HP EliteBook 6930p Notebook PC

Maintenance and Service Guide

© Copyright 2008, 2009, 2010 Hewlett-Packard Development Company, L.P.

Bluetooth is a trademark owned by its proprietor and used by Hewlett-Packard Company under license. Intel and Core are trademarks of Intel Corporation in the United States and other countries. Java is a US trademark of Sun Microsystems, Inc. Microsoft, Windows, and Windows Vista are U.S. registered trademarks of Microsoft Corporation in the United States. 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 2008

Second Edition: January 2009

Document Part Number: 462940-002

MSG revision history

Revision	Publication date	Description
A	November 2009	The part number has been updated to 593138-001 for the 90-W HP Smart AC adapter for use in all countries and regions except India. The information was updated in the following locations: Miscellaneous parts on page 33 and Sequential part number listing on page 35.
B	September 2010	Updated spare part number 482959-001 (Audio/ExpressCard assembly) to indicate the spare kit does not include the cable. The information was updated in the following locations: Computer major components on page 22, Sequential part number listing on page 35, and Audio/ExpressCard assembly on page 97. Updated spare part number 487432-001 (Cable Kit) to indicate the kit includes the Audio/ExpressCard cable. The information was updated in the following locations: Computer major components on page 22 and Cable Kit on page 31. Removed spare part number 593138-001 (90-W HP Smart AC adapter for use in all countries and regions except India). The information was removed from the following locations: Miscellaneous parts on page 33 and Sequential part number listing on page 35. Updated the spare part numbers for the memory. The information was updated in the following locations: Computer major components on page 22, Sequential part number listing on page 35, Primary memory module on page 67, and Expansion memory module on page 62. Added spare part numbers for new display panels. The information was added in the following locations: Computer major components on page 22, Sequential part number listing on page 35, and Display assembly on page 85. Added spare part numbers for new LED display bezels. The information was added in the following locations: Computer major components on page 22, Sequential part number listing on page 35, and Display assembly on page 85. Added spare part numbers for new system boards for Russia and the People's Republic of China. The information was added in the following locations: Computer major components on page 22, Sequential part number listing on page 35, and System board on page 100. Added spare part numbers for new WLAN modules. The information was added in the following locations: Computer major components on page 22, Sequential part number listing on page 35, and WLAN module on page 70. Added spare part numbers for new keyboards. The information was added in the following locations: Computer major components on page 22, Sequential part number listing on page 35, and Keyboard on page 65. Added spare part numbers for new AC adapters. The information was added in the following locations: Computer major components on page 22 and Sequential part number listing on page 35. Added a spare part number for a new capacitative board with cable. The information was added in the following locations: Computer major components on page 22 and Sequential part number listing on page 35.

B (continued)	September 2010	Added a spare part number for a new docking station. The information was added in the following locations: Computer major components on page 22 and Sequential part number listing on page 35. Updated the spare part number for the upgrade bay cradle from 502322-001 to 613682-001. The information was updated in the following locations: Computer major components on page 22 and Sequential part number listing on page 35. Updated the spare part numbers for various processors. The information was updated in the following locations: Computer major components on page 22, Sequential part number listing on page 35, and Processor on page 83. Added a spare part number for a new top cover without fingerprint reader. The information was added in the following locations: Computer major components on page 22, Sequential part number listing on page 35, and Top cover on page 90. Updated and added spare part numbers for various new hard drives. The information was updated and added in the following locations: Computer major components on page 22, Sequential part number listing on page 35, Mass storage devices on page 32, and Hard drive on page 56. Added spare part numbers for new batteries. The information was added in the following locations: Computer major components on page 22, Sequential part number listing on page 35, and Battery on page 50. Updated the hard drive specifications in the following location: Hard drive specifications on page 111.

Safety warning notice

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

Table of contents

1 Product description 1

2 External component identification 9

Top components 9

Display 9

Antennae 10

Button, switches, and fingerprint reader 11

Keys 12

Lights 13

Pointing devices 14

Front components 16

Rear components 17

Right-side components 17

Left-side components 18

Bottom components 19

3 Illustrated parts catalog 21

Serial number location 21

Computer major components 22

Plastics Kit 30

Cable Kit 31

Mass storage devices 32

Miscellaneous parts 33

Sequential part number listing 35

4 Removal and replacement procedures 42

Preliminary replacement requirements 42

Tools required 42

Service considerations 42

Plastic parts 42

Cables and connectors 43

Drive handling 43

Grounding guidelines 44

Electrostatic discharge damage 44
Packaging and transporting guidelines 45
Workstation guidelines 45
Equipment guidelines 46
Unknown user password 47
Component replacement procedures 48
Service tag 48
Computer feet 49
Battery 50
SIM 51
Display inverter 52
Bluetooth module 54
Hard drive 56
Optical drive 59
Upgrade bay device 60
Expansion memory module 62
WWAN module 63
Keyboard 65
Primary memory module 67
Modem module 69
WLAN module 70
RTC battery 73
Switch cover 74
Power button board 76
Fan 77
Heat sink 78
Processor 83
Display assembly 85
Top cover 90
TouchPad 92
Fingerprint reader board 94
Bluetooth module cable 95
Speaker 96
Audio/ExpressCard assembly 97
Modem module cable 98
System board 100

5 Computer Setup 103

Starting Computer Setup 103
Using Computer Setup 103
Navigating and selecting in Computer Setup 103
Restoring factory settings in Computer Setup 104
Computer Setup menus 105

File menu 105
Security menu 105
Diagnostics menu 106
System Configuration menu 107

6 Specifications 109
Computer specifications 109
14.1-inch, WXGA display specifications 110
Hard drive specifications 111
DVD±RW and CD-RW Double-Layer Combo Drive specifications 112
DVD/CD-RW Combo Drive specifications 113
DVD-ROM Drive 114
System DMA specifications 115
System interrupt specifications 116
System I/O address specifications 117
System memory map specifications 119

7 Screw listing 120
Phillips PM2.0×5.0 captive screw 121
Phillips PM2.5×11.0 captive screw 122
Phillips PM3.0×4.0 screw 123
Phillips 2.5×9.0 captive screw 124
Phillips PM2.0×3.0 screw 125
Phillips PM2.5×4.0 screw 126
Phillips PM2.5×4.0 screw 127
Phillips PM2.0×3.0 broad-head screw 129
Torx8 T8M2.5×7.0 screw 131
Phillips PM2.5×7.0 screw 133
Phillips PM2.5×11.0 captive screw 135
Phillips PM2.0×5.0 screw 136

8 Backup and recovery in Windows Vista 137
Overview 137
Creating recovery discs 138
Backing up your information 139
Backup tips 139
Backing up individual files or folders 140
Scheduling an automatic backup 140
Creating system restore points 141
Performing a recovery 142
Recovering individual files 142
Restoring the computer to a previous state 143
Recovering information using f8 recovery tools 143

Recovering information using Windows Recovery Environment (WinRE) 144
Recovering information using Recovery Manager 145
Recovering the entire hard drive using f11 145
Recovering information using a Windows Vista operating system DVD (purchased separately) 146

9 Backup and recovery in Windows XP 147
Backing up your information 147
When to back up 147
Backup suggestions 148
Backing up individual files or folders 148
Backing up all files and folders 149
Creating recovery points 149
Scheduling backups 151
Performing a recovery 151
Initiating a recovery in Windows 151

10 Connector pin assignments 152
1394 152
Audio-in (microphone) 153
Audio-out (headphone) 153
External monitor 154
RJ-11 (modem) 155
RJ-45 (network) 155
Universal Serial Bus 156

11 Power cord set requirements 157
Requirements for all countries and regions 157
Requirements for specific countries and regions 158

12 Recycling 159
Battery 159
Display 159

Index 165

1 Product description

Category	Description	Computer models equipped with discrete graphics subsystem memory	Computer models equipped with Unified Memory Architecture (UMA) graphics subsystem memory
Product Name	HP EliteBook 6930p Notebook PC	√	√
Processors	Intel® Core™ 2 Duo processors		
	• *T9900 3.06-GHz processor, 6-MB L2 cache, 1066-MHz front side bus (FSB)*	√	√
	• *T9800 2.93-GHz processor, 6-MB L2 cache, 1066-MHz FSB*	√	√
	• T9600 2.80-GHz processor, 6-MB L2 cache, 1066-MHz FSB	√	√
	• *T9550 2.66-GHz processor, 6-MB L2 cache, 1066-MHz FSB, 35W*	√	√
	• T9400 2.53-GHz processor, 6-MB L2 cache, 1066-MHz FSB, 35W	√	√
	• *P9600 2.66-GHz processor, 6-MB L2 cache, 1066-MHz FSB, 25W*	√	√
	• *P9500 2.53-GHz processor, 6-MB L2 cache, 1066-MHz FSB, 25W*	√	√
	• *P8800 2.66-GHz processor, 3-MB L2 cache, 1066-MHz FSB*	√	√
	• *P8700 2.53-GHz processor, 3-MB L2 cache, 1066-MHz FSB*	√	√
	• P8600 2.40-GHz processor, 3-MB L2 cache, 1066-MHz FSB	√	√
	• P8400 2.26-GHz processor, 3-MB L2 cache, 1066-MHz FSB	√	√
Chipset	Northbridge: Intel GM45 with up to 1067 FSB with iAMT support	√	
	Northbridge: Intel PM45 with up to 1067 FSB with iAMT support		√
	Southbridge: Intel ICH9M enhanced	√	√

Category	Description	Computer models equipped with discrete graphics subsystem memory	Computer models equipped with Unified Memory Architecture (UMA) graphics subsystem memory
Graphics	ATI M82-SCE Mobility Radeon HD 3450 discrete graphics subsystem memory with 128 MB GDDR3 (operating at 700 MHz) or 256 MB GDDR3 (operating at 700 MHz)	√	
	Mobile Intel GMA X4500 HD Universal Memory Architecture (UMA) graphics subsystem integrated with shared video memory (dynamically allocated), up to 384 MB		√
Panels	All display assemblies include 3 wireless local area network (WLAN) antennae	√	√
	Supports HP Panel Protection System	√	√
	Supports HP privacy filter	√	√
	Supports the following display assemblies:		
	• 14.1-inch WXGA LED	√	√
	• 14.1-inch WXGA+	√	√
	• 14.1-inch WXGA	√	√
Memory	2 customer-accessible/upgradable memory module slots	√	√
	Supports dual-channel memory	√	√
	Supports up to 8 GB of system RAM	√	√
	PC2-6400, 800-MHz, DDR2	√	√

Category	Description	Computer models equipped with discrete graphics subsystem memory	Computer models equipped with Unified Memory Architecture (UMA) graphics subsystem memory
	Supports the following configurations in all countries and regions except Brazil: • 8192-MB total system memory (4096 × 2, dual-channel) • 4096-MB total system memory (2048 × 2, dual-channel) • 4096-MB total system memory (4096 × 1) • 3072-MB total system memory (2048 + 1024, dual-channel) • 2048-MB total system memory (1024 × 2) • 2048-MB total system memory (2048 × 1) • 1024-MB total system memory (512 × 2, dual-channel) • 1024-MB total system memory (1024 × 1)	√	√
	Supports the following configurations only in Brazil: • 4096-MB total system memory (2048 × 2, dual-channel) • 2048-MB total system memory (1024 × 2, dual-channel) • 2048-MB total system memory (2048 × 1) • 1024-MB total system memory (512 × 2, dual-channel) • 1024-MB total system memory (1024 × 1)	√	√
Hard drives	Supports 9.5-mm (2.5-inch) hard drives	√	√
	Customer-accessible	√	√
	Serial ATA	√	√
	Supports Disk Sanitizer	√	√
	Supports full disk encryption	√	√
	Supports HP 3D DriveGuard	√	√

Category	Description	Computer models equipped with discrete graphics subsystem memory	Computer models equipped with Unified Memory Architecture (UMA) graphics subsystem memory
	Supports RAID 0 (striping) and RAID 1 (mirror)	√	√
	Supports the following drives: • 320-GB, 7200-rpm hard drive • 250-GB, 7200-rpm hard drive • 160-GB, 7200-rpm hard drive • 120-GB, 7200-rpm hard drive • 128-GB, solid-state drive • 80-GB solid-state drive	√	√
Upgrade bay	Fixed (removal of 1 screw required)	√	√
	Customer-accessible	√	√
	Serial ATA	√	√
	12.7-mm tray load	√	√
	Supports weight saver option	√	√
	Supports the following optical drives: • DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive with LightScribe • DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive • DVD/CD-RW Combo Drive • DVD-ROM Drive	√	√
	Supports the following hard drives (requires the upgrade bay cradle): • 250-GB, 5400-rpm • 160-GB, 7200-rpm	√	√
Audio/video	HD audio	√	√
	Integrated dual array microphones (2)	√	√
	Stereo speakers (2)	√	√
	Integrated 2-megapixel webcamera	√	√
Modem	56K V.92 1.5-inch data/fax modem	√	√
	Support for no-modem option	√	√

Category	Description	Computer models equipped with discrete graphics subsystem memory	Computer models equipped with Unified Memory Architecture (UMA) graphics subsystem memory
Ethernet	Intel 82567LM 10/100/1000 Ethernet, with iAMT Intel 82567LM Gigabit network connection	√	√
	S4/S5 wake on LAN: DC - no	√	√
	S4/S5 wake on LAN: AC - yes	√	√
Wireless	**Integrated WLAN options by way of wireless module:**		
	3 WLAN antennae built into display assembly	√	√
	Support for no-WLAN option	√	√
	Support for the following WLAN formats: • Broadcom 4322 802.11a/b/g/n • Broadcom 4311AG 802.11a/b/g • Broadcom BCM4312 802.11b/g • Intel Wi-Fi Link 5300 802.11a/b/g/n • Intel Wi-Fi Link 5100 802.11a/b/g/n • Intel Wi-Fi Link 5100 802.11b/g	√	√
	Integrated WWAN options by way of wireless module:		
	2 WWAN antennae built into display assembly	√	√
	Subscriber identity module (SIM) security	√	√
	Integrated personal area network (PAN) options by way of Bluetooth® module:		
	Support for no-WPAN option	√	√
	Broadcom Bluetooth 2.0+EDR	√	√
External media cards	One ExpressCard/54 slot	√	√
	SD card reader supporting Secure Digital (SD) Memory Card and MultiMediaCard (MMC)	√	√
Ports	Audio-in (mono microphone)	√	√
	Audio-out (stereo headphone)	√	√
	Docking	√	√

Category	Description	Computer models equipped with discrete graphics subsystem memory	Computer models equipped with Unified Memory Architecture (UMA) graphics subsystem memory
	Battery (system)	√	√
	Battery (travel)	√	√
	RJ-11 (modem)	√	√
	RJ-45 (Ethernet, includes link and activity lights)	√	√
	USB (3)	√	√
	VGA (Dsub 15-pin) supporting 1600 × 1200 external resolution at 75-GHz (hot plug/unplug with auto-detect)	√	√
	1394a	√	√
	3-pin HP Smart AC Adapter	√	√
Keyboard/ pointing devices	11.97-inch keyboard with embedded numeric keypad	√	√
	Spill-resistant keyboard	√	√
	Dura-Keys	√	√
	Vertical scrolling, taps enabled as default	√	√
	Dualpoint (pointing stick and TouchPad) with 2 pointing stick buttons and 2 TouchPad buttons	√	√
Power requirements	90-W HP Smart AC Adapter with localized cable plug support (2-wire plug with ground pin, supports 2-pin DC connector)	√	√
	120-W HP Smart AC Adapter with localized cable plug support (2-wire plug with ground pin, supports 2-pin DC connector)	√	√
	8-cell, 58-Wh Li-ion battery	√	√
	6-cell, 55-Wh Li-ion battery	√	√
	4-cell, 37-Wh Li-ion battery	√	√
	Support for 12-cell Ultra Capacity Battery	√	√
	Support for 8-cell Li-ion Extended Life Battery	√	√
	HP Fast Charge Technology	√	√

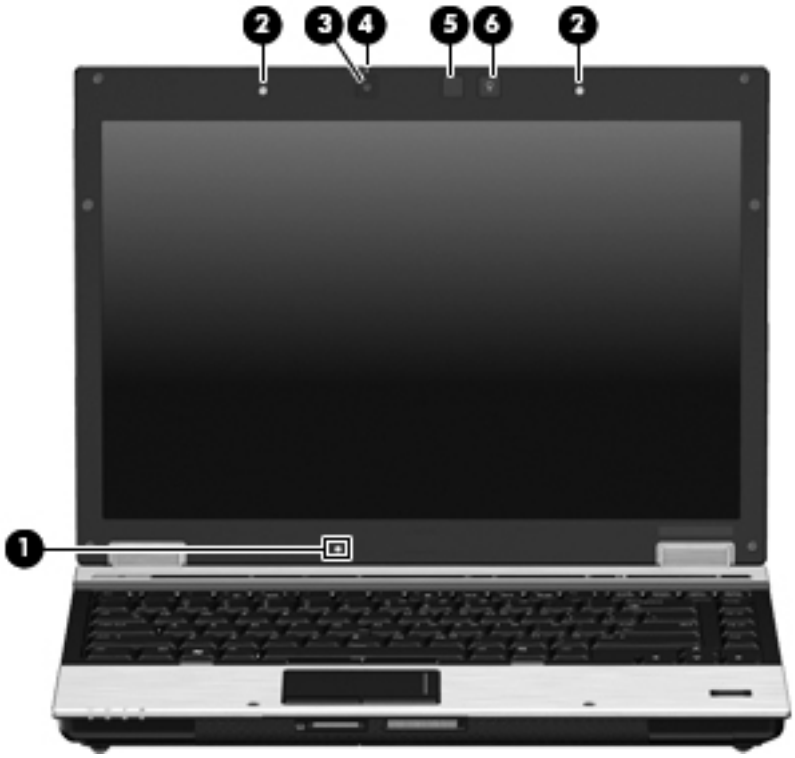
Category	Description	Computer models equipped with discrete graphics subsystem memory	Computer models equipped with Unified Memory Architecture (UMA) graphics subsystem memory
Security	Supports Kensington security sock	√	√
	Infineon Trusted Platform Module (TPM) v. 1.2	√	√
	TPM Enhanced Drive Lock	√	√
	Fingerprint reader	√	√
	Integrated smart card reader	√	√
Operating system	**Preinstalled:**		
	Windows® Vista® Basic 32 with and without Office Ready	√	√
	Windows Vista Business 32 with and without Office Ready	√	√
	Windows Vista Ultimate with Office Ready (in Canada and the United States)	√	√
	Windows Vista Business with Windows® XP Pro with and without Office Ready	√	√
	Windows Vista Basic 32 with Office Personal and Powerpoint (Japan)	√	√
	Windows Vista Basic 32 with Office Pro 2007 (Japan)	√	√
	Windows Vista Business 32 with Office Personal and Powerpoint (Japan)	√	√
	Windows Vista Business 32 with Office Pro 2007 (Japan)	√	√
	Windows Vista Business 32 with Office Personal (Japan)	√	√
	Windows Vista Business with Windows XP Pro and Office Personal with Powerpoint (Japan)	√	√
	Windows Vista Business with Windows XP Pro and Office Pro 2007 (Japan)	√	√
	Windows Vista Business with Windows XP Pro with Office Personal (Japan)	√	√
	FreeDOS	√	√
	Restore media:		

Category	Description	Computer models equipped with discrete graphics subsystem memory	Computer models equipped with Unified Memory Architecture (UMA) graphics subsystem memory
	DRDVD Windows Vista	√	√
	DRDVD Windows XP	√	√
	Windows Vista Basic 32	√	√
	Windows Vista Business 32	√	√
	Windows Vista Business 64	√	√
	Windows Vista Ultimate	√	√
	Windows XP Pro	√	√
	Certified:		
	Microsoft® WHQL	√	√
	Novell	√	√
	SuSE Linux	√	√
	Web support:		
	Windows Vista Enterprise 32	√	√
	Windows Vista Enterprise 64	√	√
	Windows XP Pro	√	√
Serviceability	**Customer service replaceable (CSR) parts:**		
	AC adapter	√	√
	Battery (system)	√	√
	Expansion memory module	√	√
	Hard drive	√	√
	Keyboard	√	√
	Optical drive	√	√
	Primary memory module	√	√
	SIM	√	√
	WLAN module	√	√
	WWAN module	√	√

2 External component identification

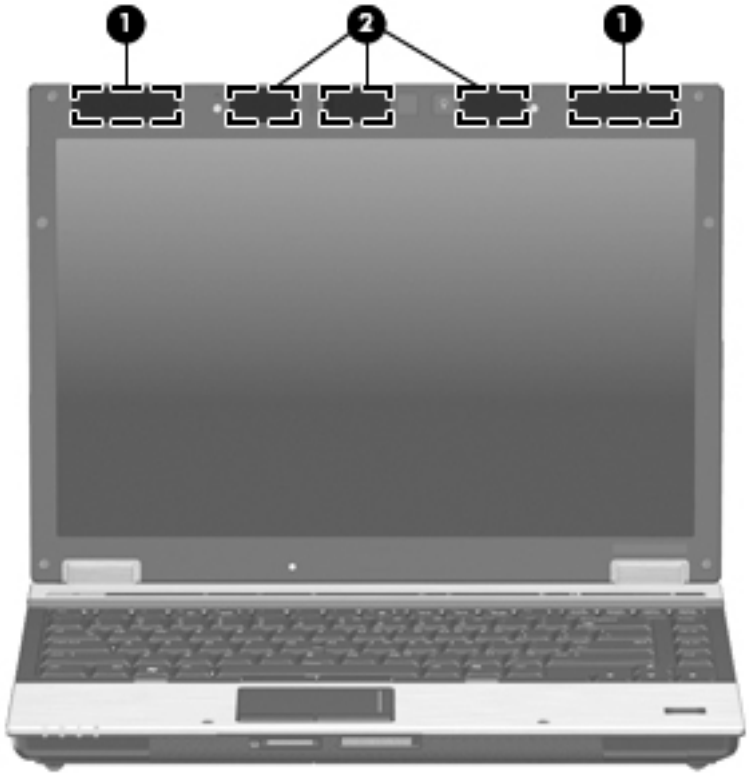
Top components

Display



Item	Component	Function
(1)	Ambient light sensor	Automatically adjusts the display brightness based on the lighting conditions in your environment.
(2)	Internal microphones (2)	Record sound.
(3)	HP Webcam	Records video and captures still video.
(4)	HP Webcam light	On: The integrated camera is in use.
(5)	Keyboard light	Illuminates the keyboard in low-light conditions when the keyboard light button is pressed.
(6)	Keyboard light button	Opens and turns on the keyboard light.

Antennae



Item	Component	Description
(1)	WWAN antennae (2)*	Send and receive wireless signals to communicate with wireless wide-area networks (WWAN).
(2)	WLAN antennae (3)*	Send and receive wireless signals to communicate with wireless local area networks (WLAN).

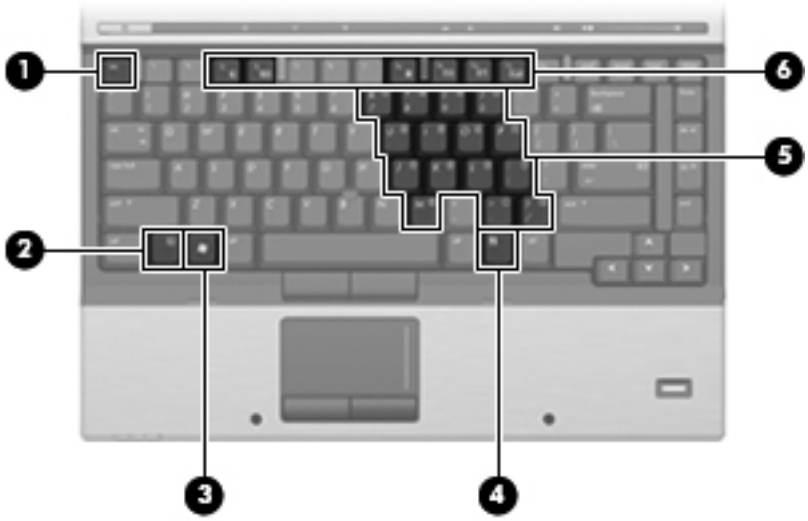
*The antennae are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennae free from obstructions.

Button, switches, and fingerprint reader

Item	Component	Function
(1)	Power button	• When the computer is off, press the button to turn on the computer. • When the computer is on, press the button to shut down the computer. • When the computer is in the Sleep state, press the button briefly to exit Sleep. • When the computer is in Hibernation, press the button briefly to exit Hibernation. If the computer has stopped responding and Windows® shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer. To learn more about your power settings, select **Start > Control Panel > System and Maintenance > Power Options**.
(2)	Internal display switch	Turns off the display if the display is closed while the power is on.
(3)	Info button	Launches Info center, which enables you to open various software solutions.
(4)	Wireless button	Turns the wireless feature on or off but does not establish a wireless connection. **NOTE:** A wireless network must be set up in order to establish a wireless connection.
(5)	Presentation button	Starts the presentation feature.
(6)	Volume mute button	Mutes and restores speaker sound.

Item	Component	Function
(7)	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.
(8)	Fingerprint reader (select models only)	Allows a fingerprint logon to Windows, instead of a password logon.

Keys



Item	Component	Function
(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

Item	Component	Function
(1)	Wireless lights (2)*	• On: An integrated wireless device, such as a wireless local area network (WLAN) device, the HP Broadband Wireless Module, and/or a Bluetooth® device, is on. • Amber: All wireless devices are off.
(2)	Power lights (2)†	• On: The computer is on. • Blinking: The computer is in the Sleep state. • Blinking rapidly: An AC adapter with a higher power rating should be connected. • Off: The computer is off or in Hibernation.
(3)	Battery light	• Amber: A battery is charging. • Green: 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.
(4)	Drive light	• Blinking green: The hard drive or optical drive is being accessed. • Amber: HP 3D DriveGuard has temporarily parked the internal hard drive, and if present, the hard drive in the upgrade bay.

Item	Component	Function
(5)	Caps lock light	On: Caps lock is on.
(6)	Num lock light	On: Num lock is on or the embedded numeric keypad is enabled.
(7)	Volume mute light	• On: Computer sound is on. • Amber: Computer sound is off.
(8)	Volume down light	Blinking: The volume scroll zone is being used to decrease speaker volume.
(9)	Volume up light	Blinking: The volume scroll zone is being used to increase speaker volume.

*The 2 wireless lights display the same information. The light on the wireless button is visible only when the computer is open. The wireless light on the front of the computer is visible whether the computer is open or closed.

†The 2 power lights display the same information. The light on the power button is visible only when the computer is open. The power light on the front of the computer is visible whether the computer is open or closed.

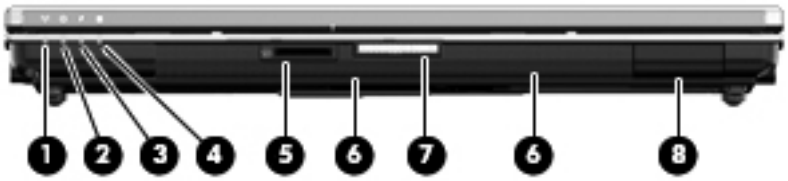
Pointing devices

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

Item	Component	Function
(7)	Right TouchPad button*	Functions like the right button on an external mouse.

*This table describes factory settings. To view or change pointing device preferences, select **Start > Control Panel > Hardware and Sound > Mouse**.

Front components



Item	Component	Function
(1)	Wireless light	On: An integrated wireless device, such as a wireless local area network (WLAN) device, the HP Broadband Wireless Module, and/ or a Bluetooth device, is on. Amber: All wireless devices are off.
(2)	Power light	• On: The computer is on. • Blinking: The computer is in the Sleep state. • Blinking rapidly: An AC adapter with a higher power rating should be connected. • Off: The computer is off or in Hibernation.
(3)	Battery light	• Amber: A battery is charging. • Green: 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.
(4)	Drive light	Blinking green: The hard drive or optical drive is being accessed. Amber: HP 3D DriveGuard has temporarily parked the hard drive.
(5)	SD card reader	Supports the Secure Digital (SD) Memory Card and MultiMediaCard (MMC) optional digital card formats.
(6)	Speakers (2)	Produce sound.
(7)	Display release button	Opens the computer.
(8)	Bluetooth compartment	Contains a Bluetooth device.

Rear components

Item	Component	Description
(1)	Security cable slot	Attaches an optional security cable to the computer. **NOTE:** The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.
(2)	Power connector	Connects an AC adapter.
(3)	External monitor port	Connects an external VGA monitor or projector.

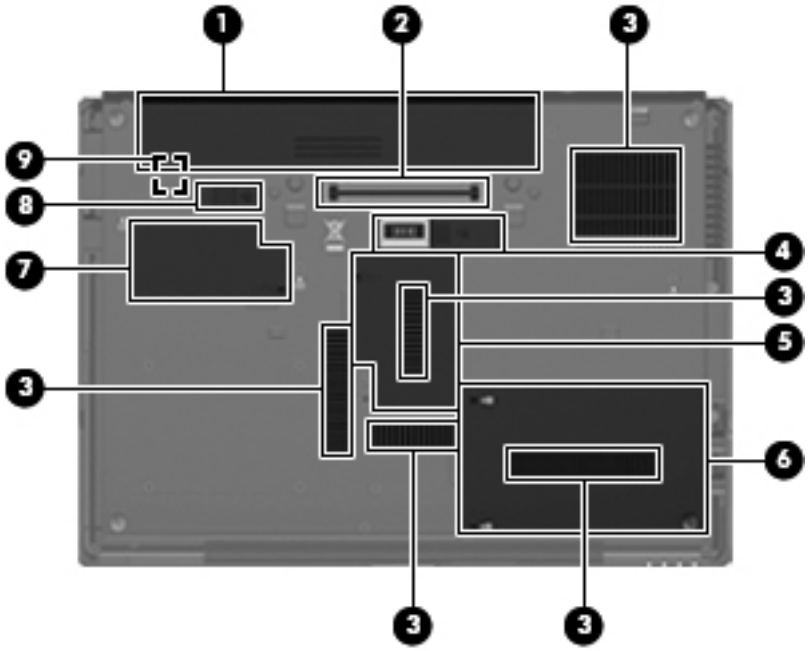
Right-side components

Item	Component	Function
(1)	Smart card reader	Supports optional smart cards and Java™ cards.
(2)	Upgrade bay	Supports an optical drive or hard drive.
(3)	USB port	Connects an optional USB device.
(4)	RJ-45 (network) jack	Connects a network cable.
(5)	RJ-11 (modem) jack	Connects a modem cable.

Left-side components

Item	Component	Function
(1)	Vent	Enables airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(2)	USB ports (2)	Connect optional USB devices.
(3)	1394 port	Connects an optional IEEE 1394 or 1394a device, such as a camcorder.
(4)	Audio-in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.
(5)	Audio-out (headphone) jack	Produces sound when connected to optional powered stereo speakers, headphones, ear buds, a headset, or television audio.
(6)	ExpressCard slot	Supports optional ExpressCards.

Bottom components



Item	Component	Function
(1)	Battery bay	Holds the battery.
(2)	Docking connector	Connects an optional docking device.
(3)	Vents (5)	Enable airflow to cool internal components. **CAUTION:** To prevent overheating, do not obstruct 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 thick rugs or clothing, to block airflow. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(4)	Accessory battery connector	Connects an optional accessory battery.
(5)	Memory module compartment	Contains the expansion memory module slot.
(6)	Hard drive bay	Holds the hard drive.
(7)	WWAN module compartment	Contains a WWAN module (select models only). **CAUTION:** To prevent an unresponsive system and the display of a warning message, replace the device with only a WLAN module authorized for use in the computer by the governmental agency that regulates wireless devices in your country. If you replace the device and then receive a warning message, remove the device to restore computer functionality, and then contact technical support through Help and Support.

Item	Component	Function
(8)	Battery release latch	Releases the battery from the battery bay.
(9)	SIM slot (select models only)	Contains a wireless subscriber identity module (SIM). The SIM slot is located inside the battery bay.

3 Illustrated parts catalog

Serial number location

The service tag, affixed to the bottom of the computer, provides information that may be needed when troubleshooting system problems. The service tag provides the following information:

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

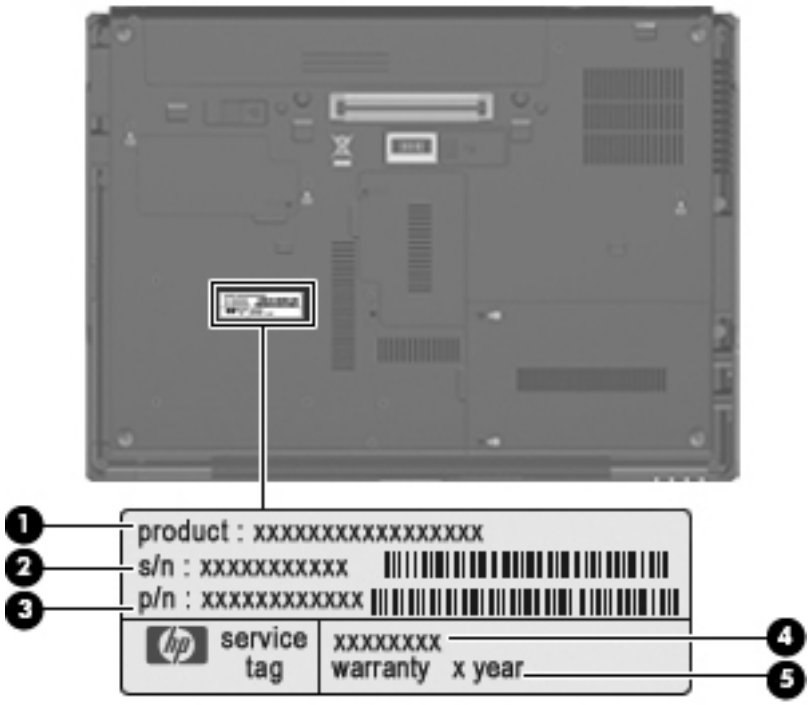
(2) Serial number (s/n): This is an alphanumeric identifier that is unique to each product.

