



HP EliteBook 725 G2 Notebook PC

Maintenance and Service Guide

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Product notice

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


Not all features are available in all editions of Windows 8. This computer may require upgraded and/or separately purchased hardware, drivers, and/or software to take full advantage of Windows 8 functionality. See <http://www.microsoft.com> for details.

Software terms

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

For any further information or to request a full refund of the computer, please contact your local point of sale (the seller).

Important Notice about Customer Self-Repair Parts

 **CAUTION:** Your computer includes Customer Self-Repair parts and parts that should only be accessed by an authorized service provider. See Chapter 5, "Removal and replacement procedures for Customer Self-Repair parts," for details. Accessing parts described in Chapter 6, "Removal and replacement procedures for Authorized Service Provider only parts," can damage the computer or void your warranty.

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).

Table of contents

1 Product description	1
2 External component identification	7
Display	7
Buttons and fingerprint reader (select models only)	9
Keys	11
Lights	12
TouchPad	13
Front	14
Left side	15
Right side	16
Bottom	17
3 Illustrated parts catalog	18
Locating the serial number, product number, and model number	18
Computer major components	19
Display assembly components	26
Plastics Kit	28
Mass storage devices	29
Miscellaneous parts	30
4 Removal and replacement preliminary requirements	33
Tools required	33
Service considerations	33
Plastic parts	33
Cables and connectors	34
Drive handling	34
Grounding guidelines	35
Electrostatic discharge damage	35
Packaging and transporting guidelines	36
Workstation guidelines	36
5 Removal and replacement procedures for Customer Self-Repair parts	38
Component replacement procedures	38
Service cover	38
Battery	40

Hard drive	42
WWAN module	45
Solid-state drive	47
WLAN module	49
Memory module	51
Keyboard	52
6 Removal and replacement procedures for Authorized Service Provider parts	57
Component replacement procedures	57
RTC battery	57
Top cover	58
Display assembly	62
TouchPad	68
Card reader board	69
Heat sink	71
Fan	73
System board	75
Fingerprint reader board	80
Speaker assembly	81
Power button board	83
7 Computer Setup (BIOS), TPM, and HP Sure Start – Windows 10	84
Using Computer Setup	84
Starting Computer Setup	84
Navigating and selecting in Computer Setup	85
Restoring factory settings in Computer Setup	85
Updating the BIOS	86
Determining the BIOS	86
Downloading a BIOS update	86
Changing the boot order using the f9 prompt	87
TPM BIOS settings (select products only)	88
Using HP Sure Start (select products only)	88
8 HP PC Hardware Diagnostics (UEFI) – Windows 10	89
Downloading HP PC Hardware Diagnostics (UEFI) to a USB device	90
9 Computer Setup (BIOS), MultiBoot, and System Diagnostics – Windows 8	91
Using Computer Setup	91
Starting Computer Setup	91
Navigating and selecting in Computer Setup	91

Restoring default settings in Computer Setup	92
Updating the BIOS	93
Determining the BIOS version	93
Downloading a BIOS update	93
Using MultiBoot	94
About the boot device order	94
Choosing MultiBoot preferences	94
Setting a new boot order in Computer Setup	95
Dynamically choosing a boot device using the f9 prompt	95
Setting a MultiBoot Express prompt	96
Entering MultiBoot Express preferences	96
Using System Diagnostics	97
10 Computer Setup (BIOS), MultiBoot, and UEFI – Windows 7	98
Using Computer Setup	98
Starting Computer Setup	98
Navigating and selecting in Computer Setup	98
Restoring default settings in Computer Setup	99
Updating the BIOS	99
Determining the BIOS version	100
Downloading a BIOS update	100
Using MultiBoot	101
About the boot device order	101
Choosing MultiBoot preferences	101
Setting a new boot order in Computer Setup	102
Dynamically choosing a boot device using the f9 prompt	102
Setting a MultiBoot Express prompt	102
Entering MultiBoot Express preferences	103
Using HP PC Hardware Diagnostics (UEFI) (select models only)	103
Downloading HP PC Hardware Diagnostics (UEFI) to a USB device	103
11 Computer Setup (BIOS) and Advanced System Diagnostics – SUSE Linux	104
Starting Computer Setup	104
Using Computer Setup	104
Navigating and selecting in Computer Setup	104
Restoring default settings in Computer Setup	105
Updating the BIOS	105
Determining the BIOS version	106
Downloading a BIOS update	106
Using Advanced System Diagnostics	107

12 Specifications	108
13 Backup and recovery – Windows 10	109
Creating recovery media and backups	109
Creating HP Recovery media (select products only)	110
Using Windows Tools	111
Restore and recovery	111
Recovering using HP Recovery Manager	112
What you need to know before you get started	112
Using the HP Recovery partition (select products only)	113
Using HP Recovery media to recover	113
Changing the computer boot order	114
Removing the HP Recovery partition (select products only)	114
14 Backup and recovery – Windows 8	115
Backing up your information	115
Performing a system recovery	117
Using f11 recovery tools	117
Using Windows 8 operating system media (purchased separately)	118
Using Windows Refresh for quick and easy recovery	119
Remove everything and reinstall Windows	119
Using HP Software Setup	120
15 Backup and recovery – Windows 7	121
Creating recovery media and backups	121
Guidelines	122
Creating recovery media with HP Recovery Disc Creator	122
Creating recovery media	122
Backing up your information	123
Performing a system recovery	123
Using the Windows recovery tools	124
Using f11 recovery tools (select models only)	125
Using Windows 7 operating system media	125
16 Backup and Recovery – SUSE Linux	127
Creating backups	127
Creating restore media	127
Backing up your information	127
Performing a system recovery	128
Remove everything and reinstall SLED	129

17 Statement of Volatility	130
Non-volatile memory usage	131
Questions and answers	134
Using HP Sure Start (select models only)	136
18 Power cord set requirements	137
Requirements for all countries	137
Requirements for specific countries and regions	137
19 Recycling	139
Index	140

1 Product description

Category	Description
Product Name	HP EliteBook 725 G2 Notebook PC
Chipset	AMD® A76M fusion controller hub (FCH)
Processor	<ul style="list-style-type: none">• AMD A10 Pro-7350B 2.10-GHz (SC turbo up to 3.30-GHz) quad core processor (4.00-MB L2 cache, 19 W)• AMD A8 Pro-7150B 2.00-GHz (SC turbo up to 3.20-GHz) quad core processor (4.00-MB L2 cache, 19 W)• AMD A6 Pro-7050B 2.20-GHz (SC turbo up to 3.00-GHz) dual core processor (1.00-MB L2 cache, 17 W)
Panel	<ul style="list-style-type: none">• 12.5-in, Premium AntiGlare (AG), full high-definition (FHD), light-emitting diode (LED), 1920×1080, UWVA, typical brightness: 300 nits, ultraslim (1.2-mm), 50% CG, eDP display panel with and without webcam• 12.5-in, AG, HD, LED, 1366×768, SVA, typical brightness: 200 nits, ultraslim (1.2-mm), 45% CG, eDP display panel with and without webcam
Graphics	<p>AMD Graphics: Radeon® R6 Graphics on computer models equipped with an A10 Pro-7350B processor; Radeon R5 Graphics on computer models equipped with an A8 Pro-7150B processor; Radeon R4 Graphics on computer models equipped with an A6 Pro-7050B processor</p> <p>Universal memory architecture (UMA) graphics</p> <p>Support for dual-display ports through the HP 2013 UltraSlim Docking Station</p> <p>Support for up to 3 displays through the HP 2013 UltraSlim Docking Station</p>
Memory	<p>Two customer-accessible/upgradable memory module slots</p> <p>Support for DDR3L, 1600, PCL3-12800 dual channel memory</p> <p>Support for 16384-MB of system memory in the following configurations:</p> <ul style="list-style-type: none">• 16384-MB total system memory (8192 MB × 2; not available with Windows 7 32-bit operating system, available with Windows 7 Downgrade)• 12288-MB total system memory (8192 MB + 4096 MB)• 8192-MB total system memory (4096 MB × 2 or 8192 MB × 1; not available with Windows 7 32-bit operating system, available with Windows 7 Downgrade)• 6144-MB total system memory (4096 MB + 2048 MB)• 4096-MB total system memory (4096 MB × 1 or 2048 MB × 2)• 2048-MB total system memory (2048 MB × 1)
Primary storage	<p>Support for 6.35-cm (2.5-in) hard drives in 7.0-mm (.28-in) and 9.5-mm (.37-in) thickness</p> <p>Support for Serial ATA Support for 3D DriveGuard hard drive protection</p> <p>Support toolless removal</p> <p>Support for the following hard drives:</p> <ul style="list-style-type: none">• 1-TB, 5400-rpm, SATA, 7.0-mm hard drive• 500-GB, 7200-rpm, SATA, 7.0-mm hard drive

Category	Description
Primary storage <i>(continued)</i>	<ul style="list-style-type: none"> • 500-GB, 7200-rpm, SED, 7.0-mm hard drive • 500-GB, 5400-rpm, SATA, FIPS, 7.0-mm hard drive • 320-GB, 7200-rpm, SATA, 7.0-mm hard drive <p>Support for the following 6.35-cm (2.5-in) solid-state drives:</p> <ul style="list-style-type: none"> • 512-GB, SATA-3, TLC, solid-state drive • 256-GB, SATA-3, Opal 2, locked, solid-state drive • 256-GB, SATA-3, SED, Opal 2, solid-state drive • 256-GB, SATA-3, TLC, solid-state drive • 240-GB, SATA-3, solid-state drive • 180-GB, SATA-3, solid-state drive • 180-GB, SATA-3, SED, Opal 2, solid-state drive • 180-GB, SATA-3, SED, Opal 1, solid-state drive • 128-GB, SATA-3, solid-state drive • 128-GB, SATA-3, TLC, solid-state drive
Audio and video	<p>Webcam, 720p</p> <p>Dual array microphones</p> <p>Stereo speakers</p> <p>HD audio with DTS Studio sound</p>
Ethernet	<p>Realtek RTL8111EP 10/100/1000 Ethernet with DASH support</p> <p>S3/S4/S5 wake on LAN</p>
Wireless networking	<p>Integrated wireless local area network (WLAN) options by way of wireless module</p> <p>Two WLAN antennas built into display assembly</p> <p>Support for the following WLAN formats:</p> <ul style="list-style-type: none"> • Atheros AR9485 802.11 b/g/n WiFi Adapter • Broadcom BCM943228HMB 802.11 abgn 2×2 Wi-Fi Adapter, Broadcom Bluetooth 4.0 Adapter • Broadcom BCM4352 802.11 ac 2×2 Wi-Fi + Bluetooth 4.0 Combo Adapter <p>Integrated wireless wide area network (WWAN) options by way of wireless module (select models only)</p> <p>Two WWAN antennas built into display assembly (select models only)</p> <p>Support for the following WWAN formats:</p> <ul style="list-style-type: none"> • HP lt4211 LTE/EV-DO/HSPA+ 4G Module Broadband Module • HP lt4112 LTE/HSPA+ Mobile Broadband Module • HP hs3110 HSPA+ Mobile Broadband Module
External expansion	<p>SD media reader slot</p> <p>Support for SD, SDHC, SDXC</p> <p>Push-push insertion/removal</p>

Category	Description
External expansion <i>(continued)</i>	SIM slot (populated with WWAN; tool-less user-accessible)
Ports	<ul style="list-style-type: none"> • AC adapter, HP Smart (4.5-mm barrel) • Audio-in (mono microphone)/audio-out (stereo headphone) combo jack • DisplayPort 1.2 • Docking • RJ45 (Ethernet) • USB 3.0 charging (1) • USB 3.0 (2) • VGA (Dsub 15 pin) supporting: 1920×1200 external resolution @ 75 Hz, hot plug and unplug and autodetection for correct output to wide-aspect vs. standard aspect video
Docking	HP 2013 UltraSlim Docking Station
Keyboard/pointing devices	<p>Dual point, spill-resistant (with drain) keyboard with DuraKeys, function keys and optional backlight</p> <p>Touchpad Requirements: Glass with chemical etched surface, on/off button, support for 2-way scroll, Taps enabled as default, Gestures enabled by default (2-finger scrolling, 2-finger zoom (pinch))</p>
Power requirements	<p>Support for removable 3-cell, 46-WHr, 4.15-AHr, Li-ion battery and 3-cell, 26-WHr, 2.50-AHr, Li-ion battery</p> <p>Support for the following AC adapters:</p> <ul style="list-style-type: none"> • 65-W HP Smart adapter (EM, RC/V, 3-wire, 4.5-mm) • 65-W HP Smart adapter (non-PFC, 3-wire, 4.5-mm) • 45-W HP Smart adapter (non-PFC, RC/V, 3-wire, 4.5-mm)
Security	<p>Support for the following:</p> <ul style="list-style-type: none"> • Fingerprint reader • Full-volume encryption • Integrated Smart Card reader (active) • Preboot authentication (password, Smart Card) • Support Security Lock • Trusted Platform Module (TPM) 1.2 (Infineon; soldered down)
Operating system	<p>Preinstalled:</p> <p>Windows 10:</p> <ul style="list-style-type: none"> • Windows 10 Home 64-bit (not available on computer models equipped with an FHD display assembly and more than or equal to 8.0-GB system memory) • Windows 10 Home Chinese Market 64-bit (only available with People's Republic of China country loc; not available on computer models equipped with an FHD display assembly and more than or equal to 8.0-GB system memory) • Windows 10 Home Chinese Market CPPP 64-bit (only available with People's Republic of China country loc) • Windows 10 Home Chinese Market High-End 64-bit (only available with People's Republic of China country loc; only available on computer models equipped with an FHD display assembly and more than or equal to 8.0-GB system memory)

Category	Description
Operating system <i>(continued)</i>	<ul style="list-style-type: none"> Windows 10 Home High-End 64-bit (only available on computer models equipped with an FHD display assembly and more than or equal to 8.0-GB system memory) Windows 10 Home Single Language 64-bit (not available on computer models equipped with an FHD display assembly and more than or equal to 8.0-GB system memory) Windows 10 Home Single Language High-End 64-bit (only available on computer models equipped with an FHD display assembly and more than or equal to 8.0-GB system memory) Windows 10 Professional 64-bit Windows 10 Professional 64-bit Downgrade to Windows 7 64-bit Windows 10 Professional 64-bit Downgrade to Windows 7 32-bit
	<p>Windows 8</p> <ul style="list-style-type: none"> Windows 8.1 Chinese Market 64-bit (only available with People's Republic of China country loc) Windows 8.1 Chinese Market 64-bit CPPP (000, only available with People's Republic of China country loc) Windows 8.1 Core for Higher Education Multilanguage 64-bit (OOC) Windows 8.1 Emerging Markets 64-bit (not available on computer models equipped with an FHD display assembly and more than or equal to 8.0-GB system memory) Windows 8.1 Emerging Markets 64-bit High End (not available on computer models equipped with an FHD display assembly and more than or equal to 8.0-GB system memory) Windows 8.1 Multilanguage 64-bit (not available on computer models equipped with an FHD display assembly and more than or equal to 8.0-GB system memory) Windows 8.1 Multilanguage 64-bit High End (not available on computer models equipped with an FHD display assembly and more than or equal to 8.0-GB system memory) Windows 8.1 Professional 64-bit Windows 8.1 Professional 64-bit DPK with Windows 7 Professional 64-bit image Windows 8.1 Professional 64-bit DPK with Windows 7 Professional 64-bit image, MSNA Windows 8.1 Professional 64-bit DPK with Windows 7 Professional 32-bit image Windows 8.1 Professional 64-bit DPK with Windows 7 Professional 32-bit image, MSNA Windows 8.1 Professional 64-bit for Education (OOC, not available in the People's Republic of China) Windows 8.1 Professional 64-bit MSNA
	<p>Windows 7</p> <ul style="list-style-type: none"> Windows 7 Home Basic 32-bit, Service Pack 1 (available only if 4096-MB of total system memory [4096-MB × 1] or less is selected) Windows 7 Home Basic CPPP 32-bit, Service Pack 1 (OOC, only available with People's Republic of China country loc) Windows 7 Home Premium 64-bit, Service Pack 1 Windows 7 Professional 32-bit, Service Pack 1 (available only if 4096-MB of total system memory [4096-MB × 1] or less is selected) Windows 7 Professional 64-bit, Service Pack 1 Windows 7 Professional MSNA 64-bit, Service Pack 1 Windows 7 Professional 32-bit, Service Pack 1 (available only if 4096-MB of total system memory [4096-MB × 1] or less is selected)

Category	Description
Operating system <i>(continued)</i>	<p>Others</p> <ul style="list-style-type: none"> • Ubuntu Linux 12.04 (not available on computer models equipped with WWAN capability and TouchScreen display assembly) • FreeDOS 2.0 <p>Restore Media–DRDVD:</p> <ul style="list-style-type: none"> • Windows 10 (available with any Windows 10 operating system, required with any Windows 10 Downgrade operating system) • Windows 8.1 (available with any Windows 8.1 operating system, required with any Windows 8.1 Professional Downgrade operating system) • Windows 7 (available with any Windows 7 or Windows 10 or Windows 8 Professional Downgrade operating system) <p>Restore Media–SRDVD: Ubuntu Linux</p> <p>OSDVD:</p> <ul style="list-style-type: none"> • Windows 10 OSDVD Downgrade RTF (required with any Windows 10 Downgrade operating system) • Windows 8.1 64-bit (for service only) • Windows 8.1 Country-Specific 64-Bit (for service only) • Windows 8.1 Emerging Markets 64-Bit (for service only) • Windows 8.1 Professional 64-bit (include in Windows 8.1 Downgrade operating system AVs only; do not include for Asia/Pacific countries or regions or the People's Republic of China) • Windows 8.1 Professional for Education 64-bit (for service only) • Windows 7 Home Basic 32-bit (available with any Windows 7 Home Basic localization except Asia/Pacific countries/regions or the People's Republic of China) • Windows 7 Home Premium 64-bit (available with any Windows 7 HP operating system except Asia/Pacific countries/regions or the People's Republic of China) • Windows 7 Home Premium 32-bit (available with any Windows 7 HP operating system except Asia/Pacific countries/regions or the People's Republic of China) • Windows 7 Professional 64-bit (available with any Windows 7 Professional or Windows 8.1 Professional Downgrade localization except Asia/Pacific countries or regions or the People's Republic of China) • Windows 7 Professional 32-bit (available with any Windows 7 Professional or Windows 8.1 Professional Downgrade localization except Asia/Pacific countries/regions or the People's Republic of China) <p>Certified: WHQL</p> <p>Web-only Support:</p> <ul style="list-style-type: none"> • Windows 10 Enterprise • Windows 8.1 Enterprise 64-bit • Windows 7 Enterprise 64-bit • Windows 7 Enterprise 32-bit
Serviceability	<p>End user replaceable parts:</p> <ul style="list-style-type: none"> • AC adapter • Battery (system)

Category	Description
	<ul style="list-style-type: none"><li data-bbox="574 220 718 241">• Hard drive<li data-bbox="574 262 710 283">• Keyboard<li data-bbox="574 304 774 325">• Memory module<li data-bbox="574 346 774 367">• Solid-state drive<li data-bbox="574 388 750 409">• WLAN module<li data-bbox="574 430 758 451">• WWAN module

2 External component identification

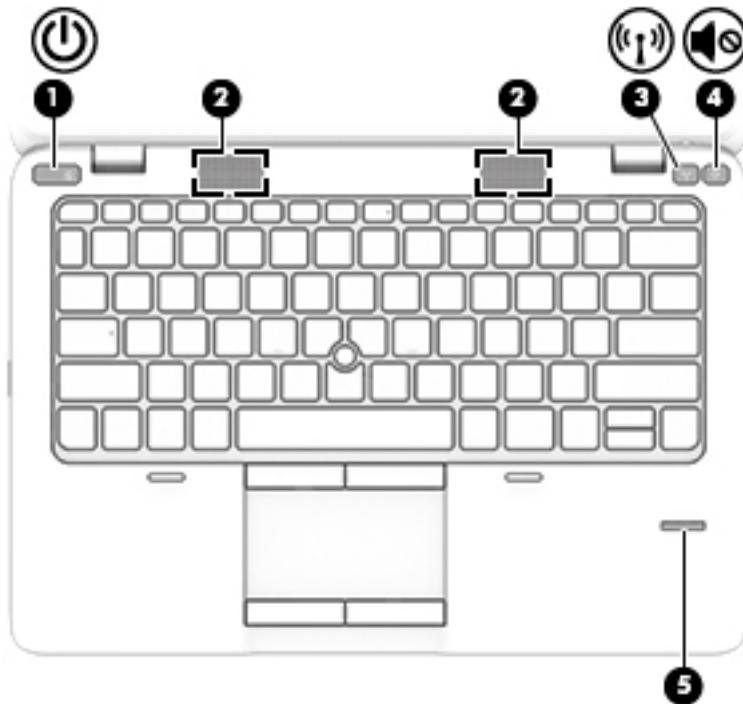
Display



Item	Component	Description
(1)	WLAN antennas (2)*	Send and receive wireless signals to communicate with wireless local area networks. NOTE: To set up a WLAN and connect to the Internet, you need a broadband modem (either DSL or cable) (purchased separately), high-speed Internet service, purchased from an Internet service provider, and a wireless router (purchased separately).
(2)	WWAN antennas (2)*	Send and receive wireless signals to communicate with wireless wide area networks.
(3)	Internal microphones	Record sound.
(4)	Webcam light (select models only)	On: The webcam is in use.
(5)	Webcam (select models only)	Records video and captures still photographs. For information on using the webcam: <ul style="list-style-type: none">• Windows 10 – Type <code>camera</code> in the taskbar search box, and then select Camera.• Windows 8 – Access HP Support Assistant. To access HP Support Assistant on the Start screen, select the HP Support Assistant app.• Windows 7 – Select Start > All Programs > Communication and Chat > HP WebCam.
(6)	Internal display switch	Turns off the display and initiates Sleep if the display is closed while the power is on.

Item	Component	Description
NOTE: The internal display switch is not visible from the outside of the computer.		
*The antennas are not visible on the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions.		
For wireless regulatory notices, see the section of the <i>Regulatory, Safety, and Environmental Notices</i> that applies to your country or region.		
To access this guide:		
Windows 10:		
1. Type <code>support</code> in the taskbar search box, and then select the HP Support Assistant app.		
– or –		
Click the question mark icon in the taskbar.		
2. Select My PC , select the Specifications tab, and then select User Guides .		
Windows 8 or Windows 7:		
▲ Select the HP Support Assistant app on the Start screen, select My computer , and then select User guides .		

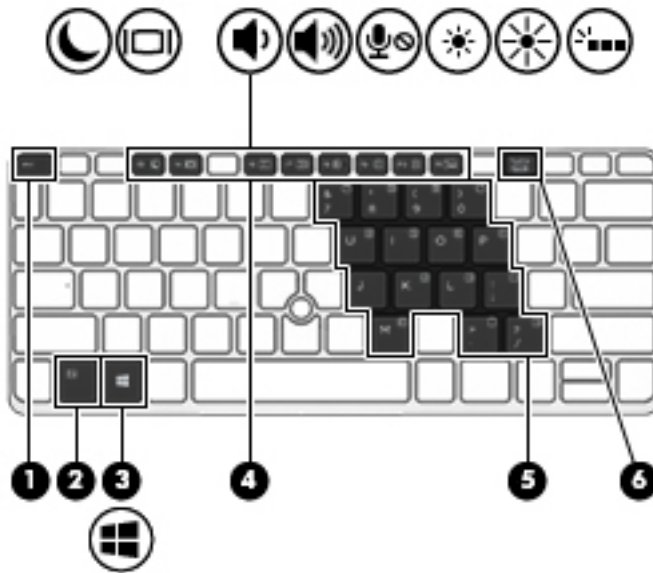
Buttons and fingerprint reader (select models only)



Item	Component	Description
(1)	Power button	<ul style="list-style-type: none"> When the computer is off, press the button to turn on the computer. When the computer is on, press the button briefly to initiate Sleep (Windows)/ Suspend (Linux). When the computer is in the Sleep state, press the button briefly to exit Sleep (Windows)/Suspend (Linux). When the computer is in Hibernation, press the button briefly to exit Hibernation. <p>CAUTION: Pressing and holding down the power button will result in the loss of unsaved information.</p> <p>If the computer has stopped responding and operating system shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer.</p> <p>To learn more about your power settings:</p> <p>Windows 10: Type <code>power</code> in the taskbar search box, and then select Power and sleep settings.</p> <p>– or –</p> <p>Right-click the Start button, and then select Power Options.</p> <p>Windows 8: See your power options. From the Start screen, type <code>power</code>, select Settings, and then select Power Options.</p> <p>Windows 7: See your power options. Select Start > Control Panel > System and Settings > Power Options.</p> <p>Linux:</p> <ol style="list-style-type: none"> Select Computer > Control Center.

Item	Component	Description
		2. In the left pane, click System , and then click Power Management in the right pane.
(2)	Speakers	Produce sound.
(3)	Wireless button	Turns the wireless feature on or off but does not establish a wireless connection.
(4)	Volume mute button	Mutes and restores speaker sound.
(5)	Fingerprint reader (select models only)	Allows a fingerprint logon to Windows, instead of a password logon.

Keys



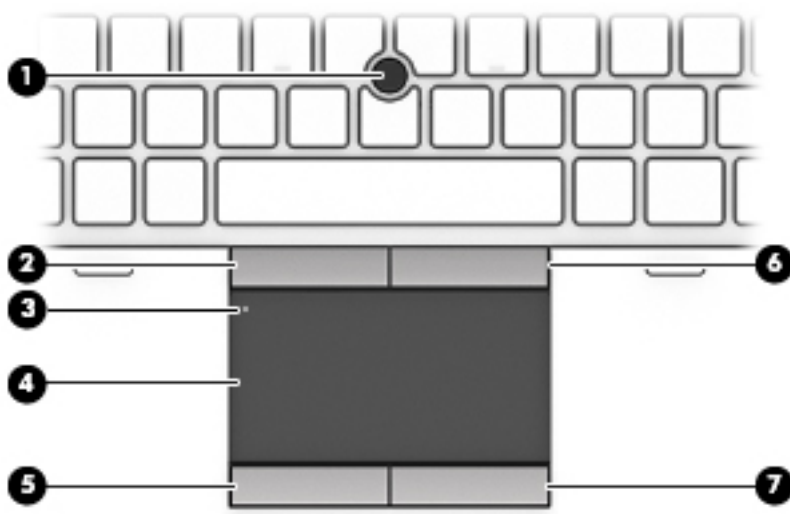
Item	Component	Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes frequently used system functions when pressed in combination with a function key, the num lk key, the esc key, or other keys.
(3)	Windows key NOTE: Windows 10 models only.	Opens the Start menu. NOTE: Pressing the Windows key again will close the Start menu.
(3)	Windows button NOTE: Windows 8 and Windows 7 models only.	Windows 8: Returns you to the Start screen from an open app or the Windows desktop. NOTE: Pressing the Windows button again will return you to the previous screen. Windows 7: Displays the Windows Start menu.
(4)	Function keys	Execute frequently used system functions when pressed in combination with the fn key.
(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 lk key	Windows 10 and Windows 8: Turns the embedded numeric keypad on and off when pressed in combination with the fn key. Alternates between the navigational and numeric functions on the integrated numeric keypad. Windows 7 and Linux: Alternates between the navigational and numeric functions on the integrated numeric keypad.

Lights



Item	Component	Description
(1)	Power light	<ul style="list-style-type: none">• On: The computer is on.• Blinking: The computer is in the Sleep state.• Off: The computer is off or in Hibernation.
(2)	Caps lock light	On: Caps lock is on.
(3)	Microphone mute light	On: Microphone is muted.
(4)	Num lock light	On: Num lock is on.
(5)	Wireless light	<ul style="list-style-type: none">• White: An integrated wireless device, such as a wireless local area network (WLAN) device, is on.• Amber: All wireless devices are off.
(6)	Mute light	<ul style="list-style-type: none">• Off: Computer sound is on.• Amber: Computer sound is off.

