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 is automatically updated, which is always enabled. High-speed internet and Microsoft account required. ISP fees may apply and additional requirements may apply over time for updates. See http://www.microsoft.com. **If your product ships with Windows in S Mode:** Windows in S Mode works exclusively with apps from the Microsoft Store within Windows. Certain default settings, features, and apps cannot be changed. Some accessories and apps that are compatible with Windows may not work (including some antivirus, PDF writers, driver utilities, and accessibility apps), and performance may vary, even if you switch out of S Mode. If you switch to Windows, you cannot switch back to S Mode. Learn more at Windows.com/SmodeFAQ.

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.

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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 ENVY x360 15.6 inch 2-in-1 Laptop PC
	Model number: 15-ey0xxx
	CTO model number: 15z-ey000
Processors	AMD™ Ryzen7-5825U 2.0 GHz processor (8 cores, 16 MB Cache, 15 W)
	AMD Ryzen5-5625U 2.3 GHz processor (6 cores, 16 MB Cache, 15 W)
Chipset	AMD integrated soldered-on-circuit (SoC) fusion controller hub (FCH)
Graphics card	AMD Radeon integrated graphics
Display	39.6 cm (15.6 in), liquid crystal display (LCD), full high-definition (FHD), widescreen ultra extended graphics array (WUXGA, 1920 × 1080), brightview, organic light-emitting diode (OLED) + low blue light (LBL), ultrawide viewing angle (UWVA), Digital Cinema Initiatives - Protocol 3 (DCI-P3), 100% CG, embedded DisplayPort™ (eDP) 1.4 + panel self refresh (PSR), virtual world environment (VWE) 2, bent, touch on panel (TOP) display panel with narrow bezel; typical brightness: 400 nits
	39.6 cm (15.6 in), LCD, FHD, WUXGA (1920 × 1080), antiglare, white light-emitting diode (WLED), UWVA, 45% CG, eDP 1.2 without PSR, VWE, bent, TOP display panel with narrow bezel; typical brightness: 250 nits
Memory	Two customer-accessible memory module slots (small outline dual in-line memory modules (SODIMMs) supporting up to 16 GB of RAM in the following configurations: • 16 GB (8 × 2) • 12 GB (8 × 1 + 4 × 1) • 8 GB (4 × 2)
	Double data rate (DDR4)-3200
Storage	**M.2 solid state drive:** 512 GB, M.2 2280, Peripheral Component Interconnect Express (PCIe)-3×4, Non-Volatile Memory Express (NVMe) solid-state drive with three-layer cell (TLC)
	Solid-state drive, support for the following configurations: • 1 TB, 2280, PCIe-3×4, NVMe solid-state drive with TLC • 1 TB, 2280, PCIe, NVMe, value solid-state drive • 512 GB, 2280, PCIe, NVMe, value solid-state drive • 256 GB, 2280, PCIe, NVMe, value solid-state drive

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

Category	Description
Audio and video	**Audio brand:** BANG and OLUFSEN
	Support for dual speakers
	HP support for Far Field Cortana
	Support for Alexa
	Support for HP Audio Boost 2.0
	Support for Speaker Swap
	Support for XiaoWei
	HP True Vision Camera: 5 MP, USB 2.0, fixed, infrared (IR), integrated camera with sliding shutter
	Dual-array microphone
Wireless	**Wireless Local Area Network (WLAN)**
	Mediatek MT7921 Wi-Fi® 6 + Bluetooth® 5.2 M.2 2230 PCI-e + USB worldwide (WW) WLAN module
	Mediatek RZ616 Wi-Fi 6e + Bluetooth 5.2 M.2 2230 160 MHz PCI-e + USB WW WLAN module
Pen	HP Pen (Zenvo, in nightfall black finish)
Ports	Hot plug/unplug and autodetect for correct output to wide-aspect vs. standard aspect video
	• Audio-out (headphone)/Audio-in (microphone) combo jack • HDMI port • SIM card slot (select products only) • Smart card reader (select products only) • USB SuperSpeed 5 Gbps port • USB SuperSpeed 5 Gbps port with HP Sleep and Charge • USB Type-C® power connector and Thunderbolt™ ports with HP Sleep and Charge and DisplayPort output (2)
Keyboard/pointing devices	**Keyboard:** Backlit, island-style, standard notebook PC keyboard with Clickpad in nightfall black finish
	Touchpad
	Clickpad with image sensor
	Multitouch gestures enabled
	Precision touchpad support
	Taps enabled as default
Power requirements	**3 cell, 51 Whr, polymer, HP Long Life battery with HP Fast Charge Technology**
	HP 65 W AC adapter (USB Type-C®, non-Power Factor Correction (nPFC), slim with straight barrel, 1.8m [6.0 ft])
	C5, 1.0 m (3.3 ft), premium with sticker power cord

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

Category	Description
Security	Microphone mute
	Privacy camera shutter door
	Trusted platform module (TPM) 2.0 - discrete
	TPM 2.0 - firmware
Sensors	Accelerometer × 2
	Ambient light sensor (ALS)
	Gyroscope / E-compass / Accelerometer + Magnetometer
	Infared (IR) Thermal Sensor
	Sensor hub
Operating system	Windows® 11 Home 64
	Windows 11 Home 64 Plus
	Windows 11 Home 64 Plus Single Language
	Windows 11 Home 64 Single Language
	Windows 11 Pro 64
Serviceability	**End user replaceable part:** AC adapter

2 Components

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

2.1 Locating hardware

Use these instructions to find out what hardware is installed on your computer.

- Select the **Search** icon (select products only) in the taskbar, type `device manager` in the search box, and then select the **Device Manager** app.

A list displays all the devices installed on your computer.

For information about system hardware components and the system BIOS version number, press fn+esc (select products only).

2.2 Locating software

Use these instructions to find out what software is installed on your computer:

- Right-click the **Start** button, and then select **Apps and Features**.

2.3 Right

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

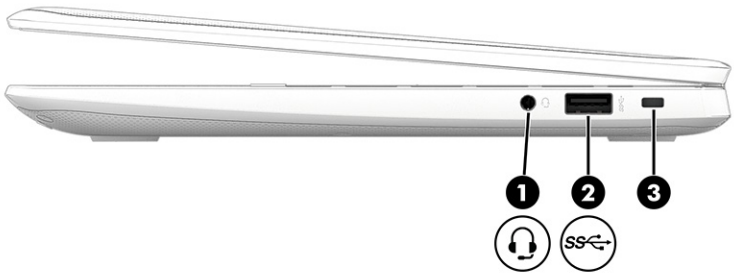


Table 2-1 **Right-side components and their descriptions**

Component		Description
(1)	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: ▪ Select the **Search** icon (select products only) in the taskbar, type `HP Documentation` in the search box, and then select **HP Documentation**. NOTE: When a device is connected to the jack, the computer speakers are disabled.
(2)	USB SuperSpeed 5 Gbps port	Connects a USB device, provides high-speed data transfer, and (for select products) charges small devices (such as a smartphone) when the computer is on or in Sleep mode. NOTE: Use a standard USB Type-A charging cable or cable adapter (purchased separately) when charging a small external device.
(3)	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.

2.4 Left

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

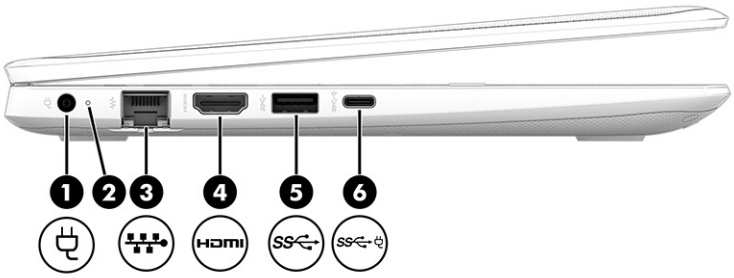


Table 2-2 **Left-side components and their descriptions**

Component		Description
(1)	Power connector	Connects an AC adapter.

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

Component		Description
(2)	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.
(3)	RJ-45 (network) jack/status lights	Connects a network cable. • Green (left): The network is connected. • Amber (right): Activity is occurring on the network.
(4)	HDMI port	Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed High Definition Multimedia Interface (HDMI) device.
(5)	USB SuperSpeed 5 Gbps port	Connects a USB device, provides high-speed data transfer, and (for select products) charges small devices (such as a smartphone) when the computer is on or in Sleep mode. NOTE: Use a standard USB Type-A charging cable or cable adapter (purchased separately) when charging a small external device.
(6)	USB Type-C power connector and SuperSpeed 5 Gbps port	Connects an AC adapter that has a USB Type-C connector, supplying power to the computer and, if needed, charging the computer battery. – and – Connects a USB device, provides high-speed data transfer, and (for select products) charges small devices (such as a smartphone) when the computer is on or in Sleep mode. NOTE: Use a standard USB Type-C charging cable or cable adapter (purchased separately) when charging a small external device.

2.5 29.6 mm (11.6 in) display specifications

This section provides specifications for your display.

Table 2-3 Display specifications

	Metric	U.S.
Active diagonal size	29.6 cm	11.6 in
Resolution	1368 × 768 (HD)	
Surface treatment	Brightview (LED panel)	

Table 2-3 Display specifications (continued)

	Metric	U.S.
Brightness	250 nits (HD, 50% NTSC panel)	
	250 nits (HD, 45% NTSC panel)	
Viewing angle	UWVA	
	SVA	
Backlight	LED	
Display panel interface	eDP	

2.5.1 Low blue-light mode (select products only)

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

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

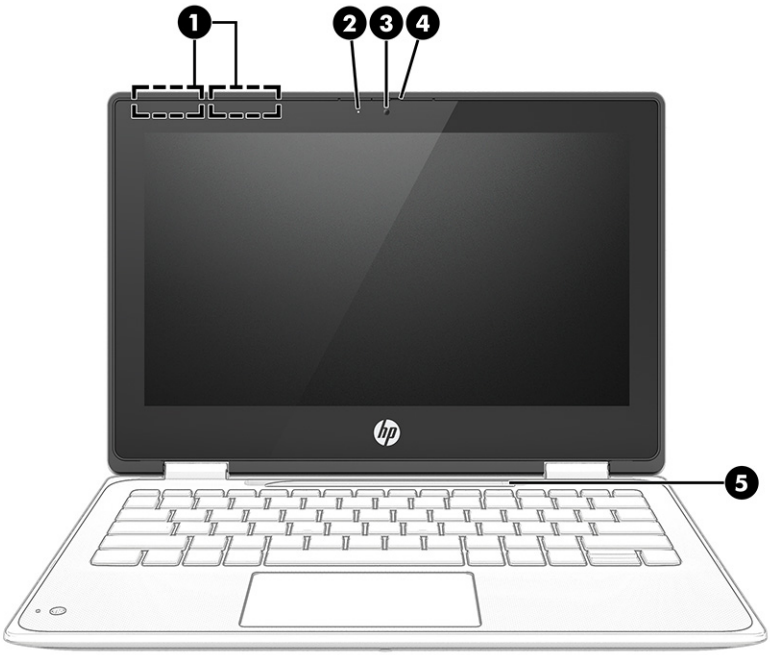


Table 2-4 Display and top cover components and their descriptions

Component		Description
(1)	WLAN antennas*	Send and receive wireless signals to communicate with wireless local area networks.
(2)	Camera light	On: The camera is in use.

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

Component		Description
(3)	Camera	Allows you to video chat, record video, and record still images. Some cameras also allow a facial recognition logon to Windows, instead of a password logon. NOTE: Camera functions vary depending on the camera hardware and software installed on your product.
(4)	Camera privacy cover (select products only)	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.
(6)	Magnetic pen attachment area (select products only)	Stores the magnetic pen (select products only).

*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:

- Select the **Search** icon (select products only) in the taskbar, type `HP Documentation` in the search box, and then select **HP Documentation**.

2.6 Keyboard area

Keyboards can vary by language.

2.6.1 Touchpad

The touchpad settings and components are described here.

2.6.1.1 Touchpad settings

You learn how to adjust the touchpad settings and components here.

2.6.1.1.1 Adjusting touchpad settings

Use these steps to adjust touchpad settings and gestures.

1. Select the **Search** icon (select products only) in the taskbar, type `touchpad settings` in the search box, and then press enter.
2. Choose a setting.

2.6.1.1.2 Turning on the touchpad

Follow these steps to turn on the touchpad.

1. Select the **Search** icon (select products only) in the taskbar, type `touchpad settings` in the search box, and then press enter.

2. Using an external mouse, click the **Touchpad** button.

   If you are not using an external mouse, press the Tab key repeatedly until the pointer rests on the **touchpad** button. Then press the spacebar to select the button.

2.6.1.2 Touchpad components

Use the illustration and table to identify the touchpad components.

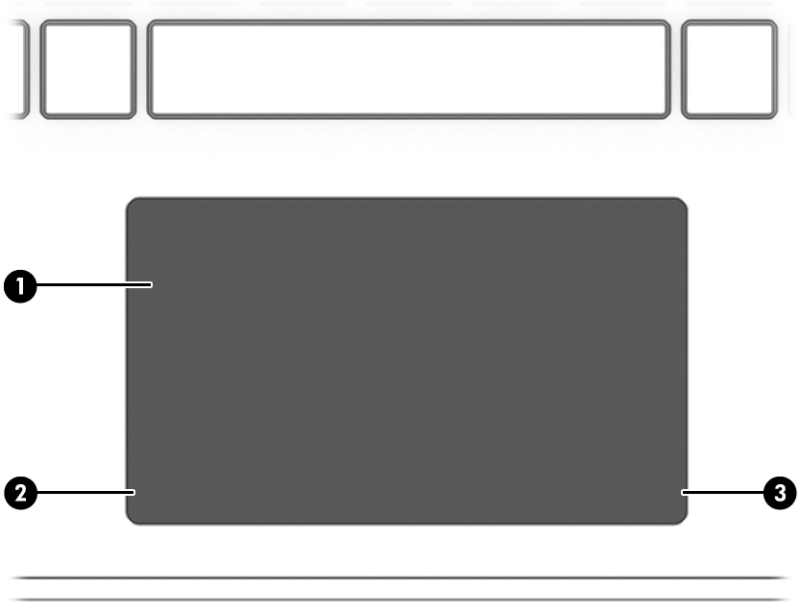


Table 2-5 **Touchpad components and their descriptions**

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

2.6.2 Special keys

Use the illustration and table to identify the special keys.

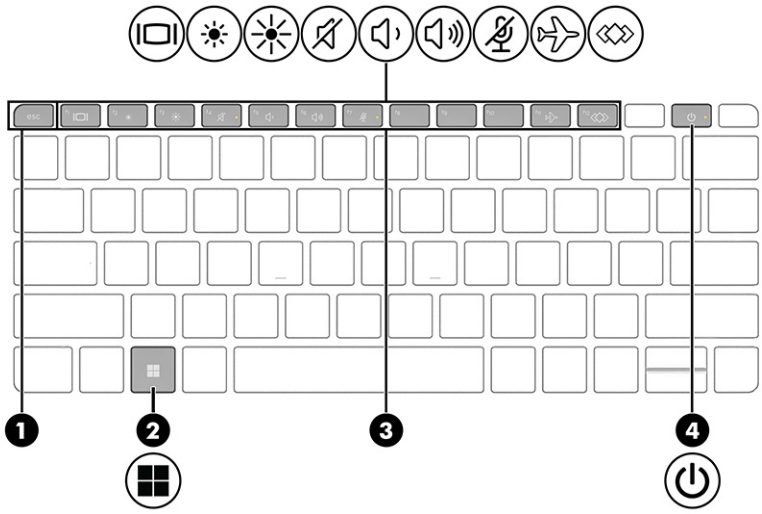


Table 2-6 Special keys and their descriptions

Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	Windows key	Opens the Start menu. NOTE: Pressing the Windows key again will close the Start menu.
(3)	Action keys	Execute frequently used system functions.
(4)	Power key	• When the computer is off, press the key briefly to turn on the computer. • When the computer is on, press the key briefly to initiate Sleep. • When the computer is in the Sleep state, press the key briefly to exit Sleep (select products only). • When the computer is in Hibernation, press the key briefly to exit Hibernation. IMPORTANT: Pressing and holding down the power key results in the loss of unsaved information. If the computer has stopped responding and shutdown procedures are ineffective, press and hold the power key for at least 4 seconds to turn off the computer. To learn more about your power settings, use the Power icon. • Right-click the **Power** icon and then, depending on your product, select **Power and sleep settings** or **Power Options**.

