HP ProBook 4310s Notebook PC
HP ProBook 4311s Notebook PC

Maintenance and Service Guide

Document Part Number: 531680-001

August 2009

This guide is a troubleshooting reference used for maintaining and servicing the computer. It provides comprehensive information on identifying computer features, components, and spare parts; troubleshooting computer problems; and performing computer disassembly procedures.

© Copyright 2009 Hewlett-Packard Development Company, L.P.

Bluetooth is a trademark owned by its proprietor and used by Hewlett-Packard Company under license. Intel, Celeron, and Core are trademarks of Intel Corporation in the U.S. and other countries. Microsoft, Windows, and Windows Vista are U.S. registered trademarks of Microsoft Corporation. SD Logo is a trademark of its proprietor.

The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

First Edition: August 2009
Document Part Number: 531680-001

MSG revision history

Revision	Publication date	Description
A	February 2010	The description for part number 579319-001 has been corrected to 4-cell, 2.20-Ah (37-Wh) Li-ion battery in the following locations: “Computer major components” on page 3-2, “Sequential part number listing” on page 3-15, and “Battery” on page 4-7.
B	February 2010	The description for the 6-cell, 2.20-Ah (37-Wh) Li-ion battery has been corrected to 4-cell, 2.20-Ah (37-Wh) Li-ion battery in the following location: “Product description” on page 1-1.

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).

Contents

1 Product description

2 External component identification

Display 2–1
Top components 2–2
Buttons and fingerprint reader 2–2
Keys 2–4
Lights 2–5
Pointing devices 2–6
Front components 2–7
Right-side components 2–8
Left-side components 2–9
Bottom components 2–10

3 Illustrated parts catalog

Service tag 3–1
Computer major components 3–2
Cable Kit 3–9
Display assembly subcomponents 3–10
Plastics Kit 3–12
Mass storage devices 3–13
Miscellaneous parts 3–14
Sequential part number listing 3–15

4 Removal and replacement procedures

Preliminary replacement requirements 4–1
Tools required 4–1
Service considerations 4–1
Grounding guidelines 4–2
Component replacement procedures 4–5
Service tag 4–5
Computer feet 4–6
Battery 4–7
SIM 4–8
Hard drive 4–9
WLAN module 4–12
Memory module 4–16
WWAN module 4–17
Optical drive 4–18
Keyboard and switch cover 4–20
Speakers 4–24
Palm rest 4–25

Display assembly 4–27
Top cover 4–36
USB board 4–39
Bluetooth module 4–40
Modem module 4–42
Modem module cable 4–44
Power connector cable 4–45
Power button board 4–46
System board 4–47
Network cable 4–50
Fan and heat sink 4–51
RTC battery 4–54
Processor 4–55

5 Computer Setup

Starting Computer Setup 5–1
Using Computer Setup 5–1
Navigating and selecting in Computer Setup 5–1
Computer Setup menus 5–3
File menu 5–3
Security menu 5–4
Diagnostics menu 5–5
System Configuration menu 5–5

6 Specifications

Computer specifications 6–1
13.3-in display specifications 6–2
Hard drive specifications 6–3
Blu-ray ROM DVD±R/RW SuperMulti Double-Layer Drive specifications 6–4
DVD±RW and CD-RW SuperMulti Double-Layer Drive specifications 6–5
DVD-ROM Drive specifications 6–6
System DMA specifications 6–7
System memory map specifications 6–7
System interrupt specifications 6–8
System I/O address specifications 6–9

7 Screw listing

Phillips PM2.0×6.0 captive screw 7–1
Phillips PM2.5×11.0 captive screw 7–2
Phillips PM3.0×4.0 screw 7–3
Phillips PM2.5×4.0 screw 7–4
Phillips PM2.5×8.0 screw 7–5
Slotted Torx T8M2.5×7.0 screw 7–6
Torx T8M2.5×6.0 screw 7–8
Phillips PM2.0×4.0 screw 7–10
Phillips PM2.0×5.0 screw 7–12
Phillips PM2.0×2.0 broadhead screw 7–13
Phillips PM2.0×3.0 screw 7–14
Phillips PM2.0×9.0 captive screw 7–15

8 Backup and recovery

Backup and recovery in Windows Vista 8–1
Overview 8–1
Backing up your information 8–2
Performing a recovery 8–3
Using the Windows recovery tools 8–3
Using f11 8–4
Using a Windows Vista operating system DVD (purchased separately) 8–4
Backup and recovery in Windows XP 8–5
Overview 8–5
Backing up your information 8–5
Performing a recovery 8–6

9 Connector pin assignments

Audio-in (microphone) 9–1
Audio-out (headphone) 9–1
External monitor 9–2
HDMI 9–3
RJ-11 (modem) 9–4
RJ-45 (network) 9–5
Universal Serial Bus 9–6

10 Power cord set requirements

Requirements for all countries and regions 10–1
Requirements for specific countries and regions 10–2

11 Recycling

Battery 11–1
Display 11–1

Index

1

Product description

Category	Description	PM45 chipset	GM45 chipset	GL40 chipset
Product name	**HP ProBook 4310s Notebook PC**	✓	✓	✓
	HP ProBook 4311s Notebook PC (People's Republic of China only)	✓		
Processors	Intel® Core™2 Duo processors: ■ T9600 2.80-GHz processor, 6-MB L2 cache, 1066-MHz front side bus (FSB) ■ P8700 2.53-GHz processor, 3-MB L2 cache, 1066-MHz FSB ■ P7370 2.00-GHz processor, 3-MB L2 cache, 1066-MHz FSB	✓	✓	
	■ T6570 2.10-GHz processor, 2-MB L2 cache, 800-MHz FSB (not available in Japan) ■ Intel Core Duo T5870 2.00-GHz processor, 2-MB L2 cache, 800-MHz FSB (not available in Japan)	✓	✓	
	Intel Dual Core Celeron® processors: ■ T1700 1.83-GHz processor, 1-MB L2 cache, 667-MHz FSB ■ T1600 1.66-GHz processor, 1-MB L2 cache, 667-MHz FSB	✓		✓
	Intel Celeron 585 2.16-GHz processor, 2-MB L2 cache, 800-MHz FSB	✓		✓

(Continued)

Category	Description	PM45 chipset	GM45 chipset	GL40 chipset
Chipset	Northbridge:			
	■ Intel PM45 with up to 1066-MHz FSB	✓		
	■ Intel GM45 with up to 1066-MHz FSB		✓	
	■ Intel GL40 with up to 667-MHz FSB			✓
	Southbridge: Intel ICH-9M	✓	✓	✓
Graphics	AMD M92S2-LP (ATI Mobility Radeon™ HD 4330) discrete graphics with Hypermemory support, 512 MB GDDR2 (64 MB × 16 × 2) at 500-MHz	✓		
	Intel UMA graphics (Mobile Intel GMA X4500 HD) Integrated with shared video memory (dynamically allocated)		✓	✓
Panel	■ 13.3-in, high-definition (HD, 1366 × 768), AntiGlare, LED display assembly	✓	✓	✓
	■ 13.3-in, HD (1366 × 768), BrightView, LED display assembly			
	■ 13.3-in, HD (1280 × 720), 720P BrightView, LED display assembly			
	■ Supports privacy filter			

(Continued)

Category	Description	PM45 chipset	GM45 chipset	GL40 chipset
Memory	2 customer-accessible/upgradable memory module slots Supports dual-channel memory Supports the following DDR3 configurations at 1333 MHz in all countries and regions except Brazil: ■ 8192-MB total system memory (4096 × 2, dual-channel) ■ 6144-MB total system memory (4096 + 2048, dual-channel) ■ 5120-MB total system memory (4096 + 1024, dual-channel) ■ 4096-MB total system memory (4096 × 1) ■ 4096-MB total system memory (2048 × 2, dual-channel) ■ 3072-MB total system memory (2048 + 1024, dual-channel) ■ 2048-MB total system memory (1024 × 2, dual-channel) ■ 2048-MB total system memory (2048 × 1) ■ 1024-MB total system memory (1024 × 1)	✓	✓	✓
	Supports the following DDR3 configurations at 1333 MHz in Brazil: ■ 3072-MB total system memory (2048 + 1024, dual-channel) ■ 2048-MB total system memory (1024 × 2, dual-channel) ■ 2048-MB total system memory (2048 × 1) ■ 1024-MB total system memory (1024 × 1)	✓	✓	✓

(Continued)

Category	Description	PM45 chipset	GM45 chipset	GL40 chipset
Hard drives	Supports 9.50-mm, 6.35-cm (2.50-in) hard drives Supports HP 3D DriveGuard Hard Drive Protection Customer-accessible Serial ATA (SATA) Supports the following hard drives: ■ 500-GB, 7200- and 5400-rpm ■ 320-GB, 7200- and 5400-rpm ■ 250-GB, 7200-rpm ■ 160-GB, 7200-rpm	✓	✓	✓
Optical drives	12.7-mm tray load Serial ATA (SATA) Fixed (removal of 1 screw required) Customer-accessible Supports no-optical-drive option Supports the following drives:	✓	✓	✓
	■ Blu-ray ROM DVD±R/RW and CD-RW SuperMulti Double-Layer Drive with LightScribe	✓	✓	✓
	■ DVD±RW and CD-RW SuperMulti Double-Layer Drive with LightScribe	✓	✓	✓
	■ 8X DVD-ROM Drive	✓	✓	✓
Diskette drive	Supports external USB drive only Supports boot from USB device	✓	✓	✓
Microphone	Integrated dual-array digital microphone	✓	✓	✓

(Continued)

Category	Description	PM45 chipset	GM45 chipset	GL40 chipset
Audio	2 stereo speakers with enclosures Azalea ADI1984 CODEC with digital equalization Headphone jack Microphone jack	✓	✓	✓
Webcam	Integrated 2-megapixel camera with fixed focus	✓	✓	✓
Modem	High-speed 56K data/fax modem Supports no-modem option Modem module cable not included	✓	✓	✓
Ethernet	Marvell 88E8072-B1 10/100/1000 network interface card (NIC) S3/S4/S5 wake on LAN (AC mode only) Ethernet cable not included	✓	✓	✓
Wireless	Integrated wireless local-area network (WLAN) options via Mini PCI module: ■ Broadcom 4322AGN 802.11b/g/n WLAN module ■ Broadcom 4312G 802.11b/g WLAN module ■ Intel WiFi Link 5100 802.11b/g/n WLAN module ■ Intel WiFi Link 5100 802.11b/g WLAN module Supports no-WLAN option 2 WLAN antennas built into the display assembly	✓	✓	✓
	Integrated wireless wide-area network (WWAN) options via Mini PCI module: ■ High-speed packet access (HSPA), evolution-data optimized (EV-DO) WWAN module ■ Telecom EV-DO CT1 WWAN module ■ Telecom EV-DO CT2 WWAN module WWAN security provided by subscriber identity module (SIM), user-accessible behind battery 2 WWAN antennas (worldwide, 5-band) built into the display assembly Does not support WWAN aftermarket option	✓	✓	✓
	Integrated wireless personal area network (WPAN) options via Bluetooth® module	✓	✓	✓

(Continued)

Category	Description	PM45 chipset	GM45 chipset	GL40 chipset
External media cards	One ExpressCard slot, supporting optional ExpressCard/34 cards SD Card Reader supporting the following optional digital card formats: ■ MultiMediaCard ■ MultiMediaCard Plus ■ Secure Digital Memory Card ■ Secure Digital High Capacity Memory Card	✓	✓	✓
Ports	Audio-in (stereo microphone) Audio-out (stereo headphone) HDMI v.1.3 Multi-pin AC power RJ-45 (Ethernet, includes link and activity lights) RJ-11 (modem) USB v. 2.0 (3) VGA (Dsub 15-pin) supporting 1600 × 1200 external resolution at 75 GHz	✓	✓	✓
Keyboard/ pointing devices	Spill-resistant keyboard TouchPad with TouchPad buttons Touch-sensitive controls Supports 2-way scroll with legend Taps enabled by default	✓	✓	✓
Power requirements	90-W AC adapter for use only on computer models equipped with a graphics subsystem with discrete memory	✓		
	65-W AC adapter for use only on computer models equipped with a graphics subsystem with UMA memory		✓	✓
	Supports multipin AC connector and 3-wire plug (with ground pin)	✓	✓	✓
	Battery options: ■ 8-cell, 2.55-Ah (73-Wh) Li-ion battery ■ *4-cell, 2.20-Ah (37-Wh) Li-ion battery*	✓	✓	✓
Security	Security cable slot Integrated fingerprint reader	✓	✓	✓

(Continued)

Category	Description	PM45 chipset	GM45 chipset	GL40 chipset
Operating system	**Preinstalled:** ■ Free DOS ■ Red Flag Linux (People's Republic of China only) ■ Windows Vista® Business 32 ■ Windows Vista Business with Windows® XP Pro image ■ Windows Vista Home Basic ■ Windows Vista Home Premium 32	✓	✓	✓
	Preinstalled with Microsoft® Office: ■ Windows Vista Home Basic 32 with Office 2007 Ready ■ Windows Vista Home Basic 32 with Office 2007 Personal (Japan only) ■ Windows Vista Home Basic 32 with Office 2007 Personal with PowerPoint (Japan only) ■ Windows Vista Home Premium 32 with Office 2007 Ready ■ Windows Vista Business 32 with Office 2007 Ready ■ Windows Vista Business 32 with Office 2007 Personal (Japan only) ■ Windows Vista Business 32 with Office 2007 Personal with PowerPoint (Japan only) ■ Windows Vista Business 32 (with XP Pro images) with Office 2007 Ready ■ Windows Vista Business 32 (with XP Pro images) with Office 2007 Personal (Japan only) ■ Windows Vista Business 32 (with XP Pro images) with Office 2007 Personal with PowerPoint (Japan only)	✓	✓	✓

(Continued)

Category	Description	PM45 chipset	GM45 chipset	GL40 chipset
Operating system *(continued)*	**Restore media:** ■ DRDVD Windows Vista ■ DRDVD Windows XP Pro ■ Microsoft Office Ready DVD ■ Red Flag Linux (People's Republic of China only) ■ Windows Vista Business 32 ■ Windows Vista Business 64 ■ Windows Vista Home Basic 32 ■ Windows Vista Home Premium ■ Windows XP Pro	✓	✓	✓
	Certified: ■ Microsoft WHQL ■ SuSE Linux	✓	✓	✓
	Web-only support: Windows Vista Business 64	✓	✓	✓
Serviceability	**End-user replaceable parts:** AC adapter Battery (system) Hard drive Keyboard Memory modules Optical drive SIM WLAN module WWAN module	✓	✓	✓

2

External component identification

Display

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

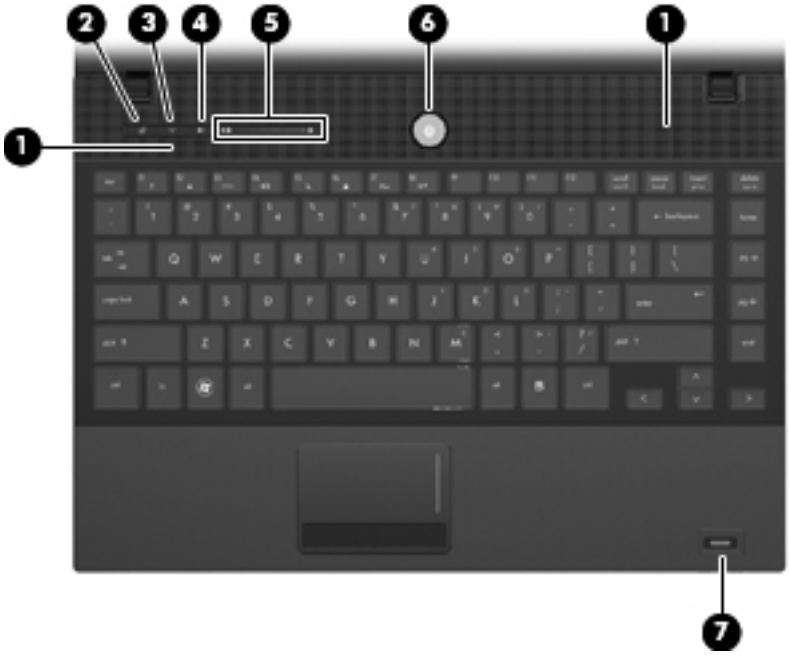
Item	Component	Description
(1)	Internal display switch	Turns off the display if the display is closed while the power is on.
(2)	WWAN antennas (2)*	Send and receive wireless signals to communicate with wireless wide-area networks (WWAN).
(3)	Internal microphones (2)	Record sound.
(4)	WLAN antennas (2)*	Send and receive wireless signals to communicate with wireless local area networks (WLAN).
(5)	Webcam light (select models only)	On: The webcam is in use.
(6)	Webcam (select models only)	Records audio and video and captures still photographs.

*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 regulation notices, refer to the section of the *Regulatory, Safety and Environmental Notices* that applies to your country or region. These notices are located in Help and Support.

Top components

Buttons and fingerprint reader



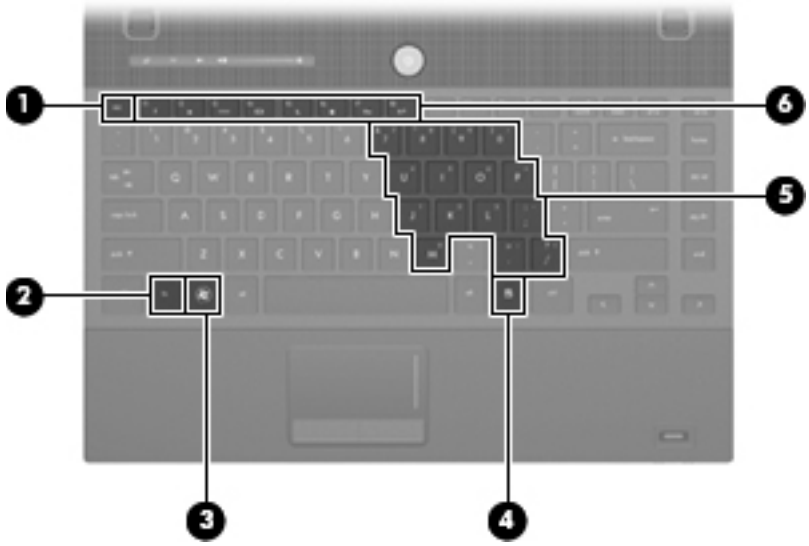
Item	Component	Description
(1)	Speakers (2)	Produce sound.
(2)	Info Center/QuickLook button	Launches Info Center or QuickLook.
(3)	Wireless button	Turns the wireless feature on or off but does not establish a wireless connection. ✎ You must set up or access a wireless network to establish a wireless connection.
(4)	Volume mute button	Mutes and restores speaker sound.
(5)	Volume scroll zone	Adjusts speaker volume. Slide your finger to the left to decrease volume and to the right to increase volume. You can also press the left side of the volume slider to decrease volume, or press the right side of the volume slider to increase volume.

(Continued)

Item	Component	Description
(6)	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 (Standby in Windows XP), press the button briefly to exit Sleep (Standby). ■ 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. To learn more about your power settings: ■ In Windows Vista: Select **Start > Control Panel > System and Maintenance > Power Options**. ■ In Windows XP: Select **Start > Control Panel > Performance and Maintenance > Power Options**.
(7)	Fingerprint reader (select models only)	Allows a fingerprint logon to Windows instead of a password logon.

Keys

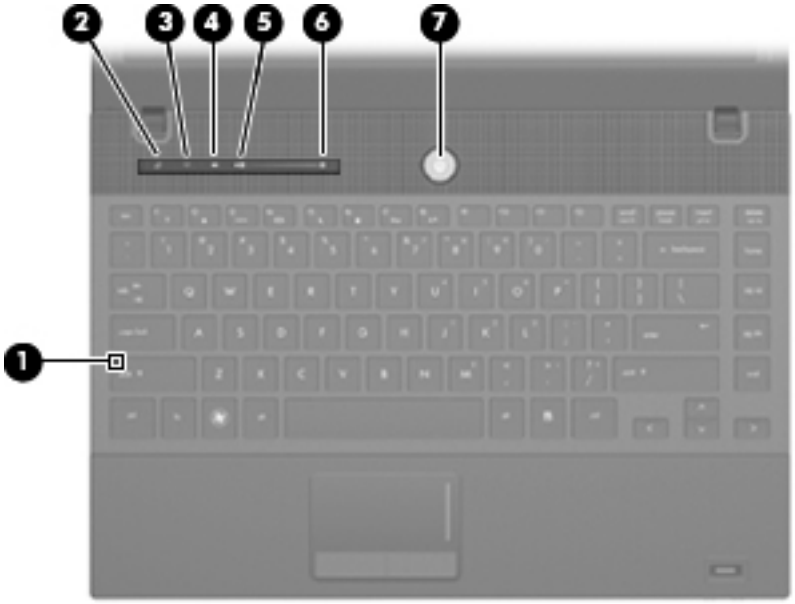
Your computer may look slightly different from the illustration in this section.



Item	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 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)	Embedded 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.

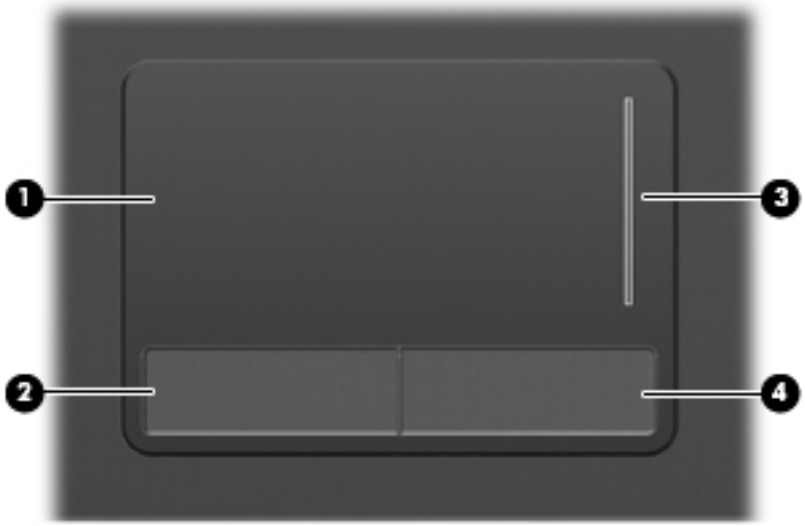
Lights

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



Item	Component	Description
(1)	Caps lock light	On: Caps lock is on.
(2)	Info Center/QuickLook light	■ On: The computer is on. ■ Blinking (5 times): ❒ When the computer is on, press the button to launch Info Center. ❒ When the computer is off or in Hibernation, press the button to launch QuickLook. ■ Off: The computer is off or in the Sleep (Standby in Windows XP) or Hibernation state.
(3)	Wireless light	■ Blue: An integrated wireless device, such as a WLAN device and/or a Bluetooth device, is on. ■ Amber: All wireless devices are off.
(4)	Volume mute light	■ Turquoise: Computer sound is on. ■ Amber: Computer sound is off.
(5)	Volume down light	Blinking: The volume scroll zone is being used to decrease speaker volume.
(6)	Volume up light	Blinking: The volume scroll zone is being used to increase speaker volume.
(7)	Power light	■ On: The computer is on. ■ Blinking: The computer is in the Sleep state (Standby in Windows XP). ■ Off: The computer is off or in Hibernation.

Pointing devices



Item	Component	Description
(1)	TouchPad*	Moves the pointer and selects or activates items on the screen.
(2)	Left TouchPad button*	Functions like the left button on an external mouse.
(3)	TouchPad scroll zone	Scrolls up or down.
(4)	Right TouchPad button*	Functions like the right button on an external mouse.

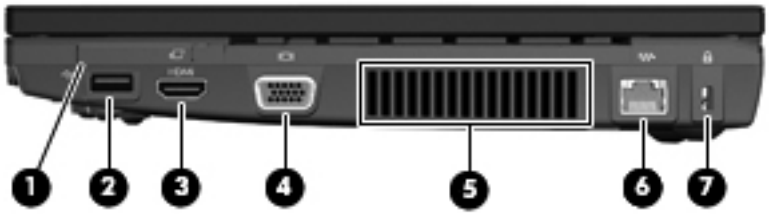
*This table describes factory settings. To view or change pointing device preferences:

- For Windows Vista: Select **Start > Control Panel > Hardware and Sound > Mouse**.
- For Windows XP: Select **Start > Control Panel > Printers and Other Hardware > Mouse**.

Front components

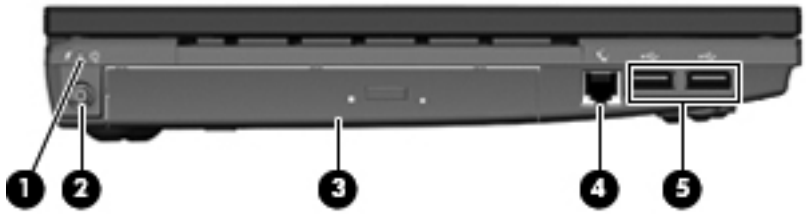
Item	Component	Description
(1)	Drive light	■ Blinking turquoise: The hard drive or optical drive is being accessed. ■ Amber: HP 3D DriveGuard has temporarily parked the hard drive.
(2)	SD Card Reader	Supports the following optional digital card formats: ■ MultiMediaCard ■ MultiMediaCard Plus ■ Secure Digital Memory Card ■ Secure Digital High Capacity Memory Card
(3)	Audio-out (headphone) jack	Produces sound when connected to optional powered stereo speakers, headphones, ear buds, a headset, or television audio. ✎ 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



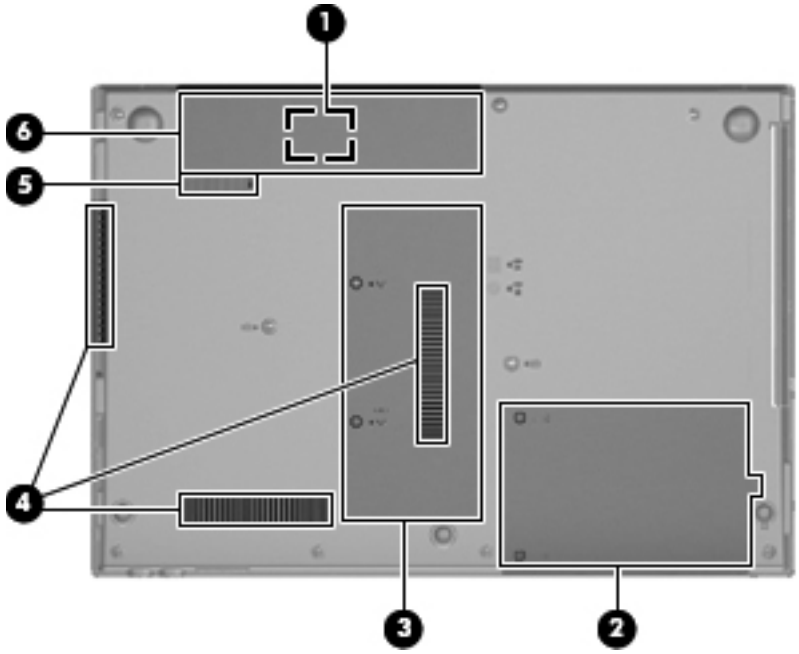
Item	Component	Description
(1)	ExpressCard slot	Supports optional ExpressCards.
(2)	USB port	Connects an optional USB device.
(3)	HDMI port	Connects an optional HDMI device.
(4)	External monitor port	Connects an external VGA monitor or projector.
(5)	Vent	Enables airflow to cool internal components. ✎ 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.
(6)	RJ-45 (network) jack	Connects a network cable.
(7)	Security cable slot	Attaches an optional security cable to the computer. ✎ The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.

Left-side components



Item	Component	Description
(1)	Battery light	■ Amber: A battery is charging. ■ Turquoise: A battery is close to full charge capacity. ■ Blinking amber: A battery that is the only available power source has reached a low battery level. When the battery reaches a critical battery level, the battery light begins blinking rapidly. ■ Off: If the computer is plugged into an external power source, the light turns off when all batteries in the computer are fully charged. If the computer is not plugged into an external power source, the light stays off until the battery reaches a low battery level.
(2)	Power connector	Connects an AC adapter.
(3)	Optical drive (select models only)	Reads optical discs and, on select models, also writes to optical discs.
(4)	RJ-11 (modem) jack (select models only)	Connects a modem cable.
(5)	USB ports (2)	Connect optional USB devices.

Bottom components



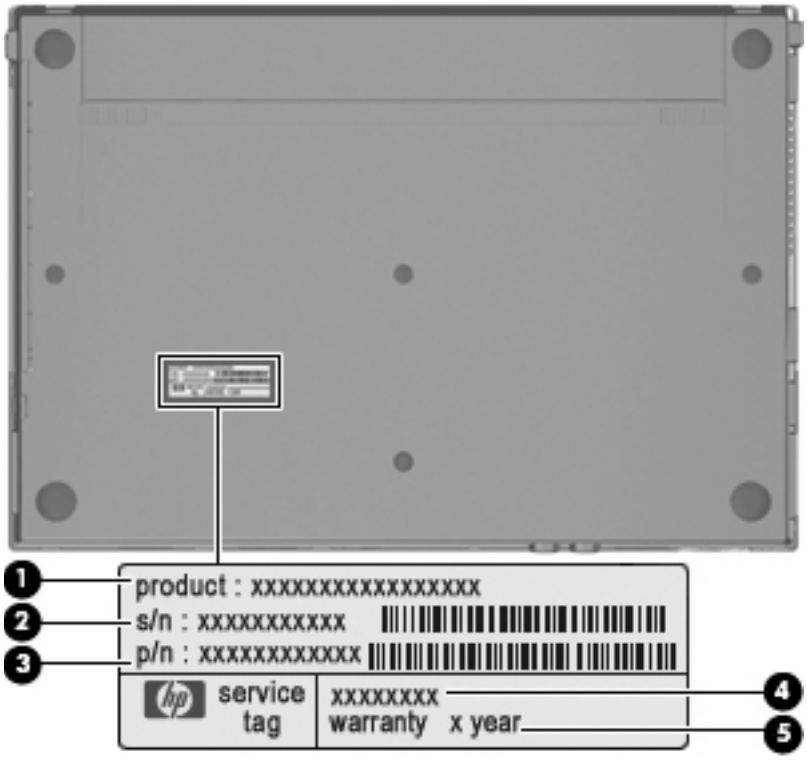
Item	Component	Description
(1)	SIM slot (select models only)	Contains a wireless subscriber identity module (SIM). The SIM slot is located inside the battery bay.
(2)	Hard drive bay	Holds the hard drive and a Bluetooth device.
(3)	Memory module compartment	Contains the memory module slots and a wireless LAN module slot. △ To prevent an unresponsive system and the display of a warning message, replace the WLAN module with only a 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.
(4)	Vents (3)	Enable airflow to cool internal components. ✎ The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(5)	Battery release latch	Releases the battery from the battery bay.
(6)	Battery bay	Holds the battery.

