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Maintenance and Service Guide

Compaq Armada 7800 Family of Personal Computers

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Compaq Computer Corporation

Preface

This *Maintenance and Service Guide* is a troubleshooting reference that can be used when servicing the Compaq Armada 7800 Series of Personal Computers.

Compaq Computer Corporation reserves the right to make changes to the Compaq Armada 7800 Series of Personal Computers without notice.

Additional information is available on the *Compaq Armada 7800 Series of Personal Computers Illustrated Parts Map*. Information for the Compaq ArmadaStation and Armada MiniStation E and EX is available in the *Compaq ArmadaStation and Armada MiniStation E and EX Maintenance and Service Guide* and *Illustrated Parts Map*.

Symbols

The following words and symbols mark special messages throughout this guide:



WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.



CAUTION: Text set off in this manner indicates that failure to follow directions in the caution could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents clarifying information or specific instructions.

NOTE: Text set off in this manner presents commentary, sidelights, or interesting points of information.

Technician Notes



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 modifications may void any warranty or exchange allowances.



WARNING: The computer is designed to be electrically grounded. To ensure proper operation, plug the AC power cord into a properly grounded electrical outlet only.



CAUTION: To properly ventilate the system, you must provide at least 3 inches (7.62 cm) of clearance on the left and right sides of the computer.

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Serial Number

When requesting information or ordering spare parts, provide the computer serial number. The serial number is on the bottom of the computer.

Locating Additional Information

The following documentation provides information for the computer:

- Compaq Armada 7800 Series of Personal Computers documentation set
- Microsoft *Windows 95/Windows NT 4.0 User's Guide*
- Compaq Service Training Guides
- Compaq Service Advisories and Bulletins
- *Compaq QuickFind*
- *Compaq Service Quick Reference Guide*
- *Compaq Armada 7800 Series of Personal Computers Illustrated Parts Map*
- *Compaq ArmadaStation and Armada MiniStation E and EX Maintenance and Service Guide*
- *Compaq ArmadaStation and Armada MiniStation E and EX Illustrated Parts Map*
- Compaq Internet site at <http://www.Compaq.com>

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Product Description

1.1 Computer Features and Models

The Compaq Armada 7800 Family of Personal Computers offers advanced modularity, an Intel Pentium II processor with 64-bit architecture, an industry-leading Accelerated Graphics Port (AGP) implementation, and extensive multimedia support. The computer provides desktop functionality and connectivity through the optional ArmadaStation and Armada MiniStation.



Figure 1-1. Compaq Armada 7800 Personal Computer

Models

The Armada 7800 models are shown in Table 1-1. The computer model designation is composed of a group of characters that define each model's features.

Table 1-1 Models and Model Naming Convention Compaq Armada 7800 Series of Personal Computers										
Key										
7	8	0	0	6	366	T	14.1	D	M	1
A	B			C	D	E	F	G	H	I
Key	Description		Options							
A	Line designator		7 = Performance							
B	Series designator		8 = Armada 7800							
C	Processor type		6 = Intel Mobile Pentium II processor with MMX technology							
D	Processor speed		366 = 366 MHz 333 = 333 MHz				300 = 300 MHz 266 = 266 MHz			
E	Panel type		T = 13.3" XGA TFT 1024 x 768				T14 = 14.1" XGA TFT 1024 x 768			
F	Hard drive capacity		14.1 = 14.1 GB 10.0 = 10.0 GB				8.1 = 8.1 GB 5.0 = 5.0 GB			
G	Drive type		D = CD-ROM		V = DVD-ROM		0 = none			
H	Modem		M = internal or PC Card modem				0 = audio only			
I	Operating system & software version		0 = No operating system 1 = Windows 95 2 = Windows 98				3 = Windows NT 4.0 4 = Windows NT 5.0			

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Model	Memory	Config. Code	SKU#
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Armada 7800	6366	T	14100	V	M	1	64 MB	CHR1	386741- XX2
Armada 7800	6366	T	14100	V	0	1	64 MB	CHR2	386742- XX2
Armada 7800	6366	T	14100	V	M	3	64 MB	CDJ3	386743- XX2
Armada 7800	6366	T	14100	V	0	3	64 MB	CDJ4	386744- XX2
Armada 7800	6300	T	8100	V	0	1	64 MB	CB61	315000- XX2
Armada 7800	6300	T	8100	V	0	3	64 MB	CB62	315050- XX2
Armada 7800	6300	T	8100	V	M	1	64 MB	CB63	315130- XX2
Armada 7800	6300	T	5000	D	M	1	64 MB	CB64 CB69	204486- XX1 103140- 001
Armada 7800	6300	T	5000	D	0	3	64 MB	CB65	204487- XX1
Armada 7800	6300	T	5000	D	0	1	64 MB	CB66	202876- XX1
Armada 7800	6300	T	5000	D	M	1	64 MB	CB67	401304- 371
Armada 7800	6300	T	5000	D	M	3	64 MB	CB68	401632- XX1
Armada 7800	6266	T	8100	D	M	1	64 MB	CB41	340150- XX2
Armada 7800	6266	T	8100	D	0	1	64 MB	CB42	340350- XX2
Armada 7800	6266	T	8100	D	0	3	64 MB	CB43	340250- XX2
Armada 7800	6266	T	5000	D	M	1	64 MB	BS81	314900- XX2
Armada 7800	6266	T	5000	D	0	1	64 MB	BS82	314950- XX2
Armada 7800	6266	T	5000	D	0	3	64 MB	BS83	315150- XX2
Armada 7800	6266	T	5000	D	M	1	96 MB	BS84	315120- 001
Armada 7800	6266	T	5000	D	M	1	160 MB	BS85	315120- 002
Armada 7800	6266	T	5000	D	M	1	64 MB	BS86	315242- 002
Configure to Order (CTO) model								BZ8Z	315424- 999
Configure to Order (CTO) model								CDJZ	342627- 999

Features

The computer has the following standard features:

- Intel Mobile 366-, 333-, 300-, and 266-MHz Pentium II processor with 64-bit architecture, MMX technology, and 512-KB, level-2 cache memory
- Industry-leading portable computer AGP implementation, featuring:
 - 66-MHz dedicated graphics bus
 - frame made AGP
- 4-MB SGRAM (synchronous graphics)
- 64-MB of SDRAM (synchronous): 32-MB on system board, 32-MB in memory expansion compartment; expandable to 160 megabytes
- Upgradable flash ROM BIOS
- 14.1- and 13.3-inch XGA (1024 × 768) TFT color display, true color (24-bit) support
- Keyboard with built-in EasyPoint III pointing device and mouse buttons
- Lithium ion (Li-ion) battery pack
- Removable 14.1-, 10.0-, 8.1-, and 5.0-GB hard drives
- MultiBay that supports a second hard drive, a second battery pack, a diskette drive, a CD-ROM drive, or a DVD-ROM drive
- Two PC Card slots that accept 32- and 16-bit Type I, II, and III PC Cards, with zoomed video interface in the bottom slot
- IrDa-compliant infrared port¹ (4-Mbps standard) for wireless file transfer, printing, and file synchronization
- Built-in stereo speakers providing Compaq PremierSound, microphone, and jacks for stereo audio sound with electronic equalization and wave table synthesis
- Energy Star-compliant power saving features
- Ports and connectors for external equipment, including universal serial bus (USB), serial, parallel, external monitor, and PS/2-compatible pointing device or keyboard
- Security features
- Desktop functionality available with the optional Compaq ArmadaStation and Armada MiniStation
- Domestic and international modem and Ethernet connectivity
- Integrated AC Adapter
- Integrated 33.6-Kbps data/fax modem

¹ IrDa 4MB compliant. Infrared performance may vary depending on performance of infrared peripherals, distance between infrared devices, and applications used.

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Intelligent Manageability

Intelligent Manageability consists of preinstalled software tools for the computer and Compaq servers that assist in tracking, troubleshooting, protecting, and maintaining the computer. It provides the following functions:

- Asset Management—provides detailed configuration and diagnostic information.
- Fault Management—prevents, predicts, and alerts of impending hardware problems.
- Security Management—protects against unauthorized access to data and components.
- Integration Management—uses industry-standard technologies such as DMI and SNMP to integrate with PC management software providers.
- Configuration Management—optimizes the computer by providing the latest drivers, utilities, and software, which are available on CD-ROM and the Compaq web site at <http://www.compaq.com>.

NOTE: For further help with Intelligent Manageability, refer to Intelligent Manageability Help. Click Start ⇒ Compaq Information Center ⇒ double-click Intelligent Manageability Help.

Asset Management

AssetControl retrieves component information when on the road or connected to the network.

AssetControl also enables the network administrator to remotely retrieve information from any Compaq computer connected to the network. The information can be used to assist in tracking and maintaining the computer and its components. It provides the following information:

- Inventory information—The network administrator can retrieve information about the computer over the network by using Compaq Insight Manager or any PC management tool provided by Compaq Solution Partners. AssetControl information retrieved from the computer includes:
 - Manufacturer, model, and serial number of Compaq computers, monitors, hard drives, battery packs, memory boards, processor speeds, and operating systems.
 - Asset tag
 - System board and ROM revision levels
 - BIOS settings
- Diagnostic information—Diagnostics for Windows includes the information on hard drives, ports, and video, sound, and other components. Compaq Diagnostics for Windows can be accessed by clicking Start ⇒ Programs ⇒ Compaq Utilities ⇒ Compaq Diagnostics.

All of the above information can be viewed, printed, or saved.

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Changing the Asset Tag Number

1. Turn on or restart the computer.
2. Press **F10** when the cursor appears in the upper right corner of the screen.
3. Select Computer Setup ⇒ Intelligent Manageability.
4. Follow the instructions on the screen.

Fault Management

The Fault Management features minimize downtime and data loss by monitoring system performance and generating the following alerts:

- **Hard drive alert**—provides warning up to 72 hours in advance of impending hard drive problems and can automatically start optional backup software.
- **System temperature alert**—reports overheating. As the system temperature rises, this feature first adjusts fan speed and other cooling components, then displays an alert, then shuts down the system.
- **Battery pack alert**—reports charging problems and battery pack failure.
- **Monitor alert**—diagnoses and displays external monitor operational problems.
- **Memory alert**—reports memory board configuration changes when a memory board is removed, added, or reconfigured. It also provides the previous and current configurations for comparison.

The alerts work with or without network connection. Of course, if the computer is not connected to the network, the network administrator cannot receive alerts from the computer.

Fault Management Alerts

Alerts can be enabled, disabled, and tested, and software can be set to back up information whenever a hard drive alert occurs.

- While the computer is connected to a network, alerts appear on the computer display and are simultaneously reported to the network console.

NOTE: A battery charging problem alert is reported only on the computer display.

- When the computer is not connected to a network, the user will receive a local alert.

To set alerts, double-click the Intelligent Manageability icon.

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Security Management Overview

Security Management features customize system security.

- Power-On and Setup Passwords—prevent unauthorized access to your information and computer configuration.
- DriveLock—prevents access to hard drives.
- Device disabling—prevents unauthorized data transfer through modems, serial ports, parallel ports, and infrared ports on the computer and an optional docking station.
- QuickLock/QuickBlank—locks the keyboard and clears the screen.
- Ownership Tag—displays ownership information during system restart.

Configuration Management

Configuration Management optimizes software upgrade and customer support procedures. Compaq provides support software to optimize the performance of the computer. This support software is accessible through a monthly subscription CD-ROM. Support software can also be downloaded from the Compaq web site at <http://www.compaq.com>. Support software includes:

- Locator browser—searches for the latest device drivers, utilities, ROM images, and other support software on a CD-ROM and at the Compaq web site at <http://www.compaq.com>.
- Decision Support—provides detailed information about drivers, utilities, and software available on the computer. The information includes descriptions, features, enhancements, dependencies, and necessary upgrades.
- InfoMessenger—provides notifications by email when support software for the computer becomes available.

1.2 Computer Components

The following table lists the components that ship with the computer and those that are available as options. All components are available as spare parts. For more information about ordering components, refer to Chapter 3, “Illustrated Parts Catalog.”

Component	Ships with Computer	Available as Option
Battery pack	■	■
Modem (not available in all locations)	■	
Modem cable (country specific)	■	■
Diskette drive	■	
MultiBay weight saver	■	
Slip case (shipped with computer only in Europe, Middle East, and Africa)	■	
EasyPoint III caps	■	
Telephone cable (country specific)	■	
Power cable	■	
3-prong to 2-prong converter (Japan only)	■	
Quick Restore CD-ROM	■	
Security kit	■	
ArmadaStation		■
Armada MiniStation E and EX		■
Memory expansion board		■
Battery charger		■
Automobile/aircraft adapter		■
Headset		■
Hard Drive MultiBay Adapter		■
24X CD-ROM drive	■	■
DVD-ROM drive	■	■
14.1-, 10.0-, 8.1-, or 5.0-GB hard drive	■	■

The computer options are described in the following sections.

System Memory Options

The main memory subsystem supports a minimum standard 32 megabytes of Synchronous SDRAM, expandable to 160 megabytes. The minimum standard Synchronous SDRAM is integrated on the system board. The upgrade SDRAM is accomplished with memory expansion boards that are available in 16-, 32-, and 64-megabytes.

The memory expansion slot cover is secured to the computer by a Torx T-8 screw. A tamper-resistant security screw, included with the computer, can be used to provide added security. The security wrench, also included with the computer, must be used to remove the tamper-resistant security screw.

System memory can be upgraded as shown in Table 1-3.

Base Memory on System Board	Memory Expansion Board	Total Memory
32 MB	16 MB (1 × 16 MB)	48 MB
32 MB	32 MB (2 × 16 MB or 1 × 32 MB)	64 MB
32 MB	48 MB (1 × 16 MB + 1 × 32 MB)	80 MB
32 MB	64 MB (2 × 32 MB or 1 × 64 MB)	96 MB
32 MB	80 MB (1 × 16 MB + 1 × 64 MB)	112 MB
32 MB	96 MB (1 × 32 MB + 1 × 64 MB)	128 MB
32 MB	128 MB (2 × 64 MB)	160 MB

The computer is shipped with 32-MB of memory on the system board and 32-MB in the memory expansion compartment.

