



Maintenance and Service Guide

OMEN by HP 15 Laptop PC

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Product notice

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

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

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

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

Important Notice about Customer Self-Repair Parts



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

Safety warning notice

 **CAUTION:** To reduce the possibility of heat-related injuries or of overheating the device, do not place the device directly on your lap or obstruct the device air vents. Use the device only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The device and the AC adapter comply with the user-accessible surface temperature limits defined by applicable safety standards.

Table of contents

| | |
|--|-----------|
| 1 Product description | 1 |
| 2 Getting to know your computer | 6 |
| Right side | 6 |
| Left side | 7 |
| Rear | 8 |
| Display | 9 |
| Low blue light mode (select products only) | 9 |
| Keyboard area | 10 |
| Touchpad | 10 |
| Lights | 11 |
| Button | 12 |
| Special keys | 13 |
| Bottom | 14 |
| Labels | 15 |
| HP OMEN Command Center | 16 |
| 3 Illustrated parts catalog | 17 |
| Computer major components | 17 |
| Display assembly subcomponents | 20 |
| Cables | 22 |
| Mass storage devices | 23 |
| Miscellaneous parts | 24 |
| 4 Removal and replacement procedures preliminary requirements | 26 |
| Tools required | 26 |
| Service considerations | 26 |
| Plastic parts | 26 |
| Cables and connectors | 26 |
| Drive handling | 27 |
| Workstation guidelines | 27 |
| Electrostatic discharge information | 27 |
| Generating static electricity | 28 |
| Preventing electrostatic damage to equipment | 28 |
| Personal grounding methods and equipment | 29 |
| Grounding the work area | 29 |

| | |
|---|-----------|
| Recommended materials and equipment | 29 |
| Packaging and transporting guidelines | 30 |
| 5 Removal and replacement procedures for Customer Self-Repair parts | 31 |
| Component replacement procedures | 31 |
| Preparation for disassembly | 31 |
| Bottom cover | 32 |
| Solid-state drive and Optane memory module | 34 |
| Memory module | 35 |
| Hard drive assembly | 37 |
| 6 Removal and replacement procedures for authorized service provider parts | 39 |
| Component replacement procedures | 39 |
| Battery | 39 |
| WLAN module | 41 |
| Power connector | 43 |
| Speaker assembly | 44 |
| Touchpad button board | 45 |
| Heat sink/fan assembly | 46 |
| Card reader/USB board | 49 |
| System board | 50 |
| Power button board | 52 |
| Thermal sensor | 53 |
| Display assembly | 54 |
| Keyboard/top cover | 62 |
| 7 Using Setup Utility (BIOS) | 63 |
| Starting Setup Utility (BIOS) | 63 |
| Updating Setup Utility (BIOS) | 63 |
| Determining the BIOS version | 63 |
| Downloading a BIOS update | 64 |
| 8 Using HP PC Hardware Diagnostics | 65 |
| Using HP PC Hardware Diagnostics Windows (select products only) | 65 |
| Downloading HP PC Hardware Diagnostics Windows | 65 |
| Downloading the latest HP PC Hardware Diagnostics Windows version | 66 |
| Downloading HP Hardware Diagnostics Windows by product name or number (select products only) | 66 |
| Installing HP PC Hardware Diagnostics Windows | 66 |
| Using HP PC Hardware Diagnostics UEFI | 66 |

| | |
|---|-----------|
| Starting HP PC Hardware Diagnostics UEFI | 67 |
| Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive | 67 |
| Downloading the latest HP PC Hardware Diagnostics UEFI version | 67 |
| Downloading HP PC Hardware Diagnostics UEFI by product name or number (select products only) | 67 |
| Using Remote HP PC Hardware Diagnostics UEFI settings (select products only) | 68 |
| Downloading Remote HP PC Hardware Diagnostics UEFI | 68 |
| Downloading the latest Remote HP PC Hardware Diagnostics UEFI version | 68 |
| Downloading Remote HP PC Hardware Diagnostics UEFI by product name or number | 68 |
| Customizing Remote HP PC Hardware Diagnostics UEFI settings | 68 |
| 9 Backing up, restoring, and recovering | 70 |
| Backing up information and creating recovery media | 70 |
| Using Windows tools | 70 |
| Using the HP Cloud Recovery Download Tool to create recovery media (select products only) | 70 |
| Restoring and recovery | 71 |
| Restoring, resetting, and refreshing using Windows tools | 71 |
| Recovering using HP Recovery media | 71 |
| Changing the computer boot order | 71 |
| 10 Specifications | 72 |
| 11 Power cord set requirements | 73 |
| Requirements for all countries | 73 |
| Requirements for specific countries and regions | 74 |
| 12 Recycling | 76 |
| Index | 77 |

1 Product description

Table 1-1 Product components and their descriptions

| Category | Description |
|----------------------|--|
| Product Name | OMEN by HP 15 Laptop PC Model numbers: 15-dh0000~15-dh0999, 15t-dh000 |
| Processor | Intel® Core™ i9-9880H (2.3 GHz, turbo up to 4.8 GHz, 2666 MHz FSB, 16 MB L3 cache, eight core, 45 W) Intel Core i7-9750H (2.6 GHz, turbo up to 4.5 GHz, 2666 MHz FSB, 12 MB L3 cache, six core, 45 W) Intel Core i5-9300H (2.4 GHz, turbo up to 4.1 GHz, 2666 MHz FSB, 8 MB L3 cache, quad core, 45 W) |
| Graphics | Internal graphics Intel UHD Graphics 630 Discrete graphics NVIDIA® GeForce® RTX 2080 with up to 8 GB of dedicated video memory (N18E-G3) NVIDIA GeForce RTX 2070 with up to 8 GB of dedicated video memory (N18E-G2) NVIDIA GeForce RTX 2060 with up to 6 GB of dedicated video memory (N18E-G0) NVIDIA GeForce GTX 1660Ti with up to 6 GB of dedicated video memory (N18E-G0) NVIDIA GeForce GTX 1650 with up to 4 GB of dedicated video memory (N18P-G0) Supports HD decode, DX12, and HDMI Supports Optimus™ Supports FPS (GPU Performance Scaling) Supports VR Supports MR ready |
| Display panel | 39.6 cm (15.6 in.), WLED, UWVA, ultra slim (2.6 mm), narrow bezel, Microsoft HDR streaming capable Full high-definition (FHD) (1920 × 1080), antiglare, 72% CG, eDP 1.2, 300 nits FHD (1920 × 1080), antiglare, 72% CG, eDP 1.2, A/P, 300 nits FHD (1920 × 1080), antiglare, 144 Hz, 72% CG, eDP 1.4 + PSR, 300 nits FHD (1920 × 1080), antiglare, 240 Hz, sRGB, eDP 1.4 + PSR 2, 300 nits Ultra high-definition (UHD) (3840 × 2160), antiglare, 72% CG, A/P, eDP 1.3 + PSR, 340 nits UHD (3840 × 2160), antiglare, eDP 1.3 + PSR, 72% CG, 340 nits UHD (3840 × 2160), BrightView, AMOLED, eDP + PSR, DCI-P3, 400 nits |
| Memory | Two SODIMM slots, customer accessible/upgradeable DDR4-2666 dual channel support, 1.2 V Supports up to 32 GB maximum system memory in the following configurations: |

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

| Category | Description |
|-----------------------------|---|
| | <ul style="list-style-type: none"> • 32 GB (16 GB × 2) • 16 GB (16 GB × 1 or 8 GB × 2) • 12 GB (8 GB × 1 + 4 GB × 1) • 8 GB (8 GB × 1 or 4 GB × 2) • 4 GB (4 GB × 1) |
| Storage | <p>Supports 7.0 mm/7.2 mm, 2.5 in SATA hard drives</p> <p>Support for solid-state drive + hard drive</p> <p>Support for M.2 PCIe or SATA solid-state drive</p> <p>Accelerometer hard drive protection support</p> <p>Single hard drive configurations</p> <p>1 TB, 7200 rpm, 7.0 mm</p> <p>Dual storage configurations</p> <p>512 GB, PCIe, NVMe, TLC, solid-state drive + 1 TB, 7200 rpm hard drive</p> <p>256 GB, PCIe, NVMe, TLC, solid-state drive + 2 TB, 5400 rpm hard drive</p> <p>256 GB, PCIe, NVMe, TLC, solid-state drive + 1 TB, 7200 rpm hard drive</p> <p>128 GB, PCIe, NVMe, TLC, solid-state drive + 1 TB, 7200 rpm hard drive</p> <p>NVMe, TLC, M.2 solid-state drive</p> <p>1 TB, PCIe-3 × 4</p> <p>512 GB, PCIe-3 × 4</p> <p>256 GB, PCIe-3 × 4</p> <p>128 GB, PCIe-3 × 2</p> <p>Intel Optane™ (3D Xpoint) Solution (PCIe) Gen3 × 2, solid-state drive</p> <p>32 GB (Optane) + 512 GB, PCIe-3 × 2 × 2 solid-state drive</p> <p>16 GB (Optane) + 1 TB, 7200 rpm hard drive</p> |
| Audio | <p>Audio brand: Bang & Olufsen</p> <p>Audio control panel: OMEN Audio Control (supports DTS: X Ultra)</p> <p>Supports HP Audio Boost 2.0 with discrete amplifier</p> <p>Dual speakers</p> <p>Supports Headphone X</p> |
| Video | <p>HP Wide Vision HD Camera - indicator LED, USB 2.0, HD BSI sensor, f2.0, WDR, 88° WFOV</p> <p>720p by 30 frames per second</p> <p>Dual-array digital microphone with appropriate software: beam forming, echo cancellation, noise suppression</p> |
| RJ-45 (network) jack | Integrated 10/100/1000 NIC |

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

| Category | Description |
|----------------------------------|--|
| | Supports Network Booster |
| Sensors | Accelerometer |
| Wireless networking | <p>Integrated wireless option with dual antennas (M.2/MIPI/BRI)</p> <p>Intel Wireless-AC 9560 802.11ac 2 × 2 Wi-Fi + Bluetooth® 5 (non-vPro) (MU-MIMO, Gigabit Wi-Fi speeds supported)</p> <p>Integrated wireless option with dual antennas (M.2/PCIe)</p> <p>Intel Wi-Fi 6 AX200 + Bluetooth 5 (802.11ax 2 × 2 vPro, supporting gigabit transfer speeds)</p> <p>Realtek RTL8822BE 802.11 ac 2 × 2 Wi-Fi + Bluetooth 4.2 Combo Adapter (MU-MIMO supported)</p> <p>Support for Wi-Fi CERTIFIED Miracast™ devices</p> |
| Ports | <p>HP Smart Plug AC adapter</p> <p>Audio-out (headphone)/Audio-in (microphone) combo jack</p> <p>RJ-45 (network) jack</p> <p>High-definition multimedia interface (HDMI) v.2.0 + HDCP 2.2 supporting up to 4096 × 2160 at 60 Hz</p> <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>Mini DisplayPort™</p> <p>USB 3.0 Type A ports (3); two on left side, one on right side; supports HP Sleep & Charge (right side)</p> <p>USB 3.1 Gen 2 Type-C port (left side; supports data transfer, DisplayPort 1.4 output up to 7680 × 3840 [60 Hz]; supports HP Sleep & Charge)</p> <p>USB 3.1 Gen 2 Type-C port with Thunderbolt™ Gen 3 technology (left side)</p> |
| Media card reader | <p>Supports microSD™/SDHC™/SDXC™</p> <p>Push-push insertion/removal</p> |
| Internal card expansion | <p>One M.2 slot for WLAN</p> <p>One M.2 slot for solid-state drive</p> |
| Keyboard/pointing devices | <p>Keyboard</p> <p>Full-sized, backlit, island-style, keyboard with numeric keypad, single-zone lighting</p> <p>Full-sized, backlit, island-style, keyboard with numeric keypad, 4-zone lighting</p> <p>Special highlight for WASD keys</p> <p>Supports 26-key RO antighosting keys</p> <p>Touchpad requirements</p> <p>Touchpad with image sensor</p> <p>Multitouch gestures enabled</p> <p>Support for precision touchpad</p> <p>Support for modern trackpad gestures</p> <p>Taps enabled as default</p> |

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

| Category | Description | |
|--|--|--|
| Power requirements | Battery | |
| | Supports a 6 cell, 69 Wh, polymer battery | |
| | Supports a 3 cell, 52 Wh, polymer battery | |
| | Supports battery life enhancement | |
| | Supports battery fast charge (45 minutes, 50% charged) | |
| | Smart AC adapter (PFC, slim barrel, 4.5 mm) | |
| | 200 W | |
| | 150 W | |
| | Power cord (1 m, conventional) | |
| | C13 (for adapters > 200 W) | |
| | C5 | |
| | Security | Trusted Platform Module (fTPM) 2.0, firmware based |
| | Operating system | Preinstalled |
| Windows® 10 Home 64 | | |
| Windows 10 Home 64 Advanced | | |
| Windows 10 Home 64 Advanced Single Language | | |
| Windows 10 Home 64 Chinese Market CPPP | | |
| Windows 10 Home 64 High-End Chinese Market CPPP | | |
| Windows 10 Home 64 Plus | | |
| Windows 10 Home 64 Plus Single Language | | |
| Windows 10 Home 64 Plus Single Language APAC EM PPP | | |
| Windows 10 Home 64 Plus Single Language India Market PPP | | |
| Windows 10 Home 64 Plus Single Language Indonesia Market PPP | | |
| Windows 10 Home 64 Single Language | | |
| Windows 10 Home 64 Single Language APAC EM PPP | | |
| Windows 10 Home 64 Single Language India Market PPP | | |
| Windows 10 Home 64 Single Language Indonesia Market PPP | | |
| Windows 10 Pro 64 | | |
| Windows 10 Pro 64 High End | | |
| Windows 10 Pro 64 Web/Kiosk | | |
| Windows 10 Home 64 Plus Single Language Africa Market PPP | | |
| Windows 10 Home 64 Single Language Africa Market PPP | | |
| FreeDOS 3.0 | | |

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

| Category | Description |
|-----------------------|-----------------------------------|
| Serviceability | End-user replaceable parts |
| | AC adapter |
| | Memory modules |
| | Solid-state drive |
| | Hard drive |

2 Getting to know your computer

Your computer features top-rated components. This chapter provides details about your components, where they are located, and how they work.

 **NOTE:** Actual computer color, features, feature locations, and icon labels may vary from the images depicted.

Right side

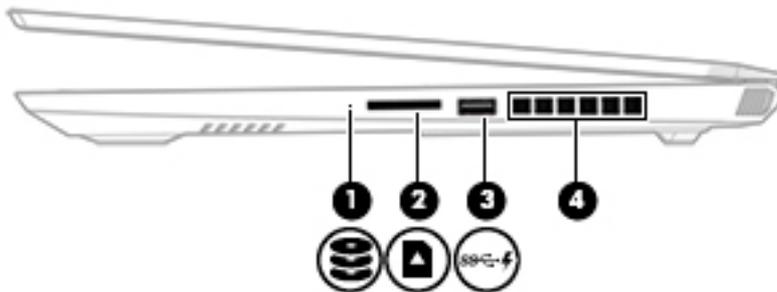


Table 2-1 Right-side components and their descriptions

| Component | Description |
|--|--|
| (1)  Drive light | <ul style="list-style-type: none">• Blinking white: The hard drive is being accessed.• Amber: HP 3D DriveGuard has temporarily parked the hard drive. |
| (2)  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">1. Hold the card label-side up, with connectors facing the computer.2. Insert the card into the memory card reader, and then press in on the card until it is firmly seated. <p>To remove a card:</p> <ul style="list-style-type: none">▲ Press in on the card, and then remove it from the memory card reader. |
| (3)  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. |
| (4) Vent | <p>Enables airflow to cool internal components.</p> <p>NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.</p> |

Left side

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

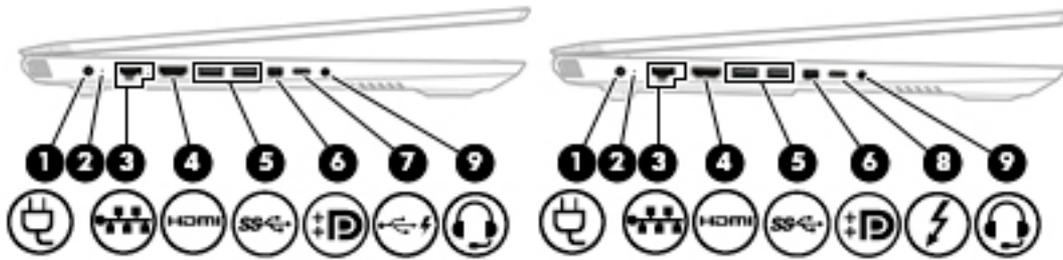


Table 2-2 Left-side components and their descriptions

| Component | Description |
|-----------|---|
| (1) | Power connector |
| (2) | AC adapter and battery light |
| (3) | RJ-45 (network) jack/status lights |
| (4) | HDMI port |
| (5) | USB SuperSpeed ports |
| (6) | Dual-Mode DisplayPort connector |
| (7) | USB Type-C port with HP Sleep and Charge |
| (8) | USB Type-C Thunderbolt™ port with HP Sleep and Charge |

- Connects an AC adapter.
- White: The AC adapter is connected and the battery is fully charged.
- Blinking white: The AC adapter is disconnected and the battery has reached a low battery level.
- Amber: The AC adapter is connected and the battery is charging.
- Off: The battery is not charging.

- Connects a network cable.
- White: The network is connected.
- Amber: Activity is occurring on the network.

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.

Connect a USB device, such as a cell phone, camera, activity tracker, or smartwatch, and provides high-speed data transfer.

Connects an optional digital display device, such as a high-performance monitor or projector.

