



HP Pavilion Gaming Laptop

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.

Software terms

By installing, copying, downloading, or otherwise using any software product preinstalled on this computer, you agree to be bound by the terms of the HP End User License Agreement (EULA). If you do not accept these license terms, your sole remedy is to return the entire unused product (hardware and software) within 14 days for a refund subject to the refund policy of your place of purchase.

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

Safety warning notice

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

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1 Product description

Category	Description
Product name	HP Pavilion Gaming Laptop PC <i>* Model number: 15-cx0000 – 15-cx0999</i>
Processor	8th generation Intel® Core™ processors i7-8750H (2.2-GHz, turbo up to 4.1 GHz, 2400-MHz/9-MB L3 cache, six core, 45 W, Intel UHD Graphics 630 GPU) i7-8550U (1.8-GHz, turbo up to 4.0 GHz, 2400-MHz/8-MB L3 cache, quad core, 15 W, Intel UHD Graphics 620 GPU) i5-8300H (2.3-GHz, turbo up to 4.0 GHz, 2400-MHz/8-MB L3 cache, quad core, 45 W, Intel UHD Graphics 630 GPU) i5-8250U (1.6-GHz, turbo up to 3.4 GHz, 2400-MHz/6-MB L3 cache, quad core, 15 W, Intel UHD Graphics 620 GPU)
Graphics	Internal graphics Intel UHD Graphics 630 (i5-8750H/i5-8300H processors) Intel UHD Graphics 620 (i5-8550U/i5-8250U processors) Hybrid graphics GeForce GTX 1050 with 4096 MB or 2048 GB of dedicated video memory MD Radeon RX 560X with 2048 MB of dedicated video memory Nvidia GTX1050Ti with 4096 MB of dedicated video memory Support HD Decode, DX12, and HDMI Supports Optimus Support GPS (GPU Performance Scaling)
Panel	39.6-cm (15.6-in), white light-emitting diode (WLED) Full high-definition (FHD), anti glare (1920×1080), SVA, slim, eDP; typical brightness: 220 nits FHD, anti glare (1920×1080), UWVA, slim, eDP; typical brightness: 220 nits FHD, anti glare (1920×1080), UWVA, eDP; typical brightness: 300 nits Ultra high-definition (UHD), anti glare (3840×2160), UWVA, typical brightness: 340 nits
Memory	Two non-customer-accessible/upgradable memory module slots DDR4-2666 dual channel support (8750H/8300H processors) DDR4-2400 dual channel support (8550U/8250U processors) Supports up to 16 GB of system RAM in the following configurations: <ul style="list-style-type: none">• 16384-MB total system memory (8192×2)• 12288-MB total system memory (8192×1) + (4096×1)

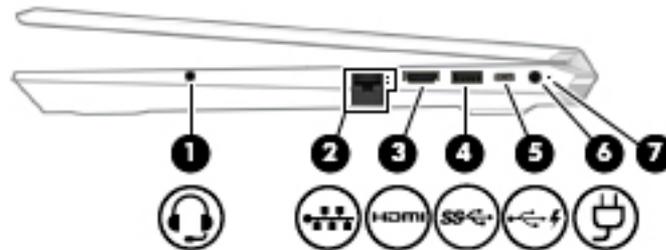
Category	Description
	<ul style="list-style-type: none"> 8192-MB total system memory (8192×1) or (4096×2) 4096-MB total system memory (4096×1)
Hard drives	<p>Supports 6.35-cm (2.5-in) SATA hard drives in 9.5-mm (.37-in) and 7.0-mm/7.2-mm (.28-in) thicknesses</p> <p>Support for solid-state drive + hard drive</p> <p>Support for M.2 solid-state drive</p> <p>Accelerometer/hard drive protection support</p> <p>Single hard drive configurations (2.5-in):</p> <p>2-TB, 5400 rpm, 9.5 mm/7.2 mm</p> <p>1-TB, 7200 rpm, 9.5 mm/7.2 mm</p> <p>1-TB, 5400 rpm, 9.5 mm</p> <p>M.2 solid-state drive, TLC:</p> <p>256 GB, PCIe</p> <p>128 GB, PCIe</p> <p>128 GB, SATA-3</p> <p>Dual storage configurations:</p> <p>16 GB PCIe M.2 Optane solid-state drive + 1 TB (7200 rpm) hard drive</p> <p>256 GB PCIe, NVMe, TLC, M.2 solid-state drive + 1 TB (7200 rpm) hard drive</p> <p>128 GB SATA-3, TLC, M.2 solid-state drive + 1 TB (5400 rpm) hard drive</p> <p>128 GB PCIe, NVMe, TLC, M.2, solid-state drive + 2 TB (5400 rpm)</p> <p>128 GB PCIe, NVMe, TLC, M.2, solid-state drive + 1 TB (7200 rpm)</p>
Camera/mic	<p>HP Wide Vision HD camera - indicator LED, USB 2.0, HD BSI sensor, f2.0, WDR, 88° WFOV, 720p by 30 frames per second</p> <p>Dual array digital microphones with appropriate software - beam forming, echo cancellation, noise suppression</p> <p>HP Wide Vision FHD IR Camera, indicator LED & 2x IR LEDs, USB 2.0, FHD Hybrid BSI sensor, f2.2, WDR, 88° WFOV, 1080p by 30 frames per second</p> <p>Support Windows Hello</p> <p>Dual array digital microphones with appropriate software - beam forming, echo cancellation, noise suppression</p> <p>Supports WDR (Wide Dynamic Range)</p>
Audio	<p>Audio brand: B&O Play</p> <p>Audio control panel: B&O Play Audio Control</p> <p>Supports HP Audio Boost</p> <p>Dual speakers</p>
Ethernet	Integrated 10/100/1000 network interface card (NIC)
Wireless Network	Integrated wireless options with dual antennas (M.2/PCIe):

Category	Description
	<p>Compatible with Miracast-certified devices</p> <p>Support for the following WLAN formats:</p> <ul style="list-style-type: none"> Intel Dual Band Wireless-AC 9560 802.11 AC 2x2 WiFi + Bluetooth 5.0 Combo Adapter (non-vPro, MU-MIMO supported) Realtek RTL8822BE 802.11 ac 2x2 WiFi + Bluetooth 4.2 Combo Adapter (MU-MIMO supported)
External media card	<p>HP Multi-Format Digital Media Reader</p> <p>Support SD/SDHC/SDXC</p> <p>Push-push insertion/removal</p>
Internal Card Expansion	<p>One M.2 slot for solid-state drive</p> <p>One M.2 slot for WLAN</p>
Ports	<p>Hot plug/unplug and auto detect for correct output to wide-aspect vs. standard aspect video (auto adjust panel resolution to fit embedded panel and external monitor connected)</p> <p>HDMI v2.0 supporting up to 4096×2160 @ 60Hz</p> <p>RJ-45 (Ethernet)</p> <p>USB 3.1 Gen1 Type-A ports (3)</p> <p>USB 3.1 Gen1 Type-C port (support data transfer, DisplayPort 1.2 out up to 4096×2304 (60Hz), HP Sleep & Charge)</p> <p>AC Smart Pin adapter plug</p> <p>Headphone/line out and microphone/line in combo jack</p>
Keyboard/pointing devices	<p>Keyboard</p> <p>Full-size backlit, 3-coat paint, island style keyboard with numeric keypad (8750H/8300H processors)</p> <p>Full-size, 2-coat paint, island style keyboard with numeric keypad (8550U/8250U processors)</p> <p>TouchPad</p> <p>Image sensor</p> <p>Multi-touch gestures enabled</p> <p>Taps enabled by default</p> <p>Supports Modern Trackpad Gestures</p>
Power	<p>AC adapters (Smart, PFC, 4.5 mm)</p> <p>200 W (8750H/8300H processors and GeForce GTX 1060 Max-Q graphics)</p> <p>150 W (8750H/8300H processors and GeForce GTX 1050 Ti and Radeon RX 560 graphics)</p> <p>135 W (8750H/8300H processors and GeForce GTX 1050 graphics)</p> <p>120 W (8550U/8250U processors and GeForce GTX 1050 graphics)</p> <p>Power cord</p> <p>1 meter premium power cord</p> <p>Battery</p>

Category	Description
	4-cell, 70-Whr, 4550 mAh, polymer battery (8750H/8300H processors and GeForce GTX 1060 Max-Q graphics)
	3-cell, 52.5-Whr, 4550 mAh, polymer battery (all models except with GeForce GTX 1060 Max-Q graphics)
Security	TPM 2.0
	Kensington Security Lock
Operating system	FreeDOS 2.0
	Windows 10 Home 64
	Windows 10 Home 64 Advanced
	Windows 10 Home 64 Advanced QVC
	Windows 10 Home 64 Advanced Single Language
	Windows 10 Home 64 Advanced Web/Kiosk
	Windows 10 Home 64 Chinese Market CPPP
	Windows 10 Home 64 High-End Chinese Market CPPP
	Windows 10 Home 64 Plus QVC
	Windows 10 Home 64 Plus Single Language
	Windows 10 Home 64 Plus Single Language APAC EM PPP
	Windows 10 Home 64 Plus Single Language India Market PPP
	Windows 10 Home 64 Plus Single Language Indonesia Market PPP
	Windows 10 Home 64 Plus Web/Kiosk
	Windows 10 Home 64 QVC
	Windows 10 Home 64 Single Language
	Windows 10 Home 64 Single Language APAC EM PPP
	Windows 10 Home 64 Single Language India Market PPP
	Windows 10 Home 64 Single Language Indonesia Market PPP
	Windows 10 Home 64 Web/Kiosk
	Windows 10 Pro 64
	Windows 10 Pro 64 Web/Kiosk
Serviceability	End-user replaceable parts
	AC adapter

2 Getting to know your computer

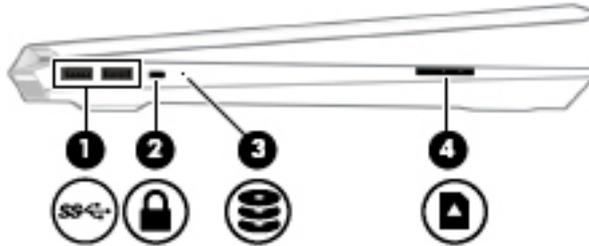
Right side



Component	Description
(1) 	<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>
(2) 	<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.
(3) 	<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>
(4) 	<p>USB SuperSpeed port</p> <p>Connects a USB device, such as a cell phone, camera, activity tracker, or smartwatch, and provides high-speed data transfer.</p>
(5) 	<p>USB Type-C port with HP Sleep and Charge</p> <p>Connects a USB device that has a Type-C connector, provides high-speed data transfer, and even when the computer is off, charges products such as a cell phone, camera, activity tracker, or smartwatch.</p> <p>– and –</p> <p>Connects a display device that has a USB Type-C connector, providing DisplayPort output.</p> <p>NOTE: Cables and/or adapters (purchased separately) may be required.</p>
(6)	<p>Power connector</p> <p>Connects an AC adapter.</p>
(7)	<p>Power light</p> <ul style="list-style-type: none"> • On: The computer is on.

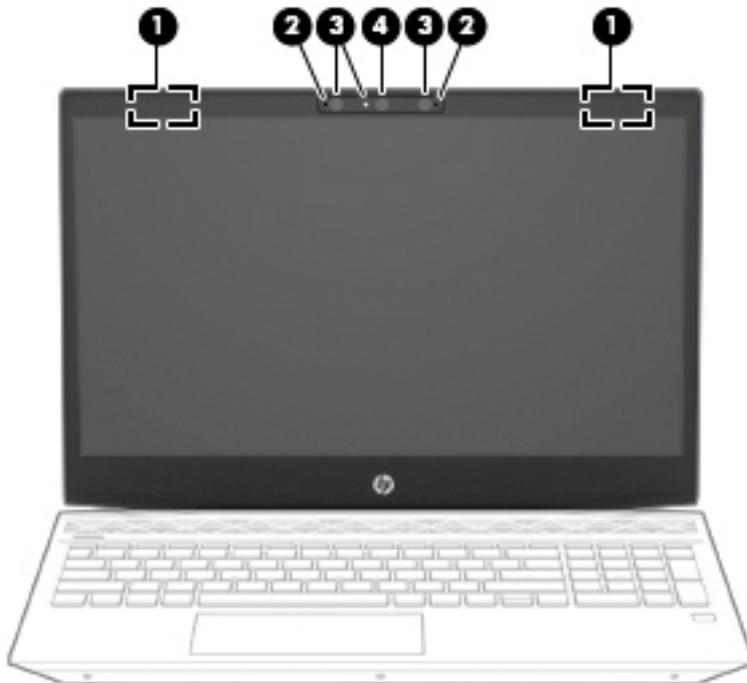
Component	Description
	<ul style="list-style-type: none"> Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components. Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.

Left side



Component	Description
(1) 	<p>USB SuperSpeed ports (2)</p> <p>Connect a USB device, such as a cell phone, camera, activity tracker, or smartwatch, and provide high-speed data transfer.</p>
(2) 	<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>
(3) 	<p>Drive light</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.
(4) 	<p>Memory card reader</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"> Hold the card label-side up, with connectors facing the computer. 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*	Send and receive wireless signals to communicate with wireless local area networks (WLANs).
(2) Internal microphones	Record sound.
(3) Camera lights (select products only)	On: One or more cameras are in use.
(4) Cameras (select products only)	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. For optimal transmission, keep the areas immediately around the antennas free from obstructions.

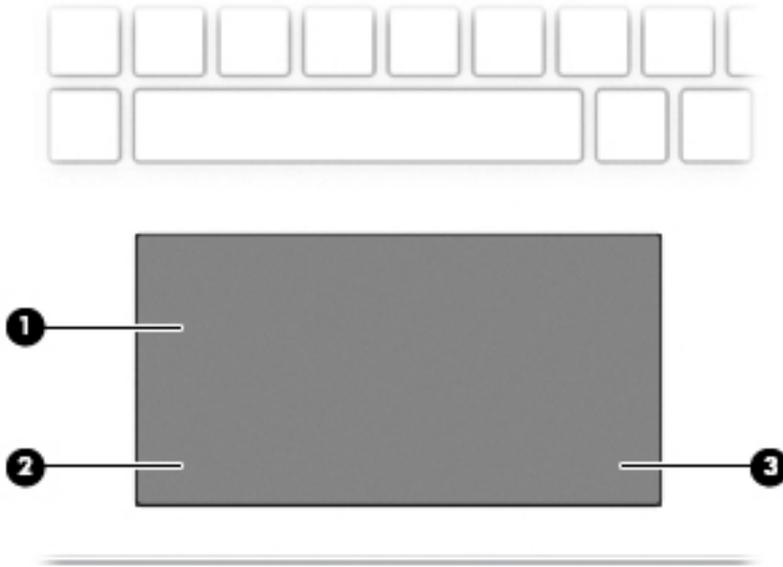
For wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region.

To access this guide:

1. Type `support` in the taskbar search bar, and then select the **HP Support Assistant** app.
– or –
Click the question mark icon in the taskbar.
2. Select **My PC**, select the **Specifications** tab, and then select **User Guides**.

