COMPAQ

Maintenance and Service Guide

Compaq Notebook Evo N180 Series

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

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1

Product Description

The Compaq Notebook Evo N180 Series of Personal Computers offers advanced modularity, Intel Mobile Pentium III and Intel CeleronT processors with 64-bit architecture, industry-leading Accelerated Graphics Port (AGP) implementation, and extensive multimedia support.

Figure 1-1. Compaq Notebook Evo N180

1.1 Models

Computer models are shown in Table1-1.

Table 1-1
Compaq Notebook Evo N180
Models and Model Naming Conventions

Key										
N18	P	120	X5	48	V	M	25	L	O	XXXXXX-XXX
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**

Key	Description	Options	
1	Brand/series designator	N1 = Evo Notebook 180	
2	Processor type	P = Intel Mobile Pentium III	C = Intel CeleronT
3	Processor speed	133 = 1.33 GHz 120 = 1.20 GHz 106 = 1.066 GHz	100 = 1.00 GHz 933 = 933 MHz
4	Display type/ size/resolution	X = XGA P = SXGA+	5 = 15.x inch
5	Hard drive size	30 = 30 GB 20 = 20 GB	10 = 10 GB
6	Optical drive designator	D = CD-ROM V = DVD-ROM	W = DVD-RW R = CD-RW
7	Integrated communication	M = modem	0 = none
8	RAM	51 = 512 MB 25 = 256 MB 12 = 128 MB	
9	Battery cells/type	L = 8 cells, Lithium ion (Li ion)	
10	Operating system	2 = Windows 2000	
11	SKU#	Computer part number	

Table 1-1
Compaq Notebook Evo N180
Models and Model Naming Conventions *(Continued)*

Build-to-Order Models										
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
N18	P	133	P5	30	W	M	25	L	2	SKU#
All models in this section have a configuration code of **KDK1.**										
Australia / New Zealand				470023-498			Korea			470020-895
Asia / Pacific				470020-894						
Video memory = 32 MB; Future Bay device = diskette drive										
N18	P	133	P5	30	W	M	25	L	2	SKU#
People's Republic of China				Configuration code = **KDK2**						470020-538
Video memory = 16 MB; Future Bay device = diskette drive										
N18	P	133	P5	30	R	M	25	L	2	SKU#
Taiwan / Hong Kong				Configuration code = **KDK3**						470020-896
Video memory = 32 MB; Future Bay device = diskette drive										
N18	P	120	P5	30	V	M	25	L	2	SKU#
All models in this section have a configuration code of **KDKE.**										
Europe				470020-393			Italy			470020-401
Germany				470020-400			United Kingdom			470023-503
Video memory = 32 MB; Future Bay device = CD-RW drive										

Table 1-1
Compaq Notebook Evo N180
Models and Model Naming Conventions *(Continued)*

Build-to-Order Models										
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
N18	P	100	P5	30	V	M	51	L	2	SKU#
United States				Configuration code = **KDK7**						470020-367
Video memory = 16 MB; Future Bay device = CD-RW drive										
N18	P	100	X5	30	V	M	25	L	2	SKU#
Sweden				Configuration code = **KKH7**						470025-273
Video memory = 32 MB; Future Bay device = diskette drive										
N18	P	100	X5	30	V	M	25	L	2	SKU#
United States				Configuration code = **FP8Z**						470024-825
Video memory = 16 MB; Future Bay device = CD-RW drive										
N18	P	100	X5	20	V	M	25	L	2	SKU#
All models in this section have a configuration code of **KDK4.**										
Belgium				470024-732			Italy			470024-565
Europe				470023-499			The Netherlands			470023-597
France				470023-500			Norway			470024-738
Israel				470024-736			United Kingdom			470023-502
Video memory = 32 MB; Future Bay device = CD-RW drive										

Table 1-1
Compaq Notebook Evo N180
Models and Model Naming Conventions *(Continued)*

Build-to-Order Models										
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
N18	P	100	X5	20	V	M	25	L	2	SKU#
Germany				Configuration code = **KDKX**						470024-185
Video memory = 32 MB; Future Bay device = diskette drive										
N18	P	100	X5	20	V	M	25	L	2	SKU#
United States				Configuration code = **FP8Z**						470024-824
Video memory = 16 MB; Future Bay device = diskette drive										
N18	P	100	X5	20	V	M	25	L	2	SKU#
All models in this section have a configuration code of **KDK6.**										
Canada				470024-184			United States			470020-369
Video memory = 8 MB; Future Bay device = CD-RW drive										
N18	C	933	X5	20	V	M	12	L	2	SKU#
United States				Configuration code = **FP8Z**						470024-823
Video memory = 8 MB; Future Bay device = diskette drive										

Table 1-1
Compaq Notebook Evo N180
Models and Model Naming Conventions *(Continued)*

Configure-to-Order Models

All configure-to-order models:

- Are United States models.
- Have a configuration code of **FP8Z.**
- Contain a 1.44-MB diskette drive in the Future Bay.
- Contain 32 MB of video memory, unless noted with an asterisk (*). Models noted with an asterisk (*) contain 16 MB of video memory.
- Have network capability built in to the system board.
- Have a modem installed in the mini PCI communications socket.

1	2	3	4	5	6	7	8	9	10	11
N18	P	120	P5	30	W	M	51	L	2	470025-290
N18	P	120	P5	30	W	M	51	L	2	470025-294
N18	P	120	P5	30	W	M	25	L	2	470025-289
N18	P	120	P5	30	W	M	25	L	2	470025-293
N18	P	120	P5	30	V	M	51	L	2	470025-288
N18	P	120	P5	30	V	M	25	L	2	470025-287
N18	P	120	P5	30	V	M	25	L	2	470025-295*
N18	P	120	X5	30	W	M	51	L	2	470025-298*
N18	P	120	X5	30	W	M	51	L	2	470025-302*
N18	P	120	X5	30	W	M	51	L	2	470025-306
N18	P	120	X5	30	W	M	51	L	2	470025-310
N18	P	120	X5	30	W	M	25	L	2	470025-297*
N18	P	120	X5	30	W	M	25	L	2	470025-301*
N18	P	120	X5	30	W	M	25	L	2	470025-305
N18	P	120	X5	30	W	M	25	L	2	470025-309

Table 1-1
Compaq Notebook Evo N180
Models and Model Naming Conventions *(Continued)*

Configure-to-Order Models										
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
N18	P	120	X5	30	V	M	51	L	2	470025-296*
N18	P	120	X5	30	V	M	51	L	2	470025-300*
N18	P	120	X5	30	V	M	51	L	2	470025-304
N18	P	120	X5	30	V	M	51	L	2	470025-308
N18	P	120	X5	30	V	M	25	L	2	470025-299*
N18	P	120	X5	30	V	M	25	L	2	470025-303
N18	P	120	X5	30	V	M	25	L	2	470025-307
N18	P	106	P5	30	W	M	51	L	2	470025-343
N18	P	106	P5	30	W	M	51	L	2	470025-347
N18	P	106	P5	30	W	M	25	L	2	470025-342
N18	P	106	P5	30	W	M	25	L	2	470025-346
N18	P	106	P5	30	V	M	51	L	2	470025-292
N18	P	106	P5	30	V	M	51	L	2	470025-341
N18	P	106	P5	30	V	M	51	L	2	470025-345
N18	P	106	P5	30	V	M	25	L	2	470025-291
N18	P	106	P5	30	V	M	25	L	2	470025-340
N18	P	106	P5	30	V	M	25	L	2	470025-344
N18	P	106	P5	20	W	M	51	L	2	470025-319
N18	P	106	P5	20	W	M	51	L	2	470025-323
N18	P	106	P5	20	W	M	25	L	2	470025-318
N18	P	106	P5	20	W	M	25	L	2	470025-320
N18	P	106	P5	20	W	M	25	L	2	470025-322

Table 1-1
Compaq Notebook Evo N180
Models and Model Naming Conventions *(Continued)*

Configure-to-Order Models										
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
N18	P	106	P5	20	V	M	51	L	2	470025-317
N18	P	106	P5	20	V	M	51	L	2	470025-321
N18	P	106	P5	20	V	M	25	L	2	470025-316
N18	P	106	X5	30	W	M	51	16	F	470025-351
N18	P	106	X5	30	W	M	51	16	F	470025-355
N18	P	106	X5	30	W	M	51	32	F	470025-363
N18	P	106	X5	30	W	M	25	16	F	470025-350
N18	P	106	X5	30	W	M	25	16	F	470025-354
N18	P	106	X5	30	W	M	25	32	F	470025-356
N18	P	106	X5	30	W	M	25	32	F	470025-362
N18	P	106	X5	30	V	M	51	16	F	470025-349
N18	P	106	X5	30	V	M	51	16	F	470025-353
N18	P	106	X5	30	V	M	51	32	F	470025-357
N18	P	106	X5	30	V	M	51	32	F	470025-359
N18	P	106	X5	30	V	M	51	32	F	470025-361
N18	P	106	X5	30	V	M	25	16	F	470025-348
N18	P	106	X5	30	V	M	25	16	F	470025-352
N18	P	106	X5	30	V	M	25	32	F	470025-358
N18	P	106	X5	30	V	M	25	32	F	470025-360

Table 1-1
Compaq Notebook Evo N180
Models and Model Naming Conventions *(Continued)*

Configure-to-Order Models										
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
N18	P	106	X5	20	W	M	51	16	F	470025-327
N18	P	106	X5	20	W	M	51	16	F	470025-331
N18	P	106	X5	20	W	M	51	32	F	470025-335
N18	P	106	X5	20	W	M	51	32	F	470025-339
N18	P	106	X5	20	W	M	25	16	F	470025-326
N18	P	106	X5	20	W	M	25	16	F	470025-330
N18	P	106	X5	20	W	M	25	32	F	470025-334
N18	P	106	X5	20	W	M	25	32	F	470025-338
N18	P	106	X5	20	V	M	51	16	F	470025-325
N18	P	106	X5	20	V	M	51	16	F	470025-329
N18	P	106	X5	20	V	M	51	32	F	470025-333
N18	P	106	X5	20	V	M	51	32	F	470025-337
N18	P	106	X5	20	V	M	25	16	F	470025-324
N18	P	106	X5	20	V	M	25	16	F	470025-328
N18	P	106	X5	20	V	M	25	32	F	470025-332
N18	P	106	X5	20	V	M	25	32	F	470025-336

1.2 Features

- The following processors are available, varying by computer model:
  - 1.33-GHz Intel Mobile Pentium III processor with 256-KB integrated L2 cache
  - 1.20-GHz Intel Mobile Pentium III processor with 256-KB integrated L2 cache
  - 1.06-GHz Intel Mobile Pentium III processor with 256-KB integrated L2 cache
  - 933-MHz Intel Mobile CeleronT processor with 64-KB integrated L2 cache
- ATI Mobility Radeon with 64-bit video graphics, video memory expandable from 8 to 32 MB, and a 4X AGP graphics card
- 128- or 256-MB high-performance Synchronous DRAM (SDRAM), expandable to 1024 MB
- Microsoft Windows 2000 operating system
- The following displays are available, varying by computer model:
  - 15.0-inch SXGA+, TFT
  - 15.0-inch XGA, TFT
- Full-size keyboard with TouchPad pointing device and 4-way Internet scroll button

- Network interface card (NIC) integrated on system board, with mini PCI V.90 modem
- Support for one Type I/II/III PC Card slot with support for both 32-bit CardBus and 16-bit PC Cards
- External 60W AC adapter with power cord
- 8-cell Lithium ion (Li ion) battery pack
- 30-, 20-, or 10-GB high-capacity hard drive, varying by computer model
- Connectors for:
  - RJ-11 modem
  - RJ-45 network
  - S-Video
  - External monitor
  - 1394 digital devices
  - Universal Serial Bus
  - External keyboard/mouse
  - Parallel devices
  - AC power
  - Stereo line out/headphone
  - Mono microphone
- JBL Pro stereo speakers with bass reflex

1.3 Clearing a Password

If the notebook you are servicing has an unknown password, follow these steps to clear the password. These steps also clear CMOS:

1. Prepare the computer for disassembly (refer to Section 5.3, "Preparing the Computer for Disassembly," for more information).
2. Remove the RTC battery (refer to Section 5.12, "Disk Cell RTC Battery").
3. Wait approximately five minutes.
4. Replace the RTC battery and reassemble the computer.
5. Connect AC power to the computer. Do **not** reinsert any battery packs at this time.
6. Turn on the computer.

All passwords and all CMOS settings have been cleared.

1.4 Power Management

The computer comes with power management features that extend battery operating time and conserve power. The computer supports the following power management features:

- Standby
- Hibernation
- Setting customization by the user
- Hotkeys for setting level of performance
- Smart battery that provides an accurate battery power gauge
- Battery calibration
- Lid switch suspend/resume
- Power/suspend button
- Advanced Configuration and Power Management (ACP) compliance

1.5 Computer External Components

The external components on the front and right side of the computer are shown in Figure 1-2 and described in Table 1-2.

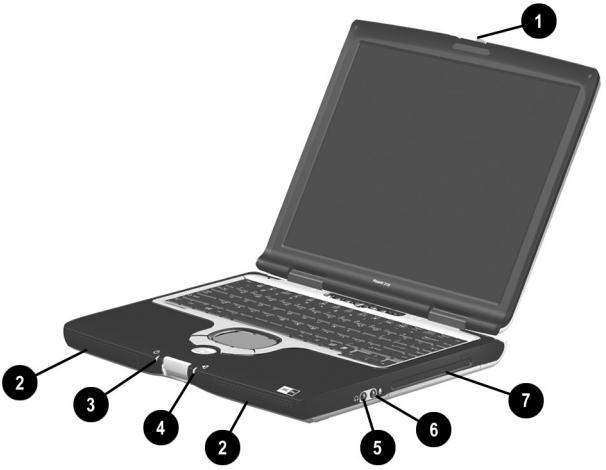


Figure 1-2. Front and Right Side Components

Table 1-2
Front and Right Side Components

Item	Component	Function
1	Display release latch	Opens the computer.
2	Stereo speakers (2)	Produce stereo sound.

Table 1-2
Front and Right Side Components *(Continued)*

Item	Component	Function
3	Drive activity light	Turns on when the hard drive or a CD- or DVD-ROM drive is accessed.
4	Battery light	On: A battery pack is charging. Blinking: A battery pack that is the only available power source has reached a low-battery condition.
5	Stereo speaker/ headphone jack	Connects stereo speakers, headphones, headset, or television audio.
6	Mono microphone jack	Connects a mono microphone, disabling the built-in microphone.
7	Future Bay	Accepts Future Bay devices, such as a diskette drive, optical drive, hard drive, or optional battery pack.

The computer rear panel and left side components are shown in Figure 1-3 and described in Table 1-3.

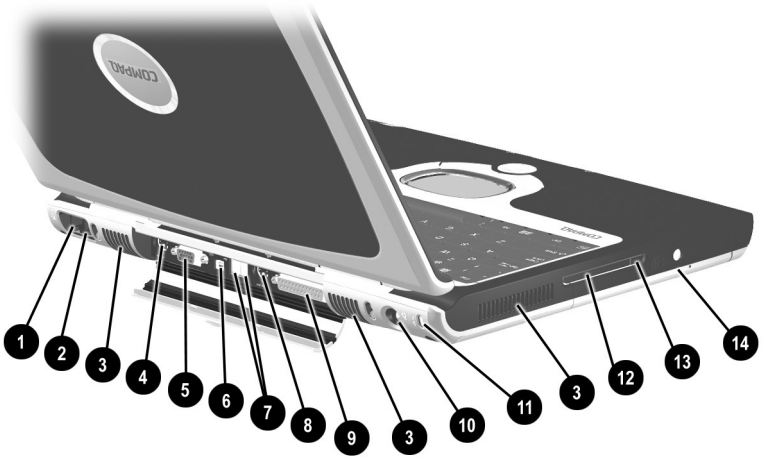


Figure 1-3. Rear Panel and Left Side Components

Table 1-3
Rear Panel and Left Side Components

Item	Component	Function
1	RJ-11 jack	Connects the modem cable to an internal modem. A modem cable is included with internal modem models.
2	RJ-45 jack	Connects the network cable. A network cable is not included with the computer.
3	Vents (3)	Allow airflow to cool internal components.
	△ **CAUTION:** To prevent damage, the computer shuts down if an overheating condition occurs. Do not block the cooling vents. Avoid placing the computer on a blanket, rug, or other flexible surface that may cover the vent areas.	
4	S-video connector	Connects a television, VCR, camcorder, or overhead projector.

Table 1-3
Rear Panel and Left Side Components *(Continued)*

Item	Component	Function
5	External monitor connector	Connects an external monitor or overhead projector.
6	1394 connector	Connects IEEE 1394-compliant products, such as digital camcorders, video editing equipment, VCRs, cameras, and audio players. A 1394 firewire cable is required for use with this jack.
7	USB connectors (2)	Connects USB devices.
8	External keyboard/ mouse connector	Connects an optional full-sized keyboard or a mouse. Both the external mouse and computer pointing device are active. An optional splitter/adapter allows an external keyboard and mouse to be used at the same time.
9	Parallel connector	Connects a parallel device.
10	DC power jack	Connects any one of the following: ■ AC adapter ■ Optional automobile power adapter/charger ■ Optional aircraft power adapter
11	Security cable slot	Attaches an optional security cable to the computer.
12	PC Card slot	Supports a 32-bit (CardBus) or 16-bit PC Card.
13	PC Card eject button	Ejects a PC Card from the PC Card slot.
14	Optical drive bay	Accepts a CD- or DVD-ROM drive.

The keyboard components are shown in Figure 1-4 and described in Table 1-4.

Figure 1-4. Keyboard Components

Table 1-4
Keyboard Components

Item	Component	Function
1	**F1** through **F12** function keys	Perform preset functions.
2	**Numeric lock** key	Turns on the numeric lock function.
3	Embedded numeric keypad	Converts keys to numeric keypad.
4	Cursor control keys	Move the cursor around the screen.
5	Windows application key	Displays a menu when using a Microsoft application. The menu is the same one that is displayed by pressing the right mouse button.
6	Windows logo keys (2)	Display Windows Start menu.
7	**Fn** key	Used with hotkeys to perform preset hotkey functions.

The components on the top of the computer are shown in Figure 1-5 and described in Table 1-5.

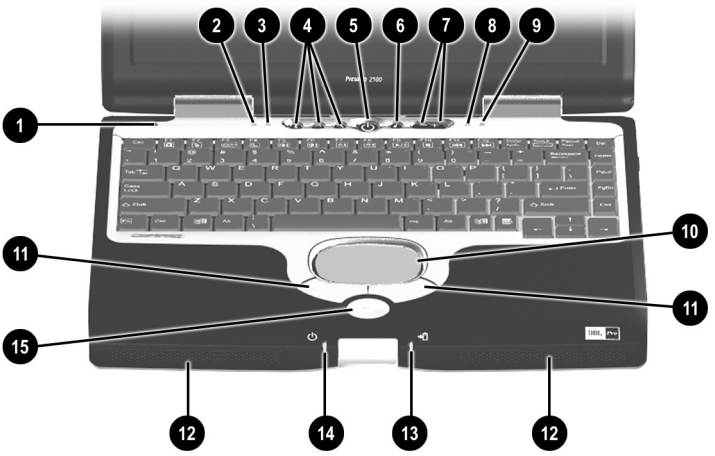


Figure 1-5. Top Components

Table 1-5
Top Components

Item	Component	Function
1	Display lid switch	Turns off the computer display if the computer is closed while on.
2	Power light	On: Power is turned on. Blinking: Computer is in Standby. The power light also blinks if a battery pack that is the only available power source reaches a low-battery condition.
3	Caps lock light	On: **Caps lock** is on.
4	Easy Access buttons (3)	Provide quick access to the Internet. Refer to the hardware guide that ships with the computer for information about these buttons.

Table 1-5
Top Components *(Continued)*

Item	Component	Function
5	Power button	Turns on the computer. Use the operating system Shut Down command to turn off the computer.
6	Digital audio button	Launches Windows Media Player to play MP3 music.
7	Volume control buttons (2)	Adjust the volume of the stereo speakers.
8	Numeric lock light	On: **Num lock** is on and the embedded numeric keypad is enabled.
9	Scroll lock light	On: **Scroll lock** is on.
10	TouchPad	Moves the mouse cursor, selects, and activates.
11	TouchPad buttons (2)	Function like the left and right mouse buttons on an external mouse.
12	Stereo speakers (2)	Produce stereo sound.
13	Battery light	On: A battery pack is charging. Blinking: A battery pack that is the only available power source has reached a low-battery condition.
14	Drive activity light	Turns on when the hard drive CD- or DVD-ROM drive is accessed.
15	EasyScroll button	Scrolls the screen left, right, up, and down.

The external components on the bottom of the computer are shown in Figure 1-6 and described in Table 1-6.

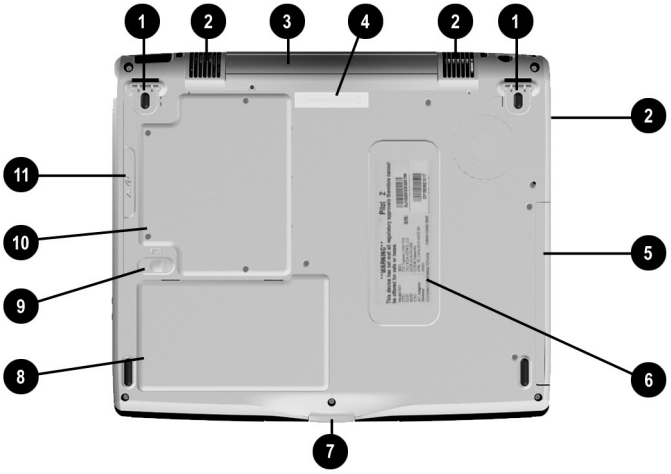


Figure 1-6. Bottom Components

Table 1-6
Bottom Components

Item	Component	Function
1	Tilt feet (2)	Tilt the computer for ease of use.
2	Vents (3)	Allow airflow to cool internal components.

△ **CAUTION:** To prevent damage, the computer shuts down if an overheating condition occurs. Do not block the cooling vents. Avoid placing the computer on a blanket, rug, or other flexible surface that may cover the vent areas.

Table 1-6
Bottom Components *(Continued)*

Item	Component	Function
3	Connector cover	Covers the S-video, external monitor, 1394, USB, external keyboard/mouse, and parallel connectors.
4	Docking connector	Connects the computer to an optional port replicator.
5	Optical drive bay	Contains a CD- or DVD-ROM drive.
6	Labels area	Contains the serial number and Microsoft Certificate of Authenticity labels, which may be needed when you call Compaq customer support or use some Windows operating systems.
7	Display release latch	Opens the computer.
8	Battery bay	Accepts an 8-cell Lithium ion (Li ion) battery pack.
9	Battery release latch	Releases the battery pack from the battery compartment.
10	Expansion compartment cover	Covers the two memory expansion slots, the video memory expansion slot, and the mini PCI communications slot.
11	Future Bay release bezel	Releases the Future Bay device from the Future Bay.

1.5 Design Overview

This section presents a design overview of key parts and features of the computer. Refer to Chapter 3, “Illustrated Parts Catalog,” to identify replacement parts, and Chapter 5, “Removal and Replacement Procedures,” for disassembly steps. The system board provides the following device connections:

- Memory expansion board
- Video memory expansion board
- Hard drive
- Display
- Keyboard
- TouchPad
- Audio
- Intel Pentium III or Celeron processors
- Fan
- PC Card
- Modem

The computer uses an electrical 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 applications. Exhaust air is displaced through the ventilation grill located on the left side of the computer.

CAUTION: To properly ventilate the computer, allow at least a 3-inch (7.6 cm) clearance on the left and right sides of the computer.

2

Troubleshooting

WARNING: Only authorized technicians trained by Compaq should repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard. Any indication of component replacement or printed wiring board modification may void any warranty or exchange allowances.

Utilities that are preinstalled on the computer include:

- **PhoenixBIOS Setup Utility**—Allows you to modify or restore factory default settings and configure the system BIOS to diagnose and solve minor problems.
- **Power Management**—Allows you to reduce your computer power consumption.
- **Security**—Allows you to set or remove your power-on password.

