



Maintenance and Service Guide

Compaq Notebook Evo N160 Series

Document Part Number: 260552-001

October 2001

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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Product Description

The Compaq Notebook Evo N160 Series of Personal Computers offers advanced modularity, Intel Pentium III processors with 64-bit architecture, industry-leading Accelerated Graphics Port (AGP) implementation, and extensive multimedia support.



Figure 1-1. Compaq Notebook Evo N160

Models

Computer models are shown in Table 1-1.

Table 1-1
Compaq Notebook Evo N160
Models and Model Naming Conventions

Key										
N16	P	100	X4	20	V	C	12	L	2	XXXXXXX-XXX
1	2	3	4	5	6	7	8	9	10	11
Key	Description				Options					
1	Brand / Series designator				N=Notebook			16=160		
2	Processor type				P=Intel Pentium III			C=Intel Celeron		
3	Processor speed				120=1.20 GHz 113=1.13 GHz 106=1.06 GHz			100=1.00 GHz 933=933 MHz 866=866 MHz		
4	Display type / size / resolution				X=XGA (1024 × 768)			4=14.x-inch 3=13.x-inch		
5	Hard drive size				48=48 GB 30=30 GB 20=20 GB			15=15 GB 10=10 GB		
6	Optical drive designator				V=8X Max DVD-ROM drive			D=24X Max CD-ROM drive		
7	Integrated communication				M=modem 0=none			C=modem/NIC combination card		
8	RAM				12=128 MB					
9	Battery cells / type				L=8 cells, Lithium ion (Li ion)					
10	Operating system				8=Windows 98			2=Windows 2000		
11	SKU#									

All computer models use configuration code **KHYZ**.

Table 1-1
Compaq Notebook Evo N160
Models and Model Naming Conventions (Continued)

1	2	3	4	5	6	7	8	9	10	11
N16	P	100	X4	20	V	C	12	L	8	
Arabic				470024-097			The Netherlands			470024-099
Australia				470024-980			Norway			470024-101
Belgium				470024-081			Portugal			470024-103
Czech Republic				470024-083			Russia			470024-105
Denmark				470024-085			Slovakia / Slovenia			470024-106
European				470024-070			Spain			470024-107
France				470024-087			Sweden / Finland			470024-109
French Canada				470023-990			Switzerland			470024-111 470024-113
Germany				470024-089			Turkey			470024-115
Greece / Poland				470024-091			United Kingdom			470024-117
Hong Kong				470023-984			United States			470023-988 470024-072 (NAFTA)
Korea				470024-050			Taiwan			470023-982
Latin America				470024-055 470024-065 (NAFTA)						

Table 1-1
Compaq Notebook Evo N160
Models and Model Naming Conventions (*Continued*)

N16	P	100	X4	20	V	C	12	L	2	
Arabic				470024-098			Latin America			470024-058 470024-067 (NAFTA)
Australia				470024-981			The Netherlands			470024-100
Czech Republic				470024-084			Norway			470024-102
Denmark				470024-086			Portugal			470024-104
European				470024-082			Spain			470024-108
France				470024-088			Sweden / Finland			470024-110
French Canada				470023-991			Switzerland			470024-112 470024-114
Germany				470024-090			Taiwan			470023-983
Hong Kong				470023-985			Turkey			470024-116
Italy				470024-096			United Kingdom			470024-118
Korea				470024-052			United States			470023-989 470024-074 (NAFTA)

Table 1-1
Compaq Notebook Evo N160
Models and Model Naming Conventions (*Continued*)

N16	C	933	X4	15	V	C	12	L	8	
Australia				470024-079			The Netherlands			470024-061
Denmark				470024-044			Norway			470024-064
European				470024-043			People's Republic of China			470024-036
France				470024-048			Portugal			470024-068
French Canada				470024-042			Sweden / Finland			470024-073
Germany				470024-051			Taiwan			470024-023
Greece / Poland				470024-054			Turkey			470024-076
Hong Kong				470024-026			United Kingdom			470024-077
Japan				470024-030 470024-034			United States			470024-041
Korea				470024-039						
N16	C	933	X4	15	V	0	12	L	8	
European										470024-080

**Table 1-1
Compaq Notebook Evo N160
Models and Model Naming Conventions (Continued)**

N16	C	933	X4	15	V	C	12	L	2	
France				470024-049			Norway			470024-066
Greece / Poland				470024-056			People's Republic of China			470024-037
Hong Kong				470024-028 470024-027			Spain			470024-071
Italy				470024-059			Sweden / Finland			470024-075
Japan				470024-035			United Kingdom			470024-078
The Netherlands				470024-063						
N16	C	933	X3	10	D	C	12	L	8	
Asia / Pacific / Thailand				470023-996			People's Republic of China			470024-038
Belgium				470024-001			Portugal			470024-012
Czech Republic				470024-002			Russia			470024-014
Denmark				470024-003			Slovakia / Slovenia			470024-015
France				470024-004			Spain			470024-017
French Canada				470023-998			Swedish / Finnish			470024-021
Germany				470024-006			Taiwan			470023-995
Hong Kong				470023-992			Turkey			470024-024
Hungary				470024-008			United Kingdom			470024-025
Israel				470024-009			United States			470023-997
Italy				470024-010						

Table 1-1
Compaq Notebook Evo N160
Models and Model Naming Conventions (*Continued*)

N16	C	933	X3	10	D	C	12	L	2	
France				470024-005			Swedish / Finnish			470024-022
Germany				470024-007			People's Republic of China			470024-040
Italy				470024-011			Taiwan			470023-994
Spain				470024-018			Hong Kong			470023-993

1.1 Features

- 1.2-, 1.13-, 1.06-, 1.0-GHz or 933- or 866-MHz Intel Pentium III Processor, with 512-KB integrated L2 cache, or 933- or 866-MHz Intel Celeron Processor with 128-KB integrated L2 cache, varying by computer model
- ATI Mobility Radeon with 64-bit video graphics, 8-MB double data rate (DDR) SDRAM, 4X AGP graphics card
- 128-MB high-performance Synchronous DRAM (SDRAM), expandable to 1024 MB
- Microsoft Windows 98, Windows XP Home, or Windows 2000 preinstalled, varying by computer model
- 14.1-inch, SXGA or 14.1- or 13.3-inch, XGA, TFT (1024 × 768) display, with over 16.7 million colors, varying by computer model
- Full-size keyboard with TouchPad pointing device
- Network interface card (NIC) integrated on system board, with mini PCI V.90 modem
- Support for one Type II PC Card slot with support for both 32-bit CardBus and 16-bit PC Cards
- External AC adapter with power cord
- 8-cell Lithium ion (Li ion) battery pack
- 48-, 30-, 20-, 15-, or 10-GB high-capacity hard drive, varying by computer model

- Connectors for:
 - ❑ RJ-45 network
 - ❑ RJ-11 modem
 - ❑ Universal Serial Bus
 - ❑ S-Video
 - ❑ Parallel devices
 - ❑ External monitor
 - ❑ 1394 digital devices
 - ❑ AC power
 - ❑ Stereo line out/headphone
 - ❑ Mono microphone
 - ❑ QuickDock Port Replicator
- Stereo speakers providing Compaq *Premier·Sound*™ 16-bit stereo sound

1.2 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 5.13, “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.

1.3 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

1.4 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 1-1.

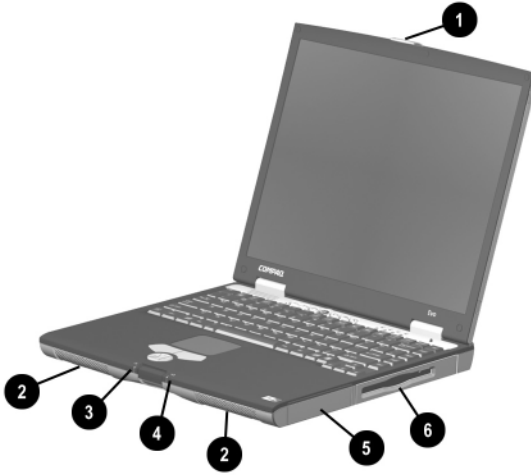


Figure 1-2. Front and Right Side Components

Table 1-1
Front and Right Side Components

Item	Component	Function
1	Display release latch	Opens the computer.
2	Stereo speakers	Produce stereo sound.
3	Drive indicator light	Turns on when the hard drive, 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	Battery bay	Accepts a 9- or 6-cell Lithium ion (li ion) battery pack.
6	Modular media bay	Accepts a diskette drive or optical drive.

The computer rear panel and left side components are shown in Figure 1-3 and described in Table 1-2.

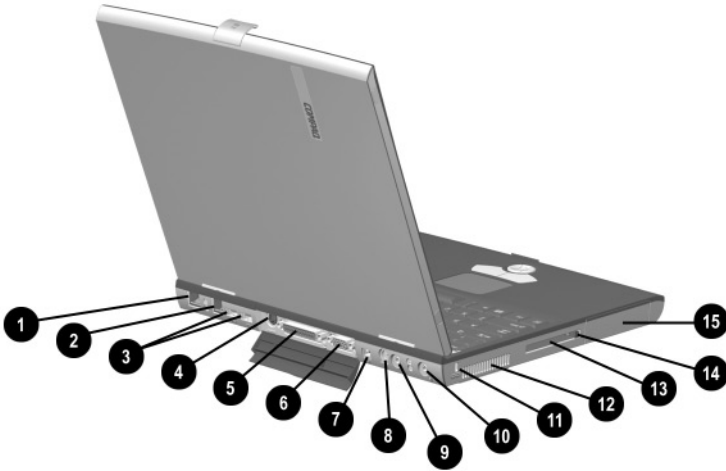



Figure 1-3. Rear Panel and Left Side Components

Table 1-2
Rear Panel and Left Side Components

Item	Component	Function
1	RJ-45 jack (network models only)	Connects the network cable. A network cable is not included with the computer.
2	RJ-11 jack (internal modem models only)	Connects the modem cable to an internal modem. A modem cable is included with internal modem models.
3	USB connectors (2)	Connects USB devices.
4	S-Video connector	Connects a television, VCR, camcorder, or overhead projector.
5	Parallel connector	Connects a parallel device.
6	External monitor connector	Connects an external monitor or overhead projector.

Table 1-2
Rear Panel and Left Side Components (Continued)

Item	Component	Function
7	1394 jack	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.
8	DC power jack	Connects any one of the following: <ul style="list-style-type: none"> ■ AC adapter ■ Optional automobile power adapter/charger ■ Optional aircraft power adapter
9	Stereo speaker/headphone jack	Connects stereo speakers, headphones, headset, or television audio.
10	Mono microphone jack	Connects a mono microphone, disabling the built-in microphone.
11	Security cable slot	Attaches an optional security cable to the computer.
12	Vent	Allows airflow to cool internal components. <p> CAUTION: To prevent damage, the computer shuts down if an overheating condition occurs. Do not block the cooling vent. Avoid placing the computer on a blanket, rug, or other flexible surface that may cover the vent area.</p>
13	PC Card slot	Supports a 32-bit (CardBus) or 16-bit PC Card.
14	PC Card eject button	Ejects a PC Card from the PC Card slot.
15	Hard drive bay	Supports the removable primary hard drive. The hard drive is secured to the computer by one screw.

The keyboard components are shown in Figure 1-4 and described in Table 1-3.

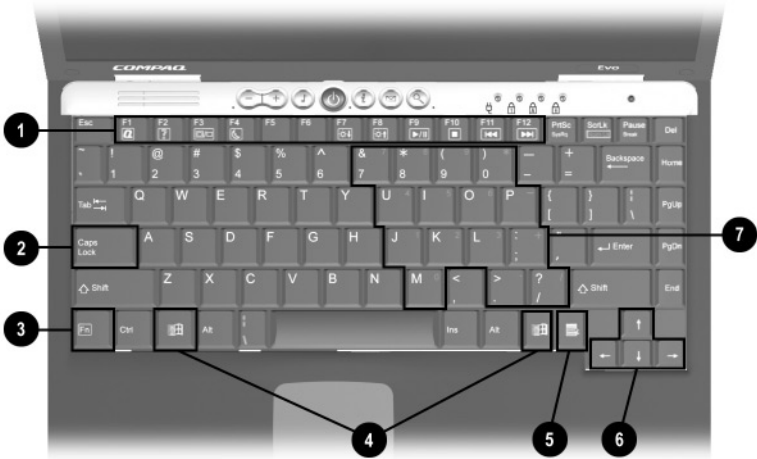


Figure 1-4. Keyboard Components

Table 1-3
Keyboard Components

Item	Component	Function
1	F1 through F12 function keys	Perform preset functions.
2	Caps lock key	Turns on the caps lock function.
3	Fn key	Used with hotkeys to perform preset hotkey functions.
4	Windows logo key	Displays Windows Start menu.
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	Cursor control keys	Move the cursor around the screen.
7	Embedded numeric keypad	Converts keys to numeric keypad.

The components on the top of the computer are shown in Figure 1-5 and described in Table 1-4.

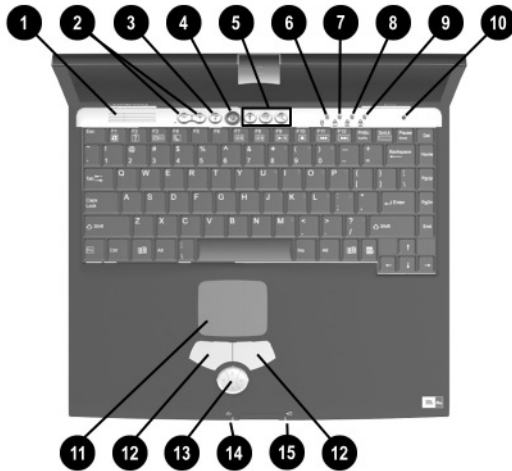


Figure 1-5. Top Components

**Table 1-4
Top Components**

Item	Component	Function
1	Vent	Allows airflow to cool internal components. ⚠ CAUTION: To prevent damage, the computer shuts down if an overheating condition occurs. Do not block the cooling vent. Avoid placing the computer on a blanket, rug, or other flexible surface that may cover the vent area.
2	Volume control buttons	Adjust the volume of the stereo speakers.
3	Digital audio button	Launches Windows Media Player to play MP3 music.

Table 1-4
Top Components (Continued)

Item	Component	Function
4	Power button	Turns on the computer. Use the operating system Shut Down command to turn off the computer.
5	Easy Access buttons	Provide quick access to the Internet. Refer to the <i>Hardware Guide</i> that ships with the computer for information about these buttons.
6	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.
7	Num lock light	On: Num lock is on and the embedded numeric keypad is enabled.
8	Caps lock light	On: Caps lock is on.
9	Scroll lock light	On: Scroll is on.
10	Display lid switch	Turns off the computer display if the computer is closed while on.
11	TouchPad	Moves the mouse cursor, selects, and activates.
12	Left and right TouchPad buttons	Function like the left and right mouse buttons on an external mouse.
13	Easy Scroll button	Scrolls the screen left, right, up, and down.
14	Drive indicator light	Turns on when the hard drive, CD-, or DVD-ROM drive is accessed.
15	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.

The external components on the bottom of the computer are shown in Figure 1-6 and described in Table 1-5.

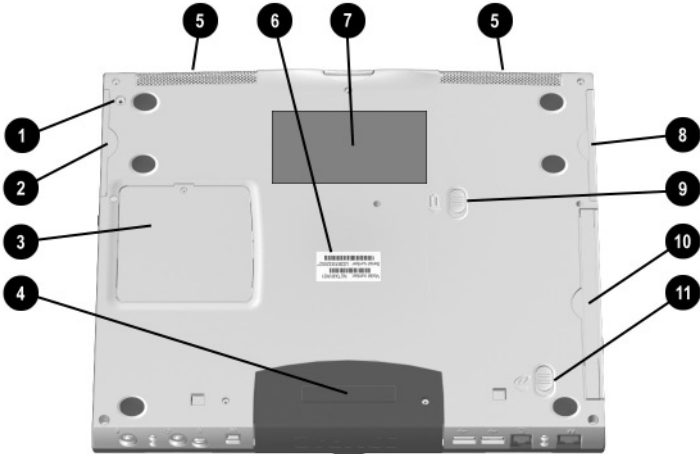


Figure 1-6. Bottom Components

**Table 1-5
Bottom Components**

Item	Component	Function
1	Hard drive retention screw	Secures the hard drive to the computer.
2	Hard drive bay	Supports the removable primary hard drive. The hard drive is secured to the computer by one screw.

Table 1-5
Bottom Components (*Continued*)

Item	Component	Function
3	Memory expansion compartment cover	Covers the memory expansion compartment that contains two memory expansion slots for memory expansion boards.
4	Docking connector	Connects the computer to an optional port replicator.
5	Stereo speakers	Produce stereo sound.
6	Serial number	Identifies the computer; needed when you call Compaq customer support.
7	Certificate of Authenticity label	Contains the Product Key, which may need to be entered before using some Windows operating systems.
8	Battery bay	Accepts a 9- or 6-cell Lithium ion (li ion) battery pack.
9	Battery pack release switch	Releases the battery pack from the battery compartment.
10	Modular media bay	Accepts a diskette drive or optical drive.
11	Modular media bay release switch	Releases the modular media bay device from the connector.

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
- Hard drive
- Display
- Keyboard/TouchPad or pointing stick
- Audio
- Intel Pentium III processors
- Fan
- PC Card
- Modem or modem/NIC

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.

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 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.