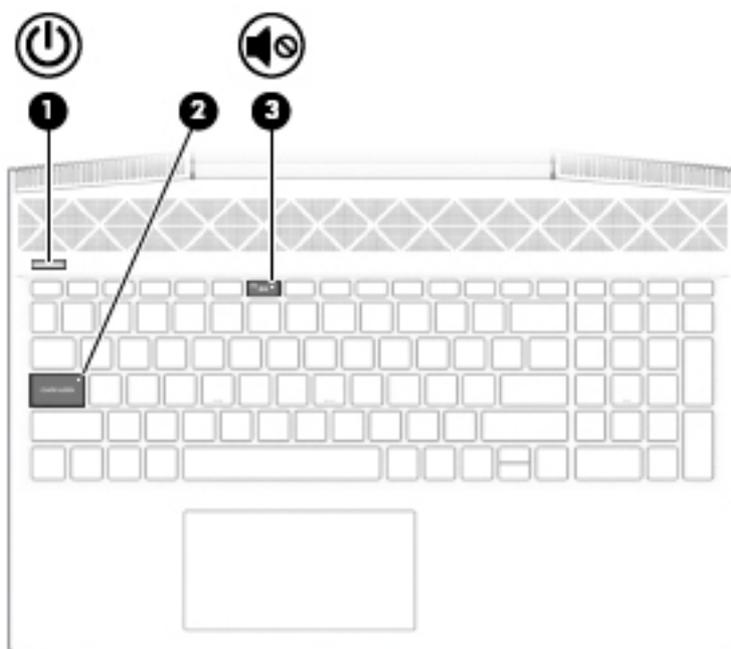
Keyboard area

TouchPad



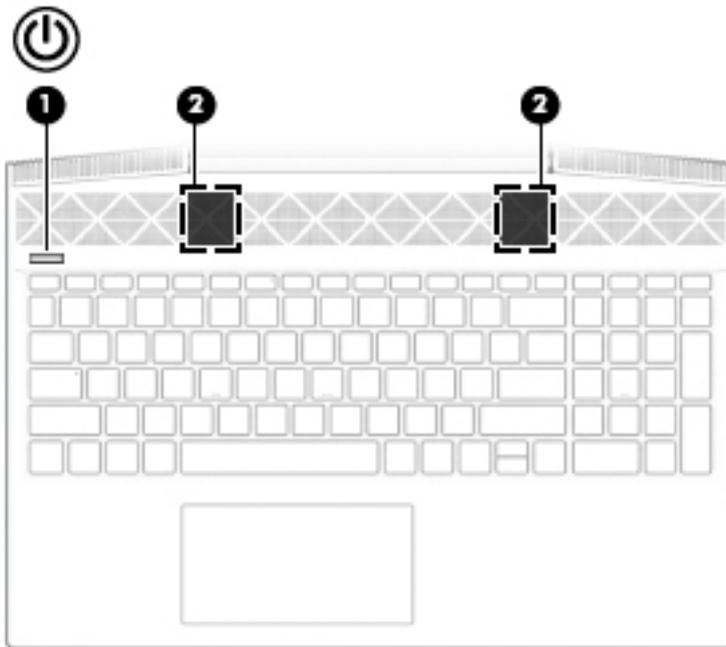
Component	Description
(1) TouchPad zone	Reads your finger gestures to move the pointer or activate items on the screen.
(2) Left TouchPad button	Functions like the left button on an external mouse.
(3) Right TouchPad button	Functions like the right button on an external mouse.

Lights



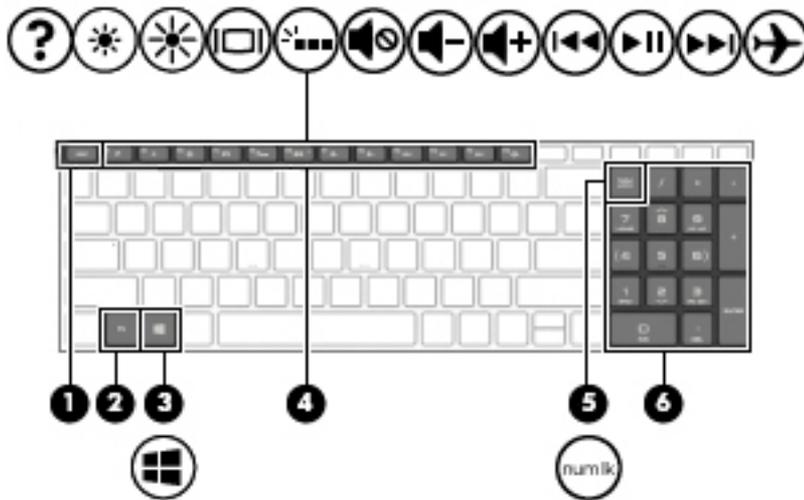
Component	Description
(1) Power light	<ul style="list-style-type: none">• On: The computer is on.• Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components.• Off: The computer is off or in Hibernation. Hibernation is 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, speakers, and fingerprint reader



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

Special keys



Component	Description
(1) <code>esc</code> key	Displays system information when pressed in combination with the <code>fn</code> key.
(2) <code>fn</code> key	Executes 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.
(5) <code>num lock</code> key	Alternates between the navigational and numeric functions on the integrated numeric keyboard.
(6) Integrated numeric keypad	A separate keypad to the right of the alphabet keyboard. When <code>num lock</code> is pressed, the keypad can be used like an external numeric keypad. NOTE: If the keypad function is active when the computer is turned off, that function is reinstated when the computer is turned back on.

Action keys

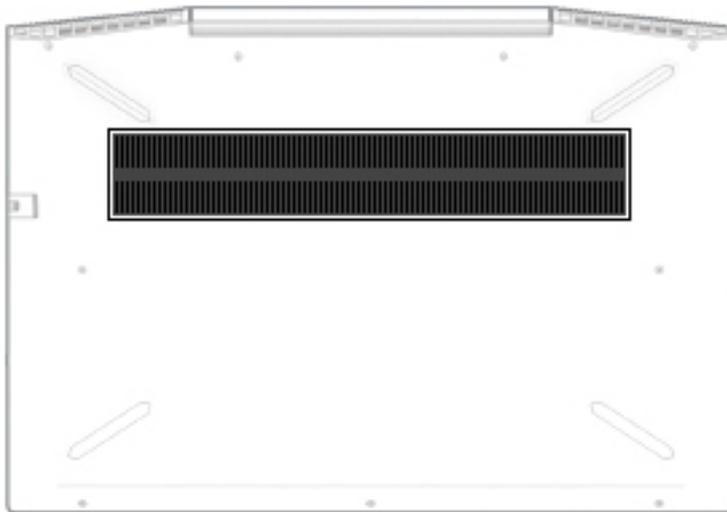
An action key performs the function indicated by the icon on the key. To determine which keys are on your product, see [Special keys on page 11](#).

▲ To use an action key, press and hold the key.

Icon	Description
	Helps prevent side-angle viewing from onlookers. If needed, decrease or increase brightness for well-lit or darker environments. Press the key again to turn off the privacy screen.
	
	Decreases the screen brightness incrementally as long as you hold down the key.
	Increases the screen brightness incrementally as long as you hold down the key.
	Opens the “How to get help in Windows 10” webpage.
	Switches the screen image between display devices connected to the system. For example, if a monitor is connected to the computer, repeatedly pressing this key alternates the screen image from the computer display to the monitor display to a simultaneous display on both the computer and the monitor.
	Turns the keyboard backlight off or on (select products only). NOTE: To conserve battery power, turn off this feature.
	Plays the previous track of an audio CD or the previous section of a DVD or a Blu-ray Disc (BD).
	Starts, pauses, or resumes playback of an audio CD, a DVD, or a BD.
	Plays the next track of an audio CD or the next section of a DVD or a BD.
	Stops audio or video playback of a CD, a DVD, or a BD.
	Decreases speaker volume incrementally while you hold down the key.
	Increases speaker volume incrementally while you hold down the key.
	Mutes or restores speaker sound.
	Turns the wireless feature on or off.

Icon	Description
	NOTE: A wireless network must be set up before a wireless connection is possible.
	Turns the airplane mode and wireless feature on or off. NOTE: The airplane mode key is also referred to as the wireless button. NOTE: A wireless network must be set up before a wireless connection is possible.

Bottom



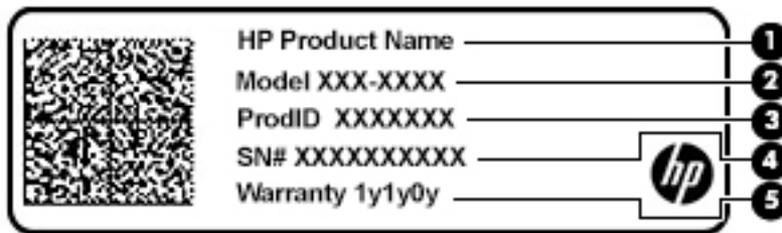
Component	Description
Vent	Enables airflow to cool internal components. NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.

Labels

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

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

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



Component

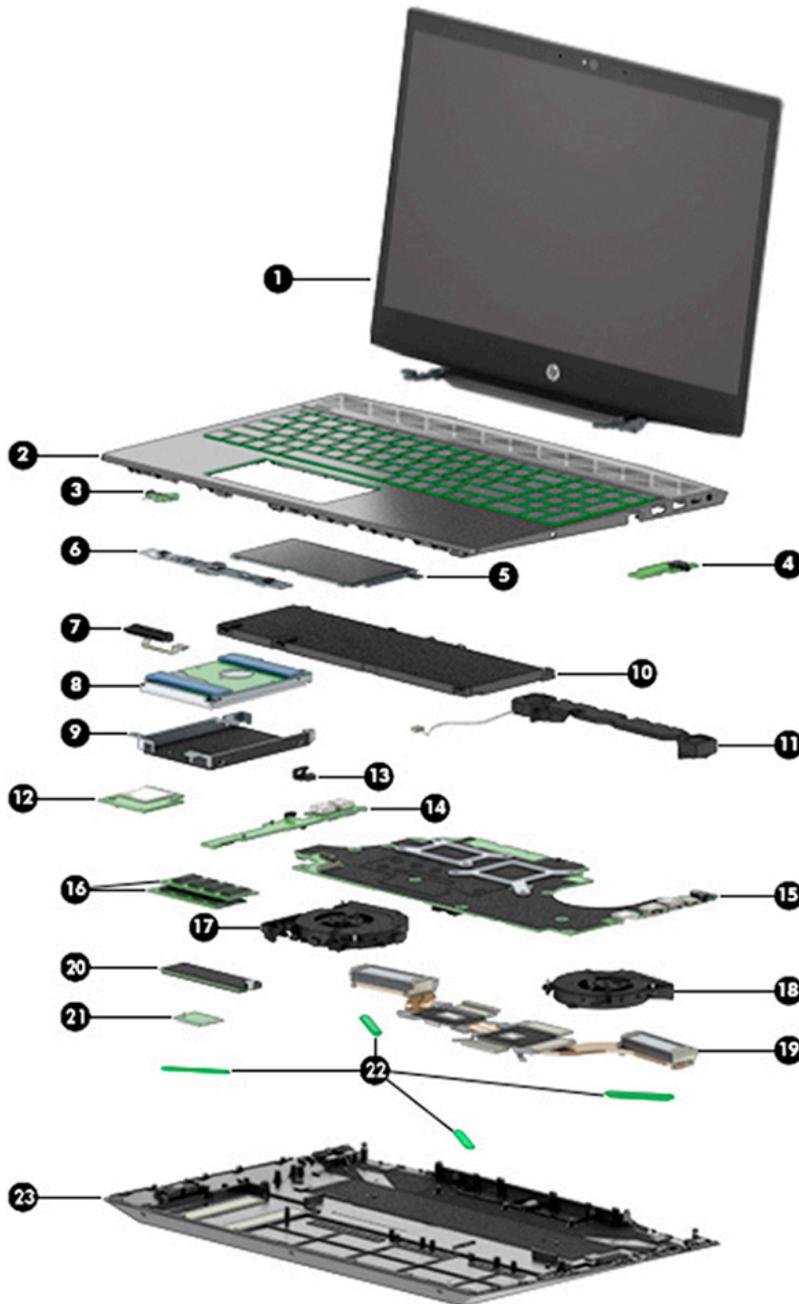
-
- | | |
|-----|-----------------|
| (1) | HP product name |
| (2) | Model number |
| (3) | Product ID |
| (4) | Serial number |
| (5) | Warranty period |
-

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

3 Illustrated parts catalog

Computer major components

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

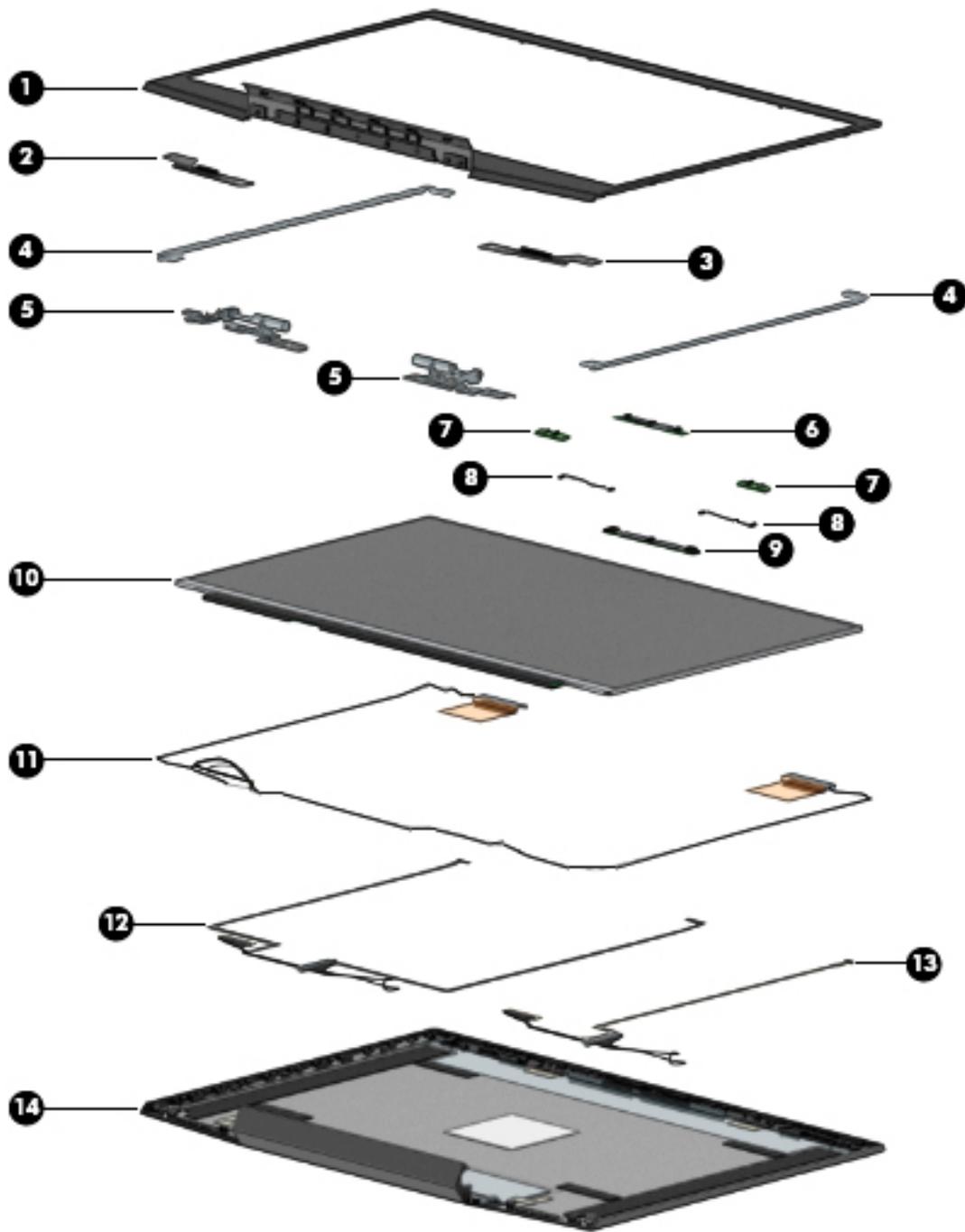


Item	Component	Spare part number
(1)	Display assembly NOTE: For display assembly subcomponent spare part information, see Display assembly subcomponents on page 19 .	not spared
(2)	Top cover/keyboard (includes thermal grease and keyboard connector Mylar) NOTE: For a detailed list of keyboard country codes, see Top cover/keyboard on page 68 .	
	For use in ghost white models with 8250U/8550U processors without a backlight	L20669-xxx
	For use in ghost white models with 8300H/8750H processors with a backlight	L20670-xxx
	For use in ghost white models with 8250U/8550U processors with a backlight	L21412-xxx
	For use in acid green models with 8300H/8750H processors with a backlight	L20671-xxx
	For use in ultra violet models with 8300H/8750H processors with a backlight	L20672-xxx
(3)	Power button board (includes rubber and thermal grease) NOTE: The power button board cable is available using spare part number L20352-001.	
	Acid green	L20342-001
	Ultra violet	L20343-001
	Ghost white	L20344-001
(4)	Audio board NOTE: The audio board cable is available using spare part number L20328-001.	
	For use in models with 8300H/8750H processors	L20326-001
	For use in models with 8250U/8550U processors	L20327-001
(5)	TouchPad board NOTE: The TouchPad cable is available using spare part number L20332-001.	L20333-001
(6)	TouchPad bracket (not illustrated)	L20331-001
(7)	Hard drive connector/cable	L20324-001
(8)	Hard drive, 2.5-inch (includes sponge; does not include brackets, connector board, or cable) NOTE: The hard drive cable is available using spare part number L20324-001.	
	2-TB, 5400-rpm	912487-857
	1-TB, 7200-rpm	766457-858
	1-TB, 5400-rpm	762990-006
(9)	Hard drive bracket	L20325-001
(10)	Battery (includes Mylar and sponge)	
	4 cell	917724-856
	3 cell	L08855-856
(11)	Speakers (include thermal grease)	L20345-001
(12)	Card reader board	

