HP ProBook 4540s Notebook PC
HP ProBook 4440s Notebook PC
HP ProBook 4441s 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).

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1   Product description

Category	Description	4540s (UMA)	4540s (Disc)	4440s (UMA)	4440s/ 4441s (Disc)
Product Name	**HP ProBook 4540s Notebook PC**	√	√		
	HP ProBook 4440s Notebook PC			√	√
	HP ProBook 4441s Notebook PC				√
Processors	**Intel® Core™ i7 processor, Quad Core** (6-MB L3 cache, 35W)				
	Intel® Core i5 processors, Dual Core (3-MB L3 cache, 35W)				
	3380M, 2.90-GHz processor	√	√	√	√
	3360M, 2.80-GHz processor	√	√	√	√
	3340M, 2.70-GHz processor	√	√	√	√
	3320M, 2.60-GHz processor	√	√	√	√
	3230M, 2.60-GHz processor	√	√	√	√
	2450M, 2.50-GHz processor	√	√	√	√
	Intel Core i3 processors, Dual Core, 3rd generation (3-MB L3 cache, 35W)				
	3130M, 2.60-GHz processor	√	√	√	√
	3120M, 2.50-GHz processor	√	√	√	√
	3110M, 2.40-GHz processor	√	√	√	√
	Intel Core i3 processors, Dual Core, 2nd generation (3-MB L3 cache, 35W)				
	2370M, 2.40-GHz processor	√	√	√	√
	2350M, 2.30-GHz processor	√	√	√	√
	2328M, 2.20-GHz processor	√	√	√	√
	Intel Pentium processor, Dual Core (2-MB L3 cache, 35W)				
	2020M, 2.40-GHz processor	√	√	√	√
	B980, 2.40-GHz processor	√	√	√	√

Category	Description	4540s (UMA)	4540s (Disc)	4440s (UMA)	4440s/ 4441s (Disc)
	B970, 2.30-GHz processor	√	√	√	√
	Intel Celeron processor (2-MB L3 cache, 35W)				
	1000M, 1.80-GHz processor	√	√	√	√
	B840, 1.90-GHz processor	√	√	√	√
Chipset	Mobile Intel HM76 chipset	√	√	√	√
Graphics	Intel HD Graphics (UMA)	√		√	
	AMD Radeon™ HD 7650M, 1-GB or 2-GB (discrete)		√		√
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	√			
	39.6-cm (15.6-inch) HD, 1366x768, includes camera	√	√		
	39.6-cm (15.6-inch) HD, 1366x768, includes camera and WWAN	√			
	35.6-cm (14.0-inch) HD, 1366x768			√	
	35.6-cm (14.0-inch) HD, 1366x768, with camera			√	√
	35.6-cm (14.0-inch) HD, 1366x768, with camera and WWAN			√	
	35.6-cm (14.0-inch) HD, BrightView, 1366x768			√	
	35.6-cm (14.0-inch) HD, BrightView, 1366x768, with camera			√	√
	35.6-cm (14.0-inch) HD, BrightView, 1366x768, with camera and WWAN			√	
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 (4096 × 2)

- 6144 (4096 + 2048)

- 4096 (2048 × 2)

- 4096 (4096 × 1)

- 2048 (2048 × 1)

Category	Description	4540s (UMA)	4540s (Disc)	4440s (UMA)	4440s/ 4441s (Disc)
	Brazil			√	
	● 8192 (4096 × 2; dual channel)				
	● 4096 (2048 × 2; dual channel)				
	● 4096 (4096 × 1)				
	● 2048 (2048 × 1)				
Hard drives	Supports 7-mm/9.5-mm, 2.5-in SATA hard drives with HP 3D DriveGuard	√	√	√	√
	Supports 12.7-mm. 2.5-inch hard drives with HP 3D DriveGuard	√	√		
	Customer-accessible	√	√	√	√
	Supports the following drives:			√	√
	● 750-GB, 7200-rpm or 5400-rpm				
	● 640-GB, 5400-rpm				
	● 500-GB, 7200-rpm or 5400-rpm				
	● 320-GB, 7200-rpm or 5400-rpm				
	Supports the following drives:	√	√		
	● 750-GB, 7200-rpm or 5400-rpm				
	● 640-GB, 5400-rpm				
	● 500-GB, 7200-rpm				
	● 320-GB, 7200-rpm				
Fixed optical drives	Supports the following 12.7-mm SATA optical drives:	√	√	√	√
	● DVD+/-RW SuperMulti DL				
	● Blu-ray ROM DVD+/-RW SuperMulti DL				
	DVD-ROM drive	√	√		
	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	√	√	√	√
	IDT 92HD87	√	√	√	√

Category	Description	4540s (UMA)	4540s (Disc)	4440s (UMA)	4440s/ 4441s (Disc)
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: ● Atheros 9485GN 802.11b/g/n 1x1 WiFi and 3012 Bluetooth 4.0 Combo Adapter ● Broadcom 4313GN 802.11b/g/n 1x1 WiFi and 20702 Bluetooth 4.0 Combo Adapter ● Intel Centrino Wireless-N 2230 ● Intel Centrino Advanced-N 6235 ● Ralink WLAN Ralink Ripple3 RT5390F_802.11 b/g/n 1x1 PCIe HMC ● Atheros AR9485 802.11b/g/n 1x1 WiFi Adapter ● Atheros AR9565 802.11bgn 1x1 WiFi + BT4.0 combo Adapter ● Ralink RT3290LE 802.11bgn 1x1 Wi-Fi and Bluetooth 4.0 Combo Adapter ● Ralink RT5390R 802.11bgn 1x1 Wi-Fi Adapter	√	√	√	√
	Integrated WWAN options by way of wireless module:				
	Two WWAN antennas built into display assembly (world-wide 5 band, configured with panels)	√		√	
	Subscriber identity module (SIM) security (customer-accessible)	√		√	
	Supports "no WWAN" option	√	√	√	√
	Supports the following WWAN modules: ● Sierra MC8355 HSPA/CDMA with GPS ● Ericsson 5321 HSPA+ with GPS	√		√	
	Integrated personal area network (PAN) options by way of Bluetooth® module:				
	Bluetooth 4.0 only supported by combo card	√	√	√	√
External media card	6-in-1 Digital Media Reader Slot	√	√	√	√
Ports	Audio-in (stereo microphone)	√	√	√	√
	Audio-out (stereo headphone)	√	√	√	√

| Category	Description	4540s (UMA)	4540s (Disc)	4440s (UMA)	4440s/ 4441s (Disc)
	RJ-45 (Ethernet, includes link and activity lights)	√	√	√	√
	USB 3.0 (2)	√	√	√	√
	USB 2.0 (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	√	√	√	√
	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	√		√	
	9-cell, 93-Wh Li-ion battery	√	√	√	√
	6-cell, 47-Wh Li-ion battery	√	√	√	√
Security	Integrated fingerprint reader	√	√	√	√
	Intel AT support	√	√	√	√
	Support Kensington security lock	√	√	√	√
	Support no fingerprint reader option	√	√	√	√
Operating system	**Preinstalled:**				
	Windows 7 Professional 64 with Microsoft Basics	√	√	√	√
	Windows 7 Professional 32 with Microsoft Basics (Japan only)	√	√		
	Windows 7 Home Premium 64 with Microsoft Basics	√	√	√	√
	Windows 8 Professional 64-bit Digital Product Key (DPK) with Windows 7 Professional Microsoft Basics	√	√	√	√
	Windows 8 Professional 32-bit Digital Product Key with Windows 7 Professional Microsoft Basics	√	√		
	Windows 8 Multi-language (ML) 64-bit with Microsoft Basics	√	√	√	√
	Windows 8 Professional 64-bit with Microsoft Basics	√	√	√	√

Category	Description	4540s (UMA)	4540s (Disc)	4440s (UMA)	4440s/ 4441s (Disc)
	Novell™: SuSE Linux™ – SLED 11, 64-bit, SP2 (not available with WWAN)	√	√	√	√
	FreeDOS	√	√	√	√
	Preinstalled with Microsoft Office:				
	Windows 7 Home Basic 64 with Microsoft Office 2010 Starter (not for Japan)	√	√	√	√
	Windows 7 Home Basic 64 with Microsoft Office 2010 Starter – EDGI	√	√	√	√
	Windows 7 Home Basic 64 with Microsoft Office 2010 Professional (Japan only)	√	√	√	√
	Windows 7 Professional 64 with Microsoft Office 2010 Starter MSNA	√	√	√	√
	Windows 7 Professional 64 with Microsoft Office 2010 Starter EDGI	√	√	√	√
	Windows 7 Professional 64 with Microsoft Office 2010 Starter (not for Japan)	√	√	√	√
	Windows 7 Professional 64 with Microsoft Office 2010 Personal (Japan only)	√	√	√	√
	Windows 7 Professional 64 with Microsoft Office 2010 Home & Business (Japan only)	√	√	√	√
	Windows 7 Professional 64 with Microsoft Office 2010 Professional (Japan only)	√	√	√	√
	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 7 Home Premium 64 with Microsoft Office 2010 Starter EDGI	√	√	√	√
	Windows 7 Home Premium 64 with Microsoft Office 2010 Starter (not for Japan)	√	√	√	√
	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 Premium 64 with Microsoft Office 2010 Professional	√	√	√	√
	Windows 8 Professional Digital Product Key (DPK) 64-bit with Windows 7 Professional 32 Image and Office 2010 Personal	√	√		

Category	Description	4540s (UMA)	4540s (Disc)	4440s (UMA)	4440s/ 4441s (Disc)
	Windows 8 Professional Digital Product Key 64-bit with Windows 7 Professional 32 Image and Office 2010 Home & Business	√	√		
	Windows 8 Professional Digital Product Key 64-bit with Windows 7 Professional 32 Image Digital Product Key and Office 2010 Home & Business	√	√		
	Windows 8 Professional Digital Product Key 64-bit with Windows 7 Professional 64 Image and Office 2010 Starter	√	√	√	√
	Windows 8 Professional Digital Product Key 64-bit with Windows 7 Professional 64 Image and Office 2010 Personal	√	√	√	√
	Windows 8 Professional Digital Product Key 64-bit with Windows 7 Professional 64 Image and Office 2010 Home & Business	√	√	√	√
	Windows 8 Professional Digital Product Key 64-bit with Windows 7 Professional 64 Image and Office 2010 Professional	√	√	√	√
	Windows 8 Multi-language (ML) 64-bit with Office 2010 Transition OEM Preinstallation Kit (OPK)	√	√	√	√
	Windows 8 Emerging Markets (EM) 64-bit with Office 2010 Transition OEM Preinstallation Kit	√	√	√	√
	Windows 8 Chinese Market (CH) 64-bit with Office 2010 Transition OEM Preinstallation Kit	√	√	√	√
	Windows 8 Multi-language 64-bit with Office 2010 Personal	√	√	√	√
	Windows 8 Multi-language 64-bit with Office 2010 Home & Business	√	√	√	√
	Windows 8 Multi-language 64-bit with Office 2010 Professional	√	√	√	√
	Windows 8 Professional 64-bit with Office 2010 Transition OEM Preinstallation Kit	√	√	√	√
	Windows 8 Professional 64-bit with Office 2010 Personal	√	√	√	√
	Windows 8 Professional 64-bit with Office 2010 Home & Business	√	√	√	√
	Windows 8 Professional 64-bit with Office 2010 Professional	√	√	√	√
	Restore Media:				
	Windows 7 Professional 64	√	√	√	√
	Windows 7 Professional 32	√	√		
	Windows 7 Home Premium 64	√	√	√	√
	Windows 7 Home Basic 64	√	√	√	√

Category	Description	4540s (UMA)	4540s (Disc)	4440s (UMA)	4440s/ 4441s (Disc)
	DRDVD Windows 7	√	√	√	√
	DRDVD Windows 8	√	√	√	√
	Windows 8 Professional 64	√	√	√	√
	Web-only support:				
	Windows XP Professional (Discrete graphic drive not supported)	√	√	√	√
	Windows 7 Home Basic 32	√	√	√	√
	Windows 7 Home Premium 32	√	√	√	√
	Windows 7 Professional 32	√	√	√	√
	Certified:				
	Microsoft WHQL	√	√	√	√
Serviceability	**End-user replaceable parts:**				
	AC adapter	√	√	√	√
	Battery (system)	√	√	√	√
	Hard drive	√	√	√	√
	Memory module	√	√	√	√
	Optical drive	√	√	√	√
	WLAN module	√	√	√	√
	WWAN module	√		√	
	Keyboard	√	√	√	√

2 External component identification

Display
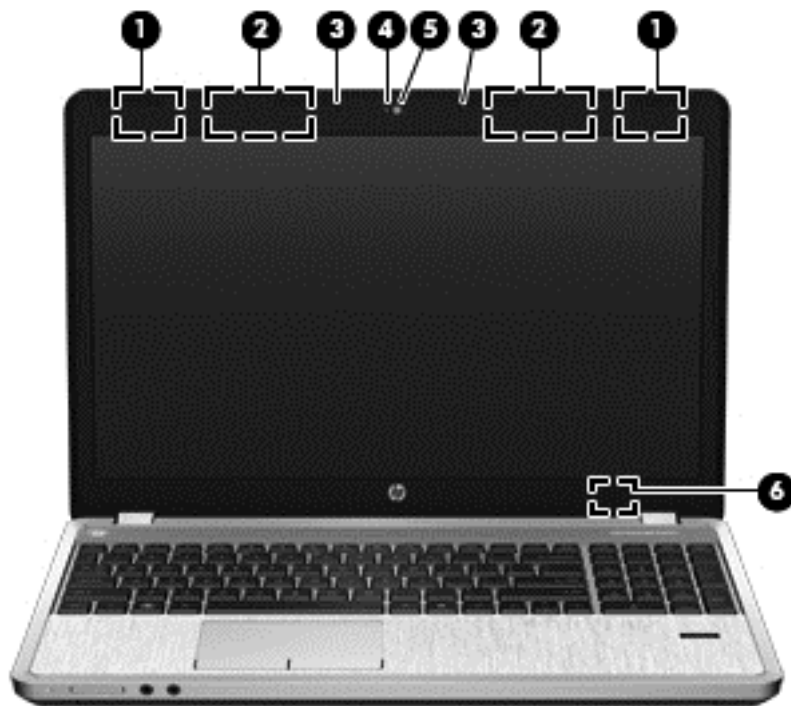
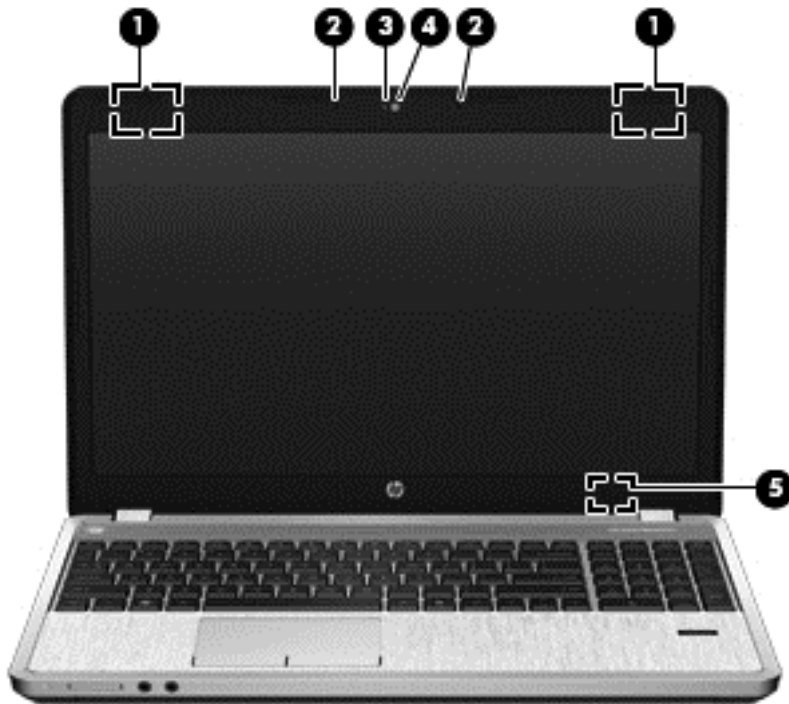| Component		Description
(1)	WWAN antennas (2)* (select models only)	Send and receive wireless signals to communicate with wireless wide-area networks (WWAN).
(2)	WLAN antennas (2)*	Send and receive wireless signals to communicate with wireless local area networks (WLAN).
(3)	Internal microphone(s) (1 or 2 depending on model)	Record sound.
(4)	Webcam light (select models only)	On: The webcam is in use.
(5)	Webcam (select models only)	Records video and captures still photographs.
		To use the webcam, select **Start > All Programs > Music, Photos and Videos>WebCam Companion**.

Component		Description
(6)	Internal display switch	Turns off the display or initiates Sleep if the display is closed while the power is on.
		NOTE: The display switch is not visible from the outside of the computer.

*The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions. To see wireless regulatory notices, refer to the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region. These notices are located in Help and Support. To access this guide in Windows 8, select the HP Support Assistant app on the Start screen, select My computer, and then select the User guides.

Display - SUSE Linux models

Component		Description
(1)	WLAN antennas (2)*	Send and receive wireless signals to communicate with wireless local area networks (WLAN).
(2)	Internal microphones (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.
(5)	Internal display switch	Turns off the display or initiates Suspend if the display is closed while the power is on.
		NOTE: The display switch is not visible from the outside of the computer.

*The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions. To see wireless regulatory notices, refer to the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region.
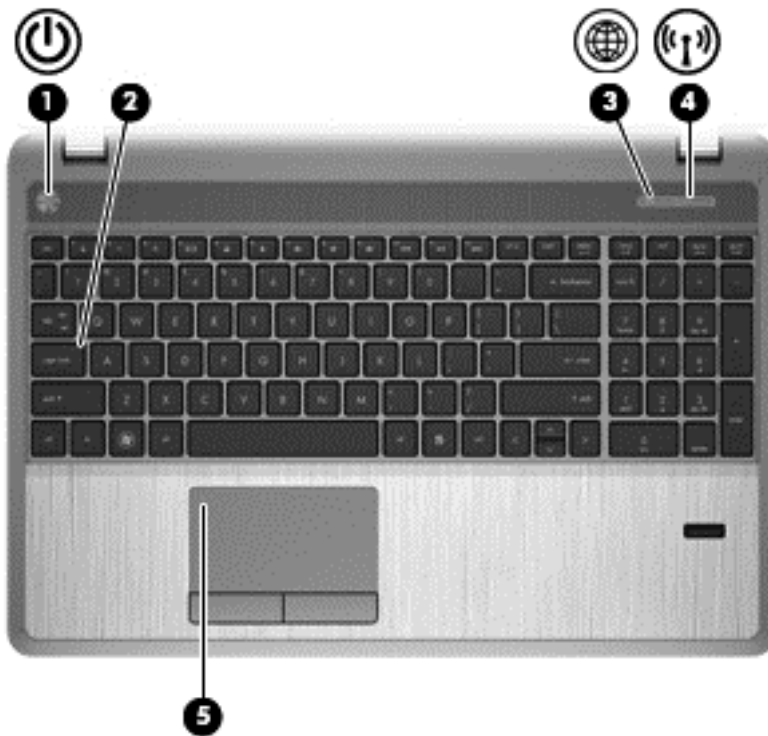
Top

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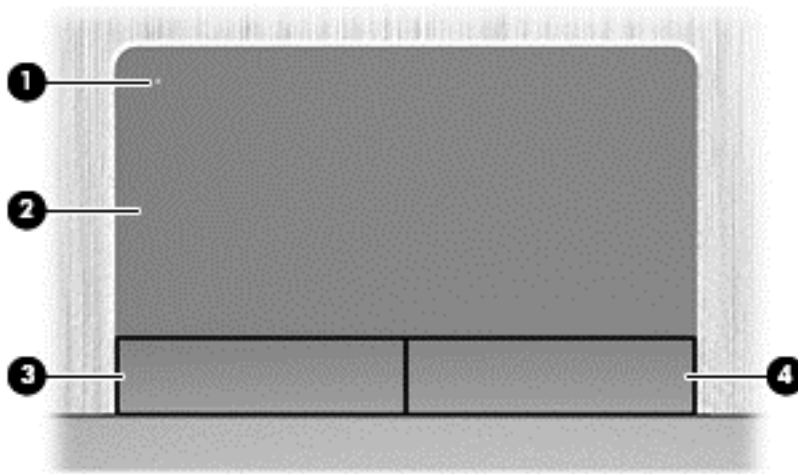
	Component	Description
(1)	TouchPad on/off button	Turns the TouchPad on and off.
(2)	TouchPad zone	Moves the pointer and selects or activates items on the screen.
(3)	Left TouchPad button	Functions like the left button on an external mouse.
(4)	Right TouchPad button	Functions like the right button on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

Lights

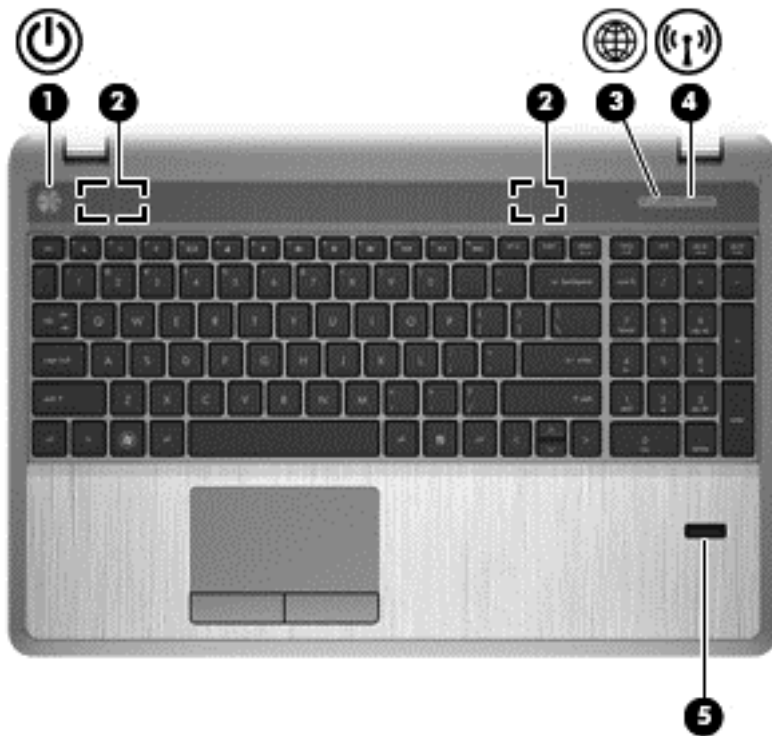| Components		Description
(1)	Power light	● On: The computer is on.
		● Blinking: The computer is in the Sleep state.
		● Off: The computer is off or in Hibernation. Hibernation is an energy-saving mode that uses the least amount of power.
(2)	Caps lock light	On: Caps lock is on.
(3)	Web browser light	● On: The computer is on.
		● Off: The computer is off, in Suspend mode, or in Hibernation.
		In SUSE Linux: Off: The computer is off, in the Suspend state, or in Hibernation.
(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: TouchPad is on.

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

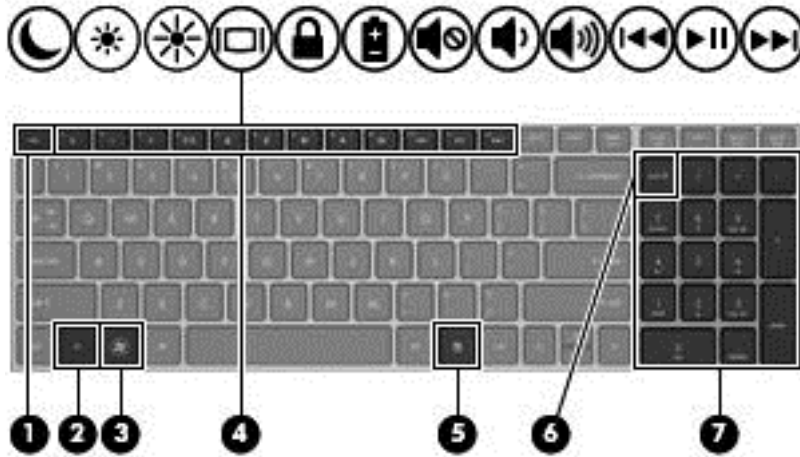| Component			Description
(1)		Power button	● When the computer is off, press the button to turn on the computer.
			● When the computer is on, press the button briefly to initiate Sleep/Suspend.
			● When the computer is in the Sleep state, press the button briefly to exit Sleep/Suspend.
			● When the computer is in Hibernation, press the button briefly to exit 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:
			In Windows 7:
			● Select **Start > Control Panel > System and Security > Power Options**.
			In Windows 8:
			● From the Start screen, type `power options`. Click **Settings**, and then select **Power Options** from the options displayed.
			In 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 Windows, instead of a password logon.

Keys – Windows models

Model 4540s

Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes frequently used system functions when pressed in combination with a function key, the num lk key, the esc key, or other keys.
(3)	Windows 7 logo key	Displays the Windows Start menu.
	Windows 8 logo key	
(4)	Function keys	Execute frequently used system functions when pressed in combination with the fn key.
(5)	Windows 7 applications key	Windows 7: Displays a shortcut menu for items beneath the cursor.
	Windows 8 applications key	Windows 8: Displays the App bar and a shortcut menu for items beneath the cursor.
(6)	num lk key	Alternates between the navigational and numeric functions on the integrated numeric keypad.
(7)	Integrated numeric keypad	Can be used like an external numeric keypad.

Model 4440s/4441s

Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes frequently used system functions when pressed in combination with a function key, the num lk key, the esc key, or other keys.
(3)	Windows 7 logo key	Displays the Windows Start menu.
	Windows 8 logo key	
(4)	Function keys	Execute frequently used system functions when pressed in combination with the fn key.
(5)	Embedded numeric keypad keys	When the keypad is turned on, it can be used like an external numeric keypad. Each key on the keypad performs the function indicated by the icon in the upper-right corner of the key.
(6)	Windows 7 applications key	Windows 7: Displays a shortcut menu for items beneath the cursor.
	Windows 8 applications key	Windows 8: Displays the App bar and a shortcut menu for items beneath the cursor.
(7)	num lk key	Turns the embedded numeric keypad on and off when pressed in combination with the fn key.

Keys - SUSE Linux models

NOTE: Refer to the illustration that most closely matches your computer.

Component		Description
(1)	fn key	Executes frequently used system functions when pressed in combination with a function key.
(2)	Operating system logo key	Displays the operating system menu.
(3)	Function keys	Execute frequently used system functions when pressed in combination with the fn key.
(4)	Embedded numeric keypad keys	When the keypad is turned on, it can be used like an external numeric keypad. Each key on the keypad performs the function indicated by the icon in the upper-right corner of the key
(5)	Operating system applications key	Displays a shortcut menu for items beneath the cursor.
(6)	num lk key	Turns the embedded numeric keypad on and off when pressed in combination with the fn key.

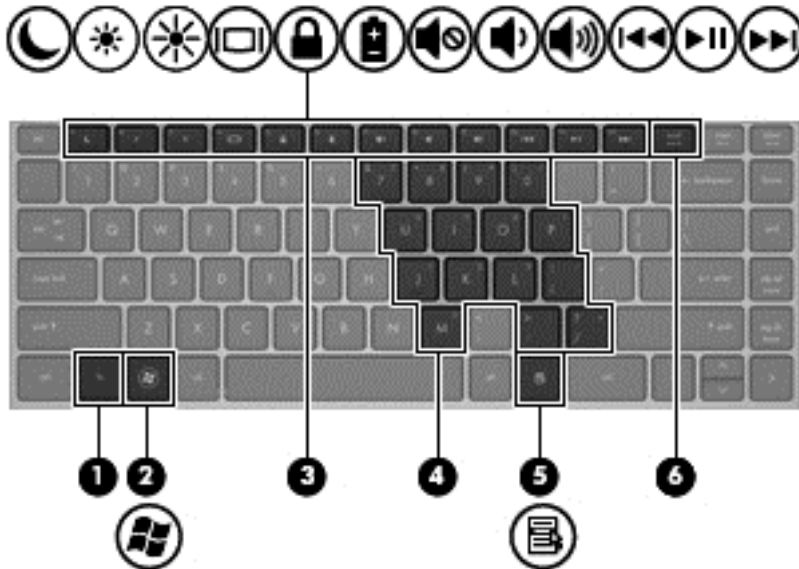| Component		Description
(1)	fn key	Executes frequently used system functions when pressed in combination with a function key.
(2)	Operating system logo key	Displays the operating system menu.
(3)	Function keys	Execute frequently used system functions when pressed in combination with the fn key.
(4)	Operating system applications key	Displays a shortcut menu for items beneath the cursor.
(5)	num lk key	Alternates between the navigational and numeric functions on the integrated numeric keypad.
(6)	Integrated numeric keypad	Can be used like an external numeric keypad.

Front

Component		Description
(1)	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 PRO Duo (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	Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. **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* **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.

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	● White: The computer is connected to external power and the battery is charged from 90 to 99 percent. ● Amber: The computer is connected to external power and the battery is charged from 0 to 90 percent. ● Blinking amber: A battery that is the only available power source has reached a low battery level. When the battery reaches a critical battery level, the battery light begins blinking rapidly. ● Off: The battery is fully charged.
(4)	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.