Using the PhoenixBIOS Setup Utility

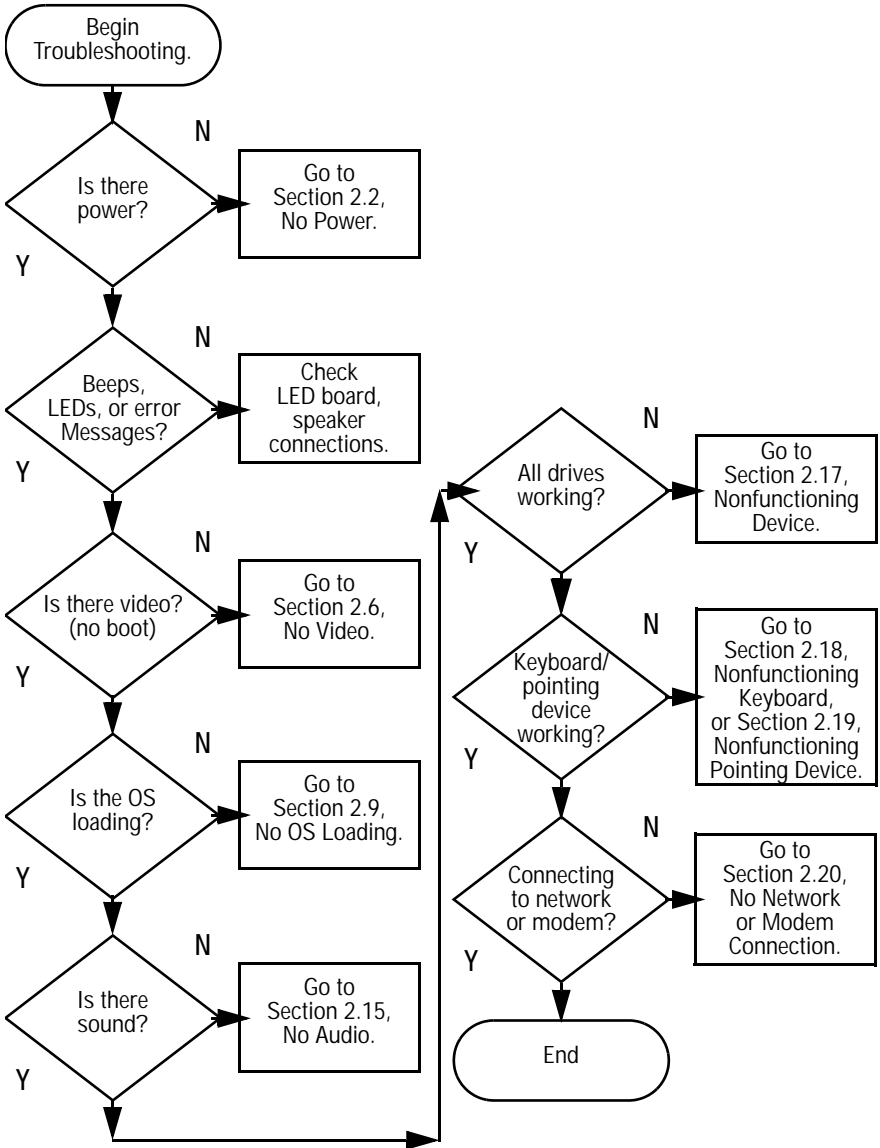
The PhoenixBIOS Setup Utility (PSU) is built into the system. You can configure the system BIOS and modify or restore factory default settings, such as date and time, types of disk drives, power management, and password settings. To run PSU, press the **F10** key during system startup. When the main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

Troubleshooting Flowcharts

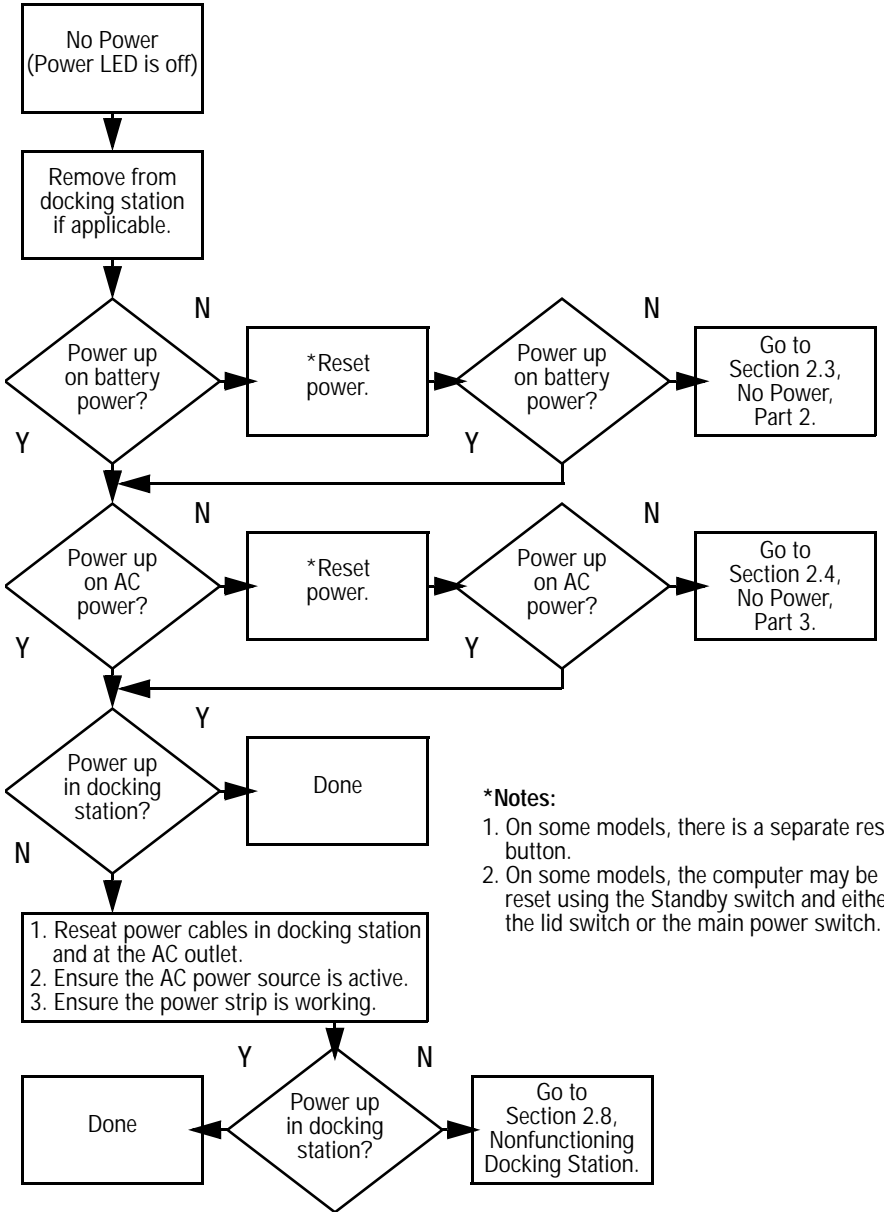
Table 2-1
Troubleshooting Flowcharts Overview

