HP EliteBook Folio 9480m Notebook PC

Maintenance and Service Guide

First Edition: July 2014

Document Part Number: 768849-001

Product notice

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

Not all features are available on 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.

This computer may require upgraded and/ or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality. See http://windows.microsoft.com/en-us/windows7/get-know-windows-7 for details.

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

Category	Description
Product Name	HP EliteBook Folio 9480m Notebook PC
Processors	Intel® Core® processors: • i7-4650U 1.7-GHz (max turbo frequency 3.3-GHz), 4-MB L3 Cache, 15W • i7-4600U 2.1-GHz (max turbo frequency 3.3-GHz), 4-MB L3 Cache, 15W • i5-4310U 2.0-GHz (max turbo frequency 3.0-GHz), 3-MB L3 Cache, 15W • i5-4210U 1.7-GHz (max turbo frequency 2.7-GHz), 3-MB L3 Cache, 15W
Chipset	Integrated with processor
Graphics	Intel UMA Graphics with shared video memory: Intel HD Graphics 5000 (i7-4650U) Intel UMA Graphics with shared video memory: Intel HD Graphics 4400 (i7-46000U, i5-4310U, i5-4210U))
Panels	35.6-cm (14.0-in), 3.0-mm, flat/thin backlit, light-emitting diode (LED), high-definition+ (HD+), AntiGlare (AG), SVA (1600×900) display with and without webcam 35.6-cm (14.0-in), 3.0-mm, flat/thin backlit, LED, HD, AG, SVA (1366×768) display with and without webcam
Memory	Two customer-accessible/upgradable memory module slots DDR3L PC3-1600-MHz dual channel support Supports 16384-MB of system RAM in the following configurations: • 16384-MB (8192-MB×2) • 8192-MB (8192-MB×1) • 4096-MB (4096-MB×1)
Flash cache	32-GB MLC mSATA module, not available on computer models equipped with SSD or SED. Supports no Flash cache module configuration.
Hard drive	Supports 7.0-mm (.28-in), 6.35-cm (2.5-in) SATA hard drives and solid-state drives • 500-GB, 7200-rpm, self-encrypting drive (SED) • 500-GB, 7200-rpm
Solid-state drive	Supports the following SATA III SSDs: • 256-GB SED • 240-GB • 180-GB • 128-GB
MiniCard SSD	Supports 120-GB M.2 solid-state drive No available with flash cache module

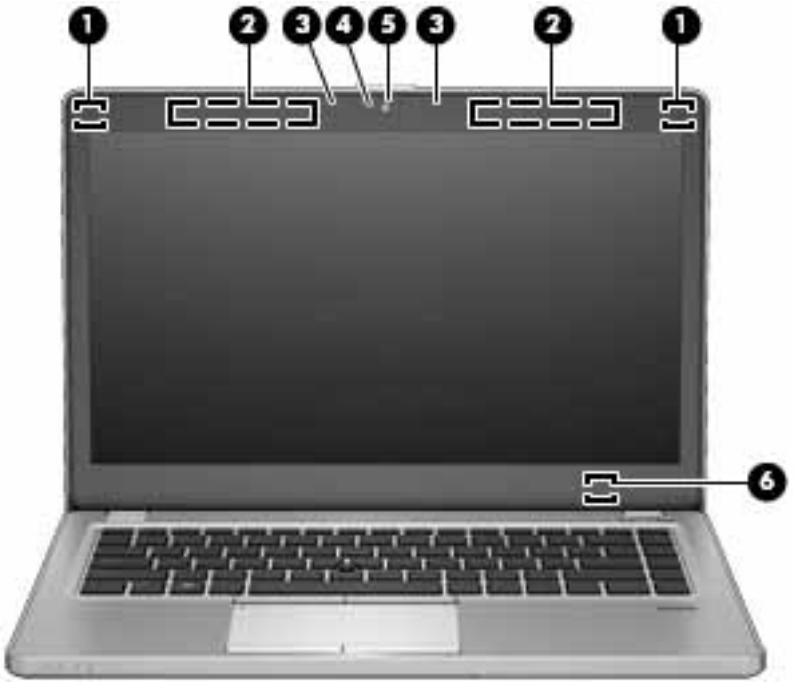
Category	Description
Audio and video	Two stereo speakers
	HD audio with DTS Studio Sound
	Integrated 720p HD webcam (supports no camera option)
	Integrated dual-array microphone
Ethernet	Intel I1218LM 10/100/1000 Ethernet network interface card (NIC) with iAMT
	NIC Power Down technology
	S3/S4/S5 wake on LAN
Wireless	Integrated wireless local area network (WLAN) options by way of wireless module
	Two WLAN antennas built into display assembly
	Support for the following WLAN formats: • Intel Dual Band Wireless-AC 7260 802.11 AC 2x2 WiFi + BT 4.0 Combo Adapter • HP Intel Dual Band Wireless-N 7260AN 802.11 a/b/g/n (2x2) combination WiFi and Bluetooth 4.0 WLAN module • Intel Dual Band Wireless-N 7260AN 802.11 a/b/g/n (2x2) combination WiFi and Bluetooth 4.0 WLAN module for use in Indonesia
	Supports no WLAN option
	Integrated wireless wide area network (WWAN) options by way of wireless module
	Two world-wide/5-band WWAN antennas built into display assembly
	Secured by subscriber identity module (SIM, user-accessible behind battery)
	Support for the following WWAN formats: • HP lt4112 LTE/HSPA+ Mobile Broadband Module • HP lt4211 LTE/EV-DO/HSPA+ Gobi 4G Module • HP hs3110 HSPA+ Mobile Broadband Module
	Supports no WWAN option
	Supports WWAN after market option
External media cards	Secure Digital (SD) flash media slot supporting the following digital card formats: • Secure Digital (SD) Memory Card • SDHC • SDXC
Ports	Headphone/Microphone combo
	Battery connector
	DisplayPort 1.2a
	Docking connector
	Multi-Pin AC Port
	RJ-45 (Ethernet)
	USB 3.0 ports (2)
	USB 3.0 charging/powered port (1)

Category	Description
	VGA (Dsub 15 pin) supporting: 1920×1200 external resolution @ 60 Hz, hot plug and unplug and auto-detection for correct output to wide-aspect vs. standard aspect video
Keyboard/pointing devices	Full chiclet keyboard, backlit, dual-point, spill-resistant with durakeys
	Gesture support: MultiTouch gestures enabled, two-finger scrolling, and pinch-zoom as default
	Taps enabled by default
	Touchpad on/off button
	Touchpad supports 2-way scroll with legend
Power requirements	Supports the following AC adapters:
	65-W Smart EM adapter 45-W Smart AC adapter 45-W AC adapter (2-prong) for use in Japan
	Supports the following batteries: • Primary: 4-cell, 52-Wh, 3.55-Ah battery • Secondary: 6-cell, 60-Wh, 2.7-Ah battery
	Supports the following power cords: • 2 wire plug (1.0 m) • 3 wire plug with ground pin (1.0 m) • 3 wire plug with ground pin (1.8 m)
Security	Supports security cable lock
	Supports fingerprint reader and no fingerprint reader option
	Supports Trusted Platform Module (TPM) 1.2 (Infineon, soldered down)
	Integrated Smart Card reader (active)
	Full volume encryption
	HP ProtectTools
Operating system	**Preinstalled:** • Windows 8.1 Professional 64 DPK with Windows 7 Professional 64 image • Windows 8.1 Professional 64 DPK with Windows 7 Professional 64 image – MSNA • Windows 8.1 EM 64 • Windows 8.1 CH 64 • Windows 8.1 ML 64 • Windows 8.1 Professional 64 • Windows 8.1 Professional 64 – MSNA • FreeDOS • Ubuntu Linux

Category	Description
	Restore media • DRDVD Windows 7 • DRDVD Windows 8.1 • SRDVD Ubuntu • Windows 7 Professional 64 • Windows 8.1 Professional 64 • Windows 8.1 64-bit • Windows 8.1 Country Specific 64-bit • Windows 8.1 Emerging Market 64-bit
	Web-only support: • Windows 8.1 Enterprise 64 • Windows 7 Professional 64- and 32-bit • Windows 7 Enterprise 64- and 32-bit
Serviceability	End user replaceable parts: • AC adapter • Battery • Hard drive • Solid-state drive • Keyboard • Memory module • mSATA flash cache • WLAN module • WWAN module

2 External component identification

Display



Component		Description
(1)	WLAN antennas (2)* (select models only)	Send and receive wireless signals to communicate with wireless local area networks (WLAN).
(2)	WWAN antennas (2)* (select models only)	Send and receive wireless signals to communicate with wireless wide area networks (WWAN).
(3)	Internal microphones (2)	Record sound.
(4)	Webcam light (select models only)	On: The webcam is in use.
(5)	Webcam (select models only)	Records video and captures photographs. Some models allow you to video conference and chat online using streaming video. Windows 8.1: For information on using the webcam, access HP Support Assistant. To access HP Support Assistant, from the Start screen, select the **HP Support Assistant** app. Windows 7: For information on using the webcam, select **Start > All Programs > Communication and Chat > CyberLink YouCam**.
(6)	Internal display switch	Turns off the display or initiates Sleep if the display is closed while the power is on. **NOTE:** The display switch is not visible from the outside of the computer.

*The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions. For wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices*

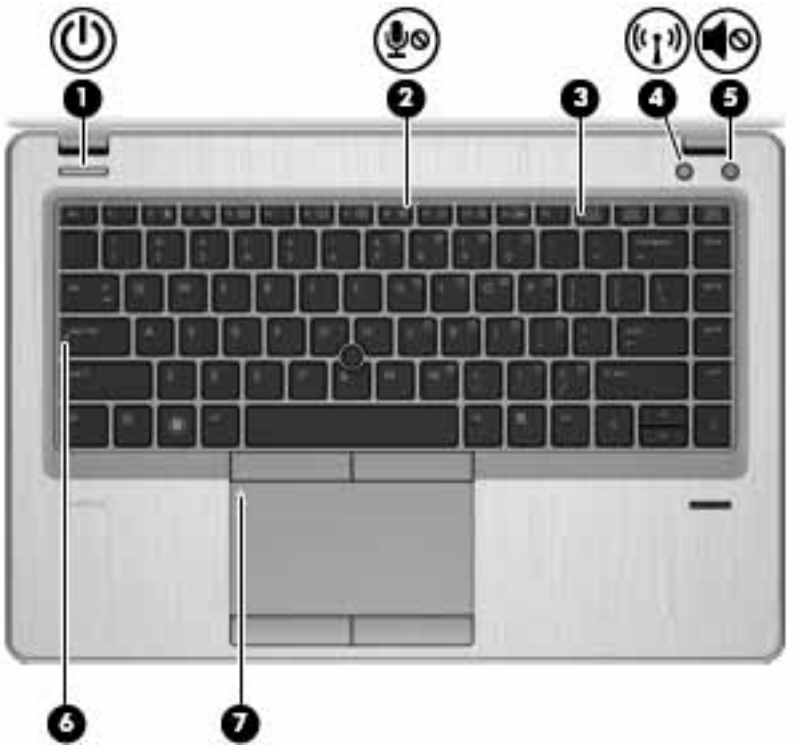
Component	Description
that applies to your country or region. To access this guide in Windows 8.1, from the Start screen, type `support`, and then select the **HP Support Assistant** app. To access the user guides in Windows 7, select **Start > Help and Support > User Guides**.	

Top

TouchPad

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.

Lights



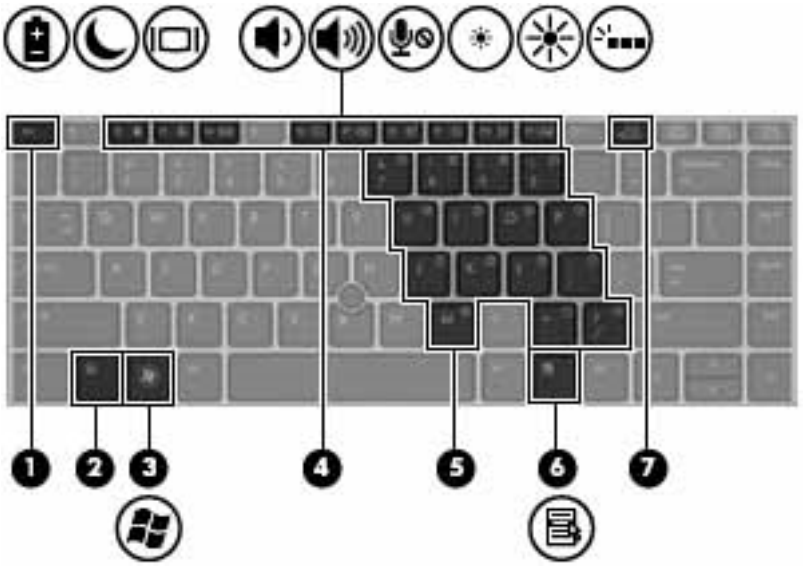
Component		Description
(1)	Power light	• On: The computer is on. • Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components. • Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power. **NOTE:** For select models, the Intel® Rapid Start Technology feature is enabled at the factory. Rapid Start Technology allows your computer to resume quickly from inactivity.
(2)	Microphone mute light	• Amber: microphone sound is off. • Off: microphone sound is on.
(3)	Num lock light	On: Num lock is on.
(4)	Wireless light	White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on. **NOTE:** On some models, the wireless light is amber when all wireless devices are off.
(5)	Mute light	• Amber: Computer sound is off. • White: Computer sound is on.
(6)	Caps lock light	White: Caps lock is on, which switches the keys to all capital letters.
(7)	TouchPad light	• Amber: The TouchPad is off. • Off: The TouchPad is on.

Buttons, speakers, and fingerprint reader (select models only)

Component		Description
(1)	Power button	• When the computer is off, press the button to turn on the computer. • When the computer is on, press the button briefly to initiate Sleep. • When the computer is in the Sleep state, press the button briefly to exit Sleep. • When the computer is in Hibernation, press the button briefly to exit Hibernation. **CAUTION:** Pressing and holding down the power button will result in the loss of unsaved information. If the computer has stopped responding and Windows shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer. **NOTE:** For select models, the Intel® Rapid Start Technology feature is enabled at the factory. Rapid Start Technology allows your computer to resume quickly from inactivity. To learn more about your power settings in Windows 8.1, see your power options. From the Start screen, type `power`, select **Power and sleep settings**, and then select **Power and sleep** from the list of applications. To learn more about your power settings in Windows 7: Select **Start > Control Panel > System and Security > Power Options**.
(2)	Wireless button	Turns the wireless feature on or off but does not establish a wireless connection.

Component		Description
(3)	Volume mute button	Mutes and restores speaker sound.
(4)	Fingerprint reader (select models only)	Allows a fingerprint logon to Windows, instead of a password logon.

Keys



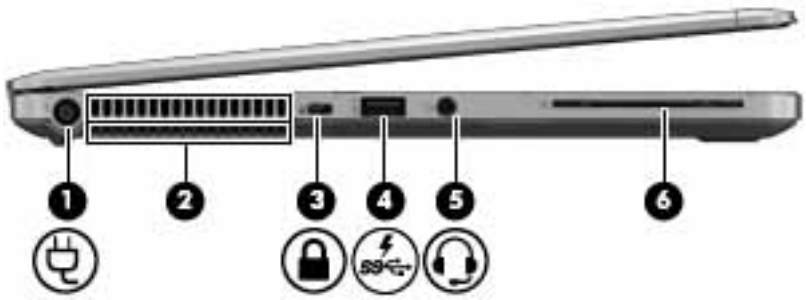
Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes frequently used system functions when pressed in combination with a function key, the num lk key, the esc key, or the b key.
(3)	Windows key	Windows 8.1: Returns you to the Start screen from an open app or the Windows desktop. **NOTE:** Pressing the Windows key 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)	Windows applications key	Windows 8.1: Displays options for a selected object.

Component		Description
		Windows 7: Displays a shortcut menu for items beneath the cursor.
(7)	num lk key	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.

Front

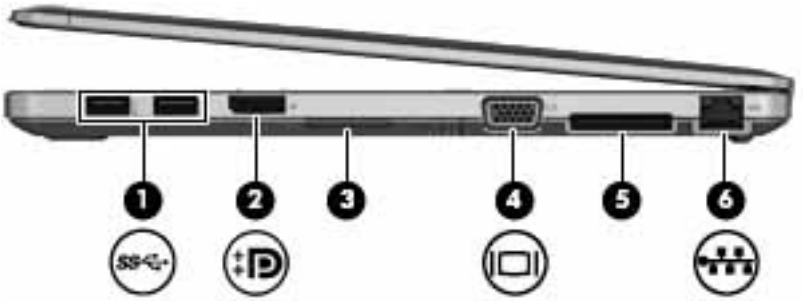
Component			Description
(1)		Wireless light	White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on. **NOTE:** On some models, the wireless light is amber when all wireless devices are off.
(2)		Power light	• On: The computer is on. • Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components. • Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power. **NOTE:** For select models, the Intel® Rapid Start Technology feature is enabled at the factory. Rapid Start Technology allows your computer to resume quickly from inactivity.
(3)		AC adapter/Battery light	• White: The computer is connected to external power and the battery is charged from 90 to 99 percent. • Amber: The computer is connected to external power and the battery is charged from 0 to 89 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	• Blinking white: The hard drive is being accessed. • Amber: HP 3D DriveGuard has temporarily parked the hard drive.

Left



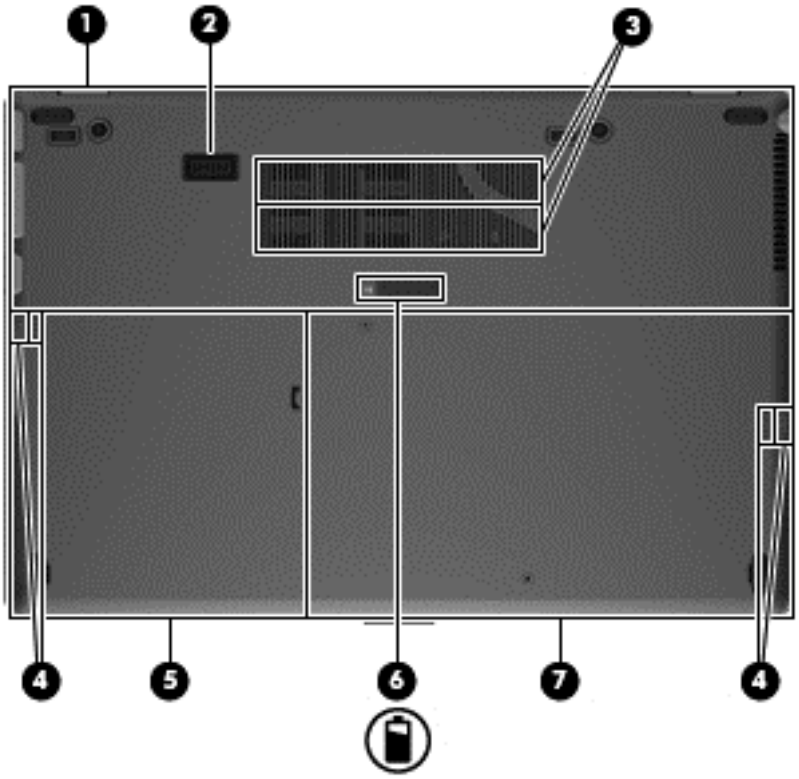
Component			Description
(1)		Power connector	Connects an AC adapter.
(2)		Vent	Enables airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(3)		Security cable slot	Attaches an optional security cable to the computer. **NOTE:** The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.
(4)		USB 3.0 charging (powered) port	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub. Standard USB ports will not charge all USB devices or will charge using a low current. Some USB devices require power and require you to use a powered port. **NOTE:** USB charging ports can also charge select models of cell phones and MP3 players, even when the computer is off.
(5)		Audio-out (headphone)/Audio-in (microphone) jack	Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional microphone-only devices. **WARNING!** To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, see the *Regulatory, Safety, and Environmental Notices.* To access this guide in Windows 8.1, from the Start screen, type `support`, and then select the **HP Support Assistant** app. To access the user guides in Windows 7, select **Start > Help and Support > User Guides**. **NOTE:** When a device is connected to the jack, the computer speakers are disabled. **NOTE:** Be sure that the device cable has a 4-conductor connector that supports both audio-out (headphone) and audio-in (microphone).
(6)		Smart card reader	Supports optional Smart cards.

Right



Component			Description
(1)		USB 3.0 ports (2)	Each USB 3.0 port connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.
(2)		DisplayPort	Connects an optional digital display device, such as a high-performance monitor or projector.
(3)		Memory card reader	Reads optional memory cards that store, manage, share, or access information.
(4)		External monitor port	Connects an external VGA monitor or projector.
(5)		Docking connector	Connects an optional docking device.
(6)		RJ-45 (network) jack/lights	Connects a network cable. • Green (right): The network is connected. • Amber (left): The network is showing activity.

