



OMEN by HP 15 Notebook PC

Maintenance and Service Guide

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Product notice

This user 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. Go to <http://www.microsoft.com> for details.

In accordance with Microsoft's support policy, HP does not support the Windows 8 or Windows 7 operating system on this product or provide any Windows 8 or Windows 7 drivers on <http://support.hp.com>.

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 full refund subject to the refund policy of your seller.

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

Important Notice about Customer Self-Repair Parts

 **CAUTION:** Your computer includes Customer Self-Repair parts and parts that should only be accessed by an authorized service provider. See Chapter 5, "Removal and replacement procedures for Customer Self-Repair parts," for details. Accessing parts described in Chapter 6, "Removal and replacement procedures for authorized service provider parts," can damage the computer or void your warranty.

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	OMEN by HP 15 Laptop PC (model numbers 15-ce100 through 15-ce199, 15-ce600 through 15-ce699, and 15t-ce100)
Processors	8th Generation Intel processors Intel® Core i7-8750H processor (2.2 GHz, turbo up to 4.1 GHz, 2666 MHz, 9 MB L3 cache) Intel Core i5-8300H processor (2.3 GHz, turbo up to 4.0 GHz, 2666 MHz, 8 MB L3 cache)
Graphics	Internal graphics: Intel HD Graphics 630 Discrete graphics: NVIDIA N17E-G1 (GeForce GTX 1060) Max-Q with up to 6144 MB of dedicated video memory (256 Mb×32 GDDR5 8 Gbps × 6 PCs) Hybrid graphics: NVIDIA N17P-G1 (GeForce GTX 1050 Ti) with up to 4096 MB of dedicated video memory (256 Mb×32 GDDR5 7 Gbps × 4 PCs) Support for HD Decode, DX12, and HDMI Support for Optimus Support for GPS (GPU Performance Scaling) Support for VR Support for MR ready
Panel	15.6-in (1920×1080), FHD, WLED, AntiGlare, typical brightness: 220 nits, slim (3.2 mm), UWVA, eDP
Memory	Support for 16384 MB of DDR4 2666 MHz system memory in the following configurations: 16384 MB (8192 MB × 2) 12288 MB (8192 MB × 1 + 4096 MB × 1) 8192 MB (8192 MB × 1)
Hard drive	Support for the following single hard drive and solid state drive configurations: 1 TB 7200 rpm, 9.5 mm hard drive Support for the following dual-storage configurations: 1 TB 7200 rpm, 9.5 mm hard drive with 256 GB PCIe NVMe TLC M.2 solid state drive 1 TB 7200 rpm, 9.5 mm hard drive with 128 GB PCIe NVMe TLC M.2 solid state drive
Optical drive	Support for external 9.5 mm tray load, SATA, DVD+/-RW DL SuperMulti drive
Audio and video	Support for the following integrated cameras: HP Wide Vision camera: high definition (HD 720 by 30 frames/sec), fixed (no tilt), with activity light Support for Windows Hello Dual speakers

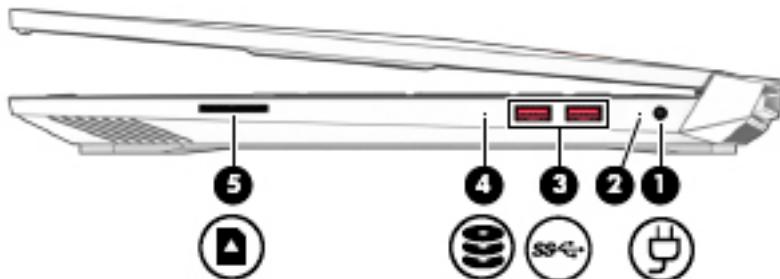
Category	Description
	Bang & Olufsen Audio
Ethernet	Gigabit LAN
Wireless	Realtek RTL8822BE 802.11 AC 2×2 WiFi + BT 4.2 Combo Adapter Intel Dual Band Wireless-AC 9560 802.11 AC 2×2 WiFi + BT 5 Combo Adapter Compatible with Miracast-certified devices
External media cards	HP Multi-Format Digital Media Card Reader with push-push technology. Supports SD/SDHC/SDXC
Ports	AC adapter: HP Smart pin plug (4.5 mm barrel) Audio: one combo audio-out (headphone)/audio-in (microphone) jack HDMI: v2.0 supporting: up to 4096×2160 at 60 Hz with HDCP 2.2 Mini DisplayPort RJ-45/Ethernet (3) USB 3.x (1 on left side, 2 on right side) (1) USB Type-C (Generation 2, with Thunderbolt) on left side (select products only) (1) USB Type-C (Generation 1) on left side
Keyboard/pointing devices	Full size backlit 3-coat paint island-style keyboard with numeric key pad in Dragon Red color Full size backlit 3-coat paint island-style keyboard with numeric key pad with White OMEN logo and RGB backlight TouchPad: TouchPad with image sensor Multitouch gestures enabled by default Support for Modern Touchpad gestures Taps enabled by default Support for 26-key NKRO Anti-Ghosting keys
Power requirements	200-W Smart AC adapter (using 4.5 mm plug) with localized cable plug support, for use only on models equipped with the Nvidia N17E GPU 150-W Smart AC adapter (using 4.5 mm plug) with localized cable plug support, for use only on models equipped with the Nvidia N17P GPU 1 meter power cord 4-cell, 70-Wh, 4.55-AH, Li-ion battery 3-cell, 52.5-Wh, 4.55-AH, Li-ion battery (select products only)
Security	Kensington Lock slot TPM 2.0 support
Operating system	Preinstalled: Windows 10 Pro Windows 10 Windows 10 Home Plus ML Windows 10 Home Plus EM/SL Windows 10 Home Plus EM/SL IPPP

Category	Description
	Windows 10 Home Plus EM/SL Indonesia PPP
	Windows 10 Home Plus EM/SL APAC PPP
	Free DOS 2.0
Serviceability	End user replaceable parts:
	Hard drive
	Solid state drive
	Memory module
	AC adapter

2 External component identification

Right side

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

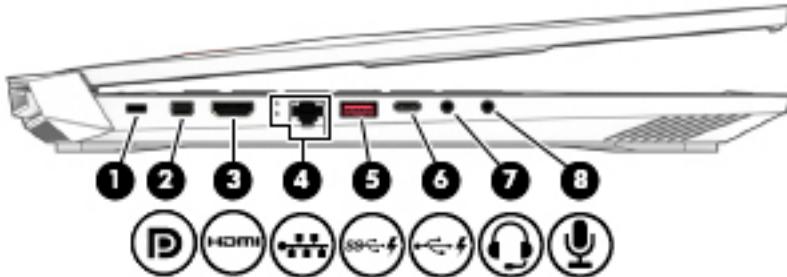


Component	Description
(1) 	Power connector Connects an AC adapter.
(2)	AC adapter and battery light
	<ul style="list-style-type: none">White: The AC adapter is connected and the battery is fully charged.Blinking white: The AC adapter is disconnected and the battery has reached a low battery level.Amber: The AC adapter is connected and the battery is charging.Off: The battery is not charging.
(3) 	USB SuperSpeed ports (2) Connect USB devices, such as a cell phone, camera, activity tracker, or smartwatch, and provide high-speed data transfer.
(4) 	Drive light <ul style="list-style-type: none">Blinking white: The hard drive or the solid-state drive is being accessed.Amber: HP 3D DriveGuard has temporarily parked the hard drive.
(5) 	Memory card reader Reads optional memory cards that enable you to store, manage, share, or access information. To insert a card: <ol style="list-style-type: none">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. To remove a card: <ul style="list-style-type: none">Press in on the card, and then remove it from the memory card reader.

Left side



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

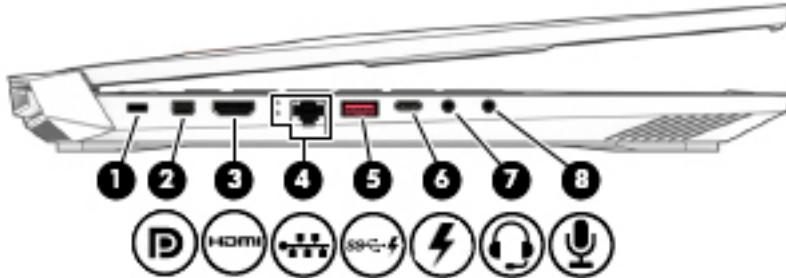


Component	Description
(1)	Attaches an optional security cable to the computer. NOTE: The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.
(2)	Connects an optional digital display device, such as a high-performance monitor or projector.
(3)	Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed High-Definition Multimedia Interface (HDMI) device.
(4)	Connects a network cable. <ul style="list-style-type: none">White: The network is connected.Amber: Activity is occurring on the network.
(5)	Connects a USB device, provides high-speed data transfer, and even when the computer is off, charges most products such as a cell phone, camera, activity tracker, or smartwatch.
(6)	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>– or –</p> Connects a display device that has a USB Type-C connector, providing DisplayPort output. NOTE: Cables and/or adapters (purchased separately) may be required.
(7)	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.

Component	Description
	<p>WARNING! To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the <i>Regulatory, Safety, and Environmental Notices</i>.</p> <p>To access this guide:</p> <ul style="list-style-type: none"> ▲ Select the Start button, select 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>
(8) 	<p>Audio-in (microphone) jack</p> <p>Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.</p> <p>NOTE: The audio-in (microphone) jack does not support optional combo devices, such as a headset.</p> <p>NOTE: When devices are connected to the audio-out (headphone)/Audio-in (microphone) combo jack and the audio-in (microphone) jack at the same time, the audio-in jack has higher priority.</p>



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



Component	Description
(1) 	<p>Security cable slot</p> <p>Attaches an optional security cable to the computer.</p> <p>NOTE: The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.</p>
(2) 	<p>Mini DisplayPort</p> <p>Connects an optional digital display device, such as a high-performance monitor or projector.</p>
(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>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.
(5) 	<p>USB SuperSpeed port with HP Sleep and Charge (2)</p> <p>Connects a USB device, provides high-speed data transfer, and even when the computer is off, charges most products such as a cell phone, camera, activity tracker, or smartwatch.</p>

Component	Description		
(6)	 USB Type-C power connector and Thunderbolt port with HP Sleep and Charge	<p>Connects an AC adapter that has a USB Type-C connector, supplying power to the computer and, if needed, charging the computer battery.</p> <p>– and –</p>	
		<p>Connects and charges most USB devices that have a Type-C connector, such as a cell phone, camera, activity tracker, or smartwatch, and provides high-speed data transfer.</p> <p>– and –</p>	
		<p>Connects a display device that has a USB Type-C connector, providing DisplayPort output.</p>	
		<p>NOTE: Your computer may also support a Thunderbolt docking station.</p>	
		<p>NOTE: Cables and/or adapters (purchased separately) may be required.</p>	
(7)		<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, refer to the <i>Regulatory, Safety, and Environmental Notices</i>.</p>	
		<p>To access this guide:</p>	
		<ul style="list-style-type: none"> ▲ Select the Start button, select 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>	
(8)		<p>Audio-in (microphone) jack</p>	<p>Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.</p>
		<p>NOTE: The audio-in (microphone) jack does not support optional combo devices, such as a headset.</p>	
		<p>NOTE: When devices are connected to the audio-out (headphone)/Audio-in (microphone) combo jack and the audio-in (microphone) jack at the same time, the audio-in jack has higher priority.</p>	

Display



Component	Description
(1) Internal microphones (2)	Record sound.
(2) Camera light(s)	On: One or more cameras are in use.
(3) Camera	Allows you to video chat, record video, and record still images. Some cameras also allow 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.
(4) WLAN antennas* (2)	Send and receive wireless signals to communicate with wireless local area networks (WLANs).

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

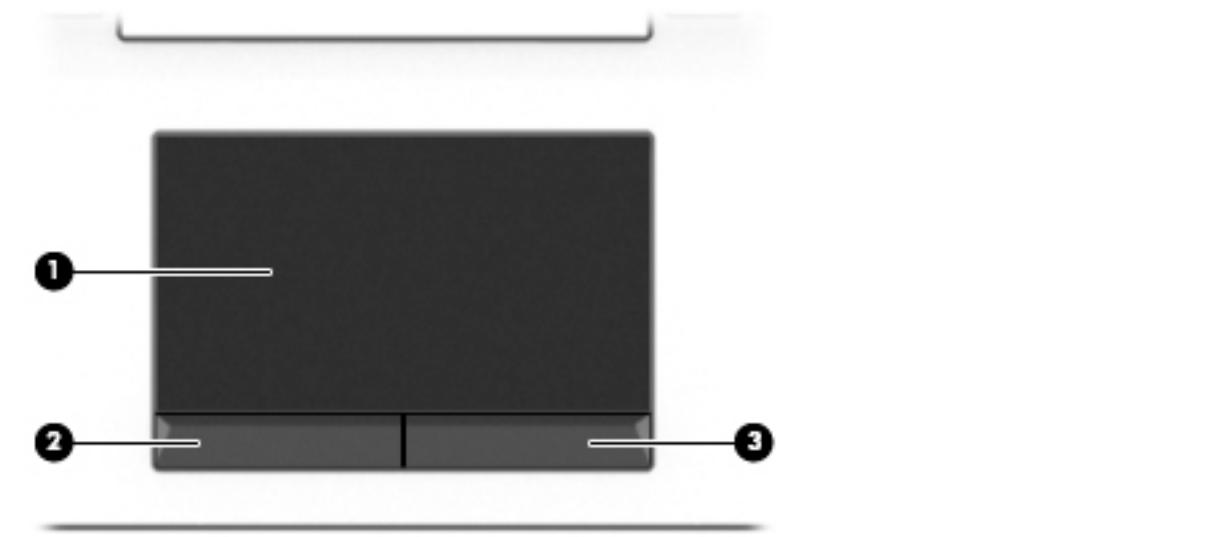
For wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region.

To access this guide:

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**, select the **Specifications** tab, and then select **User Guides**.

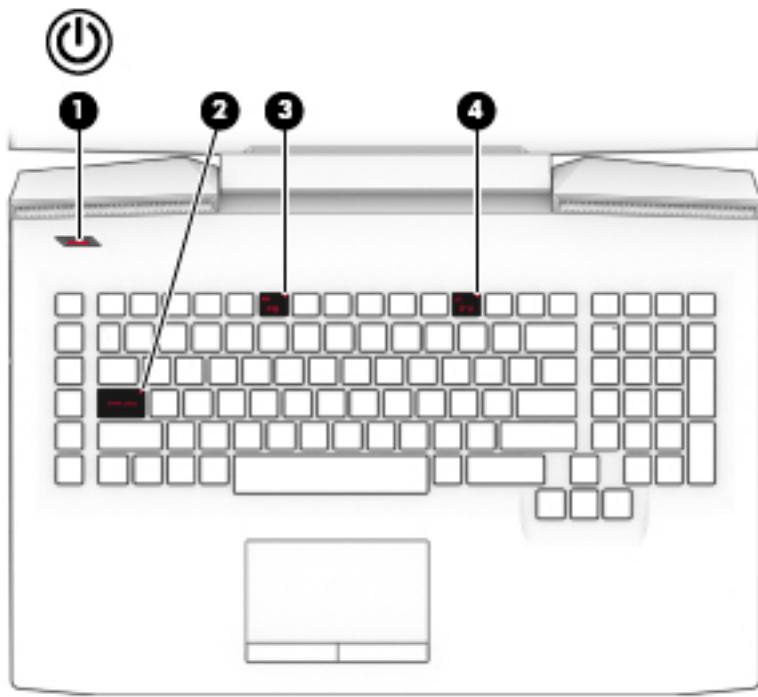
Keyboard area

TouchPad



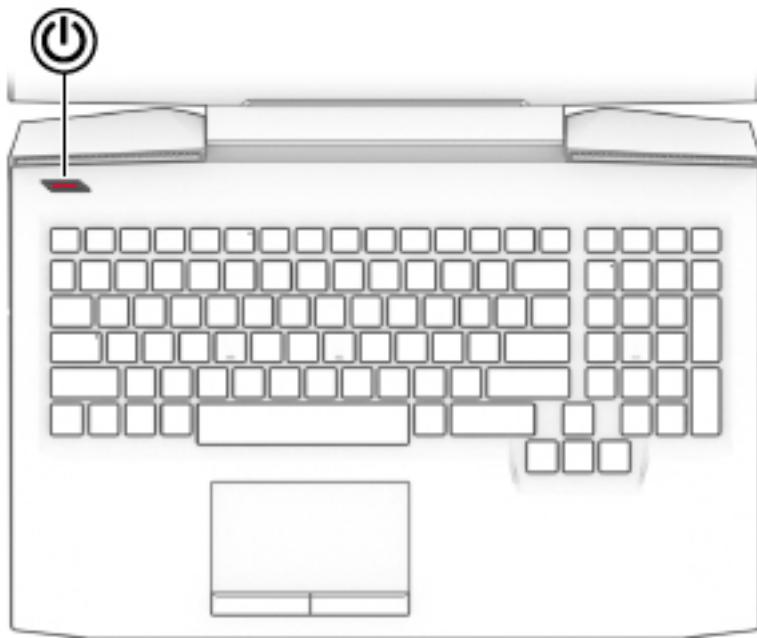
Component	Description
(1) TouchPad zone	Reads your finger gestures to move the pointer or activate items on the screen.
(2) Left TouchPad button	Functions like the left button on an external mouse.
(3) Right TouchPad button	Functions like the right button on an external mouse.

