



# OMEN by HP 17 Laptop PC

## Maintenance and Service Guide

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#### Product notice

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

Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. Go to <http://www.microsoft.com> for details.

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## Important Notice about Customer Self-Repair Parts

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 **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.

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## Processor information

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 **IMPORTANT:** This version of Windows running with the processor or chipsets used in this system has limited support from Microsoft. For more information about Microsoft's support, please see Microsoft's Support Lifecycle FAQ at <https://support.microsoft.com/lifecycle>.

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## Safety warning notice

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 **WARNING!** To reduce the possibility of heat-related injuries or of overheating the computer, do not place the computer directly on your lap or obstruct the computer air vents. Use the computer 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 come into contact with the skin or a soft surface, such as pillows or rugs or clothing, during operation. The computer 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
<b>Product Name</b>	OMEN by HP 17 Laptop PC (models 17-an100~17-an199 and 17t-an100)
<b>Processors</b>	Intel® Core™ i7-8750H (2.2 GHz, turbo up to 4.1 GHz), 2666 MHz/9 MB L3, Quad TDP 45 W cTDP 35 W Intel Core i5-8300HQ (2.3 GHz, turbo up to 4.0 GHz), 2666 MHz/8 MB L3, Quad TDP 45 W cTDP 35 W
<b>Chipset</b>	Intel HM370
<b>Graphics</b>	<p><b>Internal graphics:</b></p> <ul style="list-style-type: none"><li>Intel HD Graphics 630</li></ul> <p><b>Hybrid Discrete Graphics:</b></p> <ul style="list-style-type: none"><li>NVIDIA® 17P-G0 (GeForce® GTX 1050) with up to 2048 MB of dedicated video memory (128 Mb× 32 GDDR 5 7 Gbps × 4 PCs)</li><li>NVIDIA 17P-G0 (GeForce GTX 1050) with up to 4096 MB of dedicated video memory (256 Mb× 32 GDDR 5 7 Gbps × 4 PCs)</li><li>NVIDIA 17P-G1 (GeForce GTX 1050Ti) with up to 4096 MB of dedicated video memory (256 Mb× 32 GDDR 5 7 Gbps × 4 PCs),(For units equipped with 7th generation Intel Core i7 processor only)</li></ul> <p><b>Switchable Discrete Graphics (For units equipped with 7th generation Intel Core i7 processor only):</b></p> <ul style="list-style-type: none"><li>NVIDIA N17E-G2 (GeForce GTX 1070) with up to 8192 MB of dedicated video memory (256 Mb × 32 GDDR 5 8 Gbps × 8 PCs 1.5 V / 8 Gbps)</li><li>NVIDIA N17E-G1 (GeForce GTX 1060) with up to 3072 MB of dedicated video memory (128 Mb × 32 GDDR 5 8 Gbps × 6 PCs 1.5 V / 8 Gbps)</li></ul> <p>Supports HD Decode, DX12, and HDMI; Optimus; VR (N17E-G1 and N17E-G2 processors only); G-Sync (N17E-G1 and N17E-G2 processors only); and GPU Performance Scaling (GPS)</p>
<b>Panel</b>	<p><b>43.94 cm (17.3") 16:9 Ultra Wide Aspect Ratio panel:</b></p> <ul style="list-style-type: none"><li>Full High Definition (FHD), WLED AntiGlare (1920 × 1080) flat-flat (4.2 mm) UWVA, 60 Hz, eDP, typical brightness 300 nits (cd/m<sup>2</sup>), non-touch</li><li>FHD, WLED AntiGlare (1920 × 1080) flat-flat (4.2 mm) UWVA, 120 Hz, eDP+NVSr, typical brightness 300 nits (cd/m<sup>2</sup>), non-touch</li><li>Ultra High Definition (UHD) WLED AntiGlare (3840×2160) flat-flat (4.2 mm) UWVA, 60 Hz, eDP+PSR, typical brightness 300 nits (cd/m<sup>2</sup>), for non-touch only</li><li>FHD, WLED AntiGlare, slim-flat (3.2 mm), UWVA, 144 Hz, eDP+NVSr, typical brightness 300 nits (cd/m<sup>2</sup>), non-touch</li></ul>
<b>Memory</b>	<p><b>Two SODIMM slots:</b></p> <ul style="list-style-type: none"><li>DDR4-2666 dual channel support</li></ul> <p>Supports up to 32 GB max system memory with the following:</p> <ul style="list-style-type: none"><li>32768 MB (16384 MB × 2), no support for 32-bit OS or Windows® 7 Home Basic</li><li>16384 MB (8192 MB × 2), no support for 32-bit OS or Windows® 7 Home Basic</li><li>12288 MB (8192 MB +4096 MB), no support for 32-bit OS</li><li>8192 MB (4096 MB × 2) or 8192 MB (8192 MB × 1), no support for 32-bit OS</li></ul>

Category	Description
<b>Hard drive</b>	<p><b>Single HDD configurations:</b></p> <ul style="list-style-type: none"> <li>1 TB (7200) 9.5 mm</li> </ul> <p><b>Hybrid HDD configurations:</b></p> <ul style="list-style-type: none"> <li>2 TB 5400 RPM 7 mm RAW with 8 GB NAND</li> </ul> <p><b>Dual Storage Configurations:</b></p> <ul style="list-style-type: none"> <li>2 TB 5400 RPM 9.5 mm/7.2 mm HDD + 256 GB PCIe NVMe TLC M.2 SSD</li> <li>2 TB 5400 RPM 9.5 mm/7.2 mm HDD + 128 GB PCIe NVMe TLC M.2 SSD</li> <li>1 TB 7200 RPM 9.5 mm/7.2 mm HDD + 512 GB PCIe NVMe TLC M.2 SSD</li> <li>1 TB 7200 RPM 9.5 mm/7.2 mm HDD + 256 GB PCIe NVMe TLC M.2 SSD</li> <li>1 TB 7200 RPM 9.5 mm/7.2 mm HDD + 128 GB PCIe NVMe TLC M.2 SSD</li> <li>1 TB 7200 RPM 9.5 mm/7.2 mm HDD + 16 GB Optane™ (3D Xpoint) PCIe Gen 3×2 M.2 SSD</li> </ul> <p><b>M.2 PCIe NVMe (TLC) solid state drive:</b></p> <ul style="list-style-type: none"> <li>256 GB</li> <li>512 GB</li> </ul> <p>Supports all 7 mm/7.2 mm/9.5 mm, SATA 2.5" HDDs</p> <p>HP 3D DriveGuard</p> <p>Support for second drive</p> <p>7 mm and 9.5 mm share the same bracket</p>
<b>Optical drive</b>	<p>DVD+/-RW Double-Layer SuperMulti</p> <p>Supports Zero-Power Optical Drive</p> <p>Supports M-disc</p>
<b>Audio and video</b>	<p><b>Dual speakers</b></p> <p>Bang &amp; Olufsen</p> <p>OMEN audio control</p> <p>Supports HP Audio Boost 2.0</p> <p><b>Cameras:</b></p> <ul style="list-style-type: none"> <li>HP Wide Vision HD: HD camera - indicator LED, USB 2.0, BSI sensor, f2.0, 88° WFOV <ul style="list-style-type: none"> <li>720p by 30 frames per second</li> </ul> </li> <li>HP Wide Vision IR camera - indicator LED and 2x IR LEDs, USB 2.0, FHD Hybrid BSI sensor, 88° WFOV <ul style="list-style-type: none"> <li>1080p by 30 frames per second</li> <li>Supports Windows Hello</li> </ul> </li> </ul>
<b>Ethernet</b>	<p>Integrated 10/100/1000 NIC</p>
<b>Wireless</b>	<p><b>Intel Dual Band Wireless-AC 9560</b> 802.11 ac 2 × 2 + Bluetooth® 5 Combo Adapter (non vPRO)</p> <p><b>Realtek RTL 8822BE</b> 802.11 ac 2 × 2 + Bluetooth® 4.2 Combo Adapter</p> <p>Integrated wireless options with dual antenna (M.2/PCIe)</p> <p>Intel WiDi support (select products only)</p> <p>Compatible with Miracast-certified devices, for Windows 10</p>

<b>Category</b>	<b>Description</b>
<b>External media cards</b>	<p>HP Multi-Format Digital Media Card Reader</p> <p>Supports SD/SDHC/SDXC</p> <p>Push-Push insertion/removal</p>
<b>Ports</b>	<p>Hot Plug / Unplug and auto detect for correct output to wide-aspect vs. standard aspect video (auto adjust panel resolution to fit embedded panel and external monitor connected)</p> <p>HDMI v2.0 supporting: up to 4096 × 2160 @ 60 Hz</p> <p>Headphone / Line out</p> <p>Microphone input</p> <p>USB Type-C port</p> <p>USB 3.0 ports (3)</p> <p>Mini display port</p> <p>RJ-45/Ethernet port</p> <p>AC Smart Pin adapter plug</p>
<b>Keyboard/ pointing devices</b>	<p>Full-size 3-coat paint island-style backlit keyboard with numeric keypad in Dragon Red</p> <p>Full-size 3-coat paint island-style backlit keyboard with numeric keypad with RGB lighting</p> <p>TouchPad with image sensor</p> <p>Multitouch gestures enabled</p> <p>Supports Modern Trackpad Gestures</p> <p>Taps enabled as default</p>
<b>Power requirements</b>	<p>8-cell cylindrical battery – 82 Whr (5600 mAh) (for products equipped with NVIDIA N17P-G0 (1050) or N17P-G1 (1050Ti) processors)</p> <p>8-cell cylindrical battery – 86 Whr (6000 mAh) (for products equipped with NVIDIA N17E-G1 (1060) N17E-G2 (1070))</p> <p>Support battery fast charge (90 minutes to 90% charged)</p> <p>135 W AC adapter (barrel type) with 1 M length power cord (for products equipped with NVIDIA 1050 processors)</p> <p>150 W AC adapter (barrel type) with 1 M length power cord (for products equipped with NVIDIA 1050Ti processors)</p> <p>230 W AC adapter (barrel type) with 1 M length power cord (for products equipped with NVIDIA 1060/1070)</p>
<b>Security</b>	<p>TPM 2.0</p> <p>Security lock slot</p>
<b>Operating system</b>	<p><b>Pre-installed</b></p> <p>Windows 10 Professional</p> <p>Windows 10 Home ML</p> <p>Windows 10 Home Plus ML</p> <p>Windows 10 Home High End EM/SL/China</p> <p>SEAP Windows 10 Home</p> <p>SEAP Windows 10 Home Plus</p> <p>FreeDOS 2.0 (non-touch only)</p>
<b>Serviceability</b>	<b>End user replaceable parts:</b>

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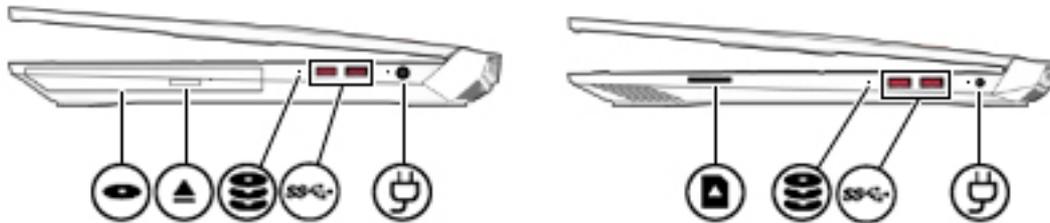
<b>Category</b>	<b>Description</b>
	Memory module
	Optical drive
	Hard drive
	Solid state drive
	AC adapter

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## 2 External component identification

### Right side

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

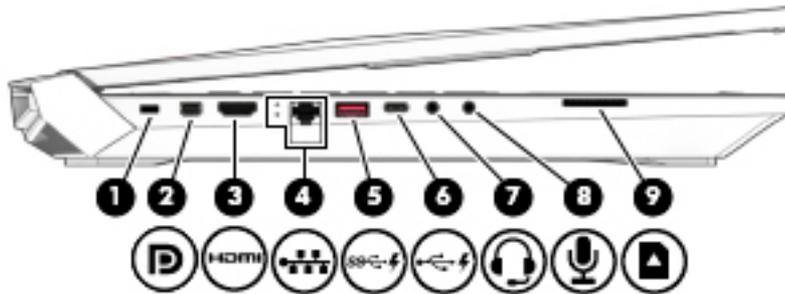


Component	Description
	Optical drive (select products only)
	Depending on your computer model, reads an optical disc or reads and writes to an optical disc.
	Optical drive eject button (select products only)
	Releases the optical drive disc tray.
	Drive light
	<ul style="list-style-type: none"> <li>Blinking white: The hard drive or the solid-state drive is being accessed.</li> <li>Amber: HP 3D DriveGuard has temporarily parked the hard drive.</li> </ul>
	Memory card reader
	<p>Reads optional memory cards that enable you to store, manage, share, or access information.</p> <p>To insert a card:</p> <ol style="list-style-type: none"> <li>Hold the card label-side up, with connectors facing the computer.</li> <li>Insert the card into the memory card reader, and then press in on the card until it is firmly seated.</li> </ol> <p>To remove a card:</p> <ul style="list-style-type: none"> <li>Press in on the card, and then remove it from the memory card reader.</li> </ul>
	USB SuperSpeed ports (2)
	Connect USB devices, such as a cell phone, camera, activity tracker, or smartwatch, and provide high-speed data transfer.
	AC adapter and battery light
	<ul style="list-style-type: none"> <li>White: The AC adapter is connected and the battery is fully charged.</li> <li>Blinking white: The AC adapter is disconnected and the battery has reached a low battery level.</li> <li>Amber: The AC adapter is connected and the battery is charging.</li> </ul>

Component	Description
 Power connector	<ul style="list-style-type: none"><li>• Off: The battery is not charging.</li></ul> Connects an AC adapter.

## Left side

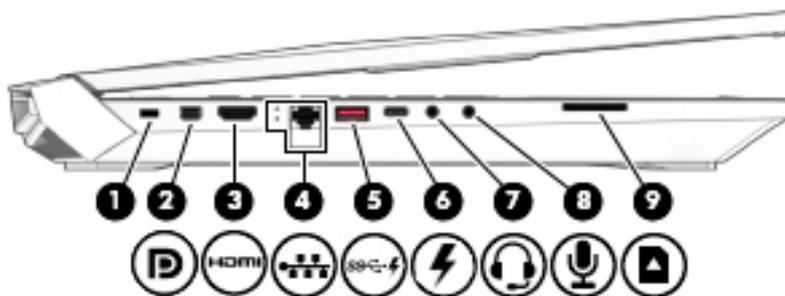
 **NOTE:** Refer to the illustration that most closely matches your computer.