Connects a USB device that has a Type-C connector, provides data transfer, and even when the computer is off, charges most products such as a cell phone, camera, activity tracker, or smartwatch.

– and –

Connects a display device that has a USB Type-C connector, providing DisplayPort output.

NOTE: Cables and/or adapters (purchased separately) may be required.

Even when the computer is off, 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.

Table 2-2 Left-side components and their descriptions (continued)

| Component | Description |
|--|---|
| | <p>– and –</p> <p>Connects a display device that has a USB Type-C connector, providing DisplayPort output.</p> <p>NOTE: Your computer may also support a Thunderbolt docking station.</p> <p>NOTE: Cables and/or adapters (purchased separately) may be required.</p> |
| (9)  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>WARNING! To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, see the <i>Regulatory, Safety, and Environmental Notices</i>.</p> <p>To access this guide:</p> <ul style="list-style-type: none">▲ Type HP Documentation in the taskbar search box, and then select HP Documentation. <p>NOTE: When a device is connected to the jack, the computer speakers are disabled.</p> |

Rear



Table 2-3 Rear components and their descriptions

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

Display

Low blue light mode (select products only)

Your computer display is shipped from the factory in low blue light mode for improved eye comfort and safety. Also, blue light mode automatically adjusts blue light emissions when you are using the computer at night or for reading.

⚠ WARNING! To reduce the risk of serious injury, read the *Safety & Comfort Guide*. It describes proper workstation setup and proper posture, health, and work habits for computer users. The *Safety & Comfort Guide* also provides important electrical and mechanical safety information. The *Safety & Comfort Guide* is available on the web at <http://www.hp.com/ergo>.



Table 2-4 Display components and their descriptions

| Component | Description |
|--------------------------|---|
| (1) WLAN antennas* | Send and receive wireless signals to communicate with wireless local area networks (WLANs). |
| (2) Internal microphones | Record sound. |
| (3) Camera light | On: The camera is in use. |
| (4) Camera | Allows you to video chat, record video, and record still images. Some cameras also allow a facial recognition logon to Windows, instead of a password logon. NOTE: Camera functions vary depending on the camera hardware and software installed on your product. |

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

Table 2-4 Display components and their descriptions (continued)

| Component | Description |
|--|-------------|
| For wireless regulatory notices, see the section of the <i>Regulatory, Safety, and Environmental Notices</i> that applies to your country or region. | |
| To access this guide: | |
| 1. Type <code>support</code> 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

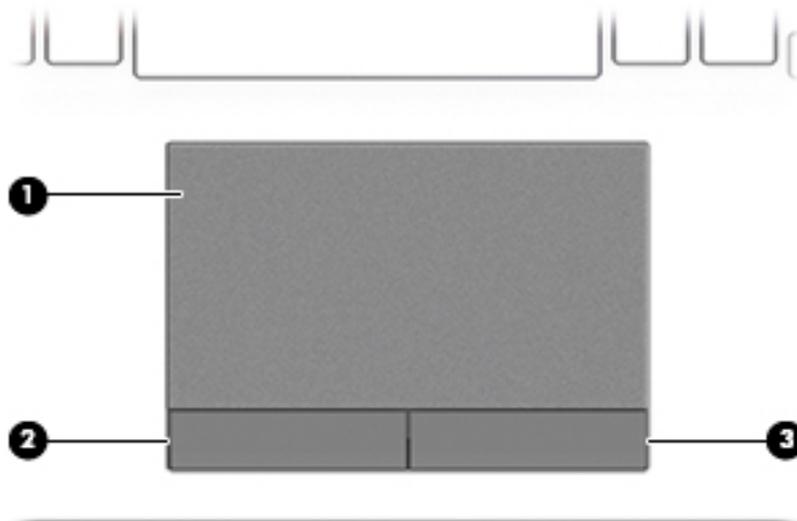


Table 2-5 Touchpad components and their descriptions

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

Lights

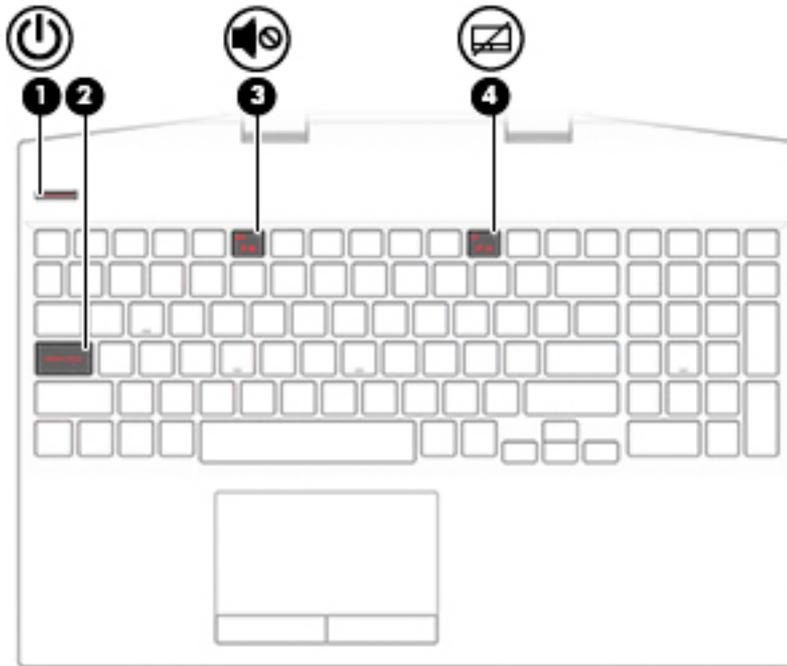


Table 2-6 Lights and their descriptions

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

Button

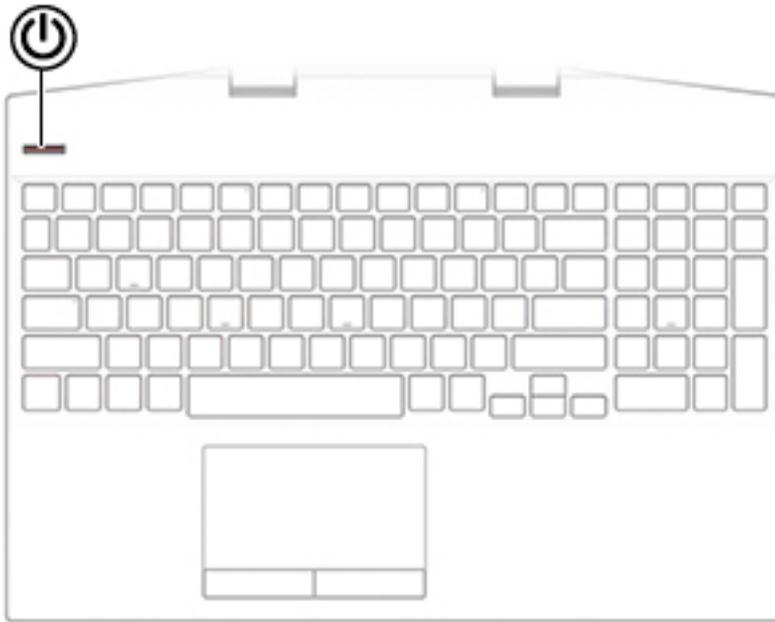


Table 2-7 Button and description

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

Special keys

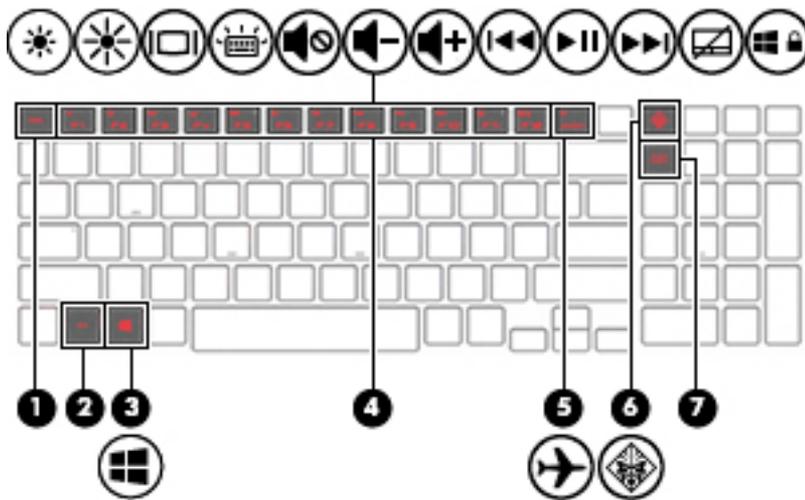


Table 2-8 Special keys and their descriptions

| Component | Description |
|---|---|
| (1) esc key | Displays system information when pressed in combination with the fn key. |
| (2) fn key | Executes specific functions when pressed in combination with another key. |
| (3)  Windows key | Opens the Start menu. NOTE: Pressing the Windows key again will close the Start menu. |
| (4) Action keys | Execute frequently used system functions when pressed in combination with the fn key. |
| (5)  Airplane mode key (also referred to as the wireless button) | Turns the airplane mode and wireless feature on or off. NOTE: A wireless network must be set up before a wireless connection is possible. |
| (6)  | Opens the OMEN Command Center software. |
| (7) num lk key | Alternates between the navigational and numeric functions on the integrated numeric keypad. |

Bottom

 **NOTE:** Your computer may look slightly different from the illustration in this section.

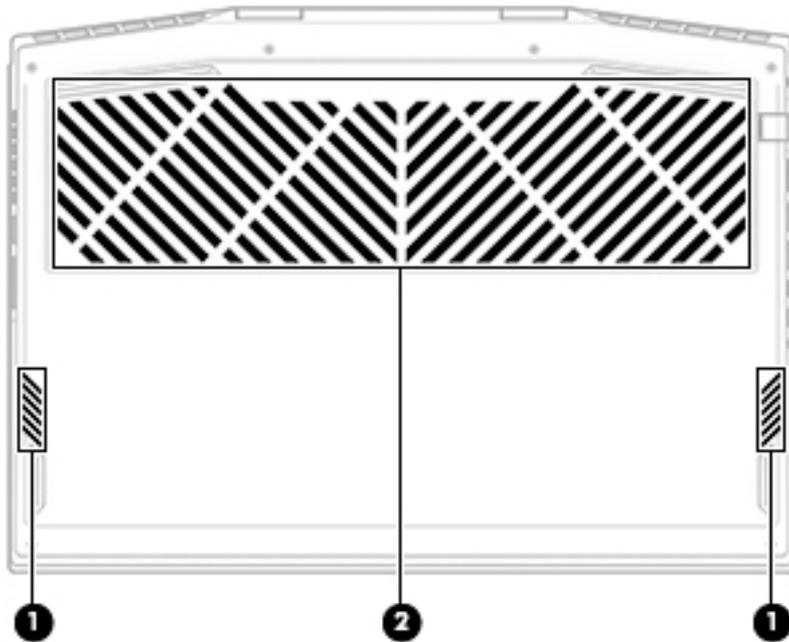


Table 2-9 Bottom components and their descriptions

| Component | Description |
|--------------|--|
| (1) Speakers | Produce sound. |
| (2) Vent | Enables airflow to cool internal components. NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation. |

Labels

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

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

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

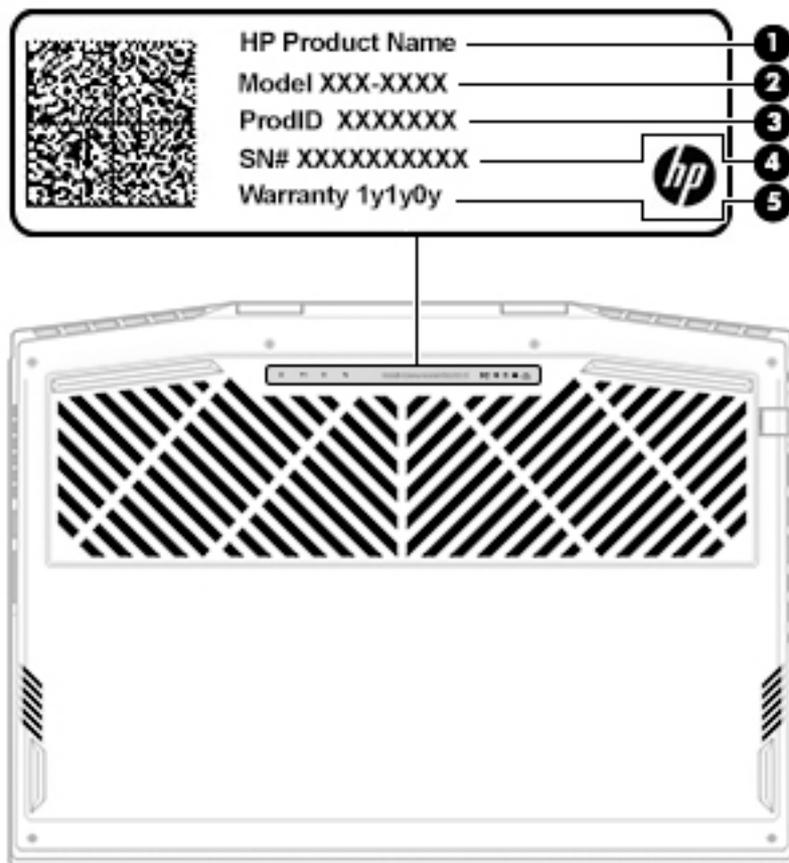


Table 2-10 Service label components

| Component |
|---------------------|
| (1) HP product name |
| (2) Model number |
| (3) Product ID |

Table 2-10 Service label components (continued)

| Component | |
|-----------|-----------------|
| (4) | Serial number |
| (5) | Warranty period |

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

HP OMEN Command Center

HP OMEN Command Center allows you to customize your computer for your specific gaming needs.

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

– or –

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

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

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

- **System Vitals:** Monitor the computer status and performance.
- **Lighting:** Customize the keyboard lighting (select products only).
- **Network Booster:** View and adjust network priorities and settings.
- **Performance Control:** Optimize the performance of your computer for the task you are performing.
- **Gaming Macro Keys:** Configure the P-keys (select products only).
- **OMEN Game Stream:** Provide the ability to stream games to other devices.
- **Update:** Update the OMEN Command Center software.
- **Help:** Access “How to” information and frequently asked questions.

