Maintenance and Service Guide

HP ENVY 17 Laptop PC
HP ENVY 17m Laptop PC

IMPORTANT! This document is intended for HP authorized service providers only.

First Edition: February 2020

Document Part Number: L98712-001

Product notice

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

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

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

Software terms

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

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

Safety warning notice

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

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1 Product description

Table 1-1 Product components and their descriptions

Category	Description
Product Name	HP ENVY 17 Laptop PC
	HP ENVY 17m Laptop PC
	HP model numbers:17m-cg0001~17m-cg0999, 17-cg0001~17-cg0999
Processors	Intel® i7-1065G7 (1.3 GHz, turbo up to 3.9 GHz, 3200 MHz FSB, 8 MB L3 cache, quad core, 12 W)
	Intel Core i5-1035G1 (1.0 GHz, turbo up to 3.6 GHz, 3200 MHz FSB, 6 MB L3 cache, quad core, 12 W)
Graphics	**Hybrid graphics:**
	NVIDIA® GeForce® MX330 with up to 4 GB of dedicated video memory (Core i7 processor)
	NVIDIA GeForce MX330 with up to 2 GB of dedicated video memory (Core i7/i5 processors)
	Supports HD decode, DX12, and HDMI
	Supports Optimus™
	Supports GPS (GPU Performance Scaling)
Panel	**43.9 cm (17.3 in) WLED, anti glare, slim-flat (3.5 mm), 16:9 ultrawide aspect ratio**
	Full high-definition (FHD) (1920 × 1080), UWVA, eDP, narrow bezel (DBCG) typical brightness: 300 nits, 100% color gamut (touch)
	Ultra high-definition (UHD) (3840 x 2160), UWVA, eDP, narrow bezel (DBCG) typical brightness: 400 nits, 100% color gamut (nontouch)
Memory	Two SODIMM slots, nonaccessible/non upgradeable
	DDR4-2400 dual-channel support
	Supports up to 32 GB maximum system memory in the following configurations
	• 32 GB (2 × 16 GB) • 16 GB (8 GB × 2 + 1 × 16 GB) • 12 GB (8 GB × 1 + 4 GB × 1) • 8 GB (8 GB × 1 or 4 GB × 2)
Hard drive	**Supports 7.2 mm SATA hard drives**
	Support for solid-state drive + hard drive
	Support for M.2 solid-state drive
	Accelerometer/hard drive protection support
	Single hard drive configurations
	1 TB, 7200 rpm, 7.2 mm
	Dual storage configurations
	256 GB, PCIe, TLC, solid-state drive + 1 TB hard drive

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

Category	Description
	256 GB, PCIe, value, solid-state drive + 1 TB hard drive
	128 GB, SATA-3, TLC, solid-state drive + 1 TB hard drive
	PCIe, NVMe, TLC, M.2 solid-state drive
	512 GB
	PCIe, NVMe, value, M.2 solid-state drive
	512 GB
	Intel Optane™ (3D Xpoint) Solution (PCIe)
	16 GB (Optane) + 1 TB hard drive
	32 GB (Optane) + 1 TB hard drive
Audio and video	Audio Brand: BANG and OLUFSEN
	Audio control panel:BANG and OLUFSEN Audio Control
	Supports HP Audio Boost 2.0 (with discrete amplifier)
	Dual speakers
	Supports Far-Field Cortana
Video	HP Wide Vision HD Camera - indicator LED, USB2.0, HD BSI sensor, f2.0, WDR, 88° WFOV
	720p by 30 frames per second
	Dual array digital microphone with appropriate software - beam forming, echo cancellation, noise suppression.
Sensors	Accelerometer
Wireless	**Integrated wireless option with dual antennas (M.2/PCIe)**
	Intel Wireless-AC 9560 802.11ac 2 × 2 Wi-Fi + Bluetooth® 5 (non-vPro) (MU-MIMO, Gigabit Wi-Fi speeds supported)
	Intel Wireless-AC 2230 802.11ac Wi-Fi + Bluetooth 5, (MIPI + BRI, Gigabit Wi-Fi speeds supported)
	Support for Miracast®-certified devices
Ports	HP Smart Plug AC adapter
	Audio-out (headphone)/ Audio-in (microphone) combo jack
	High-definition multimedia interface (HDMI) v.2.0 + HDCP 2.2 supporting up to 4096 × 2160 at 60 Hz
	Hot plug/unplug and autodetect for correct output to wide-aspect vs. standard aspect video (auto-adjust panel resolution to fit embedded panel and external monitor connected)
	USB 3.2 Gen Type A ports (3); two on left side, one on right side; supports HP Sleep & Charge (right side)
	USB 3.2 Gen 1 Type-C port (supports data transfer, Power Delivery 3.0, Type-C adapter [65 W],
Media card reader	Supports SD™/SDHC™/SDXC™
	Push-push insertion/removal
Internal card expansion	One M.2 slot for WLAN
	One M.2 slot for solid-state drive

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

Category	Description
Keyboard/pointing devices	Backlit, full-sized, island-style, keyboard with numeric keypad
	Touchpad requirements
	ClickPad with image sensor
	Multitouch gestures enabled
	Support for Precision touchpad
	Support for modern trackpad gestures
	Taps enabled as default
Power requirements	Battery
	4-cell, 55 Whr, polymer/prismatic-mix battery
	Battery life enhancement
	Supports battery fast charge
	AC adapter
	65 W HP Smart AC adapter (non-PFC, slim black barrel, 4.5 mm, straight)
	90 W HP Smart AC adapter, (Smart PFC, standard barrel, 4.5 mm, straight, 1.8 m)
	Power cord
	1 m, conventional power cord (C5)
Security	Trusted Platform Module (TPM) 2.0, firmware based
	Privacy camera shutter door
	Universal 2nd Factor Authentication
Operating system	**Preinstalled**
	Windows® Win 10 Home 64
	Win 10 Home 64 Advanced
	Win 10 Home 64 Advanced Single Language
	Win 10 Home 64 Plus
	Win 10 Home 64 Plus Single Language
	Win 10 Home 64 Plus Single Language Africa Market PPP
	Win 10 Pro 64
Serviceability	**End user replaceable parts:**
	AC adapter

2 Getting to know your computer

Right side

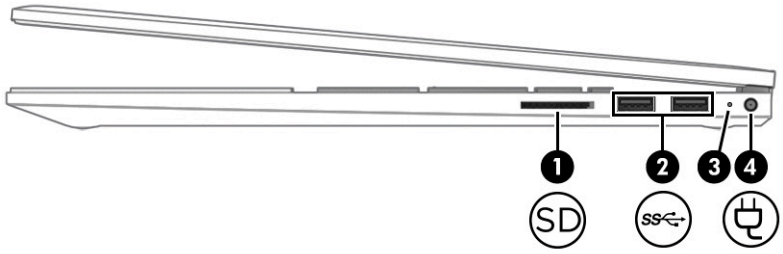


Table 2-1 Right-side components and their descriptions

Component		Description
(1)	Memory card reader	Reads optional memory cards that enable you to store, manage, share, or access information. To insert a card: 1. Hold the card label-side up, with connectors facing the computer. 2. Insert the card into the memory card reader, and then press in on the card until it is firmly seated. To remove a card: ▲ Press in on the card, and then remove it from the memory card reader.
(2)	USB SuperSpeed ports (2)	Connect USB devices, such as a cell phone, camera, activity tracker, or smartwatch, and provide high-speed data transfer.
(3)	AC adapter and battery light	• White: The AC adapter is connected and the battery is fully charged. • Blinking white (select products only): The AC adapter is disconnected and the battery has reached a low battery level. • Amber: The AC adapter is connected and the battery is charging. • Off: The battery is not charging.
(4)	Power connector	Connects an AC adapter.

Left side

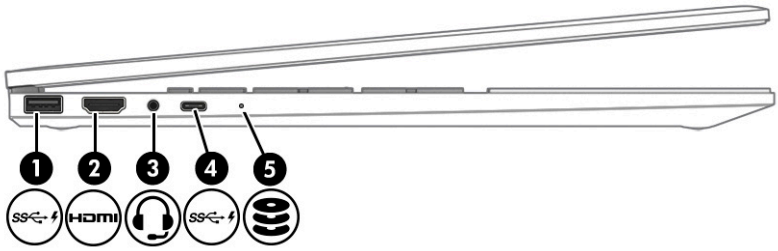


Table 2-2 Left-side components and their descriptions

Component		Description
(1)	USB SuperSpeed port with HP Sleep and Charge	Connects a USB device, provides high-speed data transfer, and even when the computer is off, charges most products such as a cell phone, camera, activity tracker, or smartwatch.
(2)	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.
(3)	Audio-out (headphone)/Audio-in (microphone) combo jack	Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional standalone microphones. **WARNING!** To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, see the *Regulatory, Safety, and Environmental Notices*. To access this guide: ▲ Type `HP Documentation` in the taskbar search box, and then select **HP Documentation**. **NOTE:** When a device is connected to the jack, the computer speakers are disabled.
(4)	USB Type-C SuperSpeed port with HP Sleep and Charge	Connects a USB device that has a Type-C connector, provides high-speed data transfer, and even when the computer is off, charges most products such as a cell phone, camera, activity tracker, or smartwatch. – and – Connects a display device that has a USB Type-C connector, providing DisplayPort output. **NOTE:** Cables, adapters, or both (purchased separately) might be required.
(5)	Drive light	• Blinking white: The hard drive is being accessed. • Amber: HP 3D DriveGuard has temporarily parked the hard drive.

Display

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.

⚠ **WARNING!** 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.

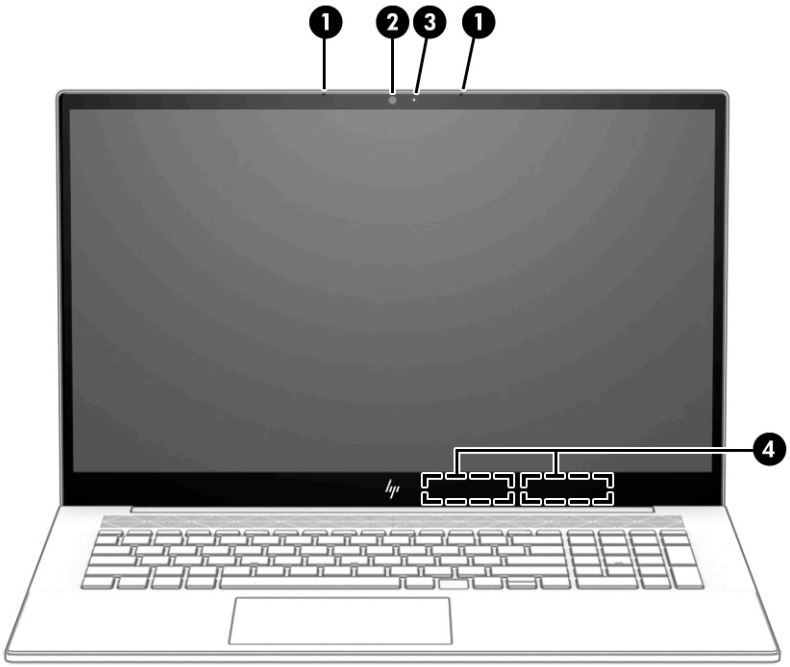


Table 2-3 Display components and their descriptions

Component		Description
(1)	Internal microphones	Record sound.
(2)	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:** To turn the camera on or off, press the camera privacy key. When the camera is turned on, the camera light is on, and the camera privacy key light is turned off. When the camera is turned off, the camera light is off, and the camera privacy light is turned on. **NOTE:** Camera functions vary depending on the camera hardware and software installed on your product.
(3)	Camera light	On: The camera is in use.
(4)	WLAN antennas*	Send and receive wireless signals to communicate with wireless local area networks (WLANs).

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

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

Component	Description
For wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region. To access this guide: ▲ Type `HP Documentation` in the taskbar search box, and then select **HP Documentation**.	

Keyboard area

NOTE: Keyboards can vary by language.

Touchpad

Touchpad settings

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

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

To turn on the touchpad:

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

– or –

- Press the Tab key repeatedly until the pointer rests on the **touchpad** button. Then press the spacebar to select the button.

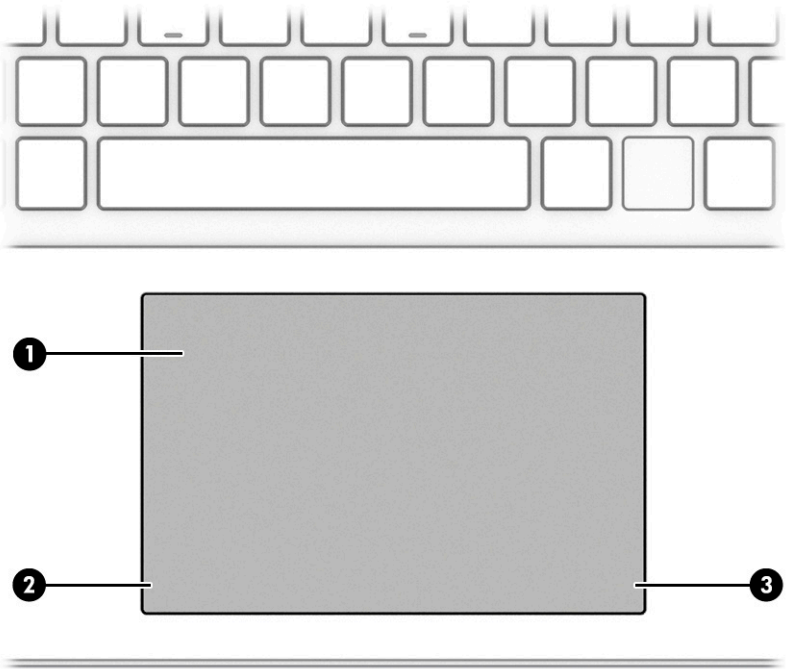


Table 2-4 Touchpad components and their descriptions

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

Lights

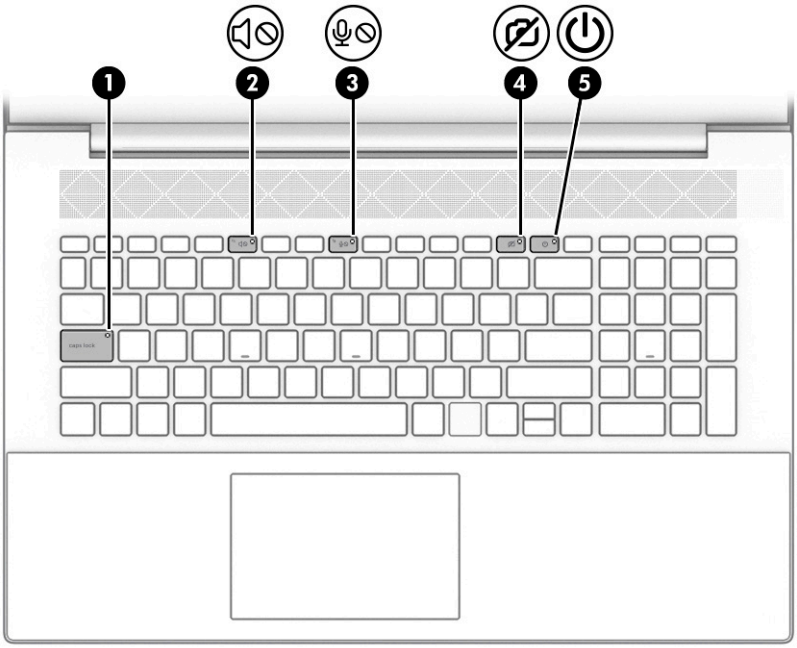


Table 2-5 Lights and their descriptions

Component			Description
(1)		Caps lock light	On: Caps lock is on, which switches the key input to all capital letters.
(2)		Mute light	• On: Computer sound is off. • Off: Computer sound is on.
(3)		Microphone mute light	• On: Microphone is off. • Off: Microphone is on.
(4)		Camera privacy light	• On: The camera is off. • Off: The camera is on.
(5)		Power light	• On: The computer is on. • Blinking: (select products only): The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unnecessary components. • Off: Depending on your computer model, the computer is off, in Hibernation, or in Sleep. Hibernation is the power-saving state that uses the least amount of power.