Component	Description
(1)  Security cable slot	Attaches an optional security cable to the computer.  <b>NOTE:</b> The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.
(2)  Mini DisplayPort	Connects an optional digital display device, such as a high-performance monitor or projector.
(3)  HDMI port	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)  RJ-45 (network) jack/status lights	Connects a network cable. <ul style="list-style-type: none"> <li>• White: The network is connected.</li> <li>• Amber: Activity is occurring on the network.</li> </ul>
(5)  USB SuperSpeed port with HP Sleep and Charge	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)  USB Type-C port with HP Sleep and Charge	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.  – or – Connects a display device that has a USB Type-C connector, providing DisplayPort output.  <b>NOTE:</b> Cables and/or adapters (purchased separately) may be required.
(7)  Audio-out (headphone)/Audio-in (microphone) combo jack	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><b>WARNING!</b> To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the <i>Regulatory, Safety, and Environmental Notices</i>.</p> <p>To access this guide:</p> <ul style="list-style-type: none"> <li>▲ Select the <b>Start</b> button, select <b>HP Help and Support</b>, and then select <b>HP Documentation</b>.</li> </ul> <p><b>NOTE:</b> When a device is connected to the jack, the computer speakers are disabled.</p>
(8)  Audio-in (microphone) jack	<p>Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.</p> <p><b>NOTE:</b> The audio-in (microphone) jack does not support optional combo devices, such as a headset.</p> <p><b>NOTE:</b> 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>
(9)  Memory card reader	<p>Reads optional memory cards that enable you to store, manage, share, or access information.</p> <p>To insert a card:</p> <ol style="list-style-type: none"> <li>1. Hold the card label-side up, with connectors facing the computer.</li> <li>2. Insert the card into the memory card reader, and then press in on the card until it is firmly seated.</li> </ol> <p>To remove a card:</p> <ul style="list-style-type: none"> <li>▲ Press in on the card, and then remove it from the memory card reader.</li> </ul>

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



Component	Description
(1)  Security cable slot	<p>Attaches an optional security cable to the computer.</p> <p><b>NOTE:</b> The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.</p>
(2)  Mini DisplayPort	<p>Connects an optional digital display device, such as a high-performance monitor or projector.</p>

Component	Description
(3)  HDMI port	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)  RJ-45 (network) jack/status lights	Connects a network cable. <ul style="list-style-type: none"> <li>• White: The network is connected.</li> <li>• Amber: Activity is occurring on the network.</li> </ul>
(5)  USB SuperSpeed port with HP Sleep and Charge (2)	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)  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><b>NOTE:</b> Your computer may also support a Thunderbolt docking station.</p> <p><b>NOTE:</b> Cables and/or adapters (purchased separately) may be required.</p>
(7)  Audio-out (headphone)/Audio-in (microphone) combo jack	<p>Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional standalone microphones.</p> <p><b>WARNING!</b> To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the <i>Regulatory, Safety, and Environmental Notices</i>.</p> <p>To access this guide:</p> <ul style="list-style-type: none"> <li>▲ Select the <b>Start</b> button, select <b>HP Help and Support</b>, and then select <b>HP Documentation</b>.</li> </ul> <p><b>NOTE:</b> When a device is connected to the jack, the computer speakers are disabled.</p>
(8)  Audio-in (microphone) jack	<p>Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.</p> <p><b>NOTE:</b> The audio-in (microphone) jack does not support optional combo devices, such as a headset.</p> <p><b>NOTE:</b> 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>
(9)  Memory card reader	<p>Reads optional memory cards that enable you to store, manage, share, or access information.</p> <p>To insert a card:</p>

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Component	Description
	<ol style="list-style-type: none"><li data-bbox="884 222 1414 275">1. Hold the card label-side up, with connectors facing the computer.</li><li data-bbox="884 296 1414 348">2. Insert the card into the memory card reader, and then press in on the card until it is firmly seated.</li></ol>
	To remove a card:
	<ul style="list-style-type: none"><li data-bbox="884 417 1362 470">▲ Press in on the card, and then remove it from the memory card reader.</li></ul>

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# Display

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



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. <b>NOTE:</b> 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.

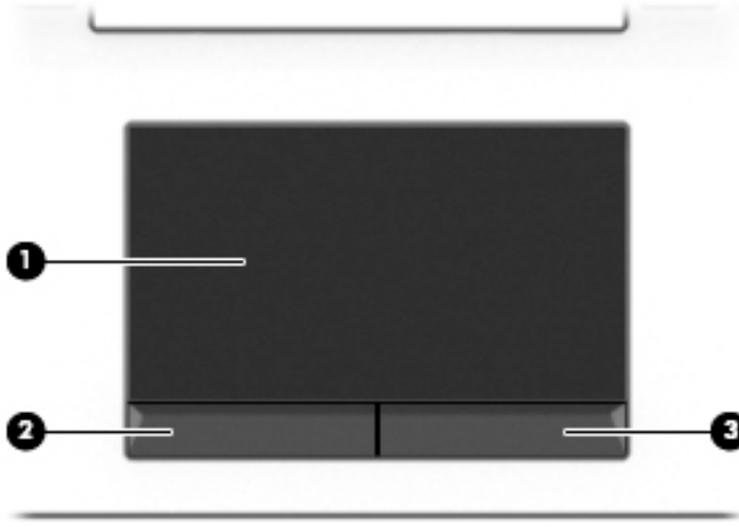
For wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region.

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**.

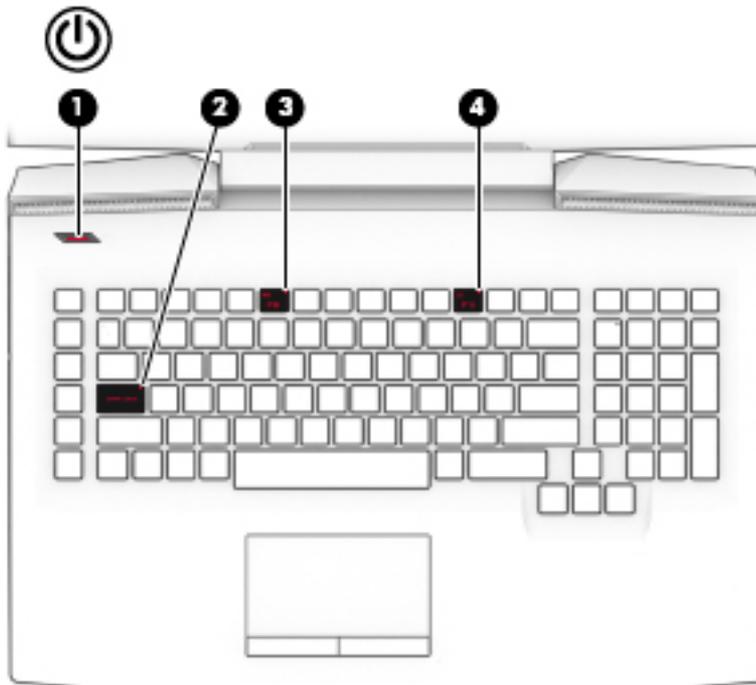
# Keyboard area

## TouchPad



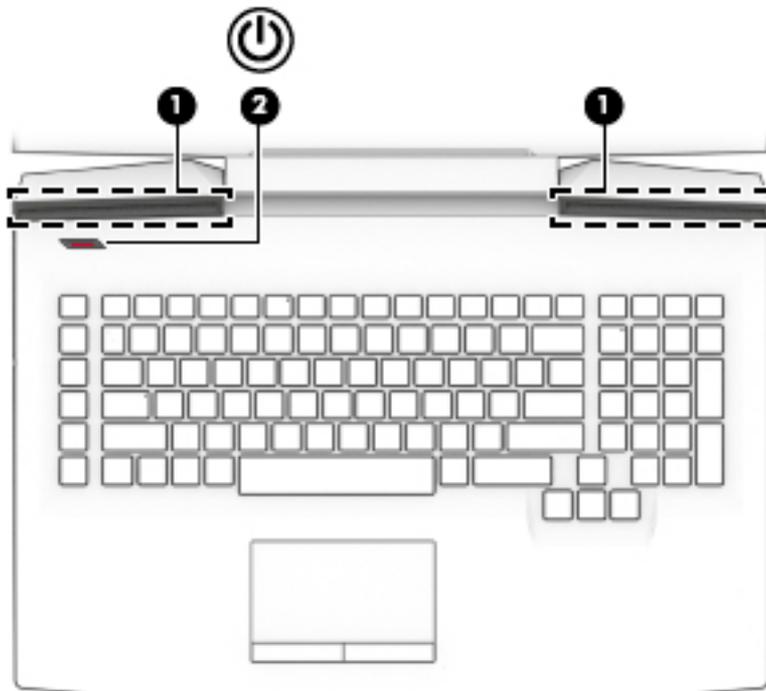
Component		Description
(1)	TouchPad zone	Reads your finger gestures to move the pointer or activate items on the screen.
(2)	Left TouchPad button	Functions like the left button on an external mouse.
(3)	Right TouchPad button	Functions like the right button on an external mouse.

## Lights



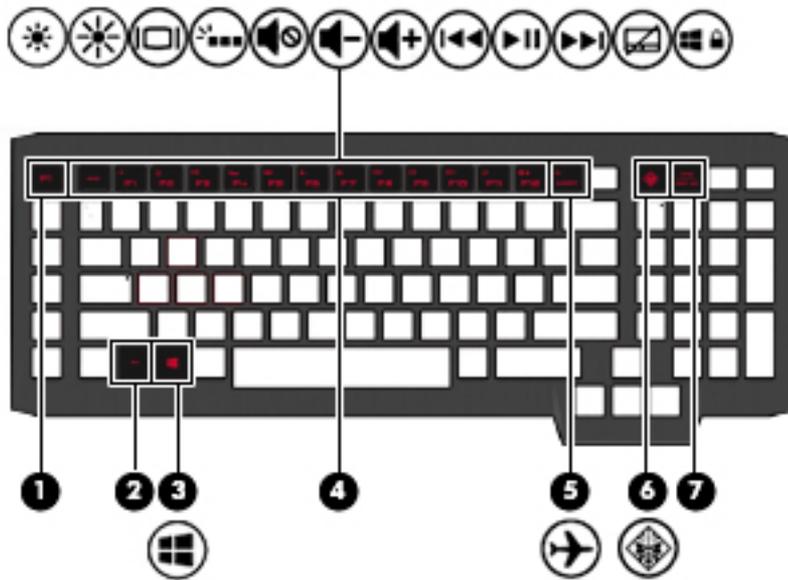
Component	Description
(1)  Power light	<ul style="list-style-type: none"><li>On: The computer is on.</li><li>Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components.</li><li>Off: The computer is off or in Hibernation.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

## Button



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

## Special keys



Component	Description
(1) <code>esc</code> key	Displays system information when pressed in combination with the <code>fn</code> key.
(2) <code>fn</code> key	Executes specific functions when pressed in combination with another key.
(3)  Windows key	Opens the <b>Start</b> menu. <b>NOTE:</b> Pressing the Windows key again will close the <b>Start</b> menu.
(4) Action keys	Execute frequently used system functions.
(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 <code>fn</code> key. <b>NOTE:</b> 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 <code>fn</code> key.

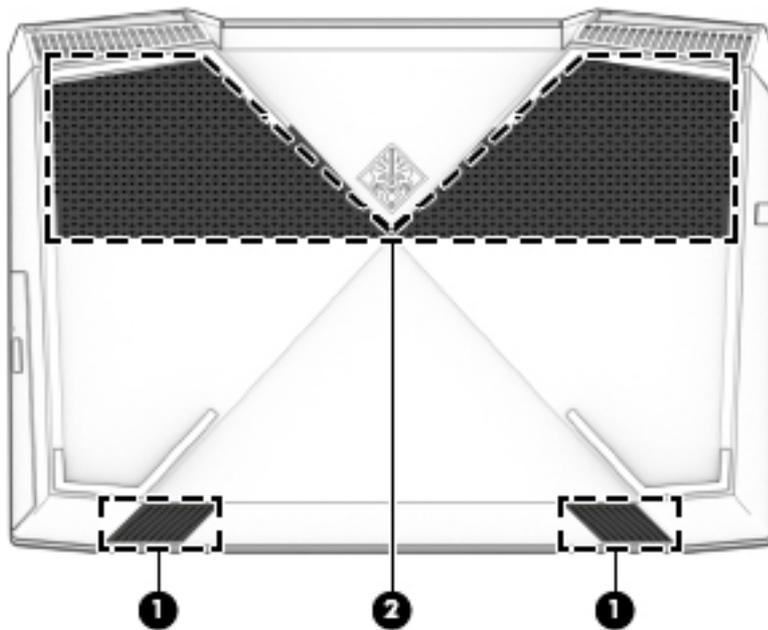
## Action keys

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 15](#).

▲ 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 to a simultaneous display on both the computer and the monitor.
	Turns the keyboard backlight off or on. <b>NOTE:</b> 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
(1) Vents (2)	Enable airflow to cool internal components. <b>NOTE:</b> The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(2)  Speakers (2)	Produce sound.

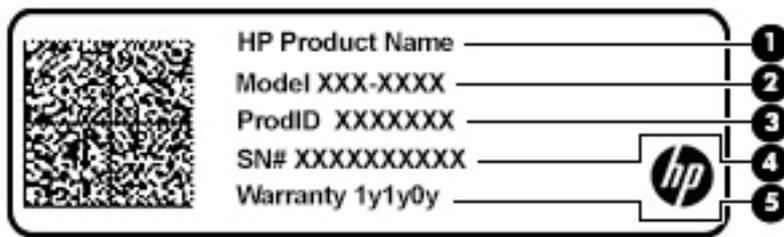
# Labels

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.

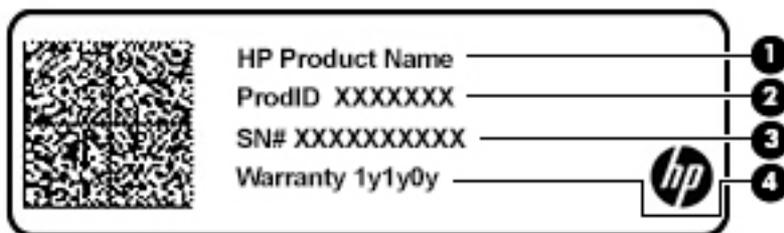
- Service label—Provides important information to identify your computer. When contacting support, you may be asked for the serial number, the product number, or the model number. Locate this information before you contact support.

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

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**Component**

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**(3)** Serial number

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**(4)** Warranty period

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- 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.

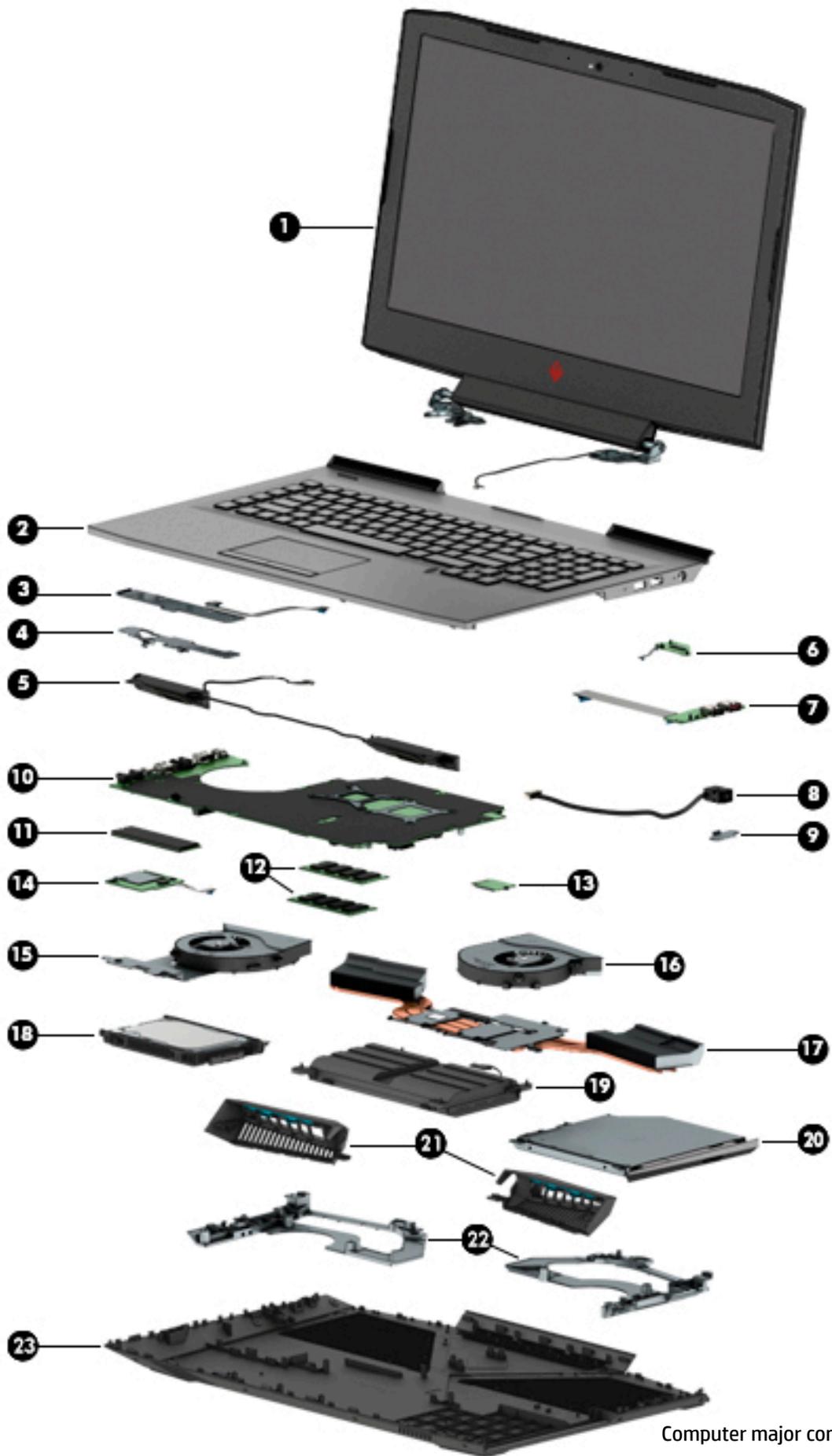
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## 3 Illustrated parts catalog

