Maintenance and Service Guide

SUMMARY

This guide provides information about spare parts, removal and replacement of parts, security, backing up, and more.

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Product notice

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

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

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

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

Reduce the possibility of heat-related injuries or of overheating the computer by following the practices described.

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

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1 Product description

This table provides detailed product information.

Table 1-1 Product components and their descriptions

Category	Description
Product Name	**HP ProBook x360 435 G7 Notebook PC**
Processors	**AMD® processors**
	AMD Ryzen™ 7-4750U with Radeon™ Graphics (1.7 GHz [turbo up to 4.1 GHz], 8 cores, 8 MB L3 cache)
	AMD Ryzen 7-4700U with Radeon Graphics (2.0 GHz [turbo up to 4.1 GHz], 8 cores, 8 MB L3 cache)
	AMD Ryzen 5-4650U with Radeon Graphics (2.1 GHz [turbo up to 4.0 GHz], 6 cores, 8 MB L3 cache)
	AMD Ryzen 5-4500U with Radeon Graphics (2.3 GHz [turbo up to 4.0 GHz], 6 cores, 8 MB L3 cache)
	AMD Ryzen 3-4300U with Radeon Graphics (2.7 GHz [turbo up to 3.7 GHz], 4 cores, 4 MB L3 cache)
Graphics	**Internal graphics**
	AMD Radeon Graphics
	Supports 4 independent displays when on the HP Thunderbolt™ Dock 120W G2; Max resolution = 4 K @ 30 Hz (DisplayPort 1) or 4 K @ 30 Hz (DisplayPort 2)
	Supports 2 independent displays when on the HP USB-C Dock G5; Max resolution = FHD @ 60 Hz (DisplayPort 1) and FHD @ 60 Hz (DisplayPort 2) -or- FHD @ 60Hz (DisplayPort) and FHD @ 60 Hz (HDMI) -or- 2.5 K @ 60 Hz (one HDMI) or 2.5 K @ 60 Hz (one DisplayPort) & 2.5 K @ 60 Hz (USB Type-C® output port using a USB Type C-to-DisplayPort adapter
	Supports 3 independent displays when on the HP USB-C/A Universal Dock G2; Max resolution = 2.5 K @ 60 Hz (DisplayPort 1) and 2.5 K @ 60 Hz (DisplayPort 2) and 2.5 K @ 60Hz (HDMI) -or- 4 K @ 60 Hz (one HDMI) -or- 4 K @ 60 Hz (one DisplayPort) and 4 K @ 60 Hz (USB Type-C output port using a USB Type C-to-DisplayPort adapter)
Touch module/pen option	HP Pro Pen (select products only)
	Pen loop
Display	**33.8 cm (13.3 in), LED, full high definition (FHD) (1920 × 1080), narrow bezel, UWVA, touch screen**
	Slim, 45% CG, eDP, 250 nits, with HD camera
	Slim, 45% CG, eDP, 250 nits, with HD + IR camera
	Ultraslim, 72% CG, low power, eDP + PSR, 400 nits, with HD camera
	Ultraslim, 72% CG, lower power, eDP + PSR, 400 nits, with HD + IR camera
	Ultraslim, BrightView, 72% CG, eDP + PSR, 1000 nits, privacy, with HD camera
	Ultraslim, BrightView, 72% CG, eDP + PSR, 1000 nits, privacy, with HD + IR camera
Memory	Two memory module slots supporting up to 16 GB of RAM
	Both slots are accessible/upgradeable by IT or self-maintainers only
	DDR4-3200 dual-channel support

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

Category	Description
	Supports the following configurations:
	• 16 GB (8 × 2) or (16 × 1)
	• 8 GB (4 × 2) or (8 × 1)
	• 4 GB (4 × 1)
Primary storage	**PCIe, SS, M.2 2280 solid-state drives**
	1 TB, PCIe, Gen 3 × 4, TLC
	512 GB, PCIe, Gen 3 × 4, TLC
	512 GB, PCIe, value
	256 GB, PCIe, value
	128 GB, SATA-3, TLC
Audio and video	**Audio brand:** HP Audio
	Camera, HD RGB 720p
	Camera, HD RGB 720p + IR (supports WFoV [Wide Field of View])
	Supports WDR (Wide Dynamic Range)
	Dual-array digital microphone
	Rear-facing camera (select products only)
	Dual-array digital microphone with appropriate software: beam forming, echo cancellation, noise suppression
	Stereo speakers
RJ-45 (network) jack	Support only using accessories
	The following support S4/S5 wake on LAN (via out-of-band): HP USB-C Dock G5HP USB-C/A Universal Dock G2, HP USB-C Dock G4, HP Thunderbolt Dock 120W G2, and HP USB-C Mini Dock
	The following support S0/S0x/S4/S5 MPAT (via out-of-band): HP USB-C Dock G5, HP USB-C/A Universal Dock G2, HP USB-C Dock G4, HP Thunderbolt Dock 120W G2, and HP USB-C Mini Dock
Wireless (select products only)	**Integrated WLAN options with dual antennas (M.2 2230 socket PCIe/USB)**
	Intel Wi-Fi 6 AX200 + Bluetooth® 5 (non-vPro) (802.11ax 2 × 2, supporting gigabit file transfer speeds)
	Intel Wireless-AC 9260 802.11ac 2 × 2 WiFi + Bluetooth 5 (non-vPro, supporting gigabit file transfer speeds)
	Realtek RTL8822CE 802.11ac 2 × 2 Wi-Fi + Bluetooth 5
	WLAN antennas (2) (configured at top of panel)
	Support WoWLAN S3/S4
	Compatible with Miracast® devices
	Supports HP LAN-Wireless Protection (WLAN/LAN switching)
	Supports HP Connection Optimizer
	Supports HP Extended Range Wireless LAN
	Supports Dynamic BIOS SAR

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

Category	Description
	Supports Bluetooth S3 Wake-up
Media card reader	Supports microSD™, SDHC™, SDXC™
Ports	HDMI v1.4b
	Audio-out (headphone)/audio-in (microphone) combo jack
	(2) USB 3.1 Gen 1 Type A ports (1 charging port)
	USB 3.1 Gen 1 Type C port
Keyboard/pointing devices	**HP Premium Keyboard**
	Non-backlit, spill resistent
	Non-backlit, spill resistent, for second camera
	Backlit, spill resistent, with HP Dura Keys
	Backlit, spill resistant, with HP Dura Keys, for second camera
	Backlit, spill resistant, with HP Dura Keys, privacy
	Backlit, spill resistant, with HP Dura Keys, for second camera, privacy
	Clickpad requirements
	Support for Microsoft® precision touchpad default gestures
	No hybrid mode support
Power requirements	**Battery**
	3 cell, 45 Whr, lithium polymer, HP Long Life
	HP Fast Charge Technology
	Smart AC adapters
	65 W, right angle, 4.5 mm
	65 W, right angle, 4.5 mm, Argentina
	65 W, right angle, 4.5 mm, EM
	65 W, straight, USB Type-C
	45 W, right angle, 4.5 mm
	45 W, right angle, 4.5 mm, Argentina
	45 W, right angle, 4.5 mm, 2 prong, Japan
	45 W, straight, USB Type-C
	Power cord
	C7, 1 m, 2 wire
	C5, 1 m, 3 wire
Security	Supports Trusted Platform Module (TPM) 2.0 (Infineon, soldered down)
	Touch fingerprint sensor (select products only)

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

Category	Description
	Nano security lock
	Preboot authentication (password)
	Hardware-enforced firmware protection: HP Hardware Root of Trust + Sure Start for AMD
Operating system	Windows® 10 Home 64
	Windows 10 Home 64 Single Language
	Windows 10 Home 64 Single Language Africa Market PPP
	Windows 10 Home 64 Single Language APAC EM PPP
	Windows 10 Home 64 Single Language India Market PPP
	Windows 10 Home 64 Single Language Indonesia Market PPP
	Windows 10 Home 64 Advanced
	Windows 10 Home 64 Advanced Single Language
	Windows 10 Home 64 Chinese Market PPP
	Windows 10 Home 64 High-End Chinese Market PPP
	Windows 10 Home 64 Plus
	Windows 10 Home 64 Plus Single Language
	Windows 10 Home 64 Plus Single Language Africa Market PPP
	Windows 10 Home 64 Plus Single LanguageAPAC EM PPP
	Windows 10 Home 64 Plus Single Language India Market PPP
	Windows 10 Home 64 Plus Single Language Indonesia Market PPP
	Windows 10 Pro 64
	Windows 10 Pro 64 Chinese Market
	Windows 10 Pro 64 StF MSNA Plus
	Windows 10 Pro 64 StF MSNA Standard
	Windows 10 Pro 64 StF MSNA Strategic
	FreeDOS
	Restore media
	Windows 10 Professional 64-bit OS DVD
	Windows 10 Professional 64-bit OS USB
	Windows 10 Driver DVD
	Windows 10 Driver USB
	Certified
	Microsoft WHQL
	Web-only support

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

Category	Description
	Windows 10 Pro 64 CBB 1903
	Windows 10 Enterprise 64
	Tested and documented
	Windows 10 Enterprise 64 LTSC 1809 (upon request)
Serviceability	**End user replaceable parts**
	AC adapter

2 Components

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

Right side

Use the illustration and table to identify the components on the right side of the computer.

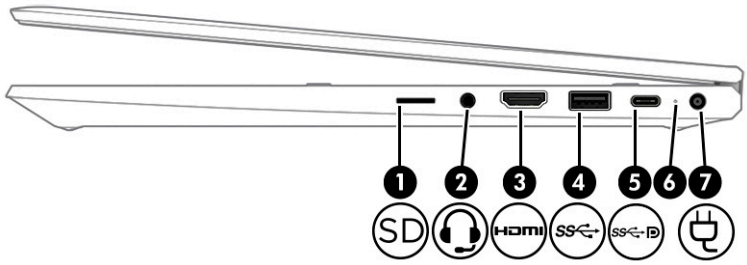


Table 2-1 Right-side components and their descriptions

Component			Description
(1)	SD	microSD™ memory card reader	Reads optional memory cards that enable you to store, manage, share, or access information. To insert a card: 1. Hold the card label-side up, with connectors facing the computer. 2. Insert the card into the memory card reader, and then press in on the card until it is firmly seated. To remove a card: ▲ Press in on the card, and then remove it from the memory card reader.
(2)		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.

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

Component		Description
(3)	HDMI port	Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed High-Definition Multimedia Interface (HDMI) device.
(4)	USB SuperSpeed port	Connects a USB device, provides high-speed data transfer, and (for select products) charges small devices when the computer is on or in Sleep mode.
(5)	USB Type-C SuperSpeed port and DisplayPort™ connector	Connects a USB device, provides high-speed data transfer, and (for select products) charges small devices when the computer is on or in Sleep mode. **NOTE:** Cables, adapters, or both (purchased separately) might be required. - and - Connects a DisplayPort device that has a USB Type-C connector, providing display output.
(6)	Battery light	When AC power is connected: • White: The battery charge is greater than 90%. • Amber: The battery charge is from 0 to 90%. • 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.
(7)	Power connector	Connects an AC adapter.

Left side

Use the illustration and table to identify the components on the left side of the computer.

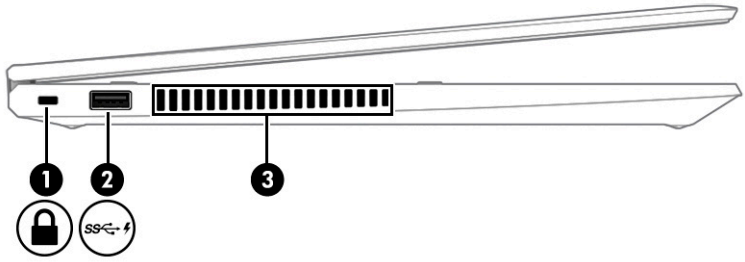


Table 2-2 Left-side components and their descriptions

Component		Description
(1)	Security cable slot	Attaches an optional security cable to the computer. **NOTE:** The security cable is designed to act as a deterrent, but it might not prevent the computer from being mishandled or stolen.
(2)	USB SuperSpeed port with HP Sleep and Charge	Connects a USB device, provides high-speed data transfer, and charges small devices, even when the computer is off.
(3)	Vent	Enables airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.

Display

The computer display can include essential components such as speakers, antennas, cameras, and microphones.

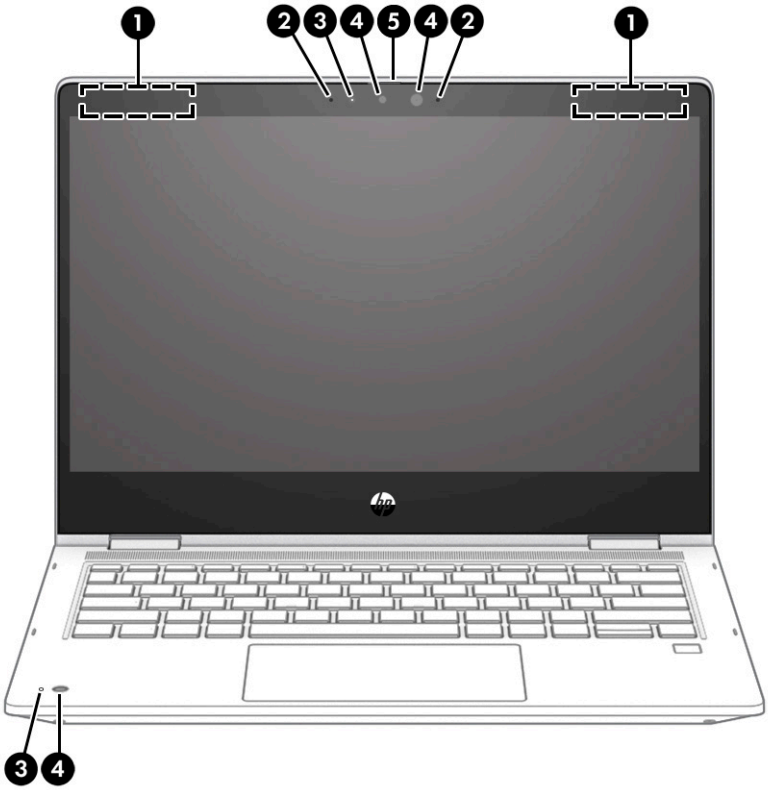


Table 2-3 Display components and their descriptions

Component		Description
(1)	WLAN antennas* (select products only)	Send and receive wireless signals to communicate with wireless local area networks (WLANs).
(2)	Internal microphones	Record sound.