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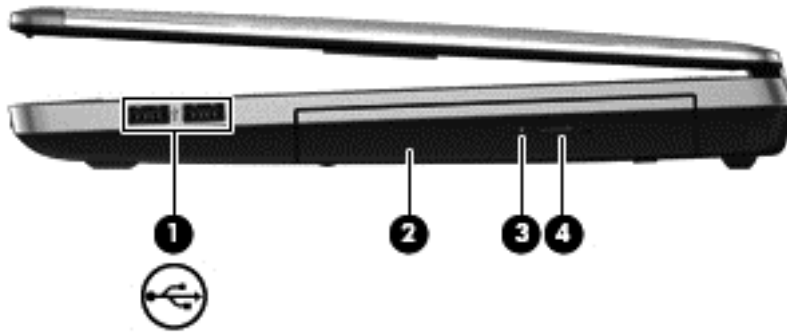
Component		Description
(1)	⟵ USB 2.0 ports (2)	Connect optional USB devices.
(2)	Optical drive (select models only)	Reads an optical disc. **NOTE:** On select models, the optical drive also writes to an optical disc.
(3)	Optical drive light (select models only)	● On: The optical drive is being accessed.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

Bottom

Component		Description
(1)	Battery and service door release latches	● Releases the battery from the battery bay by sliding the release latches one time. ● When the battery has been removed from the battery bay, releases 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, the WWAN module slot, and the memory module slots. **CAUTION:** To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore computer functionality, and then contact technical support through Help and Support. On Windows 7 models, contact technical support through Help and Support. On Windows 8 models, from the Start screen, type `help`, and then select **Help and Support**.
(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.

3 Illustrated parts catalog

Service tag and PCID label

Service tag

When ordering parts or requesting information, provide the computer serial number and model description provided on the service tag.
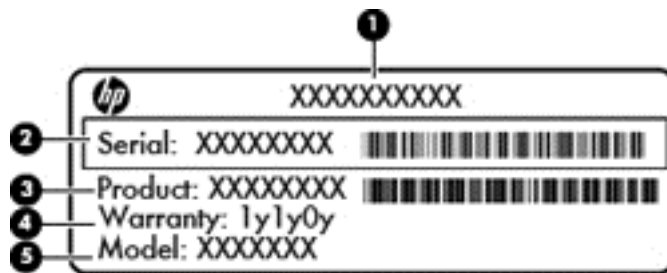
- Product name **(1)**. This is the product name affixed to the front of the computer.

- Serial number (s/n) **(2)**. This is an alphanumeric identifier that is unique to each product.

- Part number/Product number (p/n) **(3)**. This number provides specific information about the product's hardware components. The part number helps a service technician to determine what components and parts are needed.

- Warranty period **(4)**. This number describes the duration (in years) of the warranty period for the computer.

- Model description (select models only) **(5)**. This is the alphanumeric identifier used to locate documents, drivers, and support for the computer.

PCID label

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

NOTE: Computer details may vary from images.

Windows 8 models
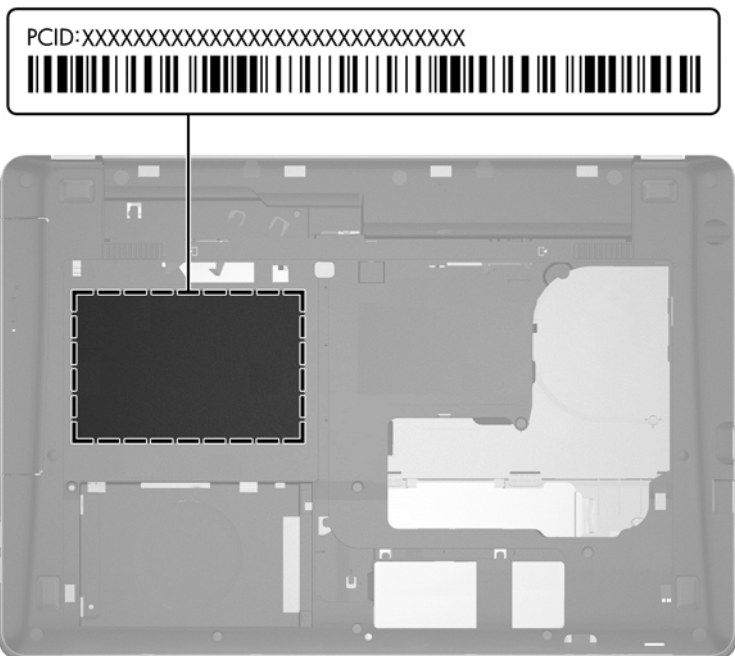
Non-Windows 8 models
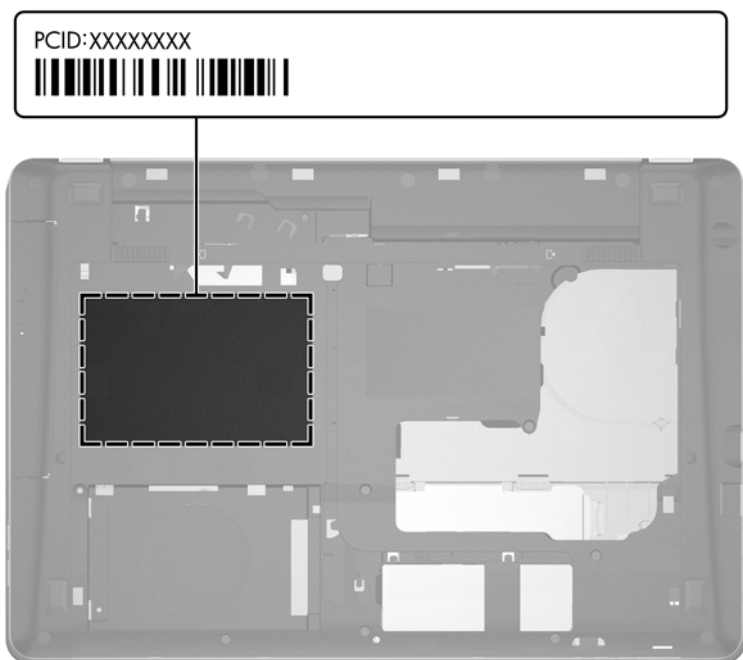
Computer major components

Model 4540s

Model 4540s
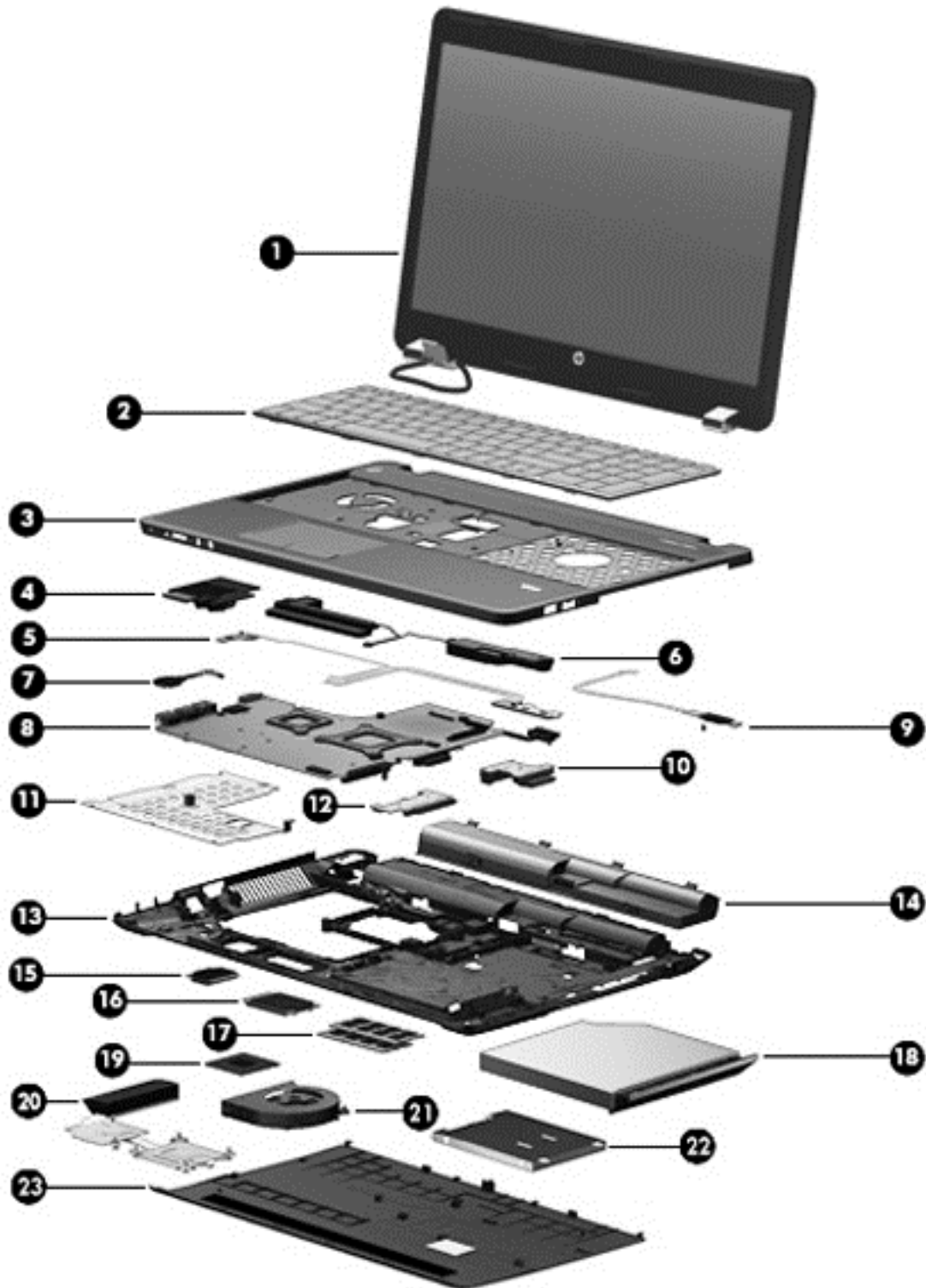
Item	Description	Spare part number
(1)	**Display panel**	
	39.6-cm (15.6-inch) HD, anti-glare, without webcam	683481-001
	39.6-cm (15.6-inch) HD, anti-glare, with webcam	683482-001
	39.6-cm (15.6-inch) HD, anti-glare, with webcam and WWAN	683483-001
(2)	**Keyboard** (includes cable)	
	NOTE: For a detailed list of available keyboards, see Sequential part number listing on page 41.	
	For use in models without Windows 8	683491-xxx
	For use in models with Windows 8	702237-xxx
(3)	**Top cover** (includes touchpad assembly and cable)	
	With a fingerprint reader	683506-001
	Without a fingerprint reader	683507-001
(4)	**Audio board**	683475-001
(5)	**Function board/Power button board assembly** (includes cable)	683486-001
(6)	**Speaker assembly**	683505-001
(7)	**RTC battery**	683502-001
(8)	**System board** (includes replacement thermal material)	
	For use in models in which the processor is NOT soldered to the system board; without Windows 8:	
	● UMA graphics with WWAN	683496-001
	● UMA graphics without WWAN	683495-001
	● 1-GB discrete graphics memory	683493-001
	● 2-GB discrete graphics memory	683494-001
	For use in models in which the processor is NOT soldered to the system board; with Windows 8:	
	● Windows 8 Standard and UMA graphics with WWAN	683496-501
	● Windows 8 Professional and UMA graphics with WWAN	683496-601
	● Windows 8 Standard and UMA graphics without WWAN	683495-501
	● Windows 8 Professional and UMA graphics without WWAN	683495-601
	● Windows 8 Standard and 1-GB discrete graphics memory	683493-501
	● Windows 8 Professional and 1-GB discrete graphics memory	683493-601
	● Windows 8 Standard and 2-GB discrete graphics memory	683494-501
	● Windows 8 Professional and 2-GB discrete graphics memory	683494-601
	For use in models in which the processor is soldered to the system board:	
	● Non-Windows 8 models with UMA graphics and an Intel Core i3-3120M processor	712922-001

Item	Description	Spare part number
	● Windows 8 Standard models with UMA graphics and an Intel Core i3-3120M processor	712922-501
	● Windows 8 Professional models with UMA graphics and an Intel Core i3-3120M processor	712922-601
	● Non-Windows 8 models with UMA graphics and an Intel Core i3-3110M processor	712921-001
	● Windows 8 Standard models with UMA graphics and an Intel Core i3-3110M processor	712921-501
	● Windows 8 Professional models with UMA graphics and an Intel Core i3-3110M processor	712921-601
	● Non-Windows 8 models with 1-GB of discrete graphics and an Intel Core i3-3120M processor	712924-001
	● Windows 8 Standard models with 1-GB of discrete graphics and an Intel Core i3-3120M processor	712924-501
	● Windows 8 Professional models with 1-GB of discrete graphics and an Intel Core i3-3120M processor	712924-601
	● Non-Windows 8 models with 1-GB of discrete graphics and an Intel Core i3-3110M processor	712923-001
	● Windows 8 Standard models with 1-GB of discrete graphics and an Intel Core i3-3110M processor	712923-501
	● Windows 8 Professional models with 1-GB of discrete graphics and an Intel Core i3-3110M processor	712923-601
	For use in models only in Brazil in which the processor is soldered to the system board:	
	● Non-Windows 8 models with UMA graphics and an Intel Core i3-3120M processor	718659-001
	● Windows 8 Standard models with UMA graphics and an Intel Core i3-3120M processor	718659-501
	● Windows 8 Professional models with UMA graphics and an Intel Core i3-3120M processor	718659-601
	● Non-Windows 8 models with UMA graphics and an Intel Core i3-3110M processor	718658-001
	● Windows 8 Standard models with UMA graphics and an Intel Core i3-3110M processor	718658-501
	● Windows 8 Professional models with UMA graphics and an Intel Core i3-3110M processor	718658-601
(9)	**Fingerprint reader assembly** (includes cable, bracket, and screws)	683485-001
(10)	**Optical drive extension board**	683498-001
(11)	**Heat shield**	687696-001
(12)	**Hard drive extension 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**	

Item	Description	Spare part number
	Atheros 9485GN 802.11b/g/n 1x1 WiFi and 3012 Bluetooth 4.0 Combo Adapter	655795-001
	Broadcom 4313GN 802.11b/g/n 1x1 WiFi and 20702 Bluetooth 4.0 Combo Adapter	657325-001
	Intel Centrino Wireless-N 2230	670290-001
	Intel Centrino Advanced-N 6235	670292-001
	Ralink WLAN Ralink Ripple3 RT5390F_802.11 b/g/n 1x1 PCIe HMC	670691-001
	Atheros AR9485 802.11b/g/n 1x1 WiFi Adapter	675794-001
	Atheros AR9565 802.11bgn 1x1 WiFi + BT4.0 combo Adapter	690019-001
	Ralink RT3290LE 802.11bgn 1x1 Wi-Fi and Bluetooth 4.0 Combo Adapter	690020-001
	Ralink RT5390R 802.11bgn 1x1 Wi-Fi Adapter	691415-001
(16)	**WWAN modules**	
	Ericsson F5321 HSPA+ with GPS	668969-001
	Sierra MC8355 HSPA/CDMA with GPS	634400-001
	HP un2430 EV-DO/HSPA Mini Card	702080-001
	HP hs2350 hspa+ Mobile Broadband Module	710788-001
(17)	**Memory modules** (PC3-12800, 1600-MHz, DDR3)	
	4-GB	641369-001
	2-GB	652972-001
(18)	**Optical drive** (includes bracket, bezel, and screws)	
	DVD-ROM drive	700845-001
	DVD±RW Double-Layer Drive	683500-001
	Blu-ray ROM DVD±RW SuperMulti DL Drive	683499-001
(19)	**Processor** (includes thermal material)	
	Intel Core i7 processor, Quad Core	
	3632QM, 2.2-GHz processor with 6-MB L3 cache	701658-001
	3612QM, 2.1-GHz processor with 6-MB L3 cache	680647-001
	Intel Core i5 processors, Dual Core	
	3380M, 2.9-GHz processor with 3-MB L3 cache (includes thermal grease)	708762-001
	3360M, 2.8-GHz processor with 3-MB L3 cache (includes thermal grease)	681953-001
	3340M, 2.7-GHz processor with 3-MB L3 cache (includes thermal grease)	708761-001
	3320M, 2.6-GHz processor with 3-MB L3 cache (includes thermal grease)	681952-001
	3230M, 2.6-GHz processor with 3-MB L3 cache (includes thermal grease)	711903-001
	3210M, 2.5-GHz processor with 3-MB L3 cache (includes thermal grease)	680645-001
	2450M, 2.5-GHz processor with 3-MB L3 cache (includes thermal grease)	676359-001
	Intel Core i3 processors, Dual Core	

Item	Description	Spare part number
	3130M, 2.6-GHz processor with 3-MB L3 cache (includes thermal grease)	713163-001
	3120M, 2.5-GHz processor with 3-MB L3 cache (includes thermal grease)	700627-001
	3110M, 2.3-GHz processor with 3-MB L3 cache (includes thermal grease)	682417-001
	2370M, 2.4-GHz processor with 3-MB L3 cache (includes thermal grease)	677152-001
	2350M, 2.3-GHz processor with 3-MB L3 cache (includes thermal grease)	653340-001
	Intel Pentium processor, Dual Core	
	2020M, 2.4-GHz, with 2-MB L3 cache	700628-001
	B980, 2.4-GHz, with 2-MB L3 cache	692428-001
	B970, 2.3-GHz, with 2-MB L3 cache	676785-001
	Intel Celeron processor	
	1000M, 1.8-GHz, with 2-MB L3 cache	713162-001
	B840, 1.9-GHz, with 2-MB L3 cache	664663-001
(20)	**Heat sink** (includes replacement thermal material)	
	For use in models with a removable processor:	
	● Discrete graphics	683489-001
	● UMA graphics	683490-001
	For use in models with the processor soldered to the system board:	
	● Discrete graphics	712919-001
	● UMA graphics	712920-001
(21)	**Fan**	683484-001
(22)	**Hard drive**	
	750-GB, 7200-rpm	633252-001
	750-GB, 5400-rpm	634250-001
	640-GB, 5400-rpm	669300-001
	500-GB, 7200-rpm	634925-001
	500-GB, 5400-rpm	683802-001
	320-GB, 7200-rpm	641672-001
	320-GB, 5400-rpm	645193-001
(23)	**Bottom door**	690978-001

Model 4440s/4441s

Figure 3-2 Model 4440s/4441s
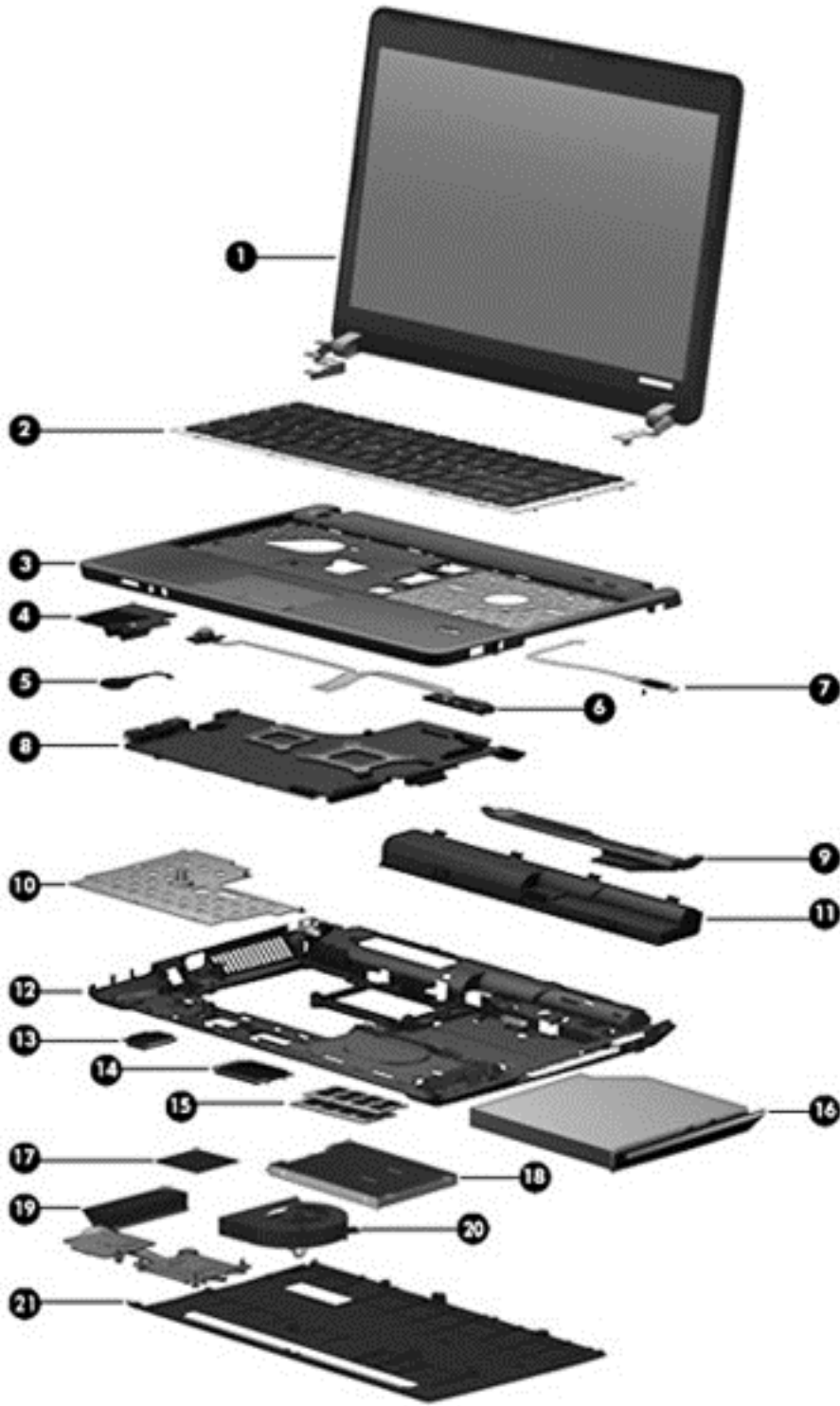
Item	Description	Spare part number
(1)	**Display panel**	
	35.6-cm (14.0-inch), anti-glare, without webcam	683644-001
	35.6-cm (14.0-inch), anti-glare, with webcam	683645-001
	35.6-cm (14.0-inch), anti-glare, with webcam and WWAN	683646-001
	35.6-cm (14.0-inch), BrightView, without webcam	683647-001
	35.6-cm (14.0-inch), BrightView, with webcam	683648-001
	35.6-cm (14.0-inch), BrightView, with webcam and WWAN	683650-001
(2)	**Keyboard** (includes cable)	
	NOTE: For a detailed list of available keyboards, see Sequential part number listing on page 41.	
	For use in models without Windows 8	683657-xxx
	For use in models with Windows 8	702238-xxx
(3)	**Top cover** (includes touchpad assembly)	
	With a fingerprint reader	683666-001
	Without a fingerprint reader	683667-001
(4)	**Audio board**	683475-001
(5)	**RTC battery**	683502-001
(6)	**Function board/Power button board assembly** (includes cable)	683653-001
(7)	**Fingerprint reader assembly** (includes cable, bracket, and screws)	683652-001
(8)	**System board** (includes replacement thermal material)	
	For use in models in which the processor is NOT soldered to the system board; without Windows 8:	
	● 1-GB discrete graphics	683493-001
	● 2-GB discrete graphics	683494-001
	● UMA graphics without WWAN	683495-001
	● UMA graphics and with WWAN	683496-001
	For use in models in which the processor is NOT soldered to the system board; with Windows 8:	
	● Windows 8 Standard and UMA graphics with WWAN	683496-501
	● Windows 8 Professional and UMA graphics with WWAN	683496-601
	● Windows 8 Standard and UMA graphics without WWAN	683495-501
	● Windows 8 Professional and UMA graphics without WWAN	683495-601
	● Windows 8 Standard and 1-GB discrete graphics memory	683493-501
	● Windows 8 Professional and 1-GB discrete graphics memory	683493-601
	● Windows 8 Standard and 2-GB discrete graphics memory	683494-501

Item	Description	Spare part number
	● Windows 8 Professional and 2-GB discrete graphics memory	683494-601
	For use in models in which the processor is soldered to the system board:	
	● Non-Windows 8 models with UMA graphics and an Intel Core i3-3120M processor	712922-001
	● Windows 8 Standard models with UMA graphics and an Intel Core i3-3120M processor	712922-501
	● Windows 8 Professional models with UMA graphics and an Intel Core i3-3120M processor	712922-601
	● Non-Windows 8 models with UMA graphics and an Intel Core i3-3110M processor	712921-001
	● Windows 8 Standard models with UMA graphics and an Intel Core i3-3110M processor	712921-501
	● Windows 8 Professional models with UMA graphics and an Intel Core i3-3110M processor	712921-601
	● Non-Windows 8 models with 1-GB of discrete graphics and an Intel Core i3-3120M processor	712924-001
	● Windows 8 Standard models with 1-GB of discrete graphics and an Intel Core i3-3120M processor	712924-501
	● Windows 8 Professional models with 1-GB of discrete graphics and an Intel Core i3-3120M processor	712924-601
	● Non-Windows 8 models with 1-GB of discrete graphics and an Intel Core i3-3110M processor	712923-001
	● Windows 8 Standard models with 1-GB of discrete graphics and an Intel Core i3-3110M processor	712923-501
	● Windows 8 Professional models with 1-GB of discrete graphics and an Intel Core i3-3110M processor	712923-601
	For use in models only in Brazil in which the processor is soldered to the system board:	
	● Non-Windows 8 models with UMA graphics and an Intel Core i3-3120M processor	718659-001
	● Windows 8 Standard models with UMA graphics and an Intel Core i3-3120M processor	718659-501
	● Windows 8 Professional models with UMA graphics and an Intel Core i3-3120M processor	718659-601
	● Non-Windows 8 models with UMA graphics and an Intel Core i3-3110M processor	718658-001
	● Windows 8 Standard models with UMA graphics and an Intel Core i3-3110M processor	718658-501
	● Windows 8 Professional models with UMA graphics and an Intel Core i3-3110M processor	718658-601
(9)	**Speaker assembly**	683665-001
(10)	**Heat shield**	683497-001
(11)	**Battery, Li-ion**	
	9-cell (93 WHr, 2.8 Ah)	633809-001
	6-cell (47 WHr, 2.2 Ah)	633805-001
(12)	**Base enclosure**	683639-001

Item	Description	Spare part number
(13)	**WLAN module**	
	Atheros 9485GN 802.11b/g/n 1x1 WiFi and 3012 Bluetooth 4.0 Combo Adapter	655795-001
	Broadcom 4313GN 802.11b/g/n 1x1 WiFi and 20702 Bluetooth 4.0 Combo Adapter	657325-001
	Intel Centrino Wireless-N 2230	670290-001
	Intel Centrino Advanced-N 6235	670292-001
	Ralink WLAN Ralink Ripple3 RT5390F_802.11 b/g/n 1x1 PCIe HMC	670691-001
	Atheros AR9485 802.11b/g/n 1x1 WiFi Adapter	675794-001
	Atheros AR9565 802.11bgn 1x1 WiFi + BT4.0 combo Adapter	690019-001
	Ralink RT3290LE 802.11bgn 1x1 Wi-Fi and Bluetooth 4.0 Combo Adapter	690020-001
	Ralink RT5390R 802.11bgn 1x1 Wi-Fi Adapter	691415-001
(14)	**WWAN modules**	
	Ericsson F5321 HSPA+ with GPS	668969-001
	Sierra MC8355 HSPA/CDMA with GPS	634400-001
	HP un2430 EV-DO/HSPA Mini Card	702080-001
	HP hs2350 hspa+ Mobile Broadband Module	710788-001
(15)	**Memory modules** (PC3-12800, 1600-MHz, DDR3)	
	4-GB	641369-001
	2-GB	652972-001
(16)	**Optical drive** (includes bracket, bezel, and screws)	
	DVD±RW and CD-RW Super Multi Double-Layer Combo Drive	691110-001
	Blu-ray ROM DVD±RW SuperMulti DL Drive	691111-001
(17)	**Processor** (includes thermal material)	
	Intel Core i7 processor, Quad Core	
	3632QM, 2.2-GHz processor with 6-MB L3 cache	701658-001
	3612QM, 2.1-GHz processor with 6-MB L3 cache	680647-001
	Intel Core i5 processors, Dual Core	
	3380M, 2.9-GHz processor with 3-MB L3 cache (includes thermal grease)	708762-001
	3360M, 2.8-GHz processor with 3-MB L3 cache (includes thermal grease)	681953-001
	3340M, 2.7-GHz processor with 3-MB L3 cache (includes thermal grease)	708761-001
	3320M, 2.6-GHz processor with 3-MB L3 cache (includes thermal grease)	681952-001
	3230M, 2.6-GHz processor with 3-MB L3 cache (includes thermal grease)	711903-001
	3210M, 2.5-GHz processor with 3-MB L3 cache (includes thermal grease)	680645-001
	2450M, 2.5-GHz processor with 3-MB L3 cache (includes thermal grease)	676359-001
	Intel Core i3 processors, Dual Core	