### Computer major components

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-  **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 18](#) for details.
-



Item	Component	Spare part number
(1)	<b>Display</b> (spared at the component level; see <a href="#">Display assembly subcomponents on page 28</a> )	
(2)	<b>Top cover with keyboard and TouchPad</b> in Onyx Black, with Carbon Fiber pattern (full-size 4-coat paint island-style backlit with numeric keypad, white logo and RGB lighting)	
	<b>For products equipped with NVIDIA N17E (GTX 1070/GTX 1060) (without ODD)</b>	
	For use in the United States	L14991-001
	For use in the United Kingdom	L14991-031
	For use in Germany	L14991-041
	For use in France	L14991-051
	For use in Italy	L14991-061
	For use in Spain	L14991-071
	For use in Portugal	L14991-131
	For use in Turkey	L14991-141
	For use in Greece	L14991-151
	For use in Latin America	L14991-161
	For use in Saudi Arabia	L14991-171
	For use in Hungary	L14991-211
	For use in Russia	L14991-251
	For use in Bulgaria	L14991-261
	For use in Romania	L14991-271
	For use in Thailand	L14991-281
	For use in Japan	L14991-291
	For use in Belgium	L14991-A41
	For use in Korea	L14991-AD1
	For use Internationally	L14991-B31
	For use in Slovenia	L14991-BA1
	For use in Israel	L14991-BB1
	For use in Switzerland	L14991-BG1
	For use in Canada	L14991-DB1
	For use in Nordic Regions	L14991-DH1
	For use in Czech/Slovakia	L14991-FL1
	<b>For products equipped with NVIDIA N17E (GTX 1070/GTX 1060) (with ODD)</b>	
	For use in the United States	L14992-001
	For use in the United Kingdom	L14992-031
	For use in Germany	L14992-041

<b>Item</b>	<b>Component</b>	<b>Spare part number</b>
	For use in France	L14992-051
	For use in Italy	L14992-061
	For use in Spain	L14992-071
	For use in Portugal	L14992-131
	For use in Turkey	L14992-141
	For use in Greece	L14992-151
	For use in Latin America	L14992-161
	For use in Saudi Arabia	L14992-171
	For use in Hungary	L14992-211
	For use in Russia	L14992-251
	For use in Bulgaria	L14992-261
	For use in Romania	L14992-271
	For use in Thailand	L14992-281
	For use in Japan	L14992-291
	For use in Belgium	L14992-A41
	For use in Korea	L14992-AD1
	For use Internationally	L14992-B31
	For use in Slovenia	L14992-BA1
	For use in Israel	L14992-BB1
	For use in Switzerland	L14992-BG1
	For use in Canada	L14992-DB1
	For use in Nordic Regions	L14992-DH1
	For use in Czech/Slovakia	L14992-FL1
	<b>For products equipped with NVIDIA N17P (GTX 1050/GTX 1050Ti) processors (without ODD)</b>	
	For use in the United States	L14993-001
	For use in the United Kingdom	L14993-031
	For use in Germany	L14993-041
	For use in France	L14993-051
	For use in Italy	L14993-061
	For use in Spain	L14993-071
	For use in Portugal	L14993-131
	For use in Turkey	L14993-141
	For use in Greece	L14993-151
	For use in Latin America	L14993-161

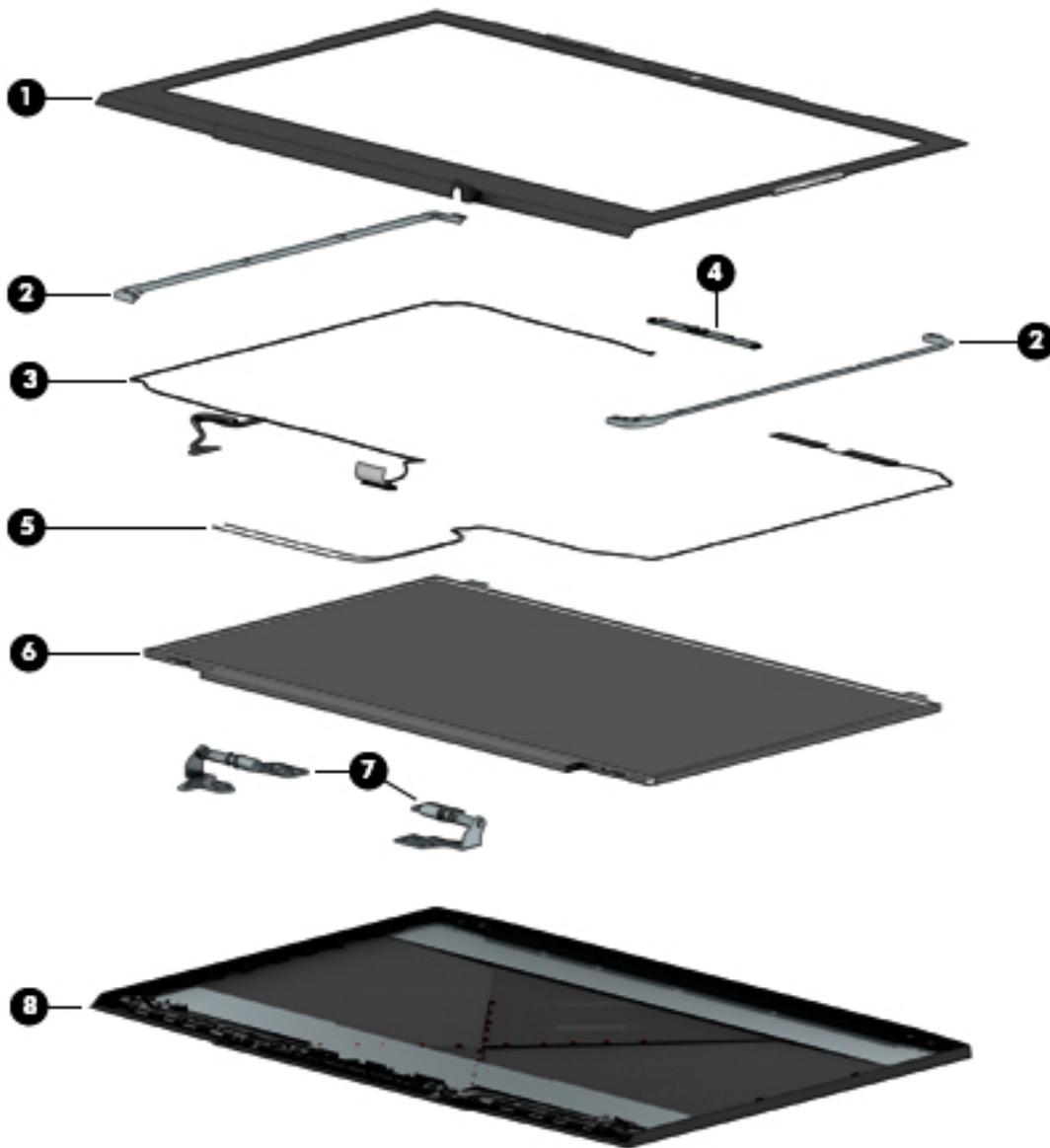
<b>Item</b>	<b>Component</b>	<b>Spare part number</b>
	For use in Saudi Arabia	L14993-171
	For use in Hungary	L14993-211
	For use in Russia	L14993-251
	For use in Bulgaria	L14993-261
	For use in Romania	L14993-271
	For use in Thailand	L14993-281
	For use in Japan	L14993-291
	For use in Belgium	L14993-A41
	For use in Korea	L14993-AD1
	For use Internationally	L14993-B31
	For use in Slovenia	L14993-BA1
	For use in Israel	L14993-BB1
	For use in Switzerland	L14993-BG1
	For use in Canada	L14993-DB1
	For use in Nordic Regions	L14993-DH1
	For use in Czech/Slovakia	L14993-FL1
	<b>For products equipped with NVIDIA N17P (GTX 1050/GTX 1050Ti) processors (with ODD)</b>	
	For use in the United States	L14994-001
	For use in the United Kingdom	L14994-031
	For use in Germany	L14994-041
	For use in France	L14994-051
	For use in Italy	L14994-061
	For use in Spain	L14994-071
	For use in Portugal	L14994-131
	For use in Turkey	L14994-141
	For use in Greece	L14994-151
	For use in Latin America	L14994-161
	For use in Saudi Arabia	L14994-171
	For use in Hungary	L14994-211
	For use in Russia	L14994-251
	For use in Bulgaria	L14994-261
	For use in Romania	L14994-271
	For use in Thailand	L14994-281
	For use in Japan	L14994-291

Item	Component	Spare part number
	For use in Belgium	L14994-A41
	For use in Korea	L14994-AD1
	For use Internationally	L14994-B31
	For use in Slovenia	L14994-BA1
	For use in Israel	L14994-BB1
	For use in Switzerland	L14994-BG1
	For use in Canada	L14994-DB1
	For use in Nordic Regions	L14994-DH1
	For use in Czech/Slovakia	L14994-FL1
<b>(3)</b>	<b>TouchPad click button board and cable</b>	931594-001
<b>(4)</b>	<b>TouchPad board</b>	929472-001
<b>(5)</b>	<b>Speaker</b> (includes wire connected left and right speakers)	931598-001
<b>(6)</b>	<b>Power button board</b> (cable spared separately as 931561-005)	931590-001
<b>(7)</b>	<b>USB board</b> (cable spared separately as 931560-005)	
	For units equipped with NVIDIA N17E (GTX1070/GTX 1060)	L14990-001
	For units equipped with NVIDIA N17P (GTX1050/GTX 1050Ti)	L14989-001
<b>(8)</b>	<b>Power in connector</b> (cable is spared separately as 931561-001)	
	For products equipped with a 135 W adapter, and NV N17P (GTX 1050/GTX 1050Ti) processors	926204-002
	For products equipped with a 230 W adapter, and NV N17E (GTX 1070/GTX 1060)	926564-001
<b>(9)</b>	Power in connector bracket ( for products equipped with a 135 W adapter only. Products with a 230 W adapter do not have a bracket)	931582-001
<b>(10)</b>	<b>System board</b> (includes processor and replacement thermal material):	
	All system boards use the following part numbers:	
	xxxxxx-001 Non-Windows operating systems	
	xxxxxx-601 Windows 10 operating systems	
	NVIDIA N17E-G2 (GeForce GTX 1070), 8 GB i7-8750H	L11136-xxx
	NVIDIA N17E-G1 (GeForce GTX 1060), 6 GB i7-8750H	L11137-xxx
	NVIDIA N17E-G1 (GeForce GTX 1060), 3 GB i7-8750H	L18941-xxx
	NVIDIA N17P-G1 (GeForce GTX 1050Ti), 4 GB i7-8750H	L11139-xxx
	NVIDIA N17P-G0 (GeForce GTX 1050), 4 GB i7-8750H	L11140-xxx
	NVIDIA N17P-G0 (GeForce GTX 1050), 4 GB i5-8300H	L11141-xxx
	NVIDIA N17P-G0 (GeForce GTX 1050), 2 GB i7-8750H	L11142-xxx
	NVIDIA N17P-G0 (GeForce GTX 1050), 2 GB i5-8300H	L11143-xxx
	NVIDIA N17E-G1 (GeForce GTX 1060), 6 GB i5-8300H	L11138-xxx

<b>Item</b>	<b>Component</b>	<b>Spare part number</b>
<b>(11)</b>	<b>M.2 SATA solid state drive, PCIe NVMe TLC</b>	
	256 GB 2280 M2 PCIe 3x4SS NVMe TLC PA	847109-022
	512 GB 2280 M2 PCIe 3x4SS NVMe TLC PA	847110-019
	128 GB 2280 M2 PCIe 3x4SS NVMe TLC PA	912322-005
	16 GB 2280 M2 PCIe 3x4SS NVMe 3D XP ML	L09145-014
<b>(12)</b>	<b>Memory</b>	
	16 GB 2666 MHz 1.2 v DDR4 shared	937438-850
	8 GB 2666 MHz 1.2 v DDR4 shared	937236-850
	4 GB 2666 MHz 1.2 v DDR4 shared	L10598-850
<b>(13)</b>	<b>WLAN</b>	
	Intel Stone Peak 2 Dual Band Wireless-AC 9560 802.11 ac 2x2 WiFi + BT 5 Combo Adapter (non vPRO)	L22634-005
	RealTek Cartier ac 2x2 (for products equipped with NV N17E (GTX 1070/GTX 1060) processors	924813-855
<b>(14)</b>	<b>Memory card reader with foil, (cable is spared separately as 931562-001)</b>	
	For products equipped with NV N17P (GTX 1050/GTX 1050Ti) processors	931591-001
	For products equipped with NV N17E (GTX 1070/GTX 1060)	931592-001
<b>(15)</b>	<b>Left Fan</b>	931576-001
<b>(16)</b>	<b>Right fan</b> (for products equipped with NV N17P-G0 (GTX 1050), N17P-G1 (GTX 1050Ti) and N17E-G1 (GTX-1060) processors	931577-001
<b>(17)</b>	<b>Heat sink</b> (includes thermal pads, thermal plastic, and spacer sponges)	
	For products with (GTX 1050) N17P-G0 processors	931571-001
	For products with (GTX 1050Ti) N17P-G1 processors	931572-001
	For products with (GTX 1060) N17E-G1 processors	931573-001
	For products with (GTX 1070) N17E-G2 processors	931574-001
<b>(18)</b>	<b>Hard drive (cable is spared separately as 931564-001)</b>	
	2 TB 5400 RPM SATA RAW HYBRID 7 mm	929167-850
	2 TB 5400 RPM SATA RAW 7 mm	912487-850
	1 TB 7200 RPM SATA RAW 9.5 mm	766644-001
<b>(19)</b>	<b>Battery</b>	
	8 cell 82 WHr 2.8 AH Li-ion (for products with N17P (GTX 1050/GTX 1050Ti) processors)	922976-855
	8 cell 82 WHr 3.0 AH Li-ion (for products with N17E GTX 1070/GTX 1060 processors)	922977-855
<b>(20)</b>	<b>Optical drive (cable is spared separately as 931563-001), SATA 9.5 mm tray</b>	
	DVD+/-RW Double-Layer SuperMulti	803929-017
<b>(21)</b>	<b>Right trunk</b>	931596-001

<b>Item</b>	<b>Component</b>	<b>Spare part number</b>
	<b>Left trunk</b>	931595-001
<b>(22)</b>	<b>Trunk metal brackets</b>	Not spared
<b>(23)</b>	<b>Base enclosure</b>	
	For products equipped with optical drive	931556-001
	For products not equipped with optical drive	931555-001

