

HP Pavilion dv3 Entertainment PC

Maintenance and Service Guide



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Safety warning notice

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

1 Product description

2 External component identification

Top components	4
Display components	4
Buttons and fingerprint reader (select models only)	5
Keys	6
Lights	8
TouchPad	9
Front components	10
Right-side components	10
Left-side components	11
Bottom components	12

3 Illustrated parts catalog

Serial number location	13
Computer major components	14
Display assembly components	17
Plastics Kit	19
Mass storage devices	20
Miscellaneous parts	21
Sequential part number listing	22

4 Removal and replacement procedures

Preliminary replacement requirements	24
Tools required	24
Service considerations	24
Plastic parts	24
Cables and connectors	25
Drive handling	25
Grounding guidelines	26
Electrostatic discharge damage	26
Packaging and transporting guidelines	27

Workstation guidelines	27
Equipment guidelines	28
Unknown user password	29
Component replacement procedures	30
Serial number	30
Computer feet	31
Battery	32
WLAN module	33
Optical drive	35
Memory module	36
Hard drive	38
Keyboard and switch cover	40
Display assembly	43
Top cover	49
Fingerprint reader board	51
System board	52
Speakers	54
Bluetooth module	55
RTC battery	57
Fan/heat sink assembly	58
Processor	60

5 Setup Utility

Starting the Setup Utility	62
Changing the language of the Setup Utility	62
Navigating and selecting in the Setup Utility	63
Displaying system information	63
Restoring default settings in the Setup Utility	63
Exiting the Setup Utility	64
Setup Utility menus	64
Main menu	64
Security menu	64
System Configuration menu	65
Diagnostics menu	65

6 Specifications

Computer specifications	66
13.3-inch, WXGA, BrightView display specifications	67
Hard drive specifications	68
DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive specifications	69
System DMA specifications	70
System memory map specifications	70
System interrupt specifications	71

System I/O address specifications	72
7 Screw listing	
Phillips PM2.0×2.0 broadhead screw	74
Phillips PM2.0×3.0 captive screw	75
Phillips PM2.0×4.0 screw	76
Phillips PM2.0×8.0 captive screw	77
Phillips PM2.5×4.0 screw	78
Phillips PM2.5×5.0 screw	80
Phillips PM2.5×6.0 captive screw	82
Phillips PM2.5×7.0 screw	83
8 Backup and recovery	
Recovering system information	85
Creating recovery discs	85
Backing up your information	86
When to back up	86
Backup suggestions	86
Using system restore points	87
When to create restore points	87
Create a system restore point	87
Restore to a previous date and time	87
Performing a recovery	88
Recovering from the recovery discs	88
Recovering from the dedicated recovery partition (select models only)	88
9 Connector pin assignments	
Audio-in (microphone)	90
Audio-out (headphone)	90
External monitor	90
RJ-11 (modem)	92
RJ-45 (network)	92
Universal Serial Bus	93
10 Power cord set requirements	
Requirements for all countries or regions	94
Requirements for specific countries or regions	95
11 Recycling	
Battery	96
Display	96

1 Product description

Category	Description
Product Name	HP Pavilion dv3 Entertainment PC
Processors	AMD Turion™ Ultra Dual-Core ZM-86 2.40-GHz processor (35W, 2-MB L2 cache) AMD Turion Ultra Dual-Core ZM-84 2.30-GHz processor (35W, 2-MB L2 cache) AMD Turion Ultra Dual-Core ZM-82 2.20-GHz processor (35W, 2-MB L2 cache) AMD Turion Dual-Core RM-74 2.20-GHz processor (35W, 1-MB L2 cache) AMD Turion Dual-Core RM-72 2.10-GHz processor (35W, 1-MB L2 cache) AMD Athlon™ X2 Dual-Core QL-64 2.10-GHz processor (35W, 1-MB L2 cache) AMD Athlon™ X2 Dual-Core QL-62 2.00-GHz processor (35W, 1-MB L2 cache)
Chipset	Southbridge: SB700
Graphics	ATI Radeon HD 3200 Graphics
Panel	13.3-inch, WXGA with BrightView
Memory	2 SODIMM slots Customer-accessible/upgradable Supports up to 8 GB of system RAM Support for DDR2 dual-channel 800-MHz Support for: <ul style="list-style-type: none">• 8192 MB total system memory (4096 × 2)• 4096 MB total system memory (2048 × 2)• 2048 MB total system memory (1024 × 2)• 1024 MB total system memory (1024 × 1, 512 × 2)
Hard drives	Support for 9.5-mm, 2.5-inch hard drives Support for HP ProtectSmart Hard Drive Protection Support for solid state drive (SDD) Serial ATA

Category	Description
	Support for the following drives: <ul style="list-style-type: none"> • 500-GB, 5400-rpm • 400-GB, 5400-rpm • 320-GB, 5400-rpm • 250-GB, 5400-rpm • 160-GB, 5400-rpm
Optical drives	MultiBay II
	Serial ATA
	9.5-mm tray-load or slot-load
	Support for: <ul style="list-style-type: none"> • DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive
Camera	Low-light VGA camera with activity light
	Fixed (no tilt)
Microphone	Dual-array digital microphones
Audio	HP-branded Altec Lansing speakers
Ethernet	Integrated 10/100/1000 network interface card (NIC)
	Ethernet cable not included
Wireless	Integrated wireless local area network (WLAN) options by way of wireless module:
	Broadcom 4322AGN 802.11a/b/g/n
	Broadcom 802.11b/g
External media cards	Secure Digital (SD) Memory Card, MultiMediaCard (MMC), Memory Stick (MS), Memory Stick Pro (MSP), xD-Picture Card (XD)
	Support for miniature versions of SD, MMC, and MS Duo with adapter (adapter is not included)
	ExpressCard slot
Ports	Audio-in (stereo microphone)
	Audio-out (stereo headphone)
	Consumer infrared
	Extended serial advanced technology (eSATA)
	High Definition Multimedia Interface (HDMI) version 1.3 supporting 1080p with High-bandwidth Digital Content Protection (HDCP) key
	RJ-45 (Ethernet, includes link and activity lights)
	USB (2)
	VGA (Dsub, 15-pin) supporting 1600 × 1200 external resolution @ 75 Hz, hot plug/unplug, and autodetect for correct output to wide-aspect vs. standard-aspect video
	2-pin, 65-W AC power

Category	Description
Docking	No docking
Keyboard/pointing devices	33.80-cm (13.3-inch) keyboard
	TouchPad
	2-way scroll
	Taps enabled as default
Power requirements	<ul style="list-style-type: none"> • 9-cell, 83-Wh, 2.55-Ah Li-ion battery • 6-cell, 55-Wh, 2.55-Ah Li-ion battery
	65-W HP Smart Adapter with localized cable plug support (2-wire plug with ground pin, supports 2-pin DC connector)
Security	Security cable slot
	Fingerprint reader with Digital Persona software support
Operating system	Preinstalled:
	Windows Vista® Business (32-bit)
	Windows Vista Ultimate (64-bit)
	Windows Vista Premium (32-bit and 64-bit)
Serviceability	End-user replaceable parts:
	AC adapter
	Battery (system)
	Hard drive
	Memory module
	Optical drive

2 External component identification

Top components

Display components



Component	Description
(1) Wireless antennae (2)*	Send and receive wireless signals to communicate with WLANs.
(2) Internal microphones (2)	Record sound.
(3) Webcam light	On: The webcam is in use.
(4) Webcam	Records audio and video and captures still photographs.

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

Buttons and fingerprint reader (select models only)

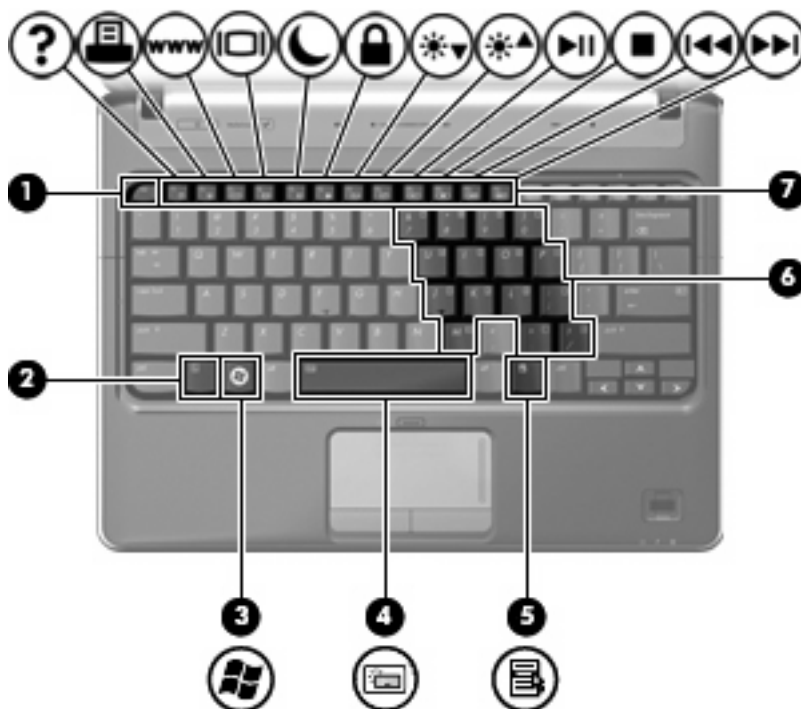


Component	Description
(1) Power button*	<ul style="list-style-type: none"> When the computer is off, press the button to turn on the computer. When the computer is on, press the button briefly to initiate Sleep. When the computer is in the Sleep state, press the button briefly to exit Sleep. When the computer is in Hibernation, press the button briefly to exit Hibernation. <p>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.</p> <p>To learn more about your power settings, select Start > Control Panel > System and Maintenance > Power Options.</p>
(2) MediaSmart button	Launches HP MediaSmart when the computer is on.
(3) Eject button	Ejects the CD, DVD, or BD.
(4) Volume mute button	Mutes and restores speaker sound.
(5) Volume scroll zone	Adjusts speaker volume. Slide your finger to the left to decrease volume and to the right to increase volume. You can also tap the minus (-) sign on the scroll zone to decrease volume, or tap the plus (+) sign on the scroll zone to increase volume.

Component	Description
(6) Previous/rewind button	<ul style="list-style-type: none"> Plays the previous track or chapter when the button is pressed once. Rewinds media when the button is pressed in combination with the fn key.
(7) Play/pause button	Plays or pauses media.
(8) Next/fast forward button	<ul style="list-style-type: none"> Plays the next track or chapter when the button is pressed once. Fast forwards media when pressed in combination with the fn key.
(9) Stop button	Stops playback.
(10) Wireless button	Turns the wireless feature on or off but does not create a wireless connection. NOTE: To establish a wireless connection, a wireless network must already be set up.
(11) Fingerprint reader (select models only)	Allows a fingerprint logon to Windows, instead of a password logon.

*This table describes factory settings. For information about changing factory settings, refer to the user guides located in Help and Support.

Keys



Component	Description
(1) esc key	Displays system information when pressed in combination with the fn key.

Component	Description
(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) Spacebar	Turns the keyboard lights on and off when pressed in combination with the fn key (select models only).
(5) Windows applications key	Displays a shortcut menu for items beneath the pointer.
(6) Embedded numeric keypad keys	Can be used like the keys on an external numeric keypad.
(7) Function keys	Execute frequently used system functions when pressed in combination with the fn key.

Lights

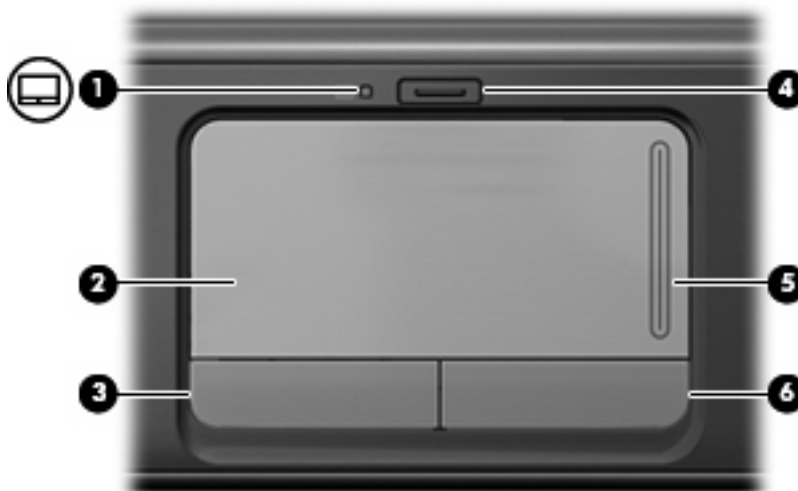


Component	Description
(1) Caps lock light	On: Caps lock is on.
(2) Power lights (2)*	<ul style="list-style-type: none"> On: The computer is on. Blinking: The computer is in the Sleep state. Off: The computer is off or in Hibernation.
(3) Volume mute light	<ul style="list-style-type: none"> White: Computer sound is on. Amber: Computer sound is off.
(4) Volume down light	On: The volume scroll zone is being used to decrease speaker volume.
(5) Volume up light	On: The volume scroll zone is being used to increase speaker volume.
(6) Num lock light	On: Num lock is on or the embedded numeric keypad is enabled.
(7) Wireless light	<ul style="list-style-type: none"> On: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on. Off: All wireless devices are off.

Component	Description
(8) Battery light	<ul style="list-style-type: none"> On: A battery is charging. Blinking: 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 is turned 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.
(9) Drive light	Blinking: The hard drive or optical drive is being accessed.

*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.

TouchPad



Component	Description
(1) TouchPad light	<ul style="list-style-type: none"> White: TouchPad is enabled. Amber: TouchPad is disabled.
(2) TouchPad*	Moves the pointer and selects or activates items on the screen.
(3) Left TouchPad button*	Functions like the left button on an external mouse.
(4) TouchPad on/off button	Enables/disables the TouchPad.
(5) TouchPad scroll zone	Scrolls up or down.
(6) Right TouchPad button*	Functions like the right button on an external mouse.

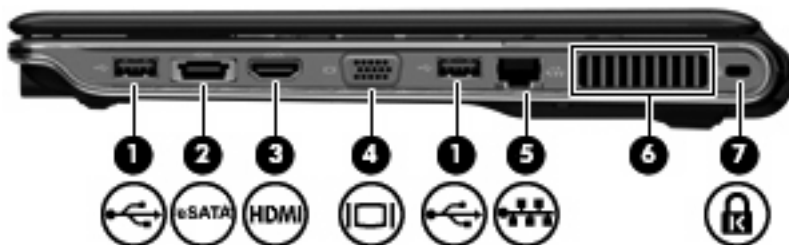
*This table describes factory settings. To view and change pointing device preferences, select **Start > Control Panel > Hardware and Sound > Mouse**.

Front components



Component	Description
(1) Speakers (2)	Produce sound.
(2) Consumer infrared lens	Receives a signal from the remote control (provided with select models only).
(3) Audio-out (headphone) jack	Produce sound when connected to optional powered stereo speakers, headphones, ear buds, a headset, or television audio.
(4) Audio-in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.
(5) Digital Media Slot	Supports the following digital card formats: <ul style="list-style-type: none"> • Memory Stick (MS) • Memory Stick Pro (MSP) • MultiMediaCard (MMC) • Secure Digital (SD) Memory Card • Secure Digital High Capacity (SDHC) Memory Card • xD-Picture Card (XD) • xD-Picture Card (XD) Type H • xD-Picture Card (XD) Type M
(6) Digital Media Slot light	On: The Digital Media Slot is in use.


Right-side components

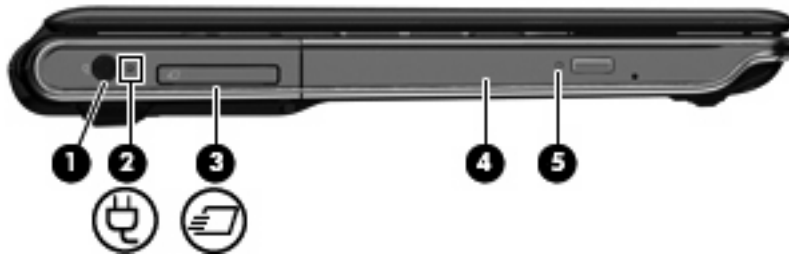


Component	Description
(1) USB ports (2)	Connect optional USB devices.
(2) eSATA/USB port	Connects a high-performance eSATA component, such as an eSATA external hard drive, or connects an optional USB device.

Component	Description
(3) HDMI port (select models only)	Connects an optional video or audio device, such as a high-definition television, or any compatible digital or audio component. NOTE: Depending on your computer model, the computer may include an HDMI port or a USB port at this location.
(4) External monitor port	Connects an external VGA monitor or projector.
(5) RJ-45 (network) jack	Connects a network cable.
(6) 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.
(7) 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.

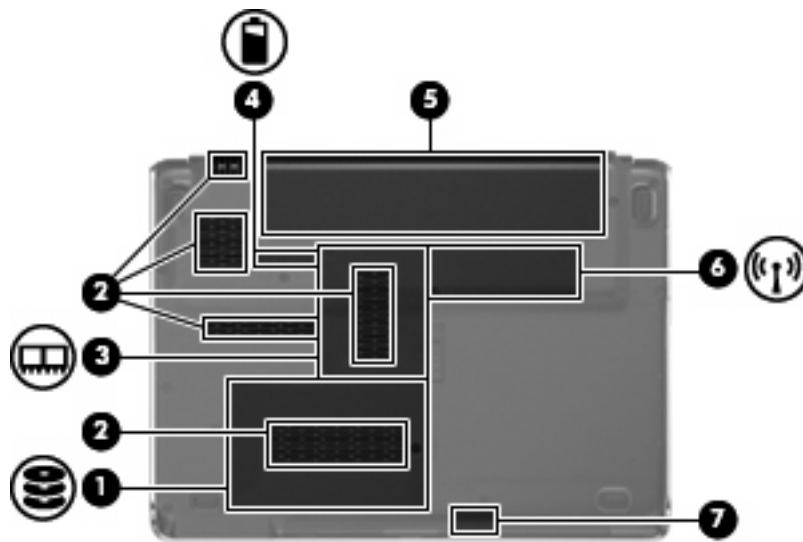
Left-side components

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



Component	Description
(1) Power connector	Connects an AC adapter.
(2) AC adapter light	<ul style="list-style-type: none"> On: The computer is connected to external power. Off: The computer is not connected to external power.
(3) ExpressCard slot	Supports an optional ExpressCard/34 module.
(4) Optical drive	Reads optical discs and, on select models, also writes to optical discs.
(5) Optical drive light	Blinking: The optical drive is being accessed.

Bottom components

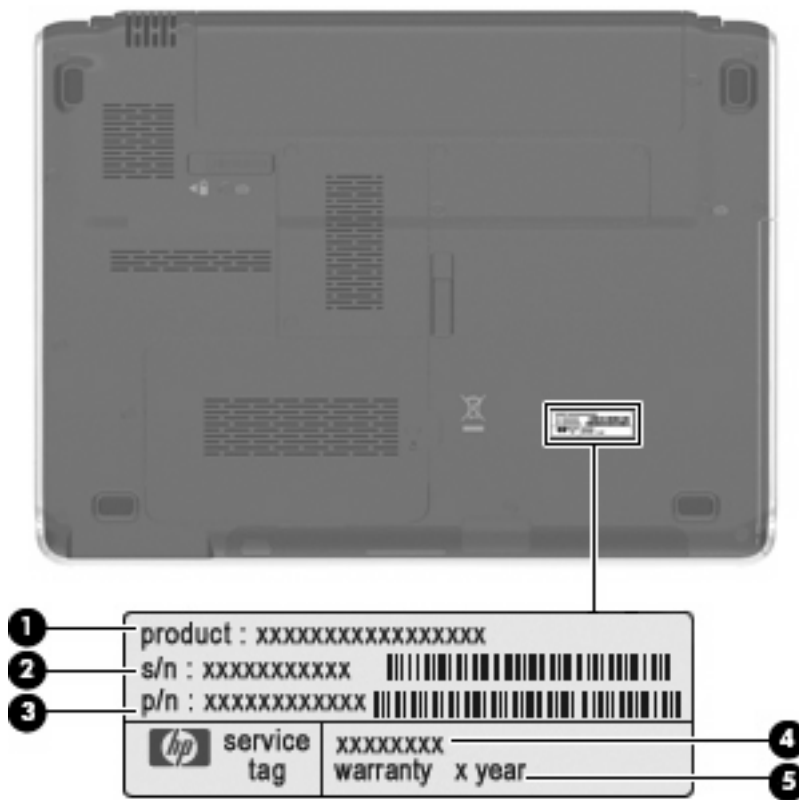


Component	Description
(1) Hard drive bay	Holds the hard drive.
(2) Vents (5)	Enable airflow to cool internal components. NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(3) Memory module compartment	Contains the memory module slots.
(4) Battery release latch	Releases the battery from the battery bay.
(5) Battery bay	Holds the battery.
(6) Wireless module compartment	Holds a wireless LAN module. NOTE: To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore computer functionality, and then contact technical support through Help and Support.
(7) Bluetooth compartment	Contains a Bluetooth device.