Item	Component	Spare part number
	NOTE: The card reader board cable is available using spare part number L20330-001.	
	For use only in models with GeForce GTX 1060 Max-Q graphics	L20329-001
	For use all models without GeForce GTX 1060 Max-Q graphics	L25944-001
(13)	Security bracket	L20353-001
(14)	USB board	
	NOTE: The USB board cable is available using spare part number L20351-001.	
	For use only in models with GeForce GTX 1060 Max-Q graphics	L20336-001
	For use all models without GeForce GTX 1060 Max-Q graphics	L20337-001
(15)	System board (includes thermal pad kit and thermal grease)	
	All system boards use the following part numbers:	
	xxxxxx-001: Non-Windows operating systems	
	xxxxxx-601: Windows 10 operating system	
	Intel Core i7-8750H processor and GeForce GTX 1060 Max-Q graphics controller with 3 GB of memory	L20304-xx1
	Intel Core i7-8750H processor and GeForce GTX 1050 graphics controller with 4 GB of memory	L20302-xx1
	Intel Core i7-8750H processor and GeForce GTX 1050 Ti graphics controller with 4 GB of memory	L20300-xx1
	Intel Core i7-8750H processor and GeForce GTX 1050 graphics controller with 2 GB of memory	L20296-xx1
	Intel Core i5-8300H processor and Radeon RX 560 graphics controller with 2 GB of memory	L20303-xx1
	Intel Core i5-8300H processor and GeForce GTX 1050 Ti graphics controller with 4 GB of memory	L20301-xx1
	Intel Core i5-8300H processor and GeForce GTX 1050 graphics controller with 4 GB of memory	L20299-xx1
	Intel Core i5-8300H processor and GeForce GTX 1050 graphics controller with 2 GB of memory	L20295-xx1
	Intel Core i5-8550U processor and GeForce GTX 1050 graphics controller with 2 GB of memory	L20298-xx1
	Intel Core i5-8250U processor and GeForce GTX 1050 graphics controller with 2 GB of memory	L20297-xx1
(16)	Memory module	
	DDR4-2400	
	• 8-GB	862398-855
	• 4-GB	862397-855
	DDR4-2666	
	• 8-GB	937236-855
	• 4-GB	L10598-855
	Fans	
(17)	System processor (CPU)	L20334-001
(18)	Graphics processor (VGA)	L20335-001
(19)	Heat sink assembly (includes replacement thermal materials)	
	For use in models with 8250U/8550U processors and GeForce GTX 1050	L20338-001

Item	Component	Spare part number
	For use in models with 8300H/8750H processors and GeForce GTX 1050/1050 Ti graphics	L20339-001
	For use in models with 8300H/8750H processors and GeForce GTX 1060 Max-Q	L20340-001
	For use in models with 8300H/8750H processors and Radeon RX 560 graphics	L20341-001
	Thermal pad kit (for use on system board components serviced by the heat sink)	L23785-001
(20)	Solid-state drive, M.2	
	256 GB, PCIe	L21752-001
	128 GB, PCIe	L21751-001
	128 GB, SATA-3	L21750-001
	Optane memory module, 16 GB	L21753-001
(21)	WLAN module	
	Realtek RTL8822BE 802.11 ac 2x2 WiFi + Bluetooth 4.2 Combo Adapter (MU-MIMO supported)	924813-855
	Intel Dual Band Wireless-AC 9560 802.11 AC 2x2 WiFi + Bluetooth 5.0 Combo Adapter (non-vPro, MU-MIMO supported)	L22634-005
(22)	Rubber Feet Kit	
	Acid green	L20321-001
	Ultra violet	L20322-001
	Ghost white	L20323-001
(23)	Bottom cover	
	For use in acid green models	L20317-001
	For use in ultra violet models	L20318-001
	For use in ghost white models with 8300H/8750H processors	L20319-001
	For use in ghost white models with 8250U/8550U processors	L20320-001

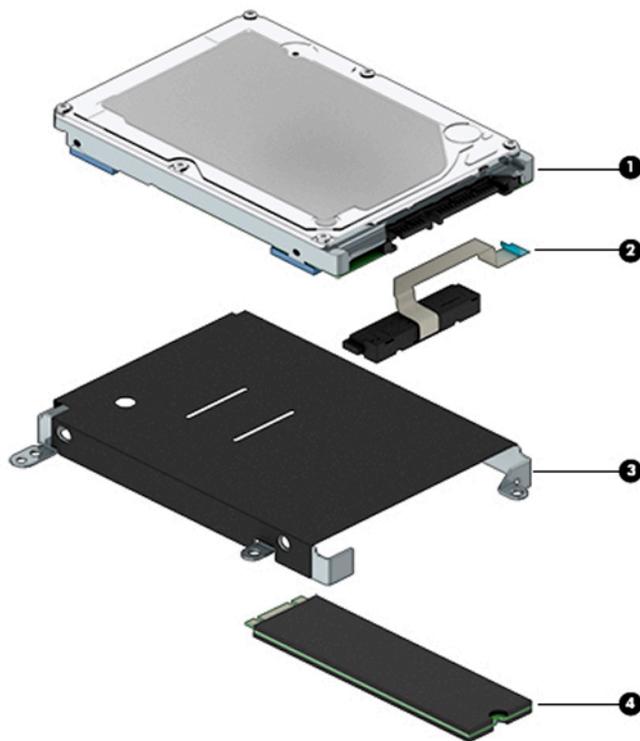
Display assembly subcomponents



Item	Component	Spare part number
(1)	Display bezel	
	For use in models with a standard HD camera	L20309-001
	For use in models with an IR camera	L20310-001
	Display enclosure support brackets	

Item	Component	Spare part number
(2)	Left	L20312-001
(3)	Right	L20311-001
(4)	Hinge brackets (left and right)	L21053-001
(5)	Hinges (left and right; includes thermal pad kit and thermal grease)	L20316-001
(6)	HD camera module (includes microphone rubber)	L20771-001
(7)	Camera boards	
	HD camera board	L20349-001
	IR camera board	L20350-001
(8)	Camera board cables (for use with the HD camera board and the IR camera board)	L20347-001
(9)	IR FHD camera module (includes microphone rubber)	L20770-001
(10)	Raw display panel (includes display panel adhesive kit and display enclosure gaskets)	
	FHD, SVA	L20359-001
	FHD, UWVA, 144 Hz	L20360-001
	FHD, UWVA, 60 Hz	L20361-001
	UHD	L20358-001
(11)	Antennas , dual (includes thermal pads and grease)	L20346-001
	Display cable (includes display panel adhesive)	
(12)	For use in models with an FHD display and IR FHD camera	L20355-001
(12)	For use in models with an UHD display and IR FHD camera	L20357-001
(13)	For use in models with an FHD display and HD camera	L20354-001
(13)	For use in models with an UHD display and HD camera	L20356-001
(14)	Display enclosure (includes display panel adhesive):	
	• Acid green	L20313-001
	• Ghost white	L20314-001
	• Ultra violet	L20315-001

Mass storage devices



Item	Component	Spare part number
(1)	Hard drive (includes sponge; does not include brackets, connector board, or cable):	
	2-TB, 5400-rpm	912487-857
	1-TB, 7200-rpm	766457-858
	1-TB, 5400-rpm	762990-006
	Miscellaneous Kit (includes WLAN Mylar and hard drive cover Mylar; not illustrated)	L29160-001
(2)	Hard drive connector/cable	L20324-001
(3)	Hard drive bracket	L20325-001
(4)	Solid-state drive, M.2	
	256 GB, PCIe	L21752-001
	128 GB, PCIe	L21751-001
	128 GB, SATA-3	L21750-001
	Optane memory module, 16 GB	L21753-001

Miscellaneous parts

Component	Spare part number
HP Smart AC adapter (PFC, slim, 4.5 mm)	
200 W	L00818-850
150 W	917649-850
135 W	L15534-001
120 W	710415-001
Power cord (C5), 1 meter:	
For use in Argentina	L22106-001
For use in Australia	L22327-001
For use in Chile	L22105-001
For use in Europe	L22321-001
For use in India	L22624-001
For use in Italy	L22105-001
For use in Japan	L22330-001
For use in North America	L22319-001
For use in the People's Republic of China	L21930-001
For use in South Korea	L22328-001
For use in Taiwan	L22329-001
For use in Thailand	L22326-001
For use in the United Kingdom	L22320-001
Power cord (C13), 1 meter:	
For use in Australia	L22339-001
For use in Argentina	L22104-001
For use in Chile	L22103-001
For use in Europe	L22333-001
For use in India	L22343-001
For use in Italy	L22103-001
For use in Japan	L22344-001
For use in North America	L22331-001
For use in the People's Republic of China	L22341-001
For use in South Africa	L22337-001
For use in South Korea	L22340-001
For use in Taiwan	L22342-001
For use in Thailand	L22338-001

Component	Spare part number
For use in the United Kingdom	L22332-001
Thermal pad kit (for use on system board components serviced by the heat sink)	L23785-001
RJ-45 support bracket	L29261-001
Miscellaneous Kit (includes WLAN Mylar and hard drive cover Mylar)	L29160-001
Screw Kit	L20769-001
USB-C to USB-A adapter	914936-001
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:

- Non-marking, plastic pry tool
- Thin tool to disengage feet from bottom cover
- Phillips P0 and P1 magnetic 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 14](#) for details.

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

There are as many as 54 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.

Display subcomponents (bezel, panel, camera)

 **NOTE:** Display assemblies are spared at the subcomponent level only.

This section illustrates how to remove the display bezel, display panel, and camera module without removing the display from the computer. [Display assembly on page 64](#) illustrates removing display subcomponents that require that you remove the display assembly from the computer.

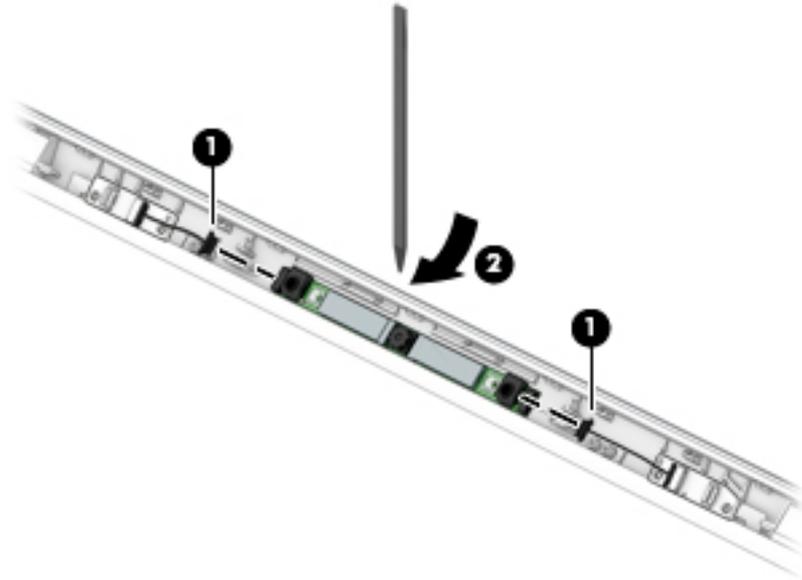
To remove display assembly subcomponents, follow these steps:

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

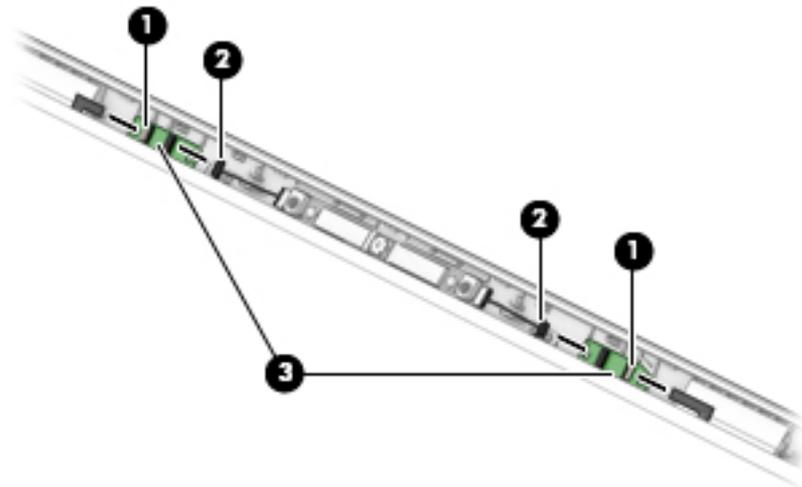
Remove the display assembly subcomponents:

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

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

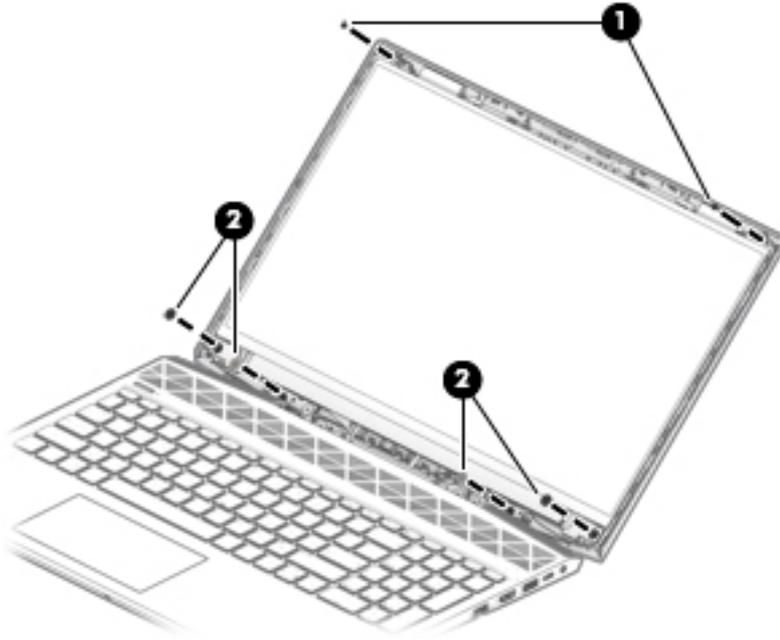


5. To remove the IR camera board and/or HD camera board:
 - a. Position the display assembly with the top edge toward you.
 - b. Disconnect the cable from the ZIF connector outside of the board **(1)** and disconnect the cable from the connector on the inside of the board **(2)**.
 - c. Pry up to disengage the board from the adhesive that secures it to the display **(3)**.

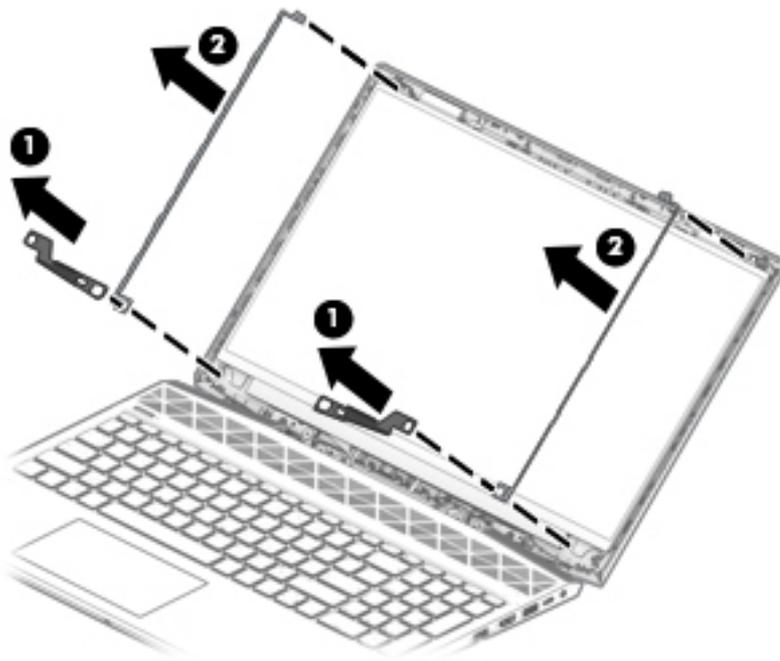


6. To remove the display panel:

- a. Remove the two Phillips M2.0×3.0 screws **(1)** that secure the display panel to the top of the enclosure.
- b. Remove the four broad head Phillips M2.5×3.0 screws **(2)** that secure the display panel to the bottom of the enclosure.



