



HP Elite x2 1012 G1 Tablet

**HP Elite x2 1012 G1 Tablet with Advanced
Keyboard**

**HP Elite x2 1012 G1 Tablet with Travel
Keyboard**

Maintenance and Service Guide

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

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Product notice

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

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First Edition: December 2015

Document Part Number: 839796-001

Safety warning notice

 **WARNING!** To reduce the possibility of heat-related injuries or of overheating the device, do not place the device directly on your lap or obstruct the device air vents. Use the device only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The device and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950-1).

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1 Product description

Category	Description	1012 Tablet	1012 tablet with Travel Keyboard	1012 tablet with Advanced Keyboard
Product Name	HP Elite x2 1012 G1 Tablet	✓		
	HP Elite x2 1012 G1 Travel Keyboard		✓	
	HP Elite x2 1012 G1 Advanced Keyboard			✓
Chipset	Intel Skylake Premium PCH (integrated with CPU)			
Graphics	Internal graphics: Intel UMA Graphics (GT2) (with shared video memory)			
Panel	Touch screen Corning Gorilla 4 Glass, GF2-MM, Direct Bonded 12.0" 3:2 (LED backlight – Ultra-Slim): 12.0" WUXGA+ BV UWVA 60% 340 nits eDP Ultraslim 2.4mm PSR (1920x1280)			
Memory	Memory soldered on system board LPDDR3 1866 253 ball Supports up to 8 GB Dual Channel Memory in the following configurations: 4096 MB Total System Memory (16Gb 128Mx32x4, Qty 2) 8192 MB Total System Memory (32Gb 256Mx32x4, Qty 2)			
Solid-state drive	M.2 SSD SS 2280: 128GB SATA III - TLC 180GB SATA III 180GB SATA III self-encrypting OPAL2 256GB SATA III - TLC 256GB SATA III self-encrypting OPAL2 512GB SATA III - TLC 256 GB PCIe SSD (NVMe)			
Audio and video	HD Audio with DTS Studio Sound (For Windows products only) Bang & Olafsun branding Microphone (Dual Array) Front-facing Camera 2 MP (1080p) Rear Camera: 5 MP (1080p) Stereo Speakers (2)			
Ethernet	Ethernet via USB-C Dongle only			

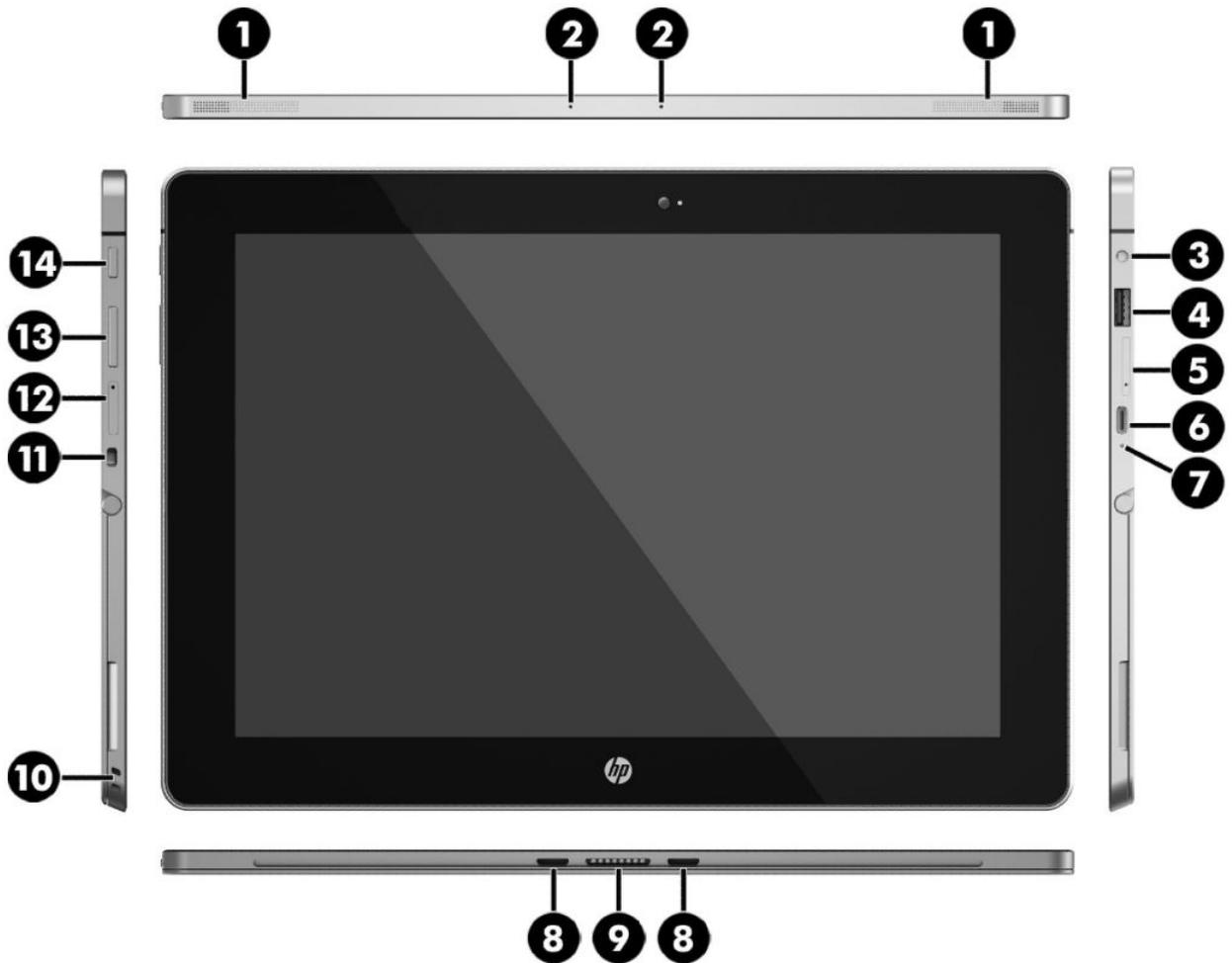
Category	Description	1012 Tablet	1012 tablet with Travel Keyboard	1012 tablet with Advanced Keyboard
Wireless	WLAN:			
	WLAN options via M.2:			
	Intel® 802.11 2x2ac + BT 4.1 Combo (non-vPro)- Snowfield Peak 8260			
	Intel® 802.11 2x2ac + BT 4.1 Combo Snowfield Peak 8260			
	Intel® 802.11 2x2 AC + BT 4.1 Combo + WiGig RF Exposure (Douglas Peak) 18260			
	WLAN Antennas (2) (configured with panel on all units)			
	WiGig Antenna (For IDS, only configured with WiGig)			
	WWAN (select products only):			
	SIM Module: (user-accessible on side of slate) (3FF/micro SIM). (SIM module installed in factory when Service Provider is configured)			
	Huawei MU736 HSPA+ w/GPS NGFF (Wrangler)			
Foxconn MDM9625 LTE/EVDO/HSPA+ NGFF (Amstel)				
CAT3 906J LTE DCM				
CAT3 906J LTE KDDI				
WPAN Bluetooth:				
BT4.1 supported only with combo card				
External media cards	USB-C Thunderbolt (Docking, Power, USB)			
	MicroSD			
	Micro SIM			
	USB 3.0a Port			
	Headphone/Microphone Combo			
Keyboard/ pointing devices	Thin:		√	
	Keyboard			
	ClickPad			
Keyboard/ pointing devices	Productivity:			√
	Smart Card			
	NFC			
	Keyboard			
	ClickPad			
Docking External Keyboard	Workstation Thunderbolt docking:			√
	Thin External Keyboard			
	Productivity External Keyboard			
Keyboard/ pointing devices	Thin External Keyboard	√		
	Productivity External Keyboard			

Category	Description	1012 Tablet	1012 tablet with Travel Keyboard	1012 tablet with Advanced Keyboard
Power requirements	Battery			
	Slate:			
	4-cell Long Life Polymer 40 Whr (2.86Ahr)			
	Base:			
	None			
	AC adapter: (USB Type-C)			
	45W "Smart" AC Adapter non-PFC USB-C			
	Power Cord, localized			
Duckhead for use in United States and South Korea				
Duckhead Power Cord for use in all countries except South Korea				
Security	TPM 1.2/2.0 SLB9670 (Infineon; soldered down)	√		
	Fingerprint Reader (select products only)			
	Drive encryption pre-boot (Password, Fingerprint, select Smart Cards)			
	Power-on Authentication (Password, Fingerprint)			
	Integrated Smart Card Reader (Active)			√
Operating system	Windows 10 Threshold 2			
	Preinstalled:			
	Win 10 Pro 64			
	Win 10 Home 64			
	Win 10 Home 64 Chinese Market CPPP			
	Win 10 Home 64 Single Language			
	Win 10 Home High End 64			
	Win 10 Home High End 64 Single Language			
	Restore Media:			
	DRDVD:			
	DRDVD Win 10			
	OSDVD:			
	Windows 10			
	Certified:			
	Microsoft WHQL			
	Web-only Support:			
	Windows 10 Enterprise 64			
Windows 8.1 Enterprise 64				
Windows 8.1 Chinese Market 64				

Category	Description	1012 Tablet	1012 tablet with Travel Keyboard	1012 tablet with Advanced Keyboard
	Windows 8.1 Emerging Markets 64			
	Windows 8.1 Multi-Language 64			
	Windows 8.1 Professional 64			
Serviceability	End user replaceable parts:			
	AC Adapter: Slate only			
	Active Pen (select products only)			

2 External component identification

Tablet edge components

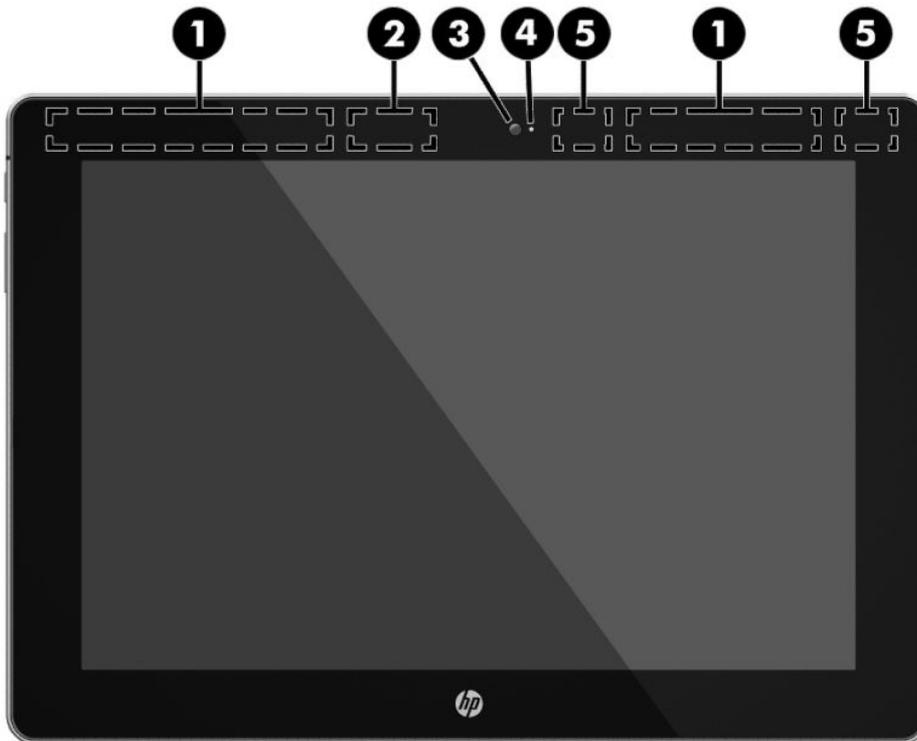


Component		Description
(1)	Speakers	Produce sound.
(2)	Internal microphones	Record sound.
(3)	Audio-out (headphone)/Audio-in (microphone) combo jack	Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional microphone-only devices.

Component	Description
	<p>WARNING! To reduce the risk of personal injury, adjust the volume before using headphones, earbuds, or a headset. For additional safety information, see the <i>Regulatory, Safety and Environmental Notices</i>.</p> <p>To access this guide:</p> <ul style="list-style-type: none"> ▲ Select the Start button, select All apps, select HP Help and Support, and then select HP Documentation. <p>NOTE: When a device is connected to the jack, the tablet speakers are disabled.</p>
(4)	<p>USB 3.0 charging (powered) port</p> <p>Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub. Standard USB ports will not charge all USB devices or will charge using a low current. Some USB devices require power and require you to use a powered port.</p> <p>NOTE: USB charging ports can also charge select models of cell phones and MP3 players, even when the tablet is off.</p>
(5)	<p>MicroSD card reader</p> <p>Reads microSD cards that store, manage, share, or access information.</p>
(6)	<p>USB Type-C (Thunderbolt-enabled) port</p> <p>Connects an AC adapter and connects any USB device with a Type-C connector. Your tablet may also support a Thunderbolt docking station.</p> <p>NOTE: Some USB Type-C ports can charge select models of cell phones, laptops, tablets, and MP3 players, even when the tablet is off. Some can also connect DisplayPort, VGA, HDMI, Thunderbolt, and other video devices.</p> <p>NOTE: Adapters (purchased separately) may be required.</p>
(7)	<p>AC adapter and battery light</p> <ul style="list-style-type: none"> • White: The AC adapter is connected and the battery is fully charged. • Blinking white: 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 from this port.
(8)	<p>Alignment post connectors (2)</p> <p>Align and attach the tablet to the optional keyboard.</p>
(9)	<p>ZIF (Zero Insertion Force) expansion slot</p> <p>Allows you to connect accessories such as a keyboard or power supply using the POGO pin connector.</p>
(10)	<p>Pen loop slots</p> <p>Allow you to connect the pen to the tablet using the pen loop.</p>
(11)	<p>Security cable slot</p> <p>Attaches an optional security cable to the tablet.</p> <p>NOTE: The security cable is designed to act as a deterrent, but it may not prevent the tablet from being mishandled or stolen.</p>
(12)	<p>Micro SIM card slot (select products only)</p> <p>Supports a wireless subscriber identity module (SIM) card.</p>
(13)	<p>Volume button</p> <p>Press to increase or decrease sound.</p>
(14)	<p>Power button</p> <ul style="list-style-type: none"> • When the tablet is off, press the button to turn on the tablet. • When the tablet is on, press the button briefly to initiate Sleep.