2.1 Using the PhoenixBIOS Setup Utility

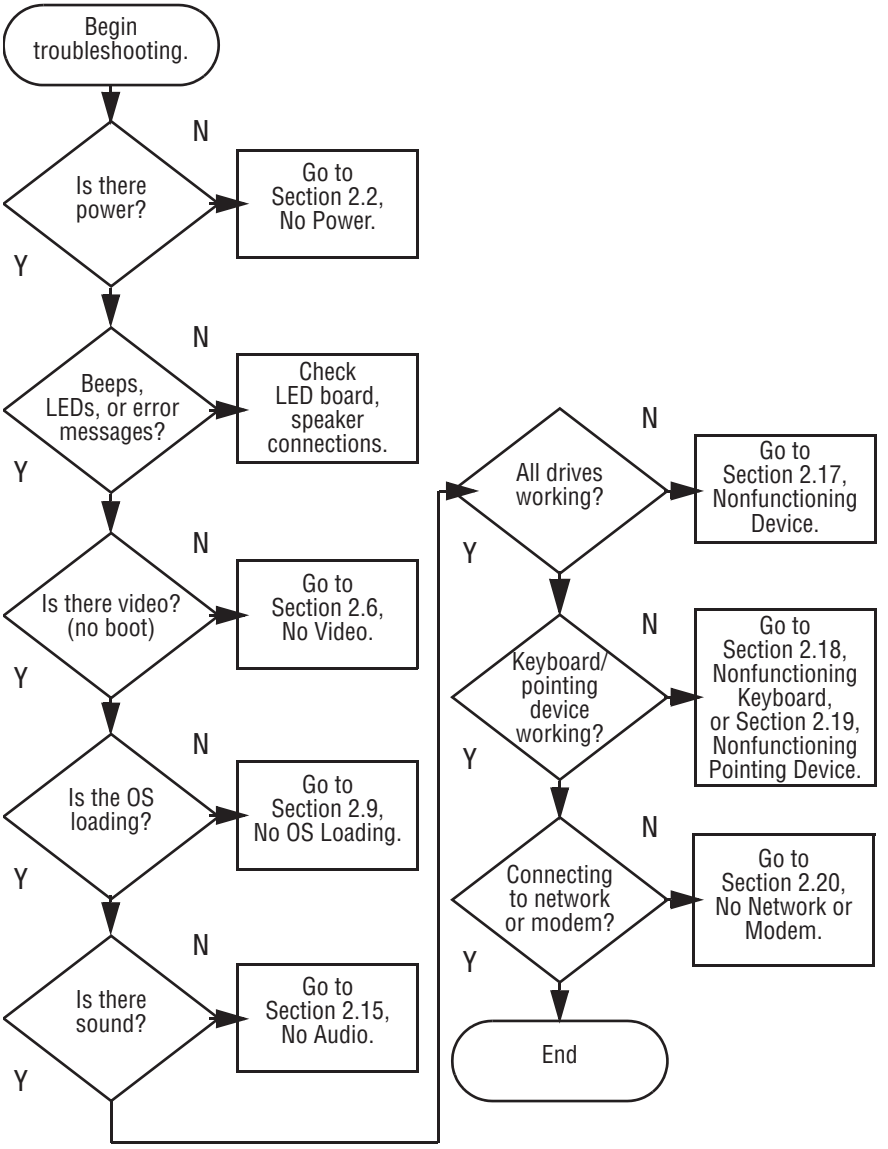
The PhoenixBIOS Setup Utility (PSU) is built into the system. You can configure the system BIOS and modify or restore factory default settings such as date and time, types of disk drives, power management, and password settings. To run PSU, press the **F10** key during system startup. When the main screen displays, use the keyboard and arrow keys to move around the menus and make selections.

2.2 Troubleshooting Flowcharts

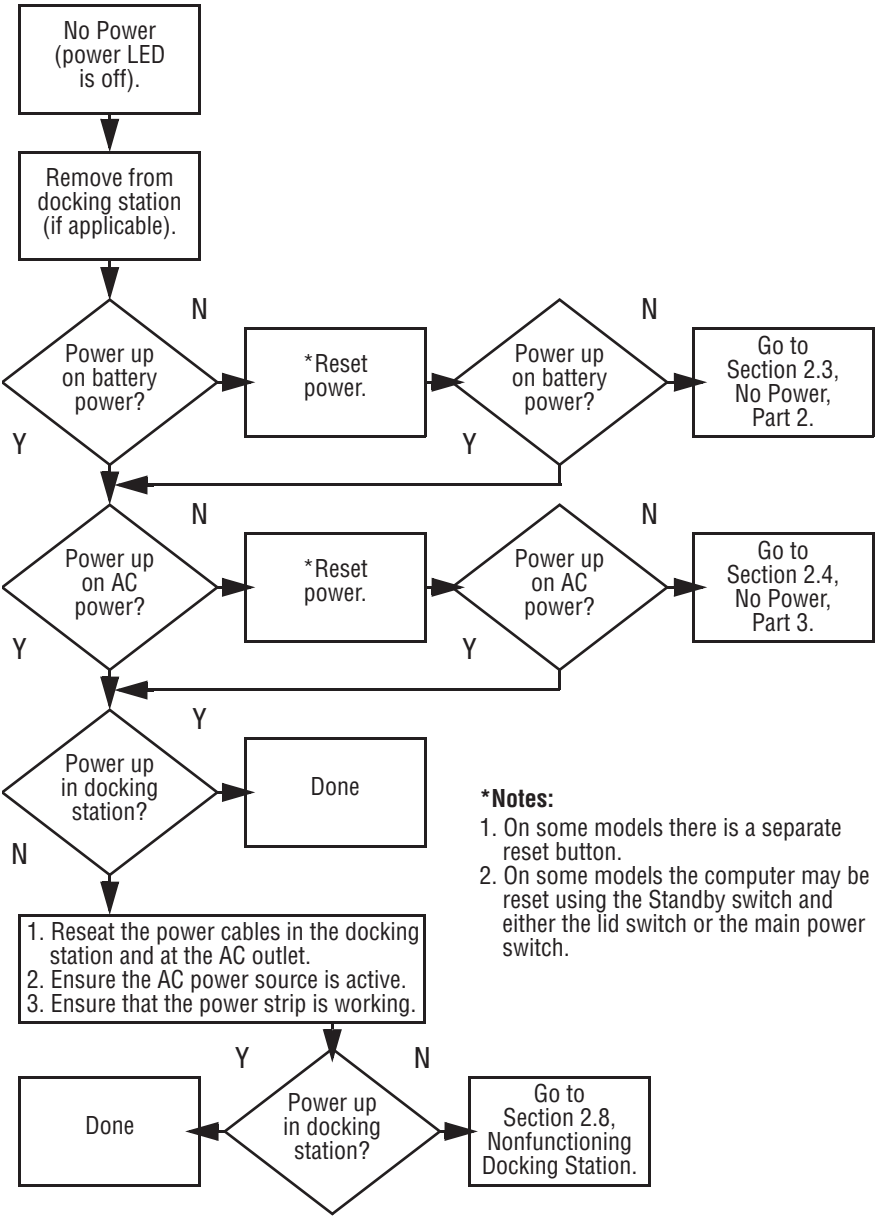
Table 2-1
Troubleshooting Flowcharts Overview

Flowchart	Description
2.1	Initial troubleshooting
2.2	No power, part 1
2.3	No power, part 2
2.4	No power, part 3
2.5	No power, part 4
2.6	No video, part 1
2.7	No video, part 2
2.8	Nonfunctioning docking station
2.9	No operating system (OS) loading
2.10	No OS loading from hard drive, part 1
2.11	No OS loading from hard drive, part 2
2.12	No OS loading from hard drive, part 3
2.13	No OS loading from diskette drive
2.14	No OS loading from CD- or DVD-ROM drive
2.15	No audio, part 1
2.16	No audio, part 2
2.17	Nonfunctioning device
2.18	Nonfunctioning keyboard
2.19	Nonfunctioning pointing device
2.20	No network or modem connection

Flowchart 2.1 - Initial Troubleshooting



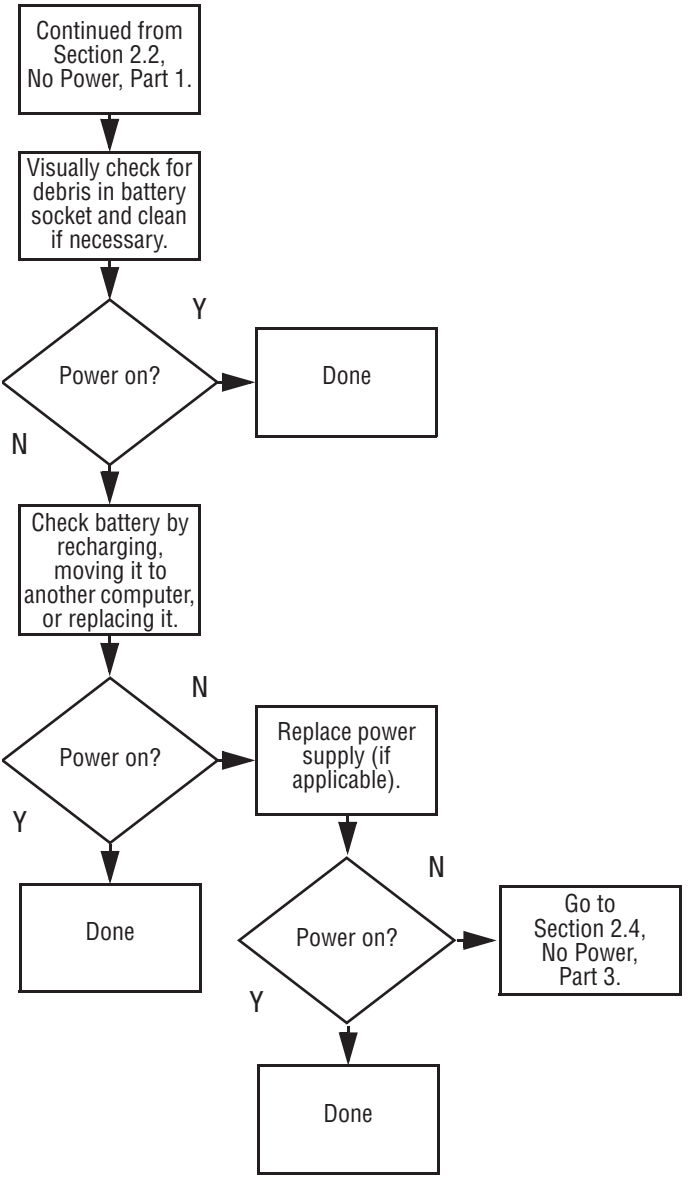
Flowchart 2.2 - No Power, Part 1



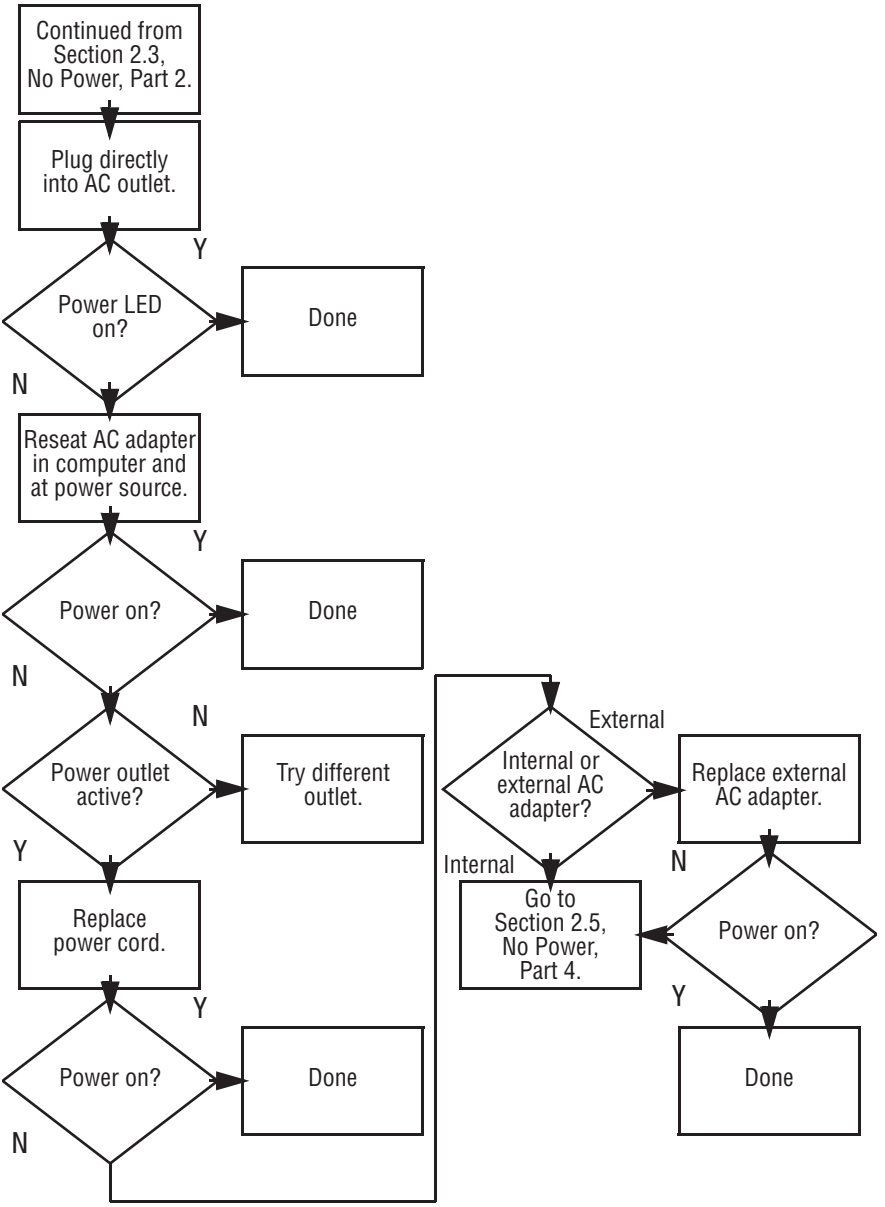
***Notes:**

1. On some models there is a separate reset button.
2. On some models the computer may be reset using the Standby switch and either the lid switch or the main power switch.

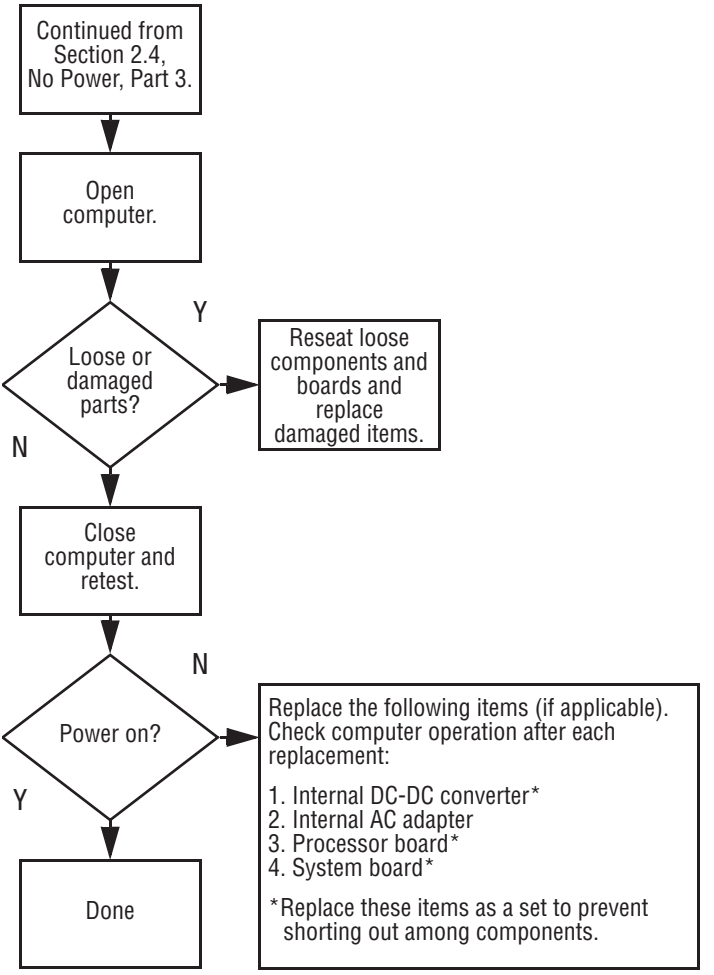
Flowchart 2.3 - No Power, Part 2



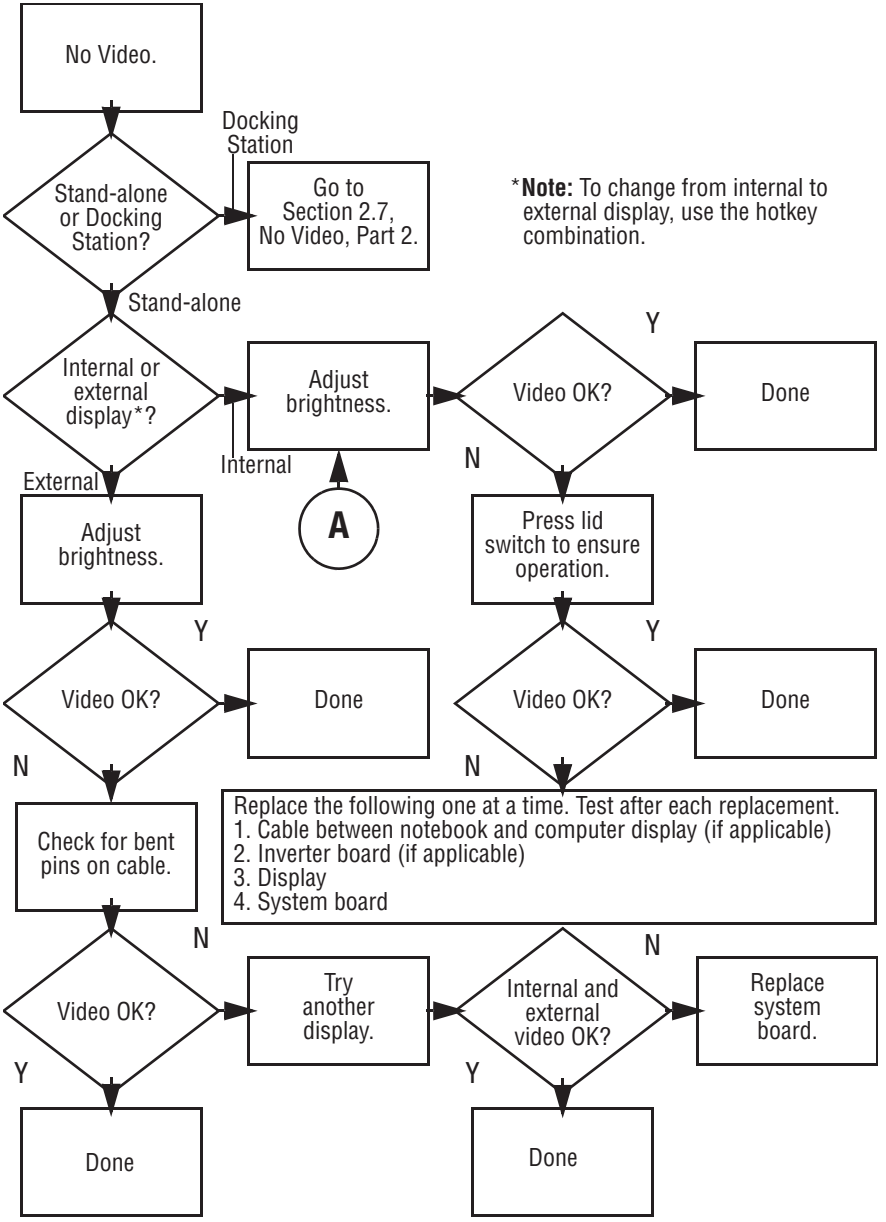
Flowchart 2.4 - No Power, Part 3



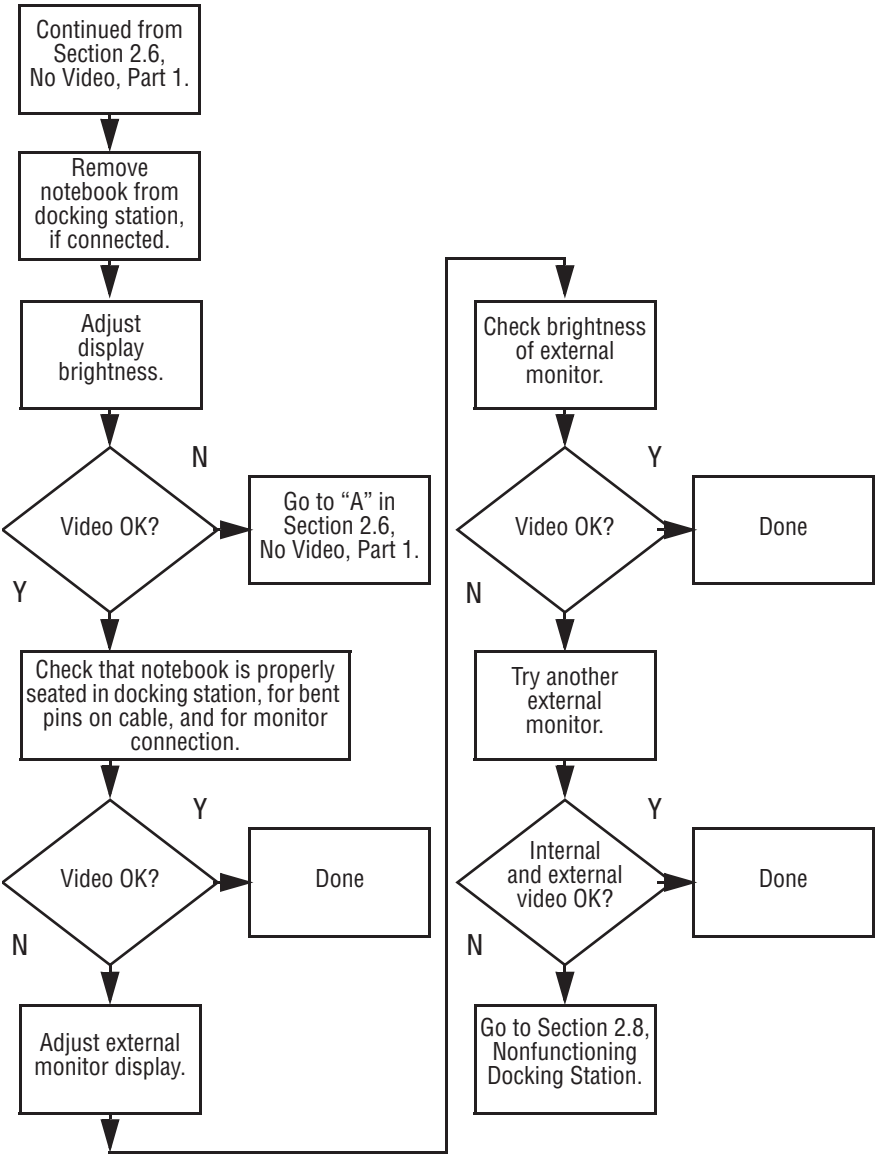
Flowchart 2.5 - No Power, Part 4



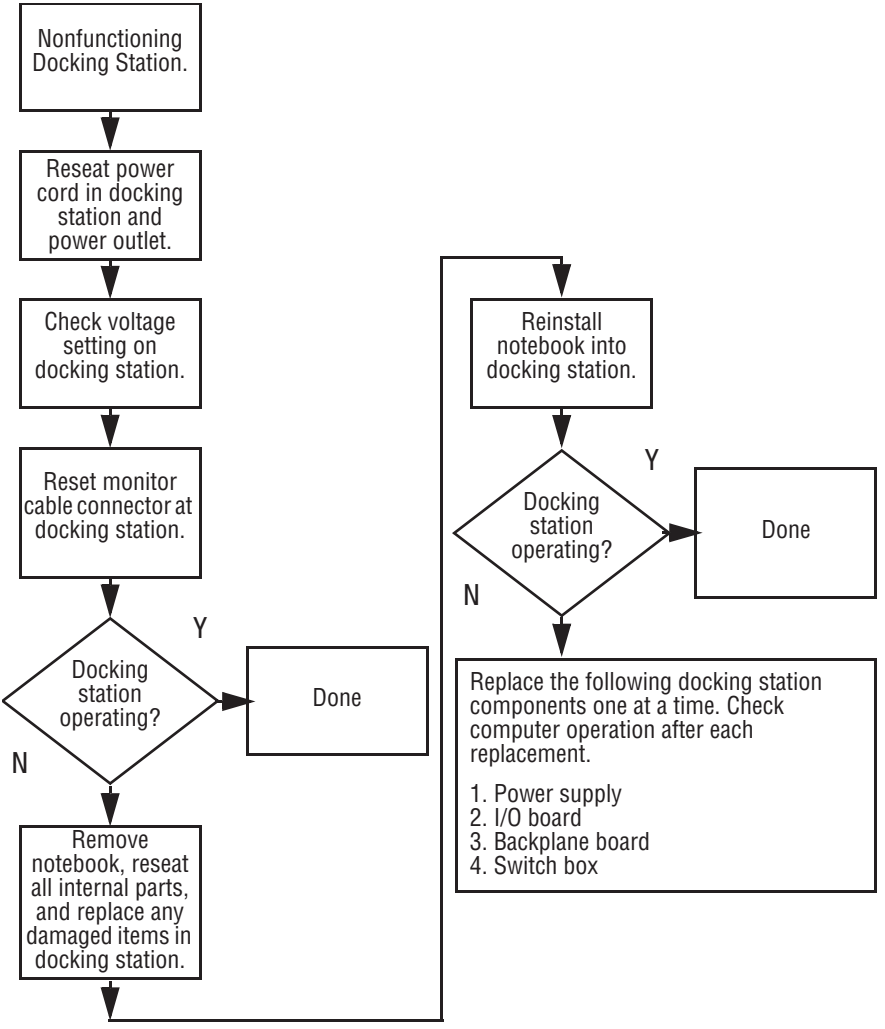
Flowchart 2.6 - No Video, Part 1



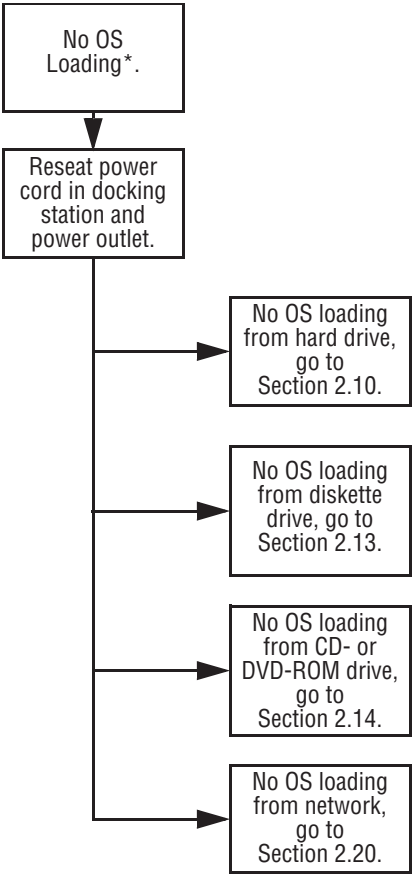
Flowchart 2.7 - No Video, Part 2



Flowchart 2.8 - Nonfunctioning Docking Station (if applicable)