Item	Description	Spare part number
	3130M, 2.6-GHz processor with 3-MB L3 cache (includes thermal grease)	713163-001
	3120M, 2.5-GHz processor with 3-MB L3 cache (includes thermal grease)	700627-001
	3110M, 2.3-GHz processor with 3-MB L3 cache (includes thermal grease)	682417-001
	2370M, 2.4-GHz processor with 3-MB L3 cache (includes thermal grease)	677152-001
	2350M, 2.3-GHz processor with 3-MB L3 cache (includes thermal grease)	653340-001
	Intel Pentium processor, Dual Core	
	2020M, 2.4-GHz, with 2-MB L3 cache	700628-001
	B980, 2.4-GHz, with 2-MB L3 cache	692428-001
	B970, 2.3-GHz, with 2-MB L3 cache	676785-001
	Intel Celeron processor	
	1000M, 1.8-GHz, with 2-MB L3 cache	713162-001
	B840, 1.9-GHz, with 2-MB L3 cache	664663-001
(18)	**Hard drive**	
	750-GB, 7200-rpm	633252-001
	750-GB, 5400-rpm	634250-001
	640-GB, 5400-rpm	669300-001
	500-GB, 7200-rpm	634925-001
	500-GB, 7200-rpm hard drive (locked)	718475-001
	500-GB, 5400-rpm	669299-001
	320-GB, 7200-rpm	641672-001
	320-GB, 5400-rpm	622643-001
	128-GB solid-state drive	684253-001
(19)	**Heat sink** (includes replacement thermal material)	
	For use in models with removable processors:	
	● Discrete graphics	683655-001
	● UMA graphics	683656-001
	For use in models with processors soldered onto the system board:	
	● Discrete graphics	713376-001
	● UMA graphics	713377-001
(20)	**Fan**	683651-001
(21)	**Bottom door**	690979-001

Display components
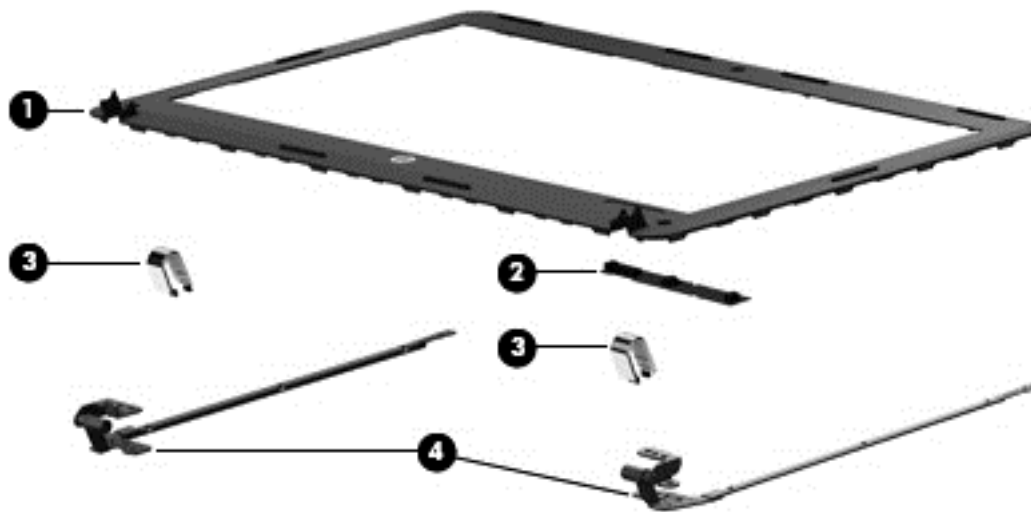
Item	Description	Spare part number
(1)	**Display bezel**	
	For use with 4540s models with a webcam	683478-001
	For use with 4540s models without a webcam	683479-001
	For use with 4440/4441s models with a webcam	683641-001
	For use with 4440/4441s models without a webcam	683642-001
(2)	**Webcam module** for use in all models	683508-001
	Microphone module (not illustrated)	647675-001
	Display Hinge Kit	
	For use with 4540s models	683480-001
	For use with 4440/4441s models	683643-001
(3)	● Display hinge covers	
(4)	● Display hinges	
	Display Cable Kit for use in 4440s/4441s models	731549-001
	● Screw covers (not illustrated)	

Plastics Kit

Item	Description	Spare part number
	Plastics Kit for use in 4540s models	683501-001
	Plastics Kit for use in 4440s/4441s models	683662-001
(1)	Optical drive protective insert	
(2)	Secure Digital card protective insert	

Cable Kit
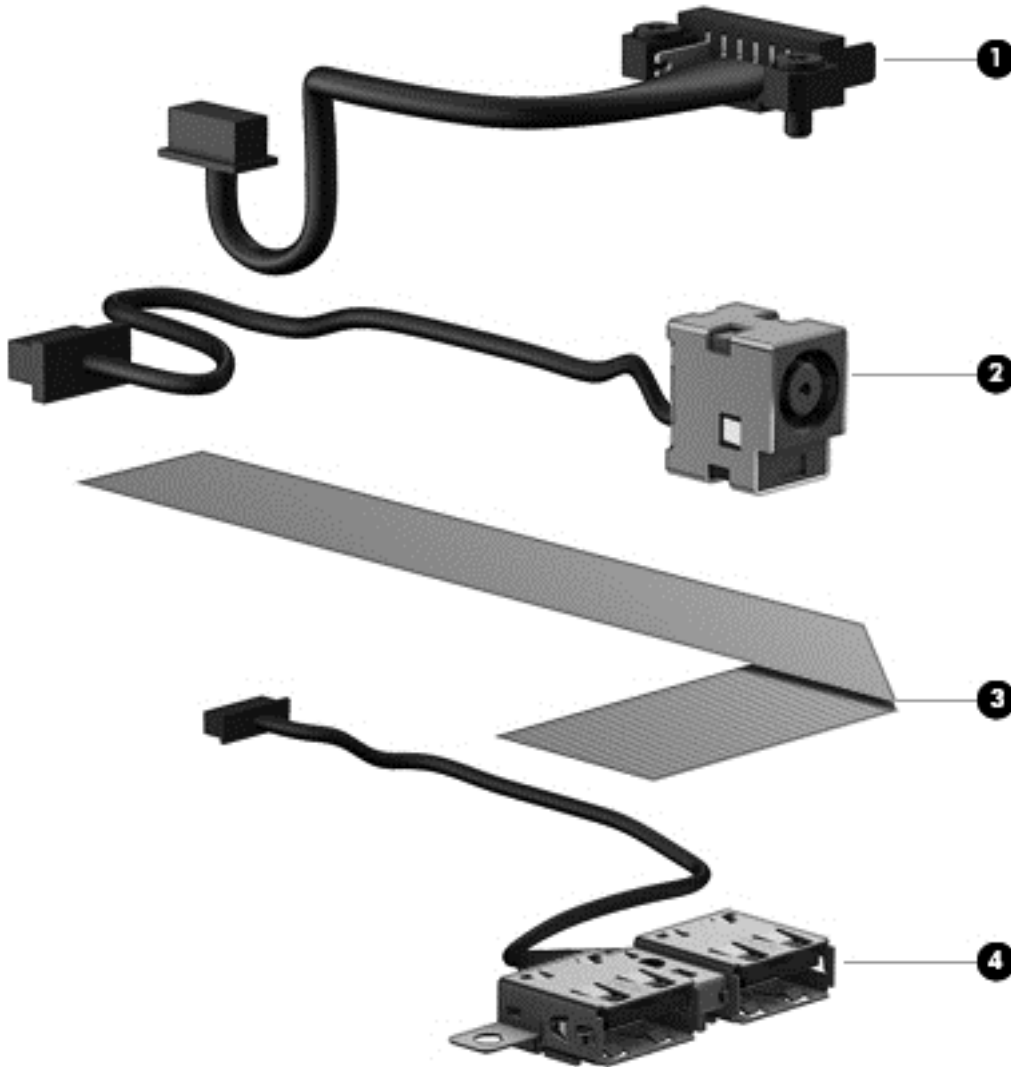
Item	Description	Spare part number
	Cable Kit for use in 4540s models	683477-001
	Cable Kit for use in 4440s/4441s models	683640-001
(1)	Battery connector cable	
(2)	Power connector cable	
(3)	Audio cable	
(4)	USB connector and cable	

Mass storage devices

	Description	Spare part number
(1)	**Hard drives**	
	750-GB, 7200-rpm	633252-001
	750-GB, 5400-rpm	634250-001
	640-GB, 5400-rpm	669300-001
	500-GB, 7200-rpm	634925-001
	500-GB, 7200-rpm hard drive (locked; model 4440s/4441s only)	718475-001
	500-GB, 5400-rpm (4540s models only)	683802-001
	500-GB, 5400-rpm (4440s/4441s models only)	669299-001
	320-GB, 7200-rpm	641672-001
	320-GB, 5400-rpm (4540s models only)	645193-001
	320-GB, 5400-rpm (4440s/4441s models only)	622643-001
	128-GB solid-state drive	684253-001
	Hard Drive Hardware Kit (includes hard drive bracket and screws; not illustrated)	683488-001
(2)	**Optical drives**	
	For use in 4540s models:	
	DVD-ROM drive	700845-001
	● DVD±RW and CD-RW Super Multi Double-Layer Combo Drive	683500-001
	● Blu-ray ROM DVD±RW SuperMulti DL Drive	683499-001
	For use in 4440s/4441s models:	
	● DVD±RW and CD-RW Super Multi Double-Layer Combo Drive	691111-001
	● Blu-ray ROM DVD±RW SuperMulti DL Drive	691110-001

Miscellaneous parts

Description	Spare part number
AC adapters	
65-W AC adapter	693711-001
65-W AC adapter for use in India and the People's Republic of China	693710-001
90-W AC adapter	693712-001
90-W AC adapter for use in India and the People's Republic of China	693713-001
Power cords:	
For use in Argentina	490371-D01
For use in Brazil	490371-202
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 South Africa	490371-AR1
For use in Switzerland	490371-111
For use in Thailand	490371-201
For use in the United Kingdom	490371-031
For use in the United States	490371-001
Rubber Kit (includes LCD screw covers rubber feet)	
For use with model 4540s	683503-001
For use with model 4440s/4441s	683663-001
Screw Kit	
For use with model 4540s	683504-001
For use with model 4440s/4441s	683664-001
Locks	
Notebook combination lock	591699-001
Mice	
HP USB Optical Travel Mouse	434594-001
Cases	
Slim top load case	592923-001
Nylon case	612757-001
Top load case	679921-001

Sequential part number listing

CSR flag designations:

A = Mandatory

B = Optional

C = Service technician recommended

N = Non-user replaceable

Spare part number	CSR flag	Description
434594-001	A	HP USB 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
490371-201	A	Power cord for use in Thailand
490371-202	A	Power cord for use in Brazil
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	Slim top load case
612757-001	A	Nylon case
622643-001	A	320-GB, 5400-rpm hard drive (4440s/4441s models only)
633252-001	A	750-GB, 7200-rpm hard drive
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
634250-001	A	750-GB, 5400-rpm hard drive
634400-001	A	Sierra MC8355 HSPA/CDMA with GPS
634925-001	A	500-GB, 7200-rpm hard drive
641369-001	A	4-GB memory module (PC3-12800, 1600-MHz, DDR3)
641672-001	A	320-GB, 7200-rpm hard drive
645193-001	A	320-GB, 5400-rpm hard drive (4540s models only)
647675-001	N	Microphone module

Spare part number	CSR flag	Description
652972-001	A	2-GB memory module (PC3-12800, 1600-MHz, DDR3)
653340-001	N	Intel Core i3 processor, 2350M, 2.3-GHz processor, 3-MB L3 cache (includes thermal material)
655795-001	A	Atheros 9485GN 802.11b/g/n 1x1 WiFi and 3012 Bluetooth 4.0 Combo Adapter
657325-001	A	Broadcom 4313GN 802.11b/g/n 1x1 WiFi and 20702 Bluetooth 4.0 Combo Adapter
664663-001	N	Intel Celeron B840 processor, 1.9-GHz processor, 3-MB L3 cache (includes thermal material)
668969-001	A	Ericsson F5321 HSPA+ with GPS
669299-001	A	500-GB, 5400-rpm hard drive (4440s/4441s models only)
669300-001	A	640-GB, 5400-rpm hard drive
670290-001	A	Intel Centrino Wireless-N 2230 WLAN card
670292-001	A	Intel Centrino Advanced-N 6235 WLAN card
670691-001	A	Ralink WLAN Ralink Ripple3 RT5390F_802.11 b/g/n 1x1 PCIe HMC
675794-001	A	Atheros AR9485 802.11b/g/n 1x1 WiFi Adapter
676359-001	N	Intel Core i5 processor, 2450M, 2.5-GHz, 3-MB L3 cache (include thermal material)
676785-001	N	Intel Pentium B970 processor, 2.3-GHz, 2-MB L3 cache (includes thermal material)
677152-001	N	Intel Core i3 processor, 2370M, 2.4-GHz, 3-MB L3 cache (includes thermal material)
679921-001	A	Top load case
680645-001	A	Intel Core i5 processor, 3210M, 2.5-GHz, 3-MB L3 cache (includes thermal grease)
680647-001	N	Intel Core i7 processor, 3612QM, 2.1-GHz, 6-MB L3 cache (include thermal material)
681952-001	N	Intel Core i5 processor, 3320M, 2.6-GHz, 3-MB L3 cache (include thermal material)
681953-001	N	Intel Core i5 processor, 3360M, 2.8-GHz, 3-MB L3 cache (include thermal material)
682417-001	N	Intel Core i3 processor, 3110M, 2.3-GHz, 3-MB L3 cache (include thermal material)
683475-001	N	Audio board
683476-001	N	Base enclosure for use with 4540s models
683477-001	N	Cable Kit for use in 4540s models (see Cable Kit on page 38 for more Cable Kit spare part information)
683478-001	N	Display bezel for use with HP ProBook 4540s models with a webcam
683479-001	N	Display bezel for use with HP ProBook 4540s models without a webcam
683480-001	N	Display Hinge Kit for use on 4540s models (includes left and right hinges, hinge covers, screw covers, and screws)
683481-001	N	39.6-cm (15.6-inch) display assembly, HD, anti-glare, without webcam, for use in 4540s models
683482-001	N	39.6-cm (15.6-inch) display assembly, HD, anti-glare, with webcam, for use in 4540s models
683483-001	N	39.6-cm (15.6-inch) display assembly, HD, anti-glare, with webcam and WWAN, for use in 4540s models
683484-001	N	Fan
683485-001	N	Fingerprint reader assembly for use in 4540s models (includes cable, bracket, and screws)

Spare part number	CSR flag	Description
683486-001	N	Function board/power button board assembly for use in 4540s models (includes cable)
683487-001	N	Hard drive extension board for use in 4540s models
683488-001	N	Hard Drive Hardware Kit (includes hard drive bracket and screws)
683489-001	N	Heat sink for use in computers with discrete graphics with a removable processor (includes thermal material)
683490-001	N	Heat sink for use in computers with UMA graphics with a removable processor (includes thermal material)
683491-001	A	Keyboard for use in 4540s models without Windows 8 in the United States
683491-031	A	Keyboard for use in 4540s models without Windows 8 in the United Kingdom
683491-041	A	Keyboard for use in 4540s models without Windows 8 in Germany
683491-051	A	Keyboard for use in 4540s models without Windows 8 in France
683491-061	A	Keyboard for use in 4540s models without Windows 8 in Italy
683491-071	A	Keyboard for use in 4540s models without Windows 8 in Spain
683491-131	A	Keyboard for use in 4540s models without Windows 8 in Portugal
683491-141	A	Keyboard for use in 4540s models without Windows 8 in Turkey
683491-151	A	Keyboard for use in 4540s models without Windows 8 in Greece
683491-161	A	Keyboard for use in 4540s models without Windows 8 in Latin America
683491-171	A	Keyboard for use in 4540s models without Windows 8 in Saudi Arabia
683491-211	A	Keyboard for use in 4540s models without Windows 8 in Hungary
683491-251	A	Keyboard for use in 4540s models without Windows 8 in Russia
683491-261	A	Keyboard for use in 4540s models without Windows 8 in Bulgaria
683491-271	A	Keyboard for use in 4540s models without Windows 8 in Romania
683491-281	A	Keyboard for use in 4540s models without Windows 8 in Thailand
683491-291	A	Keyboard for use in 4540s models without Windows 8 in Japan
683491-A41	A	Keyboard for use in 47540s models without Windows 8 in Belgium
683491-AB1	A	Keyboard for use in 4540s models without Windows 8 in Taiwan
683491-AD1	A	Keyboard for use in 4540s models without Windows 8 in South Korea
683491-B31	A	Keyboard for use in 4540s models without Windows 8 in the Netherlands and Europe
683491-BA1	A	Keyboard for use in 4540s models without Windows 8 in Slovakia
683491-BB1	A	Keyboard for use in 4540s models without Windows 8 in Israel
683491-BG1	A	Keyboard for use in 4540s models without Windows 8 in Switzerland
683491-D61	A	Keyboard for use in 4540s models without Windows 8 in India
683491-DB1	A	Keyboard for use in 4540s models without Windows 8 in Canada and England
683491-DD1	A	Keyboard for use in 4540s models without Windows 8 in Iceland

Spare part number	CSR flag	Description
683491-DH1	A	Keyboard for use in 4540s models without Windows 8 in the Netherlands
683491-FL1	A	Keyboard for use in 4540s models without Windows 8 in the Czech Republic and Slovakia
683491-FP1	A	Keyboard for use in 4540s models without Windows 8 — Arabic
683493-001	N	System board for use in models in which the processor is NOT soldered to the system board; without Windows 8; with 1-GB of discrete graphics memory (includes thermal material)
683493-501	N	System board for use in models in which the processor is NOT soldered to the system board; with Windows 8 Standard; with 1-GB of discrete graphics memory (includes thermal material)
683493-601	N	System board for use in models in which the processor is NOT soldered to the system board; with Windows 8 Professional; with 1-GB of discrete graphics memory (includes thermal material)
683494-001	N	System board for use in models in which the processor is NOT soldered to the system board; without Windows 8; with 2-GB of discrete graphics memory (includes thermal material)
683494-501	N	System board for use in models in which the processor is NOT soldered to the system board; with Windows 8 Standard; with 2-GB of discrete graphics memory (includes thermal material)
683494-601	N	System board for use in models in which the processor is NOT soldered to the system board; with Windows 8 Professional; with 2-GB of discrete graphics memory (includes thermal material)
683495-001	N	System board for use in models in which the processor is NOT soldered to the system board; without Windows 8; with UMA graphics; without WWAN (includes thermal material)
683495-501	N	System board for use in models in which the processor is NOT soldered to the system board; with Windows 8 Standard; with UMA graphics; without WWAN (includes thermal material)
683495-601	N	System board for use in models in which the processor is NOT soldered to the system board; with Windows 8 Professional, with UMA graphics; without WWAN (includes thermal material)
683496-001	N	System board for use in models in which the processor is NOT soldered to the system board; without Windows 8, with UMA graphics, with WWAN (includes thermal material)
683496-501	N	System board for use in models in which the processor is NOT soldered to the system board; with Windows 8 Standard; with UMA graphics; with WWAN (includes thermal material)
683496-601	N	System board for use in models in which the processor is NOT soldered to the system board; with Windows 8 Professional; UMA graphics; with WWAN (includes thermal material)
683497-001	N	Metal heat shield for use in 4440s/4441s models
683498-001	N	Optical drive extension board for use in 4540s models
683499-001	A	Blu-ray ROM DVD±RW SuperMulti DL Drive for use in 4540s models (includes bezel, bracket, and screws)
683500-001	A	DVD±RW and CD-RW SuperMulti DL Combo Drive for use in 4540s models (includes bezel, bracket, and screws)
683501-001	N	Plastics Kit for use in 4540s models (for more information, see Plastics Kit on page 37)
683502-001	A	RTC battery
683503-001	N	Rubber Kit for use with model 4540s (includes rubber LCD screw covers and rubber feet)
683504-001	N	Screw Kit for use in 4540s models
683505-001	N	Speaker assembly for use in 4540s models
683506-001	N	Top cover for use in 4540s models with a fingerprint reader (includes touchpad)
683507-001	N	Top cover for use in 4540s models without a fingerprint reader (includes touchpad)

Spare part number	CSR flag	Description
683508-001	N	Webcam module
683639-001	N	Base enclosure for use with 4440s/4441s models
683640-001	N	Cable Kit for use in 4440s/4441s models (see Cable Kit on page 38 for more Cable Kit spare part information)
683641-001	N	Display bezel for use with HP ProBook 4440s/4441s models with a webcam
683642-001	N	Display bezel for use with HP ProBook 4440s/4441s models without a webcam
683643-001	N	Display Hinge Kit for use in 4440s/4441s models (includes left and right hinges, hinge covers, bezel screw covers, and screws)
683644-001	N	35.6-cm (14.0-inch) display assembly, anti-glare, without webcam
683645-001	N	35.6-cm (14.0-inch) display assembly, anti-glare, with webcam
683646-001	N	35.6-cm (14.0-inch) display assembly, anti-glare, with webcam and WWAN
683647-001	N	35.6-cm (14.0-inch) display assembly, BrightView, without webcam
683648-001	N	35.6-cm (14.0-inch) display assembly, BrightView, with webcam
683650-001	N	35.6-cm (14.0-inch) display assembly, BrightView, with webcam and WWAN
683651-001	N	Fan for use in 4440s/4441s models
683652-001	N	Fingerprint reader assembly for use in 4440s/4441s models (includes cable, bracket, and screws))
683653-001	N	Function board/Power button board for use in 4440s/4441s models (includes cable)
683655-001	N	Heat sink for use in 4440s/4441s models with discrete graphics and removable processors (includes thermal material)
683656-001	N	Heat sink for use in 4440s/4441s models with UMA graphics and removable processors (includes thermal material)
683657-001	A	Keyboard for use in 4440s/4441s models without Windows 8 in the United States
683657-161	A	Keyboard for use in 4440s/4441s models without Windows 8 in Latin America
683657-201	A	Keyboard for use in 4440s/4441s models without Windows 8 in Brazil
683657-281	A	Keyboard for use in 4440s/4441s models without Windows 8 in Thailand
683657-291	A	Keyboard for use in 4440s/4441s models without Windows 8 in Japan
683657-AB1	A	Keyboard for use in 4440s/4441s models without Windows 8 in Taiwan
683657-AD1	A	Keyboard for use in 4440s/4441s models without Windows 8 in South Korea
683657-D61	A	Keyboard for use in 4440s/4441s models without Windows 8 in India
683657-DB1	A	Keyboard for use in 4440s/4441s models without Windows 8 in Canada/England
683662-001	N	Plastics Kit for use in 4440s/4441s models
683663-001	N	Rubber Kit for use with model 4440s/4441s (includes rubber LCD screw covers and rubber feet)
683664-001	N	Screw Kit for use in 4440s/4441s models
683665-001	N	Speaker assembly for use in 4440s/4441s models
683666-001	N	Top cover for use in 4440s/4441s models with a fingerprint reader (includes touchpad)

Spare part number	CSR flag	Description
683667-001	N	Top cover for use in 4440s/4441s models without a fingerprint reader (includes touchpad)
683802-001	A	500-GB, 5400-rpm hard drive (4540s models only)
687696-001	N	Heat shield for use in 4540s models
690019-001	A	Atheros AR9565 802.11bgn 1x1 WiFi + BT4.0 combo Adapter
690020-001	A	Ralink RT3290LE 802.11bgn 1x1 Wi-Fi and Bluetooth 4.0 Combo Adapter
690978-001	A	Bottom door for use in 4540s models
690979-001	A	Bottom door for use in 4440s/4441s models
691110-001	A	Blu-ray ROM DVD±RW SuperMulti DL Drive (includes bezel, bracket, and screws)
691111-001	A	DVD±RW and CD-RW Super Multi Double-Layer Combo Drive (includes bezel, bracket, and screws)
691415-001	A	Ralink RT5390R 802.11bgn 1x1 Wi-Fi Adapter
692428-001	N	Intel Pentium B980 processor, 2.4-GHz, 2-MB L3 cache (includes thermal material)
693710-001	A	65-W AC adapter for use in India and the People's Republic of China
693711-001	A	65-W AC adapter
693712-001	A	90-W AC adapter
693713-001	A	90-W AC adapter for use in India and the People's Republic of China
700627-001	N	Intel Core i3 processor, 3120M, 2.5-GHz, 3-MB L3 cache (includes thermal material)
700628-001	N	Intel Pentium 2020M processor, 2.4-GHz, 2-MB L3 cache (includes thermal material)
700845-001	A	DVD-ROM drive for use in 4540s models
701658-001	N	Intel Core i7 processor, 3632QM, 2.2-GHz, 6-MB L3 cache (include thermal material)
702080-001	A	HP un2430 EV-DO/HSPA Mini Card
702237-001	A	Keyboard for use in 4540s models with Windows 8 in the United States
702237-031	A	Keyboard for use in 4540s models with Windows 8 in the United Kingdom
702237-041	A	Keyboard for use in 4540s models with Windows 8 in Germany
702237-051	A	Keyboard for use in 4540s models with Windows 8 in France
702237-061	A	Keyboard for use in 4540s models with Windows 8 in Italy
702237-071	A	Keyboard for use in 4540s models with Windows 8 in Spain
702237-131	A	Keyboard for use in 4540s models with Windows 8 in Portugal
702237-141	A	Keyboard for use in 4540s models in Turkey
702237-151	A	Keyboard for use in 4540s models with Windows 8 in Greece
702237-161	A	Keyboard for use in 4540s models with Windows 8 in Latin America
702237-171	A	Keyboard for use in 4540s models with Windows 8 in Saudi Arabia
702237-211	A	Keyboard for use in 4540s models with Windows 8 in Hungary
702237-251	A	Keyboard for use in 4540s models with Windows 8 in Russia

Spare part number	CSR flag	Description
702237-261	A	Keyboard for use in 4540s models with Windows 8 in Bulgaria
702237-271	A	Keyboard for use in 4540s models with Windows 8 in Romania
702237-281	A	Keyboard for use in 4540s models with Windows 8 in Thailand
702237-291	A	Keyboard for use in 4540s models with Windows 8 in Japan
702237-A41	A	Keyboard for use in 47540s models with Windows 8 in Belgium
702237-AB1	A	Keyboard for use in 4540s models with Windows 8 in Taiwan
702237-AD1	A	Keyboard for use in 4540s models with Windows 8 in South Korea
702237-B31	A	Keyboard for use in 4540s models with Windows 8 in the Netherlands and Europe
702237-BA1	A	Keyboard for use in 4540s models with Windows 8 in Slovakia
702237-BB1	A	Keyboard for use in 4540s models with Windows 8 in Israel
702237-BG1	A	Keyboard for use in 4540s models with Windows 8 in Switzerland
702237-D61	A	Keyboard for use in 4540s models with Windows 8 in India
702237-DB1	A	Keyboard for use in 4540s models with Windows 8 in Canada and England
702237-DD1	A	Keyboard for use in 4540s models with Windows 8 in Iceland
702237-DH1	A	Keyboard for use in 4540s models with Windows 8 in the Netherlands
702237-FL1	A	Keyboard for use in 4540s models with Windows 8 in the Czech Republic and Slovakia
702237-FP1	A	Keyboard for use in 4540s models with Windows 8 — Arabic
702238-001	A	Keyboard for use in 4440s/4441s models with Windows 8 in the United States
702238-161	A	Keyboard for use in 4440s/4441s models with Windows 8 in Latin America
702238-201	A	Keyboard for use in 4440s/4441s models with Windows 8 in Brazil
702238-281	A	Keyboard for use in 4440s/4441s models with Windows 8 in Thailand
702238-291	A	Keyboard for use in 4440s/4441s models with Windows 8 in Japan
702238-AB1	A	Keyboard for use in 4440s/4441s models with Windows 8 in Taiwan
702238-AD1	A	Keyboard for use in 4440s/4441s models with Windows 8 in South Korea
702238-D61	A	Keyboard for use in 4440s/4441s models with Windows 8 in India
702238-DB1	A	Keyboard for use in 4440s/4441s models with Windows 8 in Canada/England
708761-001	N	Intel Core i5 processor, 3340M, 2.7-GHz, 3-MB L3 cache (include thermal material)
708762-001	N	Intel Core i5 processor, 3380M, 2.9-GHz, 3-MB L3 cache (include thermal material)
710788-001	A	HP hs2350 hspa+ Mobile Broadband Module
711903-001	N	Intel Core i5 processor, 3230M, 2.6-GHz, 3-MB L3 cache (includes thermal grease)
712919-001	N	Heat sink for use in 4540s discrete graphics models with the processor soldered to the system board
712920-001	N	Heat sink for use in 4540s UMA graphics models with the processor soldered to the system board

Spare part number	CSR flag	Description
712921-001	N	System board for use in non-Windows 8 models with UMA graphics and a soldered on Intel Core i3-3110M processor
712921-501	N	System board for use in Windows 8 Standard models with UMA graphics and a soldered on Intel Core i3-3110M processor
712921-601	N	System board for use in Windows 8 Professional models with UMA graphics and a soldered on Intel Core i3-3110M processor
712922-001	N	System board for use in non-Windows 8 models with UMA graphics and a soldered on Intel Core i3-3120M processor
712922-501	N	System board for use in Windows 8 Standard models with UMA graphics and a soldered on Intel Core i3-3120M processor
712922-601	N	System board for use in Windows 8 Professional models with UMA graphics and a soldered on Intel Core i3-3120M processor
712923-001	N	System board for use in non-Windows 8 models with 1 GB of discrete graphics and a soldered on Intel Core i3-3110M processor
712923-501	N	System board for use in Windows 8 Standard models with 1 GB of discrete graphics and a soldered on Intel Core i3-3110M processor
712923-601	N	System board for use in Windows 8 Professional models with 1 GB of discrete graphics and a soldered on Intel Core i3-3110M processor
712924-001	N	System board for use in non-Windows 8 models with 1 GB of discrete graphics and a soldered on Intel Core i3-3120M processor
712924-501	N	System board for use in Windows 8 Standard models with 1 GB of discrete graphics and a soldered on Intel Core i3-3120M processor
712924-601	N	System board for use in Windows 8 Professional models with 1 GB of discrete graphics and a soldered on Intel Core i3-3120M processor
713162-001	N	Intel Celeron 1000M processor, 1.8-GHz processor, 3-MB L3 cache (includes thermal material)
713163-001	N	Intel Core i3 processor, 3130M, 2.6-GHz, 3-MB L3 cache (includes thermal material)
713376-001	N	Heat sink for use in 4440s/4441s models with discrete graphics and the processor soldered onto the system board (includes thermal material)
713377-001	N	Heat sink for use in 4440s/4441s models with UMA graphics and the processor soldered onto the system board (includes thermal material)
718475-001	A	500-GB, 7200-rpm hard drive (locked; model 4440s/4441s only)
718658-001	N	System board for use in non-Windows 8 models with UMA graphics and a soldered on Intel Core i3-3110M processor for use only in Brazil
718658-501	N	System board for use in Windows 8 Standard models with UMA graphics and a soldered on Intel Core i3-3110M processor for use only in Brazil
718658-601	N	System board for use in Windows 8 Professional models with UMA graphics and a soldered on Intel Core i3-3110M processor for use only in Brazil
718659-001	N	System board for use in non-Windows 8 models with UMA graphics and a soldered on Intel Core i3-3120M processor for use only in Brazil
718659-501	N	System board for use in Windows 8 Standard models with UMA graphics and a soldered on Intel Core i3-3120M processor for use only in Brazil

Spare part number	CSR flag	Description
718659-601	N	System board for use in Windows 8 Professional models with UMA graphics and a soldered on Intel Core i3-3120M processor for use only in Brazil
731549-001	N	Display Cable Kit for use in 4440s/4441s models

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.