Battery Equipment Options

The following battery options are available:

- Automobile/Aircraft Adapter
- Lithium ion battery pack
- Battery Charger

Automobile/Aircraft Adapter

The Automobile/Aircraft Adapter allows the computer to operate from a 12-volt aircraft DC socket and from an automobile cigarette lighter receptacle.

Lithium Ion Battery Pack

The battery pack can be used in the computer dedicated battery bay, computer MultiBay, ArmadaStation MultiBays, and Armada MiniStation EX MultiBay and battery charging bay.

Battery Charger

The external Battery Charger has the following features:

- Two battery charging bays
- Charging of one battery in 1.5 hours
- Charging of two batteries in 3 hours

Mass Storage Devices

The following mass storage devices are available for the computer.

Table 1-4
Mass Storage Devices

Device	Dimensions
Diskette drive	3.5-inch, 1.44-MB
Hard drive	14.1, 10.0, 8.1, or 5.0 GB (also available as an option)
CD-ROM drive	24- or 20-speed Max (also available as an option)
LS-120 external diskette drive	120-MB

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Diskette Drive

The computer uses a 3.5-inch diskette drive that fits into the computer, ArmadaStation, or Armada MiniStation EX MultiBays. The diskette drive is a three-mode type that is compatible with 1.44 Megabytes, 1.2 Megabytes, and 720 Kilobytes (formatted) AT drive types. The system supports a maximum of two diskette drives: one in the computer MultiBay and one in the ArmadaStation or Armada MiniStation EX MultiBay.

Hard Drive

The dedicated hard drive bay supports a removable 14.1-, 10.0-, 8.1-, or 5.0-GB hard drive. The MultiBay supports a second hard drive. Before a hard drive can be used in the MultiBay, it first must be inserted in the Hard Drive MultiBay Adapter.

CD-ROM Drive

A 24- or 20-speed Max CD-ROM drive comes as standard equipment with the computer, depending on the model. This CD-ROM drive is also available as an option. The drive supports 3.5-inch and 5.25-inch media in the following formats:

- ISO-9660, the most common CD-ROM format
- CD-ROM XA eXtended Architecture, a standard for storing multimedia information
- Photo CD (single and multisession), Kodak's format for storing photographic images on CD-ROM
- CD-i and CD-i Bridge
- CD-DA (digital audio)
- CD-ROM Mode 1 and Mode 2
- CD-I Mode 2 (Form 1 and Form 2)
- Video CD

1.3 Computer External Components

The external components on the display, front, and left side of the computer are shown in Figure 1-2 and described in Table 1-5.

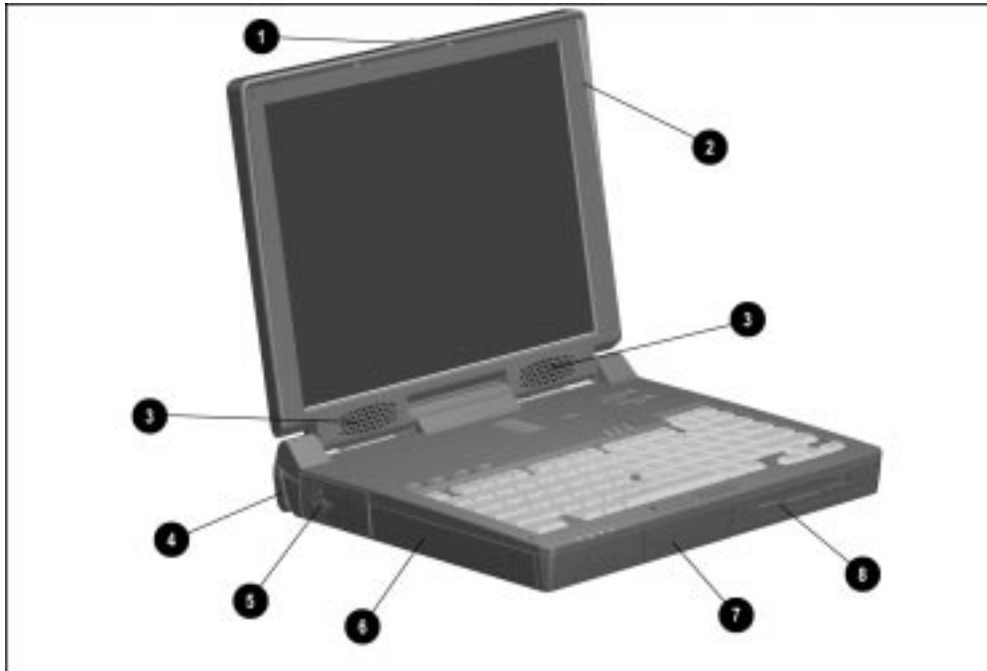


Figure 1-2. Display, Front, and Left Side Components

Table 1-5
Display, Front, and Left Side Components

Item	Component	Function
1	Display release latch	Opens the computer.
2	Mono Microphone	Allows for audio input; located on the inside and outside of the display, can be used whether the computer is open or closed.
3	Stereo speakers (2)	Produce high-quality stereo sound.
4	Tilt feet (2)	Tilt the computer for ease of use.
5	Fan	Provides airflow exhaust.
6	Battery bay	Accepts Lithium ion battery pack.
7	Hard drive bay	Accepts removable hard drive.
8	MultiBay	Accepts MultiBay devices: CD-ROM drive, diskette drive, hard drive (in Hard Drive MultiBay Adapter), LS-120 MultiBay Drive, battery pack.

The external components on the right side of the computer are shown in Figure 1-3 and are described in Table 1-6.



Figure 1-3. Right Side Components

Table 1-6
Right Side Components

Item	Component	Function
1	Security slot	Secures the computer to a fixed object to prevent theft.
2	PC Card eject levers (2)	Eject PC Cards from the slots.
3	PC Card slots	Accepts 16- and 32-bit CardBus PC Cards.
4	25-pin modem connector	Connects a country-specific 25-pin telephone cable (all countries except North America, Latin America, Japan, China, and Hong Kong). Also connects a cellular phone to the computer (U.S. only).

The external components on the rear panel of the computer are shown in Figure 1-4 and are described in Table 1-7.

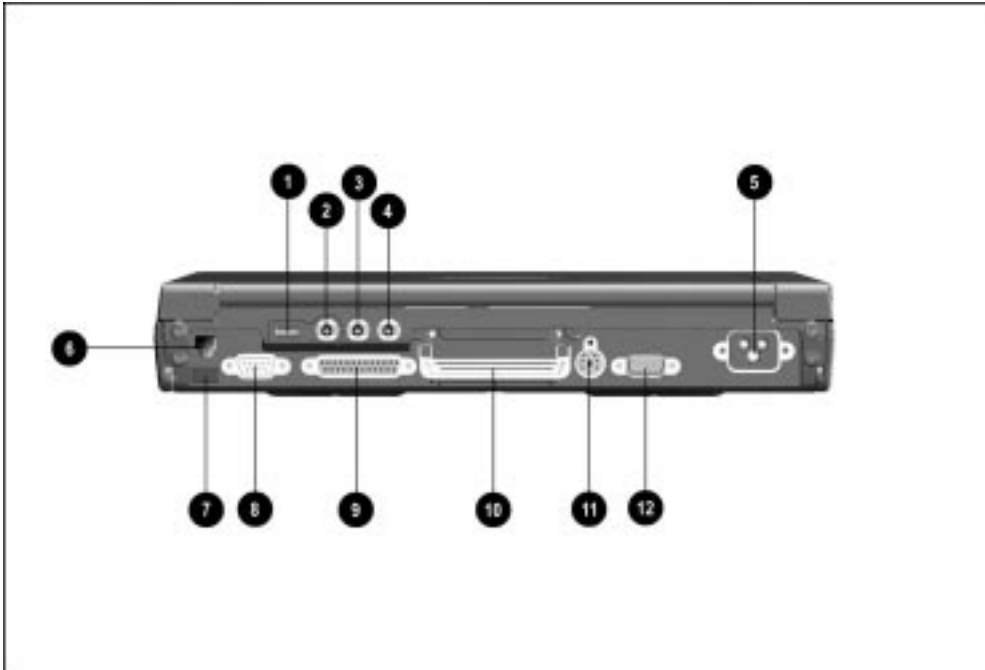


Figure 1-4. Rear Panel Components

Table 1-7
Rear Panel Components

Item	Component	Function
1	Universal serial bus (USB) connector	<p>Connects USB devices, such as cameras for video conferencing, or hubs which connect multiple USB devices.</p> <p>The USB connector is a powered hub. When running Windows 95 or higher or Windows NT or higher, any combination of up to five powered or unpowered hubs can be connected in any sequence, as long as two unpowered hubs are not connected next to each other.</p> <p>When running a lower version of Windows or Windows NT, or if using a different operating system, up to two hubs can be connected.</p>

Continued

Table 1-7 *Continued*

2	Mono microphone jack	Connects mono microphone, disabling the built-in microphone.
3	Stereo speaker/headphone jack	Connects external stereo speakers, headphones, or headset. This jack is driven by an amplifier and has volume control. The internal computer speakers are turned off when external speakers or headphones are plugged into this jack.
4	Stereo line-in jack	Connects external device such as a CD player, tuner, or tape deck.
5	Power cord connector	Connects external (AC) power.
6	RJ-11 modem jack	Connects a standard telephone cable for a modem in North America, Latin America, Japan, China, and Hong Kong only.
7	Infrared port	Provides wireless communication between the computer and another infrared-equipped device using an infrared beam.
8	Serial connector	Connects optional serial devices such as a mouse.
9	Parallel connector	Connects optional parallel devices such as a printer.
10	Docking connector	Connects optional ArmadaStation or Armada MiniStation E or EX.
11	Keyboard/mouse connector	Connects an optional full-sized keyboard or a mouse. Both external mouse and computer pointing device are active. An optional splitter/adaptor allows both an external keyboard and mouse to be used at the same time.
12	External monitor connector	Connects an optional external monitor. Also connects a television adapter.

Computer keyboard components are shown in Figure 1-5 and described in Table 1-8.



Figure 1-5. *Computer Components: Keyboard*

Table 1-8
Keyboard Components

Item	Component	Function
1	Display switch	Turns off the display if it is closed while the computer is turned on. The computer beeps unless audio has been disabled.
2	Vents	Allows airflow to cool the computer.
3	Suspend button	Toggles on to initiate or off to exit Suspend.
4	Volume control	Adjusts volume of stereo speakers.
5	Power switch	Turns computer on or off.
6	Scroll lock key	Turns on the scroll function.
7	Page up and page down keys	Moves image to previous or following screen.
8	Num Lk key	Turns on the numeric lock function.
9	Embedded numeric keypad	Converts keys to numeric keypad.
10	Cursor-control keys	Moves the cursor around the screen.
11	Fn key	Used with hotkeys to perform preset hotkey functions.
12	Caps lock key	Turns on the caps lock function.
13	F1 through F12 function keys	Perform preset functions.
14	Programmable keys	Assign and launch frequently used documents or applications and emulate Windows and Application Logo Keys.

Additional computer keyboard components are shown in Figure 1-6 and described in Table 1-9.

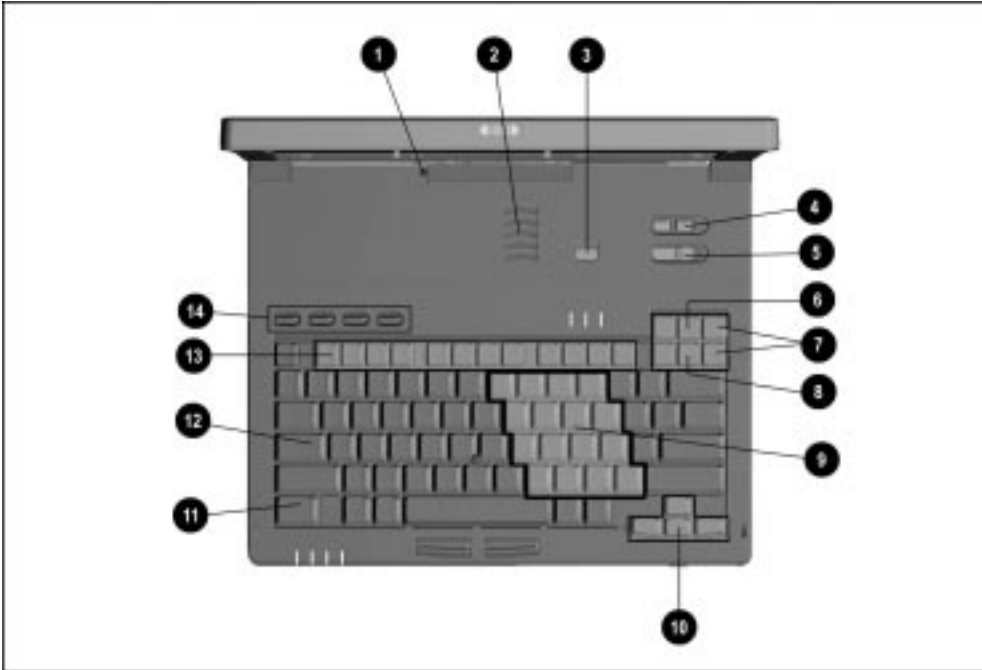


Figure 1-6. Keyboard Components (continued)

Table 1-9
Keyboard Components (continued)

Item	Component	Function
1	Power/suspend light (green)	Turns on when computer is turned on; blinks in Suspend; turns off when computer is in Hibernation or turned off.
2	Battery power light (orange)	Turns on when a battery pack in the battery bay is charging or waiting to charge. Turns off when battery pack is fully charged. Blinks 6 times if low-battery condition is reached. Blinks continuously if critical low-battery condition is reached. If AC power is not connected within 20 seconds, Hibernation is initiated (unless Hibernation has been disabled).
3	Hard drive light (green)	Turns on when the hard drive is being accessed.
4	MultiBay drive light (green)	Turns on when the MultiBay device is being accessed or when a battery pack in the MultiBay is charging or waiting to be charged.
5	Left and right mouse buttons	Function like left and right mouse buttons on an external mouse.
6	EasyPoint III pointing device	Moves the cursor across the screen.
7	Caps lock light	Turns on when the Caps Lock function is on.



8	Scroll lock light	Turns on when Scroll function is on.
9	Numeric lock light	Turns on when the Numeric Lock function is on.