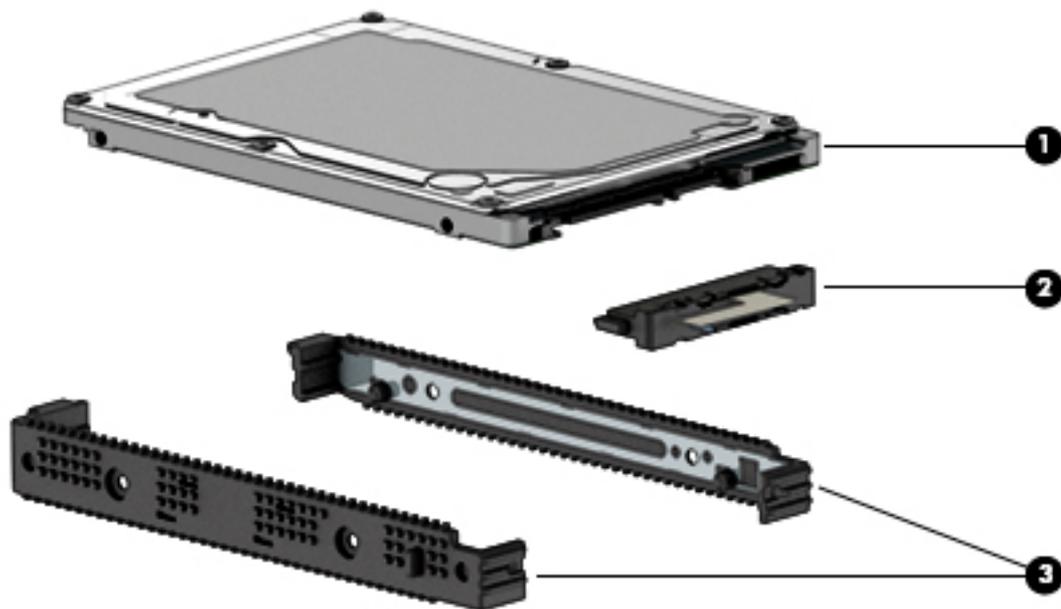
## Display assembly subcomponents



Item	Component	Spare part number
<b>(1)</b>	<b>Display bezel</b>	
	For products with HD camera	931558-001
	For products with IR camera	931559-001
<b>(2)</b>	<b>Display brackets</b>	
	<b>Left bracket</b>	931585-001
	<b>Right bracket</b>	931586-001
<b>(3)</b>	<b>Display cable</b>	
	For products with non-touch FHD 60 Hz screen and HD camera	931565-001

<b>Item</b>	<b>Component</b>	<b>Spare part number</b>
	For products with non-touch FHD 120 or 144 Hz screen and HD camera	931566-001
	For products with non-touch FHD 60 Hz screen and IR camera	931567-001
	For products with non-touch FHD 120 or 144 Hz screen and IR camera	931568-001
	For products with non-touch UHD screen and HD camera	931569-001
	For products with non-touch UHD screen and IR camera	931570-001
<b>(4)</b>	<b>Camera</b>	
	HD camera	919573-008
	IR camera	919579-006
<b>(5)</b>	<b>Dual antennas</b>	931674-001
<b>(6)</b>	<b>43.94 cm (17.3") raw panel</b>	
	<ul style="list-style-type: none"> <li>Non-touch screen, FHD, AG, UWVA, 300 eDP, 60 Hz Flat APJ ML (for products equipped with NV N17P (GTX 1050/GTX 1050Ti) processors)</li> </ul>	936915-001
	<ul style="list-style-type: none"> <li>Non-touch screen, FHD, AG, UWVA, 300 eDP, 120 Hz, DPNVSR Flat GML (for products equipped with NV N17E (GTX 1070/GTX 1060) processors)</li> </ul>	922934-001
	<ul style="list-style-type: none"> <li>Non-touch screen, FHD, AG, UWVA, 300 eDP, 144 Hz, DPNVSR Flat GML (for products equipped with NV N17E (GTX 1070/GTX 1060) processors)</li> </ul>	L11397-001
	<ul style="list-style-type: none"> <li>Non-touch screen, UHD, AG, UWVA, 300 eDP, 60 Hz, Flat PSR, ML (for products equipped with NV N17E (GTX 1070/GTX 1060 and N17P (GTX 1050/GTX 1050Ti) processors)</li> </ul>	845823-004
<b>(7)</b>	<b>Hinge kit (includes left and right hinges)</b>	931587-001
<b>(8)</b>	<b>Back cover</b> in Shadow Mesh, includes dual antenna	
	For products equipped with HD camera	931554-001
	For products equipped with IR camera	938011-001

## Mass storage devices



Item	Component	Spare part number
(1)	<b>Hard drive</b>	
	2 TB 5400 RPM SATA RAW HYBRID 7 mm	929167-850
	2 TB 5400 RPM SATA RAW 7 mm	912487-850
	1 TB 7200 RPM SATA RAW 9.5 mm	766644-001
(2)	<b>Hard drive connector and cable</b>	Not spared
(3)	<b>Hard drive bracket</b>	929561-001

## Miscellaneous parts

Component	Spare part number
<b>AC adapter:</b>	
230 W PFC, S-3P, slim, 4.5 mm (for use with products with NVIDIA N17E (GeForce GTX 1070/GTX 1060) processors)	693706-001
150 W PFC, Smart, slim, 4.5 mm (for use with products with NVIDIA N17P (GeForce GTX 1050/GTX 1050Ti) only)	917649-850
135 W PFC, Smart, slim, 4.5 mm (for use with products with NVIDIA N17P (GeForce GTX 1050) only)	L15534-001
<b>HDMI to VGA adapter</b>	701943-001
<b>Dongle (USB-C to USB-A)</b>	833960-001
<b>Omen logo nameplate</b>	L01639-001
<b>Power cord (black, 1 m)(for 230 W adapters):</b>	

<b>Component</b>	<b>Spare part number</b>
For use in North America	121565-023
For use in South Africa	187487-012
For use in Denmark	130627-014
For use in Europe	100614-016
For use in Italy	109197-012
For use in Israel	398062-011
For use in Switzerland	150304-015
For use in Australia	100661-021
For use in South Korea	231216-015
For use in Thailand	285052-013
For use in Japan	653326-005
For use in the United Kingdom and Singapore	100613-021
For use in India	403440-008
For use in Taiwan	393312-008
For use in the Peoples Republic of China	286496-024
<b>Power cord</b> (black, 1 m)(for 150 W adapters):	
For use in North America	920689-001
For use in Italy	920689-002
For use in Europe	920689-005
For use in the United Kingdom and Singapore	920689-006
For use in Denmark	920689-007
For use in Israel	920689-008
For use in Switzerland	920689-009
For use in South Africa	920689-010
For use in Australia	920689-011
For use in Thailand	920689-012
For use in South Korea	920689-013
For use in Taiwan	920689-015
For use in the Peoples Republic of China	920689-014
For use in India	920689-016
For use in Japan	920689-017
<b>Keyboard hook</b>	929473-001
<b>Screw kit</b>	931597-001

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# 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.



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

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## Plastic parts



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

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## Cables and connectors

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**⚠ 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.

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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

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**⚠ 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."

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# Grounding guidelines

## Electrostatic discharge damage

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

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

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

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

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

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

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

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

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

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

Typical electrostatic voltage levels			
Event	Relative humidity		
	10%	40%	55%
Walking across carpet	35,000 V	15,000 V	7,500 V
Walking across vinyl floor	12,000 V	5,000 V	3,000 V
Motions of bench worker	6,000 V	800 V	400 V
Removing DIPS from plastic tube	2,000 V	700 V	400 V
Removing DIPS from vinyl tray	11,500 V	4,000 V	2,000 V
Removing DIPS from 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

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# 5 Removal and replacement procedures for Customer Self-Repair parts

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

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 **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.

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## Component replacement procedures

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 **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 18](#) 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.

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There are two screws that must be removed, replaced, and/or loosened when servicing Customer Self-Repair parts. Make special note of the screw sizes and locations during removal and replacement.

## Battery

Description	Spare part number
Battery 8 cell 86 Whr 3.0 AH Li-ion (for use with NVIDIA N17E (GTX1070/GTX 1060) processors)	922977-855
Battery 8 cell 82 Whr 2.8 AH Li-ion (for use with NVIDIA N17P (GTX1050/GTX 1050Ti) processors)	922976-855

Before removing the battery, follow these steps:

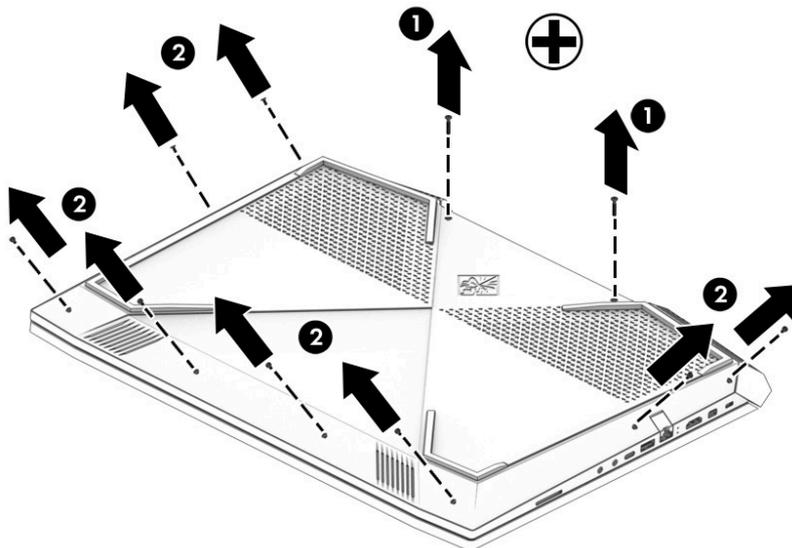
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from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

Remove the battery:

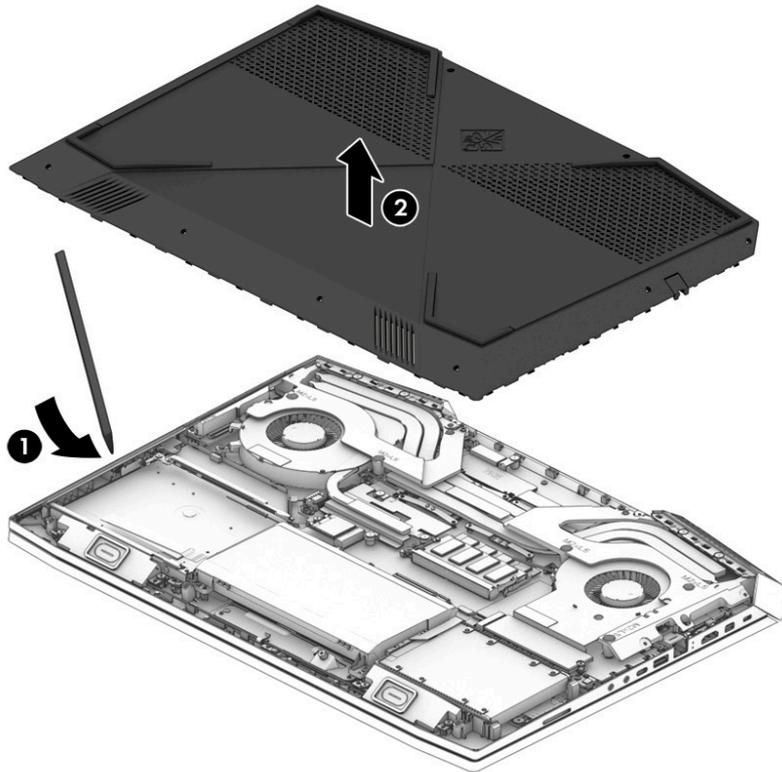
**⚠ WARNING!** To reduce potential safety issues, use only the user-replaceable battery provided with the computer, a replacement battery provided by HP, or a compatible battery purchased from HP.

**⚠ 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.

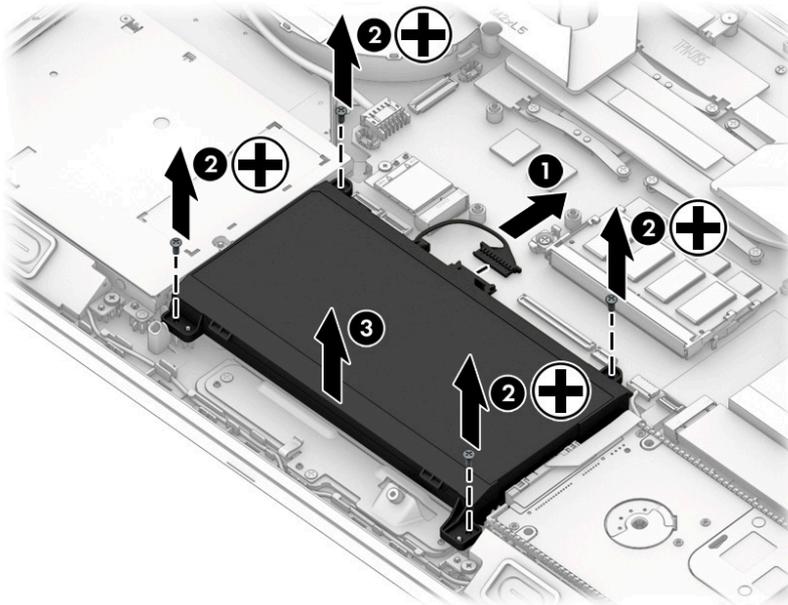
1. Position the computer upside down on a flat surface.
2. Loosen but do not remove two screws from the bottom cover (**1**). Remove the remaining eight Phillips screws (**2**) from the bottom cover.



3. Using a case utility tool, gently separate the bottom cover from the enclosure (1). Remove the bottom cover (2).



4. Disconnect the battery (1). Remove the four Phillips screws (2) that secure the battery to the keyboard/top cover. Lift the battery out of the enclosure (3).



To insert the battery, reverse the removal procedures.

## Hard drive

Description	Spare part number
<b>Hard drive</b>	
• 2 TB 5400 RPM SATA RAW HYBRID 7 mm	929167-850
• 2 TB 5400 RPM SATA RAW 7 mm	912487-850
• 1 TB 7200 RPM SATA RAW 9.5 mm	766644-001
<b>Hard drive connector and cable</b>	931564-001

Before removing the hard drive, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
  - a. Base enclosure (see [Base enclosure on page 45](#))
  - b. Battery (see [Battery on page 38](#))

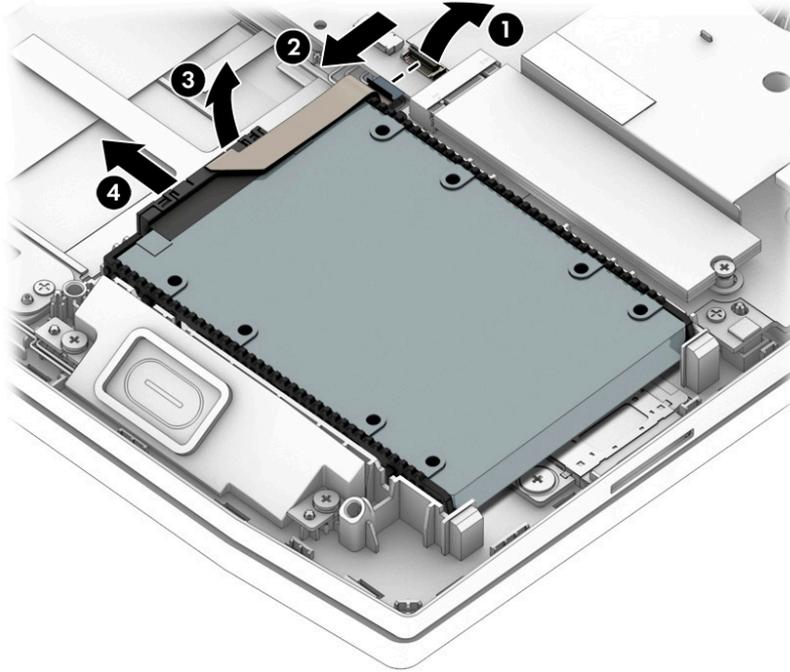
Remove the hard drive:



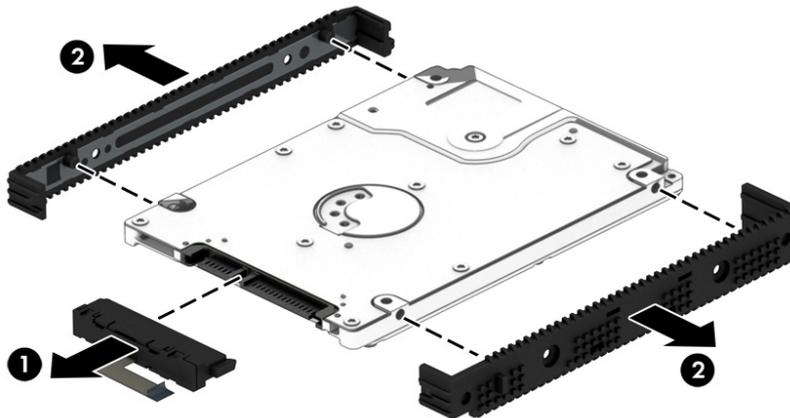
**NOTE:** Use minimal force when lifting the locking bar up on the ZIF connector and disconnecting the cable.