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.

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

    NOTE: You can slide the battery release latches simultaneously or one at a time.

3. Tilt the battery upward **(2)**, and remove it from the battery bay **(3)**.

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

Using the optional security screw

Use the optional security screw to lock the service door to the bottom of the computer. When not in use the security screw can be stored inside the battery bay.

Remove the battery:

To use the security screw:

1. Remove the battery.

2. Remove the security screw from inside the battery bay **(1)** and insert it **(2)** to lock the service door in place.

Bottom door

Description	Spare part number
Bottom door for use in 4540s models	690978-001
Bottom door for use in 4440s/4441s models	690979-001

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 55).

Remove the bottom door:

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

2. With the battery bay toward you, remove the security screw **(1)** (if the security screw is being used). For additional information about the security screw, see Using the optional security screw on page 57.

3. Slide the service door release latches **(2)** to release the service door.

> **NOTE:** You can slide the service door release latches simultaneously or you can slide them one at a time.

4. Slide the service door towards the front of the computer **(3)** and then lift it **(4)** away from the computer.
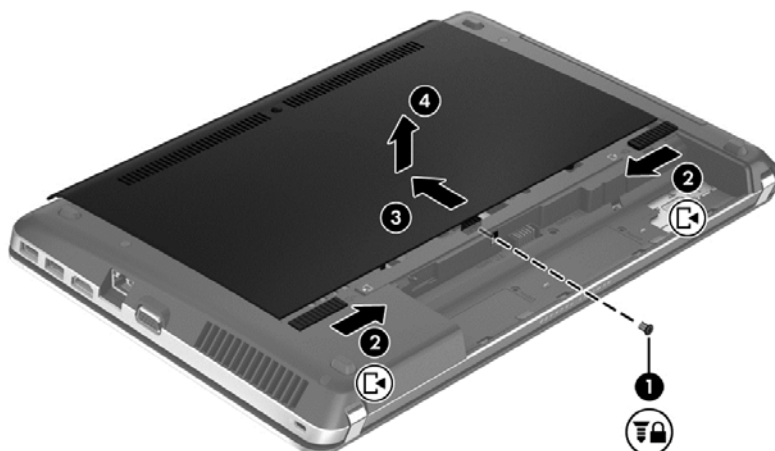
Reverse the removal procedures to install the bottom door.

SIM

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

NOTE: The SIM is provided by the end-user as a security measure for the WWAN module. The SIM should be removed, placed into a static-dissipative container, and then replaced when the computer is reassembled.
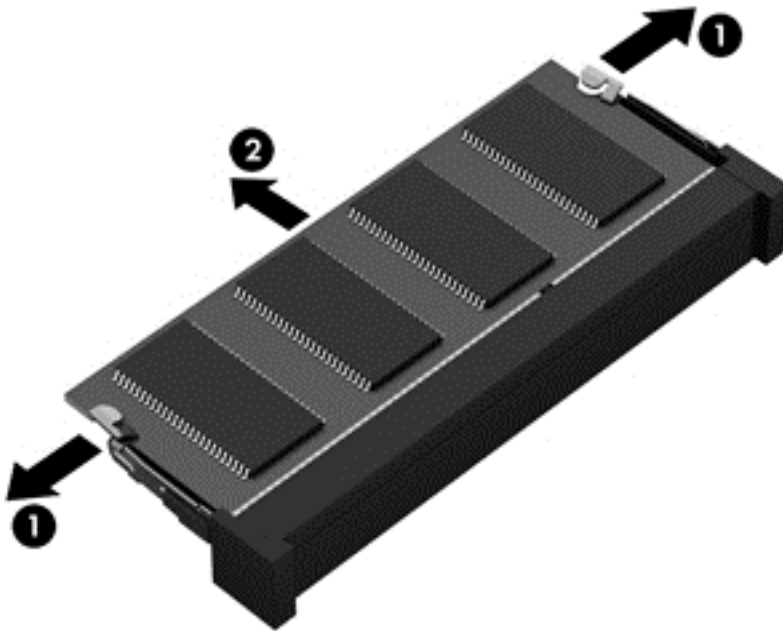
Before removing the SIM, follow these steps:

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 55).

5. Remove the bottom door (see Bottom door on page 58).

Remove the SIM:

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

2. Remove the SIM **(2)** from the SIM slot.
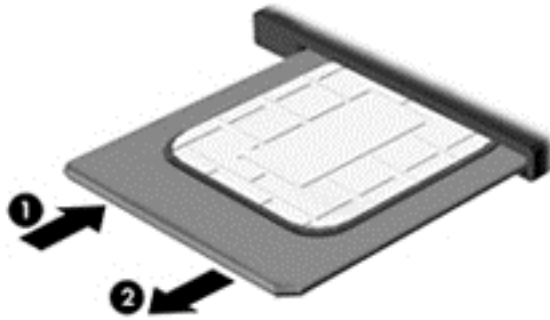
Reverse this procedure to install the SIM.

Optical drive

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

Description	Spare part number
For use in 4540s models	
DVD-ROM drive	700845-001
DVD±RW and CD-RW Super Multi Double-Layer Combo Drive	683500-001
Blu-ray ROM DVD±RW SuperMulti DL Drive	683499-001
For use in 4440s/4441s models	
DVD±RW and CD-RW Super Multi Double-Layer Combo Drive	691111-001
Blu-ray ROM DVD±RW SuperMulti DL Drive	691110-001

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).

5. Remove the bottom door (see).

Remove the optical drive:

1. Position the computer upside-down.

2. Remove the Phillips PM2.5×6.0 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.
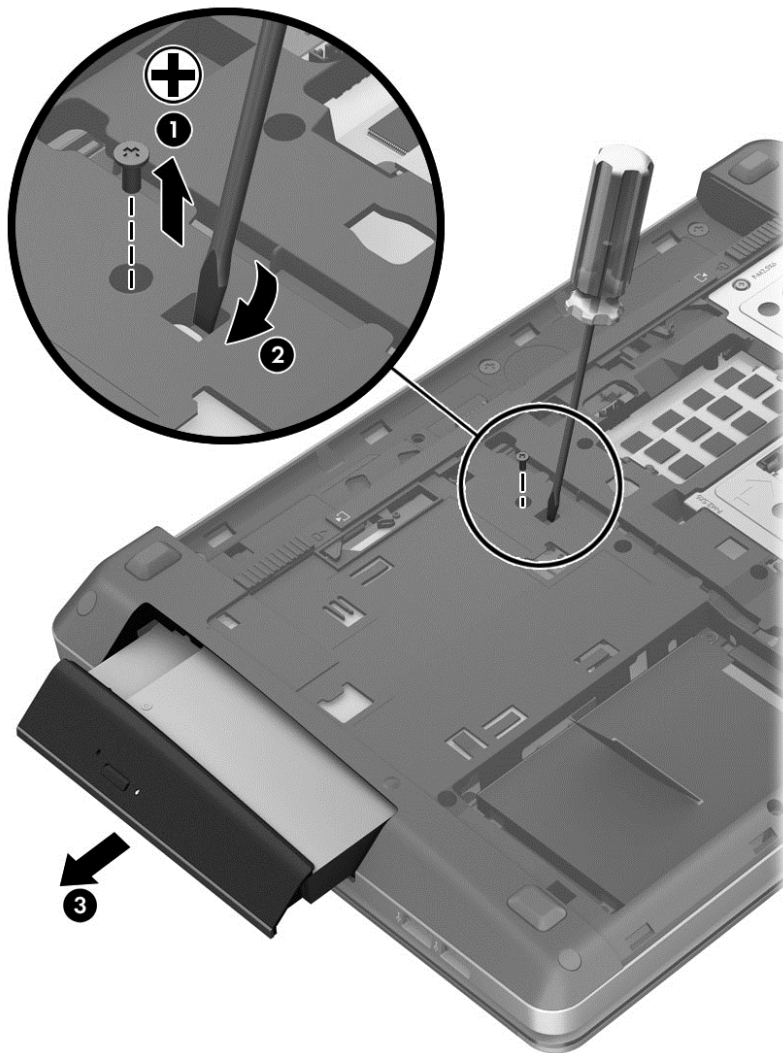
Reverse this procedure to install an optical drive.

Hard drive

NOTE: All hard drive spare part kits include a hard drive bracket and screws.

Description	Spare part number
750-GB, 7200-rpm hard drive	633252-001
750-GB, 5400-rpm hard drive	634250-001
640-GB, 5400-rpm hard drive	669300-001
500-GB, 7200-rpm hard drive	634925-001
500-GB, 7200-rpm hard drive (locked)	718475-001
500-GB, 5400-rpm hard drive (4540s models only)	683802-001
500-GB, 5400-rpm hard drive (4440s/4441s models only)	669299-001
320-GB, 7200-rpm hard drive	641672-001
320-GB, 5400-rpm hard drive (4540s models)	645193-001
320-GB, 5400-rpm hard drive (4440s/4441s models only)	622643-001
128-GB solid-state drive	684253-001
Hard Drive Hardware Kit (includes hard drive bracket and screws)	683488-001

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).

5. Remove the bottom door (see).

   NOTE: Instructions for removing the hard drive are imprinted on the service door.

Remove the hard drive:

1. Position the computer upside-down.

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

3. Pull the Mylar tab on the hard drive **(2)** toward the side of the computer to disengage the hard drive from the connector, and then lift the hard drive out of the hard drive bay.

> **NOTE:** Model 4540s shown.
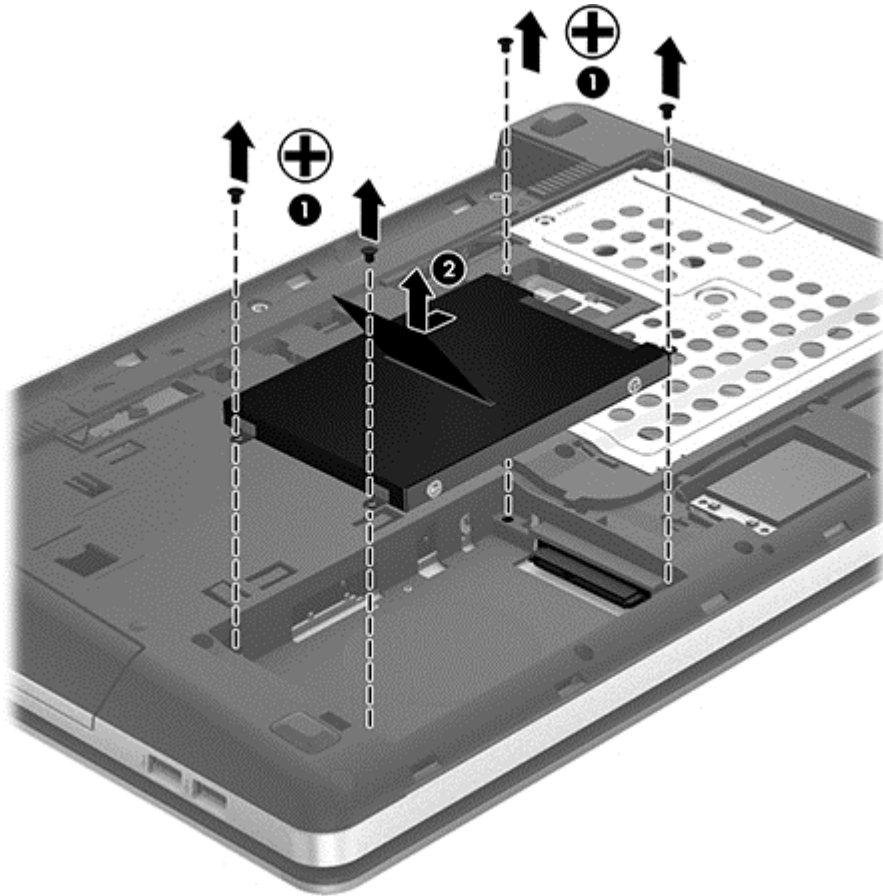
4. If it is necessary to replace the hard drive cover, lift the Mylar tab to unlock it.
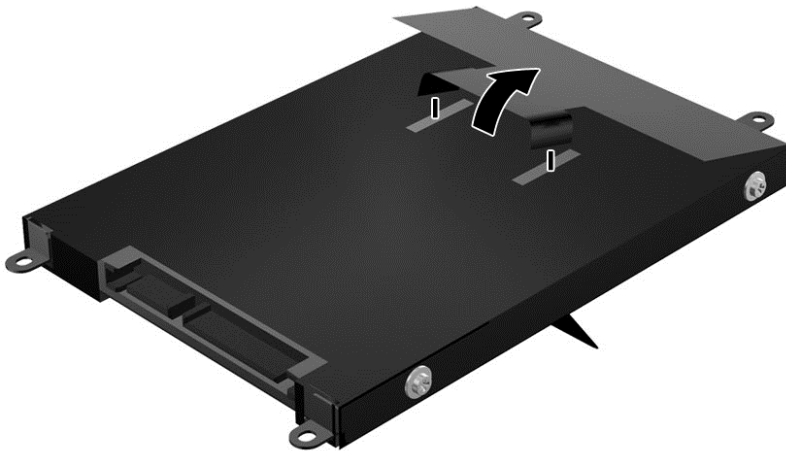
5. Remove the four Phillips PM3.0×3.0 hard drive cover screws **(1)** that secure the cover to the hard drive.

6. Lift the top of the Mylar cover **(2)** from the drive, and then remove the cover from the hard drive **(3)**.
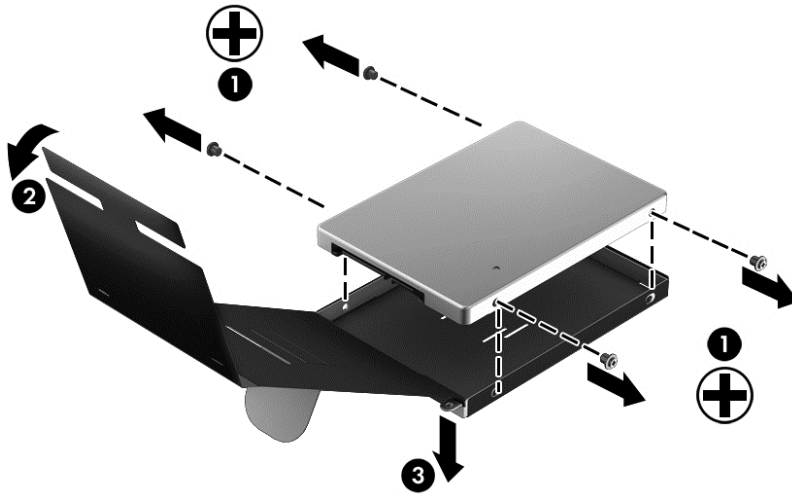
Reverse this procedure to reassemble and install the hard drive.

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 55).

5. Remove the bottom door (see Bottom door on page 58).

Remove the memory module:

1. Position the computer upside-down.

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 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.

WWAN module

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

Description	Spare part number
Ericsson F5321 HSPA+ with GPS	668969-001
Sierra MC8355 HSPA/CDMA with GPS	634400-001
HP un2430 EV-DO/HSPA Mini Card	702080-001
HP hs2350 hspa+ Mobile Broadband Module	710788-001

Before removing the WWAN 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 55).

5. Remove the bottom door (see Bottom door on page 58).

Remove the WWAN module:

1. Position the computer upside-down.

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

📝 **NOTE:** The red WWAN antenna cable is connected to the WWAN module "Main" terminal. The blue WWAN antenna cable is connected to the WWAN module "Aux" terminal.

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

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

> **NOTE:** WWAN modules are designed with a notch to prevent incorrect insertion.

Figure 4-1 Removing the WWAN module
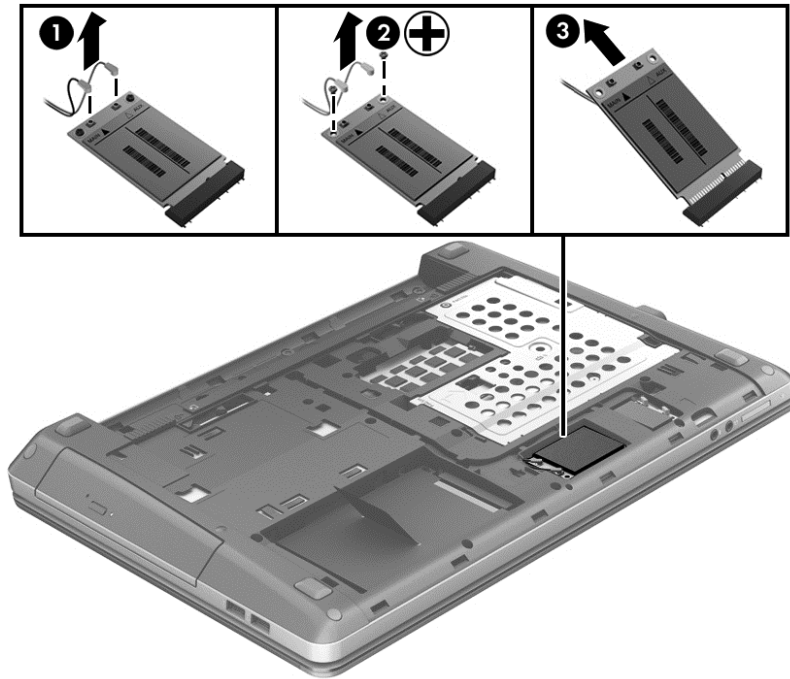
> **NOTE:** If the WWAN antennas are not connected to the terminals on the WWAN module, the protective sleeves must be installed on the antenna connectors, as shown in the following illustration.
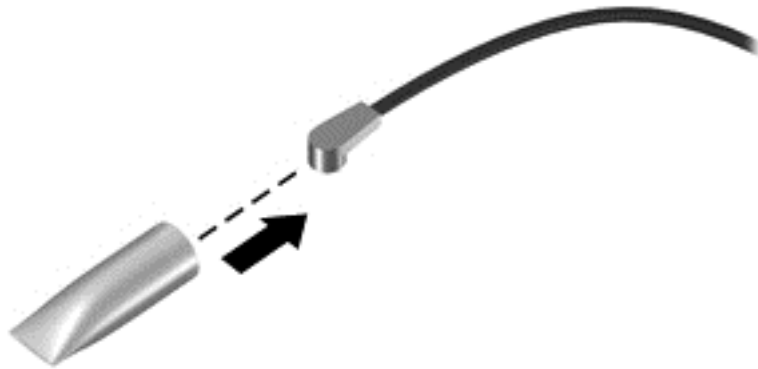
Reverse this procedure to install the WWAN module.

WLAN/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 802.11b/g/n 1x1 WiFi and 3012 Bluetooth 4.0 Combo Adapter	655795-001
Broadcom 4313GN 802.11b/g/n 1x1 WiFi and 20702 Bluetooth 4.0 Combo Adapter	657325-001
Intel Centrino Wireless-N 2230	670290-001
Intel Centrino Advanced-N 6235	670292-001
Ralink WLAN Ralink Ripple3 RT5390F_802.11 b/g/n 1x1 PCIe HMC	670691-001
Atheros AR9485 802.11b/g/n 1x1 WiFi Adapter	675794-001
Atheros AR9565 802.11bgn 1x1 WiFi + BT4.0 combo Adapter	690019-001
Ralink RT3290LE 802.11bgn 1x1 Wi-Fi and Bluetooth 4.0 Combo Adapter	690020-001
Ralink RT5390R 802.11bgn 1x1 Wi-Fi 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 55).

5. Remove the bottom door (see Bottom door on page 58).

Remove the WLAN module:

1. Position the computer upside-down.

2. 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.

3. 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.)

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

NOTE: WLAN modules are designed with a notch to prevent incorrect insertion.
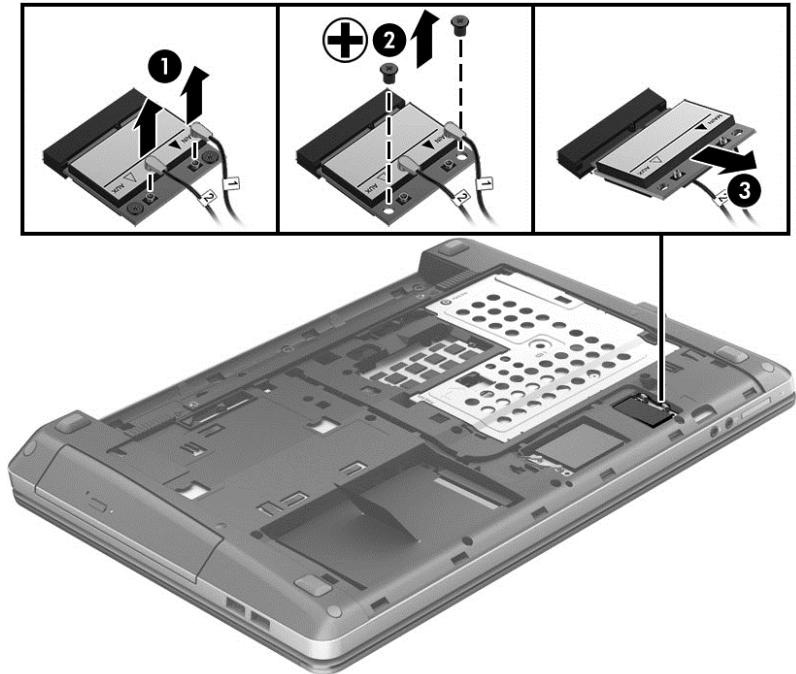
NOTE: If the WLAN antennas are not connected to the terminals on the WLAN module, the protective sleeves must be installed on the antenna connectors, as shown in the following illustration.
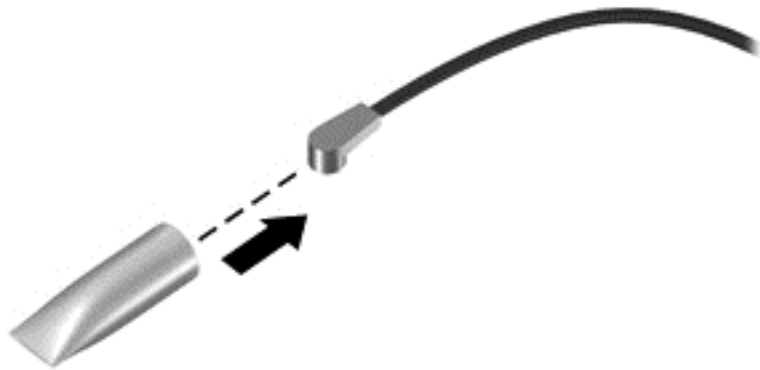
Reverse this procedure to install the WLAN module.

Keyboard

Description	Spare part number
Keyboard for use in 4540s models without Windows 8	683491-xxx
Keyboard for use in 4540s models with Windows 8	702237-xxx
Keyboard for use in 4440s/4441s models without Windows 8	683657-xxx
Keyboard for use in 4440s/4441s models with Windows 8	702238-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 Battery on page 55).

5. Remove the bottom door (see Bottom door on page 58).

Remove the keyboard:

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

2. For model 4540s, remove the three Phillips PM2.5×6.0 screws that secure the keyboard to the computer.
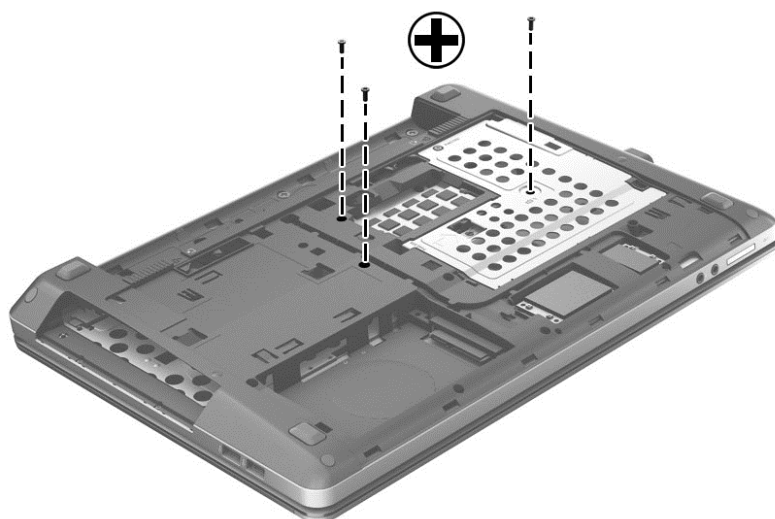
3. For model 4440s/4441s, remove the two Phillips PM2.5×6.0 screws that secure the keyboard to the computer.
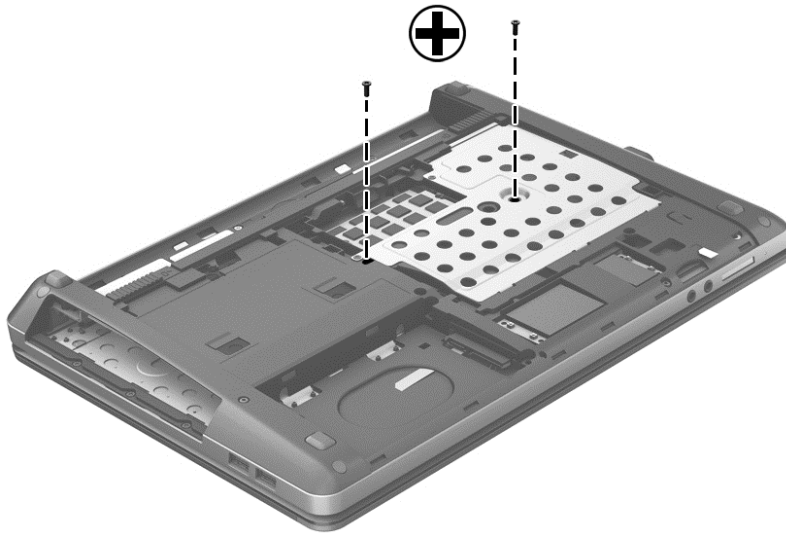
4. Position the computer right-side up with the front toward you.

5. Open the computer as far as possible.

6. Slide the keyboard downward toward the palm rest **(1)**.

7. Lift the top of the keyboard at an angle **(2)**, and then pull the keyboard up to remove it from the palm rest**(3)**.

> **NOTE:** Only pull the keyboard up enough to release it from the computer and flip it over onto the palm rest. Under the keyboard, the cable is connected to the system board.