3 Illustrated parts catalog

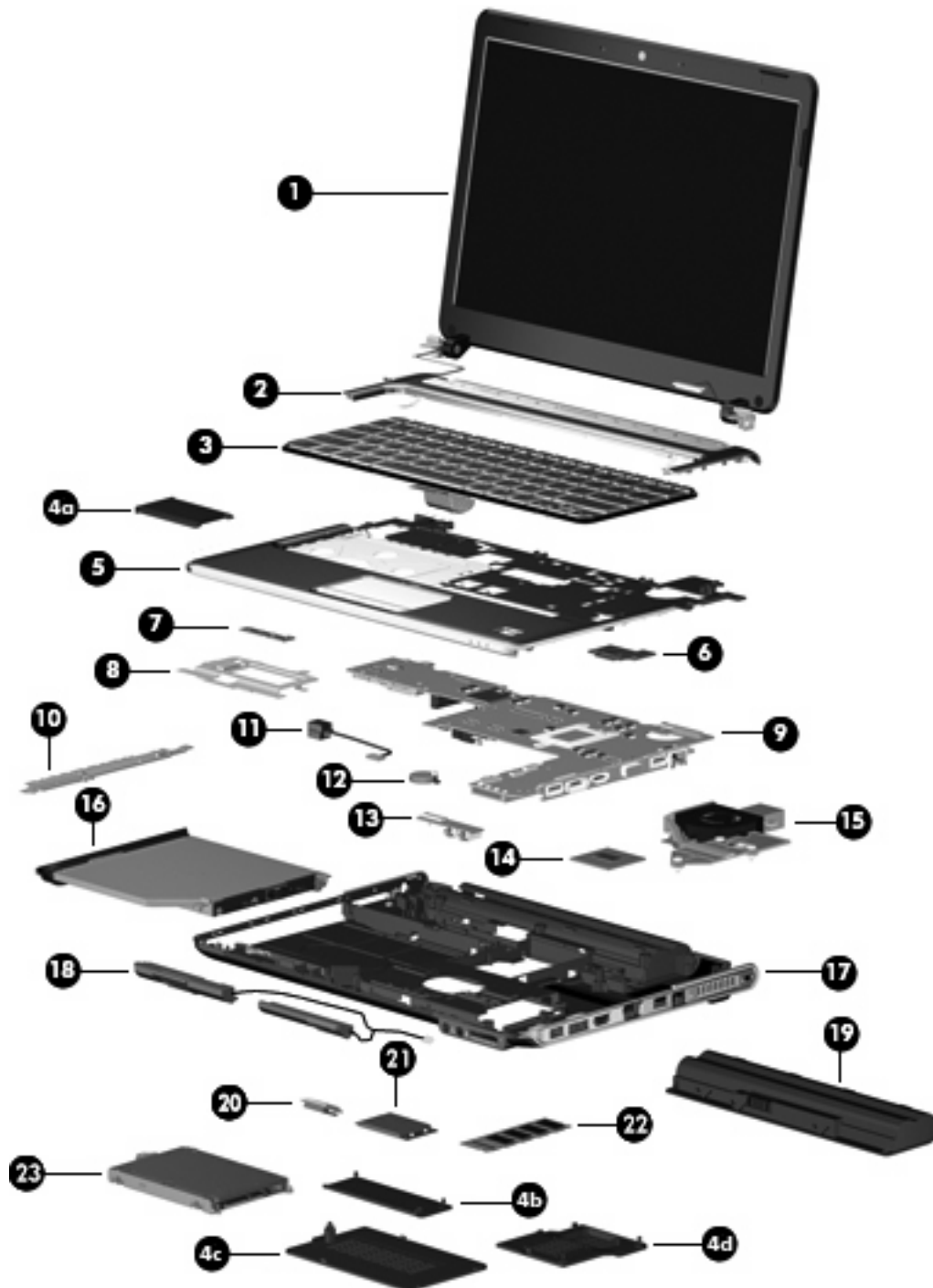
Serial number location

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



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

Computer major components

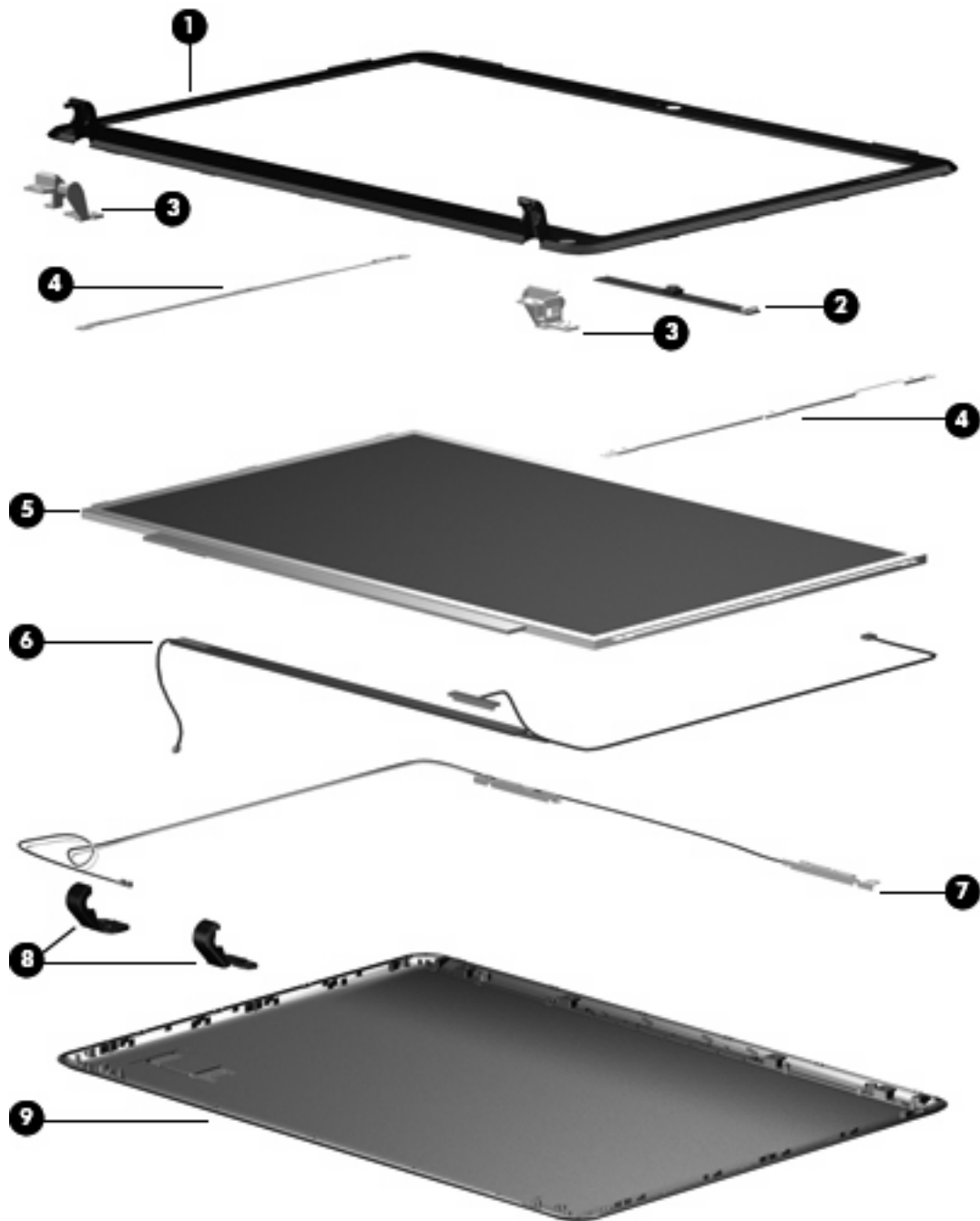


Item	Description	Spare part number
(1)	13.3-inch, WXGA BrightView display assembly (includes camera/microphone module, camera/microphone module cable, 2 microphones, and 2 wireless antenna transceivers and cables)	506155-001
(2)	Switch cover (includes: power button board and cable, LED board and cable)	506240-001

Item	Description	Spare part number
(3)	Keyboard	
	For use in Canada	507091-121
	For use in the United States	507091-001
	For use in the United States (with backlight)	507092-001
	Plastics Kit (see Plastics Kit on page 19 for more information)	506953-001
(4a)	ExpressCard slot bezel	
(4b)	Wireless module compartment cover	
(4c)	Hard drive cover	
(4d)	Memory module compartment cover	
(5)	Top cover (includes TouchPad and cable, fingerprint reader board cable, and caps lock LED board and cable)	506241-001
(6)	Fingerprint reader board (includes fingerprint reader board cable, not illustrated)	506962-001
(7)	TouchPad on/off button board	506957-001
(8)	TouchPad bracket	507885-001
(9)	System board (includes replacement thermal material and power connector cable)	506147-001
(10)	LED bracket	507886-001
(11)	Power connector	507094-001
(12)	RTC battery	486835-001
(13)	Audio board (includes audio board cable, not illustrated)	507093-001
(14)	Processor (includes replacement thermal material)	
	AMD Turion Ultra Dual-Core ZM-86 2.40-GHz processor (35W, 2-MB L2 cache)	506148-001
	AMD Turion Ultra Dual-Core ZM-84 2.30-GHz processor (35W, 2-MB L2 cache)	506149-001
	AMD Turion Ultra Dual-Core ZM-82 2.20-GHz processor (35W, 2-MB L2 cache)	506150-001
	AMD Turion Dual-Core RM-74 2.20-GHz processor (35W, 1-MB L2 cache)	506151-001
	AMD Turion Dual-Core RM-72 2.10-GHz processor (35W, 1-MB L2 cache)	506152-001
	AMD Athlon X2 Dual-Core QL-64 2.10-GHz processor (35W, 1-MB L2 cache)	506153-001
	AMD Athlon X2 Dual-Core QL-62 2.00-GHz processor (35W, 1-MB L2 cache)	506154-001
(15)	Fan and heat sink (includes heat sink retention clip and replacement thermal material)	506960-001
(16)	Optical drive (includes bezel and bracket)	
	DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive (tray-load)	506234-001
	DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive (slot-load)	506235-001
(17)	Base enclosure (for tray-load optical drive)	506938-001
	Base enclosure (for slot-load optical drive)	506239-001
	Rubber Foot Kit (not illustrated, includes 4 base enclosure rubber feet)	507887-001
(18)	Speakers	506955-001

Item	Description	Spare part number
(19)	Battery	
	9-cell, 83-Wh, 2.55-Ah Li-ion	506238-001
	6-cell, 55-Wh, 2.55-Ah Li-ion	506237-001
(20)	Bluetooth module	398393-002
	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 486847-001.	
(21)	WLAN module	
	Broadcom 802.11b/g WLAN module	459263-001
	Broadcom 4322AGN 802.11a/b/g/n WLAN module	487330-001
(22)	Memory module	
	4096-MB (PC2-6400, 800-MHz, DDR2)	506934-001
	2048-MB (PC2-6400, 800-MHz, DDR2)	506933-001
	1024-MB (PC2-6400, 800-MHz, DDR2)	506932-001
(23)	Hard drive (includes bracket)	
	500-GB, 5400-rpm	506232-001
	400-GB, 5400-rpm	512225-001
	320-GB, 5400-rpm	506231-001
	250-GB, 5400-rpm	506230-001
	160-GB, 5400-rpm	506229-001
	Hard Drive Kit (not illustrated, includes hard drive bracket and screws)	506935-001

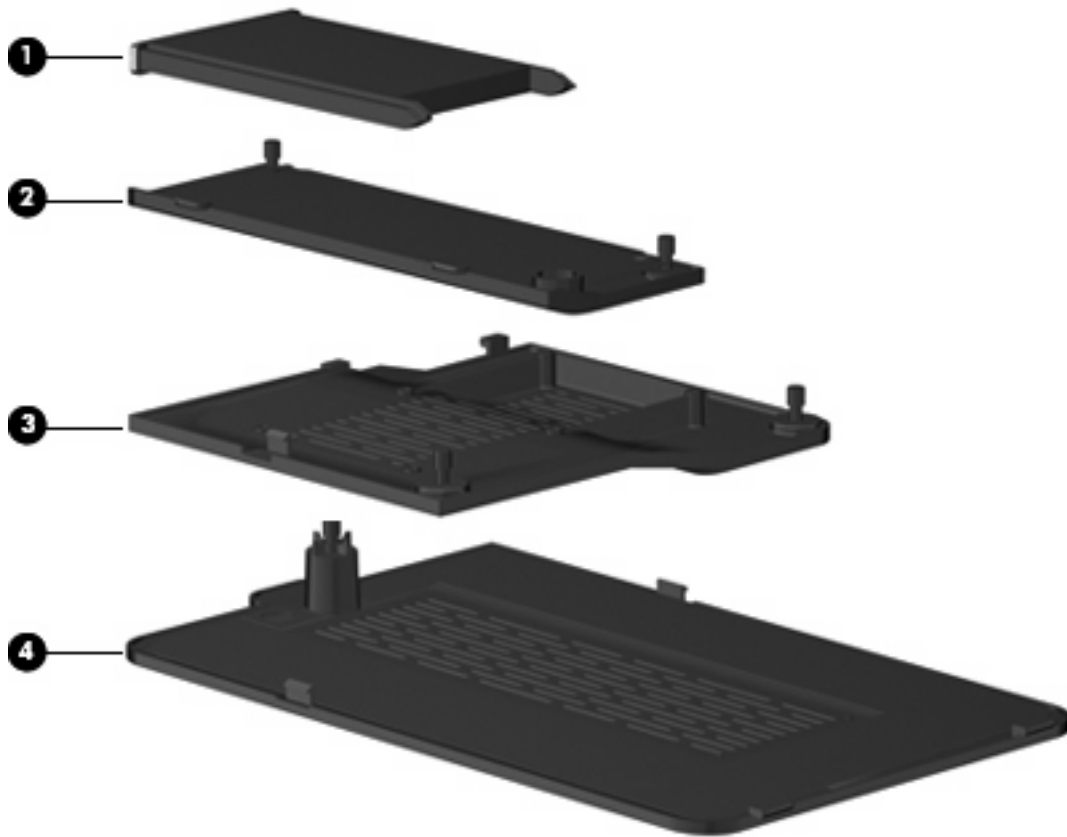
Display assembly components



Item	Description	Spare part number
(1)	Display bezel	506222-001
(2)	Camera/microphone module	506930-001
(3)	Display Hinge Kit (includes left and right display hinges)	506223-001
(4)	Display Bracket Kit	506931-001
(5)	13.3-inch, WXGA BrightView display panel	506156-001

Item	Description	Spare part number
(6)	Display Cable Kit (includes 3 wireless antenna transceivers and cables and display panel cable)	506226-001
(7)	Camera/microphone module cable (included in the Display Cable Kit)	506226-001
(8)	Display hinge covers	506224-001
(9)	Display enclosure	506225-001
	Display Rubber Kit (not illustrated; includes display bezel screw covers and display bezel bumper pads)	506227-001
	Display Screw Kit (not illustrated)	506228-001

Plastics Kit



Item	Description	Spare part number
	Plastics Kit	506953-001
(1)	ExpressCard slot bezel	
(2)	Wireless module compartment cover	
(3)	Memory module compartment cover	
(4)	Hard drive cover (includes 1 captive screw, secured by a C-clip)	

Mass storage devices



Item	Description	Spare part number
(1)	Hard drive (includes bracket)	
	500-GB, 5400-rpm	506232-001
	400-GB, 5400-rpm	512225-001
	320-GB, 5400-rpm	506231-001
	250-GB, 5400-rpm	506230-001
	160-GB, 5400-rpm	506229-001
	Hard Drive Kit (not illustrated, includes hard drive bracket and screws)	506935-001
(2)	Optical drive (includes bezel and bracket)	
	DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive (tray-load)	506234-001
	DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive (slot-load)	506235-001

Miscellaneous parts

Description	Spare part number
65-W PFC HP Smart Adapter	463958-001
Remote control (fits inside ExpressCard slot)	465539-002
Power cord	490371-001
Screw Kit	506961-001
<ul style="list-style-type: none">• Phillips PM2.0×2.0 broadhead screw• Phillips PM2.0×3.0 screw• Phillips PM2.0×4.0 screw• Phillips PM2.0×8.0 captive screw• Phillips PM2.5×4.0 screw• Phillips PM2.5×5.0 screw• Phillips PM2.5×6.0 captive screw• Phillips PM2.5×7.0 screw	

Sequential part number listing

Spare part number	Description
398393-002	Bluetooth module (includes double-sided tape)
459263-001	Broadcom 802.11b/g WLAN module
463958-001	65-W PFC HP Smart Adapter
465539-002	Remote control (fits inside ExpressCard slot)
486835-001	RTC battery
486847-001	Cable Kit
487330-001	Broadcom 4322AGN 802.11a/b/g/n WLAN module
490371-001	Power cord for use in the United States
506147-001	System board (includes replacement thermal material and power connector cable)
506148-001	AMD Turion Ultra Dual-Core ZM-86 2.40-GHz processor (35W, 2-MB L2 cache)
506149-001	AMD Turion Ultra Dual-Core ZM-84 2.30-GHz processor (35W, 2-MB L2 cache)
506150-001	AMD Turion Ultra Dual-Core ZM-82 2.20-GHz processor (35W, 2-MB L2 cache)
506151-001	AMD Turion Dual-Core RM-74 2.20-GHz processor (35W, 1-MB L2 cache)
506152-001	AMD Turion Dual-Core RM-72 2.10-GHz processor (35W, 1-MB L2 cache)
506153-001	AMD Athlon X2 Dual-Core QL-64 2.10-GHz processor (35W, 1-MB L2 cache)
506154-001	AMD Athlon X2 Dual-Core QL-62 2.00-GHz processor (35W, 1-MB L2 cache)
506155-001	13.3-inch, WXGA BrightView display assembly (includes camera/microphone module, camera/microphone module cable, 2 microphones, and 2 wireless antenna transceivers and cables)
506156-001	13.3-inch, WXGA BrightView display panel
506222-001	Display bezel
506223-001	Display Hinge Kit (includes left and right display hinges)
506224-001	Display hinge covers
506225-001	Display enclosure
506226-001	Display Cable Kit (includes 3 wireless antenna transceivers and cables and display panel cable)
506227-001	Display Rubber Kit (includes display bezel screw covers and display bezel bumper pads)
506228-001	Display Screw Kit
506229-001	160-GB, 5400-rpm hard drive (includes bracket)
506230-001	250-GB, 5400-rpm hard drive (includes bracket)
506231-001	320-GB, 5400-rpm hard drive (includes bracket)
506232-001	500-GB, 5400-rpm hard drive (includes bracket)
506234-001	DVD±RW and CD-RW Super Multi Double-Layer Combo Drive (tray-load)
506235-001	DVD±RW and CD-RW Super Multi Double-Layer Combo Drive (slot-load)

Spare part number	Description
506237-001	6-cell, 55-Wh, 2.55-Ah Li-ion battery
506238-001	9-cell, 83-Wh, 2.55-Ah Li-ion battery
506239-001	Base enclosure (for slot-loading optical drive)
506240-001	Switch cover (includes LED board and cable)
506241-001	Top cover (includes TouchPad and cable, fingerprint reader board cable, and caps lock LED board and cable)
506930-001	Camera/microphone module
506931-001	Display Bracket Kit
506932-001	1024-MB (PC2-6400, 800-MHz, DDR2) memory module
506933-001	2048-MB (PC2-6400, 800-MHz, DDR2) memory module
506934-001	4096-MB (PC2-6400, 800-MHz, DDR2) memory module
506935-001	Hard Drive Kit (includes hard drive bracket and screws)
506938-001	Base enclosure (for tray-loading optical drive)
506953-001	Plastics Kit
506955-001	Speakers
506957-001	TouchPad on/off button board
506960-001	Fan and heat sink (includes heat sink retention clip and replacement thermal material)
506961-001	Screw Kit
506962-001	Fingerprint reader board (includes fingerprint reader board cable)
507091-001	Keyboard for use in the United States
507091-121	Keyboard for use in Canada
507092-001	Keyboard (with backlight) for use in the United States
507093-001	Audio board (includes audio board cable)
507094-001	Power connector
507885-001	TouchPad bracket
507886-001	LED bracket
507887-001	Rubber Foot Kit (includes 4 base enclosure rubber feet)
512225-001	400-GB, 5400-rpm hard drive (includes bracket)

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

Service considerations

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

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

Plastic parts

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

Cables and connectors

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

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

Drive handling

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

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

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

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

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

Avoid dropping drives from any height onto any surface.

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

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

Avoid exposing a drive to temperature extremes or liquids.

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

Grounding guidelines

Electrostatic discharge damage

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

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

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

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

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

Use nonmagnetic tools.

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

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

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

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

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

Typical electrostatic voltage levels			
Event	Relative humidity		
	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 $\pm 10\%$ 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.

Before disassembling the computer, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 32](#)).
5. Remove the RTC battery (see [RTC battery on page 57](#)).
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.

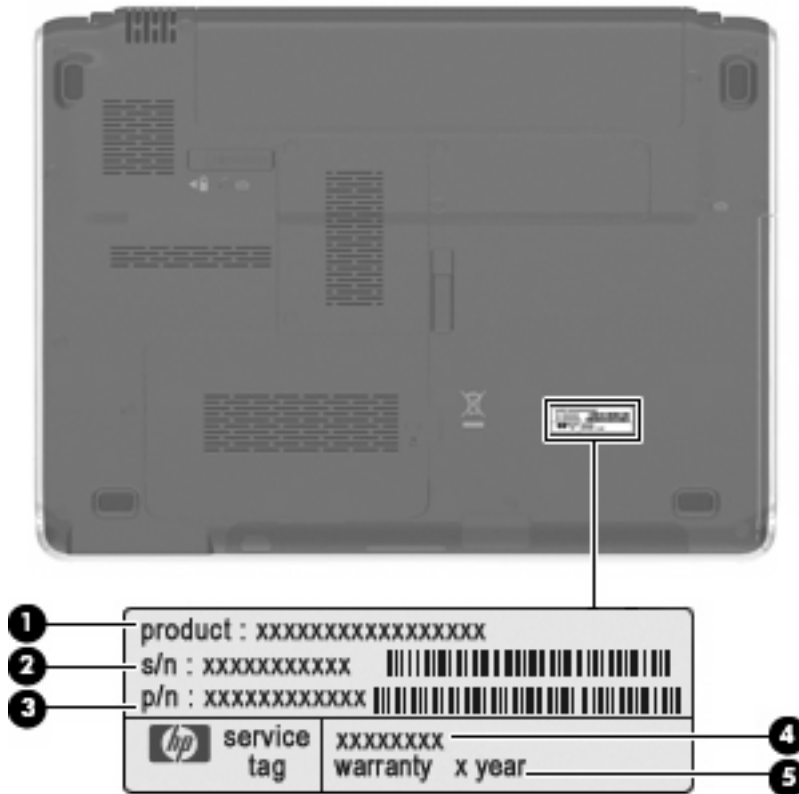
Component replacement procedures

This chapter provides removal and replacement procedures.

