HP 2133 Mini-Note PC
Maintenance and Service Guide

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Safety warning notice

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

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1 Product description

Category	Description
Product Name	HP 2133 Mini-Note PC
Processors	VIA Technology C7-M Ultra Low Voltage (ULV) processors
	• VIA C7-M ULV 1.6-GHz processor, 800-MHz front-side bus (FSB), 8-W thermal design power (TDP)
	• VIA C7-M ULV 1.2-GHz processor, 800-MHz FSB, 5-W TDP
	• VIA C7-M ULV 1.0-GHz processor, 400-MHz FSB, 3.5-W TDP
Chipset	Northbridge: VIA CN896
	Southbridge: VIA 8237s
Graphics	VIA Universal Memory Architecture (UMA) graphics subsystem
Panels	All display assemblies include 2 microphones, 2 speakers, and 2 WLAN antenna transceivers and cables
	• 8.9-inch WXGA (1280 × 768) with camera
	• 8.9-inch WXGA (1280 × 768) without camera
	• 8.9-inch WSVGA (1024 × 600) with camera
	• 8.9-inch WSVGA (1024 × 600) without camera
Memory	One customer-accessible/upgradable memory module slot
	Supports up to 2 GB of system RAM
	PC2-5300, 667-MHz, DDR2
	Supports the following configurations: • 2048-MB total system memory (2048 × 1) • 1024-MB total system memory (1024 × 1) • 512-MB total system memory (512 × 1)
Mass storage device	Supports 9.5-mm (2.5-inch) serial ATA (SATA) hard drives
	Supports the following SATA hard drives: • 160-GB, 7200-rpm • 160-GB, 5400-rpm • 120-GB, 7200-rpm • 120-GB, 5400-rpm

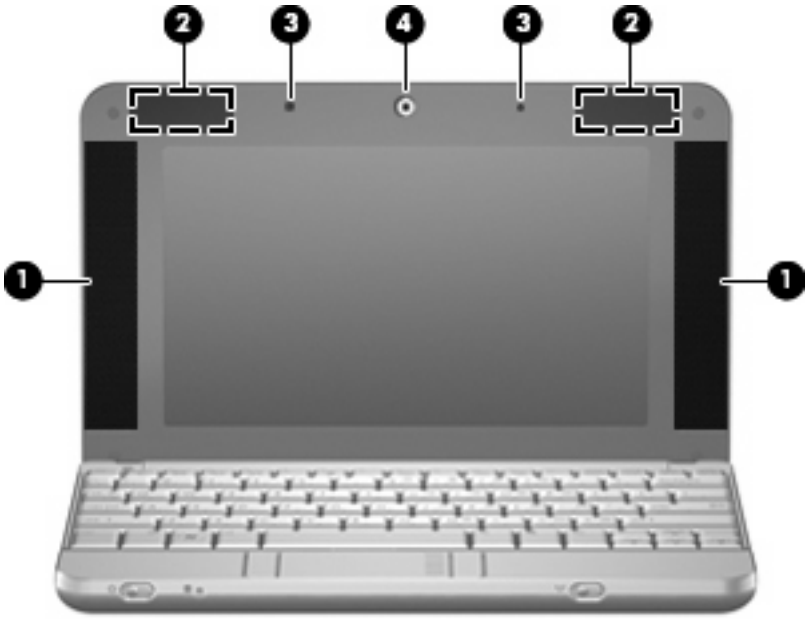
Category	Description
	80-GB solid state drive
	Supports 9.5-mm (2.5-inch) SATA 4-GB flash storage drive
Optical drive	Supports external USB optical drive only
Diskette drive	Supports external USB diskette drive only
Audio	HD audio - AD1984
	Stereo speakers (2)
	Intergrated stereo microphones (2)
Webcam	Optional integrated VGA webcam
Modem	Supports external USB modem only
Ethernet	Broadcom 5788 10/100/1000 LAN
	S3/S4/S5 wake on LAN: DC - no
	S3/S4/S5 wake on LAN: AC - yes
Wireless	**Integrated WLAN options by way of wireless module:**
	2 WLAN antennae built into display assembly
	Support for no-WLAN option
	Support for the following WLAN formats: • Broadcom 4311AG 802.11a/b/g WLAN module • Broadcom BCM4312 802.11b/g WLAN module
	Integrated personal area network (PAN) options by way of Bluetooth® module:
	Support for no-WPAN option
	Broadcom Bluetooth 2.0+EDR
External media card	One ExpressCard/54 slot
	SD/MMC Card Reader supporting Secure Digital (SD) Memory Card and MultiMediaCard (MMC)
Ports	Audio-in (stereo microphone)
	Audio-out (stereo headphone)
	RJ-45 (Ethernet, includes link and activity lights)
	USB (non-powered)
	USB (powered)
	VGA (Dsub 15-pin) supporting 1920 × 1440 external resolution at 75-GHz (hot plug/unplug with auto-detect)
	2-pin AC power
Keyboard/ pointing devices	25.4-cm (10.0-inch) keyboard with embedded numeric keypad
	Windows Vista® Start button

Category	Description
	TouchPad, with 2 TouchPad buttons and vertical scrolling (taps enabled as default)
Power requirements	65-W AC adapter with localized cable plug support (3-wire plug, supports 2-pin DC connector)
	6-cell, 55-Wh Li-ion battery
	3-cell, 28-Wh Li-ion battery
Security	Supports Kensington security lock
	HP 3D DriveGuard
Operating system	**Preinstalled:**
	Windows Vista® Basic 32 with Office 2007 Ready
	Windows Vista Business 32 with Office 2007 Ready
	Windows® XP Professional
	Windows XP Home
	SUSE Linux Enterprise Desktop
	Restore media:
	DR DVD Windows Vista Home Basic
	OS DVD Windows Vista Business
	DR DVD/OS DVD Windows XP Pro
	SUSE Linux Enterprise Desktop
Serviceability	**End-user replaceable parts:**
	AC adapter
	Battery (system)
	Hard drive
	Memory module

2 External component identification

Top components

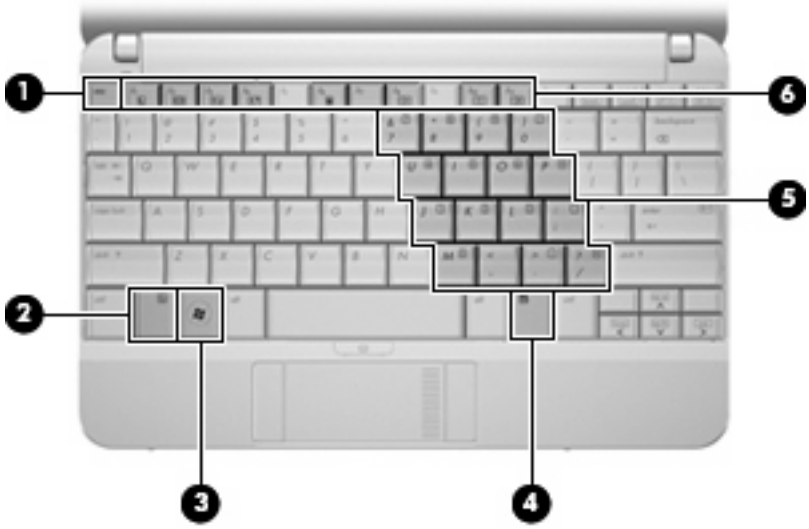
Display



Item	Component	Function
(1)	Speakers (2)	Produce sound.
(2)	Wireless antennae (2)	Send and receive signals from one or more wireless devices. **NOTE:** The antennae are not visible from the outside of the computer.
(3)	Internal microphones (2)	Record sound. **NOTE:** If there is a microphone icon next to each microphone opening, your computer has internal microphones.
(4)	Webcam (select models only)	• Records and plays back webcam video. • Includes streaming video options and special effects for adding frames, filters, and emoticons to snapshots and video.

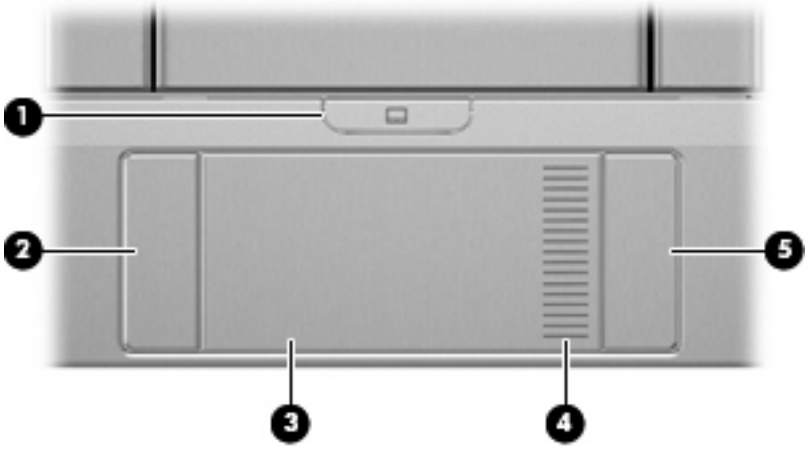
Item	Component	Function
		• Captures single frame or burst webcam snapshots. • Connects to e-mail photos and video.

Keys



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

TouchPad



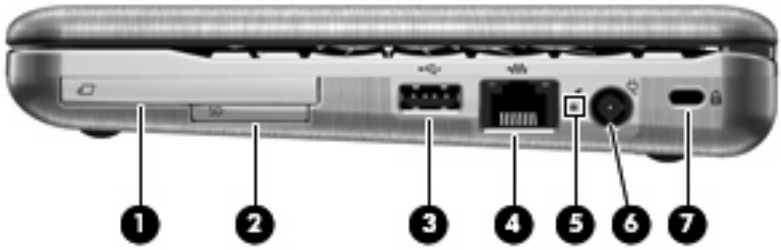
Item	Component	Function
(1)	TouchPad on/off button	Enables/disables the TouchPad.
(2)	Left TouchPad button*	Functions like the left button on an external mouse.
(3)	TouchPad*	Moves the pointer and selects or activates items on the screen.
(4)	TouchPad scroll zone	Scrolls up or down.
(5)	Right TouchPad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

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

Front components

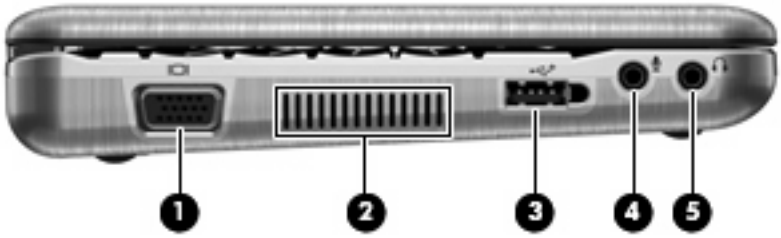
Item	Component	Function
(1)	Power light	• Blue: The computer is on. • Blinking: The computer is in the Sleep state. • Off: The computer is off or in Hibernation.
(2)	Power switch	• When the computer is off, slide the switch to turn on the computer. • When the computer is on, slide the switch briefly to initiate Hibernation. • When the computer is in the Sleep state, slide the switch briefly to exit Sleep. • When the computer is in Hibernation, slide the switch briefly to exit Hibernation. If the computer has stopped responding and Windows® shutdown procedures are ineffective, slide and hold the power switch for at least 5 seconds to turn off the computer. To learn more about your power settings, select **Start > Control Panel > System and Maintenance > Power Options.**
(3)	Drive light	Blinking: The hard drive is being accessed.
(4)	Wireless light	• Blue: An integrated wireless device, such as a wireless local area network (WLAN) device, the HP Broadband Wireless Module, and/or a Bluetooth® device, is on. • Amber: All wireless devices are off. **NOTE:** The wireless light turns amber when the computer turns on, but all wireless devices are off.
(5)	Wireless switch	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.

Right-side components



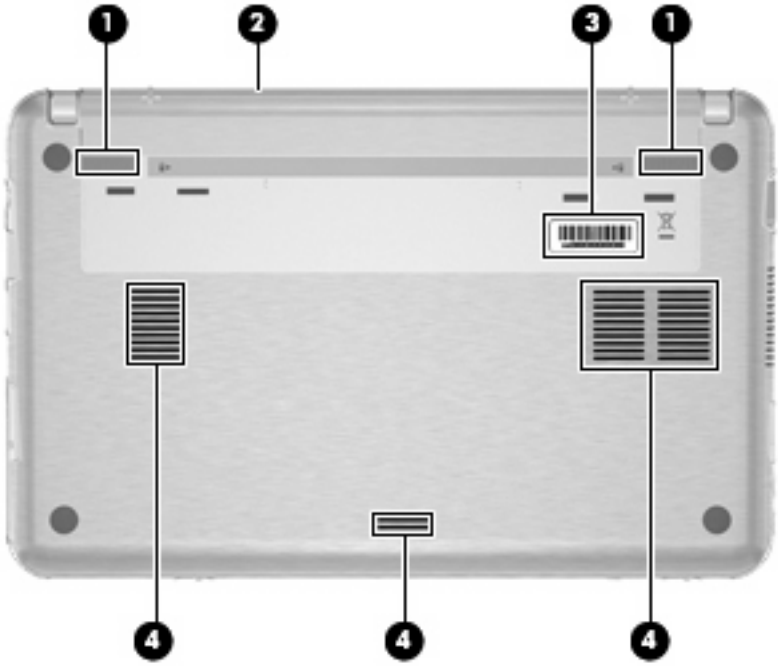
Item	Component	Function
(1)	ExpressCard slot	Supports optional ExpressCards 54.
(2)	SD Card Reader	Supports the following optional digital card formats: • Secure Digital (SD) Memory Card • MultiMediaCard (MMC)
(3)	USB port	Connects an optional USB device.
(4)	RJ-45 (network) jack	Connects a network cable.
(5)	Battery light	• Amber: A battery is charging. • Blue: A battery is close to full charge capacity. • Blinking amber: A battery that is the only available power source has reached a low battery level. • If the computer is plugged into an external power source, the light turns off when all batteries in the computer are fully charged. If the computer is not plugged into an external power source, the light stays off until the battery reaches a low battery level.
(6)	Power connector	Connects an AC adapter.
(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



Item	Component	Function
(1)	External monitor port	Connects an external VGA monitor or projector.
(2)	Vent	Enables airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(3)	Powered USB port	Provides power to a USB device, such as an optional external MultiBay or an optional external optical drive, if used with a powered USB cable.
(4)	Audio-in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.
(5)	Audio-out (headphone) jack	Produces sound when connected to optional powered stereo speakers, headphones, ear buds, a headset, or television audio.

Bottom components



Item	Component	Function
(1)	Battery release latches (2)	Release the battery from the battery bay.
(2)	Battery bay	Holds the battery.
(3)	Service tag	Provides the product brand and series name, serial number (s/n), and product number (p/n) of your computer. Have this information available when you contact technical support.
(4)	Vents (3)	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.

Wireless antennae (select models only)

On select computer models, at least 2 antennae send and receive signals from one or more wireless devices. These antennae are not visible from the outside of the computer.

NOTE: For optimal transmission, keep the areas immediately around the antennae free from obstructions.