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

Component		Description
(3)	Camera light(s)	On: One or more cameras are in use.
(4)	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.
(5)	Camera privacy cover	By default, the camera lens is uncovered, but you can slide the camera privacy cover to block the camera's view. To use the camera, slide the camera privacy cover in the opposite direction to reveal the lens. **NOTE:** If you have both front-facing and rear-facing cameras, when one camera lens is revealed and ready to use, the other is concealed.

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

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

To access this guide:

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

Keyboard area

Keyboards can vary by language.

Touchpad components

Identify the touchpad components.

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.

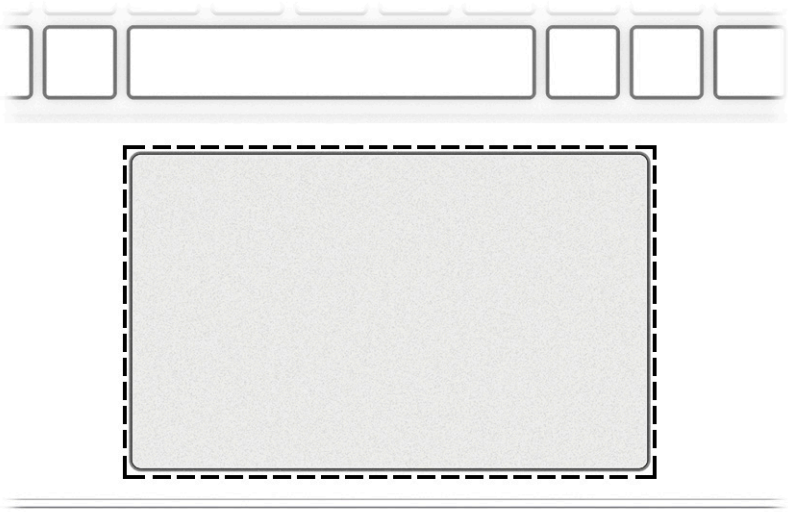


Table 2-4 Touchpad components and their descriptions

Component	Description
Touchpad zone	Reads your finger gestures to move the pointer or activate items on the screen.

Lights

Identify the lights on the computer.

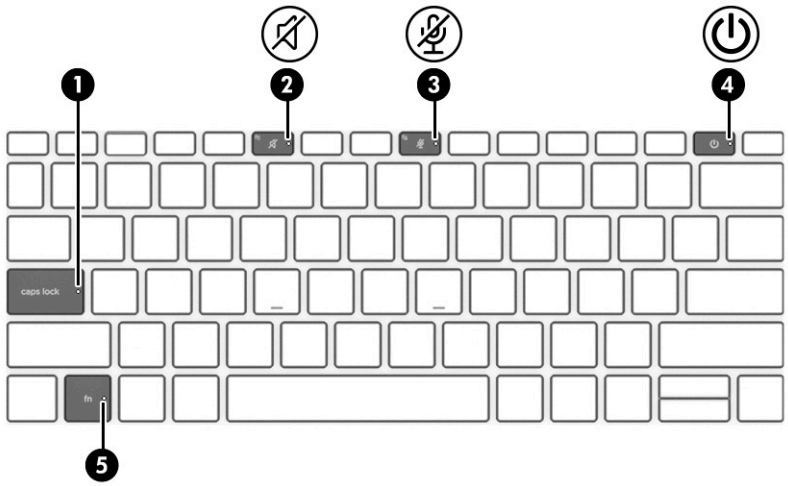


Table 2-5 Lights and their descriptions

Component		Description
(1)	Caps lock light	On: Caps lock is on, which switches the key input to all capital letters.
(2)	Mute light	• On: Computer sound is off. • Off: Computer sound is on.
(3)	Microphone mute light	• On: The microphone is off. • Off: The microphone is on.

Table 2-5 Lights and their descriptions (continued)

Component		Description
(4)	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 unnecessary components. • Off: Depending on your computer model, the computer is off, in Hibernation, or in Sleep. Hibernation is the power-saving state that uses the least amount of power.
(5)	Fn lock light	On: The fn key is locked.

Button, speakers, and fingerprint reader

Identify the computer button, speakers, and fingerprint reader.

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

IMPORTANT: To verify that your computer supports fingerprint reader sign-in, type Sign-in options in the taskbar search box and follow the on-screen instructions. If **Fingerprint reader** is not listed as an option, then your notebook does not include a fingerprint reader.

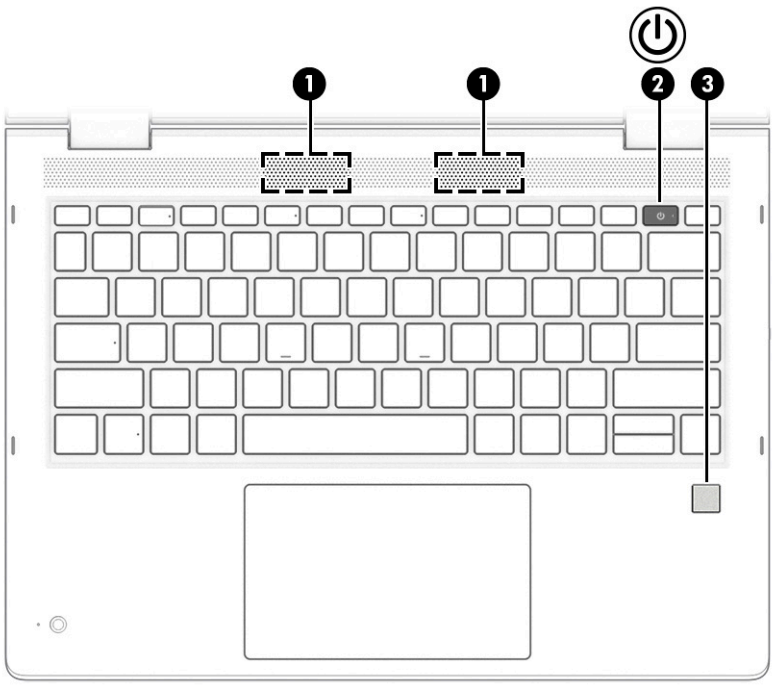


Table 2-6 Button, speakers, and fingerprint reader and their descriptions

Component		Description
(1)	Speakers	Produce sound
(2)	Power button	• When the computer is off, press the button briefly to turn on the computer.

Table 2-6 Button, speakers, and fingerprint reader and their descriptions (continued)

Component		Description
		• 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 down for at least 4 seconds to turn off the computer. To learn more about your power settings, see your power options: ▲ Right-click the **Power** icon, and then select **Power Options**.
(3)	Fingerprint reader (select products only)	Allows a fingerprint logon to Windows, instead of a password logon. ▲ Swipe down across the fingerprint reader. **IMPORTANT:** To prevent fingerprint logon issues, be sure when you register your fingerprint that all sides of your finger are registered by the fingerprint reader.

Special keys

Identify the special keys.

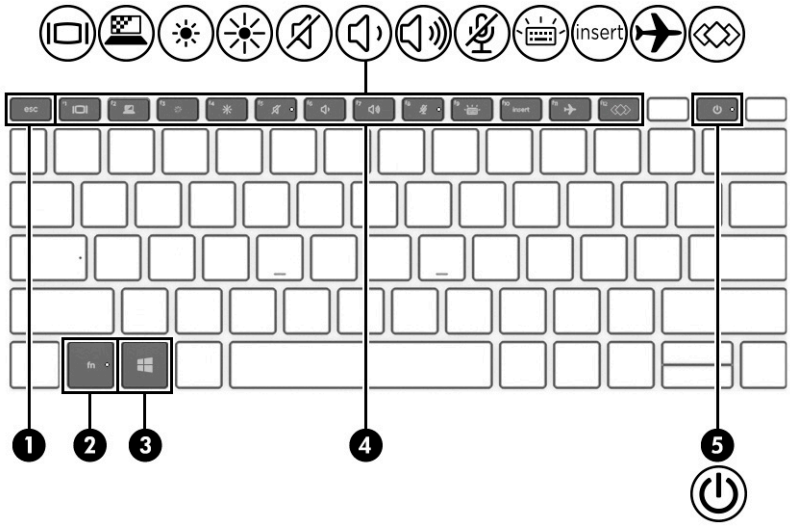


Table 2-7 Special keys and their descriptions

Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.

Table 2-7 Special keys and their descriptions (continued)

Component		Description
(2)	fn key	Executes frequently used system functions when pressed in combination with another key. Such key combinations are called hot keys.
(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)	Power button	• When the computer is off, press the button briefly 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 down for at least 4 seconds to turn off the computer. To learn more about your power settings, see your power options: ▲ Right-click the **Power** icon, and then select **Power Options**.

Hot keys (select products only)

Identify the hot keys.

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 2-8 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.

Bottom

Identify the bottom component.

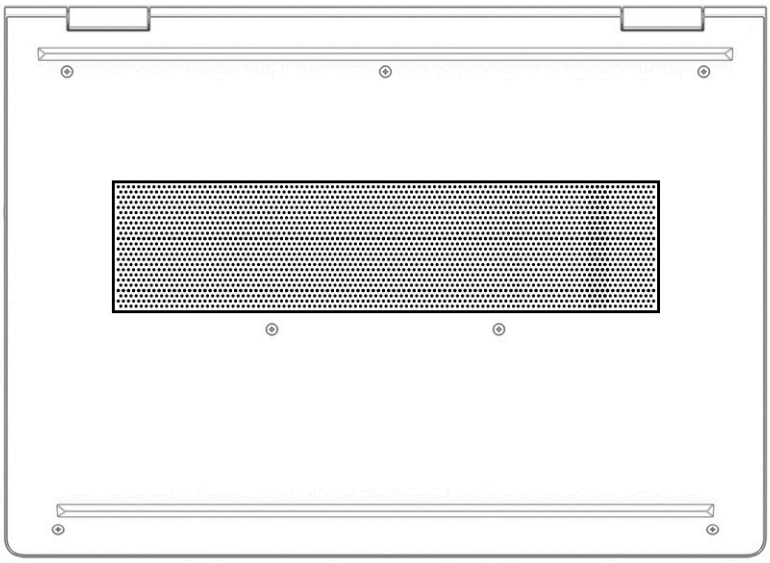


Table 2-9 Bottom component and its description

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

Labels

The labels affixed to the computer provide information that you might need when you troubleshoot system problems or travel internationally with the computer. Labels can 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 might be asked for the serial number, the product number, or the model number. Locate this information before you contact support.

  Your service label information order may vary by country and might not include the wording "Model" due to the country regulation.

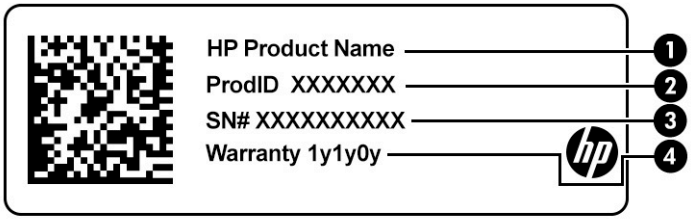


Table 2-10 Service label components

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

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

3 Illustrated parts catalog

Use this table to determine the spare parts that are available for the computer.

Computer major components

To identify the computer major components, use this illustration and table.

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

NOTE: Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer.

