HP ProBook 4545s Notebook PC

Maintenance and Service Guide

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).

Table of contents

1 Product description

Category	Description	UMA	Discrete
Product Name	**HP ProBook 4545s Notebook PC**	√	√
	AMD A8-4500M, 2.8-GHz Max/1.9-GHz Base, 4-MB L2 cache, quad-core, 35W Graphics: HD 7640G	√	√
	AMD A6-4400M, 3.20-GHz Max/2.7-GHz Base, 1-MB L2 cache, dual-core, 35W Graphics: HD 7520G	√	√
	AMD A4-4300M, 3.0-GHz Max/2.5-GHz Base, 1-MB L2 cache, dual-core, 35W Graphics: HD 7420G	√	√
Fusion Controller Hub (Chipset)	AMD A70M FCH (Fusion Controller Hub)	√	√
Graphics	AMD UMA Processor-specific, see **Processors**.	√	
	AMD Discrete Graphics: A8-4500M, Graphic branding HD 7640G + AMD Radeon™ HD 7650M or A6-4400M, Graphic branding HD 7520G + AMD Radeon HD 7650M -or- A4-4300M, Graphic branding HD7420G + AMD Radeon HD 7650M		√
Panel	All display assemblies include 2 wireless local area network (WLAN) antennas All displays are LED backlit	√	√
	39.6-cm (15.6-inch) HD, 1366x768, Anti-glare, without web cam	√	√
	39.6-cm (15.6-inch) HD, 1366x768, Anti-glare, with web cam	√	√
Memory	Two customer-accessible/upgradeable memory module slots supporting up to 8 GB of RAM	√	√
	Supports dual-channel memory	√	√
	PC3-10600, 1333-MHz, DDR3	√	√
	Supports the following configurations: ● 8192 MB (4096 × 2) (dual channel) ● 6144 MB (4096 + 2048) (dual channel) ● 4096 MB (2048 × 2) (dual channel) ● 4096 MB (4096 × 1) ● 2048 MB (2048 × 1)	√	√
Hard drives	Supports 7-mm/9.5-mm/12.7-mm, and 2.5-in SATA hard drives with HP 3D DriveGuard	√	√

Category	Description	UMA	Discrete
	Customer-accessible	√	√
	Supports the following drives: ● 750-GB, 7200-rpm, 2.5-in ● 750-GB, 5400 rpm, 2.5 in ● 640-GB, 5400-rpm, 2.5-in ● 500-GB, 7200-rpm, 2.5-in ● 320-GB, 7200-rpm, 2.5–in	√	√
Fixed optical drives	Supports the following 12.7-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 dual-array microphone (webcam models only)	√	√
	Integrated mono (non-webcam models)	√	√
	Stereo speakers (2)	√	√
	Integrated webcam (720p HD)	√	√
	Supports no camera option	√	√
	Headphone and microphone jacks	√	√
Ethernet	Realtek RTL8151FH-CG 10/100/1000	√	√
	S3/S4/S5 wake on LAN (AC mode only)	√	√
	Ethernet cable not included	√	√
Wireless	**Integrated WLAN options by way of wireless module:**	√	√
	Two WLAN antennas built into display assembly	√	√
	Supports "no WLAN" option	√	√
	Supports the following WLAN formats: ● Ralink RT5390F 802.11 b/g/n 1×1 PCIe HMC ● Ralink RT3290LE 802.11 b/g/n 1x1 WiFi and Bluetooth 4.0 Combo Adapter ● Ralink RT5390R 802.11 b/g/n 1x1 WiFi Adapter ● Broadcom 4313GN 802.11 b/g/n 1×1 WiFi and 20702 Bluetooth 4.0 Combo Adapter ● Atheros 9485GN 802.11 b/g/n 1x1 WiFi and 3012 Bluetooth 4.0 Combo Adapter ● Atheros AR9485 802.11 b/g/n WiFi Adapter ● Atheros AR9462 802.11 a/b/g/n 2x2 Bluetooth 4.0 Combo ● Atheros AR9465 802.11 b/g/n 1x1 WiFi with Bluetooth 4.0 Combo Adapter	√	√
	Integrated personal area network (WPAN) options by way of Bluetooth® module:	√	√

Category	Description	UMA	Discrete
	Bluetooth 4.0 only supported by combo card	√	√
External media card	6-in-1 Digital Media Reader Slot. Supports SD,SDHC, SDXC, MMC, MMC+ and Memory Stick	√	√
Ports	Audio-in (stereo microphone)	√	√
	Audio-out (stereo headphone)	√	√
	RJ-45 (Ethernet, includes link and activity lights)	√	√
	USB 2.0 (2)	√	√
	USB 3.0 (2)	√	√
	VGA (Dsub 15-pin) supporting 1600 × 1200 external resolution at 75-GHz (hot plug/unplug with auto-detect)	√	√
	HDMI	√	√
	Multi-pin AC port	√	√
Keyboard/ pointing devices	Full-sized keyboard with numeric keypad	√	√
	TouchPad includes: supports 2-way scroll with legend, taps enabled by default, 2-finger scrolling and zoom enabled by default	√	√
Power requirements	Smart AC adapter with localized cable plug support (3-wire plug with ground pin):	√	√
	90-W		√
	65-W	√	
	Battery	√	√
	9-cell, 93-Wh Li-ion battery	√	√
	6-cell, 47-Wh Li-ion battery	√	√
Security	Integrated fingerprint reader	√	√
	Support Kensington security lock	√	√
	Support no fingerprint reader option	√	√
Operating system	**Preinstalled:**		
	Windows 7 Professional 64 with Microsoft Basics	√	√
	Windows 7 Home Premium 64 with Microsoft Basics	√	√
	Windows 7 Professional 32 with Microsoft Basics (Japan only)	√	√
	Novell™: SuSE Linux™ 64 bit SP2 (excludes Japan)	√	√
	FreeDOS (excludes Japan)	√	√
	Windows 8 ML 64 with Microsoft Office Basics	√	√
	Windows 8 Pro 64 with Microsoft Office Basics	√	√
	Preinstalled with Microsoft Office:	√	√
	Windows 7 Professional 64 with Microsoft Office 2010 Starter (excludes Japan)	√	√

Category	Description	UMA	Discrete
	Windows 7 Professional 64 with Microsoft Office 2010 Starter PPP (EDGI)	√	√
	Windows 7 Professional 64 with Microsoft Office 2010 Professional (Japan only)	√	√
	Windows 7 Professional 64 with Microsoft Office 2010 Personal (Japan only)	√	√
	Windows 7 Professional 64 with Microsoft Office 2010 Starter - MSNA	√	√
	Windows 7 Professional 64 with Microsoft Office 2010 Home & Business (Japan only)	√	√
	Windows 7 Home Premium 64 with Microsoft Office 2010 Starter (excludes Japan)	√	√
	Windows 7 Home Premium 64 with Microsoft Office 2010 Starter - PPP (EDGI)	√	√
	Windows 7 Home Premium 64 with Microsoft Office 2010 Professional (Japan only)	√	√
	Windows 7 Home Premium 64 with Microsoft Office 2010 Personal (Japan only)	√	√
	Windows 7 Home Premium 64 with Microsoft Office 2010 Home & Business (Japan only)	√	√
	Windows 7 Home Basic 64 with Microsoft Office 2010 Starter – PPP (EDGI)	√	√
	Windows 7 Home Basic 64 with Microsoft Office 2010 Starter (excludes Japan)	√	√
	Windows 7 Professional 32 with Microsoft Office 2010 Personal (Japan only)	√	√
	Windows 7 Professional 32 with Microsoft Office 2010 Home & Business (Japan only)	√	√
	Windows 7 Professional 32 with Microsoft Office 2010 Professional (Japan only)	√	√
	Windows 8 ML 64 with Office 2010 Transition OPK (excludes Japan)	√	√
	Windows 8 EM 64 with Office 2010 Transition OPK (excludes Japan)	√	√
	Windows 8 ML 64 with Office 2010 Personal (Japan only)	√	√
	Windows 8 ML 64 with Office 2010 Home & Business (Japan only)	√	√
	Windows 8 ML 64 with Office 2010 Professional (Japan only)	√	√
	Windows 8 Pro 64 with Office 2010 Transition OPK (excludes Japan)	√	√
	Windows 8 Pro 64 with Office 2010 Personal (Japan only)	√	√
	Windows 8 Pro 64 with Office 2010 Home & Businessl (Japan only)	√	√
	Windows 8 Pro 64 with Office 2010 Professional (Japan only)	√	√
	Restore Media:	√	√
	Windows 7 Professional 64	√	√
	Windows 7 Home Basic 64	√	√
	Windows 7 Home Premium 64	√	√
	DRDVD Win 8	√	√
	Win 7 Pro 32	√	√
	Win 8 ML 64	√	√

Category	Description	UMA	Discrete
	Win 8 Pro 64	√	√
	DRDVD Windows 7	√	√
	Web-only support:		
	Windows XP Professional	√	√
	Windows 7 Home Basic 32	√	√
	Windows 7 Home Premium 32	√	√
	Windows 7 Professional 32	√	√
	Certified:		
	Microsoft WHQL	√	√
	SuSE Linux Enterpriise (SLED) SP2 64 bit	√	√
Serviceability	**End-user replaceable parts:**		
	AC adapter	√	√
	Battery (system)	√	√
	Hard drive	√	√
	Optical drive	√	√
	Memory module	√	√
	WLAN module	√	√
	Keyboard	√	√

2 External Component Identification

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.
(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
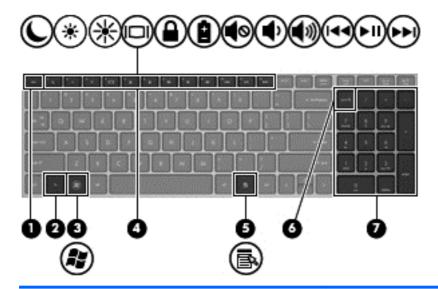
Component		Description
(1)	Power light	• On: The computer is on.
		• Blinking: The computer is in the Sleep/Suspend state, which is an energy-saving mode. The computer shuts off power to the display and other unneeded components.
		• Off: The computer is off or in Suspend/Hibernation. Hibernation is an energy-saving mode that uses the least amount of power.
(2)	Caps lock light	On: Caps lock is on.
(3)	Web browser light	• On: The computer is on.
		• Off: The computer is off or in Suspend/Hibernation. Hibernation is an energy-saving mode that uses the least amount of power.
(4)	Wireless light	• White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on.
		• Amber: All wireless devices are off.
(5)	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/Suspend. - When the computer is in the Sleep/Suspend state, press the button briefly to exit Sleep/Suspend. - When the computer is in Suspend/Hibernation, press the button down briefly to exit Suspend/Hibernation. If the computer has stopped responding and operating system shutdown procedures are ineffective, press and hold the power button down for at least 5 seconds to turn off the computer. **CAUTION:** Pressing and holding down the power button will result in the loss of unsaved information. To learn more about your power settings: Windows 7: **1.** Select **Computer > Control Panel**. **2.** In the left pane, click **System**, and then click **Power Management** in the right pane. Windows 8: From the Start screen, type `power options`. Click **Settings**, and then select **Power Options** from the options displayed. SUSE Linux: **1.** Select **Computer > Control Center**. **2.** In the left pane, click **System**, and then click **Power Management** in the right pane.
(2)	Speakers (2)	Produce sound.
(3)	Web browser button	Opens the default Web browser.
(4)	Wireless button	Turns the wireless feature on or off but does not establish a wireless connection. **NOTE:** A wireless connection may be established if one has been previously configured.
(5)	Fingerprint reader (select models only)	Allows a fingerprint logon to the operating system, instead of a password logon.

Keys
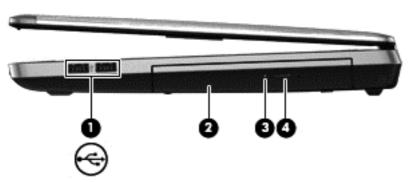
Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn. key
(2)	fn key	Executes frequently used system functions when pressed in combination with a function key, the num lk key or the esc key.
(3)	Windows 7 logo key	Displays the operating system Start screen.
	Windows 8 logo key	
(4)	Function keys	Execute frequently used system functions when pressed in combination with the fn key.
(5)	Windows applications key	**Windows 7:** Displays a shortcut menu for items beneath the cursor. **Windows 8:** Displays a shortcut menu for items beneath the cursor. Displays the **Apps** bar. **SUSE Linux:** Displays a shortcut menu for items beneath the cursor.
(6)	num lk key	Alternates between the navigational and numeric functions of the integrated numeric keypad. . **NOTE:** They keypad function that is active when the computer is turned off is reinstated when the computer is turned back on.
(7)	Integrated numeric keypad	When num lk has been enabled, it can be used like an external numeric keypad.

Front
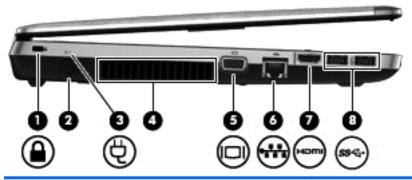
Component		Description
(1)	Hard drive light	● Blinking White: The hard drive is being accessed. ● Amber: HP 3D DriveGuard has temporarily parked the hard drive.
(2)	Media Card Reader	Supports the following digital card formats: ● Memory Stick Pro ● Memory Stick Duo Pro (needs an adapter) ● MultiMediaCard (MMC) ● MultiMediaCardplus (MMC+) ● Secure Digital (SD) Card ● Secure Digital HIgh Capacity (SDHC) Card ● Secure Digital Extra Capacity (SDXC) Card
(3)	Audio-out (headphone) jack	Produces sound when connected to optional powered stereo speakers, headphones, earbuds, a headset, or television audio. **WARNING!** To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the *Regulatory, Safety, and Environmental Notices*. Windows 8: To access this guide, select the **HP Support Assistant** app on the Start screen, select **My computer**, and then select the **User guides**. **NOTE:** When a device is connected to the jack, the computer speakers are disabled.
(4)	Audio-in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.