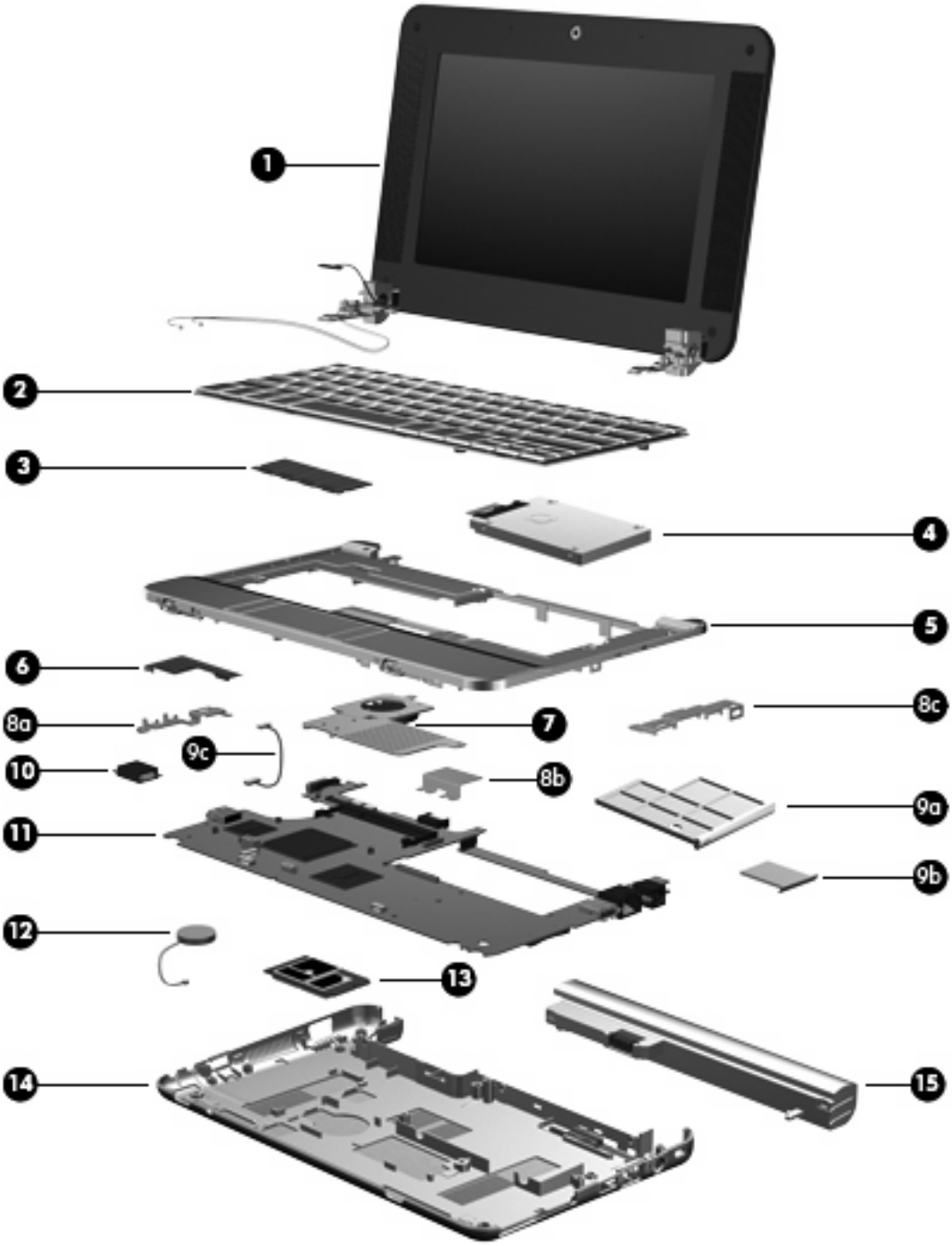
To see wireless regulatory notices, refer to the section of the *Regulatory, Safety and Environmental Notices* that applies to your country or region. These notices are located in Help and Support.

3 Illustrated parts catalog

Serial number location

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

Computer major components



Item	Description	Spare part number
(1)	**8.9-inch, WXGA display assemblies** (include 2 microphones, 2 speakers, and 2 WLAN antenna transceivers and cables)	
	For use only with computer models equipped with camera module	483384-001
	For use only with computer models not equipped camera module	482278-001

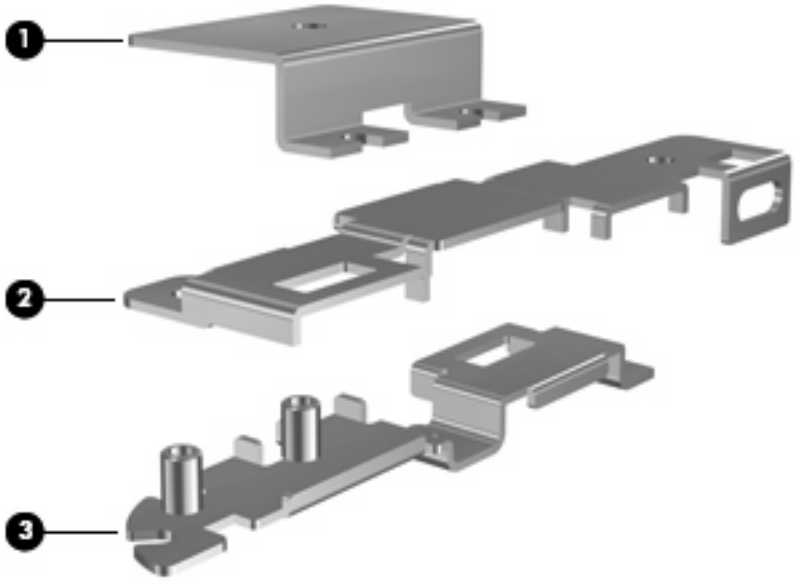
Item	Description	Spare part number
	8.9-inch, WSVGA display assemblies (include 2 microphones, 2 speakers, and 2 WLAN antenna transceivers and cables)	
	For use only with computer models equipped with camera module and system boards with the following spare part numbers: 498308-001, 500754-001, and 500755-001	498309-001
	For use only with computer models not equipped with camera module and system boards with the following spare part numbers: 498308-001, 500754-001, and 500755-001	500459-001
(2)	**Keyboards**	
	For use in Brazil	482280-201
	For use in the Czech Republic	482280-221
	For use in Denmark	482280-081
	For use in Europe	482280-181
	For use in France	482280-051
	For use in French Canada	482280-121
	For use in Germany	482280-041
	For use in Greece	482280-DJ1
	For use in Hungary	482280-211
	For use in Iceland	482280-DD1
	For use internationally	482280-B31
	For use in Israel	482280-BB1
	For use in Italy	482280-061
	For use in Japan	482280-291
	For use in Latin America	482280-161
	For use in Norway	482280-091
	For use in Portugal	482280-131
	For use in Saudi Arabia	482280-171
	For use in Slovakia	482280-231
	For use in Slovenia	482280-BA1
	For use in South Korea	482280-AD1
	For use in Spain	482280-071
	For use in Sweden and Finland	482280-B71
	For use in Switzerland	482280-BG1
	For use in Taiwan	482280-AB1
	For use in Thailand	482280-281
	For use in the United Kingdom	482280-031
	For use in the United States	482280-001

Item	Description	Spare part number
(3)	**Memory modules** (PC2-5300, 667-MHz, DDR2)	
	2048-MB	417506-001
	1024-MB	414046-001
	512-MB	414045-001
(4)	**Mass storage devices**	
	Hard drives (include bracket and SATA connector)	
	160-GB, 7200-rpm	482271-001
	160-GB, 5400-rpm	482269-001
	120-GB, 7200-rpm	482268-001
	120-GB, 5400-rpm	482267-001
	80-GB solid-state drive (includes bracket and SATA connector)	502600-001
	4-GB solid-state drive (includes bracket and SATA connector)	482272-001
(5)	**Top cover** (includes power on switch board and cable, TouchPad board and cable, and wireless on/off switch board and cable)	482265-001
(6)	**Audio board**	505907-001
	For use only in computer models with WXGA displays	482274-001
(7)	**Fan/heat sink** (includes replacement thermal material)	482279-001
	Bracket Kit (see Bracket Kit on page 18 for more Bracket Kit spare part number information)	482266-001
(8a)	Audio/USB connector bracket	
(8b)	ExpressCard assembly bracket	
(8c)	USB/RJ-45 connector bracket	
	Plastics/Cable Kit (see Plastics/Cable Kit on page 19 for more Plastics/Cable Kit spare part number information)	483381-001
(9a)	ExpressCard slot bezel	
(9b)	SD Card slot bezel	
(9c)	Bluetooth module cable	
(10)	**Broadcom Bluetooth modules** (embedded) **NOTE:** The Bluetooth module spare part kits do not include a Bluetooth module cable. The Bluetooth module cable is included in the Plastics/Cable Kit, spare part number 483381-001. See Plastics/Cable Kit on page 19 for more Plastics/Cable Kit spare part number information.	
	For use in all countries and regions except Japan and Asia Pacific countries and regions	398393-002
	For use only in Japan and Asia Pacific countries and regions	450066-001
(11)	**System boards** (include ExpressCard assembly, fan/heat sink, processor, RTC battery, and replacement thermal material)	
	Equipped with 1.6-GHz processor and only for use with WXGA displays	482277-001
	Equipped with 1.2-GHz processor and only for use with WXGA displays	482276-001

Item	Description	Spare part number
	Equipped with 1.0-GHz processor and only for use with WXGA displays	482275-001
	Equipped with 1.6-GHz processor	500755-001
	Equipped with 1.2-GHz processor	498308-001
	Equipped with 1.0-GHz processor	500754-001
(12)	**RTC battery**	449137-001
(13)	**WLAN modules**	
	Broadcom 4311AG 802.11a/b/g WLAN modules:	
	• For use in Canada, the Cayman Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and the United States	441075-001
	• For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	441075-002
	• For use in Japan	441075-291
	Broadcom BCM4312 802.11b/g WLAN modules:	
	• For use in Canada, the Cayman Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and the United States	459263-001
	• For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg,	459263-002

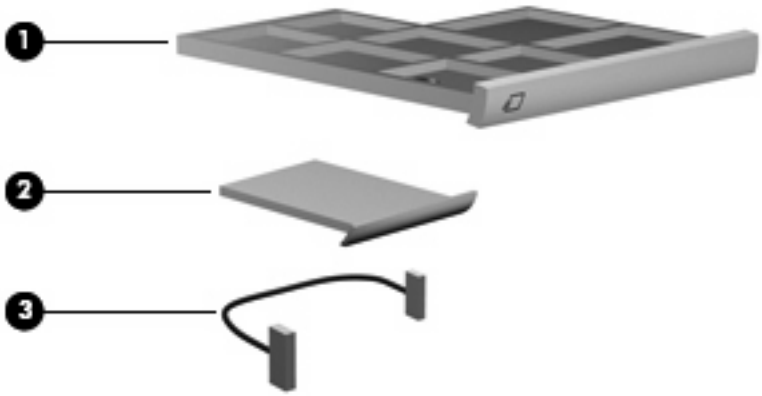
Item	Description	Spare part number
	Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	
(14)	**Base enclosure** (includes 4 rubber feet)	482264-001
	Rubber Kit (not illustrated, contains 4 computer feet)	483382-001
(15)	**Batteries**	
	6-cell, 55-Wh Li-ion battery	482263-001
	3-cell, 28-Wh Li-ion battery	482262-001

Bracket Kit



Item	Description	Spare part number
	Bracket Kit:	482266-001
(1)	ExpressCard assembly bracket	
(2)	USB/RJ-45 connector bracket	
(3)	Audio/USB connector bracket	

Plastics/Cable Kit



Item	Description	Spare part number
	Plastics/Cable Kit:	483381-001
(1)	ExpressCard slot bezel	
(2)	SD Card slot bezel	
(3)	Bluetooth module cable	

Miscellaneous parts

Description	Spare part number
65-W HP Smart AC adapter	463958-001
Power cords:	
For use in Australia	246959-011
For use in Brazil	246959-201
For use in Denmark	246959-081
For use in Europe, the Middle East, and Africa	246959-021
For use in Israel	246959-BB1
For use in Italy	246959-061
For use in Japan	246959-291
For use in South Korea	246959-AD1
For use in Switzerland	246959-AG1
For use in Taiwan	394279-AB1
For use in the United Kingdom	246959-031

Description	Spare part number
For use the United States	246959-001
Screw Kit • Phillips PM2.0×3.0 screw • Torx8 T8M2.5×10.0 screw • Torx8 T8M2.5×5.0 screw • Torx8 T8M2.0×6.0 screw • Torx8 T8M2.0×4.0 screw	483383-001

Sequential part number listing

Spare part number	Description
246959-001	Power cord for use in the United States
246959-011	Power cord for use in Australia and New Zealand
246959-021	Power cord for use in Europe, the Middle East, and Africa
246959-031	Power cord for use in the United Kingdom
246959-061	Power cord for use in Italy
246959-081	Power cord for use in Denmark
246959-201	Power cord for use in Brazil
246959-291	Power cord for use in Japan
246959-AD1	Power cord for use in South Korea
246959-AG1	Power cord for use in Switzerland
246959-BB1	Power cord for use in Israel
394279-AB1	Power cord for use in Taiwan
398393-002	Bluetooth module for use in all countries and regions except Japan and Asia Pacific countries and regions **NOTE:** The Bluetooth module spare part kits do not include a Bluetooth module cable. The Bluetooth module cable is included in the Plastics/Cable Kit, spare part number 483381-001. See Plastics/Cable Kit on page 19 for more Plastics/Cable Kit spare part number information.
414045-001	512-MB memory module (PC2-5300, 667-MHz, DDR2)
414046-001	1024-MB memory module (PC2-5300, 667-MHz, DDR2)
417506-001	2048-MB memory module (PC2-5300, 667-MHz, DDR2)
441075-001	Broadcom 4311AG 802.11a/b/g WLAN module for use in Canada, the Cayman Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and the United States
441075-002	Broadcom 4311AG 802.11a/b/g WLAN module for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo,

Spare part number	Description
	Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe
441075-291	Broadcom 4311AG 802.11a/b/g WLAN module for use in Japan
449137-001	RTC battery
450066-001	Bluetooth module for use only in Japan and Asia Pacific countries and regions **NOTE:** The Bluetooth module spare part kits do not include a Bluetooth module cable. The Bluetooth module cable is included in the Plastics/Cable Kit, spare part number 483381-001. See Plastics/Cable Kit on page 19 for more Plastics/Cable Kit spare part number information.
459263-001	Broadcom BCM4312 802.11b/g WLAN module for use in Canada, the Cayman Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and the United States
459263-002	Broadcom BCM4312 802.11b/g WLAN module for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe
463958-001	65-W HP Smart AC adapter
482262-001	3-cell, 28-Wh Li-ion battery
482263-001	6-cell, 55-Wh Li-ion battery
482264-001	Base enclosure (includes 4 rubber feet)
482265-001	Top cover (includes power on switch board and cable, TouchPad board and cable, and wireless on/off switch board and cable)

Spare part number	Description
482266-001	Bracket Kit (see Bracket Kit on page 18 for more Bracket Kit spare part number information)
482267-001	120-GB, 5400-rpm hard drive (includes bracket and SATA connector)
482268-001	120-GB, 7200-rpm hard drive (includes bracket and SATA connector)
482269-001	160-GB, 5400-rpm hard drive (includes bracket and SATA connector)
482271-001	160-GB, 7200-rpm hard drive (includes bracket and SATA connector)
482272-001	4-GB solid-state drive (includes bracket and SATA connector)
482274-001	Audio board for use only in computer models with WXGA displays
482275-001	System board equipped with 1.0-GHz processor and only for use with WXGA displays (includes ExpressCard assembly, fan/heat sink, processor, RTC battery, and replacement thermal material)
482276-001	System board equipped with 1.2-GHz processor and only for use with WXGA displays (includes ExpressCard assembly, fan/heat sink, processor, RTC battery, and replacement thermal material)
482277-001	System board equipped with 1.6-GHz processor and only for use with WXGA displays (includes ExpressCard assembly, fan/heat sink, processor, RTC battery, and replacement thermal material)
482278-001	8.9-inch, WXGA display assembly for use only with computer models not equipped camera module (includes 2 microphones, 2 speakers, and 2 WLAN antenna transceivers and cables)
482279-001	Fan/heat sink (includes replacement thermal material)
482280-001	Keyboard for use in the United States
482280-031	Keyboard for use in the United Kingdom
482280-041	Keyboard for use in Germany
482280-051	Keyboard for use in France
482280-061	Keyboard for use in Italy
482280-071	Keyboard for use in Spain
482280-081	Keyboard for use in Denmark
482280-091	Keyboard for use in Norway
482280-121	Keyboard for use in French Canada
482280-131	Keyboard for use in Portugal
482280-161	Keyboard for use in Latin America
482280-171	Keyboard for use in Saudi Arabia
482280-181	Keyboard for use in Europe
482280-201	Keyboard for use in Brazil
482280-211	Keyboard for use in Hungary
482280-221	Keyboard for use in Czechoslovakia
482280-231	Keyboard for use in Slovakia
482280-251	Keyboard for use in Russia
482280-281	Keyboard for use in Thailand

Spare part number	Description
482280-291	Keyboard for use in Japan
482280-AB1	Keyboard for use in Taiwan
482280-AD1	Keyboard for use in South Korea
482280-B31	Keyboard for use internationally
482280-B71	Keyboard for use in Sweden and Finland
482280-BA1	Keyboard for use in Slovenia
482280-BB1	Keyboard for use in Israel
482280-BG1	Keyboard for use in Switzerland
482280-DD1	Keyboard for use in Iceland
482280-DJ1	Keyboard for use in Greece
483381-001	Plastics/Cable Kit (see Plastics/Cable Kit on page 19 for more Plastics/Cable Kit spare part number information)
483382-001	Rubber Kit (contains 4 computer feet)
483383-001	Screw Kit
483384-001	8.9-inch, WXGA display assembly for use only with computer models not equipped camera module (includes 2 microphones, 2 speakers, and 2 WLAN antenna transceivers and cables)
498308-001	System board equipped with 1.2-GHz processor (includes ExpressCard assembly, fan/heat sink, processor, RTC battery, and replacement thermal material)
498309-001	8.9-inch, WSVGA display assembly for use only with computer models equipped with a camera module and system boards with the following spare part numbers: 498308-001, 500754-001, and 500755-001 (includes 2 microphones, 2 speakers, and 2 WLAN antenna transceivers and cables)
500459-001	8.9-inch, WSVGA display assembly for use only with computer models not equipped with a camera module and system boards with the following spare part numbers: 498308-001, 500754-001, and 500755-001 (includes 2 microphones, 2 speakers, and 2 WLAN antenna transceivers and cables)
500754-001	System board equipped with 1.0-GHz processor (includes ExpressCard assembly, fan/heat sink, processor, RTC battery, and replacement thermal material)
500755-001	System board equipped with 1.6-GHz processor (includes ExpressCard assembly, fan/heat sink, processor, RTC battery, and replacement thermal material)
502600-001	80-GB solid-state drive (includes bracket and SATA connector)
505907-001	Audio board

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
- Torx8 T8 screwdriver

Service considerations

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

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

Plastic parts

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

Cables and connectors

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

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

Drive handling

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

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

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

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

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

Avoid dropping drives from any height onto any surface.