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

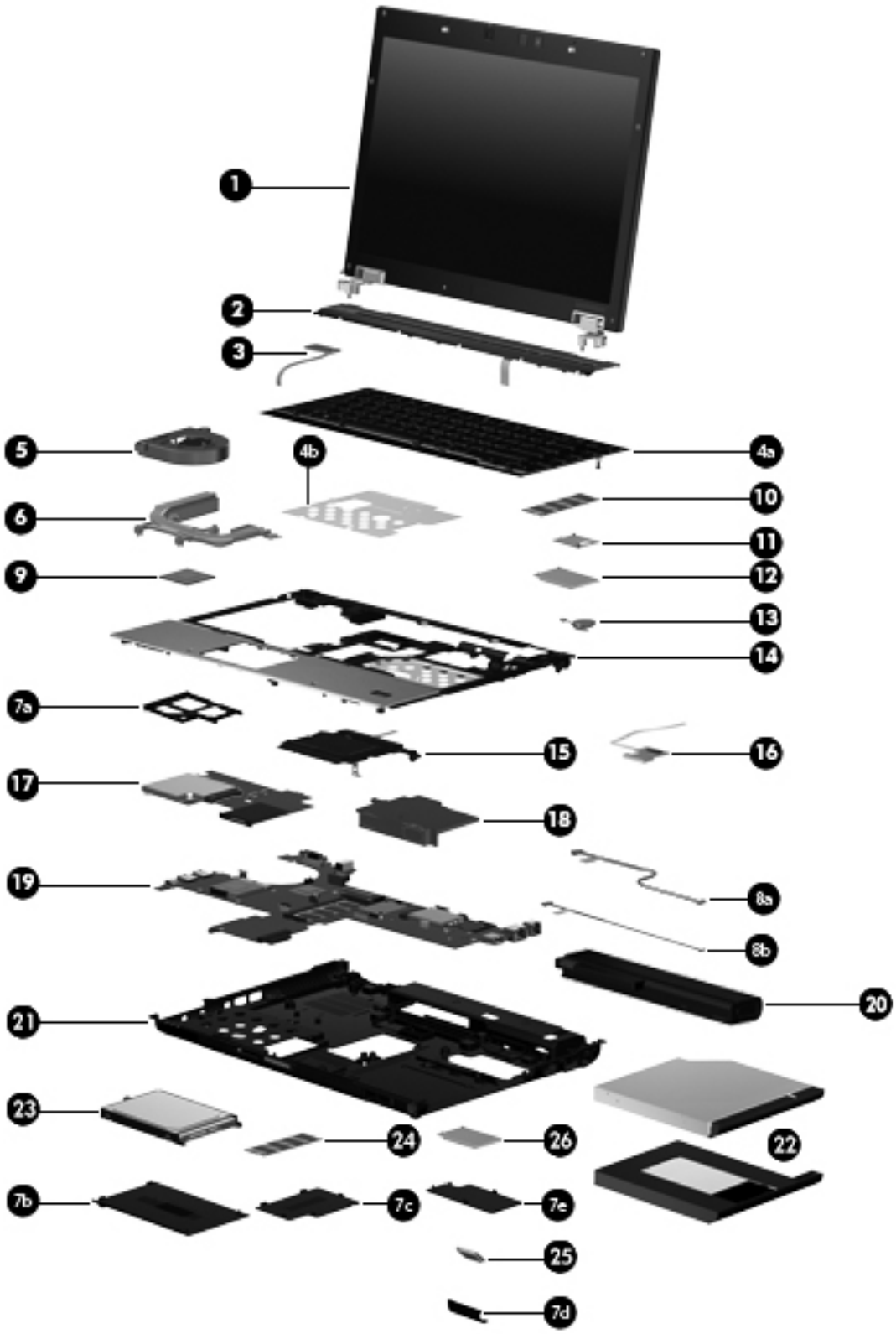
(4) Model description: This is the number used to locate documents, drivers, and support for the computer.

(5) Warranty period: Describes the duration of the warranty period for the computer.

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



Computer major components



Item	Description	Spare part number
(1)	**14.1-inch, AntiGlare display assemblies** (include three WLAN antenna cables, two WWAN antenna cables, and two microphones):	
	WXGA LED display assembly with webcam (includes webcam cable)	487433-001
	WXGA LED display assembly without webcam	483202-001
	WXGA+ display assembly with webcam (includes webcam cable)	487435-001
	WXGA+ display assembly without webcam	483201-001
	WXGA display assembly with webcam (includes webcam cable)	487434-001
	WXGA display assembly without webcam	483200-001
	Display assembly internal components:	
	Display bezels	
	For use only with computer models equipped with non-LED displays and a webcam	488189-001
	For use only with computer models equipped with non-LED displays without a webcam	488190-001
	For use only with computer models equipped with LED displays and a webcam	*518420-001*
	For use only with computer models equipped with LED displays without a webcam	*518421-001*
	Webcam	486302-001
	Display panels	
	WXGA display panel	*623154-001*
	WXGA LED display panel	*623155-001*
	WXGA+ display panel	*623156-001*
	Display inverter	487431-001
	Display Hinge Kit (includes left and right hinges)	482967-001
	Display Cable Kit (includes display panel cable)	482966-001
	Logo Kit	500325-001
	Wireless Antenna Kit (includes 3 WLAN antenna transceivers and cables and 2 WWAN antenna transceivers and cables)	482969-001
(2)	**Switch cover** (includes capacitative board and cable)	486307-001
	Capacitative board (includes cable; not illustrated)	*487428-001*
(3)	**Power button board** (includes cable)	482964-001
(4a)	**Keyboards** (include keyboard cable, keyboard shield, pointing stick, and pointing stick cable)	
	For use in Belgium	483010-A41
	For use in Brazil	483010-201
	For use in the Czech Republic	483010-221
	For use in Denmark	483010-081

Item	Description	Spare part number
	For use in Europe, the Middle East, and Africa	*483010-021*
	For use in France	483010-051
	For use in French Canada	483010-121
	For use in Germany	483010-041
	For use in Greece	483010-DJ1
	For use in Hungary	483010-211
	For use in Iceland	483010-DD1
	For use in Israel	483010-BB1
	For use in Italy	483010-061
	For use in Japan	483010-291
	For use in Latin America	483010-161
	For use in the Netherlands	483010-B31
	For use in Norway	483010-091
	For use in Portugal	483010-131
	For use in Russia	483010-251
	For use in Saudi Arabia	483010-171
	For use in Sweden and Finland	483010-B71
	For use in Slovakia	483010-231
	For use in Slovenia	*483010-BA1*
	For use in South Korea	483010-AD1
	For use in Spain	483010-071
	For use in Switzerland	483010-BG1
	For use in Taiwan	483010-AB1
	For use in Turkey	483010-141
	For use in the United Kingdom	483010-031
	For use in the United States	483010-001
(4b)	**Keyboard shield** (included with keyboard spare part kit)	
	Pointing stick rubber caps (not illustrated)	486565-001
(5)	**Fan**	487436-001
(6)	**Heat sinks** (include replacement thermal material)	
	For use only with computer models with discrete graphics subsystem memory	483011-001
	For use only with computer models with UMA graphics subsystem memory	483012-001

Item	Description	Spare part number
	Plastics Kit (see Plastics Kit on page 30 for more Plastics Kit spare part information):	487429-001
(7a)	ExpressCard slot bezel	
(7b)	Hard drive bay cover	
(7c)	Memory module compartment cover	
(7d)	Bluetooth module compartment cover	
(7e)	WWAN module compartment cover	
	Cable Kit:	487432-001
(8a)	Bluetooth module cable	
(8b)	Modem module cable (includes RJ-11 connector)	
	Audio board cable (not illustrated)	
(9)	**Intel Core 2 Duo processors** (include replacement thermal material)	
	T9900, 3.06-GHz (1066-MHz FSB, 6-MB L2 cache)	*570434-001*
	T9800, 2.93-GHz (1066-MHz FSB, 6-MB L2 cache)	*507951-001*
	T9600, 2.80-GHz (1066-MHz FSB, 6-MB L2 cache)	*507955-002*
	T9550, 2.66-GHz (1066-MHz FSB, 6-MB L2 cache, 35W)	*507953-001*
	T9400, 2.53-GHz (1066-MHz FSB, 6-MB L2 cache, 35W)	*507956-002*
	P9600, 2.66-GHz (1066-MHz FSB, 3-MB L2 cache, 25W)	*507957-001*
	P9500, 2.53-GHz (1066-MHz FSB, 6-MB L2 cache, 25W)	*507958-001*
	P8800, 2.66-GHz (1066-MHz FSB, 3-MB L2 cache)	*570036-001*
	P8700, 2.53-GHz (1066-MHz FSB, 3-MB L2 cache)	*507960-001*
	P8600, 2.40-GHz (1066-MHz FSB, 3-MB L2 cache)	*507963-002*
	P8400, 2.26-GHz (1066-MHz FSB, 3-MB L2 cache)	*507964-002*
(10)	**Primary memory modules** (PC2-6400, 800-MHz, DDR2)	
	4096-MB	*598855-001*
	2048-MB	*598858-001*
	1024-MB	*598861-001*
(11)	**Modem modules** **NOTE:** The modem module spare part kits do not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 487432-001. See Cable Kit on page 31 for more Cable Kit spare part information.	
	For use in all countries and regions except Australia and New Zealand	461750-001
	For use only in Australia and New Zealand	461750-011
(12)	**WLAN modules**	

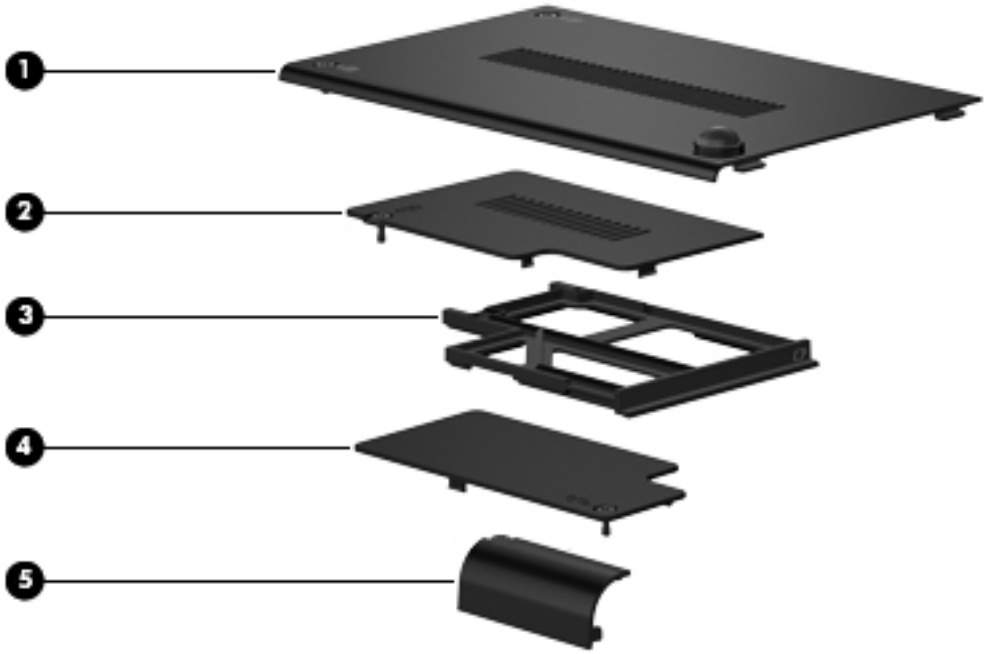
Item	Description	Spare part number
	Intel Wi-Fi Link 5300 802.11a/b/g/n WLAN module for use in all countries and regions	480986-001
	Intel Wi-Fi Link 5100 802.11a/b/g/n WLAN module for use in all countries and regions	480985-001
	Intel Wi-Fi Link 5100 802.11a/b/g WLAN module for use in all countries and regions	482957-001
	Broadcom 4322 802.11a/b/g/n WLAN modules:	
	• For use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States	487330-001
	• For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	487330-002
	Broadcom BCM4312 802.11b/g WLAN modules:	
	• For use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States	459263-001

Item	Description	Spare part number
	• For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	459263-002
	Intel Wi-Fi Link 5100 802.11a/b/g/n 1x2 WLAN module with iAMT 4.0 support for use in Antigua and Barbuda, Argentina, Aruba, the Bahamas, Barbados, Bermuda, Brunei, Canada, the Cayman Islands, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Hong Kong, India, Indonesia, Malaysia, Mexico, Panama, Paraguay, Peru, Saudi Arabia, Taiwan, Uruguay, the United States, Venezuela, and Vietnam	*506678-001*
	Intel Wi-Fi Link 5300 802.11a/b/g/n 3x3 WLAN module with iAMT 4.0 support for use in Antigua and Barbuda, Argentina, Aruba, the Bahamas, Barbados, Bermuda, Brunei, Canada, the Cayman Islands, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Hong Kong, India, Indonesia, Malaysia, Mexico, Panama, Paraguay, Peru, Saudi Arabia, Taiwan, Uruguay, the United States, Venezuela, and Vietnam	*506679-001*
	Intel 802.11a/b/g WLAN module for use in Russia, Ukraine, and Pakistan	*506680-001*
(13)	**RTC battery**	482963-001
(14)	**Top cover** (includes smart card reader and TouchPad buttons)	
	With fingerprint reader	486303-001
	Without fingerprint reader	*611810-001*
(15)	**TouchPad** (includes cable and TouchPad button board and cable)	486306-001
(16)	**Fingerprint reader board** (includes cable)	486309-001

Item	Description	Spare part number
(17)	**Audio/ExpressCard assembly** (includes ExpressCard slot, cable, headphone and microphone connectors, and SD card reader slot) **NOTE:** *The Audio/ExpressCard assembly spare part kit does not include an audio cable. The Audio/ExpressCard assembly cable is included in the Cable Kit, spare part number 487432-001. See* Cable Kit on page 31 *for more Cable Kit spare part information.*	482959-001
(18)	**Speaker**	486308-001
(19)	**System boards** (include replacement thermal material)	
	For use in all countries and regions except for Russia and the People's Republic of China	
	• For use only with computer models with discrete graphics subsystem memory (includes 256 MB of graphics subsystem memory	486300-001
	• For use only with computer models with discrete graphics subsystem memory (includes 128 MB of graphics subsystem memory	486299-001
	• For use only with computer models with UMA graphics subsystem memory	486301-001
	For use in only in Russia and the People's Republic of China	
	• *For use only with computer models with discrete graphics subsystem memory (includes 256 MB of graphics subsystem memory*	*510352-001*
	• *For use only with computer models with discrete graphics subsystem memory (includes 128 MB of graphics subsystem memory*	*510351-001*
	• *For use only with computer models with UMA graphics subsystem memory*	*510353-001*
(20)	**Batteries**	
	8-cell, 58-Wh Li-ion battery for use only in Japan	*534063-291*
	6-cell, 62-Wh Li-ion battery for use only in Japan	*534218-291*
	6-cell, 55-Wh Li-ion battery	482962-001
	4-cell, 37-Wh Li-ion battery	482961-001
(21)	**Base enclosure**	482960-001
	Rubber Kit (not illustrated, includes base enclosure rubber feet and rubber screw covers)	482968-001
(22)	**Optical drives** (include bezel and bracket)	
	DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive	*515874-001*
	DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive with LightScribe	483190-001
	DVD/CD-RW Combo Drive	483189-001
	DVD-ROM Drive	483191-001
	Upgrade bay device cradle	*613682-001*
(23)	**Hard drives** (include bracket)	
	320-GB, 7200-rpm	*531969-001*

Item	Description	Spare part number
	250-GB, 7200-rpm	*495059-001*
	160-GB, 7200-rpm	483186-001
	120-GB, 7200-rpm	483184-001
	128-GB solid-state drive (not illustrated)	*575554-001*
	80-GB solid-state drive (not illustrated)	486304-001
(24)	**External memory modules** (PC2-6400, 800-MHz, DDR2)	
	4096-MB	*598855-001*
	2048-MB	*598858-001*
	1024-MB	*598861-001*
(25)	**Bluetooth module** **NOTE:** The Bluetooth module spare part kit does not include a Bluetooth module cable. The Bluetooth module cable is included in the Cable Kit, spare part number 487432-001. See Cable Kit on page 31 for more Cable Kit spare part information.	483113-001
(26)	**HP un2400 Mobile Broadband WWAN module**	483377-001

Plastics Kit

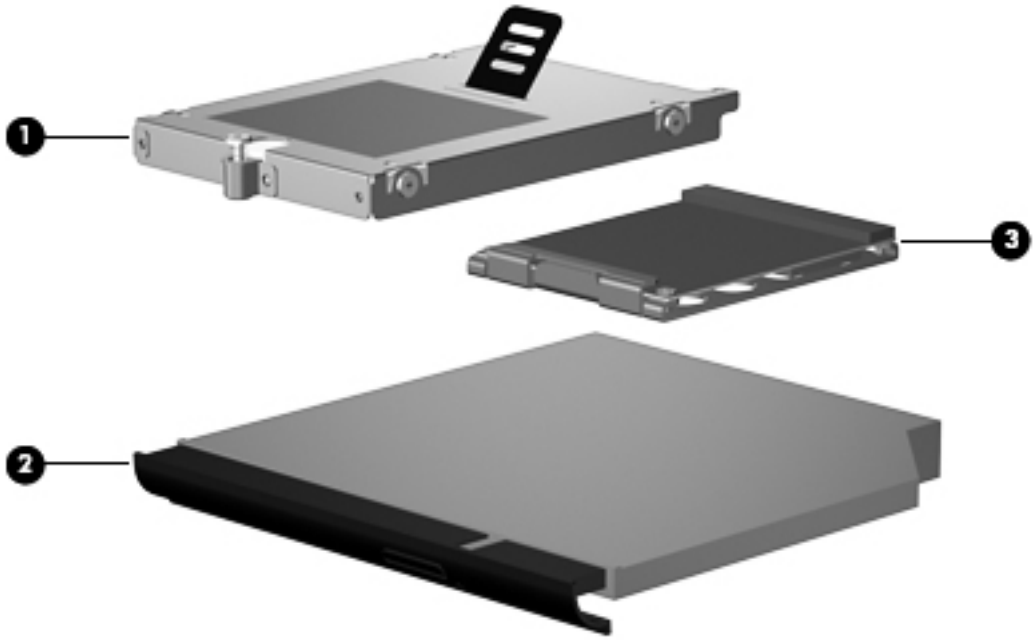


Item	Description	Spare part number
	Plastics Kit:	487429-001
(1)	Hard drive bay cover (includes 2 captive screws, secured by C-clips)	
(2)	Memory module compartment cover (includes one captive screw, secured by a C-clip)	
(3)	ExpressCard slot bezel	
(4)	WWAN module compartment cover (includes one captive screw, secured by a C-clip)	
(5)	Bluetooth module compartment cover (includes one captive screw, secured by a C-clip)	

Cable Kit

Item	Description	Spare part number
	Cable Kit:	487432-001
(1)	Modem module cable (includes RJ-11 connector)	
(2)	Bluetooth module cable	
	Audio/ExpressCard cable (not illustrated)	

Mass storage devices



Item	Description	Spare part number
(1)	**Hard drives** (include bracket)	
	320-GB, 7200-rpm	*531969-001*
	250-GB, 7200-rpm	*495059-001*
	160-GB, 7200-rpm	483186-001
	120-GB, 7200-rpm	483184-001
(2)	**Optical drives** (include bezel and bracket)	
	DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive	*515874-001*
	DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive with LightScribe	483190-001
	DVD/CD-RW Combo Drive	483189-001
	DVD-ROM Drive	483191-001
(3)	**Solid-state drives**	
	128-GB	*575554-001*
	80-GB	486304-001
	Upgrade bay device cradle (not illustrated)	*613682-001*

Miscellaneous parts

Description	Spare part number
Docking station	*483203-001*
AC adapters	
Smart Adapter, 90-W PFC AC adapter for use only in India	*535593-001*
Smart Adapter, 90-W PFC, RC/V 3W	*620656-001*
Smart Adapter, 90-W PFC, RC/V EM 3W for use only in India	*613160-001*
Smart Adapter, 90-W PFC, RC/V 3W	*613153-001*
Smart Adapter, 90-W, for use only in India	463956-001
Smart Adapter, 120-W PFC, RC/V 3W	*613154-001*
Smart Adapter, 120-W PFC, 3P/RC	*463953-001*
Power cords:	
For use in Argentina	490371-D01
For use in Australia	490371-011
For use in Brazil	490371-201
For use in Europe, the Middle East, and Africa	*490371-021*
For use in Iceland	490371-BB1
For use in India	490371-D61
For use in Italy	490371-061
For use in Japan	490371-291
For use in the People's Republic of China	490371-AA1
For use in South Africa	490371-AR1
For use in South Korea	490371-AD1
For use in Switzerland	490371-111
For use in Taiwan	490371-AB1
For use in the United Kingdom	490371-031
For use in the United States	490371-001

Description	Spare part number
Screw Kit • Phillips PM3.0×4.0 screw • Phillips PM2.5×11.0 captive screw • Phillips PM2.5×10.0 captive screw • Phillips PM2.5×9.0 captive screw • Phillips PM2.5×7.0 screw • Phillips PM2.5×4.0 screw • Phillips PM2.0×5.0 captive screw • Phillips PM2.0×5.0 screw • Phillips PM2.0×3.0 broad-head screw • Phillips PM2.0×3.0 screw • Torx T8M2.5×7.0 screw	486305-001
Travel battery	456946-001

Sequential part number listing

Spare part number	Description
456946-001	Travel battery
459263-001	Broadcom BCM4312 802.11b/g WLAN module for use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States
459263-002	Broadcom BCM4312 802.11b/g WLAN module for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe
461750-001	Modem module for use in all countries and regions except Australia and New Zealand **NOTE:** The modem module spare part kits do not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 487432-001. See Cable Kit on page 31 for more Cable Kit spare part information.
461750-011	Modem module for use only in Australia and New Zealand **NOTE:** The modem module spare part kits do not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 487432-001. See Cable Kit on page 31 for more Cable Kit spare part information.
463953-001	*Smart Adapter, 120-W PFC, 3P/RC*
463956-001	Smart Adapter, 90-W, for use only in India
480985-001	Intel Wi-Fi Link 5100 802.11a/b/g/n WLAN module for use in all countries and regions
480986-001	Intel Wi-Fi Link 5300 802.11a/b/g/n WLAN module for use in all countries and regions
482957-001	Intel Wi-Fi Link 5100 802.11a/b/g WLAN module for use in all countries and regions
482959-001	Audio/ExpressCard assembly (includes ExpressCard slot, cable, headphone and microphone connectors, and SD card reader slot)*The Audio/ExpressCard assembly spare part kit does not include an audio cable. The Audio/ExpressCard assembly cable is included in the Cable Kit, spare part number 487432-001. See* Cable Kit on page 31 *for more Cable Kit spare part information.*

Spare part number	Description
482960-001	Base enclosure
482961-001	4-cell, 37-Wh Li-ion battery
482962-001	6-cell, 55-Wh Li-ion battery
482963-001	RTC battery
482964-001	Power button board (includes cable)
482966-001	Display Cable Kit (includes display panel cable)
482967-001	Display Hinge Kit (includes left and right hinges)
482968-001	Rubber Kit (includes base enclosure rubber feet, rubber screw covers, and display bezel rubber screw covers)
482969-001	Wireless Antenna Kit (includes 3 WLAN antenna transceivers and cables and 2 WWAN antenna transceivers and cables)
483010-001	Keyboard for use in the United States (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-021	*Keyboard for use in Europe, the Middle East, and Africa (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)*
483010-031	Keyboard for use in the United Kingdom (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-041	Keyboard for use in Germany (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-051	Keyboard for use in France (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-061	Keyboard for use in Italy (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-071	Keyboard for use in Spain (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-081	Keyboard for use in Denmark (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-091	Keyboard for use in Norway (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-121	Keyboard for use in French Canada (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-131	Keyboard for use in Portugal (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-141	Keyboard for use in Turkey (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-161	Keyboard for use in Latin America (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-171	Keyboard for use in Saudi Arabia (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)

Spare part number	Description
483010-201	Keyboard for use in Brazil (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-211	Keyboard for use in Hungary (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-221	Keyboard for use in the Czech Republic (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-231	Keyboard for use in Slovakia (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-251	Keyboard for use in Russia (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-281	Keyboard for use in Thailand (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-291	Keyboard for use in Japan (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-A41	Keyboard for use in Belgium (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-AB1	Keyboard for use in Taiwan (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-AD1	Keyboard for use in South Korea (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-BA1	*Keyboard for use in the Slovenia (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)*
483010-B31	Keyboard for use in the Netherlands (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-B71	Keyboard for use in Sweden and Finland (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-BB1	Keyboard for use in Israel (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-BG1	Keyboard for use in Switzerland (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-DD1	Keyboard for use in Iceland (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483010-DJ1	Keyboard for use in Greece (includes keyboard cable, keyboard shield, pointing stick, and pointing stick cable)
483011-001	Heat sink for use only with computer models with discrete graphics subsystem memory (includes replacement thermal material)
483012-001	Heat sink for use only with computer models with UMA graphics subsystem memory (includes replacement thermal material)

Spare part number	Description
483113-001	Bluetooth module **NOTE:** The Bluetooth module spare part kit does not include a Bluetooth module cable. The Bluetooth module cable is included in the Cable Kit, spare part number 487432-001. See Cable Kit on page 31 for more Cable Kit spare part information.
483184-001	120-GB, 7200-rpm hard drive (includes bracket)
483186-001	160-GB, 7200-rpm hard drive (includes bracket)
483189-001	DVD/CD-RW Combo Drive
483190-001	DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive with LightScribe
483191-001	DVD-ROM Drive
483200-001	14.1-inch, WXGA AntiGlare display assembly for use on computer models not equipped with a webcam (includes three WLAN antenna cables, two WWAN antenna cables, and two microphones)
483201-001	14.1-inch, WXGA+ AntiGlare display assembly for use on computer models not equipped with a webcam (includes three WLAN antenna cables, two WWAN antenna cables, and two microphones)
483202-001	14.1-inch, WXGA AntiGlare LED display assembly for use on computer models not equipped with a webcam (includes three WLAN antenna cables, two WWAN antenna cables, and two microphones)
483203-001	*Docking station*
483377-001	HP un2400 Mobile Broadband WWAN module
486299-001	System board with 128 MB of discrete graphics subsystem memory for use in all countries and regions except for Russia and the People's Republic of China (includes replacement thermal material)
486300-001	System board with 256 MB of discrete graphics subsystem memory for use in all countries and regions except for Russia and the People's Republic of China (includes replacement thermal material)
486301-001	System board for use only with computer models with UMA graphics subsystem memory for use in all countries and regions except for Russia and the People's Republic of China (includes replacement thermal material)
486302-001	Webcam
486303-001	Top cover with fingerprint reader (includes TouchPad buttons)
486304-001	80-GB solid-state drive
486305-001	Screw Kit
486306-001	TouchPad (includes cable and TouchPad button board and cable)
486307-001	Switch cover (includes capacitative board and cable)
486308-001	Speaker
486309-001	Fingerprint reader board (includes cable)
486565-001	Pointing stick rubber caps
487330-001	Broadcom 4322 802.11a/b/g/n WLAN module for use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States

Spare part number	Description
487330-002	Broadcom 4322 802.11a/b/g/n WLAN module for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe
487428-001	*Capacitative board (includes cable)*
487429-001	Plastics Kit (see Plastics Kit on page 30 for more Plastics Kit spare part information)
487431-001	Display inverter
487432-001	Cable Kit (see Cable Kit on page 31 for more Cable Kit spare part information)
487433-001	14.1-inch, WXGA AntiGlare LED display assembly for use on computer models equipped with a webcam (includes three WLAN antenna cables, two WWAN antenna cables, and two microphones)
487434-001	14.1-inch, WXGA AntiGlare display assembly for use on computer models equipped with a webcam (includes three WLAN antenna cables, two WWAN antenna cables, and two microphones)
487435-001	14.1-inch, WXGA+ AntiGlare display assembly for use on computer models equipped with a webcam (includes three WLAN antenna cables, two WWAN antenna cables, and two microphones)
487436-001	Fan
488189-001	Display bezel for use only with computer models equipped with non-LED displays and a webcam
488190-001	Display bezel for use only with computer models equipped with non-LED displays without a webcam
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
490371-061	Power cord for use in Italy
490371-111	Power cord for use in Switzerland
490371-201	Power cord for use in Brazil

Spare part number	Description
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 Iceland
490371-D01	Power cord for use in Argentina
490371-D61	Power cord for use in India
495059-001	*250-GB, 7200-rpm hard drive (includes bracket)*
500325-001	Logo Kit
502322-0001	Upgrade bay device cradle
506678-001	*Intel Wi-Fi Link 5100 802.11a/b/g/n 1x2 WLAN module with iAMT 4.0 support for use in Antigua and Barbuda, Argentina, Aruba, the Bahamas, Barbados, Bermuda, Brunei, Canada, the Cayman Islands, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Hong Kong, India, Indonesia, Malaysia, Mexico, Panama, Paraguay, Peru, Saudi Arabia, Taiwan, Uruguay, the United States, Venezuela, and Vietnam*
506679-001	*Intel Wi-Fi Link 5300 802.11a/b/g/n 3x3 WLAN module with iAMT 4.0 support for use in Antigua and Barbuda, Argentina, Aruba, the Bahamas, Barbados, Bermuda, Brunei, Canada, the Cayman Islands, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Hong Kong, India, Indonesia, Malaysia, Mexico, Panama, Paraguay, Peru, Saudi Arabia, Taiwan, Uruguay, the United States, Venezuela, and Vietnam*
506680-001	*Intel 802.11a/b/g WLAN module for use in Russia, Ukraine, and Pakistan*
507951-001	*Intel Core 2 Duo T9800, 2.93-GHz processor (1066-MHz FSB, 6-MB L2 cache, includes replacement thermal material)*
507953-001	*Intel Core 2 Duo T9550, 2.66-GHz processor (1066-MHz FSB, 6-MB L2 cache, 35W, includes replacement thermal material)*
507955-002	Intel Core 2 Duo T9600, 2.80-GHz processor (1066-MHz FSB, 6-MB L2 cache, includes replacement thermal material)
507956-002	Intel Core 2 Duo T9400, 2.53-GHz processor (1066-MHz FSB, 6-MB L2 cache, 35W, includes replacement thermal material)
507957-001	*Intel Core 2 Duo P9600, 2.66-GHz processor (1066-MHz FSB, 3-MB L2 cache, 25W, includes replacement thermal material)*
507958-001	*Intel Core 2 Duo P9500, 2.53-GHz processor (1066-MHz FSB, 6-MB L2 cache, 25W, includes replacement thermal material)*
507960-001	*Intel Core 2 Duo P8700, 2.53-GHz processor (1066-MHz FSB, 3-MB L2 cache, includes replacement thermal material)*
507963-002	Intel Core 2 Duo P8600, 2.40-GHz processor (1066-MHz FSB, 3-MB L2 cache, includes replacement thermal material)
507964-002	Intel Core 2 Duo P8400, 2.26-GHz processor (1066-MHz FSB, 3-MB L2 cache, includes replacement thermal material)

Spare part number	Description
510351-001	*System board with 128 MB of discrete graphics subsystem memory for use only in Russia and the People's Republic of China (includes replacement thermal material)*
510352-001	*System board with 256 MB of discrete graphics subsystem memory for use only in Russia and the People's Republic of China (includes replacement thermal material)*
510353-001	*System board for use only in computer models with UMA graphics subsystem memory for use only in Russia and the People's Republic of China (includes replacement thermal material)*
515874-001	*DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive*
518420-001	*Display bezel for use only with computer models equipped with LED displays that include a webcam*
518421-001	*Display bezel for use only with computer models equipped with LED displays without a webcam*
531969-001	*320-GB, 7200-rpm hard drive (includes bracket)*
534063-291	*8-cell, 58-Wh Li-ion battery for use only in Japan*
534218-291	*6-cell, 62-Wh Li-ion battery for use only in Japan*
535593-001	*Smart Adapter, 90-W PFC, for use only in India*
570036-001	*Intel Core 2 Duo P8800, 2.66-GHz processor (1066-MHz FSB, 3-MB L2 cache, includes replacement thermal material)*
570434-001	*Intel Core 2 Duo T9900, 3.06-GHz processor (1066-MHz FSB, 6-MB L2 cache, includes replacement thermal material)*
575554-001	*128-GB solid-state drive*
598855-001	4096-MB memory module (PC2-6400, 800-MHz, DDR2)
598858-001	2048-MB memory module (PC2-6400, 800-MHz, DDR2)
598861-001	1024-MB memory module (PC2-6400, 800-MHz, DDR2)
611810-001	*Top cover without fingerprint reader (includes TouchPad buttons)*
613153-001	*Smart Adapter, 90-W PFC, RC/V 3W*
613154-001	*Smart Adapter, 120-W PFC, RC/V 3W*
613160-001	*Smart Adapter, 90-W PFC, RC/V EM 3W for use only in India*
613682-001	*Upgrade bay device cradle*
620656-001	*Smart Adapter, 90-W PFC, RC/V 3W*
623154-001	*WXGA display panel*
623155-001	*WXGA LED display panel*
623156-001	*WXGA+ display panel*

4 Removal and replacement procedures

Preliminary replacement requirements

Tools required

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

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

Service considerations

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

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

Plastic parts

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

Cables and connectors

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

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

Drive handling

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

Before removing or inserting a hard drive, shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

Before handling a drive, be sure that you are discharged of static electricity. While handling a drive, avoid touching the connector.

Before removing a diskette drive or optical drive, be sure that a diskette or disc is not in the drive and be sure that the optical drive tray is closed.

Handle drives on surfaces covered with at least one inch of shock-proof foam.

Avoid dropping drives from any height onto any surface.

After removing a hard drive, an optical drive, or a diskette drive, place it in a static-proof bag.

Avoid exposing a hard drive to products that have magnetic fields, such as monitors or speakers.

Avoid exposing a drive to temperature extremes or liquids.

If a drive must be mailed, place the drive in a bubble pack mailer or other suitable form of protective packaging and label the package “FRAGILE.”

Grounding guidelines

Electrostatic discharge damage

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

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

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

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

Keep components in their electrostatic-safe containers until you area ready to install them.

Use nonmagnetic tools.

Before touching an electronic component, discharge static electricity by using the guidelines described in this section.

Avoid touching pins, leads, and circuitry. Handle electronic components as little as possible.