Right

Component		Description
(1)	USB 2.0 ports (2)	Connect optional USB devices.
(2)	Optical drive (select models only)	Reads to an optical disc.
		NOTE: On select models, the optical drive also writes to an optical disc.
(3)	Optical drive light (select models only)	● On: The optical drive is being accessed.
		● Off: The optical drive is idle.
(4)	Optical drive eject button (select models only)	Releases the optical drive disc tray.
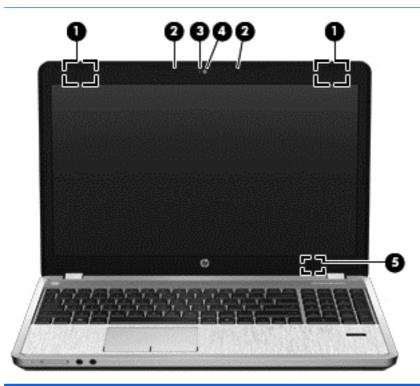
Left

Component		Description
(1)	Security cable slot	Attaches an optional security cable to the computer.
		NOTE: The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.
(2)	Power connector	Connects an AC adapter.
(3)	AC adapter/battery light	• Amber: The computer is connected to external power and the battery is charged from 0 to 90 percent.
		• White: The computer is connected to external power and the battery is charged from 90 to 99 percent.
		• Blinking amber: A battery that is the only available power source has reached a low battery level. When the battery reaches a critical battery level, the AC adapter/battery light begins blinking rapidly.
		• Off: The battery is fully charged.
(4)	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.
(5)	External monitor port	Connects an external VGA monitor or projector.
(6)	RJ-45 (network) jack	Connects a network cable.
(7)	HDMI port	Connects an optional video or audio device, such as a high-definition television, or any compatible digital or audio device.
(8)	USB 3.0 ports (2)	Connect optional USB devices.

Display
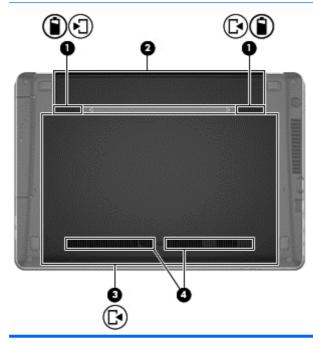
Component		Description
(1)	WLAN antennas (2)*	Send and receive wireless signals to communicate with wireless local area networks (WLAN).
(2)	Internal microphone(s) (1 or 2 depending on model)	Record sound.
(3)	Webcam light (select models only)	On: The webcam is in use.
(4)	Webcam (select models only)	Records video and captures still photographs. Windows 8: For information on using the webcam, access Help and Support. From the Start screen, type `help`, and then select **Help and Support**.
(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 on the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions. To see wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region.

For Windows 8: To access this guide, select the **HP Support Assistant** app on the Start screen, select **My computer**, and then select the **User guides**.

Bottom
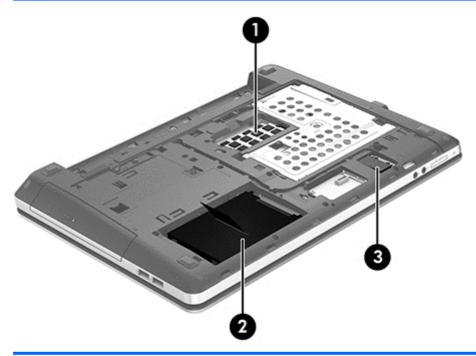
NOTE: Your computer may look slightly different from the illustration in this section.

Component		Description
(1)	Battery and service door release latches	• Release the battery from the battery bay by sliding the release latches one time. • When the battery has been removed from the battery bay, release the service door from the computer by sliding the release latches a second time.
(2)	Battery bay	Holds the battery.
(3)	Service door	Protects the hard drive bay, the wireless LAN (WLAN) module slot, and the memory module slots. **CAUTION:** To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore computer functionality, and then contact support. Windows 7: Contact is made through Help and Support. Windows 8: Contact is made through Help and Support. From the Start screen, type `help`, and then select **Help and Support**. SUSE Linux: Contact is made through Linux Help
(4)	Vents (2)	Enable airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.

Identifying the bottom parts of the computer

NOTE: The service door has been removed in the following illustration.
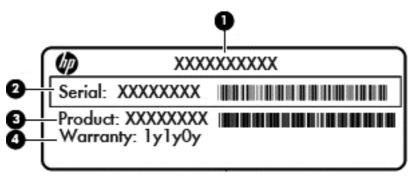
Component		Description
(1)		Memory modules
(2)		Hard drive
(3)		WLAN module slot (select models only)

3 Illustrated parts catalog

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.
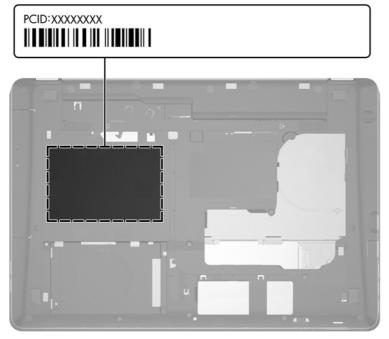
PCID label

The PCID label provides the information required to properly reset the notebook firmware (BIOS) back to the factory shipped specifications when replacing the system board. The following image illustrates label location.

NOTE: Computer layout may vary from that shown.

For Windows 7 and SUSE Linux models:

For Windows 8 models:

Computer major components
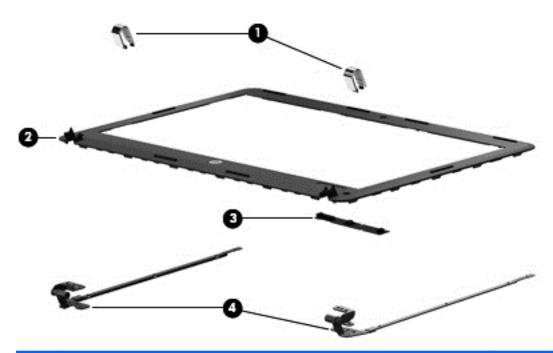
Item	Description	Spare part number
(1)	**Display panel**	
	39.6-cm (15.6-inch) HD, Anti-glare, with webcam	683597-001

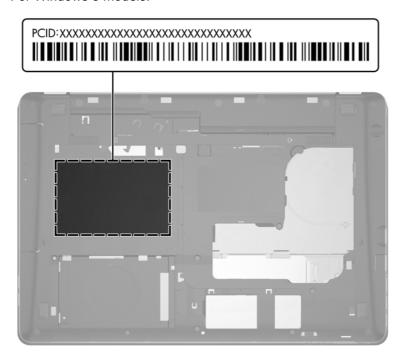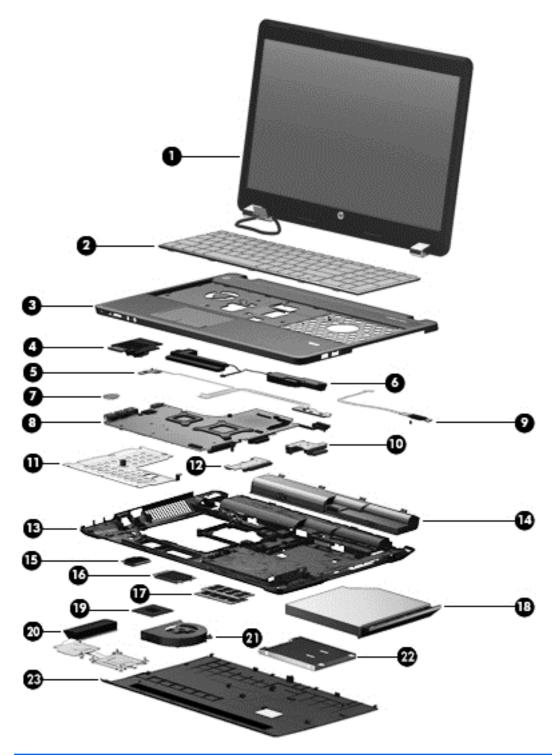| Item	Description	Spare part number
	39.6-cm (15.6-inch) HD, Anti-glare, without webcam	683596-001
(2)	**Keyboard** (includes cable)	
	For use with models using Windows 7	683491-xxx
	NOTE: For a detailed list of available keyboards, see Sequential part number listing on page 26.	
	For use with models using Windows 8	702237-xxx
	NOTE: For a detailed list of available keyboards, see Sequential part number listing on page 26.	
(3)	**Top cover** (includes TouchPad board with cable)	
	With a fingerprint reader (includes fingerprint reader board and screw)	683506-001
	Without a fingerprint reader board. Includes:ESD board screws, fingerprint dummy with screws, and fingerprint bracket with screws.	683507-001
(4)	**Audio board**	683475-001
(5)	**Power button board**	683486-001
(6)	**Speaker assembly**	683505-001
(7)	**RTC battery**	683601-001
(8)	**System board** (includes replacement thermal material)	
	For use in models with 1-GB of discrete memory using Windows 7	683598-001
	For use in models with 1-GB of discrete memory using Windows 8 Std	683598-501
	For use in models with 1-GB of discrete memory using Windows 8 Pro	683598-601
	For use in models with 2-GB of discrete memory using Windows 7	683599-001
	For use in models with 2-GB of discrete memory using Windows 8 Std	683599-501
	For use in models with 2-GB of discrete memory using Windows 8 Pro	683599-601
	For use in models with UMA graphics using Windows 7	683600-001
	For use in models with UMA graphics using Windows 8 Std	683600-501
	For use in models with UMA graphics using Windows 8 Pro	683600-601
(9)	**Fingerprint reader module** (includes cable)	683485-001
(10)	**Optical drive extender board**	683498-001
(11)	**Metal heat shield**	687696-001
(12)	**Hard drive extender board**	683487-001
(13)	**Base enclosure**	683476-001
(14)	**Battery, Li-ion**	
	9-cell (93 WHr, 2.8 Ah)	633809-001
	6-cell (47 WHr, 2.2 Ah)	633805-001
(15)	**WLAN module**	
	Atheros 9485GN 802.11b/g/n 1x1 WiFi and 3012 Bluetooth 4.0 Combo Adapter	655795-001

Item	Description	Spare part number
	Atheros AR9485 802.11b/g/n WiFi Adpater HMC	675794-001
	Atheros AR9462 802.11 a/b/g/n 2x2 Bluetooth 4.0 Combo	676786-001
	Atheros AR9565 802.11 b/g/n + Bluetooth 4.0 Combo Adapter	690019-001
	Broadcom 4313GN 802.11b/g/n 1x1 WiFi and 20702 Bluetooth 4.0 Combo Adapter	657325-001
	Ralink RT5390F 802.11 b/g/n 1x1 PCIe C	670691-001
	Ralink RT3290LE 802.11 b/g/n 1x1 WiFi and Bluetooth 4.0 Combo Adapter	690020-001
	Ralink RT5390R 802.11 b/g/n 1x1 WiFi Adapter	691415-001
(16)	**USB connectors with cable** (part of Cable Kit 683477-001)	
(17)	**Memory modules** (PC3-12800, 1600-MHz, DDR3)	
	4-GB	641369-001
	2-GB	652972-001
(18)	**Optical drive** (includes bracket, bezel, and screws)	
	Blu-ray ROM DVD±RW SuperMulti DL Drive	683499-001
	DVD-ROM ±RW Double Layer	683500-001
	DVD-ROM	700845-001
(19)	**Processor** (includes thermal material)	
	AMD A4-4300M (3.0-GHz/2.5-GHz, 1-MB L2 cache)	685990-001
	AMD A6-4400M (3.0-GHz/2.6-GHz, 4-MB L2 cache)	683047-001
	AMD A8-4500M (3.0-GHz/2.1-GHz, 2-MB L2 cache)	683048-001
(20)	**Heat sink** (includes replacement thermal material — thermal grease for CPU and thermal pad for VGA)	
	For use in models with discrete graphics	683602-001
	For use in models with UMA graphics	683603-001
(21)	**Fan**	683484-001
(22)	**Hard drive**	
	750-GB, 7200-rpm (2.5 in)	633252-001
	750-GB, 5400 rpm (2.5 in)	634250-001
	640-GB, 5400-rpm (2.5 in)	669300-001
	500-GB, 7200 rpm (2.5 in)	634925-001
	320-GB, 7200-rpm (2.5 in)	641672-001
(23)	**Bottom door**	690978-001

Display components
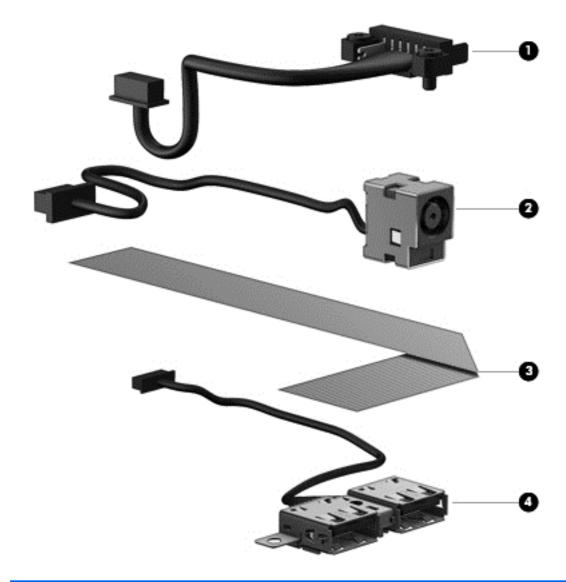
Item	Description	Spare part number
(1)	**Display hinge covers (part of Display hinge kit 683480-001)**	
(2)	**Display bezel**	
	For use with models with a webcam	683478-001
	For use with models without a webcam	683479-001
(3)	**Webcam module**	683508-001
	Microphone module (not illustrated)	647675-001
(4)	**Display hinges** (includes left and right hinges, plastic hinge covers, and LCD rubbers)	683480-001

Plastics Kit

Item	Description	Spare part number
	Plastics Kit	683501-001
(1)	Optical drive protective insert	
(2)	Secure Digital card protective insert	

Cable Kit

Item	Description	Spare part number
	Cable Kit	683477-001
(1)	Battery cable	
(2)	DC-in cable	
(3)	Audio cable	
(4)	USB module with cable	

Mass storage devices

Description	Spare part number
Optical drives	
Blu-ray BD-R/RE DVD±RW SuperMulti DL Drive	683499-001
DVD-ROM with SuperMulti DL Drive	683500-001
DVD-ROM optical drive	700845-001
Hard drives	
750-GB, 7200-rpm (2.5-in)	633252-001
750-GB, 5400 rpm (2.5-in)	634250-001
640-GB, 5400-rpm (2.5-in)	669300-001
500-GB, 7200 rpm (2.5 in)	634925-001
320-GB, 7200-rpm (2.5 in)	641672-001
Hard Drive Hardware Kit (includes hard drive bracket, mylar insulator, and screws)	683488-001