- c. Remove the cover plates **(1)** and the display brackets **(2)**.



- d. The panel is secured to the display enclosure with long strips of tape. Pull the tape out from under each side of the display panel **(1)**.

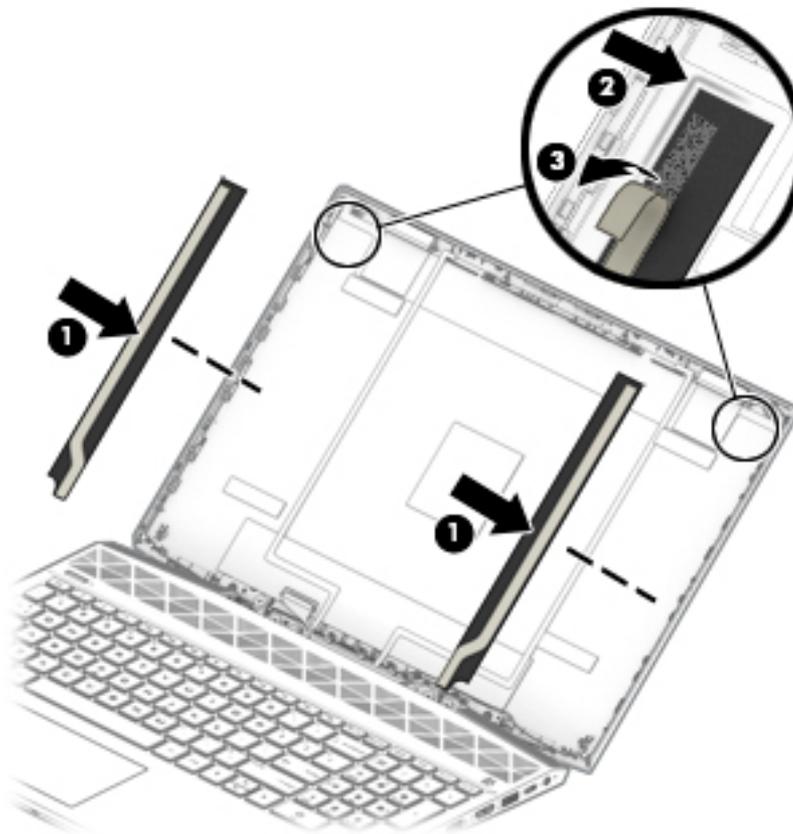


NOTE: You have to pull on the tape multiple times before it is completely removed.

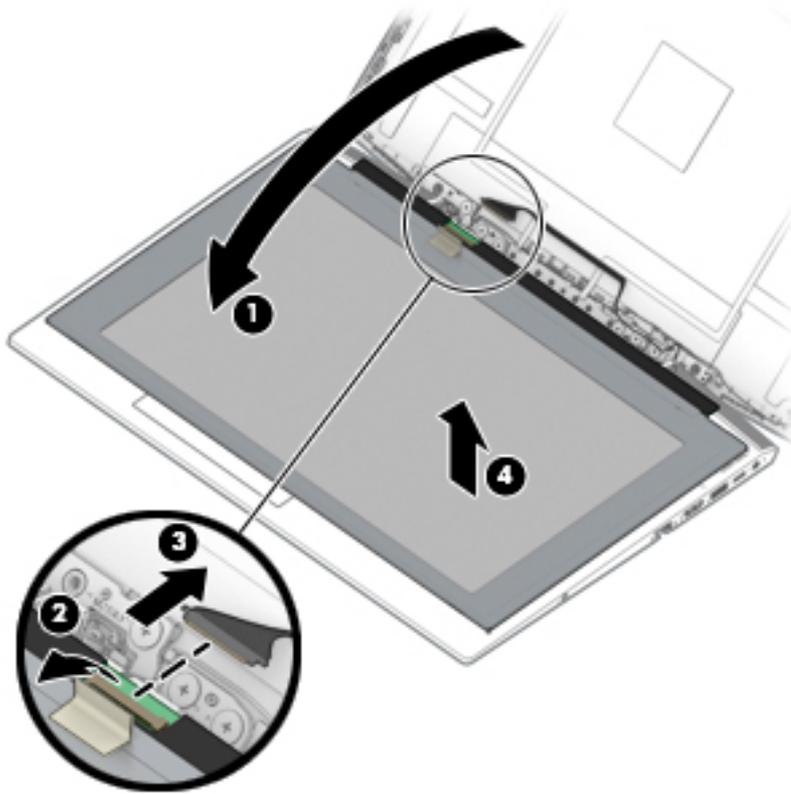
- e. Lift the top of the display panel off the display rear cover (2).



- f. Use the following illustration to determine tape installation location when replacing the panel. Position the top of the adhesive at the right angle marks (1), place the adhesive on the display enclosure (2), and then remove the paper from the adhesive (3).

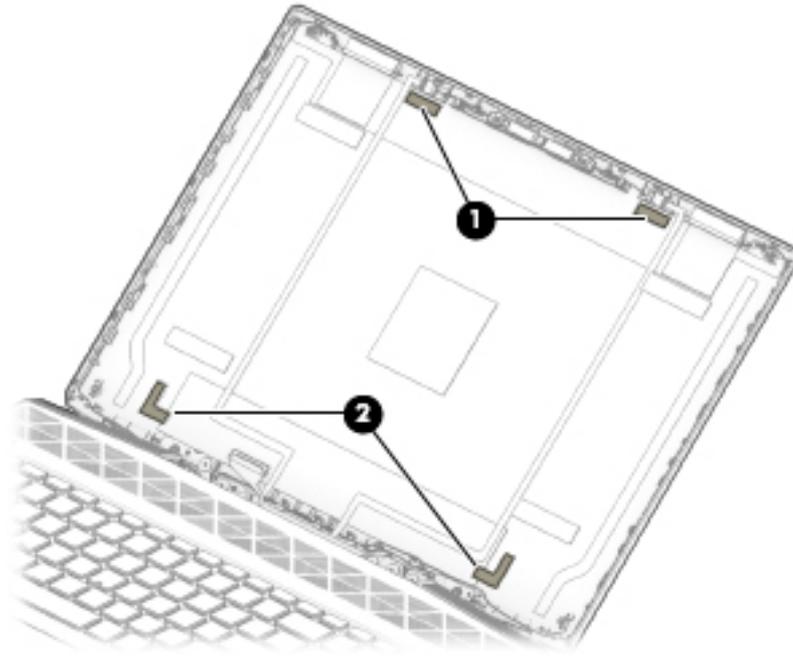


- g.** Rotate the display panel onto the keyboard **(1)** to gain access to the display cable connection on the back of the panel.
- h.** On the back of the display panel, release the adhesive strip that secures the display panel cable to the display panel **(2)**, and then disconnect the cable **(3)**.
- i.** Remove the display panel from the display enclosure **(4)**.



- j. If replacing the raw display panel, install the EMI gaskets **(1)** and cover gaskets **(2)** as shown in the following image:

 **NOTE:** The gaskets are included in the raw display panel spare parts kits.



Reverse this procedure to reassemble and install the display assembly components.

Bottom cover

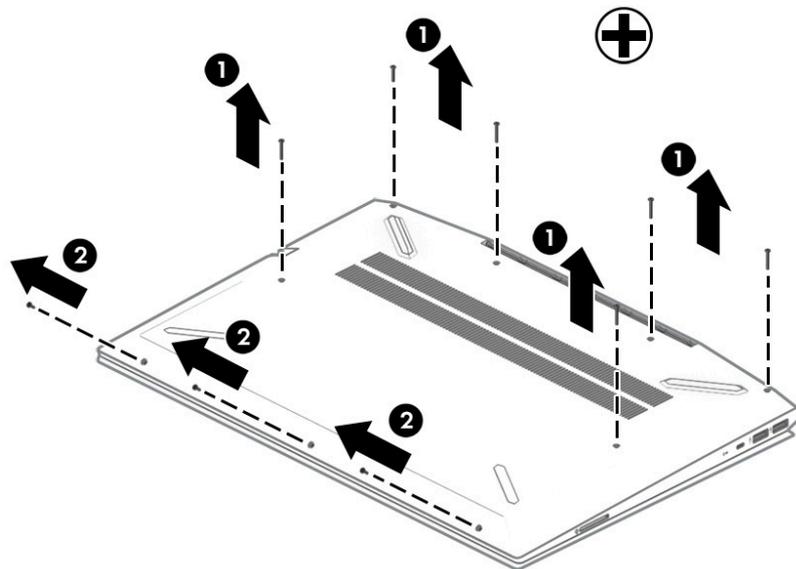
Description	Spare part number
Bottom cover for use in acid green models	L20317-001
Bottom cover for use in ultra violet models	L20318-001
Bottom cover for use in ghost white models with 8300H/8750H processors	L20319-001
Bottom cover for use in ghost white models with 8250U/8550U processors	L20320-001

Before removing the bottom cover, follow these steps:

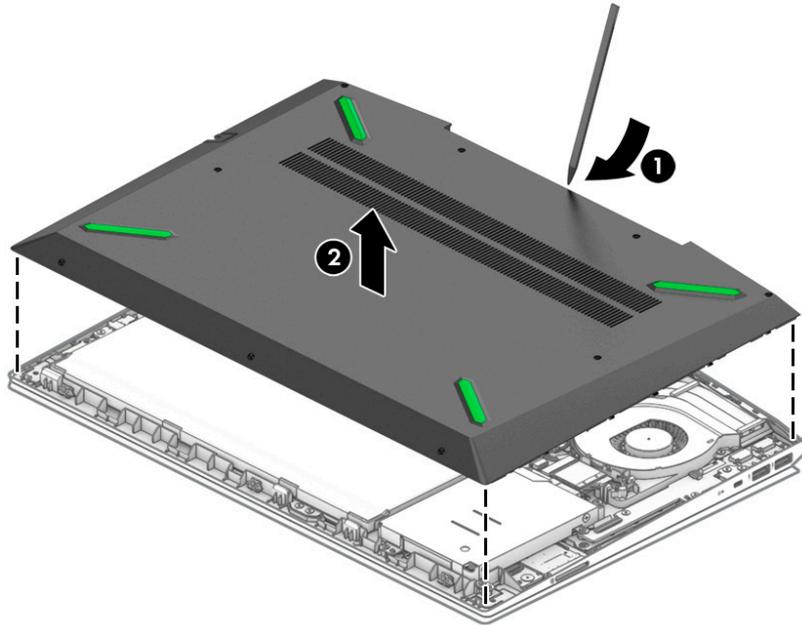
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord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

To remove the bottom cover:

1. Position the computer upside down with the front toward you.
2. Remove the six Phillips M2.0×13.0 screws (1) on the top half of the bottom cover.
3. Remove the three Phillips M2.0×5.0 screws (2) along the bottom of the bottom cover.



4. Using a non-marking tool, start prying near the middle of the computer near the display and work around to separate the bottom cover from computer **(1)**, and then remove the bottom cover **(2)**.



Reverse this procedure to install the bottom cover.

Rubber feet

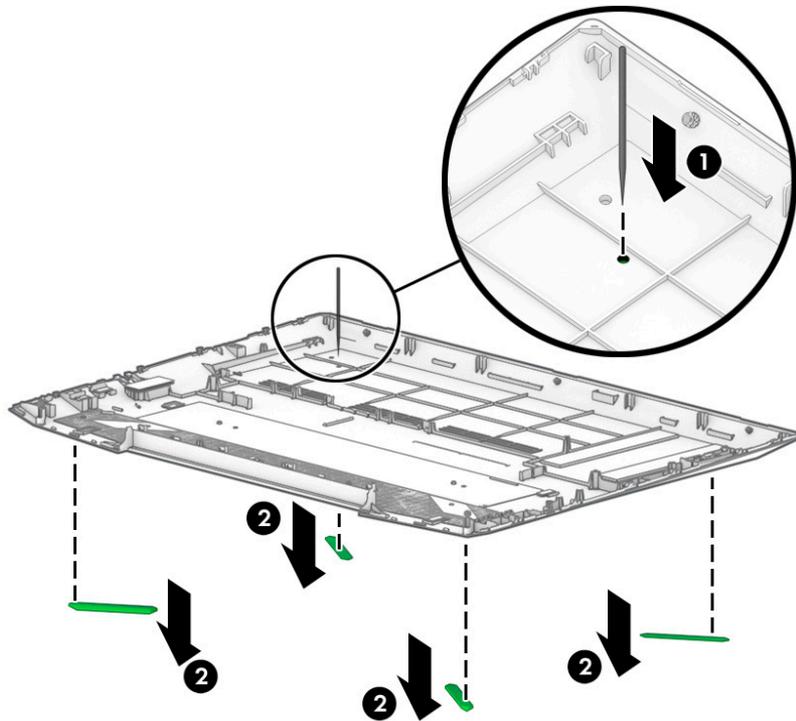
Description	Spare part number
Rubber feet for use in acid green models	L20321-001
Rubber feet for use in ultra violet models	L20322-001
Rubber feet for use in ghost white models	L20323-001

Before removing the rubber feet, 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 36](#)).

To remove the rubber feet:

1. Position the bottom cover so you can access the inside.
2. From the inside of the bottom cover, use a thin tool to push through the holes to help disengage the feet **(1)**.
3. From the outside of the bottom cover, peel the feet off the cover **(2)**.



Reverse this procedure to install the rubber feet.

Battery

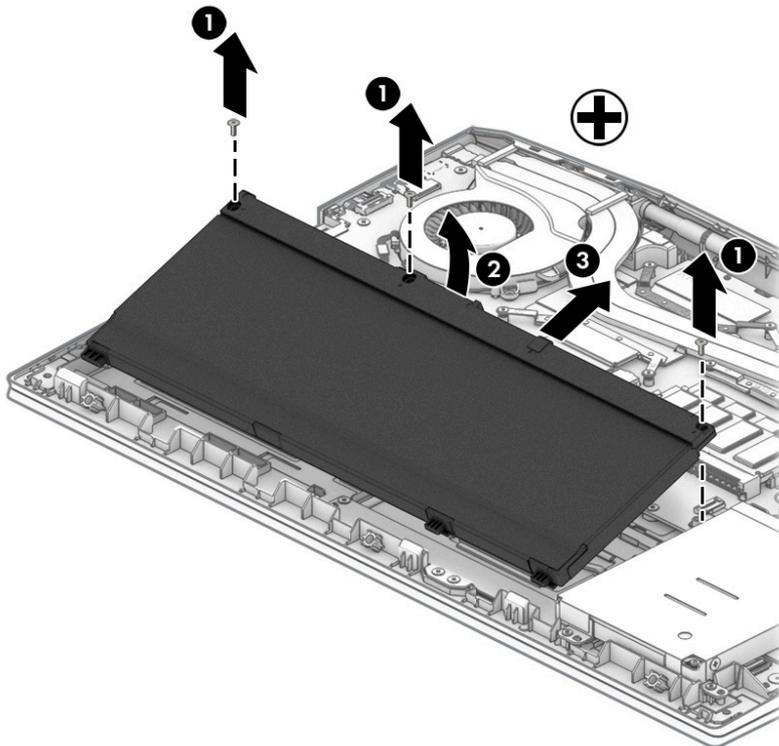
Description	Spare part number
Battery, 4 cell, 70 Wh, 4.55 Ah (includes Mylar and sponge)	917724-856
Battery, 4 cell, 52 Wh, 4.55 Ah (includes Mylar and sponge)	L08855-856

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 36](#)).