Button, speakers, and fingerprint reader

NOTE: Keyboards can vary by language.

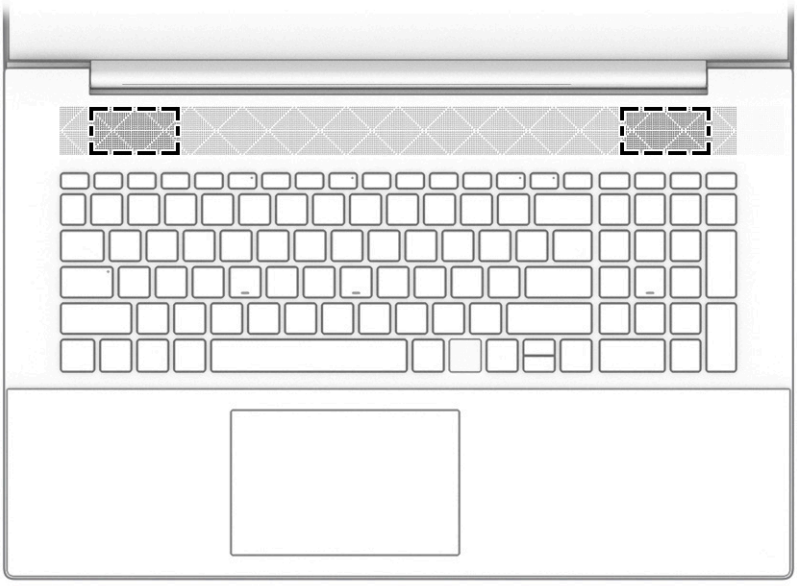


Table 2-6 Button, speakers, and fingerprint reader and their descriptions

Component		Description
(1)	Speakers (2)	Produce sound.
(2)	Power button	• When the computer is off, press the button briefly to turn on the computer. • When the computer is on, press the button briefly to initiate Sleep. • When the computer is in the Sleep state, press the button briefly to exit Sleep (select products only). • When the computer is in Hibernation, press the button briefly to exit Hibernation. **IMPORTANT:** Pressing and holding down the power button results in the loss of unsaved information. If the computer has stopped responding and shutdown procedures are ineffective, press and hold the power button down for at least 10 seconds to turn off the computer. To learn more about your power settings, see your power options:

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

Component			Description
			▲ Right-click the **Power** icon, and then select **Power Options**.
(3)		Fingerprint reader	Allows a fingerprint logon to Windows, instead of a password logon. ▲ Touch your finger to the fingerprint reader. **IMPORTANT:** To prevent fingerprint logon issues, make sure when you register your fingerprint that all sides of your finger are registered by the fingerprint reader.

Special keys

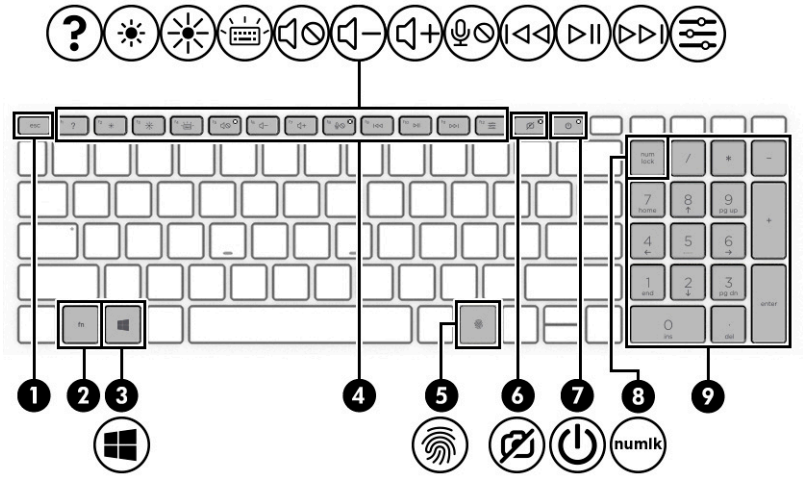


Table 2-7 Special keys and their descriptions

Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes specific functions when pressed in combination with another key.
(3)	Windows key	Opens the Start menu. **NOTE:** Pressing the Windows key again closes the Start menu.
(4)	Action keys	Execute frequently used system functions as defined by the icon symbols on f1 through f12 function keys. The action keys vary by computer.
(5)	Fingerprint reader	Allows a fingerprint logon to Windows, instead of a password logon. ▲ Touch your finger to the fingerprint reader. **IMPORTANT:** To prevent fingerprint logon issues, make sure when you register your fingerprint that all sides of your finger are registered by the fingerprint reader.
(6)	Camera privacy key	Turns the camera off and on.
(7)	Power button	• When the computer is off, press the button to turn on the computer. • When the computer is on, press the button briefly to initiate Sleep. • When the computer is in the Sleep state, press the button briefly to exit Sleep (select products only). • When the computer is in Hibernation, press the button briefly to exit Hibernation. **IMPORTANT:** Pressing and holding down the power button results in the loss of unsaved information.

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

Component		Description
		If the computer has stopped responding and shutdown procedures are ineffective, press and hold the power button down for at least 10 seconds to turn off the computer. To learn more about your power settings, see your power options: ▲ Right-click the **Power** icon, and then select **Power Options**.
(8)	num lock key	Alternates between the navigational and numeric functions on the integrated numeric keypad.
(9)	Integrated numeric keypad	A separate keypad to the right of the alphabet keyboard. When num lock is pressed, the keypad can be used like an external numeric keypad. **NOTE:** If the keypad function is active when the computer is turned off, that function is reinstated when the computer is turned back on.

Bottom

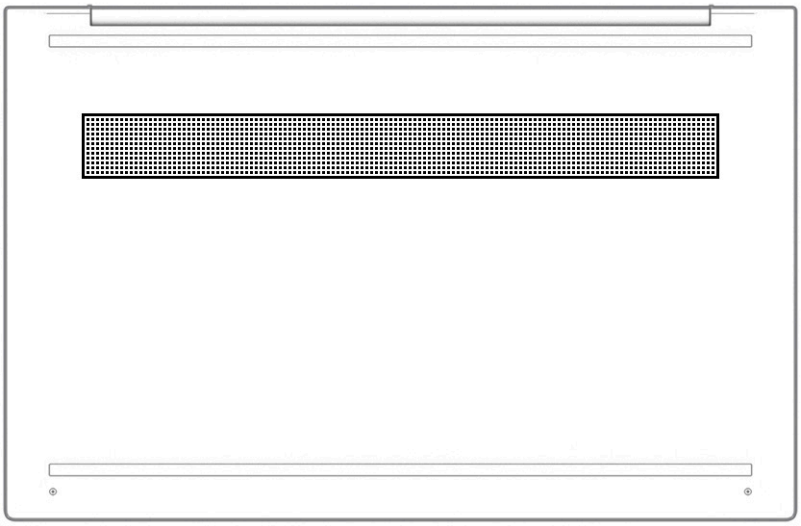


Table 2-8 Bottom components and their descriptions

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

Labels

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

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

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

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

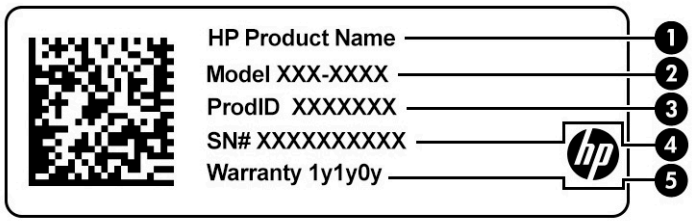


Table 2-9 Service label components

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

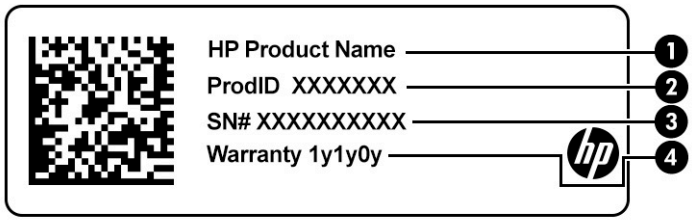


Table 2-10 Service label components

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

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

3 Illustrated parts catalog

Computer major components

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.

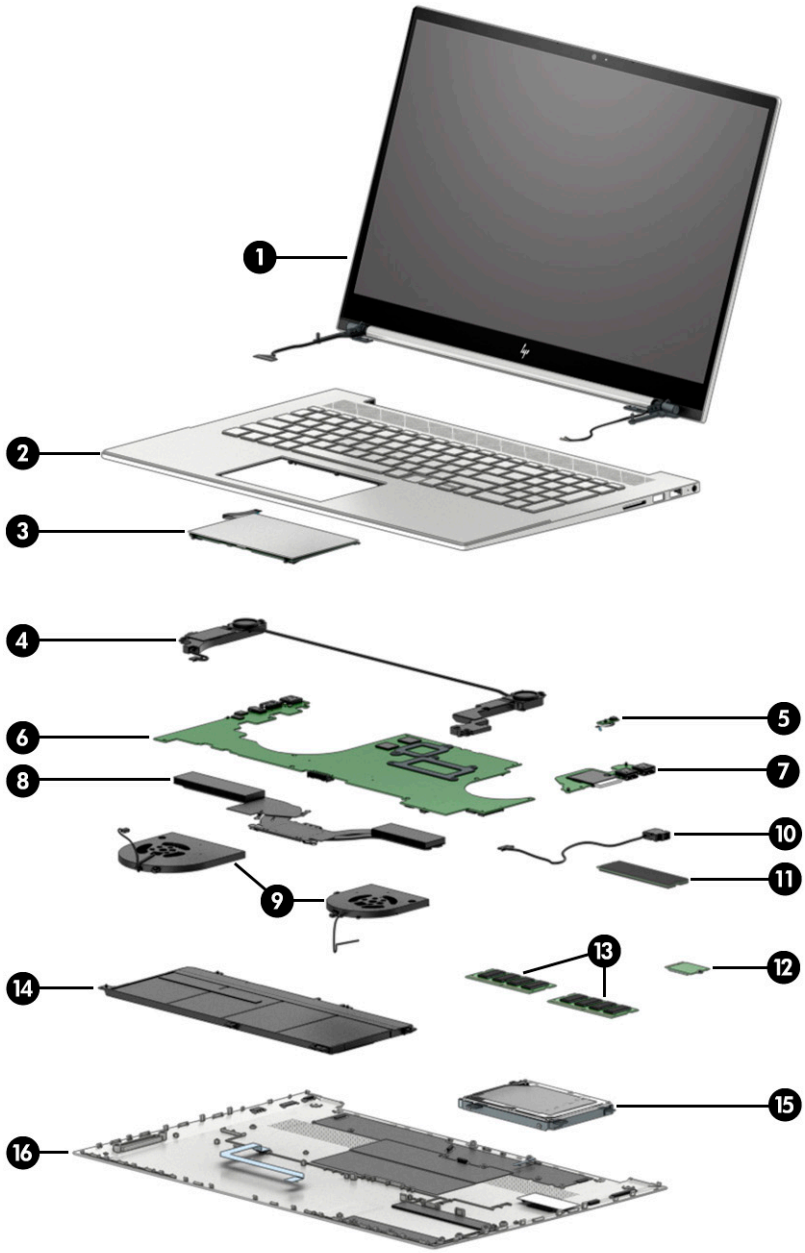


Table 3-1 Computer major components and their descriptions

Item	Component	Spare part number
(1)	**Display assembly**	
	FHD antiglare natural silver finish nontouch screen	L87972-001
	UHD antiglare natural silver finish nontouch screen	L87973-001
	FHD antiglare nightfall black finish nontouch screen	L92495-001
	UHD antiglare nightfall black finish nontouch screen	L92496-001
	FHD antiglare nightfall black finish touch screen	L87971-001
	FHD antiglare nightfall black finish touch screen	L92494-001

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

Item	Component	Spare part number
(2)	**Top cover** with keyboard	
	For use in Saudi Arabia in natural silver finish with backlight	L87983-171
	For use in Belgium in natural silver finish with backlight	L87983-A41
	For use in the Czech Republic and Slovenia in natural silver finish with backlight	L87983-FL1
	For use in France in natural silver finish with backlight	L87983-051
	For use in Canada in natural silver finish with backlight	L87983-DB1
	For use in French Arabia in natural silver finish with backlight	L87983-FP1
	For use in Greece in natural silver finish with backlight	L87983-151
	For use in Germany in natural silver finish with backlight	L87983-041
	For use in Hungary in natural silver finish with backlight	L87983-211
	For use in International in natural silver finish with backlight	L87983-B31
	For use in Israel in natural silver finish with backlight	L87983-BB1
	For use in Italy in natural silver finish with backlight	L87983-061
	For use in Denmark, Finland, Norway, and Sweden in natural silver finish with backlight	L87983-DH1
	For use in Portugal in natural silver finish with backlight	L87983-131
	For use in Romania in natural silver finish with backlight	L87983-271
	For use in Slovenia in natural silver finish with backlight	L87983-BA1
	For use in Russia in natural silver finish with backlight	L87983-251
	For use in Spain in natural silver finish with backlight	L87983-071
	For use in Switzerland in natural silver finish with backlight	L87983-BG1
	For use in Turkey in natural silver finish with backlight	L87983-141
	For use in the United Kingdom in natural silver finish with backlight	L87983-031
	For use in Ukraine in natural silver finish with backlight	L87983-BD1
	For use in the United States in natural silver finish with backlight	L87983-001
	Top cover with keyboard and touchpad (touchpad cannot be replaced)	
	For use in Saudi Arabia in nightfall black finish with wood veneer and backlight	L87984-171
	For use in Belgium in nightfall black finish with wood veneer and backlight	L87984-A41
	For use in the Czech Republic and Slovenia in nightfall black finish with wood veneer and backlight	L87984-FL1
	For use in France in nightfall black finish with wood veneer and backlight	L87984-051
	For use in Canada in nightfall black finish with wood veneer and backlight	L87984-DB1
	For use in French Arabia in nightfall black finish with wood veneer and backlight	L87984-FP1
	For use in Greece in nightfall black finish with wood veneer and backlight	L87984-151
	For use in Germany in nightfall black finish with wood veneer and backlight	L87984-041