If you remove a component, place it in an electrostatic-safe container.

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

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

Typical electrostatic voltage levels

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

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe tubes, bags, or boxes.
- Protect ESD-sensitive parts and assemblies with conductive or approved containers or packaging.
- Keep ESD-sensitive parts in their containers until the parts arrive at static-free workstations.
- Place items on a grounded surface before removing items from their containers.
- Always be properly grounded when touching a component or assembly.
- Store reusable ESD-sensitive parts from assemblies in protective packaging or nonconductive foam.
- Use transporters and conveyors made of antistatic belts and roller bushings. Be sure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

Workstation guidelines

Follow these grounding workstation guidelines:

- Cover the workstation with approved static-shielding material.
- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.
- Use conductive field service tools, such as cutters, screwdrivers, and vacuums.
- When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and Styrofoam.
- Handle ESD-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.

Equipment guidelines

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

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megohm ±10% resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, use alligator clips to connect a wrist strap.
- When standing, use foot straps and a grounded floor mat. Foot straps (heel, toe, or boot straps) can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use foot straps on both feet with a minimum of one megohm resistance between the operator and ground. To be effective, the conductive strips must be worn in contact with the skin.

The following grounding equipment is recommended to prevent electrostatic damage:

- Antistatic tape
- Antistatic smocks, aprons, and sleeve protectors
- Conductive bins and other assembly or soldering aids
- Nonconductive foam
- Conductive tabletop workstations with ground cords of one megohm resistance
- Static-dissipative tables or floor mats with hard ties to the ground
- Field service kits
- Static awareness labels
- Material-handling packages
- Nonconductive plastic bags, tubes, or boxes
- Metal tote boxes
- Electrostatic voltage levels and protective materials

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

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

Unknown user password

If the computer you are servicing has an unknown user password, follow these steps to clear the password:

NOTE: These steps also clear CMOS.

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 50).
5. Remove the real-time clock (RTC) battery (see RTC battery on page 73).
6. Wait approximately 5 minutes.
7. Replace the RTC battery and reassemble the computer.
8. Connect AC power to the computer. Do not reinsert any batteries at this time.
9. Turn on the computer.

All passwords and all CMOS settings have been cleared.

Component replacement procedures

This chapter provides removal and replacement procedures.

There are as many as 72 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

The service tag, affixed to the bottom of the computer, provides information that may be needed when troubleshooting system problems. The service tag provides the following information:

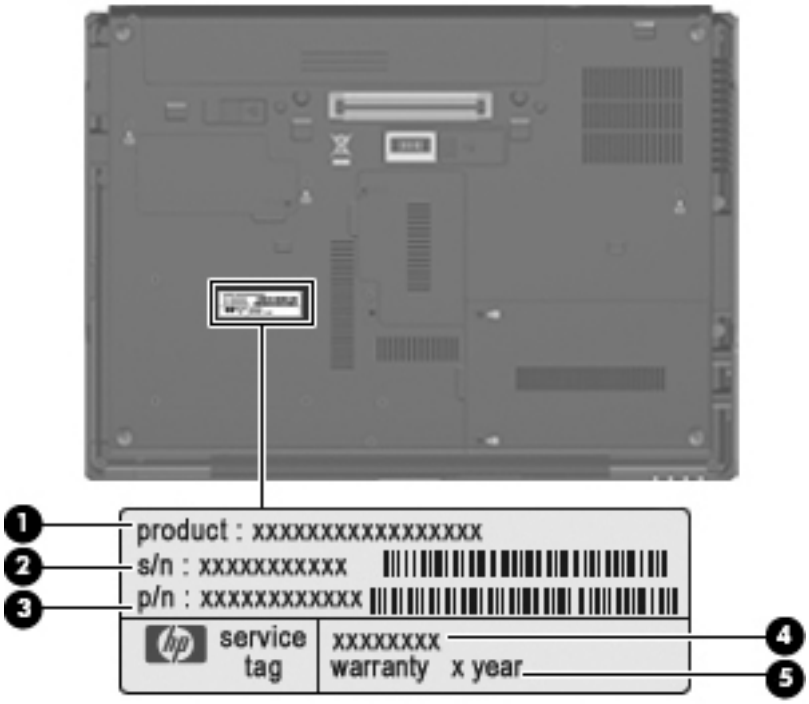
(1) Product name: This is the product name affixed to the front of the computer.

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

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

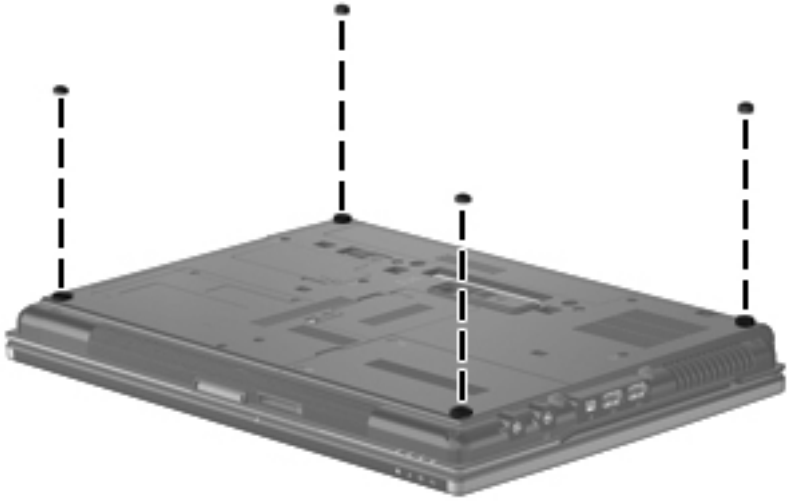
(4) Model description: This is the number used to locate documents, drivers, and support for the computer.

(5) Warranty period: 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 Kit, spare part number 482968-001. There are 4 rubber feet that attach to the base enclosure in the locations illustrated below.



Battery

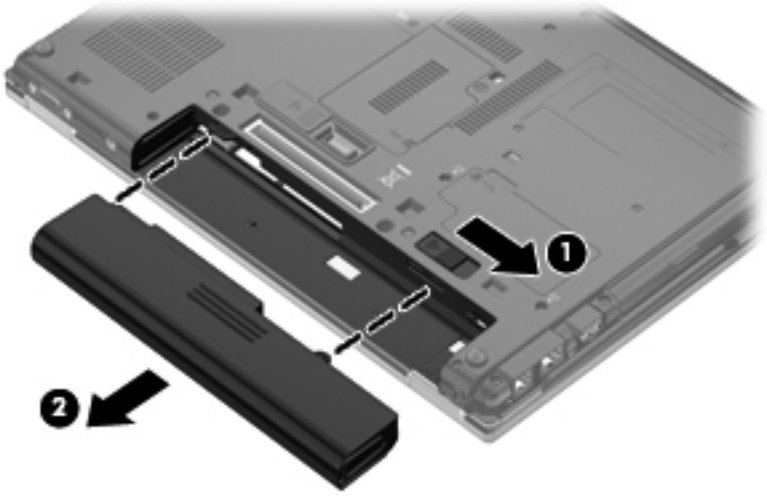
Description	Spare part number
8-cell, 58-Wh Li-ion battery for use only in Japan	*534063-291*
6-cell, 62-Wh Li-ion battery for use only in Japan	*534218-291*
6-cell, 55-Wh Li-ion battery	482962-001
4-cell, 37-Wh Li-ion battery	482961-001

Before disassembling the computer, follow these steps:

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

Remove the battery:

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



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

SIM

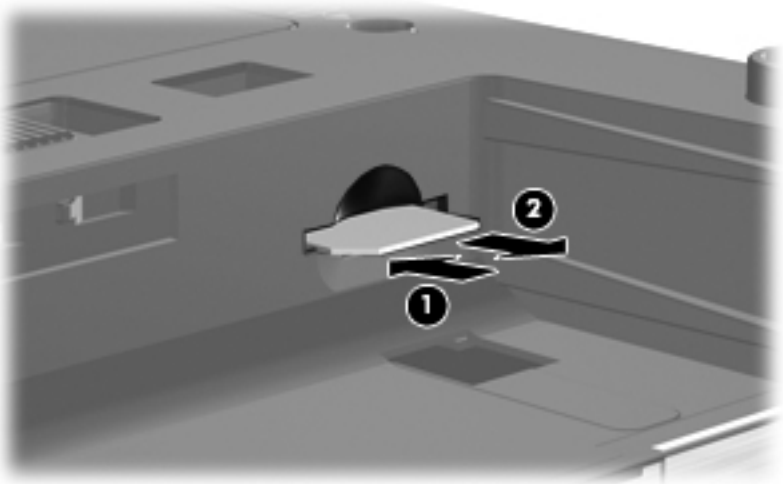
NOTE: This section applies only to computer models with WWAN capability. If there is a SIM inserted in the SIM slot, it should be removed before disassembling the computer. Be sure the SIM is reinserted in the SIM slot after reassembling the computer.

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 50).

Remove the SIM:

1. Press in on the SIM **(1)**. (The module is partially ejected from the SIM slot.)
2. Remove the SIM **(2)** from the SIM slot.



Reverse this procedure to install the SIM.

Display inverter

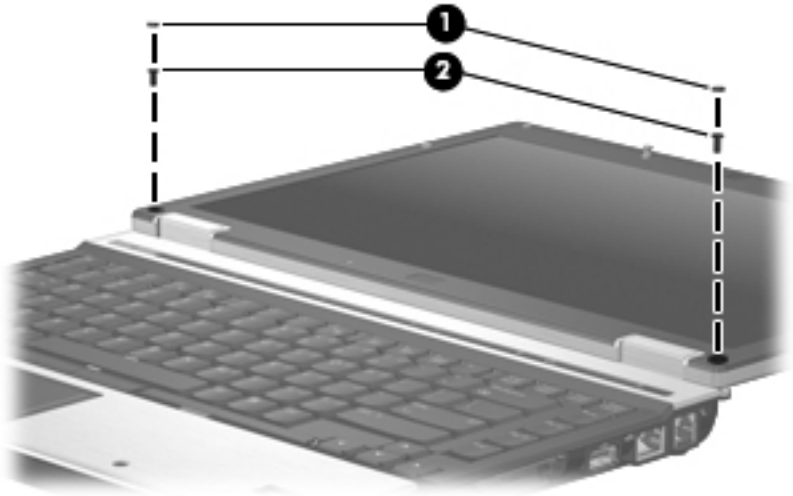
Description	Spare part number
Display inverter	487431-001

Before removing the display inverter, 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 50).

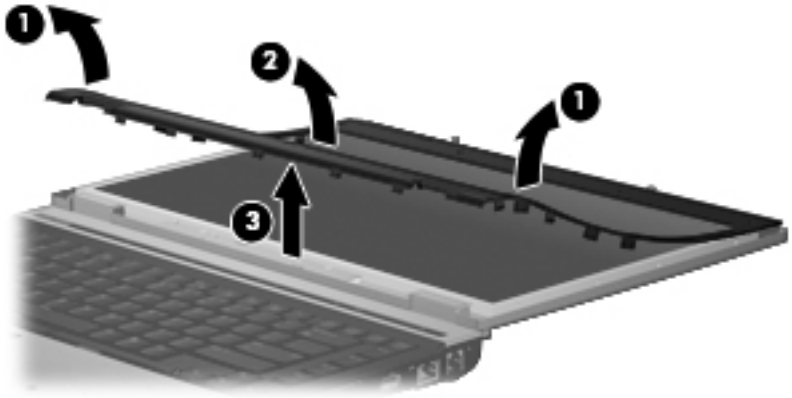
Remove the display inverter:

1. Turn the computer right-side up, with the front toward you.
2. Open the computer as far as it will open.
3. Remove the two rubber screw covers **(1)** on the bottom edge of the display bezel. The rubber screw covers are available in the Display Rubber Kit, spare part number 482966-001.
4. Remove the two Phillips PM2.5×6.0 screws **(2)** that secure the bottom edge of the display bezel to the display enclosure.

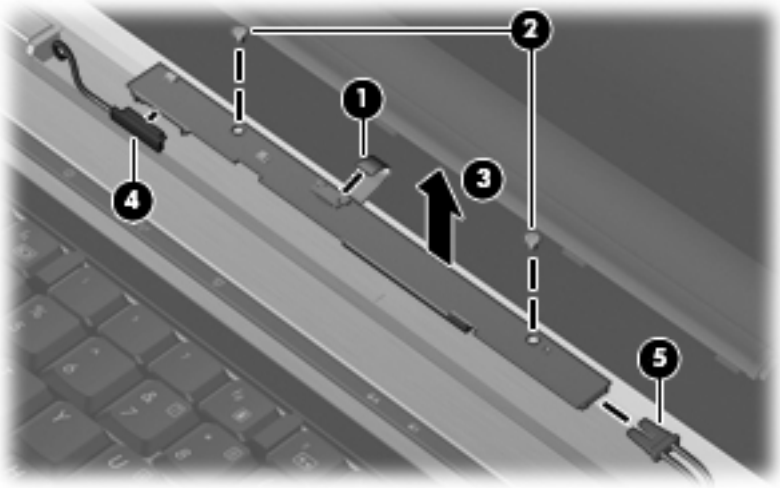


5. Flex the hinge cover areas **(1)** and the bottom edge **(2)** of the display bezel until the bezel disengages from the display enclosure.

6. Release the bottom edge of the display bezel **(3)** from the display assembly.



7. Release the zero insertion force (ZIF) connector **(1)** to which the keyboard light cable is attached, and disconnect the keyboard light cable from the display inverter.
8. Remove the two Phillips PM2.5×4.0 screws **(2)** that secure the display inverter to the display enclosure.
9. Release the display inverter **(3)** from the display enclosure as far as the display panel cable and backlight cable allow.
10. Disconnect the display panel cable **(4)** and the backlight cable **(5)** from the display inverter.



11. Remove the display inverter.

Reverse this procedure to install the display inverter.

Bluetooth module

NOTE: The Bluetooth® module spare part kit does not include a Bluetooth module cable. The Bluetooth module cable is included in the Cable Kit, spare part number 487432-001. See Bluetooth module cable on page 95 for removal procedures for the Bluetooth module cable.

Description	Spare part number
Bluetooth module	483113-001

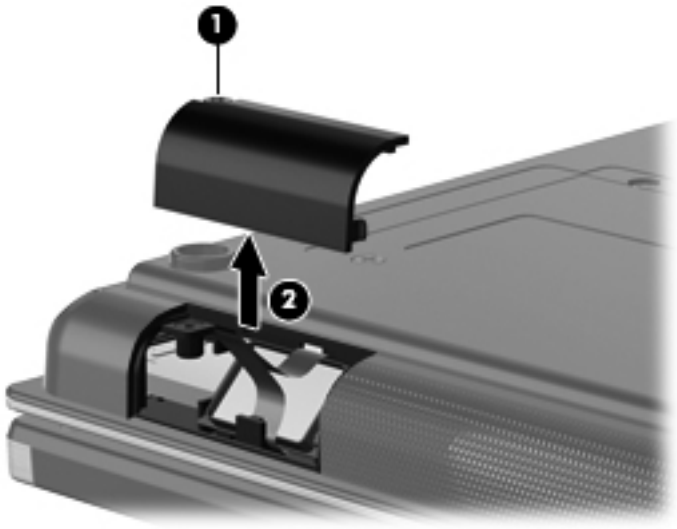
Before removing the Bluetooth module, follow these steps:

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 50).

Remove the Bluetooth module:

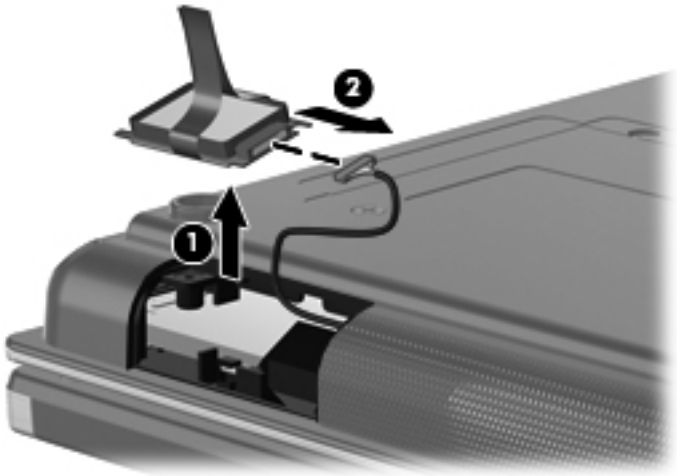
1. Loosen the Phillips PM2.0×5.0 captive screw **(1)** that secures the Bluetooth module compartment cover to the computer.
2. Remove the Bluetooth module compartment cover **(2)** by lifting it straight up.

NOTE: The Bluetooth module compartment cover is included in the Plastics Kit, spare part number 487429-001.



3. Release the Bluetooth module **(1)** from the computer as far as the Bluetooth module cable allows.

4. Disconnect the Bluetooth module cable **(2)** from the Bluetooth module.



5. Remove the Bluetooth module.

Reverse this procedure to install the Bluetooth module.

Hard drive

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

Description	Spare part number
320-GB, 7200-rpm	*531969-001*
250-GB, 7200-rpm	*495059-001*
160-GB, 7200-rpm	483186-001
120-GB, 7200-rpm	483184-001
128-GB solid-state drive	*575554-001*
80-GB solid-state drive	486304-001

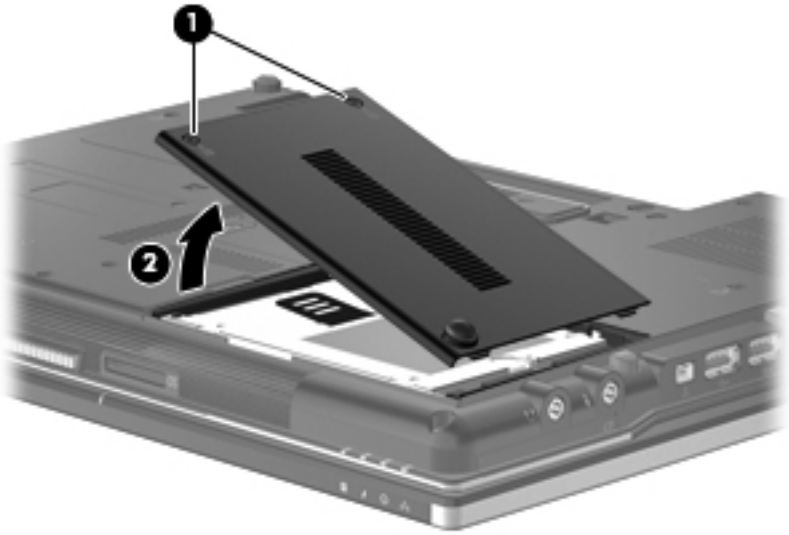
Before removing the hard drive, follow these steps:

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 50).

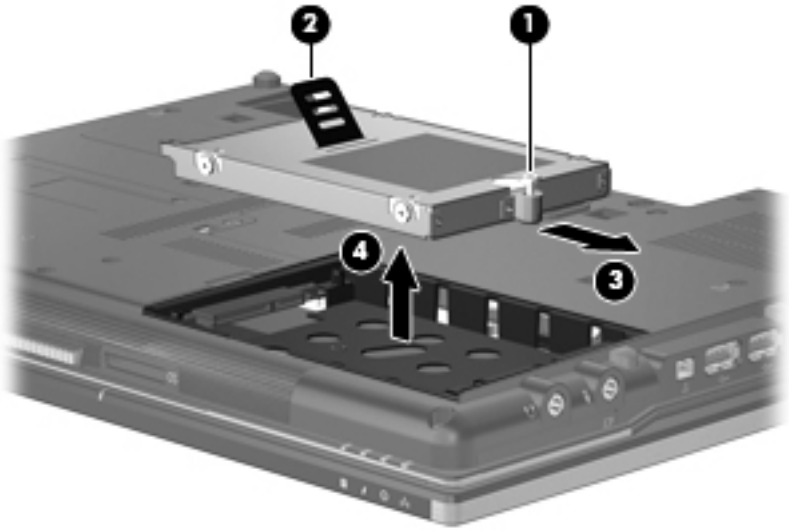
Remove the hard drive:

1. Position the computer with the front toward you.
2. Loosen the two Phillips PM2.0×5.0 captive screws **(1)** that secure the hard drive bay cover to the computer.

3. Lift the left side of the hard drive bay cover **(2)**, swing it up and to the right, and remove the cover. The hard drive bay cover is included in the Plastics Kit, spare part number 487429-001.

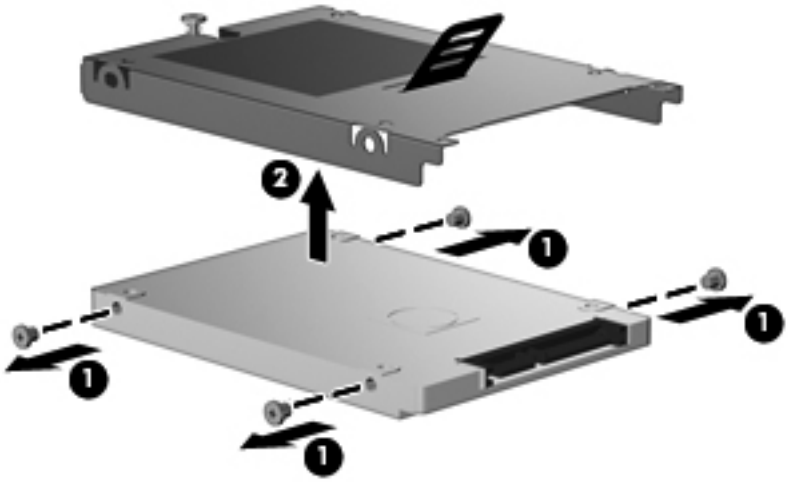


4. Loosen the Phillips PM2.5×10.0 captive screw **(1)** that secures the hard drive to the computer.
5. Grasp the Mylar tab **(2)** on the hard drive and slide the hard drive **(3)** to the right to disconnect it from the system board.
6. Remove the hard drive **(4)** from the hard drive bay.



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

8. Lift the bracket **(2)** straight up to remove it from the hard drive.



Reverse this procedure to reassemble and install the hard drive.

Optical drive

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

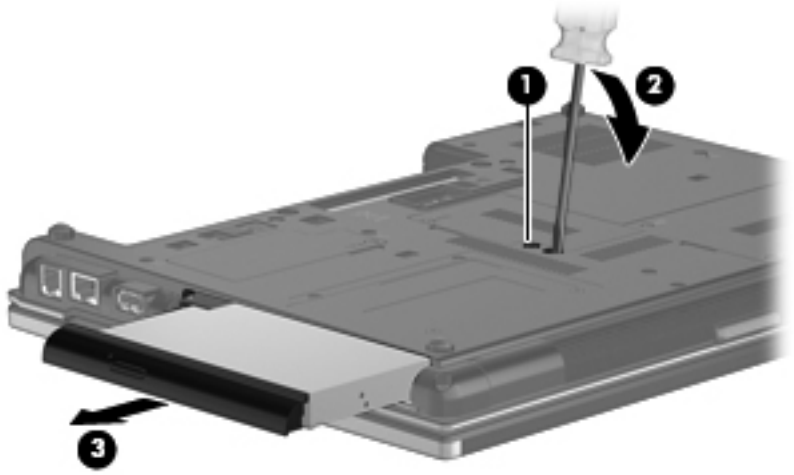
Description	Spare part number
DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive	*515874-001*
DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive with LightScribe	483190-001
DVD/CD-RW Combo Drive	483189-001
DVD-ROM Drive	483191-001

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 50).

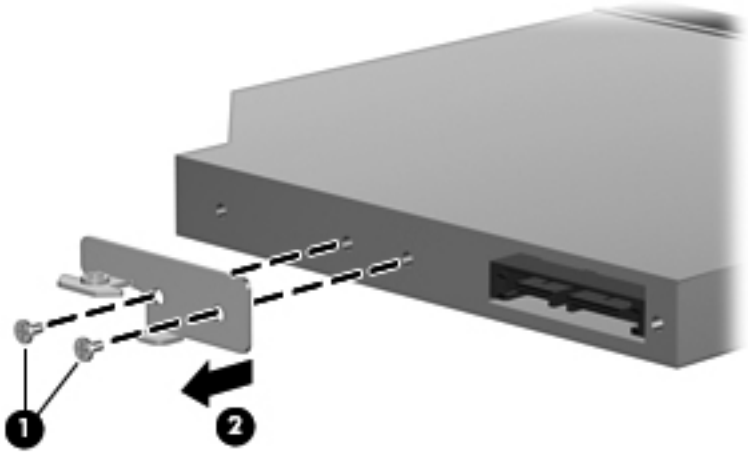
Remove the optical drive:

1. Position the computer with the front toward you.
2. Loosen the Phillips PM2.5×9.0 captive screw **(1)** that secures the optical drive to the computer.
3. Insert a flat-bladed screwdriver or similar tool into the optical drive tab access **(2)** and press the tab to the left to release the optical drive from the computer.
4. Remove the optical drive **(3)** from the upgrade bay.



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

6. Remove the two Phillips PM2.0×3.0 screws **(1)** that secure the optical drive bracket to the optical drive.
7. Remove the optical drive bracket **(2)**.



Reverse this procedure to reassemble and install an optical drive.

Upgrade bay device

Description	Spare part number
Upgrade bay device cradle	502322-001

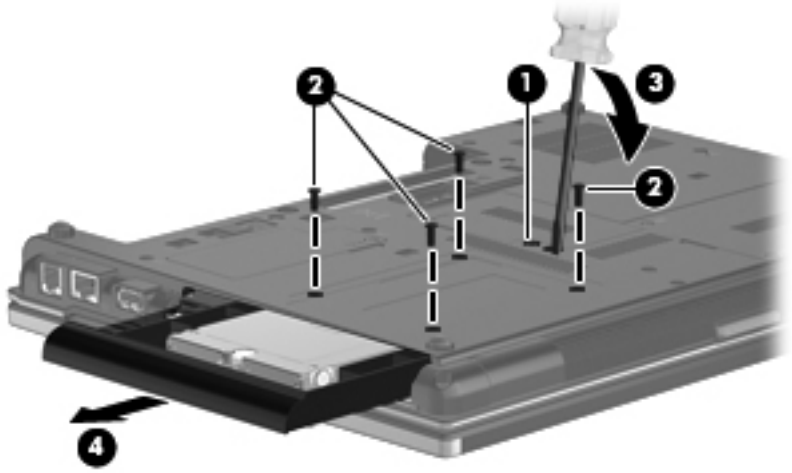
Before removing the upgrade bay device, follow these steps:

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 50).

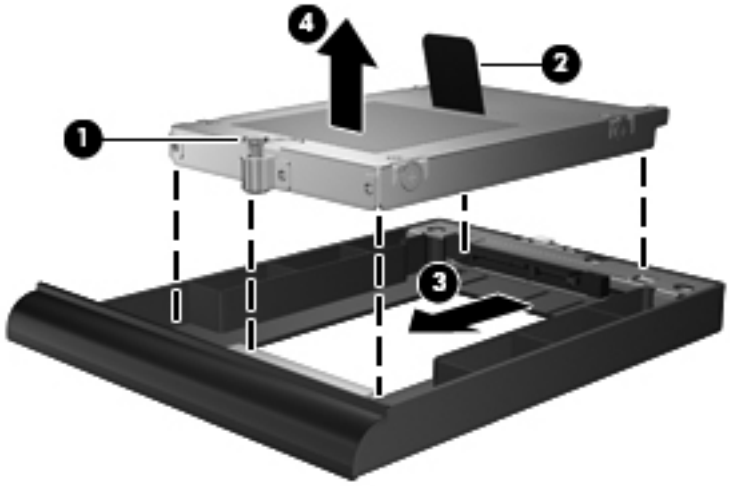
Remove the upgrade bay device:

1. Position the computer with the front toward you.
2. Loosen the Phillips PM2.5×9.0 captive screw **(1)** that secures the upgrade bay device to the computer.
3. Remove the four Phillips PM2.5×4.0 screws **(2)** that secure the upgrade bay device to the computer.
4. Insert a flat-bladed screwdriver or similar tool into the upgrade bay device tab access **(3)** and press the tab to the left to release the upgrade bay device from the computer.

5. Remove the upgrade bay device **(4)** from the computer.



6. If it is necessary to remove the hard drive from the upgrade bay cradle, position the upgrade bay cradle with the front bezel toward you.
7. Loosen the Phillips PM2.5×10.0 captive screw **(1)** that secures the hard drive to the upgrade bay cradle.
8. Grasp the Mylar tab **(2)** on the hard drive and slide the hard drive **(3)** forward to disconnect it from the upgrade bay cradle.
9. Remove the hard drive **(4)** from the upgrade bay cradle.



Reverse this procedure to install the upgrade bay device.

Expansion memory module

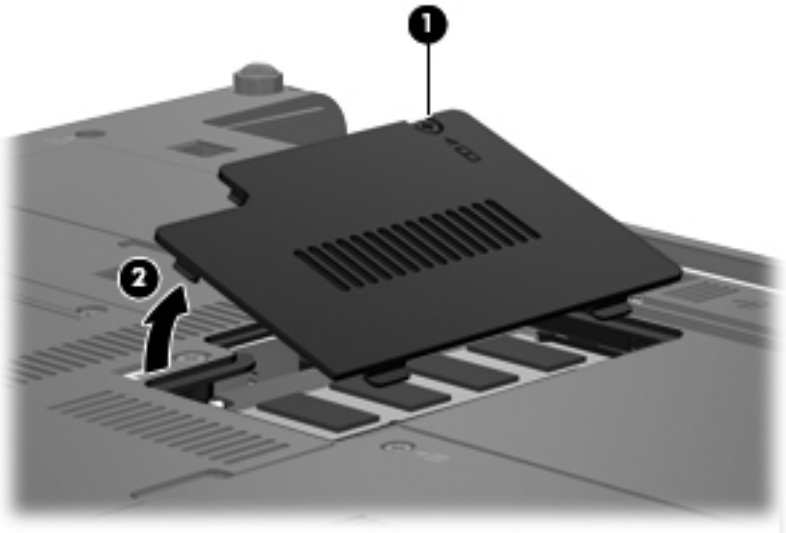
Description	Spare part number
4096-MB memory module (PC2-6400, 800-MHz, DDR2)	*598855-001*
2048-MB memory module (PC2-6400, 800-MHz, DDR2)	*598858-001*
1024-MB memory module (PC2-6400, 800-MHz, DDR2)	*598861-001*

Before removing the expansion 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 50).

Remove the memory module:

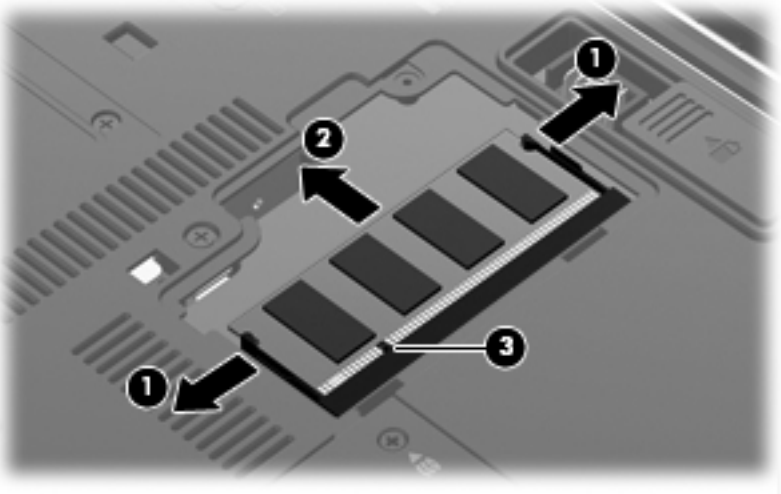
1. Position the computer with the front toward you.
2. Loosen the Phillips PM2.0×5.0 captive screw **(1)** that secures the memory module compartment cover to the computer.
3. Lift the left side of the cover **(2)**, swing it up and to the right, and remove the cover. The memory module compartment cover is included in the Plastics Kit, spare part number 487429-001.



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

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

NOTE: Memory modules are designed with a notch **(3)** to prevent incorrect insertion into the memory module slot.



Reverse this procedure to install the expansion memory module.

WWAN module

Description	Spare part number
HP un2400 Mobile Broadband WWAN module	483377-001

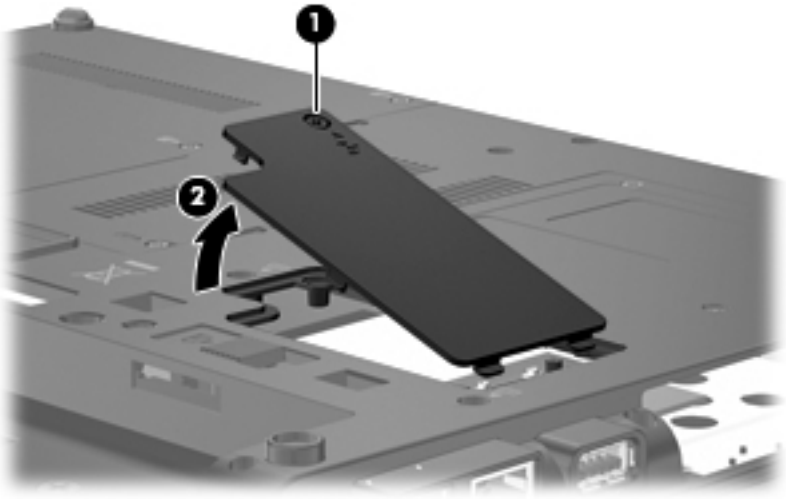
Before removing the WWAN module, follow these steps:

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 50).

Remove the WWAN module:

1. Loosen the Phillips PM2.0×5.0 captive screw **(1)** that secures the WWAN module compartment cover to the computer.

2. Lift the left side of the cover **(2)**, swing it up and to the right, and remove the cover. The WWAN module compartment cover is included in the Plastics Kit, spare part 487429-001.