Miscellaneous parts

Description	Spare part number
AC adapters	
65-W AC adapter, non-PFC	693711-001
90-W AC adapter, PFC	693712-001
Power cords:	
For use in Argentina	490371-D01
For use in Denmark	490371-081
For use in Europe, the Middle East, and Africa	490371-021
For use in Israel	490371-BB1
For use in Italy	490371-061
For use in Japan	490371-291
For use in South Africa	490371-AR1
For use in Switzerland	490371-111
For use in the United Kingdom	490371-031
For use in the United States	490371-001
Rubber Kit (includes 10ea LCD rubbers and lower case rubbers)	683503-001
Screw Kit (includes 15 ea all screws)	683504-001
HP keyed cable lock	626729-001
Mouse, optical, 2-button	390632-001

Description	Spare part number
HP optical travel mouse	434594-001
Professional slim, top load case	592923-001
Notebook combination lock	591699-001
Essential top load case	679921-001
Nylon case	612757-001

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
390632-001	A	Mouse, optical, 2-button
434594-001	A	HP optical travel mouse
490371-001	A	Power cord for use in North America
490371-021	A	Power cord for use in Europe, the Middle East, and Africa
490371-031	A	Power cord for use in the United Kingdom
490371-061	A	Power cord for use in Italy
490371-081	A	Power cord for use in Denmark
490371-111	A	Power cord for use in Switzerland
490371-291	A	Power cord for use in Japan
490371-AR1	A	Power cord for use in South Africa
490371-BB1	A	Power cord for use in Israel
490371-D01	A	Power cord for use in Argentina
591699-001	A	Notebook combination lock
592923-001	A	Professional slim, top load case
612757-001	A	Nylon case
626729-001	A	HP keyed cable lock
633252-001	A	750-GB, 7200-rpm hard drive, (2.5-in)
633805-001	A	6-cell, 47 WHr, 2.2 Ah Li-ion battery
633809-001	A	9-cell, 93 WHr, 2.8 Ah Li-ion battery

Spare part number	CSR flag	Description
634250-001	A	750-GB, 5400 rpm hard drive (2.5 in)
634925-001	A	500-GB, 7200 rpm hard drive (2.5 in)
641369-001	A	4-GB memory module (PC3-12800, 1600 MHz, DDR3)
641672-001	A	320-GB, 7200-rpm hard drive (2.5 in)
647675-001	N	Microphone module
652972-001	A	2-GB memory module (PC3-12800, 1600 MHz, DDR3)
655795-001	A	Atheros 9485GN 802.11 b/g/n 1x1 WiFi and 3012 Bluetooth 4.0 Combo Adapter
657325-001	A	Broadcom 4313GN 802.11 b/g/n 1x1 WIFi and 20702 Bluetooth 4.0 Combo Adapter
669300-001	A	640-GB, 5400 rpm (2.5-in) hard drive
670691-001	A	Ralink RT5390F 802.11 b/g/n 1x1 PCIe C
675794-001	A	Atheros AR9485 802.11b/g/n WiFi Adapter
676786-001	A	Atheros AR9462 802.11 a/b/g/n 2x2 Bluetooth 4.0 Combo
679921-001	A	Essential top load case
683047-001	N	AMD processor A6-4400M (3.2-GHz/2.7-GHz, 1-MB L2 cache)
683048-001	N	AMD processor A8-4500M (2.8-GHz/1.9-GHz, 4-MB L2 cache)
683475-001	N	Audio board
683476-001	N	Base enclosure
683477-001	N	Cable kit includes audio cable, DC-in cable, battery cable, and USB module with cable
683478-001	N	Display bezel with webcam
683479-001	N	Display bezel without webcam
683480-001	N	Display hinges with left and right plastic hinge covers and LCD rubbers
683484-001	N	Fan
683485-001	N	Fingerprint reader module with cable
683486-001	N	Power button board with cable
683487-001	N	Hard drive extender board
683488-001	A	Hard drive hardware kit includes hard drive bracket, mylar insulator, and screws
683491-001	A	Keyboard with TouchPad for use in the United States, Windows 7
683491-031	A	Keyboard with TouchPad for use in the United Kingdom, Windows 7
683491-041	A	Keyboard with TouchPad for use in Germany, Windows 7
683491-051	A	Keyboard with TouchPad for use in France, Windows 7
683491-061	A	Keyboard with TouchPad for use in Italy, Windows 7
683491-071	A	Keyboard with TouchPad for use in Spain, Windows 7
683491-131	A	Keyboard with TouchPad for use in Portugal, Windows 7
683491-141	A	Keyboard with TouchPad for use in Turkey, Windows 7

Spare part number	CSR flag	Description
683491-151	A	Keyboard with TouchPad for use in Greece, Windows 7
683491-161	A	Keyboard with TouchPad for use in Latin America, Windows 7
683491-171	A	Keyboard with TouchPad for use in Saudi Arabia, Windows 7
683491-211	A	Keyboard with TouchPad for use Hungary, Windows 7
683491-251	A	Keyboard with TouchPad for use in Russia, Windows 7
683491-261	A	Keyboard with TouchPad for use in Bulgaria, Windows 7
683491-271	A	Keyboard with TouchPad for use in Romania, Windows 7
683491-291	A	Keyboard with TouchPad for use in Japan, Windows 7
683491-A41	A	Keyboard with TouchPad for use in Belgium, Windows 7
683491-B31	A	Keyboard with TouchPad for use in the Netherlands and Europe, Windows 7
683491-BA1	A	Keyboard with TouchPad for use in Slovakia, Windows 7
683491-BB1	A	Keyboard with TouchPad for use in Israel, Windows 7
683491-BG1	A	Keyboard with TouchPad for use in Switzerland, Windows 7
683491-DB1	A	Keyboard with TouchPad for use in Canada/English, Windows 7
683491-DD1	A	Keyboard with TouchPad for use in Iceland, Windows 7
683491-DH1	A	Keyboard with TouchPad for use in the Netherlands, Windows 7
683491-FL1	A	Keyboard with TouchPad for use in the Czech Republic and Slovakia, Windows 7
683491-FP1	A	Keyboard with TouchPad with TouchPad for use in Africa–French, Windows 7
683498-001	N	ODD extender board
683499-001	N	Blu-ray BD-R/RE DVD±RW SuperMulti DL Drive
683500-001	N	DVD ROM Drive SuperMulti
683501-001	N	Plastics Kit, includes bottom door, Secure digital card protective insert, and ODD protective insert
683503-001	N	Rubber kit includes 5 ea LCD rubbers and lower case rubbers
683504-001	N	Screw kit includes 15 ea all screws
683505-001	N	Speaker assembly
683506-001	N	Top cover with touchpad and fingerprint reader
683507-001	N	Top cover with TouchPad without fingerprint reader
683508-001	N	Webcam module
683596-001	N	Display, hinge-up assy, 39.6-cm (15.6-in) HD Anti-glare without web cam
683597-001	N	Display, hinge-up assy, 39.6-cm (15.6-in) HD Anti-glare with web cam
683598-001	N	System board for use in models with 1-GB of discrete memory using Windows 7
683598-501	N	System board for use in models with 1-GB of discrete memory using Windows 8 Std
683598-601	N	System board for use in models with 1-GB of discrete memory using Windows 8 Pro
683599-001	N	System board for use in models with 2-GB of discrete memory using Windows 7

Spare part number	CSR flag	Description
683599–501	N	System board for use in models with 2-GB of discrete memory using Windows 8 Std
683599–601	N	System board for use in models with 2-GB of discrete memory using Windows 8 Pro
683600-001	N	System board for use in models with UMA graphics using Windows 7
683600-501	N	System board for use in models with UMA graphics using Windows 8 Std
683600-601	N	System board for use in models with UMA graphics using Windows 8 Pro
683601-001	N	RTC battery
683602-001	N	Heat sink for use in models with discrete graphics
683603-001	N	Heat sink for use in models with UMA graphics
685990-001	N	Processor, AMD A4-4300M (3.0-GHz/2.5-GHz, 1-MB L2 cache)
687696-001	N	Metal heat shield for 39.6-cm (15.6-in) models
690019-001	A	WLAN, Atheros AR9565 802.11 b/g/n 1x1 WiFi with Bluetooth 4.0 Combo Adapter
690020-001	A	WLAN, Ralink RT3290LE 802.11 b/g/n WiFi with Bluetooth 4.0 Combo Adapter
690978-001	A	Bottom door
691415-001	A	WLAN, Ralink RT5390R 802.11 b/g/n 1x1 WiFi Adapter
693711-001	A	65W non-PFC power adapter
693712-001	A	90W PFC power adapter
700845-001	A	Optical drive , DVD-ROM
702237-001	A	Keyboard with TouchPad for use in the United States with Windows 8
702237-031	A	Keyboard with TouchPad for use in the United Kingdom with Windows 8
702237-041	A	Keyboard with TouchPad for use in Germany with Windows 8
702237-051	A	Keyboard with TouchPad for use in France with Windows 8
702237-061	A	Keyboard with TouchPad for use in Italy with Windows 8
702237-071	A	Keyboard with TouchPad for use in Spain with Windows 8
702237-131	A	Keyboard with TouchPad for use in Portugal with Windows 8
702237-141	A	Keyboard with TouchPad for use in Turkey with Windows 8
702237-151	A	Keyboard with TouchPad for use in Greece with Windows 8
702237-161	A	Keyboard with TouchPad for use in Latin America with Windows 8
702237-171	A	Keyboard with TouchPad for use in Saudi Arabia with Windows 8
702237-211	A	Keyboard with TouchPad for use in Hungary with Windows 8
702237-251	A	Keyboard with TouchPad for use in Russia with Windows 8
702237-261	A	Keyboard with TouchPad for use in Bulgaria with Windows 8
702237-271	A	Keyboard with TouchPad for use in Romania with Windows 8
702237-291	A	Keyboard with TouchPad for use in Japan with Windows 8
702237-A41	A	Keyboard with TouchPad for use in Belgium with Windows 8

Spare part number	CSR flag	Description
702237-B31	A	Keyboard with TouchPad for use in the Netherlands and Europe with Windows 8
702237-BA1	A	Keyboard with TouchPad for use in Slovakia with Windows 8
702237-BB1	A	Keyboard with TouchPad for use in Hebrew with Windows 8
702237-BG1	A	Keyboard with TouchPad for use in Switzerland with Windows 8
702237-DB1	A	Keyboard with TouchPad for use in Canada/English with Windows 8
702237-DD1	A	Keyboard with TouchPad for use in Iceland with Windows 8
702237-DH1	A	Keyboard with TouchPad for use in the Netherlands with Windows 8
702237-FL1	A	Keyboard with TouchPad for use in the Czech Republic and Slovakia with Windows 8
702237-FP1	A	Keyboard with TouchPad for use in Africa-French with Windows 8

4   Removal and replacement procedures

Preliminary replacement requirements
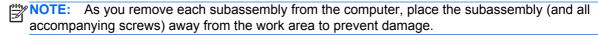
Tools required

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
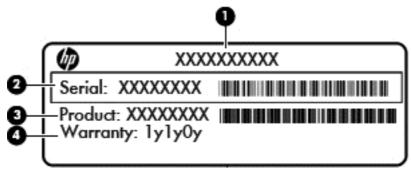
Component replacement procedures

This chapter provides removal and replacement procedures.

There are as many as 95 screws and screw locks, in 15 different sizes, that must be removed, replaced, or loosened when servicing the computer. Make special note of each screw and screw lock size and location during removal and replacement.

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.

Battery
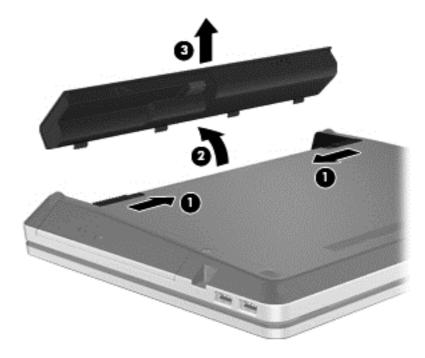
Description	Spare part number
9-cell, 93 WHr, 2.8 Ah Li-ion battery	633809-001
6-cell, 47 WHr, 2.2 Ah Li-ion battery	633805-001

Before disassembling the computer, 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.

Remove the battery:

1. Position the computer upside-down on a flat surface with the battery bay away from you.

2. Slide the battery release latches **(1)** to release the battery.

3. Pivot the battery **(2)** upward to remove it from the computer **(3)**.

Install the battery by inserting it into the battery bay until you hear a click.

Bottom door

| Description	Spare part number
Bottom door	690978-001

Before disassembling the computer, 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 37).

Remove the bottom door:

1. Position the computer upside-down on a flat surface with the battery bay toward you.

2. Remove the locking screw (if installed) **(1)** and slide the two bottom door release latches **(2)** to release the door.

3. Slide the door toward the front of the computer **(3)**, and then lift the door off the computer **(4)**.
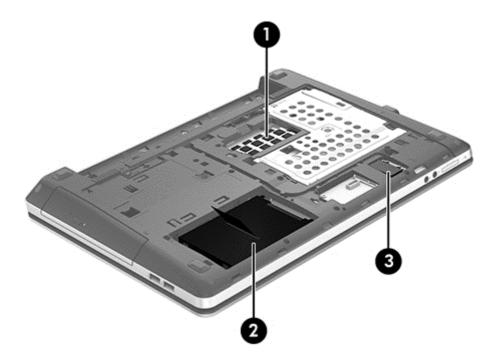
Reverse the removal procedures to install the bottom door.

Bottom parts location

Some customer replaceable parts are accessible after removing the bottom door.