2.7 Bottom

Use the illustration and table to identify the bottom component.

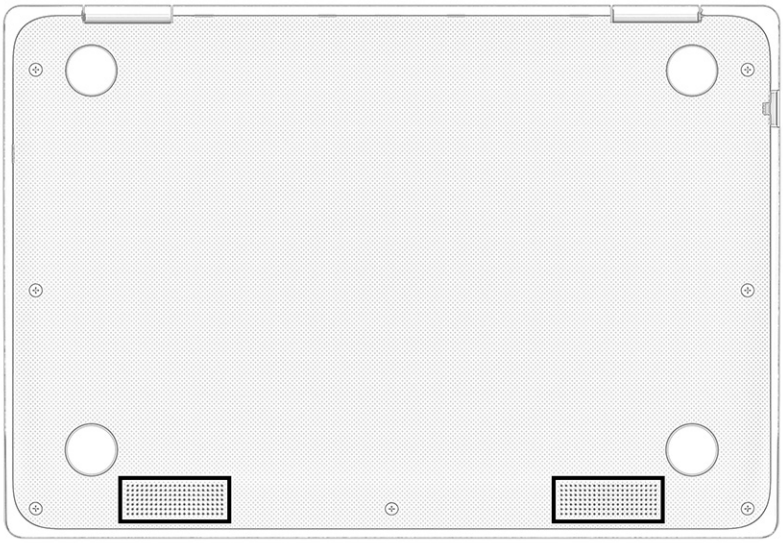


Table 2-7 **Bottom component and its description**

Component	Description
Speakers	Produce sound.

2.8 Labels

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

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 will resemble one of the examples shown below. Refer to the illustration that most closely matches the service label on your computer.

- Regulatory labels—Provide regulatory information about the computer.

- Wireless certification labels—Provide 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.

3.1 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.

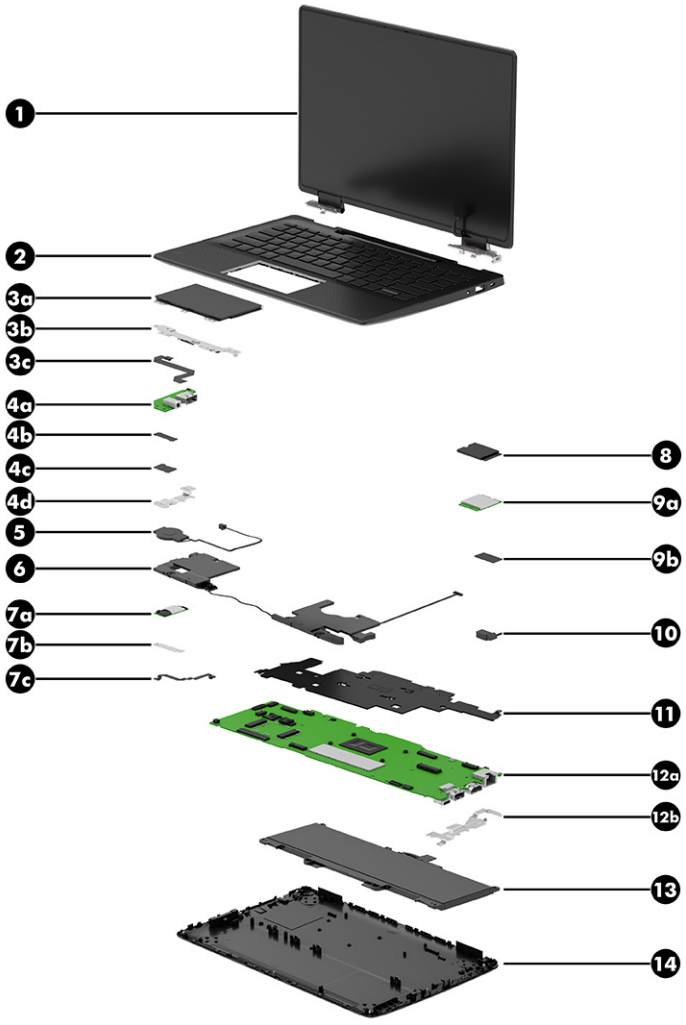


Table 3-1 Computer major component descriptions and part numbers

Item	Component	Spare part number
(1)	**29.6 cm (11.6 in), LCD, LED, BrightView, touchscreen display assembly with slim panel:**	
	Display assemblies in jellyfish blue finish:	
	HD (1366×768), UWVA, 50% CG, eDP display assembly with HD webcam; typical brightness: 250 nits	N08003-001
	HD (1366×768), SVA, 45% CG, eDP, display assembly with HD webcam; typical brightness: 250 nits	N00430-001
	Display assemblies in jet black finish:	
	HD (1366×768), UWVA, 50% CG, eDP display assembly with HD webcam; typical brightness: 250 nits	N08004-001
	HD (1366×768), SVA, 45% CG, eDP, display assembly with HD webcam; typical brightness: 250 nits	N00431-001
(2)	**Spill-resistant top cover/keyboard** with touchpad in jellyfish blue finish for use on computer models equipped with a digital pen and a top cover webcam.	N13129-xxx
	Spill-resistant top cover/keyboard with touchpad in jellyfish blue finish for use on computer models equipped with a top cover webcam.	N13128-xxx
	Spill-resistant top cover/keyboard with touchpad in jellyfish blue finish for use on computer models equipped with a digital pen.	N13130-xxx
	Spill-resistant top cover/keyboard with touchpad in jellyfish blue finish.	N13127-xxx
	Spill-resistant top cover/keyboard with touchpad in jet black finish for use on computer models equipped with a digital pen and a top cover webcam.	N13133-xxx
	Spill-resistant top cover/keyboard with touchpad in jet black finish for use on computer models equipped with a top cover webcam.	N13132-xxx
	Spill-resistant top cover/keyboard with touchpad in jet black finish for use on computer models equipped with a digital pen.	N13134-xxx
	Spill-resistant top cover/keyboard with touchpad in jet black finish.	N13131-xxx
	For use in Belgium	-A41
	For use in Bulgaria	-261
	For use in the Czech Republic and Slovakia	-FL1
	For use in Denmark	-081
	For use in Denmark, Finland, and Norway	-DH1
	For use in France	-051
	For use in French Canada	-DB1
	For use in Germany	-041
	For use in Greece	-151
	For use in Hungary	-211
	For use in Iceland	-DD1
	For use in India	-D61
	For use in Israel	-BB1
	For use in Italy	-061

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

Item	Component	Spare part number
	For use in Japan	-291
	For use in Kazakhstan	-DF1
	For use in Latin America	-161
	For use in the Netherlands	-B31
	For use in North Africa	-FP1
	For use in Norway	-091
	For use in Portugal	-131
	For use in Romania	-271
	For use in Russia	-251
	For use in Saudia Arabia	-171
	For use in Slovenia	-BA1
	For use in South Korea	-AD1
	For use in Spain	-071
	For use in Sweden and Finland	-B71
	For use in Switzerland	-BG1
	For use in Taiwan	-AB1
	For use in Thailand	-281
	For use in Turkey	-141
	For use in the United Kingdom	-031
	For use in the United States	-001
(3a)	**Touchpad:** NOTE: The touchpad spare part kit does not include the touchpad bracket or touchpad cable. The touchpad bracket is included in the Bracket Kit, spare part number N14742-001. The touchpad cable is included in the Cable Kit, spare part number N14743-001.	
	In jellyfish blue finish	N00443-001
	In jet black finish	N00442-001
(3b)	**Touchpad bracket** (included in the Bracket Kit, spare part number N14742-001)	
(3c)	**Touchpad cable** (included in the Cable Kit, spare part number N14743-001)	
(4a)	**Connector board** (includes audio jack and USB port) NOTE: The connector board spare part kit does not include the connector board I/O bracket or the audio jack and USB port cables. The bracket is included in the Bracket Kit, spare part number N14742-001. The cables are available using spare part number N05860-001.	N02669-001
(4b)	**Audio jack cable**	N05860-001
(4c)	**USB port cable**	N05860-001
(4d)	**Connector board I/O bracket** (included in the Bracket Kit, spare part number N14742-001)	
(5)	**RTC battery** (includes cable and double-sided adhesive)	L14744-001

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

Item	Component	Spare part number
(6)	**Speakers** (includes cables and 4 rubber isolator grommets)	N02671-001
(7a)	**Top cover webcam** NOTE: The top cover webcam spare part kit does not include the top cover webcam bracket or top cover webcam cable. The top cover webcam bracket is included in the Bracket Kit, spare part number N14742-001. The top cover webcam cable is included in the Cable Kit, spare part number N14743-001.	N00444-001
(7b)	**Top cover webcam bracket** (included in the Bracket Kit, spare part number N14742-001)	
(7c)	**Top cover webcam cable** (included in the Cable Kit, spare part number N14743-001)	
(8)	**Solid-state drive:**	
	256 GB, 2230, PCIe, NVMe solid-state drive	M11042-002
	128 GB, 2230, PCIe, NVMe solid-state drive	M11040-002
(9a)	**WLAN module:**	
	Intel 9560 ac 2×2 + Bluetooth 5.0 MU-MIMO M.2 2230 non-vPro 160 MHz MIPI+BRI WW WLAN module with two antennas	L22634-002
	Intel AX211 Wi-Fi 6e + Bluetooth 5.2 M.2 2230 160 MHz CNVi WW WLAN module with two antennas	M53366-002
(9b)	**WLAN module shield** (included in the Bracket Kit, spare part number N14742-001)	
(10)	**Power connector cable**	N02674-001
(11)	**Heat sink** (includes replacement thermal material)	N14741-001
(12a)	**System board** (includes integrated processor, UMA graphics subsystem, and replacement thermal material)	
	Equipped with an Intel Core i5-1230U 1.0GHz (burst up to 3.3 GHz) processor (10 cores, 12 MB L3 Smart Cache, 9 W), 8 GB of system memory, and the Windows 11 operating system	N13122-601
	Equipped with Intel Core i5-1230U 1.0GHz (burst up to 3.3 GHz) processor (10 cores, 12 MB L3 Smart Cache, 9 W), 8 GB of system memory, and a non-Windows operating system	N13122-001
	Equipped with an Intel Core i3-1210U 1.0 GHz (burst up to 3.3 GHz) processor (6 cores, 10 MB L3 Smart Cache, 9 W), 8 GB of system memory, and the Windows 11 operating system	N13121-601
	Equipped with an Intel Core i3-1210U 1.0 GHz (burst up to 3.3 GHz) processor (6 cores, 10 MB L3 Smart Cache, 9 W), 8 GB of system memory, and a non-Windows operating system	N13121-001
	Equipped with an Intel Core i3-1210U 1.0 GHz (burst up to 3.3 GHz) processor (6 cores, 10 MB L3 Smart Cache, 9 W), 4 GB of system memory, and the Windows 11 operating system	N13120-601
	Equipped with an Intel Core i3-1210U 1.0 GHz (burst up to 3.3 GHz) processor (6 cores, 10 MB L3 Smart Cache, 9 W), 4 GB of system memory, and a non-Windows operating system	N13120-001
(12b)	**System board I/O bracket** (included in the Bracket Kit, spare part number N14742-001)	
(13)	**Battery** (3 cell, 41 Whr)	M73474-007
(14)	**Bottom cover:**	
	In jellyfish blue finish	N14740-001
	In jet black finish	N14739-001

3.2 Brackets

To identify the brackets, use this illustration and table.

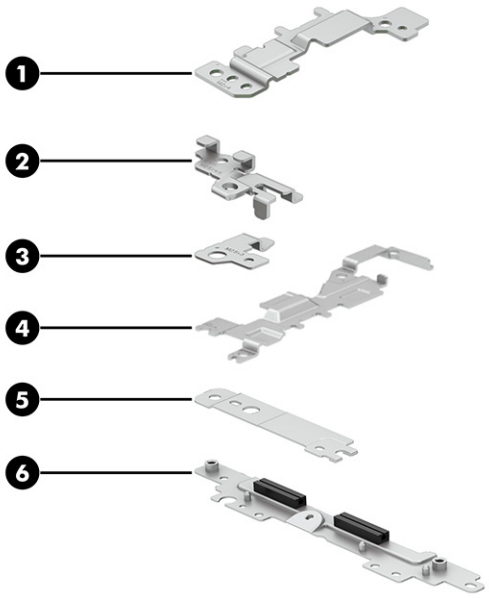


Table 3-2 Bracket descriptions

Item	Component
	The following brackets are included in the Bracket Kit, spare part number N14742-001.
(1)	**Connector board I/O bracket**
(2)	**Power connector cable bracket**
(3)	**Sensor board bracket**
(4)	**System board I/O bracket**
(5)	**Top cover webcam bracket**
(6)	**Touchpad bracket** (includes rubber retention clips for speaker cable)

3.3 Cables

To identify the cables, use this illustration and table.

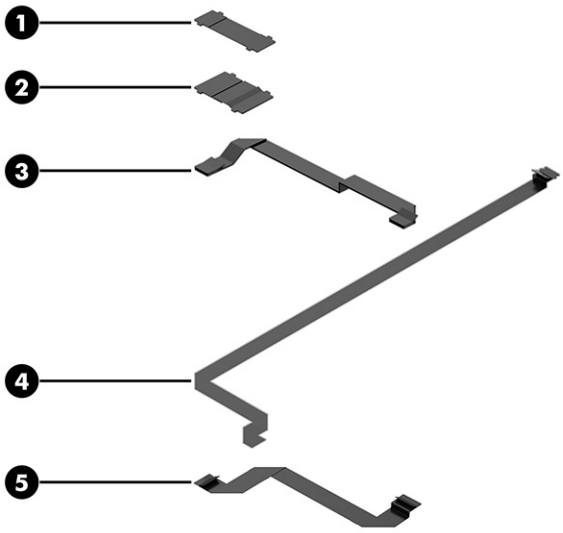


Table 3-3 Cable descriptions and part numbers

Item	Component	Spare part number
(1)	**Connector board audio jack cable**	N05860-001
(2)	**Connector board USB port cable**	N05860-001
(3)	**Sensor board cable**	N02670-001
(4)	**Top cover webcam cable** (included in the Cable Kit, spare part number N14743-001)	
(5)	**Touchpad cable** (included in the Cable Kit, spare part number N14743-001)	

3.4 Miscellaneous parts

To identify the miscellaneous parts, use this table.

