfer board cable. FHD camera models use two transfer board cables.	934976-001
(9)	Camera board cable (not illustrated)	
	For use in models with HD and FHD/IR cameras	934974-001
	For use in models with an FHD IR camera	934975-001
(10)	Transfer board	
	For use in models with HD and FHD/IR cameras	934981-001
	For use with FHD/IR cameras	934982-001
(11)	Raw display panel	934967-001
(12)	Display enclosure: (includes wireless antennas)	
	Mineral silver	932296-001
	Silk gold	932297-001
	Orchid pink	932298-001

Miscellaneous parts

Component	Spare part number
HP Smart AC adapter (4.5 mm, non-PFC):	
90-W	710413-001
65-W	710412-001
65-W (EM)	913691-850
45-W	741553-850
Power cord, C5, 1.0 m	
For use in Australia	920688-011
For use in Denmark	920688-007
For use in Europe	920688-005
For use in India	920688-016
For use in Israel	920688-008
For use in North America	920688-001
For use in the People's Republic of China	920688-014
For use in South Africa	920688-010
For use in Switzerland	920688-009
For use in Taiwan	920688-015
For use in Thailand	920688-012
For use in the United Kingdom	920688-006
Screw Kit	930613-001
RJ-45 door	934988-001
USB-C to USB-A adapter	833960-001
HP HDMI to VGA Adapter	701943-001

4 Removal and replacement procedures preliminary requirements


Tools required

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


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

Service considerations


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

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

Plastic parts

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

Cables and connectors

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

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

Drive handling

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

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

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

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, place it in a static-proof bag.

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

Avoid exposing a drive to temperature extremes or liquids.

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

Grounding guidelines

Electrostatic discharge damage

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

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

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

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

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

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

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

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

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

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

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

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

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

Workstation guidelines

Follow these grounding workstation guidelines:

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

Equipment guidelines

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

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


The following grounding equipment is recommended to prevent electrostatic damage:

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

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


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

5 Removal and replacement procedures for Authorized Service Provider parts

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

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

Component replacement procedures

 **NOTE:** Details about 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 13](#) for details.

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

There are as many as 62 screws that must be removed, replaced, or loosened when servicing Authorized Service Provider only parts. Make special note of each screw size and location during removal and replacement.

Bottom cover

Description	Spare part number
Bottom cover	930593-001
Rubber Kit (includes rubber feet)	932299-001

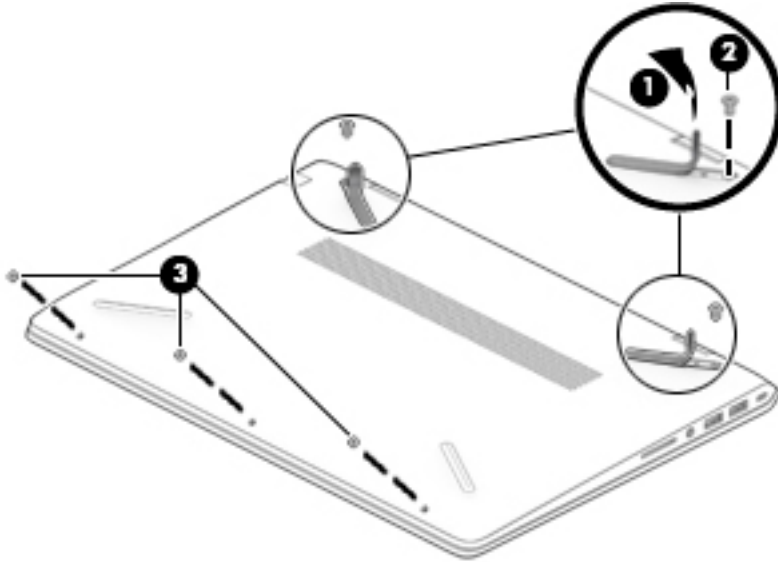
Before removing the bottom cover, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 29](#)).

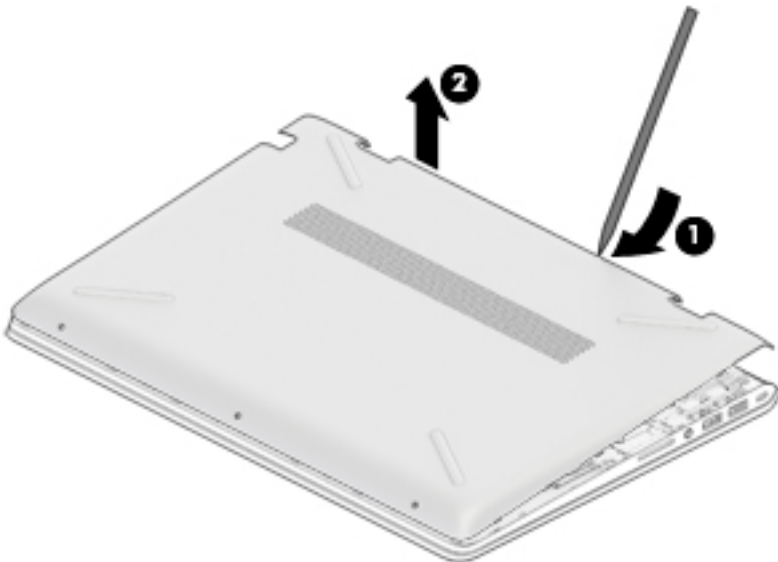
To remove the bottom cover:

1. Position the computer upside down with the front toward you.
2. Peel back the two upper rubber feet **(1)** so you can access the screws underneath.
3. Remove the two Phillips PM2.5×6.0 screws **(2)** that were under the two upper rubber feet.

4. Remove the three remaining Phillips PM2.0×5.0 screws (3).



5. Start prying along the top edge of the computer (1), then along the left and right sides (as necessary), and then remove the bottom cover (2).



Reverse this procedure to install the bottom cover.

Battery

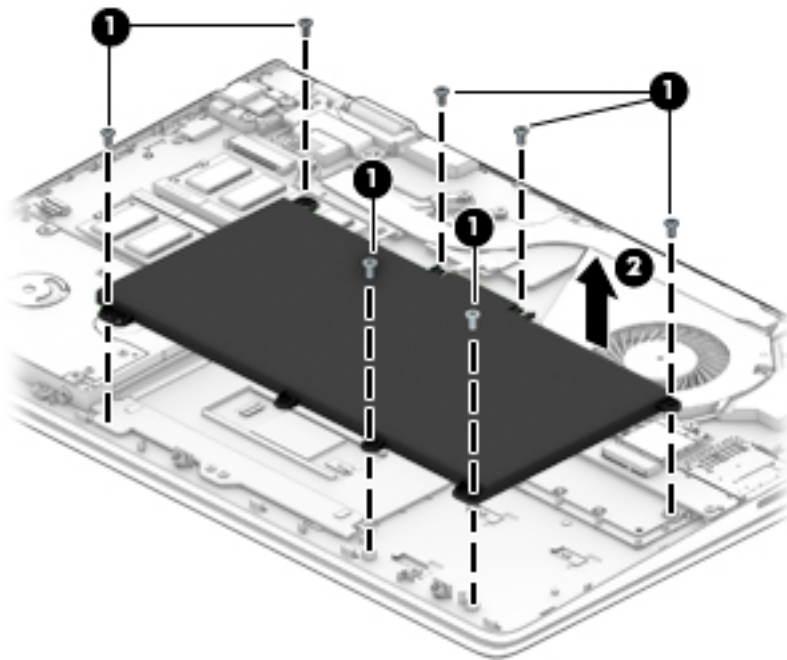
Description	Spare part number
Battery, 4 cell, 70 Wh, 4.55 Ah	920070-855

Before disassembling the computer, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 27](#)).

To remove the battery:


1. Remove the seven Phillips PM2.0×3.0 screws (1) that secure the battery to the computer.
2. Lift the battery up and out of the computer (2).



Reverse this procedure to install the battery.

WLAN module

Description	Spare part number
Intel Dual Band Wireless-AC 7265 802.11AC 2x2 WiFi + BT 4.2 Combo Adapter (non-vPro)	901229-855
Realtek RTL8723DE 802.11 bgn 1x1 WiFi + BT 4.2 Combo Adapter	927230-855
Intel Dual Band Wireless-AC 3168 802.11 ac 1x1 WiFi + BT 4.2 Combo Adapter	863934-855

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

Before removing the WLAN module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 27](#)).
5. Remove the battery (see [Battery on page 29](#)).

To remove the WLAN module:

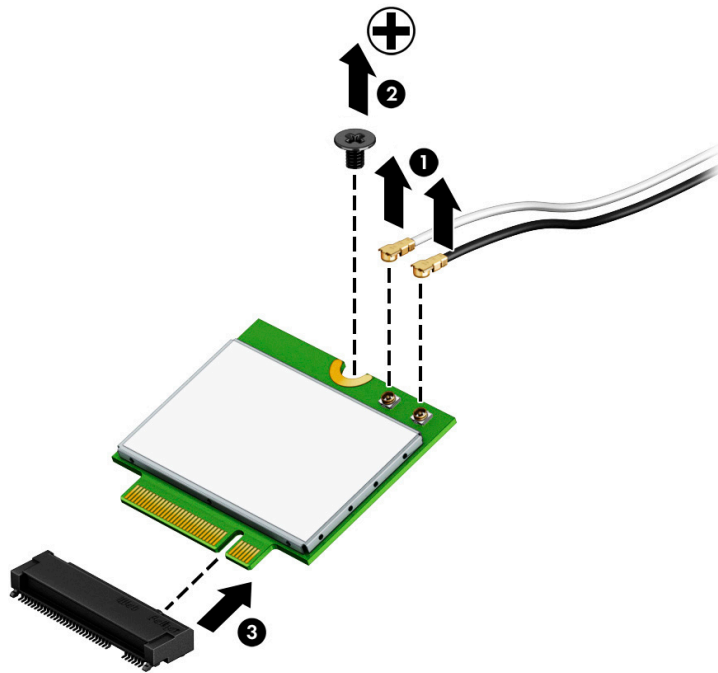
1. Disconnect the WLAN antenna cables **(1)** from the terminals on the WLAN module.




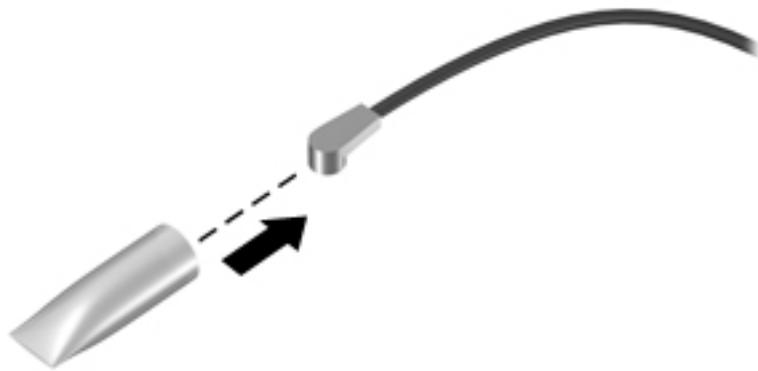
NOTE: The WLAN antenna cable labeled “1” connects to the WLAN module “Main” terminal labeled “1”. The WLAN antenna cable labeled “2” connects to the WLAN module “Aux” terminal labeled “2” (if applicable).