Lights



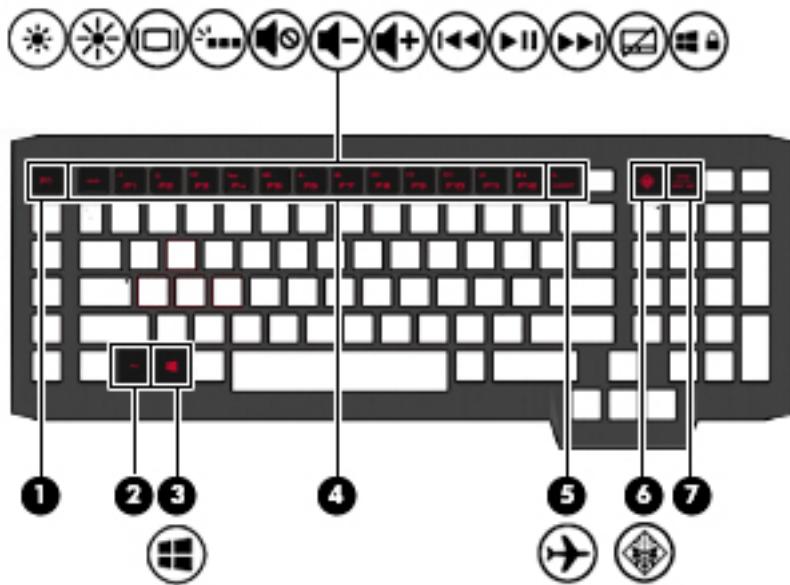
Component	Description
(1) 	<p>Power light</p> <ul style="list-style-type: none">On: The computer is on.Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components.Off: The computer is off or in Hibernation. Hibernation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

Button



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

Special keys



Component	Description
(1) esc key	Displays system information when pressed in combination with the fn key.
(2) fn key	Executes specific functions when pressed in combination with 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.
(5) INSERT/Airplane mode key (also referred to as the wireless button)	Turns the insert mode on or off. – or – Turns the airplane mode on or off. ▲ Press and hold the key in combination with the fn key. NOTE: A wireless network must be set up before a wireless connection is possible.
(6) OMEN key	Opens the OMEN Command Center software.
(7) END/PRT SC key	Turns the END mode on or off. – or – Prints the screen image. ▲ Press and hold the key in combination with the fn key.

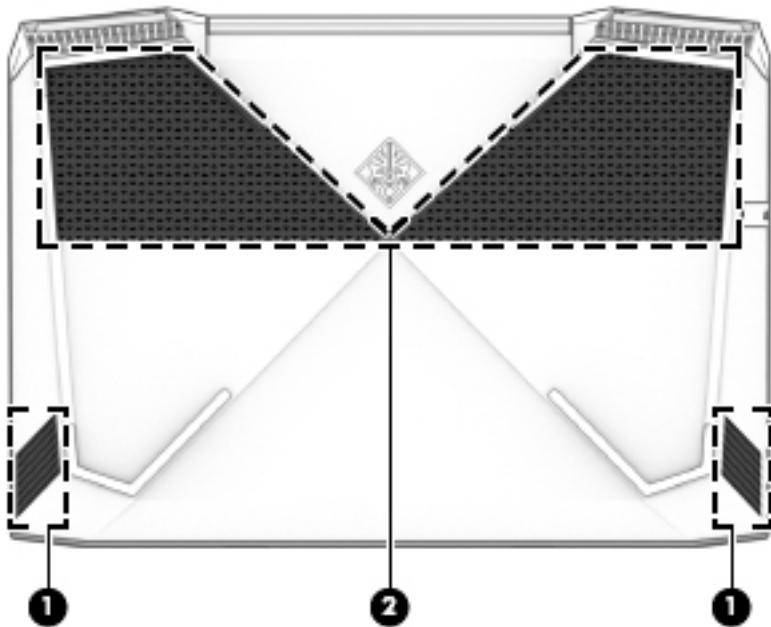
Action keys

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 12](#).

- ▲ To use an action key, press and hold the key in combination with the **fn** key.

Icon	Description
	Decreases the screen brightness incrementally as long as you hold down the key.
	Increases the screen brightness incrementally as long as you hold down the key.
	Switches the screen image between display devices connected to the system. For example, if a monitor is connected to the computer, repeatedly pressing this key alternates the screen image from the computer display to the monitor display or a simultaneous display on both the computer and the monitor.
	Turns the keyboard backlight off or on. NOTE: To conserve battery power, turn off this feature.
	Mutes or restores speaker or headphone sound.
	Decreases speaker or headphone volume incrementally while you hold down the key.
	Increases speaker or headphone volume incrementally while you hold down the key.
	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.
	Turns the TouchPad off or on.
	Disables the Windows key .

Bottom



Component	Description
Speakers (2)	Produce sound.
Vents (2)	Enable airflow to cool internal components. NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.

Labels

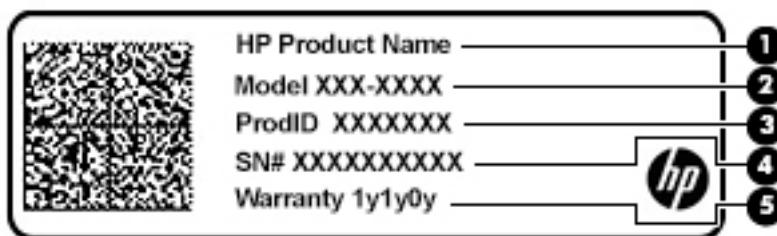
The labels affixed to the computer provide information you may need when you troubleshoot system problems or travel internationally with the computer. Labels may be in paper form or imprinted on the product.



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.

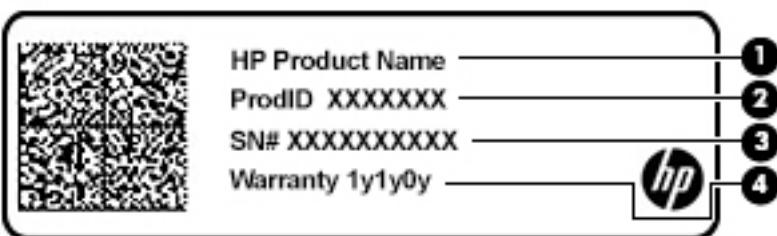
- Service label—Provides important information to identify your computer. When contacting support, you may be asked for the serial number, the product number, or the model number. Locate this information before you contact support.

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



Component

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



Component

- (1) HP product name
- (2) Product ID

Component
(3) Serial number
(4) Warranty period

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

HP OMEN Command Center

HP OMEN Command Center allows you to customize your computer for your specific gaming needs. HP OMEN Command Center is a continuously evolving platform.

- ▲ To open HP OMEN Command Center, select the **Start** button, select **HP OMEN Command Center**, and then follow the on-screen instructions.

– or –

Select the **OMEN**  key at the top right side of the keyboard.

The HP OMEN Command Center dashboard provides a central location to access and configure the following features:

 **NOTE:** Features may vary by platform.

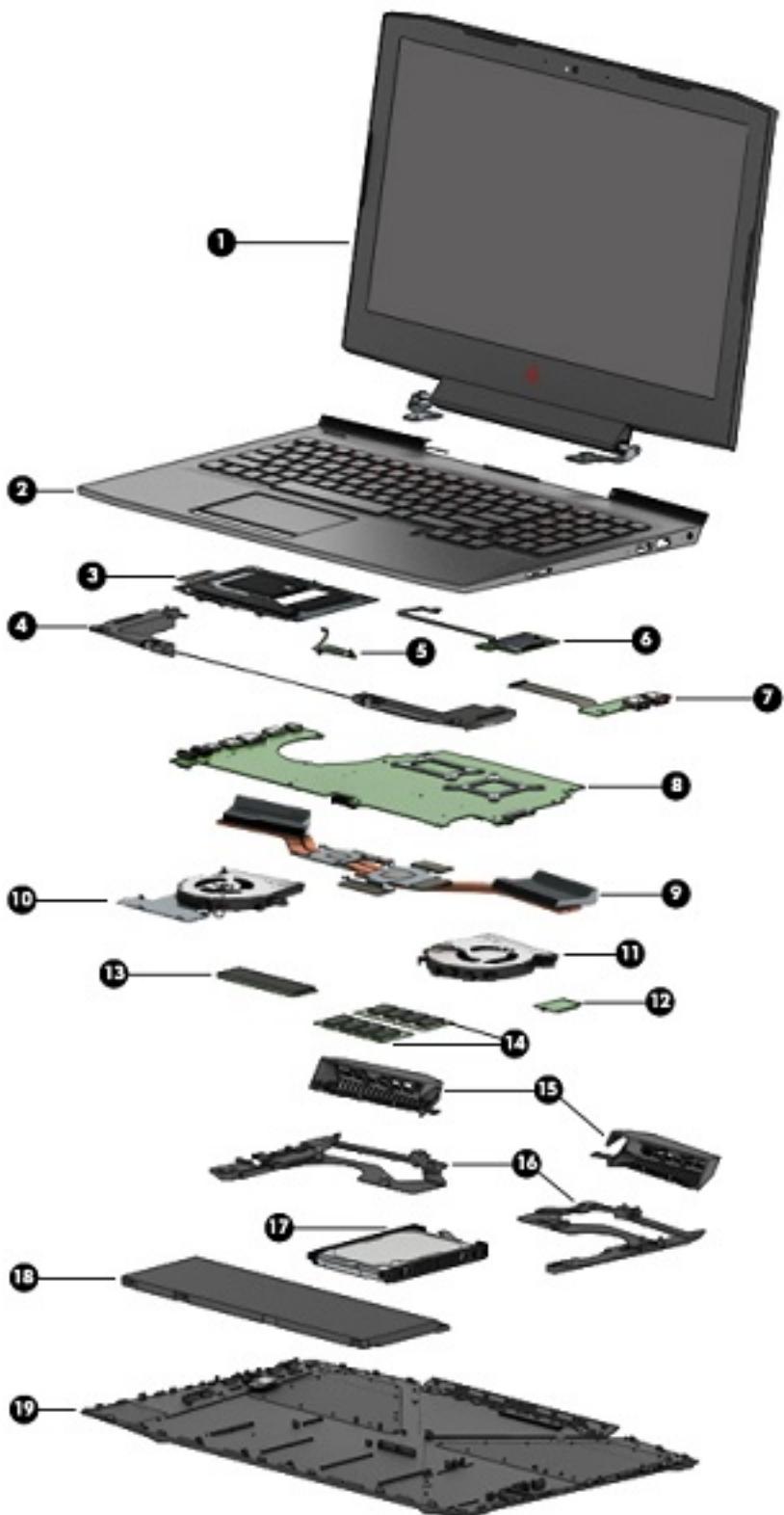
- **Network speed**—View and adjust priorities.
 - **Gaming Macro Keys**—Configure the P-keys (select products only).
 - **Keyboard lighting**—Customize the keyboard lighting.
 - **OMEN Game Stream**—Stream your games from anywhere.
 - **Update**—Refresh the display.
 - **Help**—Access “How to” information and frequently asked questions.
- ▲ To minimize the dashboard, select the < button at the top of the dashboard.

3 Illustrated parts catalog

Computer major components

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

 **NOTE:** Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer. See [Labels on page 15](#) for details.



Item	Component	Spare part number
(1)	Display assembly: For display assembly spare part information, see Display assembly subcomponents on page 24 .	

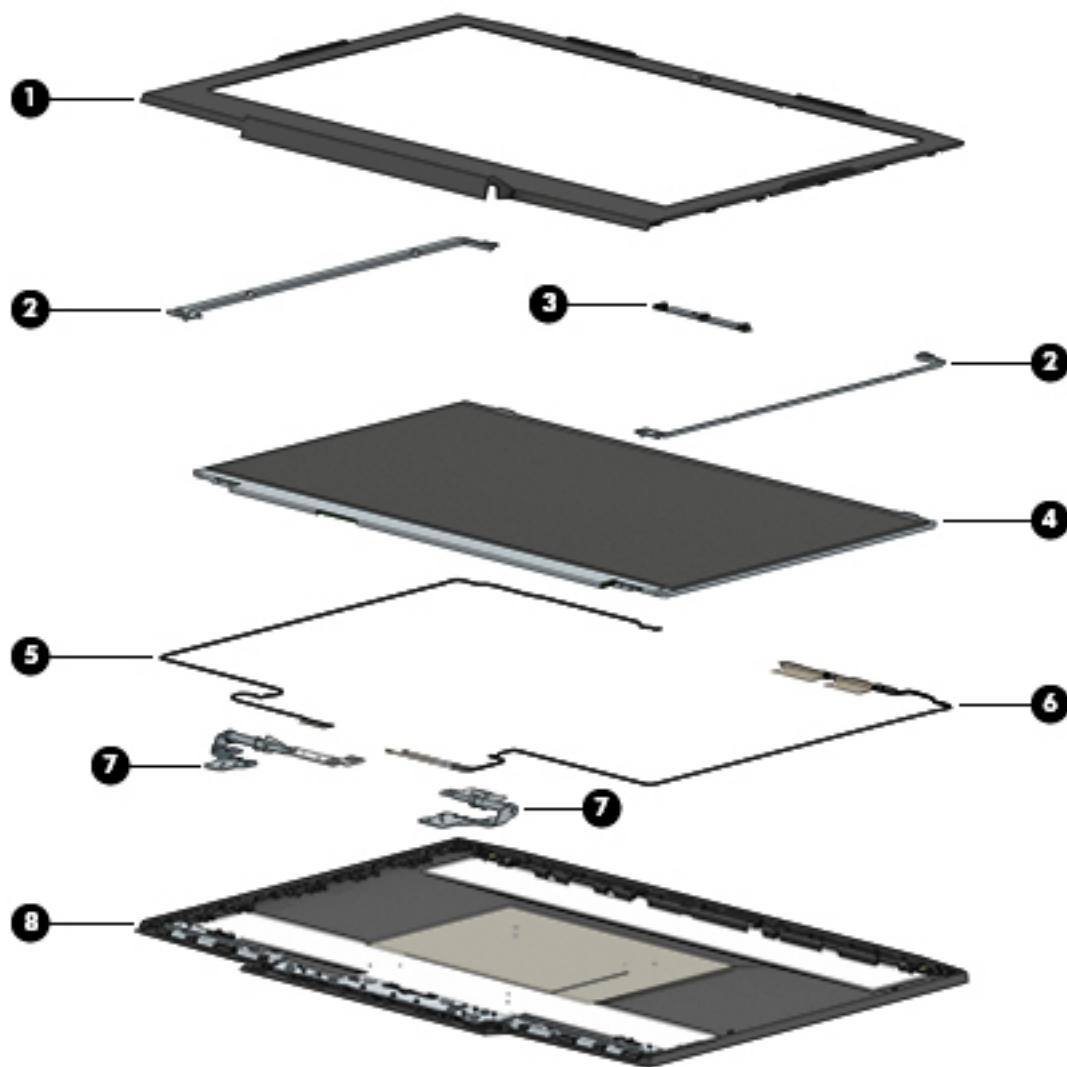
Item	Component	Spare part number
(2)	Keyboard/top cover (Dragon Red, for use only on computer models equipped with a USB 3.x Thunderbolt port)	
	For use internationally	929479-B31
	For use in Belgium	929479-A41
	For use in Bulgaria	929479-261
	For use in Canada	929479-DB1
	For use in the Czech Republic and Slovakia	929479-FL1
	For use in France	929479-051
	For use in Germany	929479-041
	For use in Greece	929479-151
	For use in Hungary	929479-211
	For use in Israel	929479-BB1
	For use in Italy	929479-061
	For use in Japan	929479-291
	For use in Latin America	929479-161
	For use in Norway	929479-DH1
	For use in Portugal	929479-131
	For use in Romania	929479-271
	For use in Russia	929479-251
	For use in Saudi Arabia	929479-171
	For use in Slovenia	929479-BA1
	For use in South Korea	929479-AD1
	For use in Spain	929479-071
	For use in Switzerland	929479-BG1
	For use in Taiwan	929479-AB1
	For use in Thailand	929479-281
	For use in Turkey	929479-141
	For use in the United Kingdom and Singapore	929479-031
	For use in the United States	929479-001
	Keyboard/top cover (Dragon Red, for use only on computer models equipped with a standard USB 3.x port)	
	For use Internationally	929478-B31
	For use in Belgium	929478-A41
	For use in Bulgaria	929478-261
	For use in Canada	929478-DB1
	For use in Czech Republic and Slovakia	929478-FL1