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

Item	Component	Spare part number
	For use in Hungary in nightfall black finish with wood veneer and backlight	L87984-211
	For use in International in nightfall black finish with wood veneer and backlight	L87983-B31
	For use in Israel in nightfall black finish with wood veneer and backlight	L87983-BB1
	For use in Italy in nightfall black finish with wood veneer and backlight	L87984-061
	For use in Denmark, Finland, Norway, and Sweden in nightfall black finish with wood veneer and backlight	L87984-DH1
	For use in Portugal in nightfall black finish with wood veneer and backlight	L87984-131
	For use in Russia in nightfall black finish with wood veneer and backlight	L87983-251
	For use in Slovenia in nightfall black finish with wood veneer and backlight	L87984-BA1
	For use in Spain in nightfall black finish with wood veneer and backlight	L87983-071
	For use in Switzerland in nightfall black finish with wood veneer and backlight	L87984-BG1
	For use in Turkey in nightfall black finish with wood veneer and backlight	L87984-141
	For use in Romania in nightfall black finish with wood veneer and backlight	L87984-271
	For use in the United Kingdom in nightfall black finish with wood veneer and backlight	L87984-031
	For use in Ukraine in nightfall black finish with wood veneer and backlight	L87984-BD1
	For use in the United States in nightfall black finish with wood veneer and backlight	L87984-001
(3)	**Touchpad** **NOTE:** The touchpad spare part kit does not include the touchpad cable. The touchpad cable is available using spare part number L87955-001.	
	In natural silver finish	L87969-001
(4)	**Speaker kit**	L87977-001
(5)	**IR sensor board**	L87964-001
(6)	**System board**	
	Intel Core i5-1035 G1 processor and 2 GB of discrete graphics memory	L87978-601
	Intel Core i7-1065 G7 processor and 2 GB of discrete graphics memory	L87979-601
	Intel Core i7-1065 G7 processor and 4 GB of discrete graphics memory	L87980-601
	Thermal Pad (not illustrated)	L90545-001
(7)	**USB board**	L87965-001
(8)	**Heat sink**	L87960-001
(9)	Fans	
	Fan (CPU)	L87961-001
	Fan (GPU)	L87962-001
(10)	**Power connector/cable**	L87959-001
(11)	**Solid-state drive**	

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

Item	Component	Spare part number
	1 T GB PCIe-NVMe Value	L85370-001
	1 T GB PCIe-NVMe Value Gen 3 × 4 TLC SS	L85348–001
	512 GB M2 2280 PCIe NVMe Value	L85364-001
	512 GB, PCIe, Gen 3 × 4 TLC SS	L85360-001
	512 GB, PCIe, Gen 3 × 4 TLC SS	L85360-001
	256 GB, PCIe, Gen 3 × 4 TLC SS	L85350-001
	256 GB, PCIe, value	L85354-001
	128 GB, SATA-3, TLC	L85346-001
	32 GB/512 GB, PCIe-NVMe 3 × 4 TLC SS (Optane Memory Module/solid-state drive combination drive)	L85366-001
	16 GB, PCIe NVMe Value (Optane Memory Module)	L85372-001
(12)	**WLAN modules**	
	Intel Wireless-AC 2230 802.11ac Wi-Fi + Bluetooth 5, MIPI + BRI	L22634-005
	Intel Wireless-AC 9560 802.11ac 2 × 2 Wi-Fi + Bluetooth 5 (non-vPro) (MU-MIMO)	L57250-005
(13)	**Memory modules**	
	8 GB 3200MHz 1.2v DDR4	L46598-005
	16 GB DDR4-3200 1.2v	67710-005
	4 GB DDR4-3200 1.2v	L83673-005
(14)	**Battery**	L43267-005
(15)	**Hard drive**	L06427-855
(16)	**Bottom cover**	
	Bottom cover in natural silver finish	L87948-001
	Bottom cover in nightfall black finish	L87949-001

Display assembly subcomponents

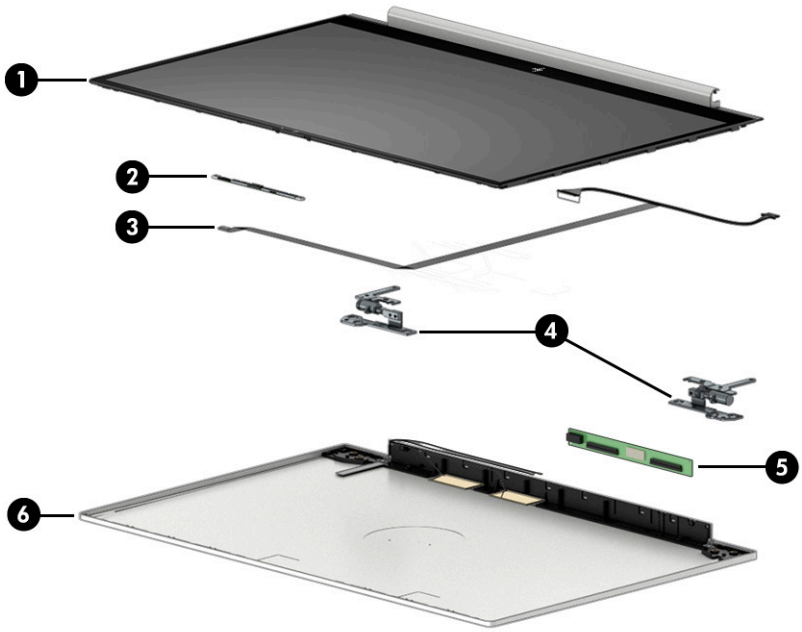


Table 3-2 Display components and their descriptions

Item	Component	Spare part number
(1)	**Display panel**	
	FHD antiglare, touch screen, natural silver finish	L87971-001
	FHD antiglare, touch screen, natural black finish	L92494-001
	FHD antiglare, nontouch screen, natural black finish	L87972-001
	UHD antiglare, nontouch screen, natural silver finish	L87973-00
	FHD antiglare, nontouch screen, natural black finish	L92495-001
	UHD antiglare, nontouch screen, natural black finish	L92496-001
(2)	**Webcam**	L87982-001
(3)	**Display panel cable**	
	Display panel cable for FHD screen	L87957-001
	Display panel cable for UHD screen	L87958-001
(4)	**Hinge kit**	L87963-001
(5)	**Touch screen board** (select products only)	L87956-001
(6)	**Back cover** with antenna **NOTE:** The antenna that is separate from the back cover is available as spare part number L87945-001.	
	In natural silver finish	L87946-001
	In nightfall black finish	L87947-001

Mass storage devices

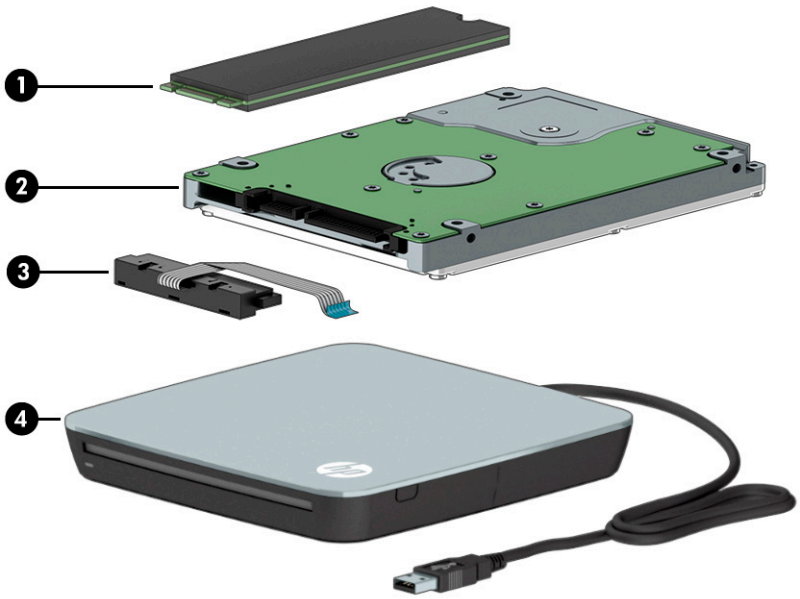


Table 3-3 Mass storage devices and their descriptions

Item	Component	Spare part number
(1)	**Solid-state drives**	
	1 T GB PCIe-NVMe 3 × 4 TLC SS	L85348-001
	1 T GB PCIe-NVMe Value	L85370-001
	512 GB, PCIe, Gen 3 × 4 TLC SS	L85360-001
	512 GB, PCIe, Gen 3 × 4 TLC SS	L85360-001
	256 GB, PCIe, Gen 3 × 4 TLC SS	L85350-001
	256 GB, PCIe, value	L85354-001
	128 GB, SATA-3, TLC	L85346-001
	32 GB/512 GB, PCIe-NVMe 3 × 4 TLC SS (Optane Memory Module/solid-state drive combination drive)	L85366-001
	16 GB, PCIe NVMe Value (Optane Memory Module)	L85372-001
(2)	**Hard Drive** (1 TB, 7200 rpm)	L06427-855
(3)	**Hard Drive connector/cable**	L87952-001
(4)	**USB optical disk drive** (external)	747080-001

Cables

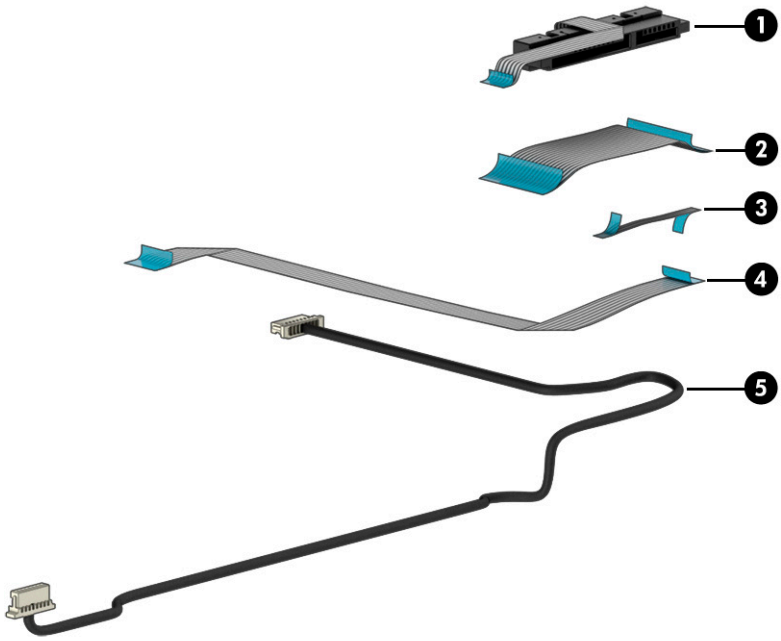


Table 3-4 Cables and their descriptions

	Component	Spare part number
(1)	**Hard drive connector cable**	L87952-001
(2)	**USB board cable**	L87954-001
(3)	**IR sensor cable**	L87953-001
(4)	**Touchpad**	L87955-001
(5)	**Touch screen board cable** (select products only)	L87956-001

Miscellaneous parts

Table 3-5 Miscellaneous parts and their descriptions

Component	Spare part number
AC adapter	
90 W Smart AC adapter (Smart PFC, 4.5 mm, RA 1.8 m)	937532-850
65 W AC adapter (slim, non-PFC, 4.5 mm, 1.8 m)	L24008-001
Power cord (straight, C5, 1.0 m)	
For use in Denmark	L22322-001
For use in Europe	L22321-001
For use in Israel	L22323-001
For use in North America	L22319-001

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

Component	Spare part number
For use in South Africa	L22325-001
For use in Switzerland	L22324-001
For use in the United Kingdom	L22320-001
Hub, USB-C–to–Multiport	916838-001
Hub, USB-C to USB-A Hub	L39572-001
Hub, HP Elite USB-C Multi Port Hub	L39572-001
Adapter, USB to Gigabit RJ45	829941-001
Adapter, USB-C to VGA	831751-001
Adapter, USB-C–to–USB-A	916838-001
Adapter, HP USB-C to RJ45	855560-001
Adapter, HDMI to VGA	701943-001
Display panel adhesive	L90544-001
Screw kit	L87976-001
WLAN Mylar	L92736-001

4 Removal and replacement procedures preliminary requirements

Tools required

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

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

Service considerations

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

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

Plastic parts

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

Cables and connectors

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

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

Drive handling

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

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

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

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

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

Avoid dropping drives from any height onto any surface.

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

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

Avoid exposing a drive to temperature extremes or liquids.

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

Workstation guidelines

Follow these grounding workstation guidelines:

- Cover the workstation with approved static-shielding material.
- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.
- Use conductive field service tools, such as cutters, screw drivers, and vacuums.
- When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and polystyrene foam.
- Handle ESD-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.

Electrostatic discharge information

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

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

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

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

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

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

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

Generating static electricity

Note the following:

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

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

	Relative humidity		
Event	**55%**	**40%**	**10%**
Walking across carpet	7,500 V	15,000 V	35,000 V
Walking across vinyl floor	3,000 V	5,000 V	12,000 V
Motions of bench worker	400 V	800 V	6,000 V
Removing DIPs (dual in-line packages) from plastic tube	400 V	700 V	2,000 V
Removing DIPs from vinyl tray	2,000 V	4,000 V	11,500 V
Removing DIPs from polystyrene foam	3,500 V	5,000 V	14,500 V
Removing bubble pack from PCB (printed circuit board)	7,000 V	20,000 V	26,500 V
Packing PCBs in foam-lined box	5,000 V	11,000 V	21,000 V
Multiple electric components can be packaged together in plastic tubes, trays, or polystyrene foam.			

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

Preventing electrostatic damage to equipment

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

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

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

Personal grounding methods and equipment

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

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

Table 4-2 Static shielding protection levels

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

Grounding the work area

To prevent static damage at the work area, use the following precautions:

- Cover the work surface with approved static-dissipative material. Provide a wrist strap connected to the work surface and properly grounded tools and equipment.
- Use static-dissipative mats, foot straps, or air ionizers to give added protection.
- Handle electrostatic sensitive components, parts, and assemblies by the case or PCB laminate. Handle them only at static-free work areas.
- Turn off power and input signals before inserting and removing connectors or test equipment.
- Use fixtures made of static-safe materials when fixtures must directly contact dissipative surfaces.
- Keep work area free of nonconductive materials such as ordinary plastic assembly aids and polystyrene foam.
- Use field service tools, such as cutters, screwdrivers, and vacuums, that are conductive.

Recommended materials and equipment

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

- Antistatic tape
- Antistatic smocks, aprons, or sleeve protectors
- Conductive bins and other assembly or soldering aids
- Conductive foam
- Conductive tabletop workstations with ground cord of 1 MΩ ±10% resistance

- Static-dissipative table or floor mats with hard tie to ground
- Field service kits
- Static awareness labels
- Wrist straps and footwear straps providing 1 MΩ ±10% resistance
- Material handling packages
- Conductive plastic bags
- Conductive plastic tubes
- Conductive tote boxes
- Opaque shielding bags
- Transparent metallized shielding bags
- Transparent shielding tubes

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

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

5 Removal and replacement procedures for authorized service provider parts

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

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

Component replacement procedures

There are as many as 52 screws that must be removed, replaced, or loosened when servicing the parts described in this chapter. Make special note of each screw size and location during removal and replacement.

Preparation for disassembly

See Removal and replacement procedures preliminary requirements on page 24 for initial safety procedures.