Section	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

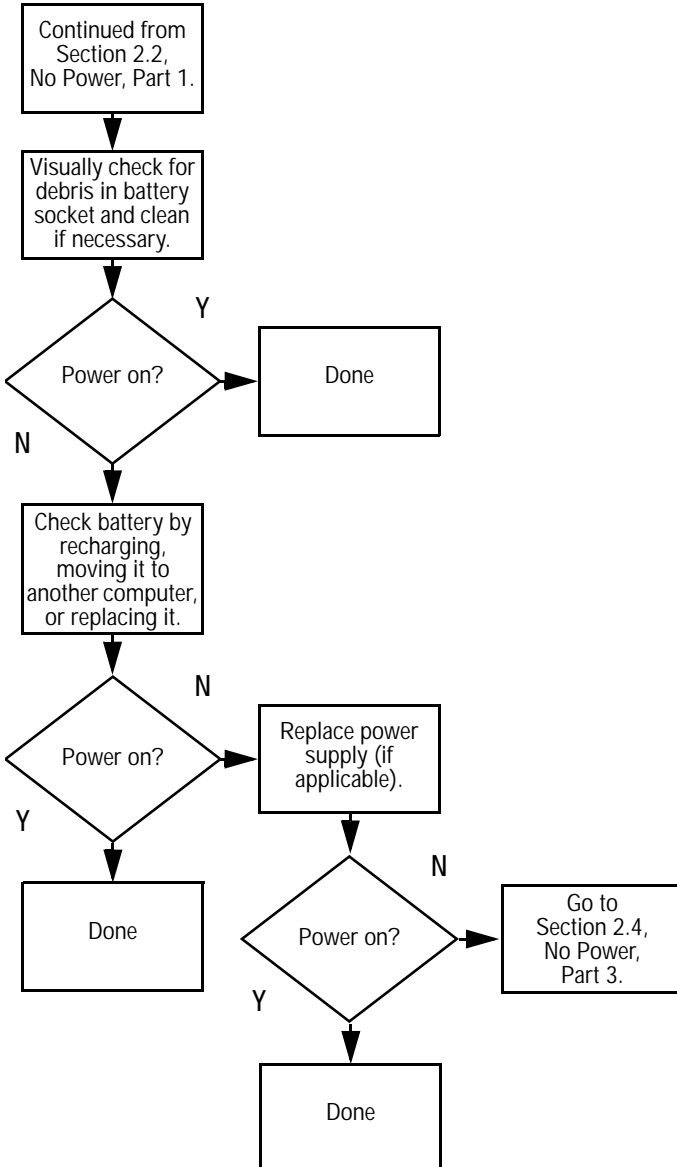
Initial Troubleshooting



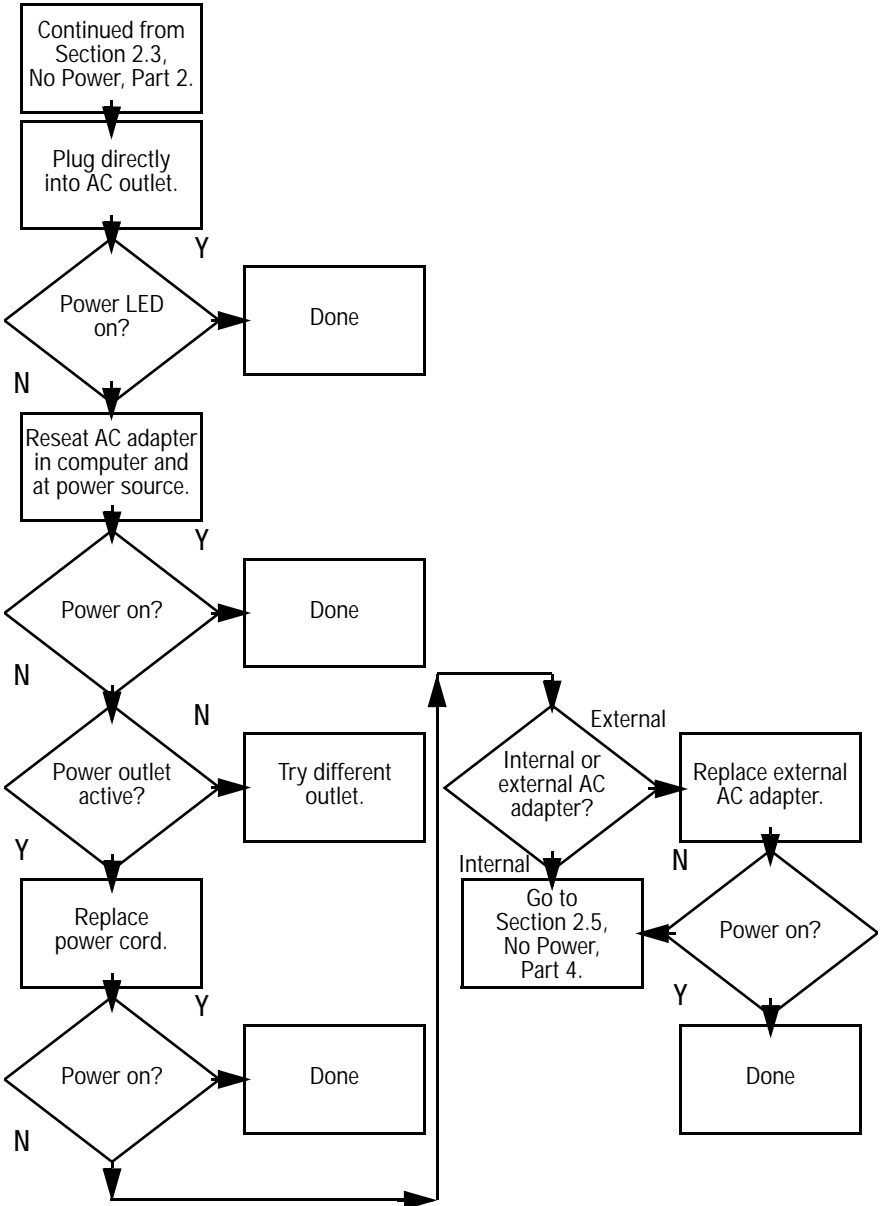
2.2 No Power, Part 1



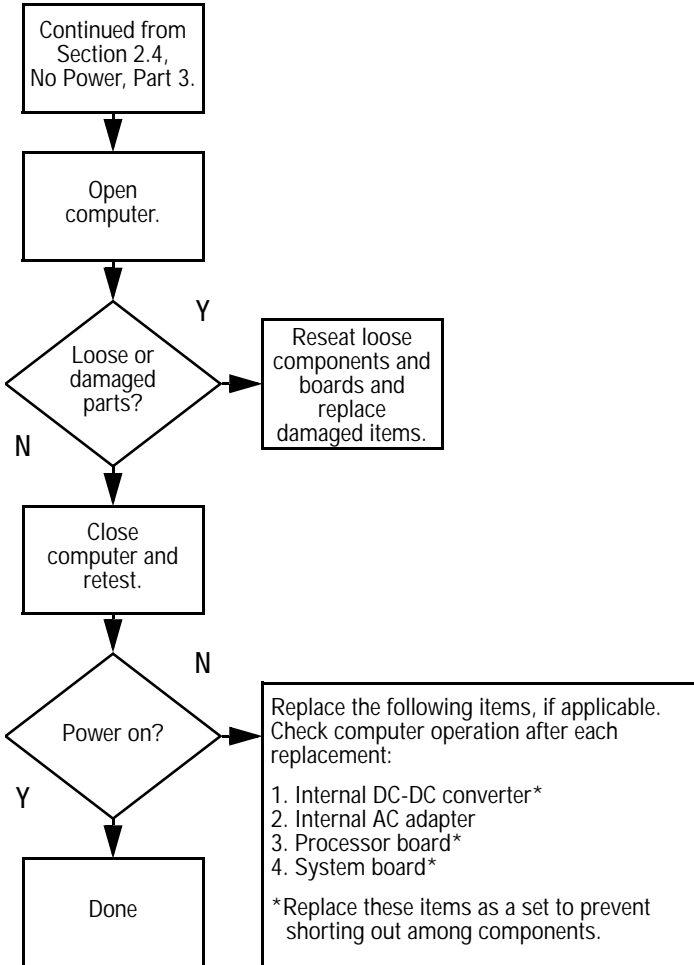
2.3 No Power, Part 2



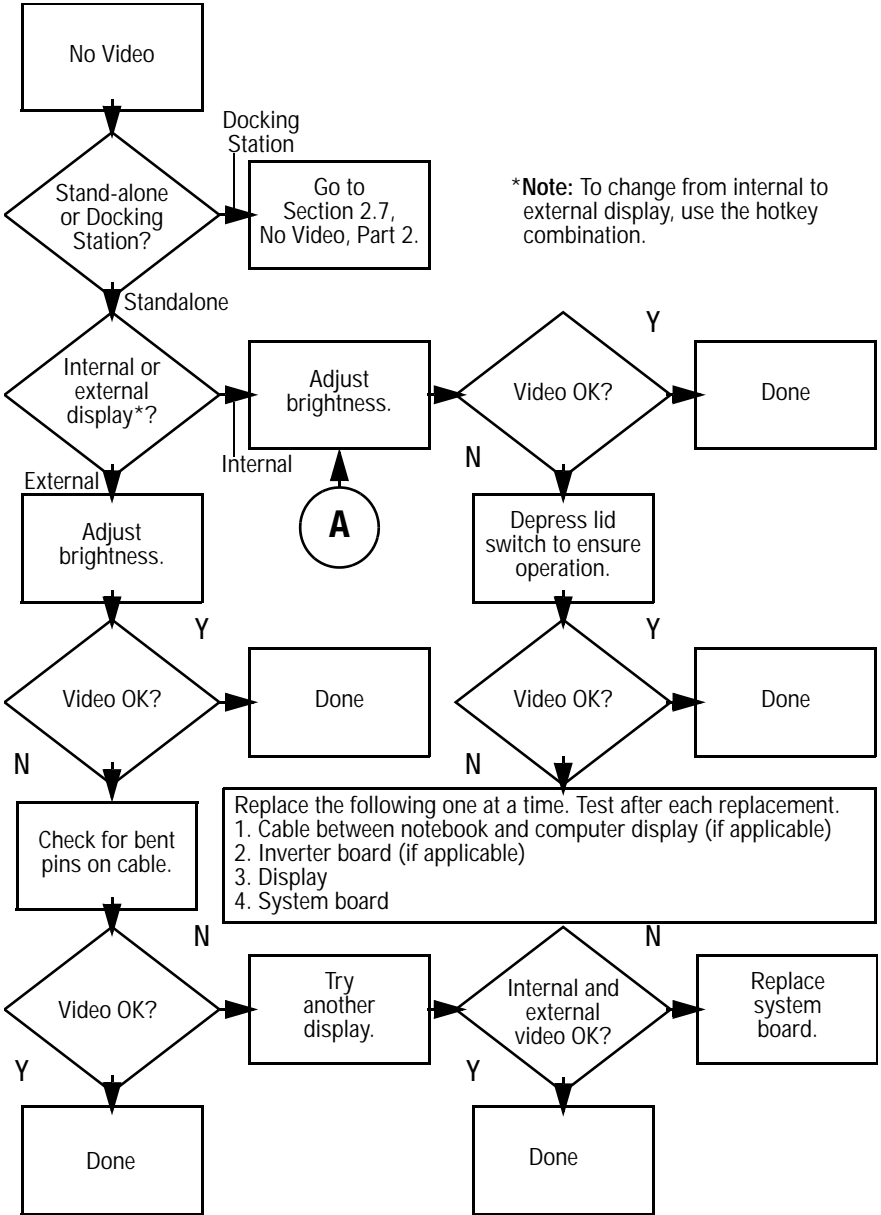
2.4 No Power, Part 3



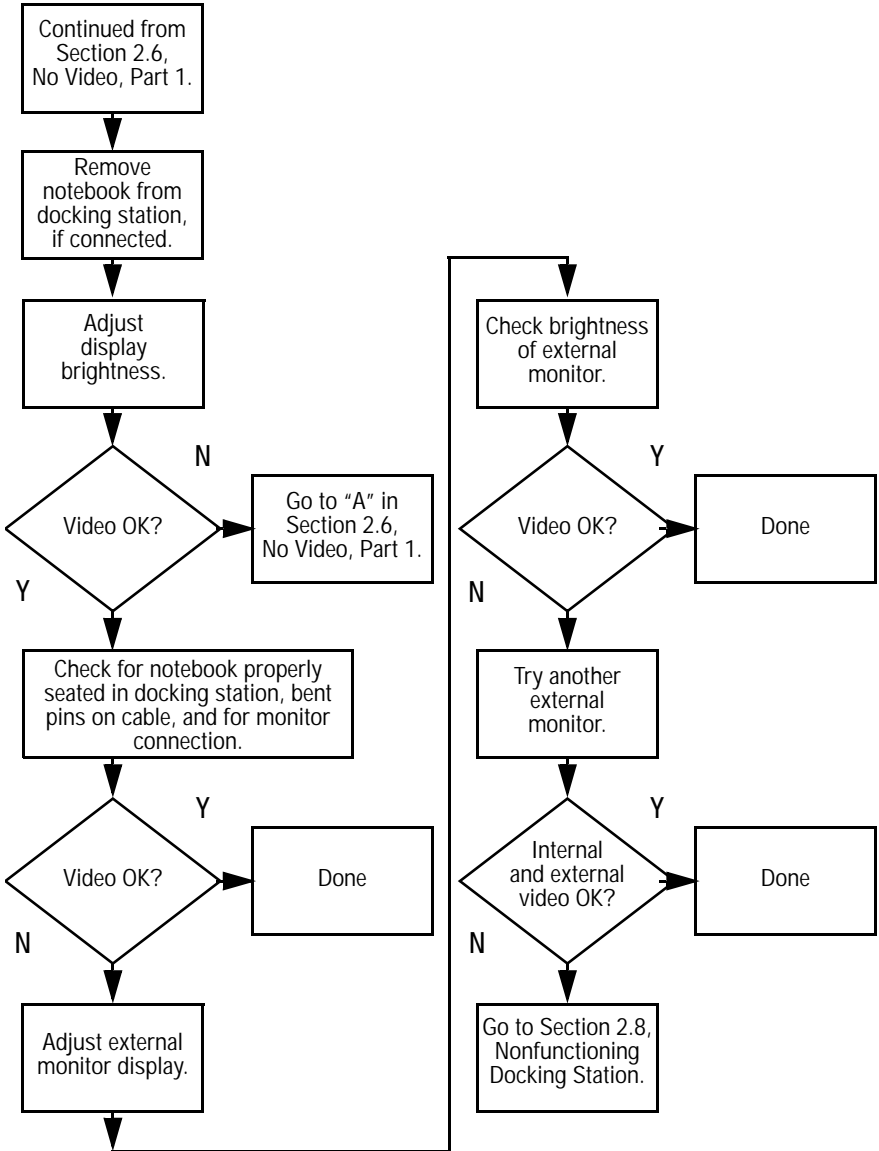
2.5 No Power, Part 4



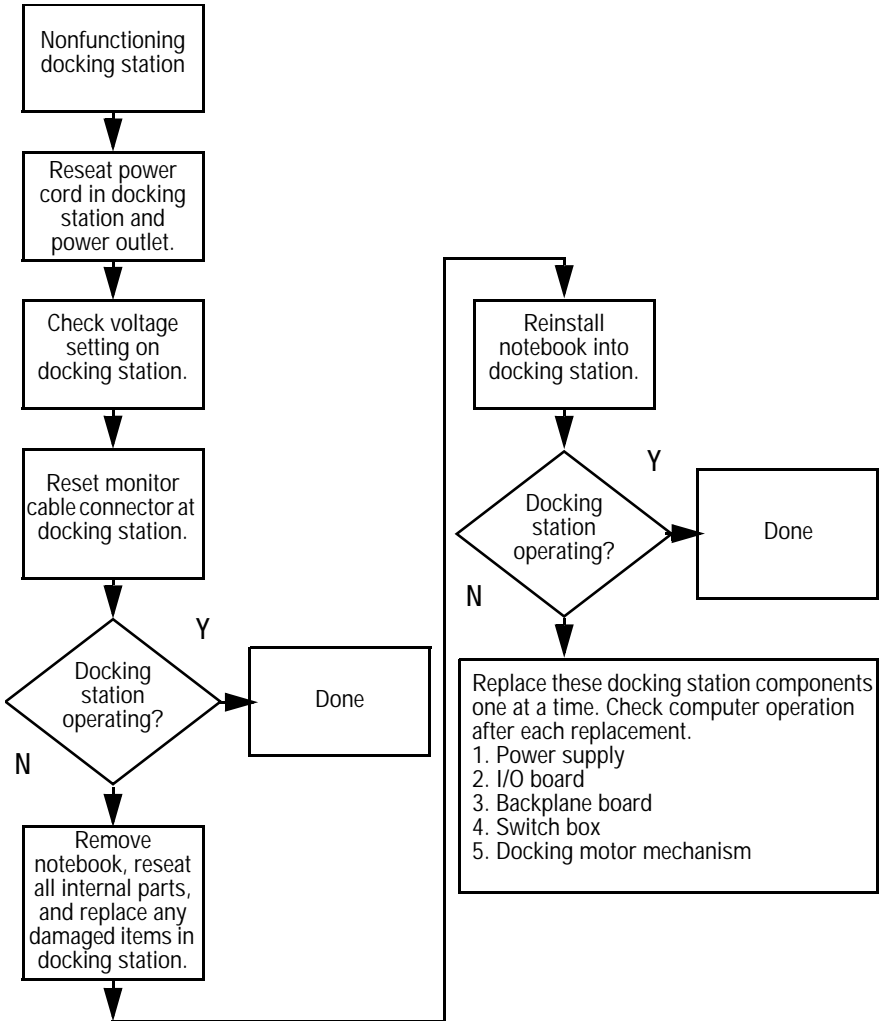
2.6 No Video, Part 1



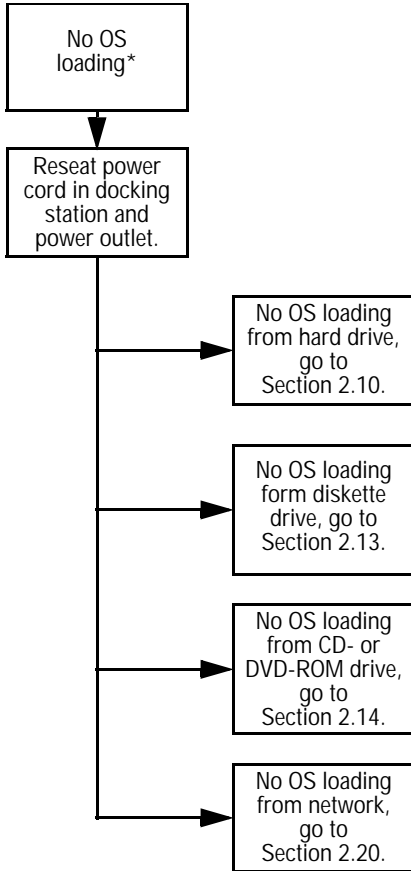
2.7 No Video, Part 2



2.8 Nonfunctioning Docking Station (if applicable)

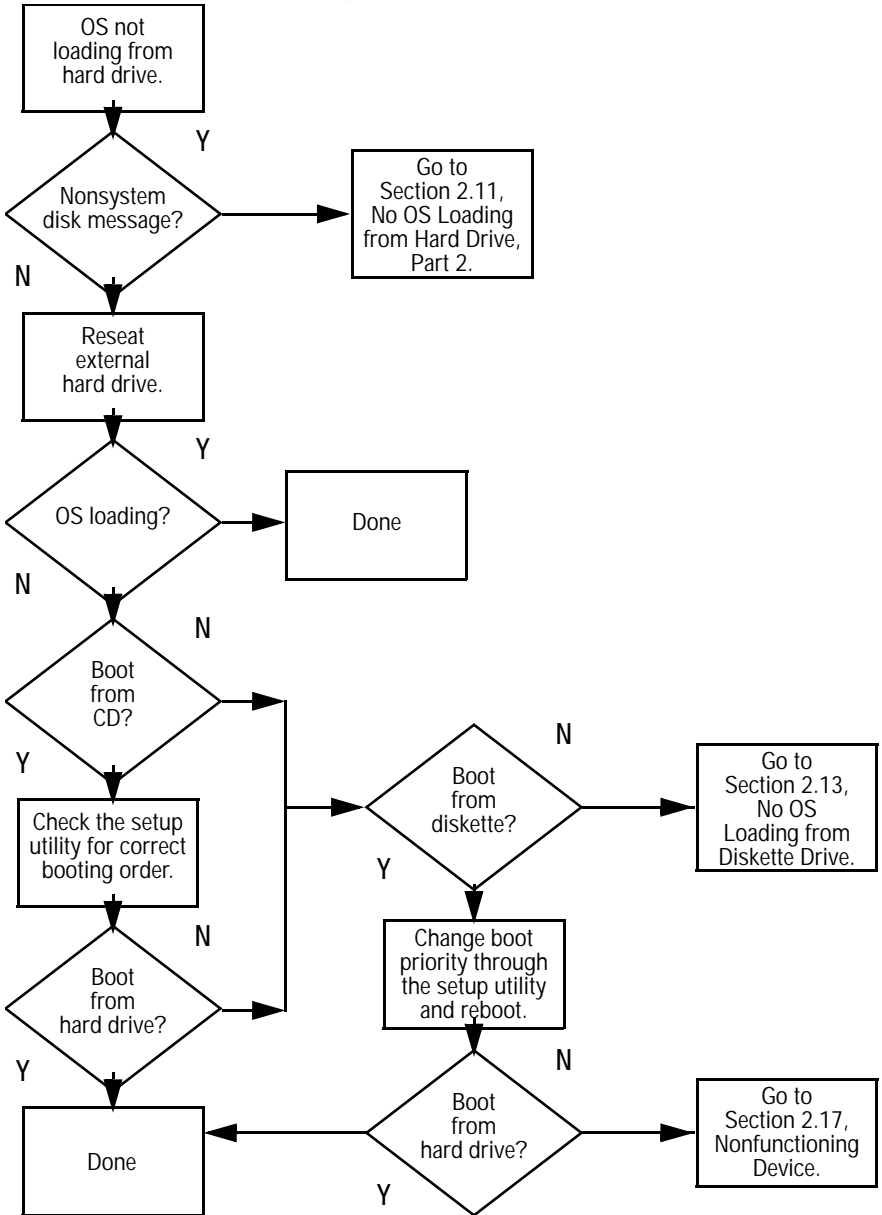


2.9 No Operating System (OS) Loading

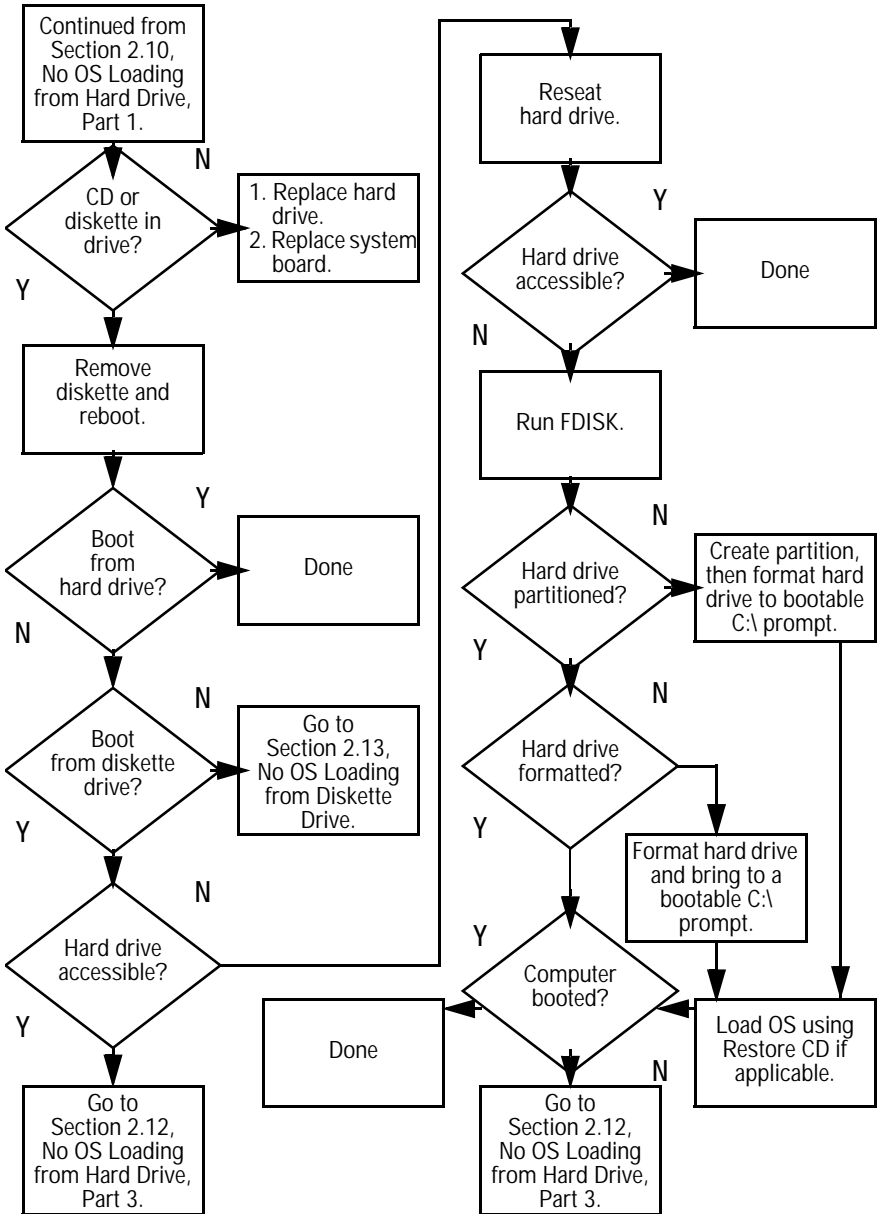


*Before beginning, always check cable connections, cable ends, and drives for bent or damaged pins.

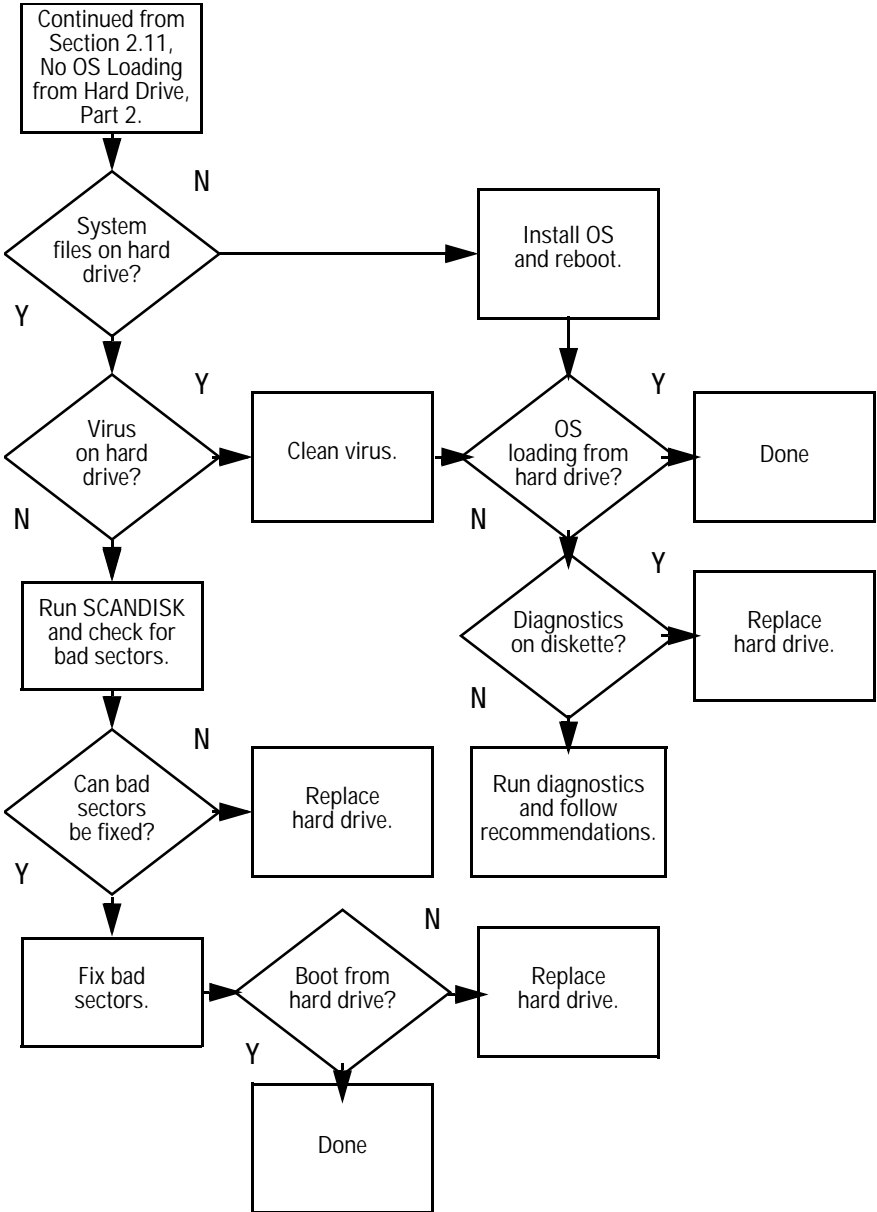
2.10 No OS Loading from Hard Drive, Part 1



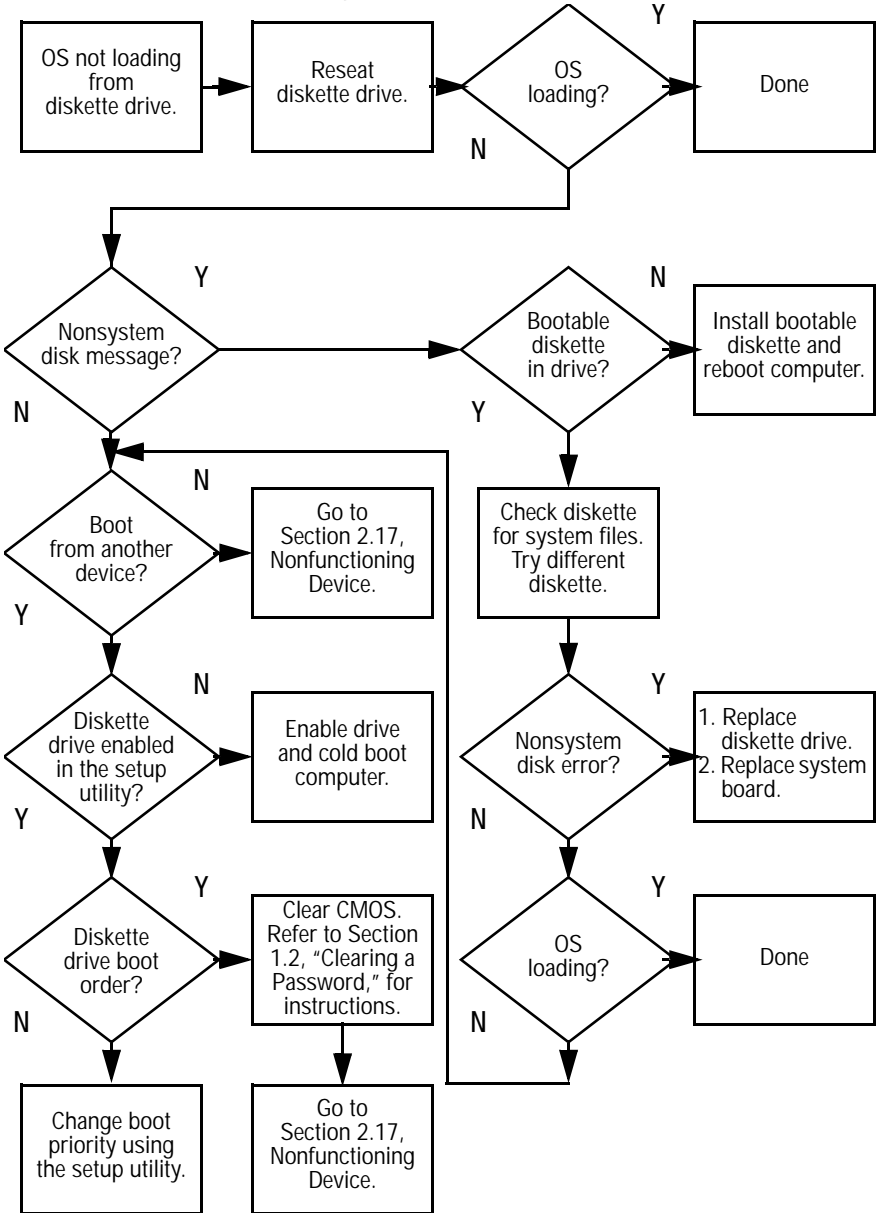
2.11 No OS Loading from Hard Drive, Part 2



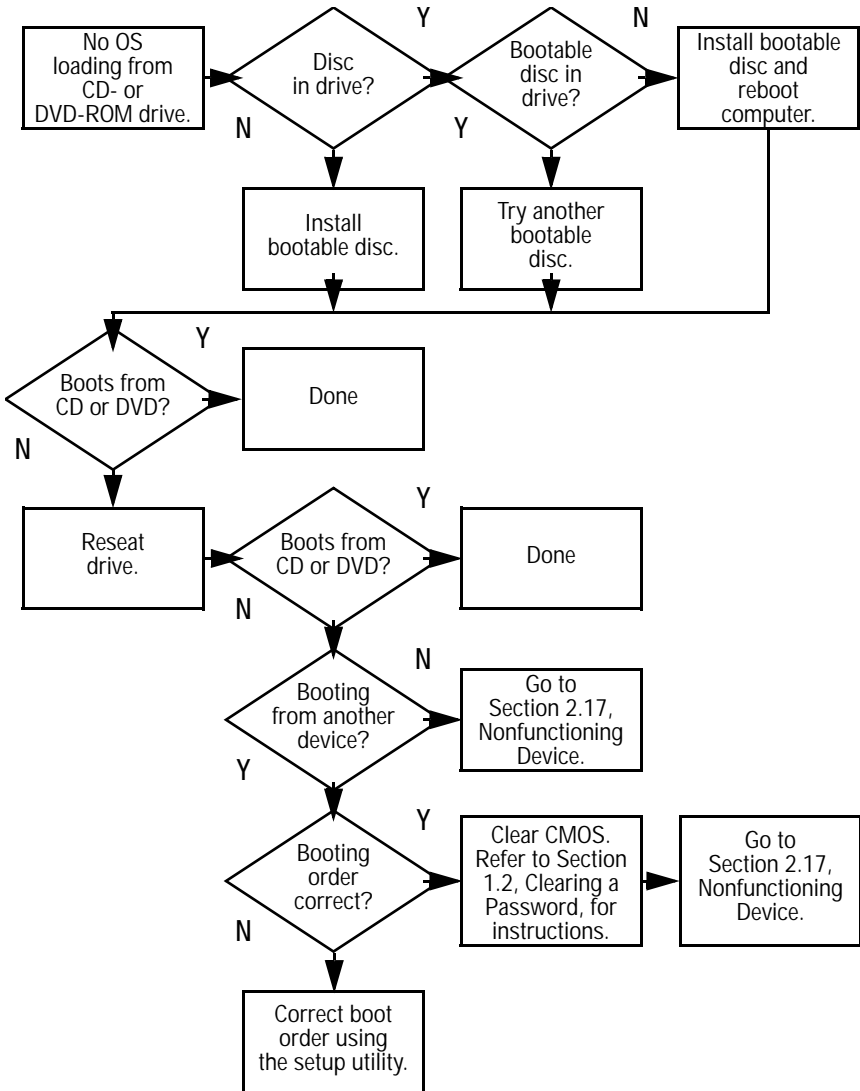
2.12 No OS Loading from Hard Drive, Part 3