3

Illustrated parts catalog

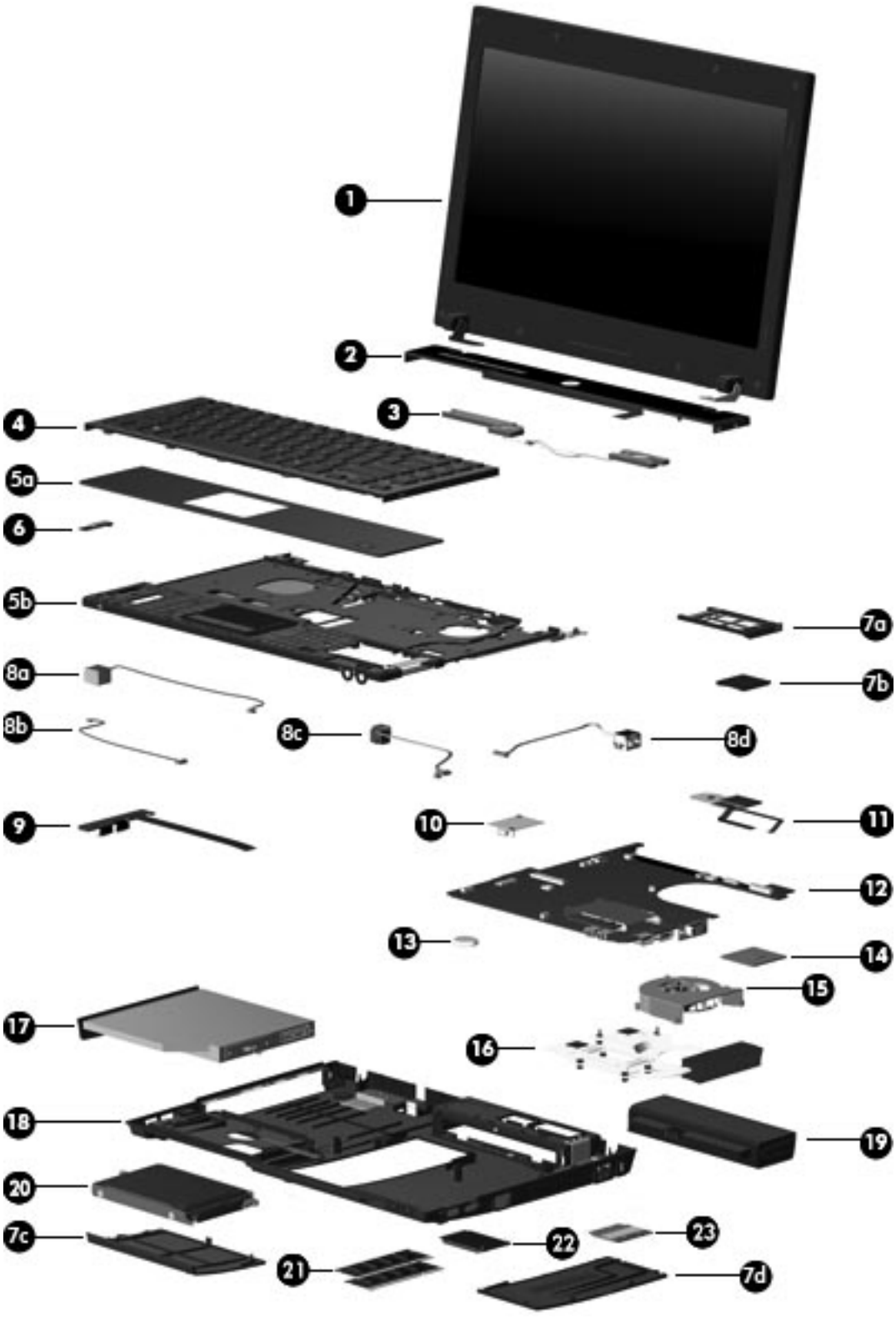
Service tag

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



Item	Component	Description
(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 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 the computer.

Computer major components



Item	Description	Spare part number
(1)	**13.3-in, LED, HD display assembly** (includes 2 WLAN antenna transceivers and cables, nameplate, and logo):	
	■ AntiGlare display assembly with webcam and 2 WWAN antennas in black trim	577173-001
	■ AntiGlare display assembly with webcam and 2 WWAN antennas in red trim	577182-001
	■ AntiGlare display assembly with webcam in black trim	577174-001
	■ AntiGlare display assembly with webcam in red trim	577183-001
	■ AntiGlare display assembly without webcam in black trim	577172-001
	■ AntiGlare display assembly without webcam in red trim	577181-001
	■ 1366 × 768 BrightView display assembly with webcam and 2 WWAN antennas in black trim	577176-001
	■ 1366 × 768 BrightView display assembly with webcam and 2 WWAN antennas in red trim	577185-001
	■ 1366 × 768 BrightView display assembly with webcam in black trim	577175-001
	■ 1366 × 768 BrightView display assembly with webcam in red trim	577184-001
	■ 1366 × 768 BrightView display assembly without webcam in black trim	577177-001
	■ 1366 × 768 BrightView display assembly without webcam in red trim	577186-001
	■ 1280 × 720 BrightView display assembly with webcam and 2 WWAN antennas in black trim	583090-001
	■ 1280 × 720 BrightView display assembly with webcam and 2 WWAN antennas in red trim	583091-001
	■ 1280 × 720 BrightView display assembly with webcam in black trim	577179-001
	■ 1280 × 720 BrightView display assembly with webcam in red trim	577188-001
	■ 1280 × 720 BrightView display assembly without webcam in black trim	577178-001
	■ 1280 × 720 BrightView display assembly without webcam in red trim	577187-001
	✎ See "Display assembly subcomponents" on page 3-10 for display assembly internal component spare part information.	
(2)	**Switch cover** (includes LED board and cable):	
	■ In black trim	577207-001
	■ In red trim	577208-001
(3)	**Speakers** (include cables)	577215-001
(4)	**Keyboard** (includes keyboard cable):	
	■ For use in Belgium	577205-A41
	■ For use in Brazil	577205-201
	■ For use in Bulgaria	577205-261
	■ For use in the Czech Republic	577205-221
	■ For use in Denmark	577205-081
	■ For use in France	577205-051
	■ For use in French Canada	577205-121
	■ For use in Germany	577205-041
	■ For use in Greece	577205-DJ1
	■ For use in Hungary	577205-211

(Continued)

Item	Description	Spare part number
(4)	**Keyboard** *(continued)*:	
	■ For use in Iceland	577205-DD1
	■ For use in Israel	577205-BB1
	■ For use in Italy	577205-061
	■ For use in Japan	577205-291
	■ For use in Latin America	577205-161
	■ For use in the Netherlands	577205-B31
	■ For use in Norway	577205-091
	■ For use in Portugal	577205-131
	■ For use in Russia	577205-251
	■ For use in Saudi Arabia	577205-171
	■ For use in Slovakia	577205-231
	■ For use in Slovenia	577205-BA1
	■ For use in South Korea	577205-AD1
	■ For use in Spain	577205-071
	■ For use in Sweden and Finland	577205-B71
	■ For use in Switzerland	577205-BG1
	■ For use in Taiwan	577205-AB1
	■ For use in Thailand	577205-281
	■ For use in Turkey	577205-141
	■ For use in the United Kingdom	577205-031
	■ For use in the United States	577205-001
(5a)	**Palm rest** (included with top cover spare part kit)	
(5b)	**Top cover** (includes palm rest, TouchPad button board and cable, and TouchPad board and cable):	
	■ For use only on computer models equipped with fingerprint reader in black trim (includes fingerprint reader board and cable)	577216-001
	■ For use only on computer models equipped with fingerprint reader in red trim (includes fingerprint reader board and cable)	577218-001
	■ For use only on computer models not equipped with fingerprint reader in black trim	577217-001
	■ For use only on computer models not equipped with fingerprint reader in red trim	577219-001
(6)	**Bluetooth module**	537921-001
	✎ 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 577214-001.	
	Plastics Kit, includes:	577211-001
(7a)	ExpressCard slot bezel	
(7b)	SD Card Reader slot bezel	
(7c)	Hard drive cover	
(7d)	Memory/wireless module compartment cover	
	✎ See "Plastics Kit" on page 3-12 for more Plastics Kit spare part information.	

(Continued)

Item	Description	Spare part number
	Cable Kit, includes:	577214-001
(8a)	Modem module cable (includes RJ-11 connector)	
(8b)	Bluetooth module cable	
(8c)	Power connector cable	
(8d)	Network cable (includes RJ-45 connector)	
	✎ See "Cable Kit" on page 3-9 for more Cable Kit spare part information.	
(9)	**USB board** (includes cable)	577659-001
(10)	**Modem module:**	
	✎ The modem module spare part kit does not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 577214-001.	
	■ For use in all countries and regions except Australia and New Zealand	510100-001
	■ For use only in Australia and New Zealand	510100-011
(11)	**Power button board** (includes two cables):	
	■ For use only on computer models equipped with WWAN capability (includes SIM slot)	577662-001
	■ For use only on computer models not equipped with WWAN capability	577661-001
(12)	**System board** (includes replacement thermal material):	
	PM45 system board for use only on computer models equipped with graphics subsystems with discrete memory:	
	■ For use only on computer models equipped with WWAN capability	577223-001
	■ For use only on computer models not equipped with WWAN capability	577222-001
	GM45 system board for use only on computer models equipped with graphics subsystems with UMA memory:	
	■ For use only on computer models equipped with WWAN capability	577225-001
	■ For use only on computer models not equipped with WWAN capability	577224-001
	GL40 system board for use only on computer models equipped with graphics subsystems with UMA memory:	
	■ For use only on computer models equipped with WWAN capability	577221-001
	■ For use only on computer models not equipped with WWAN capability	577220-001
(13)	**RTC battery**	581926-001

(Continued)

Item	Description	Spare part number
(14)	**Processor** (includes replacement thermal material):	
	Intel Core2 Duo processors:	
	■ T9600 2.80-GHz processor, 6-MB L2 cache, 1066-MHz FSB	507955-002
	■ P8700 2.53-GHz processor, 3-MB L2 cache, 1066-MHz FSB	507960-001
	■ P7570 2.26-GHz processor, 3-MB L2 cache, 1066-MHz FSB	572930-001
	■ P7370 2.00-GHz processor, 3-MB L2 cache, 1066-MHz FSB	507966-001
	Intel Core Duo processors:	
	■ T6570 2.10-GHz processor, 2-MB L2 cache, 800-MHz FSB (not available in Japan)	513598-001
	■ T5870 2.00-GHz processor, 2-MB L2 cache, 800-MHz FSB (not available in Japan)	535835-001
	■ T4200 2.00-GHz processor, 1-MB L2 cache, 800-MHz FSB	513599-001
	■ T3100 1.90-GHz processor, 1-MB L2 cache, 800-MHz FSB	572925-001
	■ T3000 1.80-GHz processor, 1-MB L2 cache, 800-MHz FSB	572926-001
(15)	**Fan** (includes replacement thermal material)	577206-001
(16)	**Heat sink** (includes replacement thermal material):	
	■ For use only on computer models equipped with a graphics subsystem with discrete memory	577227-001
	■ For use only on computer models equipped with a graphics subsystem with UMA memory	577226-001
(17)	**Optical drive** (includes bezel and bracket):	
	■ Blu-ray ROM DVD±R/RW SuperMulti Double-Layer Drive with LightScribe	577202-001
	■ DVD±RW and CD-RW SuperMulti Double-Layer Drive with LightScribe	577204-001
	■ DVD-ROM Drive	577203-001
(18)	**Base enclosure** (includes 5 rubber feet)	577209-001
	Rubber Feet Kit (not illustrated, includes 5 rubber feet and 8 display bezel screw covers)	577212-001
(19)	**Battery:**	
	■ 8-cell, 2.55-Ah (73-Wh) Li-ion battery	579320-001
	■ *4-cell, 2.20-Ah (37-Wh) Li-ion battery*	579319-001
(20)	**Hard drive** (includes hard drive connector and hard drive bracket):	
	■ 500-GB, 7200-rpm	579213-001
	■ 500-GB, 5400-rpm	577201-001
	■ 320-GB, 7200-rpm	579212-001
	■ 320-GB, 5400-rpm	577200-001
	■ 250-GB, 7200-rpm	577199-001
	■ 160-GB, 7200-rpm	577198-001
(21)	**Memory modules** (1333-MHz, DDR2):	
	■ 2048-MB	577197-001
	■ 1024-MB	577196-001

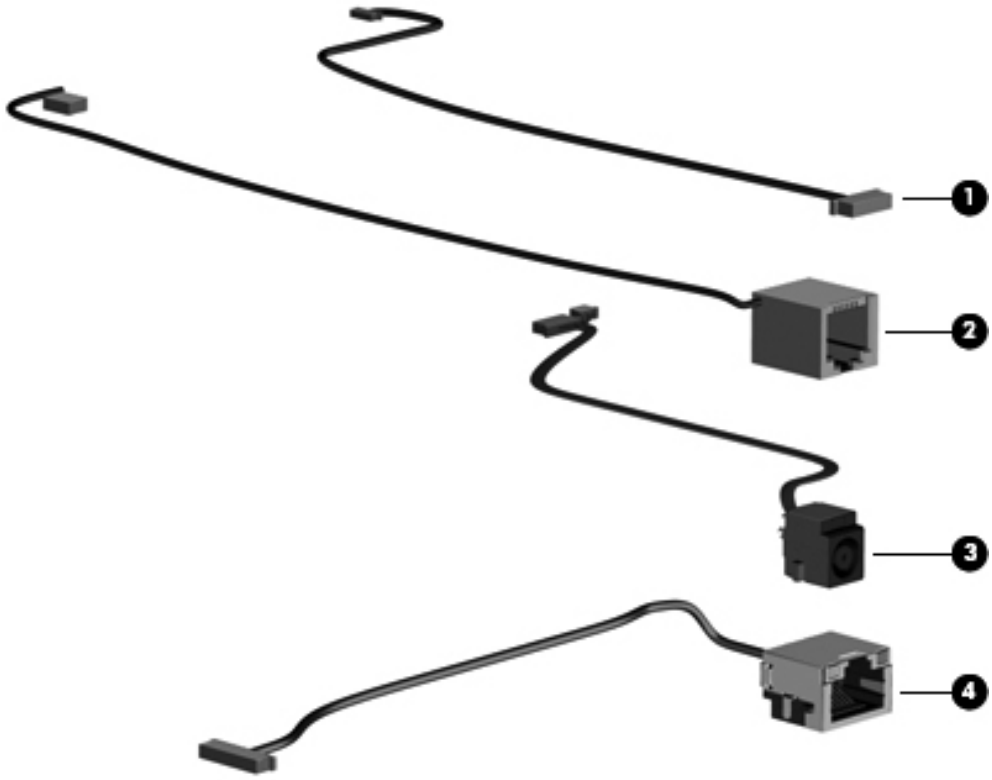
(Continued)

Item	Description	Spare part number
(22)	**WLAN module:**	
	802.11b/g/n WLAN module:	
	■ Intel WiFi Link 5100 802.11b/g/n WLAN module for use in all countries and regions except Pakistan, Russia, and the Ukraine	480985-001
	■ Broadcom 4322AGN 802.11b/g/n WLAN module for use in Canada, the Cayman Islands, Guam, Puerto Rico, the United States, and the U.S. Virgin Islands	504664-001
	■ Broadcom 4322AGN 802.11b/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, Cambodia, Cameroon, Cape Verde, the Central African Republic, Chad, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial 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, Indonesia, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, 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, the People's Republic of China, Peru, the Philippines, Poland, Portugal, Qatar, 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, Syria, Taiwan, Tajikistan, Tanzania, Thailand, 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	504664-002
	Intel WiFi Link 5100 802.11b/g WLAN module for use only in Pakistan, Russia, and the Ukraine	482957-001

(Continued)

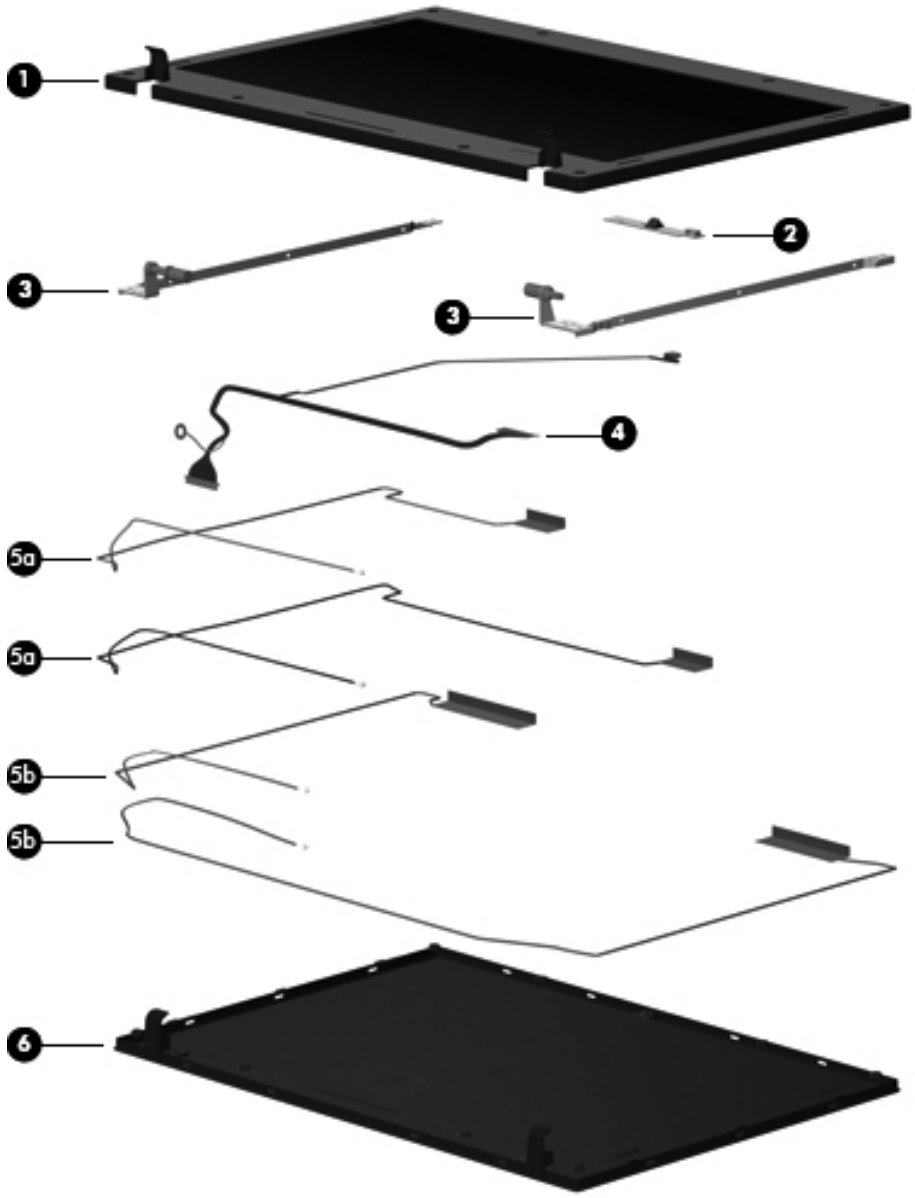
Item	Description	Spare part number
(22)	**WLAN module** *(continued)*:	
	802.11b/g WLAN module:	
	■ Broadcom 4312G 802.11b/g WLAN module for use in Canada, the Cayman Islands, Guam, Puerto Rico, the United States, and the U.S. Virgin Islands	504593-003
	■ Broadcom 4312G 802.11b/g WLAN module for use 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, Cambodia, Cameroon, Cape Verde, the Central African Republic, Chad, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial 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, Indonesia, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, 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, the People's Republic of China, Peru, the Philippines, Poland, Portugal, Qatar, 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, Syria, Taiwan, Tajikistan, Tanzania, Thailand, 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
(23)	**WWAN module:**	
	■ HSPA EV-DO WWAN module for use in all countries and regions except the People’s Republic of China	483377-002
	■ Telecom EV-DO CT1 WWAN module for use only in the People’s Republic of China	574246-001
	■ Telecom EV-DO CT2 WWAN module for use only in the People’s Republic of China	582724-001

Cable Kit



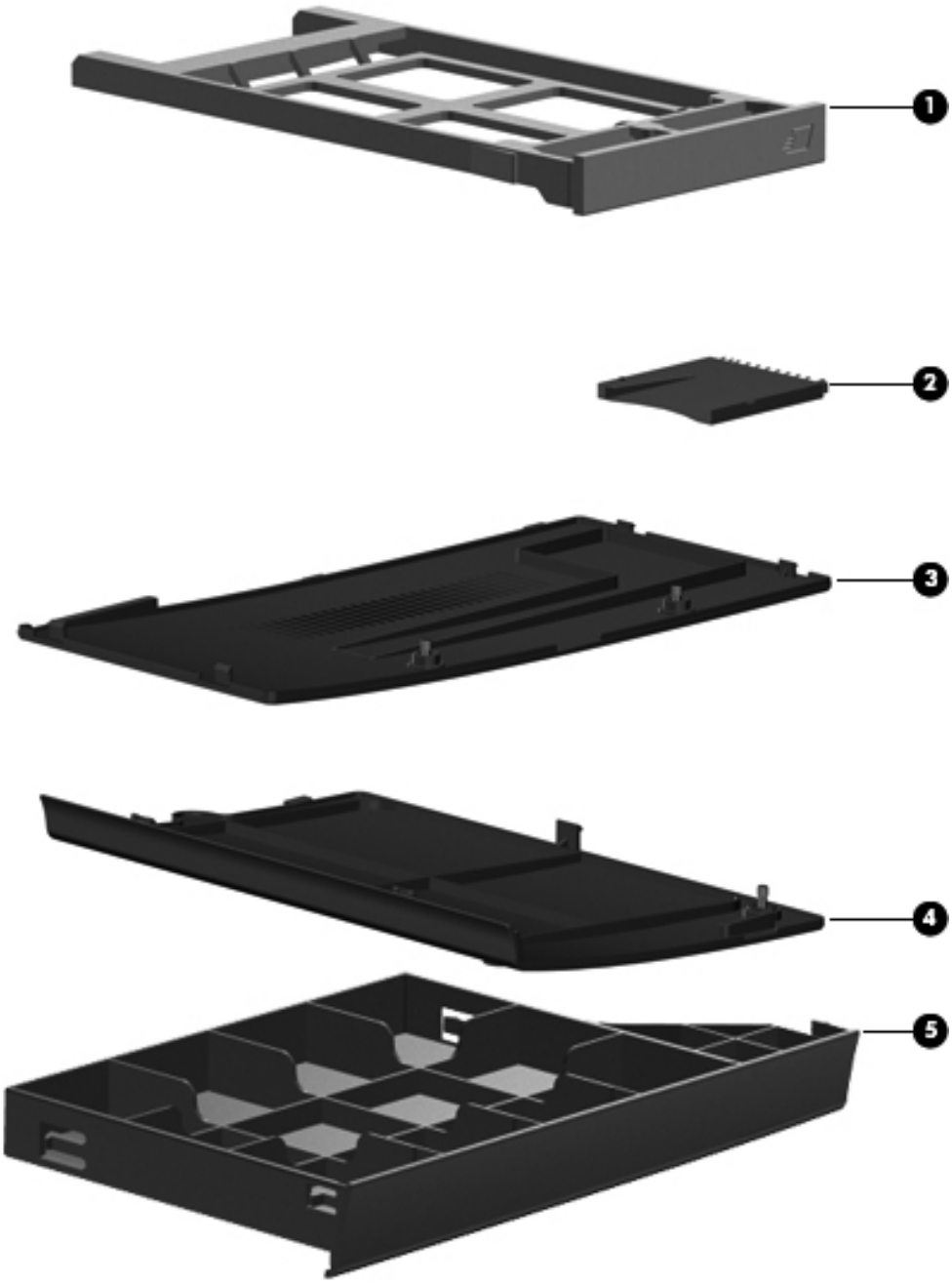
Item	Description	Spare part number
	Cable Kit:	577214-001
(1)	Bluetooth module cable	
(2)	Modem module cable (includes RJ-11 connector)	
(3)	Power connector cable	
(4)	Network cable (includes RJ-45 connector)	

Display assembly subcomponents



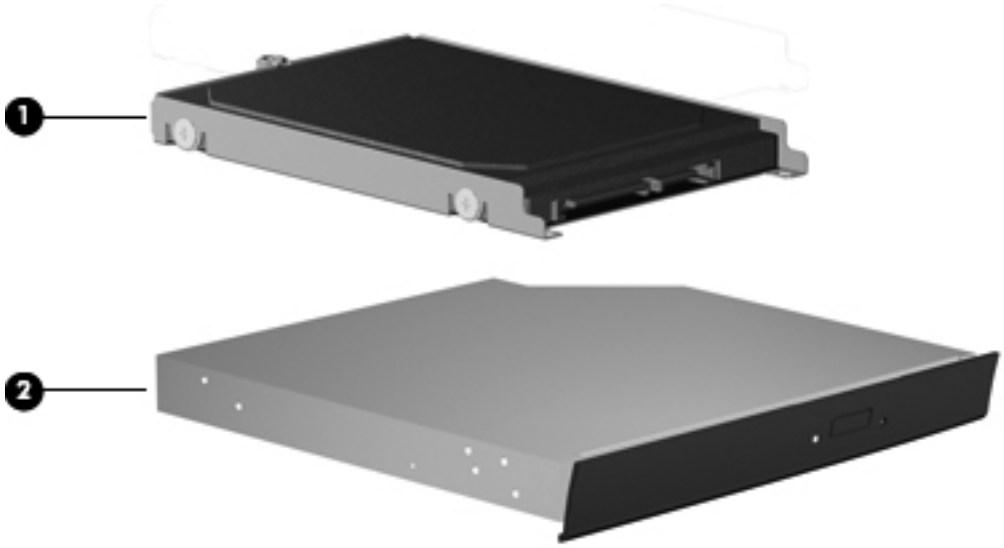
Item	Description	Spare part number
(1)	**Display bezel:**	
	■ For use only on computer models equipped with a webcam	577194-001
	■ For use only on computer models not equipped with a webcam	577195-001
(2)	**Webcam module**	577171-001
(3)	**Display hinges (2)**	577191-001
(4)	**Display panel cable:**	
	■ For use only on computer models equipped with a webcam	577663-001
	■ For use only on computer models not equipped with a webcam	577190-001
	Display Cable Kit:	
(5a)	■ For use only on computer models equipped with WWAN capability (includes WLAN and WWAN antenna transceivers and cables, and microphones and cables)	577228-001
(5b)	■ For use only on computer models not equipped with WWAN capability (includes WLAN antenna transceivers and cables, and microphones and cables)	578365-001
(6)	**Display enclosure:**	
	■ In black trim	577192-001
	■ In red trim	577193-001

Plastics Kit



Item	Description	Spare part number
	Plastics Kit:	577211-001
(1)	ExpressCard slot bezel	
(2)	SD Card Reader slot bezel	
(3)	Hard drive cover	
(4)	Memory/wireless module compartment cover	
(5)	Optical drive slot bezel	

Mass storage devices



Item	Description	Spare part number
(1)	**Hard drive** (includes hard drive connector and hard drive bracket):	
	■ 500-GB, 7200-rpm	579213-001
	■ 500-GB, 5400-rpm	577201-001
	■ 320-GB, 7200-rpm	579212-001
	■ 320-GB, 5400-rpm	577200-001
	■ 250-GB, 7200-rpm	577199-001
	■ 160-GB, 7200-rpm	577198-001
(2)	**Optical drive** (includes bezel and bracket):	
	■ Blu-ray ROM DVD±R/RW SuperMulti Double-Layer Drive with LightScribe	577202-001
	■ DVD±RW and CD-RW SuperMulti Double-Layer Drive with LightScribe	577204-001
	■ DVD-ROM Drive	577203-001

Miscellaneous parts

Description	Spare part number
AC adapters:	
■ 90-W PFC HP Smart Adapter (for use only on computer models equipped with graphics subsystems with discrete memory)	463955-001
■ 90-W PFC RC/V HP Smart Adapter (for use only on computer models equipped with graphics subsystems with discrete memory)	535593-001
■ 65-W PFC HP Smart Adapter (for use only on computer models equipped with graphics subsystems with UMA memory)	463958-001
■ 65-W PFC RC/V HP Smart Adapter (for use only on computer models equipped with graphics subsystems with UMA memory)	577170-001
Power cords:	
■ For use in Argentina	490371-D01
■ For use in Australia	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 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 People's Republic of China	490371-AA1
■ For use in the United Kingdom and Singapore	490371-031
■ For use in the United States	490371-001
Screw Kit: ■ Phillips PM3.0×4.0 screw ■ Phillips PM2.5×11.0 captive screw ■ Phillips PM2.5×8.0 screw ■ Phillips PM2.5×4.0 screw ■ Phillips PM2.0×9.0 captive screw ■ Phillips PM2.0×6.0 captive screw ■ Phillips PM2.0×5.0 screw ■ Phillips PM2.0×4.0 screw ■ Phillips PM2.0×3.0 screw ■ Phillips PM2.0×2.0 broadhead screw ■ Slotted Torx T8M2.5×7.0 screw ■ Torx T8M2.5×6.0 screw	577213-001

Sequential part number listing

Spare part number	Description
463955-001	90-W PFC HP Smart Adapter (for use only on computer models equipped with graphics subsystems with discrete memory)
463958-001	65-W PFC HP Smart Adapter (for use only on computer models equipped with graphics subsystems with UMA memory)
480985-001	Intel WiFi Link 5100 802.11b/g/n WLAN module for use in all countries and regions except Pakistan, Russia, and the Ukraine
482957-001	Intel WiFi Link 5100 802.11b/g WLAN module for use only in Pakistan, Russia, and the Ukraine
483377-002	HSPA EV-DO WWAN module for use in all countries and regions except the People's Republic of China
490371-001	Power cord for use in the United States
490371-011	Power cord for use in Australia
490371-021	Power cord for use in Europe, the Middle East, and Africa
490371-031	Power cord for use in the United Kingdom and Singapore
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 4312G 802.11b/g WLAN module for use in Canada, the Cayman Islands, Guam, Puerto Rico, the United States, and the U.S. Virgin Islands

(Continued)

Spare part number	Description
504593-004	Broadcom 4312G 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, Cambodia, Cameroon, Cape Verde, the Central African Republic, Chad, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial 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, Indonesia, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, 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, the People's Republic of China, Peru, the Philippines, Poland, Portugal, Qatar, 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, Syria, Taiwan, Tajikistan, Tanzania, Thailand, 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
504664-001	Broadcom 4322AGN 802.11b/g/n WLAN module for use in Canada, the Cayman Islands, Guam, Puerto Rico, the United States, and the U.S. Virgin Islands
504664-002	Broadcom 4322AGN 802.11b/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, Cambodia, Cameroon, Cape Verde, the Central African Republic, Chad, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial 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, Indonesia, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, 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, the People's Republic of China, Peru, the Philippines, Poland, Portugal, Qatar, 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, Syria, Taiwan, Tajikistan, Tanzania, Thailand, 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
507955-002	Intel Core2 Duo T9600 2.80-GHz processor (6-MB L2 cache, 1066-MHz FSB, includes replacement thermal material)
507960-001	Intel Core2 Duo P8700 2.53-GHz processor (3-MB L2 cache, 1066-MHz FSB, includes replacement thermal material)
507966-001	Intel Core2 Duo P7370 2.00-GHz processor (3-MB L2 cache, 1066-MHz FSB, includes replacement thermal material)

(Continued)

Spare part number	Description
510100-001	Modem module for use in all countries and regions except Australia and New Zealand ✎ The modem module spare part kit does not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 577214-001.
510100-011	Modem module for use only in Australia and New Zealand ✎ The modem module spare part kit does not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 577214-001.
513598-001	Intel Core Duo T6570 2.10-GHz processor (2-MB L2 cache, 800-MHz FSB, includes replacement thermal material, not available in Japan)
513599-001	Intel Core Duo T4200 2.00-GHz processor (1-MB L2 cache, 800-MHz FSB, includes replacement thermal material)
535593-001	90-W PFC RC/V HP Smart Adapter (for use only on computer models equipped with graphics subsystems with discrete memory)
535835-001	Intel Core Duo T5870 2.00-GHz processor (2-MB L2 cache, 800-MHz FSB, includes replacement thermal material, not available in Japan)
537921-001	Bluetooth module ✎ 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 577214-001.
572925-001	Intel Core Duo T3100 1.90-GHz processor (1-MB L2 cache, 800-MHz FSB, includes replacement thermal material)
572926-001	Intel Core Duo T3000 1.80-GHz processor (1-MB L2 cache, 800-MHz FSB, includes replacement thermal material)
572930-001	Intel Core2 Duo P7570 2.26-GHz processor (3-MB L2 cache, 1066-MHz FSB, includes replacement thermal material)
574246-001	Telecom EV-DO CT1 WWAN module for use only in the People's Republic of China
577170-001	65-W PFC RC/V HP Smart Adapter (for use only on computer models equipped with graphics subsystems with UMA memory)
577171-001	Webcam module
577172-001	13.3-in, LED, HD AntiGlare display assembly without webcam in black trim (includes 2 WLAN antenna transceivers and cables, nameplate, and logo)
577173-001	13.3-in, LED, HD AntiGlare display assembly with webcam and 2 WWAN antennas in black trim (includes 2 WLAN antenna transceivers and cables, 2 WWAN antenna transceivers and cables, nameplate, and logo)
577174-001	13.3-in, LED, HD AntiGlare display assembly with webcam in black trim (includes 2 WLAN antenna transceivers and cables, nameplate, and logo)
577175-001	13.3-in, LED, HD 1366 × 768 BrightView display assembly with webcam in black trim (includes 2 WLAN antenna transceivers and cables, nameplate, and logo)
577176-001	13.3-in, LED, HD 1366 × 768 BrightView display assembly with webcam and 2 WWAN antennas in black trim (includes 2 WLAN antenna transceivers and cables, 2 WWAN antenna transceivers and cables, nameplate, and logo)
577177-001	13.3-in, LED, HD 1366 × 768 BrightView display assembly without webcam in black trim (includes 2 WLAN antenna transceivers and cables, nameplate, and logo)
577178-001	13.3-in, LED, HD 1280 × 720 BrightView display assembly without webcam in black trim (includes 2 WLAN antenna transceivers and cables, nameplate, and logo)
577179-001	13.3-in, LED, HD 1280 × 720 BrightView display assembly with webcam in black trim (includes 2 WLAN antenna transceivers and cables, nameplate, and logo)