 **NOTE:** To minimize the dashboard, select the ◀ button at the top of the dashboard.

3 Illustrated parts catalog

Computer major components

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

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

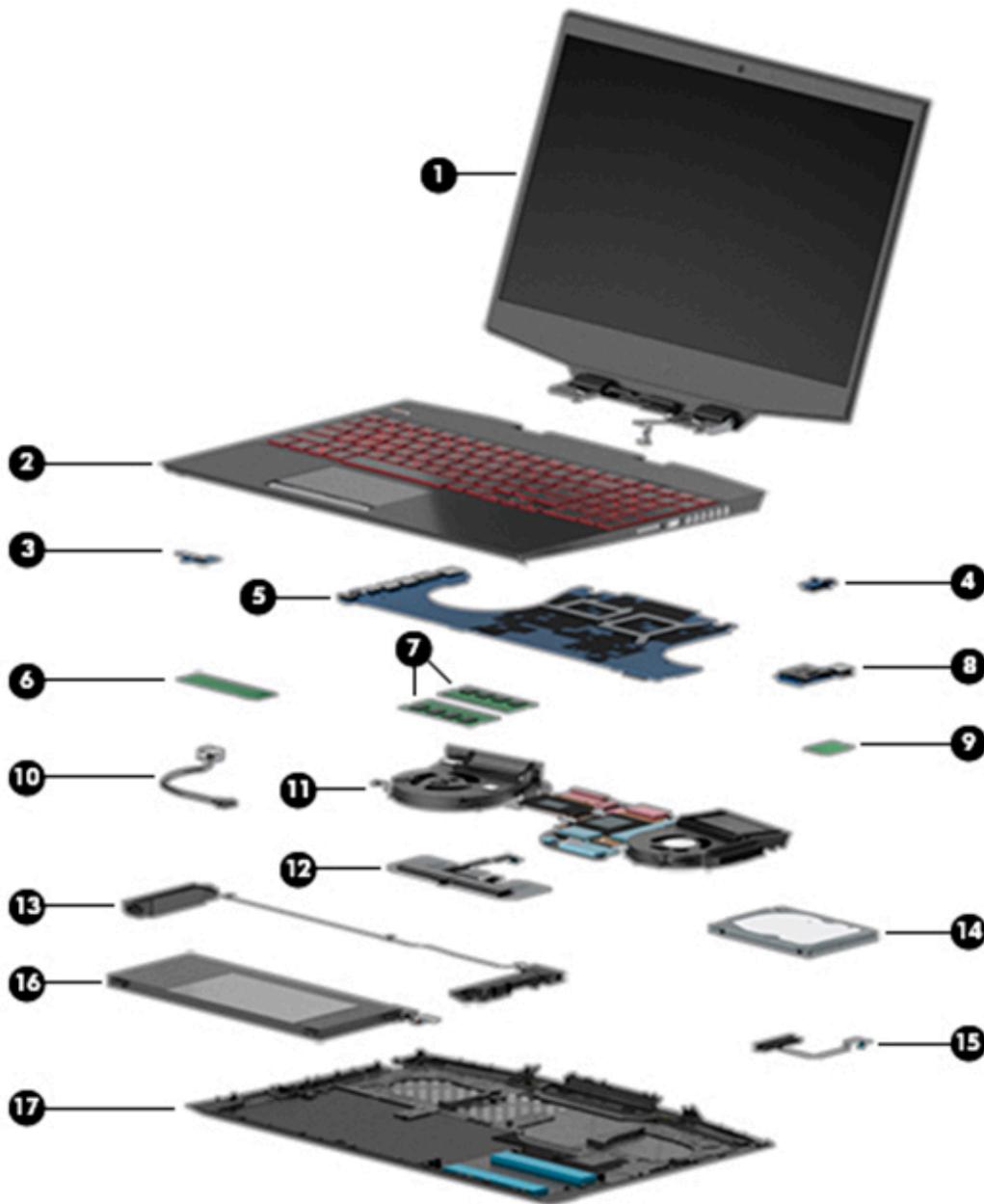


Table 3-1 Computer major components and their descriptions

| Item | Component | Spare part number |
|------------|--|-------------------|
| (1) | Display assembly NOTE: Display assemblies are spared only at a subcomponent level. | |
| (2) | Keyboard/top cover (includes acetate tape): For a detailed list of country codes, see Keyboard/top cover on page 62 . For use models with 1-zone lighting (dragon red legend + red backlight) | L57322-xx1 |
| | For use models with 4-zone lighting (white legend + RGB backlight) | L57323-xx1 |
| | For use models with 1-zone lighting (dragon red legend + red backlight) with Thunderbolt | L57324-xx1 |
| | For use models with 4-zone lighting (white legend + RGB backlight) with Thunderbolt | L57325-xx1 |
| (3) | Power button board NOTE: The power button board cable is available as spare part number L57339-001. | L57319-001 |
| (4) | Thermal sensor NOTE: The thermal sensor cable is available as spare part number L57340-001. | L57318-001 |
| (5) | System board (includes processor): All system boards use the following part numbers: xxxxxx-001: Non-Windows operating system xxxxxx-601: Windows 10 operating system | |
| | Intel Core i9-9880H processor and 8 GB of discrete graphics memory (GeForce RTX 2080) | L59769-xx1 |
| | Intel Core i7-9750H processor and 8 GB of discrete graphics memory (GeForce RTX 2080) | L59768-xx1 |
| | Intel Core i7-9750H processor and 8 GB of discrete graphics memory (GeForce RTX 2070; G-Sync) | L59767-xx1 |
| | Intel Core i7-9750H processor and 6 GB of discrete graphics memory (GeForce RTX 2060) | L59766-xx1 |
| | Intel Core i7-9750H processor and 6 GB of discrete graphics memory (GeForce GTX 1660Ti) | L59764-xx1 |
| | Intel Core i7-9750H processor and 4 GB of discrete graphics memory (GeForce GTX 1650) | L59762-xx1 |
| | Intel Core i5-9300H processor and 6 GB of discrete graphics memory (GeForce RTX 2060) | L59765-xx1 |
| | Intel Core i5-9300H processor and 6 GB of discrete graphics memory (GeForce GTX 1660Ti) | L59763-xx1 |
| | Intel Core i5-9300H processor and 4 GB of discrete graphics memory (GeForce GTX 1650) | L59761-xx1 |
| | Thermal pad kit (not illustrated) | L57443-001 |
| (6) | Solid-state drive (M.2): | |
| | 1 TB, PCIe, Gen 3 × 4 | L57387-001 |
| | 512 GB, PCIe, Gen 3 × 4 | L57351-001 |
| | 512 GB, PCIe + 32 GB Optane memory | L57352-001 |
| | 256 GB, PCIe, Gen 3 × 4 | L57350-001 |
| | 128 GB, PCIe, Gen 3 × 2 | L57349-001 |
| | 16 GB, PCIe, Gen 3 × 2 Optane memory module | L57348-001 |

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

| Item | Component | Spare part number |
|-------------|--|-------------------|
| (7) | Memory modules (DDR4-2666): | |
| | 16 GB | 937438-850 |
| | 8 GB | 937236-850 |
| | 4 GB | L10598-850 |
| (8) | Card reader/USB board | L57317-001 |
| | NOTE: The card reader/USB board cable is available as spare part number L57338-001. | |
| (9) | WLAN module | |
| | Intel Wireless-AC 9560 802.11ac 2 × 2 Wi-Fi + Bluetooth 5 | L22634-005 |
| | Intel Wi-Fi 6 AX200 802.11ax 2 × 2 + Bluetooth 5 (non-vPro) | L35282-005 |
| | Realtek RTL8822BE 802.11ac 2 × 2 Wi-Fi + Bluetooth 4.2 Combo Adapter (MU-MIMO supported) | 924813-855 |
| (10) | Power connector cable | L57333-001 |
| (11) | Heat sink for use in models with GeForce GTX 1650 graphics | L57329-001 |
| | Heat sink for use in models with GeForce GTX 1660Ti graphics | L57330-001 |
| | Heat sink for use in models with GeForce RTX 2060 graphics | L64443-001 |
| | Heat sink for use in models with GeForce RTX 2070 graphics | L64444-001 |
| | Heat sink for use in models with GeForce RTX 2080 graphics | L64445-001 |
| | Thermal grease (not illustrated) | L65268-001 |
| | Thermal pad kit (not illustrated) | L57443-001 |
| (12) | Touchpad button board | L57343-001 |
| (13) | Speaker assembly (includes cushion) | L57342-001 |
| (14) | Hard drive | |
| | 2 TB, 5400 rpm | 912487-850 |
| | 1 TB, 7200 rpm | L06427-850 |
| (15) | Hard drive connector | L57337-001 |
| (16) | Battery | |
| | 6 cell, 69 Wh (includes thermal pad) | L48497-006 |
| | 3 cell, 52 Wh (includes battery rubber) | L48495-006 |
| (17) | Bottom cover | |
| | For use in models with N18P graphics (NVIDIA GeForce GTX 1650) | L57326-001 |
| | For use in models with N18E graphics (NVIDIA GeForce RTX 2080/2070/2060, GTX 1660Ti) | L57327-001 |

Display assembly subcomponents

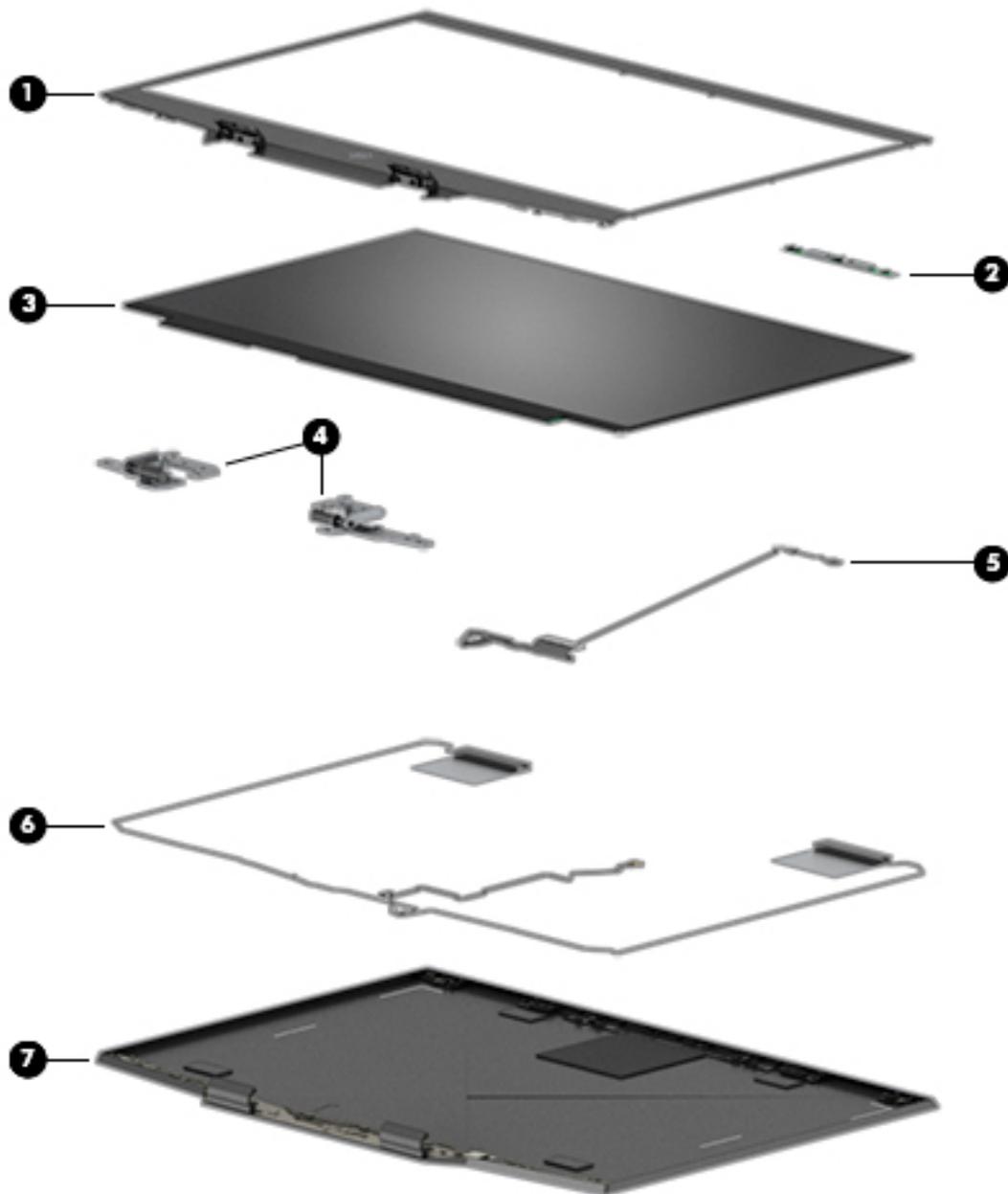


Table 3-2 Display components and their descriptions

| Item | Component | Spare part number |
|------------|---|-------------------|
| (1) | Display bezel with magnet | |
| | For use in models with an LCD display | L57328-001 |
| | For use in models with an OLED display | L66157-001 |
| (2) | Webcam/microphone module (includes bezel adhesive) | |
| | For models with an LCD display | L61453-001 |

Table 3-2 Display components and their descriptions (continued)

| Item | Component | Spare part number |
|------------|--|-------------------|
| | For models with an OLED display | L67363-001 |
| (3) | Display panel (includes panel adhesive tape and bezel adhesive): NOTE: Display panel adhesive is available as spare part number L57335-001 for LCD displays and L66213-001 for OLED displays. | |
| | UHD, BrightView, OLED | L66159-001 |
| | UHD, antiglare, 340 nits | L57345-001 |
| | FHD, antiglare, 60 Hz | L57346-001 |
| | FHD, antiglare, 144 Hz | L57347-001 |
| | FHD, antiglare, 240 Hz | L60898-001 |
| (4) | Display hinges (left and right; includes bezel adhesive) | |
| | For models with an LCD display | L57321-001 |
| | For models with an OLED display | L67364-001 |
| (5) | Display panel/webcam cable (includes display panel adhesive tape and bezel adhesive): | |
| | For use in FHD, 60 Hz displays | L57331-001 |
| | For use in FHD/UHD, 144 Hz displays | L57332-001 |
| | For use in FHD, 240 Hz displays | L63889-001 |
| | OLED displays | L66158-001 |
| (6) | Wireless antennas (main and aux; includes bezel adhesive and acetate tape) | |
| | For models with an LCD display | L57334-001 |
| | For models with an OLED display | L66155-001 |
| (7) | Display back cover (includes bezel adhesive, acetate tape, and display panel adhesive tape) | |
| | For models with an LCD display | L57320-001 |
| | For models with an OLED display | L66156-001 |

Cables

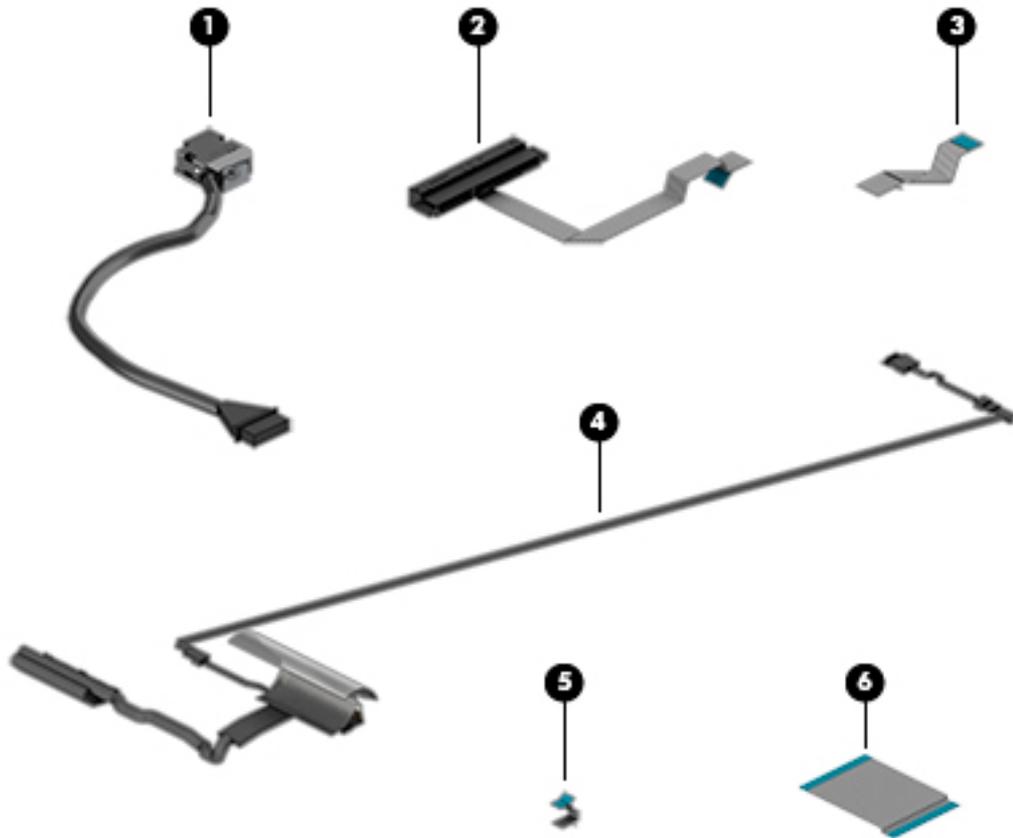


Table 3-3 Cables and their descriptions

| Item | Component | Spare part number |
|------|--|-------------------|
| (1) | Power connector cable | L57333-001 |
| (2) | Hard drive connector/cable | L57337-001 |
| (3) | Power button board cable | L57339-001 |
| (4) | Display cable | |
| | For use in models with an FHD, 60 Hz display | L57331-001 |
| | For use in models with an FHD/UHD 144 Hz display | L57332-001 |
| | For use in models with an FHD, 240 Hz display | L63889-001 |
| | For use in models with an OLED display | L66158-001 |
| (5) | Thermal sensor cable | L57340-001 |
| (6) | Card reader/USB board cable | L57338-001 |

Mass storage devices

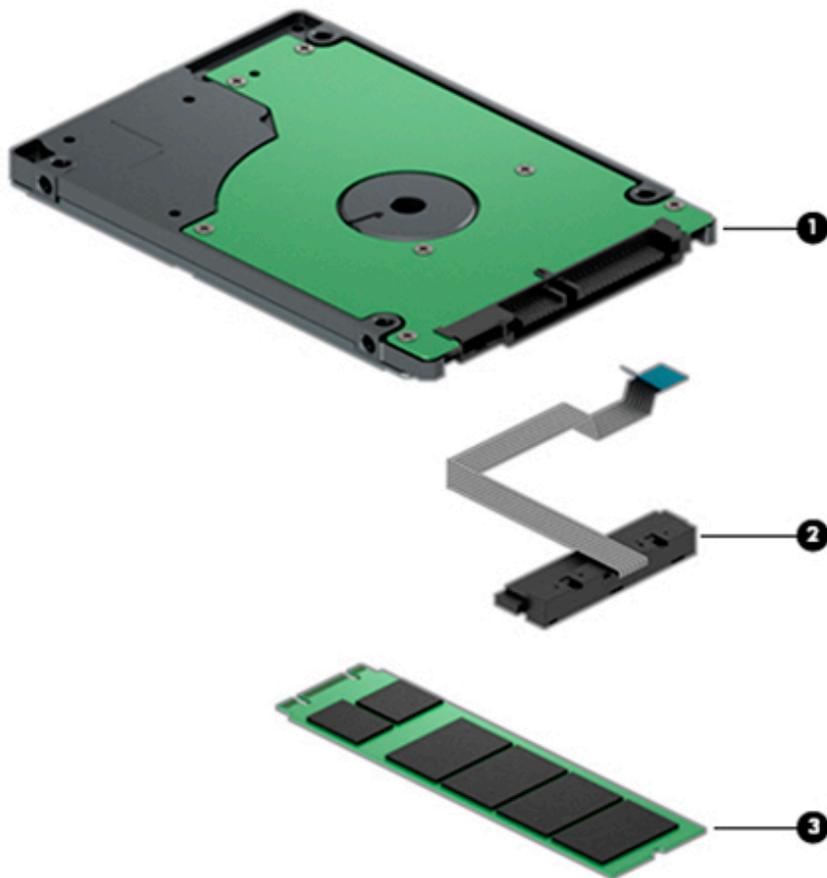


Table 3-4 Mass storage devices and their descriptions

| Item | Component | Spare part number |
|------|---|-------------------|
| (1) | Hard drive | |
| | 2 TB, 5400 rpm | 912487-850 |
| | 1 TB, 7200 rpm | L06427-850 |
| (2) | Hard drive connector/cable | L57337-001 |
| (3) | Solid-state drive (M.2) | |
| | 1 TB, PCIe, Gen 3 × 4 | L57387-001 |
| | 512 GB, PCIe, Gen 3 × 4 | L57351-001 |
| | 512 GB, PCIe + 32 GB Optane memory | L57352-001 |
| | 256 GB, PCIe, Gen 3 × 4 | L57350-001 |
| | 128 GB, PCIe, Gen 3 × 2 | L57349-001 |
| | 16 GB, PCIe, Gen 3 × 2 Optane memory module | L57348-001 |

Miscellaneous parts

Table 3-5 Miscellaneous parts and their descriptions

| Component | Spare part number |
|---|-------------------|
| AC adapter (PFC, slim, 4.5 mm): | |
| 200 W | L00818-850 |
| 150 W | L32661-001 |
| Power cord (C5, 1.0 m): | |
| For use in Argentina | L30811-001 |
| For use in Australia | L22327-001 |
| For use in Denmark | L22322-001 |
| For use in Europe | L22321-001 |
| For use in India | L22624-001 |
| For use in Israel | L22323-001 |
| For use in Italy | L30813-001 |
| For use in Japan | L22330-001 |
| For use in North America | L22319-001 |
| For use in the People's Republic of China | L21930-001 |
| For use in South Africa | L22325-001 |
| For use in South Korea | L22328-001 |
| For use in Switzerland | L22324-001 |
| For use in Taiwan | L22329-001 |
| For use in Thailand | L22326-001 |
| For use in the United Kingdom | L22320-001 |
| Power cord (C13, 1.0 m): | |
| For use in Argentina | L22104-001 |
| For use in Australia | L22339-001 |
| For use in Denmark | L22334-001 |
| For use in Europe | L22333-001 |
| For use in India | L22343-001 |
| For use in Israel | L22335-001 |
| For use in Italy/Chile | L22103-001 |
| For use in Japan | L22344-001 |
| For use in North America | L22331-001 |
| For use in the People's Republic of China | L22341-001 |
| For use in South Africa | L22337-001 |

Table 3-5 Miscellaneous parts and their descriptions (continued)

| Component | Spare part number |
|-------------------------------|--------------------------|
| For use in South Korea | L22340-001 |
| For use in Switzerland | L22336-001 |
| For use in Taiwan | L22342-001 |
| For use in Thailand | L22338-001 |
| For use in the United Kingdom | L22332-001 |
| External optical drive | 747080-001 |
| Thermal grease | L65268-001 |
| Thermal pad kit | L57443-001 |
| HDMI-to-VGA adapter | 701943-001 |
| USB-C-to-USB-A adapter | 833960-001 |
| Screw Kit | L57344-001 |

4 Removal and replacement procedures preliminary requirements

Tools required

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

- Non-marking, non-conductive pry tool
- Magnetic Phillips P1 screwdriver
- Tweezers

Service considerations

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

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

Plastic parts

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

Cables and connectors

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

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

Drive handling



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

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

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

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

Handle drives on surfaces covered with at least 2.54 cm (1 inch) of shock-proof foam.