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

Bottom cover and rubber feet

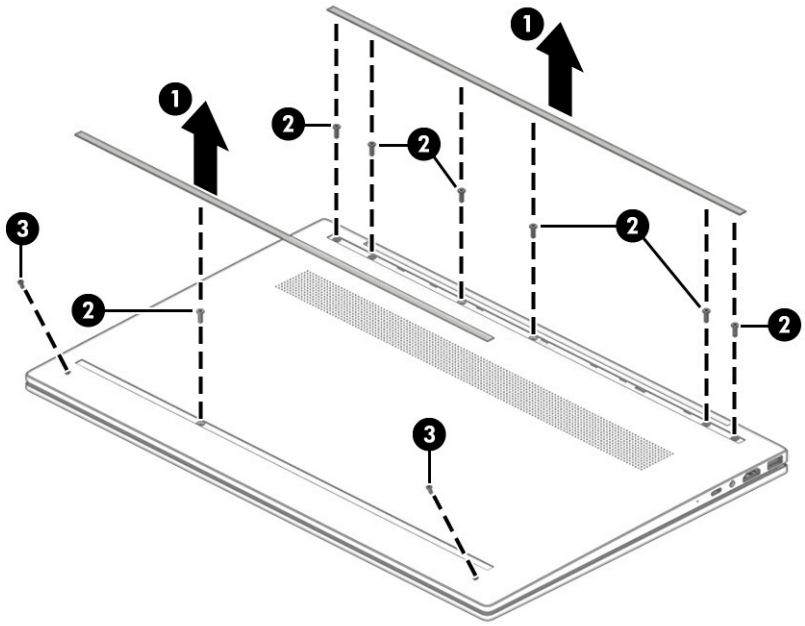
Table 5-1 Bottom cover and rubber feet descriptions and part numbers

Description	Spare part number
Bottom cover in natural silver finish	L87948-001
Bottom cover in nightfall black finish	L87949-001
Rubber foot kit for natural silver finish	L87974-001
Rubber foot kit for nightfall black finish	L87975-001

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

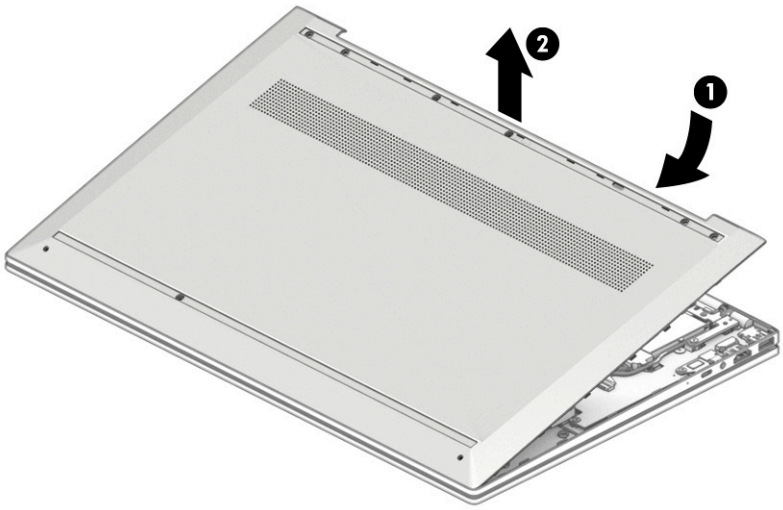
To remove the bottom cover and rubber feet:

1. Peel the two rubber feet off the bottom of the computer **(1)**.
2. Remove the seven Phillips M2.5 × 8.5 screws from under the rubber feet **(2)**.
3. Remove the two M2.0 × 3.0 screws from each side of the computer **(3)**.



4. Use a plastic tool **(1)** to separate the front of the bottom cover from the computer.

5. On the hinge side, lift up near both hinges to remove the bottom cover from the computer **(2)**.



Reverse this procedure to install the bottom cover and rubber feet.

Battery

Table 5-2 Battery description and part number

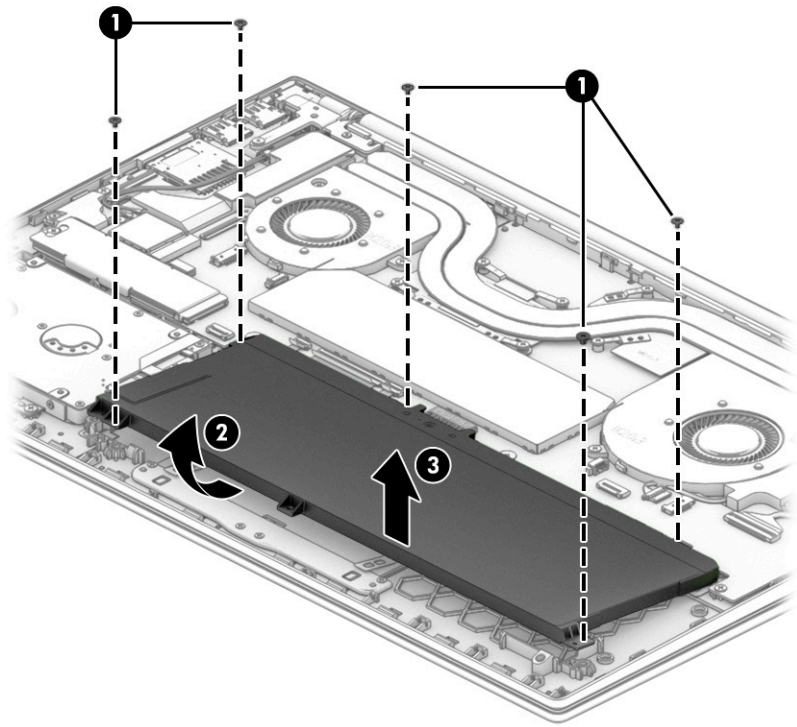
Description	Spare part number
Battery (4 cell, 55 Whr)	L43267-005

Before removing the battery, follow these steps:

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

To remove the battery:

1. Remove the four Phillips M2.0 × 3.0 screws and one Phillips M2.0 × 2.5 **(1)** that secure the battery to the computer.
2. Rotate the battery upward from the bottom **(2)**.
3. Remove the battery from the computer **(3)**.



Reverse this procedure to install the battery.

WLAN module

Table 5-3 WLAN module description and part number

Description	Spare part number
Intel Wireless-AC 2230 802.11ac 2 × 2 Wi-Fi + Bluetooth, MIPI + BRI	L22634-005
Intel Wireless-AC 2230 802.11ac 2 × 2 Wi-Fi + Bluetooth 5	L57250-005

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

Before removing the WLAN module, follow these steps:

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

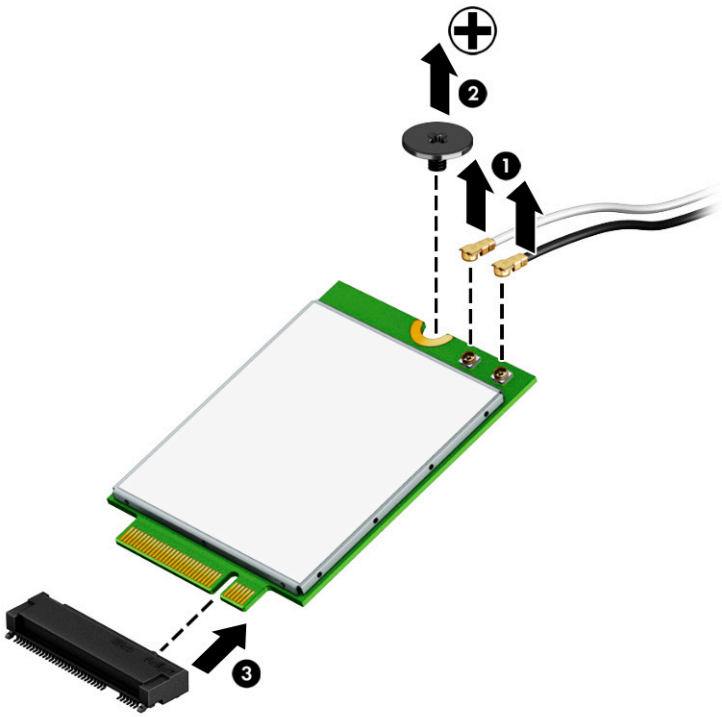
To remove the WLAN module:

1. Disconnect the WLAN antenna cables **(1)** from the terminals on the WLAN module.

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

2. Remove the Phillips M2.0 × 3.0 screw **(2)** that secures the WLAN module to the computer. (The WLAN module tilts up.)

3. Remove the WLAN module **(3)** by pulling the module away from the slot at an angle.



Reverse this procedure to install the WLAN module.

Hard drive, drive rubber holder, and cable

Table 5-4 Hard drive, drive rubber holder, and cable descriptions and part numbers

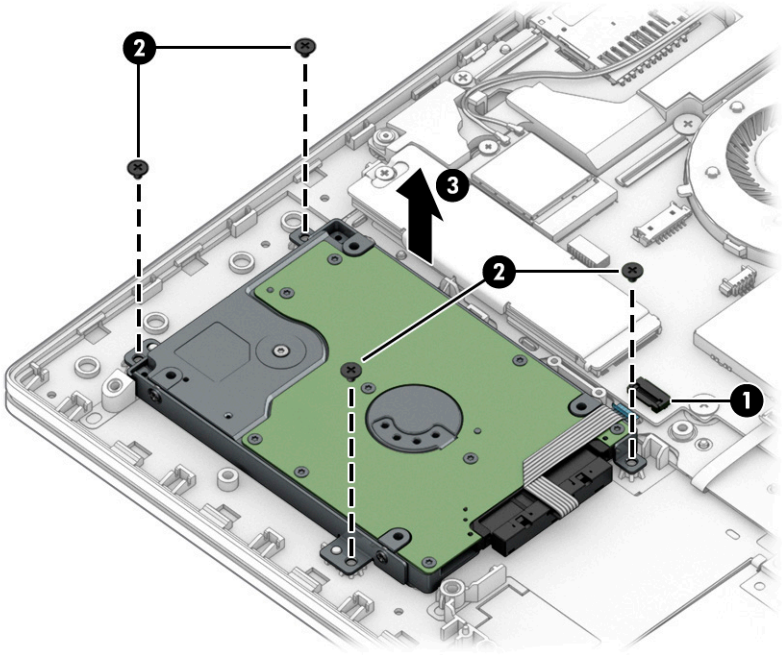
Description	Spare part number
Hard drive, 1 TB, 7200 rpm	L06427-855
Hard drive connector	L87952-001

Before removing the hard drive, follow these steps:

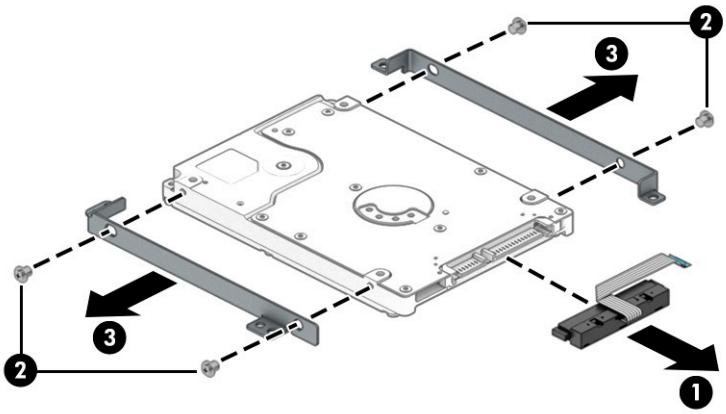
1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover and rubber feet on page 30).
3. Remove the battery (see Battery on page 32).

To remove the hard drive (select products only)

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



4. If it is necessary to remove the hard drive connector from the hard drive **(1)**, remove the 4 M2.5 × 2.5 screws securing the hard drive brackets to each side of the hard drive **(2)**, and then remove the two hard drive brackets **(3)**.



Reverse this procedure to reassemble and install the hard drive.

Solid-state drive and Optane Memory Module

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

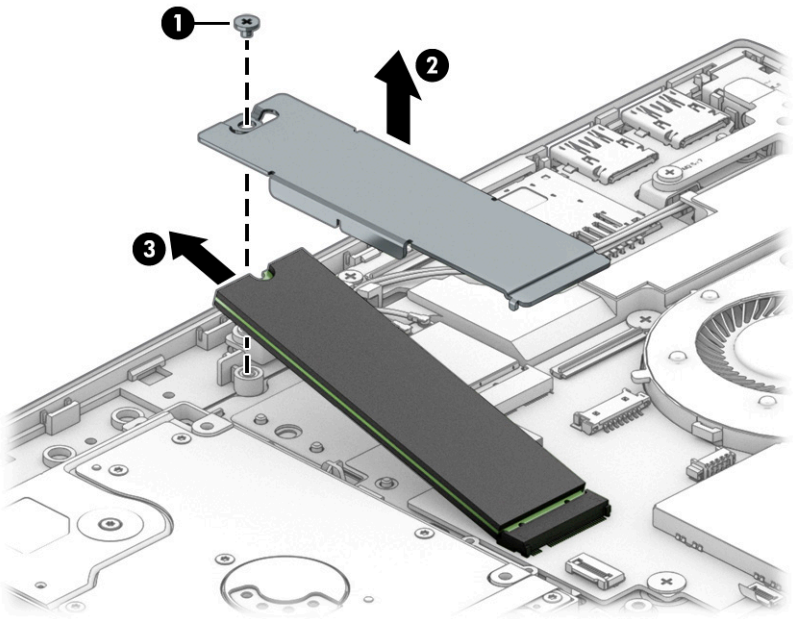
Description	Spare part number
512 GB, PCIe, Gen 3 × 4	L85360-001
512 GB, PCIe, value	L85364-001
256 GB, PCIe, Gen 3 × 4	L85350-001
256 GB, PCIe	L85354-001
128 GB, SATA-3, TLC	L85346-001
32 GB/512 GB, PCIe (Optane Memory Module/solid-state drive combination drive)	L85366-001
16 GB PCIe (Optane Memory Module/solid-state drive combination drive)	L85372-001
1TB M2 2280 PCIe-NVMe Value	L85370-001
1TB M2 2280 PCIe-NVMe 3 × 4 TLC SS	L85348-001

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

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

To remove the solid-state drive:

▲ Remove the Phillips M2.0 × 3.0 screw **(1)**, lift the solid-state drive module bracket **(2)**, and then pull the solid-state drive module from the socket **(3)**.



Reverse this procedure to install the solid-state drive.

Memory module

Table 5-6 Memory descriptions and part numbers

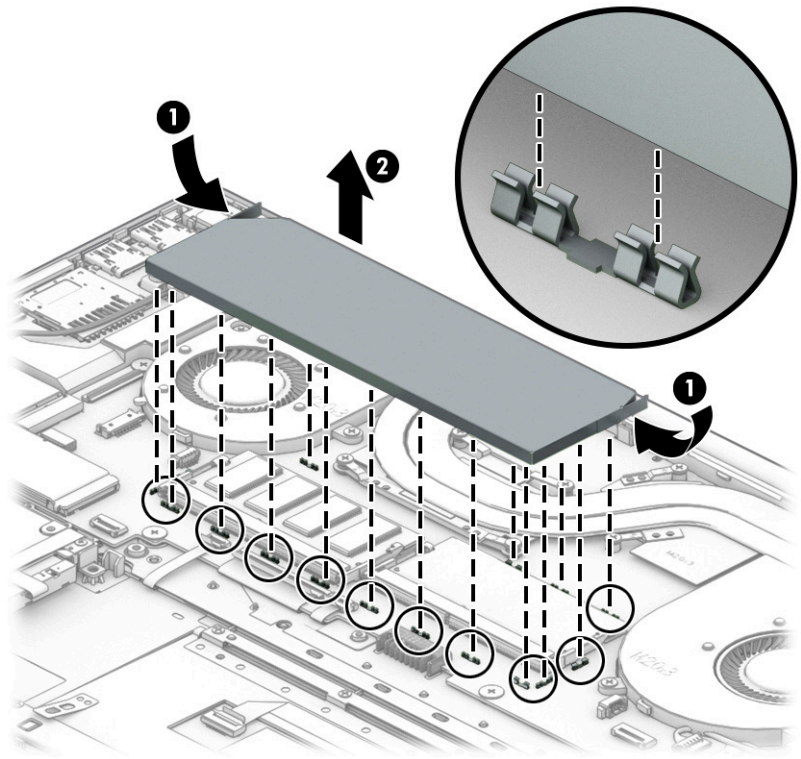
Description	Spare part number
8 GB	L46598-005
4 GB	L83673-005
16 GB	L67710-005

Before removing the memory modules, follow these steps:

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

To remove the memory modules:

1. Squeeze the ends of the memory cover **(1)**, and then lift the cover off the system board **(2)**.



2. Spread the two retention clips outward **(1)** until the memory module tilts up at a 45° angle.
3. Grasp the edge of the memory module **(2)**, and then gently pull the module out of the slot. Use the same procedure to remove both memory modules.