Bottom



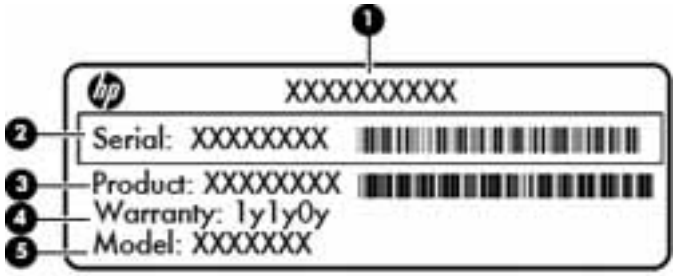
Component		Description
(1)	Wireless and memory module compartment	Contains the wireless and memory modules. **CAUTION:** To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices 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 HP Support Assistant. To access HP Support Assistant in Windows 8.1, from the Start screen, select the **HP Support Assistant** app. To access Help and Support in Windows 7, select **Start > Help and Support**.
(2)	Travel battery connector	Connects an optional travel battery.
(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.
(4)	Speakers (2)	Produce sound.
(5)	Hard drive bay	Contains the hard drive.

Component		Description
(6)	Battery release latch	Releases the battery from the battery bay.
(7)	Battery bay and SIM slot	Holds the battery. Supports a wireless subscriber identity module (SIM). The SIM slot is located inside the battery bay.

Service tag and PCID label

Service tag

When ordering parts or requesting information, provide the computer serial number and model description provided on the service tag.

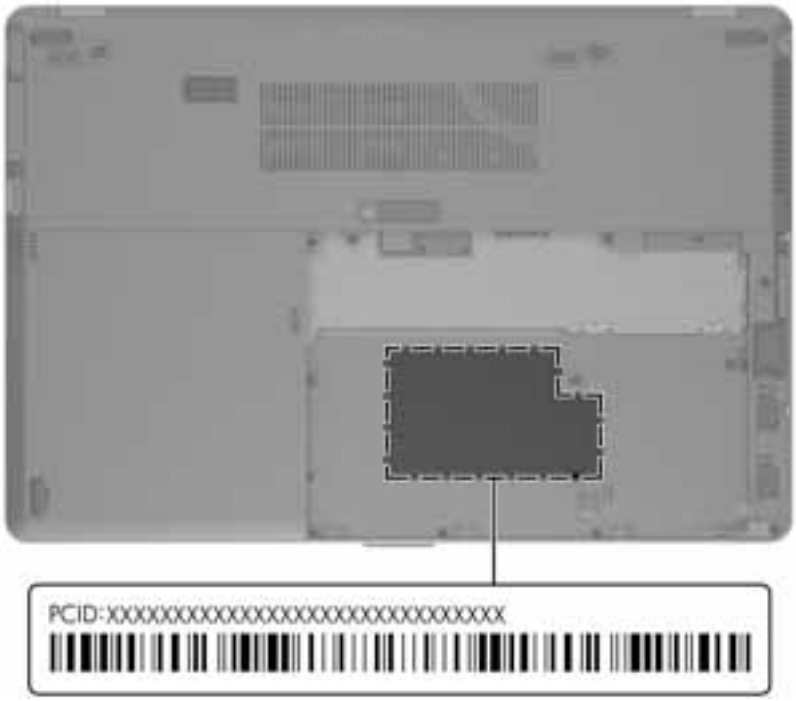


- Product name **(1)**. This is the product name affixed to the front of the computer.
- Serial number (s/n) **(2)**. This is an alphanumeric identifier that is unique to each product.
- Part number/Product number (p/n) **(3)**. This number provides specific information about the product's hardware components. The part number helps a service technician to determine what components and parts are needed.
- Warranty period **(4)**. This number describes the duration (in years) of the warranty period for the computer.
- Model description (select models only) **(5)**. This is the alphanumeric identifier used to locate documents, drivers, and support for the computer.

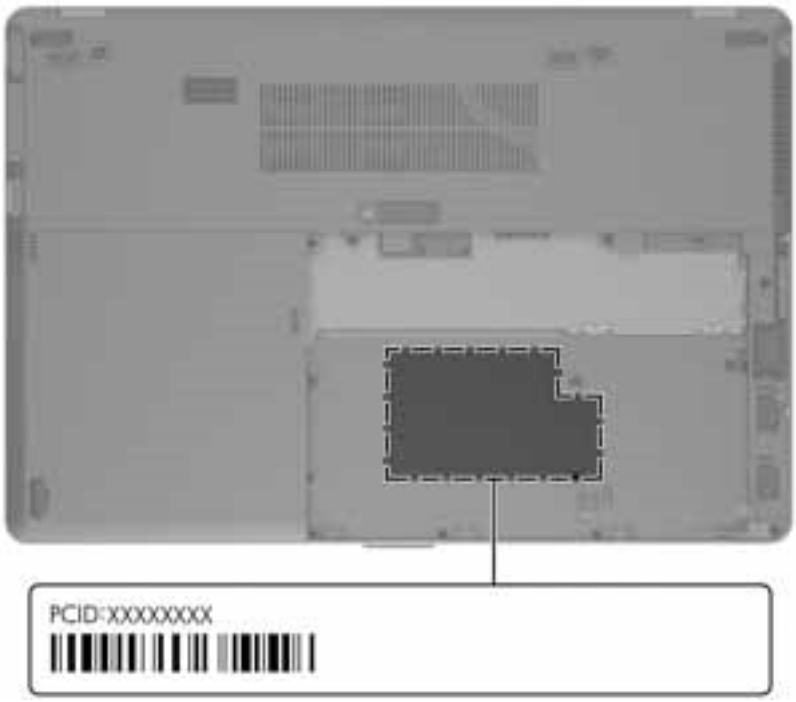
PCID label

The PCID label provides the information required to properly reset the notebook firmware (BIOS) back to factory shipped specifications when replacing the system board. The label may have a different number of characters depending on the operating system on the computer.

Windows 8 models



Non-Windows 8 models

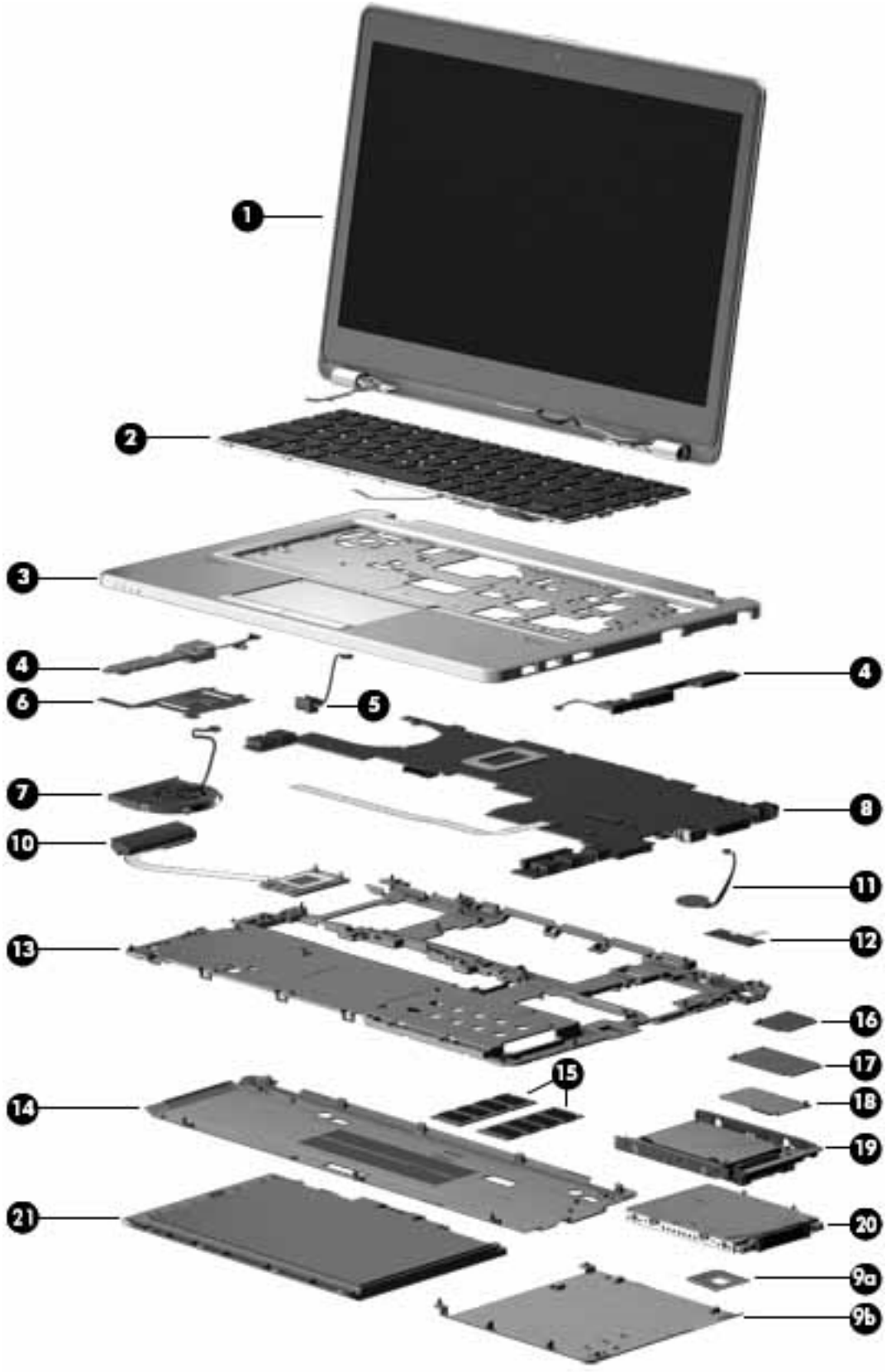


3 Illustrated parts catalog

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.

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 Illustrated parts catalog on page 17 for details.

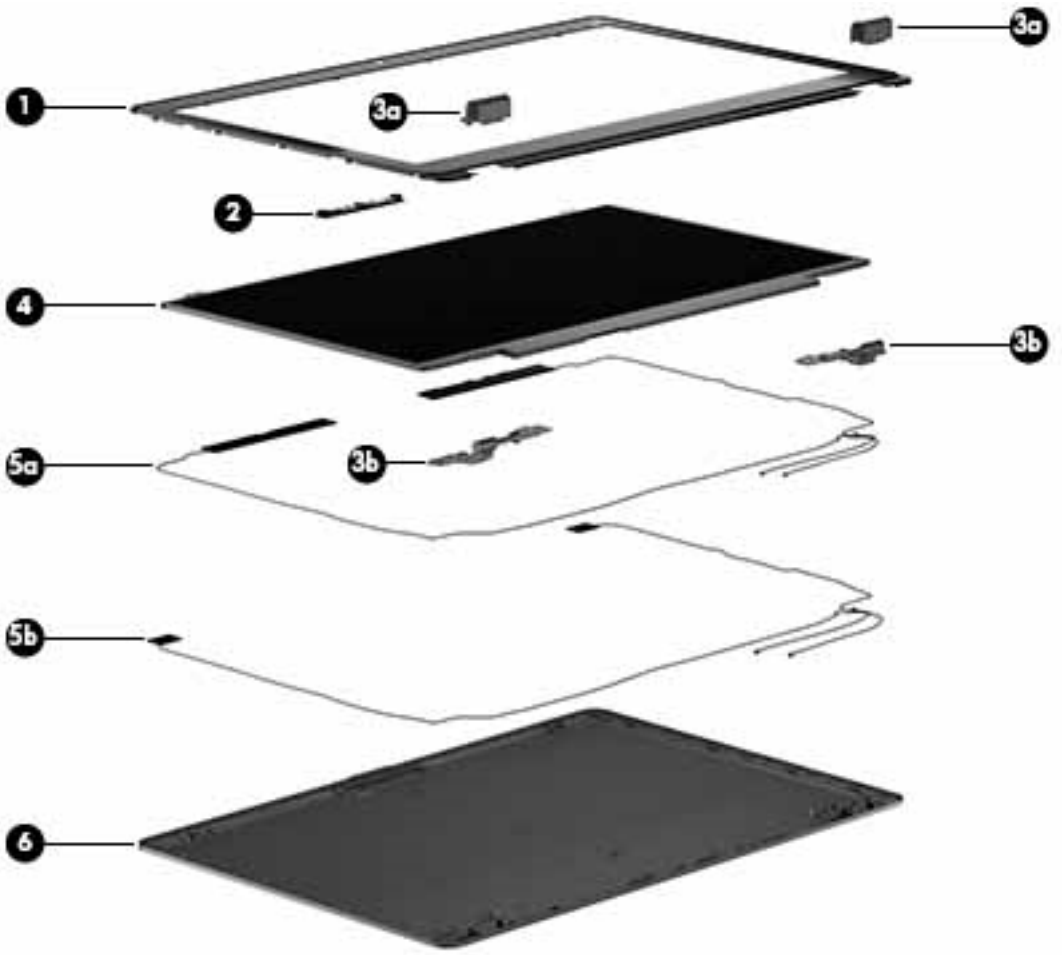
Computer major components



Item	Component	Spare part number
(1)	**Display assembly**: The display assembly is spared at the subcomponent level only. For more display assembly spare part information, see Display assembly subcomponents on page 21.	
(2)	**Keyboard** (backlit; includes keyboard cable and pointing stick cable): **NOTE:** For a detailed list of available keyboards, see Sequential part number listing on page 25.	785648-xx1
(3)	**Top cover**	
	With fingerprint reader board	748352-001
	Without fingerprint reader board	748353-001
	Touchpad assembly (not illustrated)	763218-001
(4)	**Speakers** (right and left; include cables)	702869-001
(5)	**AC power connector**	702875-001
(6)	**Smart Card reader** (includes cable)	769707-001
(7)	**Fan** (includes cable)	702859-001
(8)	**System board** (includes processor and replacement thermal material):	
	For use in models without Windows 8:	
	• Intel Core i7-4650U processor	769720-001
	• Intel Core i7-4600U processor	769719-001
	• Intel Core i5-4310U processor	769718-001
	• Intel Core i5-4210U processor	769717-001
	For use in Windows 8 models:	
	• Intel Core i7-4650U processor for use in models with Windows 8 Standard	769720-501
	• Intel Core i7-4650U processor for use in models with Windows 8 Professional	769720-601
	• Intel Core i7-4600U processor for use in models with Windows 8 Standard	769719-501
	• Intel Core i7-4600U processor for use in models with Windows 8 Professional	769719-601
	• Intel Core i5-4310U processor for use in models with Windows 8 Standard	769718-501
	• Intel Core i5-4310U processor for use in models with Windows 8 Professional	769718-601
	• Intel Core i5-4210U processor for use in models with Windows 8 Standard	769717-501
	• Intel Core i5-4210U processor for use in models with Windows 8 Professional	769717-601
	Plastics Kit, includes:	702877-001
(9a)	SD card insert	
(9b)	Hard drive cover	
(10)	**Heat sink** (includes replacement thermal material):	769708-001
(11)	**RTC battery**	702853-001
(12)	**Fingerprint reader board** (includes cable)	702845-001
(13)	**Base enclosure**	702863-001

Item	Component	Spare part number
(14)	**Service cover**	704441-001
	Service cover, RCTO	713547-001
(15)	**Memory modules** (PC3L-12800, 1600-MHz):	
	4-GB	691740-001
	8-GB	693374-001
(16)	**WLAN module:**	
	Intel Dual Band Wireless-AC 7260 802.11 AC 2x2 WiFi + BT 4.0 Combo Adapter	710663-001
	HP Intel Dual Band Wireless-N 7260AN 802.11 a/b/g/n (2x2) combination WiFi and Bluetooth 4.0 WLAN module	717379-001
	HP Intel Dual Band Wireless-N 7260AN 802.11 a/b/g/n (2x2) combination WiFi and Bluetooth 4.0 WLAN module for use in Indonesia	747833-001
(17)	**WWAN module:**	
	HP lt4112 LTE/HSPA+ Mobile Broadband Module	740011-001
	HP lt4211 LTE/EV-DO/HSPA+ Gobi 4G Module	748021-001
	HP hs3110 HSPA+ Mobile Broadband Module	748599-001
(18)	**Solid-state drive (SSD), M.2**:	
	120-GB, M.2	769712-001
	32-GB, M.2	769711-001
	Hard Drive Hardware Kit (not illustrated, includes hard drive bracket, connector, and screws)	702870-001
(19)	**Solid-state drive** (includes bracket, connector, and screws):	
	256-GB, SATA III, self-encrypting drive (SED)	769716-001
	240-GB, SATA III	769715-001
	180-GB, SATA III	769714-001
	128-GB, SATA III	769713-001
(20)	**Hard drive** (does not include hard drive bracket, connector, or screws):	
	500-GB, 7200-rpm, 7-mm, self-encrypting drive	703268-001
	500-GB, 7200-rpm, 7-mm	703267-001
(21)	**Battery** (Li ion):	
	4-cell, 52-Wh, 3.55-Ah	687945-001
	6-cell, 60-Wh, 2.7-Ah (travel battery; not illustrated)	696621-001

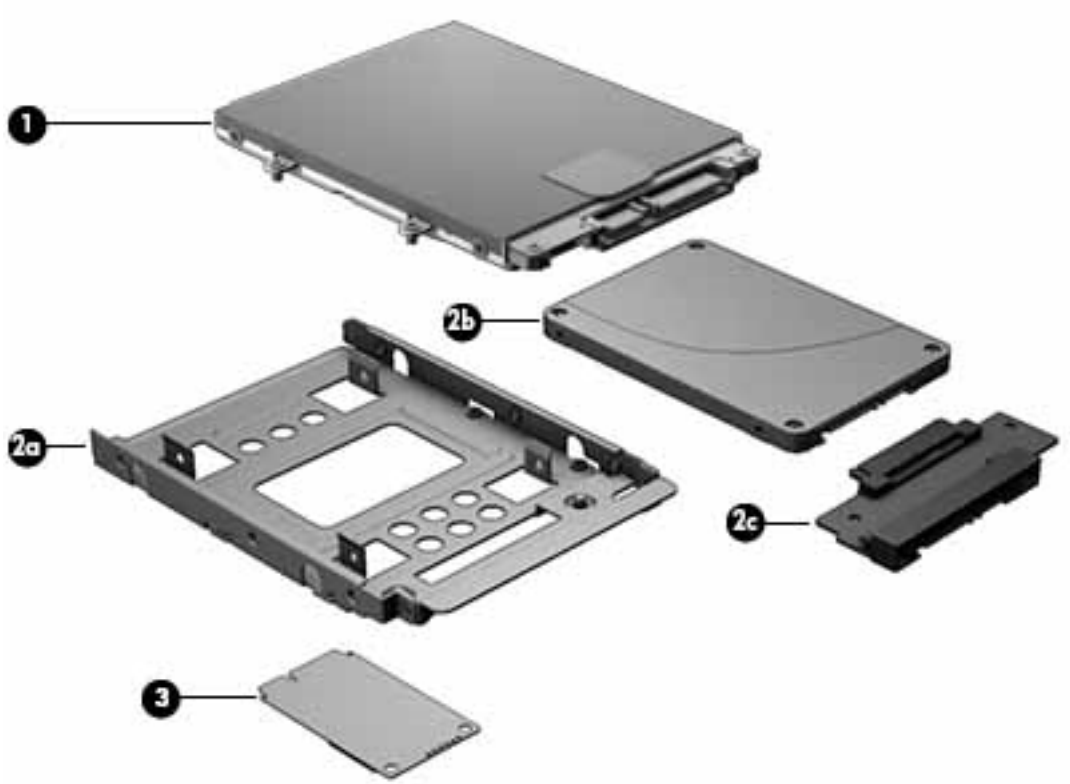
Display assembly subcomponents



Item	Component	Spare part number
(1)	**Display bezel:**	
	For use on models with a webcam	769705-001
	For use on models without a webcam	769706-001
(2)	**Webcam/microphone module**	769710-001
	Microphone module	702873-001
	Display Hinge Kit (includes left and right display hinges and left and right hinge covers)	702857-001
(3a)	Display hinge covers (2)	
(3b)	Display hinges	
(4)	**35.6-cm (14.0-in), LED, AntiGlare display panel:**	
	HD+	769722-001
	HD	769721-001
	Antenna Kit, includes:	769704-001
(5a)	WWAN antenna cables and transceivers	

Item	Component	Spare part number
(5b)	WLAN antenna cables and transceivers	
(6)	**Display enclosure**	748350-001
	Display Panel Support Kit (includes WLAN antenna cables and transceivers, WWAN antenna cables and transceivers, and display enclosure)	769709-001

Mass storage devices



Item	Description	Spare part number
(1)	**Hard drive** (does not include hard drive bracket or screws):	
	500-GB, 7200-rpm, 7-mm, SED	703268-001
	500-GB, 7200-rpm, 7-mm	703267-001
	Solid-State Drive (includes drive bracket, connector, and screws):	
	256-GB, SATA III, self-encrypting drive (SED)	769716-001
	240-GB SSD, SATA III	769715-001
	180-GB, SATA III	769714-001
	128-GB, SATA III	769713-001
(2a)	Solid-state drive bracket	
(2b)	Solid-state drive	

Item	Description	Spare part number
(2c)	Drive connector	
(3)	**Solid-state drive, M.2**:	
	120-GB, M.2	769712-001
	32-GB, M.2	769711-001
	Hard Drive Hardware Kit (not illustrated), includes:	702870-001
	Hard drive connector	
	Hard drive bracket	
	Hard drive bracket screws	