Component	Description
	<ul style="list-style-type: none"><li data-bbox="895 226 1417 275">• When the tablet is in the Sleep state, press the button briefly to exit Sleep. <p data-bbox="895 298 1461 346">CAUTION: Pressing and holding down the power button results in the loss of unsaved information.</p> <p data-bbox="895 369 1461 443">NOTE: Although you can turn off the tablet with the power button, the recommended procedure is to use the Windows Shut down command.</p> <p data-bbox="895 466 1398 514">To learn more about your power settings, see your power options.</p> <ul style="list-style-type: none"><li data-bbox="895 537 1426 585">▲ Type <code>power</code> in the taskbar search box, and then select Power and sleep settings.

Display



Component	Description
(1) WWAN antennas* (select products only)	Send and receive wireless signals to communicate with wireless wide area networks (WWANs).
(2) WiGig antenna*	Sends and receives wireless signals to the Wireless Dock (WiDock). The WiDock is a wireless gigabit (WiGig) device that connects the tablet to other wireless devices located within 0.6 m to 1.2 m (2 ft to 4 ft) of the WiDock.
(3) Webcam	Records video and captures photographs. Some models allow you to video conference and chat online using streaming video. To use the webcam: <ul style="list-style-type: none">▲ Type <code>camera</code> in the taskbar search box, and then select Camera.
(4) Webcam light	On: The webcam is in use.
(5) WLAN antennas*	Send and receive wireless signals to communicate with wireless local area networks (WLANs).

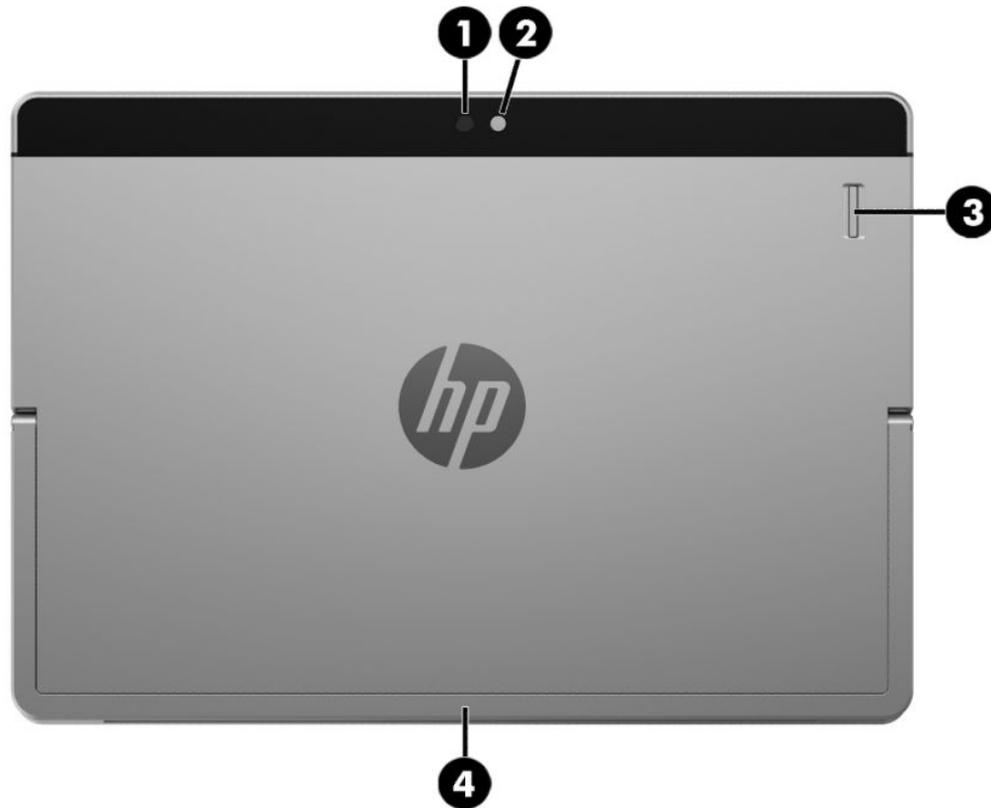
*The antennas are not visible from the outside of the tablet. For optimal transmission, keep the areas immediately around the antennas free from obstructions.

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

To access this guide:

- ▲ Select the **Start** button, select **All apps**, select **HP Help and Support**, and then select **HP Documentation**.

Back

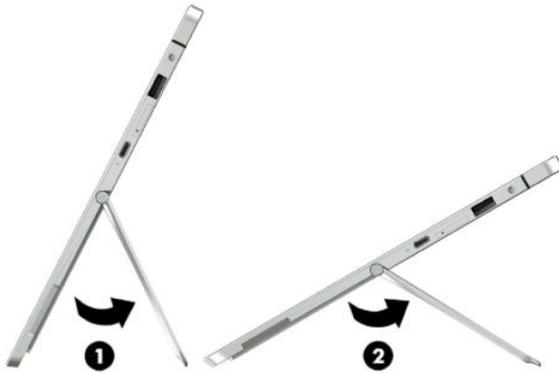


Component	Description
(1) Camera flash	Provides a camera flash. You can control the flash using the Windows Metro Camera app.
(2) Webcam (rear)	Records video and captures photographs. Some products allow you to video conference and chat online using streaming video.
(3) Fingerprint reader (select products only)	Allows a fingerprint logon to Windows, instead of a password logon.
(4) Kickstand	Provides stability and the best viewing angle.

Using the kickstand

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

1. Hold the tablet with top edge up (the speakers are on top).
2. Slide the kickstand away from the tablet and position the kickstand at the desired angle. The kickstand will hold at a midway point **(1)** of about 52 degrees or at full stopping point **(2)** of about 118 degrees.



To close the kickstand, push the kickstand against the bottom of the tablet until it is flush with the bottom.

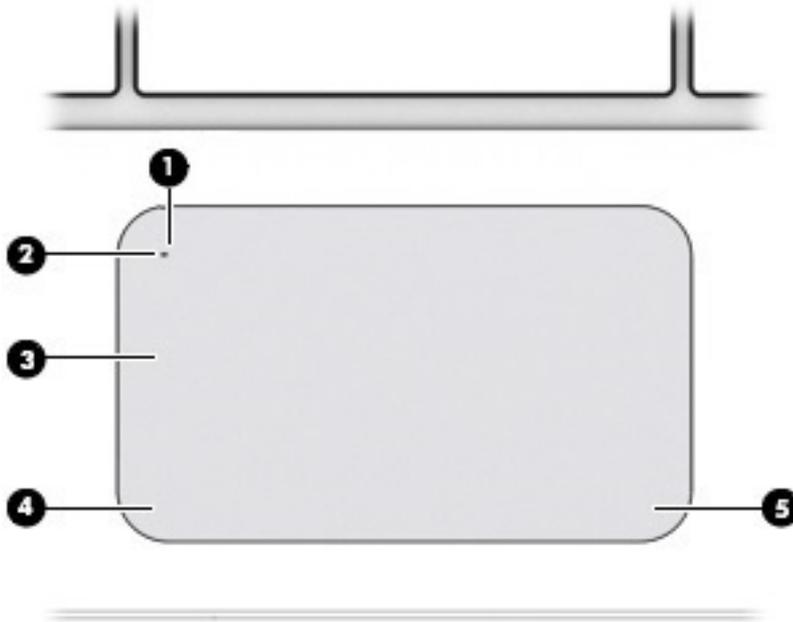


Keyboard base components (select products only)

Your tablet supports an optional keyboard. This section provides information about the common features of the supported keyboards.

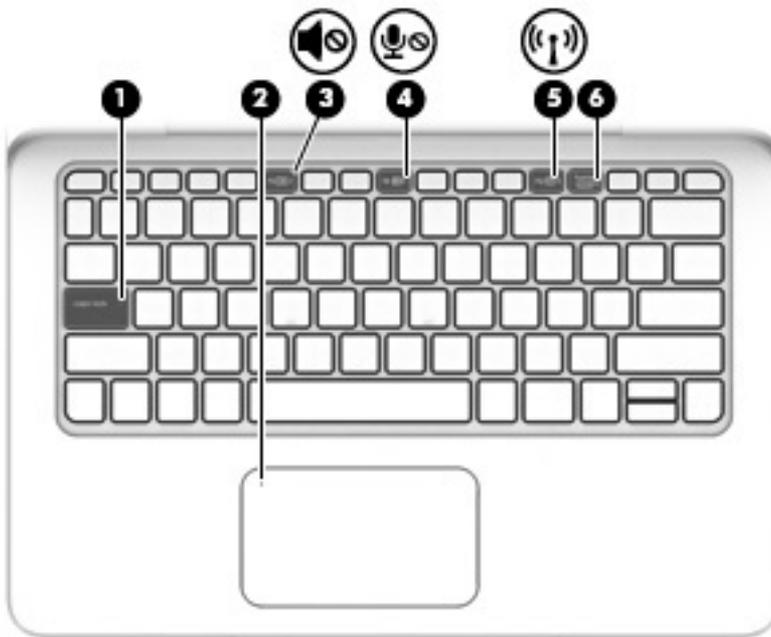
 **NOTE:** Keyboard appearance and features might vary.

TouchPad



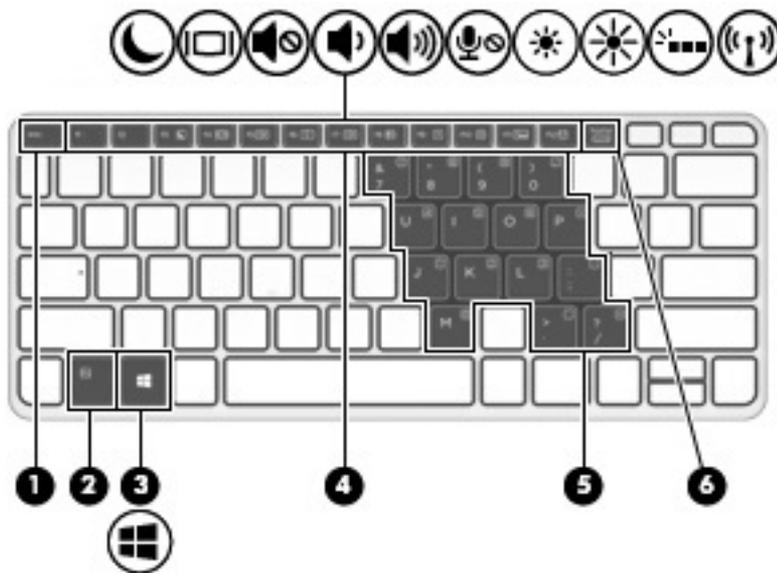
Component	Description
(1)	TouchPad on/off button Turns the TouchPad on and off.
(2)	TouchPad light <ul style="list-style-type: none">On: The TouchPad is off.Off: The TouchPad is on.
(3)	TouchPad zone Reads your finger gestures to move the pointer or activate items on the screen.
(4)	Left TouchPad click area Functions like the left button on an external mouse.
(5)	Right TouchPad click area Functions like the right button on an external mouse.

Lights



Component	Description
(1) Caps lock light	<ul style="list-style-type: none"> On: Caps lock is on, which switches the keys to all capital letters.
(2) TouchPad light	<ul style="list-style-type: none"> On: The TouchPad is off. Off: The TouchPad is on.
(3)  Mute light	<ul style="list-style-type: none"> Amber: Sound is off. Off: Sound is on.
(4)  Microphone mute light	<ul style="list-style-type: none"> Amber: microphone sound is off. Off: microphone sound is on.
(5)  Wireless light	<p>On: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on.</p> <p>NOTE: On some models, the wireless light is amber when all wireless devices are off.</p>
(6) Num lock light	On: Num lock is on.

Special function keys



Component	Description
(1) esc key	Displays system information when pressed in combination with the fn key.
(2) fn key	Executes frequently used system functions when pressed in combination with a function key, the num lock key, or the esc key.
(3)  Windows key	Opens the Start menu. NOTE: Pressing the Windows key again will close the Start menu.
(4) Function keys	Execute frequently used system functions when pressed in combination with the fn key. NOTE: Function keys do not display or function from the on-screen tablet keyboard.
(5) Embedded numeric keypad	When the keypad is turned on, it can be used like an external numeric keypad. Each key on the keypad performs the function indicated by the icon in the upper-right corner of the key.
(6) num lock key	Turns the embedded numeric keypad on and off when pressed in combination with the fn key.

