



Maintenance and Service Guide

HP Elite Dragonfly Notebook PC

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Product notice

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

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

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

Safety warning notice


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

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1 Product description

Table 1-1 Product components and their descriptions

Category	Description
Product Name	HP Elite Dragonfly Notebook PC
Processors	8th generation Intel® Core® processors i7-8665U (1.9 GHz, turbo up to 4.8 GHz, 8 MB SmartCache, quad core, 15 W) i7-8565U (1.8 GHz, turbo up to 4.6 GHz, 8 MB SmartCache, quad core, 15 W) i5-8365U (1.6 GHz, turbo up to 4.1 GHz, 6 MB SmartCache, quad core, 15 W) i5-8265U (1.6 GHz, turbo up to 3.9 GHz, 6 MB SmartCache, quad core, 15 W) i3-8145U (2.1 GHz, turbo up to 3.9 GHz, 4 MB SmartCache, dual core, 25 W)
Graphics	Intel UHD Graphics 620 Supports HD decode, DX12, HDMI 1.4b, HDCP 2.2 via HDMI up to 4 K @ 30 Hz Supports HD decode, DX12, DisplayPort™ 1.2, HDCP 2.2 via DisplayPort up to 4 K @ 60 Hz Supports two independent displays through HP Thunderbolt™ Dock 120 W G2: maximum resolution = 2.5 K @ 60 Hz (DisplayPort 1) and 2.5 K @ 60 Hz (DisplayPort 2) or 4 K @ 60 Hz (one DisplayPort) and 4 K @ 60 Hz (USB Type-C output port using a Type C-to-DisplayPort adapter)
Panels	33.8 cm (13.3 in), ultrawide viewing angle (UWVA), LED backlight, ultraslim (2.0 mm), eDP + PSR, touch screen Full high-definition (FHD) (1920 × 1080), BrightView, 400 nits FHD (1920 × 1080), BrightView, 1000 nits, privacy Ultra high-definition (UHD) (3840 × 2160), BrightView, HDR400, sRGB 95%, 550 nits Supports narrow bezel
Memory	On-board (soldered) memory, not configurable LPDDR3, 2133 MHz, dual-channel support Supports up to 16 GB of system RAM in the following configurations: <ul style="list-style-type: none">• 16 GB• 8 GB
Operating system recovery storage	32 GB eMMC
Primary storage	M.2 solid-state drives (2280) 2 TB, PCIe, Gen 3 × 4, SS, NVMe, TLC 1 TB, PCIe, Gen 3 × 4, SS, NVMe, TLC 512 GB, PCIe, Gen 3 × 4, SS, NVMe, TLC 512 GB, PCIe, Gen 3 × 4, SS, NVMe, TLC, Opal 2

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

Category	Description
	512 GB, SATA-3, SS, TLC, FIPS-140-2
	512 GB, PCIe, value
	512 GB + 32 GB Optane™ Memory Module
	256 GB, PCIe, Gen 3 × 4, NVMe, SS, TLC
	256 GB, PCIe, NVMe, SS, value
	256 GB, SATA-3, self-encrypting drive (SED), Opal 2, TLC
	256 GB + 32 GB Optane Memory Module
	128 GB, SATA-3, SS, TLC
Audio and video	HP Bang & Olufsen audio
	Premium stereo speakers (4)
	Discrete amplifiers (4)
	Hybrid FHD RGB 720p + IR camera
	Camera privacy cover
	Supports WDR (Wide Dynamic Range)
	Integrated multi-array microphone including rear-facing 3rd microphone
RJ-45 (network)	No direct RJ-45 (network) support – available from accessories only
	The following support S4/S5 wake on LAN (via out of band): HP USB-C Dock G4, HP USB-C Universal Dock, HP Thunderbolt Dock 120W G2, HP USB-C Mini Dock
	The following support S0/S0ix/S4/S5 MAPT (via out of band): HP USB-C Dock G4, HP USB-C Universal Dock, HP Thunderbolt Dock 120W G2, HP USB-C Mini Dock
Wireless networking	Tile
	Built-in Tile module (not available with WWAN)
	Tile antenna (1 antenna) configured at top of panel
	Bluetooth®
	Bluetooth 5.0 support
	Wireless local area network (WLAN)
	Integrated WLAN options with dual antennas (M.2 12 × 16 soldered down PCIe/USB):
	<ul style="list-style-type: none"> Intel Wi-Fi 6 AX200 + Bluetooth 5 (802.11ax 2 × 2 vPro, supporting gigabit transfer speeds) Intel Wi-Fi 6 AX200 + Bluetooth 5 (802.11ax 2 × 2 non-vPro, supporting gigabit transfer speeds)
	Two WLAN antennas configured at top of display assembly
	Compatible with Wi-Fi CERTIFIED Miracast™ devices
	Supports HP Connection Optimizer
	Supports HP LAN-Wireless Protection (WLAN/LAN/WWAN switching)
	Support Turbo Lite Wi-Fi

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

Category	Description
	Support Dynamic BIOS SAR for Intel modules
	Wireless wide area network (WWAN) (select models only)
	WWAN cards are compatible with a programmable removable eSIM
	Integrated WWAN options with two 4G antennas, worldwide 5 band, configured in base of unit (M.2 30 × 42 socket PCIe):
	<ul style="list-style-type: none"> Intel® XMM™ 7560 LTE-Advanced Pro (CAT 16)
	Integrated WWAN options with four 4G antennas, worldwide 5 band, two configured at top of panel and two in base of unit (M.2 30 × 42 socket PCIe):
	<ul style="list-style-type: none"> Intel XMM 7360 LTE-Advanced (CAT 9)
	Separate power on sequences and PCIe configurations in the BIOS
Ports	Audio-out (headphone)/audio-in (microphone) combo jack
	HDMI 1.4b
	USB 3.1 Gen1 Type-A charging port
	(2) USB Type-C Thunderbolt port (supports PD 3.0, BC 1.2)
Sensors	Accelerometer
	Magnetometer
	Gyro
	ALS (ambient light sensor) (not available on UHD panels)
	Hall sensor
Keyboard/pointing devices	HP Premium Collaboration Keyboard
	Backlit, spill-resistant with HP Dura keys (blue or black)
	Backlit, spill-resistant with HP Dura keys, privacy (blue or black)
	Touchpad
	Glass
	Support for precision touchpad default gestures
	Firmware PTP (Point to Point) with filter driver
Power requirements	AC adapter
	65 W straight USB Type-C
	Power cord
	Premium, C5, 1.0 m (3.3 ft)
	Duck head power cord (C5NS), 1.0 m (3.3 ft)
	Duck head (C5NS)
	Battery
	4 cell, 56.2 Whr, long-life polymer battery

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

Category	Description
	2 cell, 38.0 Whr, long-life polymer battery
Security	Security lock
	Touch fingerprint sensor
	Trusted Platform Module (TPM) 2.0 (Infineon, soldered down)
	SecureBIO
	Preboot authentication (password)
	Hardware enforced firmware protection: HP Hardware Root of Trust + Sure Start Gen4
Operating system	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 PPP
	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 Chinese Market
	Windows 10 Pro 64 StF MSNA Plus
	FreeDOS 3.0
	Restore media
	Windows 10 Driver DVD
	Windows 10 Driver USB
	Windows 10 Professional 64-bit OS DVD
	Certified
	Microsoft WHQL
	Web-only support
	Windows 10 Enterprise 64
Serviceability	User replaceable part
	AC adapter

2 Components

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

Right

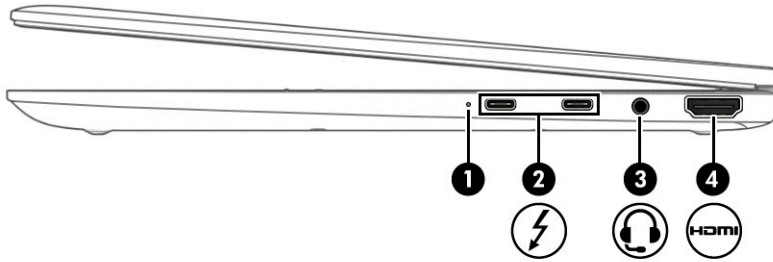


Table 2-1 Right-side components and their descriptions




Component	Description
(1) Battery light	<p>When AC power is connected:</p> <ul style="list-style-type: none"> • White: The battery charge is greater than 90%. • Amber: The battery charge is from 0 to 90%. • Off: The battery is not charging. <p>When AC power is disconnected (battery not charging):</p> <ul style="list-style-type: none"> • Blinking amber: The battery has reached a low battery level. When the battery has reached a critical battery level, the battery light begins blinking rapidly. • Off: The battery is not charging.
(2)  USB Type-C power connectors and Thunderbolt™ ports with HP Sleep and Charge (2)	<p>Connect AC adapters that have a USB Type-C connector, supplying power to the computer and, if needed, charging the computer battery.</p> <p>– and –</p> <p>Even when the computer is off, connect and charge most USB devices that have a Type-C connector, such as a cell phone, camera, activity tracker, or smartwatch, and provide high-speed data transfer.</p> <p>– and –</p> <p>Connect display devices that have a USB Type-C connector, providing DisplayPort™ output.</p> <p>NOTE: Your computer may also support a Thunderbolt docking station.</p> <p>NOTE: Cables and/or adapters (purchased separately) may be required.</p>

Table 2-1 Right-side components and their descriptions (continued)

Component	Description
<p>(3)  Audio-out (headphone)/Audio-in (microphone) combo jack</p>	<p>Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional standalone microphones.</p> <p>WARNING! To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, see the <i>Regulatory, Safety, and Environmental Notices</i>.</p> <p>To access this guide:</p> <ul style="list-style-type: none">▲ Type HP Documentation in the taskbar search box, and then select HP Documentation. <p>NOTE: When a device is connected to the jack, the computer speakers are disabled.</p>
<p>(4)  HDMI port</p>	<p>Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed High Definition Multimedia Interface (HDMI) device.</p>

Left

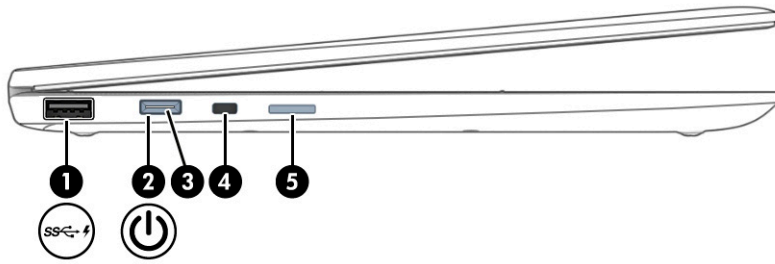





Table 2-2 Left-side components and their descriptions

Component	Description
(1) 	<p>USB SuperSpeed port with HP Sleep and Charge</p> <p>Connects a USB device, provides high-speed data transfer, and even when the computer is off, charges most products such as a cell phone, camera, activity tracker, or smartwatch.</p>
(2) 	<p>Power button</p> <ul style="list-style-type: none"> When the computer is off, press the button to turn on the computer. When the computer is on, press the button briefly to initiate Sleep. When the computer is in the Sleep state, press the button briefly to exit Sleep (select products only). When the computer is in Hibernation, press the button briefly to exit Hibernation. <p>IMPORTANT: Pressing and holding down the power button results in the loss of unsaved information.</p> <p>If the computer has stopped responding and shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer.</p> <p>To learn more about your power settings, see your power options.</p> <p>▲ Right-click the Power meter icon  and then select Power Options.</p>
(3)	<p>Power light</p> <ul style="list-style-type: none"> On: The computer is on. Blinking (select products only): The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unnecessary components. Off: Depending on your computer model, the computer is off, in Hibernation, or in Sleep. Hibernation is the power-saving state that uses the least amount of power.
(4)	<p>Nano security cable slot</p> <p>Attaches an optional security cable to the computer.</p> <p>NOTE: The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.</p>
(5)	<p>Nano SIM card slot (select products only)</p> <p>Supports a wireless subscriber identity module (SIM) card.</p>

Display

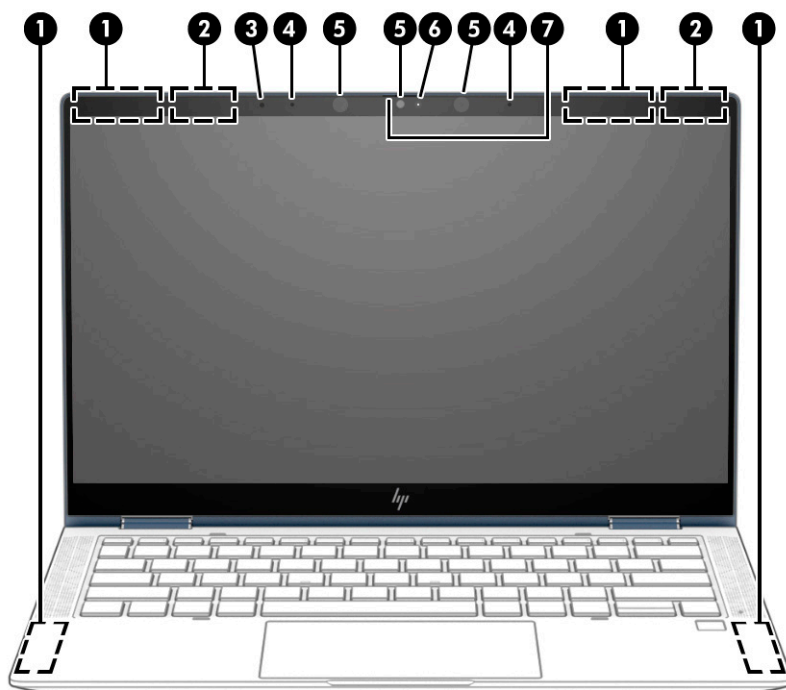


Table 2-3 Display components and their descriptions

Component	Description
(1) WWAN antennas (select products only)*	Send and receive wireless signals to communicate with wireless wide area networks (WWANs).
(2) WLAN antennas*	Send and receive wireless signals to communicate with wireless local area networks (WLANs).
(3) Ambient light sensor (select products only)	Adjusts the brightness of the display, depending on the ambient light.
(4) Internal microphones (2)	Record sound.
(5) Camera(s)	Allow(s) 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.
(6) Camera light(s)	On: One or more cameras are in use.
(7) Camera privacy cover	When closed, the camera privacy cover conceals the camera. <ul style="list-style-type: none">To reveal the camera, slide the cover to the left.To conceal the camera, slide the cover to the right.

*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**.