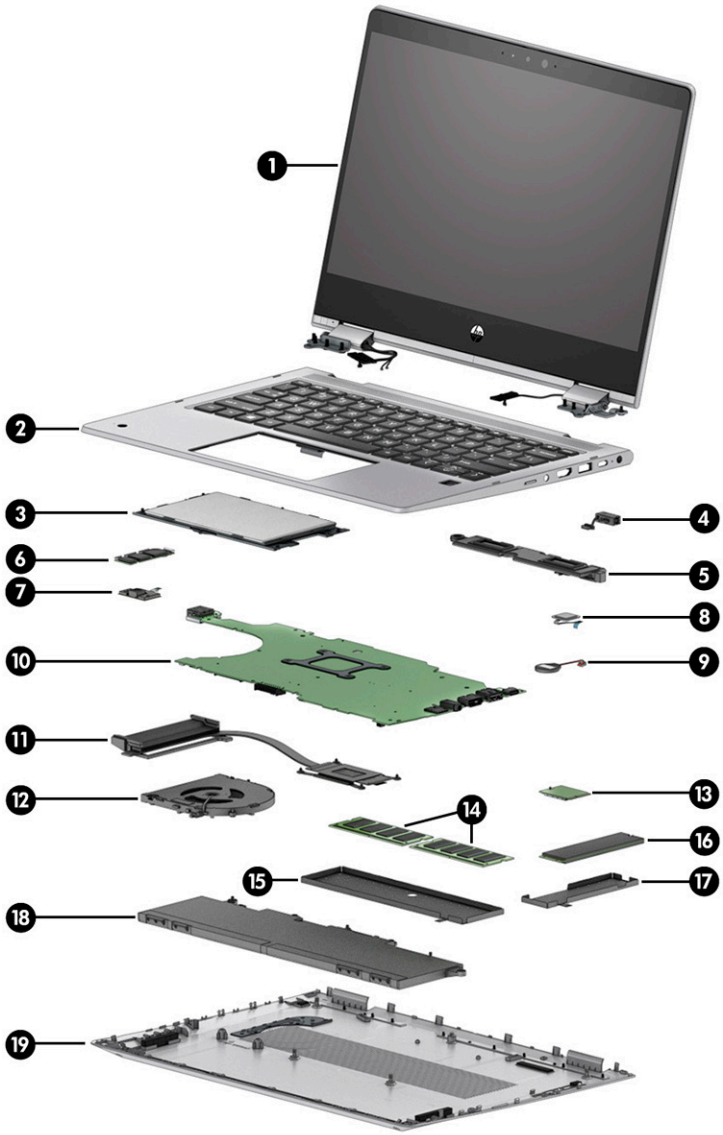


Table 3-1 Computer major component descriptions and part numbers

Item	Component	Spare part number
(1)	**Display assembly**	
	250 nits, with HD camera	M03425-001
	250 nits, with HD + IR camera	M03426-001
	400 nits, with HD camera	M03427-001
	400 nits, with HD + IR camera	M03428-001
	1000 nits, with HD camera, privacy	M03429-001
	1000 nits, with HD + IR camera, privacy	M03430-001
(2)	**Keyboard/top cover** For a detailed list of country codes, see Keyboard with top cover on page 50.	
	For models without a rear camera, backlit	M03444-xx1
	For models with a rear camera, backlit	M03445-xx1
	For models without a rear camera, backlit	M03446-xx1
	For models with a rear camera, backlit	M03447-xx1
	For models without a rear camera, not backlit	M03448-xx1
	For models with a rear camera, not backlit	M03449-xx1
(3)	**Touchpad** **NOTE:** The touchpad cable is available in the Cable Kit, spare part number M03431-001.	M03435-001
(4)	**Power connector cable**	M03424-001
(5)	**Speaker**	M03439-001
(6)	**Rear camera board** (included in Camera Module Kit)	M03443-001
(7)	**Rear camera module** (included in Camera Module Kit)	M03443-001
(8)	**Fingerprint sensor** (includes gasket) **NOTE:** The fingerprint sensor cable is available in the Cable Kit, spare part number M03431-001.	M03434-001
(9)	**RTC battery**	L13694-001
(10)	**System board** (includes integrated processor) All system boards use the following part numbers: xxxxxx-001: Non-Windows operating system xxxxxx-601: Windows 10 operating system	
	AMD Ryzen 7-4750U processor	M09344-xx1
	AMD Ryzen 7-4700U processor	M03442-xx1
	AMD Ryzen 5-4650U processor	M09343-xx1
	AMD Ryzen 5-4500U processor	M03441-xx1
	AMD Ryzen 3-4300U processor	M03440-xx1
(11)	**Heat sink**	M03433-001

Table 3-1 Computer major component descriptions and part numbers (continued)

Item	Component	Spare part number
(12)	**Fan**	M03432-001
(13)	**WLAN module**	
	Intel Wireless-AC 9260 802.11ac 2 × 2 WiFi + Bluetooth 5 (non-vPro, supporting gigabit file transfer speeds)	L16647-002
	Intel Wi-Fi 6 AX200 802.11ax 2 × 2 Wi-Fi + Bluetooth 5 (non-vPro)	L35282-002
	Realtek RTL8822CE 802.11ac 2 × 2 Wi-Fi + Bluetooth 5	L44796-002
(14)	**Memory module** (PC4-3200)	
	16 GB	L67710-002
	8 GB	L46598-002
	4 GB	L83673-002
(15)	**Memory cover** (included in Bracket Kit)	M03436-001
(16)	**Solid-state drive**	
	512 GB, PCIe, TLC	L85360-002
	512 GB, PCIe, value	L85364-002
	256 GB, PCIe, value	L85354-002
	128 GB, SATA-3, TLC	L85346-002
(17)	**Soid-state drive cover** (included in Bracket Kit)	M03436-001
(18)	**Battery** (includes gasket)	L78125-006
(19)	**Bottom cover**	M03423-001

Cables

To identify the cables, use this illustration and table.

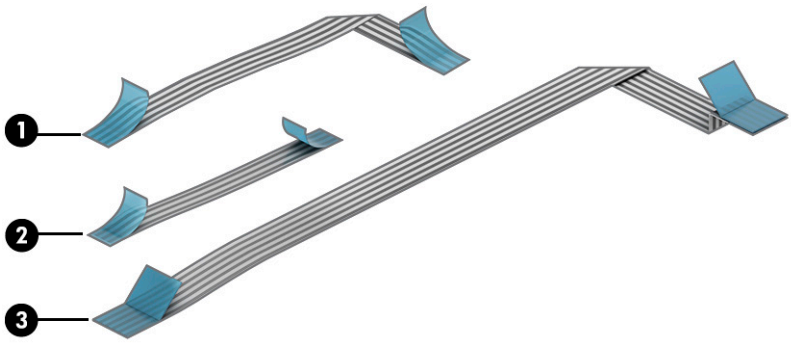


Table 3-2 Cable descriptions and part numbers

Item	Component	Spare part number
	Cable Kit, includes:	M03431-001

Table 3-2 Cable descriptions and part numbers (continued)

Item	Component	Spare part number
(1)	Touchpad cable	
(2)	Fingerprint sensor cable	
(3)	Rear camera cable	

Brackets

To identify the brackets, use this illustration and table.

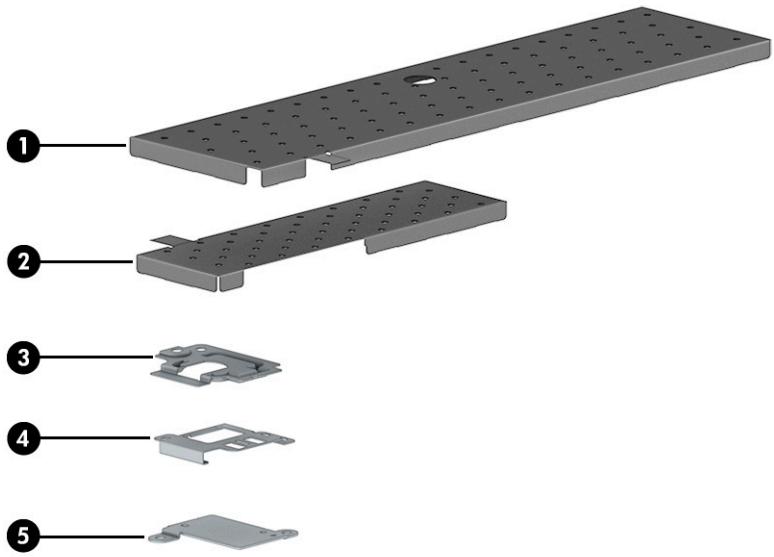


Table 3-3 Bracket descriptions and part numbers

Item	Component	Spare part number
	Bracket Kit, includes:	M03436-001
(1)	**Memory module cover**	
(2)	**Solid-state drive cover**	
(3)	**Fingerprint sensor bracket**	
(4)	**System board USB port bracket**	
(5)	**Rear camera bracket**	

Plastics Kit

To identify the Plastics Kit, use this illustration and table.

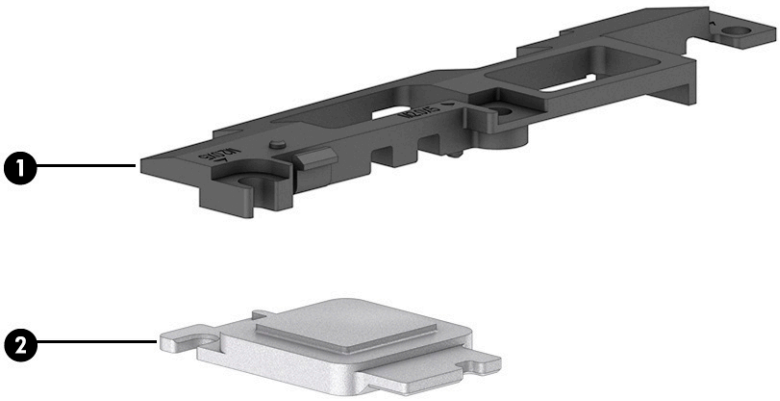


Table 3-4 Plastics Kit description and part number

Item	Component	Spare part number
	Plastics Kit, includes:	M03437-001
(1)	Plastic system board bracket	
(2)	Fingerprint reader insert (for models without a fingerprint sensor)	
	Camera thermal shield (not illustrated)	

Miscellaneous parts

To identify the miscellaneous parts, use this table.

Table 3-5 Miscellaneous part descriptions and part numbers

Component	Spare part number
AC adapters	
65 W, Smart, nPFC, 4.5 mm	710412-001
65 W, Smart, nPFC, 4.5 mm, EM	913691-850
65 W, USB Type-C, 1.8 m	L67440-001
45 W, Smart, nPFC, 4.5 mm	741727-001
45 W, Smart, nPFC, 4.5 mm, 2 pin	742436-001
45 W, USB Type-C, 1.8 m, 3 pin	L43407-001
Screw Kit	M03438-001
Power cords (C5, 1.0 m)	
Argentina	L19357-001
Australia	L19358-001
Brazil	L19359-001
Denmark	L19360-001
Europe (Austria, Belgium, Finland, France, Germany, the Netherlands, Norway, and Sweden)	L19361-001

Table 3-5 Miscellaneous part descriptions and part numbers (continued)

Component	Spare part number
India	L19363-001
Israel	L19362-001
Italy	L19364-001
Japan	L19365-001
North America	L19367-001
People's Republic of China	L19368-001
South Africa	L19369-001
South Korea	L19366-001
Switzerland	L19370-001
Taiwan	L19372-001
Thailand	L19371-001
United Kingdom	L19373-001
Power cord (C7, 1.0 m)	
Japan	L19375-001

4 Removal and replacement procedures preliminary requirements

Use this information to properly prepare to disassemble and reassemble the computer.

Tools required

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

- Tweezers
- Nonconductive, nonmarking pry tool
- Magnetic Phillips P1 screwdriver

Service considerations

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

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

Plastic parts

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

Cables and connectors

Handle cables with extreme care to avoid damage.

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.

Apply only the tension required to unseat or seat the cables during removal and insertion. Handle cables by the connector whenever possible. In all cases, avoid bending, twisting, or tearing cables. Be sure that cables are routed so that they cannot be caught or snagged as you remove or replace parts. Handle flex cables with extreme care; these cables tear easily.

Drive handling

Note the following guidelines when handling drives.

IMPORTANT: Drives are fragile components. Handle them 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 remove or install 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 Personal grounding methods and equipment on page 26.

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

Follow these static electricity guidelines.

- 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

Using certain equipment can 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, follow these 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 certain 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 authorized service provider parts

This chapter provides 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.

Component replacement procedures

To remove and replace computer components, use these procedures.

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

You must remove, replace, or loosen as many as 45 screws when you service the parts described in this chapter. Make special note of each screw size and location during removal and replacement.

Preparation for disassembly

To remove and replace computer components, use these procedures.

See Removal and replacement procedures preliminary requirements on page 23 for initial safety procedures.

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

Bottom cover

To remove the bottom cover, use this procedure and illustration.

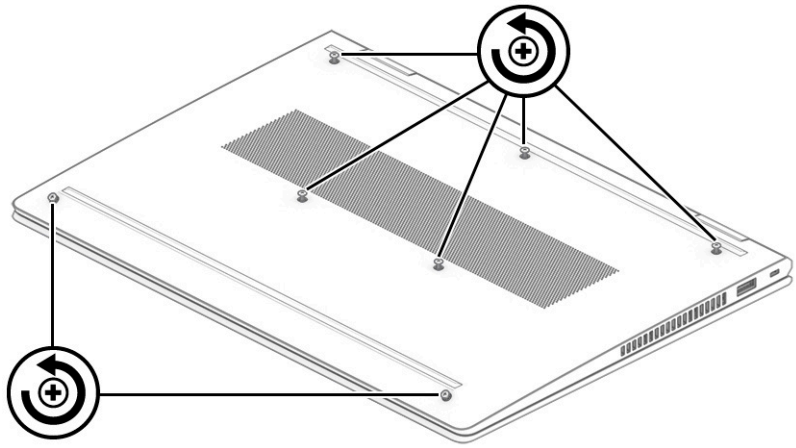
Table 5-1 Bottom cover description and part number

Description	Spare part number
Bottom cover	M03423-001

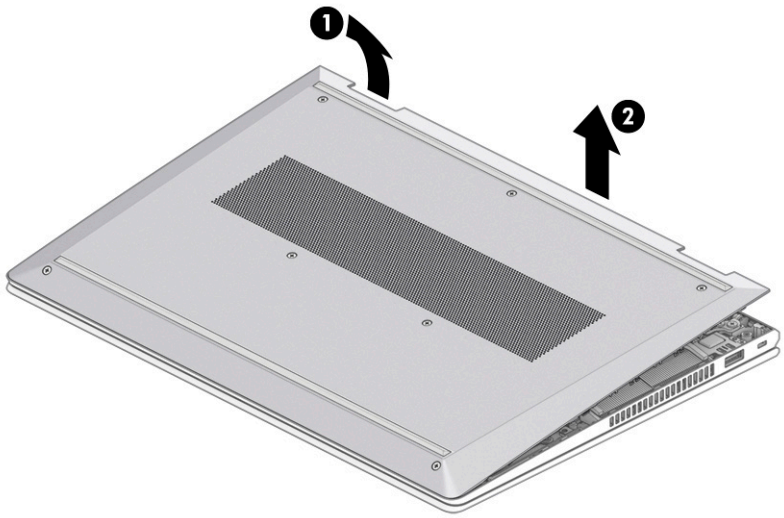
Before removing the bottom cover, prepare the computer for disassembly (Preparation for disassembly on page 29).

Remove the bottom cover:

1. Loosen the seven captive Phillips screws that secure the bottom cover.



2. Starting near the hinges, release the bottom cover from the computer **(1)**.
3. Remove the bottom cover from the computer **(2)**.



To replace the bottom cover, reverse the removal procedures.

