Maintenance and Service Guide

OMEN by HP 17 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.

To access the latest user guides, go to http://www.hp.com/support, and follow the instructions to find your product. Then select **User Guides**.

Software terms

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

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

Important Notice about Customer Self-Repair Parts

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.

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1 Product description

Table 1-1 Product components and their descriptions

Category	Description
Product Name	**OMEN by HP 17 Laptop PC**
	Model numbers: 17-cb0000~17-cb0999, 17-cb000
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 GPS (GPU Performance Scaling)
	Supports VR
	Supports MR ready
Display panel	**43.9 cm (17.3 in.), full high-definition (FHD) (1920 × 1080), antiglare, 72% CG, WLED, UWVA, slim, narrow bezel, 300 nits; Microsoft® HDR streaming capable**
	eDP 1.2, A/P, 60 Hz
	eDP 1.4 + PSR, A/P, 144 Hz
	eDP 1.4 + PSR, 144 Hz
	eDP 1.4 + PSR2, 60 Hz
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:
	• 32 GB (16 GB × 2)
	• 16 GB (16 GB × 1 or 8 GB × 2)
	• 12 GB (8 GB × 1 + 4 GB × 1)

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

Category	Description
	• 8 GB (8 GB × 1 or 4 GB × 2)
Storage	**Supports 7.0 mm/7.2 mm, 2.5 in. SATA hard drives**
	Support for solid-state drive + hard drive
	Support for M.2 PCIe/SATA solid-state drive
	Accelerometer/hard drive protection support
	Single hard drive configurations
	1 TB, 7200 rpm, 7.0 mm, 2.5 in.
	Dual storage configurations
	512 GB, PCIe, NVMe, TLC, solid-state drive + 1 TB, PCIe, NVMe, TLC solid-state drive
	512 GB, PCIe, NVMe, TLC, solid-state drive + 1 TB, 7200 rpm hard drive
	512 GB, PCIe, NVMe, TLC, x2, RAID 0 solid-state drive + 2 TB, 5400 rpm hard drive
	256 GB, PCIe, NVMe, TLC, solid-state drive + 1 TB, 7200 rpm hard drive
	256 GB, PCIe, NVMe, TLC, solid-state drive + 2 TB, 5400 rpm hard drive
	256 GB, PCIe, NVMe, TLC, x2, RAID 0 solid-state drive + 1 TB, 5400 rpm hard drive
	128 GB, PCIe, NVMe, TLC, solid-state drive + 1 TB, 7200 rpm hard drive
	NVMe, TLC, M.2 solid-state drive
	1 TB, PCIe-3 × 4
	512 GB, PCIe-3 × 4
	256 GB, PCIe-3 × 4
	Intel Optane™ (3D Xpoint) Solution (PCIe) Gen3 × 2 configurations
	32 GB (Optane) + 512 GB, PCIe-3 × 2 × 2 solid-state drive
	16 GB (Optane) + 1 TB, 7200 rpm hard drive
Audio	**Audio brand**: Bang & Olufsen
	Audio control panel: OMEN Audio Control (supports DTS: X Ultra)
	Supports HP Audio Boost 2.0 with discrete amplifier
	Dual speakers
	Supports Headphone X
Video	**HP Wide Vision HD Camera** - indicator LED, USB 2.0, HD BSI sensor, f2.0, WDR, 88° WFOV
	720p by 30 frames per second
	Dual-array digital microphone with appropriate software: beam forming, echo cancellation, noise suppression
RJ-45 (network) jack	Integrated 10/100/1000 NIC
	Supports Network Booster
Sensors	Accelerometer

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

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

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

Category	Description
	Supports a 4 cell, 70 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)
	330 W, 7.4 mm
	230 W, 7.4 mm
	200 W, 4.5 mm
	150 W, 4.5 mm
	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 High-End Chinese Market CPPP
	Windows 10 Home 64 Plus
	Windows 10 Home 64 Plus Single Language
	Windows 10 Home 64 Plus Single Language Africa Market
	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 Pro 64
	Windows 10 Pro 64 High End
	Windows 10 Pro 64 Web/Kiosk
	FreeDOS 3.0
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, feature locations, and icon labels may vary from the images depicted.

Right side

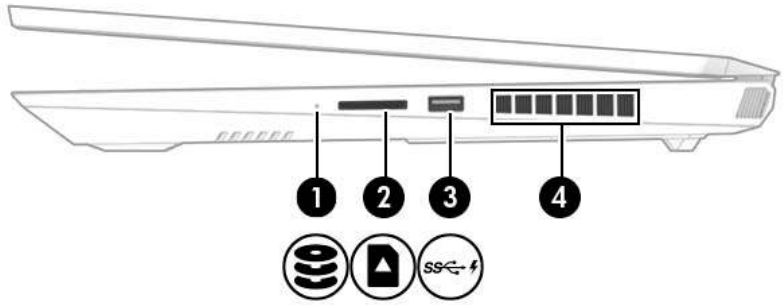


Table 2-1 Right-side components and their descriptions

Component			Description
(1)		Drive light	• Blinking white: The hard drive is being accessed. • Amber: HP 3D DriveGuard has temporarily parked the hard drive.
(2)	 – or – SD	Memory card reader	Reads optional memory cards that enable you to store, manage, share, or access information. To insert a card: 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. To remove a card: ▲ 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	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.

Left side

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

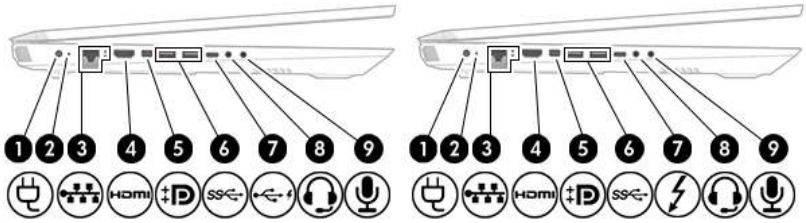


Table 2-2 Left-side components and their descriptions

Component		Description
(1)	Power connector	Connects an AC adapter.
(2)	AC adapter and battery light	• White: The AC adapter is connected and the battery is fully charged. • Blinking white: The AC adapter is disconnected and the battery has reached a low battery level. • Amber: The AC adapter is connected and the battery is charging. • Off: The battery is not charging.
(3)	RJ-45 (network) jack/status lights	Connects a network cable. • White: The network is connected. • Amber: Activity is occurring on the network.
(4)	HDMI port	Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed High-Definition Multimedia Interface (HDMI) device.
(5)	Dual-Mode DisplayPort connector	Connects an optional digital display device, such as a high-performance monitor or projector.
(6)	USB SuperSpeed ports	Connect a USB device, such as a cell phone, camera, activity tracker, or smartwatch, and provide high-speed data transfer.
(7)	USB Type-C port with HP Sleep and Charge	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.
(7)	USB Type-C power connector and Thunderbolt™ port with HP Sleep and Charge	Even when the computer is off, connects and charges most USB devices that have a Type-C connector, such as a cell phone,

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

Component			Description
			camera, activity tracker, or smartwatch, and provides high-speed data transfer. – and – Connects a display device that has a USB Type-C connector, providing DisplayPort output. **NOTE:** Your computer may also support a Thunderbolt docking station. **NOTE:** Cables and/or adapters (purchased separately) may be required.
(8)		Audio-out (headphone)/Audio-in (microphone) combo jack	Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional standalone microphones. **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 *Regulatory, Safety, and Environmental Notices*. To access this guide: ▲ Type `HP Documentation` in the taskbar search box, and then select **HP Documentation**. **NOTE:** When a device is connected to the jack, the computer speakers are disabled.
(9)		Audio-in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.

Rear



Table 2-3 Rear components and their descriptions

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

Display

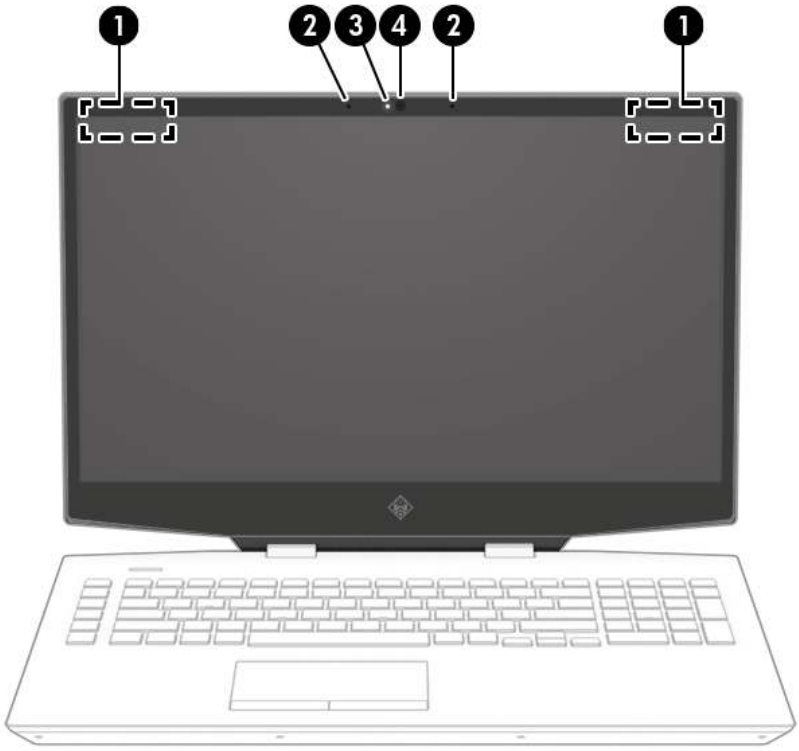


Table 2-4 Display components and their descriptions

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.

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

To access this guide:

▲ Type `HP Documentation` in the taskbar search box, and then select **HP Documentation**.

Keyboard area

Touchpad

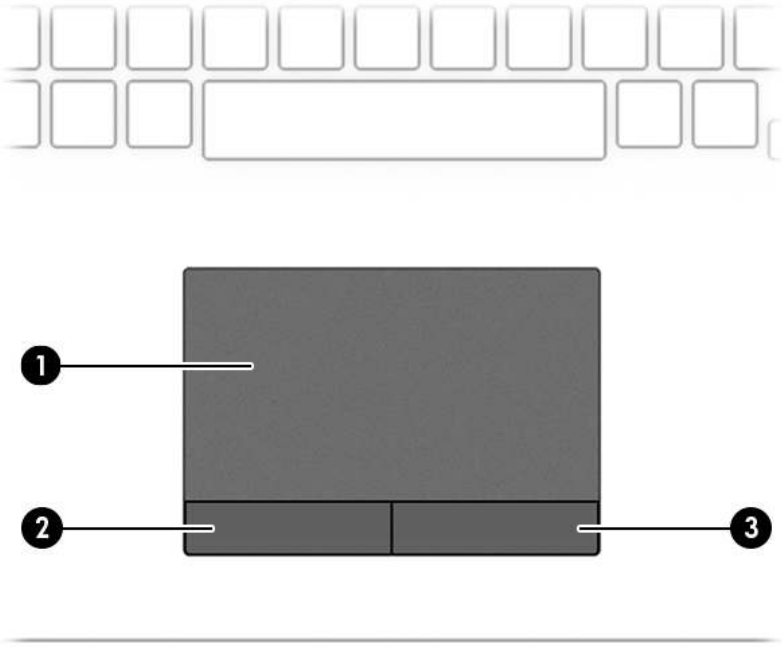


Table 2-5 Touchpad components and their descriptions

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

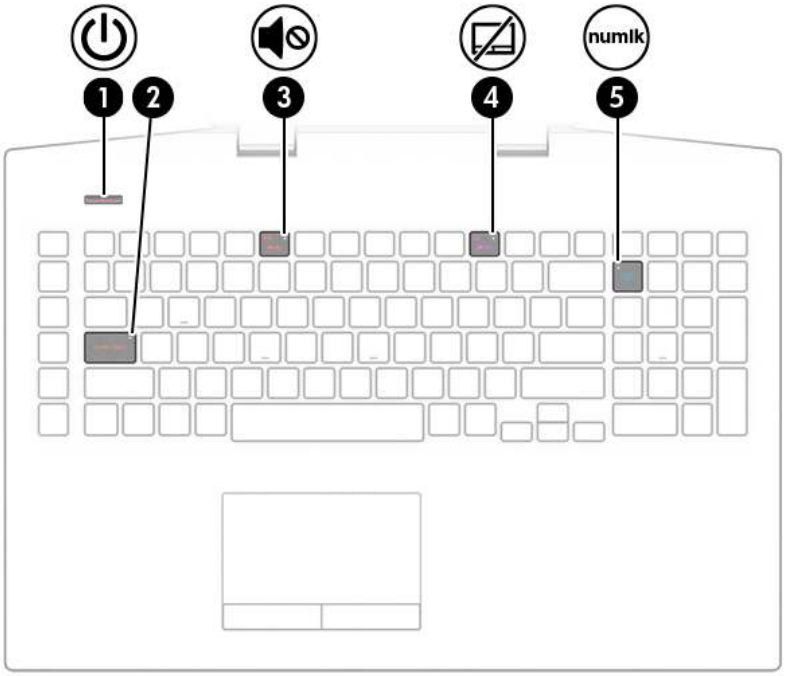


Table 2-6 Lights and their descriptions

Component		Description
(1)	Power light	• 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	• On: Computer sound is off. • Off: Computer sound is on.
(4)	Touchpad light	• On: The touchpad is off. • Off: The touchpad is on.
(5)	Num lock light	• On: Num lock is on. When num lock is on, the keypad can be used like an external numeric keypad. • Off: Num lock is off.