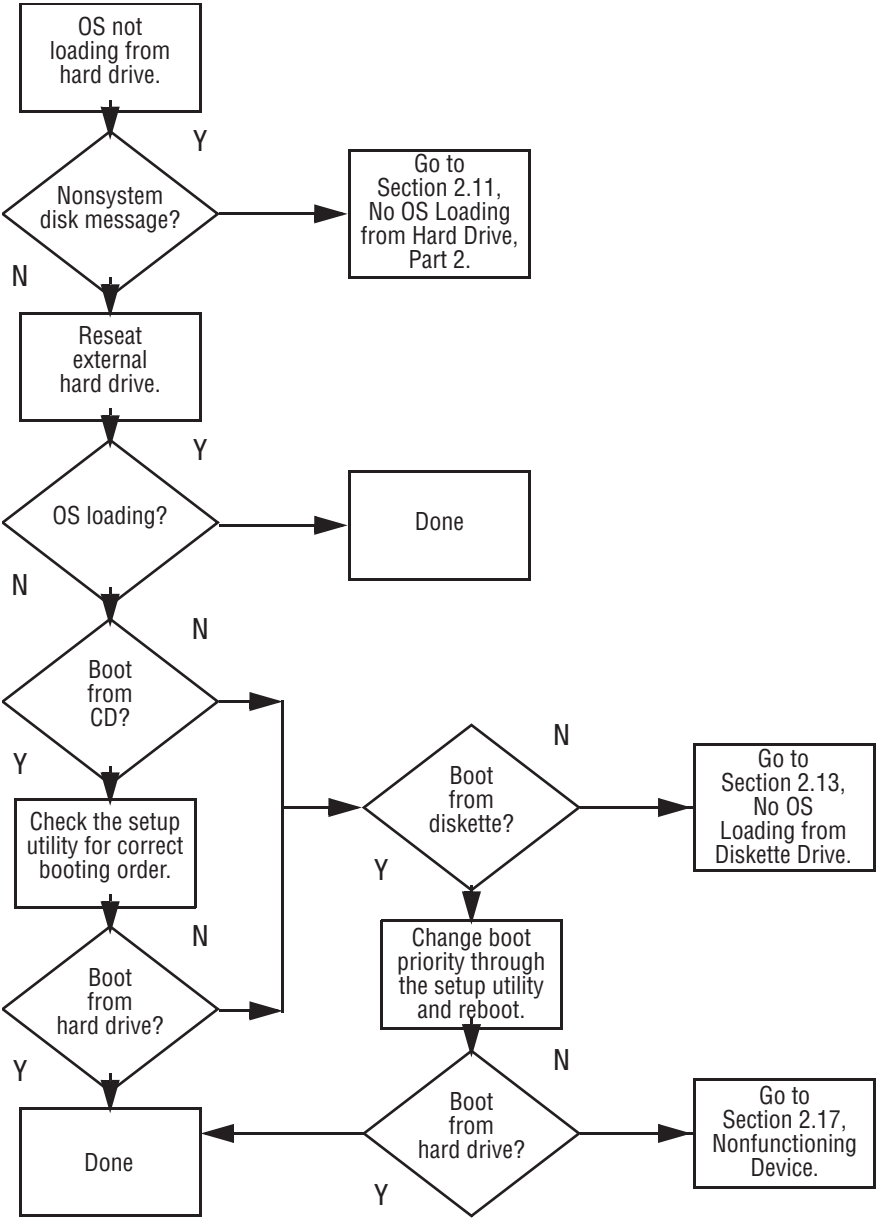


Flowchart 2.9 - No Operating System (OS) Loading

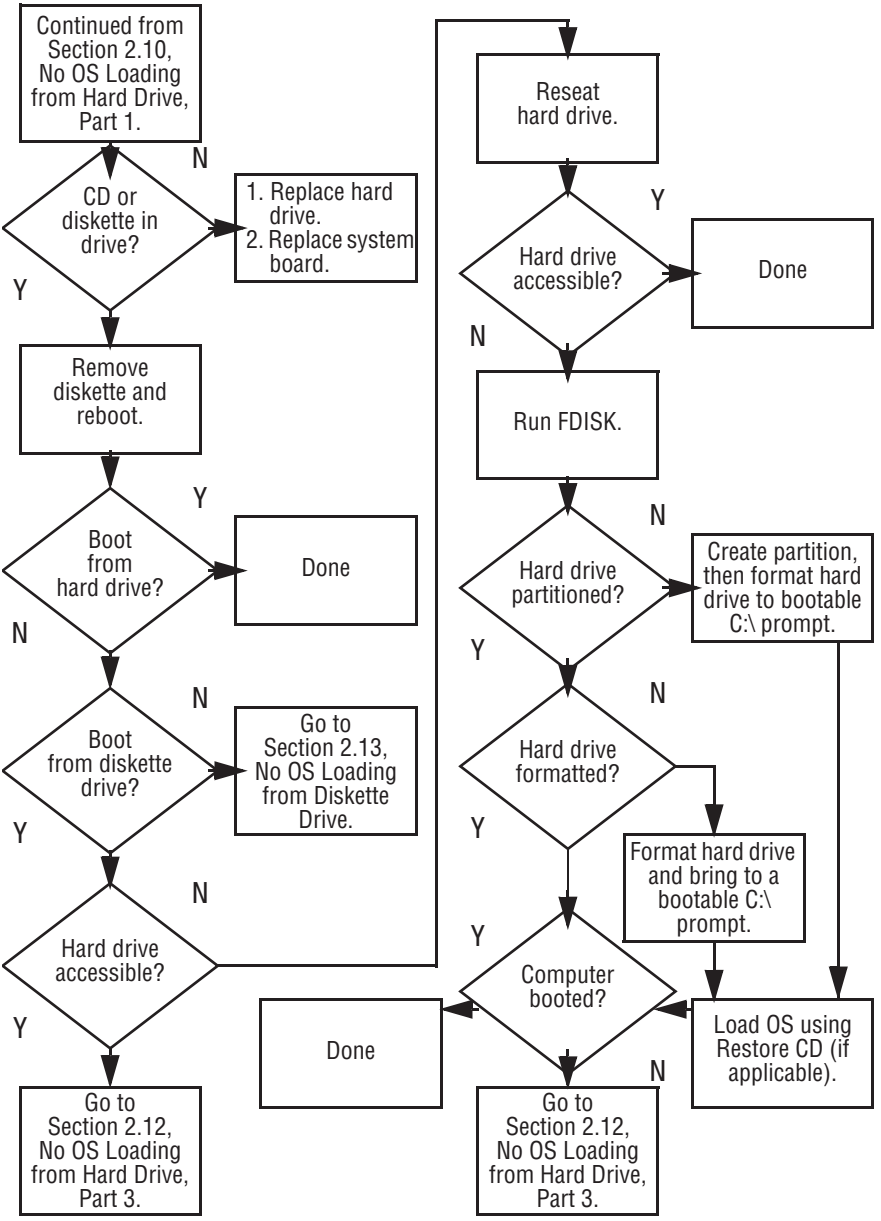


*Before beginning troubleshooting, always check cable connections, cable ends, and drives for bent or damaged pins.

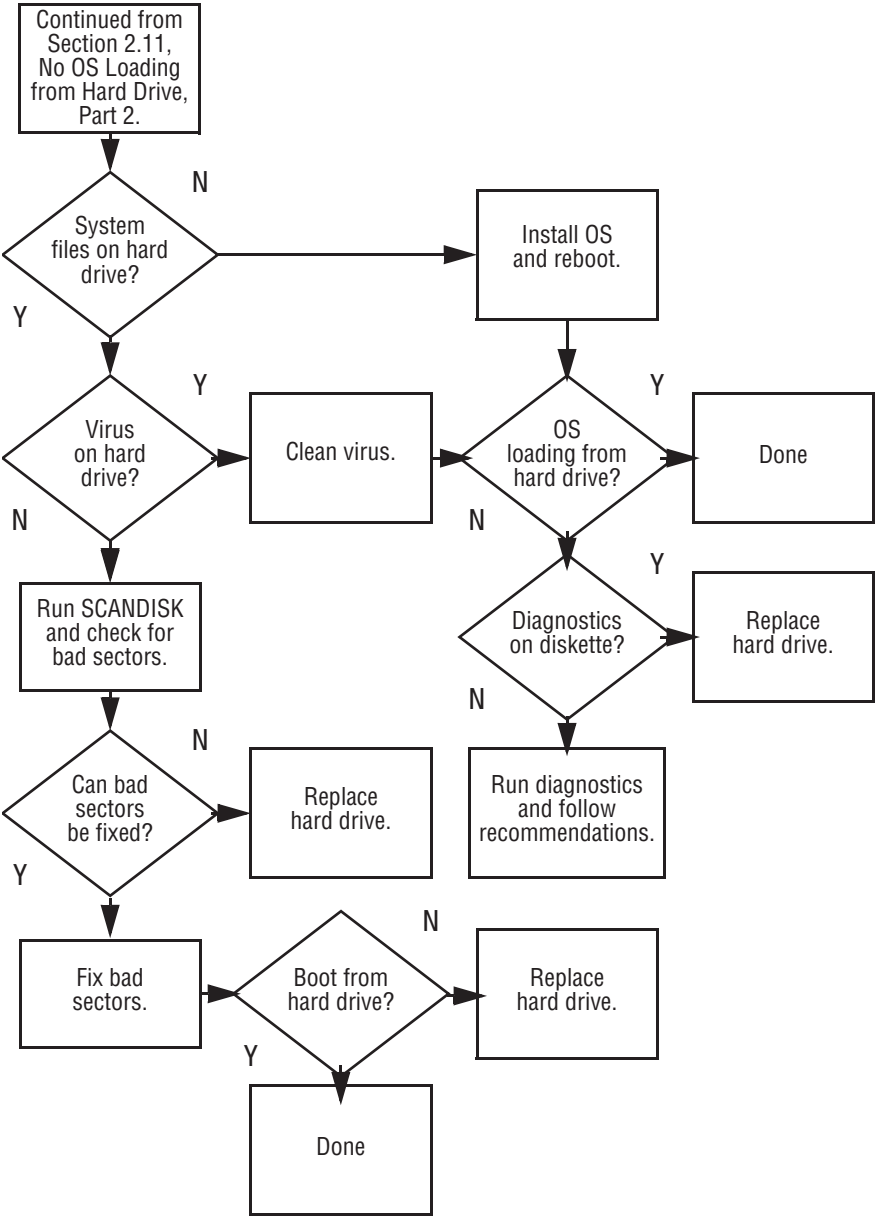
Flowchart 2.10 - No OS Loading from Hard Drive, Part 1



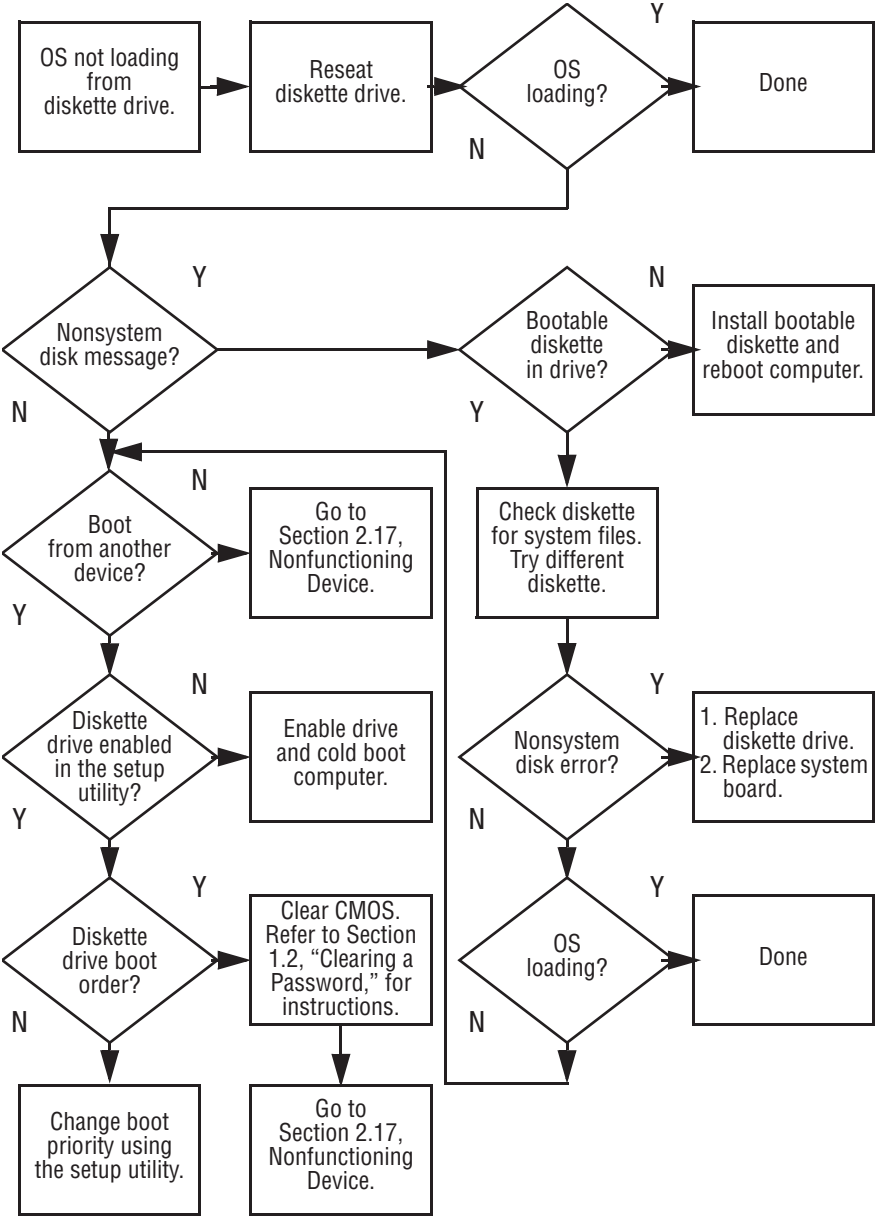
Flowchart 2.11 - No OS Loading from Hard Drive, Part 2



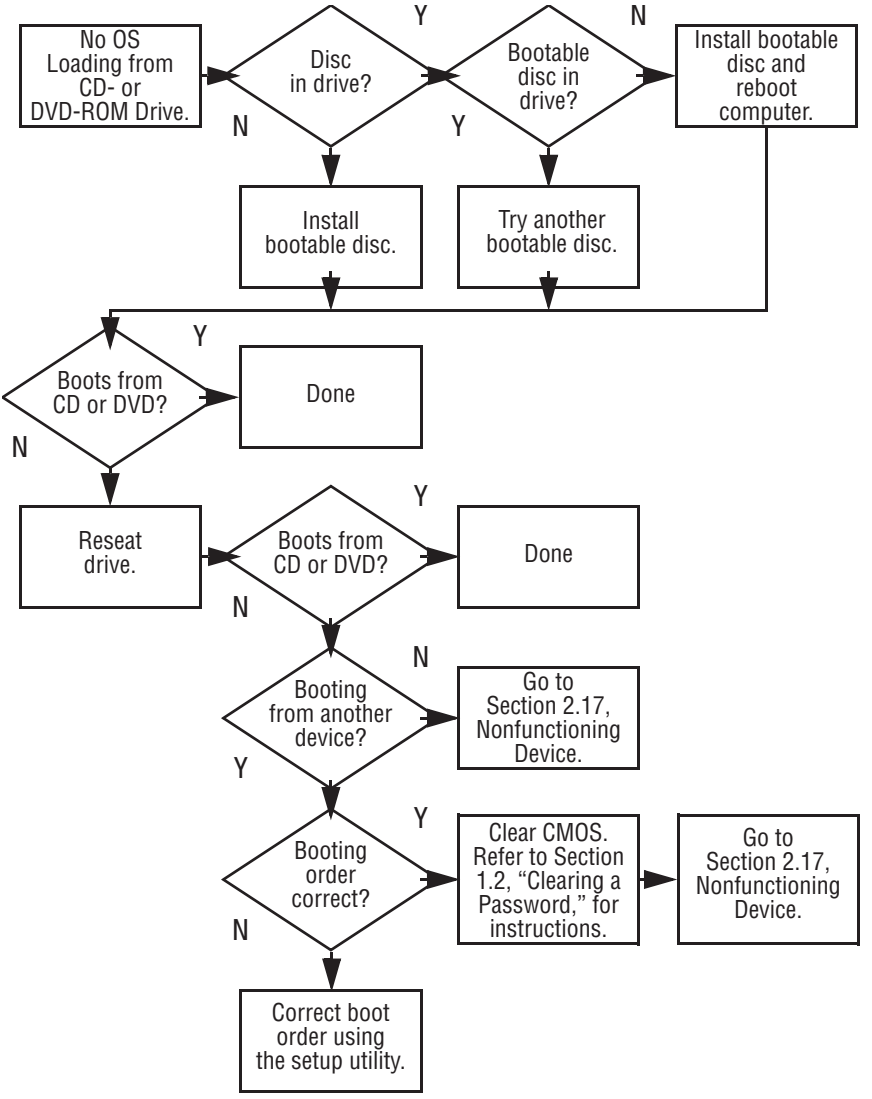
Flowchart 2.12 - No OS Loading from Hard Drive, Part 3



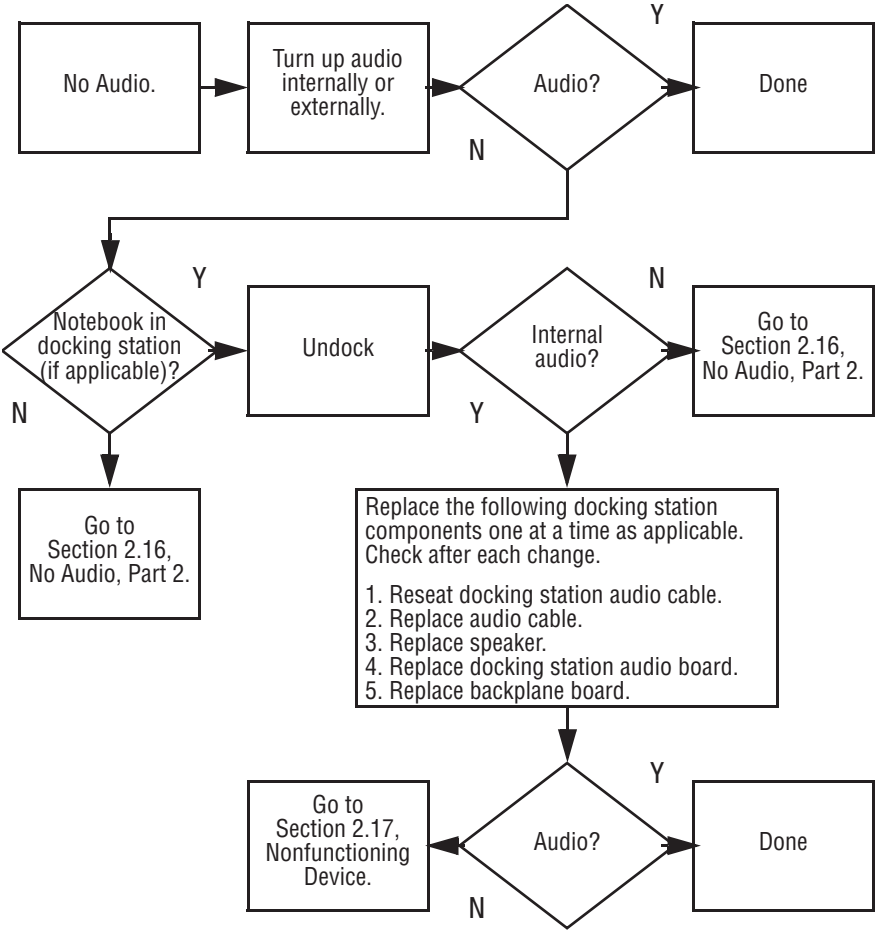
Flowchart 2.13 - No OS Loading from Diskette Drive



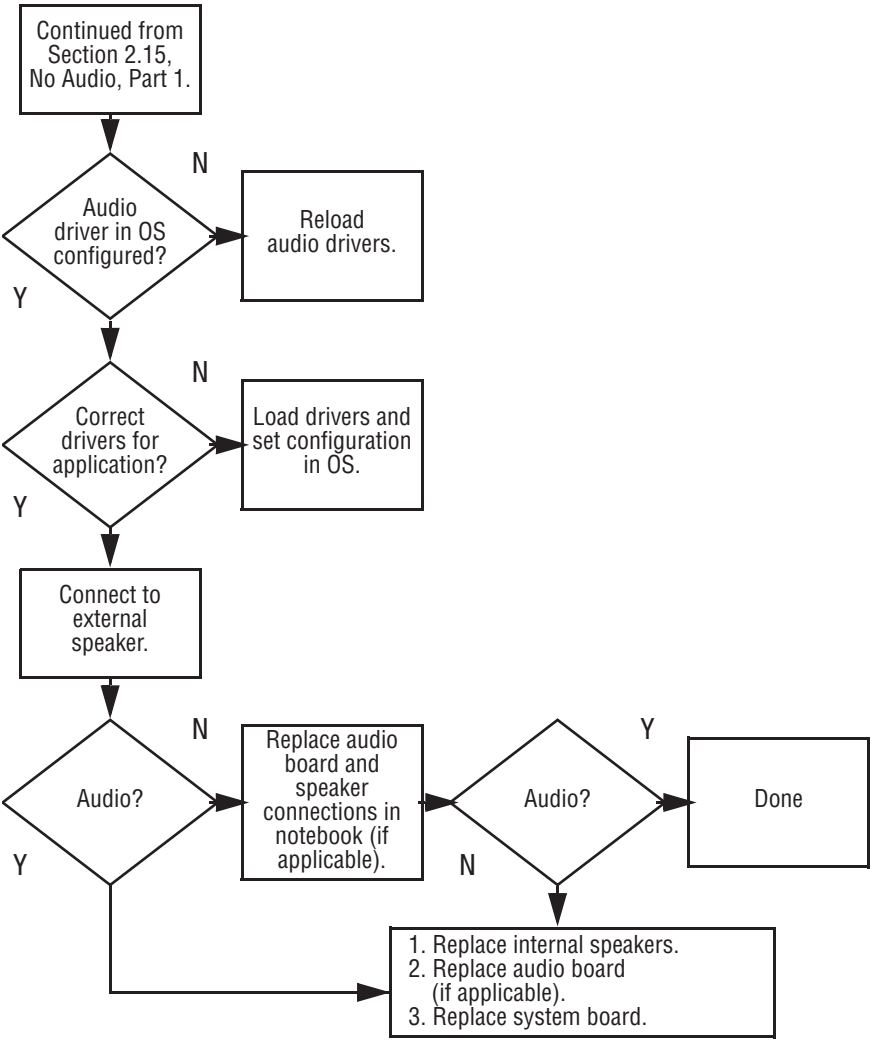
Flowchart 2.14 - No OS Loading from CD- or DVD-ROM Drive