Item	Component	Spare part number
	For use in France	929478-051
	For use in Germany	929478-041
	For use in Greece	929478-151
	For use in Hungary	929478-211
	For use in Israel	929478-BB1
	For use in Italy	929478-061
	For use in Japan	929478-291
	For use in Latin America	929478-161
	For use in Norway	929478-DH1
	For use in Portugal	929478-131
	For use in Romania	929478-271
	For use in Russia	929478-251
	For use in Saudi Arabia	929478-171
	For use in Slovenia	929478-BA1
	For use in South Korea	929478-AD1
	For use in Spain	929478-071
	For use in Switzerland	929478-BG1
	For use in Taiwan	929478-AB1
	For use in Thailand	929478-281
	For use in Turkey	929478-141
	For use in the United Kingdom and Singapore	929478-031
	For use in the United States	929478-001
	Keyboard/top cover (White OMEN legend with RGB backlight, for use only on computer models equipped with a standard USB 3.x port)	
	For use in the United States	L20534-001
	For use in Latin America	L20534-161
	For use in Canada (French)	L20534-DB1
	Keyboard/top cover (White OMEN legend with RGB backlight, for use only on computer models equipped with a USB 3.x Thunderbolt port)	
	For use in the United States	L20535-001
	For use in Latin America	L20535-161
	For use in Canada (French)	L20535-DB1
(3)	Touchpad (does not include the Touchpad button bracket, spare part number 929462-001)	929472-001
(4)	Speakers	929477-001

Item	Component	Spare part number
(5)	Power button board (does not include the power button board connector cable, spare part number 929448-001)	929468-001
(6)	Memory card reader board (does not include the memory card reader board connector cable, spare part number 934752-001)	
	For use only on computer models equipped with an Nvidia N17P GPU	929471-001
	For use only on computer models equipped with an Nvidia N17E GPU	929470-001
(7)	USB board (does not include the USB board connector cable, spare part number 929447-001)	
	For use only on computer models equipped with an Nvidia N17E GPU	L17321-001
	For use only on computer models equipped with an Nvidia N17P GPU	L17322-001
(8)	System board	
	Equipped with an Intel Core i7-8750 2.20 GHz (SC turbo up to 4.1 GHz) processor (2666 MHz FSB, 9 MB L3 cache, hexa core, 45W), a graphic subsystem with an Nvidia N17E 6 GB GPU (Generation 1), and the Windows 10 operating system	L10770-601
	Equipped with an Intel Core i7-8750 2.20 GHz (SC turbo up to 4.1 GHz) processor (2666 MHz FSB, 9 MB L3 cache, hexa core, 45W), a graphic subsystem with an Nvidia N17E 6 GB GPU (Generation 1), and a non-Windows 10 operating system	L10770-001
	Equipped with an Intel Core i7-8750 2.20 GHz (SC turbo up to 4.1 GHz) processor (2666 MHz FSB, 9 MB L3 cache, hexa core, 45W), a graphic subsystem with an Nvidia N17P 4 GB GPU (Generation 1), and the Windows 10 operating system	L10772-601
	Equipped with an Intel Core i7-8750 2.20 GHz (SC turbo up to 4.1 GHz) processor (2666 MHz FSB, 9 MB L3 cache, hexa core, 45W), a graphic subsystem with an Nvidia N17P 4 GB GPU (Generation 1), and a non-Windows 10 operating system	L10772-001
	Equipped with an Intel Core i5-8300 2.30 GHz (SC turbo up to 4.0 GHz) processor (2666 MHz FSB, 8 MB L3 cache, quad core, 45W), a graphic subsystem with an Nvidia N17E 6 GB GPU (Generation 1), and the Windows 10 operating system	L10771-601
	Equipped with an Intel Core i5-8300 2.30 GHz (SC turbo up to 4.0 GHz) processor (2666 MHz FSB, 8 MB L3 cache, quad core, 45W), a graphic subsystem with an Nvidia N17E 6 GB GPU (Generation 1), and a non-Windows 10 operating system	L10771-001
(9)	Heatsink:	
	For use only on computer models equipped with an Nvidia N17E GPU	929559-001
	For use only on computer models equipped with an Nvidia N17P GPU (Generation 1)	929457-001
(10)	Fan (left, paired as a kit with the right fan)	L22261-001
(11)	Fan (right, paired as a kit with the left fan)	L22261-001
(12)	WLAN module:	
	Intel Dual Band Wireless-AC 9560 802.11 AC 2×2 WiFi + BT 5 Combo Adapter	L22634-001
	Realtek RTL8822BE 802.11 AC 2×2 WiFi + BT 4.2 Combo Adapter	915623-001
(13)	Solid state drive	
	256 GB 2280 M2	847109-023
	128 GB 2280 M2	912322-006
(14)	Memory module (DDR4, 2666-Mhz)	
	8 GB	937236-850

Item	Component	Spare part number
	4 GB	L10598-850
(15)	Hinge covers	
	Hinge cover (left)	929474-001
	Hinge cover (right)	929475-001
(16)	System support brackets	not spared
(17)	Hard drive: (does not include the hard drive bracket, spare part number 929561-001, or connector cable, spare part number 929450-001.)	
	1 TB, 7200 rpm, 9.5mm	766644-001
(18)	Battery (4-cell, 70-WHr, 4.55-AH, Li-ion)	
	4-cell, 70-WHr, 4.55-AH, Li-ion for use in products equipped with the N17E GPU	917724-855
	3-cell, 52.5-WHr, 4.55-AH, Li-ion for use only in products equipped with the N17P GPU	L08855-855
(19)	Bottom cover	929443-001

Display assembly subcomponents



Item	Component	Spare part number
(1)	Bezel:	929444-001
(2)	Display bracket:	
	Left bracket	929461-001
	Right bracket	929460-001
(3)	Webcam:	919573-001
(4)	Display panel:	752920-019
(5)	Display panel cable:	929451-001
(6)	WLAN antenna (includes cable)	929441-001
(7)	Display hinges	929464-001
(8)	Back cover:	929442-001

Miscellaneous parts

Component	Spare part number
AC adapter:	
For use only on computer models equipped with an Nvidia N17E GPU	835888-001
For use only on computer models equipped with an Nvidia N17P	917649-850
HDMI to VGA adapter	
	701943-001
Optical drive	
	747080-001
Plastics kit	
	929473-001
Power cord (3-pin, black, 1 m, for use only on computer models equipped with an Nvidia N17E GPU):	
For use internationally	109197-012
For use in Argentina	401328-018
For use in North America	121565-023
Power cord (3-pin, black, 1 m, for use only on computer models equipped with an Nvidia N17P or AMD R71M GPU):	
For use internationally	920689-002
For use in Argentina	920689-003
For use in North America	920689-001
Rubber kit	
	936974-001
Screw kit	
	929476-001
USB Type-C to USB Type-A dongle	
	833960-001

4 Removal and replacement procedures preliminary requirements

Tools required

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

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

Service considerations

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



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

Plastic parts



CAUTION: Using excessive force during disassembly and reassembly can damage plastic parts. Use care when handling the plastic

Cables and connectors

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

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

Drive handling

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

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

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

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

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

Avoid dropping drives from any height onto any surface.

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

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

Avoid exposing a drive to temperature extremes or liquids.

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

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	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 plastic foam	14,500 V	5,000 V	3,500 V
Removing bubble pack from PCB	26,500 V	20,000 V	7,000 V
Packing PCBs in foam-lined box	21,000 V	11,000 V	5,000 V

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

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

Workstation guidelines

Follow these grounding workstation guidelines:

- Cover the workstation with approved static-shielding material.
- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.
- Use conductive field service tools, such as cutters, screwdrivers, and vacuums.
- When fixtures must directly contact dissipative surfaces, use fixtures made only of static safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and plastic foam.
- 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 equipment 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 Customer Self-Repair parts

This chapter provides removal and replacement procedures for Customer Self-Repair parts.

 **NOTE:** The Customer Self-Repair program is not available in all locations. Installing a part not supported by the Customer Self-Repair program may void your warranty. Check your warranty to determine if Customer Self-Repair is supported in your location.

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 15](#) for details.

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

There are as many as thirteen screws that must be removed, replaced, and/or loosened when servicing Customer Self-Repair parts. Make special note of each screw size and location during removal and replacement.

Hard drive

 **NOTE:** The hard drive spare part does not include the hard drive bracket (929561-001) or connector cable (929450-001).

Description	Spare part number
1 TB, 7200 rpm, 9.5mm	766644-001
Hard drive bracket kit	929561-001
Hard drive connector cable	929450-001

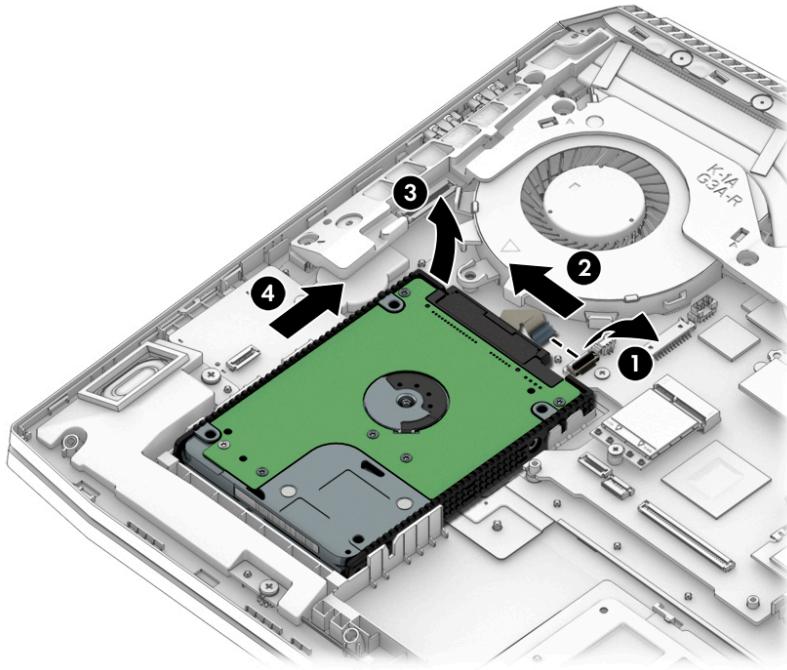
 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement

Before removing the hard drive, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)).

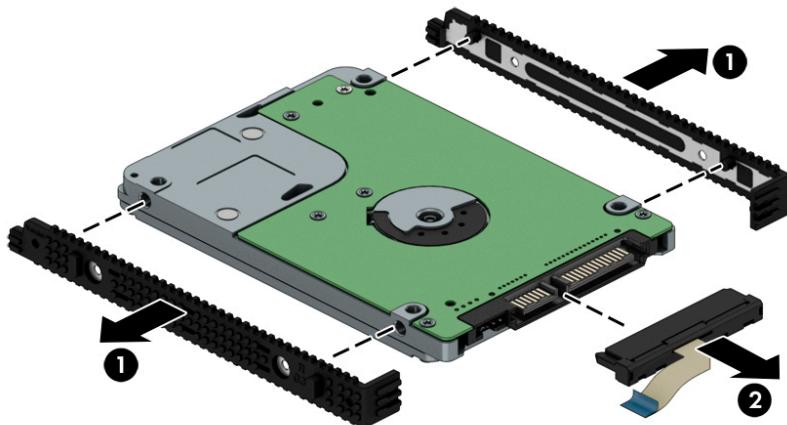
Remove the hard drive:

1. Release the hard drive connector cable from the zero insertion force (ZIF) connector **(1)** on the system board.
2. Remove the hard drive connector cable from the ZIF connector **(2)**.
3. Lift the top edge of the hard drive upward **(3)**.
4. Slide the hard drive toward the top of the computer **(4)**, then remove it from the computer.



Disassemble the hard drive:

1. Remove the bracket **(1)** from the sides of the hard drive.
2. Remove the hard drive connector cable **(2)** from the hard drive.



Reverse this procedure to install the hard drive.

Solid state drive

Description	Spare part number
256 GB	847109-023
128 GB	912322-006

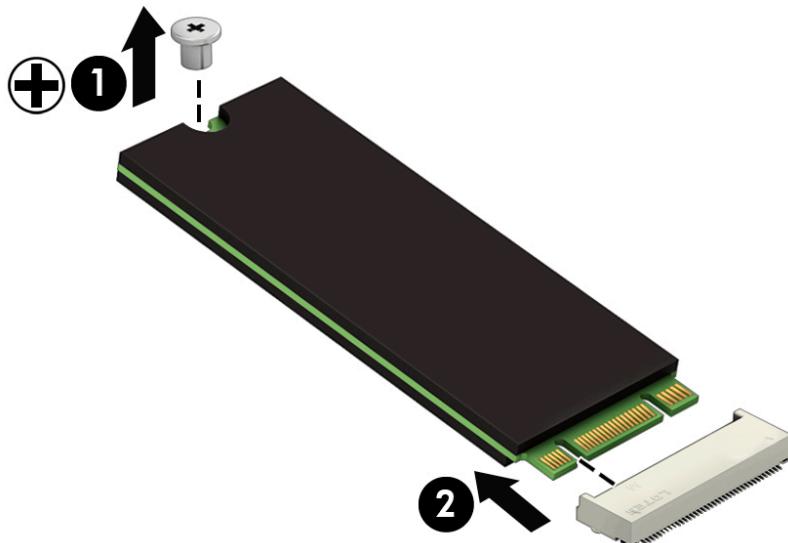
 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement

Before removing the solid state drive, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)).