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

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

Avoid exposing a drive to temperature extremes or liquids.

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

Grounding guidelines

Electrostatic discharge damage

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

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

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

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

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

Use nonmagnetic tools.

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

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

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

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

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

Typical electrostatic voltage levels

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

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

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

Workstation guidelines

Follow these grounding workstation guidelines:

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

Equipment guidelines

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

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

The following grounding equipment is recommended to prevent electrostatic damage:

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

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

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

Unknown user password

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

NOTE: These steps also clear CMOS.

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 32).
5. Remove the real-time clock (RTC) battery (see RTC battery on page 52).
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 31 screws, in 5 different sizes, that must be removed or replaced when servicing the computer. Make special note of each screw size and location during removal and replacement.

Serial number

Report the computer serial number to HP when requesting information or ordering spare parts. The serial number is located on the bottom of the computer.

Computer feet

The computer feet are adhesive-backed rubber pads. The feet are included in the Rubber Kit, spare part number 483382-001. There are 4 rubber feet that are installed on the base enclosure in the locations illustrated below. The rubber feet are attached to the base enclosure by tethers.

Battery

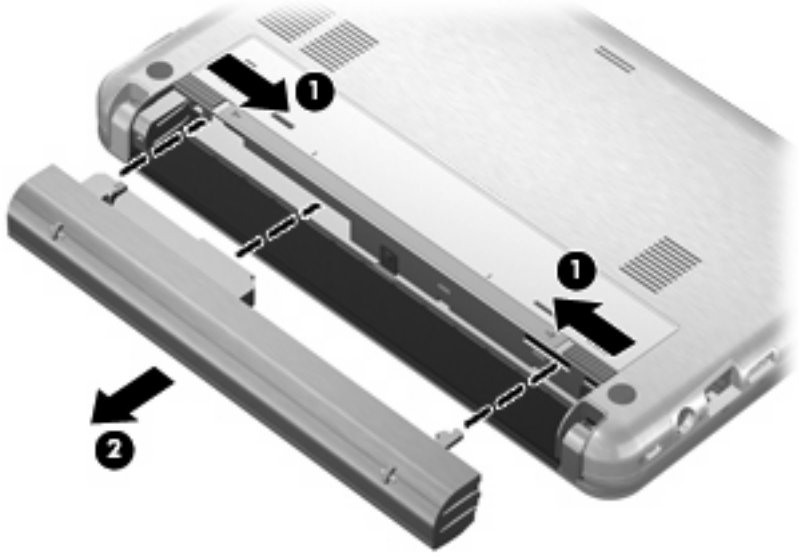
Description	Spare part number
6-cell, 55-Wh Li-ion battery	482262-001
3-cell, 28-Wh Li-ion battery	482263-001

Before disassembling the computer, follow these steps:

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

Remove the battery:

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



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

Keyboard

Keyboards for use in the following countries or regions:			
Country or region:	**Spare part number**	**Country or region:**	**Spare part number**
Brazil	482280-201	Norway	482280-091
Czechoslovakia	482280-221	Portugal	482280-131
Denmark	482280-081	Russia	482280-251
Europe	482280-181	Saudi Arabia	482280-171
France	482280-051	Slovakia	482280-231
French Canada	482280-121	Slovenia	482280-BA1
Germany	482280-041	South Korea	482280-AD1
Greece	482280-DJ1	Spain	482280-071
Hungary	482280-211	Sweden and Finland	482280-B71
Iceland	482280-DD1	Switzerland	482280-BG1
International	482280-B31	Taiwan	482280-AB1
Israel	482280-BB1	Thailand	482280-281
Italy	482280-061	The United Kingdom	482280-031
Japan	482280-291	The United States	482280-001
Latin America	482280-161		

Before removing the keyboard, follow these steps:

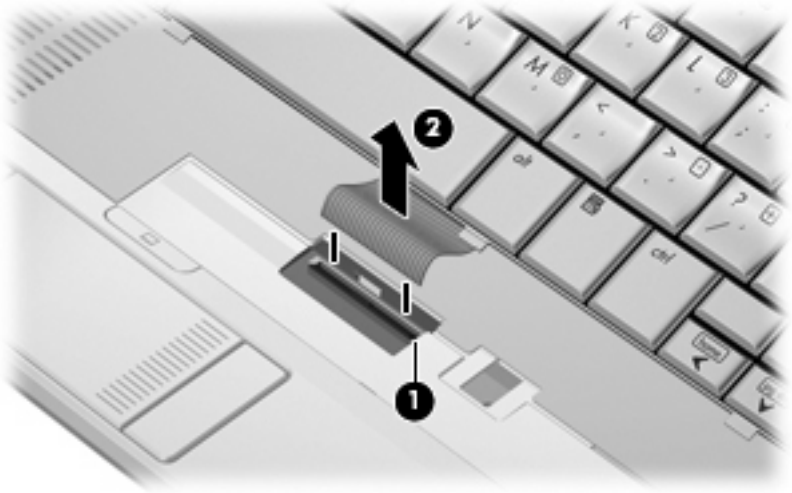
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord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

Remove the keyboard:

1. Remove the three Phillips PM2.0×3.0 screws that secure the keyboard to the computer.

2. Turn the computer display-side up, with the front toward you.
3. Open the computer as far as possible.
4. Lift the rear edge of the keyboard **(1)** until it rests at an angle, and then slide it back **(2)** until it rests on the display assembly.

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



6. Remove the keyboard.

Reverse this procedure to install the keyboard.

Memory module

Description	Spare part number
2048-MB (PC2-5300, 667-MHz, DDR2)	417506-001
1024-MB (PC2-5300, 667-MHz, DDR2)	414046-001
512-MB (PC2-5300, 667-MHz, DDR2)	414045-001

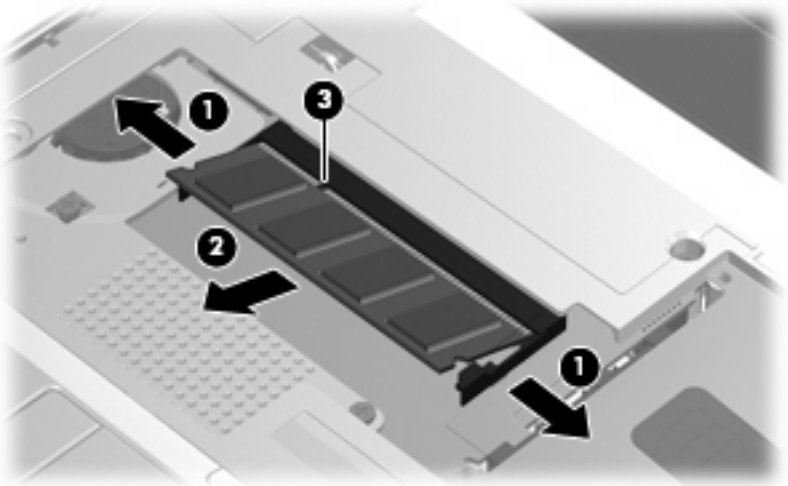
Before removing the memory module, follow these steps:

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).
5. Remove the keyboard (see Keyboard on page 33).

Remove the memory module:

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

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



Reverse this procedure to install a memory module.

Mass storage device

NOTE: All hard drive and solid-state drive spare part kits include a bracket and SATA adapter.

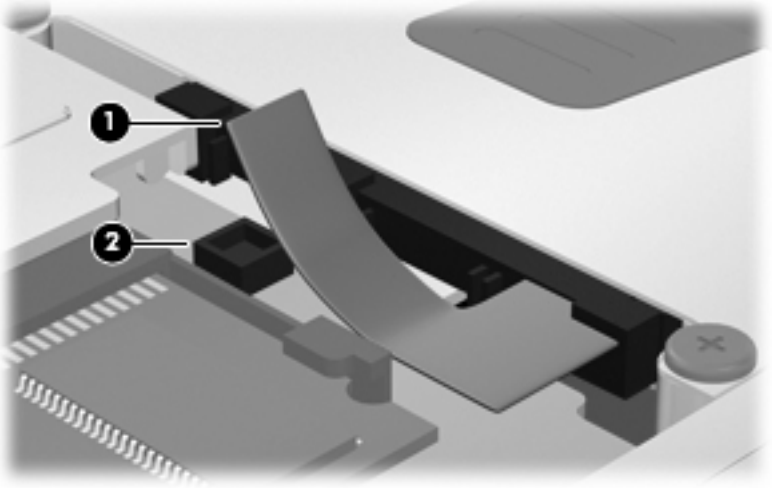
Description	Spare part number
SATA hard drives:	
160-GB, 7200-rpm hard drive	482271-001
160-GB, 5400-rpm hard drive	482269-001
120-GB, 7200-rpm hard drive	482268-001
120-GB, 5400-rpm hard drive	482267-001
80-GB solid state drive	502600-001
4-GB solid state drive	482272-001

Before removing the hard drive or solid-state 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).
5. Remove the keyboard (see Keyboard on page 33).

Remove the hard drive or solid-state drive:

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

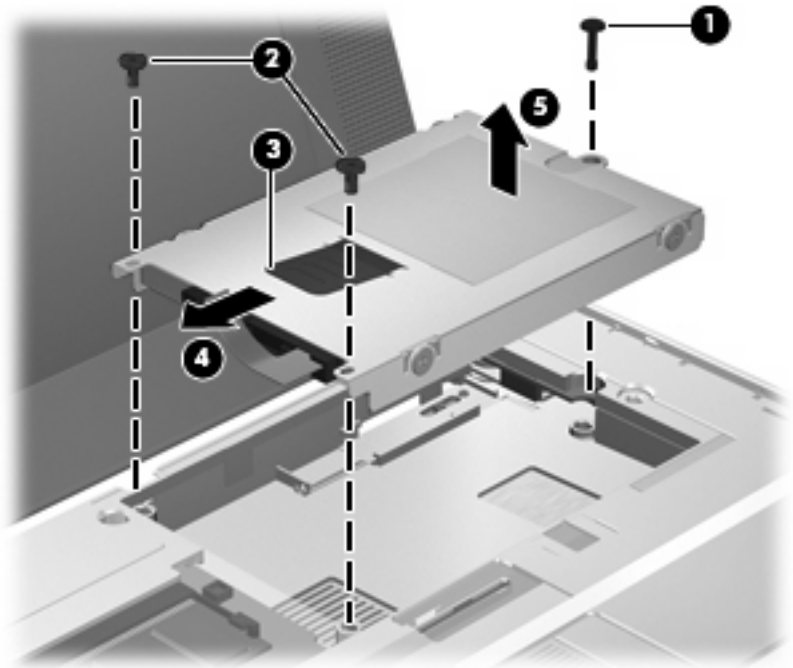


2. Remove the Phillips PM2.0×5.0 screw **(1)** and the two PM2.0×5.0 screws **(2)** that secure the drive to the computer.

NOTE: The screw highlighted by callout **(1)** is captive in hard drives, non-captive in solid state drives.

3. Grasp the Mylar tab **(3)** on the drive and slide the drive **(4)** to the left to release it from the drive bay.

4. Remove the drive **(5)** from the drive bay.



Reverse this procedure to install the hard drive or solid-state drive.

Top cover

Description	Spare part number
Top cover	482265-001

Before removing the top cover, follow these steps:

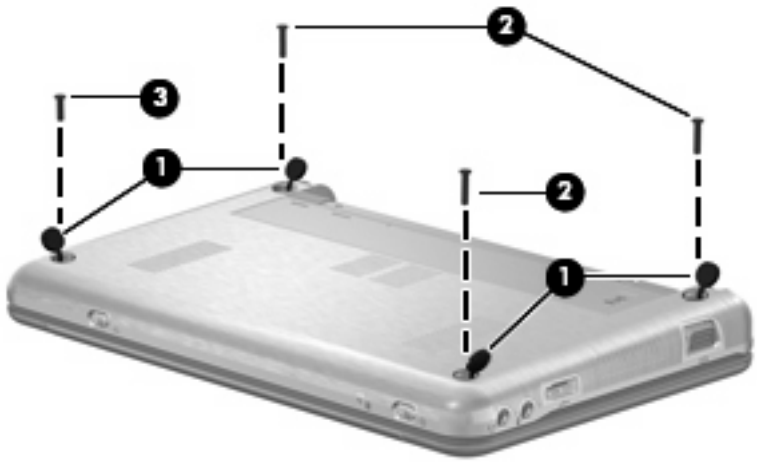
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord 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 keyboard (see Keyboard on page 33).
6. Remove the hard drive or solid-state drive (see Mass storage device on page 37).

Remove the top cover:

1. Turn the computer upside down, with the front toward you.
2. Use a thin, flat tool to release the four rubber feet **(1)**.

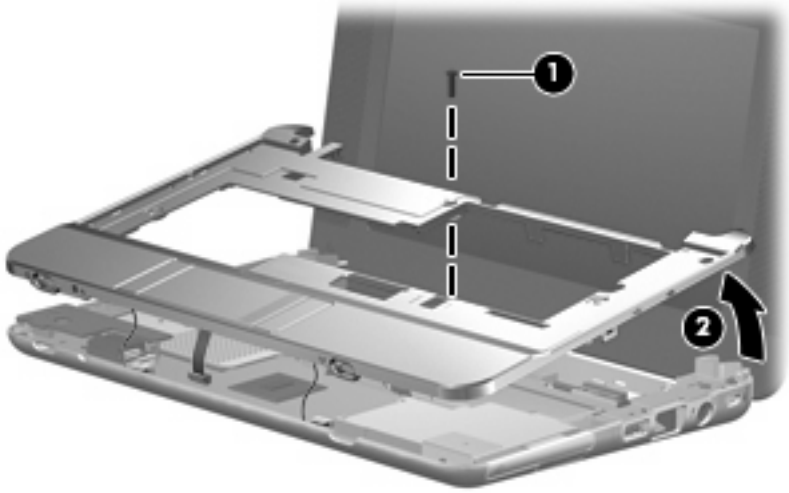
△ **CAUTION:** The rubber feet are attached to the base enclosure by tethers. Exercise caution when releasing the rubber feet to prevent damaging the feet.