Table 3-4 Miscellaneous part descriptions and part numbers

Component	Spare part number
AC adapters:	
120 W HP Smart adapter (PFC, RC, slim barrel)	M95377-001
65 W HP Smart adapter (non-PFC, RC, EM, 4.5 mm [0.17 in])	913691-850
65 W AC adapter (non-PFC, S-3P, 4.5 mm [0.17 in])	710412-001
65 W travel AC adapter (non-PFC, USB Type-C)	L21487-001
45 W HP Smart adapter (non-PFC, RC, 2P, 4.5 mm [0.17 in])	742436-001
45 W HP Smart adapter (non-PFC, RC, non-slim, 4.5 mm [0.17 in])	741727-001
45 W AC adapter (non-PFC, USB Type-C, 1.8 m [6.0 ft], 3 pin)	L43407-001
Adapters:	
HDMI-to-DVI-D connector adapter	691227-001

Table 3-4 Miscellaneous part descriptions and part numbers (continued)

Component	Spare part number
HP Smart AC Adapter	734734-001
USB Type-C-to-DisplayPort adapter	831753-001
USB Type-C-to-USB 3.0 adapter	814618-001
USB Type-C-to-VGA adapter	831751-001
USB Type-C-to-USB Type-A connector adapter	L65254-001
Backpacks and bags:	
HP business 43.9 cm (17.3 in) laptop backpack	M55004-001
HP Prelude Pro 39.6 cm (15.6 in) backpack	M03617-001
HP Prelude Pro 15.6 top load backpack	M03618-001
HP business 35.8 cm (14.1 in) laptop bag	M55007-001
Bracket Kit (includes connector board I/O bracket, power connector cable bracket, sensor board bracket, system board I/O bracket, top cover webcam bracket and touchpad bracket)	N14742-001
Cable Kit (includes connector board audio jack cable, connector board USB port cable, top cover webcam cable, and touchpad cable)	N14743-001
USB Type-C male-to-USB Type-C male cable, 1.0 m (3.3 ft)	L65253-001
Cases:	
HP Always On Case (black, 29.6 mm [11.6 in])	M16115-001
HP USB Type-C bottom case	L65256-001
Docks:	
HP Thunderbolt dock with cable (120 W)	L15809-001
HP USB Type-C dock with cable	L64086-001
HP USB Type-C mini dock	935327-001
HP USB Type-A/Type-C universal dock with cable	L64087-001
HP dock audio module	L15811-001
Duckhead adapters:	
Duckhead adapter, C5NS, Premium with sticker, black for use in North America	L50818-002
Duckhead adapter, C5NS, Premium with sticker, black for use in South Korea	L50818-001
Duckhead adapter, C5, Premium, for use in Europe and South Korea	854703-001
Duckhead adapter, C5, Premium, for use in Japan	L33157-001
Duckhead adapter, C5, Premium, for use in North America	L50816-002
Duckhead adapter, C5, Premium, for use in South Korea	L50816-001
HP USB Type-C-to-USB Type-A hub	916838-001
HP USB Type-C travel hub	L65088-001
HP Nano security cable lock	918431-001
HP Sure Key cable lock	L65088-001

Table 3-4 **Miscellaneous part descriptions and part numbers (continued)**

Component	Spare part number
Mouse:	
HP Bluetooth travel mouse	L62043-001
HP USB laser mouse	674318-001
HP USB travel mouse	757770-001
HP Pro slim pen	M89498-001
Plastics Kit:	
For use on computer models equipped with WWAN capability only (includes Ni/Cu boss gasket [PRS, FR], WLAN module shield with adhesive, Ni/Cu gasket [PPW, 30 mm × 10 mm × 2.5 mm], Ni/Cu WWAN gasket [PPW, DFR, 117], and switch cover gasket)	N02672-001
For use on computer models equipped with WLAN capability only (includes WLAN module shield with adhesive, Ni/Cu boss gasket [PRS, FR], and switch cover gasket)	N05694-001
Power cord with ground lead for use in Japan	349756-001
Power cord (Option 917, 3 cord, 1.8 m [6.0 ft], LG, Restriction of Hazardous Substances [RoHS})	361240-001
Power cord (C5, 1.0 m [3.3 ft], FX, DH, premium with sticker, for use in North America)	L30410-001
Power cords (C5, black):	
For use in Europe	213350-001
For use in Italy	213352-001
For use in North America	213349-001
For use in South Korea	267836-001
For use in Switzerland	213354-001
For use in the United Kingdom and Singapore	213351-001
Power cords (C5, 1.0 m [3.3 ft], conventional with sticker):	
For use in Argentina	931249-001 & L19357-001
For use in Australia	923430-001 & L19358-001
For use in Denmark	923430-003 & L19360-001
For use in Europe	923430-004 & L19361-001
For use in India	923430-006 & L19363-001
For use in Israel	923430-005 & L19362-001
For use in Italy	923430-007 & L19364-001
For use in Japan	931252-001 & L19365-001
For use in North America	923430-008 & L19367-001
For use in the People's Republic of China	931251-001 & L19368-001
For use in South Africa	923430-009 & L19369-001
For use in South Korea	931250-001 & L19366-001
For use in Switzerland	923430-010 & L19370-001

Table 3-4 Miscellaneous part descriptions and part numbers (continued)

Component	Spare part number
For use in Taiwan	923430-012 & L19372-001
For use in the United Kingdom	923430-013 & L19373-001
Power cords (C5, FDH, 1.0 m [3.3 ft], premium with sticker):	
For use in Argentina	L36815-001
For use in Australia	L36816-001
For use in Denmark	L36817-001
For use in Europe	L36818-001
For use in India	L36820-001
For use in Israel	L36819-001
For use in Italy	L44788-001
For use in North America	L36822-001
For use in the People's Republic of China	L36823-001
For use in South Africa	L36824-001
For use in Switzerland	L36825-001
For use in Taiwan	L36827-001
For use in Thailand	L36826-001
For use in the United Kingdom	L36828-001
Power cords (C5, 1.8 m [6.0 ft], conventional with sticker):	
Power cord (C5, 1.8 m [6.0 ft]) for use in Israel	398063-001
Power cord (C5, 1.8 m [6.0 ft]) for use in Taiwan	393313-001
Power cord (C5, 1.8 m [6.0 ft], black) for use in Argentina	401300-001
Power cord (C5, 1.8 m [6.0 ft], conventional with sticker) for use in India	404827-101
Power cords (C5, 1.8 m [6.0 ft], conventional with sticker):	
For use in Argentina	931257-001 & L19357-002
For use in Australia	931265-001 & L19358-002
For use in Denmark	931261-001 & L19360-002
For use in Europe	931259-001 & L19361-002
For use in India	931270-001 & L19363-002
For use in Israel	931262-001 & L19362-002
For use in Italy	931256-001 & L19364-002
For use in Japan	L19365-002
For use in North America	L19367-002
For use in the People's Republic of China	931268-001 & L19368-002
For use in South Africa	931264-001 & L19369-002

Table 3-4 **Miscellaneous part descriptions and part numbers (continued)**

Component	Spare part number
For use in South Korea	931267-001 & L19366-002
For use in Switzerland	931263-001 & L19370-002
For use in Taiwan	931269-001 & L19372-002
For use in Thailand	L19371-002
For use in the United Kingdom	931260-001 & L19373-002
Power cord (C7, 1.0 m [3.3 ft], conventional with sticker) for use in Japan	931325-001 & L19375-001
Rubber Kit:	
For use only on computer models with WLAN capability	N05695-001
For use only on computer models with WWAN capability	N02673-001
Screw Kit	L64089-001 & N00434-001
HP reversible 29.6 mm (11.6 in) sleeve	L81451-001

4 Removal and replacement procedures preliminary requirements

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

4.1 Tools required

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

- Nonconductive, nonmarking pry tool
- Phillips P0 screwdriver
- Phillips P1 screwdriver
- Suction cups
- Torx5 screw driver
- Tweezers

4.2 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.

4.2.1 Plastic parts

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

4.2.2 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.

4.2.3 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.”

4.3 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 24.

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.

4.3.1 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.

4.3.2 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.

4.3.3 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

4.3.4 Grounding the work area

To prevent static damage at the work area, follow these precautions.

- Cover the work surface with approved static-dissipative material.
- Use a wrist strap connected to a properly grounded work surface and use 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 the work area free of nonconductive materials, such as ordinary plastic assembly aids and polystyrene foam.
- Use conductive field service tools, such as cutters, screwdrivers, and vacuums.
- Avoid contact with pins, leads, or circuitry.

4.3.5 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

4.4 Cleaning your computer

Cleaning your computer regularly removes dirt and debris so that your device continues to operate at its best. Use the following information to safely clean the external surfaces of your computer.

4.4.1 Enabling HP Easy Clean (select products only)

HP Easy Clean helps you to avoid accidental input while you clean the computer surfaces. This software disables devices such as the keyboard, touch screen, and touchpad for a preset amount of time so that you can clean all computer surfaces.

1. Start HP Easy Clean in one of the following ways:
   - Select the **Start** menu, and then select **HP Easy Clean**.

     – or –

   - Select the **HP Easy Clean** icon in the taskbar.

     – or –

   - Select **Start**, and then select the **HP Easy Clean** tile.
2. Now that your device is disabled for a short period, see Removing dirt and debris from your computer on page 26 for the recommended steps to clean the high-touch, external surfaces on your computer. After you remove the dirt and debris, you can also clean the surfaces with a disinfectant. See Cleaning your computer with a disinfectant on page 27 for guidelines to help prevent the spread of harmful bacteria and viruses.

4.4.2 Removing dirt and debris from your computer

Here are the recommended steps to clean dirt and debris from your computer.

For computers with wood veneer, see Caring for wood veneer (select products only) on page 28.

1. Wear disposable gloves made of latex (or nitrile gloves, if you are latex-sensitive) when cleaning the surfaces.
2. Turn off your device and unplug the power cord and other connected external devices. Remove any installed batteries from items such as wireless keyboards.

⚠ **CAUTION:** To prevent electric shock or damage to components, never clean a product while it is turned on or plugged in.

3. Moisten a microfiber cloth with water. The cloth should be moist, but not dripping wet.

IMPORTANT: To avoid damaging the surface, avoid abrasive cloths, towels, and paper towels.

4. Wipe the exterior of the product gently with the moistened cloth.

IMPORTANT: Keep liquids away from the product. Avoid getting moisture in any openings. If liquid makes its way inside your HP product, it can cause damage to the product. Do not spray liquids directly on the product. Do not use aerosol sprays, solvents, abrasives, or cleaners containing hydrogen peroxide or bleach that might damage the finish.

5. Start with the display (if applicable). Wipe carefully in one direction, and move from the top of the display to the bottom. Finish with any flexible cables, like power cord, keyboard cable, and USB cables.

6. Be sure that surfaces have completely air-dried before turning the device on after cleaning.

7. Discard the gloves after each cleaning. Clean your hands immediately after you remove the gloves.

See Cleaning your computer with a disinfectant on page 27 for recommended steps to clean the high-touch, external surfaces on your computer to help prevent the spread of harmful bacteria and viruses.

4.4.3 Cleaning your computer with a disinfectant

The World Health Organization (WHO) recommends cleaning surfaces, followed by disinfection, as a best practice for preventing the spread of viral respiratory illnesses and harmful bacteria.

After cleaning the external surfaces of your computer using the steps in Removing dirt and debris from your computer on page 26, Caring for wood veneer (select products only) on page 28, or both, you might also choose to clean the surfaces with a disinfectant. A disinfectant that is within HP's cleaning guidelines is an alcohol solution consisting of 70% isopropyl alcohol and 30% water. This solution is also known as rubbing alcohol and is sold in most stores.

Follow these steps when disinfecting high-touch, external surfaces on your computer:

1. Wear disposable gloves made of latex (or nitrile gloves, if you are latex-sensitive) when cleaning the surfaces.

2. Turn off your device and unplug the power cord and other connected external devices. Remove any installed batteries from items such as wireless keyboards.

CAUTION: To prevent electric shock or damage to components, never clean a product while it is turned on or plugged in.

3. Moisten a microfiber cloth with a mixture of 70% isopropyl alcohol and 30% water. The cloth should be moist, but not dripping wet.

CAUTION: Do not use any of the following chemicals or any solutions that contain them, including spray-based surface cleaners: bleach, peroxides (including hydrogen peroxide), acetone, ammonia, ethyl alcohol, methylene chloride, or any petroleum-based materials, such as gasoline, paint thinner, benzene, or toluene.

IMPORTANT: To avoid damaging the surface, avoid abrasive cloths, towels, and paper towels.

4. Wipe the exterior of the product gently with the moistened cloth.

IMPORTANT: Keep liquids away from the product. Avoid getting moisture in any openings. If liquid makes its way inside your HP product, it can cause damage to the product. Do not spray liquids directly on the product. Do not use aerosol sprays, solvents, abrasives, or cleaners containing hydrogen peroxide or bleach that might damage the finish.

5. Start with the display (if applicable). Wipe carefully in one direction, and move from the top of the display to the bottom. Finish with any flexible cables, like power cord, keyboard cable, and USB cables.

6. Be sure that surfaces have completely air-dried before turning the device on after cleaning.

7. Discard the gloves after each cleaning. Clean your hands immediately after you remove the gloves.

4.4.4 Caring for wood veneer (select products only)

Your product might feature high-quality wood veneer. As with all natural wood products, proper care is important for best results over the life of the product. Because of the nature of natural wood, you might see unique variations in the grain pattern or subtle variations in color, which are normal.

- Clean the wood with a dry, static-free microfiber cloth or chamois.
- Avoid cleaning products containing substances such as ammonia, methylene chloride, acetone, turpentine, or other petroleum-based solvents.
- Do not expose the wood to sun or moisture for long periods of time.
- If the wood becomes wet, dry it by dabbing with an absorbent, lint-free cloth.
- Avoid contact with any substance that might dye or discolor the wood.
- Avoid contact with sharp objects or rough surfaces that might scratch the wood.

See Removing dirt and debris from your computer on page 26 for the recommended steps to clean the high-touch, external surfaces on your computer. After you remove the dirt and debris, you can also clean the surfaces with a disinfectant. See Cleaning your computer with a disinfectant on page 27 for sanitizing guidelines to help prevent the spread of harmful bacteria and viruses.

4.5 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.

4.6 Accessing support information

To find the HP support that you need, use this information.

Table 4-3 Support information locations

Service consideration	Path to access information
Records of reported failure incidents stored on the computer	**Windows:** Pre-operating system failures are logged in the BIOS Event Log. To view the BIOS Event Log: 1. Press the power button. 2. Immediately and repeatedly press esc when the power button light turns white. **NOTE:** If you do not press esc at the appropriate time, you must restart the computer and again repeatedly press esc when the power button light turns white to access the utility. 3. Press f10 to enter the BIOS setup. 4. (On commercial products) Under the **Main** tab, select **BIOS event log**, and then select **View BIOS Event Log**. - or - (On consumer products) Under the **Main** tab, select **System Log**. Post-operating system failures are logged in the Event Viewer. 1. Turn on the computer and allow the operating system to open. 2. Select the search icon in the taskbar. 3. Type `Event Viewer`, and then press enter. 4. Select the log from the left panel. Details display in the right panel. **Chrome:** 1. Go to support.google.com/chrome. 2. Search `collect Chrome device logs`.
Technical bulletins	To locate technical bulletins: 1. Go to www.hp.com. 2. Place the cursor over **Problem solving** to display more options. 3. Select **Support & Troubleshooting**. 4. Type the serial number, product number, or product name to go to the product support page. 5. Select **Advisories** to view technical bulletins.

Table 4-3 Support information locations (continued)

Service consideration	Path to access information
Repair professionals	To locate repair professionals: 1. Go to www.hp.com. 2. Place the cursor over **Support resources** to display more options. 3. Select **Authorized service providers**.
Component and diagnosis information, failure detection, and required action	To locate diagnosis information and actions: 1. Go to http://www.hp.com/go/techcenter/pcdiags. 2. Select **Get Support**. 3. Near the bottom of the window, select **Notebook PCs**, and then select your location.

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.

5.1 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 56 screws when you service the parts described in this chapter. Make special note of each screw size and location during removal and replacement.

5.1.1 Preparation for disassembly

To remove and replace computer components, use these procedures.

See Removal and replacement procedures preliminary requirements on page 22 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.

