HP ProBook 4520s Notebook PC
HP ProBook 4720s Notebook PC

Maintenance and Service Guide

MSG revision history

Revision	Publication date	Description
A	July 2010	• Updated commodities in the following location: Product description on page 1.
		• Updated AC adapter spare part numbers in the following locations: Miscellaneous parts on page 36, Sequential part number listing on page 38
		• Updated the RTC battery spare part number in the following locations: RTC battery on page 107, Sequential part number listing on page 38
		• Added newly supported hard drives to spare parts listings in the following locations: Computer major components on page 21, Sequential part number listing on page 38, Mass storage devices on page 35, Hard drive on page 87
		• Added newly supported processors to spare parts listings in the following locations: Computer major components on page 21, Sequential part number listing on page 38, Processor on page 83
		• Added newly supported WLAN modules to spare parts listings in the following locations: Computer major components on page 21, Sequential part number listing on page 38, WLAN module on page 70
		• Added newly supported a switch cover to spare parts listings in the following locations: Computer major components on page 21, Sequential part number listing on page 38, Switch cover and keyboard on page 56
		• Added newly supported display panels to spare parts listings in the following locations: Computer major components on page 21, Sequential part number listing on page 38, Display assembly on computers with 15.6-in displays on page 96
		• Added a newly supported palm rest to spare parts listings in the following locations: Computer major components on page 21, Sequential part number listing on page 38, Palm rest on page 84
		• Added a newly supported system boards to spare parts listings in the following locations: Computer major components on page 21, Sequential part number listing on page 38, System board on page 114
		• Updated hard drive specifications in the following location: Hard drive specifications on page 135

Safety warning notice

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

Table of contents

1 Product description

Category	Description	HP ProBook 4520s UMA	HP ProBook 4520s discrete	HP ProBook 4720s discrete
Product Name	HP ProBook 4520s Notebook PC	√	√	
	HP ProBook 4720s Notebook PC			√
Processors	Intel® Core™ processors:			
	● *i7-640M, 2.80-GHz (Turbo up to 3.46 GHz), 4MB L3 cache*	√	√	√
	● i7-620M, 2.66-GHz (Turbo up to 3.33 GHz), 4MB L3 cache	√	√	√
	● *i5-580M, 2.66-GHz (Turbo up to 3.33 GHz), 3MB L3 cache*	√	√	√
	● *i5-560M, 3.20-GHz (Turbo up to 3.06 GHz), 3MB L3 cache*	√	√	√
	● i5-540M, 2.53-GHz (Turbo up to 3.06 GHz), 3MB L3 cache	√	√	√
	● i5-520M, 2.4-GHz (Turbo up to 2.93 GHz), 3MB L3 cache	√	√	√
	● *i5-460M, 2.53-GHz (Turbo up to 2.80 GHz), 3MB L3 cache (select models only)*	√	√	√
	● *i5-450M, 2.40-GHz (Turbo up to 2.66 GHz), 3MB L3 cache (select models ony)*	√	√	√
	● i5-430M, 2.26-GHz (Turbo up to 2.53 GHz), 3MB L3 cache (select models ony)	√	√	√
	● *i3-380M, 2.53-GHz, 3MB L3 cache (select models ony)*	√	√	√
	● *i3-370M, 2.40-GHz, 3MB L3 cache (select models ony)*	√	√	√
	● i3-350M, 2.26-GHz, 3MB L3 cache (select models only)	√	√	√
	● i3-330M, 2.13-GHz, 3MB L3 cache (select models only)	√	√	√
	Intel Pentium® processors:			

Category	Description	HP ProBook 4520s UMA	HP ProBook 4520s discrete	HP ProBook 4720s discrete
	● *P6200, 2.13-GHz, 3MB L3 cache (select models only)*	√	√	√
	● *P6100, 2.00-GHz, 3MB L3 cache (select models only)*	√	√	√
	● *P6000, 1.86-GHz, 3MB L3 cache (select models only)*	√	√	√
	Intel Celeron® processor:			
	● *P4600, 2.00-GHz, 2MB L3 cache (select models only)*	√	√	√
	● *P4500, 1.86-GHz, 2MB L3 cache (select models only)*	√	√	√
Chipsets	Intel HM57 Express	√	√	√
Graphics	Intel HD Graphics	√		
	Intel Universal Memory Architecture (UMA) graphics subsystem integrated with shared video memory (dynamically allocated)			
	ATI Mobility Radeon HD 6370 with 1-GB memory		√	√
	ATI Mobility Radeon HD 5470 with 512-MB memory		√	√
	ATI Mobility Radeon HD 530v with 512-MB memory		√	√
Panels	All display assemblies support privacy filter	√	√	√
	15.6-in HD LED backlight panel: ● 1366×768 AntiGlare ● 1366×768 AntiGlare for webcam ● 1366×768 AntiGlare for webcam and WWAN ● 1366×768 BrightView ● 1366×768 BrightView for webcam ● 1366×768 BrightView for webcam and WWAN ● *1366×768 HD+* ● *1366×768 HD+ for webcam*	√	√	

Category	Description	HP ProBook 4520s UMA	HP ProBook 4520s discrete	HP ProBook 4720s discrete
	17.3-in HD LED backlight panel:			√
	• 1600×900 AntiGlare			
	• 1600×900 AntiGlare for webcam and WWAN			
	• 1600×900 BrightView for webcam			
	• 1600×900 BrightView for webcam and WWAN			
Memory	2 customer-accessible/upgradable memory module slots	√	√	√
	Supports dual-channel memory	√	√	√
	Supports up to 8 GB of system RAM	√	√	√
	PC3-8500, 1066-MHz, DDR3	√	√	√
	Supports the following configurations in all countries and regions:	√	√	√
	• *8192-MB total system memory (4096-MB × 2)*			
	• 4096-MB total system memory (4096-MB × 1)			
	• 4096-MB total system memory (2048-MB × 2, dual-channel)			
	• 3072-MB total system memory (2048-MB + 1024-MB, dual-channel)			
	• 2048-MB total system memory (2048-MB × 1)			
	• 2048-MB total system memory (1024-MB × 2, dual-channel)			
	• 1024-MB total system memory (1024-MB × 1)			
Hard drives	Supports 9.5-mm, 6.35-cm (2.50-in) hard drives	√	√	√
	Customer-accessible	√	√	√
	Serial ATA	√	√	√

Category	Description	HP ProBook 4520s UMA	HP ProBook 4520s discrete	HP ProBook 4720s discrete
	Supports the following drives:	√	√	√
	● *750-GB, 5400-rpm*			
	● *640-GB, 5400-rpm*			
	● 500-GB, 7200-rpm			
	● 320-GB, 7200-rpm			
	● 250-GB, 7200-rpm			
	Supports 9.5-mm, 6.35-cm (2.50-in) hard drives			
	● *750-GB, 5400-rpm*	√	√	√
	HP 3D DriveGuard (not available on Linux)	√	√	√
Optical drives	Fixed, no modular requirements	√	√	√
	SATA 12.7-mm tray load	√	√	√
	Supports option of no optical drive	√	√	√
	Supports the following drives:	√	√	√
	● DVD-ROM Drive			
	● DVD±RW SuperMulti Double-Layer Combo Drive with Lightscribe			
	● Blu-ray ROM DVD±RW SuperMulti DL Drive (not available with UMA base unit and Windows XP)			
Diskette drive	Supports external USB diskette drive only	√	√	√
Audio/visual	IDT 92HD80	√	√	√
	Integrated microphone	√	√	√
	Stereo speakers (2)	√	√	√
	Integrated 2MP camera with fixed focus (select models only)	√	√	√
Modem	High-speed 56K modem for all regions and countries except APJ	√	√	√
	High-speed 56K modem APJ only	√	√	√
	Modem cable not included	√	√	√
	Supports no modem option	√	√	√
Ethernet	10/100/1000 Ethernet network interface card (NIC)	√	√	√
	S3/S4/S5 wake on LAN: AC only mode	√	√	√

Category	Description	HP ProBook 4520s UMA	HP ProBook 4520s discrete	HP ProBook 4720s discrete
Wireless	**Integrated WLAN options by way of MiniPCI card:**			
	2 WLAN antennas built into display assembly	√	√	√
	Supports option for no-WLAN	√	√	√
	Support for the following WLAN formats:	√	√	√
	● Broadcom 802.11b/g			
	● *Broadcom 802.11b/g/n*			
	● *Broadcom 802.11a/b/g/n*			
	● Atheros 802.11 b/g/n (1 x 1)			
	● *Ralink 802.11 b/g/n with Bluetooth*			
	● Realtek 802.11 b/g/n (1 x 1)			
	● Intel 802.11 b/g 1S/2R Russia only			
	● Intel 802.11 b/g/n 1S/2R			
	● Intel 802.11 a/b/g 1S/2R			
	● Intel 802.11 a/b/g/n 2S/2R			
	Integrated personal area network (PAN) options by way of Bluetooth® module:			
	Support option for no-WPAN	√	√	√
	Bluetooth 2.1	√	√	√
	Integrated WWAN options by way of HP Mobile Broadband Module:			
	Supports only HP certified WWAN options	√	√	
	WWAN module UNDP Gobi2 including GPS with 2 antennas (not available with Linux or Celeron)	√		
	Dual WWAN antennas (world wide 5 band)	√	√	
	SIM module (user accessible behind battery)	√	√	
External media cards	One ExpressCard/34 mm	√	√	√
	Media Card Reader supporting Memory Stick (MS), Memory Stick Pro (MSP), Secure Digital (SD) Memory Card, Secure Digital High Capacity (SDHC) Memory Card, MultiMediaCard (MMC), and xD-Picture Card formats	√	√	√
Ports	Audio-in (stereo microphone)	√	√	√
	Audio-out (stereo headphone)	√	√	√

Category	Description	HP ProBook 4520s UMA	HP ProBook 4520s discrete	HP ProBook 4720s discrete
	RJ-11 (modem)	√	√	√
	RJ-45 (Ethernet, includes link and activity lights)	√	√	√
	USB 2.0 (3)	√	√	√
	Combination eSATA/USB 2.0 (1)	√	√	√
	VGA (Dsub 15-pin) supporting 1600 × 1200 external resolution at 75-GHz (hot plug/unplug with auto-detect)	√	√	√
	Multi-pin AC power	√	√	√
	HDMI	√	√	√
Keyboard/ pointing devices	15.6-in keyboard with integrated number pad and Clickpad	√	√	
	17.3-in keyboard with integrated number pad and Clickpad			√
	Suports 2-way scroll with legend and gestures (taps enabled as default)	√	√	√
Power requirements	65-W AC adapter with localized cable plug support (3-wire plug with ground pin)	√		
	90-W AC adapter with localized cable plug support (3-wire plug with ground pin)		√	√
	8-cell, 73-Wh Li-ion battery			√
Security	Supports Kensington security lock	√	√	√
Fingerprint reader	15.6-in Integrated fingerprint reader	√	√	
	17.3-in Integrated fingerprint reader			√
	Supports no fingerprint reader option	√	√	√
Operating system	**Preinstalled with Microsoft Office:**	√	√	√
	Windows 7 Home Premium 32 with Office 2007 Ready (excludes Japan)	√	√	√
	Windows 7 Home Premium 32 with Office 2007 Personal (Japan only)	√	√	√
	Windows 7 Home Premium 32 with Office 2007 Personal with PowerPoint (Japan only)	√	√	√
	Windows 7 Home Premium 32 with Office 2007 Professional (Japan only)	√	√	√
	Windows 7 Professional with Office 2007 Ready (excludes Japan)	√	√	√

Category	Description	HP ProBook 4520s UMA	HP ProBook 4520s discrete	HP ProBook 4720s discrete
	Windows 7 Professional with Office 2007 Personal (Japan only)	√	√	√
	Windows 7 Professional with Office 2007 Personal with PowerPoint (Japan only)	√	√	√
	Windows 7 Professional with Office 2007 Professional (Japan only)	√	√	√
	Windows Vista Home Basic 32 with Office 2007 Ready (Japan only)	√	√	√
	Windows Vista Home Basic 32 with Office 2007 Personal (Japan only)	√	√	√
	Windows Vista Home Basic 32 with Office 2007 Professional (Japan only)	√	√	√
	Windows Vista Business 32 with Office 2007 Personal (Japan only)	√	√	√
	Windows Vista Business 32 with Office Personal with PowerPoint (Japan only)	√	√	√
	Windows Vista Business 32 with Office Professional (Japan only)	√	√	√
	Windows 7 Starter with Office 2007 ready (excludes Japan)	√	√	√
	Windows 7 Starter 32 with Office 2007 ready – EDGI	√	√	√
	Windows 7 Home Basic 32 with Office 2007 ready (excludes Japan)	√	√	√
	Windows 7 Home Basic with Office 2007 ready – EDGI	√	√	√
	Windows 7 Home Premium with Office 2007 ready – EDGI	√	√	√
	Windows 7 Professional 32 with Office 2007 ready – EDGI	√	√	√
	Windows 7 Professional 32 with XP Pro images with Office 2007 ready (excludes Japan)	√	√	√
	Windows 7 Professional 32 with XP Pro images with Office 2007 ready – EDGI	√	√	√
	Windows 7 Professional 32 with XP Pro images with Office 2007 Personal (Japan only)	√	√	√
	Windows 7 Professional 32 with XP Pro images with Office 2007 Personal with PowerPoint (Japan only)	√	√	√

Category	Description	HP ProBook 4520s UMA	HP ProBook 4520s discrete	HP ProBook 4720s discrete
	Preinstalled:			
	Windows 7 Professional 32 (Japan only)	√	√	√
	Windows 7 Home Premium 32 (Japan only)	√	√	√
	Windows Vista Home Basic 32 with MS Basics (Japan only)	√	√	√
	Windows Vista Business 32 with MS Basics (Japan only)	√	√	√
	Windows 7 32 (with XP Professional images) with MS Basics (Japan only)	√	√	√
	FreeDOS	√	√	√
	RedFlag Linux (People's Republic of China only)	√	√	√
	SuSE Linux	√	√	√
	Restore media:			
	Windows 7 Home Basic 32	√	√	√
	Windows 7 Home Premium 32	√	√	√
	Windows Vista Business 64	√	√	√
	Windows 7 Professional 32	√	√	√
	Windows 7 Professional 64	√	√	√
	DRDVD Windows 7 – Home Premium/Pro	√	√	√
	DRDVD Windows 7 – Starter/Home Basic	√	√	√
	Windows Vista Home Basic 32	√	√	√
	Windows Vista Home Premium	√	√	√
	Windows Vista Business 32	√	√	√
	Windows XP Professional	√	√	√
	SuSE Linux	√	√	√
	Red Flag Linux (People's Republic of China only)	√	√	√
	DRDVD Windows Vista	√	√	√
	DRDVD Windows XP Pro	√	√	√
	Certified: Microsoft® WHQL	√	√	√
	Web Support:	√	√	√
	Windows Vista business	√	√	√

Category	Description	HP ProBook 4520s UMA	HP ProBook 4520s discrete	HP ProBook 4720s discrete
Serviceability	**End-user replaceable parts:**			
	AC adapter	√	√	√
	Battery (system)	√	√	√
	Hard drive	√	√	√
	Memory module	√	√	√
	Optical drive	√	√	√
	WLAN module	√	√	√
	WWAN module	√	√	

2 External component identification

> **NOTE:** Depending on the operating system installed on your comouter, some components may function differently than described. Some functionality may not be supported by the operating system installed on your computer.
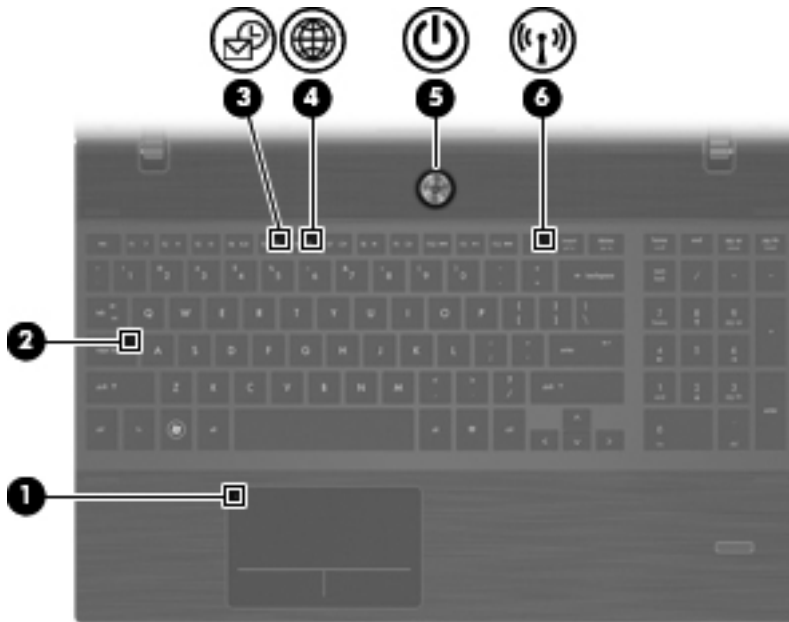
Top Components

TouchPad
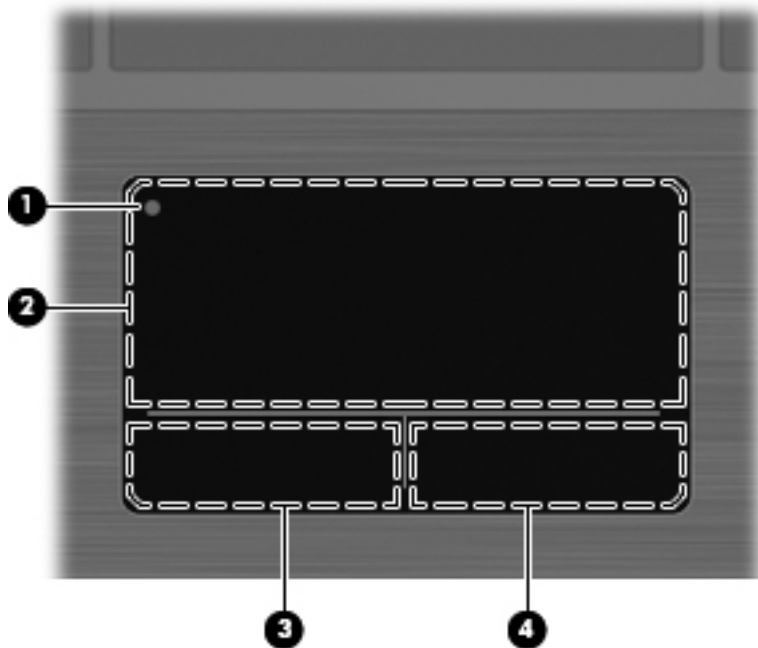
Component		Description
(1)	TouchPad off indicator light	To turn the TouchPad zone on and off, quickly double-tap the TouchPad off indicator. **NOTE:** When the TouchPad zone is active, the light is off.
(2)	TouchPad zone*	Moves the pointer and selects or activates items on the screen.
(3)	Left TouchPad button	Functions like the left button on an external mouse.

Component	Description
(4) Right TouchPad button	Functions like the right button on an external mouse.

*This table describes factory settings.

Lights

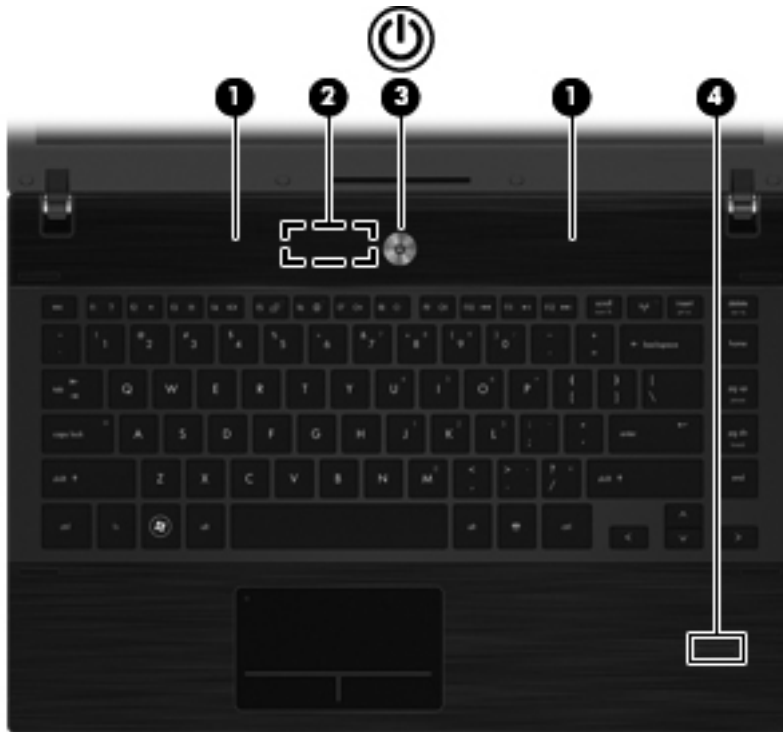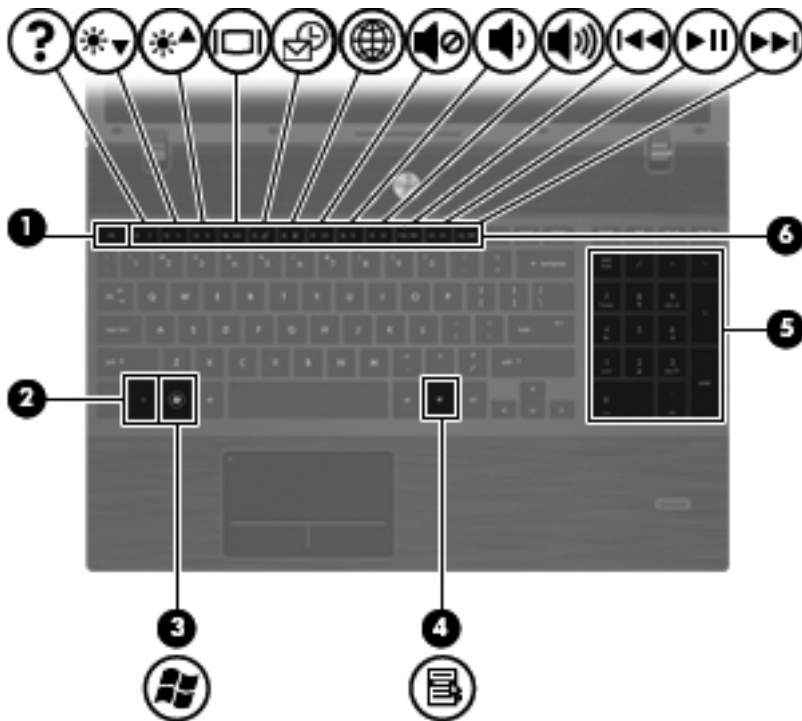| Component	Description
(1) TouchPad off indicator	● Amber: The TouchPad is off. ● Off: The TouchPad is on.
(2) Caps lock light	On: Caps lock is on.
(3) HP QuickLook light	Blinking: QuickLook is being opened or closed.
(4) HP QuickWeb light	Blinking: QuickWeb browser is being opened or closed.
(5) Power light	● On: The computer is on. ● Blinking: The computer is in the Sleep state. ● Off: The computer is off or in Hibernation.
(5) 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.

Buttons, switches, and speakers (select models only)

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

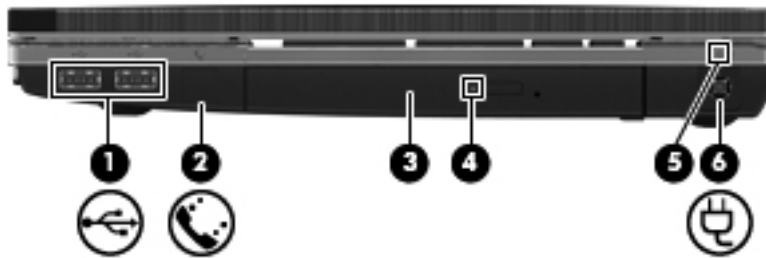| Component		Description
(1)	Speakers (2)	Produce sound.
(2)	Internal display switch	Turns off the display if the display is closed while the power is on.
(3)	Power button	- When the computer is off, press the button to turn on the computer. - When the computer is on, press the button to shut down the computer. - When the computer is in the Sleep state, press the button briefly to exit Sleep. - When the computer is in Hibernation, press the button briefly to exit Hibernation. If the computer has stopped responding and Windows shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer.
(4)	Fingerprint reader (select models only)	Allows a fingerprint logon to Windows, instead of a password logon.

Keys

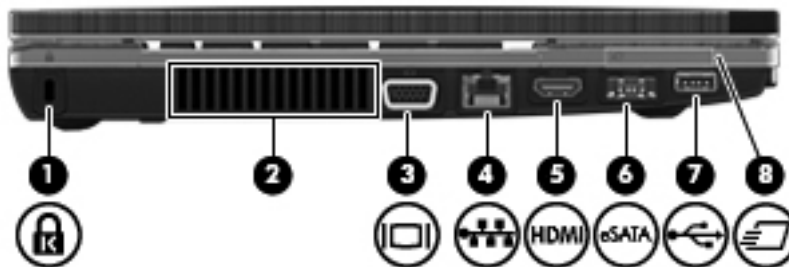| Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes frequently used system functions when pressed in combination with a function key, the num lk key, or the esc key.
(3)	Windows logo key	Displays the Windows Start menu.
(4)	Windows applications key	Displays a shortcut menu for items beneath the pointer.
(5)	Integrated numeric keypad keys	Can be used like the keys on an external numeric keypad.
(6)	Function keys	Execute frequently used system functions when pressed in combination with the fn key.

Front components

	Component	Description
(1)	Drive light	• Blinking white: The hard drive or optical drive is being accessed. • Amber: HP 3D DriveGuard has temporarily parked the hard drive.
(2)	Media Card Reader	Supports the following optional digital card formats: • Memory Stick • Memory Stick Duo (adapter required) • Memory Stick Pro (adapter required) • MultiMediaCard (MMC) • Secure Digital (SD) Memory Card • xD-Picture Card (XD) • xD-Picture Card (XD) Type H • xD-Picture Card (XD) Type M
(3)	Audio-out (headphone) jack	Produces sound when connected to optional powered stereo speakers, headphones, ear buds, a headset, or television audio. **NOTE:** When a device is connected to the headphone jack, the computer speakers are disabled.
(4)	Audio-in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.

Right-side components

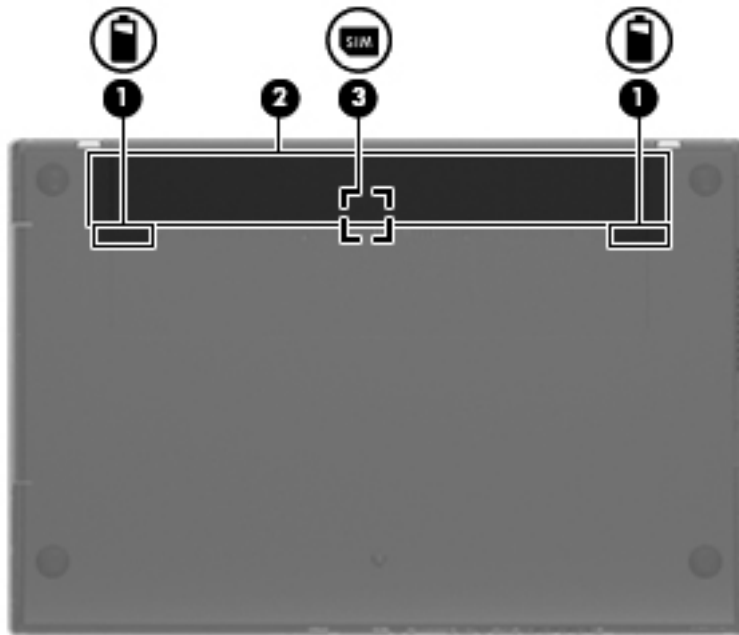|	Component	Description
(1)	USB ports (2)	Connect optional USB devices.
(2)	RJ-11 (modem) jack (select models only)	Connects a modem cable.
(3)	Optical drive (select models only)	Reads optical discs and, on select models, also writes to optical discs.
(4)	Optical drive light (select models only)	Blinking: The optical drive is being accessed.
(5)	AC adapter light	• On: The computer is connected to external power and the battery is charging. • Off: The computer is not connected to external power.
(6)	Power connector	Connects an AC adapter.

Left-side components

	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)	Vent	Enables airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(3)	External monitor port	Connects an external VGA monitor or projector.
(4)	RJ-45 (network) jack	Connects a network cable.

Component		Description
(5)	HDMI port	Connects an optional HDMI device.
(6)	Combo eSATA/USB port	Connects an optional USB device or high-performance eSATA components such as an eSATA external hard drive.
(7)	USB port	Connects optional USB device.
(8)	ExpressCard slot	Supports optional ExpressCards.

Bottom components

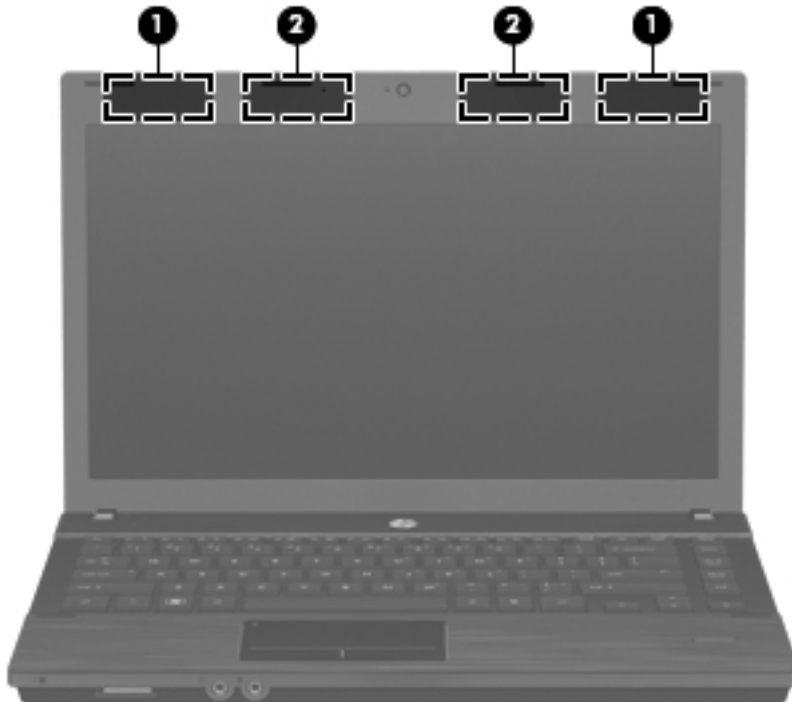| Component		Description
(1)	Battery release latches (2)	Release the battery from the battery bay.
(2)	Battery bay	Holds the battery.
(3)	SIM slot (select models only)	Contains a wireless subscriber identity module (SIM). The SIM slot is located inside the battery bay.

Display
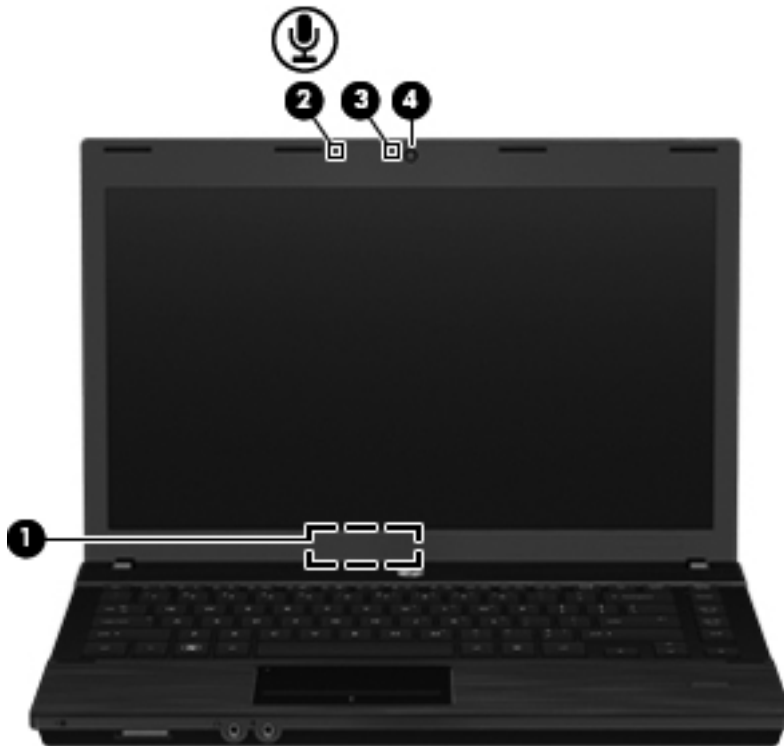
Component		Description
(1)	Internal display switch	Turns off the display if the display is closed while the power is on.
(2)	Internal microphone	Records sound.
(3)	Webcam light (select models only)	On: The webcam is in use.
(4)	Webcam (select models only)	Records audio and video and captures still photographs.