1. Open the zero insertion force (ZIF) connector to release the hard drive cable **(1)** from 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.



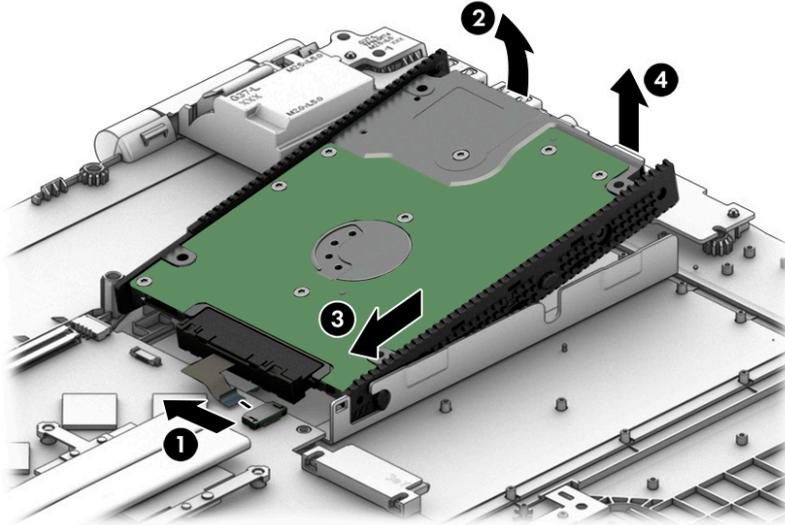
5. If it is necessary to disassemble the hard drive, perform the following steps:
  - a. Remove the hard drive cable connector **(1)** from the hard drive.
  - b. Slide the two hard drive brackets **(2)** off the hard drive.



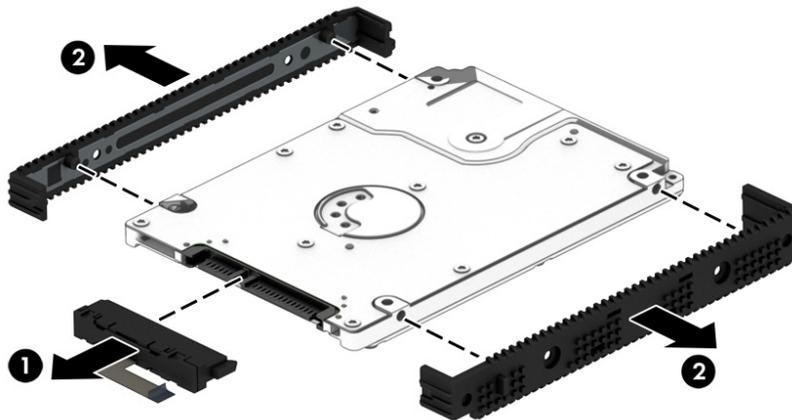
To remove the second hard drive, follow these steps:

1. Open the zero insertion force (ZIF) connector to release the hard drive cable **(1)** from the system board.
2. Lift the hard drive **(2)** up.

3. Release the hard drive from the notch (3), and then slide the drive (4) forward to remove it from the computer.



4. If it is necessary to disassemble the hard drive, perform the following steps:
  - a. Remove the hard drive cable connector (1) from the hard drive.
  - b. Slide the two hard drive brackets (2) off the hard drive.



Reverse this procedure to reassemble and install the hard drive.

## Memory module

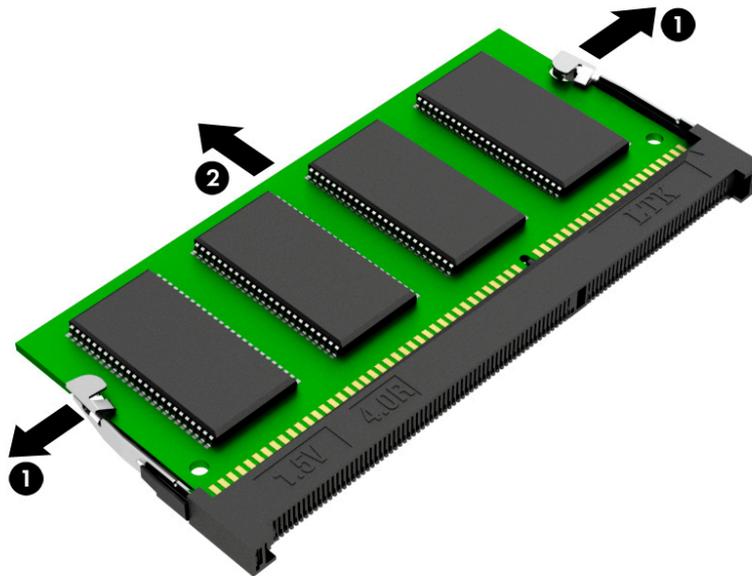
Description	Spare part number
<b>Memory</b>	
16 GB 2666 MHz 1.2 v DDR4 shared	937438-850
8 GB 2666 MHz 1.2 v DDR4 shared	937236-850
4 GB 2666 MHz 1.2 v DDR4 shared	L10598-850

Before removing a memory module, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
  - a. Base enclosure (see [Base enclosure on page 45](#))
  - b. Battery (see [Battery on page 38](#))

Remove the memory module:

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



Reverse this procedure to install a memory module.

## Solid state drive

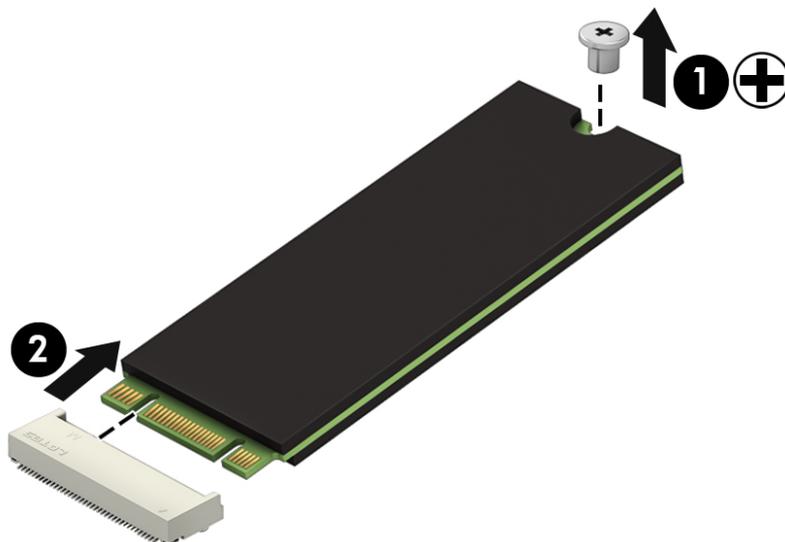
Description	Spare part number
<b>M.2 SATA SSD, PCIe NVMe TLC</b>	
• 512 GB 2280 M2 PCIe 3x4SS NVMe TLC PA	847110-004
• 256 GB 2280 M2 PCIe 3x4SS NVMe TLC PA	847109-002
• 128 GB 2280 M2 3x4SS Value PA	912322-005
• 16 GB 2280 M2 3x4SS Value PA	L09145-014

Before removing the SSD, 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 first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
  - a. Base enclosure (see [Base enclosure on page 45](#))
  - b. Battery (see [Battery on page 38](#))

Remove the SSD:

1. Remove the Phillips screw (1) that secures the SSD to the system board.
2. Remove the SSD (2) by pulling the drive away from the slot at an angle.



Reverse this procedure to install the SSD.

# 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 18](#) 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 may be as many as 85 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.

## Base enclosure

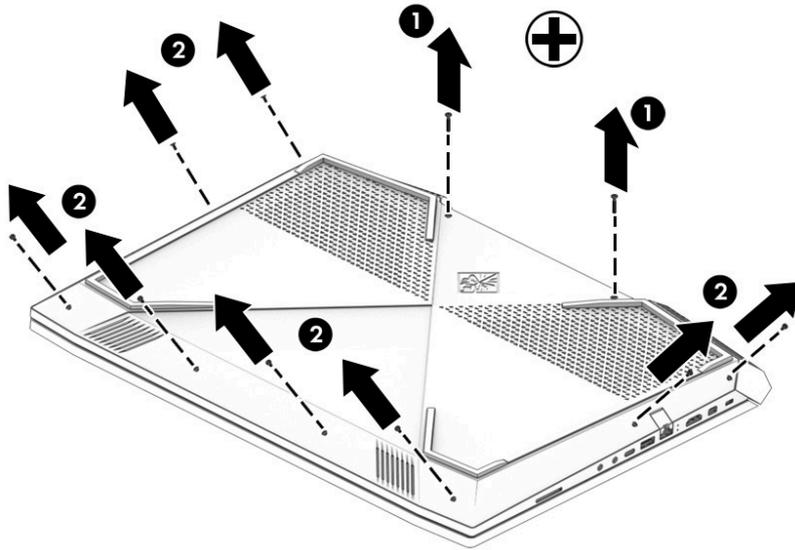
Description	Spare part number
Base enclosure (for products with no optical drive installed)	931555-001
Base enclosure (for products with optical drive installed)	931556-001

Before removing the base enclosure, follow these steps:

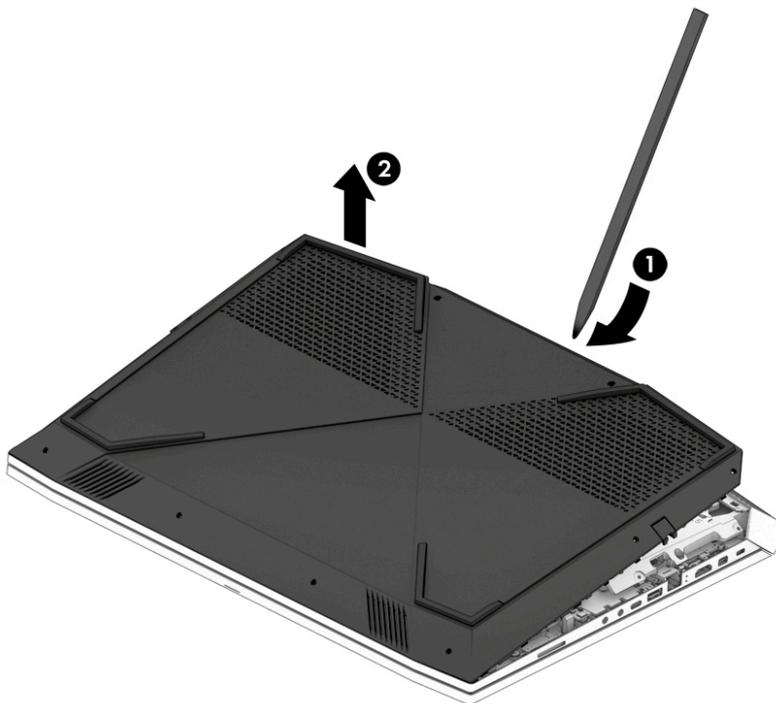
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from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

Remove the base enclosure:

1. Loosen but do not remove the two screws from the bottom cover **(1)**. Remove the remaining eight Phillips screws **(2)** from the bottom cover.



2. Using a case utility tool, gently separate the bottom cover from the enclosure (1). Remove the bottom cover (2).



Reverse the removal procedures to install the base enclosure.

## Speakers

 **NOTE:** The speaker spare part kit includes the cable.

Description	Spare part number
Speaker Kit (includes right and left speakers)	931598-001

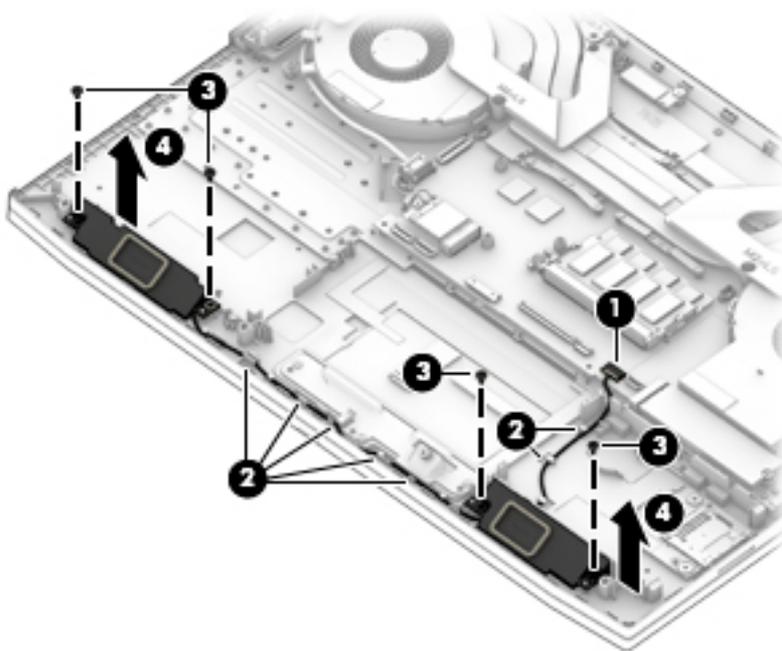
 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement.

Before removing the speakers, follow these steps:

1. Shut down the computer.
2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
3. Disconnect all external devices connected to the computer.
4. Remove the following components:
  - a. Base enclosure (see [Base enclosure on page 45](#))
  - b. Battery (see [Battery on page 38](#))

Remove the speakers:

1. Carefully disconnect the speaker connector **(1)** from the system board.
2. Release the display cable from the routing channels **(2)**.
3. Remove the Phillips M2.0x4 screw and Phillips M2.5x5 screw **(3)**.
4. Lift the left and right speakers **(4)** to remove them.



Reverse this procedure to install the speakers.

## Optical drive

Description	Spare part number
<b>Optical drive</b>	
<ul style="list-style-type: none"><li>DVD+/-RW Double-Layer SuperMulti</li></ul>	756564-038
<b>Optical drive bracket</b> (left side)	931583-001
<b>Optical drive bracket</b> (right side)	931584-001
Optical drive bezel	931557-001

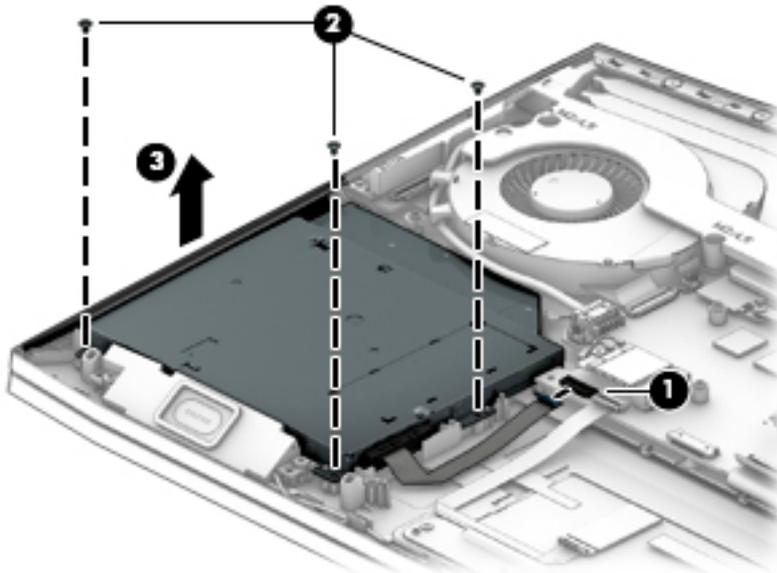
 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement.

Before removing the optical drive, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
3. Disconnect all external devices connected to the computer.
4. Remove the battery (see [Battery on page 38](#)).