Button

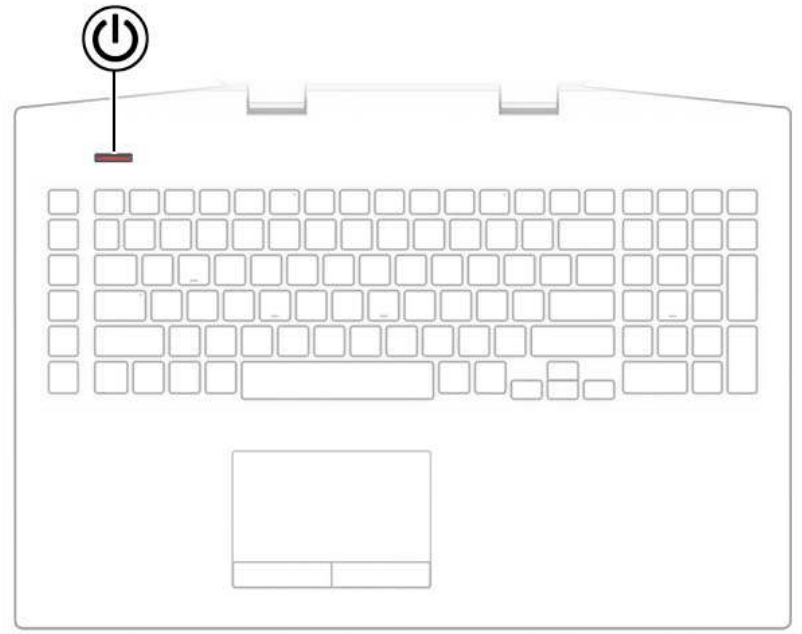


Table 2-7 Button and description

Component		Description
(1)	Power button	• 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 (select products only). • When the computer is in Hibernation, press the button briefly to exit Hibernation. **CAUTION:** Pressing and holding down the power button results in the loss of unsaved information. 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. To learn more about your power settings, see your power options: ▲ Right-click the **Power** icon, and then select **Power Options**.

Special keys

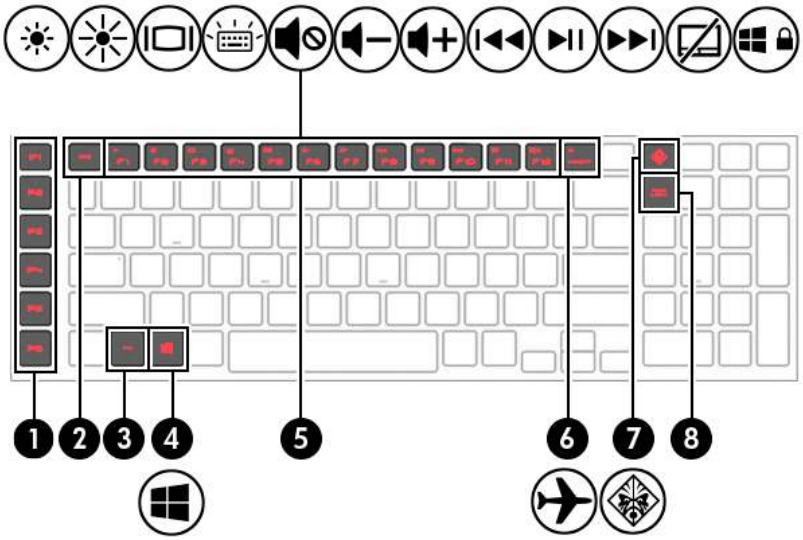


Table 2-8 Special keys and their descriptions

Component		Description
(1)	Gaming macro keys	Allow you to create different gaming key combinations when used alone or with the fn, ctrl, alt, or shift keys. **NOTE:** See HP OMEN Command Center on page 15 for more information.
(2)	esc key	Displays system information when pressed in combination with the fn key.
(3)	fn key	Executes frequently used system functions when pressed in combination with the fn key.
(4)	Windows key	Opens the Start menu. **NOTE:** Pressing the Windows key again will close the Start menu.
(5)	Action keys	Execute frequently used system functions. **NOTE:** On select products, the f5 action key turns the keyboard backlight feature off or on.
(6)	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.
(7)	OMEN key	Opens the OMEN Command Center software.
(8)	num lk key	Alternates between the navigational and numeric functions on the integrated numeric keypad.

Bottom

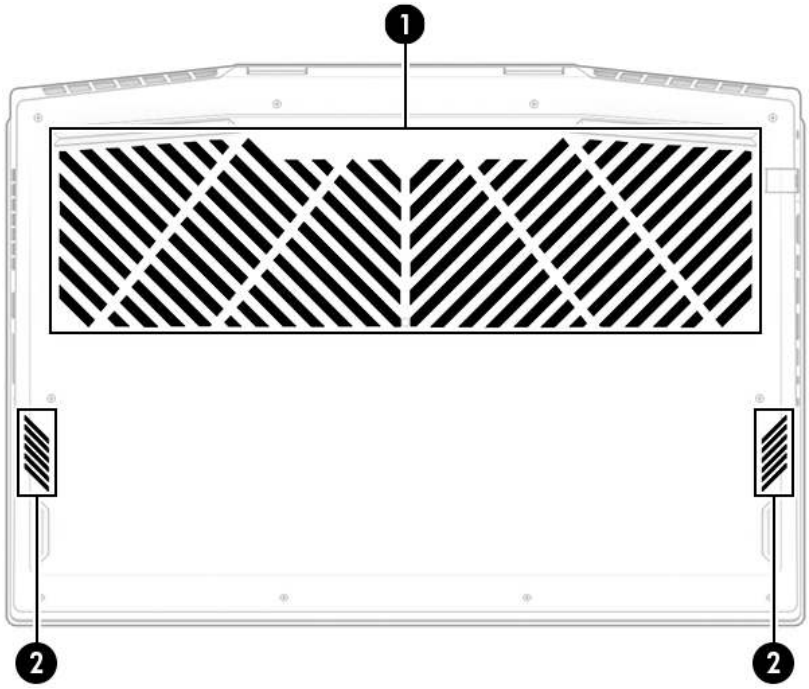


Table 2-9 Bottom components and their descriptions

Component		Description
(1)	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.
(2)	Speakers	Produce sound.

Labels

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

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

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

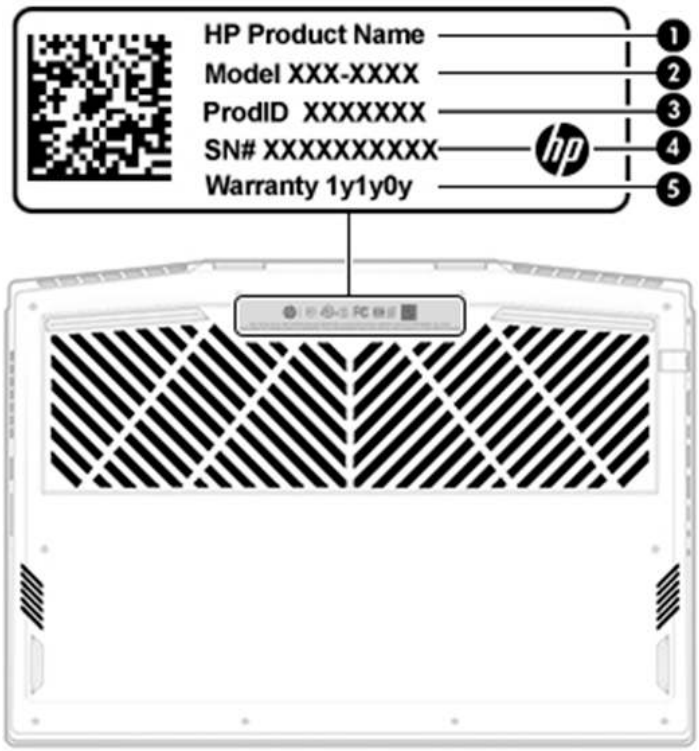


Table 2-10 Service label components

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

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

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 **HP 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 14 for details.

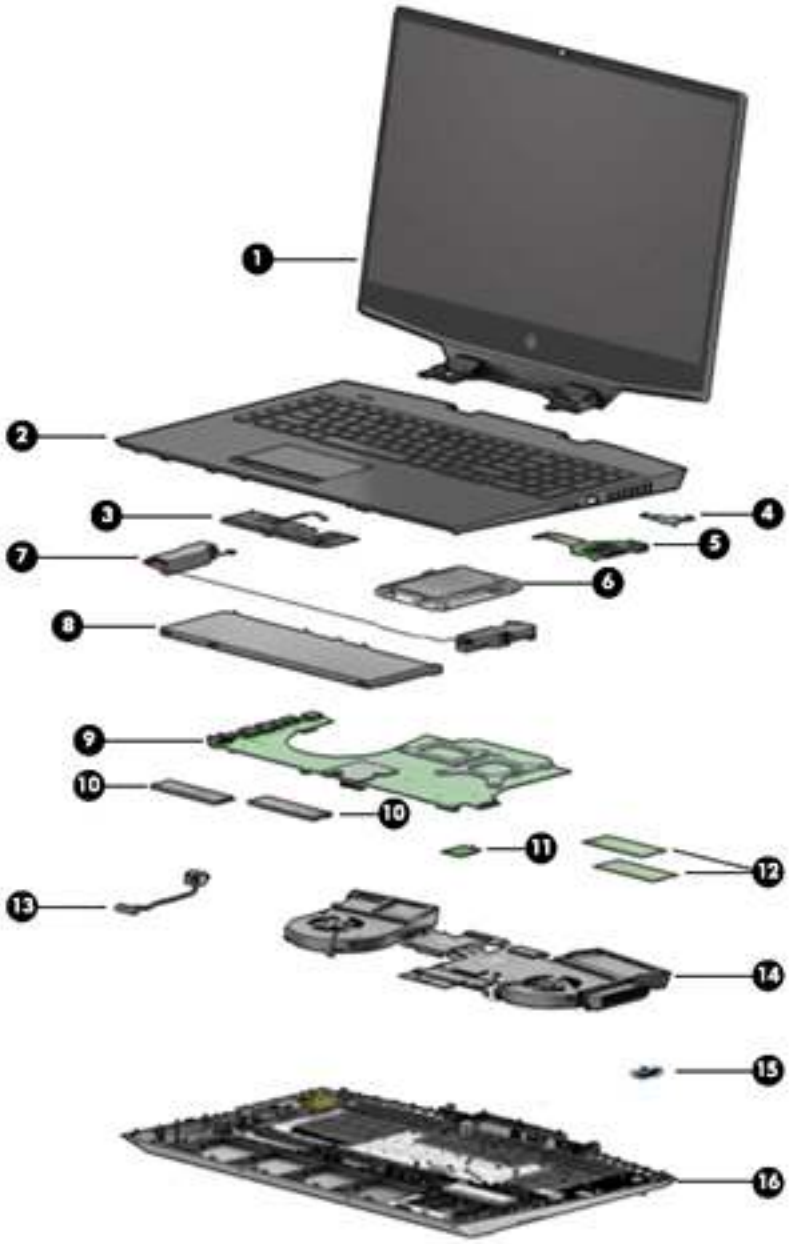


Table 3-1 Computer major components and their descriptions

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 59.	
	For use models with 1-zone lighting (dragon red legend + red backlight)	L57377-xx1
	For use models with 4-zone lighting (white legend + RGB backlight)	L57378-xx1
	For use models with 1-zone lighting (dragon red legend + red backlight) with Thunderbolt	L57379-xx1
	For use models with 4-zone lighting (white legend + RGB backlight) with Thunderbolt	L57380-xx1
	For use models with 1-zone lighting (dragon red legend + red backlight) with Thunderbolt (G-sync)	L62862-xx1
	For use models with 4-zone lighting (white legend + RGB backlight) with Thunderbolt (G-sync)	L62863-xx1
(3)	**Touchpad button board**	L57343-001
(4)	**Power button board** **NOTE:** The power button board cable is available as spare part number L57364-001.	L57371-001
(5)	**Card reader/USB board** **NOTE:** The card reader/USB board cable is available as spare part number L57363-001.	L57370-001
(6)	**Hard drive** **NOTE:** The hard drive connector is available as spare part number L57362-001.	
	2 TB, 5400 rpm	912487-850
	1 TB, 7200 rpm	766644-001
(7)	**Speaker assembly** (includes cushion)	L57375-001
(8)	**Battery**	
	4 cell, 70 Wh	917724-855
	3 cell, 52 Wh	L08855-855
(9)	**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; G-Sync)	L59778-xx1
	Intel Core i7-9750H processor and 8 GB of discrete graphics memory (GeForce RTX 2080; G-Sync)	L59777-xx1
	Intel Core i7-9750H processor and 8 GB of discrete graphics memory (GeForce RTX 2070; G-Sync)	L59776-xx1
	Intel Core i7-9750H processor and 6 GB of discrete graphics memory (GeForce RTX 2060)	L59775-xx1
	Intel Core i7-9750H processor and 6 GB of discrete graphics memory (GeForce GTX 1660Ti)	L59774-xx1
	Intel Core i7-9750H processor and 4 GB of discrete graphics memory (GeForce GTX 1650)	L59772-xx1
	Intel Core i5-9300H processor and 6 GB of discrete graphics memory (GeForce GTX 1660Ti)	L59773-xx1