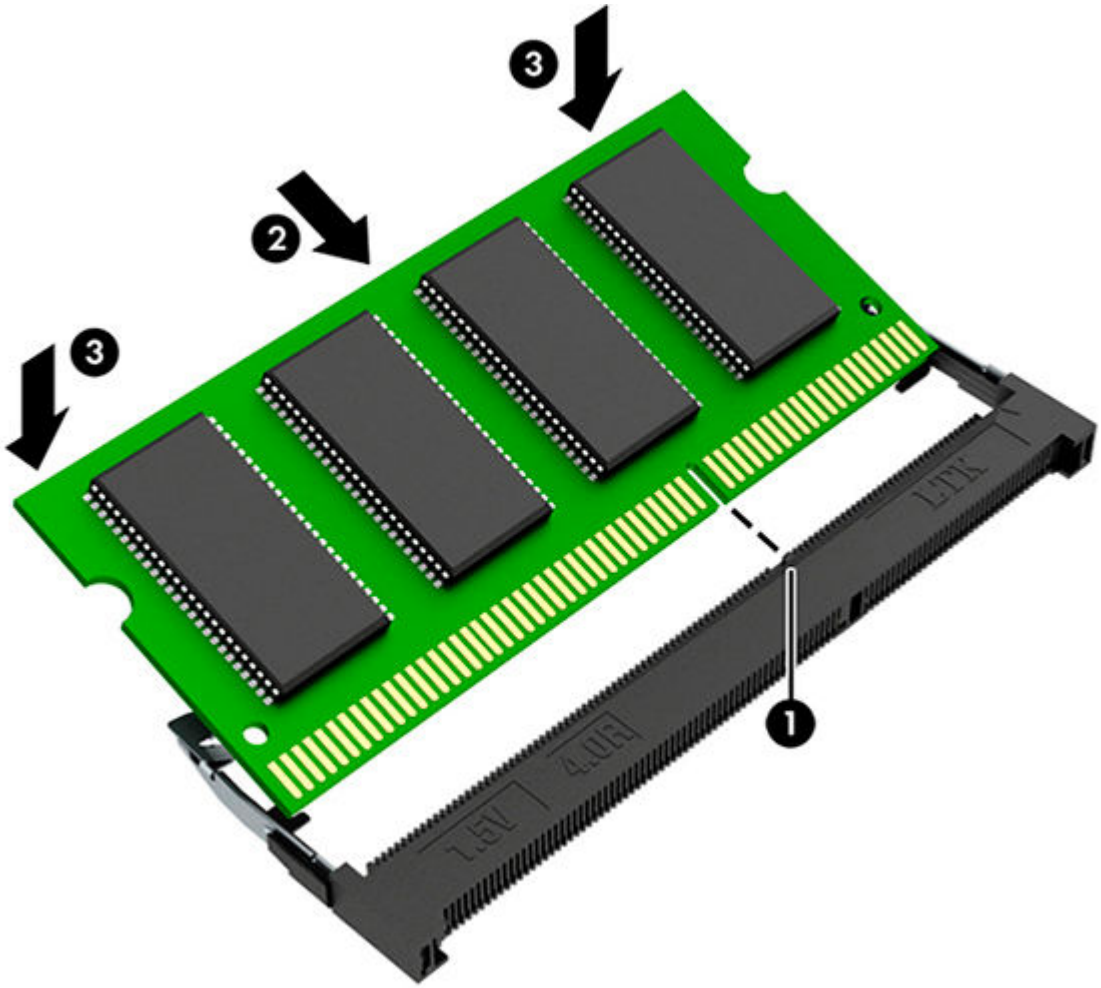
IMPORTANT: To prevent damage to the memory module, hold the memory module by the edges only. Do not touch the components on the memory module

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

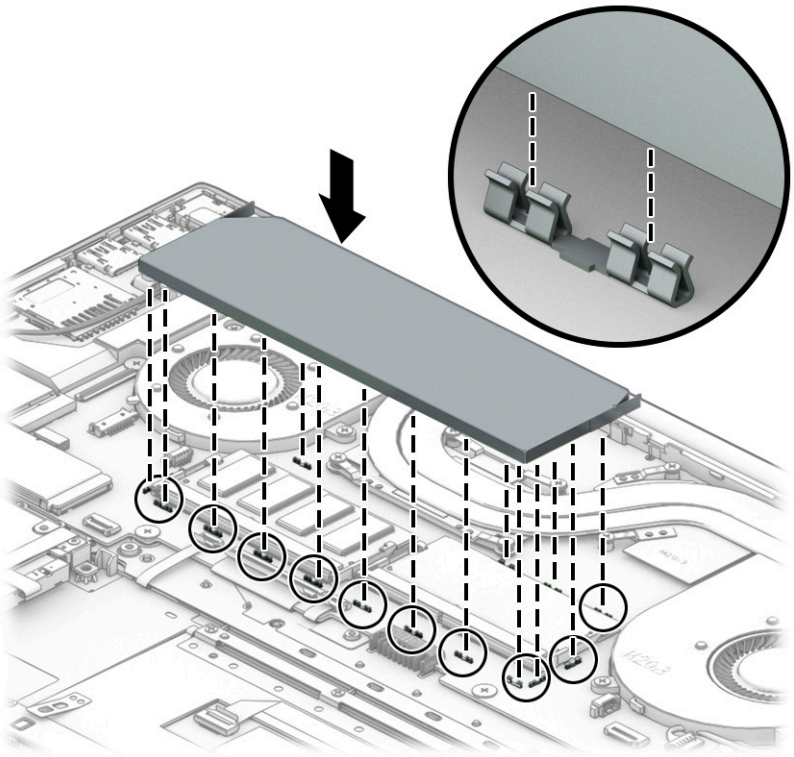
IMPORTANT: To prevent damage to the memory module, hold the memory module by the edges only. Do not touch the components on the memory module. Do not bend the memory module.

To install the memory modules:

1. Align the notched edge of the memory module with the tab in the memory module slot **(1)**.
2. Press the module into the slot until seated **(2)**.
3. Gently press down on the module edges until the side retention clips snap into place **(3)**.



To replace the memory cover, insert the edges to the cover into the clips on the system board.



USB board

Table 5-7 USB board description and part number

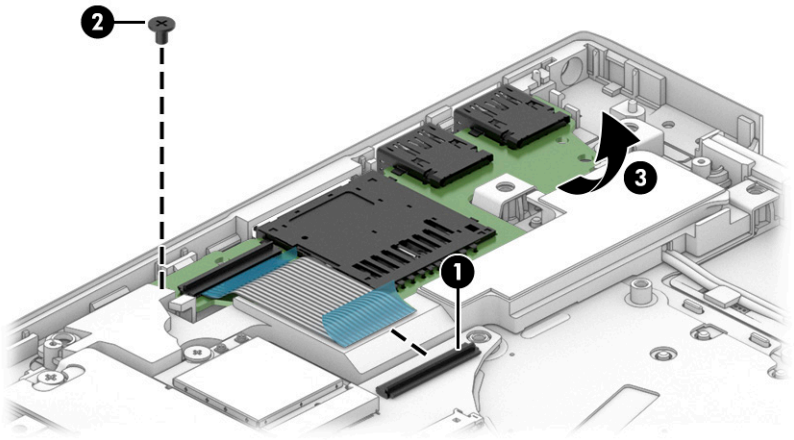
Description	Spare part number
USB board	L87965-001
USB board cable	L87954-001

Before removing the USB board, follow these steps:

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

To remove the USB board:

1. Remove the USB board cable **(1)**.
2. Remove the one Phillips M2.0 × 3.0 screw **(2)** that secure the board to the computer.
3. Remove the board from the computer **(3)**.



Reverse this procedure to install the USB board.

Touchpad

NOTE: The touchpad spare part kit does not include the touchpad cable. The touchpad cable is available using spare part number L87955-001. Touchpads that are included with keyboard/top covers with wood veneer cannot be replaced.

Table 5-8 Touchpad description and part number

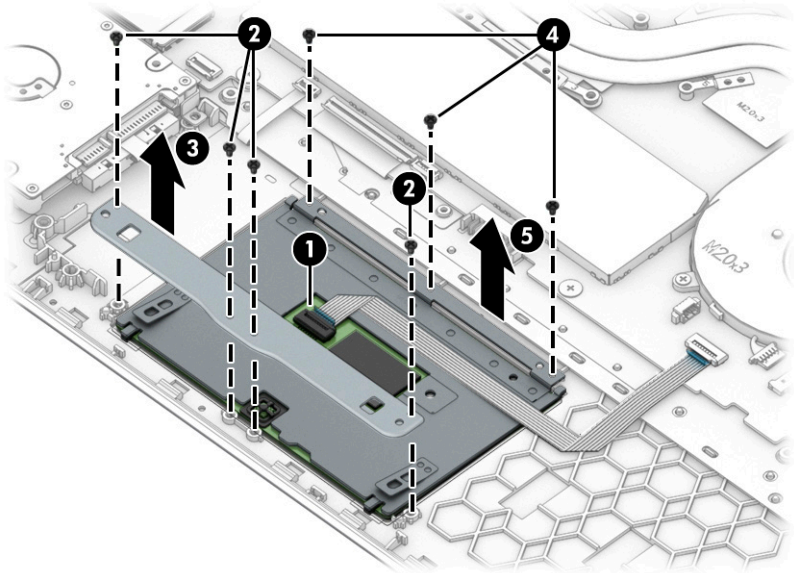
Description	Spare part number
Touchpad (in natural silver finish)	L87969-001

Before removing the touchpad, follow these steps:

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

To remove the touchpad:

1. Disconnect the touchpad cable from the touchpad connector on the touchpad **(1)**.
2. Remove the four Phillips M1.6 × 2.0 screws **(2)** that secure the touchpad bracket to the computer.
3. Remove the touchpad bracket from the computer **(3)**.
4. Remove the three broadhead Phillips M1.6 × 2.5 screws **(4)** that secure the touchpad to the computer.
5. Remove the touchpad from the computer **(5)**.



Reverse this procedure to install the touchpad.

Fans

Table 5-9 Fan description and part number

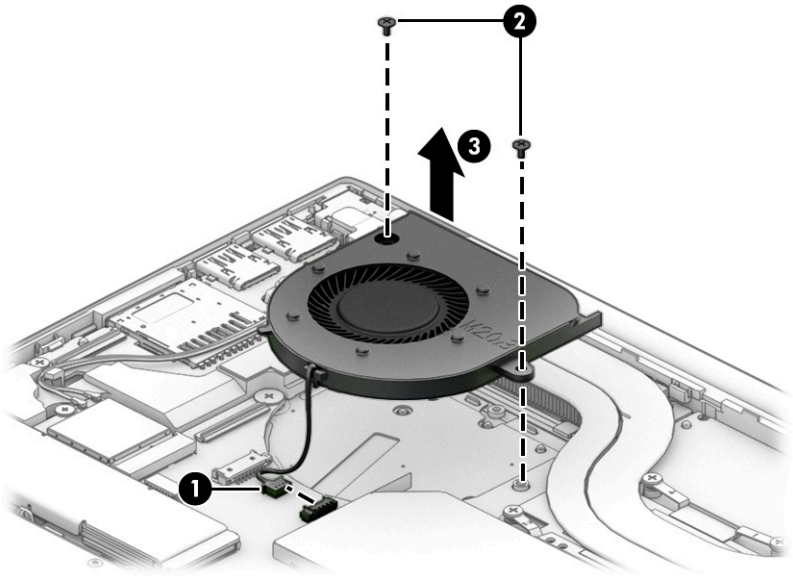
Description	Spare part number
Fan/heat sink	L87960-001
Fan (CPU)	L87961-001
Fan (GPU)	L87962-001

Before removing the fan, follow these steps:

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

To remove the CPU fan:

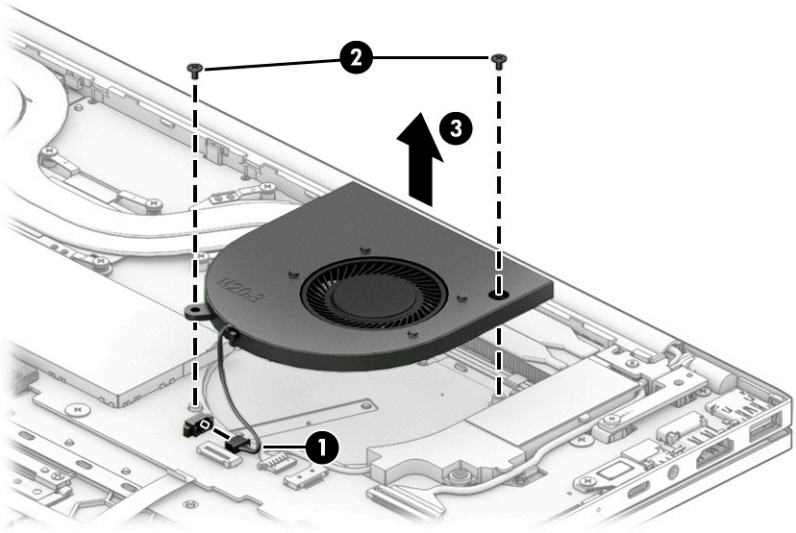
1. Disconnect the CPU fan cable from the computer **(1)**.
2. Remove the two Phillips M2.5 × 6.0 screws **(2)** that secure the CPU fan to the computer.
3. Remove the CPU fan from the computer **(3)**.



Reverse this procedure to install the CPU fan.

To remove the GPU fan:

1. Disconnect the GPU fan cable from the computer **(1)**.
2. Remove the two Phillips M2.5 × 6.0. screws **(2)** that secure the GPU fan to the computer.
3. Remove the GPU fan from the computer **(3)**



Reverse this procedure to install the GPU fan.

Heat sink

Table 5-10 Heat sink and thermal pad descriptions and part numbers

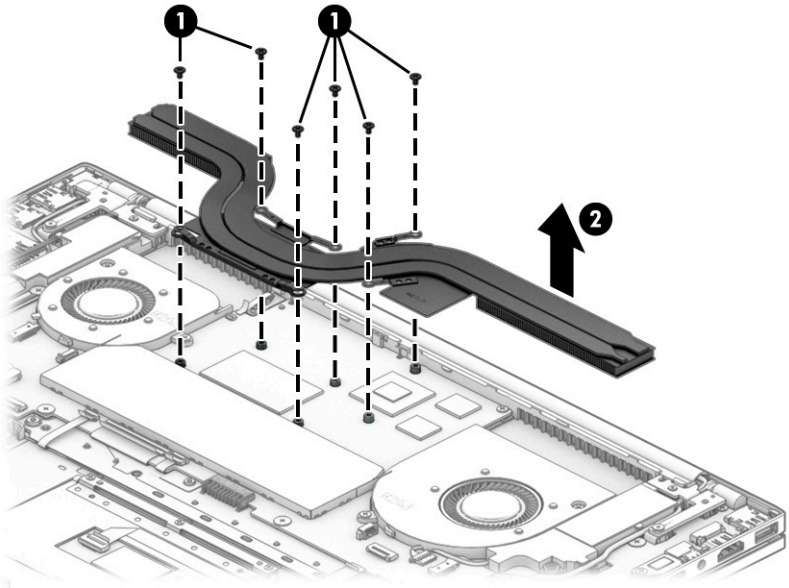
Description	Spare part number
Heat sink	L87960-001
Thermal pad	L90545-001

Before removing the heat sink, follow these steps:

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

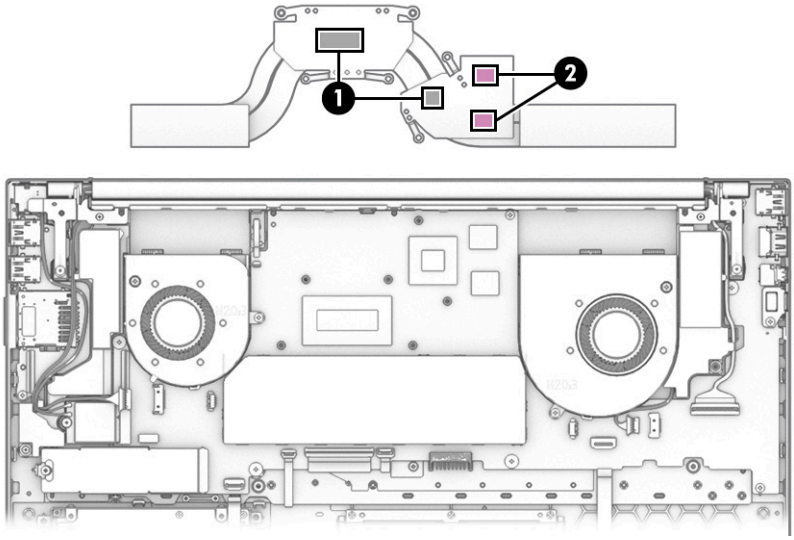
Remove the heat sink:

1. Remove the six Phillips M2.0 × 3.0 screws **(1)** that secure the heat sink to the system board.
2. Remove the heat sink **(2)**.