Battery

To remove the battery, use this procedure and illustration.

Table 5-2 Battery description and part number

Description	Spare part number
Battery (3 cell, 45 Whr)	L78125-006

WARNING! To avoid personal injury and damage to the product:

- Do *not* puncture, twist, or crack the battery.
- Do *not* cause an external puncture or rupture to the battery. They can cause a short inside the battery, which can result in battery thermal runaway.
- Do *not* handle or touch the battery enclosure with sharp objects such as tweezers or pliers, which might puncture the battery.
- Do *not* compress or squeeze the battery case with tools or heavy objects stacked on top of the case. These actions can apply undue force on the battery.
- Do *not* touch the connectors with any metallic surface or object, such as metal tools, screws, or coins, which can cause shorting across the connectors.

Before removing the battery, follow these steps:

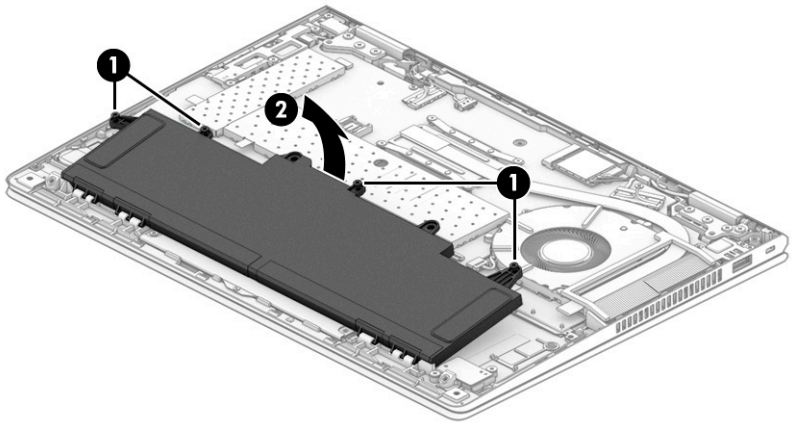
1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (Bottom cover on page 29).

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

IMPORTANT: Removing a battery that is the sole power source for the computer can cause loss of information. To prevent loss of information, save your work or shut down the computer through Windows before you remove the battery.

Remove the battery:

1. Loosen the four captive Phillips screws **(1)** that secure the battery to the computer.
2. Lift the top of the battery to remove it from the computer **(2)**.



To insert the battery, reverse the removal procedures.

Touchpad

To remove the touchpad, use this procedure and illustration.

Table 5-3 Touchpad description and part number

Description	Spare part number
Touchpad	M03435-001

Table 5-3 Touchpad description and part number

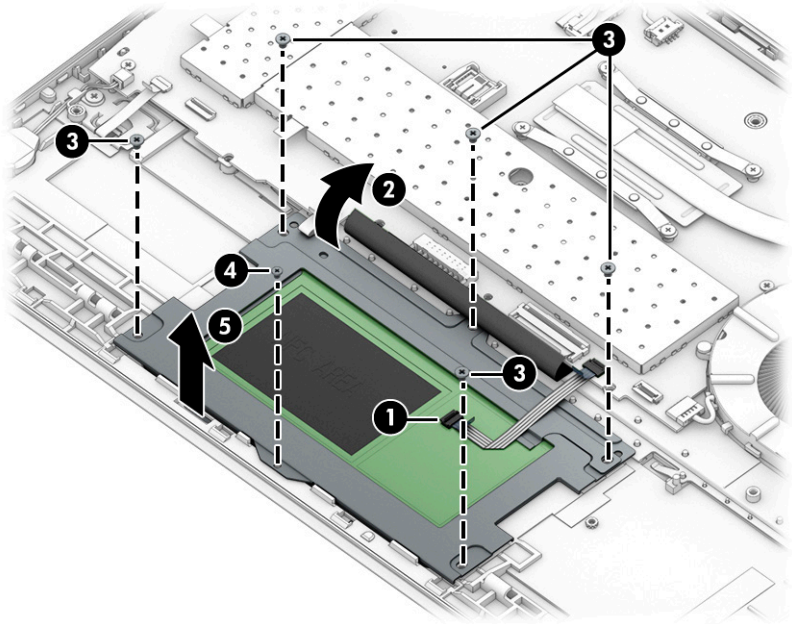
Description	Spare part number
NOTE: The touchpad cable is available in the Cable Kit, spare part number M03431-001.	

Before removing the touchpad, follow these steps:

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

Remove the touchpad:

1. Disconnect the cable from the ZIF connector on the touchpad **(1)**.
2. Lift the protective shielding from the top of the touchpad **(2)**.
3. Remove the four Phillips M2.0 × 3.0 screws **(3)** that secure the touchpad to the computer.
4. Remove the Phillips M1.6 × 2.0 screw **(4)** that secures the touchpad to the computer.
5. Remove the touchpad from the computer **(5)**.



Reverse this procedure to install the touchpad.

Solid-state drive

To remove the M.2 solid-state drive, use this procedure and illustration.

Table 5-4 Solid-state drive descriptions and part numbers

Description	Spare part number
512 GB, PCIe, TLC	L85360-002
512 GB, PCIe, value	L85364-002

Table 5-4 Solid-state drive descriptions and part numbers (continued)

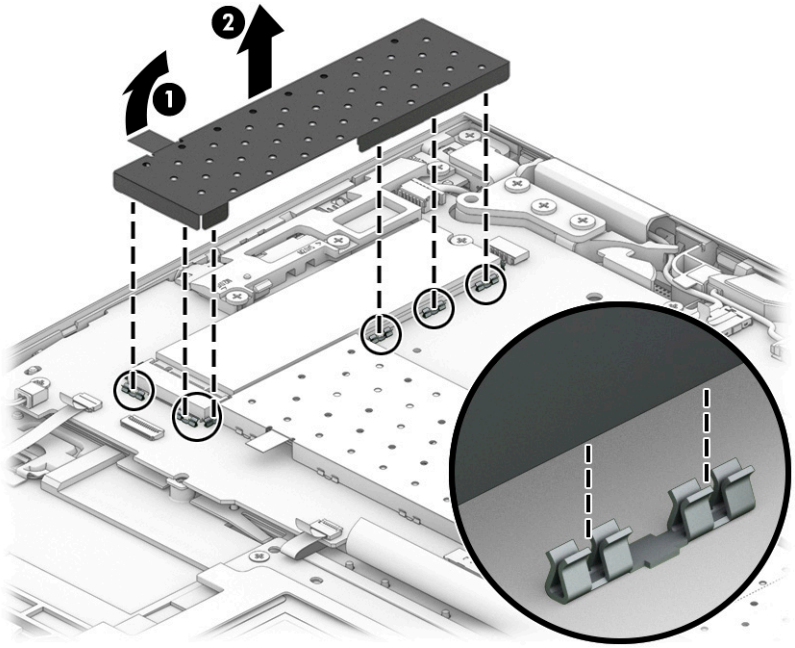
Description	Spare part number
256 GB, PCIe, value	L85354-002
128 GB, SATA-3, TLC	L85346-002

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

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

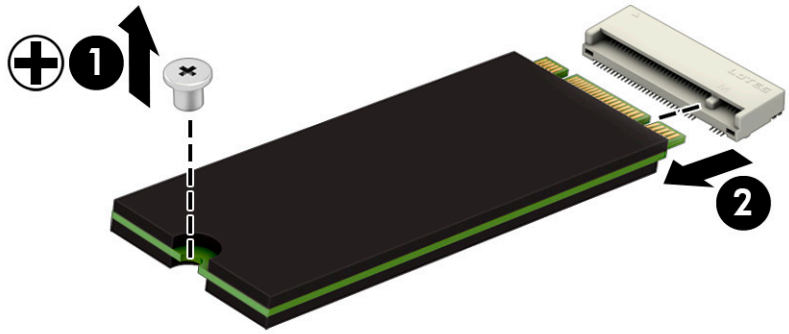
Remove the solid-state drive:

1. Use the pull tab **(1)** to remove the cover from the solid-state drive **(2)**.



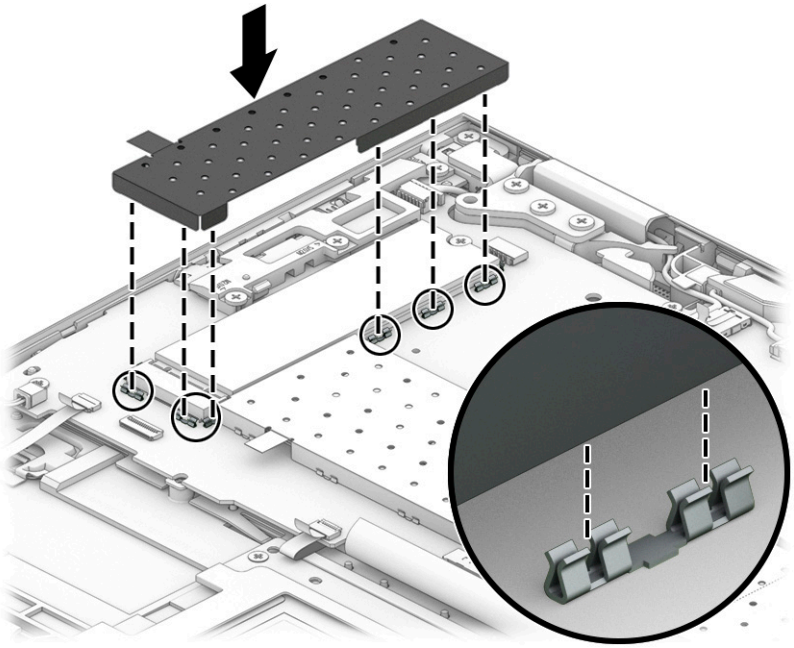
2. Remove the Phillips M2.0 × 2.5 screw **(1)** that secures the drive to the computer.

3. Pull the drive away from the socket to remove it **(2)**.



To install the solid-state drive, reverse the removal procedures.

When installing the solid-state drive cover, be sure that the edges of the cover fit into the clips next to the solid-state drive module.



NOTE: Solid-state drives are designed with a notch to prevent incorrect insertion.

Memory modules

To remove the memory modules, use this procedure and illustration.

Table 5-5 Memory module descriptions and part numbers

Description	Spare part number
16 GB, DDR4-3200	L67710-002

Table 5-5 Memory module descriptions and part numbers (continued)

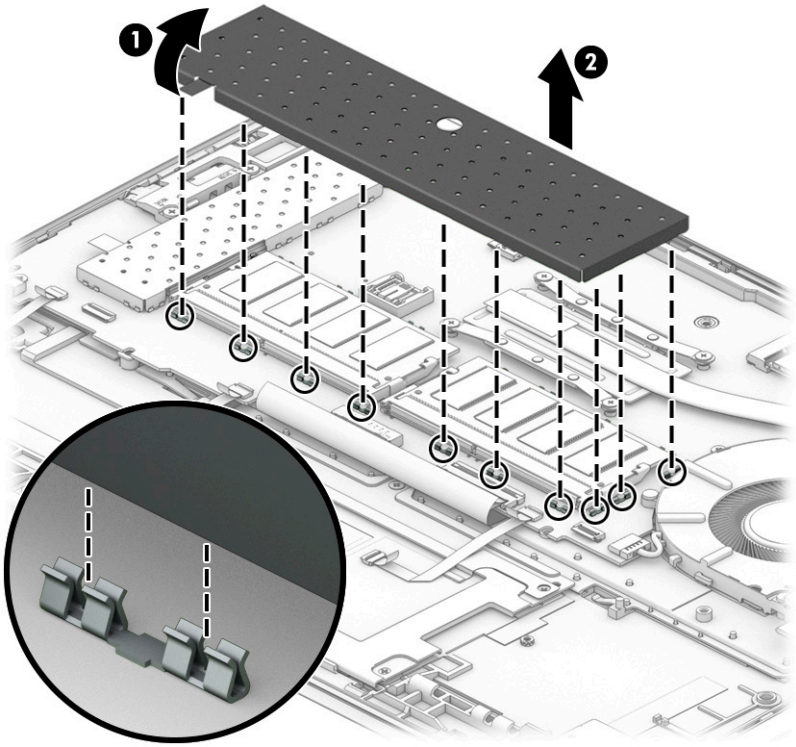
Description	Spare part number
8 GB, DDR4-3200	L46598-002
4 GB, DDR4-3200	L83673-002

Before removing the memory, follow these steps:

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

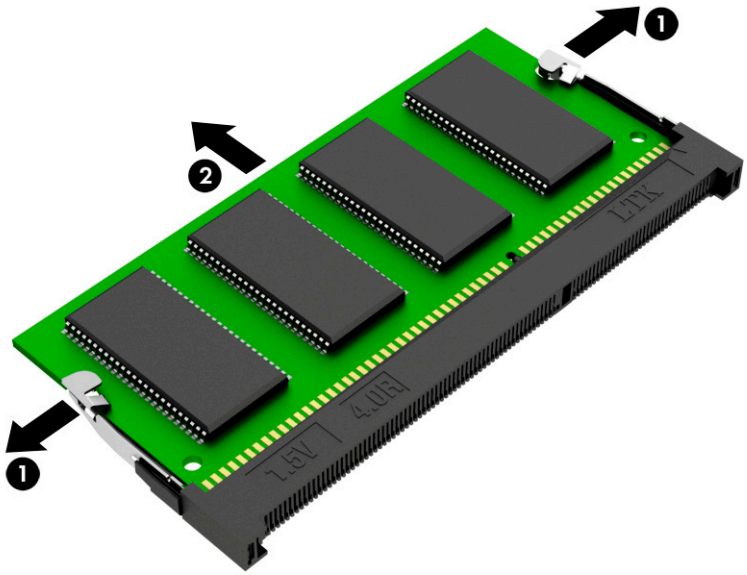
If you are replacing a memory module, remove the existing memory module:

1. Use the pull tab **(1)** to remove the cover from the memory modules **(2)**.



2. Spread the two retention clips outward **(1)** until the memory module tilts up at a 45° angle, and then remove the module **(2)**. Use the same procedure to remove all memory modules.