There are as many as 69 screws, in 8 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.

Serial number

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

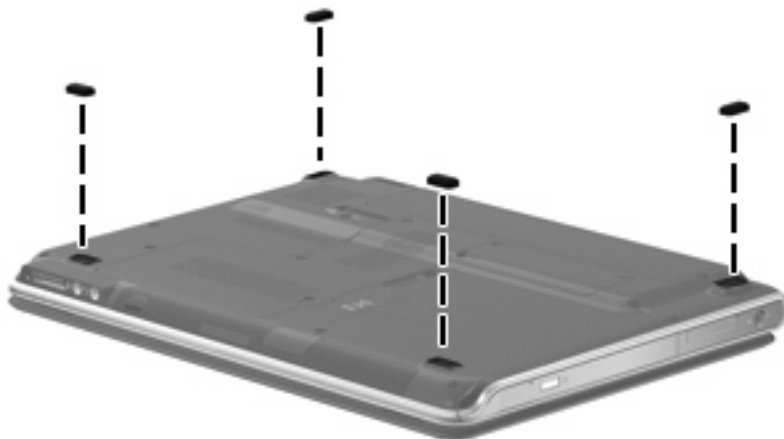


Component	Description
(1) Product name	This is the product name affixed to the front of the computer.
(2) Serial number (s/n)	This is an alphanumeric identifier that is unique to each product.
(3) Part number/Product number (p/n)	This number provides specific information about the product's hardware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

Computer feet

Description	Spare part number
Rubber Foot Kit (includes 4 base enclosure rubber feet)	507887-001

The computer feet are adhesive-backed rubber pads. The feet attach to the base enclosure in the locations illustrated below.



Battery


Description	Spare part number
9-cell, 83-Wh, 2.55-Ah Li-ion	506236-001
6-cell, 55-Wh, 2.55-Ah Li-ion	506237-001

Before disassembling the computer, follow these steps

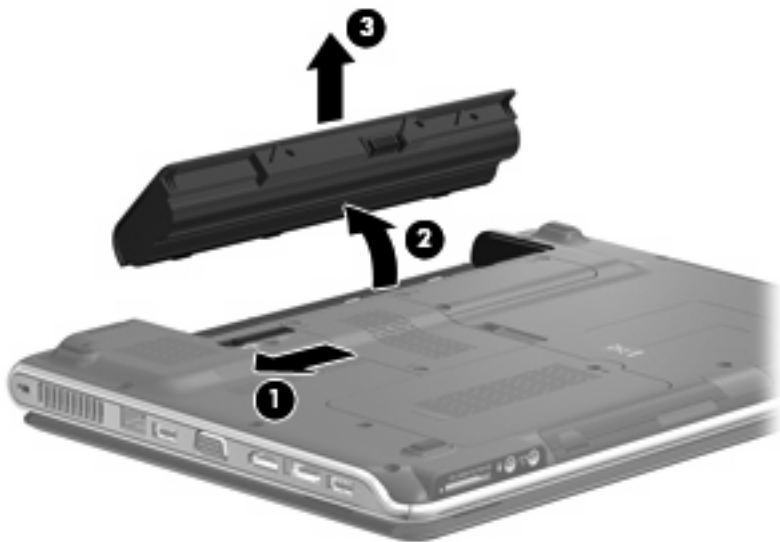
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord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

 **NOTE:** The battery release latch automatically returns to its original position.

3. Lift the battery by the inner edge (2) to release the battery from the battery bay.
4. Remove the battery (3).



To install the battery, insert the outer edge of the battery into the battery bay, and then press down on the inner edge until the battery is seated. The battery release latch automatically locks the battery in place.


WLAN module

Description	Spare part number
Broadcom 802.11b/g WLAN module	459263-001
Broadcom 4322AGN 802.11a/b/g/n WLAN module	487330-001

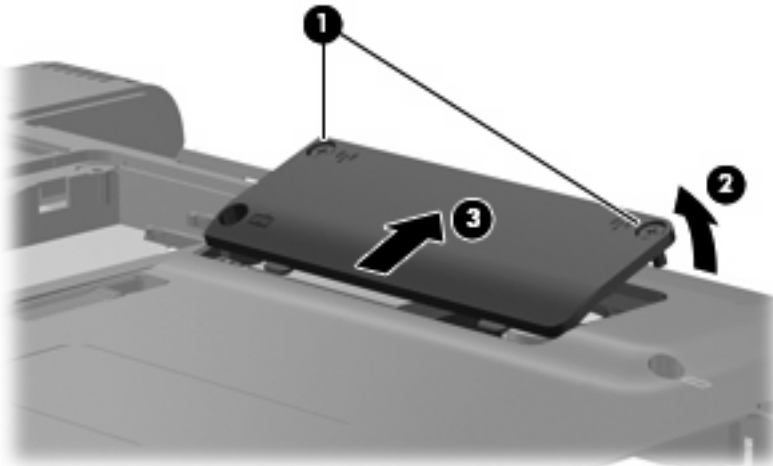
Before removing the WLAN module, follow these steps:

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 32](#)).


Remove the WLAN module:

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

1. Loosen the Phillips PM2.5×6.0 screws (1) that secure the wireless module compartment cover to the computer.
2. Lift the rear edge of the cover (2), swing it up, and remove the cover (3). The wireless module compartment cover is included in the Plastics Kit, spare part number 506953-001.




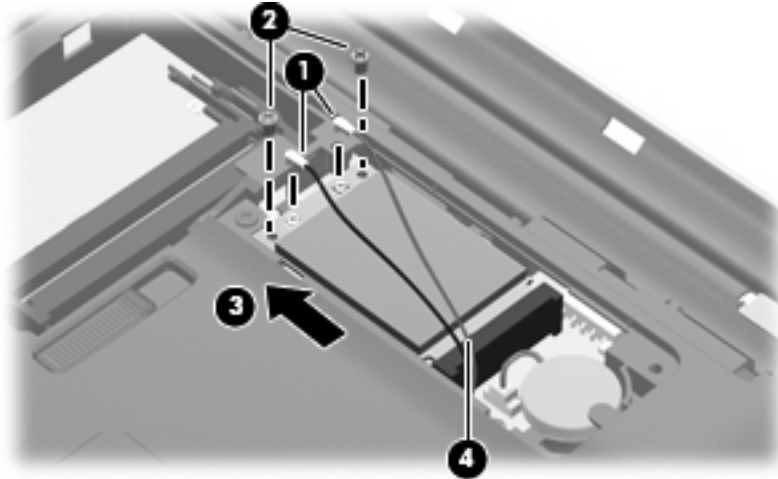
3. Disconnect the two WLAN antenna cables (1) from the WLAN module.

 **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.

NOTE: Computer models equipped with an 802.11ab/g/n WLAN module will have an additional wireless antenna cable, yellow in color.


4. Remove the two Phillips PM2.0×4.0 screws **(2)** that secure the WLAN module to the computer.
5. Remove the WLAN module **(3)** by pulling it away from the slot at an angle.

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



Reverse this procedure to install a WLAN module.

Optical drive

 **NOTE:** The optical drive spare part kit includes an optical drive bezel.

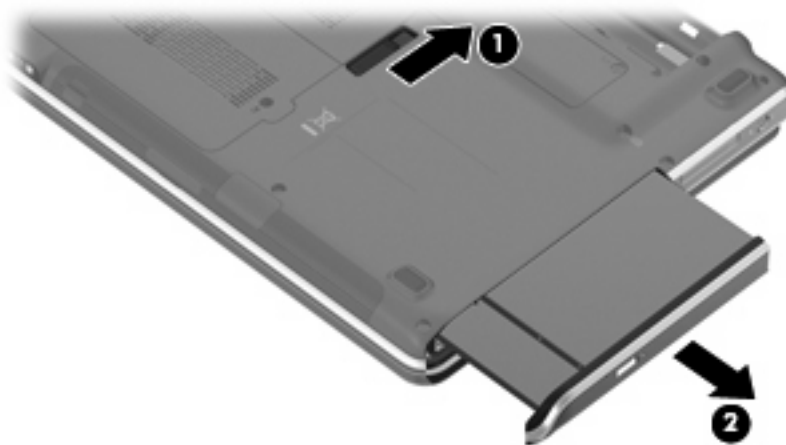
Description	Spare part number
DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive (tray-load)	506234-001
DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive (slot-load)	506235-001

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 32](#)).

Remove the optical drive:

1. Slide the optical drive release latch **(1)** to release the optical drive from the computer.
2. Remove the optical drive **(2)** by sliding it out of the optical drive bay.



To install the optical drive, insert the rear edge of the optical drive into the optical drive bay and slide it in until the optical drive is seated. The optical drive release latch automatically locks the optical drive in place.

Memory module

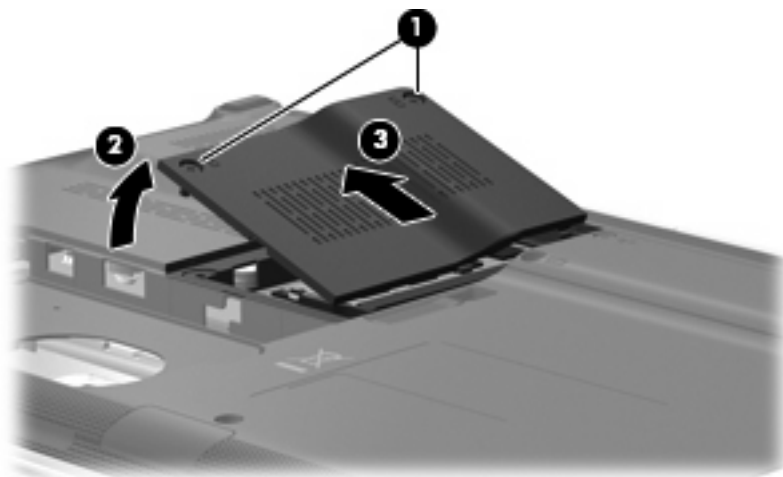
Description	Spare part number
4096-MB (PC2-6400, 800-MHz, DDR2)	506934-001
2048-MB (PC2-6400, 800-MHz, DDR2)	506933-001
1024-MB (PC2-6400, 800-MHz, DDR2)	506932-001

Before removing the memory module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 32](#)).


Remove the memory module:

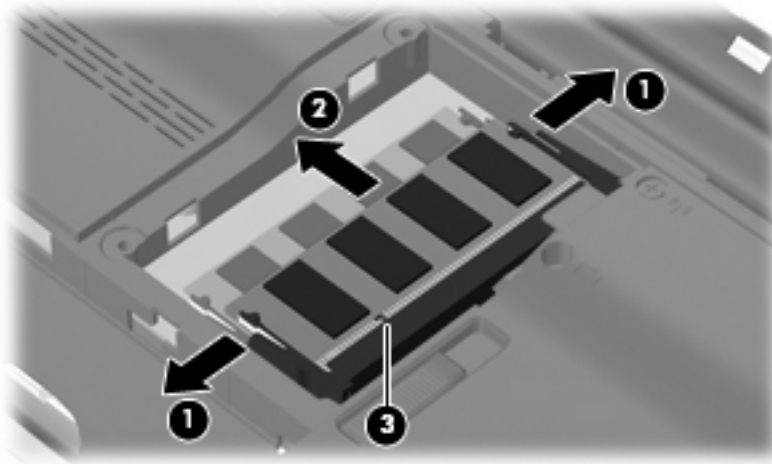
1. Loosen the two Phillips PM2.5×6.0 captive screws **(1)** that secure the memory module compartment cover to the computer.
2. Lift the rear edge **(2)** of the cover, swing it up and forward, and remove the cover **(3)**. The memory module compartment cover is included in the Plastics Kit, spare part number 506953-001.



3. 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.)


4. Remove the module (2) by pulling it 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 a memory module.

Hard drive

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

Description	Spare part number
500-GB, 5400-rpm	506232-001
400-GB, 5400-rpm	512225-001
320-GB, 5400-rpm	506231-001
250-GB, 5400-rpm	506230-001
160-GB, 5400-rpm	506229-001
Hard Drive Kit (includes hard drive bracket and screws)	506935-001

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 32](#)).

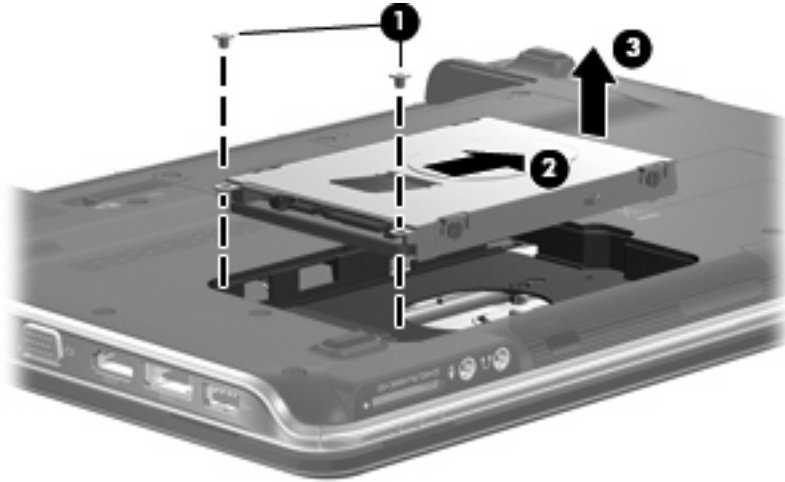
Remove the hard drive:

1. Loosen the Phillips PM2.5×6.0 captive screw (1) that secures the hard drive cover to the computer.
2. Lift the right side of the hard drive cover (2), and remove the cover (3). The hard drive cover is included in the Plastics Kit, spare part number 506953-001.




3. Loosen the two Phillips PM2.5×4.0 screws (1) that secure the hard drive to the computer.
4. Grasp the Mylar tab (2), and pull the hard drive to the right until it disconnects from the system board.

5. Remove the hard drive (3) from the hard drive bay.



Reverse this procedure to reassemble and install the hard drive.

Keyboard and switch cover

 **NOTE:** The keyboard and switch cover must be removed simultaneously.

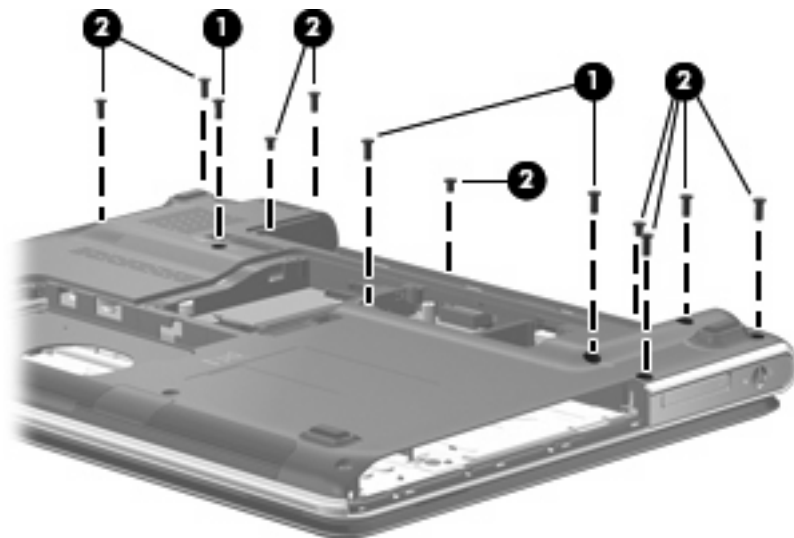
Description	Spare part number	Description	Spare part number
Keyboard (The United States)	507091-001	Backlit keyboard (The United States)	507092-001
Keyboard (Canada)	507091-121	Switch cover	506240-001

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

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 32](#)).
5. Remove the hard drive (see [Hard drive on page 38](#)).

Remove the keyboard and switch cover:

1. Remove the three Phillips PM2.5×7.0 screws (1) that secure the keyboard to the computer.
2. Remove the nine Phillips screws (2) that secure the switch cover to the computer.



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

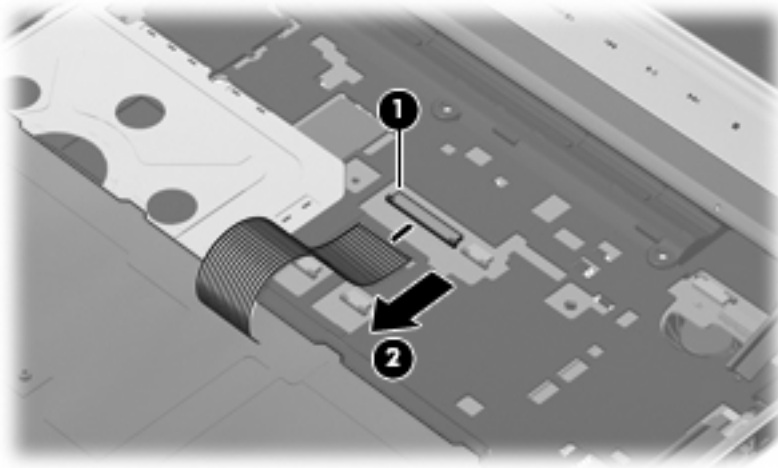
5. Lift the rear edge of the switch cover (1) up slightly and pull back at an angle (2) to access the keyboard.



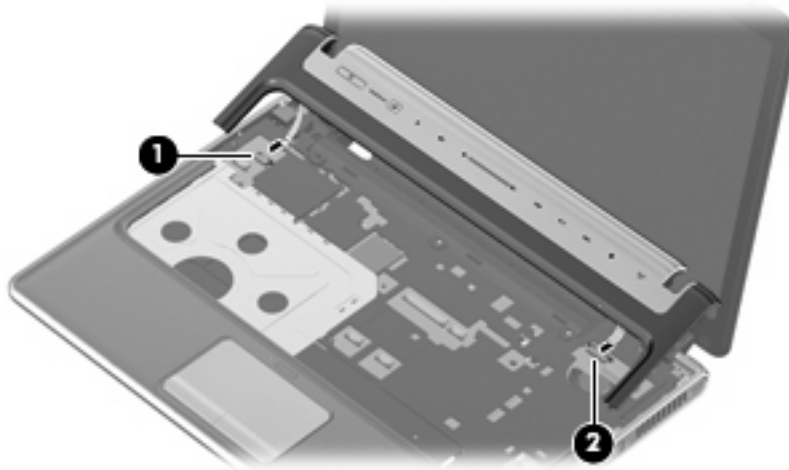
6. Lift the rear edge of the keyboard (1) and swing it up and forward until it rests upside down on the palm rest (2).



7. Release the zero insertion force (ZIF) connector to which the keyboard cable (1) is attached and disconnect the cable (2) from the system board.



8. Remove the keyboard.
9. Disconnect the power button board cable (1) from the system board.
10. Release the ZIF connector to which the LED board cable is connected, and disconnect the cable (2) from the system board.
11. Remove the switch cover.



Reverse this procedure to install the keyboard and switch cover.

Display assembly

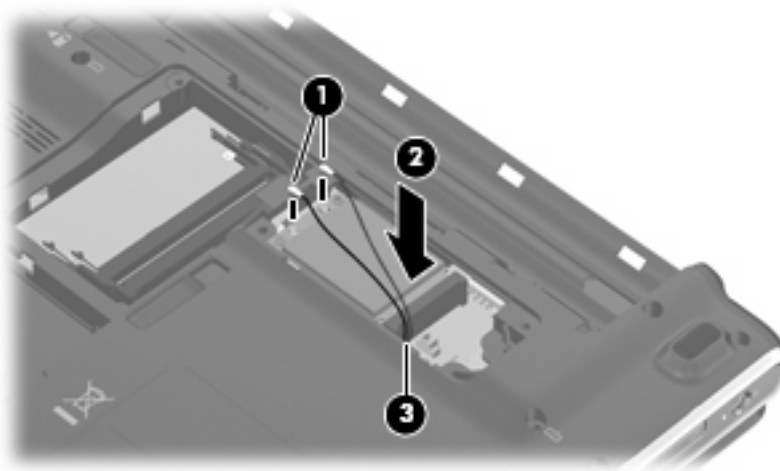
Description	Spare part number
13.3-inch, WXGA BrightView display assembly (includes camera/microphone module, camera/microphone module cable, 2 microphones, and 3 wireless antenna transceivers and cables)	506155-001

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 32](#)).
5. Disconnect the wireless antenna cables from the WLAN module (see [WLAN module on page 33](#)).
6. Remove the keyboard and switch cover (see [Keyboard and switch cover on page 40](#)).