Top cover

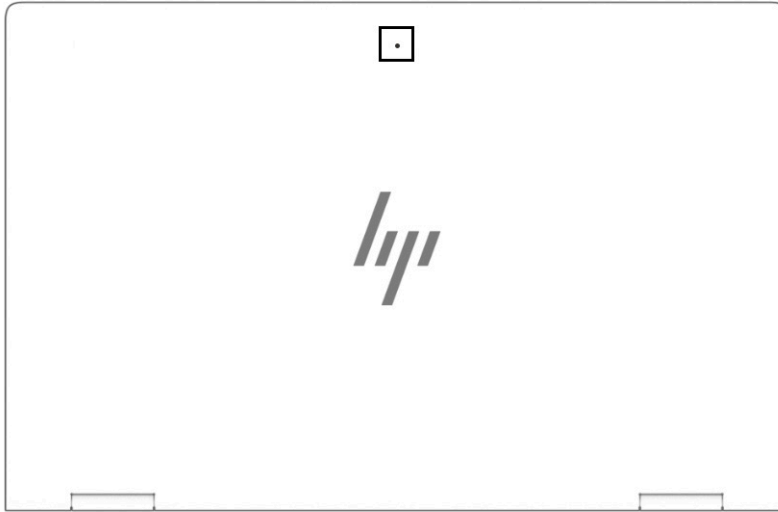


Table 2-4 Top cover components and their descriptions

Component	Description
Internal microphone	Records sound.

Keyboard area

Touchpad

Touchpad settings

To adjust touchpad settings and gestures, or to turn off the touchpad:

1. Type `touchpad settings` in the taskbar search box, and then press [enter](#).
2. Choose a setting.

To turn on the touchpad:

1. Type `touchpad settings` in the taskbar search box, and then press [enter](#).
2. Using an external mouse, click the **Touchpad** button.

– or –

- ▲ Press the [Tab](#) key repeatedly until the pointer rests on the **Touchpad** button. Then press the [spacebar](#) to select the button.



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

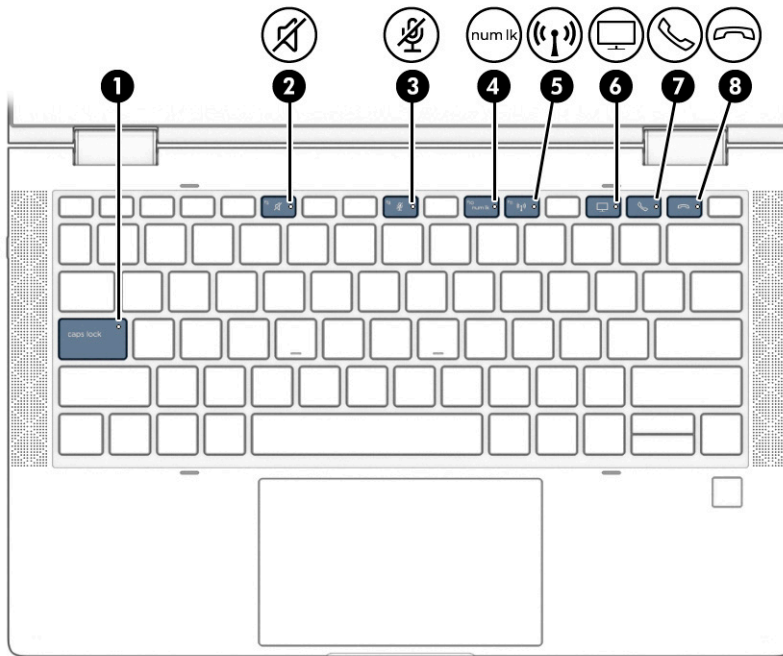








Table 2-6 Lights and their descriptions

Component	Description
(1) Caps lock light	On: Caps lock is on, which switches the key input to all capital letters.
(2)  Mute light	<ul style="list-style-type: none"> On: Computer sound is off. Off: Computer sound is on.
(3)  Microphone mute light	<ul style="list-style-type: none"> On: Microphone is off. Off: Microphone is on.
(4) num lk Num lk light	On: Num lock is on.
(5)  Wireless light	<p>On: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on.</p> <p>NOTE: On some models, the wireless light is amber when all wireless devices are off.</p>
(6)  Sharing or presenting light	On: Sharing is on.
(7)  Call answer light	On: Call answer is on.
(8)  Call end light	On: Call end is on.

Speakers and fingerprint reader

Fingerprint readers can be located on the touchpad, on a side panel of the computer, or on the top cover below the keyboard.

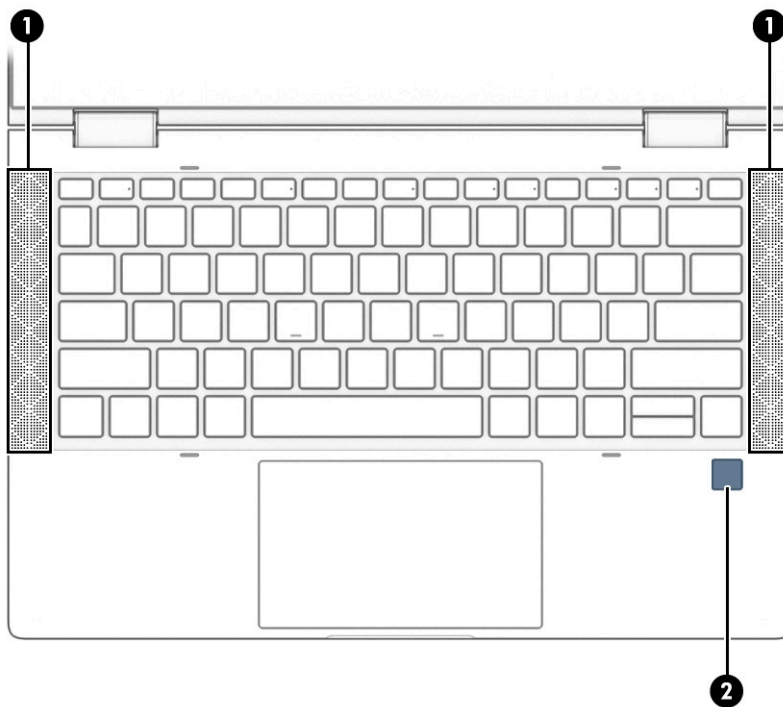


Table 2-7 Speakers and fingerprint reader and their descriptions

Component		Description
(1)	Speakers (2)	Produce sound.
(2)	Fingerprint reader	Allows a fingerprint logon to Windows, instead of a password logon. ▲ Touch your finger to the fingerprint reader. IMPORTANT: To prevent fingerprint logon issues, be sure when you register your fingerprint that all sides of your finger are registered by the fingerprint reader.

Special keys

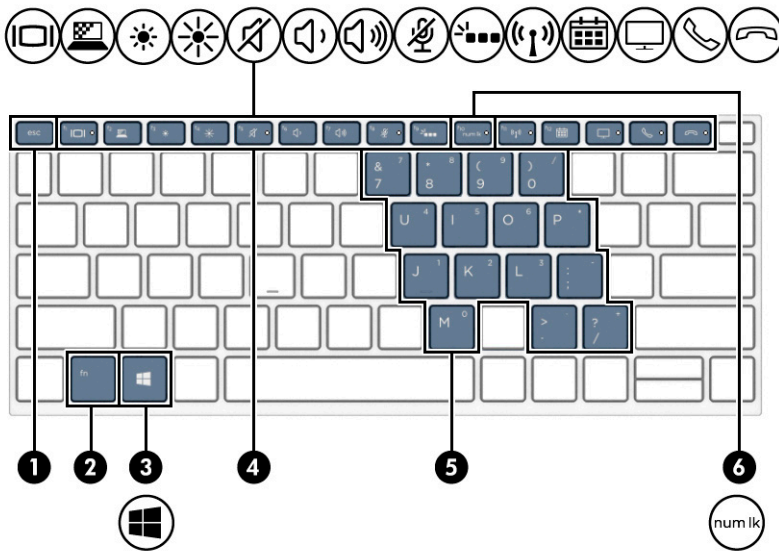



Table 2-8 Special keys and their descriptions

Component	Description
(1) <code>esc</code> key	Displays system information when pressed in combination with the <code>fn</code> key.
(2) <code>fn</code> key	Executes frequently used system functions when pressed in combination with another key. Such key combinations are called <i>hot keys</i> . See Hot keys (select products only) on page 14 .
(3)  Windows key	Opens the Start menu. NOTE: Pressing the Windows key again closes the Start menu.
(4) Action keys	Execute frequently used system functions.
(5) Embedded numeric keypad	A numeric keypad superimposed over the keyboard alphabet keys. When <code>num lk</code> is pressed, the keypad can be used like an external numeric keypad. Each key on the keypad performs the function indicated by the icon in the upper-right corner of the key. NOTE: If the keypad function is active when the computer is turned off, that function is reinstated when the computer is turned back on.
(6) <code>num lk</code> key	Turns the embedded numeric keypad on and off.

Hot keys (select products only)

A hot key is the combination of the **fn** key and another key.

To use a hot key:

- ▲ Press the **fn** key, and then press one of the keys listed in the following table.

Table 2-9 Hot keys and their descriptions

Key	Description
C	Turns on scroll lock.
E	Turns on the insert function.
R	Breaks the operation.
S	Sends a programming query.
W	Pauses the operation.

Bottom

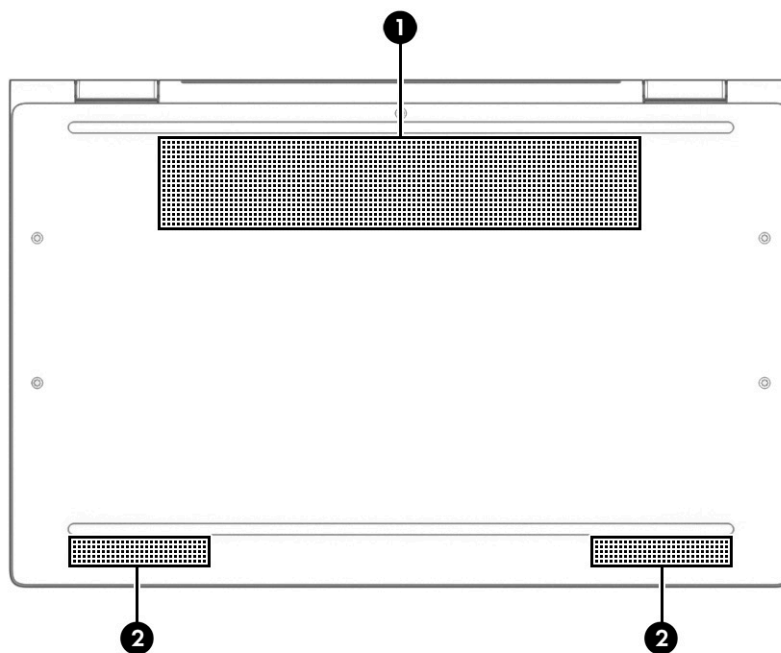


Table 2-10 Bottom components and their descriptions

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 (2) Produce sound.

Rear

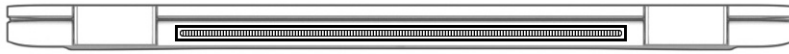


Table 2-11 Rear components and their descriptions

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

Labels

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

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

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

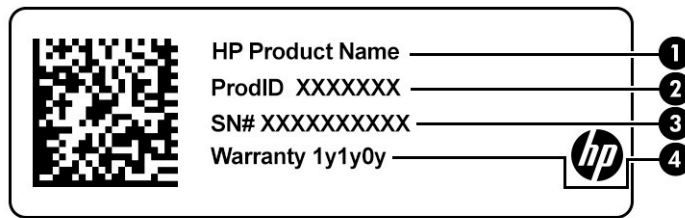




Table 2-12 Service label components

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

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

Inserting a SIM card (select products only)


 **IMPORTANT:** Inserting a SIM card of the wrong size could damage the SIM card or cause the SIM card to become stuck in the slot. The use of SIM card adapters is not recommended. To prevent damage to the SIM card or the connectors, use minimal force when inserting or removing a SIM card.

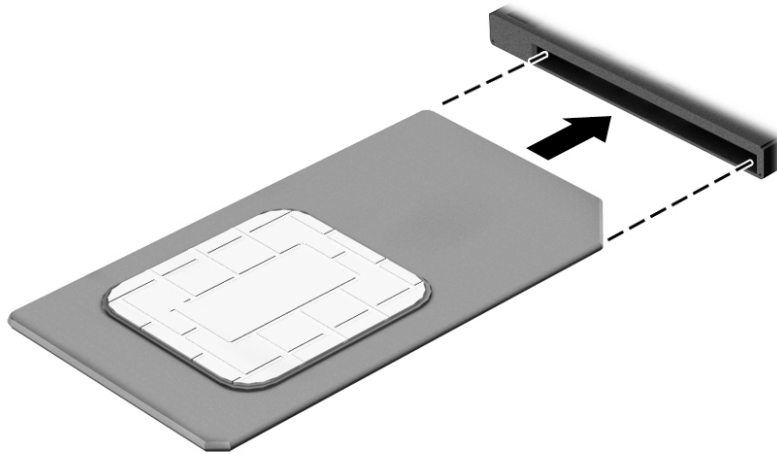
 **NOTE:** Before purchasing a SIM card, follow these instructions to determine the correct SIM card size for your computer:

1. Go to <http://www.hp.com/support>, and then search for your computer by product name or number.
2. Select **Product Information**.
3. Refer to the listed options to determine which card to purchase.

To insert a SIM card, follow these steps:

1. Turn off the computer by using the Shut down command.
2. Insert the SIM card into the SIM card slot, and then press in on the SIM card until it is firmly seated.

 **NOTE:** The SIM card in your computer may look slightly different from the illustration in this section.




To remove a SIM card, press in on the SIM card, and then remove it from the slot.

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 16](#) for details.