Miscellaneous parts

Component	Spare part number
AC adapter:	
45-W HP Smart AC adapter, 7.4 mm, slim (non-PFC)	744893-001
45-W HP Smart AC adapter, 2 prong (non-PFC)	742437-001
65-W HP Smart AC adapter	693711-001
65-W HP Smart AC adapter for use in India	693710-001
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

Component	Spare part number
For use in the United Kingdom and Singapore	490371-031
For use in the United States	490371-001
Power cord (3-pin, black, 1.0-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
For use in Taiwan	755530-AB1
For use in Thailand	755530-201
For use in the United Kingdom and Singapore	755530-031
For use in the United States	755530-001
Power cord (2-pin, black, 1.0-m):	
For use in Japan	762689-291
DisplayPort to HDMI 1.4 adapter	749288-001
Screw Kit	702846-001
Pointing stick cover	750348-001
Docking station	732252-001
Cable lock docking station	575921-001
HP Ultraslim Keyed Cable Lock	703372-001
Essential Backpack	679923-001
HP Business Backpack	718548-001
HP Business Slim Load Top Case	718549-001
Essential Top Load Case	679921-001

Sequential part number listing

CSR flag designations:

A = Mandatory

B = Optional

C = Service technician recommended

N = Non-user replaceable

Spare part number	CSR flag	Description
490371-001	A	Power cord for use in North America (3-pin, black, 1.83-m)
490371-011	A	Power cord for use in Australia (3-pin, black, 1.83-m)
490371-021	A	Power cord for use in Europe (3-pin, black, 1.83-m)
490371-031	A	Power cord for use in the United Kingdom and Singapore (3-pin, black, 1.83-m)
490371-061	A	Power cord for use in Italy (3-pin, black, 1.83-m)
490371-081	A	Power cord for use in Denmark (3-pin, black, 1.83-m)
490371-111	A	Power cord for use in Switzerland (3-pin, black, 1.83-m)
490371-202	A	Power cord for use in Brazil (3-pin, black, 1.83-m)
490371-291	A	Power cord for use in Japan (3-pin, black, 1.83-m)
490371-AA1	A	Power cord for use in the People's Republic of China (3-pin, black, 1.83-m)
490371-AB1	A	Power cord for use in Taiwan (3-pin, black, 1.83-m)
490371-AD1	A	Power cord for use in South Korea (3-pin, black, 1.83-m)
490371-AR1	A	Power cord for use in South Africa (3-pin, black, 1.83-m)
490371-D01	A	Power cord for use in India (3-pin, black, 1.83-m)
490371-D61	A	Power cord for use in Argentina (3-pin, black, 1.83-m)
575921-001	A	Cable lock docking station
679921-001	A	Essential Top Load Case
679923-001	A	Essential Backpack
687945-001	A	4-cell, 52-Wh, 3.55-Ah, Li-ion battery
691740-001	A	4-GB memory module (PC3L, 12800, 1600-MHz)
693374-001	A	8-GB memory module (PC3L, 12800, 1600-MHz)
693710-001	A	65-W HP Smart AC adapter for use in India
693711-001	A	65-W HP Smart AC adapter
696621-001	A	6-cell, 51-Wh, 2.55-Ah, Li-ion travel battery
702845-001	N	Fingerprint reader board (includes cable)
702846-001	A	Screw Kit
702853-001	B	RTC battery (includes cable and double-sided tape)

Spare part number	CSR flag	Description
702857-001	N	Display Hinge Kit (includes left and right hinges and left and right hinge covers)
702859-001	N	Fan (includes cable)
702863-001	N	Base enclosure
702869-001	N	Speaker assembly (includes cable)
702870-001	N	Hard Drive Hardware Kit (includes hard drive bracket, connector, and screws)
702873-001	N	Microphone module
702875-001	A	AC power connector
702877-001	N	Plastics Kit (includes SD slot insert and hard drive cover)
703267-001	A	500-GB, 7200-rpm, 7-mm hard drive (does not include hard drive bracket, connector, or screws) **NOTE:** The hard drive bracket, connector, and screws are included in the Hard Drive Hardware Kit, spare part number 702870-001.
703268-001	A	500-GB, 7200-rpm, 7-mm SED hard drive (does not include hard drive bracket, connector, or screws) **NOTE:** The hard drive bracket, connector, and screws are included in the Hard Drive Hardware Kit, spare part number 702870-001.
703372-001	A	HP Ultraslim Keyed Cable Lock
704441-001	A	Service cover
710663-001	A	Intel Dual Band Wireless-AC 7260 802.11 AC 2x2 WiFi + BT 4.0 Combo Adapter
713547-001	A	Service door (RCTO)
714749-001	A	HP Mobile Connect
717379-001	A	HP Intel Dual Band Wireless-N 7260AN 802.11 a/b/g/n (2x2) combination WiFi and Bluetooth 4.0 WLAN module
718548-001	A	HP Business Slim Load Case
718549-001	A	HP Business Backpack
732252-001	A	Docking station
740011-001	B	HP lt4112 LTE/HSPA+ Mobile Broadband Module
742437-001	A	45-W HP Smart AC adapter, 2 prong (non-PFC)
744893-001	A	45-W HP Smart AC adapter, 7.4 mm, slim (non-PFC)
747833-001	A	HP Intel Dual Band Wireless-N 7260AN 802.11 a/b/g/n (2x2) combination WiFi and Bluetooth 4.0 WLAN module for use in Indonesia
748021-001	B	HP lt4211 LTE/EV-DO/HSPA+ Gobi 4G Module
748350-001	N	Display enclosure
748352-001	N	Top cover with fingerprint reader board
748353-001	N	Top cover without fingerprint reader board
748599-001	B	HP hs3110 HSPA+ Mobile Broadband Module
749288-001	A	DisplayPort to HDMI 1.4 adapter
750348-001	A	Pointing stick cover

Spare part number	CSR flag	Description
755530-001	A	Power cord for use in North America (3-pin, black, 1.0-m)
755530-011	A	Power cord for use in Australia (3-pin, black, 1.0-m)
755530-021	A	Power cord for use in Europe, the Middle East, and Africa (3-pin, black, 1.0-m)
755530-031	A	Power cord for use in the United Kingdom and Singapore (3-pin, black, 1.0-m)
755530-061	A	Power cord for use in Italy (3-pin, black, 1.0-m)
755530-081	A	Power cord for use in Denmark (3-pin, black, 1.0-m)
755530-111	A	Power cord for use in Switzerland (3-pin, black, 1.0-m)
755530-201	A	Power cord for use in Thailand (3-pin, black, 1.0-m)
755530-202	A	Power cord for use in Brazil (3-pin, black, 1.0-m)
755530-291	A	Power cord for use in Japan (3-pin, black, 1.0-m)
755530-AA1	A	Power cord for use in the People's Republic of China (3-pin, black, 1.0-m)
755530-AB1	A	Power cord for use in Taiwan (3-pin, black, 1.0-m)
755530-AD1	A	Power cord for use in South Korea (3-pin, black, 1.0-m)
755530-AR1	A	Power cord for use in South Africa (3-pin, black, 1.0-m)
755530-BB1	A	Power cord for use in Israel (3-pin, black, 1.0-m)
755530-D01	A	Power cord for use in Argentina (3-pin, black, 1.0-m)
755530-D61	A	Power cord for use in India (3-pin, black, 1.0-m)
762689-291	A	Power cord for use in Japan (2-pin, black, 1.0-m)
763218-001	N	Touchpad assembly
769704-001	N	Antenna Kit (includes left and right WLAN antenna cables and transceivers and left and right WWAN antenna cables and transceivers)
769705-001	N	Display bezel for use on models with a webcam
769706-001	N	Display bezel for use on models without a webcam
769707-001	N	Smart Card reader (includes cable)
769708-001	N	Heat sink
769709-001	N	Display Panel Support Kit (includes display enclosure, WLAN antenna cables and transceivers, and WWAN antenna cables and transceivers)
769710-001	N	Webcam/microphone module (includes double-sided tape)
769711-001	N	Solid-state drive, 32-GB, M.2
769712-001	N	Solid-state drive, 120-GB, M.2
769713-001	N	Solid-state drive, 128-GB, SATA III, self-encrypting drive (SED) (includes bracket, connector, and screws)
769714-001	N	Solid-state drive, 180-GB, SATA III, self-encrypting drive (SED) (includes bracket, connector, and screws)
769715-001	N	Solid-state drive, 240-GB, SATA III, self-encrypting drive (SED) (includes bracket, connector, and screws)
769716-001	N	Solid-state drive, 256-GB, self-encrypting (SED)

Spare part number	CSR flag	Description
769717-001	N	System board with Intel Core i5-4210U processor for use in models without Windows 8
769717-501	N	System board with Intel Core i5-4210U processor for use in models with Windows 8 Standard
769717-601	N	System board with Intel Core i5-4210U processor for use in models with Windows 8 Professional
769718-001	N	System board with Intel Core i5-4310U processor (1.70 GHz [2.6-GHz max turbo frequency], 3-MB cache) for use in models without Windows 8
769718-501	N	System board with Intel Core i5-4310U processor (1.70 GHz [2.6-GHz max turbo frequency], 3-MB cache) for use in models with Windows 8 Standard
769718-601	N	System board with Intel Core i5-4310U processor (1.70 GHz [2.6-GHz max turbo frequency], 3-MB cache) for use in models with Windows 8 Professional
769719-001	N	System board with Intel Core i7-4600U processor for use in models without Windows 8
769719-501	N	System board with Intel Core i7-4600U processor for use in models with Windows 8 Standard
769719-601	N	System board with Intel Core i7-4600U processor for use in models with Windows 8 Professional
769720-001	N	System board with Intel Core i7-4650U processor for use in models without Windows 8
769720-501	N	System board with Intel Core i7-4650U processor for use in models with Windows 8 Standard
769720-601	N	System board with Intel Core i7-4650U processor for use in models with Windows 8 Professional
769721-001	N	35.6-cm (14.0-in), LED, HD, AntiGlare display panel
769722-001	N	35.6-cm (14.0-in), LED, HD+, AntiGlare display panel
785648-001	B	Keyboard with pointing stick for use in the United States (includes keyboard cable and pointing stick cable)
785648-031	B	Keyboard with pointing stick for use in the United Kingdom and Singapore (includes keyboard cable and pointing stick cable)
785648-041	B	Keyboard with pointing stick for use in Germany (includes keyboard cable and pointing stick cable)
785648-051	B	Keyboard with pointing stick for use in France (includes keyboard cable and pointing stick cable)
785648-061	B	Keyboard with pointing stick for use in Italy (includes keyboard cable and pointing stick cable)
785648-071	B	Keyboard with pointing stick for use in Spain (includes keyboard cable and pointing stick cable)
785648-081	B	Keyboard with pointing stick for use in Denmark (includes keyboard cable and pointing stick cable)
785648-091	B	Keyboard with pointing stick for use in Norway (includes keyboard cable and pointing stick cable)
785648-131	B	Keyboard with pointing stick for use in Portugal (includes keyboard cable and pointing stick cable)
785648-141	B	Keyboard with pointing stick for use in Turkey (includes keyboard cable and pointing stick cable)
785648-151	B	Keyboard for use in Greece (includes keyboard cable and pointing stick cable)
785648-161	B	Keyboard with pointing stick for use in Latin America (includes keyboard cable and pointing stick cable)
785648-171	B	Keyboard with pointing stick for use in Saudi Arabia (includes keyboard cable and pointing stick cable)
785648-201	B	Keyboard with pointing stick for use in Brazil (includes keyboard cable and pointing stick cable)
785648-211	B	Keyboard with pointing stick for use in Hungary (includes keyboard cable and pointing stick cable)
785648-251	B	Keyboard with pointing stick for use in Russia (includes keyboard cable and pointing stick cable)
785648-261	B	Keyboard with pointing stick for use in Bulgaria (includes keyboard cable and pointing stick cable)

Spare part number	CSR flag	Description
785648-271	B	Keyboard with pointing stick for use in Romania (includes keyboard cable and pointing stick cable)
785648-281	B	Keyboard with pointing stick for use in Thailand (includes keyboard cable and pointing stick cable)
785648-291	B	Keyboard with pointing stick for use in Japan (includes keyboard cable and pointing stick cable)
785648-A41	B	Keyboard with pointing stick for use in Belgium (includes keyboard cable and pointing stick cable)
785648-AB1	B	Keyboard with pointing stick for use in Taiwan (includes keyboard cable and pointing stick cable)
785648-AD1	B	Keyboard with pointing stick for use in South Korea (includes keyboard cable and pointing stick cable)
785648-B31	B	Keyboard with pointing stick for use in the Netherlands (includes keyboard cable and pointing stick cable)
785648-B71	B	Keyboard with pointing stick for use in Sweden and Finland (includes keyboard cable and pointing stick cable)
785648-BA1	B	Keyboard with pointing stick for use in Slovenia (includes keyboard cable and pointing stick cable)
785648-BB1	B	Keyboard with pointing stick for use in Israel (includes keyboard cable and pointing stick cable)
785648-BG1	B	Keyboard with pointing stick for use in Switzerland (includes keyboard cable and pointing stick cable)
785648-D61	B	Keyboard with pointing stick for use in India (includes keyboard cable and pointing stick cable)
785648-DB1	B	Keyboard with pointing stick for use in Canada (includes keyboard cable and pointing stick cable)
785648-DD1	B	Keyboard with pointing stick for use in Iceland (includes keyboard cable and pointing stick cable)
785648-FL1	B	Keyboard with pointing stick for use in the Czech Republic and Slovakia (includes keyboard cable and pointing stick cable)
785648-FP1	B	Keyboard with pointing stick for use in northwest Africa (includes keyboard cable and pointing stick cable)

4 Removal and replacement procedures 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 and P1 screw drivers

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			
	Relative humidity		
Event	**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 ±10% resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, use alligator clips to connect a wrist strap.
- When standing, use foot straps and a grounded floor mat. Foot straps (heel, toe, or boot straps) can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use foot straps on both feet with a minimum of one megohm resistance between the operator and ground. To be effective, the conductive must be worn in contact with the skin.

The following grounding equipment is recommended to prevent electrostatic damage:

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

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

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

5 Removal and replacement procedures for Customer Self-Repair parts

CAUTION: 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

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

There are as many as 14 screws that must be removed, replaced, or loosened when servicing Customer Self-Repair parts. Make special note of each screw size and location during removal and replacement.

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 Illustrated parts catalog on page 17 for details.

Battery

Description	Spare part number
4-cell, 52-Wh, 3.55-Ah, Li ion battery	687945-001
6-cell, 60-Wh, 2.7-Ah, Li ion travel battery	696621-001

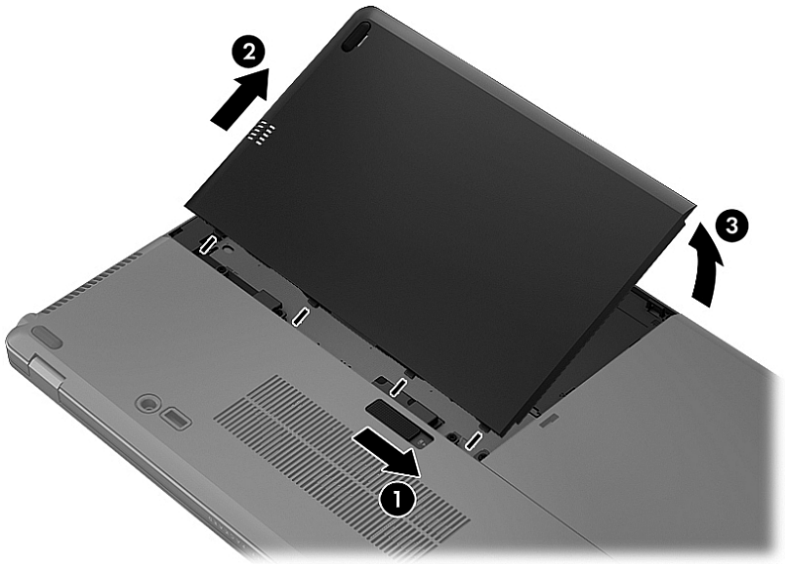
Before disassembling the computer, follow these steps:

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 battery:

1. Position the computer upside-down on a flat surface.
2. Slide the battery release latch **(1)** to release the battery.

3. Slide the battery outward **(2)**, lift the outer edge of the battery **(3)**, and then remove it from the computer **(3)**.



When installing the battery:

1. Insert the battery connector end of the battery into the bay, aligning it to the left edge.
2. Slide the battery into the bay until it drops and the latch snaps, and then slide the latch to the left to lock the battery.

NOTE: In the locked position there will be no red color shown in the latch slot.

SIM

NOTE: This section applies only to computer models with WWAN capability.

NOTE: If there is a SIM inserted in the SIM slot, it must be removed before disassembling the computer. Be sure that the SIM is reinserted in the SIM slot after reassembling the computer.

The SIM slot is located inside the battery bay on the right side.

Before removing the SIM, 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 battery (see Battery on page 35).

Remove the SIM:

1. Press in on the SIM **(1)**. (The module is partially ejected from the SIM slot.)

2. Remove the SIM **(2)** from the SIM slot.

Reverse this procedure to install the SIM.

Hard drive cover

NOTE: The hard drive cover is available in the Plastics kit, spare part number 702877-001.

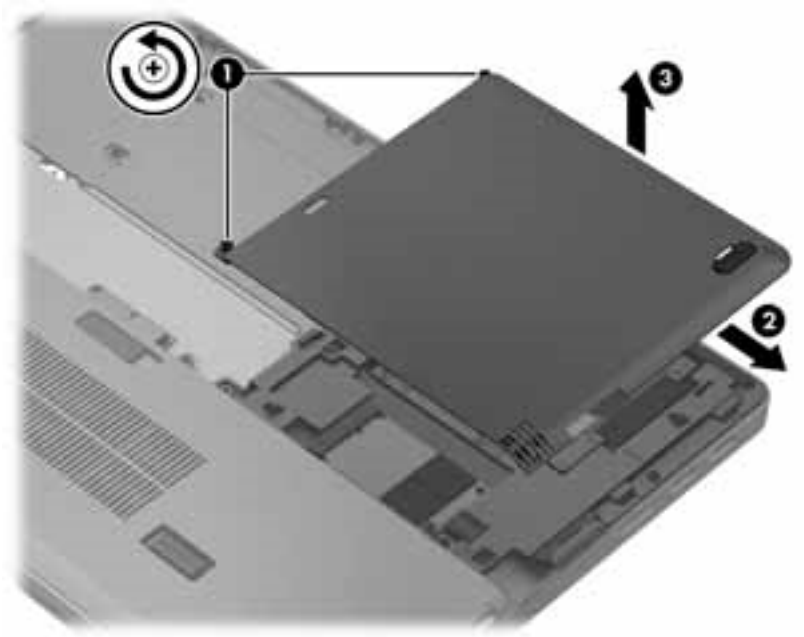
Description	Spare part number
Plastics kit	702877-001

Before removing the hard drive 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 battery (see Battery on page 35).

Remove the hard drive cover:

1. Loosen the 2 captive hard drive cover screws **(1)**.
2. Slide the hard drive cover away from the computer **(2)**, and then lift the cover off the computer **(3)**.



Reverse the removal procedures to install the hard drive cover.

Hard drive/SSD drive

NOTE: The hard drive spare part kit does not include the hard drive bracket, connector, or screws.

The solid-state drive spare part kit includes the Hard Drive Hardware Kit, which includes the bracket, connector, and screws..

Description	Spare part number
Hard drive (does not include hard drive bracket or screws):	
500-GB, 7200-rpm, 7-mm, SED	703268-001
500-GB, 7200-rpm, 7-mm	703267-001
Solid-state drive (includes bracket, connector, and screws):	
256-GB, SATA III, self-encrypting drive (SED)	769716-001
240-GB, SATA III	769715-001
180-GB, SATA III	769714-001
128-GB, SATA III	769713-001
Hard Drive Hardware Kit (includes hard drive bracket, connector, and screws)	702870-001

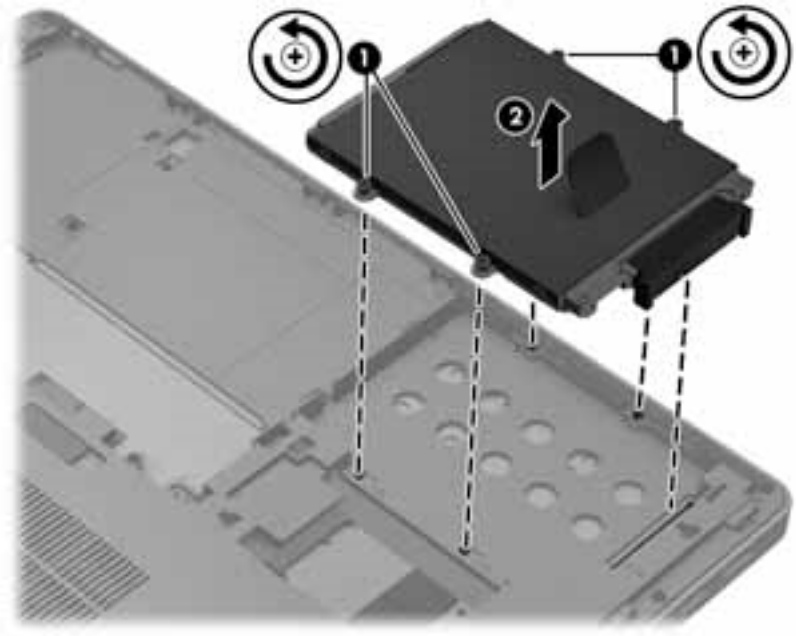
Before removing the hard drive, follow these steps:

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 battery (see Battery on page 35).
5. Remove the hard drive cover (see Hard drive cover on page 38).