Wireless antennas

The antennas send and receive signals from one or more wireless devices. These antennas are not visible from the outside of the computer.
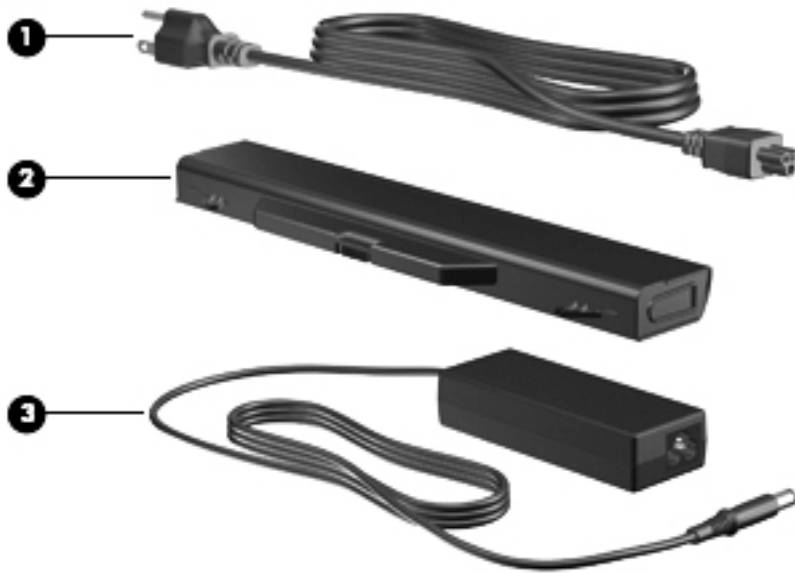
Component		Description
(1)	WWAN antennas (2)* (select models only)	Send and receive wireless signals to communicate with wireless wide-area networks (WWAN).
(2)	WLAN antennas (2)*	Send and receive wireless signals to communicate with wireless local area networks (WLAN).

*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 *Regulatory, Safety and Environmental Notices* that apply to your country or region. These notices are located in Help and Support.

Additional hardware components

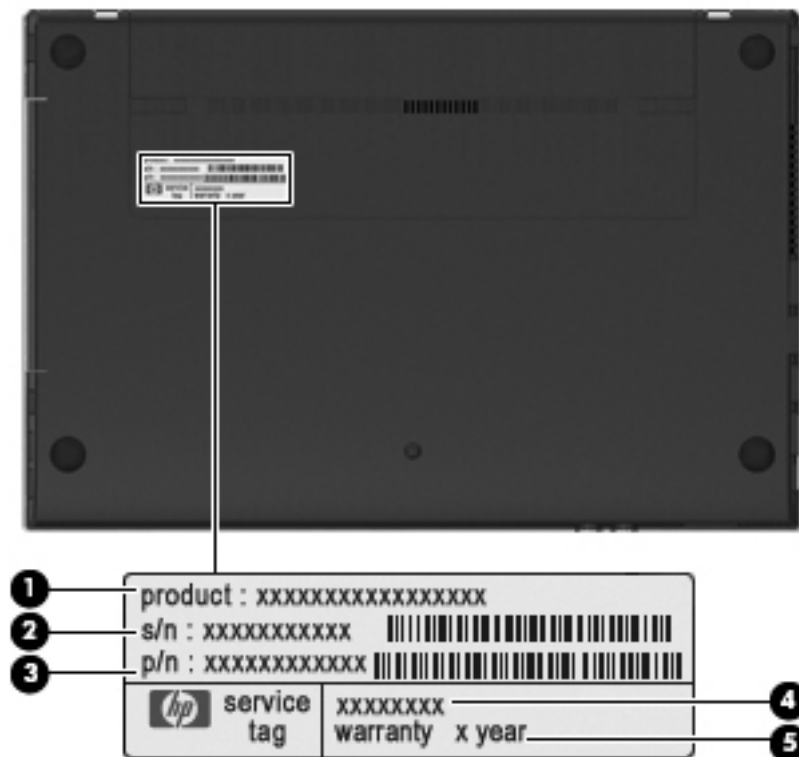|	Component	Description
(1)	Power cord*	Connects an AC adapter to an AC outlet.
(2)	Battery*	Powers the computer when the computer is not plugged into external power.
(3)	AC adapter	Converts AC power to DC power.

*Batteries and power cords vary in appearance by country or region.

3   Illustrated parts catalog

Service tag

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

(1) Product name: This is the product name affixed to the front of the computer.

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

(3) Part number/product number (p/n): 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.

(4) Model description: This is the alphanumeric identifier used to locate documents, drivers, and support for your computer.

(5) Warranty period: This number describes the duration of the warranty period for this computer.

Computer major components
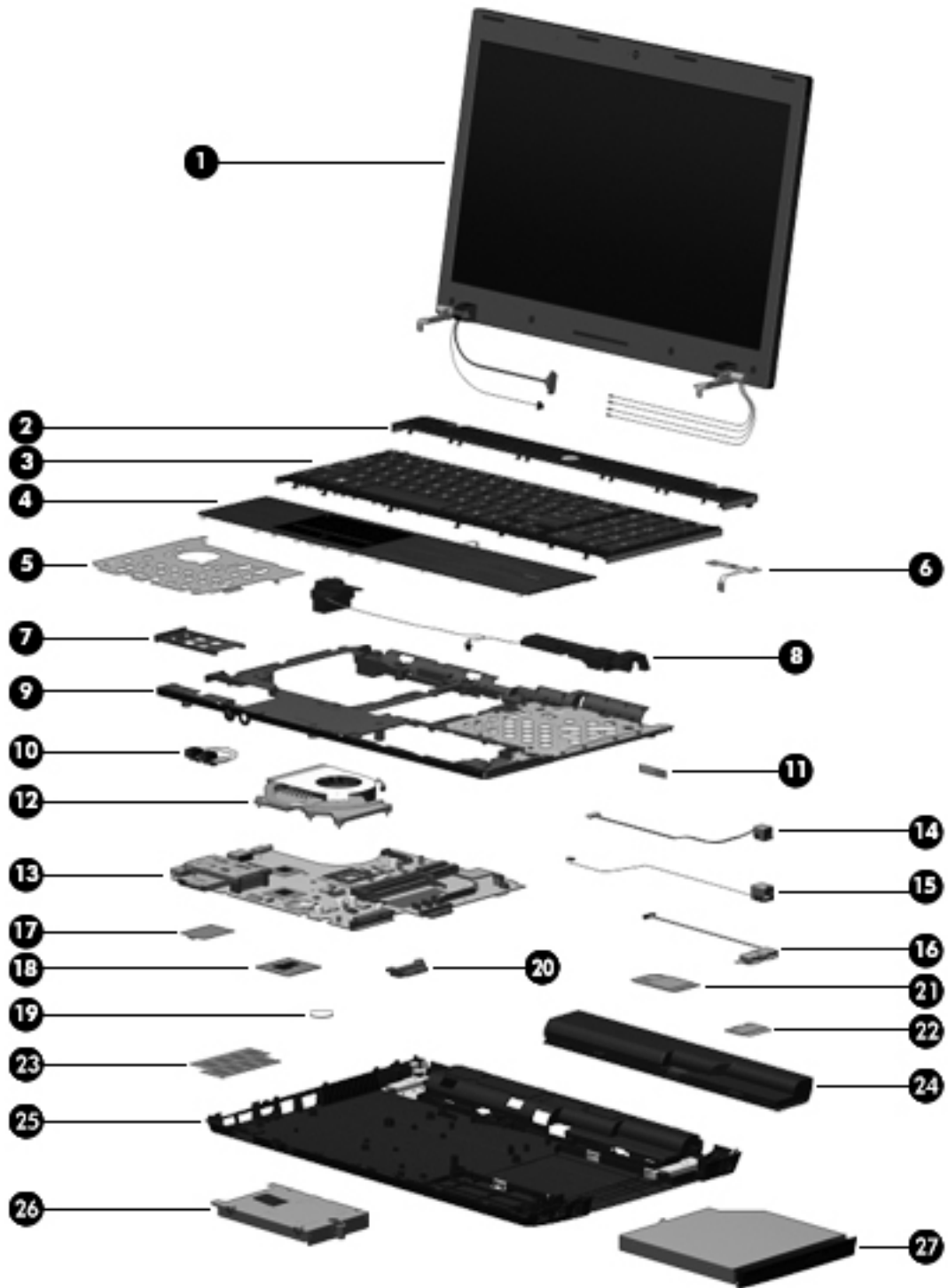
Item	Description
(1)	**Display assembly** (includes microphone, 2 WLAN antenna transceivers and cables and, on select computer models, 2 WWAN antenna transceivers and cables)
	For use only with computers with 17.3-in displays

Item	Description	
	● 17.3-in HD BrightView display assembly for use in computers equipped with webcam and WWAN (1600×900 resolution)	598708-001
	● 17.3-in HD BrightView display assembly (1600×900 resolution)	606167-001
	● 17.3-in HD AntiGlare display assembly for use in computers equipped with webcam and WWAN (1600×900 resolution)	606166-001
	● 17.3-in HD AntiGlare display assembly (1600×900 resolution)	606165-001
	● *17.3-in HD+ AntiGlare display assembly (1600×900 resolution)*	*599080-001*
	For use only with computers with 15.6-in displays and black trim	
	● 15.6-in HD BrightView display assembly for use in computers equipped with webcam and WWAN (1366×768 resolution)	598707-001
	● 15.6-in HD BrightView display assembly for use in computers with webcam (1366×768 resolution)	598706-001
	● 15.6-in HD BrightView display assembly (1366×768 resolution)	598705-001
	● *15.6-in HD BrightView LVDS display assembly (1366×768 resolution)*	*623182-001*
	● 15.6-in HD AntiGlare display assembly for use in computers equipped with webcam and WWAN (1366×768 resolution)	598704-001
	● 15.6-in HD AntiGlare display assembly for use in computers equipped with webcam (1366×768 resolution)	598703-001
	● 15.6-in HD AntiGlare display assembly (1366×768 resolution)	598702-001
	● *15.6-in HD SVA LVDS AntiGlare display assembly (1366×768 resolution)*	*624238-001*
	● *15.6-in WVA LVDS HD AntiGlare display assembly (1366×768 resolution)*	*624643-001*
	For use only with computers with 15.6-in displays and red trim	
	● 15.6-in HD BrightView display assembly for use in computers with webcam and WWAN (1366×768 resolution)	604859-001
	● 15.6-in HD BrightView display assembly for use in computers with a webcam (1366×768 resolution)	604858-001
	● 15.6-in HD BrightView display assembly for use in computers (1366×768 resolution)	604857-001
	● 15.6-in HD AntiGlare display assembly for use in computers equipped with webcam and WWAN (1366×768 resolution)	604856-001
	● 15.6-in HD AntiGlare display assembly for use in computers equipped with a webcam (1366×768 resolution)	604855-001
	● 15.6-in HD AntiGlare display assembly (1366×768 resolution)	604854-001
	For use only with computers with 15.6-in displays and champagne trim	
	● *15.6-in HD BrightView display assembly for use in computers with webcam and WWAN (1366×768 resolution)*	*626120-001*
	● *15.6-in HD BrightView display assembly for use in computers with a webcam (1366×768 resolution)*	*626119-001*
	● *15.6-in HD BrightView display assembly (1366×768 resolution)*	*626118-001*

Item	Description	
	• *15.6-in HD AntiGlare display assembly for use in computers equipped with a webcam and WWAN (1366×768 resolution)*	*626117-001*
	• *15.6-in HD AntiGlare display assembly for use in computers equipped with a webcam (1366×768 resolution)*	*626116-001*
	• *15.6-in HD AntiGlare display assembly (1366×768 resolution)*	*626115-001*
(2)	**Switch cover**	
	For use in computers with 17.3-in displays	598675-001
	For use in computers with 15.6-in displays and red trim	604853-001
	For use in computers with 15.6-in displays and black or red trim	598674-001
	For use in computers with 15.6-in displays and champagne-colored trim	*626114-001*
(3)	**Keyboard**	
	NOTE: For a detailed list of available keyboards, see <u>Sequential part number listing on page 38</u>.	
	For use in computers with 17.3-in displays	598692-xxx
	For use in computers with 15.6-in displays	598691-xxx
(4)	**Palm rest** (includes TouchPad and cables)	
	For use in computers with 17.3-in displays	598689-001
	For use in computers with 15.6-in displays	598688-001
	For use in computers with 15.6-in displays and red trim	604852-001
	For use in computers with 17.3-in displays with fingerprint reader	599805-001
	For use in computers with 15.6-in displays with fingerprint reader and with black trim	599804-001
	For use in computers with 15.6-in displays with fingerprint reader and with red trim	604861-001
	For use in computers with 15.6-in displays with fingerprint reader and with champagne-colored trim	*626113-001*
(5)	**Thermal shield**	603700-001
(6)	**Power button board**	609952-001
(7)	**ExpressCard bezel** (part of Plastics Kit spare part number 598673-001)	
(8)	**Speakers**	
	For use in computers with 17.3-in displays	598686-001
	For use in computers with 15.6-in displays	598685-001
(9)	**Top cover**	
	For use in computers with 17.3-in displays	598683-001
	For use in computers with 15.6-in displays	598682-001
(10)	**Audio board**	598684-001

Item	Description	
(11)	**Bluetooth module**	537921-001
	HP Integrated module with Bluetooth 2.1 wireless technology for use in Andorra, Argentina, Australia, Austria, Bangladesh, Belarus, Belgium, Bermuda, Brazil, Brunei, Bulgaria, Canada, Cayman Islands, Chile, China, Croatia, Cyprus, Czech Republic, Denmark, Egypt, El Salvador, Estonia, Finland, France, Germany, Greece, French Guiana, Guadeloupe, Guam, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Jordan, South Korea, Latvia, Puerto Rico, Liechtenstein, Lithuania, Luxembourg, Malaysia, Malta, Martinique, Mexico, Morocco, Netherlands, New Zealand, Norway, Pakistan, Panama, Peru, Philippines, Poland, Portugal, Romania, Russia, Saudi Arabia, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Thailand, Tunisia, Turkey, Ukraine, United Arab Emirates, the United Kingdom, the United States, Venezuela, and the Virgin Islands	
(12)	**Fan/heat sink assembly**	
	For use in computers with discrete graphics subsystems	598677-001
	For use in computers with UMA graphics subsystems	607132-001
(13)	**System board** (includes RTC battery and replacement thermal material)	
	System board with discrete graphics subsystem memory	598668-001
	System board with UMA graphics subsystem memory	598667-001
	System board with discrete graphics, WWAN capability, and RTC battery for use in 4720s models	*598670-001*
	System board with UMA graphics subsystem memory and WWAN	598669-001
	System board with discrete graphics subsystem memory for use only in the People's Republic of China and Russia	605169-001
	System board with UMA graphics subsystem memory for use only in the People's Republic of China and Russia	605168-001
	System board with UMA graphics subsystem memory and WWAN for use only in the People's Republic of China and Russia	605170-001
	System board with discrete graphics, WWAN capability, and RTC battery for use only in the People's Republic of China and Russia	*605171-001*
	System board with ATI Mobility Radeon HD 5470 graphics for use in 4720s models	*628794-001*
	System board with ATI Mobility Radeon HD 5470 graphics for use in 4520s models	*628795-001*
(14)	**Power connector** (part of Base Cable Kit 603188-001 for computers with 17.3-in displays and Base Cable Kit 599807-001 for computers with 15.6-in displays)	
(15)	**RJ-11 connector** (part of Base Cable Kit 603188-001 for computers with 17.3-in displays and Base Cable Kit 599807-001 for computers with 15.6-in displays)	
(16)	**USB connector** (part of Base Cable Kit 603188-001 for computers with 17.3-in displays and Base Cable Kit 599807-001 for computers with 15.6-in displays)	
(17)	**WLAN module**	
	Intel Centrino Advanced-N6200 802.11 a/b/g 2x2 for use only in Russia and Ukraine	572510-001

Item	Description	
	Intel Centrino Advanced-N6200 802.11 a/b/g/n 2x2 for use in Andorra, Antigua & Barbuda, Argentina, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Barbados, Belgium, Bolivia, Bosnia & Herzegovina, Brazil, Brunei, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Finland, France, Georgia, Germany, Ghana, Greece, Guam, Guatemala, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Ivory Coast, Jamaica. Japan, Jordan, Kenya, South Korea, Kuwait, Kyrgyzstan, Latvia, Lebanon, Martinique, Nether Antilles, Puerto Rico, French Guiana, Guadeloupe, Cayman Islands, Bermuda, Aruba, Liechtenstein, Lithuania, Luxembourg, Malawi, Malaysia, Malta, Mauritius, Mexico, Monaco, Montenegro, Morocco, Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Romania, San Marino, Saudi Arabia, Senegal, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Tanzania, Thailand, Trinidad & Tobago, Tunisia, Turkey, United Arab Emirates, the United Kingdom, the United States, Uruguay, Venezuela, Vietnam, Virgin Islands	572509-001
	Intel Centrino Wireless-N1000 802.11 b/g 1x2 for use in Andorra, Antigua & Barbuda, Argentina, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Barbados, Belgium, Bermuda, Bolivia, Bosnia & Herzegovina, Brazil, Brunei, Bulgaria, Canada, Cayman Islands, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Finland, France, French Guiana, Georgia, Germany, Ghana, Greece, Guadeloupe. Guatemala, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kenya, South Korea, Kuwait, Kyrgyzstan, Latvia, Lebanon, Nether Antilles, Martinique, Puerto Rico, Guam, Liechtenstein, Lithuania, Luxembourg, Malawi, Malaysia, Malta, Mauritius, Mexico, Monaco, Montenegro, Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, , Romania, San Marino, Saudi Arabia, Senegal, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Tanzania, Thailand, Trinidad & Tobago, Turkey, Ukraine, United Arab Emirates, the United Kingdom, the United States, Uruguay, Venezuela, Vietnam, Virgin Islands	585984-001
	Broadcom 4312G 802.11b/g WiFi adapters:	
	• For use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States	504593-003

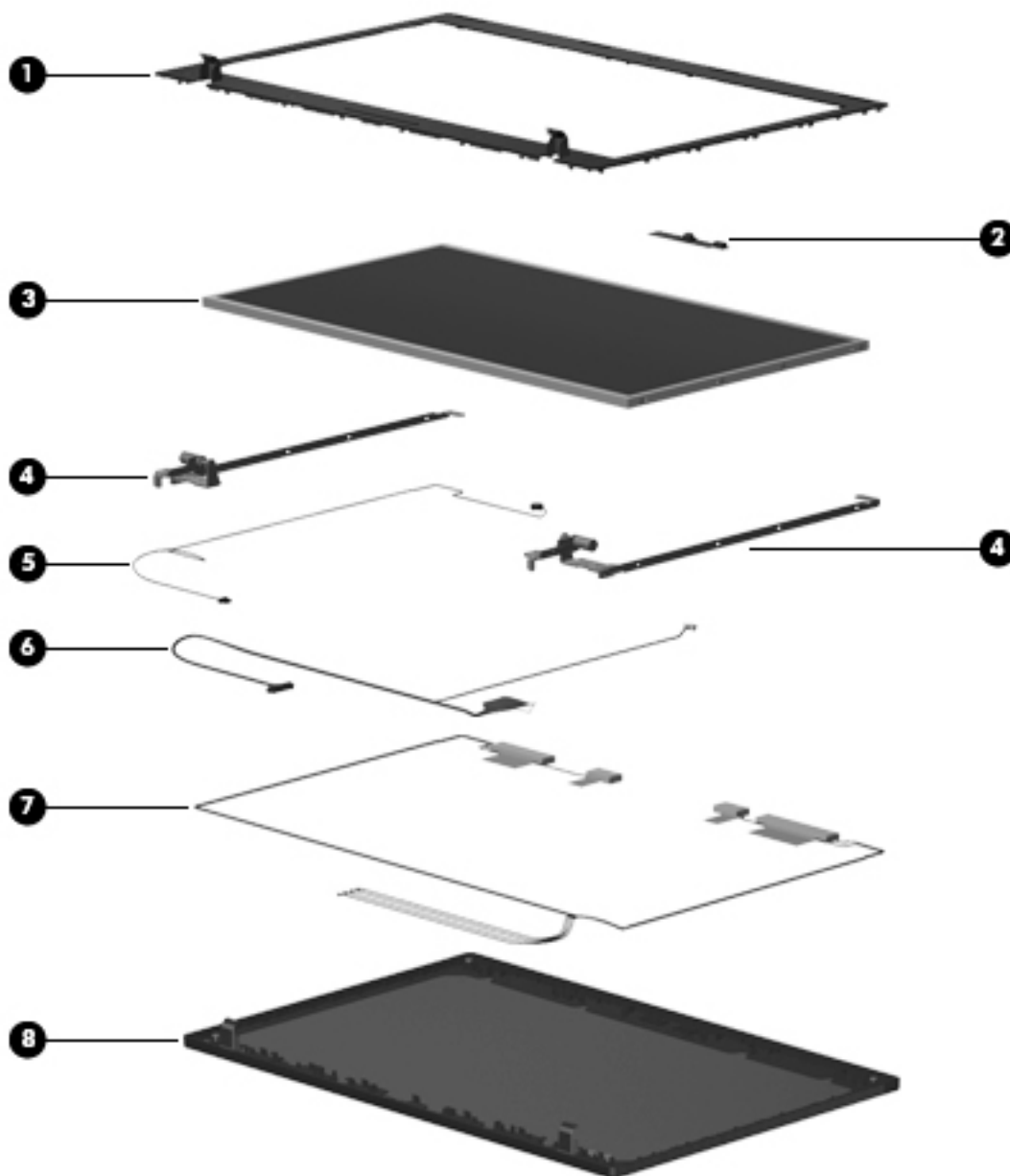| Item	Description	
	• For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	504593-004
	Intel Wi-Fi Link 1000, 802.11b/g/n WLAN module for use in Andorra, Antigua and Barbuda, Argentina, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Barbados, Belgium, Bolivia, Bosnia and Herzegovina, Brazil, Brunei, Bulgaria, Canada, Cayman Islands, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, the Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Finland, France, French Guiana, Guadeloupe, Guam, Georgia, Germany, Ghana, Greece, Guatemala, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kenya, Kuwait, Kyrgyzstan, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malawi, Malaysia, Malta, Martinique, Mauritius, Mexico, Monaco, Montenegro, Morocco, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Nigeria, Nigeria, Oman, Pakistan, Panama, Paraguay, Peru, the Philippines, Poland, Portugal, Puerto Rico, Quatar, Romania, San Marino, Saudi Arabia, Senegal, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Tanzania, Thailand, Trinidad and Tobago, Turkey, United Arab Emirates, the United Kingdom, the United States, Uruguay, the U.S. Virgin Islands, Venezuela, and Vietnam	572520-001
	Atheros 9285G 802.11b/g/n WiFi Adapter for use in all countries and regions	605560-005
	Realtek RTL8191SE 802.11b/g/n WiFi Adapter for use in all countries and regions	593533-001
	Broadcom 4322 AGN, 802.11a/b/g/n	
	• *For use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States*	*518434-001*

Item	Description	
	• *For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe*	*518434-002*
	Broadcom 4313AGN 802.11a/b/g/draft-n WiFi Adapter *for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Martinique, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe*	*593836-001*

Item	Description	
	Broadcom 4313 802.11b/g/n 1x1 WiFi and 2070 Bluetooth 2.1+EDR Combo Adapter *for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Puerto Rico, Qatar, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, the United States, Uruguay, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe*	*600370-001*
	Ralink RT3090BC4 802.11b/g/n 1x1 WiFi and Bluetooth 2.1+EDR Combo Adapter *for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, Puerto Rico, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the US Virgin Islands, the United States, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe*	*602992-001*
(18)	**Processor** (includes replacement thermal material)	
	Intel Core processors:	
	i3-330M, 2.13-GHz, 3-MB cache	597622-001
	i3-350M, 2.26-GHz, 3-MB cache	597623-001

Item	Description	
	i3-370M, 2.40-GHz, 3-MB cache	*613584-001*
	i3-380M, 2.53-GHz, 3-MB cache	*625823-001*
	i5-430M, 2.26-GHz, 3-MB cache	597624-001
	i5-450M, 2.40-GHz, 3-MB cache	*613585-001*
	i5-460M, 2.53-GHz, 3-MB cache	*626039-001*
	i5-520M, 2.4-GHz, 3-MB cache	594187-001
	i5-540M, 2.53-GHz, 3-MB cache	594188-001
	i7-620M, 2.26-GHz, 4-MB cache	587259-001
	Intel Pentium processors:	
	P6000, 1.86-GHz, 3-MB cache	*613586-001*
	P6100, 2.00-GHz, 3-MB cache	613587-001
	P6200, 2.13-GHz, 3-MB cache	625831-001
	Intel Celeron processor:	
	P4500, 1.86-GHz, 2-MB cache	611699-001
(19)	**RTC battery**	*616073-001*
(20)	**HP un2420 Broadband Module**	531993-001
(21)	**Optical drive extender** for use only in computers with 17.3-in displays	598687-001
(22)	**Modem module**	
	NOTE: The modem module spare part kit does not include a modem module cable. The modem module cable is included in the Base Cable Kit , spare part numbers 599807-001. See Cable Kits on page 33 for more Cable Kit spare part information.	
	For use in all countries and regions except Australia and New Zealand	510100-001
	For use only in Australia and New Zealand	510100-011
(23)	**Memory module**	
	4-GB (PC3-10600, 1333-MHz, DDR3)	*599092-001*
	2-GB (PC3-10600, 1333-MHz, DDR3)	598856-001
	1-GB (PC3-10600, 1333-MHz, DDR3)	598859-001
(24)	**Battery**	
	8-cell, 73-Wh, 2.55-Ah for use in computers with 17.3-in displays	593576-001
	9-cell, 93-Wh, 2.8-Ah for use in computers with 15.6-in displays	593573-001
	6-cell, 47-Wh, 2.2 Ah for use in computers with 15.6-in displays	593572-001
(25)	**Base enclosure**	
	For use in computers with 17.3-in displays	598681-001

Item	Description	
	For use in computers with 15.6-in displays	598680-001
(26)	**Hard drive** (includes hard drive bracket)	
	750-GB, 5400-rpm	*598699-001*
	640-GB, 5400-rpm	*617667-001*
	500-GB, 7200-rpm	598698-001
	320-GB, 7200-rpm	598697-001
	250-GB, 7200-rpm	598696-001
(27)	**Optical drive** (includes bezel)	
	DVD-ROM Drive	598693-001
	DVD±RW Double-Layer Drive with LightScribe	598694-001
	Blu-ray Disc ROM Drive with SuperMulti DVD±R/RW Double-Layer	598695-001
	Rubber Kit (not illustrated, contains: 10 front rubber feet, 10 rear rubber feet, 10 back edge screw covers, and 10 mylar screw covers for LCD bezel)	598678-001

Display assembly components

Item	Description	Spare part number
(1)	**Display bezel**	
	For use in computers with 17.3-in displays without webcam	600924-001
	For use in computers with 15.6-in displays without webcam	598690-001
	For use in computers with 17.3-in displays with webcam	600927-001
	For use in computers with 15.6-in displays with webcam	600926-001
(2)	**Webcam module**	598671-001
(3)	**Display** (For Reference only. Not spared separately.)	

Item	Description	Spare part number
(4)	**Display Hinge Kit**	
	For use in computers with 17.3-in displays	602677-001
	For use in computers with 15.6-in displays	598679-001
(5)	Microphone cable	
(6)	**LCD Cable Kit with webcam cable**	
	For use in computers with 17.3-in displays	602999-001
	For use in computers with 15.6-in displays	600925-001
(7)	**WLAN and WWAN antenna transceivers and cables**	
(8)	**Display enclosure**	
	For use in computers with 17.3-in displays	600929-001
	For use in computers with 15.6-in displays and black trim	600928-001
	For use in computers with 15.6-in displays and red trim	607133-001

Plastics Kit
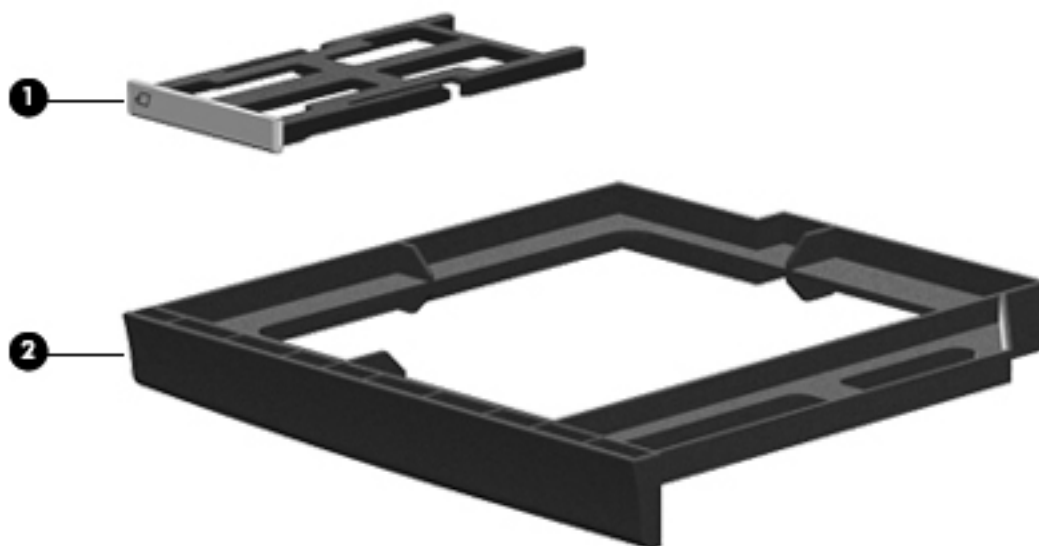
Item	Description	Spare part number
	Plastics Kit:	598673-001
(1)	ExpressCard slot bezel	
(2)	Optical drive bezel	
	RJ-11 Dummy door (not illustrated)	

Cable Kits
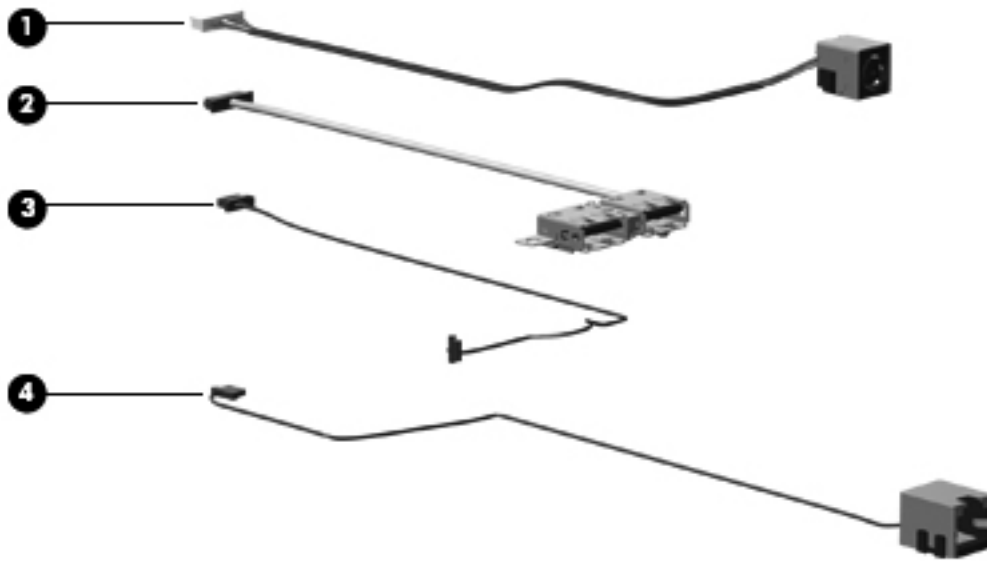
Item	Description	Spare part number
	Base Cable Kit	
	For use in computers with 17.3-in displays, includes DC-in cable **(1)**, USB cable **(2)**, Bluetooth cable **(3)**, and RJ-11 cable **(4)**.	603188-001
	For use in computers with 15.6-in displays, includes DC-in cable **(1)**, USB cable **(2)**, Bluetooth cable **(3)**, and RJ-11 cable **(4)**.	599807-001
(1)	DC-in cable, lengths differ for 17.3-in and 15.6-in computers	
(2)	USB cable, lengths differ for 17.3-in and 15.6-in computers	
(3)	Bluetooth cable, lengths differ for 17.3-in and 15.6-in computers	
(4)	RJ-11 cable, common to both 17.3-in and 15.6-in computers	
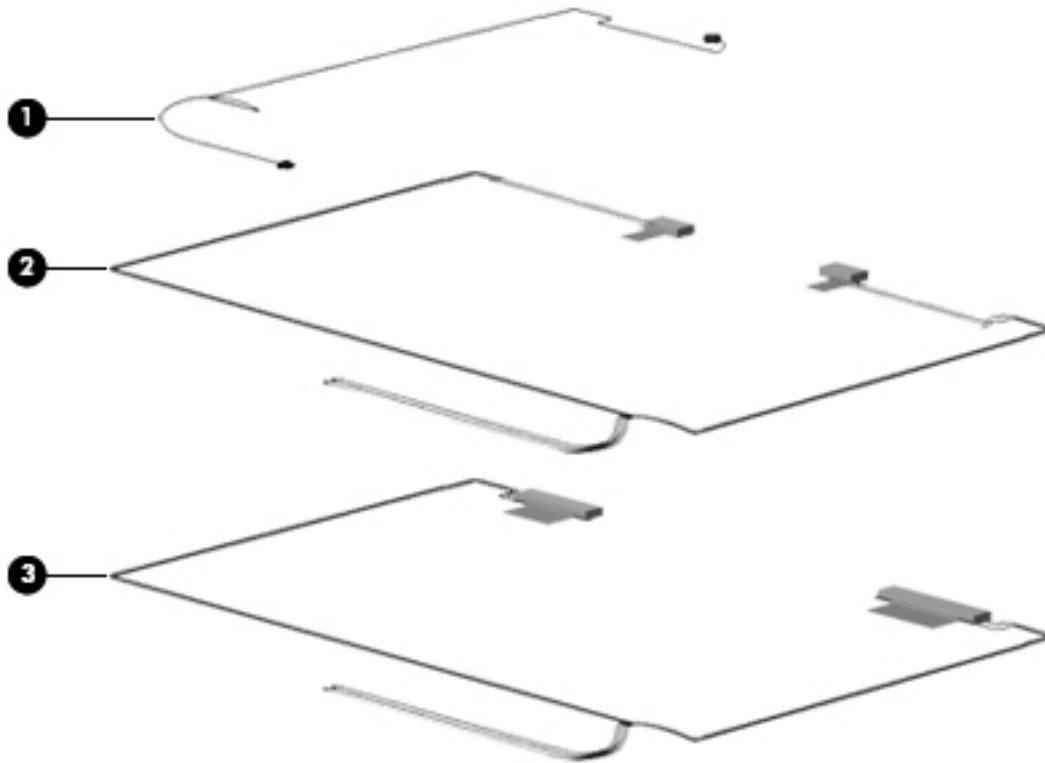
Item	Description	Spare part number
	Misc LCD Cable Kit	
	For use in computers with 15.6-in displays, includes microphone cable **(1)**, WWAN transceiver with cable **(2)**, and WLAN transceiver with cable **(3)**	599806-001
	For use in computers with 17.3-in displays, includes items **(1)**, **(2)**, and **(3)**	606974-001
	Display cable, HD+	*629030-001*
(1)	Microphone cable, lengths differ for 17.3-in and 15.6-in computers	
(2)	WWAN transceiver with cable, lengths differ for 17.3-in and 15.6-in computers	
(3)	WLAN transceiver with cable, lengths differ for 17.3-in and 15.6-in computers	