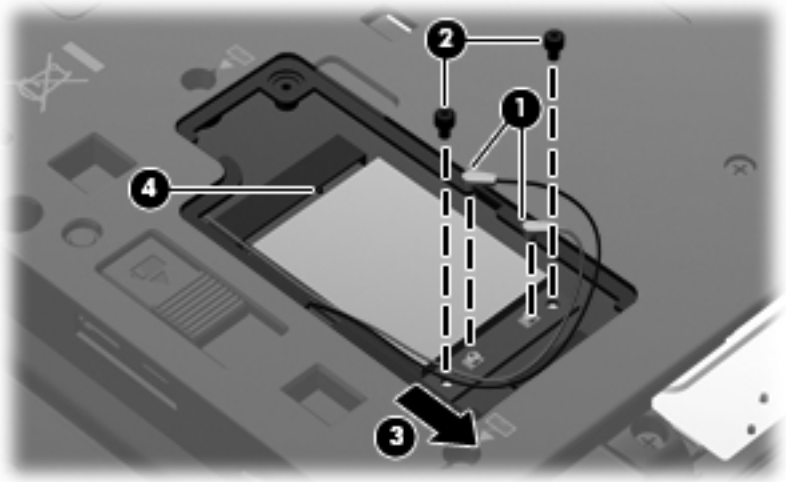
3. Disconnect the WWAN antenna cables **(1)** from the terminals on the WWAN module.

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

4. Remove the two Phillips PM2.5×4.0 screws **(2)** that secure the WWAN module to the computer. (The edge of the module opposite the slot rises away from the computer.)

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

NOTE: WWAN modules are designed with a notch **(4)** to prevent incorrect insertion into the WWAN module slot.



Reverse this procedure to install the WWAN module.

Keyboard

NOTE: All keyboard spare part kits include a keyboard cable, keyboard shield, pointing stick, and pointing stick cable.

Country or region	Spare part number	Country or region	Spare part number
Belgium	483010-A41	Norway	483010-091
Brazil	483010-201	Portugal	483010-131
The Czech Republic	483010-221	Russia	483010-251
Denmark	483010-081	Saudi Arabia	483010-171
Europe, the Middle East, and Africa	*483010-021*	Sweden and Finland	483010-B71
France	483010-051	Slovakia	483010-231
French Canada	483010-121	*Slovenia*	*483010-BA1*
Germany	483010-041	South Korea	483010-AD1
Greece	483010-DJ1	Spain	483010-071
Hungary	483010-211	Switzerland	483010-BG1
Iceland	483010-DD1	Taiwan	483010-AB1
Israel	483010-BB1	Thailand	483010-281
Italy	483010-061	Turkey	483010-141
Japan	483010-291	The United Kingdom	483010-031
Latin America	483010-161	The United States	483010-001
The Netherlands	483010-B31		
Pointing stick rubber caps			486565-001

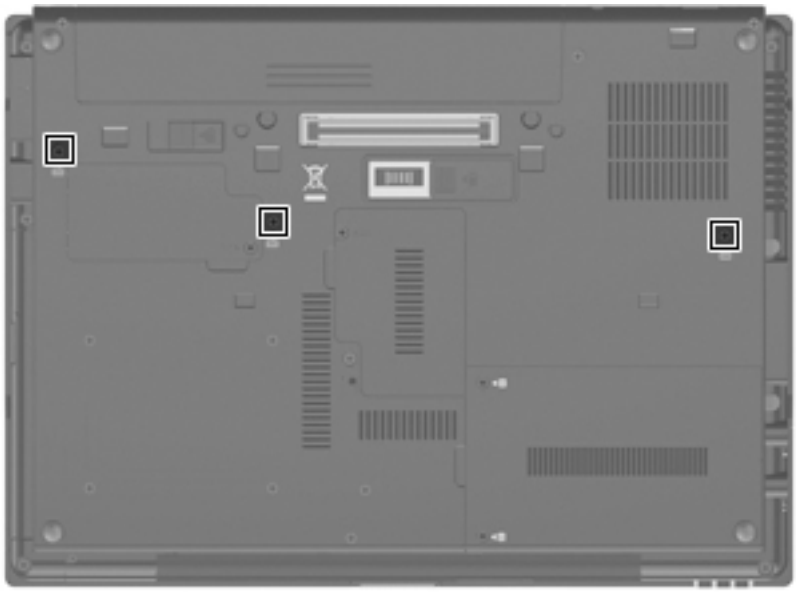
Before removing the keyboard, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC Adapter from the computer.
4. Remove the battery (see Battery on page 50).

Remove the keyboard:

1. Position the computer with front toward you.

2. Loosen the three Phillips PM2.5×9.0 captive screws that secure the keyboard to the computer.



3. Turn the computer display-side up, with the front toward you.

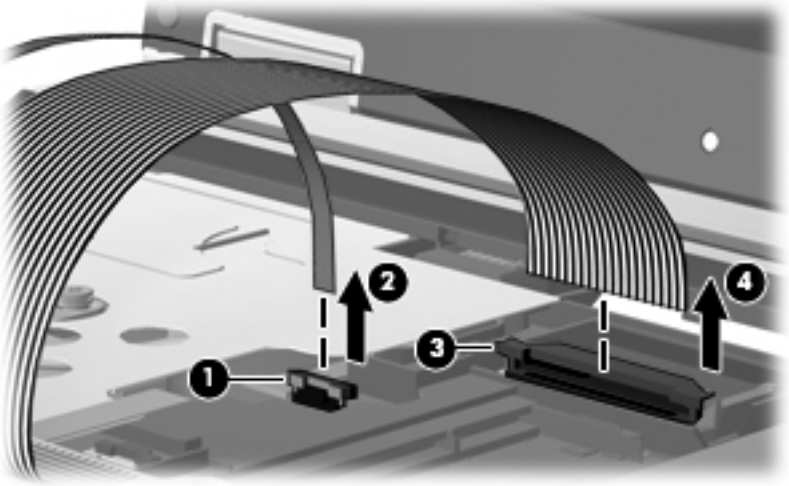
4. Open the computer as far as possible.

5. Slide the four keyboard retention tabs **(1)** toward you. The tabs are located between the esc and f1 keys, between the f4 and f5 keys, between the f8 and f9 keys, and between the f12 and scroll keys.

6. Lift the rear edge of the keyboard **(2)**, and swing it up and forward until it rests upside down on the palm rest.

7. Release the ZIF connector **(1)** to which the pointing stick cable is attached, and disconnect the pointing stick cable **(2)** from the system board.

8. Release the ZIF connector **(3)** to which the keyboard cable is attached, and disconnect the keyboard cable **(4)** from the system board.



9. Remove the keyboard.

Reverse this procedure to install the keyboard.

Primary memory module

Description	Spare part number
4096-MB memory module (PC2-6400, 800-MHz, DDR2)	*598855-001*
2048-MB memory module (PC2-6400, 800-MHz, DDR2)	*598858-001*
1024-MB memory module (PC2-6400, 800-MHz, DDR2)	*598861-001*

Before removing the primary memory module, follow these steps:

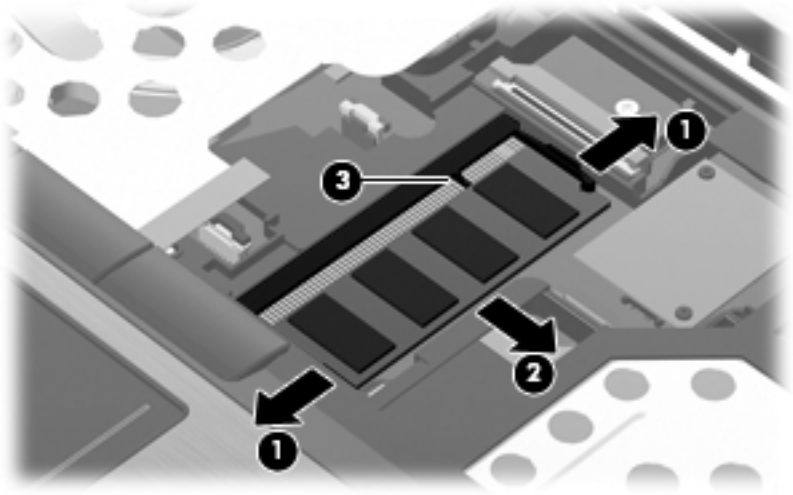
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC Adapter from the computer.
4. Remove the battery (see Battery on page 50).
5. Remove the keyboard (see Keyboard on page 65).

Remove the primary memory module:

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

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

NOTE: Memory modules are designed with a notch **(3)** to prevent incorrect insertion into the memory module slot.



Reverse this procedure to install the primary memory module.

Modem module

NOTE: The modem module spare part kits do not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 487432-001.

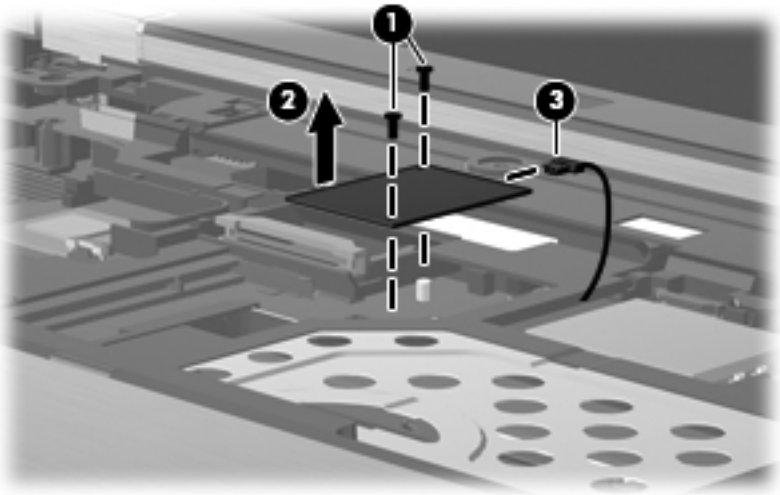
Description	Spare part number
For use in all countries and regions except Australia and New Zealand	461750-001
Modem module for use only in Australia and New Zealand	461750-011

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 50).
5. Remove the keyboard (see Keyboard on page 65).

Remove the modem module:

1. Remove the two Phillips PM2.5×4.0 screws **(1)** that secure the modem module to the system board.
2. Release the modem module **(2)** from the computer as far as the modem module cable allows.
3. Disconnect the modem module cable **(3)** from the modem module.



4. Remove the modem module.

Reverse this procedure to install the modem module.

WLAN module

Description	Spare part number
Intel Wi-Fi Link 5300 802.11a/b/g/n WLAN module for use in all countries and regions	480986-001
Intel Wi-Fi Link 5100 802.11a/b/g/n WLAN module for use in all countries and regions	480985-001
Intel Wi-Fi Link 5100 802.11a/b/g WLAN module for use in all countries and regions	482957-001
Broadcom 4322 802.11a/b/g/n WLAN modules:	
• For use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States	487330-001
• For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	487330-002
Broadcom BCM4312 802.11b/g WLAN modules:	
• For use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States	459263-001

Description	Spare part number
• For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	459263-002
Intel Wi-Fi Link 5100 802.11a/b/g/n 1x2 WLAN module with iAMT 4.0 support for use in Antigua and Barbuda, Argentina, Aruba, the Bahamas, Barbados, Bermuda, Brunei, Canada, the Cayman Islands, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Hong Kong, India, Indonesia, Malaysia, Mexico, Panama, Paraguay, Peru, Saudi Arabia, Taiwan, Uruguay, the United States, Venezuela, and Vietnam	*506678-001*
Intel Wi-Fi Link 5300 802.11a/b/g/n 3x3 WLAN module with iAMT 4.0 support for use in Antigua and Barbuda, Argentina, Aruba, the Bahamas, Barbados, Bermuda, Brunei, Canada, the Cayman Islands, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Hong Kong, India, Indonesia, Malaysia, Mexico, Panama, Paraguay, Peru, Saudi Arabia, Taiwan, Uruguay, the United States, Venezuela, and Vietnam	*506679-001*
Intel 802.11a/b/g WLAN module for use in Russia, Ukraine, and Pakistan	*506680-001*

Before removing the WLAN module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 50).
5. Remove the keyboard (see Keyboard on page 65).

Remove the WLAN module:

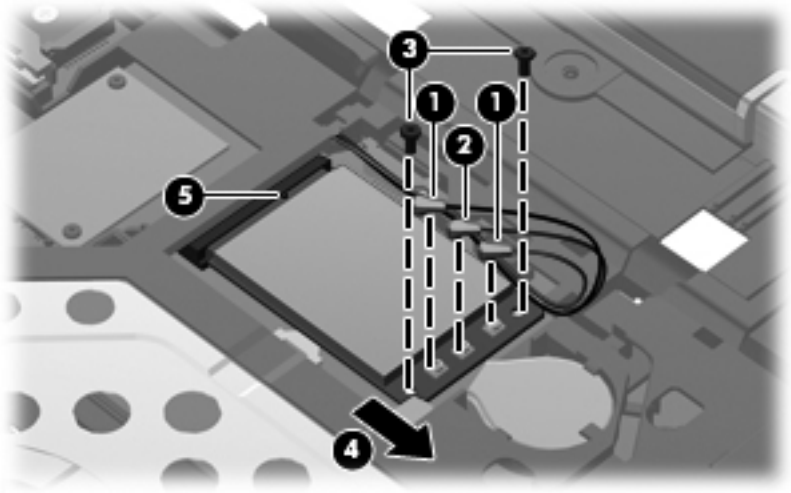
1. Disconnect the WLAN antenna cables **(1)** from the terminals on the WLAN module.

NOTE: The black WLAN antenna cable is connected to the WLAN module "Main" terminal. The white WLAN antenna cable is connected to the WLAN module "Aux" terminal. If the computer is equipped with an 802.11a/b/g/n WLAN module, the yellow WLAN antenna cable **(2)** is connected to the middle terminal on the WLAN module.

2. Remove the two Phillips PM2.5×4.0 screws **(3)** that secure the WLAN module to the computer. (The edge of the module opposite the slot rises away from the computer.)

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

NOTE: WLAN modules are designed with a notch **(5)** to prevent incorrect insertion into the WLAN module slot.



Reverse this procedure to install the WLAN module.

RTC battery

NOTE: Removing the RTC battery and leaving it uninstalled for 5 or more minutes causes all passwords and CMOS settings to be cleared.

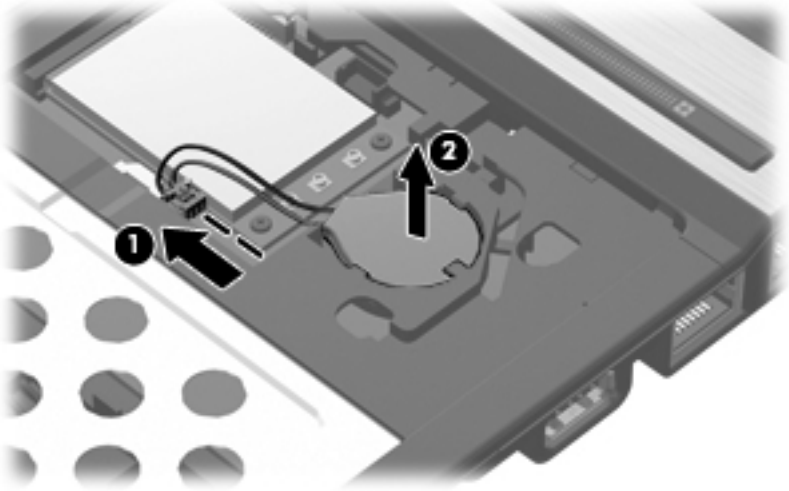
Description	Spare part number
RTC battery	482963-001

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 50).
5. Remove the keyboard (see Keyboard on page 65).

Remove the RTC battery:

1. Disconnect the RTC battery cable **(1)** from the system board.
2. Remove the RTC battery **(2)** from the clip built into the top cover.



Reverse this procedure to install the RTC battery.

Switch cover

Description	Spare part number
Switch cover (includes capacitative board and cable)	486307-001
Capacitative board (includes cable)	*487428-001*

Before removing the 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 50).
5. Remove the keyboard (see Keyboard on page 65).

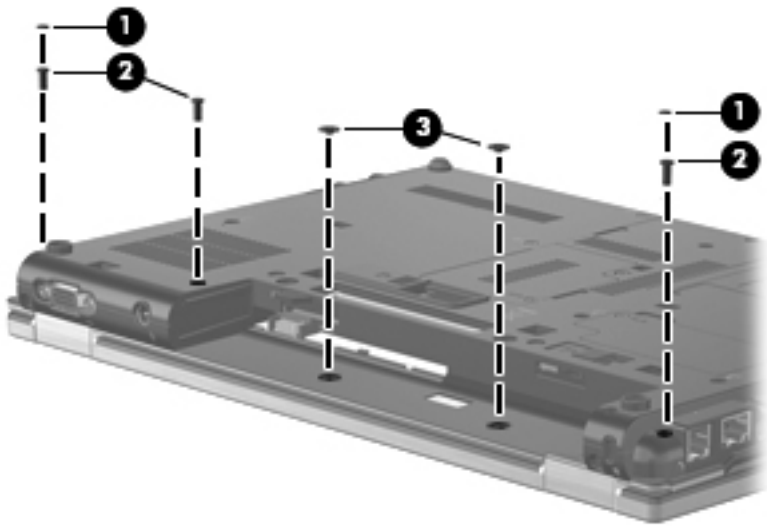
Remove the switch cover:

1. Close the computer and turn it upside down, with the rear panel toward you.
2. Remove the following:

   (1) Two rubber screw covers. Screw covers are available in the Rubber Kit, spare part number 482966-001.

   (2) Three Torx T8M2.5×7.0 screws.

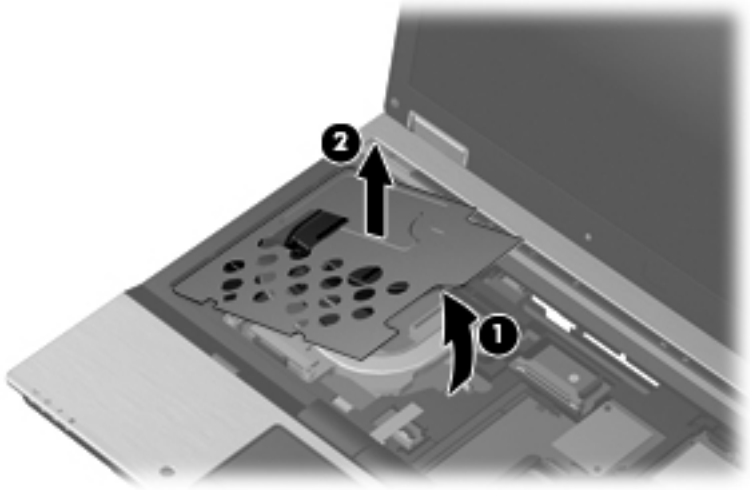
   (3) Two Phillips PM2.0×4.0 broad-head screws.



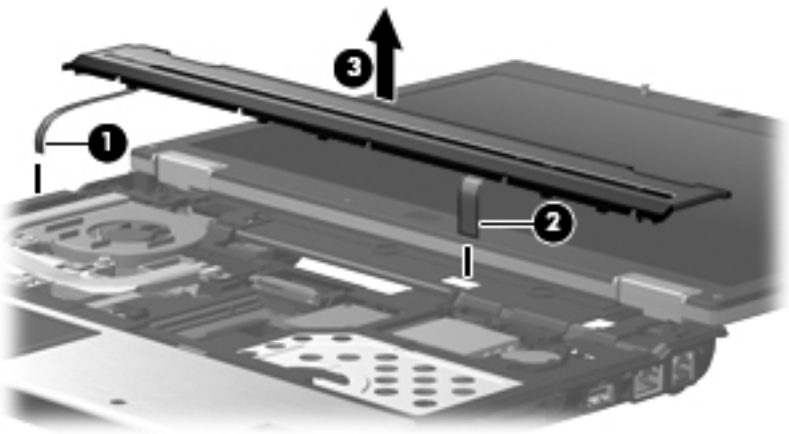
3. Turn the computer display-side up, with the front toward you.
4. Open the computer as far as possible.

5. Lift the right side of the keyboard shield **(1)** until it rests at an angle, and then remove the shield **(2)** by lifting it straight up.

NOTE: The keyboard shield is included with the keyboard spare part kit.



6. Release the ZIF connector **(1)** to which the power button board cable is attached, and disconnect the power button board cable from the system board.
7. Release the ZIF connector **(2)** to which the LED board cable is attached, and disconnect the LED board cable from the system board.
8. Remove the switch cover by lifting it straight up **(3)**.



Reverse this procedure to install the switch cover.

Power button board

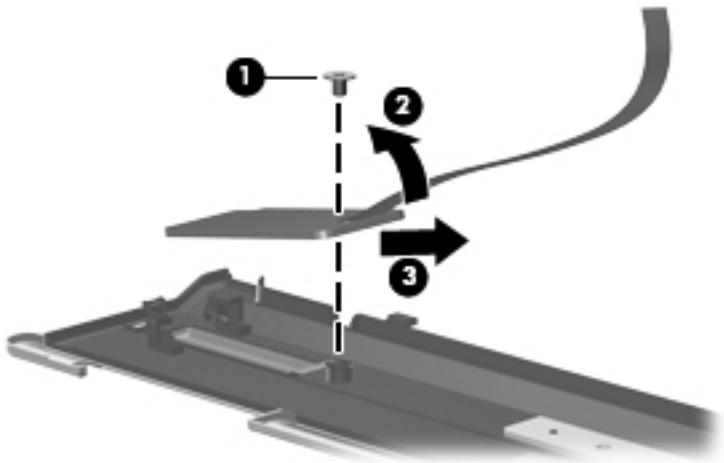
Description	Spare part number
Power button board (includes cable)	482964-001

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 50).
5. Remove the keyboard (see Keyboard on page 65).
6. Remove the switch cover (see Switch cover on page 74).

Remove the power button board:

1. Turn the switch cover upside down, with the front toward you.
2. Remove the Phillips PM2.0×4.0 screw **(1)** that secures the power button board to the switch cover.
3. Lift the right side of the power button board **(2)** until it rests at an angle.
4. Remove the power button board **(3)** by sliding the board to the right at an angle.



Reverse this procedure to install the power button board.

Fan

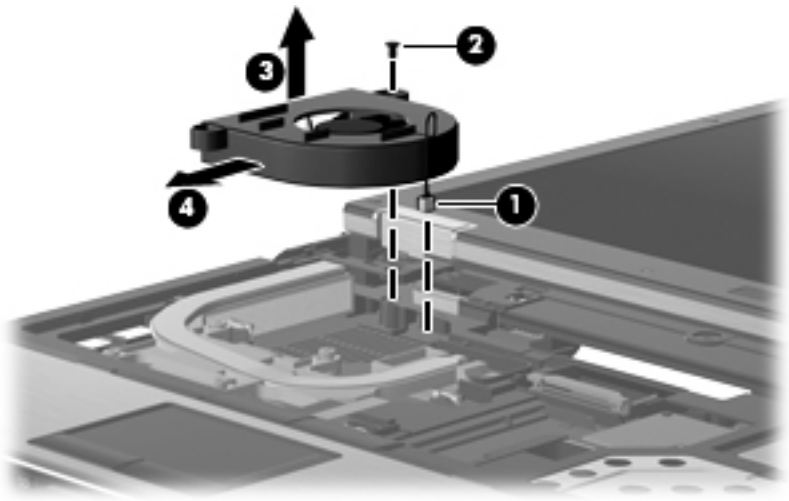
Description	Spare part number
Fan	487436-001

Before removing the fan, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 50).
5. Remove the keyboard (see Keyboard on page 65).
6. Remove the switch cover (see Switch cover on page 74).

Remove the fan:

1. Disconnect the fan cable **(1)** from the system board.
2. Remove the Phillips PM2.5×7.0 screw **(2)** that secures the fan to the base enclosure.
3. Lift the front edge of the fan **(3)** until it rests at an angle.
4. Remove the fan **(4)** by sliding it forward at an angle.



Reverse this procedure to install the fan.

NOTE: To properly ventilate the computer, allow at least a 7.6-cm (3-inch) clearance on the left side of the computer.

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

Heat sink

NOTE: The heat sink spare part kits include replacement thermal material.

Description	Spare part number
For use only with computer models with discrete graphics subsystem memory	483011-001
For use only with computer models with UMA graphics subsystem memory	483012-001

Before removing the heat sink, follow these steps:

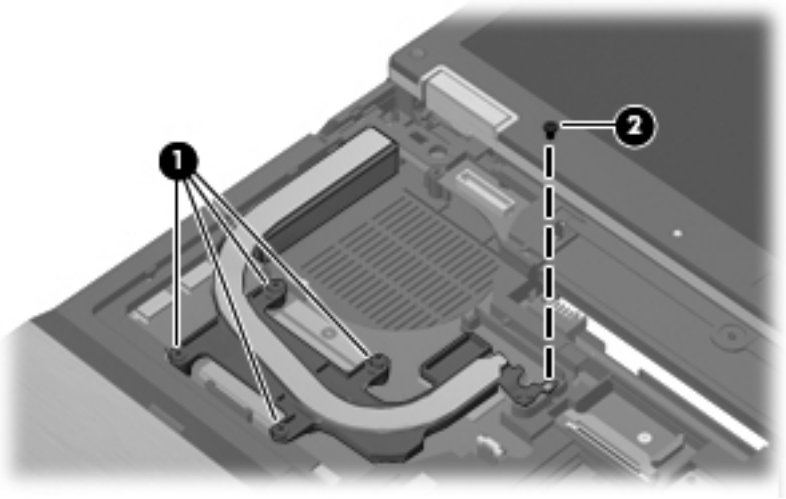
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 50).
5. Remove the following.
   a. Keyboard (see Keyboard on page 65)
   b. Switch cover (see Switch cover on page 74)
   c. Fan (see Fan on page 77)

Remove the heat sink:

NOTE: Steps 1 through 5 apply only to computer models equipped with discrete graphics subsystem memory. See steps 6 through 8 for removing the heat sink on computer models with UMA graphics subsystem memory.

1. Following the 1, 2, 3, 4 sequence stamped into the heat sink, loosen the four Phillips PM2.5×11.0 captive screws **(1)** that secure the heat sink to the system board.

2. Remove the Phillips PM2.5×4.0 screw **(2)** that secures the heat sink to the system board.

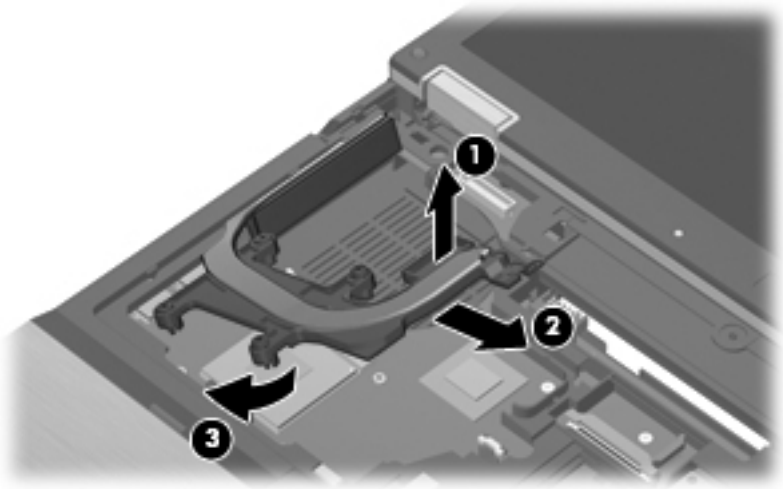


3. Lift the right side of the heat sink **(1)** until it rests at angle.

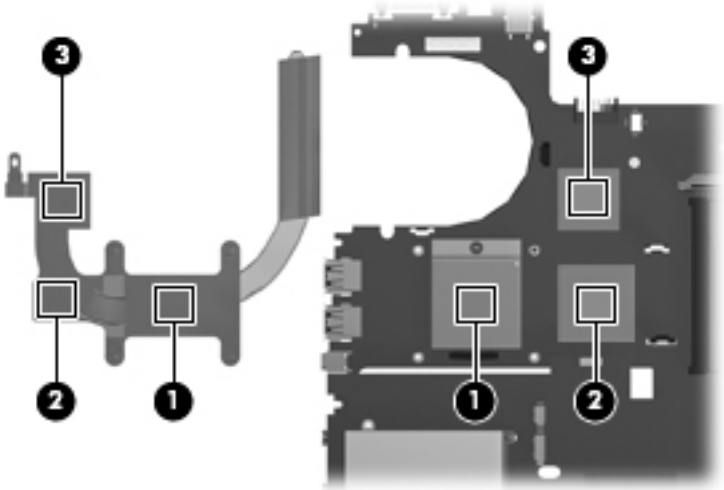
NOTE: Due to the adhesive quality of the thermal material located between the heat sink and system board components, it may be necessary to move the heat sink from side to side to detach it.

4. Release the heat sink **(2)** by sliding it to the right until it clears the left side of the top cover.

5. Remove the heat sink **(3)** by sliding it up and forward.

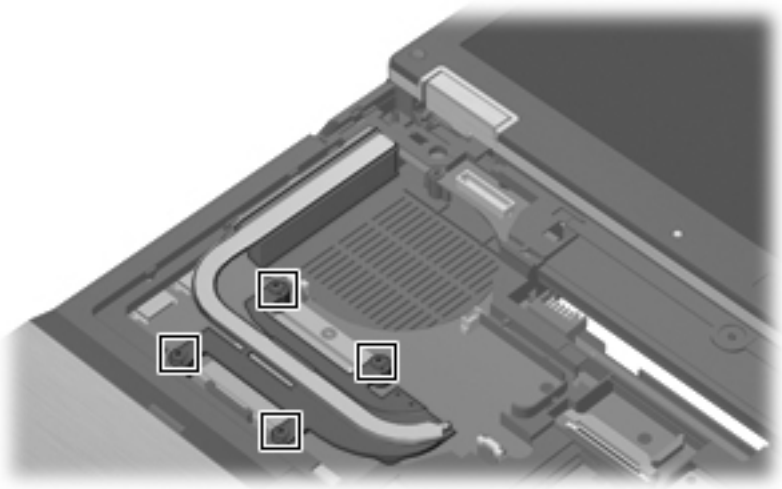


NOTE: The thermal material must be thoroughly cleaned from the surfaces of the heat sink and the system board each time the heat sink is removed. Thermal paste is used on the processor **(1)** and the section of the heat sink **(1)** that services it. Thermal pads are used on the Northbridge chip **(2)** and the section of the heat sink **(2)** that services it, and on the graphics subsystem chip **(3)** and the section of the heat sink **(3)** that services it. Replacement thermal material is included with all heat sink, system board, and processor spare part kits.



NOTE: Steps 6 through 8 apply only to computer models equipped with UMA graphics subsystem memory. See steps 1 through 5 for removing the heat sink on computer models with discrete graphics subsystem memory.

6. Following the 1, 2, 3, 4, sequence stamped into the heat sink, loosen the four Phillips PM2.5×11.0 screws **(1)** that secure the heat sink to the system board.

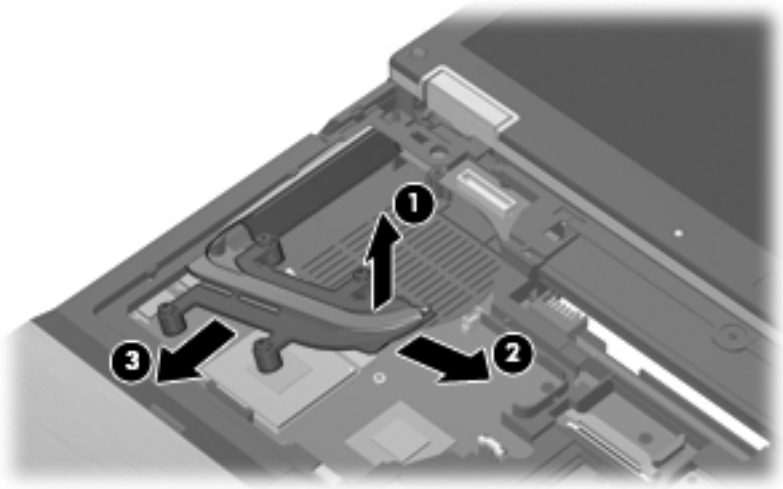


7. Lift the right side of the heat sink **(1)** until it rests at an angle.

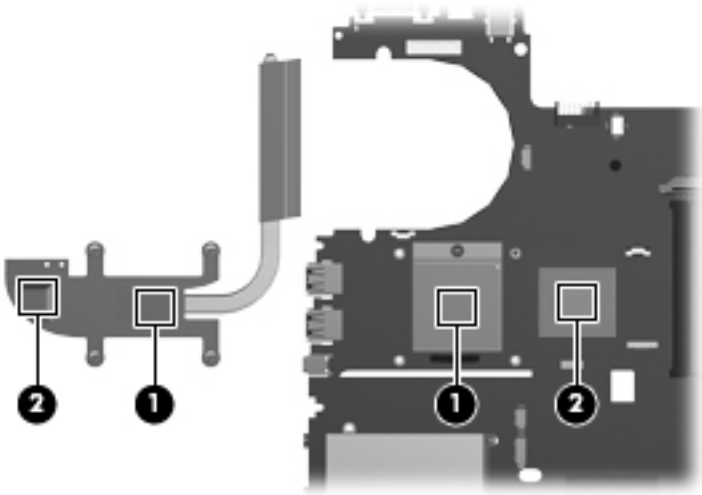
NOTE: Due to the adhesive quality of the thermal material located between the heat sink and system board components, it may be necessary to move the heat sink from side to side to detach it.

8. Release the heat sink **(2)** by sliding it to the right until it clears the left side of the top cover.

9. Remove the heat sink **(3)** by sliding it up and forward.



NOTE: The thermal material must be thoroughly cleaned from the surfaces of the heat sink and the system board each time the heat sink is removed. Thermal paste is used on the processor **(1)** and the section of the heat sink **(1)** that services it. Thermal pads are used on the Northbridge chip **(2)** and the section of the heat sink **(2)** that services it. Replacement thermal material is included with all heat sink, system board, and processor spare part kits.



Reverse this procedure to install the heat sink.