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

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



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



Reverse this procedure to install the WLAN module.

Memory module

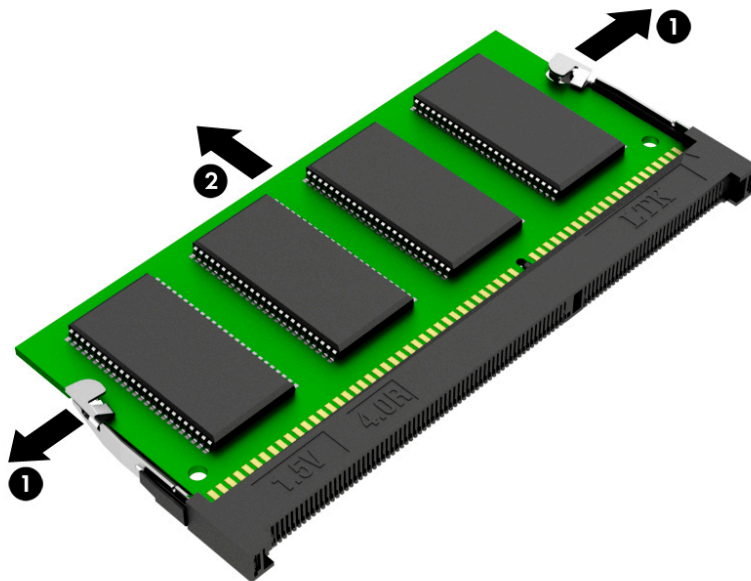
Description	Spare part number
Memory module (PC4-2400)	
8-GB	862398-855
4-GB	862397-855
2-GB	864271-855

Before removing a memory module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 27](#)).
5. Remove the battery (see [Battery on page 29](#)).

To remove a memory module:

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



Reverse this procedure to install a memory module.

Hard drive



NOTE: The hard drive spare part kit does not include the hard drive bracket or cable.

Description	Spare part number
Hard drives (7 mm):	
2-TB, 5400-rpm	912487-855
1-TB, 5400-rpm	762990-005
500-GB, 5400-rpm	778186-005
Hard drive bracket	
Left	934983-001
Right	934984-001
Hard drive connector/cable	930596-001

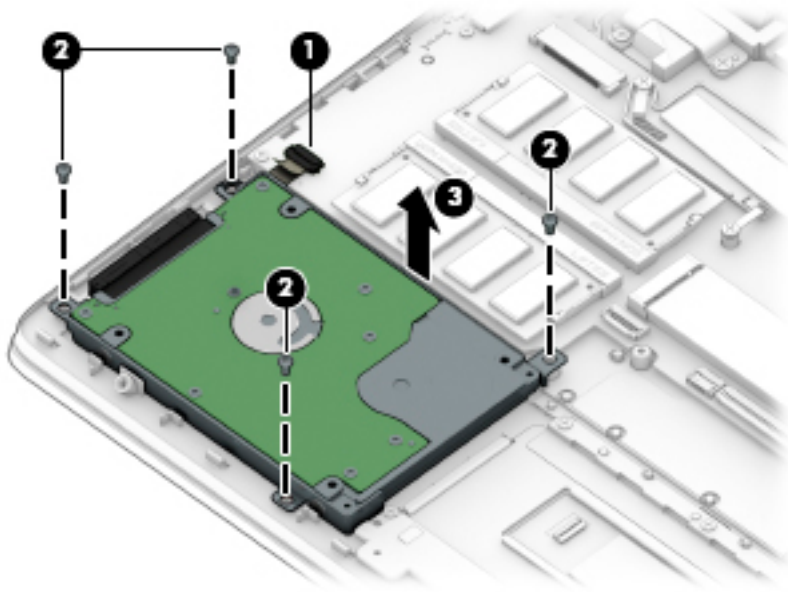
Before removing the hard drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 27](#)).
5. Remove the battery (see [Battery on page 29](#)).

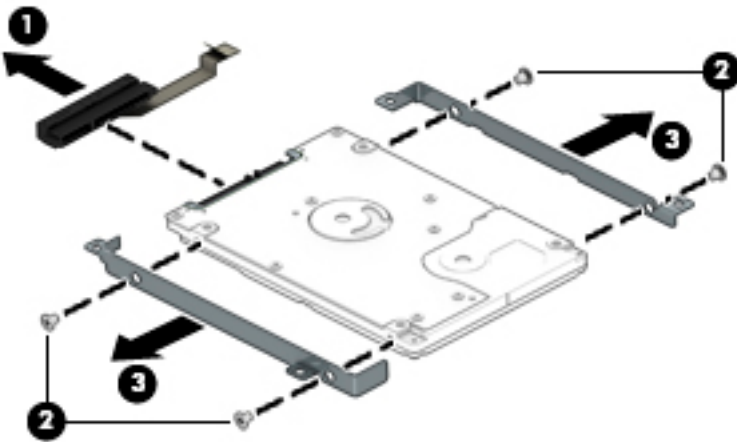
To remove the hard drive:

1. Disconnect the hard drive connector cable from the system board **(1)**.
2. Remove the four Phillips PM2.0×3.0 screws **(2)** that secure the hard drive assembly to the computer.

3. Lift the hard drive out of the computer **(3)**.



4. To disassemble the hard drive, pull the connector away from the hard drive **(1)**.
5. Remove the four Phillips PM2.0×3.0 screws **(2)** that secure the brackets to the hard drive.
6. Pull each bracket away from the sides of the hard drive **(3)**.



Reverse this procedure to reassemble and install the hard drive.

Solid-state drive (SSD)


Description	Spare part number
512 GB	763008-022
256 GB	760615-037
128 GB	759848-015

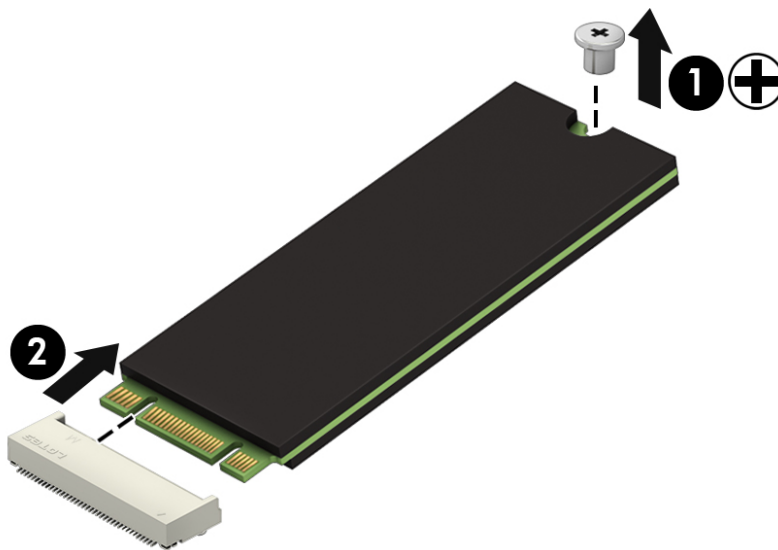
Before removing the solid-state drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 27](#)).
5. Remove the battery (see [Battery on page 29](#)).

Remove the solid-state drive:

1. Remove the Phillips PM2.0×2.0 screw **(1)** that secures the drive to the system board.
2. Remove the drive **(2)** by pulling it away from the connector.

 **NOTE:** Solid-state drives are designed with notches to prevent incorrect insertion.



Reverse this procedure to reassemble and install the solid-state drive.

M.2 solid-state drive adapter bracket and board

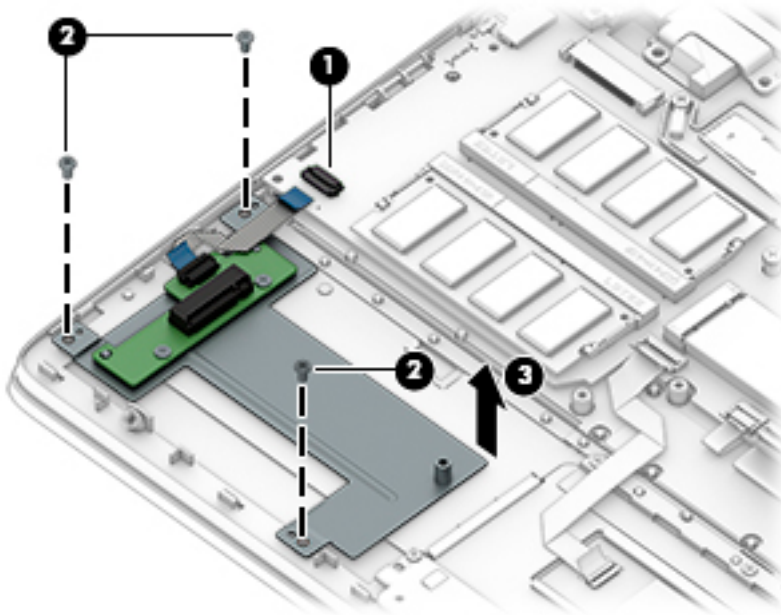
Description	Spare part number
Solid-state drive adapter bracket	L00160-001
Solid-state drive adapter board	L00159-001
Solid-state drive board cable	L01440-001

Before removing the solid-state drive adapter bracket and board, follow these steps:

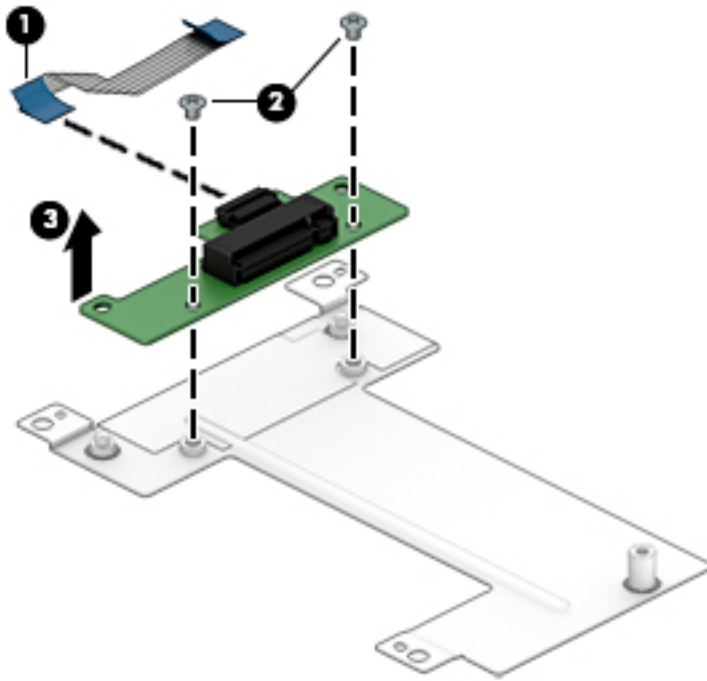
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 27](#)).
5. Remove the battery (see [Battery on page 29](#)).