Avoid dropping drives from any height onto any surface.

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

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

Avoid exposing a drive to temperature extremes or liquids.

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

Workstation guidelines

Follow these grounding workstation guidelines:

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

Electrostatic discharge information

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

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



IMPORTANT: To prevent damage to the device when you are removing or installing internal components, observe these precautions:

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

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

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

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

Generating static electricity

Note the following:

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

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

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

Electronic components can be packaged together in plastic tubes, trays, or Styrofoam.



NOTE: As little as 700 V can degrade a product.

Preventing electrostatic damage to equipment

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

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

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

Personal grounding methods and equipment

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

- **Wrist straps** are flexible straps with a maximum of $1\text{ M}\Omega \pm 10\%$ resistance in the ground cords. To provide proper ground, a strap must be worn snug against bare skin. The ground cord must be connected and fit snugly into the banana plug connector on the grounding mat or workstation.
- **Heel straps/Toe straps/Boot straps** can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use them on both feet with a maximum of $1\text{ M}\Omega \pm 10\%$ resistance between the operator and ground.

Table 4-2 Static shielding protection levels

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

Grounding the work area

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

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

Recommended materials and equipment

HP recommends the following materials and equipment to prevent static electricity:

- Antistatic tape
- Antistatic smocks, aprons, or sleeve protectors
- Conductive bins and other assembly or soldering aids
- Conductive foam
- Conductive tabletop workstations with ground cord of $1\text{ M}\Omega \pm 10\%$ resistance
- Static-dissipative table or floor mats with hard tie to ground

- Field service kits
- Static awareness labels
- Wrist straps and footwear straps providing $1\text{ M}\Omega \pm 10\%$ resistance
- Material handling packages
- Conductive plastic bags
- Conductive plastic tubes
- Conductive tote boxes
- Opaque shielding bags
- Transparent metallized shielding bags
- Transparent shielding tubes

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

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

5 Removal and replacement procedures for Customer Self-Repair parts

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

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

Component replacement procedures

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

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

There are as many as 15 screws that must be removed, replaced, and/or loosened when servicing Customer Self-Repair parts. Make special note of each screw size and location during removal and replacement.

Preparation for disassembly

See [Removal and replacement procedures preliminary requirements on page 26](#) for initial safety procedures.

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

Bottom cover

Table 5-1 Bottom cover descriptions and part numbers

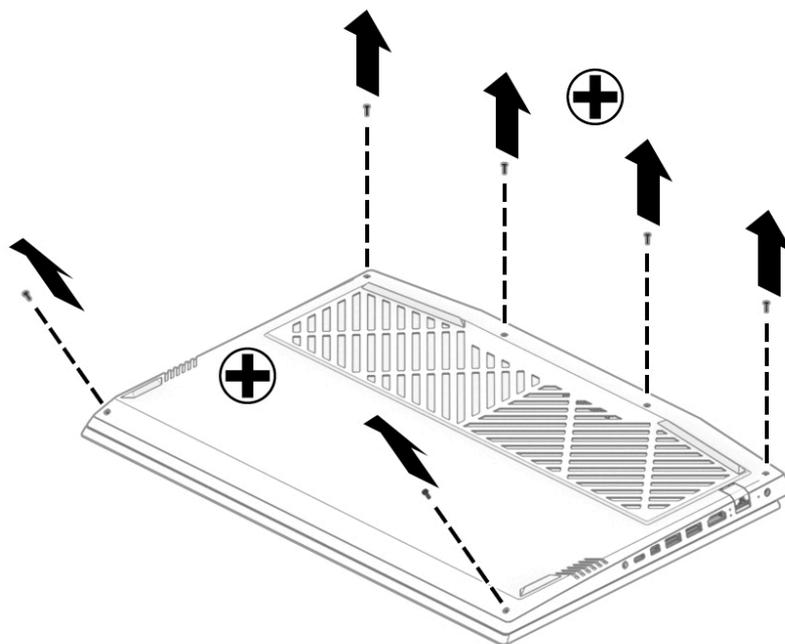
| Description | Spare part number |
|---|-------------------|
| Bottom cover for use in models with N18P graphics (NVIDIA GeForce GTX 1650) | L57326-001 |
| Bottom cover for use in models with N18E graphics (NVIDIA GeForce RTX 2080/2070/2060, GTX 1660Ti) | L57327-001 |

Before removing the bottom cover, follow this step:

- ▲ Prepare the computer for disassembly ([Preparation for disassembly on page 31](#)).

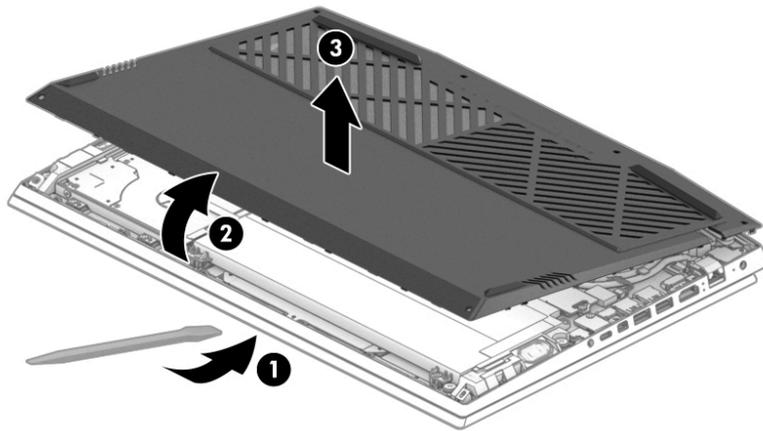
Remove the bottom cover:

1. Remove the six Phillips M2.0 × 6.0 screws from the bottom cover.



2. Insert a plastic tool between the bottom cover and the computer chassis **(1)**, and then flex and lift the top edge of the bottom cover enough to separate it from the computer **(2)**.

3. Remove the bottom cover from the computer **(3)**.



Reverse this procedure to install the bottom cover.

Solid-state drive and Optane memory module

Table 5-2 Solid-state drive and Optane memory module descriptions and part numbers

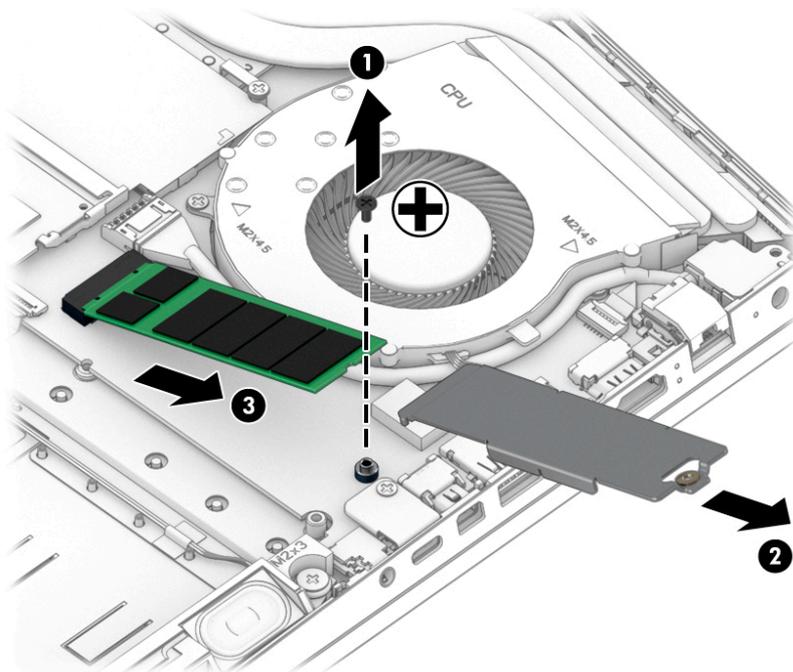
| Description | Spare part number |
|---|-------------------|
| 1 TB, PCIe, Gen 3 × 4 | L57387-001 |
| 512 GB, PCIe, Gen 3 × 4 | L57351-001 |
| 512 GB, PCIe + 32 GB Optane memory | L57352-001 |
| 256 GB, PCIe, Gen 3 × 4 | L57350-001 |
| 128 GB, PCIe, Gen 3 × 2 | L57349-001 |
| 16 GB, PCIe, Gen 3 × 2 Optane memory module | L57348-001 |

Before removing the solid-state drive or Optane memory module, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 31](#)).
2. Remove the bottom cover (see [Bottom cover on page 32](#)).
3. Disconnect the battery cable from the system board (see [Battery on page 39](#)).

Remove the solid-state drive or Optane memory module:

- ▲ Remove the Phillips M2.0 × 4.0 screw **(1)**, lift the metal cover off the drive **(2)**, and then pull the drive from the socket **(3)**.



Reverse this procedure to install the solid-state drive or Optane memory module.

Memory module

Table 5-3 Memory descriptions and part numbers

| Description | Spare part number |
|----------------------|-------------------|
| Memory module, 16 GB | 937438-850 |
| Memory module, 8 GB | 937236-850 |
| Memory module, 4 GB | L10598-850 |

Before removing the memory modules, follow these steps:

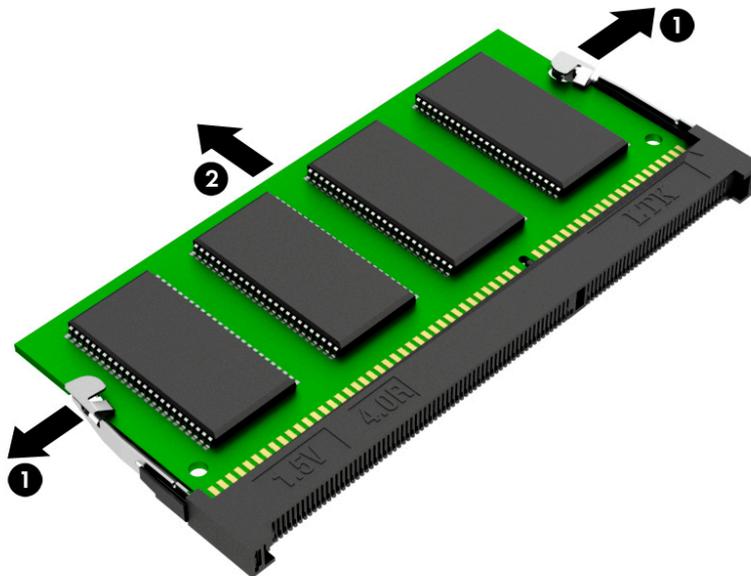
1. Prepare the computer for disassembly ([Preparation for disassembly on page 31](#)).
2. Remove the bottom cover (see [Bottom cover on page 32](#)).
3. Disconnect the battery cable from the system board (see [Battery on page 39](#)).

Remove the memory modules:

1. Spread the two retention clips outward **(1)** until the memory module tilts up at a 45° angle.
2. Grasp the edge of the memory module **(2)**, and then gently pull the module out of the slot. Use the same procedure to remove both memory modules.

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

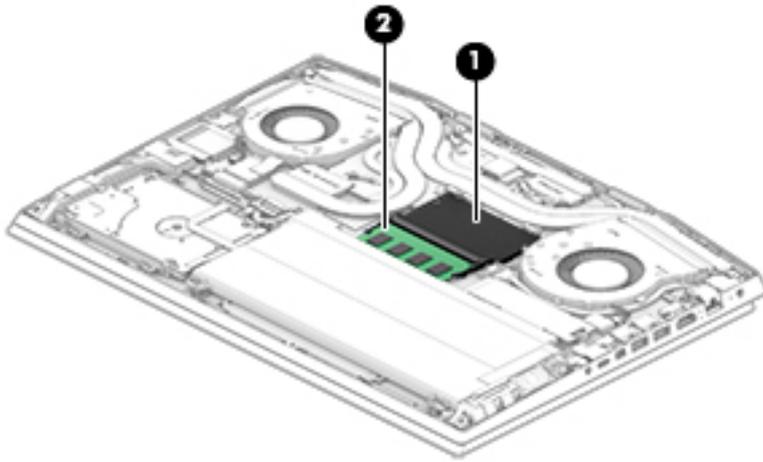
To protect a memory module after removal, place it in an electrostatic-safe container.



Install the memory modules:

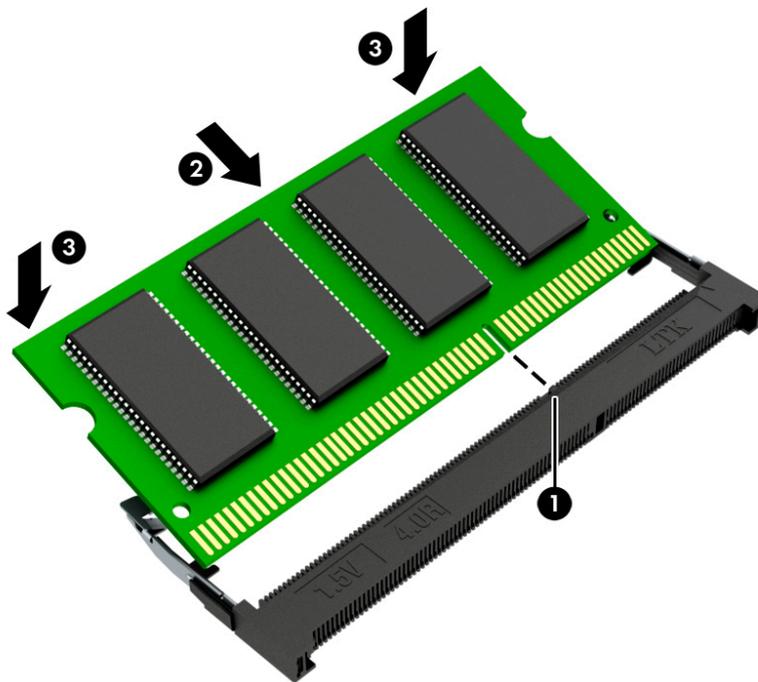
Use the following illustration to determine primary **(1)** and secondary **(2)** memory module locations.

IMPORTANT: Do not completely remove the protective sheet from the primary memory module.



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

1. Align the notched edge of the memory module with the tab in the memory module slot **(1)**.
2. Press the module into the slot until seated **(2)**.
3. Gently press down on the module edges until the side retention clips snap into place **(3)**.