Processor

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

Description	Spare part number
Intel Core 2 Duo T9900, 3.06-GHz processor (1066-MHz FSB, 6-MB L2 cache)	*570434-001*
Intel Core 2 Duo T9800, 2.93-GHz processor (1066-MHz FSB, 6-MB L2 cache)	*507951-001*
Intel Core 2 Duo T9600, 2.80-GHz processor (1066-MHz FSB, 6-MB L2 cache)	*507955-002*
Intel Core 2 Duo T9550, 2.66-GHz processor (1066-MHz FSB, 6-MB L2 cache, 35W)	*507953-001*
Intel Core 2 Duo T9400, 2.53-GHz processor (1066-MHz FSB, 6-MB L2 cache, 35W)	*507956-002*
Intel Core 2 Duo P9600, 2.66-GHz processor (1066-MHz FSB, 3-MB L2 cache, 25W)	*507957-001*
Intel Core 2 Duo P9500, 2.53-GHz processor (1066-MHz FSB, 6-MB L2 cache, 25W)	*507958-001*
Intel Core 2 Duo P8800, 2.66-GHz processor (1066-MHz FSB, 3-MB L2 cache)	*570036-001*
Intel Core 2 Duo P8700, 2.53-GHz processor (1066-MHz FSB, 3-MB L2 cache)	*507960-001*
Intel Core 2 Duo P8600, 2.40-GHz processor (1066-MHz FSB, 3-MB L2 cache)	*507963-002*
Intel Core 2 Duo P8400, 2.26-GHz processor (1066-MHz FSB, 3-MB L2 cache)	*507964-002*

Before removing the processor, follow these steps:

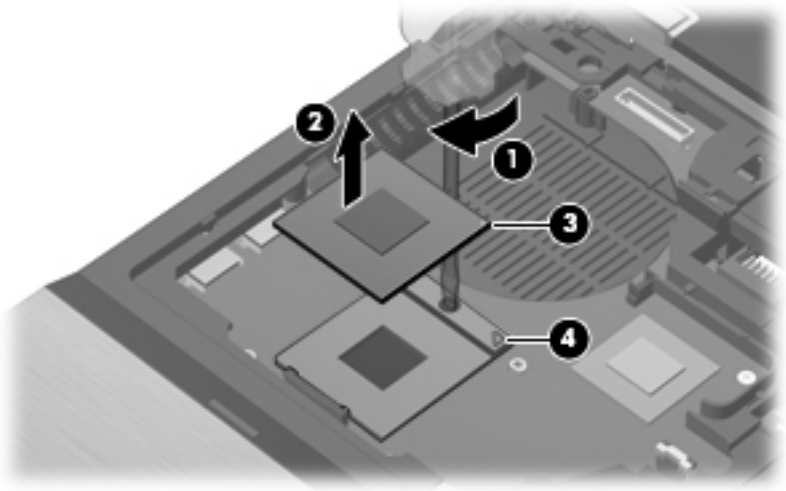
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 50).
5. Remove the following:
   a. Keyboard (see Keyboard on page 65)
   b. Switch cover (see Switch cover on page 74)
   c. Fan (see Fan on page 77)
   d. Heat sink (see Heat sink on page 78)

Remove the processor:

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

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

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



Reverse this procedure to install the processor.

Display assembly

Description	Spare part number
14.1-inch, WXGA AntiGlare LED display assembly for use on computer models equipped with a webcam (includes three WLAN antenna cables, two WWAN antenna cables, and two microphones)	487433-001
14.1-inch, WXGA AntiGlare LED display assembly for use on computer models not equipped with a webcam (includes three WLAN antenna cables, two WWAN antenna cables, and two microphones)	483202-001
14.1-inch, WXGA+ AntiGlare display assembly for use on computer models equipped with a webcam (includes three WLAN antenna cables, two WWAN antenna cables, and two microphones)	487435-001
14.1-inch, WXGA+ AntiGlare display assembly for use on computer models not equipped with a webcam (includes three WLAN antenna cables, two WWAN antenna cables, and two microphones)	483201-001
14.1-inch, WXGA AntiGlare display assembly for use on computer models equipped with a webcam (includes three WLAN antenna cables, two WWAN antenna cables, and two microphones)	487434-001
14.1-inch, WXGA AntiGlare display assembly for use on computer models not equipped with a webcam (includes three WLAN antenna cables, two WWAN antenna cables, and two microphones)	483200-001

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 50).
5. Disconnect the wireless antenna cables from the WLAN module (see WLAN module on page 70).
6. Remove the keyboard (see Keyboard on page 65).
7. Remove the switch cover (see Switch cover on page 74).

Remove the display assembly:

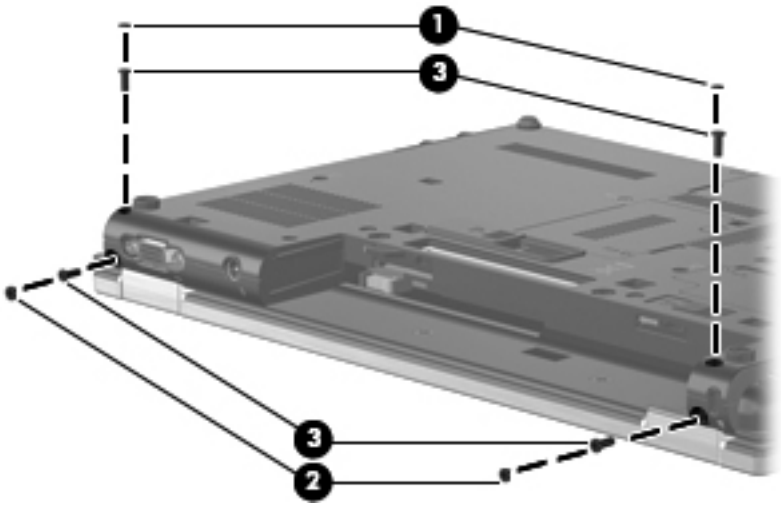
1. Close the computer and turn it upside down, with the rear panel toward you.

2. Remove the following:

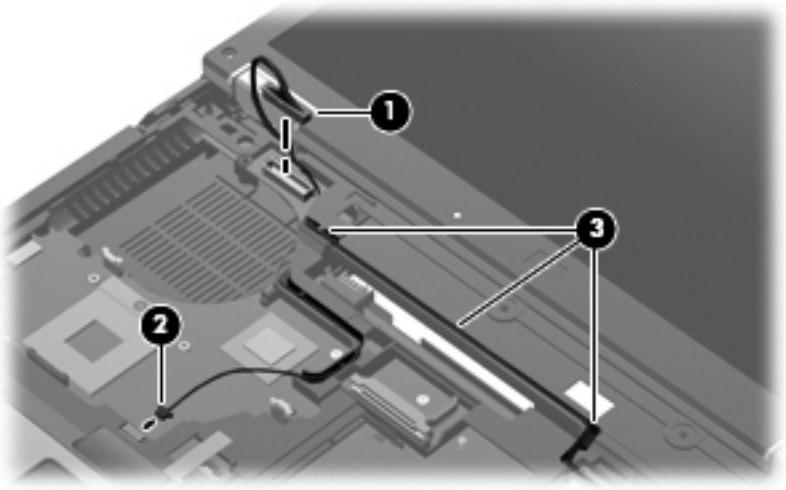
   (1) Two round rubber screw covers. Screw covers are available in the Rubber Kit, spare part number 482966-001.

   (2) Two wedge-shaped rubber screw covers. Screw covers are available in the Rubber Kit, spare part number 482966-001.

   (3) Four Torx T8M2.5×7.0 screws that secure the display assembly to the computer.

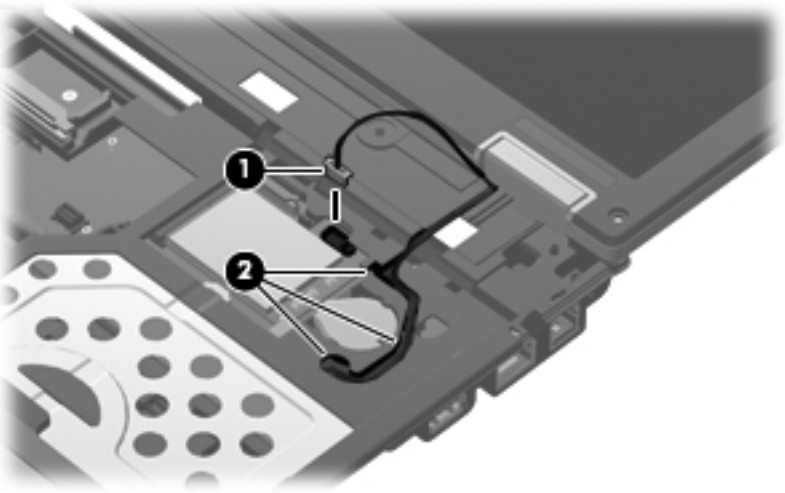


3. Turn the computer right-side up, with the front toward you.
4. Open the computer as far as possible.
5. Disconnect the display panel cable **(1)** from the system board.
6. Disconnect the microphone cable **(2)** from the system board.
7. Remove the wireless antenna cables **(3)** from the clips and routing channels built into the top cover.



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

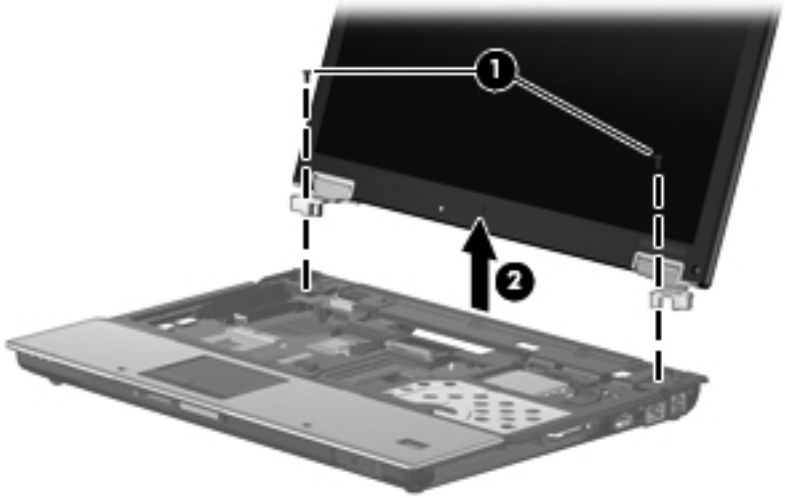
9. Remove the wireless antenna cables **(2)** from the clips and routing channels built into the top cover.



△ **CAUTION:** The display assembly will be unsupported when the following screws are removed. To prevent damage to the display assembly, support it before removing the screws.

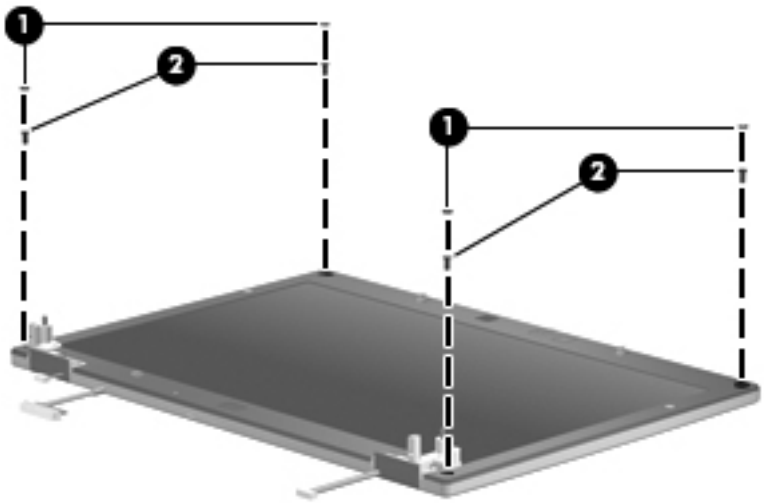
10. Remove the two T8M2.5×7.0 screws **(1)** that secure the display assembly to the computer.

11. Remove the display assembly **(2)** by lifting it straight up.



12. If it is necessary to replace the display bezel or display hinges, remove the four rubber screw covers **(1)** and the four Phillips PM2.5×7.0 screws **(2)** that secure the display bezel to the display assembly. The rubber screw covers are available in the Rubber Kit, spare part number 482966-001.

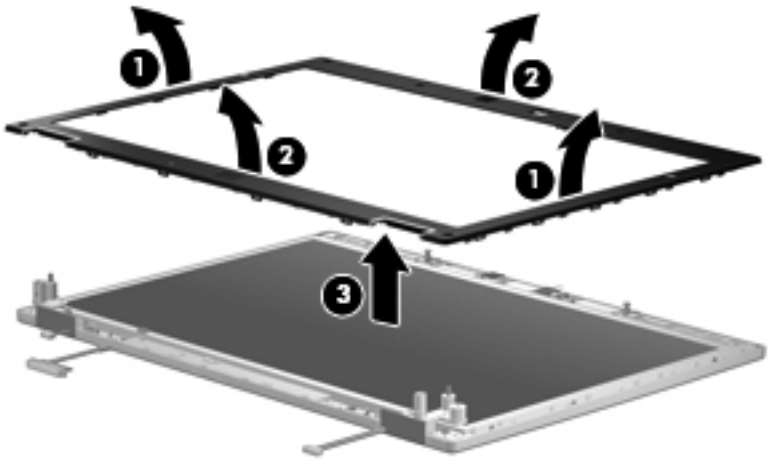
NOTE: See Display inverter on page 52 for procedures on removing the display inverter.



13. Flex the inside edges of the left and right sides **(1)** and the top and bottom sides **(2)** of the display bezel until the bezel disengages from the display enclosure.

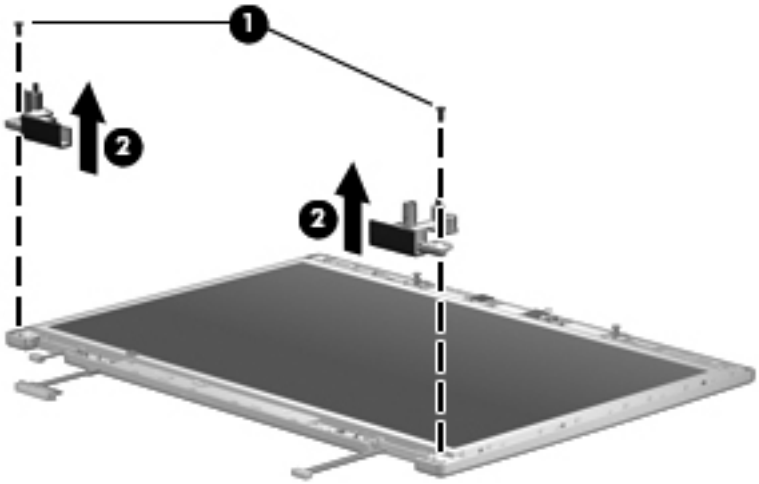
14. Remove the display bezel **(3)**. The display bezel is available using spare part numbers:

- 488189-001 (for use in computer models equipped with non-LED displays and a webcam)
- 488190-001 (for use in computer models equipped with non-LED displays without a webcam)
- 518420-001 (for use in computer models equipped with LED displays and a webcam)
- 518421-001 (for use in computer models equipped with LED displays without a webcam)



15. If it is necessary to replace the display hinges, remove the two Phillips PM2.5×7.0 screws **(1)** that secure the display hinges to the display enclosure.

16. Remove the display hinges **(2)**. The left and right display hinges are included in the Display Hinge Kit, spare part number 482967-001.



The display panel is available using the following spare part numbers:

- 623154-001 (for use in computer models equipped with WXGA displays)
- 623155-001 (for use in computer models equipped with WXGA LED displays)
- 623156-001 (for use in computer models equipped with WXGA+ displays)

Reverse this procedure to reassemble and install the display assembly.

Top cover

Description	Spare part number
Top cover with fingerprint reader (includes TouchPad buttons)	486303-001
Top cover without fingerprint reader (includes TouchPad buttons)	*611810-001*

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 50).
5. Remove the following:
   a. Hard drive (see Hard drive on page 56)
   b. Keyboard (see Keyboard on page 65)
   c. Switch cover (see Switch cover on page 74)
   d. Display assembly (see Display assembly on page 85)

Remove the top cover:

1. Turn the computer upside down, with the front toward you.

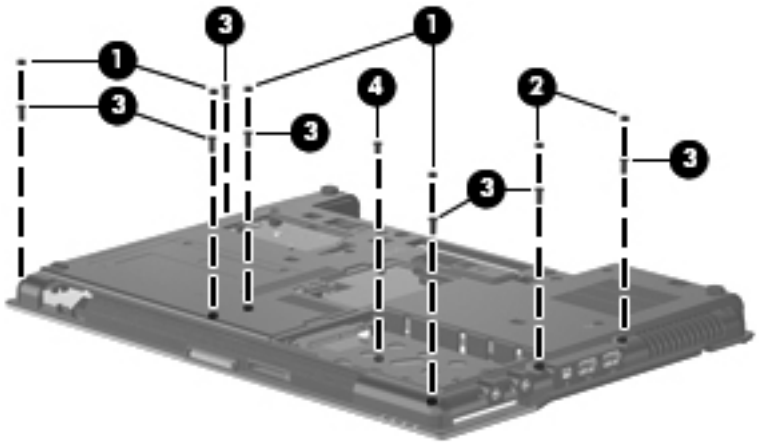
2. Remove the following:

   (1) Two round rubber screw covers on the front edge of the base enclosure. Rubber screw covers are available in the Rubber Kit, spare part number 482968-001.

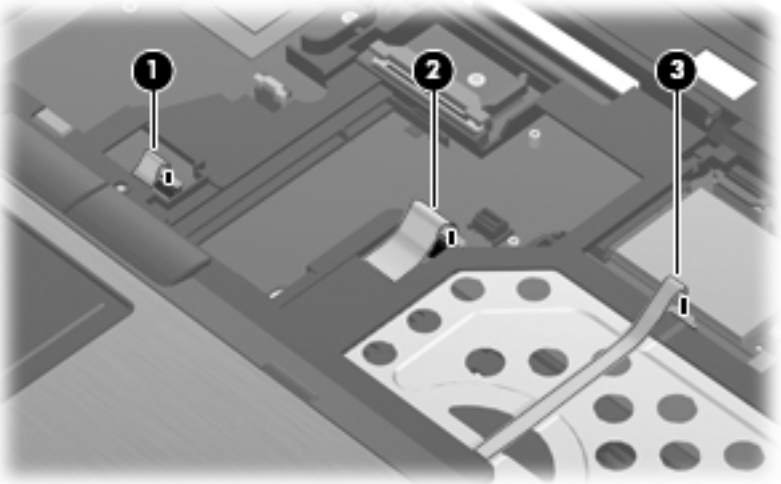
   (2) Two cup-shaped rubber screw covers on the right edge of the base enclosure. Rubber screw covers are available in the Rubber Kit, spare part number 482968-001.

   (3) Seven Torx8 T8M2.5×7.0 screws.

   (4) One Phillips PM2.0×5.0 screw.

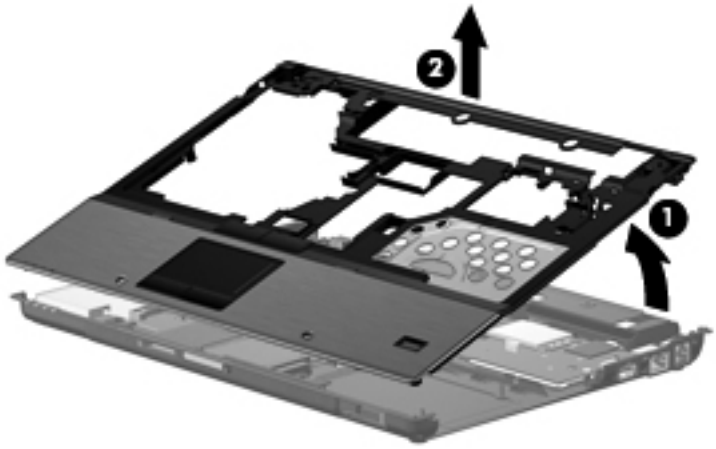


3. Turn the computer right-side up, with the front toward you.
4. Release the ZIF connector **(1)** to which the TouchPad cable is attached, and disconnect the TouchPad cable from the system board.
5. Release the ZIF connector **(2)** to which the audio/ExpressCard assembly cable is attached, and disconnect the audio/ExpressCard assembly cable from the system board.
6. Release the ZIF connector **(3)** to which the fingerprint reader board cable is attached, and disconnect the fingerprint reader board cable from the system board.



7. Lift the rear edge of the top cover **(1)** until it detaches from the base enclosure.

8. Remove the top cover **(2)** by lifting it straight up.



Reverse this procedure to install the top cover.

TouchPad

Description	Spare part number
TouchPad (includes cable and TouchPad button board and cable)	486306-001

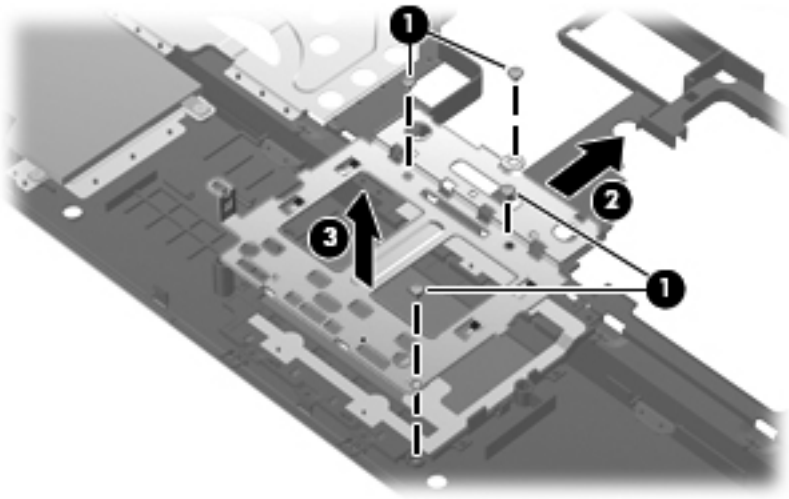
Before removing the TouchPad, follow these steps:

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 50).
5. Remove the following:
   a. Hard drive (see Hard drive on page 56)
   b. Keyboard (see Keyboard on page 65)
   c. Switch cover (see Switch cover on page 74)
   d. Display assembly (see Display assembly on page 85)
   e. Top cover (see Top cover on page 90)

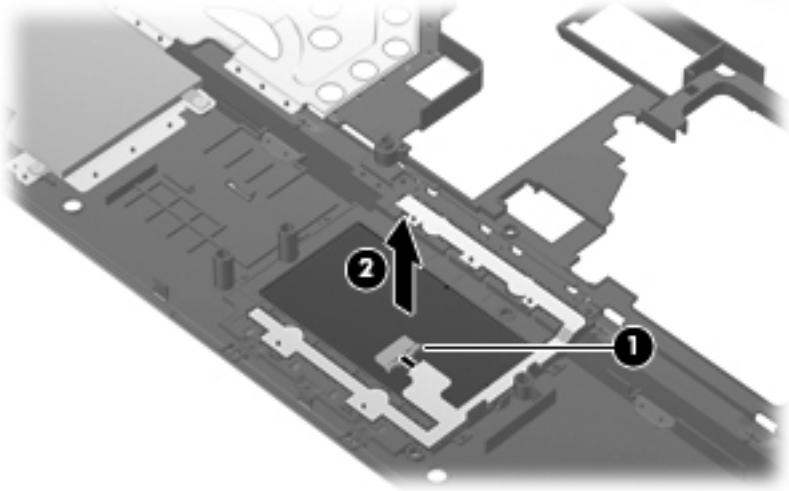
Remove the TouchPad:

1. Turn the top cover upside down, with the front toward you.
2. Remove the four Phillips PM2.0×3.0 screws **(1)** that secure the TouchPad bracket to the top cover.

3. Release the TouchPad bracket **(2)** by sliding it toward the back of the top cover.
4. Remove the TouchPad bracket **(3)** by lifting it straight up.



5. Release the ZIF connector **(1)** to which the TouchPad button board cable is attached, and disconnect the TouchPad button board cable from the TouchPad board.
6. Remove the TouchPad board **(2)** by lifting it straight up.



Reverse this procedure to install the TouchPad.

Fingerprint reader board

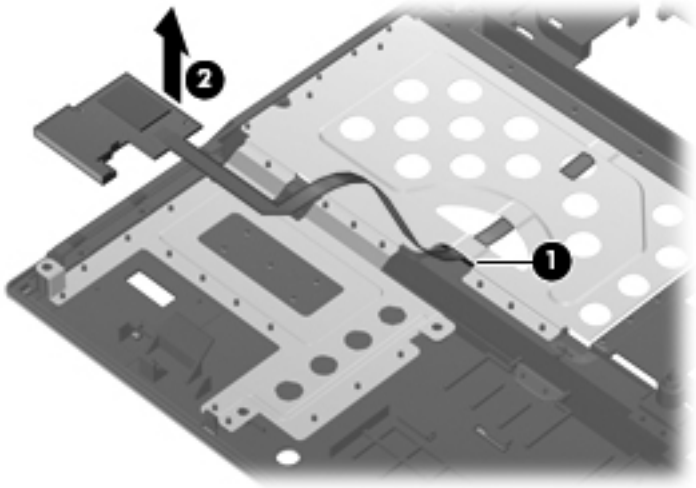
Description	Spare part number
Fingerprint reader board (includes cable)	486309-001

Before removing the fingerprint reader board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC Adapter from the computer.
4. Remove the battery (see Battery on page 50).
5. Remove the following:
   a. Hard drive (see Hard drive on page 56)
   b. Keyboard (see Keyboard on page 65)
   c. Switch cover (see Switch cover on page 74)
   d. Display assembly (see Display assembly on page 85)
   e. Top cover (see Top cover on page 90)
   f. Audio/ExpressCard assembly (see Audio/ExpressCard assembly on page 97)

Remove the fingerprint reader board:

1. Remove the fingerprint reader board cable **(1)** from the opening in the top cover.
2. Remove the fingerprint reader board **(2)** by lifting it straight up. The fingerprint reader board is attached to the top cover using double-sided tape.



Reverse this procedure to install the fingerprint reader board.

Bluetooth module cable

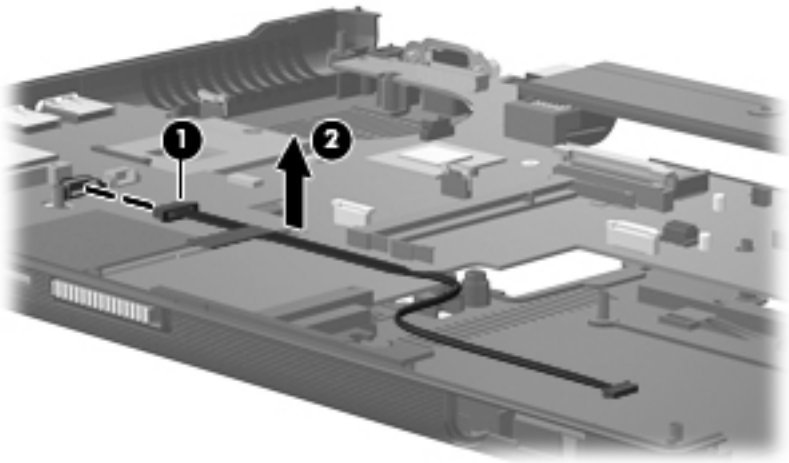
NOTE: The Bluetooth module spare part kit does not include a Bluetooth module cable. The Bluetooth module cable is included in the Cable Kit, spare part number 487432-001.

Before removing the Bluetooth 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 50).
5. Remove the following:
   a. Hard drive (see Hard drive on page 56)
   b. Keyboard (see Keyboard on page 65)
   c. Switch cover (see Switch cover on page 74)
   d. Display assembly (see Display assembly on page 85)
   e. Top cover (see Top cover on page 90)

Remove the Bluetooth module cable:

1. Disconnect the Bluetooth module cable **(1)** from the system board.
2. Detach the Bluetooth module cable **(2)** from the speaker. The Bluetooth module cable is attached to the speaker using double-sided tape.



Reverse this procedure to install the Bluetooth module cable.

Speaker

Description	Spare part number
Speaker	486308-001

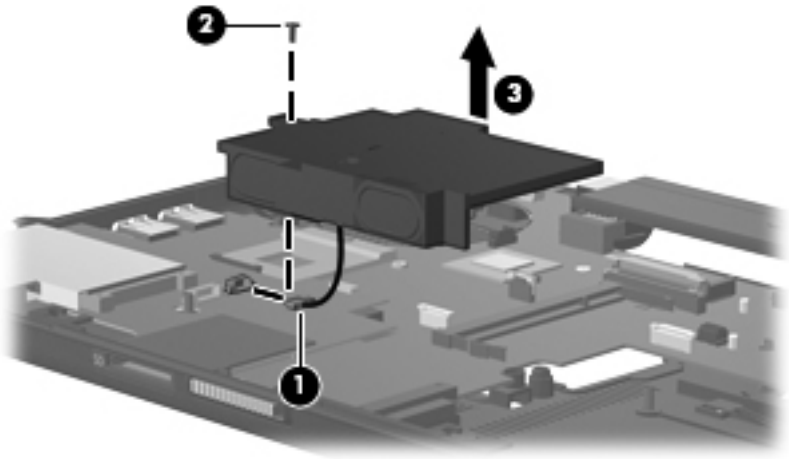
Before removing the speaker, follow these steps:

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 50).
5. Remove the following:
   a. Hard drive (see Hard drive on page 56)
   b. Keyboard (see Keyboard on page 65)
   c. Switch cover (see Switch cover on page 74)
   d. Display assembly (see Display assembly on page 85)
   e. Top cover (see Top cover on page 90)
   f. Bluetooth module cable (see Bluetooth module cable on page 95)

Remove the speaker:

1. Disconnect the speaker cable **(1)** from the system board.
2. Remove the Torx8 T8M2.5×7.0 screw **(2)** that secures the speaker to the base enclosure.

3. Remove the speaker **(3)** by lifting it straight up.



Reverse this procedure to install the speaker.

Audio/ExpressCard assembly

NOTE: *The Audio/ExpressCard assembly spare part kit does not include an audio cable. The Audio/ExpressCard assembly cable is included in the Cable Kit, spare part number 487432-001. See* Cable Kit on page 31 *for more Cable Kit spare part information.*

Description	Spare part number
Audio/ExpressCard assembly (includes ExpressCard slot, cable, headphone and microphone connectors, and SD card reader slot)	482959-001

Before removing the audio/ExpressCard 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 50).
5. Remove the following:
   a. Hard drive (see Hard drive on page 56)
   b. Keyboard (see Keyboard on page 65)
   c. Switch cover (see Switch cover on page 74)
   d. Display assembly (see Display assembly on page 85)

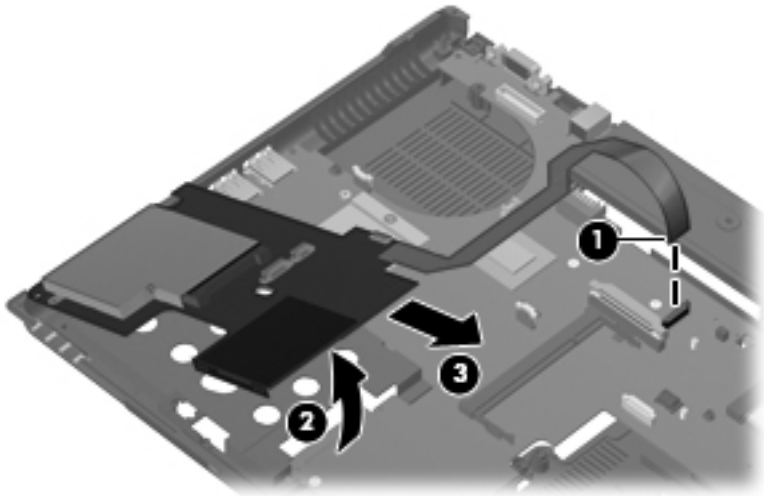
e. Top cover (see Top cover on page 90)

f. Bluetooth module cable (see Bluetooth module cable on page 95)

g. Speaker (see Speaker on page 96)

Remove the audio/ExpressCard assembly:

1. Release the ZIF connector **(1)** to which the audio/ExpressCard assembly cable is attached, and disconnect the audio/ExpressCard assembly cable from the system board.
2. Lift the right side of the audio/ExpressCard assembly **(2)** to disconnect it from the system board.
3. Remove the audio/ExpressCard assembly **(3)** by sliding it up and to the right.



Reverse this procedure to install the audio/ExpressCard assembly.

Modem module cable

NOTE: The modem module spare part kits do not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 487432-001. The modem module cable includes an RJ-11 connector.

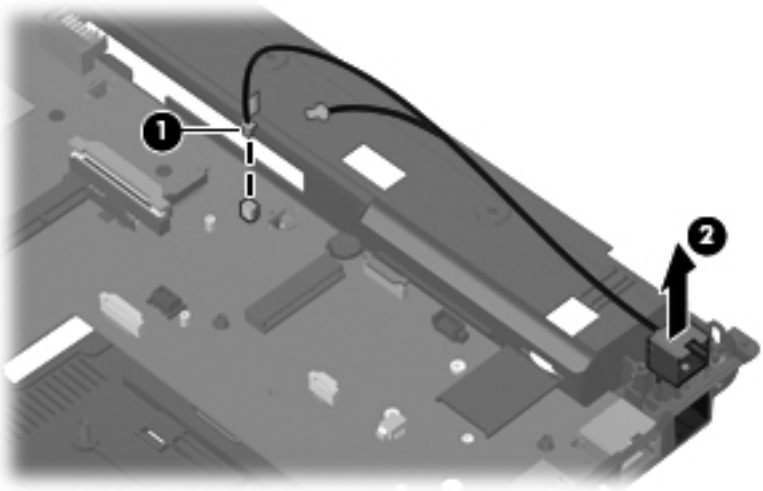
Before removing the modem module cable, follow these steps:

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 50).
5. Remove the following:
   a. Hard drive (see Hard drive on page 56)
   b. Keyboard (see Keyboard on page 65)
   c. Switch cover (see Switch cover on page 74)
   d. Display assembly (see Display assembly on page 85)
   e. Top cover (see Top cover on page 90)

Remove the modem module cable:

1. Disconnect the modem module cable **(1)** from the system board.
2. Remove the RJ-11 connector **(2)** from the clip built into the base enclosure.



Reverse this procedure to install the modem module cable.