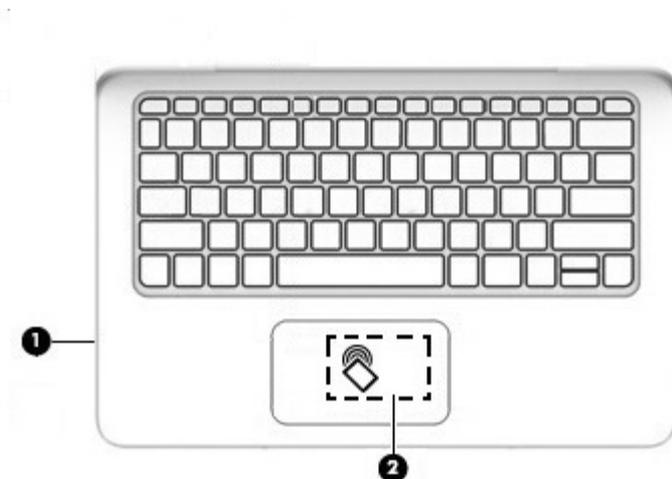
Using the hot keys

To use a hot key:

- ▲ Press the **fn** key, and then press the correct function key represented by the icons below.

Press fn +function key	Description
	Initiates Sleep, which saves your information in system memory. The display and other system components turn off and power is conserved. To exit Sleep, briefly press the power button. CAUTION: To reduce the risk of information loss, save your work before initiating Sleep.
	Switches the screen image between display devices connected to the system. For example, if a monitor is connected to the tablet, repeatedly pressing this key alternates the screen image from the tablet to the monitor display to a simultaneous display on both the tablet and the monitor.
	Mutes or restores speaker sound.
	Decreases speaker volume incrementally while you hold down the key.
	Increases speaker volume incrementally while you hold down the key.
	Mutes the microphone.
	Decreases the screen brightness incrementally as long as you hold down the key.
	Increases the screen brightness incrementally as long as you hold down the key.
	Turns the keyboard backlight off or on. NOTE: To conserve battery power, turn off this feature.
	Turns the wireless feature on or off. NOTE: A wireless network must be set up before a wireless connection is possible.

NFC and Smart Card (select products only)



Component		Description
(1)	Smart card reader	Supports optional Smart cards.
(2)	Near Field Communication (NFC) antenna* and NFC tapping area	Send and receive wireless signals to communicate and transfer data/info to and from your NFC-compatible devices.

*The antenna is not visible from the outside of the keyboard. For optimal transmission, keep the areas immediately around the antenna free from obstructions.

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

To access this guide:

- ▲ Select the **Start** button, select **All apps**, select **HP Help and Support**, and then select **HP Documentation**.

Connecting the tablet to the keyboard base

To connect the tablet to the keyboard base, follow these steps:

1. Insert the tablet POGO pin connector docking port into the keyboard base POGO pin docking connector.

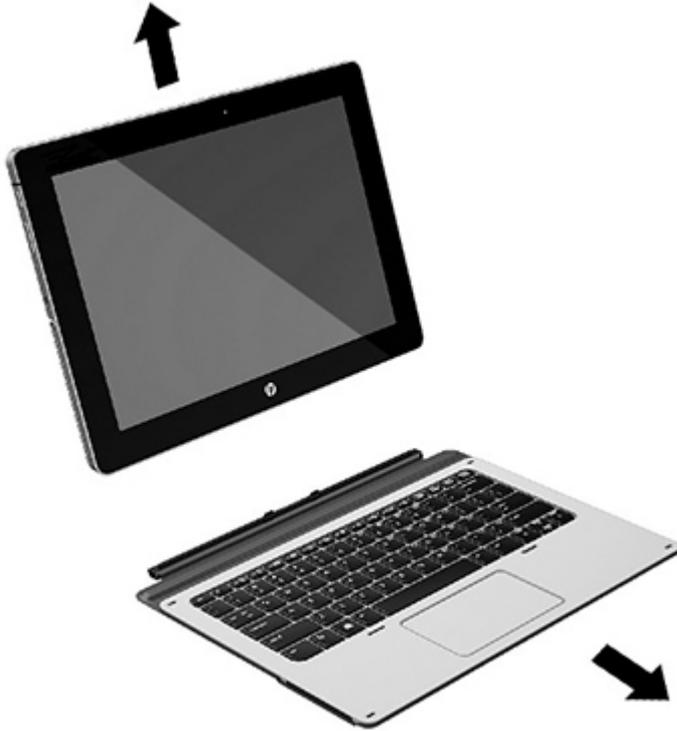


2. Position the kickstand at the desired angle.

 **NOTE:** If you close the kickstand, you can leave the keyboard attached and position the keyboard behind the tablet. The keyboard keys and TouchPad are locked to prevent you from accidentally typing while the keyboard is in this position.

Removing the keyboard base from the tablet

To remove the keyboard base from the tablet, pull the keyboard away from the tablet.



Locating system information

The labels affixed to the tablet provide information you may need when you troubleshoot system problems or travel internationally with the tablet.

 **IMPORTANT:** Check the bottom of the tablet and the back of the display for the labels described in this section.

- **Service label**—Provides important information to identify your tablet. When contacting support, you will probably be asked for the serial number, and possibly for the product number or the model number. Locate these numbers before you contact support.

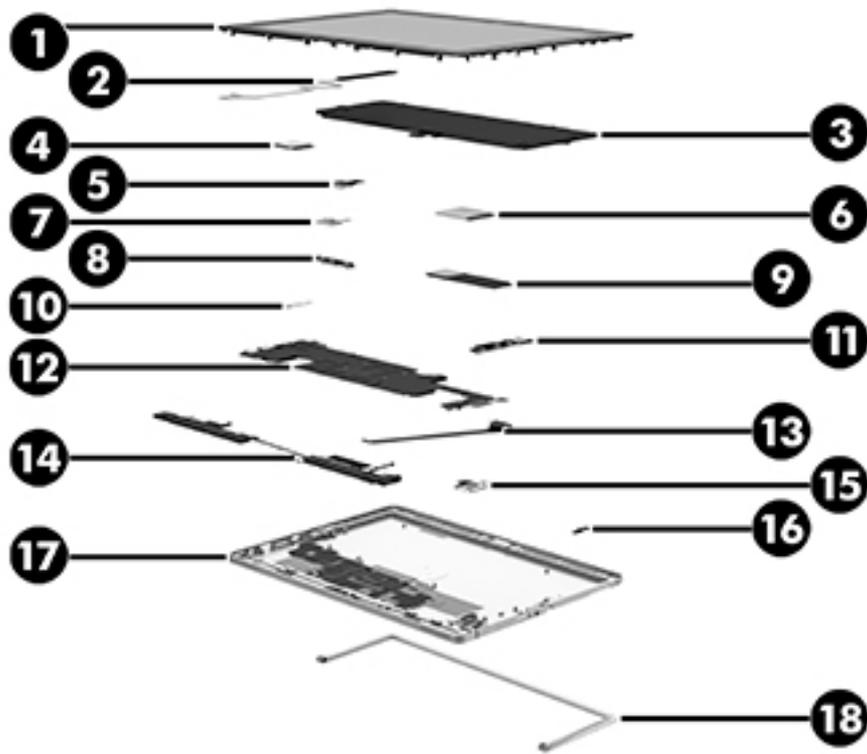
Your service label will resemble the example shown below.

3 Illustrated parts catalog

Computer major components

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

 **NOTE:** Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer. See [Locating system information on page 17](#) for details.



Item	Component	Spare part number
(1)	Panel	844861-001
(2)	Display Cable Kit	844872-001
(3)	Battery	812205-001
(4)	WWAN module (select products only)	
	FOX T77W595 LTE M.2	813559-005
	ME906J DOCO LTE/HSPA+ w/GPS M.2	836166-001
	ME906J HP LT4225 LTE M.2 w/GPS	820019-001

Item	Component	Spare part number
	MU736 HS3110 HSPA+ w/GPS M.s	822828-001
	WWAN antenna	844870-001
(5)	Rear webcam	844883-001
(6)	WLAN module	
	WIGIG Module W/Bracket W/Cable	844884-001
	11ac 2x2 INT 8260NGW SnfP2	806721-001
	11ac 2x2 INT 8260NGW SnfP2NV	806722-001
	INT 802.11AC 18260+BT4 2x2	810814-005
	WLAN antenna	844869-001
(7)	Front webcam	844882-001
(8)	Microphone board	844878-001
(9)	Solid-state drive	
	128 GB SATA-3 TLC	844862-001
	180 GB SATA-3 TLC	844863-001
	180 GB SATA-3 self-encrypting drive OPAL2	844864-001
	256 GB SATA-3 TLC	844865-001
	256 GB SATA-3 self-encrypting drive OPAL2	844866-001
	256 GB PCIe-3x4 NVMe	844868-001
	512 GB SATA-3 TLC	844867-001
(10)	USB Type-C bracket (included with system board. See System board on page 50.)	
(11)	Button board (includes cable)	
	For products with WWAN capability	844876-001
	For products without WWAN capability	848827-001
(12)	System board	
	UMA graphics M3-6Y30 4GBx2 1012 G1 with Windows operating system	844858-601
	UMA graphics M3-6Y30 4GB fWWANx2 1012 G1 with Windows operating system and WWAN capability	845470-601
	UMA graphics M5-6Y54 4GBx2 1012 G1 with Windows operating system	845483-601
	UMA graphics M5-6Y54 4GBx2 1012 G1 with Windows operating system and WWAN capability	845484-601
	UMA graphics M5-6Y54 8GBx2 1012 G1 with Windows operating system	845485-601
	UMA graphics M5-6Y54 8GBx2 1012 G1 with Windows operating system	845486-601
	UMA graphics M5-6Y57 4GB fWWANx2 1012 G1 with Windows operating system and WWAN capability	845471-601
	UMA graphics M5-6Y57 8GBx2 1012 G1 with Windows operating system	845472-601

Item	Component	Spare part number
	UMA graphics M5-6Y578GBfWWANx2 1012 G1 with Windows operating system and WWAN capability	845473-601
	UMA graphics M7-6Y758GBfWWANx2 1012 G1 with Windows operating system and WWAN capability	845474-601
(13)	POGO connector (includes cable)	844877-001
(14)	Speaker	844881-001
(15)	Fingerprint reader	844875-001
(16)	Hall sensor	844874-001
(17)	Back cover	844871-001
(18)	Kickstand (included with back cover)	

Miscellaneous parts

Component	Spare part number
AC adapter	
45W adapter NPFC SMART WallMnt USB-C	828769-001
HP USB-C to DisplayPort Adapter	831753-001
HP USB-C to HDMI Adapter	831752-001
HP USB-C to USB 3.0 Adapter	814618-001
HP USB-C to VGA Adapter	831751-001
Keyboard (See Keyboard (select products only) on page 29 for a detailed list of country codes.)	
Keyboard base with TouchPad	846748-001
Advanced Keyboard base	850487-001
HP Active Pen (select products only)	
	846410-001
Plastics Kit	
	844879-001
Power Cord, AC power line, 0.5 m	
For use in Argentina	401300-009
For use in Australia	213356-010
For use in Brazil	438722-006
For use in the People's Republic of China	286497-010
For use in Denmark	4213353-010
For use in Europe	213350-011
For use in India	404827-005
For use in Israel	398063-005
For use in Italy	213352-010

Component	Spare part number
For use in Japan	349756-004
For use in NEMA	213349-012
For use in Africa	361240-004
For use in Switzerland	213354-010
For use in Taiwan	393313-005
For use in Thailand	285096-009
For use in the United Kingdom	213351-010
HP Active Pen with App Launch (selct products only)	846410-001
Screw Kit	844880-001

4 Removal and replacement procedures preliminary requirements

Tools required

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

- Flat-bladed screwdriver
- Magnetic screwdriver
- Phillips P0 and P1 screwdrivers

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

 **CAUTION:** Using excessive force during disassembly and reassembly can damage plastic parts. Use care when handling the plastic

Cables and connectors

⚠ CAUTION: 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

⚠ CAUTION: 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 a diskette drive or optical drive, be sure that a diskette or disc is not in the drive and be sure that the optical drive tray is closed.

Handle drives on surfaces covered with at least one inch of shock-proof foam.

Avoid dropping drives from any height onto any surface.

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

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.”

Grounding guidelines

Electrostatic discharge damage

Electronic components are sensitive to electrostatic discharge (ESD). Circuitry design and structure determine the degree of sensitivity. Networks built into many integrated circuits provide some protection, but in many cases, ESD contains enough power to alter device parameters or melt silicon junctions.

A discharge of static electricity from a finger or other conductor can destroy static-sensitive devices or microcircuitry. Even if the spark is neither felt nor heard, damage may have occurred.

An electronic device exposed to ESD may not be affected at all and can work perfectly throughout a normal cycle. Or the device may function normally for a while, then degrade in the internal layers, reducing its life expectancy.

CAUTION: To prevent damage to the computer 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.

The following table shows how humidity affects the electrostatic voltage levels generated by different activities.

CAUTION: A product can be degraded by as little as 700 V.

Typical electrostatic voltage levels			
Event	Relative humidity		
	10%	40%	55%
Walking across carpet	35,000 V	15,000 V	7,500 V
Walking across vinyl floor	12,000 V	5,000 V	3,000 V
Motions of bench worker	6,000 V	800 V	400 V
Removing DIPS from plastic tube	2,000 V	700 V	400 V
Removing DIPS from vinyl tray	11,500 V	4,000 V	2,000 V
Removing DIPS from Styrofoam	14,500 V	5,000 V	3,500 V
Removing bubble pack from PCB	26,500 V	20,000 V	7,000 V
Packing PCBs in foam-lined box	21,000 V	11,000 V	5,000 V

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.

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, screwdrivers, 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 Styrofoam.
- 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.

Equipment guidelines

Grounding equipment must include either a wrist strap or a foot strap at a grounded workstation.

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megohm $\pm 10\%$ resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, use alligator clips to connect a wrist strap.
- When standing, use foot straps and a grounded floor mat. Foot straps (heel, toe, or 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 foot straps on both feet with a minimum of one megohm resistance between the operator and ground. To be effective, the conductive must be worn in contact with the skin.