5.1.2 Bottom cover

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

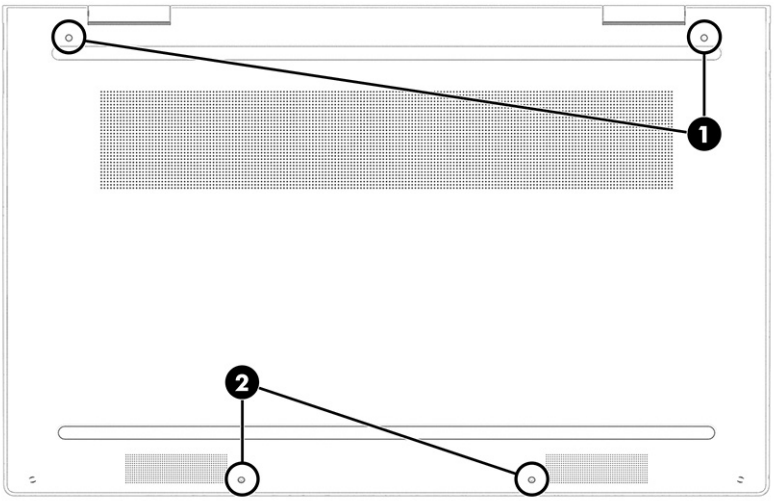
Table 5-1 Bottom cover description and part number

Description	Spare part number
Bottom cover	N09628-001

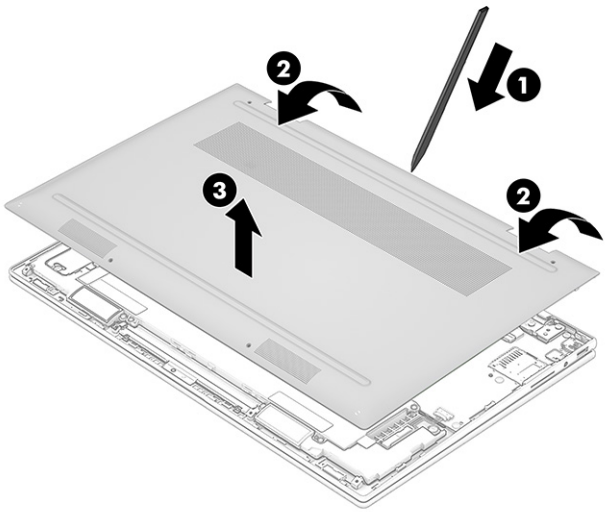
Before removing the bottom cover, prepare the computer for disassembly (see Preparation for disassembly on page 31).

Remove the bottom cover:

1. Remove the two Torx5 M2.0 × 6.2 screws **(1)** and the two Torx5 M2.0 × 3.2 screws **(2)** that secure the bottom cover to the computer.



2. Use a nonmarking, nonconductive tool **(1)** to separate the rear edge of the bottom cover **(2)** from the computer.
3. Remove the bottom cover **(3)** from the computer.



To replace the bottom cover, reverse the removal procedures.

5.1.3 Battery

To remove the battery, use this procedure and illustration.

Table 5-2 **Battery description and part number**

Description	Spare part number
3 cell, 51 Whr, 4.45 Ahr, LI battery (includes cable)	M77034-006

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 (see Preparation for disassembly on page 31).
2. Remove the bottom cover (see Bottom cover on page 31).

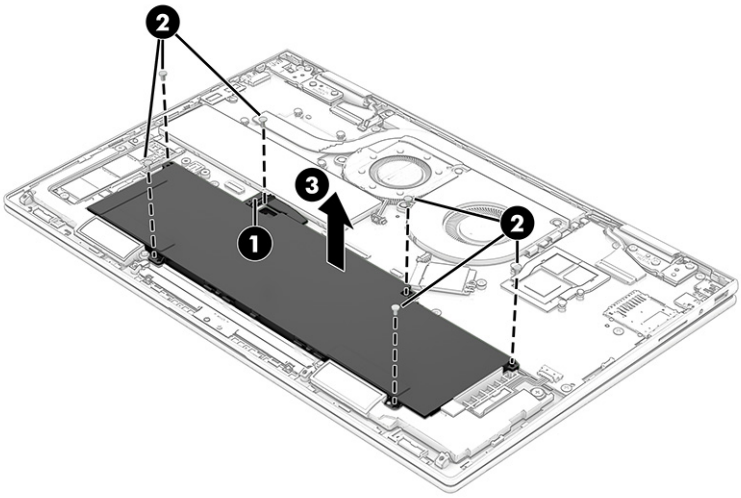
WARNING! To reduce potential safety issues, use only the user-replaceable battery provided with the computer, a replacement battery provided by HP, or a compatible battery purchased from HP.

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. Disconnect the battery cable **(1)** from the system board.
2. Remove the six Phillips M2.0 × 4.1 screws **(2)** that secure the battery to the computer.

3. Remove the battery **(3)**.



To insert the battery, reverse the removal procedures.

5.1.4 Solid-state drive

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

Table 5-3 Solid-state drive descriptions and part numbers

Description	Spare part number
1 TB, M.2 2280, PCIe, NVMe-3×4, SS solid-state drive with TLC	M85348-005
1 TB, M.2 2280, PCIe, NVMe, value solid-state drive	M85370-005
512 GB, M.2 2280, PCIe, NVMe-3×4, SS solid-state drive with TLC	M85360-005
512 GB, M.2 2280, PCIe, NVMe, value solid-state drive	M85364-005
256 GB, M.2 2280, PCIe, NVMe, value solid-state drive	M85354-005
Solid-state drive top shield: The solid-state drive top shield is not available as a spare part component.	
Solid-state drive bottom shield	N09637-001
Solid-State Drive Thermal Pad Kit	N09636-001

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

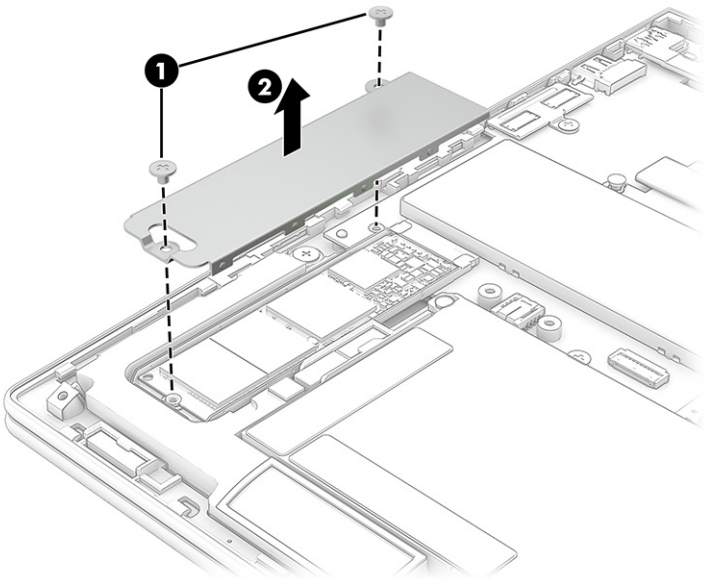
1. Prepare the computer for disassembly (see Preparation for disassembly on page 31).
2. Remove the bottom cover (see Bottom cover on page 31).
3. Disconnect the battery cable from the system board (see Battery on page 32).

Remove the solid-state drive:

1. Remove the two Phillips M2.0 × 3.4 screws **(1)** that secure the solid-state drive top shield to the computer.

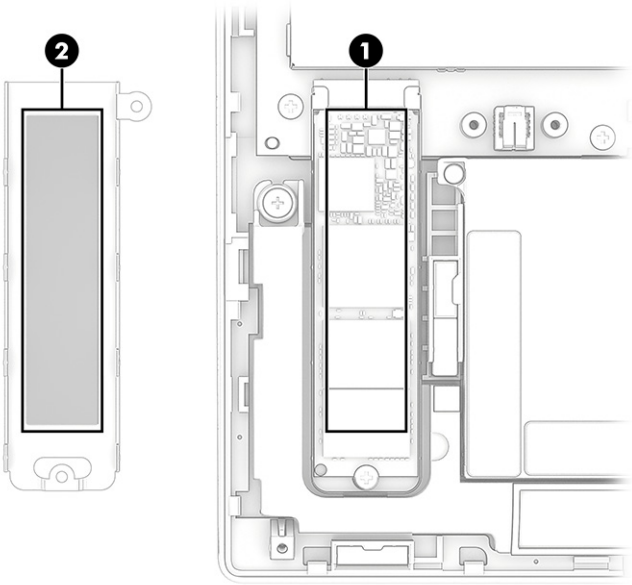
2. Remove the solid-state drive top shield **(2)**.

   The solid-state drive top shield is not available as a spare part component.



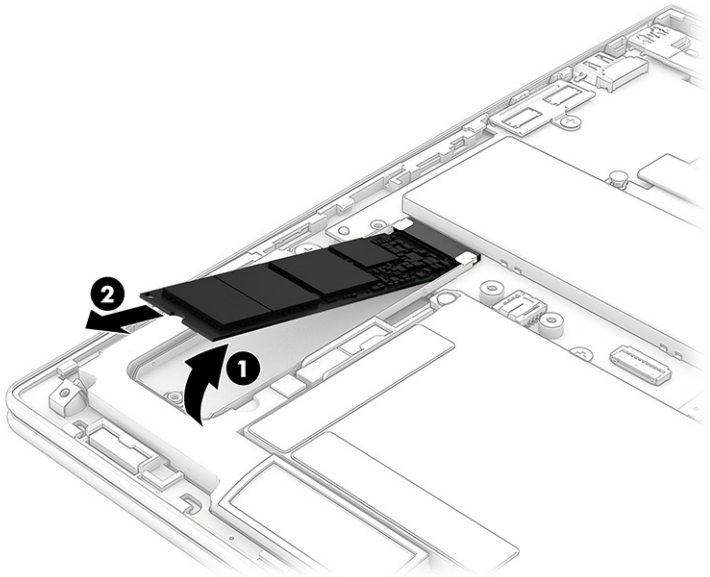
3. Thoroughly clean the thermal material from the surfaces of the solid-state drive and the solid-state drive top shield each time the solid-state drive top shield is removed. The solid-state drive thermal pad is available in the Solid-State Drive Thermal Pad Kit, spare part number N09636-001. The following illustration shows the replacement thermal material locations.

   A thermal pad is used on the solid-state drive **(1)** and on the solid-state drive shield area **(2)** that services it.



4. Lift the front edge of the solid-state drive **(1)** until it rests at an angle.

5. Pull the solid-state drive **(2)** away from the socket to remove it.



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

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

5.1.5 Memory modules

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

Table 5-4 Memory module descriptions and part numbers

Description	Spare part number
8 GB memory module (SODIMM, DDR4-3200, 1.2v)	L46598-005
4 GB memory module (SODIMM, DDR4-3200, 1.2v)	L83673-005
Memory module shield: The memory module shield is not available as a spare part component.	

Before removing the memory, follow these steps:

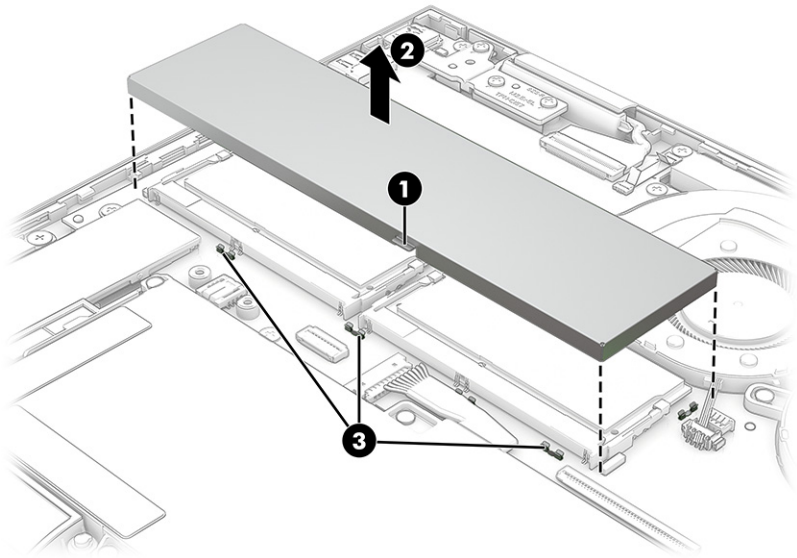
1. Prepare the computer for disassembly (see Preparation for disassembly on page 31).
2. Remove the bottom cover (see Bottom cover on page 31).
3. Disconnect the battery cable from the system board (see Battery on page 32).

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

1. Use the tab **(1)** and slot on the front of the memory module shield to lift and remove the shield **(2)**.

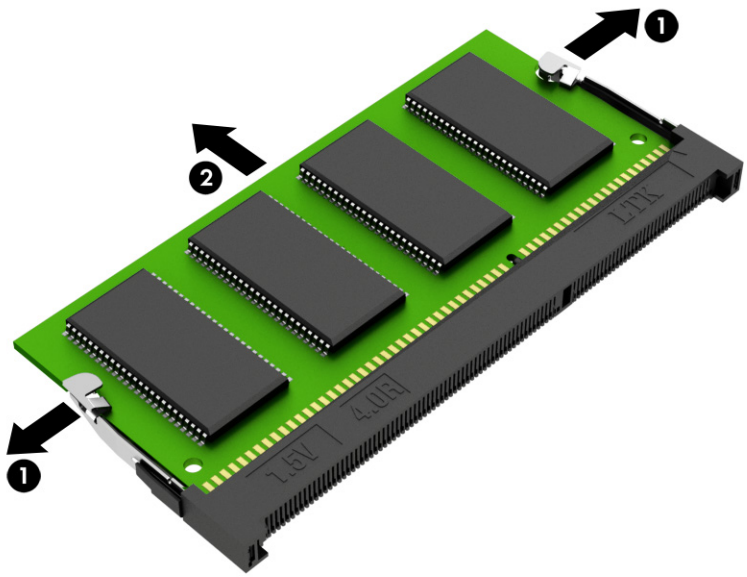
   The memory module shield is not available as a spare part component.

NOTE: When installing the memory module shield, be sure that the edges of the shield fit into all the retention clips **(3)** that are built into the system board.



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.

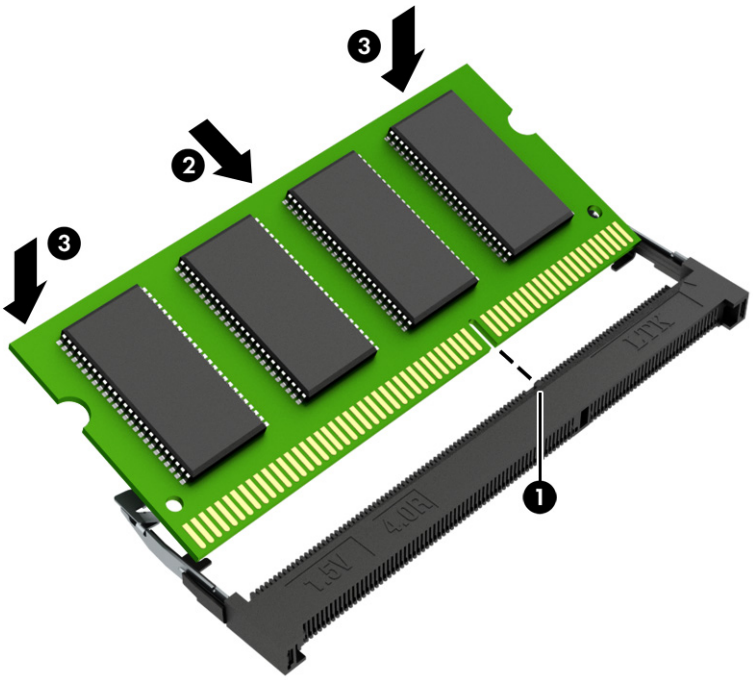


To protect a memory module after removal, place it in an electrostatic-safe container.

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)**.