Remove the hard drive:

1. Loosen the 4 captive hard drive screws **(1)** that secure the drive to the computer.
2. Pull the hard drive tab **(2)** upward to disconnect the hard drive.

3. Lift the hard drive, and then pull the hard drive out of the hard drive bay.

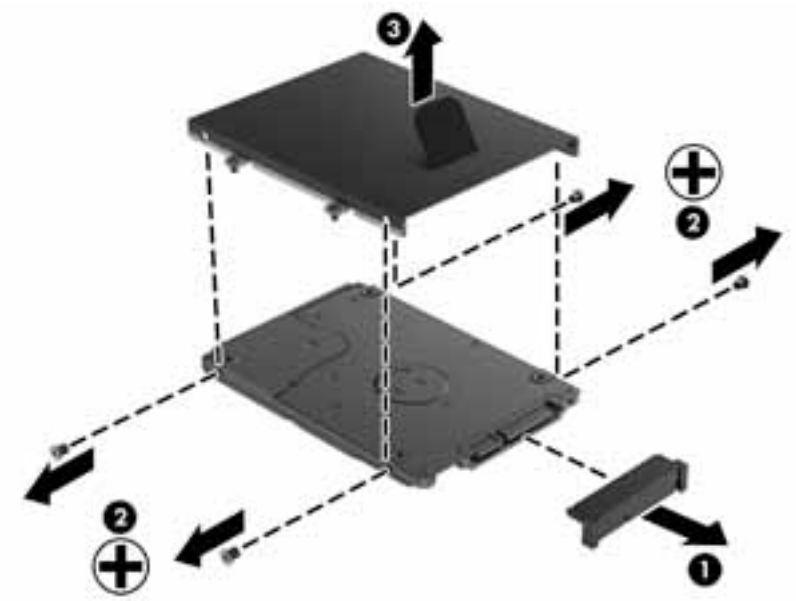


4. If it is necessary to disassemble the hard drive, perform the following steps:

   a. Remove the connector from the hard drive **(1)**.

   b. Remove the four Phillips PM3.0×4.0 screws **(2)** that secure the hard drive bracket to the hard drive.

   c. Remove the hard drive bracket **(3)** from the hard drive. The hard drive bracket, connector, and screws are available in the Hard Drive Hardware Kit, spare part number 702870-001.



Reverse this procedure to reassemble and install the hard drive.

mSATA drive

Description	Spare part number
120-GB drive, M.2	769712-001
32-GB drive, M.2	769711-001

Before removing the mSATA 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 battery (see Battery on page 35).
5. Remove the hard drive cover (see Hard drive cover on page 38).

Remove the mSATA drive:

1. Remove the two Phillips PM2.0×3.0 screws **(1)** that secure the drive to the system board. (The drive tilts up.)

2. Remove the drive **(2)** by pulling it away from the slot at an angle.

NOTE: mSATA drives are designed with a notch to prevent incorrect insertion.

Reverse this procedure to install the mSATA drive.

RTC battery

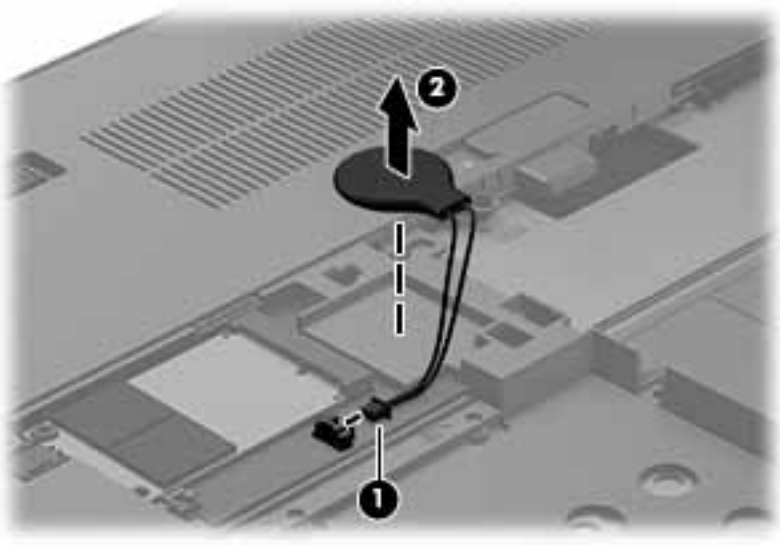
Description	Spare part number
RTC battery (includes cable and double-sided tape)	702853-001

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 battery (see Battery on page 35).
5. Remove the hard drive cover (see Hard drive cover on page 38).

Remove the RTC battery:

1. Disconnect the RTC battery cable **(1)** from the system board.
2. Detach the RTC battery **(2)** from the computer.



3. Remove the RTC battery.

Reverse this procedure to install the RTC battery.

Service cover

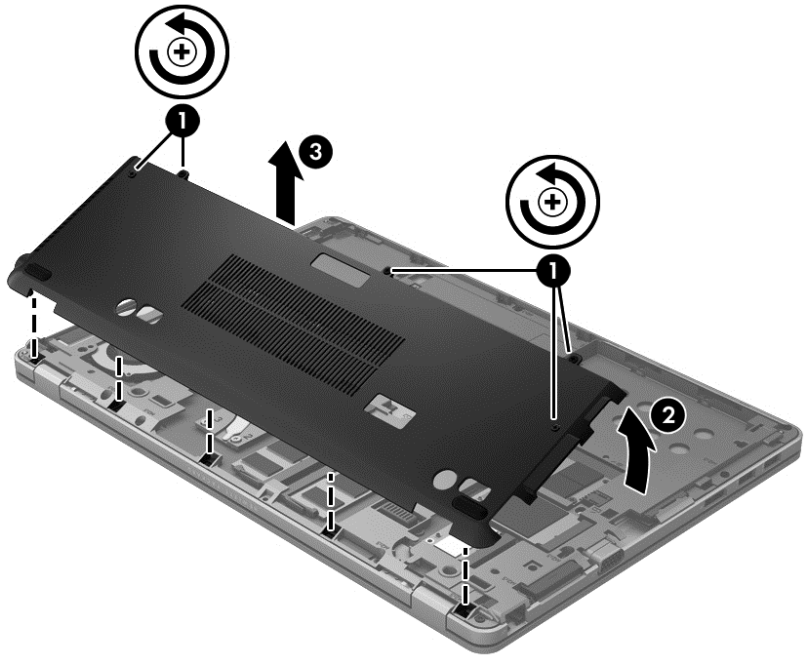
Description	Spare part number
Service cover	704441-001
Service door (RCTO)	713547-001

Before removing the service 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 battery (see Battery on page 35).
5. Remove the hard drive cover (see Hard drive cover on page 38).

Remove the service cover:

1. Loosen the 5 captive Phillips screws **(1)** that secure the cover to the computer.
2. Tilt the door up from the computer slightly **(2)**, and then lift the cover up and off the computer **(3)**.



Reverse the removal procedures to install the service cover.

Memory module

NOTE: Primary and expansion memory is installed in a stacked configuration in the bottom of the computer.

Description	Spare part number
4-GB memory module (PC3L, 12800, 1600-MHz)	691740-001
8-GB memory module (PC3L, 12800, 1600-MHz)	693374-001

Update BIOS before adding memory modules

Before adding new memory, make sure you update the computer to the latest BIOS.

CAUTION: Failure to update the computer to the latest BIOS prior to installing new memory may result in various system problems.

To update BIOS:

1. Navigate to www.hp.com.
2. Click **Support & Drivers > Drivers & Software**.
3. In the **Enter a product name/number box**, type the computer model information, and then click **Search**.
4. Click the link for the computer model.
5. Select the operating system, and then click **Next**.
6. Under **Step 2: Select a Download**, click the **BIOS** link.
7. Click the link for the most recent BIOS.
8. Click the **Download** button, and then follow the on-screen instructions.

Before removing a 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 battery (see Battery on page 35).
5. Remove the hard drive cover (see Hard drive cover on page 38).
6. Remove the service cover Service cover on page 44).

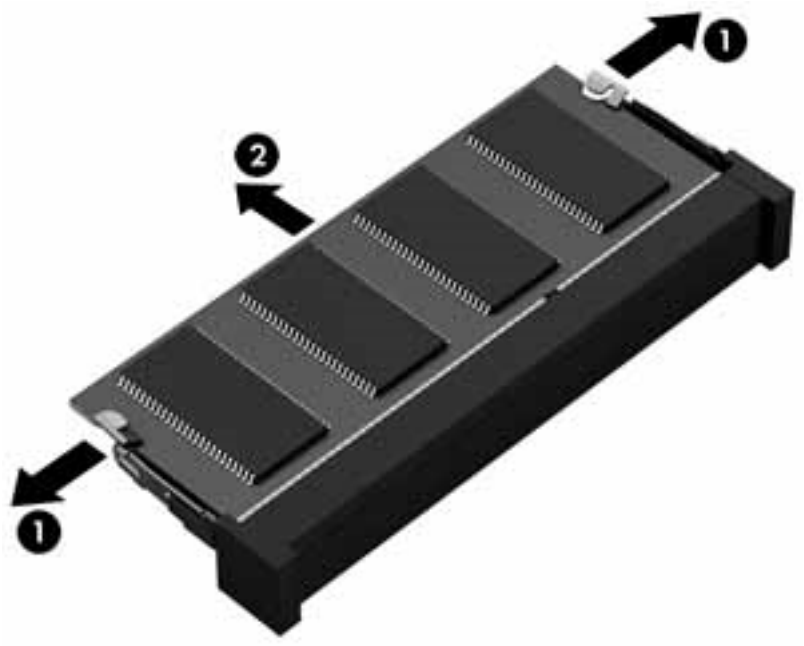
Remove the memory module:

1. Spread the retaining tabs **(1)** on each side of the memory module slot to release the memory module. (The edge of the module opposite the slot rises away from the computer.)

2. Remove the memory module **(2)** by pulling the module away from the slot at an angle.

NOTE: Memory modules are designed with a notch to prevent incorrect insertion into the memory module slot.

NOTE: The computer uses two memory slots. The top slot houses the expansion memory module and the bottom slot houses the primary memory module.



Reverse this procedure to install a memory module.

WWAN module

NOTE: The WWAN module and the WLAN module are not interchangeable.

Description	Spare part number
HP lt4112 LTE/HSPA+ Mobile Broadband Module	740011-001
HP lt4211 LTE/EV-DO/HSPA+ Gobi 4G Module	748021-001
HP hs3110 HSPA+ Mobile Broadband Module	748599-001

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 battery (see Battery on page 35).
5. Remove the hard drive cover (see Hard drive cover on page 38).
6. Remove the service cover (see Service cover on page 44).

Remove the WWAN module:

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

NOTE: The red WWAN antenna cable is connected to the WWAN module “Main” terminal. The blue WWAN antenna cable is connected to the WWAN module “Aux” terminal.

2. Remove the two Phillips PM2.0×3.0 screws **(2)** that secure 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: WWAN modules are designed with a notch to prevent incorrect insertion.

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

Reverse this procedure to install the WWAN module.

WLAN module

Description	Spare part number
Intel Dual Band Wireless-AC 7260 802.11 AC 2x2 WiFi + BT 4.0 Combo Adapter	710663-001
HP Intel Dual Band Wireless-N 7260AN 802.11 a/b/g/n (2x2) combination WiFi and Bluetooth 4.0 WLAN module	717379-001
Intel Dual Band Wireless-N 7260AN 802.11 a/b/g/n (2x2) combination WiFi and Bluetooth 4.0 WLAN module for use in Indonesia	747833-001

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 device functionality, and then contact technical support.

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 battery (see Battery on page 35).
5. Remove the hard drive cover (see Hard drive cover on page 38).
6. Remove the service cover (see Service cover on page 44).

Remove the WLAN module:

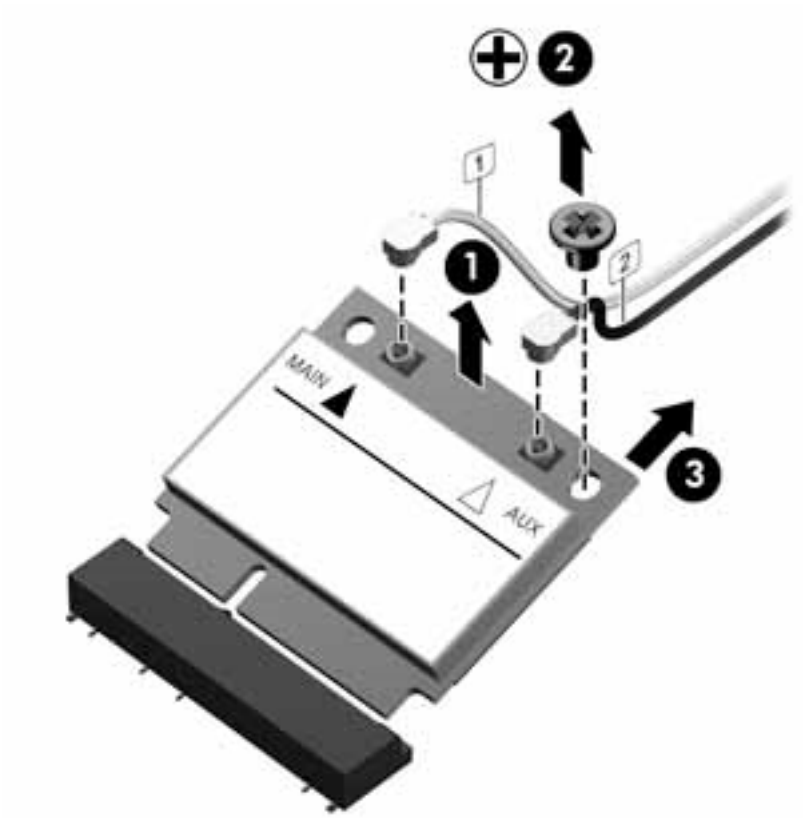
1. Disconnect the WLAN antenna cables **(1)** from the terminals on the WLAN module.

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”. If the computer is equipped with an 802.11a/b/g/n WLAN module, the yellow WLAN antenna cable connects to the middle terminal on the WLAN module.

2. Remove the Phillips PM2.0×3.0 screw **(2)** that secures 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: WLAN modules are designed with a notch to prevent incorrect insertion.



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

Reverse this procedure to install the WLAN module.

Keyboard

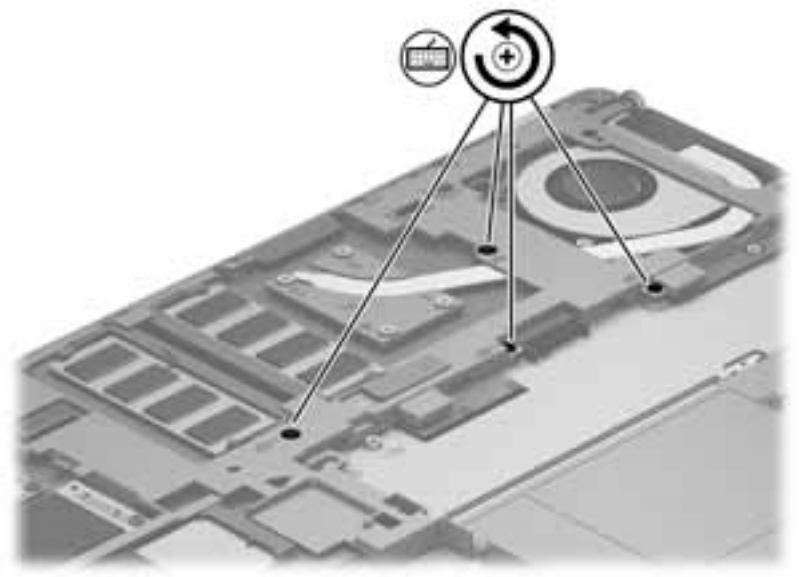
Description	Spare part number
Keyboard	684252-xx1

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 battery (see Battery on page 35).
5. Remove the hard drive cover (see Hard drive cover on page 38).
6. Remove the service cover (see Service cover on page 44).

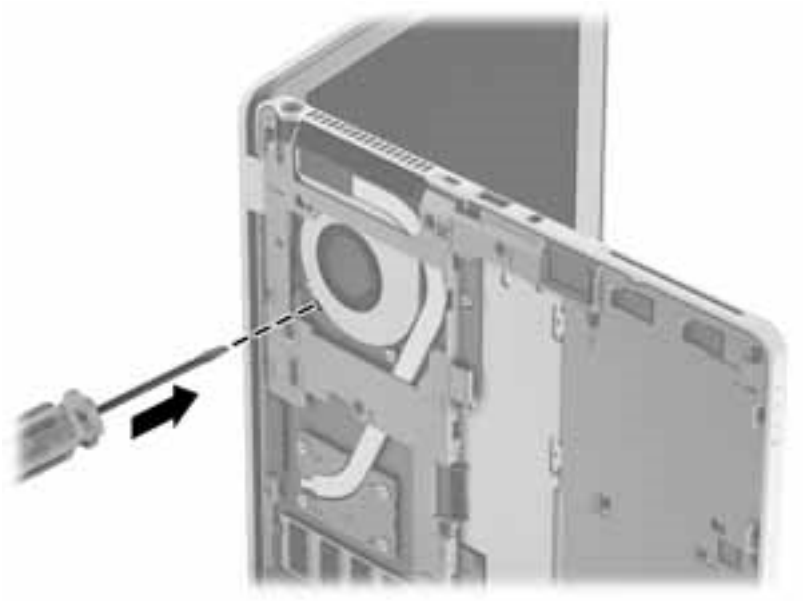
Remove the keyboard:

1. Loosen the 4 captive Phillips screws that secure the keyboard to the computer.



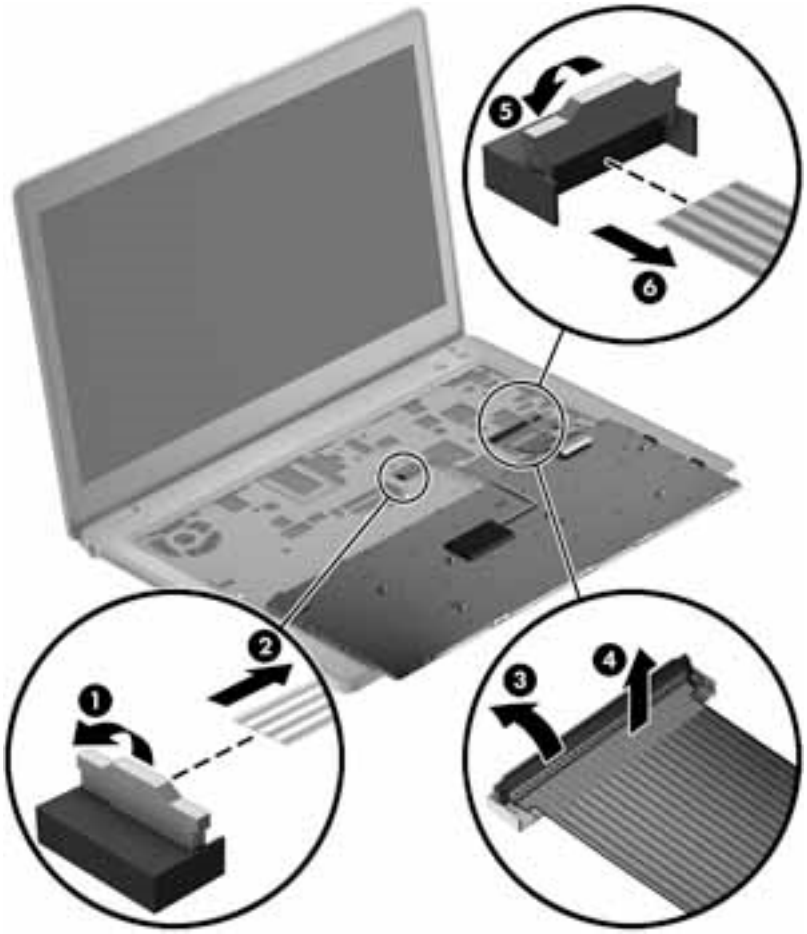
2. Rest and secure the computer on its right side.
3. Partially open the computer.

4. Insert a screw driver or similar thin tool into the keyboard release opening near the fan, and then press on the back of the keyboard until the keyboard disengages from the computer.



5. Turn the computer right-side up with the front toward you.
6. Lift the rear edge of the keyboard **(1)**, and then swing the keyboard up and forward **(2)** until it rests upside down on the palm rest **(3)**.

7. Release and disconnect the following connectors and cables:
   - Release the pointing stick connector **(1)** and remove the cable **(2)**.
   - Release the large keyboard connector **(3)** and remove the cable **(4)**.
   - Release the small keyboard connector **(5)** and remove the cable **(6)**.