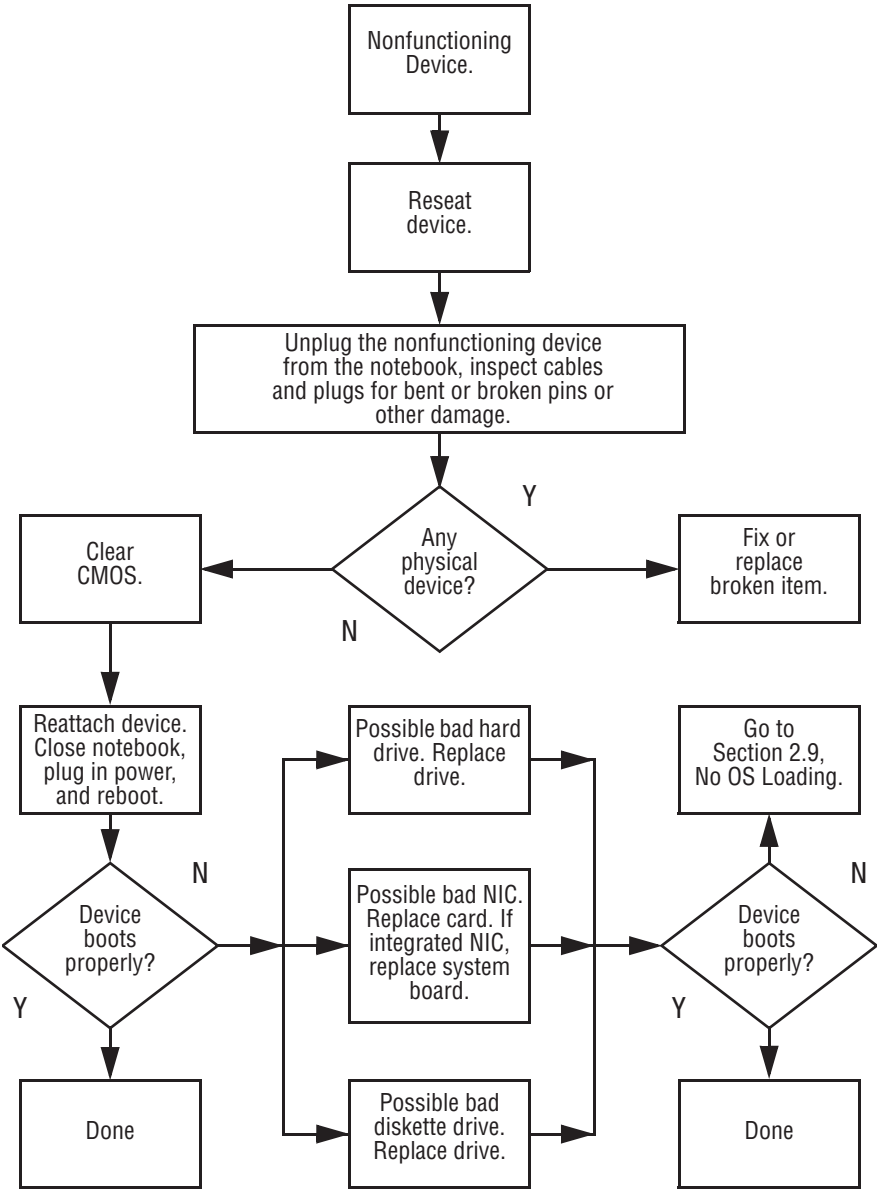
Flowchart 2.15 - No Audio, Part 1



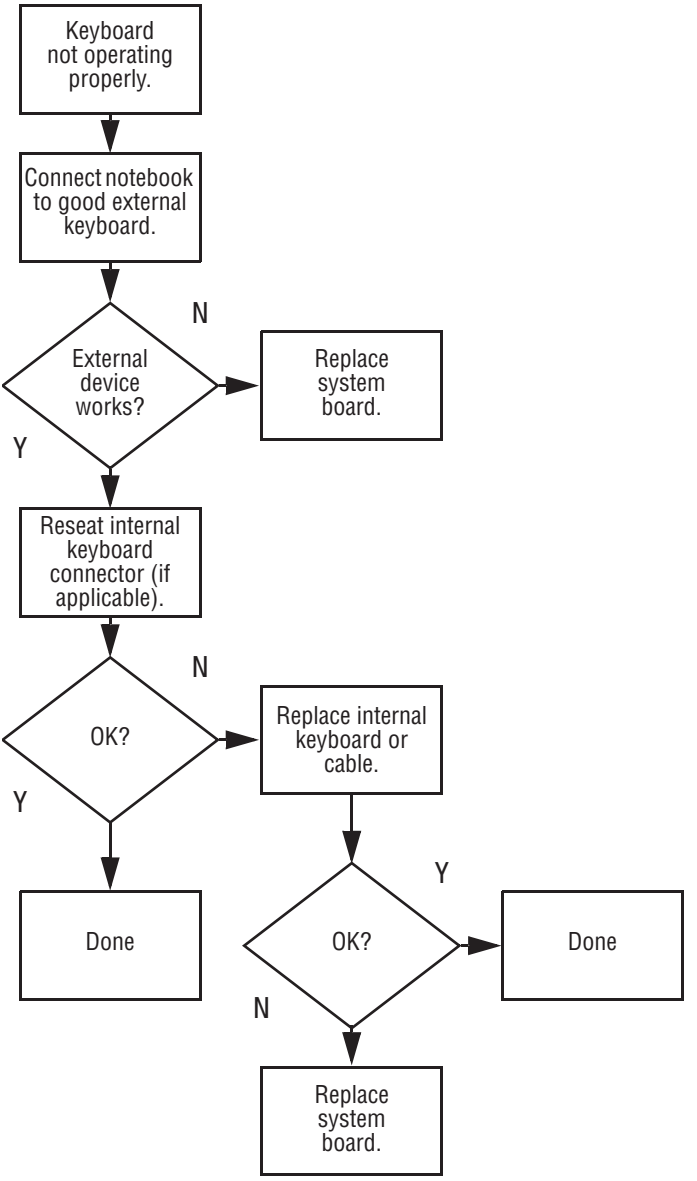
Flowchart 2.16 - No Audio, Part 2



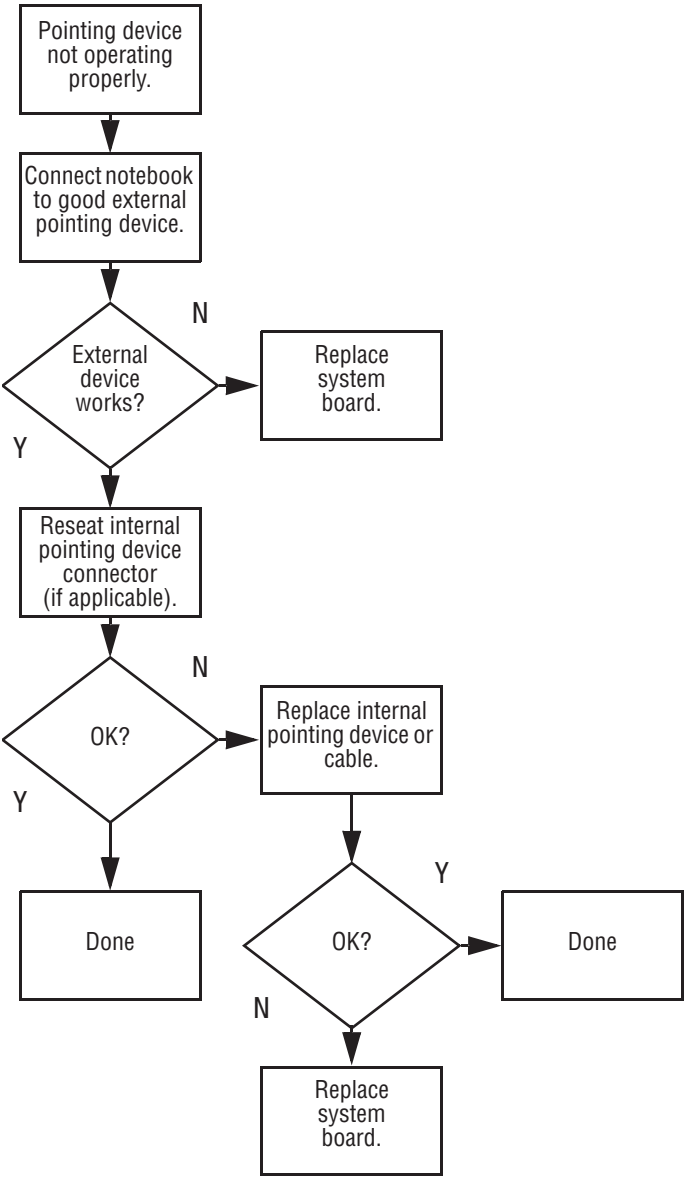
Flowchart 2.17 - Nonfunctioning Device



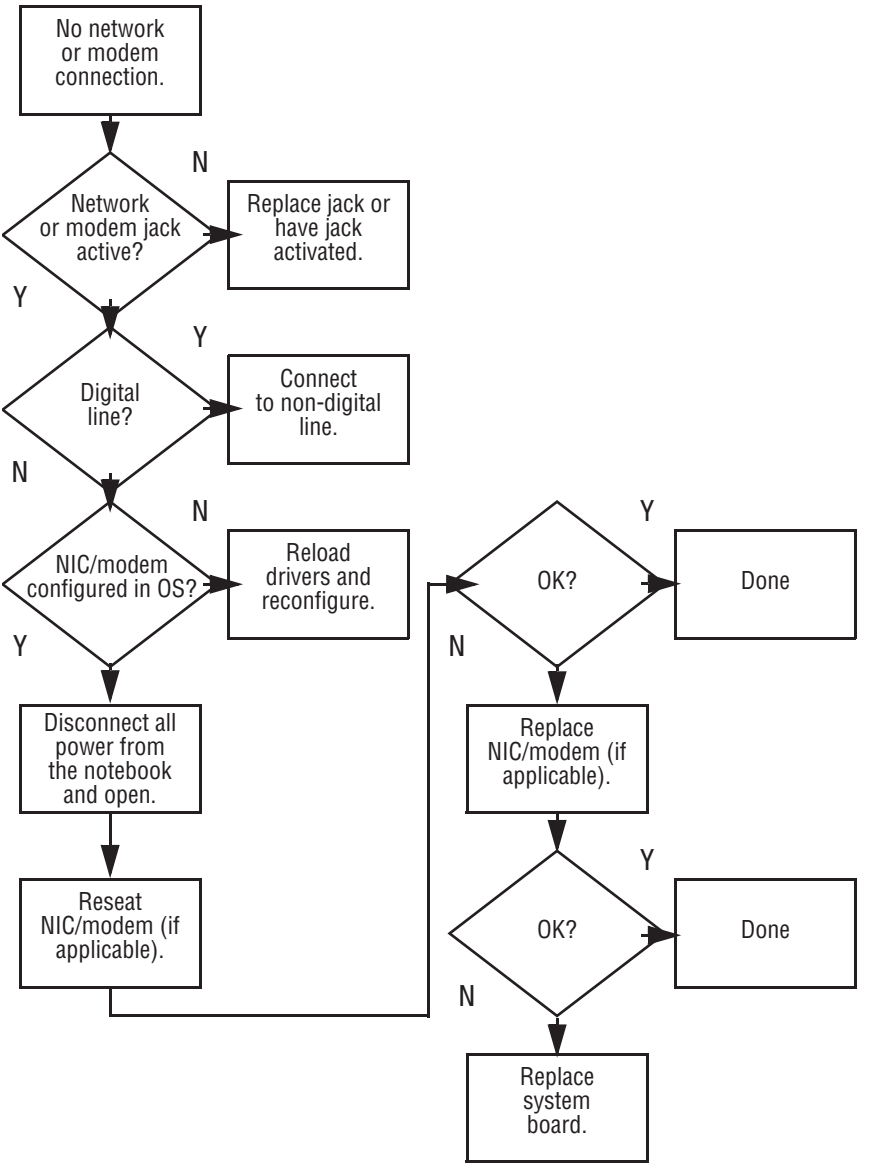
Flowchart 2.18 - Nonfunctioning Keyboard



Flowchart 2.19 - Nonfunctioning Pointing Device



Flowchart 2.20 - Network or Modem Connection



3

Illustrated Parts Catalog

This chapter provides an illustrated parts breakdown and a reference for spare part numbers and option part numbers.

3.1 Serial Number Location

When ordering parts or requesting information, provide the computer serial number and model number located on the bottom of the computer (Figure 3-1).

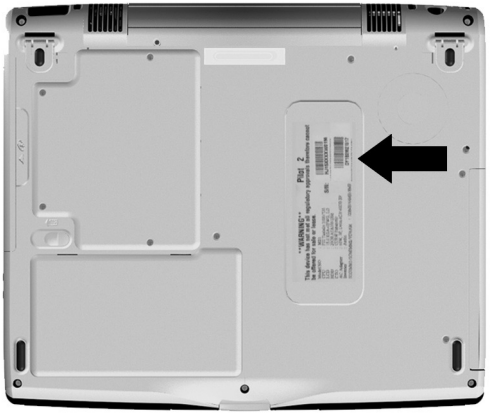


Figure 3-1. Serial Number Location

3.2 Computer System Major Components

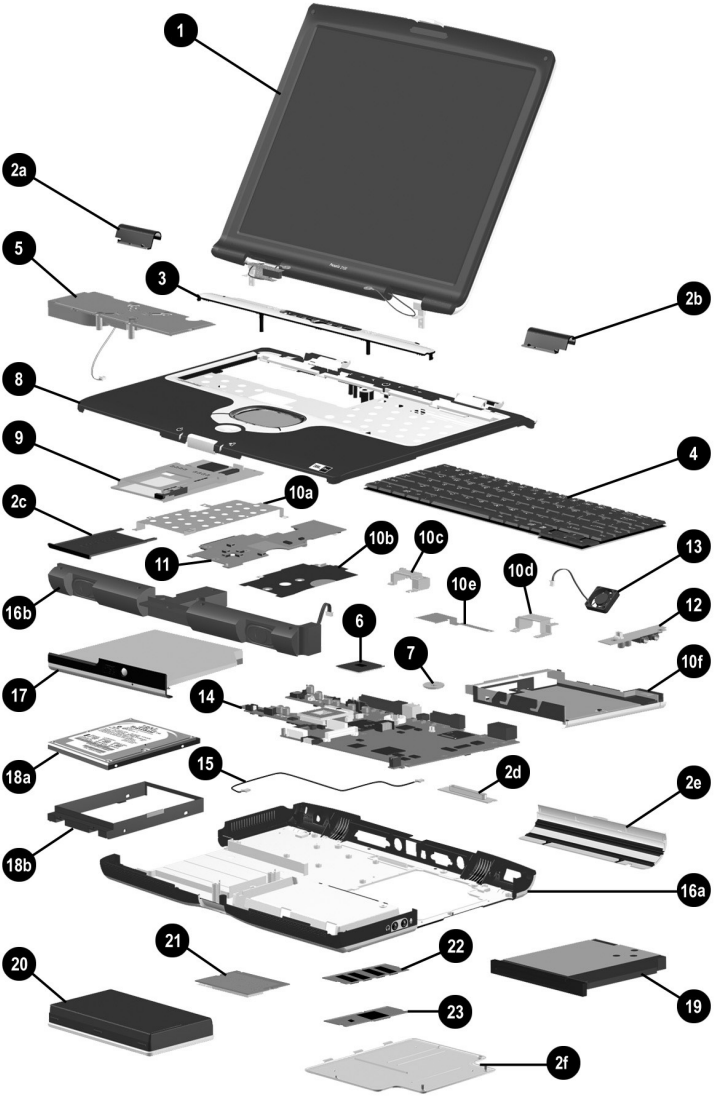
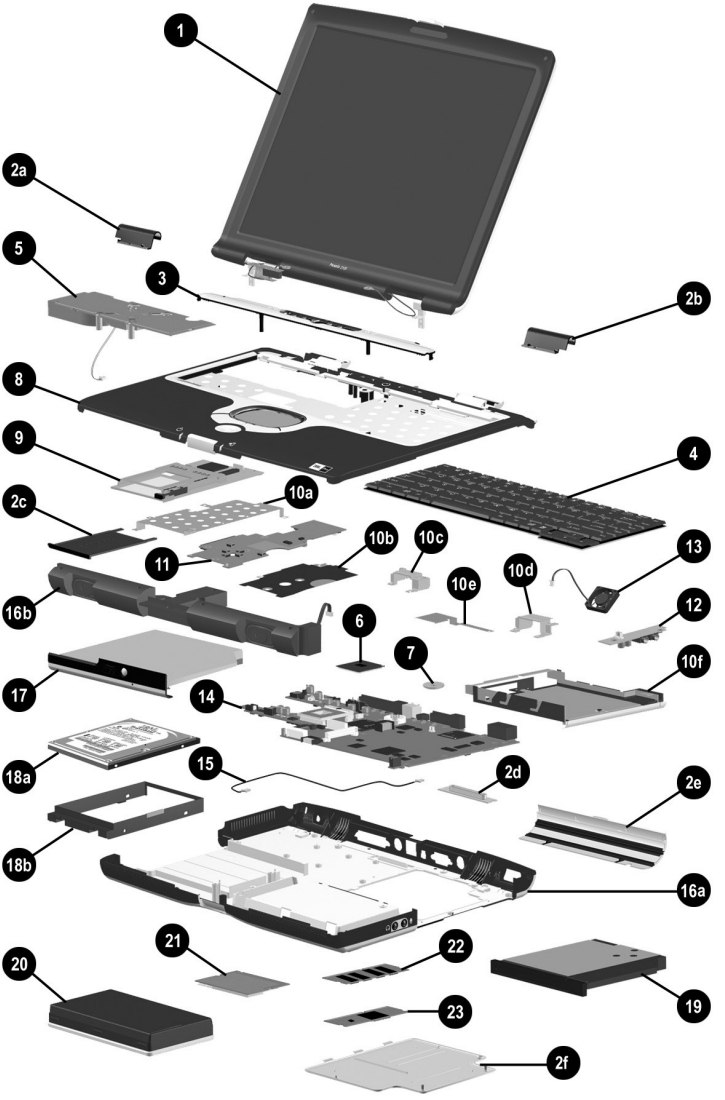


Figure 3-2. Computer System Major Components

Table 3-1
Spare Parts: Computer System Major Components

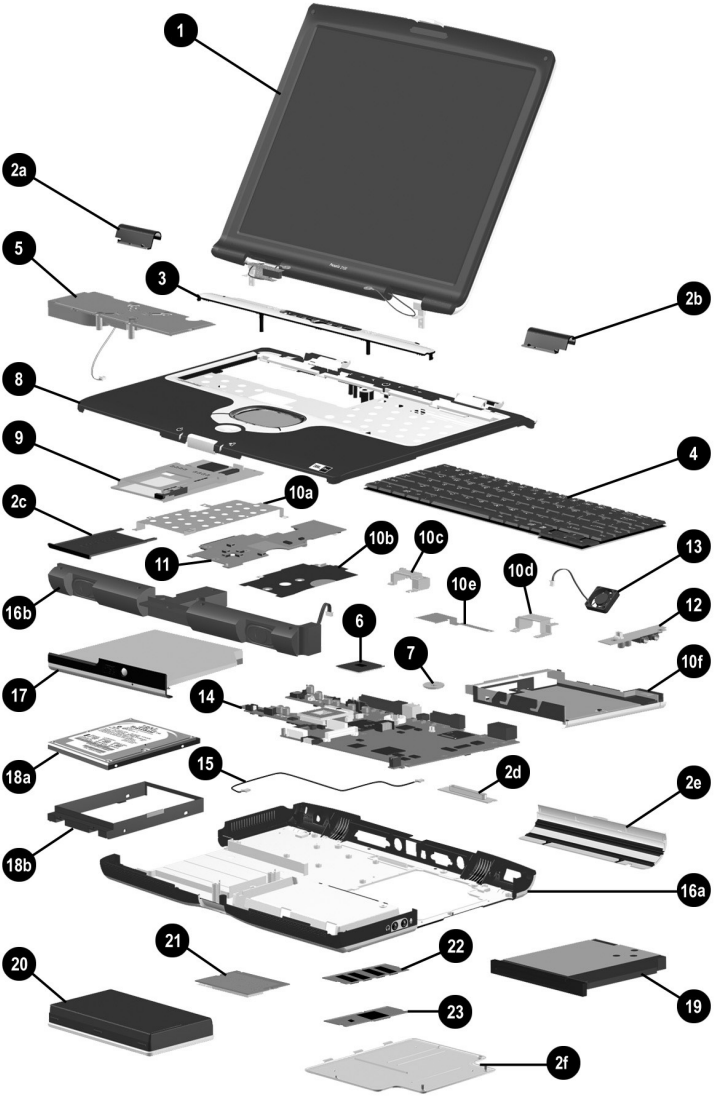
Item	Description		Spare Part Number
1	**Displays**		
	15.0-inch, XGA, CTFT		266978-001
	15.0-inch, SXGA+, CTFT		266979-001
	Plastics Kit, includes:		253944-001
2a	left hinge cover	not illustrated:	
2b	right hinge cover	tilt feet (2)	
2c	PC Card space saver	front computer feet (2)	
2d	connector cover	rear computer feet (2)	
2e	docking connector cover		
2f	expansion cover		
3	**LED cover**		253932-001
4	**U.S. English keyboard**		253929-001
5	**Heat sink** (includes fan)		253933-001
6	**Processors**		
	Intel Mobile Pentium III 1.2 GHz		253907-001
	Intel Mobile Pentium III 1.066 GHz		263656-001
	Intel Mobile Pentium III 1.0 GHz		253905-001
	Intel Celeron 933 MHz		260610-001
7	**Disk cell RTC battery**		253947-001
8	**Top cover** (includes TouchPad, TouchPad buttons, and Easy Scroll)		253934-001



Computer System Major Components (Continued)

Table 3-1
Spare Parts: Computer System Major Components *(Continued)*

Item	Description		Spare Part Number
9	**PC Card assembly**		253936-001
	Hardware Kit, includes:		253937-001
10a	PC Card assembly shield	not illustrated:	
10b	Charger board shield	1394/USB shield	
10c	Left display support		
10d	Right display support		
10e	VGA chip EMI shield		
10f	Keyboard support plate		
11	**Charger board**		253935-001
12	**Audio board**		253938-001
13	**Fan**		273906-001
14	**System board** (includes network interface; does not include any memory)		253914-001
	Cable Kit, includes:		253946-001
15	Modem cable	not illustrated: Diskette drive cable CD-ROM drive cable TouchPad cable	
16a	**Base enclosure**		260611-001
16b	**Speaker assembly** (spared with base enclosure)		
17	**Optical drives**		
	24X Max CD-ROM drive		253923-001
	DVD/CD-RW combination drive		253926-001
	CD-RW drive		253924-001
	8X Max DVD drive		253925-001



Computer System Major Components (Continued)

Table 3-1
Spare Parts: Computer System Major Components *(Continued)*

Item	Description	Spare Part Number
18a	**Hard drives**	
	30 GB	253921-001
	20 GB	253920-001
	10 GB	253918-001
18b	**Hard drive bracket** (spared with hard drive)	
19	**Future Bay devices**	
	24X Max CD-ROM drive	257981-001
	DVD/CD-RW combination drive	257983-001
	CD-RW drive	257982-001
	8X Max DVD drive	257984-001
	Battery pack (32.4 WHr, 3.0 AHr)	233478-001
	Space saver	257987-001
	Diskette drive	257985-001
20	**4.0 AHr, 57.6 WHr, Li ion battery pack**	233477-001
21	**United States modem board**	253928-001
22	**Memory expansion boards**	
	512 MB	253943-001
	256 MB	253942-001
	128 MB	253941-001
23	**Video memory boards**	
	32 MB	253917-001
	16 MB	253916-001
	8 MB	253915-001

3.3 Plastics Kit Components

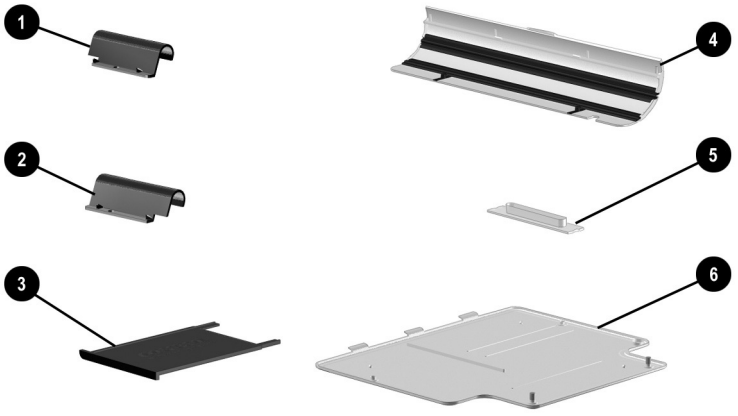


Figure 3-3. Plastics Kit Components

Table 3-2
Plastics Kit Components
Spare Part Number 253944-001

Item	Description	
1	Left hinge cover	not illustrated:
2	Right hinge cover	Tilt feet (2)
3	PC Card space saver	Front computer feet (2)
4	Connector cover	Rear computer feet (2)
5	Docking connector cover	
6	Expansion cover	