Hard drive assembly

Table 5-4 Hard drive and connector descriptions and part numbers

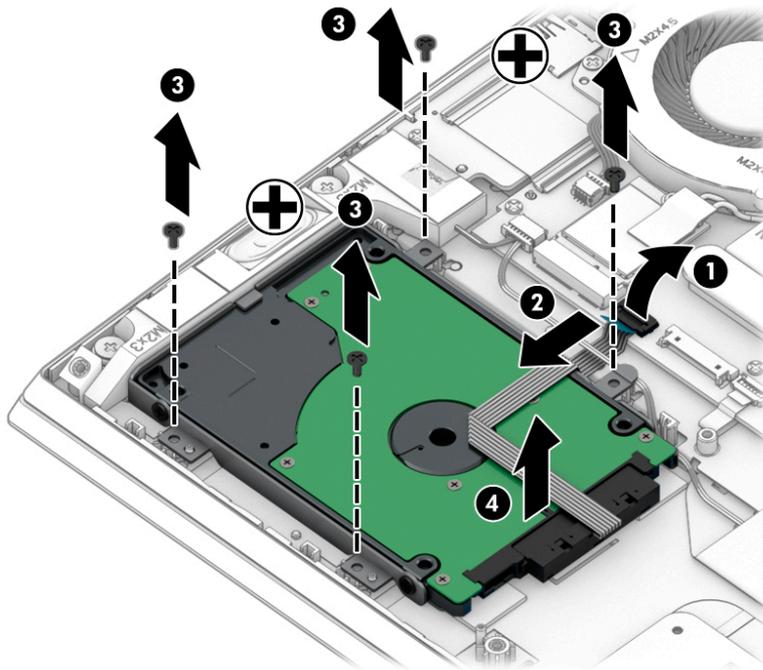
| Description | Spare part number |
|----------------------------|-------------------|
| Hard drive, 2 TB, 5400 rpm | 912487-850 |
| Hard drive, 1 TB, 7200 rpm | L06427-850 |
| Hard drive connector/cable | L57337-001 |

Before removing the hard drive assembly, follow these steps:

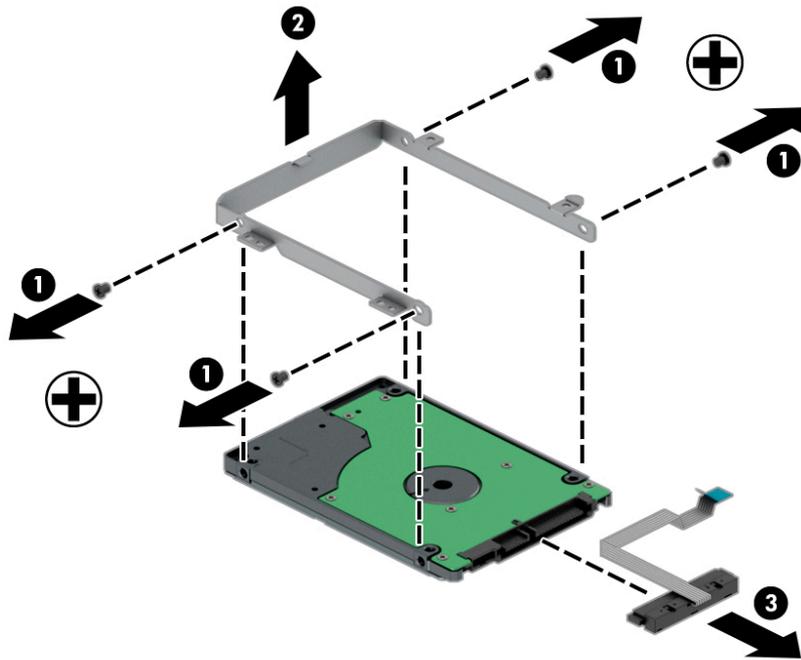
1. Prepare the computer for disassembly ([Preparation for disassembly on page 31](#)).
2. Remove the bottom cover (see [Bottom cover on page 32](#)).
3. Disconnect the battery cable from the system board (see [Battery on page 39](#)).

Remove the hard drive assembly:

1. Lift the latch on the system board ZIF connector (**1**), and then disconnect the hard drive cable (**2**).
2. Remove the four Phillips M2.0 × 3.0 screws (**3**) that secure the hard drive assembly to the computer.
3. Lift the hard drive assembly out of the computer (**4**).



4. If it is necessary to disassemble the hard drive, remove the four Phillips M3.0 × 3.0 screws (1) from the bracket, and then remove the bracket from the hard drive (2). Disconnect the cable from the drive (3).



Reverse this procedure to reassemble and install the hard drive.

6 Removal and replacement procedures for authorized service provider parts

 **IMPORTANT:** 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.

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

Component replacement procedures

There are as many as 48 screws that must be removed, replaced, and/or loosened when servicing the computer. Make special note of each screw size and location during removal and replacement.

Battery

Table 6-1 Battery description and part number

| Description | Spare part number |
|--|-------------------|
| Battery, 6 cell, 69 Wh (includes thermal pad) | L48497-006 |
| Battery, 3 cell, 52 Wh (includes battery rubber) | L48495-006 |

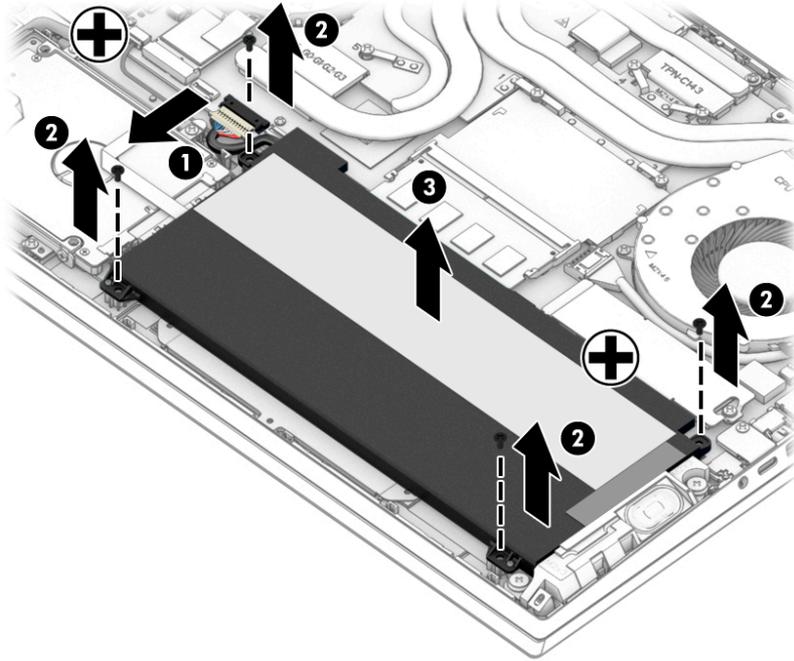
Before removing the battery, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 31](#)).
2. Remove the bottom cover (see [Bottom cover on page 32](#)).

Remove the battery:

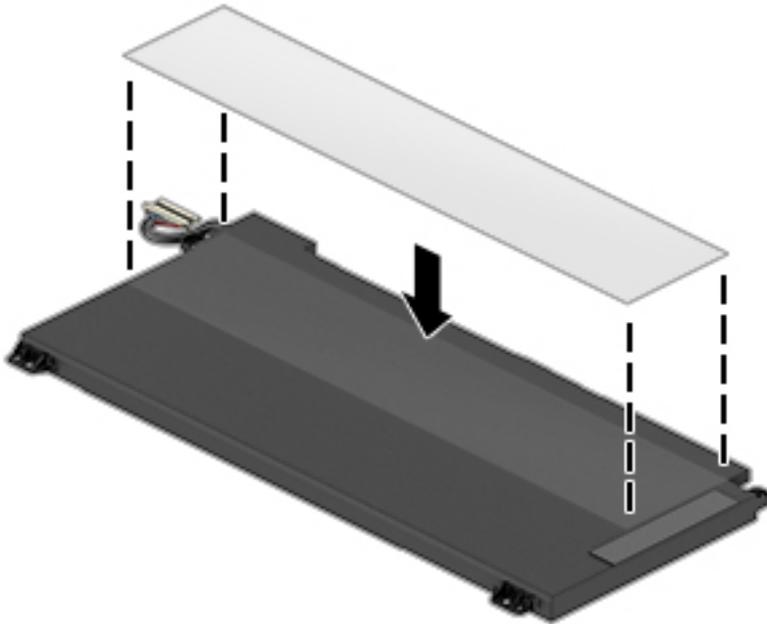
1. Disconnect the battery cable from the system board **(1)**.
2. Remove the four Phillips M2.0 × 4.0 screws **(2)** that secure the battery to the computer.

3. Remove the battery from the computer (3).



Reverse this procedure to install the battery.

Before installing the 6-cell battery (L48497-006), be sure to install the thermal pad onto the battery as shown in the following illustration.



WLAN module

Table 6-2 WLAN module description and part number

| Description | Spare part number |
|--|-------------------|
| Intel Wireless-AC 9560 802.11ac 2 × 2 Wi-Fi + Bluetooth 5 | L22634-005 |
| Intel Wi-Fi 6 AX200 802.11ax 2 × 2 + Bluetooth 5 (non-vPro) | L35282-005 |
| Realtek RTL8822BE 802.11ac 2 × 2 Wi-Fi + Bluetooth 4.2 Combo Adapter (MU-MIMO supported) | 924813-855 |

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

Before removing the WLAN module, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 31](#)).
2. Remove the bottom cover (see [Bottom cover on page 32](#)).
3. Disconnect the battery cable from the system board (see [Battery on page 39](#)).

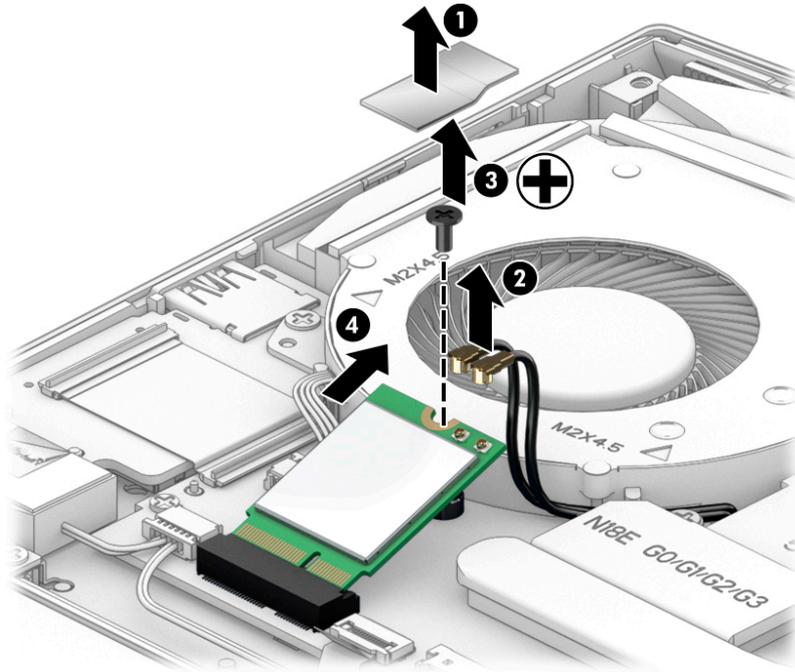
Remove the WLAN module:

1. Remove the plastic protector from on top of the antenna terminals on the WLAN module **(1)**.
2. Disconnect the WLAN antenna cables **(2)** from the terminals on the WLAN module.

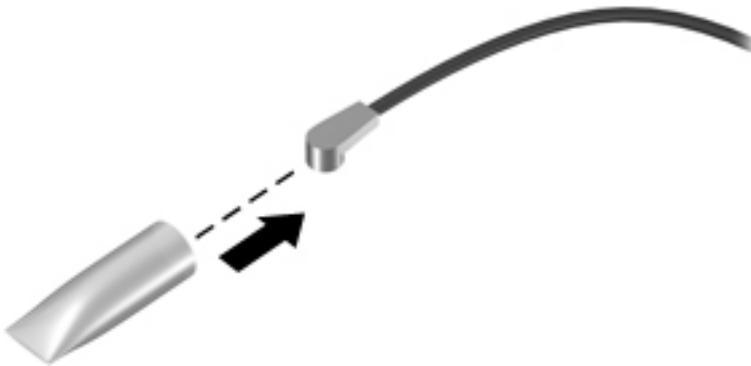
 **NOTE:** Models have either one or two WLAN antennas. On models with two antennas, the #1/white WLAN antenna cable connects to the WLAN module #1/Main terminal. The #2/black WLAN antenna cable connects to the WLAN module #1/Aux terminal.

3. Remove the Phillips M2.0 × 4.0 screw **(3)** that secures the WLAN module to the bottom cover. (The WLAN module tilts up.)

4. Remove the WLAN module (4) by pulling the module away from the slot at an angle.



 **NOTE:** If the WLAN antenna is not connected to the terminal on the WLAN module, a protective sleeve must be installed on the antenna connector, as shown in the following illustration.



Reverse this procedure to install the WLAN module.

Power connector

Table 6-3 Power connector description and part number

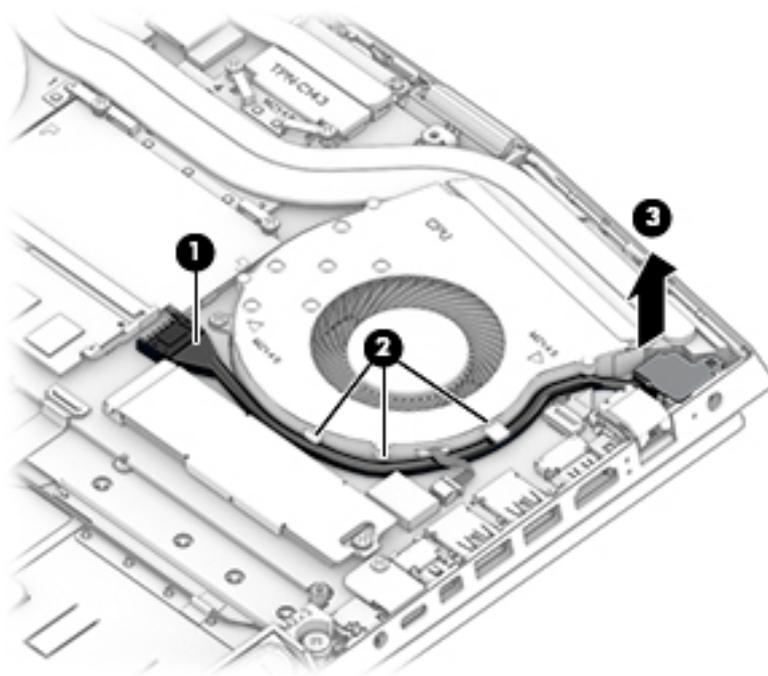
| Description | Spare part number |
|-----------------|-------------------|
| Power connector | L57333-001 |

Before removing the power connector cable, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 31](#)).
2. Remove the bottom cover (see [Bottom cover on page 32](#)).
3. Disconnect the battery cable from the system board (see [Battery on page 39](#)).

Remove the power connector cable:

1. Disconnect the cable from the system board (**1**).
2. Remove the cable from the clips on the fan (**2**).
3. Remove the power connector and cable from the computer (**3**).



Reverse this procedure to install the power connector cable.

Speaker assembly

Table 6-4 Speaker assembly description and part number

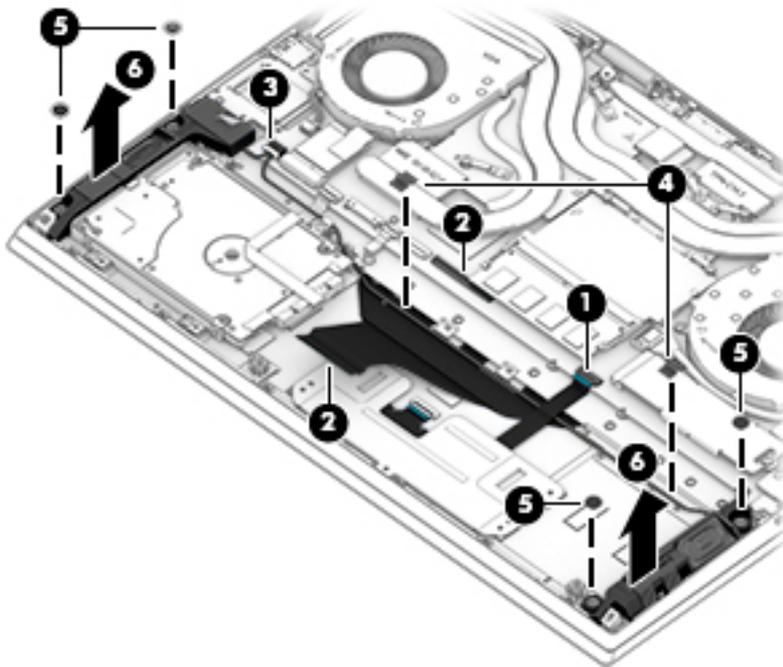
| Description | Spare part number |
|-------------------------------------|-------------------|
| Speaker assembly (includes cushion) | L57342-001 |

Before removing the speaker assembly, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 31](#)).
2. Remove the bottom cover (see [Bottom cover on page 32](#)).
3. Remove the battery (see [Battery on page 39](#)).

Remove the speakers:

1. Disconnect the touchpad cable from the system board **(1)**.
2. Disconnect the keyboard cable from the system board **(2)**.
3. Disconnect the speaker cable from the system board **(3)**.
4. Remove the tape that secures the speaker cable to the computer chassis **(4)**.
5. Remove the two Phillips M2.0 × 3.0 screws **(5)** that secure each speaker to the computer.
6. Remove the speaker assembly from the computer **(6)**.



Reverse this procedure to install the speaker assembly.

Touchpad button board

Table 6-5 Touchpad button board description and part number

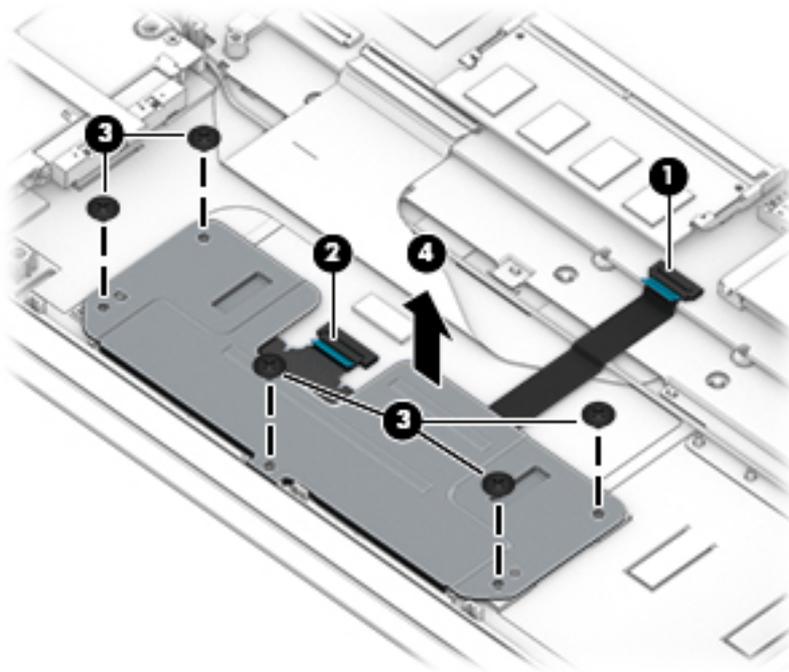
| Description | Spare part number |
|-----------------------|-------------------|
| Touchpad button board | L57343-001 |

Before removing the touchpad button board, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 31](#)).
2. Remove the bottom cover (see [Bottom cover on page 32](#)).
3. Remove the battery (see [Battery on page 39](#)).