8. Remove the keyboard.

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

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

There are as many as 53 screws that must be removed, replaced, or loosened when servicing Authorized Service Provider only parts. Make special note of each screw size and location during removal and replacement.

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 Illustrated parts catalog on page 17 for details.

Display assembly components (panel, bezel, webcam, microphone)

All display assemblies include WLAN antenna transceivers and cables. WWAN models also include 2 WWAN antenna transceivers and cables.

Full hinge-up displays are not spared.

This section describes removing components that do not require that you entirely remove the display assembly from the computer. You can remove the display bezel, webcam/microphone module, and display panel with the display assembly still attached to the computer.

To remove the remaining display components, including the display brackets, antennas, and enclosure, you must remove the entire display assembly from the computer. See Display assembly on page 72 for more information about removing the remaining components.

Description	Spare part number
Display panels	
35.6-cm (14.0-in), HD+, anti-glare, LED	769722-001
35.6-cm (14.0-in), HD anti-glare, LED	769721-001
Display bezels	
For use with models with a webcam	769705-001
For use with models without a webcam	769706-001
Webcam module with microphone	769710-001
Microphone module	702873-001

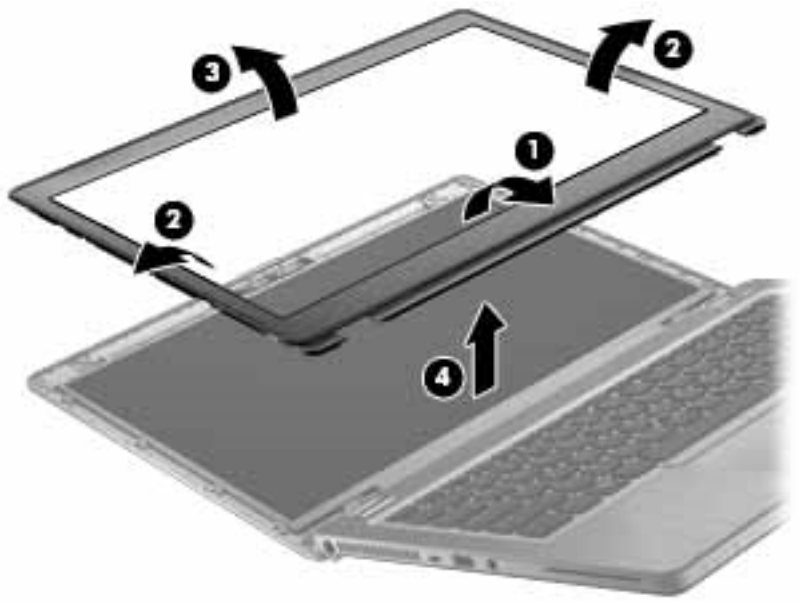
Before removing the display panel, follow these steps:

1. 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.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 35).

Remove the display assembly components:

1. Position the computer upright, with the front toward you.
2. Open the computer as far as possible.
3. If it is necessary to replace the display bezel or any of the display assembly subcomponents:
   a. Flex the inside edges of the bottom edge **(1)**, the left and right sides **(2)**, and the top edge **(3)** of the display bezel until the bezel disengages from the display enclosure.

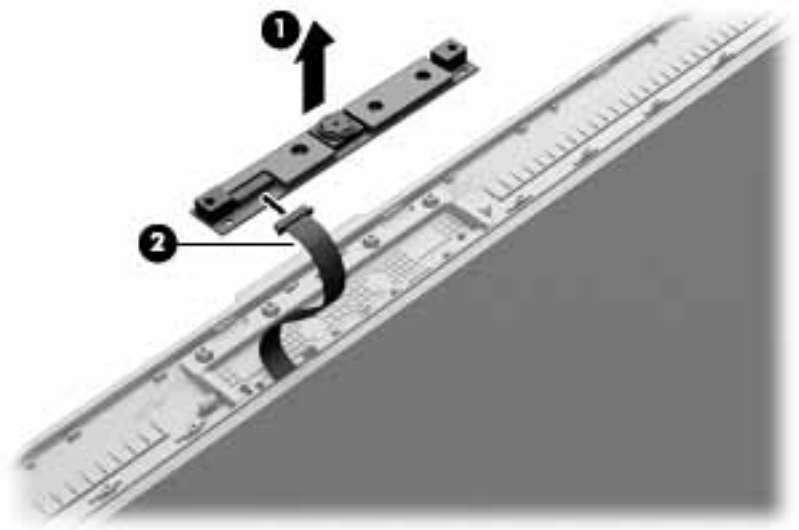
b. Remove the display bezel **(4)**. The display bezel is available using spare part number 769705-001 on models with a webcam and 769706-001 on models without a webcam.



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

   a. Detach the webcam/microphone module **(1)** from the display enclosure. (The webcam/microphone module is attached to the display enclosure with double-sided tape.)

   b. Disconnect the cable **(2)** from the webcam/microphone module.

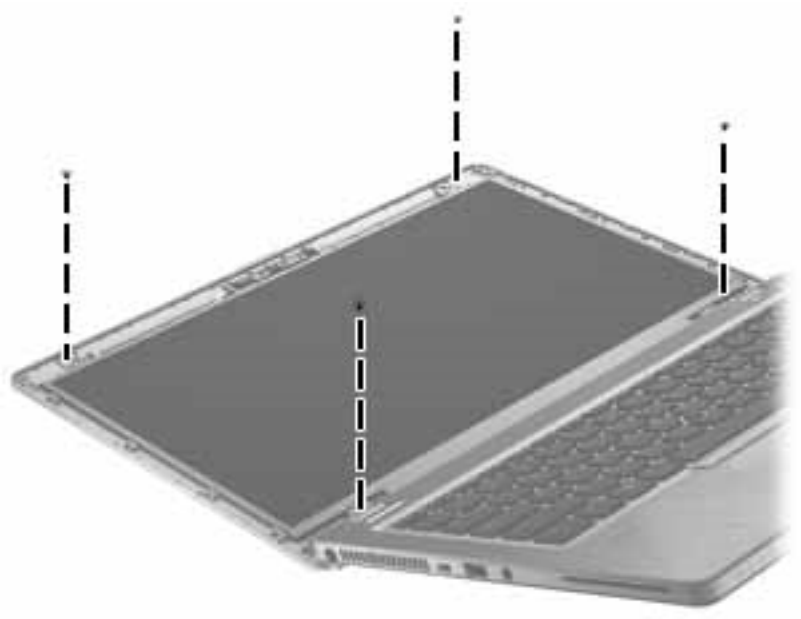


   c. Remove webcam/microphone module. The webcam module is available using spare part number 769710-001. The microphone module is available using spare part number 702873-001.

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

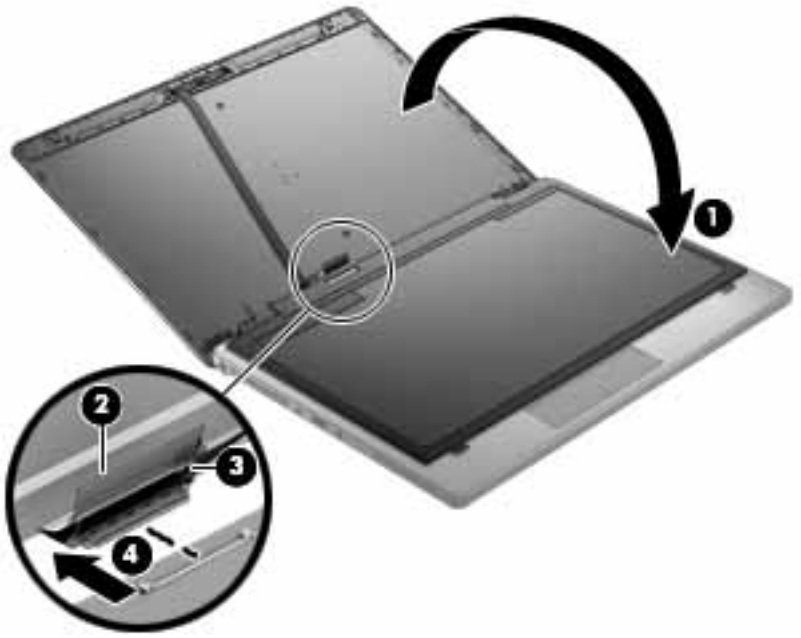
   a. Remove the four Phillips PM2.0×3.0 screws that secure the display panel to the display enclosure.

   - 769721-001 — 35.6-cm (14.0-in), LED, HD, AntiGlare display panel
   - 769722-001 — 35.6-cm (14.0-in), LED, HD+, AntiGlare display panel



b. Rotate the top of the display panel downward **(1)**.

c. Lift the tape that secure the display cable connector on the panel **(2)**, and then disconnect the cable **(3)** from the connector **(4)**.



Reverse this procedure to reassemble and install the display assembly components.

Base enclosure

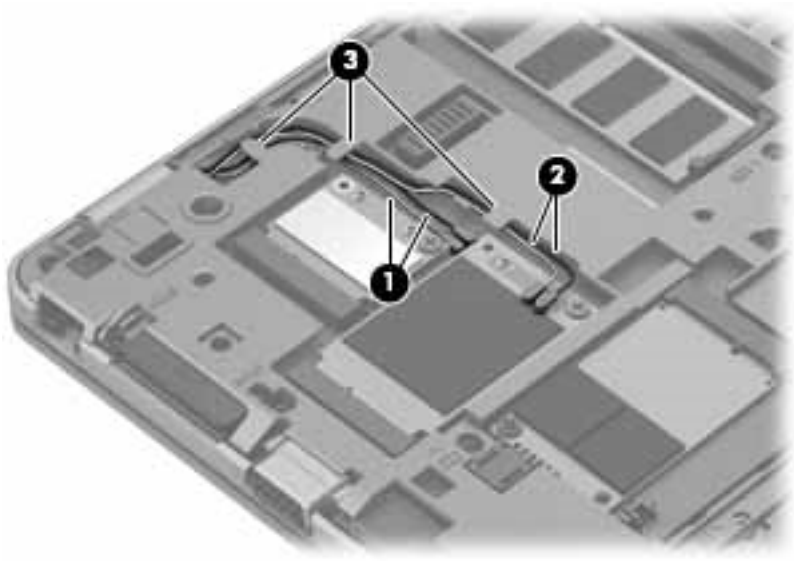
Description	Spare part number
Base enclosure	702863-001

Before removing the base enclosure, follow these steps:

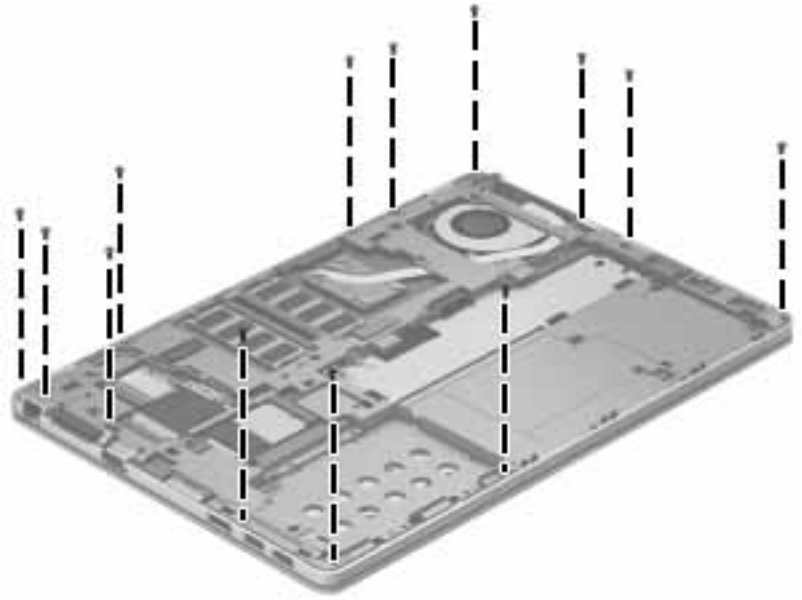
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see Battery on page 35), and then remove the following components:
   a. Hard drive cover (see Hard drive cover on page 38)
   b. Hard drive (see Hard drive/SSD drive on page 39)
   c. Service cover (see Service cover on page 44)
   d. Keyboard (see Keyboard on page 51)

Remove the base enclosure:

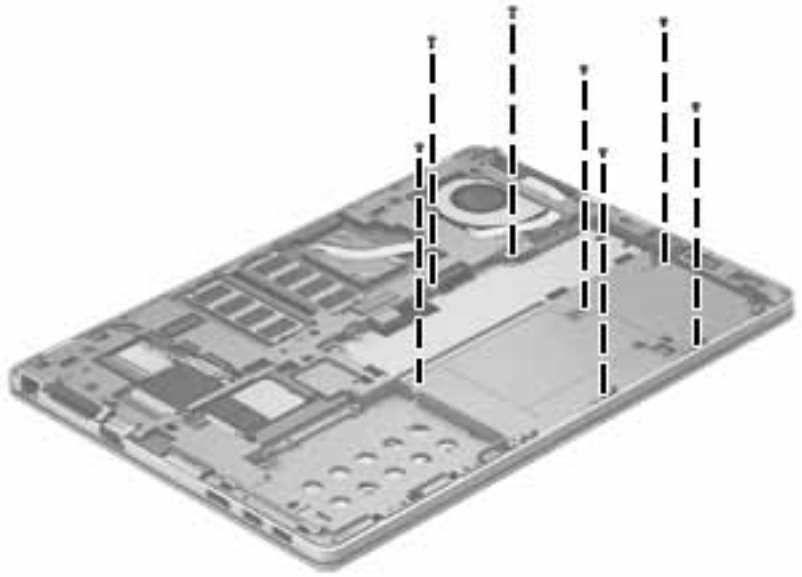
1. Close the computer and position it upside down.
2. Remove the WLAN **(1)** and WWAN **(2)** antennas from the routing path **(3)** in the base enclosure.



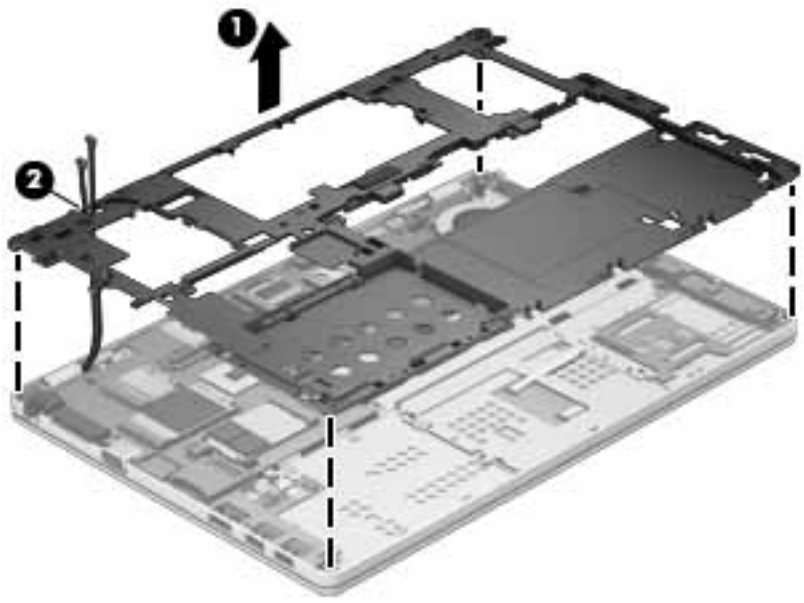
3. Remove the 13 Torx PM2.0×5.0 screws that secure the base enclosure to the computer.



4. Remove the 7 Torx PM2.0×3.0 screws from the battery bay that secure the base enclosure to the computer.



5. Lift the base enclosure **(1)** off the computer while threading the antenna cables through the hole in the base enclosure **(2)**.



Reverse this procedure to install the base enclosure.

Touchpad

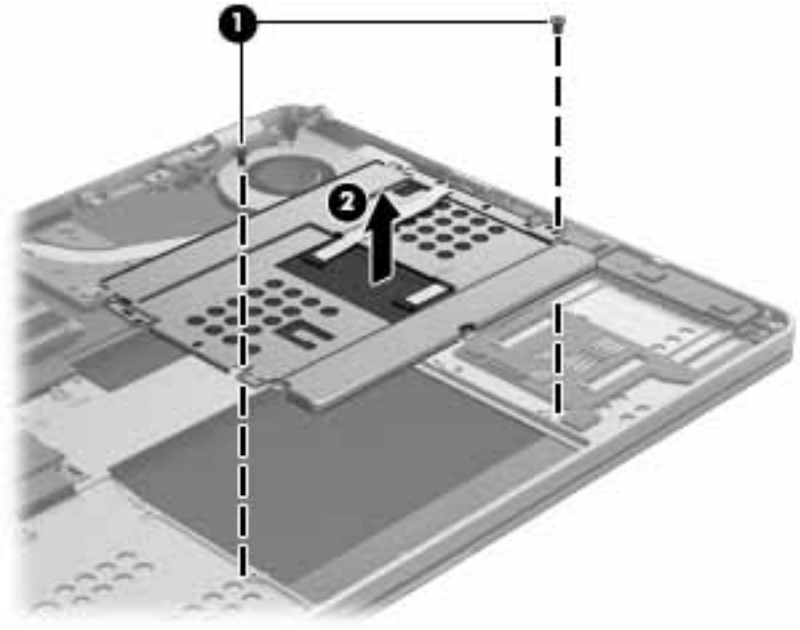
Before removing the touchpad, follow these steps:

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 battery (see Battery on page 35), and then remove the following components:
   a. Hard drive cover (see Hard drive cover on page 38)
   b. Hard drive (see Hard drive/SSD drive on page 39)
   c. Service cover (see Service cover on page 44)
   d. Keyboard (see Keyboard on page 51)
   e. Base enclosure (see Base enclosure on page 58)

Remove the touchpad:

1. Remove the 2 Phillips PM2.0×3.0 screws **(1)** that secure the touchpad to the computer.

2. Lift the touchpad from the computer **(2)**.



3. Remove the touchpad.

Reverse this procedure to install the touchpad.

NOTE: When replacing the touchpad, make sure to install the screws into holes closer to the edge of computer.

Power connector

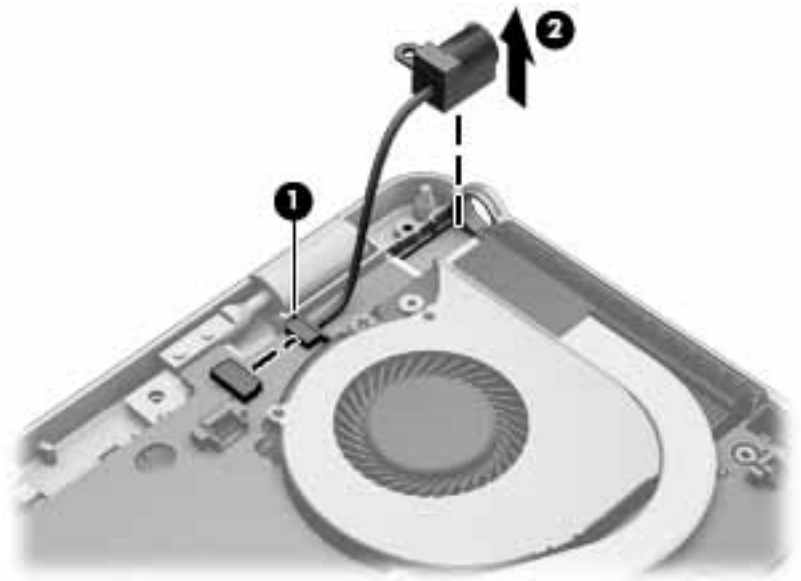
Description	Spare part number
Power connector	702875-001

Before removing the power connector, 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 battery (see Battery on page 35), and then remove the following components:
   a. Hard drive cover (see Hard drive cover on page 38)
   b. Hard drive (see Hard drive/SSD drive on page 39)
   c. Service cover (see Service cover on page 44)
   d. Keyboard (see Keyboard on page 51)
   e. Base enclosure (see Base enclosure on page 58)

Remove the power connector:

1. Position the base enclosure with the front toward you.
2. Disconnect the power connector cable from the system board **(1)**.
3. Lift the power connector from the computer **(2)**.



4. Remove the power connector.

Reverse this procedure to install the power connector.

Fan

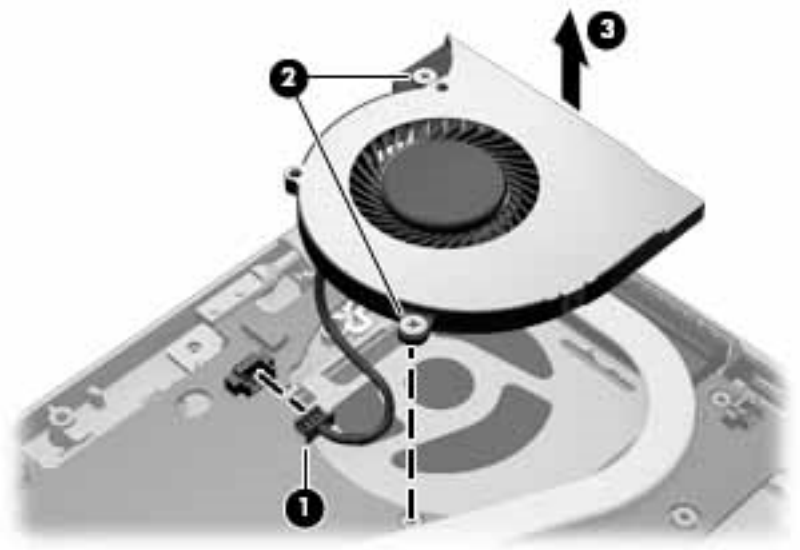
Description	Spare part number
Fan (includes cable)	702859-001

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 battery (see Battery on page 35).
   a. Hard drive cover (see Hard drive cover on page 38)
   b. Hard drive (see Hard drive/SSD drive on page 39)
   c. Service cover (see Service cover on page 44)
   d. Keyboard (see Keyboard on page 51)
   e. Base enclosure (see Base enclosure on page 58)

Remove the fan:

1. Disconnect the fan cable **(1)** from the system board.
2. Loosen the 2 captive Phillips screws **(2)** that secure the fan to the top cover.
3. Remove the fan **(3)**.



