HP ProBook 470 G2 Notebook PC

Maintenance and Service Guide

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Product notice

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

Not all features are available 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 computer, do not place the computer directly on your lap or obstruct the computer air vents. Use the computer only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The computer and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950).

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1 Product description

Category	Description
Product Name	**HP ProBook 470 G2 Notebook PC**
Processors	**Intel® Core™ i7 processor, Dual Core, 4th generation** (4-MB L3 cache)
	4558U, 2.8-GHz/3.3-GHz Core Turbo/Intel Iris Graphics 5100
	4510U, 2.0-GHz/3.1-GHz Core Turbo/Intel HD Graphics 5000
	Intel® Core i5 processors, Dual Core, 4th generation (3-MB L3 cache)
	4210U, 1.7-GHz/2.7-GHz Core Turbo processor/Intel HD Graphics 4400
	Intel Core i3 processors, Dual Core, 4th generation (3-MB L3 cache)
	4030U, 1.9-GHz processor/Intel HD Graphics 4400
Chipset	Integrated with processor
Graphics	**Switchable discrete (Intel processors):** AMD Radeon R5 M255 with 2 GB or 1 GB dedicated video memory
	Supports HD decode, DX11, HDMI, PX7.0
Panel	**HD+ LVDS wedge**
	43.9-cm (17.3-inch), anti-glare, HD+, 1600x900, SVA, 200 nits, 1 or 2 WLAN antennas
	FHD LVDS wedge
	43.9-cm (17.3-inch), anti-glare, FHD, 1920x1080, WVA, 300 nits, 1 or 2 WLAN antennas
Memory	Two customer-accessible memory module slots supporting up to 16 GB of RAM
	Supports dual-channel memory
	PC3L-12800, 1600-MHz, DDR3L SODIMMs
	Supports the following configurations: • 16384 MB (8192 × 2; dual channel) • 12288 MB (8192 + 4096; dual channel) • 8192 MB (8192 × 1) • 8192 MB (4096 × 2; dual channel) • 6144 MB (4096 + 2048; dual channel) • 4096 MB (4096 × 1) • 2048 MB (2048 × 1)
Primary storage	Supports 7-mm/9.5-mm, 2.5-in SATA hard drives with HP 3D DriveGuard
	Customer-accessible
	Supports the following drives: • 1.5-TB, 5400-rpm

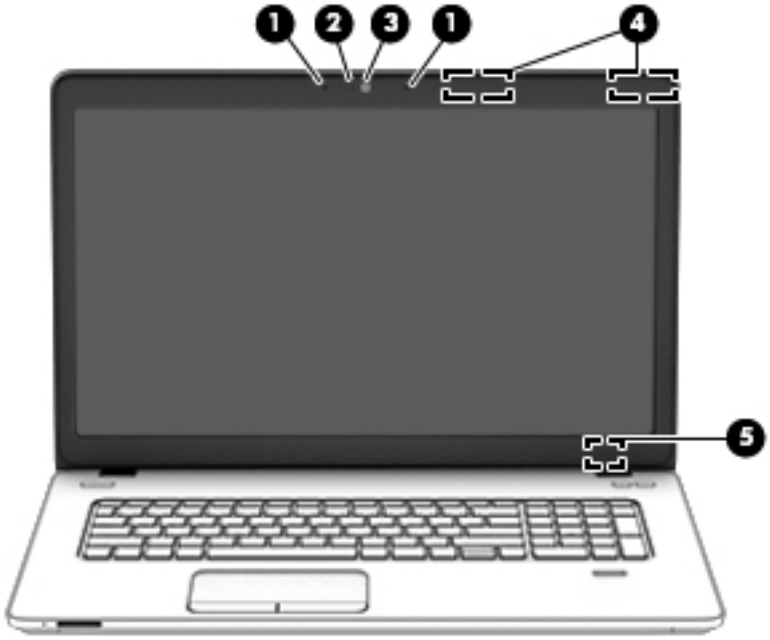
Category	Description
	• 1-TB, 5400-rpm • 750-GB, 7200-rpm • 500-GB, 7200-rpm • 500-GB, 5400-rpm, hybrid (8-GB SSD) MLC • 500-GB, 5400-rpm • 320-GB, 5400-rpm • 128-GB Solid-state drive (SSD)
Fixed optical drives	Supports the following 9.5-mm SATA optical drives: • DVD-ROM • DVD+/-RW SuperMulti DL • Blu-ray ROM DVD+/-RW SuperMulti DL
	Supports no optical drive option
Audio/Visual	Integrated camera (720p HD)
	Stereo speakers (2)
	Integrated dual-array microphone (webcam models only)
	Integrated mono microphone (non-webcam models only)
	Headphone/microphone combo jack
	Realtek ALC3227-CG
	Skype-ready
	HD audio with DTS Sound+
	Supports “no camera” option
Ethernet	Realtek RTL8161GSH-CG 10/100/1000
	S3/S4/S5 wake on LAN (AC mode and battery mode)
	NIC power down technology
	Ethernet cable not included
Wireless	**Integrated WLAN options by way of wireless module:**
	WLAN antennas built into display assembly
	Supports “no WLAN/Bluetooth” option
	Integrated WLAN options via Minicard: • Intel 802.11 a/b/g/n/AC 2x2 +BT Combo (Wilkins Peak 2) - no vPro • Intel 802.11 a/b/g/n/AC 1x1 +BT Combo (Wilkins Peak 1) • QCA 802.11 b/g/n 1x1 (Marilyn) Backup • Broadcom 802.11 a/b/g/n 2x2 +BT Combo (Bumblebee) w/o WiDi • Broadcom 802.11 b/g/n 1x1 +BT Combo (Harrier) Backup • Realtek 802.11 b/g/n 1x1 (Focus)

Category	Description
	• Realtek 802.11 b/g/n 1x1 +BT Combo (Skyray)
	Wireless Personal Area Network (PAN) only supported by Bluetooth 4.0 combo card
External media card	Digital Media Reader Slot
	Supports SD, SDHC, SDXC
Ports	Headphone/Microphone Combo Jack
	RJ-45 (Ethernet, includes link and activity lights)
	USB 3.0 (2)
	USB 2.0 (2)
	VGA (Dsub 15-pin) supporting 2048 × 1536 external resolution at 50-GHz (hot plug/unplug with auto-detect)
	HDMI 1.4
	Multi-pin AC port
Keyboard/pointing devices	Full-sized, chiclet, spill-resistant keyboard with numeric keypad
	Backlit, full-sized, chiclet, spill-resistant keyboard with numeric keypad
	Touchpad includes: on/off button on board; 2-way scroll with legend, taps enabled by default, 2-finger scrolling and zoom enabled by default
Power requirements	90-W Smart AC adapter with localized cable plug support (3-wire plug with ground pin)
	65-W Smart AC adapter with localized cable plug support (3-wire plug with ground pin)
	Power cord: 3-wire plug - 1.8 m or 1.0 m
	6-cell, 51-Wh, 2.55 Ah, Li-ion battery (long life)
	6-cell, 47-Wh, 2.2 Ah, Li-ion battery
Security	Integrated fingerprint reader
	No fingerprint reader option
	Security lock
	TPM SLB9660 (FW ver. 1.2) (Infineon; soldered down)
	TPM support
Operating system	**Preinstalled:**
	Windows 7 Professional 64
	Windows 7 Home Premium 64
	Windows 7 Home Basic 64
	Windows 8.1 Professional 64-bit Digital Product Key (DPK) with Windows 7 Professional 64
	Windows 8.1 Professional 64-bit Digital Product Key (DPK) with Windows 7 Professional 64 – MSNA
	Windows 8.1 China (CH) 64-bit
	Windows 8.1 Emerging Markets (EM) 64-bit
	Windows 8.1 Multi-language (ML) 64-bit

Category	Description
	Windows 8.1 Professional 64-bit
	Windows 8.1 Professional 64-bit – MSNA
	FreeDOS 2.0
	Ubuntu Linux
	Restore Media (DRDVD/SRDVD):
	DRDVD Windows 8.1
	DRDVD Windows 7
	SRDVD Ubuntu Linux
	Restore Media (OSDVD):
	Windows 7 Home Basic 64
	Windows 7 Home Premium 64
	Windows 7 Professional 32
	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 7 Professional 32
	Windows 7 Enterprise 64
	Windows 7 Enterprise 32
	Windows 8.1 Enterprise 64
	Certified:
	Microsoft WHQL
Serviceability	**End-user replaceable parts:**
	AC adapter
	Battery (system)
	Hard drive
	Memory module
	Optical drive
	WLAN module
	Keyboard

2 External component identification

Display

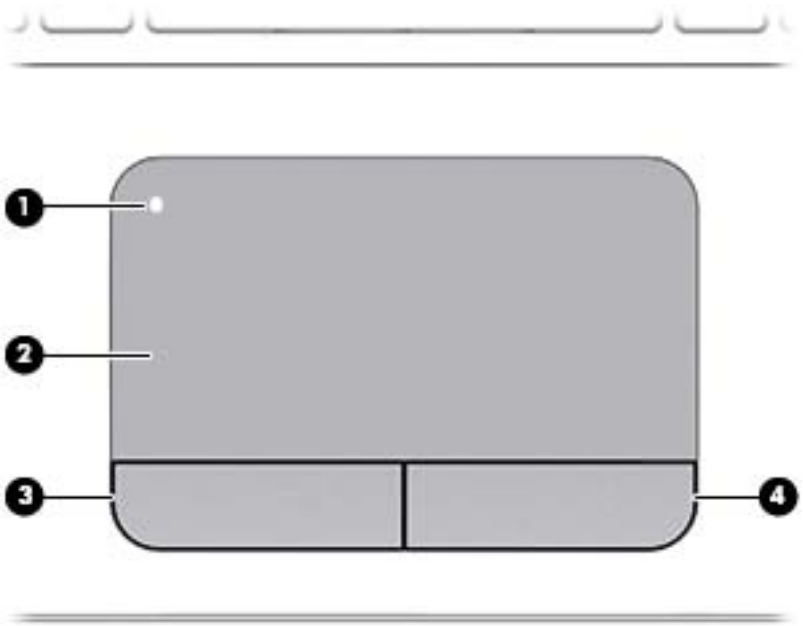


Component		Description
(1)	Internal microphones (2)	Record sound.
(2)	Webcam light	On: The webcam is in use.
(3)	Webcam	Records video and captures photographs. Some models allow you to video conference and chat online using streaming video. For information on using the webcam in Windows 8, access HP Support Assistant. To access HP Support Assistant, from the Start screen, select the **HP Support Assistant** app. For information on using the webcam in Windows 7, select **Start > All Programs > Communication and Chat > HP WebCam**.
(4)	WLAN antennas (2)* (select models only)	Send and receive wireless signals to communicate with wireless local area networks (WLAN).
(5)	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* that applies to your country or region. To access this guide in Windows 8, 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**.

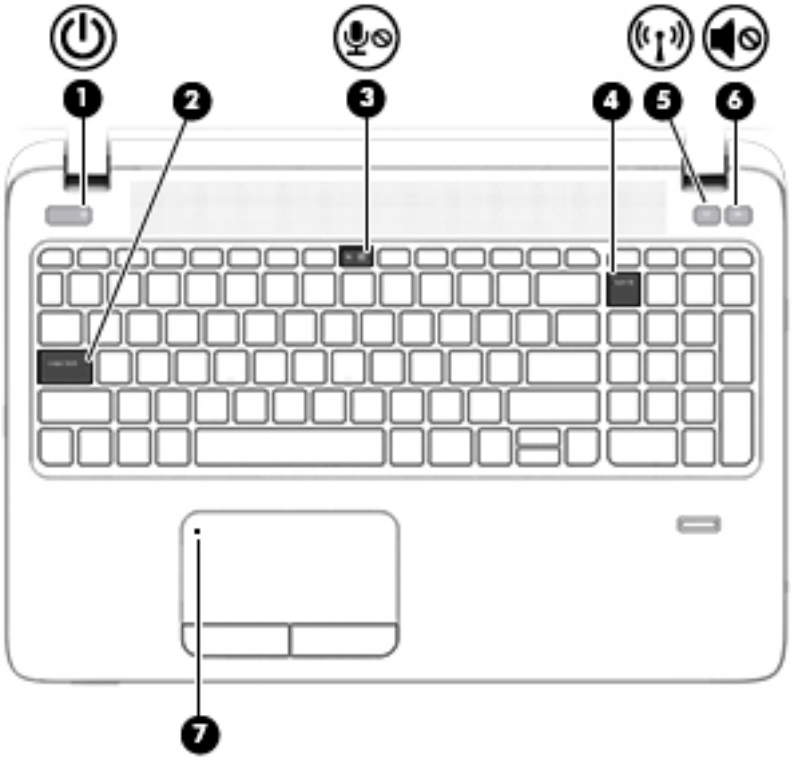
Top

TouchPad



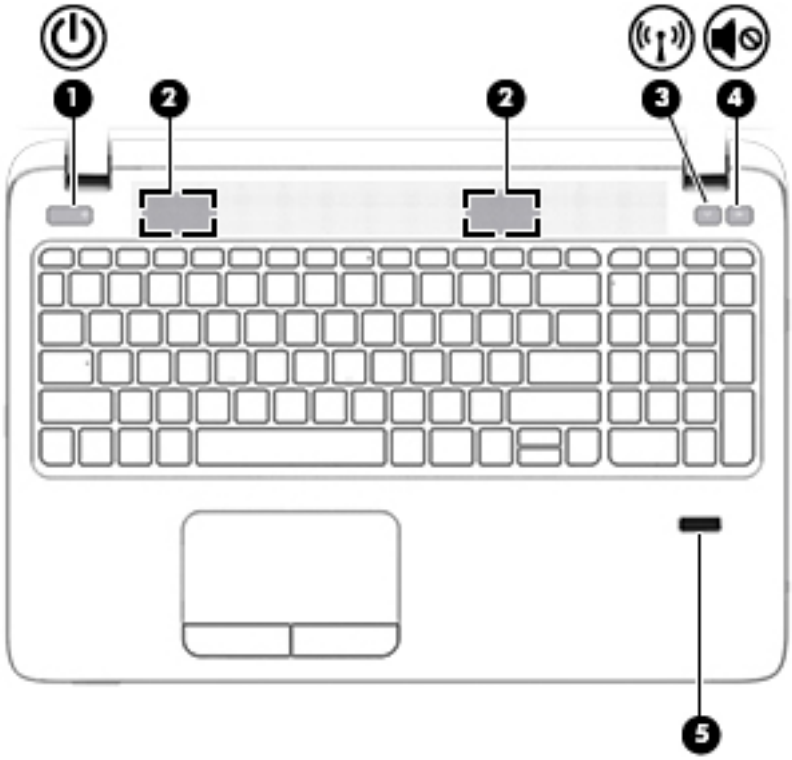
Component		Description
(1)	TouchPad on/off button	Turns the TouchPad on and off.
(2)	TouchPad zone	Moves the pointer and selects or activates items on the screen. **NOTE:** The TouchPad also supports edge-swipe gestures.
(3)	Left TouchPad button	Functions like the left button on an external mouse.
(4)	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.
(2)	Caps lock light	On: Caps lock is on, which switches the keys to all capital letters.
(3)	Microphone mute light	• Amber: microphone sound is off. • Off: microphone sound is on.
(4)	Num lock light	On: Num lock is on.
(5)	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.
(6)	Speaker mute light	• Amber: Computer sound is off. • White: Computer sound is on.
(7)	TouchPad light	• Amber: The TouchPad is off. • Off: The TouchPad is on.

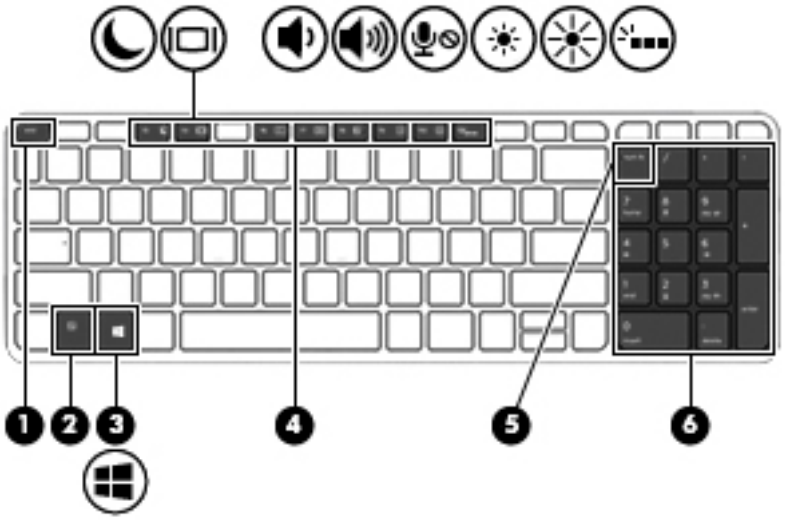
Buttons, speakers, and fingerprint reader (select models only)



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. To learn more about your power settings in Windows 8, 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)	Speakers (2)	Produce sound.
(3)	Wireless button	Turns the wireless feature on or off but does not establish a wireless connection.

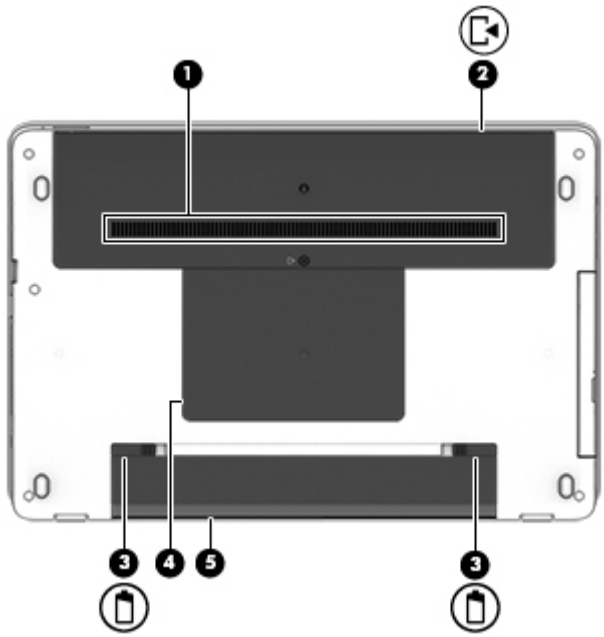
Component		Description
(4)	Speaker mute button	Mutes and restores speaker sound.
(5)	Fingerprint reader (select models only)	Allows a fingerprint logon to Windows, instead of a password logon.

Keys



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, or the esc key.
(3)	Windows key	Windows 8: 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)	num lk key	Alternates between the navigational and numeric functions on the integrated numeric keypad.
(6)	Integrated numeric keypad	When num lk has been enabled, it can be used like an external numeric keypad.

Bottom

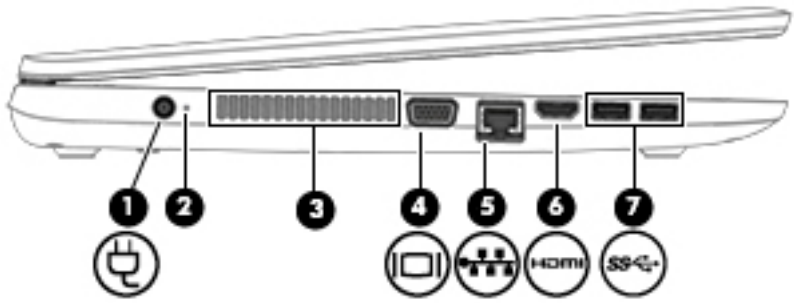


Component		Description
(1)	Vent	Enable airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(2)	Service door	Provides access to the hard drive bay and the memory module slots.
(3)	Battery release latches (2)	Releases the battery.
(4)	Service door	Provides access to the wireless LAN (WLAN) module slot. **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, from the Start screen, select the **HP Support Assistant** app. To access Help and Support in Windows 7, select **Start > Help and Support**.
(5)	Battery bay	Holds the battery.

Front

Component		Description
(1)	Hard drive light	• Blinking white: The hard drive is being accessed. • Amber: HP 3D DriveGuard has temporarily parked the hard drive.
(2)	Memory card reader	Reads optional memory cards that store, manage, share, or access information.

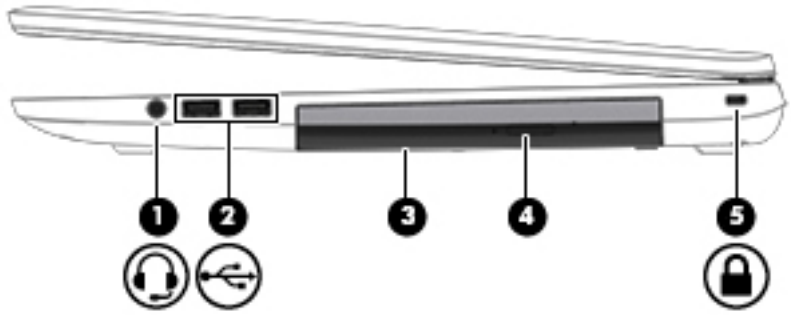
Left



Component		Description
(1)	Power connector	Connects an AC adapter.
(2)	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. • Off: The battery is fully charged.
(3)	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.
(4)	External monitor port	Connects an external VGA monitor or projector.
(5)	RJ-45 (network) jack/lights	Connects a network cable. • Green (right): The network is connected.

Component			Description
			• Amber (left): Activity is occurring on the network.
(6)		HDMI port	Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed HDMI device.
(7)		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.

Right



Component			Description
(1)		Audio-out (headphone)/Audio-in (microphone) jack	Connects optional powered stereo speakers, headphones, earbuds, or a headset. 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, 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**. To access this guide in Windows 8, 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).
(2)		USB 2.0 ports (2)	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.
(3)		Optical drive (select models only)	Depending on your computer model, reads an optical disc or reads and writes to an optical disc.