The following grounding equipment is recommended to prevent electrostatic damage:

- Antistatic tape
- Antistatic smocks, aprons, and sleeve protectors
- Conductive bins and other assembly or soldering aids
- Nonconductive foam
- Conductive tabletop workstations with ground cords of one megohm resistance
- Static-dissipative tables or floor mats with hard ties to the ground
- Field service kits
- Static awareness labels
- Material-handling packages
- Nonconductive plastic bags, tubes, or boxes
- Metal tote boxes
- Electrostatic voltage levels and protective materials

The following table lists the shielding protection provided by antistatic bags and floor mats.

Material	Use	Voltage protection level
Antistatic plastics	Bags	1,500 V
Carbon-loaded plastic	Floor mats	7,500 V
Metallized laminate	Floor mats	5,000 V

5 Removal and replacement procedures for Authorized Service Provider parts

This chapter provides removal and replacement procedures for Authorized Service Provider only parts.

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

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

Component replacement procedures

 **NOTE:** Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer. See [Locating system information on page 17](#) for details.

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

There are as many as 32 screws that must be removed, replaced, and/or loosened when servicing Authorized Service Provider only parts. Make special note of each screw size and location during removal and replacement.

Keyboard (select products only)

Description	Spare part number
Keyboard base with TouchPad	846748-001
Advanced Keyboard base	850487-001

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

To remove the keyboard, see [Removing the keyboard base from the tablet on page 17](#).

Back cover

Description	Spare part number
Back cover	844871-001

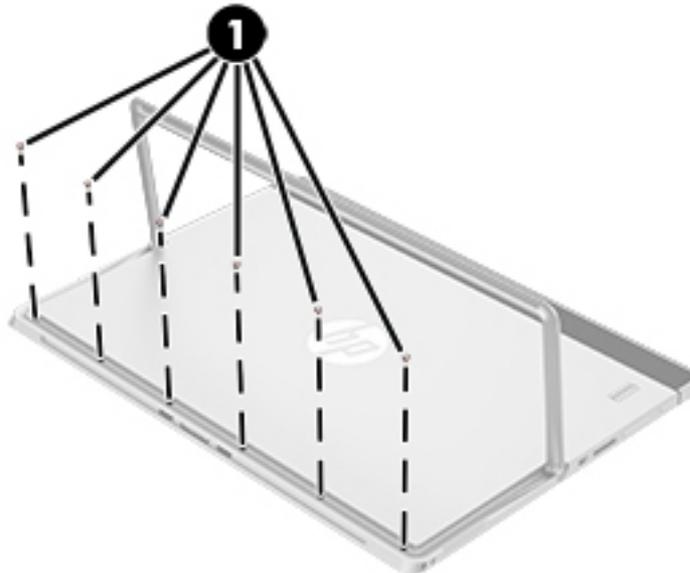
 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement.

Before removing the back cover, follow these steps:

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.
4. Remove the following components:
 - ▲ Keyboard (select products only) (see [Keyboard \(select products only\) on page 29](#))

Remove the back cover:

- ▲ Remove the 6 Torx screws under the kickstand **(1)**.



Reverse this procedure to replace the back cover screws.

Display panel

Description	Spare part number
Panel	844861-001
Display Cable Kit	844872-001

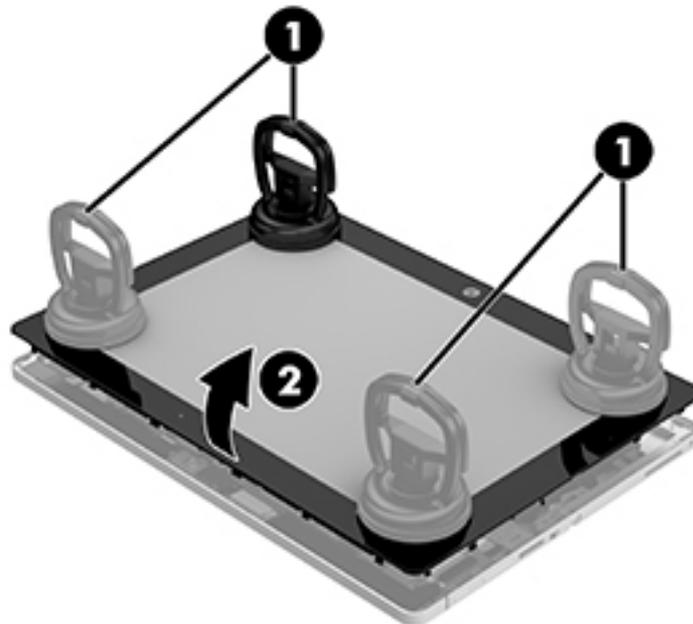
 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement.

Before removing the display panel, follow these steps:

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.
4. Remove the following components:
 - a. Keyboard (select products only) (see [Keyboard \(select products only\) on page 29](#))
 - b. Back cover (see [Back cover on page 30](#))

Remove the display panel:

1. Use a suction tool to loosen all 4 corners of the display panel **(1)**, and then lift the display panel **(2)** to remove it.



2. Disconnect the touch board cable (1) and the display cable (2), and then remove the display panel (3).



Reverse this procedure to replace the display panel.

Touch controller board

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

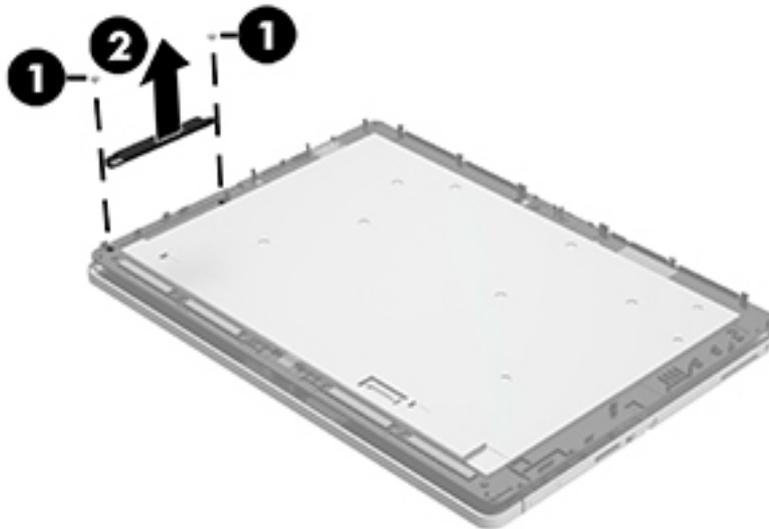
Description	Spare part number
Touch controller board	844861-001

Before removing the touch controller board, follow these steps:

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.
4. Remove the following components:
 - a. Keyboard (select products only) (see [Keyboard \(select products only\) on page 29](#))
 - b. Back cover (see [Back cover on page 30](#))
 - c. Display panel (see [Display panel on page 31](#))

Remove the touch controller board:

- ▲ Remove the 2 Phillips screws **(1)**, and then remove the touch controller board **(2)**.



Reverse this procedure to replace the touch controller board.

WLAN module

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

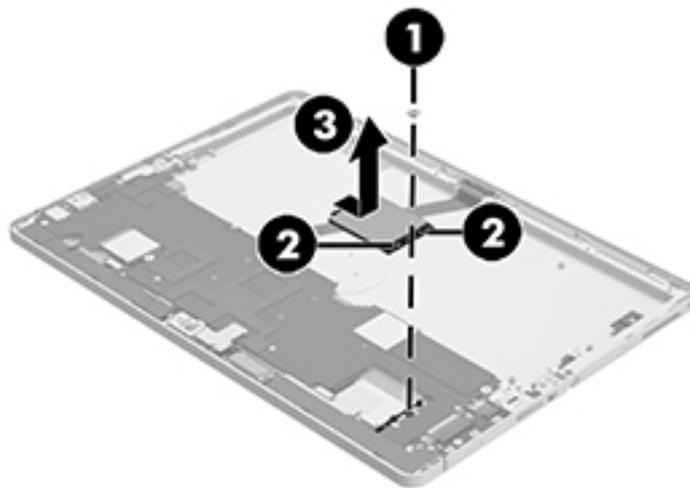
Description	Spare part number
WLAN module	
WIGIG Module W/Bracket W/Cable	844884-001
11ac 2x2 INT 8260NGW SnfP2	806721-001
11ac 2x2 INT 8260NGW SnfP2NV	806722-001
INT 802.11AC 18260+BT4 2x2	810814-005
WLAN antenna	844869-001

Before removing the WLAN module, follow these steps:

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.
4. Remove the following components:
 - a. Keyboard (select products only) (see [Keyboard \(select products only\) on page 29](#))
 - b. Back cover (see [Back cover on page 30](#))
 - c. Display panel (see [Display panel on page 31](#))
 - d. Touch controller board (see [Touch controller board on page 33](#))

Remove the WLAN module:

- ▲ Remove 1 Phillips M2.0x2.0 screw **(1)**, disconnect the 2 cables **(2)**, slide the WLAN module to the right, and then remove it **(3)**.



Reverse this procedure to replace the WLAN module.

WWAN module (select products only)



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

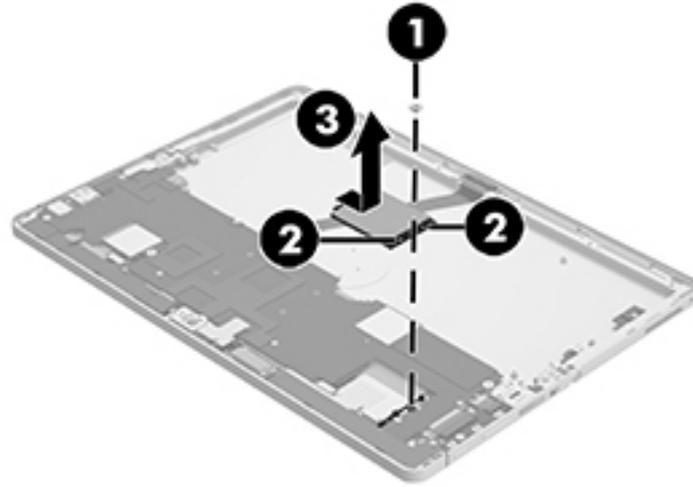
Description	Spare part number
WWAN module (select products only)	
UMA graphics M3-6Y30 4GBx2 1012 G1 with Windows operating system	844858-601
UMA graphics M3-6Y30 4GB fWWANx2 1012 G1 with Windows operating system and WWAN capability	845470-601
UMA graphics M5-6Y54 4GBx2 1012 G1 with Windows operating system	845483-601
UMA graphics M5-6Y54 4GBx2 1012 G1 with Windows operating system and WWAN capability	845484-601
UMA graphics M5-6Y54 8GBx2 1012 G1 with Windows operating system	845485-601
UMA graphics M5-6Y54 8GBx2 1012 G1 with Windows operating system	845486-601
UMA graphics M5-6Y57 4GB fWWANx2 1012 G1 with Windows operating system and WWAN capability	845471-601
UMA graphics M5-6Y57 8GBx2 1012 G1 with Windows operating system	845472-601
UMA graphics M5-6Y578GBfWWANx2 1012 G1 with Windows operating system and WWAN capability	845473-601
UMA graphics M7-6Y758GBfWWANx2 1012 G1 with Windows operating system and WWAN capability	845474-601
WWAN antenna (select products only)	844870-001

Before removing the WWAN module, follow these steps:

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.
4. Remove the following components:
 - a. Keyboard (select products only) (see [Keyboard \(select products only\) on page 29](#))
 - b. Back cover (see [Back cover on page 30](#))
 - c. Display panel (see [Display panel on page 31](#))
 - d. Touch controller board (see [Touch controller board on page 33](#))
 - e. WLAN module (see [WLAN module on page 34](#))

Remove the WWAN module:

- ▲ Remove 1 Phillips M2.0x2.0 screw **(1)**, disconnect the 2 cables **(2)**, slide the WWAN module to the right, and then remove it **(3)**.



Reverse this procedure to replace the WWAN module (select products only).

Solid-state drive

Description	Spare part number
Solid-state drive	
128 GB SATA-3 TLC	844862-001
180 GB SATA-3 TLC	844863-001
180 GB SATA-3 self-encrypting drive OPAL2	844864-001
256 GB SATA-3 TLC	844865-001
256 GB SATA-3 self-encrypting drive OPAL2	844866-001
256 GB PCIe-3x4 NVMe	844868-001
512 GB SATA-3 TLC	844867-001

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

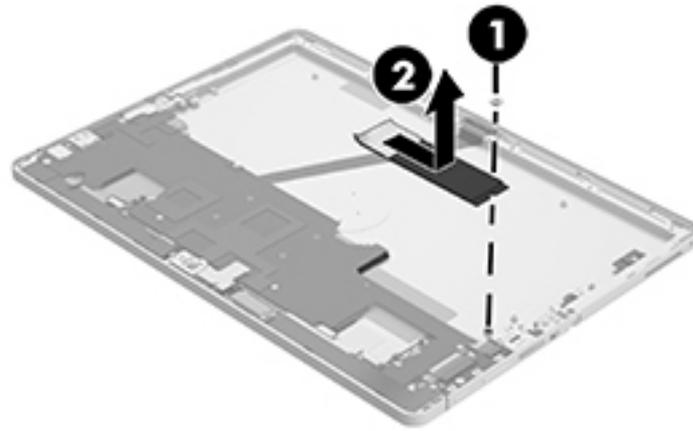
Before removing the solid-state drive, follow these steps:

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.
4. Remove the following components:
 - a. Keyboard (select products only) (see [Keyboard \(select products only\) on page 29](#))
 - b. Back cover (see [Back cover on page 30](#))
 - c. Display panel (see [Display panel on page 31](#))
 - d. Touch controller board (see [Touch controller board on page 33](#))
 - e. WLAN module (see [WLAN module on page 34](#))

Remove the solid-state drive:

1. Remove 1 Phillips M2.0x2.0 screw **(1)**.

2. Slide the solid-state drive **(2)** to the right, and then lift the solid-state drive to remove it.



Reverse this procedure to replace the solid-state drive.