8. Rotate the keyboard until it rests on the palm rest **(1)**, and then disconnect the keyboard cable by lifting the keyboard connector latch **(2)**, and then disconnecting the keyboard cable from the system board **(3)**.
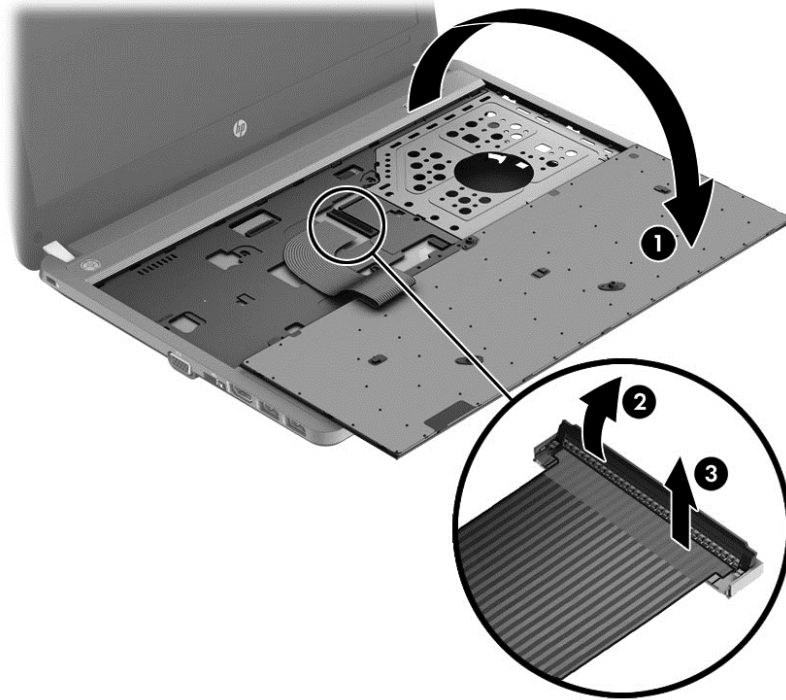
9. Remove the keyboard.

Reverse this procedure to install the keyboard.

Heat shield

Description	Spare part number
Heat shield for use in 4540s models	687696-001
Heat shield for use in 4440s/4441s models	683497-001

Before removing the 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 55).

5. Remove the following components:

    a. Bottom door (see Bottom door on page 58).

    b. Keyboard (see Keyboard on page 70)

Remove the heat shield:

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

2. If disassembling model 4440s/4441s, skip to step 7.

3. For model 4540s, remove the three Phillips PM2.5×6.0 screws **(1)** that secure the heat shield to the computer.

4. Slide the shield toward the inside of the computer **(2)**.

5. Rotate the top of the shield upward **(3)**.

6. Remove the heat shield from the computer **(4)**.
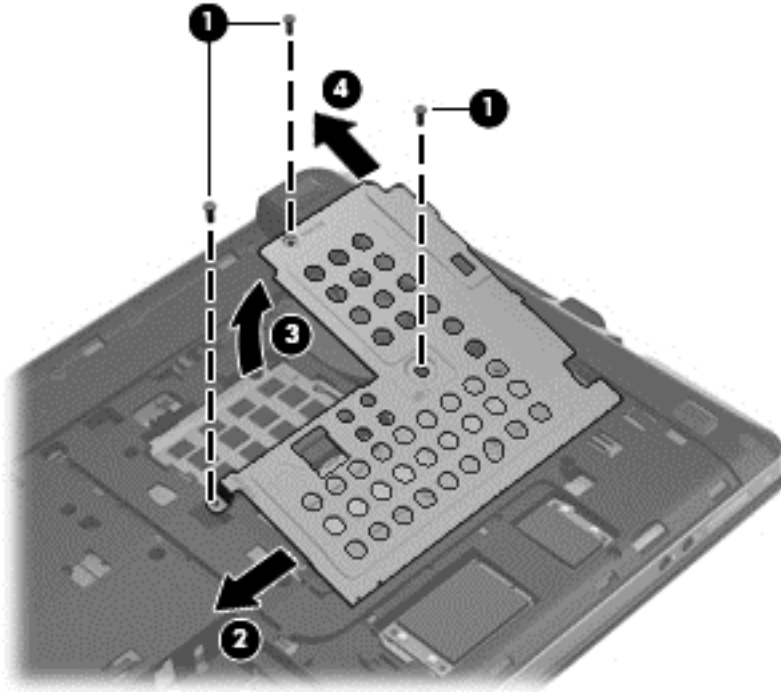
7. For model 4440s/4441s, remove the three Phillips PM2.0×3.0 screws **(1)** that secure the heat shield to the computer.

8. Rotate the top of the shield upward **(2)**.

9. Lift the heat shield from the computer **(3)**.
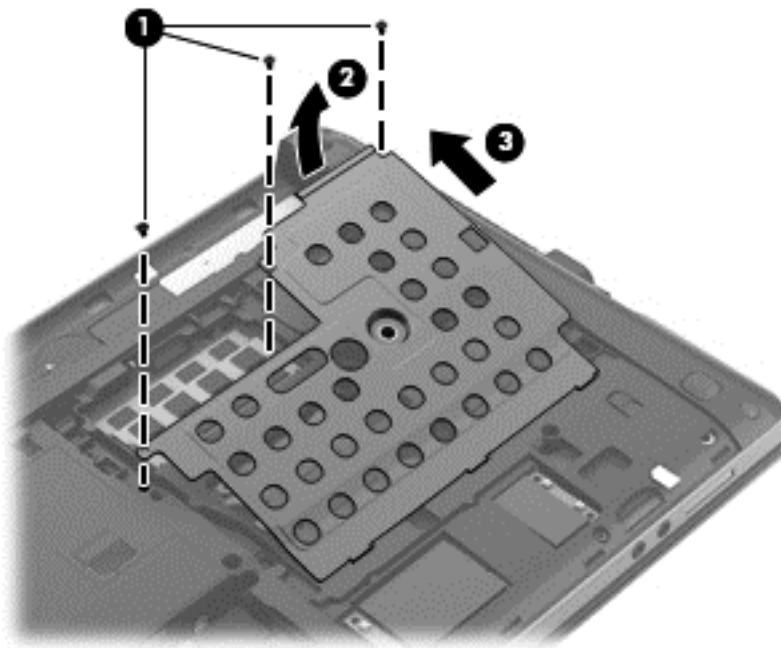
Reverse this procedure to install the heat shield.

Fan

Description	Spare part number
Fan for use in 4540s models	683484-001
Fan for use in 4440s/4441s models	683651-001

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 55).

5. Remove the following components:

   a. Bottom door (see Bottom door on page 58).

   b. Keyboard (see Keyboard on page 70)

   c. Heat shield (see Heat shield on page 73)

Remove the fan:

1. Position the computer upside-down.

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

3. Remove the two Phillips PM2.5×5.0 screws **(2)** that secure the fan to the system board.

4. Remove the fan from the system board **(3)**.
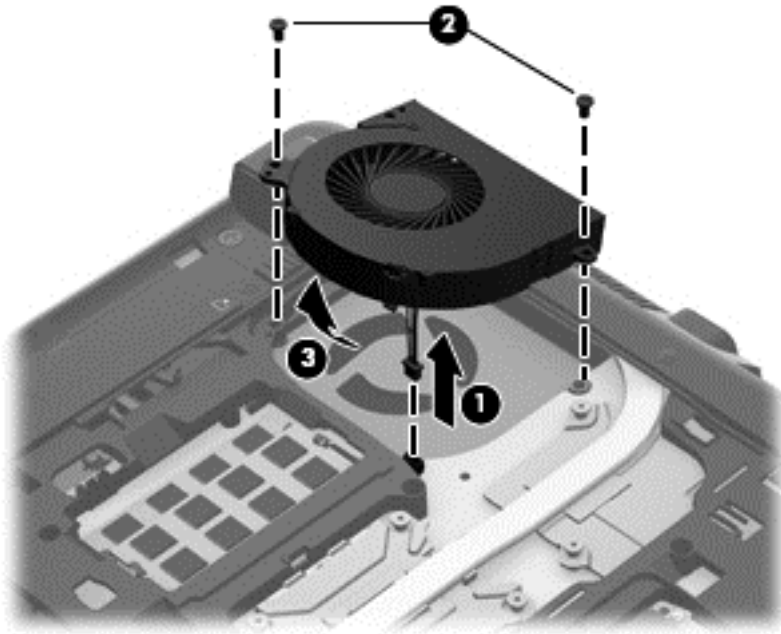
Reverse this procedure to install the fan.

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
For use in 4540s models:	
Heat sink for use in models with UMA graphics and a removable processor	683489-001
Heat sink for use in models with discrete graphics and a removable processor	683490-001
Heat sink for use in models with UMA graphics and the processor soldered to the system board	712920-001
Heat sink for use in models with discrete graphics and the processor soldered to the system board	712919-001
For use in 4440s/4441s models:	
Heat sink for use in models with discrete graphics and a removable processor	683655-001
Heat sink for use in models with UMA graphics and a removable processor	683656-001
Heat sink for use in models with discrete graphics and the processor soldered to the system board	713376-001
Heat sink for use in models with UMA graphics and the processor soldered to the system board	713377-001

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 55).

5. Remove the following components:

   a. Bottom door (see Bottom door on page 58).

   b. Keyboard (see Keyboard on page 70)

   c. Heat shield (see Heat shield on page 73)

   d. Fan (see Fan on page 75)

Remove the heat sink:

1. Position the computer upside-down.

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

3. Lift the left side of the heat sink up at an angle **(2)**, and then pull it away from the side of the computer to remove it **(3)**.
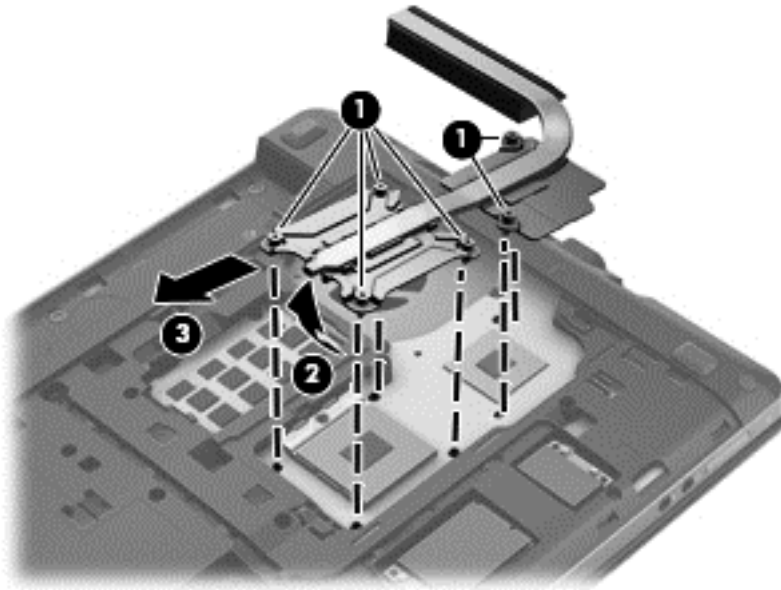
4. To remove the UMA heat sink, in the order indicated, loosen the four captive Phillips screws **(1)** that secure the heat sink to the system board.

5. Lift the left side of the heat sink up at an angle **(2)**, and then pull it away from the side of the computer to remove it **(3)**.
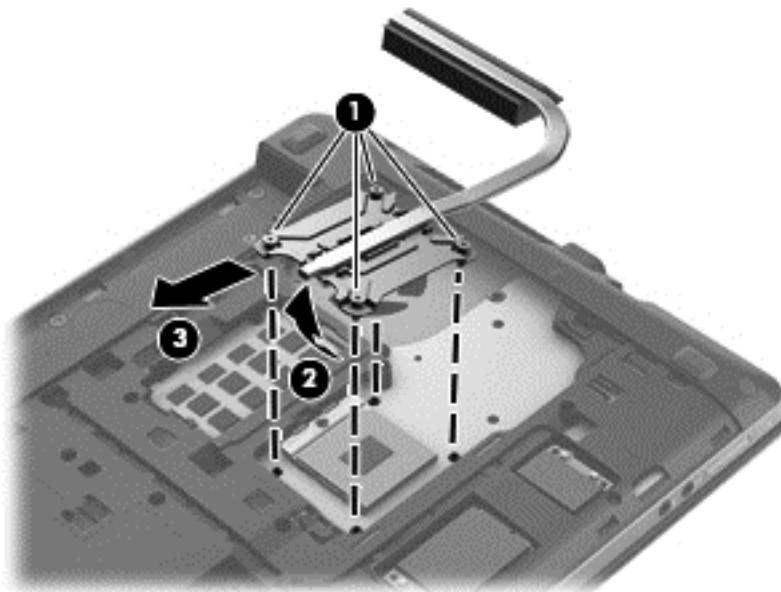
NOTE: For discrete models, thoroughly clean thermal material from the surfaces of the system board components **(1)(3)** and the heat sink **(2)(4)** each time you remove the heat sink. All heat sink and processor spare part kits include thermal material.
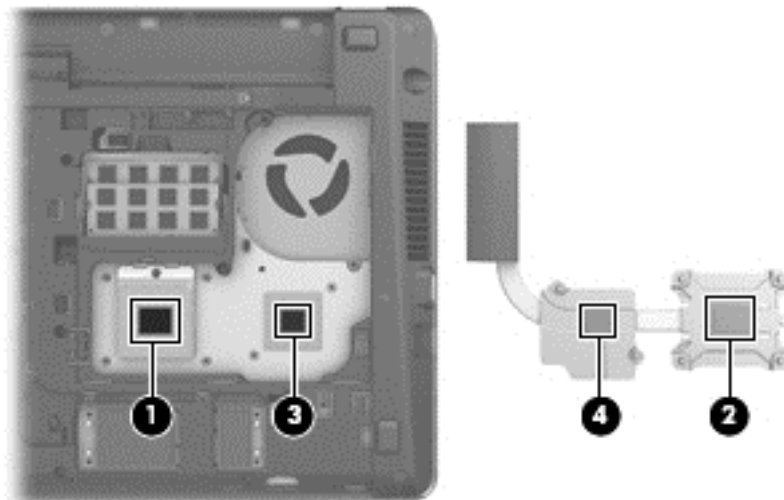
NOTE: For UMA models, thoroughly clean thermal material from the surface of the system board **(1)** and heat sink **(2)** each time you remove the heat sink. All heat sink and processor spare part kits include thermal material.
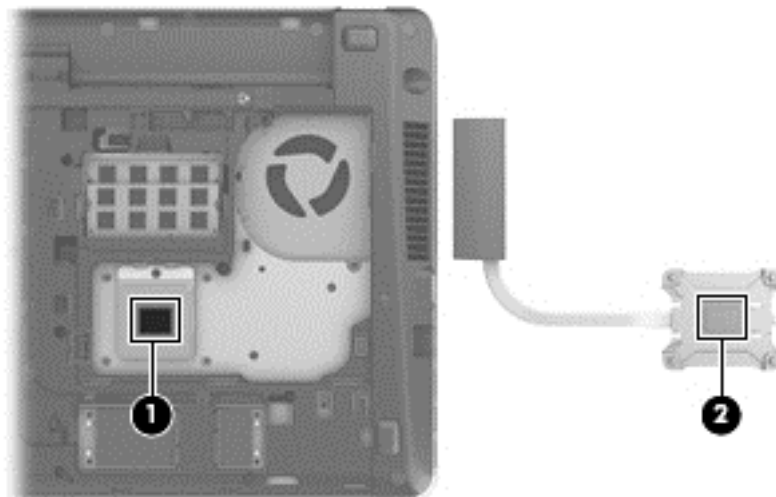
Reverse this procedure to install the heat sink.

Processor

NOTE: All processor spare part kits include replacement thermal material.

Description	Spare part number
Intel Core i7 processor, Quad Core:	
3632QM, 2.2-GHz processor with 6-MB L3 cache	701658-001
3612QM, 2.1-GHz processor with 6-MB L3 cache	680647-001
Intel Core i5 processors, Dual Core:	
3380M, 2.9-GHz processor with 3-MB L3 cache	708762-001
3360M, 2.8-GHz processor with 3-MB L3 cache	681953-001
3340M, 2.7-GHz processor with 3-MB L3 cache	708761-001
3320M, 2.6-GHz processor with 3-MB L3 cache	681952-001
3230M, 2.6-GHz processor with 3-MB L3 cache	711903-001
3210M, 2.5-GHz processor with 3-MB L3 cache	680645-001
2450M, 2.5-GHz processor with 3-MB L3 cache	676359-001
Intel Core i3 processors, Dual Core:	
3130M, 2.6-GHz processor with 3-MB L3 cache	713163-001
3120M, 2.5-GHz processor with 3-MB L3 cache	700627-001
3110M, 2.3-GHz processor with 3-MB L3 cache	682417-001
2370M, 2.4-GHz processor with 3-MB L3 cache	677152-001
2350M, 2.3-GHz processor with 3-MB L3 cache	653340-001
Intel Pentium processor, Dual Core:	
2020M, 2.4-GHz, with 2-MB L3 cache	700628-001
B980, 2.4-GHz, with 2-MB L3 cache	692428-001
B970, 2.3-GHz, with 2-MB L3 cache	676785-001
Intel Celeron processor:	
1000M, 1.8-GHz, with 2-MB L3 cache	713162-001
B840, 1.9-GHz, with 2-MB L3 cache	664663-001

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 55).

5. Remove the following components:

    a. Bottom door (see Bottom door on page 58).

    b. Keyboard (see Keyboard on page 70)

    c. Heat shield (see Heat shield on page 73)

    d. Fan (see Fan on page 75)

    e. Heat sink (see Heat sink on page 77)

Remove the processor:

1. Position the computer upside-down.

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 embossed on the processor slot when you install the processor.
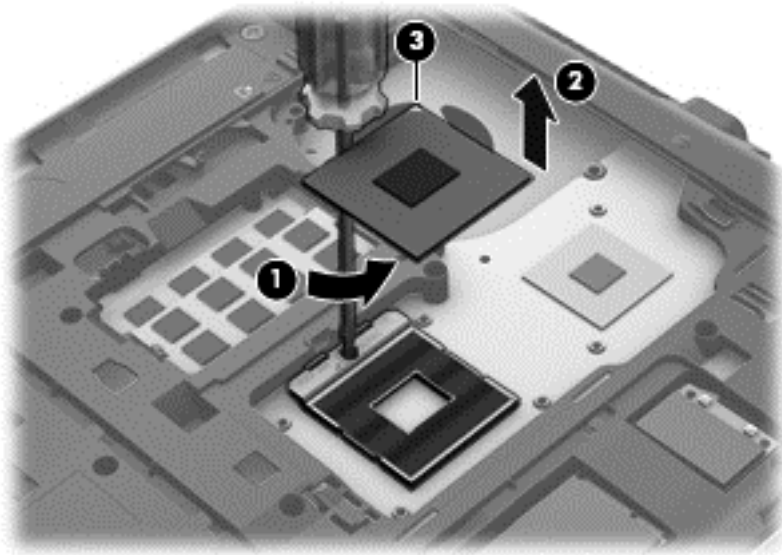
Reverse this procedure to install the processor.

Top cover

NOTE: All top covers include the touchpad assembly.

| Description	Spare part number
Top cover for use in model 4540s:	
With a fingerprint reader	683506-001
Without a fingerprint reader	683507-001
For use in model 4440s/4441s:	
With a fingerprint reader	683666-001
Without a fingerprint reader	683667-001

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 55).

5. Remove the following components:

   a. Bottom door (see Bottom door on page 58).

   b. Memory modules (see Memory modules on page 64)

   c. WLAN/Bluetooth module (see WLAN/Bluetooth combo card on page 68)

   d. WWAN module (see WWAN module on page 66)

   e. Keyboard (see Keyboard on page 70)

   f. Heat shield (see Heat shield on page 73)

Remove the top cover:

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

2. For 4540s models, disconnect the following cables from the system board:

   (1) Speaker cable

   (2) Function board/Power button board cable

   (3) Fingerprint reader board cable
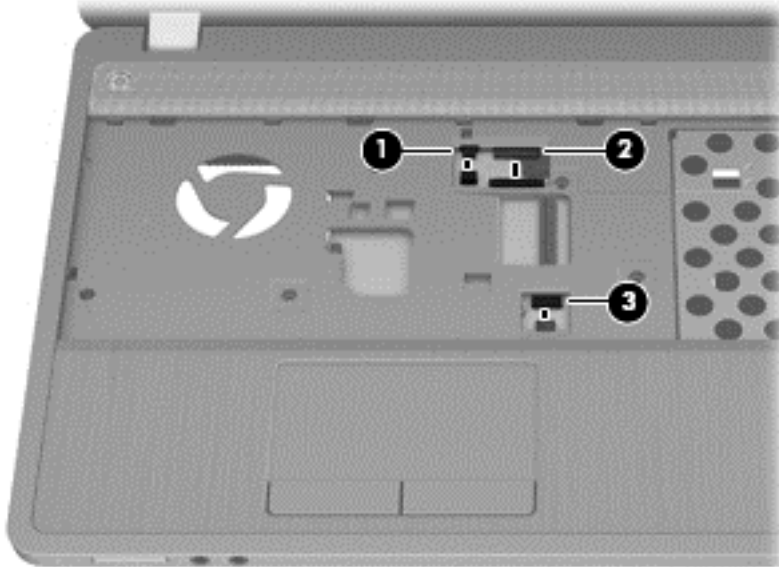
3. For 4440s/4441 models, disconnect the following cables from the system board:

   (1) Function board/Power button board cable

   (2) Finger print reader board cable
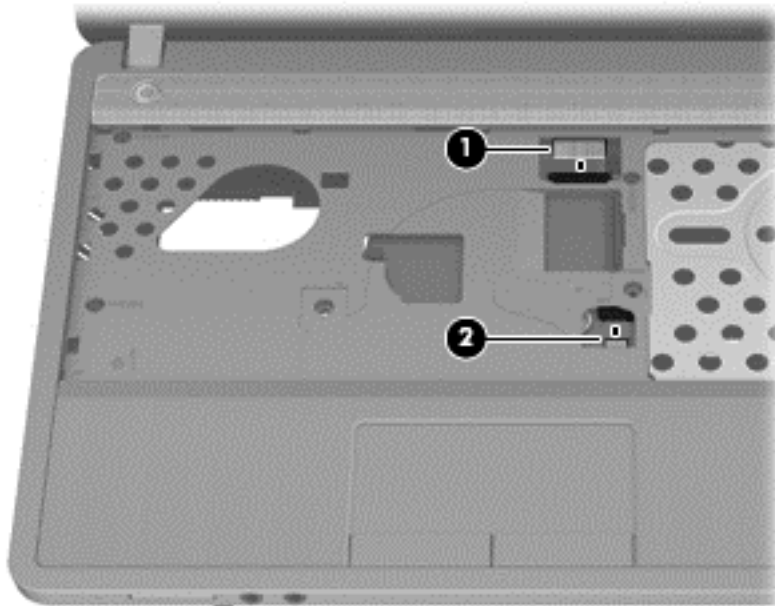
4. Position the computer upside down.

5. For 4540s models, remove the following screws that secure the top cover to the computer:

(1) 4 rubber screw covers from the corners of the computer

(2) 11 Torx T8M2.5×6.0 screws
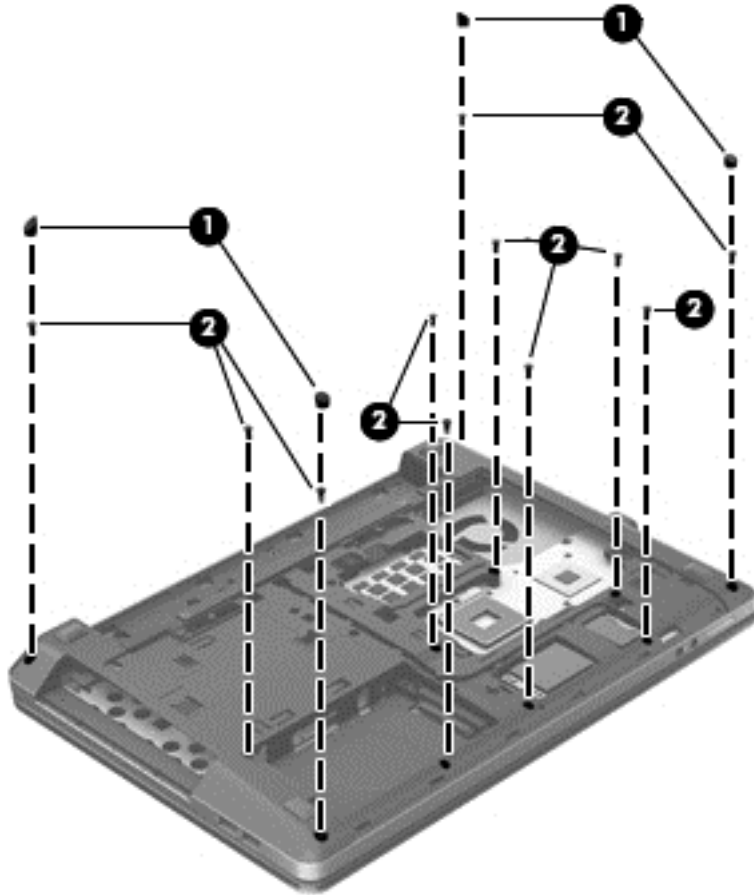
6. For 4440s/4441s models, remove the following screws that secure the top cover to the computer:

(1) 4 rubber screw covers from the corners of the computer

(2) 9 Torx T8M2.5×6.0 screws

(3) 1 Phillips PM2.5×3.0 screw from the hard drive bay
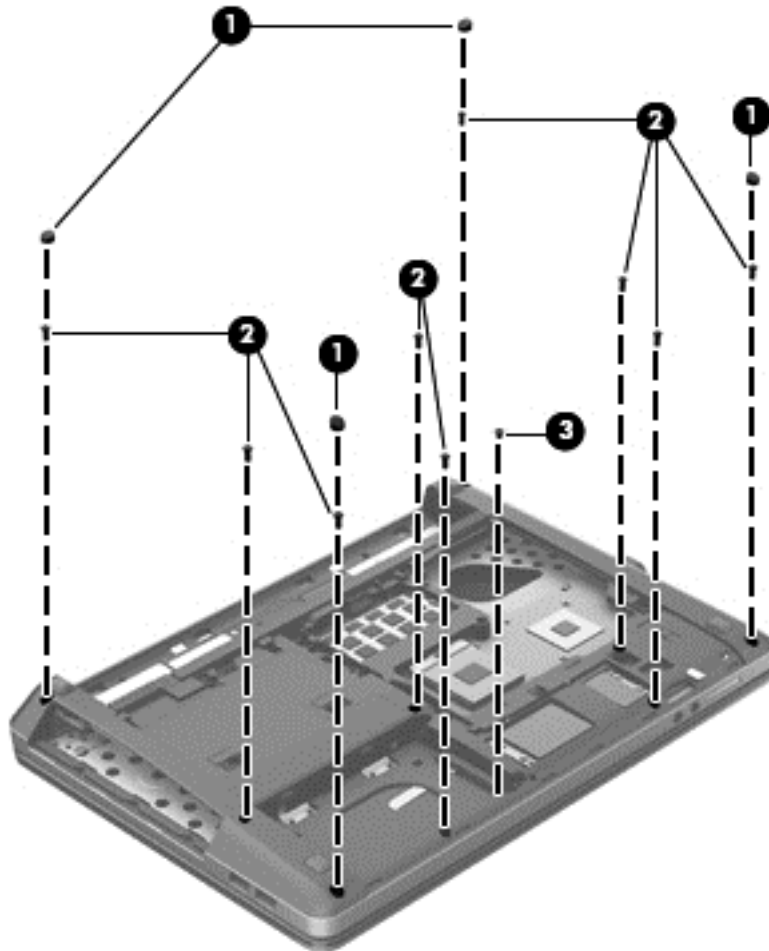
7. For 4540s models, remove the following screws that secure the top cover to the computer:

    (1) 2 Phillips PM2.0×2.5 screws from the optical drive bay

    (2) 3 Phillips PM2.0×2.0 broadhead screws from the battery bay
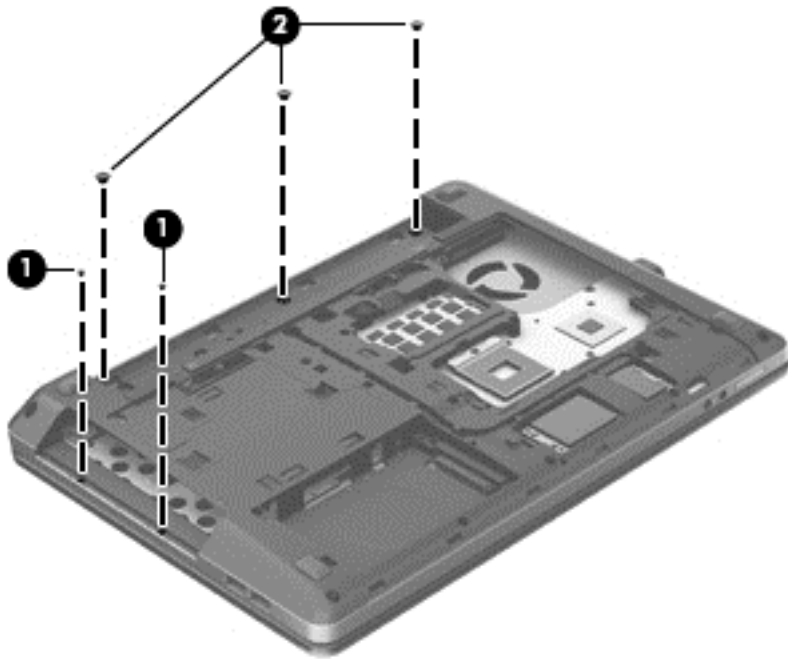
8. For 4440s/4441s models, remove the following screws that secure the top cover to the computer:

    (1) 3 Phillips PM2.0×2.5 screws from the optical drive bay

    (2) 2 Phillips PM2.0×2.0 screws from the battery bay
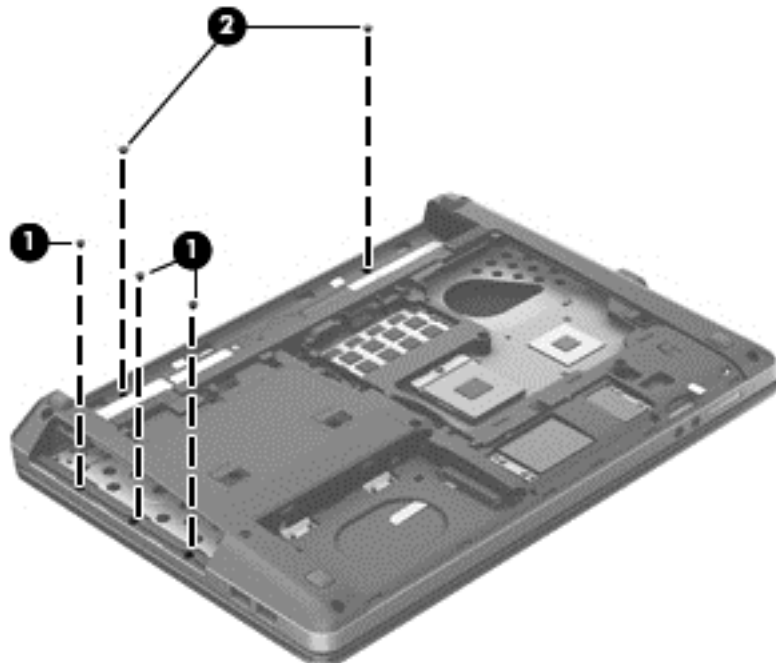
9. Position the computer upright.