Remove the solid state drive:

1. Remove the Phillips screw **(1)**.
2. Remove the solid state drive at an angle **(2)**.



Reverse this procedure to install the solid state drive.

Memory module

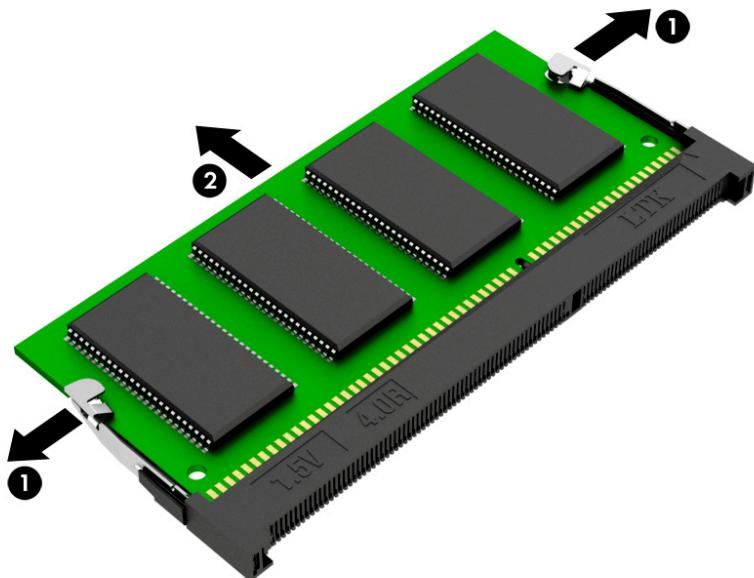
Description	Spare part number
8 GB	937236-850
4 GB	L10598-850

Before removing the memory module, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)).

Remove the memory module(s):

1. Release the retention clips holding the memory module in place (1).
2. Slide the memory module out of the connector (2).



Reverse this procedure to install the memory module.

6 Removal and replacement procedures for authorized service provider parts

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

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 15](#) for details.

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

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

Battery

Description	Spare part number
4cell, 70Whr, 4.55AH, Li-ion battery for use in products equipped with a N17E GPU	917724-855
3cell, 52.5Whr, 4.55AH, Li-ion battery for use in products equipped with a N17P GPU	L08855-855

Before disassembling the computer, follow these steps:

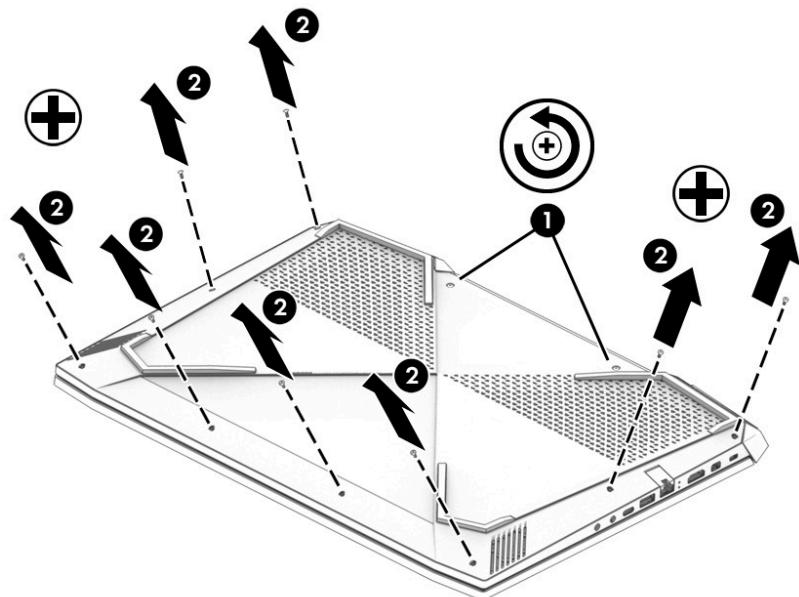
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.

Remove the battery:

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

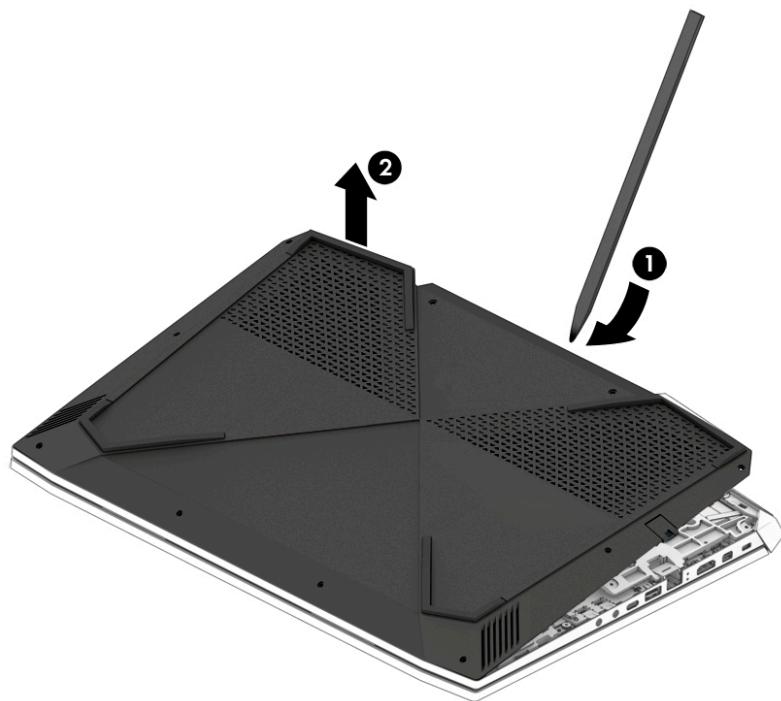
⚠️ CAUTION: Removing a user-replaceable battery that is the sole power source for the computer can cause loss of information. To prevent loss of information, save your work or shut down the computer through Windows before removing the battery.

1. Position the computer upside down on a flat surface.
2. Loosen the captive Phillips screws **(1)**.
3. Remove the remaining eight Phillips PM2.0×4.7 screws **(2)** from the bottom cover.

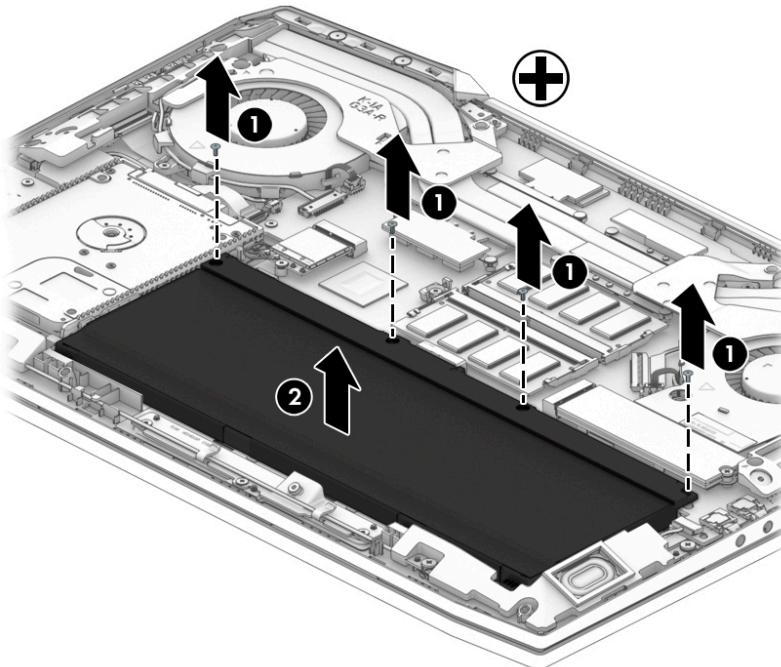


4. Using a case utility tool, gently separate the bottom cover from the enclosure **(1)**.

5. Remove the bottom cover (2).



6. Remove the four Phillips PM2.0×5.7 screws (1) that secure the battery to the keyboard/top cover.
7. Lift the battery out of the bottom enclosure (2).



To insert the battery, reverse the removal procedures.

WLAN module

Description	Spare part number
Realtek RTL8822BE 802.11 AC 2×2 WiFi + BT 4.2 Combo Adapter	915623-001
Intel Dual Band Wireless-AC 9560 802.11 AC 2×2 WiFi + BT 5 Combo Adapter	L22634-001

 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement

Before removing the WLAN module, follow these steps:

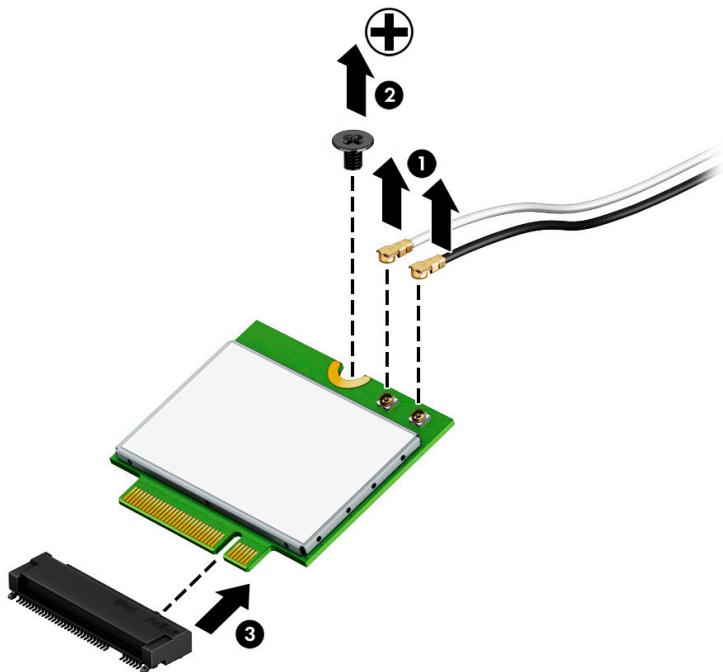
1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)).

Remove the WLAN module:

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

 **NOTE:** The WLAN antenna cable labeled "1" connects to the WLAN module "Main" terminal labeled "1". The WLAN antenna cable labeled "2" connects to the WLAN module "Aux" terminal labeled "2".

2. Remove the Phillips PM2.0×3.4 screw (2) that secures the WLAN module to the system board (the WLAN module tilts up).
3. Remove the WLAN module (3) by pulling the module away from the slot at an angle.



 **NOTE:** The WLAN module configuration in the computer may not match the illustration exactly.

Reverse this procedure to install the WLAN module.

Speakers



NOTE: The speaker spare part kit includes both speakers and the connector cable.

Description	Spare part number
Speaker kit	929477-001



IMPORTANT: Make special note of each screw and screw lock size and location during removal and replacement

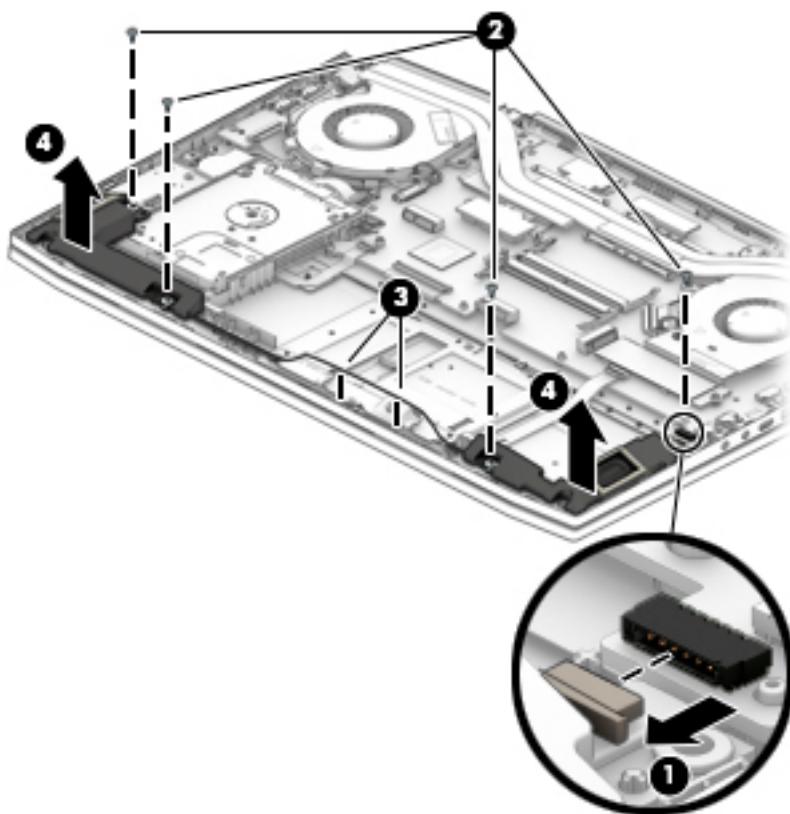
Before removing the speakers, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)).

Remove the speakers:

1. Disconnect the speaker cable from the system board **(1)**.
2. Remove the four Phillips PM2.0×6.3 screws **(2)** that secure the speakers to the computer.
3. Remove the cable from clips built into the chassis **(3)**.

4. Remove the speakers (4) from the computer.



Reverse this procedure to install the speakers.

Memory card reader board



NOTE: The memory card reader board spare part kit does not include the connector cable.

Description	Spare part number
Memory card reader board (for use only on computer models equipped with an Nvidia N17E GPU)	929470-001
Memory card reader board (for use only on computer models equipped with an Nvidia N17P GPU)	929471-001
Memory card reader board connector cable	934752-001



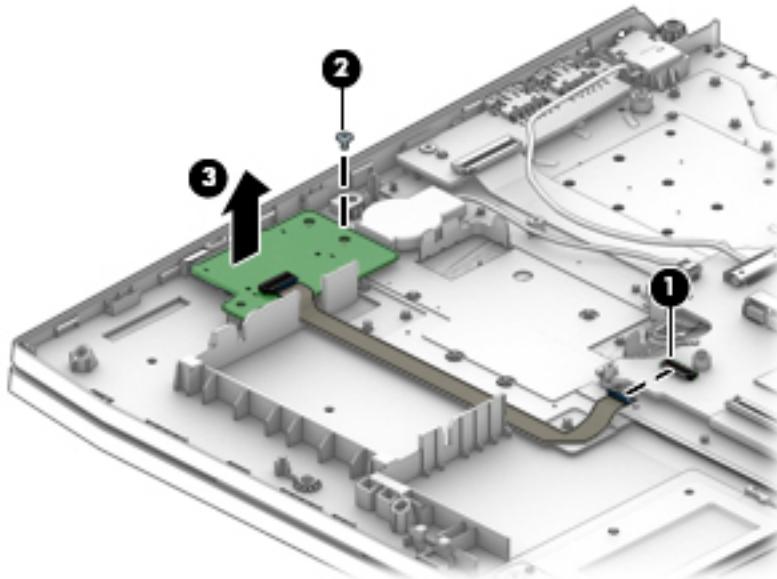
IMPORTANT: Make special note of each screw and screw lock size and location during removal and replacement

Before removing the memory card reader board, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)), and then remove the following components:
 - a. Hard drive (see [Hard drive on page 31](#)).
 - b. Speakers (see [Speakers on page 40](#)).

Remove the memory card reader board:

1. Disconnect the connector cable from the system board **(1)**.
2. Remove the Phillips PM2.0×3.4 screw **(2)** that secures the board to the computer.
3. Remove the memory card reader board from the computer **(3)**.



Reverse this procedure to install the memory card reader board.

