Maintenance and Service Guide

HP Elite x2 G4 Tablet

Product notice

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

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

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

Software terms

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

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

Safety warning notice

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

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1 Product description

Table 1-1 Product components and their descriptions

Category	Description
Product Name	HP Elite x2 G4 Tablet
Processors	**Intel® Core™ processors, quad core**
	Intel Core i7-8665U (1.9 GHz, turbo up to 4.6 GHz, 8 MB SmartCache, 15 W)
	Intel Core i7-8565U (1.8 GHz, turbo up to 4.6 GHz, 8 MB SmartCache, 15 W)
	Intel Core i5-8365U (1.6 GHz, turbo up to 4.1 GHz, 6 MB SmartCache, 15 W)
	Intel Core i5-8265U (1.6 GHz, turbo up to 3.9 GHz, 6 MB SmartCache, 15 W)
Graphics	**Intel UMA graphics**
	Intel UHD Graphics 620
Panel	**13.0 inch, WLED, UWVA, eDP 1.4 + PSR, 72% of NTSC, ultraslim, touch screen**
	● WUXGA+ (1920 × 1280), antiglare, privacy, 1000 nits
	● 3k × 2k (3000 × 2000), BrightView, 450 nits
	12.3 inch, WLED, UWVA, 72% of NTSC, eDP 1.4 + PSR, ultraslim
	● WUXGA+ (1920 × 1280), BrightView, 400 nits
Memory	Memory soldered onto system board, non-upgradeable, non-removable
	LPDDR3 2133
	Supports dual-channel memory
	Supports up to 16 GB system memory in the following configurations:
	● 16 GB
	● 8 GB
Operating system recovery storage	32 GB eMMC
Primary storage	**Supports M.2 2280 solid-state drive (SSD)**
	128 GB, SATA-3, TLC
	256 GB, SATA-3, self-encrypting drive (SED), Opal 2, TLC
	256 GB, PCIe
	256 GB, PCIe, TLC
	512 GB, PCIe, self-encrypting drive (SED), Opal 2, TLC
	512 GB, PCIe, value
	512 GB, PCIe, TLC
	512 GB, PCIe, TLC, FIPS-140-2

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

Category	Description
	512 GB, PCIe + 32 GB Optane™ memory module
	1 TB, PCIe, TLC
	2 TB, PCIe, TLC
Audio/visual	HP Bang & Olufsen Audio
	Audio Solution Codec Realtek ALC3292 + Discrete amp NXP9892
	Microphone (multiple array including rear-facing third mic)
	Hybrid IR/RGB camera, front facing
	Rear-facing camera, 8 MP
	Two premium stereo speakers
RJ-45 (network)	No integrated RJ-45 (network) support
Wireless	**Bluetooth®**
	Bluetooth 5.0 only supported via combo card
	WLAN
	WLAN options via soldered minicard connector (PCIe/USB):
	● 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)
	WLAN antennas (2) (world wide 5 band, configured at top of panel on all models)
	Support Fast PCIe Error Identification
	Supports Turbo Lite Wi-Fi
	Compatible with Wi-Fi CERTIFIED Miracast™ devices
	Supports Dynamic BIOS SAR
	Supports WLAN/LAN/WWAN switching
	Support HP Connection Optimizer
	GPS (select models only)
	U-Blox GPS EVA-M8M M.2/USB WW, not available with WWAN
	WWAN (select models only)
	● Intel XMM™ 7360 LTE-Advanced (CAT 9)
	● Intel XMM 7560 LTE-Advanced Pro (CAT 16)
	SIM (user-accessible on side (4FF/nano SIM)
	WWAN antennas 4G (2) (Intel XMM 7360)
	WWAN antennas 4G (4) (Intel XMM 7560)
Ports	**Tablet**
	Audio-out (headphone)/audio-in (microphone) combo jack

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

Category	Description
	Nano SIM (push-push)
	(2) USB Type-C 3.1 port with Thunderbolt™ (docking, power, USB, PD 3.0), BC 1.2
	USB Type-C 3.1 with GP and PD 3.0, BC 1.2
	Keyboard
	Keyboard
	Touchpad
Sensors	Combo chip
	● Accelerometer
	● Gyro
	● Magnetometer
	Ambient light sensor (ALS)
	Dual accelerometers (in keyboard)
	Hall sensor
Docking	HP Thunderbolt Dock 120 W
	HP Thunderbolt Dock G2
	HP Thunderbolt Dock with Audio
	HP USB-C Dock G4
	HP USB-C Universal Dock
	HP USB-C Mini Dock
	HP USB-C/A Universal Dock G2
	HP Elite USB-C Dock G5
Keyboard/pointing devices	**Keyboard**
	HP Collaboration Keyboard
	HP Folio Keyboard
	Backlit with HP Dura Keys
	Touchpad requirements
	Microsoft precision touchpad default gestures support
	Firmware PTP with Filter Driver
Power requirements	**Battery**
	2 cell Long Life Polymer 47 Wh, 3250 mAh
	Supports HP Fast Charge
	AC adapter (USB Type-C, straight):
	65 W

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

Category	Description
	65 W, slim
	Power cord
	1.0 m, C5
	Duckhead (C5NS), 1.0 m
	Duckhead (C5NS)
Security	TPM 2.0 SLB9670 (Infineon, soldered down)
	Pad fingerprint sensor (select products only)
	Preboot authentication (password, fingerprint)
	Hardware enforced Firmware Protection: HP Hardware Root of Trust
	Security lock
Operating system	Windows® 10 Home 64 High-end Chinese Market
	Windows 10 Home 64 Plus
	Windows 10 Home 64 Plus Single Language Africa Market
	Windows 10 Home 64 Plus Single Language APAC EM
	Windows 10 Home 64 Plus Single Language India Market
	Windows 10 Home 64 Plus Single Language Indonesia Market
	Windows 10 Pro 64
	Windows 10 Pro 64 Chinese Market
	Windows 10 Pro 64 StF MSNA Plus
	Restore media
	Windows 10 Driver DVD
	Windows 10 Driver USB
	Windows 10 Professional 64-bit OS DVD
	Windows 10 Professional 64-bit OS USB
	Certified
	Microsoft WHQL
	Web support
	Windows 10 Enterprise 64
	Windows 10 Pro 64 CBB 1803
Serviceability	**End user replaceable parts**
	AC adapter (Slate only)
	Keyboard

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

Category	Description
	Kickstand
	Pen

2   Components

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

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

Right

Table 2-1 Right-side components and their descriptions

	Component	Description
(1)	SIM ▶ Nano SIM card slot (select products only)	Supports a wireless subscriber identity module (SIM) card. **NOTE:** The nano SIM card slot is located under the kickstand.
(2)	⚡ USB Type-C power connector and Thunderbolt™ ports with HP Sleep and Charge (2)	Connect AC adapters that have a USB Type-C connector, supplying power to the computer and, if needed, charging the computer battery. – and – 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. – and – Connect display devices that have a USB Type-C connector, providing DisplayPort™ output. **NOTE:** Your computer might also support a Thunderbolt docking station. **NOTE:** Cables and/or adapters (purchased separately) might be required.
(3)	SS⇌Ð USB Type-C power connector port, SuperSpeed port, and DisplayPort connector	Connects an AC adapter that has a USB Type-C connector, supplying power to the computer and, if needed, charging the computer battery. – and – Connects a USB device that has a Type-C connector, such as a cell phone, camera, activity tracker, or smartwatch, and provides high-speed data transfer. – and – Connects a display device that has a USB Type-C connector, providing DisplayPort output. **NOTE:** Cables and/or adapters (purchased separately) might be required.
(4)	Battery light	When AC power is connected:

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

Component	Description
	● White: The battery charge is greater than 90 percent.
	● Amber: The battery charge is from 0 to 90 percent.
	● Off: The battery is not charging.
	When AC power is disconnected (battery not charging):
	● 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.

Left
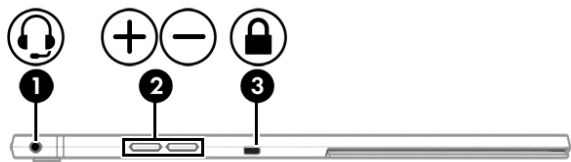
Table 2-2 Left-side components and their descriptions

Component			Description
(1)	🎧	Audio-out (headphone)/Audio-in (microphone) combo jack	Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional standalone microphones. **WARNING!** To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, see the *Regulatory, Safety, and Environmental Notices*. To access this guide: ▲ Type `HP Documentation` in the taskbar search box, and then select **HP Documentation**. **NOTE:** When a device is connected to the jack, the computer speakers are disabled.
(2)	− +	Volume buttons	Control speaker volume on the computer.
(3)	🔒	Nano security cable slot	Attaches an optional security cable to the computer. **NOTE:** The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.

Display
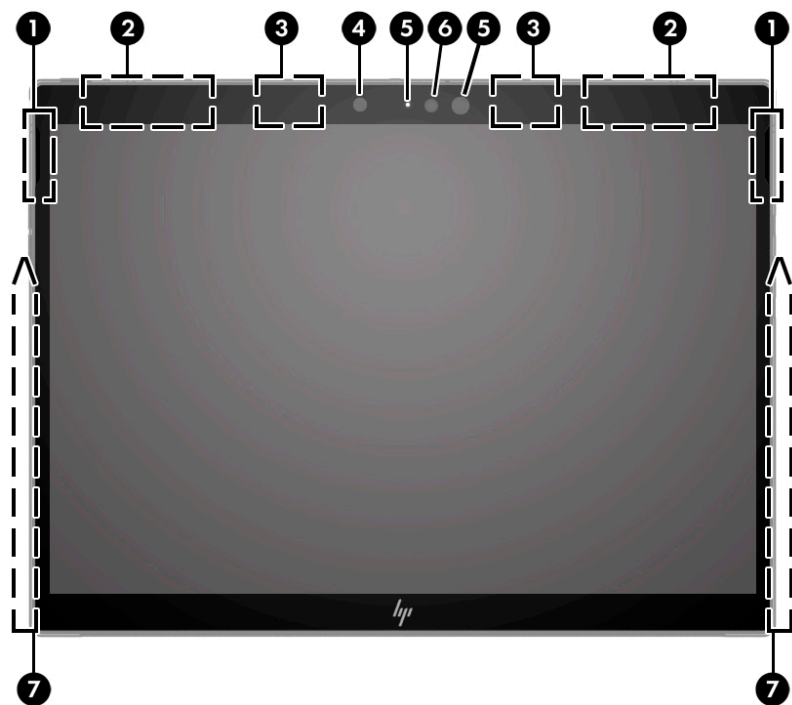
Table 2-3 Display components and their descriptions

Component		Description
(1)	Speakers (2)	Produce sound.
(2)	WWAN antennas (select products only)*	Send and receive wireless signals to communicate with wireless wide area networks (WWANs).
(3)	WLAN antennas*	Send and receive wireless signals to communicate with wireless local area networks (WLANs).
(4)	Ambient light sensor	Adjusts the brightness of the display, depending on the ambient light.
(5)	Camera light(s)	On: One or more cameras are in use.
(6)	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.
(7)	Magnetic pen attachment area	Holds an optional pen. Place the pen tip up (facing the top of the computer) for optimal magnetic attachment.
		NOTE: For more information about the pen, see the documentation provided with the pen.

*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

Table 2-4 Top components and their descriptions

Component			Description
(1)		Vents (2)	Enable airflow to cool internal components.
			NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(2)	🎤	Internal microphones (2)	Record sound.
(3)		Camera privacy cover	Controls the front and rear facing cameras simultaneously. When facing the display side with the front-facing camera:
			● To reveal the camera, slide the cover to the left.
			● To conceal the camera, slide the cover to the right.
(4)	⏻	Power button	● When the computer is off, press the button to turn on the computer.
			● When the computer is on, press the button briefly to initiate Sleep.
			● When the computer is in the Sleep state, press the button briefly to exit Sleep (select products only).
			● When the computer is in Hibernation, press the button briefly to exit Hibernation.
			IMPORTANT: Pressing and holding down the power button results in the loss of unsaved information.
			If the computer has stopped responding and shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer.
			To learn more about your power settings, see your power options.
			▲ Right-click the **Power meter** icon 🔋 and then select **Power Options**.
(5)		Power light	● 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 unneeded components.

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

Component	Description
	• 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.

Bottom
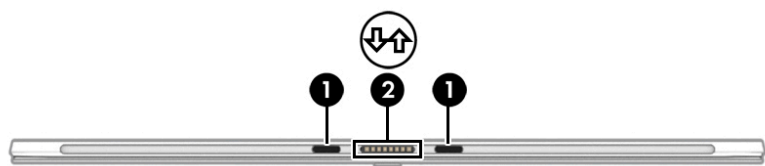
Table 2-5 Bottom components and their descriptions

Component			Description
(1)		Alignment connectors (2)	Connect to the alignment connectors on the keyboard (select products only).
(2)		Keyboard connector	Connects the computer to the keyboard (select products only).

Rear
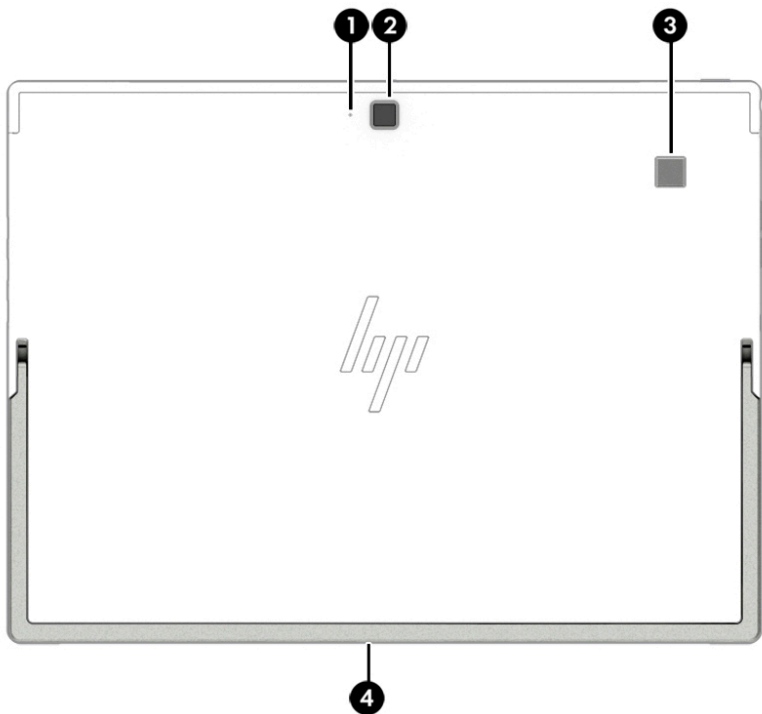
Table 2-6 Rear components and their descriptions

Component		Description
(1)	Rear internal microphone	Records sound.
(2)	Rear camera	Allows you to video chat, record video, and record still images. Some cameras also allow a facial recognition logon to Windows, instead of a password logon. **NOTE:** Camera functions vary depending on the camera hardware and software installed on your product.