The external components on the bottom of the computer are shown in Figure 1-7 and are described in Table 1-10.

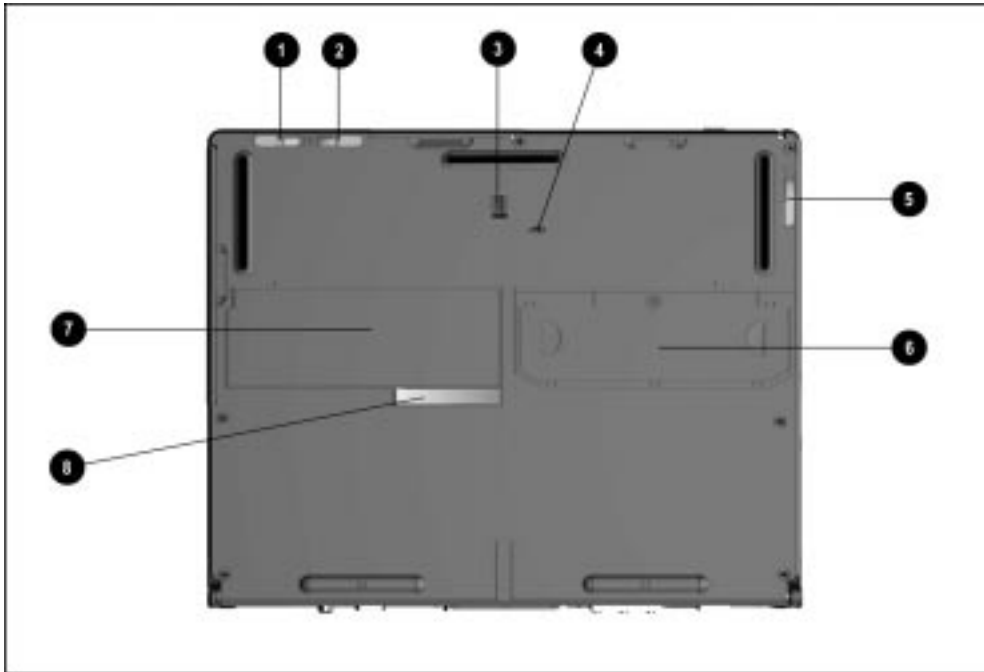


Figure 1-7. Bottom Components

Table 1-10
Bottom Components

Item	Component	Function
1	Battery release latch	Releases the battery from the battery bay.
2	Hard drive release latch	Releases the hard drive from the hard drive bay.
3	Docking restraint latch recess	Secures the computer to the ArmadaStation.
4	Hard drive/MultiBay security screw slot	Allows hard drives and MultiBay devices to be secured inside the computer using the single and dual bay security screws.
5	MultiBay release latch	Releases devices from the MultiBay.
6	Memory expansion slot cover	Covers the memory expansion compartment.
7	Labels area	Contains labels that describe the computer model and provide agency and modem information.
8	Serial number	Numerical identification for the computer.

1.4 Design Overview

This section presents a design overview of key parts and features of the computer. For assembly/disassembly instructions for the parts described in this section, refer to Chapter 5.

System Board

The system board provides the following device connections:

- Memory expansion board
- Diskette drive
- Hard drive
- CD-ROM drive
- Display
- Keyboard/EasyPoint III pointing device
- Audio
- Pentium II processor
- Fan
- PC Cards
- Modem

The computer is equipped with a 3.1-volt, Intel Mobile Pentium II 366-, 333-, 300-, or 266-MHz processor. For ventilation, an electrical fan is installed. The fan operates on from 5 to 12 volts and is controlled by a temperature sensor. The fan 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

Follow these basic steps when beginning the troubleshooting process:

1. Complete the preliminary steps listed in Section 2.1.
2. Run the Power-On Self-Test (POST) as described in Section 2.3.
3. Run Computer Setup as described in Section 2.5.
4. Run the Computer Checkup (TEST) as described in Section 2.6.
5. If you are unable to run POST or Computer Checkup or if the problem persists after running POST and Computer Checkup, perform the recommended actions described in the diagnostic tables in Section 2.5.

Follow these guidelines when troubleshooting:

- Complete the recommended actions in the order in which they are given.
- Repeat POST and Computer Checkup after each recommended action until the problem is resolved and the error message does not return.
- When the problem is resolved, stop performing the troubleshooting steps and do not complete the remaining recommended actions.
- Refer to Chapter 5 for removal and replacement procedures that are recommended.
- If the problem is intermittent, check the computer several times to verify that the problem is solved.

The following table describes the troubleshooting actions:

If You Want To:	Then Run:
Check for POST error messages	POST
Check that computer components are recognized and running properly	Computer Checkup (TEST) under Compaq Utilities
View information about the computer and installed or connected devices	View System Information (INSPECT) under Compaq Utilities
Perform any of the following: <ul style="list-style-type: none">■ Check the system configuration■ Set the system power management parameters■ Return the system to its original configuration■ Check system configuration of installed devices	Computer Setup

.....

2.1 Preliminary Steps

IMPORTANT: Use AC power when running POST, Computer Setup, or Computer Checkup. A low battery condition could initiate Hibernation and interrupt the test.

Before running POST and Computer Checkup, complete the following steps:

1. Obtain established passwords. If you must clear the passwords, go to Section 2.2.
2. Ensure that the hard drive is installed in the computer.
3. Ensure that the battery pack is installed in the computer and the power cord is connected to the computer and plugged into an AC power source.
4. Turn on the computer.
5. If a power-on password has been established, type the password and press **Enter**.
6. Run Computer Setup (Section 2.5). If a Setup password has been established, type the password and press **Enter**.
7. Turn off the computer and all external devices.
8. Disconnect external devices that you do not want to test. If you want to use the printer to log error messages, leave it connected to the computer.

NOTE: If a problem only occurs when an external device is connected to the computer, the problem could be with the external device or its cable. Isolate the problem by running POST with and without the external device connected.

9. Use Compaq Utilities and loopback plugs in the serial and parallel connectors if you plan to test these ports.

Follow these steps to run Compaq Utilities:

- a. If you are running Compaq Utilities from the hard drive, turn on or restart the computer. Press **F10** when the cursor appears in the upper-right corner of the screen. If you do not press **F10** in time, restart the computer and try again.

If you are running Compaq Utilities from diskette, insert the Compaq Utilities diskette in drive A. Turn on or restart the computer.

- b. Press **Enter** to accept **OK**.
- c. Select Computer Checkup (TEST).
- d. Select Prompted Diagnostics.
- e. After “Identifying System Hardware” completes, select Interactive Testing and follow the instructions on the screen.

.....

2.2 Clearing Passwords

1. Turn off the computer.
2. Disconnect the power cord (refer to Section 5.4).
3. Remove the battery pack (Section 5.7).
4. Remove the keyboard (Section 5.11).
5. Remove the audio/USB board (Section 5.14).
6. Remove the modem board (Section 5.15).
7. Remove the audio assembly bracket (Section 5.16).
8. Remove the lithium disc cell battery (Section 5.17).
9. Disconnect the auxiliary battery (Section 5.19).
10. Allow the computer to set for five minutes.
11. Reconnect the auxiliary battery.
12. Install the lithium disc cell battery.
13. Install the audio assembly bracket, modem board, audio/USB board, and keyboard.
14. Reconnect the power cord. Do **not** reinstall the battery pack yet.
15. Turn on the computer.

NOTE: Remember to set the date and time the next time the computer is turned on.

2.3 Power-On Self-Test (POST)

The Power-On Self-Test (POST) is a series of tests that run every time the computer is turned on. POST verifies that the system is configured and functioning properly.

To run POST, complete the following steps:

1. Complete the preliminary steps (Section 2.1).
2. Turn on the computer.

If POST does not detect any errors, the computer beeps once or twice to indicate that POST has run successfully. The computer boots from the hard drive or from a bootable diskette if one is installed in the diskette drive.

2.4 POST Error Messages

If the system is not functioning well enough to run POST, or if the display is not functioning well enough to show POST error messages, refer to the Troubleshooting tables in Section 2.7.

If POST detects an error, one of the following events occurs:

- A message with the prefix "WARNING" appears, informing you where the error occurred. The system pauses until you press **F1** to continue.
- A message with the prefix "FATAL" appears, informing you where the error occurred. After the message, the system emits a series of beeps, then stops.
- The system emits a series of beeps, then stops.

Warning messages indicate that a potential problem, such as a system configuration error, exists. When **F1** is pressed, the system should resume. You should be able to correct problems that produce WARNING messages.

IMPORTANT: When a WARNING message includes the prompt to "RUN SCU," press **F10** to run Computer Setup. (Computer Setup replaces the SCU utility.)

If you receive one of the error messages listed below, follow the recommended action.

**Table 2-1
Warning Messages**

Message	Description	Recommended Action
CMOS checksum invalid, run SCU	CMOS RAM information has been corrupted.	Run Computer Setup to reinitialize CMOS-RAM.
CMOS failure, run SCU	CMOS RAM has lost power.	Run Computer Setup to reinitialize CMOS-RAM.
Diskette controller error	The diskette drive controller failed to respond to the recalibrate command.	If there is no diskette drive in the system, run Computer Setup to properly configure the CMOS-RAM to show no diskette drive present. If the problem persists, or if a diskette drive is present, complete these steps until the problems is solved: <ol style="list-style-type: none">1. Check diskette drive connections.2. Replace diskette drive.3. Replace system board.
Diskette track 0 failed	The diskette drive cannot read track 0 of the diskette in the drive.	Try another diskette. If the problem persists, you may need to replace the diskette drive.



Hard disk controller error	The hard drive controller failed to respond to the reset command.	Check the drive parameters. Turn off the system and check all related connections.
----------------------------	---	---

Continued

Table 2-1 *Continued*

Keyboard controller failure	The keyboard failed the self-test command.	Replace the system board.
Keyboard failure	The keyboard failed to respond to the RESET ID command.	Replace the keyboard. If the problem persists, replace the system board.
No interrupts from Timer 0	The periodic timer interrupt is not occurring.	Replace the system board.
ROM at xxxx (LENGTH yyyy) with nonzero checksum (zz)	An illegal adapter ROM was located at the specified address.	Check the external adapter (such as a video card) to determine if it is causing the conflict.
Time/Date corrupt - run SCU	The time and date stored in the real time clock have been corrupted, possibly by a power loss.	<ol style="list-style-type: none">1. Run Computer Setup.2. If problem persists, replace auxiliary battery.3. If problems persists, replace system board.
Hard disk xx failure (or error)	A failure or an error occurred when trying to access the hard drive.	<ol style="list-style-type: none">1. Run Scan disk.2. Check disk in DOS and Windows 95. If problem persists, refer to Table 2-10.

Fatal errors emit a beep and may display a FATAL message. Fatal errors indicate severe problems, such as a hardware failure. Fatal errors do not allow the system to resume. Some of the Fatal error beep codes are listed at the end of this section.

Table 2-2
Fatal Error Messages

Message	Description	Beep Code*
CMOS RAM test failed	A walking bit test of CMOS RAM location 0E (Hex) - 3F (Hex) failed.	3
DMA controller faulty	A sequential read/write of the transfer count and transfer address registers within the primary and secondary DMA controllers failed.	4
Faulty DMA page registers	A walking bit read/write of the 16 DMA controller page registers starting at location 80 Hex failed.	0
Faulty refresh circuits	A continuous read/write test of port 61h found that bit 4 (Refresh Detect) failed to toggle within an allotted amount of time.	1
Interrupt controller failed	A sequential read/write of various Interrupt Controller registers failed.	5
ROM checksum incorrect	A checksum of the ROM BIOS does not match the byte value at F000:FFFF.	2
RAM error at location xxxx	RAM error occurred during memory test.	None

.....

*Beep codes are defined in Table 2-3.

**Table 2-3
Fatal Error Beep Codes**

Beep Code	Beep Sequence	Description	Recommended Action
0	S-S-S-P-S-S-L-P	The DMA page registers are faulty.	Replace system board or system board if memory on system board is faulty.
1	S-S-S-P-S-L-S-P	The refresh circuitry is faulty.	
2	S-S-S-P-S-L-L-P	The ROM checksum is incorrect.	
3	S-S-S-P-L-S-S-P	The CMOS RAM test failed.	
4	S-S-S-P-L-S-L-P	The DMA controller is faulty.	
5	S-S-S-P-L-L-S-P	The interrupt controller failed.	
6	S-S-S-P-L-L-L-P	The keyboard controller failed.	
7	S-S-L-P-S-S-S-P	Graphics adapter is faulty.	
8	S-S-L-P-S-S-L-P	Internal RAM is faulty.	

NOTE: S = Short, L = Long, P = Pause

2.5 Compaq Utilities

Compaq Utilities contain several functions that

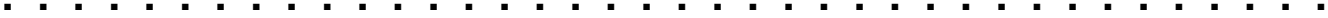
- Determine if various computer devices are recognized by the system and are operating properly.
- Provide information about the system once it is configured.

Compaq Utilities include the following programs:

- Computer Setup
- Computer Checkup (TEST)
- View System Information (INSPECT)

To access Compaq Utilities:

1. Turn on or restart the computer by clicking Start → Shut Down → Restart the computer.
2. Press **F10** when the blinking cursor appears in the upper-right corner of the display.



3. Select a menu option.

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Computer Setup

Computer Setup contains utilities that give you an overall picture of the computer hardware configuration and aid in troubleshooting. These utilities also allow you to set custom features such as security options, power conservation levels, and startup preferences.

If you are running Windows 95, the computer automatically recognizes and configures the system for new devices. If you have a configuration problem or want to view or reset configuration settings, you can use Computer Setup.

NOTE: If you are running Windows 95, you should use Computer Setup only to adjust system features such as the power-on password or battery conservation level. Windows 95 may override other configuration changes.

If you are running Windows NT, the computer does not automatically recognize new devices added to the system. All devices ordered with your system have been configured for you. Use Computer Setup to view settings for a new device you have added or to reset configuration settings for preinstalled devices.

Computer Setup provides two methods of viewing the computer configuration: by type (factory setting) or connection.