Kickstand

Description

Kickstand (included with Back cover spare part kit, 844871-001 (see [Back cover on page 30](#))).

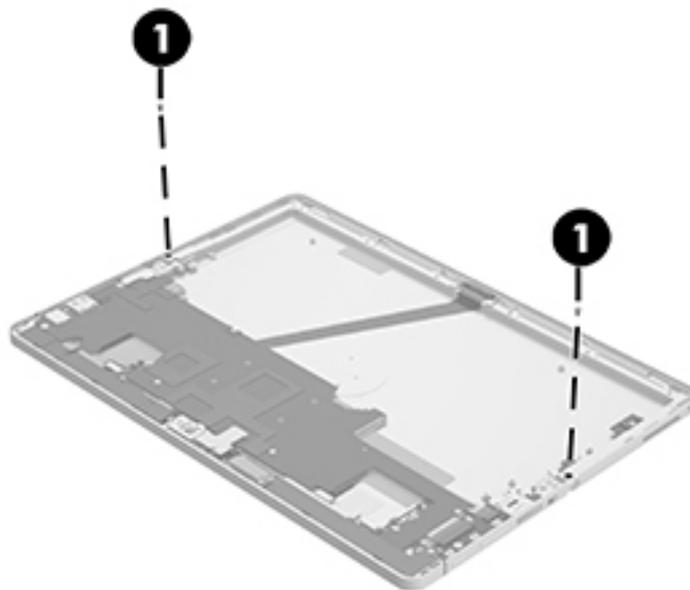
 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement.

Before removing the display panel, follow these steps:

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.
4. Remove the following components:
 - a. Keyboard (select products only) (see [Keyboard \(select products only\) on page 29](#))
 - b. Back cover (see [Back cover on page 30](#))
 - c. Display panel (see [Display panel on page 31](#))
 - d. Touch controller board (see [Touch controller board on page 33](#))
 - e. WLAN module (see [WLAN module on page 34](#))
 - f. WWAN module (select products only) (see [WWAN module \(select products only\) on page 36](#))
 - g. Solid-state drive (see [Solid-state drive on page 38](#))

Remove the kickstand:

1. Remove 1 Torx-5 screw from each hinge (1).



2. Lift the kickstand to remove it.



Reverse this procedure to replace the kickstand.

Battery

Description	Spare part number
4-cell Long Life Polymer 40 Whr (2.86Ahr) Battery	812205-001



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

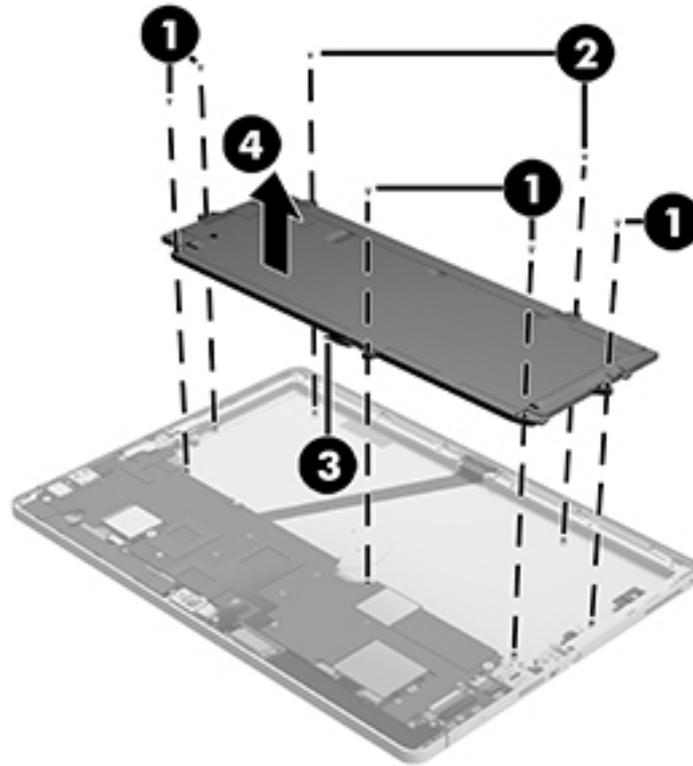
Before removing the display panel, follow these steps:

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.
4. Remove the following components:
 - a. Keyboard (select products only) (see [Keyboard \(select products only\) on page 29](#))
 - b. Back cover (see [Back cover on page 30](#))
 - c. Display panel (see [Display panel on page 31](#))
 - d. Touch controller board (see [Touch controller board on page 33](#))
 - e. WLAN module (see [WLAN module on page 34](#))
 - f. WWAN module (select products only) (see [WWAN module \(select products only\) on page 36](#))
 - g. Solid-state drive (see [Solid-state drive on page 38](#))
 - h. Battery (see [Battery on page 42](#))

Remove the battery:

1. Remove 5 silver Phillips M1.6x2.5 screws in numbered order left to right **(1)**.
2. Remove 2 black Phillips M1.6x2 screws **(2)**.

3. Disconnect the battery cable (3), and then lift the battery (4) to remove it.



Reverse this procedure to replace the battery.

Microphone board

Description	Spare part number
Microphone board	844878-001

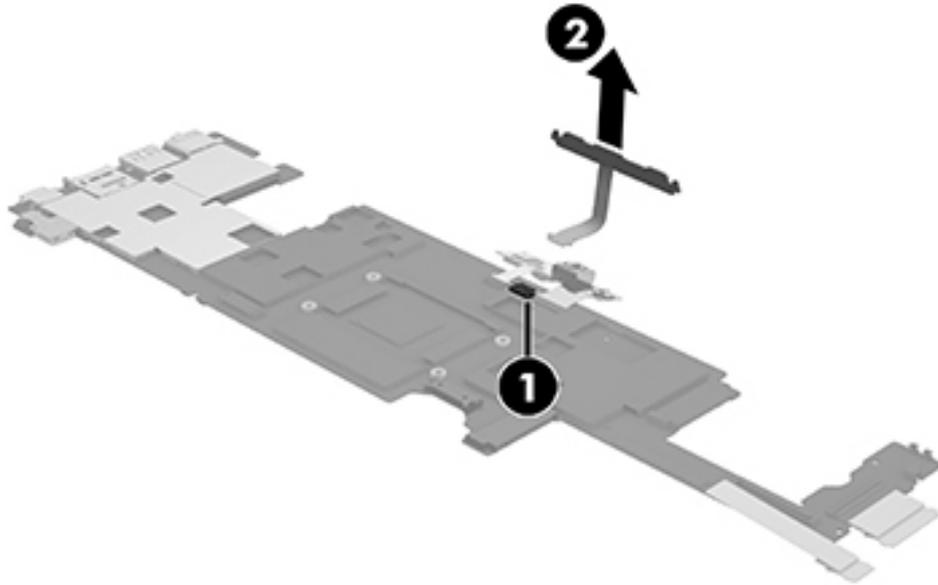
 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement.

Before removing the display panel, follow these steps:

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.
4. Remove the following components:
 - a. Keyboard (select products only) (see [Keyboard \(select products only\) on page 29](#))
 - b. Back cover (see [Back cover on page 30](#))
 - c. Display panel (see [Display panel on page 31](#))
 - d. Touch controller board (see [Touch controller board on page 33](#))
 - e. WLAN module (see [WLAN module on page 34](#))
 - f. WWAN module (select products only) (see [WWAN module \(select products only\) on page 36](#))
 - g. Solid-state drive (see [Solid-state drive on page 38](#))
 - h. Battery (see [Battery on page 42](#))

Remove the microphone board:

- ▲ Disconnect the cable **(1)** from the system board, and then lift the microphone board to remove it **(2)**.



Reverse this procedure to replace the microphone board.

Rear webcam

Description	Spare part number
Rear webcam	844883-001

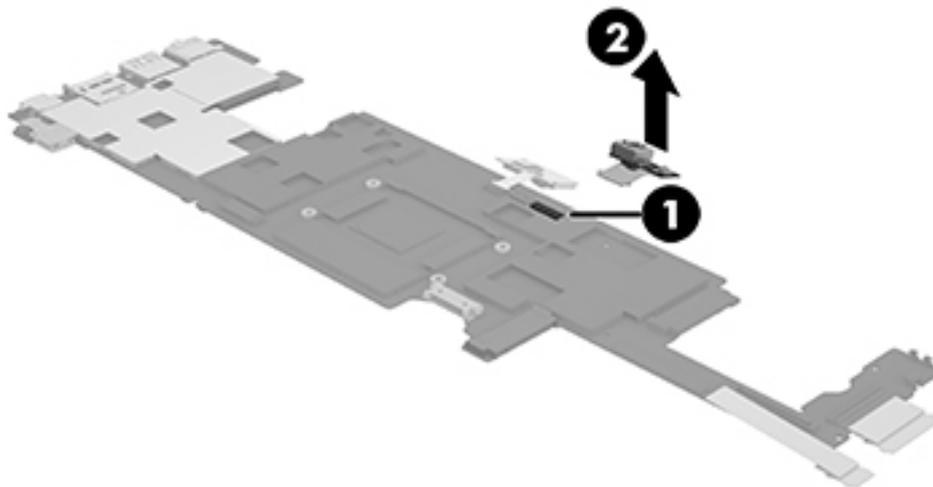
 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement.

Before removing the display panel, follow these steps:

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.
4. Remove the following components:
 - a. Keyboard (select products only) (see [Keyboard \(select products only\) on page 29](#))
 - b. Back cover (see [Back cover on page 30](#))
 - c. Display panel (see [Display panel on page 31](#))
 - d. Touch controller board (see [Touch controller board on page 33](#))
 - e. WLAN module (see [WLAN module on page 34](#))
 - f. WWAN module (select products only) (see [WWAN module \(select products only\) on page 36](#))
 - g. Solid-state drive (see [Solid-state drive on page 38](#))
 - h. Battery (see [Battery on page 42](#))

Remove the rear webcam:

- ▲ Disconnect the cable from the system board **(1)**, and then lift the rear webcam to remove it **(2)**.



Reverse this procedure to replace the rear webcam.

Front webcam

Description	Spare part number
Front webcam	844882-001

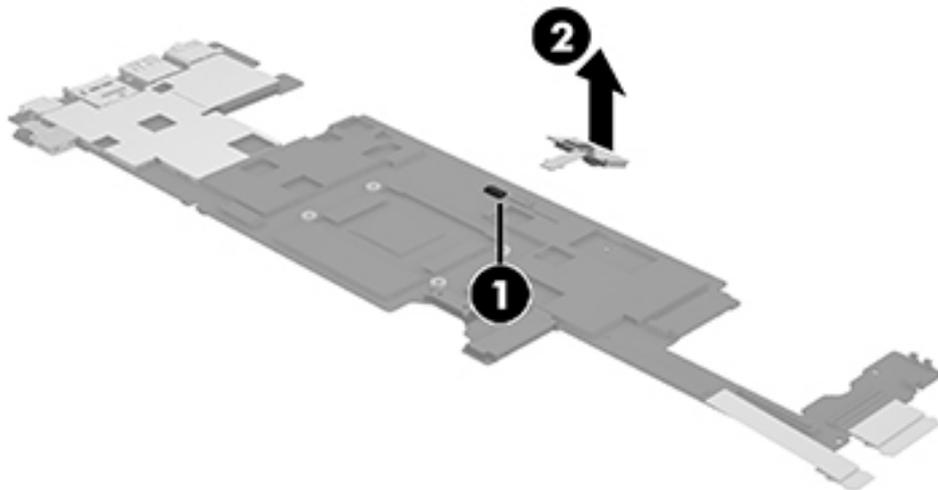
 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement.

Before removing the display panel, follow these steps:

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.
4. Remove the following components:
 - a. Keyboard (select products only) (see [Keyboard \(select products only\) on page 29](#))
 - b. Back cover (see [Back cover on page 30](#))
 - c. Display panel (see [Display panel on page 31](#))
 - d. Touch controller board (see [Touch controller board on page 33](#))
 - e. WLAN module (see [WLAN module on page 34](#))
 - f. WWAN module (select products only) (see [WWAN module \(select products only\) on page 36](#))
 - g. Solid-state drive (see [Solid-state drive on page 38](#))
 - h. Battery (see [Battery on page 42](#))

Remove the front webcam:

- ▲ Disconnect the cable from the system board **(1)**, and then lift the front webcam to remove it **(2)**.



Reverse this procedure to replace the front webcam.

USB Type-C bracket

Description

USB type-C bracket (included with System Board. See [System board on page 50](#)).



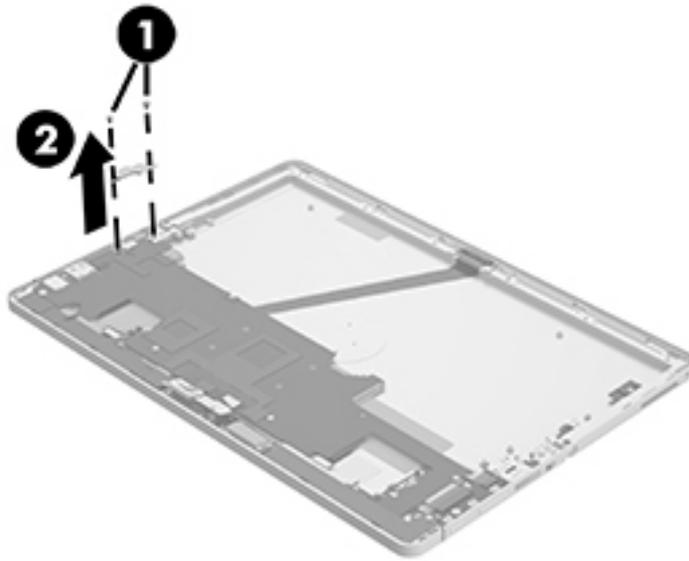
IMPORTANT: Make special note of each screw and screw lock size and location during removal and replacement.