Reverse this procedure to install the fan.

System board

NOTE: The system board spare part kit includes replacement thermal material.

Description	Spare part number
System boards for use in models without Windows 8:	
Intel Core i7-4650U processor	769720-001
Intel Core i7-4600U processor	769719-001
Intel Core i5-4310U processor	769718-001
Intel Core i5-4210U processor	769717-001
System boards for use in Windows 8 models:	
Intel Core i7-4650U processor for use in models with Windows 8 Standard	769720-501
Intel Core i7-4650U processor for use in models with Windows 8 Professional	769720-601
Intel Core i7-4600U processor for use in models with Windows 8 Standard	769719-501
Intel Core i7-4600U processor for use in models with Windows 8 Professional	769719-601
Intel Core i5-4310U processor for use in models with Windows 8 Standard	769718-501
Intel Core i5-4310U processor for use in models with Windows 8 Professional	769718-601
Intel Core i5-4210U processor for use in models with Windows 8 Standard	769717-501
Intel Core i5-4210U processor for use in models with Windows 8 Professional	769717-601

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 battery (see Battery on page 35), and then remove the following components:
   a. Hard drive cover (see Hard drive cover on page 38)
   b. Hard drive (see Hard drive/SSD drive on page 39)
   c. Service cover (see Service cover on page 44)
   d. Fan (see Fan on page 63)
   e. Keyboard (see Keyboard on page 51)
   f. Base enclosure (see Base enclosure on page 58)

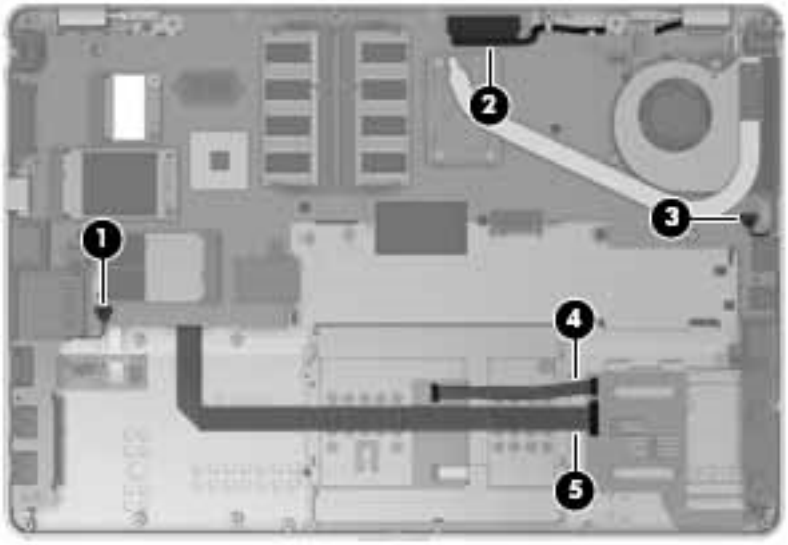
NOTE: When replacing the system board, be sure that the following components are removed from the defective system board and installed on the replacement system board:

- SIM (see SIM on page 36, if applicable)
- Memory module (see Memory module on page 45)
- WWAN module (see WWAN module on page 47)

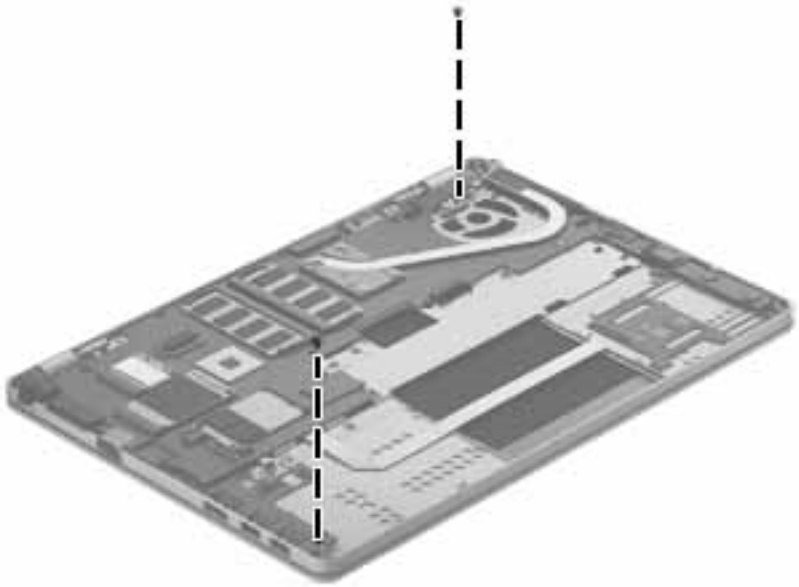
- WLAN module (see WLAN module on page 49)
- Heat sink (see Heat sink on page 67)

Remove the system board:

1. Disconnect the following cables:
   - **(1)**: Right speaker cable
   - **(2)**: Display panel
   - **(3)**: Left speaker cable
   - **(4)**: Touchpad
   - **(5)**: Smart card reader



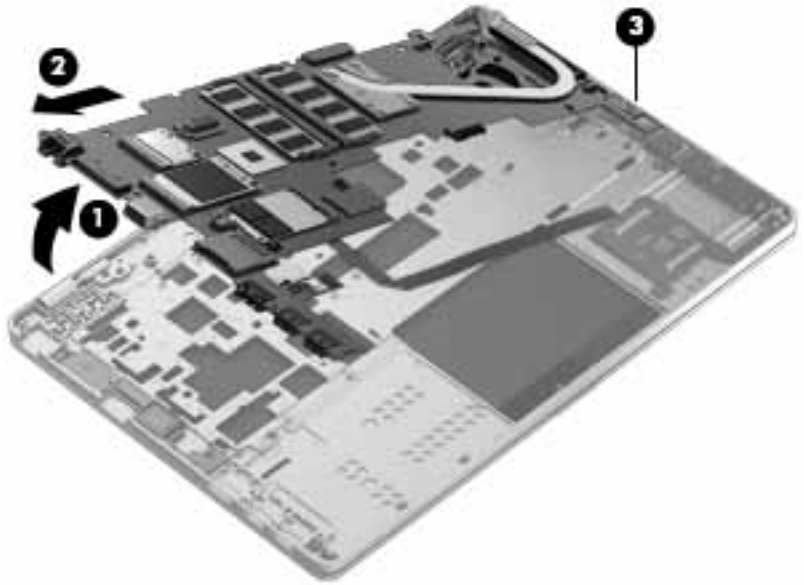
2. Remove the 2 Phillips PM2.0×4.0 screws that secure the system board to the computer.



3. Lift the left side of the system board up at an angle **(1)**.

4. Pull the system board away from and out of the computer **(2)**, making sure the connectors on the right side of the board **(3)** are clear of the computer.

NOTE: To avoid breaking the board, support the right side of the system board near the heat sink **(3)** as you lift it up and out of the computer.



Reverse this procedure to install the system board.

Heat sink

NOTE: The heat sink spare part kit includes replacement thermal material.

Description	Spare part number
Heat sink	769708-001

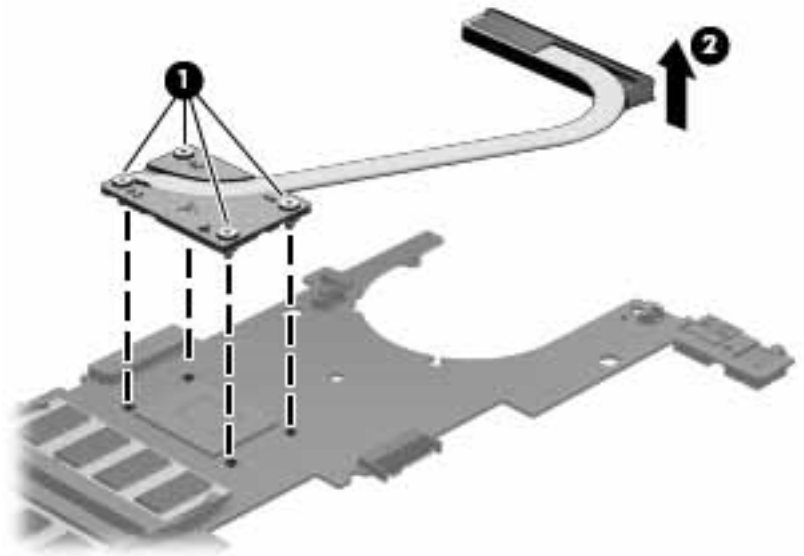
Before removing the heat sink, follow these steps:

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 battery (see Battery on page 35), and then remove the following components:
   a. Hard drive cover (see Hard drive cover on page 38)
   b. Hard drive (see Hard drive/SSD drive on page 39)
   c. Service cover (see Service cover on page 44)
   d. WLAN module (see WLAN module on page 49)
   e. WWAN module (see WWAN module on page 47)
   f. Fan (see Fan on page 63)
   g. Keyboard (see Keyboard on page 51)
   h. Base enclosure (see Base enclosure on page 58)
   i. System board (see System board on page 64)

Remove the heat sink:

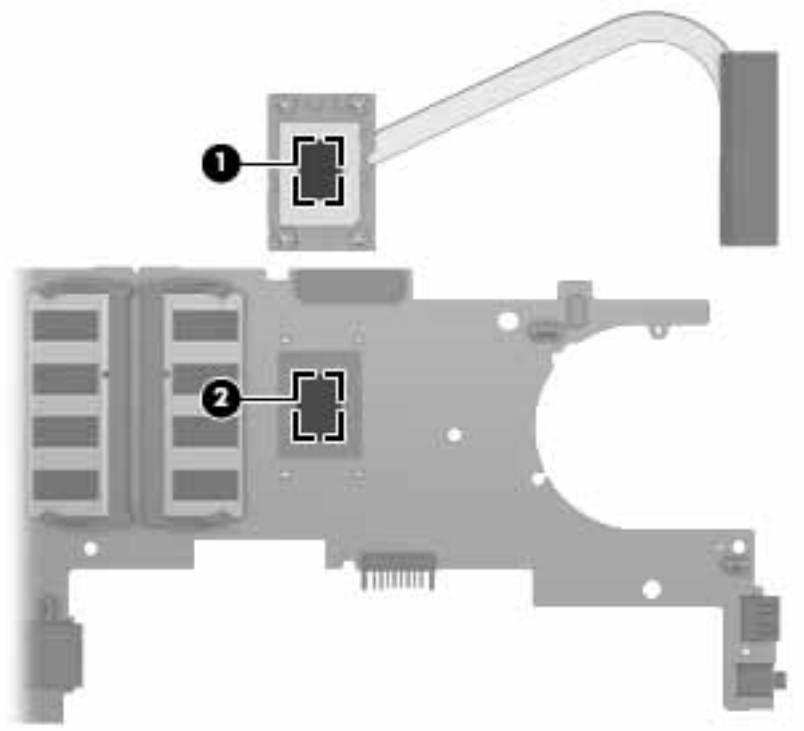
1. Following the 1, 2, 3, 4 sequence stamped into the heat sink, loosen the four captive Phillips screws **(1)** that secure the heat sink to the system board.

2. Remove the heat sink **(2)**.



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, processor, and system board spare part kits.

The following illustration shows the replacement thermal material locations. Thermal paste is used on the heat sink **(1)** and the processor **(2)**.



Reverse this procedure to install the heat sink.

Speaker assembly

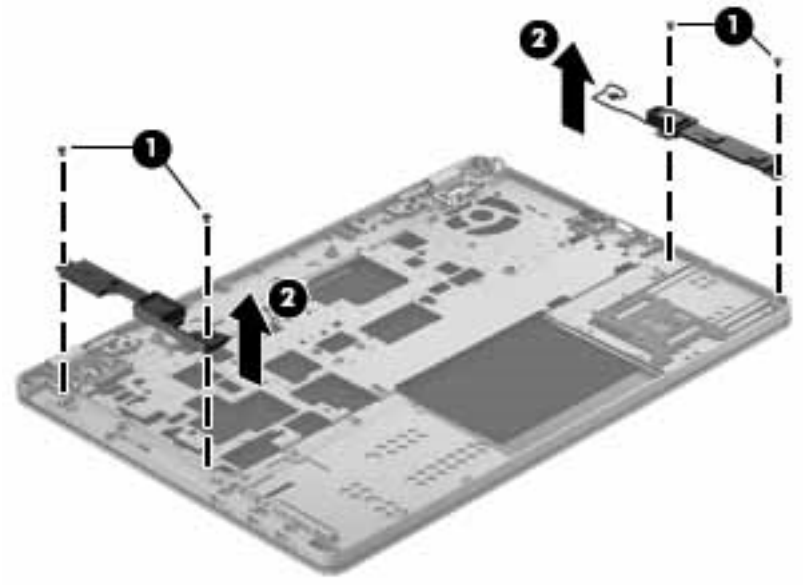
Description	Spare part number
Speaker assembly (includes cable)	702869-001

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 battery (see Battery on page 35), and then remove the following components:
   a. Hard drive cover (see Hard drive cover on page 38)
   b. Hard drive (see Hard drive/SSD drive on page 39)
   c. Service cover (see Service cover on page 44)
   d. Keyboard (see Keyboard on page 51)
   e. Base enclosure (see Base enclosure on page 58)
   f. Fan (see Fan on page 63)
   g. System board (see System board on page 64)

Remove the speaker assembly:

1. Remove the 2 Phillips PM2.0×3.0 screws **(1)** that secure each speaker to the computer.
2. Remove the speakers **(2)** from the computer.



Reverse this procedure to install the speakers.

Smart card board

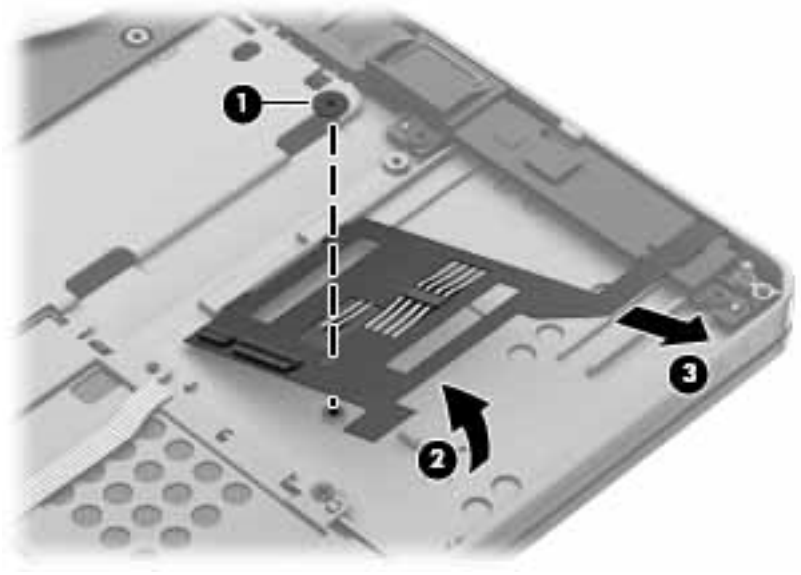
Description	Spare part number
Smart card board (includes cable)	769707-001

Before removing the smart card reader, 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 battery (see Battery on page 35).
   a. Hard drive cover (see Hard drive cover on page 38)
   b. Hard drive (see Hard drive/SSD drive on page 39)
   c. Service cover (see Service cover on page 44)
   d. Keyboard (see Keyboard on page 51)
   e. Base enclosure (see Base enclosure on page 58)
   f. Fan (see Fan on page 63)
   g. System board (see System board on page 64)

Remove the smart card board:

1. Remove the Phillips PM2.0×2.5 broadhead screw **(1)** that secures the board to the computer.
2. Rotate the board upward **(2)** at an angle, and then remove it from the computer **(3)**.



Reverse the removal procedures to install the smart card board.

Fingerprint reader board

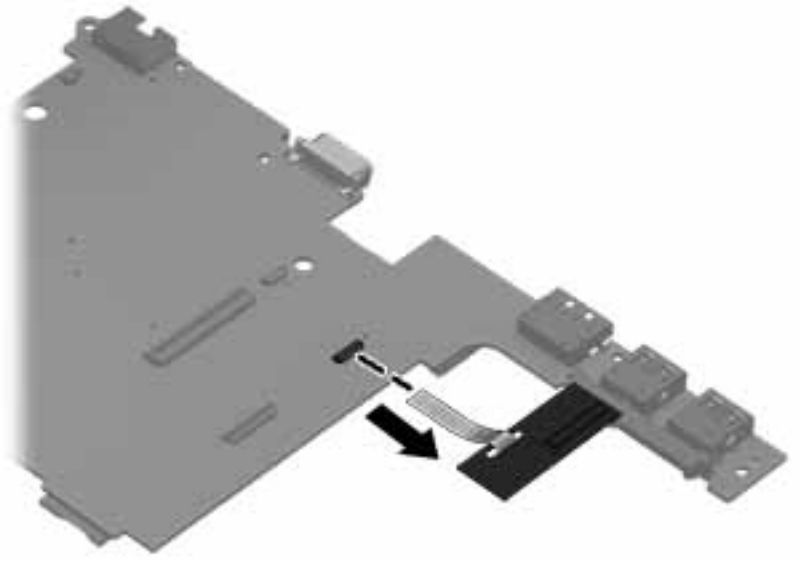
Description	Spare part number
Fingerprint reader board (includes cable)	702845-001

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 battery (see Battery on page 35), and then remove the following components:
   a. Hard drive cover (see Hard drive cover on page 38)
   b. Hard drive (see Hard drive/SSD drive on page 39)
   c. Service cover (see Service cover on page 44)
   d. Keyboard (see Keyboard on page 51)
   e. Base enclosure (see Base enclosure on page 58)
   f. Fan (see Fan on page 63)
   g. System board (see System board on page 64)

Remove the fingerprint reader board:

1. Position the system board upside down.
2. Disconnect the fingerprint reader board cable from the system board connector, and then remove the assembly.



3. Remove the fingerprint reader board and cable.

Reverse this procedure to install the fingerprint reader board.

Display assembly

This section describes removing components that require you to completely remove the display panel. For more information about removing display components that do not require that you remove the assembly from the computer, see Display assembly components (panel, bezel, webcam, microphone) on page 55.

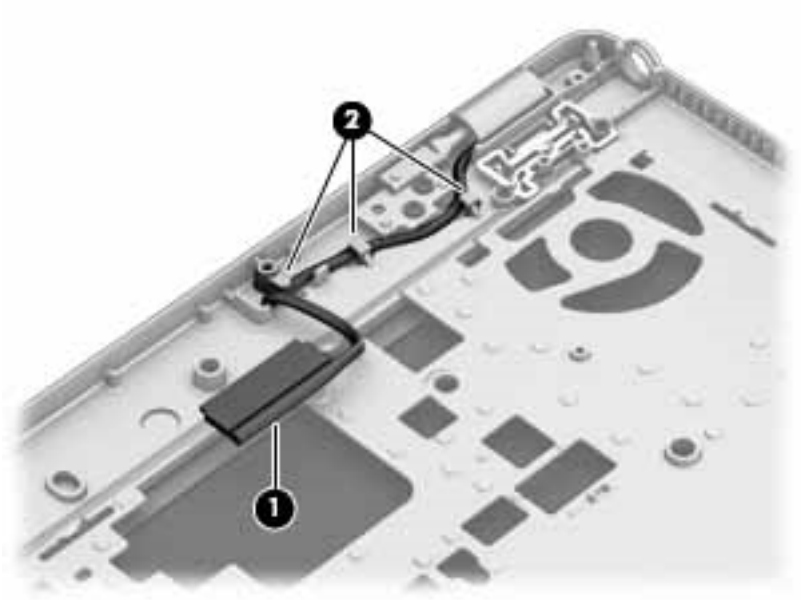
NOTE: The display assembly is spared at the subcomponent level only.