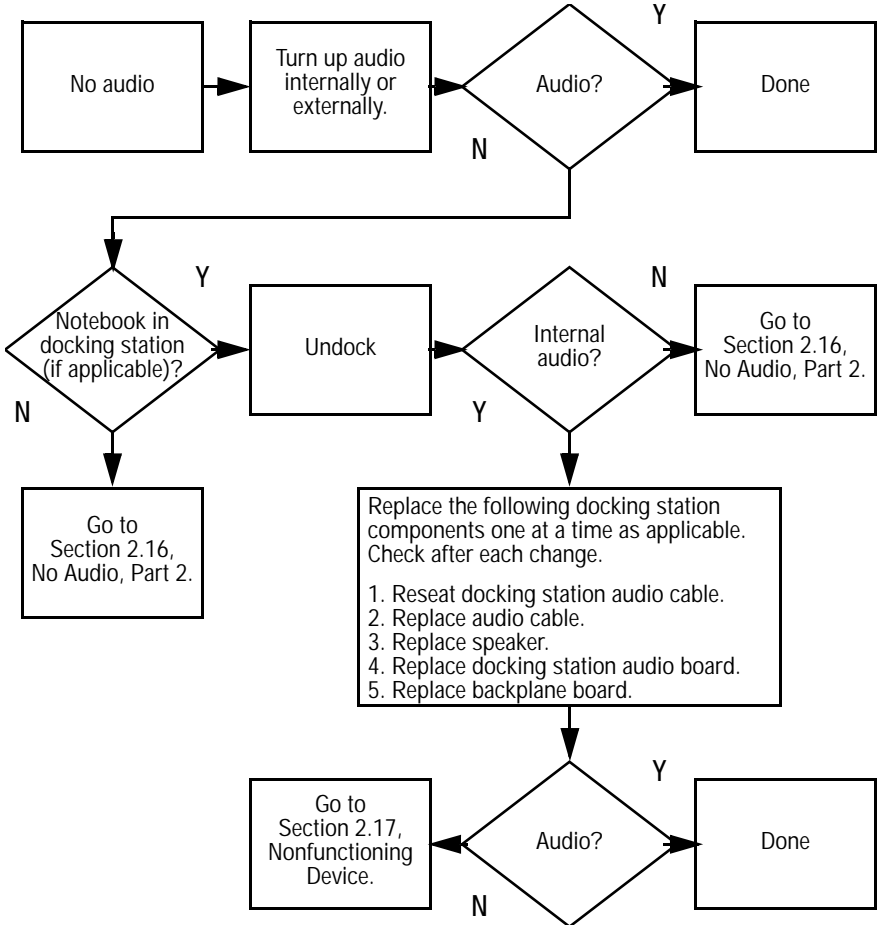
2.13 No OS Loading from Diskette Drive



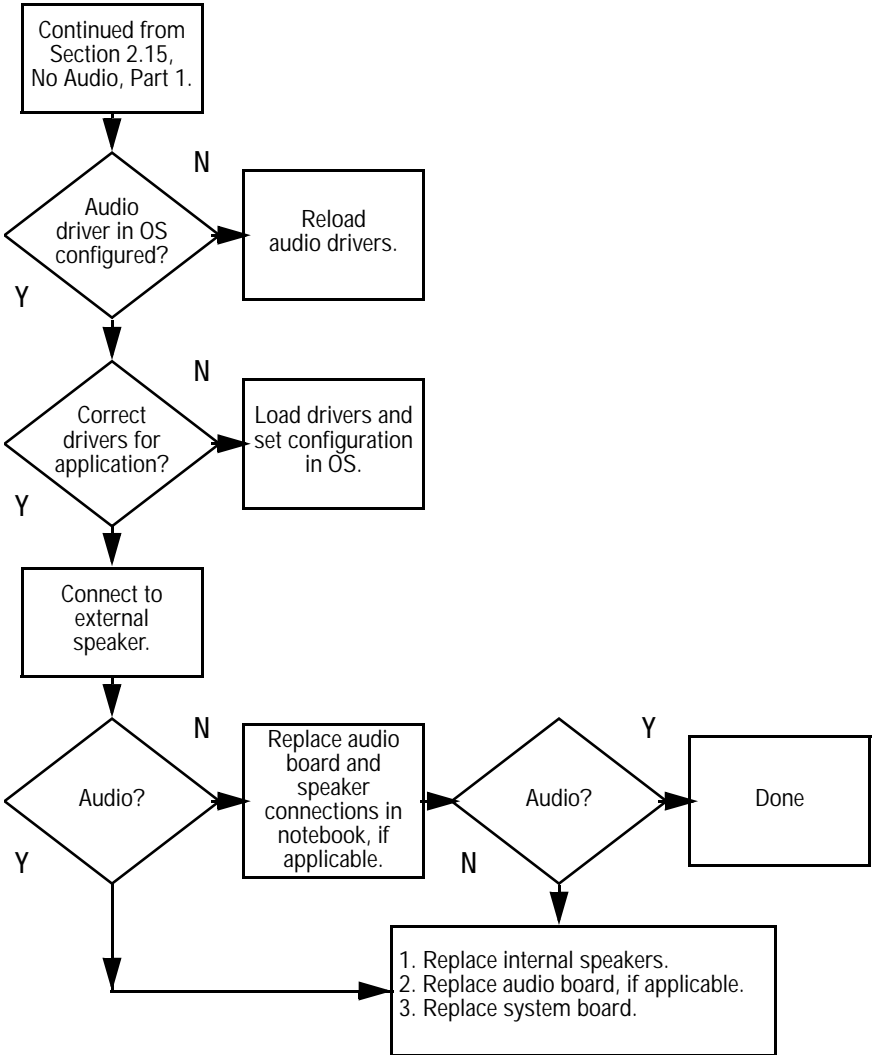
2.14 No OS Loading from CD- or DVD-ROM Drive



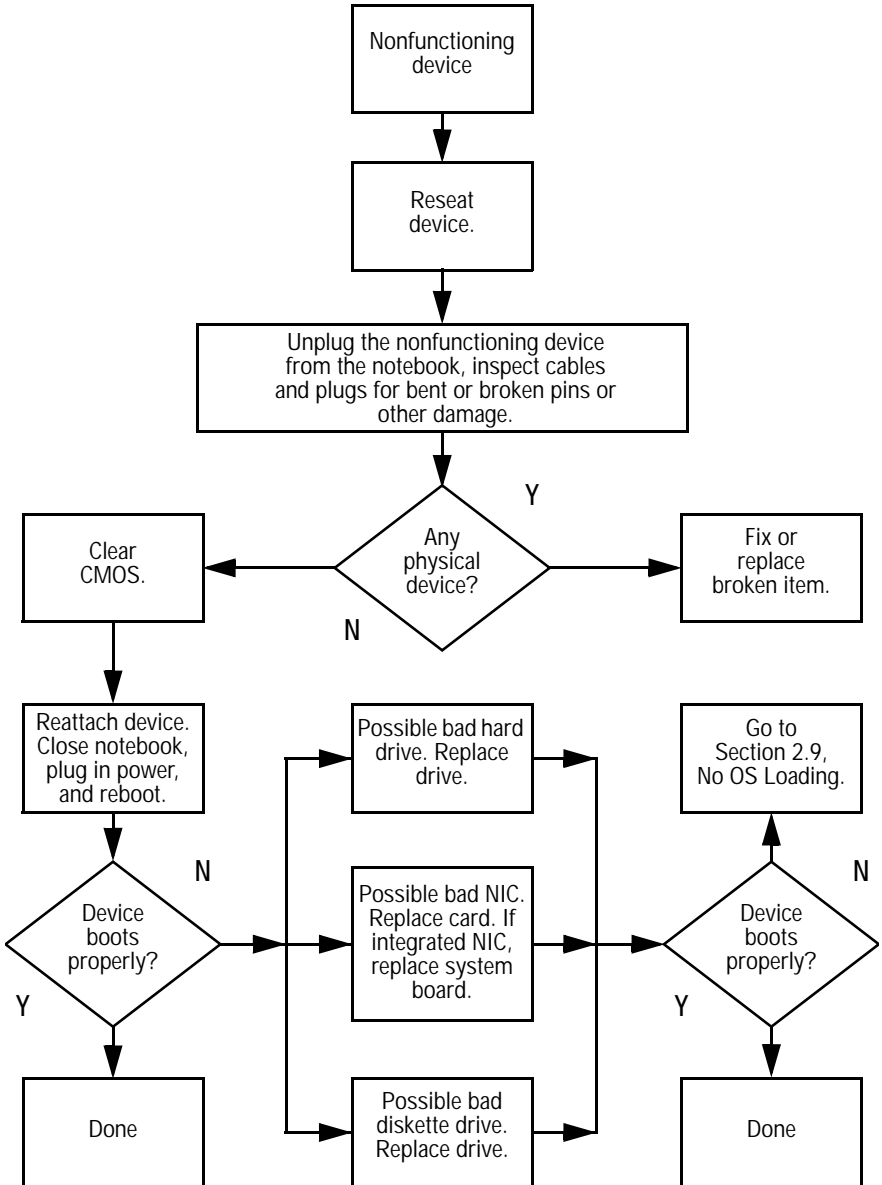
2.15 No Audio, Part 1



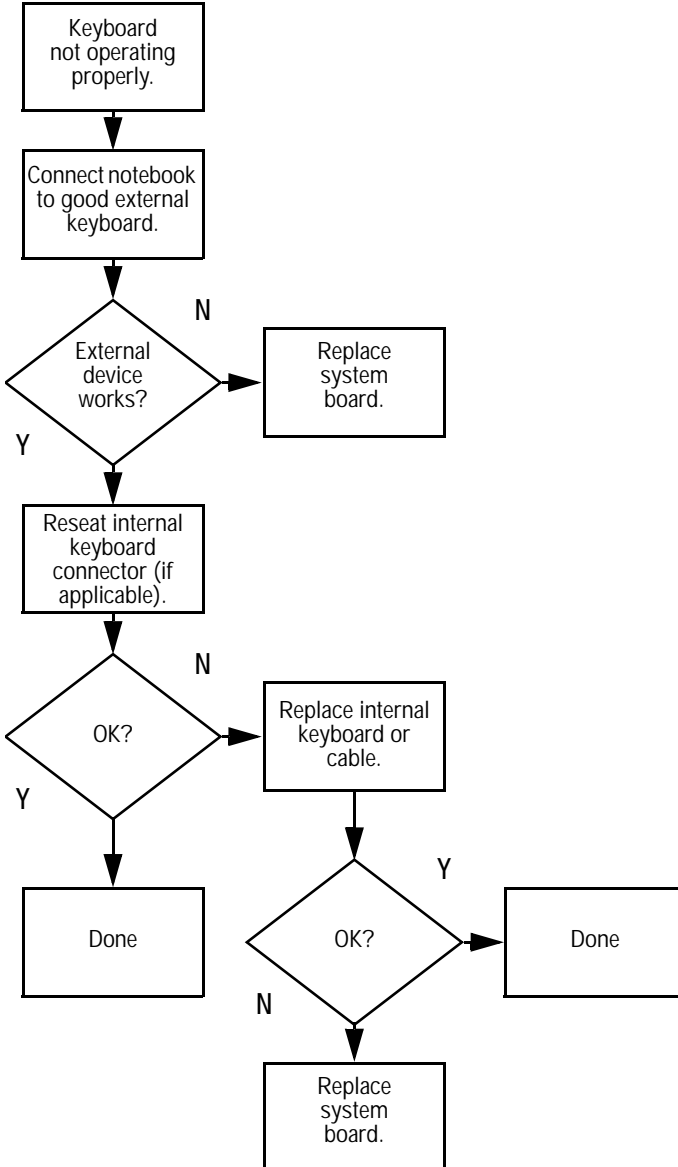
2.16 No Audio, Part 2



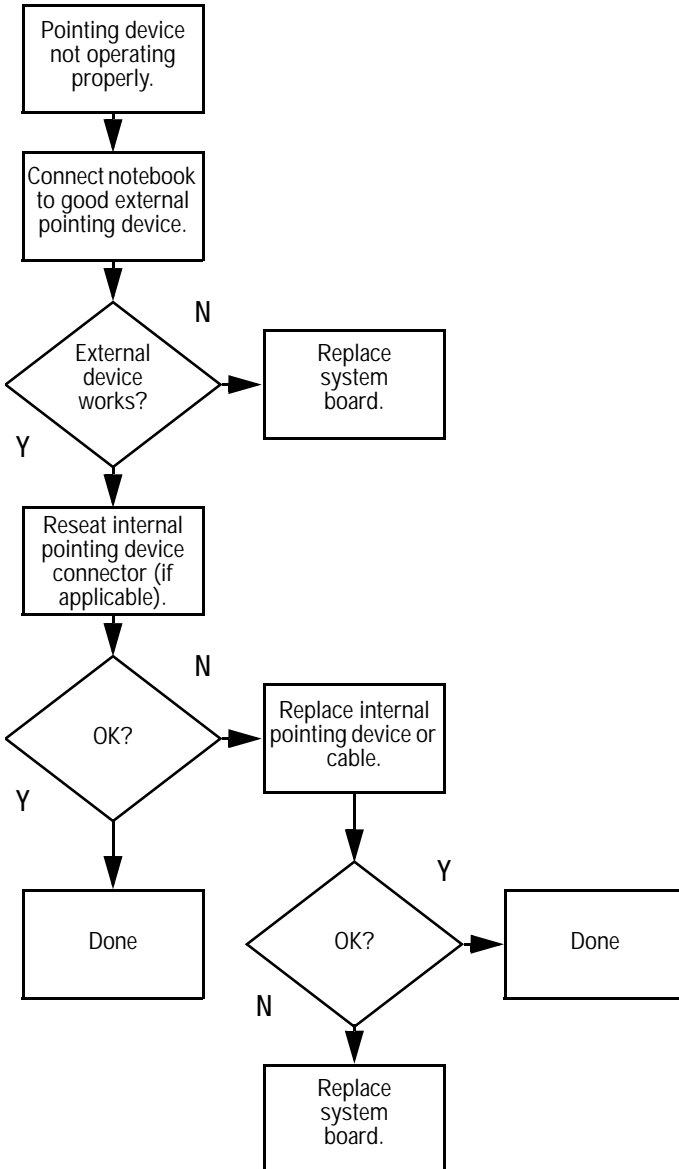
2.17 Nonfunctioning Device



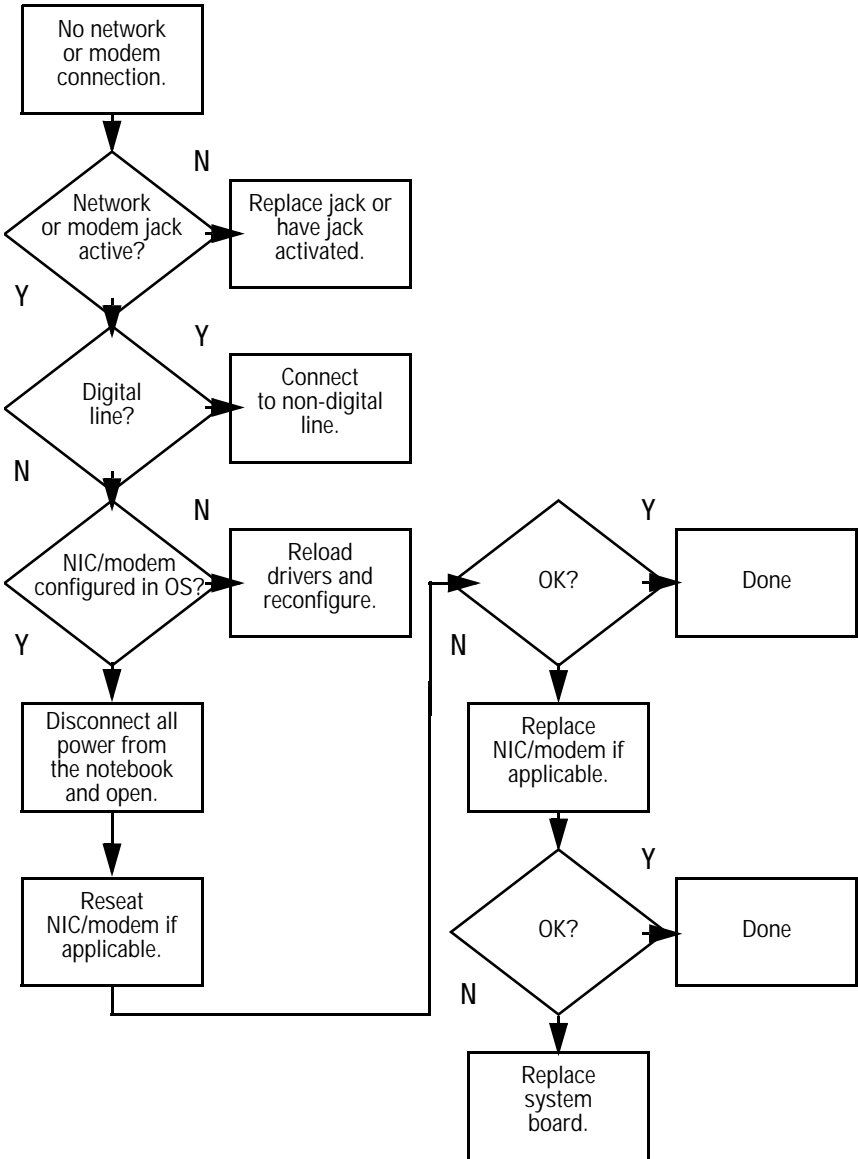
2.18 Nonfunctioning Keyboard



2.19 Nonfunctioning Pointing Device



2.20 Network or Modem Connection Problems



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).

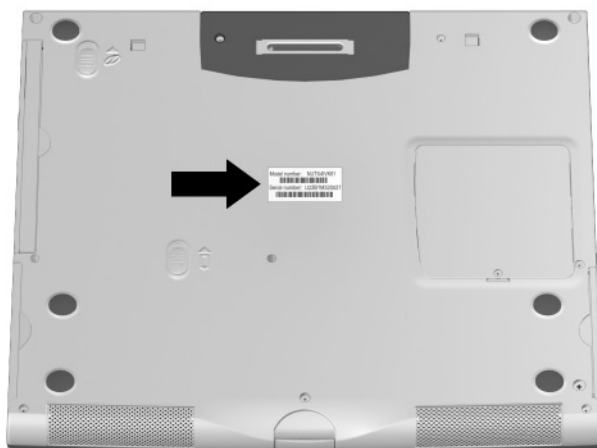


Figure 3-1. Serial Number Location

3.2 Computer System Major Components

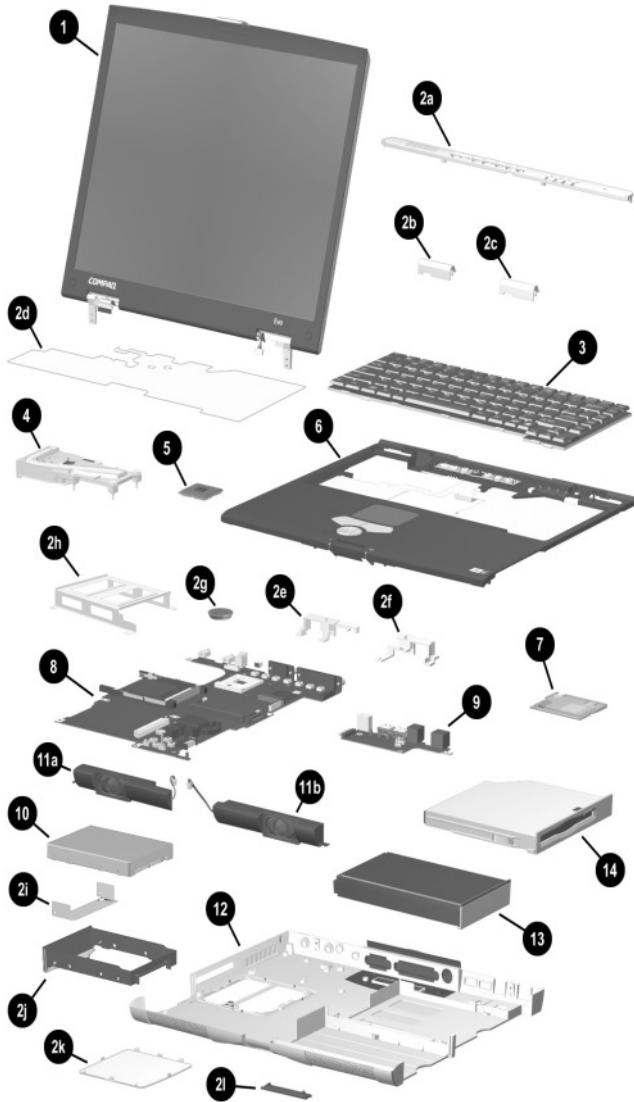
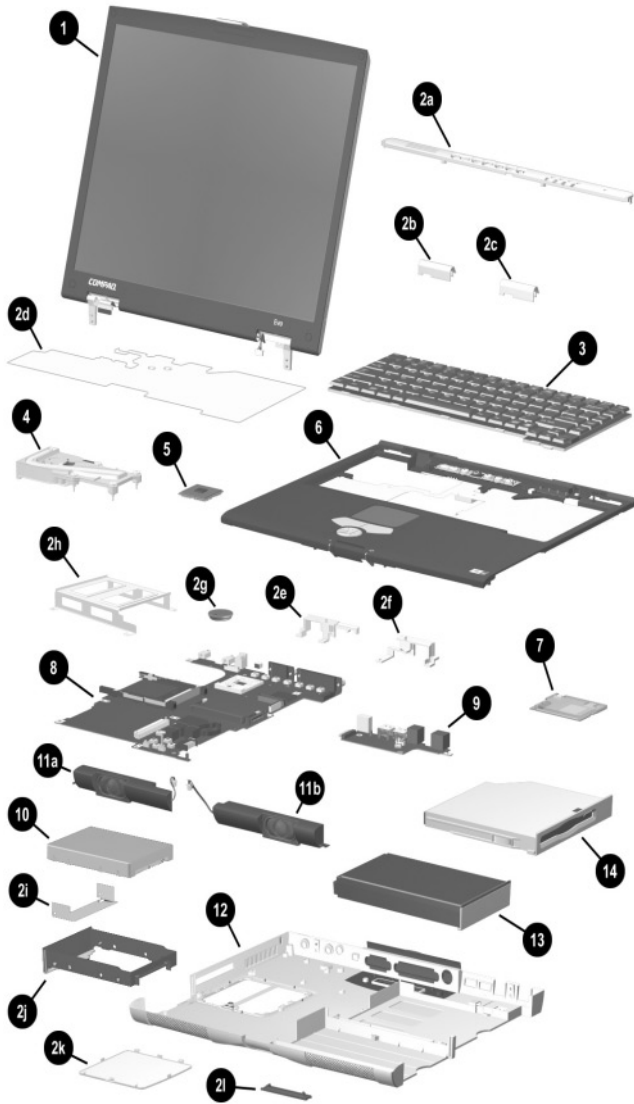