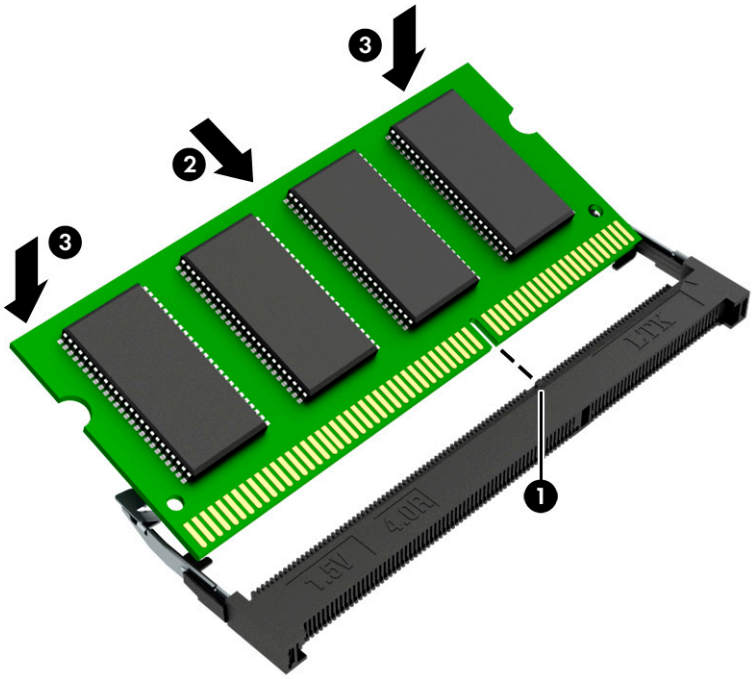
IMPORTANT: To prevent damage to the memory module, hold the memory module by the edges only. Do not touch the components on the memory module.



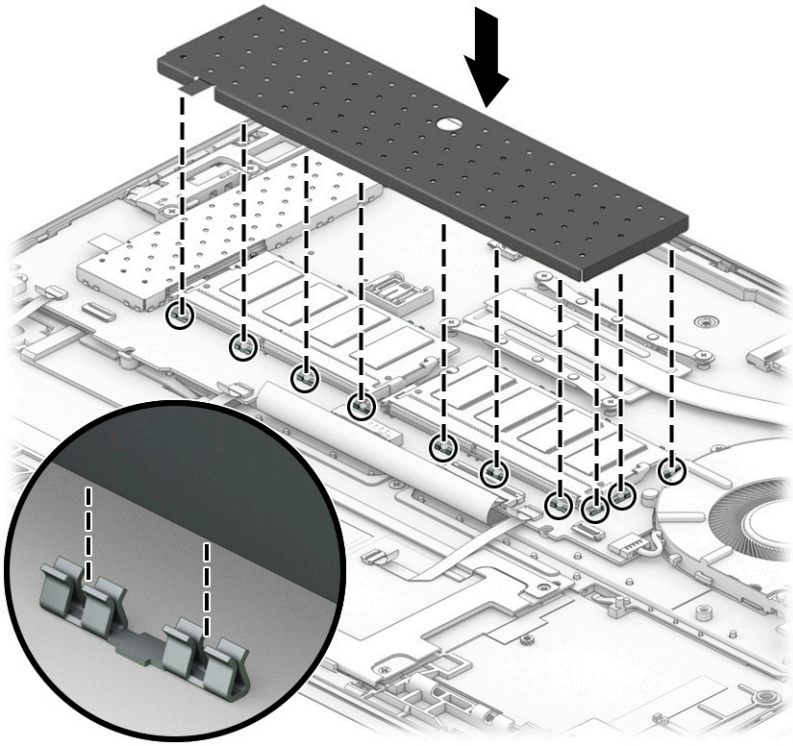
To protect a memory module after removal, place it in an electrostatic-safe container.

To install a memory module:

1. Align the notched edge of the module with the tab in the slot **(1)**, and then press the module into the slot at an angle until it is seated **(2)**.
2. Press down on the module until the side retention clips snap into place **(3)**.



3. When installing the memory module cover, be sure that the edges of the cover fit into the clips next to the memory modules.



WLAN module

To remove the WLAN module, use this procedure and illustration.

Table 5-6 WLAN module descriptions and part numbers

Description	Spare part number
Intel Wireless-AC 9260 802.11ac 2 × 2 WiFi + Bluetooth 5 (non-vPro)	L16647-002
Intel Wi-Fi 6 AX200 802.11ax 2 × 2 Wi-Fi + Bluetooth 5 (non-vPro)	L35282-002
Realtek RTL8822CE 802.11ac 2 × 2 Wi-Fi + Bluetooth 5	L44796-002

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

Before removing the WLAN module, follow these steps:

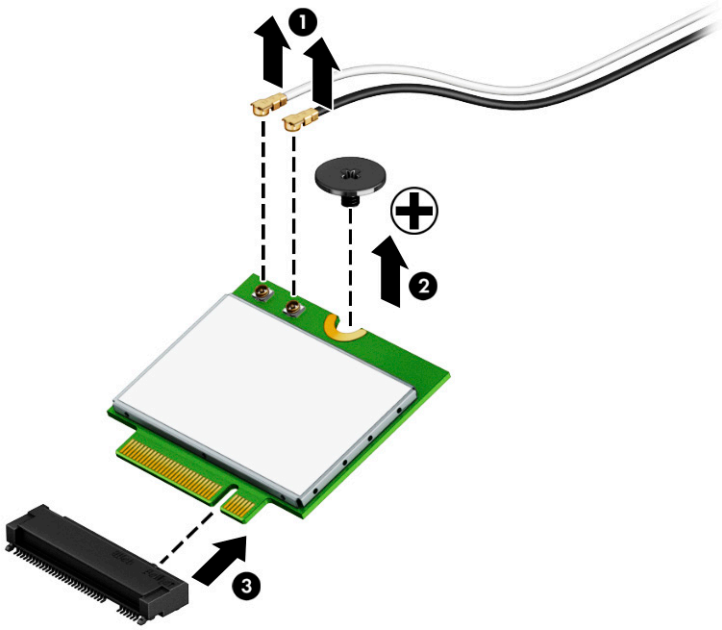
1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (Bottom cover on page 29).
3. Remove the battery (see Battery on page 30).

Remove the WLAN module:

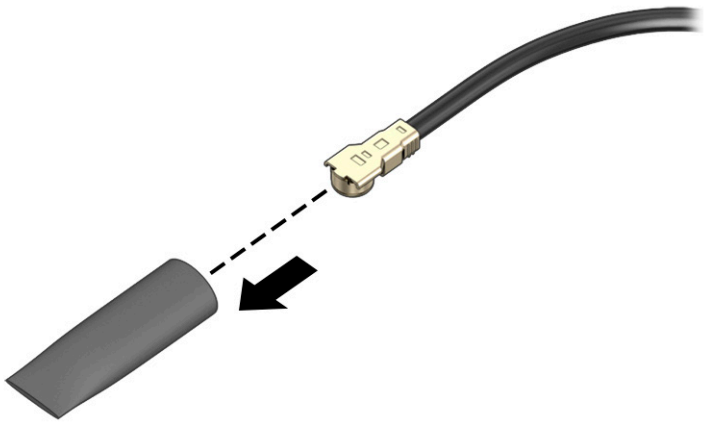
1. Carefully disconnect the two antenna cables from the module **(1)**.

2. Remove the Phillips M2.0 × 2.5 screw **(2)**, and then remove the WLAN module **(3)**.

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



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



Reverse this procedure to install the WLAN module.

RTC battery

To remove the RTC battery, use this procedure and illustration.

Table 5-7 RTC battery description and part number

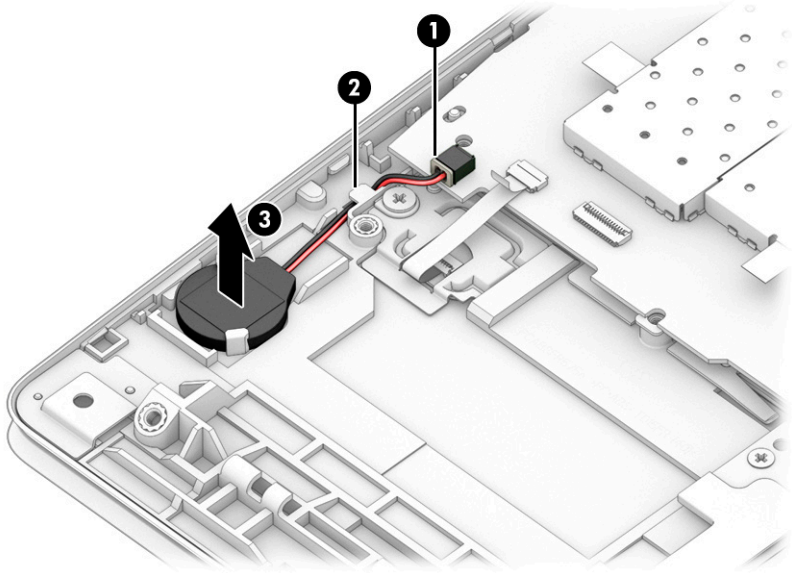
Description	Spare part number
RTC battery	L13694-001

Before removing the RTC battery, follow these steps:

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

Remove the RTC battery:

1. Disconnect the RTC battery cable from the system board **(1)**, and then remove the cable from the clip **(2)**.
2. Remove the RTC battery from the computer **(3)**.



Reverse this procedure to install the RTC battery.

Rear camera module and board

To remove the rear camera and board, use this procedure and illustration.

Table 5-8 Rear camera and board description and part number

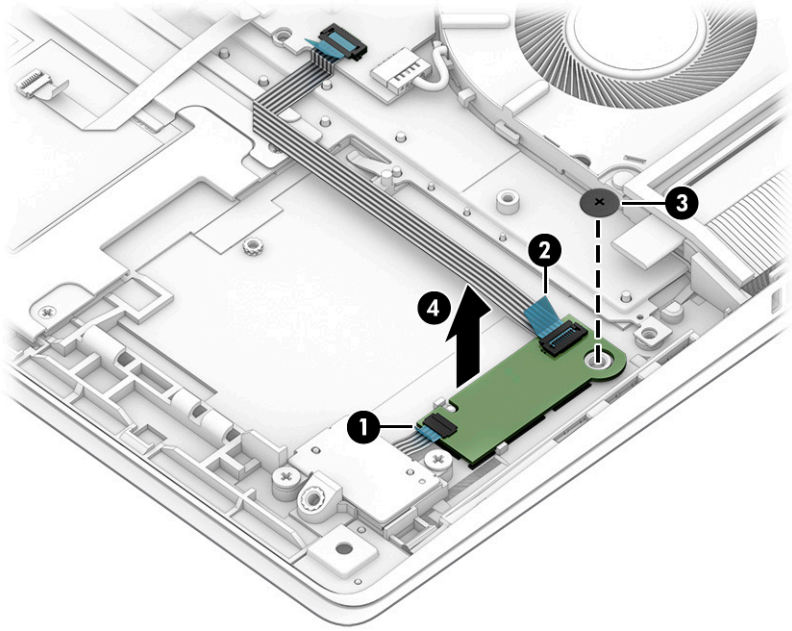
Description	Spare part number
Rear camera and camera board	M03443-001
NOTE: The camera cable is included in the Cable Kit, spare part number M03431-001. The camera bracket is included in the Bracket Kit, spare part number M03436-001. The camera thermal shield is included in the Plastics Kit, spare part number M03437-001.	

Before removing the rear camera and camera board, follow these steps:

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

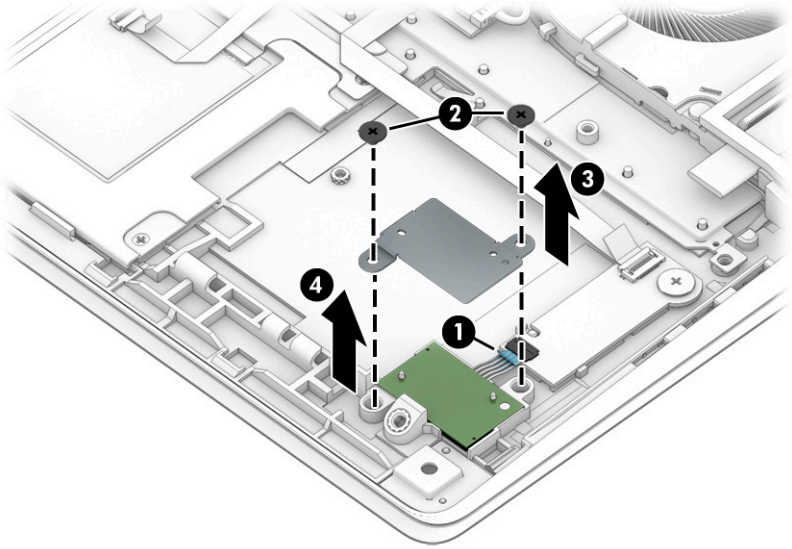
Remove the rear camera:

1. **To remove the camera board**, disconnect the camera module cable **(1)** and the system board cable **(2)** from the ZIF connectors on the camera board.
2. Remove the M2.0 × 3.0 screw **(3)** that secures the board, and then remove the board from the computer **(4)**.



3. **To remove the camera module**, disconnect the camera cable from the ZIF connector on the camera board **(1)**.

4. Remove the two M2.0 × 3.0 screws **(2)** that secure the camera module bracket, remove the bracket **(3)**, and then remove the camera **(4)**.



Reverse this procedure to install the rear camera and rear camera board.

Fan

To remove the fan, use this procedure and illustration.