3. Remove the three Torx8 T8M2.5×10.0 screws **(2)** and the Torx8 T8M2.0×4.0 screw **(3)** that secure the top cover to the base enclosure.

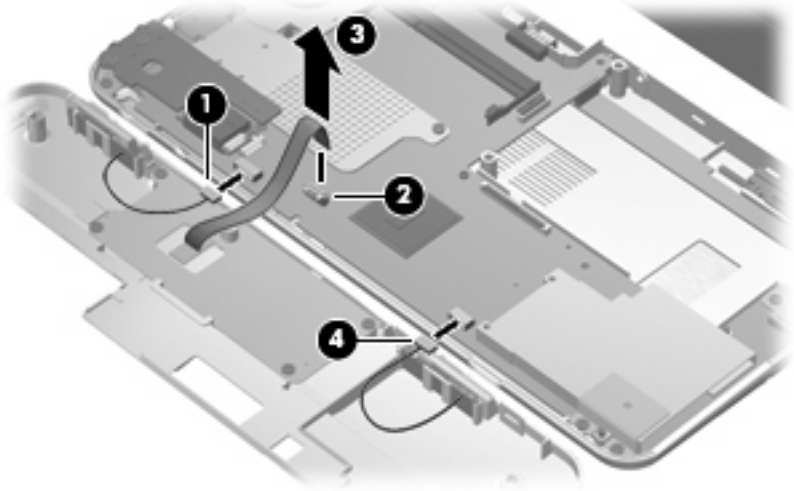


4. Turn the computer right-side up, with the front toward you.
5. Open the computer as far as possible.
6. Remove the Torx8 T8M2.5×10.0 screw **(1)** that secures the top cover to the base enclosure.

7. Lift the rear edge of the top cover **(2)** and swing it up and forward until it rests upside down in front of the computer.



8. Disconnect the power switch board cable **(1)** from the system board.
9. Release the ZIF connector **(2)** to which the TouchPad cable is connected and disconnect the TouchPad cable **(3)** from the system board.
10. Disconnect the wireless on/off switch board cable **(4)** from the system board.



11. Remove the top cover.

Reverse this procedure to install the top cover.

Audio board

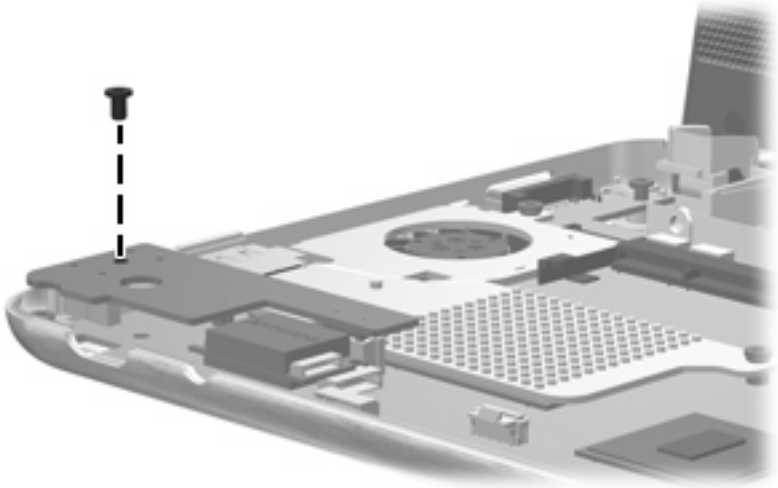
Description	Spare part number
Audio board for use only in computer models with WXGA displays	482274-001
Audio board	505907-001

Before removing the audio board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 32).
5. Remove the following components:
   a. Keyboard (see Keyboard on page 33)
   b. Hard drive or solid-state drive (see Mass storage device on page 37)
   c. Top cover (see Top cover on page 39)

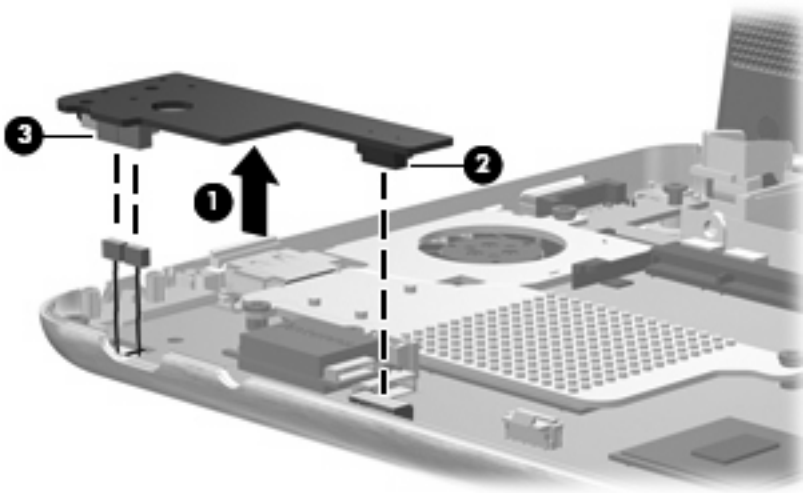
Remove the audio board:

1. Remove the Torx8 T8M2.0×6.0 screw that secures the audio board to the computer.



2. Lift the audio board **(1)** to disconnect the audio board connector **(2)** from the system board.

3. Disconnect the audio board cables **(3)** from the audio board.



4. Remove the audio board.

Reverse this procedure to install the audio board.

Bluetooth module

NOTE: The Bluetooth module spare part kits do not include a Bluetooth module cable. The Bluetooth module cable is included in the Plastics/Cable Kit, spare part number 483381-001. See Plastics/Cable Kit on page 19 for more Plastics/Cable Kit spare part number information.

Description	Spare part number
For use in all countries and regions except Japan and Asia Pacific countries and regions	398393-002
For use only Japan and Asia Pacific countries and regions	450066-001

Before removing the Bluetooth module, follow these steps:

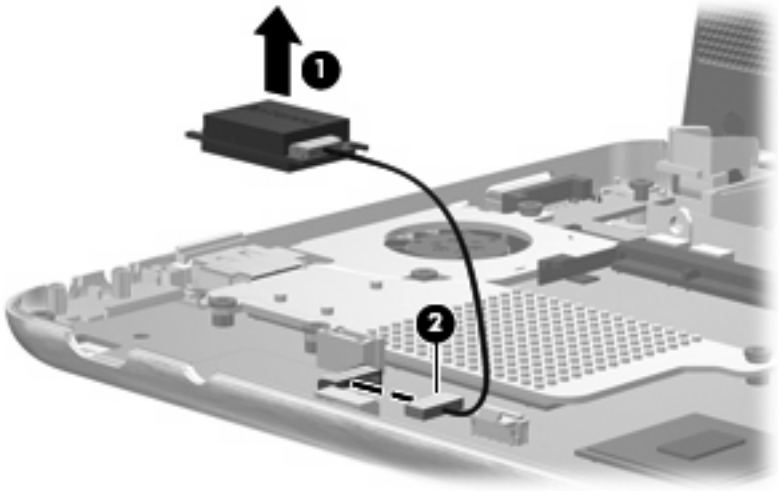
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 32).
5. Remove the following components:
   a. Keyboard (see Keyboard on page 33)
   b. Hard drive or solid-state drive (see Mass storage device on page 37)
   c. Top cover (see Top cover on page 39)
   d. Audio board (see Audio board on page 41)

Remove the Bluetooth module:

1. Detach the Bluetooth module **(1)** from the system board.

NOTE: The Bluetooth module is attached to the system board by double-sided tape.

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



3. Remove the Bluetooth module.

Reverse this procedure to install the Bluetooth module.

System board

NOTE: All system board spare part kits include an ExpressCard assembly, fan/heat sink, processor, RTC battery, and replacement thermal material).

Description	Spare part number
Equipped with 1.6-GHz processor and only for use with WXGA displays	482277-001
Equipped with 1.2-GHz processor and only for use with WXGA displays	482276-001
Equipped with 1.0-GHz processor and only for use with WXGA displays	482275-001
Equipped with 1.6-GHz processor	500755-001
Equipped with 1.2-GHz processor	398308-001
Equipped with 1.0-GHz processor	500754-001

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. Keyboard (see Keyboard on page 33)
   b. Hard drive (see Mass storage device on page 37)
   c. Top cover (see Top cover on page 39)
   d. Audio board (see Audio board on page 41)

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

- Memory module (see Memory module on page 36)
- WLAN module (see WLAN module on page 49)

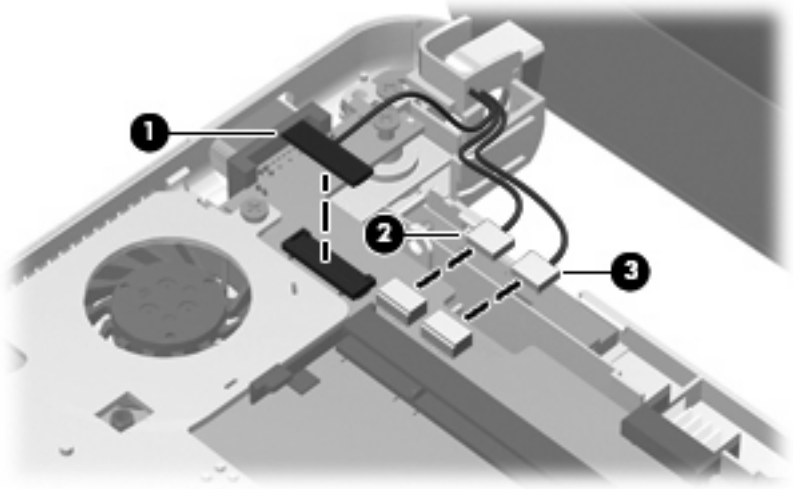
Remove the system board:

1. Disconnect the following cables from the system board:

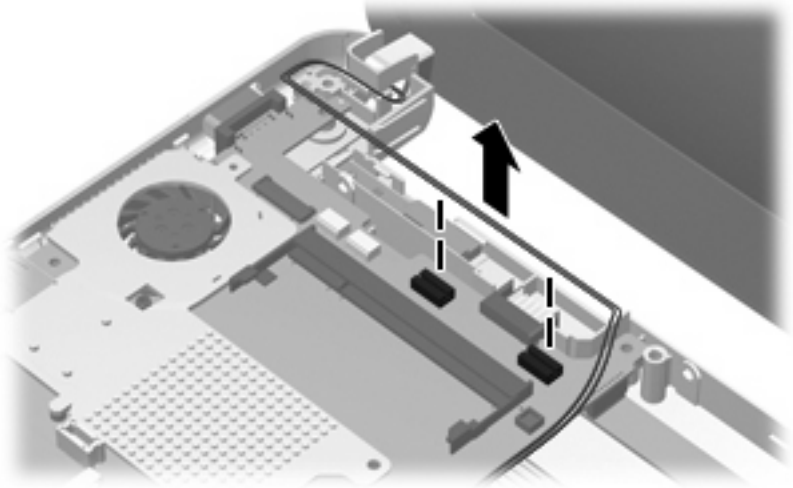
   (1) Display panel cable

   (2) Microphone cable

   (3) Camera module cable (only on computer models equipped with webcam)



2. Remove the wireless antenna cables from the clips built onto the system board.



3. Remove the seven Torx8 T8M2.0×6.0 screws **(1)** that secure the system board and the three system board brackets to the base enclosure.

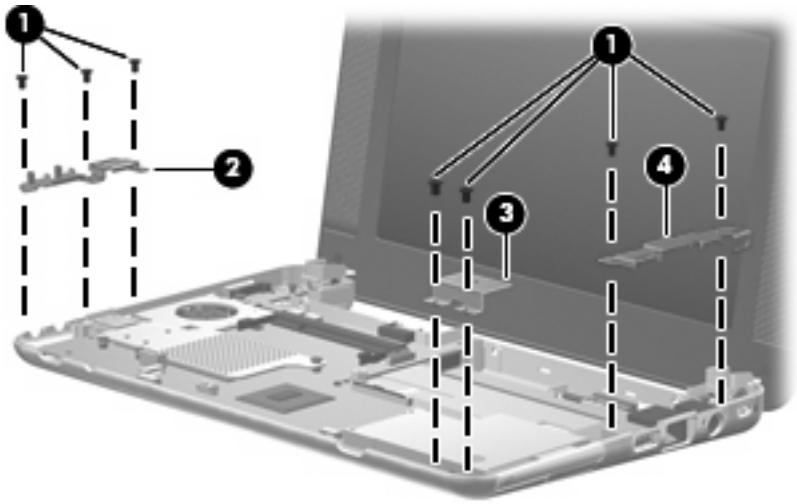
4. Remove the following brackets:

   (2) Audio/USB connector bracket

   (3) ExpressCard assembly bracket

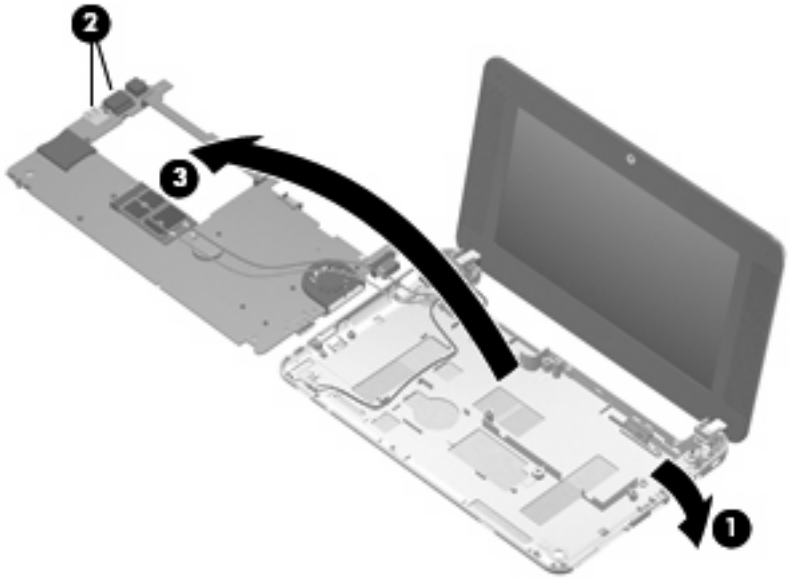
   (4) USB/RJ-45 connector bracket

NOTE: The audio/USB connector bracket, ExpressCard assembly bracket, and USB/RJ-45 connector bracket are included in the Bracket Kit, spare part number 482266-001.



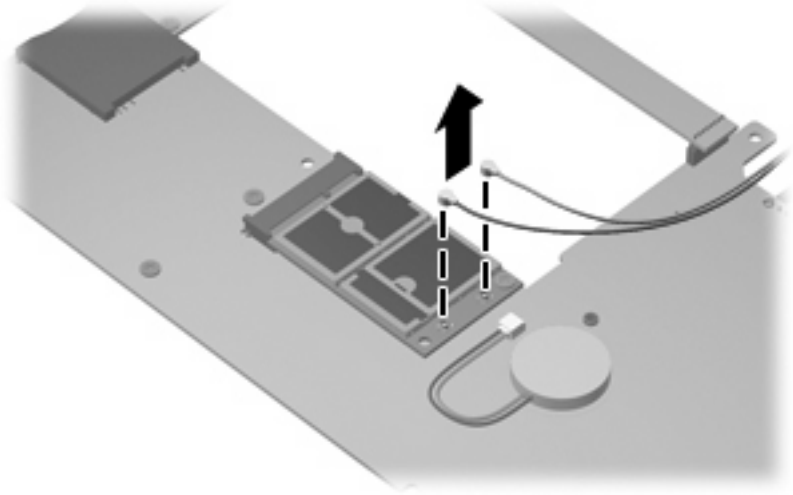
5. Flex the right side of the base enclosure **(1)** until the USB connector and RJ-45 jack **(2)** are clear of the base enclosure.

6. Lift the right side of the system board **(3)**, and then swing it up and to the left until it rests upside down on the left side of the computer.