5.1.6 WLAN module

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

Table 5-5 **WLAN module descriptions and part numbers**

Description	Spare part number
Mediatek MT7921 Wi-Fi 6 + Bluetooth 5.2 M.2 2230 PCI-e + USB worldwide WW WLAN module	M74879-005
Mediatek RZ616 Wi-Fi 6e + Bluetooth 5.2 M.2 2230 160 MHz PCI-e + USB WW WLAN module	M90511-005
WLAN module shield	N10779-001

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 (see Preparation for disassembly on page 31).
2. Remove the bottom cover (see Bottom cover on page 31).
3. Disconnect the battery cable from the system board (see Battery on page 32).

Remove the WLAN module:

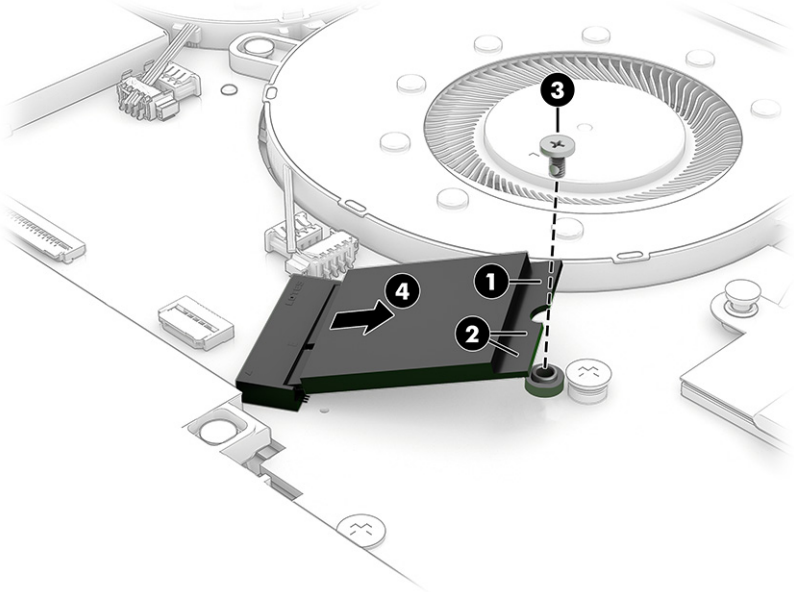
1. Remove the WLAN module shield **(1)**.

   The WLAN module shield is available using spare part number N10779-001.

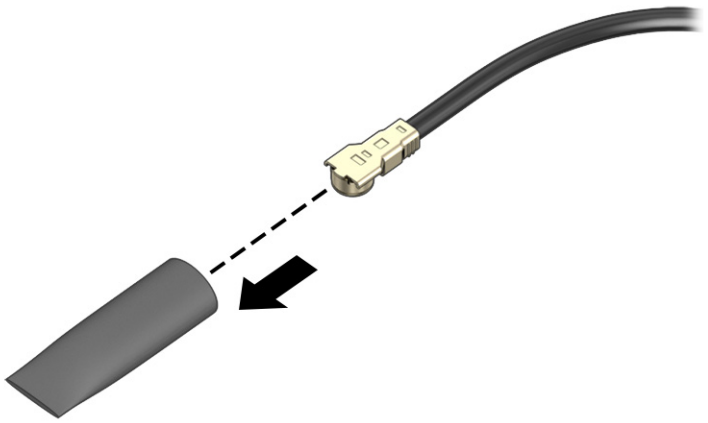
2. Carefully disconnect the WLAN antenna cables from the WLAN module **(2)**.

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

3. Remove the Phillips M2.0 × 3.4 screw **(3)** that secures the WLAN module to the system board.
4. Remove the WLAN module **(4)** by pulling it away from the socket at an angle.



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



Reverse this procedure to install the WLAN module.

5.1.7 Infrared cable

To remove the infrared cable, use this procedure and illustration.

Table 5-6 **Infrared cable description and part number**

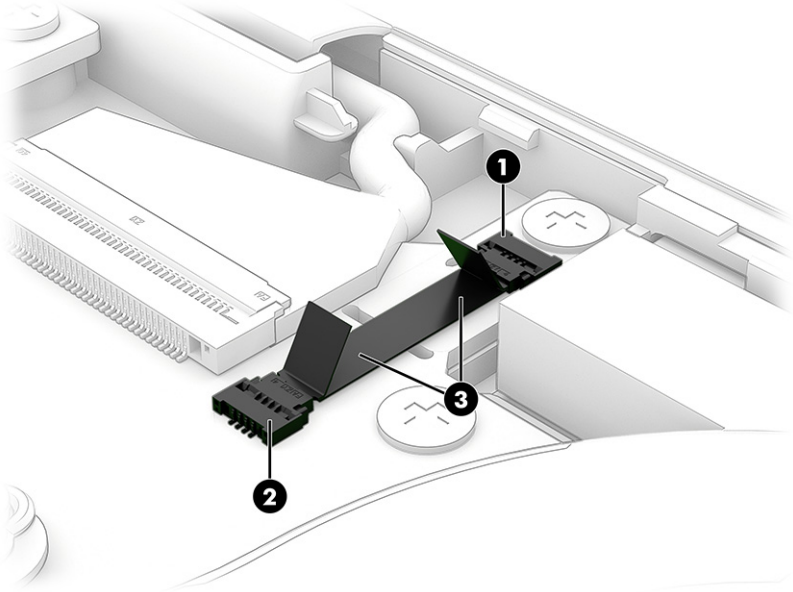
Description	Spare part number
Infrared cable	N09639-001

Before removing the infrared cable, follow these steps:

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

Remove the infrared cable:

1. Release the zero insertion force (ZIF) connector **(1)** to which the infrared cable is connected, and then disconnect the cable from the system board.
2. Release the ZIF connector **(2)** to which the infrared cable is connected, and then disconnect the cable from the system board.
3. Remove the infrared cable from the computer **(3)**.



Reverse this procedure to install the infrared cable.

5.1.8 System fan

To remove the system fan, use this procedure and illustration.

Table 5-7 System fan description and part number

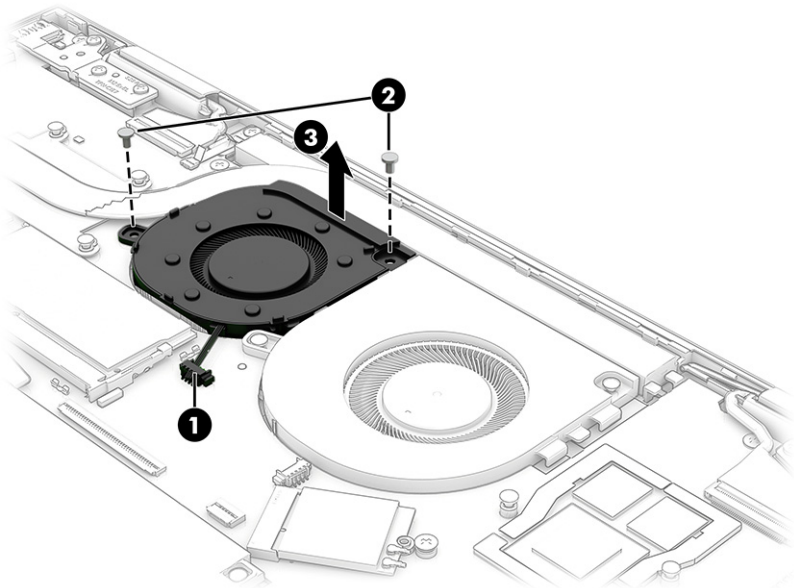
Description	Spare part number
System fan (includes cable)	N09635-001

Before removing the system fan, follow these steps:

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

Remove the system fan:

1. Disconnect the system fan cable **(1)** from the system board.
2. Remove the two Phillips M2.0 × 4.1 screws **(2)** that secure the system fan to the computer.
3. Remove the system fan **(3)** from the computer.



Reverse this procedure to install the system fan.

5.1.9 Graphics subsystem fan

To remove the graphics subsystem fan, use this procedure and illustration.

NOTE: This section applies only to computer models equipped with a graphics subsystem with discrete memory.

Table 5-8 Graphics subsystem fan description and part number

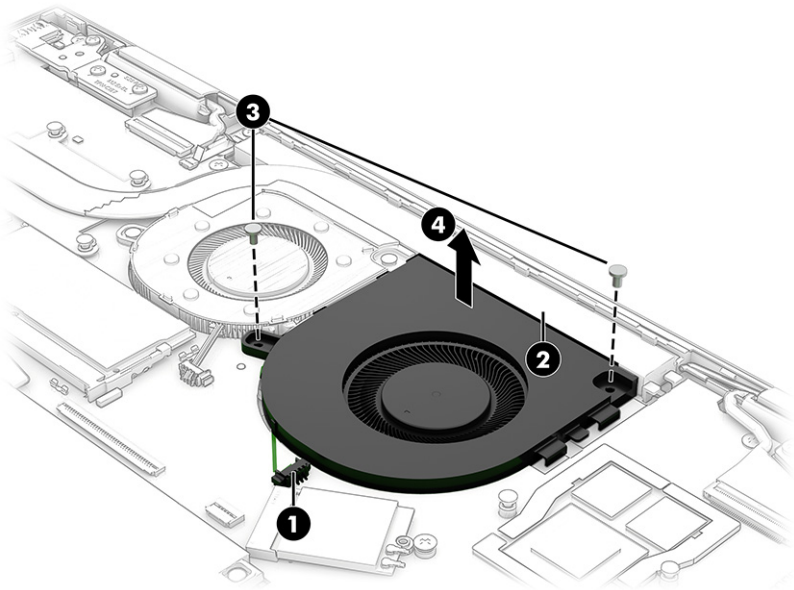
Description	Spare part number
Graphics subsystem fan (includes cable)	N09634-001

Before removing the graphics subsystem fan, follow these steps:

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

Remove the graphics subsystem fan:

1. Disconnect the graphics subsystem fan cable **(1)** from the system board.
2. Detach the tape **(2)** that secures the graphics subsystem fan to the heat sink.
3. Remove the two Phillips M2.0 × 4.1 screws **(3)** that secure the graphics subsystem fan to the computer.
4. Remove the graphics subsystem fan **(4)** from the computer.



Reverse this procedure to install the graphics subsystem fan.

5.1.10 Display assembly

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

IMPORTANT: After replacing the display panel assembly, it is necessary to run the service tool to have the new ambient light sensor (ALS) data written to the system BIOS. Refer to Service Advisory TBD for details on downloading and installing the service tool for updating the ALS system BIOS.

IMPORTANT: After replacing the display panel assembly, it is necessary to reload the calibration data. Refer to Service Advisory c06640672 for details on reloading the HP Display Control Panel Color Calibration Data Reload Process.

IMPORTANT: After replacing the display panel assembly, it is necessary to update the Touch Panel Firmware. Refer to Service Advisory c06220255 for details on downloading and installing the Touch Panel Firmware.

Before removing the display panel, follow these steps:

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

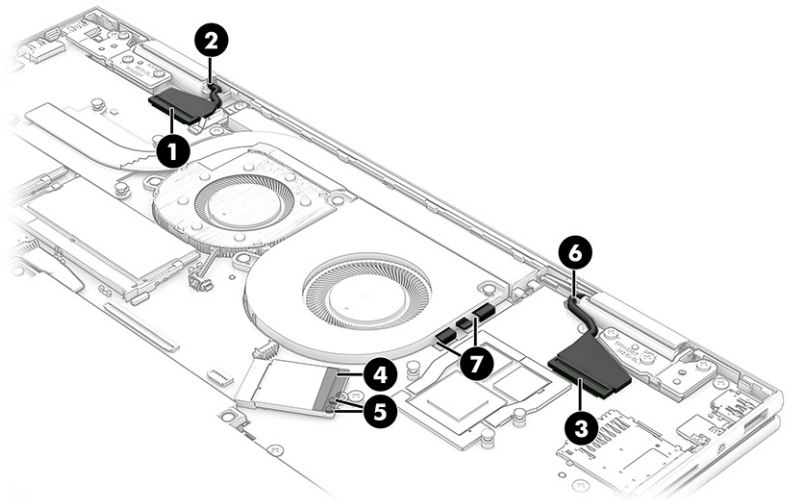
Remove the display assembly:

1. Release the ZIF connector **(1)** to which the webcam/microphone module cable is connected, and then disconnect the webcam/microphone module cable from the system board.
2. Release the webcam/microphone module cable from the retention clips **(2)** that are built into the top cover/keyboard.
3. Release the ZIF connector **(3)** to which the display panel cable is connected, and then disconnect the display panel cable from the system board.
4. Remove the WLAN module shield **(4)**.

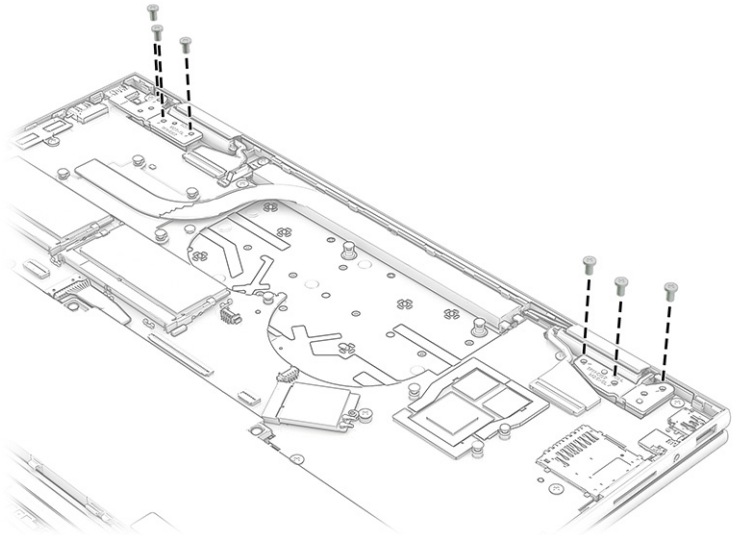
   The WLAN module shield is available using spare part number N10779-001.
5. Carefully disconnect the WLAN antenna cables **(5)** from the WLAN module.

NOTE: Computer 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.

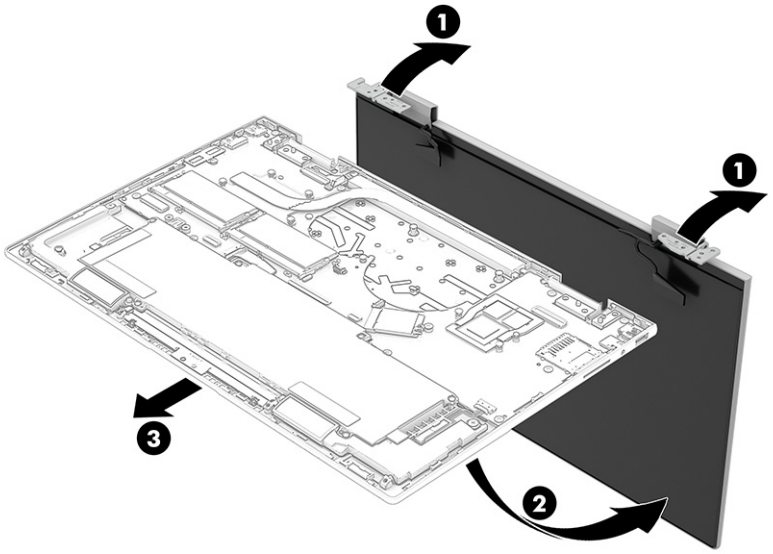
6. Release the display panel cable from the retention clip **(6)** that is built into the computer.
7. Release the WLAN antenna cables from the retention clips **(7)** that are built into the fan.