Item	Description
1	Memory module
2	Hard drive
3	WLAN module

WLAN/Bluetooth combo card

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

⚠ **CAUTION:** The WLAN module and the WWAN module are not interchangeable.

| Description	Spare part number
Atheros 9485GN 802.11 b/g/n 1x1 WiFi and 3012 Bluetooth 4.0 Combo Adapter	655795-001
Atheros AR9485 802.11 b/g/n 1x1 WiFi Adapter HMC	675794-001
Atheros AR9462 802.11 a/b/g/n 2x2 Bluetooth 4.0 Combo	676786-001
Atheros AR9565 802.11 b/g/n with Bluetooth 4.0 Combo Adapter	690019-001
Broadcom 4313GN 802.11 b/gn 1x1 WiFi and 20702 Bluetooth 4.0 Combo Adapter	657325-001
Rallink RT5390F 802.11 b/g/n 1x1 PCIe C	670691-001
Ralink RT3290LE 802.11 b/g/n 1x1 WiFi and Bluetooth 4.0 Combo Adapter	690020-001
Ralink RT5390R 802.11 b/g/n 1x1 WiFi Adapter	691415-001
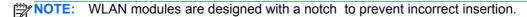
Before removing the WLAN module, follow these steps:
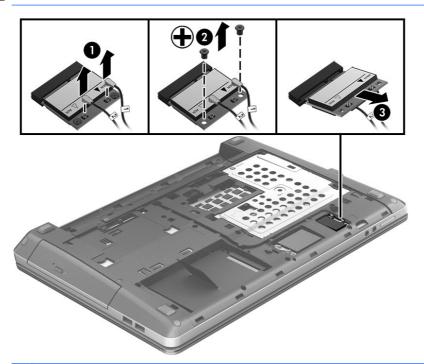
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

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 37).

5. Remove the bottom door (see Bottom door on page 38).

Remove the WLAN module:
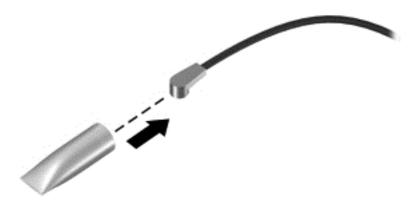
1. Position the computer upside-down with the battery bay away from you.

2. Locate and remove the mylar protector glued to the base enclosure (see bottom parts location Bottom parts location on page 39) to access the WLAN card.

3. 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.

4. Remove the two Phillips PM2.0×3.0 screws **(2)** that secure the WLAN module to the computer. (The edge of the module opposite the slot rises away from the computer.)

5. 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.

Optical drive

📝 **NOTE:** All optical drive spare part kits include an optical drive bezel and a bracket with mounting screws.

Description	Spare part number
Blu-ray BD-R/RE DVD±RW SuperMulti DL Drive (includes bracket and screws)	683499-001

| Description	Spare part number
DVD±RW and CD-RW SuperMulti DL Combo Drive (includes bracket and screws)	683500-001
DVD-ROM drive	700845-001
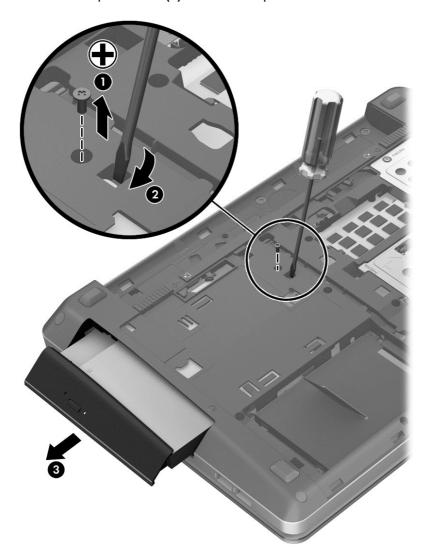
Before removing the optical drive, follow these steps:

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 37).

5. Remove the bottom door (see Bottom door on page 38).

Remove the optical drive:
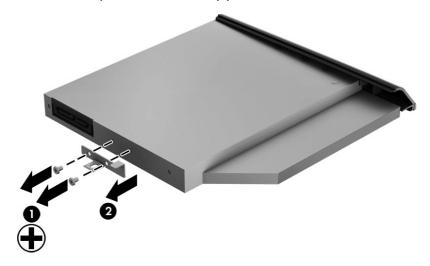
1. Position the computer upside-down with the battery bay away from you.

2. Remove the Phillips PM2.5×5.0 screw **(1)** that secures the optical drive to the computer.

3. Push the optical drive tab **(2)** to release the optical drive from the computer.

4. Remove the optical drive **(3)** from the computer.

5. If it is necessary to replace the optical drive bracket, position the optical drive with the rear toward you.

6. Remove the two Phillips PM2.0×3.0 screws **(1)** that secure the optical drive bracket to the optical drive.

7. Remove the optical drive bracket **(2)**.

Reverse this procedure to install an optical drive.

Hard drive

| Description	Spare part number
750-GB, 7200-rpm (2.5 in)	633252-001
750-GB, 5400-rpm (2.5 in)	634250-001
640-GB, 5400-rpm (2.5 in)	669300-001
500-GB, 7200 rpm (2.5 in)	634925-001
320-GB, 7200-rpm (2.5 in)	641672-001
Hard Drive Hardware Kit (includes hard drive bracket, mylar insulator, and screws)	690978-001
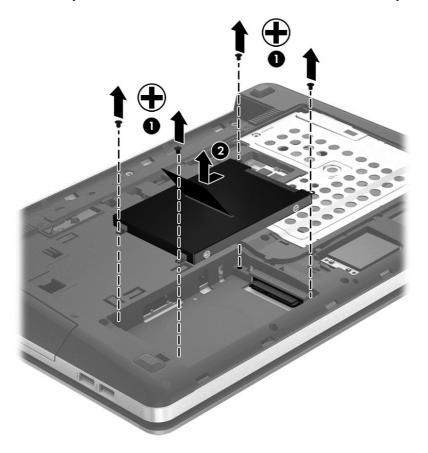
Before disassembling the computer, follow these steps:

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 37).

5. Remove the bottom door (see Bottom door on page 38).

Remove the hard drive:

1. Position the computer upside-down with the front toward you.
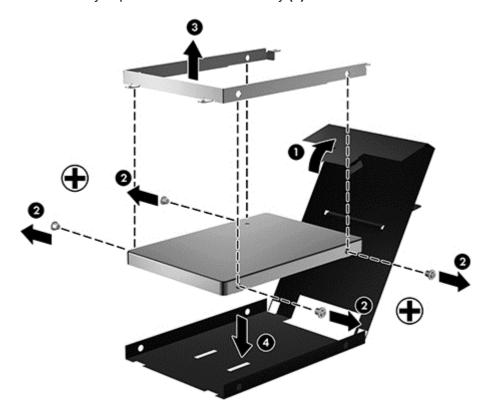
2. Locate the hard drive on the bottom of the computer (see bottom parts location Bottom parts location on page 39)

3. Remove the four Phillips PM2.0×4.0 screws **(1)** that secure the hard drive to the computer.

4. Grasp the Mylar cover on the hard drive and slide the hard drive to the left **(2)** to disconnect it from the system board connector and lift it from the hard drive bay. .

5. If it is necessary to replace the hard drive bracket, unwrap the mylar cover **(1)** that surrounds the drive.

6. Remove the two Phillips PM3.0×3.0 hard drive bracket screws **(2)** from each side of the hard drive (4 total screws).

7. Lift the mounting bracket from around the hard drive **(3)**.

8. Lower the mylar protector from the assembly **(4)**.

Reverse this procedure to reassemble and install the hard drive.

Keyboard

NOTE: For a detailed list of available keyboards, see .
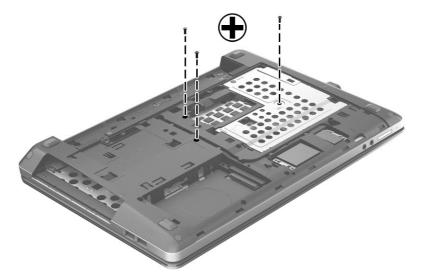
| Description	Spare part number
Keyboard for use with models using Windows 7	683491-xxx
Keyboard for use with models using Windows 8	702237-xxx

Before removing the keyboard, follow these steps:
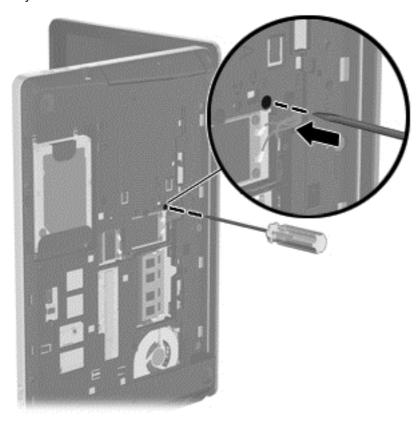
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

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).

5. Remove the bottom door (see).

6. Remove the Optical drive (see).

Remove the keyboard:

1. Position the computer upside-down with the front toward you.

2. Remove the three Phillips PM2.5×6.0 screws that secure the keyboard to the computer.

3. Position the computer on its side with the bottom facing you and the computer open.

4. Insert a screwdriver or similar tool in the Optical drive compartment and push to disengage the keyboard.
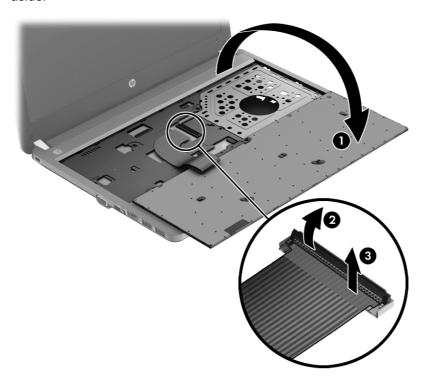
5. Position the computer upright with the front toward you.

6. Open the computer as far as possible.

7. Slide the keyboard towards you **(1)**, then lift the keyboard from the top **(2)** and pull it out of the top cover **(3)**.

8. Rotate the keyboard **(1)** to access the cable connector.

9. Release the cable locking device **(2)** and remove the cable **(3)**. The keyboard may now be set aside.

Reverse this procedure to install the keyboard.

Memory modules

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

Description	Spare part number
2-GB (PC3-12800, 1600-MHz, DDR3)	652972-001
4-GB (PC3-12800, 1600-MHz, DDR3)	641369-001

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.
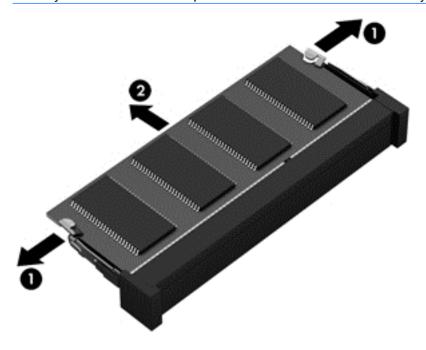
Before removing the memory module, follow these steps:

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 37).
5. Remove the bottom door (see Bottom door on page 38).
6. Locate the memory module (see Bottom parts location Bottom parts location on page 39)

Remove the memory module:

1. Position the computer upside-down with the battery bay toward you.
2. 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.)

3. 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 is shown in the following image. 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.

Metal heat shield
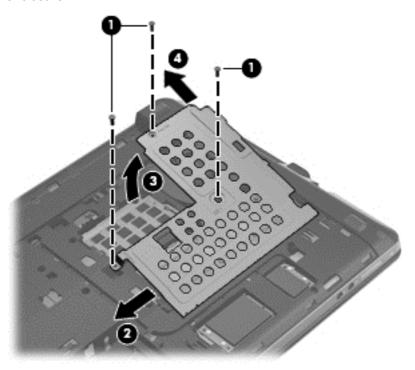
Before removing the metal heat shield, follow these steps:

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 37).

5. Remove the bottom door (see Bottom door on page 38).

Remove the metal heat shield:

1. Position the computer upside-down with the battery bay away from you.

2. Remove the one Phillips screw **(1)** in the middle of the shield that secures the keyboard and the two screws **(1)** that hold the edges of the shield in place.

3. Slide the shield to the left **(2)**, then rotate the shield up **(3)** and remove it **(4)** from the base enclosure .

Reverse this procedure to install the metal heat shield.

Fan
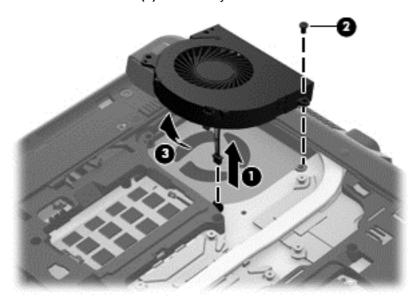
Description	Spare part number
Fan	646285-001

Before removing the fan, 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 37).

5. Remove the following components:

   a. Bottom door (see Bottom door on page 38).

   b. Metal heat shield (see Metal heat shield on page 51).

Remove the fan:

1. Position the computer upside-down with front towards user.

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

3. Remove the single Phillips PM2.5×6.0 screw **(2)** that secures the fan to the system board.

4. Rotate and lift the fan **(3)** from the system board.

Reverse this procedure to install the fan.

NOTE: To properly ventilate the computer, allow at least a 7.6-cm (3-in) 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.

Heat sink

All heat sink spare part kits include replacement thermal material.

Description	Spare part number
Heat sink for use in computers with discrete graphics	654310-001
Heat sink for use in computers with UMA graphics	654311-001
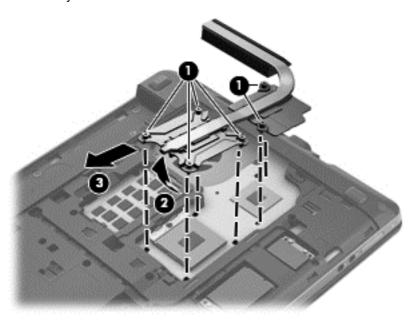
Before removing the heat sink, follow these steps:

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 37).

5. Remove the following components:

   a. Bottom door (see Bottom door on page 38).

   b. Metal heat shield (see Metal heat shield on page 51).

   c. Fan (see Fan on page 53).

Remove the discrete heat sink:
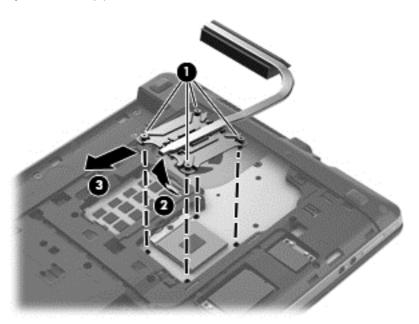
1. Position the computer upside down with battery bay away from you.

2. To remove the discrete heat sink, loosen the six captive Phillips screws **(1)** in the order indicated on the components, that secure the heat sink to the system board.