Remove the optical drive:

- ▲ Disconnect the optical drive cable from the computer **(1)**. Remove the Phillips M2.0 × 2.5 screw **(2)** securing the optical drive in the computer, and then lift drive **(3)** away from the computer.



Reverse this procedure to install the optical drive.

## Trunks

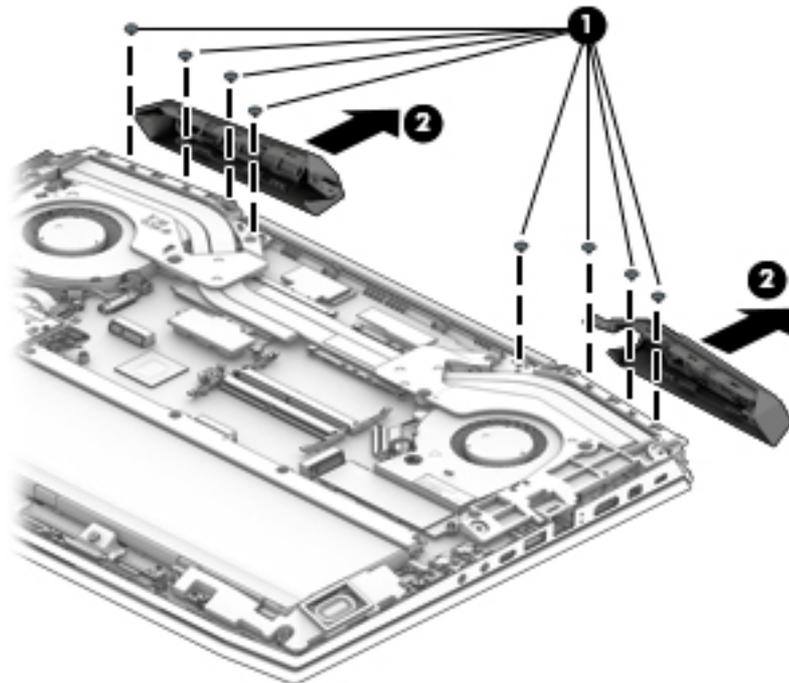
Description	Spare part number
Left trunk	931595-001
Right trunk	931596-001

Before removing the trunks, 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 first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
  - a. Base enclosure (see [Base enclosure on page 45](#))
  - b. Battery (see [Battery on page 38](#))  
Optical drive (see [Optical drive on page 48](#))
  - c. Speakers (see [Speakers on page 47](#))

Remove the trunks:

1. Remove eight Phillips screws (1) securing the trunks.
2. Remove the trunks (2).



Reverse this procedure to install the trunks.

## WLAN module

Description	Spare part number
WLAN assembly RT CARTIER ac 2 × 2 (for products with NVIDIA N17E (GTX 1070/GTX 1060))	924813-855
Intel Dual Band Wireless-AC 9560 802.11 ac 2 × 2 WiFi + Bluetooth 5 Combo Adapter (non vPRO)	LT22634-005

Before removing the WLAN module, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
  - a. Base enclosure (see [Base enclosure on page 45](#))
  - b. Battery (see [Battery on page 38](#))
  - c. Optical drive (see [Optical drive on page 48](#))

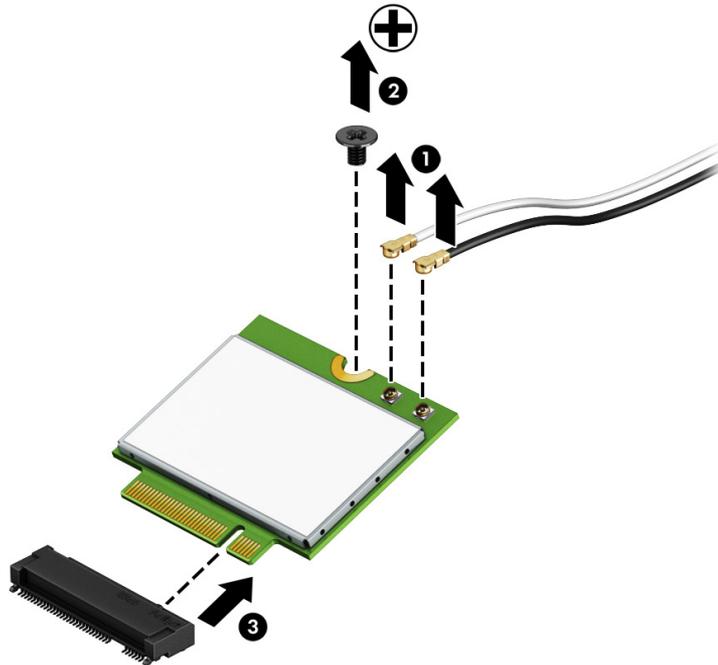
Remove the WLAN module:

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

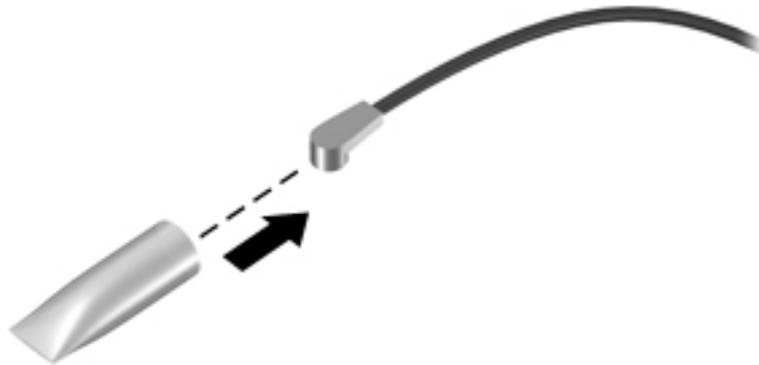
 **NOTE:** The WLAN antenna cable labeled “1” connects to the WLAN module “Main” terminal labeled “1”. The WLAN antenna cable labeled “2” connects to the WLAN module “Aux” terminal labeled “2”.
2. Remove the Phillips M2.0 × 2.5 screw **(2)** that secures the WLAN module to the system board. (The WLAN module tilts up.)

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

 **NOTE:** WLAN modules are notched to prevent incorrect installation.



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



Reverse this procedure to install the WLAN module.

## USB board

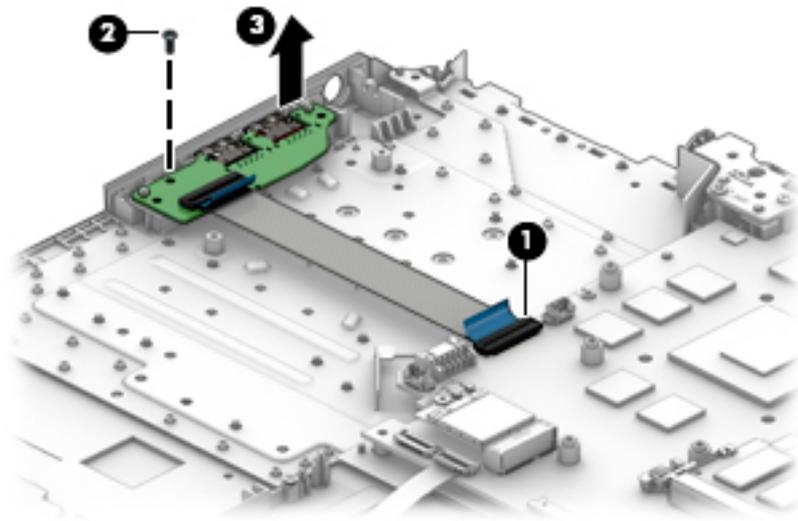
Description	Spare part number
USB board (for use in products equipped with N17E processors only (GTX 1070/1060))	L14990-001
USB board (for use in products equipped with N17P processors only (GTX 1050Ti/1050))	L14989-001

Before removing the USB board, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
  - a. Base enclosure (see [Base enclosure on page 45](#))
  - b. Battery (see [Battery on page 38](#))
  - c. Optical drive (see [Optical drive on page 48](#))
  - d. Speakers (see [Speakers on page 47](#))

Remove the USB board:

1. Open the zero insertion force (ZIF) connector **(1)** and release the USB board cable.
2. Remove the two Phillips M2.0 × 4.0 screws **(2)** that secure the USB board to the computer.
3. Remove the USB board **(3)**.



Reverse this procedure to install the USB board.

## Fans



**NOTE:** The left and right fans are spared separately.

Description	Spare part number
<b>Left fan</b> (includes cable)	931576-001
<b>Right fan</b> (includes cable)	931577-001

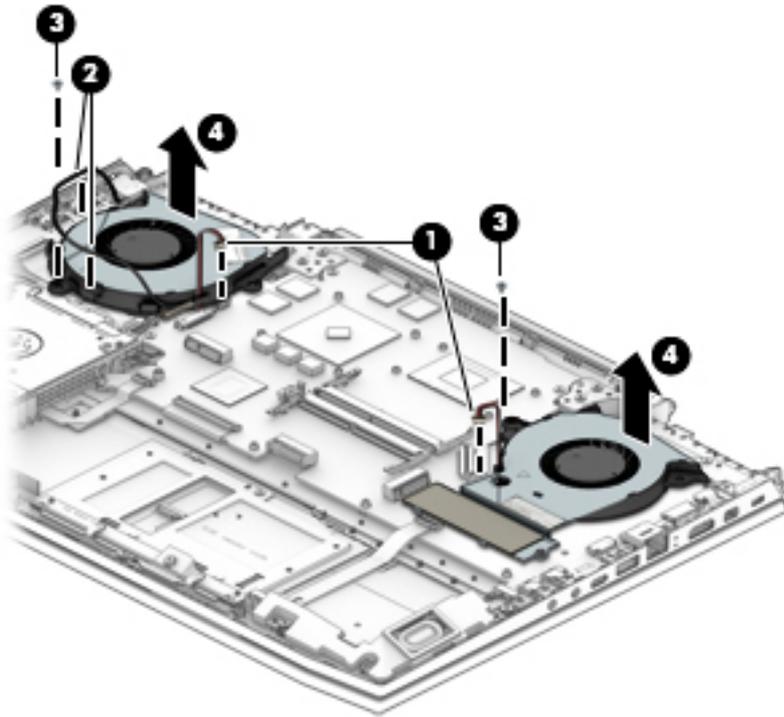
Before removing the fans, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
  - a. Base enclosure (see [Base enclosure on page 45](#))
  - b. Battery (see [Battery on page 38](#))
  - c. Optical drive (see [Optical drive on page 48](#))

Remove the fans:

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

4. Remove the fans (4).



Reverse this procedure to install the fans.

## Heat sink

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

Description	Spare part number
Heat sink (for use only on products equipped with NVIDIA N17E-G2) (GTX-1070)	931574-001
Heat sink (for use only on products equipped with NVIDIA N17E-G1) (GTX-1060)	931573-001
Heat sink (for use only on products equipped with NVIDIA N17P-G1) (GTX-1050ti)	931572-001
Heat sink (for use only on products equipped with NVIDIA N17P-G0) (GTX-1050)	931571-001

 **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. 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 first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:

- a. Base enclosure (see [Base enclosure on page 45](#))
- b. Battery (see [Battery on page 38](#))
- c. Speakers (see [Speakers on page 47](#)).
- d. Optical drive (see [Optical drive on page 48](#))
- e. Remove the fans (see [Fans on page 53](#))

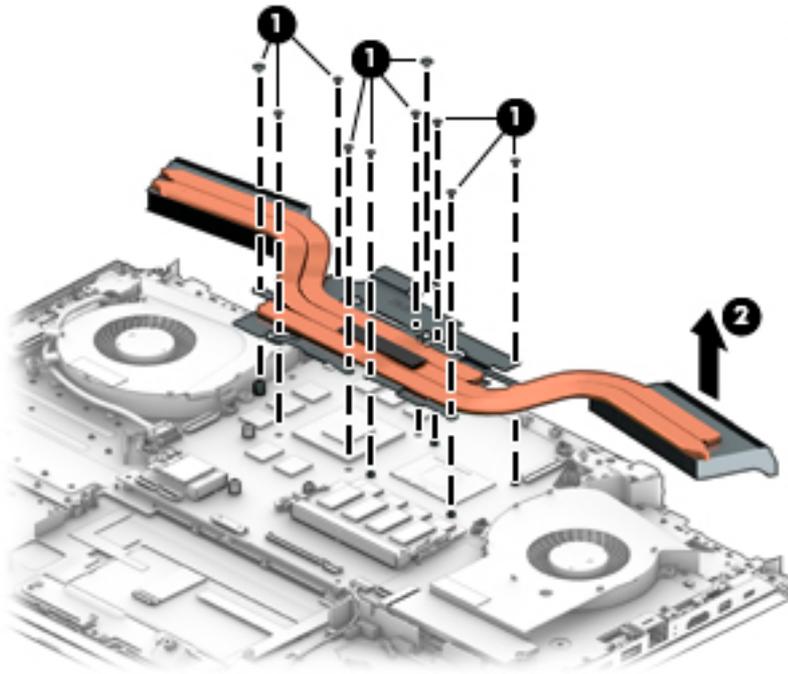
Remove the heat sink:

Following the sequence stamped into the heat sink, loosen the eight Phillips screws **(1)** and then carefully lift the heat sink **(2)** to remove it from the system board.

---

 **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.

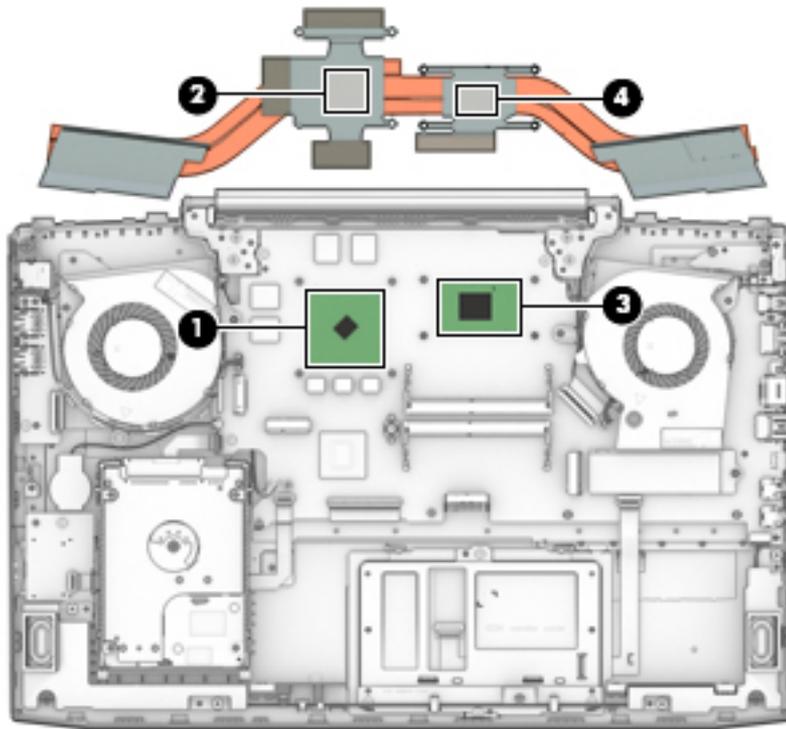
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 **NOTE:** The thermal material must be thoroughly cleaned from the surfaces of the heat sink and the system board components each time the heat sink is removed. Thermal paste is used on the processor **(1)**, the graphics processor **(3)**, and the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

---



Reverse this procedure to install the heat sink.