10. For 4540s models, remove the two 2 Torx T8M2.5×6.0 screws screws that secure the top cover to the computer.
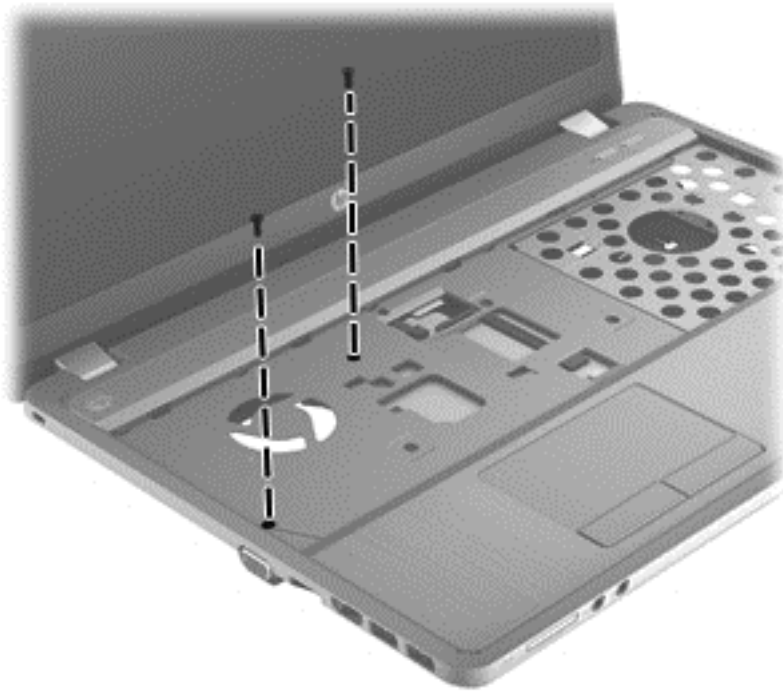
11. For 4440s/4441s models, remove the three 2 Torx T8M2.5×6.0 screws screws that secure the top cover to the computer.
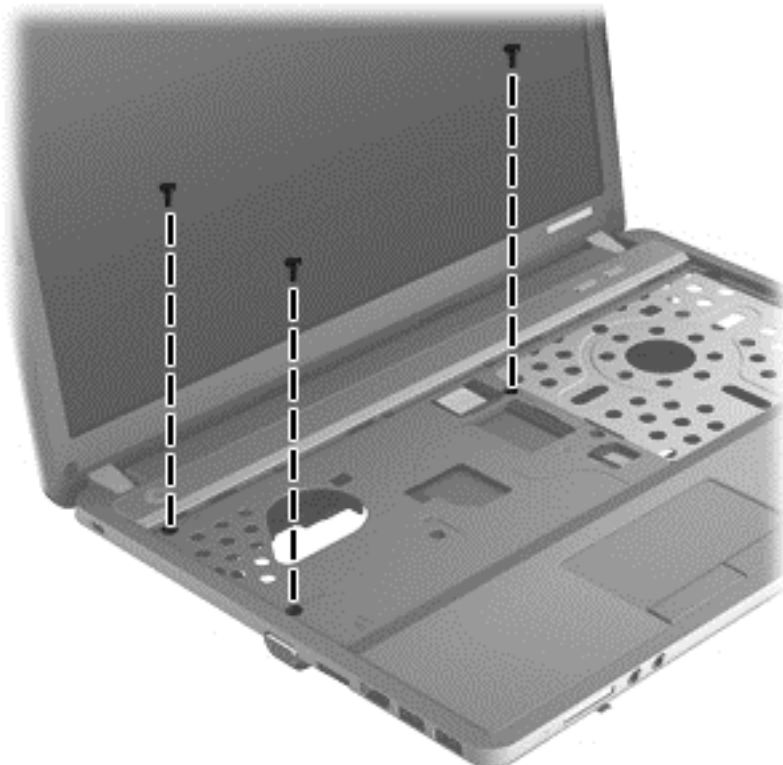
12. Turn the computer upright and open it as far as possible.

13. Pry the top of the top cover loose from the computer **(1)**.

14. Lift the top cover up slightly **(2)**, enough not to inadvertently disconnect the touch pad cable from the system board.
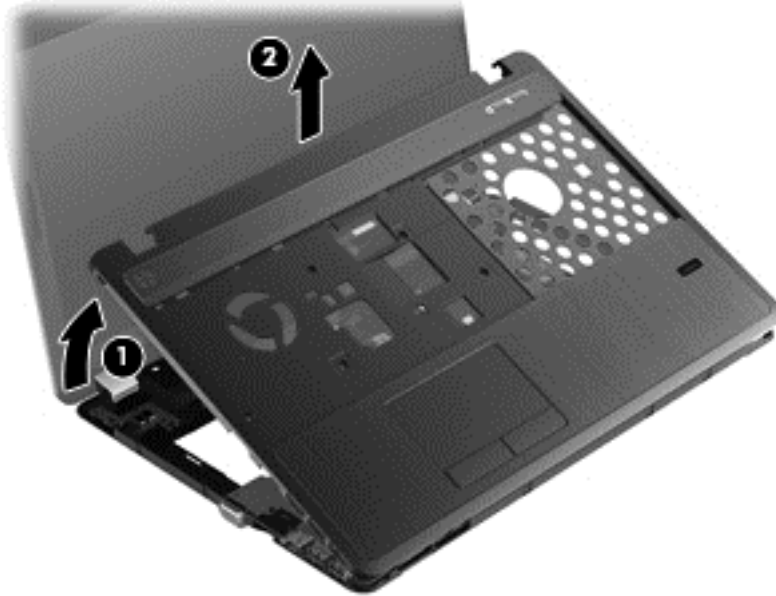
15. Lift the top cover upward enough to access the audio board cable **(1)**, and the disconnect the cable from the system board **(2)**.
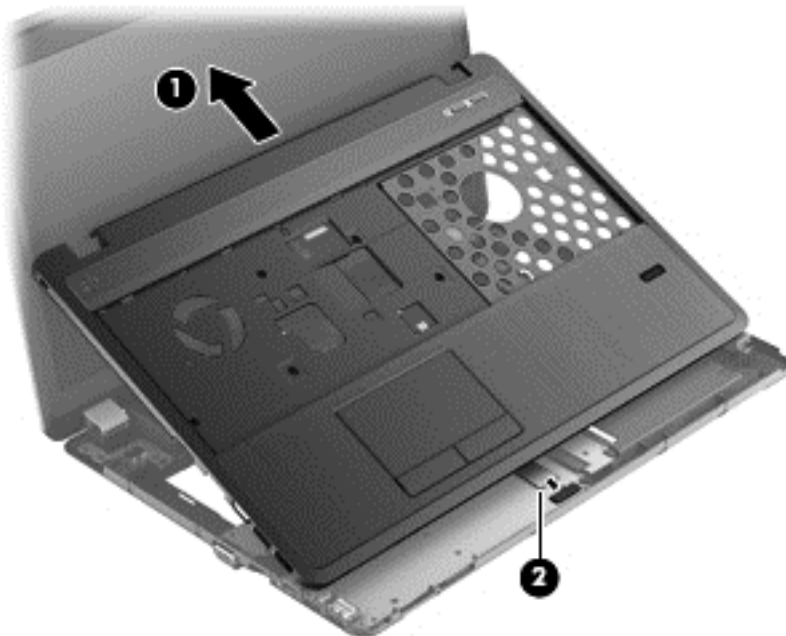
16. Remove the top cover from the computer.

Reverse this procedure to install the top cover.

Fingerprint reader board

NOTE: Fingerprint assembly spare part kits include cable, bracket, and screws.

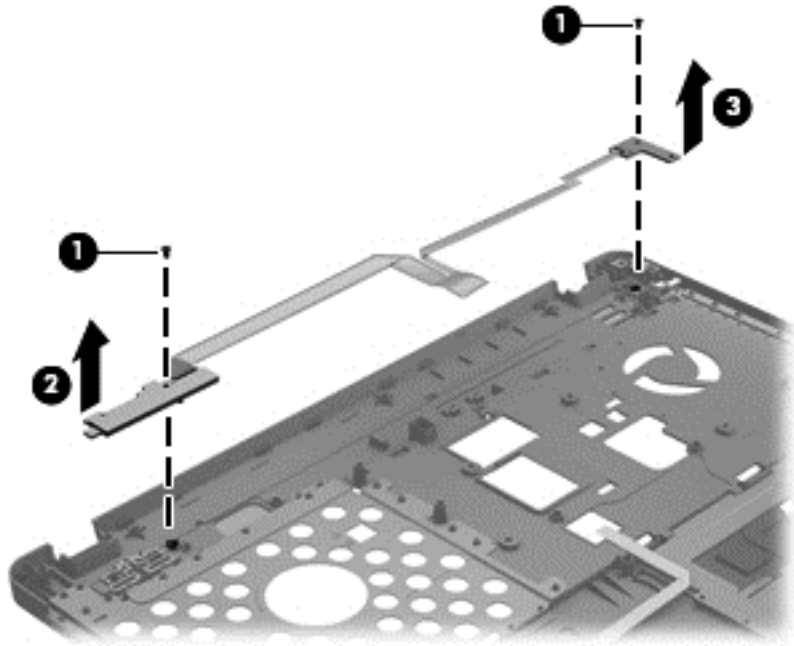| Description	Spare part number
Fingerprint reader board for use in 4540s models	683485-001
Fingerprint reader board for use in 4440s/4441s models	683652-001

Before removing the fingerprint reader board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 55).

5. Remove the following components:

   a. Bottom door (see Bottom door on page 58).

   b. Keyboard (see Keyboard on page 70)

   c. Top cover (see Top cover on page 82)

Remove the fingerprint reader board:

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

2. Remove the Phillips PM2.0×4.0 screw **(1)** that secures the fingerprint reader board bracket to the top cover.

3. Slide the bracket toward the bottom of the top cover **(2)**, and then lift it off the top cover **(3)**.

4. Remove the reader and cable assembly from the top cover **(4)**.
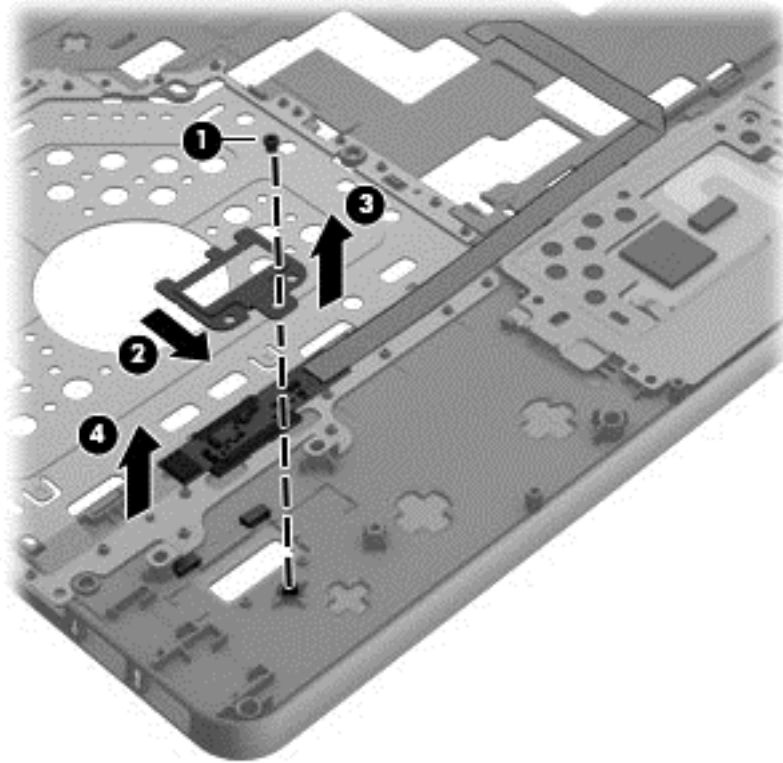
Reverse this procedure to install the fingerprint reader board.

Speaker assembly

NOTE: In 4540s models, the speakers are mounted to the bottom of the top cover.

NOTE: In 4440s/4441s models, the speakers are mounted to the base enclosure.

Description	Spare part number
Speaker assembly for use in 4540s models	683505-001
Speaker assembly for use in 4440s/4441s models	683665-001

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 55).

5. Remove the following components:

    a. Bottom door (see Bottom door on page 58).

    b. Keyboard (see Keyboard on page 70)

    c. Top cover (see Top cover on page 82)

Remove the speaker assembly:

1. If disassembling model 4440s/4441s, skip to step 7.

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

3. For model 4540s, disconnect the speaker cable from the system board **(1)** and remove the cables from under the power button board cable and from the clips.

4. Remove the cables from under the power button board cable and from the clips.

5. Remove the two Phillips PM2.0×7.0 screws **(2)** that secure the speakers to the computer.

6. Lift the opposite end of each speaker away from the tab and up at an angle, and then pull the speaker away from tab and up and off the top cover **(3)**.
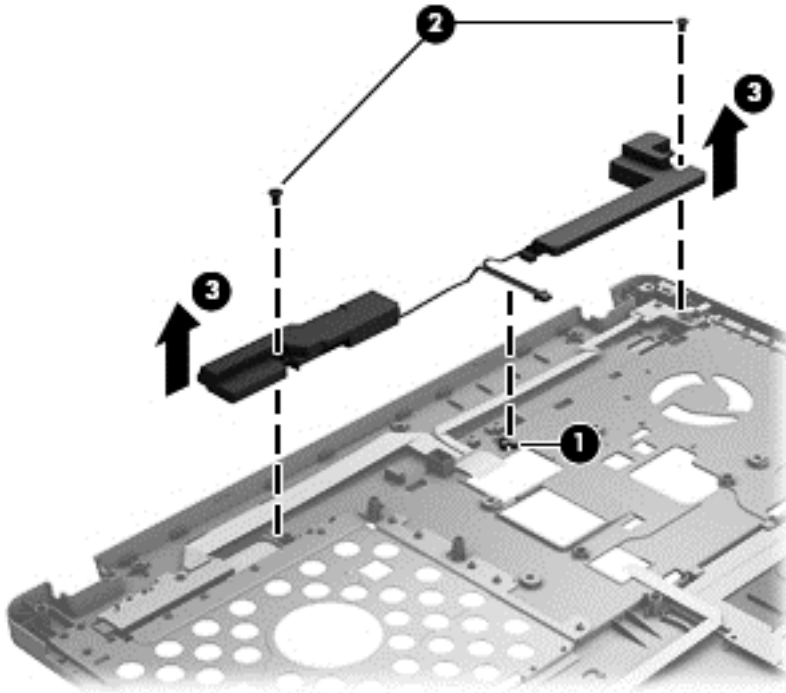
7. For model 4440s/4441s, position the computer upright and open as far as possible.

8. Disconnect the speaker cable from the system board **(1)**.

9. Remove the two broadhead PM2.0×3.0 screws **(2)** that secure the speakers to the computer, and the remove the speakers from the computer **(3)**.
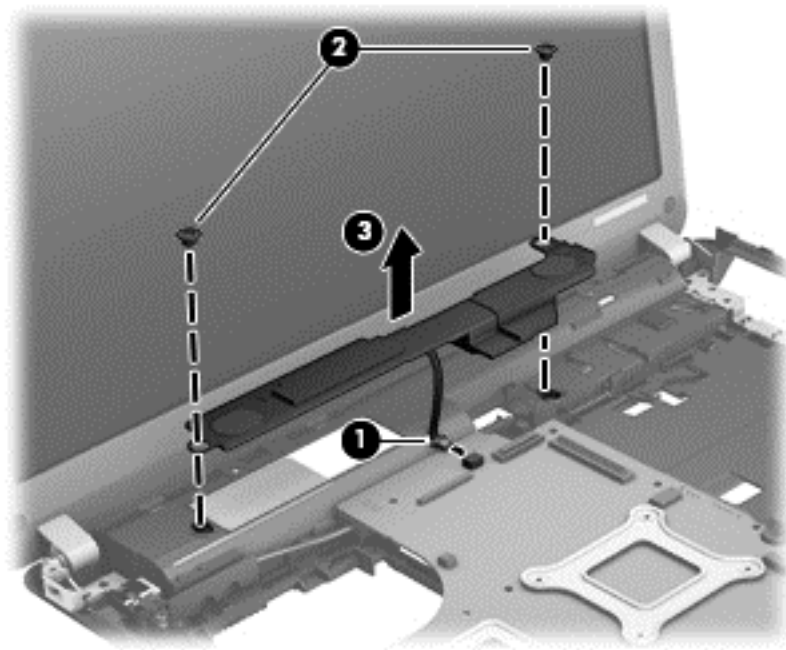
Reverse these procedures to install the speaker assembly.

Function board/Power button board assembly

Description	Spare part number
Function board/Power button board assembly for use in 4540s models (includes cable)	683486-001
Function board/Power button board for use in 4440s/4441s models (includes cable)	683653-001

Before removing the function board and power button board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 55).

5. Remove the following components:

   a. Bottom door (see Bottom door on page 58).

   b. Keyboard (see Keyboard on page 70)

   c. Top cover (see Top cover on page 82)

   d. Speaker (see Speaker assembly on page 91)

Remove the function board/power button board assembly:

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

2. Remove the two Phillips PM2.0×4.0 screws **(1)** that secure the boards to the top cover.

3. Remove the function board from the top cover **(2)**.

4. Remove the power button board from the top cover. **(3)**.

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

Audio board

Description	Spare part number
Audio board (includes cable)	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 55).

5. Remove the following components:

    a. Bottom door (see Bottom door on page 58).

    b. Keyboard (see Keyboard on page 70)

    c. Top cover (see Top cover on page 82)

Remove the audio board:

1. Position the top cover upside-down.

2. Disconnect the smaller touchpad button cable **(1)**.

3. Remove the Phillips PM2.0×4.0 screw **(2)** that secures the audio board to the computer.

4. Rotate the top of the board upward, pull the board away from the connectors (to remove them from top cover holes), and then lift the board off the top cover **(3)**.
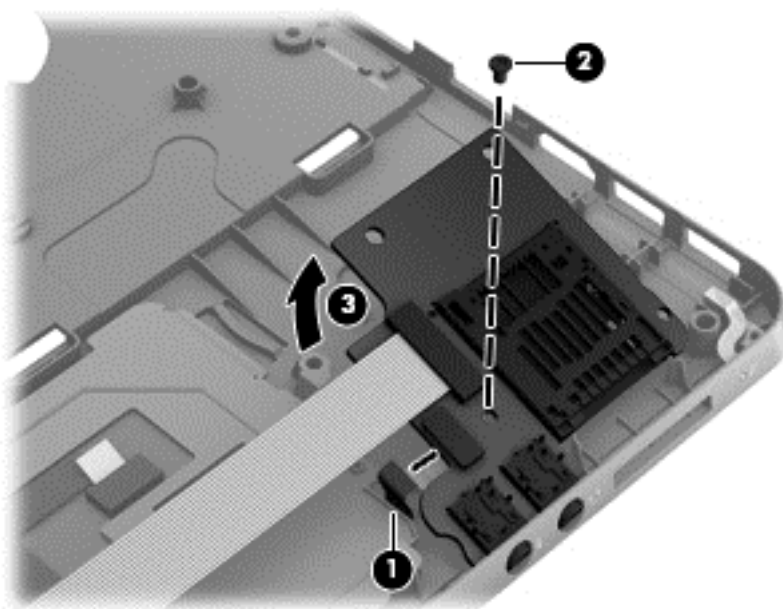
Reverse this procedure to install the audio board.

USB connector assembly

The USB connector assembly is included in the Cable Kit, spare part number 683477-001 for 4540s models and 683640-001 for 4440s/4441s models.

Before removing the USB connector 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 55).

5. Remove the following components:

    a. Bottom door (see Bottom door on page 58).

    b. Keyboard (see Keyboard on page 70)

    c. Top cover (see Top cover on page 82)

Remove the USB connector assembly:

1. Position the computer upright.

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

3. Remove the cables from the routing path **(2)**.

4. Remove the two Phillips PM2.5×4.5 screws (4440s/4441s models) **(3)** that secure the USB connector to the computer.

> **NOTE:** Model 4540s has only one screw securing the USB connector. Model 4440s/4441s has two screws.
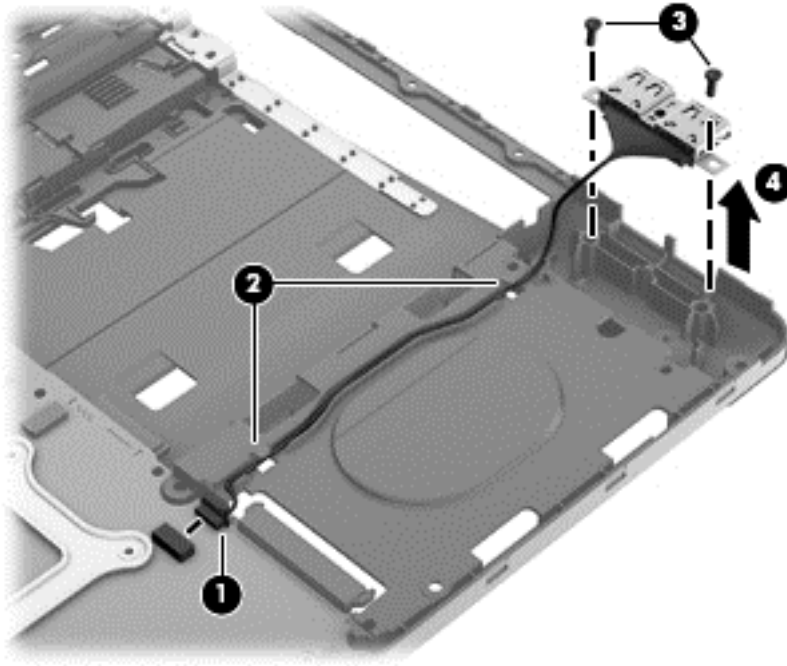
Reverse this procedure to install the USB connector assembly.

Battery cable

The battery cable is included in the Cable Kit, spare part number 683477-001 for 4540s models, 684640-001 for 4440s/4441s models.

Before removing the battery 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 55).

5. Remove the following components:

   a. Bottom door (see Bottom door on page 58).

   b. Keyboard (see Keyboard on page 70)

   c. Top cover (see Top cover on page 82)

Remove the battery cable:

1. Position the computer upright.

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

3. Remove the two Phillips PM2.5×4.5 screws that secure the cable to the computer **(2)**.

4. Remove the battery cable from the computer **(3)**.
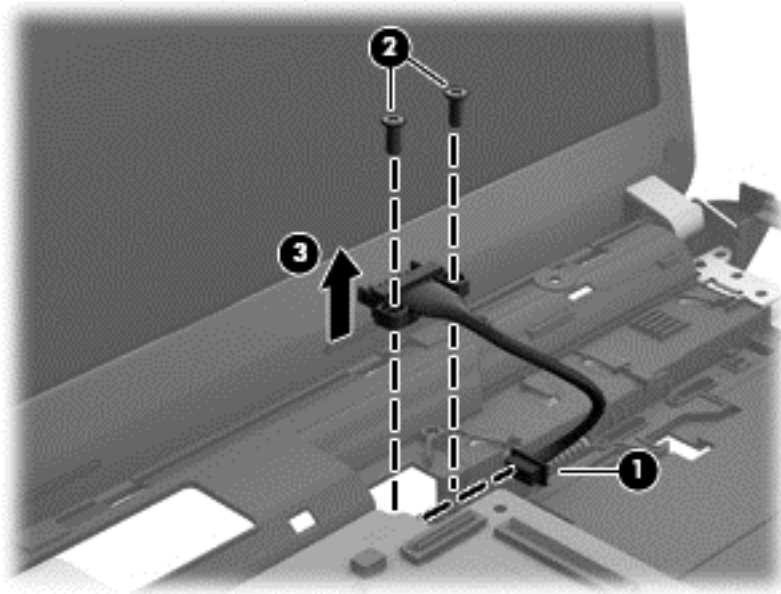
Reverse this procedure to install the battery cable.

System board

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

Description	Spare part number
System board for use in models in which the processor is NOT soldered to the system board; without Windows 8:	
UMA graphics with WWAN	683496-001
UMA graphics without WWAN	683495-001
1-GB of discrete graphics memory	683493-001
2-GB of discrete graphics memory	683494-001
System board for use in models in which the processor is NOT soldered to the system board; with Windows 8:	
Windows 8 Standard and UMA graphics with WWAN	683496-501
Windows 8 Professional and UMA graphics with WWAN	683496-601
Windows 8 Standard and UMA graphics without WWAN	683495-501
Windows 8 Professional and UMA graphics without WWAN	683495-601
Windows 8 Standard and 1-GB discrete graphics memory	683493-601
Windows 8 Professional and 1-GB discrete graphics memory	683493-601
Windows 8 Standard and 2-GB discrete graphics memory	683494-601
Windows 8 Professional and 2-GB discrete graphics memory	683494-601
System board for use in models with the processor soldered onto the system board:	
Non-Windows 8 models with UMA graphics and an Intel Core i3-3120M processor	712922-001
Windows 8 Standard models with UMA graphics and an Intel Core i3-3120M processor	712922-501
Windows 8 Professional models with UMA graphics and an Intel Core i3-3120M processor	712922-601
Non-Windows 8 models with UMA graphics and an Intel Core i3-3110M processor	712921-001
Windows 8 Standard models with UMA graphics and an Intel Core i3-3110M processor	712921-501
Windows 8 Professional models with UMA graphics and an Intel Core i3-3110M processor	712921-601
Non-Windows 8 models with 1 GB of discrete graphics and an Intel Core i3-3120M processor	712924-001
Windows 8 Standard models with 1 GB of discrete graphics and an Intel Core i3-3120M processor	712924-501
Windows 8 Professional models with 1 GB of discrete graphics and an Intel Core i3-3120M processor	712924-601
Non-Windows 8 models with 1 GB of discrete graphics and an Intel Core i3-3110M processor	712923-001
Windows 8 Standard models with 1 GB of discrete graphics and an Intel Core i3-3110M processor	712923-501
Windows 8 Professional models with 1 GB of discrete graphics and an Intel Core i3-3110M processor	712923-601
System board for use only in models in Brazil with the processor soldered onto the system board:	
Non-Windows 8 models with UMA graphics and an Intel Core i3-3120M processor	718659-001

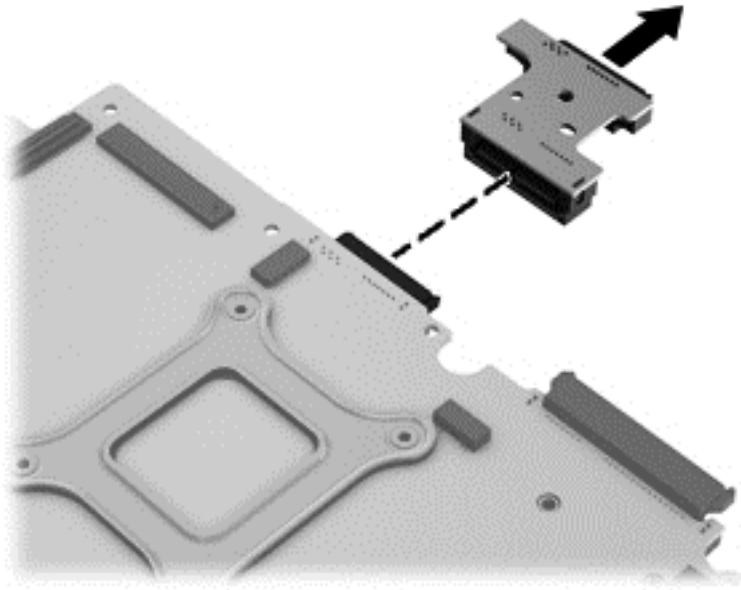| Description	Spare part number
Windows 8 Standard models with UMA graphics and an Intel Core i3-3120M processor	718659-501
Windows 8 Professional models with UMA graphics and an Intel Core i3-3120M processor	718659-601
Non-Windows 8 models with UMA graphics and an Intel Core i3-3110M processor	718658-001
Windows 8 Standard models with UMA graphics and an Intel Core i3-3110M processor	718658-501
Windows 8 Professional models with UMA graphics and an Intel Core i3-3110M processor	718658-601

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 55).