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 battery (see Battery on page 35), and then remove the following components:
   a. Hard drive cover (see Hard drive cover on page 38)
   b. Hard drive (see Hard drive/SSD drive on page 39)
   c. Service cover (see Service cover on page 44)
   d. WLAN module (see WLAN module on page 49)
   e. WWAN module (see WWAN module on page 47)
   f. Fan (see Fan on page 63)
   g. Keyboard (see Keyboard on page 51)
   h. Base enclosure (see Base enclosure on page 58)

Remove the display assembly:

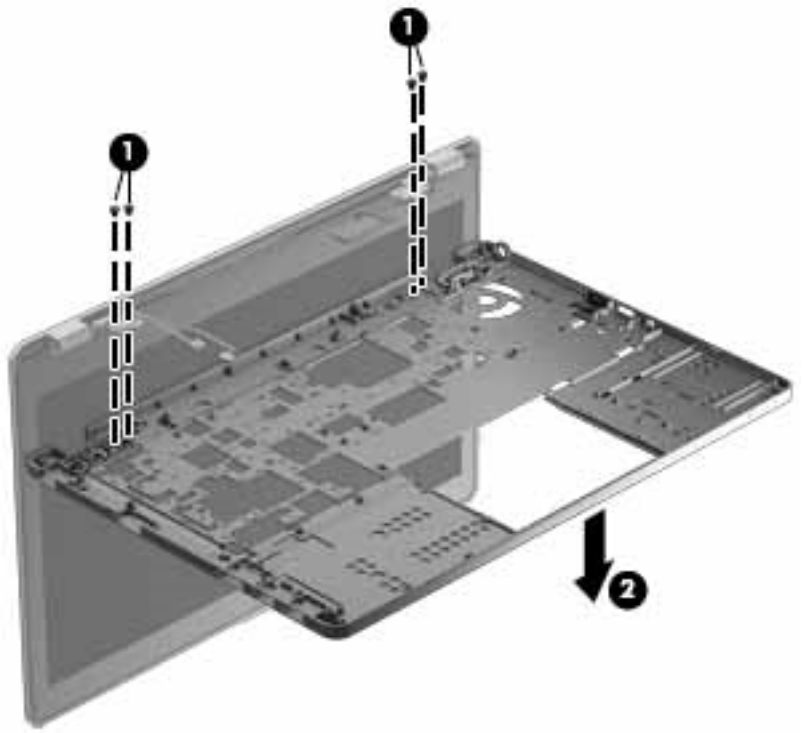
1. Disconnect the display panel cable **(1)** from the system board.
2. Release the display panel cable from the routing channel **(2)**.



3. Open the computer and position it with the base enclosure on a table and the display hanging down.

NOTE: Be sure to support the display when removing the screws.

4. Remove the four Phillips PM2.5×4.0 screws **(1)** that secure the display assembly to the computer.
5. Remove the display assembly from the top cover **(2)**.

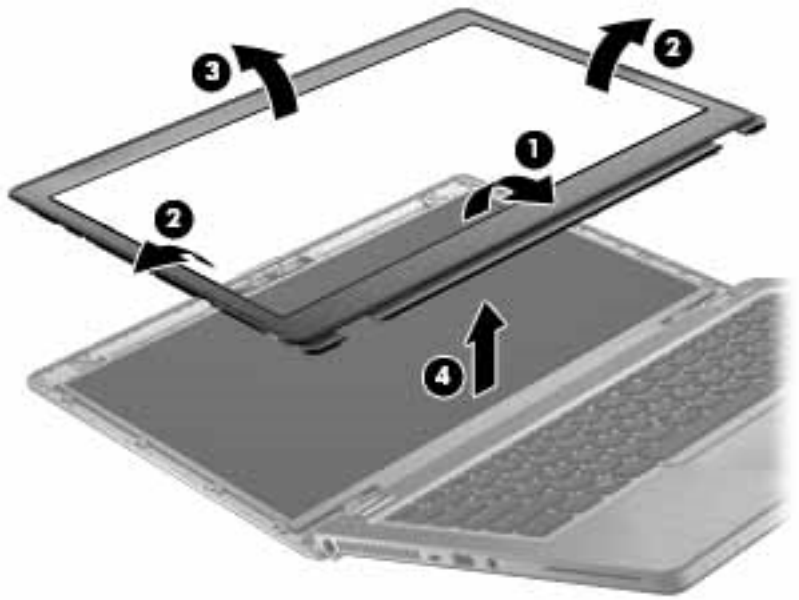


6. To remove the display bezel:

   a. Flex the inside edges of the bottom edge **(1)**, the left and right sides **(2)**, and the top edge **(3)** of the display bezel until the bezel disengages from the display enclosure.

b. Remove the display bezel **(4)**. The display bezel is available using spare part number 769705-001 on models with a webcam and 769706-001 on models without a webcam.

NOTE: For this procedure the display will not be connected to the computer as shown in the following image.



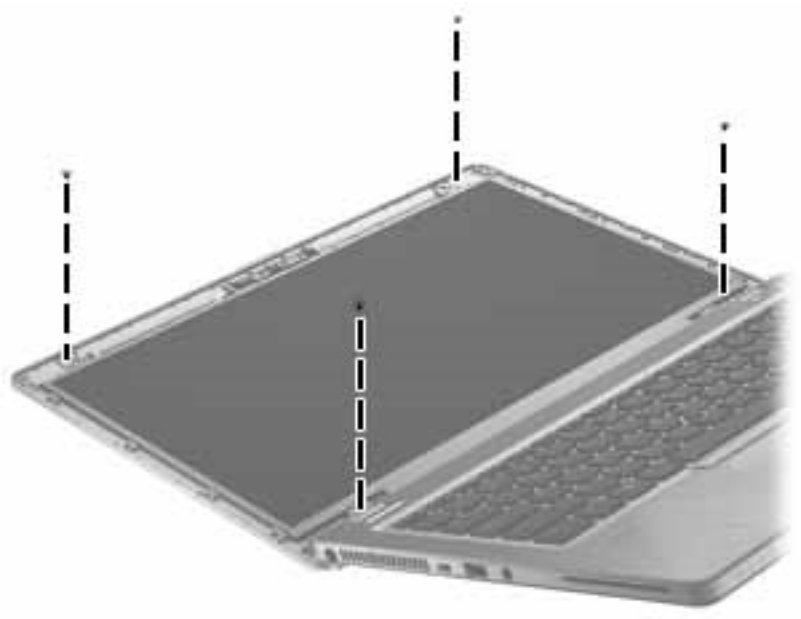
7. To remove the display panel:

NOTE: For this procedure the display will not be connected to the computer as shown in the following images.

a. Remove the four Phillips PM2.0×3.0 screws that secure the display panel to the display enclosure.

Display panels are available using the following spare part numbers:

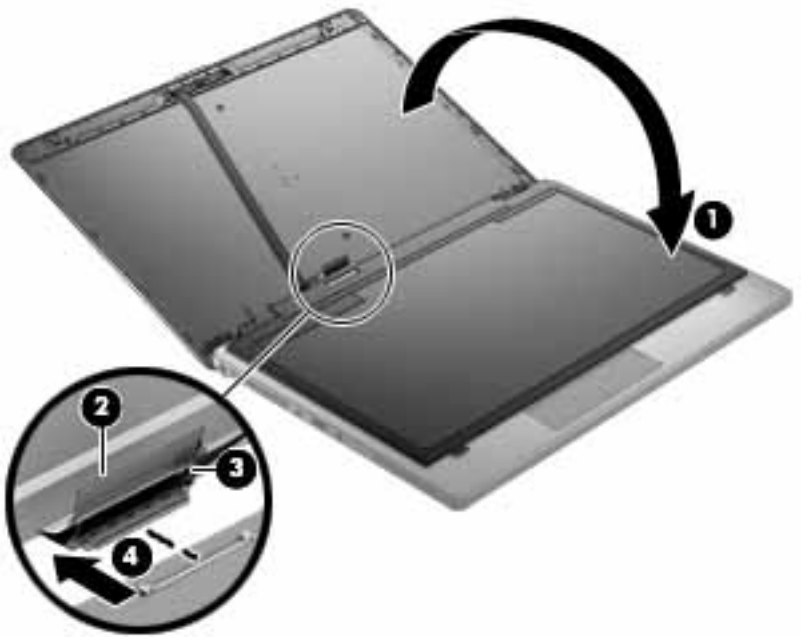
- 769721-001 — 35.6-cm (14.0-in), LED, HD, AntiGlare display panel
- 769722-001 — 35.6-cm (14.0-in), LED, HD+, AntiGlare display panel



b. Rotate the top of the display panel downward **(1)**.

c. Lift the tape that secure the display cable connector on the panel **(2)**, and then disconnect the cable **(3)** from the connector **(4)**.

NOTE: For this procedure the display will not be connected to the computer as shown in the following image.

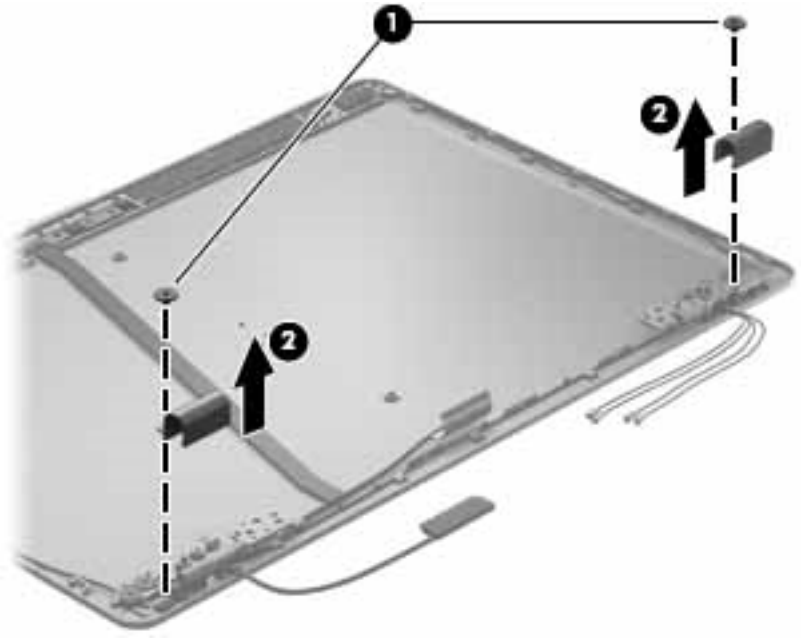


8. If it is necessary to replace the display hinges:

Display hinge covers and hinges are available in the Display Hinge Kit, spare part number 702857-001.

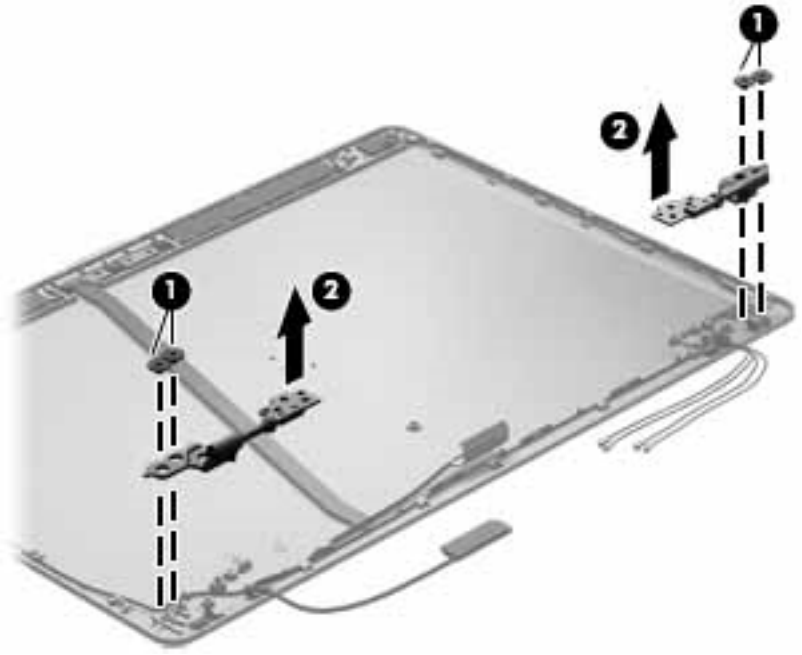
a. Remove the Phillips broadhead PM2.0×2.5 screw **(1)** that secures each hinge cover to the display enclosure.

b. Remove the display hinge covers **(2)** from atop the hinges.



c. Remove the 2 broadhead Phillips PM2.0×2.5 screws **(1)** that secure each display hinge to the display enclosure.

d. Lift the display hinges off the display enclosure **(2)**.



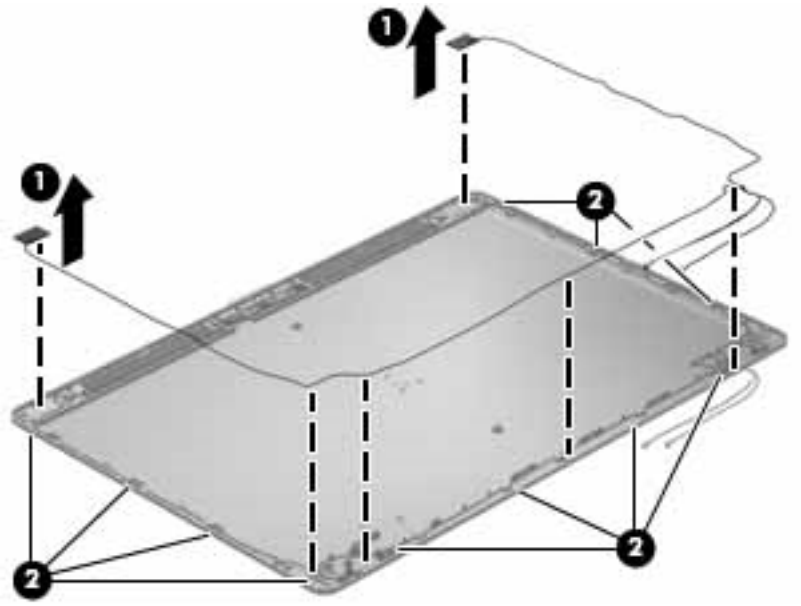
9. If it is necessary to replace the WLAN antenna cables and transceivers:

WLAN and WWAN antennas are available in the Antenna Kit, spare part number 769704-001.

a. Release the WLAN antenna transceivers **(1)** from the clips built into the display enclosure. (The WLAN antenna transceivers are attached to the display enclosure with double-sided tape.)

b. Detach the WLAN antenna cables from the routing channels **(2)** built into the display enclosure.

c. Remove the WLAN antenna cables and transceivers. The WLAN antenna cables and transceivers are included in the Antenna Kit, spare part number 769704-001.



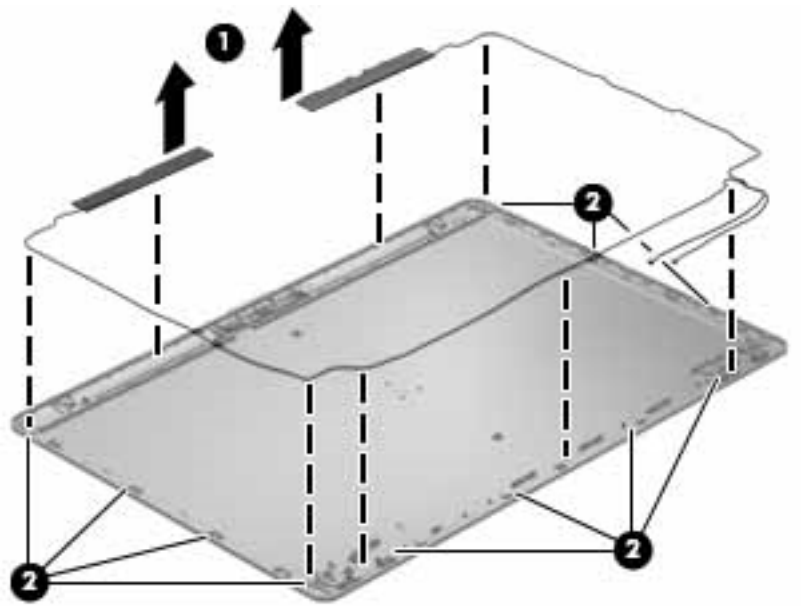
10. If it is necessary to replace the WWAN antenna cables and transceivers:

    WLAN and WWAN antennas are available in the Antenna Kit, spare part number 769704-001.

    a. Release the WWAN antenna transceivers **(1)** from the clips built into the display enclosure. (The WWAN antenna transceivers are attached to the display enclosure with double-sided tape.)

    b. Detach the WWAN antenna cables from the routing channels **(2)** built into the display enclosure.

    c. Remove the WWAN antenna cables and transceivers. The WWAN antenna cables and transceivers are included in the Antenna Kit, spare part number 769704-001.



Reverse this procedure to reassemble and install the display assembly.

7 Computer Setup (BIOS), MultiBoot, and HP PC Hardware Diagnostics (UEFI) in 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 arrow keys to select **Main > 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 arrow keys to select **Main > 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. 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 **Main > 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 **Main > 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 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 revealed 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 **Main > 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 arrow keys to select **Main > 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, type `hp support assistant`, and then select the HP Support Assistant app.
2. Click **Updates and tune-ups**, and then click **Check for HP updates now**.
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.

      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 revealed on the screen after the download is complete. If no instructions are revealed, follow these steps:

1. From the Start screen, type `file`, and then select **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 one of the following options:
   - **Advanced > Boot Options > UEFI Boot Order > UEFI Hybrid**
   - **Advanced > Boot Options > UEFI Boot Order > UEFI Native Boot mode**
   - **Advanced > Boot Options > Legacy Boot Order > Legacy Boot Mode**

   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 **Main > 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 **Advanced > Boot Options > MultiBoot Express Boot Popup Delay (Sec)**, 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 **Main > 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)

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.

To start HP PC Hardware Diagnostics UEFI:

1. Turn on or restart the computer, quickly press esc, and then press 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 83.

   b. Hard drive

   c. BIOS

2. When the diagnostic tool opens, use the keyboard arrow keys to select 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, press esc.

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

NOTE: Instructions for downloading HP PC Hardware Diagnostics (UEFI) are provided in English only.

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

Option 1: HP PC Diagnostics homepage—Provides access to the latest UEFI version

1. Go to http://hp.com/go/techcenter/pcdiags.
2. Click the **UEFI Download** link, and then select **Run**.

Option 2: Support and Drivers pages—Provides downloads for a specific product for earlier and later versions

1. Go to http://www.hp.com.
2. Point to **Support**, located at the top of the page, and then click **Download Drivers**.
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 model, and then select your operating system.
5. In the **Diagnostic** section, click **HP UEFI Support Environment**.

   – or –

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

8 Computer Setup (BIOS), MultiBoot, and HP PC Hardware Diagnostics (UEFI) in 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 arrow keys to select **Main > 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 arrow keys to select **Main > 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. 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 **Main > 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 **Main > 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 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 revealed 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 **Main > 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 arrow keys to select **Main > 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 revealed on the screen after the download is complete. If no instructions are revealed, 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 **Main > 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 **Main > 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 89.

   b. Hard drive

   c. BIOS

2. Use the keyboard arrow keys to select 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: Instructions for downloading HP PC Hardware Diagnostics (UEFI) are provided in English only.

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

Option 1: HP PC Diagnostics homepage—Provides access to the latest UEFI version

1. Go to http://hp.com/go/techcenter/pcdiags.
2. Click the **UEFI Download** link, and then select **Run**.

Option 2: Support and Drivers pages—Provides downloads for a specific product for earlier and later versions

1. Go to http://www.hp.com.
2. Point to **Support**, located at the top of the page, and then click **Download Drivers**.
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 model, and then select your operating system.
5. In the **Diagnostic** section, click **HP UEFI Support Environment**.

   – or –

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

9 Specifications

Computer specifications

	Metric	U.S.
Dimensions		
Width	**33.80 cm**	13.3 in
Depth	**23.13 cm**	9.09 in
Height (front to back)	**1.95 cm**	0.77 in
Weight		
Equipped with one memory module, WLAN module, and mSATA drive	**1.63 kg**	3.6 lbs
Input power		
Operating voltage and current	18.5 V dc @ 3.5 A - 65 W – or – 19.0 V dc @ 4.74 A - 90 W	
Temperature		
Operating	**5°C to 35°C**	41°F to 95°F
Nonoperating	**-20°C to 60°C**	-4°F to 140°F
Relative humidity (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating	**-15 m to 3,048 m**	-50 ft to 10,000 ft
Nonoperating	**-15 m to 12,192 m**	-50 ft to 40,000 ft

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

35.6-cm (14.0-in) display specifications

	Metric	U.S.
Dimensions		
Height	**17.6 cm**	6.93 in
Width	**31.2 cm**	12.28 in
Diagonal	**35.7 cm**	14.06 in
Number of colors	up to 16.8 million	
Contrast ratio	200:1 (typical)	
Brightness	200 nits (typical)	
Pixel resolution		
Pitch	**0.197 × 0.197 mm**	
Format	HD, SVA (1366 x 768)	
Configuration	RGB vertical stripe	
Backlight	LED	
Character display	80 × 25	
Total power consumption	3.46 W	
Viewing angle	±65° horizontal, ±50° vertical (typical)	

Hard drive specifications

	500-GB*	320-GB*
Dimensions		
Height	7 mm	7 mm
Length	100.4 mm	100.4 mm
Width	69.9 mm	69.9 mm
Weight	110 g	110 g
Interface type	SATA	SATA
Transfer rate		
Synchronous (maximum)	1.1 GB/sec	1.1 GB/sec
Security	ATA security or SED	ATA security
Seek times (typical read, including setting)		
Single track	1.5 ms	1.5 ms
Average (read/write)	11/13 ms	11/13 ms
Maximum	22 ms	22 ms
Logical blocks	976,773,168	628,142,448
Disk rotational speed	7200 rpm	7200 rpm
Operating temperature		
*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less.		
NOTE: Certain restrictions and exclusions apply. Contact technical support for details.		