Component		Description
(4)	Optical drive eject button (select models only)	Releases the optical drive disc tray.
(5)	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.

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.

NOTE: Computer details may vary from images.

Windows 8.1 models

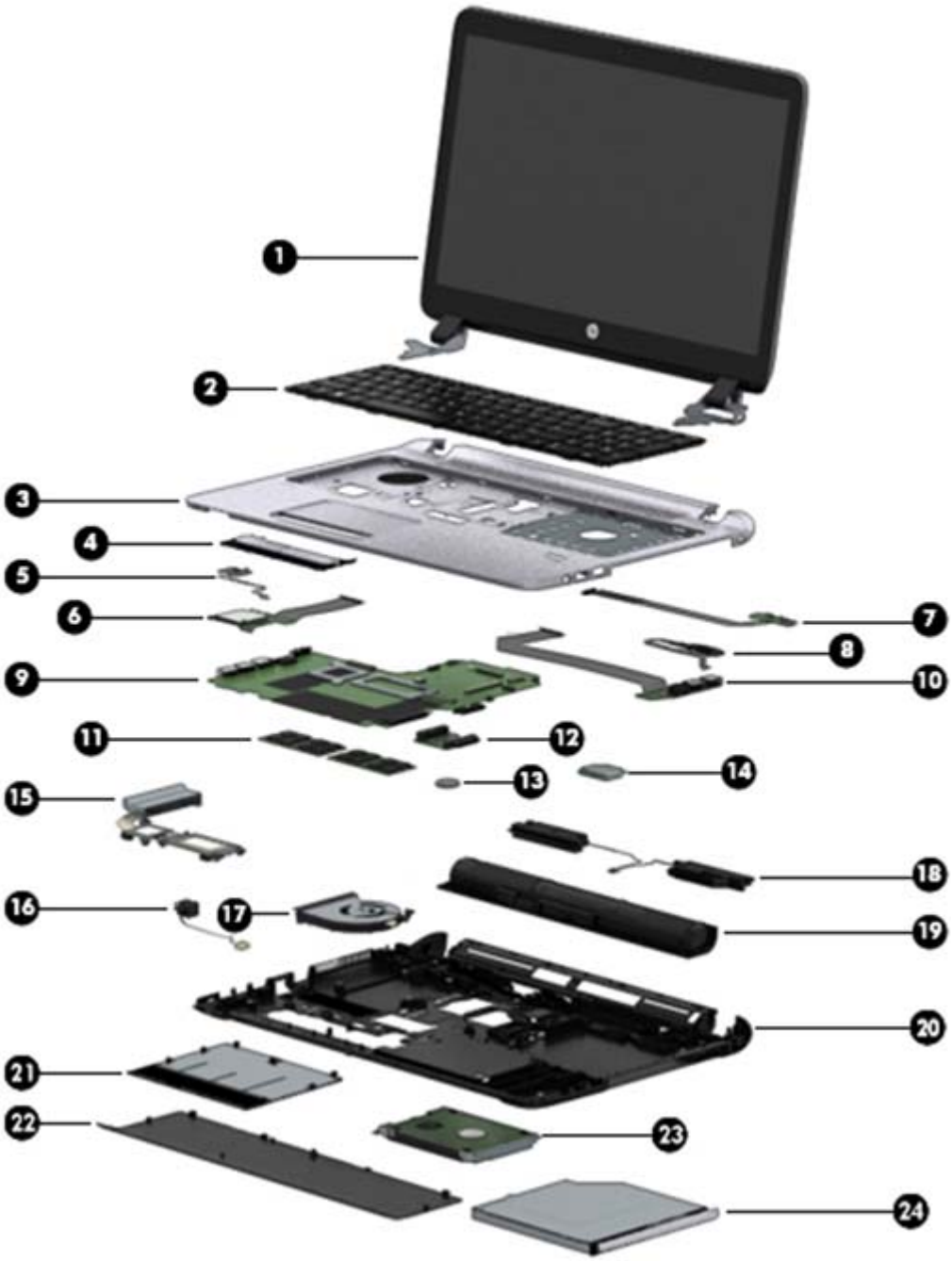
Non-Windows 8.1 models

3 Illustrated parts catalog

Computer major components

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 Service tag and PCID label on page 13 for details.

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



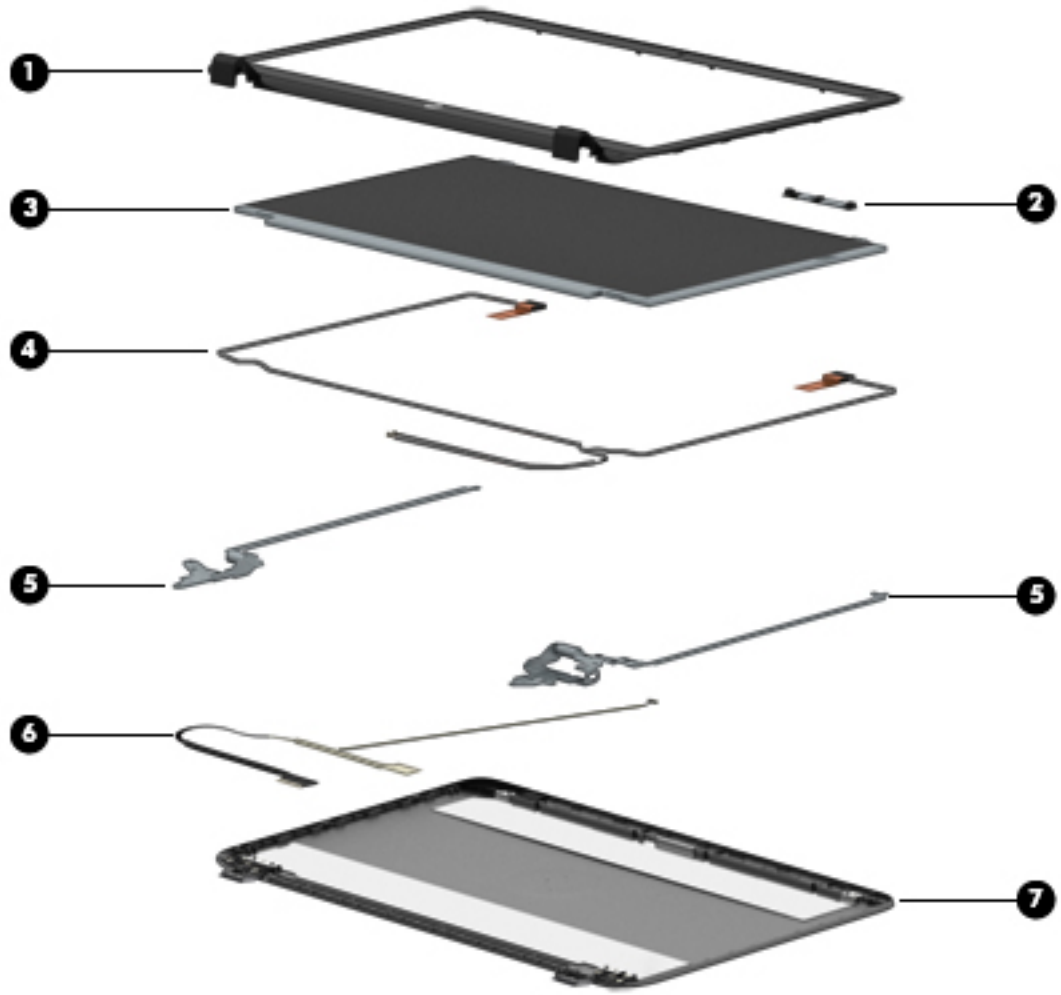
Item	Description	Spare part number
(1)	**Display panel**, 43.9-cm (17.3-inch)	not spared
(2)	**Keyboard** (includes cable) **NOTE:** For a detailed list of available keyboards, see Sequential part number listing on page 23.	
	Backlit	768130-xxx
	No backlight	768787-xx1

Item	Description	Spare part number
(3)	**Top cover** (includes touchpad assembly)	768390-001
(4)	**Touchpad button board**	768140-001
(5)	**Power button board assembly**	767442-001
(6)	**Card reader board**	768384-001
(7)	**Function board**	768380-001
(8)	**Fingerprint reader assembly** (includes cable, bracket, and bezel)	768378-001
(9)	**System board** (includes replacement thermal material)	
	Intel i7-4510U processor; 2-GB discrete graphics memory	
	• Without Windows 8.1.1	768401-001
	• Windows 8.1 Professional	768401-501
	• Windows 8.1 Standard	768401-601
	Intel i5-4210U processor; 2-GB discrete graphics memory	
	• Without Windows 8.1	768399-001
	• Windows 8.1 Professional	768399-501
	• Windows 8.1 Standard	768399-601
	Intel i3-4030U processor; 2-GB discrete graphics memory	
	• Without Windows 8.1	768398-001
	• Windows 8.1 Professional	768398-501
	• Windows 8.1 Standard	768398-601
	Intel i7-4558U processor; 1-GB discrete graphics memory	
	• Without Windows 8.1	768395-001
	• Windows 8.1 Professional	768395-501
	• Windows 8.1 Standard	768395-601
	Intel i5-4210U processor; 1-GB discrete graphics memory	
	• Without Windows 8.1	768393-001
	• Windows 8.1 Professional	768393-501
	• Windows 8.1 Standard	768393-601
	Intel i3-4030U processor; 1-GB discrete graphics memory	
	• Without Windows 8.1	768392-001
	• Windows 8.1 Professional	768392-501
	• Windows 8.1 Standard	768392-601
(10)	**USB/audio board**	768382-001
(11)	**Memory modules** (PC3L-12800, 1600-MHz, DDR3L)	
	8-GB	693374-001

Item	Description	Spare part number
	4-GB	691740-001
	2-GB	691739-001
(12)	**Optical drive extension board**	not spared
(13)	**RTC battery**	738824-001
(14)	**WLAN module**	
	Atheros AR9485 802.11b/g/n 1x1 WiFi Adapter	675794-001
	Realtek RTL8188EE 802.11bgn Wi-Fi Adapter	709848-001
	Intel Dual Band Wireless-AC 3160 802.11 ac 1x1 WiFi + BT 4.0 combo adapter	710662-001
	Broadcom BCM943228HMB 802.11abgn 2x2 Wi-Fi Adapter + Broadcom Bluetooth 4.0 Adapter	730668-001
	Broadcom BCM43142 802.11 bgn 1x1 Wi-Fi + BT4.0 HMC combo adapter	753076-001
	Realtek RT8723BE 802.11 bgn 1x1 Wi-Fi + BT4.0 combo adapter	753077-001
	Intel Dual Band Wireless-AC 7260 802.11 ac 2x2 WiFi + Intel Dual Band Wireless-AC 7260 BT 4.0 combo adapter	756753-001
	Heat sink assembly (includes replacement thermal material)	
(15)	For use in models with all processors except for the Intel i7-4558U	768050-001
	For use in models with an Intel i7-4558U processor	768049-001
(16)	**Power connector and cable**	767432-001
(17)	**Fan**	767433-001
(18)	**Speaker assembly**	768389-001
(19)	**Battery, Li-ion**	
	6-cell, 51 WHr, 2.55 Ah	757661-001
	6-cell, 47 WHr, 2.2 Ah	708457-001
(20)	**Base enclosure**	768374-001
	Service doors, includes:	768385-001
(21)	Small service door	
(22)	Large service door	
(23)	**Hard drive**	
	1.5-TB, 5400-rpm, 9.5 mm	747375-001
	1-TB, 5400-rpm	676521-001
	750-GB, 7200-rpm	778191-001
	750-GB, 5400-rpm	634250-001
	500-GB, 7200-rpm	703267-001
	500-GB, 5400-rpm, 7 mm, hybrid (8-GB SSD)	732000-001
	320-GB, 5400-rpm	778183-001
	128-GB Solid-state drive, M.2	773069-001

Item	Description	Spare part number
(24)	**Optical drive** (includes bracket, bezel, and screws)	
	Blu-ray ROM DVD±RW SuperMulti DL Drive	768473-001
	DVD±RW SuperMulti DL Drive	768475-001
	DVD-ROM drive	768474-001

Display components



Item	Description	Spare part number
(1)	**Display bezel**	
	For use in models with a webcam	768375-001
	For use in models without a webcam	768376-001
(2)	**Webcam module**	767457-001
	Microphone module	773563-001

Item	Description	Spare part number
(3)	**Display panel (raw), HD+**	768386-001
(4)	**WLAN antennas** Included in Display Rear Cover kit, 768373-001	not spared separately
(5)	**Display Hinge Kit** (includes left and right hinges)	768379-001
(6)	**Display/webcam cable assembly**	768377-001 (in Cable Kit)
(7)	**Display rear cover** (includes wireless antennas)	768373-001

Cable Kit

Item	Description	Spare part number
	Cable Kit	768377-001
(1)	Battery connector cable	
(2)	Display/webcam cable	

Mass storage devices

Description	Spare part number
Hard drives	
1.5-TB, 5400-rpm, 9.5 mm	747375-001
1-TB, 5400-rpm	676521-001
750-GB, 7200-rpm	778191-001
750-GB, 5400-rpm	634250-001
500-GB, 7200-rpm	703267-001
500-GB, 5400-rpm, 7 mm, hybrid (8-GB SSD)	732000-001

Description	Spare part number
320-GB, 5400-rpm	778183-001
128-GB Solid-state drive, M.2	773069-001
Hard Drive Hardware Kit (includes hard drive bracket and screws; not illustrated)	767437-001
Optical drives (include bezel, bracket, and screws)	
Blu-ray ROM DVD±RW SuperMulti DL Drive	768473-001
DVD±RW SuperMulti DL Drive	768475-001
DVD-ROM drive	768474-001

Miscellaneous parts

Description	Spare part number
AC adapters	
90-W AC adapter	693712-001
90-W AC adapter for use in India	693712-001
65-W AC adapter	693711-001
65-W AC adapter for use in India	693710-001
Power cords, 1.83 m, 3-pin:	
For use in Australia	490371-011
For use in Europe, the Middle East, and Africa	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 the People's Republic of China	490371-AA1
For use in South Africa	490371-AR1
For use in South Korea	490371-AD1
For use in Switzerland	490371-111
For use in Taiwan	490371-AB1
For use in Thailand	490371-201
For use in the United Kingdom	490371-031
For use in the United States	490371-001
Power cords, 1.0 m, 3-pin:	
For use in Australia	755530-011
For use in Denmark	755530-081

Description	Spare part number
For use in Europe, the Middle East, and Africa	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 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	755530-031
For use in the United States	755530-001
Power cords, 1.0 m, 2-pin:	
For use in Japan	762689-291
Rubber Kit (includes rubber base enclosure screw covers and mylar display bezel screw covers)	768387-001
Screw Kit	768388-001

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 (1.83 m, 3-pin) for use in North America
490371-011	A	Power cord (1.83 m, 3-pin) for use in Australia
490371-021	A	Power cord (1.83 m, 3-pin) for use in Europe, the Middle East, and Africa
490371-031	A	Power cord (1.83 m, 3-pin) for use in the United Kingdom
490371-061	A	Power cord (1.83 m, 3-pin) for use in Italy
490371-111	A	Power cord (1.83 m, 3-pin) for use in Switzerland
490371-201	A	Power cord (1.83 m, 3-pin) for use in Thailand
490371-291	A	Power cord (1.83 m, 3-pin) for use in Japan
490371-AA1	A	Power cord (1.83 m, 3-pin) for use in the People's Republic of China
490371-AB1	A	Power cord (1.83 m, 3-pin) for use in Taiwan
490371-AD1	A	Power cord (1.83 m, 3-pin) for use in South Korea
490371-AR1	A	Power cord (1.83 m, 3-pin) for use in South Africa
490371-BB1	A	Power cord (1.83 m, 3-pin) for use in Israel
490371-D61	A	Power cord (1.83 m, 3-pin) for use in India
634250-001	A	750-GB, 5400-rpm hard drive
675794-001	A	Atheros AR9485 802.11b/g/n 1x1 WiFi Adapter
676521-001	A	1-TB, 5400-rpm hard drive
691739-001	A	2-GB memory module (PC3L-12800, 1600-MHz, DDR3L)
691740-001	A	4-GB memory module (PC3L-12800, 1600-MHz, DDR3L)
693374-001	A	8-GB memory module (PC3L-12800, 1600-MHz, DDR3L)
693710-001	A	65-W AC adapter for use in India
693711-001	A	65-W AC adapter
693712-001	A	90-W AC adapter for use in India
693713-001	A	90-W AC adapter
703267-001	A	500 GB, 7200 rpm hard drive, 7 mm
708457-001	A	6-cell, 47 WHr, 2.2 Ah Li-ion battery
709848-001	A	Realtek RTL8188EE 802.11bgn Wi-Fi Adapter

Spare part number	CSR flag	Description
710662-001	A	Intel Dual Band Wireless-AC 3160 802.11 ac 1x1 WiFi + BT 4.0 combo adapter
730668-001	A	Broadcom BCM943228HMB 802.11abgn 2x2 Wi-Fi Adapter + Broadcom Bluetooth 4.0 Adapter
732000-001	A	500-GB, 5400-rpm, 7 mm, hybrid (8-GB SSD) hard drive
738824-001	C	RTC battery
747375-001	A	1.5-TB, 5400-rpm, 9.5 mm, hard drive
753076-001	A	Broadcom BCM43142 802.11b/g/n, 1x1 Wi-Fi + BT4.0 HMC combo adapter
753077-001	A	Realtek RT8723BE 802.11 bgn 1x1 Wi-Fi + BT4.0 combo adapter
755530-001	A	Power cord (1.0 m, 3-pin) for use in North America
755530-011	A	Power cord (1.0 m, 3-pin) for use in Australia
755530-021	A	Power cord (1.0 m, 3-pin) for use in Europe, the Middle East, and Africa
755530-031	A	Power cord (1.0 m, 3-pin) for use in the United Kingdom
755530-061	A	Power cord (1.0 m, 3-pin) for use in Italy
755530-081	A	Power cord (1.0 m, 3-pin) for use in Denmark
755530-111	A	Power cord (1.0 m, 3-pin) for use in Switzerland
755530-201	A	Power cord (1.0 m, 3-pin) for use in Thailand
755530-291	A	Power cord (1.0 m, 3-pin) for use in Japan
755530-AA1	A	Power cord (1.0 m, 3-pin) for use in the People’s Republic of China
755530-AB1	A	Power cord (1.0 m, 3-pin) for use in Taiwan
755530-AD1	A	Power cord (1.0 m, 3-pin) for use in South Korea
755530-AR1	A	Power cord (1.0 m, 3-pin) for use in South Africa
755530-BB1	A	Power cord (1.0 m, 3-pin) for use in Israel
755530-D61	A	Power cord (1.0 m, 3-pin) for use in India
756753-001	A	Intel Dual Band Wireless-AC 7260 802.11 ac 2x2 WiFi + Intel Dual Band Wireless-AC 7260 BT 4.0 combo adapter
757661-001	A	6-cell, 51 WHr, 2.55 Ah Li-ion battery
762689-291	A	Power cord (1.0 m, 2-pin) for use in Japan
767432-001	C	Power connector and cable
767433-001	C	Fan
767437-001	A	Hard Drive Hardware Kit (includes bracket and screws)
767442-001	C	Power button board
767457-001	C	Webcam module
768049-001	C	Heat sink assembly for use in models with an Intel i7-4558U processor (includes replacement thermal material)
768050-001	C	Heat sink assembly for use in models with all processors except for the Intel i7-4558U (includes replacement thermal material)

Spare part number	CSR flag	Description
768130-001	A	Keyboard, backlit, for use in the United States
768130-031	A	Keyboard, backlit, for use in the United Kingdom
768130-041	A	Keyboard, backlit, for use in Germany
768130-051	A	Keyboard, backlit, for use in France
768130-061	A	Keyboard, backlit, for use in Italy
768130-071	A	Keyboard, backlit, for use in Spain
768130-081	A	Keyboard, backlit, for use in Denmark
768130-091	A	Keyboard, backlit, for use in Norway
768130-131	A	Keyboard, backlit, for use in Portugal
768130-141	A	Keyboard, backlit, for use in Turkey
768130-151	A	Keyboard, backlit, for use in Greece
768130-171	A	Keyboard, backlit, for use in Saudi Arabia
768130-211	A	Keyboard, backlit, for use in Hungary
768130-251	A	Keyboard, backlit, for use in Russia
768130-261	A	Keyboard, backlit, for use in Bulgaria
768130-271	A	Keyboard, backlit, for use in Romania
768130-281	A	Keyboard, backlit, for use in Thailand
768130-291	A	Keyboard, backlit, for use in Japan
768130-A41	A	Keyboard, backlit, for use in Belgium
768130-AB1	A	Keyboard, backlit, for use in Taiwan
768130-AD1	A	Keyboard, backlit, for use in South Korea
768130-B31	A	Keyboard, backlit, for use in the Netherlands and Europe
768130-B71	A	Keyboard, backlit, for use in Sweden and Finland
768130-BA1	A	Keyboard, backlit, for use in Slovenia
768130-BB1	A	Keyboard, backlit, for use in Israel
768130-BG1	A	Keyboard, backlit, for use in Switzerland
768130-D61	A	Keyboard, backlit, for use in India
768130-DD1	A	Keyboard, no backlight, for use in Iceland
768130-DH1	A	Keyboard, backlit, for use in the Netherlands
768130-FL1	A	Keyboard, backlit, for use in the Czech Republic and Slovakia
768130-FP1	A	Keyboard, backlit, for use in northern Africa
768140-001	C	Touchpad button board
768373-001	C	Display rear cover (includes wireless antennas)
768374-001	C	Base enclosure