TouchPad



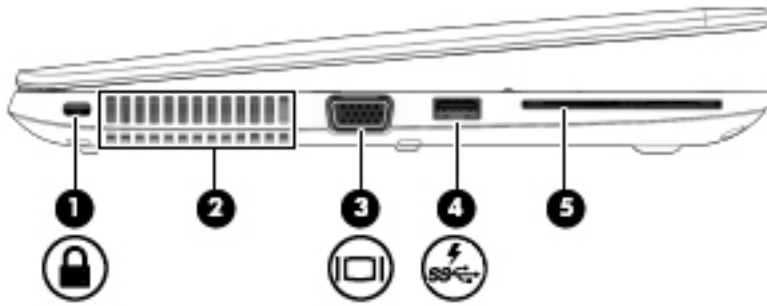
Item	Component	Description
(1)	Pointing stick	Moves the pointer and selects or activates items on the screen.
(2)	Left pointing stick button	Functions like the left button on an external mouse.
(3)	TouchPad on/off button	Turns the TouchPad on and off.
(4)	TouchPad zone	Moves the pointer and selects or activates items on the screen.
(5)	Left TouchPad button	Functions like the left button on an external mouse.
(6)	Right pointing stick button	Functions like the right button on an external mouse.
(7)	Right TouchPad button	Functions like the right button on an external mouse.

Front



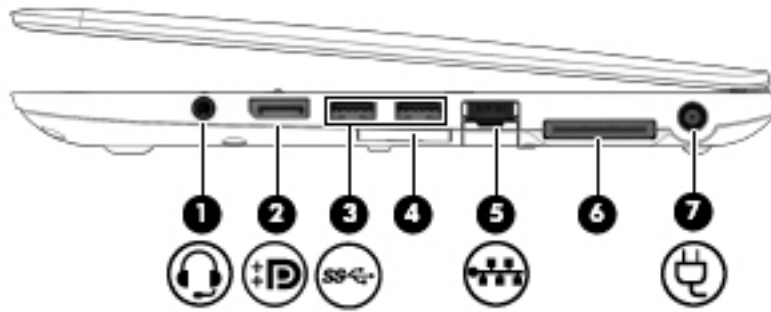
Item	Component	Description
(1)	Wireless light	The wireless connection is on.
(2)	Power light	<ul style="list-style-type: none">• On: The computer is on.• Blinking: The computer is in the Sleep state.• Off: The computer is off or in Hibernation.
(3)	AC adapter/battery light	<ul style="list-style-type: none">• Amber: The computer is connected to external power and the battery is charged from 0 to 90 percent.• White: The computer is connected to external power and the battery is charged from 90 to 99 percent.• Blinking amber: A battery that is the only available power source has reached a low battery level. When the battery reaches a critical battery level, the battery light begins blinking rapidly.• Off: The battery is fully charged.
(4)	Hard drive light	<ul style="list-style-type: none">• Blinking white: The hard drive is being accessed.• Amber: HP 3D DriveGuard has temporarily parked the hard drive. <p>NOTE: For information on HP 3D DriveGuard, see the <i>HP Notebook Reference Guide</i>.</p>

Left side



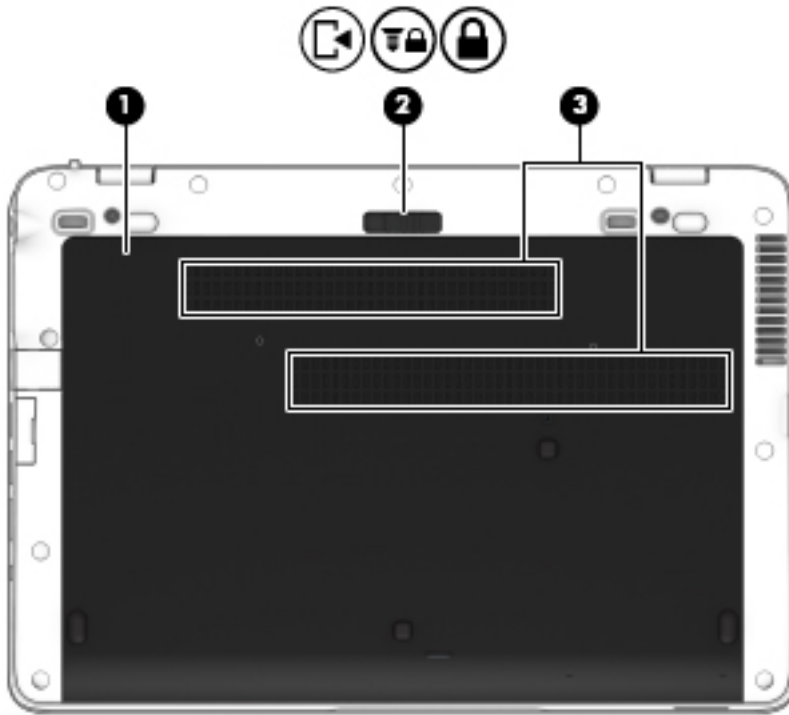
Item	Component	Description
(1)	Security cable slot	Attaches an optional security cable to the computer. NOTE: The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.
(2)	Vents (2)	Enable airflow to cool internal components. NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(3)	External VGA monitor port	Connects an external VGA monitor or projector.
(4)	USB 3.0 charging port	Connects an optional USB device. The USB charging port can also charge select models of cell phones and MP3 players, even when the computer is off. NOTE: A USB charging port (also referred to as a powered USB port) allows you to charge connected USB devices. 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.
(5)	Smart card reader	Supports optional smart cards.

Right side




Item	Component	Description
(1)	Audio-out (headphone) jack/Audio-in (microphone) combo jack	<p>Produces sound when connected to optional powered stereo speakers, headphones, earbuds, a headset, or television audio. Also connects an optional headset microphone.</p> <p>WARNING! To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, see the <i>Regulatory, Safety, and Environmental Notices</i>.</p> <p>NOTE: When a device is connected to the jack, the computer speakers are disabled.</p> <p>NOTE: Be sure that the device cable has a 4-conductor connector that supports both audio-out (headphone) and audio-in (microphone).</p>
(2)	DisplayPort	Connects an optional digital display device, such as a high-performance monitor or projector.
(3)	USB 3.0 ports (2)	Connect optional USB 3.0 devices and provide enhanced USB power performance.
(4)	Memory card reader	Reads data from and writes data to memory cards such as Secure Digital (SD).
(5)	RJ-45 (network) jack	Connects a network cable.
(6)	Docking port	Connects an optional docking device.
(7)	Power connector	Connects an AC adapter.

Bottom



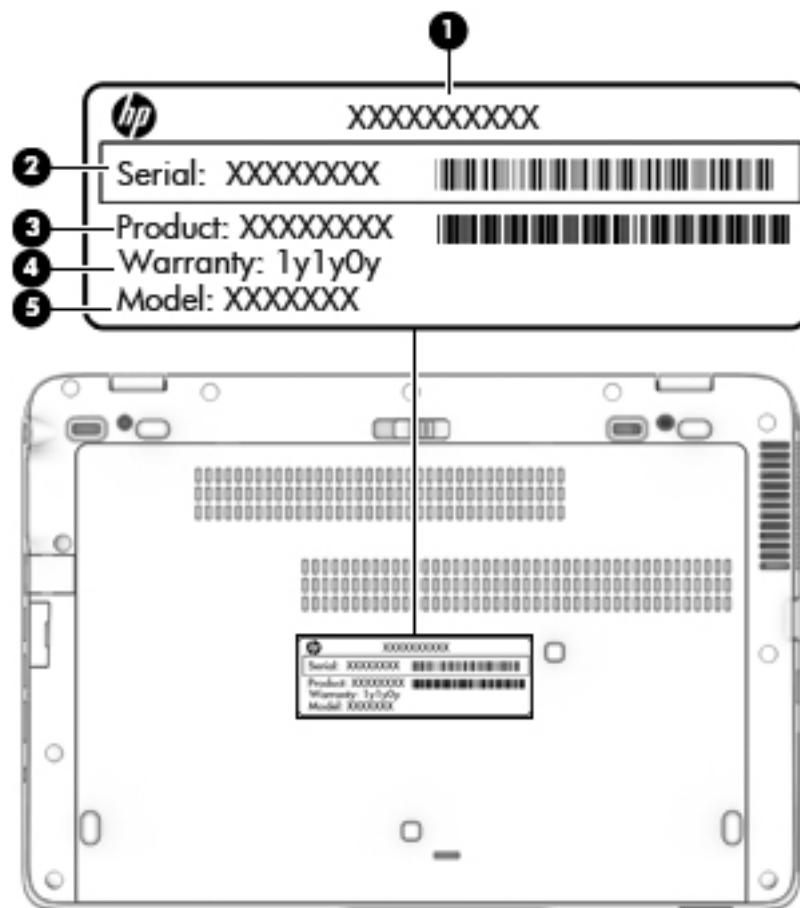
Item	Component	Description
(1)	Service cover	Provides access to the hard drive bay, the WLAN module slot, the WWAN module slot, and the memory module slots. CAUTION: To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore computer functionality, and then contact support through Help and Support.
(2)	Service cover release latch	Releases the service cover from the computer. A security screw is available to prevent the service cover from being accidentally removed.
(3)	Vents (2)	Enable airflow to cool internal components. NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.

3 Illustrated parts catalog

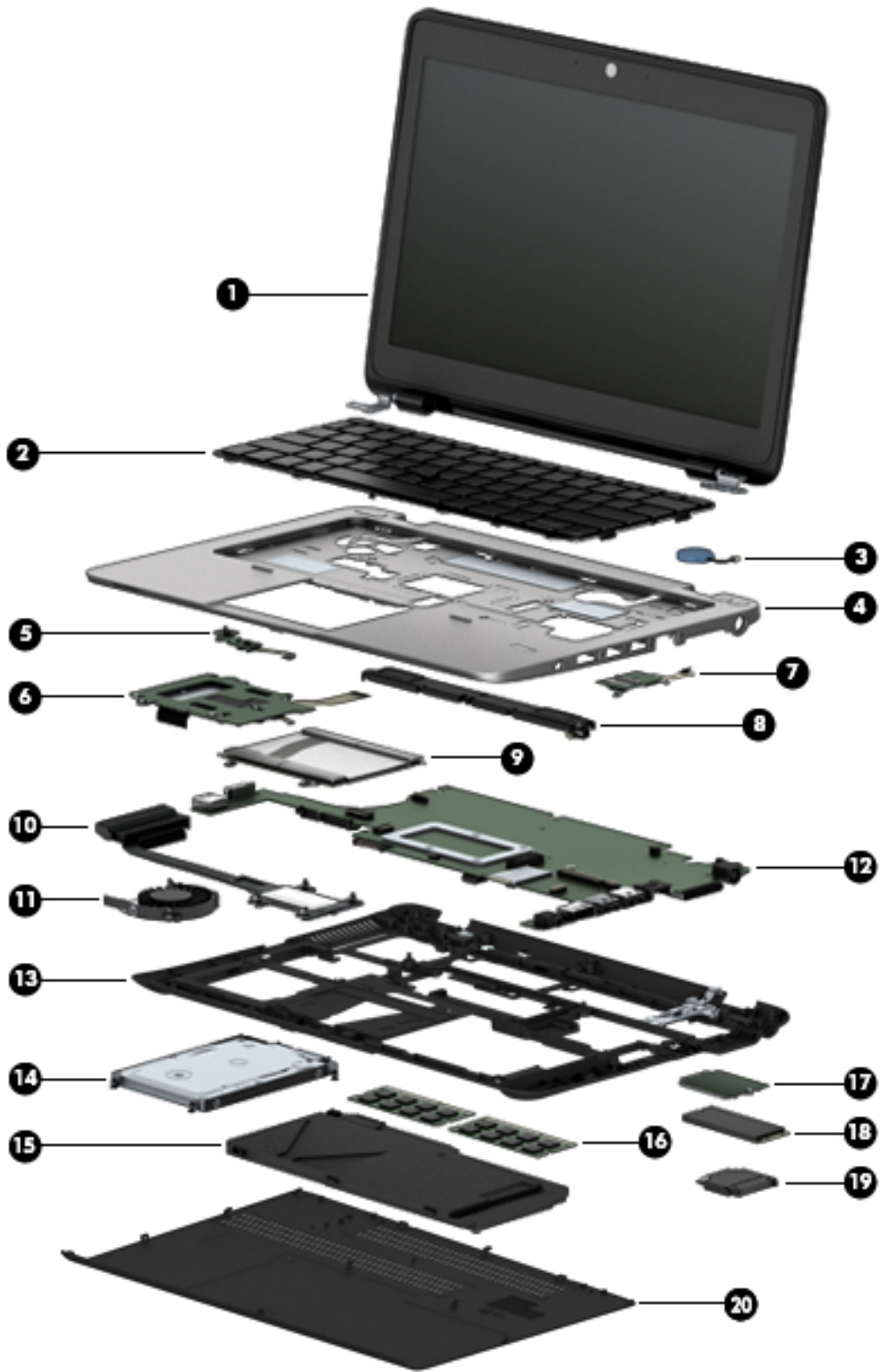
 **NOTE:** HP continually improves and changes product parts. For complete and current information on supported parts for your computer, go to <http://partsurfer.hp.com>, select your country or region, and then follow the on-screen instructions.

Locating the serial number, product number, and model number

The serial number and product number of your tablet are located on the left edge of the tablet. The model number of your tablet is located on the back of your tablet. You may need the information when you travel internationally or when you contact support.



Computer major components





IMPORTANT: For system board **(12)** replacement on serial numbers xxx501xxxx and below, use the conversion kit (see product description for “(gold conversion Kit)” in the section marked 12a of the table below). For serial numbers xxx502xxxx and above, use the standard spare kit (see product description for “(gold)”).

Item	Component	Spare part number
(1)	12.5-in, AntiGlare, FHD, LED, UWVA, TouchScreen display assembly (the TouchScreen display assembly is spared as a whole unit replacement)	765606-001
	The non-TouchScreen display assembly is spared at the subcomponent level only. For more display assembly spare part information, see Display assembly components on page 26 .	
(2)	Keyboard with backlight (includes backlight cable and keyboard cable):	
	For use in Belgium	776452-A41
	For use in Brazil	776452-201
	For use in Bulgaria	776452-BA1
	For use in Canada	776452-DB1
	For use in the Czech Republic and Slovakia	776452-FL1
	For use in Denmark	776452-081
	For use in France	776452-051
	For use in Germany	776452-041
	For use in Greece	776452-151
	For use in Hungary	776452-211
	For use in Iceland	776452-DD1
	For use in India	776452-D61
	For use in Israel	776452-BB1
	For use in Italy	776452-061
	For use in Japan	776452-291
	For use in Latin America	776452-161
	For use in the Netherlands	776452-B31
	For use in Northwest Africa	776452-FP1
	For use in Norway	776452-091
	For use in Portugal	776452-131
	For use in Romania	776452-271
	For use in Russia	776452-251
	For use in Saudi Arabia	776452-171
	For use in Slovenia	776452-BA1
	For use in South Korea	776452-AD1
	For use in Spain	776452-071
	For use in Sweden and Finland	776452-B71

Item	Component	Spare part number
	For use in Switzerland	776452-BG1
	For use in Taiwan	776452-AB1
	For use in Thailand	776452-281
	For use in Turkey	776452-141
	For use in the United Kingdom	776452-031
	For use in the United States	776452-001
	Keyboard without backlight (includes keyboard cable):	
	For use in Belgium	776451-A41
	For use in Brazil	776451-201
	For use in Bulgaria	776451-261
	For use in Canada	776451-DB1
	For use in the Czech Republic and Slovakia	776451-FL1
	For use in Denmark	776451-081
	For use in France	776451-051
	For use in Germany	776451-041
	For use in Greece	776451-151
	For use in Hungary	776451-211
	For use in Iceland	776451-DD1
	For use in India	776451-D61
	For use in Israel	776451-BB1
	For use in Italy	776451-061
	For use in Japan	776451-291
	For use in Latin America	776451-161
	For use in the Netherlands	776451-B31
	For use in Northwest Africa	776451-FP1
	For use in Norway	776451-091
	For use in Portugal	776451-131
	For use in Romania	776451-271
	For use in Russia	776451-251
	For use in Saudi Arabia	776451-171
	For use in Slovenia	776451-BA1
	For use in South Korea	776451-AD1
	For use in Spain	776451-071
	For use in Sweden and Finland	776451-B71

Item	Component	Spare part number
	For use in Switzerland	776451-BG1
	For use in Taiwan	776451-AB1
	For use in Thailand	776451-281
	For use in Turkey	776451-141
	For use in the United Kingdom	776451-031
	For use in the United States	776451-001
	Pointing stick covers (not illustrated; black, 20 pieces)	804089-001
(3)	RTC battery (includes cable and double-sided adhesive)	702853-001
(4)	Top cover	783215-001
(5)	Power button board (includes cable)	730552-001
(6)	Card reader board (includes cable):	
	Non-gold	730563-001
	Gold	802504-001
(7)	Fingerprint reader board (includes bracket and cable)	730554-001
(8)	Speaker assembly (includes left and right speakers and cables)	730555-001
(9)	TouchPad (includes cable)	730549-001
(10)	Heat sink (includes replacement thermal material)	765605-001
(11)	Fan (includes cable)	780895-001
(12)	System board (includes a graphics subsystem with UMA memory and replacement thermal material):	
	Equipped with an AMD A10 Pro-7350B 2.10-GHz (SC turbo up to 3.30-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Professional operating system (non-gold)	765617-601
	Equipped with an AMD A10 Pro-7350B 2.10-GHz (SC turbo up to 3.30-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Standard operating system (non-gold)	765617-501
	Equipped with an AMD A10 Pro-7350B 2.10-GHz (SC turbo up to 3.30-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and a non-Windows operating system (non-gold)	765617-001
	Equipped with an AMD A10 Pro-7350B 2.10-GHz (SC turbo up to 3.30-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Professional operating system (gold)	802507-601
	Equipped with an AMD A10 Pro-7350B 2.10-GHz (SC turbo up to 3.30-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Standard operating system (gold)	802507-501
	Equipped with an AMD A10 Pro-7350B 2.10-GHz (SC turbo up to 3.30-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and a non-Windows operating system (gold)	802507-001
	Equipped with an AMD A8 Pro-7150B 2.00-GHz (SC turbo up to 3.20-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Professional operating system (non-gold)	765616-601

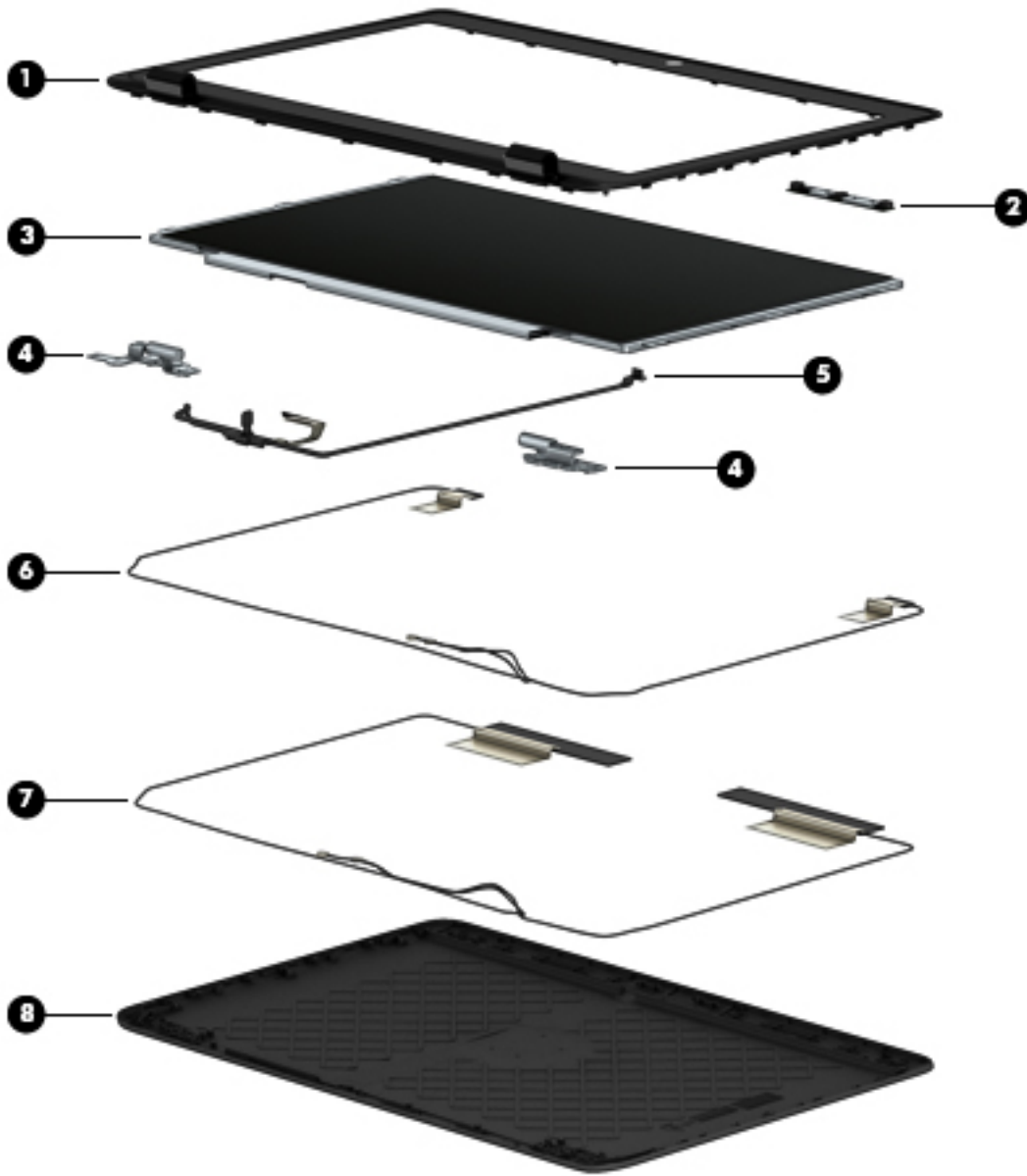
Item	Component	Spare part number
	Equipped with an AMD A8 Pro-7150B 2.00-GHz (SC turbo up to 3.20-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Standard operating system (non-gold)	765616-501
	Equipped with an AMD A8 Pro-7150B 2.00-GHz (SC turbo up to 3.20-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and a non-Windows operating system (non-gold)	765616-001
	Equipped with an AMD A8 Pro-7150B 2.00-GHz (SC turbo up to 3.20-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Professional operating system (gold)	802506-601
	Equipped with an AMD A8 Pro-7150B 2.00-GHz (SC turbo up to 3.20-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Standard operating system (gold)	802506-501
	Equipped with an AMD A8 Pro-7150B 2.00-GHz (SC turbo up to 3.20-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and a non-Windows operating system (gold)	802506-001
	Equipped with an AMD A6 Pro-7050B 2.20-GHz (SC turbo up to 3.00-GHz) dual core processor (1.00-MB L2 cache, 17 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Professional operating system (non-gold)	765615-601
	Equipped with an AMD A6 Pro-7050B 2.20-GHz (SC turbo up to 3.00-GHz) dual core processor (1.00-MB L2 cache, 17 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Standard operating system (non-gold)	765615-501
	Equipped with an AMD A6 Pro-7050B 2.20-GHz (SC turbo up to 3.00-GHz) dual core processor (1.00-MB L2 cache, 17 W), a graphics subsystem with UMA memory, and a non-Windows operating system (non-gold)	765615-001
	Equipped with an AMD A6 Pro-7050B 2.20-GHz (SC turbo up to 3.00-GHz) dual core processor (1.00-MB L2 cache, 17 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Professional operating system (gold)	802505-601
	Equipped with an AMD A6 Pro-7050B 2.20-GHz (SC turbo up to 3.00-GHz) dual core processor (1.00-MB L2 cache, 17 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Standard operating system (gold)	802505-501
	Equipped with an AMD A6 Pro-7050B 2.20-GHz (SC turbo up to 3.00-GHz) dual core processor (1.00-MB L2 cache, 17 W), a graphics subsystem with UMA memory, and a non-Windows operating system (gold)	802505-001
(12a)	System board (gold conversion Kits) (includes a graphics subsystem with UMA memory and replacement thermal material):	
	Equipped with an AMD A10 Pro-7350B 2.10-GHz (SC turbo up to 3.30-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Professional operating system (gold conversion Kit)	802507-6C1
	Equipped with an AMD A10 Pro-7350B 2.10-GHz (SC turbo up to 3.30-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Standard operating system (gold conversion Kit)	802507-5C1
	Equipped with an AMD A10 Pro-7350B 2.10-GHz (SC turbo up to 3.30-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and a non-Windows operating system (gold conversion Kit)	802507-0C1
	Equipped with an AMD A8 Pro-7150B 2.00-GHz (SC turbo up to 3.20-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Professional operating system (gold conversion Kit)	802506-6C1

Item	Component	Spare part number
	Equipped with an AMD A8 Pro-7150B 2.00-GHz (SC turbo up to 3.20-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Standard operating system (gold conversion Kit)	802506-5C1
	Equipped with an AMD A8 Pro-7150B 2.00-GHz (SC turbo up to 3.20-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and a non-Windows operating system (gold conversion Kit)	802506-0C1
	Equipped with an AMD A6 Pro-7050B 2.20-GHz (SC turbo up to 3.00-GHz) dual core processor (1.00-MB L2 cache, 17 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Professional operating system (gold conversion Kit)	802505-6C1
	Equipped with an AMD A6 Pro-7050B 2.20-GHz (SC turbo up to 3.00-GHz) dual core processor (1.00-MB L2 cache, 17 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Standard operating system (gold conversion Kit)	802505-5C1
	Equipped with an AMD A6 Pro-7050B 2.20-GHz (SC turbo up to 3.00-GHz) dual core processor (1.00-MB L2 cache, 17 W), a graphics subsystem with UMA memory, and a non-Windows operating system (gold conversion Kit)	802505-0C1
(13)	Base enclosure (includes RJ-45 cover, rubber feet, and service cover eject latch assembly)	765603-001
	Rubber Kit (not illustrated, includes base enclosure rubber screw covers)	730550-001
(14)	Hard drive (does not include hard drive bracket, hard drive connector adapter, or screws):	
	NOTE: The hard drive bracket, hard drive connector adapter, and screws are included in the Hard Drive Hardware Kit, spare part number 730539-001. See Mass storage devices on page 29 for more information on the Hard Drive Hardware Kit.	
	1-TB, 5400-rpm, SATA, 7.0-mm hard drive	762990-001
	500-GB, 7200-rpm, SATA, 7.0-mm hard drive	703267-001
	500-GB, 7200-rpm, SED, 7.0-mm hard drive	703268-001
	500-GB, 5400-rpm, SATA, FIPS, 7.0-mm hard drive	730946-001
	320-GB, 7200-rpm, SATA, 7.0-mm hard drive	634862-001
(15)	Battery:	
	3-cell, 46-WHr, 4.15-AHr, Li-ion long life battery	717378-001
	3-cell, 26-WHr, 2.50-AHr, Li-ion long life battery	717377-001
(16)	Memory module (PCL3, 12800, 1600):	
	8-GB	693374-001
	4-GB	691740-001
(17)	WWAN module:	
	HP lt4211 LTE/EV-DO/HSPA+ 4G Module Broadband Module	793116-001
	HP lt4112 LTE/HSPA+ Mobile Broadband Module	740011-001
	HP hs3110 HSPA+ Mobile Broadband Module	822828-001
(18)	Solid-state drive:	
	512-GB, SATA-3, TLC, solid-state drive	828873-001
	256-GB, SATA-3, SED, Opal 2, solid-state drive	765614-001
	256-GB, SATA-3, Opal 2, locked, solid-state drive	827868-001

Item	Component	Spare part number
	256-GB, SATA-3, TLC, solid-state drive	800167-001
	240-GB, SATA-3, solid-state drive	765612-001
	180-GB, SATA-3, SED, Opal 2, solid-state drive	795139-001
	180-GB, SATA-3, SED, Opal 1, solid-state drive	765611-001
	180-GB, SATA-3, solid-state drive	765610-001
	128-GB, SATA-3, solid-state drive	765610-001
	128-GB, SATA-3, TLC, solid-state drive	800166-001
(19)	WLAN module:	
	Atheros AR9485 802.11 b/g/n WiFi Adapter	675794-001
	Broadcom BCM943228HMB 802.11 abgn 2×2 Wi-Fi Adapter, Broadcom Bluetooth 4.0 Adapter	730668-001
	Broadcom BCM4352 802.11 ac 2×2 Wi-Fi + Bluetooth 4.0 Combo Adapter	724935-001
(20)	Service cover (includes rubber feet)	766018-001

Display assembly components

NOTE: The display assembly components listed in this section are for use only on computer models equipped with a non-TouchScreen display assembly.