Item	Description	Spare part number
(1)	**LCD Cable Kit** with webcam cable	
	For use in computers with 17.3-in displays	602999-001
	For use in computers with 15.6-in displays	600925-001
	LCD Cable without webcam cable	
	For use in computers with 17.3-in displays	606973-001
	For use in computers with 15.6-in displays	606972-001

Mass storage devices
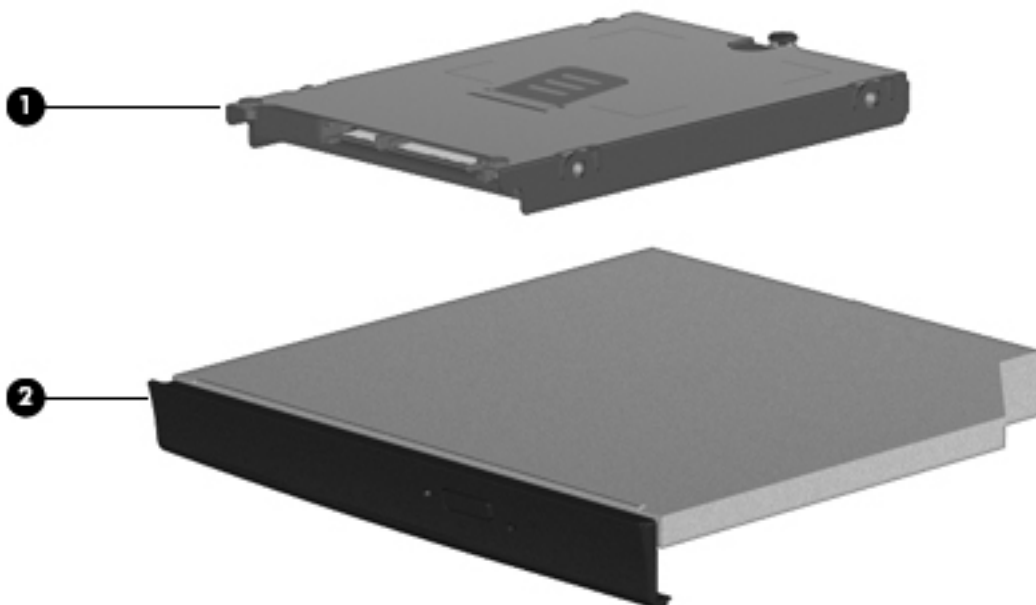
Item	Description	Spare part number
(1)	**Hard drive** (includes bracket)	
	750-GB, 5400-rpm	*598699-001*
	640-GB, 5400-rpm	*617667-001*
	500-GB, 7200-rpm	598698-001
	320-GB, 7200-rpm	598697-001
	250-GB, 7200-rpm	598696-001
(2)	**Optical drive** (includes bezel)	
	DVD±RW Double-Layer Drive with LightScribe	598694-001

Item	Description	Spare part number
	DVD-ROM Drive	598693-001
	Blu-ray Disc ROM Drive with SuperMulti DVD±R/RW Double-Layer	598695-001

Miscellaneous parts

Description	Spare part number
AC adapters	
65-W Smart AC adapter with power factor correction (PFC), RC/V EM 3W for use in the Asia-Pacific region	*609948-001 or 613161-001*
65-W AC adapter for use in computers with UMA graphics	*613152-001*
90-W Slimline PFC AC adapter for use in computers with discrete graphics	*613153-001*
Power cords	
For use in Argentina	490371-D01
For use in Australia and New Zealand	490371-011
For use in Brazil	490371-201
For use in Denmark	490371-081
For use in Europe, the Middle East, and Africa	490371-021
For use in India	490371-D61
For use in Israel	490371-BB1
For use in Italy	490371-061
For use in Japan	490371-291
For use in the People's Republic of China	490371-AA1
For use in South Africa	490371-AR1
For use in South Korea	490371-AD1
For use in Switzerland	490371-111
For use in Taiwan	490371-AB1
For use in the United Kingdom	490371-031
For use in the United States	490371-001

Description	Spare part number
Screw Kit, includes:	598672-001

- (5) Phillips 2.0×2.0 screws

- (5) Phillips 2.0×2.5 broadhead screws

- (5) Phillips 2.0×2.5 screws

- (5) Phillips 2×7.0 screws

- (5) Phillips 2.5×3.0 screws

- (5) Phillips 2.5×5.0 screws

- (5) Torx 2.5×5.0 screws

- (5) Torx 2.5×6.0 screws

- (5) Phillips 2.5×8.0 screws

- (10) Phillips 3.0×4.0 screws

Description	Spare part number
Rubber Kit (contains: 10 front and 10 rear rubber feet, 10 back edge screw covers and 10 mylar screw covers for LCD bezel)	598678-001

Sequential part number listing

Spare part number	Description
490371-001	Power cord for use in the United States
490371-011	Power cord for use in Australia and New Zealand
490371-021	Power cord for use in Europe, the Middle East, and Africa
490371-031	Power cord for use in the United Kingdom
490371-061	Power cord for use in Italy
490371-081	Power cord for use in Denmark
490371-111	Power cord for use in Switzerland
490371-201	Power cord for use in Brazil
490371-291	Power cord for use in Japan
490371-AA1	Power cord for use in the People's Republic of China
490371-AB1	Power cord for use in Taiwan
490371-AD1	Power cord for use in South Korea
490371-AR1	Power cord for use in South Africa
490371-BB1	Power cord for use in Israel
490371-D01	Power cord for use in Argentina
490371-D61	Power cord for use in India
504593-003	Broadcom BCM4312 802.11b/g WLAN module for use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States
504593-004	Broadcom 4312 802.11b/g WLAN module for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe

Spare part number	Description
510100-001	Modem module for use in all countries and regions except Australia and New Zealand
510100-011	Modem module for use in Australia and New Zealand
518434-001	Broadcom 4322 AGN 802.11a/b/g/n WLAN module for use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States
518434-002	Broadcom 4322 AGN 802.11a/b/g/n WLAN module for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe
531993-001	HP un2420 Broadband Module
537921-001	Bluetooth module with Bluetooth 2.1 wireless technology
572509-001	Intel Centrino Advanced-N6200 802.11a/b/g/n 2x2 WLAN for use in Andorra, Antigua and Barbuda, Argentina, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Barbados, Belgium, Bermuda, Bolivia, Bosnia and Herzegovina, Brazil, Brunei, Bulgaria, Canada, Cayman Islands, Chile, the People's Republic of China, Colombia, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Finland, France, French Guiana, Georgia, Germany, Ghana, Greece, Guadeloupe, Guam, Guatemala, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kenya, Kuwait, Kyrgyzstan, Latvia, Lebanon, Martinique, Liechtenstein, Lithuania, Luxembourg, Malawi, Malaysia, Malta, Mauritius, Mexico, Monaco, Montenegro, Morocco, the Nether Antilles, Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Puerto Rico, Qatar, Romania, San Marino, Saudi Arabia, Senegal, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Tanzania, Thailand, Trinidad and Tobago, Tunisia, Turkey, the United Arab Emirates, the United Kingdom, the United States, Uruguay, the U.S. Virgin Islands, Venezuela, Vietnam
572510-001	Intel Centrino Advanced-N6200 802.11a/b/g 2x2 WLAN for use in Russia, and Ukraine

Spare part number	Description
572520-001	Intel Wi-Fi Link 1000, 802.11b/g/n WLAN module for use in Andorra, Antigua and Barbuda, Argentina, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Barbados, Belgium, Bolivia, Bosnia and Herzegovina, Brazil, Brunei, Bulgaria, Canada, Cayman Islands, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, the Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Finland, France, French Guiana, Guadeloupe, Guam, Georgia, Germany, Ghana, Greece, Guatemala, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kenya, Kuwait, Kyrgyzstan, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malawi, Malaysia, Malta, Martinique, Mauritius, Mexico, Monaco, Montenegro, Morocco, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Nigeria, Nigeria, Oman, Pakistan, Panama, Paraguay, Peru, the Philippines, Poland, Portugal, Puerto Rico, Qatar, Romania, San Marino, Saudi Arabia, Senegal, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Tanzania, Thailand, Trinidad and Tobago, Turkey, United Arab Emirates, the United Kingdom, the United States, Uruguay, the U.S. Virgin Islands, Venezuela, and Vietnam
585984-001	Intel Centrino Wireless-N1000 802.11 b/g 1x2 WLAN for use in Andorra, Antigua & Barbuda, Argentina, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Barbados, Belgium, Bermuda, Bolivia, Bosnia & Herzegovina, Brazil, Brunei, Bulgaria, Canada, Cayman Islands, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Finland, France, French Guiana, Georgia, Germany, Ghana, Greece, Guadeloupe. Guatemala, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kenya, South Korea, Kuwait, Kyrgyzstan, Latvia, Lebanon, Nether Antilles, Martinique, Puerto Rico, Guam, Liechtenstein, Lithuania, Luxembourg, Malawi, Malaysia, Malta, Mauritius, Mexico, Monaco, Montenegro, Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, , Romania, San Marino, Saudi Arabia, Senegal, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Tanzania, Thailand, Trinidad & Tobago, Turkey, Ukraine, United Arab Emirates, the United Kingdom, the United States, Uruguay, Venezuela, Vietnam, Virgin Islands
587259-001	Intel Core processor i7- 620M, 2.26-GHz, 4-MB cache
593533-001	Realtek RTL8191SE 802.11b/g/n WiFi Adapter
593572-001	Battery, 6-cell, 47 Wh, 2.2 Ah for use in computers with 15.6-in displays
593573-001	Battery, 9-cell, 93 Wh, 2.8 Ah for use in computers with 15.6-in displays
593576-001	Battery, 8-cell, 73 Wh, 2.55 Ah for use in computers with 17.3-in displays
593836-001	*Broadcom 4313AGN 802.11a/b/g/draft-n WiFi Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Martinique, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe*

Spare part number	Description
594187-001	Intel Core processor i3- 520M, 2.4-GHz, 3-MB L3 cache
594188-001	Intel Core processor i3-540M, 2.53-GHz, 3-MB L3 cache
597622-001	Intel Core processor i3-330M, 2.13-GHz, 3-MB L3 cache
597623-001	Intel Core processor i3-350M, 2.26-GHz, 3-MB L3 cache
597624-001	Intel Core processor i5-430M, 2.26-GHz, 3-MB L3 cache
598667-001	System board with UMA graphics subsystem memory with RTC battery
598668-001	System board with discrete graphics subsystem memory with RTC battery
598669-001	System board with UMA graphics subsystem memory with WWAN and RTC battery
598670-001	System board with discrete graphics, WWAN capability, and RTC battery for use in 4720s models
598671-001	Webcam module
598672-001	Screw Kit
598673-001	Plastics Kit, includes ExpressCard bezel, optical drive bezel, and RJ-11 dummy door
598674-001	Switch cover with power button switch for use in computers with 15.6-in displays and black or red trim
598675-001	Switch cover with power button switch for use in computers with 17.3-in displays
598677-001	Fan/heat sink assembly for computers with discrete graphics
598678-001	Rubber Kit, includes: 4 rubber feet, 2 back edge screw covers and 4 mylar screw covers for LCD bezel
598679-001	Display Hinge Kit for use in computers with 15.6-in display
598680-001	Base enclosure for use in computers with 15.6-in displays
598681-001	Base enclosure for use in computers with 17.3-in displays
598682-001	Top cover for use in computers with 15.6-in displays
598683-001	Top cover for use in computers with 17.3-in displays
598684-001	Audio board
598685-001	Speaker Kit for use in computers with 15.6-in displays
598686-001	Speaker Kit for use in computers with 17.3-in displays
598687-001	Optical drive extender for use only in computers with 17.3-in displays
598688-001	Palm rest for use in computers with 15.6-in displays with cable but without fingerprint reader
598689-001	Palm rest for use in computers with 17.3-in displays with cable but without fingerprint reader
598690-001	Display bezel for use in computers with 15.6-in displays without webcam
598691-001	Keyboard for use in the United States on computers with 15.6-in displays
598691-031	Keyboard for use in the United Kingdom on computers with 15.6-in displays
598691-041	Keyboard for use in Germany on computers with 15.6-in displays
598691-051	Keyboard for use in France on computers with 15.6-in displays

Spare part number	Description
598691-061	Keyboard for use in Italy on computers with 15.6-in displays
598691-071	Keyboard for use in Spain on computers with 15.6-in displays
598691-081	Keyboard for use in Denmark on computers with 15.6-in displays
598691-091	Keyboard for use in Norway on computers with 15.6-in displays
598691-121	Keyboard for use in French Canada on computers with 15.6-in displays
598691-131	Keyboard for use in Portugal on computers with 15.6-in displays
598691-141	Keyboard for use in Turkey on computers with 15.6-in displays
598691-161	Keyboard for use in Latin America on computers with 15.6-in displays
598691-171	Keyboard for use in Saudi Arabia on computers with 15.6-in displays
598691-201	Keyboard for use in Brazil on computers with 15.6-in displays
598691-211	Keyboard for use in Hungary on computers with 15.6-in displays
598691-251	Keyboard for use in Russia on computers with 15.6-in displays
598691-261	Keyboard for use in Bulgaria on computers with 15.6-in displays
598691-281	Keyboard for use in Thailand on computers with 15.6-in displays
598691-291	Keyboard for use in Japan on computers with 15.6-in displays
598691-A41	Keyboard for use in Europe on computers with 15.6-in displays
598691-A81	Keyboard for use in the Czech Republic on computers with 15.6-in displays
598691-AB1	Keyboard for use in Taiwan on computers with 15.6-in displays
598691-AD1	Keyboard for use in South Korea on computers with 15.6-in displays
598691-B31	Keyboard for International use on computers with 15.6-in displays
598691-B71	Keyboard for use in Finland on computers with 15.6-in displays
598691-BA1	Keyboard for use in Slovenia on computers with 15.6-in displays
598691-BB1	Keyboard for use in Israel on computers with 15.6-in displays
598691-BG1	Keyboard for use in Switzerland on computers with 15.6-in displays
598691-DD1	Keyboard for use in Iceland on computers with 15.6-in displays
598691-DJ1	Keyboard for use in Greece on computers with 15.6-in displays
598691-DW1	Keyboard for use in French Arabic region on computers with 15.6-in displays
598692-001	Keyboard for use in the United States on computers with 17.3-in displays
598692-031	Keyboard for use in the United Kingdom on computers with 17.3-in displays
598692-041	Keyboard for use in Germany on computers with 17.3-in displays
598692-051	Keyboard for use in France on computers with 17.3-in displays
598692-061	Keyboard for use in Italy on computers with 17.3-in displays

Spare part number	Description
598692-071	Keyboard for use in Spain on computers with 17.3-in displays
598692-081	Keyboard for use in Denmark on computers with 17.3-in displays
598692-091	Keyboard for use in Norway on computers with 17.3-in displays
598692-121	Keyboard for use in French Canada on computers with 17.3-in displays
598692-131	Keyboard for use in Portugal on computers with 17.3-in displays
598692-141	Keyboard for use in Turkey on computers with 17.3-in displays
598692-161	Keyboard for use in Latin America on computers with 17.3-in displays
598692-171	Keyboard for use in Saudi Arabia on computers with 17.3-in displays
598692-201	Keyboard for use in Brazil on computers with 17.3-in displays
598692-211	Keyboard for use in Hungary on computers with 17.3-in displays
598692-251	Keyboard for use in Russia on computers with 17.3-in displays
598692-261	Keyboard for use in Bulgaria on computers with 17.3-in displays
598692-281	Keyboard for use in Thailand on computers with 17.3-in displays
598692-291	Keyboard for use in Japan on computers with 17.3-in displays
598692-A41	Keyboard for use in Europe on computers with 17.3-in displays
598692-A81	Keyboard for use in the Czech Republic on computers with 17.3-in displays
598692-AB1	Keyboard for use in Taiwan on computers with 17.3-in displays
598692-AD1	Keyboard for use in South Korea on computers with 17.3-in displays
598692-B31	Keyboard for International use on computers with 17.3-in displays
598692-B71	Keyboard for use in Finland on computers with 17.3-in displays
598692-BA1	Keyboard for use in Slovenia on computers with 17.3-in displays
598692-BB1	Keyboard for use in Israel on computers with 17.3-in displays
598692-BG1	Keyboard for use in Switzerland on computers with 17.3-in displays
598692-DD1	Keyboard for use in Iceland on computers with 17.3-in displays
598692-DJ1	Keyboard for use in Greece on computers with 17.3-in displays
598692-DW1	Keyboard for use in French Arabic region on computers with 17.3-in displays
598693-001	DVD-ROM drive with bezel
598694-001	DVD±RW Double-Layer Drive with LightScribe
598695-001	Blu-ray Disc ROM Drive with SuperMulti DVD±R/RW Double-Layer
598696-001	250-GB, 7200 rpm hard drive (includes hard drive bracket)
598697-001	320-GB, 7200 rpm hard drive (includes hard drive bracket)
598698-001	500-GB, 7200 rpm hard drive (includes hard drive bracket)

Spare part number	Description
598699-001	750-GB, 5400 rpm hard drive (includes hard drive bracket)
598702-001	15.6-in HD AntiGlare display assembly for use in computers with black trim
598703-001	15.6-in HD AntiGlare display assembly for use in computers with webcam and black trim
598704-001	15.6-in HD AntiGlare display assembly for use in computers with webcam, WWAN, and black trim
598705-001	15.6-in HD BrightView display assembly for use in computers with black trim
598706-001	15.6-in HD BrightView display assembly for use in computers with a webcam and black trim
598707-001	15.6-in HD BrightView display assembly for use in computers with a webcam, WWAN, and black trim
598708-001	17.3-in HD BrightView display assembly for use in computers with a webcam and WWAN
598856-001	Memory module, 2-GB (PC3-10600, 1333-MHz, DDR3)
598859-001	Memory module, 1-GB (PC3-10600, 1333-MHz, DDR3)
599080-001	*17.3-in HD+ AntiGlare display assembly (1600×900 resolution)*
599092-001	*Memory module, 4-GB (PC3-10600, 1333-MHz, DDR3)*
599804-001	Palm rest for use in computers with 15.6-in displays with TouchPad, fingerprint reader, and cables
599805-001	Palm rest for use in computers with 17.3-in displays with TouchPad, fingerprint reader, and cables
599806-001	Misc LCD Cable Kit, includes microphone, WLAN, and WWAN cables for computers with 15.6-in displays
599807-001	Base Cable Kit for use in computers with 15.6-in displays, includes: RJ-11 cable, modem cable, Bluetooth cable, and DC-in cable
600370-001	*Broadcom 4313 802.11b/g/n 1x1 WiFi and 2070 Bluetooth 2.1+EDR Combo Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Puerto Rico, Qatar, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, the United States, Uruguay, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe*
600924-001	Display bezel for use in computers with 17.3-in displays without webcam
600925-001	LCD Cable with webcam cable for use in computers with 15.6-in displays
600926-001	Display bezel for use in computers with 15.6-in displays with a webcam

Spare part number	Description
600927-001	Display bezel for use in computers with 17.3-in displays with a webcam
600928-001	Display enclosure for use in computers with 15.6-in displays
600929-001	Display enclosure for use in computers with 17.3-in displays
602677-001	Hinge Kit for use in computers with 17.3-in displays
602992-001	*Ralink RT3090BC4 802.11b/g/n 1x1 WiFi and Bluetooth 2.1+EDR Combo Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, Puerto Rico, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the US Virgin Islands, the United States, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe*
602999-001	LCD Cable Kit for use in computers with 17.3-in displays
603188-001	Base Cable Kit for use in computers with 17.3-in displays
603700-001	Thermal shield
604852-001	Palm rest for use in computers with 15.6 displays and red trim
604853-001	Switch cover with power button switch for use in computers with 15.6 displays and red trim
604854-001	15.6-in HD AntiGlare display assembly for use in computers with red trim (1366×768 resolution)
604855-001	15.6-in HD AntiGlare display assembly for use in computers equipped with webcam and red trim (1366×768 resolution)
604856-001	15.6-in HD AntiGlare display assembly for use in computers equipped with webcam, WWAN, and red trim (1366×768 resolution)
604857-001	15.6-in HD BrightView display assembly for use in computers with red trim (1366×768 resolution)
604858-001	15.6-in HD BrightView display assembly for use in computers equipped with webcam and red trim (1366×768 resolution)
604859-001	15.6-in HD BrightView display assembly for use in computers equipped with webcam, WWAN, and red trim (1366×768 resolution)
604861-001	Palm rest for use in computers with 15.6 displays and red trim
605168-001	System board with UMA graphics subsystem memory for use only in the People's Republic of China and Russia

Spare part number	Description
605169-001	System board with discrete graphics subsystem memory for use only in the People's Republic of China and Russia
605170-001	System board with UMA graphics subsystem memory and WWAN for use only in the People's Republic of China and Russia
605171-001	System board with discrete graphics, WWAN capability, and RTC battery for use only in the People's Republic of China and Russia
606165-001	17.3-in HD AntiGlare display assembly (1600×900 resolution)
606166-001	17.3-in HD AntiGlare display assembly for use in computers equipped with webcam and WWAN (1600×900 resolution)
606167-001	17.3-in HD BrightView display assembly (1600×900 resolution)
606972-001	LCD cable without webcam cable for use in computers with 15.6-in displays
606973-001	LCD cable without webcam cable for use in computers with 17.3-in displays
606974-001	Misc LCD Cable Kit for use in computers with 17.3-in displays
607132-001	Fan/heat sink assembly for use in computers with UMA graphics subsystems
607133-001	Display enclosure for use in computers with 15.6-in displays and red trim
609948-001	65-W Smart AC adapter with power factor correction (PFC), RC/V EM 3W for use in the Asia-Pacific region
609952-001	Power button board
611699-001	Intel Celeron P4500 processor (1.86-GHz, 2-MB, L2 cache)
613152-001	65-W AC adapter for use in computers with UMA graphics
613153-001	90-W Slimline PFC AC adapter for use in computers with discrete graphics
613161-001	65-W Smart AC adapter with power factor correction (PFC), RC/V EM 3W for use in the Asia-Pacific region
613584-001	Intel Core i5-370M processor, 2.40-GHz, 3-MB L3 cache
613585-001	Intel Core i5-450M processor, 2.40-GHz, 3-MB L3 cache
613586-001	Intel Pentium P6000 processor, 1.86-GHz, 3-MB L3 cache
613587-001	Intel Pentium P6100 processor, 2.00-GHz, 3-MB L3 cache
616073-001	RTC battery
617667-001	640-GB, 5400-rpm hard drive
623182-001	15.6-in HD BrightView LVDS display assembly for use in computers with black trim (1366×768 resolution)
624238-001	15.6-in HD SVA LVDS AntiGlare display assembly for use in computers with black trim (1366×768 resolution)
624643-001	15.6-in WVA LVDS HD AntiGlare display assembly for use in computers with black trim (1366×768 resolution)
625823-001	Intel Core i3-380M processor, 2.53-GHz, 3-MB L3 cache
625831-001	Intel Pentium P6200 processor, 2.13-MHz, 3-MB L3 cache
626039-001	Intel Core i5-460M processor, 2.53-GHz, 3-MB L3 cache
626113-001	Palm rest for use in computers with 15.6 displays and champagne-colored trim

Spare part number	Description
626114-001	Switch cover with power button switch for use in computers with 15.6-in displays and champagne-colored trim
626115-001	15.6-in HD AntiGlare display assembly for use in computers with champagne-colored trim (1366×768 resolution)
626116-001	15.6-in HD AntiGlare display assembly for use in computers equipped with webcam and champagne-colored trim (1366×768 resolution)
626117-001	15.6-in HD AntiGlare display assembly for use in computers equipped with webcam, WWAN, and champagne-colored trim (1366×768 resolution)
626118-001	15.6-in HD BrightView display assembly for use in computers with champagne-colored trim (1366×768 resolution)
626119-001	15.6-in HD BrightView display assembly for use in computers with webcam and champagne-colored trim (1366×768 resolution)
626120-001	15.6-in HD BrightView display assembly for use in computers with webcam, WWAN, and champagne-colored trim (1366×768 resolution)
628794-001	System board with ATI Mobility Radeon HD 5470 graphics for use in 4720s models
628795-001	System board with ATI Mobility Radeon HD 5470 graphics for use in 4520s models
629030-001	Display cable, HD+

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
- Magnetic 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, 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 tape

- Antistatic smocks, aprons, and sleeve protectors

- Conductive bins and other assembly or soldering aids

- Nonconductive foam

- Conductive tabletop workstations with ground cords of one megohm resistance

- Static-dissipative tables or floor mats with hard ties to the ground

- Field service kits

- Static awareness labels

- Material-handling packages

- Nonconductive plastic bags, tubes, or boxes

- Metal tote boxes

- Electrostatic voltage levels and protective materials

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

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

Component replacement procedures

This section provides removal and replacement procedures.

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

Service tag

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

(1) Product name: This is the product name affixed to the front of the computer.

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

(3) Part number/product number (p/n): 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.

(4) Model description: This is the alphanumeric identifier used to locate documents, drivers, and support for the computer.

(5) Warranty period: This number describes the duration of the warranty period for this computer.
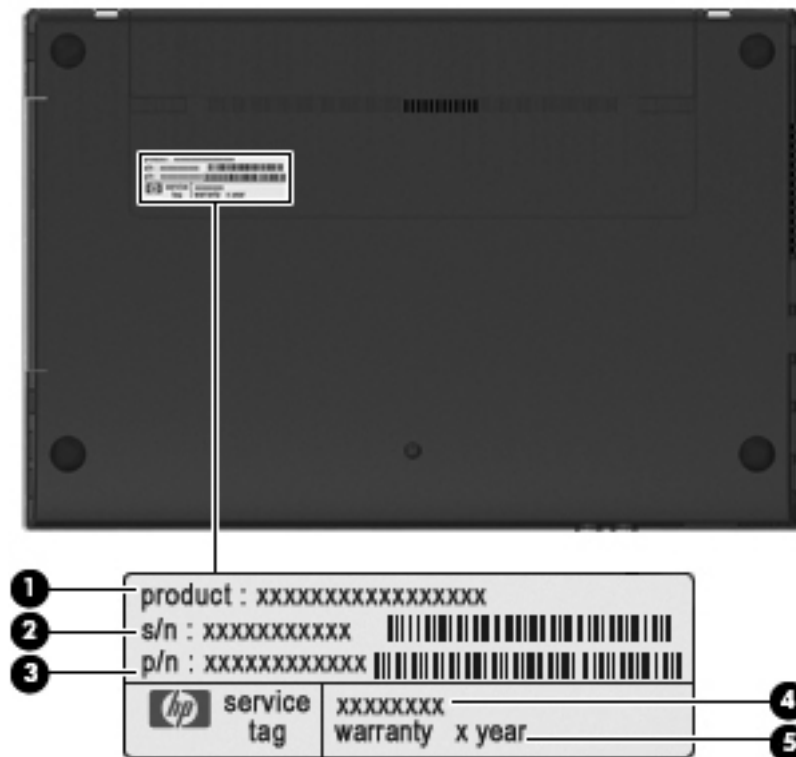
Computer feet

The computer feet are adhesive-backed rubber pads. The feet are included in the Rubber Kit, spare part number 598678-001. There are 4 rubber feet that attach to the base enclosure in the locations illustrated below.
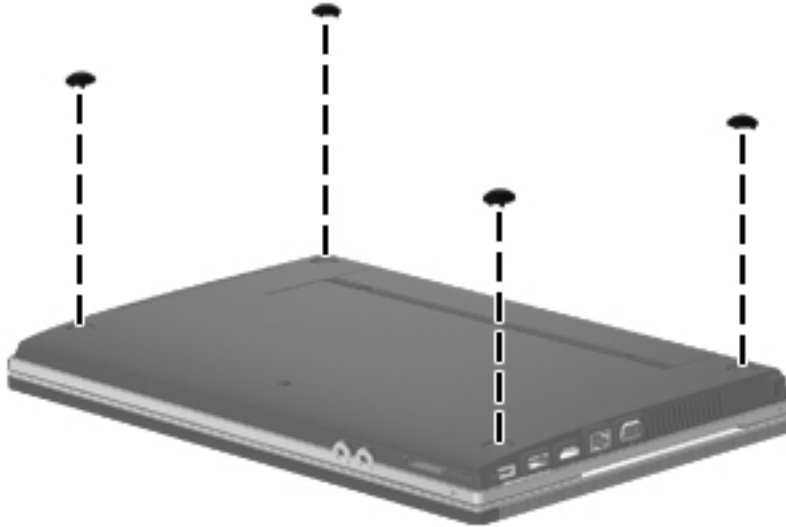
Battery

Description	Spare part number
8-cell, 73-Wh, 2.55-Ah Li-on battery for use in computers with 17.3-in displays	593576-001
6-cell, 47-Wh, 2.2-Ah Li-on battery for use in computers with 15.6-in displays	593572-001
6-cell, 93-Wh, 2.8-Ah Li-on battery for use in computers with 15.6-in displays	593573-001

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

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

3. Remove the battery **(2)** from the computer.
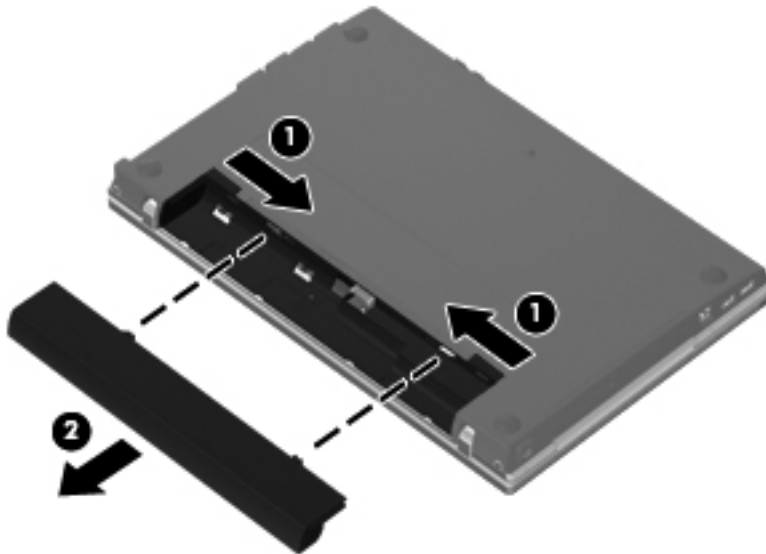
Install the battery by inserting it into the battery bay until you hear a click.

Switch cover and keyboard

Description	Spare part number
Switch cover with power button board	
For use in computers with 17.3-in displays	598675-001
For use in computers with 15.6-in displays and black or red trim	598674-001
For use in computers with 15.6-in displays and champagne-colored trim	*626114-001*
Keyboards for use in computers with 17.3-in displays	598692-xx1
Keyboards for use in computers with 15.6-in displays	598691-xx1
NOTE: For a detailed list of available keyboards, see Sequential part number listing on page 38.	

Before removing the switch cover and 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).

Remove the switch cover and keyboard:

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

2. To remove the switch cover, remove the following:

(1) Two screw covers on the rear edge of the computer

(2) Two PM2.5×2.5 screws

(3) Three PM2.0×2.5 broadhead screws located in the battery bay
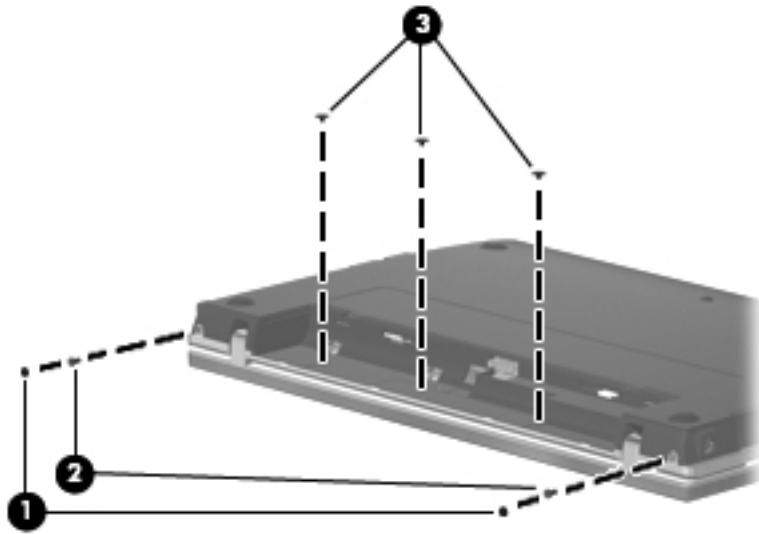
3. Open the computer as far as possible.