Spare part number	CSR flag	Description
768375-001	C	Display bezel for use in models with a webcam
768376-001	C	Display bezel for use in models without a webcam
768377-001	C	Cable Kit (see Cable Kit on page 20 for more Cable Kit spare part information)
768378-001	C	Fingerprint reader assembly (includes cable, bracket, and bezel)
768379-001	C	Display Hinge Kit (includes left and right hinges)
768380-001	C	Function board
768382-001	C	USB/audio board
768384-001	C	Card reader board
768385-001	A	Service doors (includes large and small service door)
768386-001	C	Display panel (raw), HD+
768387-001	A	Rubber Kit (includes rubber base enclosure screw covers and mylar display bezel screw covers)
768388-001	N	Screw Kit
768389-001	C	Speaker assembly
768390-001	C	Top cover (includes touchpad)
768392-001	C	System board Without Windows 8.1; Intel i3-4030U processor; 1-GB discrete graphics memory
768392-501	C	System board with Windows 8.1 Professional; Intel i3-4030U processor; 1-GB discrete graphics memory
768392-601	C	System board with Windows 8.1 Standard; Intel i3-4030U processor; 1-GB discrete graphics memory
768393-001	C	System board Without Windows 8.1; Intel i5-4210U processor; 1-GB discrete graphics memory
768393-501	C	System board with Windows 8.1 Professional; Intel i5-4210U processor; 1-GB discrete graphics memory
768393-601	C	System board with Windows 8.1 Standard; Intel i5-4210U processor; 1-GB discrete graphics memory
768395-001	C	System board Without Windows 8.1; Intel i7-4558U processor; 1-GB discrete graphics memory
768395-501	C	System board with Windows 8.1 Professional; Intel i7-4558U processor; 1-GB discrete graphics memory
768395-601	C	System board with Windows 8.1 Standard; Intel i7-4558U processor; 1-GB discrete graphics memory
768398-001	C	System board Without Windows 8.1; Intel i3-4030U processor; 2-GB discrete graphics memory
768398-501	C	System board with Windows 8.1 Professional; Intel i3-4030U processor; 2-GB discrete graphics memory
768398-601	C	System board with Windows 8.1 Standard; Intel i3-4030U processor; 2-GB discrete graphics memory
768399-001	C	System board Without Windows 8.1; Intel i5-4210U processor; 2-GB discrete graphics memory
768399-501	C	System board with Windows 8.1 Professional; Intel i5-4210U processor; 2-GB discrete graphics memory
768399-601	C	System board with Windows 8.1 Standard; Intel i5-4210U processor; 2-GB discrete graphics memory
768401-001	C	System board Without Windows 8.1; Intel i7-4510U processor; 2-GB discrete graphics memory

Spare part number	CSR flag	Description
768401-501	C	System board with Windows 8.1 Professional; Intel i7-4510U processor; 2-GB discrete graphics memory
768401-601	C	System board with Windows 8.1 Standard; Intel i7-4510U processor; 2-GB discrete graphics memory
768473-001	A	Blu-ray ROM DVD±RW SuperMulti DL Drive(includes bezel, bracket, and screws)
768474-001	A	DVD-ROM drive (includes bezel, bracket, and screws)
768475-001	A	DVD±RW SuperMulti DL Drive (includes bezel, bracket, and screws)
768787-001	A	Keyboard, no backlight, for use only in models in the United States
768787-031	A	Keyboard, no backlight, for use only in models in the United Kingdom
768787-041	A	Keyboard, no backlight, for use only in models in Germany
768787-051	A	Keyboard, no backlight, for use only in models in France
768787-061	A	Keyboard, no backlight, for use only in models in Italy
768787-071	A	Keyboard, no backlight, for use only in models in Spain
768787-081	A	Keyboard, no backlight, for use only in models in Denmark
768787-091	A	Keyboard, no backlight, for use only in models in Norway
768787-131	A	Keyboard, no backlight, for use only in models in Portugal
768787-141	A	Keyboard, no backlight, for use only in models in Turkey
768787-151	A	Keyboard, no backlight, for use only in models in Greece
768787-171	A	Keyboard, no backlight, for use only in models in Saudi Arabia
768787-211	A	Keyboard, no backlight, for use only in models in Hungary
768787-251	A	Keyboard, no backlight, for use only in models in Russia
768787-261	A	Keyboard, no backlight, for use only in models in Bulgaria
768787-271	A	Keyboard, no backlight, for use only in models in Romania
768787-281	A	Keyboard, no backlight, for use only in models in Thailand
768787-291	A	Keyboard, no backlight, for use only in models in Japan
768787-A41	A	Keyboard, no backlight, for use only in models in Belgium
768787-AB1	A	Keyboard, no backlight, for use only in models in Taiwan
768787-AD1	A	Keyboard, no backlight, for use only in models in South Korea
768787-B31	A	Keyboard, no backlight, for use only in models in the Netherlands and Europe
768787-B71	A	Keyboard, no backlight, for use only in models in Sweden and Finland
768787-BA1	A	Keyboard, no backlight, for use only in models in Slovenia
768787-BB1	A	Keyboard, no backlight, for use only in models in Israel
768787-BG1	A	Keyboard, no backlight, for use only in models in Switzerland
768787-D61	A	Keyboard, no backlight, for use only in models in India
768787-DD1	A	Keyboard, no backlight, for use only in models in Iceland

Spare part number	CSR flag	Description
768787-DH1	A	Keyboard, no backlight, for use only in models in the Netherlands
768787-FL1	A	Keyboard, no backlight, for use only in models in the Czech Republic and Slovakia
768787-FP1	A	Keyboard, no backlight, for use only in models in northern Africa
773069-001	A	128-GB Solid-state drive, M.2
773563-001	C	Microphone module
778183-001	A	320-GB, 5400-rpm hard drive
778191-001	A	750-GB, 7200-rpm hard drive

4 Removal and replacement procedures preliminary requirements

Tools required

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

- Flat-bladed screwdriver
- Phillips P0 and P1 screwdrivers
- Torx T8 screwdriver

Service considerations

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

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

Plastic parts

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 a 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, and 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.

Use nonmagnetic tools.

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, screwdrivers, and vacuums.
- When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and Styrofoam.
- Handle ESD-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.

Equipment guidelines

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

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megohm ±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 strips must be worn in contact with the skin.

The following grounding equipment is recommended to prevent electrostatic damage:

- Antistatic tapes
- 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 plastic	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

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 Service tag and PCID label on page 13 for details.

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

There are as many as 13 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.

Battery

Description	Spare part number
6-cell, 51 WHr, 2.55 Ah Li-ion battery	757661-001
6-cell, 47 WHr, 2.2 Ah Li-ion battery	708457-001

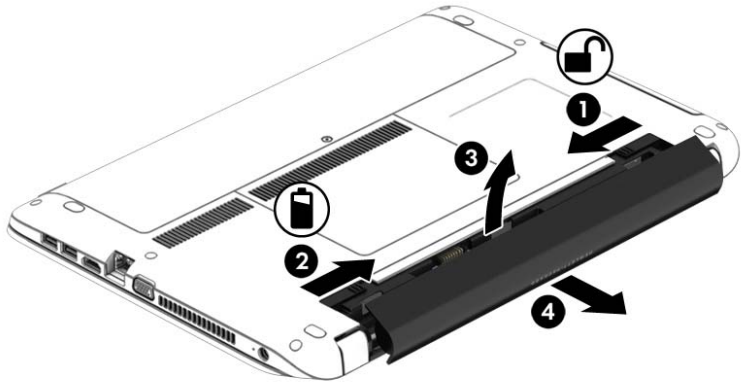
Before removing the battery, follow these steps:

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.

To remove the battery:

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

1. Turn the computer upside down on a flat surface.
2. Slide the battery lock latch **(1)**, and then slide the battery release latch **(2)** to release the battery.
3. Tilt the battery upward **(3)** and remove it from the computer **(4)**.



Service door

Description	Spare part number
Service doors (includes large and small service door)	768385-001

Before removing the service door, 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).

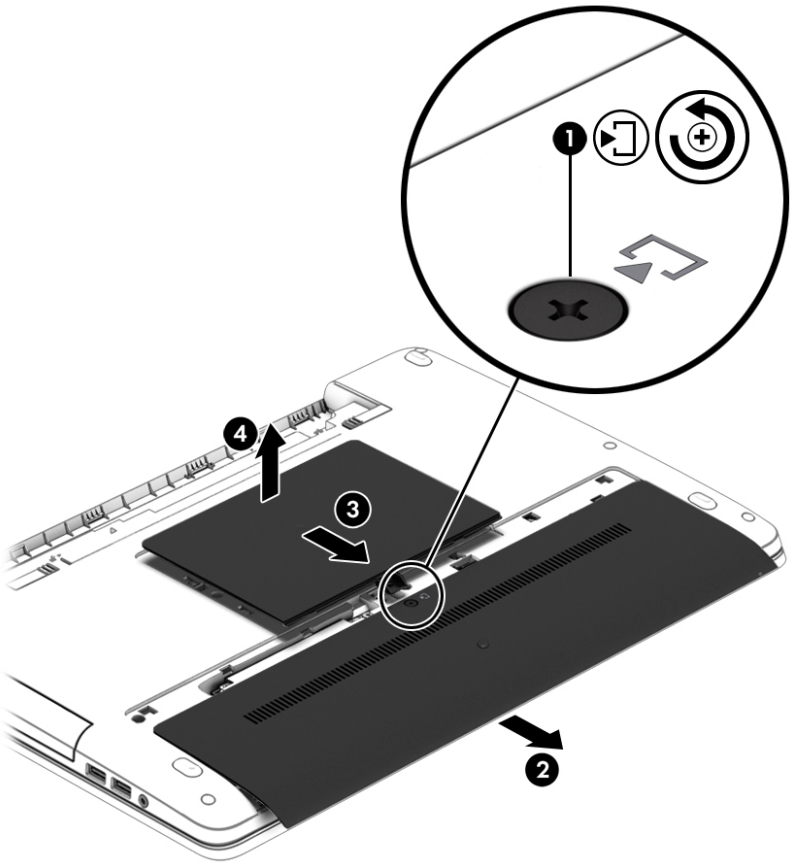
To remove the service door:

1. With the battery bay away from you, loosen the service door screw **(1)**. The service door screw secures both service doors.
2. Slide the larger service door away from the battery bay **(2)** to remove it.

NOTE: The larger service door provides access to the hard drive and memory modules.

3. Slide the smaller service door away from the battery bay **(3)** to release it, and then lift the service door **(4)** to remove it.

NOTE: The smaller service door provides access to the wireless modules, optical drive security screw, and keyboard screws. You must remove the large service door to remove the small service door.



Hard drive

Description	Spare part number
1.5-TB, 5400-rpm, 9.5 mm	747375-001
1-TB, 5400-rpm	676521-001
750-GB, 7200-rpm	778191-001
750-GB, 5400-rpm	634250-001
500-GB, 7200-rpm	703267-001
500-GB, 5400-rpm, 7 mm, hybrid (8-GB SSD)	732000-001
320-GB, 5400-rpm	778183-001
128-GB Solid-state drive, M.2	773069-001

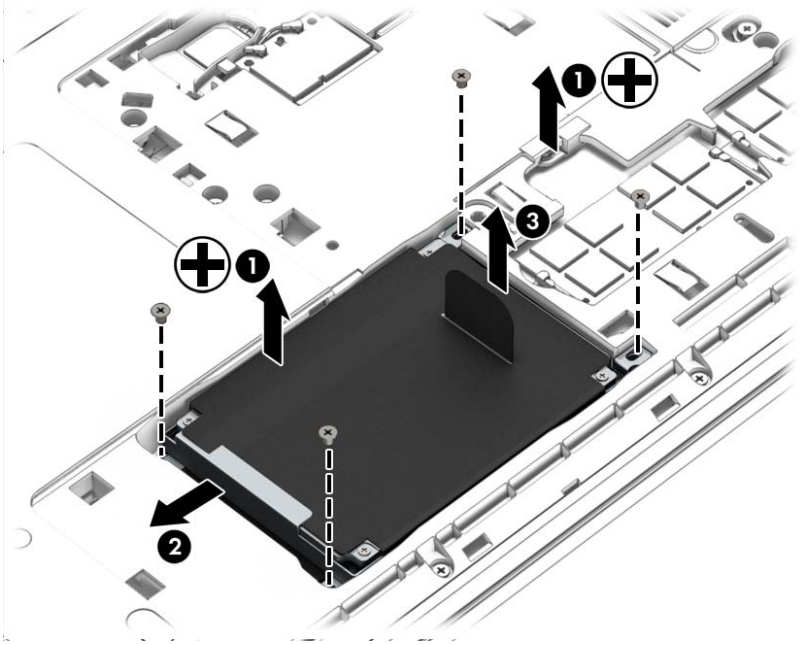
Before removing the hard drive, follow these steps:

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).
5. Remove the large service door (see Service door on page 36).

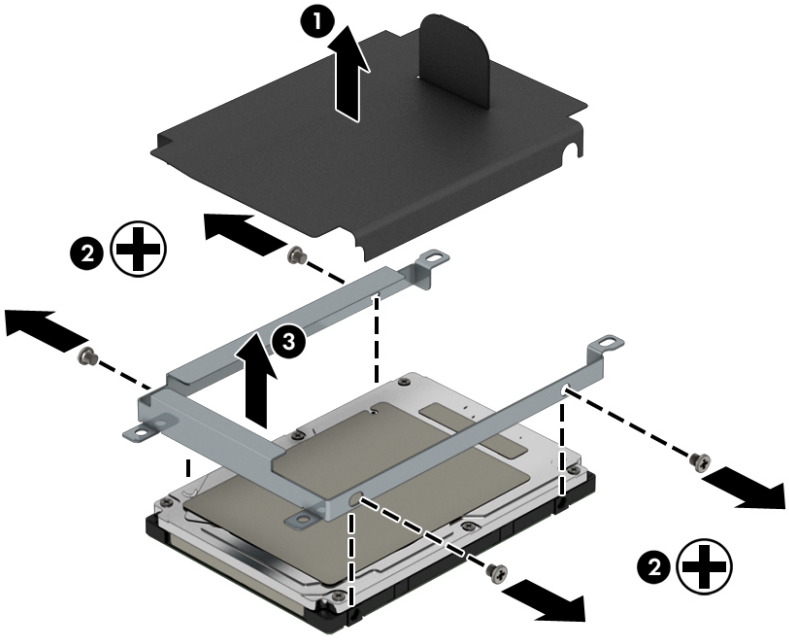
To remove a hard drive:

1. Remove the 4 Phillips PM2.5×4.0 screws **(1)** that secure the hard drive to the chassis.
2. Slide the hard drive **(2)** away from the center of the computer to disengage it from the connector.

3. Pull the plastic tab **(3)** to remove the hard drive from the bay.



4. To remove the hard drive cover and bracket from the hard drive, lift the Mylar cover up off the drive **(1)**, remove the 4 Phillips PM3.0×3.0 screws **(2)** that secure the bracket to the drive, and then lift the bracket up and off the hard drive **(3)**.



Reverse this procedure to install a hard drive.

Memory modules

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

If only one memory module is installed, it must be installed in the bottom socket.

Description	Spare part number
2-GB (PC3L-12800, 1600-MHz, DDR3L)	691739-001
4-GB (PC3L-12800, 1600-MHz, DDR3L)	691740-001
8-GB (PC3L-12800, 1600-MHz, DDR3L)	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 >** click **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 the memory module, 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).
5. Remove the large service door (see Service door on page 36).

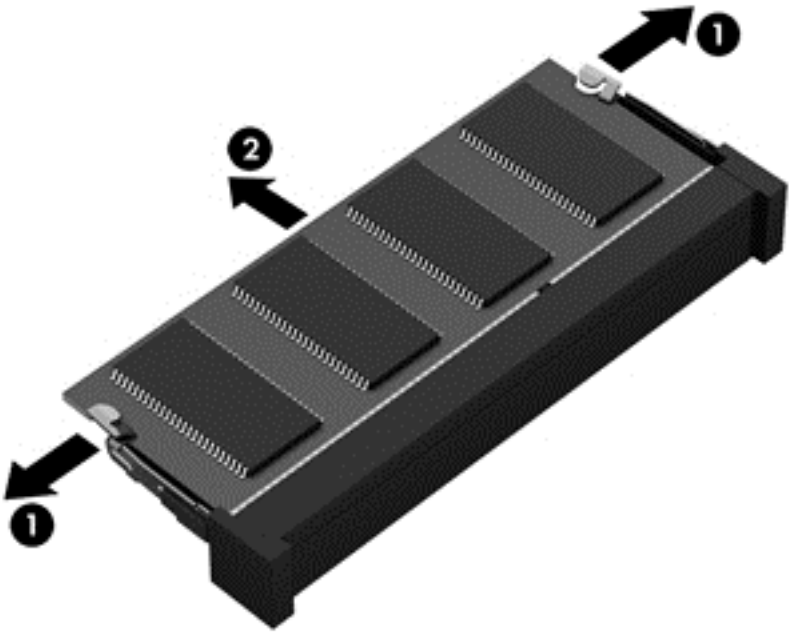
Remove the memory module:

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 sockets. The top socket houses the expansion memory module and the bottom socket houses the primary memory module. The removal procedure is the same for both memory sockets.



Reverse this procedure to install a memory module.

Optical drive

NOTE: All optical drive spare part kits include an optical drive bezel, bracket, and screws.

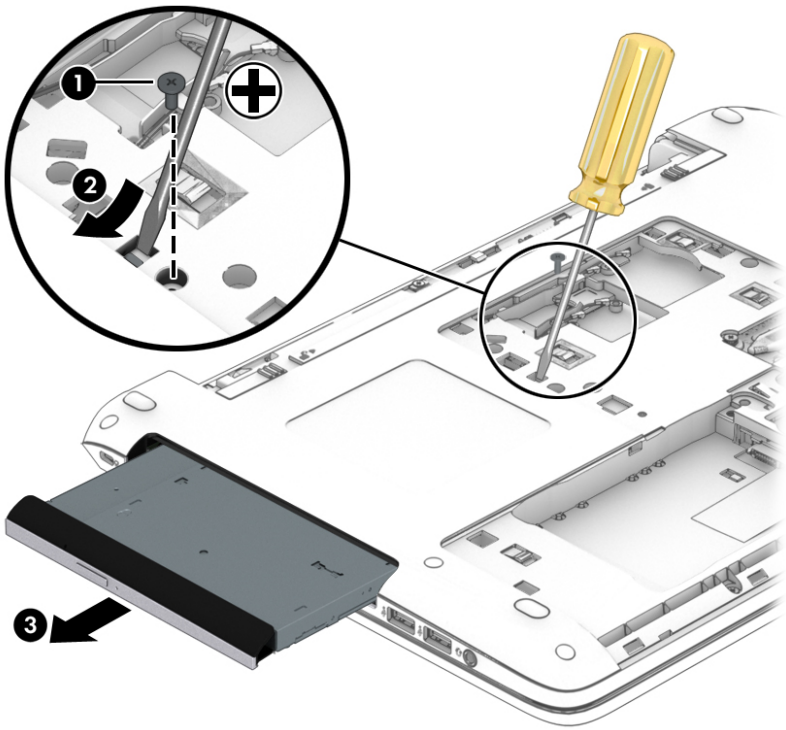
Description	Spare part number
DVD-ROM drive	768474-001
Blu-ray ROM DVD±RW SuperMulti DL Drive	768473-001
DVD±RW SuperMulti DL Drive	768475-001

Before removing the optical drive, 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).
5. Remove both service doors (see Service door on page 36).

Remove the optical drive:

1. Remove the Phillips PM2.5×6.0 screw **(1)** that secures the optical drive to the computer.
2. Push the optical drive tab **(2)** to release the optical drive from the computer.
3. Remove the optical drive **(3)** from the computer.



4. To remove the bracket from the optical drive, remove the Phillips PM2.0×3.0 screw **(1)** that secures the bracket to the drive, and then remove the bracket from the drive **(2)**.

Reverse this procedure to install an optical drive.

WLAN/Bluetooth combo card

The computer uses a card that provides both WLAN and Bluetooth functionality.

Description	Spare part number
Atheros AR9485 802.11b/g/n 1x1 WiFi Adapter	675794-001
Realtek RTL8188EE 802.11bgn Wi-Fi Adapter	709848-001
Intel Dual Band Wireless-AC 3160 802.11 ac 1x1 WiFi + BT 4.0 combo adapter	710662-001
Broadcom BCM943228HMB 802.11abgn 2x2 Wi-Fi Adapter + Broadcom Bluetooth 4.0 Adapter	730668-001
Broadcom BCM43142 802.11 bgn 1x1 Wi-Fi + BT4.0 HMC combo adapter	753076-001
Realtek RT8723BE 802.11 bgn 1x1 Wi-Fi + BT4.0 combo adapter	753077-001
Intel Dual Band Wireless-AC 7260 802.11 ac 2x2 WiFi + Intel Dual Band Wireless-AC 7260 BT 4.0 combo adapter	756753-001

Before removing the WLAN module, 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).
5. Remove both service doors (see Service door on page 36).