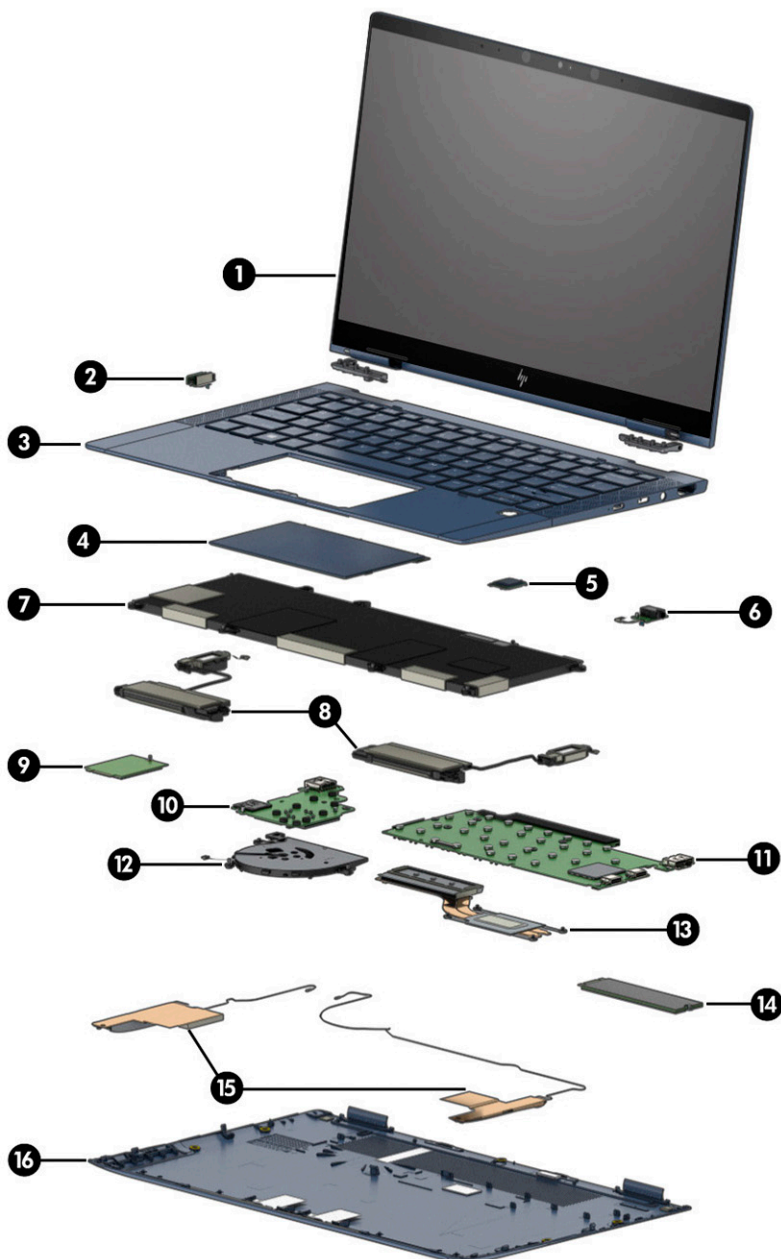


Table 3-1 Computer major components and their descriptions

Item	Component	Spare part number
(1)	Display assembly , BrightView, touch screen	
	NOTE: Touch displays are available only as full hinge-ups. Individual components are not available as spare parts for these displays.	
	FHD, for use in models without WWAN	L74089-001
	FHD, for use in models with WWAN	L83450-001
	FHD, privacy, for use in models without WWAN	L74091-001
	FHD, privacy, for use in models with WWAN	L83452-001
	UHD, for use in models without WWAN	L74090-001
UHD, for use in models with WWAN	L83451-001	
(2)	Power button board (Includes cable and plastic support piece)	L74096-001
(3)	Top cover with keyboard	
	For a detailed list of country codes, see Keyboard/top cover on page 55 .	
	For use in nonprivacy models	L74116-xx1
	For use in privacy models	L74117-xx1
(4)	Touchpad (includes bracket)	L74104-001
(5)	Fingerprint reader board (includes cable)	L74086-001
	NOTE: The fingerprint reader bracket is available in the Hardware Kit, spare part number L74087-001.	
(6)	Audio board	L74097-001
(7)	Battery	
	4 cell, 56 Whr	L52581-005
	2 cell, 38 Whr	L71760-005
(8)	Speaker assembly	L74101-001
(9)	WWAN module	
	Intel XMM 7360 LTE-Advanced (CAT 9)	L15398-001
	Intel XMM 7560 LTE-Advanced Pro (CAT 16)	L27188-001
(10)	USB board	
	For use in models with WWAN	L74099-001
	For use in models without WWAN	L74098-001
(11)	System board (includes processor, graphics subsystem with UMA memory, system memory, and replacement thermal material)	
	All system boards use the following part numbers:	
	xxxxxx-001: Non-Windows operating systems	
	xxxxxx-601: Windows 10 operating system	
	Intel Core i7-8665U processor and 16 GB of system memory	L74114-xx1

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

Item	Component	Spare part number
	Intel Core i7-8665U processor and 16 GB of system memory (OSR)	L74113-xx1
	Intel Core i7-8665U processor and 8 GB of system memory	L74115-xx1
	Intel Core i7-8565U processor and 16 GB of system memory	L74111-xx1
	Intel Core i7-8565U processor and 8 GB of system memory	L74112-xx1
	Intel Core i5-8365U processor and 16 GB of system memory	L74108-xx1
	Intel Core i5-8365U processor and 16 GB of system memory (OSR)	L79587-xx1
	Intel Core i5-8365U processor and 8 GB of system memory	L74109-xx1
	Intel Core i5-8365U processor and 8 GB of system memory (OSR)	L79588-xx1
	Intel Core i5-8265U processor and 16 GB of system memory	L74106-xx1
	Intel Core i5-8265U processor and 8 GB of system memory	L74107-xx1
	Intel Core i3-8145U processor and 8 GB of system memory	L74105-xx1
(12)	Fan	
	Standard	L74084-001
	Titanium	L78273-001
(13)	Heat sink assembly	L74085-001
(14)	Solid-state drive	
	2 TB, PCIe, NVMe, TLC	L31877-001
	1 TB, PCIe, NVMe, TLC	L31874-001
	512 GB, PCIe, NVMe, TLC	L31879-001
	512 GB, PCIe, NVMe, self-encrypting drive (SED), OPAL 2, TLC	L31880-001
	512 GB, PCIe, NVMe, value	L74102-001
	512 GB, PCIe, NVMe + 32 GB Optane memory	L74103-001
	256 GB, PCIe, NVMe, TLC	L31875-001
	256 GB, SATA-3, self-encrypting drive (SED), OPAL 2, TLC	L31881-001
	256 GB, PCIe, NVMe, value	L31876-001
	256 GB, PCIe, NVMe + 16 GB Optane memory	L86960-001
	128 GB, SATA-3, TLC	L31873-001
(15)	WWAN antennas	L74081-001
(16)	Bottom cover	L74082-001

Cable Kit

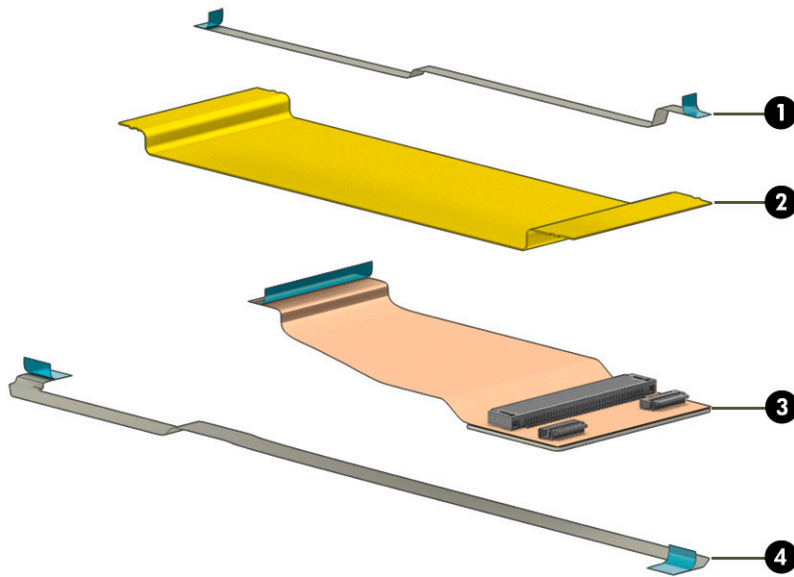


Table 3-2 Cable Kit components and their descriptions

Item	Description	Spare part number
	Cable Kit , includes the following cables:	L74083-001
(1)	WWAN cable	
(2)	USB board cable	
(3)	Extend cable	
(4)	Touchpad cable	
(5)	WLAN cable (not illustrated)	

Miscellaneous parts

Table 3-3 Miscellaneous parts and their descriptions

Component	Spare part number
Pen (with app launch button)	L57042-001
Hardware Kit (includes fingerprint reader bracket, security lock bracket, solid-state drive cover, nano SIM tray, system board ZIF connector shield, USB board ZIF connector shield, USB Type-C shield, top antenna frame, protective insulator, bottom gasket, solid-state drive protective insulator, and USB Type-C protective insulator)	L74087-001
Screw Kit	L74100-001
AC adapter	
65 W, USB Type-C, non-PFC, 1.8 m (5.9 ft)	L04650-850
65 W, USB Type-C, non-PFC, RC, 1.8 m (5.9 ft)	L32392-001
Power cord (3 pin, C5, black, 1.0 m [3.3 ft], duckhead), for use in:	

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

Component	Spare part number
Argentina	L36815-001
Australia	L36816-001
Brazil	L44789-001
Denmark	L36817-001
Europe (Austria, Belgium, Finland, France, Germany, the Netherlands, Norway, and Sweden)	L36818-001
India	L36820-001
Israel	L36819-001
Italy	L44788-001
Japan	L36821-001
North America	L36822-001
People's Republic of China	L36823-001
South Africa	L36824-001
Switzerland	L36825-001
Taiwan	L36827-001
Thailand	L36826-001
United Kingdom	L36828-001
Power cord (3 pin, C5, black, 1.0 m [3.3 ft], standard), for use in:	
Argentina	L30811-001
Australia	L22327-001
Brazil	L30812-001
Denmark	L22322-001
Europe (Austria, Belgium, Finland, France, Germany, the Netherlands, Norway, and Sweden)	L22321-001
India	L22624-001
Israel	L22323-001
Italy	L30813-001
Japan	L22330-001
North America	L22319-001
People's Republic of China	920689-014
South Africa	L30777-001
South Korea	L22328-001
Switzerland	L22324-001
Taiwan	L22329-001
Thailand	L30779-001

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

Component	Spare part number
United Kingdom	L22320-001
Power cord (C5N5, duckhead, 1.0 m [3.3 ft]), for use in:	
North America	L50818-002
South Korea	L50818-001
Japan	L33157-001

4 Removal and replacement procedures preliminary requirements

Tools required

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

- Nonconductive, nonmarking pry tool
- Magnetic Phillips P1 screwdriver
- Torx T5 screwdriver

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 so 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 polystyrene foam.
- Handle ESD-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.

Electrostatic discharge information

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

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



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

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

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

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

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

Generating static electricity

Note the following:

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

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

Event	Relative humidity		
	55%	40%	10%
Walking across carpet	7,500 V	15,000 V	35,000 V
Walking across vinyl floor	3,000 V	5,000 V	12,000 V
Motions of bench worker	400 V	800 V	6,000 V
Removing DIPs (dual in-line packages) 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 polystyrene foam	3,500 V	5,000 V	14,500 V
Removing bubble pack from PCB (printed circuit board)	7,000 V	20,000 V	26,500 V
Packing PCBs in foam-lined box	5,000 V	11,000 V	21,000 V

Multiple electric components can be packaged together in plastic tubes, trays, or polystyrene foam.



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

Preventing electrostatic damage to equipment

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

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

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

Personal grounding methods and equipment

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

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

Table 4-2 Static shielding protection levels

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

Grounding the work area

To prevent static damage at the work area, use 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 polystyrene foam.
- Use field service tools, such as cutters, screwdrivers, and vacuums, that are conductive.

Recommended materials and equipment

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

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


- Static-dissipative table or floor mats with hard tie to ground
- Field service kits
- Static awareness labels
- Wrist straps and footwear straps providing $1\text{ M}\Omega \pm 10\%$ resistance
- Material handling packages
- Conductive plastic bags
- Conductive plastic tubes
- Conductive tote boxes
- Opaque shielding bags
- Transparent metallized shielding bags
- Transparent shielding tubes

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:


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

5 Removal and replacement procedures for authorized service provider parts

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

IMPORTANT: This computer does not have user-replaceable parts. Only HP authorized service providers should perform the removal and replacement procedures described here. Accessing the internal part could damage the computer or void the warranty.

Component replacement procedures

 **NOTE:** Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer. See 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 45 screws that must be removed, replaced, and/or loosened when servicing the parts described in this chapter. Make special note of each screw size and location during removal and replacement.

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. Before removing internal components, you must place the computer in Battery Safe mode. This mode avoids short-circuits or system malfunction by removing power from internal components.

With the computer turned off and AC adapter connected, press the following key and button combination: **Windows key + Backspace key + Power button**.

After the computer powers off, disconnect the AC adapter.

3. Disconnect all external devices from the computer.

Bottom cover

Table 5-1 Bottom cover description and part number

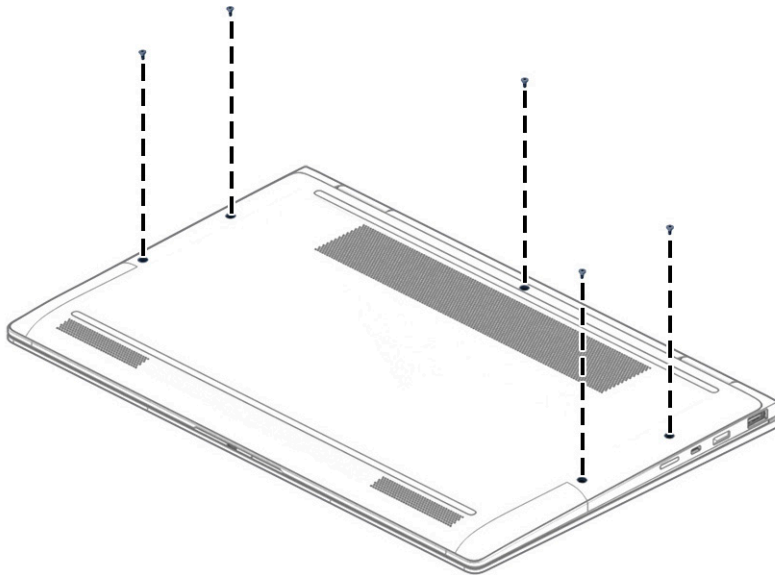
Description	Spare part number
Bottom cover	L74082-001

Before removing the bottom cover, follow these steps:

- ▲ Prepare the computer for disassembly ([Preparation for disassembly on page 29](#)).