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

Item	Component	Spare part number
	Intel Core i5-9300H processor and 4 GB of discrete graphics memory (GeForce GTX 1650)	L59771-xx1
	Thermal pad kit (not illustrated)	L57444-001
(10)	**Solid-state drives** (M.2):	
	1 TB, PCIe, Gen 3 × 4	L57387-001
	512 GB, PCIe, Gen 3 × 4	L57386-001
	512 GB, PCIe + 32 GB Optane memory	L57388-001
	256 GB, PCIe, Gen 3 × 4	L57385-001
	128 GB, PCIe, Gen 3 × 2	L57384-001
	16 GB, PCIe, Gen 3 × 2 Optane memory module	L57383-001
(11)	**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
(12)	**Memory modules** (DDR4-2666):	
	16 GB	937438-850
	8 GB	937236-850
	4 GB	L10598-850
(13)	**Power connector cable**	
	For use in models with N18P-G0 graphics (GeForce GTX 1650; 200 W)	L57358-001
	For use in models with N18E-G0/G1 graphics (GeForce GTX 1660Ti/RTX 2060; 200 W)	L57359-001
	For use in models with N18E-G2/G3 graphics (GeForce RTX 2070/2080; 330 W)	L60899-001
(14)	**Heat sink** **NOTE:** Heat sink appearance may vary.	
	Heat sink for use in models with GeForce GTX 1650 graphics	L57367-001
	Heat sink for use in models with GeForce GTX 1660Ti graphics	L57366-001
	Heat sink for use in models with GeForce RTX 2060 graphics	L62864-001
	Heat sink for use in models with GeForce RTX 2070 graphics	L62865-001
	Heat sink for use in models with GeForce RTX 2080 graphics	L62866-001
	Thermal grease (not illustrated)	L65268-001
	Thermal pad kit (not illustrated)	L57444-001
(15)	**Thermal sensor board** **NOTE:** The thermal sensor board cable is available as spare part number L57365-001.	L57372-001
(16)	**Bottom cover**	

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

Item	Component	Spare part number
	For use in models with N18P/N18E G0/G1 graphics (NVIDIA GeForce GTX 1650, 1660Ti, RTX 2060)	L57356-001
	For use in models with N18E G2/G3 graphics (NVIDIA GeForce RTX 2070/2080)	L57357-001

Mass storage devices

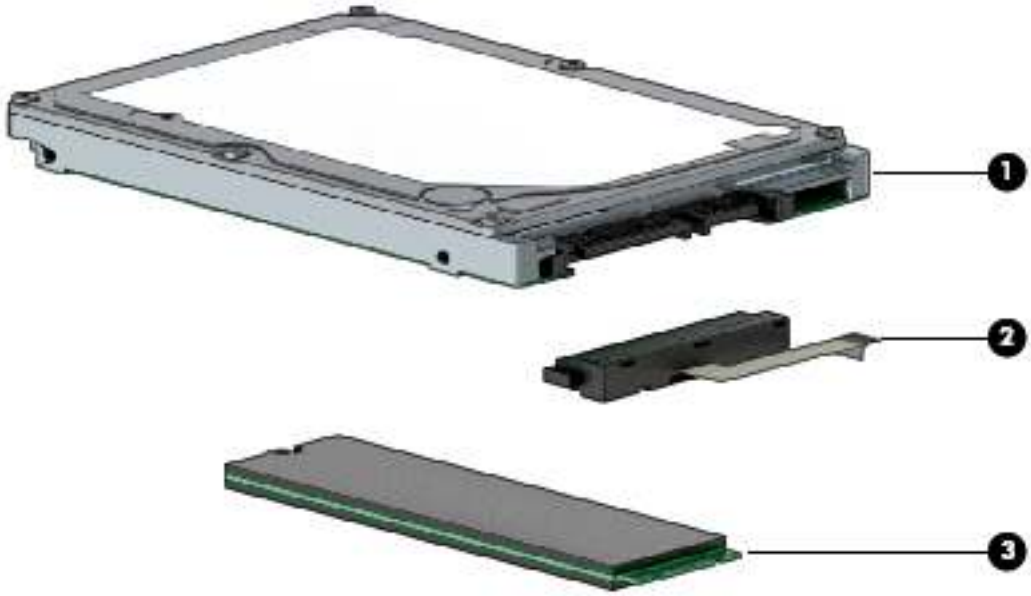


Table 3-2 Mass storage devices and their descriptions

Item	Component	Spare part number
(1)	**Hard drive**	
	2 TB, 5400 rpm	912487-850
	1 TB, 7200 rpm	766644-001
(2)	**Hard drive connector/cable**	L57362-001
(3)	**Solid-state drive** (M.2)	
	1 TB, PCIe, Gen 3 × 4	L57387-001
	512 GB, PCIe, Gen 3 × 4	L57386-001
	512 GB, PCIe + 32 GB Optane memory	L57388-001
	256 GB, PCIe, Gen 3 × 4	L57385-001
	128 GB, PCIe, Gen 3 × 2	L57384-001
	16 GB, PCIe, Gen 3 × 2 Optane memory module	L57383-001

Display assembly subcomponents

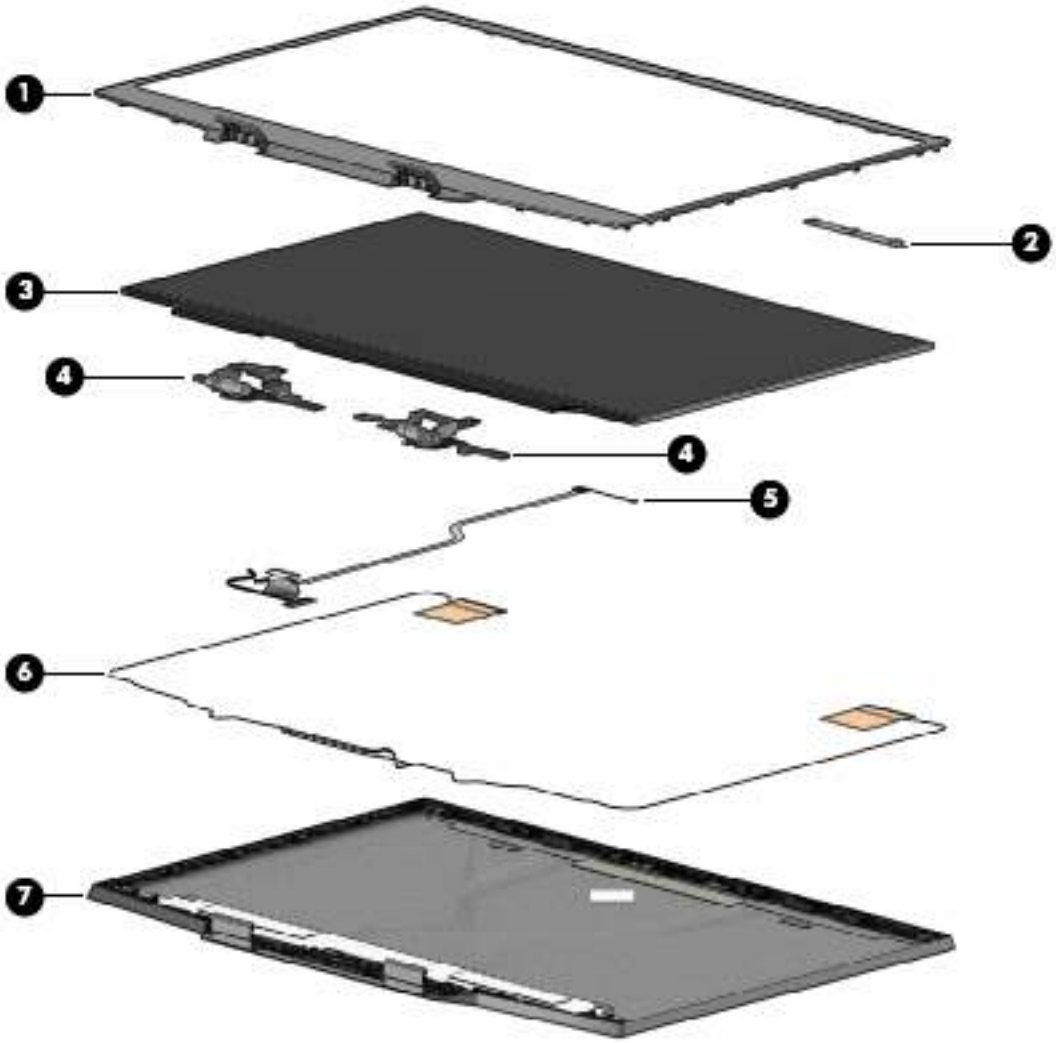


Table 3-3 Display components and their descriptions

Item	Component	Spare part number
(1)	**Display bezel with magnet**	L57354-001
(2)	**Webcam/microphone module** (includes bezel adhesive)	L61453-001
(3)	**Display panel** (includes panel adhesive tape and bezel adhesive): **NOTE:** Display panel adhesive is available as spare part number L57369-001.	
	FHD, 60 Hz	L57381-001
	FHD, 144 Hz	L57382-001
(4)	**Display hinges** (left and right; includes bezel adhesive)	L57368-001
(5)	**Display panel/webcam cable** (includes display panel adhesive tape and bezel adhesive):	
	For use in FHD, 60 Hz displays	L57360-001
	For use in FHD, 144 Hz displays	L57361-001

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

Item	Component	Spare part number
(6)	**Wireless antennas** (main and aux; includes bezel adhesive and display panel adhesive tape)	L57353-001
(7)	**Display back cover** (includes bezel adhesive and display panel adhesive tape)	L57355-001

Cables

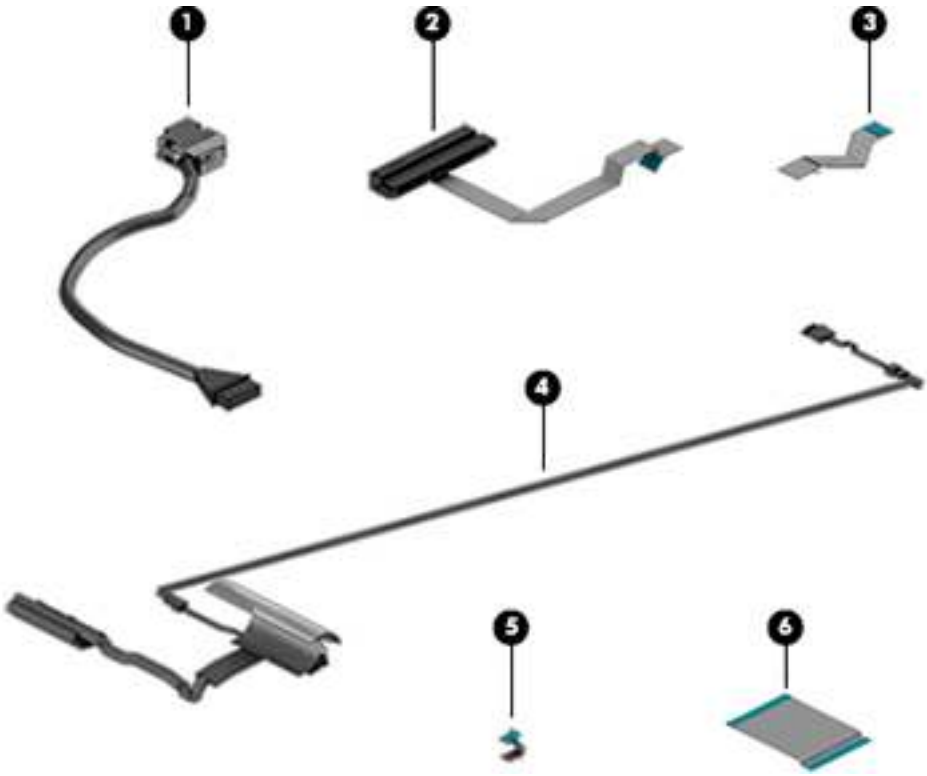


Table 3-4 Cables and their descriptions

Item	Component	Spare part number
(1)	**Power connector cable**	
	For use in models with N18P-G0 graphics (GeForce GTX 1650; 200 W)	L57358-001
	For use in models with N18E-G0/G1 graphics (GeForce GTX 1660Ti/RTX 2060; 200 W)	L57359-001
	For use in models with N18E-G2/G3 graphics (GeForce RTX 2070/2080; 330 W)	L60899-001
(2)	**Hard drive connector/cable**	L57362-001
(3)	**Power button board cable**	L57364-001
(4)	**Display cable** (includes bezel adhesive and display panel adhesive tape)	
	For use in models with an FHD, 60 Hz display	L57360-001
	For use in models with an FHD, 144 Hz display	L57361-001
(5)	**Thermal sensor cable**	L57365-001
(6)	**Card reader/USB board cable**	L57363-001

Miscellaneous parts

Table 3-5 Miscellaneous parts and their descriptions

Component	Spare part number
AC adapter (PFC):	
330 W, 7.4 mm	925142-850
230 W, 7.4 mm	925141-850
200 W, 4.5 mm	L00818-850
150 W, 4.5 mm	L32661-001
Power cord (C5, 1.0 m):	
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 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 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 Japan	L22344-001
For use in North America	L22331-001
For use in the People's Republic of China	L22341-001
For use in South Africa	L22337-001
For use in South Korea	L22340-001
For use in Switzerland	L22336-001