3.4 Hardware Kit Components

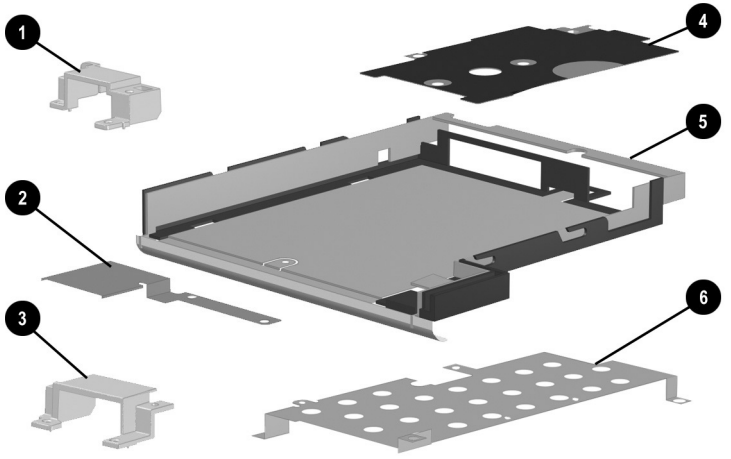


Figure 3-4. Hardware Kit Components

Table 3-3
Hardware Kit Components
Spare Part Number 253937-001

Item	Description	
1	Left display support	not illustrated:
2	VGA chip EMI shield	1394/USB shield
3	Right display support	
4	Charger board shield	
5	Keyboard support plate	
6	PC Card assembly shield	

3.5 Cable Kit Components

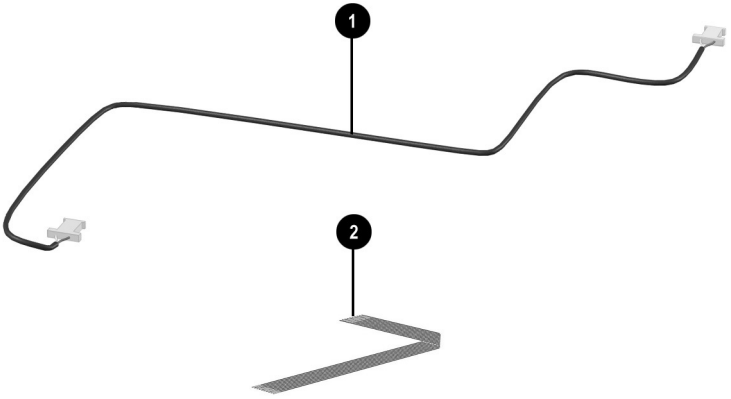


Figure 3-5. Cable Kit Components

Table 3-4
Cable Kit Components
Spare Part Number 253946-001

Item	Description	
1	Modem cable	not illustrated: CD-ROM drive cable Diskette drive cable
2	TouchPad cable	

3.6 Mass Storage Devices

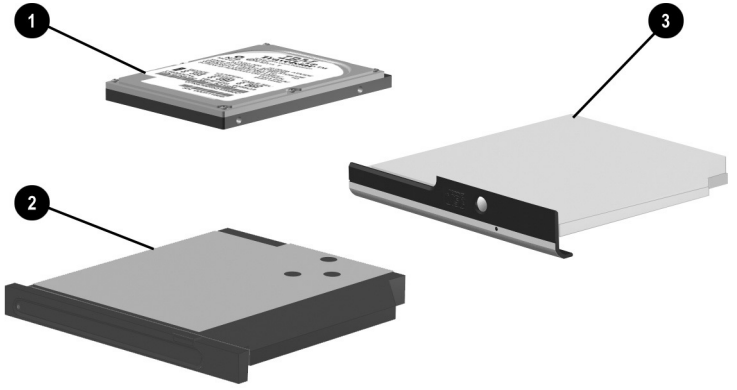
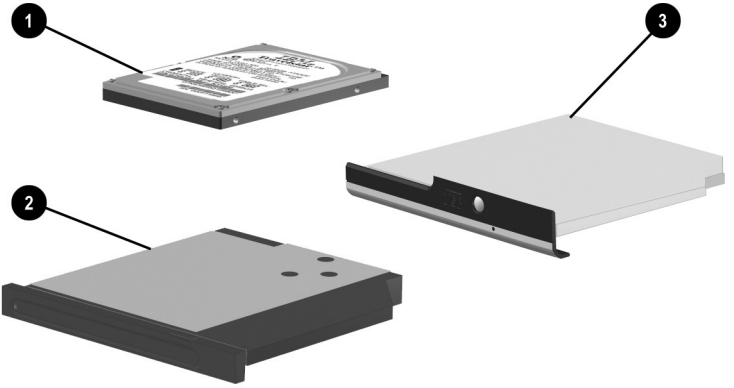


Figure 3-6. Mass Storage Devices

Table 3-5
Mass Storage Devices

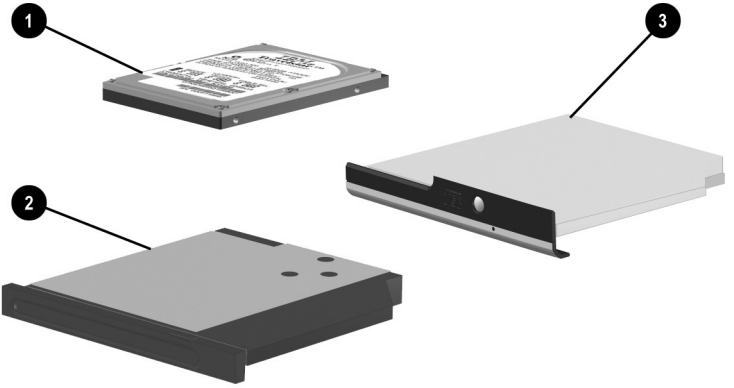
Item	Description	Spare Part Number
1	**Hard drives**	
	30 GB	253921-001
	20 GB	253920-001
	10 GB	253918-001



***Mass Storage Devices** (Continued)*

Table 3-5
Mass Storage Devices *(Continued)*

Item	Description	Spare Part Number
2	**Future Bay Devices**	
	24X Max CD-ROM drive	257981-001
	DVD/CD-RW combination drive	257983-001
	CD-RW drive	257982-001
	8X Max DVD drive	257984-001
	Battery pack (32.4 WHr, 3.0 AHr)	233478-001
	Space saver	257987-001
	Diskette drive	257985-001



***Mass Storage Devices** (Continued)*

Table 3-5
Mass Storage Devices *(Continued)*

Item	Description	Spare Part Number
3	**Optical Drives**	
	24X Max CD-ROM drive	253923-001
	DVD/CD-RW combination drive	253926-001
	CD-RW drive	253924-001
	8X Max DVD drive	253925-001

3.7 Miscellaneous

Table 3-6
Spare Parts: Miscellaneous (not illustrated)

Description	Spare Part Number
Logo kit	266152-001
Screw kit (Includes the following screws and screwlocks. Refer to Appendix C, "Screw Listing," for more information on screw specifications and usage.) ■ M2.0 × 8.0 screw ■ M2.0 × 5.5 screw ■ M2.0 × 4.5 screw ■ HM5.0 × 10.5 screwlock ■ M2.5 × 4.0 screw ■ M1.5 × 8.0 screw ■ M1.5 × 5.0 screw ■ M1.5 × 4.0 screw	253945-001
AC adapters	
60-Watt AC adapter power supply (2 wire)	222113-001
60-Watt AC adapter power supply (3 wire)	240905-021
Power cord, 3 wire, North America	197230-001
Port Replicator	253939-001

4

Removal and Replacement Preliminaries

This chapter provides essential information for proper and safe removal and replacement service.

4.1 Tools Required

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

- Magnetic screwdriver
- Phillips P0 screwdriver
- 5.0-mm hex socket (for system board screwlocks)
- Tool kit (includes connector removal tool, loopback plugs, and case utility tool)

4.2 Service Considerations

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

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

Plastic Parts

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

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. Ensure 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.

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

4.3 Preventing Damage to Removable Drives

Removable drives are fragile components that must be handled with care. To prevent damage to the computer, damage to a removable drive, or loss of information, observe the following 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, then shut it down.
- Before removing a diskette drive or optical drive, ensure that a diskette or disc is not in the drive. Ensure that the optical drive tray is closed.
- Before handling a drive, ensure that you are discharged of static electricity. While handling a drive, avoid touching the connector.
- Handle drives on surfaces that have at least one inch of shock-proof foam.
- Avoid dropping drives from any height onto any surface.
- After removing a hard drive, CD-ROM 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 to 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: Handle With Care.”

4.4 Preventing Electrostatic Damage

Many 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 the discharge contains enough power to alter device parameters or melt silicon junctions.

A sudden discharge of static electricity from a finger or other conductor can destroy static-sensitive devices or microcircuitry. Often the spark is neither felt nor heard, but damage occurs.

An electronic device exposed to electrostatic discharge 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.

4.5 Packaging and Transporting Precautions

Use the following grounding precautions when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe containers such as tubes, bags, or boxes.
- Protect all electrostatic-sensitive parts and assemblies with conductive or approved containers or packaging.
- Keep electrostatic-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 sensitive component or assembly.

- Store reusable electrostatic-sensitive parts from assemblies in protective packaging or nonconductive foam.
- Use transporters and conveyers made of antistatic belts and roller bushings. Ensure 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.

4.6 Workstation Precautions

Use the following grounding precautions at workstations:

- Cover the workstation with approved static-dissipative material (refer to Table 4-2).
- 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 using fixtures that must directly contact dissipative surfaces, only use fixtures made of static-safe materials.
- Keep the work area free of nonconductive materials such as ordinary plastic assembly aids and Styrofoam.
- Handle electrostatic-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.

4.7 Grounding Equipment and Methods

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, connect a wrist strap with alligator clips.
- 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.

Other grounding equipment recommended for use in preventing electrostatic damage includes:

- 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

Table 4-1 shows how humidity affects the electrostatic voltage levels generated by different activities.

Table 4-1
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

✎ A product can be degraded by as little as 700 volts.

Table 4-2 lists the shielding protection provided by antistatic bags and floor mats.

Table 4-2
Static-Shielding Materials

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

5

Removal and Replacement Procedures

This chapter provides removal and replacement procedures.

Phillips P1 screws are removed during disassembly. There are 63 screws and screwlocks, in nine different sizes, that must be removed and replaced when servicing the computer. Make special note of each screw size and location during removal and replacement.

Refer to Appendix C, “Screw Listing,” for detailed information on screw sizes, locations, and usage.

5.1 Serial Number

Report the computer serial number to Compaq when requesting information or ordering spare parts. The serial number is located on the bottom of the computer (Figure 5-1).

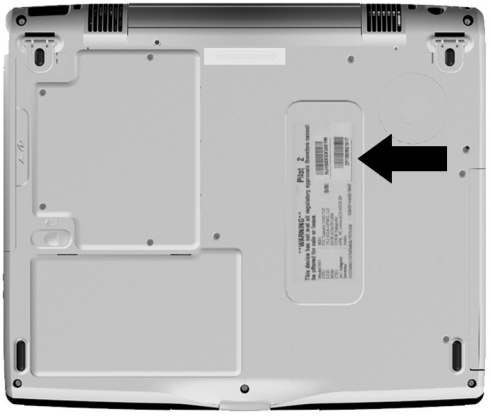


Figure 5-1. Serial Number Location

5.2 Disassembly Sequence Chart

Use the following chart to determine the section number to be referenced when removing computer components.

Table 5-1
Disassembly Sequence Chart

Section	Description	# of Screws Removed
5.3	Preparing the computer for disassembly	
	Battery pack	0
	Future Bay device	0
	Optical drive	2
	Hard drive	2 to remove hard drive 4 to separate hard drive from hard drive bracket
5.4	Memory expansion board	2 (plus 2 captive screws on expansion cover loosened)
5.5	Modem board	2 (plus 2 captive screws on expansion cover loosened)
5.6	Video memory board	2 (plus 2 captive screws on expansion cover loosened)
5.7	Computer feet	0
5.8	LED cover	2

Table 5-1
Disassembly Sequence Chart *(Continued)*

Section	Description	# of Screws Removed
5.9	Keyboard	0
5.10	Heat sink	4
5.11	Processor	0
5.12	Disk cell RTC battery	0
5.13	Display	8 (plus 2 ground screws only on 15.1-inch display models)
5.14	Top cover	14
5.15	PC Card assembly	2 to remove PC Card assembly 4 to separate PC Card assembly from PC Card assembly shield
5.16	Charger board	3
5.17	Audio board	2
5.18	Keyboard support plate	4
5.19	Speaker assembly	0
5.20	Fan	0
5.21	System board	8
5.22	Modem cable	0

5.3 Preparing the Computer for Disassembly

Perform the following steps before disassembling the computer:

1. Turn off the computer.
2. Disconnect the AC adapter and all external devices.
3. Remove the battery pack by following these steps:
   a. Turn the computer bottom side up with the front facing forward.
   b. Slide and hold the battery release latch ❶ toward the left side of the computer. The back edge of the battery pack rises up (Figure 5-2).
   c. Swing the back edge of the battery pack up and forward ❷ and remove the battery pack ❸.

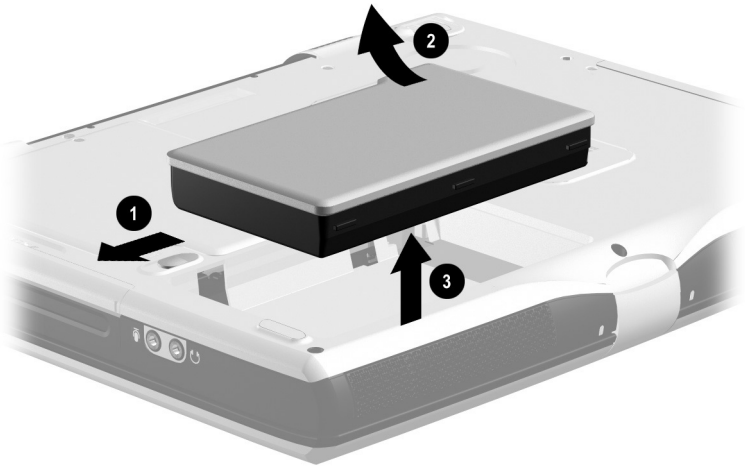


Figure 5-2. Removing the Battery Pack

Reverse the above procedure to install the battery pack.

4. Remove the Future Bay device by following these steps:
   a. Turn the computer bottom side up with the right side facing forward.
   b. Slide the Future Bay release bezel forward ❶. The Future Bay device separates from the base enclosure (Figure 5-3).
   c. Remove the Future Bay device from the base enclosure ❷.

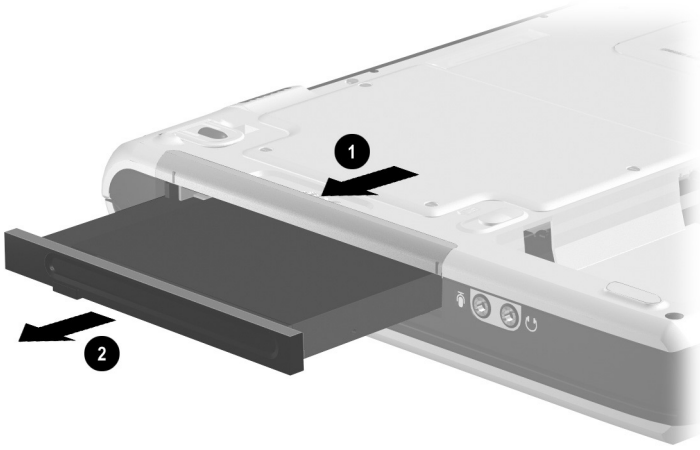


Figure 5-3. Removing the Future Bay Device

Reverse the above procedure to install the Future Bay device.

5. Remove the fixed optical drive by following these steps:
   a. Turn the computer bottom side up with the left side facing forward.
   b. Remove the two PM2.0 × 5.5 screws ❶ that secure the optical drive to the base enclosure (Figure 5-4).
   c. Slide the optical drive to the right ❷ and remove it from the optical drive bay.

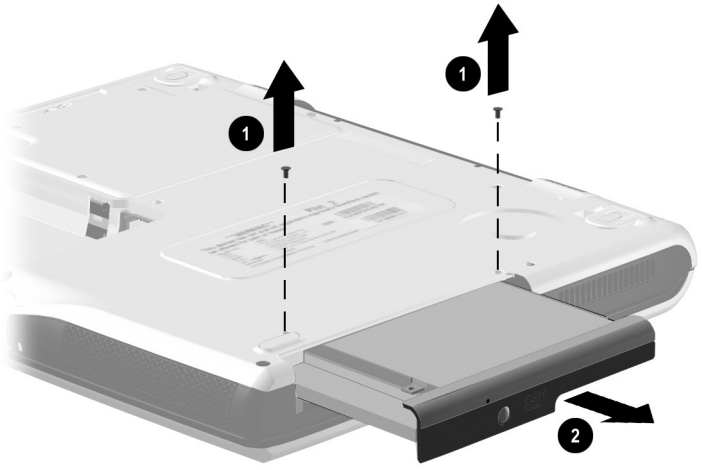


Figure 5-4. Removing the Optical Drive

Reverse the above procedure to install the optical drive.

6. Remove the hard drive by following these steps:
   a. Remove the battery pack (Section 5.3).
   b. Remove the optical drive.
   c. Remove the two PM2.0 × 5.5 screws ❶ that secure the hard drive bracket to the base enclosure (Figure 5-5).
   d. Slide the hard drive forward ❷ to unseat the hard drive connector from the system board.
   e. Lift the front edge of the hard drive bracket ❸ until it clears the base enclosure and slide the hard drive bracket out of the hard drive bay.

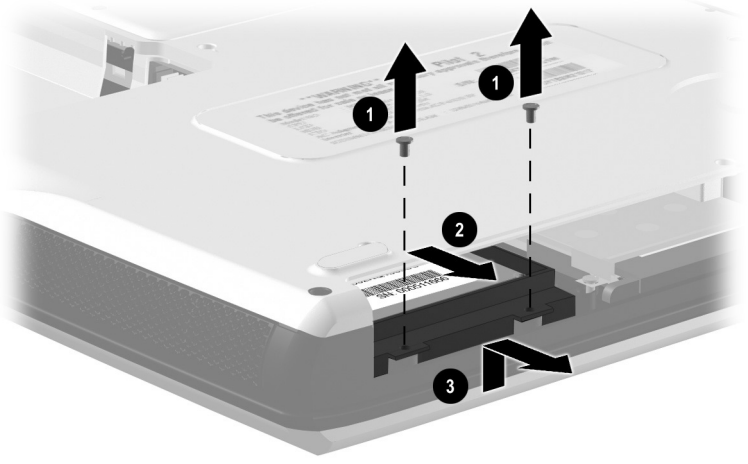


Figure 5-5. Removing the Hard Drive

Reverse the above procedure to install the hard drive.

7. The hard drive bracket is spared with the hard drive. If the hard drive must be removed from the hard drive bracket, perform the following steps:

   a. Remove the four PM2.5 × 4.0 screws ❶ that secure the hard drive to the hard drive bracket (Figure 5-6).

   b. Lift the hard drive straight up ❷ and remove it from the bracket.

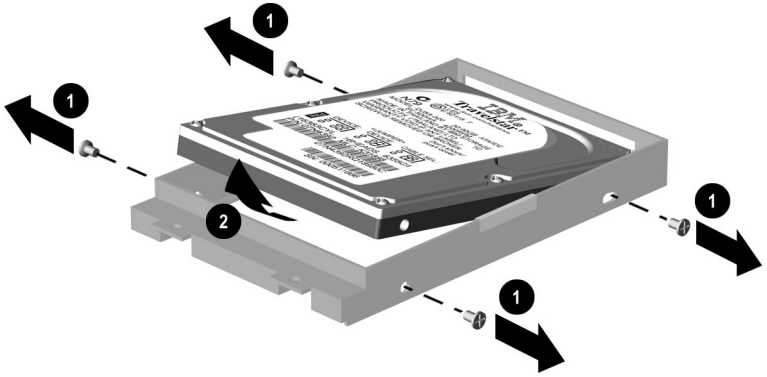


Figure 5-6. Removing the Hard Drive from the Hard Drive Bracket

Reverse the above procedure to install the hard drive in the hard drive bracket.

5.4 Memory Expansion Board

Memory Expansion Board Spare Part Number Information	
Memory expansion boards	
512 MB	253943-001
256 MB	253942-001
128 MB	253941-001

1. Prepare the computer for disassembly (Section 5.3).
2. Turn the computer bottom side up with the front facing forward.

3. Remove the two PM2.0 × 5.5 screws ❶ that secure the expansion cover to the base enclosure (Figure 5-7).
4. Loosen the two Phillips screws ❷ that secure the expansion cover to the base enclosure.

These two screws are secured to the expansion cover by C clips and should not be removed from the expansion cover.

5. Lift the left side of the expansion cover and swing it to the right ❸.
6. Remove the expansion cover ❹.

The expansion cover is included in the Plastics Kit (spare part number 253944-001).

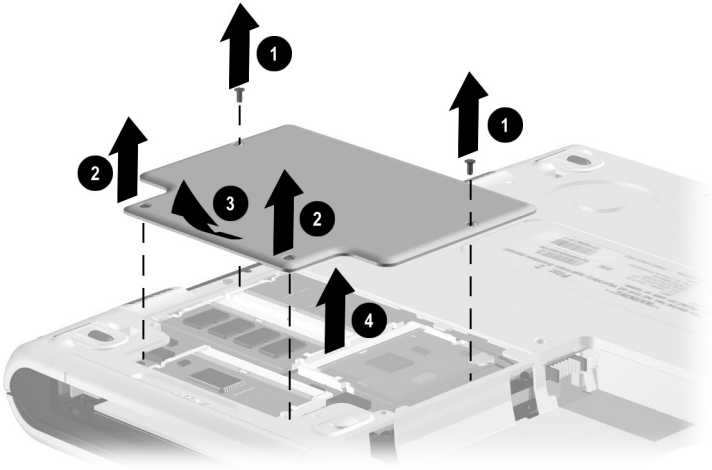


Figure 5-7. Removing the Expansion Cover

7. Spread the retaining tabs ❶ on each side of the memory expansion board (Figure 5-8). The board releases and rests at an angle.
8. Remove the board by pulling it away from the socket at an angle ❷.

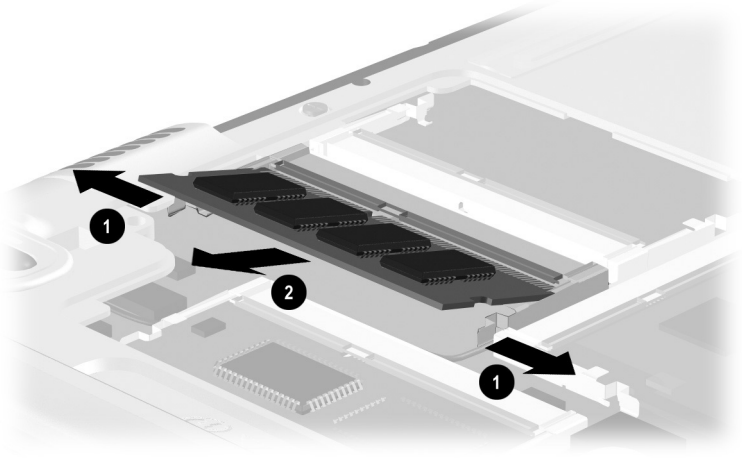


Figure 5-8. Removing the Memory Expansion Board

Reverse the above procedure to install a memory expansion board.

5.5 Modem Board

Modem Board Spare Part Number Information	
United States modem board	253928-001

1. Prepare the computer for disassembly (Section 5.3).

2. Turn the computer bottom side up with the front facing forward.
3. Remove the expansion cover as described in the Memory Expansion Board Section (Section 5.3).
4. Disconnect the modem cable from the modem board ❶ (Figure 5-9).
5. Spread the retaining tabs ❷ on each side of the modem board. The board releases and rests at an angle.
6. Remove the modem board by pulling it away from the socket at an angle ❸.