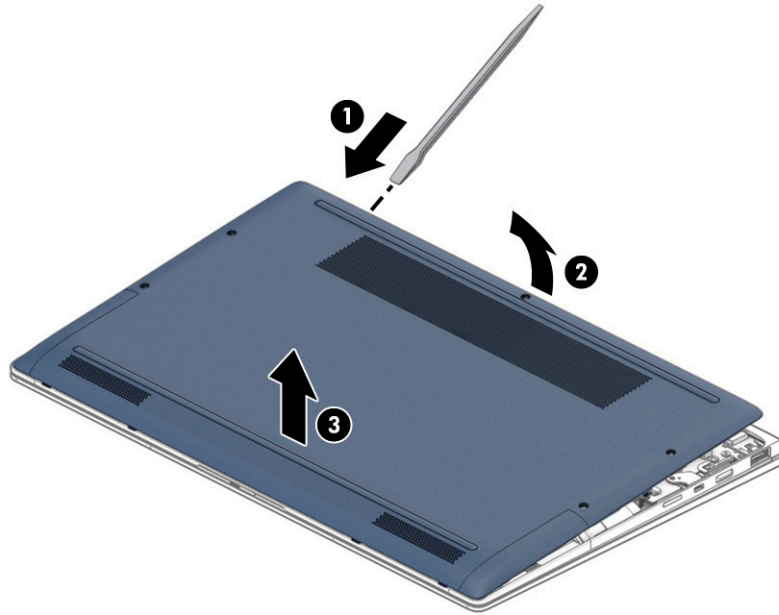
Remove the bottom cover:

1. Remove the five Torx T5 2.0 × 7.0 screws that secure the bottom cover to the computer.



2. Insert a nonmarking, nonconductive, thin tool near the hinge **(1)** and pull up to release the cover **(2)**.

3. Remove the bottom cover (3).



Reverse the removal procedures to install the bottom cover.

Battery

Table 5-2 Battery description and part number

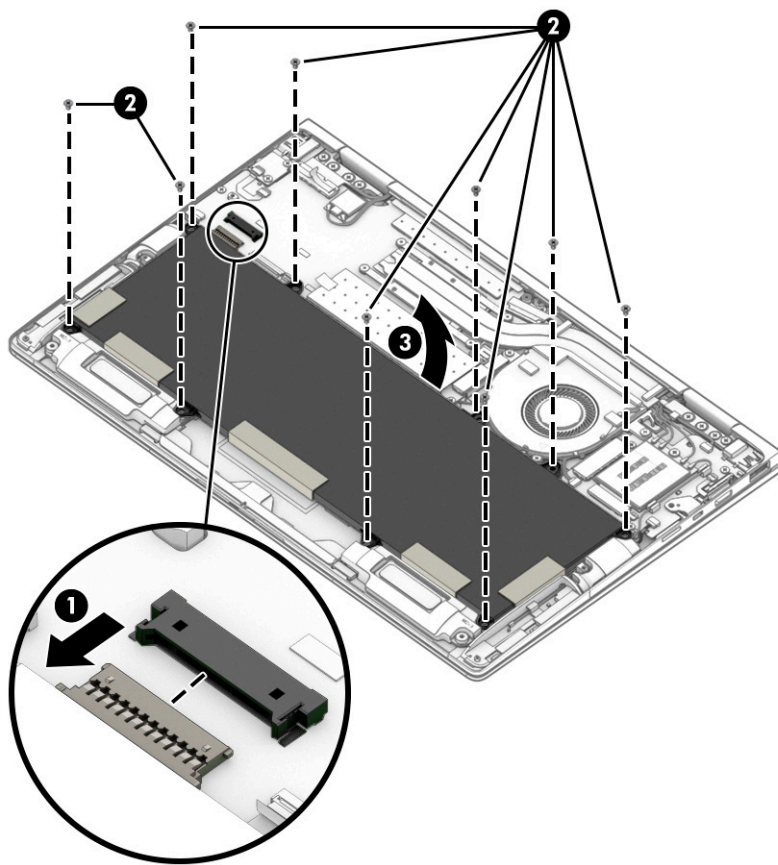
Description	Spare part number
Battery, 4 cell, 56 Whr	L52581-005
Battery, 2 cell, 38 Whr	L71760-005

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. Disconnect the battery cable from the system board **(1)**.
2. Remove the nine Phillips M2.0 × 3.0 screws **(2)** that secure the battery to the computer, and then remove the battery from the computer **(3)**.



Solid-state drive

Table 5-3 Solid-state drive description and part number

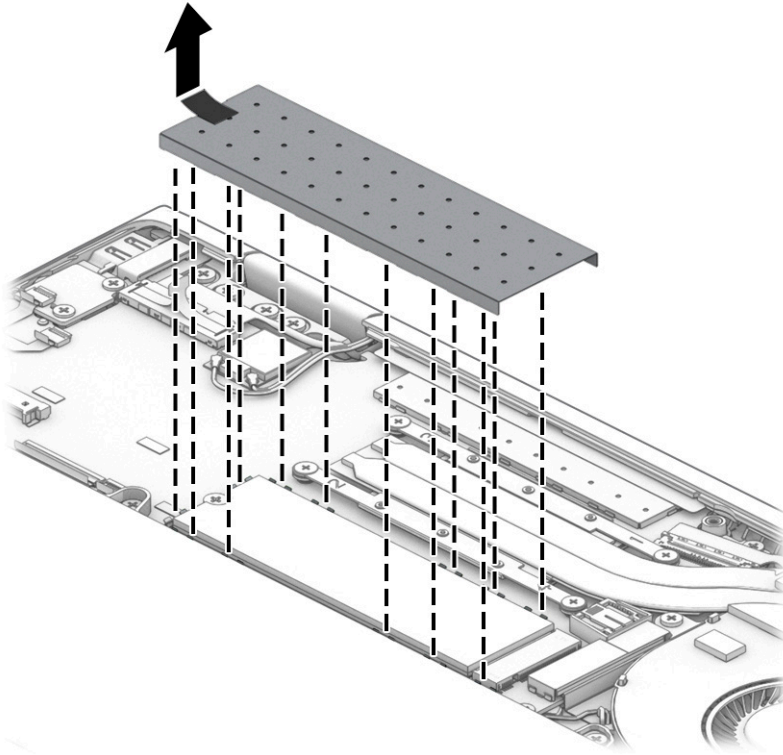
Description	Spare part number
2 TB, PCIe, NVMe, TLC	L31877-001
1 TB, PCIe, NVMe, TLC	L31874-001
512 GB, PCIe, NVMe, TLC	L31879-001
512 GB, PCIe, NVMe, self-encrypting drive (SED), OPAL 2, TLC	L31880-001
512 GB, PCIe, NVMe, value	L74102-001
512 GB, PCIe, NVMe + 32 GB Optane memory	L74103-001
256 GB, PCIe, NVMe, TLC	L31875-001
256 GB, SATA-3, self-encrypting drive (SED), OPAL 2, TLC	L31881-001
256 GB, PCIe, NVMe, value	L31876-001
256 GB, PCIe, NVMe + 16 GB Optane memory	L86960-001
128 GB, SATA-3, TLC	L31873-001

Before removing the solid-state drive, follow these steps:

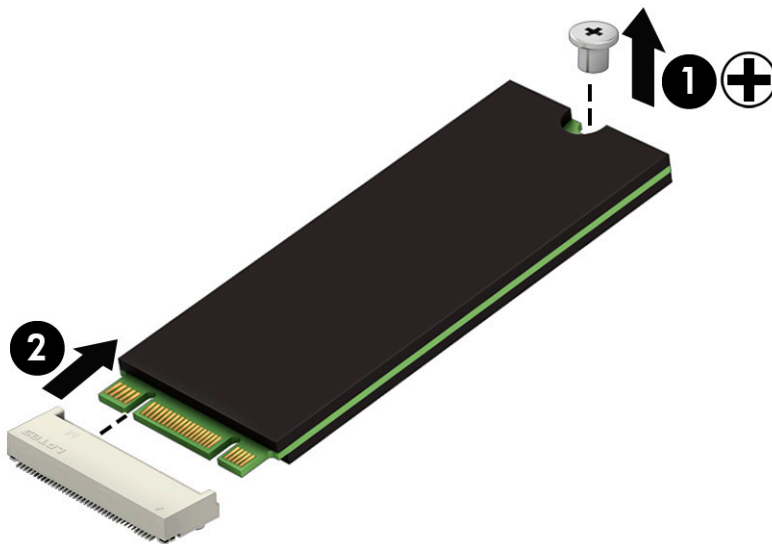
1. Prepare the computer for disassembly ([Preparation for disassembly on page 29](#)).
2. Remove the bottom cover (see [Bottom cover on page 30](#)).
3. Remove the battery (see [Battery on page 32](#)).

Remove the solid-state drive:

1. Use the tab to lift the metal cover from the solid-state drive.

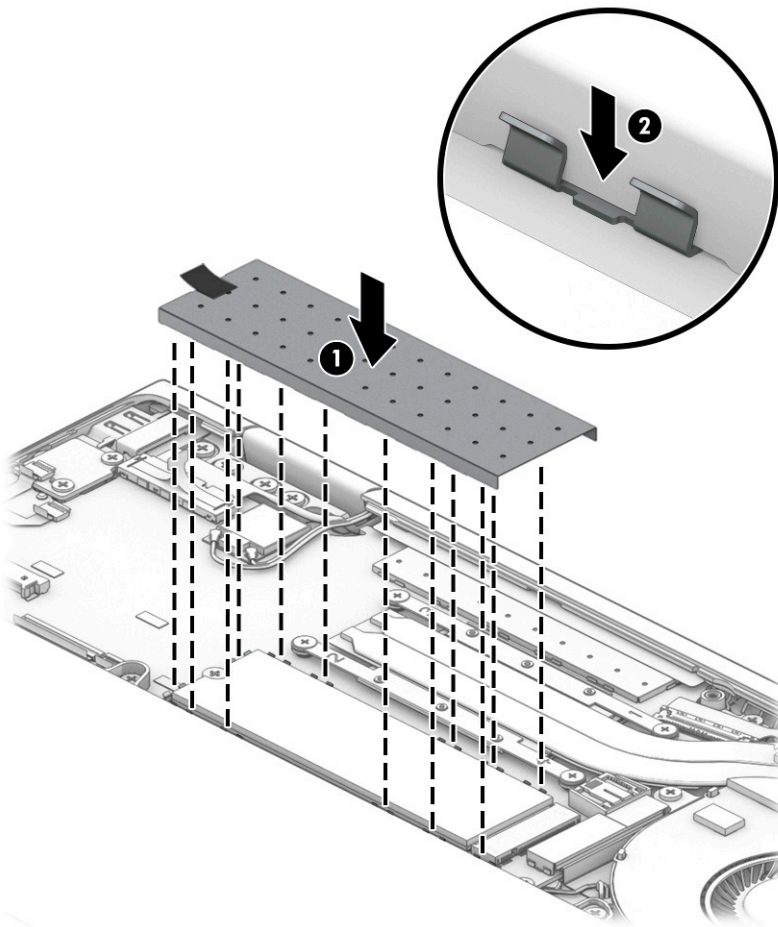


2. Remove the Phillips M2.0 × 2.0 screw **(1)** that secures the drive to the system board.
3. Remove the drive by pulling it away from the connector **(2)**.



Reverse this procedure to install the solid-state drive.

When replacing the cover over the solid-state drive, position the cover over the drive **(1)**, and the insert the edges of the cover into the clips **(2)** that secure it to the system board.



WWAN module

Table 5-4 WWAN module description and part number

Description	Spare part number
Intel XMM 7360 LTE-Advanced (CAT 9)	L15398-001
Intel XMM 7560 LTE-Advanced Pro (CAT 16)	L27188-001

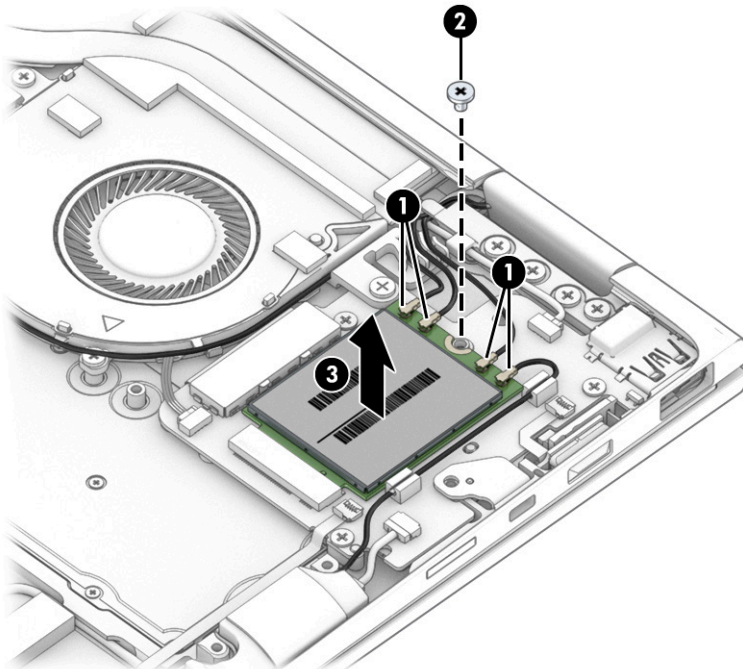
⚠ CAUTION: To prevent an unresponsive system, replace the wireless board only with a wireless board authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the board and then receive a warning message, remove the board to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

Before removing the WWAN module, follow these steps:

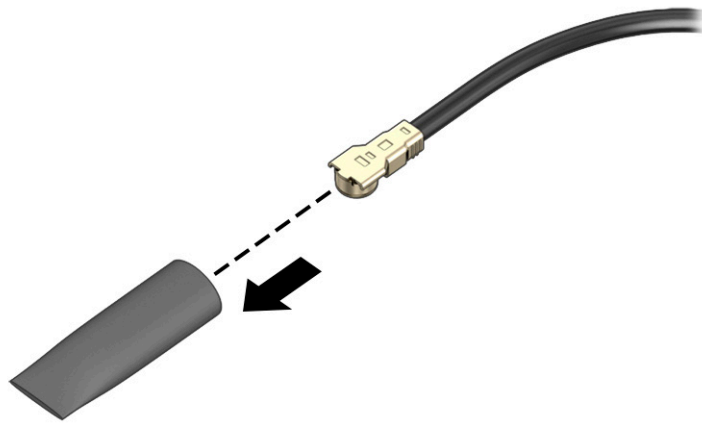
1. Prepare the computer for disassembly ([Preparation for disassembly on page 29](#)).
2. Remove the bottom cover (see [Bottom cover on page 30](#)).
3. Remove the battery (see [Battery on page 32](#)).