Categories by type:

- System Features—security, power, boot management
- Communication—port, modem, and other communication devices
- Storage—storage-related devices such as hard drive, CD-ROM drive, diskette drive
- Input Devices—keyboard, mouse, and other input devices
- Network—network adapter or other network-related devices
- Audio—sound properties and audio device settings
- Video—display timeouts and video device resources
- Other—miscellaneous devices

Categories by connection:

- System Features—security, power, boot management
- System Devices—keyboard, mouse, parallel and serial ports
- ISA—ISA bus and connected devices
- PCI—PCI bus and connected devices

-
- PC Card—PC Card devices

Running Computer Setup

1. Turn on or restart the computer by clicking Start → Shut Down → Restart the computer.
2. Press **F10** when the blinking cursor appears in the upper-right corner of the screen.

NOTE: If you a setup password is enabled, it must be used to access Computer Setup.

3. Click a language and press **Enter**.
4. Click Computer Setup and press **Enter**.
5. When you are finished, click **Exit**.

Exiting Computer Setup

1. Click **Exit**.
2. Select one of the following Exit options:
 - Save—Saves the new settings and exits Computer Setup.

NOTE: Some settings may not take effect until the computer is restarted.

- Ignore—Exits Computer Setup and restores previous settings.
- Cancel—Returns to Computer Setup.

.....

Computer Checkup (TEST)

Computer Checkup (TEST) determines whether the various computer components and devices are recognized by the computer and are functioning properly. You can display, print, or save the information that Computer Checkup generates.

NOTE: Compaq Utilities are intended for testing only Compaq-supplied components. Testing of non-Compaq components may be inconclusive.

Running Computer Checkup (TEST)

1. Plug the computer into an external power source. A low battery condition can interrupt the program.
2. Connect a printer if you want to print a log of error messages.
3. Turn on the external devices that you want to test.
4. Turn on or restart the computer.
5. Access Compaq Utilities by pressing **F10** when the blinking cursor appears in the upper-right corner of the display.
6. Click Computer Checkup → View the Device List.
 - If the list of installed devices is correct, click **OK**.
 - If the list is incorrect, ensure that any new devices are installed properly.
7. Select one of the following from the Test Option menu:
 - Quick Check Diagnostics
 - Automatic Diagnostics
 - Prompted Diagnostics
8. Follow the instructions on the screen as the devices are tested.
9. Click Exit Diagnostics → Exit from this utility.

Computer Checkup (TEST) Error Codes

Computer Checkup (TEST) error codes occur if the system recognizes a problem while running Computer Checkup. These error codes help identify possibly defective assemblies. Tables 2-4 through 2-14 list Computer Checkup error codes, a description of the error condition, and the recommended action for resolving the condition. For removal and replacement procedures, refer to Chapter 5.

IMPORTANT: Run Computer Checkup each time you complete a recommended action step. If the problem is resolved when POST and Computer Checkup are rerun (i.e., with no error codes), do not perform the remaining recommended action steps.

NOTE: The error codes in the following tables are listed in an “AYY-XX” format, where:

A or AA = Number that represents the faulty assembly

YY = Test or action that failed

XX = Specific problem

Table 2-4
Processor Test Error Codes

Error Code	Description	Recommended Action
101-xx	CPU test failed.	Replace the processor board and retest.
103-xx	DMA page registers test failed.	Replace the system board and retest.
104-xx	Interrupt controller master test failed.	
105-xx	Port 61 error.	
106-xx	Keyboard controller self-test failed.	
107-xx	CMOS RAM test failed.	
108-xx	CMOS interrupt test failed.	
109-xx	CMOS clock test failed.	
110-xx	Programmable timer load data test failed.	
113-xx	Protected mode test failed.	

**Table 2-5
Memory Test Error Codes**

Error Code	Description	Recommended Action
200-xx	Memory machine ID test failed.	The following steps apply to error codes 200-xx and 202-xx:
202-xx	Memory system CMOS checksum failed.	1. Flash the system CMOS and retest. 2. Replace the system board and retest.
203-xx	Write/Read test failed.	The following applies to error codes 203-xx through 215-xx:
204-xx	Address test failed.	Remove and replace the memory board or system board (if the memory board on the system board is faulty) and retest.
211-xx	Random pattern test failed.	
214-xx	Noise test failed.	
215-xx	Random address test failed.	

**Table 2-6
Keyboard Test Error Codes**

Error Code	Description	Recommended Action
300-xx	Failed ID Test.	The following steps apply to error codes 300-xx through 304-xx: 1. Reseat the keyboard assembly.
301-xx	Failed Self test/Interface Test.	2. Replace the keyboard and retest.
302-xx	Failed Individual Key Test.	3. Replace the system board and retest.
304-xx	Failed Keyboard Repeat Test.	

**Table 2-7
Parallel Printer Test Error Codes**

Error Code	Description	Recommended Action
401-xx	Printer failed or not connected.	The following steps apply to error codes 401-xx through 403-xx: 1. Connect the printer.
402-xx	Failed Port Test.	2. Check power to the printer.
403-xx	Printer pattern test failed.	3. Install the loopback connector and retest. 4. Check port and IRQ configuration. 5. Replace the system board and retest.

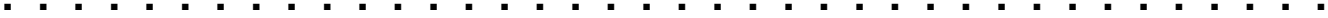


Table 2-8
Diskette Drive Error Codes

Error Code	Description	Recommended Action
600-xx	Diskette ID drive types test failed.	The following steps apply to error codes 600-xx through 698-xx:
601-xx	Diskette format failed.	1. Replace the diskette.
602-xx	Diskette read test failed.	2. Replace the diskette drive and retest.
603-xx	Diskette write, read, compare test failed.	3. Replace the system board and retest.
604-xx	Diskette random read test failed.	
605-xx	Diskette ID media test failed.	
606-xx	Diskette speed test failed.	
609-xx	Diskette reset controller test failed.	
610-xx	Diskette change line test failed.	
697-xx	Diskette type error.	
698-xx	Diskette drive speed not within limits.	
699-xx	Diskette drive/media ID error.	1. Replace media. 2. Run Compaq Utilities.

Table 2-9
Serial Test Error Codes

Error Code	Description	Recommended Action
1101-xx	Serial port test failed.	1. Check port configuration. 2. Replace the system board and retest.

Table 2-10
Hard Drive Test Error Codes

Error Code	Description	Recommended Action
1701-xx	Hard drive format test failed.	The following steps apply to error codes 1701-xx through 1736-xx: 1. Run Compaq Utilities and verify drive type. 2. Verify that all secondary drives have secondary drive capability. 3. Replace the hard drive and retest. 4. Replace the system board and retest.
1702-xx	Hard drive read test failed.	
1703-xx	Hard drive write/read/compare test failed.	
1704-xx	Hard drive random seek test failed.	
1705-xx	Hard drive controller test failed.	
1706-xx	Hard drive ready test failed.	
1707-xx	Hard drive recalibration test failed.	
1708-xx	Hard drive format bad track test failed.	
1709-xx	Hard drive reset controller test failed.	
1710-xx	Hard drive park head test failed.	
1715-xx	Hard drive head select test failed.	
1716-xx	Hard drive conditional format test failed.	
1717-xx	Hard drive ECC* test failed.	
1719-xx	Hard drive power mode test failed.	
1724-xx	Network preparation test failed.	
1736-xx	Drive monitoring test failed.	

*ECC = Error Correction Code

Table 2-11
Video Test Error Codes

Error Code	Description	Recommended Action
501-xx	Video controller test failed.	The following actions apply to error codes 501-xx through 516-xx: 1. Disconnect external monitor and test with internal LCD display. 2. Replace the display assembly and retest. 3. Replace the system board and retest.
502-xx	Video memory test failed.	
503-xx	Video attribute test failed.	
504-xx	Video character set test failed.	
505-xx	Video 80 × 25 mode 9 × 14 character cell test failed.	
506-xx	Video 80 × 25 mode 8 × 8 character cell test failed.	
507-xx	Video 40 × 25 mode test failed.	
511-xx	Video screen memory page test failed.	
512-xx	Video gray scale test failed.	
514-xx	Video white screen test failed.	
516-xx	Video noise pattern test failed.	The following actions apply to error codes 2402-xx through 2456-xx: 1. Run Compaq Utilities. 2. Disconnect external monitor and test with internal LCD display. 3. Replace the display assembly and retest. 4. Replace the system board and retest.
2402-xx	Video memory test failed.	
2403-xx	Video attribute test failed.	
2404-xx	Video character set test failed.	
2405-xx	Video 80 × 25 mode 9 × 14 character cell test failed.	
2406-xx	Video 80 × 25 mode 8 × 8 character cell test failed.	
2411-xx	Video screen memory page test failed.	
2412-xx	Video gray scale test failed.	
2414-xx	Video white screen test failed.	
2416-xx	Video noise pattern test failed.	
2418-xx	ECG/VGC memory test failed.	
2419-xx	ECG/VGC ROM checksum test failed.	
2421-xx	ECG/VGC 640 × 200 graphics mode test failed.	
2422-xx	ECG/VGC 640 × 350 16 color set test failed.	
2423-xx	ECG/VGC 640 × 350 64 color set test failed.	
2424-xx	ECG/VGC monochrome text mode test failed.	

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- 2425-xx ECG/VGC monochrome graphics mode test failed.
 - 2431-xx 640 × 480 graphics test failed.
 - 2448-xx Advanced VGA Controller test failed.
-

Continued

Table 2-11 *Continued*

Error Code	Description	Recommended Action
2451-xx	132-column Advanced VGA test failed.	
2456-xx	Advanced VGA 256 Color test failed.	
2458-xx	Advanced VGA Bit BLT test failed.	The following action applies to error codes 2458-xx to 2480-xx:
2468-xx	Advanced VGA DAC test failed.	Replace the system board and retest.
2477-xx	Advanced VGA data path test failed.	
2478-xx	Advanced VGA BitBLT test failed.	
2480-xx	Advanced VGA Linedraw test failed.	

NOTE: Refer to Table 2-25 for information about other video errors.

Table 2-12
Audio Test Error Codes

Error Code	Description	Recommended Action
114-01	Speaker test failed.	1. Check system configuration. 2. Verify display audio cable connection.
3206-xx	Audio System Internal Error	Replace the audio board and retest.

Table 2-13
Pointing Device Interface Test Error Codes

Error Code	Description	Recommended Action
8601-xx	Pointing device test failed.	The following action applies to error codes 8601-xx and 8602-xx. Replace the keyboard/CPU cover assembly.
8602-xx	Interface test failed.	

Table 2-14
CD-ROM Test Error Codes

Error Code	Description	Recommended Action
3301-xx	CD-ROM drive read test failed.	The following action applies to error codes 3301-xx and 3305-xx and 6600-xx through 6623-xx. 1. Replace the CD and retest. 2. Verify that drivers are loaded and properly installed.
3305-xx	CD-ROM drive seek test failed.	3. Replace the CD-ROM drive and retest. 4. Replace the system board and retest.
6600-xx	ID test failed.	
6605-xx	Read test failed.	
6608-xx	Controller test failed.	

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6623-xx Random read test failed.

.....

Running View System Information (INSPECT)

The View System Information (INSPECT) utility provides information about the computer and installed or connected devices. You can display, print, or save the information.

1. Connect a printer if you want to print the INSPECT information.
2. Turn on or restart the computer.
3. Access Compaq Utilities by pressing **F10** when the cursor blinks in the upper-right corner of the display.
4. If prompted, select a language.
5. Click View System Information (INSPECT).
6. Click the item you want to view from the following list:
 - System
 - ROM
 - Keyboard
 - System ports
 - System storage
 - Graphics
 - Memory
 - Audio
 - Operating system
 - System files
 - Windows files
 - Miscellaneous
 - Network (applicable only if computer is docked in the ArmadaStation or Armada MiniStation)
7. Follow the instructions on the screen to cycle through the screens, to return to the list and choose another item, or to print the information.
8. Select Exit Inspect.

Running Compaq Diagnostics

Compaq Diagnostics provides computer component information when the operating system is working.

If you are running Windows 95, access Compaq Diagnostics for Windows by double-clicking My Computer → Control Panel → Compaq Diagnostics.

If you are running Windows NT, access Windows NT Diagnostics by clicking Start → Programs → Administrative Tools → Windows NT Diagnostics.

Boot Sequencing

1. Run Computer Setup.
2. Click the System Features icon → Boot Management box → MultiBoot tab.
3. Designate the hard drive boot (startup) sequence you want.
4. Click **OK** to accept the changes.

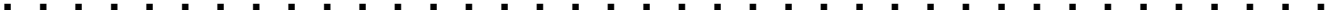
Factory Default Settings

Table 2-15
Initialization

Enable POST Memory Test	Checked (enabled)
Keyboard Num Lock	Unchecked (Off)
1	Hard drive in the computer hard drive bay
2	Hard drive in the computer MultiBay
3	Hard drive in the ArmadaStation or Armada MiniStation
4	Hard drive in the ArmadaStation half-height bay (if converted to a MultiBay)
Boot display	Auto
Language	Language of country

Table 2-16
Ports

Serial port	3F8, IRQ4
Infrared port	3F8, IRQ4
Parallel port	3F8, IRQ7
Ethernet port	300, IRQ9



**Table 2-17
Power**

Low Battery Warning Beep	Checked (enabled)
External Energy Saving Monitor Connected	Unchecked (not connected)
Power Management	
Enabled	While operating power on battery
Conservation Level	Medium
Level Definition	
High	Suspend Time: 5 minutes Hibernation Timeout: Immediate Drive Timeout: 2 minutes Screen Timeout: 2 minutes
Medium	Suspend Time: 10 minutes Hibernation Timeout: 1 hour Drive Timeout: 6 minutes Screen Timeout: 4 minutes
Custom	Suspend Time: disabled Hibernation Timeout: low battery Drive Timeout: always on Screen Timeout: always on

**Table 2-18
Security**

Enable QuickLock/QuickBlank	Unchecked (Disabled)
Enable Power-On Password	Unchecked (Disabled)
Disable Serial/Infrared Ports	Unchecked (Enabled)
Disable Parallel Port	Unchecked (Enabled)
Disable PC Card Slots	Unchecked (Enabled)
Setup Password	Password blank
Power-On Password	Password blank
Diskette Drives	
Disable Diskette Drives	Unchecked (Enabled)
Disable Diskette Boot	Unchecked (Enabled)

2.6 Troubleshooting Without Diagnostics

This section provides information about how to identify and correct some common hardware, memory, and software problems. It also explains several types of messages that may be displayed on the screen.