Figure 3-2. Computer System Major Components

Table 3-1
Spare Parts: Computer System Major Components

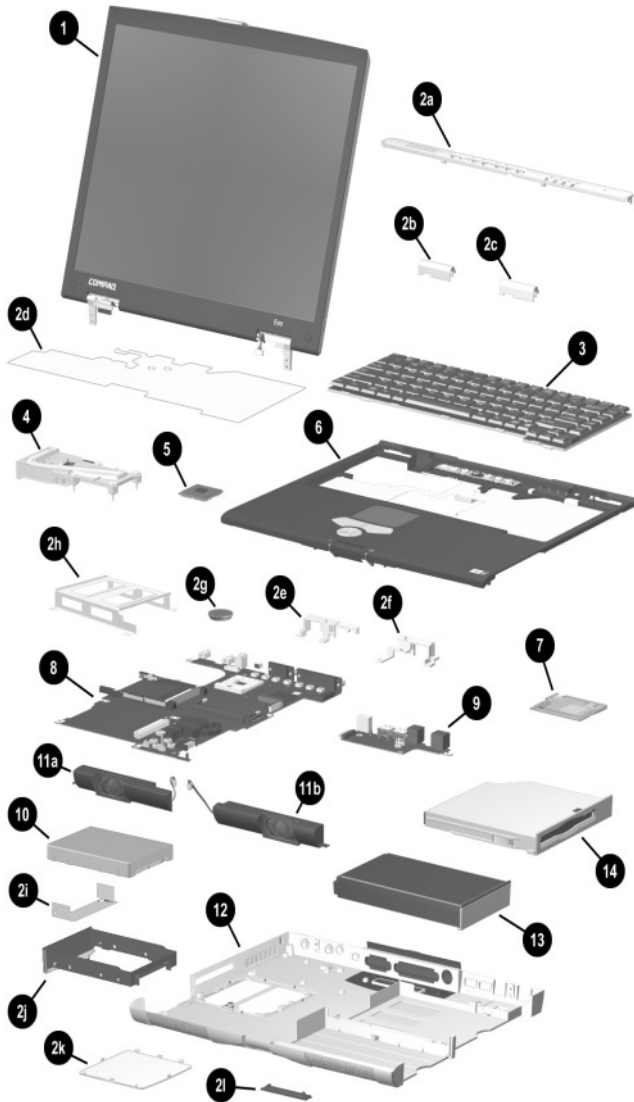
Item	Description	Spare Part Number
1	Display	
	14.1-inch, SXGA, CTFT	260604-001
	14.1-inch, XGA, CTFT	260603-001
	13.3-inch, XGA, CTFT	260602-001
	Plastics and Hardware Kit , includes:	251365-001
2a	Switch cover	
2b	Left hinge cover	
2c	Right hinge cover	
2d	Keyboard shield	
2e	Left display support	
2f	Right display support	
2g	Disk cell RTC battery	
2h	Hard drive bracket	
2i	Hard drive shield	
2j	Hard drive sleeve	
2k	Memory expansion compartment cover	
2l	Docking connector cover	
3	Keyboards	
	Belgian	251371-181 Latin American
	Brazilian	251371-201 Spanish 251371-161
	Danish	251371-081 Norwegian 251371-091
	French	251371-051 Polish 251371-241
	French	Spanish 251371-071
	Canadian	251371-121 Swedish 251371-101
	German	251371-041 Swiss 251371-111
	International	251371-002 Thai 251371-281
	Italian	251371-061 Taiwanese 251371-AB1
	Japanese	251371-191 U.K. English 251371-031
	Korean	251371-AD1 U.S. English 251371-001



Computer System Major Components (continued)

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

Item	Description	Spare Part Number
4	Fan (includes heat sink)	251367-001
5	Processors	
	Intel Pentium III 1.2 GHz	252440-001
	Intel Pentium III 1.13 GHz	251348-001
	Intel Pentium III 1.06 GHz	251347-001
	Intel Pentium III 1.0 GHz	251346-001
	Intel Pentium III 933 MHz	251345-001
	Intel Pentium III 866 MHz	252439-001
	Intel Celeron 933 MHz	252442-001
	Intel Celeron 866 MHz	252441-001
6	Top cover (includes TouchPad and TouchPad buttons)	260606-001
7	Mini PCI communications boards	
	Type III mini PCI 56-Kbps modem (domestic)	259488-001
	Type III mini PCI 56-Kbps modem (international)	259489-001
8	System board	251368-001
9	Sub I/O board	251381-001
10	Hard drives	
	48 GB	251359-001
	30 GB	251358-001
	20 GB	251357-001
	10 GB	251356-001



Computer System Major Components (continued)

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

Item	Description	Spare Part Number
Speakers		
11a	Left	251363-001
11b	Right	251364-001
12	Base enclosure	260605-001
13	Battery packs	
	4.0 amp hour capacity	240258-001
	3.6 amp hour capacity	198709-001
14	Modular media bay device	
	Diskette drive	251349-001
	24X Max CD-ROM drive	221761-001
	8X Max CD-RW drive	226745-001
	DVD-ROM drive	198702-001
	DVD-ROM/CD-RW combination drive	230217-001

3.3 Plastics and Hardware Kit Components

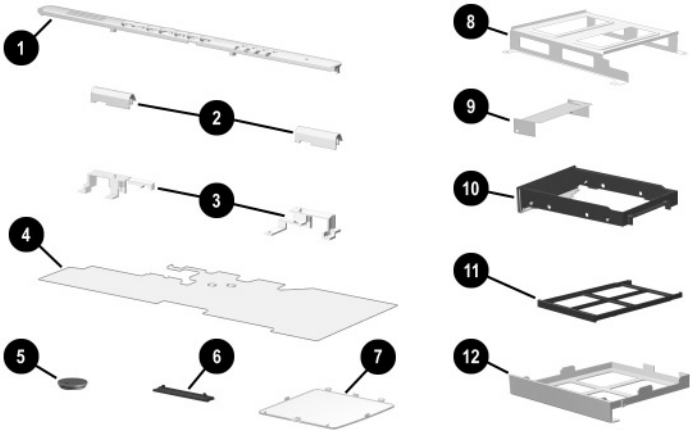


Figure 3-3 Plastics and Hardware Kit Components

**Table 3-2
Plastics and Hardware Kit Components
Spare Part Number 251365-001**

Item	Description	Item	Description
1	Switch cover	7	Memory expansion compartment cover
2	Hinge covers	8	Hard drive bracket
3	Display supports	9	Hard drive shield
4	Keyboard shield	10	Hard drive sleeve
5	Disk cell RTC battery	11	PC Card slot space saver
6	Docking connector cover	12	Modular media bay space saver

3.4 Mass Storage Devices

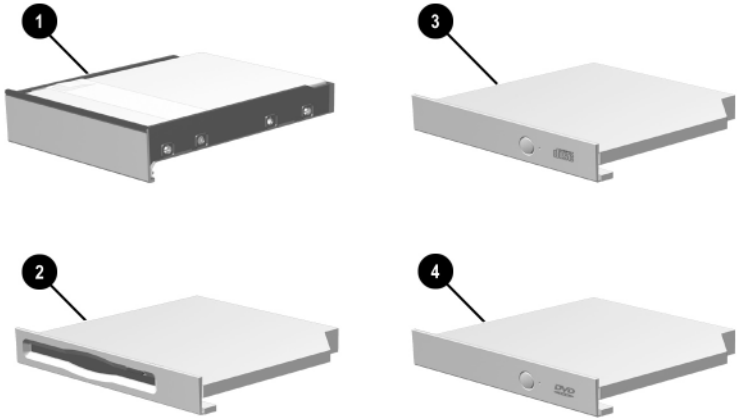


Figure 3-4. Mass Storage Devices

**Table 3-3
Mass Storage Devices**

Item	Description	Spare Part Number
1	Hard drives	
	48 GB	251359-001
	30 GB	251358-001
	20 GB	251357-001
	10 GB	251356-001
	Modular media bay device	
2	Diskette drive	251349-001
3	24X Max CD-ROM drive	221761-001
	8X Max CD-RW drive	226745-001
4	DVD-ROM drive	198702-001
	DVD-ROM/CD-RW combination drive	230217-001

3.5 Miscellaneous

Table 3-4
Spare Parts: Miscellaneous (not illustrated)

Description				Spare Part Number
QuickDock Port Replicator				238686-001
Modem adapters				
Czech	234963-221	Norwegian	234963-091	
German	236432-041	Swiss	198294-111	
Hungarian	234963-211			
Modem cable				234962-001
Modem cable adapters				
Australian			304398-011	
Belgian			304398-181	
French			304398-051	
RJ-11 P55 adapters				
Danish	316904-081	Italian	316904-061	
Finnish	316904-351	Swedish	316904-101	
RJ-11 PTT adapter (used in the United Kingdom)				158593-031
RJ-45 network cable				239049-001
Logo kit				239053-001
Screw kit (includes the following screws and bushing guides; refer to Appendix C, "Screw Listing," for more information on screw specifications and usage.)				251366-001
■ Torx T8 M2 × 7		■ Phillips M1 × 6		
■ Torx T8 M2 × 5		■ Phillips M2 × 6.5		
■ 7.0-mm bushing guide				

Table 3-4
Spare Parts: Miscellaneous (not illustrated) (Continued)

Description	Option Part Number	Spare Part Number
AC adapters		
60-Watt AC adapter power supply (2 wire)		198713-001
60-Watt AC adapter power supply (3 wire)		198714-001
Power cord, 2 wire		
Australian	174120-011	Swiss 174120-115
Chinese	174120-AA1	U.K. English 174120-031
International	174120-002	U.S. English 174120-001
Power cord, 3 wire		
Australian	198723-011	Korean 198723-AD1
Chinese	198723-AA1	Swedish 198723-101
International	198723-B31	Swiss 198723-BG1
Italian	198723-061	Taiwanese 198723-AB1
Japanese	198723-291	U.K. English 198723-031
Description	Option Part Number	Spare Part Number
Memory expansion boards		
512 MB	238830-B25	259487-001
256 MB	197898-B25	251362-001
128 MB	197987-B25	251361-001
64 MB	197896-B25	251360-001
External battery charger	135555-001	

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 and P1 screwdrivers
- 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 into 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 into 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. The device may function normally for awhile, 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.

- Place 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 $\pm 10\%$ resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, 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-megaohm 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-megaohm resistance
- Static-dissipative table or floor mats with hard tie to 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**

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


 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 P0 and P1 screws are removed and loosened during disassembly. There are 41 screws, in 10 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).

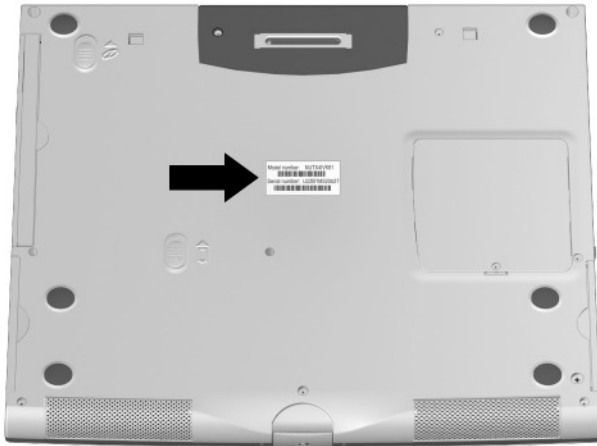


Figure 5-1. Serial Number Location

5.2 Disassembly Sequence Chart

Use the chart below 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	0
	Battery pack	0
	Hard drive	1 hard drive retention screw 4 securing hard drive to hard drive sleeve
	Modular media bay device	0
5.4	Memory expansion board	1
5.5	Computer feet	0
5.6	Switch cover	2
5.7	Keyboard	2
5.8	Fan assembly	4 (spring-loaded and captured by fan assembly)
5.9	Processor	0
5.10	Display	6
5.11	Top cover	12
5.12	Speaker assembly	2
5.13	Disk cell RTC battery	0
5.14	Mini PCI communications board	0
5.15	Sub I/O board	2
5.16	System board	5

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 you.
 - b. Slide and hold the battery release latch toward the back of the computer ❶ (Figure 5-2).
 - c. Use the notch in the battery bezel to slide the battery pack to the left ❷.
 - d. Remove the battery pack.

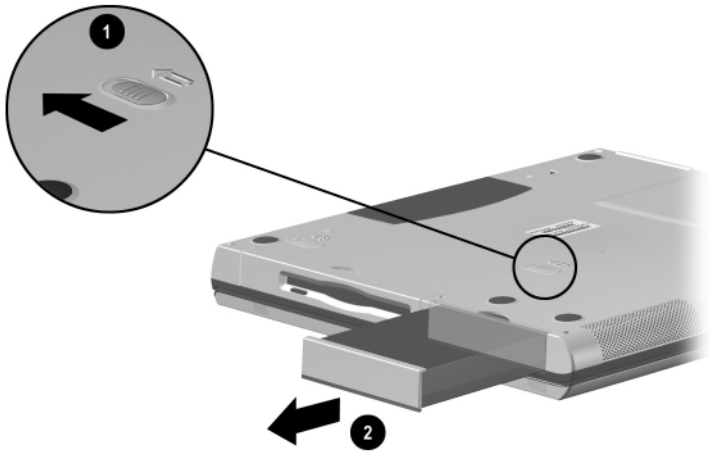


Figure 5-2. Removing the Battery Pack

Reverse the above procedure to install the battery pack.

4. Remove the hard drive by following these steps:
 - a. Turn the computer bottom side up with the front facing you.
 - b. Remove the silver M3 × 8 screw ❶ (Figure 5-3).
 - c. Use a thin flat tool (screwdriver, case utility tool) to slide the front edge of the hard drive sleeve to the right ❷.
 - d. Remove the hard drive.

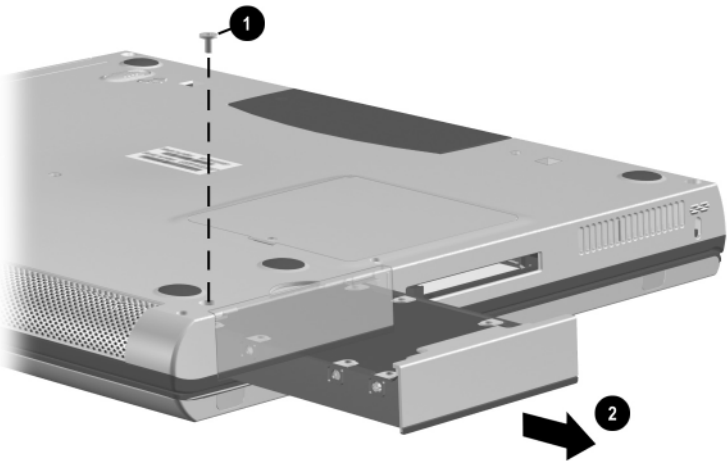


Figure 5-3. Removing the Hard Drive

Reverse the above procedure to install the hard drive.

If the hard drive must be removed from the hard drive sleeve, perform the following steps:

- a. Remove the four black M3 × 4 screws ❶ that secure the hard drive to the hard drive sleeve (Figure 5-4).
- b. Lift the hard drive straight up to remove it from the hard drive sleeve ❷.
- c. Note the orientation and position of the hard drive shield ❸ when removing the hard drive from the hard drive sleeve.



The hard drive sleeve and shield are included in the Plastics and Hardware Kit (spare part number 251365-001).

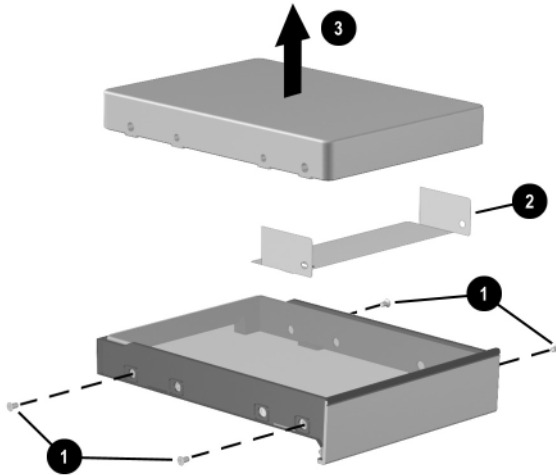


Figure 5-4. Removing the Hard Drive from the Hard Drive Sleeve

5. Remove a modular media bay device by following these steps:
 - a. Turn the computer bottom side up with the front facing you.
 - b. Slide and hold the modular media bay release switch ❶ toward the back of the computer (Figure 5-5).
 - c. Use the notch in the modular media bay device bezel ❷ to slide the device to the left.
 - d. Remove the device.

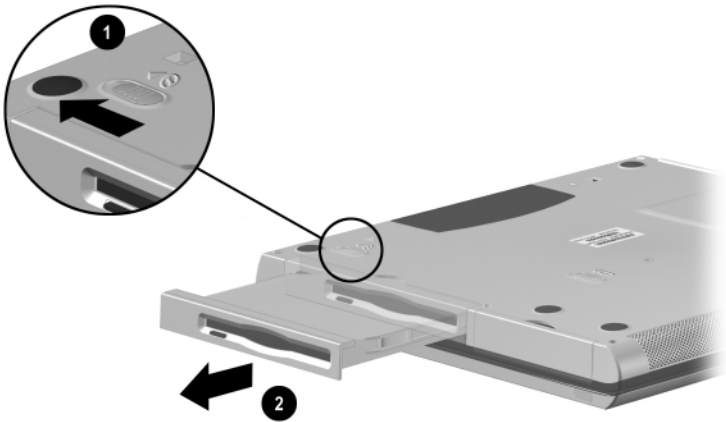


Figure 5-5. Removing a Modular Media Bay Device

Reverse the above procedure to install a modular media bay device.

5.4 Memory Expansion Board

1. Prepare the computer for disassembly (Section 5.3).
2. Turn the computer bottom side up with the front facing you.
3. Remove the silver M2 × 5 screw ❶ that secures the memory expansion compartment cover to the base enclosure (Figure 5-6).
4. Use the notch in the front of the memory expansion compartment cover to lift up the front edge of the cover and swing it up and toward the back of the computer ❷.
5. Remove the memory expansion compartment cover ❸.



The memory expansion compartment cover is included in the Plastics and Hardware Kit (spare part number 251365-001).