4. Slide the switch cover back **(1)**, and then remove it from the computer **(2)**.

5. Remove the two Phillips PM2.5×5.0 screws that secure the keyboard to the computer.

6. Slide the keyboard back toward the display **(1)**, and then rotate it forward **(2)** until it rests upside-down on the palm rest.
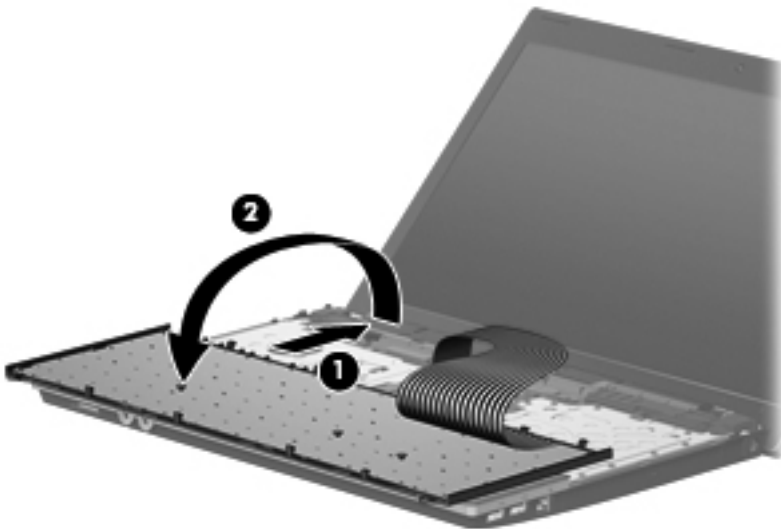
7. Release the zero insertion force (ZIF) connector **(1)** to which the keyboard cable is attached, and disconnect the keyboard cable **(2)** from the system board.

> **NOTE:** Only disconnect the keyboard cable from the system board when replacing the keyboard or removing the top cover. It is not recommended that you disconnect the cable unless it is absolutely necessary.

8. Remove the keyboard **(3)**.
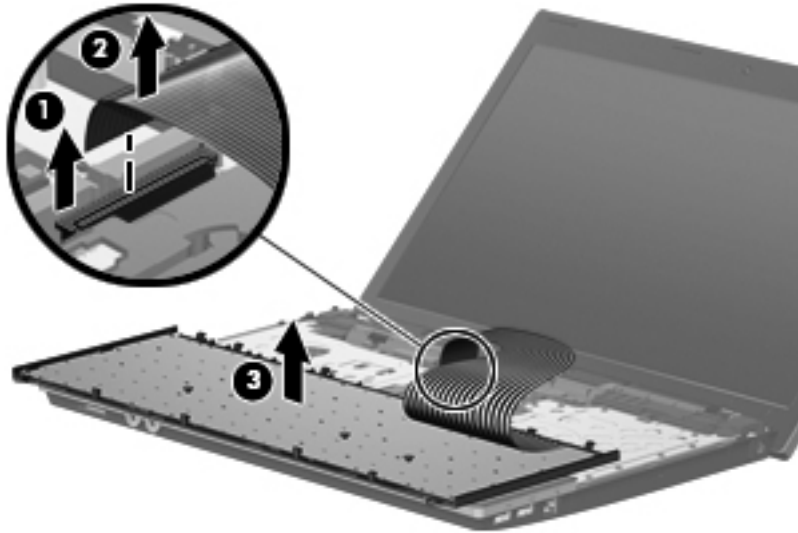
Reverse this procedure to install the switch cover and keyboard.

Memory module

📝 **NOTE:** When adding a second memory module, be sure it is the same type and speed as the installed memory module.

Description	Spare part number
4-GB (PC3-10600, 1333-MHz, DDR3)	*599092-001*
2-GB (PC3-10600, 1333-MHz, DDR3)	598856-001
1-GB (PC3-10600, 1333-MHz, DDR3)	598859-001

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 switch cover and keyboard (see Switch cover and keyboard on page 56).

📝 **NOTE:** It is not necessary to disconnect the keyboard cable from the system board to remove the memory modules.

Remove the memory module:

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

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

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

> **NOTE:** Memory modules are designed with a notch to prevent incorrect insertion into the memory module slot.
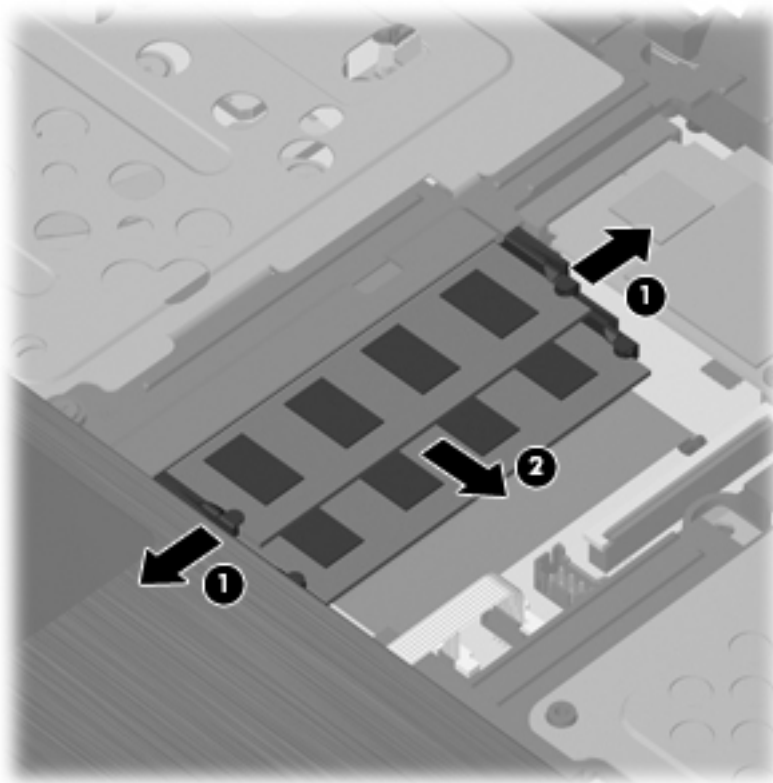
Reverse this procedure to install a memory module.

Optical drive

> **NOTE:** All optical drive spare part kits include an optical drive bezel.

Description	Spare part number
DVD±RW Double-Layer Drive with LightScribe (includes bezel)	598694-001
Blu-ray Disc ROM Drive with SuperMulti DVD±R/RW Double-Layer (includes bezel)	598695-001
DVD-ROM Drive (includes bezel)	598693-001

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 <u>Battery on page 55</u>).

5. Remove the switch cover and keyboard (see <u>Switch cover and keyboard on page 56</u>).

> 📝 **NOTE:** It is not necessary to disconnect the keyboard cable from the system board to remove the optical drive.

Remove the optical drive:

1. Position the computer with the right side toward you.

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

3. Insert a flat-bladed screwdriver or similar tool into the optical drive tab access **(2)** and press the tab to the right to release the optical drive from the computer.

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

> 📝 **NOTE:** 15.6-in model shown below
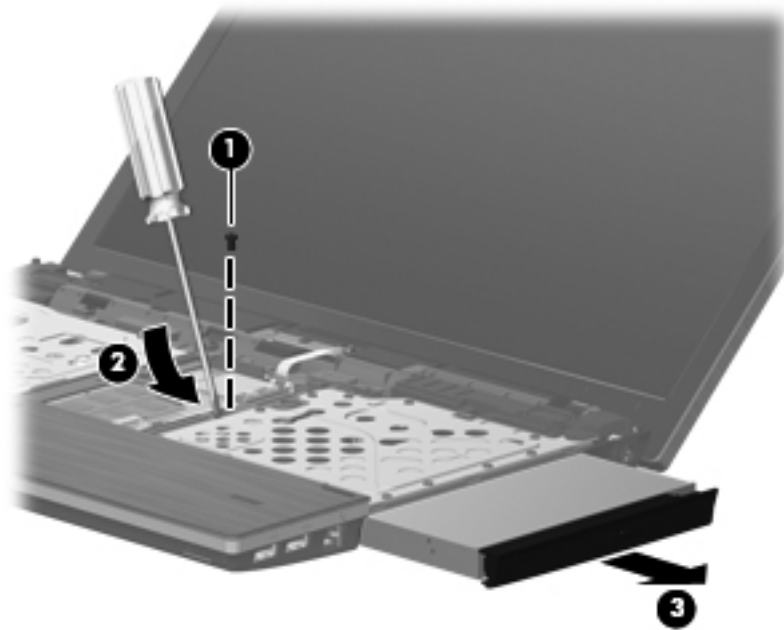
5. If it is necessary to replace the optical drive bracket, position the optical drive with the rear toward you.

6. Remove the two Phillips PM2.0×2.0 screws **(1)** that secure the optical drive bracket to the optical drive.

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

Reverse this procedure to reassemble and install an optical drive.

Power button board

Description	Spare part number
Switch cover with power button board	
For use in computers with 17.3-in displays	598675-001
For use in computers with 15.6-in displays and black or red trim	598674-001
For use in computers with 15.6-in displays and champagne-colored trim	*626114-001*

Before removing the power button board, follow these steps:

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

2. Disconnect all external devices connected to the computer.

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

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

5. Remove the switch cover and keyboard (see Switch cover and keyboard on page 56).

Remove the power button board.

1. Release the ZIF connector **(1)** and disconnect the ribbon cable **(2)** from the system board.
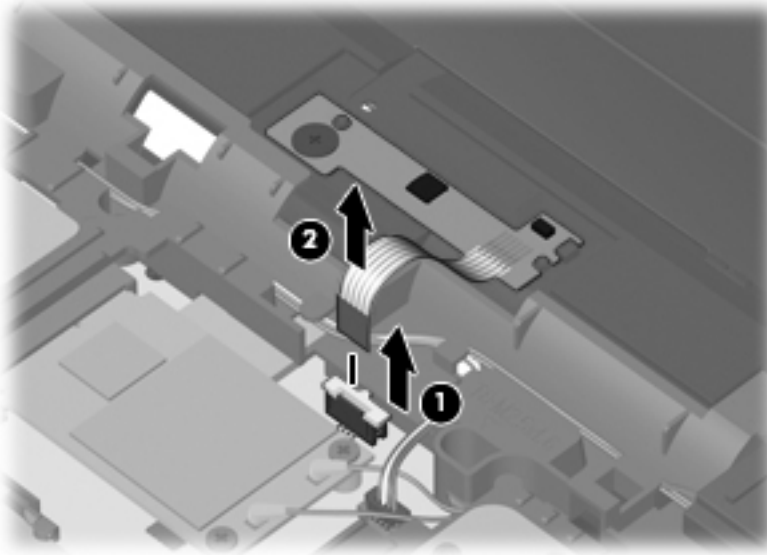
2. Remove the screw **(1)** that secures the power button board to the base pan and the slide the board out of the retainer **(2)** to the left **(3)** to remove it.
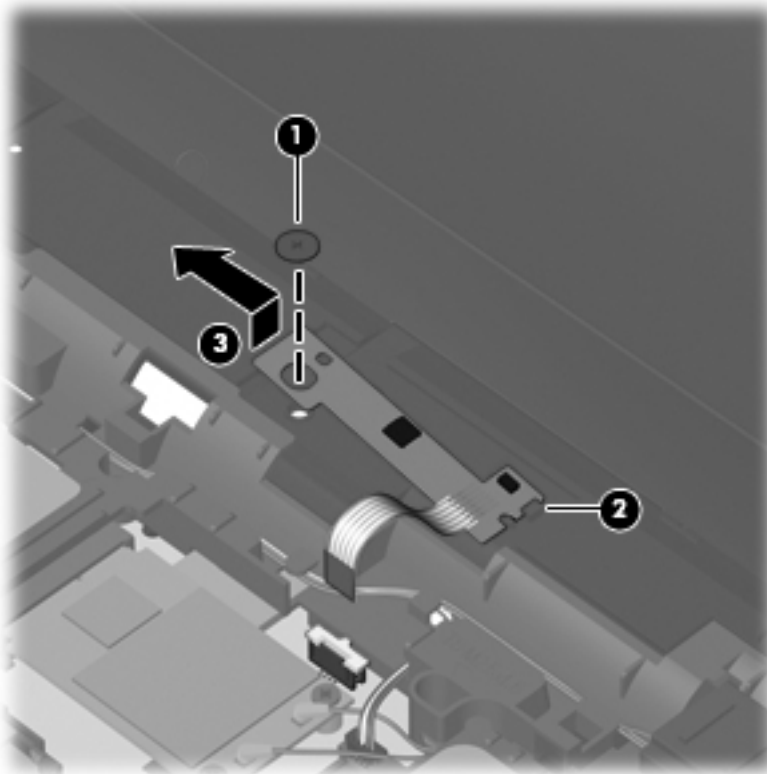
Reverse this procedure to install the power button board.

Speakers

Description	Spare part number
For use in computers with 17.3-in displays	598686-001
For use in computers with 15.6-in displays	598685-001

Before removing the speakers, 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. Disconnect the power button cable from the system board (see Power button board on page 63).

Remove the speakers from the 17.3-in computer:

1. Remove the two PM2.5x6.0 screws **(1)** that secure the speakers to the top cover.

2. Disconnect the speaker cable from the connector **(2)** on the system board.

3. Remove the cables from the routing channels and lift the speakers **(3)** from the computer.
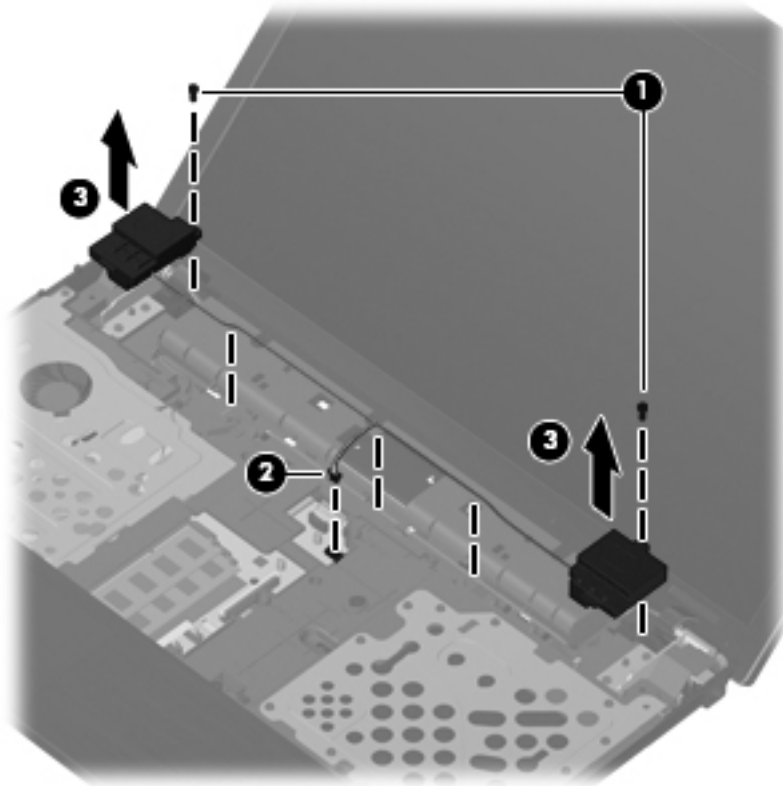
Remove the speakers from the 15.6-in computer:

1. Remove the two PM2.5x6.0 screws **(1)** that secure the speakers to the top cover.

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

3. Remove the cables from the routing channels and the speakers **(3)** from the computer.
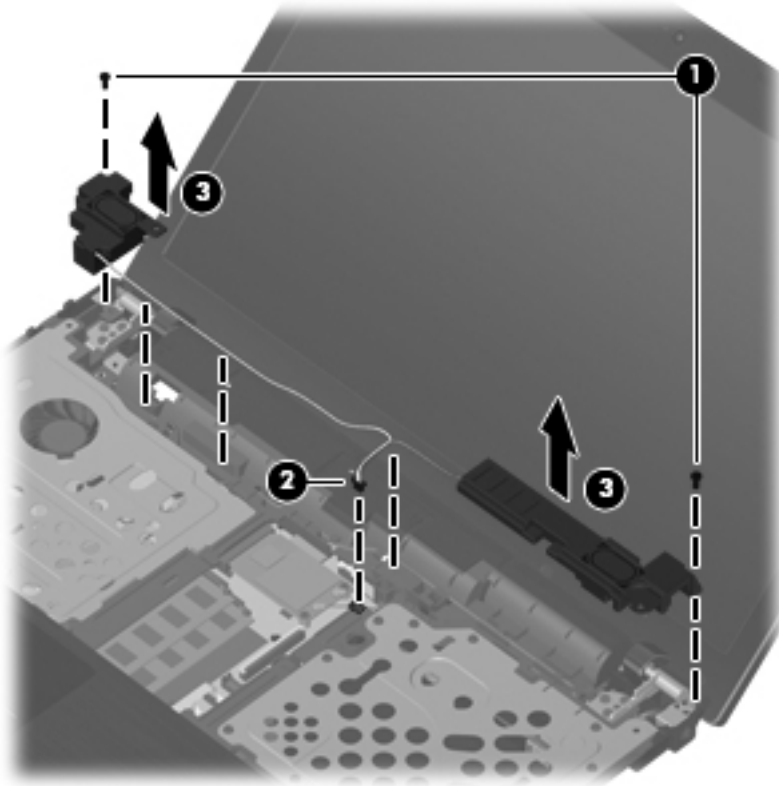
Reverse this procedure to install the speakers.

Thermal shield

NOTE: The spare part number for the thermal shield is 603700-001.

Before removing the thermal 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 switch cover and keyboard (see Switch cover and keyboard on page 56).

NOTE: It is not necessary to disconnect the keyboard cable from the system board before removing the thermal shield.

Remove the thermal shield on the 17.3-in computer:

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

2. Remove the PM2.5×3.0 screw **(1)** from the thermal shield.

3. Raise the thermal shield **(2)** and remove it **(3)** from the computer.
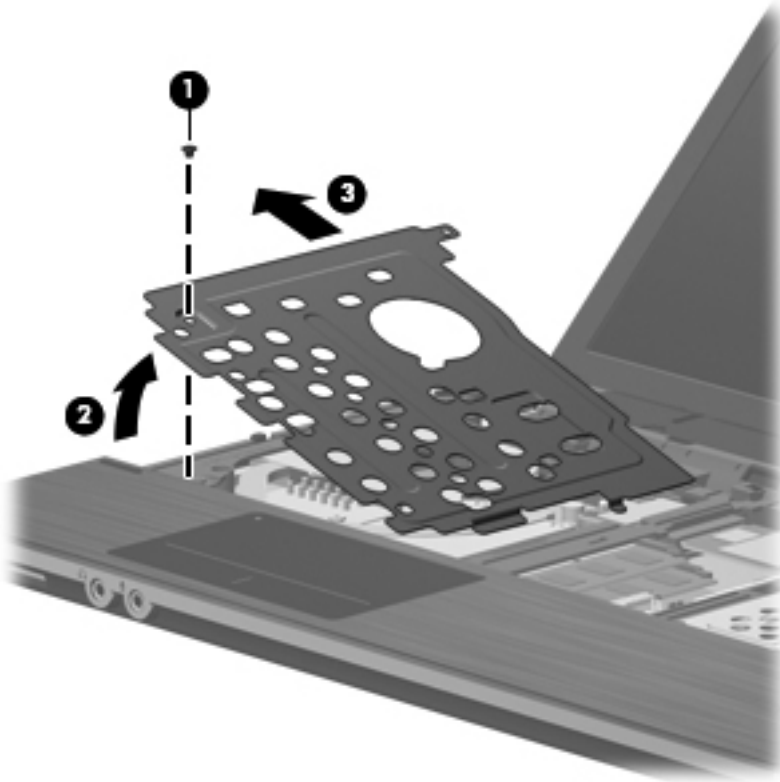
Remove the thermal shield on the 15.6-in computer:

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

2. Remove the two PM2.5×3.0 screws **(1)** and **(2)** from the thermal shield.

3. Raise the thermal shield **(3)** and remove it **(4)** from the computer.
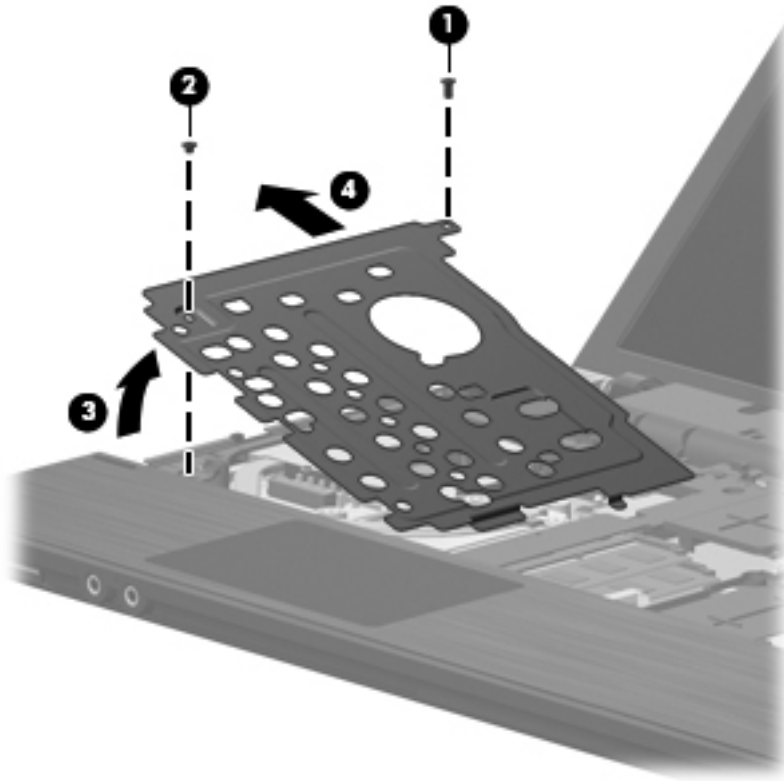
Reverse this procedure to reassemble and install an optical drive.

WLAN module

Description	Spare part number
Intel Centrino Advanced-N6200 802.11 a/b/g/n 2x2	572509-001
For use in Andorra, Antigua & Barbuda, Argentina, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Barbados, Belgium, Bolivia, Bosnia & Herzegovina, Brazil, Brunei, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Finland, France, Georgia, Germany, Ghana, Greece, Guam, Guatemala, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Ivory Coast, Jamaica. Japan, Jordan, Kenya, South Korea, Kuwait, Kyrgyzstan, Latvia, Lebanon, Martinique, Nether Antilles, Puerto Rico, French Guiana, Guadeloupe, Cayman Islands, Bermuda, Aruba, Liechtenstein, Lithuania, Luxembourg, Malawi, Malaysia, Malta, Mauritius, Mexico, Monaco, Montenegro, Morocco, Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Romania, San Marino, Saudi Arabia, Senegal, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Tanzania, Thailand, Trinidad & Tobago, Tunisia, Turkey, United Arab Emirates, the United Kingdom, the United States, Uruguay, Venezuela, Vietnam, Virgin Islands	
Intel Centrino Wireless-N1000 802.11 b/g 1x2	585984-001
For use in Andorra, Antigua & Barbuda, Argentina, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Barbados, Belgium, Bermuda, Bolivia, Bosnia & Herzegovina, Brazil, Brunei, Bulgaria, Canada, Cayman Islands, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Finland, France, French Guiana, Georgia, Germany, Ghana, Greece, Guadeloupe. Guatemala, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kenya, South Korea, Kuwait, Kyrgyzstan, Latvia, Lebanon, Nether Antilles, Martinique, Puerto Rico, Guam, Liechtenstein, Lithuania, Luxembourg, Malawi, Malaysia, Malta, Mauritius, Mexico, Monaco, Montenegro, Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, , Romania, San Marino, Saudi Arabia, Senegal, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Tanzania, Thailand, Trinidad & Tobago, Turkey, Ukraine, United Arab Emirates, the United Kingdom, the United States, Uruguay, Venezuela, Vietnam, Virgin Islands	
Broadcom 4312 802.11b/g WLAN modules	
For use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States	504593-003

Description	Spare part number
For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	504593-004
Atheros 9285G 802.11 b/g/n WiFi Adapter for use in all countries and regions	605560-005
Realtek RTL8AISE 802.11b/g/n WiFi Adapter for use in all countries and regions	593533-001
Intel Wi-Fi Link 1000, 802.11b/g/n WLAN module	572520-001
For use in Andorra, Antigua and Barbuda, Argentina, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Barbados, Belgium, Bolivia, Bosnia and Herzegovina, Brazil, Brunei, Bulgaria, Canada, Cayman Islands, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, the Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Finland, France, French Guiana, Guadeloupe, Guam, Georgia, Germany, Ghana, Greece, Guatemala, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kenya, Kuwait, Kyrgyzstan, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malawi, Malaysia, Malta, Martinique, Mauritius, Mexico, Monaco, Montenegro, Morocco, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Nigeria, Nigeria, Oman, Pakistan, Panama, Paraguay, Peru, the Philippines, Poland, Portugal, Puerto Rico, Quatar, Romania, San Marino, Saudi Arabia, Senegal, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Tanzania, Thailand, Trinidad and Tobago, Turkey, United Arab Emirates, the United Kingdom, the United States, Uruguay, the U.S. Virgin Islands, Venezuela, and Vietnam	
Broadcom 4322 AGN, 802.11a/b/g/n	
For use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States	*518434-001*

Description	Spare part number
For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea- Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay,	*518434-002*
Broadcom 4313AGN 802.11a/b/g/draft-n WiFi Adapter	*593836-001*
For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea- Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Martinique, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	
Broadcom 4313 802.11b/g/n 1x1 WiFi and 2070 Bluetooth 2.1+EDR Combo Adapter	*600370-001*

Description	Spare part number
For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Puerto Rico, Qatar, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, the United States, Uruguay, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	
Ralink RT3090BC4 802.11b/g/n 1x1 WiFi and Bluetooth 2.1+EDR Combo Adapter	*602992-001*
For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, Puerto Rico, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the US Virgin Islands, the United States, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	

△ **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.

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 following components:

   a. Switch cover and keyboard (see Switch cover and keyboard on page 56)

   b. Thermal shield (see Thermal shield on page 67)

Remove the WLAN module:

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

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

   NOTE: The black WLAN antenna cable is connected to the WLAN module "Main" terminal. The white WLAN antenna cable is connected to the WLAN module "Aux" terminal.

3. Remove the two Phillips PM2.0×4.0 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 **(4)** to prevent incorrect insertion.
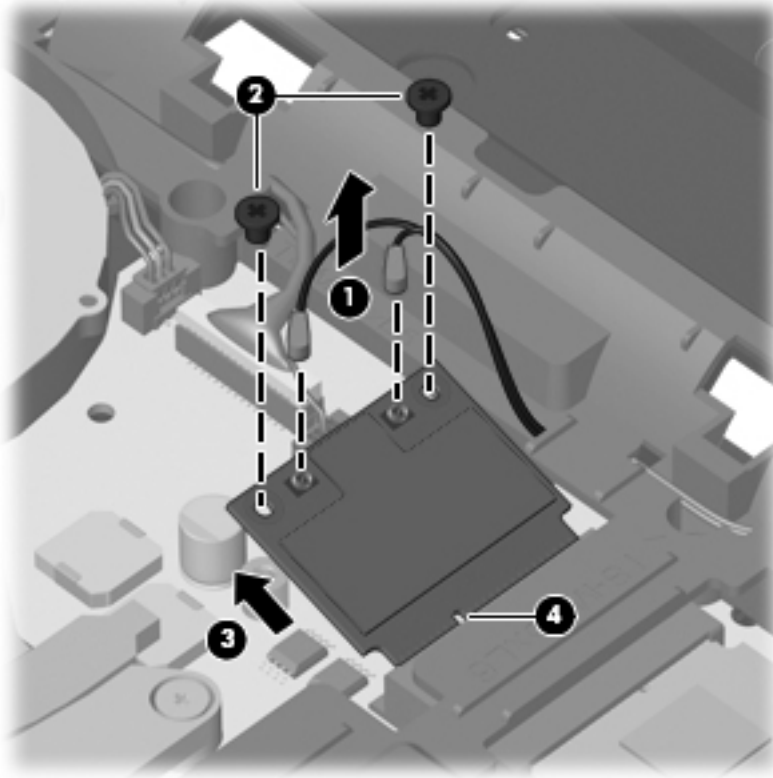
Reverse this procedure to install the WLAN module.

WWAN module

NOTE: Only computers with UMA graphics include a WWAN module.

NOTE: The spare part number for the HP un2420 Broadband Module is 531993-001.

△ **CAUTION:** To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore computer functionality, and then contact technical support through Help and Support.

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 switch cover and keyboard (see Switch cover and keyboard on page 56)

Remove the WWAN module:

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

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. The terminals and cables are both identified by number and color.

3. Remove the two Torx M2.5×6.0 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 **(4)** to prevent incorrect insertion.
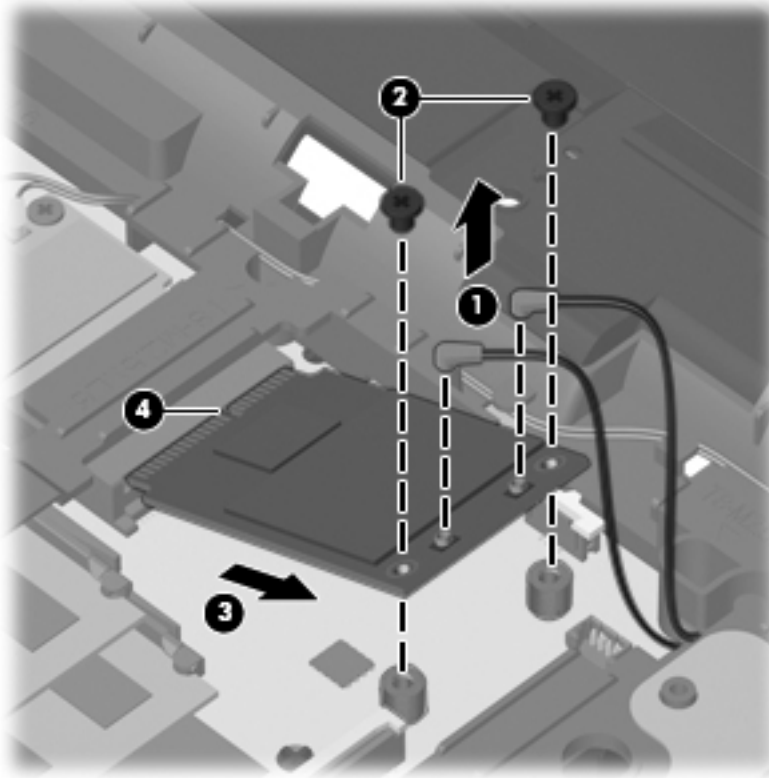
Reverse this procedure to install the WWAN module.

Heat sink and fan

Description	Spare part number
Heat sink for use in computers with UMA graphics subsystems	598676-001
Heat sink for use in computers with discrete graphics subsystems	598677-001

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. Switch cover and keyboard (see Switch cover and keyboard on page 56).

   b. Thermal shield (see Thermal shield on page 67).

Remove the heat sink:

- For computers with discrete subsystem memory on the system board, follow these steps:

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

2. Following the sequence stamped into the heat sink, loosen the six captive screws **(1)**, **(2)**, **(3)**, **(4)**, **(5)**, **(6)**, around the processor.