Remove the touchpad button board:

1. Disconnect the cable from the ZIF connector on the system board **(1)**.
2. Disconnect the cable from the ZIF connector on the touchpad **(2)**.
3. Remove the five Phillips M2.0 × 3.0 screws **(3)** that secure the touchpad button board to the computer.
4. Remove the touchpad button board from the computer **(4)**.



Reverse this procedure to install the touchpad button board.

Heat sink/fan assembly

Table 6-6 Heat sink/fan assembly, thermal pad, and thermal grease descriptions and part numbers

| Description | Spare part number |
|---|-------------------|
| Heat sink/fan assembly for use in models with GeForce GTX 1660 graphics | L57329-001 |
| Heat sink/fan assembly for use in models with GeForce GTX 1660Ti graphics | L57330-001 |
| Heat sink/fan assembly for use in models with GeForce GTX 2060 graphics | L64443-001 |
| Heat sink/fan assembly for use in models with GeForce GTX 2070 graphics | L64444-001 |
| Heat sink/fan assembly for use in models with GeForce GTX 2080 graphics | L64445-001 |
| Thermal grease | L65268-001 |
| Thermal pad kit | L57443-001 |

Before removing the heat sink/fan assembly, follow these steps:

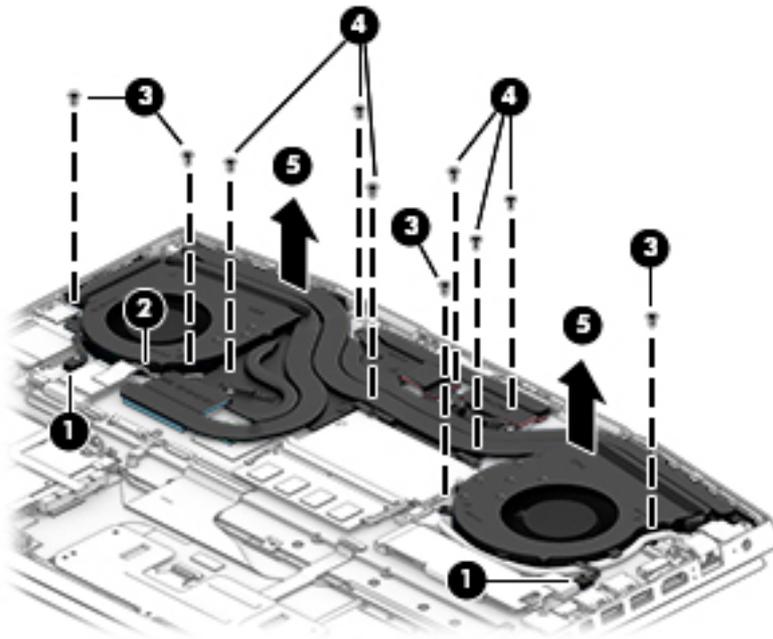
1. Prepare the computer for disassembly ([Preparation for disassembly on page 31](#)).
2. Remove the bottom cover (see [Bottom cover on page 32](#)).
3. Remove the battery (see [Battery on page 39](#)).

Remove the heat sink/fan assembly:

1. Disconnect the two fan cables from the system board **(1)**.
2. Remove the WLAN antenna from the routing channel in the right fan **(2)**.
3. Remove the two Phillips M2.0 × 4.0 screws **(3)** from each fan.
4. Remove the six Phillips M2.0 × 4.0 screws **(4)** in the order indicated on the heat sink.

5. Remove the heat sink/fan assembly (5).

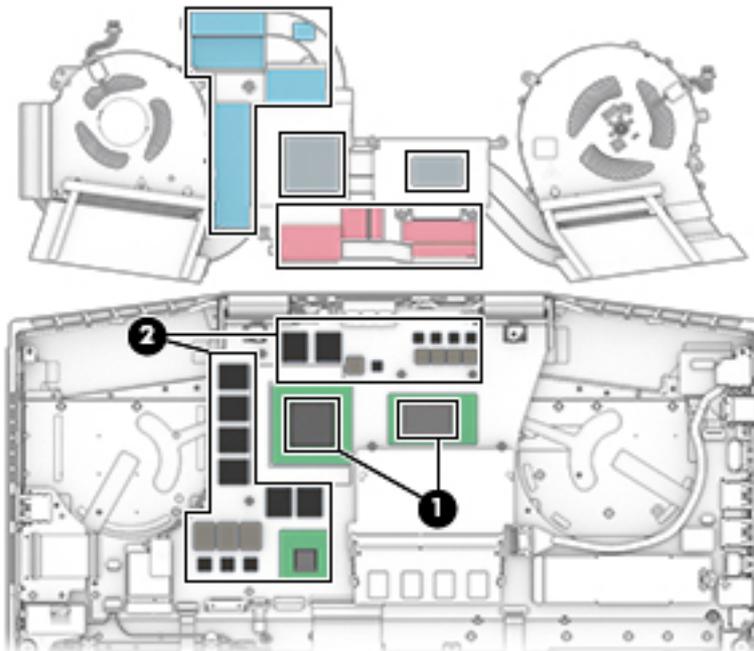
 **NOTE:** Heat sink appearance may vary.



 **IMPORTANT:** Thermal material must be applied on site and therefore is not included in component spare part kits. When removing any part that also requires removal of the heat sink, be sure to order and apply thermal material.

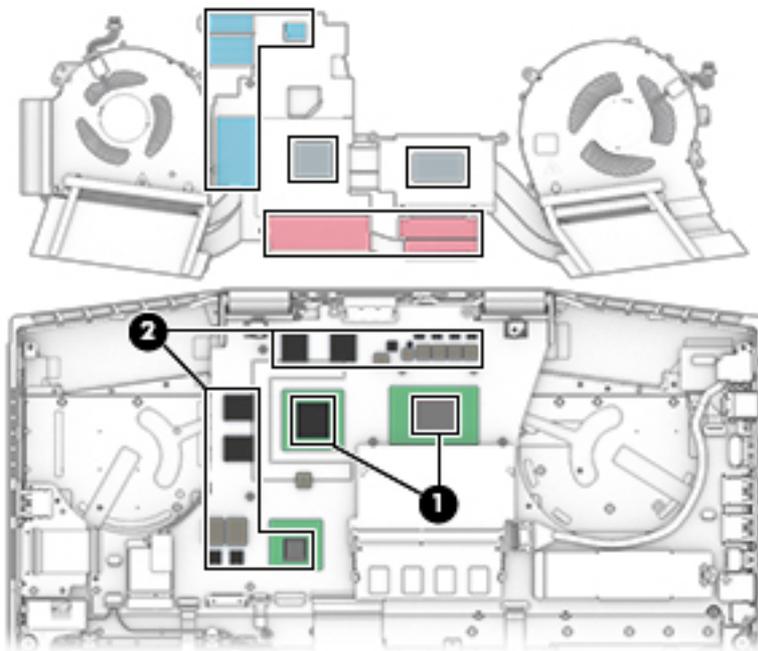
6. **Heat sink configuration 1**

Apply thermal grease to the integrated processors on the system board (1). Use thermal pads on the remaining locations on the system board (2).



7. Heat sink configuration 2

Apply thermal grease to the integrated processors on the system board (1). Use thermal pads on the remaining locations on the system board (2).



Reverse this procedure to install the heat sink/fan assembly.

Card reader/USB board

 **NOTE:** The card reader/USB board spare part kit does not include the cable. The cable is available as spare part number L57338-001.

Table 6-7 Card reader/USB board description and part number

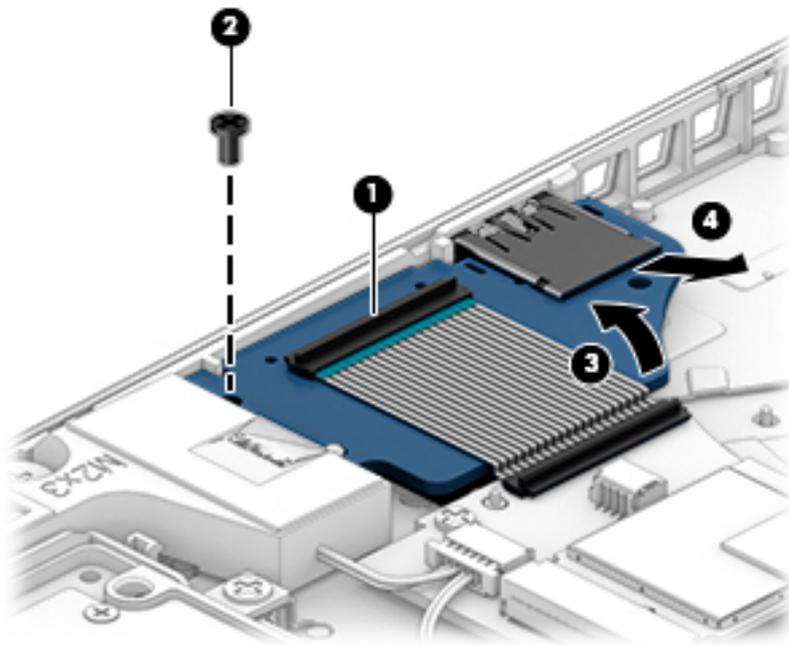
| Description | Spare part number |
|-----------------------|-------------------|
| Card reader/USB board | L57317-001 |

Before removing the card reader/USB board, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 31](#)).
2. Remove the bottom cover (see [Bottom cover on page 32](#)).
3. Remove the battery (see [Battery on page 39](#)).
4. Remove the fan/heat sink (see [Heat sink/fan assembly on page 46](#)).

Remove the card reader board:

1. Disconnect the cable from the ZIF connector on the card reader/USB board **(1)**.
2. Remove the Phillips M2.0 × 3.5 screw **(2)** that secures the board to the computer.
3. Lift the side of the board up **(3)**, and then pull the board up and into the computer to remove it **(4)**.



Reverse this procedure to install the card reader/USB board.

System board

All system boards use the following part numbers:

xxxxxx-001: Non-Windows operating system

xxxxxx-601: Windows 10 operating system

Table 6-8 System board descriptions and part numbers

| Description | Spare part number |
|---|-------------------|
| Intel Core i9-9880H processor and 8 GB of discrete graphics memory (GeForce RTX 2080) | L59769-xx1 |
| Intel Core i7-9750H processor and 8 GB of discrete graphics memory (GeForce RTX 2080) | L59768-xx1 |
| Intel Core i7-9750H processor and 8 GB of discrete graphics memory (GeForce RTX 2070; G-Sync) | L59767-xx1 |
| Intel Core i7-9750H processor and 6 GB of discrete graphics memory (GeForce RTX 2060) | L59766-xx1 |
| Intel Core i7-9750H processor and 6 GB of discrete graphics memory (GeForce GTX 1660Ti) | L59764-xx1 |
| Intel Core i7-9750H processor and 4 GB of discrete graphics memory (GeForce GTX 1650) | L59762-xx1 |
| Intel Core i5-9300H processor and 6 GB of discrete graphics memory (GeForce RTX 2060) | L59765-xx1 |
| Intel Core i5-9300H processor and 6 GB of discrete graphics memory (GeForce GTX 1660Ti) | L59763-xx1 |
| Intel Core i5-9300H processor and 4 GB of discrete graphics memory (GeForce GTX 1650) | L59761-xx1 |

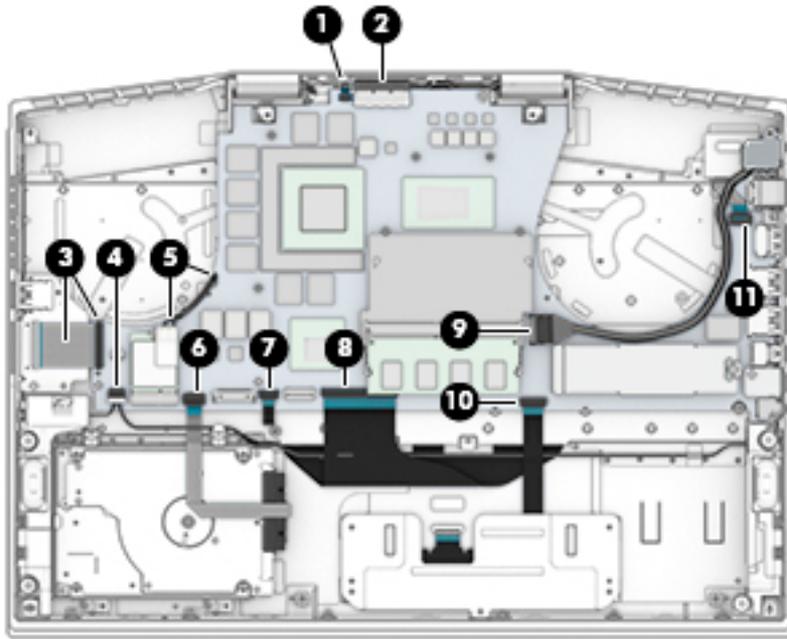
Before removing the system board, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 31](#)).
2. Remove the bottom cover (see [Bottom cover on page 32](#)).
3. Remove the battery (see [Battery on page 39](#)).
4. Remove the solid-state drive (see [Solid-state drive and Optane memory module on page 34](#)).
5. Remove the fan/heat sink (see [Heat sink/fan assembly on page 46](#)).

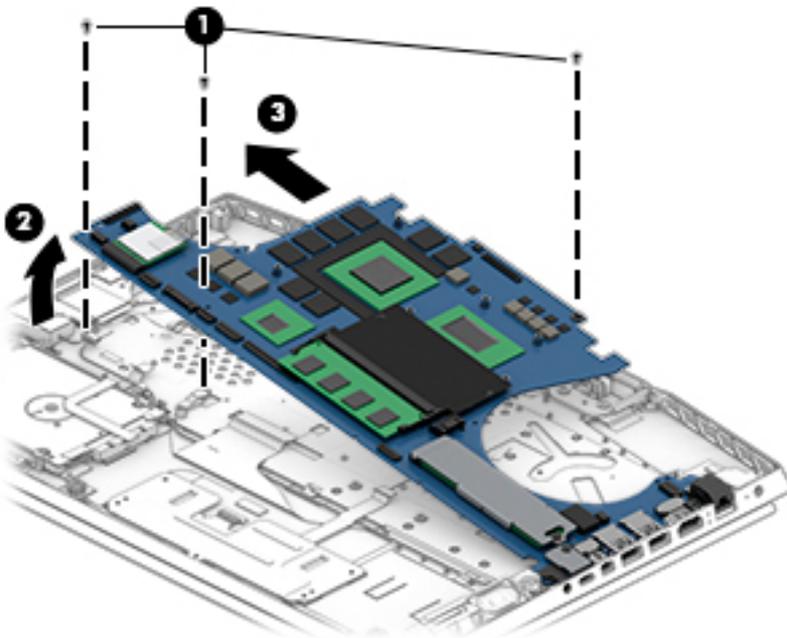
Remove the system board:

1. Disconnect the following cables from the system board:
 - (1) Thermal sensor cable (reverse ZIF)
 - (2) Display cable (ZIF)
 - (3) Card reader cable (reverse ZIF)
 - (4) Speaker cable
 - (5) WLAN module antennas
 - (6) Hard drive cable (ZIF)
 - (7) Backlight cable (ZIF)
 - (8) Keyboard cable (ZIF)
 - (9) Power connector cable
 - (10) Touchpad cable (ZIF)

(11) Power button board cable (ZIF)



2. Remove the three Phillips M2.0 × 3.5 screws **(1)** that secure the system board to the computer.
3. Lift the left side of the system board **(2)**, and then remove the system board from the computer **(3)**.



Reverse this procedure to install the system board.

Power button board

 **NOTE:** The power button board spare part kit does not include the cable. The cable is available as spare part number L57339-001.

Table 6-9 Power button board description and part number

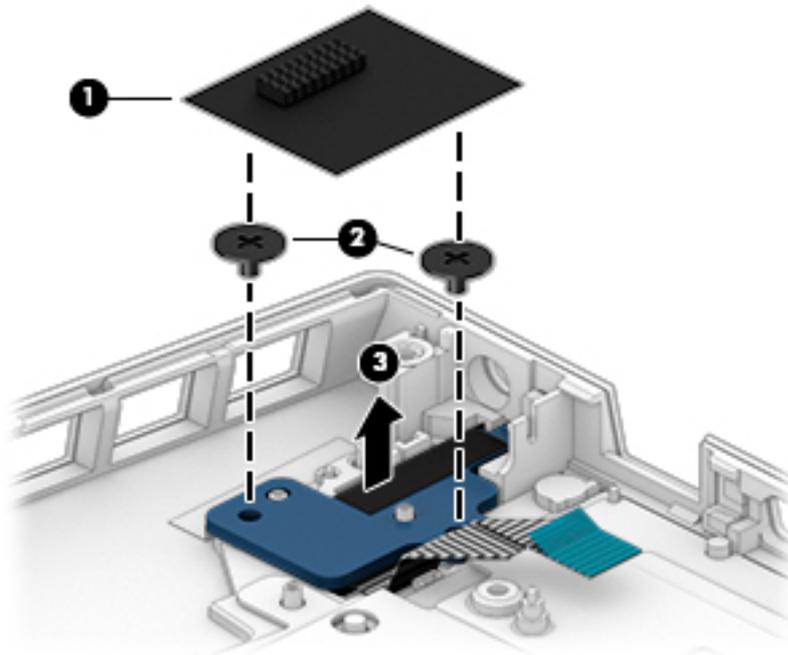
| Description | Spare part number |
|--------------------|-------------------|
| Power button board | L57319-001 |

Before removing the power button board, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 31](#)).
2. Remove the bottom cover (see [Bottom cover on page 32](#)).
3. Remove the battery (see [Battery on page 39](#)).
4. Remove the solid-state drive (see [Solid-state drive and Optane memory module on page 34](#)).
5. Remove the fan/heat sink (see [Heat sink/fan assembly on page 46](#)).
6. Remove the system board (see [System board on page 50](#)).