To remove the solid-state drive adapter bracket and board:

1. Disconnect the cable from the system board connector **(1)**.
2. Remove the three Phillips PM2.0×3.0 screws **(2)** that secure the bracket to the computer.
3. Lift the bracket and board assembly out of the computer **(3)**



4. To remove board from the bracket, disconnect the cable from the board **(1)**, remove the two Phillips PM2.0×3.0 screws **(2)**, and then remove the board from the bracket **(3)**



Reverse this procedure to reassemble and install the solid-state drive adapter bracket and board.

TouchPad board

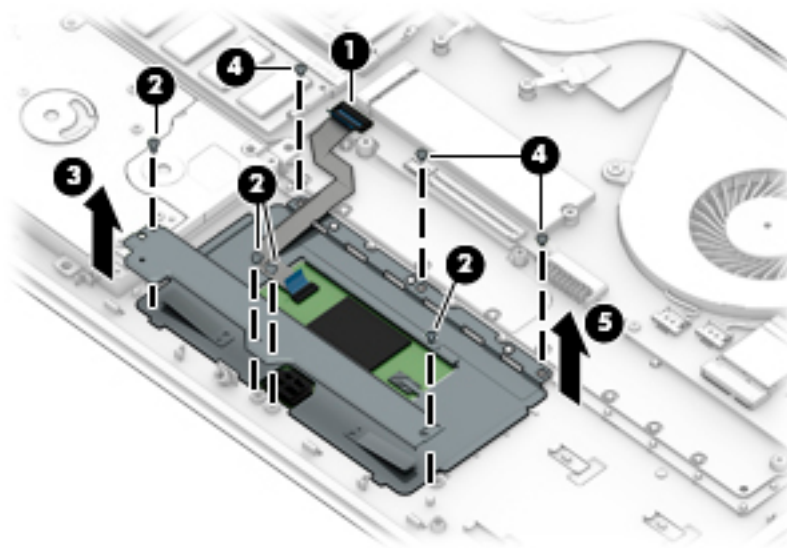
Description	Spare part number
TouchPad board	930611-001
TouchPad bracket	934987-001
TouchPad board cable	930601-001

Before removing the TouchPad board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 27](#)).
5. Remove the battery (see [Battery on page 29](#)).

To remove the TouchPad board:


1. Disconnect the cable from the system board **(1)**.
2. Remove the four Phillips PM2.0×3.0 screws **(2)** that secure the bracket to the computer, and the lift the bracket from atop the TouchPad **(3)**.
3. Remove the three Phillips broad head PM2.0×2.0 screws **(4)** that secure the TouchPad board to the computer, and the lift the TouchPad out of the computer **(5)**.



Reverse this procedure to install the TouchPad board.

Fan

Description	Spare part number
Fan	930603-001

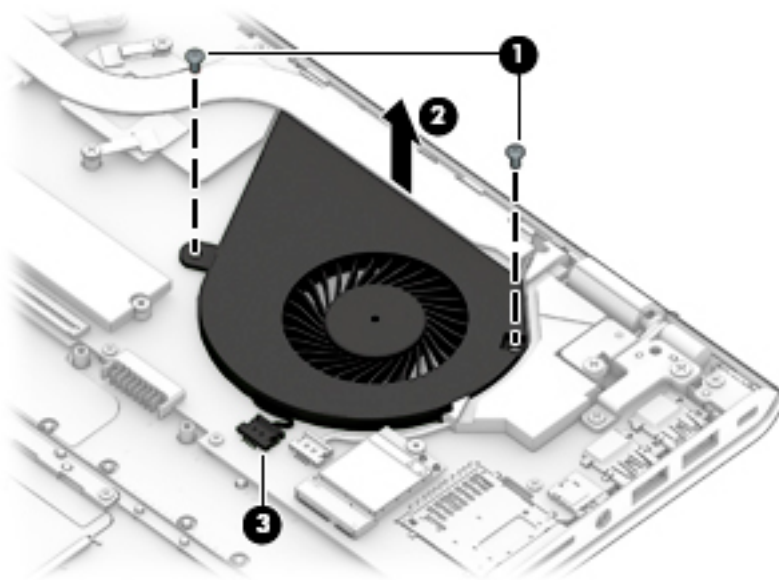
 **NOTE:** To properly ventilate the computer, allow at least **7.6 cm (3.0 in)** of clearance on the left side of the computer. The computer uses an electric fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist.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

Before removing the fan, follow these steps:


1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 27](#)).
5. Remove the battery (see [Battery on page 29](#)).

To remove the fan:

1. Remove the two Phillips PM2.0×4.0 screws **(1)** that secure the fan to the computer.
2. Lift the fan up enough to access the cable and connector on the system board **(2)**.
3. Disconnect the fan cable from the system board **(3)**.



Reverse this procedure to install the fan.

 **IMPORTANT:** Be sure to connect the fan cable to the system board connector first when installing the fan.

Heat sink



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

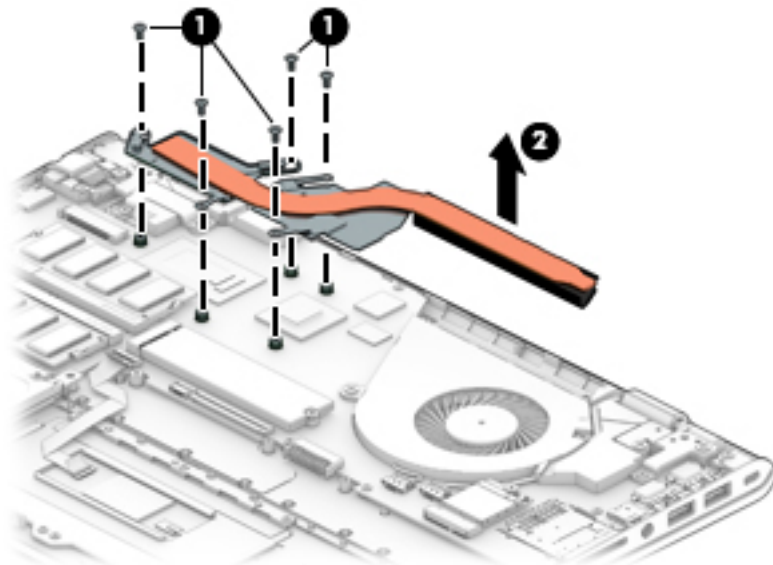
Description	Spare part number
Heat sink for use in models with UMA graphics	930604-001
Heat sink for use in models with discrete graphics	930605-001

Before removing the heat sink, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 27](#)).
5. Remove the battery (see [Battery on page 29](#)).

To remove the heat sink:

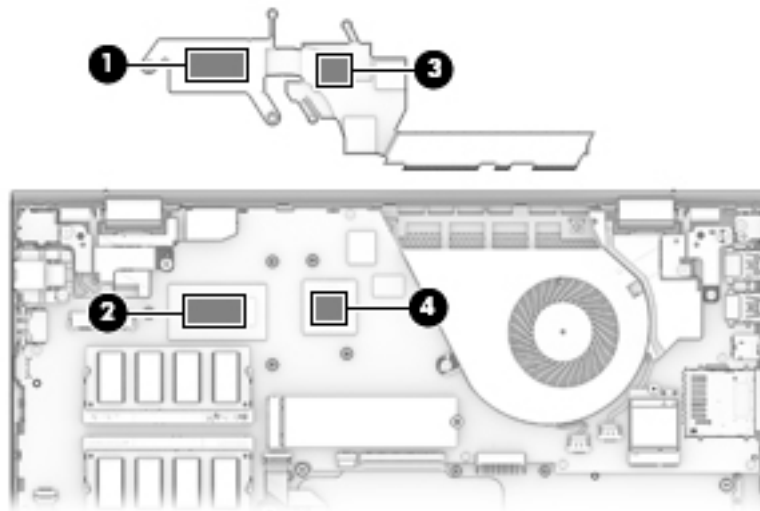
1. **Discrete graphics models:** In the order indicated on the heat sink, remove the five Phillips PM2.0×3.0 screws **(1)** that secure the heat sink to the system board.
2. Remove the heat sink from the system board **(2)**.



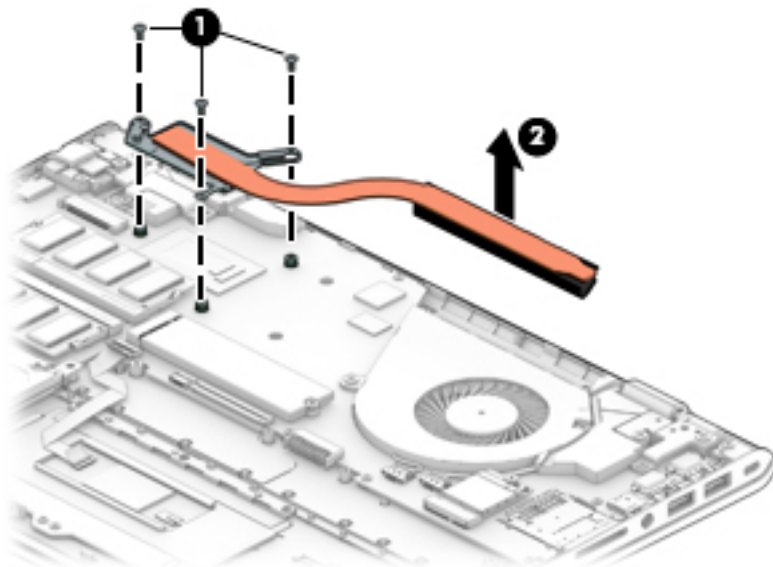
- Thermal paste is used on the heat sink **(1)** and graphics chip **(2)**, as well as on the heat sink **(3)** and processor **(4)**.