5. Remove the following components:

    a. Bottom door (see Bottom door on page 58).

    b. Hard drive (see Hard drive on page 62)

    c. Optical drive (see Optical drive on page 60)

    d. Keyboard (see Keyboard on page 70)

    e. Heat shield (see Heat shield on page 73)

    f. Fan (see Fan on page 75)

    g. Heat sink (see Heat sink on page 77)

    h. Top cover (see Top cover on page 82)

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 64)

● SIM (see SIM on page 59)

● WLAN/Bluetooth module (see WLAN/Bluetooth combo card on page 68)

● WWAN module (see WWAN module on page 66)

● Processor (see Processor on page 80)

Remove the system board:

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

2. Disconnect the following cables from the system board (model 4440s/4441s shown): .

- **(1)** Power cable
- **(2)** Display cable
- **(3)** Battery connector cable
- **(4)** USB connector cable
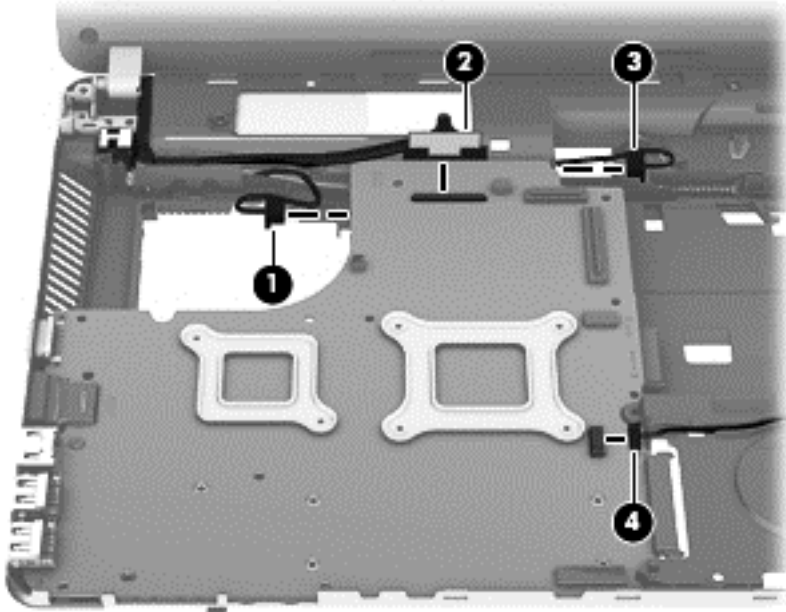
3. If disassembling 4440s/4441s models, skip to step 7.

4. For model 4540s, remove the three Phillips PM2.5×4.5 screws **(1)** that secure the system board to the computer. Note that two of the screws secure the optical drive connector board and hard drive connector board.

5. Disconnect the display cable from the system board (if necessary).

6. Lift the right side of the system board up at an angle **(2)**, and then lift it up and off the computer.
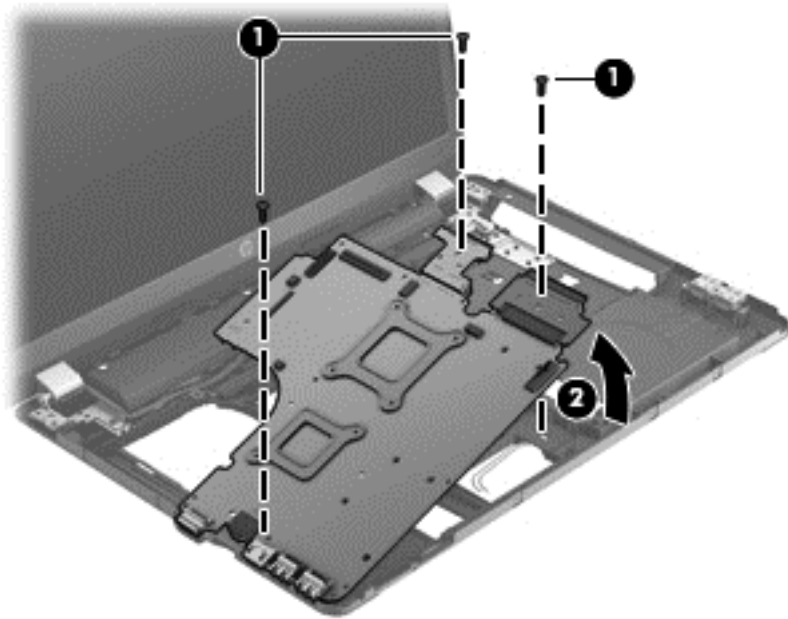
7. For 4440s/4441s models, remove the two Phillips PM2.5×4.5 screws **(1)** that secure the system board to the computer, lift the right side of the board up at an angle **(2)**, and then pull the board up and toward the right to remove it from the computer **(3)**.
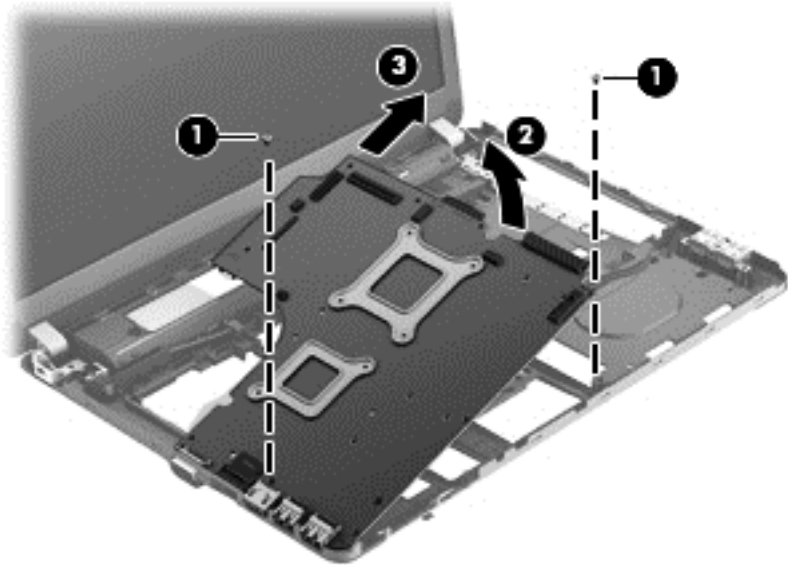
Reverse this procedure to install the system board.

RTC battery

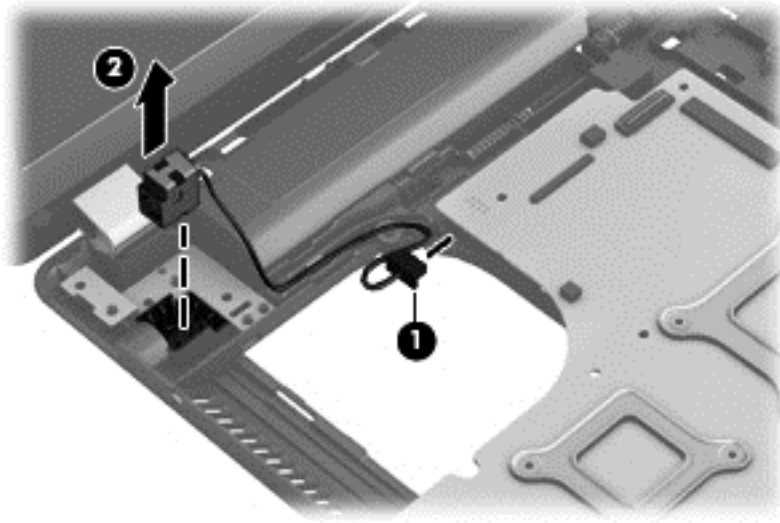| Description	Spare part number
RTC battery	683502-001

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 55).

5. Remove the following components:

   a. Bottom door (see Bottom door on page 58).

   b. Hard drive (see Hard drive on page 62)

   c. Optical drive (see Optical drive on page 60)

   d. Keyboard (see Keyboard on page 70)

   e. Heat shield (see Heat shield on page 73)

   f. Fan (see Fan on page 75)

   g. Heat sink (see Heat sink on page 77)

   h. Top cover (see Top cover on page 82)

   i. System board (see System board on page 99)

Remove the RTC battery:

1. Position the system board upside-down.

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

3. Lift the battery from the system board **(2)**.
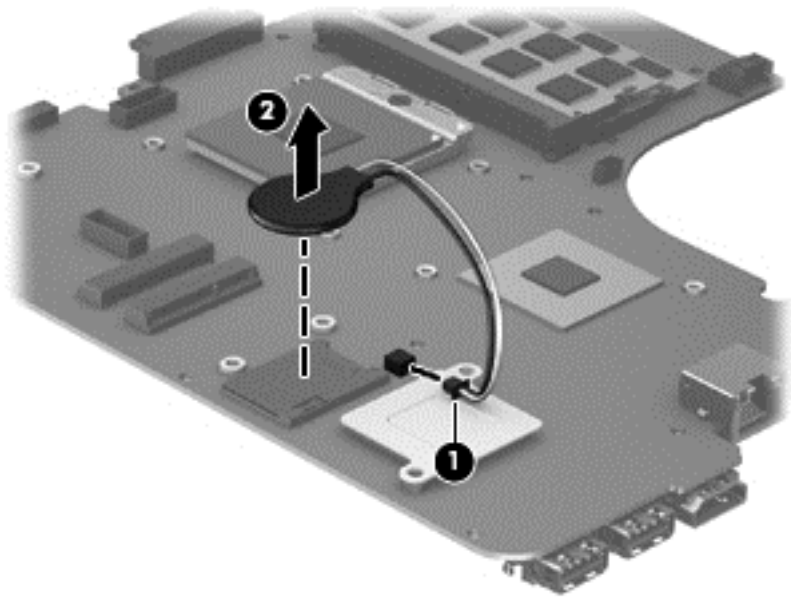
Reverse this procedure to install the RTC battery.

Optical drive extension board (4540s models only)

Description	Spare part number
Optical drive extension board	683498-001

Before removing the optical drive extension board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 55).

5. Remove the following components:

    a. Bottom door (see Bottom door on page 58).

    b. Hard drive (see Hard drive on page 62)

    c. Optical drive (see Optical drive on page 60)

    d. WLAN/Bluetooth module (see WLAN/Bluetooth combo card on page 68)

    e. WWAN module (see WWAN module on page 66)

    f. Keyboard (see Keyboard on page 70)

    g. Heat shield (see Heat shield on page 73)

    h. Fan (see Fan on page 75)

    i. Heat sink (see Heat sink on page 77)

    j. Top cover (see Top cover on page 82)

    k. System board (see System board on page 99)

Remove the optical drive extension board:

1. Lift the right side of the system board up.

2. Pull the optical drive extension board straight away from the system board.

Reverse this procedure to install the optical drive extension board.

Hard drive extension board (4540s models only)

Description	Spare part number
Hard drive extension board	683487-001

Before removing the hard drive extension board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 55).

5. Remove the following components:

    a. Bottom door (see Bottom door on page 58).

    b. Hard drive (see Hard drive on page 62)

    c. Optical drive (see Optical drive on page 60)

    d. WLAN/Bluetooth module (see WLAN/Bluetooth combo card on page 68)

    e. WWAN module (see WWAN module on page 66)

    f. Keyboard (see Keyboard on page 70)

    g. Heat shield (see Heat shield on page 73)

    h. Fan (see Fan on page 75)

    i. Heat sink (see Heat sink on page 77)

    j. Top cover (see Top cover on page 82)

    k. System board (see System board on page 99)

Remove the hard drive extension board:

1. Lift the right side of the system board up.

2. Pull the hard drive extension board straight away from the system board.
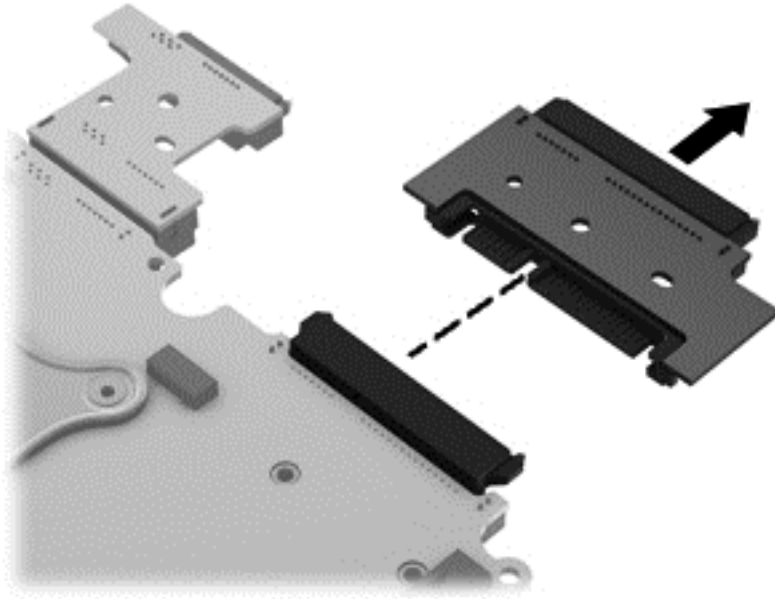
Reverse this procedure to install the hard drive extension board.

Power cable

The power cable is included in the Cable Kit, spare part number 683477-001 for 4540s models, 683640-001 for 4440s/4441s models.

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 55).

5. Remove the following components:

    a. Bottom door (see Bottom door on page 58).

    b. Optical drive (see Optical drive on page 60)

    c. WLAN/Bluetooth module (see WLAN/Bluetooth combo card on page 68)

    d. WWAN module (see WWAN module on page 66)

    e. Keyboard (see Keyboard on page 70)

    f. Top cover (see Top cover on page 82)

    g. Speaker assembly (see Speaker assembly on page 91)

    h. System board (see System board on page 99)

Remove the power cable:

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

2. If necessary, disconnect the cable from the bottom of the system board **(1)**.

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

Reverse this procedure to install the power cable.

Latch assembly

NOTE: The Latch Kit includes the latch, bracket, two screws, and spring.

Description	Spare part number
Latch Kit	684635-001

Before removing the latch 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 55).

5. Remove the following components:

   a. Bottom door (see Bottom door on page 58).

   b. Optical drive (see Optical drive on page 60)

   c. WLAN/Bluetooth module (see WLAN/Bluetooth combo card on page 68)

   d. WWAN module (see WWAN module on page 66)

   e. Keyboard (see Keyboard on page 70)

   f. Top cover (see Top cover on page 82)

g. Speaker assembly (see Speaker assembly on page 91)

h. System board (see System board on page 99)

NOTE: The latch mechanism includes a small spring. Note the location of the spring.

Remove the latch assembly:

1. Position the computer right-side up, with the front toward you.

2. Slide the latch toward the left **(1)**.

3. Lift the latch from the tab that holds it in place **(2)**.

4. Rotate the latch up and lift it out of the computer **(3)**.
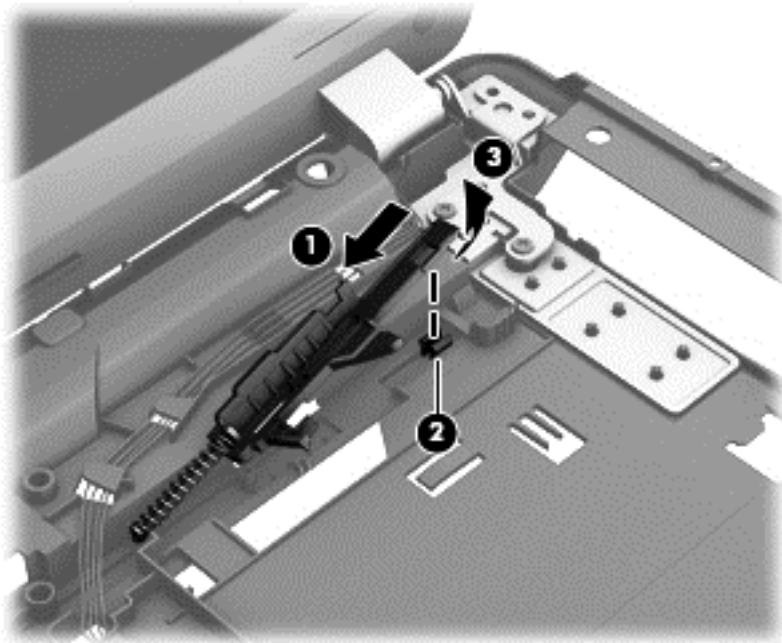
Reverse this procedure to install the latch assembly.

Display assembly

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

For a list of individual display spare parts, see Display components on page 36.

Description	Spare part number
For use in silver HP ProBook 4540s models:	
● 39.6-cm (15.6-inch) HD, anti-glare, without webcam	683481-001
● 39.6-cm (15.6-inch) HD, anti-glare, with webcam	683482-001
● 39.6-cm (15.6-inch) HD, anti-glare, with webcam and WWAN	683483-001
For use in HP ProBook 4440s/4441s models:	
● 35.6-cm (14.0-inch), Anti-glare, without webcam	683644-001
● 35.6-cm (14.0-inch), Anti-glare, with webcam	683645-001
● 35.6-cm (14.0-inch), Anti-glare, with webcam and WWAN	683646-001
● 35.6-cm (14.0-inch), BrightView, without webcam	683647-001
● 35.6-cm (14.0-inch), BrightView, with webcam	683648-001
● 35.6-cm (14.0-inch), BrightView, with webcam and WWAN	683650-001

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 55).

5. Remove the following components:

    a. Bottom door (see Bottom door on page 58).

    b. WLAN module (see WLAN/Bluetooth combo card on page 68)

    c. WWAN module (see WWAN module on page 66)

    d. Keyboard (see Keyboard on page 70)

    e. Top cover (see Top cover on page 82)

Remove the display assembly:

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

2. Open the computer as far as possible.

3. If necessary, disconnect the display cable from the system board.

4. Position the computer upside down.

5. Remove the WWAN antenna cables **(1)** and the WLAN antenna cables **(2)** from the routing path on the bottom of the computer.
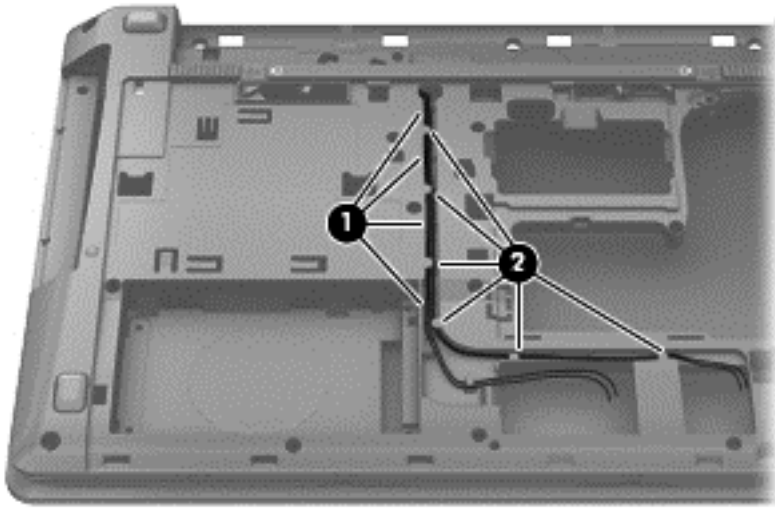
6. Position the computer upright.

7. Remove the antenna cables **(1)** from the routing path **(2)** in the base enclosure.
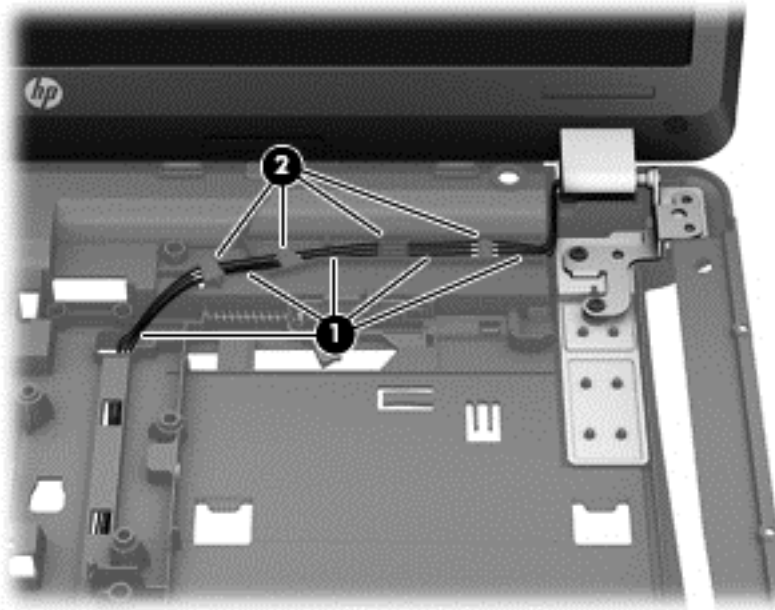
8. Pull the antenna cables through the hole that routes to the bottom of the computer .

9. Remove four Phillips PM2.5×7.0 screws **(1)** from the hinges.

10. Lift the display assembly straight up and remove it **(2)**.
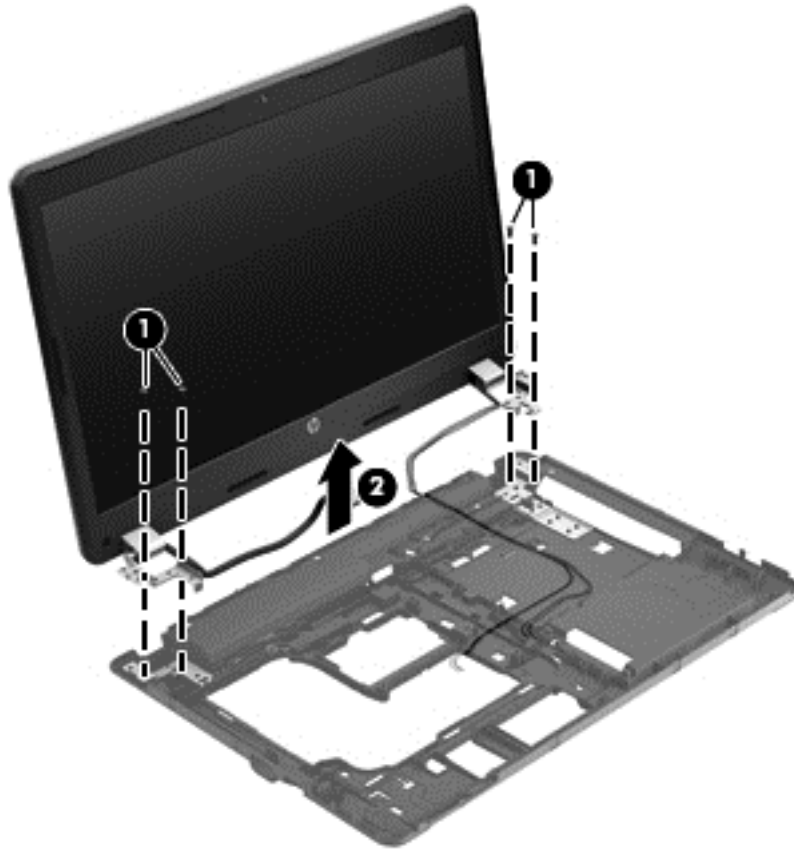
⚠ **CAUTION:** When installing the display assembly, be sure that the wireless antenna cables are routed and arranged properly.

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

11. 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 available in the Display Hinge Kit using spare part number 683480-001 for 4540s models and 683643-001 for 4440s/4441s models.

12. To replace the display bezel, remove the two rubber screw covers **(1)** and the two Phillips PM2.5×4.0 screws **(2)** in the bottom corners of the display bezel.
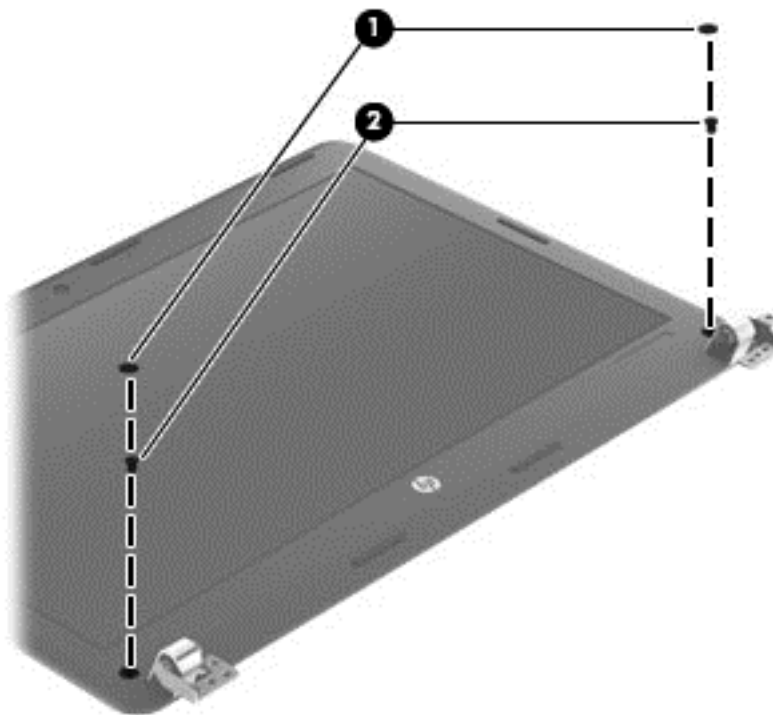
13. Flex the top **(1)** of the bezel, the inside edges of the left and right sides **(2)**, and then the bottom **(3)** of the bezel until it disengages from the display enclosure.

14. Remove the display bezel **(4)**.

The bezel is available using the following spare part numbers:

683478-001: 4540s models with a webcam

683479-001: 4540s models without a webcam

683641-001: 4440s/4441s models with a webcam

683642-001: 4440s/4441s models without a webcam
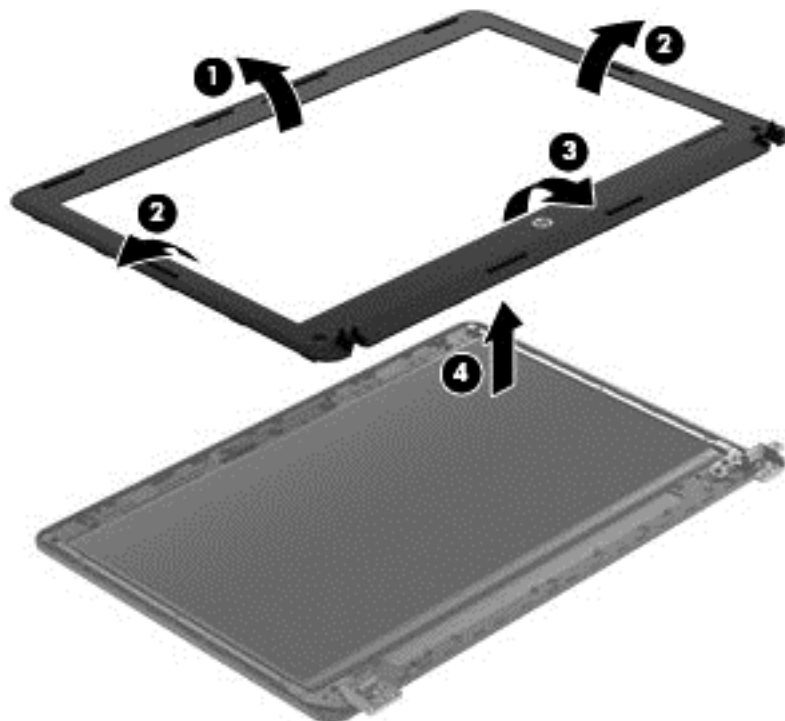
15. If it is necessary to replace the webcam module (shown in the following image) or microphone module from the display enclosure, disconnect the cable from the module **(1)**, and then gently pull the module away from the double-sided tape on the display enclosure **(2)**.

The webcam module is available using spare part number 683508-001.