3. Rotate the heats sink up on the left end **(2)** and slide the heat sink to the left **(3)** to remove it from the system board.
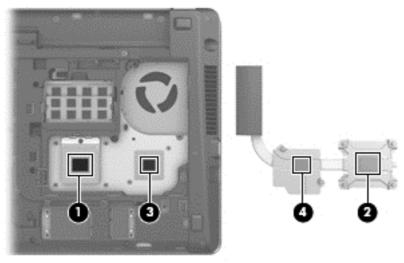
Remove the UMA heat sink.
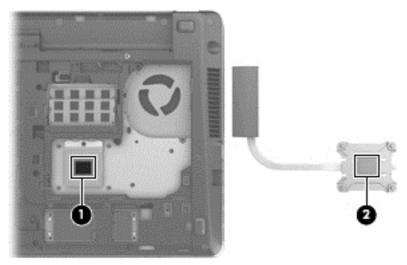
1. Position the computer upside down with battery bay away from user.

2. To remove the discrete heat sink, loosen the four captive Phillips screws **(1)** in the order indicated on the component, that secure the heat sink to the system board.

3. Lift the left end of the heat sink **(2)** and then slide the heat sink to the left to remove it from the system board **(3)**.

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

> **NOTE:** For UMA models, thoroughly clean thermal material from the surface of the system board **(1)** and from the heat sink **(2)** 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.

Processor

> **NOTE:** All processor spare part kits include replacement thermal material.
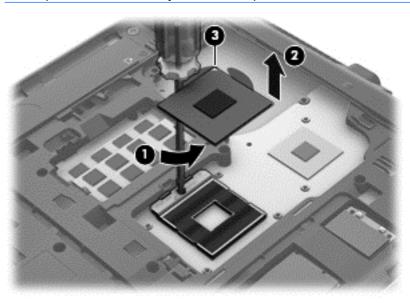
| Description	Spare part number
AMD A4-4300M APU (3.0-GHz/2.5-GHz, 1-MB L2 cache)	685990-001
AMD A6-4400M APU (3.2-GHz/2.7-GHz, 1-MB L2 cache)	683047-001
AMD A8-4500M APU (2.8-GHz/1.9-GHz, 4-MB L2 cache)	683048-001

Before removing the processor, 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 37).

5. Remove the following components:

    a. Bottom door (see Bottom door on page 38).

    b. Metal heat shield (see Metal heat shield on page 51).

    c. Fan (see Fan on page 53).

    d. Heat sink (see Heat sink on page 54).

Remove the processor:

1. Position the computer upside-down with the front toward you.

2. Use a flat-bladed screwdriver to turn the processor locking screw **(1)** one-half turn counterclockwise until you hear a click.

3. Lift the processor **(2)** straight up and remove it.

NOTE: The gold triangle **(3)** on the processor must be aligned with the triangle **(4)** embossed on the processor slot when you install the processor.

Reverse this procedure to install the processor.

Top cover

Description	Spare part number
For use in models with a fingerprint reader. Includes TouchPad assembly with cable and ESD board with screw.	683506-001
For use in models without a fingerprint reader. Includes TouchPad assembly with cable, ESD board with screw, fingerprint reader dummy with screws.	683507-001
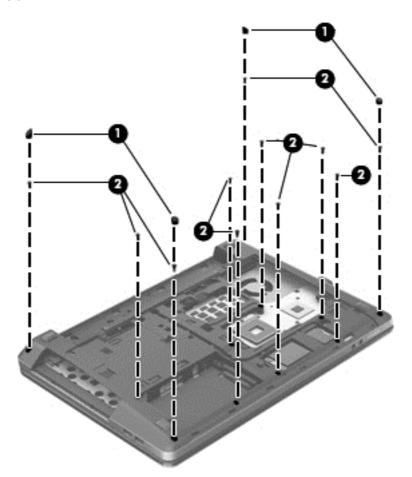
Before removing the top cover, follow these steps:

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 battery (see Battery on page 37).

5. Remove the following components:

    a. Bottom door (see Bottom door on page 38).

    b. Optical drive (see Optical drive on page 41).

    c. Hard drive (see Hard drive on page 45).

    d. Keyboard (see Keyboard on page 47).

Remove the top cover:

1. Position the computer upside-down with the front toward you.
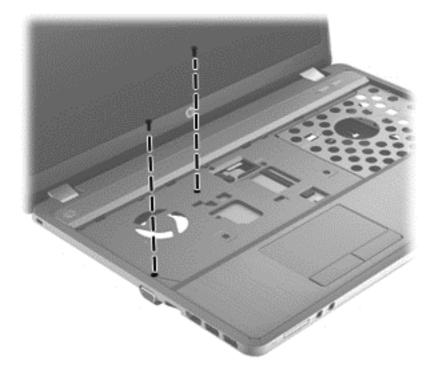
2. Remove the following covers and screws that secure the top cover to the computer:

(1) 4 rubber screw covers

(2) 11 Torx T8M2.5×6.0 screws
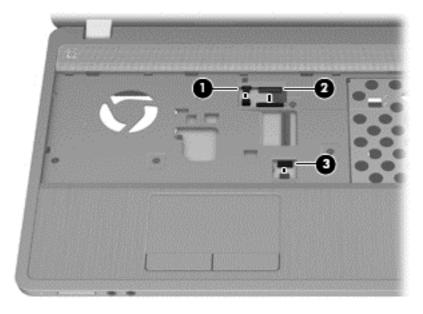
3. Remove the following screws that secure the top cover to the computer:

   (1) Two Phillips PM2.0×4.0 screws from the optical drive bay

   (2) Three Phillips PM2×2 broadhead screws from the battery bay

4. Turn the computer upright and open it as far as possible.

5. Remove the 2 Torx T8M2.5×6.0 screws that secure the top cover to the computer.
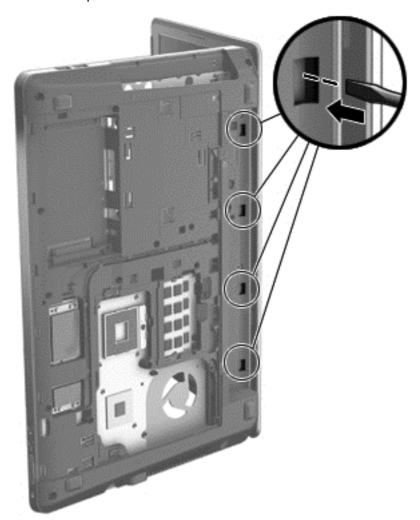
6. Remove the following cables from the system board:

   ● Lift the connector latch and disconnect the function/power board cable **(1)**

   ● Disconnect the speaker cable **(2)**

   ● Lift the connector latch and disconnect the fingerprint reader board cable **(3)**
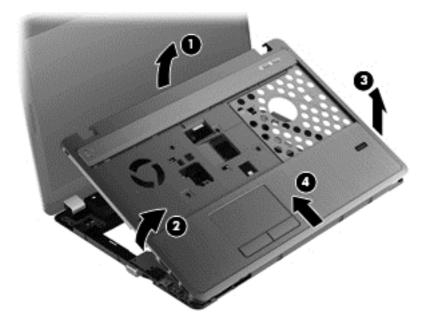
7. Position the computer on its side with the display open.

8. Insert a screwdriver through the holes in the battery bay and press to disengage the top cover from the computer.
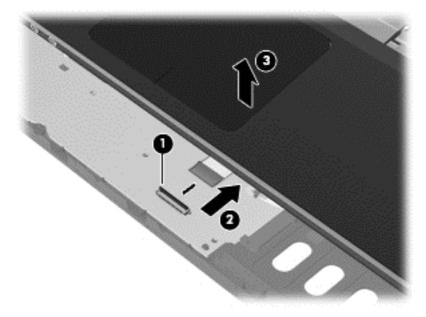
9. Position the computer upright with the front toward you.

10. To remove the top cover, pull up on the top of the top cover **(1)**, pull upward on the left **(2)** and right sides **(3)**, and then lift the bottom of the top cover **(4)** to remove it enough to access the card reader cable underneath.

11. Lift the front of the top cover slightly to gain access to the cable and connector underneath.

12. Lift the connector latch **(1)**, disconnect the card reader cable **(2)**, and then lift the top cover from the computer **(3)**.

Reverse this procedure to install the top cover.

Audio board

Description	Spare part number
Audio board	683475-001
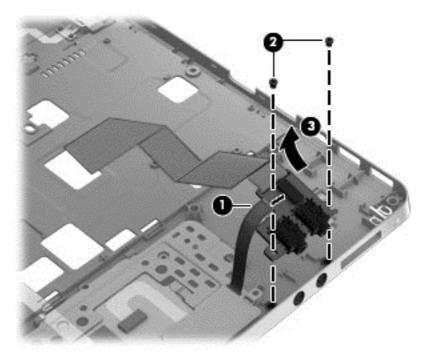
Before removing the audio board, follow these steps:

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 37).

5. Remove the following components:

    a. Bottom door (see Bottom door on page 38).

    b. Optical drive (see Optical drive on page 41).

    c. Hard drive (see Hard drive on page 45).

    d. Keyboard (see Keyboard on page 47).

    e. Metal heat shield (see Metal heat shield on page 51).

    f. Top cover (see Top cover on page 58)

Remove the audio board:

1. Position the top cover upside-down with the front toward you.

2. Disconnect the audio board cable **(1)**.

3. Remove the 2 Phillips PM2.5×5.0 screws **(2)** that secure the audio board to the top cover.

4. Rotate the audio board upward **(3)** to remove it.

Reverse this procedure to install the card reader.
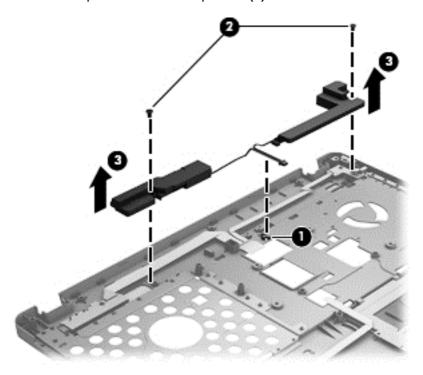
Speaker assembly

Description	Spare part number
Speaker assembly (includes housing)	683505-001

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 37).

5. Remove the following components:

   a. Bottom door (see Bottom door on page 38).

   b. Optical drive (see Optical drive on page 41).

   c. Keyboard (see Keyboard on page 47).

   d. Metal heat shield (see Metal heat shield on page 51).

   e. Top cover (see Top cover on page 58).

Remove the speaker assembly:

1. Position the top cover upside-down with the front toward you.

2. Remove the speaker cable **(1)** from the wire channel.

3. Remove the two Phillips PM2.0×4.0 screws **(2)** that secure the speakers to the computer.

4. Lift the two speakers from the top cover **(3)**.

Reverse this procedure to install the speaker assembly.

Power button board/Function board assembly

Description	Spare part number
Power button board/function board	683486-001
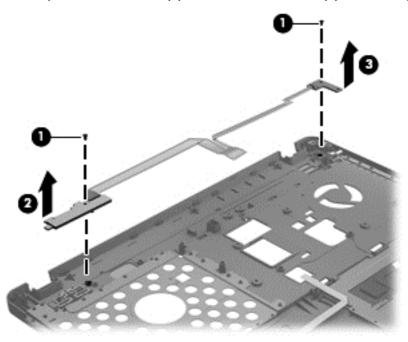
Before removing the power button board/function board, follow these steps:
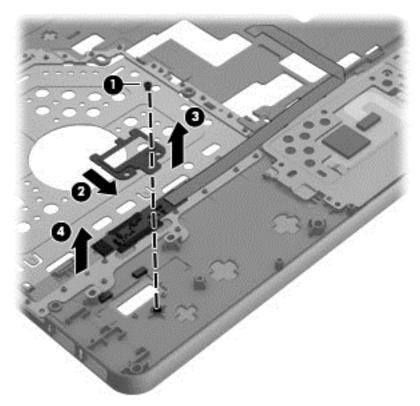
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

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 37).

5. Remove the following components:

   a. Bottom door (see Bottom door on page 38).

   b. Optical drive (see Optical drive on page 41).

c. Keyboard (see Keyboard on page 47).

d. Metal heat shield (see Metal heat shield on page 51).

e. Top cover (see Top cover on page 58).

Remove the power button board/function board:

1. Position the top cover upside-down with the front toward you.

2. Remove one Phillips PM2.0×4.0 screw **(1)** on both the power button board and the function board to the top cover.

3. Lift the power button board **(2)** and the function board **(3)** from the top cover

Reverse this procedure to install the power button board/function board.

Fingerprint board

| Description	Spare part number
Fingerprint board. Includes cable, mounting bracket, and retaining screw.	683485-001

Before removing the fingerprint 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 37).

5. Remove the following components:

    a. Bottom door (see Bottom door on page 38).

    b. Optical drive (see Optical drive on page 41).

    c. Keyboard (see Keyboard on page 47).

    d. Metal heat shield (see Metal heat shield on page 51).

    e. Top cover (see Top cover on page 58).

Remove the fingerprint board:

1. Position the top cover upside-down with the front toward you.

2. Remove the screw **(1)** that secures the fingerprint board to the top cover.

3. Remove the fingerprint board retainer **(2)**.

4. Lift the cable **(3)** that is attached to the top cover with adhesive from the top cover and then remove the fingerprint reader **(4)**.

Reverse this procedure to install the fingerprint board.

USB board

Description	Spare part number
USB board Part of Spare Cable kit	683477-001
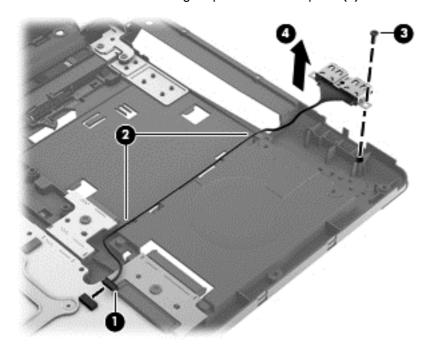
Before removing the USB board, follow these steps:

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 37).

5. Remove the following components:

    a. Bottom door (see Bottom door on page 38).

    b. Optical drive (see Optical drive on page 41).

    c. Metal heat shield (see Metal heat shield on page 51).

    d. Keyboard (see Keyboard on page 47)

    e. Top cover (see Top cover on page 58).