3. Clean the pads **(1)** and also clean and reapply thermal material to the surfaces of the system board components **(2)** each time the heat sink is removed.

NOTE: Depending on your product, thermal material quantity and location might vary.



Reverse this procedure to install the heat sink.

System board

Table 5-11 System board descriptions and part numbers

Description	Spare part number
System board including integrated Intel Core i7-1065G7 processor and 4 GB of discrete graphics memory	L87980-601
System board including integrated Intel Core i7-1065G7 processor and 2 GB of discrete graphics memory	L87979-601
System board including integrated Intel Core i5-1035G1 processor and 2 GB of discrete graphics memory	L87978-601

Before removing the system board, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover and rubber feet on page 30).
3. Remove the battery (see Battery on page 32).
4. Remove the solid-state drive (see Solid-state drive and Optane Memory Module on page 37).

To remove the system board:

1. Disconnect the following cables from the system board:

   (1) IR sensor cable

   (2) Speaker cable

   (3) Touchpad cable

   (4) Backlight cable (ZIF)

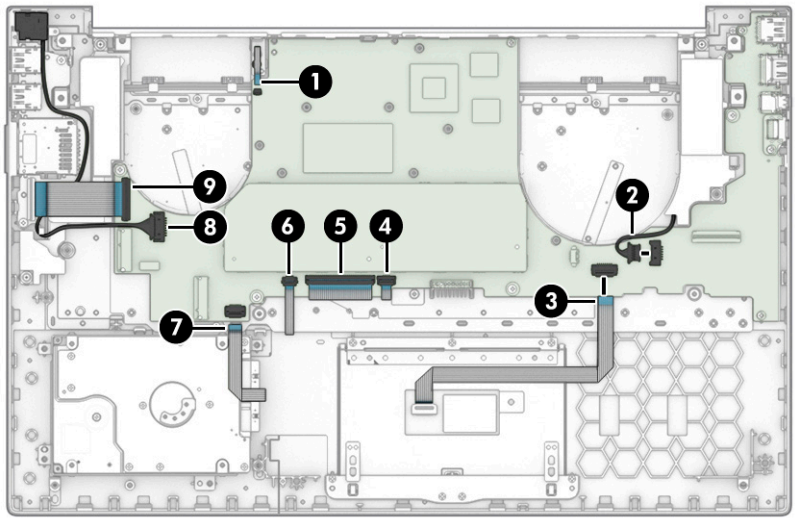
   (5) Keyboard cable (ZIF)

   (6) Fingerprint reader cable (ZIF)

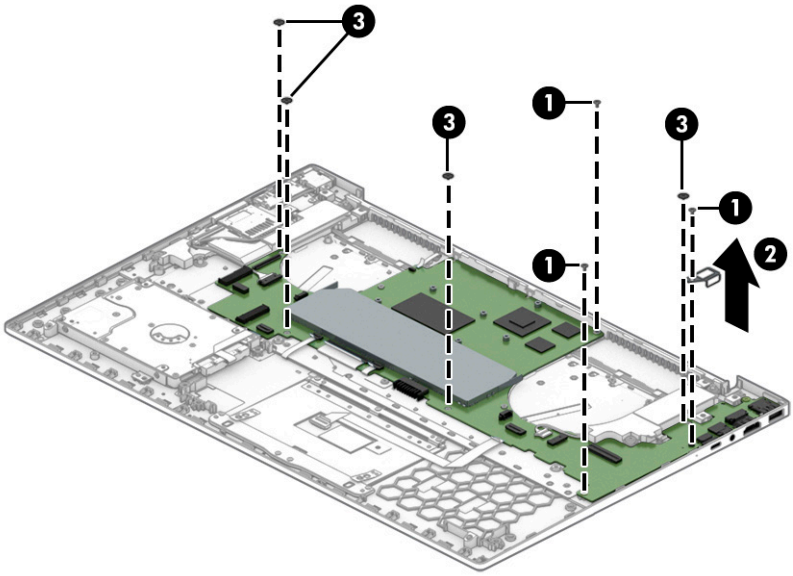
   (7) Hard drive cable (ZIF)

   (8) Power cable

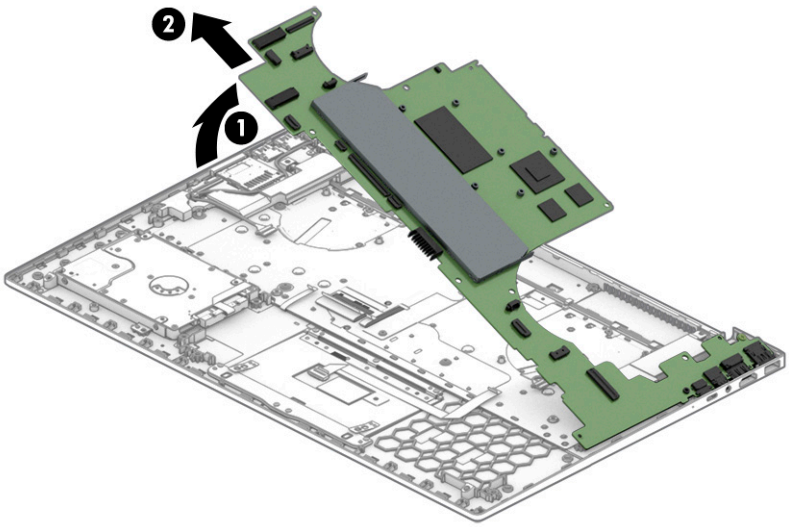
   (9) USB board cable (ZIF)



2. Remove the three Phillips M2.0 × 3.0 screws **(1)**, and then remove the USB Type C bracket securing the system board **(2)**.
3. Remove the four M2.0 × 3.0 screws securing the system board **(3)**.



▲ Lift the system board **(1)**, and then remove the board **(2)**.



Reverse this procedure to install the system board.

Speakers

Table 5-12 Speaker description and part number

Description	Spare part number
Speakers (includes left and right speakers and cables)	L87977-001

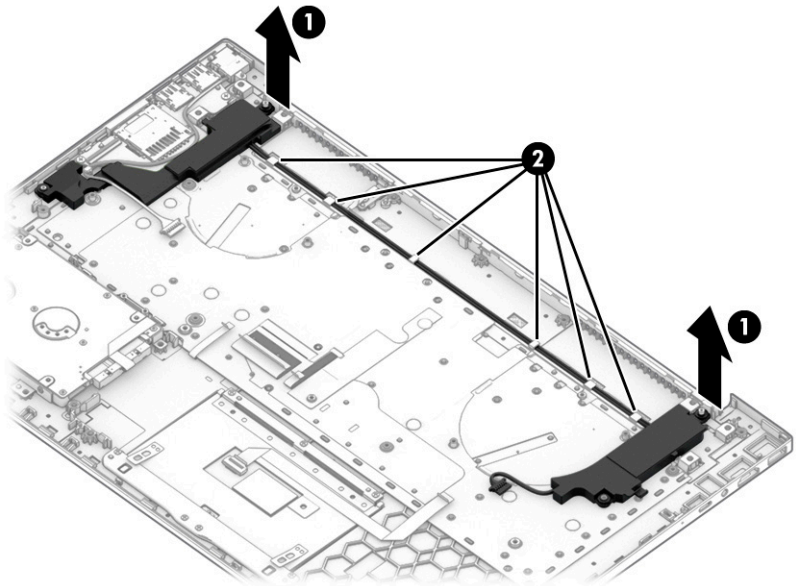
Before removing the speakers, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover and rubber feet on page 30).
3. Remove the battery (see Battery on page 32).
4. Remove the fan (see Fans on page 43).
5. Remove the USB board (see USB board on page 41).
6. Remove the heat sink (see Heat sink on page 45).
7. Remove the system board (see System board on page 47).

To remove the speakers:

NOTE: The cable that attaches the speakers is located under the system board, and has already been removed when the system board was removed earlier.

1. Lift the left and right the speakers **(1)**.
2. Remove the speaker cable securing the speakers to the computer **(2)** to remove the speaker assembly.



Reverse this procedure to install the speakers.

Display assembly

Table 5-13 Display assembly descriptions and part numbers

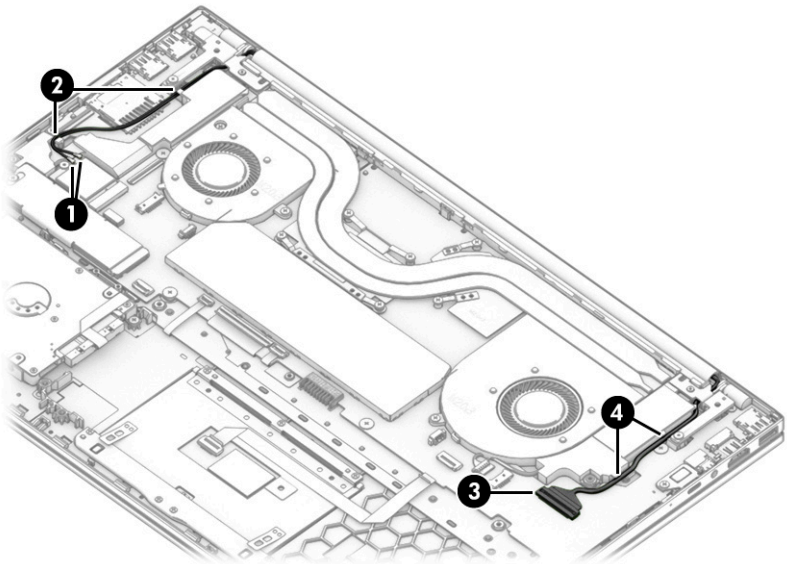
Description	Spare part number
Display assembly, FHD, natural silver finish nontouch	L87972-001
Display assembly, UHD, natural silver finish, nontouch	L87973-001
Display assembly, FHD, nightfall black finish, nontouch	L92495-001
Display assembly, UHD, nightfall black finish, nontouch	L92496-001
Display assembly, FHD, nightfall black finish, touch screen	L92494-001
Display assembly, FHD, natural silver finish, touch screen	L87971-001

Before removing the display assembly, follow these steps:

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

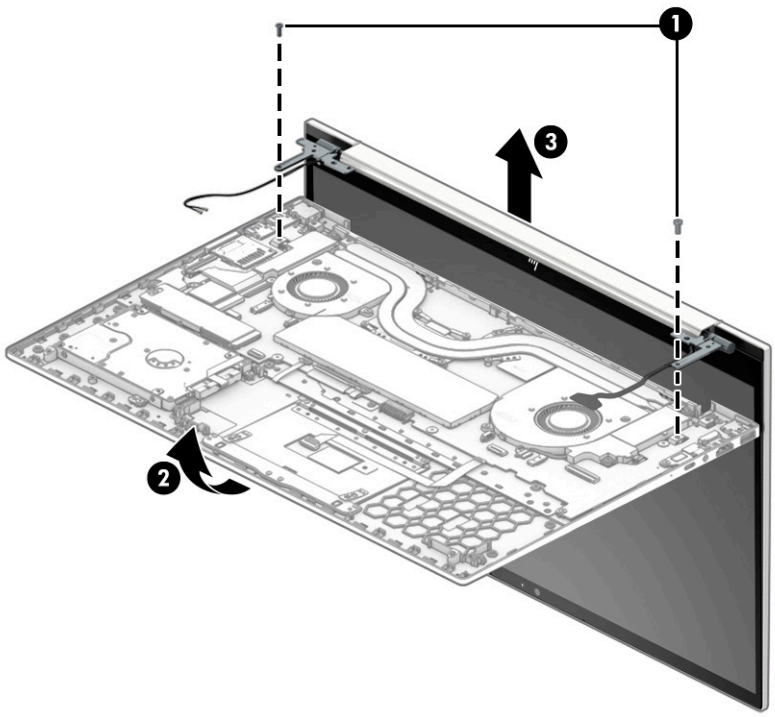
To remove the display assembly:

1. Remove the WLAN antennas and webcam cable from the clips and channel in the right speaker and computer **(1)**.
2. Remove the display panel cable from the routing channel in the left speaker **(2)**.
3. Disconnect the display panel cable on the right side **(3)** and remove the cable **(4)**.



4. Remove the two Phillips M2.0 × 3.0 screws **(1)** from each hinge.
5. Open the display to open the hinges **(2)**.

6. Separate the display from the computer by pulling the display up and away from the chassis **(3)**.



Reverse this procedure to install the display assembly.

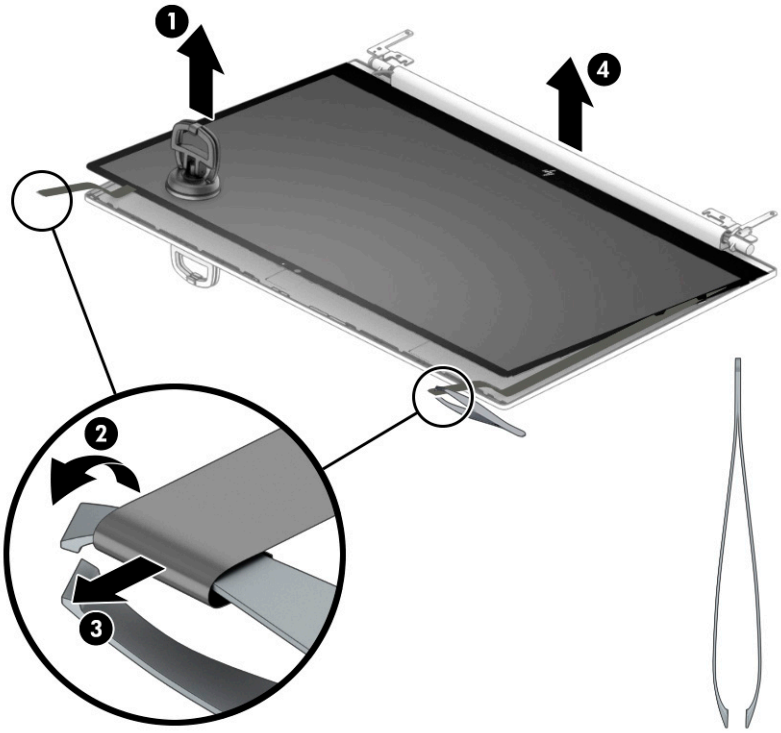
7. Position two suction cup tools at the illustrated locations on the display panel **(1)**, and then rotate each locking lever down to lock the cup **(2)**.