Remove the WWAN module:

1. Disconnect the WWAN antenna cables (**1**) from the terminals on the WWAN module.
2. Remove the Phillips M2.0 × 2.0 screw (**2**) that secures the WWAN module to the USB board. (The WWAN module tilts up.)
3. Remove the WWAN module (**3**) by pulling the board away from the slot at an angle.



📝 NOTE: If the WWAN antenna is not connected to the terminal on the WWAN module, you must install a protective sleeve on the antenna connector, as shown in the following illustration.



Reverse this procedure to install the WWAN module.

Heat sink assembly

Table 5-5 Heat sink assembly description and part number

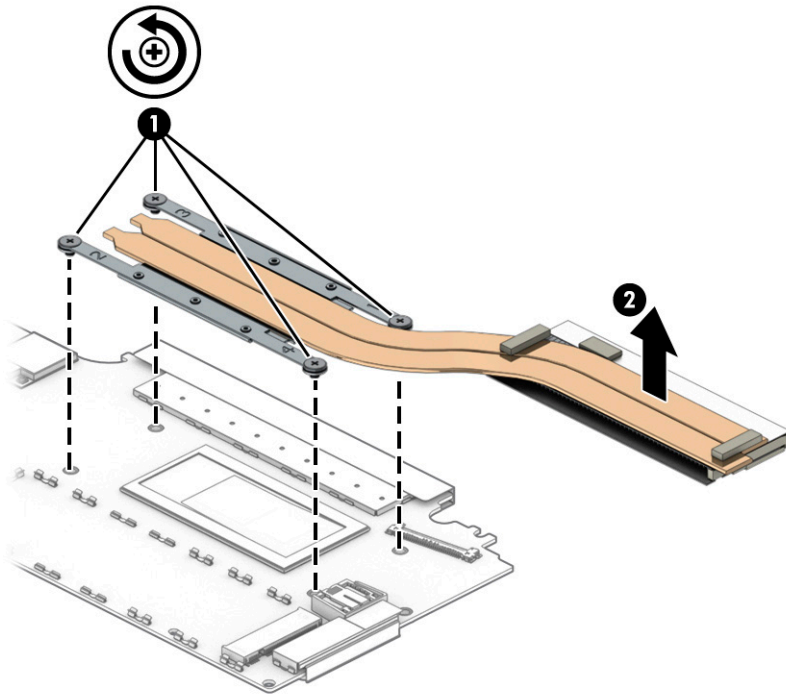
Description	Spare part number
Heat sink assembly	L74085-001

Before removing the heat sink assembly, follow these steps:

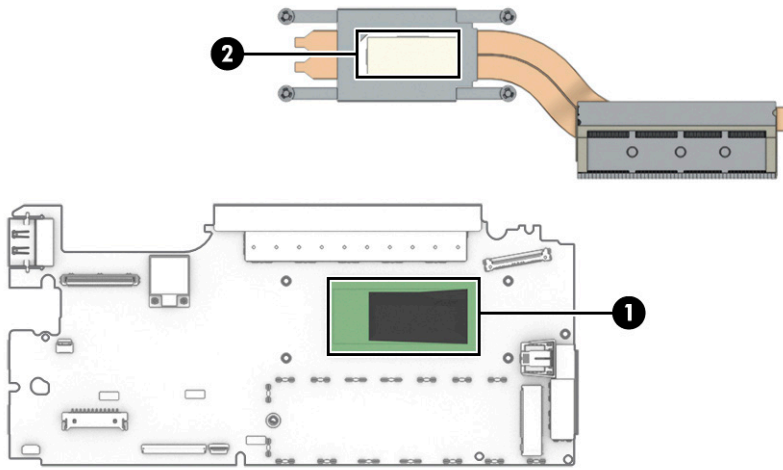
1. Prepare the computer for disassembly ([Preparation for disassembly on page 29](#)).
2. Remove the bottom cover (see [Bottom cover on page 30](#)).
3. Remove the battery (see [Battery on page 32](#)).

Remove the heat sink assembly:

1. In the order indicated on the heat sink, loosen the four captive Phillips screws that secure the heat sink **(1)**.
2. Remove the heat sink from the system board **(2)**.



When replacing the heat sink, apply thermal grease to the integrated processor on the system board **(1)** and associated location on the heat sink **(2)**.



Reverse this procedure to install the heat sink assembly.

Extend cable

Table 5-6 Extend cable description and part number

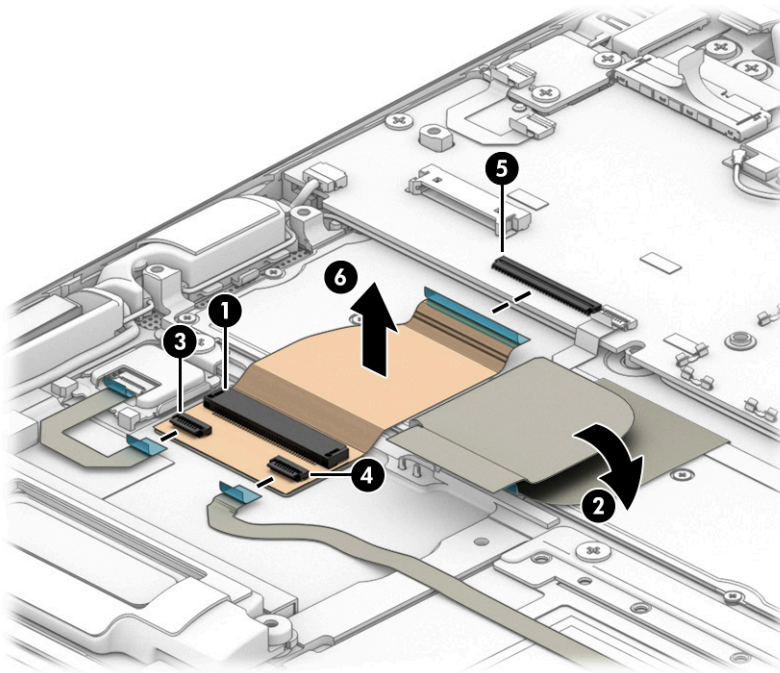
Description	Spare part number
Extend cable (available in the Cable Kit)	L74083-001

Before removing the extend 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 32](#)).

Remove the extend cable:

1. Disconnect the keyboard cable from the ZIF connector on the extend cable **(1)**, and then move the keyboard cable aside **(2)**.
2. Disconnect the fingerprint reader cable from the ZIF connector on the extend cable **(3)**.
3. Disconnect the touchpad cable from the ZIF connector on the extend cable **(4)**.
4. Disconnect the extend cable from the ZIF connector on the system board **(5)**.
5. Peel the extend cable off computer chassis to remove it **(6)**.



Reverse this procedure to install the extend cable

Fingerprint reader board

Table 5-7 Fingerprint reader board description and part number

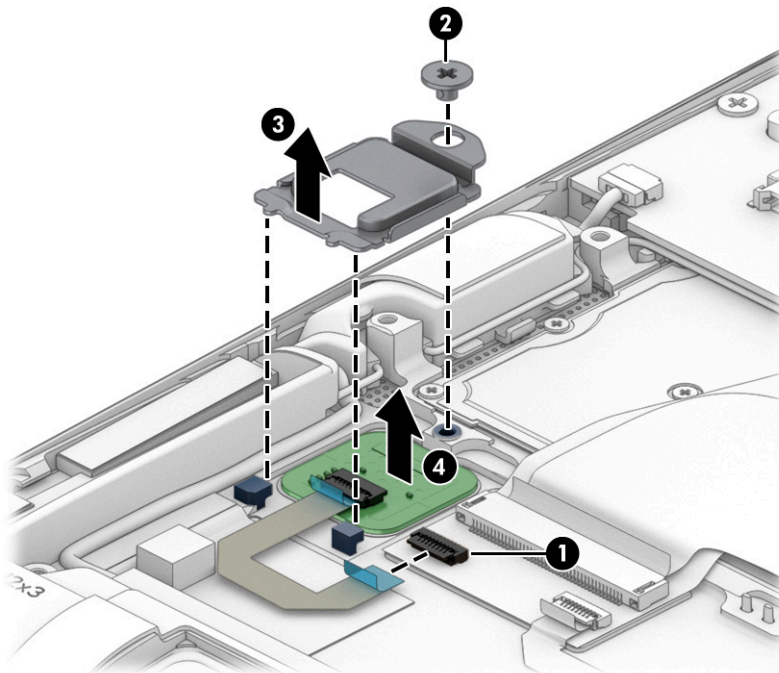
Description	Spare part number
Fingerprint reader board (includes cable)	L74086-001

Before removing the fingerprint reader 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 32](#)).

Remove the fingerprint reader board:

1. Disconnect the cable from the ZIF connector on the system board **(1)**.
2. Remove the Phillips M2.0 × 2.0 screw **(2)** that secures the fingerprint reader bracket to the computer, and then remove the bracket **(3)**.
3. Remove the fingerprint reader board from the computer **(4)**.



Reverse this procedure to install the fingerprint reader assembly.

Touchpad

Table 5-8 Touchpad description and part number

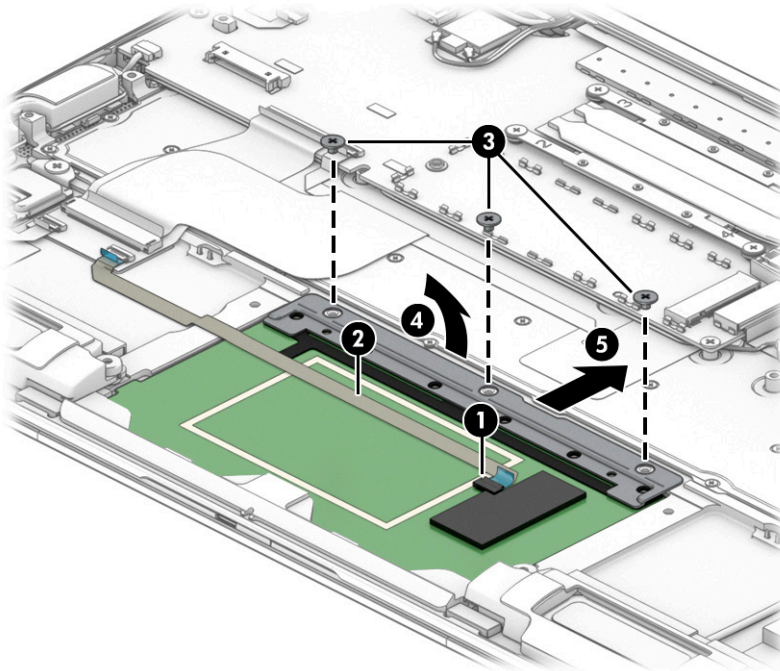
Description	Spare part number
Touchpad (includes bracket)	L74104-001
Touchpad cable (available in the Cable Kit)	L74083-001

Before removing the touchpad, 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 32](#)).

Remove the touchpad:

1. Disconnect the touchpad cable from the touchpad ZIF connector **(1)**, and then release the cable from the adhesive that secures it to the touchpad **(2)**.
2. Remove the three Phillips M2.0 × 2.0 screws **(3)** that secure the touchpad to the computer.
3. Rotate the top of the touchpad upward to a 20° to 30° angle **(4)**, and then pull the touchpad away from the computer at an angle **(5)**.



Reverse the removal procedures to install the touchpad.

Speaker assembly

Table 5-9 Speaker assembly description and part number

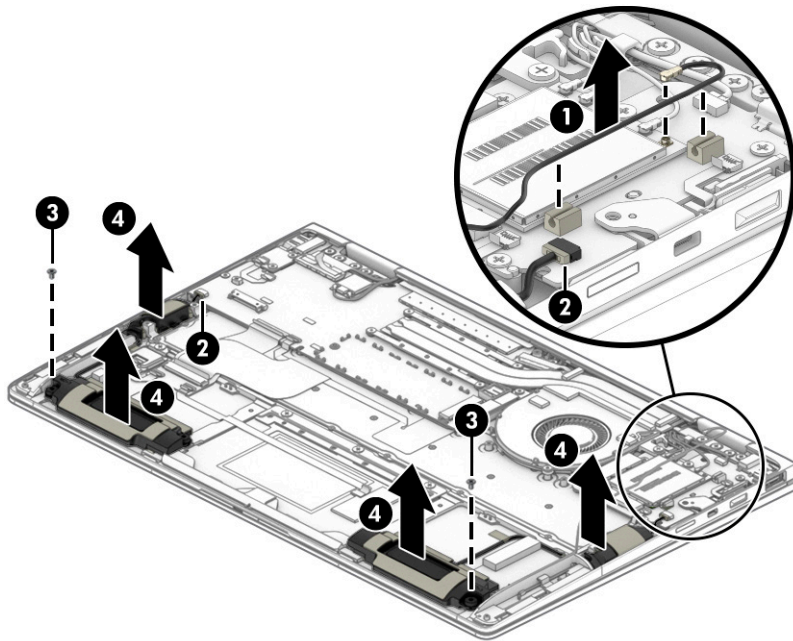
Description	Spare part number
Speaker assembly	L74101-001

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 32](#)).

Remove the speaker assembly:

1. Disconnect the WWAN antenna cable from the WWAN module and remove it from the clips on the board **(1)**.
2. Disconnect the cable from the system board for each speaker **(2)**.
3. Remove the Phillips M2.0 × 3.0 screw that secures each large speaker **(3)**.
4. Remove the speakers from the computer **(4)**.



Reverse this procedure to install the speaker assembly.

Fan

Table 5-10 Fan description and part number

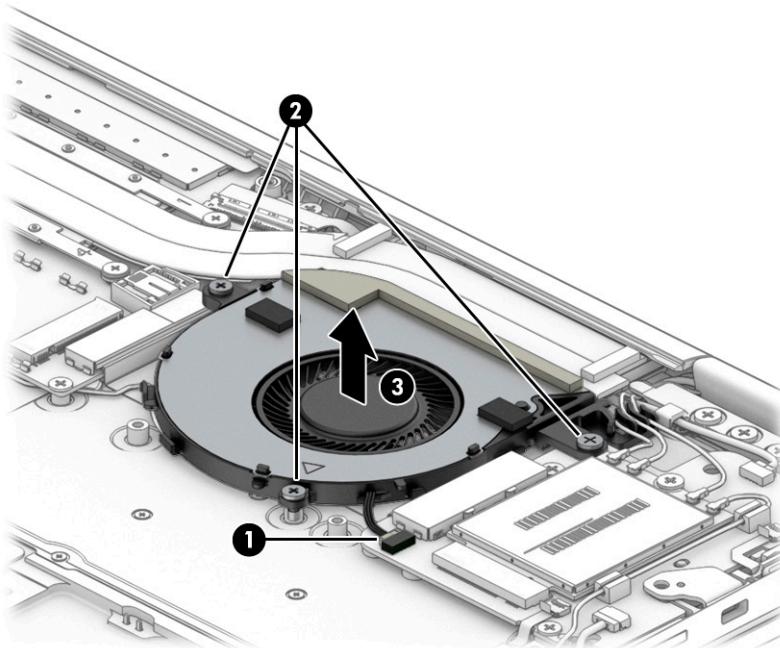
Description	Spare part number
Fan, standard	L74084-001
Fan, titanium	L78273-001

Before removing the fan, 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 32](#)).