Remove the USB board:

1. Position the computer upright with the front toward you.

2. Disconnect the USB board cable from the system board **(1)** and remove the cable **(2)** from the cable run.

3. Remove the Phillips PM2.5×5.0 screw **(3)** that secures the USB board to the computer.

4. Lift the board and cable straight up out of the computer **(4)**.

Reverse this procedure to install the USB board.

System board

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

Description	Spare part number
Systems boards for use in models without Windows 8:	
1-GB of discrete memory	683598-001
2-GB of discrete memory	683599-001
Shared video memory with UMA graphics	683600-001
Systems boards for use in Windows 8 models:	
1-GB of discrete memory	683598-501
1-GB of discrete memory	683598-601
2-GB of discrete memory	683599-501
2-GB of discrete memory	683599-601
Shared video memory UMA graphics	683600-501
Shared video memory with UMA graphics	683600-601

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 37).

5. Remove the following components:

   a. Bottom door (see Bottom door on page 38).

   b. Hard drive (see Hard drive on page 45).

   c. Optical drive (see Optical drive on page 41).

   d. WLAN/Bluetooth combo card (see WLAN/Bluetooth combo card on page 39).

   e. Keyboard (see Keyboard on page 47).

   f. Metal heat shield (see Metal heat shield on page 51).

   g. Top cover (see Top cover on page 58).
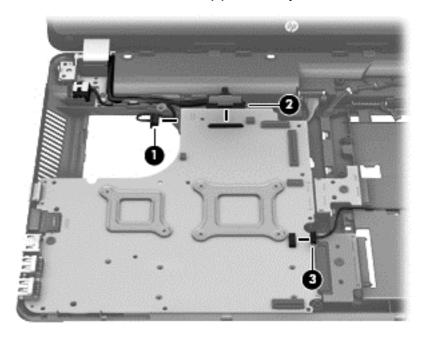
When replacing the system board, be sure to remove the following components from the defective system board and install on the replacement system board:

● Memory module (see Memory modules on page 50).

● WLAN card(see WLAN/Bluetooth combo card on page 39).

● Fan (see Fan on page 53).

● Heat sink (see Heat sink on page 54).
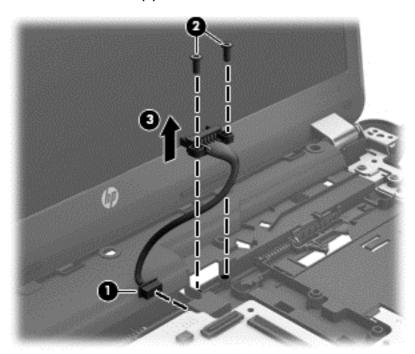
● Processor (see Processor on page 56).

Remove the system board:

1. Position the computer upright with the front toward you.

2. Disconnect the main power cable **(1)**.

3. Disconnect the graphics cable **(2)** from the system board.

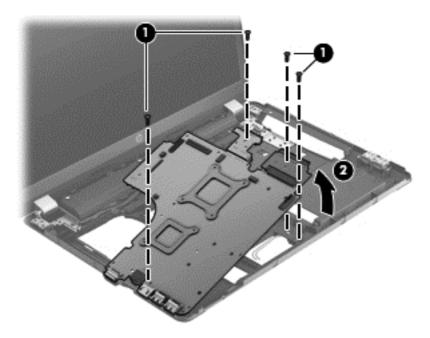**4.** Disconnect the USB board cable **(3)** from the system board.

5. Disconnect the battery cable **(1)** from the underside of the system board.

6. Remove the two screws **(2)** that secure the battery cable connector to the base enclosure and remove the connector **(3)**.

7. Remove the four screws **(1)** that secure the system board and the drive extenders to the base enclosure.

8. Lift the system board **(2)** up on its right end and remove it from the computer .

Reverse this procedure to install the system board.

RTC battery

Description	Spare part number
RTC battery	683601-001
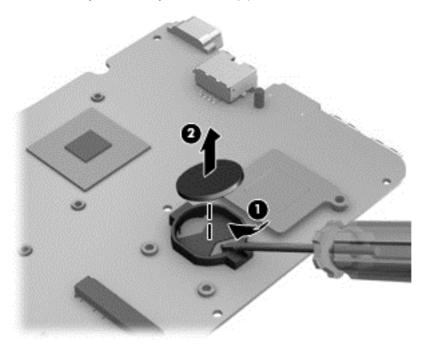
Before removing the RTC battery, follow these steps:

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 37).

5. Remove the following components:

    a. Bottom door (see Bottom door on page 38).

    b. Hard drive (see Hard drive on page 45).

    c. Optical drive (see Optical drive on page 41).

    d. Metal heat shield (see Metal heat shield on page 51).

    e. Fan (see Fan on page 53).

    f. Heat sink (see Heat sink on page 54).

    g. Keyboard (see Keyboard on page 47).

h. Top cover (see Top cover on page 58).

i. System board (see System board on page 70).

Remove the RTC battery:

1. Position the system board upside-down with the front toward you.

2. Use a screwdriver to loosen the battery from the slot **(1)**.

3. Lift the battery from the system board **(2)**.

Reverse this procedure to install the RTC battery.

Power cable

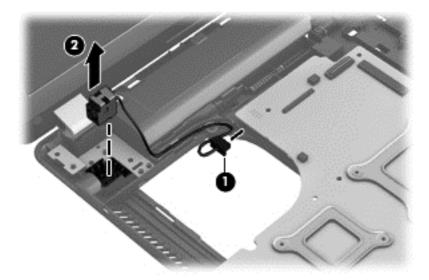The power cable is included in the Cable Kit, spare part number 683477-001.

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 37).

5. Remove the following components:

a. Bottom door (see Bottom door on page 38).

b. Hard drive (see Hard drive on page 45).

c. Optical drive (see Optical drive on page 41).

d. Metal heat shield (see Metal heat shield on page 51).

e. Fan (see Fan on page 53).

f. Heat sink (see Heat sink on page 54).

g. Keyboard (see Keyboard on page 47).

h. Top cover (see Top cover on page 58).

i. System board (see System board on page 70).

Remove the power cable:

1. Position the system upright with the front toward you.

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

3. Lift the power cable assembly **(2)** from the computer .

Reverse this procedure to install the power cable.

Drive extenders

Description	Spare part number
Optical drive extender	683498-001
Hard drive extender	683487-001
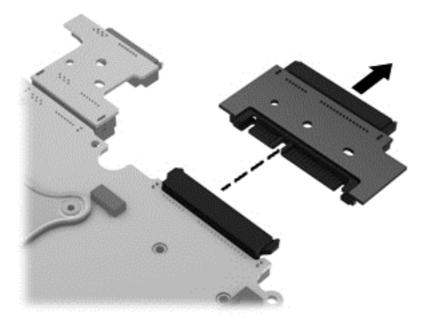
Before removing the drive extenders, follow these steps:

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 37).

5. Remove the following components:

   a. Bottom door (see Bottom door on page 38).

   b. Optical drive (see Optical drive on page 41).

   c. Hard drive (see Hard drive on page 45).

   d. Metal heat shield (see Metal heat shield on page 51).

   e. Fan (see Fan on page 53).

   f. Heat sink (see Heat sink on page 54).

   g. Keyboard (see Keyboard on page 47).

   h. Top cover (see Top cover on page 58).

   i. System board (see System board on page 70).

Remove the hard drive extender:

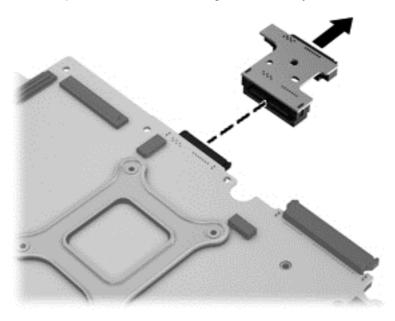1. Position the system board with the drive extenders to your right.

2. Pull the hard drive extender straight out of the system board.

Reverse this procedure to install the hard drive extender.

Remove the optical drive extender:

1. Position the system board with the drive extenders to your right.

2. Pull the optical drive extender straight out of the system board.

Reverse this procedure to install the optical drive extender.

Display assembly

All display assemblies include WLAN antenna transceivers and cables.

All display spare parts are shown in the following table:

Description	Spare part number
Complete hinge–up display assembly, 39.6-cm (15.6-inch) HD, Anti-glare, without webcam	683596-001
Complete hinge–up display assembly, 39.6-cm (15.6-inch) HD, Anti-glare, with webcam	683597-001
Display bezel 39.6-cm (15.6-inch), without webcam and LCD rubbers	683479-001
Display bezel 39.6-cm (15.6-inch), with webcam and LCD rubbers	683478-001
Display hinges, includes plastic hinge covers and LCD rubbers	683480-001
Webcam	683508-001
Microphone	647675-001
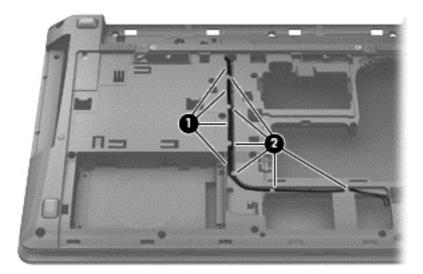
Before removing the display assembly, follow these steps:

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 37).

5. Remove the following components:

   a. Bottom door (see Bottom door on page 38).

   b. Optical drive (see Optical drive on page 41).

   c. WLAN module (see WLAN/Bluetooth combo card on page 39).

   d. Keyboard (see Keyboard on page 47).

   e. Metal heat shield (see Metal heat shield on page 51).

   f. Fan (see Fan on page 53).

   g. Heat sink (see Heat sink on page 54).

   h. Top cover (see Top cover on page 58).
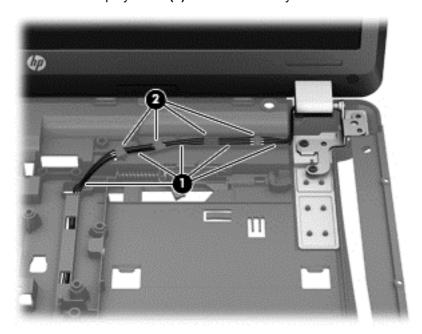
   i. System board (see System board on page 70).

Remove the display assembly:

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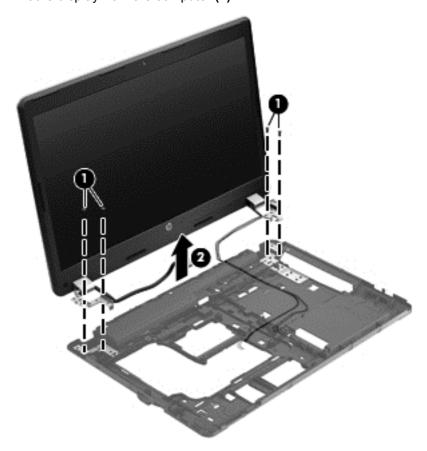
2. Open the computer as far as possible.

3. Remove the WLAN cable from the cable raceway **(1)** and from the cable clips **(2)**.

4. Remove the display cable **(1)** from the raceway and release them from the cable clips **(2)**.
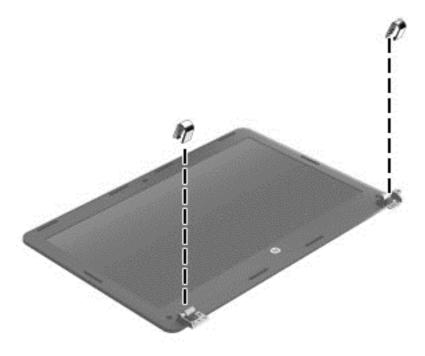
5. Remove two Torx T8M2.5×7.0 screws from each of the two hinges **(1)**.

6. Lift the display from the computer **(2)**.

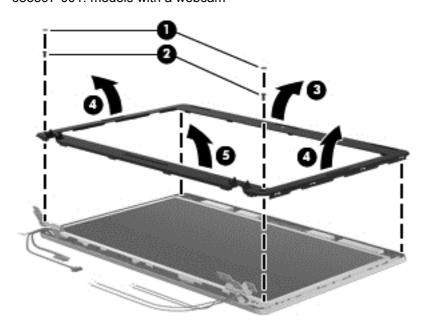**7.** If you need to remove the hinge covers from the display hinges, pull the hinges straight up and off the display to remove them.

Display hinge covers are spared with the Display hinge kit, spare part number 683480-001.

8. To replace the display bezel, remove the two rubber screw covers **(1)** and the two Torx T8M2.5×6.0 screws **(2)** in the bottom corners of the display bezel.

9. 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. Remove the display bezel.

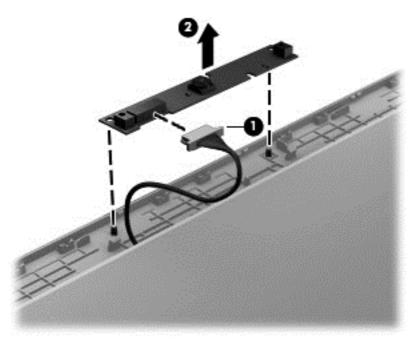The bezel is available using the following spare part numbers:

683596-001: models without a webcam

683597-001: models with a webcam

10. If it is necessary to replace the webcam module (shown in the following image) or microphone module from the display enclosure, gently pull the module away from the double-sided tape on the display enclosure **(1)** and disconnect the cable from the module **(2)**.
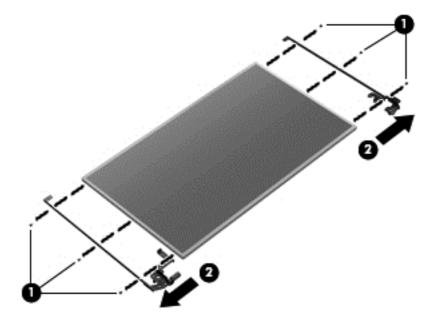
The webcam module is available using spare part number 683508-001.

The microphone module is removed using the same procedure and is available using spare part number 647675-001.

11. If it is necessary to replace the display hinges, remove the Phillips PM2.5×3.0 screws **(1)** that secure each display hinge to the display panel.

12. Remove the display hinges **(2)**.

Display hinges are available using spare part number 646279-001.

Reverse the process to install the display hinges.