Remove the WLAN module:

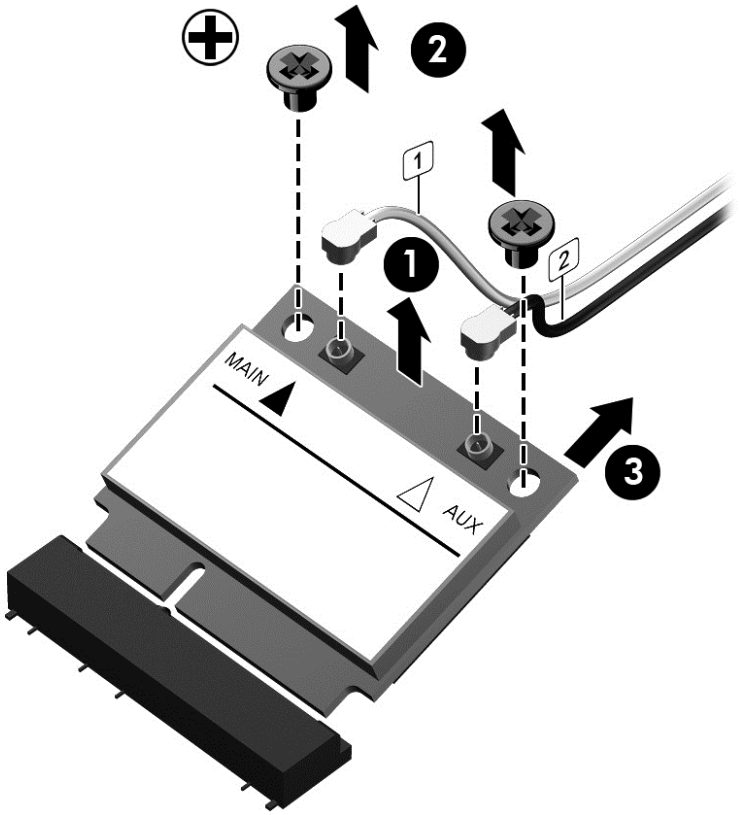
1. Disconnect the WLAN antenna cables **(1)** from the terminals on the WLAN module.

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 two Phillips PM2.5×3.0 screws **(2)** that secure the WLAN module to the computer. (The edge of the module opposite the slot rises away from the computer.)

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

NOTE: For a detailed list of available keyboards, see Sequential part number listing on page 23.

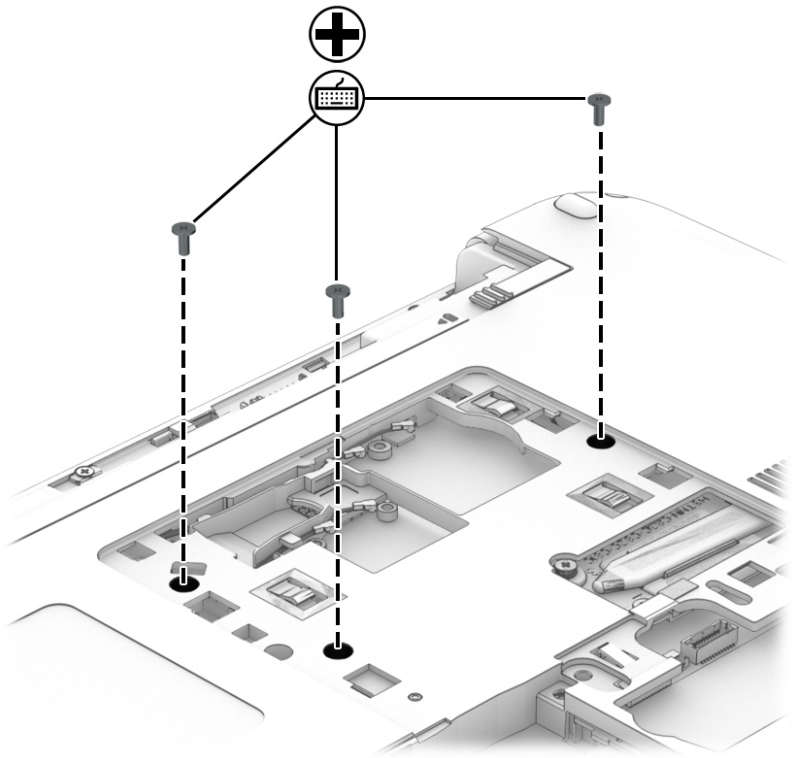
Description	Spare part number
Keyboard, backlit	768130-xxx
Keyboard, no backlight	768787-xx1

Before removing the keyboard, 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).
5. Remove both service doors (see Service door on page 36).

Remove the keyboard:

1. Remove the 3 Phillips PM2.5×6.0 screws that secure the keyboard to the computer.



2. Position the computer upright with the front toward you.
3. Open the computer as far as possible.

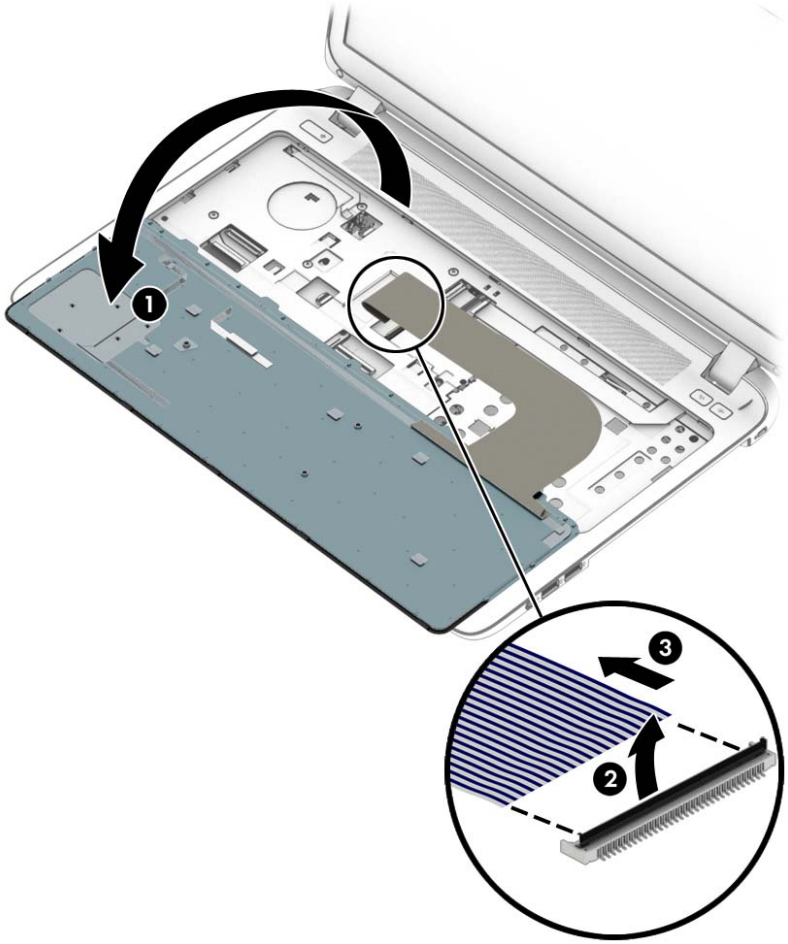
4. Slide the keyboard slightly downward toward the palm rest to disengage the top of the keyboard from the top cover.

5. Rotate the top of the keyboard upward **(1)**, and then lift the keyboard up at an angle **(2)** to disengage the tabs at the bottom of the keyboard.

NOTE: A cable connects the bottom of the keyboard to the system board. Make sure not to prematurely pull the keyboard cable out of the system board connector.

6. Rotate the keyboard until it rests on the palm rest **(1)**.

7. Disconnect the keyboard cable by lifting the keyboard connector latch **(2)**, and then disconnect the keyboard cable from the system board **(3)**.



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

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 Service tag and PCID label on page 13 for details.

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

There are as many as 57 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.

Top cover

NOTE: Top cover spare part kits include the touchpad assembly.

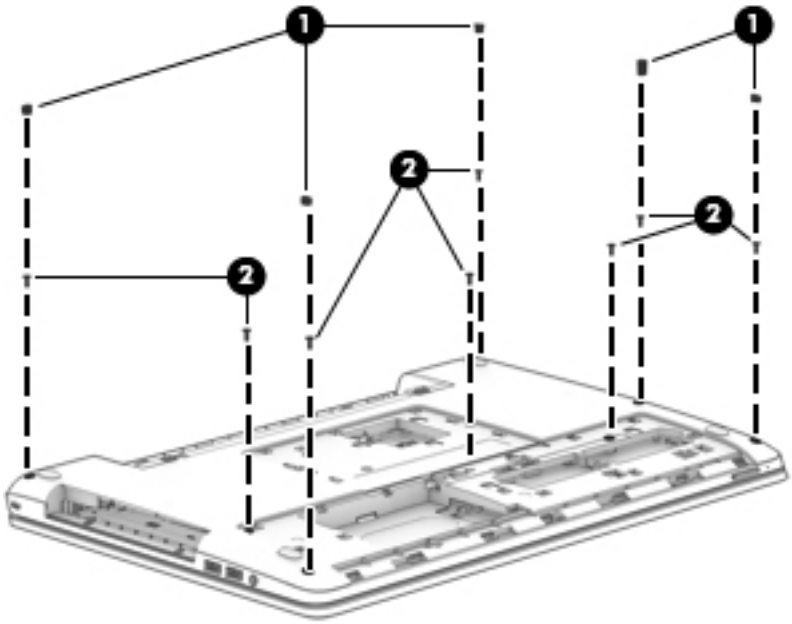
Description	Spare part number
Top cover (includes touchpad)	768390-001

Before removing the top cover, follow these steps:

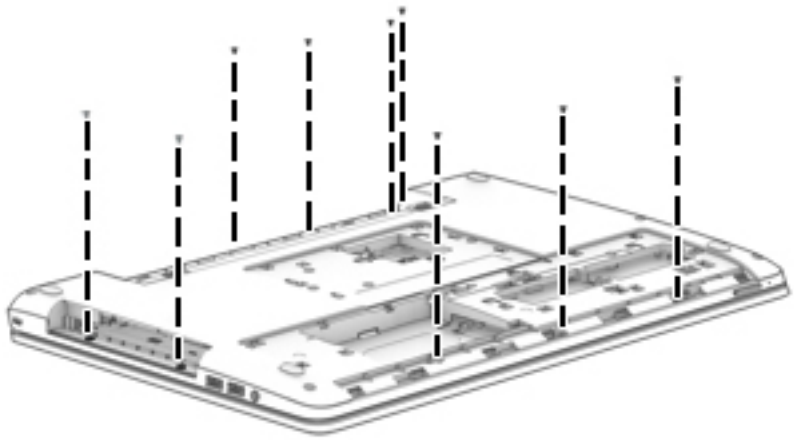
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the following components:
   a. Battery (see Battery on page 35).
   b. Service doors (see Service door on page 36).
   c. Hard drive (Hard drive on page 38)
   d. Optical drive (Optical drive on page 42)
   e. Keyboard (see Keyboard on page 46)

Remove the top cover:

1. Position the computer upside-down with the front toward you.
2. Remove the 5 rubber screw covers and 8 Torx T8M2.5×6.0 screws that secure the top cover to the computer.

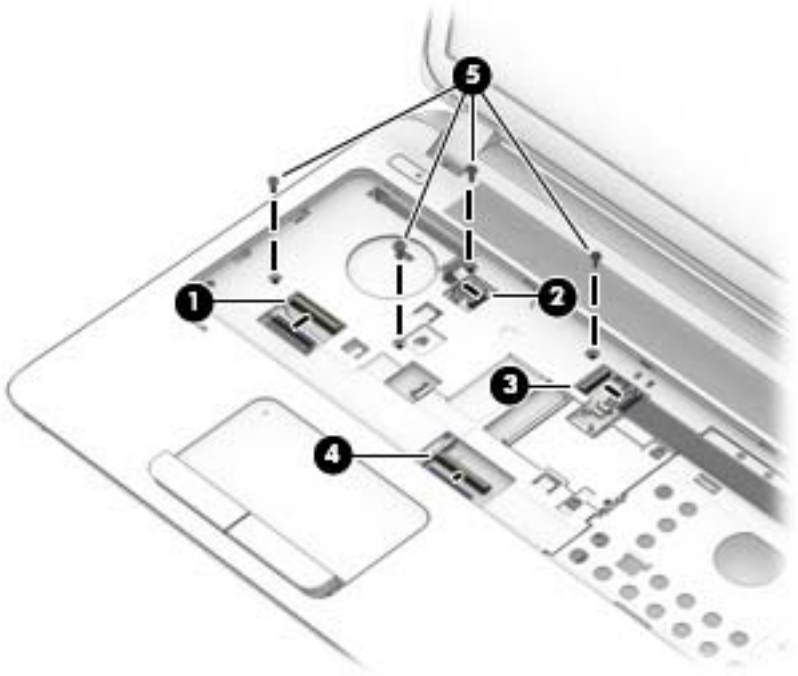


3. Remove the 9 Torx T8M2.5×3.0 screws that secure the top cover to the computer.



4. Position the computer upright and open it as far as possible.
5. Disconnect the following cables from the system board:
   - **(1)**: Card reader board cable
   - **(2)**: Power button board cable
   - **(3)**: Function board cable
   - **(4)**: Speaker cable
   - **(5)**: USB board cable

6. Remove the 4 Torx T8M2.5×6.0 screws **(5)** from the top of the computer.



7. Pry the top cover off the computer to disengage it.

NOTE: Begin by attempting to pry the top cover loose near the optical drive.

8. Lift the top of the top cover **(1)**, and the lift the top cover up and remove it from the computer **(2)**.

Reverse this procedure to install the top cover.

Speaker assembly

Description	Spare part number
Speaker assembly	768389-001

NOTE: You must remove the left speaker to remove to function board cable.

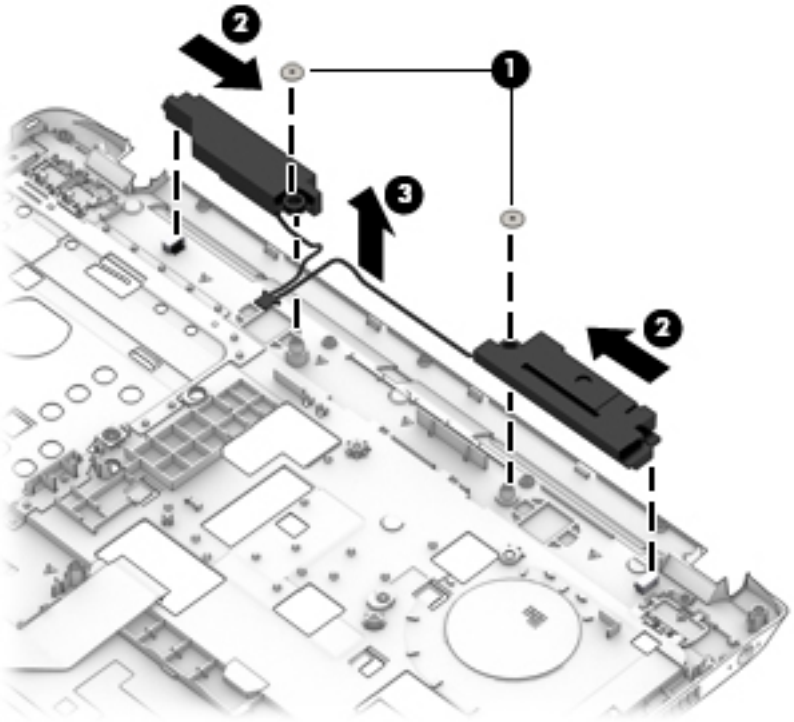
Before removing the speaker assembly, follow these steps:

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).
5. Remove the following components:
   a. Service doors (see Service door on page 36).
   b. Keyboard (see Keyboard on page 46)
   c. Hard drive (Hard drive on page 38)
   d. Optical drive (Optical drive on page 42)
   e. Top cover (see Top cover on page 49)

Remove the speaker assembly:

1. Position the top cover upside-down.
2. Remove the 2 Phillips PM2.0×3.0 broadhead screws **(1)** that secure the speakers to the computer.
3. Slide the speakers toward each other to disengage them from the top cover **(2)**.

4. Remove the speakers from the top cover **(3)**.



Reverse this procedure to install the speaker assembly.

Fingerprint reader assembly

Description	Spare part number
Fingerprint reader assembly (includes cable, bracket, and bezel)	768378-001

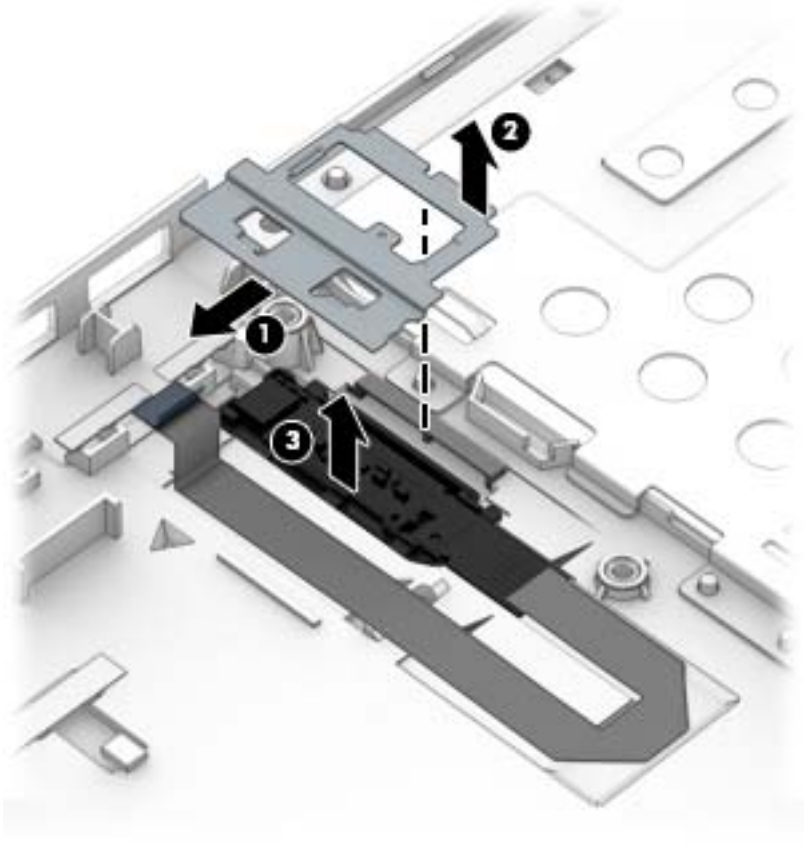
Before removing the fingerprint reader assembly, follow these steps:

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).
5. Remove the following components:
   a. Service doors (see Service door on page 36).
   b. Keyboard (see Keyboard on page 46)
   c. Hard drive (Hard drive on page 38)
   d. Optical drive (Optical drive on page 42)
   e. Top cover (see Top cover on page 49)

Remove the fingerprint reader assembly:

1. Position the top cover upside-down.
2. Slide the bracket toward the bottom of the top cover **(1)**, and then lift it off the top cover **(2)**.

3. Remove the fingerprint reader board and cable assembly from the top cover **(3)**.



Reverse this procedure to install the fingerprint reader assembly.

Power button board

Description	Spare part number
Power button board assembly	767442-001

Before removing the power button board, follow these steps:

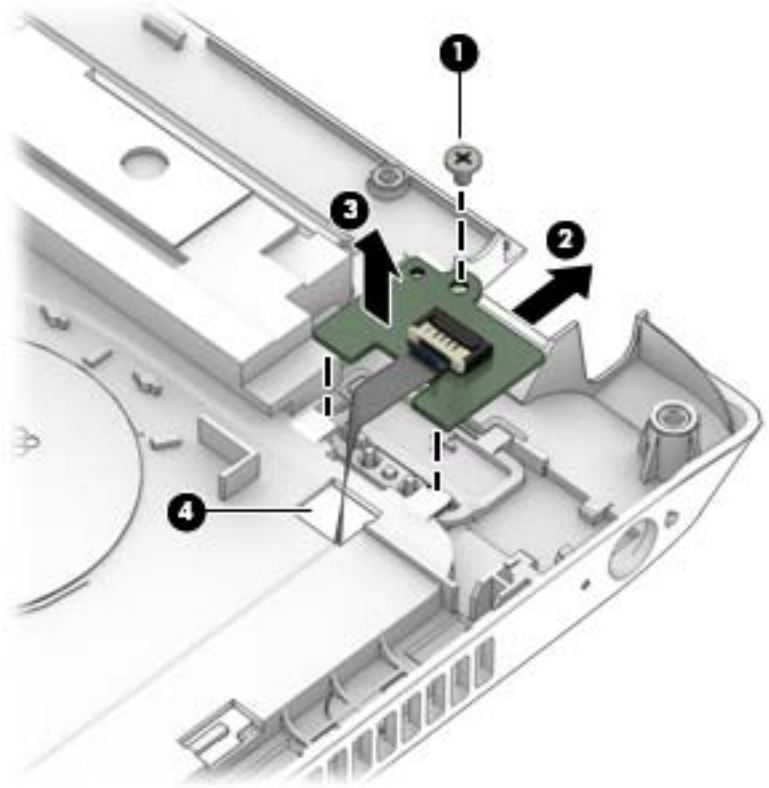
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 35).
5. Remove the following components:
   a. Service doors (see Service door on page 36)
   b. Keyboard (see Keyboard on page 46)
   c. Hard drive (Hard drive on page 38)

d. Optical drive (Optical drive on page 42)

e. Top cover (see Top cover on page 49)

Remove the power button board:

1. Position the top cover upside-down.
2. Remove the Phillips PM2.0×3.0 screw **(1)** that secures the power button board to the top cover.
3. Slide the board upward to disengage it from the tabs **(2)**.
4. Lift the board up to remove it from the top cover **(3)**, while guiding the cable through the hole in the top cover **(4)**.



Reverse this procedure to install the power button board.