Since symptoms can appear to be similar, carefully match the symptoms of the computer malfunction against the problem description in the Troubleshooting tables to avoid a misdiagnosis.

Before Replacing Parts

When troubleshooting a problem, check the following items for possible solutions before replacing parts:

- Verify that cables are connected properly to the suspected defective parts.
- Verify that all required device drivers are installed.
- Verify that all printer drivers have been installed for each application.

Checklist for Solving Problems

If you encounter a minor problem with the computer or software applications, go through the following checklist for possible solutions:

- Is the computer connected to an external power source, or does it have a fully charged battery pack installed?
- Are all cables connected properly and securely?
- Did the diskette drive contain a nonbootable diskette when you turned on the computer?
- Have you installed all the needed device drivers? For example, if you are using a mouse, you may need to install a mouse device driver.
- Are printer drivers installed for each application?

Eliminating the typical problems described in this Troubleshooting section may save you time and money. If the problem appears related to a software application, check the documentation provided with the software. You may discover something you can resolve easily by yourself.

If the condition persists, contact your Compaq authorized dealer or service provider.

Table 2-19
Solving Audio Problems

Problem	Probable Cause	Recommended Action(s)
Computer does not beep after the Power-On Self-Test (POST).	Speaker volume has been turned down.	Adjust the volume with the volume control buttons located at the top-right corner of the computer.
Computer beeped five times and battery light is blinking.	Computer has entered a low-battery condition.	Immediately save open files and resolve the low-battery condition.
Computer does not beep to indicate a low-battery condition.	Low-battery warning beeps have been turned off.	Enable low-battery warning beeps in Windows 95 Power Properties or in Computer Setup → Power Management.
	System beeps have been turned down too low.	Press Fn+F5 , then press the right arrow key to increase the volume of the system beeps.
Audio playback is too low or too loud.	The computer volume control and/or the software volume control needs to be adjusted.	In Windows 95, adjust the computer volume control buttons and adjust the volume control in Multimedia Properties. NOTE: The volume control in Multimedia Properties only affects the "Wave" audio sources such as system sounds and *.wav file playback. To change other sources such as MIDI, video sound, and game effects, use the Volume Control application in Accessories/Multimedia. In Windows NT, adjust the multimedia volume control under the Accessories folder.
Internal speakers produce no sound.	Volume has been muted.	Press the right volume control button to increase the volume.
	External speakers or headphones are connected to the computer, or the computer is docked in the ArmadaStation.	Use the external speakers or headphones or use the ArmadaStation speakers. To use the internal speakers, disconnect the external speakers or headphones or undock the computer.
	Speaker wires are not connected.	Make sure the speaker wires are connected properly.
	Speakers are bad.	Replace the speakers.
Internal speaker does not produce sound when an external audio source is connected to the stereo line-in jack.	Volume may be turned off or set too low.	<ul style="list-style-type: none"> ■ Adjust the volume control located at the top right corner of the computer. ■ Use the volume control and mixing features available in Control Panel → Multimedia. ■ Adjust the volume using the speaker icon on the taskbar.

Continued

Table 2-19 *Continued*

Problem	Probable Cause	Recommended Action(s)
Internal speaker does not produce sound when an external audio source is connected to the stereo line-in jack.	Line input may not be connected properly.	Check line input connection.
	Headphones or speakers are connected to the stereo speaker/headphone jack, which disables the internal speakers.	Disconnect the headphones or speakers to enable the internal speakers.
External microphone does not work.	The wrong type of microphone or microphone plug is being used.	Check to see if a monophonic electret condenser microphone with a 3.5-mm plug is being used.
	The microphone may not be connected properly.	Ensure that the microphone plug is properly connected to the mono microphone jack.
	Sound source is not selected.	Ensure that microphone is selected as the recording source in Control Panel → Multimedia and that the recording level is adjusted.
No sound from game program.	Audio settings are not set correctly.	Check the game program audio settings.
	Computer volume control is turned down.	Adjust the volume with the volume control buttons located at the top-right corner of the computer.
	Headphones are connected.	Use or disconnect the headphones.
No sound from headphones.	Volume or mixing controls set incorrectly.	<ul style="list-style-type: none">■ Adjust the volume with the volume control buttons located at the top-right corner of the computer.■ Use the volume control and mixing features available in Control Panel → Multimedia.
	Sound source not selected.	Verify that the sound source is selected in Control Panel → Multimedia.
	Volume or mixing controls set incorrectly.	<ul style="list-style-type: none">■ Adjust the volume with the volume control buttons located at the top-right corner of the computer.■ Check the volume and mixer controls in Control Panel → Multimedia.

NOTE: Refer to the "Solving Power Problems" section in this chapter for more information on troubleshooting battery pack problems.

**Table 2-20
Solving Battery and Battery Gauge Problems**

Problem	Probable Cause	Recommended Action(s)
The computer turns on the first time it is used, but the battery does not charge.	The battery pack is in ship mode.	Remove and reinsert the battery pack.
Computer does not turn on when battery pack is inserted and power cord is unplugged.	Battery is discharged.	Ensure that the battery pack is properly installed. Connect the computer to an external power source and charge the battery pack. Replace the battery pack with a fully charged battery pack. Check battery status by pushing the button on the battery pack.
Computer beeped five times and battery light is blinking.	Computer has entered a low-battery condition.	Immediately save any open file(s). Then do one of the following: <ul style="list-style-type: none"> ■ Connect the computer to an external power source. ■ Turn the computer off and replace the battery pack.
Computer battery light blinks to indicate low battery condition, but computer does not beep.	Low battery beeps were turned off.	Run Computer Setup and turn on the low battery warning beeps.
	Volume is turned off or turned down too low.	Press Fn+F5 to adjust the volume of the system warning beeps.
Battery light does not turn on to indicate battery pack is charging.	Battery pack is already charged.	No action is necessary.
	Battery pack was exposed to temperature extremes.	Allow time for the battery pack to return to room temperature.
	Battery pack is at the end of its life.	Replace the battery pack.
Battery pack is warm to the touch after charging.	Warming occurs during charging.	No action is required.
Computer turned off and information in memory was lost when the battery pack was replaced.	Hibernation was disabled, Suspend was not initiated, or a charged battery pack was not inserted immediately after the discharged battery pack was removed.	To prevent loss of information next time, initiate Suspend or enable Hibernation, remove the discharged battery pack, and immediately insert a fully charged battery pack.

Continued

Table 2-20 *Continued*

Problem	Probable Cause	Recommended Action(s)
Computer turned off and information in memory was lost when the battery pack was replaced.	Auxiliary battery charge is low because the computer was not connected to a power source for an extended period of time.	Connect the computer to an external power source for approximately 24 hours to fully charge the auxiliary battery.
You have to set the date and time every time you turn on the computer.	Auxiliary battery charge is low.	Connect the computer to an external source for approximately 24 hours to fully charge the auxiliary battery.
	Auxiliary battery is at the end of its life.	Replace the auxiliary battery.
Battery pack charge does not last as long as expected.	Battery pack is being exposed to high temperatures or extremely cold temperatures.	Keep the battery pack within the recommended operating temperature range 50°F to 104°F (10°C to 40°C) or recommended storage range -4°F to 86°F (-20°C to 30°C). Recharge the battery pack.
	Battery pack has partially self-discharged.	If the computer is disconnected from the external power for more than two weeks, remove the battery pack to reduce the self-discharge rate.
	Power management is disabled.	Press Fn+F7 and set the power conservation level.
Computer is beeping and battery power light is blinking.	An external device or PC Card is draining the battery.	Turn off or disconnect external devices when not using them.
	Battery pack charge is low.	Do one of the following: <ul style="list-style-type: none">■ Charge the battery pack.■ Replace the battery pack.■ Connect the computer to an external power source.■ Initiate Hibernation.

Table 2-21
Solving CD-ROM Drive Problems

Problem	Probable Cause	Recommended Action(s)
CD-ROM drive cannot read a compact disc.	Compact disc is not properly seated in the CD-ROM drive.	Open the CD loading tray, lay the compact disc on it, then close the tray.
	Compact disc in the CD loading tray is loaded upside down.	Open the CD loading tray, turn over the compact disc (label facing up), then close the tray.
	Compact disc has a scratch on its surface.	Insert a different compact disc.



CD-ROM drive is not recognized by the computer.

CD-ROM drive is not connected properly.

If you are running Windows 95, turn off the computer. Remove the CD-ROM drive from the MultiBay, then reinsert it.

If you are running Windows NT, turn off the computer or initiate Suspend. Remove the CD-ROM drive from the MultiBay, then reinsert it.

Table 2-22
Solving Diskette and Diskette Drive Problems

Problem	Probable Cause	Recommended Action(s)
Diskette drive cannot read a diskette.	Diskette media has a bad sector.	Copy remaining files to the hard drive or another formatted diskette. Reformat the diskette.
	Using the wrong diskette type for the diskette drive type. Diskette is not formatted.	Use the required diskette type. Format the diskette. If you are using Windows 95: 1. From the Windows 95 desktop, double-click My Computer. 2. Click 3 ½ Floppy (A:) → File → Format. 3. Fill in the appropriate information, then click Start. If you are using Windows NT, format the diskette by entering format a: at the system prompt.
Diskette drive cannot write to a diskette.	Diskette is not formatted.	Format the diskette. If you are using Windows 95: 1. From the Windows 95 desktop, double-click My Computer. 2. Click 3 ½ Floppy (A:) → File → Format. 3. Fill in the required information, then click Start. If you are using Windows NT, format the diskette by entering format a: at the system prompt.
	Diskette is write-protected.	Use another diskette that is not write-protected or disable the write-protect feature.
	Writing to the wrong drive.	Check the drive letter in your path statement.
	Not enough space is left on the diskette.	Save the information to another diskette.
	Disable diskette write ability is turned on.	Run Computer Setup. Click on the Storage icon. Make sure Disable diskette write ability is not checked.



CAUTION: To prevent loss of information, always maintain an up-to-date backup of the hard drive.

Table 2-23
Solving Hard Drive Problems

Problem	Probable Cause	Recommended Action(s)
Cannot access hard drive.	Hard drive is not seated.	Shut down the computer, remove and reinsert the hard drive, then turn on the computer.
	Hard drive was inserted while computer was on, in Suspend, or in Hibernation.	Shut down the computer, then turn it on again to initialize the hard drive during power on.
	Hard drive may be damaged.	Try inserting another hard drive.
Reading hard drive takes more time than usual after restarting the computer.	Hibernation was initiated and system is now exiting from it.	Give the system time to restore the previously saved data.
Hard drive error occurs.	Hard drive has bad sectors or has failed.	Do one of the following: <ul style="list-style-type: none">■ If you are running Windows 95, access ScanDisk by clicking Start → Programs → Accessories → System Tools → ScanDisk, then check the Automatically fix errors box. Click Start to begin scanning.If you are running Windows NT, go to the system prompt and type chkdsk to scan for errors.■ Reformat the hard drive.■ Contact your Compaq authorized dealer, reseller, or service provider or Compaq customer support for assistance.
Hard drive error occurs.	Hard drive may be damaged.	Try inserting another removable drive, if the hard drive is in the MultiBay.
Errors occur after starting from an additional hard drive.	Additional hard drive does not have the software and drivers necessary to boot and operate correctly.	Boot from the hard drive supplied with the computer or another hard drive that has the necessary software and drivers.
Hard drive does not work.	Hard drive is not seated.	Turn off and unplug the computer, remove the hard drive, then reinsert it.

Table 2-24
Solving Hardware Installation Problems

Problem	Probable Cause	Recommended Action(s)
New device is not recognized as part of the computer system.	The system did not automatically configure the new device.	In Windows 95, double-click the Add New Hardware icon in Control Panel. Refer to the documentation that came with the new device for installation instructions.
	Cable(s) of new external device are loose, or power cables are unplugged.	Ensure that all cables are properly and securely connected and the power cord is plugged into an electrical outlet.
	Power switch of new external device is not turned on.	1. Turn off the computer. 2. Turn on the external device. 3. Turn on the computer to integrate the device with the computer system.
	New device is not configured for Windows NT.	Use Computer Setup to view settings for the new device or to reset the configuration settings for preinstalled devices.
	New device does not meet plug and play requirements because it is a legacy ISA card.	1. Run Computer Setup. 2. Add legacy card. 3. Set the necessary legacy card resources. 4. Save the changes. 5. Restart the computer.

Table 2-25
Solving Infrared Connection Problems

Problem	Cause	Recommended Action(s)
Cannot link with another computer.	Interrupt request (IRQ) conflict	Check IRQ assignments for conflicts and reassign as necessary.
	Baud rate conflict	Select the same baud rate for both computers.
	# bits conflict	Select the same "#bits" setting for both computers.
	Stop bit conflict	Select the same stop byte for both computers.
	Parity conflict	Select the same parity setting for both computers.
Data transmission problem	Direct sunlight, fluorescent light, or flashing incandescent light is close to the infrared connections.	Remove the interfering light sources.
	Interference from other infrared devices	Keep remote control units and other infrared devices away from the infrared connections.
	Physical obstruction	Do not place objects between the two units that will interfere with a line-of-sight data transmission.
	Movement	Do not move either unit during data transmission.
	Orientation	Adjust devices so that they point within 30 degrees of each other.
	Distance	Verify that devices are not more than 3 feet (1 meter) apart.

NOTE: The computer is shipped with the infrared port disabled. The port must be enabled each time the computer is started or restarted. Follow these steps to enable the infrared port.

1. Click Start → Settings → Control Panel.
2. Double click the Infrared icon.
3. Select the Options tab.
4. Check the box labeled Enable Infrared Communications to select the Com3 port.
5. Click **OK**. The infrared icon appears on the task bar.

NOTE: Windows NT does not support infrared communication.