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

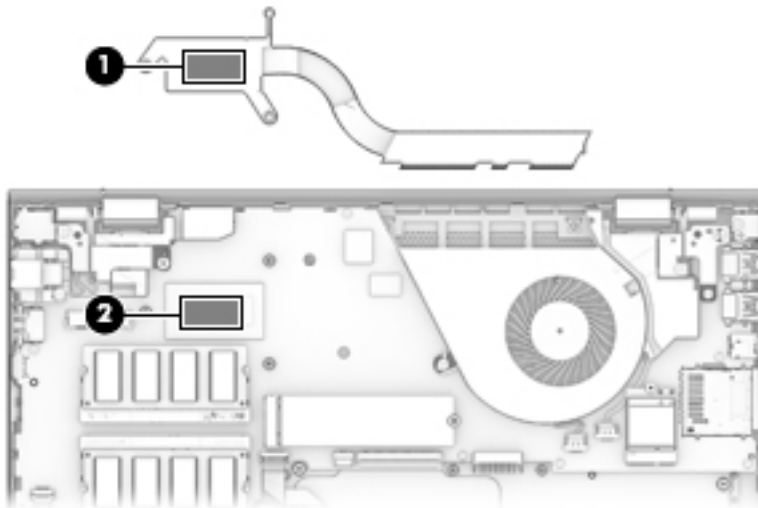


3. **UMA graphics models:** In the order indicated on the heat sink, remove the three Phillips PM2.0×3.0 screws **(1)** that secure the heat sink to the system board.
4. Remove the heat sink from the system board **(2)**.



- Thermal paste is used on the heat sink **(1)** and the processor **(2)**.

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



Reverse this procedure to reassemble and install the heat sink.

Display assembly

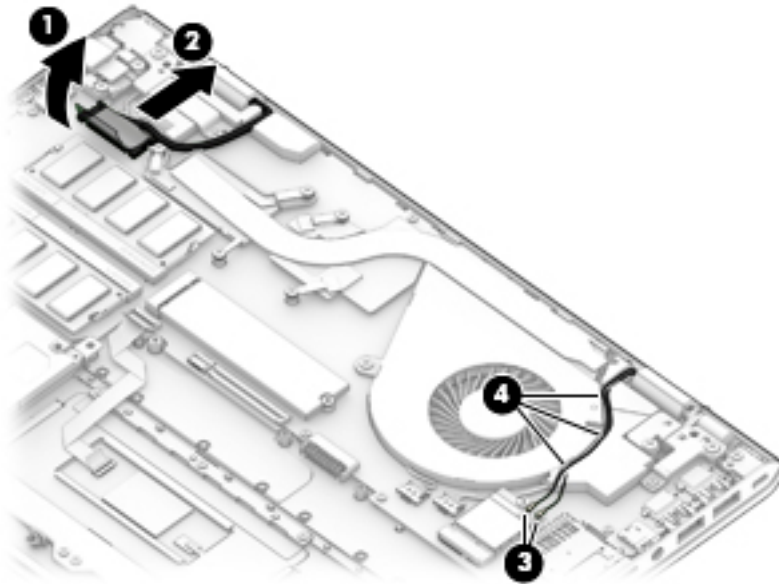
This section describes removing the display assembly and disassembling display subcomponents. You must remove the display from the computer to disassemble display subcomponents.

Before removing the display assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 27](#)).
5. Remove the battery (see [Battery on page 29](#)).
6. Remove the fan assembly (see [Fan on page 39](#)).

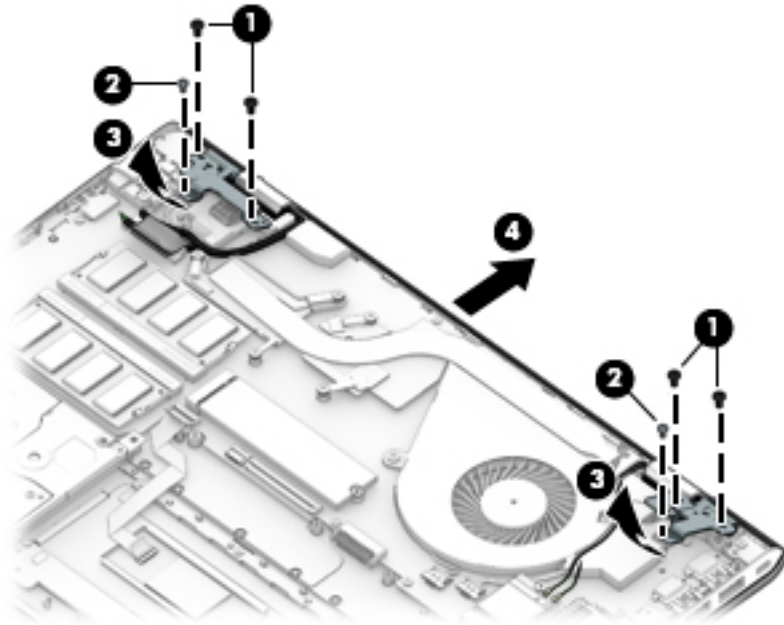
To remove the display assembly:

1. Peel the Mylar tape from atop the display connector **(1)**, and then disconnect the display panel cable from the system board **(2)**.
2. Disconnect the small display panel cable from the system board **(2)**.
3. Disconnect the wireless antennas from the WLAN module **(3)**.
4. Remove the antenna cables from their routing path in the speaker **(4)**.



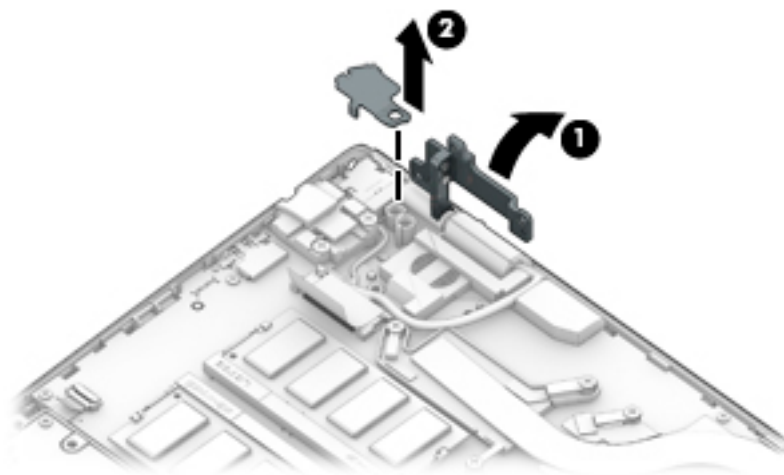
5. Remove the four Phillips PM2.5×6.0 screws **(1)** and the two Phillips PM2.5×4.0 screws **(2)** that secure the display assembly to the computer.
6. Lift the display to bend the hinges upward **(3)**.

7. Separate the display from the computer (4).



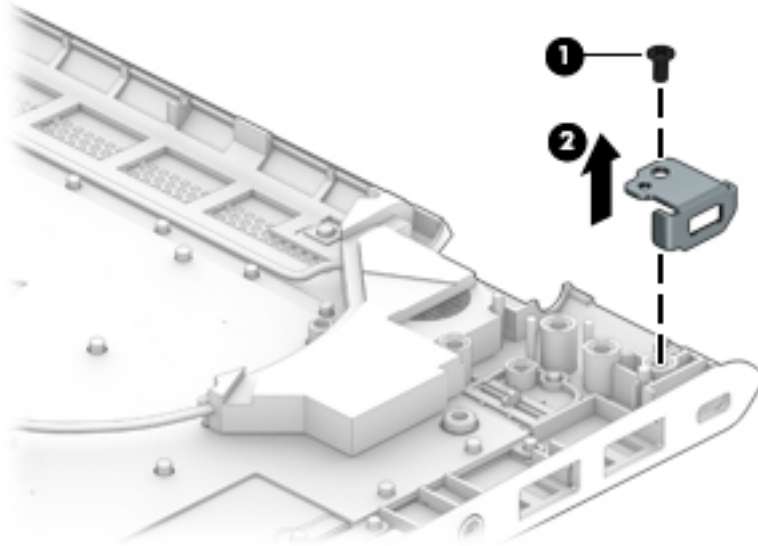
8. Remove the power connector bracket from the computer, make sure the display hinge is rotated upward (1) and then lift the bracket off of the computer (2).

The power connector bracket is available using spare part number 934985-001.



9. If it is necessary to remove the lock bracket from the computer, remove the Phillips PM2.5×6.0 screw **(1)** and then lift the bracket out of the computer **(2)**.

The lock bracket is available using spare part number 934986-001.



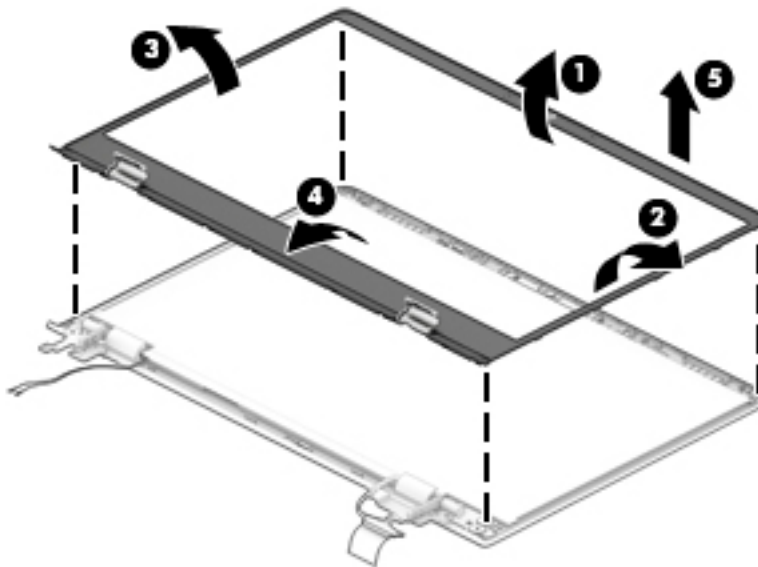
If it is necessary to replace any of the display assembly subcomponents:

1. Open the computer as far as it will open.
2. To remove the display bezel, flex the inside of the top edge **(1)**, the right edge **(2)**, the left edge **(3)**, and the bottom edge **(4)** of the display bezel until the bezel disengages from the display enclosure.

Display bezels are available using the following spare part numbers:

930594-001: Models with an HD camera

930595-001: Models with an FHD/IR camera

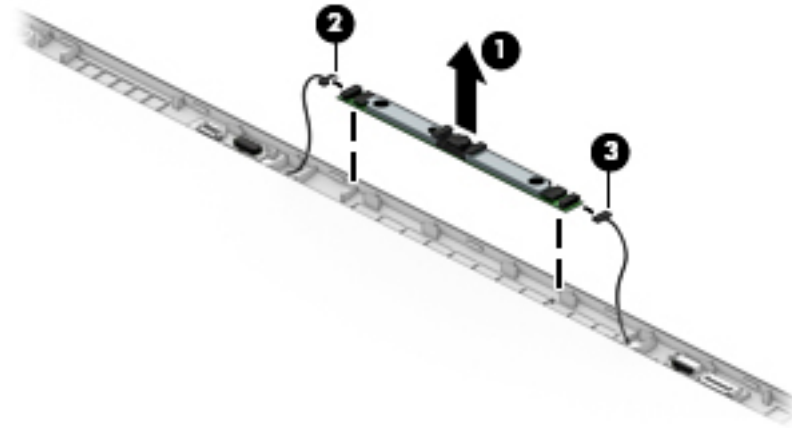


3. To remove the HD camera/microphone module:

HD camera

- a. Position the display assembly with the top edge toward you.
- b. Pry up to disengage the camera/microphone module from the adhesive that secures it to the display **(1)**.
- c. Disconnect the cables **(2) (3)** from the module.