(Continued)

Spare part number	Description
577181-001	13.3-in, LED, HD AntiGlare display assembly without webcam in red trim (includes 2 WLAN antenna transceivers and cables, nameplate, and logo)
577182-001	13.3-in, LED, HD AntiGlare display assembly with webcam and 2 WWAN antennas in red trim (includes 2 WLAN antenna transceivers and cables, 2 WWAN antenna transceivers and cables, nameplate, and logo)
577183-001	13.3-in, LED, HD AntiGlare display assembly with webcam in red trim (includes 2 WLAN antenna transceivers and cables, nameplate, and logo)
577184-001	13.3-in, LED, HD 1366 × 768 BrightView display assembly with webcam in red trim (includes 2 WLAN antenna transceivers and cables, nameplate, and logo)
577185-001	13.3-in, LED, HD 1366 × 768 BrightView display assembly with webcam and 2 WWAN antennas in red trim (includes 2 WLAN antenna transceivers and cables, 2 WWAN antenna transceivers and cables, nameplate, and logo)
577186-001	13.3-in, LED, HD 1366 × 768 BrightView display assembly without webcam in red trim (includes 2 WLAN antenna transceivers and cables, nameplate, and logo)
577187-001	13.3-in, LED, HD 1280 × 720 BrightView display assembly without webcam in red trim (includes 2 WLAN antenna transceivers and cables, nameplate, and logo)
577188-001	13.3-in, LED, HD 1280 × 720 BrightView display assembly with webcam in red trim (includes 2 WLAN antenna transceivers and cables, nameplate, and logo)
577190-001	Display panel cable for use only on computer models not equipped with a webcam
577191-001	Display hinges
577192-001	Display enclosure in black trim
577193-001	Display enclosure in red trim
577194-001	Display bezel for use only on computer models equipped with a webcam
577195-001	Display bezel for use only on computer models not equipped with a webcam
577196-001	1024-MB memory module (1333-MHz, DDR2)
577197-001	2048-MB memory module (1333-MHz, DDR2)
577198-001	160-GB, 7200-rpm hard drive (includes hard drive connector and hard drive bracket)
577199-001	250-GB, 7200-rpm hard drive (includes hard drive connector and hard drive bracket)
577200-001	320-GB, 5400-rpm hard drive (includes hard drive connector and hard drive bracket)
577201-001	500-GB, 5400-rpm hard drive (includes hard drive connector and hard drive bracket)
577202-001	Blu-ray ROM DVD±R/RW SuperMulti Double-Layer Drive with LightScribe (includes bezel and bracket)
577203-001	DVD-ROM Drive (includes bezel and bracket)
577204-001	DVD±RW and CD-RW SuperMulti Double-Layer Drive with LightScribe (includes bezel and bracket)
577205-001	Keyboard for use in the United States (includes cable)
577205-031	Keyboard for use in the United Kingdom (includes cable)
577205-041	Keyboard for use in Germany (includes cable)
577205-051	Keyboard for use in France (includes cable)
577205-061	Keyboard for use in Italy (includes cable)
577205-071	Keyboard for use in Spain (includes cable)
577205-081	Keyboard for use in Denmark (includes cable)
577205-091	Keyboard for use in Norway (includes cable)

(Continued)

Spare part number	Description
577205-121	Keyboard for use in French Canada (includes cable)
577205-131	Keyboard for use in Portugal (includes cable)
577205-141	Keyboard for use in Turkey (includes cable)
577205-161	Keyboard for use in Latin America (includes cable)
577205-171	Keyboard for use in Saudi Arabia (includes cable)
577205-201	Keyboard for use in Brazil (includes cable)
577205-211	Keyboard for use in Hungary (includes cable)
577205-221	Keyboard for use in the Czech Republic (includes cable)
577205-231	Keyboard for use in Slovakia (includes cable)
577205-251	Keyboard for use in Russia (includes cable)
577205-261	Keyboard for use in Bulgaria (includes cable)
577205-281	Keyboard for use in Thailand (includes cable)
577205-291	Keyboard for use in Japan (includes cable)
577205-A41	Keyboard for use in Belgium (includes cable)
577205-AB1	Keyboard for use in Taiwan (includes cable)
577205-AD1	Keyboard for use in South Korea (includes cable)
577205-B31	Keyboard for use in the Netherlands (includes cable)
577205-B71	Keyboard for use in Sweden and Finland (includes cable)
577205-BA1	Keyboard for use in Slovenia (includes cable)
577205-BB1	Keyboard for use in Israel (includes cable)
577205-BG1	Keyboard for use in Switzerland (includes cable)
577205-DD1	Keyboard for use in Iceland (includes cable)
577205-DJ1	Keyboard for use in Greece (includes cable)
577206-001	Fan (includes replacement thermal material)
577207-001	Switch cover in black trim (includes LED board and cable)
577208-001	Switch cover in red trim (includes LED board and cable)
577209-001	Base enclosure (includes 5 rubber feet)
577211-001	Plastics Kit ✎ See “Plastics Kit” on page 3-12 for more Plastics Kit spare part information.
577212-001	Rubber Feet Kit (includes 5 rubber feet and 8 display bezel screw covers)
577213-001	Screw Kit
577214-001	Cable Kit ✎ See “Cable Kit” on page 3-9 for more Cable Kit spare part information.
577215-001	Speakers (include cables)
577216-001	Top cover for use only on computer models equipped with fingerprint reader in black trim (includes palm rest, fingerprint reader board and cable, TouchPad and cable, and TouchPad button board and cable)

(Continued)

Spare part number	Description
577217-001	Top cover for use only on computer models not equipped with fingerprint reader in black trim (includes palm rest, TouchPad and cable, and TouchPad button board and cable)
577218-001	Top cover for use only on computer models equipped with fingerprint reader in red trim (includes palm rest, fingerprint reader board and cable, TouchPad and cable, and TouchPad button board and cable)
577219-001	Top cover for use only on computer models not equipped with fingerprint reader in red trim (includes palm rest, TouchPad and cable, and TouchPad button board and cable)
577220-001	GL40 system board for use only on computer models equipped with graphics subsystems with UMA memory and not equipped with WWAN capability (includes replacement thermal material)
577221-001	GL40 system board for use only on computer models equipped with graphics subsystems with UMA memory and equipped with WWAN capability (includes replacement thermal material)
577222-001	PM45 system board for use only on computer models equipped with graphics subsystems with discrete memory and not equipped with WWAN capability (includes replacement thermal material)
577223-001	PM45 system board for use only on computer models equipped with graphics subsystems with discrete memory and equipped with WWAN capability (includes replacement thermal material)
577224-001	GM45 system board for use only on computer models equipped with graphics subsystems with UMA memory and not equipped with WWAN capability (includes replacement thermal material)
577225-001	GM45 system board for use only on computer models equipped with graphics subsystems with UMA memory and equipped with WWAN capability (includes replacement thermal material)
577226-001	Heat sink for use only on computer models equipped with a graphics subsystem with UMA memory (includes replacement thermal material)
577227-001	Heat sink for use only on computer models equipped with a graphics subsystem with discrete memory (includes replacement thermal material)
577228-001	Display Cable Kit for use only on computer models equipped with WWAN capability (includes WLAN and WWAN antenna transceivers and cables, and microphones and cables)
577659-001	USB board (includes cable)
577661-001	Power button board for use only on computer models not equipped with WWAN capability (includes two cables)
577662-001	Power button board for use only on computer models equipped with WWAN capability (includes SIM slot and two cables)
577663-001	Display panel cable for use only on computer models equipped with a webcam
578365-001	Display Cable Kit for use only on computer models not equipped with WWAN capability (includes WLAN antenna transceivers and cables, and microphones and cables)
579212-001	320-GB, 7200-rpm hard drive (includes hard drive connector and hard drive bracket)
579213-001	500-GB, 7200-rpm hard drive (includes hard drive connector and hard drive bracket)
579319-001	*4-cell, 2.20-Ah (37-Wh) Li-ion battery*
579320-001	8-cell, 2.55-Ah (73-Wh) Li-ion battery
581926-001	RTC battery
582724-001	Telecom EV-DO CT2 WWAN module for use only in the People's Republic of China
583090-001	13.3-in, LED, HD 1280 × 720 BrightView display assembly with webcam and 2 WWAN antennas in black trim (includes 2 WLAN antenna transceivers and cables, 2 WWAN antenna transceivers and cables, nameplate, and logo)
583091-001	13.3-in, LED, HD 1280 × 720 BrightView display assembly with webcam and 2 WWAN antennas in red trim (includes 2 WLAN antenna transceivers and cables, 2 WWAN antenna transceivers and cables, nameplate, and logo)

4

Removal and replacement procedures

Preliminary replacement requirements

Tools required

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

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

Service considerations

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

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

Plastic parts

CAUTION: Using excessive force during disassembly and reassembly can damage plastic parts. Use care when handling the plastic parts. Apply pressure only at the points designated in the maintenance instructions.

Cables and connectors

CAUTION: When servicing the computer, be sure that cables are placed in their proper locations during the reassembly process. Improper cable placement can damage the computer.

Cables must be handled with extreme care to avoid damage. Apply only the tension required to unseat or seat the cables during removal and insertion. Handle cables by the connector whenever possible. In all cases, avoid bending, twisting, or tearing cables. Be sure that cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced. Handle flex cables with extreme care; these cables tear easily.

Drive handling

CAUTION: Drives are fragile components that must be handled with care. To prevent damage to the computer, damage to a drive, or loss of information, observe these precautions:

- Before removing or inserting a hard drive, shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
- Before handling a drive, be sure that you are discharged of static electricity. While handling a drive, avoid touching the connector.
- Before removing a diskette drive or optical drive, be sure that a diskette or disc is not in the drive and be sure that the optical drive tray is closed.
- Handle drives on surfaces covered with at least one inch of shock-proof foam.
- Avoid dropping drives from any height onto any surface.
- After removing a hard drive, an optical drive, or a diskette drive, place it in a static-proof bag.
- Avoid exposing a hard drive to products that have magnetic fields, such as monitors or speakers.
- Avoid exposing a drive to temperature extremes or liquids.
- If a drive must be mailed, place the drive in a bubble pack mailer or other suitable form of protective packaging and label the package "FRAGILE."

Grounding guidelines

Electrostatic discharge damage

Electronic components are sensitive to electrostatic discharge (ESD). Circuitry design and structure determine the degree of sensitivity. Networks built into many integrated circuits provide some protection, but in many cases, ESD contains enough power to alter device parameters or melt silicon junctions.

A discharge of static electricity from a finger or other conductor can destroy static-sensitive devices or microcircuitry. Even if the spark is neither felt nor heard, damage may have occurred.

An electronic device exposed to ESD may not be affected at all and can work perfectly throughout a normal cycle. Or, the device may function normally for a while, and then degrade in the internal layers, reducing its life expectancy.

CAUTION: To prevent damage to the computer when you are removing or installing internal components, observe these precautions:

- Keep components in their electrostatic-safe containers until you are ready to install them.
- Use nonmagnetic tools.
- Before touching an electronic component, discharge static electricity by using the guidelines described in this section.
- Avoid touching pins, leads, and circuitry. Handle electronic components as little as possible.
- If you remove a component, place it in an electrostatic-safe container.

The following table shows how humidity affects the electrostatic voltage levels generated by different activities.

CAUTION: A product can be degraded by as little as 700 V.

Typical electrostatic voltage levels

	Relative humidity		
Event	**10%**	**40%**	**55%**
Walking across carpet	35,000 V	15,000 V	7,500 V
Walking across vinyl floor	12,000 V	5,000 V	3,000 V
Motions of bench worker	6,000 V	800 V	400 V
Removing DIPS from plastic tube	2,000 V	700 V	400 V
Removing DIPS from vinyl tray	11,500 V	4,000 V	2,000 V
Removing DIPS from Styrofoam	14,500 V	5,000 V	3,500 V
Removing bubble pack from PCB	26,500 V	20,000 V	7,000 V
Packing PCBs in foam-lined box	21,000 V	11,000 V	5,000 V

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe tubes, bags, or boxes.
- Protect ESD-sensitive parts and assemblies with conductive or approved containers or packaging.
- Keep ESD-sensitive parts in their containers until they arrive at static-free workstations.
- Place items on a grounded surface before them 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 workstation grounding 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

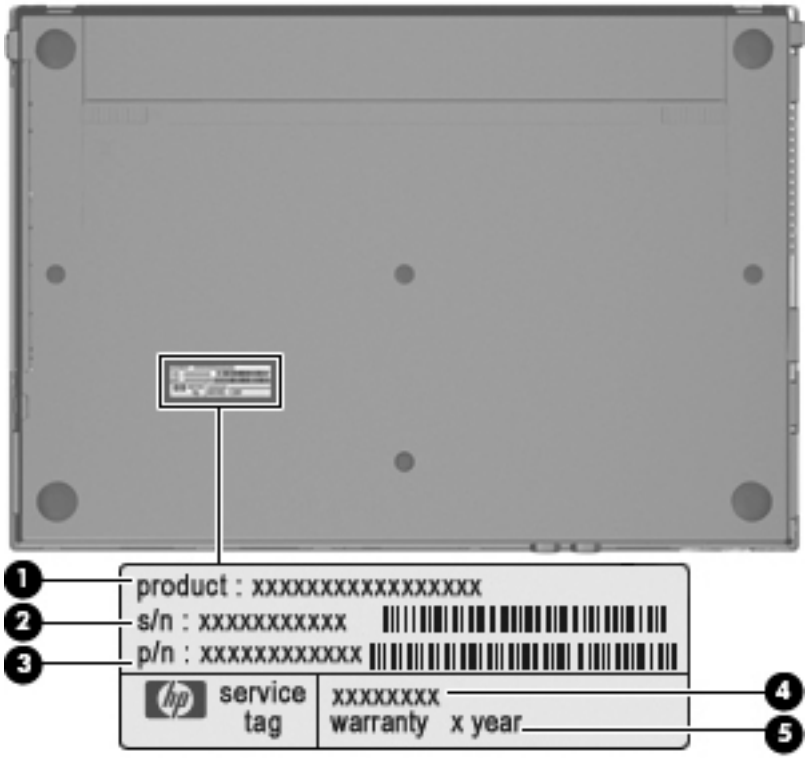
Component replacement procedures

This chapter provides removal and replacement procedures.

There are as many as 76 screws, in 12 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 number provided on the service tag.

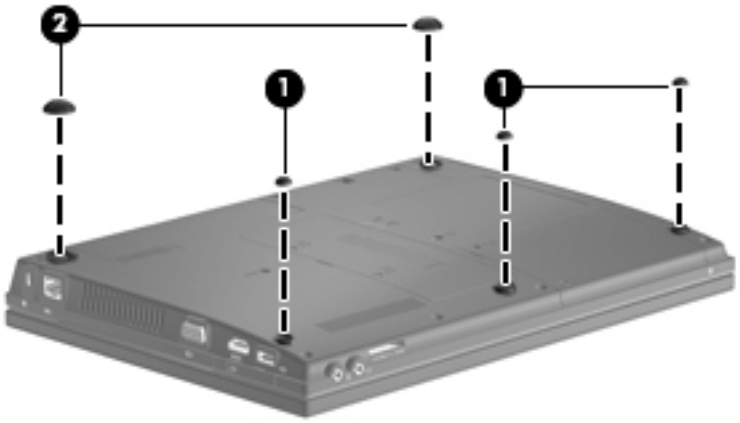


Item	Component	Description
(1)	Product name	This is the product name affixed to the front of the computer.
(2)	Serial number (s/n)	This is an alphanumeric identifier that is unique to each product.
(3)	Part number/Product number (p/n)	This number provides specific information about the product's hardware components. The part number helps a service technician 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 the computer.

Computer feet

The computer feet are adhesive-backed rubber pads. The feet are included in the Rubber Feet Kit, spare part number 577212-001. There are 5 rubber feet that attach to the base enclosure in the locations shown in the following illustration.

The three rubber feet ❶ on the front edge of the computer are smaller than the two rubber feet ❷ on the rear edge of the computer.



Battery

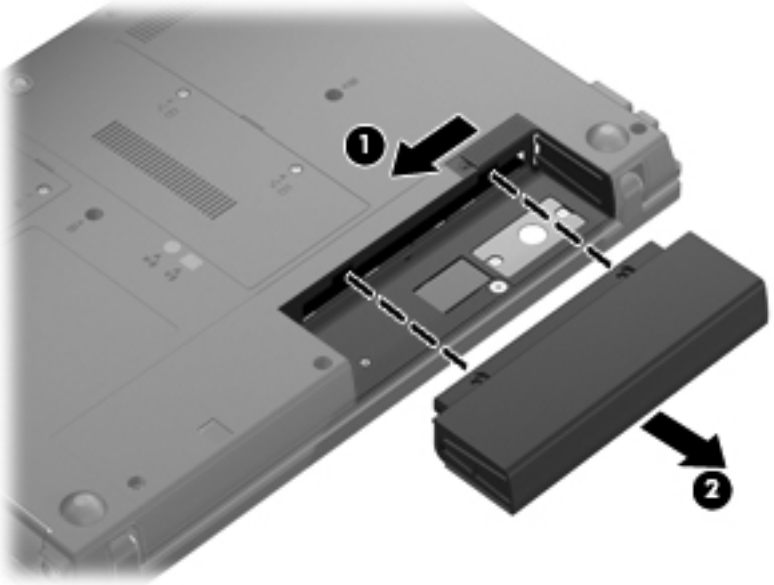
Description	Spare part number
8-cell, 2.55-Ah (73-Wh) Li-ion battery	579320-001
4-cell, 2.20-Ah (37-Wh) Li-ion battery	579319-001

Before removing the battery, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.

Remove the battery:

1. Turn the computer upside down on a flat surface, with the battery bay toward you.
2. Slide the battery release latch ❶ to release the battery.
3. Remove the battery ❷.



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

SIM

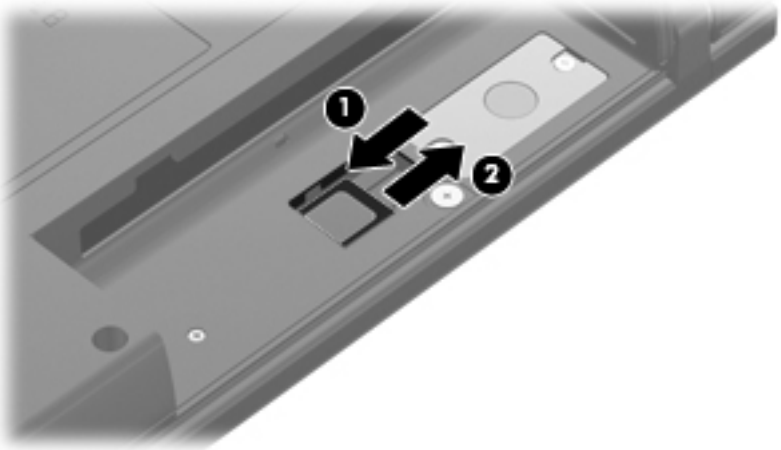
The SIM is provided by the end user as a security measure for the WWAN module. The SIM should be removed, placed into a static-dissipative container, and then replaced when the computer is reassembled.

Before removing the SIM, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see "Battery" on page 4-7).

Remove the SIM:

1. Press in on the SIM ❶ to release it from the SIM slot.
2. Remove the SIM ❷ from the computer.



Install the SIM by inserting it into the SIM slot until you hear a click.

Hard drive

The hard drive spare part kit includes a hard drive connector and hard drive bracket.

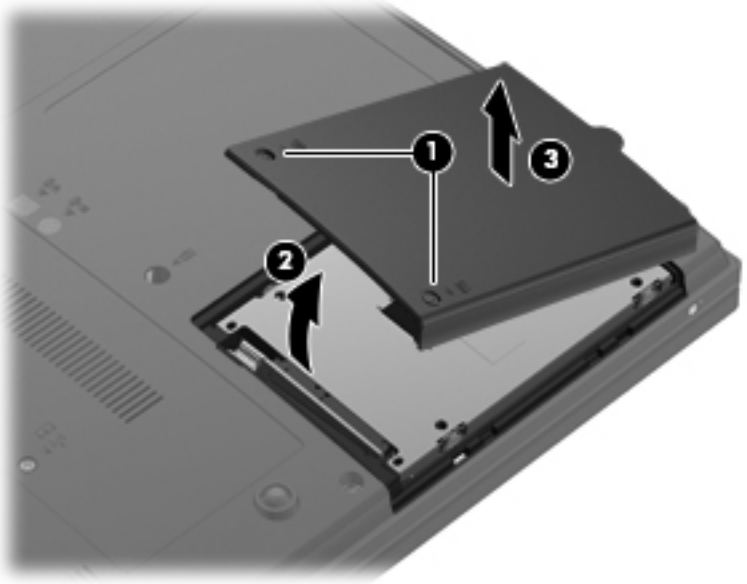
Description	Spare part number
500-GB, 7200-rpm hard drive	579213-001
500-GB, 5400-rpm hard drive	577201-001
320-GB, 7200-rpm hard drive	579212-001
320-GB, 5400-rpm hard drive	577200-001
250-GB, 7200-rpm hard drive	577199-001
160-GB, 7200-rpm hard drive	577198-001

Before removing the hard drive, follow these steps:

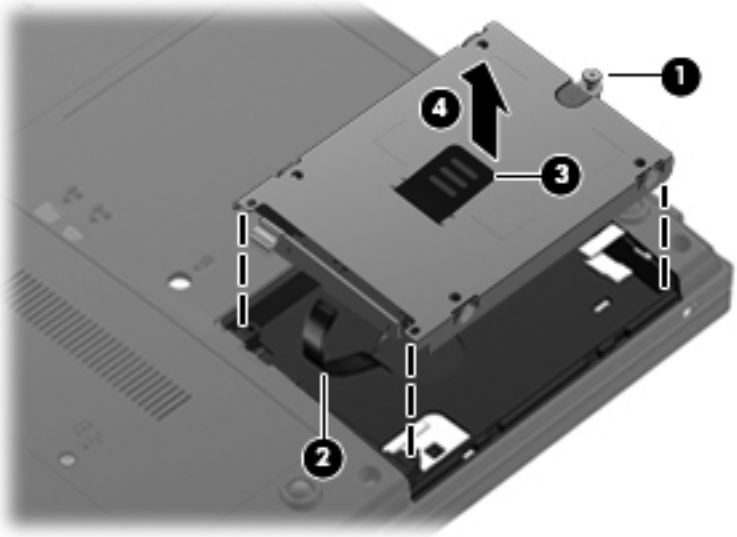
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see "Battery" on page 4-7).

Remove the hard drive:

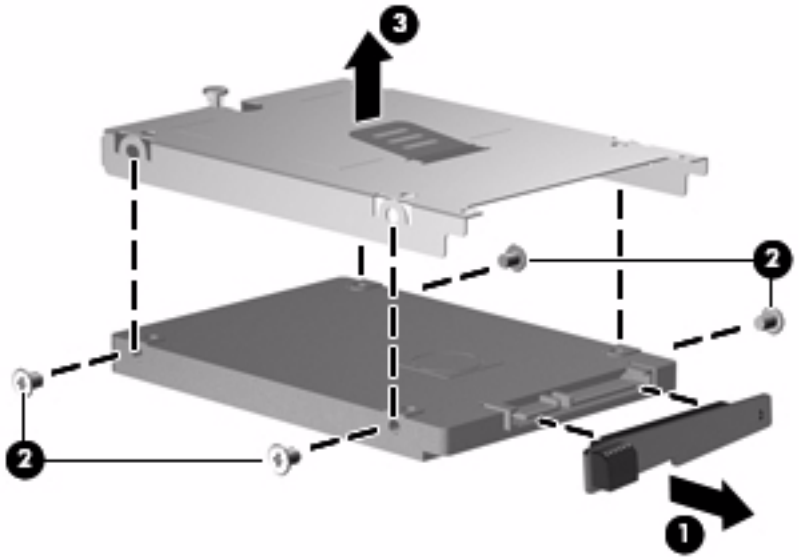
1. Position the computer with the front toward you.
2. Loosen the two Phillips PM2.0×6.0 captive screws ❶ that secure the hard drive cover to the computer.
3. Lift the left side ❷ of the hard drive cover to detach it from the computer.
4. Remove the hard drive cover ❸. The hard drive cover is included in the Plastics Kit, spare part number 577211-001.



5. Loosen the Phillips PM2.5×11.0 captive screw ❶ that secures the hard drive to the computer.
6. Grasp the Mylar tab ❷ in the hard drive bay, and then lift it up to disconnect the hard drive from the system board.
7. Grasp the Mylar tab ❸ on the hard drive, and then remove the hard drive ❹ from the hard drive bay.



8. If it is necessary to replace the hard drive bracket or connector, follow these steps:
   a. Disconnect the hard drive connector ❶ from the hard drive.
   b. Remove the four Phillips PM3.0×4.0 screws ❷ that secure the hard drive bracket to the hard drive.
   c. Lift the bracket ❸ straight up to remove it from the hard drive.



Reverse this procedure to reassemble and install the hard drive.

WLAN module

Description	Spare part number
802.11b/g/n WLAN module:	
■ Intel Wi-Fi Link 5100 802.11b/g/n WLAN module for use in all countries and regions except Pakistan, Russia, and the Ukraine	480985-001
■ Broadcom 4322AGN 802.11b/g/n WLAN module for use in Canada, the Cayman Islands, Guam, Puerto Rico, the United States, and the U.S. Virgin Islands	504664-001
■ Broadcom 4322AGN 802.11b/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, Cambodia, Cameroon, Cape Verde, the Central African Republic, Chad, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial 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, Indonesia, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, 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, the People's Republic of China, Peru, the Philippines, Poland, Portugal, Qatar, 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, Syria, Taiwan, Tajikistan, Tanzania, Thailand, 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	504664-002
Intel Wi-Fi Link 5100 802.11b/g WLAN module for use only in Pakistan, Russia, and the Ukraine	482957-001

(Continued)

Description	Spare part number
802.11b/g WLAN module:	
■ Broadcom 4312G 802.11b/g WLAN module for use in Canada, the Cayman Islands, Guam, Puerto Rico, the United States, and the U.S. Virgin Islands	504593-003
■ Broadcom 4312G 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, Cambodia, Cameroon, Cape Verde, the Central African Republic, Chad, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial 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, Indonesia, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, 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, the People's Republic of China, Peru, the Philippines, Poland, Portugal, Qatar, 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, Syria, Taiwan, Tajikistan, Tanzania, Thailand, 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

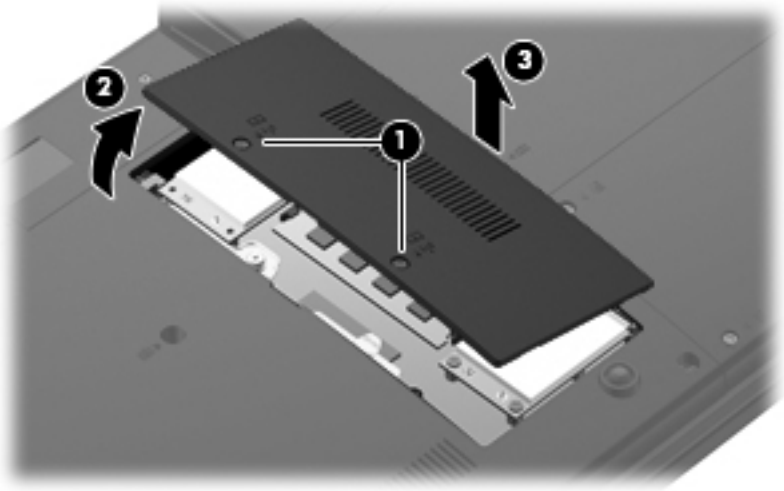
Before removing the WLAN module, follow these steps:

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 4-7).

Remove the WLAN module:

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.

1. Position the computer with the front toward you.
2. Loosen the two Phillips PM2.0×6.0 captive screws ❶ that secure the memory/wireless module compartment cover to the computer.
3. Lift the left side of the cover ❷ to detach it from the computer.
4. Remove the memory/wireless module compartment cover ❸. The memory/wireless module compartment cover is included in the Plastics Kit, spare part number 577211-001.

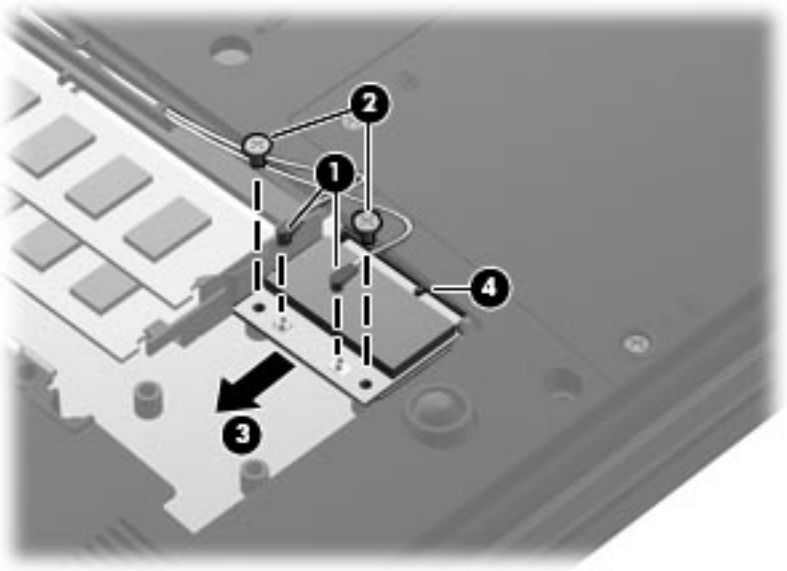


5. Disconnect the WLAN antenna cables ❶ from the terminals on the WLAN module.

   ✎ 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.

6. Remove the two Phillips PM2.5×4.0 screws ❷ that secure the WLAN module to the computer. (The WLAN module tilts up.)
7. Remove the WLAN module ❸ by pulling it away from the slot at an angle.

   ✎ WLAN modules are designed with a notch ❹ to prevent incorrect insertion of the WLAN module into the WLAN module slot.



Reverse this procedure to install the WLAN module.

Memory module

Description	Spare part number
2048-MB memory module (1333-MHz, DDR2)	577197-001
1024-MB memory module (1333-MHz, DDR2)	577196-001

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 4-7).
5. Remove the memory/wireless module compartment cover (see "WLAN module" on page 4-12).

Remove the memory module:

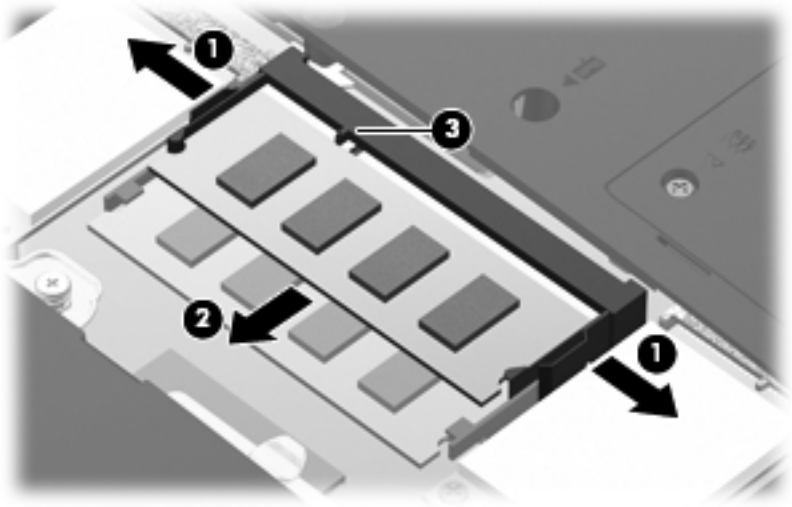
The top memory module slot is for expansion memory, and the bottom slot is for primary memory.