Remove the fan:

1. Disconnect the fan cable from the USB board **(1)**.
2. Loosen the three captive Phillips screws that secure the fan to the computer **(2)**.
3. Remove the fan from the computer **(3)**.



Reverse this procedure to install the fan.

USB board

Table 5-11 USB board description and part number

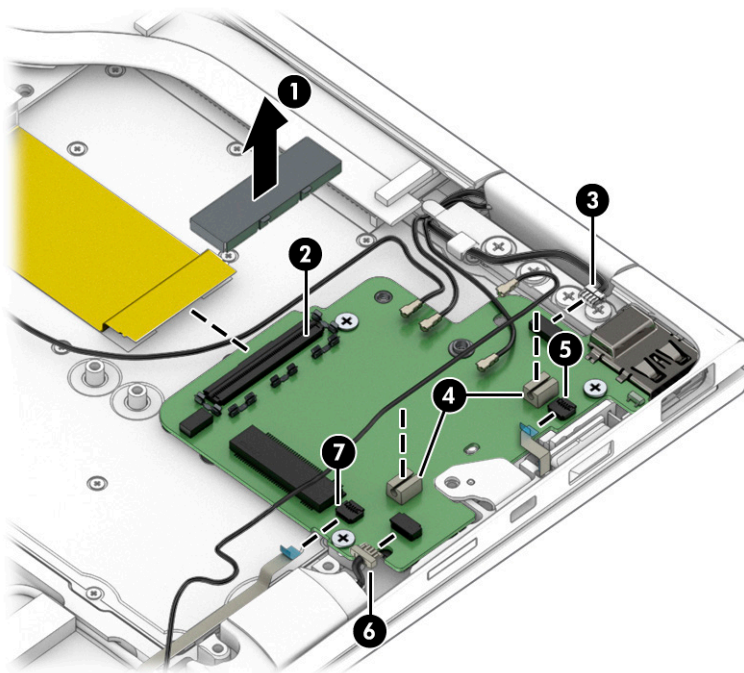
Description	Spare part number
USB/WWAN board	L74099-001
USB board (for use in models without WWAN)	L74098-001

Before removing the USB board, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 29](#)).
2. Remove the battery (see [Battery on page 32](#)).
3. Remove the bottom cover (see [Bottom cover on page 30](#)).
4. Remove the fan (see [Fan on page 44](#)).

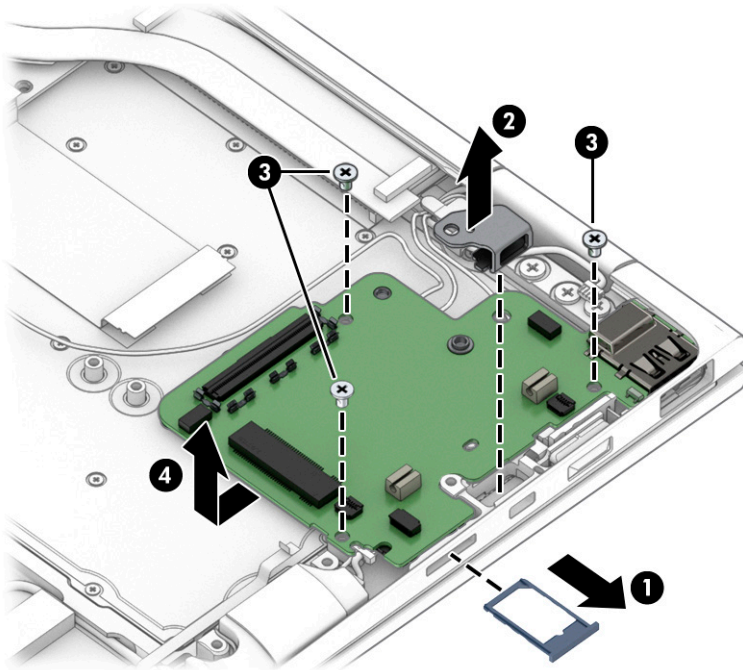
Remove the USB board:

1. Remove the connector cover **(1)**, and then disconnect the large, flat cable from the ZIF connector on the USB board **(2)**.
2. Disconnect the touch cable from the connector on the USB board **(3)**.
3. Remove the WWAN antenna from the clips on the USB board **(4)**.
4. Disconnect the power button board cable from the ZIF connector on the USB board **(5)**
5. Disconnect the speaker cable from the ZIF connector on the USB board **(6)**
6. Disconnect the WWAN cable from the ZIF connector on the USB board **(7)**



7. Remove the SIM card holder from the slot on the side of the computer **(1)**.
8. Remove the security lock metal bracket from the side of the board **(2)**.

9. Remove the three Phillips M2.0 × 3.0 screws **(3)** that secure the board to the computer.
10. Lift the bottom of the board, and then pull it out from under the ledge on the top of the computer to remove it **(4)**.



Reverse this procedure to install the USB board.

Power button board

Table 5-12 Power button board description and part number

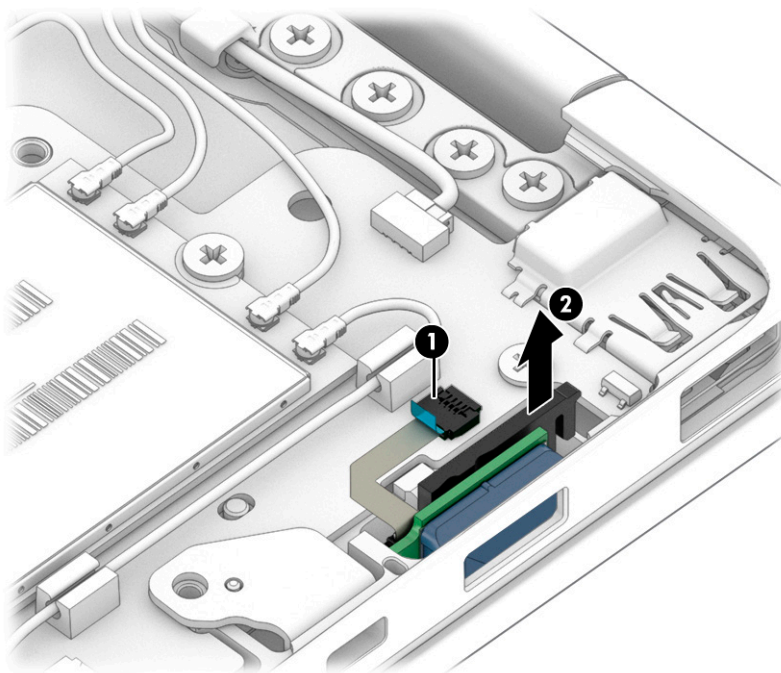
Description	Spare part number
Power button board (includes cable and plastic support piece)	L74096-001

Before removing the power button board, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 29](#)).
2. Remove the battery (see [Battery on page 32](#)).
3. Remove the bottom cover (see [Bottom cover on page 30](#)).
4. Remove the fan (see [Fan on page 44](#)).
5. Remove the USB board (see [USB board on page 45](#)).

Remove the power button board:

- ▲ Disconnect the power button board cable from the ZIF connector on the USB board **(1)**, and then lift the power button board and plastic support piece from the slot on the side of the computer **(2)**.



Reverse this procedure to install the power button board.

Audio board

Table 5-13 Audio board description and part number

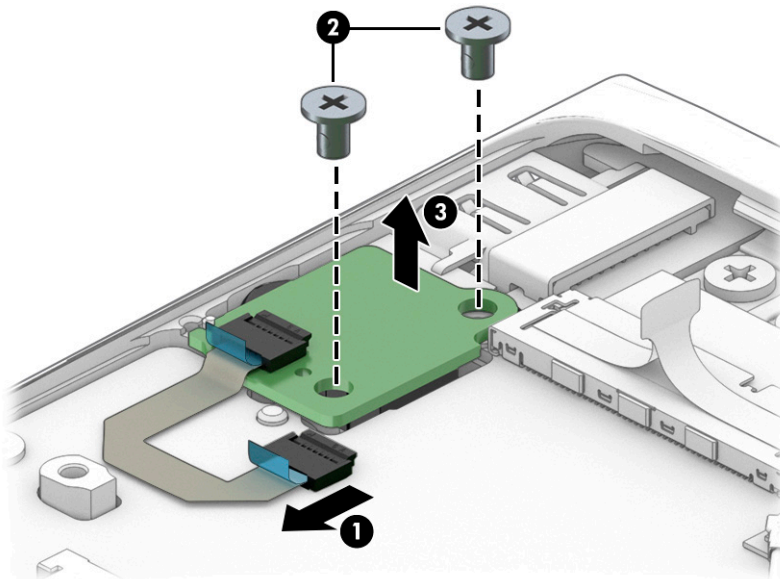
Description	Spare part number
Audio board (includes cable)	L74097-001

Before removing the audio 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 32](#)).

Remove the audio board:

1. Disconnect the cable from the ZIF connector on the system board **(1)**.
2. Remove the two Phillips M2.0 × 3.0 screws **(2)**, and then remove the audio board from the computer **(3)**.



Reverse this procedure to install the audio board.

System board



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

All system boards use the following part numbers:

xxxxxx-001: Non-Windows operating systems

xxxxxx-601: Windows operating system

Table 5-14 System board description and part number

Description	Spare part number
System board equipped with the following processor and system memory:	
Intel Core i7-8665U processor and 16 GB of system memory	L74114-xx1
Intel Core i7-8665U processor and 16 GB of system memory (OSR)	L74113-xx1
Intel Core i7-8665U processor and 8 GB of system memory	L74115-xx1
Intel Core i7-8565U processor and 16 GB of system memory	L74111-xx1
Intel Core i7-8565U processor and 8 GB of system memory	L74112-xx1
Intel Core i5-8365U processor and 16 GB of system memory	L74108-xx1
Intel Core i5-8365U processor and 16 GB of system memory (OSR)	L79587-xx1
Intel Core i5-8365U processor and 8 GB of system memory	L74109-xx1
Intel Core i5-8365U processor and 8 GB of system memory (OSR)	L79588-xx1
Intel Core i5-8265U processor and 16 GB of system memory	L74106-xx1
Intel Core i5-8265U processor and 8 GB of system memory	L74107-xx1
Intel Core i3-8145U processor and 8 GB of system memory	L74105-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 32](#)).
4. Remove the solid-state drive (see [Solid-state drive on page 33](#)).
5. Remove the audio board (see [Audio board on page 48](#)).
6. Remove the fan (see [Fan on page 44](#)).

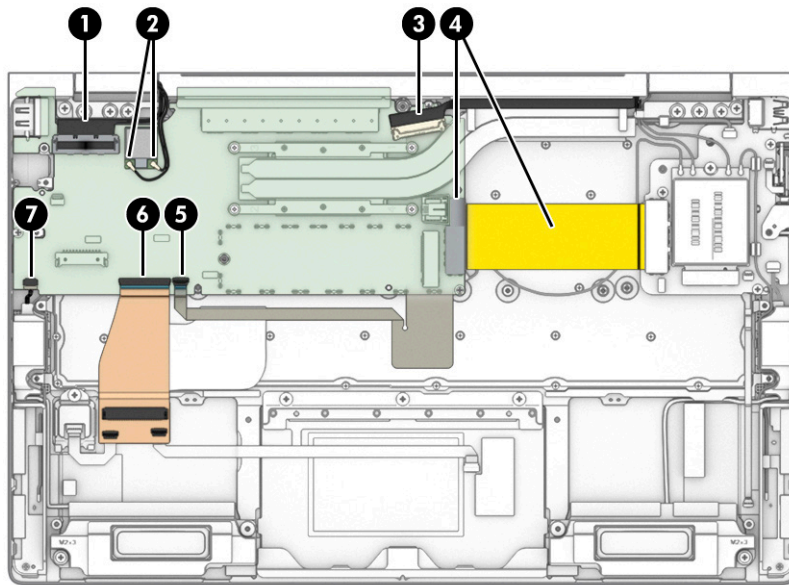
Remove the system board:

1. Disconnect the following cables:
 - (1) Display (ZIF)
 - (2) WLAN antennas
 - (3) Display
 - (4) USB board (ZIF)

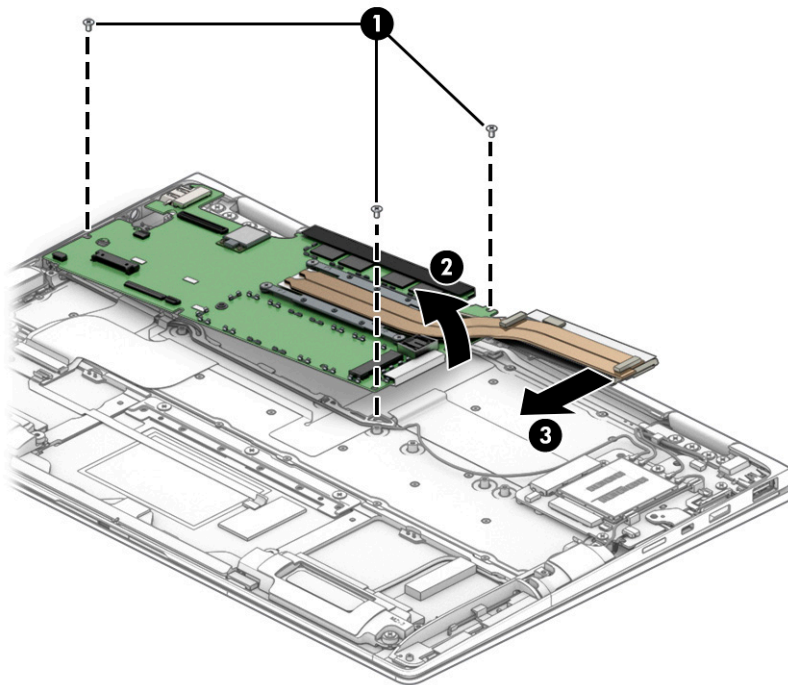
(5) Keyboard backlight (ZIF)

(6) Extend (ZIF)

(7) Speakers



2. Remove the three Phillips M2.0 × 3.0 screws **(1)** that secure the system board to the computer.
3. Rotate the system board up **(2)**, and then pull the heat sink out from under the lip at the top of the computer **(3)**.