TouchPad

 **NOTE:** The TouchPad spare part kit includes the TouchPad connector cable, but does not include the TouchPad bracket.

Description	Spare part number
TouchPad board (with connector cable)	929472-001
TouchPad bracket	929462-001

 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement

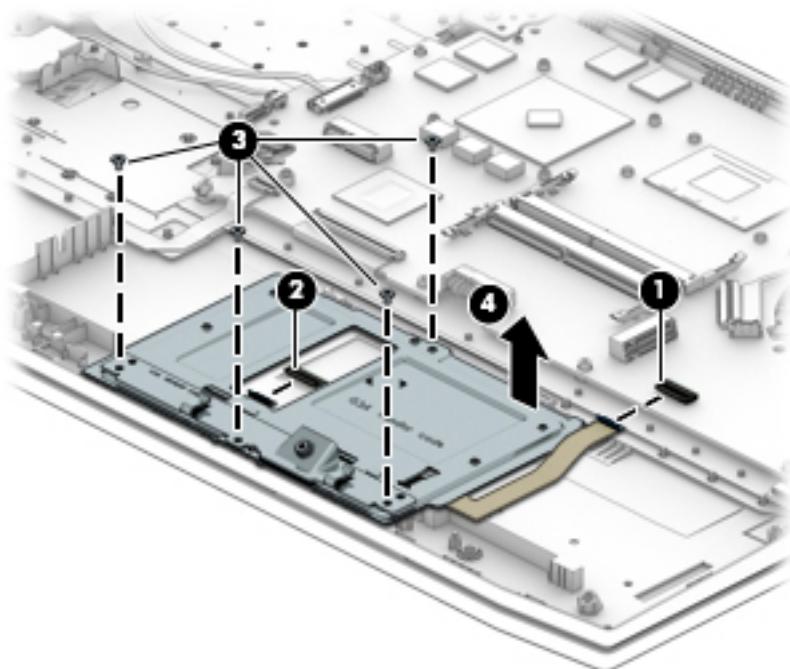
Before removing the TouchPad, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)), and then remove the following components:
 - ▲ Speakers (see [Speakers on page 40](#)).

Remove the TouchPad:

1. Disconnect the TouchPad connector cable from the system board **(1)**.
2. Disconnect the TouchPad from the keyboard/top cover **(2)**.
3. Remove the 4 Phillips PM2.0×3.4 screws **(3)**.
4. Remove the TouchPad bracket.

5. Remove the TouchPad from the computer (4).



Reverse this procedure to install the TouchPad.

Hinge covers

 **NOTE:** The hinge covers are spared separately for the left and right sides.

Description	Spare part number
Left hinge cover	929474-001
Right hinge cover	929475-001

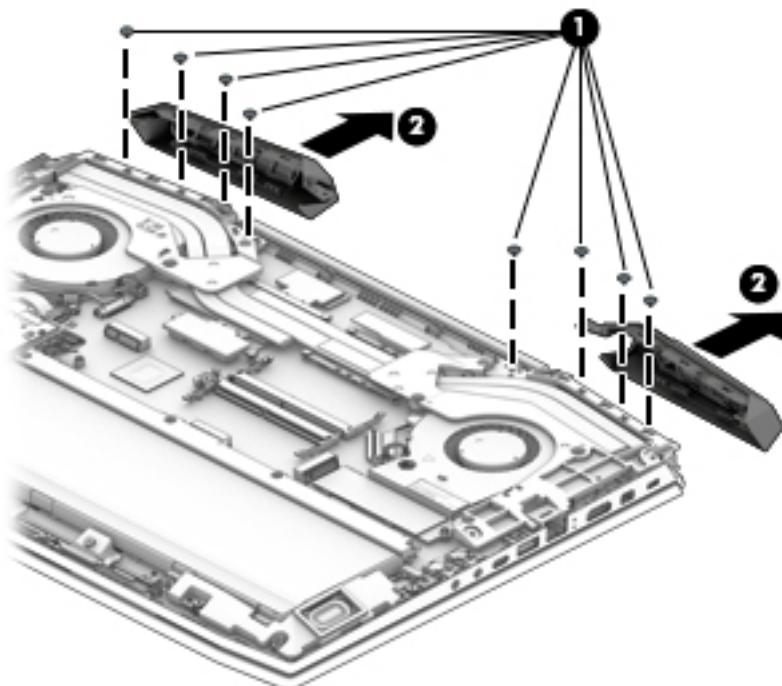
 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement

Before removing the hinge covers, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)).

Remove the hinge covers:

1. Remove the four black Phillips PM2.0×3.0 screws and the four Phillips PM2.0×5.7 screws **(1)** that secure the hinge covers to the computer.
2. Remove the hinge covers using a rotating motion toward the rear of the computer **(2)**.



Reverse this procedure to install the hinge covers.

System support brackets

 **NOTE:** The system support brackets are not spared.

 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement

Before removing the system support brackets, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)), and then remove the following components:
 - ▲ Hinge covers (see [Hinge covers on page 45](#)).

Remove the system support brackets:

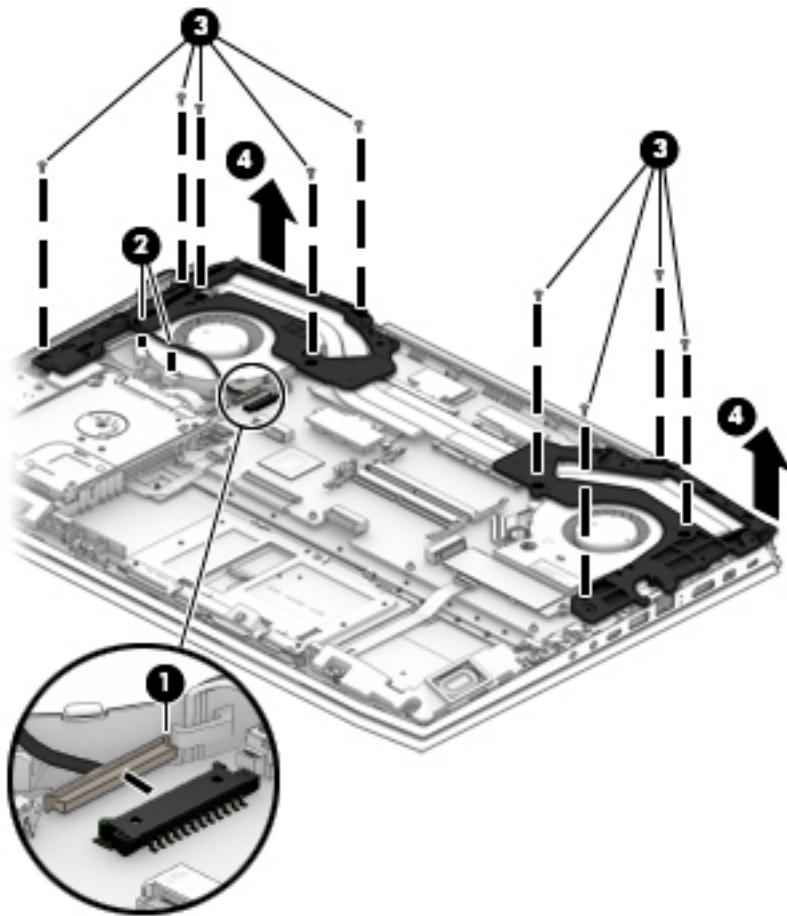
1. Disconnect the power connector cable from the system board **(1)**.
2. Remove the power connector cable from the routing path and clips **(2)**.

 **NOTE:** The power connector cable is routed through the left side system support bracket.

3. Remove the seven Phillips PM2.0×5.7 and two Phillips PM2.4×7.2 screws **(3)** that secure the brackets to the computer.

4. Remove the brackets from the computer **(4)**.

IMPORTANT: To avoid damaging the power connector cable, take care during the removal of the system support brackets.



Reverse this procedure to install the system support brackets.

Power connector cable

Description	Spare part number
For use only on computer models equipped with the Nvidia N17P GPUs	926204-001
For use only on computer models equipped with the Nvidia N17E GPU	938137-001



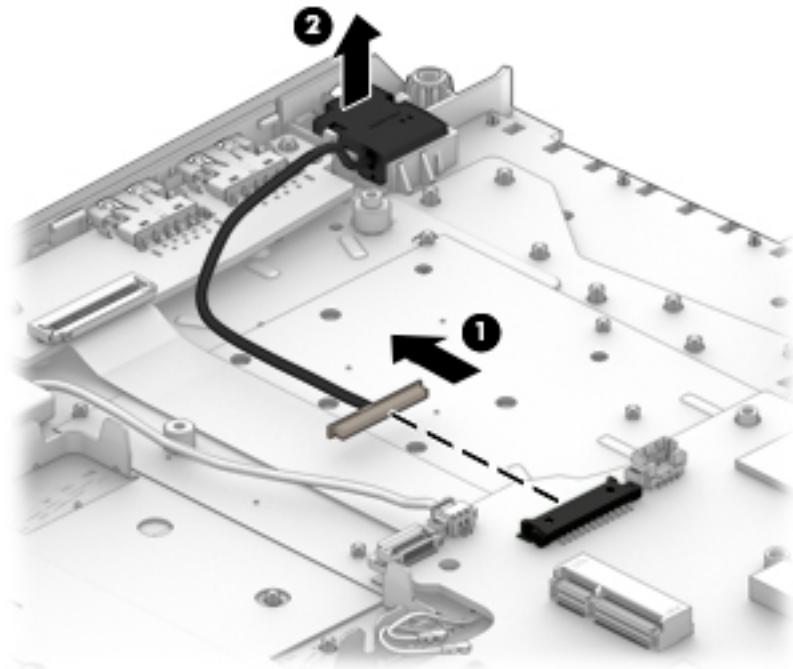
IMPORTANT: Make special note of each screw and screw lock size and location during removal and replacement

Before removing the power connector cable, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)), and then remove the following components:
 - a. Hinge covers (see [Hinge covers on page 45](#)).
 - b. System support brackets (see [System support brackets on page 46](#)).

Remove the power connector cable:

1. Disconnect the power connector cable from the system board **(1)**.
2. Remove the power connector cable **(2)**.



Reverse this procedure to install the power connector cable.

Fans

 **NOTE:** The left and right fans are spared in a single kit.

Description	Spare part number
Fan kit	L22261-001

 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement

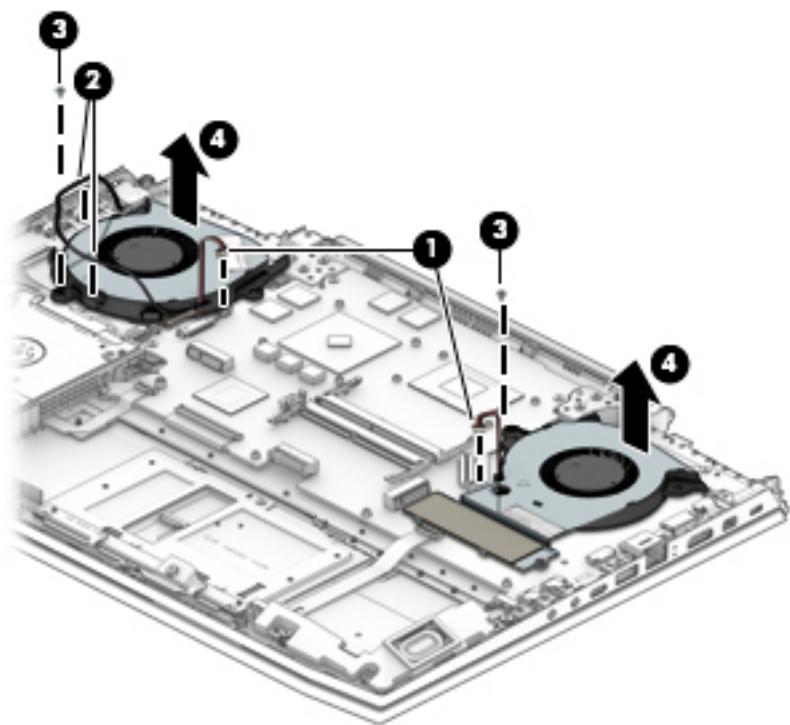
Before removing the fans, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)), and then remove the following components:
 - a. Solid state drive (see [Solid state drive on page 33](#)).
 - b. Hinge covers (see [Hinge covers on page 45](#)).
 - c. System support brackets (see [System support brackets on page 46](#)).

Remove the fans:

1. Disconnect the fan cables from the system board **(1)**.
2. Remove the fan cables from the routing path clips **(2)**.
3. Remove the two Phillips PM2.0×5.7 screws **(3)** securing the fans to the computer.

4. Remove the fans from the computer (4).



Reverse this procedure to install the fans.

USB board



NOTE: The USB board spare part kit does not include the connector cable.

Description	Spare part number
USB board (for use only on computer models equipped with an Nvidia N17E GPU)	L17321-001
USB board (for use only on computer models equipped with an Nvidia N17P GPU)	L17322-001
USB board connector cable	929447-001



IMPORTANT: Make special note of each screw and screw lock size and location during removal and replacement

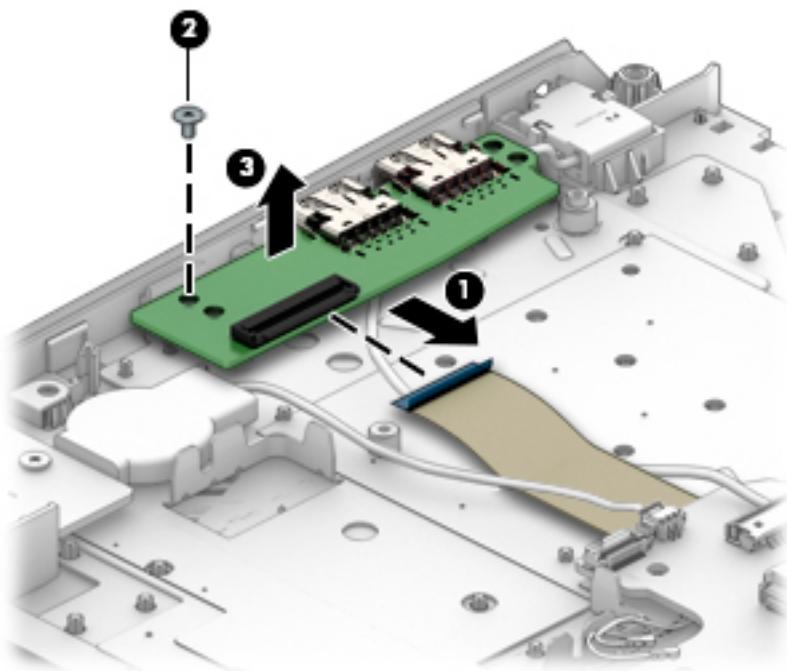
Before removing the USB board, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)), and then remove the following components:
 - a. Hinge covers (see [Hinge covers on page 45](#)).
 - b. System support brackets (see [System support brackets on page 46](#)).
 - c. Fans (see [Fans on page 49](#)).

Remove the USB board:

1. Disconnect the USB board connector cable from the USB board **(1)**.
2. Remove the Phillips PM2.0×5.7 screw **(2)**.

3. Remove the USB board from the computer (3).



Reverse this procedure to install the USB board.