Table 2-26
Solving Modem Problems

Problem	Probable Cause	Recommended Action(s)
Modem loses connection.	The connection from the phone line to the modem is loose.	Check to make sure the telephone cable is properly connected.
	Call Waiting has not been disabled.	<p>Disable Call Waiting.</p> <ol style="list-style-type: none"> 1. Click Start → Control Panel → double-click Modems. 2. From the General tab of the Modems Properties page, click Dialing Properties. 3. From the My Locations tab of the Dialing Properties page, check the box labeled This location has call waiting. Select *70, 70#, or 1170 from the drop-down list to disable call waiting for your dialing area.
Noisy telephone line	Phone line noise causing garbled or missing characters, or slow data transfer speeds.	<p>Check your telephone and modem cable connections. If they are a little loose, they can cause noise on the line.</p> <hr/> <p>Check with your local telephone company for a phone line filter.</p>
Phone line noise causing a disconnection.	Hang-up Delay S Register (S10) set too low.	<p>Change S10 default to 150.</p> <ol style="list-style-type: none"> 1. Click Start → Programs → Accessories → HyperTerminal. 2. Go to Command Mode. 3. Type ATS10=150 and press Enter. <p>This command causes the modem to take longer to disconnect even if there is noise on the line.</p>
No dial tone	Phone service is not connected to the telephone wall jack.	<p>Verify service from the local phone company:</p> <ol style="list-style-type: none"> 1. Unplug the telephone cable from the telephone wall jack. 2. Connect a telephone to the jack, pick up the handset, and listen for a dial tone. If there is a dial tone, reconnect the modem to the telephone wall jack with the telephone cable and make sure all connections are secure. 3. If there is still no dial tone, contact your local phone company or building manager.

Continued

Table 2-26 *Continued*

Problem	Probable Cause	Recommended Action(s)
No dial tone	The modem is not responding to commands from the computer keyboard.	<p>Verify the modem and computer are connected:</p> <ol style="list-style-type: none"> 1. Click Start → Programs → Accessories → HyperTerminal. 2. Go to Terminal Mode, then type AT and press the Enter key. <p>If the modem displays OK, the modem and computer are working together. If the modem displays ERROR, or does not respond, restart the computer and repeat step 1.</p> <ol style="list-style-type: none"> 3. Type ATDT and listen for a dial tone. 4. Type ATH0 (zero) to hang up.
	Speaker Control AT Command (ATM) is set to 0.	<p>Set the Speaker Control to 1:</p> <ol style="list-style-type: none"> 1. Click Start → Programs → Accessories → HyperTerminal. 2. Go to Command Mode, type ATM1 and press Enter. 3. Type ATH1 and listen for a dial tone. 4. Type ATH0 (zero) to hang up.
	The modem is plugged into a digital PBX line rather than an analog line.	<p>Plug the modem into an analog line. If you are in an office, the analog line is often the one connected to a fax machine or modem. To get an analog line in a hotel, request a room with a “data” line.</p>
Characters are garbled and transfer rates are slow.	There is noise in the telephone line.	<ul style="list-style-type: none"> ■ Check your telephone and modem cable connections. If they are loose, they can cause noise on the line. ■ Check with your local telephone company for a phone line filter.
Phone line noise causes a disconnection.	Hang-Up Delay S Register (S10) set too low.	<p>Change S10 default to 150.</p> <ol style="list-style-type: none"> 1. Click Start → Programs → Accessories → HyperTerminal. 2. Go to Command Mode. 3. Type ATS10=150 and press Enter. <p>This command causes the modem to take longer to disconnect even if there is noise on the line.</p>
Cellular connection doesn't work (United States only).	Environmental factors are interfering with the cellular connection.	<p>Refer to “How the Environment Affects Cellular Performance” in the <i>Reference Guide</i> for more information.</p>

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Continued

Table 2-26 *Continued*

Problem	Probable Cause	Recommended Action(s)
Ten-digit dialing does not work correctly under Windows 95.	Ten-digit dialing doesn't work correctly under Windows 95, making it difficult to dial numbers in a different area code that are not long distance calls.	Since Windows 95 does not limit the number of digits you can enter in the Phone Number field, set the Area Code field to match your local area code. Then type the ten-digit telephone number in the Phone Number field.
Modem cable disables/interferes with other telephony devices (Germany, Austria, and Switzerland only).	The modem cable does not provide the additional 4-wire connection required in Germany, Austria, and Switzerland to form the serial pass-through necessary so that other devices can work on the same phone line.	To use another telephony device on the same line in these countries, unplug the modem cable from the wall jack first.
Modem does not dial correctly under Windows 95 (Switzerland and Germany only).	The "Wait for dial tone before dialing" check box is checked. This causes Windows 95 to issue an ATDT; command. A typical dial string would look like this: ATDT; ATDTnnn-nnnn In Germany and Switzerland, the ';' dial modifier is not permitted to be used in this fashion by regulatory agencies since ATDT; takes the modem off-hook without dialing. Therefore, the modem returns an error message when attempting to dial. The error message reads: "The computer is not receiving a response from the modem. Check that the modem is plugged in, and if necessary, turn the modem off, then turn it back on."	<ol style="list-style-type: none">1. Click Start → Settings → Control Panel.2. Double-click the Modems icon.3. Click the Properties button.4. Select the Connection tab.5. Click the "Wait for dial tone before dialing" check box to clear it.6. Click OK → Close.

Table 2-27
Solving PC Card Problems

Problem	Probable Cause	Recommended Action(s)
Computer does not beep when PC Card is inserted but PC Card works correctly.	System beeps are turned down.	Press Fn+F5 , then press the right arrow key to increase the system beeps volume.
	PC Card sound effects have been disabled.	In Windows 95, double-click PC Card icon → Global Settings tab. Deselect Disable PC Card Sound Effects.
Computer does not beep when PC Card is inserted and PC Card does not work.	PC Card is not inserted properly.	Remove and reinsert the card gently to avoid damaging the pins.
	The PC Card slots have been disabled.	Run Computer Setup to enable the PC Card slots. When the system starts, press F10 then select Computer Setup → Other Devices → PC Card Controller → Resources. Deselect the "Disabled" check box.
	Card or card driver is not compatible with the computer or with the operating system.	In Windows 95, click Start → Settings → Control Panel → System → Device Manager → PCMCIA Socket. Double-click the Texas Instruments TI-1131 CardBus controller to view device properties. Deselect the "Disable in this hardware profile" check box. Contact service provider for a list of compatible PC Cards.
Computer beeps twice, but modem and/or fax does not work.	Telephone cord is not plugged in all the way.	Verify that the telephone connection is secure.
	The wrong COM port is being used to access the card.	Verify the COM port assigned to the card and within the application is correct. In Windows 95, click Start → Help → Contents → Troubleshooting → Problem. Follow the instructions on the screen.
Computer beeps twice but network card does not work.	Network server is unavailable.	Contact system administrator.
Computer beeps twice when a storage card is inserted, but the card does not work.	The wrong drive letter is being used to access the storage card.	Open Windows Explorer and verify the drive letter.
PC Card does not work	Windows NT was running when the PC Card was inserted.	Turn off the computer, reinsert the PC Card, and restart the computer.

Table 2-28
Solving Power Problems

Problem	Probable Cause	Recommended Action(s)
Computer will not turn on.	Computer is not connected to a power source.	Insert battery pack or connect an external power source.
	Power cord to the external power source is unplugged.	Ensure that power cord connecting the computer and the external power source is plugged in properly.
	Battery pack is discharged.	Insert a fully charged battery pack or connect an external power source.
Computer will not turn on when connected to external power if battery pack is in the computer.	Battery pack may be defective.	Remove battery pack, insert another battery pack, and try again.
Computer turned off while it was left unattended and the power/suspend light is off.	System initiated Hibernation after a preset timeout.	Turn on the computer to restore information at the point where Hibernation was initiated. NOTE: To change the Hibernation timeout setting in Windows 95, click the Hibernation tab in Power Properties. In Windows NT, run Computer Setup and select Power Management.
Computer turned off while it was left unattended and will not turn on.	System initiated Hibernation and/or shut down because of a critical low-battery condition.	Replace the battery pack with a fully charged battery pack or connect an external power source, then turn on the computer.
Computer initiated Suspend or turned off when it was docked.	The maximum operating temperature was exceeded.	Computer is in a high temperature environment and the fan is not able to cool it. Let the computer cool down and turn it on again.
		Make sure the ventilation intake and exhaust are not obstructed.
Hibernation does not work properly.	Hibernation was not reset after a memory upgrade.	Reset Hibernation in the Power Management utility.
Computer does not turn on when connected to external power and no batteries are installed.	Internal power supply is bad.	Replace the internal power supply.

IMPORTANT: Conduct all tests on a working monitor. If the recommended actions do not solve the problem, replace the display. If the problem persists with a new display, replace the system board.

**Table 2-29
Solving Screen Problems**

Problem	Probable Cause	Recommended Action(s)
Characters are dim.	The brightness or contrast control (if applicable) is not set properly.	Adjust the control(s) with the hotkeys: Fn+F9 and Fn+F10 .
	Computer screen is in direct light.	Tilt the display or move computer.
	Display is damaged.	Replace the display.
Screen is blank.	QuickLock/QuickBlank was initiated.	Enter the password to exit QuickLock/QuickBlank.
	Screen save was initiated after the Power Management timeout period.	Press any key or click the mouse.
	Brightness or contrast needs adjusting.	Adjust the control(s) with the hotkeys: Fn+F9 and Fn+F10 .
	Screen has overheated.	If computer is in direct sunlight, move it and allow it to cool.
Computer screen is blank and the screen on an external monitor displays information.	Display was switched to the external monitor.	Press the Fn+F4 hotkeys to display information on the computer screen.
Screen is blank and the power/suspend light is blinking.	System initiated Suspend.	Press the suspend button to exit Suspend. Enter the power-on password if prompted.
Screen is blank and the power/suspend light and the battery light are blinking.	System has entered a critical low-battery condition.	Immediately connect the computer to an external power source or replace the battery pack.
External monitor does not display information.	External monitor was connected after the computer was turned on.	Press the Fn+F4 hotkeys to switch to the external monitor.
	The external monitor signal cable or power cord is not properly connected.	Ensure that the cables are properly connected.
Small red, green, or blue spots appear on the computer CTFT display.	Small spots, called on-pixels, often appear on CTFT screens. Compaq limits the number of these on-pixels to 0.003 percent.	No action is required.

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Table 2-29 *Continued*

Problem	Probable Cause	Recommended Action(s)
Display on an external monitor is distorted.	Incorrect display device drivers are installed or incorrect resolution is set.	Double-click the Display icon in Control Panel, click the Settings tab, and set the correct display type and resolution for the external monitor.
	The external monitor is not Energy Star compliant, but monitor energy saving feature is enabled.	Complete these steps: <ol style="list-style-type: none">1. Press any key or move the pointing device to restore the display.2. If display remains distorted, turn off the monitor, then turn it on again.3. Disable the monitor energy saving feature in Display Properties or in Computer Setup Power Management.
The image has a black border and does not fill the screen.	The Desktop Area setting is smaller than the Resolution setting.	Adjust the settings for the Desktop Area and Resolution. Double-click Control Panel Display → Settings → Compaq. Press the Fn+T keys to expand the image.

Table 2-30
Solving USB Problems

Problem	Probable Cause	Recommended Action(s)
External device connected to a USB connector does not work.	The operating system limits external devices connected by USB to two tiers that can include no more than two hubs on the first tier and no more than one keyboard and one pointing device on the first or second tier.	Reduce the number of connected external USB devices to no more than two hubs on the first tier, and no more than one keyboard and one pointing device on the first or second tier.
External device connected to a USB connector does not work during startup (before Windows 95 loads).	During startup, only two tiers are supported by the USB connector. These tiers can include no more than two hubs on the first tier and no more than one keyboard and one pointing device on the first or second tier.	<ul style="list-style-type: none">■ Use the external device only after Windows 95 has loaded.■ Reduce the number of connected external USB devices to no more than two hubs on the first tier, and no more than one keyboard and one pointing device on the first or second tier.



External devices in lower tiers do not work.	An unpowered hub is connected to another unpowered hub.	<ul style="list-style-type: none">■ Use only powered hubs.■ Make sure that all unpowered hubs are immediately preceded by powered hubs in the USB chain.
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Illustrated Parts Catalog

IMPORTANT: Various spare parts for the Armada 7700 Series of Personal Computers may appear to be identical to corresponding spare parts on the Armada 7800 computer. However, due to color and mechanical differences, Armada 7700 spare parts should never be used when servicing an Armada 7800 computer.



CAUTION: Only spare parts listed in this chapter should be used to service an Armada 7800 computer. Failure to follow this caution can cause damage to the computer.

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). Refer to Table 1-1 for an explanation of the model number.