Function board

Description	Spare part number
Function board	768380-001

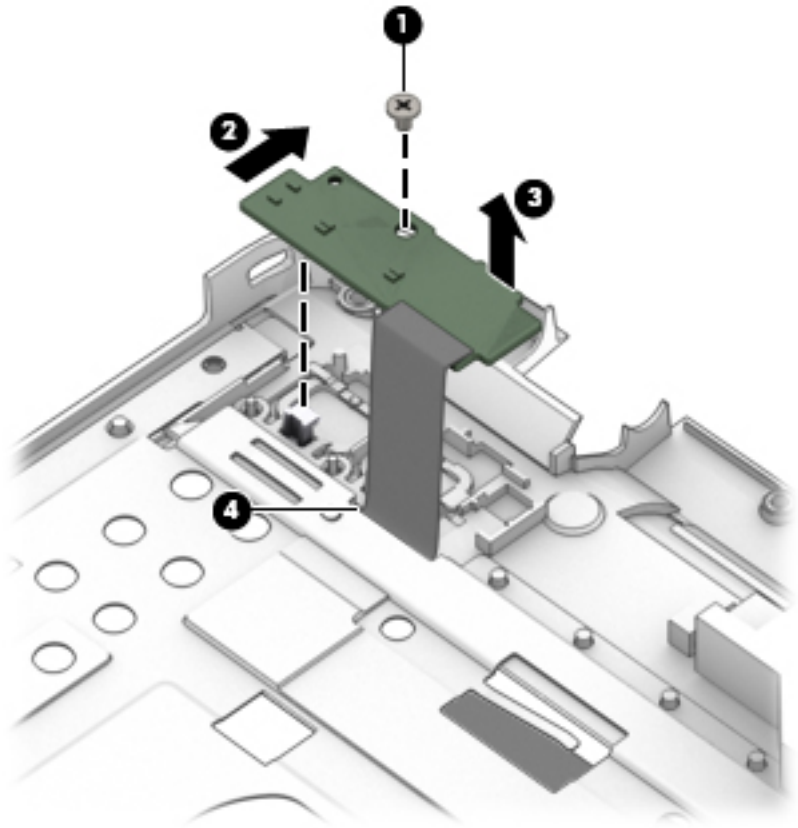
Before removing the function board, follow these steps:

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).
5. Remove the following components:
   a. Service doors (see Service door on page 36)
   b. Keyboard (see Keyboard on page 46)
   c. Hard drive (Hard drive on page 38)
   d. Optical drive (Optical drive on page 42)
   e. Top cover (see Top cover on page 49)

Remove the function board:

1. Position the top cover upside-down.
2. Remove the Phillips PM2.0×3.0 screw **(1)** that secures the function board to the top cover.
3. Slide the board toward the top of the top cover **(2)**, and then lift it off the top cover **(3)**.

4. On the front of the top cover, pull the cable to disengage it from the adhesive that secures it, and then pull the cable through the hole in the top cover **(4)**.



5. Remove the function board from the top cover.

Reverse this procedure to install the function board.

Card reader board

Description	Spare part number
Card reader board	768384-001

Before removing the card reader board, 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).
5. Remove the following components:
   a. Service doors (see Service door on page 36).
   b. Keyboard (see Keyboard on page 46)

c. Hard drive (Hard drive on page 38)

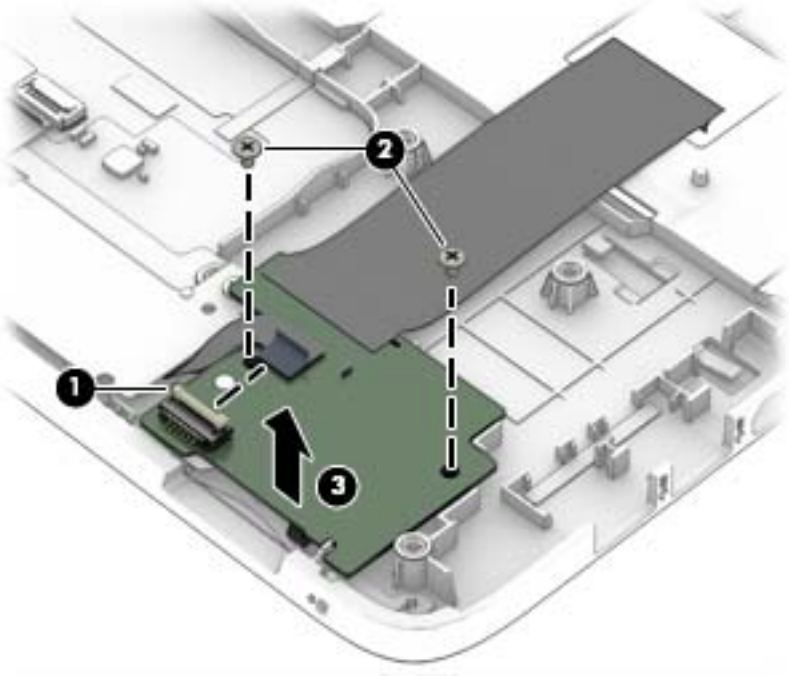
d. Optical drive (Optical drive on page 42)

e. Top cover (see Top cover on page 49)

Remove the card reader board:

NOTE: Before you remove the card reader, make sure nothing (memory card or plastic insert) in installed.

1. Position the top cover upside-down.
2. Disconnect the cable from the board **(1)**.
3. Remove the two Phillips PM2.5×4.0 screws **(2)** that secure the card reader board to the computer.
4. Remove the card reader board from the top cover **(3)**.



Reverse this procedure to install the card reader board.

USB/audio board

Description	Spare part number
USB/audio board	768382-001

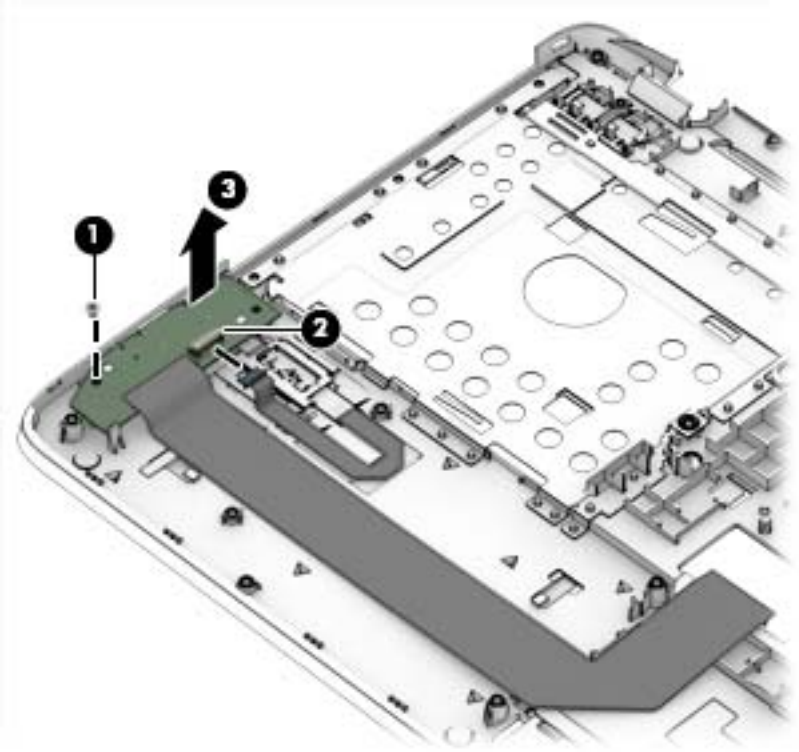
Before removing the USB/audio board, follow these steps:

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).
5. Remove the following components:
   a. Service doors (see Service door on page 36).
   b. Keyboard (see Keyboard on page 46)
   c. Hard drive (Hard drive on page 38)
   d. Optical drive (Optical drive on page 42)
   e. Top cover (see Top cover on page 49)

Remove the USB/audio board:

1. Position the top cover upside-down.
2. Remove the Phillips PM2.5×4.0 screw **(1)** that secures the USB/audio board to the computer.
3. Disconnect the cable from the board **(2)**.

4. Lift the board off the top cover **(3)**.



Reverse this procedure to install the USB/audio board.

Touchpad button board

Description	Spare part number
Touchpad button board	768140-001

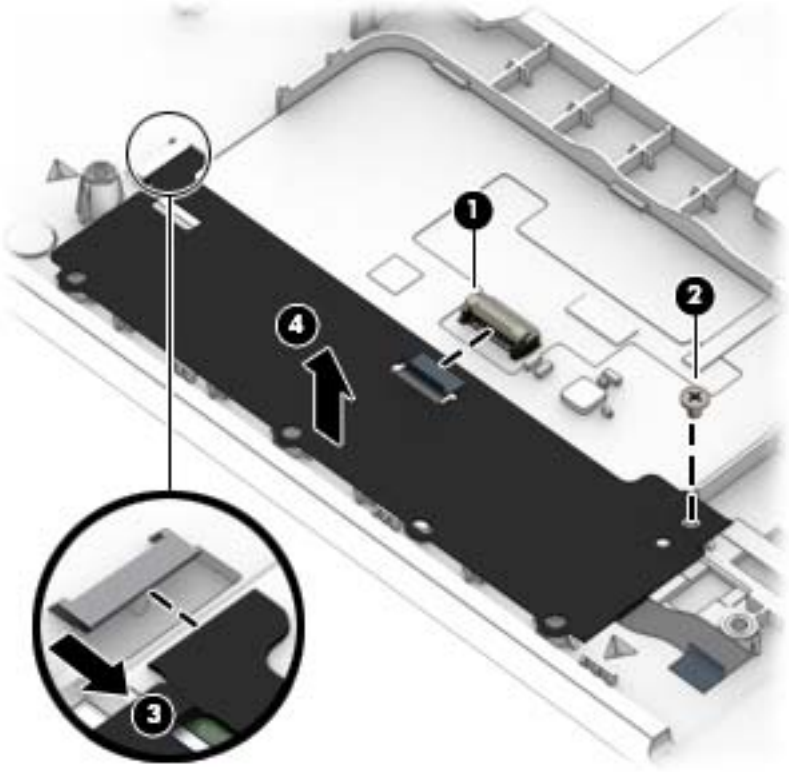
Before removing the touchpad button board, follow these steps:

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).
5. Remove the following components:
   a. Service doors (see Service door on page 36).
   b. Keyboard (see Keyboard on page 46)
   c. Hard drive (Hard drive on page 38)
   d. Optical drive (Optical drive on page 42)
   e. Top cover (see Top cover on page 49)

Remove the touchpad button board:

1. Position the top cover upside-down.
2. Disconnect the cable from the touchpad **(1)**.
3. Disconnect the cable from the card reader board **(2)**.
4. Remove the Phillips PM2.0×3.0 screw **(3)** that secures the button board to the top cover.
5. Lift the right side of the touchpad button board up, and then pull it to the right to remove it from the slot **(4)**.

6. Lift the touchpad button board off the top cover **(5)**.



Reverse this procedure to install the touchpad board.

Fan

Description	Spare part number
Fan	767433-001

NOTE: To properly ventilate the computer, allow at least **7.6 cm** (3.0 in) of clearance on the left side of the computer. The computer uses an electric fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software requirements. Exhaust air is displaced through the ventilation grill located on the left side of the computer.

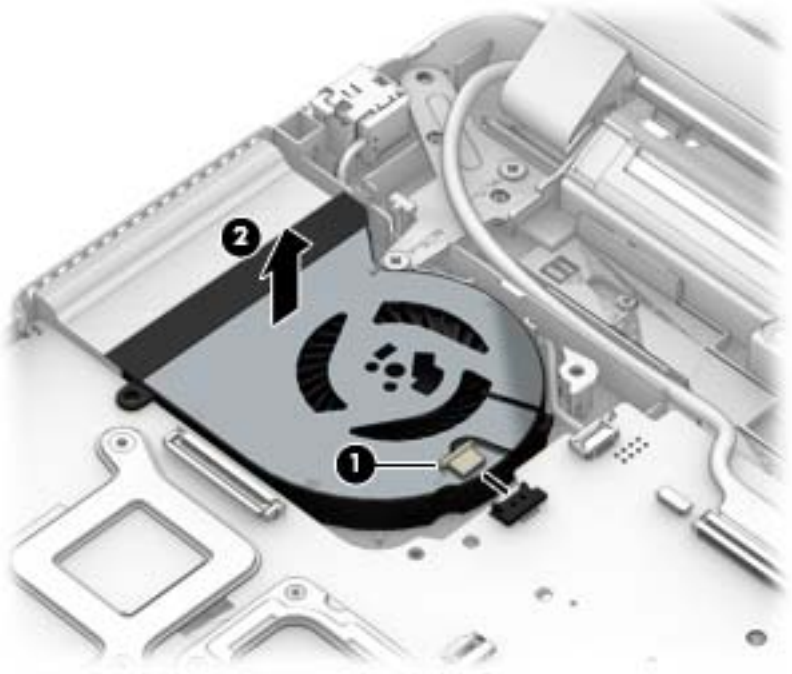
Before removing the fan/heat sink assembly, follow these steps:

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), and then remove the following components:
   a. Service doors (see Service door on page 36).
   b. Hard drive (Hard drive on page 38)
   c. Optical drive (Optical drive on page 42)
   d. Keyboard (see Keyboard on page 46)
   e. Top cover (see Top cover on page 49)

To remove the fan:

1. Disconnect the fan cable **(1)** from the system board.

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



Reverse this procedure to install the fan.

Battery connector cable

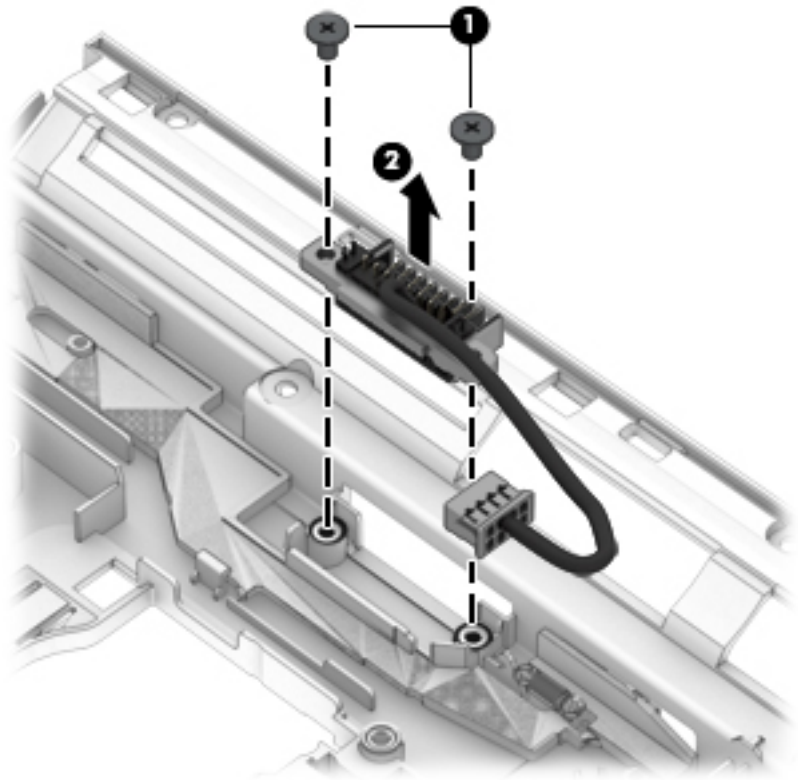
The battery connector cable is included in the Cable Kit, spare part number 768377-001.

Before removing the battery connector cable, 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).
5. Remove the following components:
   a. Service doors (see Service door on page 36).
   b. Hard drive (Hard drive on page 38)
   c. Optical drive (Optical drive on page 42)
   d. Keyboard (see Keyboard on page 46)
   e. Top cover (see Top cover on page 49)

Remove the battery connector cable:

1. Disconnect the battery connector cable from the system board **(1)**.
2. Remove the 2 Phillips PM2.5×4.0 screws that secure the battery connector cable to the computer **(2)**.
3. Remove the battery connector cable from the computer **(3)**.



Reverse this procedure to install the battery connector cable.

System board

NOTE: All system board spare part kits include replacement thermal material.

Description	Spare part number
Intel i7-4510U processor; 2-GB discrete graphics memory	
• Without Windows 8.1	768401-001
• Windows 8.1 Professional	768401-501
• Windows 8.1 Standard	768401-601
Intel i5-4210U processor; 2-GB discrete graphics memory	
• Without Windows 8.1	768399-001
• Windows 8.1 Professional	768399-501
• Windows 8.1 Standard	768399-601
Intel i3-4030U processor; 2-GB discrete graphics memory	
• Without Windows 8.1	768398-001
• Windows 8.1 Professional	768398-501
• Windows 8.1 Standard	768398-601
Intel i7-4558U processor; 1-GB discrete graphics memory	
• Without Windows 8.1	768395-001
• Windows 8.1 Professional	768395-501
• Windows 8.1 Standard	768395-601
Intel i5-4210U processor; 1-GB discrete graphics memory	
• Without Windows 8.1	768393-001
• Windows 8.1 Professional	768393-501
• Windows 8.1 Standard	768393-601
Intel i3-4030U processor; 1-GB discrete graphics memory	
• Without Windows 8.1	768392-001
• Windows 8.1 Professional	768392-501
• Windows 8.1 Standard	768392-601

Before removing the system board, 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).
5. Remove the following components:
   a. Service doors (see Service door on page 36).
   b. Hard drive (see Hard drive on page 38)
   c. Optical drive (see Optical drive on page 42)
   d. Keyboard (see Keyboard on page 46)
   e. Top cover (see Top cover on page 49)

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

- Memory modules (see Memory modules on page 40)
- WLAN/Bluetooth module (see WLAN/Bluetooth combo card on page 44)

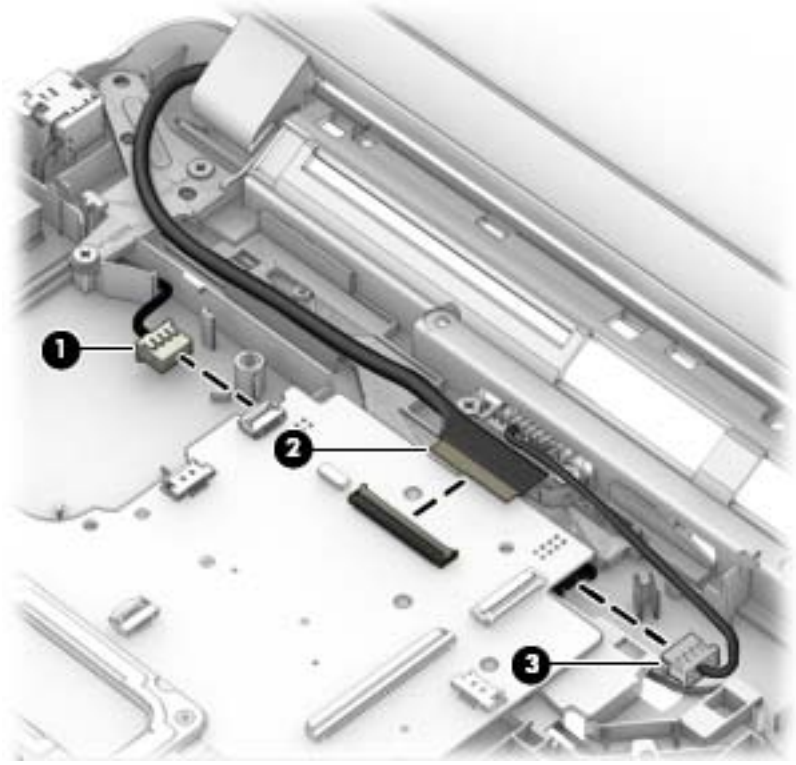
Remove the system board:

1. Position the computer upright with the front toward you.
2. Disconnect the following cables from the system board:

   (1) Power connector cable

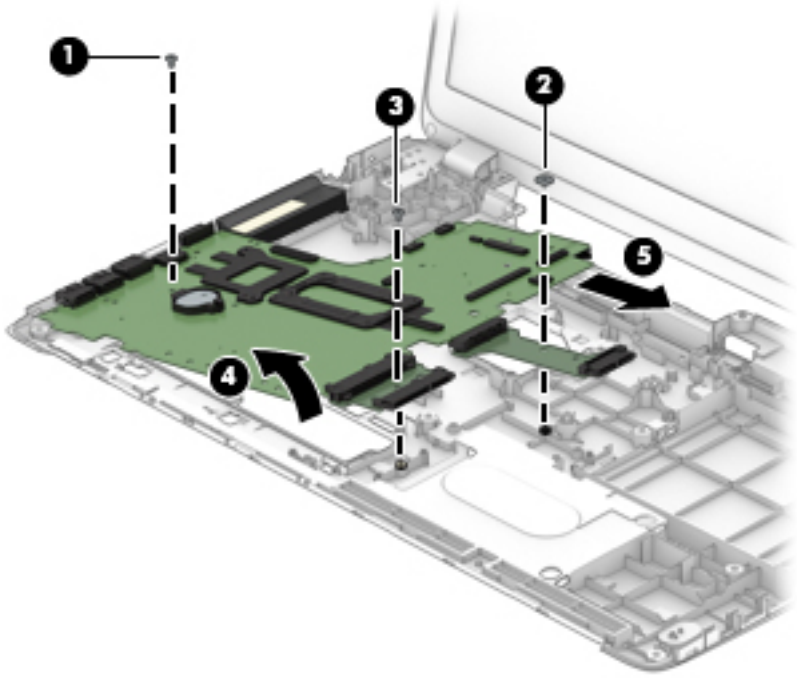
   (2) Display cable

   (3) Battery connector cable



3. Remove the hillips PM2.5×4.0 screw **(1)** that secures the system board, the broadhead Phillips PM2.0×3.0 screw **(2)** that secures the optical drive extension board, and the broadhead Phillips PM2.0×3.0 screw **(3)** that secures the hard drive extension board to the computer.