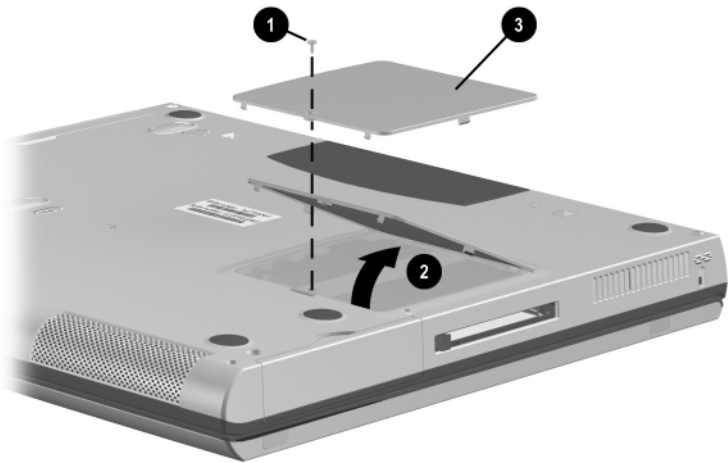


Figure 5-6. Removing the Memory Expansion Compartment Cover

6. Spread the memory expansion slot retaining tabs to release the memory expansion board ❶ (Figure 5-7).
7. The board tilts up at a 45-degree angle.
8. Remove the board by pulling it away from the connector at a 45-degree angle ❷.

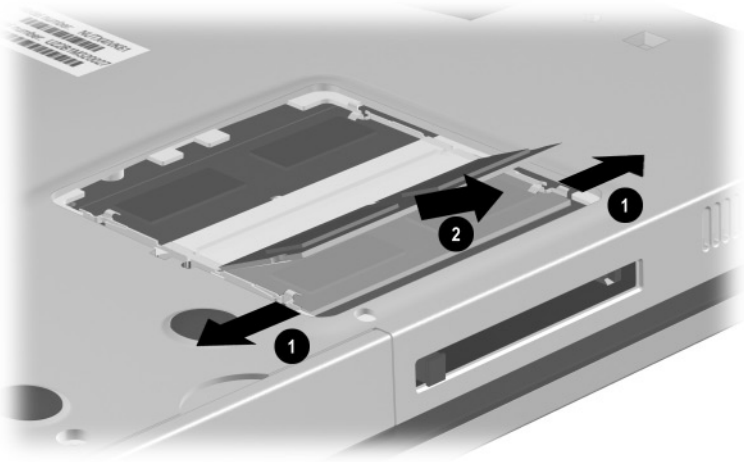


Figure 5-7. Removing a Memory Expansion Board

Reverse the above procedure to install a memory expansion board.

5.5 Computer Feet

The computer feet are adhesive-backed rubber pads. The computer feet are included in the Plastics and Hardware Kit (spare part number 251365-001). Refer to Figure 5-8 for computer feet locations.

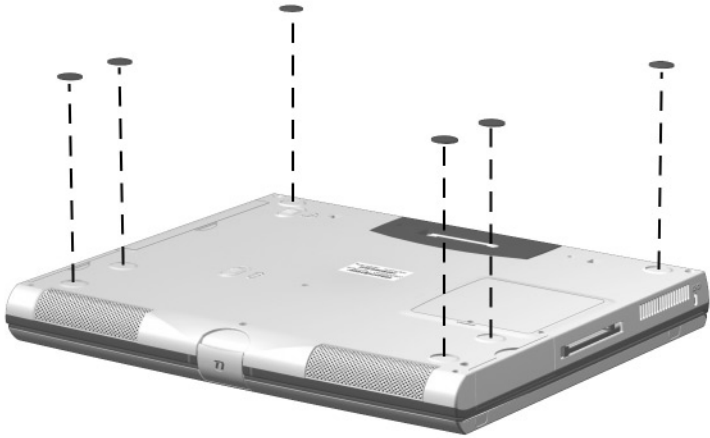


Figure 5-8. Replacing the Computer Feet

5.6 Switch Cover



The switch cover is included in the Plastics and Hardware Kit (spare part number 251365-001).

1. Prepare the computer for disassembly (Section 5.3).
2. Turn the computer bottom side up with the rear panel facing you.
3. Remove the two black M2 × 9 screws (Figure 5-9).

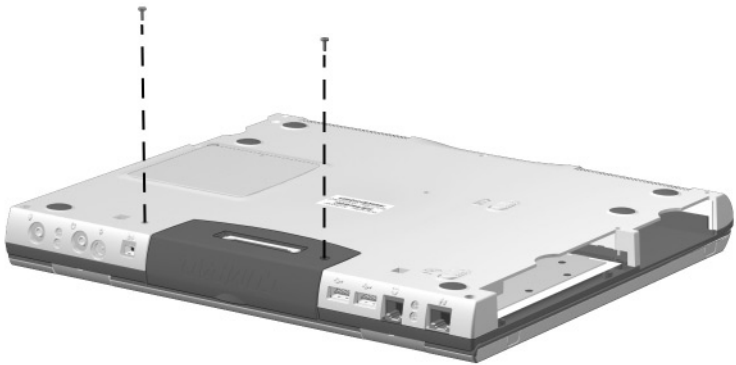


Figure 5-9. Removing the Switch Cover Screws

4. Turn the computer top side up with the front facing you.
5. Open the computer as far as it will open.

6. Press down and hold the **Esc** key ❶ (Figure 5-10).
7. Use a small straight edge tool (screwdriver or tweezers) to disengage the left side of the switch cover from the top cover ❷.
8. Remove the switch cover ❸.

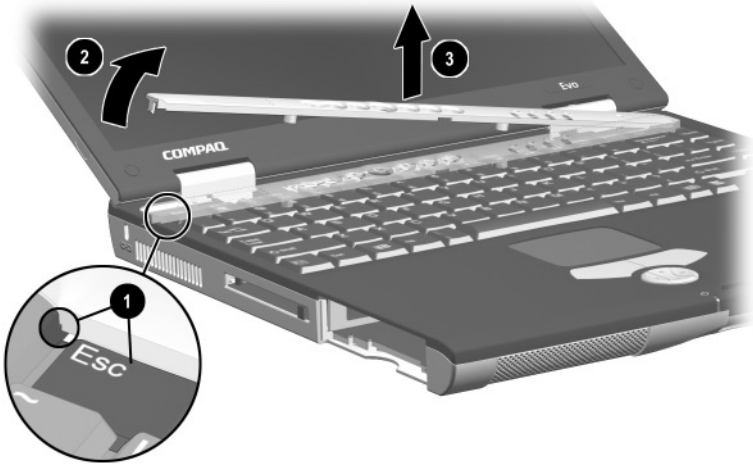


Figure 5-10. Removing the Switch Cover

Reverse the above procedure to install the switch cover.

5.7 Keyboard

Keyboards Spare Part Number Information

Belgian	251371-181	Latin American Spanish	251371-161
Brazilian	251371-201	Norwegian	251371-091
Danish	251371-081	Polish	251371-241
French	251371-051	Spanish	251371-071
French Canadian	251371-121	Swedish	251371-101
German	251371-041	Swiss	251371-111
International	251371-002	Thai	251371-281
Italian	251371-061	Taiwanese	251371-AB1
Japanese	251371-191	U.K. English	251371-031
Korean	251371-AD1	U.S. English	251371-001

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the switch cover (Section 5.6).

3. Lift up the back edge of the keyboard and swing it up and forward until it rests on the top cover (Figure 5-11).

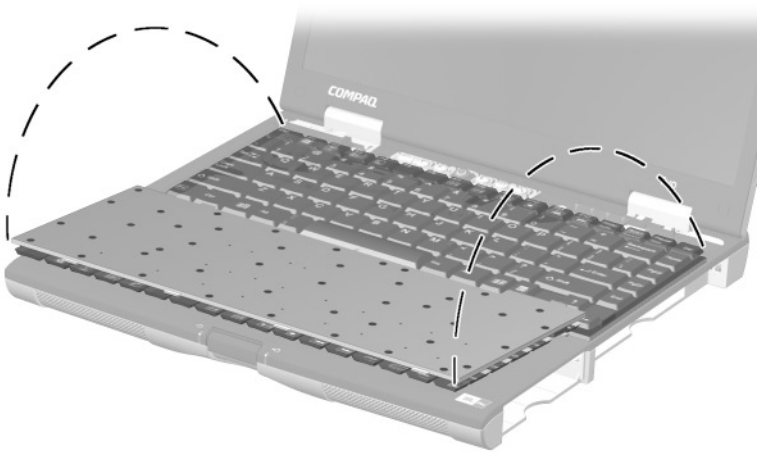


Figure 5-11. Releasing the Keyboard

4. Remove the two silver M2 × 5 screws ❶ that secure the keyboard shield to the base enclosure (Figure 5-12).
5. Remove the keyboard shield ❷.
6. Release the ZIF connector ❸ to which the keyboard cable is connected and disconnect the keyboard cable ❹.

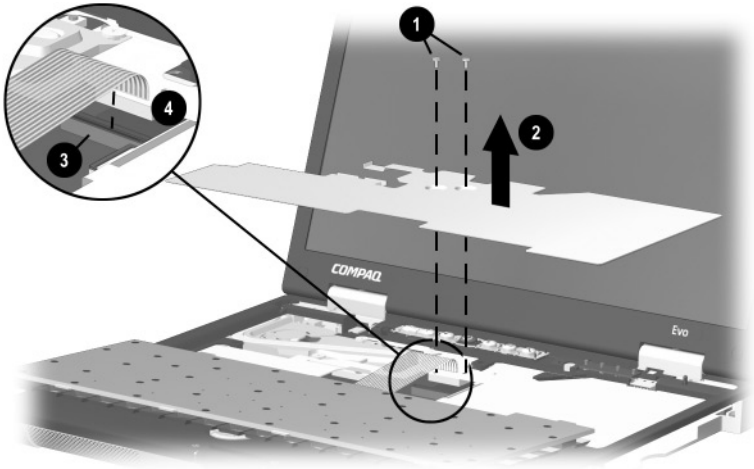


Figure 5-12. Removing the Keyboard Shield and Disconnecting the Keyboard Cable

7. Remove the keyboard.

Reverse the above procedure to install the keyboard and keyboard shield.

5.8 Fan Assembly

Fan Assembly Spare Part Number Information

Fan (includes heat sink)

251367-001

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the switch cover (Section 5.6).
3. Remove the keyboard and keyboard shield (Section 5.7).

4. Disconnect the fan cable from the system board ❶ (Figure 5-13).
5. Loosen the four silver M2.5 × 18 shoulder screws ❷ that secure the fan assembly to the base enclosure.



The fan screws are spring-loaded and are captured by the fan assembly. Do not detach the fan screws from the fan assembly.

6. Lift up the right side ❸ of the fan assembly until it clears the top cover shield.
7. Slide the fan assembly to the right at an angle ❹ to remove it from the base enclosure.

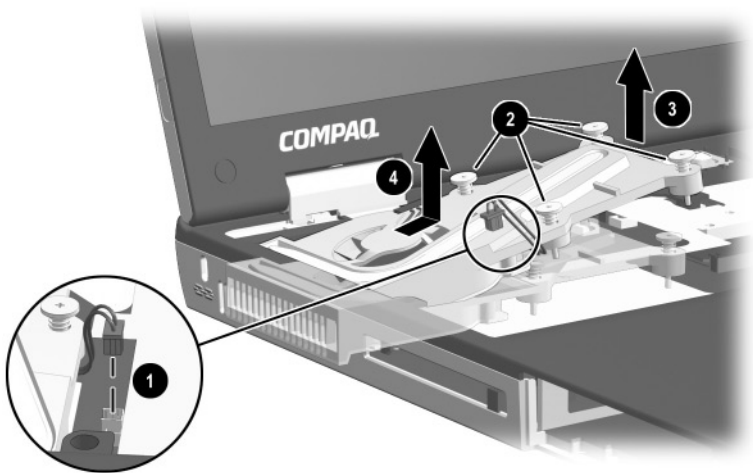


Figure 5-13. Removing the Fan Assembly

Reverse the above procedure to install the fan assembly.

5.9 Processor

Processors Spare Part Number Information

Intel Pentium III 1.2 GHz	252440-001
Intel Pentium III 1.133 GHz	251348-001
Intel Pentium III 1.066 GHz	251347-001
Intel Pentium III 1.0 GHz	251346-001
Intel Pentium III 933 MHz	251345-001
Intel Pentium III 866 MHz	252439-001
Intel Celeron 933 MHz	252442-001
Intel Celeron 866 MHz	252441-001

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
 - a. Switch cover (Section 5.6)
 - b. Keyboard and keyboard shield (Section 5.7)
 - c. Fan assembly (Section 5.8)

2. Use a flat-blade screwdriver to turn the processor locking screw ❶ one-half turn counterclockwise (Figure 5-14).
3. Lift the processor straight up ❷ to remove it from its socket.



When installing the processor, make sure the gold triangle symbol ❸ is located in the lower left corner.

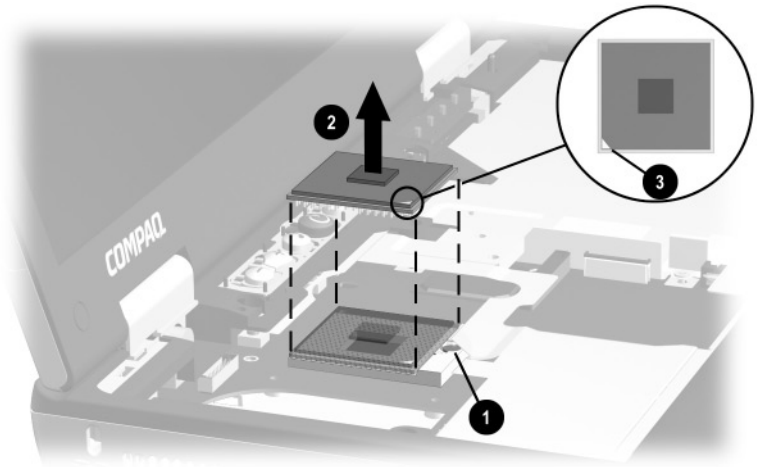


Figure 5-14. Removing the Processor

Reverse the above procedure to install the processor.

5.10 Display

Displays Spare Part Number Information

14.1-inch, SXGA, CTFT	260604-001
14.1-inch, XGA, CTFT	260603-001
13.3-inch, XGA, CTFT	260602-001

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the switch cover (Section 5.6).
3. Close the computer.
4. Turn the computer top side up with the rear panel facing you.

5. Insert a small straight edge tool (screwdriver or tweezers) into the notch ❶ in the hinge cover and partially lift the hinge cover ❷ (Figure 5-15).
6. When the hooks ❸ on the inside and outside edges of the hinge covers are exposed, press in on the edges of the hinge covers to disengage them from the top cover.
7. Remove the hinge covers ❹.



The hinge covers are included in the Plastics and Hardware Kit (spare part number 251365-001).

8. Remove the four silver M2 × 10.5 screws ❺ from the computer rear panel.

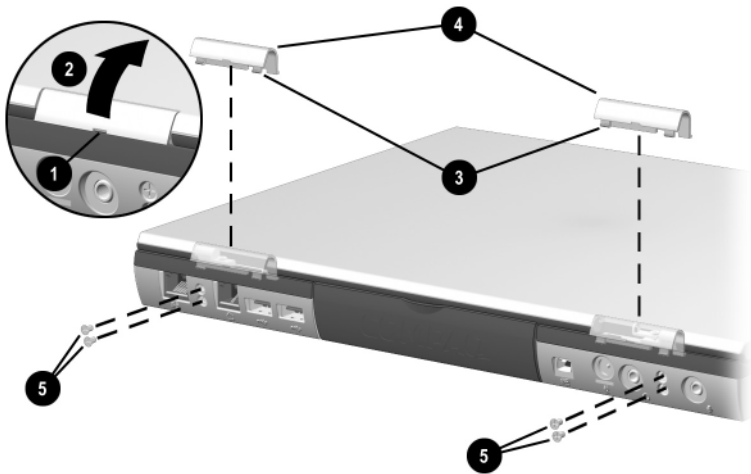


Figure 5-15. Removing the Hinge Covers and Display Screws

9. Position the computer so the front faces you.
10. Open the computer as far as it will open.
11. Lift up the back edge of the keyboard and swing it forward until it rests on the top cover.
12. Disconnect the display inverter ❶ and video cables ❷ (Figure 5-16).



When installing the display, route the display video cable through the clip ❸ in the top cover.

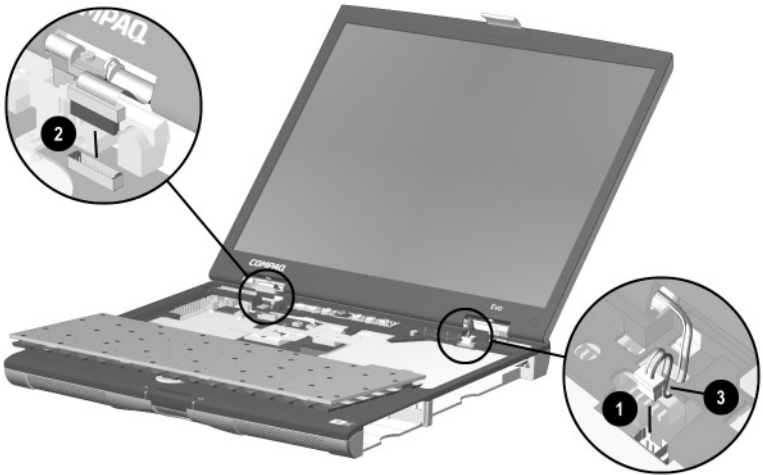


Figure 5-16. Disconnecting the Display Cables

13. Remove the black M2 × 12 screw ❶ that secures the left display hinge (Figure 5-17).



Note the orientation and position of the display hinge bracket ❷. Take special care not to lose this bracket when replacing the display.

14. Remove the silver M2 × 10.5 screw ❸ that secures the right display hinge.
15. Lift the display straight up to remove it ❹.

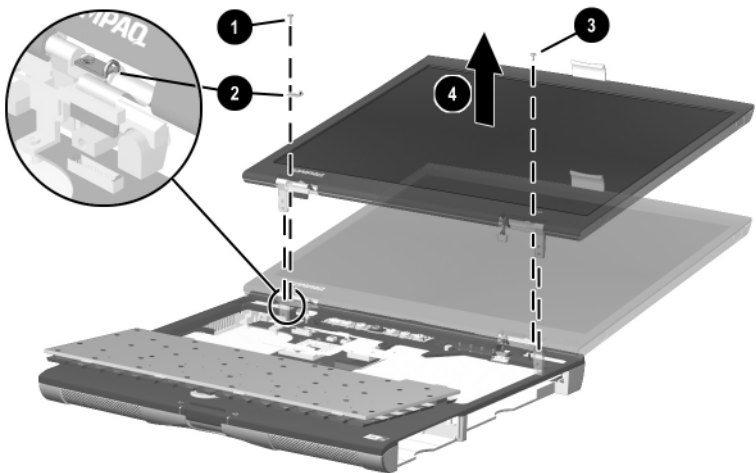


Figure 5-17. Removing the Display

Reverse the above procedure to install the display.

5.11 Top Cover

Top Cover Spare Part Number Information

Top cover (includes TouchPad and TouchPad buttons)	260606-001
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1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
 - a. Switch cover (Section 5.6)
 - b. Keyboard and keyboard shield (Section 5.7)
 - c. Display (Section 5.10)
2. Turn the computer bottom side up with the rear panel facing you.

3. Remove the eight black M2 × 9 screws ❶ that secure the top cover to the base enclosure (Figure 5-18).
4. Open the parallel and serial connector cover ❷.
5. Remove the silver M2 × 6.5 screw ❸ that secures the top cover to the base enclosure through the rear panel.