8. Remove the six Phillips M2.5 × 5.6 screws that secure the display assembly to the computer.



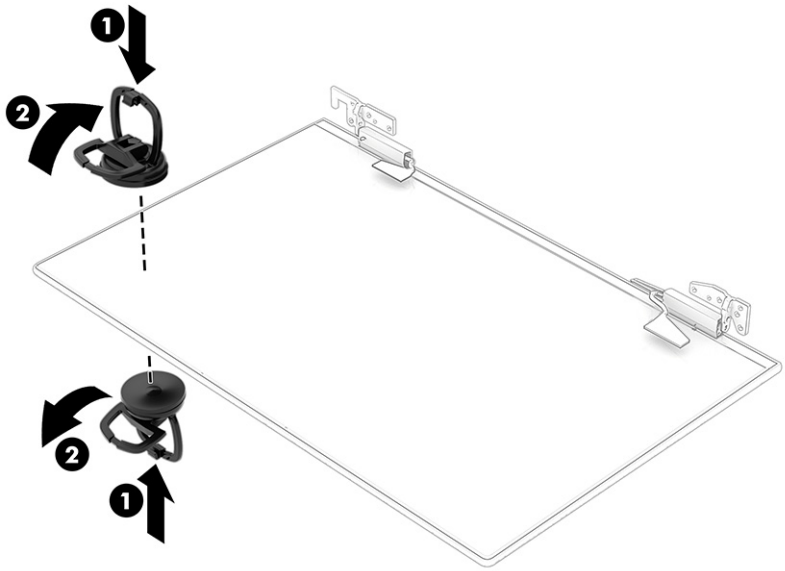
9. Swing the display hinges **(1)** up and back as far as they will go.
10. Open the display assembly **(2)** to a 90-degree angle.
11. Separate the computer **(3)** from the display assembly.



12. If you need to remove the display panel assembly, display panel cable, or any of the internal display components, follow these steps.
    a. Remove the display assembly.
    b. Position the display assembly with the panel facing down and the bottom edge of the assembly toward you.

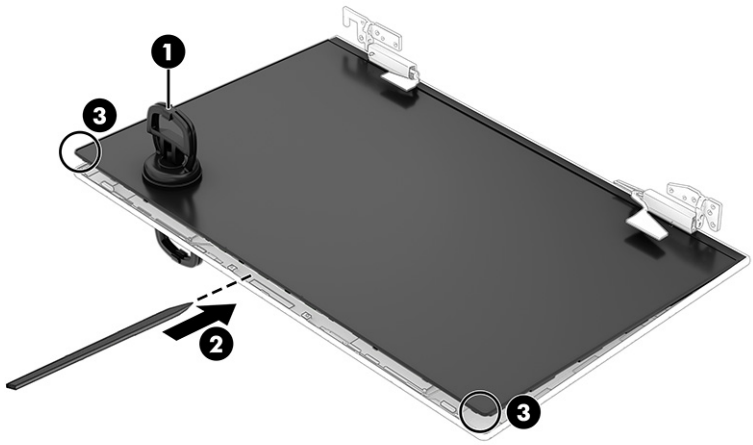
c. Attach two suction cups **(1)** to the display assembly as shown in the following illustration.

d. Secure the suction cups to the display assembly by swinging the handles **(2)** into position.



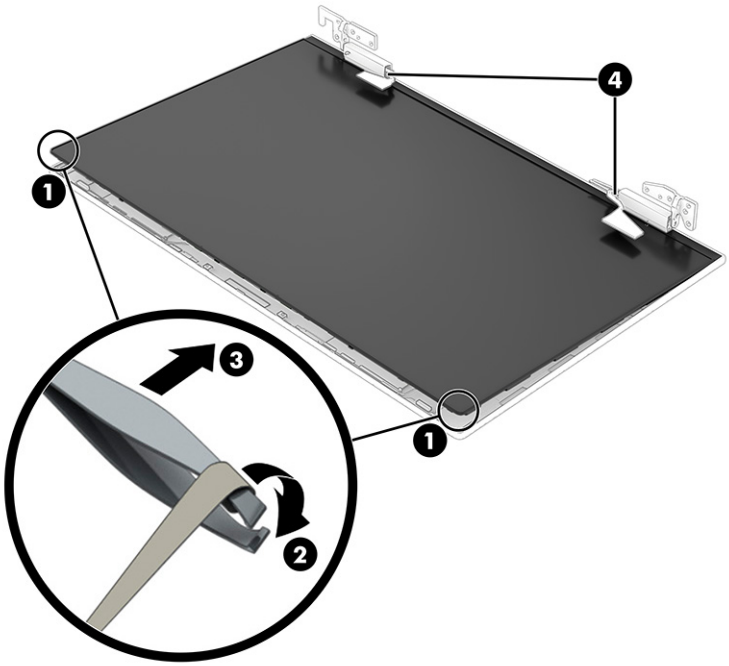
e. The display panel assembly is secured to the display back cover with retention tape that is installed under the left and right sides of the panel. Use the suction cups **(1)** and a case utility tool **(2)** to carefully separate the display panel assembly from the display back cover until the retention tape tabs are accessible in the upper left **(3)** and right corners of the display panel assembly.

When releasing the display panel assembly, be sure not to attach the suction cups to or insert the case utility tool into the area near the webcam/microphone module in the center of the display panel assembly.



f. Access the retention tape tabs in the upper left **(1)** and right corners of the display panel. Use tweezers to grasp the end of the tape **(2)**. While turning the tweezers, wrap the tape around the tweezers as you continue to pull the tape out **(3)** from behind the display panel. You must pull the tape multiple times before it is completely removed.

g. Remove the display panel cable, webcam/microphone module cable, and the wireless antenna cables from the display hinges **(4)**.



h. Swing the top edge of the display panel assembly **(1)** up and forward until it rests upside down in front of the display back cover.

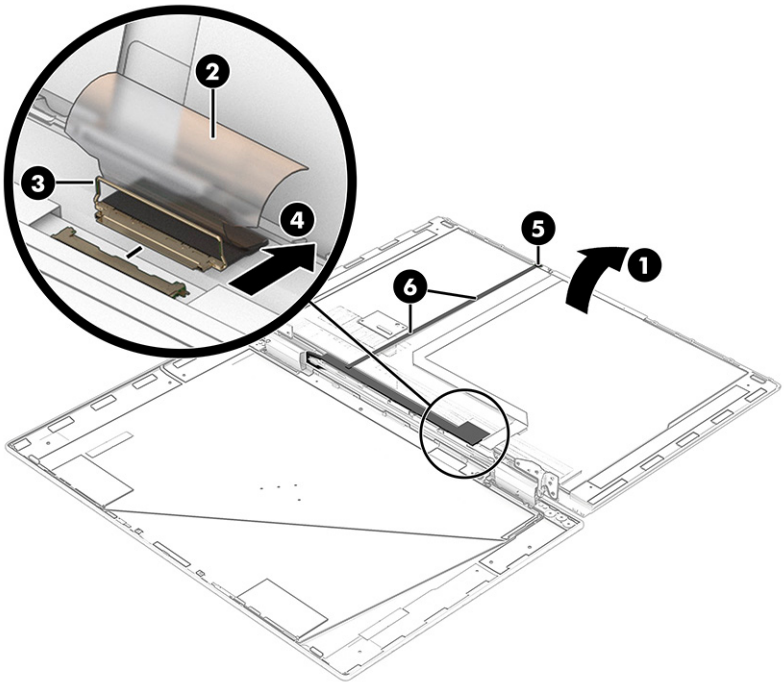
i. Release the adhesive support strip **(2)** that secures the display panel cable to the display panel.

j. Release the retention bar **(3)** that secures the display panel cable to the display panel.

k. Disconnect the display panel cable **(4)** from the display panel.

l. Release the ZIF connector **(5)** to which the ambient light sensor module cable is connected, and then disconnect the ambient light sensor module cable from the ambient light sensor module .

m. Detach the ambient light sensor module cable **(6)** from the display panel. (The ambient light sensor module cable is attached to the display panel with double-sided adhesive.)



n. Remove the display panel assembly and display panel cable.

The display panel assembly includes the display bezel, display panel, display panel cable, ambient light sensor module and cable, OLED board, touch glass, and touch control board (including color calibration internal controller and CC ROM). The display panel assembly is available using the following spare part numbers:

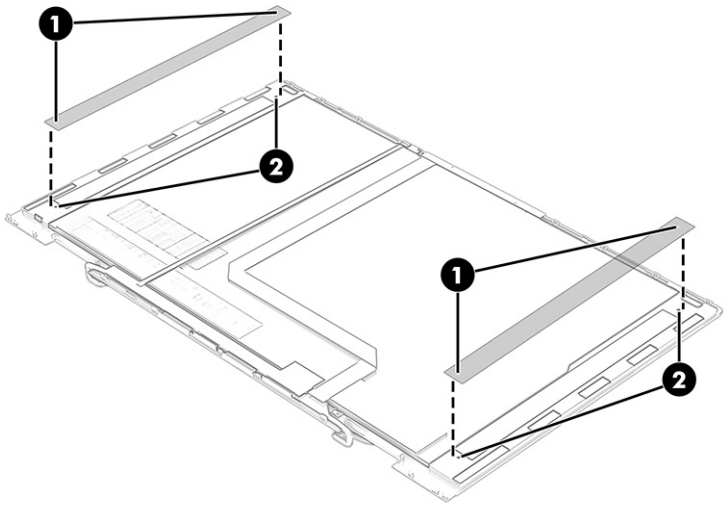
- N09667-001 – (39.6 cm [15.6 in], LCD, FHD, WUXGA [1920 × 1080], brightview, OLED) + LBL, UWVA, DCI-P3, 100% CG, eDP 1.4 + PSR, VWE 2, bent, TOP display panel with narrow bezel; typical brightness: 400 nits)
- N09665-001 – (39.6 cm [15.6 in], LCD, FHD, WUXGA [1920 × 1080], antiglare, WLED, UWVA, 45% CG, eDP 1.2 without PSR, VWE, bent, TOP display panel with narrow bezel; typical brightness: 250 nits)

The display panel cable is available using the following spare part numbers:

- N09650-001 – For use on computer models equipped with a display assembly with an OLED display panel.
- N09648-001 – For use on computer models equipped with a display panel with a non-OLED display panel.

o. Before replacing the display panel assembly, thoroughly clean all adhesive residue from the display panel assembly before installing new adhesive strips. Remove the protective backing

from the new adhesive strips, align the holes **(1)** on the strips with the pins **(2)** on the display panel assembly, and then attach the strips to the display panel assembly.



13. If you need to remove the OLED module:

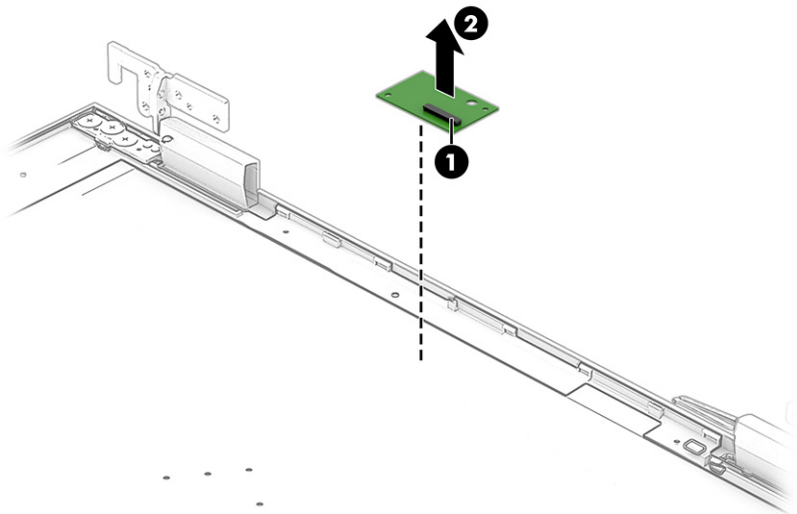
    a. Remove the display assembly.

    b. Remove the display panel assembly.

    c. Release the ZIF connector **(1)** to which the OLED module cable is connected, and then disconnect the OLED module cable from the OLED module .

    d. Detach the OLED module from the display panel. (The OLED module is attached to the display panel with double-sided adhesive.)

       The OLED module is available using spare part number N09652-001.



14. If you need to remove the webcam/microphone module:

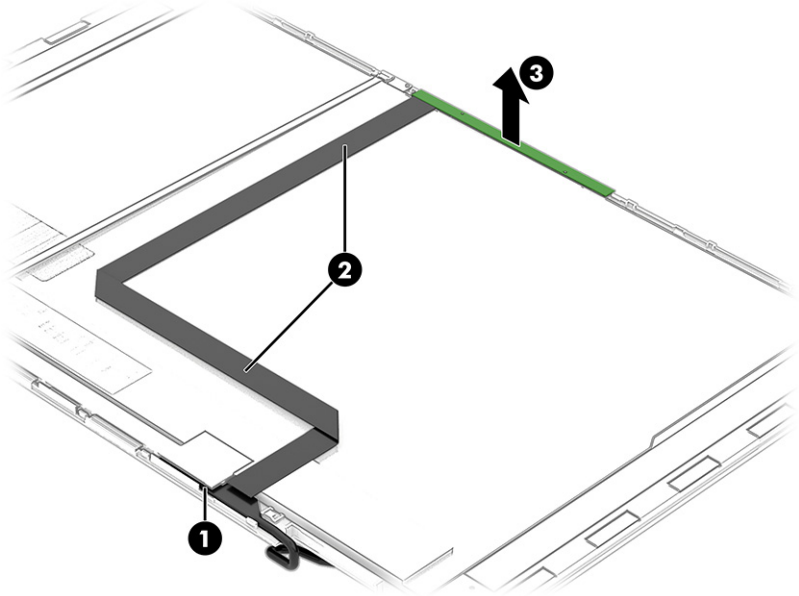
a. Remove the display bezel.

b. Remove the display panel assembly.

c. Release the webcam/microphone module cable from the retention clips **(1)** that are built into the display panel assembly.

d. Detach the webcam/microphone module cable **(2)** from the display panel. (The webcam/microphone module cable is attached to the display panel with double-sided adhesive.)

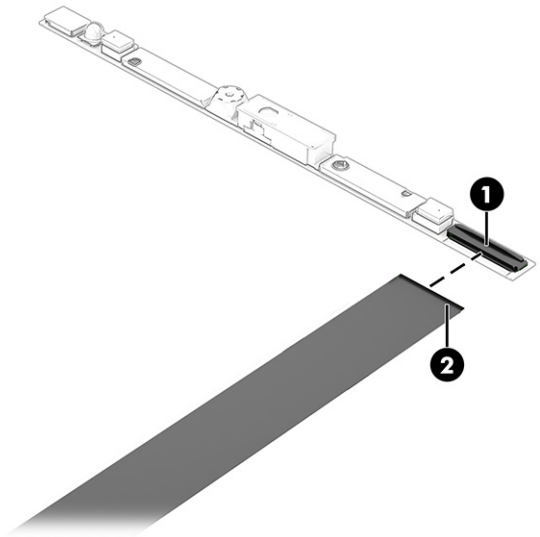
e. Detach the webcam/microphone module **(3)** from the display panel. (The webcam/microphone module is attached to the display panel with double-sided adhesive.)



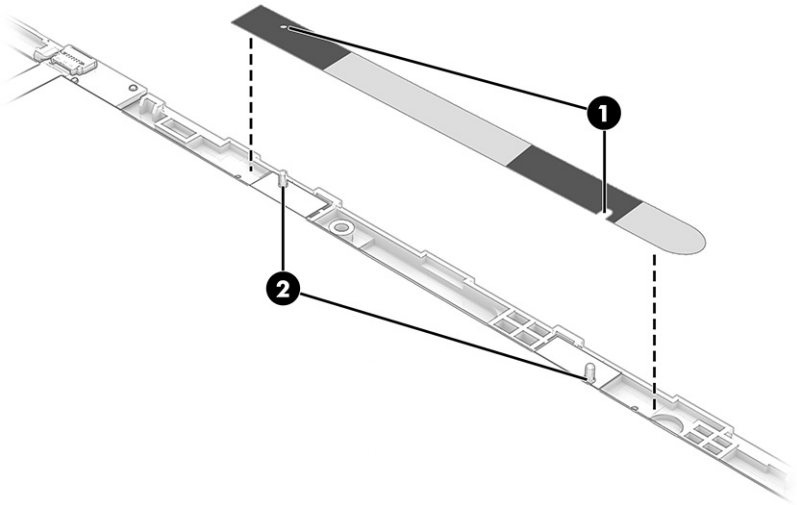
f. Release the ZIF connector **(1)** to which the webcam/microphone module cable is connected, and then disconnect the webcam/microphone module cable **(2)** from the webcam/microphone module.