(3)	Fingerprint reader (select products only)	Allows a fingerprint logon to Windows, instead of a password logon.
		
		▲ Touch your finger to the fingerprint reader.
		
		    IMPORTANT: To prevent fingerprint logon issues, make sure when you register your fingerprint that all sides of your finger are registered by the fingerprint reader.
		
		    IMPORTANT: To verify that your computer has a fingerprint reader, type `Sign-in options` in the taskbar search box and follow the on-screen instructions. If **Fingerprint reader** is listed as an option, then your computer includes a fingerprint reader.

(4)	Kickstand	Changes the angle for the display.

Using the kickstand

To change the angle for the display, follow these steps:

1. Hold the computer with top edge up. (The speakers are on top.)

2. Slide the kickstand away from the computer and position the kickstand at the appropriate angle. The kickstand will hold at a midway point **(1)** of about 52° or at full stopping point **(2)** of about 165°.
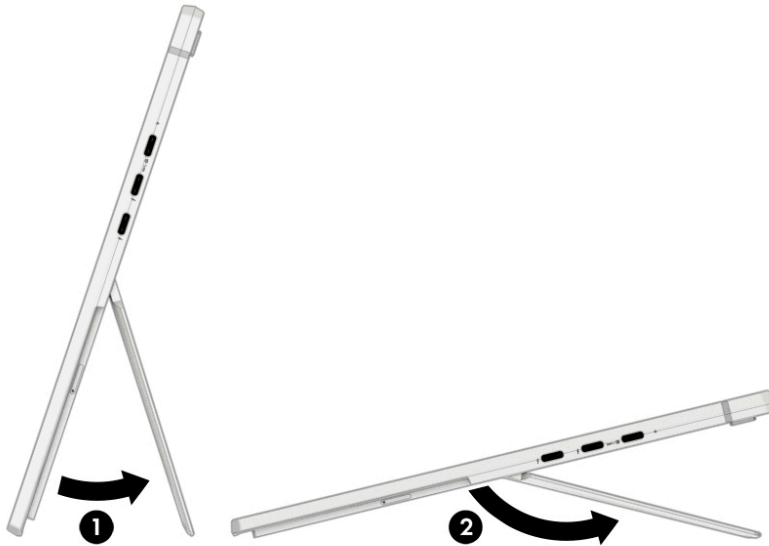
To close the kickstand, push the kickstand against the bottom of the computer until it is flush with the bottom.

Keyboard area (select products only)

📝 **NOTE:** Your keyboard may look slightly different from the illustrations in this section.

Connecting the keyboard

▲ To connect the keyboard, lower the computer onto the keyboard until the connectors click into place.

Removing the keyboard

▲ To remove the computer from the keyboard, pull the computer away from the back of the keyboard.

Connecting the leather folio keyboard

▲ To connect the leather folio keyboard, attach the keyboard cover to the back of the computer **(1)**, fitting the camera in the keyboard cutout, and then lower the computer onto the keyboard **(2)** until the POGO connectors click into place magnetically.

Removing the leather folio keyboard

▲ To remove the computer from the leather folio keyboard, pull the computer away from the keyboard **(1)**, remove the back of the keyboard cover **(2)**, and then lift the computer away from the keyboard **(3)**.

To clean the leather folio keyboard, use a soft microfiber cloth or chamois moistened with water and mild soap.

Adjusting the leather folio keyboard

To change the angle of the display using the leather folio keyboard, follow these steps.
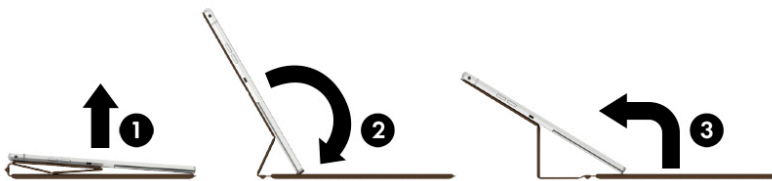
Touchpad settings

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.
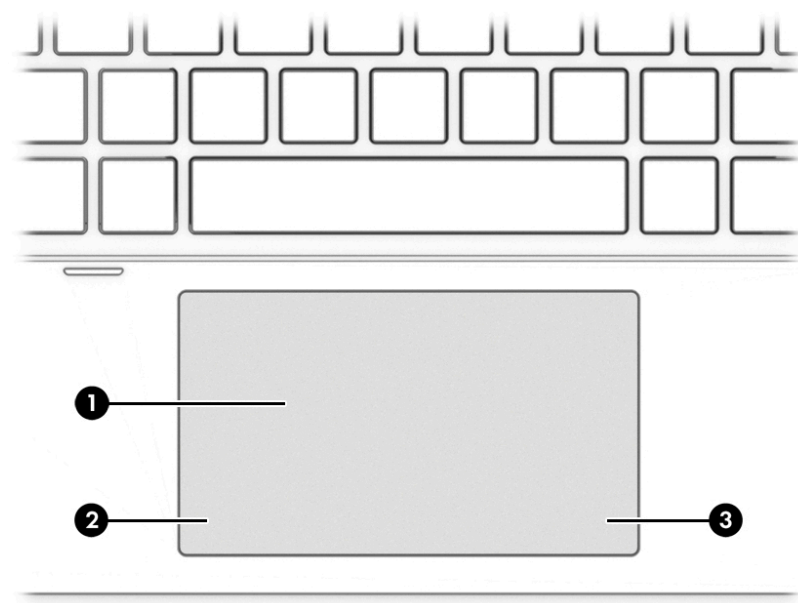
Table 2-7 Touchpad components and their descriptions

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
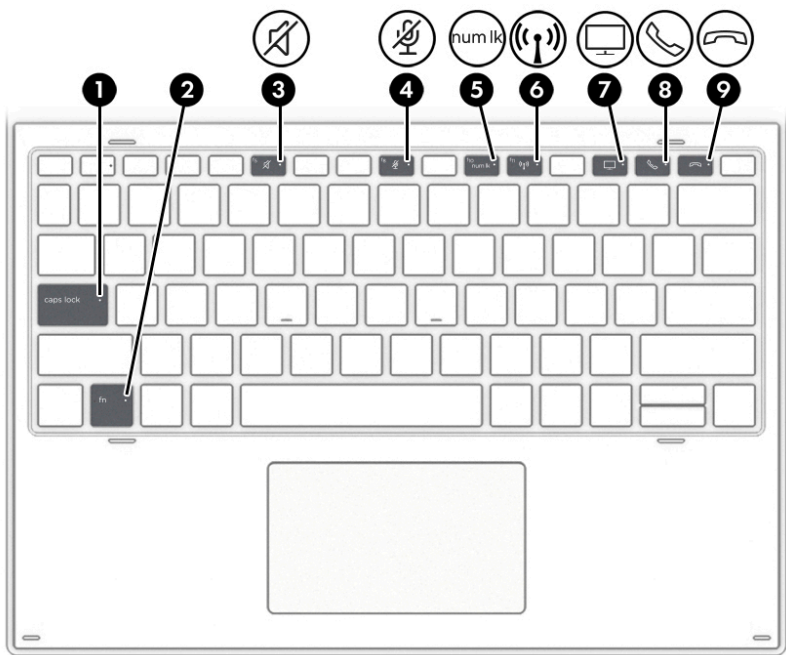
Table 2-8 Lights and their descriptions

Component		Description
(1)	Caps lock light	On: Caps lock is on, which switches the key input to all capital letters.
(2)	Fn lock light	On: The fn key is locked. For more information, see Hot keys (select products only) on page 20.
(3)	Mute light	- On: Computer sound is off. - Off: Computer sound is on.
(4)	Microphone mute light	- On: Microphone is off. - Off: Microphone is on.
(5)	Num lk light	On: Num lock is on.
(6)	Wireless light	On: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on. **NOTE:** On some models, the wireless light is amber when all wireless devices are off.
(7)	Sharing or presenting light	On: Sharing is on.
(8)	Call answer light	On: Call answer is on.
(9)	Call end light	On: Call end is on.

Special keys

Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes frequently used system functions when pressed in combination with another key. Such key combinations are called *hot keys*.
		See Hot keys (select products only) on page 20.
(3)	Windows key	Opens the Start menu.
		NOTE: Pressing the Windows key again will close the Start menu.
(4)	Action keys	Execute frequently used system functions.
(5)	Embedded numeric keypad	A numeric keypad superimposed over the keyboard alphabet keys. When num lk 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)	num lk 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 2-10 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 programing query.
W	Pauses the 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.
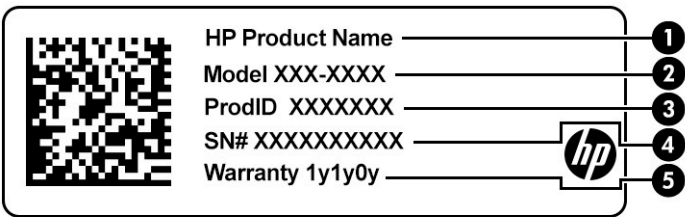
Table 2-11 Service label components

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

Table 2-11 Service label components (continued)

Component	
(4)	Serial number
(5)	Warranty period

- Regulatory label(s)—Provide(s) regulatory information about the computer.

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

Inserting a nano 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. Position the computer display-side up on a flat surface, and then lift up the kickstand.

2. Insert the removal tool or a small straightened paper clip **(1)** into the card tray access hole.

3. Press the tool or clip in gently until the card tray is ejected.

4. Remove the tray **(2)** from the computer and insert the card **(3)**.

5. Replace the tray in the computer. Press gently on the tray **(4)** until it is firmly seated.

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

📝 **NOTE:** See the image on the on the back of the display to determine which way the SIM card should be inserted into your computer.
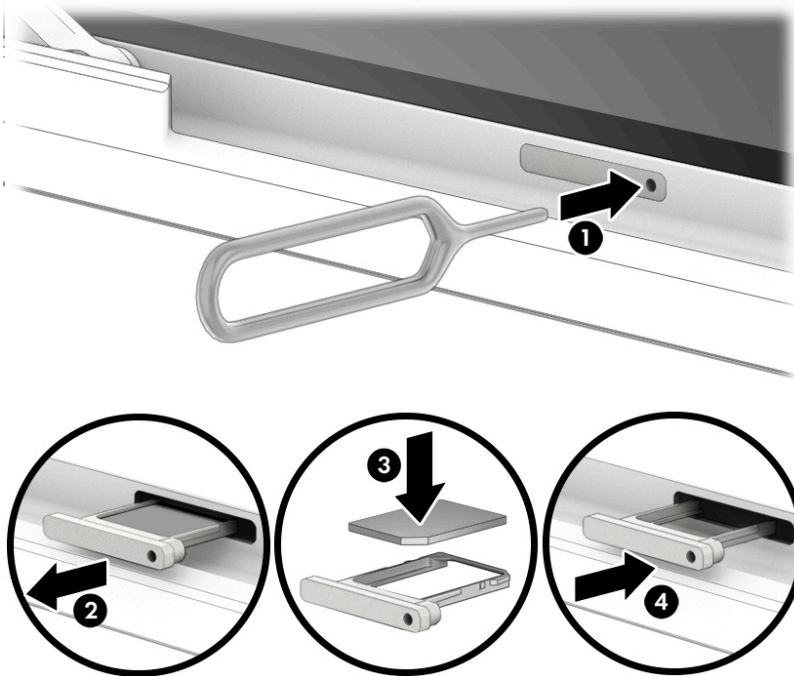
To remove a SIM card, reverse these steps.

3   Illustrated parts catalog

Computer major components
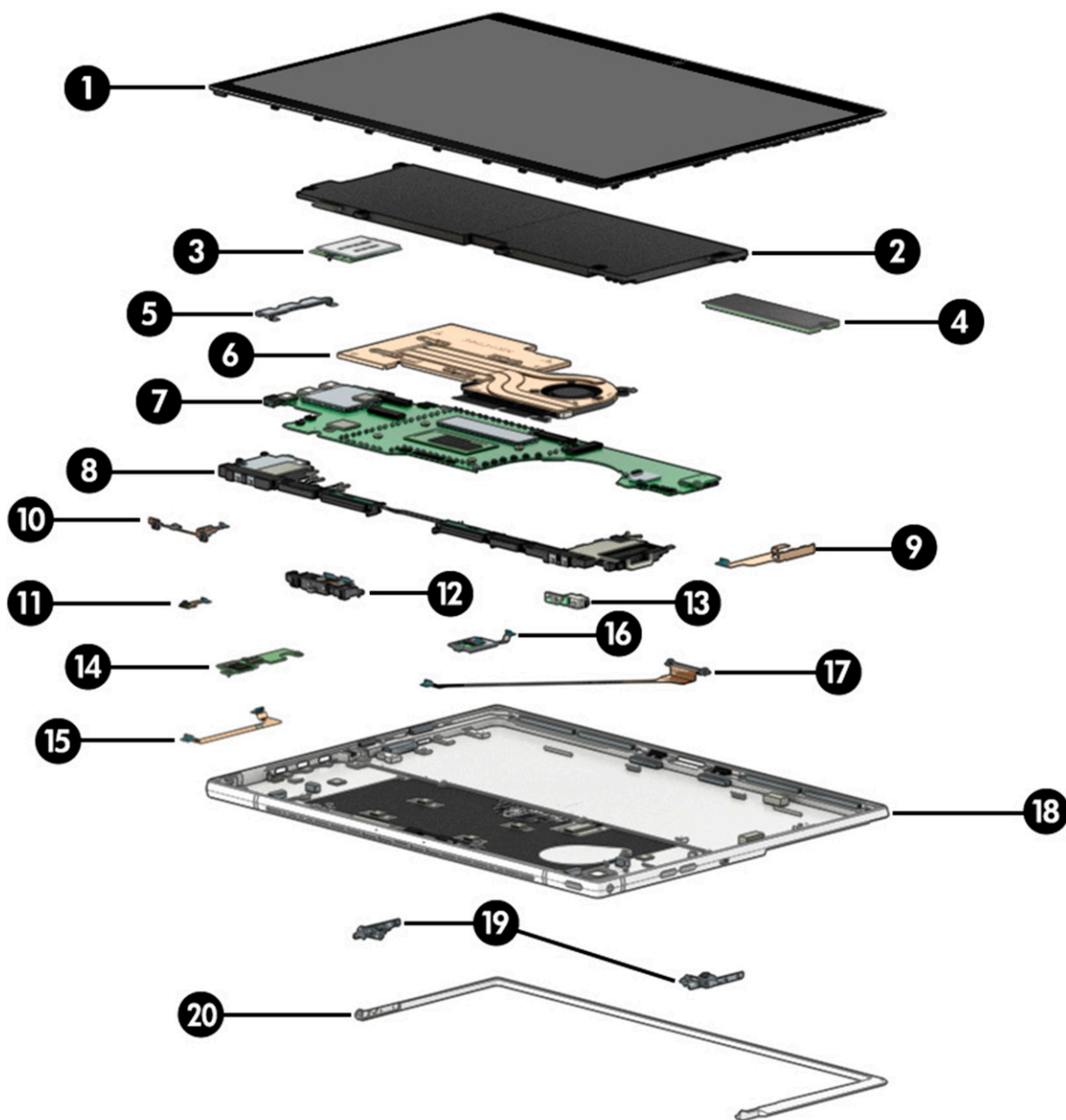
Table 3-1 Computer major components and their descriptions