3. Disconnect the fan cable from the system board **(7)**, and then remove the heat sink **(8)**.
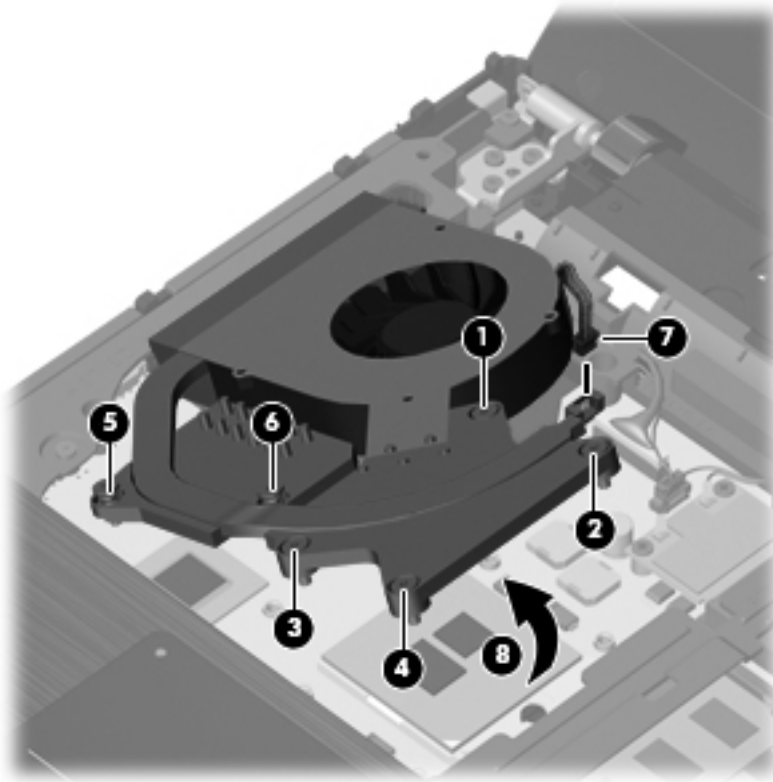
4. Clean the thermal material from the surfaces of the heat sink components **(1)** and **(3)** and from the system board **(2)** and **(4)** when the heat sink is removed. Replacement thermal material is included with all heat sink, system board, and processor spare part kits.
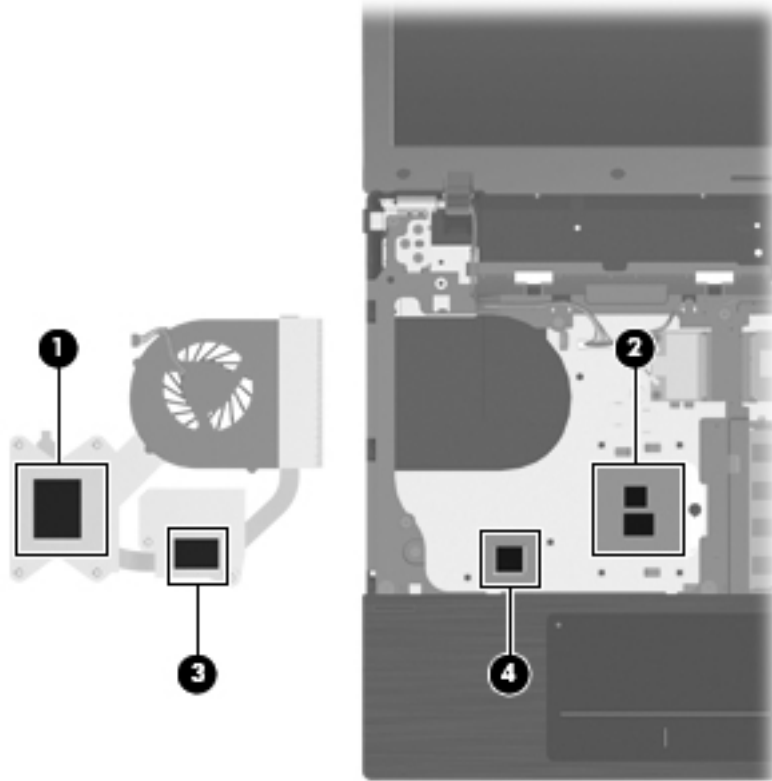
● For computers with UMA subsystem memory on the system board, follow these steps:

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

2. Following the sequence stamped into the heat sink, loosen the four screws **(1)**, **(2)**, **(3)**, **(4)** around the processor.

3. Disconnect the fan cable from the system board **(5)**, and remove the heat sink **(6)**.
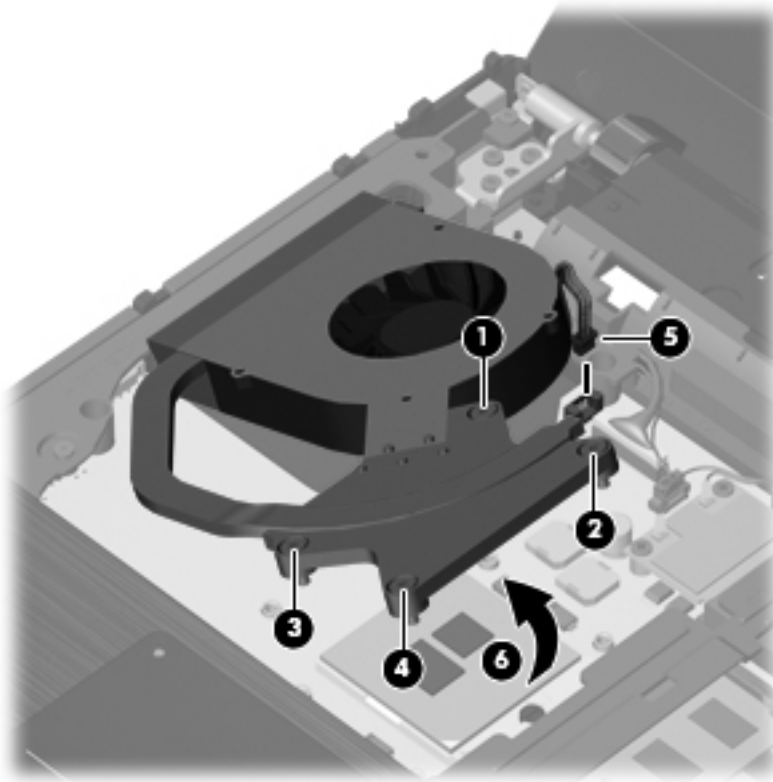
4. Clean the thermal material from the surfaces of the heat sink components **(1)** and the system board **(2)** each time the heat sink is removed. Replacement thermal material is included with all heat sink, system board, and processor spare part kits.
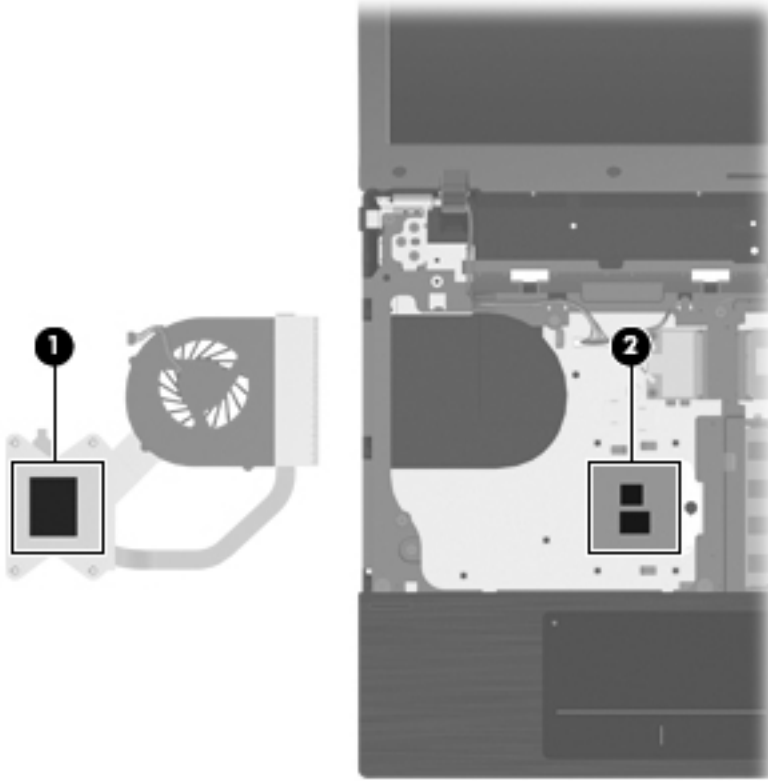
Reverse this procedure to install the heat sink and fan.

Processor

NOTE: The processor spare part kit includes replacement thermal material.

Description	Spare part number
Intel Core processors:	
i3-330M, 2.13-GHz	597622-001
i3-350M, 2.26-GHz	597623-001
i3-370M, 2.40-GHz	613584-001
i3-380M, 2.53-GHz	625823-001
i5-430M, 2.26-GHz	597624-001
i5-450M, 2.40-GHz	613585-001
i5-460M, 2.53-GHz	626039-001
i5-520M, 2.40-GHz	594187-001
i5-540M, 2.53-GHz	594188-001
i7-620M, 2.26-GHz	587259-001
Intel Pentium processors:	
P6000, 1.86-GHz	613586-001
P6100, 2.00-GHz	613587-001
P6200, 2.13-GHz	625831-001
Intel Celeron processor:	
P4500, 1.86-GHz	611699-001

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 switch cover and keyboard (see Switch cover and keyboard on page 56).

6. Remove the thermal shield (see Thermal shield on page 67).

7. Remove the heat sink and fan (see Heat sink and fan on page 78).

Remove the processor:

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

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

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

> **NOTE:** When you install the processor, the gold triangle **(3)** on the processor must be aligned with the triangle **(4)** embossed on the processor socket.
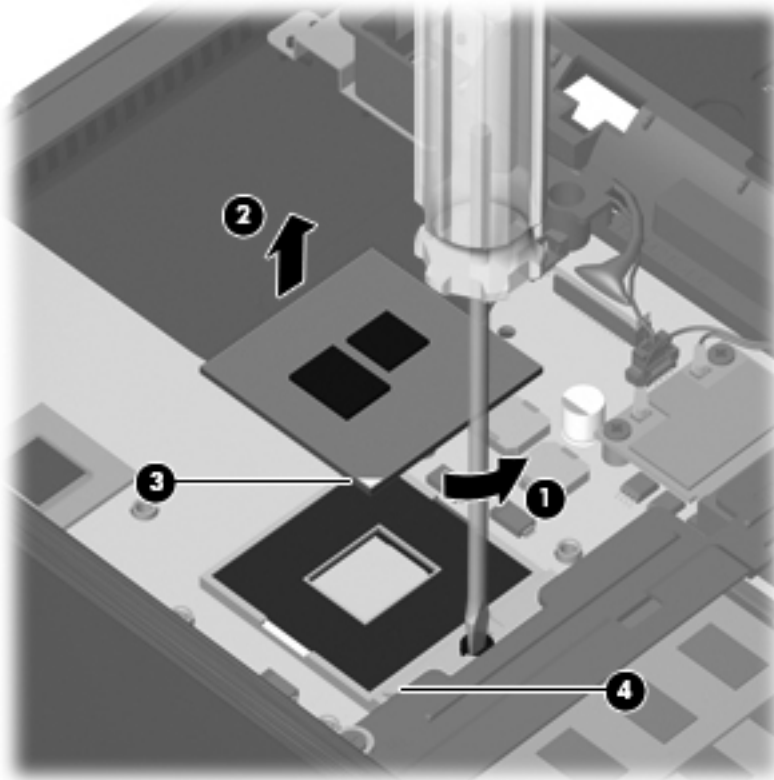
Reverse this procedure to install the processor.

Palm rest

Description	Spare part number
Palm rest for 17.3-in displays (includes TouchPad)	598689-001
Palm rest for 17.3-in displays with fingerprint reader (includes TouchPad)	599805-001
Palm rest for 15.6-in displays (includes TouchPad)	598688-001
Palm rest for 15.6-in displays with red trim (includes TouchPad)	604852-001
Palm rest for 15.6-in displays with fingerprint reader with black trim (includes TouchPad)	599804-001

Description	Spare part number
Palm rest for 15.6-in displays with fingerprint reader with red trim (includes TouchPad)	604861-001
Palm rest for 15.6-in displays with fingerprint reader with champagne-colored trim (includes TouchPad)	*626113-001*

Before removing the palm rest, 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 switch cover and keyboard (see Switch cover and keyboard on page 56).

Remove the palm rest:

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

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

3. Slide the palm rest to the right **(2)**, and then lift and rotate the rear edge **(3)** towards the display to gain access to the TouchPad cable.
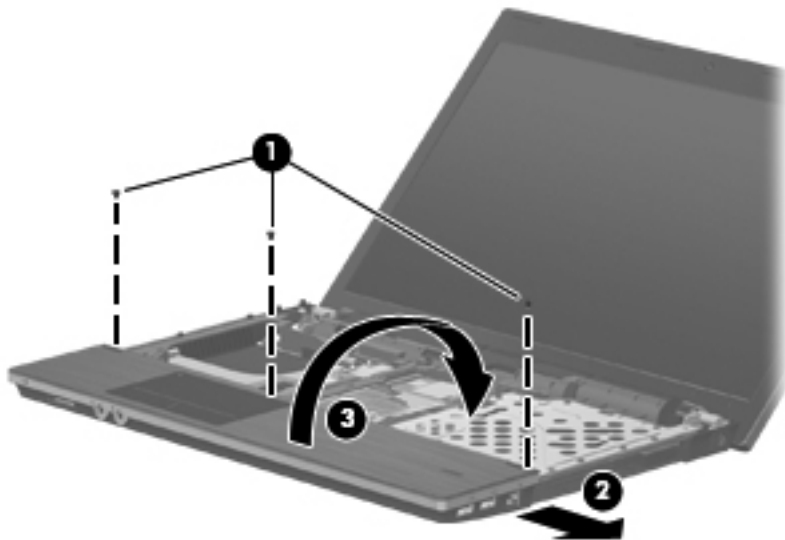
4. Release the ZIF connectors **(1)** and **(3)** to which the TouchPad and fingerprint cables are connected, and then disconnect the cables **(2)** and **(4)** from the system board.

NOTE: Only select models are equipped with fingerprint readers.
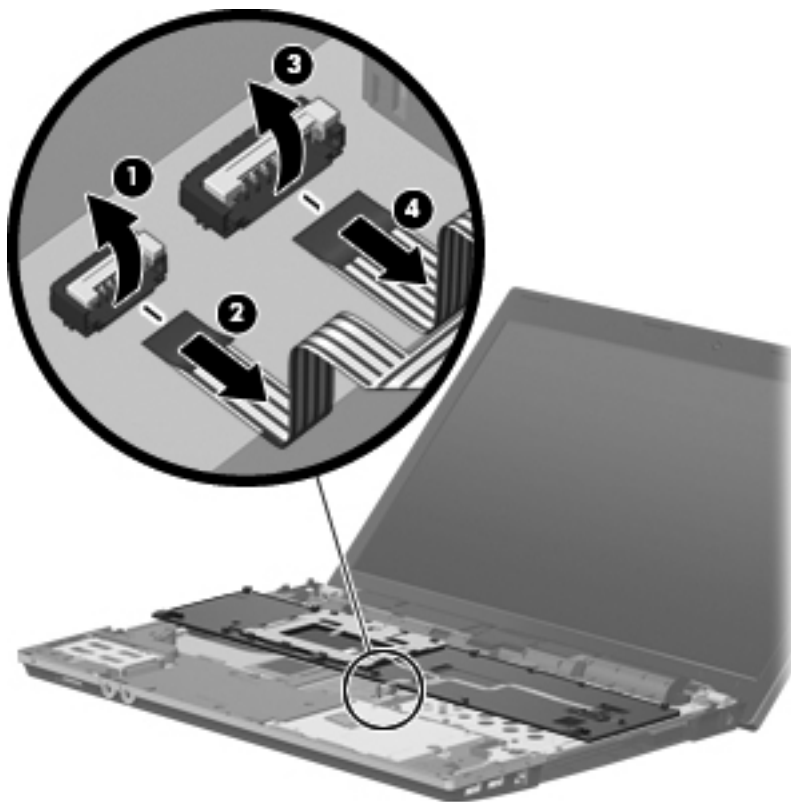
5. Remove the palm rest.

Reverse this procedure to install the palm rest.

Hard drive

NOTE: The hard drive spare part kit includes a hard drive bracket.

Description	Spare part number
750-GB, 5400-rpm hard drive	*598699-001*
640-GB, 5400-rpm hard drive	*617667-001*
500-GB, 7200-rpm hard drive	598698-001
320-GB, 7200-rpm hard drive	598697-001
250-GB, 7200-rpm hard drive	598696-001

Before removing the hard drive, follow these steps:

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

2. Disconnect all external devices connected to the computer.

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

4. Remove the battery (see).

5. Remove the Switch cover and keyboard (see).

NOTE: It is not necessary to remove the keyboard cable from the system board when removing the hard drive.

6. Remove the palm rest (see).

Remove the hard drive:

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

2. Remove the two Phillips PM2.5×6.0 screws **(1)** and loosen the Phillips PM2.5×11.0 captive screw **(2)** that secure the hard drive to the computer.

3. Grasp the mylar tab on the hard drive and slide the hard drive **(3)** to the right to disconnect it from the system board.

4. Remove the hard drive **(4)** from the hard drive bay.
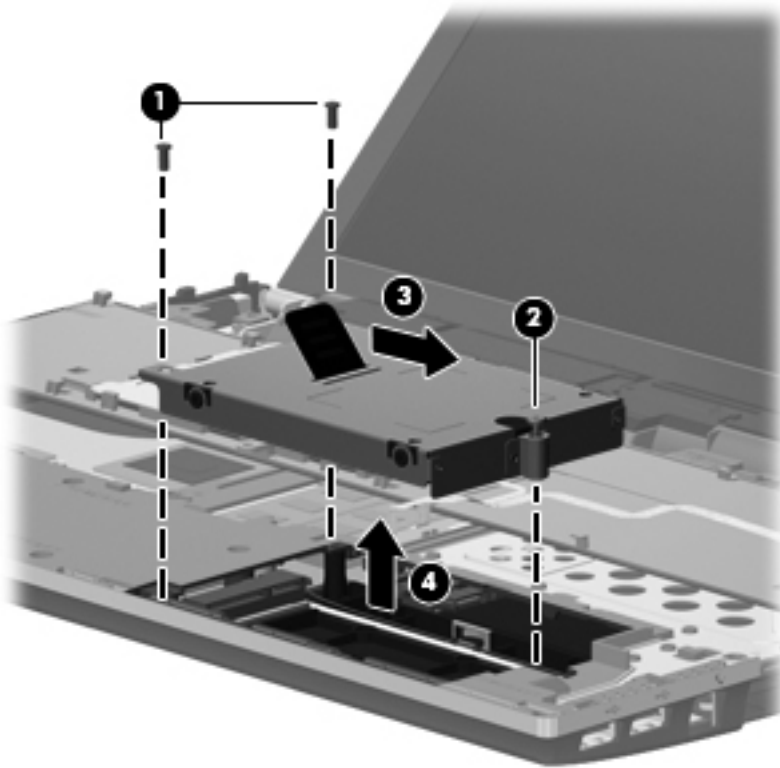
5. If it is necessary to replace the hard drive bracket, remove the two Phillips PM3.0×4.0 hard drive bracket screws **(1)** from each side of the hard drive.

6. Lift the bracket **(2)** straight up to remove it from the hard drive.
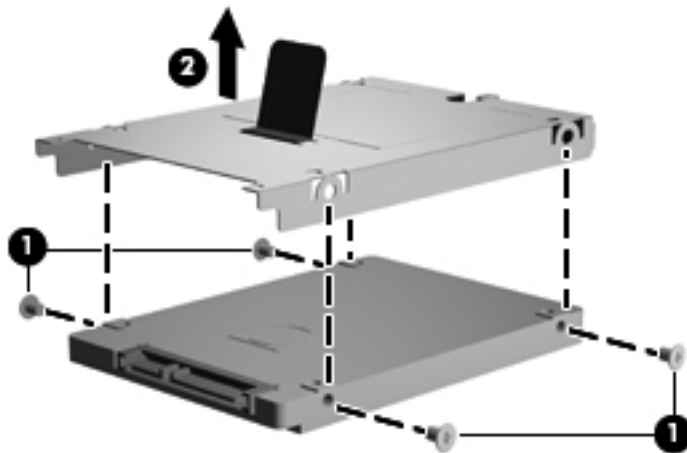
Reverse this procedure to reassemble and install the hard drive.

Display assembly on computers with 17.3-in displays

NOTE: The Miscellaneous LCD Cable Kit, spare part number 599806-001, includes 2 WLAN antenna transceivers and cables.

Description	Spare part number
17.3-in HD BrightView display assembly for use in computers equipped with webcam and WWAN (1600×900 resolution)	598708-001
17.3-in HD BrightView display assembly (1600×900 resolution)	606167-001
17.3-in HD AntiGlare display assembly for use in computers equipped with webcam and WWAN (1600×900 resolution)	606166-001
17.3-in HD BrightView display assembly (1600×900 resolution)	606165-001
17.3-in HD+ BrightView display assembly (1600×900 resolution)	*599080-001*
Display cable for use with HD+ displays	*629030-001*

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 switch cover and keyboard (see Switch cover and keyboard on page 56).

6. Disconnect the power button cable from the system board (see Power button board on page 63).

7. Remove the speakers (see Speakers on page 65).

Remove the display cables:

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

2. Open the computer as far as possible.

3. Disconnect the webcam **(1)** and display panel cable **(2)** from the system board and from the routing channels.

4. Disconnect the microphone cable **(3)** from the system board and from the routing channels.

5. Disconnect and remove the WLAN wireless antenna cables **(4)** from the tape, clips, and routing channels built into the top cover.
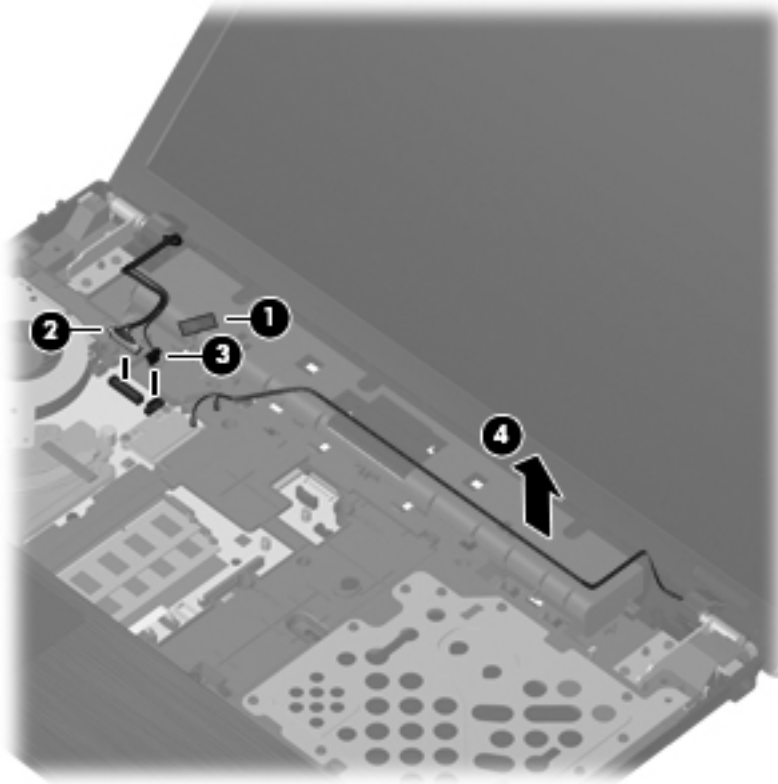
Remove the display assembly:

⚠ **CAUTION:** Support the display assembly when removing the following screws. Failure to support the display assembly can result in damage to the display assembly and other computer components.

1. Remove the six Torx M2.5×6.0 screws **(1)** that secure the display assembly to the computer.

2. Lift the display assembly **(2)** straight up.
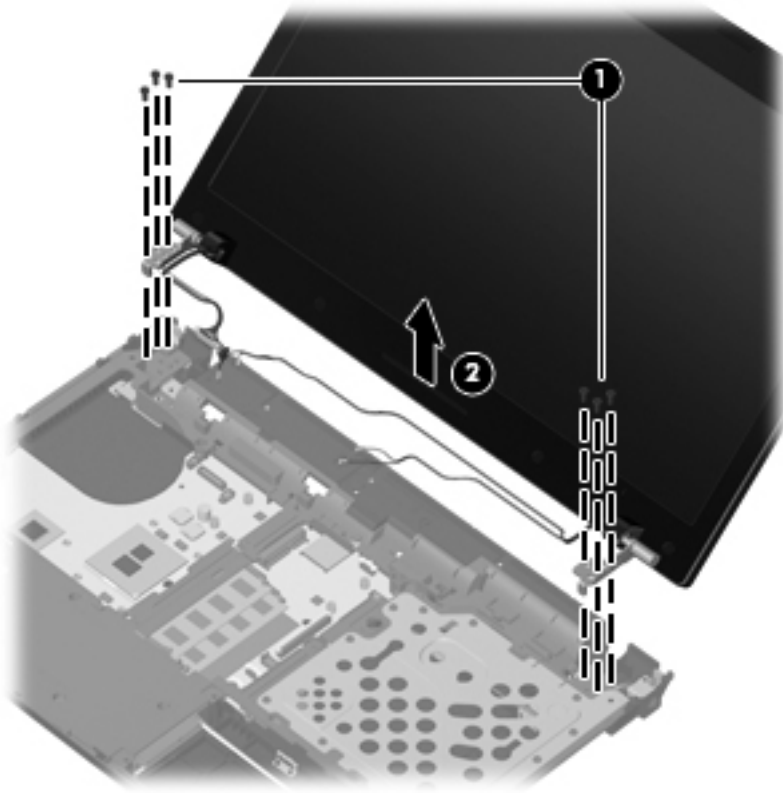
3. If it is necessary to replace the display bezel, display enclosure, or display hinges, remove the two mylar screw covers **(1)** at the bottom corners of the display and the two Torx M2.0×6.0 screws **(2)** that secure the display bezel to the display assembly.
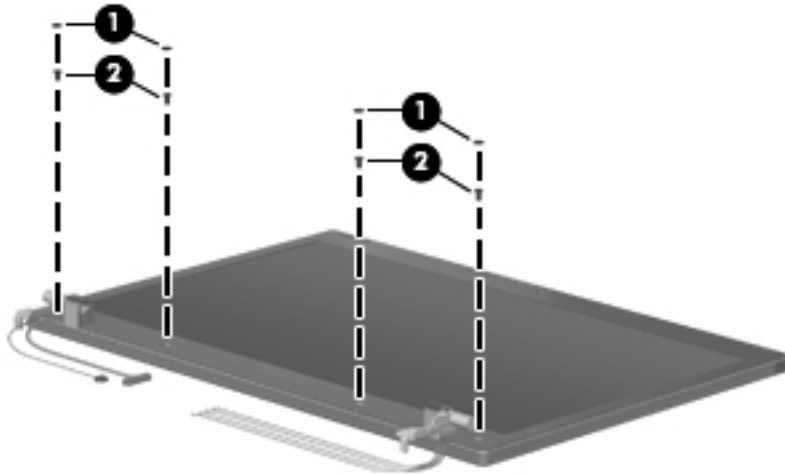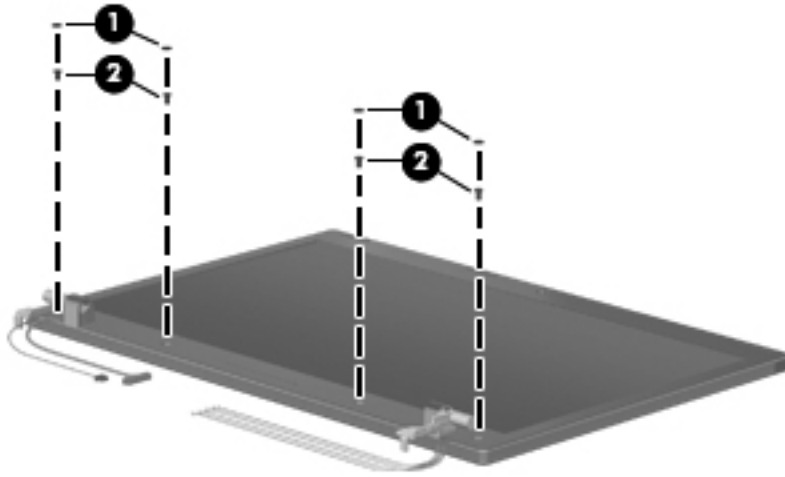
4. Flex the bottom bezel **(1)** around the hinge areas on the inside of the display enclosure and work around the periphery of the bezel **(2)** and **(3)**.

5. When the bezel is free, lift it **(4)** from the display.
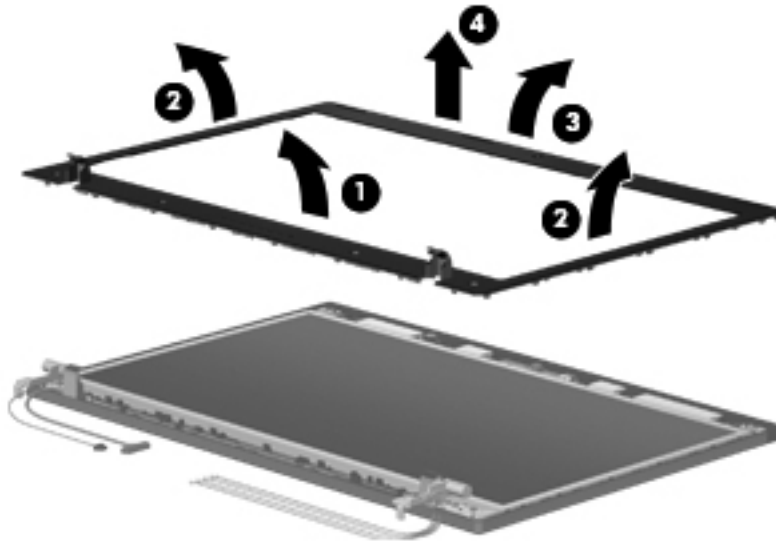
6. If it is necessary to replace the webcam module, gently pull the webcam module away from the double-sided tape on the display enclosure **(1)** and disconnect the webcam cable from the module **(2)**.The webcam module with cable can be ordered by using spare part number 598671-001.
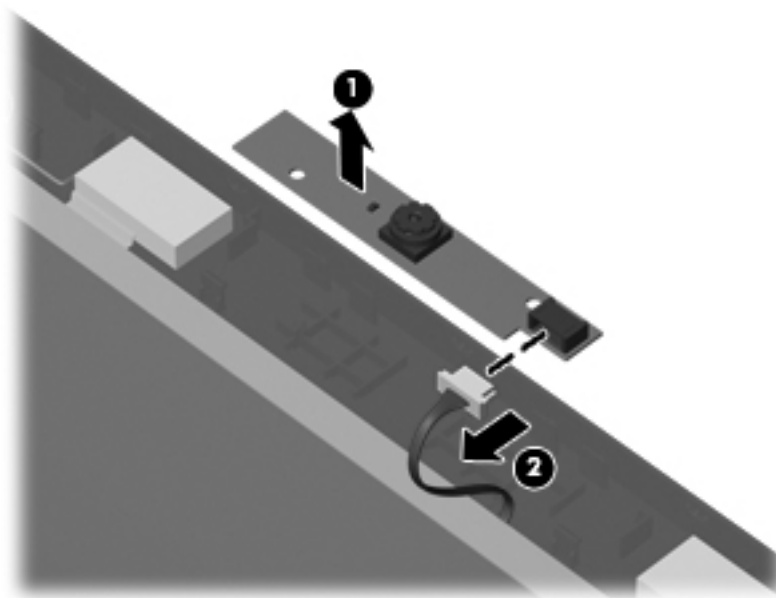
NOTE: To replace the webcam module in the display enclosure, align the holes on the webcam module with the pins on the display enclosure and press onto the double-sided tape.

7. If it is necessary to replace the display hinges, remove the display panel by removing the two Torx M2.0×6.0 screws **(1)** that secure the panel to the top of the display enclosure, and then remove the four Torx M2.0×6.0 screws **(2)** located at the hinge arms. This will allow the panel to be lifted from the enclosure.
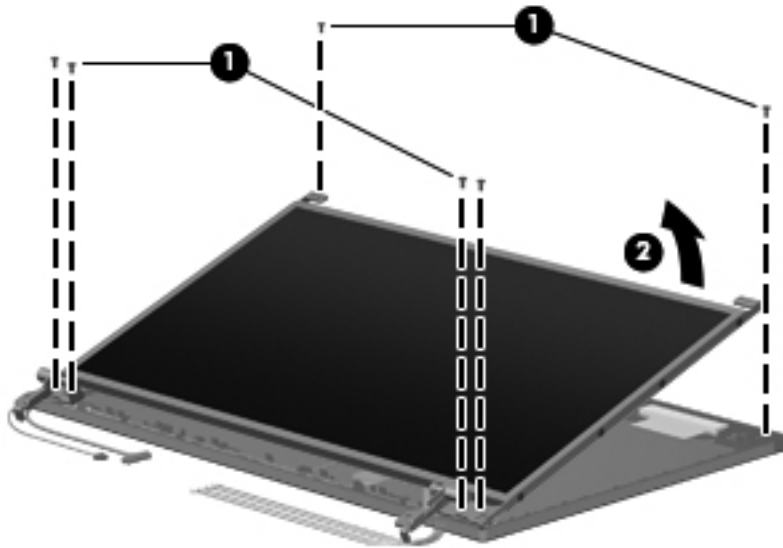
8. Remove the eight Phillips PM2.0×3.0 screws **(1)** that secure the display hinges to the display panel, and then remove the display hinges **(2)**. The left and right display hinges are available in the Display Hinge Kit, spare part number 602677-001 for computers with 17.3-in displays.
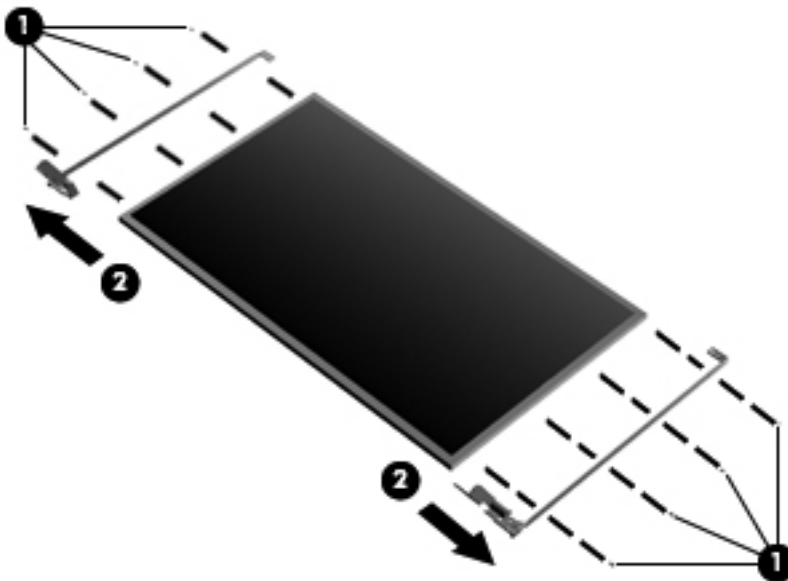
9. If it is necessary to replace the display cable, turn the display panel upside-down and remove the microphone **(1)** and the microphone cable **(2)** from the cable routing area. then disconnect the cable from the connector on the back of the display panel **(2)**.