1. Pull away the retention clips ❶ on each side of the memory module to release the memory module. (The memory module tilts up.)

CAUTION: To prevent damage to the memory module, hold it by the edges only. Do not touch the components on the memory module.

2. Grasp the edge of the memory module ❷, and then pull it out of the memory module slot.

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



Reverse this procedure to install a memory module.

WWAN module

Description	Spare part number
HSPA EV-DO WWAN module for use in all countries and regions except the People's Republic of China	483377-002
Telecom EV-DO CT1 WWAN module for use only in the People's Republic of China	574246-001
Telecom EV-DO CT2 WWAN module for use only in the People's Republic of China	582724-001

Before removing the WWAN module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see "Battery" on page 4-7).
5. Remove the memory/wireless module compartment cover (see "WLAN module" on page 4-12).

Remove the WWAN module:

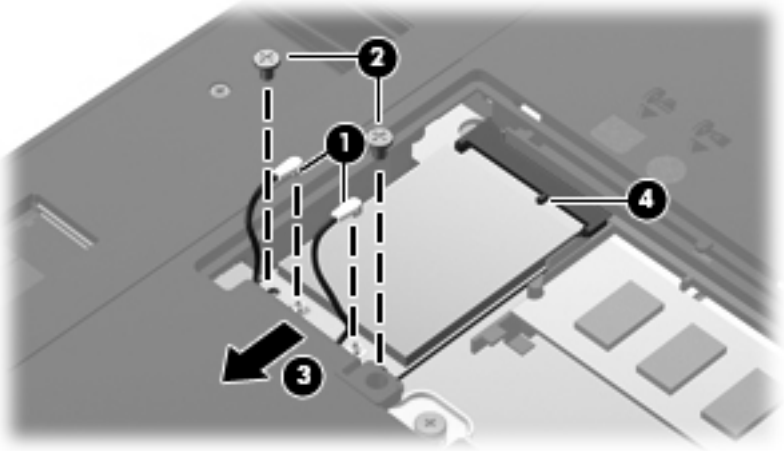
CAUTION: To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module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

1. Position the computer with the front toward you.
2. Disconnect the WWAN antenna cables ❶ from the terminals on the WWAN module.

   ✎ The red WWAN antenna cable is connected to the WWAN module "Main" terminal. The blue WWAN antenna cable is connected to the WWAN module "Aux" terminal.

3. Remove the two Phillips PM2.5×4.0 screws ❷ that secure the WWAN module to the computer. (The WWAN module tilts up.)
4. Remove the WWAN module ❸ by pulling it away from the slot at an angle.

   ✎ WWAN modules are designed with a notch ❹ to prevent incorrect insertion of the WWAN module into the WWAN module slot.



Reverse this procedure to install the WWAN module.

Optical drive

The optical drive spare part kit includes an optical drive bezel and bracket.

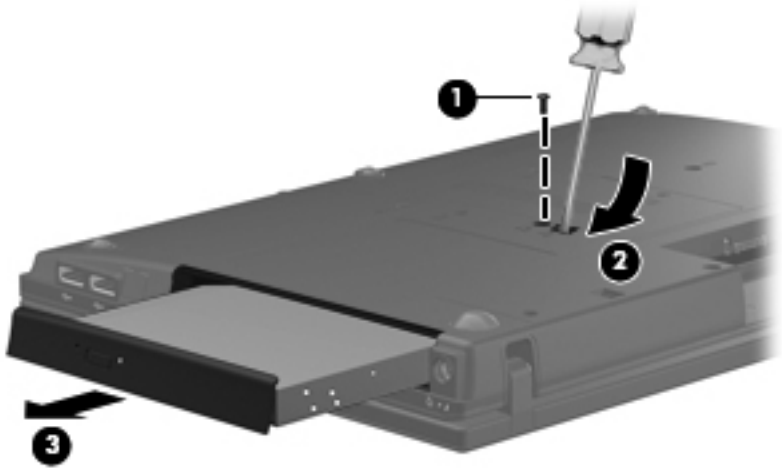
Description	Spare part number
Blu-ray ROM DVD±R/RW SuperMulti Double-Layer Drive with LightScribe	577202-001
DVD±RW and CD-RW SuperMulti Double-Layer Drive with LightScribe	577204-001
DVD-ROM Drive	577203-001

Before removing the optical drive, follow these steps:

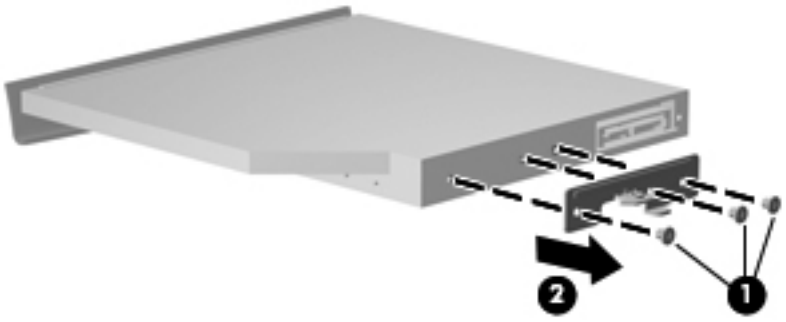
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see "Battery" on page 4-7).

Remove the optical drive:

1. Remove the slotted Phillips PM2.5×8.0 screw ❶ that secures the optical drive to the computer.
2. Insert a flat-bladed screwdriver or similar tool into the optical drive tab access ❷, and then press the tab to the left to release the optical drive from the computer.
3. Remove the optical drive ❸ from the optical drive bay.



4. If it is necessary to replace the optical drive bracket, follow these steps:
   a. Position the optical drive with the rear toward you.
   b. Remove the three Phillips PM2.0×4.0 screws ❶ that secure the optical drive bracket to the optical drive.
   c. Remove the optical drive bracket ❷.



Reverse this procedure to reassemble and install the optical drive.

Keyboard and switch cover

The switch cover spare part kit includes an LED board and cable.

Description	Spare part number
Switch cover in black trim	577207-001
Switch cover in red trim	577208-001

The keyboard spare part kit includes a keyboard cable.

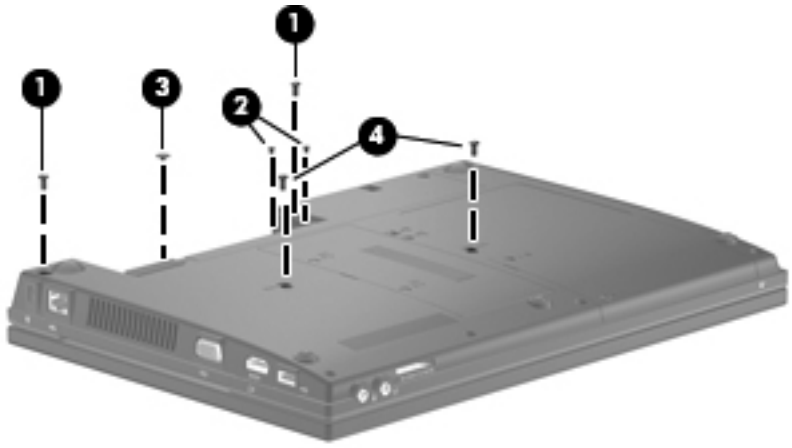
Keyboard for use in country or region:	Spare part number	Keyboard for use in country or region:	Spare part number
■ Belgium	577205-A41	■ Norway	577205-091
■ Brazil	577205-201	■ Portugal	577205-131
■ Bulgaria	577205-261	■ Russia	577205-251
■ The Czech Republic	577205-221	■ Saudi Arabia	577205-171
■ Denmark	577205-081	■ Slovakia	577205-231
■ France	577205-051	■ Slovenia	577205-BA1
■ French Canada	577205-121	■ South Korea	577205-AD1
■ Germany	577205-041	■ Spain	577205-071
■ Greece	577205-DJ1	■ Sweden and Finland	577205-B71
■ Hungary	577205-211	■ Switzerland	577205-BG1
■ Iceland	577205-DD1	■ Taiwan	577205-AB1
■ Israel	577205-BB1	■ Thailand	577205-281
■ Italy	577205-061	■ Turkey	577205-141
■ Japan	577205-291	■ The United Kingdom	577205-031
■ Latin America	577205-161	■ The United States	577205-001
■ The Netherlands	577205-B31		

Before removing the keyboard and switch cover, follow these steps:

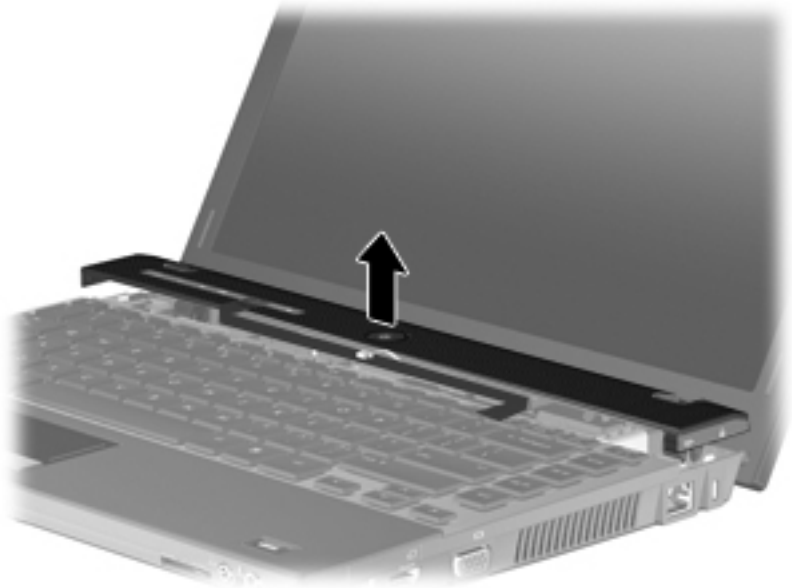
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see "Battery" on page 4-7).

Remove the keyboard and switch cover:

1. Position the computer with the front toward you.
2. Remove the following screws:
   - ❏ Two slotted Torx T8M2.5×7.0 screws ❶ that secure the switch cover to the computer
   - ❏ Two Phillips PM2.0×5.0 screws ❷ that secure the switch cover to the computer in the battery bay
   - ❏ One Phillips PM2.0×2.0 broadhead screw ❸ that secures the switch cover to the computer in the battery bay
   - ❏ Two slotted Torx T8M2.5×7.0 screws ❹ that secure the keyboard to the computer

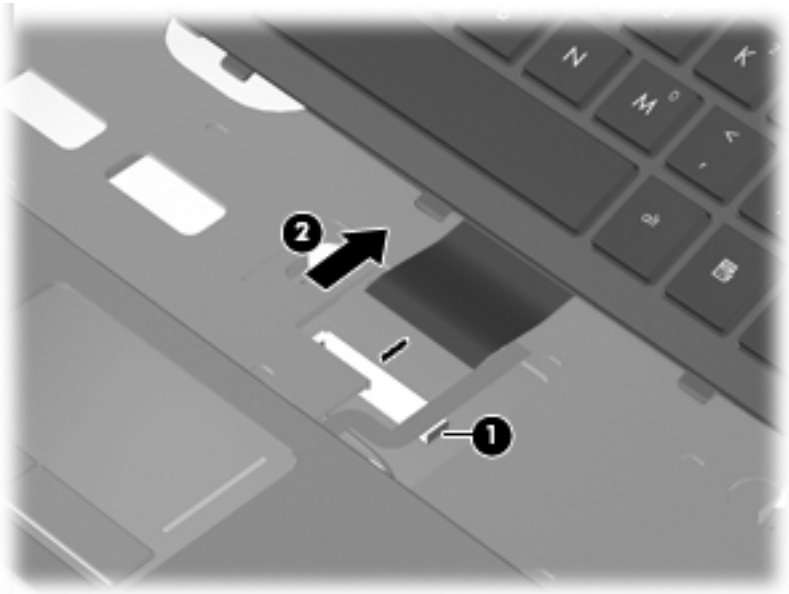


3. Turn the computer display-side up, with the front toward you.
4. Open the computer as far as possible.
5. Lift the switch cover until it releases from the computer.

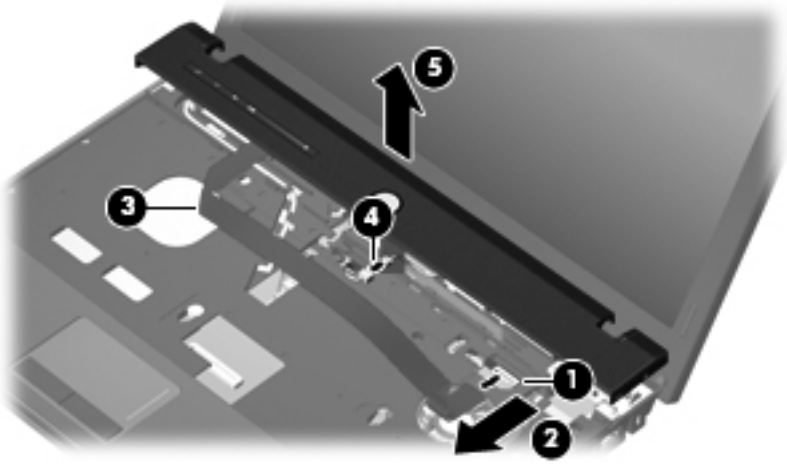


6. Lift the rear edge ❶ of the keyboard until it rests at an angle.
7. Slide the keyboard ❷ back until it rests on the switch cover and display.

8. Release the zero insertion force (ZIF) connector ❶ to which the keyboard cable is attached, and then disconnect the keyboard cable ❷ from the system board.



9. Remove the keyboard.
10. Release the ZIF connector ❶ to which the LED board cable is attached, and then disconnect the LED board cable ❷ from the system board.
11. Detach the LED board cable ❸ from the top cover. (The LED board cable is attached to the top cover with double-sided tape.)
12. Disconnect the speaker cable ❹ from the system board.
13. Remove the switch cover ❺.



Reverse this procedure to install the keyboard and switch cover.

Speakers

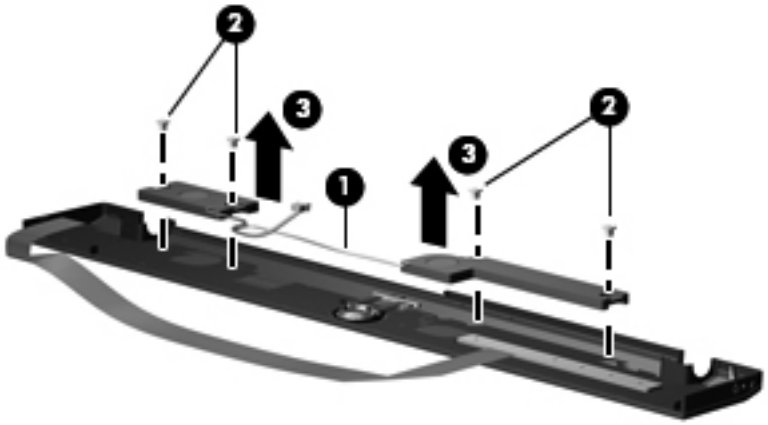
Description	Spare part number
Speakers (include cables)	577215-001

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 4-7).
5. Remove the keyboard and switch cover (see "Keyboard and switch cover" on page 4-20).

Remove the speakers:

1. Turn the switch cover upside down, with the front edge toward you.
2. Remove the speaker cable ❶ from the clips built into the switch cover.
3. Remove the four Phillips PM2.0×4.0 screws ❷ that secure the speakers to the switch cover.
4. Remove the speakers ❸.



Reverse this procedure to install the speakers.

Palm rest

The palm rest is included with the top cover. See "Top cover" on page 4-36 for top cover spare part and removal information.

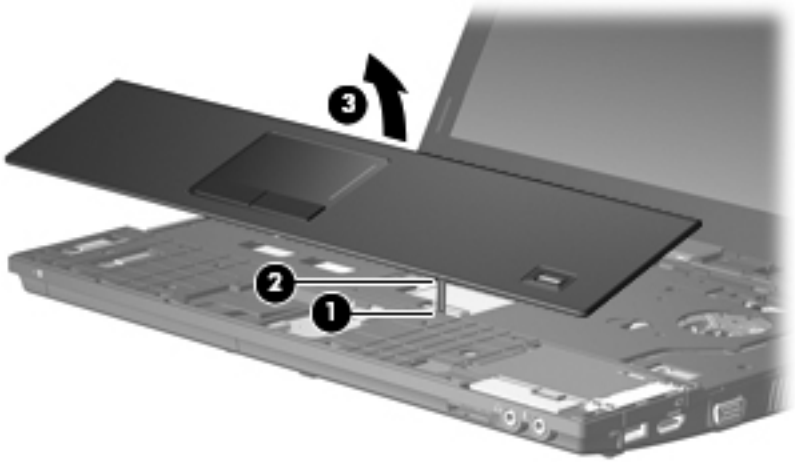
Before removing the palm rest, follow these steps:

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 4-7).
5. Remove the keyboard and switch cover (see "Keyboard and switch cover" on page 4-20).

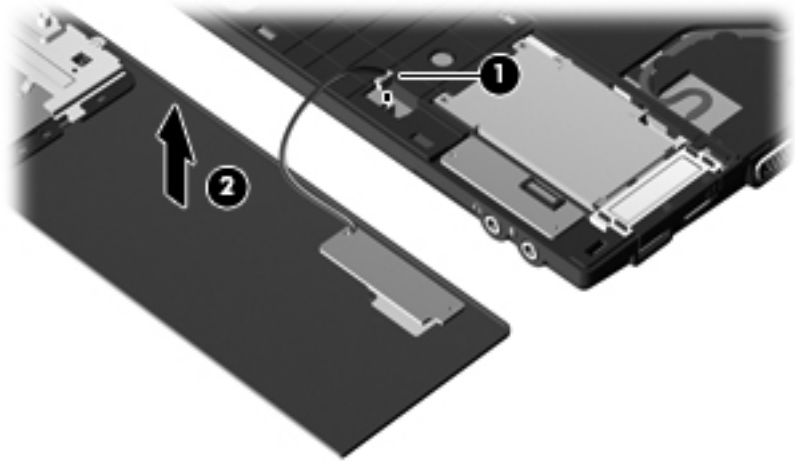
Remove the palm rest:

1. Close the computer.
2. Turn the computer upside down, with the front toward you.
3. Remove the slotted Torx T8M2.5×7.0 screw that secures the palm rest to the computer.

4. Release the ZIF connector ❶ to which the TouchPad cable is attached, and then disconnect the TouchPad cable ❷ from the system board.
5. Lift the rear edge of the palm rest ❸ until it detaches from the computer, and then swing the palm rest up and forward until it rests upside down in front of the computer.



6. Disconnect the fingerprint reader board cable ❶ from the system board.
7. Remove the palm rest ❷.



Reverse this procedure to install the palm rest.

Display assembly

The display assembly spare part kit includes two WLAN antenna transceivers and cables, nameplate, and logo.

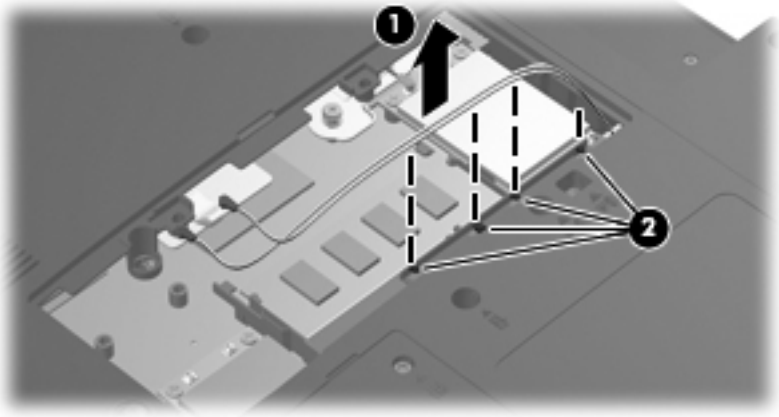
Description	Spare part number
13.3-in, LED, HD display assembly:	
■ AntiGlare display assembly with webcam and 2 WWAN antennas in black trim	577173-001
■ AntiGlare display assembly with webcam and 2 WWAN antennas in red trim	577182-001
■ AntiGlare display assembly with webcam in black trim	577174-001
■ AntiGlare display assembly with webcam in red trim	577183-001
■ AntiGlare display assembly without webcam in black trim	577172-001
■ AntiGlare display assembly without webcam in red trim	577181-001
■ 1366 × 768 BrightView display assembly with webcam and 2 WWAN antennas in black trim	577176-001
■ 1366 × 768 BrightView display assembly with webcam and 2 WWAN antennas in red trim	577185-001
■ 1366 × 768 BrightView display assembly with webcam in black trim	577175-001
■ 1366 × 768 BrightView display assembly with webcam in red trim	577184-001
■ 1366 × 768 BrightView display assembly without webcam in black trim	577177-001
■ 1366 × 768 BrightView display assembly without webcam in red trim	577186-001
■ 1280 × 720 BrightView display assembly with webcam and 2 WWAN antennas in black trim	583090-001
■ 1280 × 720 BrightView display assembly with webcam and 2 WWAN antennas in red trim	583091-001
■ 1280 × 720 BrightView display assembly with webcam in black trim	577179-001
■ 1280 × 720 BrightView display assembly with webcam in red trim	577188-001
■ 1280 × 720 BrightView display assembly without webcam in black trim	577178-001
■ 1280 × 720 BrightView display assembly without webcam in red trim	577187-001

Before removing the display assembly, follow these steps:

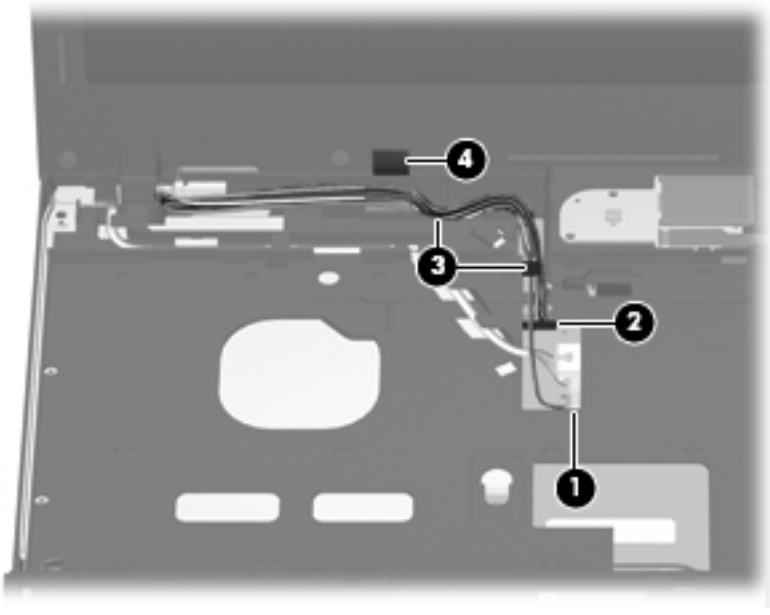
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see "Battery" on page 4-7).
5. Disconnect the wireless antenna cables from the WLAN module (see "WLAN module" on page 4-12) and WWAN module (see "WWAN module" on page 4-17).
6. Remove the keyboard and switch cover (see "Keyboard and switch cover" on page 4-20).

Remove the display assembly:

1. Close the computer.
2. Turn the computer upside down, with the front toward you.
3. Remove the WLAN and WWAN antenna cables ❶ from the clips ❷ built into the base enclosure.



4. Turn the computer display-side up, with the front toward you.
5. Open the computer as far as possible.
6. Disconnect the microphone cable ❶ from the system board.
7. Remove the wireless antenna cables ❷ from the opening in the top cover.
8. Remove the wireless antenna cables and the microphone cable from the clips ❸ and routing channel built into the top cover.
9. Release the grounding tape ❹ that covers the wireless antenna cables and microphone cable.

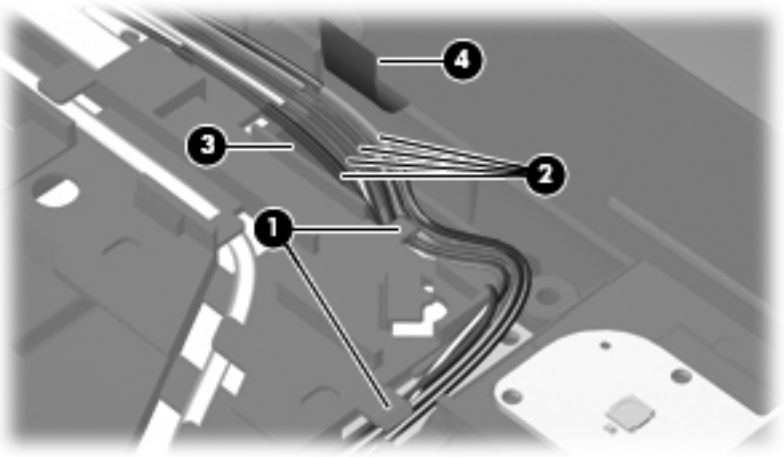


✎ When installing the display assembly, be sure to complete the following steps to properly route the wireless antenna cables. Failure to follow these guidelines can result in degraded wireless reception.

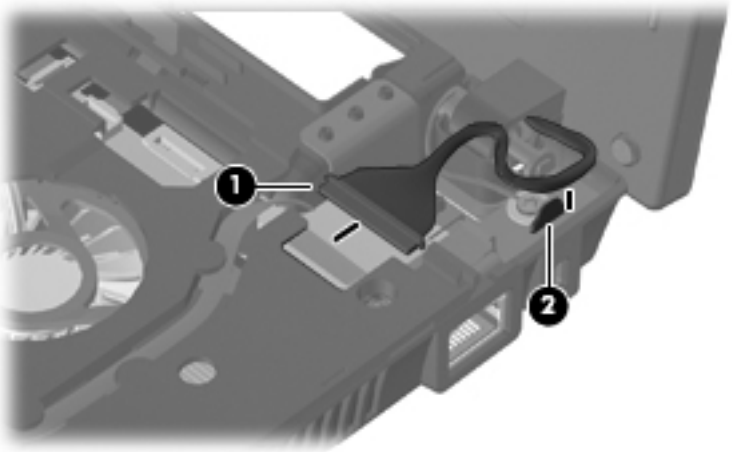
a. Route the wireless antenna cables and microphone cable inside the clips ❶ built into the top cover.

b. Align the exposed sections of the wireless antenna cables ❷ with the grounding pad ❸ attached to the top cover.

c. Secure the wireless antenna cables to the grounding pad with the grounding tape ❹ attached to the top cover.



10. Disconnect the display panel cable ❶ from the system board.
11. Release the display panel cable from the clip ❷ that secures it.

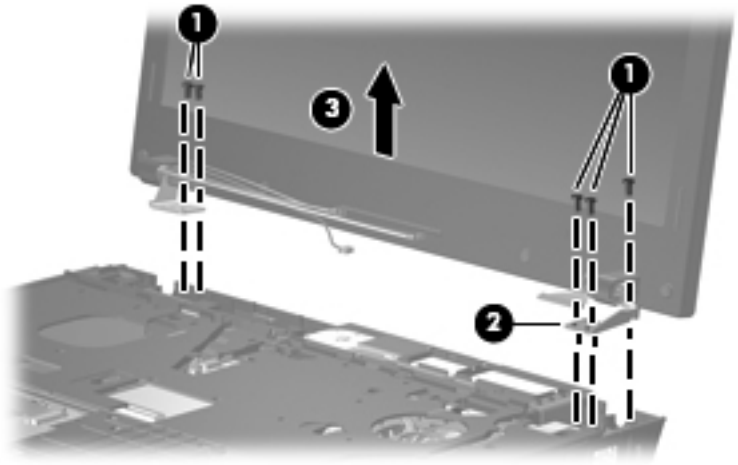


CAUTION: Support the display assembly when removing the following screws. Failure to support the display assembly can result in damage to the display assembly and other computer components.

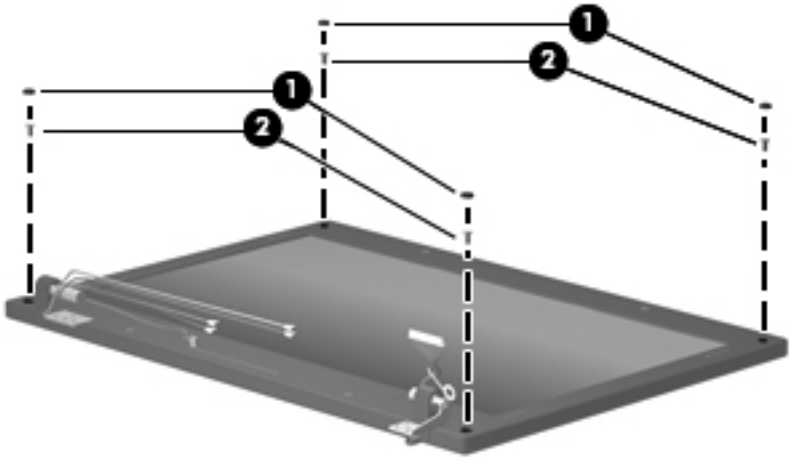
12. Remove the five Torx T8M2.5×6.0 screws ❶ that secure the display assembly to the computer.

    ✎ The front-right screw on the right hinge secures a ground loop ❷ that branches off of the display panel cable.

13. Lift the display assembly ❸ straight up and remove it.



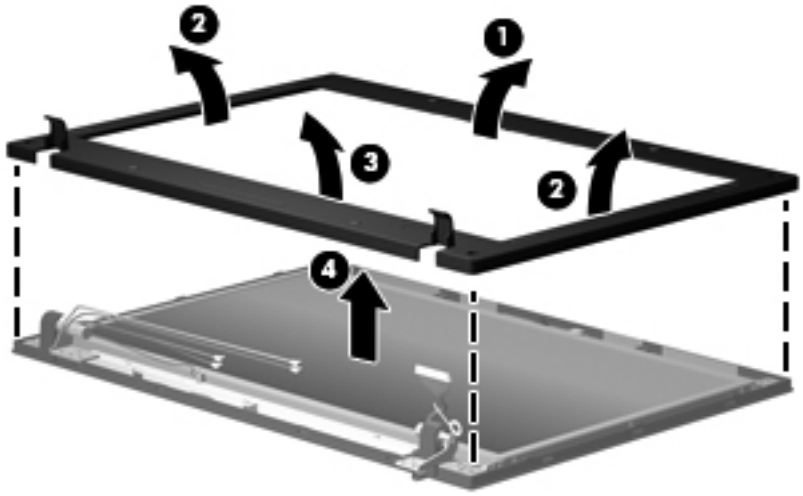
14. If it is necessary to replace the display bezel or any of the display assembly internal components:
    a. Remove the four rubber screw covers ❶ and the four Torx T8M2.5×6.0 screws ❷ that secure the display bezel to the display assembly.



b. Flex the inside edges of the top edge ❶, the left and right sides ❷, and the bottom edge ❸ of the display bezel until the bezel disengages from the display enclosure.

c. Remove the display bezel ❹. The display bezel is available using the following spare part numbers:

- 577194-001—for use only on computer models equipped with a webcam
- 577195-001—for use only on computer models not equipped with a webcam

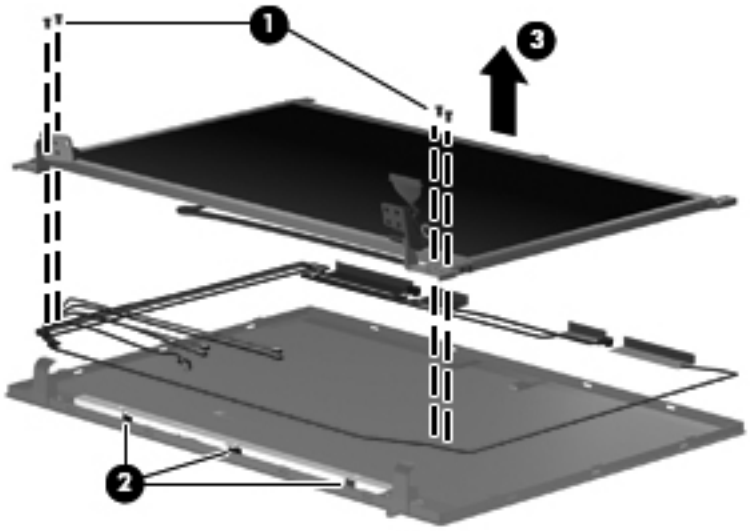


15. If it is necessary to replace the webcam module:

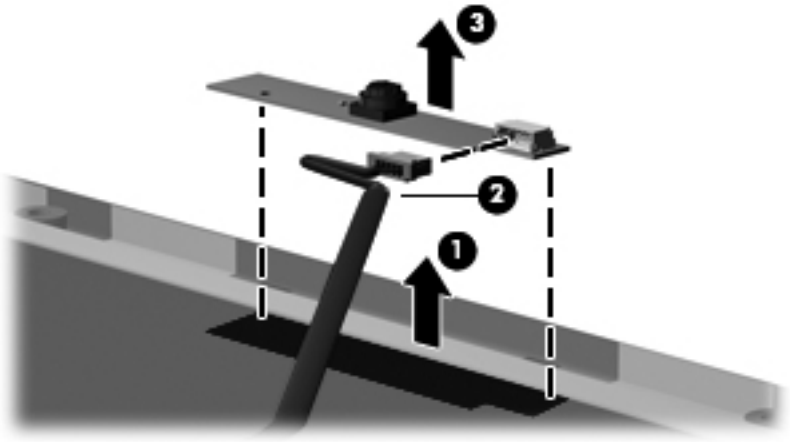
a. Remove the four Phillips PM2.5×4.0 screws ❶ that secure the display panel to the display enclosure.

b. Remove the display panel cable from the clips ❷ built into the display enclosure.