Item	Component	Spare part number
(1)	**Display panel**, touch screen	
	WUXGA+	L67406-001
	WUXGA+, privacy	L67408-001
	3k × 2k	L67407-001
(2)	**Battery, 2 cell, 47 Wh**	L46601-005
(3)	**WWAN module**	
	NOTE: The WWAN protective tape kit is available as spare part number L67434-001.	
	Intel XMM 7360 LTE-Advanced (CAT 9)	L15398-006
	Intel XMM 7560 LTE-Advanced Pro (CAT 16)	L27188-005
(4)	**Solid-state drive** (M.2)	
	2 TB, PCIe, TLC	L67401-001
	1 TB, PCIe, TLC	L67397-001
	512 GB, PCIe, TLC + 32 GB Optane memory	L67405-001
	512 GB, SATA-3, self-encrypting drive (SED), Opal 2, TLC	L674021-001
	512 GB, PCIe, TLC	L67403-001
	512 GB, PCIe	L67404-001
	256 GB, SATA-3, self-encrypting drive (SED), Opal 2, TLC	L67398-001
	256 GB, PCIe, TLC	L67399-001
	256 GB, PCIe	L67400-001
	128 GB, SATA-3, TLC	L67398-001
(5)	**USB bracket**	L67425-001
(6)	**Heat sink with fan** (includes replacement thermal material)	L67416-001
(7)	**System board** (includes integrated processor, heat sink, and replacement thermal material) (see System board on page 60)	
	Intel Core i5-8665U processor and 16 GB of system memory	L67395-601
	Intel Core i5-8665U processor and 8 GB of system memory	L67393-601
	Intel Core i5-8565U processor and 16 GB of system memory	L67394-601
	Intel Core i7-8565U processor and 8 GB of system memory	L67391-601
	Intel Core i7-8365U processor and 16 GB of system memory	L67389-601
	Intel Core i7-8365U processor and 8 GB of system memory	L67390-601
	Intel Core i5-8265U processor and 16 GB of system memory	L67392-601
	Intel Core i7-8265U processor and 8 GB of system memory	L67388-601
(8)	**Speaker Kit** (includes left and right antennas)	
	Includes WLAN antennas	L67428-001

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

Item	Component	Spare part number
	Includes GPS antennas	L67429-001
	Includes WWAN antennas for Intel XMM 7560 LTE-Advanced Pro (CAT 16)	L67430-001
	Includes WWAN antennas for Intel XMM 7360 LTE-Advanced (CAT 9)	L67431-001
	WWAN and WLAN antennas and cables	L67432-001
(9)	**Volume board**	L67419-001
(10)	**Microphone cable**	L67421-001
(11)	**Power button board**	L67420-001
(12)	**Camera module**	
	HD camera (8 MP)	L67411-001
	IR camera (2 MP)	L67412-001
(13)	**IR LED cable**	L67424-001
(14)	**SIM card holder board**	L67418-001
(15)	**SIM card holder cable**	L67423-001
(16)	**Fingerprint reader** (includes cable and bracket)	L67417-001
(17)	**POGO connector and cable**	L67422-001
(18)	**Back cover**	L67414-001
(19)	**Kickstand hinges**	L67415-001
(20)	**Kickstand**	L67409-001

Plastics Kit
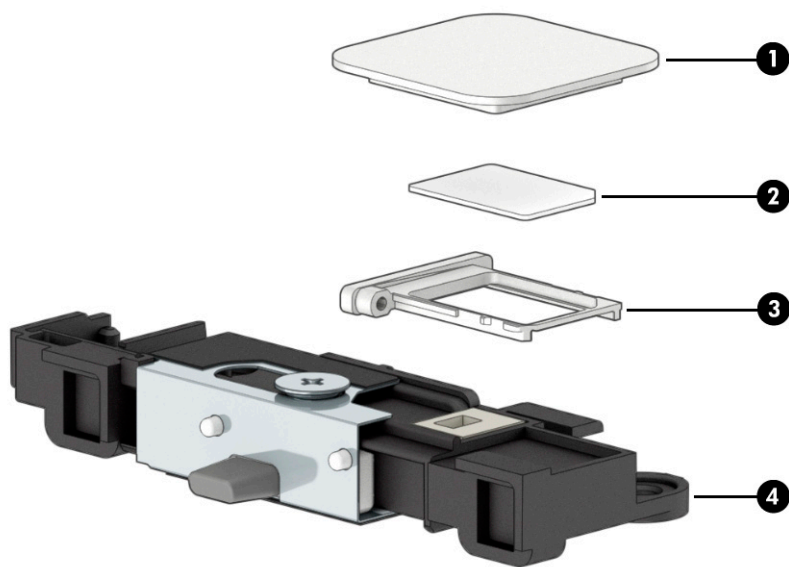
Table 3-2 Plastics Kit components and their descriptions

	Component	Spare part number
	Plastics Kit, includes the following parts:	L67426-001
(1)	Fingerprint reader insert	
(2)	SIM insert	
(3)	SIM tray	
(4)	Camera holder	
	Camera privacy cover (not illustrated)	

Miscellaneous parts

Table 3-3 Miscellaneous parts and their descriptions

Component	Spare part number
AC adapter	
65 W, nPFC, USB-C, slim, straight, 1.8 m	L04650-850
65 W, nPFC, RC, USB-C	L32392-001
Rubber Kit (includes LED rubber, fingerprint reader rubber, and battery rubber)	L67427-001
Screw Kit	L67410-001
Collaboration Travel Keyboard, leather	
For use in Belgium	L67435-A41
For use in Brazil	L67435-xx1
For use in France	L67435-051

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

Component	Spare part number
For use in French Canada	L67435-DB1
For use in Germany	L67435-041
For use in India	L67435-D61
For use internationally	L67435-B31
For use in Japan	L67435-291
For use in Latin America	L67435-161
For use in the Netherlands	L67435-DH1
For use in Portugal	L67435-131
For use in South Korea	L67435-AD1
For use in Spain	L67435-071
For use in Switzerland	L67435-BG1
For use in Taiwan	L67435-AB1
For use in Thailand	L67435-281
For use in the United Kingdom	L67435-031
For use in the United States	L67435-001
HP Collaboration Keyboard	
For use in Belgium	L67436-A41
For use in Brazil	L67436-201
For use in Bulgaria	L67436-261
For use in Canada	L67436-DB1
For use in the Czech Republic and Slovakia	L67436-FL1
For use in Denmark	L67436-081
For use in France	L67436-051
For use in Germany	L67436-041
For use in Greece	L67436-151
For use in Hungary	L67436-211
For use in Iceland	L67436-DD1
For use in India	L67436-D61
For use internationally	L67436-B31
For use in Israel	L67436-BB1
For use in Italy	L67436-061
For use in Japan	L67436-291
For use in Latin America	L67436-161

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

Component	Spare part number
For use in The Netherlands	L67436-DH1
For use in Northwest Africa	L67436-FP1
For use in Norway	L67436-091
For use in Portugal	L67436-131
For use in Romania	L67436-271
For use in Russia	L67436-251
For use in Saudi Arabia	L67436-171
For use in Slovenia	L67436-BA1
For use in South Korea	L67436-AD1
For use in Spain	L67436-071
For use in Sweden and Finland	L67436-B71
For use in Switzerland	L67436-BG1
For use in Taiwan	L67436-AB1
For use in Thailand	L67436-281
For use in Turkey	L67436-141
For use in the United Kingdom and Singapore	L67436-031
For use in the United States	L67436-001
Power cord, duckhead (C5, 1.0 m)	
For use in Argentina	L36815-001
For use in Australia	L36816-001
For use in Brazil	L44789-001
For use in Denmark	L36817-001
For use in Europe	L36818-001
For use in India	L36820-001
For use in Israel	L36819-001
For use in Italy	L44788-001
For use in Japan	L36821-001
For use in North America	L36822-001
For use in the People's Republic of China	L36823-001
For use in South Africa	L36824-001
For use in Taiwan	L36827-001
For use in Switzerland	L36825-001
For use in Thailand	L36826-001

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

Component	Spare part number
For use in the United Kingdom and Singapore	L36828-001
Power cord, duckhead (C5NS)	
For use in Australia	L50818-004
For use in North America	L50818-002
For use in the People's Republic of China	L50818-005
For use in South Korea	L50818-001
For use in the United Kingdom	L50818-003
Power cord (C5, 1.0 m)	
For use in Brazil	L30812-001
For use in Denmark	L22322-001
For use in Europe	L22321-001
For use in India	L22624-001
For use in Israel	L22323-001
For use in Italy	L30813-001
For use in North America	L22319-001
For use in the People's Republic of China	920689-014
For use in South Africa	L30777-001
For use in Switzerland	L22324-001
For use in Thailand	L30779-001
For use in the United Kingdom and Singapore	L22320-001
Power cord (C13, 1.0 m)	
For use in Argentina	L22104-001
For use in Australia	L22339-001
For use in Japan	L22344-001
For use in South Korea	L22340-001
For use in Taiwan	L22342-001

4 Removal and replacement procedures preliminary requirements

Tools required

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

- Magnetic screwdriver
- Phillips #0 screwdriver
- Torx T5 screwdriver
- Non-marking, non-magnetic pry tool
- Suction cup tool

Service considerations

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

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

Plastic parts

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

Cables and connectors

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

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

Drive handling

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

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

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

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

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

Avoid dropping drives from any height onto any surface.

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

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

Avoid exposing a drive to temperature extremes or liquids.

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

Workstation guidelines

Follow these grounding workstation guidelines:

- Cover the workstation with approved static-shielding material.

- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.

- Use conductive field service tools, such as cutters, screw drivers, and vacuums.

- When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.

- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and 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

	Relative humidity		
Event	55%	40%	10%
Walking across carpet	7,500 V	15,000 V	35,000 V
Walking across vinyl floor	3,000 V	5,000 V	12,000 V
Motions of bench worker	400 V	800 V	6,000 V
Removing DIPs (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 MΩ ±10% resistance in the ground cords. To provide proper ground, a strap must be worn snug against bare skin. The ground cord must be connected and fit snugly into the banana plug connector on the grounding mat or workstation.

- **Heel straps/Toe straps/Boot straps** can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use them on both feet with a maximum of 1 MΩ ±10% resistance between the operator and ground.

Table 4-2 Static shielding protection levels

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

Grounding the work area

To prevent static damage at the work area, 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 MΩ ±10% resistance

- Static-dissipative table or floor mats with hard tie to ground

- Field service kits

- Static awareness labels

- Wrist straps and footwear straps providing 1 MΩ ±10% resistance

- Material handling packages

- Conductive plastic bags

- Conductive plastic tubes

- Conductive tote boxes

- Opaque shielding bags

- Transparent metallized shielding bags

- Transparent shielding tubes

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe tubes, bags, or boxes.

- Protect ESD-sensitive parts and assemblies with conductive or approved containers or packaging.

- Keep ESD-sensitive parts in their containers until the parts arrive at static-free workstations.

- Place items on a grounded surface before removing items from their containers.

- Always be properly grounded when touching a component or assembly.

- Store reusable ESD-sensitive parts from assemblies in protective packaging or nonconductive foam.

- Use transporters and conveyors made of antistatic belts and roller bushings. Be sure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

5 Removal and replacement procedures for Customer Self-Repair parts

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

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

Component replacement procedures

NOTE: Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer. See Labels on page 20 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 four screws that must be removed, replaced, and/or loosened when servicing Customer Self-Repair parts. Make special note of each screw size and location during removal and replacement.

Preparation for disassembly

See Removal and replacement procedures preliminary requirements on page 30 for initial safety procedures.

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

Kickstand

Table 5-1 Kickstand description and part number
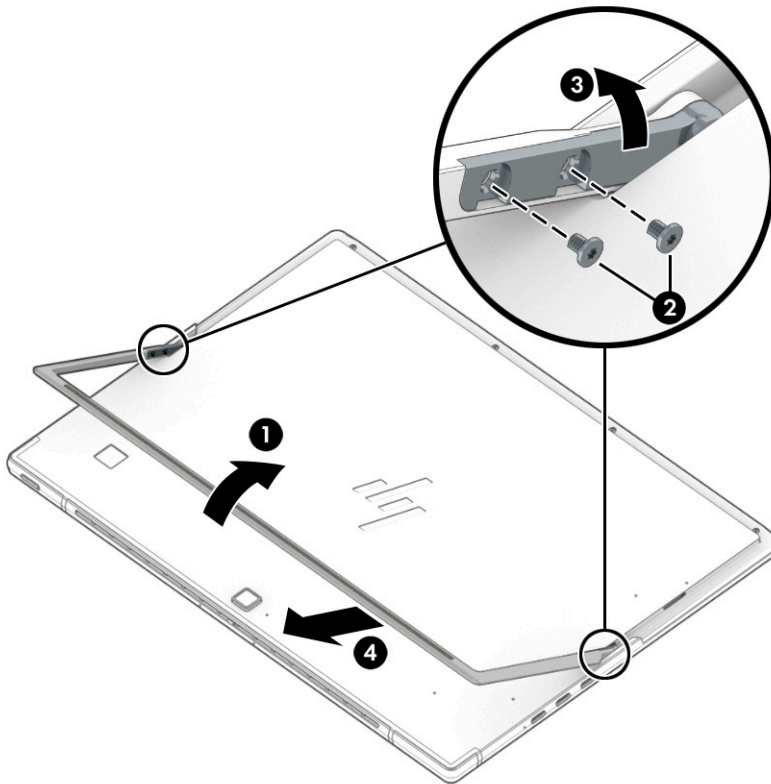
Description	
Kickstand	L67409-001

Before removing the kickstand, follow these steps:

▲ Prepare the computer for disassembly (Preparation for disassembly on page 35).

Remove the kickstand:

1. Lift the kickstand **(1)**.

2. Remove two Torx T5 1.8 × 2.5 screws from each side of the kickstand **(2)**.

3. Pull the sides of the kickstand away from the computer **(3)**, and then remove the kickstand **(4)**.

Reverse this procedure to replace the kickstand.

6 Removal and replacement procedures for authorized service provider parts

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

NOTE: 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.

Component replacement procedures

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 38 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.