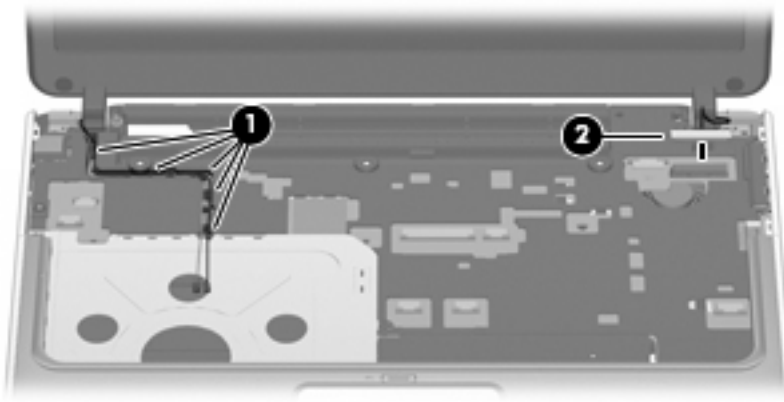
Remove the display assembly:

1. Close the computer.
2. Turn the computer upside down.
3. Pull the WLAN antenna cables (1) down through the channel (2) located between the base enclosure (3) and the top cover on the opposite side.



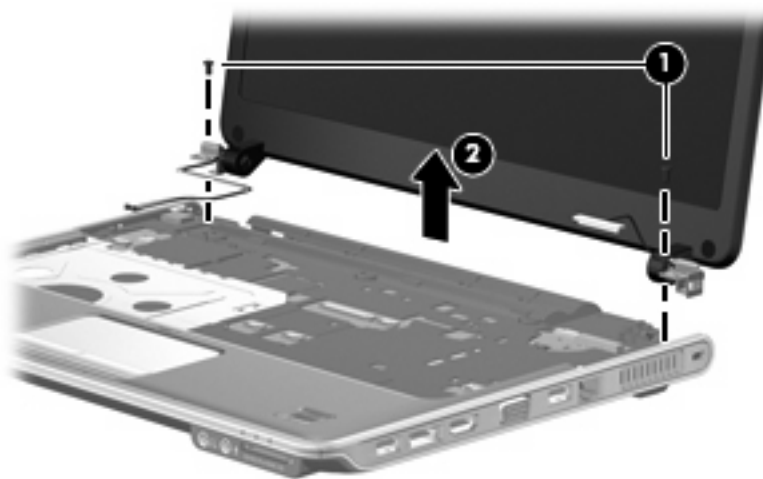
4. Turn the computer right-side up.
5. Open the computer as far as possible.
6. Remove the WLAN antenna cables (1) from the clips and routing channel built into the top cover.

7. Disconnect the display panel cable (2) from the system board.



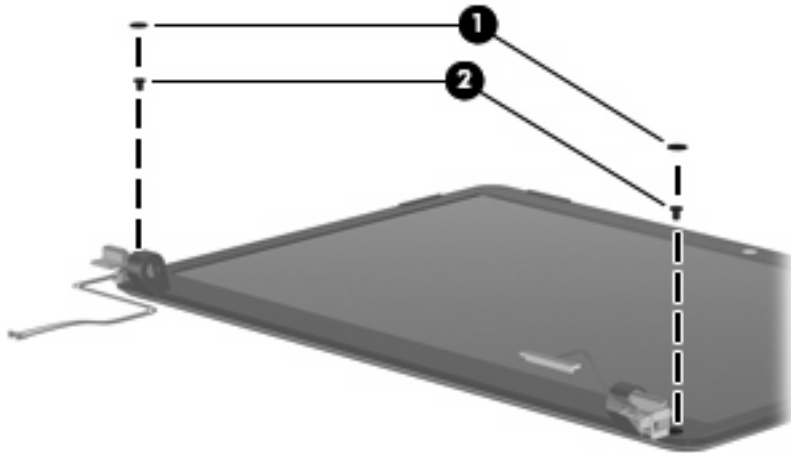
△ **CAUTION:** The display assembly will be unsupported when the following screws are removed. To prevent damage to the display assembly, support it before removing the screws.

8. Remove the two Phillips PM2.5×6.0 screws (1) that secure the display assembly to the computer.
9. Remove the display assembly (2).

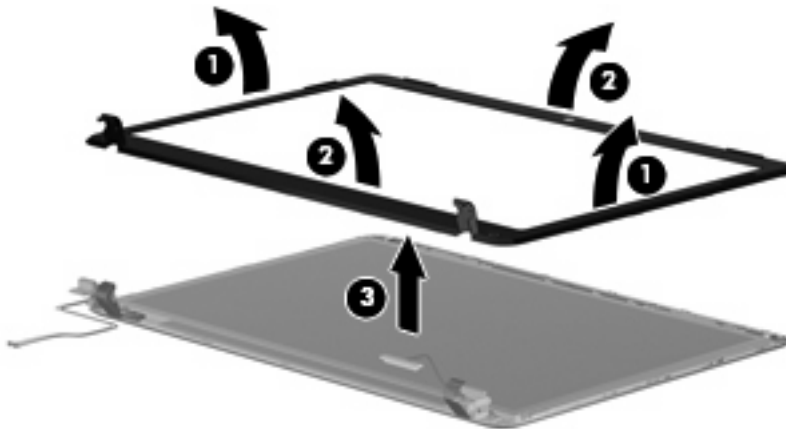


10. If it is necessary to replace any of the display assembly internal components, remove the two rubber screw covers (1) on the display bezel bottom edge. The rubber screw covers are included in the Display Rubber Kit, spare part number 506227-001.

11. Remove the two Phillips PM2.5×5.0 screws (2) that secure the display bezel to the display assembly.

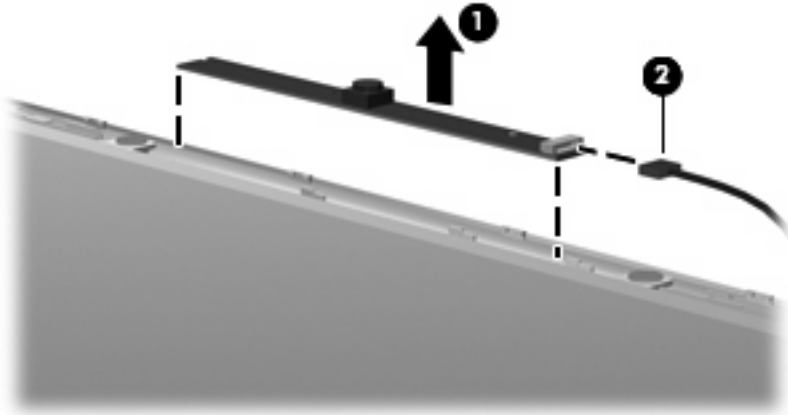


12. Flex the inside edges of the left and right sides (1) and the top and bottom edges (2) of the display bezel until the bezel disengages from the display enclosure.
13. Remove the display bezel (3). The display bezel is available using spare part number 506222-001.

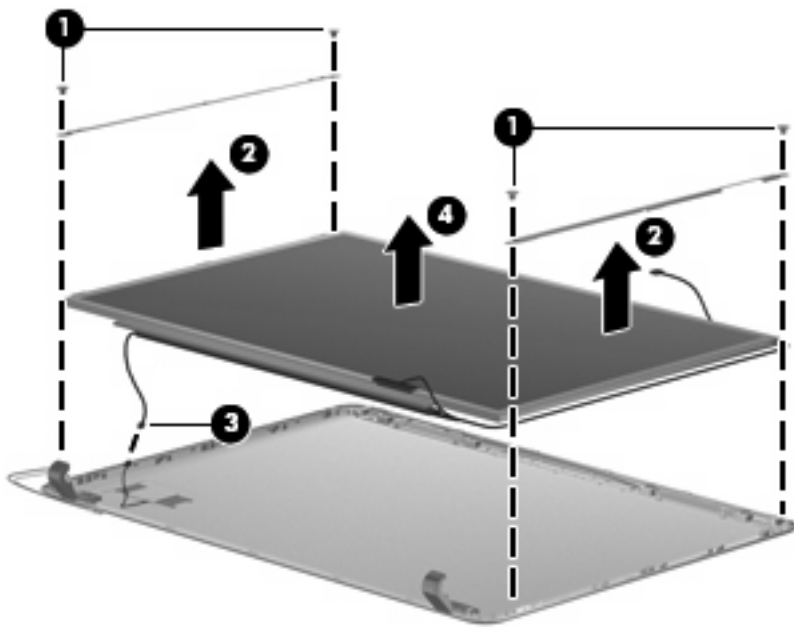


14. If it is necessary to replace the camera/microphone module, release the module (1) as far as the camera/microphone module cable allows.

15. Disconnect the camera/microphone module cable from the module (2), and remove the camera/microphone module. The camera/microphone module is available using spare part number 506930-001.

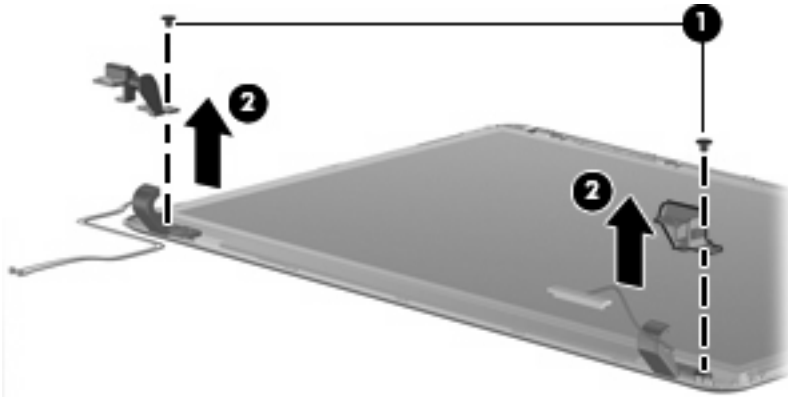


16. If it is necessary to replace the display panel, remove the four Phillips PM2.5×4.0 screws (1) that secure the panel to the display enclosure.
17. Remove the left and right display panel brackets (2).
18. Disconnect the display logo LED board cable (3) from the display panel cable.
19. Remove the display panel (4) from the display enclosure. The display panel is available using the spare part number 506156-001.

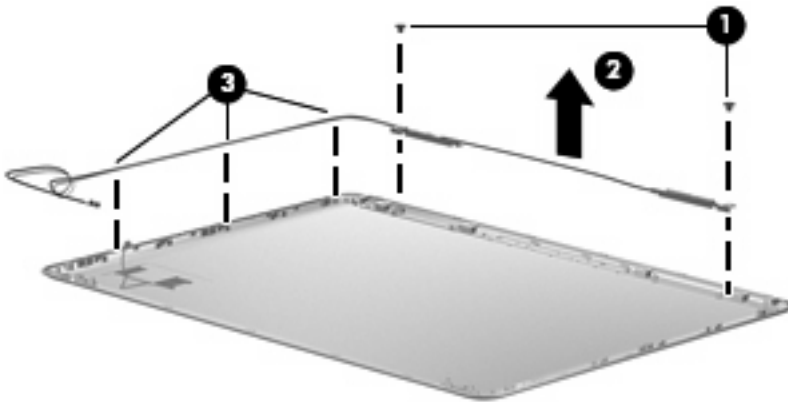


20. If it is necessary to replace the display hinges, remove the two Phillips PM2.0×4.0 screws (1) that secure each hinge to the display panel.


21. Remove the display hinges (2) from the display panel. The display hinges are available using spare part number 506223-001.

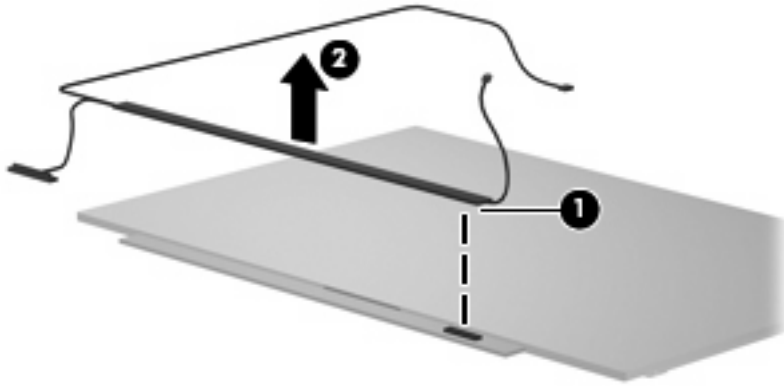


22. If it is necessary to replace the wireless antenna transceivers and cables, remove the two Phillips PM2.5×4.0 screws (1) that secure the left transceiver to the display enclosure.
23. Detach the wireless antenna transceivers (2) from the display enclosure.
24. Remove the wireless antenna cables from the clips (3) built into the display enclosure. The wireless antenna transceivers and cables are available in the Display Cable Kit, spare part number 506226-001.



25. If it is necessary to replace the camera/microphone module cable (1), remove the cable from the display enclosure (2).

 **NOTE:** The camera/microphone module cable is attached to the display enclosure with double-sided tape.



Reverse this procedure to reassemble and install the display assembly.

Top cover

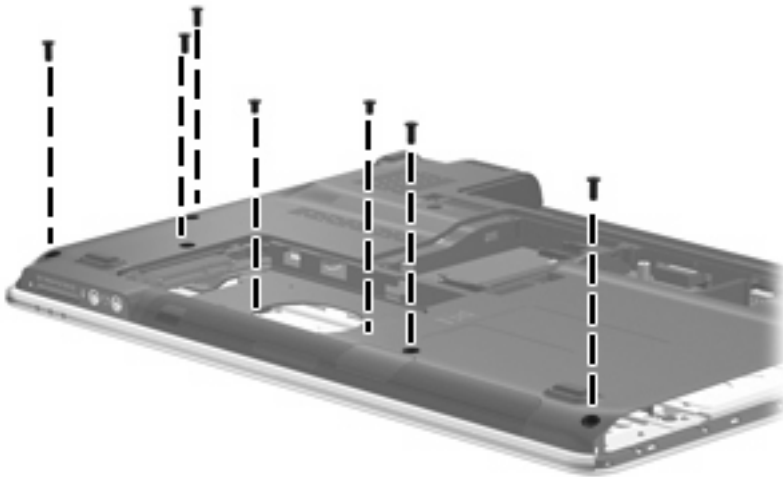
Description	Spare part number
Top cover (includes TouchPad and cable, fingerprint reader board cable, and caps lock LED board and cable)	506241-001

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 32](#)).
5. Remove the following components:
 - a. Hard drive (see [Hard drive on page 38](#))
 - b. Optical drive (see [Optical drive on page 35](#))
 - c. Keyboard and switch cover (see [Keyboard and switch cover on page 40](#))
 - d. Display assembly (see [Display assembly on page 43](#))

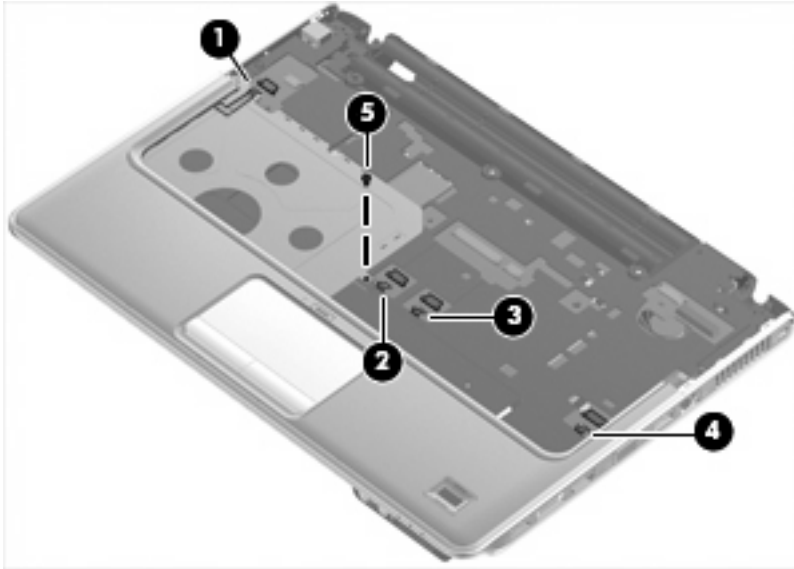
Remove the top cover:

1. Turn the computer upside down.
2. Remove the seven Phillips screws that secure the top cover to the computer.

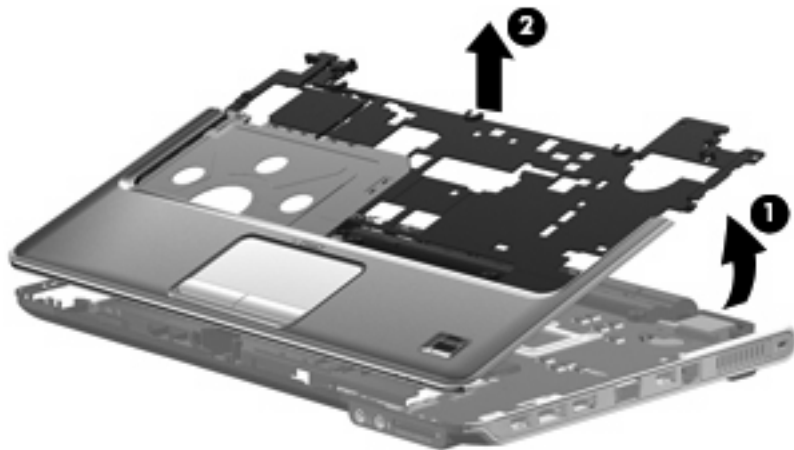


3. Turn the computer right-side up, with the front toward you.
4. Open the computer as far as possible.
5. Disconnect the caps lock LED board cable (1) from the system board.

6. Release the ZIF connector to which the TouchPad board cable is connected, and disconnect the cable (2) from on the system board.
7. Disconnect the TouchPad on/off button board cable (3) from the system board.
8. Disconnect the fingerprint reader board cable (4) from the system board.
9. Remove the Phillips PM2.5×6.0 screw (5) that secures the top cover to the computer.



10. Lift the rear edge of the top cover (1) up until the top cover detaches from the base enclosure.
11. Remove the top cover (2).



Reverse this procedure to install the top cover.

Fingerprint reader board

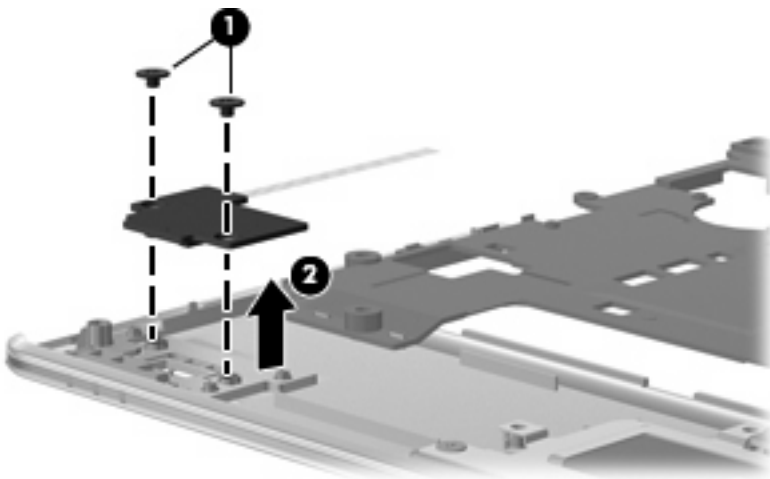
Description	Spare part number
Fingerprint reader board (includes fingerprint reader board cable)	506962-001

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 32](#)).
5. Remove the following components:
 - a. Hard drive (see [Hard drive on page 38](#))
 - b. Optical drive (see [Optical drive on page 35](#))
 - c. Keyboard and switch cover (see [Keyboard and switch cover on page 40](#))
 - d. Display assembly (see [Display assembly on page 43](#))
 - e. Top cover (see [Top cover on page 49](#))


Remove the fingerprint reader board:

1. Turn the top cover upside down, with the front toward you.
2. Remove the two Phillips PM2.0×2.0 screws (1) that secure the fingerprint reader board to the top cover.
3. Remove the fingerprint reader board (2) from the top cover.



Reverse the above procedure to install the fingerprint reader board.

System board

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

Description	Spare part number
System board (includes replacement thermal material and power connector cable)	506147-001

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 32](#)).
5. Remove the following components:
 - a. Optical drive (see [Optical drive on page 35](#))
 - b. Hard drive (see [Hard drive on page 38](#))
 - c. Keyboard and switch cover (see [Keyboard and switch cover on page 40](#))
 - d. Display assembly (see [Display assembly on page 43](#))
 - e. Top cover (see [Top cover on page 49](#))

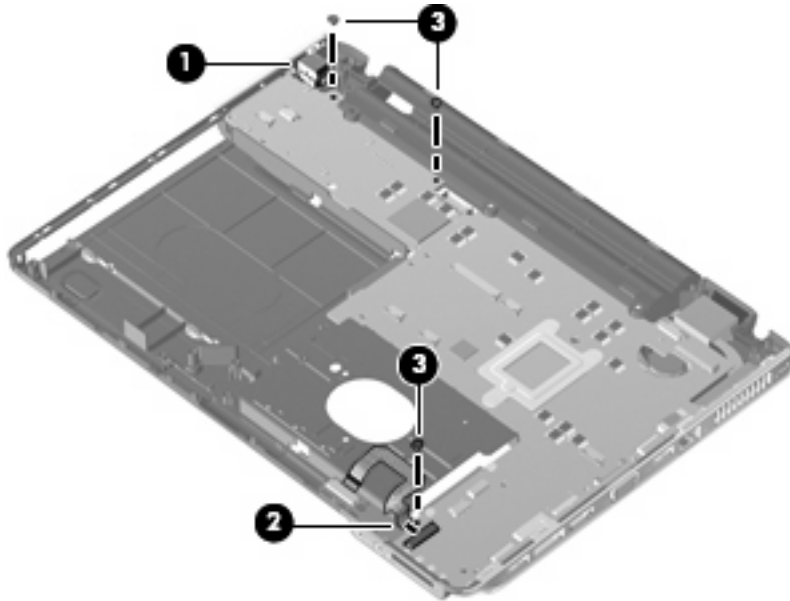
When replacing the system board, be sure that the following components are removed from the defective system board and installed on the replacement system board:

- WLAN module (see [WLAN module on page 33](#))
- Memory modules (see [Memory module on page 36](#))
- RTC battery (see [RTC battery on page 57](#))
- Fan/heat sink (see [Fan/heat sink assembly on page 58](#))
- Processor (see [Processor on page 60](#))

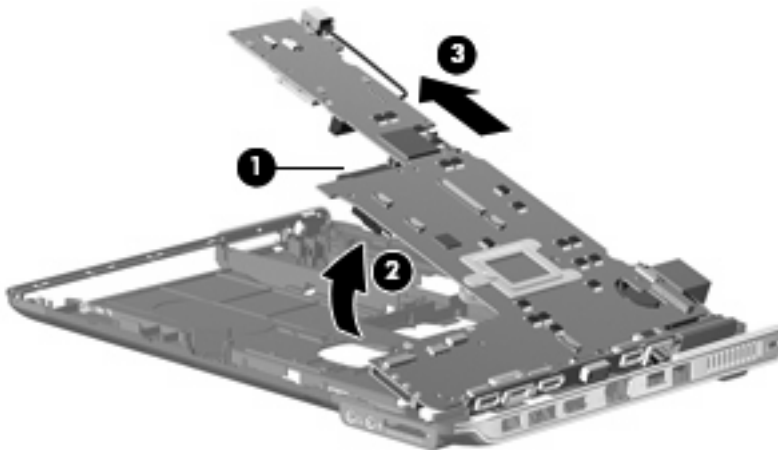
Remove the system board:

1. Disconnect the power connector **(1)** from the base enclosure.
2. Disconnect the audio board cable **(2)** from the system board.