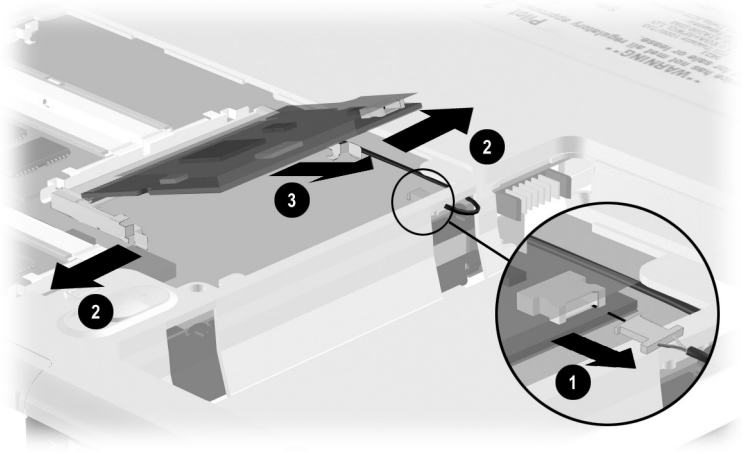


Figure 5-9. Removing the Modem Board

Reverse the above procedure to install a modem board.

5.6 Video Memory Board

Video Memory Board Spare Part Number Information	
Video memory boards	
32 MB	253917-001
16 MB	253916-001
8 MB	253915-001

1. Prepare the computer for disassembly (Section 5.3).
2. Turn the computer bottom side up with the front facing forward.
3. Remove the expansion cover as described in the Memory Expansion Board Section (Section 5.3).
4. Turn the computer bottom side up with the front facing forward.

5. Spread the retaining tabs ❶ on each side of the video memory board. The board releases and rests at an angle (Figure 5-10).
6. Remove the board by pulling it away from the socket at an angle ❷.

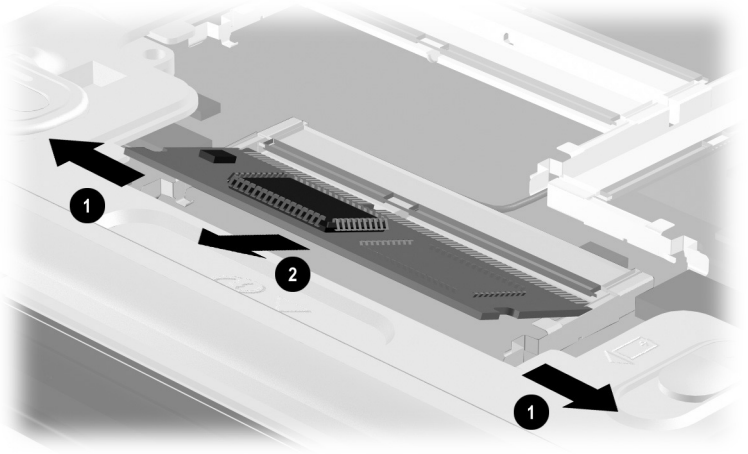


Figure 5-10. Removing the Video Memory Board

Reverse the above procedure to install a video memory board.

5.7 Computer Feet

The computer feet are adhesive-backed rubber pads. The computer feet are included in the Plastics Kit (spare part number 253944-001). Refer to Figure 5-11 for computer feet locations.

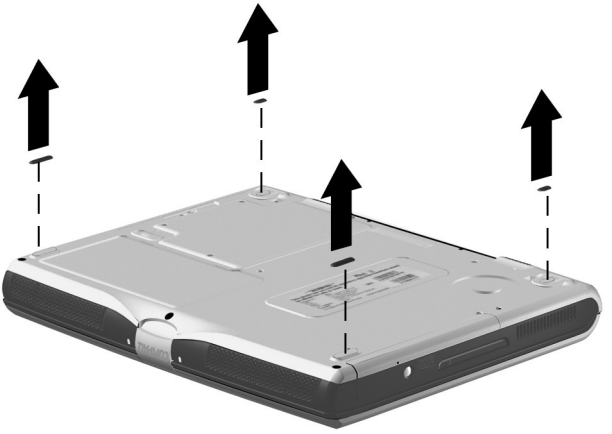


Figure 5-11. Replacing the Computer Feet

5.8 LED Cover

LED Cover Spare Part Number Information	
LED cover	253932-001

1. Prepare the computer for disassembly (Section 5.3).
2. Turn the computer bottom side up with the rear panel facing forward.
3. Remove the two PM2.0 × 8.0 screws that secure the LED cover to the base enclosure (Figure 5-12).

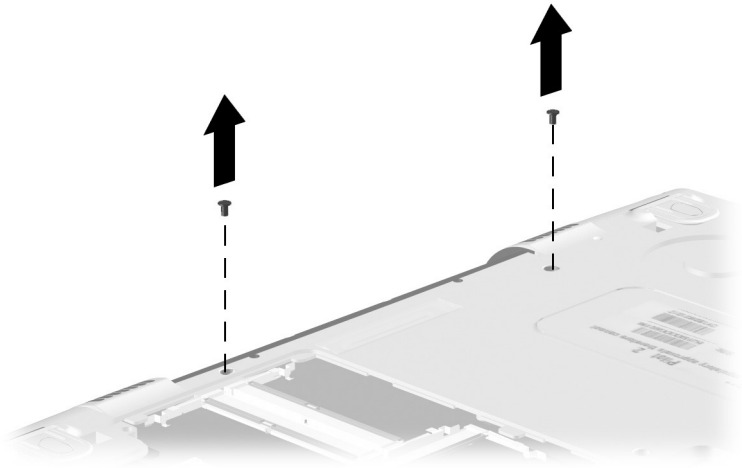


Figure 5-12. Removing the LED Cover Screws.

4. Turn the computer top side up with the front facing forward.
5. Open the computer.

6. Press the **ESC** key to reveal the notch ❶ in the LED cover (Figure 5-13).
7. Insert a flat-bladed tool in the notch and lift the left side of the LED cover ❷.
8. Remove the LED cover ❸.

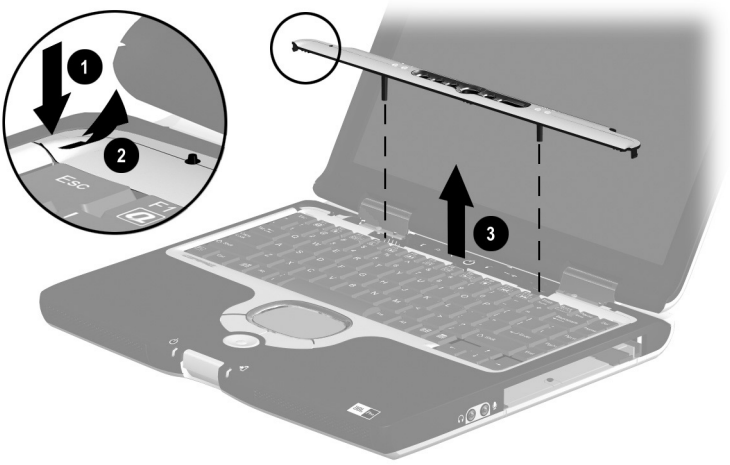


Figure 5-13. Removing the LED Cover

Reverse the above procedure to install the LED cover.

5.9 Keyboard

Keyboard Spare Part Number Information	
U.S. English Keyboard	253929-001

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the LED cover (Section 5.8).
3. Lift the back edge of the keyboard and swing it forward ❶ until it rests on the palm rest (Figure 5-14).
4. Release the ZIF connector ❷ to which the keyboard cable is connected and disconnect the keyboard cable ❸ from the system board.

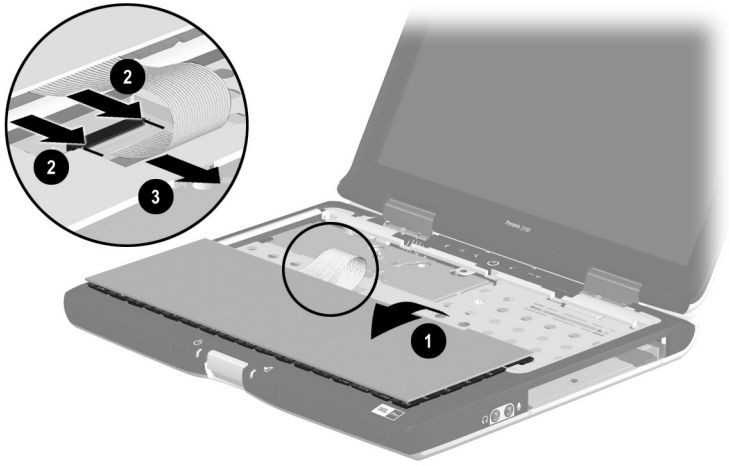


Figure 5-14. Removing the Keyboard

5. Remove the keyboard.

Reverse the above procedure to install the keyboard.

5.10 Heat Sink

Heat Sink Spare Part Number Information	
Heat sink (includes fan)	253933-001

The heat sink includes an exhaust fan. Do not remove this fan from the heat sink.

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the LED cover (Section 5.8).
3. Remove the keyboard (Section 5.9).

4. Remove the four PM2.0 × 5.5 screws ❶ that secure the heat sink to the base enclosure (Figure 5-15).

The screws should be removed and replaced in the 1, 2, 3, 4 sequence as stamped on the heat sink.

5. Lift the right side of the heat sink ❷ and slide it to the right at an angle until the left side of the heat sink is clear of the base enclosure.

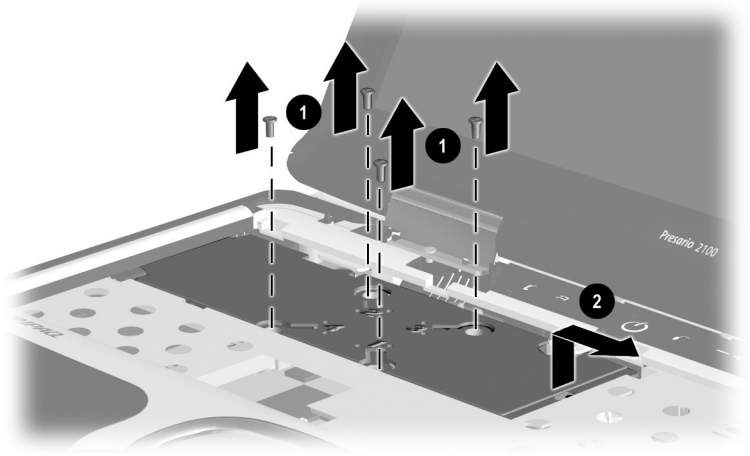


Figure 5-15. Removing the Heat Sink Screws

6. Slide the heat sink forward ❶ and rest it on the base enclosure (Figure 5-16).
7. Disconnect the fan cable ❷ from the system board.
8. Remove the heat sink.

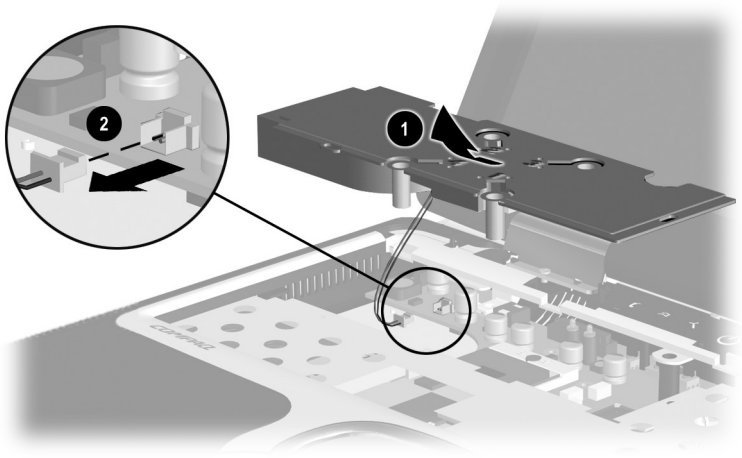


Figure 5-16. Removing the Heat Sink

Reverse the above procedure to install the heat sink.

5.11 Processor

Processor Spare Part Number Information	
Processors	
Intel Mobile Pentium III 1.2 GHz	253907-001
Intel Mobile Pentium III 1.066 GHz	263656-001
Intel Mobile Pentium III 1.0 GHz	253905-001
Intel Celeron 933 MHz	260610-001

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
   a. LED cover (Section 5.8)
   b. Keyboard (Section 5.9)
   c. Heat sink (Section 5.10)
2. Use a flat-bladed tool to turn the processor locking screw ❶ one-half turn counterclockwise (Figure 5-17).
3. Lift the processor straight up and remove it ❷.

Make sure the gold triangle ❸ is in the upper right corner when installing the processor.

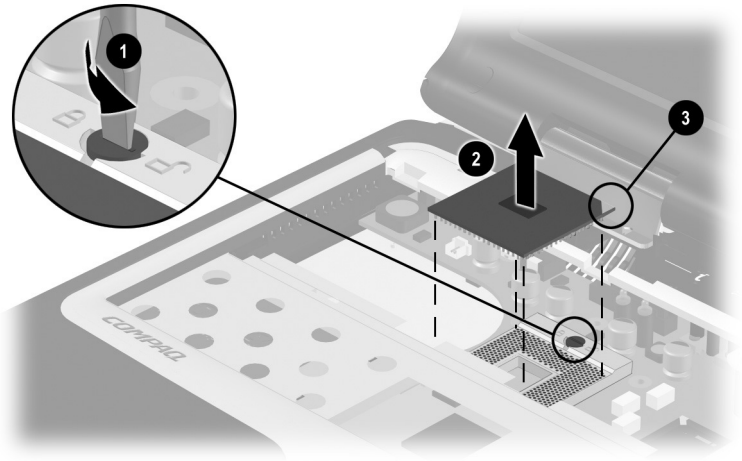


Figure 5-17. Removing the Processor

Reverse the above procedure to install the processor.

5.12 Disk Cell RTC Battery

Disk Cell RTC Battery Spare Part Number Information	
Disk cell RTC battery	253947-001

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
   a. LED cover (Section 5.8)
   b. Keyboard (Section 5.9)
   c. Heat sink (Section 5.10)

2. Use a flat-bladed tool to press the RTC battery socket release tab ❶ to the right (Figure 5-18). The RTC battery is released from its socket.
3. Remove the RTC battery ❷.

Make sure the "+" sign is facing up when installing the RTC battery.

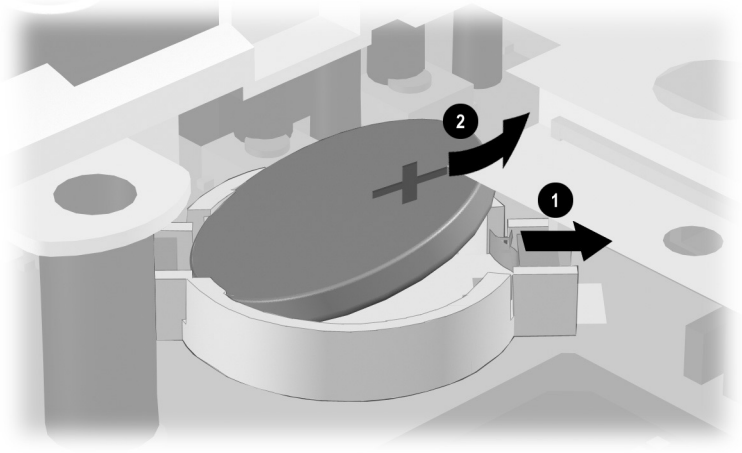


Figure 5-18. Removing the Disk Cell RTC Battery

Reverse the above procedure to install the RTC battery.

5.13 Display

Display Spare Part Number Information	
Displays	
15.0-inch, XGA, CTFT	266978-001
15.0-inch, SXGA+, CTFT	266979-001

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the LED cover (Section 5.8).
3. Remove the keyboard (Section 5.9).
4. Position the computer so the rear panel faces forward.
5. Remove the four PM2.0 × 8.0 screws that secure the display hinges to the base enclosure (Figure 5-19).

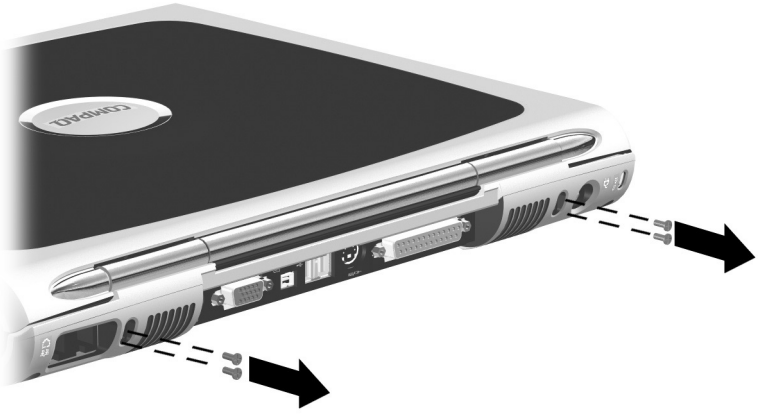


Figure 5-19. Removing the Display Screws

6. Position the computer so the front faces forward.

7. Disconnect the display cable ❶ from the system board (Figure 5-20).
8. Remove the two PM2.0 × 8.0 screws ❷ that secure the display hinges to the base enclosure.
9. Remove the two black PM1.5 × 5.0 screws ❸ that secure the hinge covers to the base enclosure.

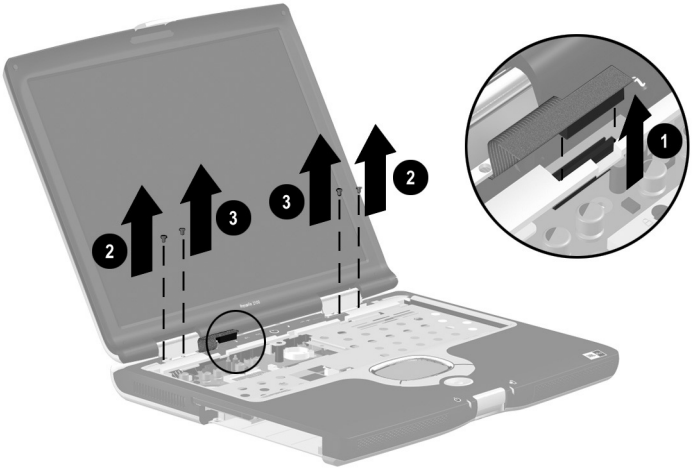


Figure 5-20. Removing the Display (Part 1)

10. Computer models with 15.1-inch displays have ground cables secured to the base enclosure by two silver PM1.5 × 5.0 screws ❶ (Figure 5-21). Remove these screws.
11. Lift the display straight up and remove it from the base enclosure ❷.

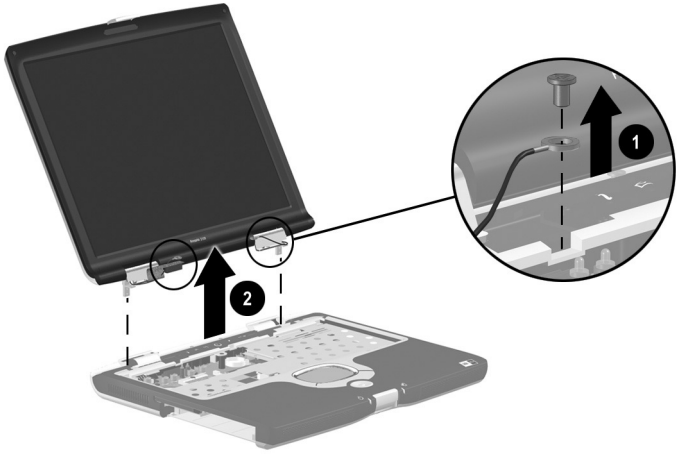


Figure 5-21. Removing the Display (Part 2)

12. Remove the hinge covers from the display (Figure 5-22).

Figure 5-22. Removing the Display Hinge Covers

Install the hinge covers on the display before installing the display on the base enclosure. The hinge covers are included in the Plastics Kit (spare part number 253944-001).

Reverse the above procedure to install the display.

5.14 Top Cover

Top Cover Spare Part Number Information	
Top cover (includes TouchPad, TouchPad buttons, and EasyScroll)	253934-001

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
   a. LED cover (Section 5.8)
   b. Keyboard (Section 5.9)
   c. Heat sink (Section 5.10)
   d. Display (Section 5.13)
2. Turn the computer bottom side up with the rear panel facing forward.

3. Remove the following screws:
   - ❏ Seven PM2.0 × 8.0 screws ❶ securing the top cover to the base enclosure (Figure 5-23)
   - ❏ One PM2.0 × 5.5 screw ❷ securing the top cover to the base enclosure in the battery bay
   - ❏ One PM2.0 × 5.5 screw ❸ that secures the top cover to the base enclosure in the optical drive/hard drive bay

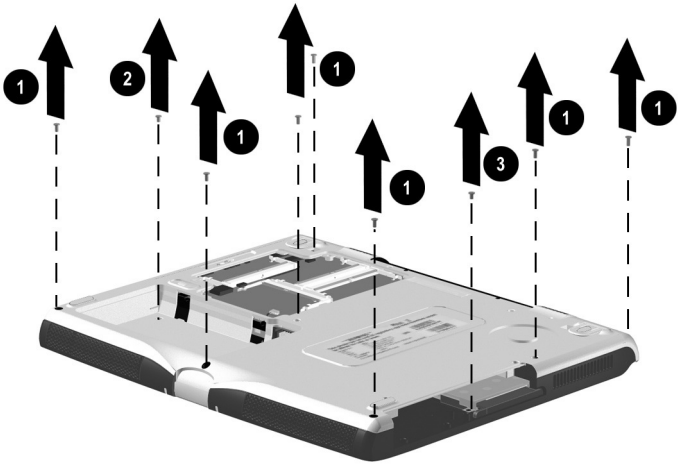


Figure 5-23. Removing the Top Cover Screws

4. Turn the computer top side up with the front facing forward.

5. Disconnect the TouchPad cable ❶ from the LIF connector on the system board (Figure 5-24).
6. Remove the four black PM1.5 × 5.0 screws ❷ and the PM2.0 × 5.5 screw ❸ that secure the top cover to the base enclosure.
7. Lift the top cover straight up ❹ and remove it from the base enclosure.

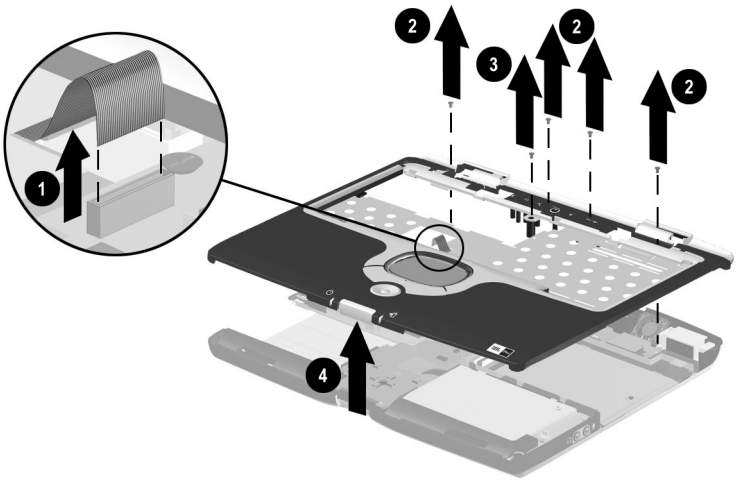


Figure 5-24. Removing the Top Cover

Reverse the above procedure to install the top cover.

5.15 PC Card Assembly

PC Card Assembly Spare Part Number Information	
PC Card assembly	253936-001

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
   a. LED cover (Section 5.8)
   b. Keyboard (Section 5.9)
   c. Heat sink (Section 5.10)
   d. Display (Section 5.13)
   e. Top cover (Section 5.14)
2. Remove the two PM2.0 × 5.5 screws ❶ that secure the PC Card assembly to the base enclosure (Figure 5-25).
3. Lift the rear/right corner ❷ of the assembly to disconnect it from the system board.
4. Remove the PC Card assembly ❸.

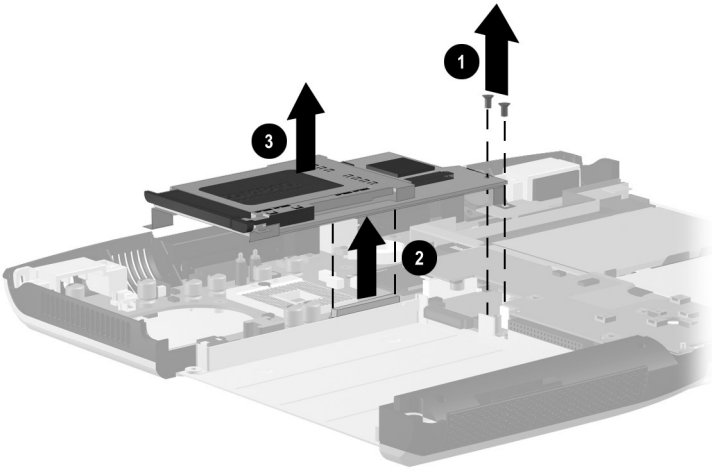


Figure 5-25. Removing the PC Card Assembly

5. Remove the two PM1.5 × 8.0 screws ❶ and the two PM1.5 × 4.0 screws ❷ that secure the PC Card assembly shield to the PC Card assembly (Figure 5-26).
6. Remove the PC Card assembly shield from the PC Card assembly.