4. Lift the right side of the system board up at an angle **(4)**.
5. Pull the system board up and toward the right to remove it from the computer **(5)**.



Reverse this procedure to install the system board.

Optical drive and hard drive extension boards

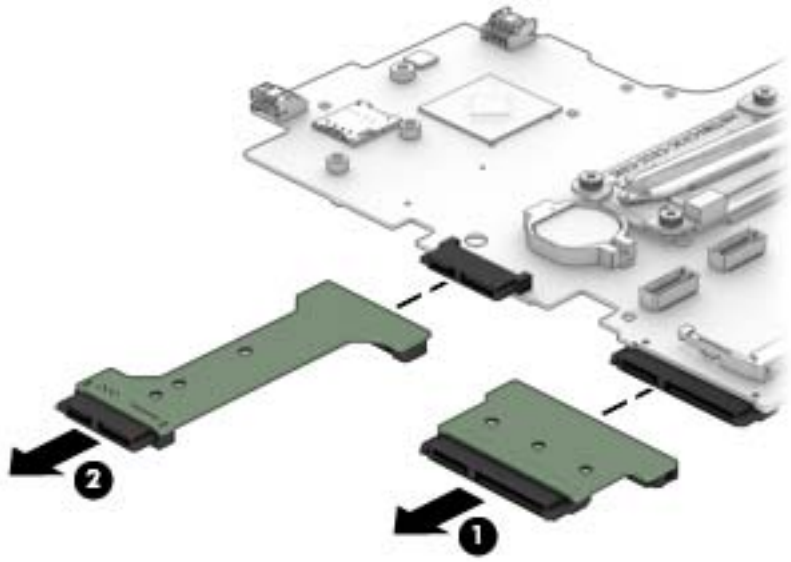
You must remove the system board to remove the optical drive extension board.

Before removing the optical drive extension board, 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).
5. Remove the following components:
   a. Service doors (see Service door on page 36).
   b. Hard drive (see Hard drive on page 38)
   c. Optical drive (see Optical drive on page 42)
   d. WLAN module (see WLAN/Bluetooth combo card on page 44)
   e. Keyboard (see Keyboard on page 46)
   f. Top cover (see Top cover on page 49)
   g. System board (see System board on page 67)

Remove the optical drive extension board:

1. Position the system board upright.
2. Pull the optical drive extension board **(1)** and/or the hard drive extension board **(2)** straight away from the side of the system board.



Reverse this procedure to install the drive extension boards.

RTC battery

Description	Spare part number
RTC battery	738824-001

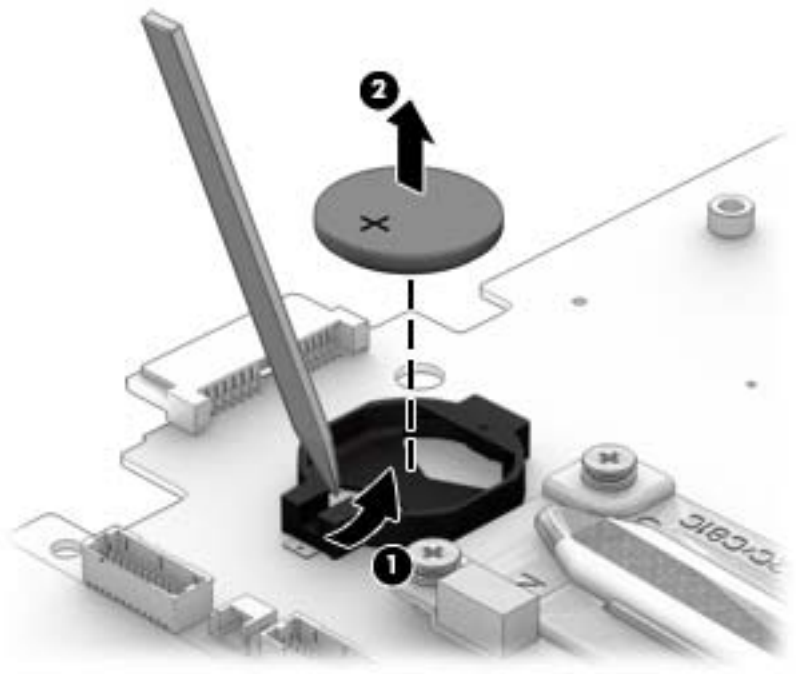
Before removing the RTC battery, follow these steps:

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).
5. Remove the following components:
   a. Service doors (see Service door on page 36).
   b. Hard drive (see Hard drive on page 38)
   c. Optical drive (see Optical drive on page 42)
   d. Keyboard (see Keyboard on page 46)
   e. Top cover (see Top cover on page 49)
   f. System board (see System board on page 67)

Remove the RTC battery:

1. Position the system board upside-down.
2. Using a flat tool, pry the battery out of the socket **(1)**.

3. Remove the battery from the socket **(2)**.



Reverse this procedure to install the RTC battery.

Heat sink assembly

All heat sink assembly spare part kits include replacement thermal material.

Description	Spare part number
Heat sink assembly:	
For use in models with discrete graphics and all processors except for the Intel i7-4558U	768050-001
For use in models with discrete graphics and an Intel i7-4558U processor	768049-001

Before removing the heat sink assembly, 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).
5. Remove the following components:
   a. Service doors (see Service door on page 36).
   b. Hard drive (see Hard drive on page 38)
   c. Optical drive (see Optical drive on page 42)
   d. WLAN module (see WLAN/Bluetooth combo card on page 44)
   e. Keyboard (see Keyboard on page 46)
   f. Top cover (see Top cover on page 49)
   g. System board (see System board on page 67)

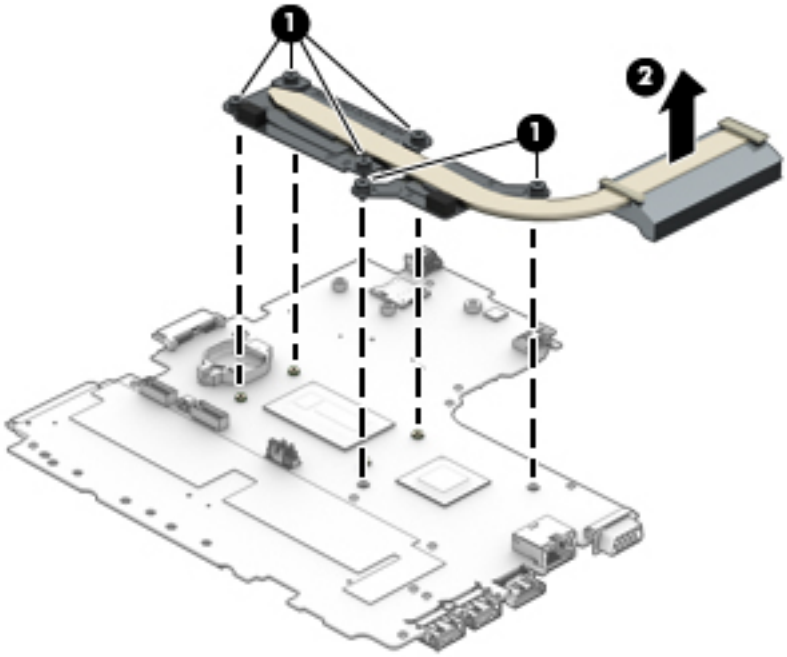
Remove the heat sink assembly:

1. Position the system board upside-down.
2. Models are available with discrete graphics.

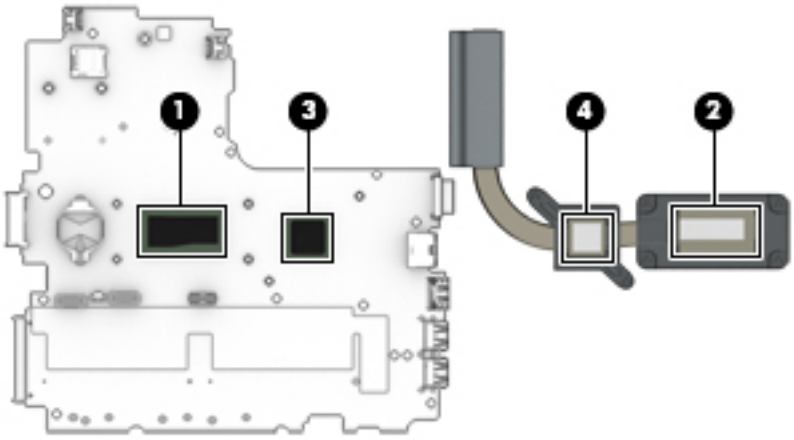
   Discrete models:

   a. To remove the heat sink assembly, in the order indicated on the heat sink, loosen the 6 captive Phillips screws **(1)** that secure the heat sink to the system board.

b. Lift the heat sink from the system board **(2)**.



NOTE: Thoroughly clean thermal material from the surfaces of the system board components **(1)(3)** and the heat sink **(2)(4)** each time you remove the heat sink. All heat sink and processor spare part kits include thermal material.



Reverse this procedure to install the heat sink assembly.

Display assembly

Entire display hinge-ups are not spared.

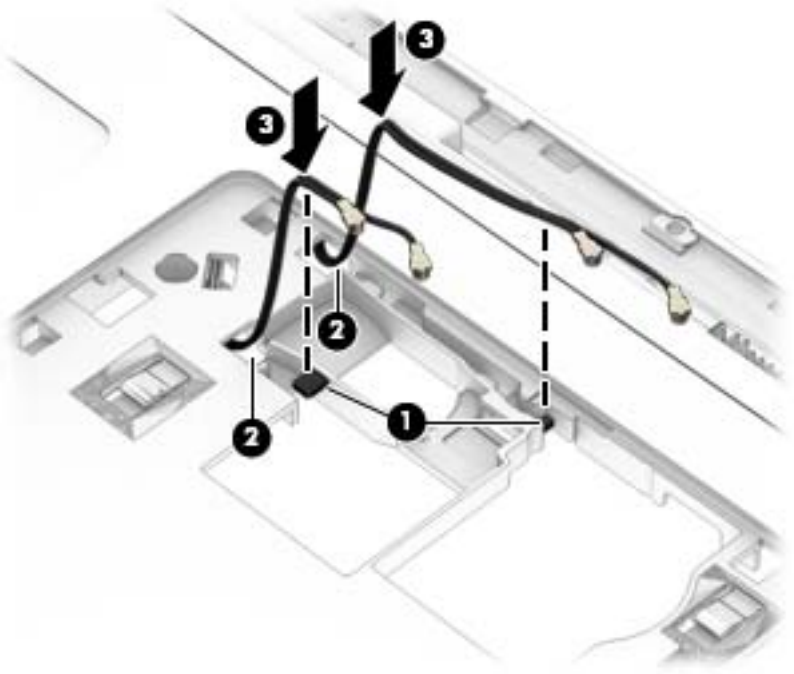
For a list of individual display spare parts, see Display components on page 19.

Before removing the display assembly, follow these steps:

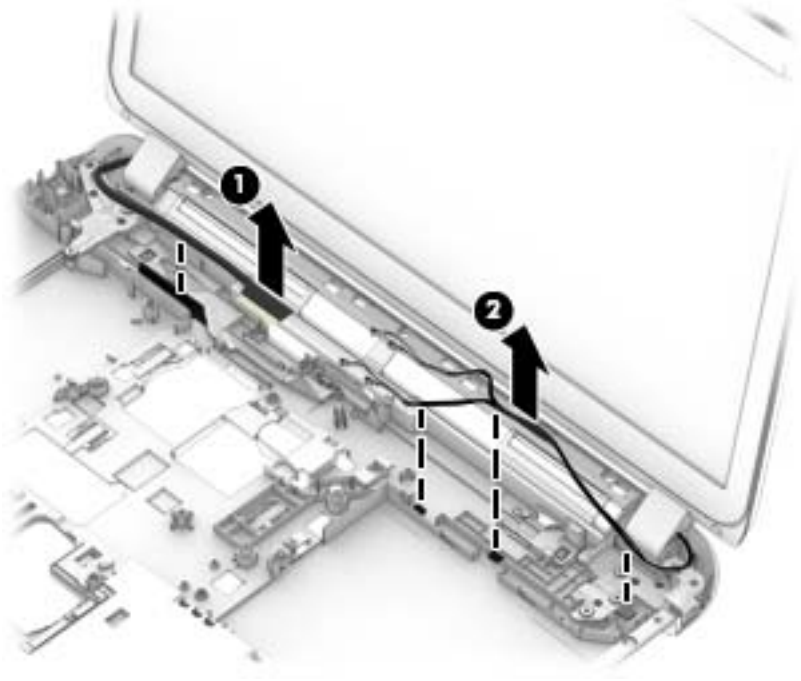
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 35).
5. Remove the following components:
   a. Service doors (see Service door on page 36).
   b. Hard drive (see Hard drive on page 38)
   c. Optical drive (see Optical drive on page 42)
   d. WLAN module (see WLAN/Bluetooth combo card on page 44)
   e. Keyboard (see Keyboard on page 46)
   f. Top cover (see Top cover on page 49)

Remove the display assembly:

1. Position the computer upside down.
2. Pull the antenna cables through from the bottom of the computer. Position the computer upside down, and then remove the cables from the clips near the wireless modules **(1)**, pulling the cables **(2)** through the holes **(3)** in the computer.

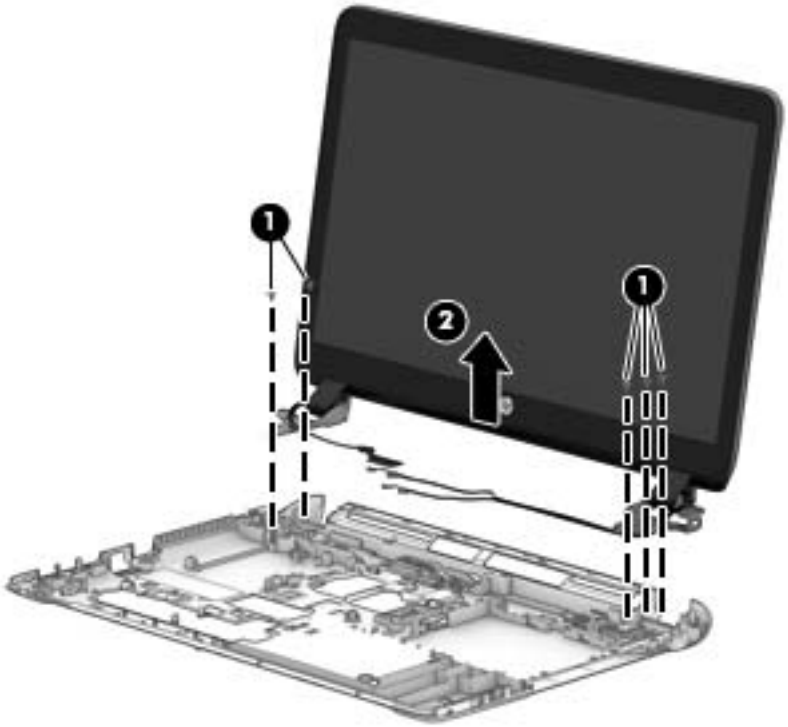


3. Position the computer upright and open.
4. Disconnect the display cable from the system board **(1)**.
5. Remove the WLAN antennas from the routing path along the base of the computer **(2)**.



6. Place the computer upright and open as far as possible.
7. Remove the 5 Phillips PM2.5×4.0 screws **(1)** from the display hinges.

8. Lift the display assembly straight up and remove it **(2)**.



CAUTION: When installing the display assembly, be sure that the wireless antenna cables are routed and arranged properly.

Failure to properly route the antennas can result in degradation of the computer's wireless performance.

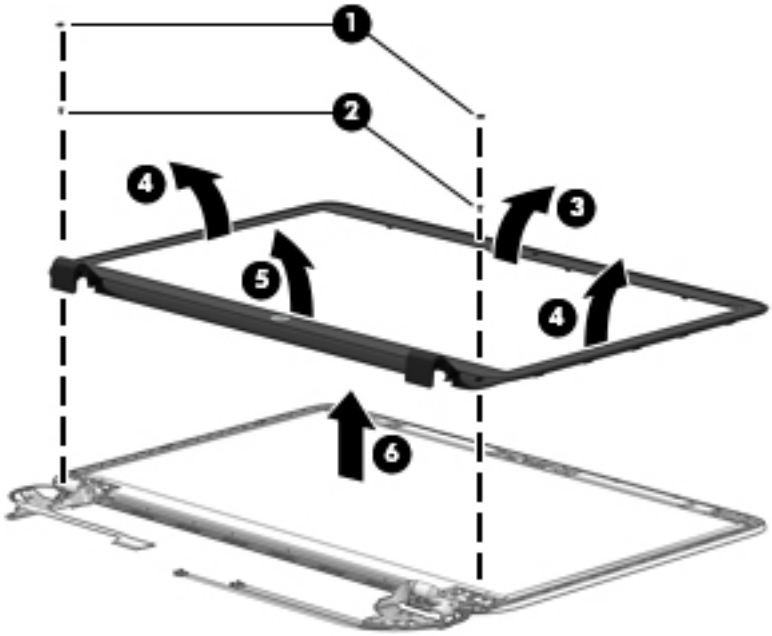
9. If you need to remove the display bezel, remove the 2 mylar screw covers **(1)** and the 2 Phillips PM2.0×3.0 screws **(2)** in the bottom corners of the display bezel.

10. Flex the top **(3)** of the bezel, the inside edges of the left and right sides **(4)**, and then the bottom **(5)** of the bezel until it disengages from the display enclosure.

NOTE: Make sure the hinges are not bent (see hinge position in following image) when you remove the bezel.

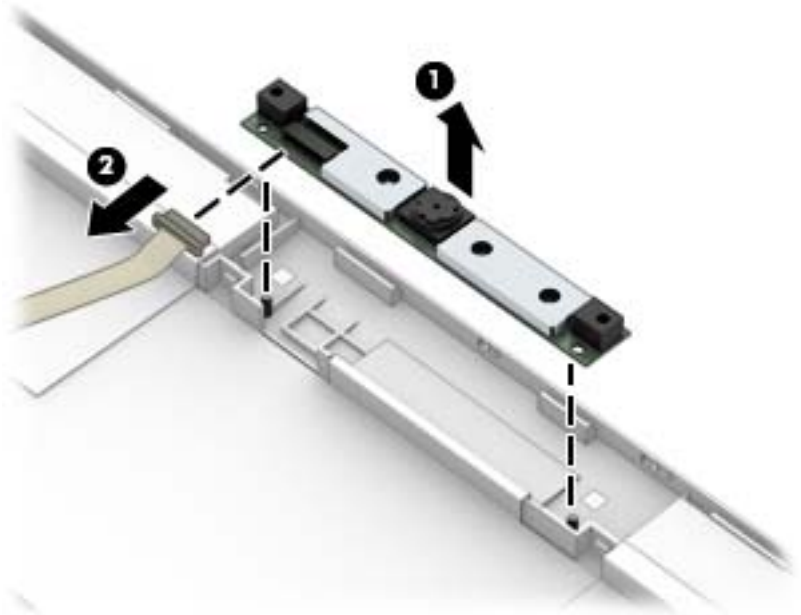
11. Remove the display bezel **(6)**.

    The display bezel is available using spare part number 768375-001 for models with a webcam and 768376-001 for models without a webcam. Display bezel mylar screw covers are available in the Rubber Kit, spare part number 768387-001.



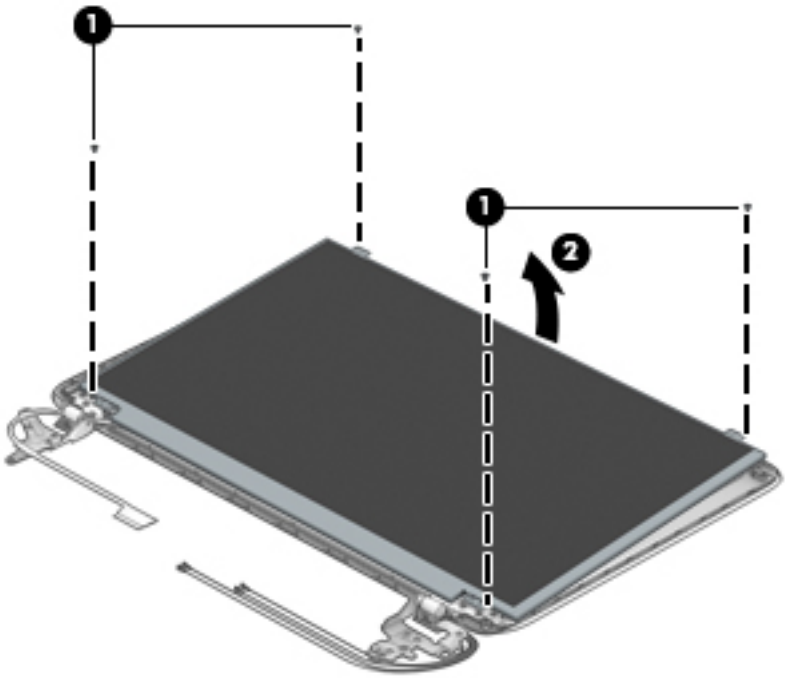
12. If it is necessary to replace the webcam or microphone module, gently pull the module away from the double-sided tape on the display enclosure **(1)**, and then disconnect the cable from the module **(2)**.

    The webcam module is available using spare part number 767457-001. The microphone module is available using spare part number 773563-001.