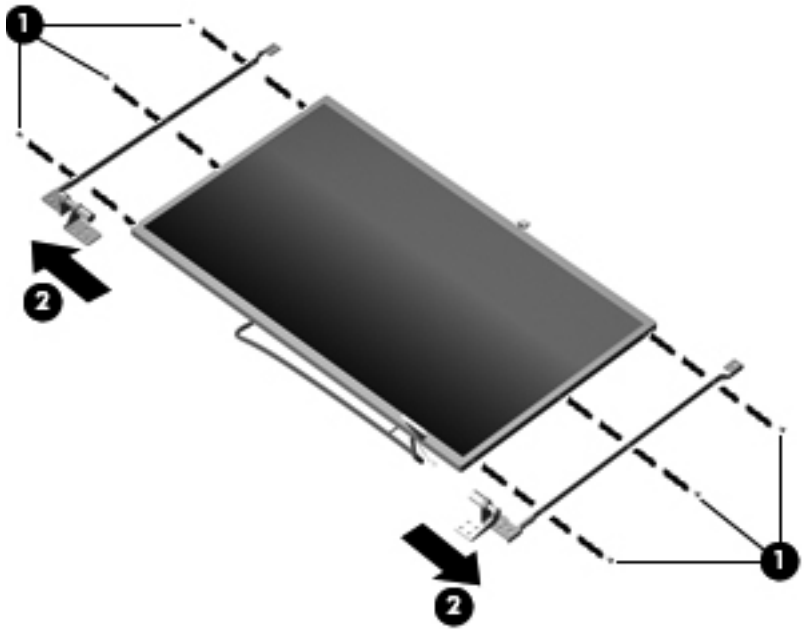
c. Remove the display panel ❸.



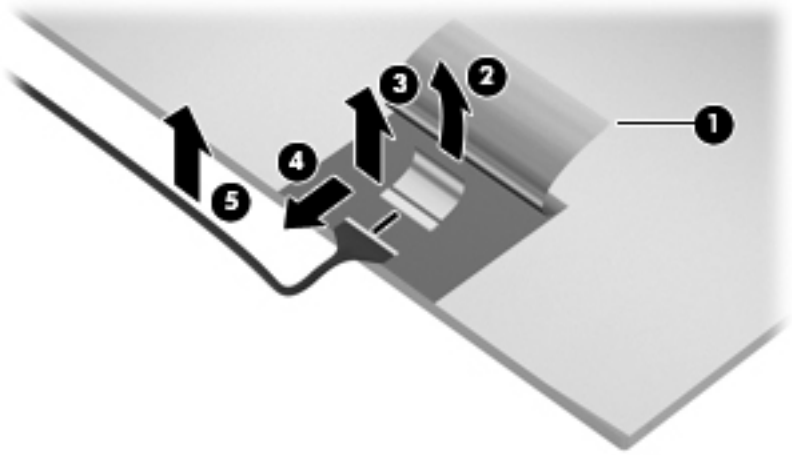
d. Release the webcam module ❶ as far from the display enclosure as the webcam module cable allows.
e. Disconnect the webcam module cable ❷ from the webcam module.
f. Remove the webcam module ❸. The webcam module is available using spare part number 577171-001.



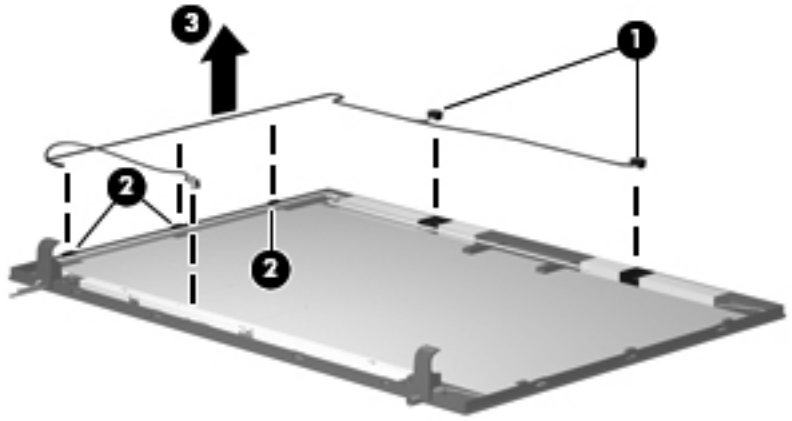
16. If it is necessary to replace the display hinges:
    a. Remove six Phillips PM2.5×3.0 screws ❶ that secure the display hinges to the display panel.
    b. Remove the display hinges ❷.



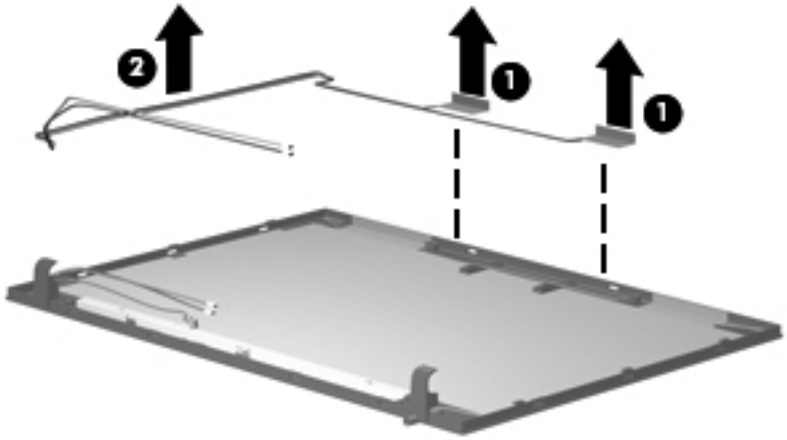
17. If it is necessary to replace the display panel cable:
    a. Turn the display panel upside down, with the bottom edge toward you.
    b. Fold back the flap ❶ in the display shielding that covers the display panel cable connector.
    c. Release the adhesive support strip ❷ that secures the display panel cable to the display panel.
    d. Release the support bar ❸ that secures the display panel cable to the display panel.
    e. Disconnect the display panel cable ❹ from the connector on the back of the display panel.
    f. Remove the display panel cable ❺. The display panel cable is available using the following spare part numbers:
        - 577663-001—for use only on computer models equipped with a webcam
        - 577190-001—for use only on computer models not equipped with a webcam



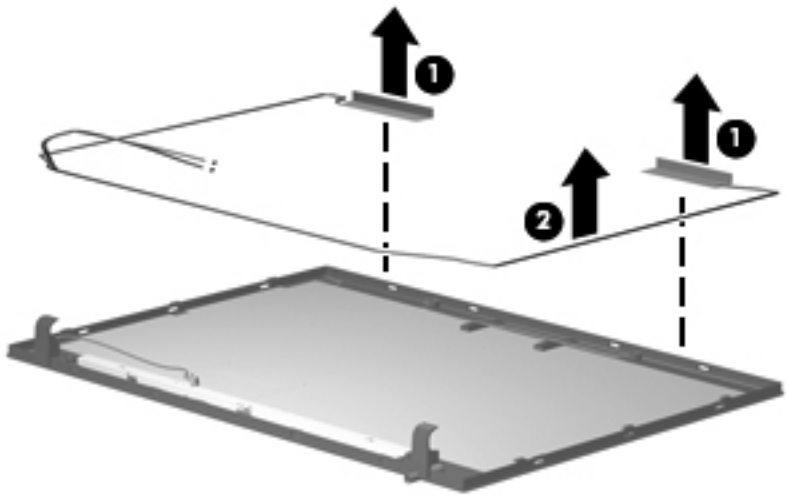
18. If it is necessary to replace the microphones and cables:
    a. Release the microphone receivers ❶ from the clips built into the display enclosure.
    b. Release the microphone cables ❷ from the clips and routing channel built into the left side of the display enclosure.
    c. Remove the microphones and cables ❸. The microphones and cables are included in the Display Cable Kits, using the following spare part numbers:
        - 577228-001—for use only on computer models equipped with WWAN capability
        - 578365-001—for use only on computer models not equipped with WWAN capability



19. If it is necessary to replace the WLAN wireless antenna transceivers and cables:
    a. Detach the transceivers ❶ from the display enclosure. (The transceivers are attached to the enclosure with double-sided tape.)
    b. Release the WLAN wireless antenna cables ❷ from the clips and routing channel built into the left side of the display enclosure.
    c. Remove the WLAN wireless antenna transceivers and cables. The wireless antenna transceivers and cables are included in the Display Cable Kits, using the following spare part numbers:
        - 577228-001—for use only on computer models equipped with WWAN capability
        - 578365-001—for use only on computer models not equipped with WWAN capability



20. If it is necessary to replace the WWAN wireless antenna transceivers and cables:
    a. Detach the transceivers ❶ from the display enclosure. (The transceivers are attached to the enclosure with double-sided tape.)
    b. Release the WWAN wireless antenna cables ❷ from the clips and routing channels built into the left and right sides of the display enclosure.
    c. Remove the WWAN wireless antenna transceivers and cables. The wireless antenna transceivers and cables are included in the Display Cable Kits, using the following spare part numbers:
        - 577228-001—for use only on computer models equipped with WWAN capability
        - 578365-001—for use only on computer models not equipped with WWAN capability



Reverse this procedure to reassemble and install the display assembly.

Top cover

The top cover spare part kit includes a palm rest, TouchPad and cable, and TouchPad button board and cable.

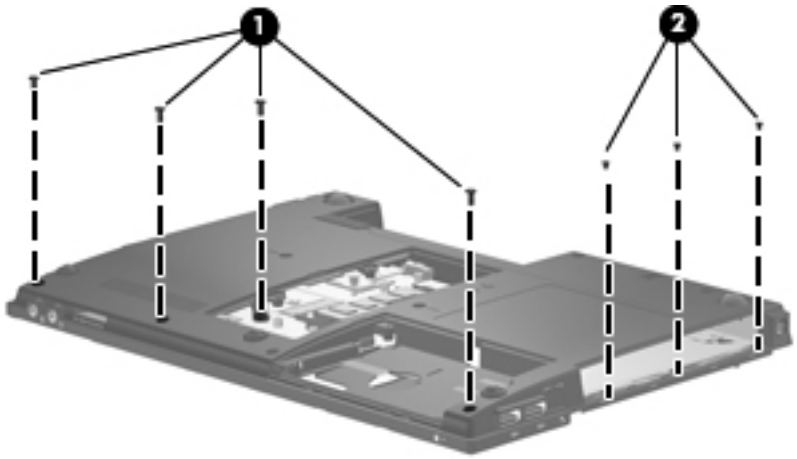
Description	Spare part number
For use only on computer models equipped with fingerprint reader in black trim (includes fingerprint reader board and cable)	577216-001
For use only on computer models equipped with fingerprint reader in red trim (includes fingerprint reader board and cable)	577218-001
For use only on computer models not equipped with fingerprint reader in black trim	577217-001
For use only on computer models not equipped with fingerprint reader in red trim	577219-001

Before removing the top cover, follow these steps:

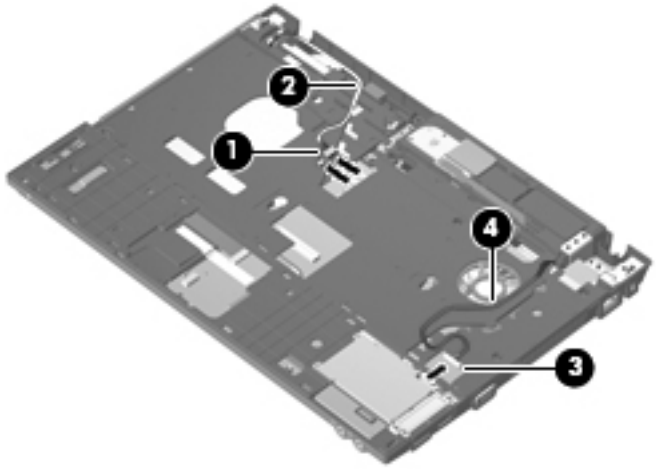
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see "Battery" on page 4-7).
5. Remove the following components:
   a. Hard drive (see "Hard drive" on page 4-9)
   b. Memory/wireless module compartment cover (see "WLAN module" on page 4-12)
   c. Optical drive (see "Optical drive" on page 4-18)
   d. Keyboard and switch cover (see "Keyboard and switch cover" on page 4-20)
   e. Palm rest (see "Palm rest" on page 4-25)
   f. Display assembly (see "Display assembly" on page 4-27)

Remove the top cover:

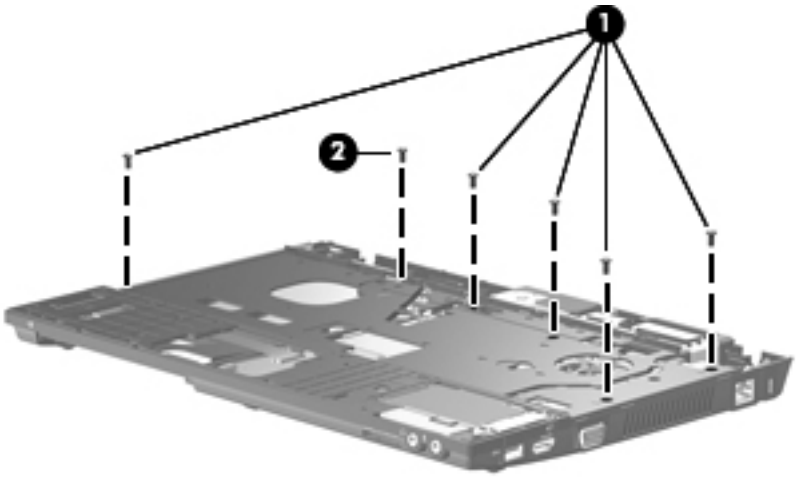
1. Turn the computer upside down, with the front toward you.
2. Remove the four slotted Torx T8M2.5×7.0 screws ❶ and the three Phillips PM2.0×3.0 screws ❷ that secure the top cover to the base enclosure.



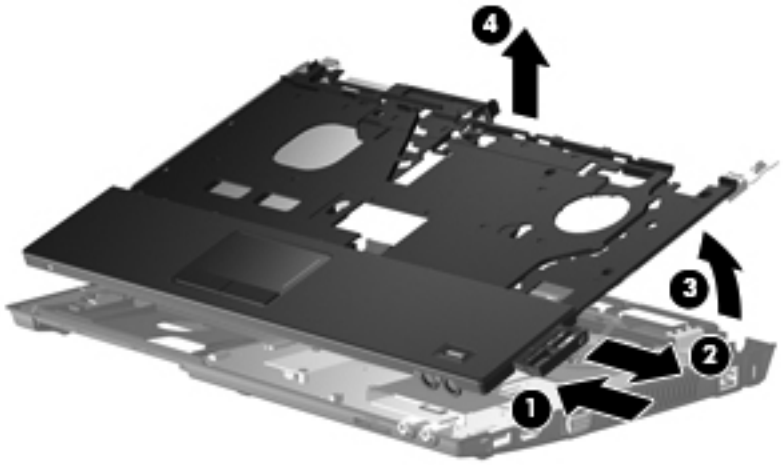
3. Turn the computer right-side up, with the front toward you.
4. Disconnect the power connector cables ❶ from the system board.
5. Release the power connector cables from the clips ❷ and routing channel built into the top cover.
6. Disconnect the network cable ❸ from the system board.
7. Release the network cable from the clips ❹ and routing channel built into the top cover.



8. Remove the five slotted Torx T8M2.5×7.0 screws ❶ and the Torx T8M2.5×6.0 screw ❷ that secure the top cover to the base enclosure.



9. Release the ExpressCard slot bezel ❶ by pressing in on it, and then remove the bezel ❷.
10. Lift the rear edge ❸ of the top cover until it detaches from the base enclosure.
11. Remove the top cover ❹ by lifting it straight up.



Reverse this procedure to install the top cover.

USB board

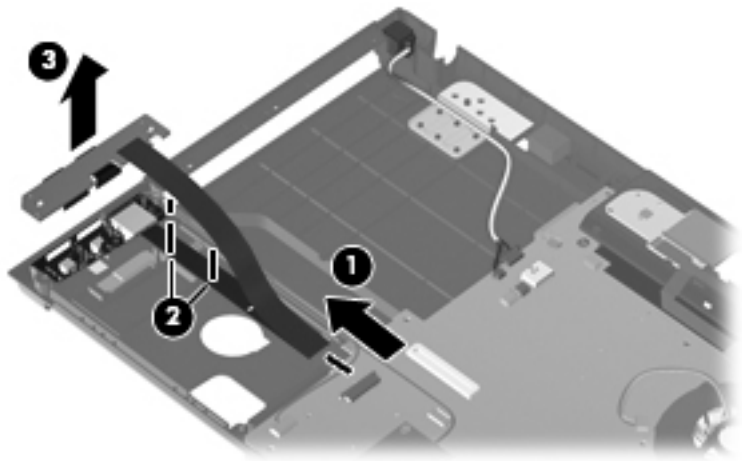
Description	Spare part number
USB board (includes cable)	577659-001

Before removing the USB board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see "Battery" on page 4-7).
5. Remove the following components:
   a. Hard drive (see "Hard drive" on page 4-9)
   b. Memory/wireless module compartment cover (see "WLAN module" on page 4-12)
   c. Optical drive (see "Optical drive" on page 4-18)
   d. Keyboard and switch cover (see "Keyboard and switch cover" on page 4-20)
   e. Palm rest (see "Palm rest" on page 4-25)
   f. Display assembly (see "Display assembly" on page 4-27)
   g. Top cover (see "Top cover" on page 4-36)

Remove the USB board:

1. Disconnect the USB board cable ❶ from the system board.
2. Detach the USB board cable ❷ from the base enclosure. (The USB board cable is attached to the base enclosure with double-sided tape.)
3. Remove the USB board ❸ and cable.



Reverse this procedure to install the USB board.

Bluetooth module

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 577214-001.

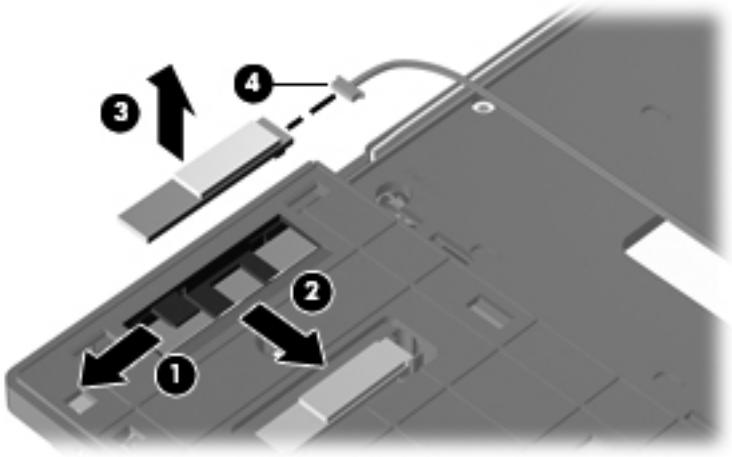
Description	Spare part number
Bluetooth module	537921-001

Before removing the Bluetooth module, follow these steps:

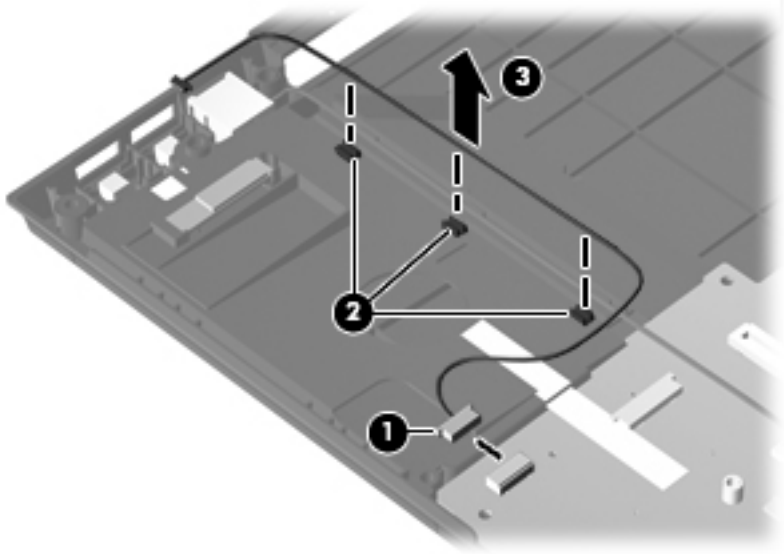
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see "Battery" on page 4-7).
5. Remove the following components:
   a. Hard drive (see "Hard drive" on page 4-9)
   b. Memory/wireless module compartment cover (see "WLAN module" on page 4-12)
   c. Optical drive (see "Optical drive" on page 4-18)
   d. Keyboard and switch cover (see "Keyboard and switch cover" on page 4-20)
   e. Palm rest (see "Palm rest" on page 4-25)
   f. Display assembly (see "Display assembly" on page 4-27)
   g. Top cover (see "Top cover" on page 4-36)

Remove the Bluetooth module and cable:

1. Release the Bluetooth module ❶ by sliding it forward until the rear edge of the module is clear of the opening in the base enclosure, and then sliding it ❷ to the right until it is clear of the clips built into the top cover.
2. Remove the Bluetooth module ❸.
3. Disconnect the Bluetooth module cable ❹ from the Bluetooth module.



4. If it is necessary to replace the Bluetooth module cable:
   a. Disconnect the Bluetooth module cable ❶ from the system board.
   b. Release the Bluetooth module cable from the clips ❷ built into the base enclosure.
   c. Remove the Bluetooth module cable ❸.



Reverse this procedure to install the Bluetooth module and cable.

Modem module

The modem module spare part kit does not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 577214-001.

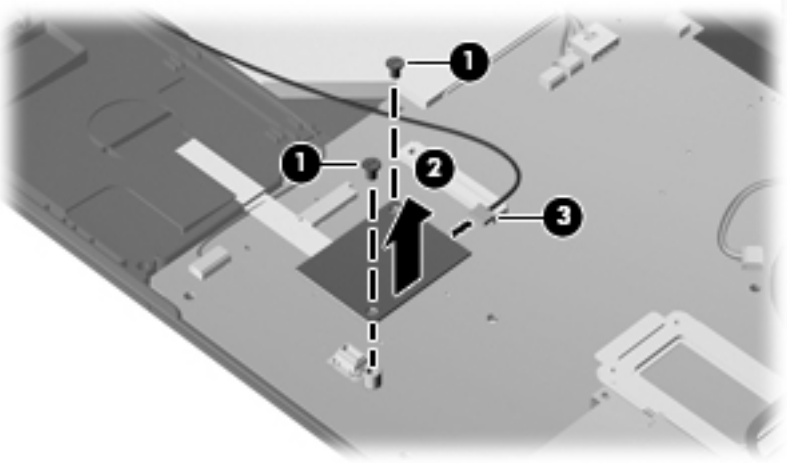
Description	Spare part number
Modem module for use in all countries and regions except Australia and New Zealand	510100-001
Modem module for use only in Australia and New Zealand	510100-011

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 4-7).
5. Remove the following components:
   a. Hard drive (see "Hard drive" on page 4-9)
   b. Memory/wireless module compartment cover (see "WLAN module" on page 4-12)
   c. Optical drive (see "Optical drive" on page 4-18)
   d. Keyboard and switch cover (see "Keyboard and switch cover" on page 4-20)
   e. Palm rest (see "Palm rest" on page 4-25)
   f. Display assembly (see "Display assembly" on page 4-27)
   g. Top cover (see "Top cover" on page 4-36)

Remove the modem module:

1. Remove the two Phillips PM2.0×4.0 screws ❶ that secure the modem module to the system board.
2. Lift the modem module ❷ away from the system board to disconnect it.
3. Disconnect the modem module cable ❸ from the modem module.



4. Remove the modem module.

Reverse this procedure to install the modem module.

Modem module cable

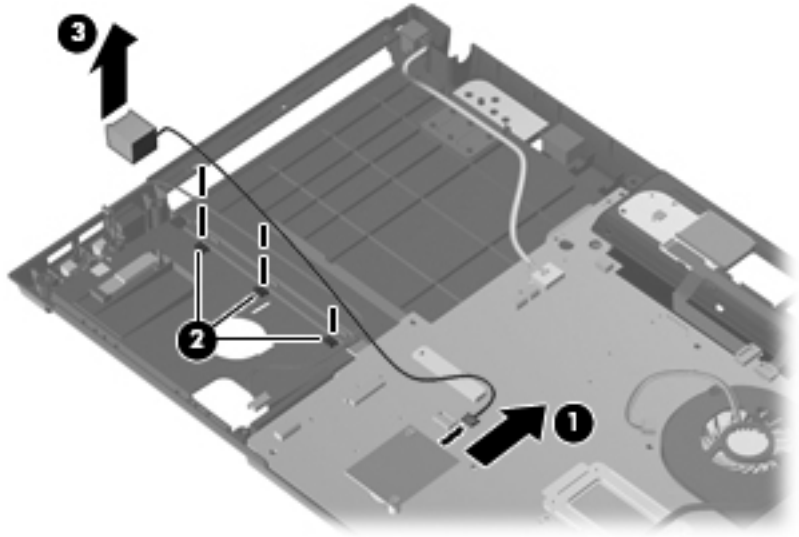
The modem module cable is included in the Cable Kit, spare part number 577214-001.

Before removing the modem module cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see "Battery" on page 4-7).
5. Remove the following components:
   a. Hard drive (see "Hard drive" on page 4-9)
   b. Memory/wireless module compartment cover (see "WLAN module" on page 4-12)
   c. Optical drive (see "Optical drive" on page 4-18)
   d. Keyboard and switch cover (see "Keyboard and switch cover" on page 4-20)
   e. Palm rest (see "Palm rest" on page 4-25)
   f. Display assembly (see "Display assembly" on page 4-27)
   g. Top cover (see "Top cover" on page 4-36)
   h. USB board (see "USB board" on page 4-39)

Remove the modem module cable:

1. Disconnect the modem module cable ❶ from the modem module.
2. Release the modem module cable ❷ from the clips built into the base enclosure.
3. Release the RJ-11 connector ❸ from the clip built into the base enclosure.



4. Remove the modem module cable.

Reverse this procedure to install the modem module cable.

Power connector cable

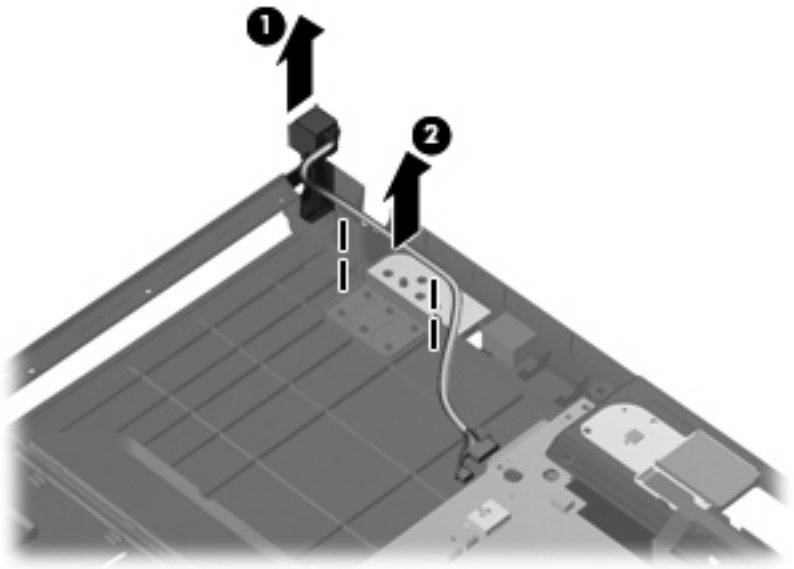
The power connector cable is included in the Cable Kit, spare part number 577214-001.

Before removing the power connector cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see "Battery" on page 4-7).
5. Remove the following components:
   a. Hard drive (see "Hard drive" on page 4-9)
   b. Memory/wireless module compartment cover (see "WLAN module" on page 4-12)
   c. Optical drive (see "Optical drive" on page 4-18)
   d. Keyboard and switch cover (see "Keyboard and switch cover" on page 4-20)
   e. Palm rest (see "Palm rest" on page 4-25)
   f. Display assembly (see "Display assembly" on page 4-27)
   g. Top cover (see "Top cover" on page 4-36)

Remove the power connector cable:

1. Release the power connector ❶ from the clip built into the base enclosure.
2. Remove the power connector cable ❷.



Reverse this procedure to install the power connector cable.

Power button board

The power button board spare part kit includes two cables.

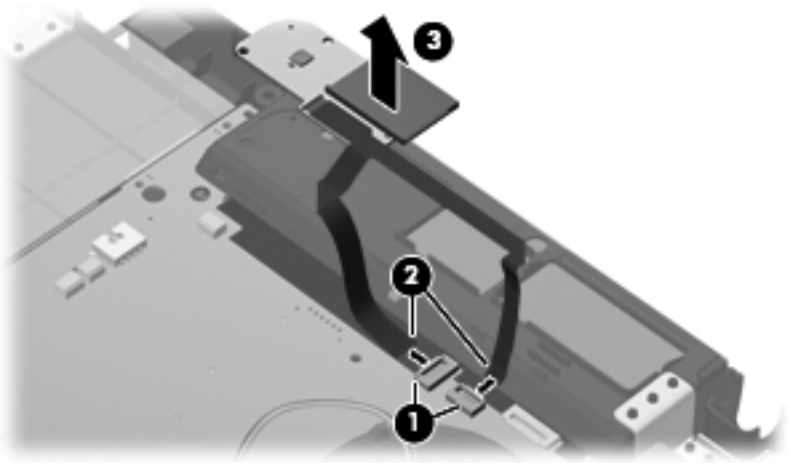
Description	Spare part number
Power button board for use only on computer models equipped with WWAN capability (includes SIM slot)	577662-001
Power button board for use only on computer models not equipped with WWAN capability	577661-001

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 4-7).
5. Remove the following components:
   a. Hard drive (see "Hard drive" on page 4-9)
   b. Memory/wireless module compartment cover (see "WLAN module" on page 4-12)
   c. Optical drive (see "Optical drive" on page 4-18)
   d. Keyboard and switch cover (see "Keyboard and switch cover" on page 4-20)
   e. Palm rest (see "Palm rest" on page 4-25)
   f. Display assembly (see "Display assembly" on page 4-27)
   g. Top cover (see "Top cover" on page 4-36)

Remove the power button board:

1. Release the two ZIF connectors ❶ to which the two power button board cables are attached, and then disconnect the cables ❷ from the system board.
2. Detach the power button board ❸ from the base enclosure. (The power button board is attached to the base enclosure with double-sided tape.)



3. Remove the power button board and cables.

Reverse this procedure to install the power button board.

System board

The system board spare part kit includes replacement thermal material.