Remove the power button board:

1. Remove the tape from the board **(1)**.
2. Remove the two broad head Phillips M2.0 × 3.0 screws **(2)** that secure the board to the computer.
3. Remove the power button board from the computer **(3)**.



Reverse this procedure to install the power button board.

 **IMPORTANT:** When replacing the power button board, be sure to replace the tape so the internal light does not show.

Thermal sensor

 **NOTE:** The thermal sensor spare part kit does not include the cable. The cable is available as spare part number L57340-001.

Table 6-10 Thermal sensor description and part number

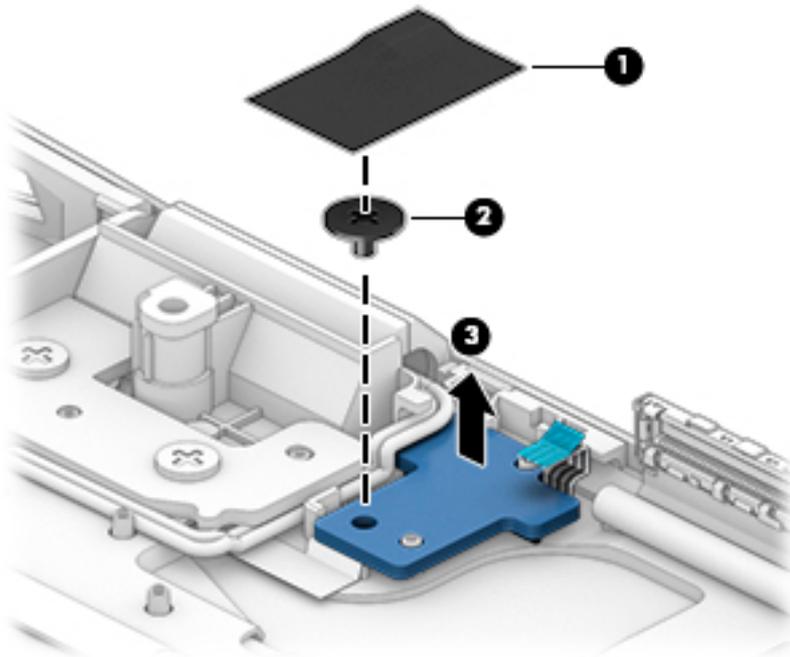
| Description | Spare part number |
|----------------|-------------------|
| Thermal sensor | L57318-001 |

Before removing the thermal sensor, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 31](#)).
2. Remove the bottom cover (see [Bottom cover on page 32](#)).
3. Remove the battery (see [Battery on page 39](#)).
4. Remove the solid-state drive (see [Solid-state drive and Optane memory module on page 34](#)).
5. Remove the fan/heat sink (see [Heat sink/fan assembly on page 46](#)).
6. Remove the system board (see [System board on page 50](#)).

Remove the thermal sensor:

1. Remove the protective tape from the board (1).
2. Remove the Phillips M2.0 × 3.0 screw (2) that secures the sensor to the computer.
3. Remove the thermal sensor from the computer (3).



Reverse this procedure to install the thermal sensor.

Display assembly

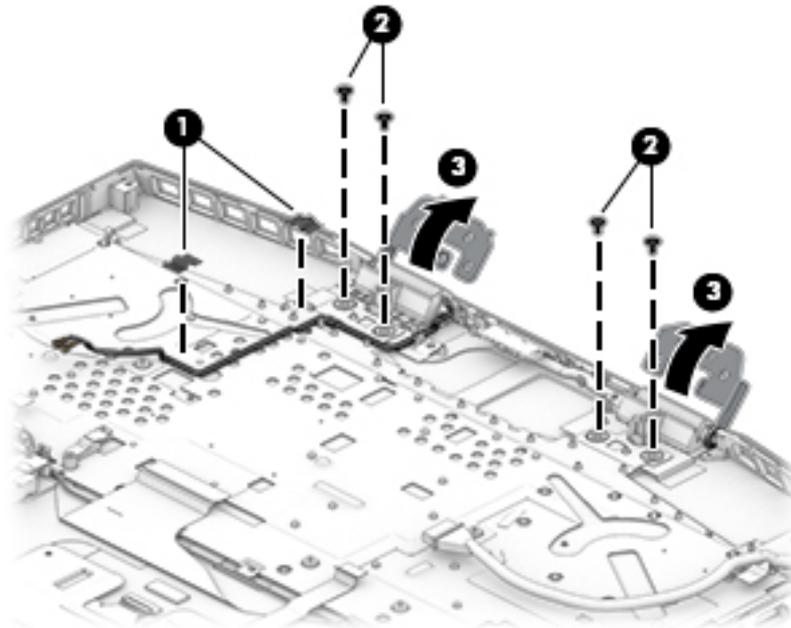
 **NOTE:** The display assembly is spared only at the subcomponent level.

Before removing the display assembly, follow these steps:

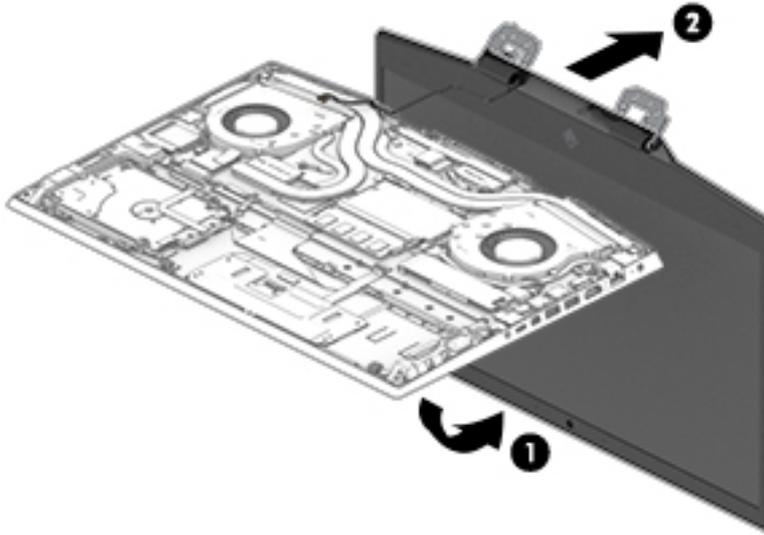
1. Prepare the computer for disassembly ([Preparation for disassembly on page 31](#)).
2. Remove the bottom cover (see [Bottom cover on page 32](#)).
3. Remove the battery (see [Battery on page 39](#)).
4. Remove the fan/heat sink (see [Heat sink/fan assembly on page 46](#)).
5. Remove the system board (see [System board on page 50](#)).

Remove the display assembly:

1. Remove the wireless antenna cables (**1**) from the tape that secures them to the computer chassis.
2. Remove the two Phillips M2.5 × 4.0 screws (**2**) from each hinge.
3. Open the hinges as far as possible (**3**).



4. Open the display **(1)**, and then separate the display from the computer by pulling the display up and away from the computer **(2)**.



5. If it is necessary to replace display assembly subcomponents, first remove the bezel:

- a. Release the top edge of the display bezel **(1)** from the display assembly.

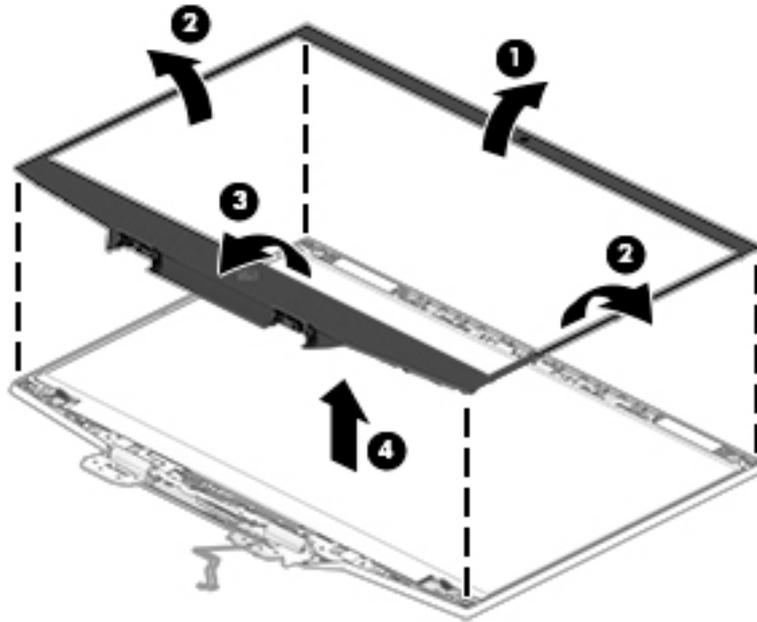


IMPORTANT: Be careful not to bend or break the narrow sections of the bezel when removing.

- b. Release the left and right edges of the display bezel **(2)** from the display assembly.
- c. Release the bottom edge of the display bezel **(3)** from the display assembly.

- d. Remove the display bezel **(4)**.

The display bezel is available as spare part number L57328-001 for models with an LCD display and L66157-001 for models with an OLED display.



6. If it is necessary to remove the display panel:
 - a. Lift the tape from the webcam module **(1)**, and then disconnect the cable from the module **(2)**.
 - b. Use tweezers to grasp the tape that routes behind both the left and right sides of the display panel **(3)**.
 - c. Pull the tape out from behind the left and right sides of the panel **(4)**.

 **NOTE:** You have to pull on the tape multiple times before it is completely removed. To avoid tearing the tape, pull the tape evenly and carefully. Rolling the tape around the tweezer or the shaft of a screwdriver as you pull it can help to avoid pulling too hard and breaking the tape.

- d. Remove the panel from the display back cover (5).

Display panels are available as the following spare part numbers:

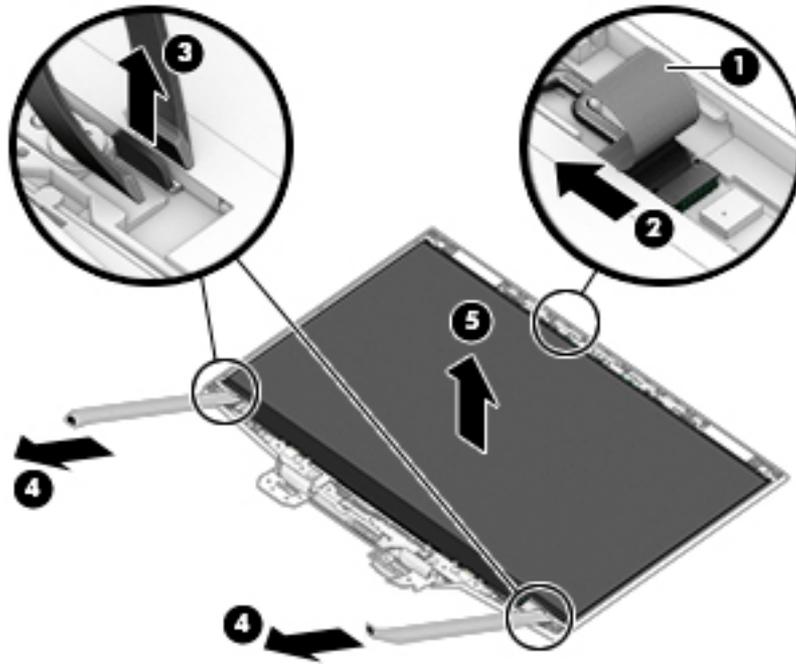
L57345-001: UHD, antiglare, 340 nits

L57346-001: FHD, antiglare, 60 Hz

L57347-001: FHD, antiglare, 144 Hz

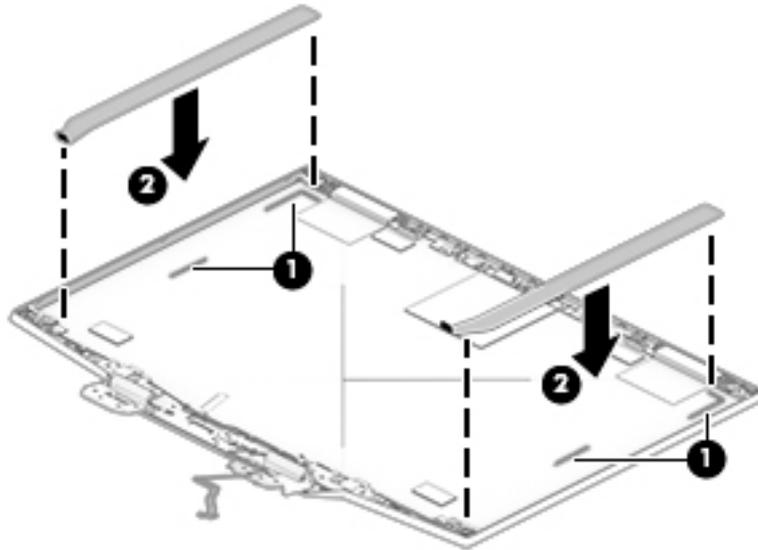
L60898-001: FHD, antiglare, 240 Hz

L66159-001: UHD, BrightView, OLED



- e. When installing the display panel adhesive tape, peel the backing from the bottom of the tape, locate the alignment marks **(1)**, and then install the tape onto both sides of the inside of the display back cover **(2)**. Remove the backing from the top of the tape before installing the display panel.

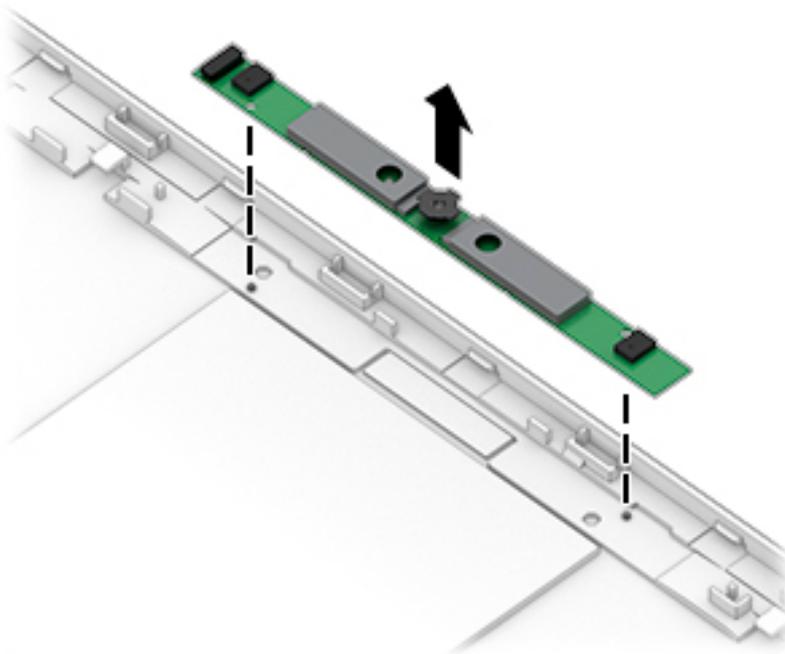
Display panel adhesive is available as spare part number L57335-001 for LCD displays and L66213-001 for OLED displays.



7. If it is necessary to remove the webcam module:

- ▲ Lift evenly on both sides of the webcam to detach it from the display back cover. (The webcam module is attached to the display back cover with double-sided adhesive.)

The webcam is available as spare part number L61453-001 for models with an LCD display and L67363-001 for models with an OLED display.



8. If it is necessary to remove the display panel cable:
 - a. Peel the tape from the display cable connector **(1)**, lift the connector latch **(2)**, and then disconnect the cable from the back of the display panel **(3)**.
 - b. Peel the cable from the back of the display panel **(4)**.