Table 5-9 Fan description and part number

Description	Spare part number
Fan assembly	M03432-001

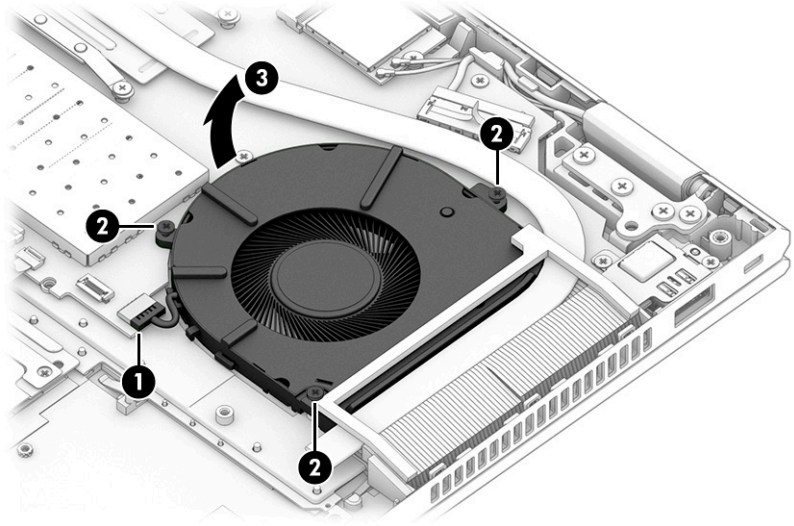
Before removing the fan, follow these steps:

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

Remove the fan assembly:

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

2. Loosen the three captive Phillips screws **(2)** that secure the fan, and then remove the fan from the computer **(3)**.



Reverse this procedure to install the fan assembly.

Heat sink

To remove the heat sink, use these procedures and illustrations.

Table 5-10 Heat sink descriptions and part numbers

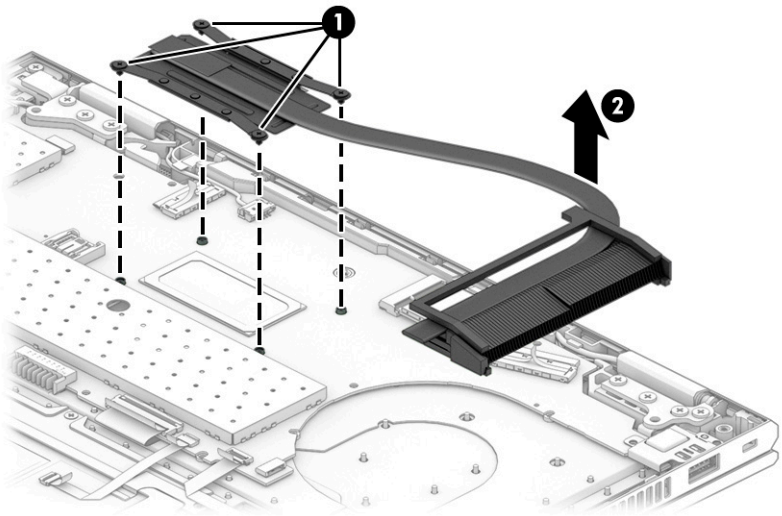
Description	Spare part number
Heat sink	M03433-001

Before removing the heat sink, follow these steps:

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

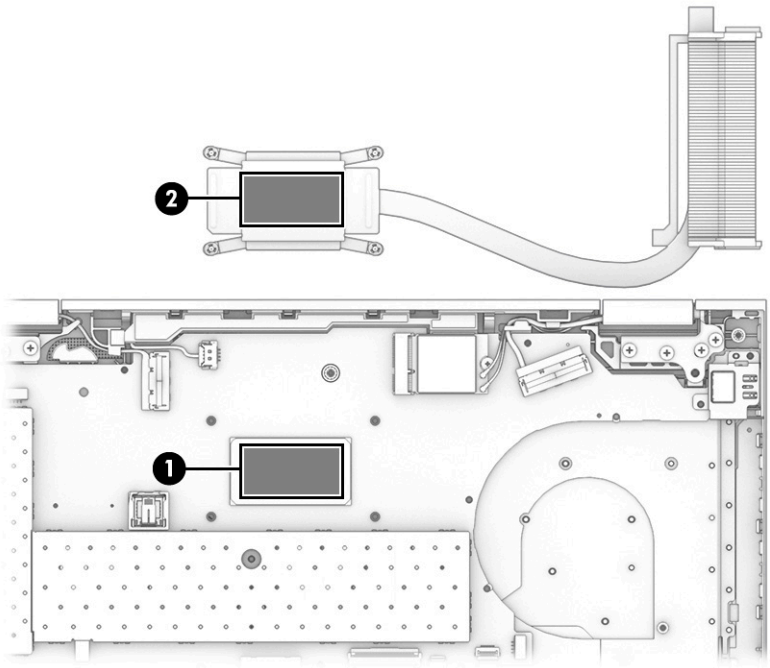
Remove the heat sink:

1. In the order indicated on the heat sink, loosen the four captive Phillips screws **(1)** that secure the heat sink, and then remove the heat sink **(2)**.



2. 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. The following illustration shows the replacement thermal material locations.

   Thermal paste is used on the system board component **(1)** and on the associated heat sink component **(2)**.



Reverse this procedure to install the heat sink.

Display assembly

To remove the display assembly, use these procedures and illustrations.

Table 5-11 Display assembly descriptions and part numbers

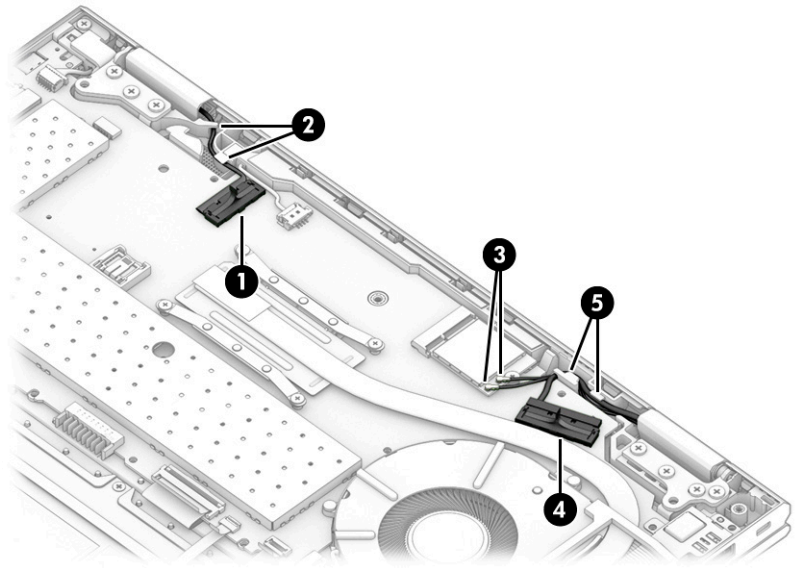
Description	Spare part number
Display assembly, 250 nits, with HD camera	M03425-001
Display assembly, 250 nits, with HD + IR camera	M03426-001
Display assembly, 400 nits, with HD camera	M03427-001
Display assembly, 400 nits, with HD + IR camera	M03428-001
Display assembly, 1000 nits, with HD camera, privacy	M03429-001
Display assembly, 1000 nits, with HD + IR camera, privacy	M03430-001

Before removing the display panel, follow these steps:

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

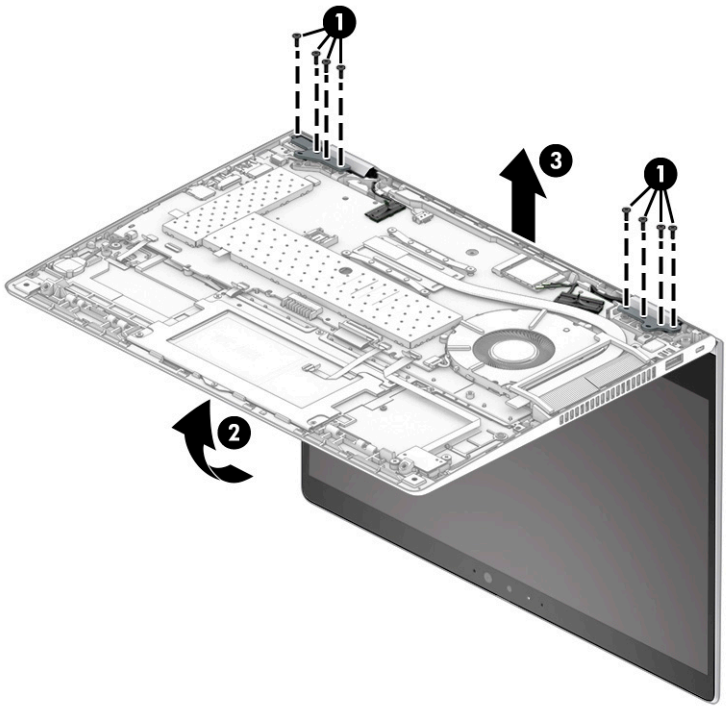
Remove the display assembly:

1. Disconnect the left display cable from the system board **(1)**, and then remove the cable from the clips **(2)**.
2. Disconnect the antenna cables from the WLAN module **(3)**.
3. Disconnect the right display cable from the system board **(4)**, and then remove the cables from the clips **(5)**.



4. Remove the eight Phillips M2.5 × 7.0 screws **(1)** that secure the display to the computer.
5. Rotate the computer to open the hinges **(2)**.

6. Separate the computer from the display **(3)**.



Reverse this procedure to replace the display assembly.

System board

To remove the system board, use these procedures and illustrations.

Table 5-12 System board descriptions and part numbers

Description	Spare part number
System board (includes processor):	
All system boards use the following part numbers:	
xxxxxx-001: Non-Windows operating system	
xxxxxx-601: Windows 10 operating system	
System board with integrated AMD Ryzen 7-4750U processor	M09344-xx1
System board with integrated AMD Ryzen 7-4700U processor	M03442-xx1
System board with integrated AMD Ryzen 5-4650U processor	M09343-xx1
System board with integrated AMD Ryzen 5-4500U processor	M03441-xx1
System board with integrated AMD Ryzen 3-4300U processor	M03440-xx1

Before removing the system board, follow these steps:

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

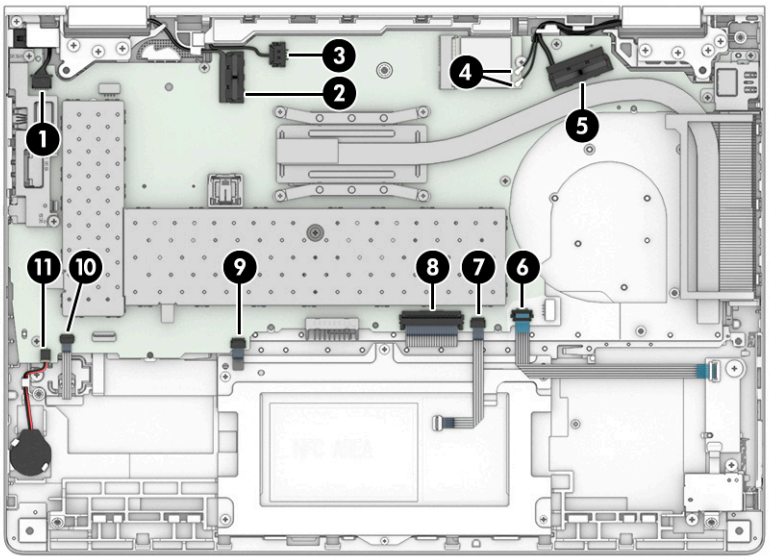
3. Remove the battery (see Battery on page 30).
4. Remove the fan (see Fan on page 41).

When you replace the system board, be sure to remove the following components (as applicable) from the defective system board and install them on the replacement system board:

- Memory modules (see Memory modules on page 34).
- WLAN module (see WLAN module on page 37).
- Heat sink (see Heat sink on page 42).

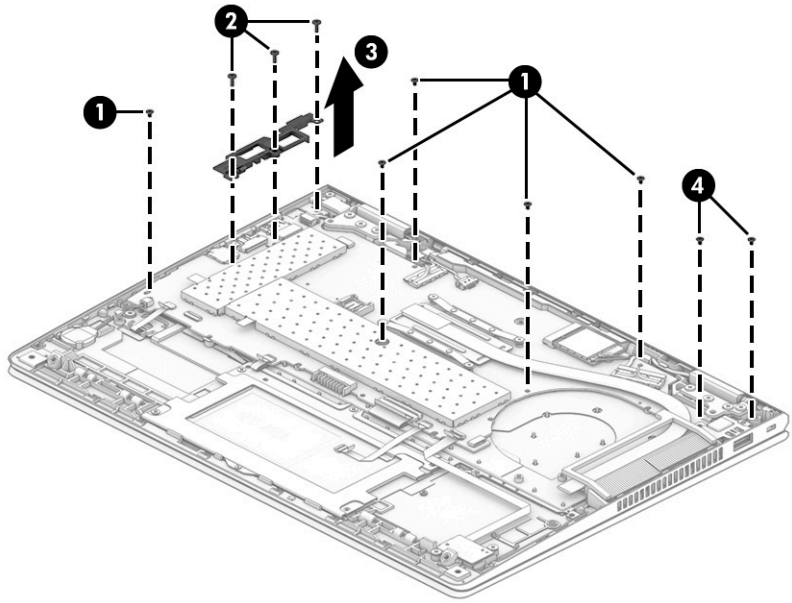
Remove the system board:

1. Disconnect the following cables from the system board:
   - Power connector cable **(1)**
   - Display cable **(2)**
   - Speaker cable **(3)**
   - Antenna cables from the WLAN module **(4)**
   - Display cable **(5)**
   - Camera cable (ZIF) **(6)**
   - Touchpad cable (reverse ZIF) **(7)**
   - Keyboard cable (reverse ZIF) **(8)**
   - Keyboard backlight cable (reverse ZIF) **(9)**
   - Fingerprint reader cable (reverse ZIF) **(10)**
   - RTC battery cable **(11)**

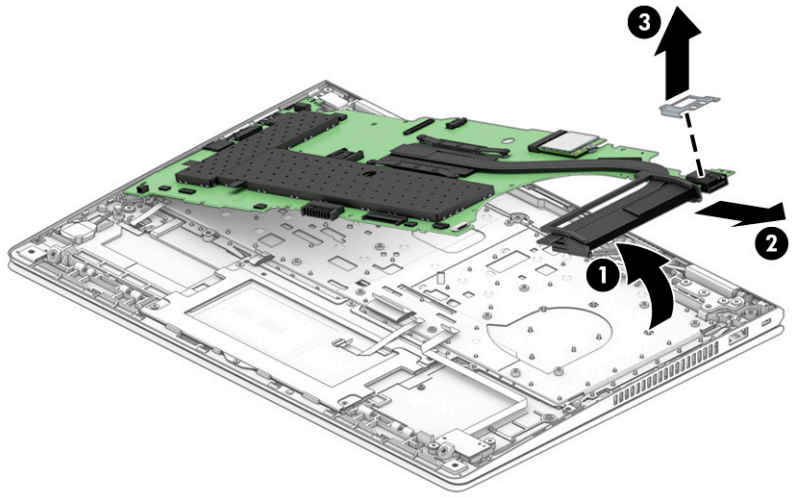


2. Remove the five Phillips M2.0 × 2.5 screws **(1)** that secure the system board to the computer.
3. Remove the three Phillips M2.0 × 5.0 screws **(2)** from the plastic bracket, and then remove the bracket **(3)**.