Display panel

Table 6-1 Display panel and back cover descriptions and part numbers

| Description	Spare part number
Back cover	L67414-001
Display panel, WUXGA+	L67406-001
Display panel, WUXGA+, privacy	L67408-001
Display panel, 3k × 2k	L67407-001

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

Before removing the display panel, follow these steps:

▲ Prepare the computer for disassembly ().
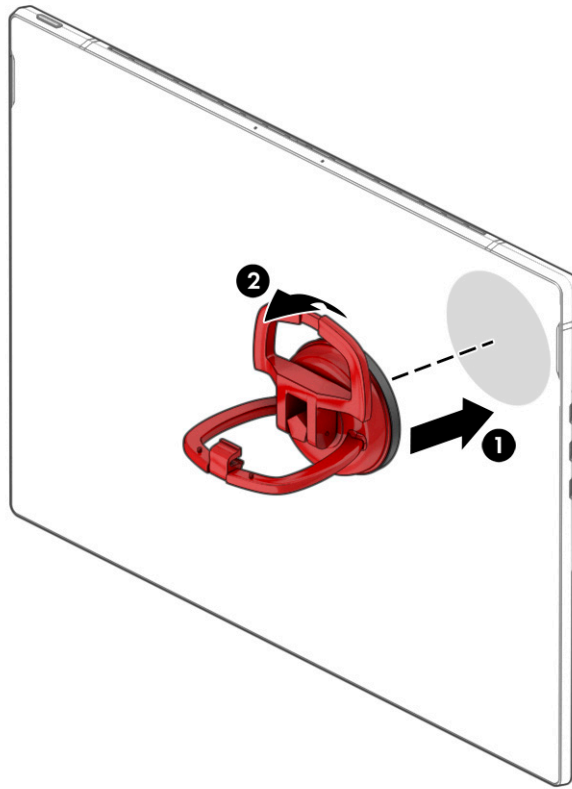
Remove the display panel:

1. Lift the kickstand **(1)**, and then remove the four Torx T5 1.8 × 2.0 screws **(2)** securing the back cover.
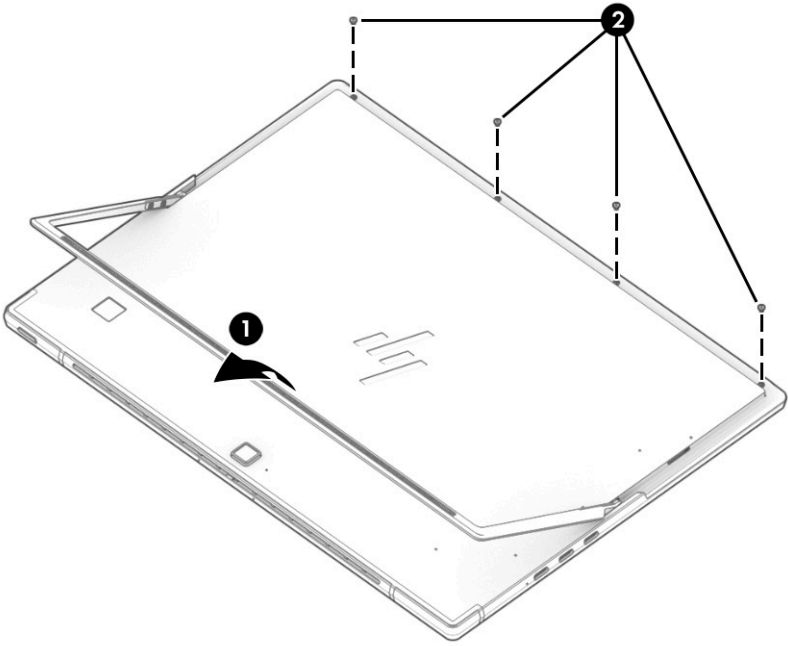
2. Position a suction tool at the top corner of the display panel **(1)**, and then rotate the locking lever to lock the cup **(2)**.

IMPORTANT: The display panel is fragile. Be sure to use no more force than necessary when removing the panel.

3. To remove the panel evenly, secure the suction tool to each corner of the display panel, and then pull the suction tool handle **(1) – (4)** to release each section of the panel from the computer. the top of the panel from the computer.

4. Rotate the top of the panel down enough to access the cables underneath **(5)**.

> **IMPORTANT:** Cables connect the panel to the computer. Be careful not to disconnect the cables when rotating the panel.
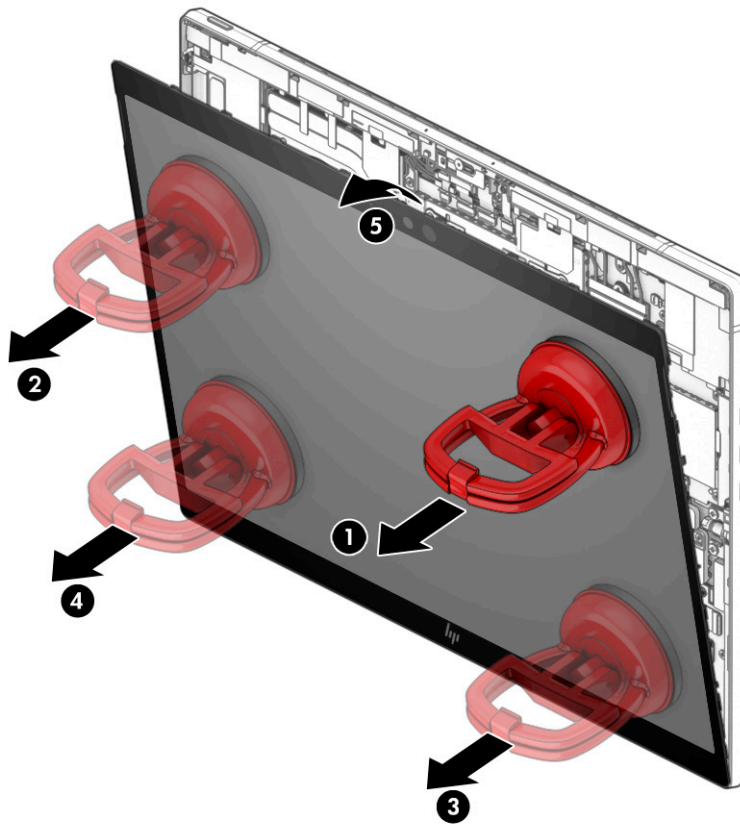
5. Lift the panel **(1)**.

> **IMPORTANT:** Be careful when opening to avoid tearing cables. Be sure to open from the top.

6. Disconnect the battery cable **(2)** from the system board.

7. Remove the tape from the display cable connector **(3)**, and then disconnect the display cable **(4)** from the system board.

8. Remove the tape from the touch cable connector **(5)**, and then disconnect the touch cable from the system board **(6)**.
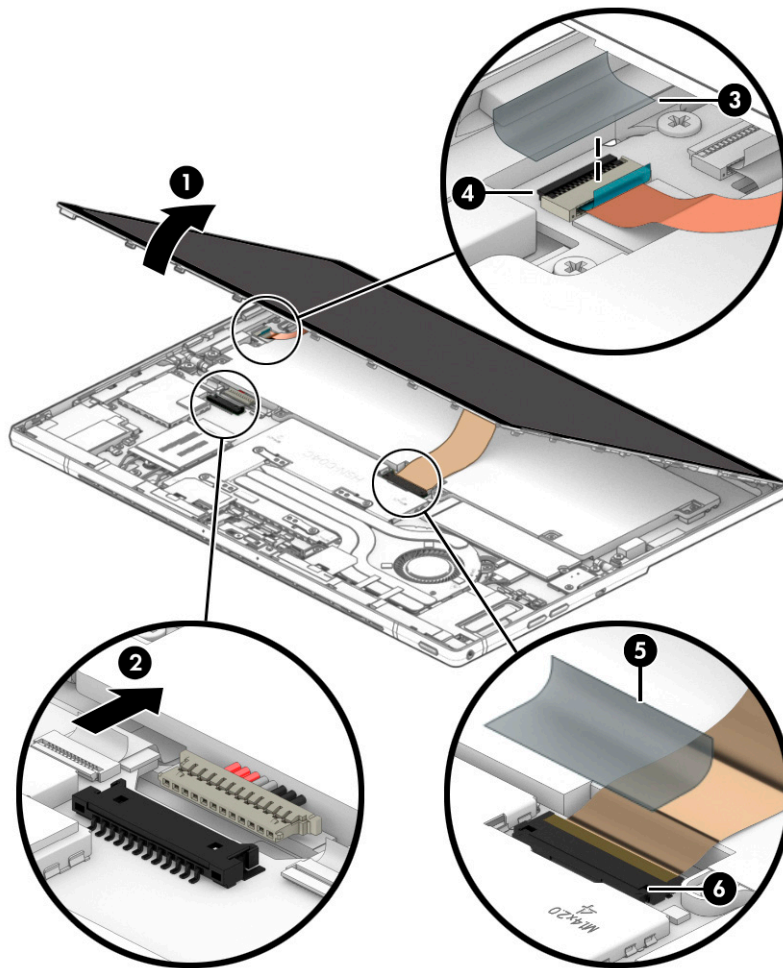
Reverse this procedure to replace the display panel.

Battery

Table 6-2 Battery description and part number

Description	Spare part number
Battery (2 cell, 47 Wh)	L46601-005

Before removing the battery, follow these steps:

1. Prepare the computer for disassembly ().

2. Remove the following components:

   ▲ Display panel (see)

Remove the battery:

⚠ **WARNING!** To avoid personal injury and damage to the product, use extreme care not to puncture, twist, or crack the battery. A puncture or rupture of the battery internally can cause a short with the battery bursting into flames.

1. Disconnect the battery cable from the system board **(1)**.

2. Remove the six Phillips M2.5 × 3.0 screws **(2)** that secure the battery to the computer.

3. Carefully rotate the top of the battery up **(1)**, and the lift the battery out of the computer **(2)**.
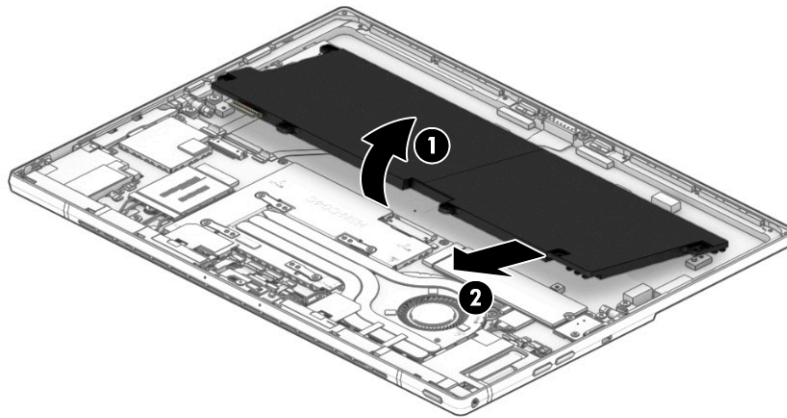
Reverse this procedure to replace the battery.

Solid-state drive

Table 6-3 Solid-state drive descriptions and part numbers

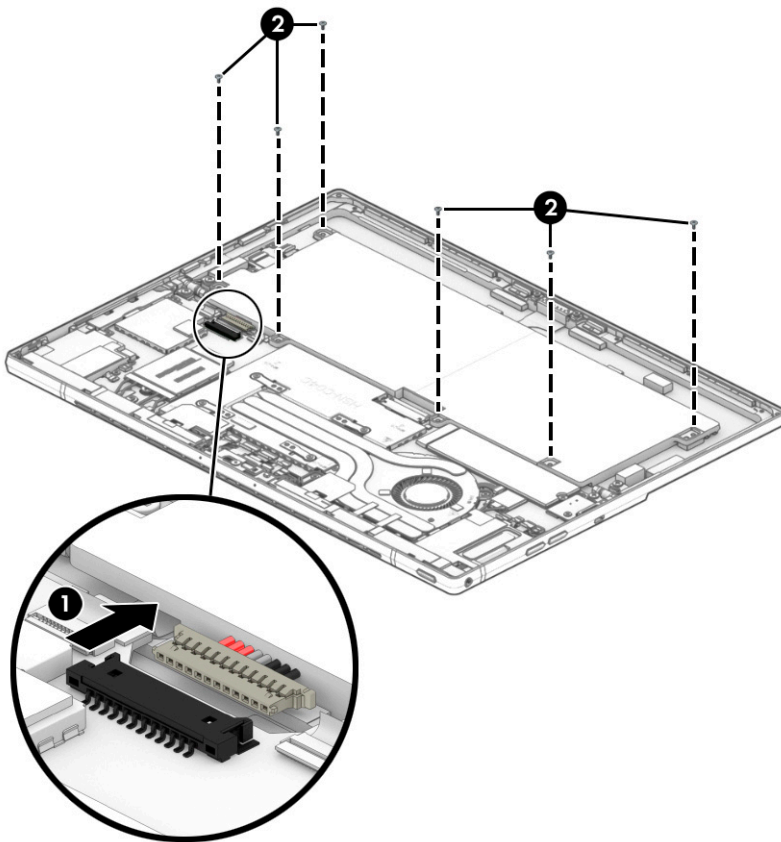| Description	Spare part number
2 TB, PCIe, TLC	L67401-001
1 TB, PCIe, TLC	L67397-001
512 GB, PCIe, TLC + 32 GB Optane memory	L67405-001
512 GB, SATA-3, self-encrypting drive (SED), Opal 2, TLC	L674021-001
512 GB, PCIe, TLC	L67403-001
512 GB, PCIe	L67404-001
256 GB, SATA-3, self-encrypting drive (SED), Opal 2, TLC	L67398-001
256 GB, PCIe, TLC	L67399-001
256 GB, PCIe	L67400-001
128 GB, SATA-3, TLC	L67398-001

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

1. Prepare the computer for disassembly (Preparation for disassembly on page 35).

2. Remove the following components:

   a. Display panel (see Display panel on page 38)

   b. Disconnect the battery cable (see Battery on page 42)

Remove the solid-state drive:

▲ Remove the Phillips M1.6 × 1.6 screw **(1)**, and then remove the solid-state drive **(2)**.

> **IMPORTANT:** Be sure to use the correct size screwdriver to avoid stripping the screw.

Reverse this procedure to replace the solid-state drive.

SIM card holder board

Table 6-4 **SIM card holder board description and part number**

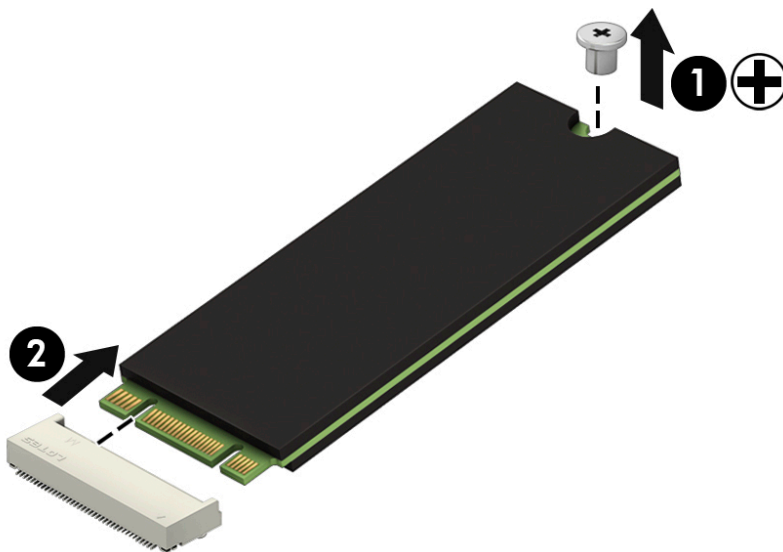| Description	Spare part number
SIM card holder board	L67418-001
SIM card holder cable	L67423-001

Before removing the SIM card holder board, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 35).