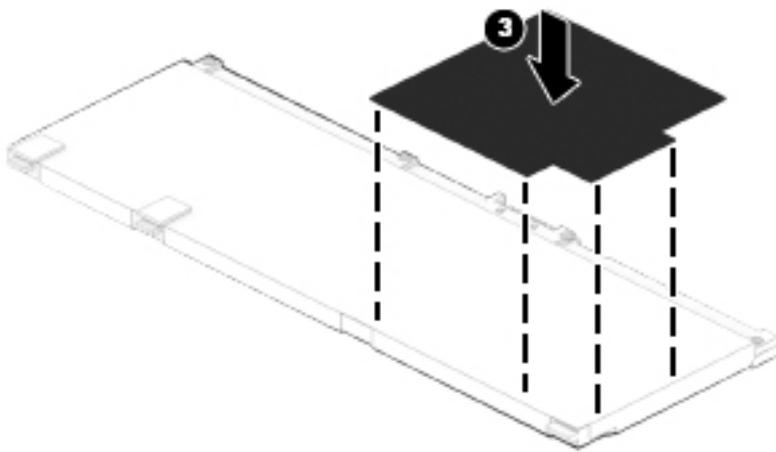
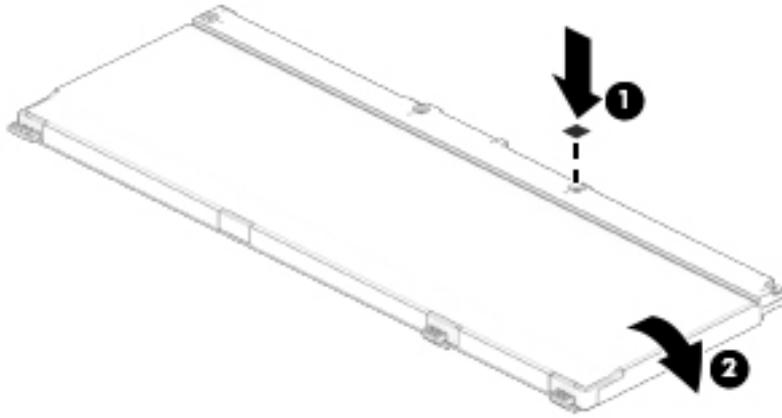
To remove the battery:

1. Remove the three Phillips PM2.0×5.0 screws **(1)** that secure the battery to the computer.
2. Lift the battery up near the connector **(2)**, and then remove the battery from the computer **(3)**.



Reverse this procedure to install the battery.

When installing a replacement battery, be sure to install the battery Mylar on the top of the battery **(1)**, turn the battery upside down **(2)**, and install the battery sponge on the bottom of the battery **(3)** as shown in the following image.



WLAN module

Description	Spare part number
Realtek RTL8822BE 802.11 ac 2x2 WiFi + Bluetooth 4.2 Combo Adapter (MU-MIMO supported)	924813-855
Intel Dual Band Wireless-AC 9560 802.11 AC 2x2 WiFi + Bluetooth 5.0 Combo Adapter (non-vPro, MU-MIMO supported)	L22634-005
Miscellaneous Kit (includes WLAN Mylar and hard drive cover Mylar)	L29160-001

 **CAUTION:** To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore device functionality, and then contact 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 36](#)).
5. Remove the battery (see [Battery on page 39](#)).

To remove the WLAN module:

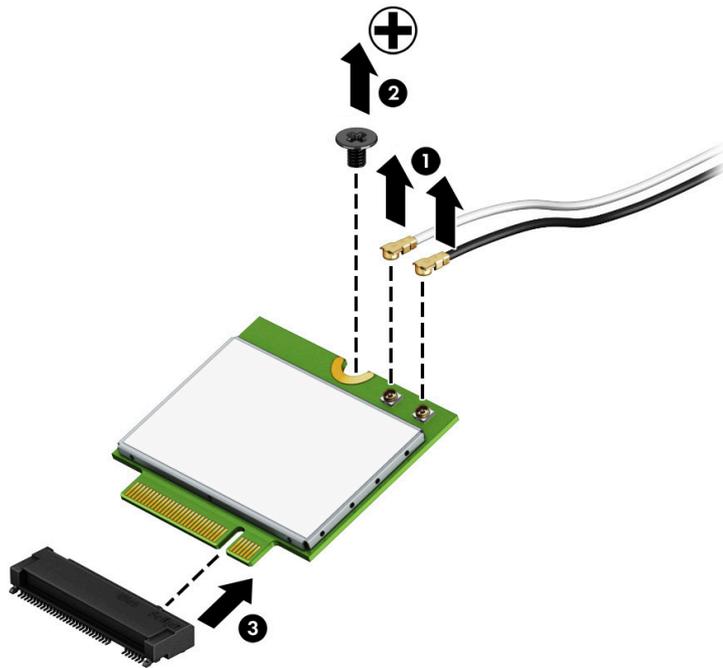
1. If necessary, lift the Mylar from on top of the antenna connectors on the WLAN module.
2. Disconnect the WLAN antenna cables **(1)** from the terminals on the WLAN module.



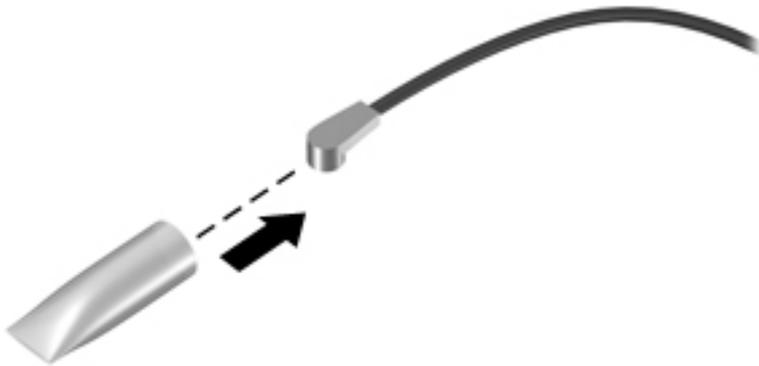
NOTE: The WLAN antenna cable labeled “1” connects to the WLAN module “Main” terminal labeled “1”. The WLAN antenna cable labeled “2” connects to the WLAN module “Aux” terminal labeled “2” (if applicable).

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

4. 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	
8-GB (DDR4-2400)	862398-855
4-GB (DDR4-2400)	862397-855
8-GB (DDR4-2666)	937236-855
4-GB (DDR4-2666)	L10598-855

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 36](#)).
5. Remove the battery (see [Battery on page 39](#)).

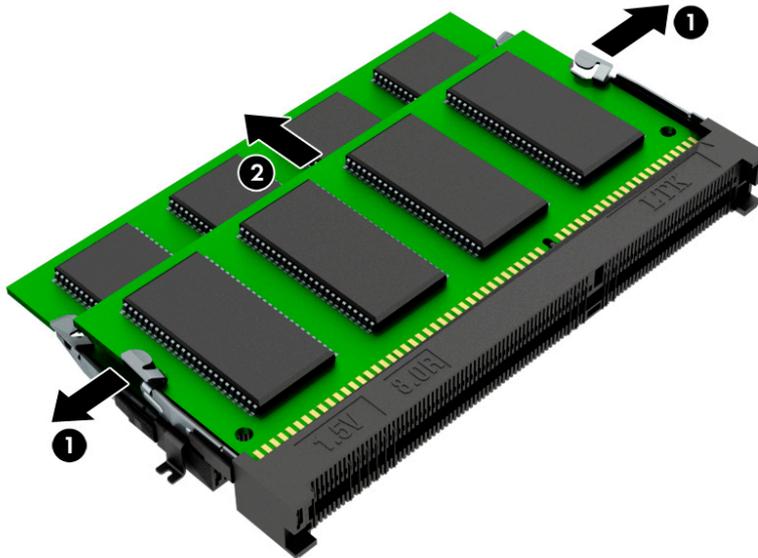
To remove a memory module:

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. Grasp the edge of the memory module (2), and then gently pull the module out of the slot. Use the same procedure to remove both memory modules.

CAUTION: To prevent damage to the memory module, hold the memory module by the edges only. Do not touch the components on the memory module.

To protect a memory module after removal, place it in an electrostatic-safe container.



Reverse this procedure to install a memory module.

IMPORTANT: If only one memory module is installed, it must be installed in the bottom slot.

Solid-state drive (SSD)

 **IMPORTANT:** The M.2 connector that supports a solid-state drive can also support an Optane memory module. You cannot simultaneously install both an Optane memory module and a solid-state drive in the computer.

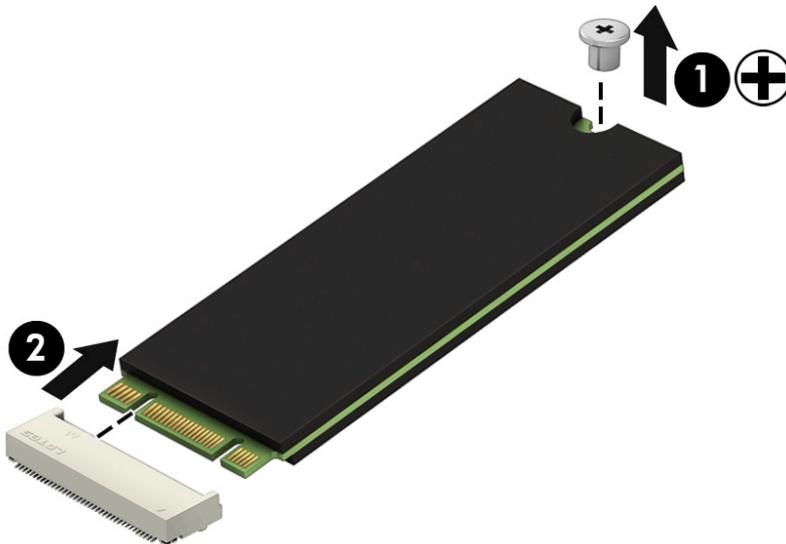
Description	Spare part number
256 GB, PCIe	L21752-001
128 GB, PCIe	L21751-001
128 GB, SATA-3	L21750-001

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 36](#)).
5. Remove the battery (see [Battery on page 39](#)).

Remove the solid-state drive:

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



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

Optane memory module

 **IMPORTANT:** The M.2 connector that supports the Optane memory module can also support a solid-state drive. You cannot simultaneously install both an Optane memory module and a solid-state drive in the computer.

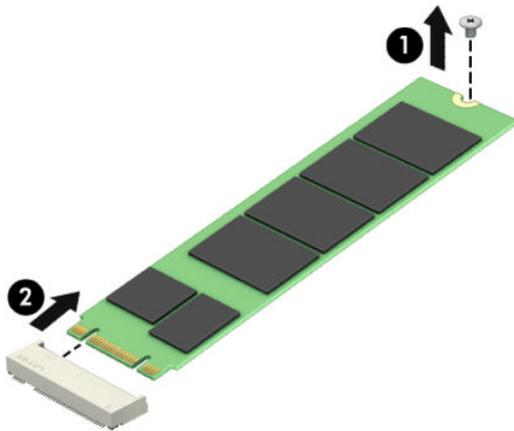
Description	Spare part number
Optane memory module, 16 GB	L21753-001

Before removing the Optane 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 36](#)).
5. Remove the battery (see [Battery on page 39](#)).

Remove the Optane memory module:

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



Reverse this procedure to install the Optane 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:	
2-TB, 5400-rpm	912487-857
1-TB, 5400-rpm	766457-858
1-TB, 5400-rpm	762990-006
Hard drive bracket	L20325-001
Hard drive cable	L20324-001
Miscellaneous Kit (includes WLAN Mylar and hard drive cover Mylar)	L29160-001

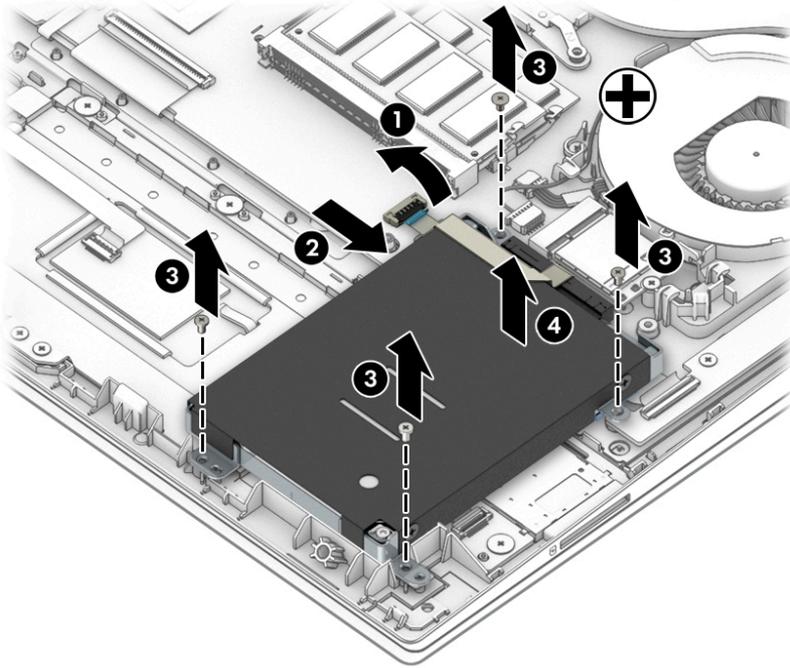
Before removing the hard drive, follow these steps:

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 36](#)).
5. Remove the battery (see [Battery on page 39](#)).

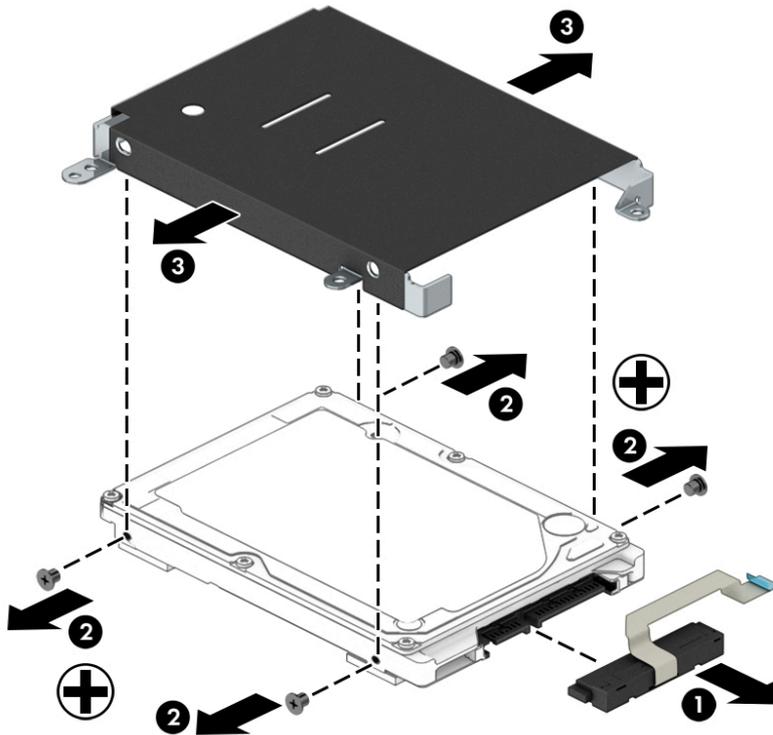
To remove the hard drive:

1. Lift the hard drive ZIF connector **(1)**, and then disconnect the hard drive cable from the system board **(2)**.
2. Remove the four Phillips M2.0×5.0 screws **(3)** that secure the hard drive to the computer.

3. Remove the hard drive from the computer (4).



4. To remove the hard drive bracket and connector, pull the connector away from the hard drive (1).
5. Remove the four Phillips M3.0×3.0 screws (2) that secure the bracket to the hard drive.
6. Pull the bracket away from the sides of the hard drive to remove it (3).



Reverse this procedure to reassemble and install the hard drive.