7. Disconnect the WLAN antenna cables from the terminals on the WLAN module.

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



8. Remove the system board.

Reverse the preceding procedure to install the system board.

WLAN module

Description	Spare part number
Broadcom 4311AG 802.11a/b/g WLAN modules:	
• For use in Canada, the Cayman Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and the United States	441075-001
• For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	441075-002
• For use in Japan	441075-291
Broadcom BCM4312 802.11b/g WLAN modules:	
• For use in Canada, the Cayman Islands, Guam, Puerto Rico, the U.S. Virgin Islands, and the United States	459263-001
• For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Portugal, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine,	459263-002

Description	Spare part number
the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	

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).
5. Remove the following components:
   a. Keyboard (see Keyboard on page 33)
   b. Hard drive or solid-state drive (see Mass storage device on page 37)
   c. Top cover (see Top cover on page 39)
   d. Audio board (see Audio board on page 41)
   e. System board (see System board on page 45)

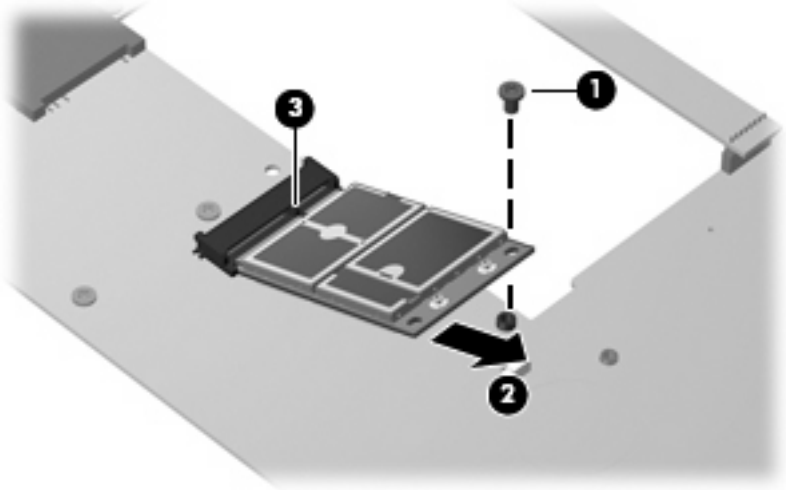
Remove the WLAN module:

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

1. Turn the system board upside down, with the front toward you.
2. Remove the Torx8 T8M2.5×5.0 screw **(1)** that secures the WLAN module to the system board. (The edge of the module opposite the slot rises away from the computer.)

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

NOTE: WLAN modules are designed with a notch **(3)** to prevent incorrect insertion.



Reverse this procedure to install the WLAN module.

RTC battery

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

Description	Spare part number
RTC battery	449137-001

Before removing the RTC battery, follow these steps:

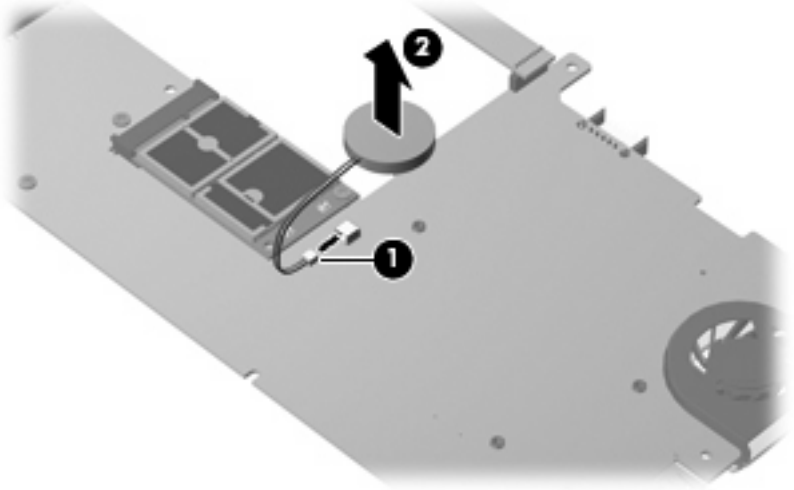
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 32).
5. Remove the following components:
   a. Keyboard (see Keyboard on page 33)
   b. Hard drive or solid-state drive (see Mass storage device on page 37)
   c. Top cover (see Top cover on page 39)
   d. Audio board (see Audio board on page 41)
   e. System board (see System board on page 45)

Remove the RTC battery:

1. Turn the system board upside down, with the front toward you.
2. Disconnect the RTC battery cable **(1)** from the system board.

3. Detach the RTC battery **(2)** from the system board.

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



4. Remove the RTC battery.

Reverse this procedure to install the RTC battery.

Fan/heat sink

Description	Spare part number
Fan/heat sink	482279-001

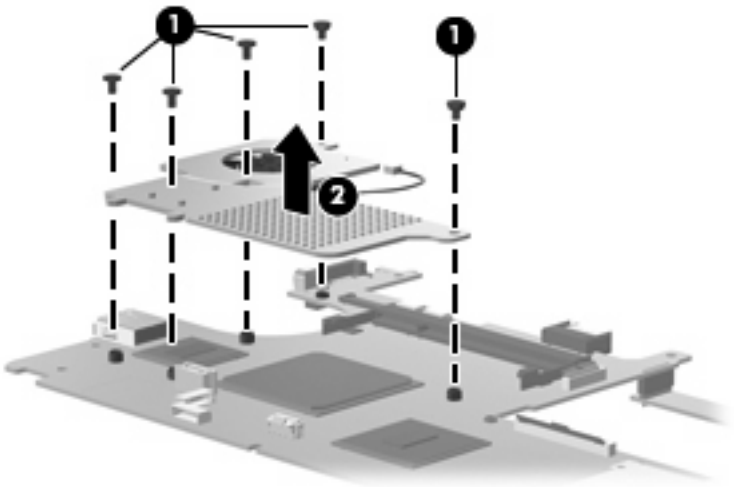
Before removing the fan/heat sink, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 32).
5. Remove the following components:
   a. Keyboard (see Keyboard on page 33)
   b. Hard drive or solid-state drive (see Mass storage device on page 37)
   c. Top cover (see Top cover on page 39)
   d. Audio board (see Audio board on page 41)
   e. System board (see System board on page 45)

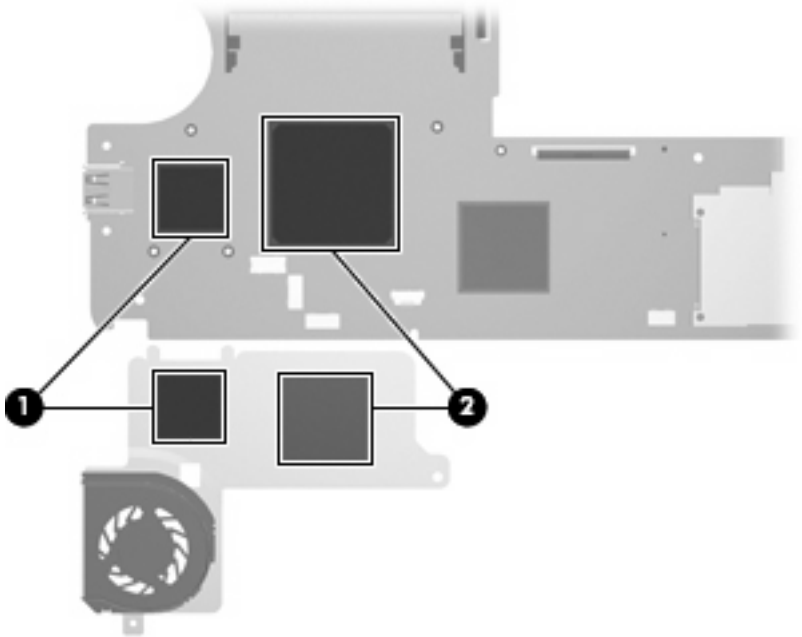
Remove the fan/heat sink:

1. Following the 1, 2, 3, 4, 5 sequence stamped into the fan/heat sink, remove the five Torx8 T8M2.0×6.0 screws **(1)** that secure the fan/heat sink to the system board

2. Remove the fan/heat sink **(2)**.



NOTE: The thermal material must be thoroughly cleaned from the surfaces of the fan/heat sink and system board components. Thermal grease is used on the video chip **(1)** and the surface of the fan/heat sink **(1)** that contacts the video chip. Thermal tape is used on the processor **(2)** and the surface of the fan/heat sink **(2)** that contacts the processor. Replacement thermal material is included with all fan/heat sink and system board spare part kits.



Reverse this procedure to install the fan/heat sink.

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

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

Display assembly

NOTE: All display assembly spare part kits include 2 microphones, 2 speakers, and 2 WLAN antenna transceivers and cables.

Description	Spare part number
8.9-inch, WXGA display assembly for use only with computer models equipped with camera module	483384-001
8.9-inch, WXGA display assembly for use only with computer models not equipped with camera module	482278-001
8.9-inch, WSVGA display assembly for use only with computer models equipped with camera module and system boards with the following spare part numbers: 498308-001, 500754-001, and 500755-001	498309-001
8.9-inch, WSVGA display assembly for use only with computer models not equipped with camera module and system boards with the following spare part numbers: 498308-001, 500754-001, and 500755-001	502600-001

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. Remove the following components:
   a. Keyboard (see Keyboard on page 33)
   b. Hard drive or solid-state drive (see Mass storage device on page 37)
   c. Top cover (see Top cover on page 39)
   d. Audio board (see Audio board on page 41)
   e. System board (see System board on page 45)
6. Disconnect the wireless antenna cables from the WLAN module (see WLAN module on page 49).

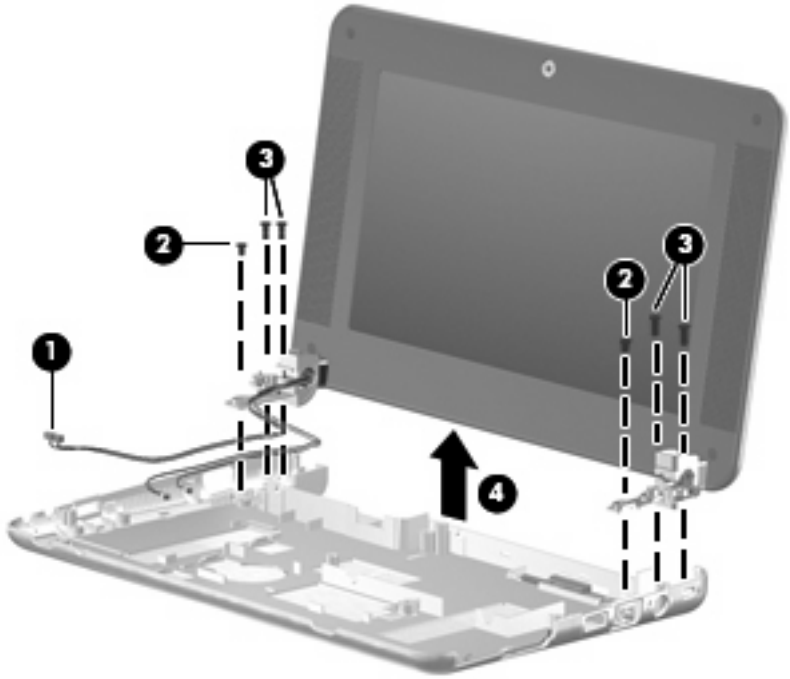
Remove the display assembly:

1. Remove the wireless antenna cables **(1)** from the clips and routing channels built into the base enclosure.

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.

2. Remove the four Torx8 T8M2.5×10.0 screws **(2)** and the two Torx8 T8M2.5×5.0 screws **(3)** that secure the display assembly to the computer.

3. Lift the display assembly **(4)** straight up and remove it.



Reverse this procedure to reassemble and install the display assembly.

5 Computer Setup

Starting Computer Setup

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

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

NOTE: Pointing devices are not supported in Computer Setup. You must use the keyboard to navigate and make selections.

NOTE: An external keyboard connected by USB can be used with Computer Setup only if USB legacy support is enabled.

To start Computer Setup:

1. Turn on or restart the computer.
2. Before your operating system opens and while the "F10 = ROM Based Setup" message is displayed in the lower-left corner of the screen, press f10.

Using Computer Setup

Navigating and selecting in Computer Setup

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

1. Open Computer Setup by turning on or restarting the computer, and then pressing f10 while the "F10 = ROM Based Setup" message is displayed in the lower-left corner of the screen.

   Because Computer Setup is not operating system 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 select an item, press enter.
   - To close open dialog boxes and return to the main Computer Setup screen, press esc.
   - To view navigation information, press f1.
   - To change the language, press f2.

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

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

   - To exit Computer Setup without saving your preferences, use the arrow keys to select **File > Ignore changes and exit**. Then follow the instructions on the screen.
   - To save your preferences and exit Computer Setup, use the arrow keys to select **File > Save changes and exit**. Then follow the instructions on the screen.

Your preferences go into effect when the computer restarts.

Restoring factory settings in Computer Setup

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

1. Open Computer Setup by turning on or restarting the computer, and then pressing f10 while the "F10 = ROM Based Setup" message is displayed in the lower-left corner of the screen.
2. Use the arrow keys to select **File > Restore defaults**, and then press enter.
3. When the confirmation dialog box opens, press f10.
4. To save your preferences and exit Computer Setup, use the arrow keys to select **File > Save changes and exit**. Then follow the instructions on the screen.

Your preferences go into effect when the computer restarts.

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

Computer Setup menus

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

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

File menu

Select	To do this
System information	• View identification information for the computer and the batteries in the system. • View specification information for the processor, cache and memory size, system ROM, video revision, and keyboard controller version.
Restore defaults	Replace the configuration settings in Computer Setup with the original factory settings. (Password settings and security settings are not changed when you restore the factory settings.)
Ignore changes and exit	Cancel any changes entered during the current session. Then exit and restart the computer.
Save changes and exit	Save any changes entered during the current session. Then exit and restart the computer. Your changes go into effect when the computer restarts.

Security menu

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

Select	To do this
BIOS Administrator password	Enter, change, or delete a setup password.
Change BIOS administrator password	Enter, change, or delete a BIOS Administrator password.
Password check	• Enable/disable Always to always check for a password. • Enable Setup to set the password.
Password Options	• Enable/disable stringent security. • Enable/disable password requirement on computer restart.
DriveLock Passwords	• Enable/disable DriveLock on any computer hard drive. • Change a DriveLock user password or master password. **NOTE:** DriveLock settings are accessible only when you enter Computer Setup by turning on (not restarting) the computer.
Notebook hard drive password status	Enable/disable hard drive password status visibility.

System Configuration menu

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

Select	To do this
Boot Options	• Set an f9 and f10 delay when starting up. • Set the Express Boot Popup delay in seconds. • Enable/disable internal network adapter boot and set the boot mode (PXE). • Enable/disable MultiBoot, which sets a boot order that can include most boot devices in the system. • Set the boot order. ◦ 1st boot device: USB devices ◦ 2nd boot device: Notebook hard drive ◦ 3rd boot device: Notebook Ethernet
Device Configurations	• Swap the functions of the fn key and left ctrl key. • Enable/disable USB legacy support. When enabled, USB legacy support allows the following: ◦ Use of a USB keyboard in Computer Setup even when your operating system is not running. ◦ Startup from bootable USB devices, including a hard drive, diskette drive, or optical drive connected by a USB port to the computer. • Enable/disable fan always on while connected to an AC outlet. • Enable/disable SATA Native Mode.
Built-In Device Options	• Enable/disable embedded WLAN Device Radio. • Enable/disable embedded Bluetooth. • Enable/disable Wake on LAN. • Enable/disable Network Interface Controller (LAN) **NOTE:** Always set the fan to 40% PWM while this item is enabled. • Enable/disable integrated camera. • Enable/disable Wake on LAN. • Enable/disable the ExpressCard slot.