4. Remove the two Phillips M2.0 × 3.0 screws **(4)** that secure the metal USB port bracket to the computer.



5. Lift the right side of the system board upward **(1)**.
6. Pull the board toward the right and out of the computer **(2)** while removing the metal bracket from the right side of the board **(3)**.



Reverse this procedure to install the system board.

Speaker

To remove the speaker, use this procedure and illustration.

Table 5-13 Speaker description and part number

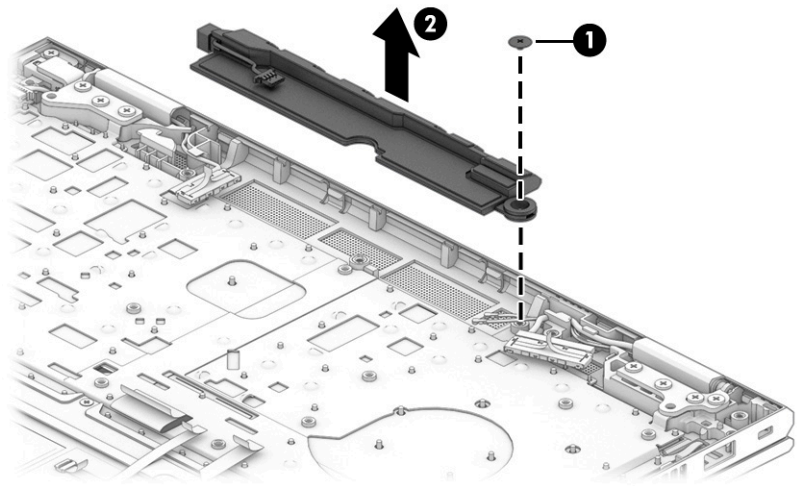
Description	Spare part number
Speaker Kit	M03439-001

Before removing the speaker, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (Bottom cover on page 29).
3. Remove the battery (see Battery on page 30).
4. Remove the fan (see Fan on page 41).
5. Remove the system board (see System board on page 45).

Remove the speaker:

1. Remove the Phillips M2.0 × 3.0 screw **(1)** that secures the speaker to the computer.
2. Remove the speaker from the computer **(2)** .



Reverse this procedure to install the speaker.

Fingerprint sensor

To remove the fingerprint sensor, use this procedure and illustration.

Table 5-14 Fingerprint sensor description and part number

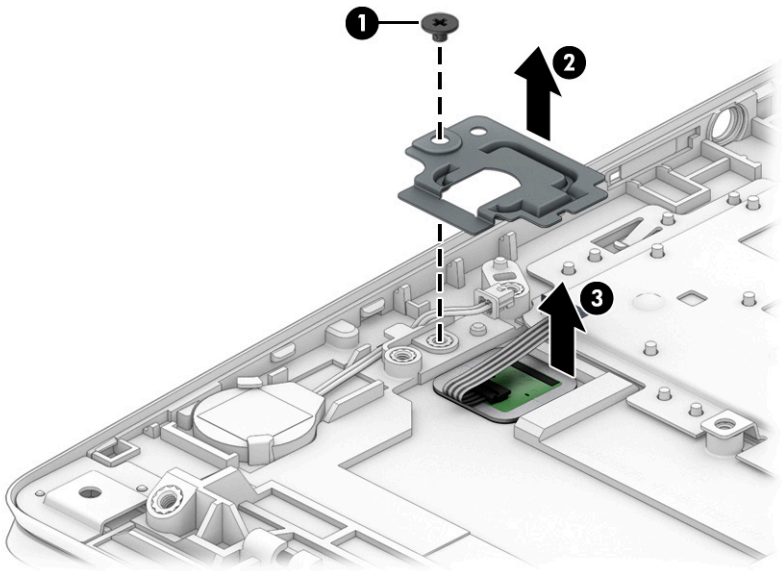
Description	Spare part number
Fingerprint sensor	M03434-001
NOTE: The fingerprint sensor cable is available in the Cable Kit, spare part number M03431-001. The fingerprint sensor bracket is available in the Bracket Kit, spare part number M03436-001.	

Before removing the fingerprint sensor, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (Bottom cover on page 29).
3. Remove the battery (see Battery on page 30).
4. Remove the fan (see Fan on page 41).
5. Remove the system board (see System board on page 45).

Remove the fingerprint sensor:

1. Remove the Phillips M2.0 × 3.0 screw **(1)** that secures the fingerprint reader bracket to the computer, and then remove the bracket **(2)**.
2. Remove the fingerprint reader sensor from the computer **(3)**.



Reverse this procedure to install the fingerprint sensor.

Power connector cable

To remove the power connector cable, use this procedure and illustration.

Table 5-15 Power connector cable description and part number

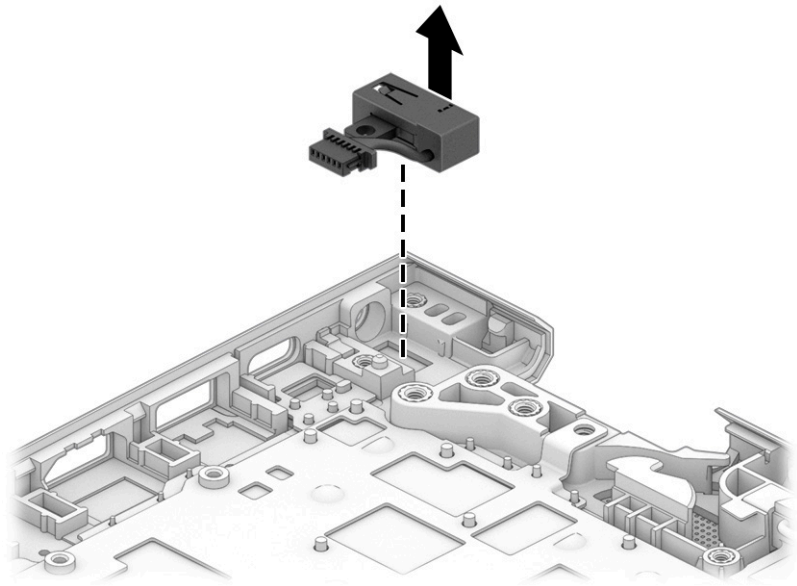
Description	Spare part number
Power connector cable	M03424-001

Before removing the power connector cable, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (Bottom cover on page 29).
3. Remove the battery (see Battery on page 30).
4. Remove the fan (see Fan on page 41).
5. Remove the system board (see System board on page 45).
6. Remove the display (see Display assembly on page 43).

Remove the power connector cable:

▲ Lift the power connector cable from the computer.



Reverse this procedure to install the power connector cable.

Keyboard with top cover

The top cover with keyboard remains after removing all other spare parts from the computer. In this section, the first table provides the main spare part number for the top cover/keyboards. The second table provides the country codes.

Table 5-16 Keyboard with top cover descriptions and part numbers

Description	Spare part number
Keyboard with top cover, for models without a rear camera, backlit	M03444-xx1
Keyboard with top cover, for models with a rear camera, backlit	M03445-xx1
Keyboard with top cover, for models without a rear camera, backlit	M03446-xx1
Keyboard with top cover, for models with a rear camera, backlit	M03447-xx1
Keyboard with top cover, for models without a rear camera, not backlit	M03448-xx1
Keyboard with top cover, for models with a rear camera, not backlit	M03449-xx1

Table 5-17 Spare part country codes

For use in country or region	Spare part number	For use in country or region	Spare part number	For use in country or region	Spare part number
Belgium	-A41	Iceland	-DD1	Slovenia	-BA1
Brazil	-201	India	-D61	South Korea	-AD1
Bulgaria	-261	Israel	-BB1	Spain	-071
Chile	-161	Italy	-061	Switzerland	-BG1
Czech Republic/Slovakia	-FL1	Japan	-291	Taiwan	-AB1

Table 5-17 Spare part country codes (continued)

For use in country or region	Spare part number	For use in country or region	Spare part number	For use in country or region	Spare part number
Denmark, Finland, and Norway	-DH1	The Netherlands	-B31	Thailand	-281
French Canada	-DB1	Northern Africa	-FP1	Turkey	-141
France	-051	Portugal	-131	Ukraine	-BD1
Germany	-041	Romania	-271	United Kingdom	-031
Greece	-151	Russia	-251	United States	-001
Hungary	-211	Saudi Arabia	-171		

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

HP provides several tools to help set up and protect your computer.

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 hard drives, display, keyboard, mouse, and printer). Computer Setup includes settings for types of devices installed, the startup sequence of the computer, and amount of system and extended memory.

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

To start 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

You can navigate and select in Computer Setup using one or more methods.

- 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

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

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

1. Start Computer Setup. See Using Computer Setup on page 53.
2. Select **Main**, select **Apply Factory Defaults and Exit**, and then select **Yes**.

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

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

Your changes go into effect when the computer restarts.

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

Updating the BIOS

Updated versions of the BIOS might be available on the HP website. Most BIOS updates on the HP website are packaged in compressed files called *SoftPaqs*.

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

Determining the BIOS version

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

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

1. Start Computer Setup. See Using Computer Setup on page 53.
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 Preparing for a BIOS update on page 54.

Preparing for a BIOS update

Be sure to follow all prerequisites before downloading and installing a BIOS update.

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

Do not disconnect power on the computer by unplugging the power cord from the AC outlet.

Do not shut down the computer or initiate Sleep.

Do not insert, remove, connect, or disconnect any device, cable, or cord.

Downloading a BIOS update

After you review the prerequisites, you can check for and download BIOS updates.

1. Type `support` in the taskbar search box, and then select the HP Support Assistant app.

   – or –

   Select the question mark icon in the taskbar.

2. Select **Updates**, and then select **Check for updates and messages**.
3. Follow the on-screen instructions.
4. At the download area, follow these steps:

   a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You might need this information to locate the update later, after it has been downloaded to your hard drive.

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

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

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

Installing a BIOS update

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)

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

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

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 Using Computer Setup on page 53.
2. Select **Security**, select **TPM Embedded Security**, and then follow the on-screen instructions.

Using HP Sure Start (select products only)

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

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

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

7 Backing up, restoring, and recovering

This chapter provides information about processes that 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 57).
- **Creating a restore point**—You can use Windows tools to create a restore point (see Using Windows tools on page 57).
- **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 57).
- **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 57).

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

These methods of creating recovery media and backups are available on select products only. Choose the appropriate method for your computer model.

Using Windows tools

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

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

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.

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

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

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

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

For details:

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

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

Restoring and recovery

You have several options for recovering your system. Choose the method that best matches your situation and level of expertise.

NOTE: Not all methods are available on all products.

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 57.

Recovering using HP Recovery media

You can use HP Recovery media to recover the original operating system and software programs that were installed at the factory. On select products, it can be created on a bootable USB flash drive using the HP Cloud Recovery Download Tool.

For details, see Using the HP Cloud Recovery Download Tool to create recovery media (select products only) on page 57.

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

To recover your system:

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

Changing the computer boot order

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

To change the boot order:

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

1. Insert the HP Recovery media.
2. Access the system **Startup** menu.
   - For computers or tablets with keyboards attached, turn on or restart the computer or tablet, quickly press esc, and then press f9 for boot options.
   - For tablets without keyboards, turn on or restart the tablet, quickly hold down the volume up button, and then select **f9**.

     – or –

     Turn on or restart the tablet, quickly hold down the volume down button, and then select **f9**.
3. Select the optical drive or USB flash drive from which you want to boot, and then follow the on-screen instructions.

Using HP Sure Recover (select products only)

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

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

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

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

8 Using HP PC Hardware Diagnostics

The HP PC Hardware Diagnostics utility allows you to run diagnostics tests to determine whether your computer hardware is running properly. The three versions are HP PC Hardware Diagnostics Windows, HP PC Hardware Diagnostics UEFI (Unified Extensible Firmware Interface), and (for select products only) a firmware feature called Remote HP PC Hardware Diagnostics UEFI.

Using HP PC Hardware Diagnostics Windows (select products only)

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

If HP PC Hardware Diagnostics Windows is not installed on your computer, first you must download and install it. To download HP PC Hardware Diagnostics Windows, see Downloading HP PC Hardware Diagnostics Windows on page 62.

Using an HP PC Hardware Diagnostics Windows hardware failure ID code

When HP PC Hardware Diagnostics Windows detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated.