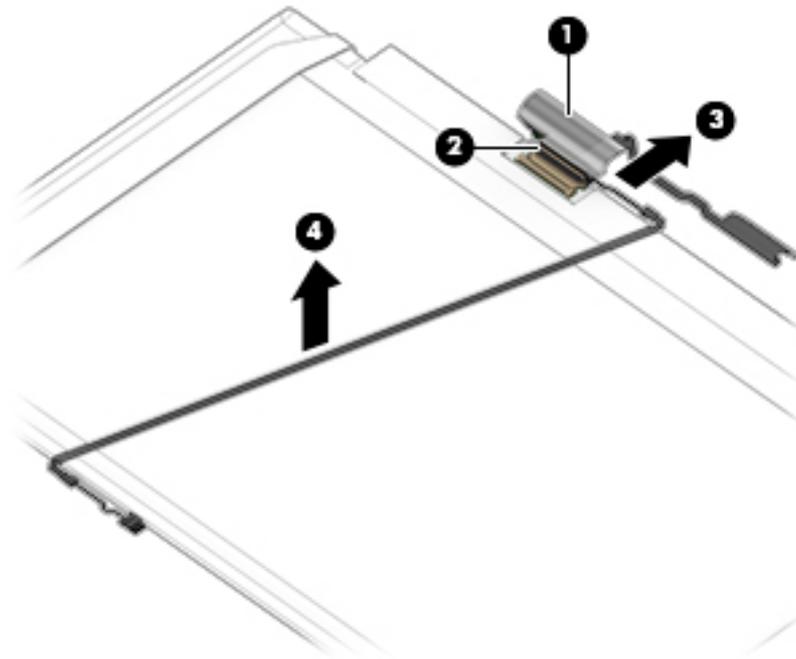
The display cable is available as the following spare part numbers:

L57331-001: FHD, 60 Hz displays

L57332-001: FHD/UHD, 144 Hz displays

L63889-001: FHD, 240 Hz displays

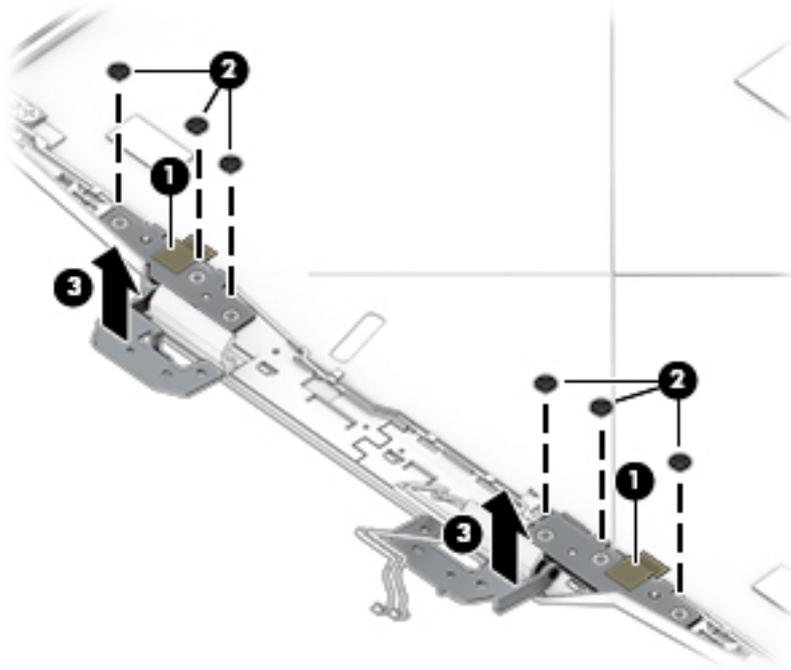
L66158-001: OLED displays



9. If it is necessary to remove the display hinges:
 - a. Remove the tape from each hinge **(1)**.
 - b. Remove the three Phillips M2.0 × 3.0 screws **(2)** from each hinge.

- c. Remove the display hinges from the display back cover **(3)**.

The display hinges are available as spare part number L57321-001 for use in models with an LCD display and L67364-001 for use in models with an OLED display.



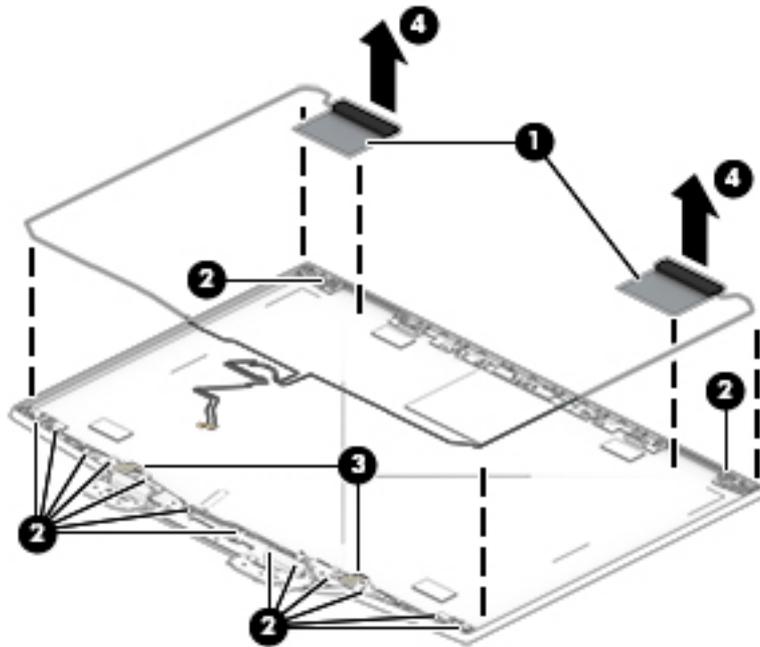
10. If it is necessary to remove the wireless antennas:

- a. Peel the antennas off the top of the display back cover **(1)**.
- b. Remove the cables from the routing in the top corners **(2)** and along the bottom **(2)** of the display back cover, and from the left and right hinges **(3)**.

The display back cover is available as spare part number L57320-001 for use in models with an LCD display and L66156-001 for use in models with an OLED display.

- c. Remove the antenna cables from the display back cover (4).

The wireless antennas are available as spare part number L57334-001 for models with an LCD display and L66155-001 for models with an OLED display.



Reverse this procedure to install the display assembly.

Keyboard/top cover

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

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

Table 6-11 Keyboard/top cover description and part number

| Description | Spare part number |
|---|-------------------|
| Keyboard/top cover for use models with 1-zone lighting (dragon red legend + red backlight) | L57322-xx1 |
| Keyboard/top cover for use models with 4-zone lighting (white legend + RGB backlight) | L57323-xx1 |
| Keyboard/top cover for use models with 1-zone lighting (dragon red legend + red backlight) with Thunderbolt | L57324-xx1 |
| Keyboard/top cover for use models with 4-zone lighting (white legend + RGB backlight) with Thunderbolt | L57325-xx1 |

Table 6-12 Keyboard country codes

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

7 Using Setup Utility (BIOS)

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

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

Starting Setup Utility (BIOS)

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

▲ Turn on or restart the computer and quickly press **f10**.

– or –

Turn on or restart the computer, quickly press **esc**, and then press **f10** when the Start menu is displayed.

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 –
Select 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 63](#)).
 2. Select **Main**, and then make note of the BIOS version.
 3. Select **Exit**, select one of the options, and then follow the on-screen instructions.
- In Windows, press **CTRL+Alt+S**.

To check for later BIOS versions, see [Downloading a BIOS update on page 64](#).

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 –
Select the question mark icon in the taskbar.
2. Select **Updates**, and then select **Check for updates and messages**.
3. Follow the on-screen instructions.
4. At the download area, follow these steps:
 - a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. 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. Select your hard drive designation. The hard drive designation is typically Local Disk (C:).
3. Using the hard drive path you recorded earlier, open the folder that contains the update.
4. Double-click the file that has an `.exe` extension (for example, `filename.exe`).

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

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

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 65](#).

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. Select **HP PC Hardware Diagnostics Windows**.

– 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**.

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

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

Downloading HP PC Hardware Diagnostics Windows

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

Downloading the latest HP PC Hardware Diagnostics Windows version

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

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

The tool is downloaded to the selected location.

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

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

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

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

The tool is downloaded to the selected location.

Installing HP PC Hardware Diagnostics Windows

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

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

Using HP PC Hardware Diagnostics UEFI

 **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 67](#).

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

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

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

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

– or –

Contact support, and provide the Failure ID code.

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

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

Starting HP PC Hardware Diagnostics UEFI

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

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

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

- a. Connected USB flash drive

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

- b. Hard drive

- c. BIOS

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

Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive

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

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

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

Downloading the latest HP PC Hardware Diagnostics UEFI version

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

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

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

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

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

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

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

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

Downloading Remote HP PC Hardware Diagnostics UEFI



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

Downloading the latest Remote HP PC Hardware Diagnostics UEFI version

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

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

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



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

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

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

Customizing Remote HP PC Hardware Diagnostics UEFI settings

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

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

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

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

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

Your changes take effect when the computer restarts.

9 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 70](#)).
- **Creating a restore point**—You can use Windows tools to create a restore point (see [Using Windows tools on page 70](#)).
- **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 70](#)).
- **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 70](#)).

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

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

Backing up information and creating recovery media

Using Windows tools

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

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

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

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

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

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

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

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

To download the tool:

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

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

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

Restoring and recovery

Restoring, resetting, and refreshing using Windows tools

Windows offers several options for restoring, resetting, and refreshing the computer. For details, see [Using Windows tools on page 70](#).

Recovering using HP Recovery media

HP Recovery media is used to recover the original operating system and software programs that were installed at the factory. On select products, it can be created on a bootable USB flash drive using the HP Cloud Recovery Download Tool. For details, see [Using the HP Cloud Recovery Download Tool to create recovery media \(select products only\) on page 70](#).

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

To recover your system:

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

Changing the computer boot order

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

To change the boot order:

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

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

For computers or tablets with keyboards attached:

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

For tablets without keyboards:

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

– or –

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

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

10 Specifications

Table 10-1 Computer specifications

| | Metric | U.S. |
|---|--------------------------|----------------------------|
| Computer dimensions | | |
| Width | 360.0 mm | 14.2 in. |
| Depth | 262.0 mm | 10.3 in. |
| Height | 20.4 mm | 0.8 in. |
| Weight | | |
| SSD + 52 Wh battery | 2236.1 g | 4.92 lbs |
| HDD + 52 Wh battery | 2292.3 g | 5.05 lbs |
| SSD + 69 Wh battery | 2324.1 g | 5.12 lbs |
| HDD + 69 Wh battery | 2380.8 g | 5.24 lbs |
| HDD +SSD + 52 Wh battery | 2299.5 g | 5.06 lbs |
| HDD +SSD + 69 Wh battery | 2388.1 g | 5.26 lbs |
| Input power | | Rating |
| Operating voltage and current | | 19.5 V dc @ 7.70 A – 150 W |
| | | 19.5 V dc @ 10.3 A – 200 W |
| Temperature | | |
| Operating | 5°C to 35°C | 41°F to 95°F |
| Nonoperating | -20°C to 60°C | -4°F to 140°F |
| Relative humidity (noncondensing) | | |
| Operating | 10% to 90% | |
| Nonoperating | 5% to 95% | |
| Maximum altitude (unpressurized) | | |
| Operating | -15 m to 3,048 m | -50 ft to 10,000 ft |
| Nonoperating | -15 m to 12,192 m | -50 ft to 40,000 ft |
| NOTE: Applicable product safety standards specify thermal limits for plastic surfaces. The device operates well within this range of temperatures. | | |

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

Table 11-1 Power cord requirements for specific countries and regions

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

1. The flexible cord must be Type H05VV-F, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

Table 11-1 Power cord requirements for specific countries and regions (continued)

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

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>.

Index

A

- AC adapter and battery light, identifying 7
- action keys
 - identifying 13
- airplane mode key 13
- antenna
 - removal 60
- antennas
 - spare part number 61
- audio, product description 2
- audio-out (headphone)/audio-in (microphone) combo jack, identifying 8

B

- back cover
 - spare part number 21
- backup, creating 70
- backups 70
- battery
 - removal 39
 - spare part number 19, 39
- bezel
 - spare part number 20, 56
- BIOS
 - determining version 63
 - downloading an update 64
 - starting the Setup Utility 63
 - updating 63
- Bluetooth label 16
- boot order, changing 71
- bottom components 14
- bottom cover
 - removal 32
 - spare part number 32
- bottom cover, spare part numbers 19
- buttons
 - left touchpad 10
 - power 12
 - right touchpad 10

C

- camera
 - identifying 9
 - camera light, identifying 9
 - caps lock light, identifying 11
 - card reader board
 - spare part numbers 49
 - card reader/USB board
 - removal 49
 - spare part numbers 19
 - card reader/USB board cable
 - spare part number 22
 - cautions
 - electrostatic discharge 27
 - components
 - bottom 14
 - display 9
 - keyboard area 10
 - left side 7
 - right side 6
 - computer major components 17
 - connector, power 7
 - connectors
 - Dual-Mode DisplayPort 7
- ## D
- display assembly
 - removal 54
 - display back cover
 - spare part number 60
 - display cable
 - removal 59
 - spare part number 22
 - display components 9
 - display panel
 - product description 1
 - removal 56
 - spare part numbers 21
 - display panel cable
 - spare part numbers 21, 59
 - drive light, identifying 6
 - Dual-Mode DisplayPort connector
 - identifying 7

E

- electrostatic discharge (ESD) 27
 - preventing damage 28
- esc key, identifying 13

F

- fn key, identifying 13

G

- graphics, product description 1
- grounding methods 29
- guidelines
 - packaging 30
 - transporting 30
 - workstation 27

H

- hard drive
 - spare part number 19, 23
- hard drive assembly
 - removal 37
 - spare part number 37
- hard drive connector
 - spare part number 19
- hard drive connector/cable
 - spare part number 23, 37
- HDMI port
 - identifying 7
- heat sink
 - spare part number 19
- heat sink/fan assembly
 - removal 46
 - spare part number 46
- hHard drive connector/cable
 - spare part number 22
- hinge
 - removal 59
 - spare part number 60
- hinges
 - spare part number 21
- HP OMEN Command Center 16
- HP PC Hardware Diagnostics UEFI
 - downloading 67
 - starting 67
 - using 66

HP PC Hardware Diagnostics Windows
 downloading 65
 installing 66
 using 65
HP Recovery media
 recovery 71

I
internal card expansion, product
 description 3
internal microphones, identifying 9

J
jacks
 audio-out (headphone)/audio-in
 (microphone) 8
 network 7
 RJ-45 (network) 7

K
keyboard/pointing devices, product
 description 3
keyboard/top cover
 removal 62
 spare part numbers 18, 62
keys
 action 13
 airplane mode 13
 esc 13
 fn 13
 num lock 13
 OMEN 13
 Windows 13

L
labels
 Bluetooth 16
 regulatory 16
 serial number 15
 service 15
 wireless certification 16
 WLAN 16
left side components 7
lights
 AC adapter and battery 7
 camera 9
 caps lock 11
 drive 6
 power 11
 RJ-45 (network) status 7
 touchpad 11

M
media card reader, product
 description 3
memory module
 removal 35
 spare part numbers 35
memory, product description 1
microphone
 product description 2
model name 1

N
network jack, identifying 7

O
OMEN key 16
 identifying 13
operating system, product
 description 4
Optane memory module
 removal 34
 spare part numbers 34

P
packaging guidelines 30
ports
 HDMI 7
 product description 3
 USB SuperSpeed 7
 USB SuperSpeed port with HP
 Sleep and Charge 6
 USB Type-C power connector and
 Thunderbolt port with HP Sleep
 and Charge 7
 USB Type-C with HP Sleep and
 Charge 7
power button board
 removal 52
 spare part number 18, 52
power button board cable
 spare part number 22
power button board cable, spare part
 number 52
power button, identifying 12
power connector
 identifying 7
power connector cable
 removal 43
 spare part number 19, 22, 43

power cord
 requirements for all countries
 73
 requirements for specific
 countries and regions 74
 set requirements 73
 spare part numbers 24
power lights, identifying 11
power requirements, product
 description 4
processor, product description 1
product description
 audio 2
 display panel 1
 graphics 1
 internal card expansion 3
 keyboard/pointing devices 3
 media card reader 3
 memory 1
 microphone 2
 operating system 4
 ports 3
 power requirements 4
 processors 1
 product name 1
 RJ-45 (network) jack 2
 security 4
 sensors 3
 serviceability 5
 storage 2
 video 2
 wireless networking 3
product name 1
product name and number,
 computer 15

R
recovery 70
 discs 71
 HP Recovery partition 71
 media 71
 USB flash drive 71
recovery media
 creating using HP Cloud Recovery
 Download Tool 70
 creating using Windows tools 70
regulatory information
 regulatory label 16
 wireless certification labels 16

Remote HP PC Hardware Diagnostics
UEFI settings
 customizing 68
 using 68
removal/replacement
 procedures 31
removal/replacement procedures
 39
restoring 70
right side components 6
RJ-45 (network) jack, identifying 7
RJ-45 (network) jack, product
 description 2
RJ-45 (network) status lights,
 identifying 7

S

Screw Kit, spare part number 25
security, product description 4
sensors, product description 3
serial number, computer 15
service labels, locating 15
serviceability, product description 5
slots
 memory card reader 6
solid-state drive
 removal 34
 spare part number 18, 23
 spare part numbers 34
speaker assembly
 removal 44
 spare part number 44
speakers
 identifying 14
 spare part number 19
special keys, using 13
static electricity 28
storage, product description 2
system board
 removal 50
 spare part numbers 50
system restore point, creating 70

T

thermal sensor
 removal 53
 spare part number 53
thermal sensor cable
 spare part number 22

thermal sensor cable, spare part
 number 49, 53
Thunderbolt port with HP Sleep and
 Charge, identifying USB Type-C 7
touchpad button board
 removal 45
 spare part numbers 19, 45
touchpad buttons
 identifying 10
touchpad cable, spare part number
 18, 19
touchpad light 11
touchpad zone, identifying 10
transporting guidelines 30
traveling with the computer 16

U

USB SuperSpeed port with HP Sleep
 and Charge, identifying 6
USB SuperSpeed port, identifying 7
USB Type-C port with HP Sleep and
 Charge, identifying 7
USB Type-C power connector and
 Thunderbolt port with HP Sleep and
 Charge, identifying 7

V

vents, identifying 6, 8, 14
video, product description 2

W

webcam
 spare part number 58
webcam module
 removal 58
webcam/microphone module
 spare part number 20
Windows
 backup 70
 recovery media 70
 system restore point 70
Windows key, identifying 13
Windows tools, using 70
wireless antennas
 spare part number 61
wireless certification label 16
wireless networking, product
 description 3
WLAN antennas, identifying 9
WLAN device 16
WLAN label 16

WLAN module
 removal 41
 spare part numbers 19, 41
workstation guidelines 27