The webcam/microphone module is available using spare part number N09654-001.

The webcam/microphone module cable is available using spare part number N09651-001.



g. Before replacing the webcam/microphone module, thoroughly clean all gasket adhesive residue from the display panel assembly before installing a new gasket. Remove the protective backing from the new gasket, align the holes **(1)** on the gasket with the pins **(2)** on the display panel assembly, and then attach the gasket to the display panel assembly.



15. If you need to remove the hinges:

    a. Remove the display bezel.

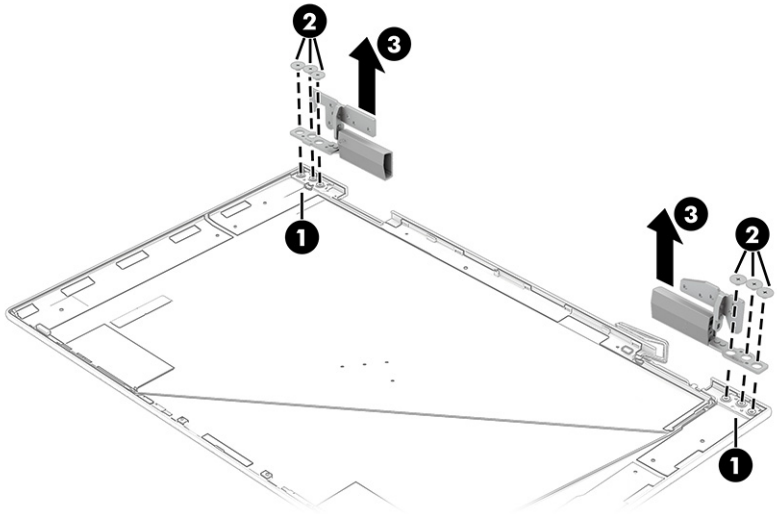
    b. Remove the display panel assembly.

    c. Release the grounding tape **(1)** that secures the right hinge to the display back cover.

    d. Remove the six Phillips M2.5 × 2.8 broad head screws **(2)** that secure the hinges to the display back cover.

e. Remove the hinges **(3)**.

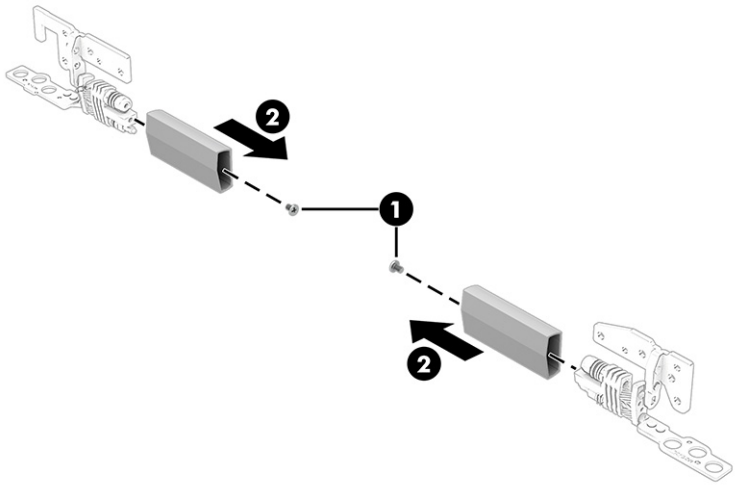
The display hinges are available using spare part number N09646-001.



f. If you need to remove the hinge covers, remove the two Phillips M2.0 × 4.3 screws **(1)** that secure the hinge covers to the hinges.

g. Remove the hinge covers **(2)**.

The hinge covers are available using spare part number N09647-001.



16. If you need to remove the wireless antenna:

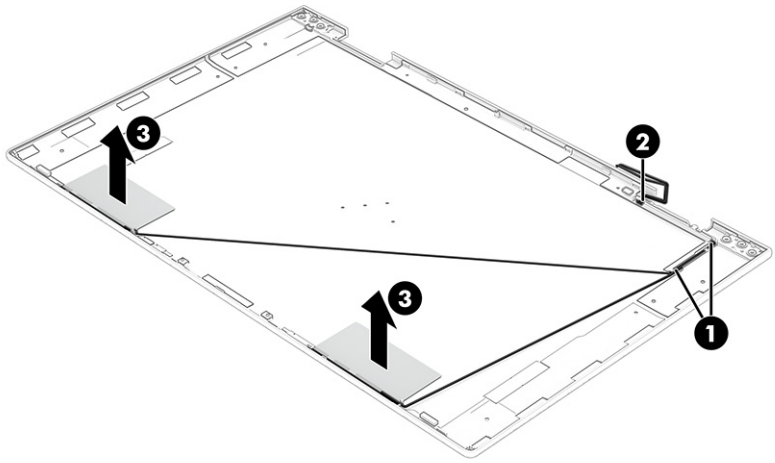
a. Remove the display bezel.

b. Remove the display panel assembly.

c. Release the wireless antenna cables from the routing channels **(1)** that are built into the display back cover.

d. Release the wireless antenna cables from the retention clip **(2)** that is built into the display back cover.

e. Detach the wireless antenna transceivers **(3)** from the display back cover. (The wireless antenna transceivers are attached to the display back cover with double-sided adhesive.)



f. Remove the wireless antenna.

The wireless antenna is available using the following spare part numbers:

- N13085-001 – For use on computer models equipped with a display assembly with an OLED display panel.
- N09643-001 – For use on computer models equipped with a display panel with a non-OLED display panel.

Reverse this procedure to reassemble and replace the display assembly.

5.1.11 Heat sink

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

Table 5-9 **Heat sink descriptions and part numbers**

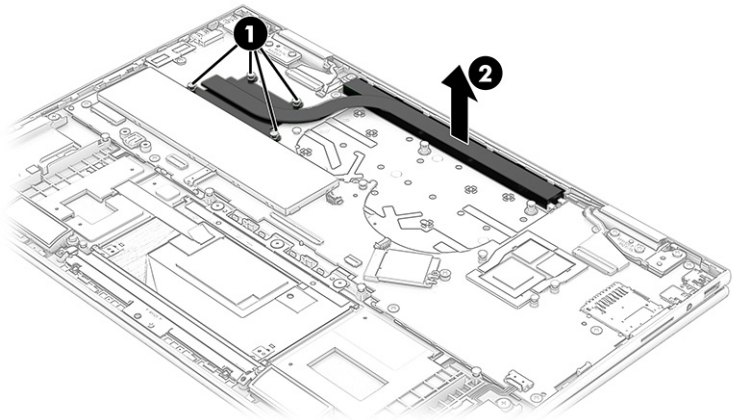
Description	Spare part number
Heat sink (includes replacement thermal material)	N09630-001

Before removing the heat sink, follow these steps:

1. Prepare the computer for disassembly (see Preparation for disassembly on page 31).
2. Remove the bottom cover (see Bottom cover on page 31).
3. Remove the battery (see Battery on page 32).
4. Remove the solid-state drive (see Solid-state drive on page 34).
5. Remove the system fan (see System fan on page 40).
6. Remove the graphics subsystem fan (see Graphics subsystem fan on page 41).

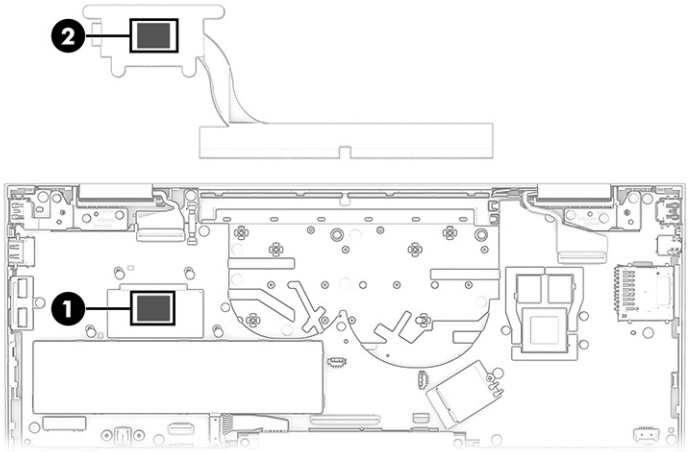
Remove the heat sink:

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



3. 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 processor **(1)** and on the heat sink area **(2)** that services it.



Reverse this procedure to install the heat sink.

5.1.12 System board

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

Table 5-10 **System board descriptions and part numbers**

Description	Spare part number
The system board spare part kit includes an integrated processor, an integrated graphics subsystem with UMA memory, and replacement thermal material.	

Table 5-10 System board descriptions and part numbers (continued)

Description	Spare part number
Equipped with an AMD Ryzen7-5825U 2.0 GHz processor (8 cores, 16 MB Cache, 15 W) and the Windows 11 operating system	N09671-601
Equipped with an AMD Ryzen5-5625U 2.3 GHz processor (6 cores, 16 MB Cache, 15 W) and the Windows 11 operating system	N09670-601

IMPORTANT: After replacing the system board, it is necessary to run the service tool to have the new ambient light sensor (ALS) data written to the system BIOS. Refer to Service Advisory TBD for details on downloading and installing the service tool for updating the ALS system BIOS.

Before removing the system board, follow these steps:

1. Prepare the computer for disassembly (see Preparation for disassembly on page 31).
2. Remove the bottom cover (see Bottom cover on page 31).
3. Remove the battery (see Battery on page 32).
4. Remove the solid-state drive (see Solid-state drive on page 34).
5. Remove the system fan (see System fan on page 40).
6. Remove the graphics subsystem fan (see Graphics subsystem fan on page 41).
7. Remove the heat sink (see Heat sink on page 52).

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

- Memory modules (see Memory modules on page 36).
- WLAN module (see WLAN module on page 38).
- Infrared cable (see Infrared cable on page 40).
- Heat sink (see Heat sink on page 52).

Remove the system board:

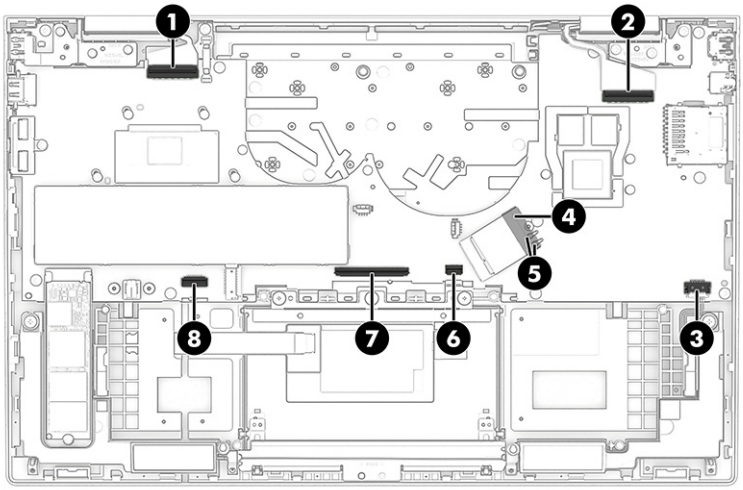
1. Release the ZIF connector **(1)** to which the webcam/microphone module cable is connected, and then disconnect the webcam/microphone module cable from the system board.
2. Release the ZIF connector **(2)** to which the display panel cable is connected, and then disconnect the display panel cable from the system board.
3. Disconnect the speaker cable **(3)** from the system board.
4. Remove the WLAN module shield **(4)**.

   The WLAN module shield is available using spare part number N10779-001.

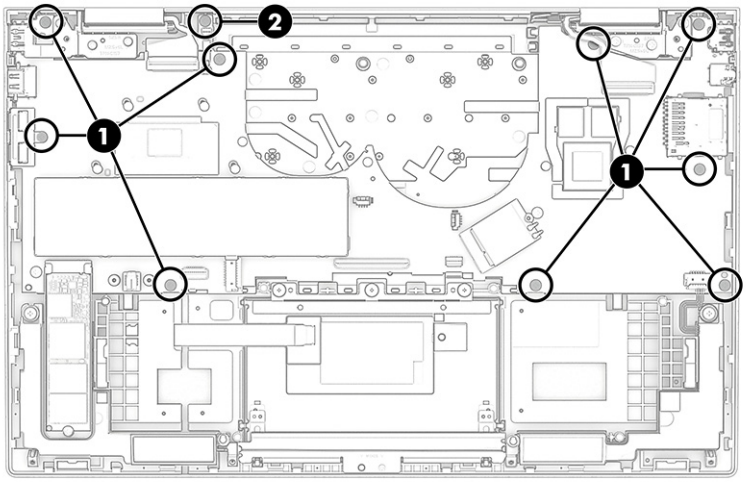
5. Carefully disconnect the WLAN antenna cables **(5)** from the WLAN module.

NOTE: Computer 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.

6. Release the ZIF connector **(6)** to which the backlight cable is connected, and then disconnect the backlight cable from the system board.
7. Release the ZIF connector **(7)** to which the keyboard cable is connected, and then disconnect the keyboard cable from the system board.
8. Release the ZIF connector **(8)** to which the touchpad cable is connected, and then disconnect the touchpad cable from the system board.

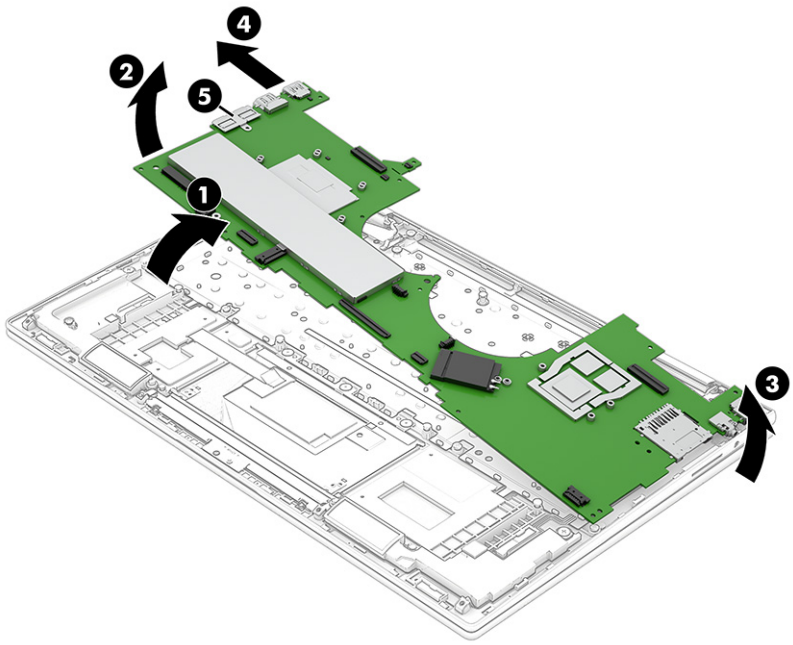


9. Remove the nine Phillips M2.0 × 3.4 screws **(1)** that secure the system board to the computer.
10. Remove the Phillips M2.0 × 4.1 screw **(2)** that secures the system board to the computer.



11. Release the solid-state drive housing **(1)** from molding that is built into the top cover/keyboard.
12. Lift the left side of the system board **(2)** until it rests at an angle.
13. Release the heat sink **(3)** from the rear edge of the top cover/keyboard.
14. Release the audio jack **(4)** from the opening in the top cover/keyboard.
15. Slide the system board **(5)** up and to the left at an angle to remove it.