8. Pull the suction tool handle to disengage the panel from the computer **(1)**. If it is necessary to remove or replace the panel,, note that the display panel is secured to the display enclosure with tape that is installed under the left and right sides of the panel. Use tweezers to grasp the end of the tape **(2)**. While turning the tweezers, wrap the tape around the tweezers **(3)** as you continue to pull the tape out from behind the display panel. You must pull the tape multiple times before it is completely removed. Remove the panel **(4)**.

IMPORTANT: If the tape tears, do not attempt to pry the panel off the enclosure. Doing so might break the panel.

The ends of the tape are accessible at both the top and bottom of the display panel.

To avoid tearing the tape, do not pull on it with the sharp end of tweezers.



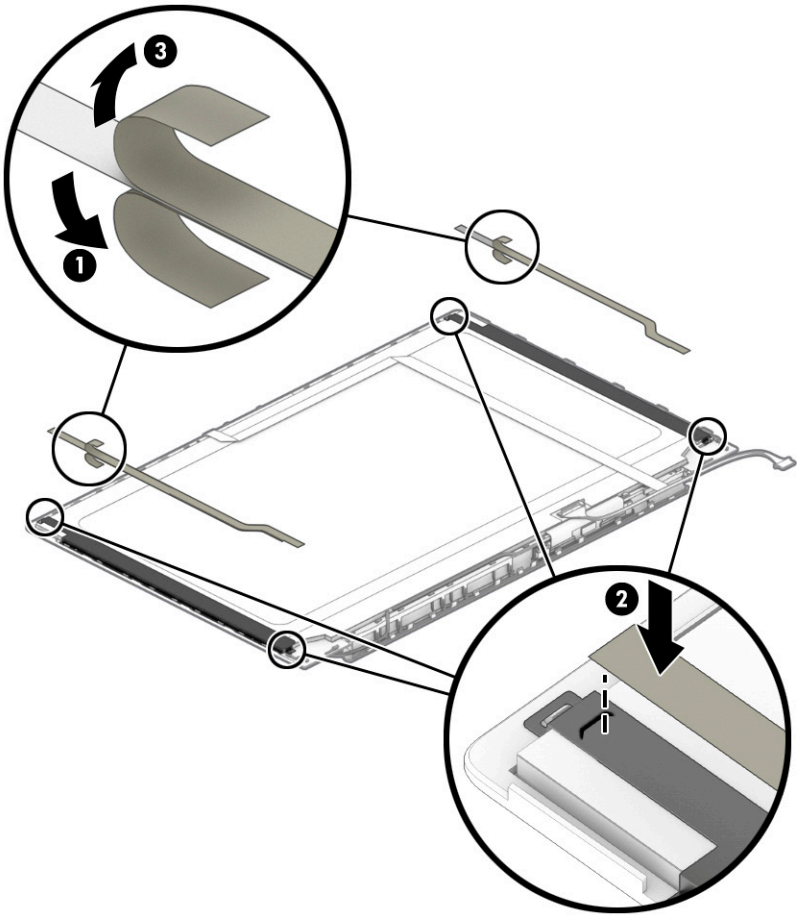
9. Use the following steps to install a display panel:

   a. Download and install the touch panel firmware when you replace the touch screen board or touch panel. Download the correct calibration firmware file based on your panel specification. For more information, see HP Help and Support.

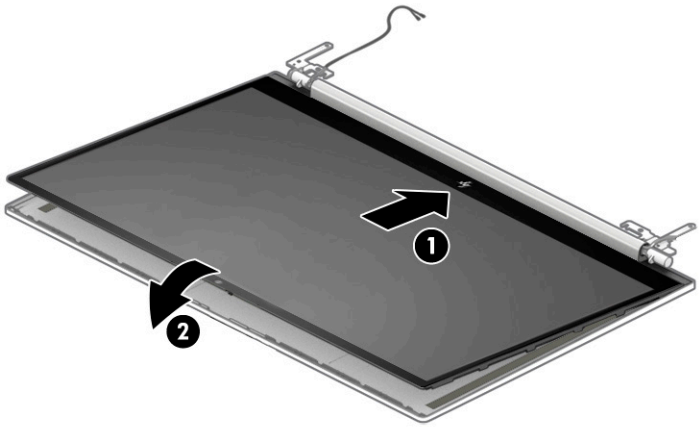
   b. Peel the bottom nonstick backing off the double-sided tape **(1)**.

   c. Add the double-sided tape to the rear of the display panel cover **(2)**.

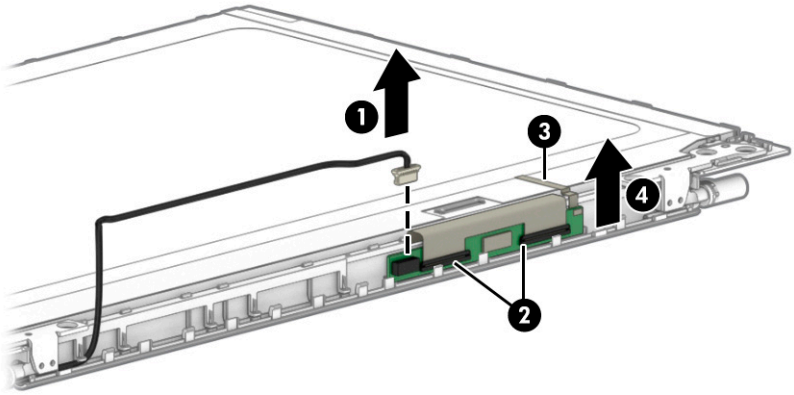
d. Peel the top nonstick backing off the double-sided tape so it can be secured to the rear **(3)**.



e. Place the panel on top of the display panel cover **(1)**, and then press the panel down to secure it to the display enclosure **(2)**.

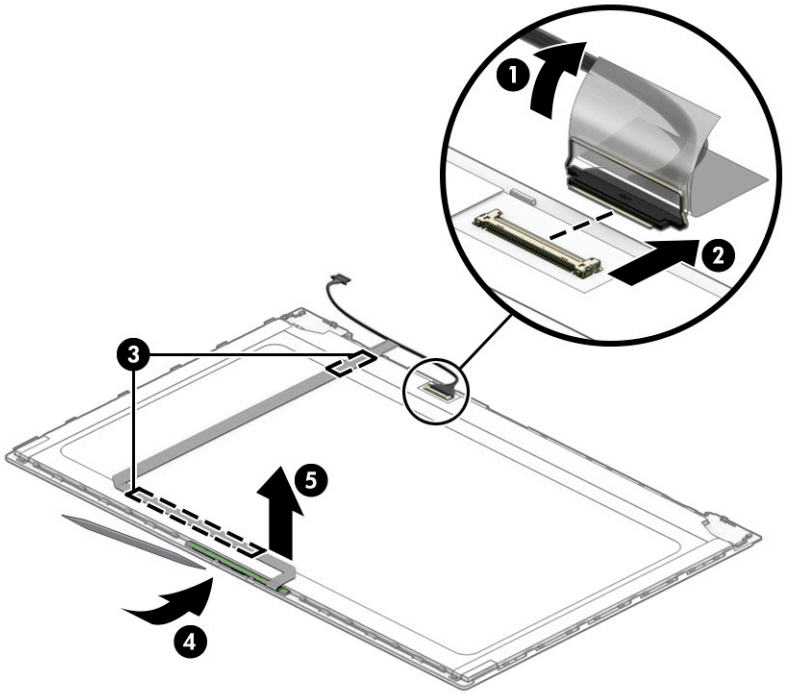


10. If it is necessary to remove or replace the touch screen board, remove the touch screen board cable from the touch screen board on the display assembly **(1)**, and then remove both touch screen cables from the touch screen board **(2)**. Release the adhesive tape from the touch screen board **(3)**, and then remove the touch screen board after releasing it from the clips securing it.

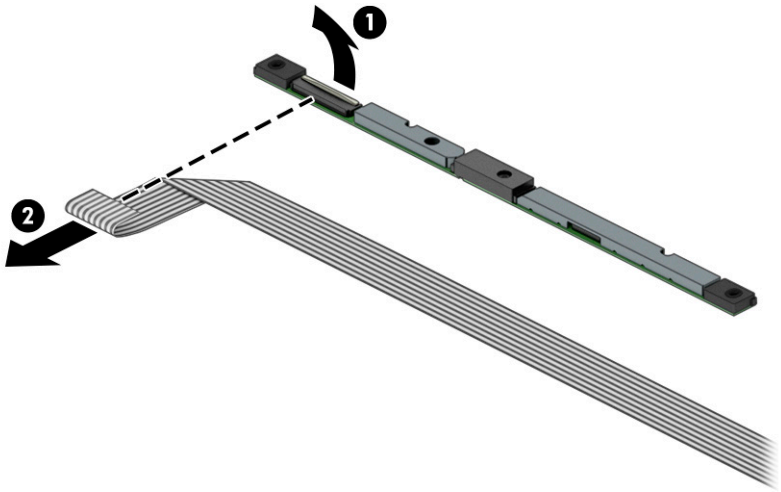


The touch screen board is available as spare part number L87966-001 and the touch screen board cable is available as spare part number L87956-001.

11. If it is necessary to remove or replace the webcam, peel back the tape **(1)** and disconnect the webcam cable from the connector **(2)**. Locate the display cable locations **(3)**. Use a plastic tool to pull the webcam from the display panel cover **(4)**, and then remove the webcam **(5)**.



To release the webcam cable from the webcam connector, lift the release arm on the webcam connector securing the webcam cable to the connector **(1)**, and then release the webcam cable **(2)**.

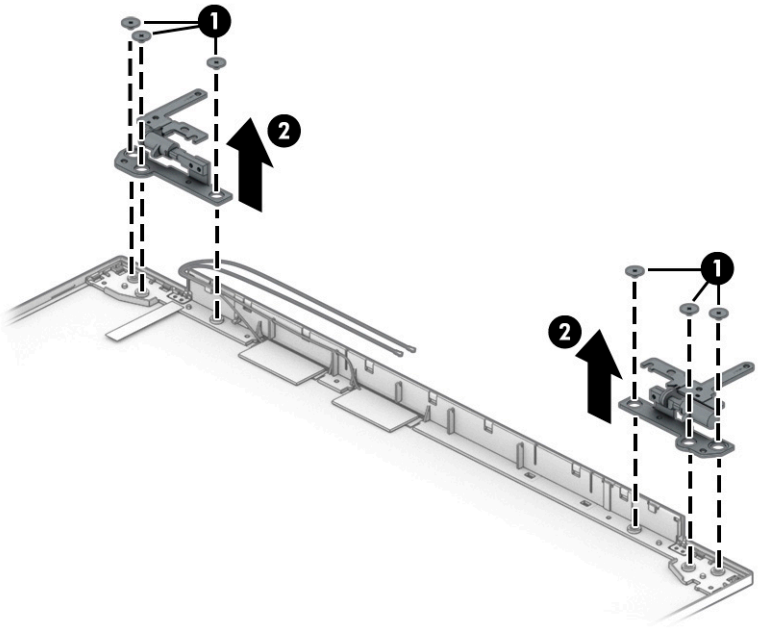


Reverse this procedure to install the webcam and the webcam cable.

The webcam is available as spare part number L87982-001.

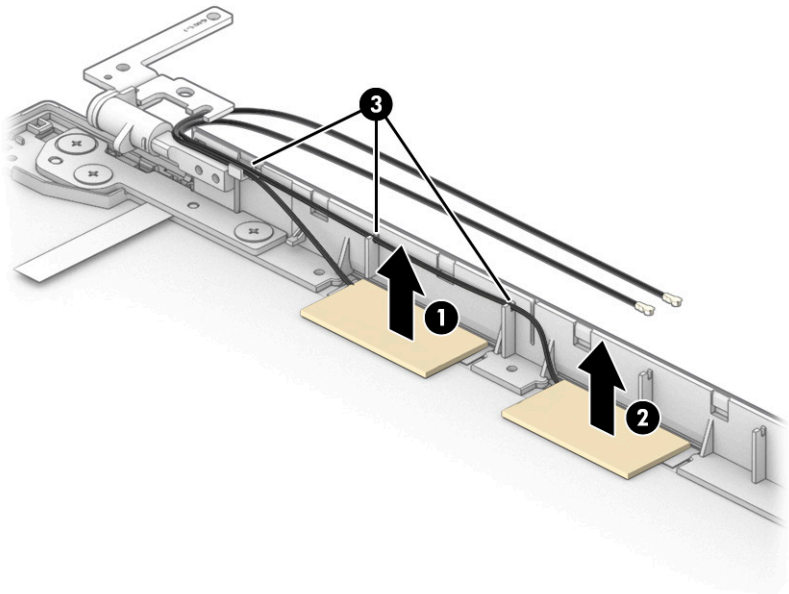
12. If it is necessary to remove the hinges from the display enclosure, remove the six screws securing the left and right hinges **(1)**. Remove the left and right hinges **(2)**.

    The display hinges are available as spare part number L87963-001.



13. If it is necessary to remove or replace the antenna, detach the auxiliary antenna **(1)** from the adhesive securing it to the display panel enclosure .Remove the main antenna **(2)**., and disengage the cable from the clips that secure the antenna cable to the display enclosure **(3)**.

    The separate antenna is available as spare part number L87945-001. The antenna that is included with the back cover is available in natural silver finish (L87946-001) and in nightfall black finish (L87947-001).



Power connector

Table 5-14 Power connector description and part number

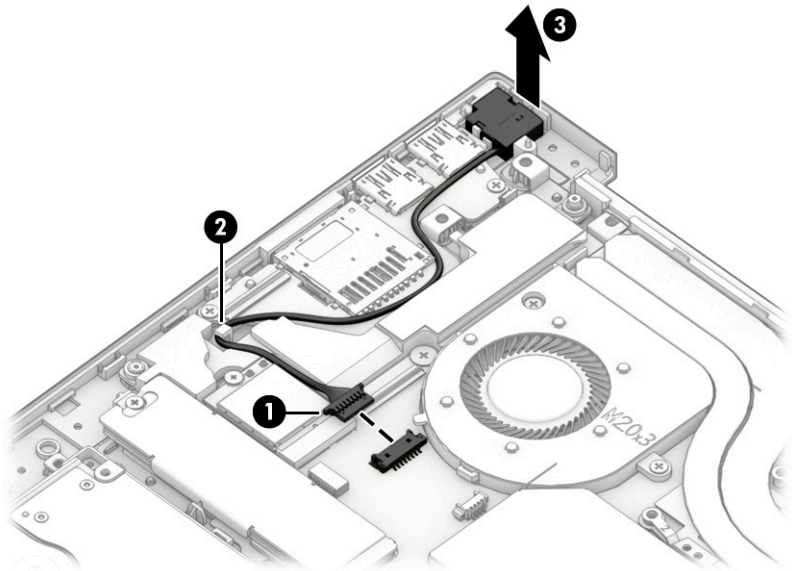
Description	Spare part number
Power connector	L87959-001

Before removing the power connector cable, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover and rubber feet on page 30).
3. Remove the battery (see Battery on page 32).
4. Remove the USB cable (see USB board on page 41) to learn how to remove the USB cable

To remove the power connector cable:

1. Remove the cable **(1)** from the clips in the computer **(2)**.
2. Remove the power connector and cable from the computer **(3)**.



Reverse this procedure to install the power connector cable.