10. Disconnect the display cable from the back of the display panel **(3)** and remove the webcam cable **(4)** from the raceway. The display cable is spared in the LCD cable kit, spare part number 599806-001.
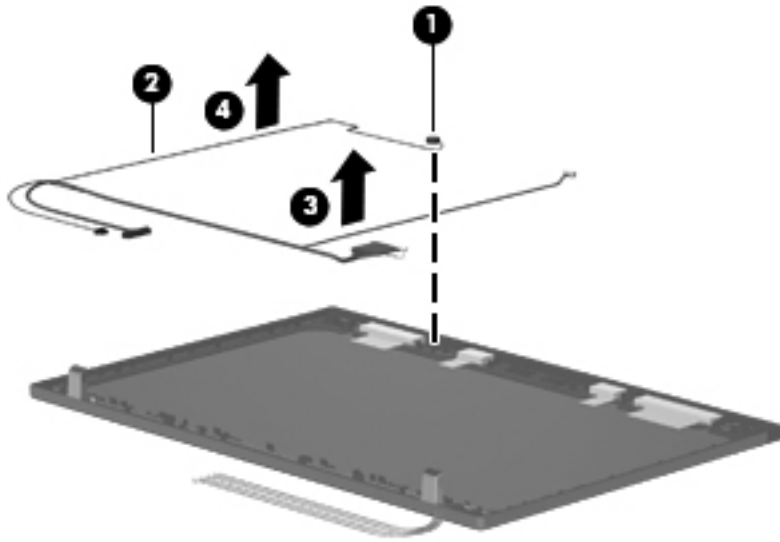
Reverse this procedure to reassemble and install the display assembly.

Display assembly on computers with 15.6-in displays

NOTE: For information about removing the display from 17.3-in models, see Display assembly on computers with 17.3-in displays on page 89.

NOTE: The Miscellaneous LCD Cable Kit, spare part number 599806-001, includes 2 WLAN antenna transceivers and cables.

Description	Spare part number
For use only with computers with 15.6-in displays and black trim	
● 15.6-in HD BrightView display assembly for use in computers equipped with webcam and WWAN (1366×768 resolution)	598707-001
● 15.6-in HD BrightView display assembly for use in computers with webcam (1366×768 resolution)	598706-001
● 15.6-in HD BrightView display assembly (1366×768 resolution)	598705-001
● *15.6-in HD BrightView LVDS display assembly (1366×768 resolution)*	*623182-001*
● 15.6-in HD AntiGlare display assembly for use in computers equipped with webcam and WWAN (1366×768 resolution)	598704-001
● 15.6-in HD AntiGlare display assembly for use in computers equipped with webcam (1366×768 resolution)	598703-001
● 15.6-in HD AntiGlare display assembly (1366×768 resolution)	598702-001
● *15.6-in HD SVA LVDS AntiGlare display assembly (1366×768 resolution)*	*624238-001*
● *15.6-in WVA LVDS HD AntiGlare display assembly (1366×768 resolution)*	*624643-001*
For use only with computers with 15.6-in displays and red trim	
● 15.6-in HD BrightView display assembly for use in computers with webcam and WWAN (1366×768 resolution)	604859-001
● 15.6-in HD BrightView display assembly for use in computers with webcam (1366×768 resolution)	604858-001
● 15.6-in HD BrightView display assembly for use in computers (1366×768 resolution)	604857-001
● 15.6-in HD AntiGlare display assembly for use in computers equipped with webcam and WWAN (1366×768 resolution)	604856-001
● 15.6-in HD AntiGlare display assembly for use in computers equipped with webcam (1366×768 resolution)	604855-001
● 15.6-in HD AntiGlare display assembly (1366×768 resolution)	604854-001
For use only with computers with 15.6-in displays and champagne-colored trim	
● *15.6-in HD BrightView display assembly for use in computers with webcam and WWAN (1366×768 resolution)*	*626120-001*
● *15.6-in HD BrightView display assembly for use in computers with webcam (1366×768 resolution)*	*626119-001*
● *15.6-in HD BrightView display assembly (1366×768 resolution)*	*626118-001*
● *15.6-in HD AntiGlare display assembly for use in computers equipped with webcam and WWAN (1366×768 resolution)*	*626117-001*

| Description	Spare part number
• *15.6-in HD AntiGlare display assembly for use in computers equipped with webcam (1366×768 resolution)*	*626116-001*
• *15.6-in HD AntiGlare display assembly (1366×768 resolution)*	*626115-001*

Before removing the 15.6-in 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 switch cover and keyboard (see Switch cover and keyboard on page 56).

6. Disconnect the power button cable from the system board (see Power button board on page 63).

7. Remove the speakers (see Speakers on page 65)

8. Remove the thermal shield (see Thermal shield on page 67).

Remove the display cables:

1. Remove the tape that holds the cables in place**(1)**. Disconnect the display and webcam cables from the system board and from the routing channels.

2. Disconnect the cable connectors for the display **(2)** and microphone **(3)** from the system board.

3. Disconnect the WLAN and WWAN cables **(4)** from the tape and from the routing channels built into the top cover.
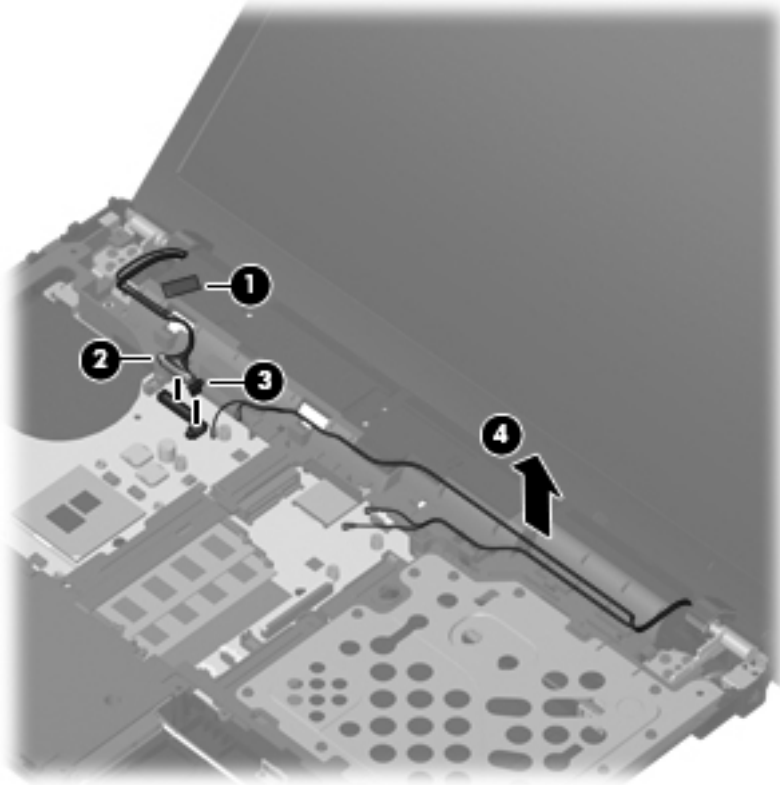
Remove the display assembly:

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

2. Open the computer as far as possible.

△ **CAUTION:** Support the display assembly when removing the retaining screws. Failure to support the display assembly can result in damage to the display assembly and other computer components.

3. Remove the six Torx M2.5×6.0 screws **(1)** that secure the display assembly to the computer.

4. Lift the display assembly up and off the computer **(2)**.
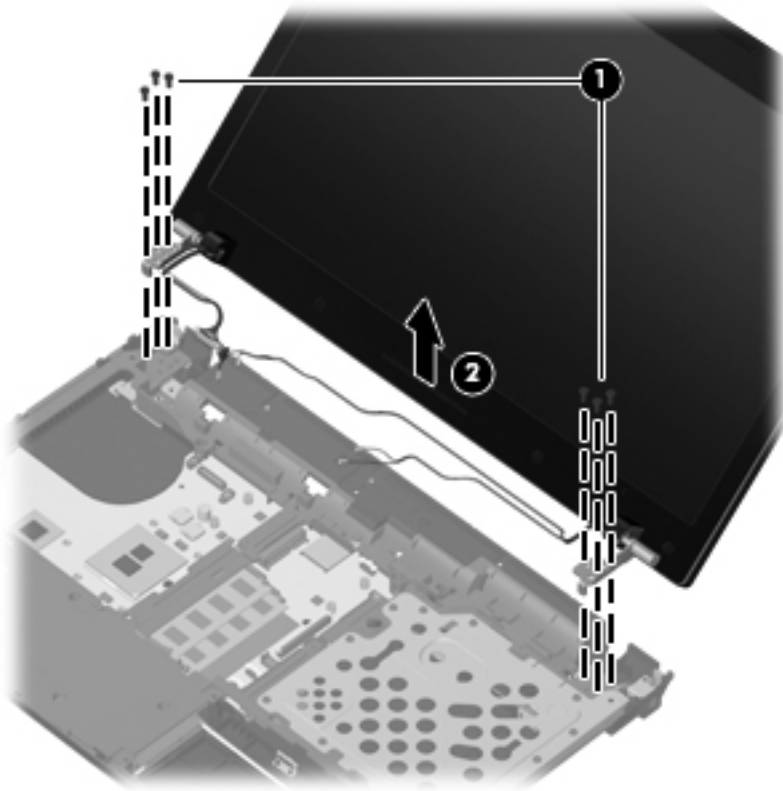
5. If it is necessary to replace the display bezel, display enclosure, or display hinges, remove the two mylar screw covers **(1)** and the 2 Torx M2.5×6.0 screws **(2)** that secure the display bezel to the display assembly. The screw covers are available in the Rubber Kit, spare part number 598678-001.
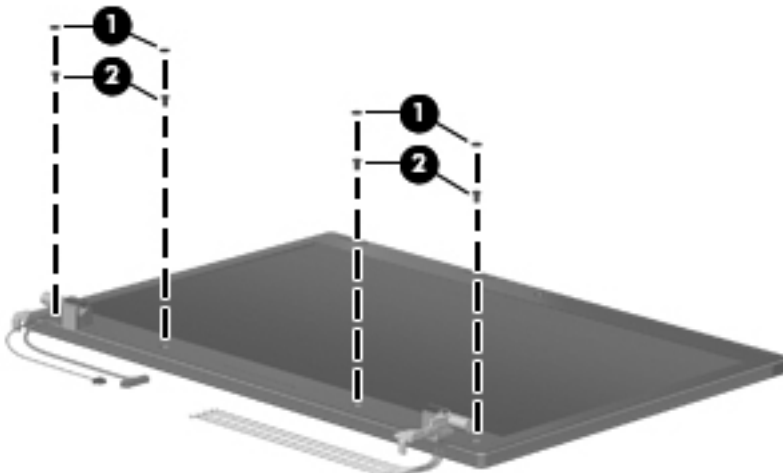
6. Flex the bottom bezel **(1)** around the hinge areas on the inside of the display enclosure and work around the periphery of the bezel **(2)** and **(3)**.

7. Lift the bezel **(4)** until it disengages completely.
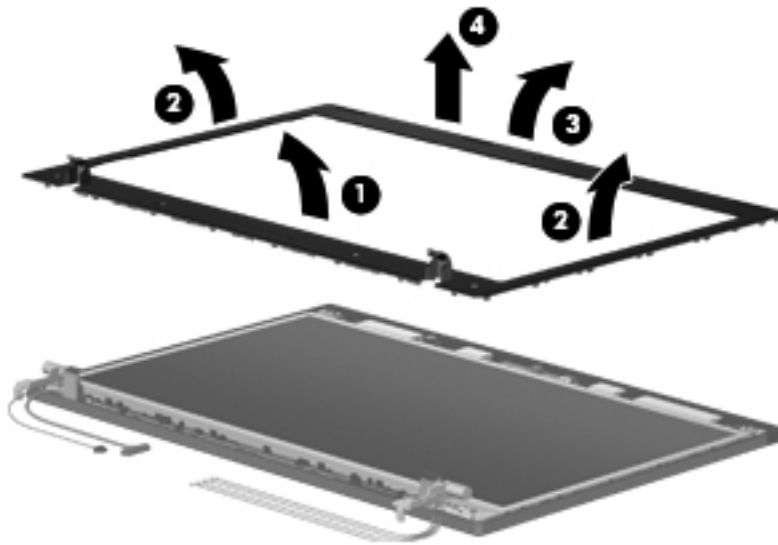
8. If it is necessary to replace the webcam module, gently pull the webcam module away from the double-sided tape on the display enclosure **(1)** and disconnect the webcam cable from the module **(2)**. The webcam module and cable can be ordered by using spare part number 598671-001.
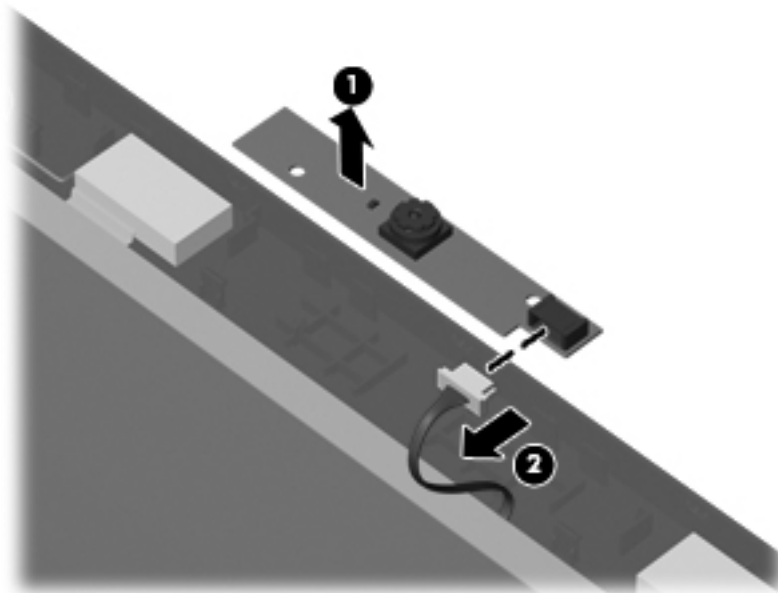
NOTE: To replace the webcam module in the display enclosure, align the holes on the webcam module with the pins on the display enclosure and press onto the double-sided tape.

9. If it is necessary to replace the display hinges, remove the six Torx M2.5×5.0 screws **(1)** that secure the hinges to the display housing.

10. Remove the display panel from the housing **(2)**.
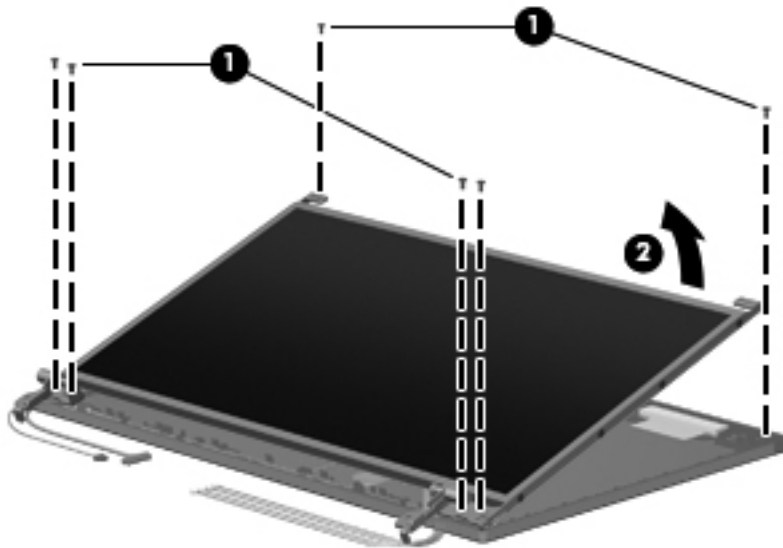
11. Remove the six Phillips PM2.0×3.0 screws **(1)** that secure the display hinges to the display panel, and then remove the display hinges **(2)**. The left and right display hinges are available in the Hinge Kit, spare part number 598679-001 for computers with 15.6-in displays.
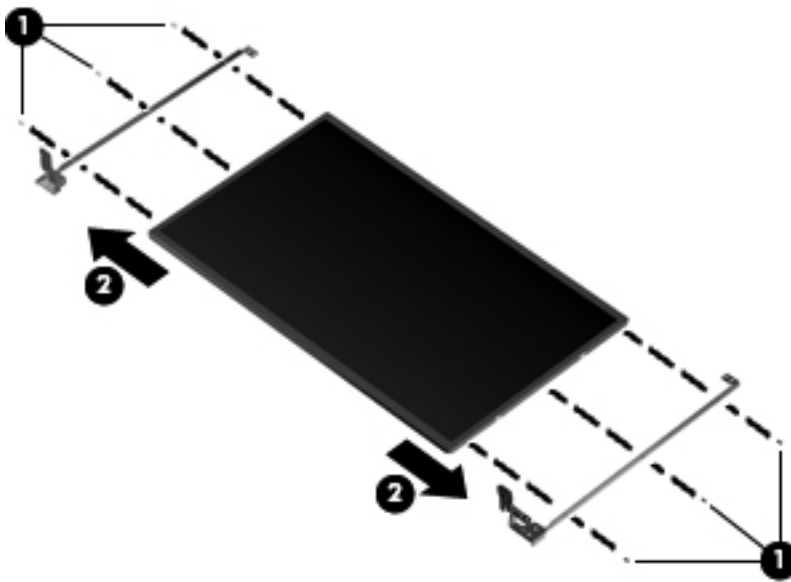
To replace the webcam, webcam cable, and display cable:

1. Remove the microphone from its socket **(1)** and lift its cable **(2)** from the raceway.

2. Remove the webcam cable **(3)** from the raceway and then, remove the cable assembly **(4)**.

📝 **NOTE:** The cables are attached to the display panel with adhesive tape.
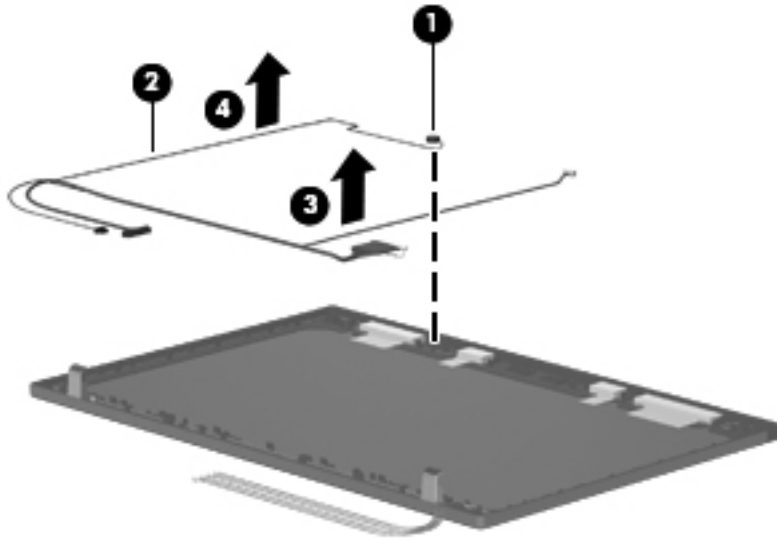
To remove the WLAN and WWAN antennas:

1. Peel the WLAN **(1)** and WWAN **(2)** antenna receivers from the housing.

2. Route the antenna cables **(3)** out of the routing channels in the inside of the display housing.
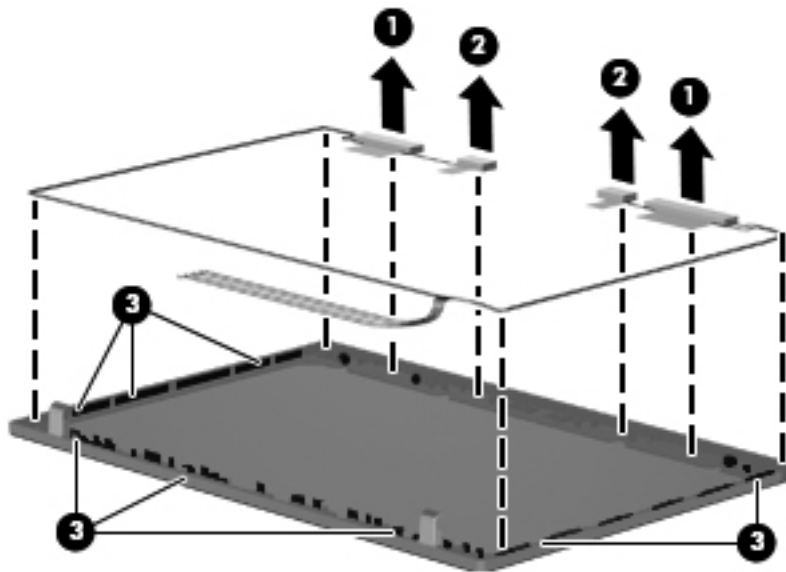
Reverse this procedure to install the display assembly.

Top cover

📝 **NOTE:** The top cover removal procedures differ for 17.3-in and 15.6-in computers.

Description	Spare part number
Top cover for use in computers with 17.3-in displays	598683-001
Top cover for use in computers with 15.6-in displays	598682-001

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).

5. Remove the switch cover and keyboard (see).

6. Remove the optical drive (see).

7. Remove the power button board cable (see).

8. Remove the speakers (see).

9. Remove the thermal shield (see).

10. Remove the display assembly (see or).

11. Remove the palm rest (see).

12. Remove the hard drive (see).

13. Remove the following components:

Remove the top cover on 17.3-in computers:

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

2. Disconnect the power button board cable from the system board by releasing the ZIF connector **(1)**, and then disconnecting the cable **(2)**.
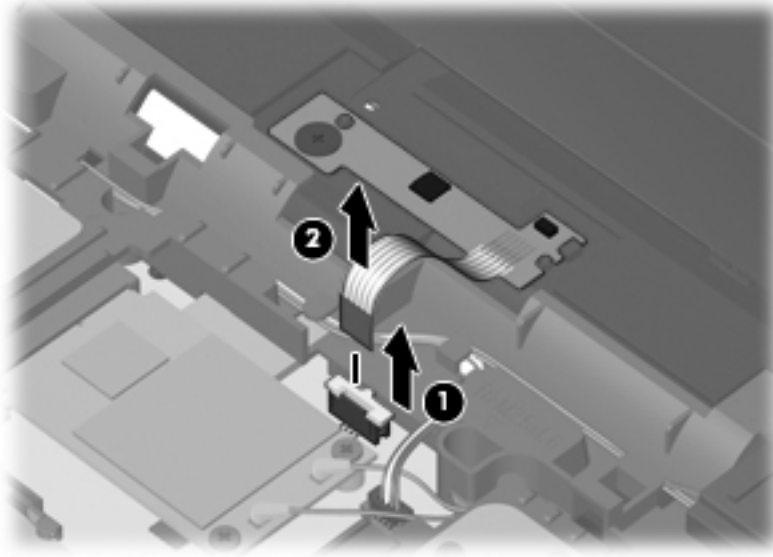
3. Remove the 17 Torx M2.5×6.0 screws that secure the top cover to the computer.
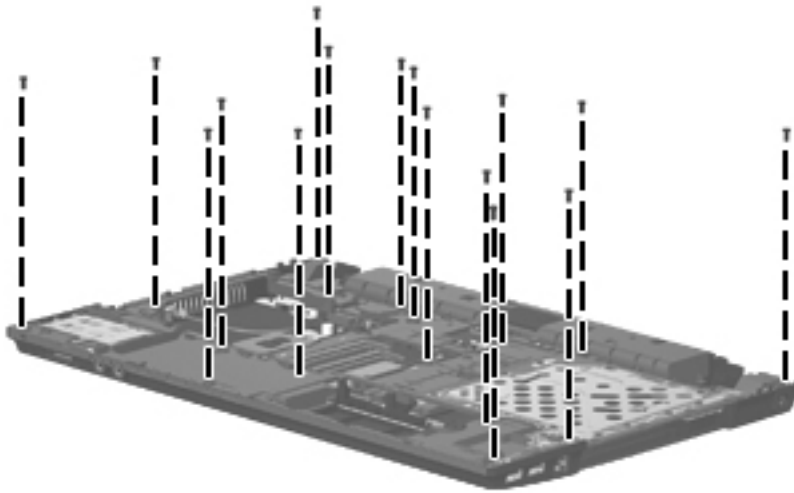
4. Remove the ExpressCard bezel **(1)**, then angle the top cover up **(2)**, and lift it up **(3)** until it disengages from the base enclosure.
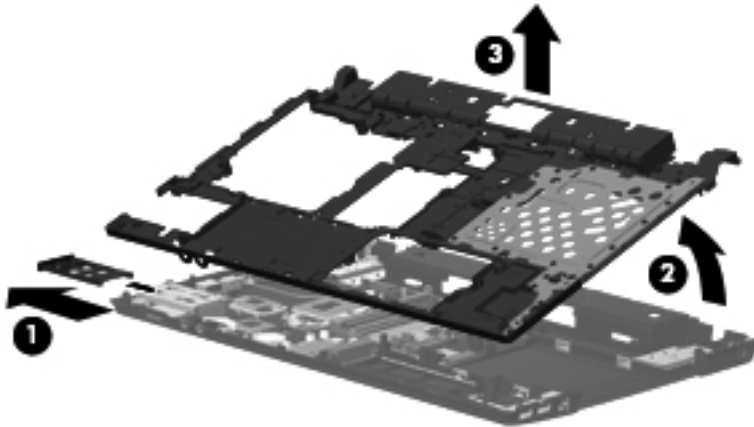
Remove the top cover on 15.6-in computers:

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

2. Disconnect the power button board cable from the system board by releasing the ZIF connector **(1)**, and then disconnecting the cable **(2)**.
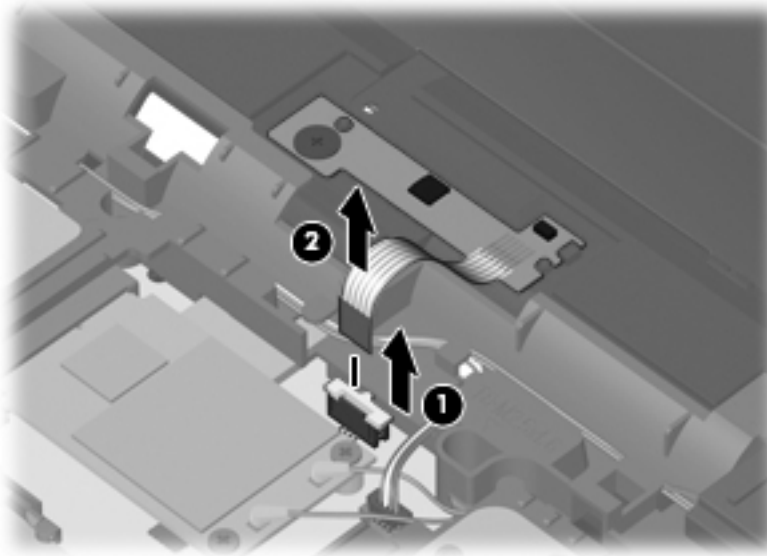
3. Remove the 10 Torx M2.5×6.0 screws that secure the top cover to the computer.
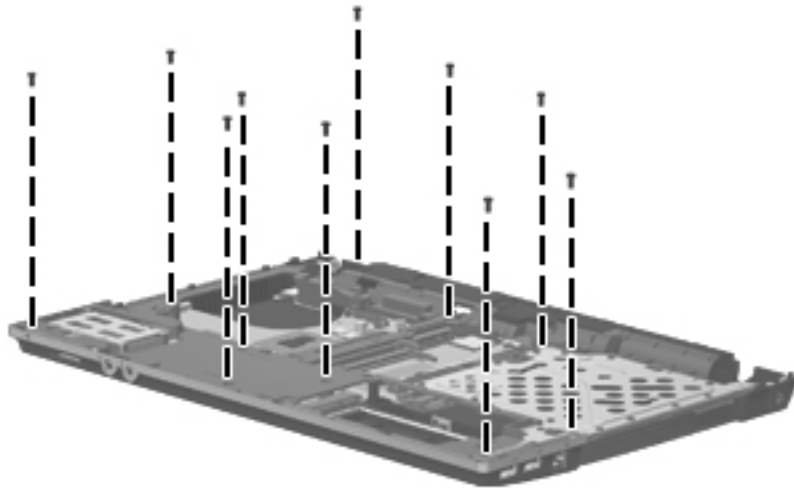
4. Remove the ExpressCard bezel **(1),** then angle the top cover up **(2)**, and lift it up **(3)** until it disengages from the base enclosure.
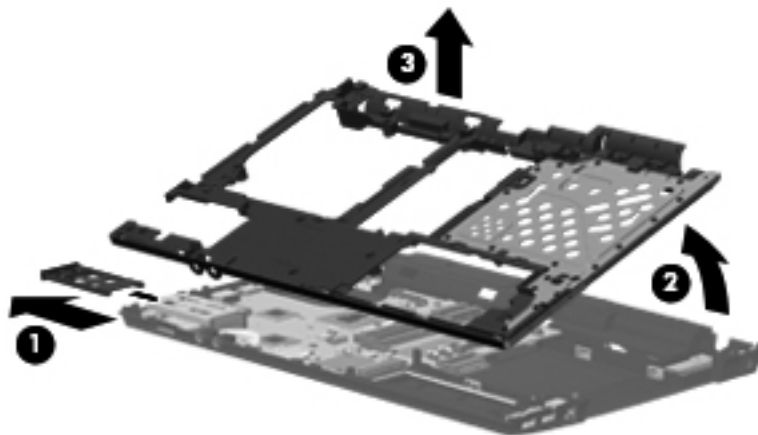
Reverse this procedure to install the top cover.

RTC battery

Description	Spare part number
RTC battery	*616073-001*

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 switch cover and keyboard (see Switch cover and keyboard on page 56).

6. Remove the optical drive (see Optical drive on page 61).

7. Remove the power button board cable (see Power button board on page 63).

8. Remove the speakers (see Speakers on page 65).

9. Remove the thermal shield (see Thermal shield on page 67).

10. Remove the display assembly (see Display assembly on computers with 17.3-in displays on page 89 or Display assembly on computers with 15.6-in displays on page 96).

11. Remove the palm rest (see Palm rest on page 84).

12. Remove the hard drive (see Hard drive on page 87).

13. Remove the top cover (see Top cover on page 103).

Remove the RTC battery:

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

2. Release the RTC battery from the socket **(1)** on the system board and lift the battery **(2)** up.
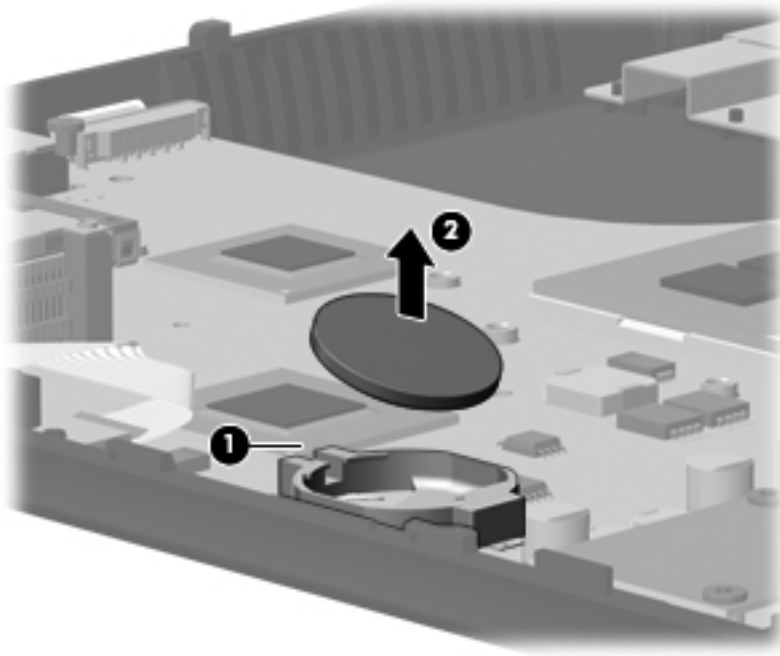
Reverse this procedure to install the RTC battery.

Bluetooth module

NOTE: The Bluetooth module spare part kit does not include a Bluetooth module cable. The Bluetooth module cable is included in the Cable Kit, spare part number 599807-001. See Cable Kits on page 33 for more Cable Kit spare part number information.

Description	Spare part number
HP Integrated Bluetooth 2.1 module for use in all countries and regions except Japan and Asia Pacific countries and regions	537921-001

Before removing the Bluetooth 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 switch cover and keyboard (see Switch cover and keyboard on page 56).

6. Remove the optical drive (see Optical drive on page 61).

7. Remove the power button board cable (see Power button board on page 63).

8. Remove the speakers (see Speakers on page 65).

9. Remove the thermal shield (see Thermal shield on page 67).

10. Remove the display assembly (see Display assembly on computers with 17.3-in displays on page 89 or Display assembly on computers with 15.6-in displays on page 96).