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

Component	Spare part number
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	L57444-001
HDMI-to-VGA adapter	701943-001
USB-C-to-USB-A adapter	833960-001
Screw Kit	L57376-001

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

	Relative humidity		
Event	**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 MΩ ±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 MΩ ±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 MΩ ±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 MΩ ±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 14 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 20 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 24 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

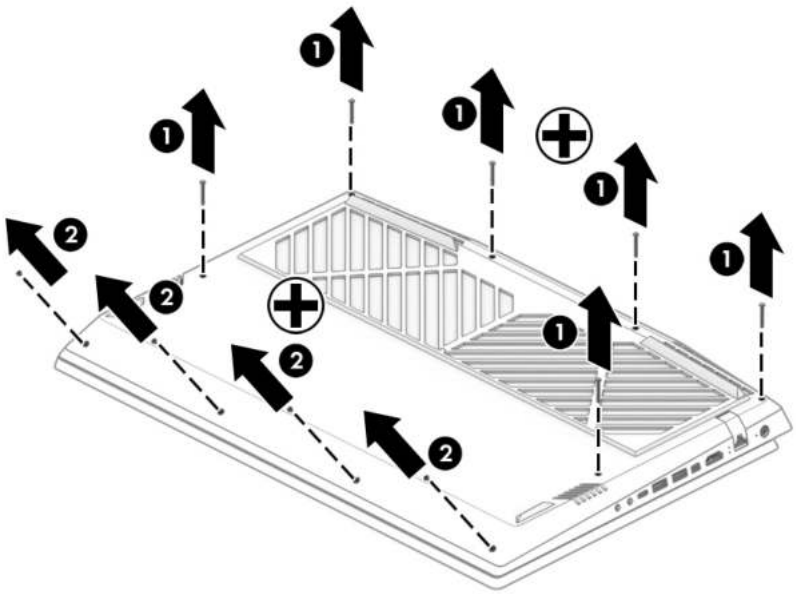
Description	Spare part number
Bottom cover for use in models with N18P/N18E G0/G1 graphics (NVIDIA GeForce GTX 1650, 1660Ti, RTX 2060)	L57356-001
Bottom cover for use in models with N18E G2/G3 graphics (NVIDIA GeForce RTX 2070/2080)	L57357-001

Before removing the bottom cover, follow this step:

▲ Prepare the computer for disassembly (Preparation for disassembly on page 29).

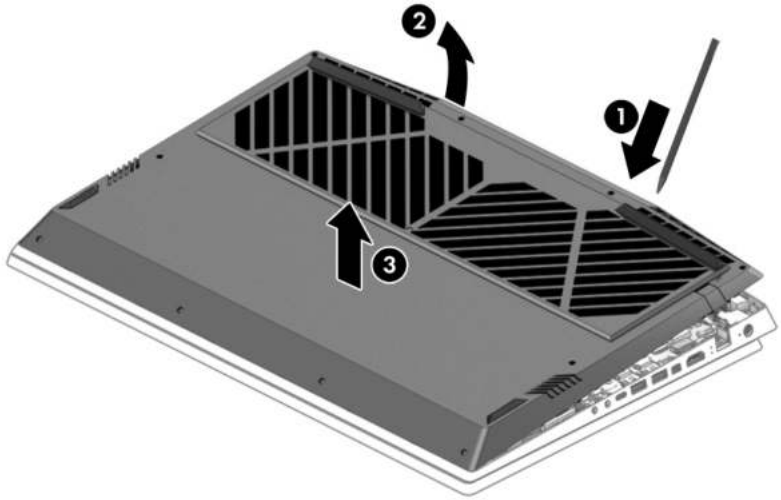
Remove the bottom cover:

1. Remove the six Phillips M2.0 × 16.0 screws **(1)** and the four Phillips M2.0 × 6.0 screws **(2)** from the bottom cover.



2. Insert a plastic tool between the bottom cover and the computer chassis **(1)**, and then flex and lift the 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	L57386-001
512 GB, PCIe + 32 GB Optane memory	L57388-001
256 GB, PCIe, Gen 3 × 4	L57385-001
128 GB, PCIe, Gen 3 × 2	L57384-001
16 GB, PCIe, Gen 3 × 2 Optane memory module	L57383-001

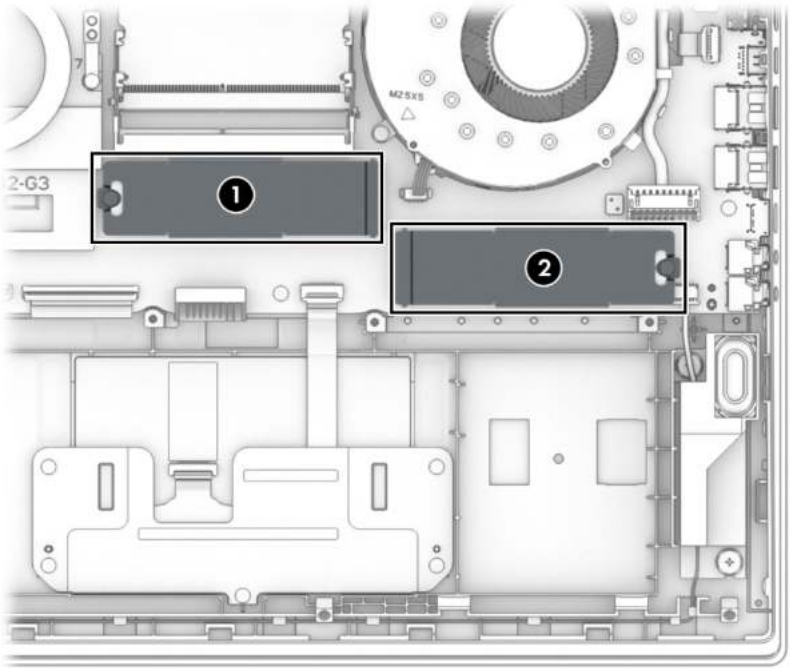
Before removing the solid-state drive or Optane memory module, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 38).

The computer offers two solid-state drive sockets as shown in the following illustration:

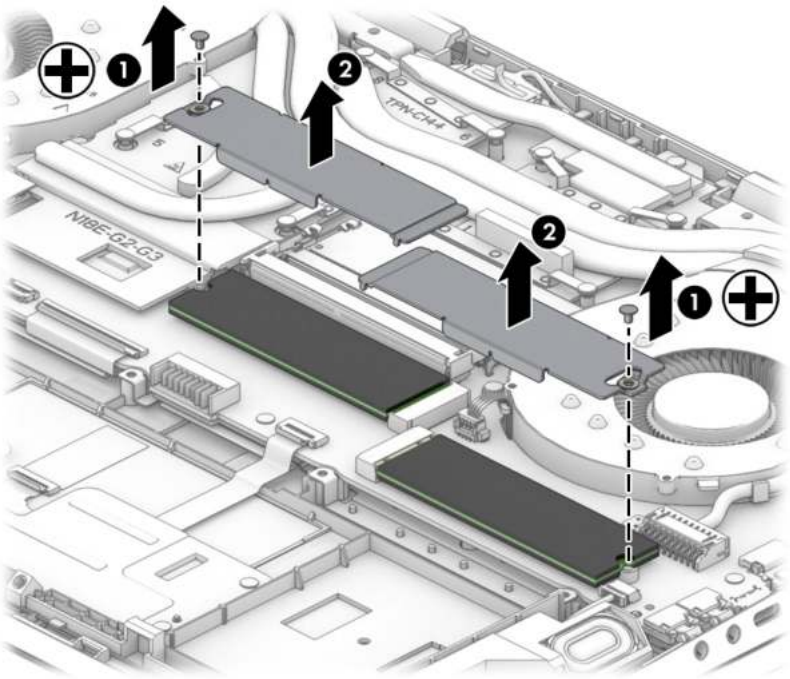
(1) Primary solid-state drive

(2) Secondary solid-state drive

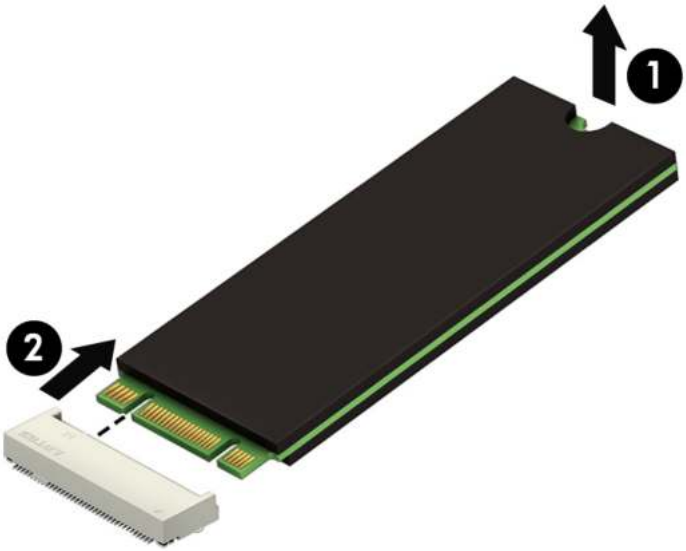


Remove the solid-state drive or Optane memory module:

1. Remove the Phillips M2.0 × 4.0 screw **(1)**, and then lift the metal cover off the drive **(2)**.



2. Lift the top of the drive **(1)**, and then pull the drive from the socket **(2)**.



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:

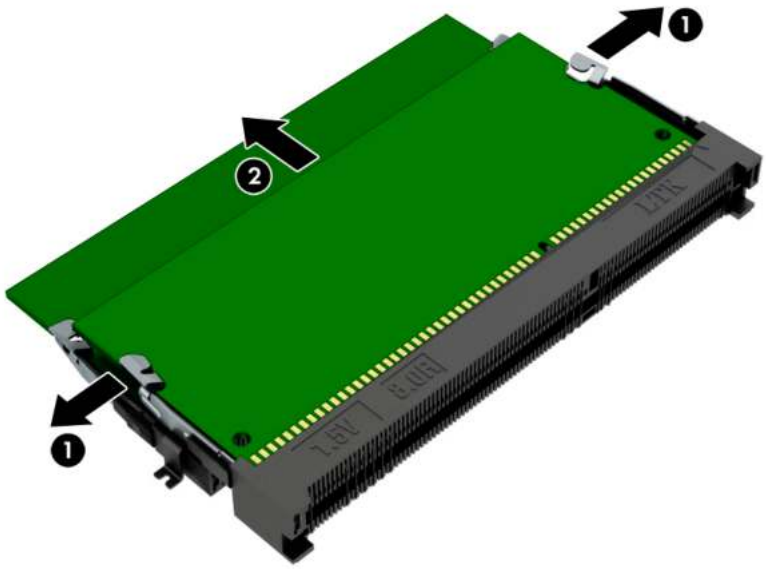
1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 38).

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.



Reverse this procedure to install memory modules.

Hard drive assembly

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

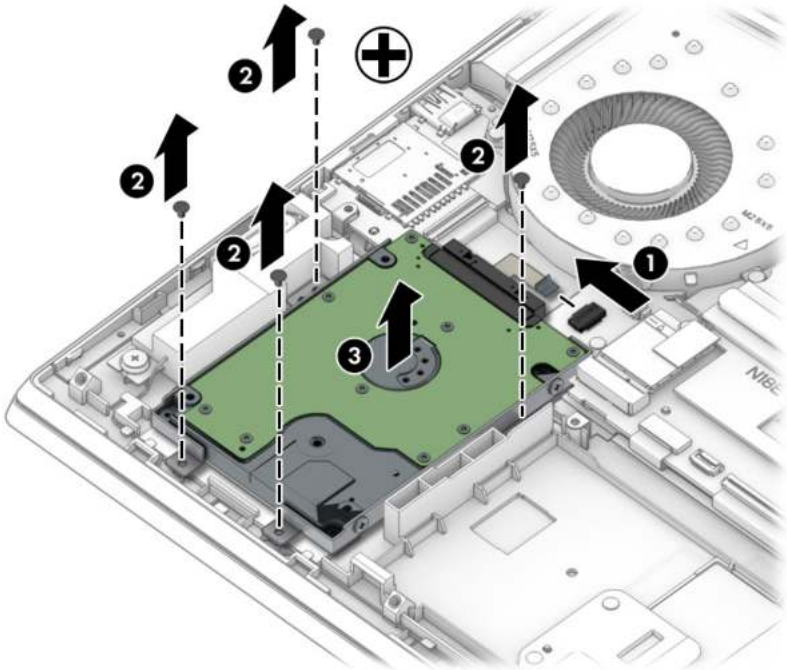
Description	Spare part number
Hard drive, 2 TB, 5400 rpm	912487-850
Hard drive, 1 TB, 7200 rpm	766644-001
Hard drive connector/cable	L57362-001

Before removing the hard drive assembly, follow these steps:

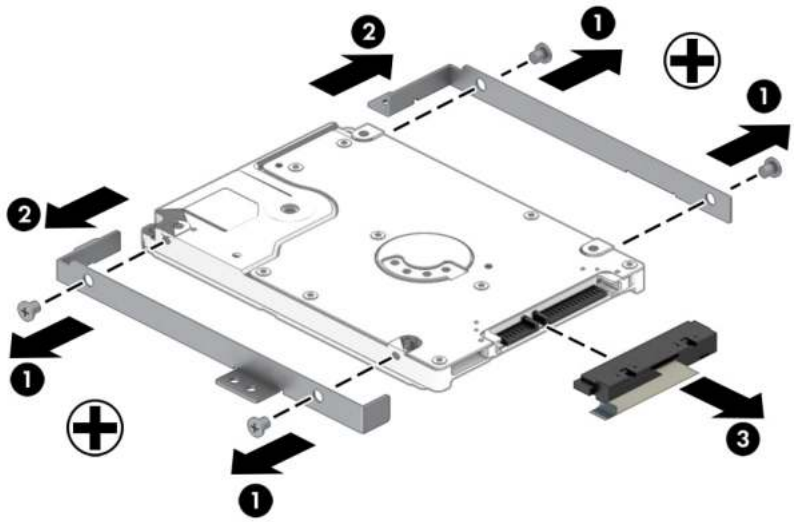
1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 38).