## System board

Description	Spare part number
<b>System board</b>	
All system boards use the following part numbers:	
xxxxxx-001 Non-Windows operating systems	
xxxxxx-601 Windows 10 operating systems	
<ul style="list-style-type: none"><li>• NVIDIA N17P-G2 (GeForce GTX 1070), 8GB i7-8750H</li></ul>	L11136-xxx
<ul style="list-style-type: none"><li>• NVIDIA N17E-G1 (GeForce GTX 1060), 6 GB i7-8750H</li></ul>	L11137-xxx
<ul style="list-style-type: none"><li>• NVIDIA N17E-G1 (GeForce GTX 1060), 3 GB i7-8750H</li></ul>	L18941-xxx
<ul style="list-style-type: none"><li>• NVIDIA N17P-G1 (GeForce GTX 1050Ti), 4 GB i7-8750H</li></ul>	L11139-xxx
<ul style="list-style-type: none"><li>• NVIDIA N17P-G0 (GeForce GTX 1050), 4 GB i7-8750H</li></ul>	L11140-xxx
<ul style="list-style-type: none"><li>• NVIDIA N17P-G0 (GeForce GTX 1050), 2 GB i7-8750H</li></ul>	L11142-xxx
<ul style="list-style-type: none"><li>• NVIDIA N17P-GR (GeForce GTX 1060), 6 GB i5-8300H</li></ul>	L11138-xxx
<ul style="list-style-type: none"><li>• NVIDIA N17P-GR (GeForce GTX 1050), 4 GB i5-8300H</li></ul>	L11141-xxx
<ul style="list-style-type: none"><li>• NVIDIA N17 E-G0 (GeForce GTX 1060), 2 GB i5-8300H</li></ul>	L11143-xxx

 **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 the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
3. Disconnect all external devices connected to the computer.
4. Remove the following components:
  - a. Base enclosure (see [Base enclosure on page 45](#))
  - b. Battery (see [Battery on page 38](#))
  - c. Speakers (see [Speakers on page 47](#)).
  - d. Optical drive (see [Optical drive on page 48](#))
  - e. Remove the fans (see [Fans on page 53](#))
  - f. Remove the heatsink (see [Heat sink on page 54](#))

 **NOTE:** When replacing the system board, be sure that the following components are removed from the defective system board and installed on the replacement system board:

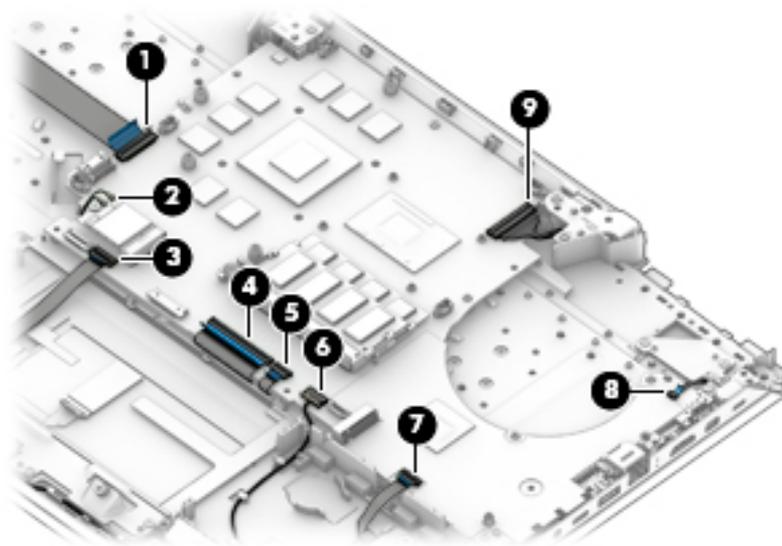
- WLAN module (see [WLAN module on page 50](#))
- Memory module (see [Memory module on page 43](#))

Remove the system board:

1. If they are not already disconnected, disconnect the following cables from the system board (note the routing location of the cables when removing them):

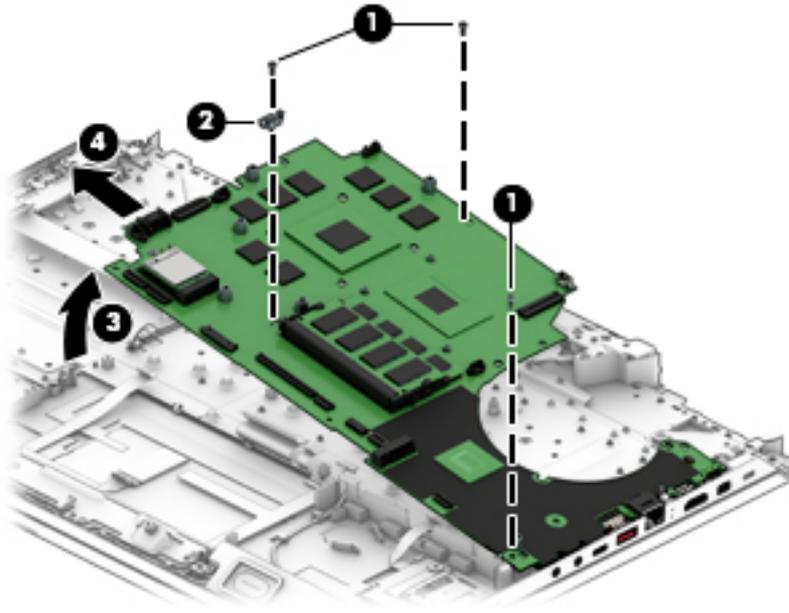
 **NOTE:** Use minimal force when lifting the locking bar up on a ZIF connector and disconnecting the cable.

- (1) USB cable
- (2) WLAN antenna cables
- (3) TouchPad cable
- (4) Keyboard/top cover cable
- (5) Keyboard/top cover backlight
- (6) Speaker cable
- (7) Solid state drive cable
- (8) Power button cable
- (9) Display cable



2. Remove the three Phillips screws (1) and the screw bracket (2) securing the system board to the computer.

3. Lift the system board **(3)** at an angle, and then remove it **(4)**.



Reverse this procedure to install the system board.

 **IMPORTANT:** After system board replacement, be sure to complete post-installation tasks as required that may include:

- Verifying functionality of the computer
- Updating the BIOS; see [Using Setup Utility \(BIOS\) on page 70](#)

## Power in connector

Description	Spare part number
For use only on products with 135 or 150 W AC adapter and NV N17P (GTX 1050/GTX 1050Ti) processors	926204-002
For use only on products with 230 W adapter AC adapter GPU NV N17E (GTX1070/GTX1060) processors	926564-001

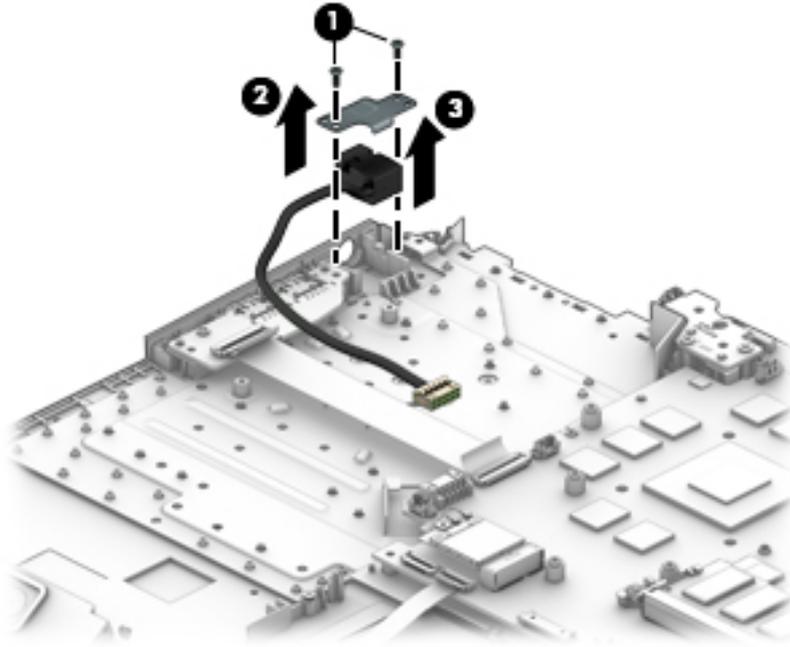
Before removing the power in connector, follow these steps:

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 first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
  - a. Base enclosure (see [Base enclosure on page 45](#))
  - b. Battery (see [Battery on page 38](#))
  - c. Speakers (see [Speakers on page 47](#)).
  - d. Optical drive (see [Optical drive on page 48](#))
  - e. Remove the fans (see [Fans on page 53](#))
  - f. Remove the heatsink (see [Heat sink on page 54](#))
  - g. Remove the system board (see [System board on page 57](#))

Remove the power in connector:

1. Remove the two Phillips screws securing the connector and bracket to the computer **(1)**.

2. Lift the connector and bracket from the holder (2), and then remove the connector (3).



Reverse this procedure to install the power in connector.

## TouchPad board

Description	Spare part number
TouchPad board	929472-001
TouchPad click button board and cable	931594-001

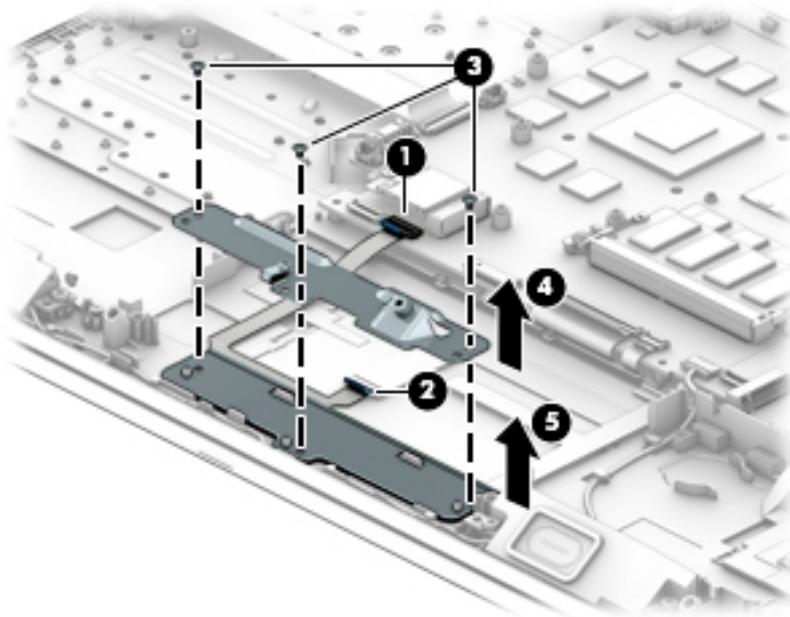
Before removing the TouchPad board, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
  - a. Base enclosure (see [Base enclosure on page 45](#))
  - b. Battery (see [Battery on page 38](#))
  - c. Speakers (see [Speakers on page 47](#)).
  - d. Optical drive (see [Optical drive on page 48](#))
  - e. Remove the fans (see [Fans on page 53](#))
  - f. Remove the heatsink (see [Heat sink on page 54](#))
  - g. Remove the system board (see [System board on page 57](#))

Remove the TouchPad board:

1. Disconnect the Touchpad connector cable from the system board **(1)**.
2. Disconnect the TouchPad from the keyboard/top cover **(2)**.
3. Carefully remove the three Phillips screws **(3)** that secure the TouchPad click board and the TouchPad to the computer.
4. **(4)** that secures the TouchPad board.

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



Reverse this procedure to install the TouchPad board.

## Display assembly

Description	Spare part number
<b>Antenna, dual</b>	931674-001
<b>Back cover</b>	
For use only on products equipped with HD camera (includes dual antenna)	931554-001
For use only on products equipped with IR camera (includes dual antenna)	938011-001
<b>Camera</b>	
• IR camera	919579-006
• HD camera	919573-008
<b>Display bezel</b>	
• For products with IR camera	931559-001
• For products with HD camera	931558-001
<b>Display cable</b>	
• For products with non-touch FHD screen with HD camera, 60 Hz	931565-001
• For products with non-touch FHD screen with HD camera, 120 or 144 Hz	931566-001
• For products with non-touch FHD screen with IR camera, 60 Hz	931567-001
• For products with non-touch FHD screen with IR camera, 120 or 144 Hz	931568-001
• For products with non-touch UHD screen and HD camera	931569-001
• For products with non-touch UHD screen and IR camera	931570-001
<b>Hinge kit (includes left and right hinges)</b>	931587-001
<b>Left display bracket</b>	931585-001
<b>Right display bracket</b>	931586-001
<b>Raw panel 43.94 cm (17.3") (non-touch screen)</b>	
• FHD, AG, UWVA, 300 eDP, 60 Hz Flat APJ ML	936915-001
• FHD, AG, UWVA, 300 eDP, 120 Hz, DPNVSR Flat GML	922934-001
• FHD, AG, UWVA, 300 eDP, 144 Hz, DPNVSR Flat GML	L11397-001
• UHD, AG, UWVA, 300 eDP, 60 Hz, Flat PSR. ML	845823-004
• FHD, AG, UWVA, 300 eDP, 60 Hz, 1.3PSR, Flat F, sync ML	939308-001



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

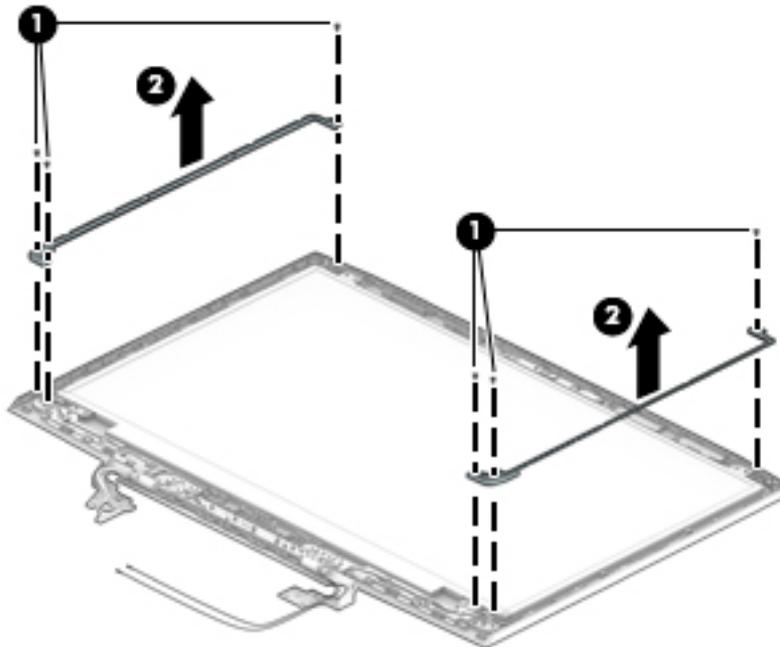
Before removing the display assembly, follow these steps:

1. Shut down the computer.
2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

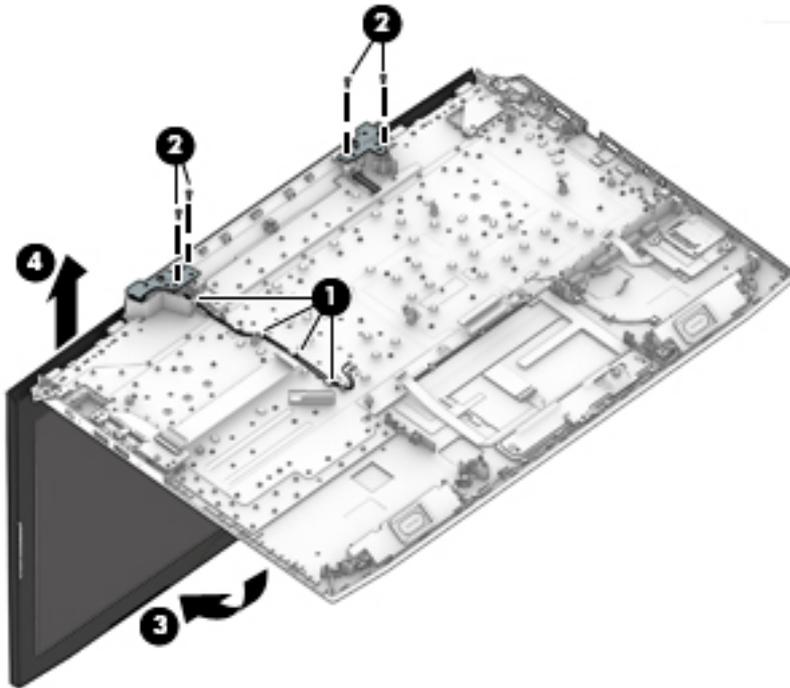
3. Disconnect all external devices connected to the computer.
4. Remove the following components:
  - a. Base enclosure (see [Base enclosure on page 45](#))
  - b. Battery (see [Battery on page 38](#))
  - c. Speakers (see [Speakers on page 47](#)).
  - d. Optical drive (see [Optical drive on page 48](#))
  - e. Remove the fans (see [Fans on page 53](#))
  - f. Remove the heatsink (see [Heat sink on page 54](#))
  - g. Remove the system board (see [System board on page 57](#))
  - h. Remove the TouchPad board (see [TouchPad board on page 62](#))

Remove the display assembly:

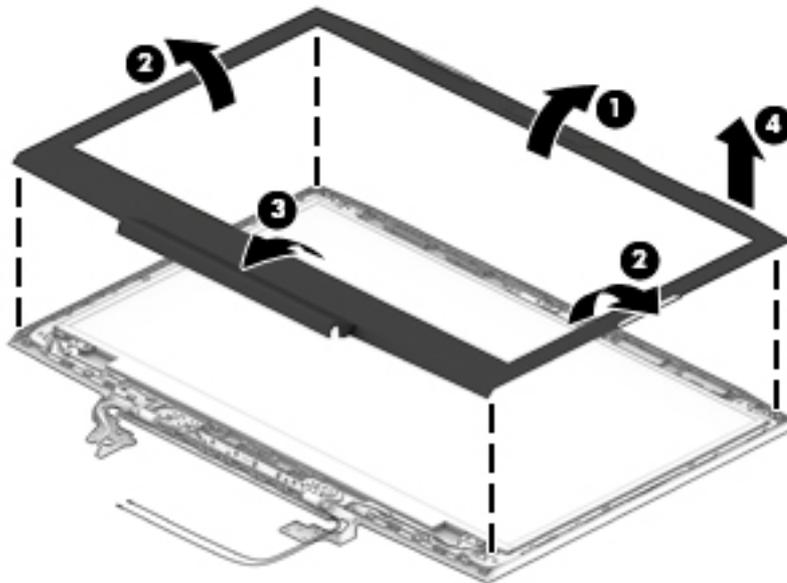
1. Remove the six Phillips PM1.9×3.5 screws securing the left and right hinge brackets **(1)**.
2. Remove the hinge brackets **(2)**.