5 Computer Setup (BIOS) and Advanced System Diagnostics

Windows 7 – Computer Setup (BIOS) and Advanced System Diagnostics

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.

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

   - To scroll up and down, click the up arrow or the down arrow in the upper-right corner of the screen, or use the up arrow key or the down arrow key.

   - To close open dialog boxes and return to the main Computer Setup screen, press esc, and then follow the on-screen instructions.

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

2. Press f10 to enter Computer Setup.

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

- To exit Computer Setup menus without saving your changes:

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

    – or –

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

- To save your changes and exit Computer Setup menus:

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

    – or –

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

Your changes go into effect when the computer restarts.

Restoring 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 **File > Restore Defaults**.

4. Follow the on-screen instructions.

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

    – or –

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

Your changes go into effect when the computer restarts.

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

Updating the BIOS

The next sections describe different ways of updating the BIOS.

Downloading *SoftPaqs* to update the BIOS

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

To install BIOS updates from the HP website, follow the steps below:

1. Download the *SoftPaq* from the HP website.

2. Click **Run**, and then follow the on-screen instructions to update the BIOS.

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

BIOS management using system diagnostics

1. Download the *SoftPaq* from the HP website.

   NOTE: Verify that the UEFI system diagnostics is installed on your computer (or USB flash drive).

2. Click **Run**, and then click **Cancel** at the Update/USB bootable dialog box.

3. Navigate to the folder located in c:\swsetup that corresponds to your *SoftPaq* number.

4. Locate the .bin file in the ROMpaq folder (for example, 68CDD.bin) and then copy it to the Hewlett-Packard\BIOS\New\ folder in either the HP_Tools partition of the hard drive, or the USB flash drive.

5. Locate the .sig file in the ROM.cab file and rename it with the same prefix as the .bin file (for example, 68CDD.sig). Copy the renamed file to the Hewlett-Packard\BIOS\New\ folder in either the HP_Tools partition of the hard drive, or the USB flash drive.

6. 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.

7. Press f2 to enter Computer Setup.

8. Click **BIOS Management** from the menu and then select **Update BIOS**.

Using f10 setup to update the BIOS

1. Download the *SoftPaq* from the HP website.

   NOTE: Verify that the UEFI system diagnostics is installed on your computer (or USB flash drive).

2. Click **Run**, and then click **Cancel** at the Update/USB bootable dialog box.

3. Navigate to the folder located in c:\swsetup that corresponds to your *SoftPaq* number.

4. Locate the .bin file in the ROMpaq folder (for example, 68CDD.bin) and then copy it to the Hewlett-Packard\BIOS\New\ folder in either the HP_Tools partition of the hard drive, or the USB flash drive.

5. Locate the .sig file in the ROM.cab file and rename it with the same prefix as the .bin file (for example, 68CDD.sig). Copy the renamed file to the Hewlett-Packard\BIOS\New\ folder in either the HP_Tools partition of the hard drive, or the USB flash drive.

6. 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.

7. Press f10 to enter Computer Setup.

8. Click **Update System BIOS**, and then click **Accept** to update the BIOS.

Determining the BIOS version

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

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

1. Start Computer Setup.

2. Use a pointing device or the arrow keys to select **File > System Information**.

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

   – or –

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

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 Sleep or Hibernation.

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

1. Select **Start > Help and Support > Maintain**.

2. Follow the on-screen instructions to identify your computer and access the BIOS update you want to download.

3. At the download area, follow these steps:

   a. Identify the BIOS update that is later than the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.

   b. Follow the on-screen instructions to download your selection to the hard drive.

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

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

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

1. Open Windows Explorer by selecting **Start > Computer**.

2. Double-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.

BIOS Setup Menu

The tables in this section provide an overview of the BIOS Setup menu options.

Main menu

Select	To do this
System information	● View and change the system time and date.
	● View identification information about your computer.
	● View specification information about the processor, memory size, and system BIOS.

Security menu

Select	To do this
Administrator password	Control access to Setup Utility.
Power-on password	Control access to your computer.

Diagnostics menu

Select	To do this
Primary Hard Disk Self Test	Run a quick or comprehensive self-test on the hard drive.
Memory Test	Run a diagnostic test on the system memory.

Using Advanced System Diagnostics

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

- Start-up test—This test analyzes the main computer components that are required to start the computer.
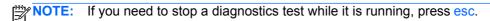
- Run-in test—This test repeats the start-up test and checks for intermittent problems that the start-up test does not detect.

- System Tune-Up—This group of additional tests checks your computer to make sure that the main components are functioning correctly. System Tune-Up runs longer and more comprehensive tests on memory modules, hard drive SMART attributes, the hard drive surface, the battery (and battery calibration), video memory, and the WLAN module status.

- Hard disk test—This test analyzes the physical condition of the hard drive, and then checks all data in every sector of the hard drive. If the test detects a damaged sector, it attempts to move the data to a good sector.

- Memory test—This test analyzes the physical condition of the memory modules. If it reports an error, replace the memory modules immediately.

- Battery test—This test analyzes the condition of the battery and calibrates the battery if necessary. If the battery fails the test, contact support to report the issue and purchase a replacement battery.

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

To start Advanced System Diagnostics:

1. Turn on or restart the computer. While the "Press the ESC key for Startup Menu" message is displayed in the lower-left corner of the screen, press esc. When the Startup Menu is displayed, press f2.

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

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

Windows 8 – Computer Setup (BIOS) and Advanced System Diagnostics

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.

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

   ● To scroll up and down, click the up arrow or the down arrow in the upper-right corner of the screen, or use the up arrow key or the down arrow key.

   ● To close open dialog boxes and return to the main Computer Setup screen, press esc, and then follow the on-screen instructions.

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

2. Press f10 to enter Computer Setup.

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

● To exit Computer Setup menus without saving your changes:

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

   – or –

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

● To save your changes and exit Computer Setup menus:

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

– or –

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

Your changes go into effect when the computer restarts.

Restoring 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 **File > Restore Defaults**.

4. Follow the on-screen instructions.

5. To save your changes and exit, click the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

– or –

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

Your changes go into effect when the computer restarts.

NOTE: Your password settings and security settings are not changed when you restore the 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 displayed by pressing fn+esc (if you are already in Windows) or by using Computer Setup.

1. Start Computer Setup.

2. Use a pointing device or the arrow keys to select **File > System Information**.

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

– or –

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

Downloading a BIOS update

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

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

Do not shut down the computer or initiate Sleep.

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

1. From the Start screen, type `help` and then select **Help and Support**.

2. In the **Help and Support** search box, type `maintain`, and then follow the on-screen instructions to identify your computer and access the BIOS update you want to download.

3. At the download area, follow these steps:

    a. Identify the BIOS update that is later than the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.

    b. Follow the on-screen instructions to download your selection to the hard drive.

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

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

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

1. From the Start screen, type `windows explorer`, and then click **Windows Explorer**.

2. Double-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.
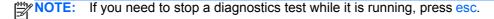
Using Advanced System Diagnostics

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

- System Tune-Up—This group of additional tests checks your computer to make sure that the main components are functioning correctly. System Tune-Up runs longer and more comprehensive tests on memory modules, hard drive SMART attributes, the hard drive surface, the battery (and battery calibration), video memory, and the WLAN module status.

- Start-up test—This test analyzes the main computer components that are required to start the computer.

- Run-in test—This test repeats the start-up test and checks for intermittent problems that the start-up test does not detect.

- Hard disk test—This test analyzes the physical condition of the hard drive, and then checks all data in every sector of the hard drive. If the test detects a damaged sector, it attempts to move the data to a good sector.

- Memory test—This test analyzes the physical condition of the memory modules. If it reports an error, replace the memory modules immediately.

- Battery test—This test analyzes the condition of the battery and calibrates the battery if necessary. If the battery fails the test, contact HP support to report the issue and purchase a replacement battery.

- BIOS Management—You can update or rollback the version of the BIOS on the system. Do not shut down or remove external power during the process. You will be given a confirmation screen before your BIOS is modified. Select **BIOS update**, **BIOS Rollback**, or **Back to main menu**.

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

To start Advanced System Diagnostics:

1. Turn on or restart the computer. While the "Press the ESC key for Startup Menu" message is displayed in the lower-left corner of the screen, press esc. When the Startup Menu is displayed, press f2.

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

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

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

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.

Using Computer Setup

Navigating and selecting in Computer Setup

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

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

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

    ●   To scroll up and down, click the up arrow or the down arrow in the upper-right corner of the screen, or use the up arrow key or the down arrow key.

    ●   To close open dialog boxes and return to the main Computer Setup screen, press esc, and then follow the on-screen instructions.

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

2. Press f10 to enter Computer Setup.

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

●   To exit Computer Setup menus without saving your changes:

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

    – or –

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

●   To save your changes and exit Computer Setup menus:

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

– or –

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

Your changes go into effect when the computer restarts.

Restoring 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 **File > Restore Defaults**.

4. Follow the on-screen instructions.

5. To save your changes and exit, click the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

   – or –

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

Your changes go into effect when the computer restarts.

NOTE: Your password settings and security settings are not changed when you restore the 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 displayed by pressing fn+esc (if you are already in Windows) or by using Computer Setup.

1. Start Computer Setup.

2. Use a pointing device or the arrow keys to select **File > System Information**.

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

   – or –

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

Downloading a BIOS update

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

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

Do not shut down the computer or initiate Sleep.

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

1. From the Start screen, type `help` and then select **Help and Support**.

2. In the **Help and Support** search box, type `maintain`, and then follow the on-screen instructions to identify your computer and access the BIOS update you want to download.

3. At the download area, follow these steps:

   a. Identify the BIOS update that is later than the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.

   b. Follow the on-screen instructions to download your selection to the hard drive.

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

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

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

1. From the Start screen, type `windows explorer`, and then click **Windows Explorer**.

2. Double-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 Advanced System Diagnostics

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

- Start-up test—This test analyzes the main computer components that are required to start the computer.

- Run-in test—This test repeats the start-up test and checks for intermittent problems that the start-up test does not detect.

- Hard disk test—This test analyzes the physical condition of the hard drive, and then checks all data in every sector of the hard drive. If the test detects a damaged sector, it attempts to move the data to a good sector.

- Memory test—This test analyzes the physical condition of the memory modules. If it reports an error, replace the memory modules immediately.

- Battery test—This test analyzes the condition of the battery and calibrates the battery if necessary. If the battery fails the test, contact support to report the issue and purchase a replacement battery.

- System Tune-Up—This group of additional tests checks your computer to make sure that the main components are functioning correctly. System Tune-Up runs longer and more comprehensive tests on memory modules, hard drive SMART attributes, the hard drive surface, the battery (and battery calibration), video memory, and the WLAN module status.

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

To start Advanced System Diagnostics:

1. Turn on or restart the computer. While the "Press the ESC key for Startup Menu" message is displayed in the lower-left corner of the screen, press esc. When the Startup Menu is displayed, press f2.

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

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

6 Specifications

Computer specifications

	Metric	U.S.
Length	25.6 cm	10.1 in
Width	37.5 cm	14.8 in
Height (front to rear)	2.9 to 3.6 cm	1.1 to 1.4 in
Weight (equipped with optical drive, 1 DIMM, hard drive, optical drive, WLAN module, 6 cell battery)	2.5 kg	5.5 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)	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F
Relative humidity (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating	-15 m to 3,048 m	-50 ft to 10,000 ft
Nonoperating	-15 m to 12,192 m	-50 ft to 40,000 ft
Shock		
Operating	125 g, 2 ms, half-sine	
Nonoperating	200 g, 2 ms, half-sine	
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.

39.6-cm (15.6-in), HD display specifications

	Metric	U.S.
Active diagonal size	39.6-cm	15.6-in
Resolution	1366x768 (HD)	
Active area	344.232x193.536	
PPI	100	
Surface treatment	Anti-glare or BrightView	
Contrast ratio	300:1 (typical) – Anti-glare	
	500:1 – BrightView	
Response time	8 ms	
Brightness	200 nits (typical)	
Viewing angle	SVA	
Backlight	LED	
Luminance uniformity @ 13 points	1.4 (typ), 1.6 (max)	
Lifetime (1/2 luminance)	12,000 hours	
Color coordinate (white)	(0.313, 0.329)	
Color tolerance (White)	+/- 0.02	
Color tolerance (R, G, B)	+/- 0.03	
Color gamut	60% (typical)	

Hard drive specifications

	750-GB*	640-GB*	500-GB*	320-GB*	250-GB*
Dimensions					
Height	9.5 mm	9.5 mm	9.5 mm	9.5 mm	9.5 mm
Width	70 mm	70 mm	70 mm	70 mm	70 mm
Weight	115 g	101 g	101 g	101 g	101 g
Interface type	SATA	SATA	SATA	SATA	SATA
Transfer rate	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
Seek times (typical read, including setting)					
Single track	1.5 ms	2 ms	3 ms	3 ms	3 ms
Average	11 ms	12 ms	13 ms	13 ms	13 ms
Maximum	14 ms	22 ms	24 ms	24 ms	24 ms
Logical blocks	1,465,149,168	1,250,263,728	1,048,576,000	625,141,400	488,397,168
Disc rotational speed	7200 rpm	7200 rpm or 5400 rpm			
Operating temperature	5°C to 55°C (41°F to 131°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.

Blu-ray BD-R/RE DVD±RW SuperMulti DL Drive specifications

Applicable disc	Read:	Write:	
	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, BD-ROM, BD-R, BD-RE	CD-R, CD-RW, DVD+R, DVD+R(9), DVD+RW, DVD-R, DVD-R(9), DVD-RW, DVD-RAM, BD-R, BD-RE	
Access time	**CD**	**DVD**	**BD-ROM**
Random	<180 ms	<180 ms	<230 ms
Maximum Media Capacity (read)	50 GB		
Maximum Media Capacity (write)	8.5 GB		
Data transfer rate			
24X CD-ROM	3,600 KB/sec		
8X DVD	10,800 KB/sec		
2X BD-ROM	9,000 KB/sec		
16X CD-R	3,600 KB/sec		
16X CD-RW	2,400 KB/sec		
8X DVD+R	10,800 KB/sec		
6X DVD+RW	8,100 KB/sec		
8X DVD-R	10,800 KB/sec		
6X DVD-RW	8,100 KB/sec		
4X DVD+R Dual Layer	5,400 KB/sec		
4X DVD-R Dual Layer	5,400 KB/sec		
5X DVD-RAM	6,750 KB/sec		
2X BD-R	9,000 KB/sec		
2X BD-RE	9,000 KB/sec		

DVD±RW and CD-RW SuperMulti DL Combo Drive specifications

Applicable disc	Read:	Write:
	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	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 Disc ROM with SuperMulti DVD±R/RW 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 specifications

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)	3600 KB/s (150 KB/s at 1X CD rate)	
DVD (8X)	10,800 KB/s (1,352 KB/s at 1X DVD 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 the in the System area, click **Device Manager**.