6 Specifications

Computer specifications

	Metric	U.S.
Dimensions		
Depth	16.51 cm	6.50 in
Width	25.50 cm	10.04 in
Height (front to back)	2.67 to 3.30 cm	1.05 to 1.30 in
Weight		
Equipped with a 3-cell battery, 120-GB hard drive, 1-GB memory, WLAN module, and 2 wireless antennae	1.27 kg	2.80 lbs
Equipped with a 3-cell battery, 4-GB solid-state drive, 1-GB memory, WLAN module, and 2 wireless antennae	1.19 kg	2.63 lbs
Input power		
Operating voltage	18.5 V dc @ 3.5 A – 65 W	
Operating current	3.5 A	
Temperature		
Operating	0°C to 35°C	32°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F
Relative humidity (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating	-15 m to 3,048 m	-50 ft to 10,000 ft
Nonoperating	-15 m to 12,192 m	-50 ft to 40,000 ft
Shock		
Operating	125 g, 2 ms, half-sine	
Nonoperating	200 g, 2 ms, half-sine	
Random vibration		
Operating	0.75 g zero-to-peak, 10 Hz to 500 Hz, 0.25 oct/min sweep rate	

	Metric	U.S.
Nonoperating	1.50 g zero-to-peak, 10 Hz to 500 Hz, 0.5 oct/min sweep rate	

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

8.9-inch, WXGA display specifications

	Metric	U.S.
Dimensions		
Height	11.7 cm	4.61 in
Width	19.5 cm	7.68 in
Diagonal	22.7 cm	8.94 in
Number of colors	Up to 16.8 million	
Contrast ratio	250:1 (typical)	
Brightness	200 nits (typical)	
Pixel resolution		
Pitch	0.279 × 0.279 mm	
Format	1280 × 768	
Configuration	RGB vertical stripe	
Backlight	Edge lit	
Character display	80 × 25	
Total power consumption	4.0 W	
Viewing angle	+/-40 horizontal, +20/–40° vertical (typical)	

8.9-inch, WSVGA display specifications

	Metric	U.S.
Dimensions		
Height	11.3 cm	4.45 in
Width	19.5 cm	7.68 in
Diagonal	22.6 cm	8.90 in
Number of colors	6-bit, 262,144	
Contrast ratio	300:1 (typical)	
Brightness	200 nits (typical)	
Pixel resolution		
Pitch	0.1905 × 0.189 mm	
Format	1024 × 600	
Configuration	RGB vertical stripe	
Backlight	Integral LED	
Total power consumption	3.0 W	
Viewing angle	+20/-40 horizontal, +40/–40° vertical (typical)	

Hard drive specifications

	160-GB*	120-GB*
Dimensions		
Height	9.5 mm	9.5 mm
Width	70 mm	70 mm
Weight	101 g	101 g
Interface type	SATA	SATA
Transfer rate	100 MB/sec	100 MB/sec
Security	ATA security	ATA security
Seek times (typical read, including setting)		
Single track	3 ms	3 ms
Average	13 ms	13 ms
Maximum	24 ms	24 ms
Logical blocks	312,560,640	234,420,480
Disc rotational speed	7200 and 5400 rpm	7200 and 5400 rpm
Operating temperature	5°C to 55°C (41°F to 131°F)	
*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less. Actual drive specifications may differ slightly.		
NOTE: Certain restrictions and exclusions apply. Contact technical support for details.		

System DMA specifications

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

System interrupt specifications

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

System I/O address specifications

I/O address (hex)	System function (shipping configuration)
000 - 00F	DMA controller no. 1
010 - 01F	Unused
020 - 021	Interrupt controller no. 1
022 - 024	Opti chipset configuration registers
025 - 03F	Unused
02E - 02F	87334 “Super I/O” configuration for CPU
040 - 05F	Counter/timer registers
044 - 05F	Unused
060	Keyboard controller
061	Port B
062 - 063	Unused
064	Keyboard controller
065 - 06F	Unused
070 - 071	NMI enable/RTC
072 - 07F	Unused
080 - 08F	DMA page registers
090 - 091	Unused
092	Port A
093 - 09F	Unused
0A0 - 0A1	Interrupt controller no. 2
I/O Address (hex)	System Function (shipping configuration)
0A2 - 0BF	Unused
0C0 - 0DF	DMA controller no. 2
0E0 - 0EF	Unused
0F0 - 0F1	Coprocessor busy clear/reset
0F2 - 0FF	Unused
100 - 16F	Unused
170 - 177	Secondary fixed disk controller
178 - 1EF	Unused
1F0 - 1F7	Primary fixed disk controller
1F8 - 200	Unused
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	ExpressCard controller in CPU
3E2 - 3E3	Unused
3E8 - 3EF	Internal modem
3F0 - 3F7	“A” diskette controller
3F8 - 3FF	Serial port (COM1/default)
CF8 - CFB	PCI configuration index register (PCIDIVO-1)
CFC - CFF	PCI configuration data register (PCIDIVO-1)

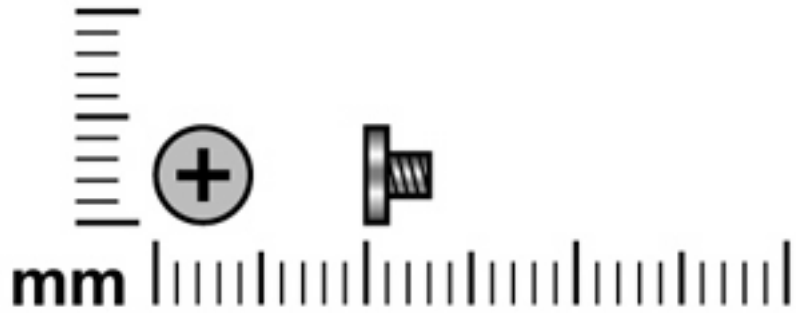
System memory map specifications

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

7 Screw listing

This section provides specification and reference information for the screws and screw locks used in the computer. All screws listed in this section are available in the Screw Kit, spare part number 483383-001.

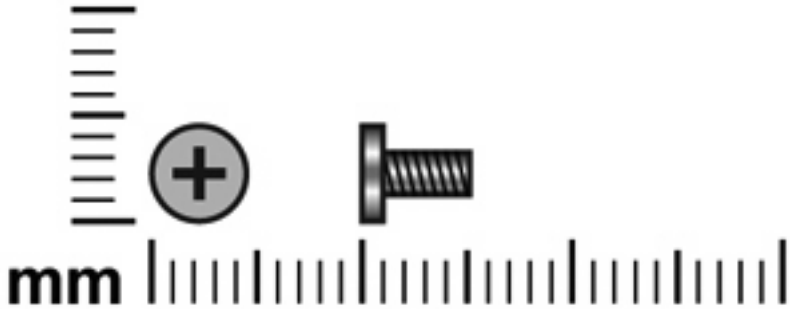
Phillips PM2.0×3.0 screw



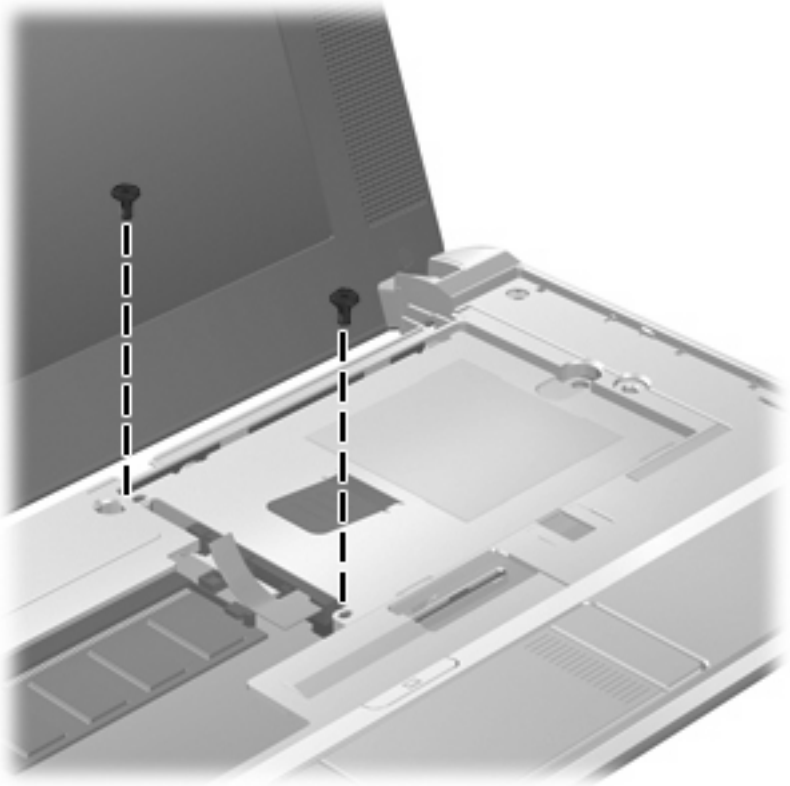
Color	Quantity	Length	Thread	Head diameter
Silver	3	3.0 mm	2.0 mm	4.5 mm

Where used: 3 screws that secure the keyboard to the computer

Phillips PM2.0×5.0 screw

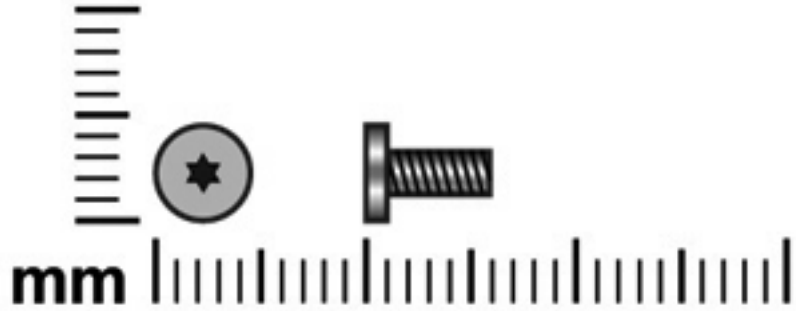


Color	Quantity	Length	Thread	Head diameter
Black	2	5.0 mm	2.0 mm	5.0 mm

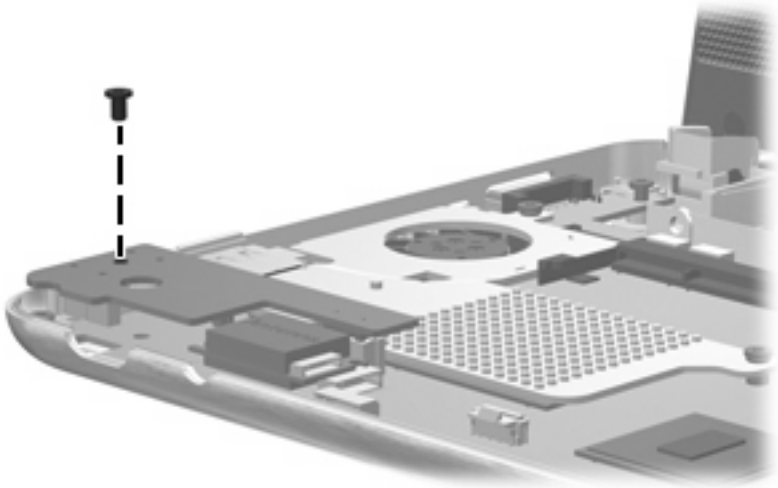


Where used: 2 screws that secure the mass storage device to the computer

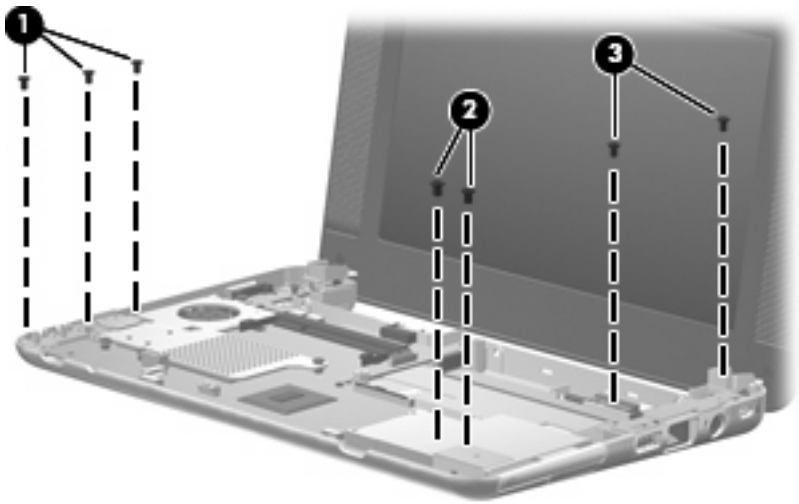
Torx8 T8M2.0×6.0 screw



Color	Quantity	Length	Thread	Head diameter
Silver	14	6.0 mm	2.0 mm	4.5 mm



Where used: One screw that secures the audio board to the system board

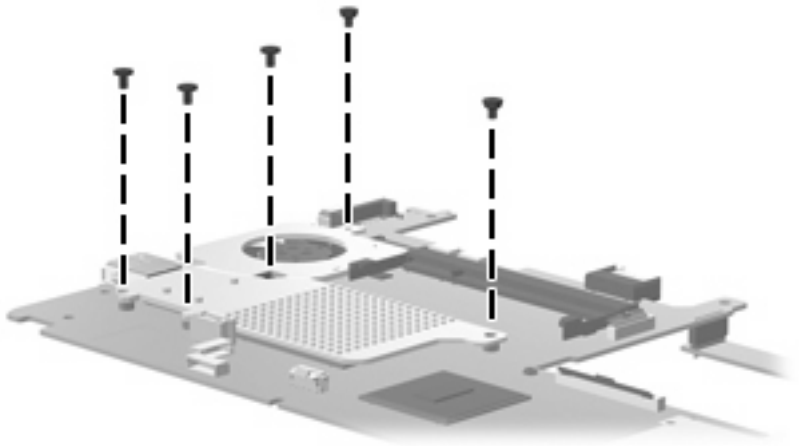


Where used:

(1) Three screws that secure the audio/USB connector bracket to the system board

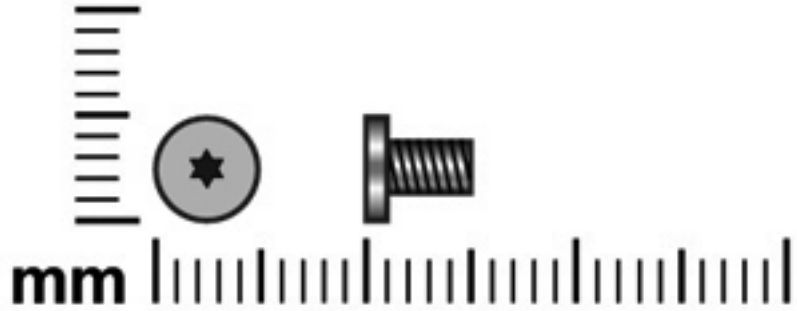
(2) Two screws that secure the ExpressCard assembly bracket to the system board