Heat sink



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

Description	Spare part number
Heat sink (for use only on computer models equipped with an Nvidia N17E GPU)	929559-001
Heat sink (for use only on computer models equipped with an Nvidia N17P Generation 1 GPU)	929457-001



IMPORTANT: Make special note of each screw and screw lock size and location during removal and replacement

Before removing the heat sink, follow these steps:

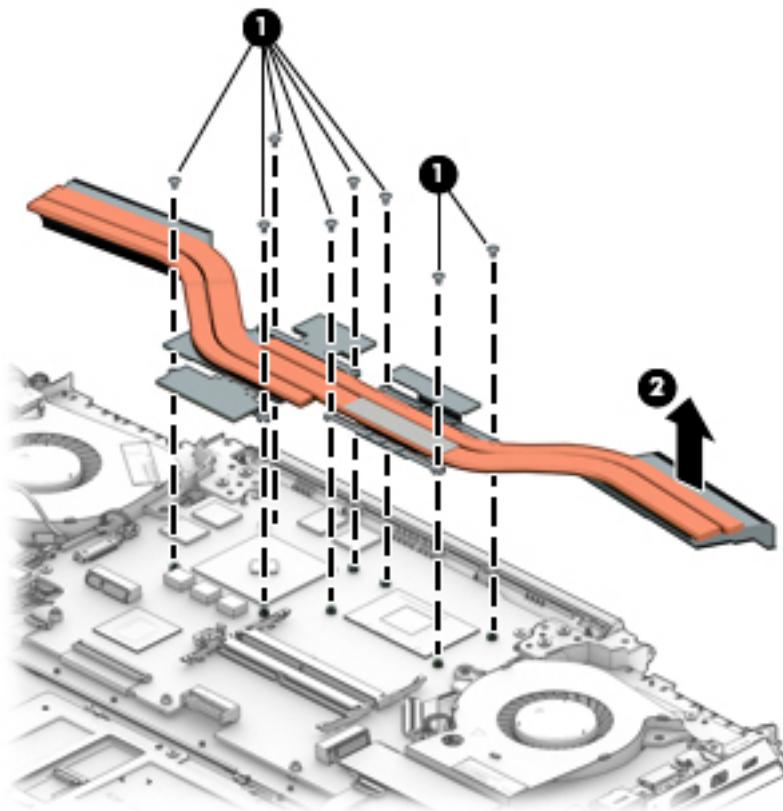
1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)), and then remove the following components:
 - a. Hinge covers (see [Hinge covers on page 45](#)).
 - b. System support brackets (see [System support brackets on page 46](#)).
 - c. Fans (see [Fans on page 49](#)).

Remove the heat sink:

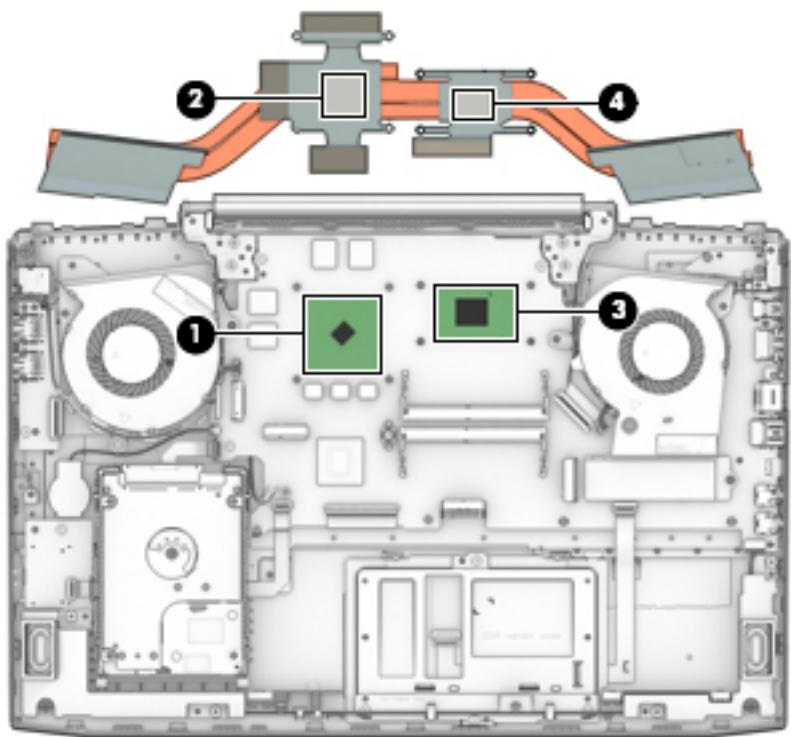
1. Following the 1 through 8 sequence stamped into the heat sink, loosen the eight captive Phillips screws **(1)** that secure the heat sink to the system board.

2. Remove the heat sink **(2)**.

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



 **NOTE:** The thermal material must be thoroughly cleaned from the surfaces of the heat sink and the system board components each time the heat sink is removed. Thermal paste is used on the processor **(1)**, the graphics processor **(3)**, and the heat sink sections **(2 and 4)** that service the processors.



Reverse this procedure to install the heat sink.

Power button board



NOTE: The power button board does not include the power button board connector cable.

Description	Spare part number
Power button board	929468-001
Power button board connector cable	929448-001



IMPORTANT: Make special note of each screw and screw lock size and location during removal and replacement

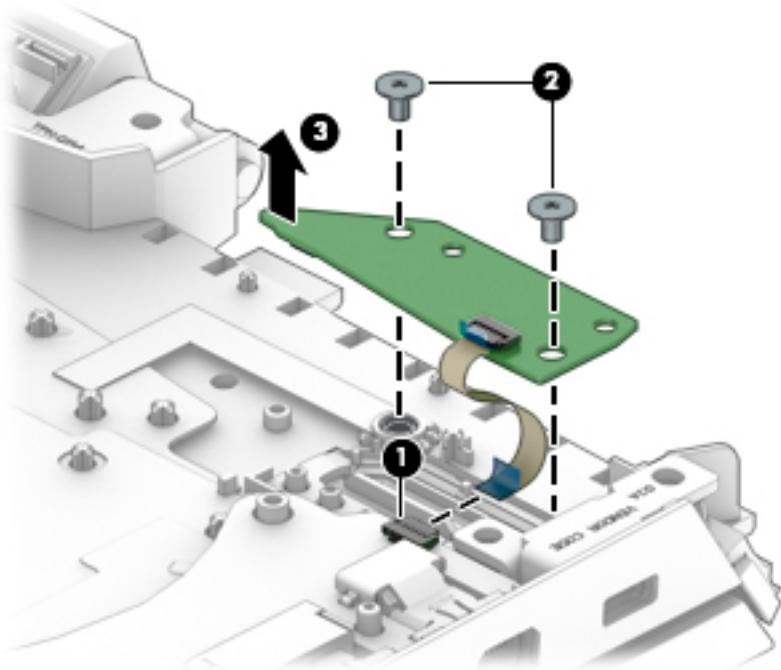
Before removing the power button board, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)), and then remove the following components:
 - a. Hinge covers (see [Hinge covers on page 45](#)).
 - b. System support brackets (see [System support brackets on page 46](#)).
 - c. Fans (see [Fans on page 49](#)).
 - d. Heat sink (see [Heat sink on page 53](#)).

Remove the power button board:

1. Disconnect the power button board cable from the system board **(1)**.
2. Remove the two Phillips PM2.0×3.5 screws **(2)** that secure 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.

System board

Description	Spare part number
Equipped with an Intel Core i7-8750 2.20 GHz (SC turbo up to 4.1 GHz) processor (2666 MHz FSB, 9 MB L3 cache, hexa core, 45W), a graphic subsystem with an Nvidia N17E 6 GB GPU (Generation 1), and the Windows 10 operating system	L10770-601
Equipped with an Intel Core i7-8750 2.20 GHz (SC turbo up to 4.1 GHz) processor (2666 MHz FSB, 9 MB L3 cache, hexa core, 45W), a graphic subsystem with an Nvidia N17E 6 GB GPU (Generation 1), and a non-Windows 10 operating system	L10770-001
Equipped with an Intel Core i7-8750 2.20 GHz (SC turbo up to 4.1 GHz) processor (2666 MHz FSB, 9 MB L3 cache, hexa core, 45W), a graphic subsystem with an Nvidia N17P 4 GB GPU (Generation 1), and the Windows 10 operating system	L10772-601
Equipped with an Intel Core i7-8750 2.20 GHz (SC turbo up to 4.1 GHz) processor (2666 MHz FSB, 9 MB L3 cache, hexa core, 45W), a graphic subsystem with an Nvidia N17P 4 GB GPU (Generation 1), and a non-Windows 10 operating system	L10772-001
Equipped with an Intel Core i5-8300 2.30 GHz (SC turbo up to 4.0 GHz) processor (2666 MHz FSB, 8 MB L3 cache, quad core, 45W), a graphic subsystem with an Nvidia N17E 6 GB GPU (Generation 1), and the Windows 10 operating system	L10771-601
Equipped with an Intel Core i5-8300 2.30 GHz (SC turbo up to 4.0 GHz) processor (2666 MHz FSB, 8 MB L3 cache, quad core, 45W), a graphic subsystem with an Nvidia N17E 6 GB GPU (Generation 1), and a non-Windows 10 operating system	L10771-001



IMPORTANT: Make special note of each screw and screw lock size and location during removal and replacement

Before removing the system board, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)), and then remove the following components:
 - a. Hinge covers (see [Hinge covers on page 45](#)).
 - b. System support brackets (see [System support brackets on page 46](#)).
 - c. Fans (see [Fans on page 49](#)).
 - d. Heat sink (see [Heat sink on page 53](#)).

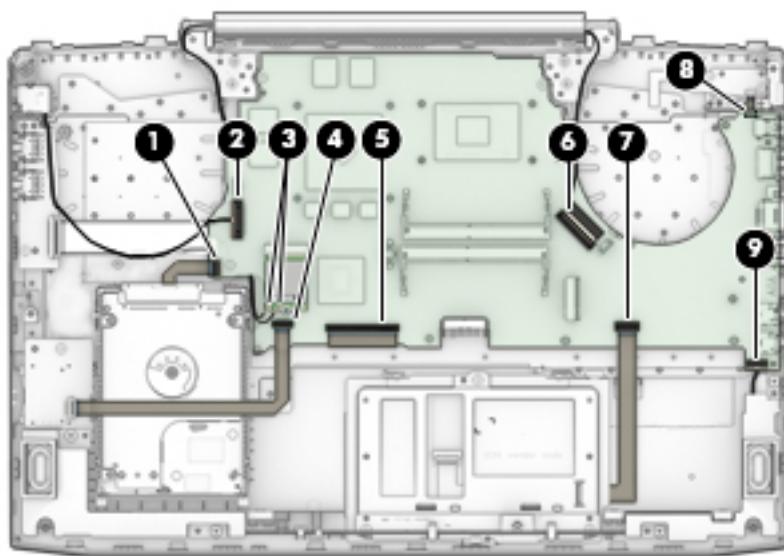
Disconnect the following cables from the system board:

1. **(1):** Hard drive connector cable
- (2):** Power connector cable
- (3):** WLAN antenna cables
- (4):** Memory card reader board connector cable
- (5):** Keyboard/top cover connector cable
- (6):** Display cable

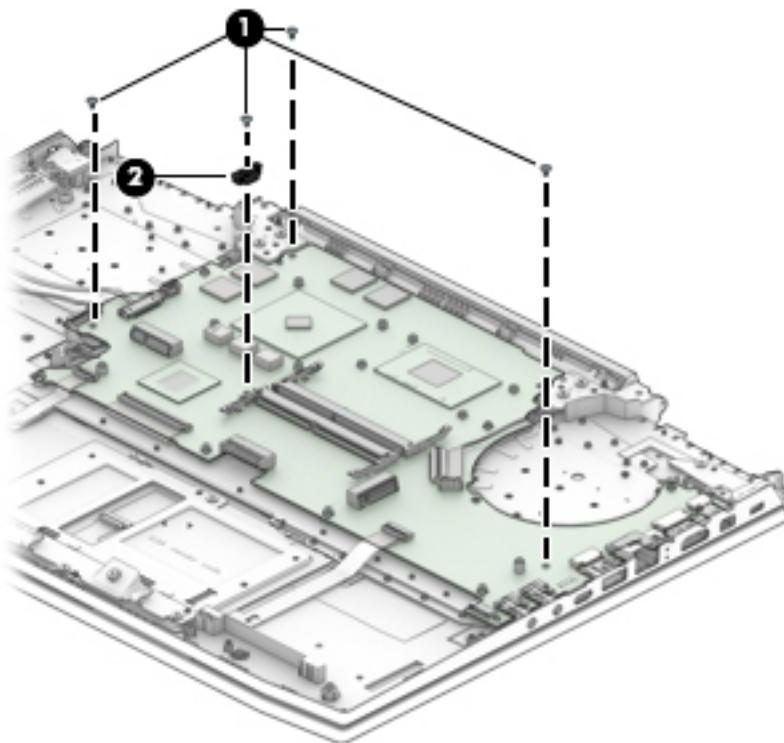
(7): TouchPad cable

(8): Power button board cable

(9): Speaker cable

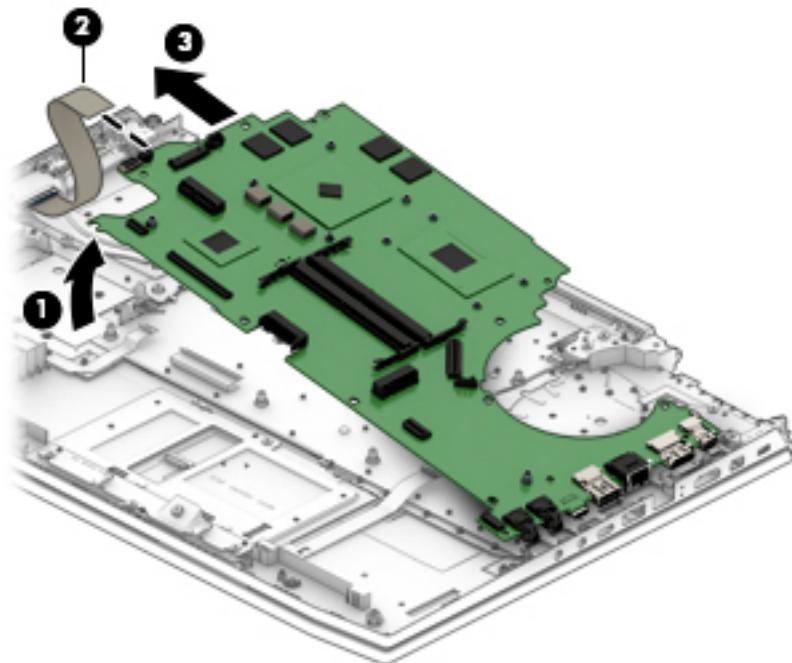


2. Remove the three Phillips PM2.0×3.4 screws and the Phillips PM1.9×5.7 screw **(1)**.
3. Remove the screw bracket **(2)**.



4. Lift the left edge of the system board at an angle **(1)** but do not remove the board.
5. Disconnect the USB board connector cable from the underside of the system board **(2)**.

- 6.** Remove the system board from the computer at an angle **(3)**.



Reverse this procedure to install the system board.

Display assembly

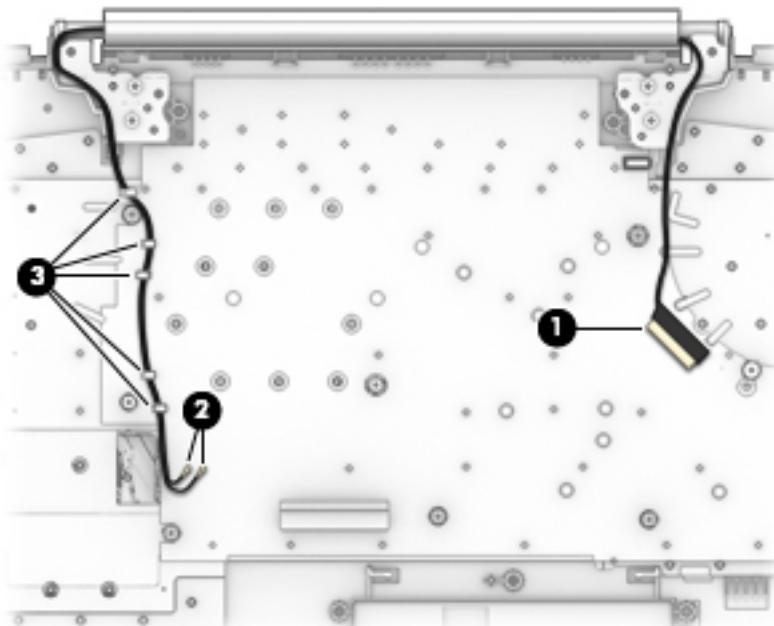
 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement

Before removing the display assembly, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)), and then remove the following components:
 - a. Hinge covers (see [Hinge covers on page 45](#)).
 - b. System support brackets (see [System support brackets on page 46](#)).
 - c. Fans (see [Fans on page 49](#)).
 - d. Heat sink (see [Heat sink on page 53](#)).
 - e. System board (see [System board on page 58](#)).