Item	Component	Spare part number
(1)	Display bezel:	
	For use only on computer models equipped with an AntiGlare, FHD, LED, UWVA display panel	775896-001
	For use only on computer models equipped with an AntiGlare, HD, LED, SVA display panel	766012-001
(2)	Webcam/microphone module (includes double-sided adhesive)	780112-001
	Microphone module (includes double-sided adhesive)	730795-001

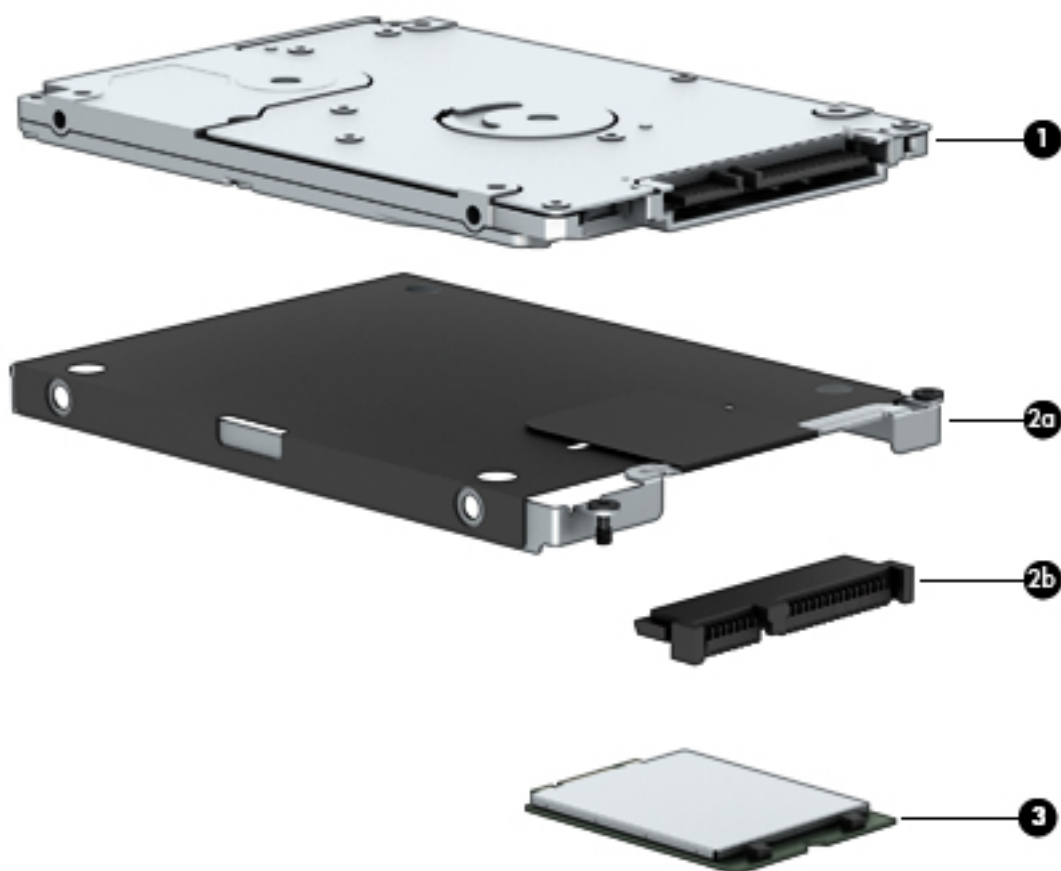
Item	Component	Spare part number
(3)	Display panel:	
	12.5-in, AG, FHD, LED, UWVA display panel	776930-001
	12.5-in, AG, HD, LED, SVA display panel	765607-001
(4)	Display Hinge Kit (includes left and right display hinges):	
	For use only on computer models equipped with an AntiGlare, FHD, LED, UWVA display panel	775895-001
	For use only on computer models equipped with an AntiGlare, HD, LED, SVA display panel	730543-001
(5)	Display Cable Kit (includes display panel cable and webcam/microphone module cable)	730537-001
	Antenna Kit , includes:	
(6)	WLAN antenna cables and transceivers	
(7)	WWAN antenna cables and transceivers	
	For use only on computer models equipped with an AntiGlare, FHD, LED, UWVA display panel	775894-001
	For use only on computer models equipped with an AntiGlare, HD, LED, SVA display panel	730560-001
(8)	Display back cover:	
	For use only on computer models equipped with an AntiGlare, FHD, LED, UWVA display panel	775893-001
	For use only on computer models equipped with an AntiGlare, HD, LED, SVA display panel	730561-001
	Display Panel Support Kit (not illustrated, includes display back cover, WLAN antenna cables and transceivers, and WWAN antenna cables and transceivers):	
	For use only on computer models equipped with an AntiGlare, FHD, LED, UWVA display panel	775897-001
	For use only on computer models equipped with an AntiGlare, HD, LED, SVA display panel	730538-001

Plastics Kit



Item	Component	Spare part number
	Plastics Kit, includes:	730562-001
(1)	Card reader bezel	
(2)	Display cable connector bracket	
(3)	Fingerprint reader cover	
(4)	RJ-45 cover	
(5a)	Service cover release latch actuator	
(5b)	Service cover release latch arm	
	Service cover release latch spring (not illustrated)	

Mass storage devices



Item	Component	Spare part number
(1)	Hard drive (does not include hard drive bracket, hard drive connector adapter, or screws): NOTE: The hard drive bracket, hard drive connector adapter, and screws are included in the Hard Drive Hardware Kit.	
	1-TB, 5400-rpm, SATA, 7.0-mm hard drive	762990-001
	500-GB, 7200-rpm, SATA, 7.0-mm hard drive	703267-001
	500-GB, 7200-rpm, SED, 7.0-mm hard drive	703268-001
	500-GB, 5400-rpm, SATA, FIPS, 7.0-mm hard drive	730946-001
	320-GB, 7200-rpm, SATA, 7.0-mm hard drive	634862-001
	Hard Drive Hardware Kit , includes:	734280-001
(2a)	Hard drive bracket	
(2b)	Hard drive connector adapter	
	Screws (not illustrated)	
(3)	Solid-state drive:	
	512-GB, SATA-3, TLC, solid-state drive	828873-001
	256-GB, SATA-3, SED, Opal 2, solid-state drive	765614-001

Item	Component	Spare part number
	256-GB, SATA-3, Opal 2, locked, solid-state drive	827868-001
	256-GB, SATA-3, TLC, solid-state drive	800167-001
	240-GB, SATA-3, solid-state drive	765612-001
	180-GB, SATA-3, SED, Opal 2, solid-state drive	795139-001
	180-GB, SATA-3, SED, Opal 1, solid-state drive	765611-001
	180-GB, SATA-3, solid-state drive	765610-001
	128-GB, SATA-3, solid-state drive	765610-001
	128-GB, SATA-3, TLC, solid-state drive	800166-001

Miscellaneous parts

Component	Spare part number
AC adapter:	
65-W HP Smart adapter (EM, RC/V, 3-wire, 4.5-mm)	693710-001
65-W HP Smart adapter (non-PFC, 3-wire, 4.5-mm)	693711-001
65-W HP Smart travel adapter (non-PFC)	693716-001
45-W HP Smart adapter (non-PFC, RC, 7.4-mm)	744893-001
45-W HP Smart adapter (non-PFC, RC, 3-wire, 4.5-mm)	721092-001
45-W HP Smart adapter (non-PFC, RC, 2-wire, 4.5-mm)	742437-001
Carrying case:	
HP Essential backpack carrying case	679923-001
HP Essential messenger bag style carrying case	679922-001
HP Essential top-load carrying case	679921-001
HP professional top-load carrying case	705621-001
HP business top-load carrying case	718550-001
HP DisplayPort-to-HDMI 1.4 adapter	749288-001
HP 2013 UltraSlim Docking Station	732252-001
HP Mobile Connect SIM module	714749-001
Lock:	
HP docking station cable lock	575921-001
HP ultraslim keyed cable lock	703372-001
Mouse:	
HP comfort-grip wireless mouse	691922-001
HP USB laser mouse	674318-001

Component	Spare part number
HP USB travel mouse	757770-001
Power cord (3-pin, black, 1.83-m):	
For use in Argentina	490371-D01
For use in Australia	490371-011
For use in Brazil	490371-202
For use in Denmark	490371-081
For use in Europe	490371-021
For use in India	490371-D61
For use in Israel	490371-BB1
For use in Italy	490371-061
For use in Japan	490371-291
For use in North America	490371-001
For use in the People's Republic of China	490371-AA1
For use in South Africa	490371-AR1
For use in South Korea	490371-AD1
For use in Switzerland	490371-111
For use in Taiwan	490371-AB1
For use in Thailand	490371-201
For use in the United Kingdom and Singapore	490371-031
Power cord (3-pin, black, 1.00-m):	
For use in Argentina	755530-D01
For use in Australia	755530-011
For use in Brazil	755530-202
For use in Denmark	755530-081
For use in Europe	755530-021
For use in India	755530-D61
For use in Israel	755530-BB1
For use in Italy	755530-061
For use in Japan	755530-291
For use in North America	755530-001
For use in the People's Republic of China	755530-AA1
For use in South Africa	755530-AR1
For use in South Korea	755530-AD1
For use in Switzerland	755530-111

Component	Spare part number
For use in Taiwan	755530-AB1
For use in Thailand	755530-201
For use in the United Kingdom and Singapore	755530-031
2-pin, black, 1.00-m power cord for use only in Japan	762689-291
Screw Kit	730553-001

4 Removal and replacement preliminary requirements


Tools required

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


- Flat-bladed screw driver
- Magnetic screw driver
- Phillips P0 screw driver

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 parts. Apply pressure only at the points designated in the maintenance instructions.

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.

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

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

Avoid exposing a drive to temperature extremes or liquids.

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

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, screw drivers, and vacuums.
- When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and 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 computerop 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 Customer Self-Repair parts

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

 **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.

Component replacement procedures

 **NOTE:** Please read and follow the procedures described here to access and replace Customer Self-Repair parts successfully.

 **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 the serial number, product number, and model number on page 18](#) for details.

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

There are as many as 15 screws that must be removed, replaced, and/or loosened when servicing the computer. Make special note of each screw size and location during removal and replacement.

Service cover

 **NOTE:** The service cover spare part kit includes rubber feet.

Description	Spare part number
Service cover	766018-001

Before removing the disassembling the computer, follow these steps:

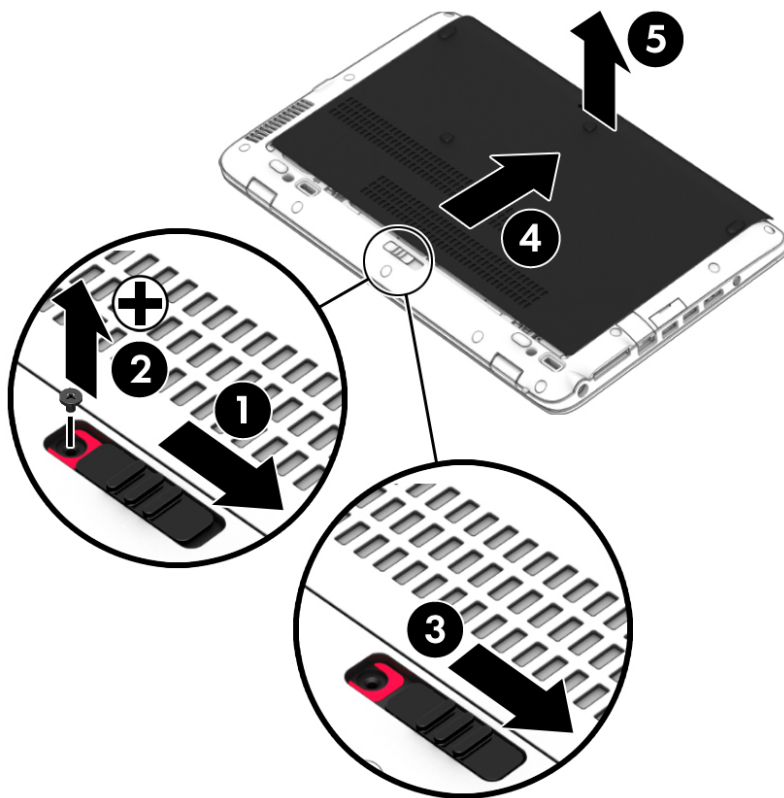
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.

Remove the service cover:

1. Turn the computer upside down, with the rear toward you.
2. Slide the service cover release latch **(1)** to gain access to the service cover security screw.
3. Remove the Phillips PM2.0×4.5 security screw **(2)** (if present).

 **NOTE:** The service cover includes a threaded receptacle for storing the security screw.

4. Slide the service cover release latch a second time **(3)** to release the service cover.
5. Release the service cover **(4)** by sliding it forward.
6. Remove the service cover **(5)**.




Reverse this procedure to install the service cover.


Battery

Description	Spare part number
3-cell, 46-WHr, 4.15-AHr, Li-ion long life battery	717378-001
3-cell, 26-WHr, 2.50-AHr, Li-ion long life battery	717377-001

Before removing the battery, 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 service cover (see [Service cover on page 38](#)).

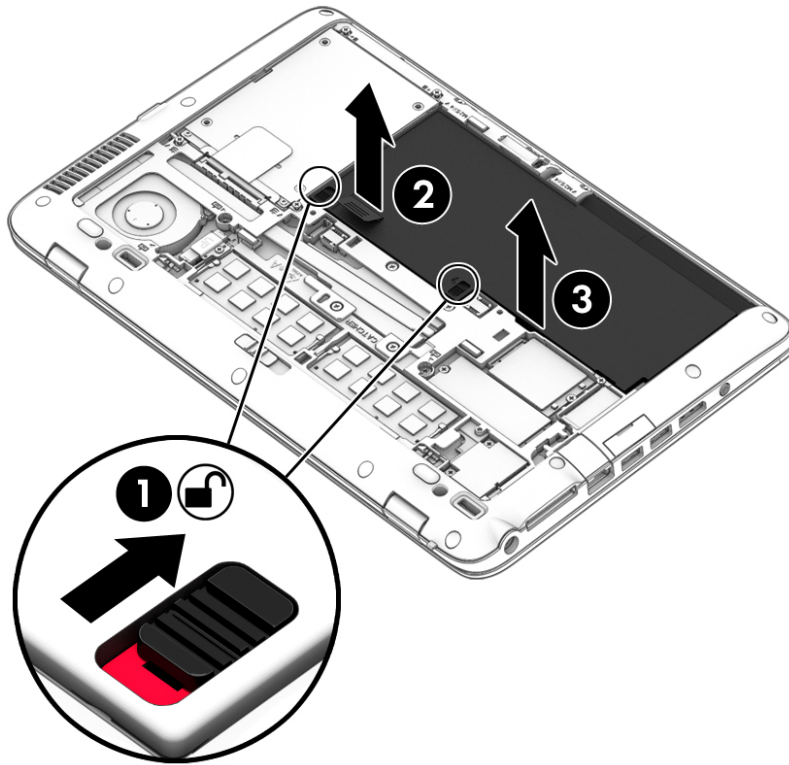
 **WARNING!** To reduce potential safety issues, use only the battery provided with the computer, a replacement battery provided by HP, or a compatible battery purchased from HP.

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

Remove the battery:

1. Slide the battery lock latches **(1)** to unlock the battery.

2. Use the release tab **(2)** to lift the rear edge of the battery **(3)** until the battery rests at an angle.



3. Remove the battery.

Reverse this procedure to install the battery.

Hard drive



NOTE: The hard drive spare part kit does not include the hard drive bracket, hard drive connector adapter, or screws. The hard drive bracket, hard drive connector adapter, and screws are included in the Hard Drive Hardware Kit, spare part number 730539-001.

Description	Spare part number
1-TB, 5400-rpm, SATA, 7.0-mm hard drive	762990-001
500-GB, 7200-rpm, SATA, 7.0-mm hard drive	703267-001
500-GB, 7200-rpm, SED, 7.0-mm hard drive	703268-001
500-GB, 5400-rpm, SATA, FIPS, 7.0-mm hard drive	730946-001
320-GB, 7200-rpm, SATA, 7.0-mm hard drive	634862-001

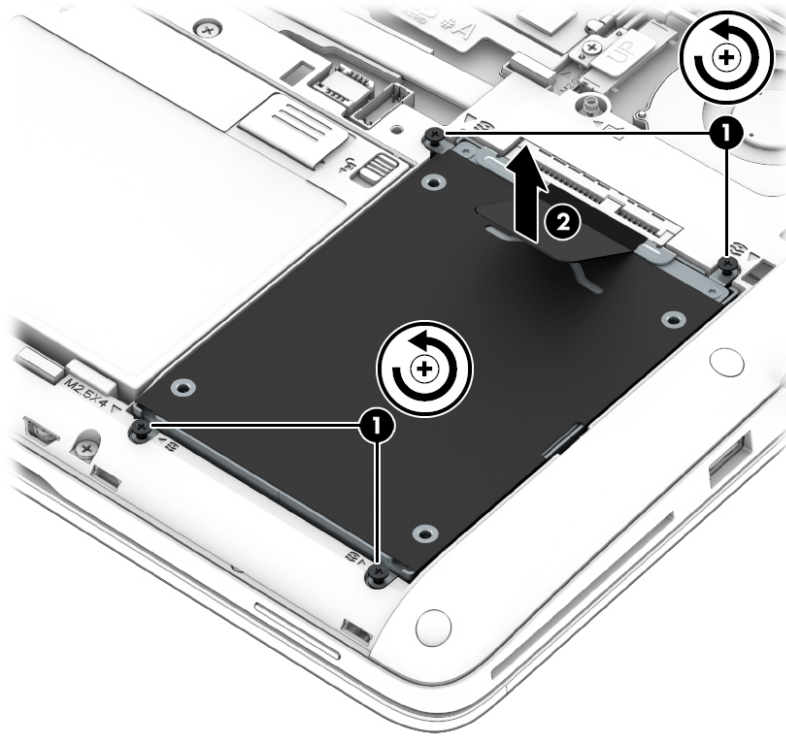
Before removing the battery, follow these steps:

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 service cover (see [Service cover on page 38](#)).
5. Remove the battery (see [Battery on page 40](#)).

Remove the hard drive:

1. Loosen the four Phillips captive screws **(1)** that secure the hard drive to the computer.

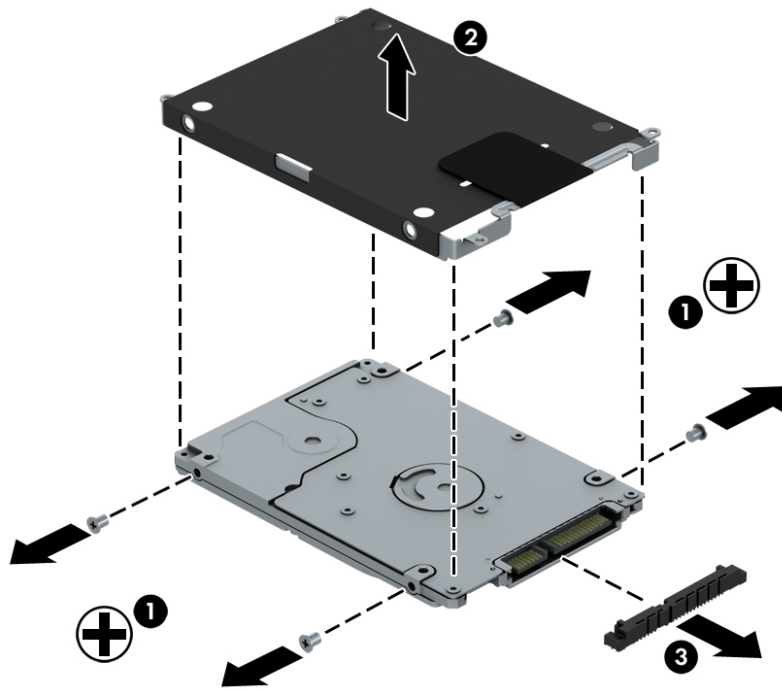
2. Use the release tab **(2)** to remove the hard drive.



3. If it is necessary to disassemble the hard drive, perform the following steps:
 - a. Position the hard drive with the rear toward you.
 - b. Remove the four Phillips PM2.75×3.5 screws **(1)** that secure the hard drive bracket to the hard drive.
 - c. Remove the hard drive bracket **(2)** from the hard drive.

- d. Remove the hard drive connector adapter **(3)** from the hard drive.

The hard drive bracket, hard drive connector adapter, and screws are available in the Hard Drive Hardware Kit, spare part number 730539-001.



Reverse this procedure to reassemble and install the hard drive.

WWAN module

Description	Spare part number
HP lt4211 LTE/EV-DO/HSPA+ 4G Module Broadband Module	793116-001
HP lt4112 LTE/HPSA+ Mobile Broadband Module	740011-001
HP hs3110 HSPA+ HP lt4112 LTE/HPSA+ Mobile Broadband Module	822828-001

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 service cover (see [Service cover on page 38](#)).
5. Remove the battery (see [Battery on page 40](#)).

Remove the WWAN module:

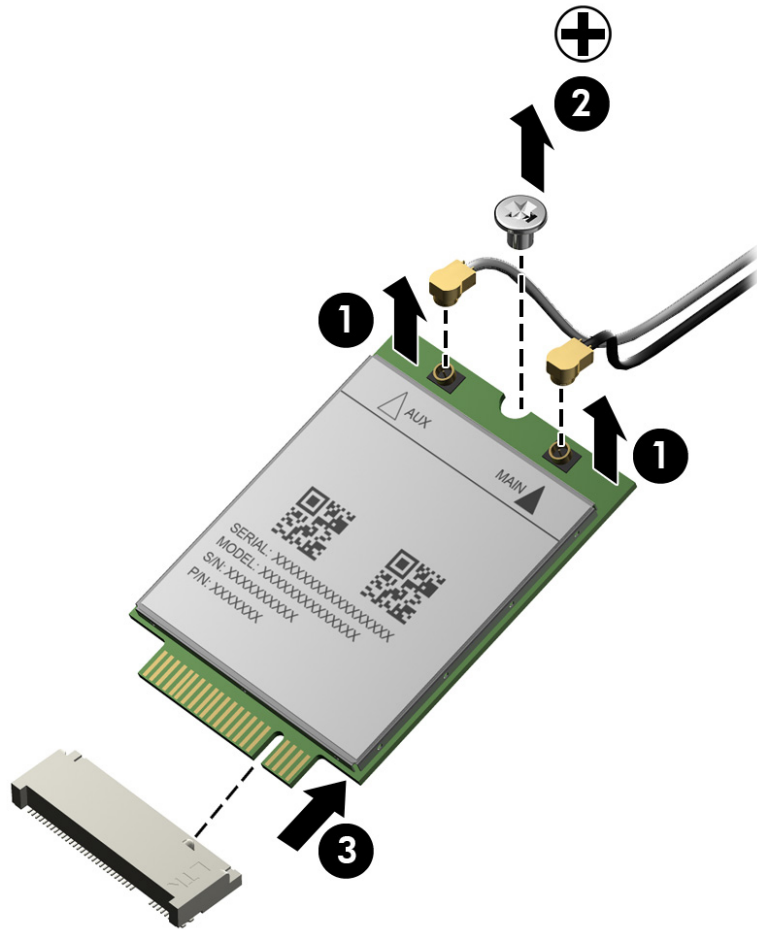
1. Disconnect the WWAN antenna cables **(1)** from the terminals on the WWAN module.



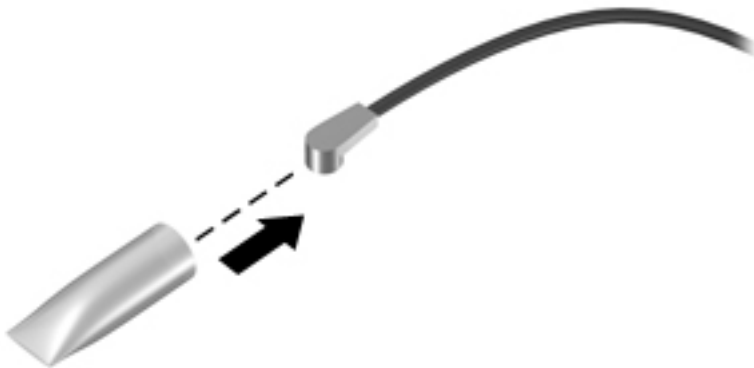
NOTE: The WWAN antenna cable labeled “5” connects to the WWAN module “Main” terminal labeled “5”. The WWAN antenna cable labeled “6” connects to the WWAN module “Aux/GPS” terminal labeled “6”.

2. Remove the Phillips PM2.0×2.5 screw **(2)** that secures the WWAN module to the system board. (The WWAN module tilts up.)

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



NOTE: If the WWAN antenna cables are not connected to the terminals on the WWAN module, protective sleeves should be installed on the antenna connectors, as shown in the following illustration.



Reverse this procedure to install the WWAN module.

Solid-state drive

Description	Spare part number
512-GB, SATA-3, TLC, solid-state drive	828873-001
256-GB, SATA-3, SED, Opal 2, solid-state drive	765614-001
256-GB, SATA-3, Opal 2, locked, solid-state drive	827868-001
256-GB, SATA-3, TLC, solid-state drive	800167-001
240-GB, SATA-3, solid-state drive	765612-001
180-GB, SATA-3, SED, Opal 2, solid-state drive	795139-001
180-GB, SATA-3, SED, Opal 1, solid-state drive	765611-001
180-GB, SATA-3, solid-state drive	765610-001
128-GB, SATA-3, solid-state drive	765610-001
128-GB, SATA-3, TLC, solid-state drive	800166-001

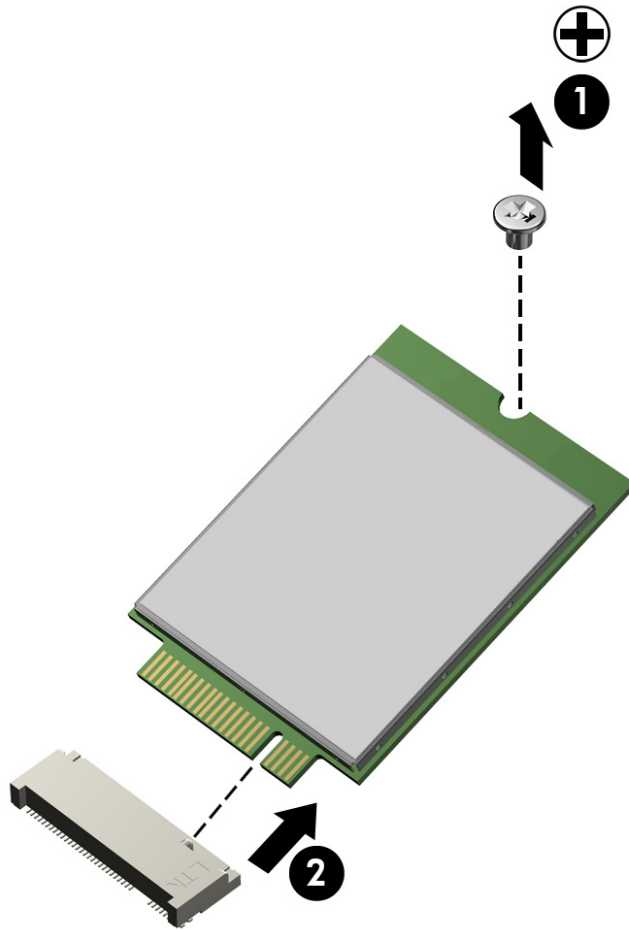
Before removing the solid-state drive, follow these steps:

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 service cover (see [Service cover on page 38](#)).
5. Remove the battery (see [Battery on page 40](#)).

Remove the solid-state drive:

1. Remove the Phillips PM2.0×2.5 screw **(1)** that secures the solid-state drive to the system board. (The solid-state drive tilts up.)

2. Remove the solid-state drive (2) by pulling the drive away from the slot at an angle.



Reverse this procedure to install the solid-state drive.

WLAN module

Description	Spare part number
Atheros AR9485 802.11 b/g/n WiFi Adapter	675794-001
Broadcom BCM943228HMB 802.11 abgn 2×2 Wi-Fi Adapter Broadcom Bluetooth 4.0 Adapter	730668-001
Broadcom BCM4352 802.11 ac 2×2 Wi-Fi + Bluetooth 4.0 Combo Adapter	724935-001

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 service cover (see [Service cover on page 38](#)).
5. Remove the battery (see [Battery on page 40](#)).