11. Remove the palm rest (see Palm rest on page 84).

12. Remove the hard drive (see Hard drive on page 87).

13. Remove the top cover (see Top cover on page 103).

Remove the Bluetooth module:

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

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

3. Remove the Bluetooth antenna **(3)** from the base enclosure.
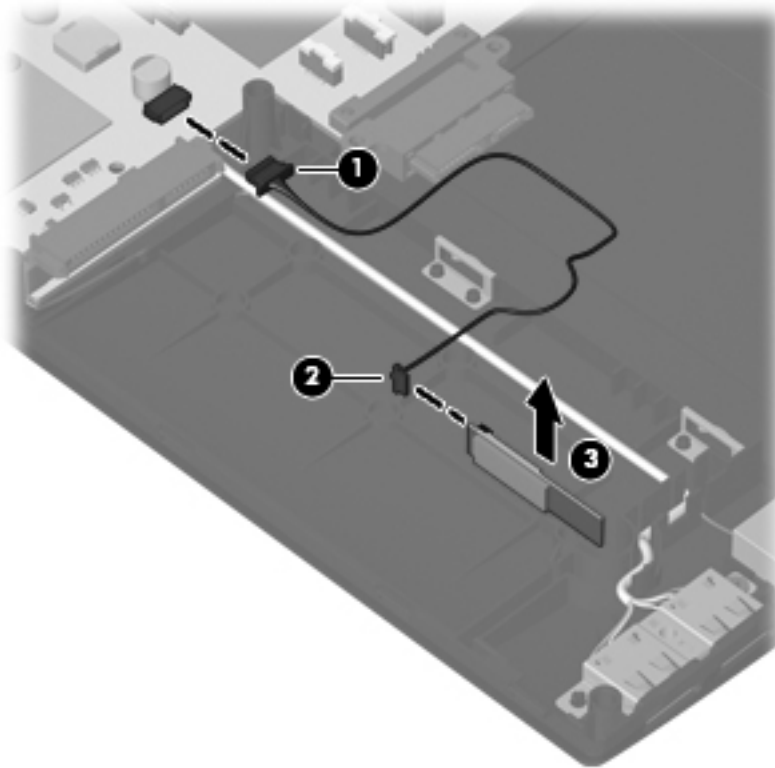
Reverse this procedure to install the Bluetooth module.

Modem module

Description	Spare part number
For use in all countries and regions except Australia and New Zealand	510100-001
For use only in Australia and New Zealand	510100-011

Before removing the modem 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 switch cover and keyboard (see Switch cover and keyboard on page 56).

6. Remove the optical drive (see Optical drive on page 61).

7. Remove the power button board cable (see Power button board on page 63).

8. Remove the speakers (see Speakers on page 65).

9. Remove the thermal shield (see Thermal shield on page 67).

10. Remove the display assembly (see Display assembly on computers with 17.3-in displays on page 89 or Display assembly on computers with 15.6-in displays on page 96).

11. Remove the palm rest (see Palm rest on page 84).

12. Remove the hard drive (see Hard drive on page 87).

13. Remove the top cover (see Top cover on page 103).

Remove the modem module:

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

2. Remove the two Phillips PM2.5×3.0 screws **(1)** that secure the modem module to the system board.

3. Lift the modem module **(2)** straight up from the system board.

4. Disconnect the modem module cable **(3)**. The modem module cable is spared in the Cable kit spare part number 599807-001.
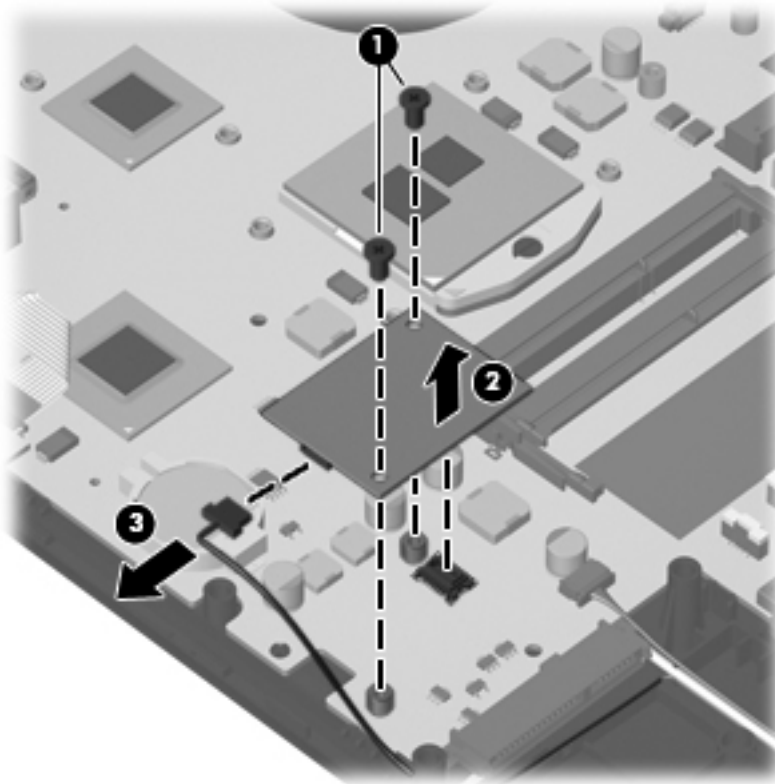
5. Remove the modem module.

Reverse this procedure to install the modem module.

Audio board
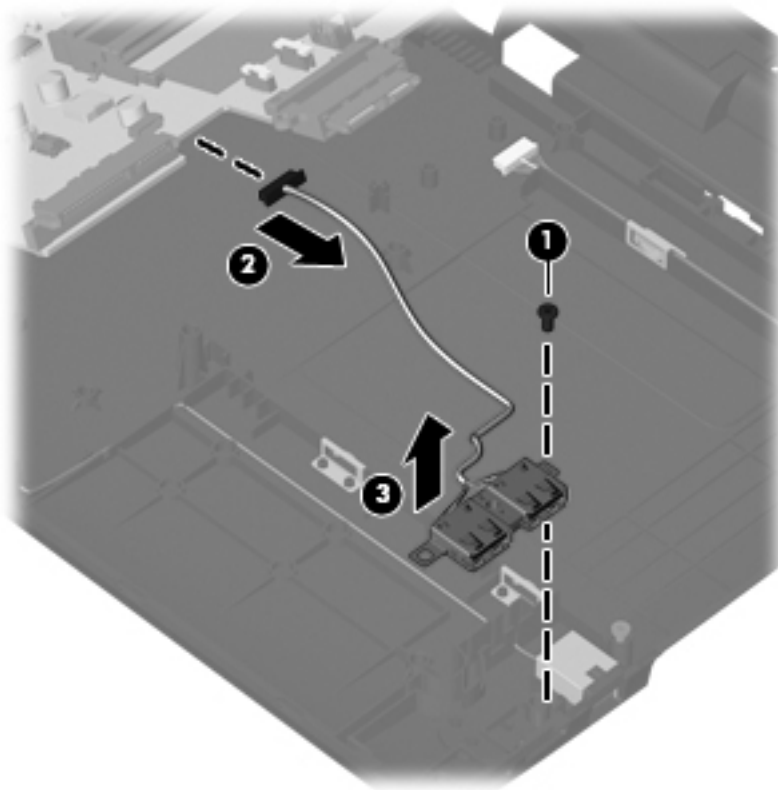
NOTE: The spare part number for the audio board is 598684-001.

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 switch cover and keyboard (see Switch cover and keyboard on page 56).

6. Remove the optical drive (see Optical drive on page 61).

7. Remove the power button board cable (see Power button board on page 63).

8. Remove the speakers (see Speakers on page 65).

9. Remove the thermal shield (see Thermal shield on page 67).

10. Remove the display assembly (see Display assembly on computers with 17.3-in displays on page 89 or Display assembly on computers with 15.6-in displays on page 96).

11. Remove the palm rest (see Palm rest on page 84).

12. Remove the hard drive (see Hard drive on page 87).

13. Remove the top cover (see Top cover on page 103).

Remove the audio board:

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

2. Remove the M2.5×3.0 screw **(1)** that secures the audio board to the system board.

3. Release the ZIF connector **(2)** and remove the cable **(3)**.

4. Remove the audio board **(4)** by pulling the module straight up and off the computer.
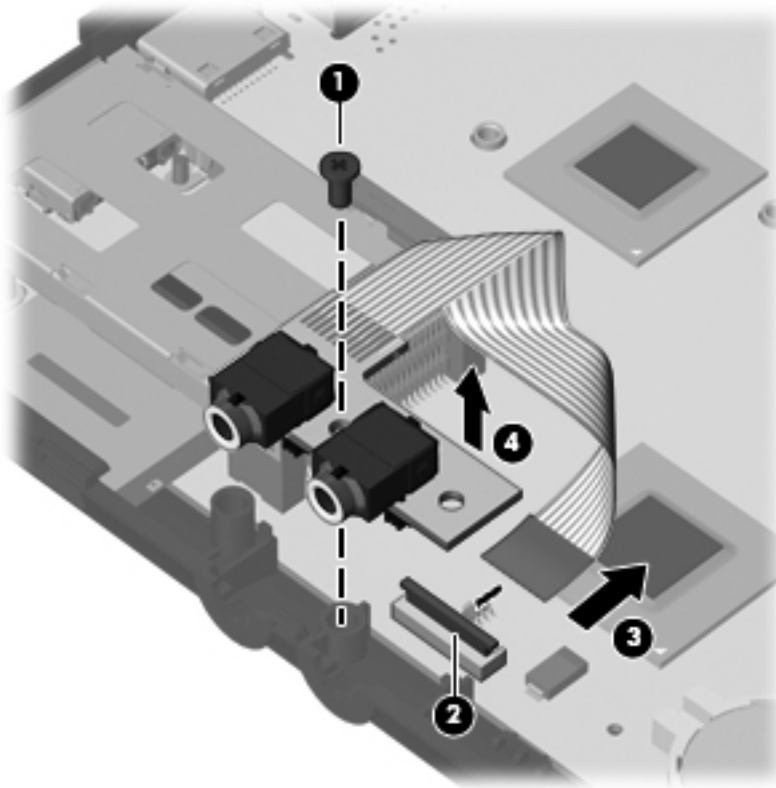
Reverse this procedure to install the audio board.

System board

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

| Description	Spare part number
System board with UMA graphics and RTC battery	598667-001
System board with UMA graphics, WWAN capability, and RTC battery	598669-001
System board with discrete graphics and RTC battery	598668-001
System board with discrete graphics, WWAN capability, and RTC battery for use in 4720s models	598670-001
System board with UMA graphics and RTC battery for use only in the People's Republic of China and Russia	605168-001
System board with UMA graphics, WWAN capability, and RTC battery for use only in the People's Republic of China and Russia	605170-001
System board with discrete graphics and RTC battery for use only in the People's Republic of China and Russia	605169-001
System board with discrete graphics, WWAN capability, and RTC battery for use only in the People's Republic of China and Russia	605171-001
System board with ATI Mobility Radeon HD 5470 graphics for use in 4720s models	*628794-001*
System board with ATI Mobility Radeon HD 5470 graphics for use in 4520s models	*628795-001*

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 switch cover and keyboard (see Switch cover and keyboard on page 56).

6. Remove the optical drive (see Optical drive on page 61).

7. Remove the power button board cable (see Power button board on page 63).

8. Remove the speakers (see Speakers on page 65).

9. Remove the thermal shield (see Thermal shield on page 67).

10. Remove the display assembly (see Display assembly on computers with 17.3-in displays on page 89 or Display assembly on computers with 15.6-in displays on page 96).

11. Remove the palm rest (see Palm rest on page 84).

12. Remove the hard drive (see Hard drive on page 87).

13. Remove the top cover (see Top cover on page 103).

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

- Memory module (see Memory module on page 60)

- WLAN module (see WLAN module on page 70)

- WWAN module (see WWAN module on page 76)

- Modem module (see Modem module on page 110)

- Processor (see Processor on page 83)

- Audio board (see Audio board on page 112)

Remove the system board:

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

2. Remove the M2.0x3.0 screw on the left of the system board **(1)**.

3. If this is a 17.3-in computer, remove the single M2.0 x 3.0 screw **(2)** that secures the optical drive connector to the base.

NOTE: The 15.6-in computer does not use a separate optical drive connector.

4. Lift the board at an angle **(3)** and remove the optical drive extender **(4)**.

5. Slide the board partially out of the base pan **(5)**.
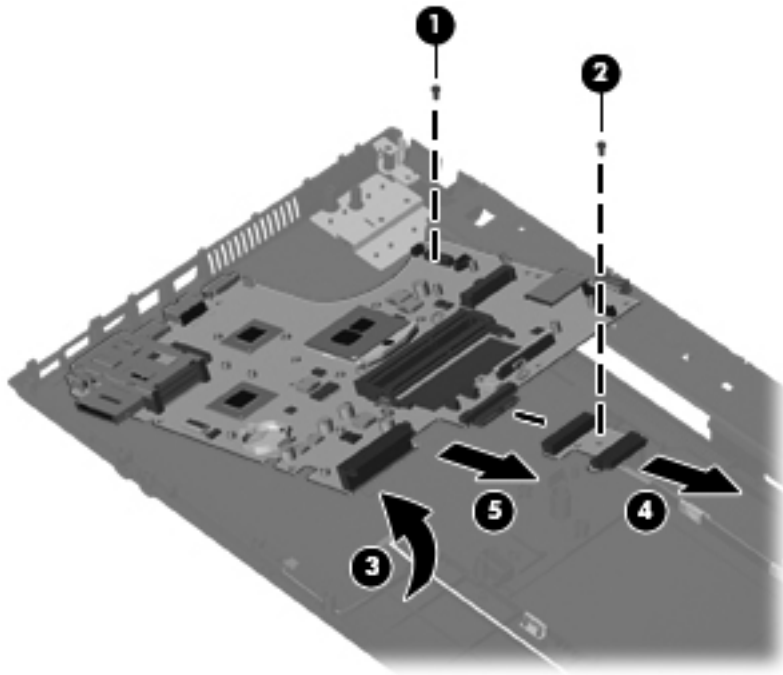
6. Disconnect the power cable **(1)** from the system board and the connector **(2)** from the computer.
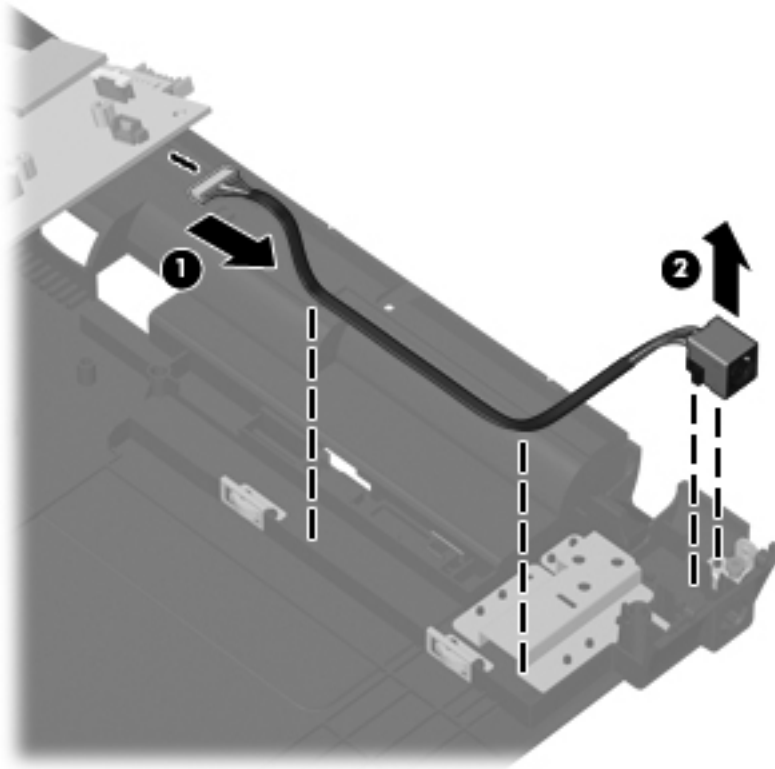
7. Disconnect the RJ11 cable **(1)** from the system board and the connector **(2)** from the computer.
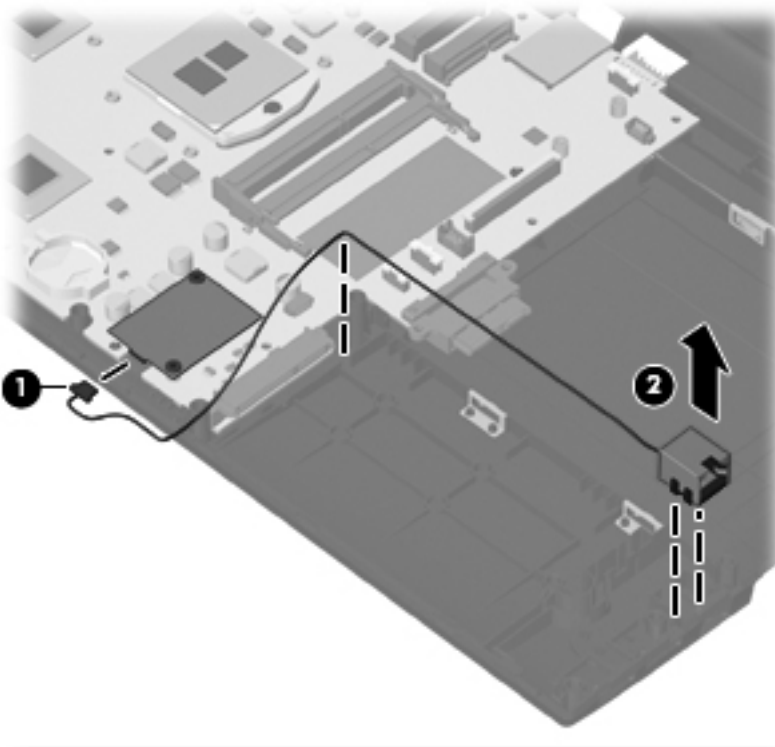
8. Remove the screw **(1)** that secures the USB to the computer, disconnect the cable **(2)** from the system board and then, remove the device **(3)** from the computer.
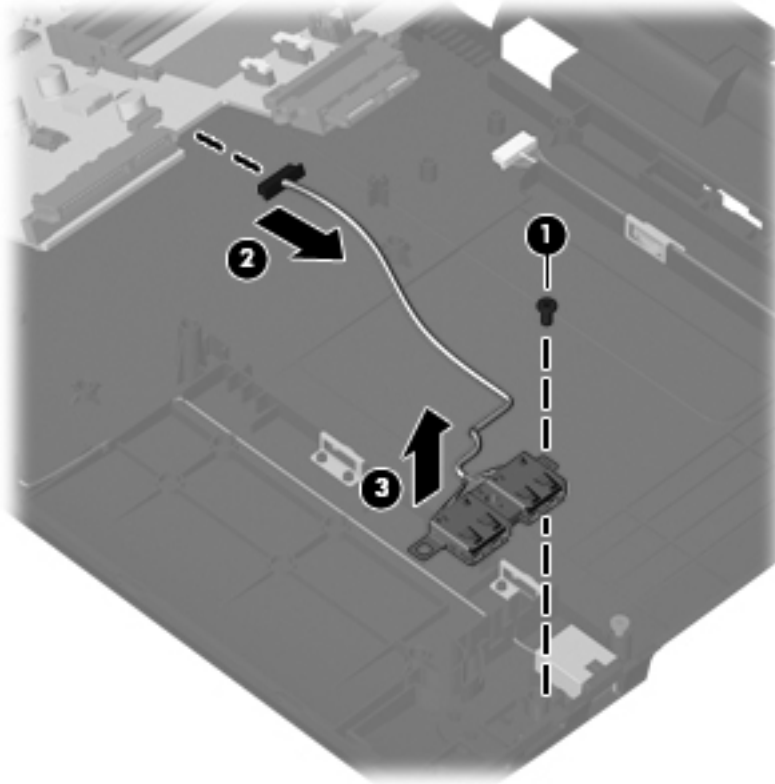
Reverse this procedure to install the system board.

USB connector assembly

NOTE: The USB connector assembly is included in the Cable Kit, spare part number 603188-001 for computers with 17.3-in displays and in 599807-001 for computers with 15.6-in displays.

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 switch cover and keyboard (see Switch cover and keyboard on page 56).

6. Remove the optical drive (see Optical drive on page 61).

7. Remove the power button board cable (see Power button board on page 63).

8. Remove the speakers (see Speakers on page 65).

9. Remove the thermal shield (see <u>Thermal shield on page 67</u>).

10. Remove the display assembly (see <u>Display assembly on computers with 17.3-in displays on page 89</u> or <u>Display assembly on computers with 15.6-in displays on page 96</u>).

11. Remove the palm rest (see <u>Palm rest on page 84</u>).

12. Remove the hard drive (see <u>Hard drive on page 87</u>).

13. Remove the top cover (see <u>Top cover on page 103</u>).

Remove the USB connector assembly:

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

2. Remove the Phillips PM2.5×3.0 screw **(1)** that secures the USB connector assembly to the base enclosure.

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

4. Remove the USB connector assembly **(3)** from the base enclosure.

Reverse this procedure to install the USB connector assembly.

RJ-11 connector assembly

📝 **NOTE:** The RJ-11 connector assembly is included in the Base Cable Kit, spare part number 603188-001 for 17.3-in computers and 599807-001 for 15.6-in computers.

Before removing the RJ-11 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 switch cover and keyboard (see Switch cover and keyboard on page 56).

6. Remove the optical drive (see Optical drive on page 61).

7. Remove the power button board cable (see Power button board on page 63).

8. Remove the speakers (see Speakers on page 65).

9. Remove the thermal shield (see Thermal shield on page 67).

10. Remove the display assembly (see Display assembly on computers with 17.3-in displays on page 89 or Display assembly on computers with 15.6-in displays on page 96).

11. Remove the palm rest (see Palm rest on page 84).

12. Remove the hard drive (see Hard drive on page 87).

13. Remove the top cover (see Top cover on page 103).

Remove the RJ-11 connector assembly:

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

2. Disconnect the cable from the system board **(1)** and remove the cable from the routing channel in the base enclosure.

3. Lift the R-11 connector **(2)** from its holder and out of the base enclosure.
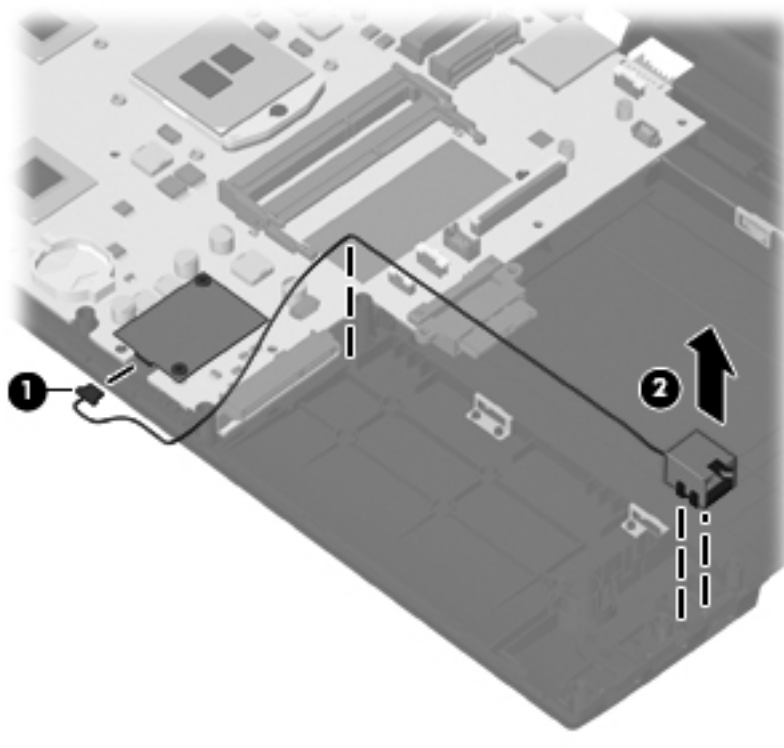
Reverse this procedure to install the RJ-11 connector assembly.

Power connector assembly

📝 **NOTE:** The power connector assembly is included in the Base Cable Kit, spare part number 603188-0001 for computers with 17.3-in displays and 599807-001 for computers with 15.6-in displays.

Before removing the power 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. Switch cover and keyboard (see Switch cover and keyboard on page 56)

    b. Optical drive (see Optical drive on page 61)

    c. Power button board cable (see Power button board on page 63)

    d. Speakers (see Speakers on page 65)

e. Thermal shield (see Thermal shield on page 67)

f. Display assembly (see Display assembly on computers with 17.3-in displays on page 89 or Display assembly on computers with 15.6-in displays on page 96)

g. Palm rest (see Palm rest on page 84)

h. Hard drive (see Hard drive on page 87)

i. Top cover (see Top cover on page 103)

Remove the power connector assembly:

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

2. Disconnect the cable from the system board **(1)** and remove the tape and cable from the routing channel in the base enclosure.

3. Lift the power connector **(2)** from the base enclosure.
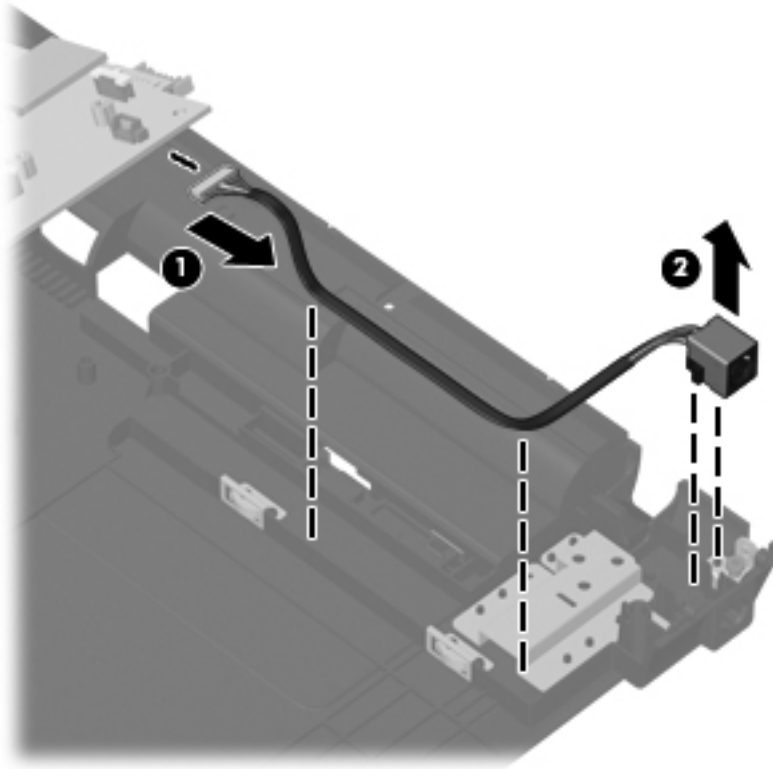
Reverse this procedure to install the power connector.

5 Computer Setup

Computer Setup

Starting Computer Setup

Computer Setup is a preinstalled, ROM-based utility that can be used even when the operating system is not working or will not load.

NOTE: Some of the Computer Setup menu items listed in this guide may not be supported by your computer or your operating system.

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 BIOS Setup.

Using Computer Setup

Navigating and selecting in Computer Setup

The information and settings in Computer Setup are accessed from the File, Security, and System Configuration menus.

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 BIOS Setup.

3. Select the **File**, **Security**, or **System Configuration** menu.

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 BIOS 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.

Computer Setup menus

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

> **NOTE:** Some of the Computer Setup menu items listed in this chapter may not be supported by your computer or your operating system.

File menu

Select	To do this
System Information	• View identification information for the computer and the batteries in the system. • View specification information for the processor, cache and memory size, system ROM, video revision, and keyboard controller version.
Set System Date and Time	Set or change the date and time on the computer.

System Diagnostics	Displays the following information:
	
	• System information
	
	  ◦ Identification information for the computer and the batteries in the system.
	
	  ◦ Specification information for the processor, cache and memory size, system ROM, video revision, and keyboard controller version.
	
	• Start-up Test—Verifies the system components needed for starting the computer.
	
	• Run-in Test—Runs a comprehensive check on system memory.
	
	• Hard Disk Test—Runs a comprehensive self-test on any hard drive in the system.
	
	• Memory Test—Runs a comprehensive test on any memory installed in the computer.
	
	• Battery Test—Runs a comprehensive test on any batteries installed in the computer.
	
	Error Log—Displays a log file if any errors have occurred.

Restore Defaults	Replace the configuration settings in Computer Setup with the original factory settings. (Hard drive mode, password settings, and security settings are not changed when you restore the factory settings.)
Reset BIOS security to factory default	Restore the BIOS security settings to the factory default.

Select	To do this
Ignore Changes and Exit	Cancel any changes entered during the current session. Then exit and restart the computer.
Save Changes and Exit	Save any changes entered during the current session. Then exit and restart the computer. Your changes go into effect when the computer restarts.

Security menu

📝 **NOTE:** Some of the menu items listed in this section may not be supported by your computer or your operating system.

Select	To do this
Setup BIOS Administrator Password	Set up a BIOS administrator password.
User Management > Create a New BIOS User Account (requires a BIOS administrator password)	• Select from a list of BIOS users. • Select from a list of ProtectTools users.
Password Policy (requires a BIOS administrator password)	Revise password policy criteria.
HP SpareKey	Enable/disable HP SpareKey (disabled by default).
Fingerprint Reset on Reboot (If Present)	Reset/clear the fingerprint reader ownership (select models only; disabled by default).
Change Password	Enter, change, or delete a BIOS administrator password.
HP SpareKey Enrollment	Enroll or reset HP SpareKey, which is a set of security questions and answers used if you forget your password.
Anti Theft > AT-p (select models only)	Enable/disable Anti-theft Protection.
DriveLock Password	• Enable/disable DriveLock on any computer hard drive (enabled by default). • Change a DriveLock user password or master password. **NOTE:** DriveLock settings are accessible only when you enter Computer Setup by turning on (not restarting) the computer.
Automatic DriveLock	Enable/disable Automatic DriveLock support (disabled by default).
Disk Sanitizer	Run Disk Sanitizer to destroy all existing data on the primary hard drive or the drive in the upgrade bay. **CAUTION:** If you run Disk Sanitizer, the data on the selected drive is destroyed permanently.
System IDs	Enter a user-defined computer asset tracking number and ownership tag.

System Configuration menu

NOTE: Some of the listed System Configuration options may not be supported by your computer or your operating system.

Select	To do this
Language	Change the Computer Setup language.
Boot Options	- Set a startup menu delay (in seconds). - Set the MultiBoot Express Boot Popup delay in seconds. - Enable/disable custom logo (disabled by default). - Enable/disable display diagnostic URL (enabled by default). - Enable/disable CD-ROM boot (enabled by default). - Enable/disable SD card boot (enabled by default). - Enable/disable floppy boot (enabled by default). - Enable/disable PXE internal NIC boot (enabled by default). - Enable/Disable Unified Extensible Firmware Interface (UEFI) Boot Mode (disabled by default). - Set the legacy boot order.

Select	To do this

Device Configurations	• Enable/disable USB legacy support (enabled by default). When enabled, USB legacy support allows the following:
	
	  ◦ Use of a USB keyboard in Computer Setup even when a Windows operating system is not running.
	
	  ◦ Startup from bootable USB devices, including a hard drive, diskette drive, or optical drive connected by a USB port to the computer.
	
	• Select a parallel port mode: ECP (Enhanced Capabilities Port), standard, bidirectional, or EPP (Enhanced Parallel Port).
	
	• Enable/disable fan always on while connected to an AC outlet (enabled by default).
	
	• Enable/disable Data Execution Prevention (select models only). When enabled, the processor can disable some virus code execution, which helps to improve computer security (enabled by default).
	
	• Select a SATA (Serial Advanced Technology Attachment) device mode. The following options are available:
	
	  ◦ AHCI (Advanced Host Controller Interface)
	
	  ◦ IDE (Integrated Drive Electronics)
	
	  ◦ RAID (Redundant Array of Independent Disks) (select models only)

Select	To do this
	NOTE: Availability of these options above varies by computer model.
	• Enable/disable secondary battery fast charge (enabled by default).
	• Enable/disable HP QuickLook 2 (enabled by default).
	• Enable/disable preboot authentication on HP QuickLock boot (enabled by default).
	• Enable/disable HP QuickWeb (enabled by default).
	• Enable/disable HP QuickWeb write protect (disabled by default).
	• Enable/disable virtualization technology (select models only; disabled by default).
	• Enable/disable Intel TXT (Trust Execution Technology) (select models only; disabled by default).
	• Enable/disable Multi Core CPU (enabled by default).
	• Enable/disable Intel HT technology (enabled by default).
	• Enable/disable wake on USB (enabled by default).
	• Enable/disable Num lock state at boot (disabled by default).

Select	To do this
Built-In Device Options	• Enable/disable the wireless button state (enabled by default).
	• Enable/disable embedded WWAN device (select models only; enabled by default).
	• Enable/disable embedded WLAN device (enabled by default).
	• Enable/disable embedded Bluetooth device (enabled by default).
	• Enable/disable the network interface controller (LAN) (enabled by default).
	• Enable/disable LAN/WLAN switching (disabled by default).
	• Set the wake on LAN state. Options include the following:
	◦ Disabled
	◦ Boot to Network (default setting)
	◦ Follow Boot Order
	• Enable/disable the ambient light sensor (enabled by default).
	• Enable/disable the notebook upgrade bay device (enabled by default).
	• Enable/disable the fingerprint device (enabled by default).
	• Enable/disable the integrated camera (enabled by default).
	• Enable/disable the power monitor circuit (enabled by default).
	• Enable/disable the audio device (enabled by default).
	• Enable/disable a modem device (enabled by default).
	• Enable/disable the microphone (enabled by default).
	• Enable/disable the internal speakers (enabled by default).

Select	To do this
Port Options	**NOTE:** All port options are enabled by default.
	• Enable/disable the serial port (select models only).
	• Enable/disable the parallel port (select models only).
	• Enable/disable the flash media reader.
	• Enable/disable the USB port.
	CAUTION: Disabling the USB port also disables MultiBay devices and ExpressCard devices on the advanced port replicator.
	• Enable/disable the 1394 port (select models only).
	• Enable/disable the ExpressCard slot (select models only).
	• Enable/disable the eSATA port (select models only).
AMT Options (select models only)	**NOTE:** All AMT options are disabled by default.
	• Enable/disable firmware verbosity.
	• Enable/disable AMT setup prompt (Ctrl-P)
	• Enable/disable USB key provisioning support.
	• Enable/disable unconfigure AMT on next boot.
	• Select terminal emulation mode. Options include the following:
	◦ ANSI (default setting)
	◦ VT100
	• Enable/disable firmware progress event support.
	• Enable/disable initiate Intel CIRA.
Set Security Level	Change, view, or hide security levels for all BIOS menu items.
Restore Security Defaults	Restore the default security settings.