(3) Two screws that secure the USB/RJ-45 connector bracket to the system board

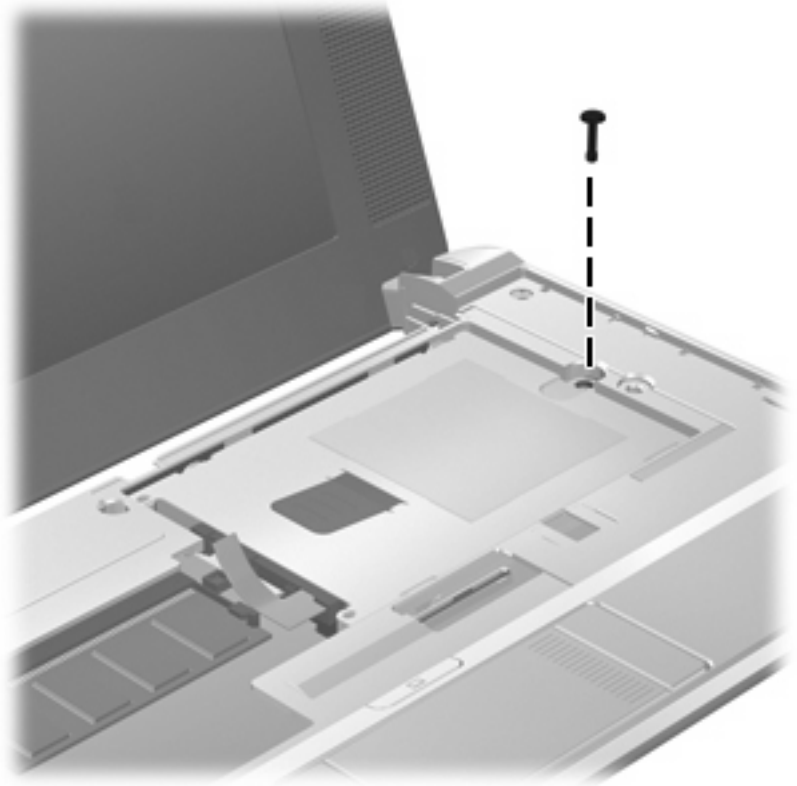


Where used: 5 screws that secure the fan/heat sink to the system board

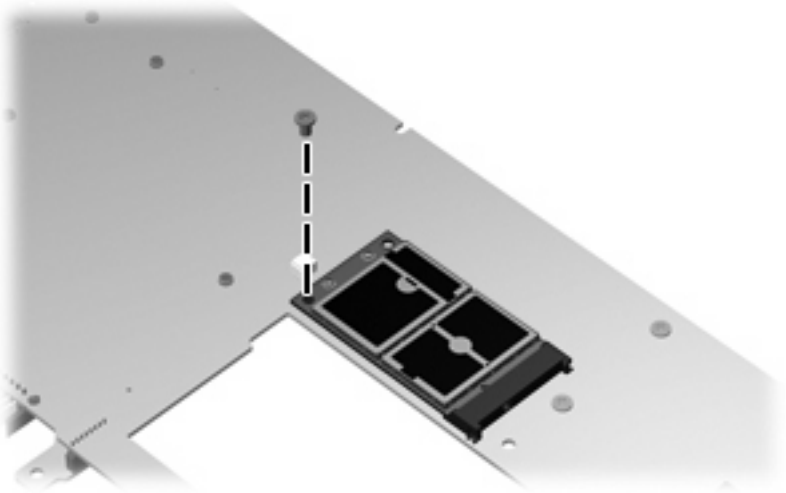
Torx8 T8M2.5×5.0 screw



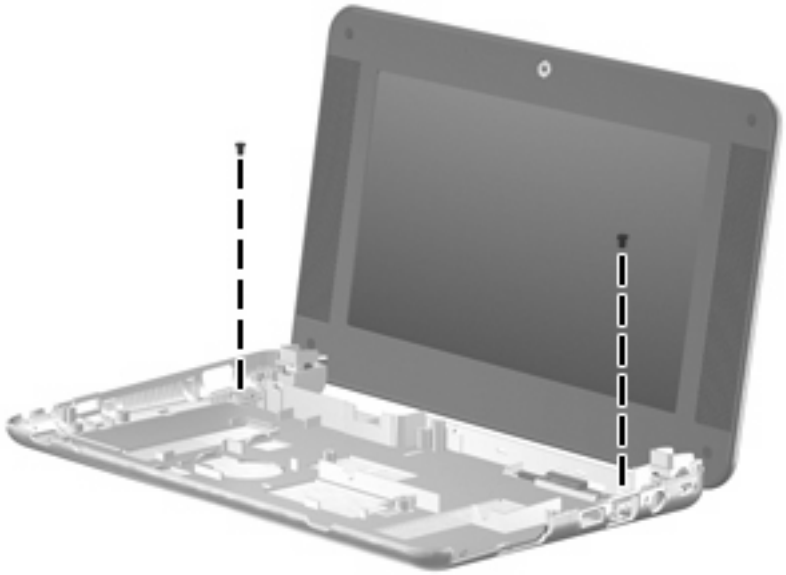
Color	Quantity	Length	Thread	Head diameter
Black	4	5.0 mm	2.5 mm	5.0 mm



Where used: One screw that secures the mass storage device to the computer

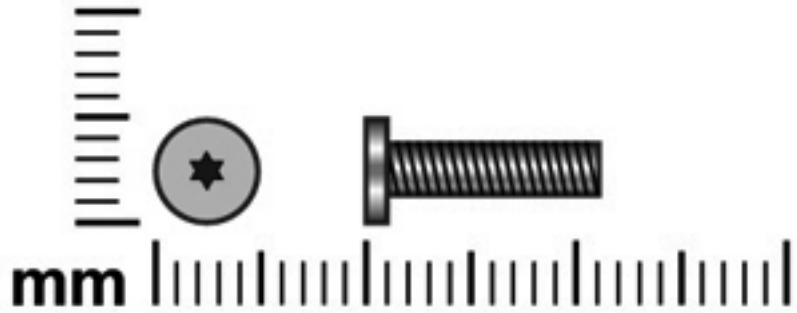


Where used: One screw that secures the WLAN module to the system board

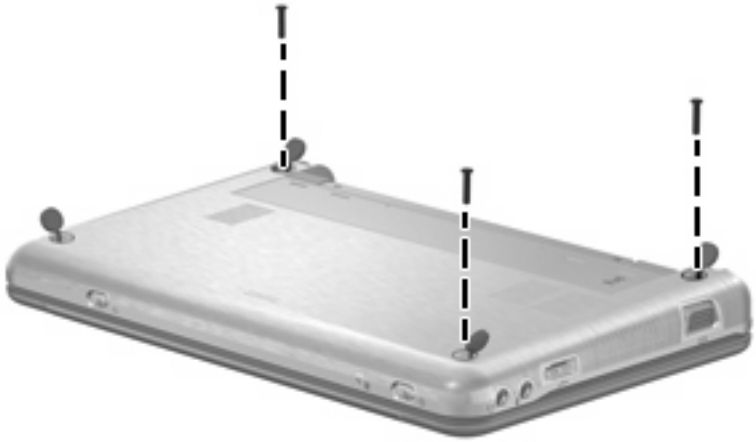


Where used: 2 screws that secure the display assembly to the base enclosure

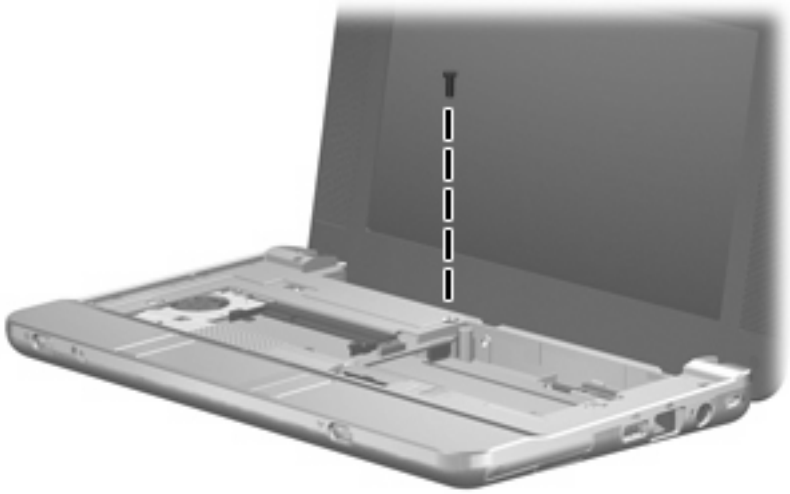
Torx8 T8M2.5×10.0 screw



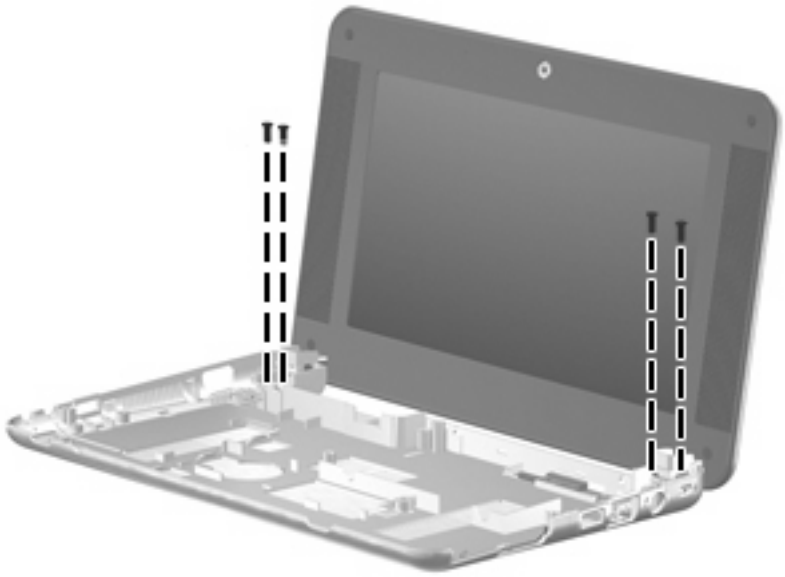
Color	Quantity	Length	Thread	Head diameter
Silver	8	10.0 mm	2.5 mm	5.0 mm



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

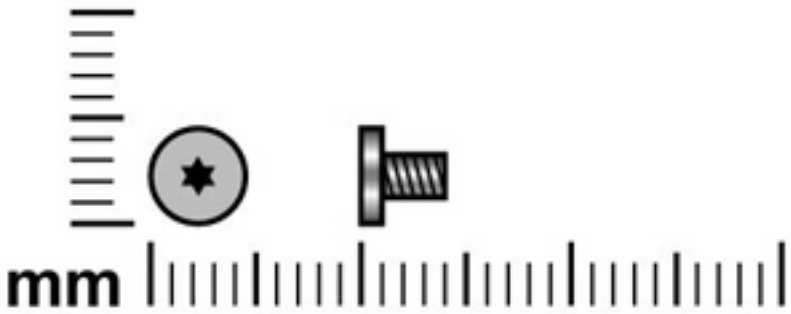


Where used: One screw that secures the top cover to the computer



Where used: 4 screws that secure the display assembly to the base enclosure

Torx8 T8M2.0×4.0 screw



Color	Quantity	Length	Thread	Head diameter
Silver	1	4.0 mm	2.0 mm	4.5 mm

Where used: One screw that secures the top cover to the computer

8 Backup and recovery

Backup and recovery in Windows Vista

Overview

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

Windows® Vista® provides the following advanced backup and recovery options:

- Backing up individual files and folders
- Backing up the entire hard drive (select models only)
- Scheduling automatic backups (select models only)
- Creating system restore points
- Recovering individual files
- Restoring the computer to a previous state
- Recovering information using recovery tools

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

Backing up

Backup tips

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

To create a screen shot:

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

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

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

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

Backing up your information

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

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

1. Select **Start > All Programs > Maintenance > Backup and Restore Center**.
2. Follow the on-screen instructions to back up your entire computer (select models only) or your files.

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

Performing a recovery

In case of system failure, use the f11 recovery tool to recover your original hard drive image. The image includes the Windows operating system and software programs installed at the factory.

NOTE: Windows Vista provides additional recovery tools through the operating system. For additional information, go to Help and Support.

NOTE: If you are unable to boot (start up) your computer, you must purchase a Windows Vista operating system DVD to reboot the computer and repair the operating system. For additional information, refer to the “Recovering information using a Windows Vista operating system DVD (purchased separately)” section in this guide.

Recovering the hard drive using f11

CAUTION: Using f11 will completely erase hard drive contents and reformat the hard drive. All files you have created and any software installed on the computer will be permanently removed. The f11 recovery tool reinstalls the operating system and HP programs and drivers that were installed at the factory. Software not installed at the factory must be reinstalled.

To recover the original hard drive image, follow these steps:

1. If possible, back up all personal files.
2. If possible, check for the presence of the HP Recovery partition. To find the partition, select **Start > Computer**.

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

3. Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
4. Press f11 while the “Press <F11> for recovery” message is displayed on the screen.
5. Follow the on-screen instructions.

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

If you are unable to boot (start up) your computer, you must purchase a Windows Vista operating system DVD to reboot the computer and repair the operating system. Make sure that your most recent backup (stored on discs or on an external drive) is easily accessible. To order a Windows Vista operating system DVD, go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions. You can also order the DVD by calling technical support. For contact information, refer to the *Worldwide Telephone Numbers* booklet included with the computer.

△ **CAUTION:** Using a Windows Vista operating system DVD will completely erase hard drive contents and reformat the hard drive. All files you have created and any software installed on the computer will be permanently removed. When reformatting is complete, the recovery process will help you restore the operating system, as well as drivers, software, and utilities.

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

NOTE: This process will take several minutes.

1. If possible, back up all personal files.
2. Restart the computer, and then insert the Windows Vista operating system DVD into the optical drive before the Windows operating system loads.
3. When prompted, press any keyboard key.
4. Follow the on-screen instructions.
5. Click **Next**.
6. Select **Repair your computer**.
7. Follow the on-screen instructions.

Backup and recovery in Windows XP

Backing up your information

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

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

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

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

When to backup

- On a regularly scheduled basis

  NOTE: Set reminders to back up your information periodically.

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

Backup suggestions

- Connect the computer to external power before performing backup and recovery procedures.
- Create system recovery points.
- Store personal files in the My Documents folder and back up these folders periodically.
- Back up templates stored in their associated programs.
- Save customized settings that appear in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time saver if you have to reset your preferences.

To copy the screen and paste it into a word-processing document:

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

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

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

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

Backing up individual files or folders

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

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

To back up individual files or folders:

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

   The Backup or Restore Wizard page opens.

2. Click **Next**.

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

4. Follow the on-screen instructions.

Backing up all files and folders

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

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

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

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

To back up all files and folders:

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

   The Backup or Restore Wizard page opens.

2. Click **Next**.

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

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

5. Follow the on-screen instructions.

Creating recovery points

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

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

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

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

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

To create a system recovery point:

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

   The System Restore window opens.

2. Click **Create a new restore point**, and then click **Next**.
3. Type a short description of the restore point. This will be used as the name of the restore point.
4. Click **Create**.
5. Follow the on-screen instructions.

Scheduling backups

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

To schedule backups:

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

   The Schedule Tasks window opens.

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

Performing a recovery

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

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

Initiating a recovery in Windows

To initiate a recovery in Windows, follow these steps:

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

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

Backup and recovery in SUSE Linux Enterprise Desktop

Performing a recovery

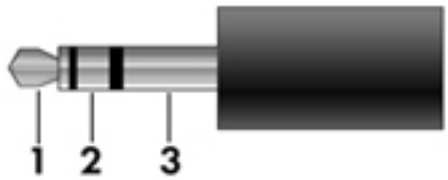
△ **CAUTION:** Using f11 completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. The f11 recovery tool reinstalls the operating system and HP programs and drivers that were installed at the factory. Software not installed at the factory must be reinstalled.

To recover the original hard drive image using f11, follow these steps:

1. If possible, back up all personal files.
2. Press f11 while the "Press <F11> for recovery" message is displayed on the screen.
3. Follow the on-screen instructions.

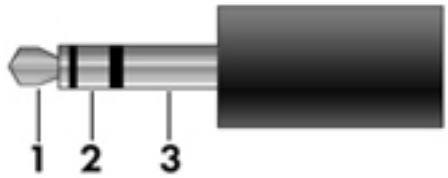
9 Connector pin assignments

Audio-out (headphone)



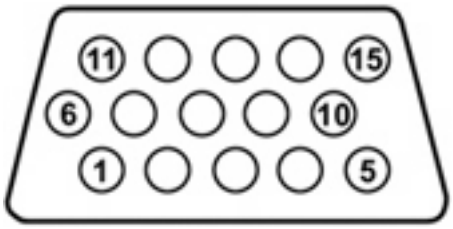
Pin	Signal
1	Audio out, left channel
2	Audio out, right channel
3	Ground

Audio-in (microphone)



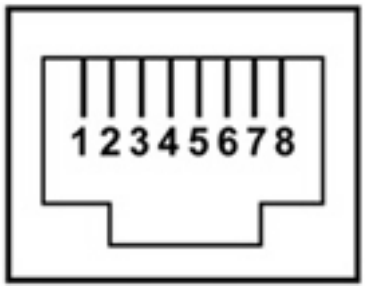
Pin	Signal
1	Audio signal in
2	Audio signal in
3	Ground

External monitor



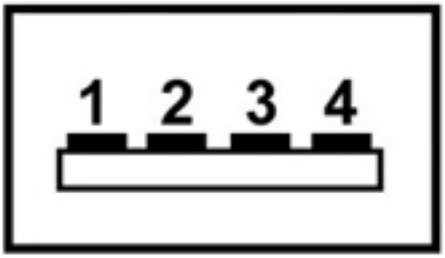
Pin	Signal
1	Red analog
2	Green analog
3	Blue analog
4	Not connected
5	Ground
6	Ground analog
7	Ground analog
8	Ground analog
9	+5 VDC
10	Ground
11	Monitor detect
12	DDC 2B data
13	Horizontal sync
14	Vertical sync
15	DDC 2B clock

RJ-45 (network)



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

Universal Serial Bus



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

10 Power cord set requirements

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

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

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

Requirements for all countries and regions

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

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

Requirements for specific countries and regions

Country/region	Accredited agency	Applicable note number
Australia	EANSW	1
Austria	OVE	1
Belgium	CEBC	1
Canada	CSA	2
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
Italy	IMQ	1
Japan	METI	3
Korea	EK	4
The Netherlands	KEMA	1
Norway	NEMKO	1
The People's Republic of China	CCC	5
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. Exercise caution when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.