Remove the hard drive assembly:

1. Disconnect the hard drive cable from the system board ZIF connector **(1)**.
2. Remove the four Phillips M2.0 × 3.0 screws **(2)** that secure the hard drive assembly to the computer.
3. Lift the hard drive assembly out of the computer **(3)**.



4. If it is necessary to disassemble the hard drive, remove the four Phillips M3.0 × 3.0 screws **(1)** from the brackets, and then remove the brackets from the hard drive **(2)**. Disconnect the connector 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 only be accessed by an authorized service provider. Accessing these parts can damage the computer or void the warranty.

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

Component replacement procedures

There are as many as 47 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.

Thermal material

Table 6-1 Thermal material description and part number

Description	Spare part number
Thermal grease	L65268-001
Thermal pad kit	L57444-001

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. Affected parts are shown in the following list:

- Heat sink
- System board
- Top cover with keyboard
- Display assembly

Battery

Table 6-2 Battery description and part number

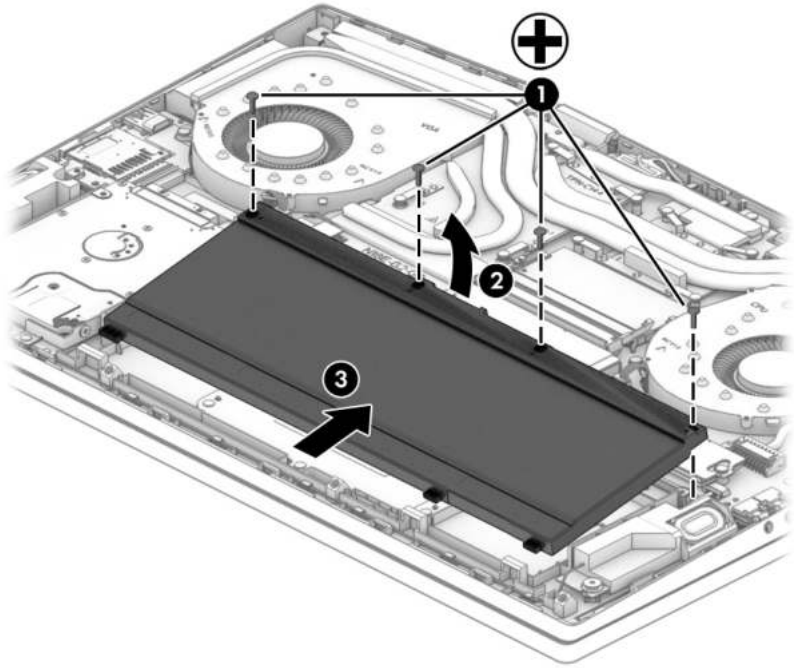
Description	Spare part number
Battery, 4 cell, 70 Wh	917724-855
Battery, 3 cell, 52 Wh	L08855-855

Before removing the battery, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).

Remove the battery:

1. Remove the four Phillips M2.0 × 7.0 screws **(1)** that secure the battery to the computer.
2. Lift the battery away from the connector **(2)**, and then remove the battery from the computer **(3)**.



Reverse this procedure to install the battery.

WLAN module

Table 6-3 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 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 38).

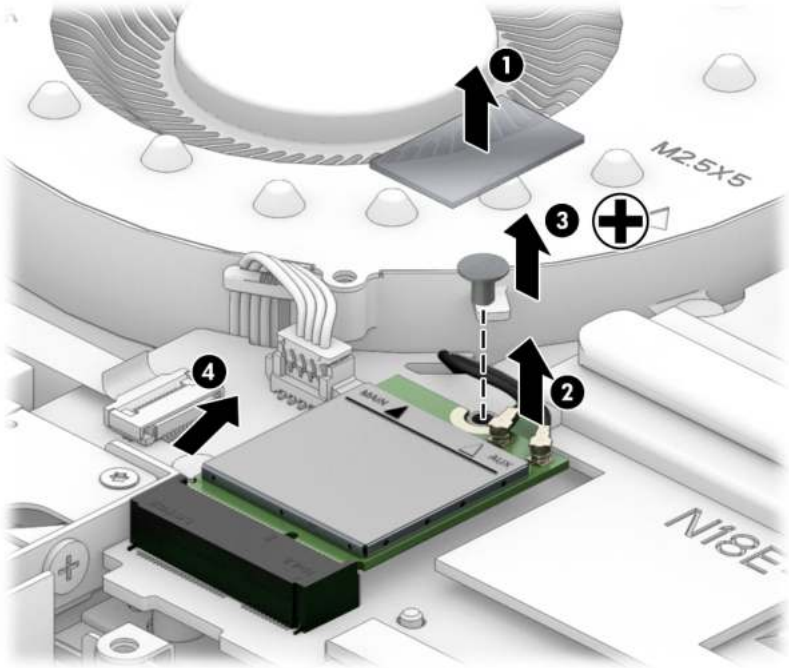
Remove the WLAN module:

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 6-4 Power connector description and part number

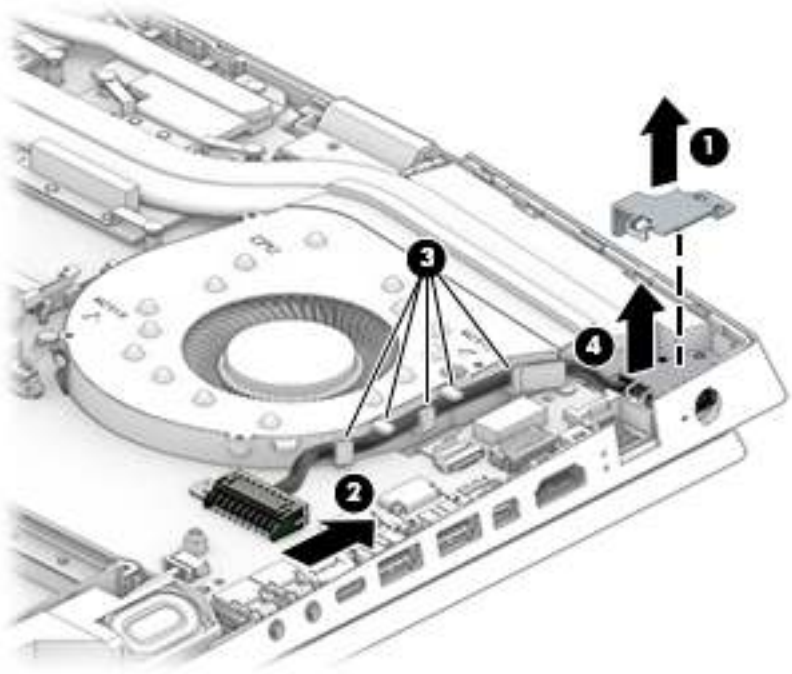
Description	Spare part number
Power connector for use in models with N18P-G0 graphics (GeForce GTX 1650; 200 W)	L57358-001
Power connector for use in models with N18E-G0/G1 graphics (GeForce GTX 1660Ti/RTX 2060; 200 W)	L57359-001
Power connector for use in models with N18E-G2/G3 graphics (GeForce RTX 2070/2080; 330 W)	L60899-001

Before removing the power connector cable, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 38).

Remove the power connector cable:

1. Remove the bracket from the connector **(1)**.
2. Disconnect the cable from the system board **(2)**.
3. Remove the cable from the clips on the fan **(3)**.
4. Remove the power connector and cable from the computer **(4)**.



Reverse this procedure to install the power connector cable.

Speaker assembly

Table 6-5 Speaker assembly description and part number

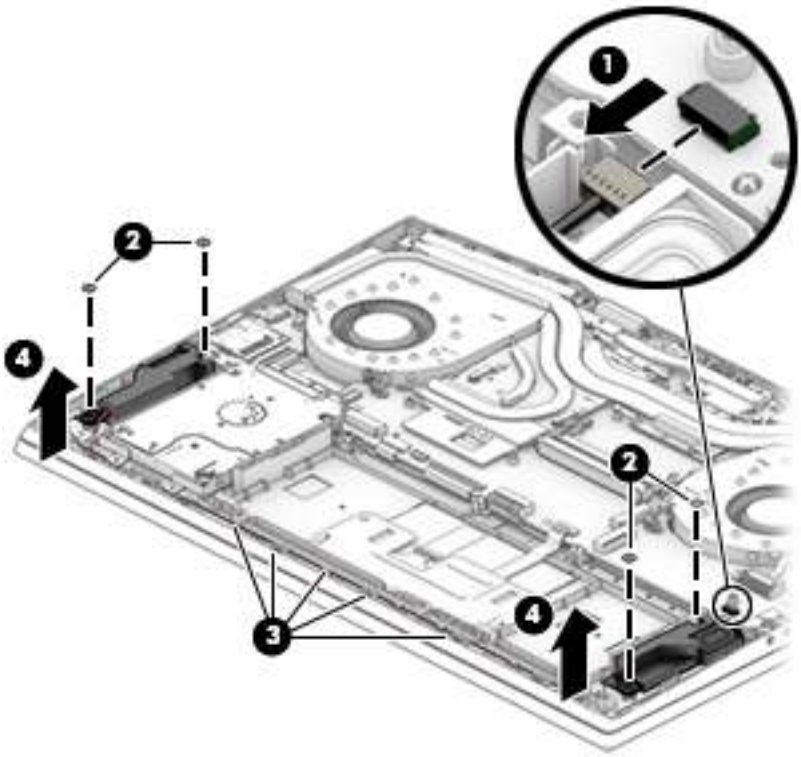
Description	Spare part number
Speaker assembly (includes cushion)	L57375-001

Before removing the speaker assembly, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 38).

Remove the speakers:

1. Disconnect the speaker cable from the system board **(1)**.
2. Remove the two Phillips M2.0 × 2.0 screws **(2)** that secure each speaker to the computer.
3. Remove cable that runs between the speakers from the clips along the bottom of the computer **(3)**.
4. Remove the speaker assembly from the computer **(4)**.



Reverse this procedure to install the speaker assembly.

Touchpad button board

Table 6-6 Touchpad button board description and part number

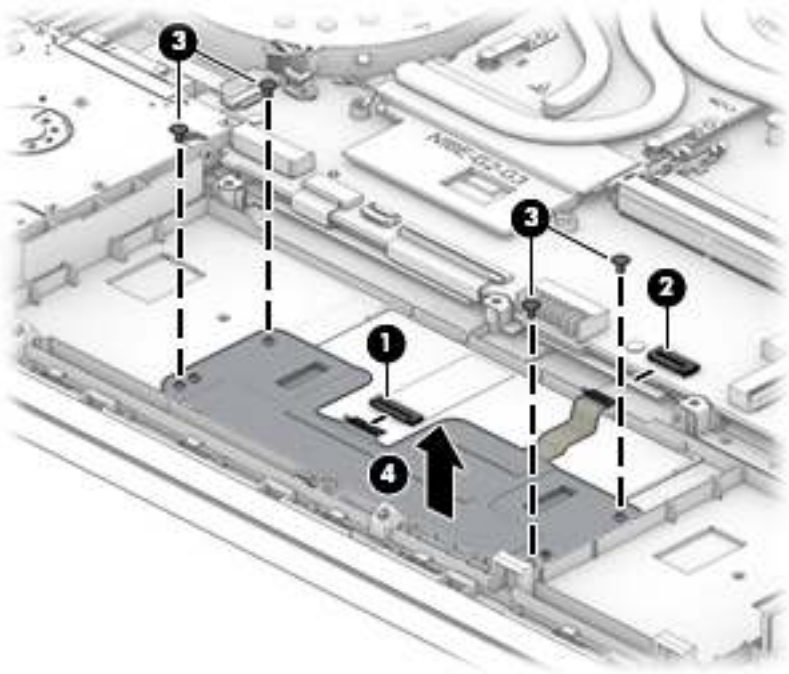
Description	Spare part number
Touchpad button board	L57343-001

Before removing the touchpad button board, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 38).