    When removing the system board, be sure to take note of the location of the I/O bracket **(6)**. This bracket may become dislodged when the system board is removed.



Reverse this procedure to install the system board.

5.1.13 Speakers

To remove the speakers, use this procedure and illustration.

Table 5-11 Speakers description and part number

Description	Spare part number
Speakers (include cables, left and right speakers, and 2 rubber isolators)	N09638-001

Before removing the speakers, follow these steps:

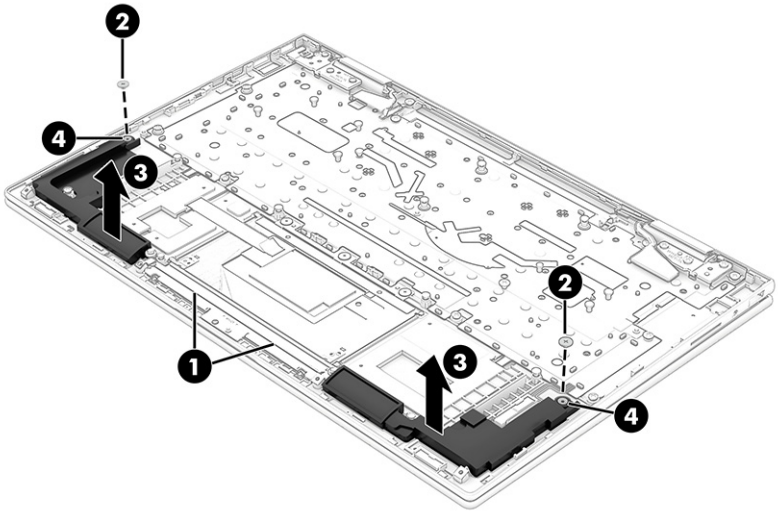
1. Prepare the computer for disassembly (see Preparation for disassembly on page 31).
2. Remove the bottom cover (see Bottom cover on page 31).
3. Remove the battery (see Battery on page 32).
4. Remove the solid-state drive (see Solid-state drive on page 34).

5. Remove the system fan (see System fan on page 40).
6. Remove the graphics subsystem fan (see Graphics subsystem fan on page 41).
7. Remove the heat sink (see Heat sink on page 52).
8. Remove the system board (see System board on page 53).

Remove the speakers:

1. Detach the speaker cable **(1)** from the touchpad bracket.
2. Remove the four Phillips M2.0 × 2.4 broad head screws **(2)** that secure the speakers to the computer.
3. Remove the speakers **(3)** from the computer.

   When removing the speakers, make note of the location of the two rubber isolator locations **(4)**. The absence of or damage to these isolators can result in degraded speaker performance.



Reverse this procedure to install the speakers.

5.1.14 Touchpad cable

To remove the touchpad cable, use this procedure and illustration.

Table 5-12 Touchpad cable description and part number

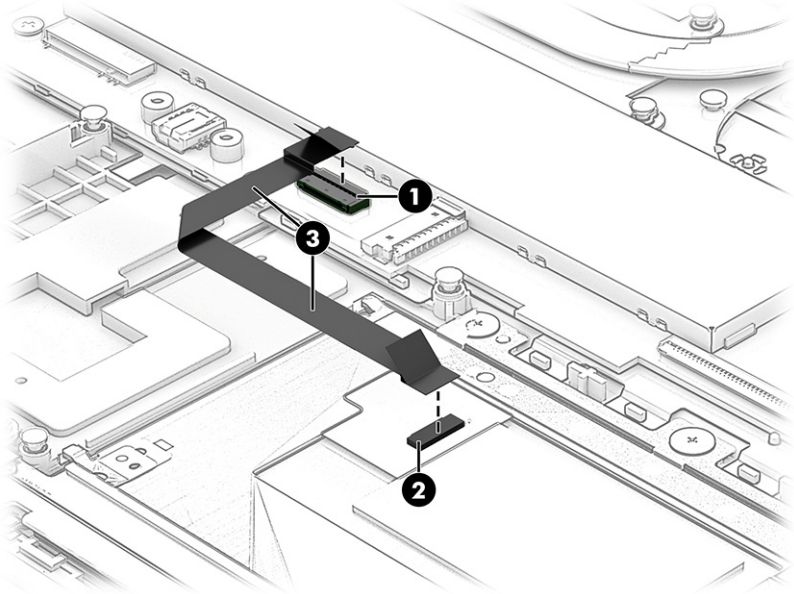
Description	Spare part number
Touchpad cable (includes double-sided adhesive)	N09640-001

Before removing the touchpad cable, follow these steps:

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

Remove the touchpad cable:

1. Release the ZIF connector **(1)** to which the touchpad cable is connected, and then disconnect the touchpad cable from the system board.
2. Release the ZIF connector **(2)** to which the touchpad cable is connected, and then disconnect the touchpad cable from the touchpad.
3. Detach the touchpad cable **(3)** from the top cover/keyboard. (The touchpad cable is attached to the top cover/keyboard with double-sided adhesive.)



4. Remove the touchpad cable.

Reverse this procedure to install the touchpad cable.

5.1.15 Touchpad

To remove the touchpad, use this procedure and illustration.

Table 5-13 Touchpad description and part number

Description	Spare part number
Touchpad	N09641-001
NOTE: The touchpad spare part kit does not include the touchpad bracket or the touchpad cable. The touchpad bracket is not available as a spare component. The touchpad cable is available using spare part number N09640-001	

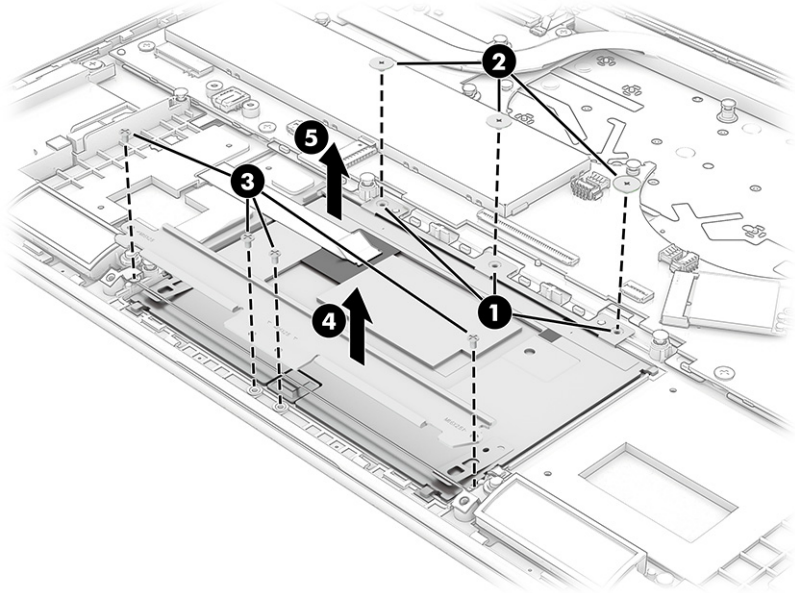
Before removing the touchpad, follow these steps:

1. Prepare the computer for disassembly (see Preparation for disassembly on page 31).
2. Remove the bottom cover (see Bottom cover on page 31).
3. Remove the battery (see Battery on page 32).
4. Remove the touchpad cable (see Touchpad cable on page 57).

Remove the touchpad:

1. Release the black plastic film **(1)** that covers the touchpad screws.
2. Remove the three Phillips M2.0 × 2.4 broad head screws **(2)** that secure the touchpad to the computer.
3. Remove the four Phillips M1.5 × 2.7 screws **(3)** that secure the touchpad and touchpad bracket to the computer.
4. Remove the touchpad bracket **(4)** from the computer.

   The touchpad bracket is not available as a spare part component.
5. Remove the touchpad **(5)** from the computer.



Reverse this procedure to install the touchpad.

5.1.16 Top cover/keyboard

The top cover/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 5-14

Description	Spare part number
Top cover/keyboard with backlight (includes backlight cable and keyboard cable)	N15946-xxx

Table 5-15 **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	Hungary	-211	Russia	-251
For use in the Czech Republic and Slovakia	-FL1	Israel	-BB1	Slovenia	-BA1

Table 5-15 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	Italy	-061	Switzerland	-BG1
French Canada	-DB1	Japan	-291	Ukraine	-BD1
France	-051	The Netherlands	-B31	United Kingdom	-031
Germany	-041	Saudi Arabia	-171	United States	-001
Greece	-151				

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

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

6.1 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.

6.1.1 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.

6.1.2 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 61.
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.

6.1.3 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.

6.1.3.1 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 61.
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 62.

6.1.3.2 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.

6.1.3.2.1 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.

6.1.3.2.2 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.

6.1.4 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.

6.2 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 61.
2. Select **Security**, select **TPM Embedded Security**, and then follow the on-screen instructions.

6.3 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

You can use Windows tools or HP software to back up your information, create a restore point, reset your computer, create recovery media, or restore your computer to its factory state. Performing these standard procedures can return your computer to a working state faster.

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.

7.1 Backing up information and creating recovery media

These methods of creating recovery media and backups are available on select products only.

7.1.1 Using Windows tools for backing up

HP recommends that you back up your information immediately after initial setup. You can do this task either using Windows Backup locally with an external USB drive or using online tools.

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.

7.1.2 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, 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.

IMPORTANT: HP recommends that you follow the Restoring and recovery methods on page 66 to restore your computer before you obtain and use the HP recovery discs. Using a recent backup can return your machine to a working state sooner than using the HP recovery discs. After the system is restored, reinstalling all the operating system software released since your initial purchase can be a lengthy process.

7.2 Restoring and recovering your system

You have several tools available to recover your system both within and outside of Windows if the desktop cannot load.

HP recommends that you attempt to restore your system using the Restoring and recovery methods on page 66.

7.2.1 Creating a system restore

System Restore is available in Windows. The System Restore software can automatically or manually create restore points, or snapshots, of the system files and settings on the computer at a particular point.

When you use System Restore, it returns your computer to its state at the time you made the restore point. Your personal files and documents should not be affected.

7.2.2 Restoring and recovery methods

After you run the first method, test to see whether the issue still exists before you proceed to the next method, which might now be unnecessary.

1. Run a Microsoft System Restore.
2. Run Reset this PC.

> NOTE: The options **Remove everything** and then **Fully clean the drive** can take several hours to complete and leave no information on your computer. It is the safest way to reset your computer before you recycle it.

3. Recover using HP Recovery media. For more information, see Recovering using HP Recovery media on page 66.

For more information about the first two methods, see the Get Help app:

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

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

7.2.3 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 65.

> 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.

> NOTE: HP recommends that you follow the Restoring and recovery methods on page 66 to restore your computer before you obtain and use the HP recovery discs. Using a recent backup can return your

machine to a working state sooner than using the HP recovery discs. After the system is restored, reinstalling all the operating system software released since your initial purchase can be a lengthy process.

7.2.4 Changing the computer boot order

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

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

To change the boot order:

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 press and hold the volume up button, and then select **f9**.

     – or –

     Turn on or restart the tablet, quickly press and hold 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.

7.2.5 Using HP Sure Recover (select products only)

Select computer models are configured with HP Sure Recover, a PC operating system (OS) recovery solution built into the hardware and software. 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. Follow the on-screen instructions to find your product and locate your documentation.

8 Using HP PC Hardware Diagnostics

You can use the HP PC Hardware Diagnostics utility 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) Remote HP PC Hardware Diagnostics UEFI, a firmware feature.

8.1 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 69.

8.1.1 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 for select component tests. For interactive tests, such as keyboard, mouse, or audio and video palette, you must perform troubleshooting steps before you can receive a failure ID.

- You have several options after you receive a failure ID:
  - Select **Next** to open the Event Automation Service (EAS) page, where you can log the case.

    – or –

  - Scan the QR code with your mobile device, which takes you to the EAS page, where you can log the case.

    – or –

  - Select the box next to the 24-digit failure ID to copy your failure code and send it to support.

8.1.2 Accessing HP PC Hardware Diagnostics Windows

After HP PC Hardware Diagnostics Windows is installed, you can access it from HP Support Assistant or the Start menu.

8.1.2.1 Accessing HP PC Hardware Diagnostics Windows from HP Help and Support (select products only)

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

8.1.2.2 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.

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**.

8.1.2.3 Accessing HP PC Hardware Diagnostics Windows from the Start menu (select products only)

After HP PC Hardware Diagnostics Windows is installed, follow these steps to access it from the Start menu.

1. Select the **Start** button.
2. Right-click **HP PC Hardware Diagnostics for Windows**, select **More**, and then select **Run as administrator**.
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**.

8.1.3 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.

8.1.3.1 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 the specific Windows diagnostics version to download to your computer or a USB flash drive.

The tool downloads to the selected location.

8.1.3.2 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 Store 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.

8.1.3.3 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.

8.1.4 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.

8.2 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 71.

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

8.2.1 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.

8.2.2 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 71.

   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.

8.2.3 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.

8.2.3.1 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**.

8.2.3.2 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.

8.3 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**.

8.3.1 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.

8.3.1.1 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**.

8.3.1.2 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.

8.3.2 Customizing Remote HP PC Hardware Diagnostics UEFI settings

Using the Remote HP PC Hardware Diagnostics setting in Computer Setup (BIOS), you can perform several 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.

9.1 Computer specifications

This section provides specifications for your computer. When you travel 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	**359 mm**	14.13 in
Depth	**229 mm**	9.02 in
Height (front to back)	**16.6 mm**	0.65 in
Weight	**1.78 kg**	3.92 lb
Input power		
Operating voltage and current	19.5 V dc @ 2.31 A - 45 W	
	19.5 V dc @ 3.33 A - 65 W	
	19.5 V dc @ 4.62 A - 90 W	
	19.5 V dc @ 7.70 A - 150 W	
	19.5 V dc @ 10.3 A - 200 W	
Temperature		
Operating	**5°C to 35°C**	41°F to 95°F
Nonoperating	**-20°C to 60°C**	-4°F to 140°F
Relative humidity (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating	**-15 m to 3,048 m**	-50 ft to 10,000 ft
Nonoperating	**-15 m to 12,192 m**	-50 ft to 40,000 ft

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

9.2 39.6 cm (15.6 in) display specifications

This section provides specifications for your display.

Table 9-2 **Display specifications**

	Metric	U.S.
Active diagonal size	**39.6 cm**	15.6 in
Resolution	1920 × 1080	
Surface treatment	Brightview	
	Antiglare	
Brightness	400 nits	
	250 nits	
Viewing angle	UWVA	
Backlight	OLED + LBL	
	WLED + LBL	
Display panel interface	eDP 1.4 + PSR	
	eDP 1.2 + PSR	

9.3 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.

Table 9-3 Solid-state drive specifications (continued)

	256 GB*	512 GB*	1 TB*
NOTE: Certain restrictions and exclusions apply. Contact support for details.			

9.4 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 can 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.

10.1 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, type 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, type 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, type 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**. Select **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, type 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:

NOTE: 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.

10.2 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 83.	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 nonfunctional.

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?
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 nonfunctional. A utility must be used for writing data to this memory and is available on the HP website; go to http://www.hp.com/support. Select **Find your product**, and then follow the on-screen instructions.
Intel Management Engine Firmware (present only in select Elite or Z models. For more information, go to http://www.hp.com/support. Select **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.

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?
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.

10.3 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 information on your hard drive. See question and answer 6 for steps to securely erase information.

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.

10.4 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 three-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.

11.1 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.

11.2 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

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

Country/region	Accredited agency	Applicable note number
Germany	VDE	1
India	BIS	1
Israel	SII	1
Italy	IMQ	1
Japan	JIS	3
Netherlands	KEMA	1
New Zealand	SANZ	1
Norway	NEMKO	1
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
United Kingdom	ASTA	1
United States	UL	2

1. The flexible cord must be Type HO5VV-F, three-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, three-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, three-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, three-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 three-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 three-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 three-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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