Reverse this procedure to install the system board.

WWAN antennas and cables

Table 5-15 WWAN antennas and cables description and part number

Description	Spare part number
WWAN antennas and cables (available in the Cable Kit)	L74081-001

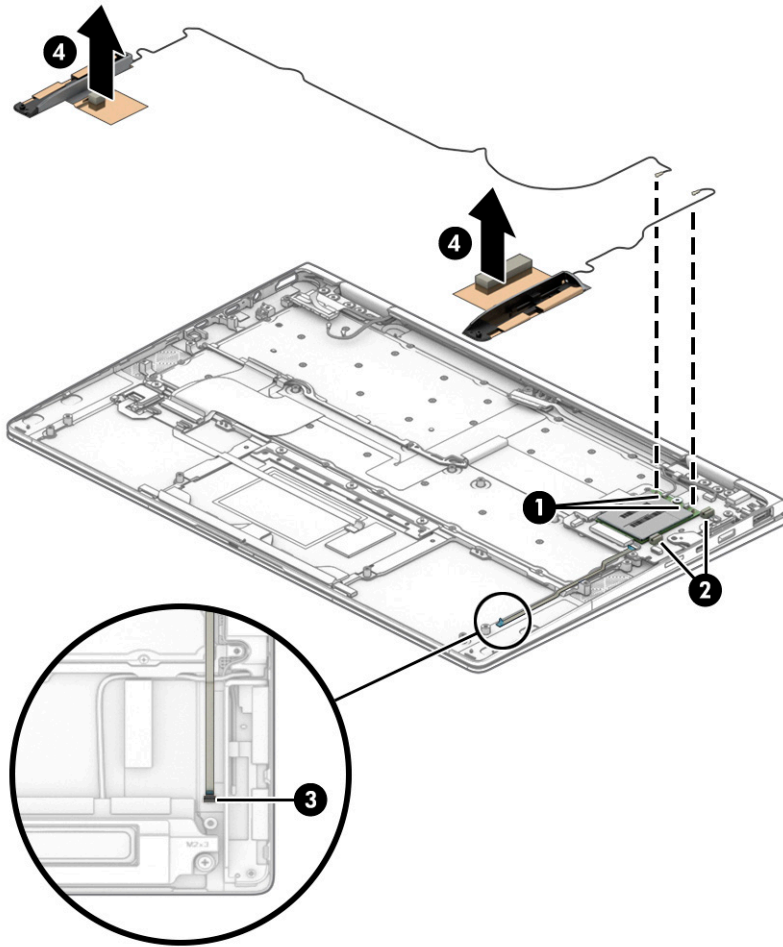
Before removing the WWAN antennas and cables, follow these steps:

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 32](#)).
4. Remove the fan (see [Fan on page 44](#)).
5. Remove the system board (see [System board on page 49](#)).
6. Remove the speaker assembly (see [Speaker assembly on page 43](#)).

Remove the WWAN antennas and cables:

1. Disconnect the antenna cables from the WWAN module **(1)**, and then remove the cables from the clips on the USB board **(2)**.
2. Disconnect the cable from the ZIF connector on the WWAN antenna **(3)**.

3. Peel the antennas off the computer (4) to remove them.



Reverse this procedure to install the WWAN antennas and cables.

Display assembly

Table 5-16 Display description and part number

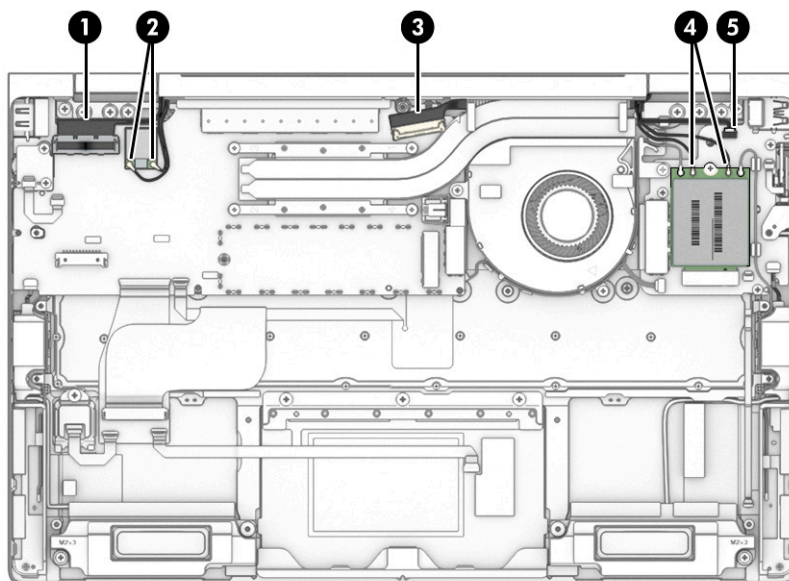
Description	Spare part number
FHD, for use in models without WWAN	L74089-001
FHD, for use in models with WWAN	L83450-001
FHD, privacy, for use in models without WWAN	L74091-001
FHD, privacy, for use in models with WWAN	L83452-001
UHD, for use in models without WWAN	L74090-001
UHD, for use in models with WWAN	L83451-001

Before removing the display assembly, follow these steps:

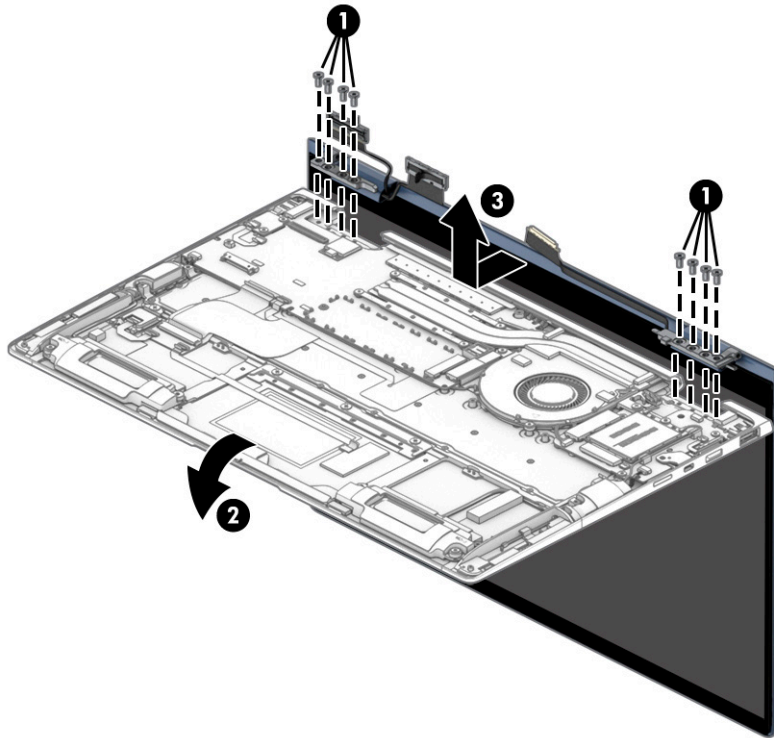
1. Prepare the computer for disassembly ([Preparation for disassembly on page 29](#)).
2. Remove the bottom cover (see [Bottom cover on page 30](#)).
3. Remove the battery (see [Battery on page 32](#)).
4. Remove the audio board (see [Audio board on page 48](#)).
5. Remove the system board (see [System board on page 49](#)).

Remove the display assembly:

1. Disconnect the display cable from the system board **(1)**.
2. Disconnect the antenna cables from the WLAN module **(2)**.
3. Disconnect the display cable from the system board **(3)**.
4. Disconnect the antenna cables from the WWAN module **(4)**.
5. Disconnect the touch cable from the USB board **(5)**.



6. Remove the four Phillips M2.5 × 4.0 screws **(1)** from each hinge.
7. Rotate the display around so that it is at a 90° angle from the bottom of the computer **(2)**, and then pull the display away from the computer **(3)**.



Reverse this procedure to reinstall the display assembly.

Keyboard/top cover

The top cover with keyboard remains after removing all other spare 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 5-17 Keyboard/top cover description and part number

Description	Spare part number
Nonprivacy models	L74116-xx1
Privacy models	L74117-xx1

Table 5-18 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	Iceland	-DD1	Slovenia	-BA1
Brazil	-201	India	-D61	South Korea	-AD1
Bulgaria	-261	Israel	-BB1	Spain	-071
Czech Republic and Slovakia	-FL1	Italy	-061	Sweden/Finland	-B71
Denmark	-081	Japan	-291	Switzerland	-BG1
Europe	-B31	Latin America	-161	Taiwan	-AB1
France	-051	Netherlands	-DH1	Thailand	-281
French Arabic	-FP1	Norway	-091	Turkey	-141
French Canada	-DB1	Portugal	-131	Turkish-F	-541
Germany	-041	Romania	-271	United Kingdom	-031
Greece	-151	Russia	-251	United States	-001
Hungary	-211	Saudi Arabia	-171		

6 Computer Setup (BIOS), TPM, and HP Sure Start

Using Computer Setup

Computer Setup, 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). Computer Setup includes settings for the types of devices installed, the startup sequence of the computer, and the amount of system and extended memory.

 **NOTE:** Use extreme care when making changes in Computer Setup. Errors can prevent the computer from operating properly.

Starting Computer Setup

- ▲ Turn on or restart the computer, and when the HP logo appears, press **f10** to enter Computer Setup.

Navigating and selecting in Computer Setup

- To select a menu or a menu item, use the **tab** key and the keyboard arrow keys and then press **enter**, or use a pointing device to select the item.
- To scroll up and down, select the up arrow or the down arrow in the upper-right corner of the screen, or use the up arrow key or the down arrow key on the keyboard.
- To close open dialog boxes and return to the main Computer Setup screen, press **esc**, and then follow the on-screen instructions.

To exit Computer Setup, choose one of the following methods:

- To exit Computer Setup menus without saving your changes, select **Main**, select **Ignore Changes and Exit**, and then select **Yes**.

 **NOTE:** If you are using arrow keys to highlight your choice, you must then press **enter**.

- To save your changes and exit Computer Setup menus, select **Main**, select **Save Changes and Exit**, and then select **Yes**.

 **NOTE:** If you are using arrow keys to highlight your choice, you must then press **enter**.

Your changes go into effect when the computer restarts.


Restoring factory settings in Computer Setup

 **NOTE:** Restoring defaults will not change the hard drive mode.

To return all settings in Computer Setup to the values that were set at the factory, follow these steps:

1. Start Computer Setup. See [Starting Computer Setup on page 56](#).
2. Select **Main**, select **Apply Factory Defaults and Exit**, and then select **Yes**.

 **NOTE:** If you are using arrow keys to highlight your choice, you must then press **enter**.

 **NOTE:** On select products, the selections might display **Restore Defaults** instead of **Apply Factory Defaults and Exit**.

Your changes go into effect when the computer restarts.

 **NOTE:** Your password settings and security settings are not changed when you restore the factory settings.

Updating the BIOS

Updated versions of the BIOS might 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 Computer Setup (BIOS), first determine the BIOS version on your computer.


You can access BIOS version information (also known as *ROM date* and *System BIOS*) by pressing **fn+esc** (if you are already in Windows) or by using Computer Setup.

1. Start Computer Setup. See [Starting Computer Setup on page 56](#).
2. Select **Main**, and then select **System Information**.
3. To exit Computer Setup menus without saving your changes, select **Main**, select **Ignore Changes and Exit**, and then select **Yes**.

 **NOTE:** If you are using arrow keys to highlight your choice, you must then press **enter**.

To check for later BIOS versions, see [Downloading a BIOS update on page 57](#).

Downloading a BIOS update

 **IMPORTANT:** 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 on 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.

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. Make a note of the date, name, or other identifier. You might 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.


 **NOTE:** If you connect your computer to a network, consult the network administrator before installing any software updates, especially system BIOS updates.

BIOS installation procedures vary. Follow any instructions that are displayed on the screen after the download is complete. If no instructions are displayed, 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.

Changing the boot order using the f9 prompt

To dynamically choose a boot device for the current startup sequence, follow these steps:

1. Access the Boot Device Options menu:
 - Turn on or restart the computer, and when the HP logo appears, press **f9** to enter the Boot Device Options menu.
2. Select a boot device, press **enter**, and then follow the on-screen instructions.

TPM BIOS settings (select products only)

 **IMPORTANT:** Before enabling Trusted Platform Module (TPM) functionality on this system, you must ensure that your intended use of TPM complies with relevant local laws, regulations and policies, and approvals or licenses must be obtained if applicable. For any compliance issues arising from your operation or usage of TPM that violates the previously mentioned requirement, you shall bear all the liabilities wholly and solely. HP will not be responsible for any related liabilities.

TPM provides additional security for your computer. You can modify the TPM settings in Computer Setup (BIOS).

 **NOTE:** If you change the TPM setting to Hidden, TPM is not visible in the operating system.

To access TPM settings in Computer Setup:

1. Start Computer Setup. See [Starting Computer Setup on page 56](#).
2. Select **Security**, select **TPM Embedded Security**, and then follow the on-screen instructions.

Using HP Sure Start (select products only)

Select computer models are configured with HP Sure Start, a technology that monitors the computer's BIOS for attacks or corruption. If the BIOS becomes corrupted or is attacked, HP Sure Start automatically restores the BIOS to its previously safe state, without user intervention.


HP Sure Start is configured and already enabled so that most users can use the HP Sure Start default configuration. Advanced users can customize the default configuration.

To access the latest documentation on HP Sure Start, go to <http://www.hp.com/support>. Select **Find your product**, and then follow the on-screen instructions.

7 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 60](#)).
- **Creating a restore point**—You can use Windows tools to create a restore point (see [Using Windows tools on page 60](#)).
- **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 60](#)).
- **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 60](#)).

 **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.

For details:

- ▲ Go to <http://www.hp.com/support>, search for HP Cloud Recovery, and then select the result that matches the type of computer that you have.

 **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 60](#).

Recovering using HP Recovery media

You can use HP Recovery media 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 60](#).

 **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.

Using HP Sure Recover (select products only)

Select computer models are configured with HP Sure Recover, a PC OS recovery solution built into the hardware and firmware. HP Sure Recover can fully restore the HP OS image without installed recovery software.