3. Remove the three Phillips PM2.5×4.0 screws (3) that secure the system board to the base enclosure.



4. Use the optical drive connector (1) to lift the left edge of the system board (2) until it rests at an angle.
5. Remove the system board (3) from the base enclosure by sliding it up and to the left at an angle.



Reverse the preceding procedure to install the system board.

Speakers

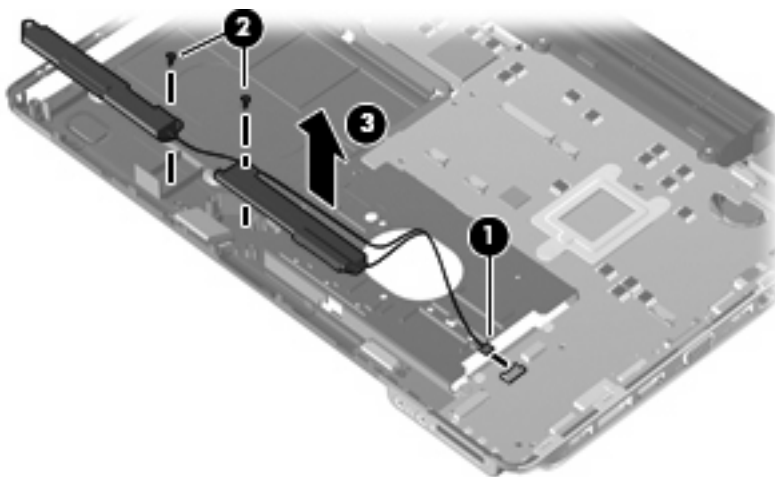
Description	Spare part number
Speakers	506955-001

Before removing the speakers, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 32](#)).
5. Remove the following components:
 - a. Optical drive (see [Optical drive on page 35](#))
 - b. Hard drive (see [Hard drive on page 38](#))
 - c. Keyboard and switch cover (see [Keyboard and switch cover on page 40](#))
 - d. Display assembly (see [Display assembly on page 43](#))
 - e. Top cover (see [Top cover on page 49](#))
 - f. System board (see [System board on page 52](#))


Remove the speakers:

1. Disconnect the speaker cable from the system board (1).
2. Remove the two Phillips PM2.5×4.0 screws (2) that secure the speakers to the base enclosure.
3. Remove the speakers from the base enclosure (3).



Reverse this procedure to install the speakers.

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 468827-001.

Description	Spare part number
Bluetooth module (includes double-sided tape)	398393-002

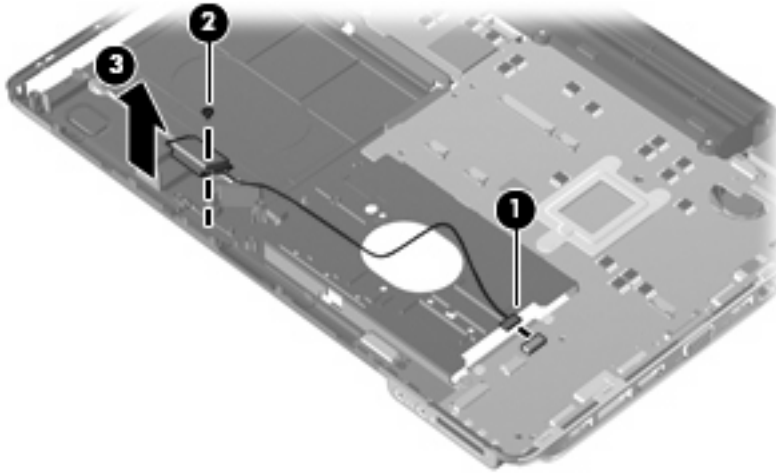
Before removing the Bluetooth module, follow these steps:

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 32](#)).
5. Remove the following components:
 - a. Optical drive (see [Optical drive on page 35](#))
 - b. Hard drive (see [Hard drive on page 38](#))
 - c. Keyboard and switch cover (see [Keyboard and switch cover on page 40](#))
 - d. Display assembly (see [Display assembly on page 43](#))
 - e. Top cover (see [Top cover on page 49](#))
 - f. System board (see [System board on page 52](#))

Remove the Bluetooth module:


1. Disconnect the Bluetooth cable from the system board **(1)**.
2. Remove the Phillips PM2.0×3.0 screw **(2)** that secures the Bluetooth module to the base enclosure.

3. Remove the Bluetooth module from the base enclosure (3).



Reverse this procedure to install the Bluetooth 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 (includes double-sided tape)	486835-001

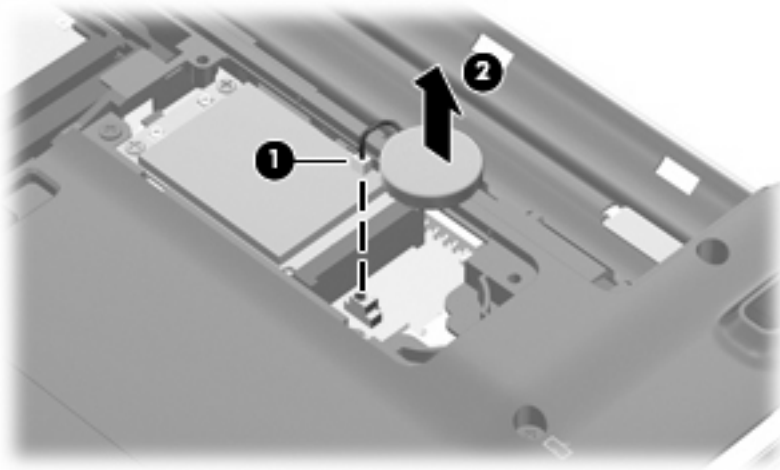
Before removing the RTC battery, follow these steps:

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 32](#)).

Remove the RTC battery:

1. Turn the computer upside down, and remove the WLAN module cover (see [WLAN module on page 33](#)).
2. Disconnect the RTC battery cable (1) from the system board.
3. Remove the RTC battery (2).

 **NOTE:** The RTC battery is attached to the system board with double-sided tape.



Reverse this procedure to install the RTC battery.

Fan/heat sink assembly

Description	Spare part number
Fan/heat sink assembly (includes replacement thermal material)	506960-001

Before removing the fan/heat sink 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 32](#)).
5. Remove the following components:
 - a. Optical drive (see [Optical drive on page 35](#))
 - b. Hard drive (see [Hard drive on page 38](#))
 - c. Keyboard and switch cover (see [Keyboard and switch cover on page 40](#))
 - d. Display assembly (see [Display assembly on page 43](#))
 - e. Top cover (see [Top cover on page 49](#))
 - f. System board (see [System board on page 52](#))

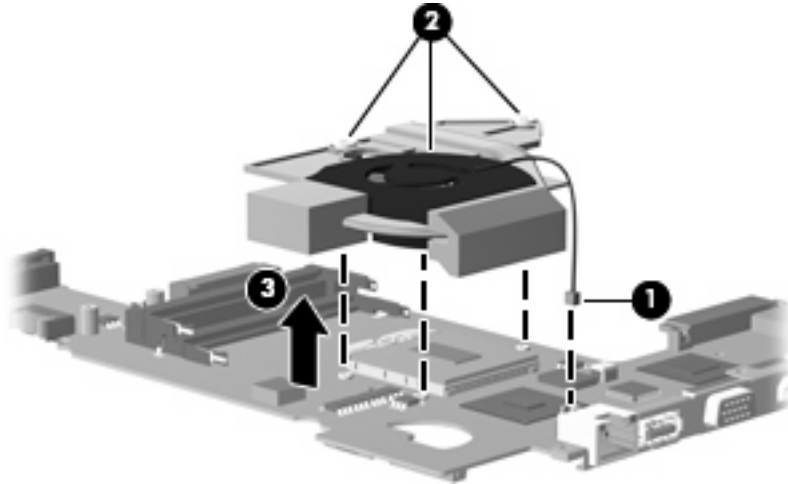
Remove the fan/heat sink assembly:

1. Turn the system board upside down, with the battery connector toward you.
2. Disconnect the fan cable **(1)** from the system board.
3. Loosen the three Phillips PM2.0×8.0 captive screws **(2)** that secure the fan/heat sink assembly to the system board.

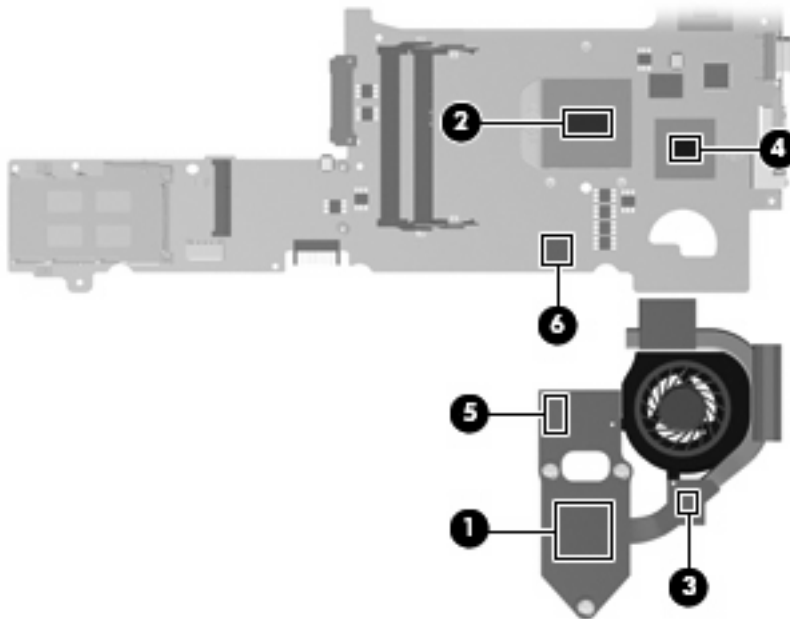


NOTE: Due to the adhesive quality of the thermal material located between the heat sink and system board components, it may be necessary to move the heat sink from side to side to detach the assembly.

4. Remove the fan/heat sink assembly (3).



NOTE: The thermal material must be thoroughly cleaned from the surfaces of the fan/heat sink assembly (1), (3), and (5); the processor (2); capacitor (6); and the graphics chip (4) each time the heat sink is removed. Thermal pads and thermal paste must be installed on all surfaces before the heat sink is reinstalled. Thermal pads and thermal paste are included with all heat sink, system board, and processor spare part kits.



Reverse this procedure to install the fan/heat sink assembly.

Processor

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

Description	Spare part number
AMD Turion Ultra Dual-Core ZM-86 2.40-GHz processor (35W, 2-MB L2 cache)	506148-001
AMD Turion Ultra Dual-Core ZM-84 2.30-GHz processor (35W, 2-MB L2 cache)	506149-001
AMD Turion Ultra Dual-Core ZM-82 2.20-GHz processor (35W, 2-MB L2 cache)	506150-001
AMD Turion Dual-Core RM-74 2.20-GHz processor (35W, 1-MB L2 cache)	506151-001
AMD Turion Dual-Core RM-72 2.10-GHz processor (35W, 1-MB L2 cache)	506152-001
AMD Athlon X2 Dual-Core QL-64 2.10-GHz processor (35W, 1-MB L2 cache)	506153-001
AMD Athlon X2 Dual-Core QL-62 2.00-GHz processor (35W, 1-MB L2 cache)	506154-001


Before removing the processor, follow these steps:

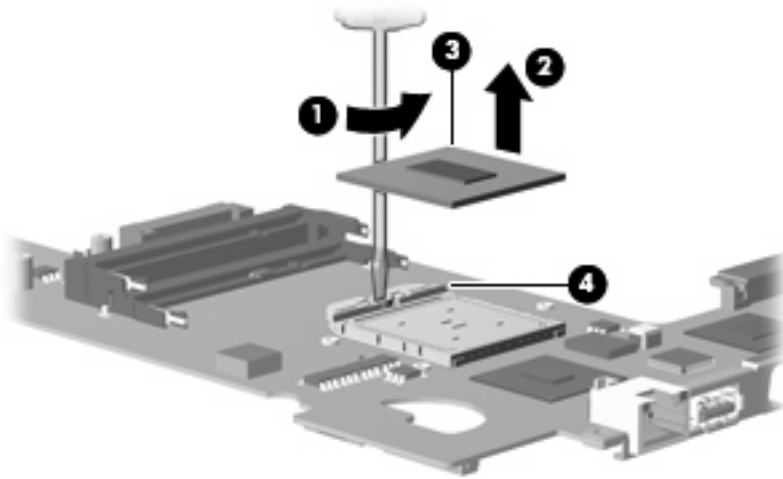
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 32](#)).
5. Remove the following components:
 - a. Optical drive (see [Optical drive on page 35](#))
 - b. Hard drive (see [Hard drive on page 38](#))
 - c. Keyboard and switch cover (see [Keyboard and switch cover on page 40](#))
 - d. Display assembly (see [Display assembly on page 43](#))
 - e. Top cover (see [Top cover on page 49](#))
 - f. System board (see [System board on page 52](#))
 - g. Fan/heat sink assembly (see [Fan/heat sink assembly on page 58](#))

Remove the processor:

1. 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 icon (4) embossed on the processor slot.




Reverse this procedure to install the processor.

5 Setup Utility

Starting the Setup Utility

The Setup Utility is a ROM-based information and customization utility that can be used even when your Windows® operating system is not working.

 **NOTE:** The fingerprint reader (select models only) cannot be used to access the Setup Utility.

The utility reports information about the computer and provides settings for startup, security, and other preferences.

To start the Setup Utility:

- Open the Setup Utility by turning on or restarting the computer. While the “Press the ESC key for Startup Menu” message is displayed in the lower-left corner of the screen, press **f10**.

– or –

1. Open the Setup Utility by turning on or restarting the computer. While the “Press the ESC key for Startup Menu” message is displayed in the lower-left corner of the screen, press **esc**.
2. When the Startup Menu is displayed, press **f10**.

Changing the language of the Setup Utility

The following procedure explains how to change the language of the Setup Utility. If the Setup Utility is not already running, begin at step 1. If the Setup Utility is already running, begin at step 2.

1. Open the Setup Utility by turning on or restarting the computer. While the “Press the ESC key for Startup Menu” message is displayed in the lower-left corner of the screen, press **f10**.

– or –

Open the Setup Utility by turning on or restarting the computer. While the “Press the ESC key for Startup Menu” message is displayed in the lower-left corner of the screen, press **esc**. When the Startup Menu is displayed, press **f10**.

2. Use the arrow keys to select **System Configuration > Language**, and then press **enter**.
3. Use the arrow keys to select a language, and then press **enter**.
4. When a confirmation prompt with your language selected is displayed, press **enter**.
5. To save your change and exit the Setup Utility, use the arrow keys to select **Exit > Exit Saving Changes**, and then press **enter**.

Your change goes into effect immediately.

Navigating and selecting in the Setup Utility

Because the Setup Utility is not Windows based, it does not support the TouchPad. Navigation and selection are by keystroke.

- To choose a menu or a menu item, use the arrow keys.
- To choose an item in a list or to toggle a field, for example an Enable/Disable field, use either the arrow keys or **f5** or **f6**.
- To select an item, press **enter**.
- To close a text box or return to the menu display, press **esc**.
- To display additional navigation and selection information while the Setup Utility is open, press **f1**.

Displaying system information

The following procedure explains how to display system information in the Setup Utility. If the Setup Utility is not open, begin at step 1. If the Setup Utility is open, begin at step 2.

1. Open the Setup Utility by turning on or restarting the computer. While the “Press the ESC key for Startup Menu” message is displayed in the lower-left corner of the screen, press **f10**.

– or –

Open the Setup Utility by turning on or restarting the computer. While the “Press the ESC key for Startup Menu” message is displayed in the lower-left corner of the screen, press **esc**. When the Startup Menu is displayed, press **f10**.

2. Select the **Main** menu. System information such as the system time and date, and identification information about the computer is displayed.
3. To exit the Setup Utility without changing any settings, use the arrow keys to select **Exit > Exit Discarding Changes**, and then press **enter**.

Restoring default settings in the Setup Utility

The following procedure explains how to restore the Setup Utility default settings. If the Setup Utility is not already running, begin at step 1. If the Setup Utility is already running, begin at step 2.

1. Open the Setup Utility by turning on or restarting the computer. While the “Press the ESC key for Startup Menu” message is displayed in the lower-left corner of the screen, press **f10**.


– or –

Open the Setup Utility by turning on or restarting the computer. While the “Press the ESC key for Startup Menu” message is displayed in the lower-left corner of the screen, press **esc**. When the Startup Menu is displayed, press **f10**.

2. Use the arrow keys to select **Exit > Load Setup Defaults**, and then press **enter**.

3. When the Setup Confirmation is displayed, press [enter](#).
4. To save your change and exit the Setup Utility, use the arrow keys to select **Exit > Exit Saving Changes**, and then press [enter](#).

The Setup Utility default settings go into effect when the computer restarts.

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

Exiting the Setup Utility

You can exit the Setup Utility with or without saving changes.

- To exit the Setup Utility and save your changes from the current session:

If the Setup Utility menus are not visible, press [esc](#) to return to the menu display. Then use the arrow keys to select **Exit > Exit Saving Changes**, and then press [enter](#).


- To exit the Setup Utility without saving your changes from the current session:

If the Setup Utility menus are not visible, press [esc](#) to return to the menu display. Then use the arrow keys to select **Exit > Exit Discarding Changes**, and then press [enter](#).

After either choice, the computer restarts in Windows.

Setup Utility menus

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

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

Main menu

Select	To do this
System information	<ul style="list-style-type: none"> • View and change the system time and date. • View identification information about the computer. • View specification information about the processor, memory size, system BIOS, and keyboard controller version (select models only).

Security menu

Select	To do this
Administrator password	Enter, change, or delete an administrator password.
Power-On Password	Enter, change, or delete a power-on password.

System Configuration menu

Select	To do this
Language Support	Change the Setup Utility language.
Button Sound (select models only)	Enable/disable the capacitive button tapping sound.
Virtualization Technology	Enable/disable the processor Virtualization Technology.
Processor C6 State (select models only)	Enable/disable the processor C6 sleep state.
LAN Power Saving (select models only)	Enable/disable LAN Power Saving. When enabled, saves power when the computer is in DC mode.
Card Reader/1394 Power Saving (select models only)	Enable/disable Card Reader/1394 Power Saving. When enabled, saves power when the computer is in DC mode.
Fan Always On	Enabled/disable Fan Always On. When enabled, the computer fan will always be on.
Boot Options	Set the following boot options: <ul style="list-style-type: none">• f9 and f10 Delay (sec.)—Set the delay for the f9 and f10 functions of the Setup Utility in intervals of 5 seconds each (0, 5, 10, 15, 20).• CD-ROM boot—Enable/disable boot from CD-ROM.• Floppy boot—Enable/disable boot from diskette.• Internal Network Adapter boot—Enable/disable boot from Internal Network Adapter.• Boot Order—Set the boot order for:<ul style="list-style-type: none">◦ USB Floppy◦ Internal CD/DVD ROM Drive◦ Hard drive◦ USB Diskette on Key◦ USB Hard drive◦ Network adapter

Diagnostics menu

Select	To do this
Hard Disk Self Test	Run a comprehensive self-test on the hard drive. NOTE: On models with two hard drives, this menu option is called the Primary Hard Disk Self Test .
Secondary Hard Disk Self Test (select models only)	Run a comprehensive self-test on a secondary hard drive.
Memory Test	Run a diagnostic test on the system memory.

6 Specifications

Computer specifications

	Metric	U.S.
Dimensions		
Length	23.00 cm	9.05 in
Width	31.20 cm	12.28 in
Height (front to rear)	2.59 to 3.24 cm	1.02 to 1.28 in
Weight (with optical drive, hard drive, and battery)	1.81 kg	4.00 lbs
Input power		
Operating voltage	18.5 V dc —19.0 V dc	
Operating current	3.5 A or 4.74 A	
Temperature		
Operating	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
NOTE: Applicable product safety standards specify thermal limits for plastic surfaces. The computer operates well within this range of temperatures.		