Remove the touchpad button board:

1. Disconnect the cable from the ZIF connector on the touchpad **(1)**.
2. Disconnect the cable from the ZIF connector on the system board **(2)**.
3. Remove the four 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 6-7 Heat sink/fan assembly, thermal pad, and thermal grease descriptions and part numbers

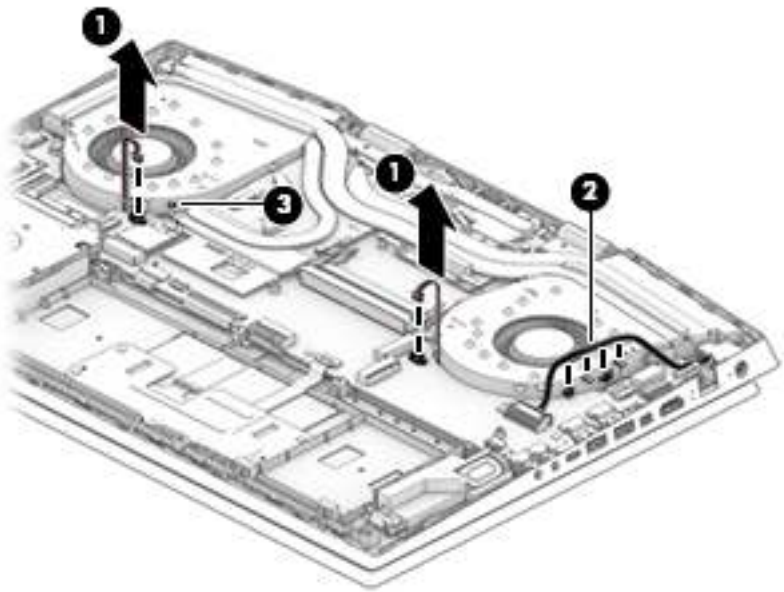
Description	Spare part number
Heat sink/fan assembly for use in models with GeForce GTX 1660 graphics	L57367-001
Heat sink/fan assembly for use in models with GeForce GTX 1660Ti graphics	L57366-001
Heat sink/fan assembly for use in models with GeForce GTX 2060 graphics	L62864-001
Heat sink/fan assembly for use in models with GeForce GTX 2070 graphics	L62865-001
Heat sink/fan assembly for use in models with GeForce GTX 2080 graphics	L62866-001
Thermal grease	L65268-001
Thermal pad kit	L57444-001

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

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 38).

Remove the heat sink/fan assembly:

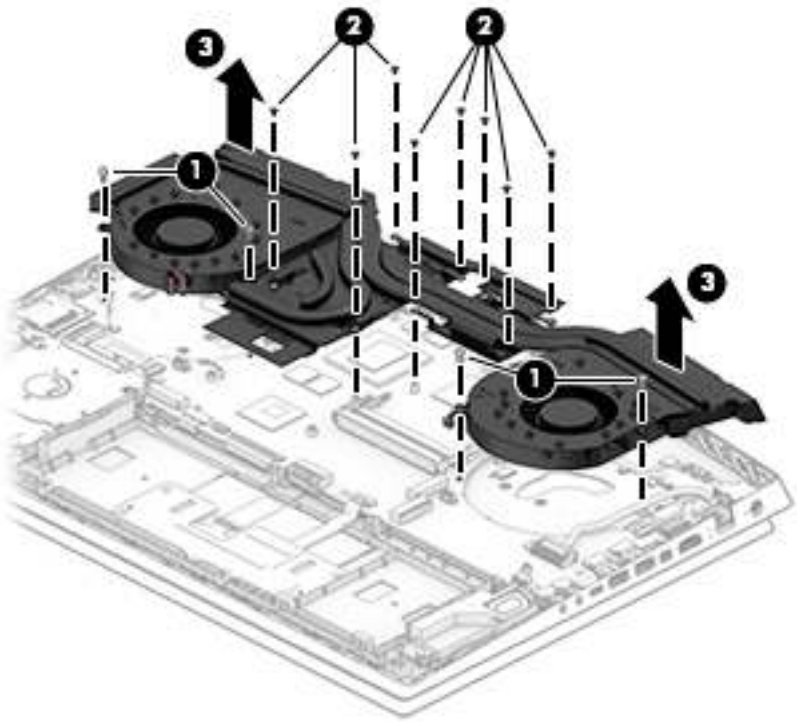
1. Disconnect the two fan cables from the system board **(1)**.
2. Remove the power connector cable from the routing channel in the left fan **(2)**.
3. Remove the WLAN antenna from the routing channel in the right fan **(3)**.



4. Remove the two Phillips M2.0 × 5.0 screws **(1)** from each fan.
5. Remove the eight Phillips M2.0 × 3.0 screws **(2)** in the order indicated on the heat sink.

6. Remove the heat sink/fan assembly **(3)**.

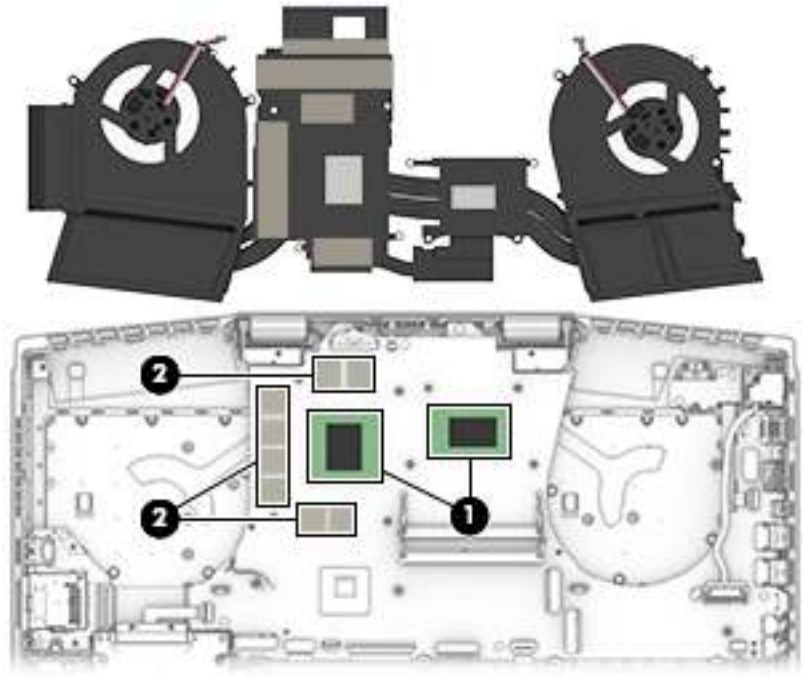
NOTE: Heat sink appearance may vary.



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.

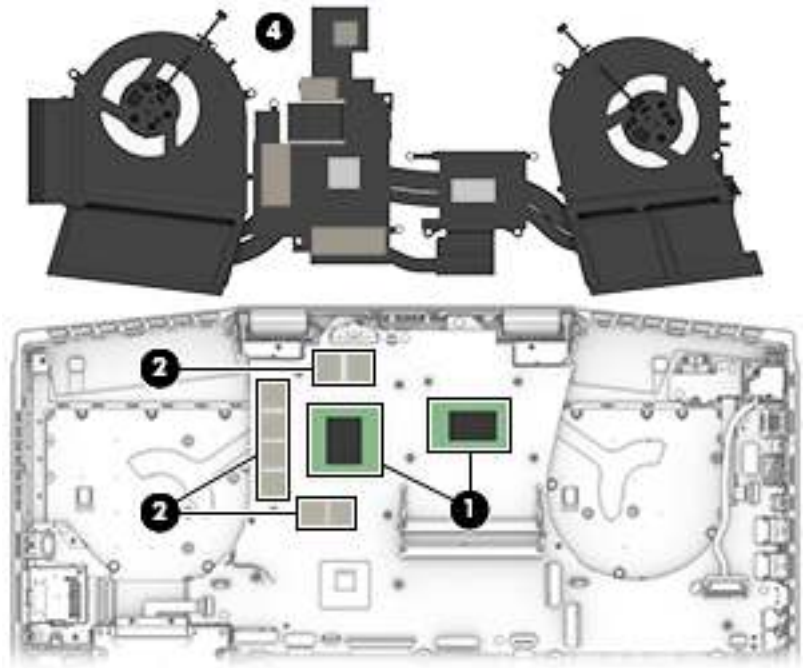
7. **Heat sink configuration 1**

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



8. **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 cable is available as spare part number L57363-001.

Table 6-8 Card reader board description and part number

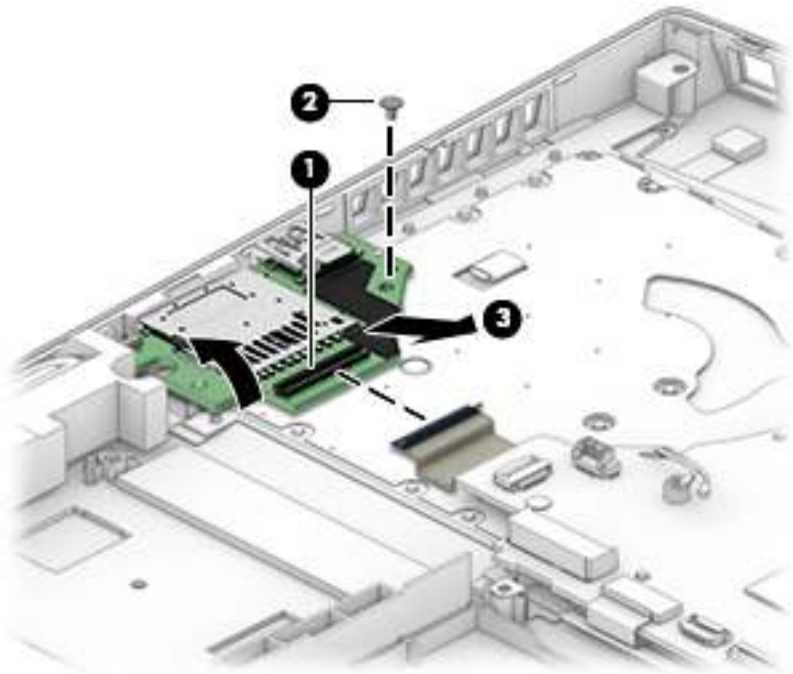
Description	Spare part number
Card reader/USB board	L57370-001

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

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 38).
4. Remove the fan/heat sink (see Heat sink/fan assembly on page 44).

Remove the card reader/USB 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, and then pull board up and into the computer to remove it **(3)**.



Reverse this procedure to install the card reader/USB 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 L57364-001.

Table 6-9 Power button board description and part number

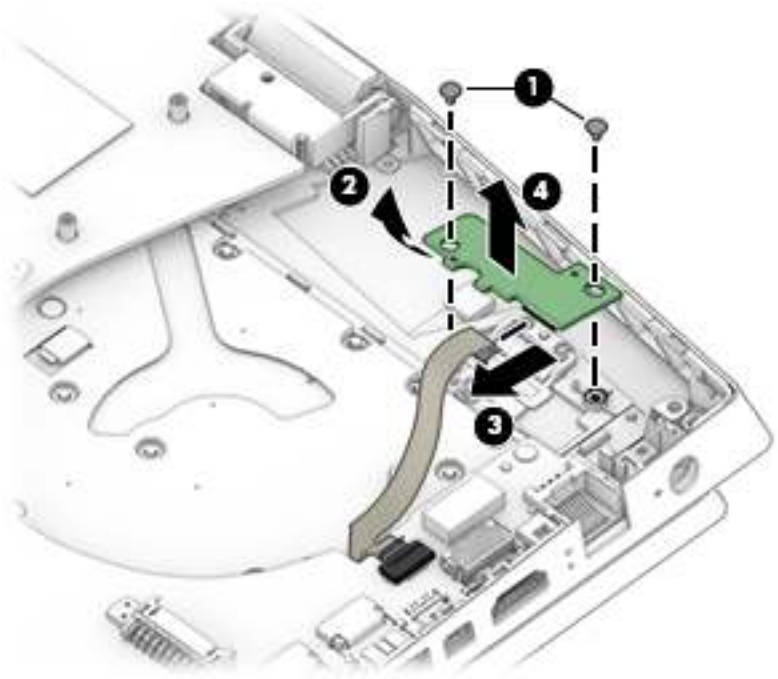
Description	Spare part number
Power button board	L57371-001

Before removing the power button board, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 38).
4. Remove the solid-state drive (see Solid-state drive and Optane memory module on page 32).
5. Remove the fan/heat sink (see Heat sink/fan assembly on page 44).

Remove the power button board:

1. Remove the two Phillips M2.0 × 3.0 screws **(1)** that secure the board to the computer.
2. Rotate board upside down so you can access connector underneath **(2)**.
3. Disconnect the cable from the ZIF connector on the board **(3)**.
4. Remove the power button board from the computer **(4)**.



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.

System board

All system boards use the following part numbers:

xxxxxx-001: Non-Windows operating system

xxxxxx-601: Windows 10 operating system

Table 6-10 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; G-Sync)	L59778-xx1
Intel Core i7-9750H processor and 8 GB of discrete graphics memory (GeForce RTX 2080; G-Sync)	L59777-xx1
Intel Core i7-9750H processor and 8 GB of discrete graphics memory (GeForce RTX 2070; G-Sync)	L59776-xx1
Intel Core i7-9750H processor and 6 GB of discrete graphics memory (GeForce RTX 2060)	L59775-xx1
Intel Core i7-9750H processor and 6 GB of discrete graphics memory (GeForce GTX 1660Ti)	L59774-xx1
Intel Core i7-9750H processor and 4 GB of discrete graphics memory (GeForce GTX 1650)	L59772-xx1
Intel Core i5-9300H processor and 6 GB of discrete graphics memory (GeForce GTX 1660Ti)	L59773-xx1
Intel Core i5-9300H processor and 4 GB of discrete graphics memory (GeForce GTX 1650)	L59771-xx1

Before removing the system board, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 38).
4. Remove the solid-state drive (see Solid-state drive and Optane memory module on page 32).
5. Remove the fan/heat sink (see Heat sink/fan assembly on page 44).