6   Specifications

Computer specifications

	Metric	U.S.
Dimensions – 15.6-in		
Depth	**24.96 cm**	9.83 in
Width	**37.18 cm**	14.6 in
Height (front to rear)	**2.77 to 3.55 cm**	1.09 to 1.40 in
Dimensions – 17.3-in		
Depth	**26.64 cm**	10.49 in
Width	**41.60 cm**	16.17 in
Height (front to rear)	**2.82 to 3.60 cm**	1.11 to 1.48 in
Weight – 15.6-in (equipped with optical drive, WXGA display assembly, 1 memory module, hard drive, and 6-cell battery)	**< 2.5 kg**	< 5.5 lbs
Weight – 17.3-in (equipped with optical drive, WXGA display assembly, 1 memory module, hard drive, and 6-cell battery)	**< 3.1kg**	< 6.8 lbs
Input power		
Operating voltage	18.5 V dc @ 4.74 A – 90 W	
Operating current	4.74 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)		

	Metric	U.S.
Operating	**-15 m to 3,048 m**	-50 ft to 10,000 ft
Nonoperating	**-15 m to 12,192 m**	-50 ft to 40,000 ft
Shock		
Operating	125 g, 2 ms, half-sine	
Nonoperating	200 g, 2 ms, half-sine	
Random vibration		
Operating	0.75 g zero-to-peak, 10 Hz to 500 Hz, 0.25 oct/min sweep rate	
Nonoperating	1.50 g zero-to-peak, 10 Hz to 500 Hz, 0.5 oct/min sweep rate	

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

17.3-in display specifications

	Metric	U.S.
Dimensions		
Height	**23.334 cm**	9.2 in
Width	**39.86 cm**	15.7 in
Diagonal	**43.94 cm**	17.3 in
Number of colors	Up to 16.8 million	
Contrast ratio	500:1 (typical BrightView), 300:1 (typical AntiGlare)	
Brightness	200 nits (typical)	
Pixel resolution		
Format	1600 × 900	
Configuration	RGB	
Backlight	LED	
Response Time	16 ms	
Total power consumption	5.3 W (max)	
Viewing angle @CR>10	5 VA	

15.6-in display specifications

	Metric	U.S.
Dimensions		
Height	**21.0 cm**	8.3 in
Width	**35.98 cm**	14.2 in
Diagonal	**39.1 cm**	15.6 in
Number of colors	Up to 16.8 million	
Contrast ratio	500:1 (min BrightView), 300:1 (min AntiGlare))	
Brightness	200 nits (typical)	
Pixel resolution		
Format	1366 × 768	
Configuration	RGB	
Backlight	LED	
Response Time	8 ms (typ)	
Total power consumption	4.1 W (max)	
Viewing angle @ CR>10	SVA	

Hard drive specifications

	750-GB*	640-GB*	500-GB*	320-GB*	250-GB*
Dimensions					
Height	**9.5 mm**	**9.5 mm**	**9.5 mm**	**9.5 mm**	**9.5 mm**
Width	**70 mm**	**70 mm**	**70 mm**	**70 mm**	**70 mm**
Weight	**101 g**	**101 g**	**101 g**	**101 g**	**101 g**
Interface type	SATA	SATA	SATA	SATA	SATA
Transfer rate	100 MB/sec	100 MB/sec	100 MB/sec	100 MB/sec	100 MB/sec
Security	ATA security	ATA security	ATA security	ATA security	ATA security
Seek times (typical read, including setting)					
Single track	2 ms	2 ms	3 ms	3 ms	3 ms
Average	12 ms	12 ms	13 ms	13 ms	13 ms
Maximum	22 ms	22 ms	24 ms	24 ms	24 ms
Logical blocks	1,465,452,806	1,250,263,728	1,048,576,000	625,141,400	488,376,280
Disc rotational speed	5400 rpm	5400 rpm	5400 rpm	5400 rpm	7200 rpm
Operating temperature	**5°C to 55°C** (41°F to 131°F)	**5°C to 55°C** (41°F to 131°F)	**5°C to 55°C** (41°F to 131°F)	**5°C to 55°C** (41°F to 131°F)	**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-ROM Drive specifications

Applicable disc	DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18, CD-ROM (Mode 1 and 2), CD Digital Audio, CD-XA ready (Mode 2, Form 1 and Form 2), CD-I (Mode 2, Form 1 and Form 2), CD-R, CD-RW, Photo CD (single and multisession), CD-Bridge	
Access time	**CD**	**DVD**
Random	< 100 ms	< 125 ms
Cache buffer	512 KB	
Data transfer rate		
CD-R (24X)	3600 KB/s (150 KB/s at 1X CD rate)	
CD-RW (10X)	1500 KB/s (150 KB/s at 1X CD rate)	
CD-ROM (24X)	3600 KB/s (150 KB/s at 1X CD rate)	
DVD (8X)	10,800 KB/s (1,352 KB/s at 1X DVD rate)	
Multiword DMA mode 2	16.6 MB/s	

DVD±RW Double-Layer 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
Access time	**CD**	**DVD**
Random	< 175 ms	< 230 ms
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	

Blu-ray Disc ROM Drive with SuperMulti DVD±R/RW Double-Layer 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, HD-ROM (Single Layer), HD-ROM (Dual Layer), HD DVD-R, HD DVD-R for Dual Layer, HD DVD-RW, BD-ROM, BD-R, BR-RE	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-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
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

7 Backup and recovery

Backup and recovery in Windows 7

Overview

To protect your information, use the Backup and Restore Center to back up individual files and folders, back up your entire hard drive (select models only), or create system restore points. In case of system failure, you can use the backup files to restore the contents of your computer.

The Backup and Restore Center provides the following options:

- Creating a system repair disc (select models only)
- Backing up individual files and folders
- Backing up 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.

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

Backing up your information

Recovery after a system failure is as complete as your most current backup. You should create system repair discs (select models only) and your initial backup immediately after software 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 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 folder, 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 screen shot:

  1. Display the screen you want to save.

  2. Copy the screen image:

     To copy only the active window, press alt+fn+prt sc.

     To copy the entire screen, press fn+prt sc.

  3. Open a word-processing document, and then select **Edit > Paste**.

     The screen image is added to the document.

  4. Save the document.

- 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 installed in your computer.

  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 optical drive of the computer.

To create a backup using Backup and Restore Center, follow these steps:

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).

   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.

Performing a recovery

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

- Windows recovery tools: You can use the Backup and Restore Center 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, refer to the "Using a Windows 7 operating system DVD (purchased separately)" section in this guide.

Using the Windows recovery tools

To recover information you previously backed up, follow these steps:

1. Click **Start > All Programs > Maintenance > Backup and Restore**.

2. Follow the on-screen instructions to recover your entire computer (select models only) or your files.

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.

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

CAUTION: Using Startup Repair 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 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 and the HP Recovery partition.

   NOTE: If the Windows partition and the HP Recovery partition have been deleted, you must recover your operating system and programs using the Windows 7 operating system DVD and the *Driver Recovery* disc (both purchased separately). For additional information, refer to the "Using a Windows 7 operating system DVD (purchased separately)" section in this guide.

3. If the Windows partition and the HP Recovery partition are listed, restart the computer, and then press f8 before the Windows operating system loads.

4. Select **Repair your computer**.

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

> △ **CAUTION:** Using f11 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, follow these steps:

1. If possible, back up all personal files.

2. If possible, check for the presence of the HP Recovery partition. To find the partition, select **Start > Computer**.

   > 📝 **NOTE:** If the HP Recovery partition has been deleted, you must recover your operating system and programs using the Windows 7 operating system DVD and the *Driver Recovery* disc (both purchased separately). For additional information, refer to the "Using a Windows 7 operating system DVD (purchased separately)" section in this guide.

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 to enter HP Recovery.

5. Follow the on-screen instructions.

Using a Windows 7 operating system DVD (purchased separately)

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. Make sure that your most recent backup (stored on discs or on an external drive) is easily accessible. To order a Windows 7 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 technical support. For contact information, refer to 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, follow these steps:

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

1. If possible, back up all personal files.

2. Restart the computer, and then insert the Windows Vista 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.

Backup and recovery in Windows Vista

Overview

To protect your information, use the Backup and Restore Center to back up individual files and folders, back up your entire hard drive (select models only), or create system restore points. In case of system failure, you can use the backup files to restore the contents of your computer.

The Backup and Restore Center provides the following options:

- Backing up individual files and folders

- Backing up the entire hard drive (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.

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

Backing up your information

Recovery after a system failure is as complete as your most current backup. You should create your initial backup immediately after software setup. As you add new software and data files, you should continue to back up your system on a regular basis to maintain a reasonably current backup.

You 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 folder, 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 screen shot:

1. Display the screen you want to save.

2. Copy the screen image:

   To copy only the active window, press alt+fn+prt sc.

   To copy the entire screen, press fn+prt sc.

3. Open a word-processing document, and then select **Edit > Paste**.

   The screen image is added to the document.

4. Save the document.

- 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 installed in your computer.

  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 optical drive of the computer.

To create a backup using Backup and Restore Center, follow these steps:

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 Center**.

2. Follow the on-screen instructions to back up your entire computer (select models only) or your files.

   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.

Performing a recovery

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

- Windows recovery tools: You can use the Backup and Restore Center 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, you must purchase a Windows Vista® operating system DVD to reboot the computer and repair the operating system. For additional information, refer to the "Using a Windows Vista operating system DVD (purchased separately)" section in this guide.

Using the Windows recovery tools

To recover information you previously backed up, follow these steps:

1. Click **Start > All Programs > Maintenance > Backup and Restore Center**.

2. Follow the on-screen instructions to recover your entire computer (select models only) or your files.

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.

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

△ CAUTION: Using Startup Repair 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 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 and the HP Recovery partition. To find the partitions, select **Start > Computer**.

    NOTE: If the Windows partition and the HP Recovery partition have been deleted, you must recover your operating system and programs using the Windows Vista operating system DVD and the *Driver Recovery* disc (both purchased separately). For additional information, refer to the "Using a Windows Vista operating system DVD (purchased separately)" section in this guide.

3. Restart the computer, and then press f8 before the Windows operating system loads.

4. Select **Repair your computer**.

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

△ CAUTION: Using f11 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, follow these steps:

1. If possible, back up all personal files.

2. If possible, check for the presence of the HP Recovery partition. To find the partition, select **Start > Computer**.

    NOTE: If the HP Recovery partition has been deleted, you must recover your operating system and programs using the Windows Vista operating system DVD and the *Driver Recovery* disc (both purchased separately). For additional information, refer to the "Using a Windows Vista operating system DVD (purchased separately)" section in this guide.

3. 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.

4. Press f11 to enter HP Recovery.

5. Follow the on-screen instructions.

Using a Windows Vista operating system DVD (purchased separately)

If you are unable to boot (start up) your computer, you must purchase a Windows Vista operating system DVD to reboot the computer and repair the operating system. Make sure that your most recent backup (stored on discs or on an external drive) is easily accessible. To order a Windows Vista 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 technical support. For contact information, refer to the *Worldwide Telephone Numbers* booklet included with the computer.

CAUTION: Using a Windows Vista 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 Vista operating system DVD, follow these steps:

NOTE: This process takes several minutes.

1. If possible, back up all personal files.

2. Restart the computer, and then insert the Windows Vista 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.

Backup and recovery in Windows XP

Overview

To protect your information, use the Windows® Backup utility (select models only) to back up files and folders or create recovery points. In case of system failure, you can use the backup files to restore your computer.

Windows provides the following options:

- Backing up individual files and folders
- Backing up all files and folders
- Scheduling automatic backups
- Creating recovery points
- Recovering information

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

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

Backing up your information

Recovery after a system failure is as complete as your most current backup. You should create your initial backup immediately after software setup. As you add new software and data files, you should continue to back up your system on a regular basis to maintain a reasonably current backup.

You can back up individual files or folders to an optional external hard drive or to a network drive.

Note the following when backing up:

- Store personal files in the My Documents folder, and back it up periodically.
- Back up templates 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 copy the screen and paste it into a word-processing document:

  a. Display the screen you want to save.

  b. Copy the screen image:

  To copy only the active window, press alt+fn+prt sc.

  To copy the entire screen, press fn+prt sc.

  c. Open a word-processing document, click **Edit > Paste**.

The screen image is added to the document.

> **d.** Save the document.

To create a backup using the Windows Backup utility (select models only), follow these steps:

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. Click **Start > All Programs > Accessories > System Tools > Backup**.

2. Follow the on-screen instructions.

Performing a recovery

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

- Windows recovery tools (select models only): You can use the Windows Backup utility to recover information you have previously backed up.

- *Operating System* and *Driver Recovery* discs (included with your computer): You can use the discs to recover your operating system and programs installed at the factory.

Recovering your information

To recover information you previously backed up, follow these steps:

1. If possible, back up all personal files.

2. Click **Start > All Programs > Accessories > System Tools > Backup**.

   The Backup or Restore Wizard opens.

3. Click **Restore files and settings**, and then click **Next**.

4. Follow the on-screen instructions.

NOTE: For additional information on initiating a recovery in Windows, perform a search for this topic in Help and Support.

Recovering the operating system and programs

CAUTION: The recovery process reformats and completely erases the hard drive. All files you have created and any software installed on the computer are permanently removed. The recovery process reinstalls the original operating system, software, and drivers. Software, drivers, and updates not installed by HP must be manually reinstalled.

To recover your operating system and programs, follow these steps:

1. If possible, back up all personal files.

2. Insert the *Operating System* disc into the optical drive.

3. Shut down the computer.

4. Turn on the computer.

5. Follow the on-screen instructions to install the operating system.

6. After the operating system is installed, remove the *Operating System* disc and insert the *Driver Recovery* disc.

7. Follow the on-screen instructions to install the drivers and programs.

8 Connector pin assignments

Audio-in (microphone)
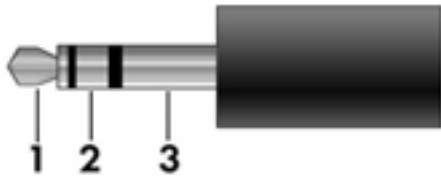
Pin	Signal
1	Audio signal in
2	Audio signal in
3	Ground

Audio-out (headphone)
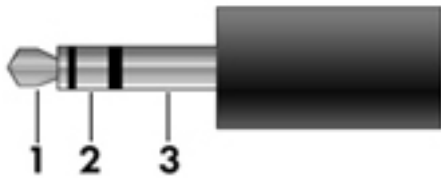
Pin	Signal
1	Audio out, left channel
2	Audio out, right channel
3	Ground

External monitor
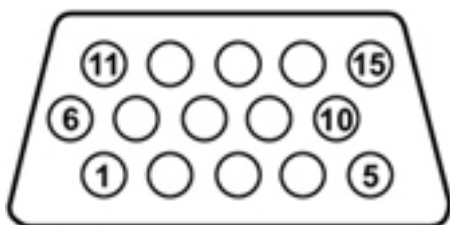
Pin	Signal
1	Red analog
2	Green analog
3	Blue analog
4	Not connected
5	Ground
6	Ground analog
7	Ground analog
8	Ground analog
9	+5 VDC
10	Ground
11	Monitor detect
12	DDC 2B data
13	Horizontal sync
14	Vertical sync
15	DDC 2B clock

HDMI
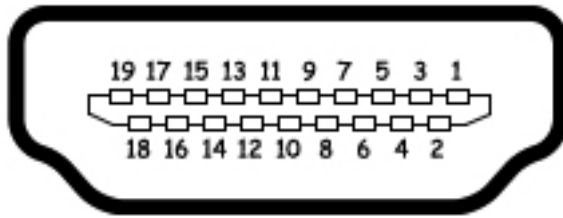
Pin	Signal
1	Transition minimized differential signal (TMDS) data 2+
2	TMDS data 2 shield
3	TMDS data 2–
4	TMDS data 1+
5	TMDS data 1 shield
6	TMDS data 1–
7	TMDS data 0+
8	TMDS data 0 shield
9	TMDS data 0–
10	TMDS clock+
11	TMDS clock shield
12	TMDS clock-
13	Consumer electronic control (CEC)
14	Not connected
15	DDC clock
16	DDC data
17	Ground
18	+5V power
19	Hot plug detect

RJ-11 (modem)
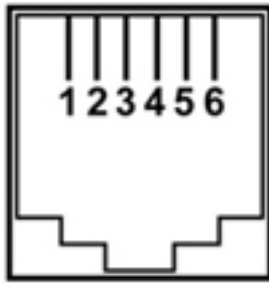
Pin	Signal
1	Unused
2	Tip
3	Ring
4	Unused
5	Unused
6	Unused

RJ-45 (network)
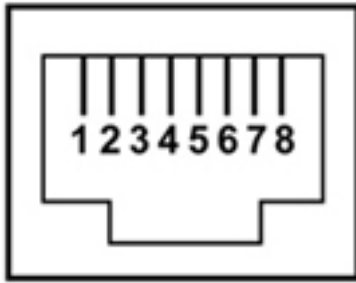
Pin	Signal
1	Transmit +
2	Transmit -
3	Receive +
4	Unused
5	Unused
6	Receive -
7	Unused
8	Unused

Universal Serial Bus
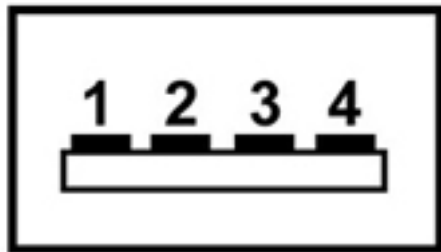
Pin	Signal
1	+5 VDC
2	Data -
3	Data +
4	Ground

9 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 requirements listed below are applicable to all countries and regions:

- The length of the power cord set must be at least 1.5 m (5.0 ft) and no more than 2.0 m (6.5 ft).

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

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

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

Requirements for specific countries and regions

Country/region	Accredited agency	Applicable note number
Australia	EANSW	1
Austria	OVE	1
Belgium	CEBC	1
Canada	CSA	2
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
Italy	IMQ	1
Japan	METI	3
The Netherlands	KEMA	1
Norway	NEMKO	1
The People's Republic of China	CCC	5
South Korea	EK	4
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	4
The United Kingdom	BSI	1
The United States	UL	2

1. The flexible cord must be Type HO5VV-F, 3-conductor, 1.0-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

2. The flexible cord must be Type SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V) configuration.

3. The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 1.00-mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) configuration.

4. The flexible cord must be Type RVV, 3-conductor, 0.75-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

5. The flexible cord must be Type VCTF, 3-conductor, 0.75-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

10 Recycling

Battery

When a 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 computer battery disposal.

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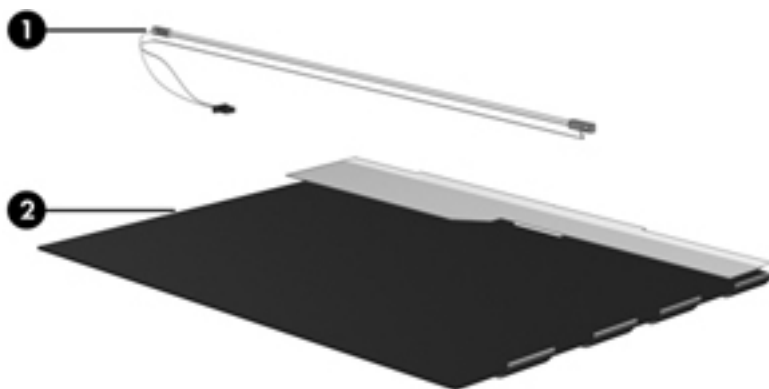
📝 **NOTE:** The procedures provided in this chapter are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

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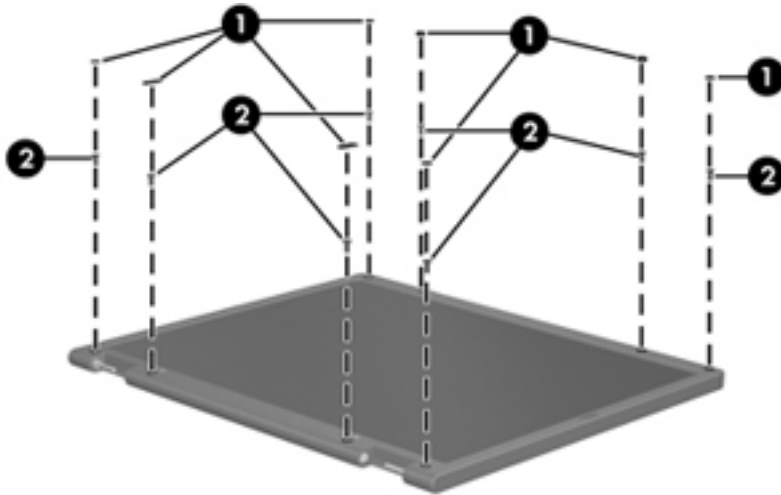
2. Lift up and out on the left and right inside edges **(1)** and the top and bottom inside edges **(2)** of the display bezel until the bezel disengages from the display assembly.

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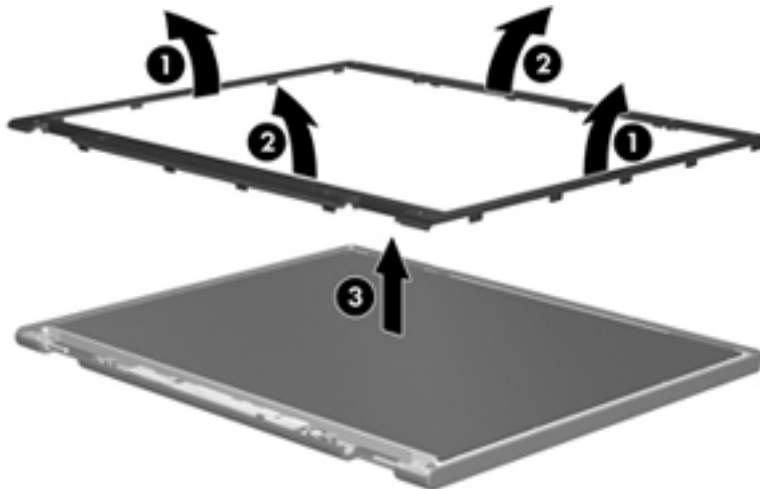
4. Disconnect all display panel cables **(1)** from the display inverter and remove the inverter **(2)**.
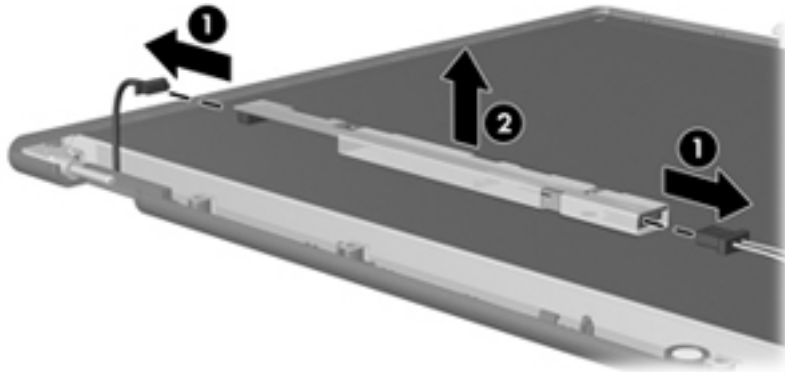
5. Remove all screws **(1)** that secure the display panel assembly to the display enclosure.

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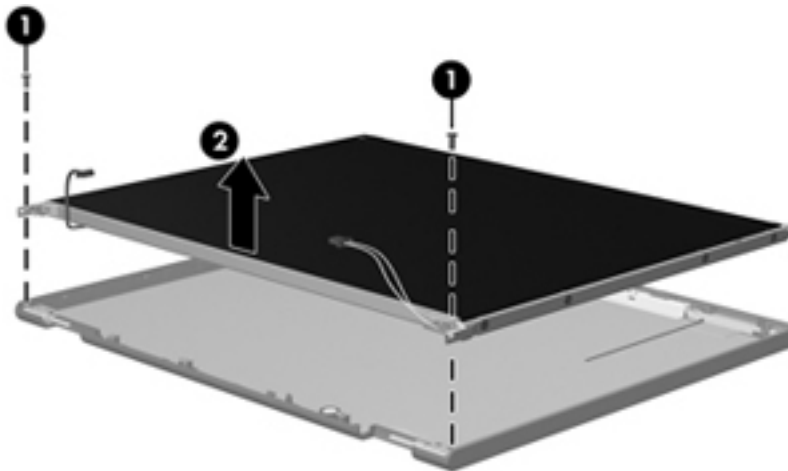
7. Turn the display panel assembly upside-down.

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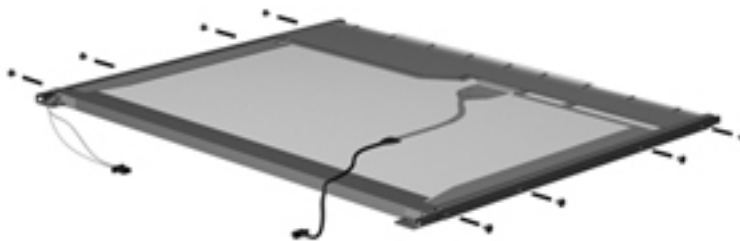
9. Use a sharp-edged tool to cut the tape **(1)** that secures the sides of the display panel to the display panel frame.

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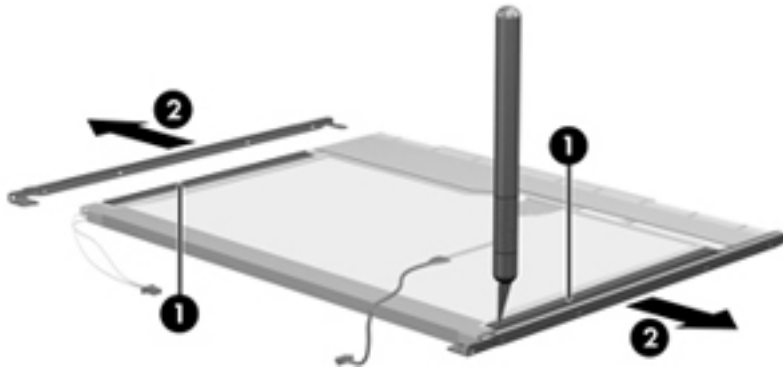
11. Remove the screws **(1)** that secure the backlight cover to the display panel.

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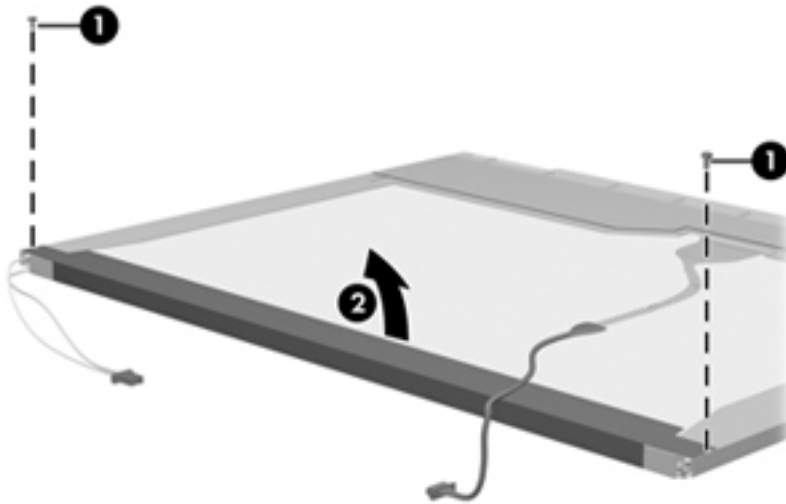
13. Remove the backlight cover.

14. Turn the display panel right-side up.

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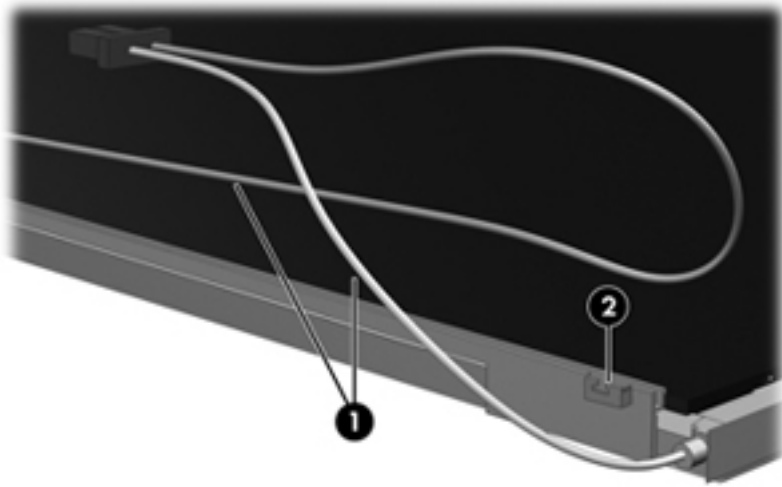
16. Turn the display panel upside-down.

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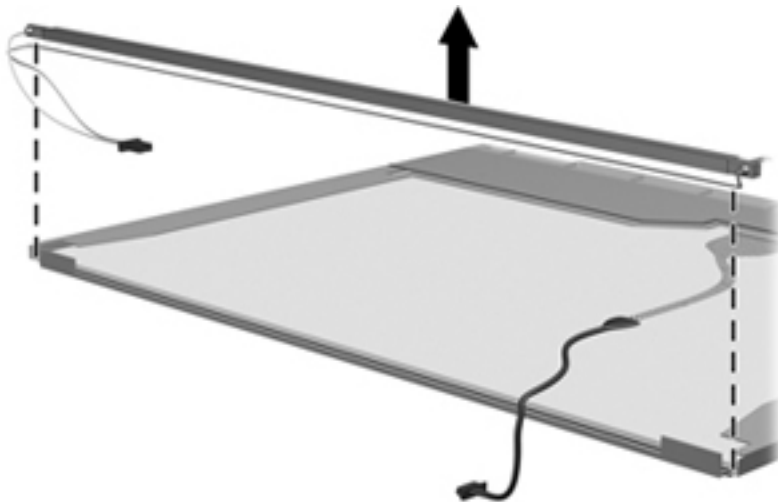
18. Remove the backlight from the backlight frame.
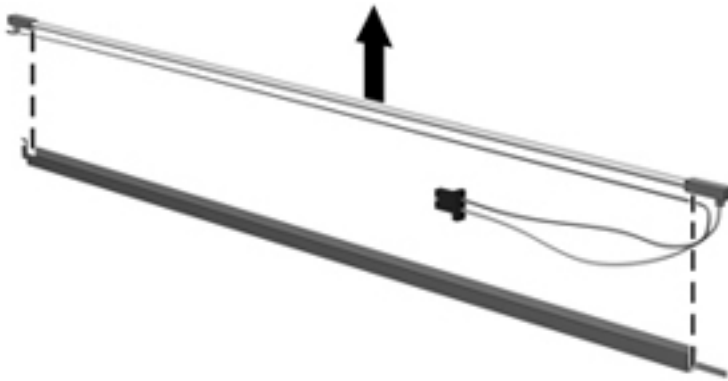
19. Disconnect the display panel cable **(1)** from the LCD panel.

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.
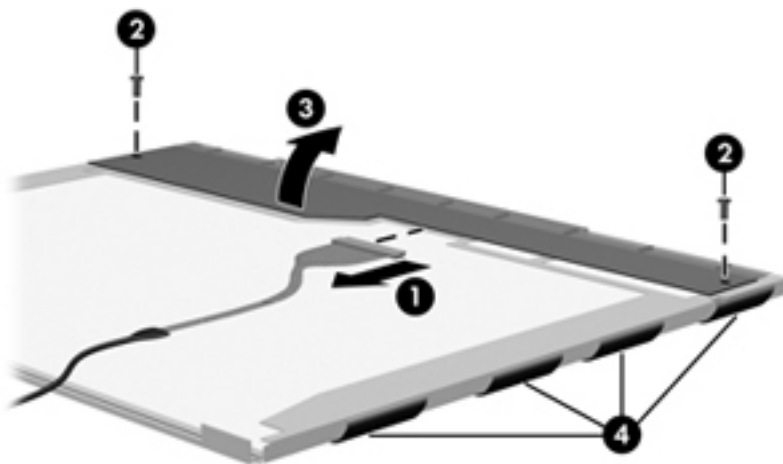
23. Remove the LCD panel.
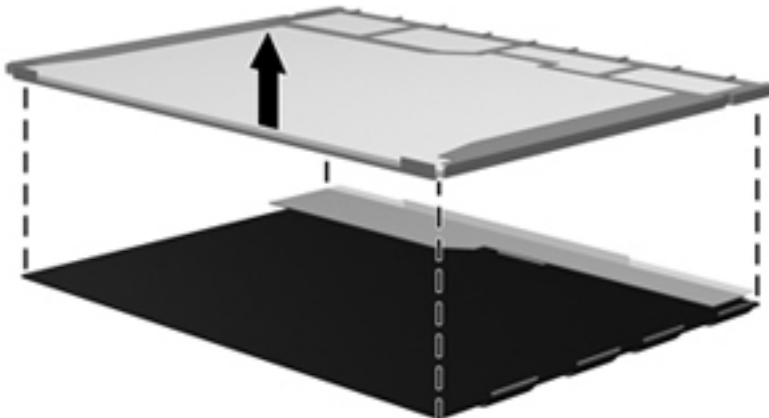
24. Recycle the LCD panel and backlight.

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