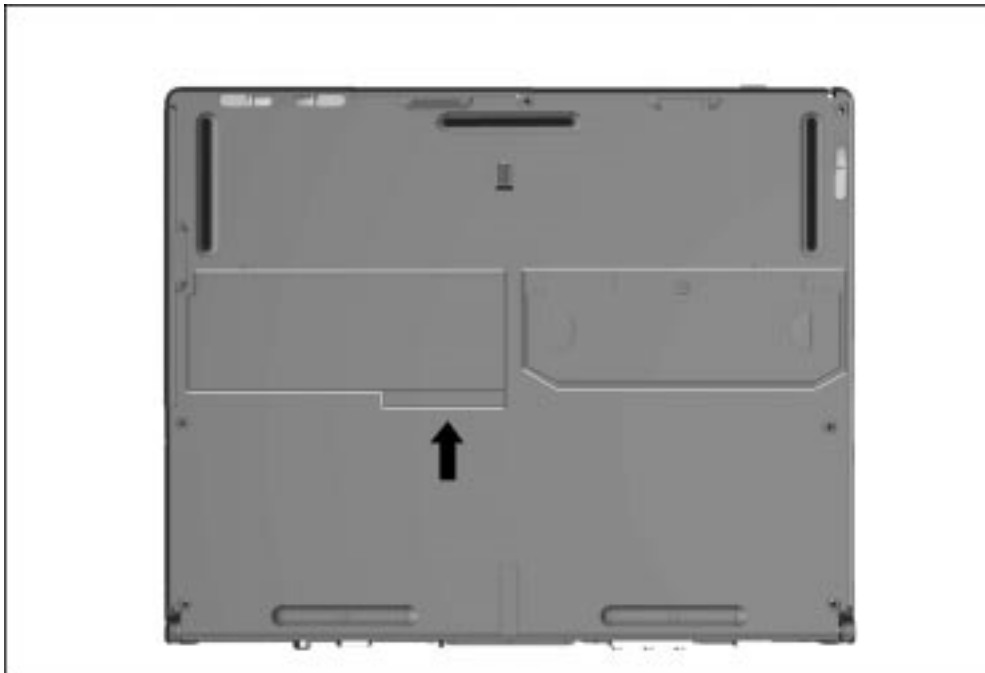


Figure 3-1. Serial Number Location

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3.2 Computer System Major Components

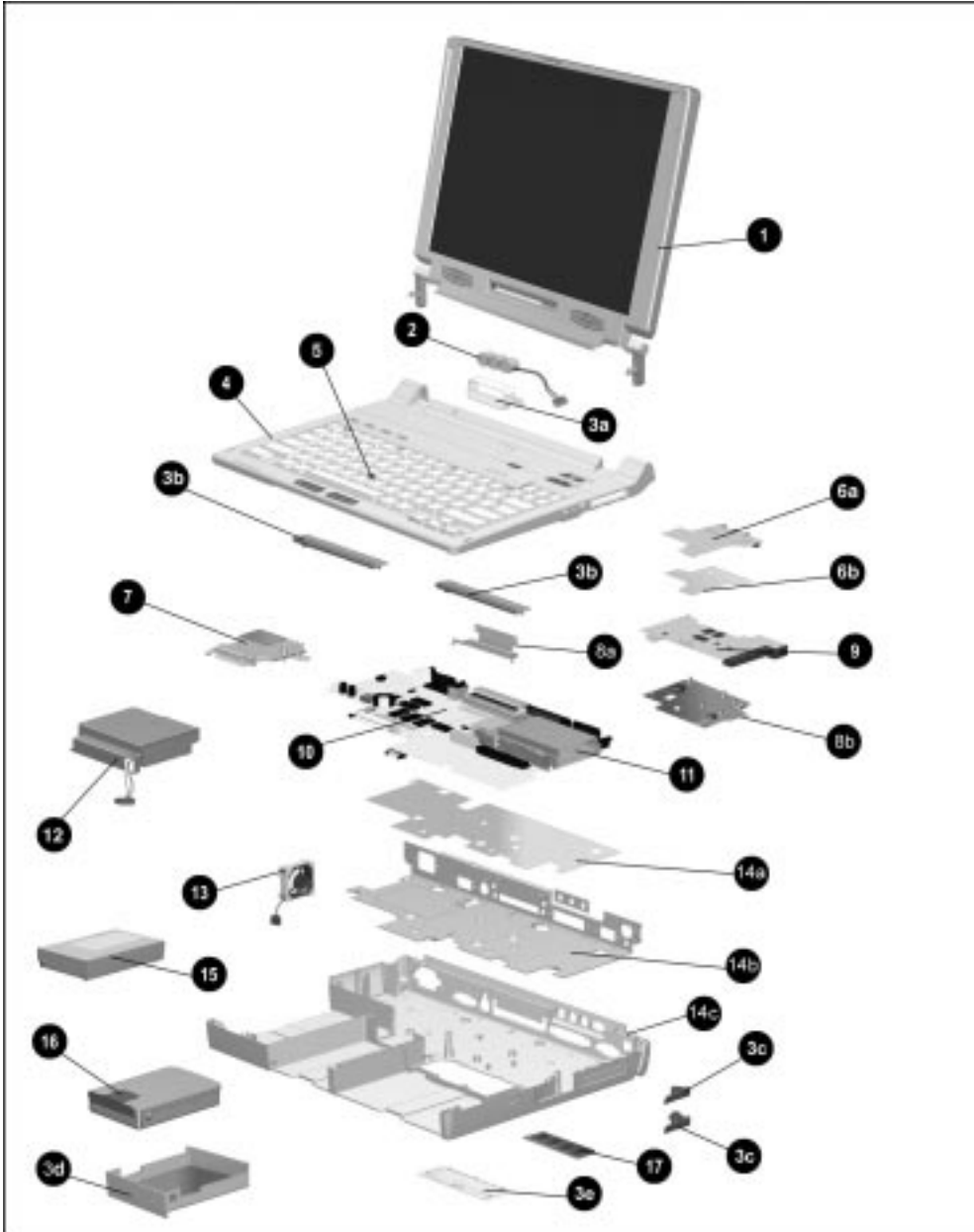


Figure 3-2. Computer System Major Components

Table 3-1
Spare Parts: Computer System Major Components

Item	Description	Spare Part Number
1	Display assembly (spared as "hingeup" assembly, includes logo kit, audio assembly bracket thermal pad, and keyboard label kit; display size varies depending on model)	
	14.1-inch, XGA, CTFT (use only on computers with config. codes starting with "CB6", "CD", "CH", and "CZ")	340120-001
	13.3-inch, XGA, CTFT (use only on computers with config. codes starting with "CB4", "BS", and "BZ")	315015-001
	NOTE: Use the hinge up assembly to perform all field repairs for units that are under warranty. Out of warranty and depot repairs should be performed using the appropriate component(s) listed below. This policy applies to both the 14.1- and 13.3-inch displays. The 14.1- and 13.3-inch displays are not interchangeable.	
	Display enclosure (includes all display components except panel and inverter; also includes logo kit, audio assembly bracket thermal pad, keyboard label kit, and screw covers)	
	14.1-inch, XGA, CTFT (use only on computers with config. codes starting with "CB6", "CD", "CH", and "CZ")	340122-001
	13.3-inch, XGA, CTFT (use only on computers with config. codes starting with "CB4", "BS", and "BZ")	315184-001
	Display inverter board (includes logo kit, audio assembly bracket thermal pad, keyboard label kit, and screw covers)	315758-001
	Display panel (includes logo kit, audio assembly bracket thermal pad, keyboard label kit, and screw covers)	
	14.1-inch, XGA, CTFT (use only on computers with config. codes starting with "CB6", "CD", "CH", and "CZ")	340121-001
	13.3-inch, XGA, CTFT (use only on computers with config. codes starting with "CB4", "BS", and "BZ")	315759-001
2	Auxiliary battery (includes keyboard label kit)	220807-001
	Miscellaneous Plastics Kit, includes:	313916-001
3a	Auxiliary battery retainer	Not Illustrated:
3b	Left & right rear covers	RJ-11 cover
3c	Top & bottom PC Card eject levers	DAA cover plug
3d		Keyboard label kit
3e	Hard drive tray	
	Memory expansion slot cover	
4	Keyboard assembly (includes keyboard label kit and DAA cover)	314963-XXX
	Arabic -171 German -041 Portuguese -131	
	Belgian -181 Italian -061 Spanish -071	
	Czech -221 International -002 Swedish -101	
	Danish -081 Japanese -291 Swiss -111	
	Dutch -331 Korean -AD1 U.K. English -031	
	French -051 Latin American U.S. English/Canadian -001	
	French Canadian -121 Norwegian -091	
5	EasyPoint III pointing device caps	314938-001
	Audio/USB board, includes:	
	use only on computers with config. codes starting with "CD" and "CH"	400131-001
	use only on computers with config. codes starting with "CB" and "B"	314949-001
6a	Audio/USB board	RJ-11 cover plug (not illustrated)
6b	Audio/USB board insulator	Keyboard label kit
7	Processor board (processor speed varies by model; includes audio assembly bracket thermal pad and keyboard label kit)	
	Intel Mobile 366-MHz Pentium II with MMX technology (use only on computers with config. codes starting with "CD" and "CH")	400133-001

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Intel Mobile 333-MHz Pentium II with MMX technology (Configure to order (CTO) option only, use only on computers with config. code "CDJZ")	342678-001
Intel Mobile 300-MHz Pentium II with MMX technology (use only on computers with config. codes starting with "BZ8Z", "CB6", and "CDJZ")	202838-001
Intel Mobile 266-MHz Pentium II with MMX technology (use only on computers with config. codes starting with "BS", "BZ8Z", and "CB4")	314947-001

continued

Table 3-1 Continued

Item	Description	Spare Part Number
8a	Miscellaneous Hardware Kit, includes: Expansion connector shield	314959-001
8b	Not illustrated: Processor module assembly ground clips (2) Audio assembly bracket Keyboard label kit Audio assembly bracket thermal pad Keyboard thermal pad base feet keyboard connector insulator	
9	Modem board assembly (includes insulator and keyboard label kit; modem speed varies depending on model) 56 Kbps (use only on computers with config. codes starting with "CH" and "CD") U.S. model International model Japanese model 33.6 Kbps (use only on computers with config. codes starting with "BS", "BZ", and "CB") U.S. model International model Japanese model Audio only board (includes RJ-11 cover plug and keyboard label kit)	313906-001 313906-002 313906-291 314956-001
10	System board supports 366- and 333-MHz processor board (use only on computers with config. codes starting with "CD" and "CH") supports 300-MHz processor board (use only on computers with config. codes starting with "BZ8Z", "CB6", and "CDJZ") supports 266-MHz processor board (use only on computers with config. codes starting with "BS", "BZ8Z", and "CB4") NOTE: All system boards include the following components (not illustrated): Expansion connector shield Keyboard connector insulator Audio assembly bracket thermal pad Keyboard label kit	342677-001 202842-001 314937-001
11	PC Card assembly (includes audio assembly bracket thermal pad and keyboard label kit)	315114-001
12	Power supply (includes keyboard label kit) 45 watt (use only on computers with config. codes starting with "C") original, need wattage (use only on computers with config. codes starting with "B")	315141-001 220699-001
13	Fan (includes isolator and keyboard label kit)	267862-002
14a	CPU base assembly, includes: I/O bracket insulator	314940-001
14b	I/O bracket	
14c	Base assembly, includes: Base feet Keyboard label kit Keyboard connector shield I/O bracket insulator	Base assembly Hard drive release assembly Battery release assembly MultiBay release assembly Expansion connector shield I/O bracket Top and bottom PC Card doors Left and right tilt feet Security clip Infrared lens
15	Battery pack, Li-ion use only on computers with config. code starting with "CD" and "CH" use only on computers with config. code starting with "B" and "CB"	400130-001 314939-001

16	Hard drive (includes Armada 7700 and 7800 hard drive trays; hard drive size varies depending on model)	
	14.1 GB (use only on computers with config. codes starting with "CD" and "CH")	400132-001
	10.0 GB (Configure to order (CTO) option only, use only on computers with config. code "CDJZ")	342676-001
	8.1 GB (use only on computers with config. codes "BZ8Z", "CB41" through "CB43", "CB61" through "CB63", and "CDJZ")	315081-001
	5.0 GB (use only on computers with config. codes "BZ8Z", "BS81" through "BS86", and "CB64" through "CB69")	315140-001
<hr/>		
17	Memory expansion board (amount of memory varies depending on model)	310345-001
	128 MB, 66 MHz, SDRAM, SODIMM	313918-001
	64 MB, 66 MHz, SDRAM, SODIMM	313911-001
	32 MB, 66 MHz, SDRAM, SODIMM	313917-001
	16 MB, 66 MHz, SDRAM, SODIMM	
<hr/>		
	3-volt Lithium disc cell battery (not illustrated)	117099-001
<hr/>		

3.3 Miscellaneous Plastics Kit Components

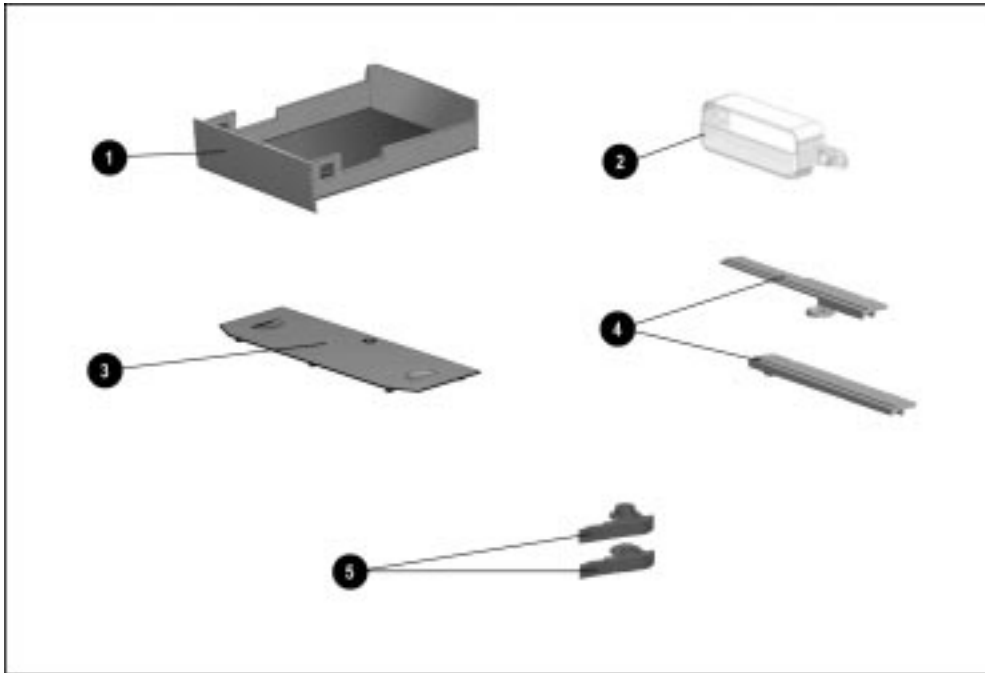


Figure 3-3. Miscellaneous Plastics Kit Components

Table 3-2
Miscellaneous Plastics Kit Components
Spare Part Number 313916-001

Item	Description
1	Hard drive tray
2	Auxiliary battery retainer
3	Memory expansion slot cover
4	Left & right rear covers
5	Top & bottom PC Card eject levers
	Not Illustrated: RJ-11 cover DAA cover plug Keyboard label kit

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3.4 Miscellaneous Hardware Kit Components