Remove the WLAN module:

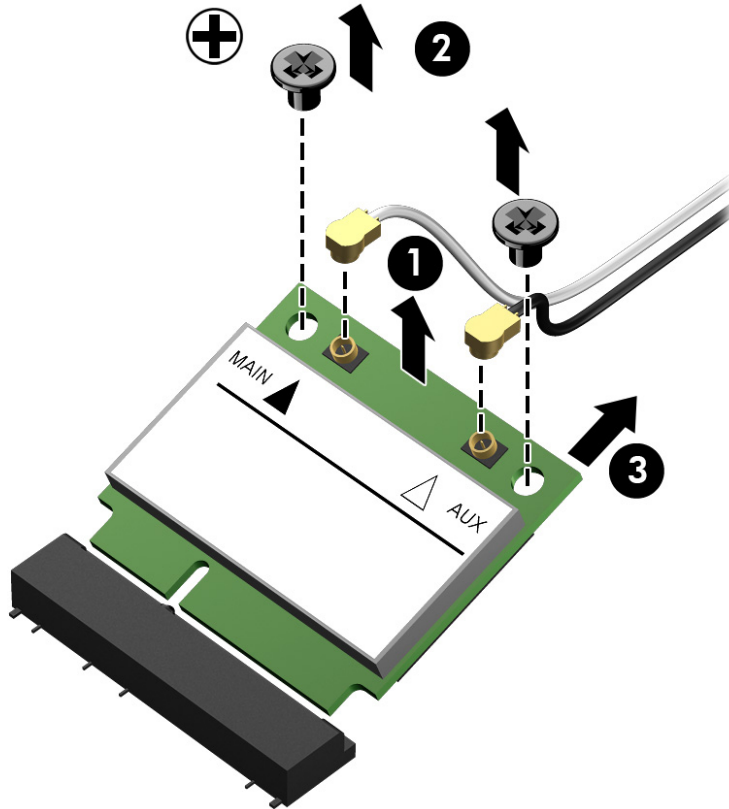
1. Disconnect the WLAN antenna cables **(1)** from the terminals on the WLAN module.




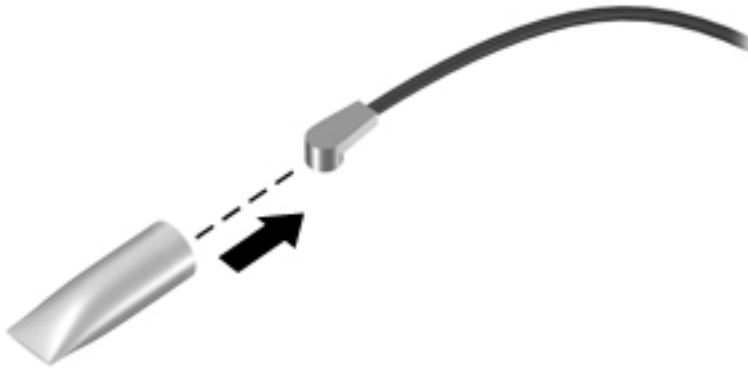
NOTE: The WLAN antenna cable labeled “1” connects to the WLAN module “Main” terminal labeled “1”. The WLAN antenna cable labeled “2” connects to the WLAN module “Aux” terminal labeled “2”.

2. Remove the two Phillips PM2.0×2.5 screws **(2)** that secure the WLAN module to the system board. (The WLAN module tilts up.)

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



 **NOTE:** If the WLAN antenna cables are not connected to the terminals on the WLAN module, protective sleeves should be installed on the antenna connectors, as shown in the following illustration.



Reverse this procedure to install the WLAN module.

Memory module

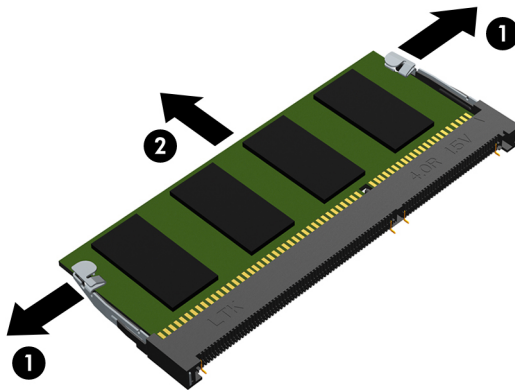
Description	Spare part number
8 GB (PCL3, 12800, 1600)	693374-001
4 GB (PCL3, 12800, 1600)	691740-001

Before removing the memory 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 service cover (see [Service cover on page 38](#)).
5. Remove the battery (see [Battery on page 40](#)).

Remove the memory module:

1. Spread the retaining tabs **(1)** on each side of the memory module slot to release the memory module. (The memory module tilts up.)
2. Remove the memory module **(2)** by pulling the module away from the slot at an angle.



Reverse this procedure to install a memory module.

Keyboard

For use in country or region	Spare part number	For use in country or region	Spare part number
Keyboard with backlight (includes backlight cable and keyboard cable):		For use in the Netherlands	776452-B31
For use in Belgium	776452-A41	For use in Northwest Africa	776452-FP1
For use in Brazil	776452-201	For use in Norway	776452-091
For use in Bulgaria	776452-BA1	For use in Portugal	776452-131
For use in Canada	776452-DB1	For use in Romania	776452-271
For use in the Czech Republic and Slovakia	776452-FL1	For use in the Russia	776452-251
For use in Denmark	776452-081	For use in Saudi Arabia	776452-171
For use in France	776452-051	For use in Slovenia	776452-BA1
For use in Germany	776452-041	For use in South Korea	776452-AD1
For use in Greece	776452-151	For use in Spain	776452-071
For use in Hungary	776452-211	For use in Sweden and Finland	776452-B71
For use in Iceland	776452-DD1	For use in Switzerland	776452-BG1
For use in India	776452-D61	For use in Taiwan	776452-AB1
For use in Israel	776452-BB1	For use in Thailand	776452-281
For use in Italy	776452-061	For use in Turkey	776452-141
For use in Japan	776452-291	For use in the United Kingdom	776452-031
For use in Latin America	776452-161	For use in the United States	776452-001
Keyboard without backlight (includes keyboard cable):		For use in the Netherlands	776451-B31
For use in Belgium	776451-A41	For use in Northwest Africa	776451-FP1
For use in Brazil	776451-201	For use in Norway	776451-091
For use in Bulgaria	776451-261	For use in Portugal	776451-131
For use in Canada	776451-DB1	For use in Romania	776451-271
For use in the Czech Republic and Slovakia	776451-FL1	For use in the Russia	776451-251
For use in Denmark	776451-081	For use in Saudi Arabia	776451-171
For use in France	776451-051	For use in Slovenia	776451-BA1
For use in Germany	776451-041	For use in South Korea	776451-AD1
For use in Greece	776451-151	For use in Spain	776451-071
For use in Hungary	776451-211	For use in Sweden and Finland	776451-B71
For use in Iceland	776451-DD1	For use in Switzerland	776451-BG1
For use in India	776451-D61	For use in Taiwan	776451-AB1
For use in Israel	776451-BB1	For use in Thailand	776451-281

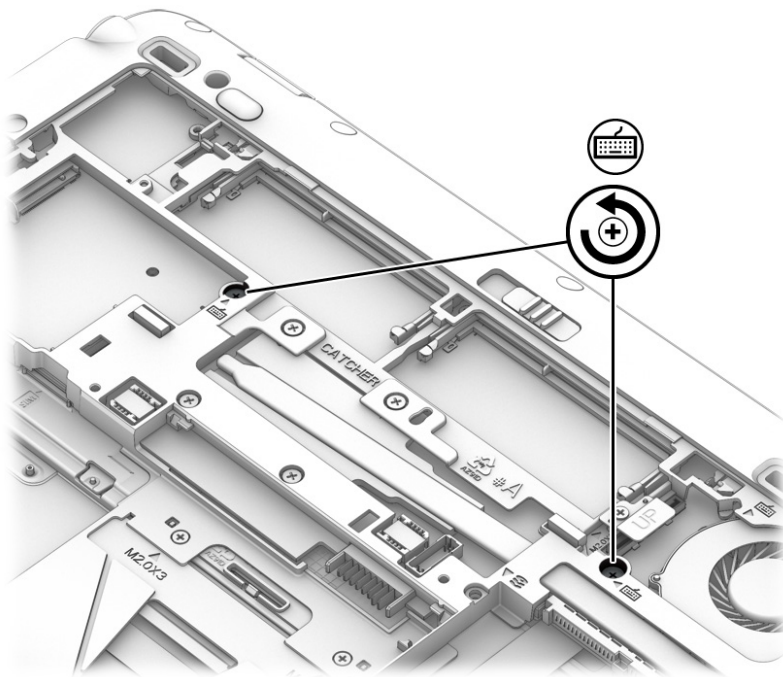
For use in country or region	Spare part number	For use in country or region	Spare part number
For use in Italy	776451-061	For use in Turkey	776451-141
For use in Japan	776451-291	For use in the United Kingdom	776451-031
For use in Latin America	776451-161	For use in the United States	776451-001

Before removing the keyboard, 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 service cover (see [Service cover on page 38](#)).
5. Remove the battery (see [Battery on page 40](#)).

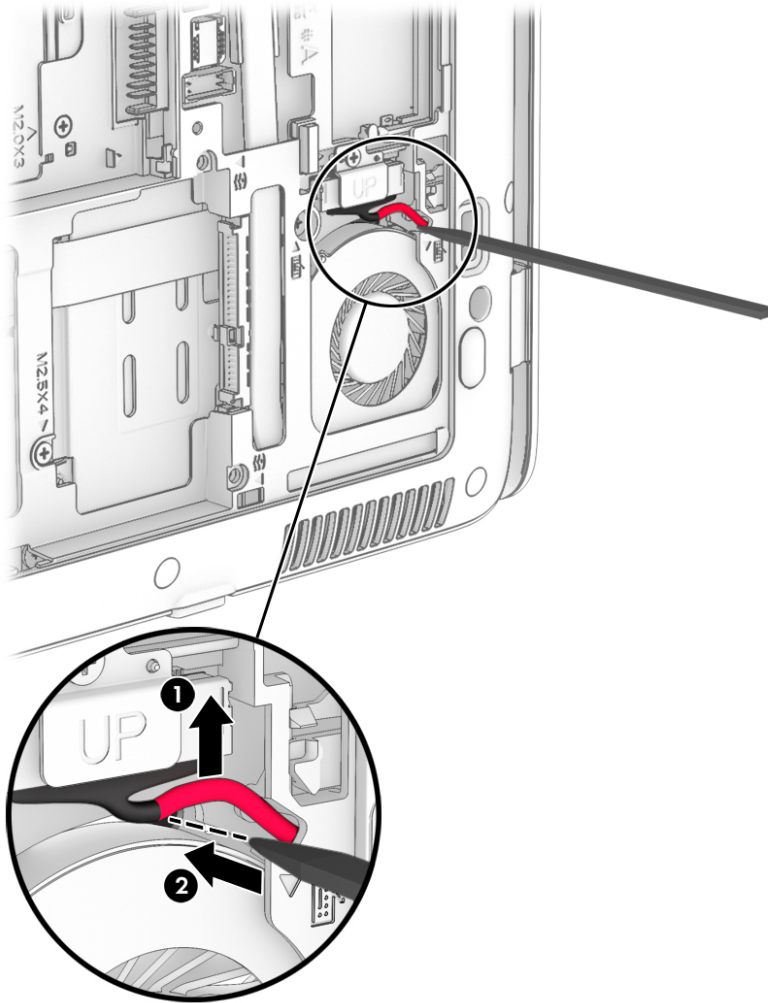
Remove the keyboard:

1. Loosen the two captive screws that secure the keyboard to the computer.



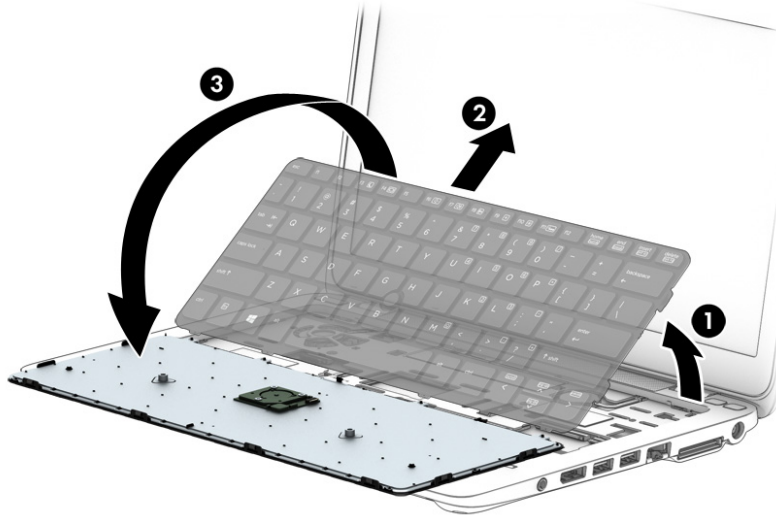
2. Partially open the computer.
3. Rest and secure the computer on its left side.


4. Insert a thin, plastic tool into the keyboard release hole next to the fan, and then press on the back of the keyboard until the keyboard disengages from the computer.



5. Open the computer as far as it will open.
6. Lift the rear edge of the keyboard **(1)** until it rests at an angle.
7. Slide the keyboard **(2)** toward the display until the tabs on the front edge of the keyboard disengage from the top cover.

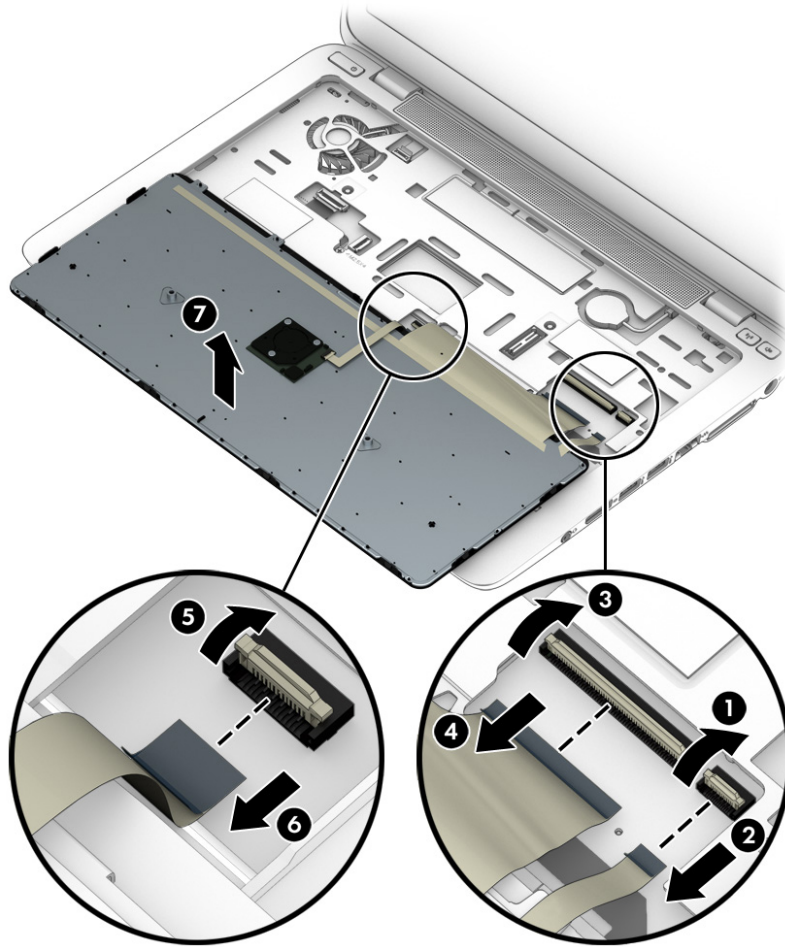
8. Swing the rear edge of the keyboard **(3)** up and forward until it rests upside down on the palm rest.



 **NOTE:** Step 9 applies only to computer models equipped with a keyboard with backlight.


9. Release the zero insertion force (ZIF) connector **(1)** to which the backlight cable is attached, and then disconnect the backlight cable **(2)** from the system board.
10. Release the ZIF connector **(3)** to which the keyboard cable is attached, and then disconnect the keyboard cable **(4)** from the system board.
11. Release the ZIF connector **(5)** to which the pointing stick cable is attached, and then disconnect the pointing stick cable **(6)** from the system board.


12. Remove the keyboard (7).




Reverse this procedure to install the keyboard.

6 Removal and replacement procedures for Authorized Service Provider 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.

 **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.

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 the serial number, product number, and model number on page 18](#) for details.

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

There are as many as 54 screws that must be removed, replaced, and/or loosened when servicing the computer. Make special note of each screw size and location during removal and replacement.

RTC battery

Description	Spare part number
RTC battery (includes cable and double-sided adhesive)	702853-001

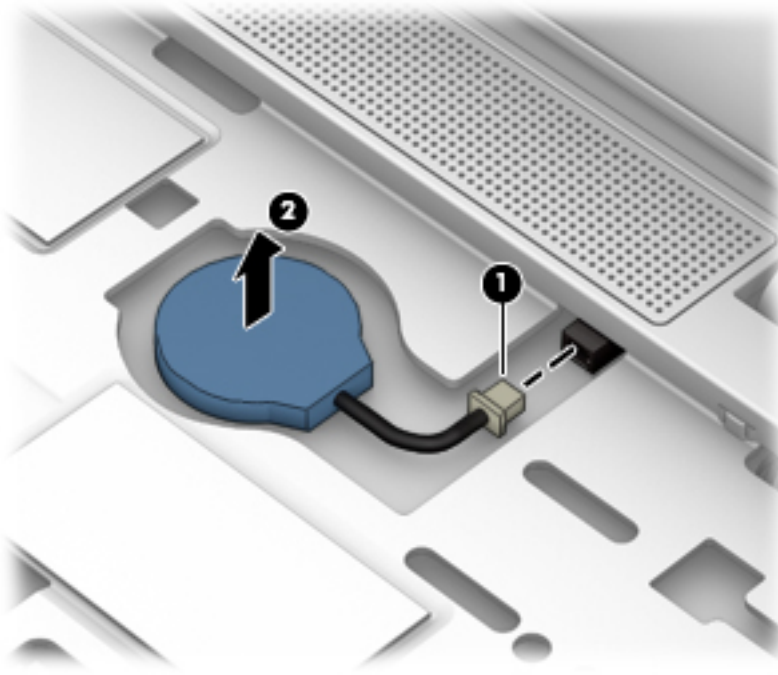
Before removing the RTC battery, follow these steps:

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 service cover (see [Service cover on page 38](#)).
5. Remove the battery (see [Battery on page 40](#)).
6. Remove the keyboard (see [Keyboard on page 52](#)).

Remove the RTC battery:

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

2. Detach the RTC battery (2) from the top cover. (The RTC battery is attached to the top cover with double-sided adhesive.)



3. Remove the RTC battery and cable.


Reverse this procedure to install the RTC battery.

Top cover

Description	Spare part number
Top cover	783215-001

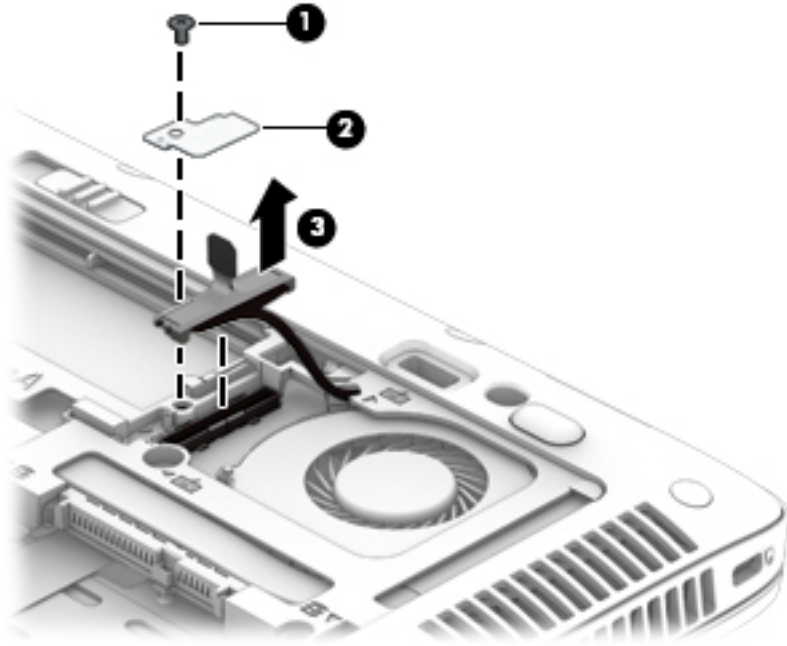
Before removing the top cover, follow these steps:

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 service cover (see [Service cover on page 38](#)), and then remove the following components:
 - a. Battery (see [Battery on page 40](#))
 - b. Hard drive (see [Hard drive on page 42](#))
 - c. Keyboard (see [Keyboard on page 52](#))

 **NOTE:** When replacing the top cover, be sure that the following components are removed from the defective top cover and installed on the replacement top cover:

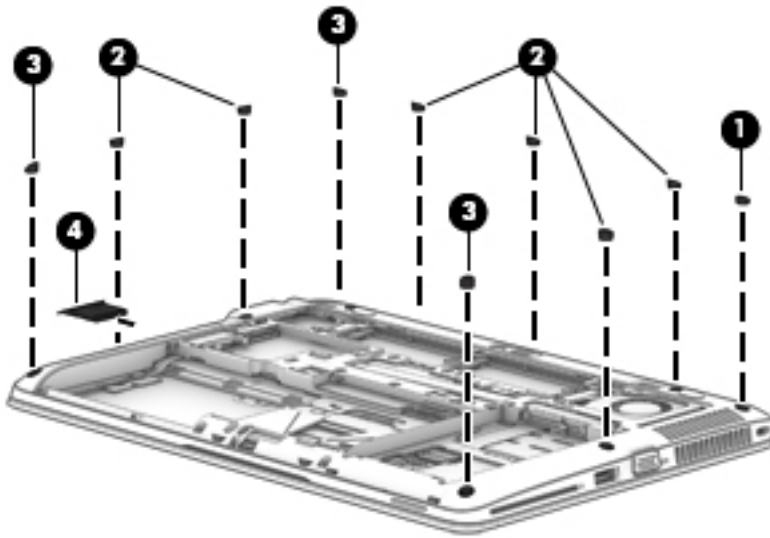
Remove the top cover:

1. Close the computer.
2. Turn the computer upside down with the front toward you.
3. Remove the Phillips PM2.0×3.25 screw **(1)** that secures the display panel cable bracket and display panel cable to the system board.
4. Remove the display panel cable bracket **(2)**.
5. Disconnect the display panel cable **(3)** from the system board.

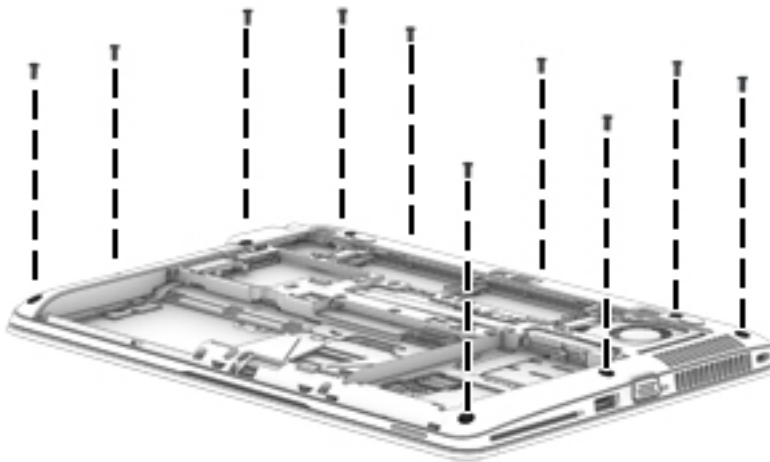


6. Remove the following rubber screw covers:
 - (1)** This screw cover has a “1” marking on the inside of the cover
 - (2)** These screw covers have a “2” marking on the inside of the cover
 - (3)** These screw covers have a “3” marking on the inside of the cover

7. Remove the card reader bezel **(4)** from the card reader slot.



8. Remove the ten Torx T8M2.5×6.5 screws **(1)** that secure the top cover to the base enclosure.

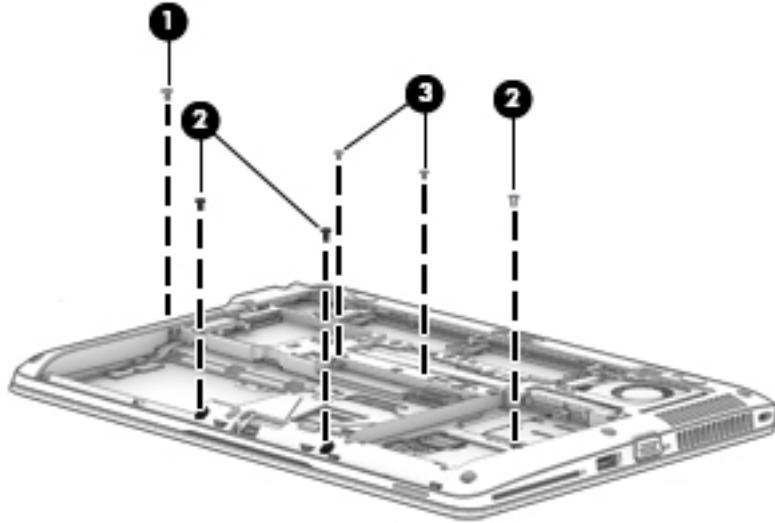


9. Remove the following screws that secure the top cover to the base enclosure:

(1) One Phillips PM2.0×6.5 screw

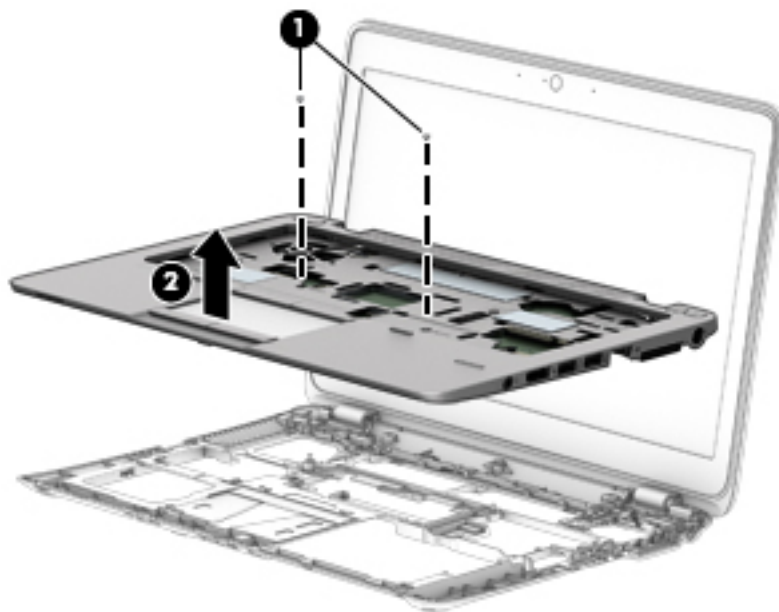
(2) Three Phillips PM2.5×4.5 screws

(3) Two Phillips PM2.0×3.0 screws




10. Remove the two Phillips PM2.5×4.5 screws (1) that secure the top cover to the base enclosure.

11. Remove the top cover (2).



Reverse this procedure to install the top cover.

Display assembly

 **NOTE:** The TouchScreen display assembly is spared as a whole unit replacement. The non-TouchScreen display assembly is spared at the subcomponent level only. For more display assembly spare part information, see the individual removal subsections.