The PC Card assembly shield is included in the Hardware Kit (spare part number 253937-001).

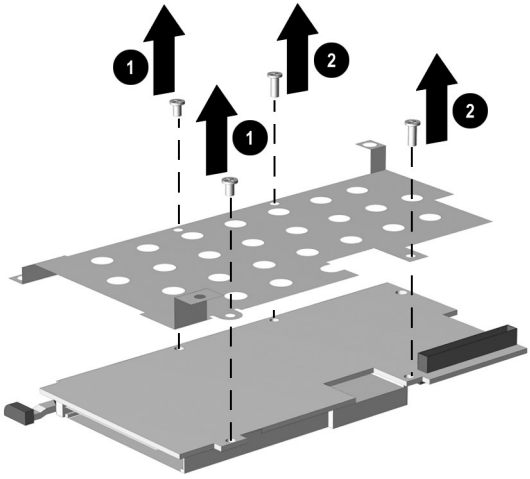


Figure 5-26. Removing the PC Card Assembly Shield

Reverse the above procedure to install the PC Card assembly.

5.16 Charger Board

Charger Board Spare Part Number Information	
Charger board	253935-001

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
   a. LED cover (Section 5.8)
   b. Keyboard (Section 5.9)
   c. Heat sink (Section 5.10)
   d. Display (Section 5.13)
   e. Top cover (Section 5.14)
   f. PC Card assembly (Section 5.15)

2. Remove the three PM2.0 × 5.5 screws ❶ that secure the charger board to the base enclosure (Figure 5-27).
3. Lift the back ❷ and middle ❸ of the board to disconnect it from the system board.
4. Lift the board straight up and remove it from the base enclosure ❹.
5. Remove the shield ❺.

The charger board shield is included in the Hardware Kit (spare part number 253937-001).

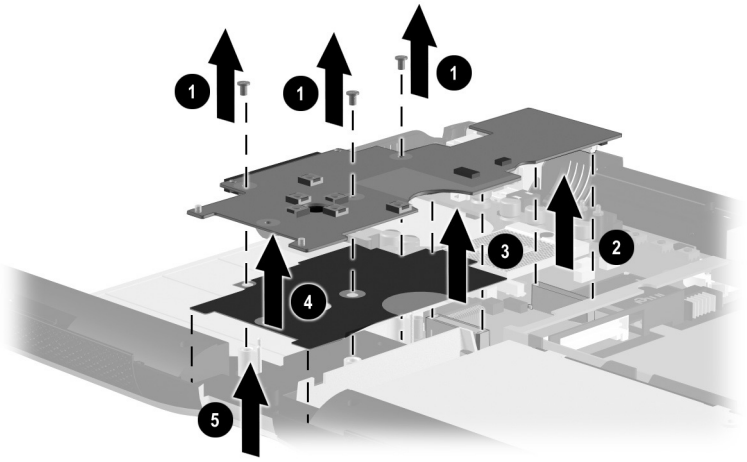


Figure 5-27. Removing the Charger Board

Reverse the above procedure to install the charger board.

5.17 Audio Board

Audio Board Spare Part Number Information	
Audio board	253938-001

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
   a. LED cover (Section 5.8)
   b. Keyboard (Section 5.9)
   c. Heat sink (Section 5.10)
   d. Display (Section 5.13)
   e. Top cover (Section 5.14)

2. Disconnect the speaker cable ❶ from the audio board.
3. Remove the two PM2.0 × 5.5 screws ❷ securing the audio board to the base enclosure (Figure 5-28).
4. Lift the back edge of the audio board ❸ to disconnect it from the system board.
5. Lift the audio board straight up ❹ and remove it from the base enclosure.

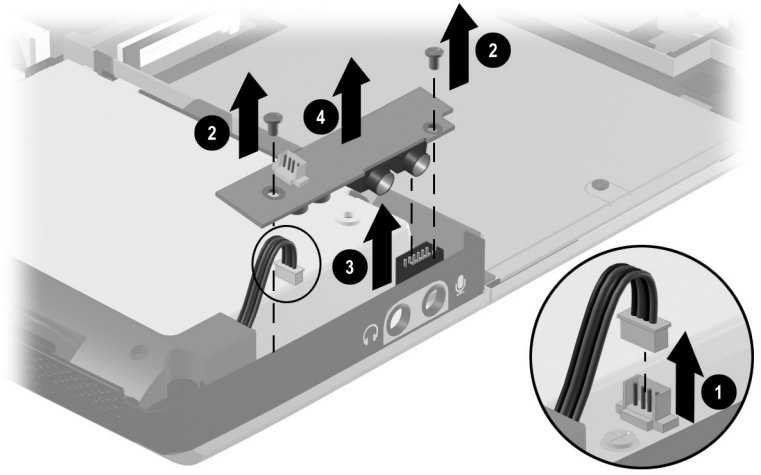


Figure 5-28. Removing the Audio Board

Reverse the above procedure to install the audio board.

5.18 Keyboard Support Plate

The keyboard support plate is included in the Hardware Kit (spare part number 253937-001).

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
   a. LED cover (Section 5.8)
   b. Keyboard (Section 5.9)
   c. Heat sink (Section 5.10)
   d. Display (Section 5.13)
   e. Top cover (Section 5.14)

2. Remove the four PM2.0 × 4.5 screws ❶ that secure the keyboard support plate to the base enclosure (Figure 5-29).
3. Lift the left side of the plate and slide the plate to the right ❷ until it clears the base enclosure, then lift the plate straight up ❸ and remove it from the base enclosure.

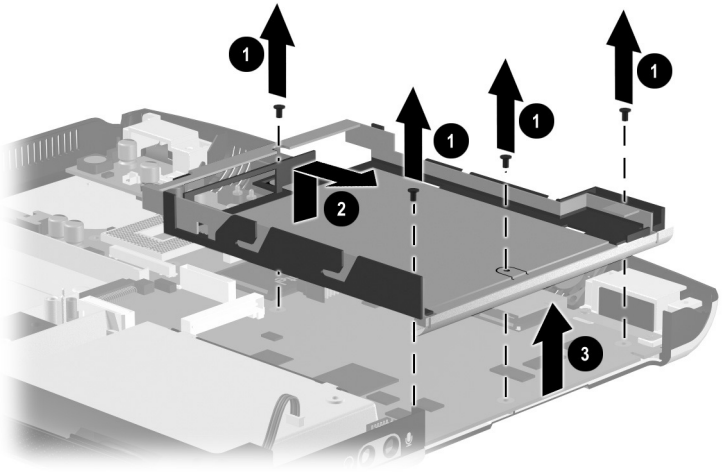


Figure 5-29. Removing the Keyboard Support Plate

Reverse the above procedure to install the keyboard support plate.

5.19 Speaker Assembly

The speaker assembly is included in the base enclosure (spare part number 260611-001).

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
   a. LED cover (Section 5.8)
   b. Keyboard (Section 5.9)

c. Heat sink (Section 5.10)

d. Display (Section 5.13)

e. Top cover (Section 5.14)

f. PC Card assembly (Section 5.15)

g. Charger board (Section 5.16)

2. Disconnect the speaker cable ❶ from the audio board (Figure 5-30).
3. Lift the speaker assembly straight up ❷ and remove it from the base enclosure.

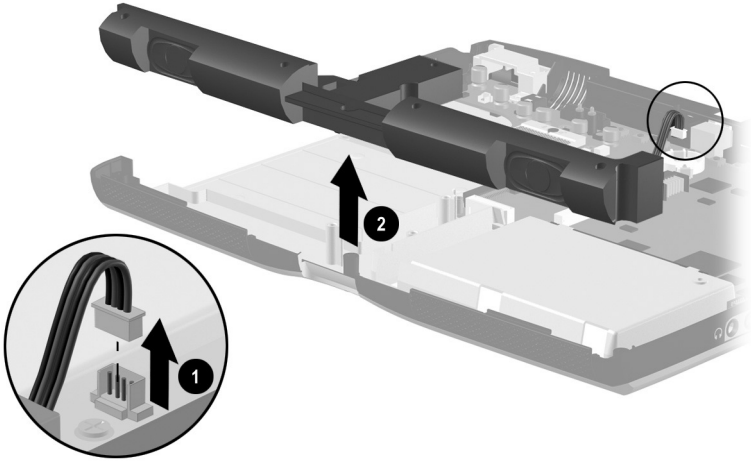


Figure 5-30. Removing the Speaker Assembly

Reverse the above procedure to install the speaker assembly.

5.20 Fan

Fan Spare Part Number Information	
Fan	273906-001

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
   a. LED cover (Section 5.8)
   b. Keyboard (Section 5.9)
   c. Heat sink (Section 5.10)
   d. Display (Section 5.13)
   e. Top cover (Section 5.14)

2. Disconnect the fan cable ❶ from the audio board (Figure 5-31).
3. Lift the fan straight up ❷ and remove it from the base enclosure.

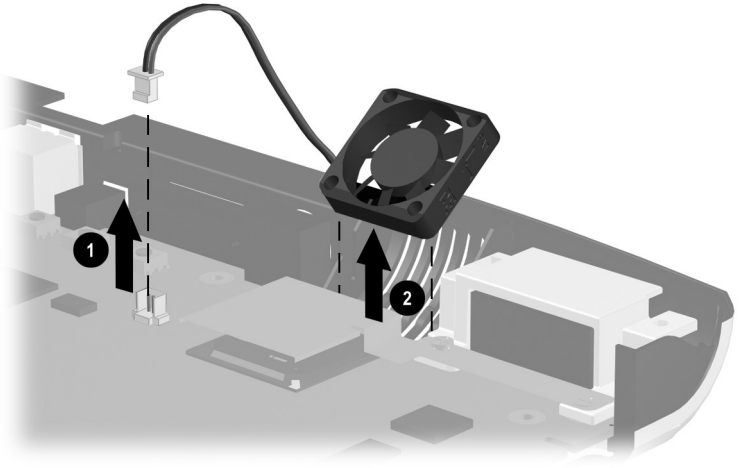


Figure 5-31. Removing the Fan

Reverse the above procedure to install the fan.

5.21 System Board

System Board Spare Part Number Information	
System board (includes network interface; does not include any memory)	253914-001

When replacing the system board, ensure that the following components are removed from the old system board and installed on the new system board:

- Memory expansion boards (Section 5.4)
- Mini PCI communications board (Section 5.5)
- Video memory board (Section 5.6)
- Processor (Section 5.11)
- Disk cell RTC battery (Section 5.12)

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
   a. LED cover (Section 5.8)
   b. Keyboard (Section 5.9)
   c. Heat sink (Section 5.10)
   d. Display (Section 5.13)
   e. Top cover (Section 5.14)
   f. PC Card assembly (Section 5.15)
   g. Charger board (Section 5.16)
   h. Audio board (Section 5.17)
   i. Keyboard support plate (Section 5.18)
   j. Fan (Section 5.20)

2. Position the computer so the rear panel faces forward.
3. Remove the four HM5 × 10.5 screwlocks that secure the system board to the base enclosure (Figure 5-32).

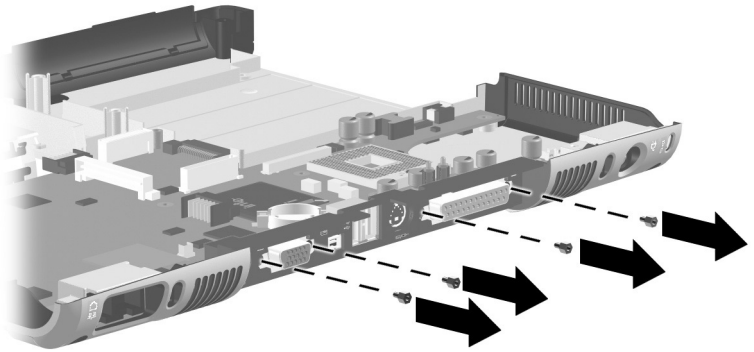


Figure 5-32. Removing the System Board Screwlocks

4. Position the computer so the front faces forward.

5. Remove the four PM2.0 × 8.0 screws ❶ that secure the left and right display supports to the base enclosure (Figure 5-33).

The two screws that secure the right display support also secure the VGA chip EMI shield ❷ to the base enclosure.

6. Remove the left ❸ and right ❹ display supports.

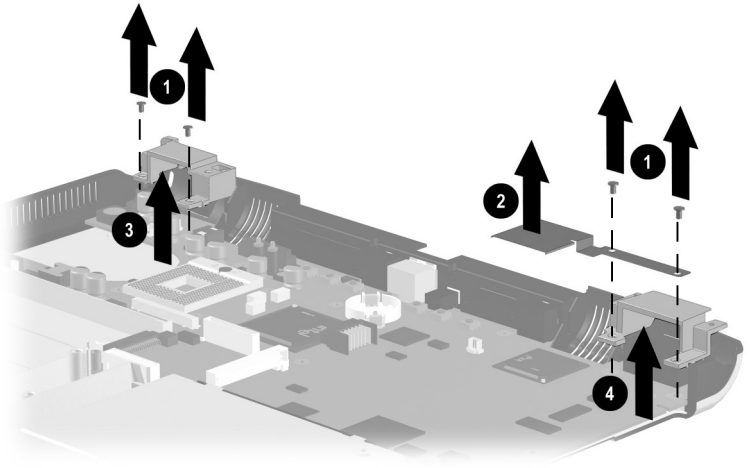


Figure 5-33. Removing the System Board Screws

7. Lift the front edge of the system board ❶ until it clears the base enclosure (Figure 5-34).
8. Slide the system board forward at angle ❷ and remove it from the base enclosure.

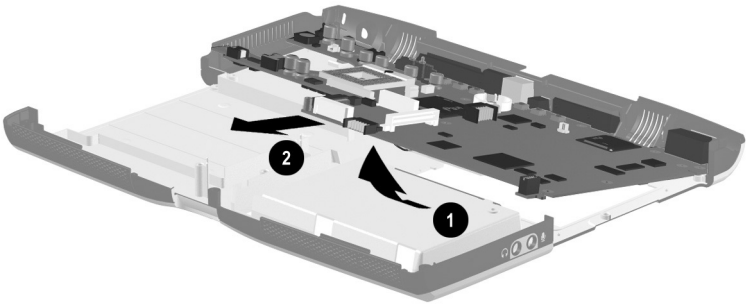


Figure 5-34. Removing the System Board

Reverse the above procedure to install the system board.

5.22 Modem Cable

The modem cable is included in the Cable Kit (spare part number 253946-001).

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the system board (Section 5.21).
3. Turn the system board bottom side up with the rear panel facing forward.
4. Disconnect the modem cable ❶ from the modem and route it from between the modem connector ❷ and the memory expansion ❸ and video memory connectors ❹ (Figure 5-35).
5. Remove the tape ❺ that secures the modem cable to the system board.
6. Disconnect the modem cable from the system board ❻.

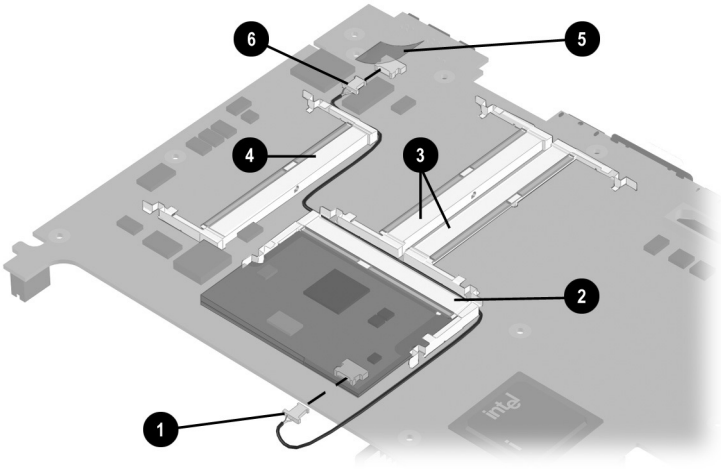


Figure 5-35. Removing the Modem Cable

Reverse the above procedure to install the modem cable.

6

Specifications

This chapter provides physical and performance specifications.

Table 6-1
Computer

Dimensions		
Height	12.91 in	32.79 cm
Width	10.99 in	27.92 cm
Depth	1.63 in	4.14 cm
Weight		
15.0-inch display with battery pack and Future Bay weight saver installed	7.65 lb	3.45 kg
14.1-inch display with battery pack and Future Bay weight saver installed	7.14 lb	3.24 kg
Stand-alone power requirements		
Nominal operating voltage (with main 8-cell Li ion battery pack)		14.8 VDC
Nominal operating voltage (with Future Bay 6-cell Li ion battery pack)		11.1 VDC
Temperature		
Operating	50° to 95° F	10° to 35° C
Nonoperating	-4° to 140° F	-20° to 60° C

Table 6-1
Computer *(Continued)*

Relative humidity (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature	
Shock		
Operating	10 G, 11 ms, half-sine	
Nonoperating	60 G, 11 ms, half-sine	
Vibration		
Operating	0.5 G zero-to-peak, 10 to 500 Hz, at 0.5 oct/min sweep rate	
Nonoperating	1.0 G zero-to-peak, 10 to 500 Hz, at 0.5 oct/min sweep rate	
Altitude (unpressurized)		
Operating	0 to 10,000 ft	0 to 3,048 m
Nonoperating	0 to 30,000 ft	0 to 9,144 m

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

Table 6-2
15.0-inch XGA, TFT Display

Dimensions		
Height	9.52 in	24.18 cm
Width	12.47 in	31.67 cm
Diagonal	15.0 in	38.10 cm
Number of colors	256K	
Contrast ratio	150:1	
Brightness	120 nits minimum	
Pixel resolution		
Pitch	0.297 × 0.297 mm	
Format	1024 × 768	
Configuration	RGB stripe	
Backlight	Cold cathode fluorescent, 1 tube	
Character display	80 × 25	
Refresh	60 Hz	
Total power consumption	5.5 W	

Table 6-3
14.1-inch XGA, TFT Display

Dimensions		
Height	8.97 in	22.8 cm
Depth	11.76 in	29.9 cm
Width	14.1 in	35.81 cm
Number of colors	256K	
Contrast ratio	150:1	
Brightness	120 nits minimum	
Pixel resolution		
Pitch	0.279 × 0.279 mm	
Format	1024 × 768	
Configuration	RGB stripe	
Backlight	Edge lit, bottom	
Character display	80 × 25	
Refresh	60 Hz	
Total power consumption	4.75 W	

Table 6-4
Hard Drives

	30 GB	20 GB	15 GB	10 GB
User capacity per drive[1]	30.0 GB	20.0 GB	15.0 GB	10.0 GB
Drive height (with drive frame)	9.5 mm	9.5 mm	9.5 mm	9.5 mm
Drive width (with drive frame)	70 mm	70 mm	70 mm	70 mm
Interface type	ATA-5	ATA-5	ATA-4	ATA-4
Seek times (typical read, including setting)				
Single track	2.5 ms	2.5 ms	2.5 ms	2.5 ms
Average	12.0 ms	12.0 ms	12.0 ms	12.0 ms
Full stroke	23.0 ms	23.0 ms	24.0 ms	23.0 ms
User addressable sectors[2]	58,605,120	39,070,080	23,579,136	19,640,880
Logical configuration				
Cylinders	22,784	16,283	16,683	16,283
Heads	16	16	16	16
Sectors per track	63	63	63	63

[1]1 GB = 1,000,000,000 bytes.

[2]Actual drive specifications may differ slightly.

[3]System capability may differ.

Certain restrictions and exclusions apply. Consult the Compaq Customer Support Center for details.

Table 6-4
Hard Drives *(Continued)*

	30 GB	20 GB	15 GB	10 GB
Physical configuration				
Cylinders[2]	22,784	22,784	25,800	22,784
Heads	6	4	2	4
Sectors per track[2]	293 to 560	293 to 560	398 to 731	293 to 560
Bytes per sector	512	512	512	512
Buffer size[2]	2 MB	2 MB	512 KB	512 KB
Disk rotational speed	4200 rpm	4200 rpm	4200 rpm	4200 rpm
Transfer rate				
Interface max (MB/s)[3]	66.6	66.6	100	66.6
Media (Mb/s)[2]	109 to 203	109 to 203	155 to 256	109 to 203

[1]1 GB = 1,000,000,000 bytes.

[2]System capability may differ.

[3]Actual drive specifications may differ slightly.

Certain restrictions and exclusions apply. Consult the Compaq Customer Support Center for details.

Table 6-5
Diskette Drive

Diskette size	3.5 inch
Light	on system
Height	0.5 in (12.7 mm)
Bytes per sector	512
Sectors per track	
High density	18 (1.44 MB)
Low density	9
Tracks per side	
High density	80
Low density	80
Read/write heads	2
Average seek times	
Track-to-track (high/low)	3 to 6 ms
Average (high/low)	95 to 174 ms
Settling time	15 ms
Latency average	100 ms

Table 6-6
CD-ROM Drive

Applicable disc	CD-ROM (Mode 1, 2, and 3) CD-XA ready (Mode 2, Form 1 and 2) CD-I ready (Mode 2, Form 1 and 2) CD-R (read only) CD Plus Photo CD (single/multisession) CD-Extra Video CD CD-WO (fixed packets only) CD-Bridge	
Center hole diameter	0.59 in	1.5 cm
Disc diameter		12 cm, 8 cm
Disc thickness		1.2 mm
Track pitch	1.6 µm	
Access time		
Random	< 150 ms	
Full stroke	< 300 ms	
Cache buffer	128 KB	
Data transfer rate		
Sustained, 16X	150 KB/s at 1X	
Variable	1500 to 3600 KB/s (10X to 24X)	
Normal PIO Mode 4 (single burst)	16.66 KB/s	
Startup time	< 8 seconds	
Stop time	< 4 seconds	

Table 6-7
DVD-ROM Drive

Applicable disc	DVD-5, DVD-9, DVD-10 CD-ROM (Mode 1 and 2) CD Digital Audio CD-XA ready (Mode 2, Form 1 and 2) CD-I ready (Mode 2, Form 1 and 2) CD-R (read only) CD Plus Photo CD (single/multisession) CD-Bridge	
Center hole diameter	0.59 in	1.5 cm
Disc diameter		12 cm, 8 cm
Disc thickness		1.2 mm
Track pitch	0.74 µm	
Access time		
Random	< 150 ms	
Full stroke	< 225 ms	
Audio output level	Line-out, 0.7 Vrms	
Cache buffer	512 KB/sec	
Data transfer rate		
Max 24X CD	3600 KB/s (150 KB/s at 1X CD rate)	
Max 8X DVD	10,800 KB/s (1352 KB/s at 1X DVD rate)	
Normal IO Mode 4 (single burst)	16.6 MB/s	
Startup time	< 12 seconds	
Stop time	< 3 seconds	

Table 6-8
CD-RW Drive

Center hole diameter	0.59 in	0.39 cm
Disc diameter		12 cm, 8 cm
Disc thickness	0.47 in	0.12 cm
Track pitch	0.74 µm	
Access time		
Random	< 150 ms	
Full stroke	< 225 ms	
Audio output level	Line-out, 0.7 Vrms	
Cache buffer	128 KB/s minimum	
Data transfer rate		
Sustained, 16X	150 KB/s	
Sustained, 4X CD-RW	5,520 KB/s	
Normal PIO Mode 4 (single burst)	16.6 MB/s	
Startup time	< 15 seconds	
Stop time	< 6 seconds	

Table 6-9
External AC Adapter

Weight	0.45 lb	0.21 kg
Power supply (input)		
Operating voltage	100 to 240 VAC RMS nominal	
Operating current	1.5 A RMS	
Operating frequency range	50 to 60 Hz AC nominal	
Maximum transient	4/50 kV	

Table 6-10
8-cell, Li ion Battery Pack

Dimensions		
Height	0.82 in	21 mm
Width	5.67 in	144 mm
Depth	3.03 in	77 mm
Weight	0.94 lb	0.43 kg
Energy		
4.0 Amp hour		
Voltage	14.4 V	
Amp-hour capacity	4.0 Ah	
Watt-hour capacity	57.6 Wh	
3.6 Amp hour		
Voltage	14.4 V	
Amp-hour capacity	3.6 Ah	
Watt-hour capacity	51.8 Wh	
Temperature		
Operating	50 to 104° F	10 to 40° C
Nonoperating	-4 to 104° F	-20 to 60° C

Table 6-11
System DMA

Hardware DMA	System Function
DMA0	Available for audio
DMA1	Entertainment audio (default; alternate = DMA0, DMA3, none)
DMA2	Diskette drive
DMA3	ECP parallel port LPT1 (default; alternate = DMA0, none)
DMA4	DMA controller cascading (not available)
DMA5	Available for PC Card
DMA6	Not assigned
DMA7	Not assigned

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

Table 6-12
System Interrupts

Hardware IRQ	System Function
IRQ0	System timer
IRQ1	Keyboard controller
IRQ2	Cascaded
IRQ3	COM2
IRQ4	COM1
IRQ5	Audio (default)*
IRQ6	Diskette drive
IRQ7	Parallel port
IRQ8	Real time clock (RTC)
IRQ9	Infrared
IRQ10	System use
IRQ11	System use
IRQ12	Internal point stick or external mouse
IRQ13	Coprocessor (not available to any peripheral)
IRQ14	IDE interface (hard drive and optical drive)
IRQ15	System use

✎ PC Cards may assert IRQ3, IRQ4, IRQ5, IRQ7, IRQ9, IRQ10, IRQ11, or IRQ15. Either the infrared or the serial port may assert IRQ3 or IRQ 4.