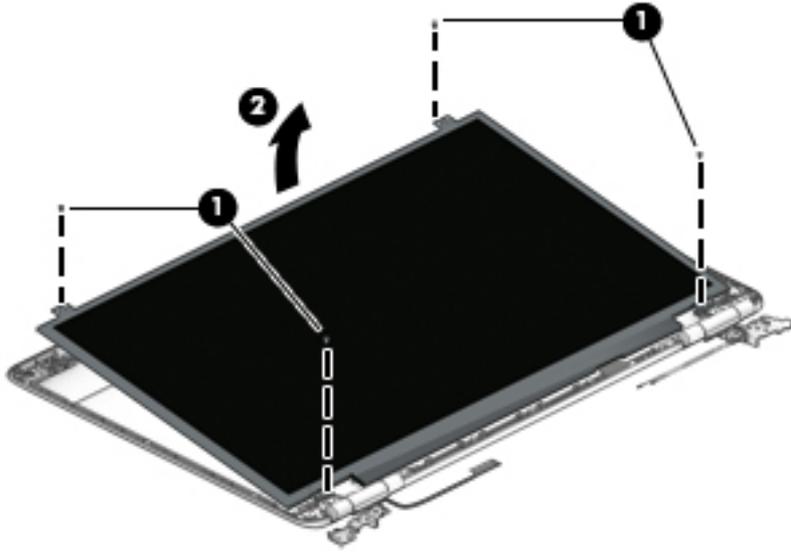
3. Disconnect the display panel cable from the computer **(1)**, remove the four Phillips screws from the hinges **(2)**. Open the display as wide as possible **(3)**, and then remove the display **(4)**.



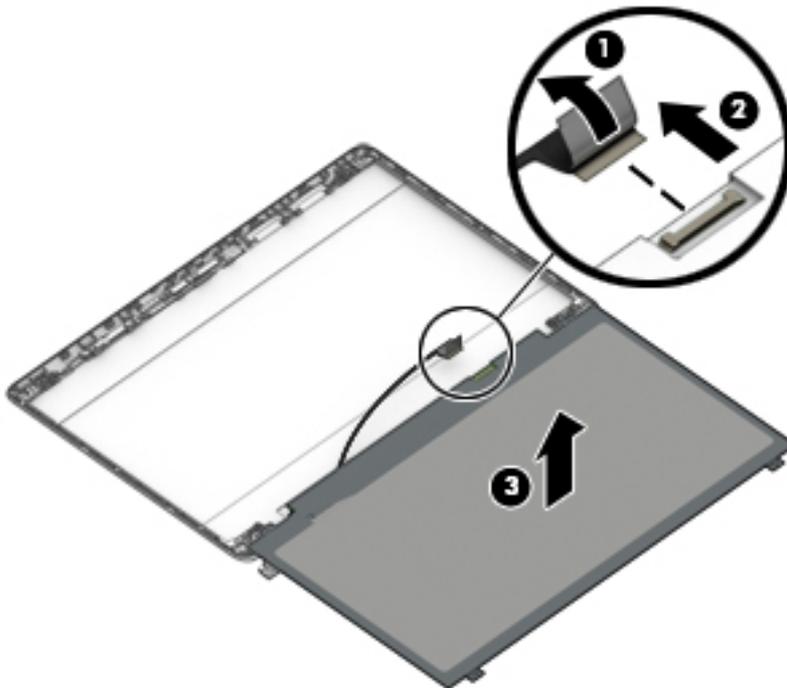
4. If it is necessary to replace the display bezel or any of the LED display assembly subcomponents:
  - a. Disengage the bezel starting at the top **(1)**, left and right sides **(2)**, and bottom **(3)**.
  - b. Remove the display bezel **(4)**.



5. If it is necessary to replace the raw display panel, remove the four Phillips screws (1) that secure the display panel to the display enclosure, and then lift the panel (2) to remove it.



6. Remove the tape (1) covering the display panel connector, disconnect the connector (2) from the display panel, and then remove the panel (3).

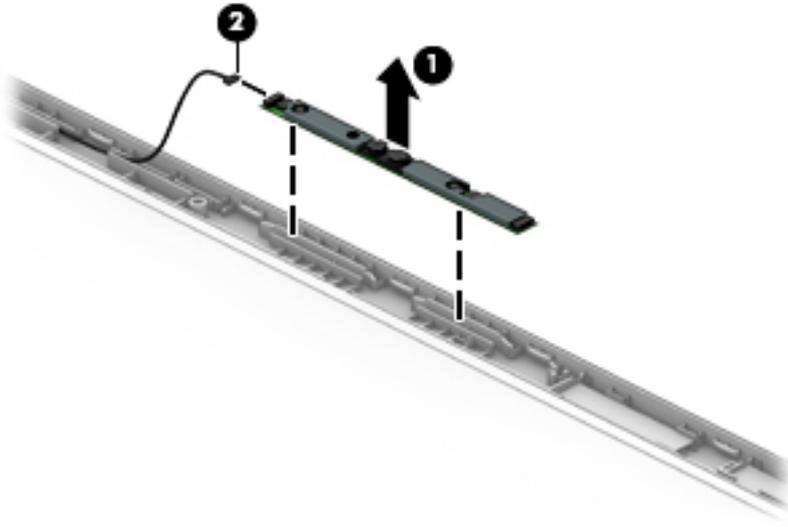


7. If it is necessary to replace the camera module:

**CAUTION:** Handle the module with caution. This module has a thin profile and is susceptible to damage when not handled carefully.

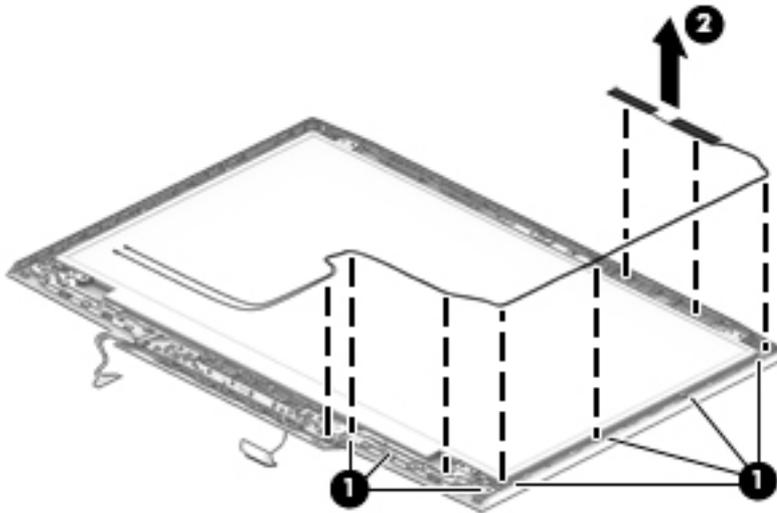
- a. Lift up the camera module and cable (1).

- b. Disconnect the cable (2) and remove the camera module.



8. If it is necessary to replace the WLAN antennas:

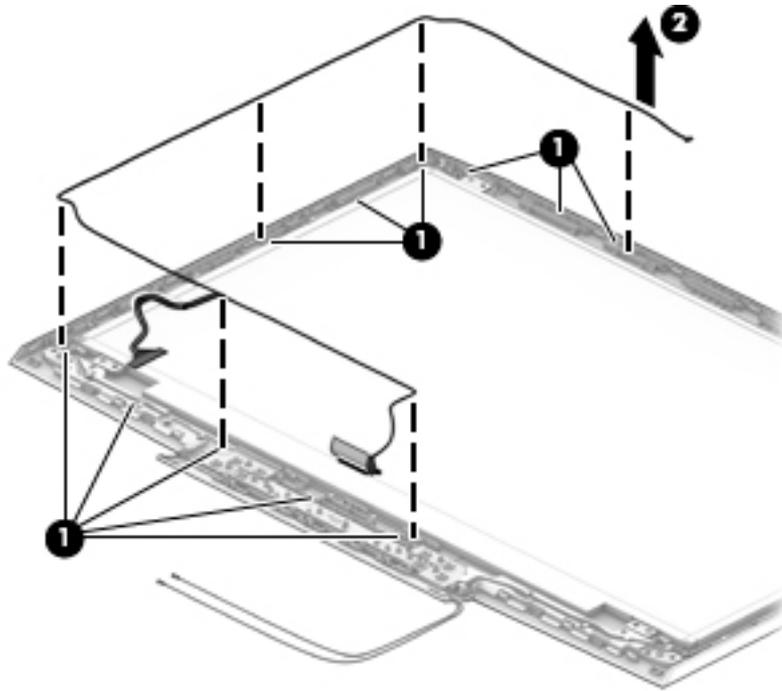
- a. Release the WLAN antenna cable from the routing path (1) of the display enclosure.
- b. Carefully peel back the metallic tape (2) to release the wireless antenna transceivers from the display enclosure.
- c. Remove the WLAN antenna cable from the display enclosure.



9. If it is necessary to replace the display cable:

- a. Release the cable from the routing path (1) along the display enclosure.

- b. Remove the cable (2).



---

 **IMPORTANT:** Use care when handling and installing the new antennas. Accidental bending of the antenna elements will detune the antenna and degrade the computer's performance.

---

Reverse this procedure to install the display assembly.

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# 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)

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 **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 70](#)).
  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 71](#).

## 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.

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# 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 72](#).

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)

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 **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

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 **NOTE:** For Windows 10 S computers, you must use a Windows computer and a USB flash drive to download and create the HP UEFI support environment because only .exe files are provided. For more information, see [Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive on page 74](#).

---

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.

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 **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



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**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 74](#).

---

- 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.

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## Downloading the latest HP PC Hardware Diagnostics UEFI version

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

1. Go to <http://www.hp.com/go/techcenter/pcdiags>. The HP PC Diagnostics home page is displayed.
2. 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)



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

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

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

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

Remote HP PC Hardware Diagnostics UEFI is a firmware (BIOS) feature that downloads HP PC Hardware Diagnostics UEFI to your computer. It can then execute the diagnostics on your computer, and it may upload results to a preconfigured server. For more information 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 77](#)).
- **Creating a restore point**—You can use Windows tools to create a restore point (see [Using Windows tools on page 77](#)).
- **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 77](#)).
- **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 77](#)).

## Backing up information and creating recovery media

### Using Windows tools

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

---

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

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

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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.

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# 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 77](#).

## 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 77](#).

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.
<b>Dimensions</b>		
Width	<b>423 mm</b>	16.66 in
Depth	<b>304.0 mm</b>	11.98 in
Height (front to back)	33.0 mm	1.30 in
<b>Weight</b>		
Non-touch	<b>3.27 kg</b> (depending on configuration)	7.21 lbs (depending on configuration)
<b>Input power</b>		
Operating voltage and current	19.5 V dc @ 7.70 A – 150 W	
	19 V dc @ 6.15 A – 120 W	
<b>Temperature</b>		
Operating	<b>5°C to 35°C</b>	41°F to 95°F
Nonoperating	<b>-20°C to 60°C</b>	-4°F to 140°F
<b>Relative humidity</b> (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
<b>Maximum altitude</b> (unpressurized)		
Operating	<b>-15 m to 3,048 m</b>	-50 ft to 10,000 ft
Nonoperating	<b>-15 m to 12,192 m</b>	-50 ft to 40,000 ft

**NOTE:** Applicable product safety standards specify thermal limits for plastic surfaces. The device operates well within this range of temperatures.

## 43.94 cm (17.3 in) display specifications

	Metric	U.S.
<b>Dimensions</b>		
Diagonal size	43.94 cm	17.3 in
Thickness	4.2 mm	0.165 in
<b>Brightness</b>	300 nits (cd/m <sup>2</sup> )	
<b>Resolution</b>		
• Non-touch FHD	1920x1080	
• Non-touch UHD	3840x2160	
<b>Backlight</b>	WLED	
<b>Surface treatment</b>	AntiGlare	
<b>Companion standard</b>		
• Non-touch	eDP+NVSR	
• Non-touch	eDP+PSR	
<b>Viewing angle</b>	SVA	

## Hard drive specifications

	1 TB*	2 TB*
<b>Dimensions</b>		
Height	9.5 mm	9.5 mm
Width	70 mm	70 mm
Weight	115 g	115 g
<b>Interface type</b>	SATA	SATA
<b>Transfer rate</b>	Synchronous (maximum) 300 MB/s (Drive Capability)	
<b>Security</b>	ATA security	ATA security
<b>Seek times</b> (typical read, including setting)		
Single track	1.4 ms	1.4 ms
Average	10 ms	10 ms
Maximum	12 ms	12 ms
<b>Logical blocks</b>	1,938,921,461	3,877,842,922
<b>Disk rotational speed</b>	7200 rpm	5400 rpm
<b>Operating temperature</b>	0°C to 60°C (0°F to 140°F)	0°C to 60°C (0°F to 140°F)

\*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.

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

1. The flexible cord must be Type H05VV-F, 3-conductor, 0.75 mm<sup>2</sup> conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
2. The flexible cord must be Type SVT/SJT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V ac) or NEMA 6-15P (15 A, 250 V ac) configuration. CSA or C-UL mark. UL file number must be on each element.

Country/region	Accredited agency	Applicable note number
		3. The appliance coupler, flexible cord, and wall plug must bear a “T” mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCTF, 3-conductor, 0.75 mm <sup>2</sup> or 1.25 mm <sup>2</sup> conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration.
		4. The flexible cord must be Type RVV, 3-conductor, 0.75 mm <sup>2</sup> conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.
		5. The flexible cord must be Type H05VV-F 3-conductor, 0.75 mm <sup>2</sup> conductor size. KTL logo and individual approval number must be on each element. Corset approval number and logo must be printed on a flag label.
		6. The flexible cord must be Type HVCTF 3-conductor, 1.25 mm <sup>2</sup> conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.
		7. For 127 V ac, the flexible cord must be Type SVT or SJT 3-conductor, 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type H05VV-F 3-conductor, 0.75 mm <sup>2</sup> or 1.00 mm <sup>2</sup> conductor size, with plug BS 1363/A with BSI or ASTA marks.

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## 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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