13.3-inch, WXGA, BrightView display specifications

	Metric	U.S.
Dimensions		
Height	18.0 cm	7.1 in
Width	28.7 cm	11.3 in
Diagonal	33.9 cm	13.4 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, +120/-40° vertical (typical)	

Hard drive specifications

	500-GB*	400-GB*	320-GB*	250-GB*	160-GB*
Dimensions					
Height	9.5 mm	9.5 mm	9.5 mm	9.5 mm	9.5 mm
Width	70 mm	70 mm	70 mm	70 mm	70 mm
Weight	102 g	102 g	102 g	102 g	102 g
Interface type	SATA	SATA	SATA	SATA	SATA
Transfer rate					
Synchronous (maximum)	100 MB/sec	100 MB/sec	100 MB/sec	100 MB/sec	100 MB/sec
Security	ATA security	ATA security	ATA security	ATA security	ATA security
Seek times (typical read, including setting)					
Single track	3 ms	3 ms	3 ms	3 ms	3 ms
Average	13 ms	13 ms	13 ms	13 ms	13 ms
Maximum	24 ms	24 ms	24 ms	24 ms	24 ms
Logical blocks	1,048,576,000	838,860,800	645,126,482	500,586,425	312,581,808
Disk rotational speed	5400 rpm				
Operating temperature	5°C to 55°C (41°F to 131°F)				
NOTE: Certain restrictions and exclusions apply. Consult technical support for details.					
*1 GB = 1 billion bytes when referring to hard drive storage capacity. Accessible capacity is less. Actual drive specifications may differ slightly.					

DVD±RW and CD-RW SuperMulti 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	10,800 KB/sec	
24X CD-R	3,600 KB/sec	
16X CD-RW	2,400 KB/sec	
8X DVD+R	10,800 KB/sec	
4X DVD+RW	5,400 KB/sec	
8X DVD-R	10,800 KB/sec	
4X DVD-RW	5,400 KB/sec	
2.4X DVD+R(9)	2,700 KB/sec	
5X DVD-RAM	6,750 KB/sec	
Transfer mode	Multiword DMA Mode	

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 PC Card
DMA6	Not assigned
DMA7	Not assigned

*PC Card controller can use DMA 1, 2, or 5.

System memory map specifications

Size	Memory address	System function
640 KB	00000000-0009FFFF	Base memory
128 KB	000A0000-000BFFFF	Video memory
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-FFFFFF	Unused
64 KB	FFFF0000-FFFFFFFF	System BIOS

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: PC Cards 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

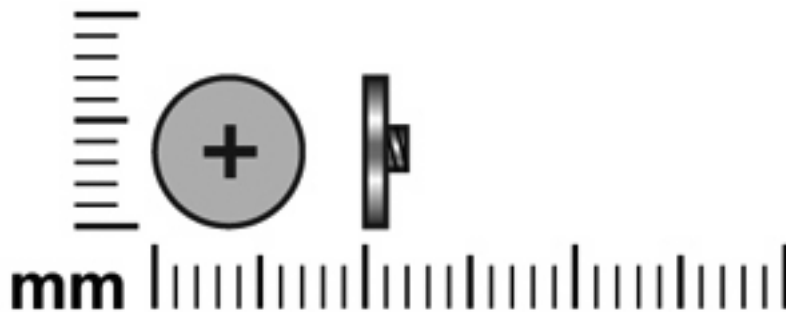
I/O address (hex)	System function (shipping configuration)
000 - 00F	DMA controller no. 1
010 - 01F	Unused
020 - 021	Interrupt controller no. 1
022 - 024	Opti chipset configuration registers
025 - 03F	Unused
02E - 02F	87334 "Super I/O" configuration for CPU
040 - 05F	Counter/timer registers
044 - 05F	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
201	JoyStick (decoded in ESS1688)
202 - 21F	Unused

I/O address (hex)	System function (shipping configuration)
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	PC Card 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)

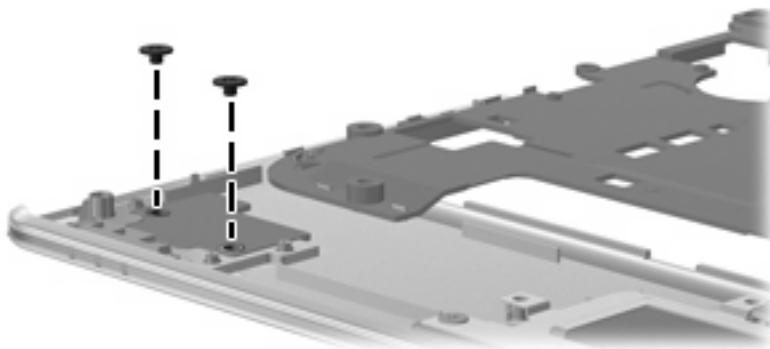
7 Screw listing

This section provides specification and reference information for the screws and screw locks used in the computer. All screws and screw locks listed in this section are available in either the Screw Kit, spare part number 506961-001, or the Display Screw Kit, spare part number 506228-001.

Phillips PM2.0×2.0 broadhead screw

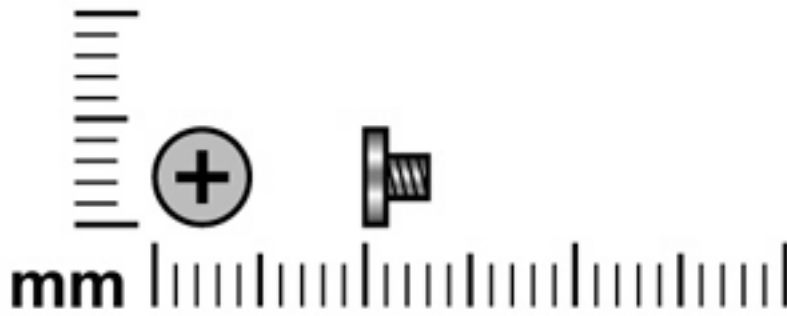


Color	Quantity	Length	Thread	Head diameter
Black	2	2.0 mm	2.0 mm	5.0 mm

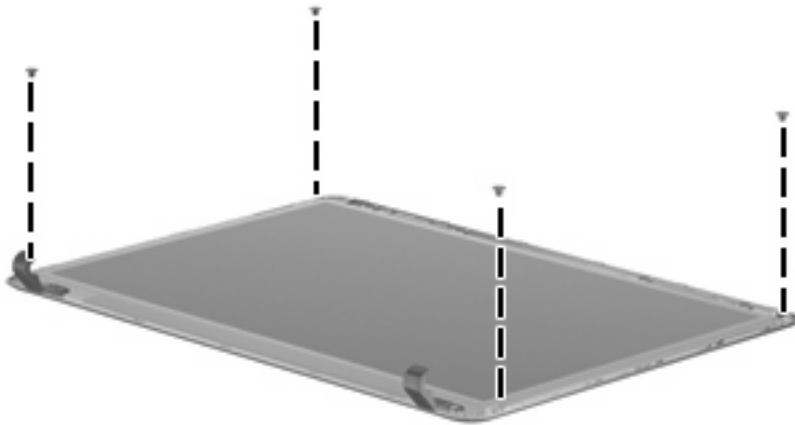


Where used: Two screws that secure the fingerprint reader board to the top cover

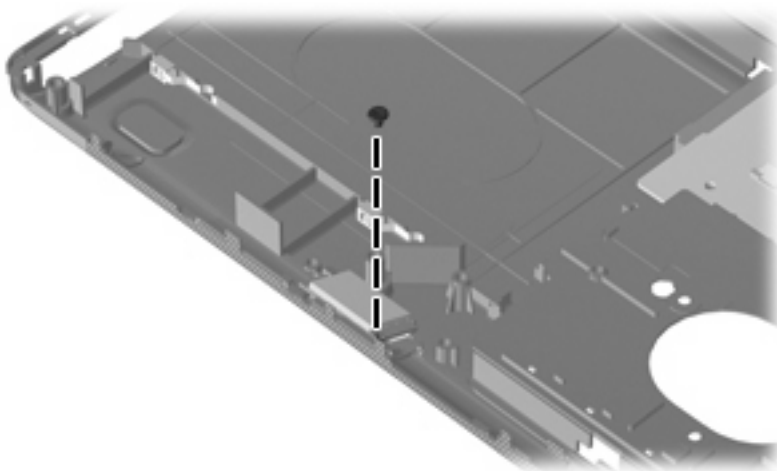
Phillips PM2.0×3.0 captive screw



Color	Quantity	Length	Thread	Head diameter
Silver	5	3.0 mm	2.0 mm	4.5 mm

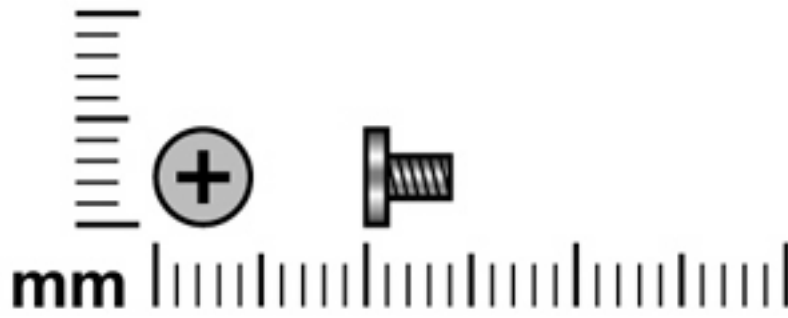


Where used: Four screws that secure the display panel to the display enclosure

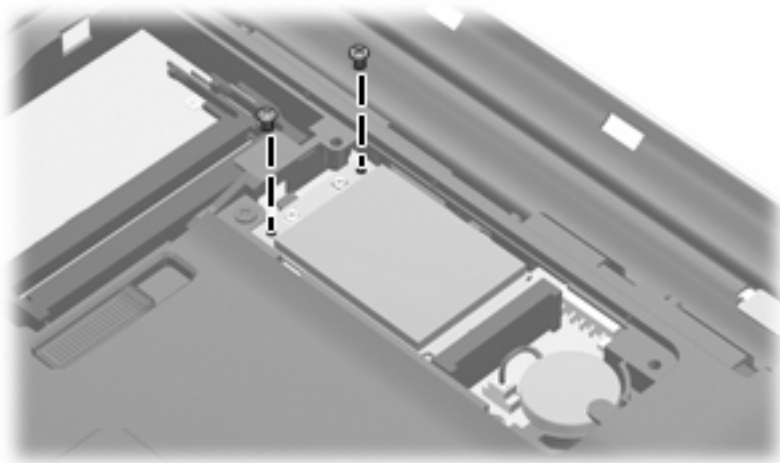


Where used: One screw that secures the Bluetooth module to the computer

Phillips PM2.0×4.0 screw

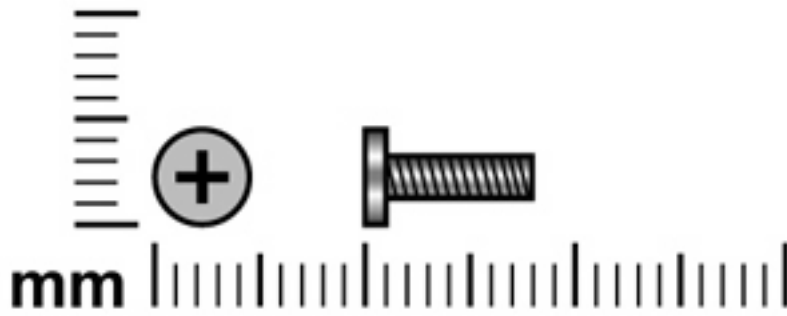


Color	Quantity	Length	Thread	Head diameter
Silver	2	4.0 mm	2.0 mm	4.5 mm

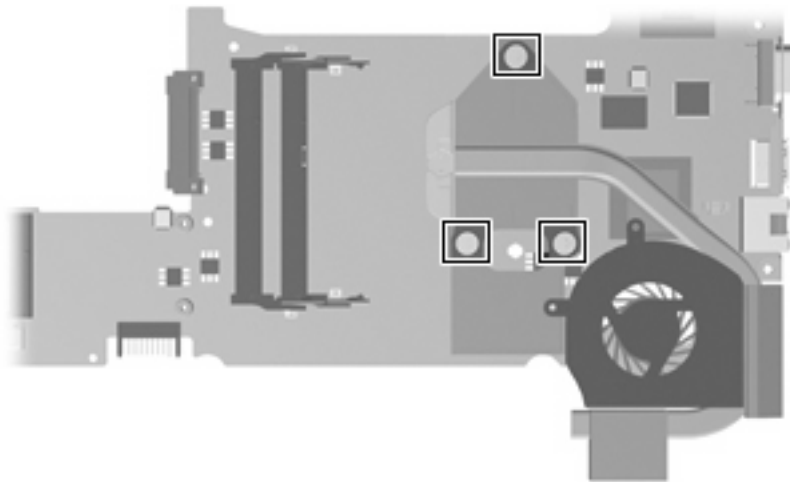


Where used: Two screws that secure the WLAN module to the computer

Phillips PM2.0×8.0 captive screw

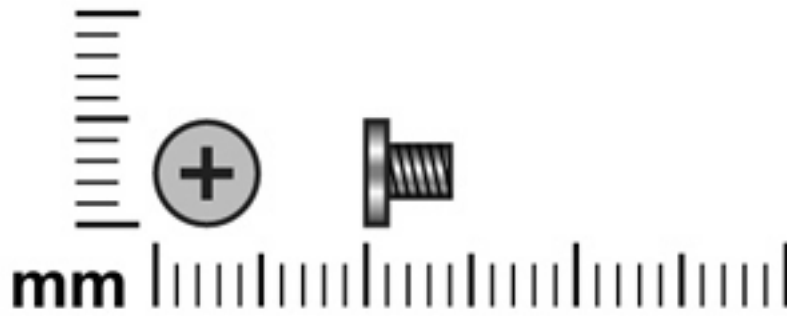


Color	Quantity	Length	Thread	Head diameter
Black	3	8.0 mm	2.0 mm	5.0 mm

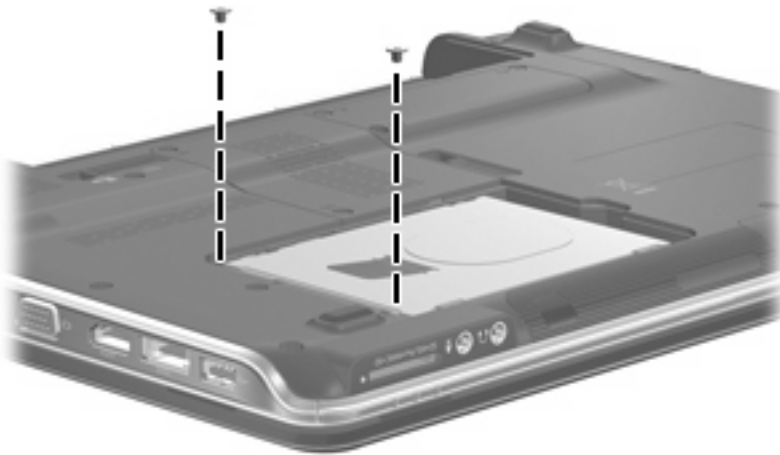


Where used: Three captive screws (secured by C-clips) that secure the heat sink retention clip to the heat sink

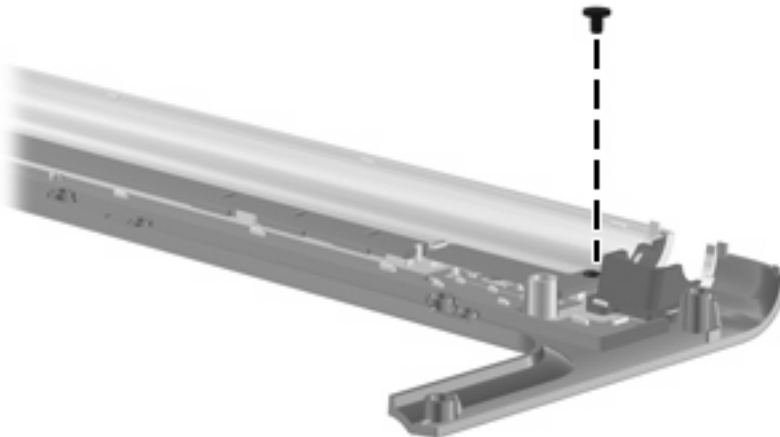
Phillips PM2.5×4.0 screw



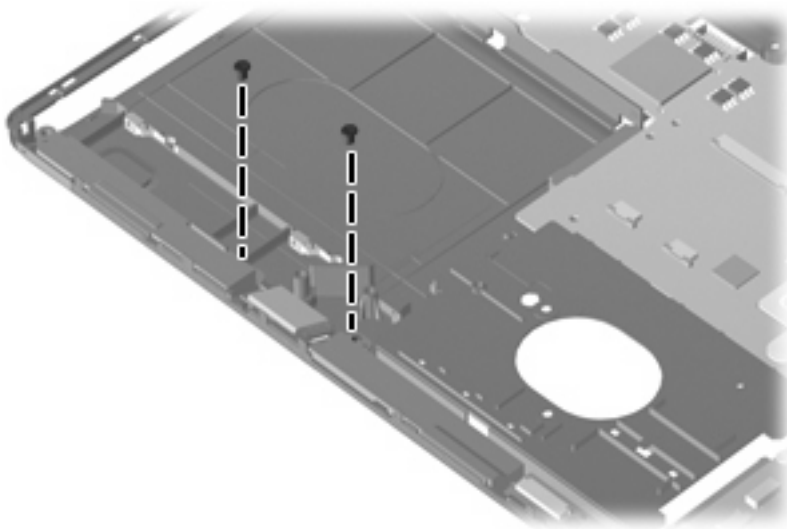
Color	Quantity	Length	Thread	Head diameter
Silver	8	4.0 mm	2.5 mm	4.5 mm



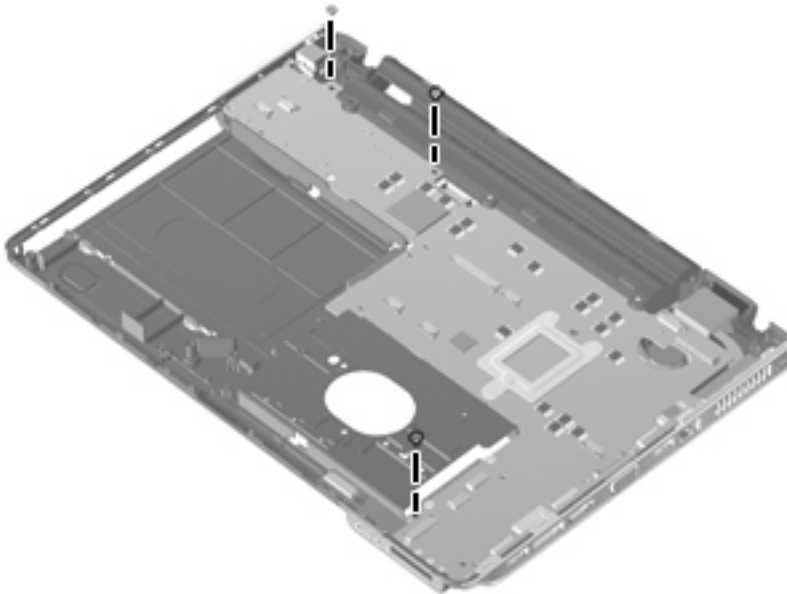
Where used: Two screws that secure the hard drive to the computer