Using HP Sure Recover, an administrator or user can restore the system and install:

- Latest version of the operating system
- Platform-specific device drivers
- Software applications, in the case of a custom image

To access the latest documentation for HP Sure Recover, go to <http://www.hp.com/support>. Select **Find your product**, and then follow the on-screen instructions.

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 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 63](#).

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 that you want to run, and then follow the on-screen instructions.



NOTE: To stop a diagnostic test, 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.
- Instructions for calling support are displayed. Follow those instructions.

Downloading HP PC Hardware Diagnostics Windows

- The HP PC Hardware Diagnostics Windows downloading 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 downloads to the selected location.

– or –

You can use the following steps to download the HP PC Hardware Diagnostics Windows from the Microsoft Store:

1. Select the Microsoft app on your desktop or enter `Microsoft Store` in the taskbar search box.
2. Enter `HP PC Hardware Diagnostics Windows` in the **Microsoft Store** search box.
3. Follow the on-screen directions.

The tool downloads to the selected location.

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



NOTE: For some products, you might have 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 downloads 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 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 65](#).

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 does not start in Windows, you can use HP PC Hardware Diagnostics UEFI to diagnose hardware issues.

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

- ▲ Select **Contact HP**, accept the HP privacy disclaimer, and then use a mobile device to scan the Failure ID code that appears on the next screen. The HP Customer Support - Service Center page appears 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 65](#).


- 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 preinstallation 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 downloading 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, you might have 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 might 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 you can download 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, you might have 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 hard 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 that you use for uploads.
- Display status information about the diagnostics run previously.

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

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

Your changes take effect when the computer restarts.

9 Specifications

Computer specifications

Table 9-1 Computer specifications

	Metric	U.S.
Dimensions		
Width	304.3 mm	11.98 in
Depth	197.5 mm	7.78 in
Height	16.1 mm	0.63 in
Weight		
38 WHr battery	999 g	2.2 lb
56 WHr battery	1130 g	2.48 lb
Input power		
Operating voltage and current	19.5 V dc @ 3.33 A – 65 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.

33.8 cm (13.3 in) display specifications

Table 9-2 Display specifications


	Metric	U.S.
Active diagonal size	33.8 cm	13.3 in
Resolution	FHD: 1920 × 1080 UHD: 3840 × 2160	
Surface treatment	BrightView	
Brightness	FHD (72% CG): 400 nits (nonprivacy) or 1000 nits (privacy) UHD (72% CG): 500 nits	
Viewing angle	UWVA	
Backlight	LED	
Aspect ratio	16:9	
Display panel interface	eDP + PSR	

10 Statement of memory volatility

The purpose of this chapter is to provide general information regarding nonvolatile memory in HP Business computers. This chapter also provides general instructions for restoring nonvolatile memory that can contain personal data after the system has been powered off and the hard drive has been removed.


HP Business computer products that use Intel®-based or AMD®-based system boards contain volatile DDR memory. The amount of nonvolatile memory present in the system depends upon the system configuration. Intel-based and AMD-based system boards contain nonvolatile memory subcomponents as originally shipped from HP, assuming that no subsequent modifications have been made to the system and assuming that no applications, features, or functionality have been added to or installed on the system.


Following system shutdown and removal of all power sources from an HP Business computer system, personal data can remain on volatile system memory (DIMMs) for a finite period of time and will also remain in nonvolatile memory. Use the steps below to remove personal data from the computer, including the nonvolatile memory found in Intel-based and AMD-based system boards.


 **NOTE:** If your tablet has a keyboard base, connect to the keyboard base before beginning steps in this chapter.

Current BIOS steps

1. Follow steps (a) through (l) below to restore the nonvolatile memory that can contain personal data. Restoring or reprogramming nonvolatile memory that does not store personal data is neither necessary nor recommended.
 - a. Turn on or restart the computer, and then quickly press **esc**.

 **NOTE:** If the system has a BIOS administrator password, enter the password at the prompt.
 - b. Select **Main**, select **Apply Factory Defaults and Exit**, and then select **Yes** to load defaults.
The computer reboots.
 - c. During the reboot, press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

 **NOTE:** If the system has a BIOS administrator password, enter the password at the prompt.
 - d. Select the **Security** menu, select **Restore Security Settings to Factory Defaults**, and then select **Yes** to restore security level defaults.
The computer reboots.
 - e. During the reboot, press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

 **NOTE:** If the system has a BIOS administrator password, enter the password at the prompt.
 - f. If an asset or ownership tag is set, select the **Security** menu and scroll down to the **Utilities** menu. Select **System IDs**, and then select **Asset Tracking Number**. Clear the tag, and then make the selection to return to the prior menu.
 - g. If a DriveLock password is set, select the **Security** menu, and scroll down to **Hard Drive Utilities** under the **Utilities** menu. Select **Hard Drive Utilities**, select **DriveLock**, then clear the check box for **DriveLock password on restart**. Select **OK** to proceed.

Nonvolatile memory usage

Table 10-1 Troubleshooting steps for nonvolatile memory usage

Nonvolatile memory type	Amount (Size)	Does this memory store customer data?	Does this memory retain data when power is removed?	What is the purpose of this memory?	How is data entered into this memory?	How is this memory write-protected?
HP Sure Start flash (select models only)	8 MB	No	Yes	Provides protected backup of critical System BIOS code, EC firmware, and critical computer configuration data for select platforms that support HP Sure Start. For more information, see Using HP Sure Start (select models only) on page 75 .	Data cannot be written to this device via the host processor. The content is managed solely by the HP Sure Start Embedded Controller.	This memory is protected by the HP Sure Start Embedded Controller.
Real Time Clock (RTC) battery backed-up CMOS configuration memory	256 bytes	No	Yes	Stores system date and time and noncritical data.	RTC battery backed-up CMOS is programmed using Computer Setup (BIOS), or by changing the Microsoft® Windows date & time.	This memory is not write-protected.
Controller (NIC) EEPROM	64 KB (not customer accessible)	No	Yes	Stores NIC configuration and NIC firmware.	NIC EEPROM is programmed using a utility from the NIC vendor that can be run from DOS.	A utility must be used to write data to this memory and is available from the NIC vendor. Writing data to this ROM in an inappropriate manner will render the NIC non-functional.
DIMM Serial Presence Detect (SPD) configuration data	256 bytes per memory module, 128 bytes programmable (not customer accessible)	No	Yes	Stores memory module information.	DIMM SPD is programmed by the memory vendor.	Data cannot be written to this memory when the module is installed in a computer. The specific write-protection method varies by memory vendor.
System BIOS	9 MB	Yes	Yes	Stores system BIOS code and computer configuration data.	System BIOS code is programmed at the factory. Code is updated when the system BIOS is updated. Configuration data and settings are entered using the Computer Setup (BIOS) or a custom utility.	NOTE: Writing data to this ROM in an inappropriate manner can render the computer non-functional. A utility must be used for writing data to this memory and is available on the HP website; go to http://www.hp.com/

Table 10-1 Troubleshooting steps for nonvolatile memory usage (continued)

Nonvolatile memory type	Amount (Size)	Does this memory store customer data?	Does this memory retain data when power is removed?	What is the purpose of this memory?	How is data entered into this memory?	How is this memory write-protected?
Intel Management Engine Firmware (present only in select Elite or Z models. For more information, go to http://www.hp.com/support . Select Find your product , and then follow the on-screen instructions.)	1.5 MB or 7 MB	Yes	Yes	Stores Management Engine Code, Settings, Provisioning Data and iAMT third-party data store.	Management Engine Code is programmed at the factory. Code is updated via Intel secure firmware update utility. Unique Provisioning Data can be entered at the factory or by an administrator using the Management Engine (MEBx) setup utility. The third-party data store contents can be populated by a remote management console or local applications that have been registered by an administrator to have access to the space.	support . Select Find your product , and then follow the on-screen instructions. The Intel chipset is configured to enforce hardware protection to block all direct read/write access to this area. An Intel utility must be used for updating the firmware. Only firmware updates digitally signed by Intel can be applied using this utility.
Bluetooth flash (select products only)	2 Mb	No	Yes	Stores Bluetooth configuration and firmware.	Bluetooth flash is programmed at the factory. Tools for writing data to this memory are not publicly available but can be obtained from the silicon vendor.	A utility must be used for writing data to this memory and is made available through newer versions of the driver whenever the flash requires an upgrade.
802.11 WLAN EEPROM	4 Kb to 8 Kb	No	Yes	Stores configuration and calibration data.	802.11 WLAN EEPROM is programmed at the factory. Tools for writing data to this memory are not made public.	A utility must be used for writing data to this memory and is typically not made available to the public unless a firmware upgrade is necessary to address a unique issue.
Webcam (select products only)	64 Kb	No	Yes	Stores webcam configuration and firmware.	Webcam memory is programmed using a utility from the device manufacturer that can be run from Windows.	A utility must be used for writing data to this memory and is typically not made available to the public unless a firmware upgrade is necessary to address a unique issue.
Fingerprint reader (select products only)	512 KB flash	Yes	Yes	Stores fingerprint templates.	Fingerprint reader memory is programmed by user enrollment in HP ProtectTools Security Manager.	Only a digitally signed application can make the call to write to the flash.

Questions and answers

1. How can the BIOS settings be restored (returned to factory settings)?



IMPORTANT: Restore defaults does not securely erase any data on your hard drive. See question and answer 6 for steps to securely erase data.

Restore defaults does not reset the Custom Secure Boot keys. See question and answer 7 for information about resetting the keys.

- a. Turn on or restart the computer, and then quickly press `esc`.
- b. Select **Main**, and then select **Apply Factory Defaults and Exit**.
- c. Follow the on-screen instructions.
- d. Select **Main**, select **Save Changes and Exit**, and then follow the on-screen instructions.

2. What is a UEFI BIOS, and how is it different from a legacy BIOS?

The Unified Extensible Firmware Interface (UEFI) BIOS is an industry-standard software interface between the platform firmware and an operating system (OS). It is a replacement for the older BIOS architecture, but supports much of the legacy BIOS functionality.

Like the legacy BIOS, the UEFI BIOS provides an interface to display the system information and configuration settings and to change the configuration of your computer before an OS is loaded. BIOS provides a secure run-time environment that supports a Graphic User Interface (GUI). In this environment, you can use either a pointing device (touch screen, touchpad, pointing stick, or USB mouse) or the keyboard to navigate and make menu and configuration selections. The UEFI BIOS also contains basic system diagnostics.

The UEFI BIOS provides functionality beyond that of the legacy BIOS. In addition, the UEFI BIOS works to initialize the computer's hardware before loading and executing the OS; the run-time environment allows the loading and execution of software programs from storage devices to provide more functionality, such as advanced hardware diagnostics (with the ability to display more detailed system information) and advanced firmware management and recovery software.

HP has provided options in Computer Setup (BIOS) to allow you to run in legacy BIOS, if required by the operating system. Examples of this requirement would be if you upgrade or downgrade the OS.

3. Where does the UEFI BIOS reside?

The UEFI BIOS resides on a flash memory chip. A utility must be used to write to the chip.


4. What kind of configuration data is stored on the DIMM Serial Presence Detect (SPD) memory module? How would this data be written?

The DIMM SPD memory contains information about the memory module, such as size, serial number, data width, speed/timing, voltage, and thermal information. This information is written by the module manufacturer and stored on an EEPROM. This EEPROM cannot be written to when the memory module is installed in a computer. Third-party tools do exist that can write to the EEPROM when the memory module is not installed in a computer. Various third-party tools are available to read SPD memory.

5. What is meant by “Restore the nonvolatile memory found in Intel-based system boards”?

This message relates to clearing the Real Time Clock (RTC) CMOS memory that contains computer configuration data.

6. How can the BIOS security be reset to factory defaults and data erased?

 **IMPORTANT:** Resetting results in the loss of information.

These steps do not reset Custom Secure Boot Keys. See question and answer 7 for information about resetting the keys.

- a. Turn on or restart the computer, and then quickly press **esc**.
- b. Select **Main**, and then select **Reset Security to Factory Defaults**.
- c. Follow the on-screen instructions.
- d. Select **Main**, select **Save Changes and Exit**, and then follow the on-screen instructions.

7. How can the Custom Secure Boot Keys be reset?

Secure Boot is a feature to ensure that only authenticated code can start on a platform. If you enabled Secure Boot and created Custom Secure Boot Keys, simply disabling Secure Boot does not clear the keys. You must also select to clear the Custom Secure Boot Keys. Use the same Secure Boot access procedure you used to create the Custom Secure Boot Keys, but make the selection to clear or delete all Secure Boot Keys.

- a. Turn on or restart the computer, and then quickly press **esc**.
- b. Select the **Security** menu, select **Secure Boot Configuration**, and then follow the on-screen instructions.
- c. At the **Secure Boot Configuration** window, select **Secure Boot**, select **Clear Secure Boot Keys**, and then follow the on-screen instructions to continue.

Using HP Sure Start (select models only)

Select computer models are configured with HP Sure Start, a technology that continuously monitors your computer's BIOS for attacks or corruption. If the BIOS becomes corrupted or is attacked, HP Sure Start restores the BIOS to its previously safe state, without user intervention. Those select computer models ship with HP Sure Start configured and enabled. HP Sure Start is configured and already enabled so that most users can use the HP Sure Start default configuration. The default configuration can be customized by advanced users.

To access the latest documentation on HP Sure Start, go to <http://www.hp.com/support>. Select **Find your product**, and then follow the on-screen instructions.

11 Power cord set requirements

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

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

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

Requirements for all countries

The following requirements are applicable to all countries and regions:

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

Requirements for specific countries and regions

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

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

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

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

Country/region	Accredited agency	Applicable note number
		2. The flexible cord must be Type SVT/SJT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V ac) or NEMA 6-15P (15 A, 250 V ac) configuration. CSA or C-UL mark. UL file number must be on each element.
		3. The appliance coupler, flexible cord, and wall plug must bear a “T” mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCTF, 3-conductor, 0.75 mm ² or 1.25 mm ² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration.
		4. The flexible cord must be Type RVV, 3-conductor, 0.75 mm ² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.
		5. The flexible cord must be Type H05VV-F 3-conductor, 0.75 mm ² conductor size. KTL logo and individual approval number must be on each element. Approval number and logo must be printed on a flag label.
		6. The flexible cord must be Type HVCTF 3-conductor, 1.25 mm ² conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.
		7. For 127 V ac, the flexible cord must be Type SVT or SJT 3-conductor, 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type H05VV-F 3-conductor, 0.75 mm ² or 1.00 mm ² conductor size, with plug BS 1363/A with BSI or ASTA marks.

12 Recycling

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

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

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