The HD camera is available using spare part number 932302-001.

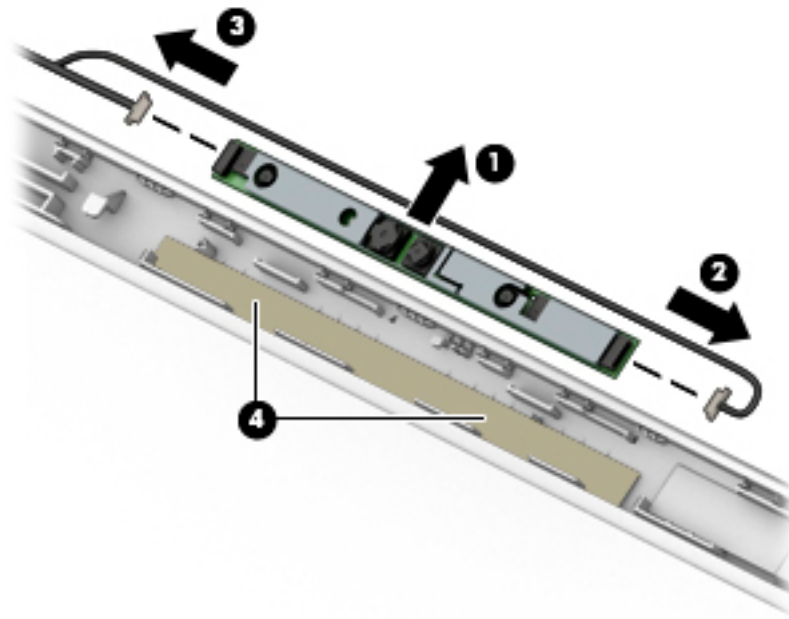


4. To remove the infrared (IR) camera/microphone module:

FHD IR webcam

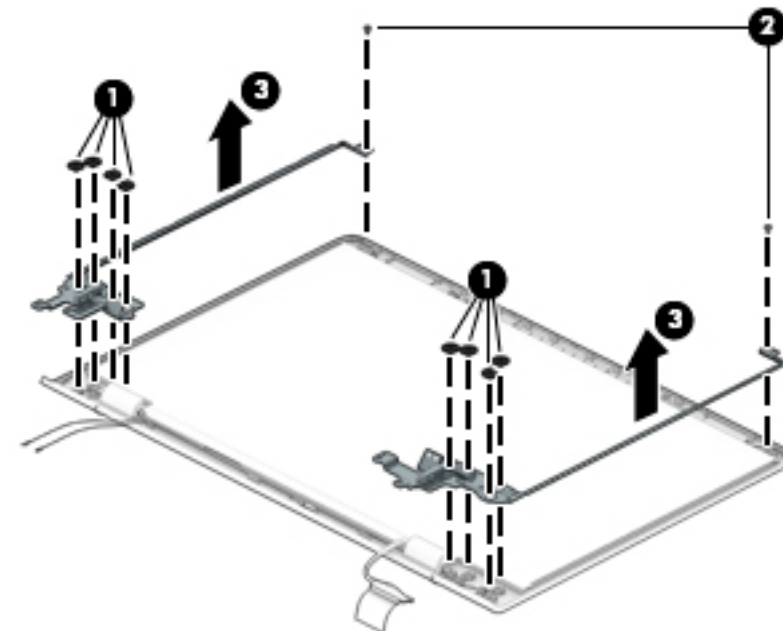
- a. Position the display assembly with the top edge toward you.
- b. Pry up to disengage the camera/microphone module from the adhesive that secures it to the display **(1)**.
- c. Disconnect the cables from the right side of the camera **(2)** and the left side of the camera **(3)**.

- d. Remove the tape from the enclosure **(4)**. Replacement cameras come with tape already installed. The FHD IR camera is available using spare part number 932303-001.



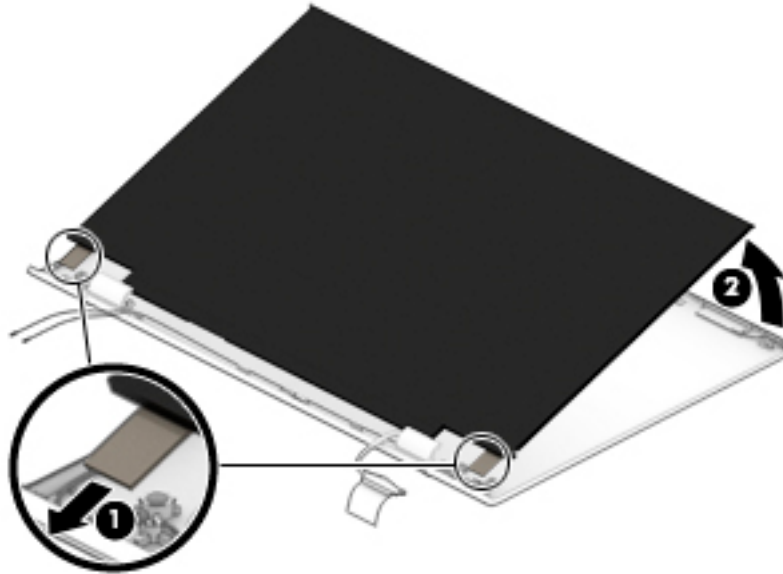
5. To remove the display panel:

- a. For each hinge, remove the four Phillips PM2.5×6.0 screws **(1)** and the Phillips PM2.5×4.0 screw **(2)** that secures the display panel to the enclosure. Lift the hinges from the display **(3)**.

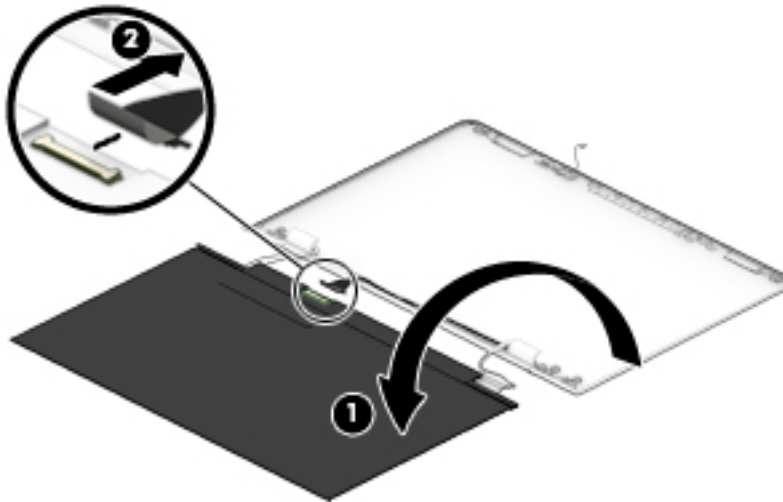


- b.** Pull the tape until it is fully removed from under each side of the display panel **(1)**. Lift the top of the display panel **(2)**.

The raw display panel is available using spare part number 934967-001.

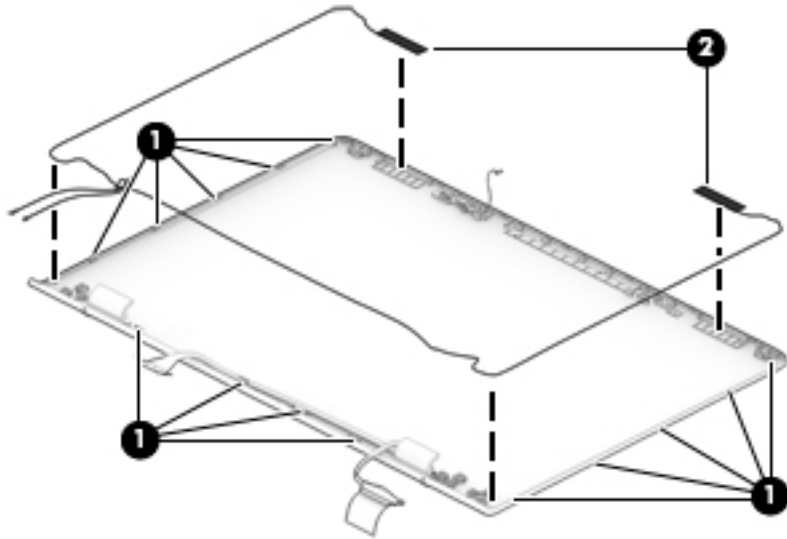


- c.** Rotate the display panel over **(1)** to gain access to the display cable connection on the back of the panel.
- d.** On the back of the display panel, release the adhesive strip **(2)** that secures the display panel cable to the display panel, and then disconnect the cable **(3)**.



6. To remove the wireless antennas and cables, remove the antennas cables from the routing paths along with sides of the display enclosure **(1)**, and then peel the antennas **(2)** off the display enclosure.

The antennas are available using spare part number 930573-001.

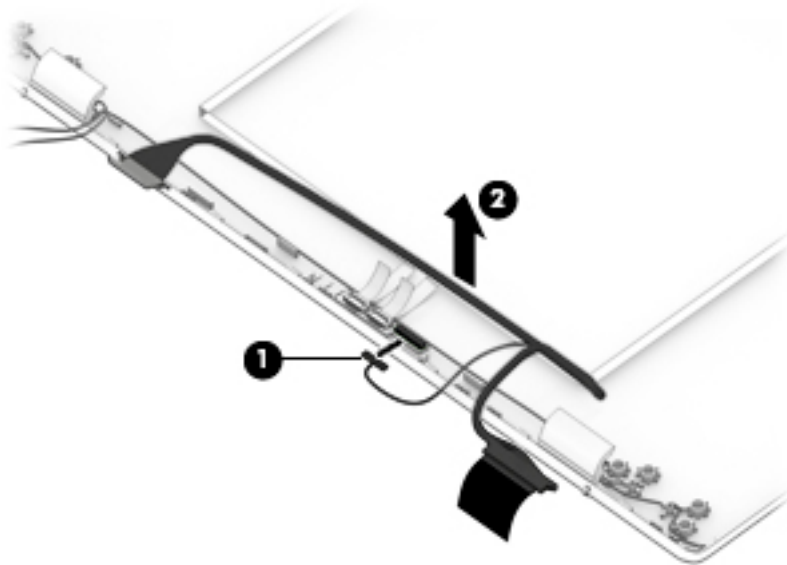


7. To remove the display cable, disconnect the cable from the board at the bottom of the display **(1)**, and then remove the cable from the display enclosure **(2)**.