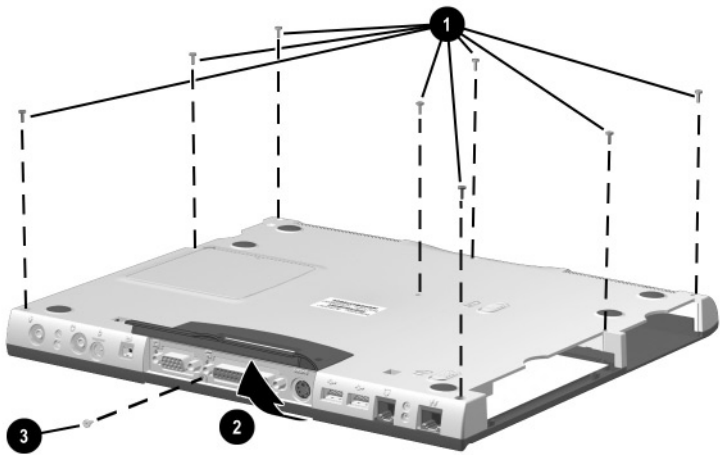


Figure 5-18. Removing the Top Cover Screws

6. Turn the computer top side up with the front facing you.

7. Release the ZIF connector ❶ to which the TouchPad cable is attached and disconnect the TouchPad cable ❷ from the system board (Figure 5-19).
8. Remove the two black M2 × 9 screws ❸ and the silver M2 × 7 screw ❹ that secures the top cover to the base enclosure.

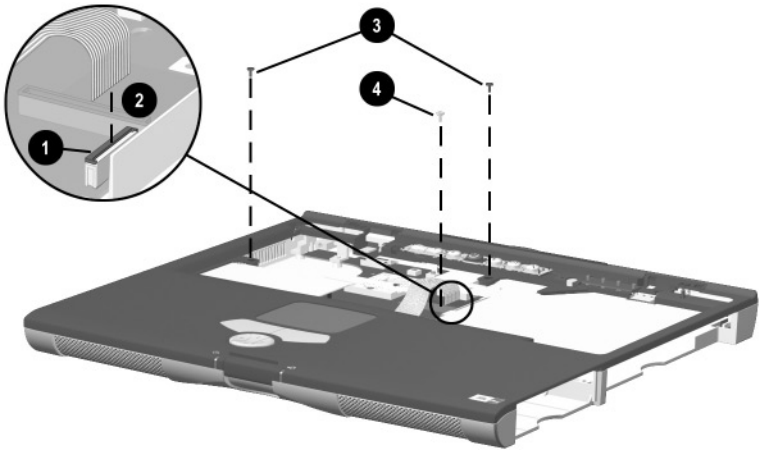


Figure 5-19. Disconnecting the TouchPad Cable and Removing the Top Cover Screws

9. Lift the top cover straight up to remove it (Figure 5-20).

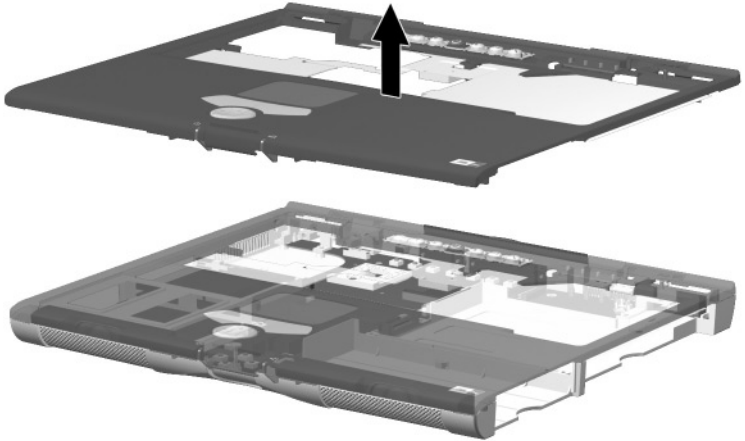


Figure 5-20. Removing the Top Cover

Reverse the above procedure to install the top cover.

5.12 Speaker Assembly



The left and right speakers are not interchangeable. The right speaker has a longer cable.

Speaker Assembly Spare Part Number Information

Left speaker	251363-001
Right speaker	251364-001

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
 - a. Switch cover (Section 5.6)
 - b. Keyboard and keyboard shield (Section 5.7)
 - c. Display (Section 5.10)
 - d. Top cover (Section 5.11)

2. Disconnect the speaker cables ❶ from the system board (Figure 5-21).
3. Remove the gold M2 × 5 screws ❷ that secure the speaker assemblies to the base enclosure.
4. Remove the speaker assemblies ❸.

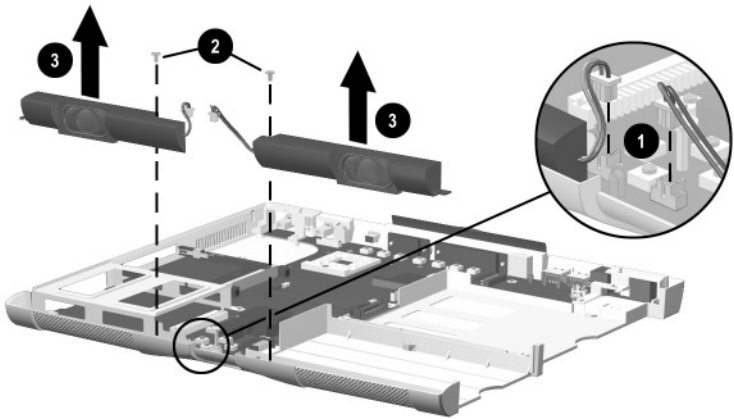


Figure 5-21. Removing the Speaker Assemblies

Reverse the above procedure to install the speaker assemblies.

5.13 Disk Cell RTC Battery



The disk cell RTC battery is included in the Plastics and Hardware Kit (spare part number 251365-001).

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
 - a. Switch cover (Section 5.6)
 - b. Keyboard and keyboard shield (Section 5.7)
 - c. Display (Section 5.10)
 - d. Top cover (Section 5-11)
2. Lift up the back edge of the RTC battery and remove it from its socket on the system board (Figure 5-22).

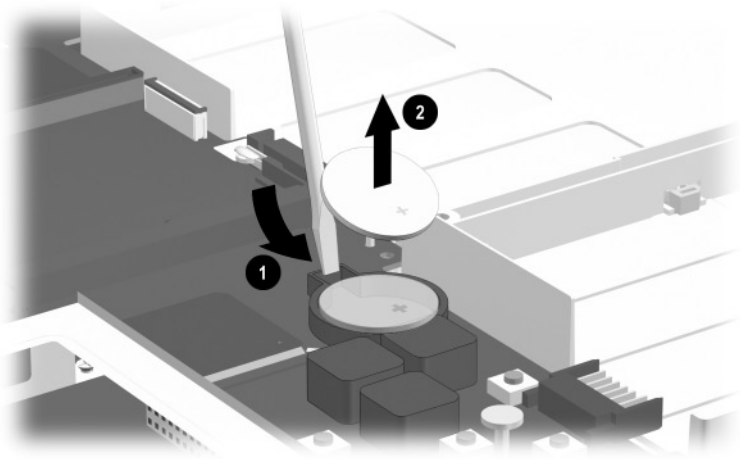


Figure 5-22. Removing the Disk Cell RTC Battery

Reverse the above procedure to install the disk cell RTC battery.

5.14 Mini PCI Communications Board

Mini PCI Communications Boards Spare Part Number Information

Mini PCI communications boards

Type III mini PCI 56-Kbps modem (domestic)	259488-001
Type III mini PCI 56-Kbps modem (international)	259489-001

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
 - a. Switch cover (Section 5.6)
 - b. Keyboard and keyboard shield (Section 5.7)
 - c. Display (Section 5.10)
 - d. Top cover (Section 5.11)

2. Disconnect the communications cable from the mini PCI communications board ❶ (Figure 5-23).
3. Spread the retaining tabs to release the mini PCI communications board ❷.

The board tilts up at a 45-degree angle.

4. Remove the board by pulling it away from the connector at a 45-degree angle ❸.

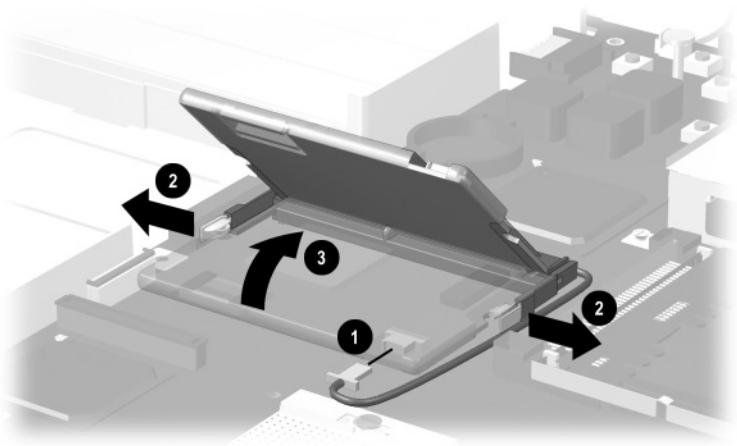


Figure 5-23. Removing the Mini PCI Communications Board

Reverse the above procedure to install the mini PCI communications board.

5.15 Sub I/O Board

Sub I/O Board Spare Part Number Information

Sub I/O board	251381-001
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1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
 - a. Switch cover (Section 5.6)
 - b. Keyboard and keyboard shield (Section 5.7)
 - c. Display (Section 5.10)
 - d. Top cover (Section 5.11)

2. Remove the black M2 × 9 screw ❶ and the silver M2 × 6.5 screw ❷ that secure the right display support to the base enclosure. The silver M2 × 6.5 screw also captures the modem/NIC ground cable ❸ (Figure 5-24).
3. Remove the right display support ❹.



The right display support is included in the Plastics and Hardware Kit (spare part number 251365-001).

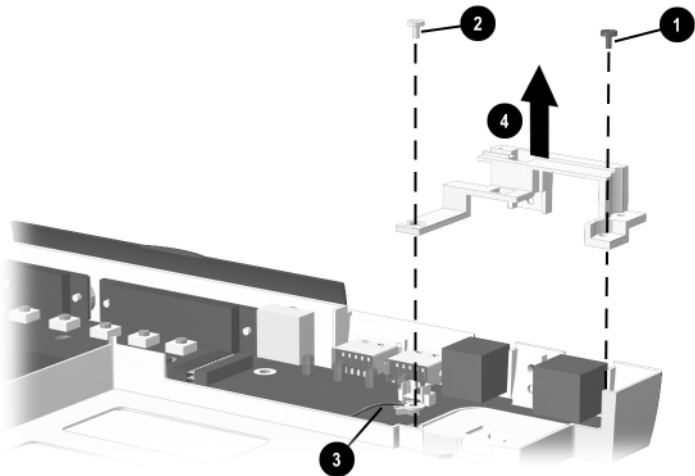


Figure 5-24. Removing the Right Display Support

4. Disconnect the modem/NIC cable ❶ from the sub I/O board (Figure 5-25).
5. Lift up the right side of the sub I/O board ❷ until it clears the base enclosure.
6. Slide the sub I/O board to the right ❸ to disconnect it from the system board.

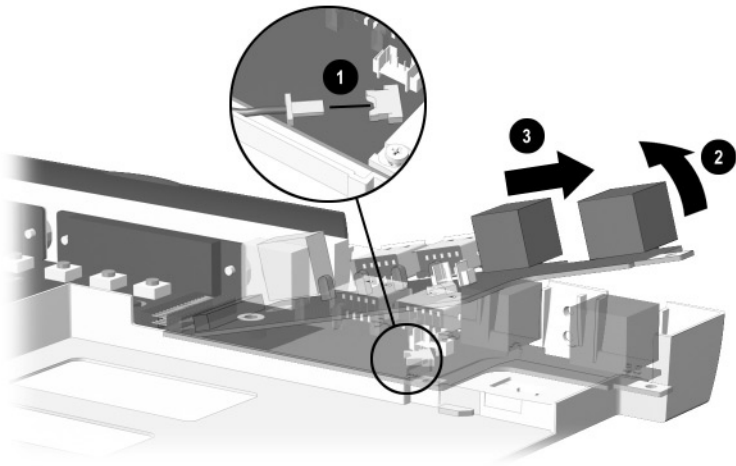


Figure 5-25. Removing the Sub I/O Board

7. Remove the sub I/O board.

Reverse the above procedure to install the sub I/O board.

5.16 System Board

System Board Spare Part Number Information

System board

251368-001

1. Prepare the computer for disassembly (Section 5.3) and remove the following components:
 - a. Switch cover (Section 5.6)
 - b. Keyboard and keyboard shield (Section 5.7)
 - c. Display (Section 5.10)
 - d. Top cover (Section 5.11)
 - e. Sub I/O board (Section 5.15)

2. Position the modem/NIC cable ❶ so it rests in the empty modular media bay in the base enclosure (Figure 5-26).
3. Disconnect the speaker assembly cables ❷ from the system board.
4. Remove the two silver M2 × 6.5 screws ❸ that secure the hard drive bracket to the base enclosure.
5. Remove the hard drive bracket ❹.

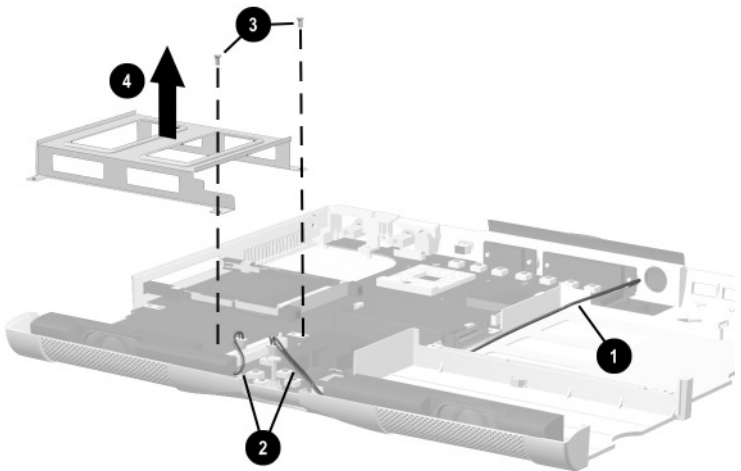


Figure 5-26. Removing the Hard Drive Bracket

6. Remove the two black M2 × 9 screws ❶ that secure the left display support to the base enclosure (Figure 5-27).
7. Remove the left display support ❷.



The left display support is included in the Plastics and Hardware Kit (spare part number 251365-001).

8. Remove the silver M2 × 5 screw ❸ that secures the system board to the base enclosure.

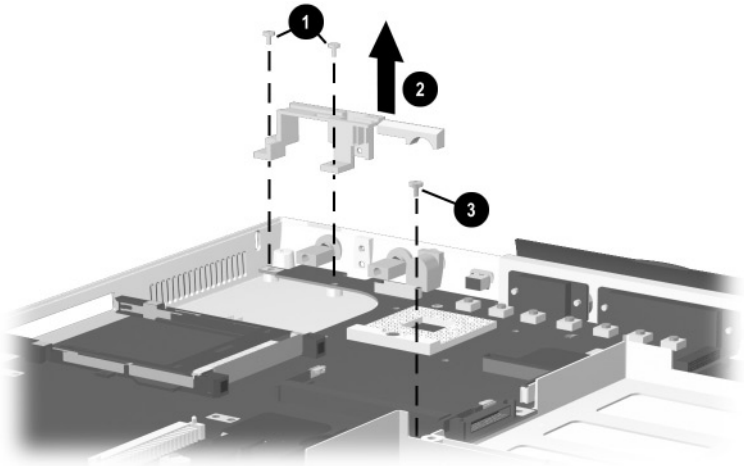


Figure 5-27. Removing the Left Display Support and System Board Screw

9. Press in and hold the PC Card eject button ❶ (Figure 5-28).
10. Lift up the front edge of the system board ❷ until it clears the base enclosure.
11. Slide the front edge of the system board forward, away from the base enclosure, at an angle ❸.

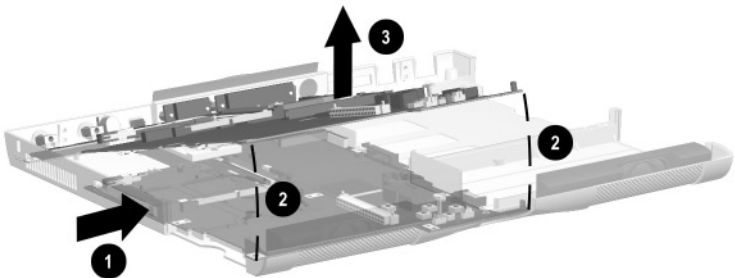


Figure 5-28. Removing the System Board

Refer to the following sections to remove components from the system board:

- Memory expansion board (Section 5.4)
- Fan assembly (Section 5.8)
- Processor (Section 5.9)
- Disk cell RTC battery (Section 5.13)
- Mini PCI communications board (Section 5.14)

Reverse the above procedure to install the system board.

6

Specifications

This chapter provides physical and performance specifications.

Table 6-1
Computer

Dimensions		
Height	1.29 in	3.28 cm
Width	12.80 in	32.51 cm
Depth	10.37 in	26.34 cm
Weight		
	4.8 to 5.7 lbs	2.17 to 2.59 kg
AC adapter power requirements		
Rated input voltage	90 to 264 VAC (auto switching)	
Rated input current	< 60 W	
Rated frequency	47 to 63 Hz	
Temperature		
Operating	50° F to 95° F	10° C to 35° C
Nonoperating	-4° F to 140° F	-20° C to 60° C
Relative humidity (noncondensing)		
Operating	10 to 90%	
Nonoperating	5 to 95%, 101.6°F/38.7°C maximum wetbulb	
Altitude (unpressurized)		
Operating	0 to 10,000 ft	0 to 3,048 m
Nonoperating	0 to 30,000 ft	0 to 9,144 m

Table 6-1
Computer (*Continued*)

Shock

Operating	10 G for 11 ms, half sine
Nonoperating	60 g for 11 ms, half sine

Vibration

Operating	0.5 G zero-to-peak, 10-500 Hz, 0.25-oct/min sweep rate
Nonoperating	1.0 G zero-to-peak, 10-500 Hz, 0.25-oct/min sweep rate



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

Table 6-2
14.1-inch XGA, TFT Display

Dimensions		
Height	8.46 in	21.40 cm
Depth	11.22 in	28.50 cm
Width	14.10 in	35.81 cm
Number of colors	Up to 16.8 million	
Contrast ratio	150:1	
Brightness	120 nits typical	
Pixel resolution		
Pitch		0.264 × 0.264 mm
Format	1024 × 768	
Configuration	RGB vertical stripe	
Backlight	Edge lit	
Character display	80 × 25	
Refresh	60 Hz	
Total power consumption	4.2 W	

Table 6-3
13.3-inch XGA, TFT Display

Dimensions

Height	7.98 in	20.28 cm
Depth	10.64 in	27.03 cm
Width	13.3 in	33.79 cm

Number of colors Up to 16.8 million

Contrast ratio 150:1

Brightness 120 nits typical

Pixel resolution

Pitch		0.264 × 0.264 mm
Format	1024 × 768	
Configuration	RGB vertical stripe	

Backlight Edge lit

Character display 80 × 25

Refresh 60 Hz

Total power consumption 4.0 W

**Table 6-3
Hard Drives**

	30.0 GB	20.0 GB	15.0 GB
User capacity per drive¹	30.0 GB	20.0 GB	15.0 GB
Drive height (with drive frame, in mm)	9.5	9.5	9.5
Drive width (with drive frame, in mm)	70.0	70.0	70.0
Interface type	ATA-5	ATA-5	ATA-4
Seek times (typical read, including setting)			
Single track	2.5 ms	2.5 ms	2.5 ms
Average	12.0 ms	12.0 ms	13.0 ms
Full stroke	23.0 ms	23.0 ms	24.0 ms
User addressable sectors³	58,605,120	39,070,080	23,579,136
Logical configuration			
Cylinders	22,784	16,383	16,683
Heads	16	16	16
Sectors per track	63	63	63

¹1 GB = 1,000,000,000 bytes.

²System capability may differ.

³Actual drive specifications may differ slightly.

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

**Table 6-3
Hard Drives (Continued)**

	30.0 GB	20.0 GB	15.0 GB
Physical configuration			
Cylinders ³	22,784	22,784	25,800
Heads	6	4	2
Sectors per track ³	293–560	293–560	398–731
Bytes per sector	512	512	512
Buffer size³	2 MB	2 MB	512 KB
Disk rotational speed (rpm)	4200	4200	4200
Transfer rate			
Interface max (MB/s) ²	66.6	66.6	100
Media (Mb/s) ³	109–203	109–203	155–256

¹1 GB = 1,000,000,000 bytes.

²System capability may differ.

³Actual drive specifications may differ slightly.