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

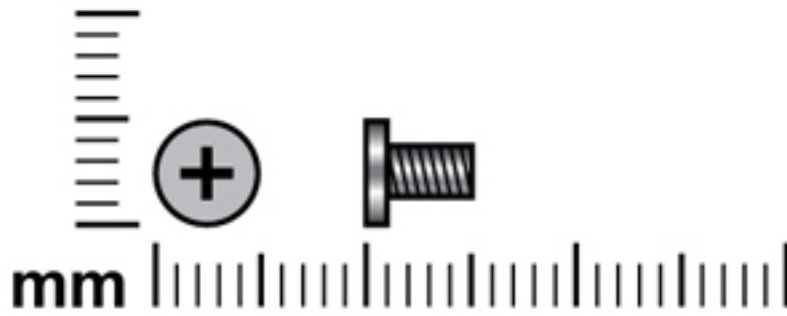


Where used: Two screws that secure the speakers to the computer

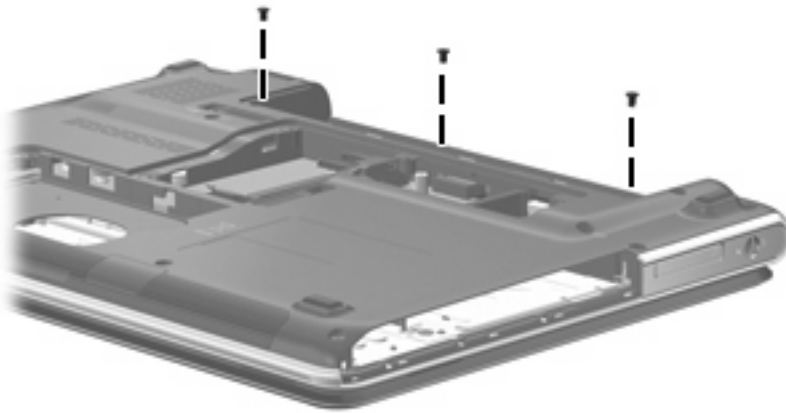


Where used: Three screws that secure the system board to the computer

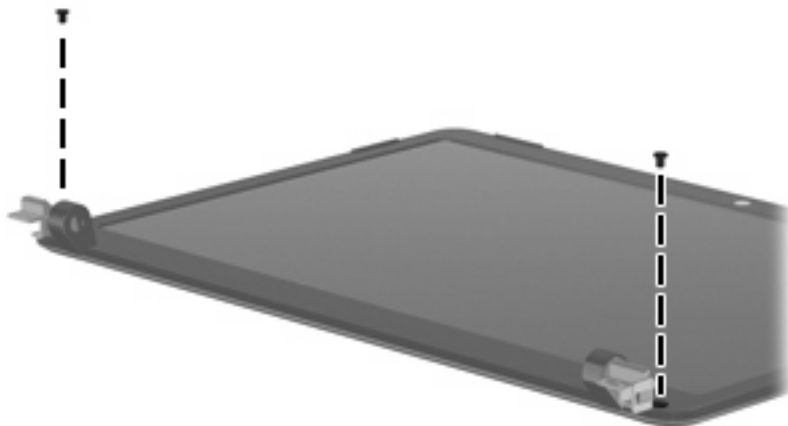
Phillips PM2.5×5.0 screw



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



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

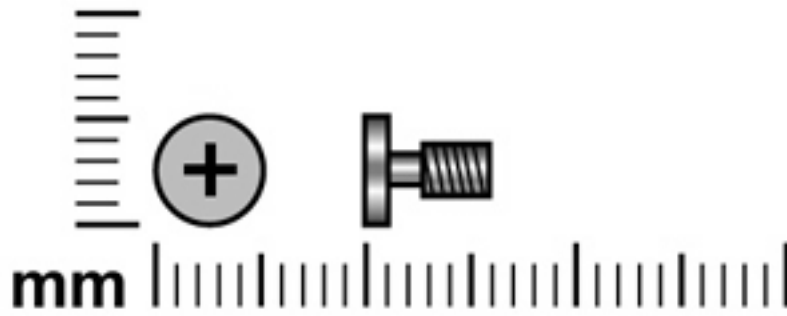


Where used: Two screws that secure the display bezel to the display

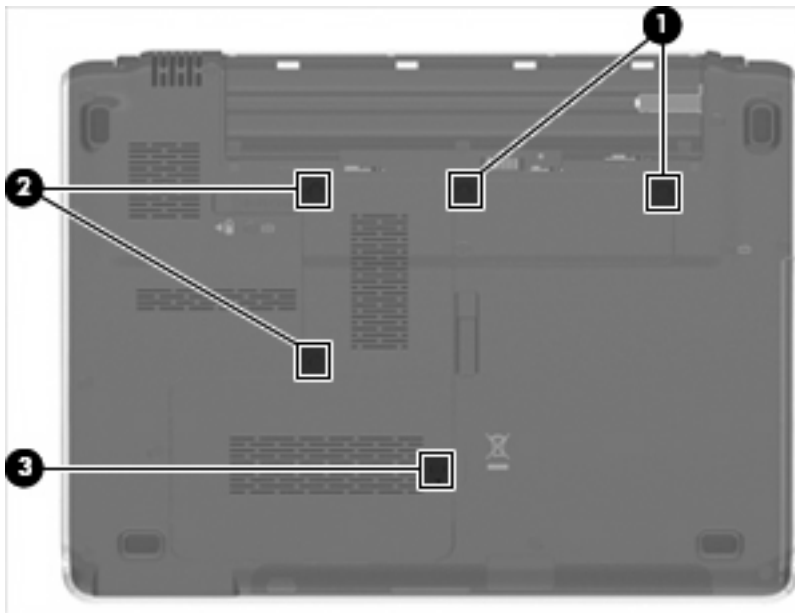


Where used: Two screws that secure the display hinges to the display

Phillips PM2.5×6.0 captive screw



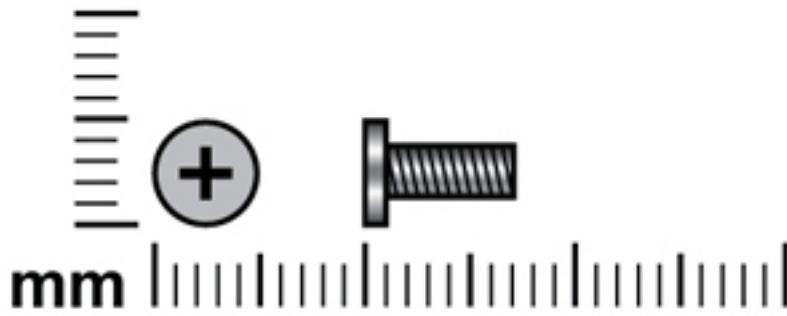
Color	Quantity	Length	Thread	Head diameter
Black	5	6.0 mm	2.5 mm	5.0 mm



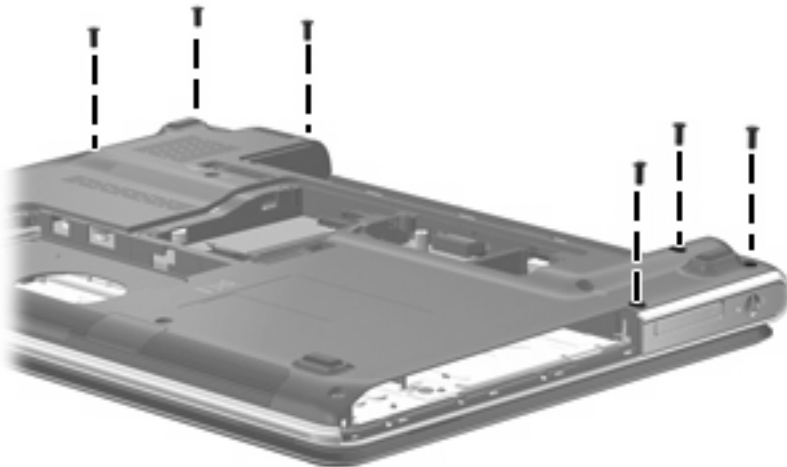
Where used:

- (1) Two captive screws (secured by a C-clip) that secure the WLAN compartment cover to the computer
- (2) Two captive screws (secured by C-clips) that secure the memory module compartment cover to the computer
- (3) One captive screw (secured by C-clips) that secures the hard drive cover to the computer

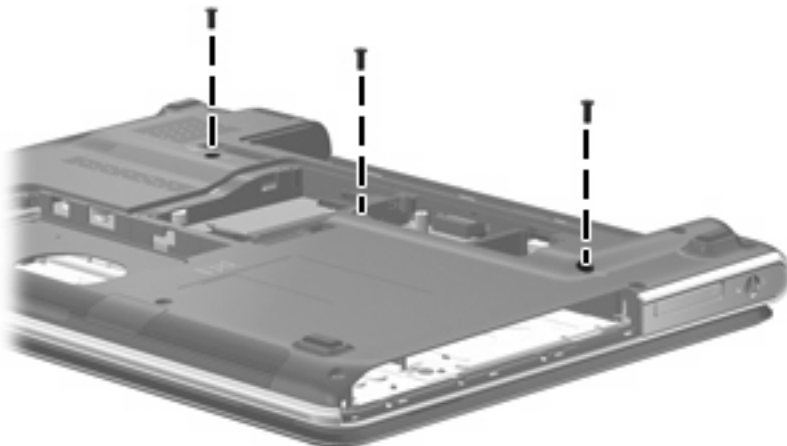
Phillips PM2.5×7.0 screw



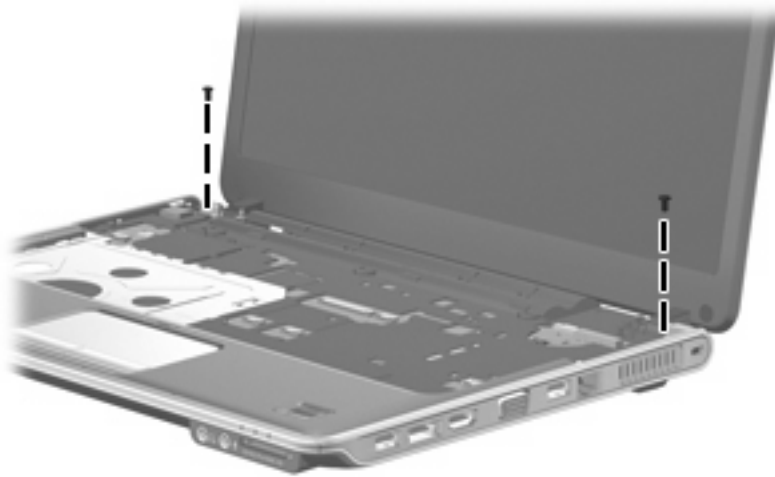
Color	Quantity	Length	Thread	Head diameter
Black	16	7.0 mm	2.5 mm	5.0 mm



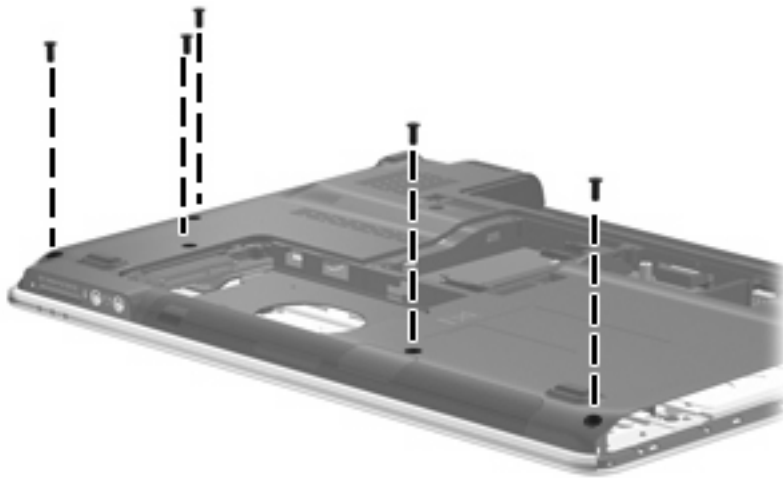
Where used: Six screws that secure the switch cover to the computer



Where used: Three screws that secure the keyboard to the computer



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



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


8 Backup and recovery

Recovering system information


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

Tools provided by the operating system and HP Recovery Manager software are designed to help you with the following tasks for safeguarding your information and restoring it in case of a system failure:

- Creating a set of recovery discs (Recovery Manager software feature). Recovery discs are used to start up (boot) your computer and restore the operating system and software programs to factory settings in case of system failure or instability.
- Backing up your information regularly to protect your important system files.
- Creating system restore points (operating system feature). System restore points allow you to reverse undesirable changes to your computer by restoring the computer to an earlier state.
- Recovering a program or driver (Recovery Manager software feature). This feature helps you reinstall a program or driver without performing a full system recovery.
- Performing a full system recovery (Recovery Manager software feature). With Recovery Manager, you can recover your full factory image if you experience system failure or instability. Recovery Manager works from a dedicated recovery partition (select models only) on the hard drive or from recovery discs you create.

 **NOTE:** If your computer includes a solid-state drive (SSD), you may not have a recovery partition. Recovery discs have been included for computers that do not have a partition. Use these discs to recover your operating system and software. To check for the presence of a recovery partition, select **Start > Computer**. If the partition is present, an HP Recovery drive is listed in the Hard Disk Drives section of the window.

Creating recovery discs

 **NOTE:** HP recommends that you create recovery discs to be sure that you can restore your system to its original factory state if you experience serious system failure or instability. Create these discs after setting up the computer for the first time.

NOTE: Handle these discs carefully and keep them in a safe place. The software allows the creation of only one set of recovery discs.

Note the following guidelines before creating recovery discs:

- You will need high-quality DVD-R, double-layer DVD-R, DVD+R, double-layer DVD+R, BD-R (writable Blu-ray), or CD-R discs. All these discs are purchased separately. DVDs and BDs have a much higher capacity than CDs. If you use CDs, up to 20 discs may be required, whereas only a few DVDs or BDs are required.



NOTE: Read-write discs, such as CD-RW, DVD±RW, double-layer DVD±RW, and BD-RE (rewritable Blu-ray) discs, are not compatible with the Recovery Manager software.

- The computer must be connected to AC power during this process.
- Only one set of recovery discs can be created per computer.
- Number each disc before inserting it into the computer optical drive.
- If necessary, you can exit the program before you have finished creating the recovery discs. The next time you open Recovery Manager, you will be prompted to continue the disc creation process.

To create a set of recovery discs:

1. Select **Start > All Programs > Recovery Manager > Recovery Manager**.

Recovery Manager opens.

2. Click **Advanced Options**.



NOTE: If you are operating the computer on battery power, you will be prompted to connect to AC power before you can go to the next step.

3. Click **Recovery disc creation**, and then click **Next**.
4. Follow the on-screen instructions.

Backing up your information

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

- Create a set of recovery discs using Recovery Manager.
- Create system restore points using the Windows® System Restore feature, and periodically copy them to disc.
- Store personal files in the Documents folder and back up these folders periodically.
- Back up templates stored in their associated programs.
- Save customized settings 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, follow these steps:

- a. Display the screen.
- b. Copy the screen:


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

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

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

Using system restore points


When you back up your system, you are creating a system restore point. A system restore point allows you to save and name 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:** Recovering to an earlier restore point does not affect data files saved or e-mails created since the last restore point.

You also can create additional restore points to provide increased protection for your system files and settings.

When to create restore points

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

 **NOTE:** If you revert to a restore point and then change your mind, you can reverse the restoration.

Create a system restore point

1. Select **Start > Control Panel > System and Maintenance > System**.
2. In the left pane, click **System protection**.
3. Click the **System Protection** tab.
4. Under **Automatic restore points**, select the disk for which you want to create a restore point.
5. Click **Create**.

The System Protection window opens.

6. Follow the on-screen instructions.

Restore to a previous date and time

To revert to a restore point (created at a previous date and time), when the computer was functioning optimally, follow these steps:


1. Select **Start > Control Panel > System and Maintenance > System**.
2. In the left pane, click **System protection**.
3. Click the **System Protection** tab.

4. Click the **System Restore** button, and then click **Next**.


The System Restore window opens.

5. Follow the on-screen instructions.

Performing a recovery

 **NOTE:** You can recover only files that you have previously backed up. HP recommends that you use HP Recovery Manager to create an entire drive backup as soon as you set up your computer.

Recovery Manager software allows you to repair or restore the system if you experience system failure or instability. Recovery Manager works from recovery discs that you create or from a dedicated recovery partition (select models only) on the hard drive. However, if your computer includes a solid-state drive (SSD), you may not have a recovery partition. If that is the case, recovery discs have been included with your computer. Use these discs to recover your operating system and software.

 **NOTE:** Windows has its own built-in repair features, such as System Restore and driver roll-back capabilities. If you have not already tried these features, try them before using Recovery Manager.


NOTE: Recovery Manager recovers only software that was preinstalled at the factory. Software not provided with this computer must be downloaded from the manufacturer's Web site or reinstalled from the disc provided by the manufacturer.

Recovering from the recovery discs

To restore the system from the recovery discs:

1. Back up all personal files.
2. Insert the first recovery disc into the optical drive and restart the computer.
3. Follow the on-screen instructions.

Recovering from the dedicated recovery partition (select models only)

 **NOTE:** If your computer includes an SSD, you may not have a recovery partition. You will not be able to recover using this procedure. Recovery discs have been included for computers that do not have a partition. Use these discs to recover your operating system and software.

On some models, you can perform a recovery from the partition on the hard drive from either the Start button or **f11**. This restores the computer to its factory condition.

To restore the system from the partition, follow these steps:

1. Access Recovery Manager in either of the following ways:
 - Select **Start > All Programs > Recovery Manager > Recovery Manager**.
 - or—
 - Restart the computer and press **f11** while the “Press <F11> for recovery” message is displayed on the screen. Then select **Recovery Manager**.

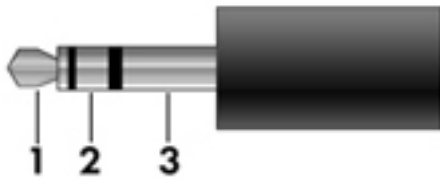
Recovery Manager opens.

2. Click **Advanced Options**.

3. Click **System recovery**, and then click **Next**.
4. Follow the on-screen instructions.

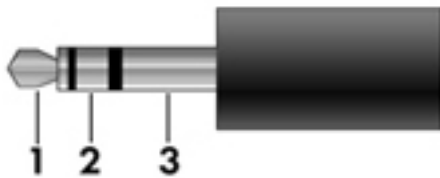
9 Connector pin assignments

Audio-in (microphone)



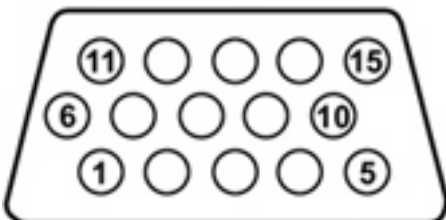
Pin	Signal
1	Audio signal in
2	Audio signal in
3	Ground

Audio-out (headphone)



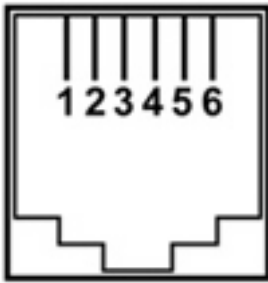
Pin	Signal
1	Audio out, left channel
2	Audio out, right channel
3	Ground

External monitor



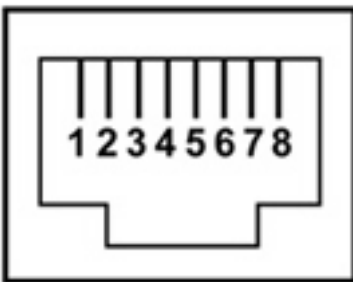
Pin	Signal
1	Red analog
2	Green analog
3	Blue analog
4	Not connected
5	Ground
6	Ground analog
7	Ground analog
8	Ground analog
9	+5 VDC
10	Ground
11	Monitor detect
12	DDC 2B data
13	Horizontal sync
14	Vertical sync
15	DDC 2B clock

RJ-11 (modem)



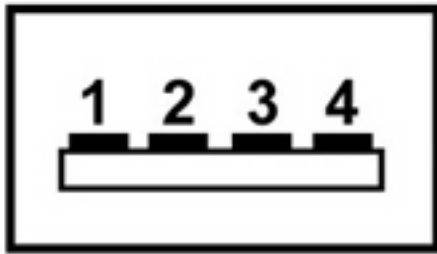
Pin	Signal
1	Unused
2	Tip
3	Ring
4	Unused
5	Unused
6	Unused

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

10 Power cord set requirements

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

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

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

Requirements for all countries or regions

The requirements listed below are applicable to all countries or 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 each country or region's power system.
- 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 or regions

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

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

11 Recycling

Battery

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

Display

- ⚠ **WARNING!** The backlight contains mercury. Caution must be exercised when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.
- ⚠ **CAUTION:** The procedures in this 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. Careful handling must be exercised when removing these components.
- 📄 **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>.

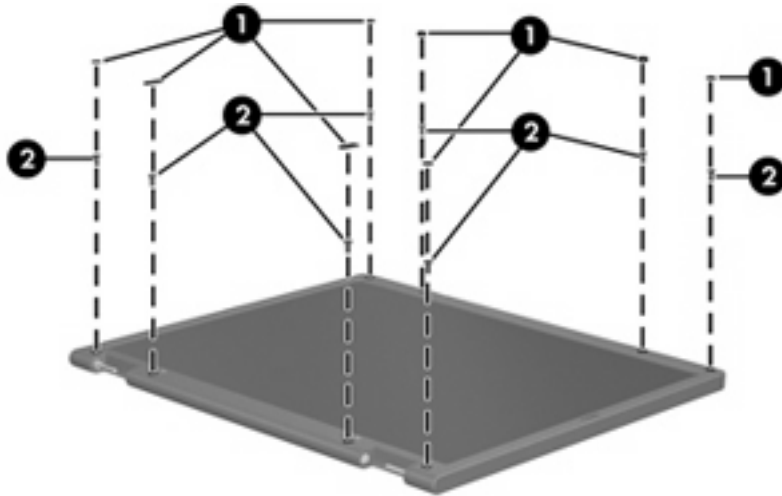
This section provides disassembly instructions for the display assembly. The display assembly must be disassembled to gain access to the backlight **(1)** and the liquid crystal display (LCD) panel **(2)**.



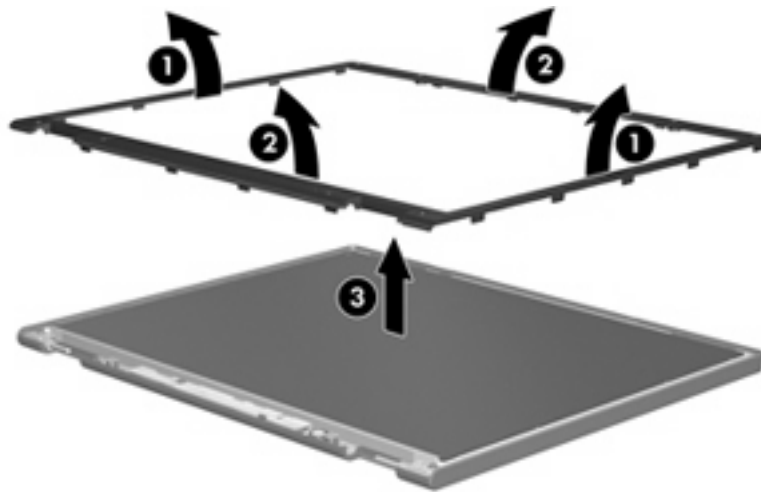
- 📄 **NOTE:** The procedures provided in this appendix are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

Perform the following steps to disassemble the display assembly:

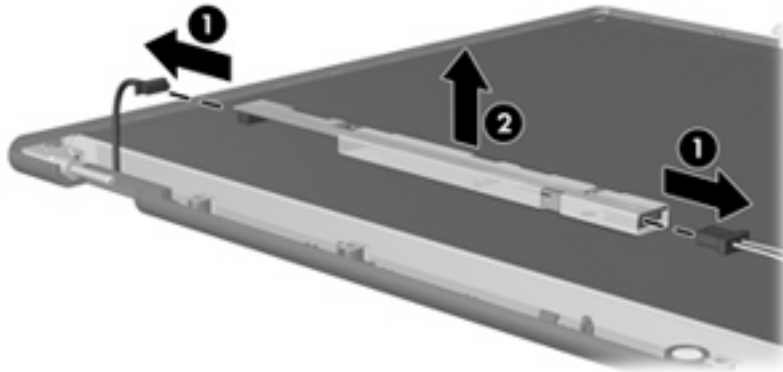
1. Remove all screw covers (1) and screws (2) that secure the display bezel to the display assembly.