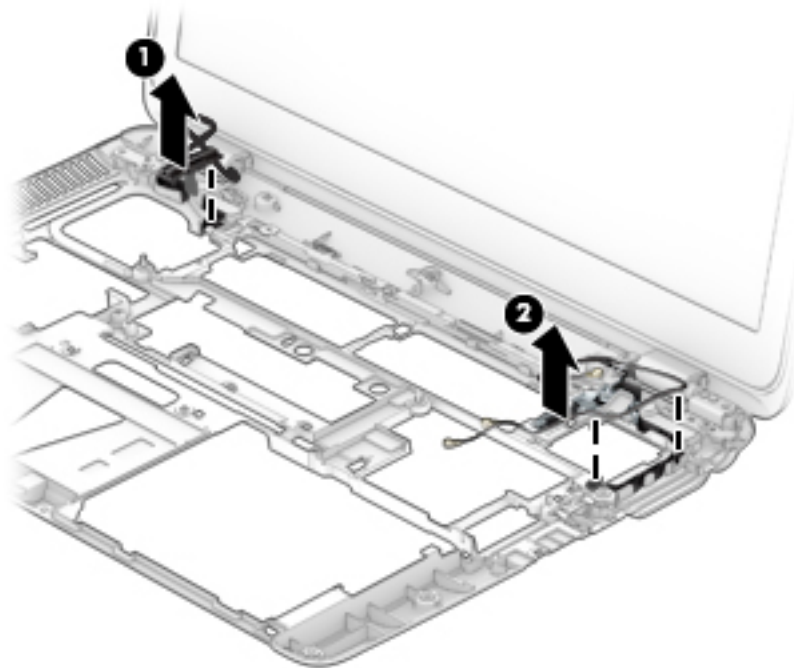
Description	Spare part number
12.5-in, AntiGlare, FHD, LED, UWVA, TouchScreen display assembly	765606-001

Before removing the display assembly, 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 service cover (see [Service cover on page 38](#)), and then remove the following components:
 - a. Battery (see [Battery on page 40](#))
 - b. Hard drive (see [Hard drive on page 42](#))
 - c. Keyboard (see [Keyboard on page 52](#))
 - d. Top cover (see [Top cover on page 58](#))

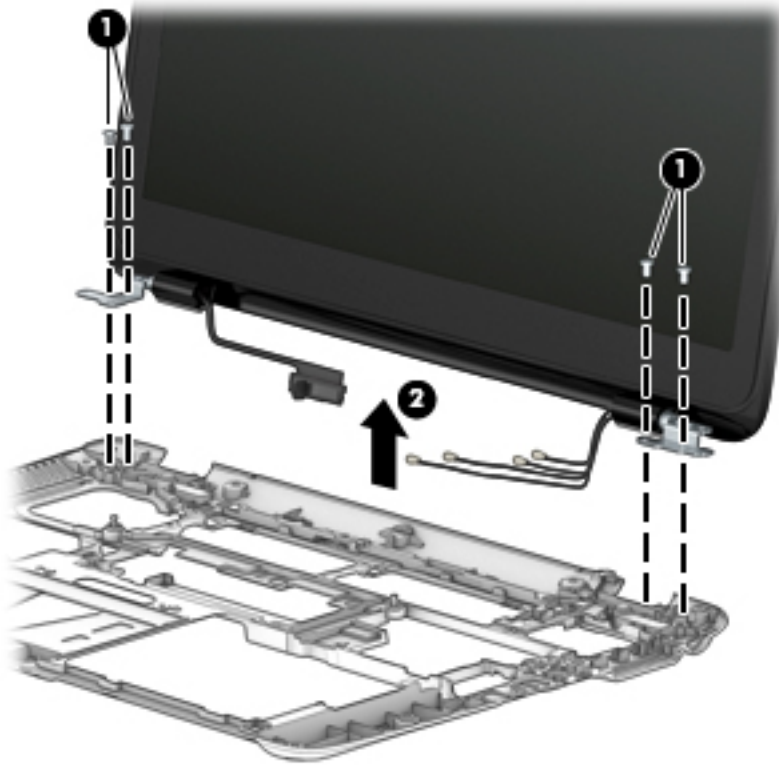
Remove the display assembly:

1. Release the display panel cable from the routing clips **(1)** and channel built into the base enclosure.
2. Release the wireless antenna cables from the routing clips **(2)** and channel built into the base enclosure.



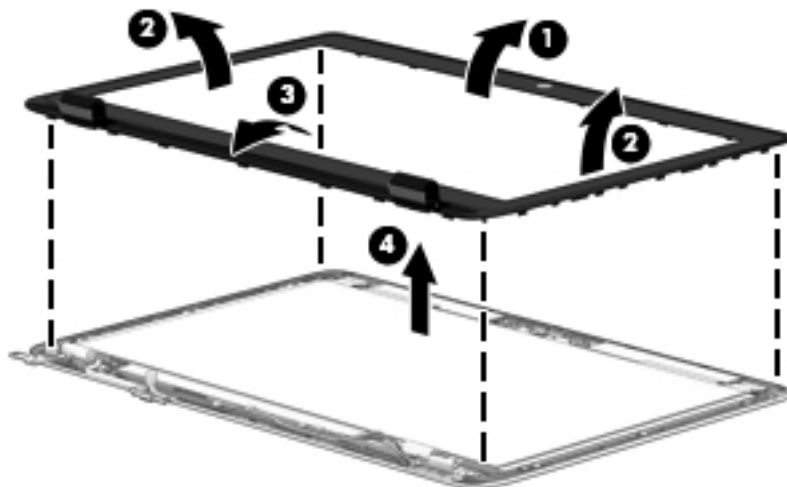
3. Remove the four Phillips PM2.5×4.5 screws **(1)** that secure the display assembly to the base enclosure.

4. Remove the display assembly (2).



5. If it is necessary to replace the display bezel or any of the display assembly subcomponents:
 - a. Flex the inside edges of the top edge (1), the left and right sides (2), and the bottom edge (3) of the display bezel until the bezel disengages from the display back cover.
 - b. Remove the display bezel (4).

The display bezel is available using spare part numbers 775896-001 (for use only on computer models equipped with and AntiGlare, FHD, LED, UWVA display panel) and 766012-001 (for use only on computer models equipped with an AntiGlare, HD, LED, SVA display panel.)

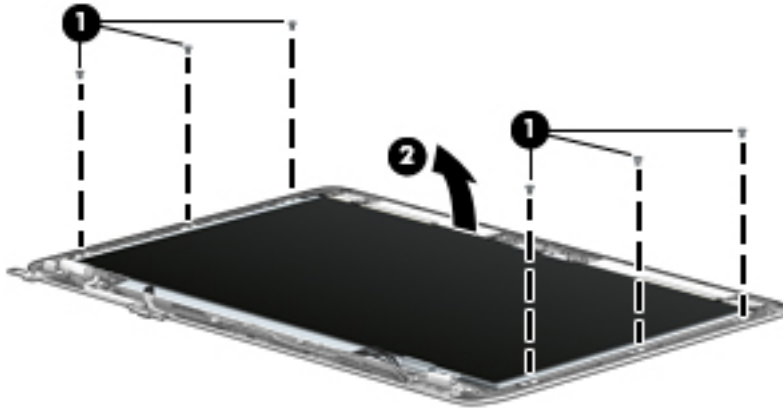


6. If it is necessary to replace the display panel:

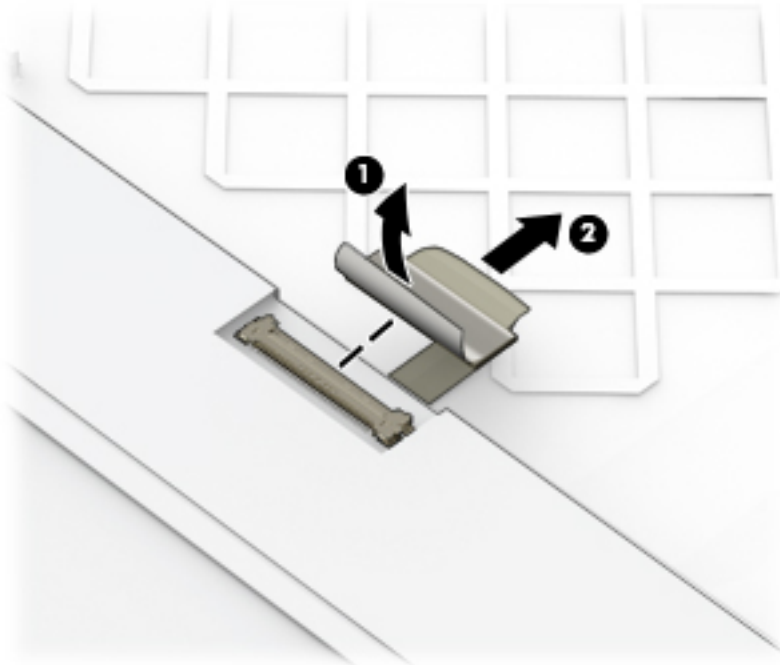
- a. Remove the six Phillips PM2.0×3.25 screws **(1)** that secure the display panel to the display enclosure.

⚠ CAUTION: Before turning the display panel upside down, make sure the work surface is clear of tools, screws, and any other foreign objects. Failure to follow this caution can result in damage to the display panel.

- b. Lift the top edge of the display panel **(2)** and swing it up and forward until it rests upside down in front of the display back cover.



- c. Release the adhesive strip **(1)** that secures the display panel cable connector to the display panel.
- d. Disconnect the display panel cable **(2)** from the display panel.



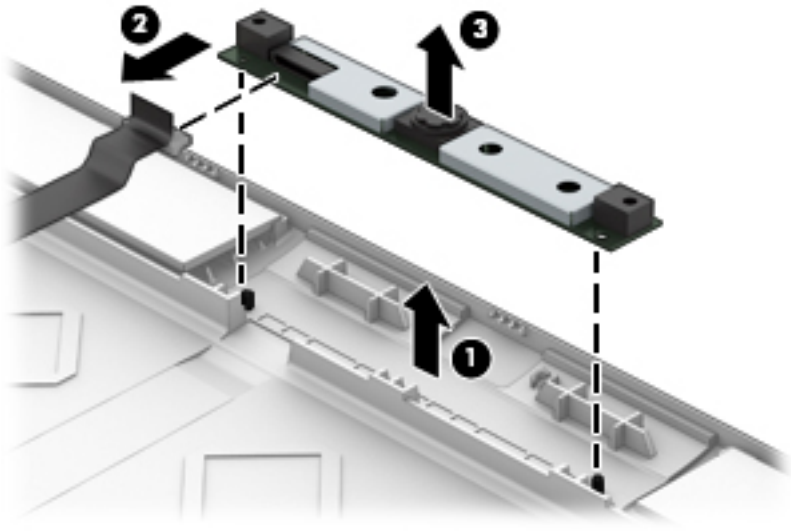
- e. Remove the display panel.

The display panel is available using spare part numbers 776930-001 (12.5-in, AG, FHD, LED, UWVA display panel) and 765607-001 (12.5-in, AG, HD, LED, SVA display panel).

7. If it is necessary to replace the webcam/microphone module or the microphone module:

- a. Detach the webcam/microphone module **(1)** from the display back cover. (The webcam/microphone module is attached to the display back cover with double-sided adhesive.)
- b. Disconnect the webcam/microphone module cable **(2)** from the webcam/ microphone module.
- c. Remove the webcam/microphone module **(3)**.

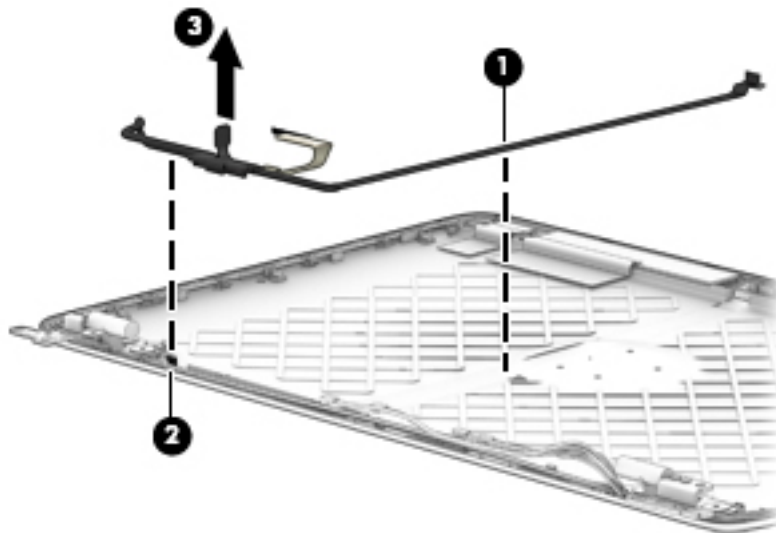
The webcam/microphone module is available using spare part number 780112-001. The microphone module is available using spare part number 730795-001.



8. If it is necessary to replace the display panel cable:

- a. Detach the display panel cable **(1)** from the display back cover. (The display panel cable is attached to the display back cover with double-sided adhesive.)
- b. Release the display panel cable from the clip **(2)** built into the display enclosure.
- c. Remove the display panel cable **(3)**.

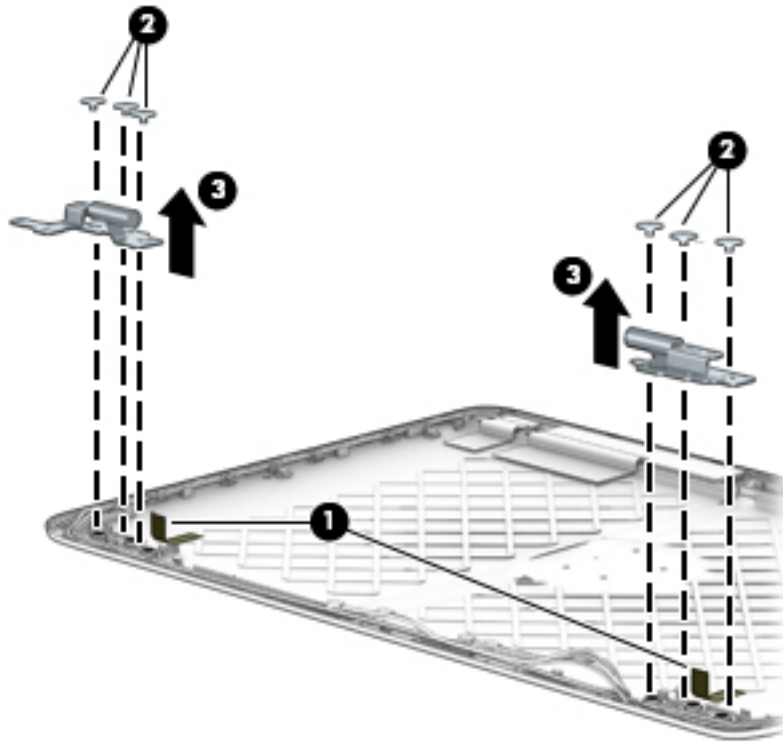
The display panel cable is included in the Display Cable Kit, spare part number 730537-001, and includes the webcam/microphone module cable.



9. If it is necessary to replace the display hinges:

- a. Release the grounding tape **(1)** that secures the display hinges to the display enclosure.
- b. Remove the six Phillips PM2.0×3.0 broad head screws **(2)** that secure the display hinges to the display enclosure.
- c. Remove the display hinges **(3)**.

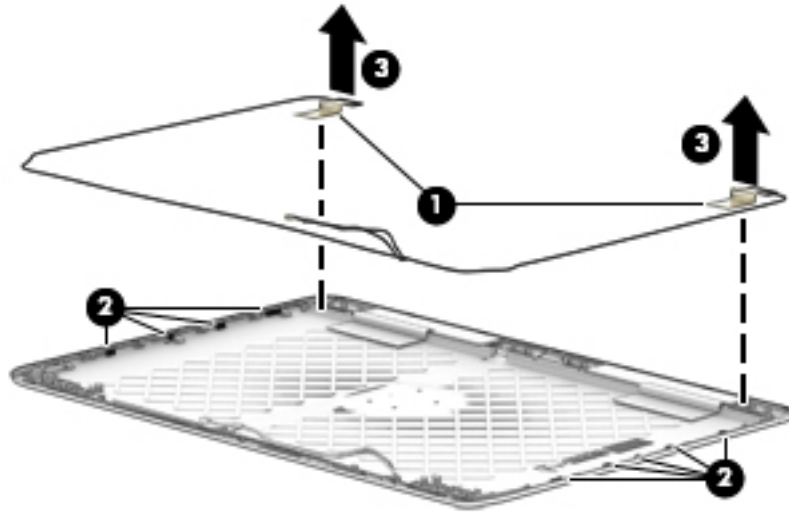
The display hinges are included in the Display Hinge Kit, spare part number 775895-001.



10. If it is necessary to replace the WLAN antenna cables and transceivers:
 - a. Detach the WLAN antenna transceivers **(1)** from the display back cover. (The WLAN antenna transceivers are attached to the display back cover with double-sided adhesive.)
 - b. Release the WLAN antenna cables from the clips **(2)** built into the left and right sides of the display enclosure.

- c. Remove the WLAN antenna cables and transceivers **(3)**.

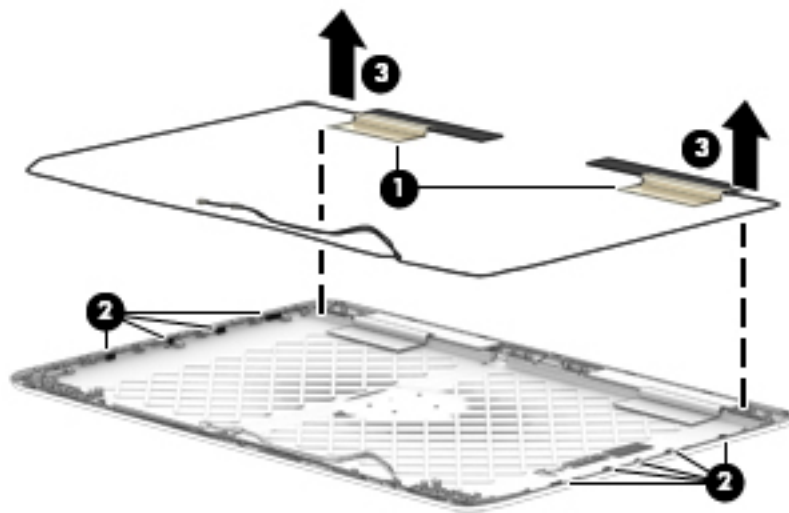
The WLAN antenna cables and transceivers are included in the Antenna Kit, spare part number 775894-001.



- 11. If it is necessary to replace the WWAN antenna cables and transceivers:

- a. Detach the WWAN antenna transceivers **(1)** from the display back cover. (The WWAN antenna transceivers are attached to the display back cover with double-sided adhesive.)
- b. Release the WWAN antenna cables from the clips **(2)** built into the left and right sides of the display enclosure.
- c. Remove the WWAN antenna cables and transceivers **(3)**.

The WWAN antenna cables and transceivers are included in the Antenna Kit, spare part number 775894-001.



Reverse this procedure to reassemble install the display assembly.

TouchPad

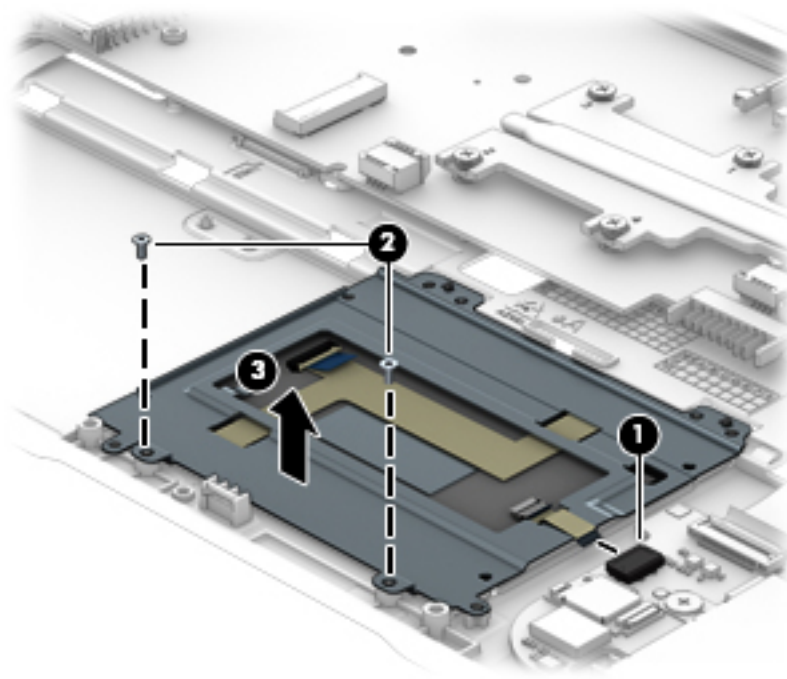
Description	Spare part number
TouchPad (includes cable)	730549-001

Before removing the TouchPad, 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 service cover (see [Service cover on page 38](#)), and then remove the following components:
 - a. Battery (see [Battery on page 40](#))
 - b. Hard drive (see [Hard drive on page 42](#))
 - c. Keyboard (see [Keyboard on page 52](#))
 - d. Top cover (see [Top cover on page 58](#))

Remove the TouchPad:

1. Turn the top cover upside down with the front toward you.
2. Release the ZIF connector **(1)** to which the TouchPad cable is attached, and then disconnect the TouchPad cable from the card reader board.
3. Remove the two Phillips PM2.0×3.25 screws **(2)** that secure the TouchPad to the top cover.
4. Remove the TouchPad and cable **(3)**.



Reverse this procedure to install the TouchPad.

Card reader board

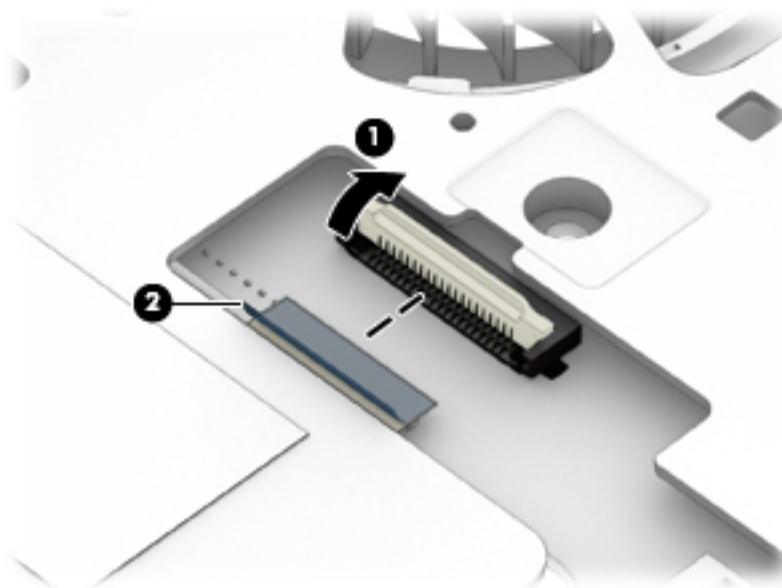
Description	Spare part number
Card reader board “non-gold” (includes cable)	730563-001
Card reader board “gold” (includes cable)	802504-001

Before removing the card reader 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 service cover (see [Service cover on page 38](#)), and then remove the following components:
 - a. Battery (see [Battery on page 40](#))
 - b. Hard drive (see [Hard drive on page 42](#))
 - c. Keyboard (see [Keyboard on page 52](#))
 - d. Top cover (see [Top cover on page 58](#))

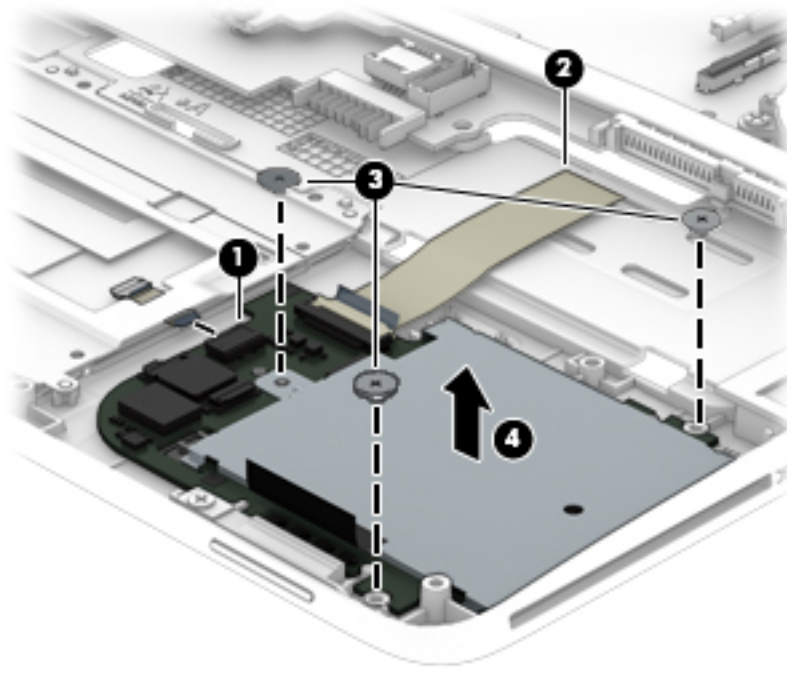
Remove the card reader board:

1. Turn the top cover upside down with the front toward you.
2. Release the ZIF connector **(1)** to which the card reader board cable is attached, and then disconnect the card reader board cable **(2)** from the system board.



3. Turn the top cover upside down with the front toward you.
4. Release the ZIF connector **(1)** to which the TouchPad cable is attached, and then disconnect the TouchPad cable from the card reader board.
5. Release the card reader board cable **(2)** through the opening in the top cover.

6. Remove the three Phillips PM2.0×2.0 broad head screws (3) that secure the card reader board to the top cover.
7. Remove the card reader board and cable (4).



8. Remove the card reader board and cable.
Reverse this procedure to install the card reader board.

Heat sink

Description	Spare part number
Heat sink (includes replacement thermal material)	765605-001

Before removing the heat sink, follow these steps:

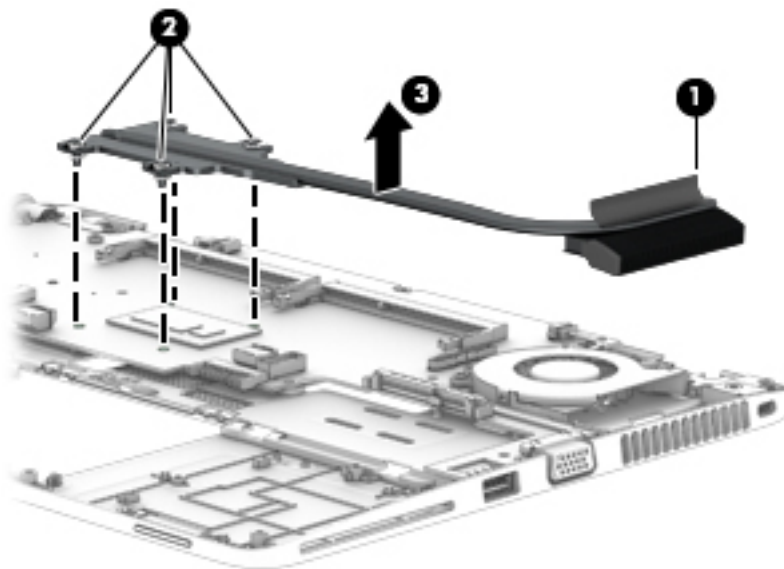
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the service cover (see [Service cover on page 38](#)), and then remove the following components:
 - a. Battery (see [Battery on page 40](#))
 - b. Hard drive (see [Hard drive on page 42](#))
 - c. Keyboard (see [Keyboard on page 52](#))
 - d. Top cover (see [Top cover on page 58](#))


Remove the heat sink:

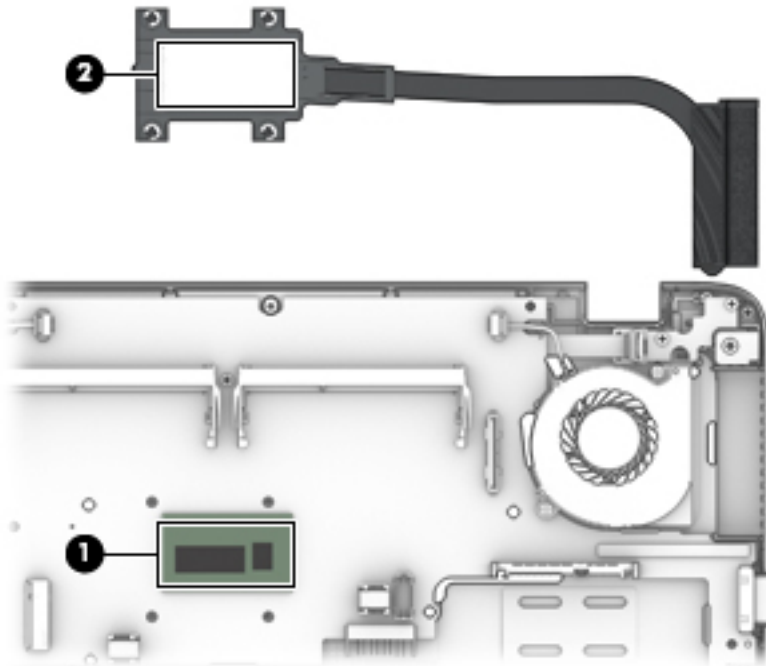
1. Turn the top cover upside down with the front toward you.
2. Detach the heat sink shroud (1) from the fan. (The heat sink shroud is attached to the fan with double-sided adhesive.)
3. Following the 1 through 4 sequence stamped into the heat sink, loosen the four Phillips captive screws (2) that secure the heat sink to the system board.
4. Remove the heat sink (3).