2. Remove the following components:

    a. Display panel (see Display panel on page 38)

    b. Disconnect the battery cable (see Battery on page 42)

Remove the SIM card holder board:

1. Remove the SIM card and tray.

2. Disconnect the cable from the ZIF connector on the system board **(1)**.

3. Peel the cable off the computer chassis **(2)**.

4. Remove the two Phillips M1.4 × 1.6 screws **(3)** that secure the board.

5. Remove the board from the computer **(4)**.
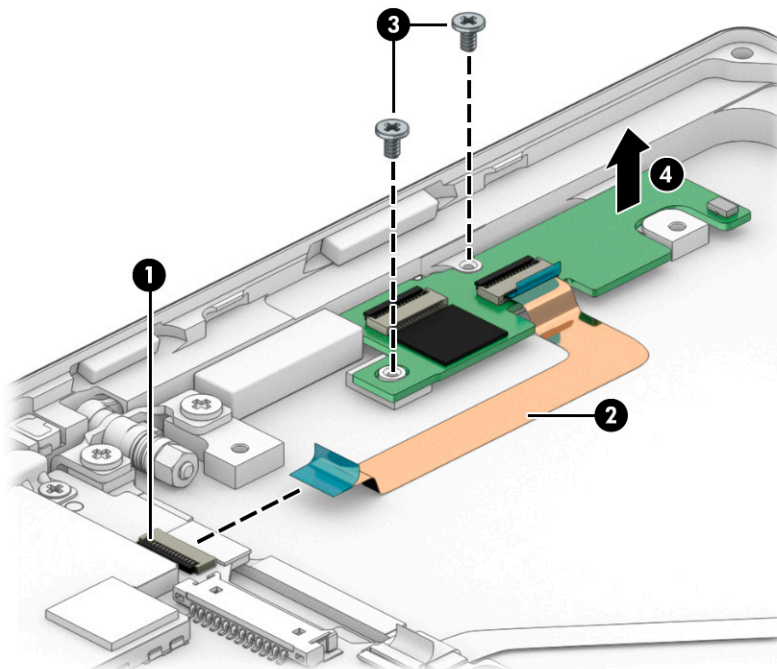
Reverse this procedure to replace the SIM card holder board.

Kickstand hinges

Table 6-5 Kickstand hinge description and part number

Description	
Kickstand hinges	L67415-001

Before removing the kickstand hinges, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 35).

2. Remove the following components:

   a. Kickstand (see Kickstand on page 35)

   b. Display panel (see Display panel on page 38)

Remove the kickstand hinges:

1. From the bottom, rotate the hinges up **(1)**.

2. Remove the two Phillips M2.0 × 3.0 screws from each kickstand hinge **(2)**, and then remove the hinges **(3)**. Pull the hinges through the holes in the chassis to remove them.
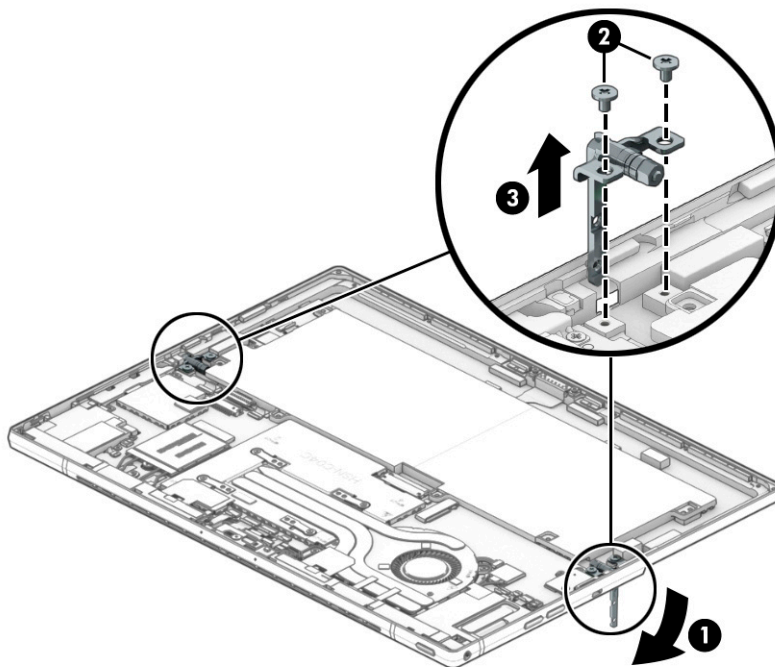
Reverse this procedure to replace the kickstand hinges.

WWAN module (select products only)

Table 6-6 WWAN module descriptions and part numbers

Description	Spare part number
Intel XMM 7360 LTE-Advanced (CAT 9)	L15398-006
Intel XMM 7560 LTE-Advanced Pro (CAT 16)	L27188-005
WWAN protective tape kit	L67434-001

Before removing the WWAN module, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 35).

2. Remove the following components:

   a. Display panel (see Display panel on page 38)

   b. Battery (see Battery on page 42)

Remove the WWAN module:

1. Remove the protective strip from on top of the antenna connectors **(1)**.

   📝 **IMPORTANT:** Be sure to keep the protective strip to reinstall when installing the WWAN module.

2. Disconnect the antenna cables **(2)**.

3. Using a Phillips #0 screwdriver, remove the Phillips M1.6 × 1.6 screw **(3)**, and then remove the module **(4)**.

   📝 **IMPORTANT:** Be sure to use the correct size screwdriver to avoid stripping the screw.
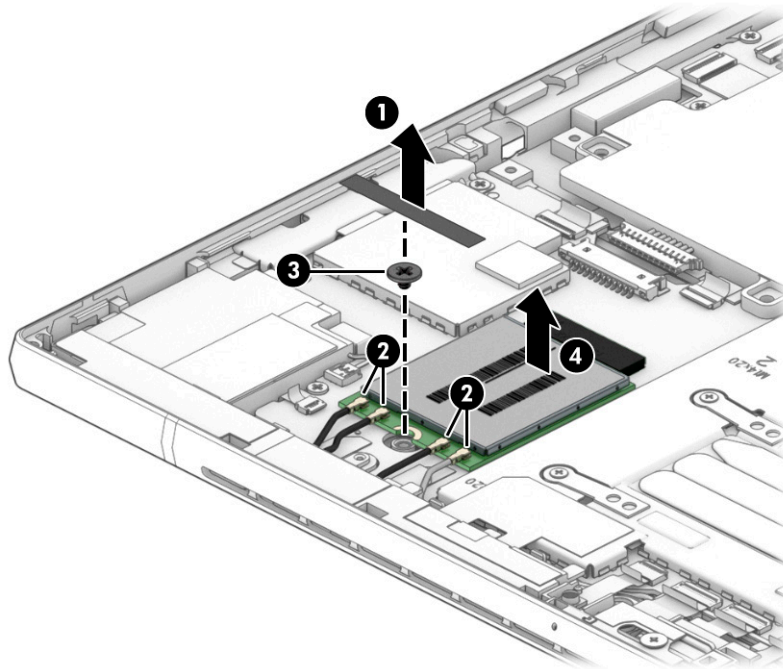
NOTE: If the antenna cables are not connected to the terminals on the module, protective sleeves should be installed on the antenna connectors, as shown in the following illustration.

Reverse this procedure to replace the WWAN module.

POGO connector

Description	Spare part number
POGO connector and cable	L67422-001

1. Prepare the computer for disassembly (Preparation for disassembly on page 35).

2. Remove the following components:

   a. Display panel (see Display panel on page 38)
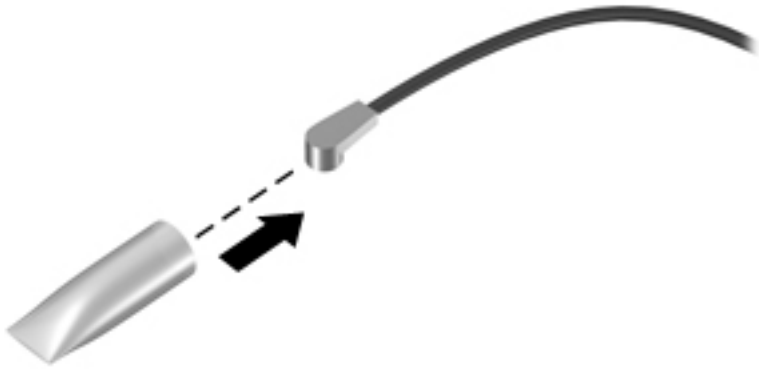
   b. Battery (see Battery on page 42)

Remove the POGO connector:

1. Disconnect the POGO cable from the ZIF connector on the system board **(1)**.

2. Remove the two Phillips M1.6 × 2.4 screws **(2)**.

   📝 **IMPORTANT:** Be sure to use the correct size screwdriver to avoid stripping the screw.

3. Peel the cable up to disengage the adhesive that secures it to the computer **(3)**, and then remove the POGO connector from the computer **(4)**.
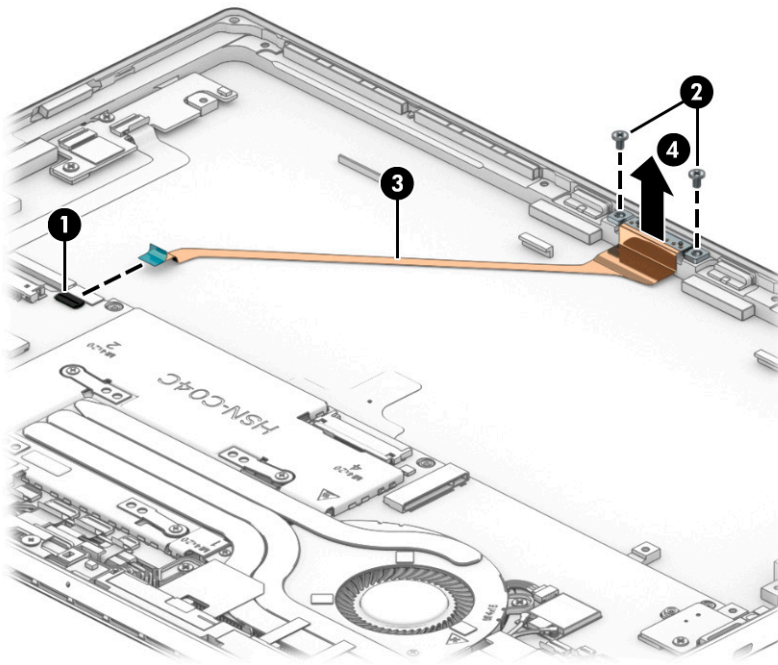
Reverse this procedure to replace the POGO connector.

Camera module

Table 6-8 Camera modules and cables descriptions and part numbers

Description	Spare part number
IR camera (2 MP)	L67412-001
HD camera (8 MP)	L67411-001
Microphone cable	L67421-001
IR LED cable	L67424-001

Before removing the camera module, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 35).

2. Remove the following components:

   a. Display panel (see Display panel on page 38)

   b. Battery (see Battery on page 42)

Remove the camera:

IMPORTANT: Use care to prevent damaging the zero-insertion force (ZIF) connector and ribbon cable.

1. Disconnect the four cables from the ZIF connectors on the camera module **(1)**.

2. Using a Phillips #0 screwdriver, remove the two Phillips M1.6 × 2.4 screws **(2)** that secure the module to the computer, and then remove the module from the computer **(3)**.
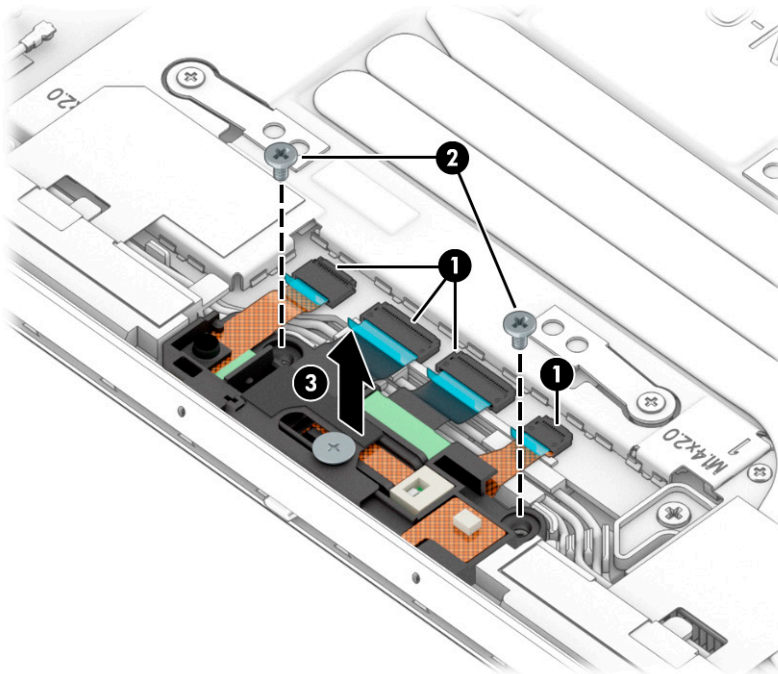
3. If you need to remove the IR LED cable or the microphone cable from the camera module:

   a. **IR LED cable**: Pull the cable straight up and off the camera module **(1)**.

b. **Microphone cable**: Remove the screw **(2)**, slide the privacy cover off the module **(3)**, and then rotate the microphone module **(4)** to remove it from the bottom of the camera module **(5)**
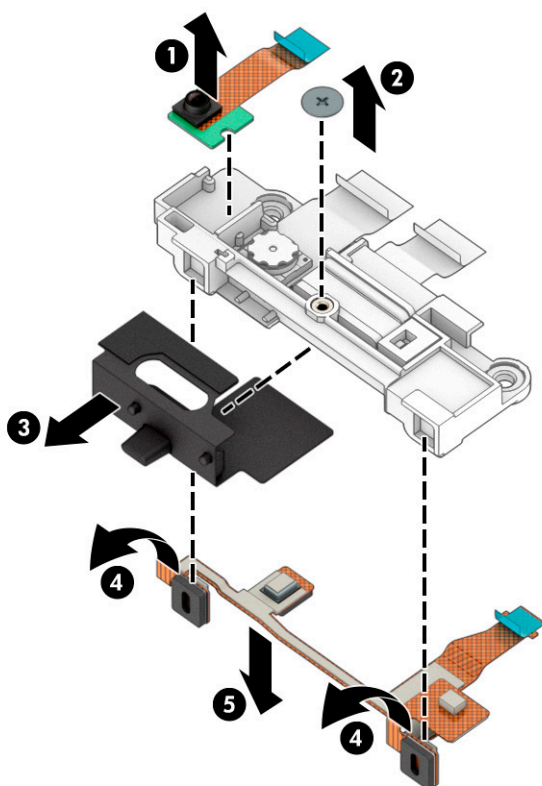
Reverse this procedure to replace the camera module and its components.