Remove the display assembly:

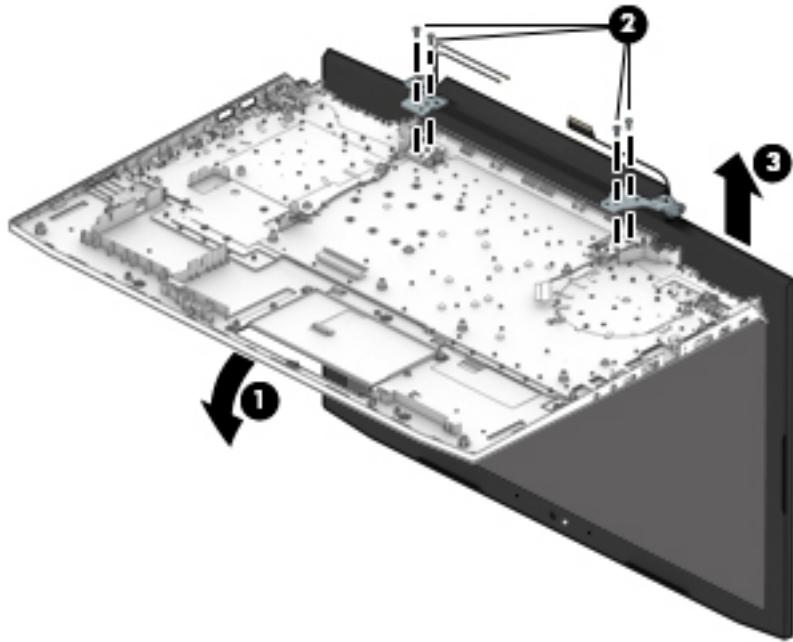
1. Disconnect the display panel cable from the system board **(1)**.
2. Disconnect the WLAN antenna cable from the system board **(2)**.
3. Release the WLAN antenna cable from the clips securing it to the computer **(3)**.



4. Open the computer with the bottom facing up **(1)**.
5. Remove the four Phillips PM2.5×5.7 screws **(2)** securing the display assembly to the computer.

 **IMPORTANT:** To avoid damaging the display assembly or display panel, ensure that the display assembly is supported before removing the hinges.

6. Remove the display assembly from the computer **(3)**.



Reverse this procedure to install the display bezel.

Keyboard/top cover

Description	Spare part number
Dragon Red, for use only on computer models equipped with a USB 3.x Thunderbolt port	
For use internationally	929479-B31
For use in Belgium	929479-A41
For use in Bulgaria	929479-261
For use in Canada	929479-DB1
For use in the Czech Republic and Slovakia	929479-FL1
For use in France	929479-051
For use in Germany	929479-041
For use in Greece	929479-151
For use in Hungary	929479-211
For use in Israel	929479-BB1
For use in Italy	929479-061
For use in Japan	929479-291
For use in Latin America	929479-161
For use in Norway	929479-DH1
For use in Portugal	929479-131
For use in Romania	929479-271
For use in Russia	929479-251
For use in Saudi Arabia	929479-171
For use in Slovenia	929479-BA1
For use in South Korea	929479-AD1
For use in Spain	929479-071
For use in Switzerland	929479-BG1
For use in Taiwan	929479-AB1
For use in Thailand	929479-281
For use in Turkey	929479-141
For use in the United Kingdom and Singapore	929479-031
For use in the United States	929479-001
Dragon Red, for use only on computer models equipped with a standard USB 3.x port	
For use Internationally	929478-B31
For use in Belgium	929478-A41
For use in Bulgaria	929478-261
For use in Canada	929478-DB1

Description	Spare part number
For use in Czech Republic and Slovakia	929478-FL1
For use in France	929478-051
For use in Germany	929478-041
For use in Greece	929478-151
For use in Hungary	929478-211
For use in Israel	929478-BB1
For use in Italy	929478-061
For use in Japan	929478-291
For use in Latin America	929478-161
For use in Norway	929478-DH1
For use in Portugal	929478-131
For use in Romania	929478-271
For use in Russia	929478-251
For use in Saudi Arabia	929478-171
For use in Slovenia	929478-BA1
For use in South Korea	929478-AD1
For use in Spain	929478-071
For use in Switzerland	929478-BG1
For use in Taiwan	929478-AB1
For use in Thailand	929478-281
For use in Turkey	929478-141
For use in the United Kingdom and Singapore	929478-031
For use in the United States	929478-001
RGB Backlight and White OMEN logo, for use only on computer models equipped with a USB 3.x Thunderbolt port	
For use in Canada (French)	L20535-B31
For use in Latin America	L20535-B31
For use in the United States	L20535-B31
RGB Backlight and White OMEN logo, for use only on computer models equipped with a standard USB 3.x port	
For use in Canada (French)	L20534-B31
For use in Latin America	L20534-B31
For use in the United States	L20534-B31



IMPORTANT: Make special note of each screw and screw lock size and location during removal and replacement

Before removing the display bezel, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)), and then remove the following components:
 - a. Hinge covers (see [Hinge covers on page 45](#)).
 - b. System support brackets (see [System support brackets on page 46](#)).
 - c. Fans (see [Fans on page 49](#)).
 - d. Heat sink (see [Heat sink on page 53](#)).
 - e. System board (see [System board on page 58](#)).
 - f. Display assembly (see [Display assembly on page 61](#)).

Display bezel

Description	Spare part number
Display bezel	929444-001

 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement

Before removing the display bezel, follow these steps:

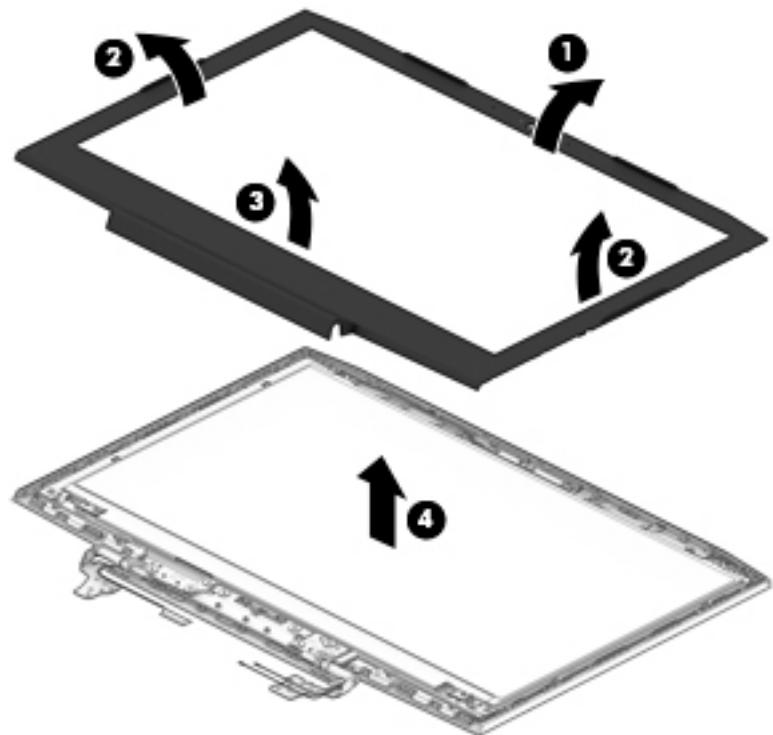
1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)), and then remove the following components:
 - a. Hinge covers (see [Hinge covers on page 45](#)).
 - b. System support brackets (see [System support brackets on page 46](#)).
 - c. Fans (see [Fans on page 49](#)).
 - d. Heat sink (see [Heat sink on page 53](#)).
 - e. System board (see [System board on page 58](#)).
 - f. Display assembly (see [Display assembly on page 61](#)).

Remove the display bezel:

1. Using a case utility tool, carefully separate the bezel from the top of the display assembly **(1)**.
2. Separate the bezel from the sides of the display assembly **(2)**.
3. Separate the bezel from the bottom of the display assembly **(3)**.

 **IMPORTANT:** To avoid damaging the display panel, use care when separating the bezel from the bottom of the display panel assembly.

4. Remove the bezel from the display assembly (4).



Reverse this procedure to install the display bezel.

Display hinges

Description	Spare part number
Display hinges	929464-001



IMPORTANT: Make special note of each screw and screw lock size and location during removal and replacement

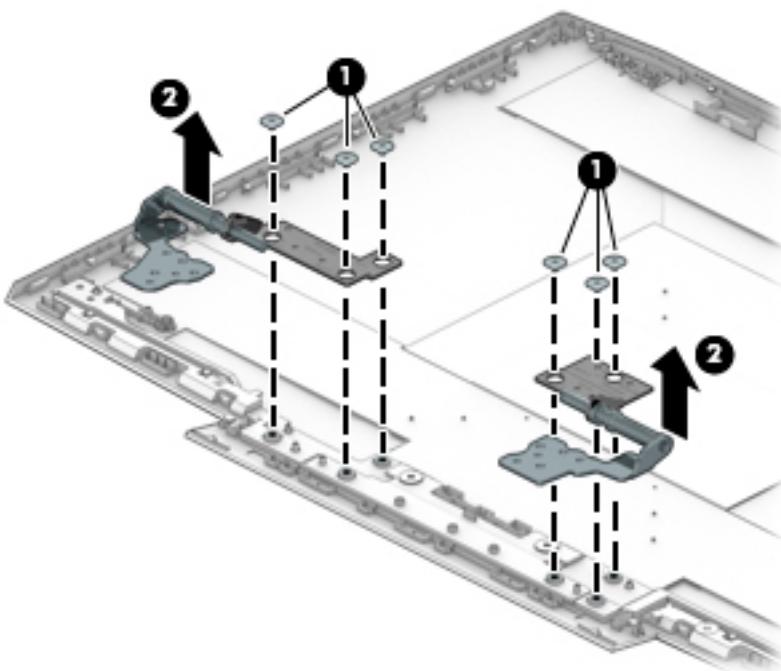
Before removing the display hinges, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)), and then remove the following components:
 - a. Hinge covers (see [Hinge covers on page 45](#)).
 - b. System support brackets (see [System support brackets on page 46](#)).
 - c. Fans (see [Fans on page 49](#)).
 - d. Heat sink (see [Heat sink on page 53](#)).
 - e. System board (see [System board on page 58](#)).
 - f. Display assembly (see [Display assembly on page 61](#)).
 - g. Display bezel (see [Display bezel on page 66](#)).

Remove the display hinges:

1. Remove the six Phillips broadhead 2.4×3.2 screws **(1)** securing the hinges to the display assembly.

2. Remove the hinges from the display assembly (2).



Reverse this procedure to install the display hinges.

Webcam



NOTE: The webcam spare part kit includes does not include the webcam cable.

Description	Spare part number
Webcam	919573-009
Webcam and display cable	929451-001



IMPORTANT: Make special note of each screw and screw lock size and location during removal and replacement

Before removing the webcam, follow these steps:

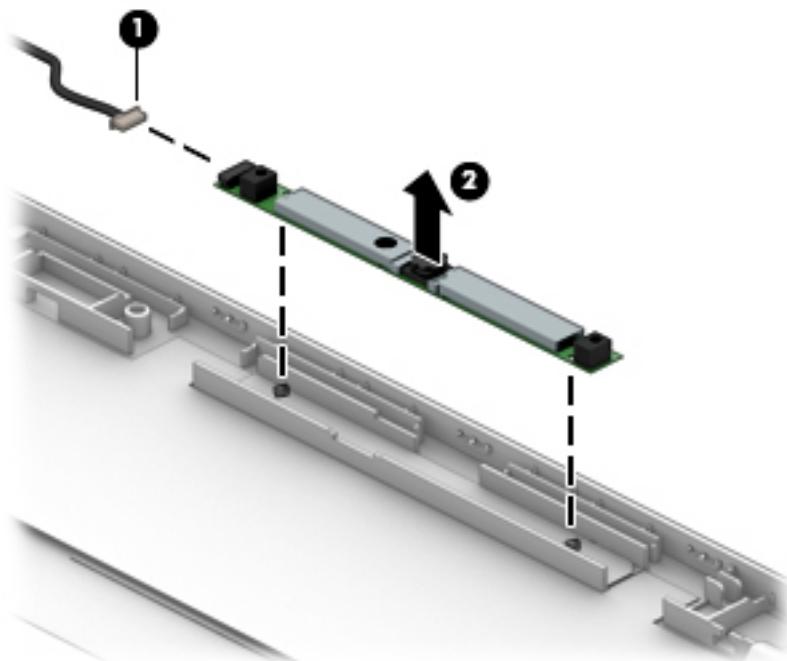
1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)), and then remove the following components:
 - a. Hinge covers (see [Hinge covers on page 45](#)).
 - b. System support brackets (see [System support brackets on page 46](#)).
 - c. Heat sink (see [Heat sink on page 53](#)).
 - d. System board (see [System board on page 58](#)).
 - e. Display assembly (see [Display assembly on page 61](#)).
 - f. Display bezel (see [Display bezel on page 66](#)).

Remove the webcam:

1. Disconnect the webcam cable from the webcam board **(1)**.

2. Remove the webcam board **(2)** from the display assembly.

 **NOTE:** Due to the adhesive located between the webcam board and the back cover, it may be necessary to move the webcam board from side to side to detach it.



Reverse this procedure to install the webcam.

Display panel

 **NOTE:** The display panel spare part kit does not include the display cable or display panel brackets.

Description	Spare part number
15.6 in, WLED, FHD, UWVA, eDP display panel	752920-019
Display and webcam cable	929451-001
Display panel bracket, left	929461-001
Display panel bracket, right	929460-001

 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement

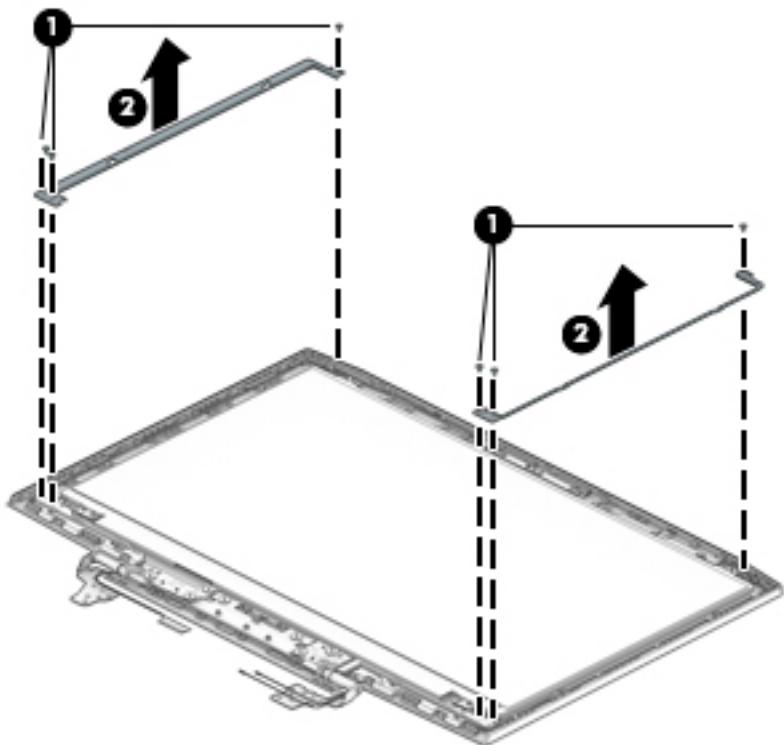
Before removing the display panel, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)), and then remove the following components:
 - a. Hinge covers (see [Hinge covers on page 45](#)).
 - b. System support brackets (see [System support brackets on page 46](#)).
 - c. Heat sink (see [Heat sink on page 53](#)).
 - d. System board (see [System board on page 58](#)).
 - e. Display assembly (see [Display assembly on page 61](#)).
 - f. Display bezel (see [Display bezel on page 66](#)).