NOTE: Due to the adhesive quality of the thermal material located between the heat sink and the system board components, it may be necessary to move the heat sink from side to side to detach it.



 **NOTE:** The thermal material must be thoroughly cleaned from the surfaces of the heat sink and the system board components each time the heat sink is removed. Replacement thermal material is included with the heat sink and system board spare part kits. Thermal paste is used on the processor **(1)** and the heat sink section **(2)** that services it.



Reverse this procedure to install the heat sink.

Fan

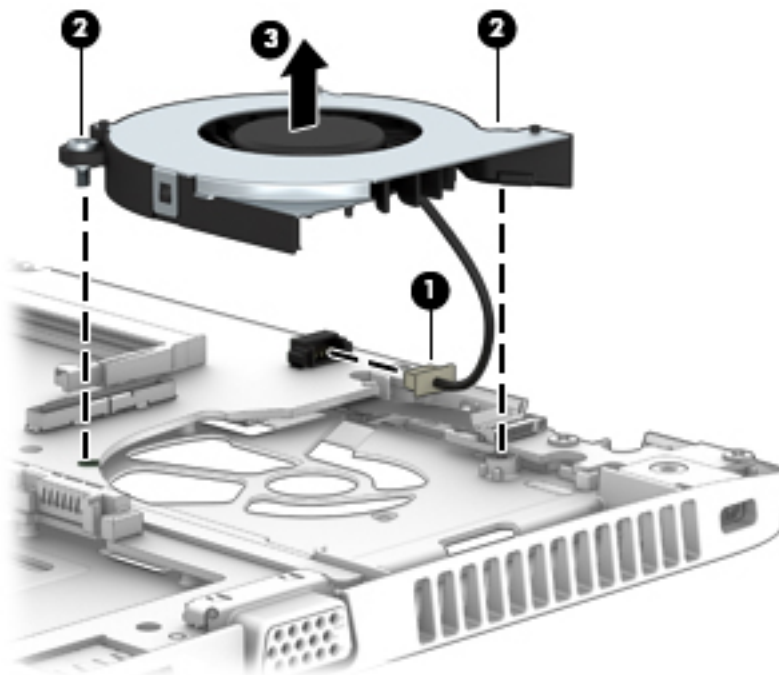
Description	Spare part number
Fan (includes cable)	780895-001


Before removing the fan, follow these steps:

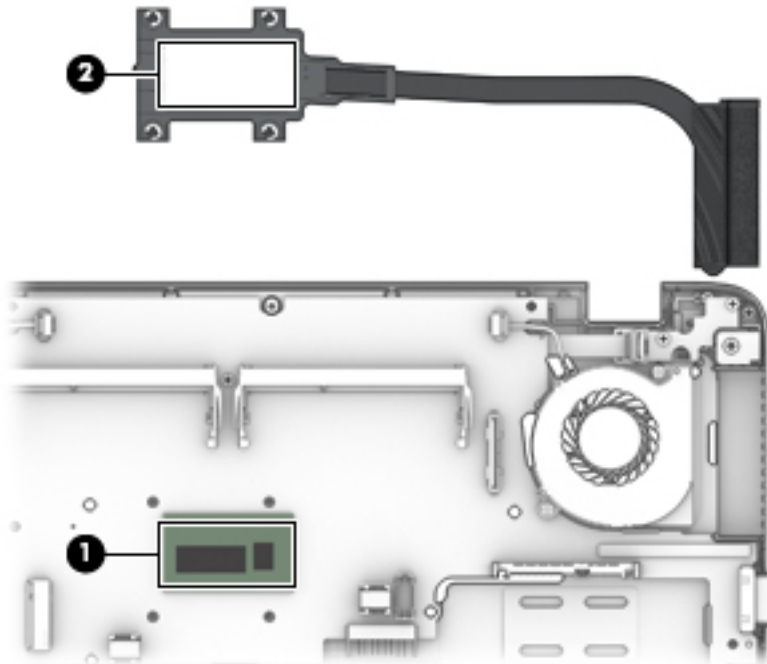
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the service cover (see [Service cover on page 38](#)), and then remove the following components:
 - a. Battery (see [Battery on page 40](#))
 - b. Hard drive (see [Hard drive on page 42](#))
 - c. Keyboard (see [Keyboard on page 52](#))
 - d. Top cover (see [Top cover on page 58](#))
 - e. Heat sink (see [Heat sink on page 71](#))

Remove the fan:

1. Turn the top cover upside down with the front toward you.
2. Disconnect the fan cable (1) from the system board.
3. Loosen the two Phillips captive screws (2) that secure the fan to the system board.
4. Remove the fan (3).





 **NOTE:** The thermal material must be thoroughly cleaned from the surfaces of the heat sink and the system board components each time the heat sink is removed. Replacement thermal material is included with the heat sink and system board spare part kits. Thermal paste is used on the processor **(1)** and the heat sink section **(2)** that services it.



Reverse this procedure to install the fan.

System board

 **NOTE:** The system board spare part kit includes the battery connector bracket and replacement thermal material.

 **IMPORTANT:** For system board replacement on serial numbers xxx501xxxx and below, use the conversion kit (see product description for “(gold conversion Kit)”). For serial numbers xxx502xxxx and above, use the standard spare kit (see product description for “(gold)”).

Description	Spare part number
System board (includes a graphics subsystem with UMA memory and replacement thermal material):	
Equipped with an AMD A10 Pro-7350B 2.10-GHz (SC turbo up to 3.30-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Professional operating system (non-gold)	765617-601
Equipped with an AMD A10 Pro-7350B 2.10-GHz (SC turbo up to 3.30-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Standard operating system (non-gold)	765617-501
Equipped with an AMD A10 Pro-7350B 2.10-GHz (SC turbo up to 3.30-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and a non-Windows operating system (non-gold)	765617-001
Equipped with an AMD A10 Pro-7350B 2.10-GHz (SC turbo up to 3.30-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Professional operating system (gold)	802507-601
Equipped with an AMD A10 Pro-7350B 2.10-GHz (SC turbo up to 3.30-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Standard operating system (gold)	802507-501
Equipped with an AMD A10 Pro-7350B 2.10-GHz (SC turbo up to 3.30-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and a non-Windows operating system (gold)	802507-001
Equipped with an AMD A8 Pro-7150B 2.00-GHz (SC turbo up to 3.20-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Professional operating system (non-gold)	765616-601
Equipped with an AMD A8 Pro-7150B 2.00-GHz (SC turbo up to 3.20-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Standard operating system (non-gold)	765616-501
Equipped with an AMD A8 Pro-7150B 2.00-GHz (SC turbo up to 3.20-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and a non-Windows operating system (non-gold)	765616-001
Equipped with an AMD A8 Pro-7150B 2.00-GHz (SC turbo up to 3.20-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Professional operating system (gold)	802506-601
Equipped with an AMD A8 Pro-7150B 2.00-GHz (SC turbo up to 3.20-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Standard operating system (gold)	802506-501
Equipped with an AMD A8 Pro-7150B 2.00-GHz (SC turbo up to 3.20-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and a non-Windows operating system (gold)	802506-001
Equipped with an AMD A6 Pro-7050B 2.20-GHz (SC turbo up to 3.00-GHz) dual core processor (1.00-MB L2 cache, 17 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Professional operating system (non-gold)	765615-601

Description	Spare part number
Equipped with an AMD A6 Pro-7050B 2.20-GHz (SC turbo up to 3.00-GHz) dual core processor (1.00-MB L2 cache, 17 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Standard operating system (non-gold)	765615-501
Equipped with an AMD A6 Pro-7050B 2.20-GHz (SC turbo up to 3.00-GHz) dual core processor (1.00-MB L2 cache, 17 W), a graphics subsystem with UMA memory, and a non-Windows operating system (non-gold)	765615-001
Equipped with an AMD A6 Pro-7050B 2.20-GHz (SC turbo up to 3.00-GHz) dual core processor (1.00-MB L2 cache, 17 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Professional operating system (gold)	802505-601
Equipped with an AMD A6 Pro-7050B 2.20-GHz (SC turbo up to 3.00-GHz) dual core processor (1.00-MB L2 cache, 17 W), a graphics subsystem with UMA memory, and the Windows 10 or Windows 8 Standard operating system (gold)	802505-501
Equipped with an AMD A6 Pro-7050B 2.20-GHz (SC turbo up to 3.00-GHz) dual core processor (1.00-MB L2 cache, 17 W), a graphics subsystem with UMA memory, and a non-Windows operating system (gold)	802505-001
System board (gold conversion Kits) (includes a graphics subsystem with UMA memory and replacement thermal material):	
Equipped with an AMD A10 Pro-7350B 2.10-GHz (SC turbo up to 3.30-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 8 Professional operating system (gold conversion Kit)	802507-6C1
Equipped with an AMD A10 Pro-7350B 2.10-GHz (SC turbo up to 3.30-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 8 Standard operating system (gold conversion Kit)	802507-5C1
Equipped with an AMD A10 Pro-7350B 2.10-GHz (SC turbo up to 3.30-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and a non-Windows operating system (gold conversion Kit)	802507-0C1
Equipped with an AMD A8 Pro-7150B 2.00-GHz (SC turbo up to 3.20-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 8 Professional operating system (gold conversion Kit)	802506-6C1
Equipped with an AMD A8 Pro-7150B 2.00-GHz (SC turbo up to 3.20-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and the Windows 8 Standard operating system (gold conversion Kit)	802506-5C1
Equipped with an AMD A8 Pro-7150B 2.00-GHz (SC turbo up to 3.20-GHz) quad core processor (4.00-MB L2 cache, 19 W), a graphics subsystem with UMA memory, and a non-Windows operating system (gold conversion Kit)	802506-0C1
Equipped with an AMD A6 Pro-7050B 2.20-GHz (SC turbo up to 3.00-GHz) dual core processor (1.00-MB L2 cache, 17 W), a graphics subsystem with UMA memory, and the Windows 8 Professional operating system (gold conversion Kit)	802505-6C1
Equipped with an AMD A6 Pro-7050B 2.20-GHz (SC turbo up to 3.00-GHz) dual core processor (1.00-MB L2 cache, 17 W), a graphics subsystem with UMA memory, and the Windows 8 Standard operating system (gold conversion Kit)	802505-5C1
Equipped with an AMD A6 Pro-7050B 2.20-GHz (SC turbo up to 3.00-GHz) dual core processor (1.00-MB L2 cache, 17 W), a graphics subsystem with UMA memory, and a non-Windows operating system (gold conversion Kit)	802505-0C1

Before removing the system 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 service cover (see [Service cover on page 38](#)), and then remove the following components:
 - a. Battery (see [Battery on page 40](#))
 - b. Hard drive (see [Hard drive on page 42](#))
 - c. Keyboard (see [Keyboard on page 52](#))
 - d. RTC battery (see [RTC battery on page 57](#))
 - e. Top cover (see [Top cover on page 58](#))
 - f. Heat sink (see [Heat sink on page 71](#))
 - g. Fan (see [Fan on page 73](#))



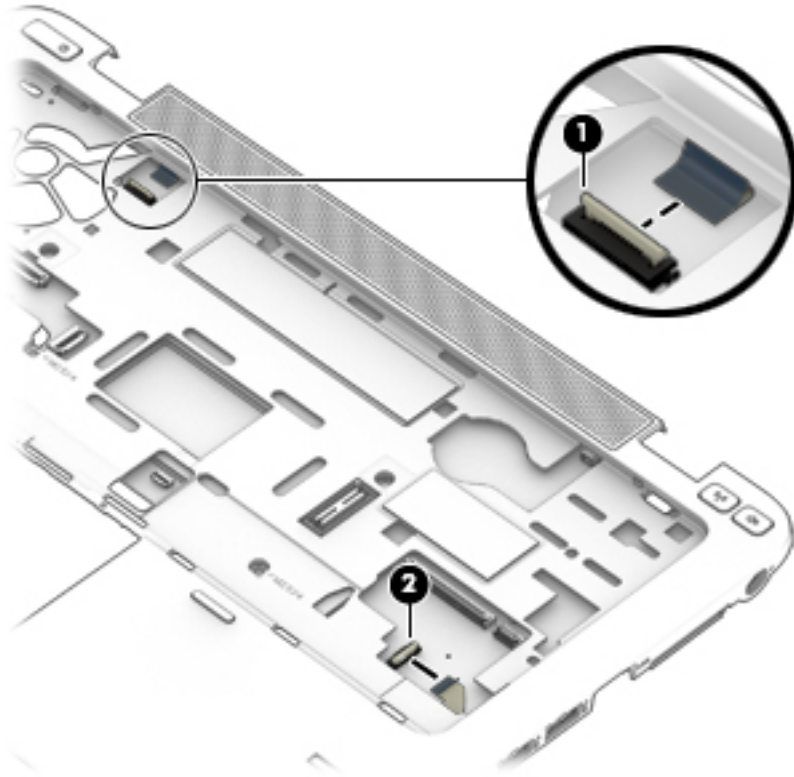
NOTE: When replacing the system board, be sure that the following components are removed from the defective system board and installed on the replacement system board:

- WWAN module (see [WWAN module on page 45](#))
- Solid-state drive (see [Solid-state drive on page 47](#))
- WLAN module (see [WLAN module on page 49](#))
- Memory modules (see [Memory module on page 51](#))

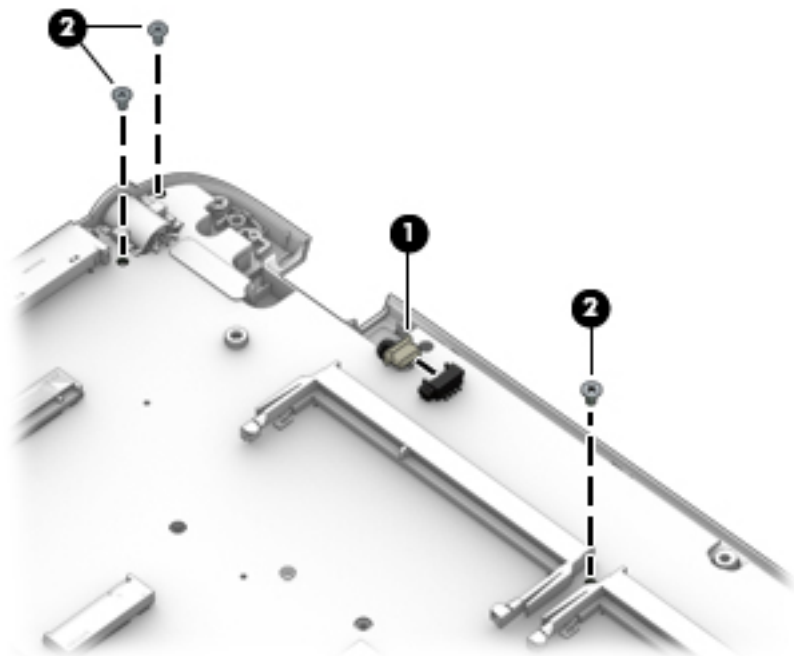
Remove the system board:

1. Turn the top cover upside down with the front toward you.
2. Release the ZIF connector **(1)** to which the power button board cable is attached, and then disconnect the power button board cable from the system board.

3. Release the ZIF connector **(2)** to which the fingerprint reader board cable is attached, and then disconnect the fingerprint reader board cable from the system board.

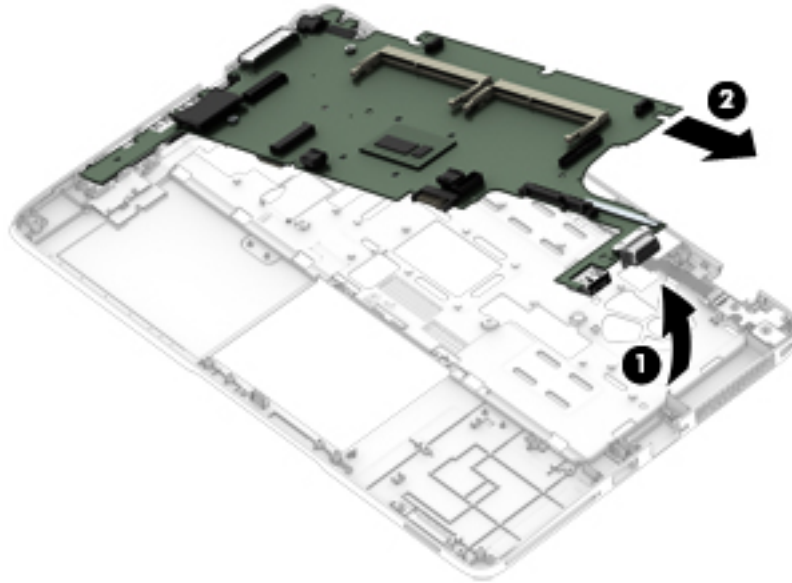


4. Disconnect the speaker cable **(1)** from the system board.
5. Remove the three Phillips PM2.0×3.0 screws **(2)** that secure the system board to the top cover.



6. Lift up on the right side of the system board **(1)** until it rests at an angle.

7. Remove the system board **(2)** by sliding it up and to the right at an angle.



Reverse this procedure to install the system board.

Fingerprint reader board

Description	Spare part number
Fingerprint reader board (includes bracket and cable)	730554-001

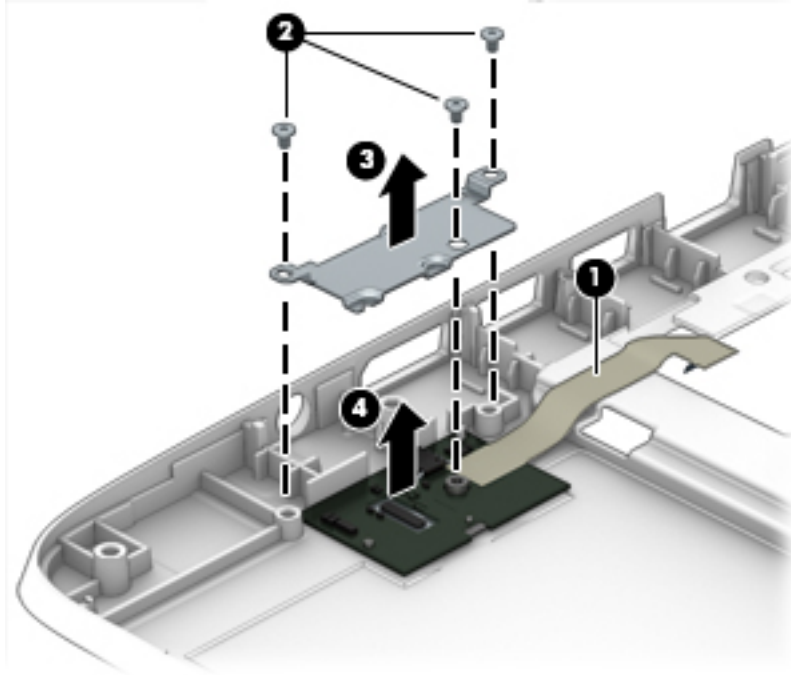
Before removing the fingerprint reader board, follow these steps:

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 service cover (see [Service cover on page 38](#)), and then remove the following components:
 - a. Battery (see [Battery on page 40](#))
 - b. Hard drive (see [Hard drive on page 42](#))
 - c. Keyboard (see [Keyboard on page 52](#))
 - d. Top cover (see [Top cover on page 58](#))

Remove the fingerprint reader board:

1. Turn the top cover upside down with the front toward you.
2. Detach the fingerprint reader board cable **(1)** from the top cover. (The fingerprint reader board cable is attached to the top cover with double-sided adhesive.)
3. Remove the three Phillips PM2.0×2.5 screws that secure the fingerprint reader board and bracket to the top cover.
4. Remove the fingerprint reader board bracket **(3)**.

5. Remove the fingerprint reader board (4).



Reverse this procedure to install the fingerprint reader board.

Speaker assembly

Description	Spare part number
Speaker assembly (includes left and right speakers and cables)	730555-001

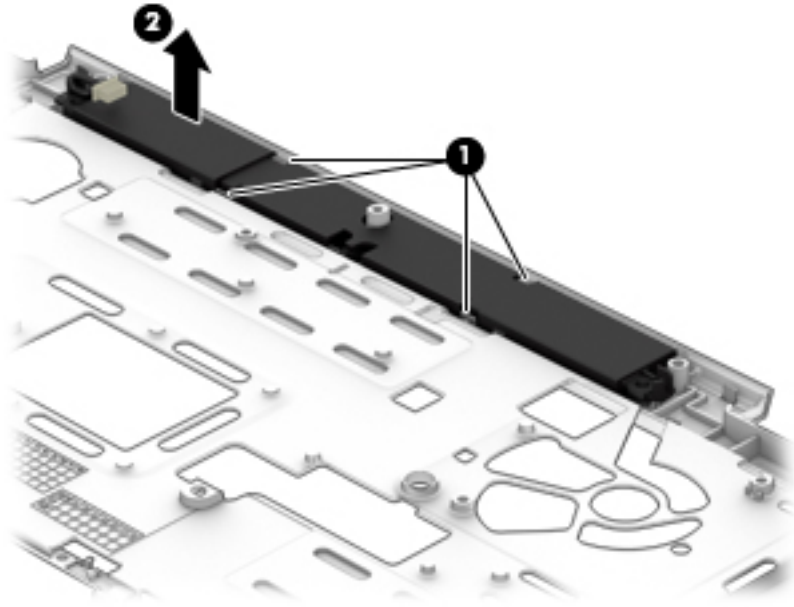
Before removing the speaker assembly, follow these steps:

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 service cover (see [Service cover on page 38](#)), and then remove the following components:
 - a. Battery (see [Battery on page 40](#))
 - b. Hard drive (see [Hard drive on page 42](#))
 - c. Keyboard (see [Keyboard on page 52](#))
 - d. Top cover (see [Top cover on page 58](#))
 - e. System board (see [System board on page 75](#))

Remove the speaker assembly:

1. Release the four clips (1) built into the top cover that secure the speaker assembly to the top cover.

2. Remove the speaker assembly (2).



Reverse this procedure to install the speaker assembly.

Power button board

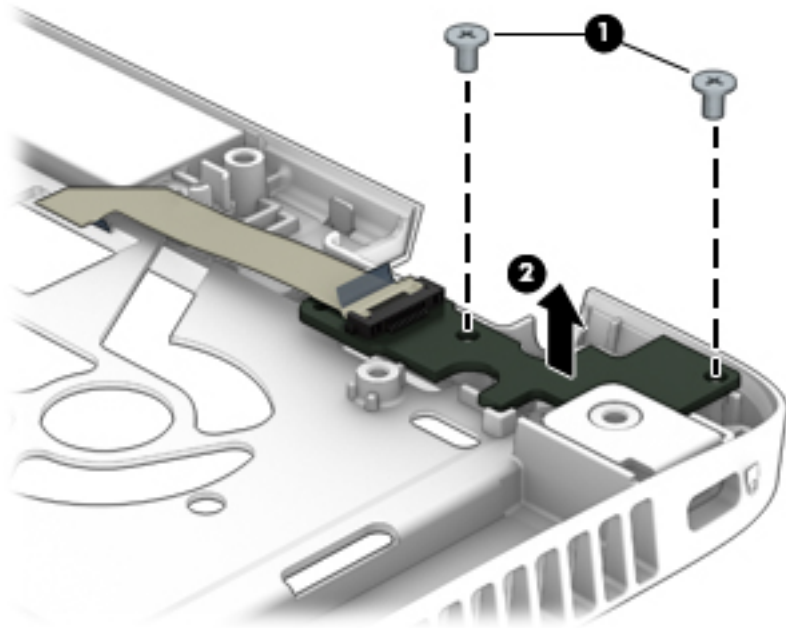
Description	Spare part number
Power button board (includes cable)	730552-001

Before removing the power button 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 service cover (see [Service cover on page 38](#)), and then remove the following components:
 - a. Battery (see [Battery on page 40](#))
 - b. Hard drive (see [Hard drive on page 42](#))
 - c. Keyboard (see [Keyboard on page 52](#))
 - d. Top cover (see [Top cover on page 58](#))
 - e. System board (see [System board on page 75](#))

Remove the power button board:

1. Remove the two Phillips PM2.0×3.25 screws (1) that secure the power button board to the top cover.
2. Remove the power button board (2) and cable.



Reverse this procedure to install the power button board.


7 Computer Setup (BIOS), TPM, and HP Sure Start – Windows 10

Using Computer Setup

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

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

Starting Computer Setup

 **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.
 - Computers or tablets with keyboards:
 - ▲ Turn on or restart the computer, 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 computer restarts.

Restoring factory settings in Computer Setup



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

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

1. Start Computer Setup. See [Starting Computer Setup on page 84](#).
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 computer restarts.



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

Updating the BIOS

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

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

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

Determining the BIOS

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

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


1. Start Computer Setup. See [Starting Computer Setup on page 84](#).
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 86](#).

Downloading a BIOS update

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

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

Do not shut down the computer or initiate Sleep.

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

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

– or –

Select the question mark icon in the taskbar.

2. Select **Updates**, and then select **Check for updates and messages**.
3. Follow the on-screen instructions.
4. At the download area, follow these steps:
 - a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
 - b. Follow the on-screen instructions to download your selection to the hard drive.

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



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

BIOS installation procedures vary. Follow any instructions that are 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. Double-click the file that has an `.exe` extension (for example, `filename.exe`).
The BIOS installation begins.
5. Complete the installation by following the on-screen instructions.




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

Changing the boot order using the f9 prompt


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

1. Access the Boot Device Options menu:
 - Computers or tablets with keyboards:
 - ▲ Turn on or restart the computer, 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 for your computer. You can modify the TPM settings in Computer Setup (BIOS).

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

To access TPM settings in Computer Setup:

1. Start Computer Setup. See [Starting Computer Setup on page 84](#).
2. Select **Security**, select **TPM Embedded Security**, and then follow the on-screen instructions.

Using HP Sure Start (select products only)


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

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

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

8 HP PC Hardware Diagnostics (UEFI) – Windows 10

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.

 **NOTE:** To start BIOS on a convertible computer, your computer must be in notebook mode and you must use the keyboard attached to your tablet. The on-screen keyboard, which displays in tablet mode, cannot access BIOS.

To start HP PC Hardware Diagnostics UEFI:

1. Start BIOS:
 - Computers or tablets with keyboards:
 - ▲ Turn on or restart the computer, quickly press [esc](#).
 - Tablets without keyboards:
 - ▲ Turn on or restart the tablet, and then quickly hold down the volume down button.
 - or –
 - Turn on or restart the tablet, and then quickly hold down the Windows button.

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 90](#).

- 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. On a tablet, press the volume down button to stop a diagnostic test.

 **NOTE:** If you need to stop a diagnostic test on computers or tablets with a keyboard, press [esc](#).

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

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, click 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. Click **Drivers & Downloads**.
3. In the text box, enter the product name, and then click **Go**.

– or –

Click **Find Now** to let HP automatically detect your product.

4. Select your computer, 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 Computer Setup (BIOS), MultiBoot, and System Diagnostics – Windows 8

Using Computer Setup

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

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

Starting Computer Setup

 **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:

1. 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.
2. Press **f10** to enter Computer Setup.

Navigating and selecting in Computer Setup

To navigate and select in Computer Setup, follow these steps:

1. 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:** You can use either a pointing device (TouchPad, pointing stick, or USB mouse) or the keyboard to navigate and make selections in Computer Setup.

2. Press **f10** to enter 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 click the item.
 - To scroll up and down, click 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:
Click the **Exit** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

– or –

Use the **tab** key and the arrow keys to select **File > Ignore Changes and Exit**, and then press **enter**.