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

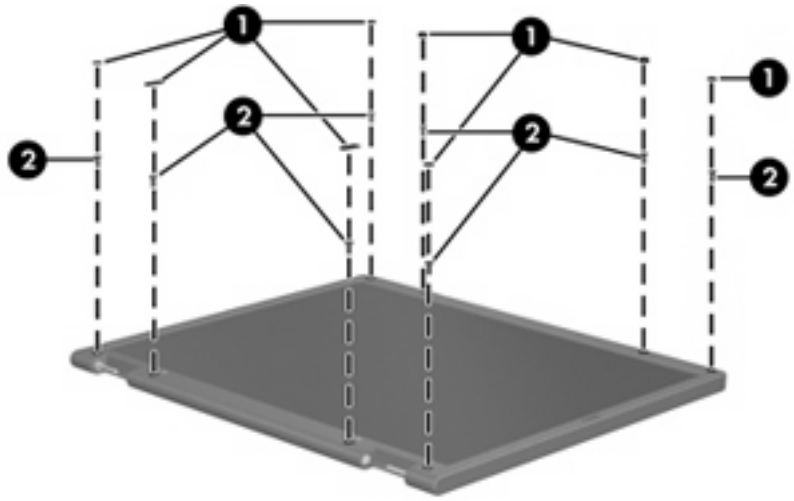
NOTE: **Materials Disposal**. This HP product contains mercury in the backlight in the display assembly that might require special handling at end-of-life. Disposal of mercury may be regulated because of environmental considerations. For disposal or recycling information, contact your local authorities,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

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

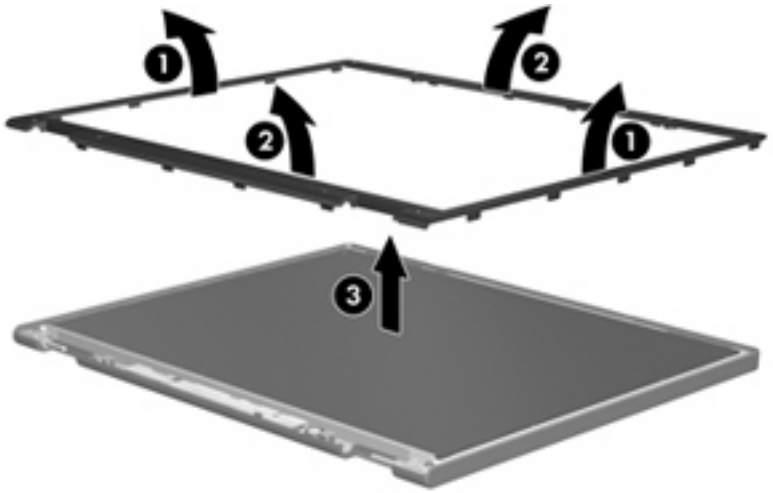
NOTE: The procedures provided in this appendix are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

Perform the following steps to disassemble the display assembly:

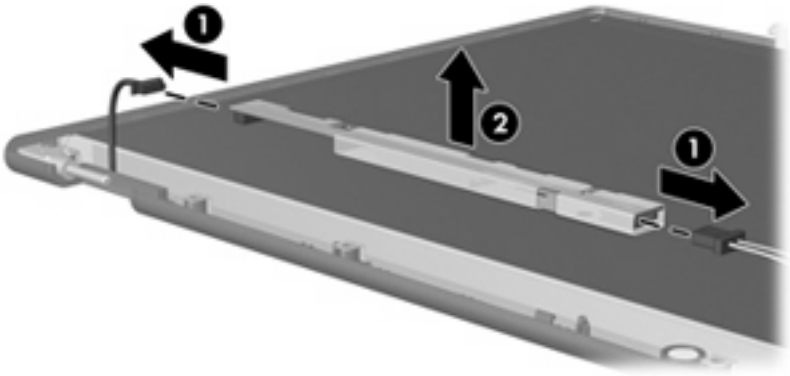
1. Remove all screw covers **(1)** and screws **(2)** that secure the display bezel to the display assembly.



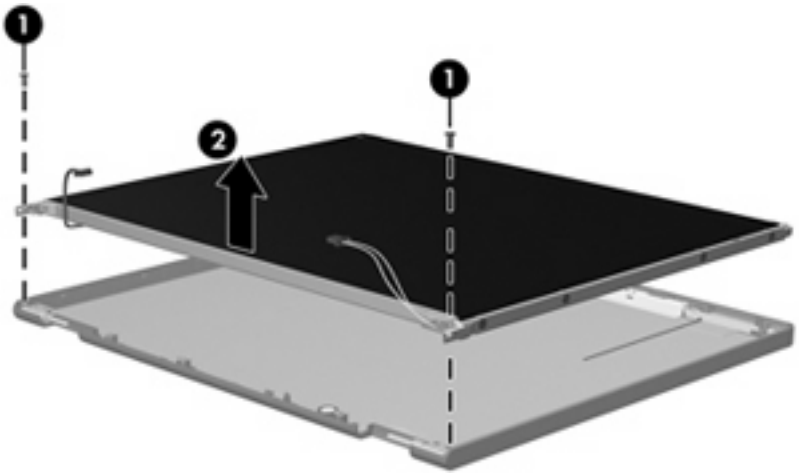
2. Lift up and out on the left and right inside edges **(1)** and the top and bottom inside edges **(2)** of the display bezel until the bezel disengages from the display assembly.
3. Remove the display bezel **(3)**.



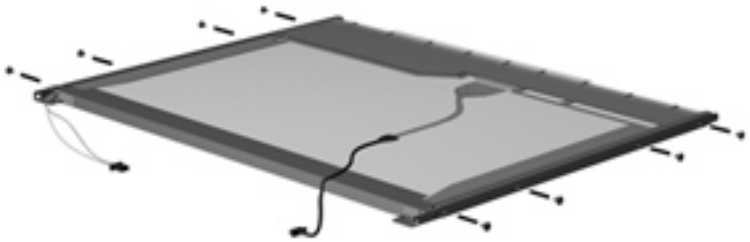
4. Disconnect all display panel cables **(1)** from the display inverter and remove the inverter **(2)**.



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

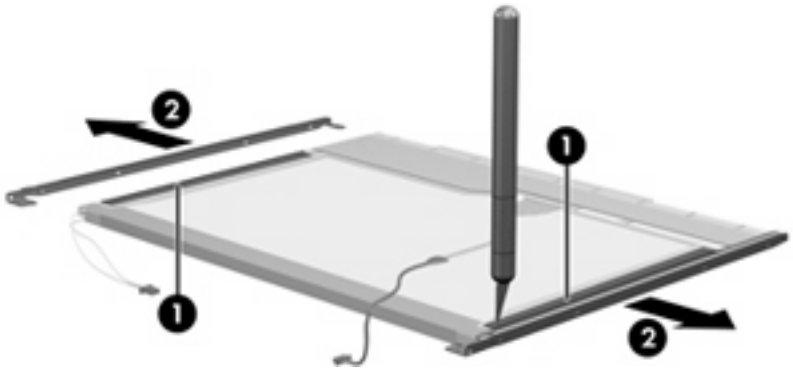


7. Turn the display panel assembly upside down.
8. Remove all screws that secure the display panel frame to the display panel.

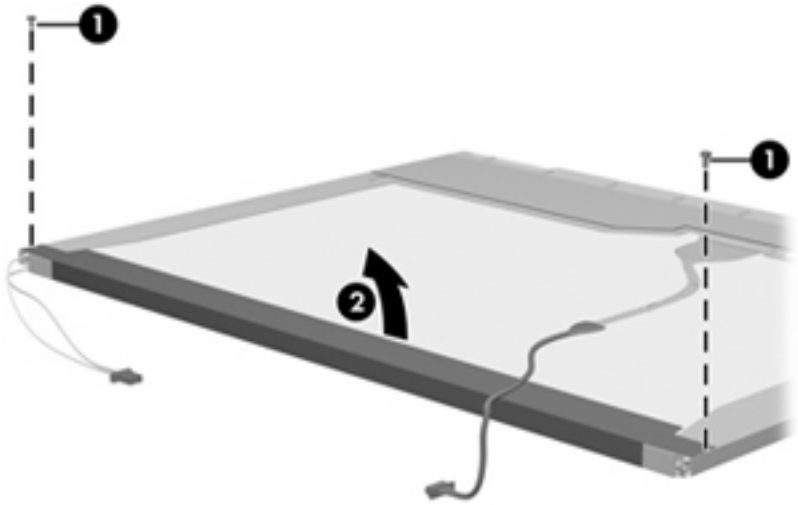


9. Use a sharp-edged tool to cut the tape **(1)** that secures the sides of the display panel to the display panel frame.

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

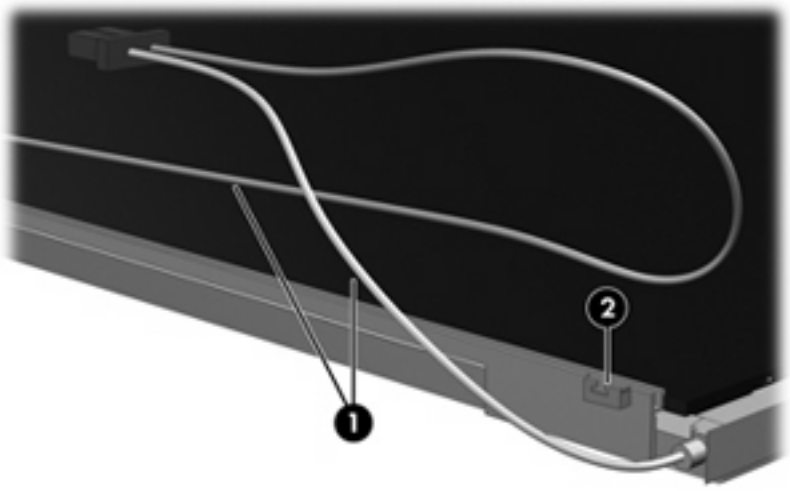


11. Remove the screws **(1)** that secure the backlight cover to the display panel.
12. Lift the top edge of the backlight cover **(2)** and swing it outward.



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

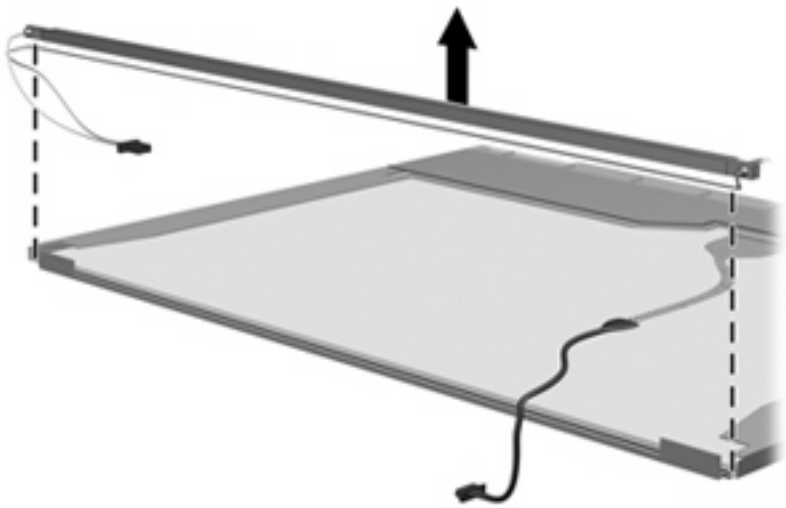
15. Remove the backlight cables **(1)** from the clip **(2)** in the display panel.



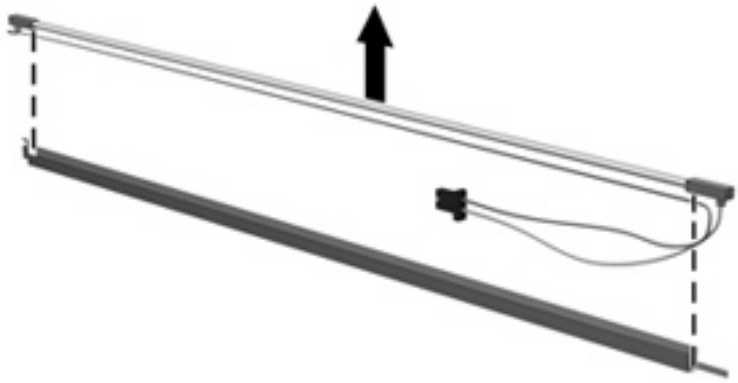
16. Turn the display panel upside down.

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

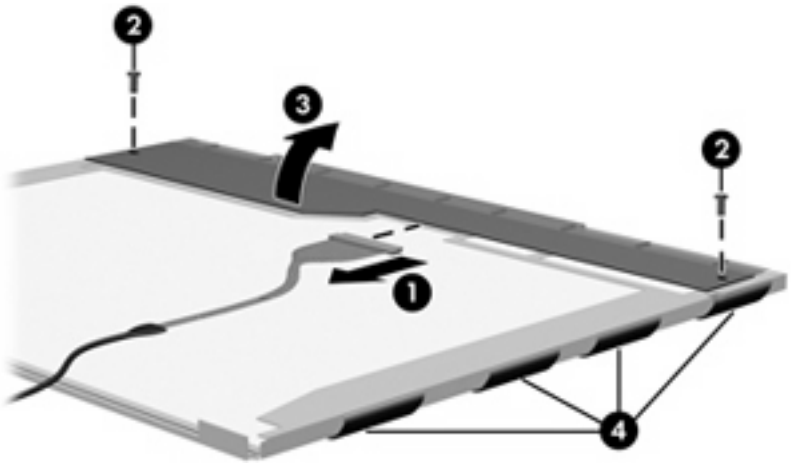
17. Remove the backlight frame from the display panel.



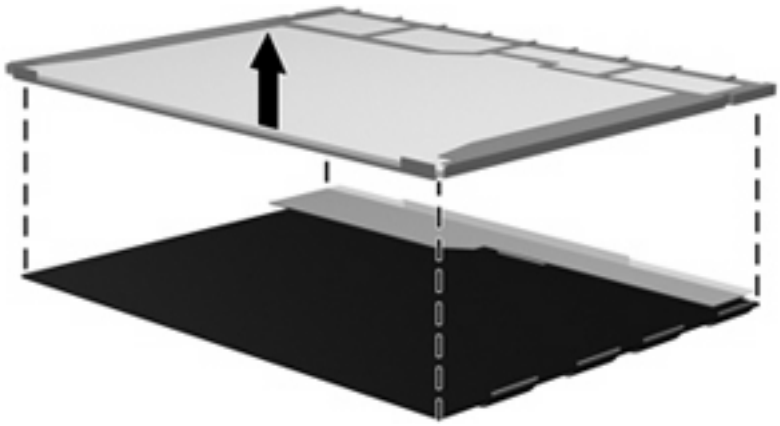
18. Remove the backlight from the backlight frame.



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



23. Remove the LCD panel.



24. Recycle the LCD panel and backlight.

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