Speakers with antennas

Table 6-9 Speakers with antennas descriptions and part numbers

Description	Spare part number
Antennas, WLAN and WWAN	L67432-001
Speakers with WLAN antennas	L67428-001
Speakers with GPS antennas	L67429-001
Speakers with WWAN antennas for Intel XMM 7560 LTE-Advanced Pro (CAT 16)	L67430-001
Speakers with WWAN antennas for Intel XMM 7360 LTE-Advanced (CAT 9)	L67431-001

Before removing the speakers, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 35).

2. Remove the following components:

    a. Display panel (see Display panel on page 38)

    b. Battery (see Battery on page 42)

Remove the speakers with antennas:

1. Disconnect the speaker cable from the system board **(1)** near the WWAN module.

2. Lift the protective strip from the top of the antenna connectors on the WWAN module **(2)**, and then disconnect the WWAN antennas from the WWAN module **(3)**.

3. Disconnect the speaker cable from the system board **(4)** near the integrated WLAN module.

4. Disconnect the WLAN antennas from the WLAN module **(5)**.
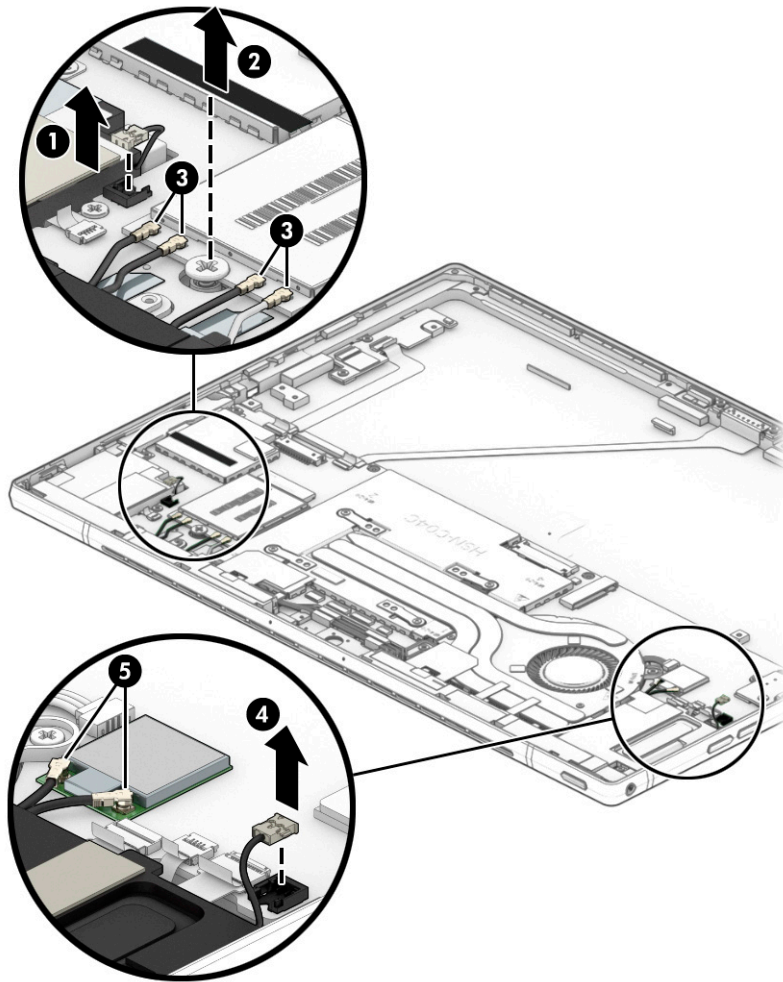
5. Peel the WLAN antennas off the heat sink **(1)**.

6. Peel the two strips of tape off the heat sink and from near the WWAN module **(2)**.

7. Remove the antenna cables from the routing insulators **(3)**.

8. Use a tool to release the left speaker from the adhesive that secures it **(4)**.

9. Remove the speakers from the computer **(5)**.
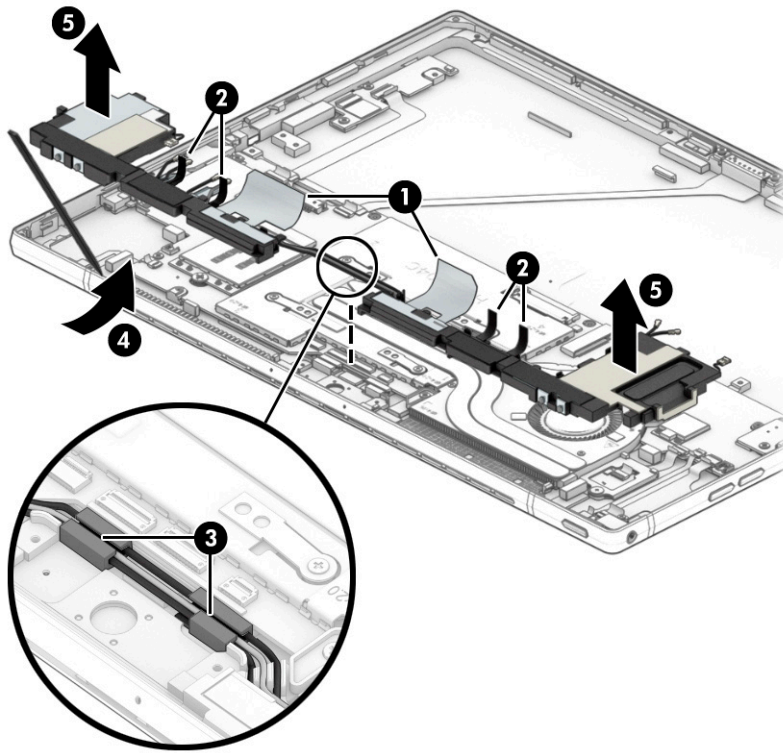
Reverse this procedure to replace the speakers with antennas.

Use the following illustrations to help with installing the antennas and speakers:

(1) Computer notches

(2) Speaker snaps
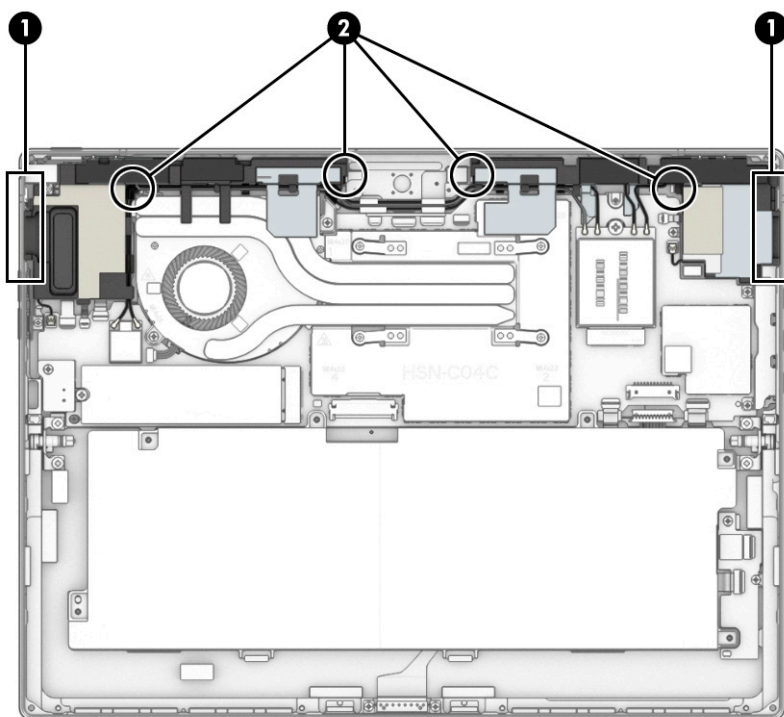
To install the number 1 antenna cable, insert the cable into the slots **(1)** and **(2)**, and then place the contact over the cable **(3)**.
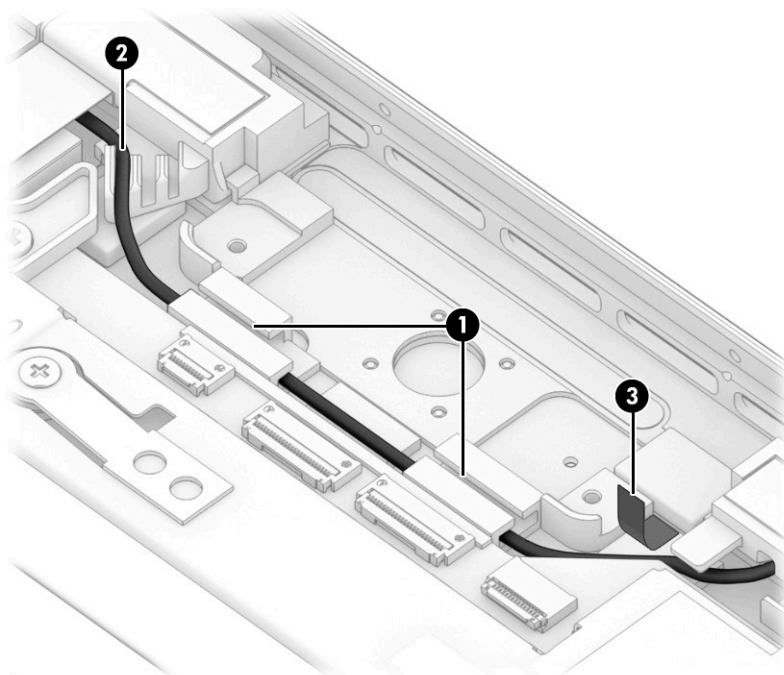
To install the number 6 and 8 antenna cables, insert the cables into the slots **(1)** and **(2)**, and then place the contact over the cables **(3)**.
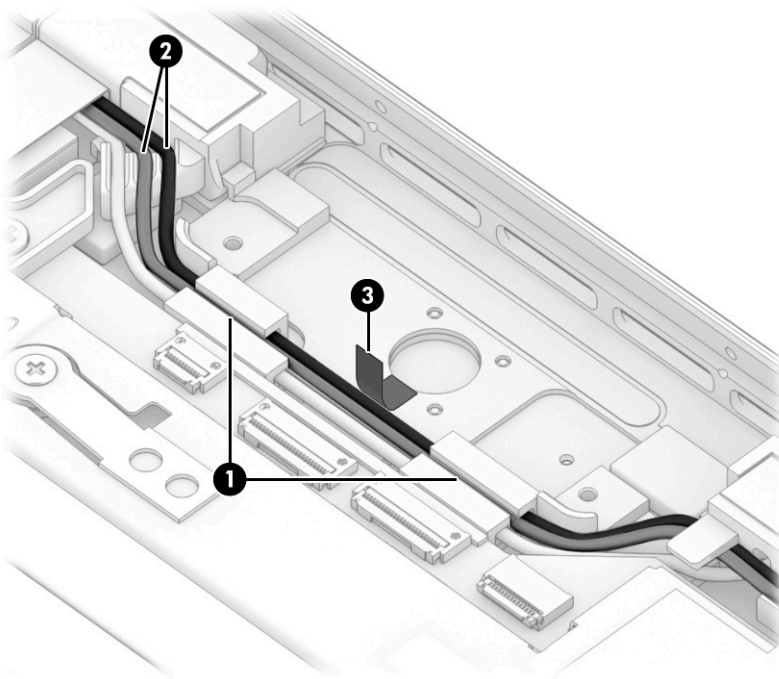
When installing the right speaker, lift the right side of the speaker **(1)**, and insert the notch on the speaker into the snap in the computer **(2)**.
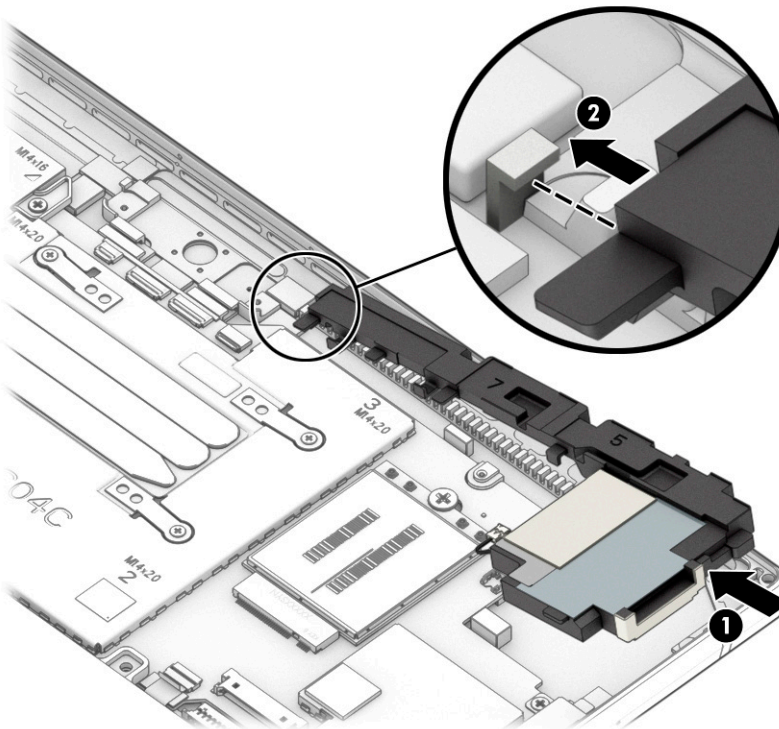
To install the left speaker, insert the speaker into the computer **(1)**, place the notch on the speaker **(2)** into the snap in the computer **(3)**, and then make sure the left channel of the speaker fits under the left notch in the computer **(4)**.
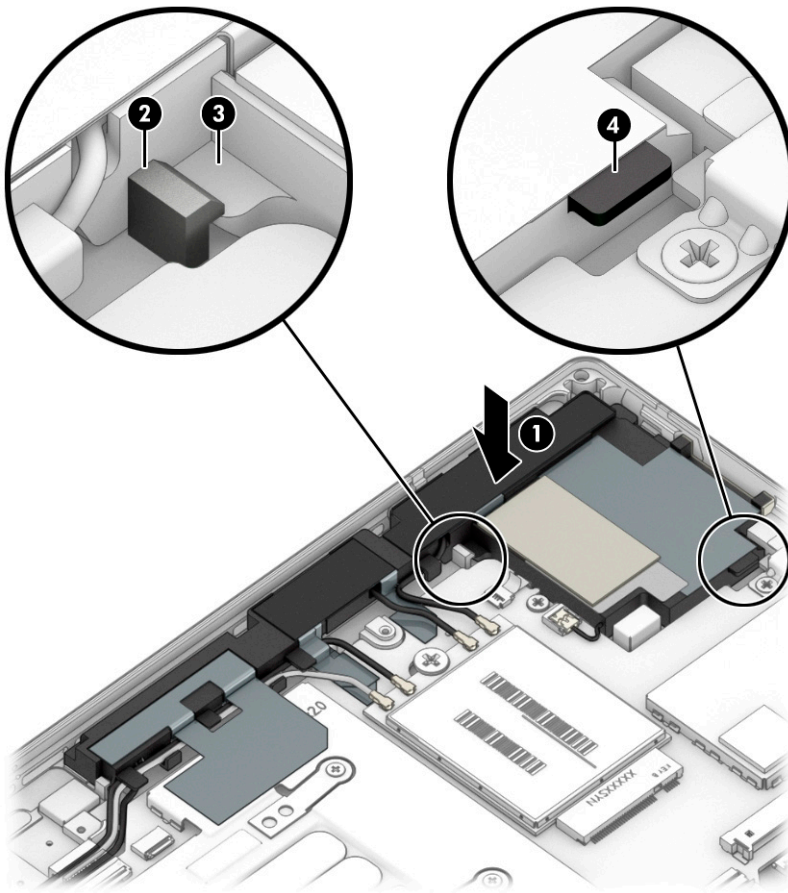
Power button board

Table 6-10 Power button board description and part number

Description	Spare part number
Power button board	L67420-001

Before removing the power button board, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 35).