Solid-state drive specifications

	180-GB*	256-GB*
Dimensions		
Height	7 mm	7 mm
Length	100.5 mm	100.5 mm
Width	69.9 mm	69.9 mm
Weight	78 g	78 g
Interface type	ATA-7	ATA-7
Transfer rate		
Sequential Read	Up to 550 MB/s	Up to 460 MB/s
Random Read	Up to 50K IOPS	Up to 46K IOPS
Sequential Write	Up to 520 MB/s	Up to 260 MB/s
Random Write	Up to 80K IOPS	Up to 56K IOPS
Ready time, Maximum (to not busy)	2.0 s	4.0 s
Access times		
Logical	0.1 ms	0.1
Total logical sectors	351,651,888	500,118,192
Operating temperature		
Operating	0° to 70°C (32°F to 158°F)	0° to 70°C (32°F to 158°F)
Non-operating	-55° to 95°C (-67°F to 203°F)	-40° to 80°C (-40°F to 176°F)

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

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

mSATA drive specifications

	24-GB*	32-GB*	256-GB*
Dimensions			
Height	1 mm	1 mm	1 mm
Length	50.8 mm	50.8 mm	50.8 mm
Width	28.9 mm	28.9 mm	28.9 mm
Weight	< 10 g	< 10 g	< 10 g
Interface type	ATA-7	ATA-7	ATA-7
Transfer rate			
Sequential Read	Up to 160 MB/s	Up to 380 MB/s	Up to 490 MB/s
Random Read	Up to 128 MB/s	Up to 180 MB/s	Up to 480 MB/s
Sequential Write	Up to 115 MB/s	Up to 80 MB/s	Up to 250 MB/s
Random Write	Up to 16 MB/s	Up to 40 MB/s	Up to 100 MB/s
Ready time, Maximum (to not busy)	2.0 s	4.0 s	4.0 s
Access times			
Logical	0.1 ms	0.1 ms	0.1
Total logical sectors	46,905,264	62,533,296	500,118,192
Operating temperature			
Operating	0° to 70°C (32°F to 158°F)	0° to 70°C (32°F to 158°F)	0° to 70°C (32°F to 158°F)
Non-operating	-55° to 95°C (-67°F to 203°F)	-40° to 80°C (-40°F to 176°F)	-40° to 80°C (-40°F to 176°F)

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

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

10 Backup and recovery in 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 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.

From the Start screen, type `restore`, click **Settings**, 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 Windows Help and Support.

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. For more information, see Windows Help and Support.

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.

For more information on the Windows backup features, see Windows Help and Support.

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 operating system media to reboot the computer and repair the operating system. For additional information, see Using Windows operating system media (purchased separately) on page 96.

Using the Windows recovery tools

To recover information you previously backed up, see Windows Help and Support for steps on restoring files and folders.

To recover your information using Automatic 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.

   From the Start screen, type `file`, and then click **File Explorer**.

   – or –

   From the Start screen, type `pc`, and then select **This PC**.

   NOTE: If the Windows partition and the Recovery Image partition are not listed, you must recover your operating system and programs using the Windows operating system DVD and the *Driver Recovery* media (both purchased separately). For additional information, see Using Windows operating system media (purchased separately) on page 96.
3. If the Windows partition and the Recovery Image partition are listed, restart the computer by pressing and holding the shift key while clicking **Restart**.
4. Select **Troubleshoot**, then select **Advanced Options**, and then select **Startup Repair**.
5. Follow the on-screen instructions.

NOTE: For additional information on recovering information using the Windows tools, perform a search for these topics in Windows Help and Support.

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 `pc`, and then select **This PC**.

   NOTE: If the Recovery Image partition is not listed, you must recover your operating system and programs using the Windows operating system media and the *Driver Recovery* media (both purchased separately). For additional information, see Using Windows operating system media (purchased separately) on page 96.
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 operating system media (purchased separately)

To order a Windows operating system DVD, contact 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.

CAUTION: Using a Windows 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 a full install of the operating system using a Windows operating system DVD:

NOTE: This process takes several minutes.

1. If possible, back up all personal files.
2. Insert the Windows operating system DVD into the optional external optical drive, and then restart the computer.
3. When prompted, press any keyboard key.
4. Follow the on-screen instructions.

After the installation is completed:

1. Eject the Windows 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 or Windows Reset

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.

The Windows Reset option allows you to perform detailed reformatting of your computer, or remove personal information before you give away or recycle your computer. For more information on these features, see Windows Help and Support.

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`.
2. Open HP Software Setup.
3. Follow the on-screen directions to reinstall drivers or select software.

11 Backup and recovery in 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 along with an optional external hard drive, a network drive, or an optional external optical drive 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 98.
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 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 99.

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.

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.

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 optional external optical 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. For additional information, see Using Windows 7 operating system media on page 101.

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 Windows partition.

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

   NOTE: If the Windows partition is not listed, you must recover your operating system and programs using the Windows 7 operating system DVD and the *Driver Recovery* media. For additional information, see Using Windows 7 operating system media on page 101.
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 HP Recovery partition: click **Start**, right-click **Computer**, click **Manage**, and then click **Disk Management**.

   NOTE: If the HP Recovery partition is not listed, you must recover your operating system and programs using the Windows 7 operating system media and the *Driver Recovery* media. For additional information, see Using Windows 7 operating system media on page 101.
3. If the HP Recovery 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 **Repair your computer**.
7. Follow the on-screen instructions.

After the repair 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.

12 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 & 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 **File** 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 **File** menu, then **Save Changes and Exit**.

   i. Reboot the system. If the system has a Trusted Platform Module (TPM) 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 VProTM, 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 de-activate 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?
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 Microsoft® Windows® date & 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 non-functional.
Keyboard ROM	64 Kbytes (not customer accessible)	No	Yes	Stores firmware code (keyboard, mouse, &	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

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?
				battery management).		data to this ROM in an inappropriate manner can render the PC non-functional.
DIMM Serial Presence Detect (SPD) configuration data	256 Bytes per memory module, 128 Bytes programmable (not customer accessible)	No	Yes	Stores memory module information.	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 or a custom 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 non-functional.
Intel Management Engine Firmware (present only in models ending in a 'p','w', or 'm' or with Intel Centrino Pro technology)	1.5 or 5MByte	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 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 HW 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	2Mbit	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	4kb to 8kb	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.
Web Camera	64K bit	No	Yes	Store Web Cam 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

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?
						upgrade is necessary to address a unique issue.
Fingerprint Reader	512kByte 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 factory settings)?**

   a. Turn on or restart the computer and press F10 when prompted near the bottom of the display.

   b. Select **File**, then select **Restore defaults**.

   c. Follow the on-screen instructions.

   d. 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 factory settings. To return these system data and configuration defaults to factory settings, refer to question and answer 1 and follow the instructions for returning the BIOS settings to factory defaults.

13 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 **1.5 m** (5.0 ft) and no more than **2.0 m** (6.5 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 amps and a nominal voltage rating of 125 or 250 V AC, as required by the power system of each country or region.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions

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

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

1. The flexible cord must be Type HO5VV-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.

14 Recycling

Battery

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.

Display

WARNING! The backlight contains mercury. Exercise caution when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.

CAUTION: The procedures in this chapter can result in damage to display components. The only components intended for recycling purposes are the LCD panel and the backlight. When you remove these components, handle them carefully.

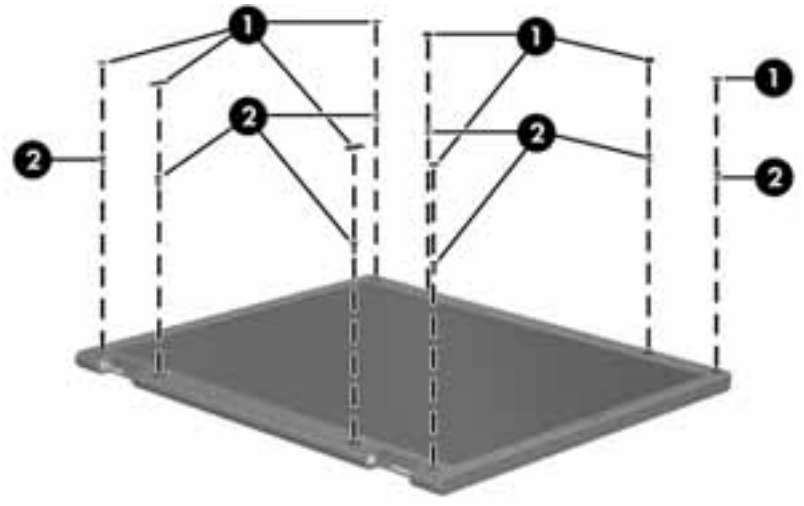
NOTE: **Materials Disposal**. This HP product contains mercury in the backlight in the display assembly that might require special handling at end-of-life. Disposal of mercury may be regulated because of environmental considerations. For disposal or recycling information, contact your local authorities, or see the Electronic Industries Alliance (EIA) Web site at http://www.eiae.org.

This section provides disassembly instructions for the display assembly. The display assembly must be disassembled to gain access to the backlight **(1)** and the liquid crystal display (LCD) panel **(2)**.

NOTE: The procedures provided in this chapter are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

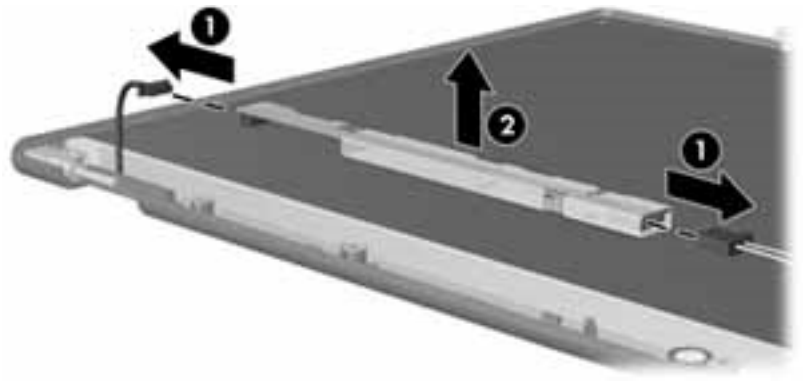
Perform the following steps to disassemble the display assembly:

1. Remove all screw covers **(1)** and screws **(2)** that secure the display bezel to the display assembly.

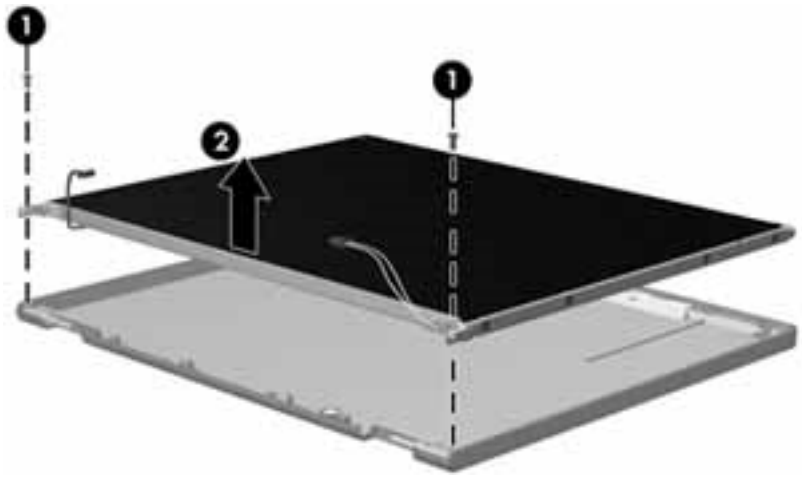


2. Lift up and out on the left and right inside edges **(1)** and the top and bottom inside edges **(2)** of the display bezel until the bezel disengages from the display assembly.
3. Remove the display bezel **(3)**.

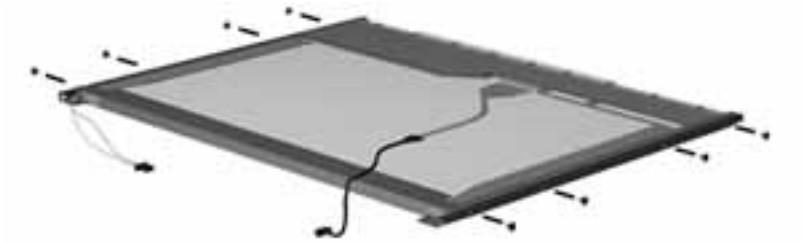
4. Disconnect all display panel cables **(1)** from the display inverter and remove the inverter **(2)**.



5. Remove all screws **(1)** that secure the display panel assembly to the display enclosure.
6. Remove the display panel assembly **(2)** from the display enclosure.



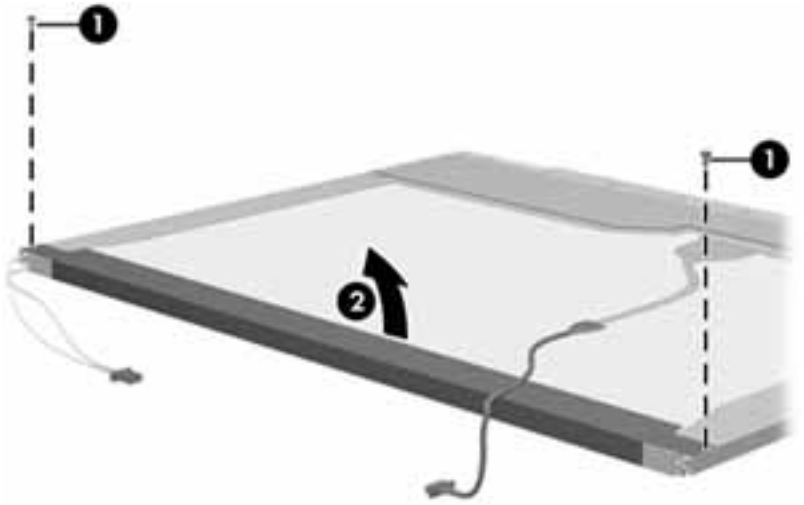
7. Position the display panel assembly upside-down.
8. Remove all screws that secure the display panel frame to the display panel.



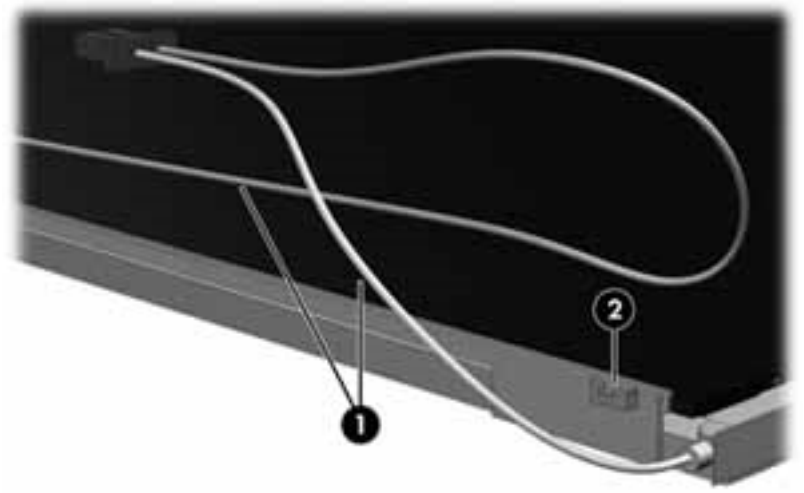
9. Use a sharp-edged tool to cut the tape **(1)** that secures the sides of the display panel to the display panel frame.
10. Remove the display panel frame **(2)** from the display panel.

11. Remove the screws **(1)** that secure the backlight cover to the display panel.

12. Lift the top edge of the backlight cover **(2)** and swing it outward.



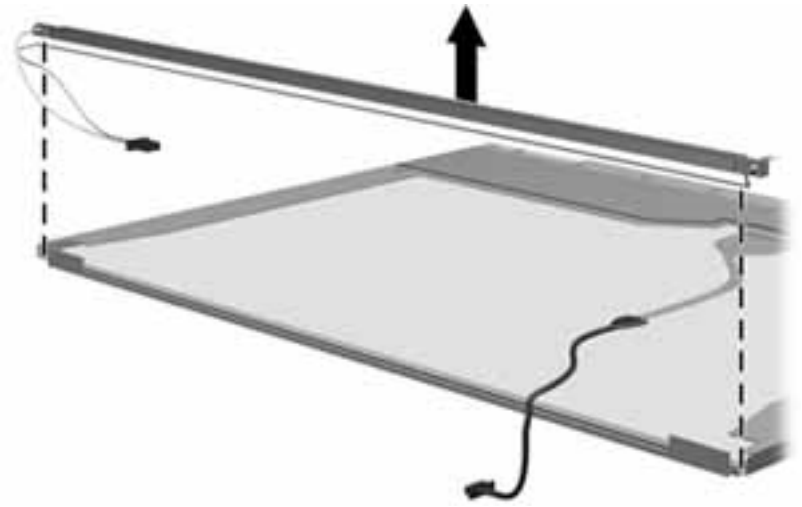
13. Remove the backlight cover.
14. Position the display panel right-side up.
15. Remove the backlight cables **(1)** from the clip **(2)** in the display panel.



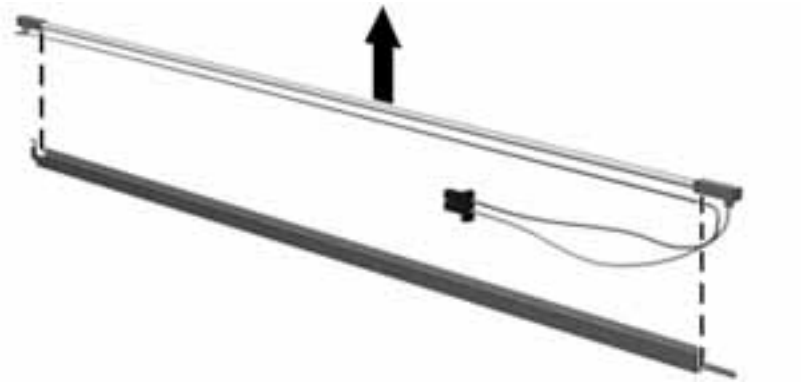
16. Position the display panel upside-down.

⚠ **WARNING!** The backlight contains mercury. Exercise caution when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.

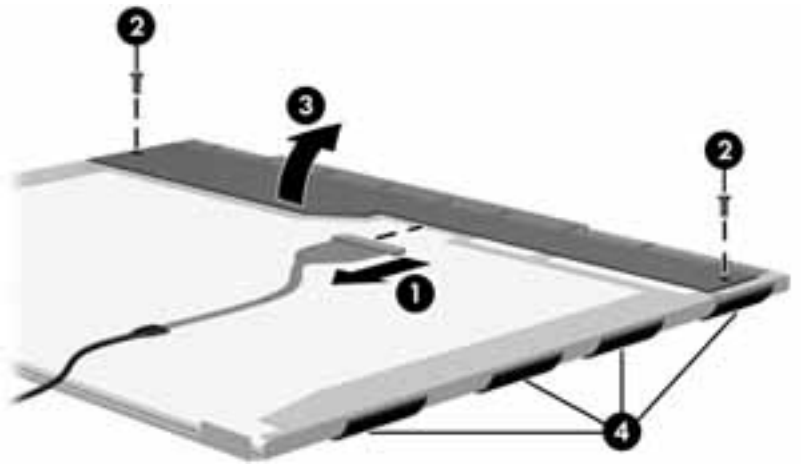
17. Remove the backlight frame from the display panel.



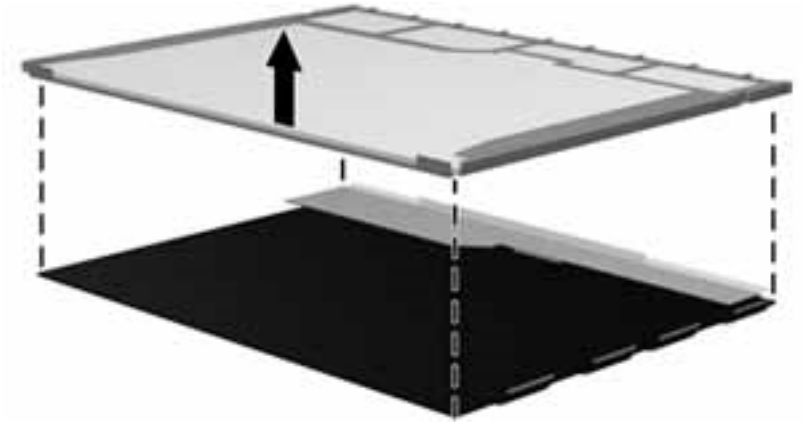
18. Remove the backlight from the backlight frame.



19. Disconnect the display panel cable **(1)** from the LCD panel.
20. Remove the screws **(2)** that secure the LCD panel to the display rear panel.
21. Release the LCD panel **(3)** from the display rear panel.
22. Release the tape **(4)** that secures the LCD panel to the display rear panel.



23. Remove the LCD panel.



24. Recycle the LCD panel and backlight.

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