To access Device Manager in Windows 7:

1.   Select **Start > Computer > System properties**.

2.   In the left pane, click **Device Manager**.
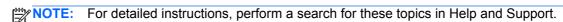
7   Backup and recovery

Windows 7 - Backup and recovery

To protect your information, use Windows Backup and Restore to 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, or create system restore points. In case of system failure, you can use the backup files to restore the contents of your computer.

Windows Backup and Restore provides the following options:

- Creating a system repair disc (select models only) by using the installed optical drive (select models only) or an optional external optical drive

- Backing up your information

- Creating a system image (select models only)

- Scheduling automatic backups (select models only)

- Creating system restore points

- Recovering individual files

- Restoring the computer to a previous state

- Recovering information using recovery tools

NOTE: For detailed instructions, perform a search for these topics in 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. See Help and Support for more information.

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 as follows:

- Windows DVD—Installs the operating system without additional drivers or applications.
- Driver 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 DVD can be created only once. Thereafter, the option to create that media will not be available.

1. Select **Start > All Programs > Productivity and Tools > HP Recovery Disc Creator**.
2. Select **Driver Disc** or **Windows Disc**.
3. From the drop-down menu, select the drive for creating the recovery media.
4. Click the **Create** button to start the burning process.

Backing up your information

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

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 programs.
- Save customized settings that appear in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time-saver if you have to reset your preferences.
- When backing up to discs, use any of the following types of discs (purchased separately): CD-R, CD-RW, 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.

  NOTE: DVDs and DVDs with double-layer (DL) support store more information than CDs, so using them for backup reduces the number of recovery discs required.

- When backing up to discs, number each disc before inserting it into the external drive.

To create a backup using Backup and Restore:

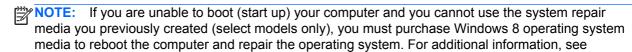**NOTE:** Be sure that the computer is connected to AC power before you start the backup process.

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

1.	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 a system repair disc (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: 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 discs you previously created (select models only), you must purchase a Windows 7 operating system DVD to reboot the computer and repair the operating system. For additional information, see the Using a Windows 7 operating system DVD (purchased separately) section.

Using the Windows recovery tools

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 completely erase hard drive contents 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**.

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, perform a search for these topics in Help and Support.

Using f11 recovery tools

⚠ **CAUTION:** Using f11 recovery tools 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 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 has been deleted, the f11 restore option will not function. You must recover your operating system and programs using the Windows 7 operating system DVD and the Driver Recovery disc (both purchased separately) if the Windows partition and the HP Recovery partition are not listed. For additional information, see the Using a Windows 7 operating system DVD (purchased separately) section.

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 a Windows 7 operating system DVD (purchased separately)

To order a Windows 7 operating system DVD, go to the HP website. 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. 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 you have created and any software 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 disc.

2. Install the Hardware Enabling Drivers first, and then install Recommended Applications.

Windows 8 - Backup and recovery

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 Help and Support. From the Start screen, type `h`, and then select **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. Refer to Help and Support for more information. From the Start screen, type `h`, and then select **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. The system repair media (select models only) are used to start up (boot) the computer and repair the operating system in case of system instability or failure. Your initial and subsequent backups allow you to restore your data and settings if a failure occurs.

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

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

Note the following when backing up:

- Store personal files in the Documents library, and back it up regularly.

- Back up templates that are stored in their associated programs.

- Save customized settings that appear in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time-saver if you have to reset your preferences.

To create a backup using Backup and Restore:

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

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

1. From the Start screen, type `backup`, click **Settings**, and then select from the list of displayed options.

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 Automatic Repair to fix problems that might prevent Windows from starting correctly.

- f11 recovery tools: You can use the f11 recovery tools to recover your original hard drive image. The image includes the Windows operating system and software programs installed at the factory.

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

Using the Windows recovery tools

To recover information you previously backed up:

▲ From the Start screen, type h, and then select **Help and Support**.

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

CAUTION: Some Automatic 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 HP Recovery partition and the Windows partition.

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

   – or –

   From the Start screen, type c, and then select **Computer**.

   NOTE: If the Windows partition and the HP Recovery partition are not listed, you must recover your operating system and programs using the Windows 8 operating system DVD and the *Driver Recovery* media (both purchased separately). For additional information, see Using Windows 8 operating system media (purchased separately) on page 113.

3. If the Windows partition and the HP Recovery partition are listed, restart the computer. After Windows has loaded, press and hold the shift key while clicking **Restart**. The system will display **Continue/Troubleshoot/ Turn off your PC**.

4. Select **Troubleshoot**. **Advanced Options**, and then **Automatic 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 Help and Support. From the Start screen, type h, and then select **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 HP Recovery partition: From the Start screen, type C, and then select **Computer**.

📝 **NOTE:** If the HP Recovery partition is not listed, you must recover your operating system and programs using the Windows 8 operating system media and the *Driver Recovery* media (both purchased separately). For additional information, see Using Windows 8 operating system media (purchased separately) on page 113.

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 8 operating system media (purchased separately)

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

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

To initiate recovery using a Windows 8 operating system DVD:

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

1. If possible, back up all personal files.

2. Restart the computer, and then insert the Windows 8 operating system DVD into the optical drive before the Windows operating system loads.

3. When prompted, press any keyboard key.

4. Follow the on-screen instructions.

After the repair is completed:

1. Eject the Windows 8 operating system media and then insert the *Driver Recovery* media.

2. Install the Hardware Enabling Drivers first, and then install Recommended Applications.

Using Windows Refresh for quick and easy recovery

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

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

NOTE: During Refresh, a list of removed traditional applications will be saved so that you have a quick way to see what you might need to reinstall. See Help and Support for instructions on reinstalling traditional applications. From the Start screen, type h, and then select **Help and Support**.

NOTE: You may be prompted for your permission or password when using Refresh. See Windows Help and Support for more information. From the Start screen, type h, and then select **Help and Support**.

To start Refresh:

1. On the Start screen, point to the far-right upper or lower corner of the screen to display the charms.

2. Click **Settings**.

3. Click **Change PC settings** in the bottom-right corner of the screen, and then select **General** from the PC settings screen.

4. Under **Refresh your PC without affecting your files**, select **Get started**, and follow the on-screen instructions.

Remove everything and reinstall Windows

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

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

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

To use the f11 key:

1. Press f11 while the computer boots.

    – or –

    Press and hold f11 as you press the power button.

2. Select **Troubleshoot** from the boot options menu.

3. Select **Reset your PC**, and follow the on-screen instructions.

To use the Start screen:

1. On the Start screen, point to the far-right upper or lower corner of the screen to display the charms.

2. Click **Settings**.

3. Click **Change PC settings** in the bottom-right corner of the screen, and then select **General** from the PC settings screen.

4. Under **Remove everything and reinstall Windows**, select **Get started**, and follow the on-screen instructions.

Using HP Software Setup

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

1. From the Start screen, type `HP Software Setup`, and select **Apps**.

2. Open HP Software Setup.

3. Follow the on-screen directions to reinstall drivers or select software.

SUSE Linux - Backup and recovery

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 .

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 Restore DVD, using an installed or an external DVD±RW 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 Restore DVD, you must first create the recovery disc. To create the recovery disc:

📝 **NOTE:** HP recommends that you create the HP Factory Image Restore DVD 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 Restore DVD** in the right pane.

3. Follow the on-screen instructions to create an image file to burn a recovery disc.

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. Press the down arrow to select **Restore SLED HP-BNB preload image** from the **Linux boot** menu, and then press enter.

5. Using the arrow keys, select **Yes** when prompted: **Do you want to start the System-Restore?**

6. Follow the on-screen instructions.

USB Recovery option (select models only)

The USB Recovery Disk On Key (flash drive) option allows you to create a backup image of the SUSE Linux 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 SUSE Linux

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.

8 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 **1.0 m** (3.3 ft) and no more than **2.0 m** (6.5 ft).

- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.

- The power cord sets must have a minimum current capacity of 10 A and a nominal voltage rating of 125 or 250 V ac, as required by the power system of each country or region.

- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions

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	METI	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	EK	5
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	6
Thailand	TISI	1
The United Kingdom	BSI	1
The United States	UL	2

1. The flexible cord must be Type HO5VV-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-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V 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 H)5VV-F3X0.75mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.

5. The flexible cord must be Type VCTF, 3-conductor, 0.75mm² 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 3X1.255mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.

7. For 127 V ac, the flexible cord must be Type SVT or SJT 3X18 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 HOVV–F 3X0.75/1.00mm² conductor size, with plug BS 1363/A with BSI or ASTA marks.

9   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 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.
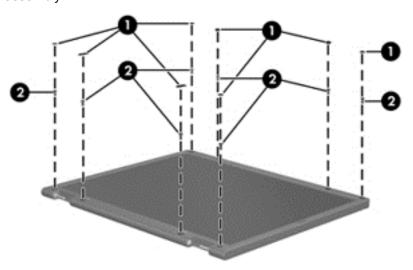
This section provides disassembly instructions for the display assembly. The display assembly must be disassembled to gain access to the backlight **(1)** and the liquid crystal display (LCD) panel **(2)**.
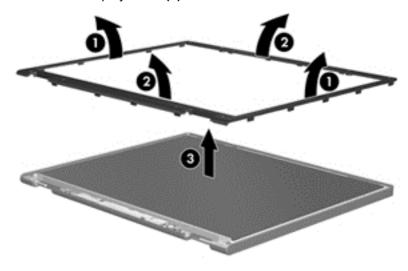
📝 NOTE: The procedures provided in this chapter are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

Perform the following steps to disassemble the display assembly:
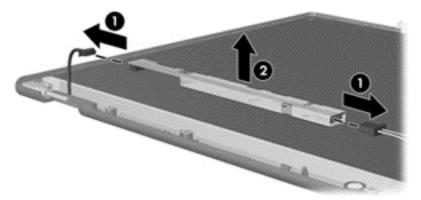
1. Remove all screw covers **(1)** and screws **(2)** that secure the display bezel to the display assembly.
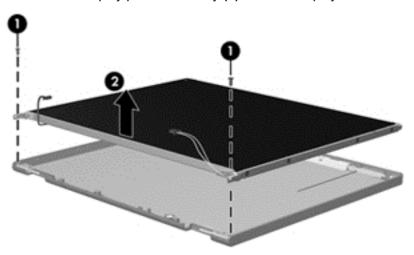
2. Lift up and out on the left and right inside edges **(1)** and the top and bottom inside edges **(2)** of the display bezel until the bezel disengages from the display assembly.

3. Remove the display bezel **(3)**.
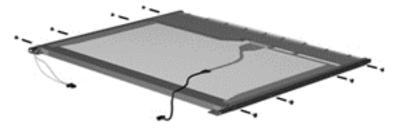
4. Disconnect all display panel cables **(1)** from the display inverter and remove the inverter **(2)**.

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.
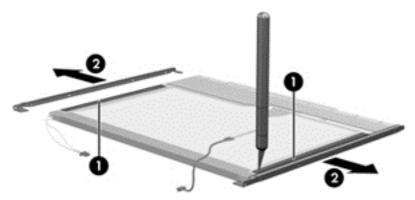
7. Position the display panel assembly upside-down.

8. Remove all screws that secure the display panel frame to the display panel.
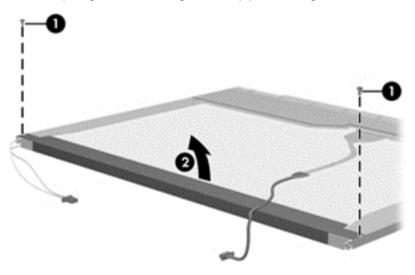
9. Use a sharp-edged tool to cut the tape **(1)** that secures the sides of the display panel to the display panel frame.
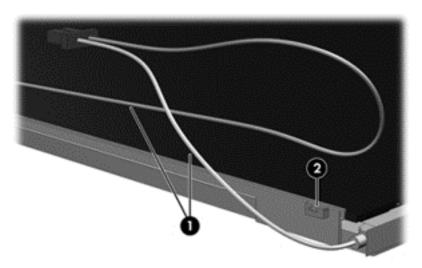
10. Remove the display panel frame **(2)** from the display panel.
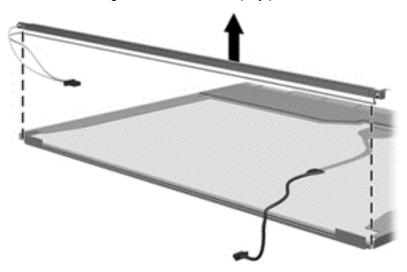
11. Remove the screws **(1)** that secure the backlight cover to the display panel.

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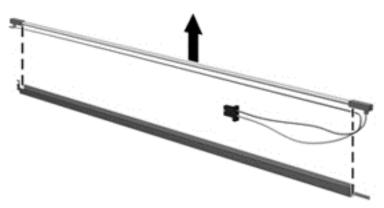
13. Remove the backlight cover.

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.
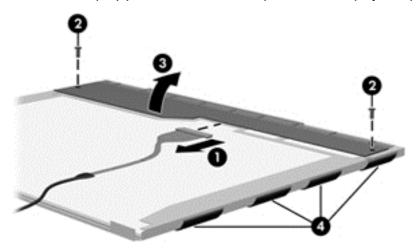
18. Remove the backlight from the backlight frame.
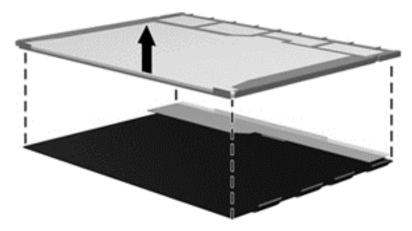
19. Disconnect the display panel cable **(1)** from the LCD panel.

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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