Card reader board

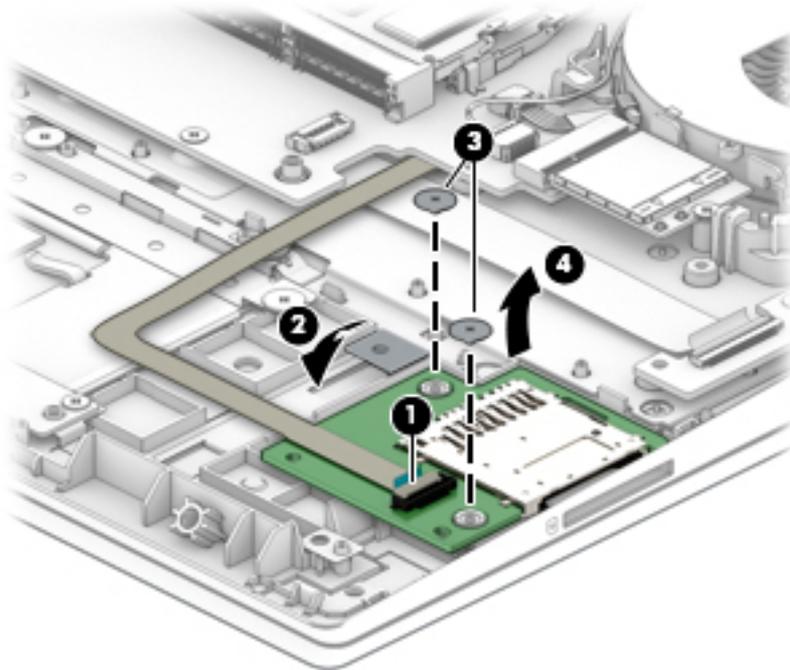
Description	Spare part number
Card reader board for use only in models with GeForce GTX 1060 Max-Q graphics	L20329-001
Card reader board for use all models without GeForce GTX 1060 Max-Q graphics	L25944-001
Card reader board cable	L20330-001

Before removing the card reader 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 36](#)).
5. Remove the battery (see [Battery on page 39](#)).
6. Remove the hard drive (see [Hard drive on page 47](#)).

To remove the card reader board:

1. Disconnect the cable from the ZIF connector on the card reader board **(1)**.
2. Remove the tape from the board **(2)**.
3. Remove the two Phillips M2.0×2.0 screws **(3)** that secure the board to the computer.
4. Lift the rear of the board up, and then pull it away from the side of the computer to remove it **(4)**.



Reverse this procedure to install the card reader board.

Fans

Description	Spare part number
Fan for use over system processor (CPU)	L20334-001
Fan for use over graphics processor (VGA)	L20335-001



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.

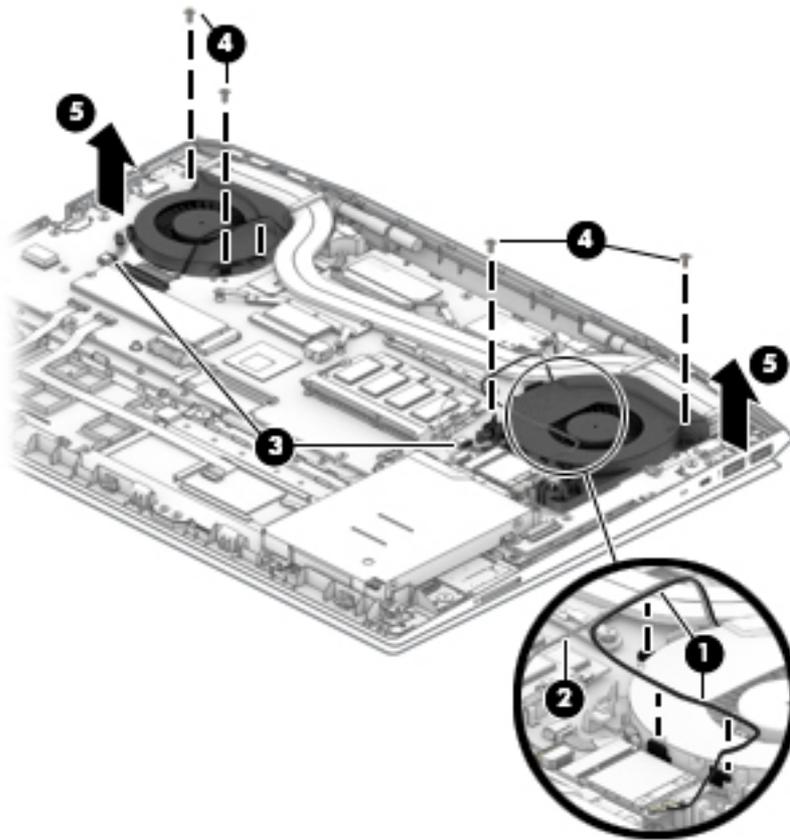
Before removing the fan assembly, follow these steps:

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 36](#)).
5. Remove the battery (see [Battery on page 39](#)).

To remove the fans:

1. Remove the antenna cables from the clips on the fans **(1)**.
2. Remove the speaker cable from the larger (CPU) fan **(2)**.
3. Disconnect the fan cables from the system board **(3)**.
4. Remove the two Phillips M2.0×5.0 screws **(4)** that secure each fan to the computer.

5. Remove the fans from the computer (5).



Reverse this procedure to install the fans.

Heat sink



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

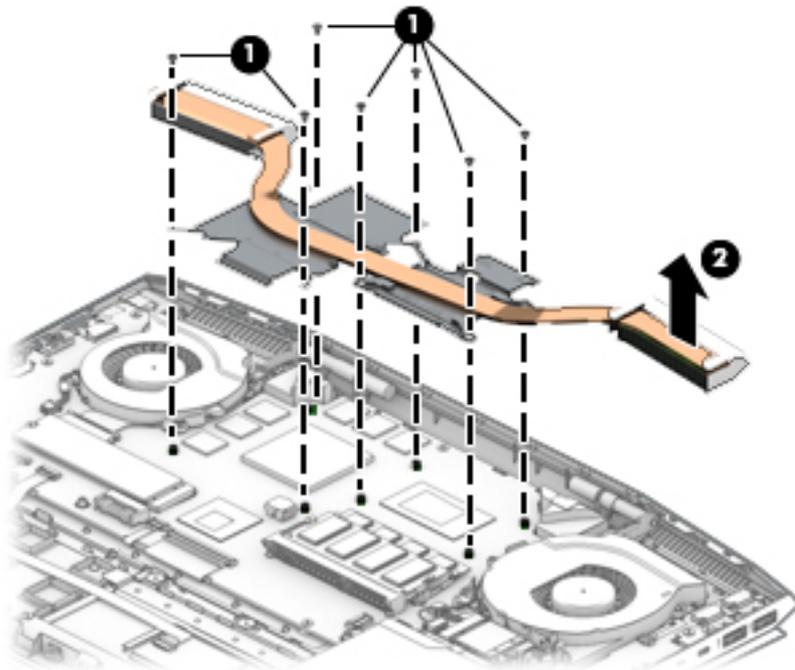
Description	Spare part number
Heat sink for use in models with 8250U/8550U processors and GeForce GTX 1050 graphics	L20338-001
Heat sink for use in models with 8300H/8750H processors and GeForce GTX 1050/1050 Ti graphics	L20339-001
Heat sink for use in models with 8300H/8750H processors and GeForce GTX 1060 Max-Q	L20340-001
Heat sink for use in models with 8300H/8750H processors and Radeon RX 560 graphics	L20341-001
Thermal pad kit (for use on system board components serviced by the heat sink)	L23785-001

Before removing the heat sink, follow these steps:

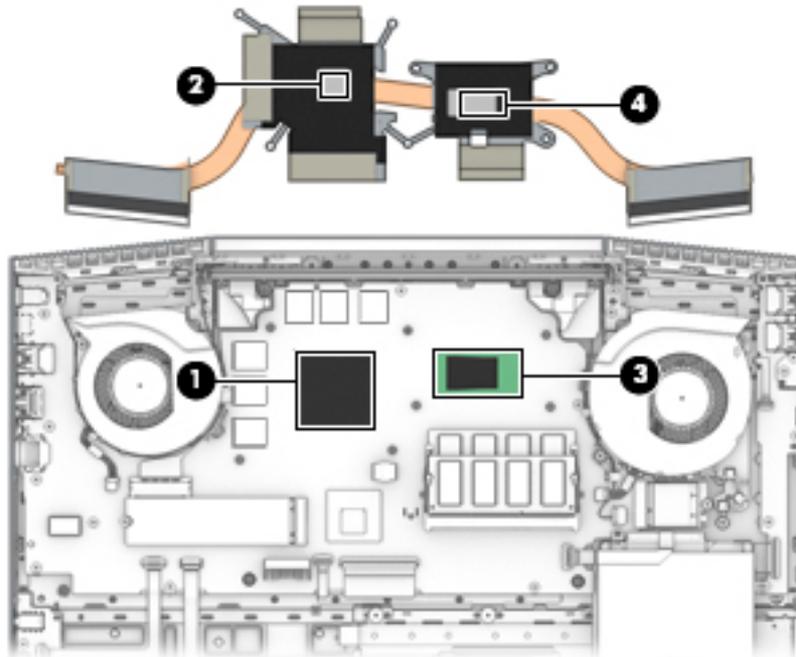
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 36](#)).
5. Remove the battery (see [Battery on page 39](#)).

To remove the heat sink assembly:

1. In the order indicated on the heat sink assembly, remove the seven Phillips M2.0×3.0 screws **(1)** that secure the heat sink to the computer.
2. Lift the heat sink assembly from the computer **(2)**.



- Each time the heat sink is removed, thoroughly clean the thermal material from the system board components **(1)(3)** and the associated surfaces of the heat sink **(2)(4)**. Replacement thermal material is included with the heat sink and system board spare part kits.



Reverse this procedure to install the heat sink.

TouchPad board

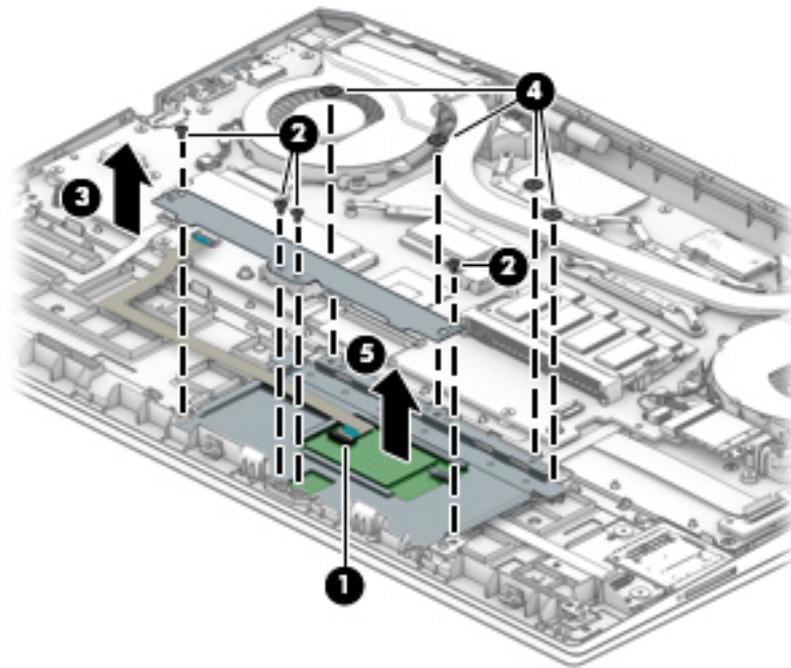
Description	Spare part number
TouchPad board	L20333-001
TouchPad bracket	L20331-001
TouchPad board cable (includes Mylar)	L20332-001

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 36](#)).
5. Remove the battery (see [Battery on page 39](#)).
6. Remove the hard drive (see [Hard drive on page 47](#)).

To remove the TouchPad board:

1. Disconnect the cable from the ZIF connector on the TouchPad board **(1)**.
2. Remove the four Phillips M2.0×3.5 screws **(2)** that secure the bracket to the computer, and the lift the bracket off the TouchPad **(3)**.
3. Remove the four Phillips broad head M2.0×2.0 screws **(4)** that secure the TouchPad board to the computer, and the lift the board from the computer **(5)**.



Reverse this procedure to install the TouchPad board.

USB board and security bracket

Description	Spare part number
USB board for use only in models with GeForce GTX 1060 Max-Q graphics	L20336-001
USB board for use all models without GeForce GTX 1060 Max-Q graphics	L20337-001
USB board cable	L20351-001
Security bracket	L20353-001

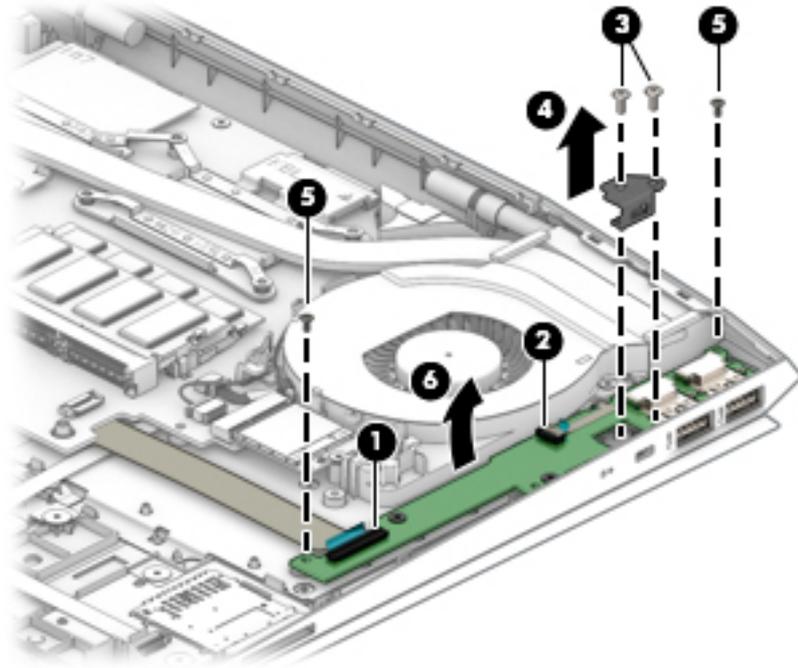
Before removing the USB board and security bracket, follow these steps:

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 36](#)).
5. Remove the battery (see [Battery on page 39](#)).
6. Remove the hard drive (see [Hard drive on page 47](#)).

To remove the USB board and security bracket:

1. Disconnect the larger (system board) **(1)** and smaller (power button board) **(2)** cables from the USB board ZIF connectors.
2. Remove the two Phillips M2.0×5.0 screws **(3)** that secure the security bracket to the computer.
3. Lift the bracket from on top of the board **(4)**.
4. Remove the two Phillips M2.0×3.0 screws **(5)** that secure the USB board to the computer.

5. Rotate the back of the board up and pull it away from the side of the computer to remove it **(6)**.



Reverse this procedure to install the USB board and security bracket.

Audio board

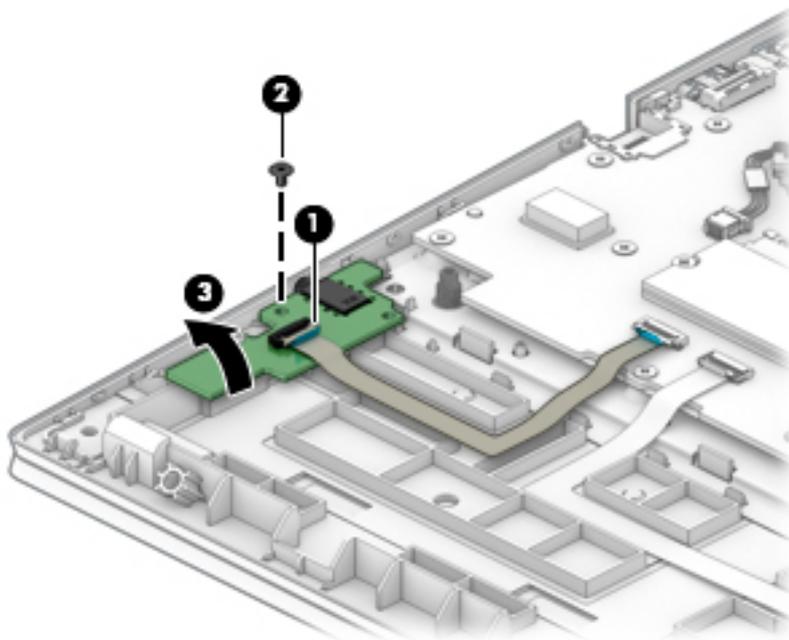
Description	Spare part number
Audio board for use in models with 8300H/8750H processors	L20326-001
Audio board for use in models with 8250U/8550U processors	L20327-001
Audio board cable	L20328-001

Before removing the audio board and security bracket, 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 36](#)).
5. Remove the battery (see [Battery on page 39](#)).
6. Remove the hard drive (see [Hard drive on page 47](#)).

To remove the audio board:

1. Disconnect the cable from the audio board ZIF connector **(1)**.
2. Remove the Phillips M2.0×3.0 screw **(2)** that secures the board to the computer.
3. Rotate the back of the board up and pull it away from the side of the computer to remove it **(3)**.