System board

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

Description	Spare part number
System board for use in all countries and regions except for Russia and the People's Republic of China	
For use only with computer models with discrete graphics subsystem memory (includes 256 MB of graphics subsystem memory	486300-001
For use only with computer models with discrete graphics subsystem memory (includes 128 MB of graphics subsystem memory	486299-001
For use only with computer models with UMA graphics subsystem memory	486301-001
System board for use in only in Russia and the People's Republic of China	
For use only with computer models with discrete graphics subsystem memory (includes 256 MB of graphics subsystem memory	*510352-001*
For use only with computer models with discrete graphics subsystem memory (includes 128 MB of graphics subsystem memory	*510351-001*
For use only with computer models with UMA graphics subsystem memory	*510353-001*

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 50).
5. Remove the following components:
   a. Bluetooth module (see Bluetooth module on page 54)
   b. Hard drive (see Hard drive on page 56)
   c. Optical drive (see Optical drive on page 59) or upgrade bay device (see Upgrade bay device on page 60)
   d. Keyboard (see Keyboard on page 65)
   e. Switch cover (see Switch cover on page 74)
   f. Display assembly (see Display assembly on page 85)
   g. Top cover (see Top cover on page 90)
   h. Bluetooth module cable (see Bluetooth module cable on page 95)

i. Speaker (see Speaker on page 96)

j. Audio/ExpressCard assembly (see Audio/ExpressCard assembly on page 97)

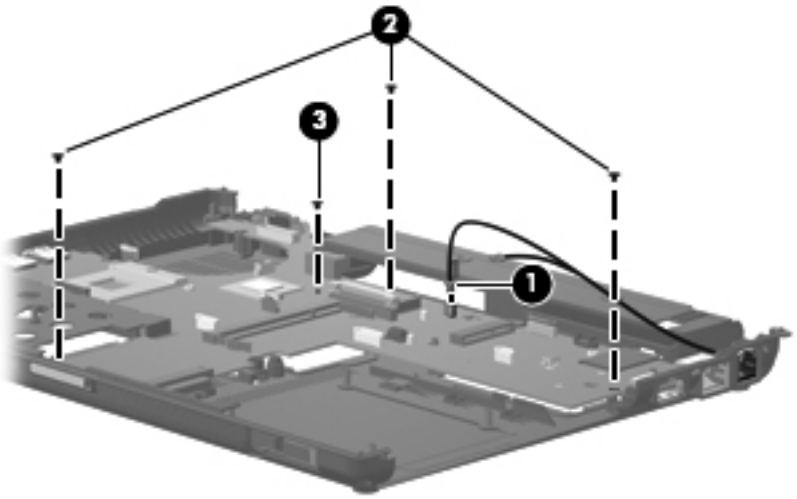
When replacing the system board, be sure that the following components are removed from the defective system board and installed on the replacement system board:

- Memory module (see Expansion memory module on page 62 and Primary memory module on page 67)
- WWAN module (see WWAN module on page 63)
- Modem module (see Modem module on page 69)
- WLAN module (see WLAN module on page 70)
- RTC battery (see RTC battery on page 73)
- Fan (see Fan on page 77)
- Heat sink (see Heat sink on page 78)
- Processor (see Processor on page 83)

Remove the system board:

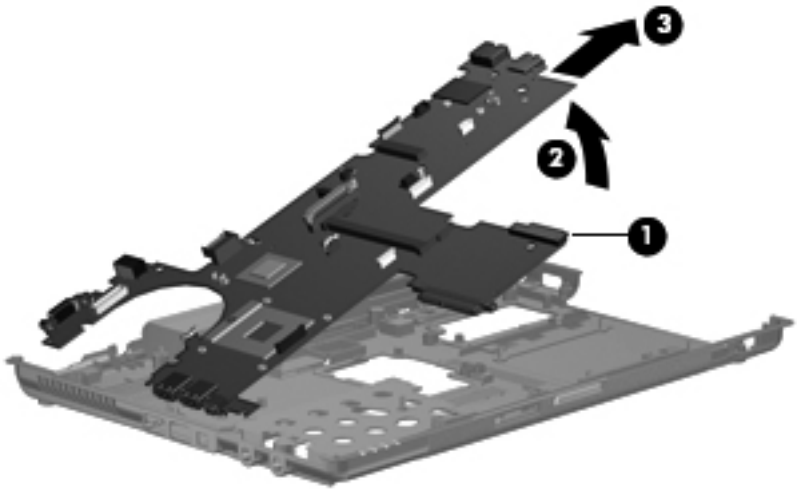
1. Disconnect the modem module cable **(1)** from the system board.
2. Remove the three Phillips PM2.5×4.0 screws **(2)** that secure the system board to the base enclosure.

NOTE: Computer models equipped with UMA graphics subsystem memory will have a fourth Phillips PM2.5×4.0 screw **(3)** securing the system board to the base enclosure.



3. Use the optical drive connector **(1)** to lift the right edge of the system board **(2)** until it rests at an angle.

4. Remove the system board **(3)** from the base enclosure by sliding it up and to the right at an angle.



Reverse the preceding procedure to install the system board.

5 Computer Setup

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

Starting Computer Setup

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

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

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

To start Computer Setup, follow these steps:

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

Using Computer Setup

Navigating and selecting in Computer Setup

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

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

- To select a menu or a menu item, use the keyboard arrow keys and then press enter, or use a pointing device to click the item.
- To scroll up and down, click the plus sign (+) or the minus sign (-) in the upper-right corner of the screen.
- To close open dialog boxes and return to the main Computer Setup screen, press esc, and then follow the on-screen instructions.

2. Press f10 to enter BIOS Setup.
3. Select the **File**, **Security**, **Diagnostics**, or **System Configuration** menu.

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

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

  – or –

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

  – or –

- To save your changes and exit Computer Setup menus, click **Save** 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.

Restoring factory settings in Computer Setup

NOTE: Restoring defaults will not change the hard drive mode.

To return all settings in Computer Setup to the values that were set at the factory, follow these steps:

1. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press f10 to enter BIOS Setup.
3. Use a pointing device or the arrow keys to select **File > Restore defaults**.
4. Follow the on-screen instructions.
5. To save your changes and exit, click **Save** in the lower-left corner of the screen, and then follow the on-screen instructions.

   – or –

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

Your changes go into effect when the computer restarts.

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

Computer Setup menus

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

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

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.
Restore defaults	Replace the configuration settings in Computer Setup with the original factory settings. (Password settings and security settings are not changed when you restore the factory settings.)
Ignore changes and exit	Cancel any changes entered during the current session. Then exit and restart the computer.
Save changes and exit	Save changes and exit Save any changes entered during the current session. Then exit and restart the computer. Your changes go into effect when the computer restarts.

Security menu

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

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)	Enable/disable the fingerprint reader (select models only; disabled by default).
Allow reset of HP ProtectTools security keys	Enable/disable reset of HP ProtectTools security keys.

Select	To do this
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. **NOTE:** DriveLock settings are accessible only when you enter Computer Setup by turning on (not restarting) the computer.
Automatic DriveLock	Enable/disable Automatic DriveLock support.
Disk Sanitizer	Run Disk Sanitizer to destroy all existing data on the primary hard drive. **CAUTION:** If you run Disk Sanitizer, the data on the primary hard drive is destroyed permanently.
System IDs	Enter a user-defined computer asset tracking number and ownership tag.
Always Prompt for HP SpareKey Enrollment	Enable/disable a prompt for HP SpareKey enrollment.

Diagnostics menu

Select	To do this
System Diagnostics menu	• F1 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. • F2 Start-up Test—Verifies the system components needed for starting the computer. • F3 Run-In Test—Runs a comprehensive check on system memory. • F4 Hard Disk Test—Runs a comprehensive self-test on any hard drive in the system.

System Configuration menu

NOTE: Some of the menu items listed in this section 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 Display Diagnostic URL (disabled by default). • Enable/disable CD-ROM boot (enabled by default). • Enable/disable SD Card boot (enabled by default). • Enable/disable diskette boot (enabled by default). • Enable/disable boot from Extensible Firmware Interface (EFI) File (select models only; enabled by default). • Enable/disable internal network adapter boot and set the Preboot eXecution Environment (PXE) (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. • Select a parallel port mode: ECP (Enhanced Capabilities Port), standard, bidirectional, or EPP (Enhanced Parallel Port). • Enable/disable BIOS DMA data transfers (select models only; enabled by default). • Enable/disable fan always on while connected to an AC outlet (disabled by default). • Enable/disable LAN Power Save. When enabled, saves power by turning off the LAN when not in use (enabled by default). • Enable/disable Data Execution Prevention. When enabled, the processor can disable some virus code execution, which helps to improve computer security. • SATA (Serial Advanced Technology Attachment) device mode. The following options are available: ◦ AHCI (Advanced Host Controller Interface) ◦ IDE (Integrated Drive Electronics) ◦ RAID (Redundant Array of Independent Disks)

Select	To do this
	NOTE: Availability of the options above varies by computer model. • Enable/disable secondary battery fast charge (enabled by default). • Enable/disable HP QuickLook (enabled by default). • Enable/disable Virtualization Technology (select models only; enabled by default). • Enable/disable TXT (Intel® Trusted Execution Technology) (select models only; enabled by default). • Enable/disable Dual Core CPU (select models only; enabled by default).
Built-In Device Options	• Enable/disable the wireless button state (enabled by default). • Enable/disable embedded WWAN device radio (select models only; enabled by default). • Enable/disable embedded Bluetooth® device radio (enabled by default). • Enable/disable the Network Interface Controller (LAN) (enabled 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 fingerprint device (enabled by default). • Enable/disable a modem device (enabled by default).
Port Options (all are enabled by default)	**NOTE:** All port options are enabled by default. • Enable/disable the serial port. • Enable/disable the parallel port. • Enable/disable the flash media reader. • Enable/disable the USB port. **CAUTION:** Disabling the USB port also disables MultiBay devices and ExpressCard devices on the advanced port replicator. • Enable/disable the 1394 port.
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		
Depth	24.30 cm	9.57 in
Width	33.10 cm	13.03 in
Height (front to rear)	3.13 to 3.41 cm	1.23 to 1.34 in
Weight (computer equipped with an optical drive, WXGA display assembly, 1 memory module, WLAN module, and 6-cell battery)	2.40 kg	5.29 lbs
Weight (computer equipped with the optical drive weight saver, WXGA display assembly, 1 memory module, WLAN module, and 4-cell battery)	2.10 kg	4.63 lbs
Input power		
Operating voltage	19.0 V dc @ 4.74 A – 90 W	
Operating current	4.74 A	
Temperature		
Operating (not writing to optical disc)	0°C to 35°C	32°F to 95°F
Operating (writing to optical disc)	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F
Relative humidity		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating	-15 m to 3,048 m	-50 ft to 10,000 ft
Nonoperating	-15 m to 12,192 m	-50 ft to 40,000 ft
Shock		
Operating	125 g, 2 ms, half-sine	
Nonoperating	200 g, 2 ms, half-sine	

	Metric	U.S.
Random vibration		
Operating	0.75 g zero-to-peak, 10 Hz to 500 Hz, 0.25 oct/min sweep rate	
Nonoperating	1.50 g zero-to-peak, 10 Hz to 500 Hz, 0.5 oct/min sweep rate	
NOTE: Applicable product safety standards specify thermal limits for plastic surfaces. The computer operates well within this range of temperatures.		

14.1-inch, WXGA display specifications

	Metric	U.S.
Dimensions		
Height	27.94 cm	11.0 in
Width	20.83 cm	8.2 in
Diagonal	35.56 cm	14.1 in
Number of colors	Up to 16.8 million	
Contrast ratio	250:1 (typical)	
Brightness	180 nits (typical)	
Pixel resolution		
Pitch	0.279 × 0.279 mm	
Format	1280 × 800	
Configuration	RGB vertical stripe	
Backlight	Edge lit	
Character display	80 × 25	
Total power consumption	4.0 W	
Viewing angle	+/-40 horizontal, +20/–40° vertical (typical)	

Hard drive specifications

		250-GB*	160-GB*	120-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	*3 ms*	3 ms	3 ms	3 ms
Average	*13 ms*	13 ms	13 ms	13 ms
Maximum	*24 ms*	24 ms	24 ms	24 ms
Logical blocks	*625,141,400*	488,376,280	312,560,640	234,420,480
Disc rotational speed	*7200 rpm*	7200 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.

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

DVD±RW and CD-RW Double-Layer Combo Drive specifications

Applicable disc	**Read:**	**Write:**
	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM	CD-R and CD-RW DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM
Access time	**CD**	**DVD**
Random	< 175 ms	< 230 ms
Cache buffer	2 MB	
Data transfer rate		
24X CD-ROM	3,600 KB/sec	
8X DVD-ROM	10,800 KB/sec	
24X CD-R	3,600 KB/sec	
16X CD-RW	2,400 KB/sec	
8X DVD+R	10,800 KB/sec	
4X DVD+RW	5,400 KB/sec	
8X DVD-R	10,800 KB/sec	
4X DVD-RW	5,400 KB/sec	
2.4X DVD+R(9)	2,700 KB/sec	
5X DVD-RAM	6,750 KB/sec	

DVD/CD-RW Combo Drive specifications

Applicable disc	**Read:**	**Write:**
	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM	CD-R and CD-RW
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	3,600 KB/sec	
24X CD-R	3,600 KB/sec	
24X CD-RW	3,600 KB/sec	

DVD-ROM Drive

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

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*	Available for ExpressCard
DMA6	Not assigned
DMA7	Not assigned
*ExpressCard controller can use DMA 1, 2, or 5.	

System interrupt specifications

Hardware IRQ	System function
IRQ0	System timer
IRQ1	Standard 101-/102-Key or Microsoft® Natural Keyboard
IRQ2	Cascaded
IRQ3	Intel 82801DB/DBM USB2 Enhanced Host Controller—24CD
IRQ4	COM1
IRQ5*	Conexant AC—Link Audio Intel 82801DB/DBM SMBus Controller—24C3 Data Fax Modem with SmartCP
IRQ6	Diskette drive
IRQ7*	Parallel port
IRQ8	System CMOS/real-time clock
IRQ9*	Microsoft ACPI-compliant system
IRQ10*	Intel USB UHCI controller—24C2 Intel 82852/82855 GM/GME Graphic Controller Realtek RTL8139 Family PCI Fast Ethernet Controller
IRQ11	Intel USB EHCI controller—24CD Intel USB UHCI controller—24C4 Intel USB UHCI controller—24C7 Intel Pro/Wireless 2200BG TI OHCI 1394 host controller TI PCI1410 CardBus controller
IRQ12	Synaptics PS/2 TouchPad
IRQ13	Numeric data processor
IRQ14	Primary IDE channel
IRQ15	Secondary IDE channel
*Default configuration; audio possible configurations are IRQ5, IRQ7, IRQ9, IRQ10, or none.	
NOTE: ExpressCards may assert IRQ3, IRQ4, IRQ5, IRQ7, IRQ9, IRQ10, IRQ11, or IRQ15. Either the infrared or the serial port may assert IRQ3 or IRQ4.	

System I/O address specifications

I/O address (hex)	System function (shipping configuration)
000 - 00F	DMA controller no. 1
010 - 01F	Unused
020 - 021	Interrupt controller no. 1
022 - 024	Opti chipset configuration registers
025 - 03F	Unused
02E - 02F	87334 “Super I/O” configuration for CPU
040 - 05F	Counter/timer registers
044 - 05F	Unused
060	Keyboard controller
061	Port B
062 - 063	Unused
064	Keyboard controller
065 - 06F	Unused
070 - 071	NMI enable/RTC
072 - 07F	Unused
080 - 08F	DMA page registers
090 - 091	Unused
092	Port A
093 - 09F	Unused
0A0 - 0A1	Interrupt controller no. 2
I/O Address (hex)	System Function (shipping configuration)
0A2 - 0BF	Unused
0C0 - 0DF	DMA controller no. 2
0E0 - 0EF	Unused
0F0 - 0F1	Coprocessor busy clear/reset
0F2 - 0FF	Unused
100 - 16F	Unused
170 - 177	Secondary fixed disk controller
178 - 1EF	Unused
1F0 - 1F7	Primary fixed disk controller
1F8 - 200	Unused

I/O address (hex)	System function (shipping configuration)
201	JoyStick (decoded in ESS1688)
202 - 21F	Unused
220 - 22F	Entertainment audio
230 - 26D	Unused
26E - 26	Unused
278 - 27F	Unused
280 - 2AB	Unused
2A0 - 2A7	Unused
2A8 - 2E7	Unused
2E8 - 2EF	Reserved serial port
2F0 - 2F7	Unused
2F8 - 2FF	Infrared port
300 - 31F	Unused
320 - 36F	Unused
370 - 377	Secondary diskette drive controller
378 - 37F	Parallel port (LPT1/default)
380 - 387	Unused
388 - 38B	FM synthesizer—OPL3
38C - 3AF	Unused
3B0 - 3BB	VGA
3BC - 3BF	Reserved (parallel port/no EPP support)
3C0 - 3DF	VGA
3E0 - 3E1	ExpressCard controller in CPU
3E2 - 3E3	Unused
3E8 - 3EF	Internal modem
3F0 - 3F7	“A” diskette controller
3F8 - 3FF	Serial port (COM1/default)
CF8 - CFB	PCI configuration index register (PCIDIVO-1)
CFC - CFF	PCI configuration data register (PCIDIVO-1)

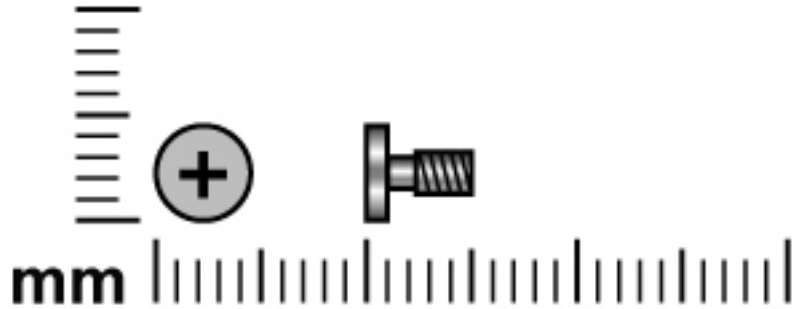
System memory map specifications

Size	Memory address	System function
640 KB	00000000-0009FFFF	Base memory
128 KB	000A0000-000BFFFF	Video memory
48 KB	000C0000-000CBFFF	Video BIOS
160 KB	000C8000-000E7FFF	Unused
64 KB	000E8000-000FFFFF	System BIOS
15 MB	00100000-00FFFFFF	Extended memory
58 MB	04800000-07FFFFFF	Super extended memory
58 MB	04800000-07FFFFFF	Unused
2 MB	08000000-080FFFFF	Video memory (direct access)
4 GB	08200000-FFFEFFFF	Unused
64 KB	FFFF0000-FFFFFFFF	System BIOS

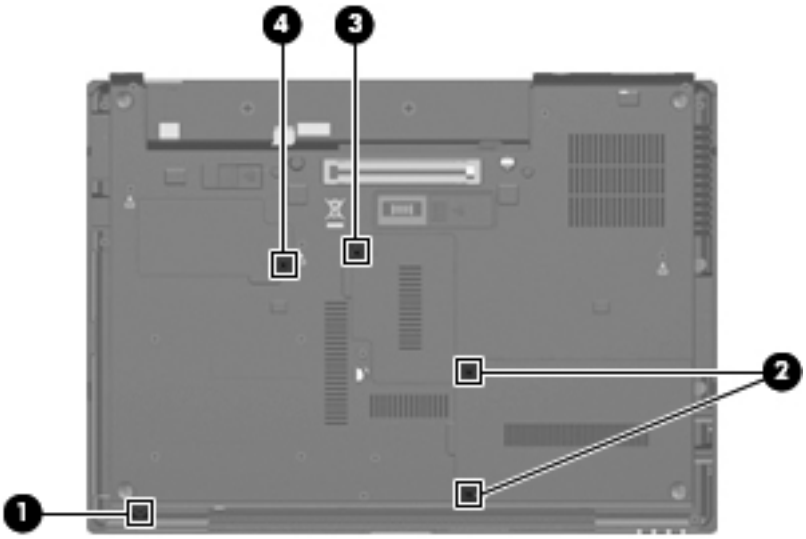
7 Screw listing

This section provides specification and reference information for the screws and screw locks used in the computer. All screws listed in this section are available in the Screw Kit, spare part number 486305-001.

Phillips PM2.0×5.0 captive screw



Color	Quantity	Length	Thread	Head diameter
Black	5	5.0 mm	2.0 mm	5.0 mm



Where used:

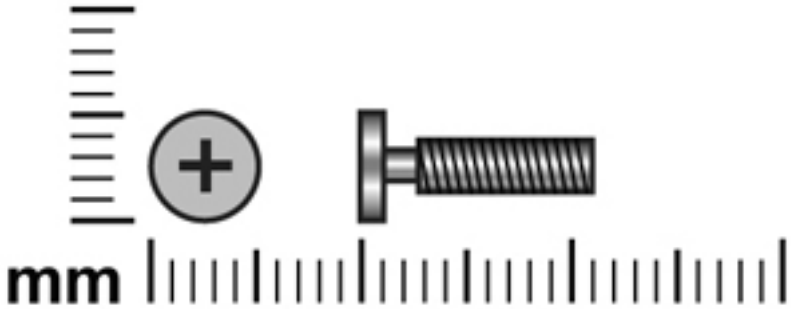
(1) One captive screw that secures the Bluetooth module compartment cover to the computer (screw is secured with a C-clip)

(2) Two captive screws that secure the hard drive bay cover to the computer (screws are secured with C-clips)

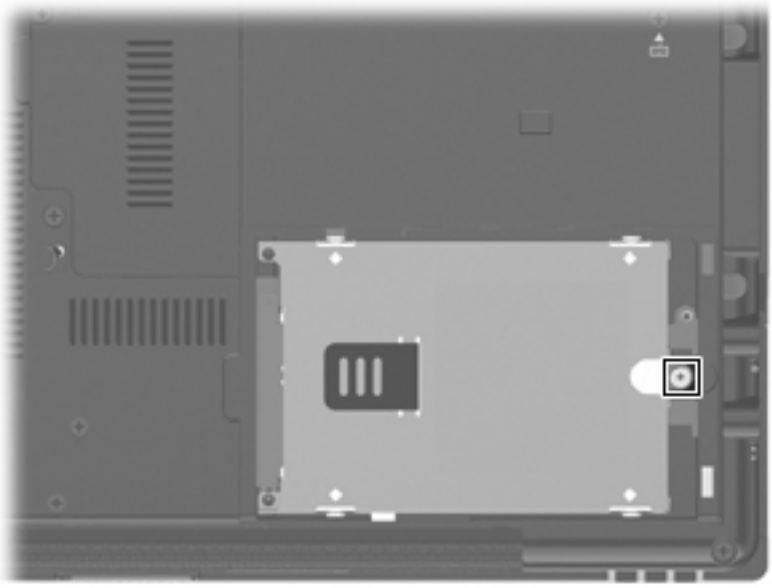
(3) One captive screw that secures the memory module compartment cover to the computer (screw is secured with a C-clip)

(4) One captive screw that secures the WLAN module compartment cover to the computer (screw is secured with a C-clip)

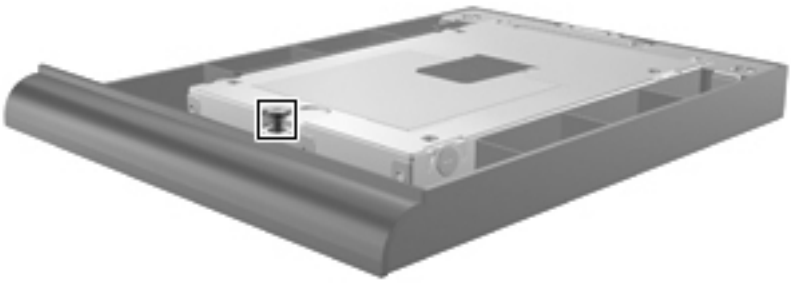
Phillips PM2.5×11.0 captive screw



Color	Quantity	Length	Thread	Head diameter
Black	2	11.0 mm	2.5 mm	5.0 mm

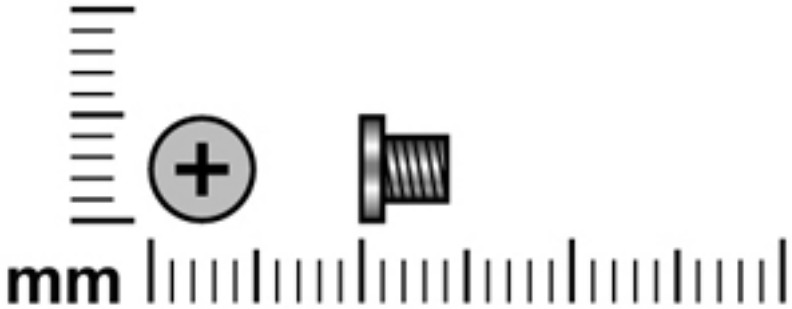


Where used: One captive screw that secures the hard drive to the computer (screw is secured by a C-clip)

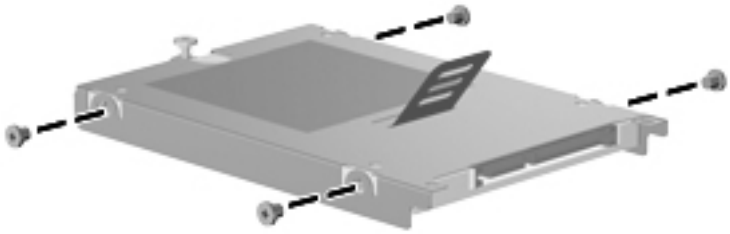


Where used: One captive screw that secures the hard drive to the upgrade bay cradle (screw is secured by a C-clip)

Phillips PM3.0×4.0 screw

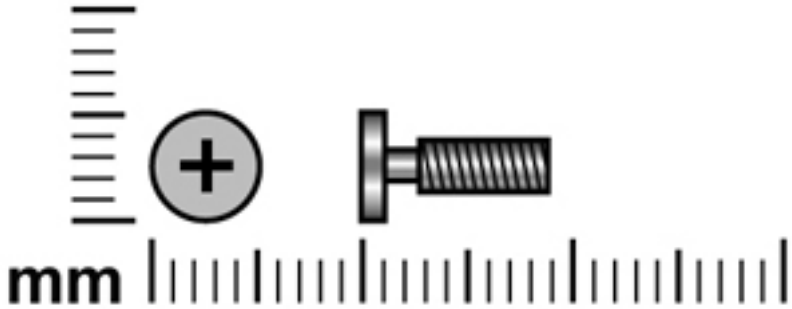


Color	Quantity	Length	Thread	Head diameter
Silver	4	4.0 mm	3.0 mm	5.0 mm

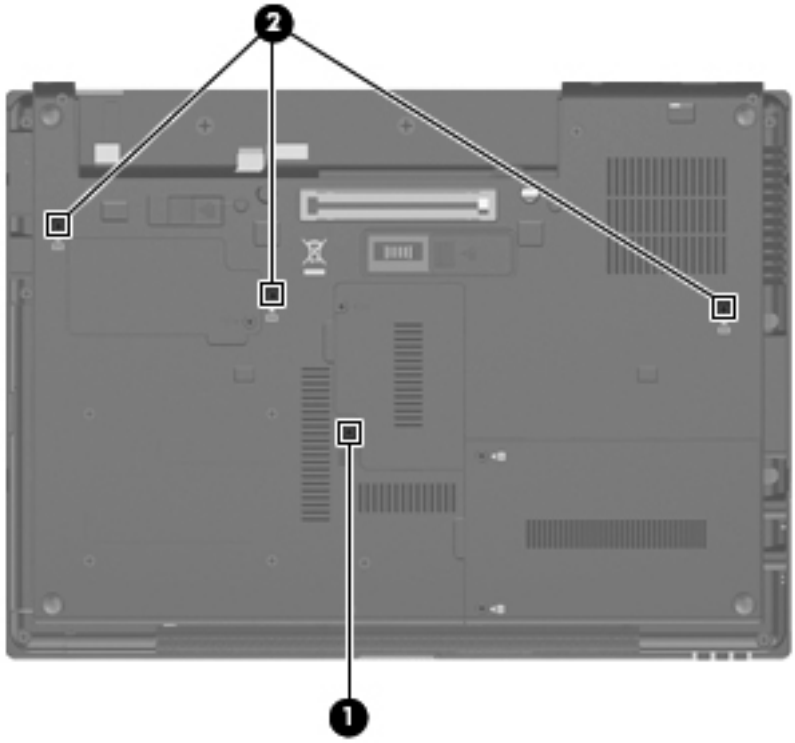


Where used: 4 screws that secure the hard drive bracket to the hard drive

Phillips 2.5×9.0 captive screw



Color	Quantity	Length	Thread	Head diameter
Black	4	9.0 mm	2.5 mm	5.0 mm



Where used:

(1) One captive screw that secures the optical drive or upgrade bay device to the computer (screw is secured by a C-clip)

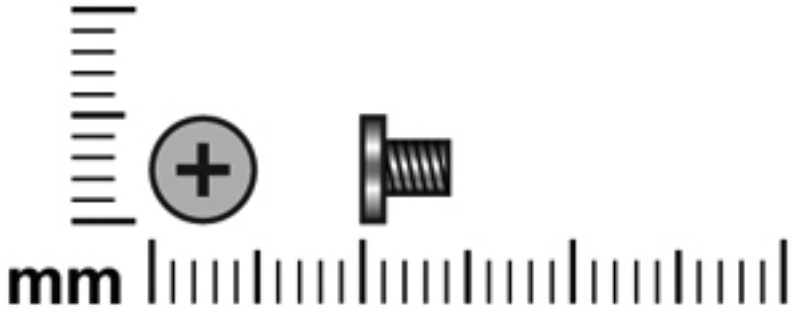
(2) Three captive screws that secure the keyboard to the computer (screws are secured by C-clips)

Phillips PM2.0×3.0 screw

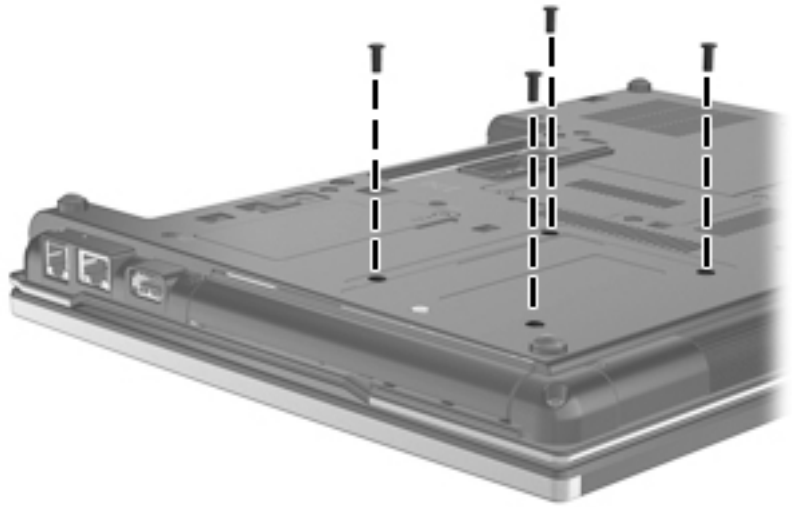
Color	Quantity	Length	Thread	Head diameter
Silver	2	3.0 mm	2.0 mm	4.5 mm

Where used: 2 screws that secure the optical drive bracket to the optical drive

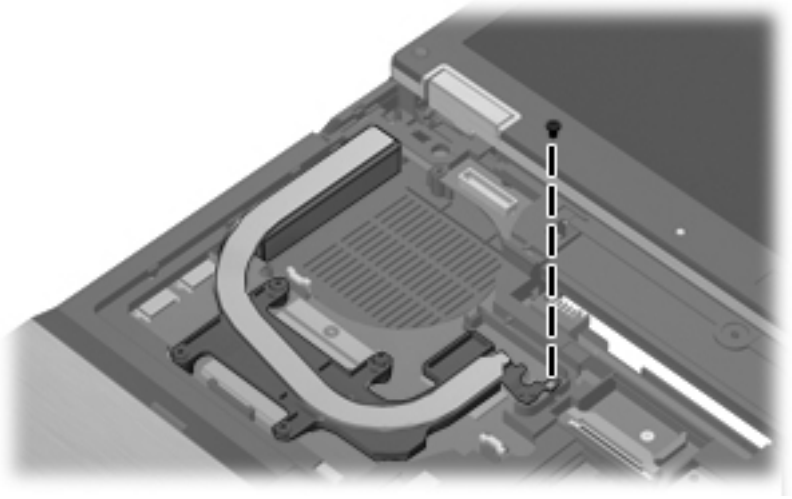
Phillips PM2.5×4.0 screw



Color	Quantity	Length	Thread	Head diameter
Black	5	4.0 mm	2.5 mm	5.0 mm

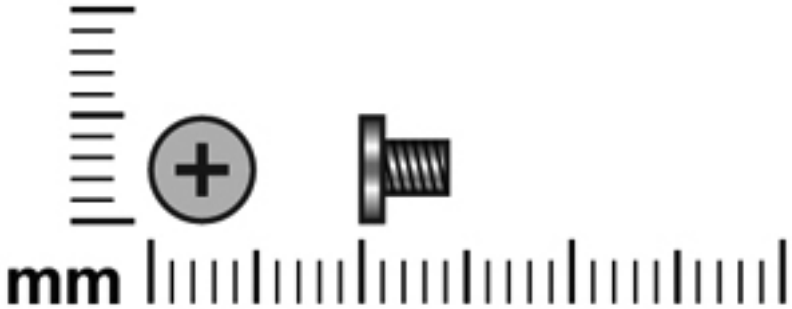


Where used: 4 screws that secure the upgrade bay device to the computer

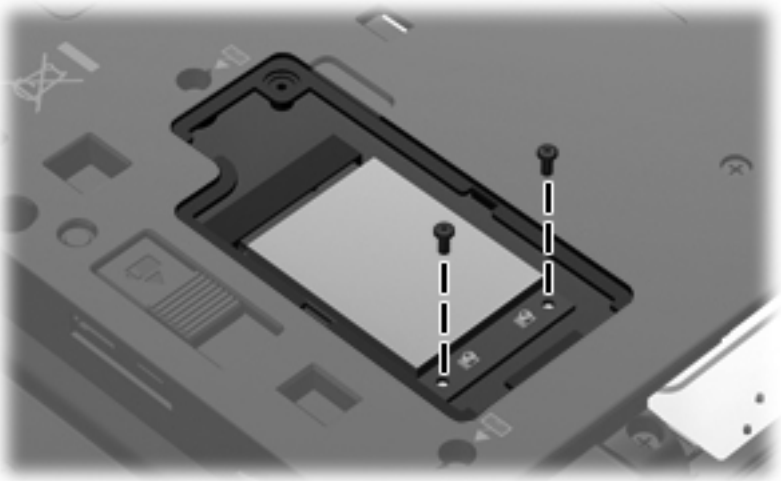


Where used: One screw that secures the heat sink to the system board on computer models equipped with discrete graphics subsystem memory