Before removing the display panel, follow these steps:

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.
4. Remove the following components:
 - a. Keyboard (select products only) (see [Keyboard \(select products only\) on page 29](#))
 - b. Back cover (see [Back cover on page 30](#))
 - c. Display panel (see [Display panel on page 31](#))
 - d. Touch controller board (see [Touch controller board on page 33](#))
 - e. WLAN module (see [WLAN module on page 34](#))
 - f. WWAN module (select products only) (see [WWAN module \(select products only\) on page 36](#))
 - g. Solid-state drive (see [Solid-state drive on page 38](#))
 - h. Battery (see [Battery on page 42](#))

Remove the type-C bracket:

- ▲ Remove 1 Phillips M1.6x2.0 screw and 1 M1.6*2.0 M1.6x3.0 screw **(1)**, and then lift the type-C bracket to remove it **(2)**.



Reverse this procedure to replace the USB type-C bracket.

System board

Description	Spare part number
System board	
UMA graphics M3-6Y30 4GBx2 1012 G1 with Windows operating system	844858-601
UMA graphics M3-6Y30 4GB fWWANx2 1012 G1 with Windows operating system and WWAN capability	845470-601
UMA graphics M5-6Y54 4GBx2 1012 G1 with Windows operating system	845483-601
UMA graphics M5-6Y54 4GBx2 1012 G1 with Windows operating system and WWAN capability	845484-601
UMA graphics M5-6Y54 8GBx2 1012 G1 with Windows operating system	845485-601
UMA graphics M5-6Y54 8GBx2 1012 G1 with Windows operating system	845486-601
UMA graphics M5-6Y57 4GB fWWANx2 1012 G1 with Windows operating system and WWAN capability	845471-601
UMA graphics M5-6Y57 8GBx2 1012 G1 with Windows operating system	845472-601
UMA graphics M5-6Y578GBfWWANx2 1012 G1 with Windows operating system and WWAN capability	845473-601
UMA graphics M7-6Y758GBfWWANx2 1012 G1 with Windows operating system and WWAN capability	845474-601
Hall sensor	844874-001



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

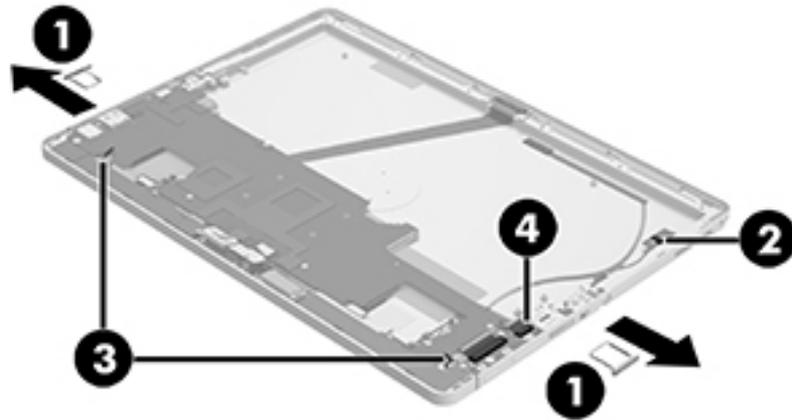
Before removing the display panel, follow these steps:

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.
4. Remove the following components:
 - a. Keyboard (select products only) (see [Keyboard \(select products only\) on page 29](#))
 - b. Back cover (see [Back cover on page 30](#))
 - c. Display panel (see [Display panel on page 31](#))
 - d. Touch controller board (see [Touch controller board on page 33](#))
 - e. WLAN module (see [WLAN module on page 34](#))
 - f. WWAN module (select products only) (see [WWAN module \(select products only\) on page 36](#))
 - g. Solid-state drive (see [Solid-state drive on page 38](#))
 - h. Battery (see [Battery on page 42](#))

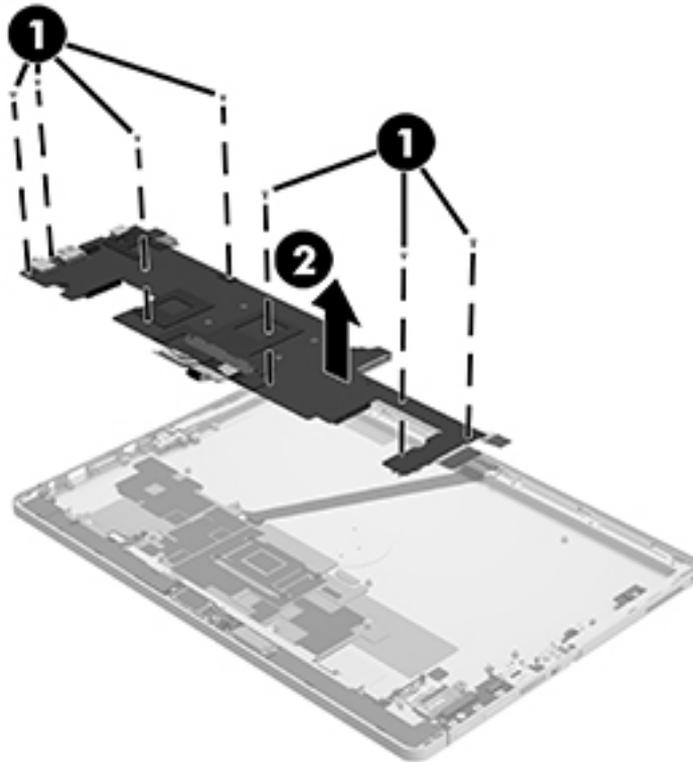
Remove the system board:

1. Remove the microSD tray and the micro SIM tray **(1)**.
2. Disconnect the hall sensor **(2)** from the display cable.
3. Disconnect 2 speaker cables **(3)**

4. Disconnect fingerprint reader cable (4).



5. Remove 7 Phillips M1.6x3 screws (1), and then lift the system board to remove it (2).



Reverse this procedure to replace the system board.

Button board

Description	Spare part number
Button board	
For products with WWAN capability	844876-001
For products without WWAN capability	848827-001

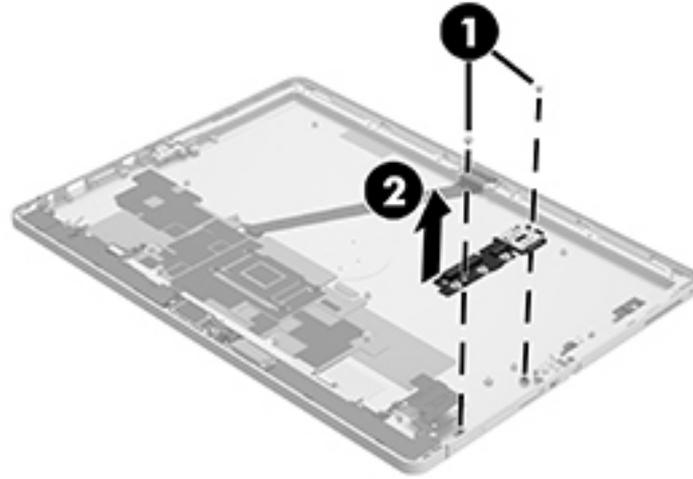
 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement.

Before removing the display panel, follow these steps:

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.
4. Remove the following components:
 - a. Keyboard (select products only) (see [Keyboard \(select products only\) on page 29](#))
 - b. Back cover (see [Back cover on page 30](#))
 - c. Display panel (see [Display panel on page 31](#))
 - d. Touch controller board (see [Touch controller board on page 33](#))
 - e. WLAN module (see [WLAN module on page 34](#))
 - f. WWAN module (select products only) (see [WWAN module \(select products only\) on page 36](#))
 - g. Solid-state drive (see [Solid-state drive on page 38](#))
 - h. Battery (see [Battery on page 42](#))
 - i. System board (see [System board on page 50](#))

Remove the button board:

- ▲ Remove 2 Phillips M1.6x2.0 screws **(1)**, disconnect cables, and then lift the button board to remove it **(2)**.



Reverse this procedure to replace the button board.

Fingerprint reader board

Description	Spare part number
Fingerprint reader board (includes cable)	844875-001

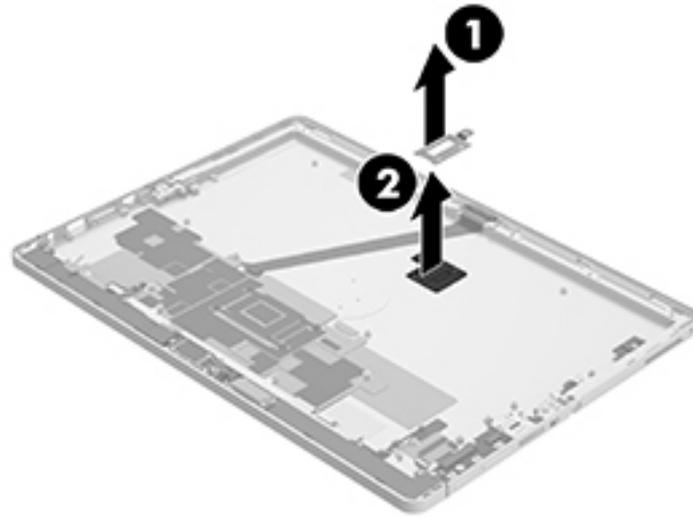
 **IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement.

Before removing the display panel, follow these steps:

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.
4. Remove the following components:
 - a. Keyboard (select products only) (see [Keyboard \(select products only\) on page 29](#))
 - b. Back cover (see [Back cover on page 30](#))
 - c. Display panel (see [Display panel on page 31](#))
 - d. Touch controller board (see [Touch controller board on page 33](#))
 - e. WLAN module (see [WLAN module on page 34](#))
 - f. WWAN module (select products only) (see [WWAN module \(select products only\) on page 36](#))
 - g. Solid-state drive (see [Solid-state drive on page 38](#))
 - h. Battery (see [Battery on page 42](#))
 - i. System board (see [System board on page 50](#))

Remove the fingerprint reader board:

- ▲ Remove the fingerprint reader bracket **(1)**, and then remove the fingerprint reader board **(2)**, which is secured with tape.



Reverse this procedure to replace the fingerprint reader board.

POGO connector

Description	Spare part number
POGO connector	844877-001



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

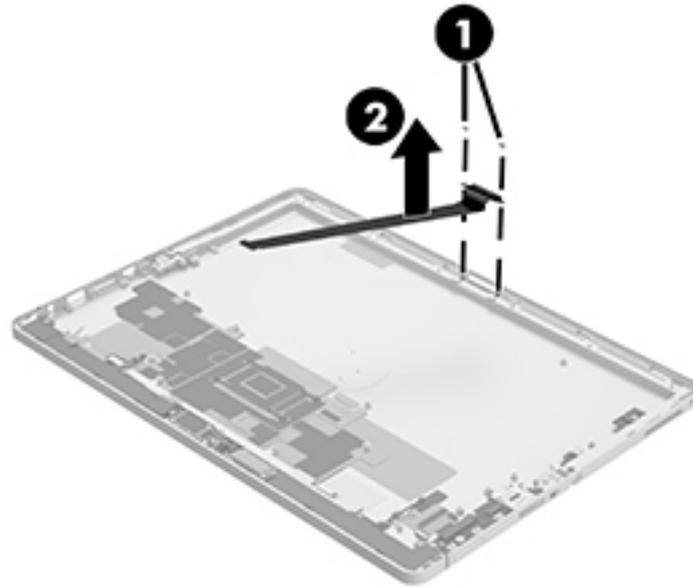
Before removing the display panel, follow these steps:

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.
4. Remove the following components:
 - a. Keyboard (select products only) (see [Keyboard \(select products only\) on page 29](#))
 - b. Back cover (see [Back cover on page 30](#))
 - c. Display panel (see [Display panel on page 31](#))
 - d. Touch controller board (see [Touch controller board on page 33](#))
 - e. WLAN module (see [WLAN module on page 34](#))
 - f. WWAN module (select products only) (see [WWAN module \(select products only\) on page 36](#))
 - g. Solid-state drive (see [Solid-state drive on page 38](#))
 - h. Battery (see [Battery on page 42](#))
 - i. System board (see [System board on page 50](#))

Remove the POGO connector:

1. Remove 2 Phillips M1.6x1.5 screws **(1)**.

2. Release the cable, which is secured with tape, and lift the cable and connector to remove them **(2)**.



Reverse this procedure to replace the POGO connector.