▲ Depending on the instructions on the screen, choose one of these options:

- If failure ID link is displayed, select the link and follow the on-screen instructions.
- If instructions for calling support are displayed. Follow those instructions.

Accessing HP PC Hardware Diagnostics Windows

After HP PC Hardware Diagnostics Windows is installed, you can access it from HP Help and Support or HP Support Assistant.

Accessing HP PC Hardware Diagnostics Windows from HP Help and Support

After HP PC Hardware Diagnostics Windows is installed, follow these steps to access it from HP Help and Support.

To access HP PC Hardware Diagnostics Windows from HP Help and Support:

1. Select the **Start** button, and then select **HP Help and Support**.
2. Select **HP PC Hardware Diagnostics Windows**.
3. When the tool opens, select the type of diagnostic test that you want to run, and then follow the on-screen instructions.

NOTE: To stop a diagnostic test, select **Cancel**.

Accessing HP PC Hardware Diagnostics Windows from Support Assistant

After HP PC Hardware Diagnostics Windows is installed, follow these steps to access it from HP Support Assistant.

To access HP PC Hardware Diagnostics Windows from HP Support Assistant:

1. Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.

   – or –

   Select the question mark icon in the taskbar.

2. Select **Troubleshooting and fixes**.
3. Select **Diagnostics**, and then select **HP PC Hardware Diagnostics Windows**.
4. When the tool opens, select the type of diagnostic test that you want to run, and then follow the on-screen instructions.

NOTE: To stop a diagnostic test, select **Cancel**.

Downloading HP PC Hardware Diagnostics Windows

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

Downloading the latest HP PC Hardware Diagnostics Windows version from HP

To download HP PC Hardware Diagnostics Windows from HP, follow these steps.

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

The tool downloads to the selected location.

Downloading the HP PC Hardware Diagnostics Windows from the Microsoft Store

You can download the HP PC Hardware Diagnostics Windows from the Microsoft Store.

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

The tool downloads to the selected location.

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

You can download HP PC Hardware Diagnostics Windows by product name or number.

NOTE: For some products, you might have to download the software to a USB flash drive by using the product name or number.

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

The tool downloads to the selected location.

Installing HP PC Hardware Diagnostics Windows

To install HP PC Hardware Diagnostics Windows, navigate to the folder on your computer or the USB flash drive where the .exe file downloaded, double-click the .exe file, and then follow the on-screen instructions.

Using HP PC Hardware Diagnostics UEFI

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.

NOTE: For Windows 10 S computers, you must use a Windows computer and a USB flash drive to download and create the HP UEFI support environment because only .exe files are provided. For more information, see Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive on page 64.

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

Using an HP PC Hardware Diagnostics UEFI hardware failure ID code

When HP PC Hardware Diagnostics UEFI detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated.

For assistance in solving the problem:

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

  – or –

  Contact support, and provide the Failure ID code.

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

NOTE: If you need to stop a diagnostic test, press esc.

Starting HP PC Hardware Diagnostics UEFI

To start HP PC Hardware Diagnostics UEFI, follow this procedure.

1. Turn on or restart the computer, and quickly press esc.
2. Press f2.

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

a. Connected USB flash drive

NOTE: To download the HP PC Hardware Diagnostics UEFI tool to a USB flash drive, see Downloading the latest HP PC Hardware Diagnostics UEFI version on page 64.

b. Hard drive

c. BIOS

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

Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive

Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive can be useful in some situations.

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

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

Downloading the latest HP PC Hardware Diagnostics UEFI version

To download the latest HP PC Hardware Diagnostics UEFI version to a USB flash drive, follow this procedure.

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)

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

NOTE: For some products, you might have to download the software to a USB flash drive by using the product name or number.

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

HP Remote PC Hardware Diagnostics UEFI is also available as a SoftPaq that you can download to a server.

Downloading the latest Remote HP PC Hardware Diagnostics UEFI version

You can 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 Remote Diagnostics**, and then select **Run**.

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

You can download HP Remote PC Hardware Diagnostics UEFI by product name or number.

NOTE: For some products, you might have to download the software by using the product name or number.

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

Customizing Remote HP PC Hardware Diagnostics UEFI settings

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

- Set a schedule for running diagnostics unattended. You can also start diagnostics immediately in interactive mode by selecting **Execute Remote HP PC Hardware Diagnostics**.
- Set the location for downloading the diagnostic tools. This feature provides access to the tools from the HP website or from a server that has been preconfigured for use. Your computer does not require the traditional local storage (such as a hard drive or USB flash drive) to run remote diagnostics.
- Set a location for storing the test results. You can also set the user name and password that you use for uploads.
- Display status information about the diagnostics run previously.

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

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

Your changes take effect when the computer restarts.

9 Specifications

This chapter provides specifications for your computer.

Computer specifications

This section provides specifications for your computer. When traveling with your computer, the computer dimensions and weights, as well as input power ratings and operating specifications, provide helpful information.

Table 9-1 Computer specifications

	Metric	U.S.
Dimensions		
Width	**308.5 mm**	12.15 in
Depth	**222.9 mm**	8.78 in
Height (front to back)	**17.9 mm**	0.71 in
Weight	**1.45 kg**	3.19 lb
Input power		
Operating voltage and current	19.5 V dc @ 3.33 A – 65 W	
	19.5 V dc @ 2.31 A – 45 W	
Temperature		
Operating	**5°C to 35°C**	41°F to 95°F
Nonoperating	**–20°C to 60°C**	–4°F to 140°F
Relative humidity (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating	**–15 m to 3,048 m**	–50 ft to 10,000 ft
Nonoperating	**–15 m to 12,192 m**	–50 ft to 40,000 ft

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

33.8 cm (13.3 in) display specifications

This section provides specifications for your display.

Table 9-2 Display specifications

	Metric	U.S.
Active diagonal size	**33.8 cm**	13.3 in
Resolution	1920 × 1080	
Surface treatment	BrightView	
Brightness	250 nits (45% CG panels) 400 nits (72% CG panels) 1000 nits (privacy panels)	
Viewing angle	UWVA	
Backlight	LED	
Display panel interface	eDP	

Solid-state drive specifications

This section provides specifications for your solid-state drives.

Table 9-3 Solid-state drive specifications

	256 GB*	512 GB*	1 TB*
Dimensions			
Height	1.0 mm	1.0 mm	1.0 mm
Length	50.8 mm	50.8 mm	50.8 mm
Width	28.9 mm	28.9 mm	28.9 mm
Weight	< 10 g	< 10 g	< 10 g
Interface type	PCIe	PCIe	PCIe
Ready time, maximum (to not busy)	1.0 ms	< 1.0 ms	1.0 ms
Access times, logical	0.1 ms	0.1 ms	0.1 ms
Transfer rate			
Sequential read	up to 2150 MB/s	up to 2150 MB/s	up to 2150 MB/s
Random read	Up to 300,000 IOPs	Up to 300,000 IOPs	Up to 300,000 IOPs
Sequential write	up to 1550 MB/s	up to 1550 MB/s	up to 1550 MB/s
Random write	Up to 100,000 IOPs	Up to 100,000 IOPs	Up to 100,000 IOPs
Total logical sectors	468,883,296	1,000,215,216	1,500,336,388
Operating temperature	**0°C to 70°C** (32°F to 158°F)		

*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less. Actual drive specifications may differ slightly.

NOTE: Certain restrictions and exclusions apply. Contact support for details.

Solid-state drive specifications (SATA-3)

This section provides specifications for your solid-state drive.

Table 9-4 Solid-state drive specifications

	128 GB*
Dimensions	
Height	1.35 mm
Weight	< 10 g
Interface type	SATA-3
Ready time, maximum (to not busy)	1.0 ms
Access times, logical	0.1 ms
Transfer rate	up to 540 MB/s
Total logical sectors	234,441,648
Operating temperature	**0°C to 70°C** (32°F to 158°F)

*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less. Actual drive specifications may differ slightly.

NOTE: Certain restrictions and exclusions apply. Contact support for details.

10 Statement of memory volatility

For general information regarding nonvolatile memory in HP Business computers, and to restore nonvolatile memory that can contain personal data after the system has been turned off and the hard drive has been removed, use these instructions.

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, with the following assumptions:

- No subsequent modifications were made to the system.
- No applications, features, or functionality were 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 also remains in nonvolatile memory. Use the following steps 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

Use these instructions to restore nonvolatile memory.

1. Follow these steps to restore the nonvolatile memory that can contain personal data. Restoring or reprogramming nonvolatile memory that does not store personal data is neither necessary nor recommended.

   a. Turn on or restart the computer, and then quickly press esc.

   NOTE: If the system has a BIOS administrator password, enter the password at the prompt.

   b. Select **Main**, select **Apply Factory Defaults and Exit**, and then select **Yes** to load defaults. The computer restarts.

   c. During the restart, 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**, and 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:

If you clear data using Secure Erase, you cannot recover it.

a. Turn on or restart the computer, and then quickly press esc.

b. Select the **Security** menu and scroll down to the esc 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:

   i. Turn on or restart the computer, and then quickly press esc.

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

   iii. Select **Hard Drive Utilities**.

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

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.

Nonvolatile memory usage

Use this table to troubleshooting nonvolatile memory usage.

Table 10-1 Troubleshooting steps for nonvolatile memory usage

Nonvolatile memory type	Amount (Size)	Does this memory store customer data?	Does this memory retain data when power is removed?	What is the purpose of this memory?	How is data entered into this memory?	How is this memory write-protected?
HP Sure Start flash (select models only)	8 MB	No	Yes	Provides protected backup of critical System BIOS code, EC firmware, and critical computer configuration data for select platforms that support HP Sure Start. For more information, see Using HP Sure Start (select products only) on page 76.	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 Windows date & time.	This memory is not write-protected.
Controller (NIC) EEPROM	64 KB (not customer accessible)	No	Yes	Stores NIC configuration and NIC firmware.	NIC EEPROM is programmed using a utility from the NIC vendor that can be run from DOS.	A utility must be used to write data to this memory and is available from the NIC vendor. Writing data to this ROM in an inappropriate manner will render the NIC non-functional.
DIMM Serial Presence Detect (SPD) configuration data	256 bytes per memory module, 128 bytes programmable (not customer accessible)	No	Yes	Stores memory module information.	DIMM SPD is programmed by the memory vendor.	Data cannot be written to this memory when the module is installed in a computer. The specific write-protection method varies by memory vendor.
System BIOS	9 MB	Yes	Yes	Stores system BIOS code and computer configuration data.	System BIOS code is programmed at the factory. Code is updated when the system BIOS is updated. Configuration data and settings are entered using the Computer Setup (BIOS) or a custom utility.	**NOTE:** Writing data to this ROM in an inappropriate manner can render the computer non-functional. A utility must be used for writing data to this memory and is available

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

Nonvolatile memory type	Amount (Size)	Does this memory store customer data?	Does this memory retain data when power is removed?	What is the purpose of this memory?	How is data entered into this memory?	How is this memory write-protected?
						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 **Identify your product for manuals and specific product information**, 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 megabits	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 kilobits to 8 kilobits	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.
Camera (select products only)	64 kilobits	No	Yes	Stores camera configuration and firmware.	Camera memory is programmed using a utility from the device manufacturer that can be run from Windows.	A utility must be used for writing data to this memory and is typically not made available to the public unless a firmware upgrade is necessary to address a unique issue.
Fingerprint reader (select products only)	512 KB flash	Yes	Yes	Stores fingerprint templates.	Fingerprint reader memory is programmed by user enrollment in HP ProtectTools Security Manager.	Only a digitally signed application can make the call to write to the flash.

Questions and answers

Use this section to answer your questions about nonvolatile memory.

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

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

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

   a. Turn on or restart the computer, and then quickly press esc.

   b. Select **Main**, and then select **Apply Factory Defaults and Exit**.

   c. Follow the on-screen instructions.

   d. Select **Main**, select **Save Changes and Exit**, and then follow the on-screen instructions.

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

   The Unified Extensible Firmware Interface (UEFI) BIOS is an industry-standard software interface between the platform firmware and an operating system (OS). It replaces 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 runtime 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 runtime 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 is the UEFI BIOS located?**

   The UEFI BIOS is located on a flash memory chip. You must use a utility 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 and timing, voltage, and thermal information. This information is written by the module manufacturer and stored on an EEPROM. You cannot write to this EEPROM 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 erase the data?**

IMPORTANT: Resetting results in the loss of information.

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

a. Turn on or restart the computer, and then quickly press esc.

b. Select **Main**, and then select **Reset Security to Factory Defaults**.

c. Follow the on-screen instructions.

d. Select **Main**, select **Save Changes and Exit**, and then follow the on-screen instructions.

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

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

a. Turn on or restart the computer, and then quickly press esc.

b. Select the **Security** menu, select **Secure Boot Configuration**, and then follow the on-screen instructions.

c. At the **Secure Boot Configuration** window, select **Secure Boot**, select **Clear Secure Boot Keys**, and then follow the on-screen instructions to continue.

Using HP Sure Start (select products 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. Advanced users can customize the default configuration.

To access the latest documentation on HP Sure Start, go to http://www.hp.com/support.

11 Power cord set requirements

This chapter provides power cord requirements for countries and regions.

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

These power cord 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 V ac 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

To determine power cord requirements for specific countries and regions, use this table.

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

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

Country/region	Accredited agency	Applicable note number
India	BIS	1
Israel	SII	1
Italy	IMQ	1
Japan	JIS	3
The Netherlands	KEMA	1
New Zealand	SANZ	1
Norway	NEMKO	1
The People's Republic of China	CCC	4
Saudi Arabia	SASO	7
Singapore	PSB	1
South Africa	SABS	1
South Korea	KTL	5
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	6
Thailand	TISI	1
The United Kingdom	ASTA	1
The United States	UL	2

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

When a nonrechargeable 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 website at http://www.hp.com/recycle.

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