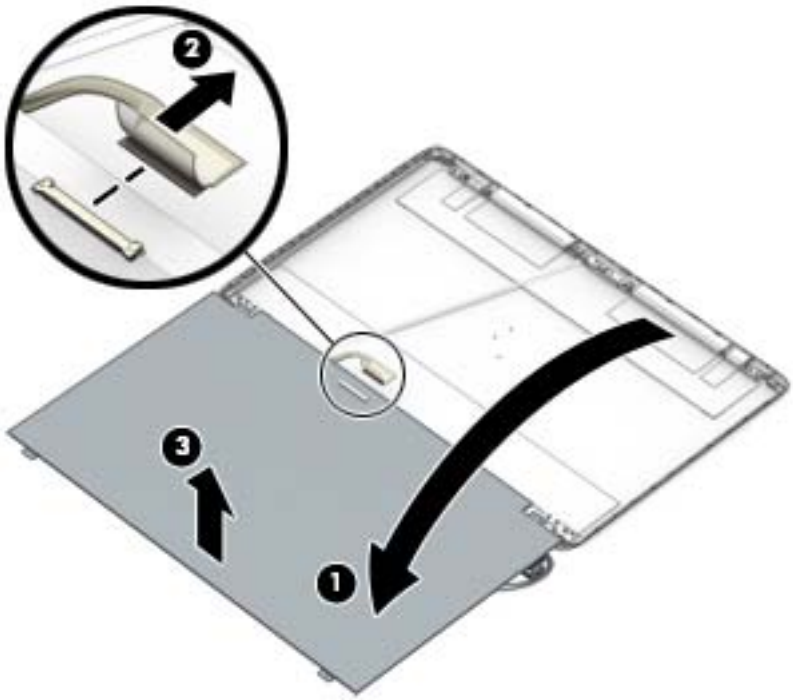


13. If it is necessary to remove the display panel from the enclosure, remove the 4 Phillips PM2.0×3.0 screws **(1)** that secure the panel to the display enclosure, and then lift the top of the panel upward **(2)**.

    The raw display panel is available using spare part number 768386-001.



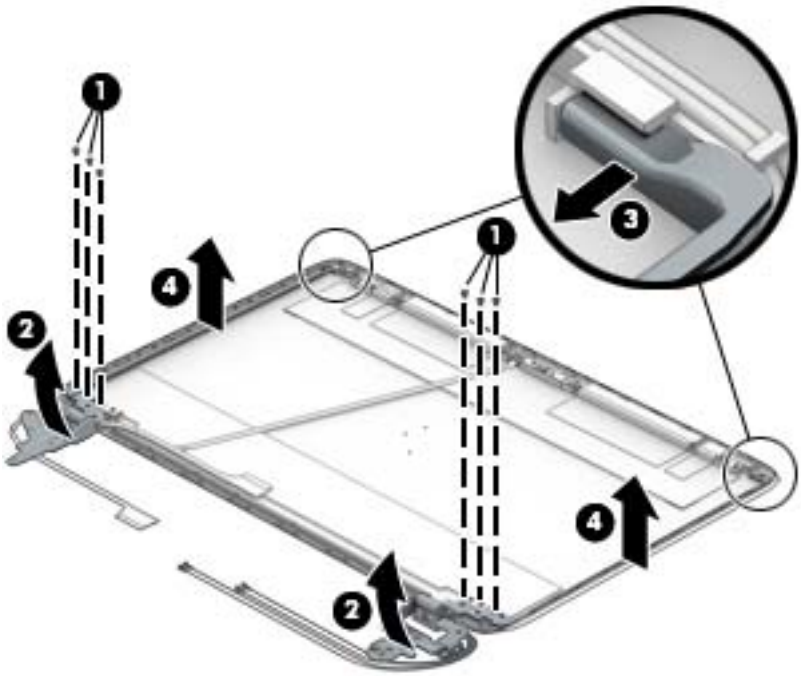
14. Rotate the display panel all the way over **(1)**, disconnect the display cable from the rear of the panel **(2)**, and then remove the display panel **(3)** from the enclosure.



15. If it is necessary to replace the display hinges, remove the 6 Phillips PM2.0×3.0 screws **(1)** that secure the display hinges to the display enclosure.

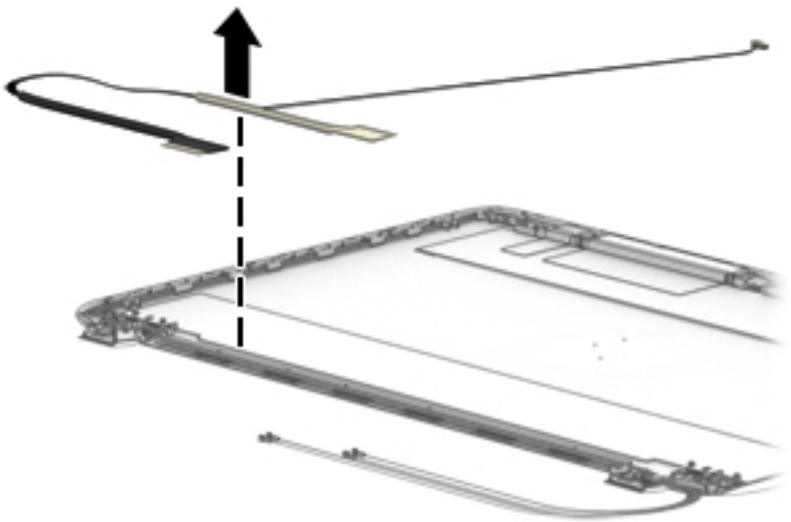
16. Lift the bottom of the hinges upward **(2)**, pull the top of the hinges out from under the tabs **(3)**, and then remove the display hinges from the display enclosure **(4)**.

    Display hinges are available in the Display Hinge Kit using spare part number 768379-001.

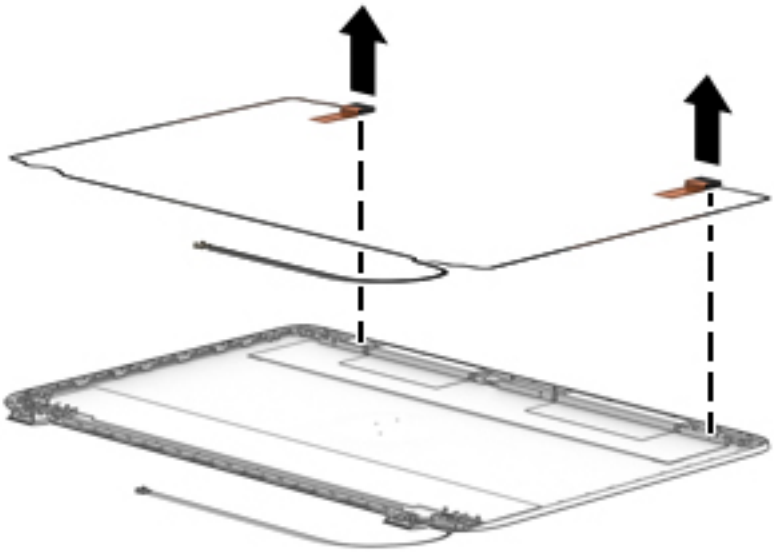


17. If it is necessary to replace the display/webcam cable, lift the display/webcam cable assembly straight up and off the display panel.

    The display cable is available in the Cable Kit using spare part number 768377-001.



18. If it is necessary to replace the WLAN antenna cables, lift them straight up and out of the display panel, noting their routing paths for reinstallation.



Reverse this procedure to reassemble and install the display assembly.

Power connector and cable

Description	Spare part number
Power connector and cable	767432-001

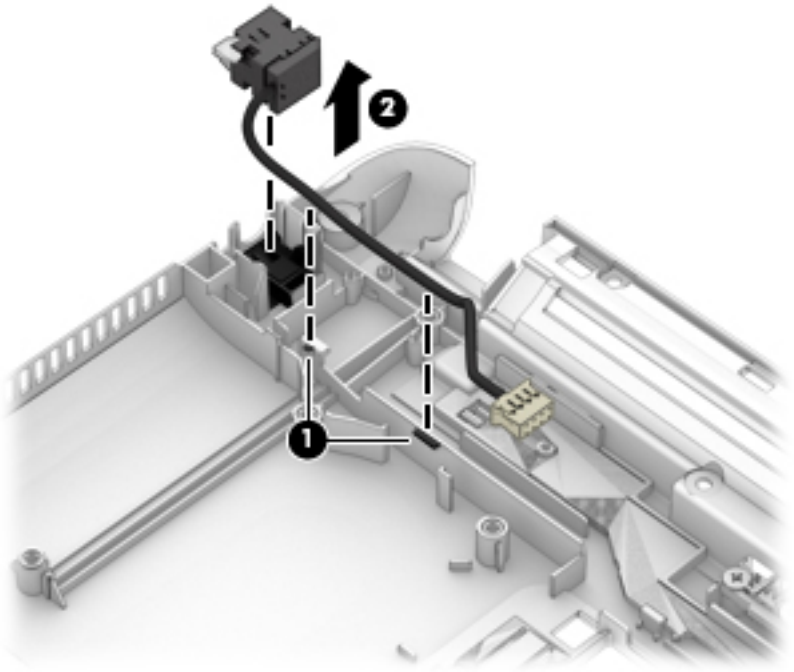
Before removing the power cable, follow these steps:

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).
5. Remove the following components:
   a. Service doors (see Service door on page 36).
   b. Keyboard (see Keyboard on page 46)
   c. Hard drive (Hard drive on page 38)
   d. Optical drive (Optical drive on page 42)
   e. Top cover (see Top cover on page 49)
   f. Display assembly (see Display assembly on page 75)

Remove the power cable:

1. Disconnect the cable from the bottom of the system board **(1)**.

2. Remove the cable from the clips built into the computer **(2)**, and then lift the power cable from the computer **(3)**.



Reverse this procedure to install the power cable.

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 USB 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 89.

   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 Hardward Diagnostics to USB device.

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

1. Go to http://www.hp.com/go/techcenter/pcdiags.
2. Click the **UEFI Dowload** 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**.
6. 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 USB 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 95.

   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 Hardward Diagnostics to USB device.

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

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

9 Computer Setup (BIOS) and HP PC Hardware Diagnostics (UEFI) in Ubuntu Linux

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

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

Starting Computer Setup

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

To start Computer Setup, follow these steps:

1. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f10 to enter Computer Setup.

Using Computer Setup

Navigating and selecting in Computer Setup

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

1. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
   - To select a menu or a menu item, use the tab key and the keyboard arrow keys and then press enter, or use a pointing device to click the item.
   - To scroll up and down, click the up arrow or the down arrow in the upper-right corner of the screen, or use the up arrow key or the down arrow key.
   - To close open dialog boxes and return to the main Computer Setup screen, press esc, and then follow the on-screen instructions.

   NOTE: You can use either a pointing device (TouchPad, pointing stick, or USB mouse) or the keyboard to navigate and make selections in Computer Setup.
2. Press f10 to enter Computer Setup.

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

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

  – or –

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

– or –

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

  – or –

  Use the 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-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.

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 Web site.

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

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

Determining the BIOS version

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

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

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-left 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.

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

Downloading a BIOS update

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

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

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

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

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

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

Using 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 two 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 99.

b. 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 Hardward Diagnostics to USB device.

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

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

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 the installed optical drive (select models only) or an optional external optical drive, or create system restore points. In case of system failure, you can use the backup files to restore the contents of your computer.

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 102.

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 102.
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 102.
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 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 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 103.
2. Use Windows Backup and Recovery tools to perform the following:
   - Back up individual files and folders
   - Back up your entire hard drive (select models only)
   - Create system repair discs (select models only) with the installed optical drive (select models only) or an optional external optical drive
   - Create system restore points

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

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

In case of system failure, you can use the backup files to restore the contents of your computer. See Backing up your information on page 104.

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 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 106.

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 106.
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 106.
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 Backup and Recovery in Ubuntu Linux

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

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

Creating backups

1. Create restore media immediately after you set up the computer. For more information, see Performing a system recovery on page 109.
2. As you add files, routinely create a backup of your system and personal information.

Backing up your information

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

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

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

1. Select **Computer > More Applications > Tools > Backup Manager Settings**, and click **Backup my home directory**.
2. Click **Storage Destination Location**, and then select a location to back up your information.
3. Click **Schedule**, and then select a time schedule to perform backups at a regularly scheduled time.

   To immediately back up your information, click the **Backup Now** check box.

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

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

To restore backup files:

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

5. Under **Restore Point**, click the time and date of the backup.

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

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

Performing a system recovery

Recovery allows you to repair or restore the computer to its original factory state. You can create an HP Factory Image, using an installed or an external DVD±RW optical drive.

NOTE: Your computer may not come equipped with an internal optical drive. In order to create the HP Factory Image, you may need to plug in an external optical drive.

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

To restore the computer using the HP Factory Image, you must first create the recovery ISO file and then burn it to an optical disc.

NOTE: HP recommends that you create the HP Factory Image in the event of a system failure.

1. Select **Computer > More Applications**.
2. In the left pane, click **Tools**, and then click **Create HP Factory Image** in the right pane.
3. Enter the root password when prompted.
4. Right-click on the HP_Recovery.iso file and select **Open with Brasero**.
5. Insert a blank DVD disc and select **Burn**. This creates the HP Factory Image Restore DVD.

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

1. If possible, back up all personal files.
2. Insert the HP Factory Image Restore DVD into the optical drive and restart the computer.
3. As the computer is restarting, press f9 to open the Computer Setup boot option menu.
4. Select **Optical Disk Drive** from the Boot Options menu and press enter.
5. Press enter to select **Restore System from Media**.
6. At both of the System Recovery prompts, select **Yes**.

USB Recovery option (select models only)

The USB Recovery Disk On Key (flash drive) option allows you to create a backup image of the Ubuntu operating system installed on select HP Business Notebooks. This Disk On Key may be used to restore the system to the original factory state when the F11 recovery option is not available. This process should be done on first obtaining the computer.

CAUTION: The USB recovery option does not preserve data present on the computer's hard drive or on the Disk On Key used for the recovery process. Back up any data on the Disk on Key or the notebook that will be recovered before starting.

NOTE: HP recommends that you create the USB Recovery Disk in the event of a system failure. The Disk On Key used for this process should be 4 GB or larger.

Creating a USB Recovery Disk On Key

1. Connect the USB Disk On Key to a USB port on the computer.
2. Select **Computer > More applications > Tools > Create Recovery USB**.
3. Enter the root password when prompted.
4. Select **USB Disk On Key** from the list.
5. Click **OK**.
6. A question dialog will remind you that the data on the USB key will be destroyed. To continue, click **OK**. Otherwise, click **Cancel** and back up the contents of the Disk On Key on another computer.
7. The backup process will display a status dialog box while the backup is in progress.

NOTE: A file browser window with the Disk On Key Contents displayed will pop up when the key is mounted. You may close the file browser window if desired. Once the USB Recovery Key has been created, the status dialog will close. The USB Recovery Key is ready for use.

Recovering from a USB Recovery Disk On Key

CAUTION: Before starting the Recovery process, make sure any data on the system to be recovered has been backed up. The recovery process destroys all data on the system to be recovered.

1. Turn off the computer.
2. Connect the USB Disk On Key to a USB port on the computer.
3. Turn on the computer while holding down the f9 key.
4. Once the system has booted, the **Boot Options** menu should appear.
5. Using the arrow keys, select **USB Disk On Key** and press enter.

NOTE: The description may vary from one USB key to another. Any entry other than Optical Disk Drive, Notebook Hard Drive or Notebook Ethernet should be the USB Recovery Disk On Key.

6. Once the USB Recovery Disk On Key has been selected, press enter. The USB Recovery Disk On Key will boot.
7. Once the USB Recovery Disk On Key has booted, a dialog box will prompt, “Do you want to start the System-Restore?” If data on the computer has not been backed up, use the tab key and select **No**. The system will reboot. Back up the system data and repeat the previous steps. If no data should be saved from the computer, use the tab key to select **Yes**. Press enter to begin the recovery process.
8. After the files are copied to the system, follow the on-screen instructions.

Remove everything and reinstall Ubuntu

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

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

You can initiate this option by using the f11 key.

To use the f11 key:

Press f11 while the computer boots.

– or –

Press and hold f11 as you press the power button.

The following options are available:

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

Select an option and follow the on-screen instructions.

13 Specifications

Computer specifications

	Metric	U.S.
Dimensions		
Length	279.5 mm	11.00 in
Width	413.8 mm	16.29 in
Height (front to rear)	26.0 to 32.2 mm	1.02 to 1.27 in
Weight		
Non-touchscreen (equipped with 1 DIMM, SSD, WLAN module, webcam, 6 cell battery, optical drive)	2.92 kg	6.45 lbs
Non-touchscreen (equipped with 1 DIMM, SSD, WLAN module, webcam, 6 cell battery, no optical drive)	2.81 kg	6.21 lbs
Non-touchscreen (equipped with 1 DIMM, hard drive, WLAN module, webcam, 6 cell battery, optical drive)	2.95 kg	6.52 lbs
Non-touchscreen (equipped with 1 DIMM, hard drive, WLAN module, webcam, 6 cell battery, no optical drive)	2.84 kg	6.28 lbs
Input power		
Operating voltage	19.0 V dc @ 4.74 A – 90 W or 18.5 V dc @ 3.5 A - 65 W	
Operating current	4.74 A or 3.5 A	
Temperature		
Operating (not writing to optical disc)	0°C to 35°C	32°F to 95°F
Operating (writing to optical disc)	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F
Relative humidity		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating (14.7 to 10.1 psia)	-15 m to 3,048 m	50 ft to 10,000 ft
Nonoperating (14.7 to 4.4 psia)	-15 m to 12,192 m	-50 ft to 40,000 ft
Shock		
Operating	125 g, 2 ms, half-sine	
Nonoperating	200 g, 2 ms, half-sine	

	Metric	U.S.
Random vibration		
Operating	0.75 g zero-to-peak, 10 Hz to 500 Hz, 0.25 oct/min sweep rate	
Nonoperating	1.50 g zero-to-peak, 10 Hz to 500 Hz, 0.5 oct/min sweep rate	

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

43.9-cm (17.3-in), HD+ display specifications

	Metric	U.S.
Active diagonal size	43.9-cm	17.3-in
Resolution	1600x900 (HD+) or 1920x1080 (FHD)	
Surface treatment	Anti-glare	
Contrast ratio	200:1 (typical)	
Brightness	200 nits (HD+) or 300 nits (FHD)	
Viewing angle	SVA (HD+) or WVA (FHD)	
Backlight	LED	
Pixel configuration	RGB vertical stripe	
Pixel pitch	0.2388x0.2388 (WxH)	
Active area	382.08x214.92 (WxH)	
Weight	540 g (typical)	

Hard drive specifications

	1.5-TB*	1-TB*	750-GB*	500-GB*	500-GB* hybrid	320-GB*
Dimensions						
Height	9.5 mm	9.5 mm	9.5 mm	9.5 mm or 7.0 mm	7.0 mm	7.0 mm
Width	70 mm	70 mm	70 mm	70 mm	70 mm	70 mm
Weight	118 g	115 g	102 g	101 g or 95 g	95 g	95 g
Interface type	SATA	SATA	SATA	SATA	SATA	SATA
Transfer rate	100 MB/sec	100 MB/sec	100 MB/sec	100 MB/sec	100 MB/sec	100 MB/sec
Security	ATA security	ATA security	ATA security	ATA security	ATA security	ATA security
Seek times (typical read, including setting)						
Single track	2.2 ms	1.4 ms	1.1 ms	3 ms	2 ms	1.1 ms
Average	13 ms	10 ms	12 ms	13 ms	12 ms	13 ms
Maximum	25 ms	12 ms	21 ms	24 ms	22 ms	25 ms
Logical blocks	2,930,277,168	1,938,921,461	1,465,149,168	1,048,576,000	976,773,168	625,141,400
Disc rotational speed	5400 rpm	5400 rpm	7200 or 5400 rpm	7200 rpm or 5400 rpm	5400 rpm	5400 rpm
Operating temperature	0°C to 60°C (32°F to 140°F)					

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

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

Solid-state drive specifications

	128-GB*
Height	7.0 mm
Weight	< 50 g
Form factor	2.5-inch
Transfer rate	up to 515 MB/sec
Interface type	SATA-3
Ready time, maximum (to not busy)	< 1.0 ms
Access times, logical	0.1 ms
Total logical sectors	250,069,680
Operating temperature	
*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less. Actual drive specifications may differ slightly.	
NOTE: Certain restrictions and exclusions apply. Contact technical support for details.	