Speaker

Description	Spare part number
Speaker	844881-001

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

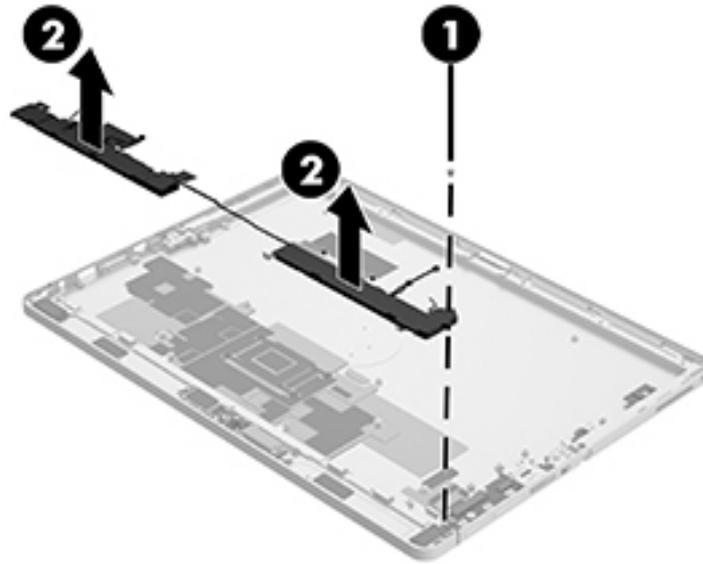
Before removing the display panel, follow these steps:

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.
4. Remove the following components:
 - a. Keyboard (select products only) (see [Keyboard \(select products only\) on page 29](#))
 - b. Back cover (see [Back cover on page 30](#))
 - c. Display panel (see [Display panel on page 31](#))
 - d. Touch controller board (see [Touch controller board on page 33](#))
 - e. WLAN module (see [WLAN module on page 34](#))
 - f. WWAN module (select products only) (see [WWAN module \(select products only\) on page 36](#))
 - g. Solid-state drive (see [Solid-state drive on page 38](#))
 - h. Battery (see [Battery on page 42](#))
 - i. System board (see [System board on page 50](#))

Remove the speaker:

1. Remove 1 Phillips M1.6x3.0 screw from the left speaker bracket **(1)**. The screw from the right side was removed when the system board was removed.

2. Use a nylon pry tool carefully to release the speaker/antenna assembly **(2)**.



Reverse this procedure to replace the speaker.

6 Backup and recovery

This chapter provides information about the following processes. The information in the chapter is standard procedure for most products.

- Creating recovery media and backups
- Restoring and recovering your system

For additional information, refer to the HP support assistant app.

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

– or –

Select the question mark icon in the taskbar.



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 keyboard to the keyboard dock before beginning any recovery process.

Creating recovery media and backups

The following methods of creating recovery media and backups are available on select products only. Choose the available method according to your model.

- Use HP Recovery Manager to create HP Recovery media after you successfully set up the tablet. This step creates a backup of the HP Recovery partition on the tablet. The backup can be used to reinstall the original operating system in cases where the hard drive is corrupted or has been replaced. For information on creating recovery media, see [Creating HP Recovery media \(select products only\) on page 60](#). For information on the recovery options that are available using the recovery media, see [Using Windows tools on page 61](#).
- Use Windows tools to create system restore points and create backups of personal information.

For more information, see [Recovering using HP Recovery Manager on page 62](#).



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

Creating HP Recovery media (select products only)

If possible, check for the presence of the Recovery partition and the Windows partition. From the **Start** menu, select **File Explorer**, and then select **This PC**.

- If your tablet does not list the Windows partition and the Recovery partition, you can obtain recovery media for your system from support. See the *Worldwide Telephone Numbers* booklet included with the tablet. You can also find contact information on the HP website. Go to <http://www.hp.com/support>, select your country or region, and follow the on-screen instructions.

You can use Windows tools to create system restore points and create backups of personal information, see [Using Windows tools on page 61](#).

- If your tablet does list the Recovery partition and the Windows partition, you can use HP Recovery Manager to create recovery media after you successfully set up the tablet. HP Recovery media can be used to perform system recovery if the hard drive becomes corrupted. System recovery reinstalls the original operating system and software programs that were installed at the factory and then configures the settings for the programs. HP Recovery media can also be used to customize the system or restore the factory image if you replace the hard drive.
 - Only one set of recovery media can be created. Handle these recovery tools carefully, and keep them in a safe place.
 - HP Recovery Manager examines the tablet and determines the required storage capacity for the media that will be required.
 - To create recovery discs, your tablet must have an optical drive with DVD writer capability, and you must use only high-quality blank DVD-R, DVD+R, DVD-R DL, or DVD+R DL discs. Do not use rewritable discs such as CD±RW, DVD±RW, double-layer DVD±RW, or BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software. Or, instead, you can use a high-quality blank USB flash drive.
 - If your tablet does not include an integrated optical drive with DVD writer capability, but you would like to create DVD recovery media, you can use an external optical drive (purchased separately) to create recovery discs. If you use an external optical drive, it must be connected directly to a USB port on the tablet; the drive cannot be connected to a USB port on an external device, such as a USB hub. If you cannot create DVD media yourself, you can obtain recovery discs for your tablet from HP. See the *Worldwide Telephone Numbers* booklet included with the tablet. You can also find contact information on the HP website. Go to <http://www.hp.com/support>, select your country or region, and follow the on-screen instructions.
 - Be sure that the tablet is connected to AC power before you begin creating the recovery media.
 - The creation process can take an hour or more. Do not interrupt the creation process.
 - If necessary, you can exit the program before you have finished creating all of the recovery DVDs. HP Recovery Manager will finish burning the current DVD. The next time you start HP Recovery Manager, you will be prompted to continue.

To create HP Recovery media:

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

1. Type `recovery` in the taskbar search box, and then select **HP Recovery Manager**.
2. Select **Create recovery media**, and then follow the on-screen instructions.

If you ever need to recover the system, see [Recovering using HP Recovery Manager on page 62](#).

Using Windows tools

You can create recovery media, system restore points, and backups of personal information using Windows tools.

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

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

- ▲ Select the **Start** button, and then select the **Get started** app.

Restore and recovery

There are several options for recovering your system. Choose the method that best matches your situation and level of expertise:

 **IMPORTANT:** Not all methods are available on all products.

- Windows offers several options for restoring from backup, refreshing the tablet, and resetting the tablet to its original state. For more information see the Get started app.
 - ▲ Select the **Start** button, and then select the **Get started** app.
- If you need to correct a problem with a preinstalled application or driver, use the Reinstall drivers and/or applications option (select products only) of HP Recovery Manager to reinstall the individual application or driver.
 - ▲ Type `recovery` in the taskbar search box, select **HP Recovery Manager**, select **Reinstall drivers and/or applications**, and then follow the on-screen instructions.
- If you want to recover the Windows partition to original factory content, you can choose the System Recovery option from the HP Recovery partition (select products only) or use the HP Recovery media. For more information, see [Recovering using HP Recovery Manager on page 62](#). If you have not already created recovery media, see [Creating HP Recovery media \(select products only\) on page 60](#).
- On select products, if you want to recover the tablet's original factory partition and content, or if you have replaced the hard drive, you can use the Factory Reset option of HP Recovery media. For more information, see [Recovering using HP Recovery Manager on page 62](#).
- On select products, if you want to remove the recovery partition to reclaim hard drive space, HP Recovery Manager offers the Remove Recovery Partition option.

For more information, see [Removing the HP Recovery partition \(select products only\) on page 64](#).

Recovering using HP Recovery Manager

HP Recovery Manager software allows you to recover the tablet to its original factory state by using the HP Recovery media that you either created or that you obtained from HP, or by using the HP Recovery partition (select products only). If you have not already created recovery media, see [Creating HP Recovery media \(select products only\) on page 60](#).

What you need to know before you get started

- HP Recovery Manager recovers only software that was installed at the factory. For software not provided with this tablet, you must either download the software from the manufacturer's website or reinstall the software from the media provided by the manufacturer.

 **IMPORTANT:** Recovery through HP Recovery Manager should be used as a final attempt to correct issues.

- HP Recovery media must be used if the hard drive fails. If you have not already created recovery media, see [Creating HP Recovery media \(select products only\) on page 60](#).
- To use the Factory Reset option (select products only), you must use HP Recovery media. If you have not already created recovery media, see [Creating HP Recovery media \(select products only\) on page 60](#).
- If your tablet does not allow the creation of HP Recovery media or if the HP Recovery media does not work, you can obtain recovery media for your system from support. See the *Worldwide Telephone Numbers* booklet included with the tablet. You can also find contact information from the HP website. Go to <http://www.hp.com/support>, select your country or region, and follow the on-screen instructions.

 **IMPORTANT:** HP Recovery Manager does not automatically provide backups of your personal data. Before beginning recovery, back up any personal data you want to retain.

Using HP Recovery media, you can choose from one of the following recovery options:

 **NOTE:** Only the options available for your tablet display when you start the recovery process.

- **System Recovery**—Reinstalls the original operating system, and then configures the settings for the programs that were installed at the factory.
- **Factory Reset**—Restores the tablet to its original factory state by deleting all information from the hard drive and re-creating the partitions. Then it reinstalls the operating system and the software that was installed at the factory.

The HP Recovery partition (select products only) allows System Recovery only.

Using the HP Recovery partition (select products only)

The HP Recovery partition allows you to perform a system recovery without the need for recovery discs or a recovery USB flash drive. This type of recovery can be used only if the hard drive is still working.

To start HP Recovery Manager from the HP Recovery partition:

 **IMPORTANT:** For a tablet with a detachable keyboard, connect the keyboard to the keyboard dock before beginning these steps (select products only).

1. Type `recovery` in the taskbar search box, select **Recovery Manager**, and then select **HP Recovery Environment**.

- or -

For tablets with keyboards attached, press **f11** while the tablet boots, or press and hold **f11** as you press the power button.

For tablets without keyboards:

Turn on or restart the tablet, and then quickly hold down the volume down button; then select **f11**.

2. Select **Troubleshoot** from the boot options menu.
3. Select **Recovery Manager**, and then follow the on-screen instructions.

Using HP Recovery media to recover

You can use HP Recovery media to recover the original system. This method can be used if your system does not have an HP Recovery partition or if the hard drive is not working properly.

1. If possible, back up all personal files.
2. Insert the HP Recovery media, and then restart the tablet.

 **NOTE:** If the tablet does not automatically restart in HP Recovery Manager, change the boot order. See [Changing the boot order on page 63](#).

3. Follow the on-screen instructions.

Changing the boot order

If your tablet does not restart in HP Recovery Manager, you can change the boot order, which is the order of devices listed in BIOS where the tablet looks for startup information. You can change the selection to an optical drive or a USB flash drive.

To change the boot order:

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

1. Insert the HP Recovery media.

2. Access BIOS:

For tablets with keyboards attached:

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

For tablets without keyboards:

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

3. Select the optical drive or USB flash drive from which you want to boot.

4. Follow the on-screen instructions.

Removing the HP Recovery partition (select products only)

HP Recovery Manager software allows you to remove the HP Recovery partition to free up hard drive space.

 **IMPORTANT:** After you remove the HP Recovery partition, you will not be able to perform System Recovery or create HP recovery media from the HP Recovery partition. So before you remove the Recovery partition, create HP Recovery media; see [Creating HP Recovery media \(select products only\) on page 60](#).

 **NOTE:** The Remove Recovery Partition option is only available on products that support this function.

Follow these steps to remove the HP Recovery partition:

1. Type `recovery` in the taskbar search box, and then select **HP Recovery Manager**.

2. Select **Remove Recovery Partition**, and then follow the on-screen instructions.

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

Using Computer Setup

Computer Setup, or Basic Input/Output System (BIOS), controls communication between all the input and output devices on the system (such as disk drives, display, keyboard, mouse, and printer). Computer Setup includes settings for the types of devices installed, the startup sequence, and the amount of system and extended memory.

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

Starting Computer Setup

 **NOTE:** An external keyboard or mouse connected to a USB port can be used with Computer Setup only if USB legacy support is enabled.

To start Computer Setup, follow these steps:

- ▲ Start Computer Setup.
 - Tablets with keyboards:
 - ▲ Turn on or restart the tablet, and when the HP logo appears, press **f10** to enter Computer Setup.
 - Tablets without keyboards:
 - ▲ Turn off the tablet. Press the power button in combination with the volume down button until the Startup menu is displayed, and then tap **F10** to enter Computer Setup.

Navigating and selecting in Computer Setup

- To select a menu or a menu item, use the **tab** key and the keyboard arrow keys and then press **enter**, or use a pointing device to select the item.

 **NOTE:** On tablets without keyboards, you can use your finger to make selections.

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

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

- To exit Computer Setup menus without saving your changes:
Select the **Exit** icon in the lower-right corner of the screen, and then follow the on-screen instructions.
– or –
Select **Main**, select **Ignore Changes and Exit**, and then press [enter](#).
- To save your changes and exit Computer Setup menus:
Select the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.
– or –
Select **Main**, select **Save Changes and Exit**, and then press [enter](#).

Your changes go into effect when the tablet restarts.

Restoring factory settings in Computer Setup

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

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

1. Start Computer Setup. See [Starting Computer Setup on page 65](#).
2. Select **Main**, and then select **Apply Factory Defaults and Exit**.

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

3. Follow the on-screen instructions.
4. To save your changes and exit, select the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.
– or –
Select **Main**, select **Save Changes and Exit**, and then press [enter](#).

Your changes go into effect when the tablet restarts.

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

Updating the BIOS

Updated versions of the BIOS may be available on the HP website.

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

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

Determining the BIOS version

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

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

1. Start Computer Setup. See [Starting Computer Setup on page 65](#).
2. Select **Main**, and then select **System Information**.
3. To exit Computer Setup without saving your changes, select the **Exit** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

– or –

Select **Main**, select **Ignore Changes and Exit**, and then press **enter**.

To check for later BIOS versions, see [Downloading a BIOS update on page 67](#).

Downloading a BIOS update

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

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

Do not shut down the tablet or initiate Sleep.

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

1. Type `support` in the taskbar search box, and then select the HP Support Assistant app.
– or –
Select the question mark icon in the taskbar.
2. Select **Updates**, and then select **Check for updates and messages**.
3. Follow the on-screen instructions.
4. At the download area, follow these steps:
 - a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your tablet. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
 - b. Follow the on-screen instructions to download your selection to the hard drive.