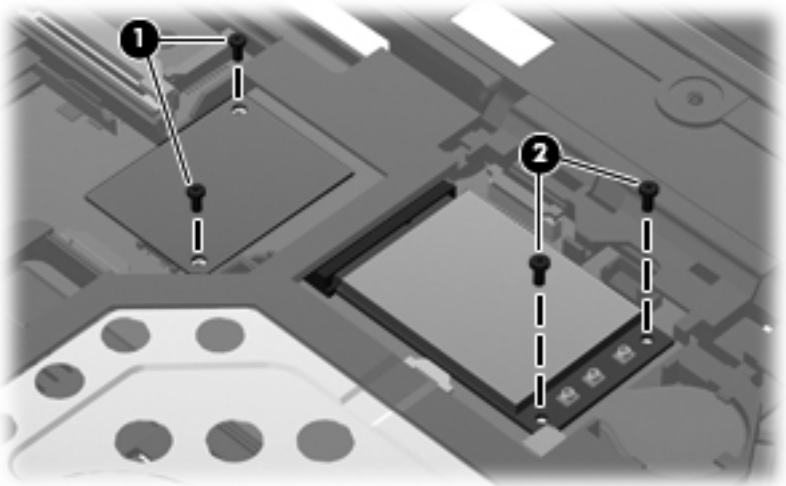
Phillips PM2.5×4.0 screw



Color	Quantity	Length	Thread	Head diameter
Silver	19	4.0 mm	2.5 mm	5.0 mm



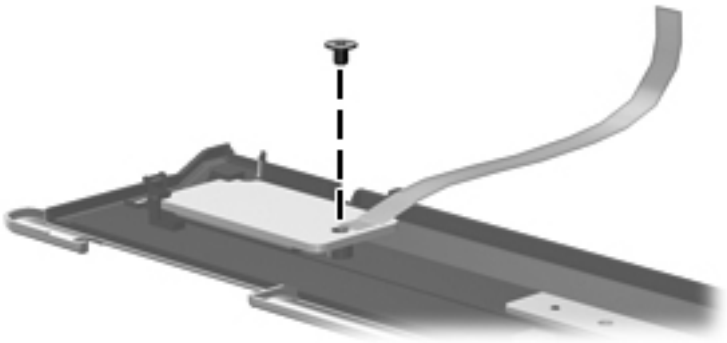
Where used: 2 screws that secure the WWAN module to the system board



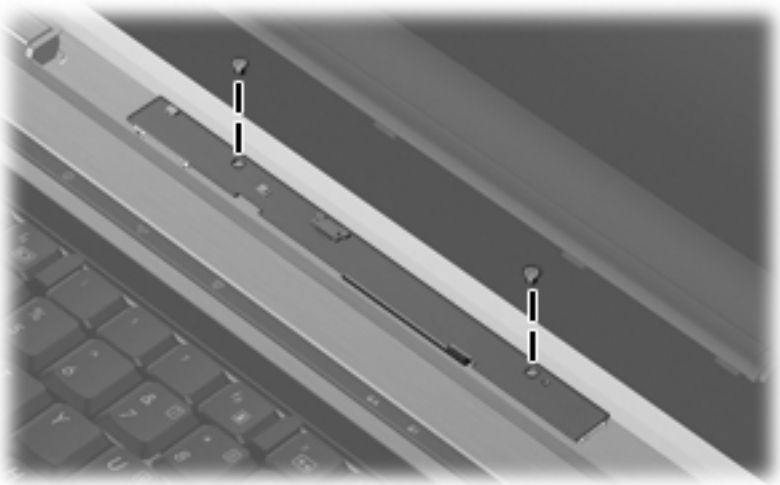
Where used:

(1) Two screws that secure the modem module to the system board

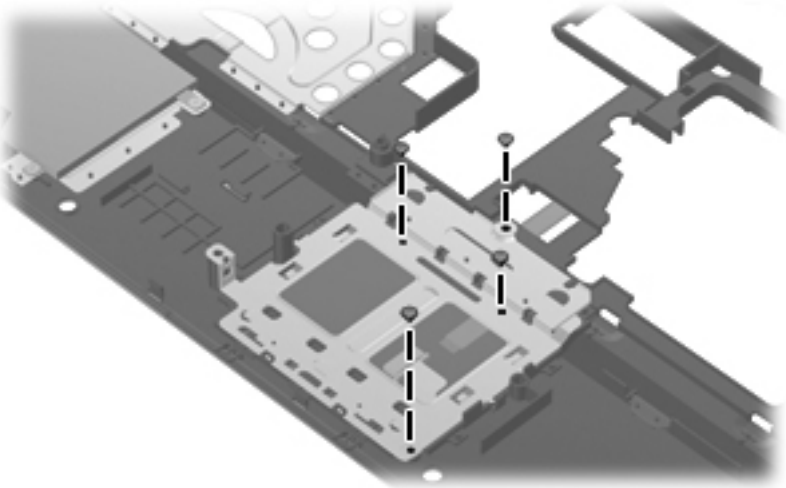
(2) Two screws that secure the WLAN module to the system board



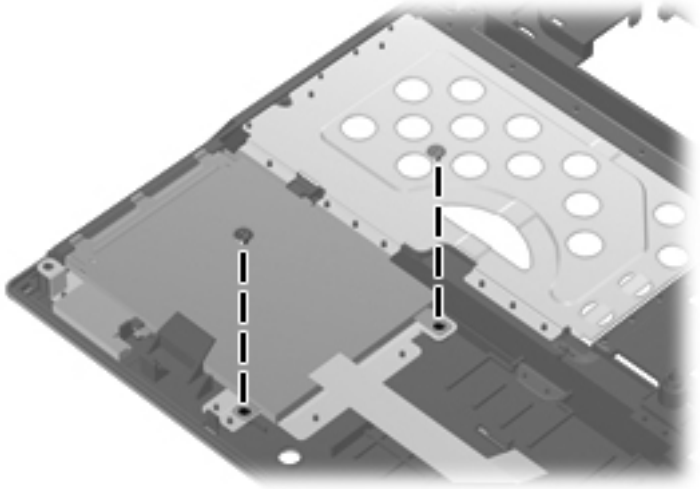
Where used: One screw that secures the power button board to the switch cover



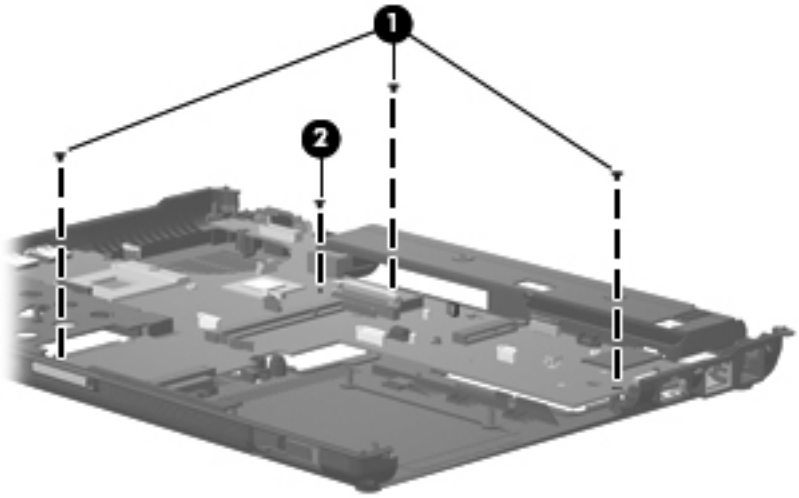
Where used: 2 screws that secure the display inverter to the display enclosure



Where used: 4 screws that secure the TouchPad bracket to the top cover



Where used: 2 screws that secure the audio/ExpressCard assembly to the top cover

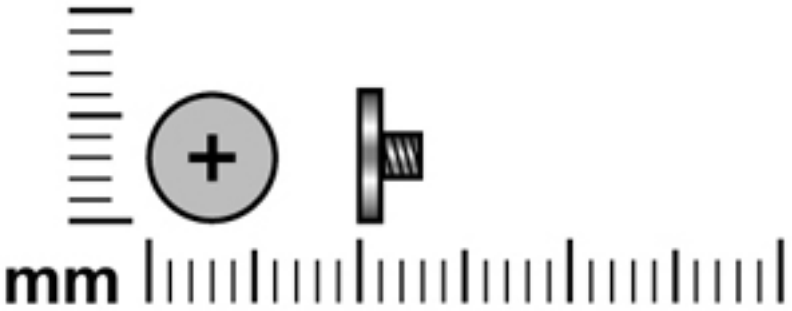


Where used:

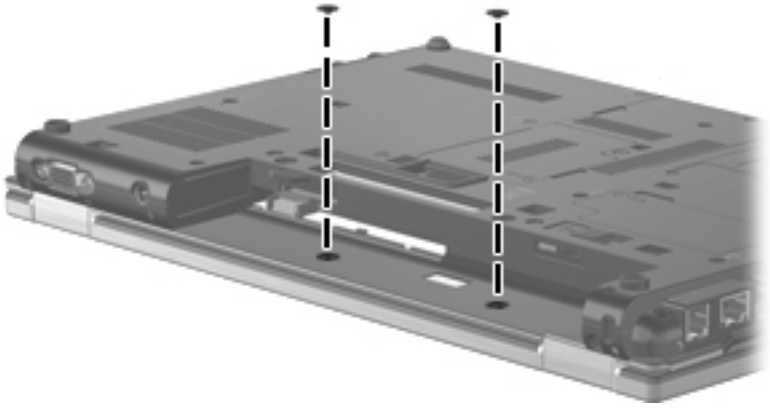
(1) Three screws that secure the system board to the base enclosure on all computer models

(2) One screw that secures the system board to the base enclosure on computer models equipped with UMA graphics subsystem memory

Phillips PM2.0×3.0 broad-head screw

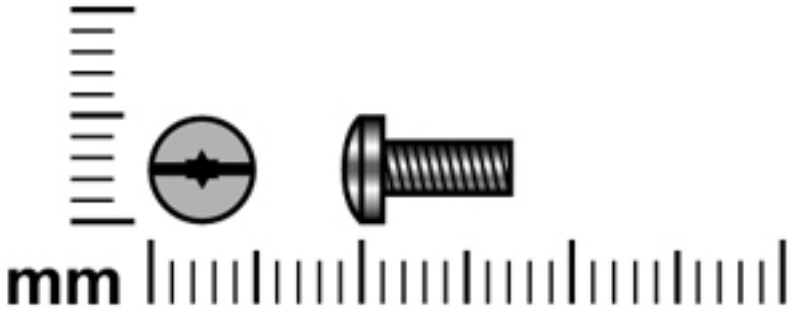


Color	Quantity	Length	Thread	Head diameter
Black	2	3.0 mm	2.0 mm	6.0 mm

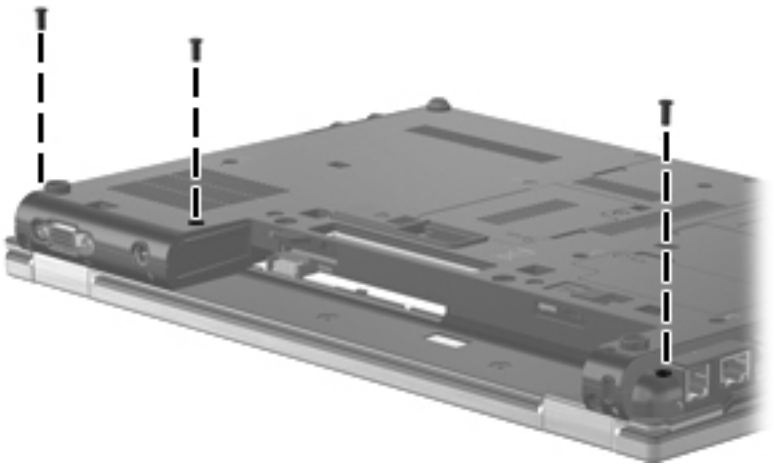


Where used: 2 screws that secure the switch cover to the computer

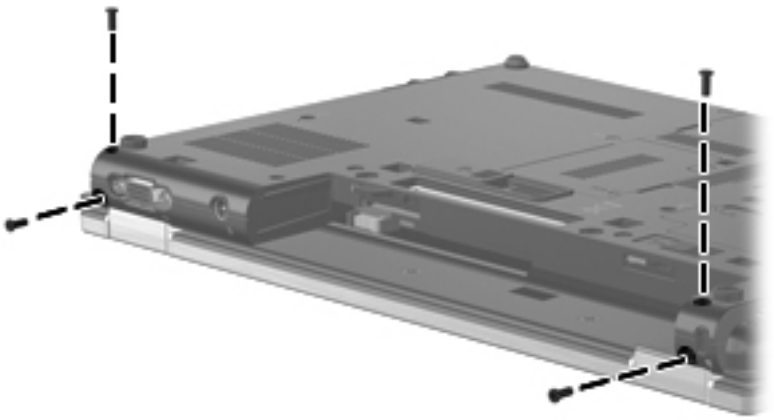
Torx8 T8M2.5×7.0 screw



Color	Quantity	Length	Thread	Head diameter
Black	17	7.0 mm	2.5 mm	5.0 mm

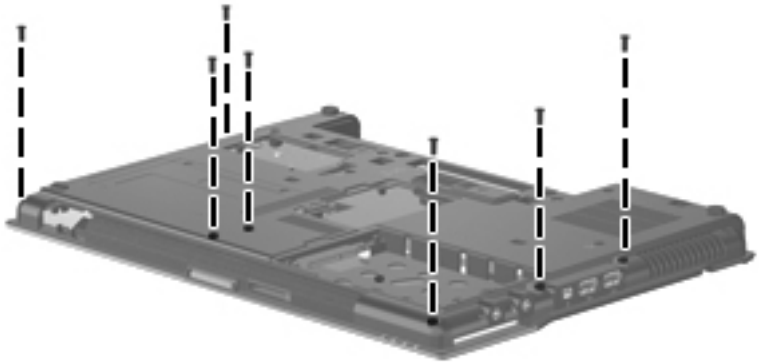


Where used: 3 screws that secure the switch cover to the computer

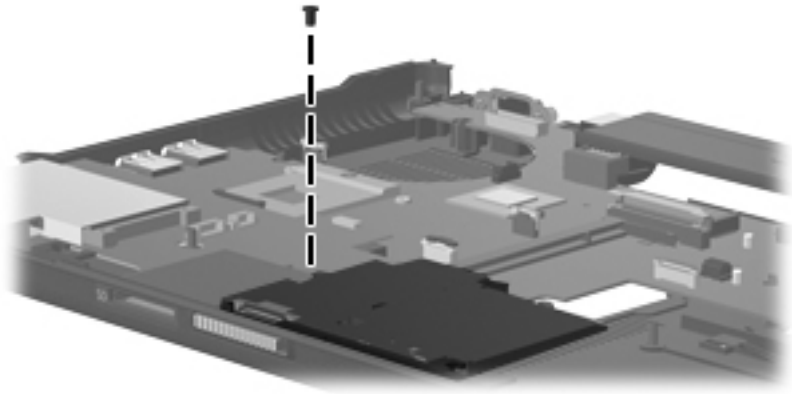


Where used: 4 screws that secure the display assembly to the computer

Where used: 2 screws that secure the display assembly to the computer

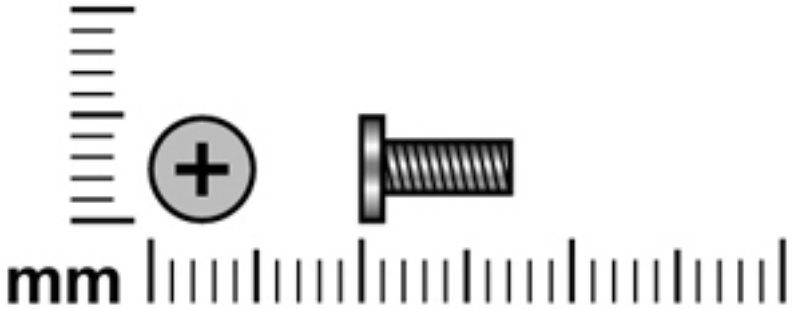


Where used: 7 screws that secure the top cover to the base enclosure

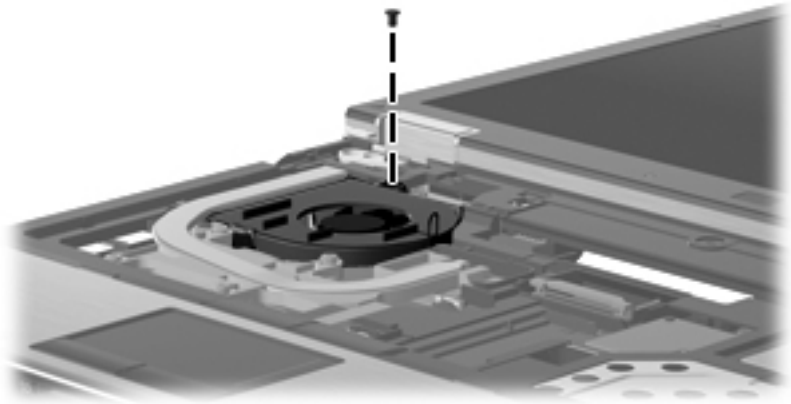


Where used: One screw that secures the speaker to the base enclosure

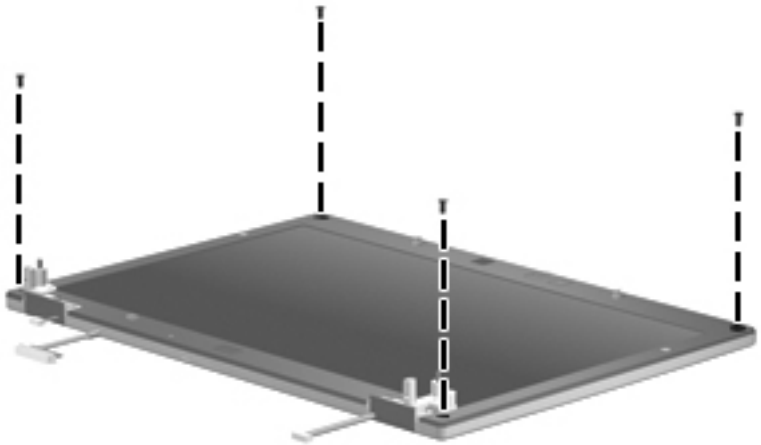
Phillips PM2.5×7.0 screw



Color	Quantity	Length	Thread	Head diameter
Black	7	7.0 mm	2.5 mm	5.0 mm



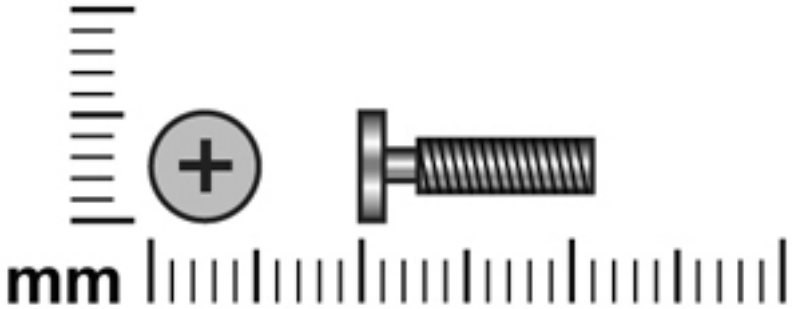
Where used: One screw that secures the fan to the base enclosure



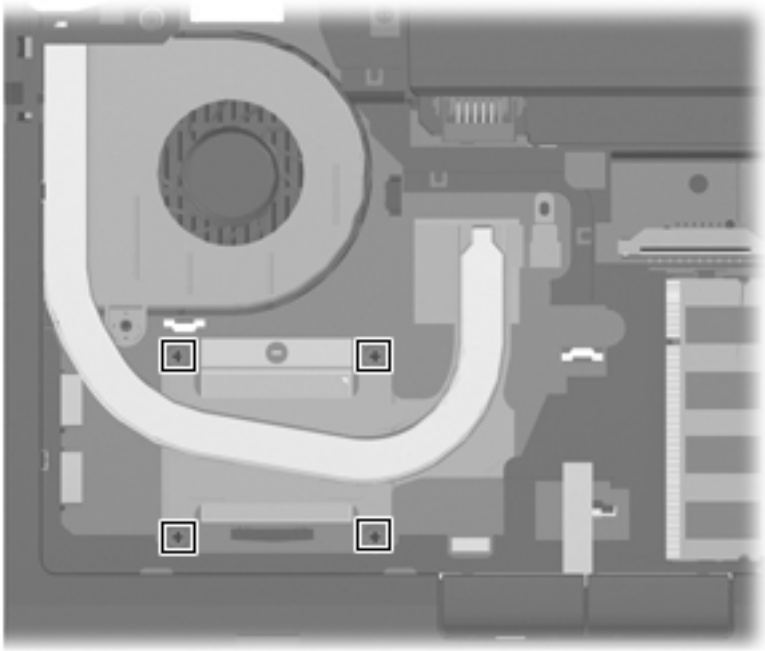
Where used: 4 screws that secure the display bezel to the display enclosure

Where used: 2 screws that secure the hinges to the display enclosure

Phillips PM2.5×11.0 captive screw

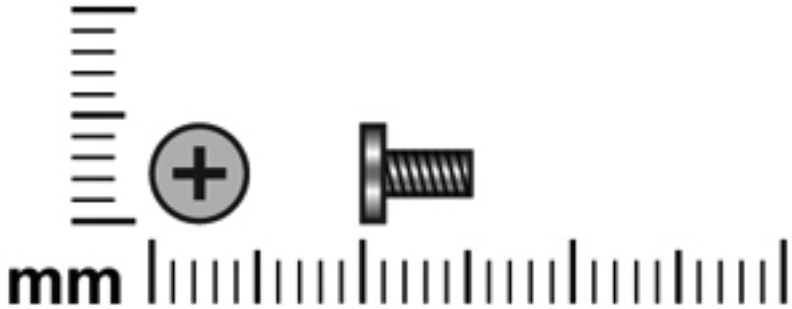


Color	Quantity	Length	Thread	Head diameter
Silver	4	11.0 mm	2.5 mm	5.0 mm

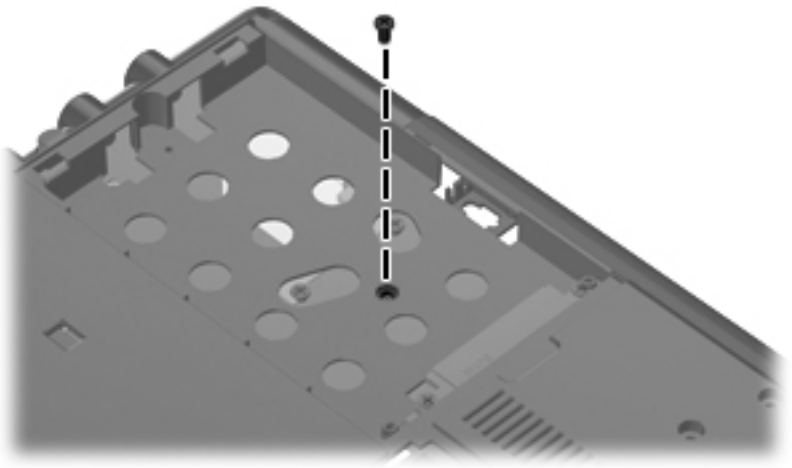


Where used: 4 captive screws that secure the heat sink to the system board (screws are secured by C-clips)

Phillips PM2.0×5.0 screw



Color	Quantity	Length	Thread	Head diameter
Black	1	5.0 mm	2.0 mm	5.0 mm



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

8 Backup and recovery in Windows Vista

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

Overview

To protect your information, the computer provides tools to back up individual files and folders or your entire hard drive. In case of system instability or failure, you can use the backup files to restore the contents of your computer.

When creating backups, HP recommends the following sequence:

1. Create a set of recovery discs of the entire hard drive as soon as possible after you set up your computer.
2. Schedule periodic backups to record changes made to your computer.

In addition to manual backup-and-recovery tools, you can use Windows® System Recovery to automatically back up and restore your information. This feature automatically backs up changes made to your computer daily and also at important milestones, such as when you add a program or driver. Use this tool to restore the computer to a previous state without losing personal files or e-mails. You can also manually set restore points and change restore settings.

Creating recovery discs

After setting up the computer, create a set of recovery discs for the initial backup of the entire hard drive.

NOTE: This process may take over an hour, depending on your computer speed and the amount of data being stored.

The recovery discs are used to start up (boot) the computer and recover the operating system and software to factory settings in case of system failure.

Note the following tips for creating recovery discs:

- Connect the computer to AC power during the process.
- Use any of the following types of discs (purchased separately): CD-R, CD-RW, DVD+R, DVD+R DL, DVD-R, DVD-R DL, or DVD±RW. The discs you use will depend on the type of optical drive installed in your computer.

  NOTE: DVDs and DVDs with double-layer (DL) support store more information than CDs and will reduce the number of recovery discs required.

- Number each disc before inserting it into the optical drive of the computer.

To create a set of recovery discs:

1. Select **Start > All Programs > Maintenance > Backup and Restore Center**.
2. Click **Back up computer**.
3. Follow the on-screen instructions.

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

Backing up your information

After you create the recovery discs for the initial backup of the entire hard drive, you should schedule automatic backups of your files. You should also back up your files before you modify the hardware or software.

Several types of backup are available in the Backup and Restore Center:

- Individual files or folders
- Restore points
- Entire hard drive

Backup tips

- Connect the computer to AC power during the backup process.
- Store personal files in the Documents folder and back them up regularly.
- Back up templates that are stored in their associated programs.
- Save customized settings that appear in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time-saver if you have to reset your preferences.

To create a screen shot:

1. Display the screen you want to save.
2. Copy the screen image:

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

   To copy the entire screen, press fn+prt sc.
3. Open a word-processing document, and then select **Edit > Paste**.

   The screen image is added to the document.
4. Save the document.

Backing up individual files or folders

When you perform a backup of the entire hard drive, you are saving the full factory image, including the Windows operating system, software programs, all personal files and folders, and configuration settings.

You can back up a copy of the entire hard drive to either of the following locations:

- Optional external hard drive
- Optical discs (CDs or DVDs)

NOTE: This process may take over an hour, depending on your computer speed and the amount of data being stored.

To back up your hard drive:

1. Select **Start > All Programs > Maintenance > Backup and Restore Center**.
2. Click **Back up computer**. You will be prompted to select a destination for the backup files.
3. Follow the on-screen instructions.

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

Scheduling an automatic backup

You can schedule automatic backups for the entire system, for recovery points, or for specific files and folders. Backups can be scheduled at specific intervals (daily, weekly, or monthly).

To schedule an automatic backup:

1. Select **Start > All Programs > Maintenance > Backup and Restore Center**.
2. Click **Change settings**.

   The Backup Status and Configuration Window opens.
3. Click **Change backup settings**. You will be prompted to select a destination for the backup files.
4. Follow the on-screen instructions.

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

Creating system restore points

In addition to the manual backup-and-recovery tools, you can use Windows System Recovery to automatically back up and restore your information. This feature automatically creates restore points just before a significant change is made to your system, such as the installation of a program or driver. You can also set manual restore points.

NOTE: The first system restore point is a snapshot of the entire image that is automatically created the first time you perform a backup. Subsequent recovery points make copies of changes made after that time.

HP recommends that you create manual restore points at the following times:

- Before you add or extensively modify software or hardware
- Periodically, whenever the system is performing optimally

NOTE: Recovering to an earlier restore point does not delete data files or e-mails created since that restore point. To create a system restore point:

1. Select **Start > All Programs > Maintenance > Backup and Restore Center**.
2. On the left side of the screen, click **Create a restore point or change settings**.
3. Click **Create**. You will be prompted to name this restore point.
4. Follow the on-screen instructions.

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

Performing a recovery

In case of hard drive failure or system instability, the computer provides tools to recover your files.

You can recover your information using the following methods:

NOTE: Have your backup files available. Some of these methods will prompt you for your backup files stored on recovery discs or on a drive.

- Recovering individual files that you have previously backed up using Backup and Restore Center
- Restoring the computer to a previous state by using system restore points
- Recovering individual files that you have previously backed up or the entire hard drive using f8 recovery tools:

  NOTE: You can use these methods only if the Windows recovery partition has not been deleted.

  - Windows Recovery Environment (WinRE)
  - Recovery Manager
- Recovering the entire hard drive using f11

  NOTE: You can use this method only if the Windows recovery partition has not been deleted.
- Recovering information using an operating system DVD (purchased separately)

Recovering individual files

To recover individual files using the Backup and Restore Center, follow these steps:

1. If possible, back up all personal files.
2. Select **Start > All Programs > Maintenance > Backup and Restore Center**.
3. Click **Restore files**. You will be prompted to select the location of the backup files.
4. Follow the on-screen instructions.

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

Restoring the computer to a previous state

Your computer automatically creates restore points daily (depending on your computer activity) and when you make a major change to the computer, such as adding software or a new driver. If you decide to reverse changes made to the computer, you can revert back to a previous restore point.

NOTE: If you don't like the state of your computer after you restore it, you can also undo the restoration.

To access a restore point:

1. Select **Start > All Programs > Maintenance > Backup and Restore Center**.
2. Click **Restore my computer to an earlier time**. A calendar is displayed to help you find dates associated with your restore points.
3. Select the restore point to revert to.

NOTE: If you do not use your computer every day, some days may not have restore points.

Recovering information using f8 recovery tools

You can recover individual files or the entire hard drive using the recovery discs that you previously created or an optional external hard drive where you have backed up your information.

The following tools will help you recover your information:

- Windows Recovery Environment (WinRE)
- Recovery Manager

NOTE: You can use these recovery methods only if the Windows recovery partition has not been deleted.

Recovering information using Windows Recovery Environment (WinRE)

Windows Recovery Environment (WinRE) can perform a recovery from either an optional external hard drive where you have backed up your information or from recovery discs that you previously created.

△ **CAUTION:** Using Windows Recovery Environment (WinRE) will completely erase hard drive contents and reformat the hard drive. All files you have created and any software installed on the computer will be permanently removed. When reformatting is complete, the recovery process will restore the operating system, as well as the drivers, software, and utilities from the backup used for recovery.

To initiate recovery using WinRE, follow these steps:

NOTE: This process will take several minutes.

1. If possible, back up all personal files.
2. Restart the computer, and then press f8 before the Windows operating system loads.
3. Select **Repair your computer**.

   NOTE: The "Repair your computer" option is displayed only if the Windows recovery partition has not been deleted. If the option is not displayed, refer to the "Recovering information using a Windows Vista operating system DVD (purchased separately)" section.

4. Follow the on-screen instructions.
5. Click **Next**.
6. Select your user name, type your password (if applicable), and then click **OK**.
7. If you are using recovery discs, insert the last disc of the recovery disc backup set.

   NOTE: Inserting the last disc of the backup set confirms the presence of a valid backup. If you insert any other disc, the backup will not be recognized.

   – or –

   If you are using an optional external hard drive, connect it to the computer.

8. Click **Windows Complete PC Restore**.
9. Follow the on-screen instructions.

Recovering information using Recovery Manager

If other methods do not work, you can recover your hard drive (in its factory state) as a last resort:

△ **CAUTION:** Using Recovery Manager will completely erase hard drive contents and reformat the hard drive. All files you have created and any software installed on the computer will be permanently removed. Recovery Manager reinstalls the operating system and HP programs and drivers that were installed at the factory. Software not installed at the factory must be reinstalled.

1. If possible, back up all personal files.
2. Restart the computer, and then press f8 before the Windows operating system loads.
3. Select **Repair your computer**.

   NOTE: The "Repair your computer" option is displayed only if the Windows recovery partition has not been deleted. If the option is not displayed, refer to the "Recovering information using a Windows Vista operating system DVD (purchased separately)" section.

4. Follow the on-screen instructions.
5. Click **Next**.
6. Select your user name, type your password (if applicable), and then click **OK**.
7. Click **HP Recovery Manager**.
8. Follow the on-screen instructions.

Recovering the entire hard drive using f11

You can recover the entire hard drive (in its factory state) from the Windows recovery partition using f11.

△ **CAUTION:** Using f11 will completely erase hard drive contents and reformat the hard drive. All files you have created and any software installed on the computer will be 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.

NOTE: You can use this recovery method only if the Windows recovery partition has not been deleted. To recover the hard drive from the recovery partition, follow these steps:

1. If possible, back up all personal files.
2. 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.
3. Press f11 while the "Press for recovery" message is displayed on the screen.
4. Follow the on-screen instructions.

Recovering information using a Windows Vista operating system DVD (purchased separately)

You can purchase a Windows Vista® operating system DVD to reboot the computer and repair the operating system. During the restore process, you will be prompted for your entire drive backup files. Make sure that your most recent backup of the hard drive (stored on recovery 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 will completely erase hard drive contents and reformat the hard drive. All files you have created and any software installed on the computer will be permanently removed. When reformatting is complete, the recovery process will help you restore the operating system, as well as drivers, software, and utilities.

To initiate recovery using a Windows Vista operating system DVD, follow these steps:

NOTE: This process will take 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.
8. Remove the Windows Vista operating system DVD.
9. If you are using recovery discs, insert the last disc of the recovery disc backup set.

   NOTE: Inserting the last disc of the backup set confirms the presence of a valid backup. If you insert any other disc, the backup will not be recognized.

   – or –

   If you are using an optional external hard drive, connect it to the computer.
10. Click **Windows Complete PC Restore**.
11. Follow the on-screen instructions.

9 Backup and recovery in Windows XP

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

Backing up your information

NOTE: You can recover only the files that you have previously backed up. HP recommends that you use the Windows backup utility to create a hard drive backup as soon as you set up your computer.