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

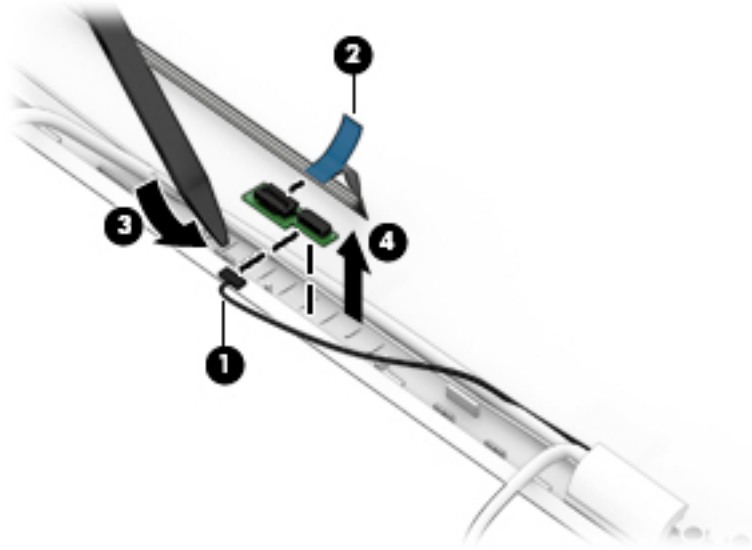
930594-001: Models with an HD camera

930595-001: Models with an FHD IR camera



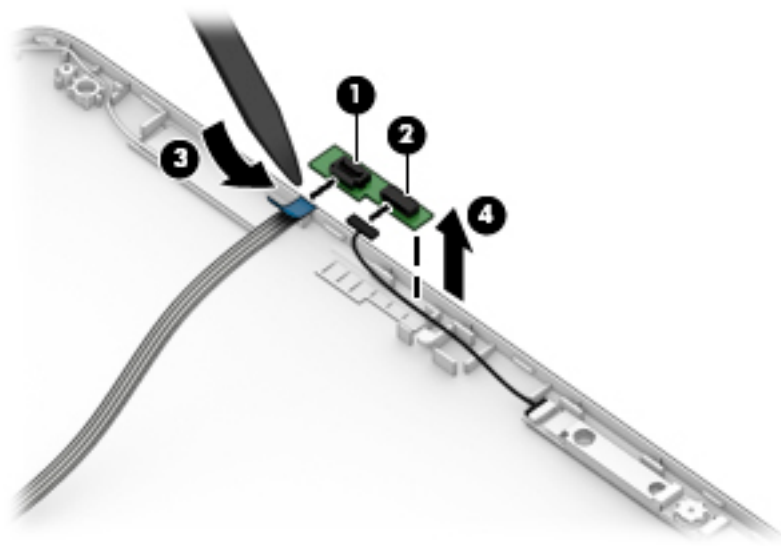
8. To remove the bottom transfer board (HD and IR models), disconnect the cables from the board **(1)(2)** pry to disengage the adhesive that secures the board **(3)**, and then remove the board from the display enclosure **(4)**.

The transfer board is available using spare part number 934981-001 for models with an HD camera and FHD/IR camera.



9. To remove the top transfer boards, disconnect the cables from the board **(1)(2)** pry to disengage the adhesive that secures the board **(3)**, and then remove the board from the display enclosure **(4)**.

The transfer board is available using spare part number 934982-001 for models with an FHD IR camera.

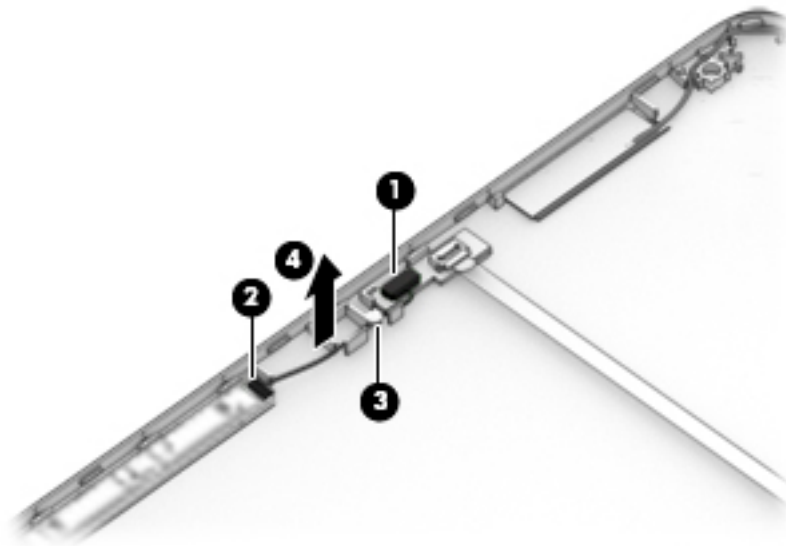
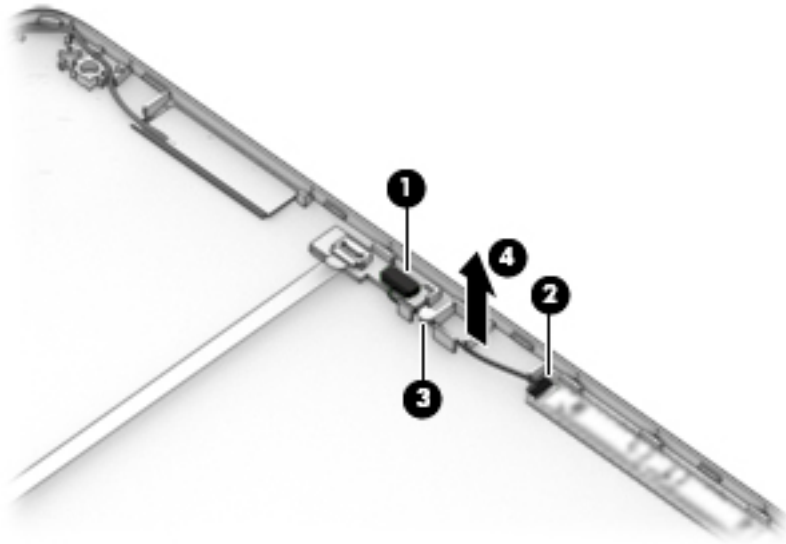


10. To remove the camera cables, disconnect the cable from the camera board (1) and the camera (2), remove the cable from the clip (3), and then remove the cable from the display enclosure (4).

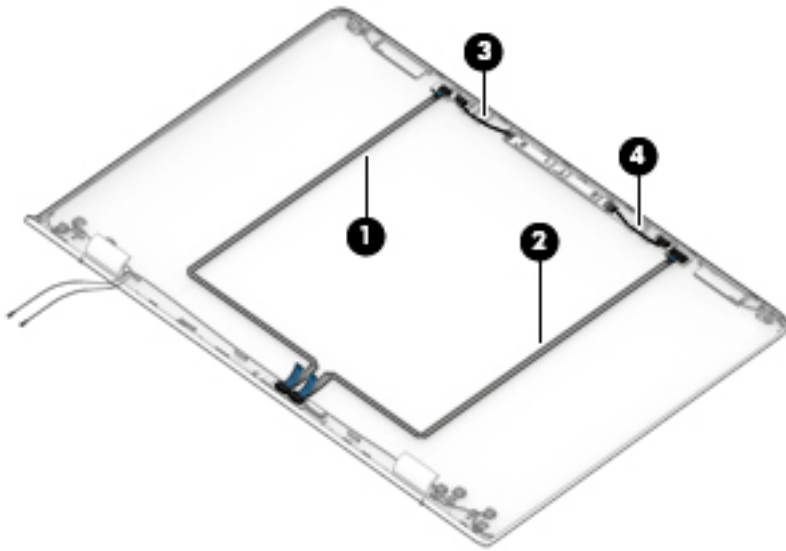
The camera cable is available using the following spare part numbers:

934974-001 for models with an HD camera and an FHD IR camera

934975-001 for models with an FHD IR camera



Use the following illustration to determine camera cable spare part numbering:



(1): 934976-001 - HD FFC camera cable

(2): 934976-001 - HD camera and FHD/IR camera cable

(3): 934974-001 - HD camera board and FHD/IR camera board cable

(4): 934975-001 - FHD/IR camera board cable



NOTE: Models with an HD camera use the cables illustrated by callouts **(1)** and **(3)**. Models with an FHD/IR camera use all cables shown.

The display back cover is available using the following spare part numbers:

932296-001: Mineral silver models

932297-001: Silk gold models

932298-001: Orchid pink models

Reverse this procedure to reassemble and install the display assembly.

System board



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

Description	Spare part number
System board (includes replacement thermal materials):	
All system boards use the following part numbers:	
xxxxxx-001: Non-Windows operating systems	
xxxxxx-601: Windows 10 operating system	
For use in models with discrete graphics memory:	
<ul style="list-style-type: none">Intel Core i7-8550U processor and 4 GB of discrete graphics memory	940762-xx1
<ul style="list-style-type: none">Intel Core i7-7500U processor and 2 GB of discrete graphics memory	930576-xx1
<ul style="list-style-type: none">Intel Core i5-8250U processor and 4 GB of discrete graphics memory	940761-xx1
<ul style="list-style-type: none">Intel Core i5-8250U processor and 2 GB of discrete graphics memory	940760-xx1
<ul style="list-style-type: none">Intel Core i5-7200U processor and 2 GB of discrete graphics memory	930577-xx1
For use in models with UMA graphics memory:	
<ul style="list-style-type: none">Intel Core i5-7200U processor	930574-xx1
<ul style="list-style-type: none">Intel Core i3-7100U processor	930575-xx1
<ul style="list-style-type: none">Intel Pentium 4415U processor	937742-xx1

Before removing the system board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 27](#)).
5. Remove the battery (see [Battery on page 29](#)).
6. Remove the WLAN module (see [WLAN module on page 30](#)).
7. Remove the memory module (see [Memory module on page 32](#)).
8. Remove the hard drive (see [Hard drive on page 33](#)).
9. Remove the solid-state drive (see [Solid-state drive \(SSD\) on page 35](#)).
10. Remove the fan assembly (see [Fan on page 39](#)).
11. Remove the display (see [Display assembly on page 43](#)).