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

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

BIOS installation procedures vary. Follow any instructions that are revealed on the screen after the download is complete. If no instructions are revealed, follow these steps:

1. Type `file` in the taskbar search box, and then select **File Explorer**.
2. Select your hard drive designation. The hard drive designation is typically Local Disk (C:).
3. Using the hard drive path you recorded earlier, open the folder that contains the update.
4. Open the file that has an `.exe` extension (for example, `filename.exe`).
The BIOS installation begins.
5. Complete the installation by following the on-screen instructions.

 **NOTE:** After a message on the screen reports a successful installation, you can delete the downloaded file from your hard drive.

Changing the boot order using the f9 prompt

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

1. Access the Boot Device Options menu:
 - Tablets with keyboards:
 - ▲ Turn on or restart the tablet, and when the HP logo appears, press **f9** to enter the Boot Device Options menu.
 - Tablets without keyboards:
 - ▲ Turn off the tablet. Press the power button in combination with the volume down button until the Startup menu is displayed, and then tap **F9** to enter the Boot Device Options menu.
2. Select a boot device, then press `enter`.

TPM BIOS settings (select products only)

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

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

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

To access TPM settings in Computer Setup:

1. Start Computer Setup. See [Starting Computer Setup on page 65](#).
2. Select **Security**, select **TPM Embedded Security**, and then follow the on-screen instructions.

Using HP Sure Start (select products only)

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

HP Sure Start is configured and already enabled so that most users can use the HP Sure Start default configuration. The default configuration can be customized by advanced users.

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

8 Using HP PC Hardware Diagnostics (UEFI)

HP PC Hardware Diagnostics is a Unified Extensible Firmware Interface (UEFI) that 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.

When HP PC Hardware Diagnostics (UEFI) detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. This ID code can then be provided to support to help determine how to correct the problem.

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

1. Start BIOS.
 - Tablets with keyboards
 - ▲ Turn on or restart the tablet, quickly press **esc**.
 - Tablets without keyboards
 - ▲ Turn off the tablet. Press the power button in combination with the volume down button until the Startup menu is displayed.

2. Press or tap **f2**.

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

- a. Connected USB drive

 **NOTE:** To download the HP PC Hardware Diagnostics (UEFI) tool to a USB drive, see [Downloading HP PC Hardware Diagnostics \(UEFI\) to a USB device on page 70](#).

- b. Hard drive

- c. BIOS

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

 **NOTE:** To stop a test, press the button you used to access UEFI.

Downloading HP PC Hardware Diagnostics (UEFI) to a USB device

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

There are two options to download HP PC Hardware Diagnostics to a USB device.

Download the latest UEFI version

1. Go to <http://www.hp.com/go/techcenter/pcdiags>. The HP PC Diagnostics home page is displayed.
2. In the HP PC Hardware Diagnostics section, select the **Download** link, and then select **Run**.

Download any version of UEFI for a specific product

1. Go to <http://www.hp.com/support>, and then select your country. The HP Support page is displayed.
2. Select **Software and Drivers**.
3. Use the categories listed to find your product.
– or –
Select **Find Now** to let HP automatically detect your product.
4. Select your tablet, and then select your operating system.
5. In the **Diagnostic** section, follow the on-screen instructions to select and download the UEFI version you want.

9 Specifications

Computer specifications

	Slate	Slate and Thin Keyboard	Slate and Productivity Keyboard
Input power			
Dimensions			
Width	300.0mm (11.81")	300.0mm (11.81")	300.0mm (11.81")
Depth	213.85mm (8.42")	213.85mm (8.42")	213.85mm (8.42")
Height (front to back)	8.05mm (0.32")	13.45mm (0.53")	16.45mm (0.65")
Weight	1.81lb (820g)	2.67 lb (1210 g)	2.87 lb (1302 g)
Operating voltage and current	12 V dc @ 3A — 36W		
Temperature			
Operating	32° to 95° F (0° to 35° C) (not writing optical) 41° to 95° F (5° to 35° C) (writing optical)		
Nonoperating	-4° to 140° F (-20° to 60° C)		
Relative humidity (noncondensing)			
Operating	10% to 90%		
Nonoperating	5% to 95%		
Shock			
Operating	40 G, 2 ms, half-sine		
Nonoperating	240 G, 2 ms, half-sine		
Random Vibration			
Operating	1.043 grms		
Nonoperating	3.50 grms		
Maximum altitude (unpressurized)			
Operating	50 to 10,000 ft (-15.24 to 3,048 m)		
Nonoperating	-50 to 40,000 ft (-15.24 to 12,192 m)		
NOTE:	Applicable product safety standards specify thermal limits for plastic surfaces. The device operates well within this range of temperatures.		

Display specifications

Internal	
Touch screen	12.0" diagonal LED-backlit BV UWVA eDP 1.3 Ultra-slim (1920 x 1280 – Full HD*) Touch screenChemically-strengthened Corning® Gorilla® Glass 4 top cover directly bonded to display
Brightness	200 nits 340 nits (typical)
Pixel resolution	
Format	1920 x 1280 (WUXGA+)
Configuration	RGB stripe
Interface	eDP 1.3
LCD Mode	IPS/FFS/VA
PPI	192 ppi
Viewing angle	UWVA 85/85/85/85 (Left/Right/Down/Up)

Solid-state drive specifications

Internal Storage*	
Supports M.2 SSD SS 2280	
128 GB SATA III Solid-state Drive	
180 GB SATA III Solid-state Drive	
180 GB SATA III self-encrypting OPAL2 Solid-state Drive	
256 GB SATA III Solid-state Drive	
256 GB SATA III Solid-state Drive NVMe	
256 GB SATA III self-encrypting OPAL2 Solid-state Drive	
512 GB SATA III Solid-state Drive	
*For solid-state drives, GB=1 billion bytes. TB=1 trillion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and up to 30 GB (for Windows 8 and 10) of system disk is reserved for system recovery software.	

Memory specifications

Memory	
LPDDR3-1866 (Transfer rates up to 1866 MT/s)	
Supports Dual Channel Memory	
Soldered down	
Standard	4 GB Total System Memory

Memory	
	8GB Total System Memory
Maximum	Up to 8 GB

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 volts AC, or from 220 to 240 volts 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 and regions must meet the requirements of the country or 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 amps 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

Country/region	Accredited agency	Applicable note number
Australia	EANSW	1
Austria	OVE	1
Belgium	CEBC	1
Canada	CSA	2
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
Italy	IMQ	1
Japan	METI	3
The Netherlands	KEMA	1
Norway	NEMKO	1
The People's Republic of China	COC	5
South Korea	EK	4

Country/region	Accredited agency	Applicable note number
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	4
The United Kingdom	BSI	1
The United States	UL	2

1. The flexible cord must be Type H05VV-F, 3-conductor, 1.0-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
2. The flexible cord must be Type SPT-3 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) or NEMA 6-15P (15 A, 250 V) configuration.
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 VCT or VCTF, 3-conductor, 1.00-mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) configuration.
4. The flexible cord must be Type RVV, 3-conductor, 0.75-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
5. The flexible cord must be Type VCTF, 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.

11 Statement of memory volatility

The purpose of this chapter is to provide general information regarding nonvolatile memory in HP Business PCs. 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 PC 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 PC 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 PC, 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 (f) below to restore the nonvolatile memory that can contain personal data. Restoring or reprogramming nonvolatile memory that does not store personal data is neither necessary nor recommended.
 - a. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

 **IMPORTANT:** If the **Main** menu displays **Restore Defaults** instead of **Apply Factory Defaults and Exit**, go to [Legacy BIOS Steps on page 78](#).

 **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 will reboot.
 - 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 will reboot.
 - 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 uncheck the checkbox 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 will reboot.
- 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) and/or fingerprint reader, one or two prompts will appear—one to clear the TPM and the other to Reset Fingerprint Sensor; press or tap **F1** to accept or **F2** to reject.
 - l. Remove all power and system batteries for at least 24 hours.
2. Complete one of the following:
- Remove and retain the storage drive.
 - or –
 - Clear the drive contents by using a third party utility designed to erase data from an SSD.
 - or –
 - Clear the contents of the drive by using the following BIOS Setup Secure Erase command option steps:



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

- a. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
- b. Select the **Security** menu and scroll down to the **Utilities** menu.
- c. Select **Hard Drive Tools**.
- 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.

Legacy BIOS Steps

Use the steps for older versions of BIOS.



NOTE: If you already completed the steps in [Current BIOS steps on page 77](#), skip this section.

1. Follow steps (a) through (i) 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.



NOTE: If you have not already done so, access the BIOS menu.

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

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

- a. Select **Main**, select **Restore Defaults**, and then select **Yes** to load defaults.
 - b. Select the **Security** menu, select **Restore Security Level Defaults**, and then select **Yes** to restore security level defaults.
 - c. 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.
 - d. If a DriveLock password is set, select the **Security** menu, and scroll down to **Hard Drive Tools** under the **Utilities** menu. Select **Hard Drive Tools**, select **DriveLock**, then uncheck the checkbox for **DriveLock password on restart**. Select **OK** to proceed.
 - e. If an Automatic DriveLock password is set, select the **Security** menu, scroll down to **Hard Drive Tools** under the **Utilities** menu. Select **Hard Drive Tools**, scroll down to **Automatic DriveLock**, then select the desired hard drive and disable protection. At the automatic drive lock warning screen, select **Yes** to continue. Repeat this procedure if more than one hard drive has an Automatic DriveLock password.
 - f. Select the **Main** menu, and then select **Reset BIOS Security to factory default**. Click **Yes** at the warning message.
 - g. Select the **Main** menu, select **Save Changes and Exit**, select **Yes** to save changes and exit, and then select **Shutdown**.
 - h. Reboot the system. If the system has a Trusted Platform Module (TPM) and/or fingerprint reader, 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.
 - i. Remove all power and system batteries for at least 24 hours.
2. Complete one of the following:
- Remove and retain the storage drive.
 - or –
 - Clear the drive contents by using a third party utility designed to erase data from an SSD.
 - or –
 - Clear the contents of the drive by using the following BIOS Setup Secure Erase command option steps:

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

- a. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
 - b. Select the **Security** menu and scroll down to the **Utilities** menu.
 - c. Select **Hard Drive Tools**.
 - 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 by using the following Disk Sanitizer command steps:

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

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

- a. Turn on or restart the computer, and then press `esc` while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
- b. Select the **Security** menu and scroll down to the **Utilities** menu.
- c. Select **Hard Drive Tools**.
- 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

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 input into this memory?	How is this memory write-protected?
HP Sure Start flash (select models only)	2 MBytes	No	Yes	Provides protected backup of critical System BIOS code, EC firmware, and critical PC configuration data for select platforms that support HP Sure Start. For more information, see Using HP Sure Start (select models only) on page 84.	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 the Computer Setup (BIOS), or changing the Microsoft Windows date & time.	This memory is not write-protected.
Controller (NIC) EEPROM	64 KBytes (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 is required 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 PC. The specific write-protection method varies by memory vendor.
System BIOS	4 MBytes to 5 MBytes	Yes	Yes	Stores system BIOS code and PC configuration data.	System BIOS code is programmed at the factory. Code is updated when the system BIOS is updated. Configuration data and settings are input using the Computer Setup (BIOS) or a custom utility.	NOTE: Writing data to this ROM in an inappropriate manner can render the PC non-functional. A utility is required 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

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 input into this memory?	How is this memory write-protected?
Intel Management Engine Firmware (present in only specific ZBook and EliteBook models. For more information, go to http://www.hp.com/support . Select Find your product , and then follow the on-screen instructions.)	1.5 MBytes or 5 MBytes	Yes	Yes	Stores Management Engine Code, Settings, Provisioning Data and iAMT third-party data store.	Management Engine Code is programmed at the factory. Code is updated via Intel secure firmware update utility. Unique Provisioning Data can be entered at the factory or by an administrator using the Management Engine (MEBx) setup utility. The third party data store contents can be populated by a remote management console or local applications that have been registered by an administrator to have access to the space.	the on-screen instructions. The Intel chipset is configured to enforce hardware protection to block all direct read/write access to this area. An Intel utility is required for updating the firmware. Only firmware updates digitally signed by Intel can be applied using this utility.
Bluetooth flash	2 Mbit	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 is required 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 Kbit to 8 Kbit	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 is required 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.
Web camera	64 Kbit	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 is required 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	512 KByte flash	Yes	Yes	Stores fingerprint templates.	Fingerprint reader memory is programmed by user enrollment in HP ProtectTools Security Manager.	Only a digitally signed application can make the call to write to the flash.

Questions and answers

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



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

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

- a. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
- b. Select **Main**, and then select **Restore defaults**.
- 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 (Touchscreen, 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 is required 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 PC. Third-party tools do exist that can write to the EEPROM when the memory module is not installed in a PC. 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 PC configuration data.

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

 **IMPORTANT:** Resetting will result in the loss of information.

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

- a. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
- b. Select **Main**, and then select **Reset BIOS Security to Factory Default**.
- c. Follow the on-screen instructions.
- d. Select **Main**, select **Save Changes and Exit**, and then follow the on-screen instructions.

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

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

- a. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
- b. Select the **Security** menu, select **Secure Boot Configuration**, and then follow the on-screen instructions.
- c. At the **Secure Boot Configuration** window, select **Secure Boot**, select **Clear Secure Boot Keys**, and then follow the on-screen instructions to continue.

Using HP Sure Start (select models only)

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

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

12 Recycling

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

HP encourages customers to recycle used electronic hardware, HP original print cartridges, and rechargeable batteries.

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