Description	Spare part number
PM45 system board for use only on computer models equipped with graphics subsystems with discrete memory:	
■ For use only on computer models equipped with WWAN capability	577223-001
■ For use only on computer models not equipped with WWAN capability	577222-001
GM45 system board for use only on computer models equipped with graphics subsystems with UMA memory:	
■ For use only on computer models equipped with WWAN capability	577225-001
■ For use only on computer models not equipped with WWAN capability	577224-001
GL40 system board for use only on computer models equipped with graphics subsystems with UMA memory:	
■ For use only on computer models equipped with WWAN capability	577221-001
■ For use only on computer models not equipped with WWAN capability	577220-001

Before removing the system board, follow these steps:

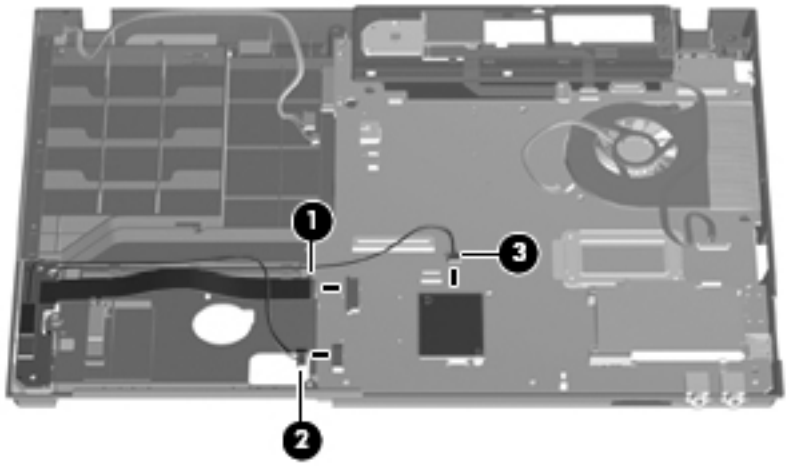
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see "Battery" on page 4-7).
5. Remove the following components:
   a. Hard drive (see "Hard drive" on page 4-9)
   b. Memory/wireless module compartment cover (see "WLAN module" on page 4-12)
   c. Optical drive (see "Optical drive" on page 4-18)
   d. Keyboard and switch cover (see "Keyboard and switch cover" on page 4-20)
   e. Palm rest (see "Palm rest" on page 4-25)
   f. Display assembly (see "Display assembly" on page 4-27)
   g. Top cover (see "Top cover" on page 4-36)

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

- SIM (see "SIM" on page 4-8)
- WLAN module (see "WLAN module" on page 4-12)
- Memory modules (see "Memory module" on page 4-16)
- WWAN module (see "WWAN module" on page 4-17)
- Modem module (see "Modem module" on page 4-42)
- Fan and heat sink (see "Fan and heat sink" on page 4-51)
- RTC battery (see "RTC battery" on page 4-54)
- Processor (see "Processor" on page 4-55)

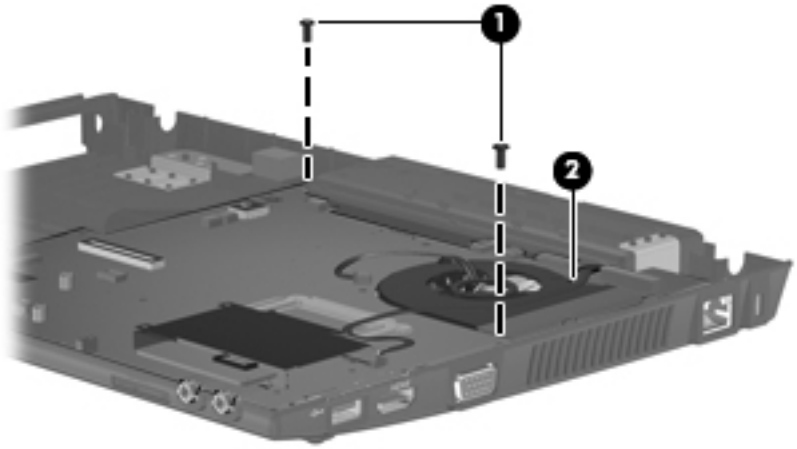
Remove the system board:

1. Release the ZIF connector ❶ to which the USB board cable is attached, and then disconnect the USB board cable from the system board.
2. Disconnect the Bluetooth module cable ❷ from the system board.
3. Disconnect the modem module cable ❸ from the modem module.

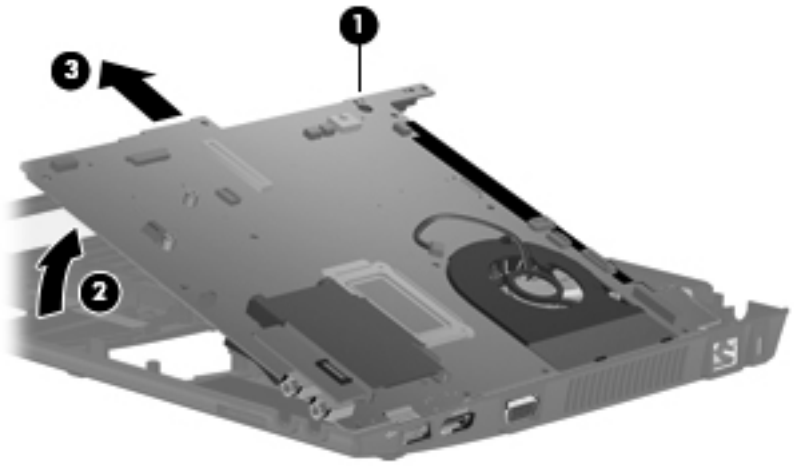


4. Release the SD Card Reader slot bezel ❶ by pressing in on it, and then remove the bezel ❷.
5. Release the two ZIF connectors ❸ to which the two power button board cables are attached, and then disconnect the cables from the system board.

6. Remove the two Torx T8M2.5×6.0 screws ❶ that secure the system board to the base enclosure.
7. Loosen the Phillips PM2.0×9.0 captive screw ❷ that secures the fan and system board to the base enclosure.



8. Use the optical drive connector ❶ to lift the left side of the system board ❷ until it rests at an angle.
9. Remove the system board ❸ by sliding it away from the base enclosure at an angle.



Reverse this procedure to install the system board.

Network cable

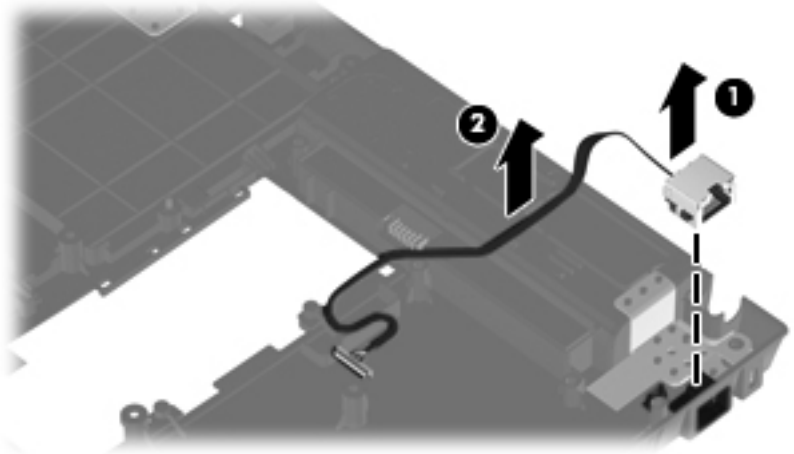
The network cable is included in the Cable Kit, spare part number 577214-001.

Before removing the network cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see "Battery" on page 4-7).
5. Remove the following components:
   a. Hard drive (see "Hard drive" on page 4-9)
   b. Memory/wireless module compartment cover (see "WLAN module" on page 4-12)
   c. Optical drive (see "Optical drive" on page 4-18)
   d. Keyboard and switch cover (see "Keyboard and switch cover" on page 4-20)
   e. Palm rest (see "Palm rest" on page 4-25)
   f. Display assembly (see "Display assembly" on page 4-27)
   g. Top cover (see "Top cover" on page 4-36)
   h. System board (see "System board" on page 4-47)

Remove the network cable:

1. Release the RJ-45 connector ❶ from the clip built into the base enclosure.
2. Remove the network cable ❷.



Reverse this procedure to install the network cable.

Fan and heat sink

The fan and heat sink spare part kits include replacement thermal material.

Description	Spare part number
Fan	577206-001

Description	Spare part number
Heat sink for use only on computer models equipped with a graphics subsystem with discrete memory	577227-001
Heat sink for use only on computer models equipped with a graphics subsystem with UMA memory	577226-001

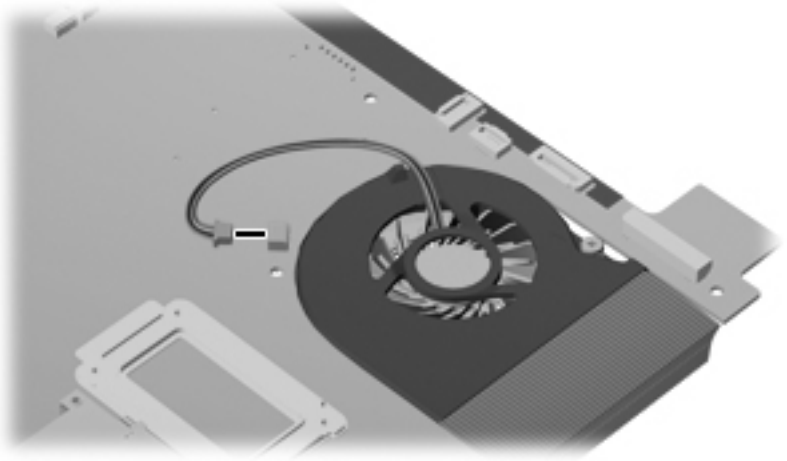
To properly ventilate the computer, allow at least 7.6 cm (3 in) of clearance on the left side of the computer. The computer uses an electric fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software requirements. Exhaust air is displaced through the ventilation grill located on the left side of the computer.

Before removing the fan and 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 4-7).
5. Remove the following components:
   a. Hard drive (see "Hard drive" on page 4-9)
   b. Memory/wireless module compartment cover (see "WLAN module" on page 4-12)
   c. Optical drive (see "Optical drive" on page 4-18)
   d. Keyboard and switch cover (see "Keyboard and switch cover" on page 4-20)
   e. Palm rest (see "Palm rest" on page 4-25)
   f. Display assembly (see "Display assembly" on page 4-27)
   g. Top cover (see "Top cover" on page 4-36)
   h. System board (see "System board" on page 4-47)

Remove the fan and heat sink:

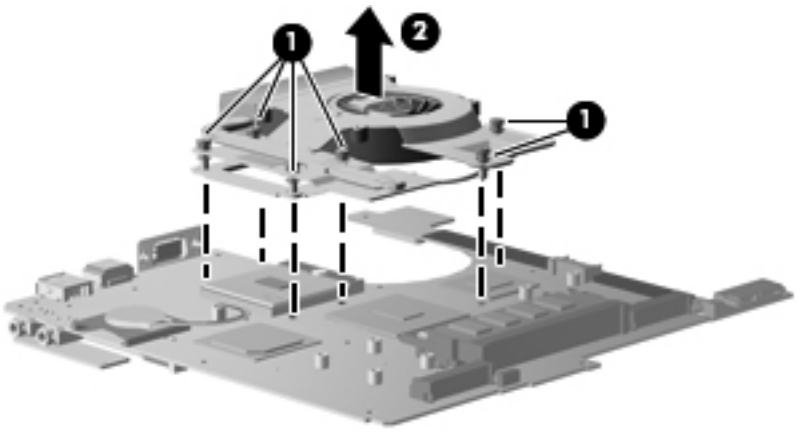
1. Disconnect the fan cable from the system board.



2. Turn the system board upside down, with the audio connectors toward you.
3. Following the 1, 2, 3, 4, 5, 6 sequence stamped into the heat sink, loosen the six Phillips PM2.0×9.0 captive screws ❶ that secure the fan and heat sink to the system board.

   ✎ Due to the adhesive quality of the thermal material located between the heat sink and system board components, it may be necessary to move the heat sink from side to side to detach it.

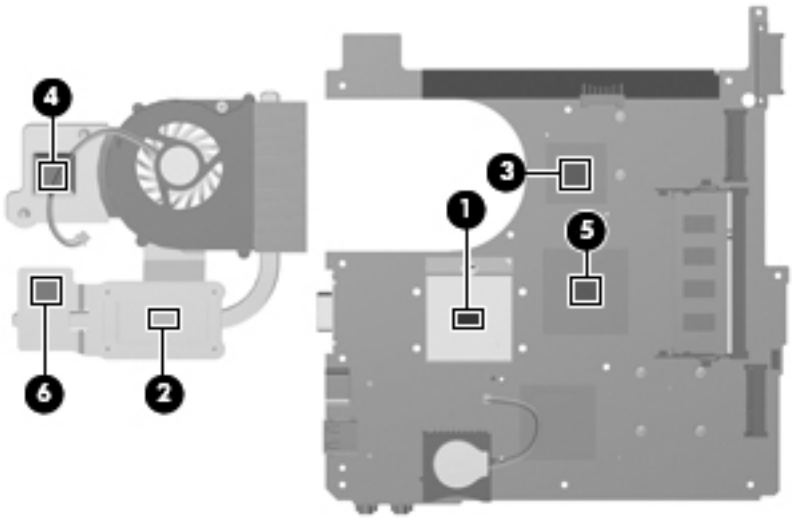
4. Remove the fan and heat sink ❷.



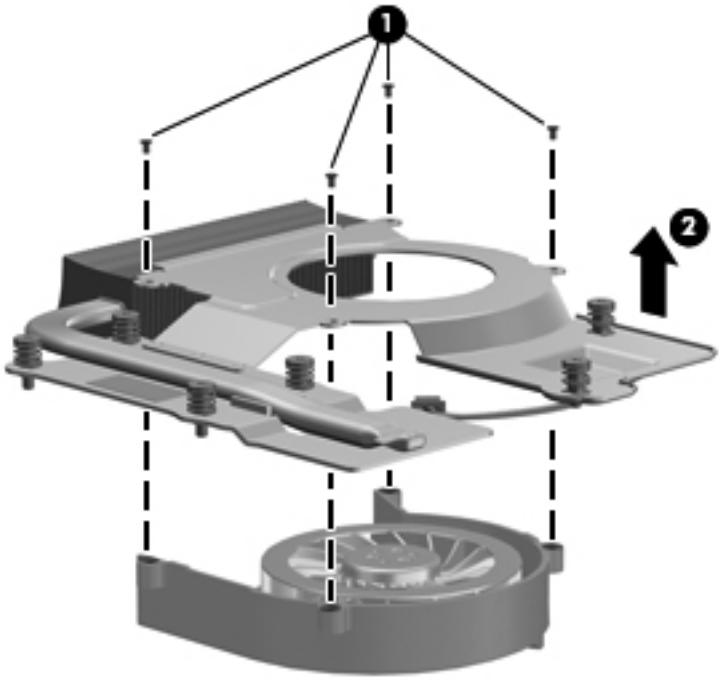
✎ The thermal material must be thoroughly cleaned from the surfaces of the heat sink and the system board each time the fan and heat sink are removed:

- Thermal paste is used on the processor ❶ and the heat sink section ❷ that services it.
- Thermal pads are used on the Northbridge chip ❸ and the heat sink section ❹ that services it.
- Thermal pads are used on the graphics subsystem memory module ❺ and the heat sink section ❻ that services it.

Replacement thermal material is included with all system board, heat sink, and processor spare part kits.



5. If it is necessary to replace the fan:
   a. Remove the four Phillips PM2.0×4.0 screws ❶ that secure the fan to the heat sink.
   b. Remove the heat sink ❷ by lifting it straight up.



Reverse this procedure to install the fan and heat sink.

RTC battery

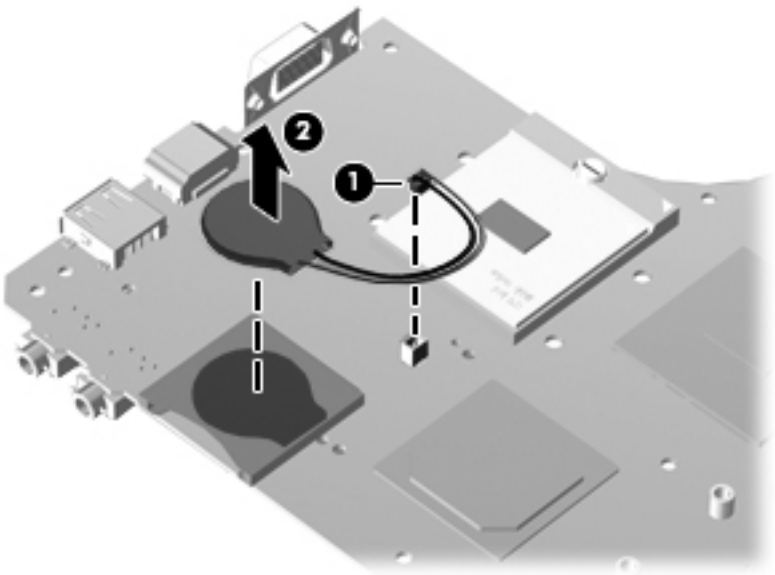
Description	Spare part number
RTC battery	581926-001

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 4-7).
5. Remove the following components:
   a. Hard drive (see "Hard drive" on page 4-9)
   b. Memory/wireless module compartment cover (see "WLAN module" on page 4-12)
   c. Optical drive (see "Optical drive" on page 4-18)
   d. Keyboard and switch cover (see "Keyboard and switch cover" on page 4-20)
   e. Palm rest (see "Palm rest" on page 4-25)
   f. Display assembly (see "Display assembly" on page 4-27)
   g. Top cover (see "Top cover" on page 4-36)
   h. System board (see "System board" on page 4-47)

Remove the RTC battery:

1. Turn the system board upside down, with the audio connectors toward you.
2. Disconnect the RTC battery cable ❶ from the system board.
3. Detach the RTC battery ❷ from the SD Card Reader. (The RTC battery is attached to the SD Card Reader with double-sided tape.)



Reverse this procedure to install the RTC battery.

Processor

The processor spare part kit includes replacement thermal material.

Description	Spare part number
Intel Core2 Duo processors:	
■ T9600 2.80-GHz processor, 6-MB L2 cache, 1066-MHz FSB	507955-002
■ P8700 2.53-GHz processor, 3-MB L2 cache, 1066-MHz FSB	507960-001
■ P7570 2.26-GHz processor, 3-MB L2 cache, 1066-MHz FSB	572930-001
■ P7370 2.00-GHz processor, 3-MB L2 cache, 1066-MHz FSB	507966-001
Intel Core Duo processors:	
■ T6570 2.10-GHz processor, 2-MB L2 cache, 800-MHz FSB (not available in Japan)	513598-001
■ T5870 2.00-GHz processor, 2-MB L2 cache, 800-MHz FSB (not available in Japan)	535835-001
■ T4200 2.00-GHz processor, 1-MB L2 cache, 800-MHz FSB	513599-001
■ T3100 1.90-GHz processor, 1-MB L2 cache, 800-MHz FSB	572925-001
■ T3000 1.80-GHz processor, 1-MB L2 cache, 800-MHz FSB	572926-001

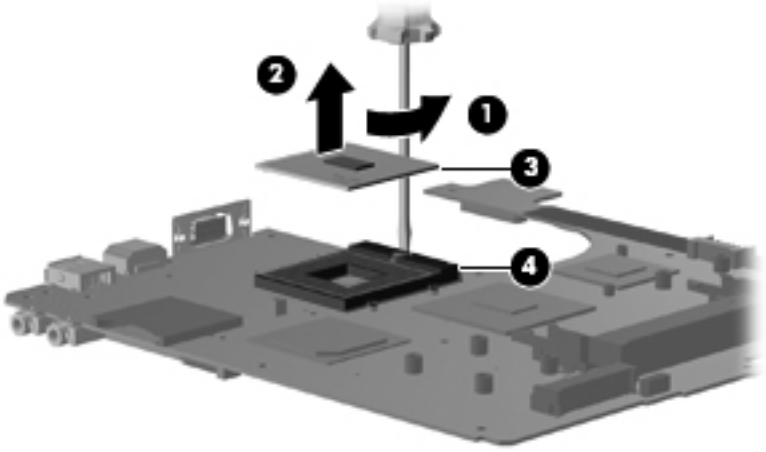
Before removing the processor, follow these steps:

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 4-7).
5. Remove the following components:
   a. Hard drive (see "Hard drive" on page 4-9)
   b. Memory/wireless module compartment cover (see "WLAN module" on page 4-12)
   c. Optical drive (see "Optical drive" on page 4-18)
   d. Keyboard and switch cover (see "Keyboard and switch cover" on page 4-20)
   e. Palm rest (see "Palm rest" on page 4-25)
   f. Display assembly (see "Display assembly" on page 4-27)
   g. Top cover (see "Top cover" on page 4-36)
   h. System board (see "System board" on page 4-47)
   i. Fan and heat sink (see "Fan and heat sink" on page 4-51)

Remove the processor:

1. Use a flat-bladed screwdriver to turn the processor locking screw ❶ one-half turn counterclockwise, until you hear a click.
2. Lift the processor ❷ straight up and remove it.

   ✎ When you install the processor, the gold triangle ❸ on the processor must be aligned with the triangle ❹ embossed on the processor socket.



Reverse this procedure to install the processor.

5

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.

✎ Some of the Computer Setup menu items listed in this chapter may not be supported by your computer.

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, Diagnostics, 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.

   ✎ 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**, **Diagnostics**, or **System Configuration** menu.

To exit Computer Setup, use one of the following methods:

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

  – or –

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

  – or –

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

  – or –

  Use the **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

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

   – or –

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

Your changes go into effect when the computer restarts.

Your password settings, language settings, security settings, and hard drive mode 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.

Some of the Computer Setup menu items listed in this chapter may not be supported by your computer.

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.
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.)
BIOS security to factory default	Reset the BIOS security policies and clear the ProtectTools user information.
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

Some of the menu items listed in this section may not be supported by your computer.

Select	To do this
Setup BIOS Administrator Password	Set up a BIOS administrator password.
User Management (requires a BIOS administrator password)	■ Create a new BIOS user account. ■ View a list of ProtectTools users.
Password Policy (requires a BIOS administrator password)	Revise password policy criteria.
HP SpareKey	Enable/disable HP SpareKey (enabled by default).
Always Prompt for HP SpareKey Enrollment	Enable/disable HP SpareKey enrollment (enabled by default).
Fingerprint Reset on Reboot (If Present)	Reset/clear the fingerprint reader ownership (select models only; disabled by default).
Allow Reset of HP ProtectTools security keys	Enable/disable reset of HP ProtectTools security keys (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.
DriveLock Passwords	■ Enable/disable DriveLock on any computer hard drive (enabled by default). ■ Change a DriveLock user password or master password. DriveLock settings are accessible only when you enter Computer Setup by turning on (not restarting) the computer.
Automatic DriveLock	Enable/disable Automatic DriveLock support.
Disk Sanitizer	Run Disk Sanitizer to destroy all existing data on the primary hard drive or the drive in the upgrade bay. 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.

Diagnostics menu

Select	To do this
System Diagnostics Menu	■ System Information—Displays the following 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.

System Configuration menu

Some of the listed System Configuration options may not be supported by your computer.

Select	To do this
Language	Change the Computer Setup language.
Boot Options	■ Set a Startup Menu delay (in seconds). ■ Enable/disable Custom Logo (disabled 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). ■ Set the Express Boot Popup delay in seconds. ■ Set the boot order.
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. ■ Enable/disable fan always on while connected to an AC outlet (enabled by default). ■ Enable/disable Data Execution Prevention. When enabled, the processor can disable some virus code execution, which helps to improve computer security (enabled by default).

(Continued)

Select	To do this
System Configuration menu *(continued)*	
Device Configurations *(continued)*	■ SATA (Serial Advanced Technology Attachment) device mode. The following options are available: ❒ AHCI (Advanced Host Controller Interface) ❒ IDE (Integrated Drive Electronics) ❒ RAID (select models only) ✎ Availability of the preceding options varies by computer model. ■ Enable/disable HP QuickLock 2 (enabled by default). ■ Enable/disable Virtualization Technology (disabled by default). ■ Enable/disable Dual Core CPU (select models only; enabled by default). ■ Enable/disable Unified Extensible Firmware Interface (UEFI) boot mode (disabled by default).
Built-In Device Options	■ Enable/disable the wireless button state (enabled by default). ■ Enable/disable the embedded WLAN device (enabled by default). ■ Enable/disable embedded Bluetooth device radio (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 (set by default) ❒ Follow Boot Order ■ Enable/disable the optical disc drive (select models only; enabled by default). ■ Enable/disable the fingerprint device (select models only; enabled by default). ■ Enable/disable the integrated camera (enabled by default). ■ Enable/disable a modem device (enabled by default). ■ Enable/disable the microphone (enabled by default).
Port Options (all are enabled by default)	✎ All port options are enabled by default. ■ Enable/disable the flash media reader. ■ Enable/disable the USB port. △ Disabling the USB port also disables MultiBay devices and ExpressCard devices on the advanced port replicator. ■ Enable/disable the ExpressCard slot.
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		
Length	22.78 cm	8.97 in
Width	32.49 cm	12.79 in
Height (front to back)	2.73 to 3.68 cm	1.07 to 1.45 in
Weight	1.9 kg	4.19 lbs
Input power		
Operating voltage	19.0 V dc @ 4.74 A - 65 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)		
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

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

13.3-in display specifications

	Metric	U.S.
Dimensions		
Height	17.8 cm	7.0 in
Width	28.4 cm	11.2 in
Diagonal	33.6 cm	13.3 in
Number of colors	Up to 16.8 million	
Contrast ratio	250:1 (typical)	
Brightness	200 nits (typical)	
Pixel resolution		
Pitch	0.279 × 0.279 mm	
Format	1366 × 768 or 1280 × 720	
Configuration	RGB vertical stripe	
Backlight	LED	
Character display	80 × 25	
Total power consumption	4.0 W	
Viewing angle	±40° horizontal, +120°/-40° vertical (typical)	

Hard drive specifications

	500-GB*	320-GB*	250-GB*	160-GB*
Dimensions				
Height	9.5 mm	9.5 mm	9.5 mm	9.5 mm
Width	70 mm	70 mm	70 mm	70 mm
Weight	101 g	101 g	101 g	101 g
Interface type	SATA	SATA	SATA	SATA
Transfer rate	100 MB/sec	100 MB/sec	100 MB/sec	100 MB/sec
Security	ATA security	ATA security	ATA security	ATA security
Seek times (typical read, including setting)				
Single track	1.0 ms	1.5 ms	2.0 ms	2.0 ms
Average	14.0 ms	12.0 ms	12.0 ms	12.0 ms
Maximum	22.0 ms	22.0 ms	22.0 ms	22.0 ms
Logical blocks	976,773,168	625,142,448	488,397,168	312,581,808
Disc rotational speed	7200 and 5400 rpm	7200 and 5400 rpm	7200 rpm	7200 rpm
Operating temperature	5°C to 55°C (41°F to 131°F)			

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

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

Blu-ray ROM DVD±R/RW SuperMulti Double-Layer Drive specifications

Applicable disc	**Read:**	**Write:**
	BD-ROM, BD-ROM-DL, BD-R, BD-R-DL, BD-RE, BD-RE-DL, DVD-ROM, DVD+R, DVD+R-DL, DVD+RW, DVD-R, DVD-R-DL, DVD-RW, DVD-RAM (Ver.2), CD-DA, CD-ROM (mode 1 and mode 2), CD-ROM XA (mode 2, form 1 and form 2), Photo CD (single and multiple sessions), CD Extra, CD-R, CD-RW, and CD-TEXT	DVD-RAM (Ver.2), DVD+R, DVD-R, CD-R, and CD-ROM
Access time	**BD**	**DVD**
Random	< 230 ms	< 180 ms
Cache buffer	4.5 MB	
Data transfer rate		
2X BD-RAM	9 MB/sec	
8X DVD	2,400 KB/sec	
16X CD-R	2,400 KB/sec	
16X CD-RW	2,400 KB/sec	

DVD±RW and CD-RW SuperMulti Double-Layer 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, and DVD-RAM	CD-R, CD-RW, DVD+R, DVD+RW, DVD-R, DVD-RW, and DVD-RAM
Access time	**CD**	**DVD**
Random	< 175 ms	< 230 ms
Cache buffer	2.5 MB	
Data transfer rate		
24X CD-ROM	3,600 KB/sec	
8X DVD	10,800 KB/sec	
24X CD-R	3,600 KB/sec	
16X CD-RW	2,400 KB/sec	
8x DVD+R	10,800 KB/sec	
4X DVD+RW	5,400 KB/sec	
8X DVD-R	10,800 KB/sec	
4X DVD-RW	5,400 KB/sec	
2.4X DVD+R(9)	2,700 KB/sec	
5X DVD-RAM	6,750 KB/sec	
Transfer mode	Multiword DMA mode	

DVD-ROM 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, CDEXTRA, Portfolio, CD-R, CD-RW), CDR, 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
Access time	**CD**	**DVD**
Random	< 110 ms	< 130 ms
Cache buffer	2 MB	
Data transfer rate		
24X CD-ROM	3,600 KB/sec	
8X DVD	10,800 KB/sec	
24X CD-R	3,600 KB/sec	
24X CD-RW	3,600 KB/sec	

System DMA specifications

Hardware	DMA System function
DMA0	Not applicable
DMA1*	Not applicable
DMA2*	Not applicable
DMA3	Not applicable
DMA4	Direct memory access controller
DMA5*	Not applicable
DMA6	Not assigned
DMA7	Not assigned
*ExpressCard controller can use DMA 1, 2, or 5.	

System memory map specifications

Size	Memory address	System function
640 KB	00000000–0009FFFF	Base memory
128 KB	000A0000–000BFFFF	Video memory
64 KB	000C0000–000CFFFF	Video BIOS
64 KB	000E8000–000FFFFF	System BIOS
	00100000–XFFFFFFF	Extended memory (based on memory installed)
	(X+1)0000000–FEDFFFFF	PCI bus
	FED00000–FED003FF	High-precision event timer
	FEE01000–FFFFFFFF	PCI bus

System interrupt specifications

Hardware IRQ	System function
IRQ0	System timer
IRQ1	Standard 101-/102-key or Microsoft natural keyboard
IRQ8	System CMOS/real-time clock
IRQ12	Synaptics PS/2 TouchPad
IRQ13	Numeric data processor
IRQ16	Intel ICH9 family USB universal host controller 2937 Mobile Intel 4 Series express chipset family
IRQ17*	High-definition audio controller Intel ICH9 family USB universal host controller 2938 Marvell Yukon 88E8072 PCIE-gigabit Ethernet controller
IRQ18	Intel ICH9 family USB universal host controller 2939 Intel ICH9 family USB universal host controller 2936
IRQ19	Intel ICH9 family USB2 enhanced controller 293C
IRQ20	Intel ICH9 family USB2 enhanced controller 293A Intel ICH9 family USB universal host controller 2934
IRQ21	Intel ICH9M-E/M SATA AHCI controller
IRQ22	Intel ICH9 family USB universal host controller 2935

*Default configuration; other possible audio configurations are IRQ5, IRQ7, IRQ9, IRQ10, or none.

✎ ExpressCards may assert IRQ3, IRQ4, IRQ5, IRQ7, IRQ9, IRQ10, IRQ11, or IRQ15. Either the infrared or the serial port may assert IRQ3 or IRQ4.

✎ For operating systems after Windows 2000, APIC (Advanced programming interrupt controller) is used.