DVD±RW SuperMulti DL Drive specifications

Applicable disc	**Read:** CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM	**Write:** CD-R and CD-RW DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM
Center hole diameter	1.5 cm (0.59 in)	
Disc diameter		
Standard disc	12 cm (4.72 in)	
Mini disc	8 cm (3.15 in)	
Disc thickness	1.2 mm (0.047 in)	
Track pitch	0.74 µm	
Access time	**CD**	**DVD**
Random	< 175 ms	< 230 ms
Full stroke	< 285 ms	< 335 ms
Audio output level	Line-out, 0.7 Vrms	
Cache buffer	2 MB	
Data transfer rate		
24X CD-ROM	3,600 KB/sec	
8X DVD-ROM	10,800 KB/sec	
24X CD-R	3,600 KB/sec	
16X CD-RW	2,400 KB/sec	
8X DVD+R	10,800 KB/sec	
4X DVD+RW	5,400 KB/sec	
8X DVD-R	10,800 KB/sec	
4X DVD-RW	5,400 KB/sec	
2.4X DVD+R(9)	2,700 KB/sec	
5X DVD-RAM	6,750 KB/sec	
Transfer mode	Multiword DMA Mode	
Startup time	< 15 seconds	
Stop time	< 6 seconds	

Blu-ray ROM DVD±RW SuperMulti DL Drive

Applicable disc	**Read:**	**Write:**	
	CD-DA, CD+(E)G, CD-MIDI, CDTEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVDROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD +RW, DVD-RAM, HD-ROM (Single Layer), HD-ROM (Dual Layer), HD DVD-R, HD DVD-R for Dual Layer, HD DVD-RW	CD-R and CD-RW DVD+R, DVD+R(9), DVD +RW, DVD-R, DVD-R(9),DVD-RW, DVD-RAM	
Access time	**CD**	**DVD**	**HD**
Random	170 ms	170 ms	230 ms
Cache buffer	8 MB		
Data transfer rate			
24X CD-ROM	3,600 KB/sec		
8X DVD	10,800 KB/sec		
24X CD-R	3,600 KB/sec		
16X CD-RW	2,400 KB/sec		
8X DVD+R	10,800 KB/sec		
4X DVD+RW	5,400 KB/sec		
8X DVD-R	10,800 KB/sec		
4X DVD-RW	5,400 KB/sec		
2.4X DVD+R(9)	2,700 KB/sec		
5X DVD-RAM	6,750 KB/sec		
1X BD-ROM	4,500 KB/sec		
1X BD-R read	4,500 KB/sec		
1X BD-RE read	4,500 KB/sec		
Transfer mode	Multiword DMA Mode		

DVD-ROM drive

Applicable disc	DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18, CD-ROM (Mode 1 and 2), CD Digital Audio, CD-XA ready (Mode 2, Form 1 and Form 2), CD-I (Mode 2, Form 1 and Form 2), CD-R, CD-RW, Photo CD (single and multisession), CD-Bridge
Center hole diameter	1.5 cm (0.59 in)
Disc diameter	
Standard disc	12 cm (4.72 in)
Mini disc	8 cm (3.15 in)

Disc thickness	1.2 mm (0.047 in)	
Track pitch	0.74 µm	
Access time	**CD**	**DVD**
Random	< 100 ms	< 125 ms
Full Stroke	< 175 ms	< 225 ms
Audio output level	Line-out, 0.7 Vrms	
Cache buffer	512 KB	
Data transfer rate		
CD-R (24X)	3600 KB/s (150 KB/s at 1X CD rate)	
CD-RW (10X)	1500 KB/s (150 KB/s at 1X CD rate)	
CD-ROM (24X)	3,600 KB/sec	
DVD (8X)	3600 KB/s (150 KB/s at 1X CD rate)	
Multiword DMA mode 2	16.6 MB/s	
Startup time	< 10 seconds	
Stop time	< 3 seconds	

Specification information in Device Manager

Device Manager allows you to view and control the hardware attached to the computer, as well as provides hardware specification information.

You can also add hardware or modify device configurations using Device Manager.

NOTE: Windows 7 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 Windows Help and Support for more information.

After you open Device Manager, drill-down to a device and double-click it to access its properties.

To access Device Manager in Windows 8:

1. From the Start screen, type `control`, and then select **Control Panel**.
2. Select **System and Security**, and then in the System area, click **Device Manager**.

   A list display all the devices installed in your computer.

To access Device Manager in Windows 7:

1. Select **Start > Computer > System properties**.
2. In the left pane, click **Device Manager**.

14 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 reprogramming 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 **Unconfigure 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 unconfigure AMT.

j. If the optional Intel® Anti-Theft Technology (AT) was activated, contact the provider to deactivate it.

k. If the optional Absolute® Software Computrace® management and tracking service was activated on the notebook PC, contact the provider to deactivate it.

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

2. Remove and retain the storage drive or clear the contents of the drive.

a. Hard Disk Drive (HDD)

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

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

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

b. Solid State Drive (SSD)

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

Non-volatile memory usage

Non Volatile Memory Type	Amount (Size)	Does this memory store customer data?	Does this memory retain data when power is removed?	What is the purpose of this memory?	How is data input into this memory?	How is this memory write protected?
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 nonfunctional.
Keyboard ROM	64 Kbytes (not customer accessible)	No	Yes	Stores firmware code (keyboard, mouse, & battery management).	Programmed at the factory. Code is updated when the system BIOS is updated.	A utility is required for writing data to this memory and is available on the HP website. Writing data to this ROM in an inappropriate manner can render the PC nonfunctional.
DIMM Serial Presence Detect (SPD) configuration data	256 Bytes per memory module, 128 Bytes programma bl e (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 nonfunctional.
Intel Management Engine Firmware (present only in models ending in a ‘p’ or ‘w’ 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	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

					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.	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 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.

15 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 and regions

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 A and a nominal voltage rating of 125 or 250 V ac, as required by the power system of each country or region.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions

Country/region	Accredited agency	Applicable note number
Argentina	IRAM	1
Australia	SAA	1
Austria	OVE	1
Belgium	CEBEC	1
Brazil	ABNT	1
Canada	CSA	2
Chile	IMQ	1
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
India	ISI	1
Israel	SII	1
Italy	IMQ	1

Country/region	Accredited agency	Applicable note number
Japan	JIS	3
The Netherlands	KEMA	1
New Zealand	SANZ	1
Norway	NEMKO	1
The People's Republic of China	CCC	4
Saudi Arabia	SASO	7
Singapore	PSB	1
South Africa	SABS	1
South Korea	KTL	5
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	6
Thailand	TISI	1
The United Kingdom	ASTA	1
The United States	UL	2

1. The flexible cord must be Type H05VV-F, 3-conductor, 0.75mm2 conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
2. The flexible cord must be Type SVT/SJT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V ac) or NEMA 6-15P (15 A, 250 V ac) configuration. CSA or C-UL mark. UL file number must be on each element.
3. The appliance coupler, flexible cord, and wall plug must bear a “T” mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCTF, 3-conductor, 0.75mm2 or 1.25mm2 conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration.
4. The flexible cord must be Type RVV, 3-conductor, 0.75mm2 conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.
5. The flexible cord must be Type H05VV-F 3X0.75mm2 conductor size. KTL logo and individual approval number must be on each element. Corset approval number and logo must be printed on a flag label.
6. The flexible cord must be Type HVCTF 3X1.25mm2 conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.
7. For 127 V ac, the flexible cord must be Type SVT or SJT 3 x 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type H05VV-F 3X0.75/1.00mm2 conductor size, with plug BS 1363/A with BSI or ASTA marks.

16 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.

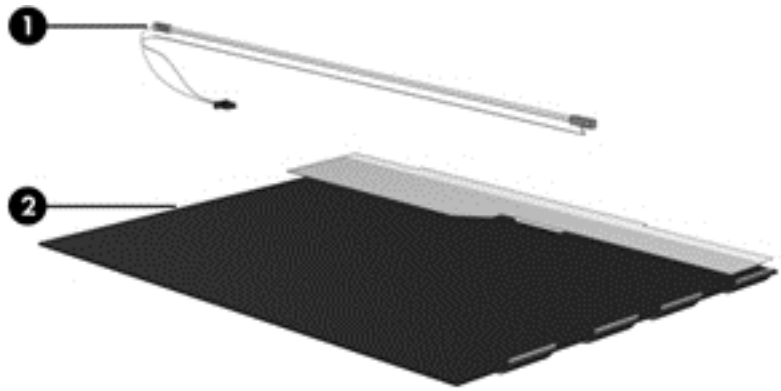
Display

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.

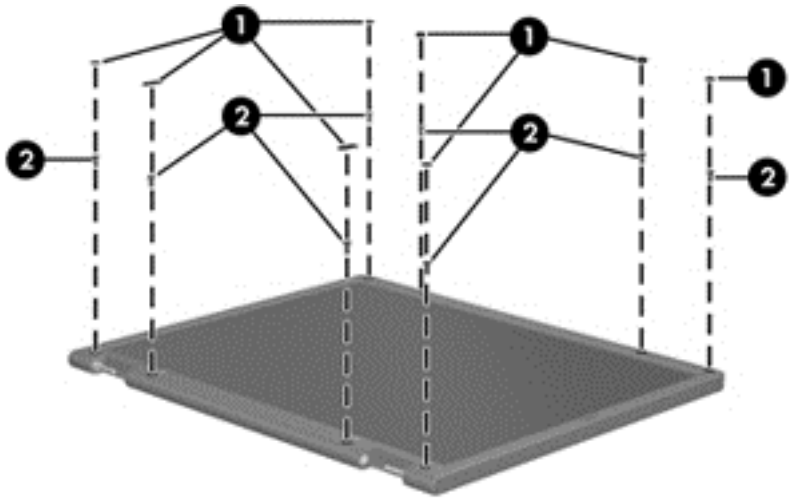
This section provides disassembly instructions for the display assembly. The display assembly must be disassembled to gain access to the backlight **(1)** and the liquid crystal display (LCD) panel **(2)**.



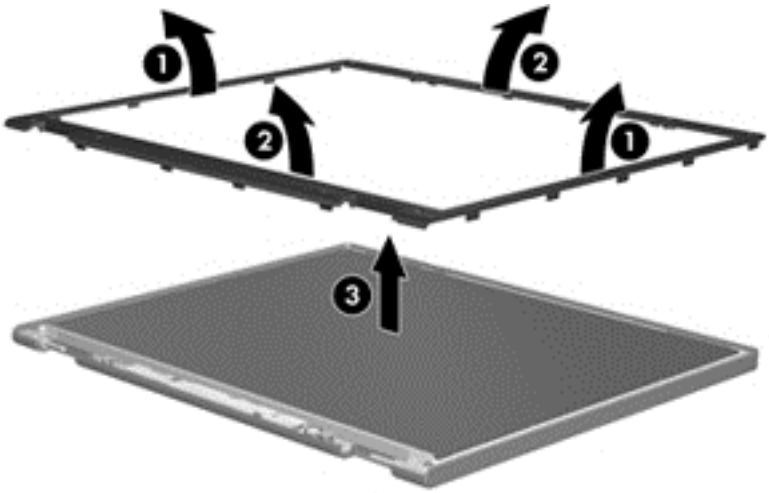
NOTE: The procedures provided in this chapter are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

Perform the following steps to disassemble the display assembly:

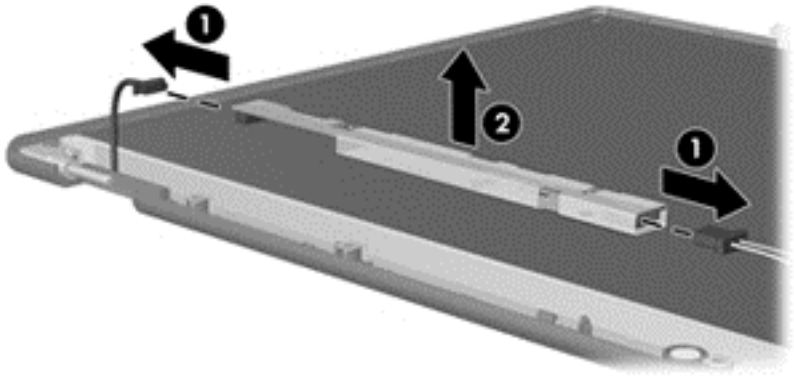
1. Remove all screw covers **(1)** and screws **(2)** that secure the display bezel to the display assembly.



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)**.

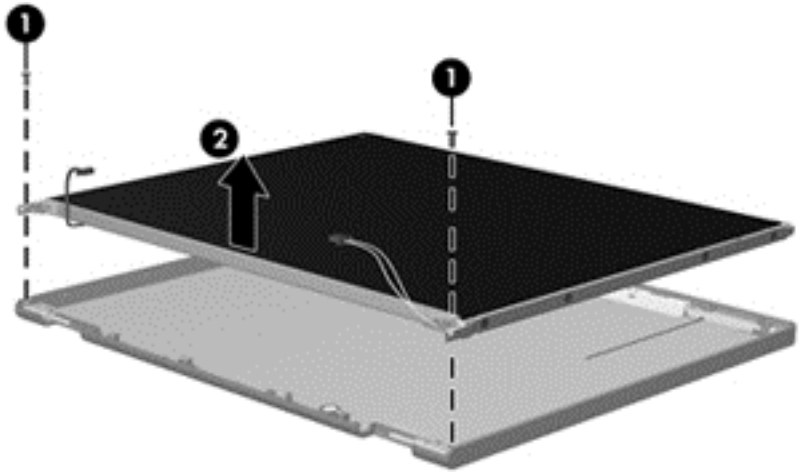


4. Disconnect all display panel cables **(1)** from the display inverter and remove the inverter **(2)**.

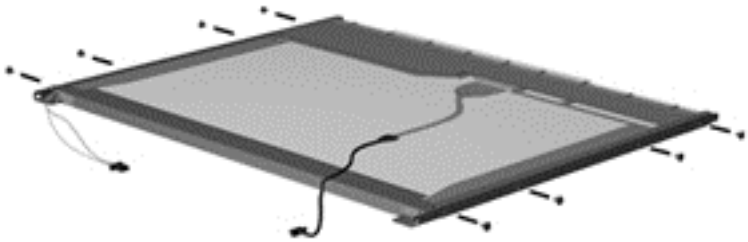


5. Remove all screws **(1)** that secure the display panel assembly to the display enclosure.

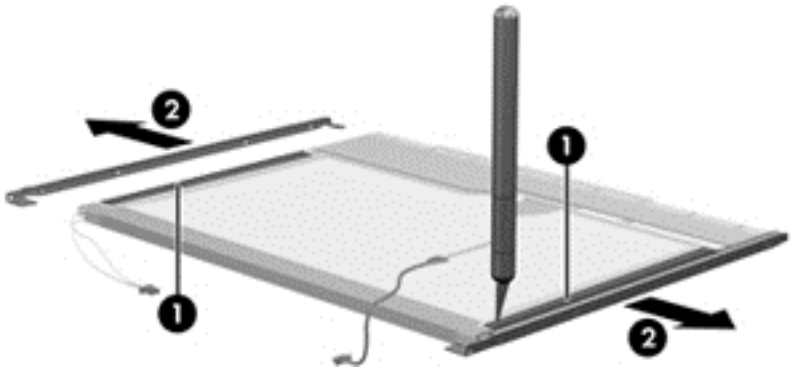
6. Remove the display panel assembly **(2)** from the display enclosure.



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

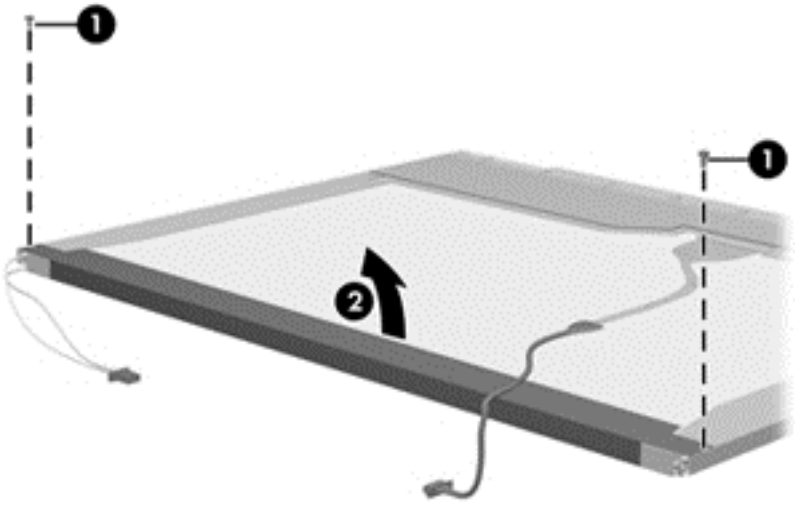


9. Use a sharp-edged tool to cut the tape **(1)** that secures the sides of the display panel to the display panel frame.
10. Remove the display panel frame **(2)** from the display panel.

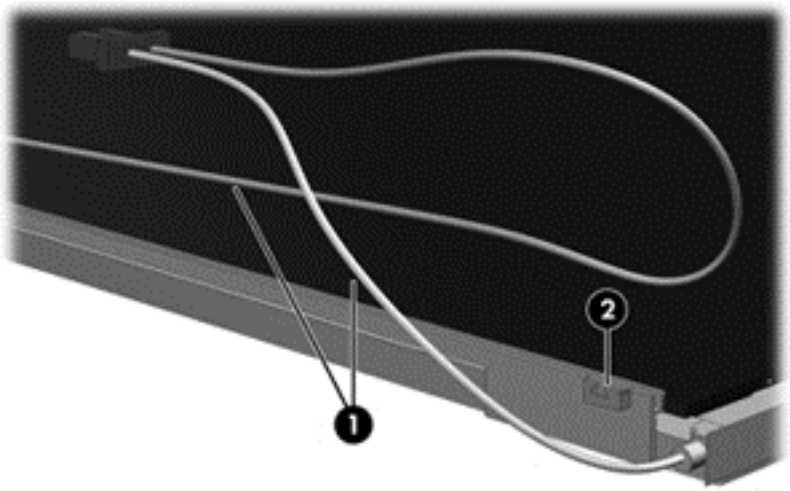


11. Remove the screws **(1)** that secure the backlight cover to the display panel.

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



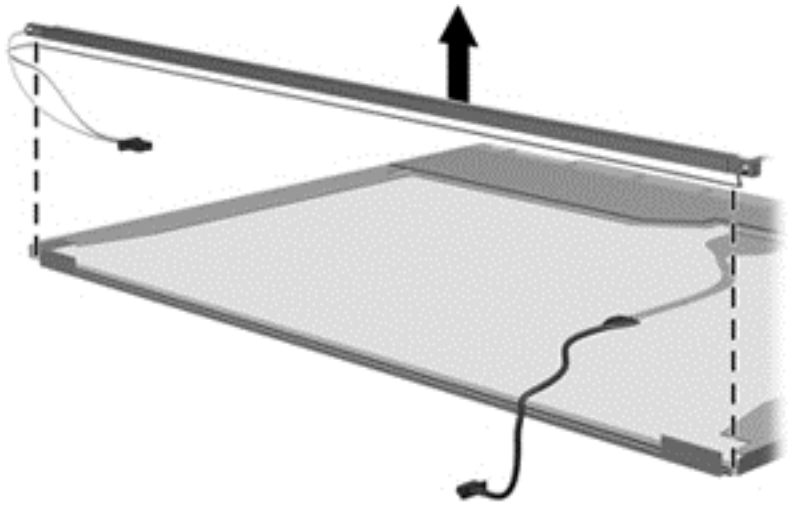
13. Remove the backlight cover.
14. Position the display panel right-side up.
15. Remove the backlight cables **(1)** from the clip **(2)** in the display panel.



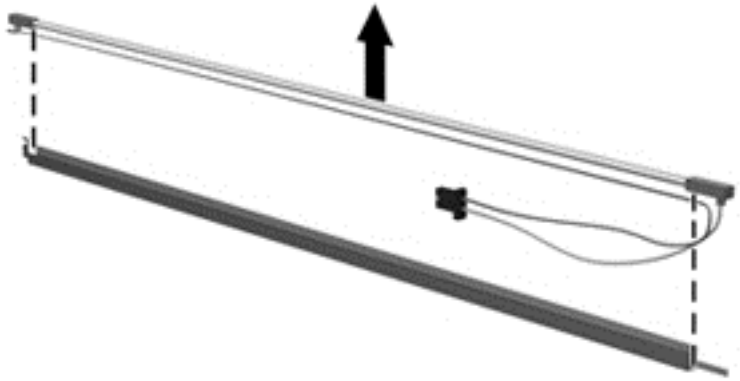
16. Position the display panel upside-down.

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

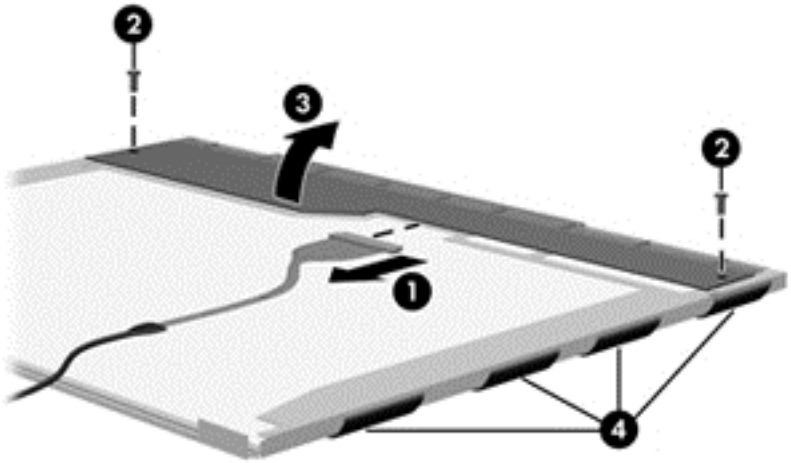
17. Remove the backlight frame from the display panel.



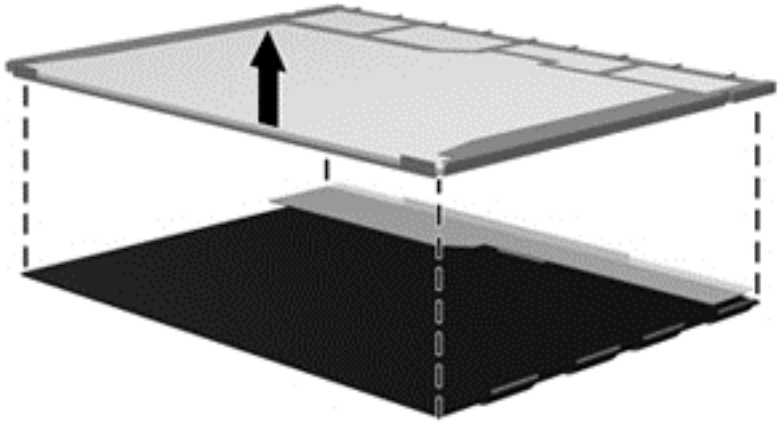
18. Remove the backlight from the backlight frame.



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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