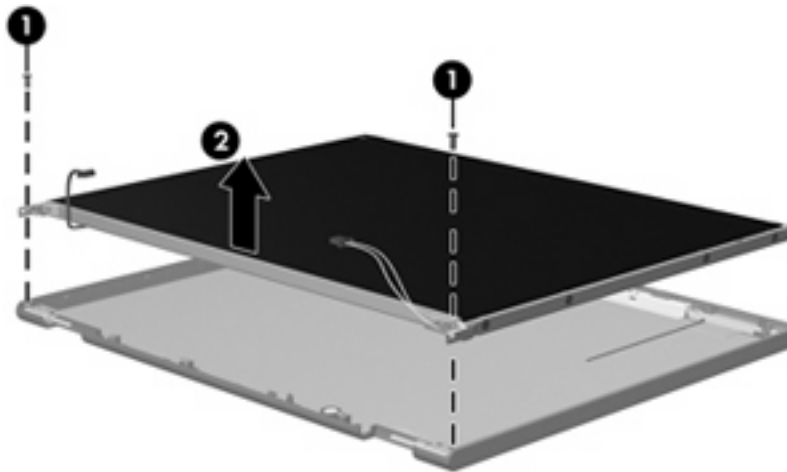
2. Lift up and out on the left and right inside edges (1) and the top and bottom inside edges (2) of the display bezel until the bezel disengages from the display assembly.
3. Remove the display bezel (3).



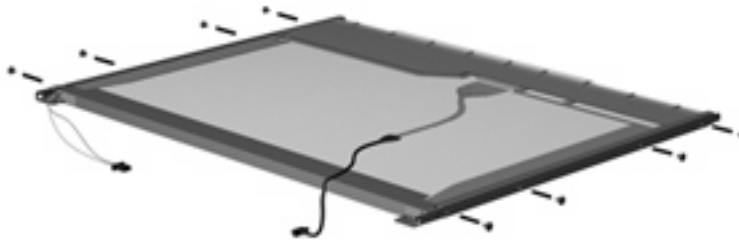
4. Disconnect all display panel cables (1) from the display inverter and remove the inverter (2).



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.

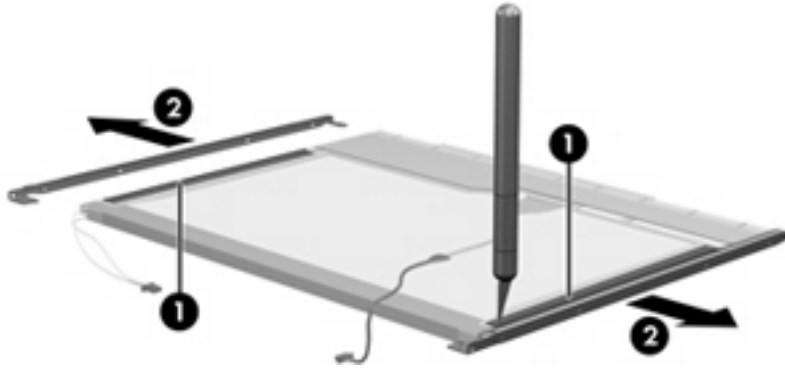


7. Turn the display panel assembly upside down.
8. Remove all screws that secure the display panel frame to the display panel.

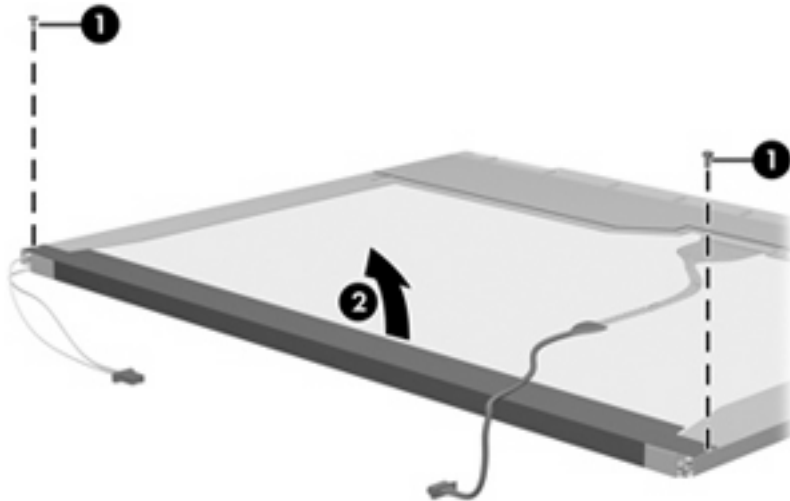


9. Use a sharp-edged tool to cut the tape (1) that secures the sides of the display panel to the display panel frame.

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

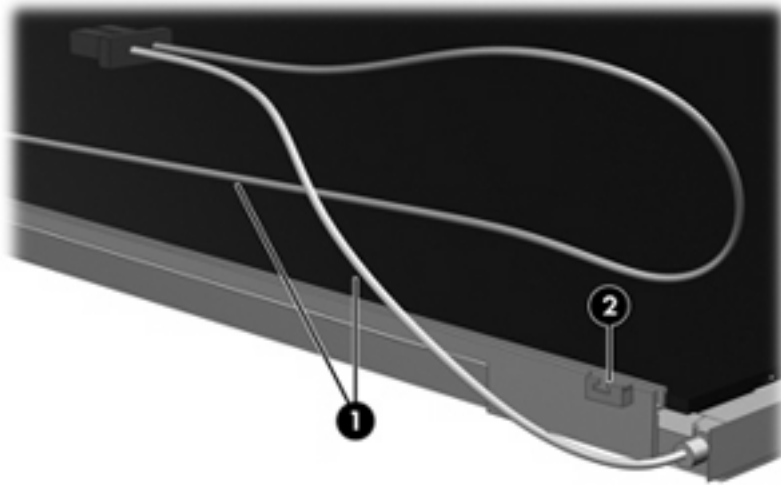


11. Remove the screws (1) that secure the backlight cover to the display panel.
12. Lift the top edge of the backlight cover (2) and swing it outward.

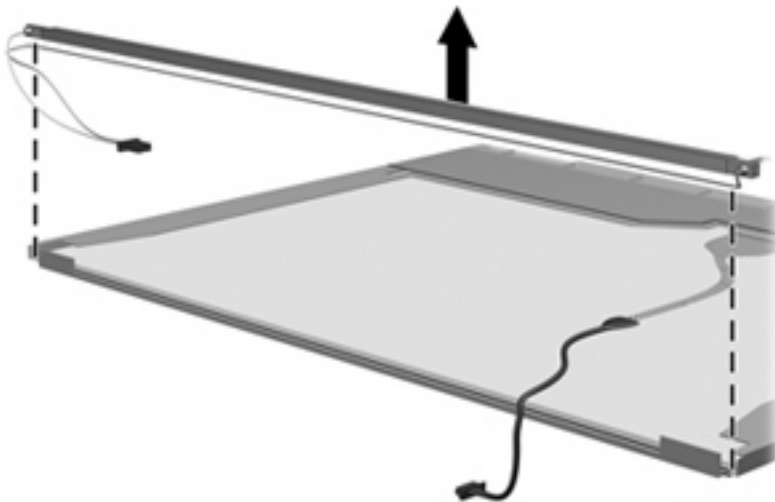


13. Remove the backlight cover.
14. Turn the display panel right-side up.

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

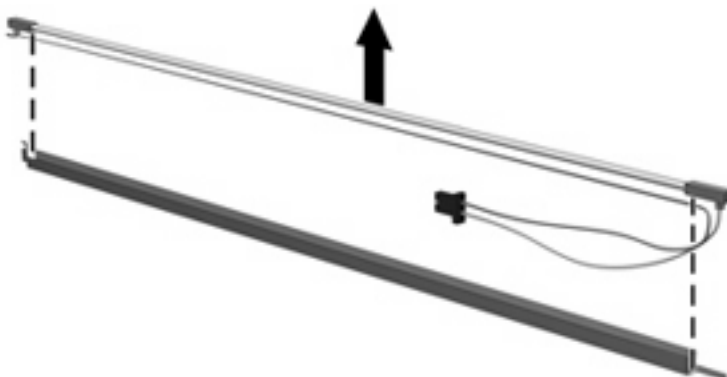


16. Turn the display panel upside down.
17. Remove the backlight frame from the display panel.

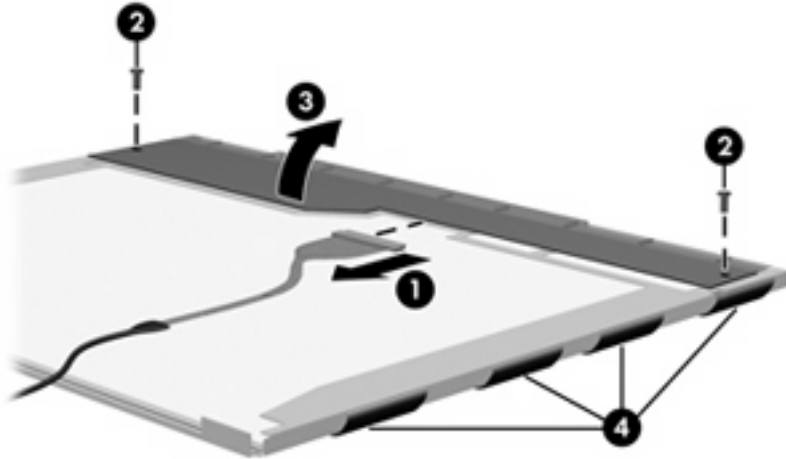


⚠ WARNING! The backlight contains mercury. Exercise caution when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.

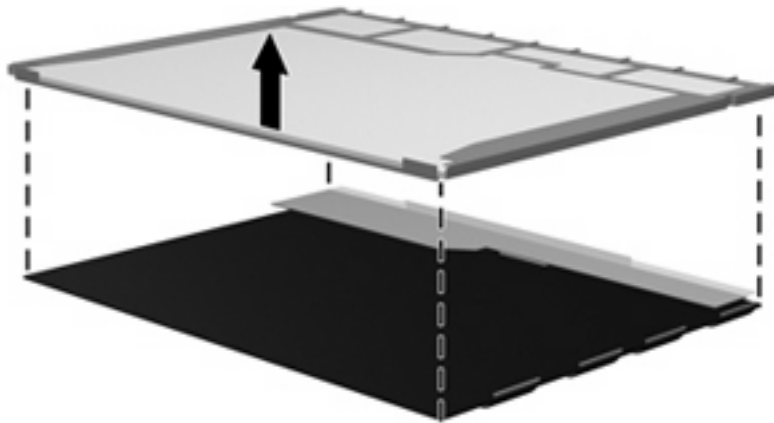
18. Remove the backlight from the backlight frame.



19. Disconnect the display cable (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 Power Saving 65

A

AC adapter light, identifying 11

AC adapter, spare part number 21

administrator password 64

antenna

illustrated 17

removal 47

spare part number 18

applications key, Windows 7

audio board

spare part number 15

audio, product description 2

audio-in (microphone) jack, identifying 10

audio-in jack

pin assignments 90

audio-out (headphone) jack, identifying 10

audio-out jack

pin assignments 90

B

backup 86

base enclosure, spare part number 15

battery

removal 32

spare part numbers 16, 32

battery bay, identifying 12

battery light, identifying 9

battery release latch, identifying 12

bays

battery 12

hard drive 12

Bluetooth module

removal 55

spare part number 16, 55

boot options 65

boot order 65

button sound 65

buttons

MediaSmart 5

next/fast forward 6

play/pause 6

power 5

previous/rewind 6

stop 6

TouchPad 9

TouchPad on/off 9

volume mute 5

wireless 6

C

cables, service considerations 25

camera, product description 2

camera/microphone module

removal 45

spare part number 17, 46

camera/microphone module cable

removal 48

spare part number 18

caps lock light, identifying 8

Card Reader Power Saving 65

changing the Setup Utility

language 62

chipset, product description 1

CMOS clearing 29

compartments

memory module 12

wireless module 12

components

bottom 12

display 4

front 4, 10

left-side 11

right-side 10

computer feet

locations 31

spare part number 31

computer specifications 66

connector pin assignments

audio-in 90

audio-out 90

external monitor 90

headphone 90

microphone 90

modem 92

monitor 90

network 92

RJ-11 92

RJ-45 92

Universal Serial Bus (USB) 93

connector, power 11

connectors

service considerations 25

D

Diagnostics menu 65

Digital Media Slot, identifying 10

diskette drive, precautions 25

display assembly

removal 43

spare part number 14

spare part numbers 43

display bezel

illustrated 17

removal 44

spare part number 17, 45

Display Bracket Kit

spare part number 17

Display Cable Kit, spare part

number 18, 47

display components

illustrated 17

- recycling 96
- spare part numbers 17
- display enclosure
 - illustrated 17
 - spare part number 18
- display hinge
 - illustrated 17
 - removal 46
 - spare part number 17, 47
- Display Hinge Covers
 - spare part number 18
- Display Hinge Kit, spare part number 17
- display inverter
 - illustrated 17
- display panel
 - illustrated 17
 - product description 1
 - removal 46
 - spare part number 17, 46
- Display Rubber Kit, spare part number 18
- Display Screw Kit, spare part number 18
- display specifications 67
- displaying system information 63
- docking support, product description 3
- drive light, identifying 9
- drives, boot order 65
- drives, preventing damage 25
- DVD±RW and CD-RW Combo Drive
 - precautions 25
 - removal 35
 - spare part number 15, 20, 35
 - specifications 69

E

- electrostatic discharge 26
- eSATA/USB port, identifying 10
- esc key, identifying 6
- Ethernet, product description 2
- exiting the Setup Utility 64
- ExpressCard slot bezel 19
- ExpressCard slot, identifying 11
- external media cards, product description 2

- external monitor port
 - pin assignments 90
- external monitor port, identifying 11

F

- f11 88
- fan always on 65
- fan/heat sink assembly
 - removal 58
 - spare part number 58
- feet
 - locations 31
 - spare part number 31
- fingerprint reader 62
- fingerprint reader board
 - removal 51
 - spare part number 15, 51
- fingerprint reader, identifying 6
- fn key, identifying 7
- front components 4
- full system recovery 85
- function keys, identifying 7

G

- graphics, product description 1
- grounding equipment and methods 28

H

- hard drive
 - precautions 25
 - product description 1
 - removal 38
 - spare part numbers 16, 20, 38
 - specifications 68
- hard drive bay, identifying 12
- hard drive cover
 - 38
 - illustrated 19
 - spare part number 38
- Hard Drive Kit, spare part number 16, 20, 38
- hard drive self test 65
- HDMI port, identifying 11
- headphone (audio-out) jack 10
- headphone jack
 - pin assignments 90
- heat sink
 - spare part number 15

I

- I/O address specifications 72
- infrared lens, identifying 10
- integrated webcam light, identifying 4
- internal microphones, identifying 4
- interrupt specifications 71

J

- jacks
 - audio-in (microphone) 10
 - audio-out (headphone) 10
 - RJ-45 (network) 11

K

- keyboard
 - product description 3
 - spare part numbers 15
- keyboard and switch cover
 - removal 40
 - spare part numbers 40
- keypad keys, identifying 7
- keys
 - esc 6
 - fn 7
 - function 7
 - keypad 7
 - Windows applications 7
 - Windows logo 7

L

- LAN Power Saving 65
- language support 65
- latch, battery release 12
- LED bracket
 - spare part number 15
- lights
 - battery 9
 - caps lock 8
 - drive 9
 - mute 8
 - num lock 8
 - optical drive 11
 - power 8, 11
 - TouchPad 9
 - volume down 8
 - volume mute 8
 - volume up 8
 - webcam 4
 - wireless 8

- M**
- Main menu 64
- mass storage devices, spare part numbers 20
- media activity buttons, identifying 6
- MediaSmart button, identifying 5
- memory map specifications 70
- memory module
 - product description 1
 - removal 36
 - spare part numbers 16, 36
- memory module compartment cover
 - illustrated 19
 - removal 36
 - spare part number 36
- memory module compartment, identifying 12
- memory test 65
- microphone
 - illustrated 17
 - product description 2
- microphone (audio-in) jack 10
- microphone jack
 - pin assignments 90
- model name 1
- modem jack
 - pin assignments 92
- monitor port
 - pin assignments 90
- monitor port, external 11
- mute button, identifying 5
- mute light, identifying 8

- N**
- navigating in the Setup Utility 63
- network jack
 - pin assignments 92
- next/fast forward button, identifying 6
- num lock light, identifying 8

- O**
- operating system, product description 3
- optical drive
 - precautions 25
 - product description 2
 - removal 35
- spare part numbers 15, 20, 35
- specifications 69, 70
- optical drive light, identifying 11
- optical drive, identifying 11

- P**
- packing guidelines 27
- password clearing 29
- passwords 64
- plastic parts 24
- Plastics Kit
 - contents 19
 - spare part number 15, 19
- play/pause button, identifying 6
- pointing device
 - product description 3
- ports
 - eSATA/USB 10
 - external monitor 11
 - HDMI 11
 - product description 2
 - USB 10
- power button, identifying 5
- power connector
 - spare part number 15
- power connector, identifying 11
- power cord
 - set requirements 94
 - spare part numbers 21
- power lights, identifying 8
- power requirements, product description 3
- power-on password 64
- previous/rewind button, identifying 6
- processor
 - product description 1
 - removal 60
 - spare part numbers 15, 60
- Processor C4 State 65
- product description
 - audio 2
 - camera 2
 - chipset 1
 - display panel 1
 - docking support 3
 - Ethernet 2
 - external media cards 2
 - graphics 1
 - hard drives 1
 - keyboard 3
 - memory module 1
 - microphone 2
 - operating system 3
 - optical drives 2
 - pointing devices 3
 - ports 2
 - power requirements 3
 - processors 1
 - product name 1
 - security 3
 - serviceability 3
 - wireless 2
- product name 1

- R**
- recovering a program or driver 85
- recovering from the dedicated recovery partition 88
- recovering from the recovery discs 88
- recovery discs 85
- Recovery Manager 85, 88
- recovery partition 85
- recovery, system 88
- remote control, spare part numbers 21
- removal/replacement preliminaries 24
- procedures 30
- restore points 87
- restoring default settings 63
- RJ-11 jack
 - pin assignments 92
- RJ-45 (network) jack, identifying 11
- RJ-45 jack
 - pin assignments 92
- RTC battery
 - removal 57
 - spare part number 15, 57
- Rubber Foot Kit, spare part number 15, 31

- S**
- Screw Kit
 - contents 74
 - spare part number 21
- screw listing 74

- scrolling regions, TouchPad 9
- secondary hard drive self test 65
- security cable slot, identifying 11
- Security menu 64
- security, product description 3
- selecting in the Setup Utility 63
- serial number 13, 30
- service considerations 24
- serviceability, product description 3
- Setup Utility 62
- slots
 - Digital Media 10
 - ExpressCard 11
 - memory module 12
 - security cable 11
- solid-state drive (SSD) 85, 88
- speakers
 - removal 54
 - spare part number 15, 54
- speakers, identifying 10
- specifications
 - computer 66
 - display 67
 - DVD±RW and CD-RW Combo Drive 69
 - hard drive 68
 - I/O addresses 72
 - interrupts 71
 - memory map 70
 - optical drive 69, 70
 - system DMA 70
- starting the Setup Utility 62
- static-shielding materials 28
- stop button, identifying 6
- supported discs 86
- switch cover
 - spare part number 14
- system board
 - removal 52
 - spare part number 15
 - spare part numbers 52
- System Configuration menu 65
- system DMA 70
- system failure or instability 85
- system information 64
- system memory map 70
- system recovery 88
- system restore points 85

T

- thermal paste, replacement 59
- tools required 24
- top cover
 - removal 49
 - spare part number 15, 49
- TouchPad
 - buttons 9
 - identifying 9
 - scrolling regions 9
- touchpad board
 - spare part number 15
- touchpad bracket
 - spare part number 15
- TouchPad light, identifying 9
- TouchPad on/off button 9
- transporting guidelines 27

U

- Universal Serial Bus (USB) port
 - pin assignments 93
- unknown password 29
- USB ports, identifying 10

V

- vents, identifying 11, 12
- Virtualization Technology 65
- volume down light, identifying 8
- volume mute button, identifying 5
- volume mute light, identifying 8
- volume scroll zone, identifying 5
- volume up light, identifying 8

W

- webcam, identifying 4
- Windows applications key, identifying 7
- Windows logo key, identifying 7
- wireless antenna
 - illustrated 17
 - removal 47
 - spare part number 18
- wireless antennae, identifying 4
- wireless button, identifying 6
- wireless light, identifying 8
- wireless module compartment
 - cover
 - illustrated 19
 - removal 33
 - spare part number 33

- wireless module compartment, identifying 12
- wireless, product description 2
- WLAN module
 - removal 33
 - spare part numbers 16, 33
- workstation guidelines 27