Reverse this procedure to install the audio board.

Power button board

Description	Spare part number
Power button board for use in acid green models (includes rubber and thermal grease)	L20342-001
Power button board for use in ultra violet models (includes rubber and thermal grease)	L20343-001
Power button board for use in ghost white (includes rubber and thermal grease)	L20344-001
Power button board cable (includes thermal pad kit and thermal grease)	L20352-001

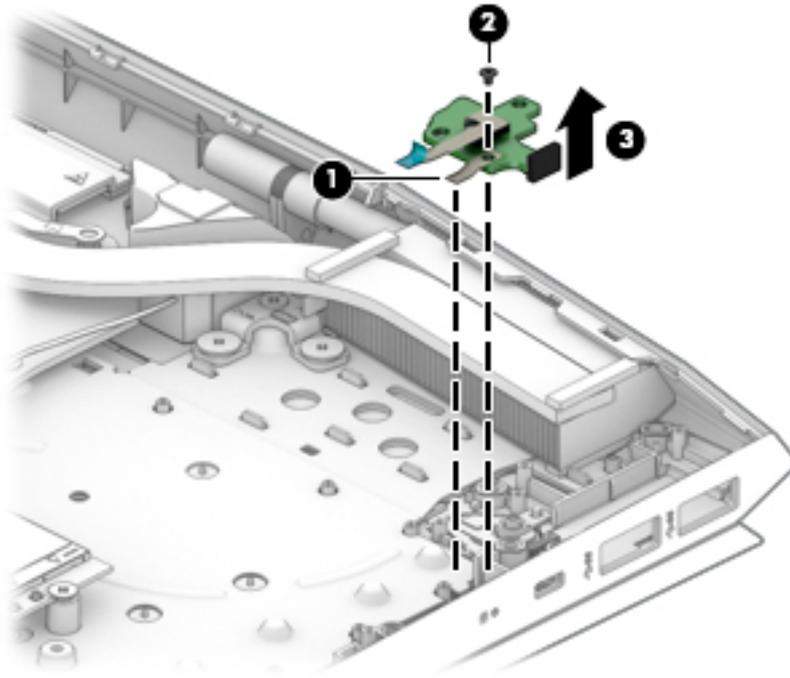
Before removing the power button board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 36](#)).
5. Remove the battery (see [Battery on page 39](#)).
6. Remove the hard drive (see [Hard drive on page 47](#)).
7. Remove the USB board (see [USB board and security bracket on page 55](#)).
8. Remove the CPU fan (see [Fans on page 50](#)).

To remove the power button board:

1. Remove the tape from the board **(1)**.
2. Using a Phillips P0 screwdriver, remove the Phillips broad head PM1.6×1.8 screw **(2)** that secures the power button board to the computer.

3. Remove the power button board from the computer (3).



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

System board



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

Description	Spare part number
System board (includes thermal pad kit and thermal grease)	
All system boards use the following part numbers:	
xxxxxx-001: Non-Windows operating systems	
xxxxxx-601: Windows 10 operating system	
Intel Core i7-8750H processor and GeForce GTX 1060 Max-Q graphics controller with 3 GB of memory	L20304-xx1
Intel Core i7-8750H processor and GeForce GTX 1050 graphics controller with 4 GB of memory	L20302-xx1
Intel Core i7-8750H processor and GeForce GTX 1050 Ti graphics controller with 4 GB of memory	L20300-xx1
Intel Core i7-8750H processor and GeForce GTX 1050 graphics controller with 2 GB of memory	L20296-xx1
Intel Core i5-8300H processor and Radeon RX 560 graphics controller with 2 GB of memory	L20303-xx1
Intel Core i5-8300H processor and GeForce GTX 1050 Ti graphics controller with 4 GB of memory	L20301-xx1
Intel Core i5-8300H processor and GeForce GTX 1050 graphics controller with 4 GB of memory	L20299-xx1
Intel Core i5-8300H processor and GeForce GTX 1050 graphics controller with 2 GB of memory	L20295-xx1
Intel Core i5-8550U processor and GeForce GTX 1050 graphics controller with 2 GB of memory	L20298-xx1
Intel Core i5-8250U processor and GeForce GTX 1050 graphics controller with 2 GB of memory	L20297-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 36](#)).
5. Remove the battery (see [Battery on page 39](#)).
6. Remove the WLAN module (see [WLAN module on page 41](#)).
7. Remove the memory module (see [Memory module on page 43](#)).
8. Remove the hard drive (see [Hard drive on page 47](#)).
9. Remove the solid-state drive (see [Solid-state drive \(SSD\) on page 45](#)).
10. Remove the fans (see [Fans on page 50](#)).



IMPORTANT: You do not have to remove the heat sink to remove the system board.

To remove the system board:

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

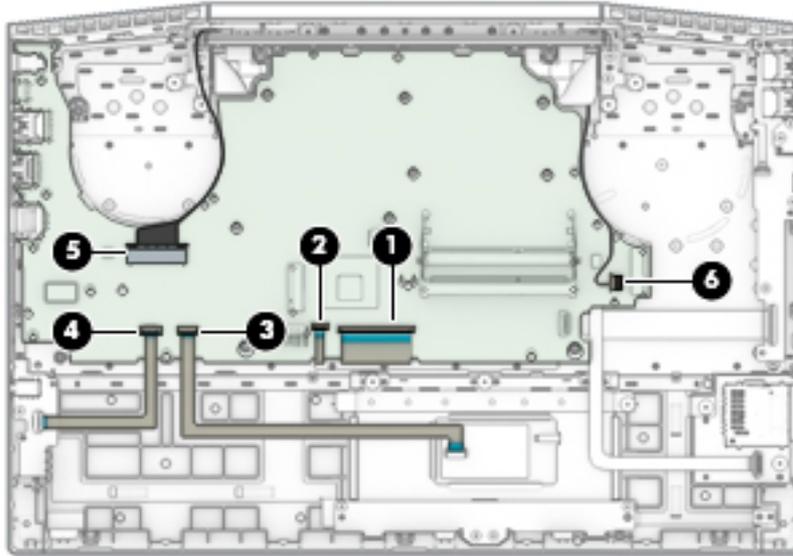
(2): Keyboard backlight cable (ZIF)

(3): TouchPad cable (ZIF)

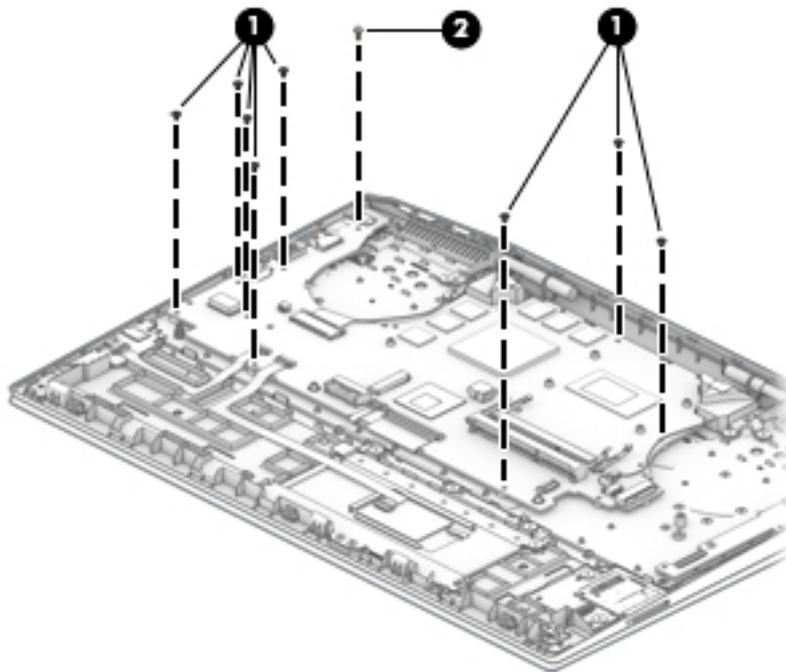
(4): Audio board cable (ZIF)

(5): Display cable (ZIF)

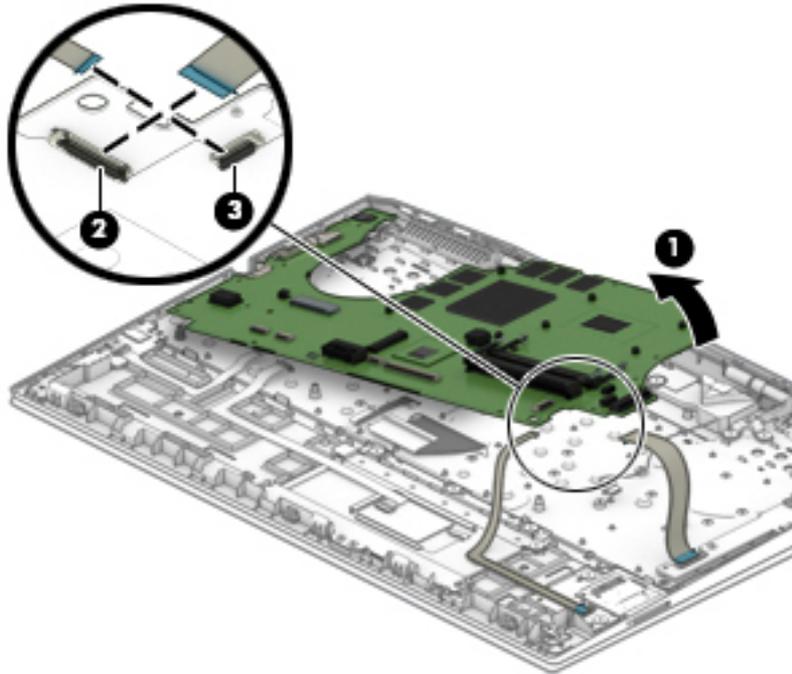
(6): Speaker cable



2. Remove the eight Phillips M2.0×3.0 screws **(1)** that secure the system board to the computer.
3. Remove the Phillips M2.0×5.0 screw **(2)** that secures the system board to the computer.



4. Rotate the interior side of the board upward **(1)**, and then disconnect the USB board cable **(2)** and the card reader board cable **(3)** from the ZIF connectors underneath the system board.



Reverse this procedure to install the system board.

Speakers

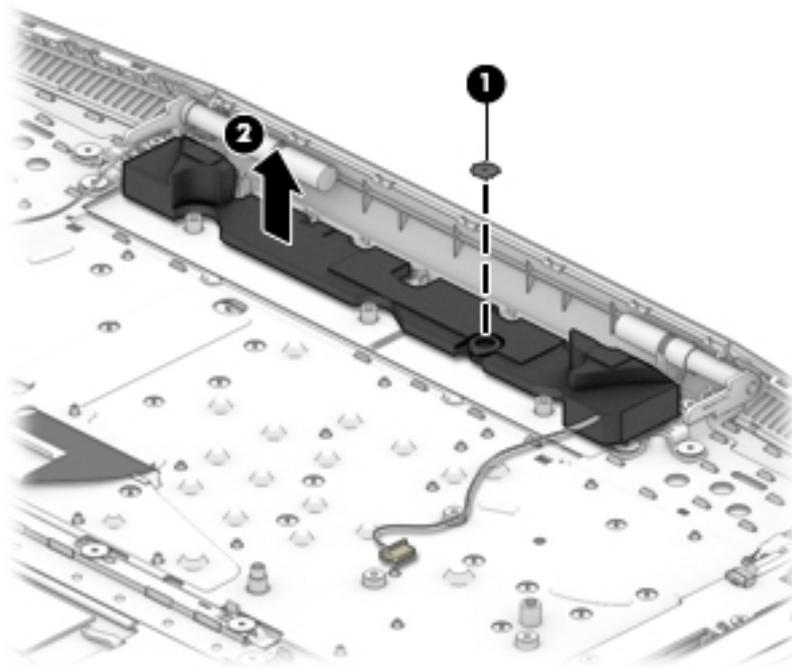
Description	Spare part number
Speakers (include thermal grease)	L20345-001

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 36](#)).
5. Remove the battery (see [Battery on page 39](#)).
6. Remove the hard drive (see [Hard drive on page 47](#)).
7. Remove the fans (see [Fans on page 50](#)).
8. Remove the system board (see [System board on page 60](#)).

To remove the speakers:

1. Remove the Phillips broad head M2.0×2.0 screw **(1)** that secures the speaker to the computer.
2. Remove the speakers from the computer **(2)**.



Reverse this procedure to install the speakers.

Display assembly

You can remove the display bezel, display panel, and camera module without removing the display assembly from the computer. For more information, see [Display subcomponents \(bezel, panel, camera\) on page 29](#). You must remove the display assembly to remove the remaining subcomponents, as described in this section.

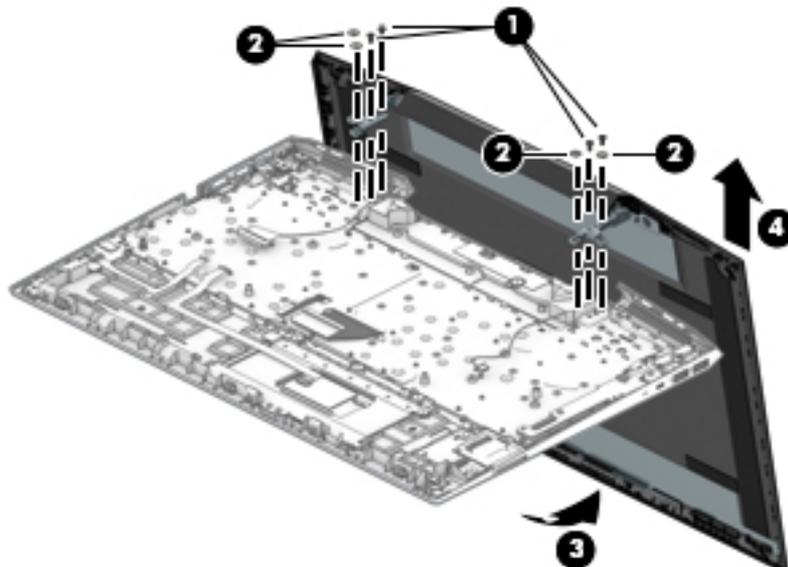
Display subcomponent spare parts are listed at [Display assembly subcomponents on page 19](#).

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 36](#)).
5. Remove the battery (see [Battery on page 39](#)).
6. Remove the hard drive (see [Hard drive on page 47](#)).
7. Remove the fan assembly (see [Fans on page 50](#)).
8. Remove the system board (see [System board on page 60](#)).

To remove the display assembly:

1. Remove the four black Phillips M2.0×5.0 screws (1) and four broad head Phillips M2.0×2.0 screws (2) that secure the display assembly to the computer.
2. Lift the display to bend the hinges upward (3).
3. Separate the display from the computer (4).