With the Windows backup utility, you can perform the following tasks:

- Backing up your information regularly to protect your important system files
- Creating system recovery points that allow you to reverse undesirable changes to your computer by restoring the computer to an earlier state
- Scheduling backups at specific intervals or events

NOTE: The Windows backup utility backs up only data files. The operating system, drivers, and programs are located on the operating system disc and System Recovery disc that are included with the computer.

When to back up

- On a regularly scheduled basis

  NOTE: Set reminders to back up your information periodically.

- Before the computer is repaired or restored
- Before you add or modify hardware or software

Backup suggestions

- Connect the computer to external power before performing backup and recovery procedures.
- Create system recovery points.
- Store personal files in the My Documents folder and back up these folders 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:

1. Display the screen you want to save.
2. Copy the screen image:

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

   To copy the entire screen, press fn+prt sc.
3. Open a word-processing document, click **Edit > Paste**.

   The screen image is added to the document.
4. Save the document.

Backing up individual files or folders

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

NOTE: This process will take several minutes, depending on the file size and the speed of the computer.

To back up individual files or folders:

1. Select **Start > All Programs > Accessories > System Tools > Backup**.

   The Backup or Restore Wizard page opens.
2. Click **Next**.
3. Click **Backup files and settings**, and then click **Next**.
4. Follow the on-screen instructions.

Backing up all files and folders

When you back up all files and folders, you are saving all personal files and folders, all system files, and configuration settings at one time.

NOTE: When you back up all files and folders, this does not include the operating system or programs.

NOTE: This process may take over an hour, depending on your computer speed and the amount of data being stored.

NOTE: A copy of the backup files can be stored on an optional external hard drive or on a network drive.

To back up all files and folders:

1. Select **Start > All Programs > Accessories > System Tools > Backup**.

   The Backup or Restore Wizard page opens.

2. Click **Next**.

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

4. Click **All information on this computer**, and then click **Next**.

5. Follow the on-screen instructions.

Creating recovery points

When you back up system modifications since your last backup, you are creating system recovery points. This allows you to save a snapshot of your hard drive at a specific point in time. You can then recover back to that point if you want to reverse subsequent changes made to your system.

NOTE: The first system recovery point, a snapshot of the entire image, is automatically created the first time you perform a backup. Subsequent recovery points make copies of changes made after that time.

HP recommends that you create recovery points at the following times:

- Before you add or extensively modify software or hardware
- Periodically, whenever the system is performing optimally

NOTE: Recovering to an earlier recovery point does not affect data files or e-mails created since that recovery point.

To create a system recovery point:

1. Select **Start > All Programs > Accessories > System Tools > System Restore**.

   The System Restore window opens.

2. Click **Create a new restore point**, and then click **Next**.

3. Type a short description of the restore point. This will be used as the name of the restore point.

4. Click **Create**.
5. Follow the on-screen instructions.

Scheduling backups

You can schedule backups for the entire system, for recovery points, or for specific files and folders. Backups can be scheduled at specific intervals (daily, weekly, or monthly) or at specific events, such as at system restart or when you log on.

To schedule backups:

1. Select **Start > All Programs > Accessories > System Tools > Schedule Tasks**.

   The Schedule Tasks window opens.

2. Double-click **Add Scheduled Task**, and then click **Next**.
3. Select **Backup** in the Application list, and then click **Next**.
4. Type a name for the backup, select when you want the backup to be performed, and then click **Next**.
5. Enter your user name, password, and password again to confirm. Click **Next**, and then click **Finish**.

Performing a recovery

The Windows backup utility helps you recover important files that you have previously backed up in case of system failure.

NOTE: To recover the operating system and programs, use the operating system disc and System Restore disc that are included with the computer.

Initiating a recovery in Windows

To initiate a recovery in Windows, follow these steps:

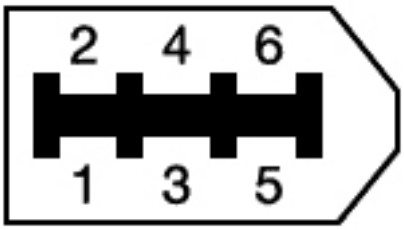
1. If possible, back up all personal files.
2. Select **Start > All Programs > Accessories > System Tools > Backup**.

   The Backup or Restore Wizard page opens.

3. Click **Restore files and settings**, and the click Next.
4. Follow the on-screen instructions.

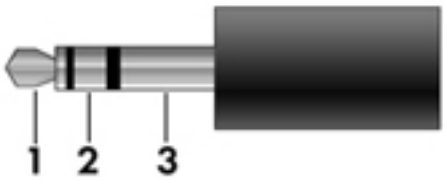
10 Connector pin assignments

1394



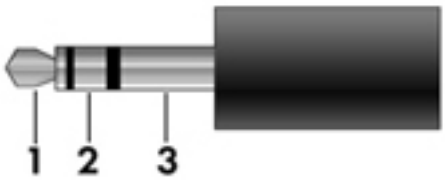
Pin	Assignment
1	Power
2	Ground
3	TPB-
4	TPB+
5	TPA-
6	TPA+

Audio-in (microphone)



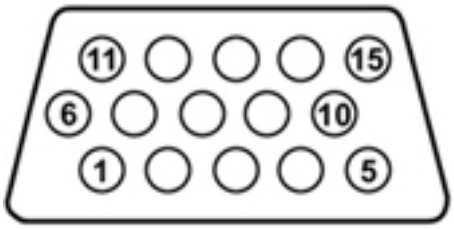
Pin	Signal
1	Audio signal in
2	Audio signal in
3	Ground

Audio-out (headphone)



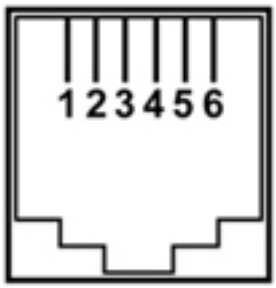
Pin	Signal
1	Audio out, left channel
2	Audio out, right channel
3	Ground

External monitor



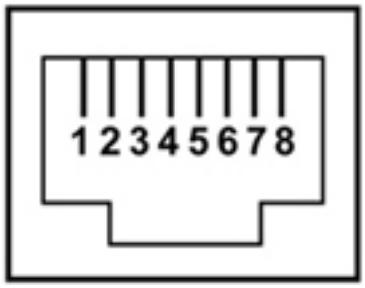
Pin	Signal
1	Red analog
2	Green analog
3	Blue analog
4	Not connected
5	Ground
6	Ground analog
7	Ground analog
8	Ground analog
9	+5 VDC
10	Ground
11	Monitor detect
12	DDC 2B data
13	Horizontal sync
14	Vertical sync
15	DDC 2B clock

RJ-11 (modem)



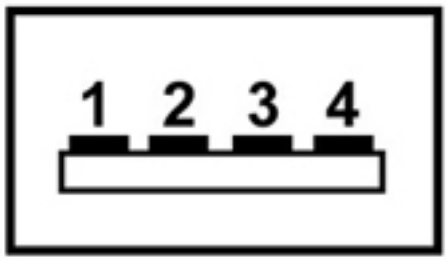
Pin	Signal
1	Unused
2	Tip
3	Ring
4	Unused
5	Unused
6	Unused

RJ-45 (network)



Pin	Signal
1	Transmit +
2	Transmit -
3	Receive +
4	Unused
5	Unused
6	Receive -
7	Unused
8	Unused

Universal Serial Bus



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

11 Power cord set requirements

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

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

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

Requirements for all countries and regions

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

- The length of the power cord set must be at least 1.5 m (5.0 ft) and no more than 2.0 m (6.5 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 amps and a nominal voltage rating of 125 or 250 V AC, as required by the power system of each country or region.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions

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

1. The flexible cord must be Type HO5VV-F, 3-conductor, 1.0-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
2. The flexible cord must be Type SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V) configuration.
3. The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 1.00-mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) configuration.
4. The flexible cord must be Type RVV, 3-conductor, 0.75-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
5. The flexible cord must be Type VCTF, 3-conductor, 0.75-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

12 Recycling

Battery

When a battery has reached the end of its useful life, do not dispose of the battery in general household waste. Follow the local laws and regulations in your area for computer battery disposal.

Display

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

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

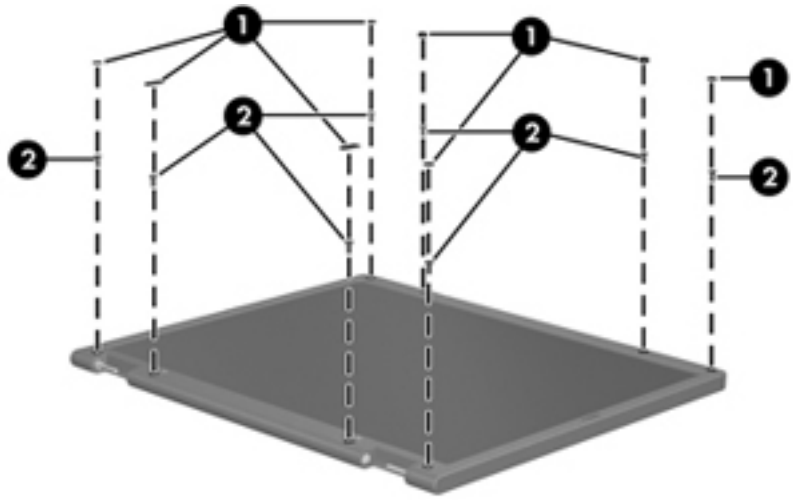
NOTE: **Materials Disposal**. This HP product contains mercury in the backlight in the display assembly that might require special handling at end-of-life. Disposal of mercury may be regulated because of environmental considerations. For disposal or recycling information, contact your local authorities,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

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

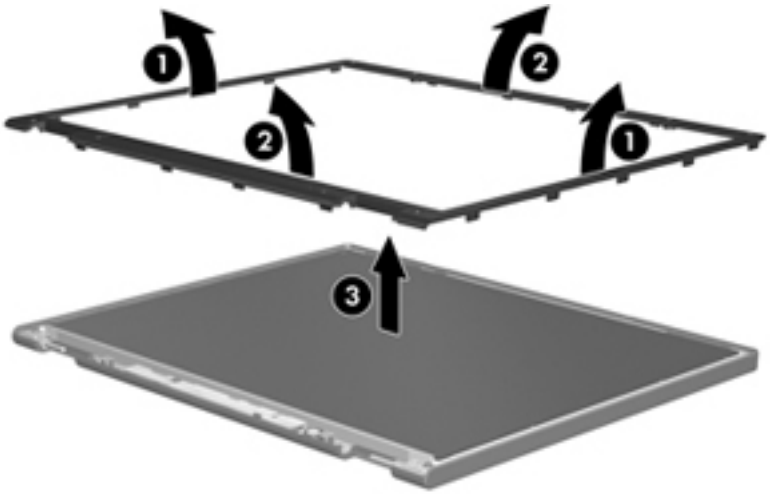
NOTE: The procedures provided in this appendix are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

Perform the following steps to disassemble the display assembly:

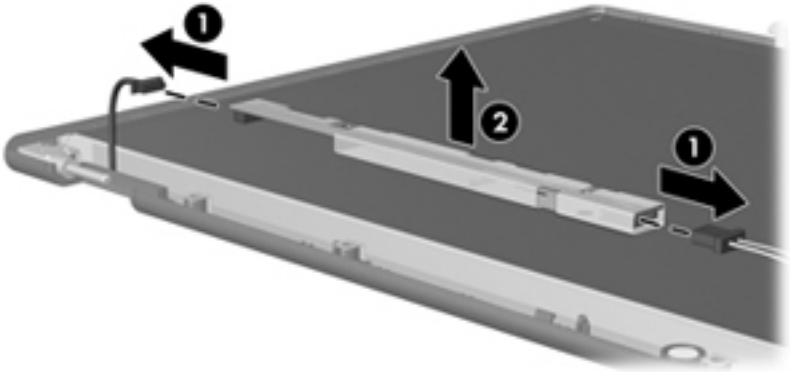
1. Remove all screw covers **(1)** and screws **(2)** that secure the display bezel to the display assembly.



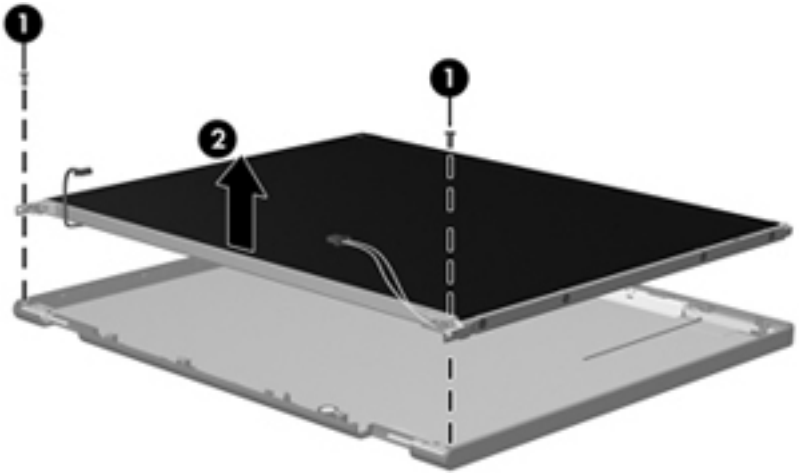
2. Lift up and out on the left and right inside edges **(1)** and the top and bottom inside edges **(2)** of the display bezel until the bezel disengages from the display assembly.
3. Remove the display bezel **(3)**.



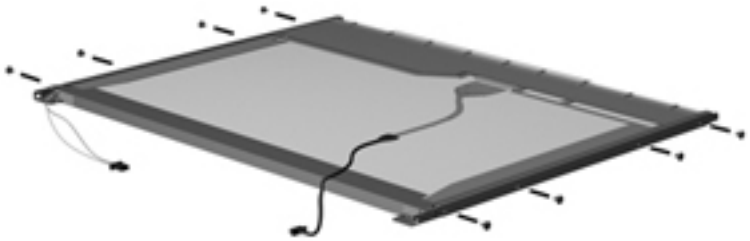
4. Disconnect all display panel cables **(1)** from the display inverter and remove the display inverter **(2)**.



5. Remove all screws **(1)** that secure the display panel assembly to the display enclosure.
6. Remove the display panel assembly **(2)** from the display enclosure.

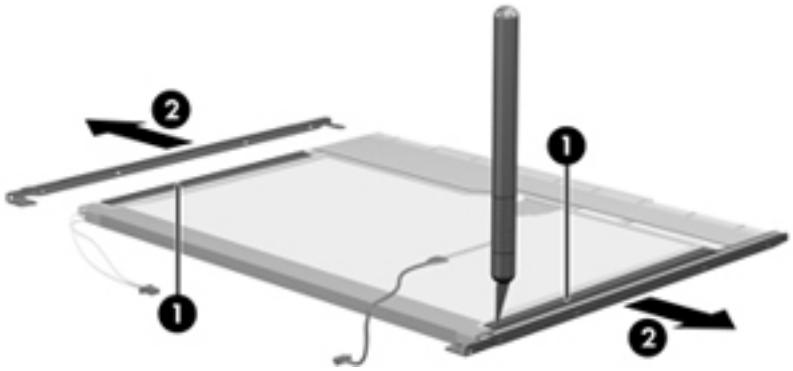


7. Turn the display panel assembly upside down.
8. Remove all screws that secure the display panel frame to the display panel.

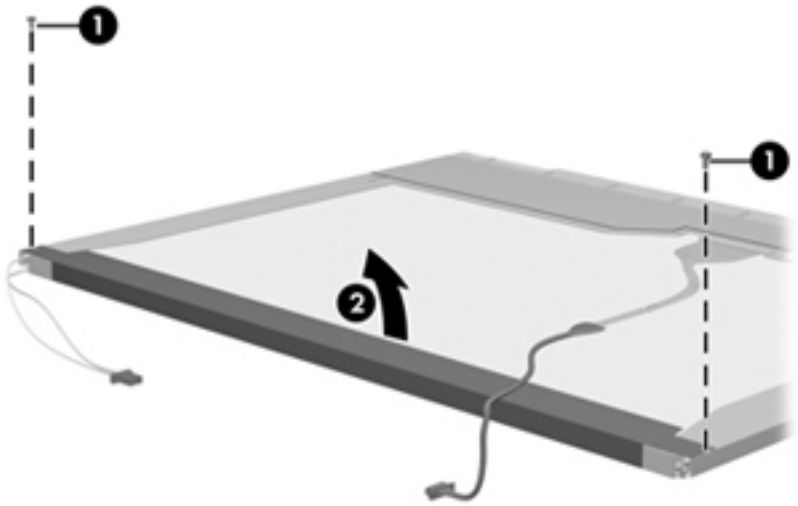


9. Use a sharp-edged tool to cut the tape **(1)** that secures the sides of the display panel to the display panel frame.

10. Remove the display panel frame **(2)** from the display panel.

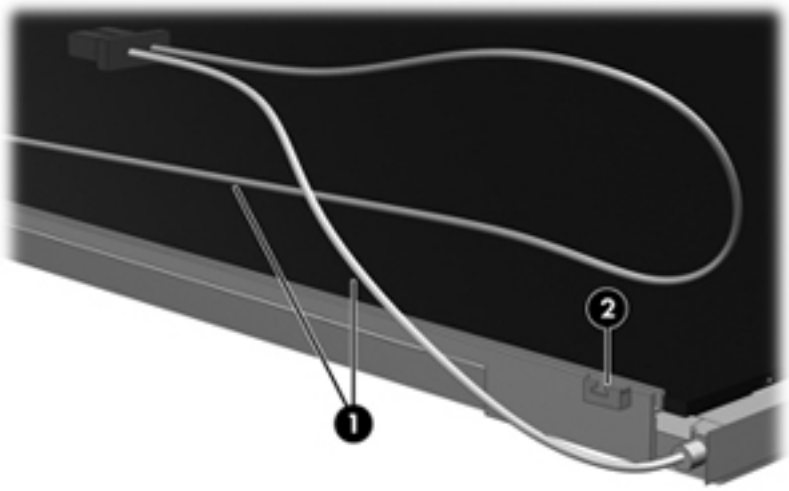


11. Remove the screws **(1)** that secure the backlight cover to the display panel.
12. Lift the top edge of the backlight cover **(2)** and swing it outward.



13. Remove the backlight cover.
14. Turn the display panel right-side up.

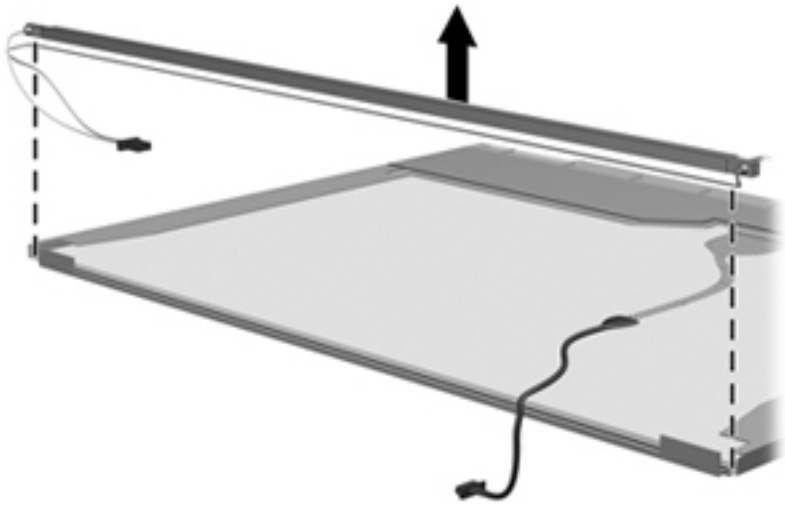
15. Remove the backlight cables **(1)** from the clip **(2)** in the display panel.



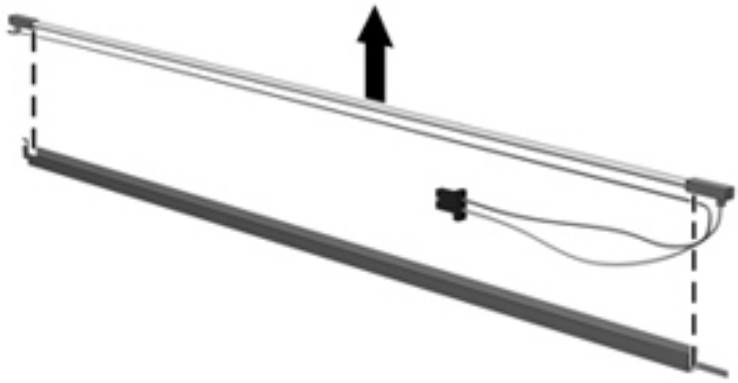
16. Turn the display panel upside down.

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

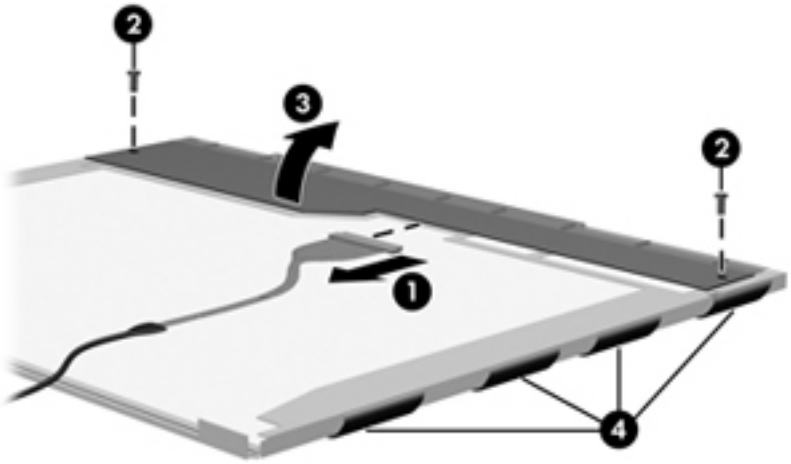
17. Remove the backlight frame from the display panel.



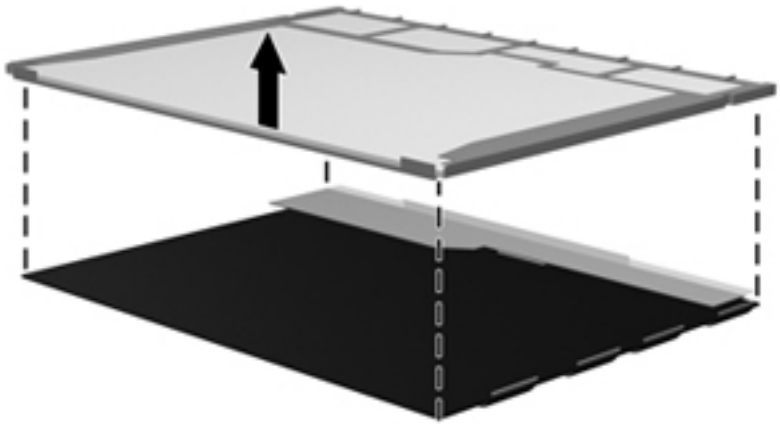
18. Remove the backlight from the backlight frame.



19. Disconnect the display panel cable **(1)** from the LCD panel.
20. Remove the screws **(2)** that secure the LCD panel to the display rear panel.
21. Release the LCD panel **(3)** from the display rear panel.
22. Release the tape **(4)** that secures the LCD panel to the display rear panel.



23. Remove the LCD panel.



24. Recycle the LCD panel and backlight.

Index

Symbols/Numerics

1394 port
  location 18
  pin assignments 152

A

AC adapter, spare part numbers 33
accessory battery connector 19
AHCI (Advanced Host Controller Interface) 107
ambient light sensor 9
antenna
  components 10
  disconnecting 64, 72
  locations 10
  spare part number 23, 36
audio card cable, spare part number 31
audio, product description 4
audio-in jack
  location 18
  pin assignments 153
audio-out jack
  location 18
  pin assignments 153
audio/ExpressCard assembly
  removal 97
  spare part number 28, 35, 97

B

backing up 140
backup
  changes to your system 137
  files and folders 140, 148
  hard drive 140, 147
  modifications made to the system 149
  scheduling 140, 151
base enclosure, spare part number 28, 36
battery
  removal 50
  spare part numbers 28, 36, 50
battery (travel), spare part number 34, 35
battery bay 19
battery light 13, 16
battery release latch 20
BIOS Administrator Password 105
Bluetooth compartment 16
Bluetooth module
  removal 54
  spare part number 29, 38, 54
Bluetooth module cable
  illustrated 31
  removal 95
Bluetooth module compartment cover
  illustrated 30
  removal 54
boot options 107
boot order 107
bottom components 19
built-in device
  Bluetooth device radio 108
  fingerprint reader 108
  modem 108
  Network Interface Controller (LAN) 108
  Wake on LAN 108
  wireless button 108
  WWAN device radio 108
built-in device options 108
button
  info 11
  power 11
  presentation 11
  volume mute 11
  wireless 11
button components 11
buttons
  display release 16
  keyboard light 9

C

Cable Kit
  contents 31
  spare part number 25, 31, 39
cables, service considerations 43
capacitative board, spare part number 39
caps lock light 14
chipset, product description 1
CMOS clearing 47
components
  antenna 10
  bottom 19
  buttons 11
  display 9
  fingerprint reader 11
  front 16
  keys 12
  left-side 18
  lights 13
  pointing device 14
  rear 17
  right-side 17
  switches 11
  top 9
  wireless antenna 10
computer feet
  locations 49
  spare part number 49

Computer Setup
accessing 103
Diagnostics menu 106
File menu 105
navigating and selecting 103
restoring factory settings 104
Security menu 105
System Configuration menu 107
using 103
computer specifications 109
connectors
accessory battery 19
docking 19
service considerations 43
creating recovery points 149

D
device configurations 107
Diagnostics menu 106
Disk Sanitizer 106
diskette drive, precautions 43
display assembly
removal 85
spare part numbers 23, 38, 39, 85
display bezel
removal 88
spare part numbers 23, 39, 88
Display Cable Kit, spare part number 23, 36
display component recycling 159
display components 9
display hinge
removal 89
spare part number 89
Display Hinge Kit, spare part number 23, 36, 89
display inverter
removal 52
spare part number 23, 39, 52
display release button 16
display specifications 110
docking connector 19
drive light 13, 16
DriveLock password 106
DriveLock, automatic 106
drives
boot order 107
preventing damage 43
Dual Core CPU 108
DVD-ROM Drive
precautions 43
removal 59
spare part number 28, 32, 38, 59
specifications 114
DVD/CD-RW Combo Drive
precautions 43
removal 59
spare part number 28, 32, 38, 59
specifications 113
DVD±RW and CD-RW Combo Drive
precautions 43
removal 59
spare part number 28, 32, 38, 59
specifications 112

E
electrostatic discharge 44
esc key 12
Ethernet, product description 5
Execution Disable 107
ExpressCard slot 18
ExpressCard slot bezel, illustrated 30
external media cards, product description 5
external monitor port
location 17
pin assignments 154

F
f11 recovery 145
f8 recovery tools
Recovery Manager 145
Windows Recovery Environment (WinRE) 144
factory state, recovering to 145
fan
removal 77
spare part number 24, 39, 77
feet
locations 49
spare part number 49
fingerprint reader 12
fingerprint reader board
removal 94
spare part number 27, 38, 94
fn key 12
front components 16
function keys 12

G
graphics, product description 2
grounding equipment and methods 46

H
hard disk test 106
hard drive
precautions 43
product description 3
removal 56
spare part numbers 28, 32, 56
specifications 111
hard drive backup 140, 147
hard drive bay 19
hard drive bay cover
illustrated 30
removal 57
hard drive bracket, removal 58
hard drive recovery 138, 151
headphone jack
location 18
pin assignments 153
heat sink
removal 78
spare part numbers 24, 37, 78
hinge
removal 89
spare part number 23, 36, 89
HP QuickLook 108
HP SpareKey Enrollment 106

I
I/O address specifications 117
IDE (Integrated Drive Electronics) 107
info button 11
internal display switch 11

interrupt specifications 116

J
jacks
audio-in 18
audio-out 18
headphone 18
microphone 18
modem 17
network 17
RJ-11 17
RJ-45 17

K
key components 12
keyboard
product description 6
removal 65
spare part numbers 23, 36, 65
keyboard light 9
keyboard light button 9
keyboard shield
removal 75
keypad keys 12
keys
esc 12
fn 12
function 12
keypad 12
Windows applications 12
Windows logo 12

L
LAN Power Save 107
language, changing in Computer Setup 107
left-side components 18
legacy support, USB 103, 107
light components 13
lights
battery 13, 16
caps lock 14
drive 13, 16
keyboard 9
num lock 14
power 13, 16
volume down 14
volume mute 14
volume up 14
webcam 9
wireless 13, 16
Logo Kit, spare part number 23, 40

M
manual restore points 141
mass storage devices, spare part numbers 32
memory map specifications 119
memory module
product description 2
removal 62, 67
spare part numbers 25, 29, 41, 62, 67
memory module compartment 19
memory module compartment cover
illustrated 30
removal 62
microphone 9
microphone jack
location 18
pin assignments 153
model name 1
modem jack
location 17
pin assignments 155
modem module
product description 4
removal 69
spare part numbers 25, 35, 69
modem module cable
illustrated 31
removal 98
monitor port
location 17
pin assignments 154

N
network jack
location 17
pin assignments 155
num lock light 14

O
operating system, product description 7
optical drive
precautions 43
product description 4
removal 59
spare part numbers 28, 32, 59
specifications 112, 113, 114

P
packing guidelines 45
panels, product description 2
parallel port mode 107
password clearing 47
passwords 105
pin assignments
1394 port 152
audio-in jack 153
audio-out jack 153
external monitor port 154
headphone jack 153
microphone jack 153
modem jack 155
monitor port 154
network jack 155
RJ-11 155
RJ-45 jack 155
Universal Serial Bus (USB) port 156
plastic parts 42
Plastics Kit
contents 30
spare part number 25, 30, 39
pointing device components 14
pointing devices, product description 6
pointing stick 14
pointing stick button 14
pointing stick rubber caps, spare part number 24, 38, 65
port options
1394 port 108
flash media reader 108
parallel port 108
serial port 108
USB port 108
ports
1394 18
external monitor 17
monitor 17
product description 5
USB 17, 18
power button 11

power button board
removal 76
spare part number 23, 36, 76
power connector 17
power cord
set requirements 157
spare part numbers 33, 39
power light 13, 16
power requirements, product description 6
presentation button 11
processor
product description 1
removal 83
spare part numbers 25, 40, 83
product description
audio 4
chipset 1
Ethernet 5
external media cards 5
graphics 2
hard drives 3
keyboard 6
memory module 2
modem module 4
operating system 7
optical drives 4
panels 2
pointing devices 6
ports 5
power requirements 6
processors 1
product name 1
security 7
serviceability 8
upgrade bay 4
video 4
wireless 5
product name 1

R

RAID (Redundant Array of Independent Disks) 107
rear components 17
recovering to factory state 145
recovery discs, creating 138
Recovery Manager 145
recovery methods
Backup and Restore Center 138
Recovery Manager 145
Windows Recovery Environment (WinRE) 144
Windows Vista operating system DVD 146
recovery partition 142
recovery points 149
removal/replacement
preliminaries 42
procedures 48
restore points 143
restore security defaults 108
restoring the factory settings 104
right-side components 17
RJ-11 jack
location 17
pin assignments 155
RJ-45 jack
location 17
pin assignments 155
RTC battery
removal 73
spare part number 27, 36, 73
Rubber Kit, spare part number 28, 36
run-in test 106

S

scheduling backups 151
Screw Kit
contents 120
spare part number 34, 38
screw listing 120
SD card reader 16
Secondary Battery Fast Charge 108
security cable slot 17
Security menu
Automatic DriveLock 106
change password 106
Disk Sanitizer 106
DriveLock 106
fingerprint reader reset 105
HP SpareKey 105
password policy 105
System IDs 106
user management 105
security, product description 7
serial number 21
service considerations 42
service tag 48
serviceability, product description 8
set security level 108
SIM slot 20
SIM, removal 51
smart card reader 17
solid-state drive, spare part number 29, 32, 38, 41, 56
speaker
removal 96
spare part number 28, 38, 96
speakers 16
specifications
computer 109
display 110
DVD-ROM Drive 114
DVD/CD-RW Combo Drive 113
DVD±RW and CD-RW Combo Drive 112
hard drive 111
I/O addresses 117
interrupts 116
memory map 119
optical drive 112, 113, 114
system DMA 115
start-up test 106
static-shielding materials 46
switch components 11
switch cover
removal 74
spare part number 23, 38, 74
system backup 137, 147
system board
removal 100
spare part numbers 28, 38, 100
System Configuration menu 107
System Diagnostics menu 106
system DMA 115
system fan 107
system IDs 106
system information 105
system memory map 119
system points 143
system recovery points 149

T

thermal material, replacement 80, 82
tools required 42
top components 9
top cover
  removal 90
  spare part number 27, 38, 41, 90
TouchPad
  location 14
  spare part number 27, 38
TouchPad board
  removal 92
  spare part number 92
TouchPad bracket, removal 93
TouchPad button 14, 15
TouchPad button board
  removal 92
  spare part number 92
TouchPad scroll zone 14
transporting guidelines 45
travel battery, spare part number 34, 35
TXT (Intel Trusted Execution Technology) 108

U

unknown password 47
upgrade bay 17
upgrade bay device
  removal 60
  spare part number 60
upgrade bay device cradle
  spare part number 28, 32, 40, 41
upgrade bay, product description 4
USB legacy support 103, 107
USB port
  location 17, 18
  pin assignments 156
using automatic restore points 141

V

vents 18, 19
video, product description 4
Virtualization Technology 108
volume down light 14
volume mute button 11
volume mute light 14
volume scroll zone 12
volume up light 14

W

webcam
  location 9
  spare part number 23, 38
webcam light 9
Windows applications key 12
Windows logo key 12
Windows Recovery Environment (WinRE) 144
Windows Vista operating system DVD 146
wireless antenna
  components 10
  disconnecting 64, 72
  locations 10
  spare part number 23, 36
Wireless Antenna Kit, spare part number 23, 36
wireless button 11
wireless light 13, 16
wireless, product description 5
WLAN module
  removal 70
  spare part numbers 25, 35, 38, 70
workstation guidelines 45
WWAN module
  removal 63
  spare part number 29, 38, 63
WWAN module compartment 19
WWAN module compartment cover
  illustrated 30
  removal 63