2. Remove the following components:

   a. Display panel (see Display panel on page 38)

   b. Battery (see Battery on page 42)

   c. Left speaker (see Speakers with antennas on page 52)

Remove the power button board:

1. Disconnect the cable from the ZIF connector on the power button board **(1)**.

2. Remove the Phillips M1.6 × 1.6 screw from the board **(2)**.

3. Remove the Phillips M1.6 × 2.4 screw from the bracket **(3)**.

4. Lift the assembly out of the computer **(4)**.
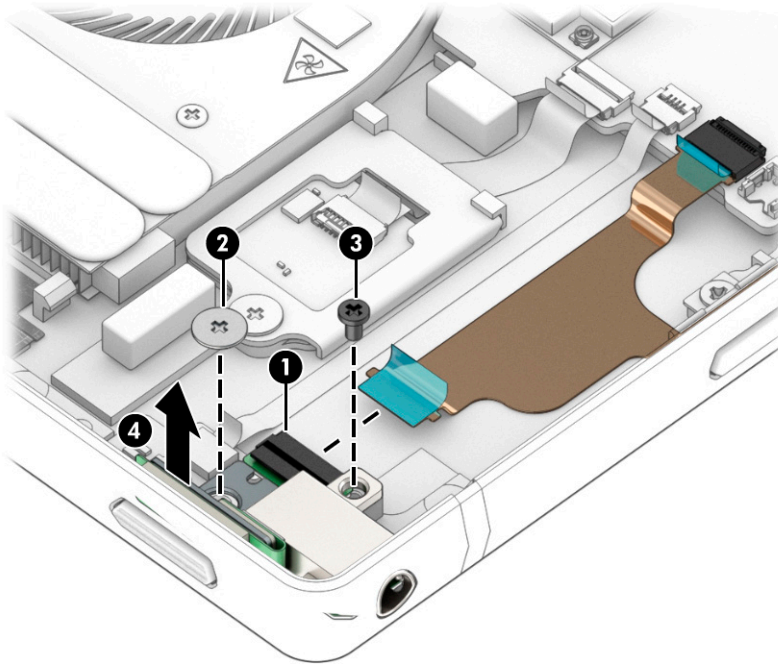
Reverse this procedure to replace the power button board.

Volume board

Description	Spare part number
Volume board	L67419-001

Before removing the volume board, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 35).

2. Remove the following components:

   a. Display panel (see Display panel on page 38)

   b. Battery (see Battery on page 42)

   c. Left speaker (see Speakers with antennas on page 52)

Remove the volume board:

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

2. Disconnect the cable from the power button board **(2)**.

3. Remove the two Phillips M1.6 × 2.0 screws **(3)** that secure the assembly to the computer.

4. Remove the assembly from the computer **(4)**.
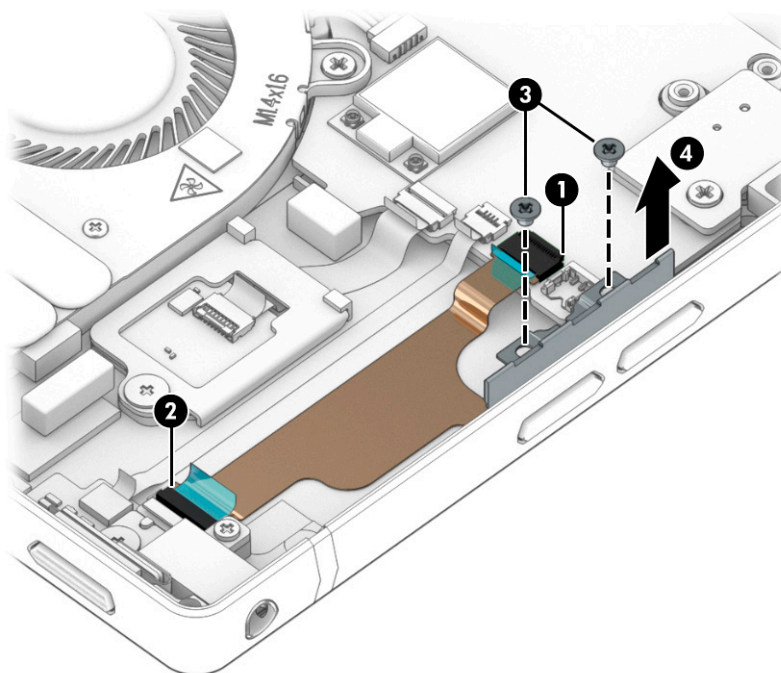
Reverse this procedure to replace the volume board.

System board

📝 **NOTE:** All system board spare part kits include integrated processor, heat sink, and replacement thermal material)

Table 6-12 System board descriptions and part numbers

Description	Spare part number
Intel Core i5-8665U processor and 8 GB of system memory	L67393-601
Intel Core i5-8565U processor and 16 GB of system memory	L67394-601
Intel Core i5-8665U processor and 16 GB of system memory	L67395-601
Intel Core i7-8565U processor and 8 GB of system memory	L67391-601
Intel Core i7-8365U processor and 16 GB of system memory	L67389-601
Intel Core i7-8365U processor and 8 GB of system memory	L67390-601
Intel Core i5-8265U processor and 16 GB of system memory	L67392-601
Intel Core i7-8265U processor and 8 GB of system memory	L67388-601
USB bracket	L67425-001

Before removing the system board, follow these steps:

1. Prepare the computer for disassembly ().

2. Remove the following components:

   a. Display panel (see)

   b. Battery (see)

   c. Solid-state drive (see)

Remove the system board:

1. Disconnect the following cables from the system board:

   (1) SIM card holder board cable

   (2) POGO cable

   (3) WLAN antenna cables

   (4) Fingerprint reader cable

   (5) Hall effect board cable

   (6) Headphone/power button board cable

   (7) Speaker cable

   (8) Microphone cable

   (9) Camera cable

   (10) Camera cable

   (11) IR LED cable

   (12) WWAN module antenna cables

(13) Hall effect board cable

(14) Speaker cable
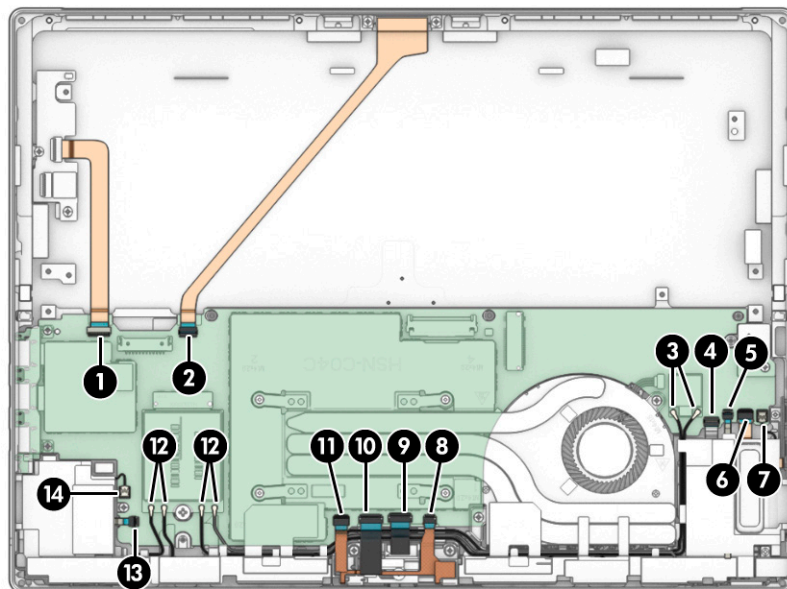
2. On models with a SIM card installed, remove the SIM tray.

📝 **NOTE:** If a SIM blank is installed, you must remove it after removing the system board.

3. Peel the two strips of tape off the heat sink and from near the WWAN module **(1)**.

4. Peel the WLAN antennas off the heat sink **(2)**.

📝 **IMPORTANT:** Use extreme care when peeling up the WLAN antennas. Keep them as flat (not wrinkled) as possible.

5. Remove the three Phillips M1.0 × 1.6 screws **(3)**.

6. Remove the two Phillips M1.6 × 2.4 screws **(4)** from the USB bracket, and then remove the bracket **(5)**.
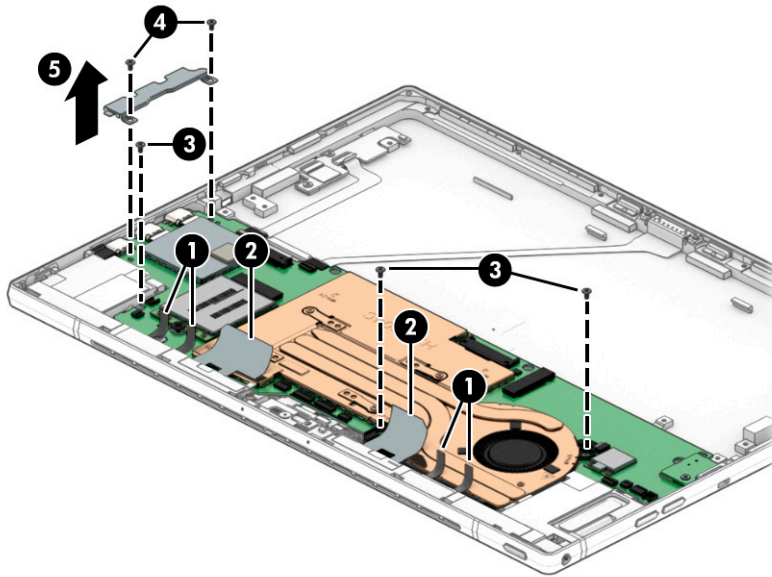
7. Lift the right edge of the system board **(1)**, and then pull it away from the connectors to remove it **(2)**.
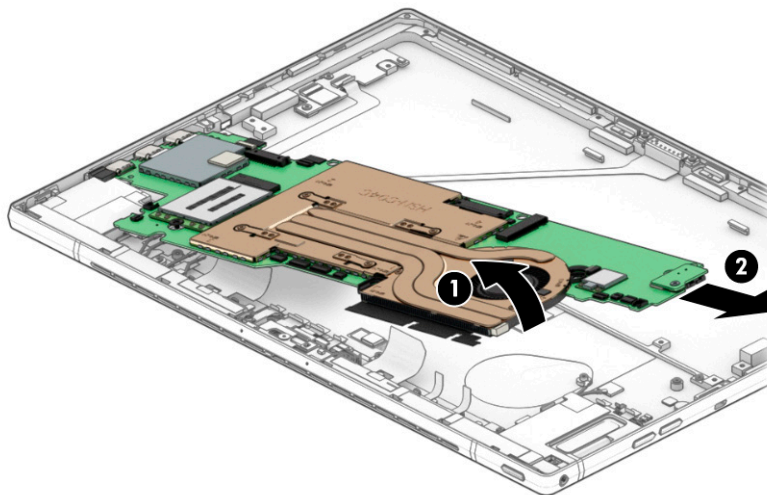
IMPORTANT: A BIOS board is connected to the system board as shown in the following image. **Do not remove this board** when removing the system board.
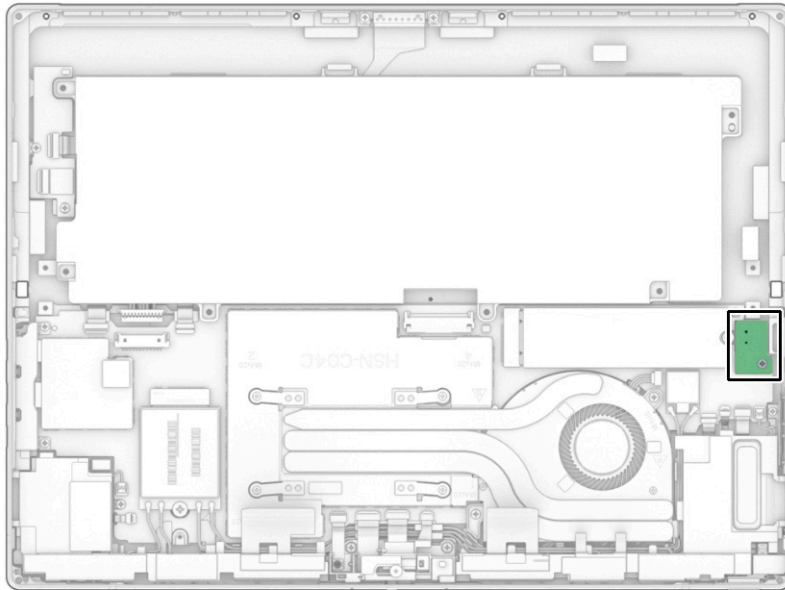
Reverse this procedure to replace the system board.

Heat sink with fan

Table 6-13 Heat sink with fan description and part number

| Description	Spare part number
Heat sink with fan (includes replacement thermal material)	L67416-001

1. Prepare the computer for disassembly (Preparation for disassembly on page 35).

2. Remove the following components:

   a. Display panel (see Display panel on page 38)

   b. Battery (see Battery on page 42)

   c. Solid-state drive (see Solid-state drive on page 44)

   d. System board (see System board on page 60)

Remove the heat sink from the system board:

1. Disconnect the fan cable from the system board **(1)**.

2. In the order indicated on the heat sink, loosen the four captive Phillips M1.6 × 2.5 screws **(2)** that secure the heat sink to the system board.

3. Use a tool to release the heat sink from the system board **(3)**.

4. Remove the heat sink from the system board **(4)**.
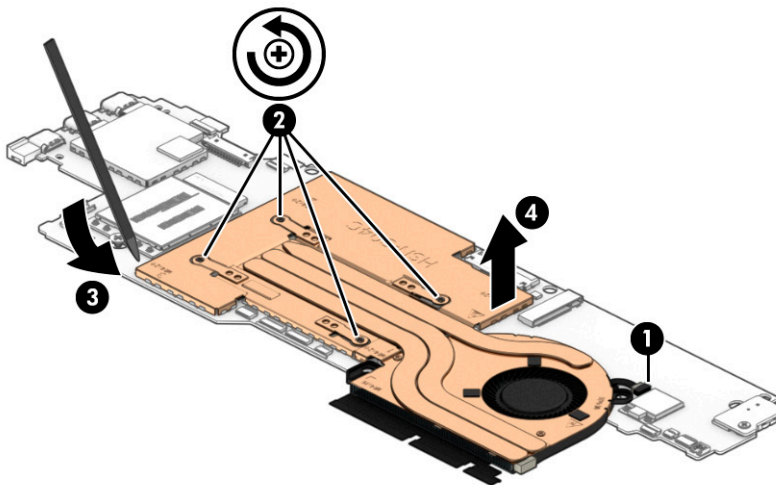
5. Thoroughly clean the thermal material from the surfaces of the heat sink and the system board components each time the heat sink is removed. Replacement thermal material is included with the heat sink and system board spare part kits.