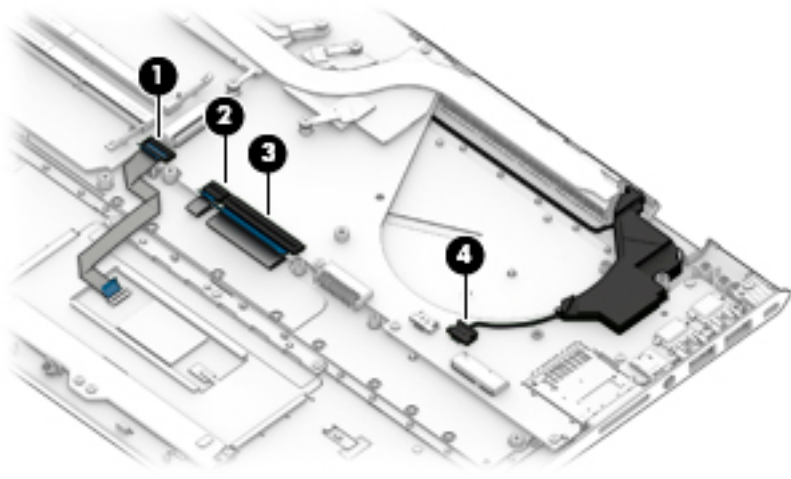
To remove the system board:

1. Position the computer upright, and then disconnect the following cables from the system board:
 - (1): TouchPad cable

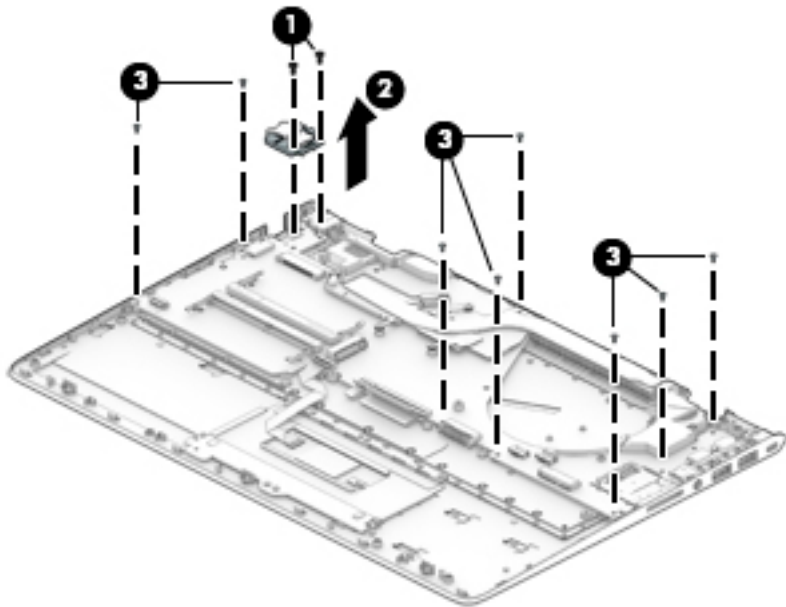
(2): Keyboard backlight cable (select models only)

(3): Keyboard cable

(4): Speaker cable

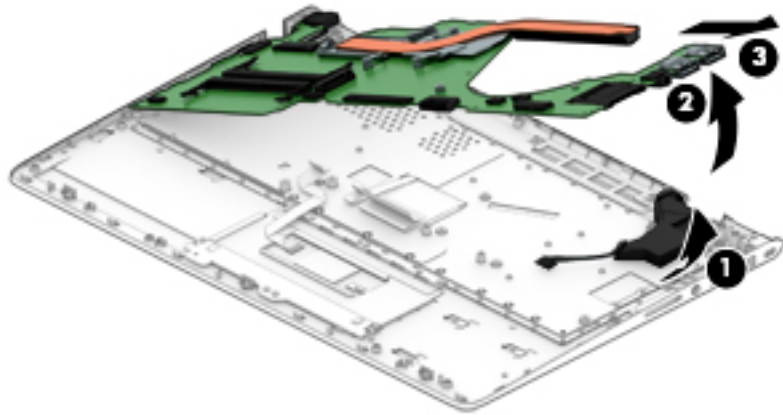


2. Remove the two Phillips PM2.5×6.0 screws **(1)** that secure the USB Type-C bracket to the system board.
3. Remove the bracket **(2)**.
4. Remove the eight Phillips PM2.0×3.0 screws **(3)** that secure the system board to the computer.



5. Lift the right speaker **(1)**
6. Rotate the right side of the system board upward **(2)**

7. Pull the system board up and to the right to remove it from the computer (3).



Reverse this procedure to install the system board.

Speakers

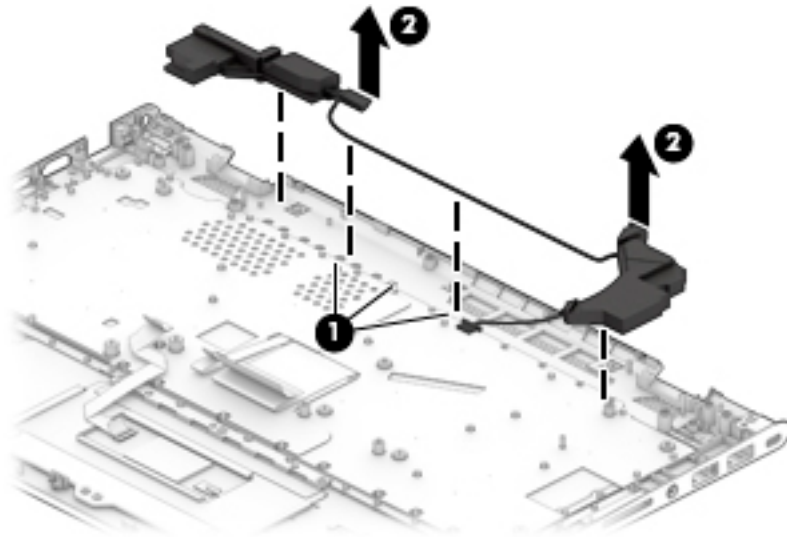
Description	Spare part number
Speakers (includes left and right speakers and cable)	930614-001

Before removing the speakers, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 27](#)).
5. Remove the battery (see [Battery on page 29](#)).
6. Remove the WLAN module (see [WLAN module on page 30](#)).
7. Remove the memory module (see [Memory module on page 32](#)).
8. Remove the hard drive (see [Hard drive on page 33](#)).
9. Remove the solid-state drive (see [Solid-state drive \(SSD\) on page 35](#)).
10. Remove the fan assembly (see [Fan on page 39](#)).
11. Remove the display (see [Display assembly on page 43](#)).
12. Remove the system board (see [System board on page 53](#)).

To remove the speakers:

- ▲ Remove the cable from its routing path along the edge of the computer **(1)**, and then remove the speakers from the computer **(2)**.



Reverse this procedure to install the speakers.



IMPORTANT: When installing the speakers, be sure to route the cable under the WLAN module.

Power connector cable

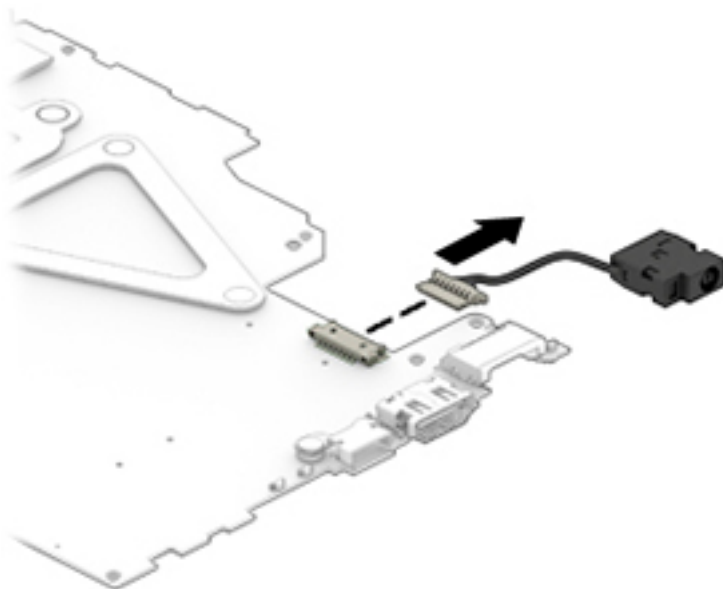
Description	Spare part number
Power connector cable	938151-001

Before removing the power connector cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 27](#)).
5. Remove the battery (see [Battery on page 29](#)).
6. Remove the WLAN module (see [WLAN module on page 30](#)).
7. Remove the memory module (see [Memory module on page 32](#)).
8. Remove the hard drive (see [Hard drive on page 33](#)).
9. Remove the solid-state drive (see [Solid-state drive \(SSD\) on page 35](#)).
10. Remove the fan assembly (see [Fan on page 39](#)).
11. Remove the display (see [Display assembly on page 43](#)).
12. Remove the system board (see [System board on page 53](#)).

To remove the power connector cable:

- ▲ Disconnect the cable from the removed system board.



Reverse this procedure to install the power connector cable.

Top cover/keyboard

The top cover/keyboard spare part remains after all other spare parts have been removed.

The top cover/keyboard spare part kit includes the keyboard, keyboard cable and the keyboard backlight cable.

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




NOTE: All top cover/keyboard spare part kits include TouchPad.

Description	Spare part number
Keyboard for use in models with backlit keyboard:	
Mineral silver	933313-xx1
Silk gold	933315-xx1
Orchid pink	933317-xx1
Keyboard for use in models without backlit keyboard:	
Mineral silver	933312-xx1
Silk gold	933314-xx1
Orchid pink	933316-xx1

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	Italy	-061	Switzerland	-BG1
Canada	-DB1	The Netherlands	-B31	Taiwan	-AB1
Czech Republic and Slovakia	-FL1	Portugal	-131	Thailand	-281
Denmark, Finland, and Norway	-DH1	Russia	-251	Turkey	-141
France	-051	Saudi Arabia	-171	United Kingdom	-031
Germany	-041	Spain	-071	United States	-001
Israel	-BB1				

6 Using Setup Utility (BIOS)

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

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

Starting Setup Utility (BIOS)

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

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

Updating Setup Utility (BIOS)

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

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

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

Determining the BIOS version


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

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


- HP Support Assistant
 1. Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.
– or –
Click the question mark icon in the taskbar.
 2. Select **My PC**, and then select **Specifications**.
- Setup Utility (BIOS)
 1. Start Setup Utility (BIOS) (see [Starting Setup Utility \(BIOS\) on page 59](#)).
 2. Select **Main**, select **System Information**, and then make note of the BIOS version.
 3. Select **Exit**, select **No**, and then follow the on-screen instructions.

To check for later BIOS versions, see [Downloading a BIOS update on page 60](#).