Remove the display panel:

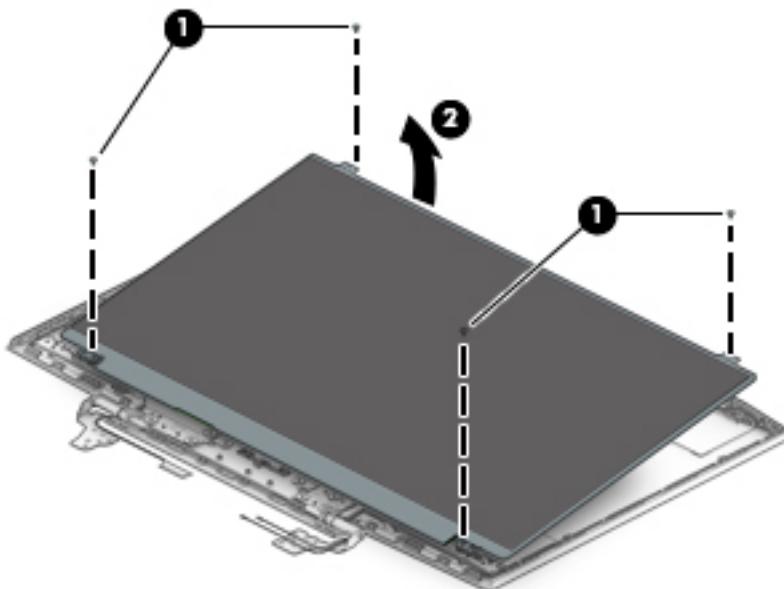
1. Remove the six Phillips PM1.9×3.5 screws **(1)** that secure the brackets to the display assembly.

2. Remove the brackets from the display assembly (2).



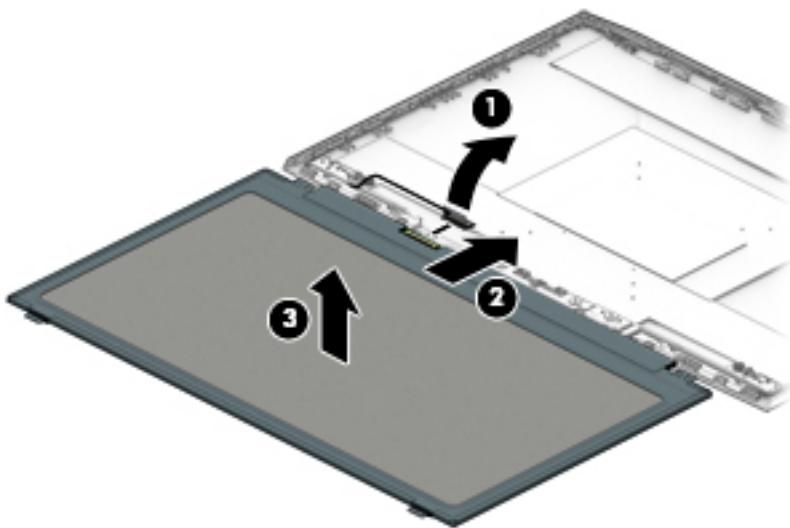
3. Remove the four Phillips PM1.9×3.5 screws (1) that secure the display panel to the display assembly.
4. Turn the display panel over face down (2).

IMPORTANT: To avoid damaging the display panel or display panel cable, do not remove the display panel from the display assembly at this time.



5. Remove the adhesive tape from the display panel connector (1).

- 6.** Disconnect the display panel cable from the display panel **(2)** that secure the brackets to the display assembly.
- 7.** Remove the display panel from the display panel assembly **(3)**.



Reverse this procedure to install the display panel.

Display cable and webcam cable



NOTE: The display cable and webcam cable are spared together in a kit.

Description	Spare part number
Display and webcam cable	929451-001



IMPORTANT: Make special note of each screw and screw lock size and location during removal and replacement

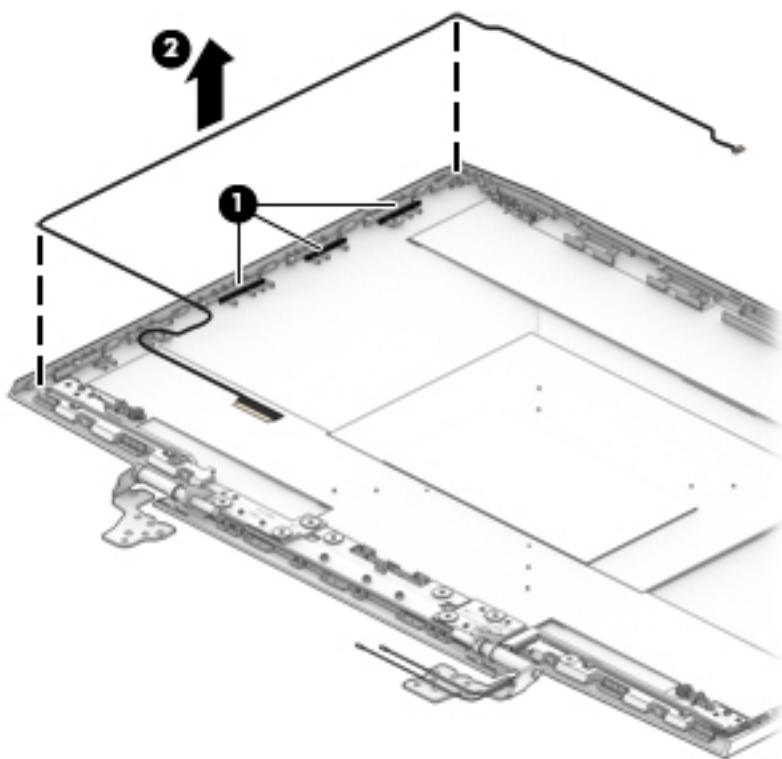
Before removing the display cable and webcam cable, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)), and then remove the following components:
 - a. Hinge covers (see [Hinge covers on page 45](#)).
 - b. System support brackets (see [System support brackets on page 46](#)).
 - c. Heat sink (see [Heat sink on page 53](#)).
 - d. System board (see [System board on page 58](#)).
 - e. Display assembly (see [Display assembly on page 61](#)).
 - f. Display bezel (see [Display bezel on page 66](#)).
 - g. Display panel (see [Display panel on page 72](#)).

Remove the display cable and webcam cable:

1. Release the webcam cable from the clips securing it to the back cover **(1)**.

- 2.** Remove the cable from the back cover (2).



Reverse this procedure to install the display cable and webcam cable.

WLAN antennas

 **NOTE:** The WLAN antennas spare part kit includes the cable and antennas.

Description	Spare part number
WLAN cable and antennas	929441-001

 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement

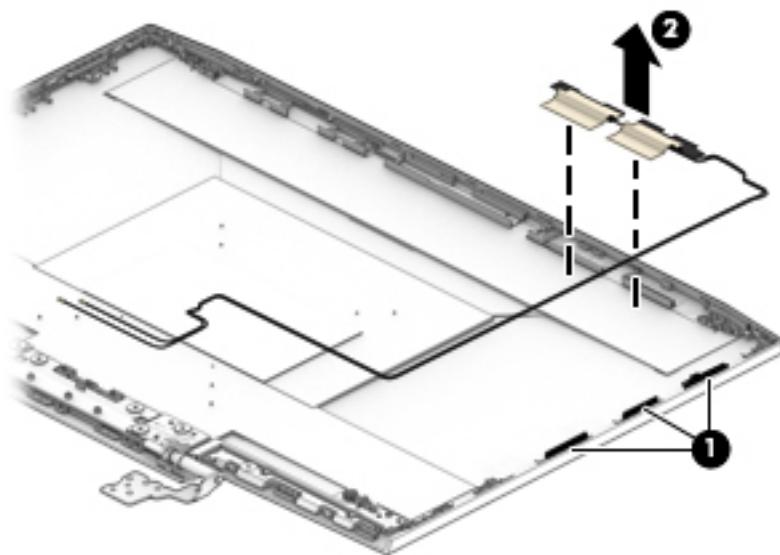
Before removing the WLAN antennas, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)), and then remove the following components:
 - a. Hinge covers (see [Hinge covers on page 45](#)).
 - b. System support brackets (see [System support brackets on page 46](#)).
 - c. Heat sink (see [Heat sink on page 53](#)).
 - d. System board (see [System board on page 58](#)).
 - e. Display assembly (see [Display assembly on page 61](#)).
 - f. Display bezel (see [Display bezel on page 66](#)).
 - g. Display panel (see [Display panel on page 72](#)).

Remove the WLAN antennas:

1. Release the WLAN antenna cable from the clips securing it to the back cover **(1)**.

2. Remove the WLAN antenna cable from the back cover (2).



Reverse this procedure to install the WLAN antennas.

Back cover

Description	Spare part number
Back cover	929442-001



IMPORTANT: Make special note of each screw and screw lock size and location during removal and replacement

To remove the back cover, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 36](#)), and then remove the following components:
 - a. Hinge covers (see [Hinge covers on page 45](#)).
 - b. System support brackets (see [System support brackets on page 46](#)).
 - c. Heat sink (see [Heat sink on page 53](#)).
 - d. System board (see [System board on page 58](#)).
 - e. Display assembly (see [Display assembly on page 61](#)).
 - f. Display bezel (see [Display bezel on page 66](#)).
 - g. Webcam (see [Webcam on page 70](#)).
 - h. Display panel (see [Display panel on page 72](#)).
 - i. Display cable and webcam cable (see [Display cable and webcam cable on page 75](#)).
 - j. WLAN antennas (see [Display panel on page 72](#)).
 - k. Display hinges (see [Display hinges on page 68](#)).

7 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 notebook**, and then select **Specifications**.
- Setup Utility (BIOS)
 1. Start Setup Utility (BIOS) (see [Starting Setup Utility \(BIOS\) on page 80](#)).
 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 81](#).

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.

8 Using HP PC Hardware Diagnostics

Using HP PC Hardware Diagnostics Windows (select products only)

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

If HP PC Hardware Diagnostics Windows is not installed on your computer, first you must download and install it. To download HP PC Hardware Diagnostics Windows, see [Downloading HP PC Hardware Diagnostics Windows on page 82](#).

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 a location on your computer or a USB flash drive.

The tool is downloaded to the selected location.

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

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

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

1. Go to <http://www.hp.com/support>.
2. Select **Get software and drivers**, select your type of product, and then enter the product name or number in the search box that is displayed.
3. In the **HP PC Hardware Diagnostics** section, select **Download**, and then select a location on your computer or a USB flash drive.

The tool is downloaded to the selected location.

Installing HP PC Hardware Diagnostics Windows

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

- ▲ Navigate to the folder on your computer or the 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

 **NOTE:** For Windows 10 S computers, you must use a Windows computer and a USB flash drive to download and create the HP UEFI support environment because only .exe files are provided. For more information, see [Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive on page 84](#).

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 84](#).

- 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**, select your type of product, enter the product name or number in the search box that is displayed, select your computer, and then select your operating system.
3. In the **Diagnostics** section, follow the on-screen instructions to select and download the **Remote UEFI** version for the product.

Customizing Remote HP PC Hardware Diagnostics UEFI settings

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

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

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

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

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

Your changes take effect when the computer restarts.

9 Backing up, restoring, and recovering

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

- **Backing up your personal information**—You can use Windows tools to back up your personal information (see [Using Windows tools on page 87](#)).
- **Creating a restore point**—You can use Windows tools to create a restore point (see [Using Windows tools on page 87](#)).
- **Creating recovery media** (select products only)—You can use the HP Cloud Recovery Download Tool (select products only) to create recovery media (see [Using the HP Cloud Recovery Download Tool to create recovery media \(select products only\) on page 87](#)).
- **Restoring and recovery**—Windows offers several options for restoring from backup, refreshing the computer, and resetting the computer to its original state (see [Using Windows tools on page 87](#)).

Backing up information and creating recovery media

Using Windows tools



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

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



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

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

- ▲ 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 to create recovery media (select products only)

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

To 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.



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

Restoring and recovery

Restoring, resetting, and refreshing using Windows tools

Windows offers several options for restoring, resetting, and refreshing the computer. For details, see [Using Windows tools on page 87](#).

Recovering using HP Recovery media

HP Recovery media is used to recover the original operating system and software programs that were installed at the factory and, on select products, can be created on a bootable USB flash drive using the HP Cloud Recovery Download Tool. For details, see [Using the HP Cloud Recovery Download Tool to create recovery media \(select products only\) on page 87](#).

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

To recover your system:

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

Changing the computer boot order

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

To change the boot order:

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

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

For computers or tablets with keyboards attached:

- ▲ Turn on or restart the computer or tablet, quickly press **esc**, and then press **f9** for boot options.

For tablets without keyboards:

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

– or –

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

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

10 Specifications

Computer specifications

	Metric	U.S.
Dimensions		
Width	38.85 cm	15.6 in
Depth	27.55 cm	10.8 in
Height (front to back)	2.48 cm	.98 in
Weight		
For models equipped with an SSD	2.532 kg	5.58 lb
For models equipped with an HDD	2.594 kg	5.72 lb
Input power		
Operating voltage and current	19.5 V dc @ 7.70 A – 150 W	
	19.5 V dc @ 10.3 A – 200 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.
Dimensions		
Height	20.77 cm	8.175 in
Width	37.78 cm	14.875 in
Diagonal	39.62 cm	15.6 in
Number of colors		
Contrast ratio	500:1 (typical)	
Brightness	200 nits	
Pixel resolution		
Pitch	0.252mm × 0.252mm	
Format	1366×768	
Configuration	RGB vertical stripe	
Backlight		
Character display	80 × 25	
Total power consumption	2.0 W	
Viewing angle	±65° horizontal, ±50° vertical (typical)	

Hard drive specifications

	1 TB
Dimensions	
Height	9.5 mm
Width	70 mm
Weight	102 g max
Interface type	
Transfer rate	300 MB/sec
Security	ATA security
Seek times (typical read, including setting)	
Single track	1.1 ms
Average	12.0 ms
Maximum	21.0 ms
Logical blocks	
Disk rotational speed	1,465,149,168
Operating temperature	5400 rpm
Operating temperature	

1 TB

*Size refers to hard drive storage capacity. Actual accessible capacity is less. Actual drive specifications may differ slightly.

NOTE: Certain restrictions and exclusions apply. Contact support for details.

11 Power cord set requirements

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

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

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

Requirements for all countries

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least **1.0 m** (3.3 ft) and no more than **2.0 m** (6.5 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 A and a nominal voltage rating of 125 or 250 V AC, as required by the power system of each country or region.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions

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	KT	5
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	6
Thailand	TISI	1
The United Kingdom	ASTA	1
The United States	UL	2

1. The flexible cord must be Type H05VV-F, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
2. The flexible cord must be Type 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
	<p>3. The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCTF, 3-conductor, 0.75 mm² or 1.25 mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V AC) configuration.</p> <p>4. The flexible cord must be Type RVV, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.</p> <p>5. The flexible cord must be Type H05VV-F 3-conductor, 0.75 mm² 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.</p> <p>6. The flexible cord must be Type HVCTF 3-conductor, 1.25 mm² conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.</p> <p>7. For 127 V AC, the flexible cord must be Type SVT or SJT 3-conductor, 18 AWG, with plug NEMA 5-15P (15 A, 125 V AC), with UL and CSA or C-UL marks. For 240 V AC, the flexible cord must be Type H05VV-F 3-conductor, 0.75 mm² or 1.00 mm² conductor size, with plug BS 1363/A with BSI or ASTA marks.</p>	

12 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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