Remove the system board:

1. Disconnect the following cables from the system board:

   (1) Speaker cable

   (2) Touchpad cable (ZIF)

   (3) Keyboard cable (ZIF)

   (4) Backlight cable (ZIF)

   (5) WLAN module antennas

   (6) Hard drive cable (ZIF)

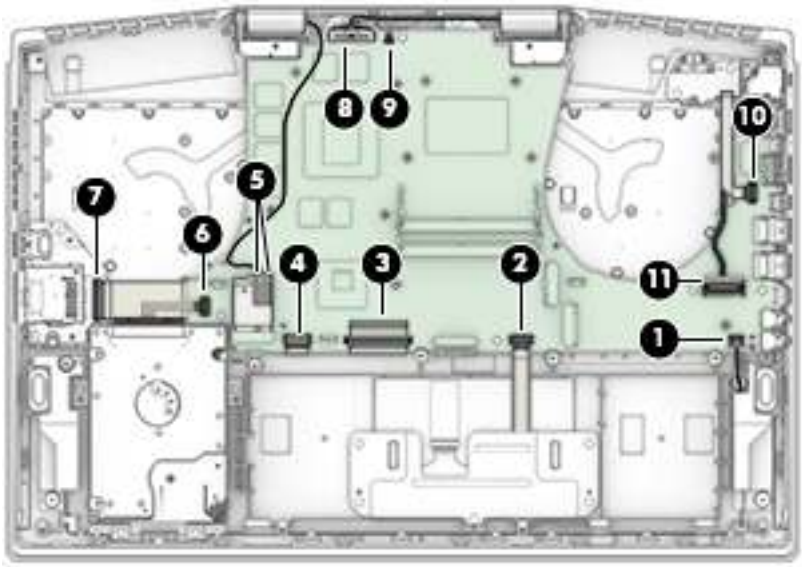
   (7) Card reader cable (reverse ZIF)

   (8) Display cable (ZIF)

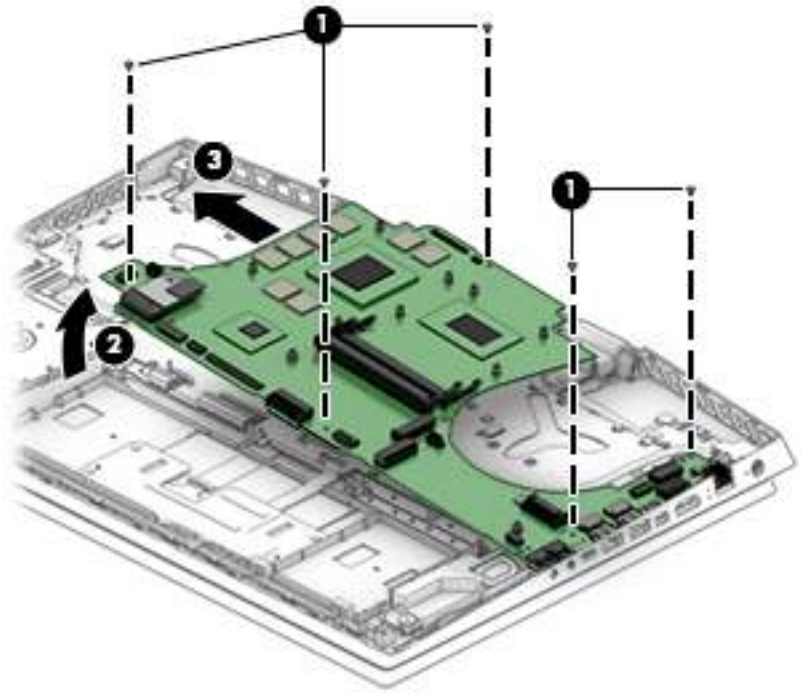
   (9) Thermal sensor cable (reverse ZIF)

   (10) Power button board cable (ZIF)

   (11) Power connector cable



2. Remove the five Phillips M2.0 × 3.0 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.

Thermal sensor board

NOTE: The thermal sensor board spare part kit does not include the cable. The cable is available as spare part number L57365-001.

Table 6-11 Thermal sensor board description and part number

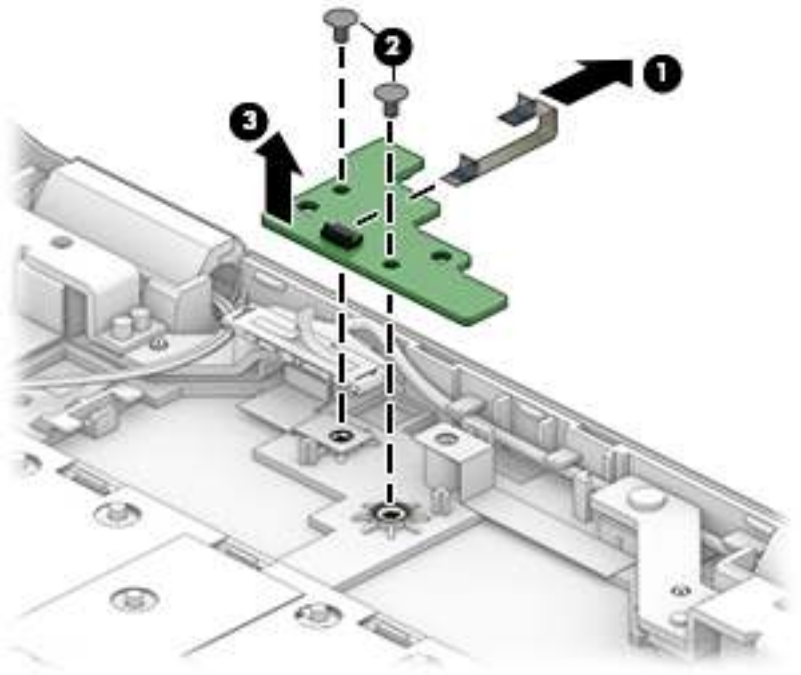
Description	Spare part number
Thermal sensor board	L57372-001

Before removing the thermal sensor board, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 38).
4. Remove the solid-state drive (see Solid-state drive and Optane memory module on page 32).
5. Remove the fan/heat sink (see Heat sink/fan assembly on page 44).
6. Remove the system board (see System board on page 49).

Remove the thermal sensor board:

1. Disconnect the cable from the ZIF connector on the sensor board **(1)**.
2. Remove the two Phillips M2.0 × 3.0 screws **(2)** that secure the sensor board to the computer.
3. Remove the thermal sensor board from the computer **(3)**.



Reverse this procedure to install the thermal sensor board.

Display assembly

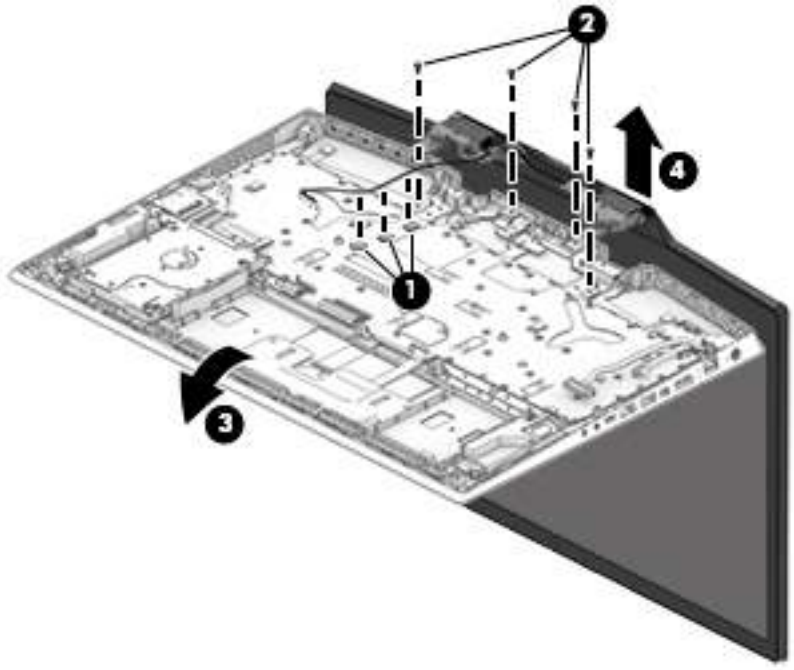
NOTE: The display assembly is spared only at the subcomponent level.

Before removing the display assembly, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 38).
4. Remove the fan/heat sink (see Heat sink/fan assembly on page 44).
5. Remove the system board (see System board on page 49).

Remove the display assembly:

1. Remove the wireless antenna cables from the clips that secure them to the computer chassis **(1)**.
2. Remove the two Phillips M2.5 × 5.0 screws **(2)** from each hinge.
3. Open the computer **(3)**, and then separate the display from the computer **(4)**.



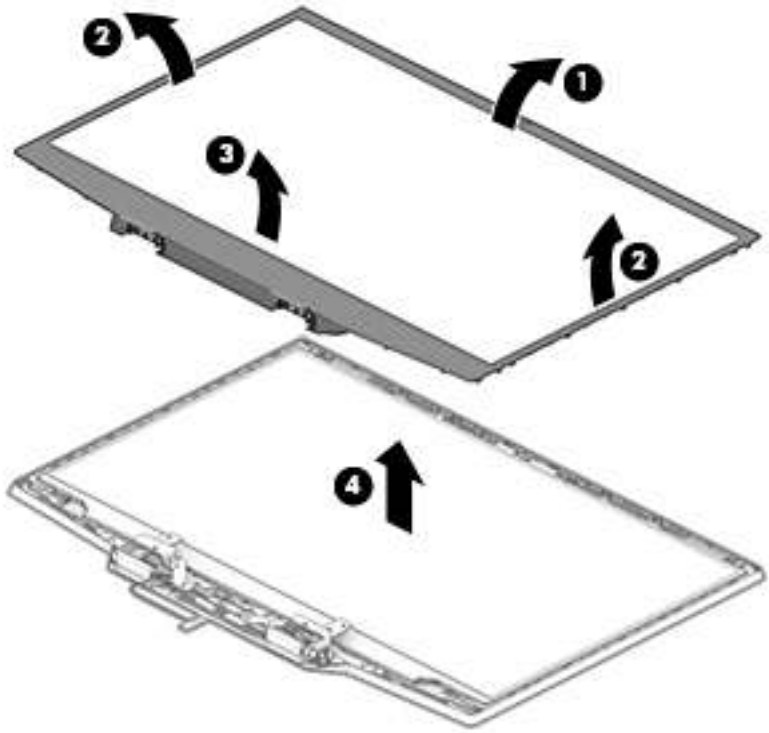
4. If it is necessary to replace display assembly subcomponents, first remove the bezel:
   a. Release the top edge of the display bezel **(1)** from the display assembly.

   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 L57354-001.



5. If it is necessary to remove the display panel:

a. Use tweezers to grasp the tape that routes behind both the left and right sides of the display panel **(1)**.

b. Roll the tape around the tweezer as you pull the tape out from behind the left and right sides of the panel **(2)**.

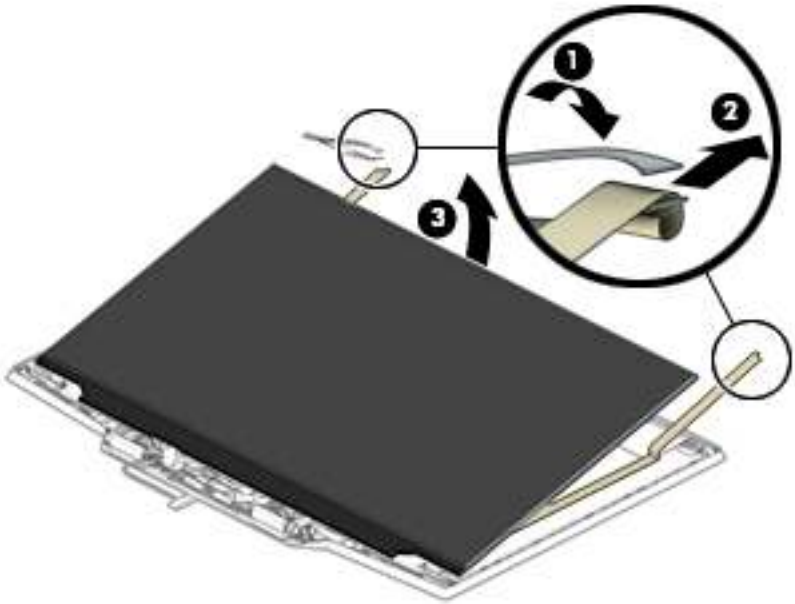
NOTE: You have to pull on the tape multiple times before it is completely removed. To avoid tearing the tape, pull the tape evenly and carefully. Rolling the tape around the tweezer or the shaft of a screwdriver as you pull it can help to avoid pulling too hard and breaking the tape.