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

Table 6-4
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)	15 (1.2 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)	94 to 174 ms	
Settling time	15 ms	
Latency average	100 ms	

Table 6-5
CD-ROM Drive

Applicable disk	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	.59 in	1.5 cm
Disk diameter	12 cm, 8 cm	
Disk thickness	1.2 mm	
Track pitch	1.6 μ m	
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 6-6
DVD-ROM Drive

Applicable disk	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	.59 in	1.5 cm
Disk diameter	12 cm, 8 cm	
Disk thickness	1.2 mm	
Track pitch	.74 μ m	
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 6-7
CD-RW Drive

Center hole diameter	.59 in	.39 cm
Disk diameter		12 cm, 8 cm
Disk thickness	.47 in	.12 cm
Track pitch	.74 μ m	
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 6-8
AC Adapter

Dimensions

Height	1.10 in	2.79 cm
Depth	1.42 in	3.61 cm
Width	3.70 in	9.40 cm

Weight

.39 lb	.18 kg
--------	--------

Power supply (input)

Operating voltage	90 to 260 VAC RMS nominal
Operating current	1.3 A RMS
Operating frequency range	47 to 63 Hz nominal
Maximum transient	4/50 kV

Table 6-9
8-cell, Li ion Battery Pack

Dimensions

Length	4.95 in	125.80 cm
Width	3.46 in	88.00 cm
Depth	0.80 in	20.40 cm
Weight	0.96 lb	0.43 kg

Energy


Voltage	14.8 V
Amp-hour capacity	Minimum 3.7 Ah, typical 3.9 Ah
Watt-hour capacity	Minimum 53.2 Ah, typical 56.1 Ah

Temperature

Operating	32 to 108°F	0 to 42°C
Nonoperating	32 to 140°F	0 to 60°C

Table 6-10
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 6-11
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 6-12
System I/O Addresses

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

Table 6-12
System I/O Addresses (Continued)

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

Table 6-12
System I/O Addresses (*Continued*)

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

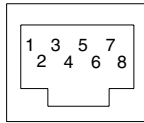
Table 6-13
System Memory Map

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

A

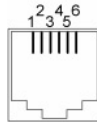
Connector Pin Assignments

Table A-1
RJ-45 Network Interface



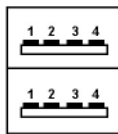
Pin	Signal	Pin	Signal
1	Transmit +	5	Unused
2	Transmit -	6	Receive -
3	Receive +	7	Unused
4	Unused	8	Unused

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



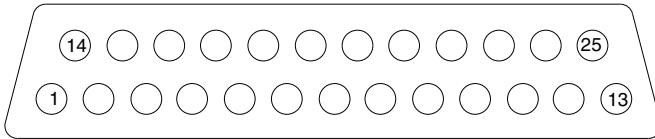
Pin	Signal	Pin	Signal
1	+5 VDC	3	Data +
2	Data -	4	Ground

Table A-4
S-Video



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

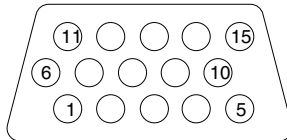
**Table A-5
Parallel**



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

Power Cord Set Requirements

3-Conductor Power Cord Set

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

The power cord set received 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 requirements listed below are applicable to all countries:

- The length of the power cord set must be at least 5.00 feet (1.5 m) and a maximum of 6.50 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 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country 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, 1.00mm² 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 251366-001.

Table C-1
Phillips M3 × 8.0 Screw



	Color	Qty	Length	Thread	Head Width
	Silver	1	8.0 mm	3.0 mm	6.0 mm

Where used:

One screw that secures the hard drive to the computer (documented in Section 5.3)



Table C-2
Phillips M3.0 x 4.0 Screw



Color	Qty	Length	Thread	Head Width
Black	4	4.0 mm	3.0 mm	6.0 mm

Where used:

Four screws that secure the hard drive to the hard drive sleeve (documented in Section 5.3)

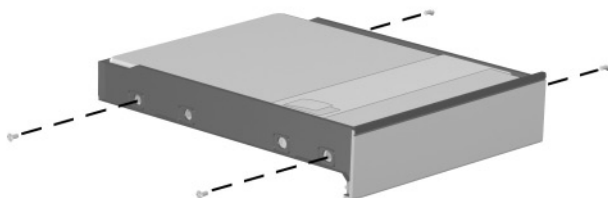


Table C-3
Phillips M2.0 x 5.0 Screw



	Color	Qty	Length	Thread	Head Width
	Silver	4	5.0 mm	2.0 mm	5.0 mm

Where used:

One screw that secures the memory expansion compartment cover to the base enclosure (documented in Section 5.4)



Table C-3
Phillips M2.0 × 5.0 Screw (Continued)



	Color	Qty	Length	Thread	Head Width
	Silver	4	5.0 mm	2.0 mm	5.0 mm

Where used:

Two screws that secure the keyboard shield to the top cover (documented in Section 5.7)

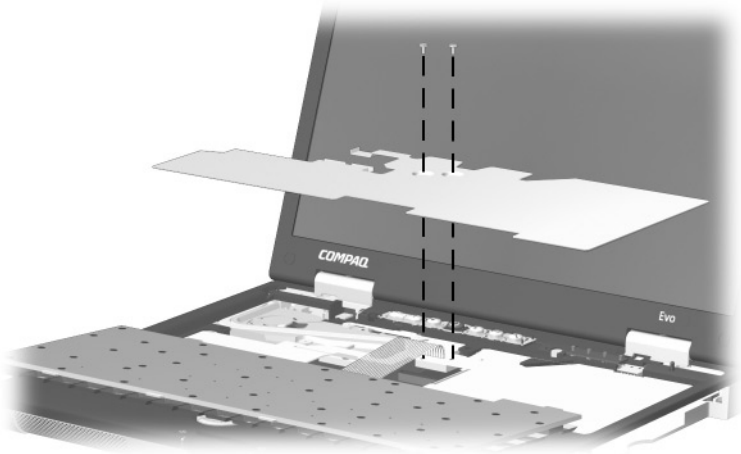


Table C-3
Phillips M2.0 x 5.0 Screw (Continued)



Color	Qty	Length	Thread	Head Width
Silver	4	5.0 mm	2.0 mm	5.0 mm

Where used:

One screw that secures the system board to the base enclosure (documented in Section 5.16)

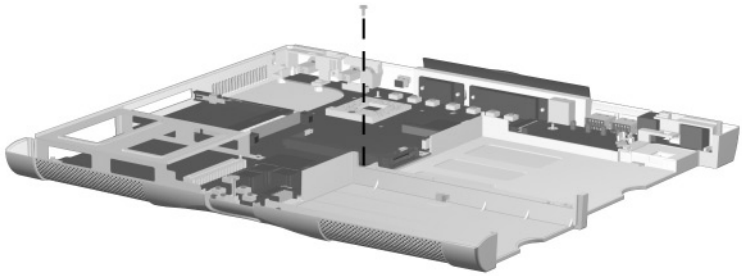


Table C-4
Phillips M2.0 × 9.0 Screw



Color	Qty	Length	Thread	Head Width
Black	15	9.0 mm	2.0 mm	5.0 mm

Where used:

Two screws that secure the switch cover to the base enclosure memory expansion compartment cover to the base enclosure (documented in Section 5.6)

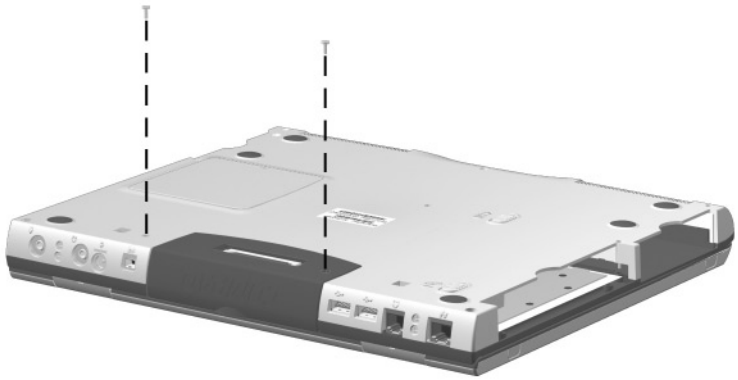


Table C-4
Phillips M2.0 × 9.0 Screw (Continued)



	Color	Qty	Length	Thread	Head Width
	Black	15	9.0 mm	2.0 mm	5.0 mm

Where used:

Eight screws that secure the top cover to the base enclosure (documented in Section 5.11)

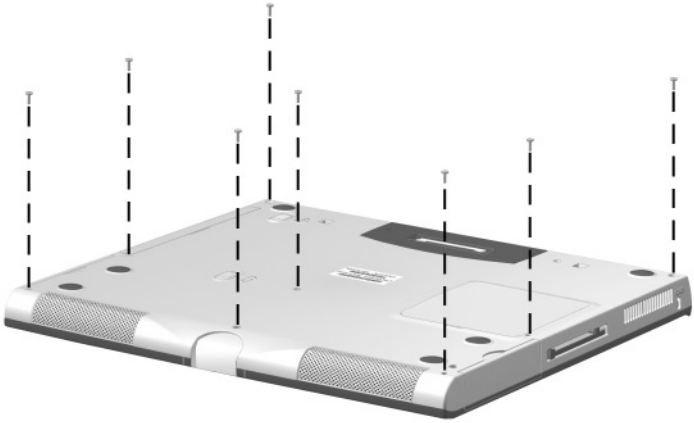


Table C-4
Phillips M2.0 × 9.0 Screw (Continued)



	Color	Qty	Length	Thread	Head Width
	Black	15	9.0 mm	2.0 mm	5.0 mm

Where used:

Two screws that secure the top cover to the base enclosure (documented in Section 5.11)

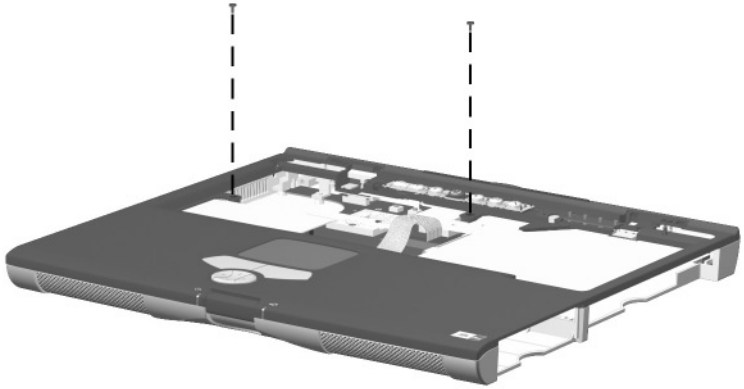


Table C-4
Phillips M2.0 x 9.0 Screw (Continued)



Color	Qty	Length	Thread	Head Width
Black	15	9.0 mm	2.0 mm	5.0 mm

Where used:

One screw that secures the right display support to the base enclosure (documented in Section 5.15)

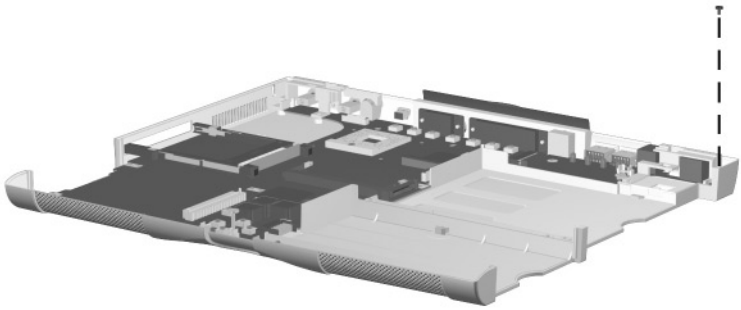


Table C-4
Phillips M2.0 × 9.0 Screw (Continued)



	Color	Qty	Length	Thread	Head Width
	Black	15	9.0 mm	2.0 mm	5.0 mm

Where used:

Two screws that secure the left display support to the base enclosure (documented in Section 5.16)

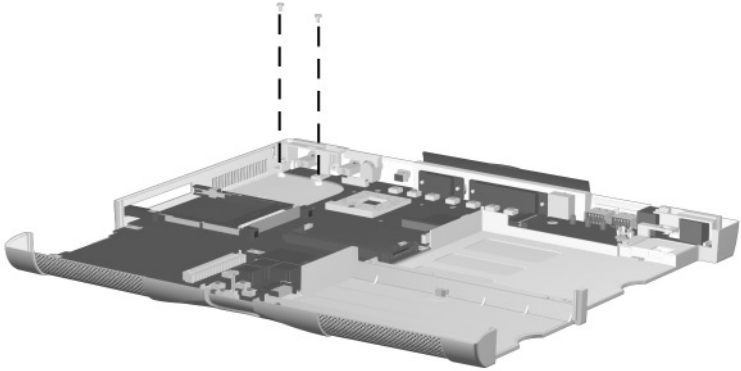


Table C-5
Phillips M2.0 × 10.5 Screw



	Color	Qty	Length	Thread	Head Width
	Silver	5	10.5	2.0 mm	5.0 mm

Where used:

Four screws that secure the display to the base enclosure through the rear panel (documented in Section 5.10)



Table C-5
Phillips M2.0 × 10.5 Screw (Continued)



	Color	Qty	Length	Thread	Head Width
	Silver	5	10.5	2.0 mm	5.0 mm

Where used:

One screw that secures the display to the base enclosure through the right hinge (documented in Section 5.10)

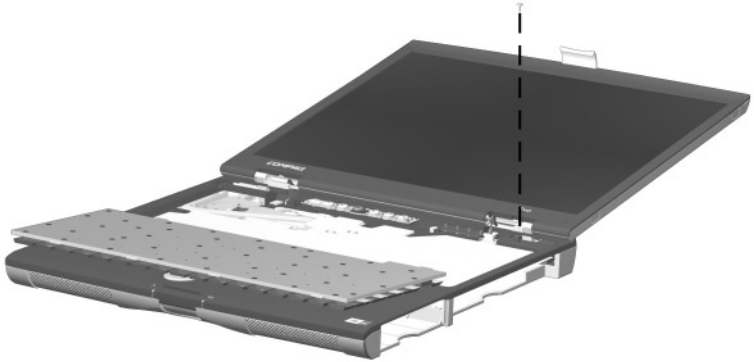


Table C-6
Phillips M2.0 × 12.0 Screw



Color	Qty	Length	Thread	Head Width
Black	1	12.0 mm	2.0 mm	5.0 mm

Where used:

One screw that secures the display to the base enclosure through the left hinge (documented in Section 5.10)

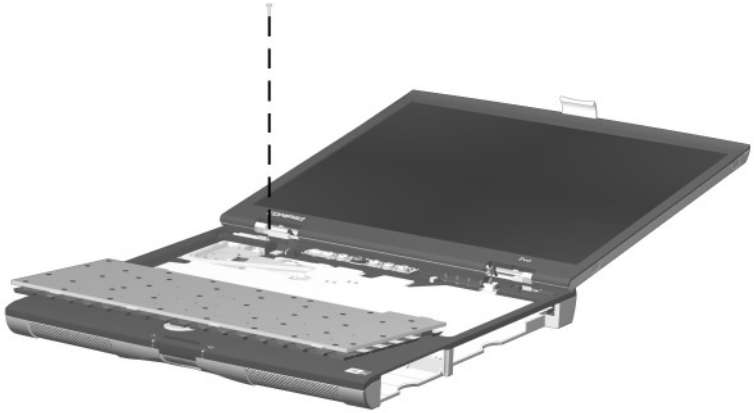


Table C-7
Phillips M2.0 × 6.5 Screw



	Color	Qty	Length	Thread	Head Width
	Silver	5	6.5 mm	2.0 mm	5.0 mm

Where used:

One screw that secures the top cover to the base enclosure through the rear panel (documented in Section 5.11)



Table C-7
Phillips M2.0 × 6.5 Screw (Continued)



	Color	Qty	Length	Thread	Head Width
	Silver	5	6.5 mm	2.0 mm	5.0 mm

Where used:

One screw that secures the top cover to the base enclosure (documented in Section 5.11)

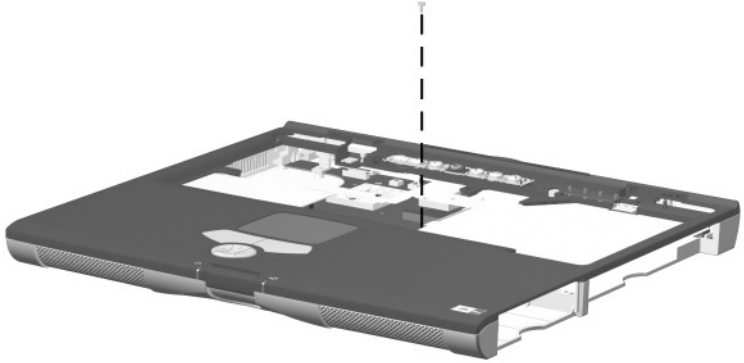


Table C-7
Phillips M2.0 × 6.5 Screw (Continued)



	Color	Qty	Length	Thread	Head Width
	Silver	5	6.5 mm	2.0 mm	5.0 mm

Where used:

One screw that secures the right display support and sub I/O board to the base enclosure; this screw also secures the modem ground cable (documented in Section 5.15)

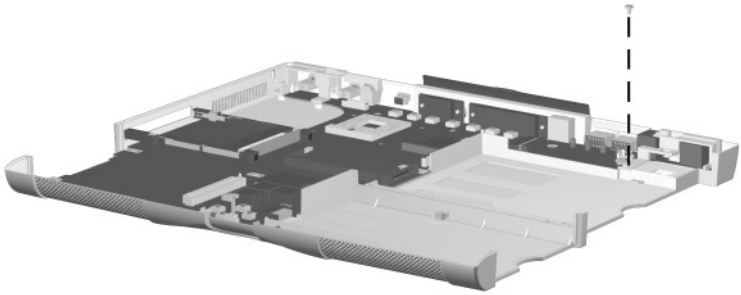


Table C-7
Phillips M2.0 x 6.5 Screw (Continued)



	Color	Qty	Length	Thread	Head Width
	Silver	5	6.5 mm	2.0 mm	5.0 mm

Where used:

Two screws that secure the hard drive bracket to the base enclosure (documented in Section 5.16)

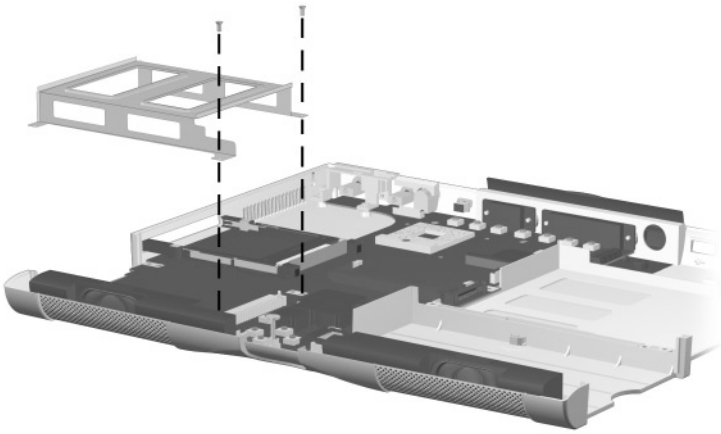

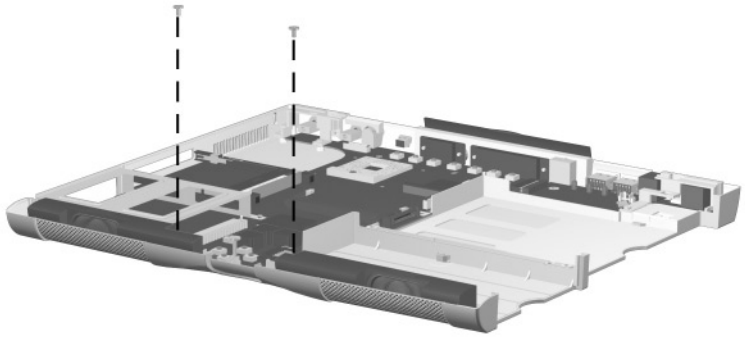


Table C-8
Phillips M2.0 × 5.0 Screw

	Color	Qty	Length	Thread	Head Width
	Gold	2	5.0 mm	2.0 mm	6.0 mm

Where used:

Two screws that secure the speaker assemblies to the base enclosure (documented in Section 5.12)



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