The removal procedure for the microphone module is the same as for the webcam module. The microphone module is available using spare part number 647675-001.
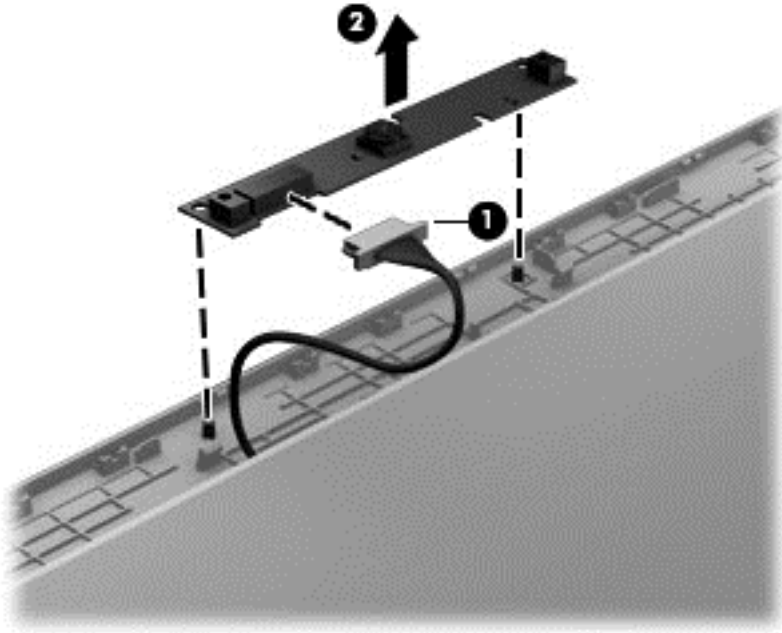
16. If it is necessary to replace the display hinges, remove the six Phillips PM2.5×3.0 screws that secure the display hinges and panel to the display enclosure.
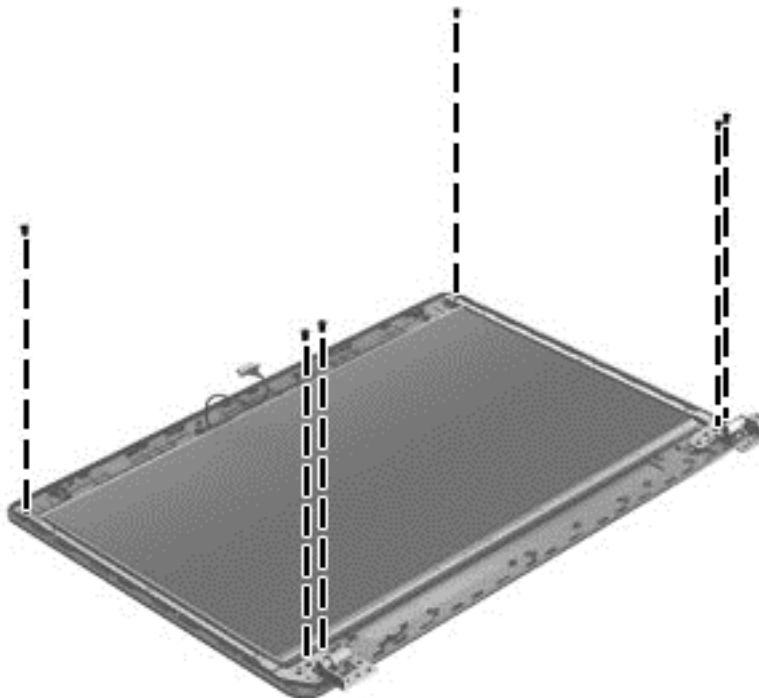
17. Remove the display hinges and panel from the display enclosure.

18. Disconnect the display panel cable by rotating the display enclosure **(1)**, lifting the tape **(2)** that covers the connector, and disconnecting the cable from the panel **(3)**.
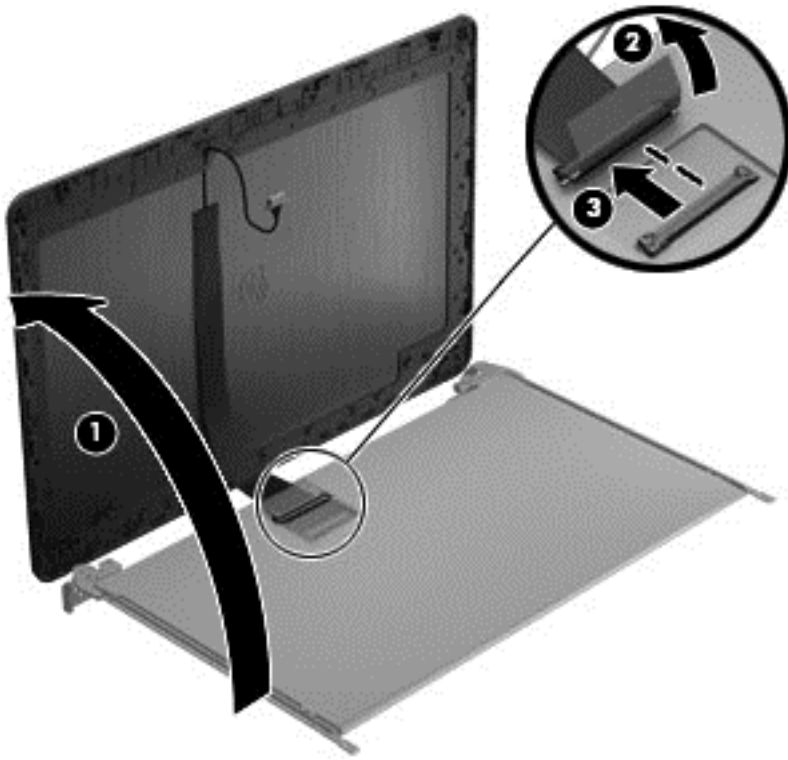
19. Remove the three Phillips PM2.0×3.0 screws **(1)** that secure each display hinge to the display panel.

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

Display hinges are available in the Display Hinge Kit using spare part number 683480-001 for 4540s models and 683643-001 for 4440s/4441s models.
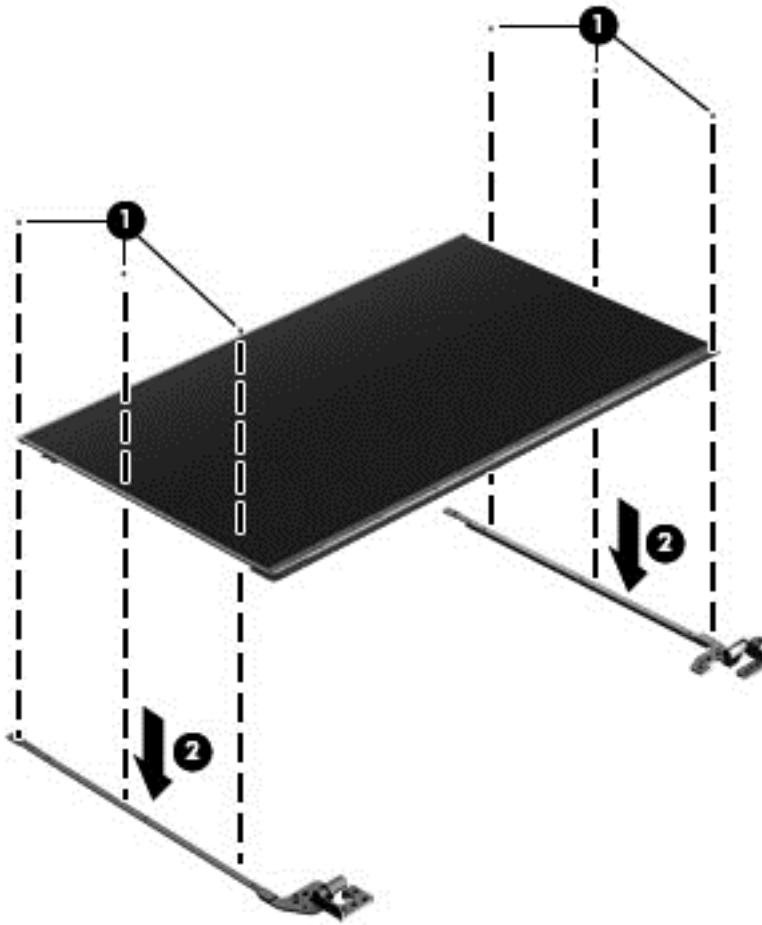
Reverse this procedure to reassemble and install the display assembly.

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-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

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.

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`, 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.

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

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

Starting Computer Setup

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

To start Computer Setup, follow these steps:

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

2. Press f10 to enter Computer Setup.

Using Computer Setup

Navigating and selecting in Computer Setup

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

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

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

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

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

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

2. Press f10 to enter Computer Setup.

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

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

  – or –

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

  – or –

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

  – or –

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

Your changes go into effect when the computer restarts.

Restoring 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

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

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

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

Determining the BIOS version

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

BIOS version information (also known as *ROM date* and *System BIOS*) can be displayed by starting 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.

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

Downloading a BIOS update

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

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

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

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

1. Open your Web browser, go to http://www.hp.com/support, and select your country or region. Access the page on the HP Web site that provides software for your computer. Follow the on-screen instructions to identify your computer and access the BIOS update you want to download.

2. Click the option for software and driver downloads, type your computer model number in the product box, and then press enter. Follow the on-screen instructions to identify your computer and access the BIOS update you want to download.

3. Click your specific product from the models listed.

4. Click the appropriate operating system.

5. Go to the BIOS section and download the BIOS software package.

6. Follow the installation instructions as provided with the downloaded BIOS software package.

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

Using Advanced System Diagnostics

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

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

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

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

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

- Battery test—This test analyzes the condition of the battery and calibrates the battery if necessary. If the battery fails the test, contact HP Customer 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.
Dimensions, 4540s models		
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
Dimensions, 4440s/4441s models		
Length	23.5 cm	9.3 in
Width	33.9 cm	13.4 in
Height (front to rear)	2.8 to 3.5 cm	1.1 to 1.4 in
Weight (equipped with optical drive, 1 SODIMM, hard drive, WLAN module, 6 cell battery)	2.1 kg	4.6 lbs
Input power		
Operating voltage	19.0 V dc @ 4.74 A – 90 W or 18.5 V dc @ 3.5 A - 65 W	
Operating current	4.74 A or 3.5 A	
Temperature		
Operating (not writing to optical disc)	0°C to 35°C	32°F to 95°F
Operating (writing to optical disc)	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F
Relative humidity		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating (14.7 to 10.1 psia)	-15 m to 3,048 m	50 ft to 10,000 ft
Nonoperating (14.7 to 4.4 psia)	-15 m to 12,192 m	-50 ft to 40,000 ft
Shock		

	Metric	U.S.
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)	

35.6-cm (14.0-in), HD display specifications

	Metric	U.S.
Active diagonal size	35.6-cm	14.0-in
Resolution	1366x768 (HD)	
Active area	309.399x173.952	
PPI	112	
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 (W, R, G, B)	+/- 0.03	
Color gamut	45% typ	

Hard drive specifications

	750-GB*	640-GB*	500-GB*	320-GB*
Dimensions				
Height	9.5 mm	9.5 mm	9.5 mm	9.5 mm
Width	70 mm	70 mm	70 mm	70 mm
Weight	115 g	101 g	101 g	101 g
Interface type	SATA	SATA	SATA	SATA
Transfer rate	100 MB/sec	100 MB/sec	100 MB/sec	100 MB/sec
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
Average	11 ms	12 ms	13 ms	13 ms
Maximum	14 ms	22 ms	24 ms	24 ms
Logical blocks	1,465,149,168	1,250,263,728	1,048,576,000	625,141,400
Disc rotational speed	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.

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		

Specification information in Device Manager

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

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

NOTE: Windows 7 includes the User Account Control feature to improve the security of your computer. You may be prompted for your permission or password for tasks such as installing software, running utilities, or changing Windows settings. Refer to Windows Help and Support for more information.

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

To access Device Manager in Windows 8:

1. From the Start screen, type `control`, and then select **Control Panel**.

2. Select **System and Security**, and then in the System area, click **Device Manager**.

   A list display all the devices installed in your computer.

To access Device Manager in Windows 7:

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

2. In the left pane, click **Device Manager**.

To access Device Manager in Windows XP:

1. Select **Start > My Computer**.

2. In the left pane of the System Tasks window, select **View system information**.

3. Select **Hardware** tab **> 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 Disk** or **Windows Disk**.

3. From the drop-down menu, select the drive for burning the recovery media.

4. Click the **Create** button to start the burning process.

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 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 media you previously created (select models only), you must purchase Windows 8 operating system media to reboot the computer and repair the operating system.

Using 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 148.

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**.

4. Select **Troubleshoot**, select **Advanced Options**, and then select **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 148.

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 SLED 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 SLED

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

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

You can initiate this option by using the f11 key.

To use the f11 key:

Press f11 while the computer boots.

– or –

Press and hold f11 as you press the power button.

The following options are available:

● Cancel/Reboot—Reboots the system. No recovery or restore activity is performed.

● Recover/Repair System—This option repairs a system that is not working properly and preserves user data.

● Restore Factory System—This option restores the system back to the original factory state. User data is not preserved.

Select an option and follow the on-screen instructions.

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 **1.5 m** (5.0 ft) and no more than **2.0 m** (6.5 ft).

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

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

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

Requirements for specific countries and regions

Country/region	Accredited agency	Applicable note number
Argentina	IRAM	1
Australia	SAA	1
Austria	OVE	1
Belgium	CEBEC	1
Brazil	ABNT	1
Canada	CSA	2
Chile	IMQ	1
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
India	ISI	1
Israel	SII	1
Italy	IMQ	1
Japan	JIS	3
The Netherlands	KEMA	1
New Zealand	SANZ	1
Norway	NEMKO	1
The People's Republic of China	CCC	4
Saudi Arabia	SASO	7
Singapore	PSB	1
South Africa	SABS	1
South Korea	KTL	5
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	6
Thailand	TISI	1
The United Kingdom	ASTA	1

Country/region	Accredited agency	Applicable note number
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 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V ac) or NEMA 6-15P (15 A, 250 V ac) configuration. CSA or C-UL mark. UL file number must be on each element.

3. The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCTF, 3-conductor, 0.75mm2 or 1.25mm2 conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration.

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

5. The flexible cord must be Type H05VV-F 3X0.75mm2 conductor size. KTL logo and individual approval number must be on each element. Corset approval number and logo must be printed on a flag label.

6. The flexible cord must be Type HVCTF 3X1.25mm2 conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.

7. For 127 V ac, the flexible cord must be Type SVT or SJT 3 x 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type H05VV-F 3X0.75/1.00mm2 conductor size, with plug BS 1363/A with BSI or ASTA marks.

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 and regulations in your area for battery disposal.

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

Display

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

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

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

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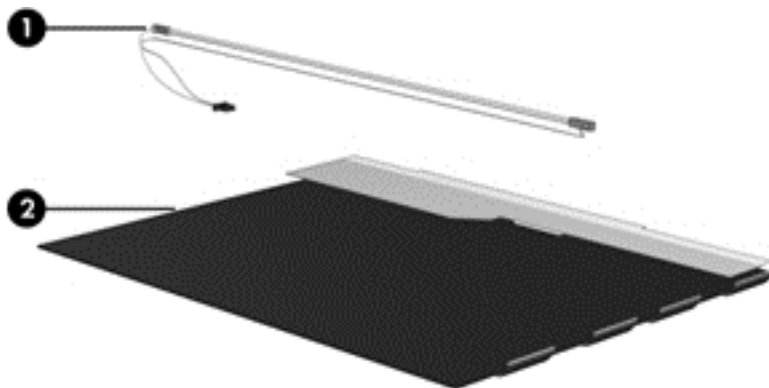
📝 **NOTE:**   The procedures provided in this chapter are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

Perform the following steps to disassemble the display assembly:

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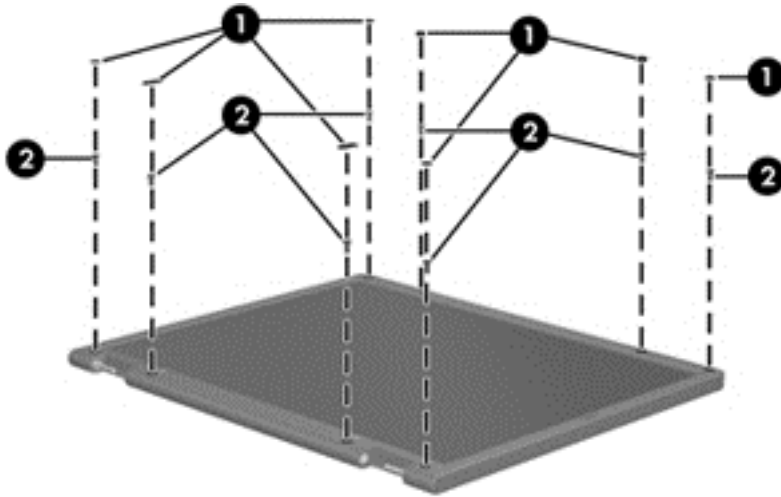
2. Lift up and out on the left and right inside edges **(1)** and the top and bottom inside edges **(2)** of the display bezel until the bezel disengages from the display assembly.

3. Remove the display bezel **(3)**.
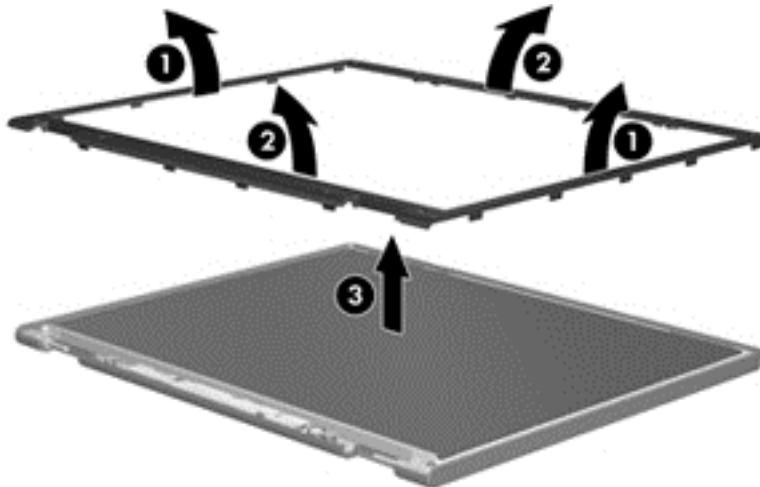
4. Disconnect all display panel cables **(1)** from the display inverter and remove the inverter **(2)**.
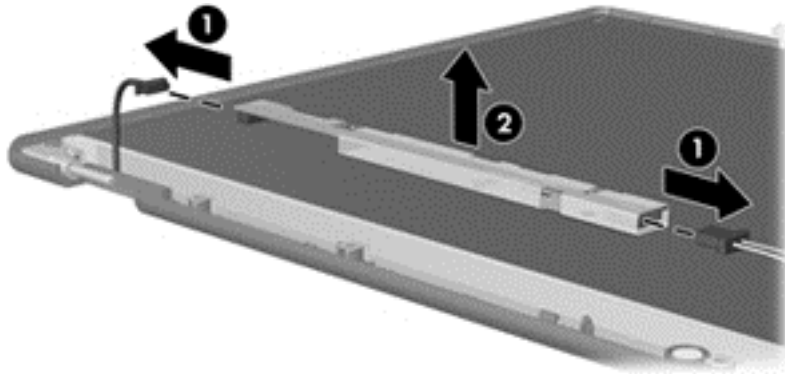
5. Remove all screws **(1)** that secure the display panel assembly to the display enclosure.

6. Remove the display panel assembly **(2)** from the display enclosure.
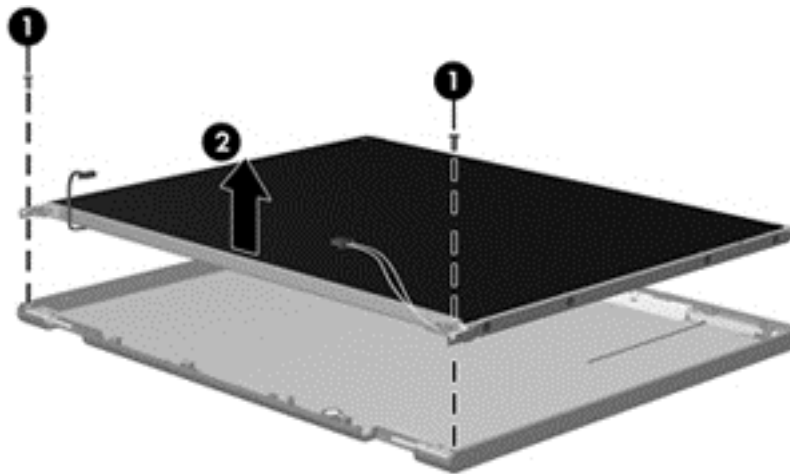
7. Position the display panel assembly upside-down.

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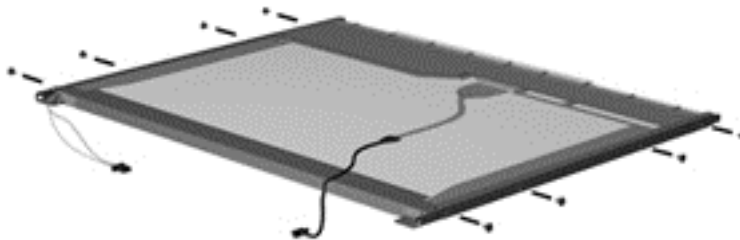
9. Use a sharp-edged tool to cut the tape **(1)** that secures the sides of the display panel to the display panel frame.

10. Remove the display panel frame **(2)** from the display panel.
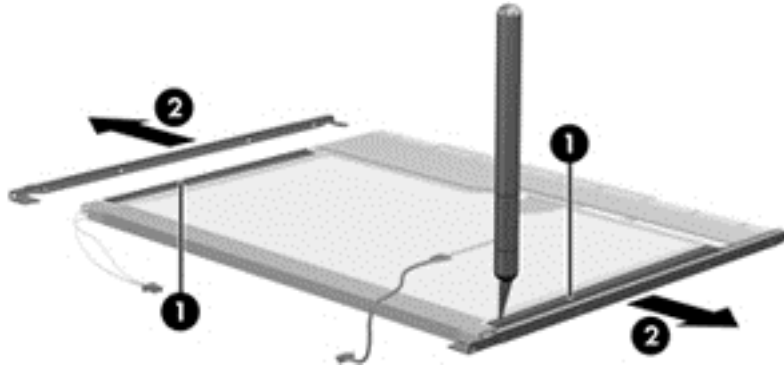
11. Remove the screws **(1)** that secure the backlight cover to the display panel.

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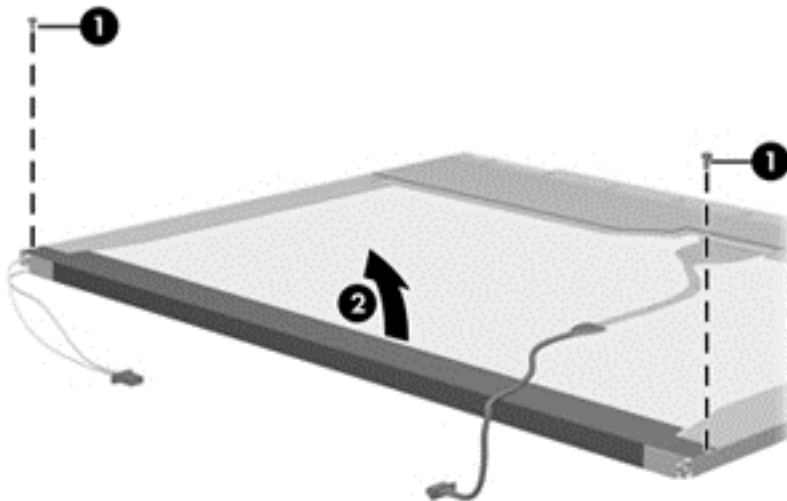
13. Remove the backlight cover.

14. Position the display panel right-side up.

15. Remove the backlight cables **(1)** from the clip **(2)** in the display panel.
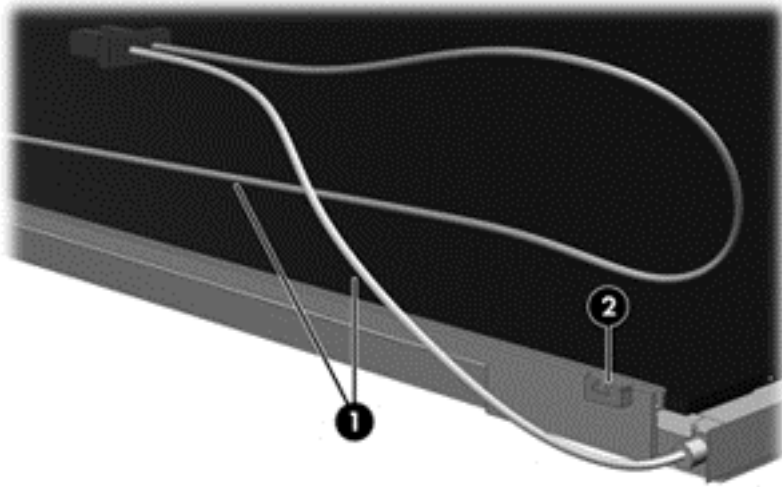
16. Position the display panel upside-down.

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

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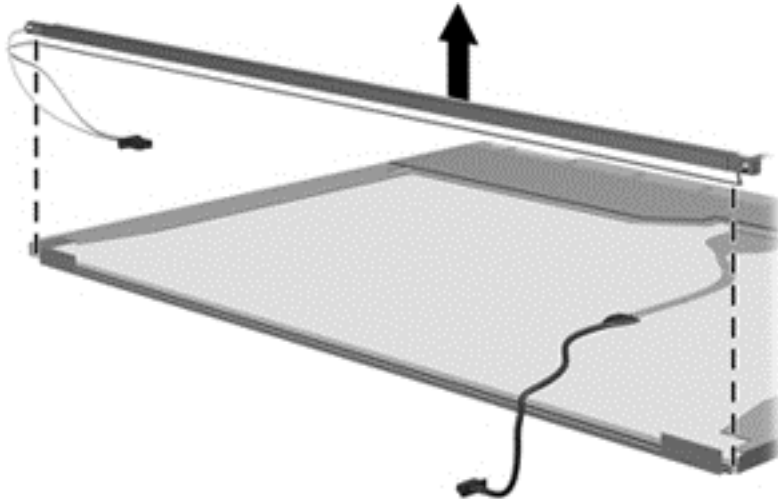
18. Remove the backlight from the backlight frame.
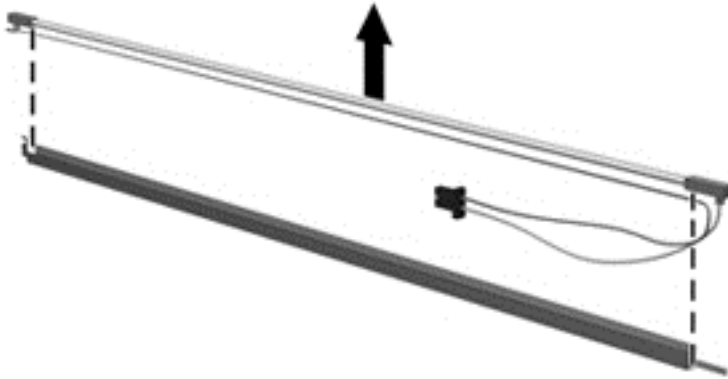
19. Disconnect the display panel cable **(1)** from the LCD panel.

20. Remove the screws **(2)** that secure the LCD panel to the display rear panel.

21. Release the LCD panel **(3)** from the display rear panel.

22. Release the tape **(4)** that secures the LCD panel to the display rear panel.
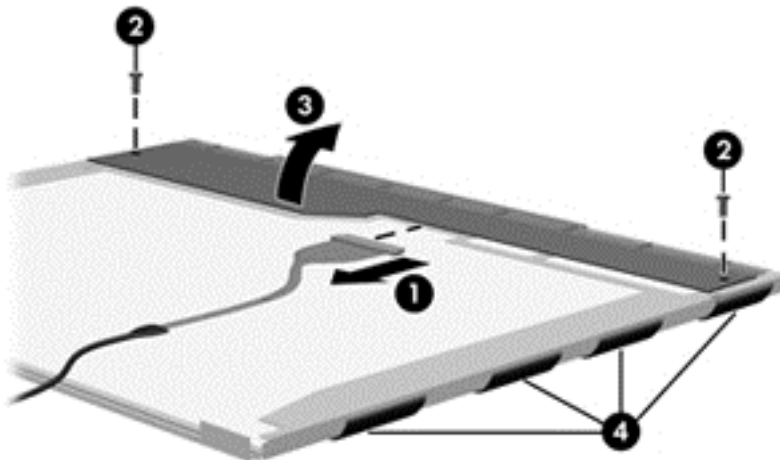
23. Remove the LCD panel.
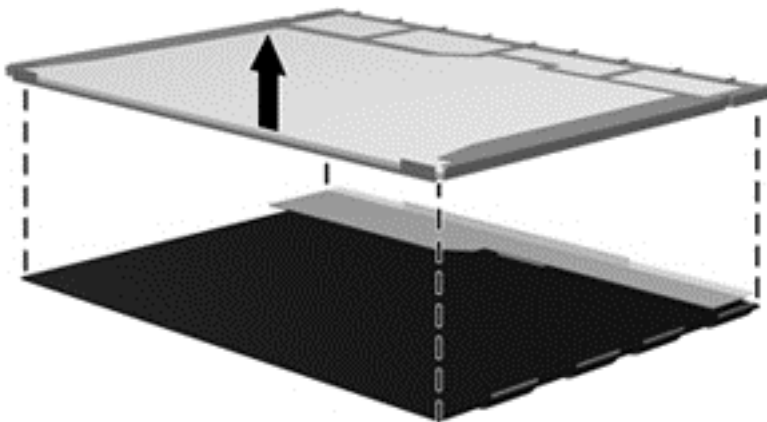
24. Recycle the LCD panel and backlight.

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