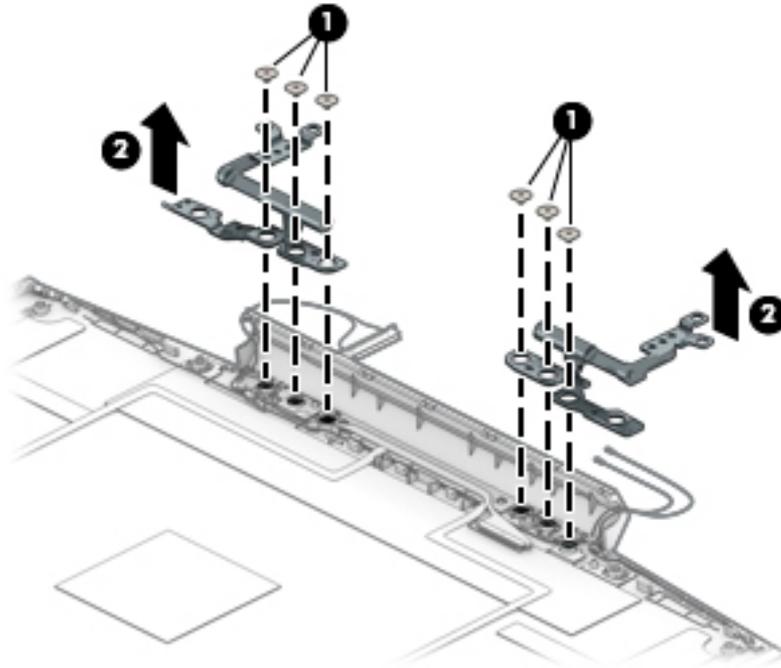


If it is necessary to replace display assembly subcomponents:

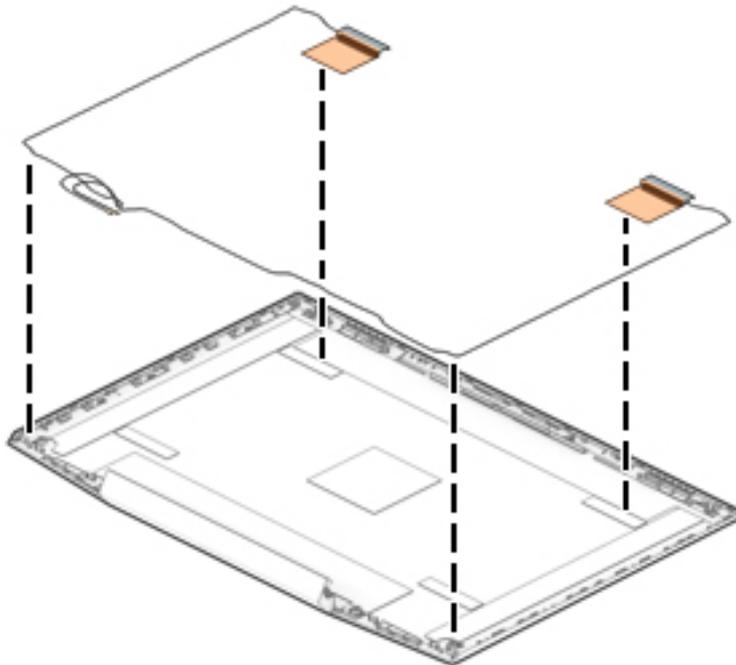
1. Remove the display bezel and display panel (see [Display subcomponents \(bezel, panel, camera\) on page 29](#)).

2. To remove the display hinges:

- a.** Remove the three Phillips broad head M2.5×3.0 screws **(1)** that secure each hinge to the display enclosure.
- b.** Remove the display hinges **(2)**.

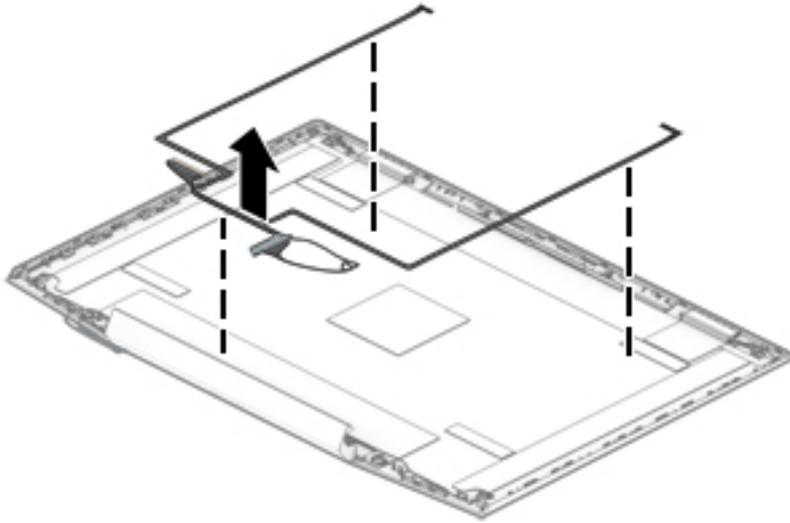


3. To remove the wireless antennas and cables, release the cables from the clips built into the side of the display enclosure, and then remove the antennas and cables.

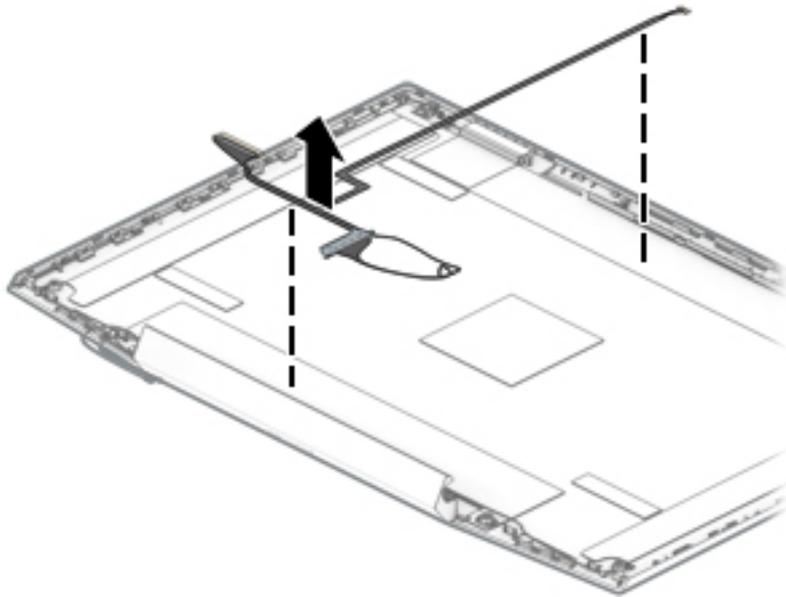


4. To remove the display/camera cable, remove the cable from the clips built into the side of the display enclosure, and then remove the cable from the display enclosure.

Models with an IR camera



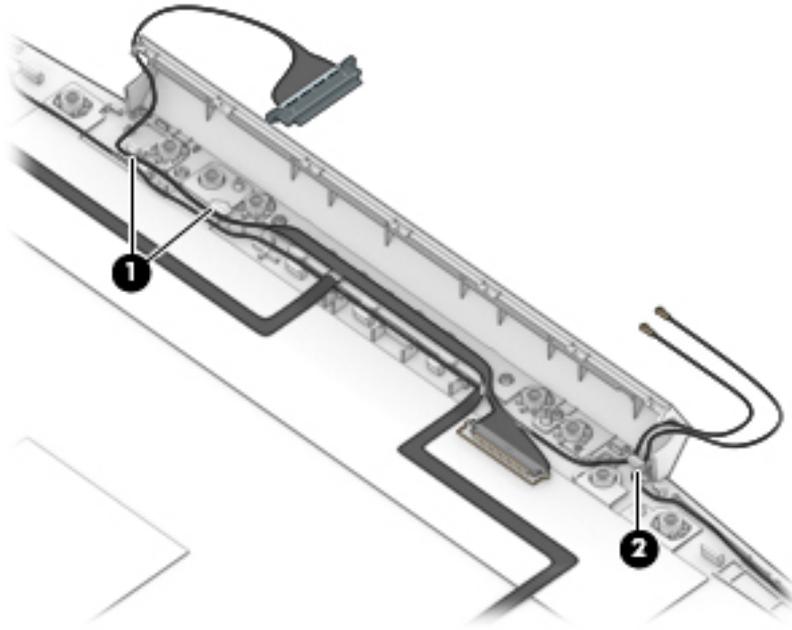
Models with an HD camera



5. Use the following image to determine proper cable routing around the left hinge for the camera/display cable and the wireless antenna cables.

(1): Display/camera cable routing path

(2): Antenna cable routing path



6. If replacing the display enclosure, be sure that the subcomponents (including the camera/microphone module, the antenna receivers, and all associated cables and hardware) are transferred to the new enclosure.

Reverse this procedure to reassemble and install the display assembly.

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 thermal grease and keyboard connector Mylar.

Description	Spare part number
Top cover/keyboard for use in ghost white models with 8250U/8550U processors without a backlight	L20669-xxx
Top cover/keyboard for use in ghost white models with 8300H/8750H processors with a backlight	L20670-xxx
Top cover/keyboard for use in ghost white models with 8250U/8550U processors with a backlight	L21412-xxx
Top cover/keyboard for use in acid green models with 8300H/8750H processors with a backlight	L20671-xxx
Top cover/keyboard for use in ultra violet models with 8300H/8750H processors with a backlight	L20672-xxx

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

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 69](#)).
 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 70](#).

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 [Using HP Recovery media \(select products only\) on page 71](#). For information on the recovery options that are available using the recovery media, see [Using Windows tools on page 72](#).
- Use Windows tools to create system restore points and create backups of personal information. See [Using Windows tools on page 72](#).

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

- On select products, use the HP Cloud Recovery Download Tool to create a bootable USB flash drive for your HP recovery media. For more information, see [Using the HP Cloud Recovery Download Tool \(select products only\) on page 73](#).

Using HP Recovery media (select products only)

If possible, check for the presence of the Recovery partition and the Windows partition. Right-click the **Start** button, 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. You can 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.
- 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. You can 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 using HP recovery manager:

 **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 73](#).

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.

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

Using the HP Cloud Recovery Download Tool (select products only)

To create HP Recovery media using the HP Cloud Recovery Download Tool:

1. Go to <http://www.hp.com/support>.
2. Select **Software and Drivers**, and then follow the on-screen instructions.

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.

 **NOTE:** You must be connected to the Internet to access 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 73](#). If you have not already created recovery media, see [Using HP Recovery media \(select products only\) on page 71](#).
- 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 73](#).
- 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 75](#).

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 [Using HP Recovery media \(select products only\) on page 71](#).

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 [Using HP Recovery media \(select products only\) on page 71](#).
- To use the Factory Reset option (select products only), you must use HP Recovery media. If you have not already created recovery media, see [Using HP Recovery media \(select products only\) on page 71](#).
- 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. You can 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 75](#).

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 [Using HP Recovery media \(select products only\) on page 71](#).

 **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

Using HP PC Hardware Diagnostics Windows

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

If HP PC Hardware Diagnostics Windows is not installed on your computer, first you must download and install it. To download HP PC Hardware Diagnostics Windows, see [Downloading HP PC Hardware Diagnostics Windows on page 77](#).

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

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

– or –

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

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

– or –

Select the question mark icon in the taskbar.
 - b. Select **Troubleshooting and fixes**.
 - c. Select **Diagnostics**, and then select **HP PC Hardware Diagnostics Windows**.
2. When the tool opens, select the type of diagnostic test you want to run, and then follow the on-screen instructions.



NOTE: If you need to stop a diagnostic test at any time, select **Cancel**.

3. When HP PC Hardware Diagnostics Windows detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. For assistance in correcting the problem, contact support, and then provide the Failure ID code.

Downloading HP PC Hardware Diagnostics Windows

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

Downloading the latest HP PC Hardware Diagnostics Windows version

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

1. Go to <http://www.hp.com/go/techcenter/pcdiags>. The HP PC Diagnostics home page is displayed.
2. In the **HP PC Hardware Diagnostics** section, select **Download**, and then select the installation location:
To run the tool on your computer, download it to the computer desktop.
– or –
To run the tool from a USB flash drive, download it to a USB flash drive.
3. Select **Run**.

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



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

To download HP PC Hardware Diagnostics Windows by product name or number (select products only), follow these steps:

1. Go to <http://www.hp.com/support>.
2. Select **Get software and drivers**, and then enter the product name or number.
3. In the **HP PC Hardware Diagnostics** section, select **Download**, and then select the installation location:
To run the tool on your computer, download it to the computer desktop.
– or –
To run the tool from a USB flash drive, download it to a USB flash drive.
4. Select **Run**.

Installing HP PC Hardware Diagnostics Windows

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

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

Using HP PC Hardware Diagnostics UEFI

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

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

When HP PC Hardware Diagnostics UEFI detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. For assistance in correcting the problem, contact support, and provide the Failure ID code.



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

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

Starting HP PC Hardware Diagnostics UEFI

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

1. Turn on or restart the computer, and quickly press [esc](#).
2. Press [f2](#).

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

- a. Connected USB flash drive



NOTE: To download the HP PC Hardware Diagnostics UEFI tool to a USB flash drive, see [Downloading the latest HP PC Hardware Diagnostics UEFI version on page 79](#).

- 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.

Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive

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

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



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

Downloading the latest HP PC Hardware Diagnostics UEFI version

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

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

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



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

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

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

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

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

Downloading Remote HP PC Hardware Diagnostics UEFI



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

Downloading the latest Remote HP PC Hardware Diagnostics UEFI version

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

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

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



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

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

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

Customizing Remote HP PC Hardware Diagnostics UEFI settings

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

- Set a schedule for running diagnostics unattended. You can also start diagnostics immediately in interactive mode by selecting **Execute Remote HP PC Hardware Diagnostics**.
- Set the location for downloading the diagnostic tools. This feature provides access to the tools from the HP website or from a server that has been preconfigured for use. Your computer does not require the traditional local storage (such as a disk drive or USB flash drive) to run remote diagnostics.
- Set a location for storing the test results. You can also set the user name and password settings used for uploads.
- Display status information about the diagnostics run previously.

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

1. Turn on or restart the computer, and when the HP logo appears, press **f10** to enter Computer Setup.
2. Select **Advanced**, and then select **Settings**.

3. Make your customization selections.
4. Select **Main**, and then **Save Changes and Exit** to save your settings.

Your changes take effect when the computer restarts.

9 Specifications

Computer specifications

	Metric	U.S.
Dimensions		
Depth	256.5 mm	10.10 in
Width	365.0 mm	14.37 in
Height	25.4 mm	1.00 in
Weight		
7th generation Intel processors, UMA graphics, SSD	2167 g	4.78 lb
8th generation Intel processors, GeForce GTX 1050/Radeon RX 560 graphics, SSD	2229 g	4.91 lb
8th generation Intel processors, GTX 1060 Max-Q graphics, SSD	2267 g	5.00 lb
7th generation Intel processors, UMA graphics, HDD	2300 g	5.07 lb
8th generation Intel processors, GeForce GTX 1050/Radeon RX 560 graphics, HDD	2362 g	5.21 lb
8th generation Intel processors, GTX 1060 Max-Q graphics, HDD	2400 g	5.29 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.		

39.6-cm (15.6-in) display specifications

	Metric	U.S.
Active diagonal size	39.6-cm	15.6-in
Resolution	1920x1080 (FHD) 3840x2160 (UHD)	
Surface treatment	Anti glare BrightView	
Brightness	220 nits (FHD) 300 nits (UHD)	
Viewing angle	UWVA	
Backlight	WLED	
Graphics adapter	eDP (FHD) eDP+NVS (UHD)	
Thickness	3.2 mm	

Hard drive specifications

	2-TB*	1-TB*
Dimensions		
Height	9.5 mm	9.5 mm
Length	100.4 mm	100.4 mm
Width	69.9 mm	69.9 mm
Weight	130.0 g	107.0 g
Interface type	SATA	SATA
Transfer rate		
Synchronous (maximum)	300 MB/sec	300 MB/sec
Security	ATA security	ATA security
Seek times (typical read, including setting)		
Single track	2.0 ms	2.0 ms
Average (read/write)	12 ms	12 ms
Maximum	22 ms	22 ms
Logical blocks	3,907,029,168	1,953,525,168
Disk rotational speed	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 PCIe solid-state drive specifications

	128-GB*	256-GB*
Dimensions		
Height	1 mm	1 mm
Length	50.8 mm	50.8 mm
Width	28.9 mm	28.9 mm
Weight	< 10 g	< 10 g
Interface type		
	ATA-7	ATA-7
Transfer rate		
Sequential Read	Up to 3100 MB/s	Up to 2150 MB/s
Random Read	Up to 330 KIOPs	Up to 300 KIOPs
Sequential Write	Up to 700 MB/s	Up to 1260 MB/s
Random Write	Up to 170 KIOPs	Up to 100 KIOPs
Ready time, Maximum (to not busy)		
	1.0 s	1.0 s
Access times		
Logical	0.1	0.1
Operating temperature		
Operating	0° to 70°C (32°F to 158°F)	0° to 70°C (32°F to 158°F)
Non-operating	-40° to 85°C (-40°F to 185°F)	-40° to 80°C (-40°F to 176°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 SATA-3 solid-state drive specifications

128-GB*	
Dimensions	
Height	1 mm
Length	50.8 mm
Width	28.9 mm
Weight	< 10 g
Interface type	
ATA-7	
Transfer rate	
Sequential Read	Up to 520 MB/s
Random Read	Up to 60K IOPs
Sequential Write	Up to 160 MB/s
Random Write	Up to 34K IOPs
Ready time, Maximum (to not busy)	
1.0 s	
Access times	
Logical	0.1 ms
Total logical sectors	
250,069,680	
Operating temperature	
Operating	0° to 70°C (32°F to 158°F)
Non-operating	-40° to 95°C (-40°F to 203°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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