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

Table 6-13
System I/O Addresses

I/O Address (hex)	**System Function** (shipping configuration)
000 to 00F	DMA controller no. 1
010 to 01F	Unused
020 to 021	Interrupt controller no. 1
022 to 024	Opti chipset configuration registers
025 to 03F	Unused
02E to 02F	87334 “Super IO” configuration for processor
040 to 05F	Counter/timer registers
044 to 05F	Unused
060	Keyboard controller
061	Port B
062 to 063	Unused
064	Keyboard controller
065 to 06F	Unused
070 to 071	NMI enable/real-time clock
072 to 07F	Unused
080 to 08F	DMA page registers
090 to 091	Unused
092	Port A
093 to 09F	Unused
0A0 to 0A1	Interrupt controller no. 2

Table 6-13
System I/O Addresses *(Continued)*

I/O Address (hex)	**System Function** (shipping configuration)
0A2 to 0BF	Unused
0C0 to 0DF	DMA controller no. 2
0E0 to 0EF	Unused
0F0 to 0F1	Coprocessor busy clear/reset
0F2 to 0FF	Unused
100 to 16F	Unused
170 to 177	Secondary fixed disk controller
178 to 1EF	Unused
1F0 to 1F7	Primary fixed disk controller
1F8 to 200	Unused
201	Joystick (decoded in ESS1688)
202 to 21F	Unused
220 to 22F	Entertainment audio
230 to 26D	Unused
26E to 26	Unused
278 to 27F	Unused
280 to 2AB	Unused
2A0 to 2A7	Unused
2A8 to 2E7	Unused
2E8 to 2EF	Reserved serial port

Table 6-13
System I/O Addresses *(Continued)*

I/O Address (hex)	**System Function** (shipping configuration)
2F0 to 2F7	Unused
2F8 to 2FF	Infrared port
300 to 31F	Unused
320 to 36F	Unused
370 to 377	Secondary diskette drive controller
378 to 37F	Parallel port (LPT1/default)
380 to 387	Unused
388 to 38B	FM synthesizer–OPL3
38C to 3AF	Unused
3B0 to 3BB	VGA
3BC to 3BF	Reserved (parallel port/no EPP support)
3C0 to 3DF	VGA
3E0 to 3E1	PC Card controller in processor
3E2 to 3E3	Unused
3E8 to 3EF	Internal modem
3F0 to 3F7	“A” diskette controller
3F8 to 3FF	Serial port (COM1/default)
CF8 to CFB	PCI configuration index register (PCIDIVO-1)
CFC to CFF	PCI configuration data register (PCIDIVO-1)

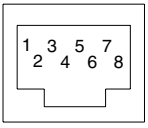
Table 6-14
System Memory Map

Size	Memory Address	System Function
640 KB	00000000 to 0009FFFF	Base memory
128 KB	000A0000 to 000BFFFF	Video memory
48 KB	000C0000 to 000CBFFF	Video BIOS
160 KB	000C8000 to 000E7FFF	Unused
64 KB	000E8000 to 000FFFFF	System BIOS
15 MB	00100000 to 00FFFFFF	Extended memory
58 MB	01000000 to 047FFFFF	Super extended memory
58 MB	04800000 to 07FFFFFF	Unused
2 MB	08000000 to 080FFFFF	Video memory (direct access)
4 GB	08200000 to FFFEFFFF	Unused
64 KB	FFFF0000 to FFFFFFFF	System BIOS

A

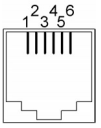
Connector Pin Assignments

Table A-1
RJ-45 Network Interface



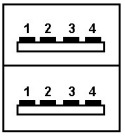
Pin	Signal	Pin	Signal
1	Transmit +	5	Unused
2	Transmit -	6	Receive -
3	Receive +	7	Unused
4	Unused	8	Unused

Table A-2
RJ-11 Modem



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

Table A-3
Universal Serial Bus

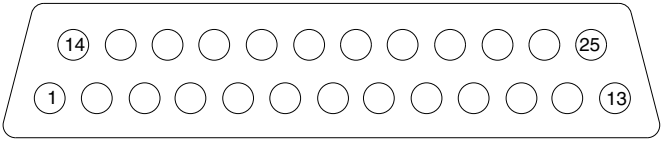


Pin	Signal	Pin	Signal
1	+5 VDC	3	Data +
2	Data -	4	Ground

Table A-4
S-Video

Pin	Signal	Pin	Signal
1	Ground (Y)	3	Y-Luminance (Intensity)
2	Ground (C)	4	C-Chrominance (Color)

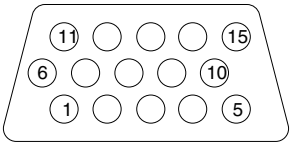
Table A-5
Parallel



Pin	Signal	Pin	Signal
1	Strobe*	10	Acknowledge*
2	Data bit 0	11	Busy
3	Data bit 1	12	Paper out
4	Data bit 2	13	Select
5	Data bit 3	14	Auto line feed*
6	Data bit 4	15	Error*
7	Data bit 5	16	Initialize printer*
8	Data bit 6	17	Select in*
9	Data bit 7	18-25	Signal ground

*Signal is active low.

Table A-6
External Monitor



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

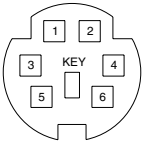
Table A-7
Stereo Speaker/Headphone

Pin	Signal	Pin	Signal
1	Audio out	2	Ground

Table A-8
Microphone

Pin	Signal	Pin	Signal
1	Audio in	2	Ground

Table A-9
External Keyboard/Mouse



Pin	Signal	Pin	Signal
1	Keyboard/mouse DATA	4	+5 VDC
2	Keyboard/mouse DATA	5	Keyboard/mouse CLK
3	Ground	6	Keyboard/mouse CLK

B

Power Cord Set Requirements

3-Conductor Power Cord Set

The wide range input features enable the computer to operate from any line voltage from 100 to 120 or 220 to 240 volts AC.

The power cord set shipped with the computer meets the requirements for use in the country where the equipment is purchased.

Power cord sets for use in other countries must meet the requirements of the country where the computer is used. For more information on power cord set requirements, contact a Compaq authorized reseller or service provider.

General Requirements

The following requirements apply to all countries:

- The length of the power cord set must be at least 5.0 feet (1.5 m) and a maximum of 6.5 feet (2.0 m).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country where the power cord set will be used.
- The power cord set must have a minimum current capacity of 10 amps and a nominal voltage rating of 125 or 250 volts AC, as required by each country's power system.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Country-Specific Requirements

3-Conductor Power Cord Set Requirements

Country	Accredited Agency	Applicable Note Number
Australia	EANSW	1
Austria	OVE	1
Belgium	CEBC	1
Canada	CSA	2
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
Italy	IMQ	1
Japan	METI	3
The Netherlands	KEMA	1
Norway	NEMKO	1
Sweden	SEMKO	1
Switzerland	SEV	1
United Kingdom	BSI	1
United States	UL	2

Notes

1. The flexible cord must be <HAR> Type HO5VV-F, 3-conductor, 1.0 mm^2 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 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 (15A, 125V) or NEMA 6-15P (15A, 250V) 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, 1.00mm^2 conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7A, 125V) configuration.

C

Screw Listing

This appendix provides specification and reference information for the screws used in the computer. All screws listed in this appendix are available in the Miscellaneous Screw Kit, spare part number 253945-001.

Table C-1
Phillips M2.0 × 5.5 Screw

	Color	Qty	Length	Thread	Head Width
	silver	20	5.5 mm	2.0 mm	4.0 mm

Where used:

❶ Two screws that secure the fixed optical drive to the computer (documented in Section 5.3, step 5)

❷ Two screws that secure the hard drive to the computer (documented in Section 5.3, step 6)

❸ Two screws that secure the expansion cover to the computer (documented in Section 5.4, step 3)

❹ One screw that secures the top cover to the base enclosure in the battery bay (documented in Section 5.14, step 3)

❺ One screw that secures the top cover to the base enclosure in the Future Bay (documented in Section 5.14, step 6)

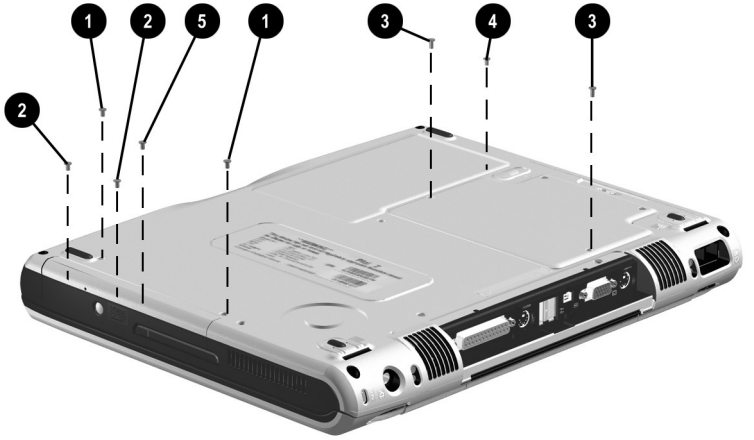


Figure C-1. Phillips M2.0 × 5.5 Screw Locations

Table C-1
Phillips M2.0 × 5.5 Screw *(Continued)*

	Color	Qty	Length	Thread	Head Width
	silver	20	5.5 mm	2.0 mm	4.0 mm

Where used:

❶ Four screws that secure the heat sink to the base enclosure (documented in Section 5.10, step 4)

❷ One screw that secures the top cover to the base enclosure (documented in Section 5.14, step 6)

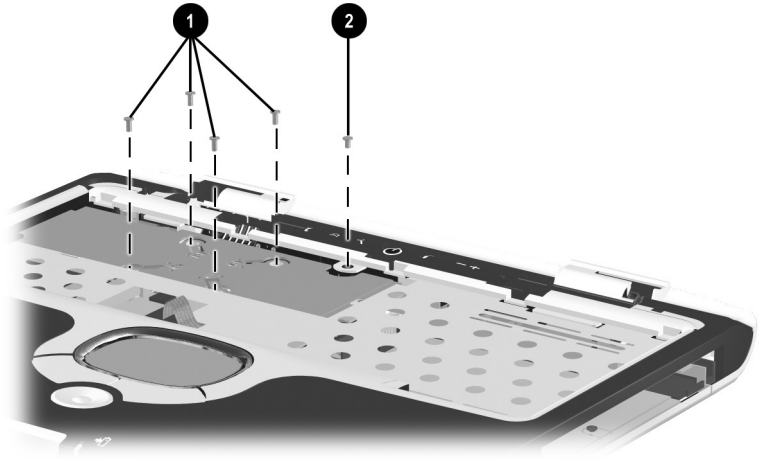


Figure C-2. Phillips M2.0 × 5.5 Screw Locations (Continued)

Table C-1
Phillips M2.0 × 5.5 Screw *(Continued)*

	Color	Qty	Length	Thread	Head Width
	silver	20	5.5 mm	2.0 mm	4.0 mm

Where used:

❶ Two screws that secure the PC Card assembly to the system board (documented in Section 5.15, step 2)

❷ Three screws that secure the charger board to the system board (documented in Section 5.16, step 2)

❸ Two screws that secure the audio board to the system board (documented in Section 5.17, step 3)

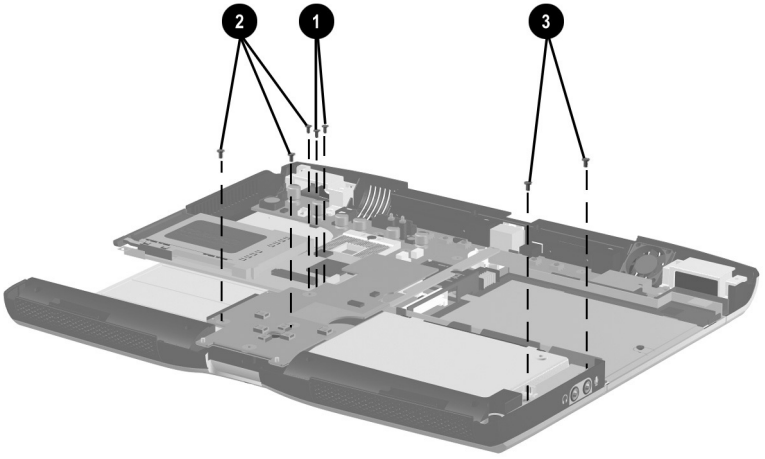


Figure C-3. Phillips M2.0 × 5.5 Screw Locations (Continued)

Table C-2
Phillips M2.5 × 4.0 Screw

	Color	Qty	Length	Thread	Head Width
	silver	4	4.0 mm	2.5 mm	4.5 mm

Where used:

Four screws that secure the hard drive to the hard drive bracket (documented in Section 5.14, step 6)

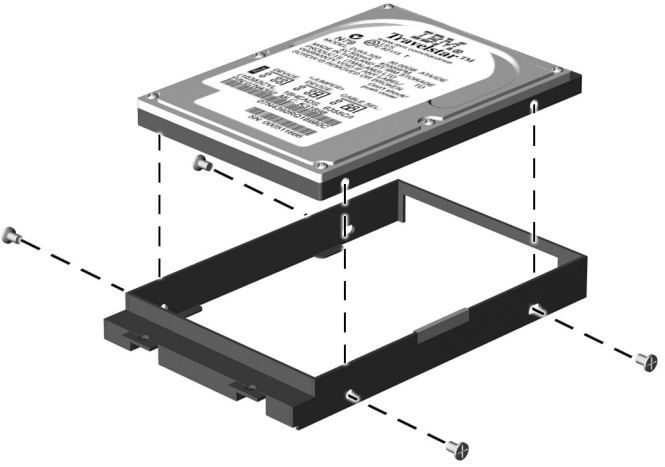


Figure C-4. Phillips M2.5 × 4.0 Screw Locations

Table C-3
Phillips M2.0 × 8.0 Screw

	Color	Qty	Length	Thread	Head Width
	silver	19	8.0 mm	2.0 mm	4.0 mm

Where used:

❶ Two screws that secure the LED cover to the base enclosure (documented in Section 5.8, step 3)

❷ Four screws that secure the display to the base enclosure (documented in Section 5.13, step 5)

❸ Seven screws that secure the top cover to the base enclosure (documented in Section 5.14, step 3)

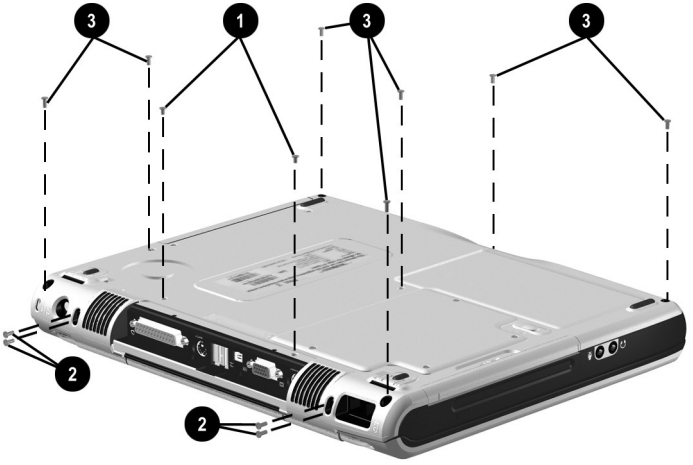


Figure C-5. Phillips M2.0 × 8.0 Screw Locations

Table C-3
Phillips M2.0 × 8.0 Screw *(Continued)*

	Color	Qty	Length	Thread	Head Width
	silver	19	8.0 mm	2.0 mm	4.0 mm

Where used:
Two screws that secure the display hinges to the base enclosure (documented in Section 5.13, step 8)

Figure C-6. Phillips M2.0 × 8.0 Screw Locations (Continued)

Table C-3
Phillips M2.0 × 8.0 Screw *(Continued)*

	Color	Qty	Length	Thread	Head Width
	silver	19	8.0 mm	2.0 mm	4.0 mm

Where used:
Four screws that secure the display supports to the base enclosure (documented in Section 5.21, step 5)

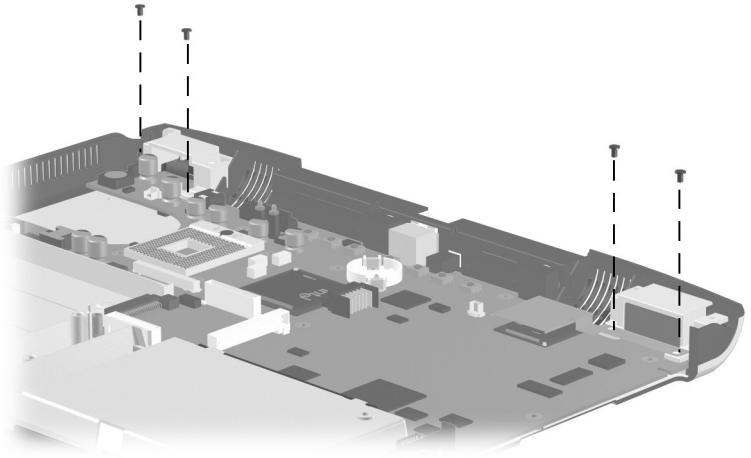


Figure C-7. Phillips M2.0 × 8.0 Screw Locations (Continued)

Table C-4
Phillips M1.5 × 5.0 Screw

	Color	Qty	Length	Thread	Head Width
	black	6	5.0 mm	1.5 mm	4.0 mm
	silver	2	5.0 mm	1.5 mm	4.0 mm

Where used:

❶ Two black screws that secure the display hinge covers to the base enclosure (documented in Section 5.13, step 9)

❷ Two silver screws that secure the display ground cable to the base enclosure on computer models with 15.1-inch displays (documented in Section 5.12, step 10)

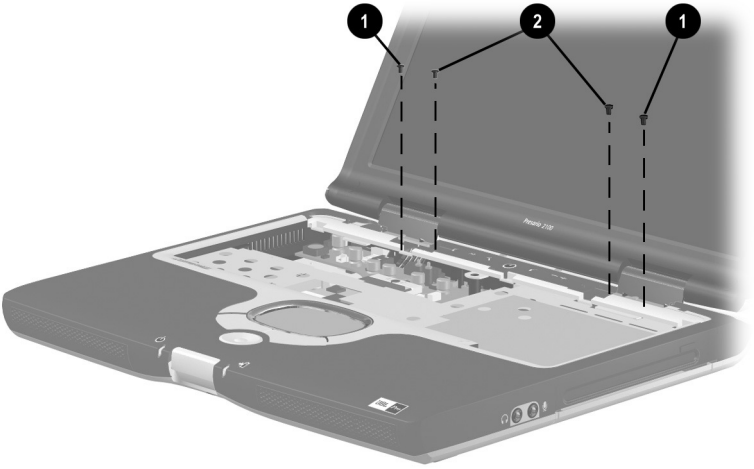


Figure C-8. Phillips M1.5 × 5.0 Screw Locations

Table C-4
Phillips M1.5 × 5.0 Screw *(Continued)*

	Color	Qty	Length	Thread	Head Width
	black	6	5.0 mm	1.5 mm	4.0 mm
	silver	2	5.0 mm	1.5 mm	4.0 mm

Where used:

Four black screws that secure the top cover to the base enclosure (documented in Section 5.14, step 6)

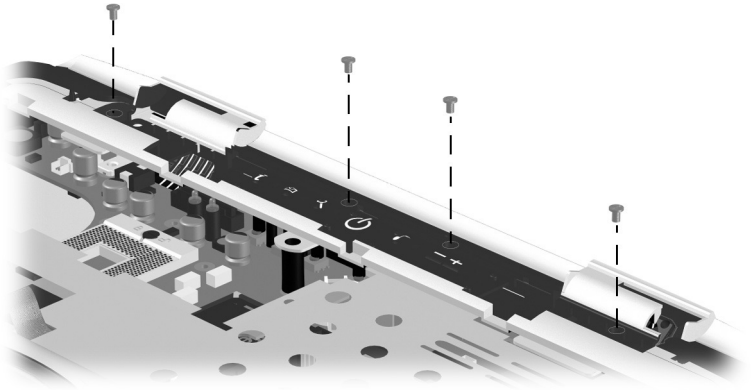


Figure C-9. Phillips M1.5 × 5.0 Screw Locations (Continued)

Table C-5
Phillips M1.5 × 8.0 Screw

	Color	Qty	Length	Thread	Head Width
	silver	2	8.0 mm	1.5 mm	4.0 mm

Where used:

❶ Two screws that secure the PC Card assembly shield to the PC Card assembly (documented in Section 5.15, step 5)

Table C-6
Phillips M1.5 × 4.0 Screw

	Color	Qty	Length	Thread	Head Width
	silver	2	4.0 mm	1.5 mm	4.0 mm

Where used:

❷ Two screws that secure the PC Card assembly shield to the PC Card assembly (documented in Section 5.15, step 5)

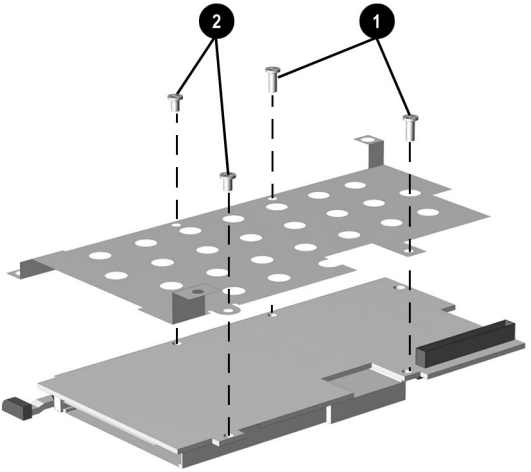


Figure C-10. Phillips M1.5 × 8.0 and Phillips M1.5 × 4.0 Screw Locations

Table C-7
Phillips M2.0 × 4.5 Screw

	Color	Qty	Length	Thread	Head Width
	black	4	4.5 mm	2.0 mm	4.0 mm

Where used:

Four screws that secure the keyboard support plate to the base enclosure (documented in Section 5.18, step 2)

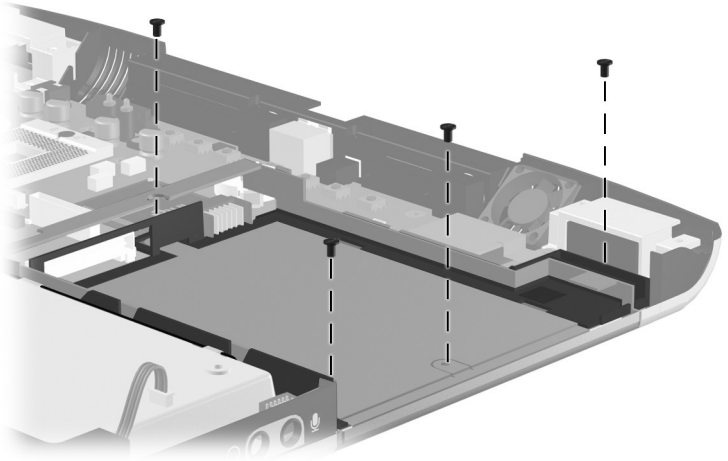


Figure C-11. Phillips M2.0 × 4.5 Screw Locations

Table C-8
Hex M5.0 × 10.5 Screwlock

	Color	Qty	Length	Thread	Head Width
	silver	4	10.5 mm	n/a	5.0 mm

Where used:
Four screwlocks that secure the system board to the base enclosure (documented in Section 5.20, step 3)

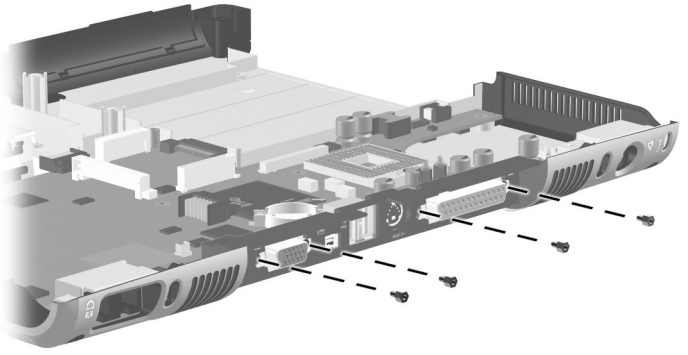


Figure C-12. Hex M5.0 × 10.5 Screwlock Locations

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