- To save your changes and exit Computer Setup menus:

Click the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

– or –

Use the **tab** key and the arrow keys to select **File > Save Changes and Exit**, and then press **enter**.

Your changes go into effect when the computer restarts.

Restoring default 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. 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.
2. Press **f10** to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **File > Restore Defaults**.
4. Follow the on-screen instructions.
5. To save your changes and exit, click the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

– or –

Use the arrow keys to select **File > Save Changes and Exit**, and then press **enter**.

Your changes go into effect when the computer restarts.



NOTE: Your password settings and security settings are not changed when you restore the default 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 determine whether available BIOS updates contain later BIOS versions than those currently installed on the computer, you need to know the version of the system BIOS currently installed.


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

1. Start Computer Setup.
2. Use a pointing device or the arrow keys to select **File > System Information**.
3. To exit Computer Setup without saving your changes, click the **Exit** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

– or –

Use the **tab** key and the arrow keys to select **File > Ignore Changes and Exit**, and then press **enter**.

Downloading a BIOS update

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


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

Do not shut down the computer or initiate Sleep.

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

1. From the Start screen, select the HP Support Assistant app.
2. Select **Updates and tune-ups**, and then select **Check for HP updates now**.
3. At the download area, follow these steps:
 - a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
 - b. Follow the on-screen instructions to download your selection to the hard drive.

If the update is more recent than your BIOS, make a note of the path to the location on your hard drive where the BIOS update is downloaded. You will need to access this path when you are ready to install the update.

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

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

1. From the Start screen, type `e`, and then click **File Explorer**.
2. Click 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 on your hard drive that contains the update.
4. Double-click the file that has an `.exe` extension (for example, `filename.exe`).
The BIOS installation begins.
5. Complete the installation by following the on-screen instructions.



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

Using MultiBoot

About the boot device order

As the computer starts, the system attempts to boot from enabled devices. The MultiBoot utility, which is enabled at the factory, controls the order in which the system selects a boot device. Boot devices can include optical drives, diskette drives, a network interface card (NIC), hard drives, and USB devices. Boot devices contain bootable media or files that the computer needs to start and operate properly.



NOTE: Some boot devices must be enabled in Computer Setup before they can be included in the boot order.

You can change the order in which the computer searches for a boot device by changing the boot order in Computer Setup. You can also press `esc` while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen, and then press `f9`. Pressing `f9` displays a menu that shows the current boot devices and allows you to select a boot device. Or, you can use MultiBoot Express to set the computer to prompt you for a boot location each time the computer turns on or restarts.

Choosing MultiBoot preferences

You can use MultiBoot in the following ways:

- To set a new boot order that the computer uses each time it is turned on, by changing the boot order in Computer Setup.
- To dynamically choose the boot device, by pressing `esc` while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen, and then pressing `f9` to enter the Boot Device Options menu.
- To use MultiBoot Express to set variable boot orders. This feature prompts you for a boot device each time the computer is turned on or restarted.

Setting a new boot order in Computer Setup

To start Computer Setup and set a boot device order that the computer uses each time it is turned on or restarted, follow these steps:

1. 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.
2. Press **f10** to enter Computer Setup.
3. Use a pointing device or the arrow keys to select the **Legacy Boot Order** list, and then press **enter**.
4. To move the device up in the boot order, use a pointing device to click the up arrow, or press the **+** key.
– or –
To move the device down in the boot order, use a pointing device to click the down arrow, or press the **-** key.
5. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.
– or –
Use the arrow keys to select **File > Save Changes and Exit**, and then press **enter**.

Dynamically choosing a boot device using the f9 prompt

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

1. Open the Select Boot Device menu by turning on or restarting the computer, and then pressing **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press **f9**.
3. Use a pointing device or the arrow keys to select a boot device, then press **enter**.

Setting a MultiBoot Express prompt

To start Computer Setup and set the computer to display the MultiBoot startup location menu each time the computer is started or restarted, follow these steps:

1. 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.
2. Press **f10** to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **System Configuration > Boot Options**, and then press **enter**.
4. In the **MultiBoot Express Popup Delay (Sec)** field, enter the length of time in seconds that you want the computer to display the startup location menu before it defaults to the current MultiBoot setting. (When 0 is selected, the Express Boot startup location menu is not displayed.)
5. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the arrow keys to select **File > Save Changes and Exit**, and then press **enter**.

Your changes go into effect when the computer restarts.

Entering MultiBoot Express preferences

When the Express Boot menu is displayed during startup, you have the following choices:

- To specify a boot device from the Express Boot menu, select your preference within the allotted time, and then press **enter**.
- To prevent the computer from defaulting to the current MultiBoot setting, press any key before the allotted time expires. The computer will not start until you select a boot device and press **enter**.
- To allow the computer to start according to the current MultiBoot settings, wait for the allotted time to expire.

Using System Diagnostics

System Diagnostics allows you to run diagnostic tests to determine if the computer hardware is functioning properly. The following diagnostic tests may be available in System Diagnostics:

- **System Tune-Up**—This group of additional tests checks your computer to make sure that the main components are functioning correctly. System Tune-Up runs longer and more comprehensive tests on memory modules, hard drive SMART attributes, the hard drive surface, the battery (and battery calibration), video memory, and the WLAN module status.
- **Start-up test**—This test analyzes the main computer components that are required to start the computer.
- **Run-in test**—This test repeats the start-up test and checks for intermittent problems that the start-up test does not detect.
- **Hard disk test**—This test analyzes the physical condition of the hard drive, and then checks all data in every sector of the hard drive. If the test detects a damaged sector, it attempts to move the data to a good sector.
- **Memory test**—This test analyzes the physical condition of the memory modules. If it reports an error, replace the memory modules immediately.
- **Battery test**—This test analyzes the condition of the battery and calibrates the battery if necessary. If the battery fails the test, contact HP support to report the issue and purchase a replacement battery.
- **BIOS Management**—You can update or rollback the version of the BIOS on the system. Do not shut down or remove external power during the process. You will be given a confirmation screen before your BIOS is modified. Select **BIOS update**, **BIOS Rollback**, or **Back to main menu**.

You can view system information and error logs or select languages in the System Diagnostics window.

To start System Diagnostics:

1. Turn on or restart the computer. While the “Press the ESC key for Startup Menu” message is displayed in the lower-left corner of the screen, press **esc**. When the Startup Menu is displayed, press **f2**.
2. Click the diagnostic test you want to run, and then follow the on-screen instructions.



NOTE: If you need to stop a diagnostics test while it is running, press **esc**.


10 Computer Setup (BIOS), MultiBoot, and UEFI – Windows 7

Using Computer Setup

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

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

Starting Computer Setup

 **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:

1. 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.
2. Press **f10** to enter Computer Setup.

Navigating and selecting in Computer Setup

To navigate and select in Computer Setup, follow these steps:

1. 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:** You can use either a pointing device (TouchPad, pointing stick, or USB mouse) or the keyboard to navigate and make selections in Computer Setup.

2. Press **f10** to enter 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 click the item.
 - To scroll up and down, click 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:
Click the **Exit** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

– or –

- Use the **tab** key and the arrow keys to select **File > Ignore Changes and Exit**, and then press **enter**.
- To save your changes and exit Computer Setup menus:
Click the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.
– or –
Use the **tab** key and the arrow keys to select **File > Save Changes and Exit**, and then press **enter**.
- Your changes go into effect when the computer restarts.

Restoring default 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. 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.
2. Press **f10** to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **File > Restore Defaults**.
4. Follow the on-screen instructions.
5. To save your changes and exit, click the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

– or –

Use the arrow keys to select **File > Save Changes and Exit**, and then press **enter**.

Your changes go into effect when the computer restarts.

 **NOTE:** Your password settings and security settings are not changed when you restore the default 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 determine whether available BIOS updates contain later BIOS versions than those currently installed on the computer, you need to know the version of the system BIOS currently installed.


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

1. Start Computer Setup.
2. Use a pointing device or the arrow keys to select **File > System Information**.
3. To exit Computer Setup without saving your changes, click the **Exit** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

– or –

Use the **tab** key and the arrow keys to select **File > Ignore Changes and Exit**, and then press **enter**.

Downloading a BIOS update

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

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

Do not shut down the computer or initiate Sleep.

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

1. Access Help and Support by selecting **Start > Help and Support**.
2. Select **Updates and tune-ups**, and then select **Check for HP updates now**.
3. At the download area, follow these steps:
 - a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
 - b. Follow the on-screen instructions to download your selection to the hard drive.

If the update is more recent than your BIOS, make a note of the path to the location on your hard drive where the BIOS update is downloaded. You will need to access this path when you are ready to install the update.



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

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

1. Select **Start > Computer**.
2. Click 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 on your hard drive that contains the update.

4. Double-click the file that has an .exe extension (for example, *filename.exe*).
The BIOS installation begins.
5. Complete the installation by following the on-screen instructions.



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

Using MultiBoot

About the boot device order

As the computer starts, the system attempts to boot from enabled devices. The MultiBoot utility, which is enabled at the factory, controls the order in which the system selects a boot device. Boot devices can include optical drives, diskette drives, a network interface card (NIC), hard drives, and USB devices. Boot devices contain bootable media or files that the computer needs to start and operate properly.



NOTE: Some boot devices must be enabled in Computer Setup before they can be included in the boot order.

You can change the order in which the computer searches for a boot device by changing the boot order in Computer Setup. You can also press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen, and then press **f9**. Pressing **f9** displays a menu that shows the current boot devices and allows you to select a boot device. Or, you can use MultiBoot Express to set the computer to prompt you for a boot location each time the computer turns on or restarts.

Choosing MultiBoot preferences

You can use MultiBoot in the following ways:

- To set a new boot order that the computer uses each time it is turned on, by changing the boot order in Computer Setup.
- To dynamically choose the boot device, by pressing **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen, and then pressing **f9** to enter the Boot Device Options menu.
- To use MultiBoot Express to set variable boot orders. This feature prompts you for a boot device each time the computer is turned on or restarted.

Setting a new boot order in Computer Setup

To start Computer Setup and set a boot device order that the computer uses each time it is turned on or restarted, follow these steps:

1. 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.
2. Press **f10** to enter Computer Setup.
3. Use a pointing device or the arrow keys to select the **Legacy Boot Order** list, and then press **enter**.
4. To move the device up in the boot order, use a pointing device to click the up arrow, or press the **+** key.
– or –
To move the device down in the boot order, use a pointing device to click the down arrow, or press the **-** key.
5. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.
– or –
Use the arrow keys to select **File > Save Changes and Exit**, and then press **enter**.

Dynamically choosing a boot device using the f9 prompt

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

1. Open the Select Boot Device menu by turning on or restarting the computer, and then pressing **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press **f9**.
3. Use a pointing device or the arrow keys to select a boot device, then press **enter**.

Setting a MultiBoot Express prompt

To start Computer Setup and set the computer to display the MultiBoot startup location menu each time the computer is started or restarted, follow these steps:

1. 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.
2. Press **f10** to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **System Configuration > Boot Options**, and then press **enter**.
4. In the **MultiBoot Express Popup Delay (Sec)** field, enter the length of time in seconds that you want the computer to display the startup location menu before it defaults to the current MultiBoot setting. (When 0 is selected, the Express Boot startup location menu is not displayed.)
5. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.
– or –
Use the arrow keys to select **File > Save Changes and Exit**, and then press **enter**.

Your changes go into effect when the computer restarts.

Entering MultiBoot Express preferences

When the Express Boot menu is displayed during startup, you have the following choices:

- To specify a boot device from the Express Boot menu, select your preference within the allotted time, and then press **enter**.
- To prevent the computer from defaulting to the current MultiBoot setting, press any key before the allotted time expires. The computer will not start until you select a boot device and press **enter**.
- To allow the computer to start according to the current MultiBoot settings, wait for the allotted time to expire.

Using HP PC Hardware Diagnostics (UEFI) (select models only)

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

To start HP PC Hardware Diagnostics UEFI:

1. Turn on or restart the computer, quickly press **esc**, and then press **f2**.

After pressing **f2**, the BIOS searches three places for the HP PC Hardware Diagnostics (UEFI) 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 103](#).

- b. Hard drive

- c. BIOS

2. Click the type of diagnostic test you want to run, and then follow the on-screen instructions.



NOTE: If you need to stop a diagnostic test while it is running, press **esc**.

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



NOTE: The HP PC Hardware Diagnostics (UEFI) download instructions are provided in English only.


1. Go to <http://www.hp.com>.
2. Click **Support & Drivers**, and then click the **Drivers & Software** tab.
3. Enter the product name in the text box, and then click **Search**.
4. Select your computer model, and then select your operating system.
5. In the Diagnostic section, click **HP UEFI Support Environment**.

– or –


Click **Download**, and then select **Run**.

11 Computer Setup (BIOS) and Advanced System Diagnostics – SUSE Linux

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 peripherals installed, the startup sequence of the computer, and the amount of system and extended memory.

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

Starting Computer Setup

 **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:

1. 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.
2. Press `f10` to enter Computer Setup.

Using Computer Setup

Navigating and selecting in Computer Setup

To navigate and select in Computer Setup, follow these steps:

1. 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.
 - 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 click the item.
 - To scroll up and down, click 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.
 - To close open dialog boxes and return to the main Computer Setup screen, press `esc`, and then follow the on-screen instructions.

 **NOTE:** You can use either a pointing device (TouchPad, pointing stick, or USB mouse) or the keyboard to navigate and make selections in Computer Setup.

2. Press `f10` to enter Computer Setup.

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

- To exit Computer Setup menus without saving your changes, click the **Exit** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the **tab** key and the arrow keys to select **File > Ignore Changes and Exit**, and then press **enter**.

– or –

- To save your changes and exit Computer Setup menus, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the **tab** key and the arrow keys to select **File > Save Changes and Exit**, and then press **enter**.

Your changes go into effect when the computer restarts.

Restoring default 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. 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.
2. Press **f10** to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **File > Restore Defaults**.
4. Follow the on-screen instructions.
5. To save your changes and exit, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the arrow keys to select **File > Save Changes and Exit**, and then press **enter**.

Your changes go into effect when the computer restarts.



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

Updating the BIOS

Updated versions of the BIOS may be available on the HP Web site.

Most BIOS updates on the HP Web site 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 determine whether available BIOS updates contain later BIOS versions than those currently installed on the computer, you need to know the version of the system BIOS currently installed.

BIOS version information (also known as *ROM date* and *System BIOS*) can be displayed as follows:

1. Start Computer Setup.
2. Use a pointing device or the arrow keys to select **File > System Information**.
3. To exit Computer Setup without saving your changes, click the **Exit** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the **tab** key and the arrow keys to select **File > Ignore Changes and Exit**, and then press **enter**.



NOTE: You can also determine the BIOS version by turning on or restarting the computer, pressing the **esc** key while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen, and then pressing the **f1** key. Follow the on-screen instructions to exit this screen.

Downloading a BIOS update



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

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

Do not shut down the computer or initiate Suspend or Hibernation.

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

1. Open your web browser. For U.S. support, go to <http://www.hp.com/go/contactHP>. For worldwide support, go to http://welcome.hp.com/country/us/en/wwcontact_us.html.
2. Follow the on-screen instructions to identify your computer and access the BIOS update you want to download.
3. Click the option for software and driver downloads, type your computer model number in the product box, and then press **enter**. Follow the on-screen instructions to identify your computer and access the BIOS update you want to download.
4. Click your specific product from the models listed.
5. Click the appropriate operating system.
6. Go to the BIOS section and download the BIOS software package.
7. Follow the installation instructions as provided with the downloaded BIOS software package.



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

Using Advanced System Diagnostics

Advanced System Diagnostics allows you to run diagnostic tests to determine if the computer hardware is functioning properly. The following diagnostic tests are available in Advanced System Diagnostics:

- **Start-up test**—This test analyzes the main computer components that are required to start the computer.
- **Run-in test**—This test repeats the start-up test and checks for intermittent problems that the start-up test does not detect.
- **Hard disk test**—This test analyzes the physical condition of the hard drive, and then checks all data in every sector of the hard drive. If the test detects a damaged sector, it attempts to move the data to a good sector.
- **Memory test**—This test analyzes the physical condition of the memory modules. If it reports an error, replace the memory modules immediately.
- **Battery test**—This test analyzes the condition of the battery and calibrates the battery if necessary. If the battery fails the test, contact support to report the issue and purchase a replacement battery.
- **System Tune-Up**—This group of additional tests checks your computer to make sure that the main components are functioning correctly. System Tune-Up runs longer and more comprehensive tests on memory modules, hard drive SMART attributes, the hard drive surface, the battery (and battery calibration), video memory, and the WLAN module status.

You can view system information and error logs in the Advanced System Diagnostics window.

To start Advanced System Diagnostics:

1. Turn on or restart the computer. While the “Press the ESC key for Startup Menu” message is displayed in the lower-left corner of the screen, press **esc**. When the Startup Menu is displayed, press **f2**.
2. Click the diagnostic test you want to run, and then follow the on-screen instructions.



NOTE: If you need to stop a diagnostics test while it is running, press **esc**.

12 Specifications

	Metric	U.S.
Dimensions		
Width	21.0 cm	12.2 in
Depth	21.5 cm	8.5 in
Height	2.1 cm	0.83 in
Equipped with 3-cell, 26-WHr battery, 1 memory module, WLAN module, lightest solid-state module, but without fingerprint reader, webcam, or WWAN module	1.33 kg	2.93 lb
Equipped with 3-cell, 46-WHr battery, 1 memory module, WLAN module, lightest solid-state module, but without fingerprint reader, webcam, or WWAN module	1.42 kg	3.13 lb
Operating voltage and current	19.5 V dc @ 2.31 A - 45 W	
	19.5 V dc @ 3.33 A - 65 W	
Temperature		
Operating	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F
Relative humidity (non-condensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating	-15 m to 3,048 m	-50 ft to 10,000 ft
Nonoperating	-15 m to 12,192 m	-50 ft to 40,000 ft
NOTE: Applicable product safety standards specify thermal limits for plastic surfaces. The device operates well within this range of temperatures.		

13 Backup and recovery – Windows 10

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 –

Click 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 computer model.

- Use HP Recovery Manager to create HP Recovery media after you successfully set up the computer. This step creates a backup of the HP Recovery partition on the computer. 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 110](#). For information on the recovery options that are available using the recovery media, see [Using Windows Tools on page 111](#).
- 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 112](#).

 **NOTE:** If storage is 32 GB or less, 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 computer 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 computer. 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 computer 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 computer. 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 computer and determines the required storage capacity for the media that will be required.
 - To create recovery discs, your computer 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 computer 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 computer; 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 computer from HP. See the *Worldwide Telephone Numbers* booklet included with the computer. 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 computer 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 112](#).

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, 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 computer, and resetting the computer 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 112](#). If you have not already created recovery media, see [Creating HP Recovery media \(select products only\) on page 110](#).
- On select products, if you want to recover the computer'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 112](#).
- 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 [Removing the HP Recovery partition \(select products only\) on page 114](#).

Recovering using HP Recovery Manager


HP Recovery Manager software allows you to recover the computer 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 110](#).

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 computer, 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 computer issues.

- 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 110](#).
- If your computer 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 computer. 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 computer 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 computer 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 computers or tablets with keyboards attached, press **f11** while the computer 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**.

– or –


Turn on or restart the tablet, and then quickly hold down the Windows 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 computer.


 **NOTE:** If the computer does not automatically restart in HP Recovery Manager, change the computer boot order. See [Changing the computer boot order on page 114](#).

3. Follow the on-screen instructions.

Changing the computer boot order

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

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 computers or tablets with keyboards attached:

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

For tablets without keyboards:

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


– or –


Turn on or restart the tablet, and then quickly hold down the Windows 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 110](#).

 **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.


14 Backup and recovery – Windows 8

To protect your information, use Windows backup and restore utilities to back up individual files and folders, back up your entire hard drive, create system repair media (select models only) by using the installed optical drive (select models only) or an optional external optical drive, or create system restore points. In case of system failure, you can use the backup files to restore the contents of your computer.


In Windows 8, from the Start screen, type `restore`, click **Settings**, and then select from the list of displayed options.

- or -

In Windows 8.1, from the Start screen, type `restore`, and then select from the list of displayed options.

 **NOTE:** For detailed instructions on various backup and restore options, perform a search for these topics in HP Support Assistant. To access HP Support Assistant on the Start screen, select the **HP Support Assistant** app.

In case of system instability, HP recommends that you print the recovery procedures and save them for later use.

 **NOTE:** Windows includes the User Account Control feature to improve the security of your computer. You may be prompted for your permission or password for tasks such as installing software, running utilities, or changing Windows settings. Refer to HP Support Assistant. To access HP Support Assistant on the Start screen, select the **HP Support Assistant** app.

Backing up your information

Recovery after a system failure is as good as your most recent backup. You should create system repair media and your initial backup immediately after initial system setup. As you add new software and data files, you should continue to back up your system on a regular basis to maintain a reasonably current backup. The system repair media (select models only) are used to start up (boot) the computer and repair the operating system in case of system instability or failure. Your initial and subsequent backups allow you to restore your data and settings if a failure occurs.


On Start screen, type `backup`, click **Settings**, and then select **Save backup copies of your files with File History**.


You can back up your information to an optional external hard drive or a network drive.

Note the following when backing up:

- Store personal files in the Documents library, and back it up regularly.
- Back up templates that are stored in their associated programs.
- Save customized settings that appear in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time-saver if you have to reset your preferences.


To create a backup using Backup and Restore in Windows 8.0:


 **NOTE:** Be sure that the computer is connected to AC power before you start the backup process.

 **NOTE:** The backup process may take over an hour, depending on file size and the speed of the computer.

1. From the Start screen, type `backup`, and then click **Settings**.
2. Click **Save backup copy of your files with file history**.
File History windows are launched.
3. Follow the on-screen instructions to use file history to backup files.
- or -
Click **recovery** to create a recovery drive using a USB flash drive.
- or -
Click **Windows 7 file recovery**, and then click **create a system image** to create a system image.

To create a backup using Backup and Restore in Windows 8.1:

 **NOTE:** Be sure that the computer is connected to AC power before you start the backup process.


 **NOTE:** The backup process may take over an hour, depending on file size and the speed of the computer.

1. From the Start screen, type `backup`.
2. Click **Save backup copy of your files with file history**.
File History windows are launched.
3. Follow the on-screen instructions to use file history to backup files.
- or -
Click **recovery** to create a recovery drive using a USB flash drive.
- or -
Click **System Image Backup** to create a system image.


Performing a system recovery

In case of system failure or instability, the computer provides the following tools to recover your files:

- **Windows recovery tools:** You can use Windows Backup and Restore to recover information you have previously backed up. You can also use Windows Automatic Repair to fix problems that might prevent Windows from starting correctly.
- **f11 recovery tools:** You can use the **f11** recovery tools to recover your original hard drive image. The image includes the Windows operating system and software programs installed at the factory.


 **NOTE:** If you are unable to boot (start up) your computer and you cannot use the system repair media you previously created (select models only), you must purchase Windows 8 operating system media to reboot the computer and repair the operating system.

Using f11 recovery tools

 **CAUTION:** Using **f11** completely erases hard drive contents and reformats the hard drive. All files that you have created and any software that you have installed on the computer are permanently removed. The **f11** recovery tool reinstalls the operating system and HP programs and drivers that were installed at the factory. Software not installed at the factory must be reinstalled.

To recover the original hard drive image using **f11**:


1. If possible, back up all personal files.
2. If possible, check for the presence of the Recovery Image partition: From the Start screen, type **C**, and then select **Computer**.

 **NOTE:** If the Recovery Image partition is not listed, you must recover your operating system and programs using the Windows 8 operating system media and the *Driver Recovery* media (both purchased separately).


3. If the Recovery Image partition is listed, 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.
4. Press **f11** while the “Press <F11> for recovery” message is displayed on the screen.
5. Choose your language.
6. Choose your keyboard layout.
7. Select **Troubleshoot** from the boot options menu.
8. Select **Reset your PC**, and follow the on-screen instructions.

Using Windows 8 operating system media (purchased separately)

To order a Windows 8 operating system DVD, go to <http://www.hp.com/support>, select your country or region, and follow the on-screen instructions. You can also order the DVD by calling support. For contact information, see the *Worldwide Telephone Numbers* booklet included with the computer.

 **CAUTION:** Using a Windows 8 operating system media completely erases hard drive contents and reformats the hard drive. All files that you have created and any software that you have installed on the computer are permanently removed. When reformatting is complete, the recovery process helps you restore the operating system, as well as drivers, software, and utilities.

To initiate recovery using a Windows 8 operating system DVD:

 **NOTE:** This process takes several minutes.


1. If possible, back up all personal files.
2. Restart the computer, and then insert the Windows 8 operating system DVD into the optical drive before the Windows operating system loads.
3. Power off the computer.
4. Power on the computer, and then press **F9** to show the BIOS boot menu.
5. When the DVD is booting, select the DVD from the **UEFI Boot Sources**.
6. When prompted, press any keyboard key.
7. Follow the on-screen instructions.


After the installation is completed:


1. Eject the Windows 8 operating system media and then insert the *Driver Recovery* media.
2. Install the Hardware Enabling Drivers first, and then install Recommended Applications.

Using Windows Refresh for quick and easy recovery

When your computer is not working properly and you need to regain system stability, the Windows Refresh option allows you to start fresh and keep what is important to you.

 **IMPORTANT:** Refresh removes any traditional applications that were not originally installed on the system at the factory.

 **NOTE:** During Refresh, a list of removed traditional applications will be saved so that you have a quick way to see what you might need to reinstall. See HP Support Assistant for instructions on reinstalling traditional applications. To access HP Support Assistant on the Start screen, select the **HP Support Assistant** app.


 **NOTE:** You may be prompted for your permission or password when using Refresh. See HP Support Assistant for more information. To access HP Support Assistant on the Start screen, select the **HP Support Assistant** app.

To start Refresh:

1. On the Start screen, point to the far-right upper or lower corner of the screen to display the charms.
2. Click **Settings**.
3. Click **Change PC settings** in the bottom-right corner of the screen.
4. In Windows 8.0, select **General** from the PC settings screen.
- or -
In Windows 8.1, select **Update and Recovery**, and then select **Recovery**.
5. Scroll the right-side choices down to display **Refresh your PC without affecting your files**.
6. Under **Refresh your PC without affecting your files**, select **Get started**, and follow the on-screen instructions.

Remove everything and reinstall Windows

Sometimes you want to perform detailed reformatting of your computer, or you want to remove personal information before you give away or recycle your computer. The process described in this section provides a speedy, simple way to return the computer to its original state. This option removes all personal data, apps, and settings from your computer, and reinstalls Windows.

 **IMPORTANT:** This option does not provide backups of your information. Before using this option, back up any personal information you wish to retain.

You can initiate this option by using the **f11** key or from the Start screen.

To use the **f11** key:

1. Press **f11** while the computer boots.
- or -
Press and hold **f11** as you press the power button.
2. Choose your language.
3. Choose your keyboard layout.
4. Select **Troubleshoot** from the boot options menu.
5. Select **Reset your PC**, and follow the on-screen instructions.

To use the Start screen:

1. On the Start screen, point to the far-right upper or lower corner of the screen to display the charms.
2. Click **Settings**.
3. Click **Change PC settings** in the bottom-right corner of the screen.
4. In Windows 8.0, select **General** from the PC settings screen.
- or -
In Windows 8.1, select **Update and Recovery**, and then select **Recovery**.
5. Scroll the right-side choices down to display **Remove everything and reinstall Windows**.
6. Under **Remove everything and reinstall Windows**, select **Get started**, and follow the on-screen instructions.

Using HP Software Setup

HP Software Setup can be used to reinstall drivers or select software that has been corrupted or deleted from the system.

1. From the Start screen, type `HP Software Setup`, and select **Apps**.
2. Open HP Software Setup.
3. Follow the on-screen directions to reinstall drivers or select software.

15 Backup and recovery – Windows 7

Your computer includes HP and Windows tools to help you safeguard your information and retrieve it if you ever need to. These tools will help you return your computer to a proper working state, all with simple steps. This section provides information about the following processes:

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

Creating recovery media and backups

Recovery after a system failure is only as good as your most recent backup.