System I/O address specifications

I/O address (hex)	System function (shipping configuration)
000–01F	DMA controller
020–021	Program interrupt controller
024–025	Program interrupt controller
028–029	Program interrupt controller
02C–03D	Program interrupt controller
02E–02F	Motherboard resources
030–031	Program interrupt controller
034–035	Program interrupt controller
038–039	Program interrupt controller
03C–03D	Program interrupt controller
040–043	System timer
04E–04F	Motherboard resources
050–053	System timer
060	Standard 101-/102-key or Microsoft natural keyboard
061	Motherboard resources
062	Microsoft ACPI-compliant embedded controller
063	Motherboard resources
064	Standard 101-/102-key or Microsoft natural keyboard
065	Motherboard resources
066	Microsoft ACPI-compliant embedded controller
067	Motherboard resources
070	Motherboard resources
071–077	System CMOS/real-time clock
080	Motherboard resources
081–091	Direct memory access controller
092	Motherboard resources
093–09F	Direct memory access controller
0A0–0A1	Program interrupt controller
0A4–0A5	Program interrupt controller
0A8–0A9	Program interrupt controller
0AC–0AD	Program interrupt controller
0B0–0B1	Program interrupt controller
0B2–0B3	Motherboard resources
0B4–0B5	Program interrupt controller
0B8–0B9	Program interrupt controller
0BC–0BD	Program interrupt controller

(Continued)

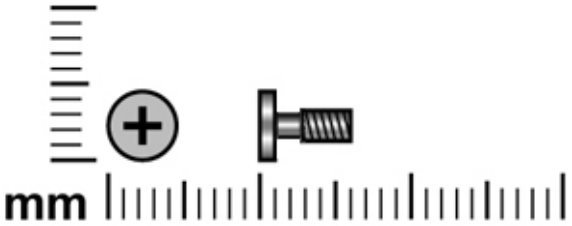
I/O address (hex)	System function (shipping configuration)
0C0–0DF	Direct memory access controller
0F0–0F0	Numeric data processor
0200–027F	Motherboard resources
3B0–3BB	Mobile Intel 4 Series express chipset family
3C0–3DF	Mobile Intel 4 Series express chipset family
400–47F	Motherboard resources
4D0–4D1	Programmable interrupt controller
500–57F	Motherboard resources
1000–1003	Motherboard resources
1010–101F	Motherboard resources
2000–20FF	Marvell Yukon 88E8072 PCIE-gigabit Ethernet controller
2000–2FFF	ICH9 family PCI express root port6-294A
3000–4FFF	ICH9 family PCI express root port5-2948
5000–6FFF	ICH9 family PCI express root port3-2944
7000–701F	ICH9M-E/M SATA AHCI controller
7020–703F	ICH9 family USB universal host controller 2936
7040–705F	ICH9 family USB universal host controller 2935
7060–707F	ICH9 family USB universal host controller 2934
7080–709F	ICH9 family USB universal host controller 2939
70A0–70BF	ICH9 family USB universal host controller 2938
70C0–70DF	ICH9 family USB universal host controller 2937
70E0–70E7	ICH9M-E/M SATA AHCI controller
70E8–70EF	ICH9M-E/M SATA AHCI Controller
70F0–70F7	Mobile Intel 4 Series express chipset family
70F8–70FB	ICH9M-E/M SATA AHCI controller
70FC–70FF	ICH9M-E/M SATA AHCI controller
EF80–EF9F	Motherboard resources
FE00–FE0F	Motherboard resources
FE80–EF8F	Motherboard resources
FFFF	Motherboard resources

7

Screw listing

This chapter provides specification and reference information for the screws used in the computer. The screws listed in this chapter are available in the Screw Kit, spare part number 577213-001.

Phillips PM2.0×6.0 captive screw

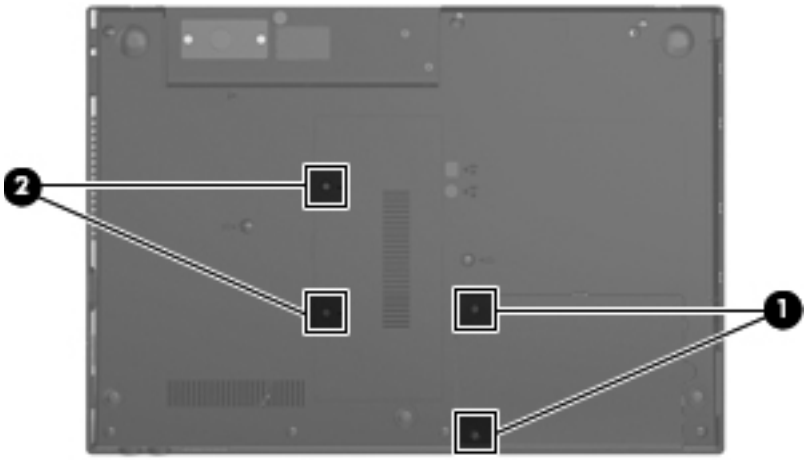


Color	Quantity	Length	Thread	Head diameter
Black	4	6.0 mm	2.0 mm	5.0 mm

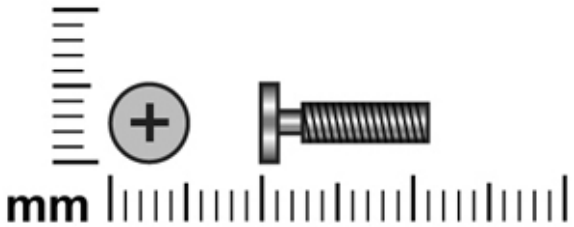
Where used:

❶ Two captive screws that secure the hard drive cover to the computer (screws are secured to the cover by C-clips)

❷ Two captive screws that secure the memory/wireless module compartment cover to the computer (screws are secured to the cover by C-clips)

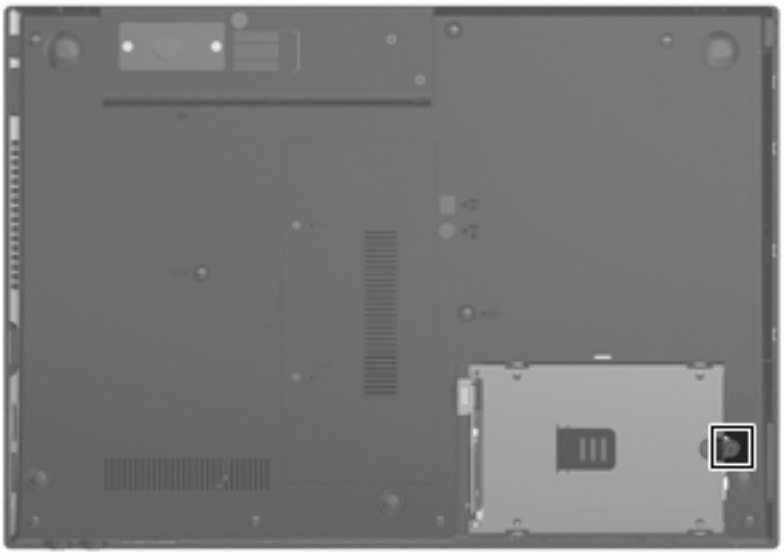


Phillips PM2.5×11.0 captive screw

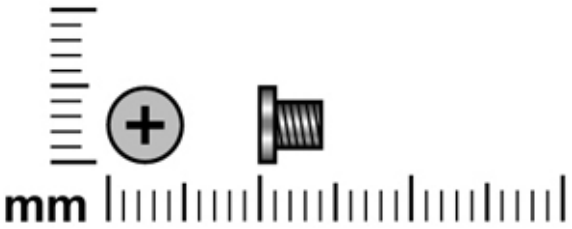


Color	Quantity	Length	Thread	Head diameter
Black	1	11.0 mm	2.5 mm	5.0 mm

Where used: One screw that secures the hard drive to the computer (screw is secured to the hard drive bracket)



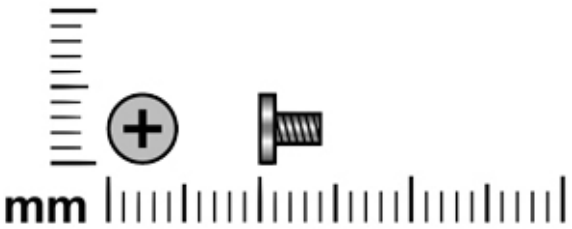
Phillips PM3.0×4.0 screw



Color	Quantity	Length	Thread	Head diameter
Silver	4	4.0 mm	3.0 mm	5.0 mm

Where used: 4 screws that secure the hard drive bracket to the hard drive

Phillips PM2.5×4.0 screw

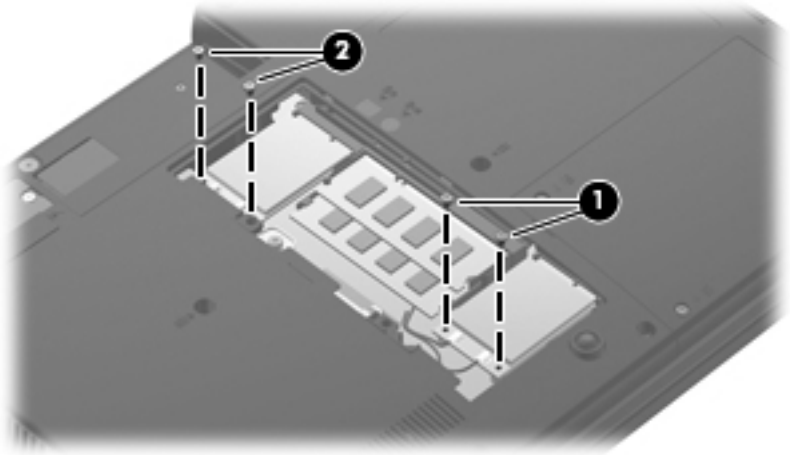


Color	Quantity	Length	Thread	Head diameter
Black	8	4.0 mm	2.5 mm	5.0 mm

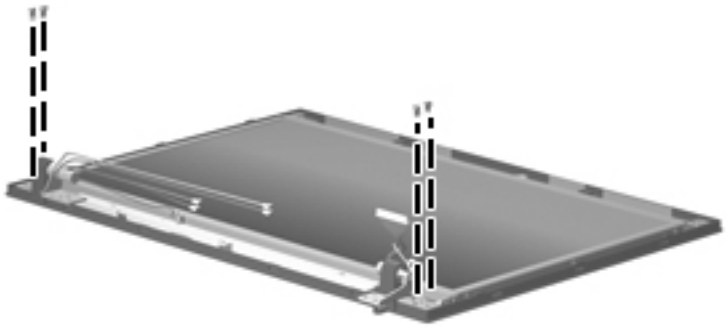
Where used:

❶ Two screws that secure the WLAN module to the computer

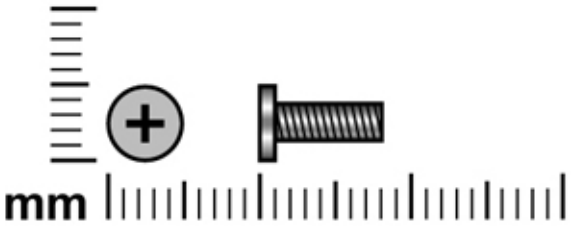
❷ Two screws that secure the WWAN module to the computer



Where used: 4 screws that secure the display panel to the display enclosure



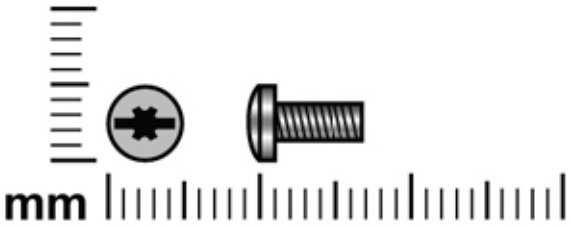
Phillips PM2.5×8.0 screw



Color	Quantity	Length	Thread	Head diameter
Black	1	8.0 mm	2.5 mm	5.0 mm

Where used: One screw that secures the optical drive to the computer

Slotted Torx T8M2.5×7.0 screw

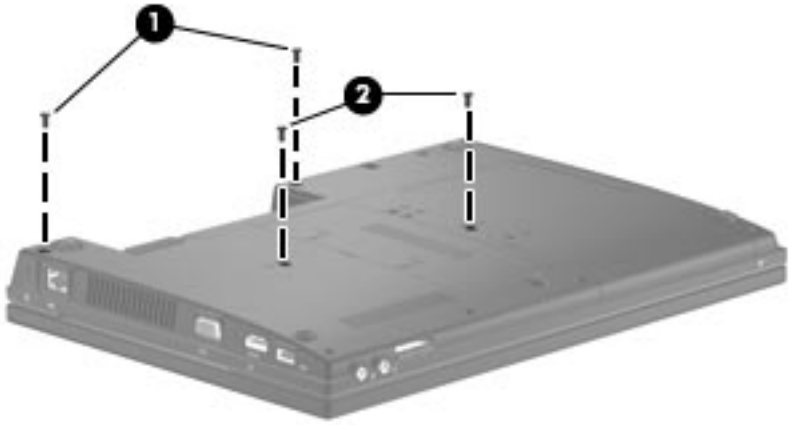


Color	Quantity	Length	Thread	Head diameter
Black	14	7.0 mm	2.5 mm	5.0 mm

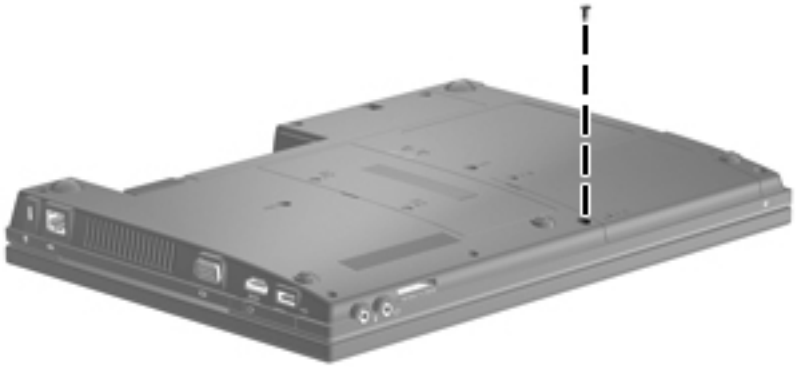
Where used:

❶ Two screws that secure the switch cover to the computer

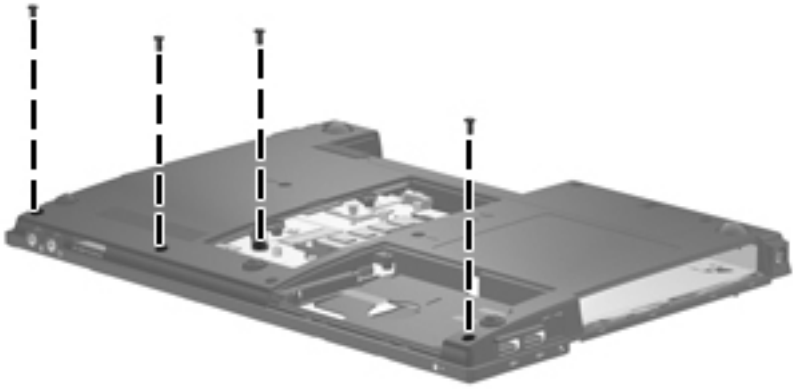
❷ Two screws that secure the keyboard to the computer



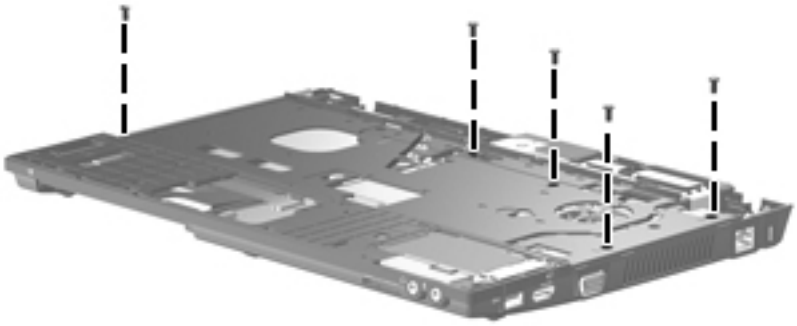
Where used: One screw that secures the palm rest to the computer



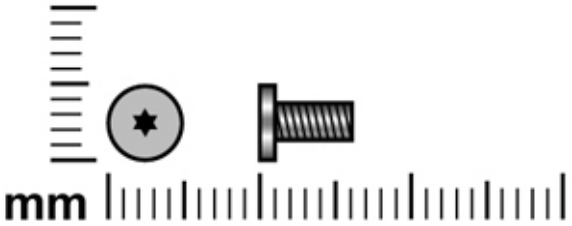
Where used: 4 screws that secure the top cover to the base enclosure



Where used: 5 screws that secure the top cover to the base enclosure

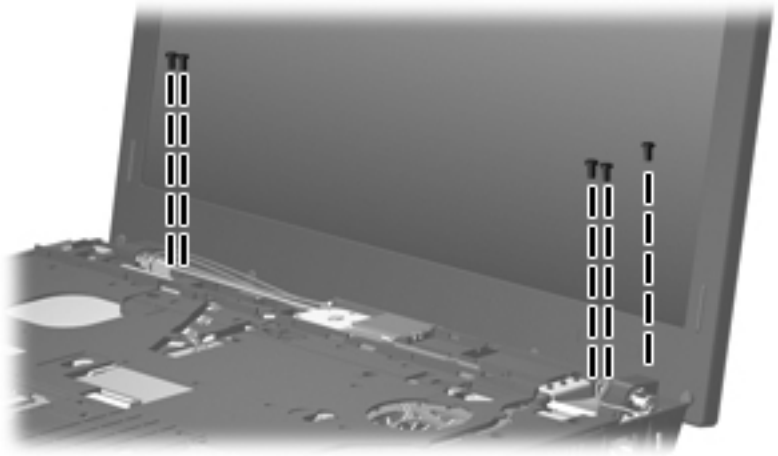


Torx T8M2.5×6.0 screw

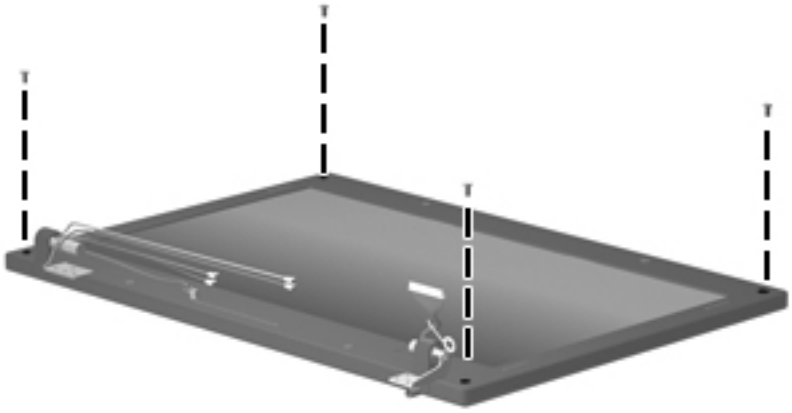


Color	Quantity	Length	Thread	Head diameter
Black	12	6.0 mm	2.5 mm	5.0 mm

Where used: 5 screws that secure the display assembly to the computer

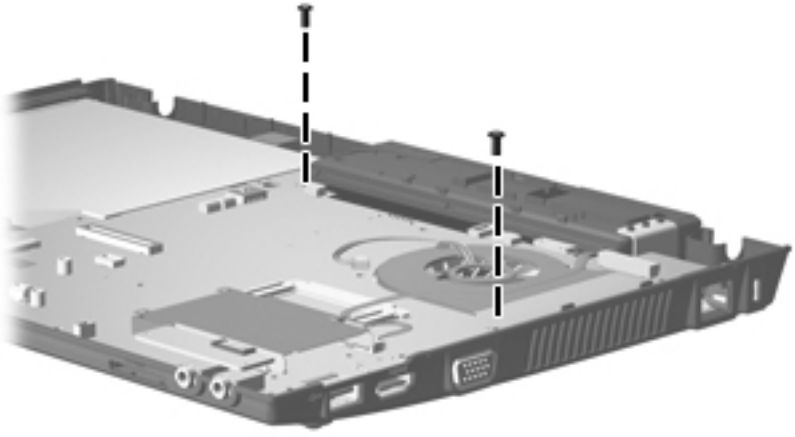


Where used: 4 screws that secure the display bezel to the display assembly

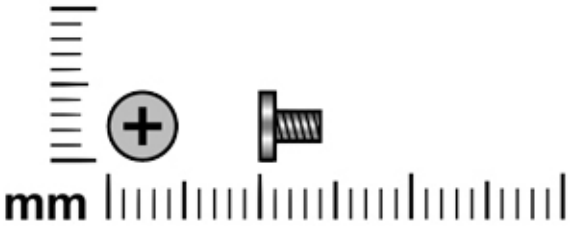


Where used: One screw that secures the top cover to the base enclosure

Where used: 2 screws that secure the system board to the base enclosure



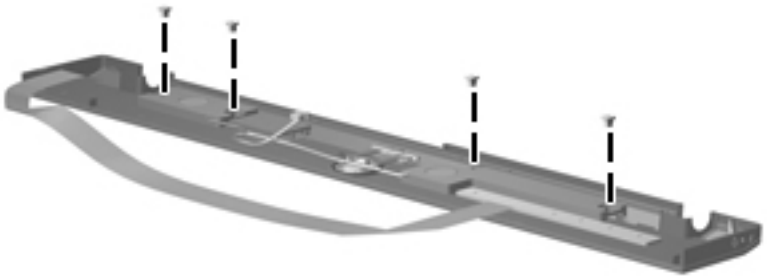
Phillips PM2.0×4.0 screw



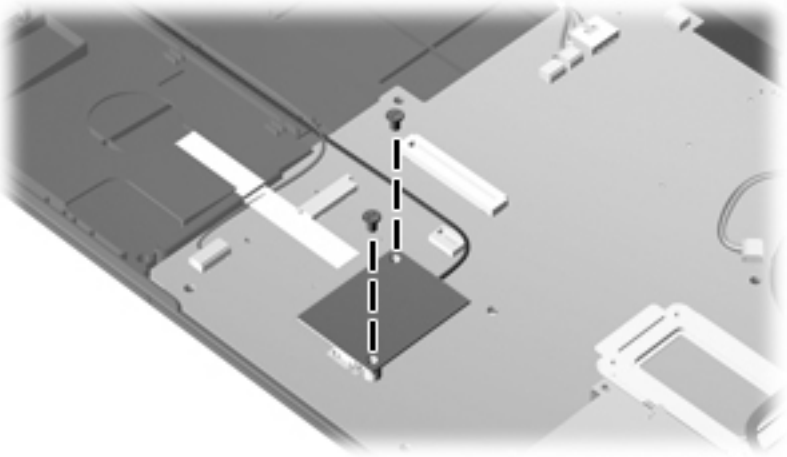
Color	Quantity	Length	Thread	Head diameter
Black	13	4.0 mm	2.0 mm	4.5 mm

Where used: 3 screws that secure the optical drive bracket to the optical drive

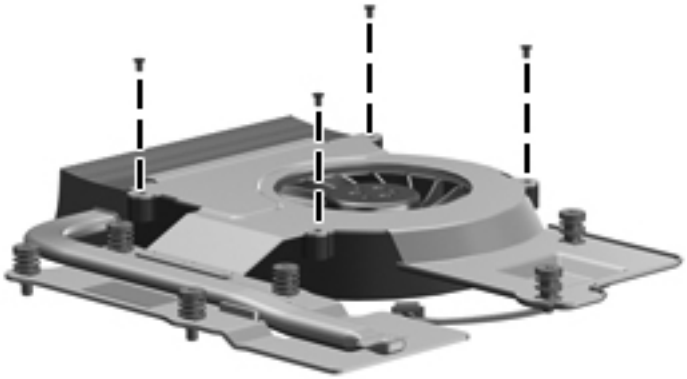
Where used: 4 screws that secure the speakers to the switch cover



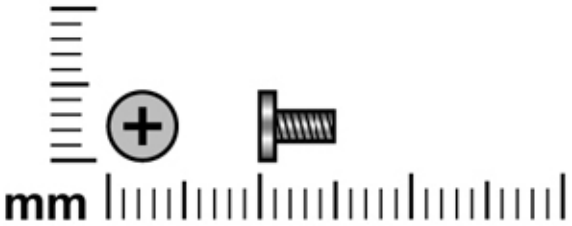
Where used: 2 screws that secure the modem module to the system board



Where used: 4 screws that secure the fan to the heat sink

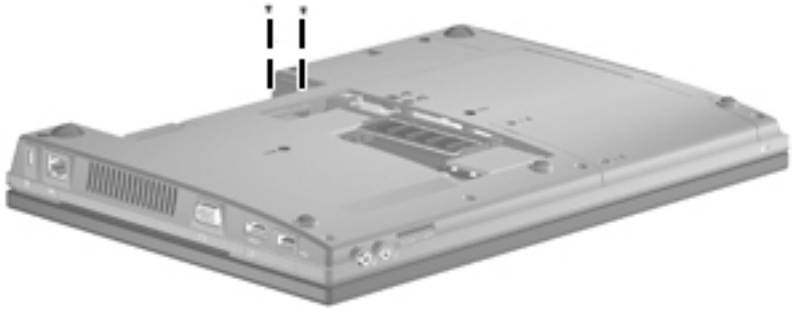


Phillips PM2.0×5.0 screw

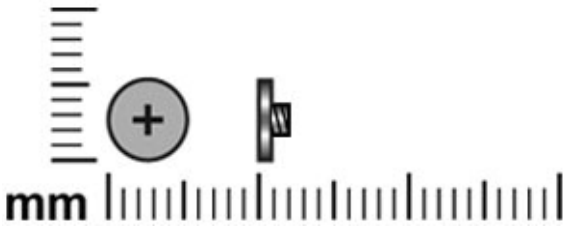


Color	Quantity	Length	Thread	Head diameter
Black	2	5.0 mm	2.0 mm	4.5 mm

Where used: 2 screws that secure the switch cover to the computer in the battery bay

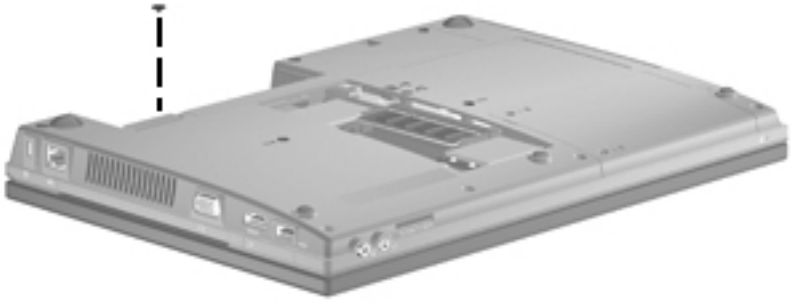


Phillips PM2.0×2.0 broadhead screw

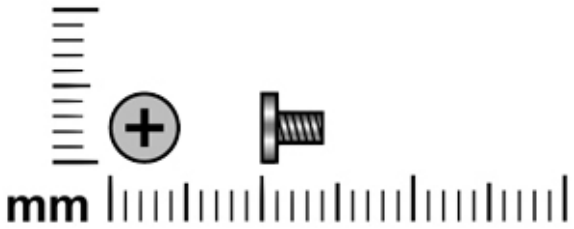


Color	Quantity	Length	Thread	Head diameter
Black	1	2.0 mm	2.0 mm	6.0 mm

Where used: One screw that secures the switch cover to the computer in the battery bay

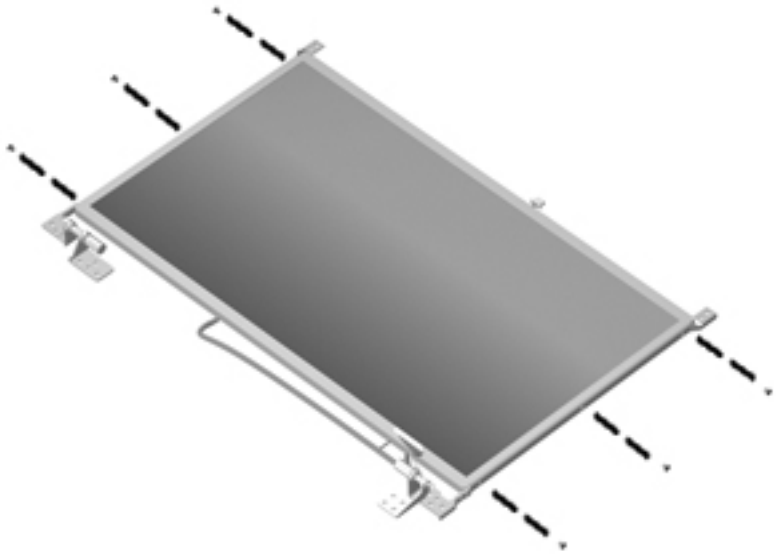


Phillips PM2.0×3.0 screw

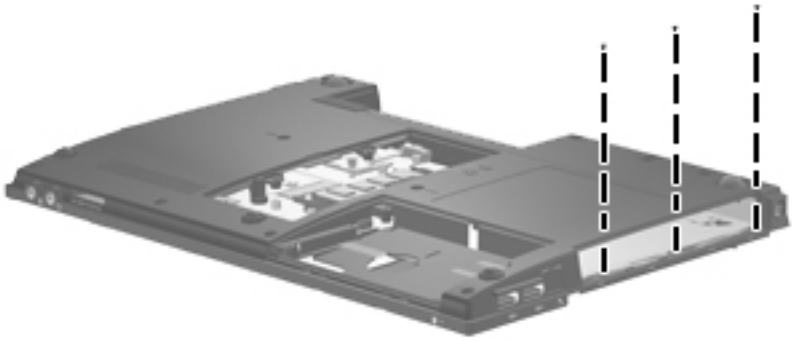


Color	Quantity	Length	Thread	Head diameter
Silver	9	3.0 mm	2.0 mm	4.5 mm

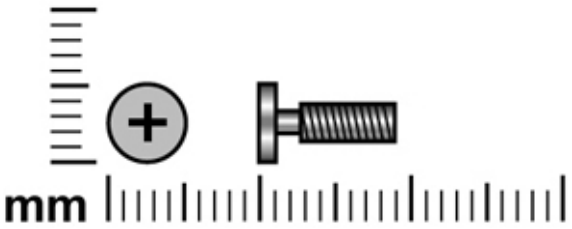
Where used: 6 screws that secure the display hinges to the display panel



Where used: 3 screws that secure the top cover to the base enclosure

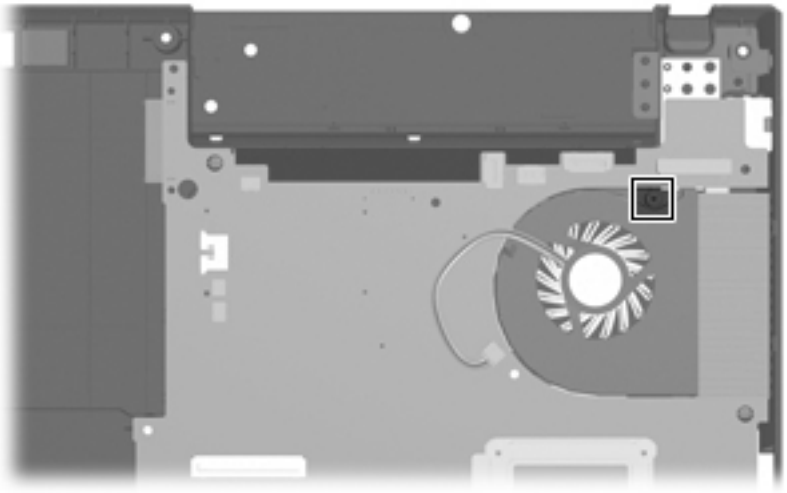


Phillips PM2.0×9.0 captive screw

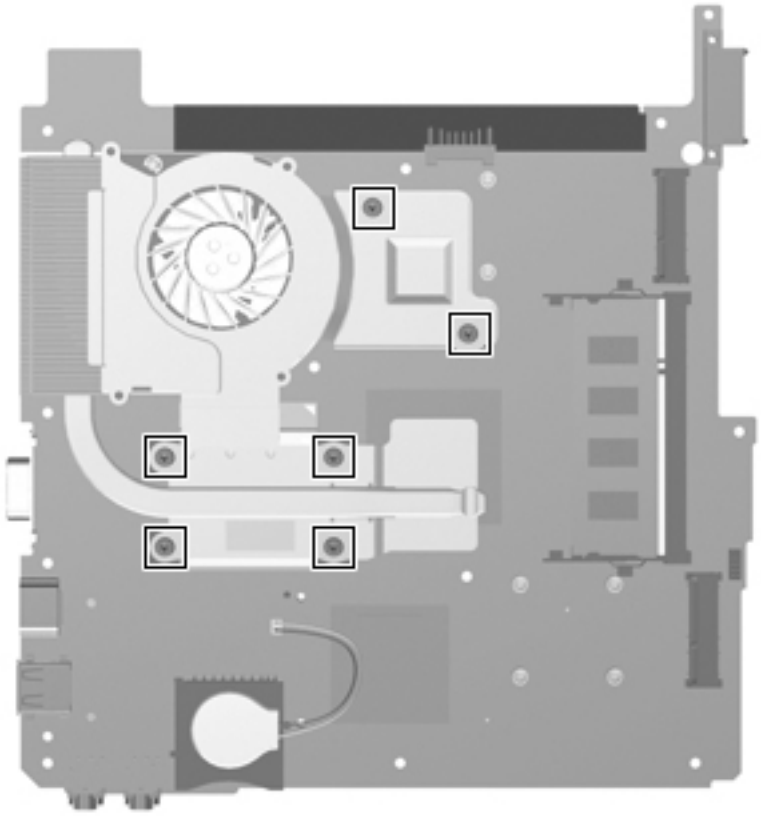


Color	Quantity	Length	Thread	Head diameter
Black	7	9.0 mm	2.0 mm	5.0 mm

Where used: One captive screw that secures the fan and system board to the base enclosure (screw is secured to the fan by a C-clip)



Where used: 6 captive screws that secure the fan and heat sink to the system board (screws are secured to the heat sink by C-clips)



8

Backup and recovery

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

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

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

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:

  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, and then select **Edit > Paste**.