IR sensor board

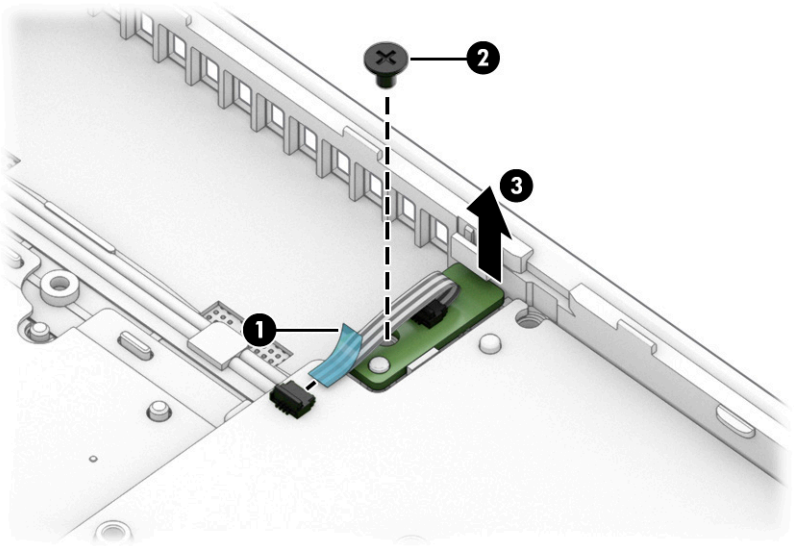
Description	Spare part number
IR sensor board	L87964-001
IR sensor board cable	L87953-001

Before removing the IR sensor board, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover and rubber feet on page 30).
3. Remove the battery (see Battery on page 32).
4. Remove the heat sink (see Heat sink on page 45.
5. Remove the system board (see System board on page 47).

To remove the IR sensor board::

1. Disconnect the IR sensor board cable from the connector on the computer **(1)**.
2. Remove the IR sensor board M2.0 × 3.0 screw from the IR board **(2)**.
3. Remove the IR board from the computer **(3)**.



Reverse this procedure to install the IR sensor board.

Keyboard/top cover

The top cover with keyboard remains after removing all other spare parts from the computer.

In this section, the first table provides the main spare part number for the top cover/keyboards. The table provides the country codes.

Table 5-15 Keyboard/top cover description and part number

Description	Spare part number
Keyboard/top cover	
Keyboard/top cover with natural silver finish with backlight	L87983–xx1
Keyboard/top cover with touchpad and nightfall black finish with wood veneer with backlight	L87984–xx1
NOTE: Touchpad cannot be replaced.	

Table 5-16 Keyboard country codes

For use in country or region	Spare part number	For use in country or region	Spare part number	For use in country or region	Spare part number
Belgium	-A41	Israel	-BB1	Slovenia	-BA1
Czech Republic and Slovakia	-FL1	Italy	-061	Spain	-071
Denmark, Finland, and Norway	-DH1	The Netherlands	-B31	Switzerland	-BG1
France	-051	Portugal	-131	Turkey	-141
French Canada	-DB1	Romania	-271	Ukraine	-BD1
Germany	-041	Russia	-251	United Kingdom	-031
Greece	-151	Saudi Arabia	-171	United States	-001
Hungary	-211				

6 Backing up, restoring, and recovering

This chapter provides information about the following processes, which are standard procedure for most products:

- **Backing up your personal information**—You can use Windows tools to back up your personal information (see Using Windows tools on page 61).
- **Creating a restore point**—You can use Windows tools to create a restore point (see Using Windows tools on page 61).
- **Creating recovery media** (select products only)—You can use the HP Cloud Recovery Download Tool (select products only) to create recovery media (see Using the HP Cloud Recovery Download Tool to create recovery media (select products only) on page 61).
- **Restoring and recovery**—Windows offers several options for restoring from backup, refreshing the computer, and resetting the computer to its original state (see Using Windows tools on page 61).

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

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

Backing up information and creating recovery media

Using Windows tools

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

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

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

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

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

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

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

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

For details:

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

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

Restoring and recovery

Restoring, resetting, and refreshing using Windows tools

Windows offers several options for restoring, resetting, and refreshing the computer. For details, see Using Windows tools on page 61.

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 61.

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

To recover your system:

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

Changing the computer boot order

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

To change the boot order:

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

1. Insert the HP Recovery media.
2. Access the system **Startup** menu.

   For computers or tablets with keyboards attached:

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

   For tablets without keyboards:

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

     – or –

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

Using HP Sure Recover (select products only)

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

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

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

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

7 Using HP PC Hardware Diagnostics

Using HP PC Hardware Diagnostics Windows (select products only)

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

If HP PC Hardware Diagnostics Windows is not installed on your computer, first you must download and install it. To download HP PC Hardware Diagnostics Windows, see Downloading HP PC Hardware Diagnostics Windows on page 64.

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

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

   a. Select the **Start** button, and then select **HP Help and Support**.

   b. Select **HP PC Hardware Diagnostics Windows**.

   – or –

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

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

      – or –

      Select the question mark icon in the taskbar.

   b. Select **Troubleshooting and fixes**.

   c. Select **Diagnostics**, and then select **HP PC Hardware Diagnostics Windows**.

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

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

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

- A Failure ID link is displayed. Select the link and follow the on-screen instructions.
- Instructions for calling support are displayed. Follow those instructions.

Downloading HP PC Hardware Diagnostics Windows

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

Downloading the latest HP PC Hardware Diagnostics Windows version

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

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

The tool downloads to the selected location.

– or –

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

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

The tool downloads to the selected location.

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

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

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

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

The tool downloads to the selected location.

Installing HP PC Hardware Diagnostics Windows

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

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

Using HP PC Hardware Diagnostics UEFI

NOTE: For Windows 10 S computers, you must use a Windows computer and a USB flash drive to download and create the HP UEFI support environment because only .exe files are provided. For more information, see Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive on page 66.

HP PC Hardware Diagnostics UEFI (Unified Extensible Firmware Interface) allows you to run diagnostic tests to determine whether the computer hardware is functioning properly. The tool runs outside the operating system so that it can isolate hardware failures from issues that are caused by the operating system or other software components.

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

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

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

  – or –

  Contact support, and provide the Failure ID code.

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

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

Starting HP PC Hardware Diagnostics UEFI

To start HP PC Hardware Diagnostics UEFI, follow these steps:

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

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

   a. Connected USB flash drive

   NOTE: To download the HP PC Hardware Diagnostics UEFI tool to a USB flash drive, see Downloading the latest HP PC Hardware Diagnostics UEFI version on page 66.

   b. Hard drive

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

Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive

Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive can be useful in the following situations:

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

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

Downloading the latest HP PC Hardware Diagnostics UEFI version

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

1. Go to http://www.hp.com/go/techcenter/pcdiags. The HP PC Diagnostics home page is displayed.
2. Select **Download HP Diagnostics UEFI**, and then select **Run**.

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

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

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

1. Go to http://www.hp.com/support.
2. Enter the product name or number, select your computer, and then select your operating system.
3. In the **Diagnostics** section, follow the on-screen instructions to select and download the specific UEFI Diagnostics version for your computer.

Using Remote HP PC Hardware Diagnostics UEFI settings (select products only)

Remote HP PC Hardware Diagnostics UEFI is a firmware (BIOS) feature that downloads HP PC Hardware Diagnostics UEFI to your computer. It can then execute the diagnostics on your computer, and it might upload results to a preconfigured server. For more information about Remote HP PC Hardware Diagnostics UEFI, go to http://www.hp.com/go/techcenter/pcdiags, and then select **Find out more**.

Downloading Remote HP PC Hardware Diagnostics UEFI

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

Downloading the latest Remote HP PC Hardware Diagnostics UEFI version

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

1. Go to http://www.hp.com/go/techcenter/pcdiags. The HP PC Diagnostics home page is displayed.
2. Select **Download Remote Diagnostics**, and then select **Run**.

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

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

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

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

Customizing Remote HP PC Hardware Diagnostics UEFI settings

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

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

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

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

Your changes take effect when the computer restarts.

8 Specifications

Computer specifications

Table 8-1 Computer specifications

	Metric	U.S.
Dimensions		
Width	**39.9 cm**	15.70 in
Depth	**25.9 cm**	10.19 in
Height (front to back)	**1.93 cm**	0.75 in
Weight	**2730 g** (depending on configuration)	6.01 lb
Input power		
Operating voltage and current	19.5 V dc @ 3.33 A – 65 W 19 V dc @ 4.62 A – 90 W 19.5 V dc @ 2.31 – 45 W (select models only)	
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.

Display specifications

Table 8-2 Display specifications

	Metric	U.S.
Dimensions		
Height	**20.77 cm**	8.175 in
Width	**37.78 cm**	14.875 in
Diagonal	**39.62 cm**	15.6 in
Number of colors	Up to 16.8 million	
Contrast ratio	500:1 (typical)	
Brightness	200 nits	
Pixel resolution		
Pitch	0.252 mm3 × 40.252 mm	
Format	1366 × 768	
Configuration	RGB vertical stripe	
Backlight	LED	
Character display	80 × 25	
Total power consumption	2.0 W	
Viewing angle	±65° horizontal, ±50° vertical (typical)	

Hard drive specifications

Table 8-3 Hard drive specifications

	500 GB*	750 GB*
Dimensions		
Height	9.5 mm	9.5 mm
Width	70 mm	70 mm
Weight	107 g max	102 g max
Interface type	SATA	SATA
Transfer rate	300 MB/sec	300 MB/sec
Security	ATA security	ATA security
Seek times (typical read, including setting)		
Single track	1.5 ms	1.1 ms
Average	12.0 ms	12.0 ms
Maximum	22.0 ms	21.0 ms
Logical blocks	976,752,240	1,465,149,168

Table 8-3 Hard drive specifications (continued)

	500 GB*	750 GB*
Disk rotational speed	5400 rpm	5400 rpm
Operating temperature	**0°C to 60°C** (0°F to 140°F)	**0°C to 60°C** (0°F to 140°F)

*Size refers to hard drive storage capacity. Actual accessible capacity is less. Actual drive specifications may differ slightly.

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

9 Statement of memory volatility

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

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

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

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

Current BIOS steps

1. Follow steps (a) through (l) below to restore the nonvolatile memory that can contain personal data. Restoring or reprogramming nonvolatile memory that does not store personal data is neither necessary nor recommended.

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

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

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

   The computer reboots.

   c. During the reboot, press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

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

   d. Select the **Security** menu, select **Restore Security Settings to Factory Defaults**, and then select **Yes** to restore security level defaults.

   The computer reboots.

   e. During the reboot, press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

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

   f. If an asset or ownership tag is set, select the **Security** menu and scroll down to the **Utilities** menu. Select **System IDs**, and then select **Asset Tracking Number**. Clear the tag, and then make the selection to return to the prior menu.

   g. If a DriveLock password is set, select the **Security** menu, and scroll down to **Hard Drive Utilities** under the **Utilities** menu. Select **Hard Drive Utilities**, select **DriveLock**, then clear the check box for **DriveLock password on restart**. Select **OK** to proceed.

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

   The computer reboots.

i. During the reboot, press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

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

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

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

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

2. Complete one of the following:

- Remove and retain the storage drive.

– or –

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

– or –

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

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

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

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

c. Select **Hard Drive Utilities**.

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

– or –

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

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

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

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

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

c. Select **Hard Drive Utilities**.

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

Nonvolatile memory usage

Table 9-1 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.	Data cannot be written to this device via the host processor. The content is managed solely by the HP Sure Start Embedded Controller.	This memory is protected by the HP Sure Start Embedded Controller.
Real Time Clock (RTC) battery backed-up CMOS configuration memory	256 bytes	No	Yes	Stores system date and time and noncritical data.	RTC battery backed-up CMOS is programmed using Computer Setup (BIOS), or by changing the Microsoft® Windows date & time.	This memory is not write-protected.
Controller (NIC) EEPROM	64 KB (not customer accessible)	No	Yes	Stores NIC configuration and NIC firmware.	NIC EEPROM is programmed using a utility from the NIC vendor that can be run from DOS.	A utility must be used to write data to this memory and is available from the NIC vendor. Writing data to this ROM in an inappropriate manner will render the NIC non-functional.
DIMM Serial Presence Detect (SPD) configuration data	256 bytes per memory module, 128 bytes programmable (not customer accessible)	No	Yes	Stores memory module information.	DIMM SPD is programmed by the memory vendor.	Data cannot be written to this memory when the module is installed in a computer. The specific write-protection method varies by memory vendor.
System BIOS	9 MB	Yes	Yes	Stores system BIOS code and computer configuration data.	System BIOS code is programmed at the factory. Code is updated when the system BIOS is updated. Configuration data and settings are entered using the Computer Setup (BIOS) or a custom utility.	**NOTE:** Writing data to this ROM in an inappropriate manner can render the computer non-functional. A utility must be used for writing data to this memory and is available on the HP website; go to http://www.hp.com/support. Select **Find your product**, and then follow the on-screen instructions.
Intel Management Engine Firmware (present only in	1.5 MB or 7 MB	Yes	Yes	Stores Management Engine Code,	Management Engine Code is programmed at the factory. Code is updated via Intel	The Intel chipset is configured to enforce hardware protection to

Table 9-1 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?
select Elite or Z models. For more information, go to http://www.hp.com/support. Select **Find your product**, and then follow the on-screen instructions.)				Settings, Provisioning Data and iAMT third-party data store.	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.	block all direct read/write access to this area. An Intel utility must be used for updating the firmware. Only firmware updates digitally signed by Intel can be applied using this utility.
Bluetooth flash (select products only)	2 Mb	No	Yes	Stores Bluetooth configuration and firmware.	Bluetooth flash is programmed at the factory. Tools for writing data to this memory are not publicly available but can be obtained from the silicon vendor.	A utility must be used for writing data to this memory and is made available through newer versions of the driver whenever the flash requires an upgrade.
802.11 WLAN EEPROM	4 Kb to 8 Kb	No	Yes	Stores configuration and calibration data.	802.11 WLAN EEPROM is programmed at the factory. Tools for writing data to this memory are not made public.	A utility must be used for writing data to this memory and is typically not made available to the public unless a firmware upgrade is necessary to address a unique issue.
Webcam (select products only)	64 Kb	No	Yes	Stores webcam configuration and firmware.	Webcam memory is programmed using a utility from the device manufacturer that can be run from Windows.	A utility must be used for writing data to this memory and is typically not made available to the public unless a firmware upgrade is necessary to address a unique issue.
Fingerprint reader (select products only)	512 KB flash	Yes	Yes	Stores fingerprint templates.	Fingerprint reader memory is programmed by user enrollment in HP ProtectTools Security Manager.	Only a digitally signed application can make the call to write to the flash.

Questions and answers

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

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

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

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

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

c. Follow the on-screen instructions.

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

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

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

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

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

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

3. **Where does the UEFI BIOS reside?**

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

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

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

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

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

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

   IMPORTANT: Resetting results in the loss of information.

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

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

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

c. Follow the on-screen instructions.

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

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

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

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

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

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

10 Power cord set requirements

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

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

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

Requirements for all countries

The following requirements are applicable to all countries and regions:

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

Requirements for specific countries and regions

Table 10-1 Power cord requirements for specific countries and regions

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

1. The flexible cord must be Type HO5VV-F, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

Table 10-1 Power cord requirements for specific countries and regions (continued)

Country/region	Accredited agency	Applicable note number

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

3. The appliance coupler, flexible cord, and wall plug must bear a T mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCTF, 3-conductor, 0.75 mm^2 or 1.25 mm^2 conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration.

4. The flexible cord must be Type RVV, 3-conductor, 0.75 mm^2 conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.

5. The flexible cord must be Type H05VV-F 3-conductor, 0.75 mm^2 conductor size. KTL logo and individual approval number must be on each element. Approval number and logo must be printed on a flag label.

6. The flexible cord must be Type HVCTF 3-conductor, 1.25 mm^2 conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.

7. For 127 V ac, the flexible cord must be Type SVT or SJT 3-conductor, 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type H05VV-F 3-conductor, 0.75 mm^2 or 1.00 mm^2 conductor size, with plug BS 1363/A with BSI or ASTA marks.

11 Recycling

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

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

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