Downloading a BIOS update

 **CAUTION:** To reduce the risk of damage to the computer or an unsuccessful installation, download and install a BIOS update only when the computer is connected to reliable external power using the AC adapter. Do not download or install a BIOS update while the computer is running on battery power, docked in an optional docking device, or connected to an optional power source. During the download and installation, follow these instructions:

- Do not disconnect power from the computer by unplugging the power cord from the AC outlet.
- Do not shut down the computer or initiate Sleep.
- Do not insert, remove, connect, or disconnect any device, cable, or cord.

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


1. Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.
– or –
Click the question mark icon in the taskbar.
2. Click **Updates**, and then click **Check for updates and messages**.
3. Follow the on-screen instructions.
4. At the download area, follow these steps:
 - a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. If the update is more recent than your BIOS version, make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
 - b. Follow the on-screen instructions to download your selection to the hard drive.

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

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

1. Type `file` in the taskbar search box, and then select **File Explorer**.
2. Click your hard drive designation. The hard drive designation is typically Local Disk (C:).
3. Using the hard drive path you recorded earlier, open the folder that contains the update.
4. Double-click the file that has an `.exe` extension (for example, `filename.exe`).

The BIOS installation begins.
5. Complete the installation by following the on-screen instructions.

 **NOTE:** After a message on the screen reports a successful installation, you can delete the downloaded file from your hard drive.

7 Backing up, restoring, and recovering

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


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

For additional information, refer to the HP Support Assistant app.

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

– or –

Select the question mark icon in the taskbar.

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

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

Creating recovery media and backups

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

- Use HP Recovery Manager to create HP Recovery media after you successfully set up the computer. This step creates a backup of the HP Recovery partition on the computer. The backup can be used to reinstall the original operating system in cases where the hard drive is corrupted or has been replaced. For information on creating recovery media, see [Creating HP Recovery media \(select products only\) on page 61](#). For information on the recovery options that are available using the recovery media, see [Using Windows tools on page 62](#).
- Use Windows tools to create system restore points and create backups of personal information.

For more information, see [Recovering using HP Recovery Manager on page 63](#).

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

Creating HP Recovery media (select products only)

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

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

You can use Windows tools to create system restore points and create backups of personal information, see [Using Windows tools on page 62](#).

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

To create HP Recovery media:



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

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

If you ever need to recover the system, see [Recovering using HP Recovery Manager on page 63](#).

Using Windows tools

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




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

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

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

Restore and recovery

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

 **IMPORTANT:** Not all methods are available on all products.

- Windows offers several options for restoring from backup, refreshing the computer, and resetting the computer to its original state. For more information see the Get help app.
 - ▲ Select the **Start** button, and then select the **Get help** app.
- If you need to correct a problem with a preinstalled application or driver, use the Reinstall drivers and/or applications option (select products only) of HP Recovery Manager to reinstall the individual application or driver.
 - ▲ Type `recovery` in the taskbar search box, select **HP Recovery Manager**, select **Reinstall drivers and/or applications**, and then follow the on-screen instructions.
- If you want to recover the Windows partition to original factory content, you can choose the System Recovery option from the HP Recovery partition (select products only) or use the HP Recovery media. For more information, see [Recovering using HP Recovery Manager on page 63](#). If you have not already created recovery media, see [Creating HP Recovery media \(select products only\) on page 61](#).
- On select products, if you want to recover the computer's original factory partition and content, or if you have replaced the hard drive, you can use the Factory Reset option of HP Recovery media. For more information, see [Recovering using HP Recovery Manager on page 63](#).
- On select products, if you want to remove the Recovery partition to reclaim hard drive space, HP Recovery Manager offers the Remove Recovery Partition option.


For more information, see [Removing the HP Recovery partition \(select products only\) on page 65](#).

Recovering using HP Recovery Manager

HP Recovery Manager software allows you to recover the computer to its original factory state by using the HP Recovery media that you either created or that you obtained from HP, or by using the HP Recovery partition (select products only). If you have not already created recovery media, see [Creating HP Recovery media \(select products only\) on page 61](#).


What you need to know before you get started

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


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

- HP Recovery media must be used if the computer hard drive fails. If you have not already created recovery media, see [Creating HP Recovery media \(select products only\) on page 61](#).
- To use the Factory Reset option (select products only), you must use HP Recovery media. If you have not already created recovery media, see [Creating HP Recovery media \(select products only\) on page 61](#).
- If your computer does not allow the creation of HP Recovery media or if the HP Recovery media does not work, you can obtain recovery media for your system from support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information from the HP

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

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

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

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


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

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

Using the HP Recovery partition (select products only)

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

To start HP Recovery Manager from the HP Recovery partition:

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

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

– or –

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

For tablets without keyboards:

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

– or –

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

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

Using HP Recovery media to recover

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

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


 **NOTE:** If the computer does not automatically restart in HP Recovery Manager, change the computer boot order. See [Changing the computer boot order on page 65](#).

3. Follow the on-screen instructions.

Changing the computer boot order

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

To change the boot order:

 **IMPORTANT:** For a tablet with a detachable keyboard, connect the 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, and then quickly hold down the volume up button; then select **f9**.


– or –


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

3. Select the optical drive or USB flash drive from which you want to boot.
4. Follow the on-screen instructions.

Removing the HP Recovery partition (select products only)

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

 **IMPORTANT:** After you remove the HP Recovery partition, you will not be able to perform System Recovery or create HP Recovery media from the HP Recovery partition. So before you remove the Recovery partition, create HP Recovery media; see [Creating HP Recovery media \(select products only\) on page 61](#).

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


Follow these steps to remove the HP Recovery partition:

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

8 Using HP PC Hardware Diagnostics (UEFI)

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

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

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

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

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

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


- a. Connected USB drive

 **NOTE:** To download the HP PC Hardware Diagnostics (UEFI) tool to a USB drive, see [Downloading HP PC Hardware Diagnostics \(UEFI\) to a USB device on page 67](#).

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

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

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

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

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

Download the latest UEFI version

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

Download any version of UEFI for a specific product

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

3. Enter the product name or number.

– or –

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

4. Select your computer, and then select your operating system.
5. In the **Diagnostic** section, follow the on-screen instructions to select and download the UEFI version you want.

Additional BIOS crisis recovery tool

HP provides a BIOS crisis recovery tool through the HP PC Hardware Diagnostics 3-in-1 USB key. This tool can be used by HP authorized service providers to recover systems that have failed due to a corrupted BIOS. For more information about using the 3-in-1 USB key for BIOS crisis recovery, go to <http://www.hp.com/go/techcenter/pcdiags>. Additional information is included in the web-based training offered by HP University. See the modules that cover HP PC Hardware Diagnostics (UEFI).

9 Specifications

Computer specifications

	Metric	U.S.
Dimensions		
Depth	227.6 mm	8.96 in
Width	324.1 mm	12.76 in
Height	19.9 mm	0.78 in
Weight		
With hard drive	1629 g	3.59 lb
With solid-state drive	1537 g	3.39 lb
Input power		
Operating voltage and current	19.5 V dc @ 3.33 A – 65 W 19.5 V dc @ 2.31 A – 45 W	
Temperature		
Operating	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F
Relative humidity (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating	-15 m to 3,048 m	-50 ft to 10,000 ft
Nonoperating	-15 m to 12,192 m	-50 ft to 40,000 ft
NOTE: Applicable product safety standards specify thermal limits for plastic surfaces. The device operates well within this range of temperatures.		

35.6-cm (14.0-in) display specifications

	Metric	U.S.
Active diagonal size	35.6-cm	14.0-in
Resolution	1920x1080 (FHD)	
Surface treatment	BrightView	
Brightness	220 nits	
Backlight	WLED	
Graphics adapter	eDP	
Thickness	3.0 mm	

Hard drive specifications

	2-TB*	1-TB*	500-GB*
Dimensions			
Height	9.5 mm or 7.2 mm	9.5 mm or 7.2 mm	7.0 mm
Length	100.4 mm	100.4 mm	100.6 mm
Width	69.9 mm	69.9 mm	70.1 mm
Weight	130.0 g	107.0 g	92.0 g
Interface type	SATA	SATA	SATA
Transfer rate			
Synchronous (maximum)	300 MB/sec	300 MB/sec	300 MB/sec
Security	ATA security	ATA security	ATA security
Seek times (typical read, including setting)			
Single track	2.0 ms	2.0 ms	3 ms
Average (read/write)	12 ms	12 ms	13 ms
Maximum	22 ms	22 ms	24 ms
Logical blocks	3,907,029,168	1,953,525,168	1,048,576,000
Disk rotational speed	5400 rpm	5400 rpm	5400 rpm
Operating temperature	0°C to 60°C (32°F to 140°F)		
*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less.			
NOTE: Certain restrictions and exclusions apply. Contact technical support for details.			

M.2 solid-state drive specifications

	128-GB*	256-GB*	512-GB*
Dimensions			
Height	1 mm	1 mm	1 mm
Length	50.8 mm	50.8 mm	50.8 mm
Width	28.9 mm	28.9 mm	28.9 mm
Weight	< 10 g	< 10 g	< 10 g
Interface type	SATA-3 (6 Gbps)	SATA-3 (6 Gbps)	SATA-3 (6 Gbps)
Transfer rate			
Sequential Read	Up to 520 MB/s	Up to 540 MB/s	Up to 530 MB/s
Random Read	Up to 60K IOPs	Up to 85K IOPs	Up to 97K IOPs
Sequential Write	Up to 160 MB/s	Up to 280 MB/s	Up to 515 MB/s
Random Write	Up to 34K IOPs	Up to 67K IOPs	Up to 88K IOPs
Ready time, Maximum (to not busy)	1.0 s	1.0 s	1.0 s
Access times			
Logical	0.1 ms	0.1	0.1
Total logical sectors	250,069,680	500,118,192	1,000,215,216
Operating temperature			
Operating	0° to 70°C (32°F to 158°F)	0° to 70°C (32°F to 158°F)	0° to 70°C (32°F to 158°F)
Non-operating	-40° to 95°C (-40°F to 203°F)	-55° to 90°C (-67°F to 194°F)	-40° to 85°C (-40°F to 185°F)
*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less.			
NOTE: Certain restrictions and exclusions apply. Contact technical support for details.			

10 Power cord set requirements

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

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

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

Requirements for all countries

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least **1.5 m** (5.0 ft) and no more than **2.0 m** (6.5 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 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

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	ISI	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, 0.75mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
2. The flexible cord must be Type 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.

Country/region	Accredited agency	Applicable note number
		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, 0.75mm ² or 1.25mm ² 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, 0.75mm ² 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 3X0.75mm ² 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 3X1.25mm ² 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 x 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 3X0.75/1.00mm ² conductor size, with plug BS 1363/A with BSI or ASTA marks.

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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