     The screen image is added to the document.

  d. 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.

  ✎ 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:

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

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.

✎ 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.

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 chapter.

Using the Windows recovery tools

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

1. Select **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.

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**.

   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 chapter.
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.

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**.

   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 chapter.
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** while the "Press <F11> for recovery" message is displayed on the screen.
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:

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

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

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

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, and then select **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:

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

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

---

1. Select **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. Select **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.

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.

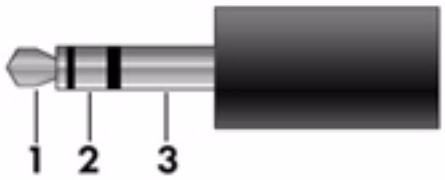
To recover your operating system and programs, follow these steps:

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.

9

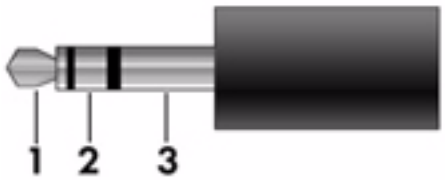
Connector pin assignments

Audio-in (microphone)



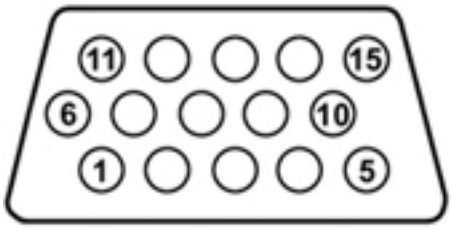
Pin	Signal
1	Audio signal in
2	Audio signal in
3	Ground

Audio-out (headphone)



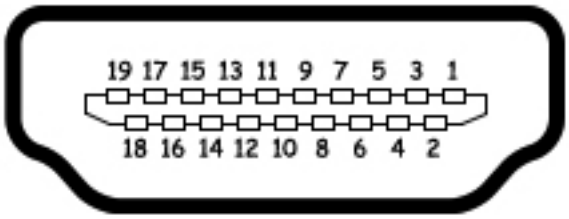
Pin	Signal
1	Audio out, left channel
2	Audio out, right channel
3	Ground

External monitor



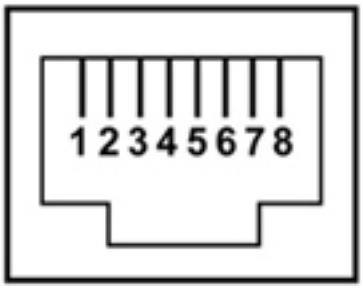
Pin	Signal
1	Red analog
2	Green analog
3	Blue analog
4	Not connected
5	Ground
6	Ground analog
7	Ground analog
8	Ground analog
9	+5 VDC
10	Ground
11	Monitor detect
12	DDC 2B data
13	Horizontal sync
14	Vertical sync
15	DDC 2B clock

HDMI



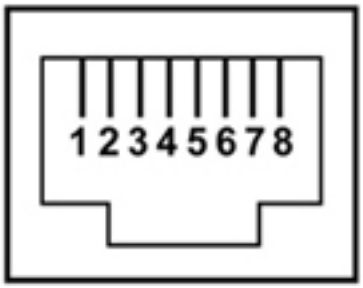
Pin	Signal
1	TMDS data 2+
2	TMDS data 2 shield
3	TMDS data 2-
4	TMDS data 1+
5	TMDS data 1 shield
6	TMDS data 1-
7	TMDS data 0+
8	TMDS data 0 shield
9	TMDS data 0-
10	TMDS clock+
11	TMDS clock shield
12	TMDS clock-
13	CEC
14	No connect
15	DDC clock
16	DDC data
17	Ground
18	+5V power
19	Hot plug detect

RJ-11 (modem)



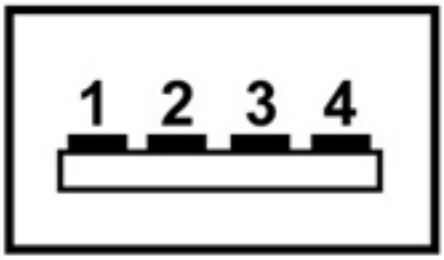
Pin	Signal
1	Unused
2	Tip
3	Ring
4	Unused
5	Unused
6	Unused
7	Unused
8	Unused

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

10

Power cord set requirements

The wide-range input feature of the computer permits it to operate from any line voltage from 100 to 120 volts AC, or from 220 to 240 volts AC.

The 3-conductor power cord set included with the computer meets the requirements for use in the country or region where the equipment is purchased.

Power cord sets for use in other countries and regions must meet the requirements of the country or region where the computer is used.

Requirements for all countries and regions

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least 1.5 m (5.0 ft) and no more than 2.0 m (6.5 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 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.

11

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. Caution must be exercised 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.

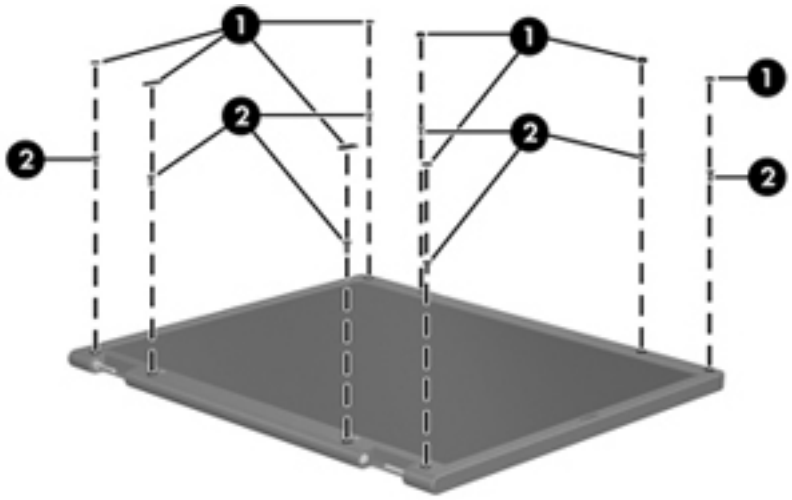
Materials Disposal. This HP product contains mercury in the backlight in the display assembly that might require special handling at end-of-life. Disposal of mercury may be regulated because of environmental considerations. For disposal or recycling information, contact your local authorities, or see 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 ❶ and the liquid crystal display (LCD) panel ❷.

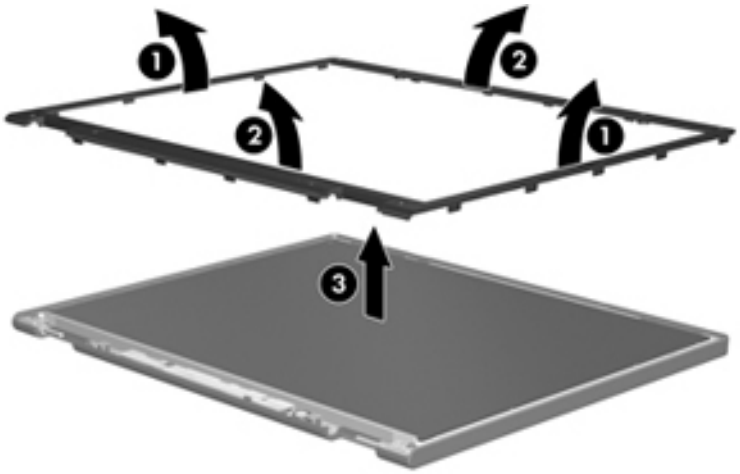
The procedures provided in this chapter are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

Perform the following steps to disassemble the display assembly:

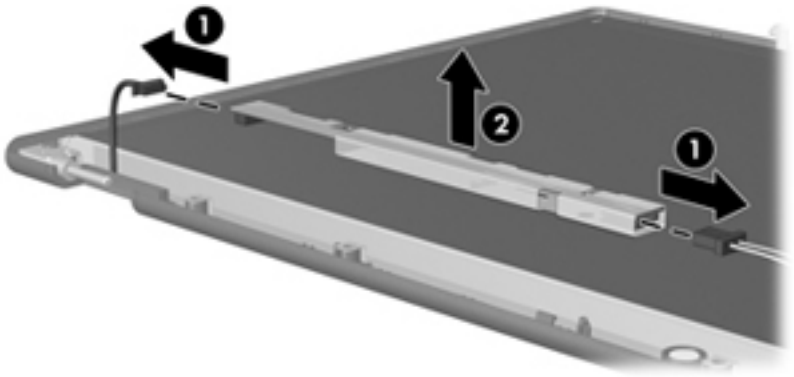
1. Remove all screw covers ❶ and screws ❷ that secure the display bezel to the display assembly.



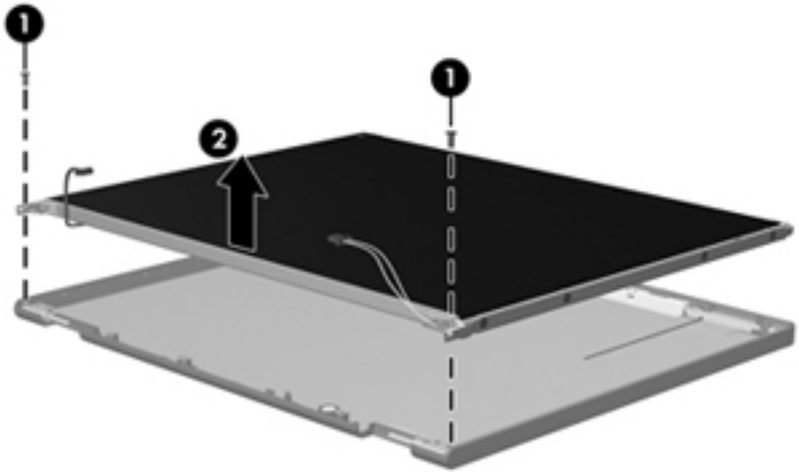
2. Lift up and out on the left and right inside edges ❶ and the top and bottom inside edges ❷ of the display bezel until the bezel disengages from the display assembly.
3. Remove the display bezel ❸.



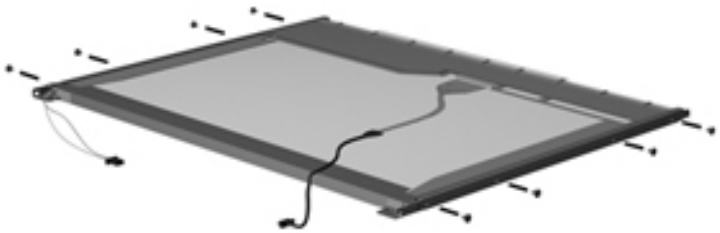
4. Disconnect all display panel cables ❶ from the display inverter and remove the inverter ❷.



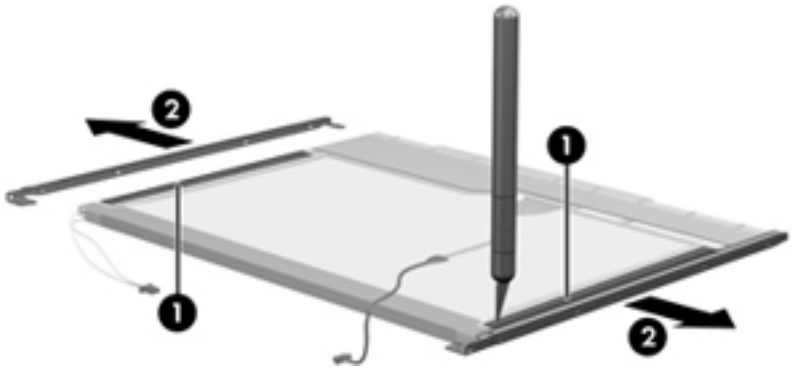
5. Remove all screws ❶ that secure the display panel assembly to the display enclosure.
6. Remove the display panel assembly ❷ from the display enclosure.



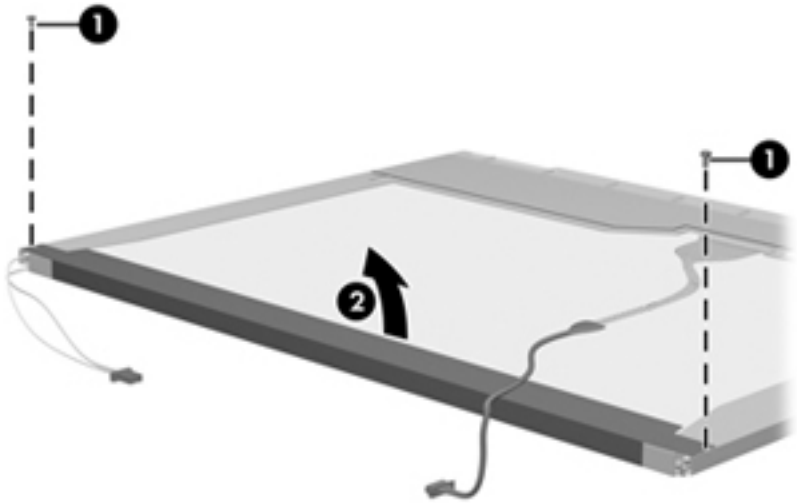
7. Turn the display panel assembly upside down.
8. Remove all screws that secure the display panel frame to the display panel.



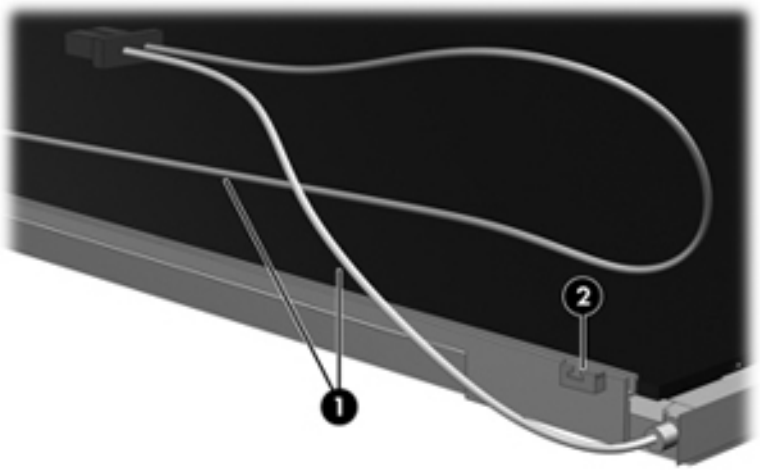
9. Use a sharp-edged tool to cut the tape ❶ that secures the sides of the display panel to the display panel frame.
10. Remove the display panel frame ❷ from the display panel.



11. Remove the screws ❶ that secure the backlight cover to the display panel.
12. Lift the top edge of the backlight cover ❷ and swing it outward.

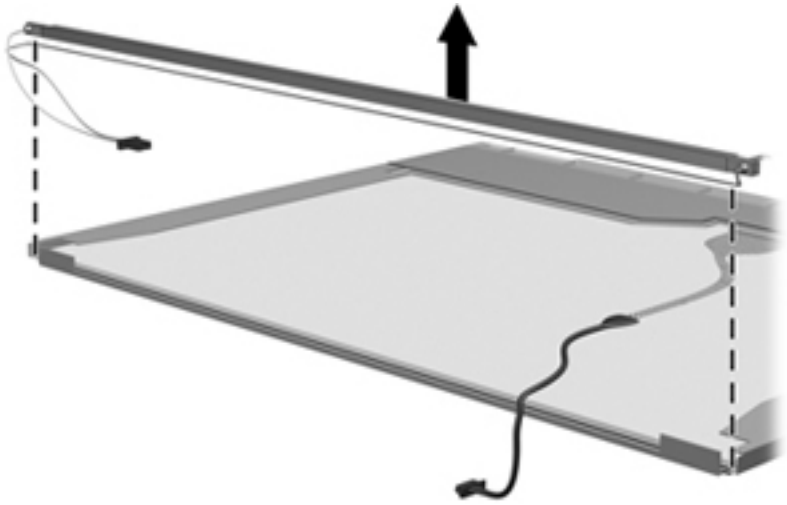


13. Remove the backlight cover.
14. Turn the display panel right-side up.
15. Remove the backlight cables ❶ from the clip ❷ in the display panel.

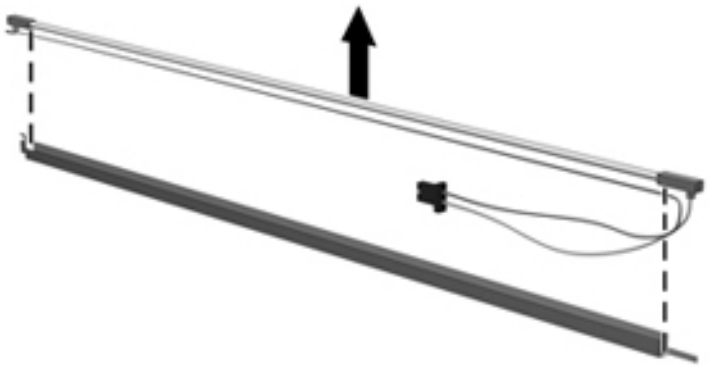


16. Turn the display panel upside down.
17. Remove the backlight frame from the display panel.

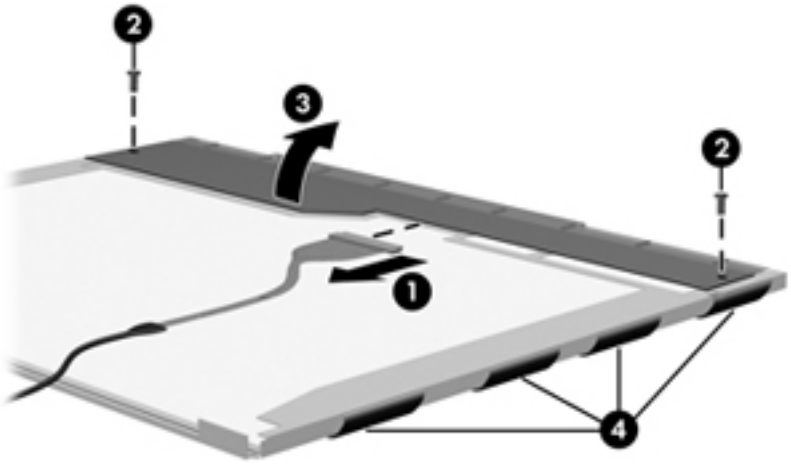
WARNING: The backlight contains mercury. Exercise caution when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.



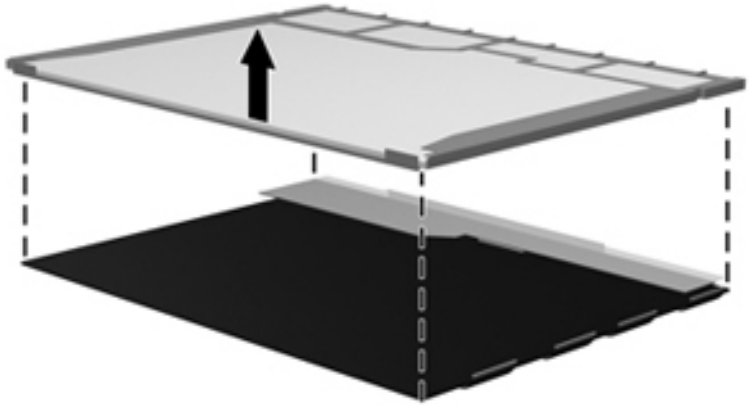
18. Remove the backlight from the backlight frame.



19. Disconnect the display cable ❶ from the LCD panel.
20. Remove the screws ❷ that secure the LCD panel to the display rear panel.
21. Release the LCD panel ❸ from the display rear panel.
22. Release the tape ❹ that secures the LCD panel to the display rear panel.



23. Remove the LCD panel.



24. Recycle the LCD panel and backlight.

Index

A

AC adapter, spare part numbers 3–14, 3–15, 3–17
antennas
  disconnecting 4–15, 4–17
  locations 2–1
  removal 4–34, 4–35
  spare part number 4–34, 4–35
audio, product description 1–5
audio-in jack
  connector pinout 9–1
  location 2–7
audio-out jack
  connector pinout 9–1
  location 2–7

B

backing up files 8–2
Backup and Restore Center 8–1, 8–2
base enclosure, spare part number 3–6, 3–19
battery
  removal 4–7
  spare part numbers 3–6, 3–20, 4–7
battery bay 2–10
battery light 2–9
battery release latch 2–10
BIOS administrator password 5–4
Bluetooth module
  removal 4–40
  spare part number 3–4, 3–17, 4–40
Bluetooth module cable
  illustrated 3–9
  removal 4–41
Blu-ray ROM DVD±R/RW SuperMulti Double-Layer Drive
  precautions 4–2
  removal 4–18
  spare part number 3–6, 3–13, 3–18, 4–18
  specifications 6–4
boot options 5–5
boot order 5–5
bottom components 2–10
built-in device
  Bluetooth device radio 5–6
  microphone 5–6
  modem 5–6
  Network Interface Controller (LAN) 5–6
  optical disc drive 5–6
  wake on LAN 5–6
  wireless button 5–6
built-in device options 5–6
buttons
  Info Center/QuickLook 2–2
  power 2–3
  TouchPad 2–6
  volume mute 2–2
  wireless 2–2

C

Cable Kit
  components 3–9
  spare part number 3–5, 3–9, 3–19
cables, service considerations 4–1
caps lock light 2–5
Card 1–6
chipset, product description 1–2
components
  bottom 2–10
  buttons 2–2
  display 2–1
  fingerprint reader 2–2
  front 2–7
  keys 2–4
  left-side 2–9
  lights 2–5
  pointing device 2–6
  right-side 2–8
  top 2–2
computer feet
  locations 4–6
  spare part number 4–6
Computer Setup
  accessing 5–1
  Diagnostics menu 5–5
  File menu 5–3
  navigating and selecting 5–1
  restoring factory settings 5–2
  Security menu 5–4
  System Configuration menu 5–5
  using 5–1
computer specifications 6–1

connector pinout
audio-in jack 9–1
audio-out jack 9–1
external monitor port 9–2
HDMI port 9–3
headphone jack 9–1
microphone jack 9–1
modem jack 9–4
monitor port 9–2
network jack 9–5
RJ-11 jack 9–4
RJ-45 jack 9–5
USB port 9–6
connectors, service considerations 4–1
creating a backup 8–2

D

device configurations 5–5, 5–6
Diagnostics menu 5–5
Disk Sanitizer 5–4
diskette drive, product description 1–4
display assembly
removal 4–27
spare part numbers 3–3, 3–17, 3–18, 3–20, 4–27
display bezel
illustrated 3–11
removal 4–30
spare part numbers 3–11, 3–18, 4–31
Display Cable Kit
illustrated 3–11
spare part numbers 3–11, 3–20
display components
illustrated 2–1
recycling 11–1
spare part numbers 3–10
display enclosure
illustrated 3–11
spare part numbers 3–11, 3–18
display hinges
illustrated 3–11
removal 4–32
spare part number 3–11, 3–18
display inverter, removal 11–3
display panel
product description 1–2
removal 4–31
display panel cable
illustrated 3–11
removal 4–33
spare part numbers 3–11, 3–18, 3–20, 4–33
display switch 2–1
drive light 2–7
DriveLock password 5–4
DriveLock, automatic 5–4
drives, boot order 5–5
DVD±RW and CD-RW SuperMulti Double-Layer Drive
precautions 4–2
removal 4–18
spare part number 3–6, 3–13, 3–18, 4–18
specifications 6–5
DVD-ROM Drive
precautions 4–2
removal 4–18
spare part number 3–6, 3–13, 3–18, 4–18
specifications 6–6

E

electrostatic discharge 4–2
equipment guidelines 4–4
esc key 2–4
Ethernet, product description 1–5
ExpressCard slot 2–8
ExpressCard slot bezel
illustrated 3–12
removal 4–38
external media card, product description 1–6
external monitor port
connector pinout 9–2
location 2–8

F

f11 recovery 8–4
fan
removal 4–51
spare part number 3–6, 3–19, 4–51
feet
locations 4–6
spare part number 4–6
File menu 5–3
fingerprint reader 2–3
fn key 2–4
front components 2–7
function keys 2–4

G

graphics, product description 1–2
grounding equipment and methods 4–2

H

hard disk test 5–5
hard drive
precautions 4–2
product description 1–4
removal 4–9
spare part numbers 3–6, 3–13, 3–18, 3–20, 4–9
specifications 6–3

hard drive bay 2–10
hard drive bracket, removal 4–11
hard drive connector, removal 4–11
hard drive cover
  illustrated 3–12
  removal 4–10
hard drive recovery 8–4
HDMI port
  connector pinout 9–3
  location 2–8
headphone jack
  connector pinout 9–1
  location 2–7
heat sink
  removal 4–51
  spare part numbers 3–6, 3–20, 4–51
hinges
  illustrated 3–11
  removal 4–32
  spare part number 3–11, 3–18
HP SpareKey Enrollment 5–4

I

Info Center/QuickLook button 2–2
Info Center/QuickLook light 2–5

J

jacks
  audio-in 2–7
  audio-out 2–7
  headphone 2–7
  microphone 2–7
  modem 2–9
  network 2–8
  RJ-11 2–9
  RJ-45 2–8

K

key components 2–4
keyboard
  product description 1–6
  removal 4–20
  spare part numbers 3–3, 3–4, 3–18, 3–19, 4–20
keys
  esc 2–4
  fn 2–4
  function 2–4
  numeric keypad 2–4
  Windows applications 2–4
  Windows logo 2–4

L

language, changing in Computer Setup 5–5
left-side components 2–9
legacy support, USB 5–1, 5–5
light components 2–5
lights
  battery 2–9
  caps lock 2–5
  drive 2–7
  Info Center/QuickLook 2–5
  power 2–5
  volume down 2–5
  volume mute 2–5
  volume up 2–5
  webcam 2–1
  wireless 2–5

M

mass storage devices, spare part numbers 3–13
memory module
  removal 4–16
  spare part numbers 3–6, 4–16
memory module compartment 2–10
memory, product description 1–3
memory/wireless module compartment cover
  illustrated 3–12
  removal 4–14
microphone
  locations 2–1
  product description 1–4
  removal 4–33
microphone jack
  connector pinout 9–1
  location 2–7
model name 3–1, 4–5
modem jack
  connector pinout 9–4
  location 2–9
modem module
  removal 4–42
  spare part numbers 3–5, 3–17, 4–42
modem module cable
  illustrated 3–9
  removal 4–44
modem, product description 1–5
monitor port
  connector pinout 9–2
  location 2–8

N

network cable
  illustrated 3–9
  removal 4–50
network jack
  connector pinout 9–5
  location 2–8

numeric keypad keys 2–4

O

operating system, product description 1–7, 1–8
optical drive
  location 2–9
  precautions 4–2
  product description 1–4
  removal 4–18
  spare part numbers 3–6, 3–13, 3–18, 4–18
  specifications 6–4, 6–5, 6–6
optical drive bracket, removal 4–19
optical drive slot bezel, illustrated 3–12

P

packing guidelines 4–3
palm rest, removal 4–25
passwords 5–4
plastic parts 4–1
Plastics Kit
  components 3–12
  contents 3–12
  spare part number 3–4, 3–12, 3–19
pointing device
  components 2–6
  illustrated 2–6
  product description 1–6
port options
  ExpressCard slot 5–6
  flash media reader 5–6
  USB port 5–6
ports
  external monitor 2–8
  HDMI 2–8
  monitor 2–8
  product description 1–6
  USB 2–8, 2–9
power button 2–3
power button board
  removal 4–46
  spare part numbers 3–5, 3–20, 4–46
power connector 2–9
power connector cable
  illustrated 3–9
  removal 4–45
power cord
  set requirements 10–1
  spare part numbers 3–14, 3–15
power light 2–5
power requirements, product description 1–6
processor
  product description 1–1
  removal 4–55
  spare part numbers 3–6, 3–16, 3–17, 4–55
product description
  audio 1–5
  chipset 1–2
  diskette drive 1–4
  display panel 1–2
  Ethernet 1–5
  external media card 1–6
  graphics 1–2
  hard drive 1–4
  keyboard 1–6
  memory 1–3
  microphone 1–4
  modem 1–5
  operating system 1–7, 1–8
  optical drive 1–4
  pointing device 1–6
  ports 1–6
  power requirements 1–6
  processor 1–1
  security 1–6
  serviceability 1–8
  webcam 1–5
  wireless 1–5
product name 1–1, 3–1, 4–5

R

recovering information 8–3
recovery partition 8–3
recovery, system 8–1
recycling
  battery 11–1
  display components 11–1
removal/replacement
  preliminaries 4–1
  procedures 4–5
restoring factory settings 5–2, 5–3
restoring security defaults 5–6
restoring the hard drive 8–2
right-side components 2–8
RJ-11 jack
  connector pinout 9–4
  location 2–9
RJ-45 jack
  connector pinout 9–5
  location 2–8
RTC battery
  removal 4–54
  spare part number 3–5, 3–20, 4–54
Rubber Feet Kit, spare part number 3–6, 3–19, 4–6
run-in test 5–5

S

SATA (Serial Advanced Technology Attachment) devices
AHCI (Advanced Host Controller Interface) 5–6
IDE (Integrated Drive Electronics) 5–6
Screw Kit, spare part number 3–14, 3–19
screw listing 7–1
SD Card Reader 2–7
SD Card Reader slot bezel
illustrated 3–4, 3–12
removal 4–48
security cable slot 2–8
Security menu 5–4
allow reset of HP ProtectTools security keys 5–4
always prompt for HP SpareKey enrollment 5–4
Automatic DriveLock 5–4
change password 5–4
Disk Sanitizer 5–4
DriveLock 5–4
HP SpareKey 5–4
HP SpareKey enrollment 5–4
password policy 5–4
set up BIOS administrator password 5–4
System IDs 5–4
user management 5–4
security, product description 1–6
service considerations 4–1
serviceability, product description 1–8
set security level 5–6
SIM slot 2–10
SIM, removal 4–8
speakers
location 2–2
removal 4–24
spare part number 3–3, 3–19, 4–24
specifications
Blu-ray ROM DVD±R/RW SuperMulti Double-Layer Drive 6–4
computer 6–1
display assembly 6–2
DVD±RW and CD-RW SuperMulti Double-Layer Drive 6–5
DVD-ROM Drive 6–6
hard drive 6–3
optical drive 6–4, 6–5, 6–6
system DMA 6–7
system I/O address 6–9
system interrupt 6–8
system memory map 6–7
switch cover
removal 4–20
spare part numbers 3–3, 3–19, 4–20
system board
removal 4–47
spare part numbers 3–5, 3–20, 4–47
System Configuration menu 5–5
system DMA specifications 6–7
system fan 5–5
system I/O address specifications 6–9
system IDs 5–4
system information 5–5
system interrupt specifications 6–8
system memory map specifications 6–7
system recovery 8–1

T

tools required 4–1
top components 2–2
top cover
removal 4–36
spare part numbers 3–4, 3–19, 3–20, 4–36
TouchPad 2–6
TouchPad buttons 2–6
TouchPad scroll zone 2–6

U

Universal Serial Bus (USB) port
connector pinout 9–6
location 2–8, 2–9
USB board
removal 4–39
spare part number 3–5, 3–20, 4–39
USB legacy support 5–1, 5–5

V

vents 2–8, 2–10
volume down light 2–5
volume mute button 2–2
volume mute light 2–5
volume scroll zone 2–2
volume up light 2–5

W

warranty period 3–1, 4–5
webcam 2–1
webcam light 2–1
webcam module
illustrated 3–11
removal 4–31
spare part number 3–11, 3–17, 4–32
webcam, product description 1–5
Windows applications key 2–4
Windows logo key 2–4
Windows Vista operating system DVD 8–3
wireless antennas
disconnecting 4–15, 4–17

locations 2–1
removal 4–34, 4–35
spare part number 4–34, 4–35
wireless button 2–2
wireless light 2–5
wireless, product description 1–5
WLAN module
removal 4–12
spare part numbers 3–7, 3–8, 3–15, 3–16, 4–12
workstation guidelines 4–4
WWAN module
removal 4–17
spare part numbers 3–8, 3–15, 3–17, 3–20, 4–17