IMPORTANT: Failure to remove and replace old thermal pads when removing and replacing the heat sink can result in reduced thermal function.

Thermal grease is used on the system board component shown by callout **(1)** and associated location on the heat sink **(2)**. Thermal pads are used on the system board **(3)** and associated locations on the heat sink **(4)**.
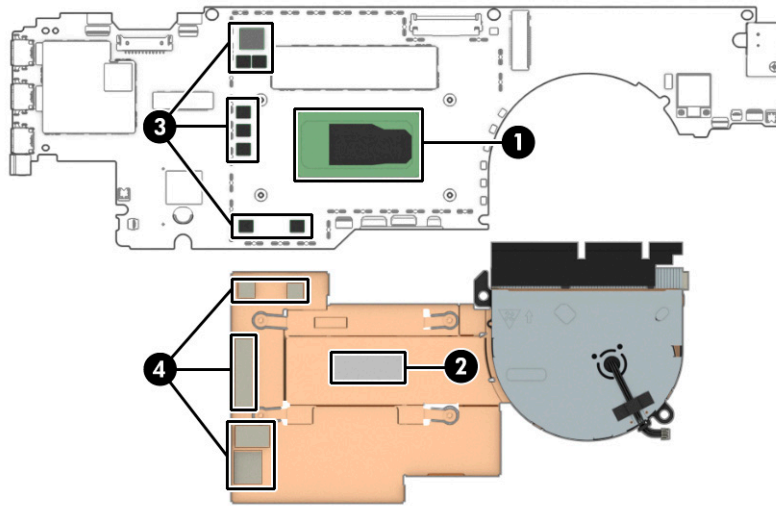
Reverse this procedure to replace the heat sink with fan.

Fingerprint reader board

Fingerprint reader board description and part number

Description	Spare part number
Fingerprint reader board (includes bracket and cable)	L67417-001
Fingerprint reader insert (for use in models without a fingerprint reader)	L67426-001 (Plastics Kit)

Before removing the fingerprint reader board, follow these steps:

1. Prepare the computer for disassembly ().

2. Remove the following components:

   a. Display panel (see)

   b. Battery (see)

   c. Solid-state drive (see)

   d. WWAN module (see)

   e. System board (see)

   f. Right speaker (see)

Remove the fingerprint reader board:

1. Remove the Phillips M1.6 × 1.6 screw that secures the bracket to the computer **(1)**.

2. Lift the bracket off the fingerprint reader **(2)**.

3. Use a tool to lift the fingerprint reader board **(3)** to release it from the adhesive securing it, and then remove the fingerprint reader board.
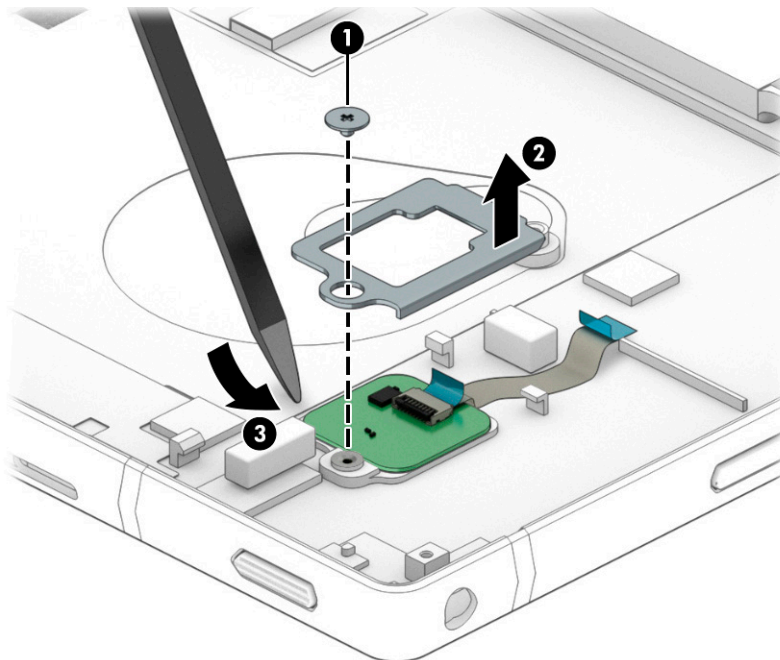
Reverse this procedure to replace the fingerprint reader board.

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 67).

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

- **Creating recovery media** (select products only)—You can use the HP Cloud Recovery Download Tool (select products only) to create recovery media (see Using the HP Cloud Recovery Download Tool to create recovery media (select products only) on page 67).

- **Restoring and recovery**—Windows offers several options for restoring from backup, refreshing the computer, and resetting the computer to its original state (see Using Windows tools on page 67).

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

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

Backing up information and creating recovery media

Using Windows tools

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

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

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

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

1. Select the **Start** button, and then select the **Get Help** app.

2. Enter the task you want to perform.

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

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

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

To download the tool:

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

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

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

Restoring and recovery

Restoring, resetting, and refreshing using Windows tools

Windows offers several options for restoring, resetting, and refreshing the computer. For details, see Using Windows tools on page 67.

Recovering using HP Recovery media

HP Recovery media is used to recover the original operating system and software programs that were installed at the factory. On select products, it can be created on a bootable USB flash drive using the HP Cloud Recovery Download Tool. For details, see Using the HP Cloud Recovery Download Tool to create recovery media (select products only) on page 67.

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

To recover your system:

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

Changing the computer boot order

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

To change the boot order:

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

1. Insert the HP Recovery media.

2. Access the system **Startup** menu.

   For computers or tablets with keyboards attached:

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

   For tablets without keyboards:

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

      – or –

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

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

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 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 .

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 may 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 may be available on the HP website.

Most BIOS updates on the HP website are packaged in compressed files called *SoftPaqs*.

Some download packages contain a file named Readme.txt, which contains information regarding installing and troubleshooting the file.

Determining the BIOS version

To decide whether you need to update Computer Setup (BIOS), first determine the BIOS version on your computer.

BIOS version information (also known as *ROM date* and *System BIOS*) can be accessed 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 70.

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 71.

Downloading a BIOS update

CAUTION: To reduce the risk of damage to the computer or an unsuccessful installation, download and install a BIOS update only when the computer is connected to reliable external power using the AC adapter. Do not download or install a BIOS update while the computer is running on battery power, docked in an optional docking device, or connected to an optional power source. During the download and installation, follow these instructions:

Do not disconnect power 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 may need this information to locate the update later, after it has been downloaded to your hard drive.

b. Follow the on-screen instructions to download your selection to the hard drive.

   Make a note of the path to the location on your hard drive where the BIOS update is downloaded. You will need to access this path when you are ready to install the update.

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/usage of TPM which violates the above 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 .

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. 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.

9 Using HP PC Hardware Diagnostics

Using HP PC Hardware Diagnostics Windows (select products only)

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

If HP PC Hardware Diagnostics Windows is not installed on your computer, first you must download and install it. To download HP PC Hardware Diagnostics Windows, see Downloading HP PC Hardware Diagnostics Windows on page 74.

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:** If you need to stop a diagnostic test at any time, select **Cancel**.

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

- A Failure ID link is displayed. Select the link and follow the on-screen instructions.

- A Quick Response (QR) code is displayed. With a mobile device, scan the code and then follow the on-screen instructions.

- Instructions for calling support are displayed. Follow those instructions.

Downloading HP PC Hardware Diagnostics Windows

- The HP PC Hardware Diagnostics Windows download instructions are provided in English only.

- You must use a Windows computer to download this tool because only .exe files are provided.

Downloading the latest HP PC Hardware Diagnostics Windows version

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

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

2. Select **Download HP Diagnostics Windows**, and then select a location on your computer or a USB flash drive.

The tool is downloaded to the selected location.

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

NOTE: For some products, 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 is downloaded to the selected location.

Installing HP PC Hardware Diagnostics Windows

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

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

Using HP PC Hardware Diagnostics UEFI

NOTE: For Windows 10 S computers, you must use a Windows computer and a USB flash drive to download and create the HP UEFI support environment because only .exe files are provided. For more information, see Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive on page 76.

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 **Get Support**, and then use a mobile device to scan the QR code that displays on the next screen. The HP Customer Support - Service Center page 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 76.

    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 download instructions are provided in English only, and you must use a Windows computer to download and create the HP UEFI support environment because only .exe files are provided.

Downloading the latest HP PC Hardware Diagnostics UEFI version

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

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

2. Select **Download HP Diagnostics UEFI**, and then select **Run**.

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

NOTE: For some products, 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 can be downloaded to a server.

Downloading the latest Remote HP PC Hardware Diagnostics UEFI version

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

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

2. Select **Download Remote Diagnostics**, and then select **Run**.

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

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

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

1. Go to http://www.hp.com/support.

2. Select **Get software and drivers**, select your type of product, enter the product name or number in the search box that is displayed, select your computer, and then select your operating system.

3. In the **Diagnostics** section, follow the on-screen instructions to select and download the **Remote UEFI** version for the product.

Customizing Remote HP PC Hardware Diagnostics UEFI settings

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

- Set a schedule for running diagnostics unattended. You can also start diagnostics immediately in interactive mode by selecting **Execute Remote HP PC Hardware Diagnostics**.

- Set the location for downloading the diagnostic tools. This feature provides access to the tools from the HP website or from a server that has been preconfigured for use. Your computer does not require the traditional local storage (such as a disk drive or USB flash drive) to run remote diagnostics.

- Set a location for storing the test results. You can also set the user name and password settings used for uploads.

- Display status information about the diagnostics run previously.

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

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

2. Select **Advanced**, and then select **Settings**.

3. Make your customization selections.

4. Select **Main**, and then **Save Changes and Exit** to save your settings.

Your changes take effect when the computer restarts.

10 Specifications

Computer specifications

	Tablet	Collaboration keyboard	Folio keyboard
Dimensions			
Width	**289.3 mm** (11.39 in)	**289.3 mm** (11.39 in)	**289.3 mm** (11.39 in)
Height	**215.8 mm** (8.51 in)	**230.0 mm** (9.06 in)	**442.0 mm** (17.40 in)
Depth	**8.8 mm** (0.35 in)	**14.2 mm** (0.56 in)	**6.2 mm** (0.24 in)
Weight	**830 g** (1.83 lb)	**368 g** (0.81 lb)	**610 g** (1.35 lb)
Operating voltage and current	5 V dc @ 3 A / 9 V dc @ 3 A / 12 V dc @ 5 A / 15 V dc @ 4.33 A / 20 V dc @ 3.25 A – 65 W USB-C		
	5 V dc @ 3 A / 9 V dc @ 3A / 10 V dc @ 5 A / 12 V dc @ 5 A / 15 V dc @ 4.33 A / 20 V dc @ 3.25 A – 65 W USB-C		
	19.5 V dc @ 3.33 A – 65 W		
Temperature			
Operating	**32° to 95° F (0° to 35° C)**		
Nonoperating	**−4° to 140° F (−20° to 60° C)**		
Relative humidity (noncondensing)			
Operating	10% to 90%		
Nonoperating	5% to 95%		
Maximum altitude (unpressurized)			
Operating	**−15.24 to 3,048 m** (−50 to 10,000 ft)		
Nonoperating	**−15.24 to 12,192 m** (−50 to 40,000 ft)		

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

Display specifications

Item	Value
Active diagonal size	**33.02 cm** (13.0 in)
Brightness	400 nits (non-privacy WUXGA+)
	450 nits (3k × 2k)
	1000 nits (privacy panel WUXGA+)
Pixel resolution	3000 × 2000 (3k × 2k)
	1920 x 1280 (WUXGA+)
Surface treatment	3k × 2k (BrightView)
	WUXGA+ (antiglare)
Interface	eDP 1.4 + PSR
Backlight	WLED
Viewing angle	UWVA

11   Power cord set requirements

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

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

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

Requirements for all countries

The following requirements are applicable to all countries and regions:

● The length of the power cord set must be at least **1.0 m** (3.3 ft) and no more than **2.0 m** (6.5 ft).

● All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.

● The power cord sets must have a minimum current capacity of 10 A and a nominal voltage rating of 125 or 250 V ac, as required by the power system of each country or region.

● The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions

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

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

1. The flexible cord must be Type HO5VV-F, 3-conductor, 0.75 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.

Country/region	Accredited agency	Applicable note number

2. The flexible cord must be Type SVT/SJT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V ac) or NEMA 6-15P (15 A, 250 V ac) configuration. CSA or C-UL mark. UL file number must be on each element.

3. The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCTF, 3-conductor, 0.75 mm² or 1.25 mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration.

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

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

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

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

12 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 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.

   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.

h. Select the **Main** menu, and then select **Reset BIOS Security to factory default**. Click **Yes** at the warning message.

The computer reboots.

i. 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.

j. Select the **Main** menu, select **Apply Factory Defaults and Exit**, select **Yes** to save changes and exit, and then select **Shutdown**.

k. Reboot the system. If the system has a Trusted Platform Module (TPM), fingerprint reader, or both, one or two prompts will appear—one to clear the TPM and the other to Reset Fingerprint Sensor. Press or tap f1 to accept or f2 to reject.

l. Remove all power and system batteries for at least 24 hours.

2. Complete one of the following:

- Remove and retain the storage drive.

– or –

- Clear the drive contents by using a third-party utility designed to erase data from an SSD.

– or –

- Clear the contents of the drive by using the following BIOS Setup Secure Erase command option steps:

> **IMPORTANT:** If you clear data using Secure Erase, it cannot be recovered.

a. Turn on or restart the computer, and then press esc while the "Press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

b. Select the **Security** menu and scroll down to the **Utilities** menu.

c. Select **Hard Drive Utilities**.

d. Under **Utilities**, select **Secure Erase**, select the hard drive storing the data you want to clear, and then follow the on-screen instructions to continue.

– or –

- Clear the contents of the drive using the following Disk Sanitizer commands steps:

> **IMPORTANT:** If you clear data using Disk Sanitizer, it cannot be recovered.

> **NOTE:** The amount of time it takes for Disk Sanitizer to run can take several hours. Plug the computer into an AC outlet before starting.

a. Turn on or restart the computer, and then press esc while the "Press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

b. Select the **Security** menu and scroll down to the **Utilities** menu.

c. Select **Hard Drive Utilities**.

   d. Under **Utilities**, select **Disk Sanitizer**, select the hard drive storing the data you want to clear, and then follow the on-screen instructions to continue.

Nonvolatile memory usage

Table 12-1 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 89.	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.

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?
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/support. Select **Find your product**, and then follow the on-screen instructions.
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.	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

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?
						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 press esc while the "Press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

   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 will result in the loss of information.

    These steps will 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 press esc while the "Press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

    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 will 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 press esc while the "Press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

    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.

13 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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