1. After you successfully set up the computer, create HP Recovery media. This step creates a Windows 7 operating system DVD and a *Driver Recovery* DVD. The Windows DVD can be used to reinstall the original operating system in cases where the hard drive is corrupted or has been replaced. The *Driver Recovery* DVD installs specific drivers and applications. See [Creating recovery media with HP Recovery Disc Creator on page 122](#).
2. Use Windows Backup and Recovery tools to perform the following:
 - Back up individual files and folders
 - Back up your entire hard drive (select models only)
 - Create system repair discs (select models only) with the installed optical drive (select models only) or an optional external optical drive
 - Create system restore points



NOTE: This guide describes an overview of backing up, restoring, and recovering options. For more details about the tools provided, see Help and Support. To access Help and Support, select **Start > Help and Support**.



NOTE: HP recommends that you print the recovery procedures and save them for later use, in case of system instability.

In case of system failure, you can use the backup files to restore the contents of your computer. See [Backing up your information on page 123](#).

Guidelines

- When creating recovery media or backing up to discs, use any of the following types of discs (purchased separately): DVD+R, DVD+R DL, DVD-R, DVD-R DL, or DVD±RW. The discs you use will depend on the type of optical drive you are using.
- Be sure that the computer is connected to AC power before you start the recovery media creation process or the backup process.

Creating recovery media with HP Recovery Disc Creator

HP Recovery Disc Creator is a software program that offers an alternative way to create recovery media. After you successfully set up the computer, you can create recovery media using HP Recovery Disc Creator. This recovery media allows you to reinstall your original operating system as well as select drivers and applications if the hard drive becomes corrupted. HP Recovery Disc Creator can create two kinds of recovery DVDs:

- *Windows 7 operating system DVD*—Installs the operating system without additional drivers or applications.
- *Driver Recovery DVD*—Installs specific drivers and applications only, in the same way that the HP Software Setup utility installs drivers and applications.

Creating recovery media



NOTE: The Windows 7 operating system DVD can be created only once. Thereafter, the option to create that media will not be available after you create a Windows DVD.

To create the Windows DVD:

1. Select **Start > All Programs > Productivity and Tools > HP Recovery Disc Creator**.
2. Select **Windows disk**.
3. From the drop-down menu, select the drive for burning the recovery media.
4. Click the **Create** button to start the burning process. Label the disc after you create it, and store it in a secure place.

After the Windows 7 operating system DVD has been created, create the *Driver Recovery DVD*:

1. Select **Start > All Programs > Productivity and Tools > HP Recovery Disc Creator**.
2. Select **Driver disk**.
3. From the drop-down menu, select the drive for burning the recovery media.
4. Click the **Create** button to start the burning process. Label the disc after you create it, and store it in a secure place.

Backing up your information


You should create system repair media and your initial backup immediately after initial system setup. As you add new software and data files, you should continue to back up your system on a regular basis to maintain a reasonably current backup. You should also create Windows system repair media (select models only) which can be used to start up (boot) the computer and repair the operating system in case of system instability or failure. Your initial and subsequent backups allow you to restore your data and settings if a failure occurs.

You can back up your information to an optional external hard drive, a network drive, or discs.


Note the following when backing up:

- Store personal files in the Documents library, and back it up regularly.
- Back up templates that are stored in their associated directories.
- Save customized settings that appear in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time-saver if you have to reset your preferences.
- When backing up to discs, number each disc after removing it from the drive.

 **NOTE:** For detailed instructions on various backup and restore options, perform a search for these topics in Help and Support. To access Help and Support, select **Start > Help and Support**.

 **NOTE:** Windows includes the User Account Control feature to improve the security of your computer. You may be prompted for your permission or password for tasks such as installing software, running utilities, or changing Windows settings. Refer to Help and Support. To access Help and Support, select **Start > Help and Support**.

To create a backup using Windows Backup and Restore:


 **NOTE:** The backup process may take over an hour, depending on file size and the speed of the computer.

1. Select **Start > All Programs > Maintenance > Backup and Restore**.
2. Follow the on-screen instructions to set up your backup, create a system image (select models only), or create system repair media (select models only).

Performing a system recovery

In case of system failure or instability, the computer provides the following tools to recover your files:


- Windows recovery tools: You can use Windows Backup and Restore to recover information you have previously backed up. You can also use Windows Startup Repair to fix problems that might prevent Windows from starting correctly.
- **f11** recovery tools (select models only): You can use the **f11** recovery tools to recover your original hard drive image. The image includes the Windows operating system and software programs installed at the factory.


 **NOTE:** If you are unable to boot (start up) your computer and you cannot use the system repair media you previously created (select models only), you must purchase Windows 7 operating system media to reboot the computer and repair the operating system.

Using the Windows recovery tools

Using the Windows recovery tools, you can:

- Recover individual files
- Restore the computer to a previous system restore point
- Recover information using recovery tools


 **NOTE:** For detailed instructions on various recovery and restore options, perform a search for these topics in Help and Support. To access Help and Support, select **Start > Help and Support**.

 **NOTE:** Windows includes the User Account Control feature to improve the security of your computer. You may be prompted for your permission or password for tasks such as installing software, running utilities, or changing Windows settings. Refer to Help and Support. To access Help and Support, select **Start > Help and Support**.

To recover information you previously backed up:


1. Select **Start > All Programs > Maintenance > Backup and Restore**.
2. Follow the on-screen instructions to recover your system settings, your computer (select models only), or your files.

To recover your information using Startup Repair, follow these steps:


 **CAUTION:** Some Startup Repair options will completely erase and reformat the hard drive. All files you have created and any software installed on the computer are permanently removed. When reformatting is complete, the recovery process restores the operating system, as well as the drivers, software, and utilities from the backup used for recovery.

1. If possible, back up all personal files.
2. If possible, check for the presence of the Recovery Image partition and the Windows partition.


To check for the Windows partition, select **Start > Computer**.

 **NOTE:** If the Windows partition and the Recovery Image partition is not listed, you must recover your operating system and programs using the Windows 7 operating system DVD and the *Driver Recovery* media.

3. If the Windows partition is listed, restart the computer, and then press **F8** before the Windows operating system loads.
4. Select **Startup Repair**.
5. Follow the on-screen instructions.


 **NOTE:** For additional information on recovering information using the Windows tools, select **Start > Help and Support**.

Using f11 recovery tools (select models only)

 **CAUTION:** Using **f11** completely erases hard drive contents and reformats the hard drive. All files that you have created and any software that you have installed on the computer are permanently removed. The **f11** recovery tool reinstalls the operating system and HP programs and drivers that were installed at the factory. Software not installed at the factory must be reinstalled.

To recover the original hard drive image using **f11**:

1. If possible, back up all personal files.
2. If possible, check for the presence of the Recovery Image partition: click **Start**, right-click **Computer**, click **Manage**, and then click **Disk Management**.


 **NOTE:** If the Recovery Image partition is not listed, you must recover your operating system and programs using the Windows 7 operating system media and the *Driver Recovery* media.

3. If the Recovery Image partition is listed, 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.
4. Press **f11** while the “Press <F11> for recovery” message is displayed on the screen.
5. Follow the on-screen instructions.


Using Windows 7 operating system media

If you cannot use the recovery media you previously created using the HP Recovery Disc Creator (select models only), you must purchase a Windows 7 operating system DVD to reboot the computer and repair the operating system.

To order a Windows 7 operating system DVD, go to the HP website. For U.S. support, go to <http://www.hp.com/support>. For worldwide support, go to http://welcome.hp.com/country/us/en/wwcontact_us.html. You can also order the DVD by calling support. For contact information, see the *Worldwide Telephone Numbers* booklet included with the computer.

 **CAUTION:** Using a Windows 7 operating system DVD completely erases hard drive contents and reformats the hard drive. All files that you have created and any software that you have installed on the computer are permanently removed. When reformatting is complete, the recovery process helps you restore the operating system, as well as drivers, software, and utilities.

To initiate recovery using a Windows 7 operating system DVD:

 **NOTE:** This process takes several minutes.

1. If possible, back up all personal files.
2. Restart the computer, and then insert the Windows 7 operating system DVD into the optical drive before the Windows operating system loads.
3. When prompted, press any keyboard key.
4. Follow the on-screen instructions.
5. Click **Next**.
6. Select **Install now**.
7. Follow the on-screen instructions.

After the installation is completed:

1. Eject the Windows 7 operating system DVD and then insert the *Driver Recovery* DVD.
2. Install the Hardware Enabling Drivers first, and then install Recommended Applications.

16 Backup and Recovery – SUSE Linux

Recovery after a system failure is as good as your most recent backup. As you add new software and data files, you should continue to back up your system on a regular basis to maintain a reasonably current backup.

Your computer includes tools provided by HP to help you safeguard your information and retrieve it if ever needed.

Creating backups

1. Create restore media immediately after you set up the computer.
2. As you add files, routinely create a backup of your system and personal information.

Creating restore media

You can create an HP Factory Image, using an installed or an external DVD±RW optical drive or a USB drive. The HP Factory Image can be used to perform system recovery in the event of a system failure. The recovery tool reinstalls the original operating system and HP programs and drivers that were installed at the factory.

To create the restore media:

1. Select **Computer > More Applications**.
2. In the left pane, click **Tools**, and then click **Create HP Factory Image** in the right pane.
3. Follow the on-screen instructions to create an image file to burn a recovery disc.



NOTE: The image produced by HP Create Factory Image can be written to a USB disk on key or a DVD. If you are writing to a DVD, follow the on-screen instructions. To write the image to a USB disk on key:

To write the image to a USB disk on key:

- a. Insert the USB disk on key in a USB port.
- b. To transfer the image to a USB disk on key, use the **dd** command.

Backing up your information

You should back up your computer files on a regular schedule to maintain a current backup. You can manually back up your information to an optional external drive, a network drive, or discs. Back up your system at the following times:

- At regularly scheduled times
- Before the computer is repaired or restored
- Before you add or modify hardware or software

To back up your home directory files using **Backup Manager Settings**:

1. Select **Computer > More Applications > Tools > Backup Manager Settings**, and click **Backup my home directory**.
2. Click **Storage Destination Location**, and then select a location to back up your information.

3. Click **Schedule**, and then select a time schedule to perform backups at a regularly scheduled time.
To immediately back up your information, click the **Backup Now** check box.



NOTE: Before you back up your information, be sure you have designated a location to save the backup files.

4. Click **Save and Backup** to start the backup and to save the backup settings.

To restore backup files:

1. Select **Computer > More Applications > Tools > Backup Manager Restore**.
2. Click **Backup Source**, and then select the location of the backup files.
3. Click **Restore Destination**, and then select the destination to restore the files.
4. To restore all files from the selected location, click **Restore all files**. To restore select files only, click **Restore selected files**, click **Select Files** and then select the files to be restored.
5. Under **Restore Point**, click the time and date of the backup.



NOTE: If multiple backups have been performed, click **Use the latest version** to restore the latest version.

6. Click **Restore** to start restoring the files, or click **Cancel** to cancel the operation.

Performing a system recovery

Recovery allows you to repair or restore the computer to its original factory state.



CAUTION: Using Recovery completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. The recovery tool reinstalls the original operating system and HP programs and drivers that were installed at the factory. Software, drivers, and updates not installed by HP must be manually reinstalled. Personal files must be restored from a backup.

To restore the computer using the HP Factory Image, you must first create the recovery media. If you have not already created it, see [Creating restore media on page 127](#).

To restore the computer from the recovery disc, follow these steps:

1. If possible, back up all personal files.
2. Insert the HP Factory Image into the optical drive or insert the USB disk on key into the USB port, and restart the computer.
3. As the computer is restarting, press **f9** to open the Computer Setup boot option menu and select the option for the optical drive, if you are using a DVD to restore. If you are using a USB disk to key, select USB disk on key.
4. Press the down arrow to select **Restore SLED HP-BNB preload image** from the **Linux boot** menu, and then press **enter**.
5. Using the arrow keys, select **Yes** when prompted: **Do you want to start the System-Restore?**
6. Follow the on-screen instructions.



NOTE: The image produced by the Create Factory Image utility may be written to either a USB disk on a key or a DVD. To write the image to a disk, use the `dd` command to transfer the image to a USB disk on a key. The USB disk on a key may be inserted in a USB port.

Remove everything and reinstall SLED

Sometimes you want to perform detailed reformatting of your computer, or you want to remove personal information before you give away or recycle your computer. The process described in this section provides a speedy, simple way to return the computer to its original state. This option removes all personal data, applications, and settings from your computer, and reinstalls the Linux operating system.



IMPORTANT: This option does not provide backups of your information. Before using this option, back up any personal information you wish to retain.

You can initiate this option by using the **f11** key.

To use the **f11** key:

Press **f11** while the computer boots.

– or –

Press and hold **f11** as you press the power button.

The following options are available:

- **Cancel/Reboot**—Reboots the system. No recovery or restore activity is performed.
- **Recover/Repair System**—This option repairs a system that is not working properly and preserves user data.
- **Restore Factory System**—This option restores the system back to the original factory state. User data is not preserved.

Select an option and follow the on-screen instructions.

17 Statement of Volatility

The purpose of this document is to provide general information regarding non-volatile memory in industry-standards based HP Business Notebook PC systems and provide 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 Notebook 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 Notebook PC system, personal data can remain on volatile system memory (DIMMs) for a finite period of time and will also remain in nonvolatile memory. The steps below will remove personal data from the notebook PC, including the nonvolatile memory found in Intel-based and AMD-based system boards. Some of these steps are disclosed in the Maintenance and Service Guides available for HP PC products available on the product support pages at www.hp.com.

1. Follow steps (a) through (i) below to restore the nonvolatile memory that can contain personal data. Restoring or re-programming nonvolatile memory that does not store personal data is neither necessary nor recommended.
 - a. Enter BIOS (F10) Setup by powering on the system and pressing **F10** when prompted near the bottom of the display, or press the **ESC** key to display the start up menu, then press **F10**. If the system has a BIOS administrator password, enter the password at the prompt.
 - b. Select the **Main** menu, then **Restore Defaults**.
 - c. Select the **System Configuration** menu, then **Restore Security Defaults**.
 - d. 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 the tag that has been set. Press the spacebar once to clear the tag, then press **Enter** to return to the prior menu.
 - e. If a DriveLock password is set, select the **Security** menu, scroll down to **DriveLock**, then select **DriveLock password**. Select the desired hard drive. Click **Disable protection**, enter the existing master DriveLock password, then press **Enter** to confirm and return to the prior menu. Repeat this procedure if more than one hard drive has a DriveLock password.
 - f. If an Automatic DriveLock password is set, select the **Security menu**, scroll down to **Automatic DriveLock**, then select the desired hard drive and disable protection. Repeat this procedure if more than one hard drive has an Automatic DriveLock password.
 - g. Select the **File** menu, then **Reset BIOS Security** to factory default. Click **yes** at the warning message.
 - h. Select the **Main** menu, then **Save Changes and Exit**.
 - i. Reboot the system. If the system has a Trusted Platform Module and/or fingerprint sensor, one or two prompts will appear: one to clear the TPM and the other to reset fingerprint sensor. Press **F1** to accept or **F2** to reject.

If the HP notebook model number ends in a 'p' or 'w' and includes Intel Centrino with VPro™, reboot the PC and enter BIOS Setup by pressing **F10** when prompted. Select **System**


Configuration, then **AMT Options**. Then select **Un-configure AMT on next boot**. Select **Save**, then **Yes**. Select the **File** menu, and then select **Save Changes and Exit**. Reboot the system and confirm that you want to un-configure AMT.

- j. If the optional Intel Anti-Theft Technology (AT) was activated, contact the provider to deactivate it.
 - k. If the optional Absolute® Software Computrace® management and tracking service was activated on the notebook PC, contact the provider to deactivate it.
 - l. Remove all power and system batteries for at least 24 hours.
2. Remove and retain the storage drive or clear the contents of the drive.

a. Hard Disk Drive (HDD)

Clear the HDD contents by using the HP Disk Sanitizer® utility or a third party application that, ideally, is U.S. Department of Defense (DOD) 5220.22-M approved.

To run HP Disk Sanitizer, enter BIOS Setup by powering on the system and pressing **F10** when prompted near the bottom of the display, or press **ESC** to display the start up menu, then press **F10**. Select the **Security** menu and scroll down to the **Utilities** menu. Select **Disk Sanitizer** and select the desired drive. For a higher level of protection, select **Optimum**.

 **NOTE:** This process will take a long time, and the amount of time varies based on the hard drive capacity.

b. Solid State Drive (SSD)

Clear the SSD contents by using the BIOS Setup Secure Erase command option, or by using a third party utility designed to erase data from an SSD. To run Secure Erase, enter BIOS Setup by powering on the system and pressing **F10** when prompted near the bottom of the display. Select the **Security** menu and scroll down to the **Utilities** menu. Select **Secure Erase** and select the desired hard drive.

Non-volatile memory usage

Non Volatile 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 MB	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 136 .	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.

Non Volatile 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?
Real Time Clock (RTC) battery backed-up CMOS configuration memory (CMOS)	256 Bytes	No	Yes	Stores system date and time and limited keyboard controller data.	Using the F10 Setup utility or changing the Windows date and time.	This memory is not write-protected. HP recommends password protecting the F10 Setup utility.
Controller (NIC) EEPROM	64 KBytes (not customer accessible)	No	Yes	Store NIC configuration and NIC firmware.	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 NIC vendor. Writing data to this ROM in an inappropriate manner will render the NIC nonfunctional.
Keyboard ROM	64 KBytes (not customer accessible)	No	Yes	Stores firmware code (keyboard, mouse, & battery management).	Programmed at the factory. Code is updated when the system BIOS is updated.	A utility is required for writing data to this memory and is available on the HP website. Writing data to this ROM in an inappropriate manner can render the PC nonfunctional.
DIMM Serial Presence Detect (SPD) configuration data	256 Bytes per memory module, 128 Bytes programmable (not customer accessible)	No	Yes	Stores memory module information.	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 to 5 MBytes	Yes	Yes	Store 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 F10 setup utility	A utility is required for writing data to this memory and is available on the HP website. Writing data to this ROM in an inappropriate manner can render the PC nonfunctional.

Non Volatile 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 only in specific ZBook and EliteBook models. For more information, go to http://www.hp.com/support , and select your country. Select Drivers & Downloads , and then follow the on-screen instructions.)	1.5 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 registered by an administrator to have access to the space.	The Intel chipset is configured to enforce hardware protection to block all direct read/write access to this area. An Intel utility is required for updating the firmware. Only firmware updates digitally signed by Intel can be applied using this utility.
Bluetooth flash	2 MBits	No	Yes	Stores Bluetooth configuration and firmware.	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 if the flash requires an upgrade.
802.11 WLAN EEPROM	4 KBytes to 8 KBytes	No	Yes	Stores configuration and calibration data.	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.

Non Volatile 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?
Webcam	64 KBits	No	Yes	Store webcam configuration and firmware.	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 KBytes flash	Yes	Yes	Stores fingerprint templates.	By enrolling 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 default settings)?

- Turn on or restart the computer and press **F10** when prompted near the bottom of the display.
- Select **File**, then select **Restore defaults**.
- Follow the on-screen instructions.
- Select **File**, save changes and exit, then press **Enter**.

2. 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. There are various third party tools available to read SPD memory.

3. Does the “Firmware Hub for System BIOS” contain the BIOS program? Is this chip writable, and if so how?

The Firmware Hub does contain the BIOS program and is writable. A utility is required to perform the write function.

4. In some PC systems, the Firmware Hub for System BIOS is a flash memory chip so that updates can be written by the customer. Is this true for these BIOS chips?

Yes, they are flash memory chips.

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

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

6. Does resetting the CMOS configuration memory return the PC back to factory defaults?

The process of resetting the CMOS will return certain system settings to factory default but will not reset many of the system data and configuration defaults to their default settings. To return these system data and configuration defaults to default settings, refer to question and answer 1 and follow the instructions for returning the BIOS settings to factory defaults.

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 automatically, with user intervention. Those select computer models ship with HP Sure Start configured and enabled. Most users can use HP Sure Start with the default configuration.

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

18 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 all countries 113

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

Country/region	Accredited agency	Applicable note number
South Korea	EK	4
Sweden	CEMKO	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.

19 Recycling

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

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

Index

- A**
 - AC adapter light 14
 - AC adapter, spare part numbers 30
 - antenna
 - location 7
 - removal 66, 67
 - spare part number 67
 - spare part numbers 27
 - Antenna Kit, spare part number 67
 - Antenna Kit, spare part numbers 27
 - audio, product description 2
 - audio-in jack 16
 - audio-out jack 16
- B**
 - backup 127
 - Backup and Restore 115, 116, 123
 - backup tools 121
 - backups
 - creating 123
 - recovering 124
 - base enclosure, spare part number 24
 - battery
 - removal 40
 - spare part numbers 24, 40
 - battery light 14
 - BIOS
 - determining version 93, 100, 106
 - downloading an update 93, 100, 106
 - updating 93, 99, 105
 - bottom components 17
 - button components 9
 - buttons
 - pointing stick 13
 - power 9
 - TouchPad 13
 - TouchPad on/off 13
 - volume mute 10
 - Windows 11
 - wireless 10
- C**
 - cables, service considerations 34
 - caps lock light 12
 - card reader board
 - removal 69
 - spare part numbers 69
 - spare part numbers: 22
 - carrying case, spare part numbers 30
 - chipset, product description 1
 - components
 - bottom 17
 - buttons 9
 - display 7
 - fingerprint reader 9
 - front 14
 - keys 11
 - left side 15
 - lights 12
 - right side 16
 - TouchPad 13
 - computer
 - major components 19
 - specifications 108
 - computer reset 119, 129
 - Computer Setup
 - navigating and selecting 91, 98, 104
 - restoring default settings 92, 99, 105
 - connectors, service considerations 34
- D**
 - display assembly
 - removal 62
 - spare part number 20
 - spare part numbers 26, 62
 - display back cover, spare part numbers 27
 - display bezel
 - removal 63
 - spare part numbers 26, 63
 - display components 7
 - Display Hinge Kit, spare part number 66
 - Display Hinge Kit, spare part numbers 27
 - display panel
 - product description 1
 - removal 63
 - spare part numbers 27, 64
 - display panel cable
 - removal 65
 - spare part number 27, 65
 - Display Panel Support Kit, spare part numbers 27
 - DisplayPort 16
 - docking port 16
 - docking station, spare part number 30
 - docking, product description 3
 - Driver Recovery DVD,
 - creating 122
 - using for restore 125
 - drives, preventing damage 34
- E**
 - electrostatic discharge 35
 - embedded numeric keypad 11
 - equipment guidelines 37
 - esc key 11
 - Ethernet, product description 2
 - external expansion, product description 2, 3
 - external VGA monitor port 15
- F**
 - f11 recovery 117, 125
 - fan
 - removal 73
 - spare part number 22, 73
 - fingerprint reader
 - component 9
 - location 10
 - fingerprint reader board
 - removal 80
 - spare part number 22, 80
 - fn key 11

front components 14
function keys 11

G

graphics, product description 1
grounding guidelines 35
guidelines
 equipment 37
 grounding 35
 packaging 36
 transporting 36
 workstation 36

H

hard drive
 precautions 34
 product description 1, 2
 removal 42
 spare part numbers 24, 29, 42
hard drive bracket
 illustrated 29
 removal 43
hard drive connector adapter
 illustrated 29
 removal 44
Hard Drive Hardware Kit
 contents 29
 spare part number 29
hard drive light 14
hard drive recovery 117, 125
headphone jack 16
heat sink
 removal 71
 spare part number 22, 71
hinge
 removal 65
 spare part number 66
 spare part numbers 27
HP DisplayPort-to-HDMI 1.4 adapter,
 spare part number 30
HP Recovery Disc Creator, using
 122
HP Recovery partition
 checking for presence 125
 using for recovery 125

I

internal display switch 7

J

jacks
 audio-in 16
 audio-out 16
 headphone 16
 microphone 16
 network 16
 RJ-45 16

K

key components 11
keyboard
 product description 3
 removal 52
 spare part numbers 20, 21, 52
keys
 esc 11
 fn 11
 function 11
 num lk 11
 Windows 11

L

left-side components 15
legacy support, USB 91, 98, 104
light components 12
lights
 AC adapter 14
 battery 14
 caps lock 12
 hard drive 14
 microphone mute 12
 mute 12
 num lock 12
 power 12, 14
 webcam 7
 wireless 12, 14
lock, spare part numbers 30

M

mass storage devices
 illustrated 29
 precautions 34
 spare part numbers 29
memory card reader 16
memory module
 product description 1
 removal 51
 spare part numbers 24, 51

microphone
 location 7
 product description 2
microphone jack 16
microphone module
 removal 64
 spare part number 26, 65
microphone mute light 12
model name 1
mouse, spare part numbers 30
mute light 12

N

network jack 16
num lk key 11
num lock light 12
numeric keypad 11

O

operating system, product
 description 3, 4, 5

P

packaging guidelines 36
plastic parts, service
 considerations 33
Plastics Kit
 components 28
 spare part number 28
pointing device, product
 description 3
pointing stick 13
pointing stick button 13
pointing stick covers, spare part
 number 22
ports
 DisplayPort 16
 docking 16
 external VGA monitor 15
 product description 3
 USB 3.0 16
 USB 3.0 charging 15
power button 9
power button board
 removal 83
 spare part number 22, 83
power connector 16
power cord
 set requirements 137
 spare part numbers 31, 32
power light 12, 14

- power requirements, product description 3
- processor, product description 1
- product description
 - audio 2
 - chipset 1
 - display panel 1
 - docking 3
 - Ethernet 2
 - external expansion 2, 3
 - graphics 1
 - hard drive 1, 2
 - keyboard 3
 - memory module 1
 - microphone 2
 - operating system 3, 4, 5
 - pointing device 3
 - ports 3
 - power requirements 3
 - primary storage 1, 2
 - processor 1
 - product name 1
 - security 3
 - serviceability 5
 - solid-state drive 1, 2
 - video 2
 - wireless networking 2
- product name 1

R

- recovery 119, 127
- recovery media, creating 122
- recovery media, using for restore 125
- recovery partition 117, 125
- recovery tools 121
- recovery tools, Windows 124
- recovery, system 123
- recycle
 - computer 119
- refresh 119
- removal/replacement
 - procedures 38, 57
- remove everything and reinstall
 - Windows 119
- reset
 - computer 119, 129
 - steps 119, 129
- restoring the hard drive 117, 125
- right-side components 16

- RJ-45 jack 16
- RTC battery
 - removal 57
 - spare part number 22, 57
- Rubber Kit, spare part number 24

S

- Screw Kit, spare part number 32
- security cable slot 15
- security, product description 3
- service considerations
 - cables 34
 - connectors 34
 - plastic parts 33
- service cover
 - location 17
 - removal 38
 - spare part number 25, 38
- service cover release latch 17
- serviceability, product description 5
- setup utility
 - navigating and selecting 91, 98
 - restoring default settings 92, 99
- SIM, spare part number 30
- SLED
 - remove everything and reinstall
 - option 129
- smart card reader 15
- solid-state drive
 - precautions 34
 - product description 1, 2
 - removal 47
 - spare part numbers 24, 29, 47
- speaker assembly
 - removal 81
 - spare part number 22, 81
- speakers, location 10
- specifications 108
- Startup Repair, using 124
- system board
 - removal 75
 - spare part numbers 22, 23, 75, 76
- System Diagnostics 97

T

- tools required 33
- top cover
 - removal 58
 - spare part number 22, 58

- TouchPad
 - removal 68
 - spare part number 22, 68
- TouchPad button 13
- TouchPad components 13
- TouchPad on/off button 13
- TouchPad zone 13
- transporting guidelines 36

U

- USB 3.0 charging port 15
- USB 3.0 port 16
- USB legacy support 91, 98, 104

V

- vents 15, 17
- video, product description 2
- volume mute button 10

W

- webcam light 7
- webcam, location 7
- webcam/microphone module
 - removal 64
 - spare part number 26, 65
- Windows
 - Refresh 119
 - reinstall 119
 - remove everything and reinstall
 - option 119
 - reset 119
- Windows 7 operating system DVD
 - creating 122
 - using for restore 125
- Windows 7 operating system media
 - creating 122
 - using for restore 125
- Windows 8 operating system DVD 118
- Windows button 11
- Windows key 11
- Windows Startup Repair, using 124
- wireless antenna
 - location 7
 - removal 66, 67
 - spare part number 67
 - spare part numbers 27
- wireless button 10
- wireless light 12, 14
- wireless networking, product description 2

WLAN module
 removal 49
 spare part numbers 25, 49
workstation guidelines 36
WWAN module
 removal 45
 spare part numbers 24, 45