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

Display panels are available as the following spare part numbers:

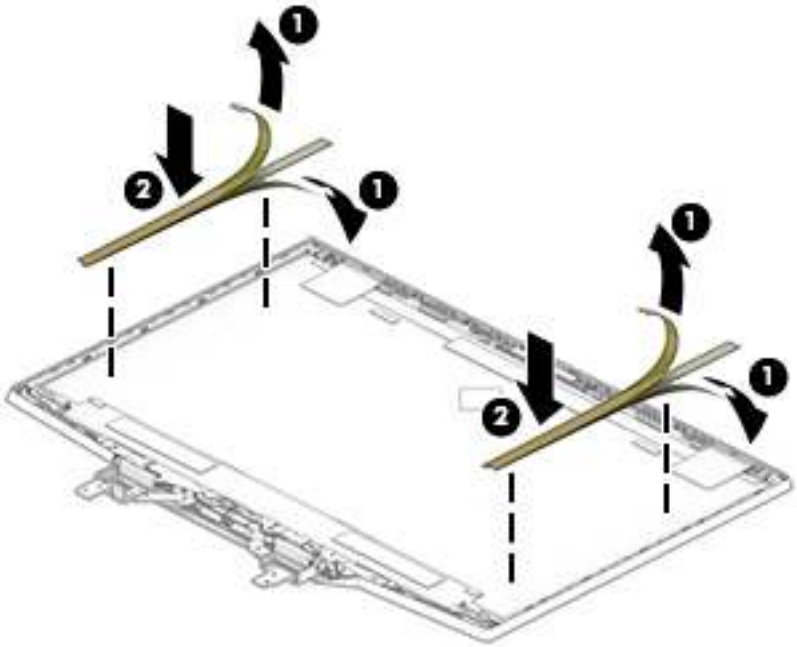
L57382-001: FHD, 144 Hz

L57381-001: FHD, 60 Hz



d. When installing the display panel adhesive tape, peel the backing from the bottom of the tape **(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 **(1)**.

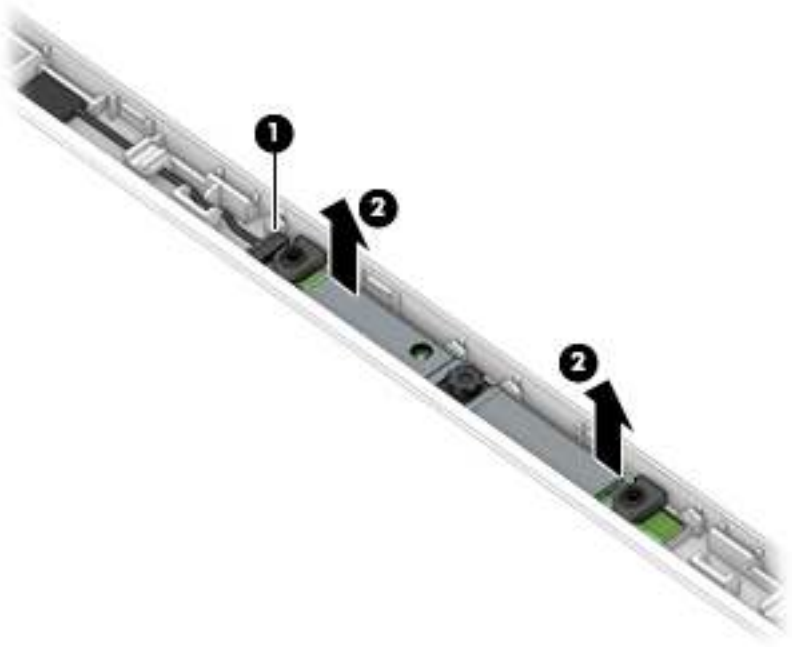
Display panel adhesive is available as spare part number L57369-001.



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

▲ Disconnect the cable from the webcam module **(1)**, and then lift evenly on both sides of the webcam to detach the it from the display back cover **(2)**. (The webcam module is attached to the display back cover with double-sided adhesive.)

The webcam is available as spare part number L61453-001.

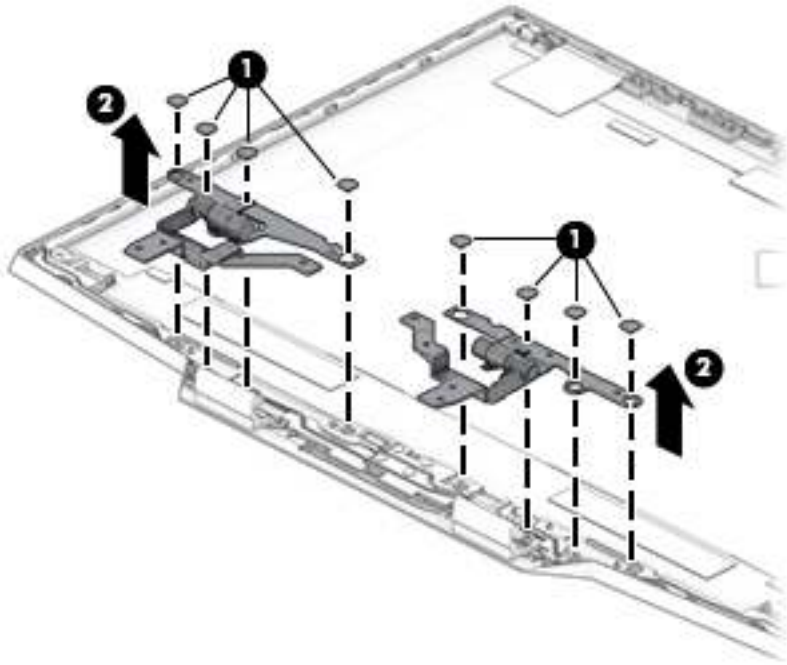


7. If it is necessary to remove the display hinges:

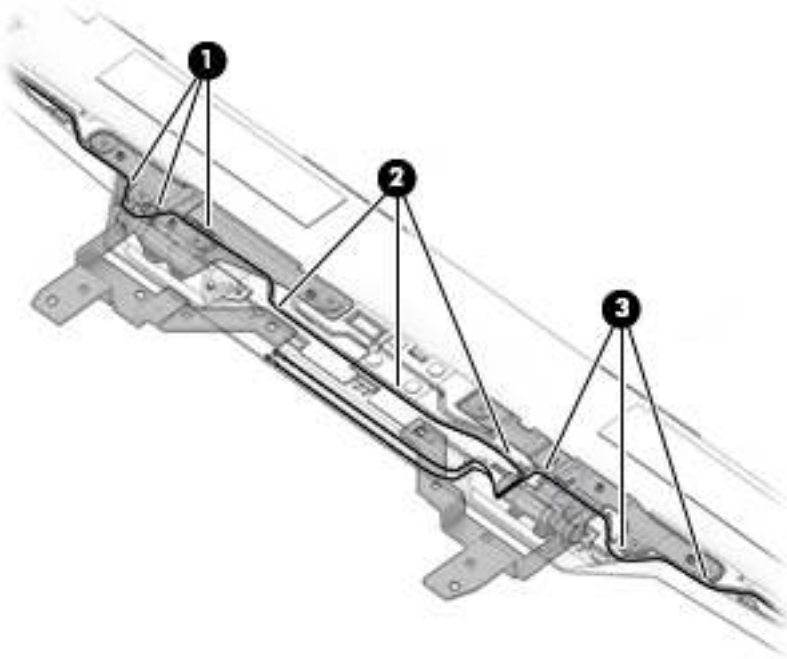
   a. Remove the four Phillips M2.0 × 3.0 screws **(1)** from each hinge.

b. Remove the hinges from the display back cover **(2)**.

The display hinges are available as spare part number L57368-001.



c. Use the following illustration to determine proper cable routing through the right hinge **(1)**, between the hinges **(2)**, and through the left hinge **(3)**.



8. If it is necessary to remove the display panel cable:

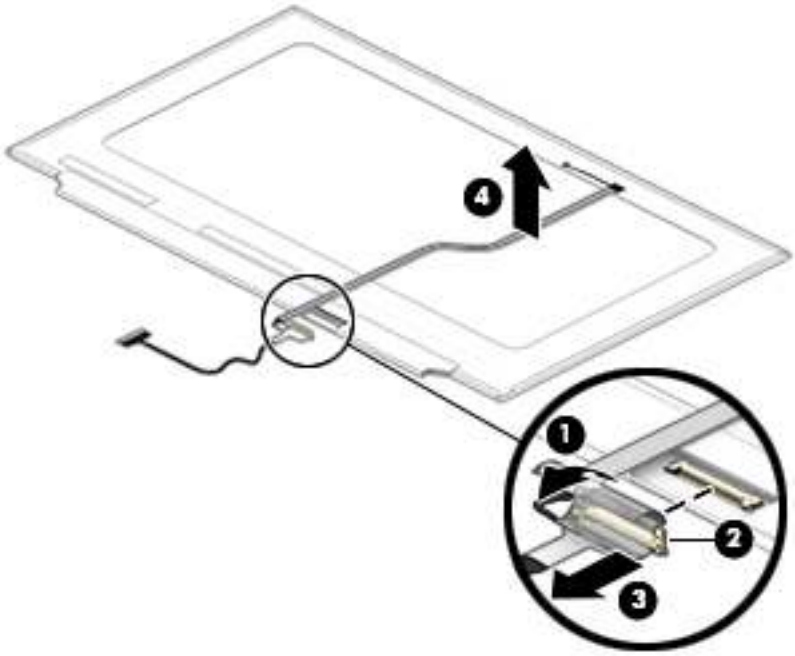
   a. Peel the tape from the display cable connector **(1)**, lift the connector latch **(2)**, and then disconnect the cable from the back of the display panel **(3)**.

b. Peel the cable from the back of the display panel **(4)**.

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

L57360-001: FHD, 60 Hz displays

L57361-001: FHD, 144 Hz displays



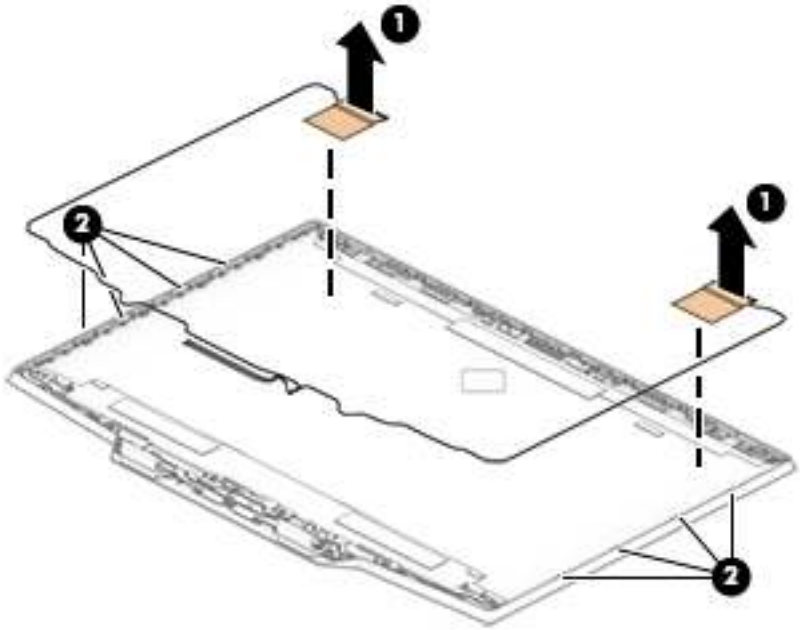
9. If it is necessary to remove the wireless antennas:

a. Peel the antennas off the top of the display back cover **(1)**.

b. Remove the antenna cables from the clips along the sides of the display back cover **(2)**.

The wireless antennas are available as spare part number L57353-001.

The display back cover is available as spare part number L57355-001.



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 6-12 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)	L57377-xx1
Keyboard/top cover for use models with 4-zone lighting (white legend + RGB backlight)	L57378-xx1
Keyboard/top cover for use models with 1-zone lighting (dragon red legend + red backlight) with Thunderbolt	L57379-xx1
Keyboard/top cover for use models with 4-zone lighting (white legend + RGB backlight) with Thunderbolt	L57380-xx1
Keyboard/top cover for use models with 1-zone lighting (dragon red legend + red backlight) with Thunderbolt (G-sync)	L62862-0xx1
Keyboard/top cover for use models with 4-zone lighting (white legend + RGB backlight) with Thunderbolt (G-sync)	L62863-xx1

Table 6-13 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
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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 60).
  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 61.

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 62.

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 64.

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 64.

   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 67).
- **Creating a restore point**—You can use Windows tools to create a restore point (see Using Windows tools on page 67).
- **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 67).
- **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 67).

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 67.

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 67.

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	**405.0 mm**	15.9 in
Depth	**280.0 mm**	11.0 in
Height	**27.0 mm**	1.1 in
Weight		
SSD + 70 Wh battery	**3230.0 g**	7.11 lbs
HDD + 70 Wh battery	**3312.0 g**	7.30 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 19.5 V dc @ 11.8 A – 230 W 19.5 V dc @ 16.92 A – 330 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 HO5VV-F, 3-conductor, 0.75 mm^2 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 mm² or 1.25 mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration.

4. The flexible cord must be Type RVV, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.

5. The flexible cord must be Type H05VV-F 3-conductor, 0.75 mm² conductor size. KTL logo and individual approval number must be on each element. Corset approval number and logo must be printed on a flag label.

6. The flexible cord must be Type HVCTF 3-conductor, 1.25 mm² conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.

7. For 127 V ac, the flexible cord must be Type SVT or SJT 3-conductor, 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type H05VV-F 3-conductor, 0.75 mm² or 1.00 mm2 conductor size, with plug BS 1363/A with BSI or ASTA marks.

12 Recycling

When a non-rechargeable or rechargeable battery has reached the end of its useful life, do not dispose of the battery in general household waste. Follow the local laws and regulations in your area for battery disposal.

HP encourages customers to recycle used electronic hardware, HP original print cartridges, and rechargeable batteries. For more information about recycling programs, see the HP Web site at http://www.hp.com/recycle.

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