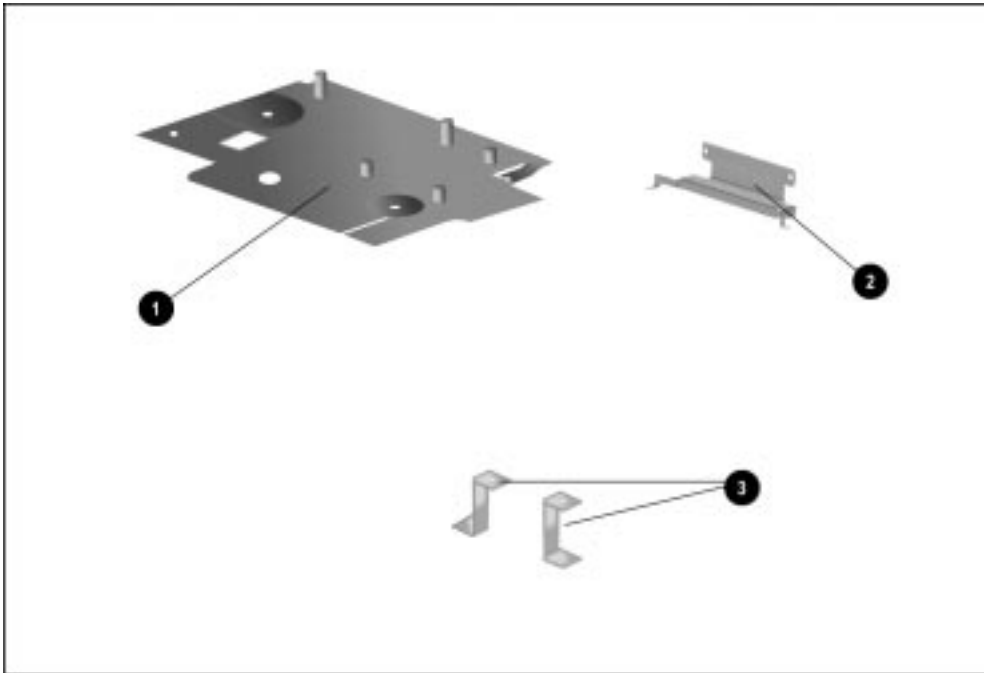


Figure 3-4. Miscellaneous Hardware Kit Components

Table 3-3
Miscellaneous Hardware Kit Components
Spare Part Number 314959-001

Item	Description
1	Audio assembly bracket
2	Expansion connector shield
3	Processor module assembly ground clips (2)
	Keyboard label kit (not illustrated)

3.5 Power Equipment

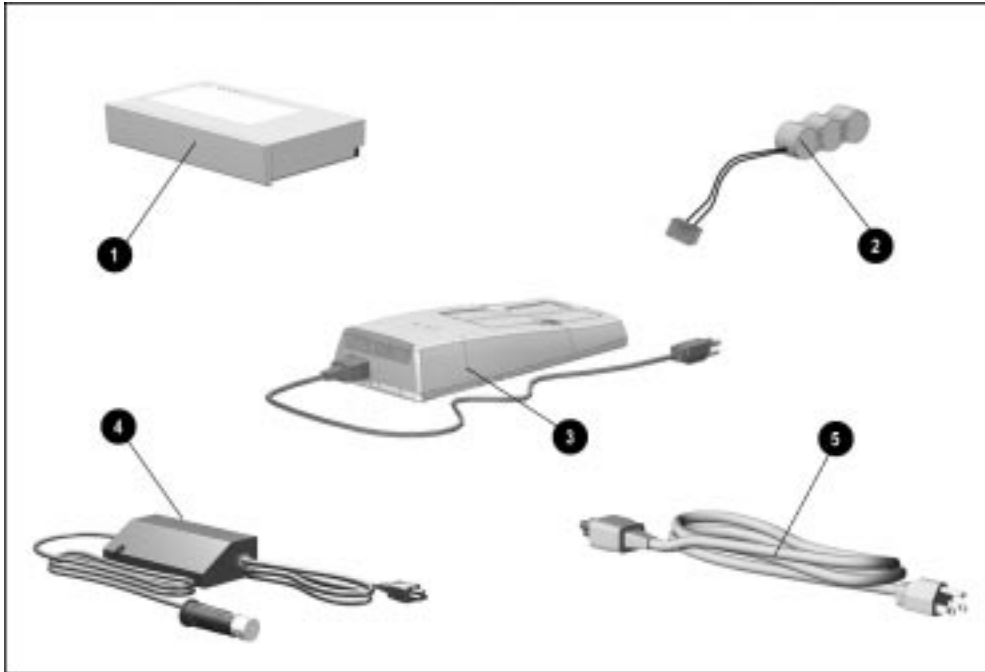


Figure 3-5. Power Equipment

Table 3-4
Spare Parts: Power Equipment

Item	Description	Spare Part Number		
1	Battery pack, Li-ion	400130-001		
	use only on computers with config. code starting with "CD" and "CH"	314939-001		
	use only on computers with config. code starting with "B" and "CB"			
2	Auxiliary battery	220807-001		
3	Battery charger	277734-001		
4	Automobile/aircraft adapter	313919-001		
	Automobile/aircraft adapter cable	315083-001		
5	Power cord			
	Australian	314957-011	Korean	314957-AD1
	Danish	314957-081	French/German/ Swiss	314957-111
	European	314957-002	U.K. English/Asia	314957-031
	Italian	314957-061	Pacific/Hong Kong	
	Japanese	314957-291	U.S. English	314957-001

3.6 Items that Ship with the Computer

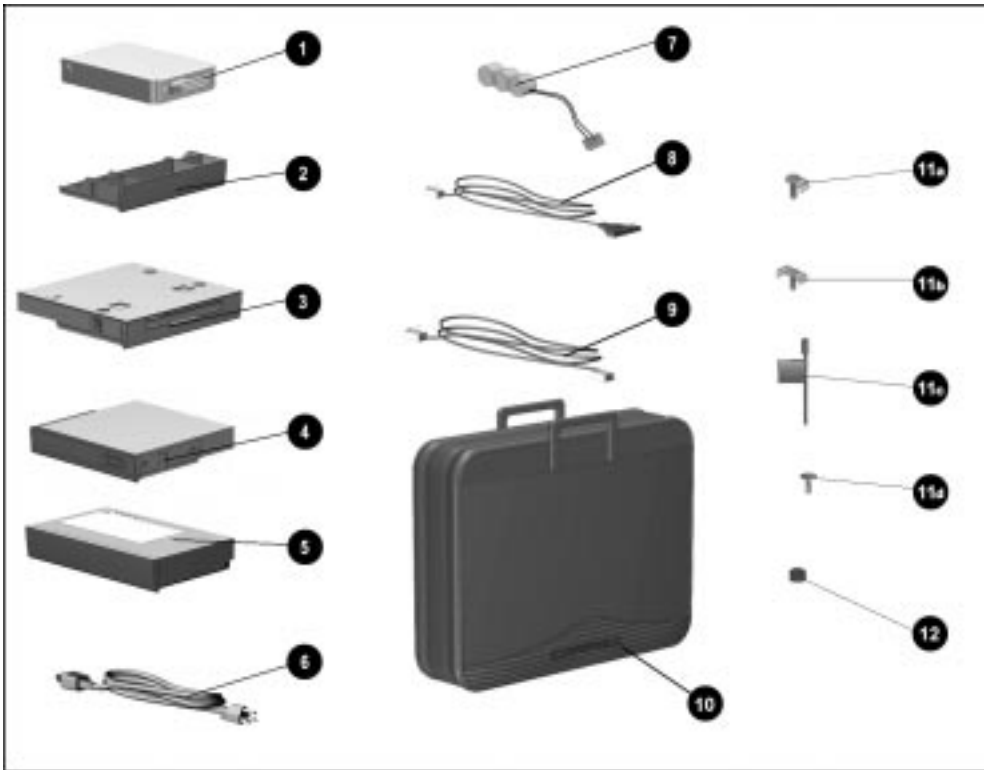


Figure 3-6. Items that Ship with the Computer

Table 3-5
Items that Ship with the Computer

Item	Description	Spare Part Number
1	Hard drive (includes Armada 7700 and 7800 hard drive trays; hard drive size varies depending on model)	
	14.1 GB (use only on computers with config. codes starting with "CD" and "CH")	400132-001
	10.0 GB (Configure to order (CTO) option only, use only on computers with config. code "CDJZ")	342676-001
	8.1 GB (use only on computers with config. codes "BZ8Z", "CB41" through "CB43", "CB61" through "CB63", and "CDJZ")	315081-001
	5.0 GB (use only on computers with config. codes "BZ8Z", "BS81" through "BS86", and "CB64" through "CB69")	315140-001

continued

Table 3-5 Continued

Item	Description	Spare Part Number		
2	MultiBay weight saver (ships in accessory box)	315113-001		
3	Diskette drive, 1.44-megabyte, 3.5-inch (ships in accessory box)	314941-001		
4	CD-ROM drive (CD-ROM drive speed varies by model) 24-speed Max (requires use of removable drive MultiBay adapter) standard equipment on computer models with config. codes "CB41" through "CB43" and "CB64" through "CB69"	100044-001		
	20-speed Max standard equipment on computer models with config. codes "BS81" through "BS86"	314936-001		
5	Battery pack, Li-ion use only on computers with config. code starting with "CD" and "CH"	400130-001		
	use only on computers with config. code starting with "B" and "CB"	314939-001		
6	Power cord Australian Danish European Italian Japanese Korean	314957-011 314957-081 314957-002 314957-061 314957-291 314957-AD1	French/German/ Swiss U.K. English/ Asia Pacific/ Hong Kong U.S. English	314957-111 314957-031 314957-001
7	Auxiliary battery	220807-001		
8	Telephone cable (country specific)	138609-001		
9	Modem cable (country specific)	248080-001		
10	Slipcase (Europe/Middle East/Africa only)	315108-001		
	Security kit	296035-001		
11a	Single bay security screw			
11b	Dual bay security screw			
11c	Security wrench			
11d	Memory expansion slot cover security screw			
12	EasyPoint III pointing device caps (2)	314938-001		
13	DVD-ROM drive (standard equipment on computer models with config. codes "CB61" through "CB63" and config. codes starting with "CHR", "CDJ3", and "CDJ4") DVD-ROM drive MultiBay adapter	202837-001 319665-001		

3.7 Options

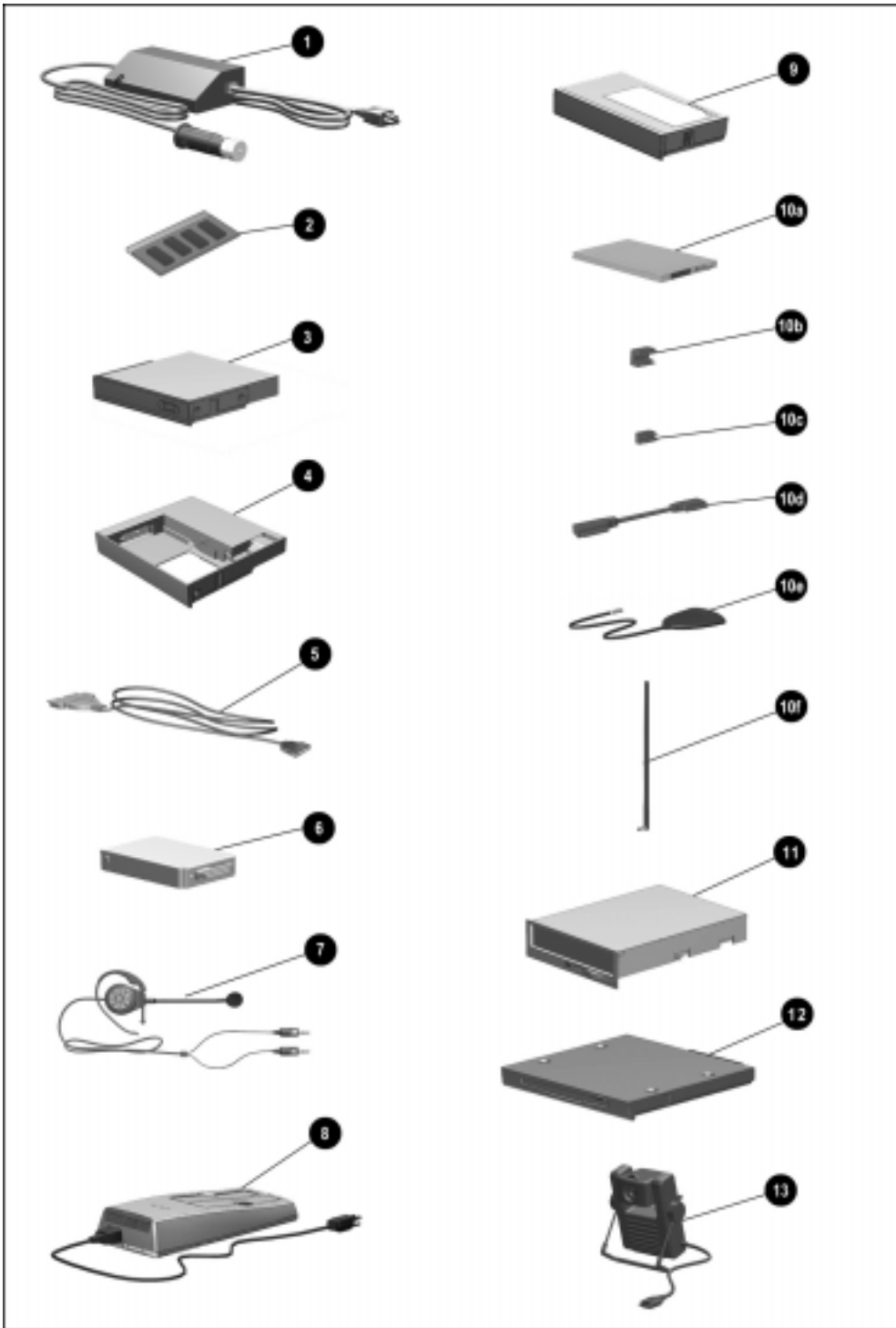


Figure 3-7. Options

Table 3-6
Spare Parts: Options

Item	Description	Spare Part Number	Option Part Number
1	Automobile/aircraft adapter	313919-001	296537-B21
2	Memory expansion board		
	128 MB	310345-001	315177-B21
	64 MB	313918-001	314891-B21
	32 MB	313911-001	314890-B21
	16 MB	313917-001	314889-B21
3	CD-ROM drive (includes slipcase; CD-ROM drive speed varies by model)		
	24-speed Max	100044-001	402321-B21
	(requires use of removable drive MultiBay adapter; standard equipment on computer models with config. codes "CB41" through "CB43" and "CB64" through "CB69")		
	20-speed Max	314936-001	297707-B25
	standard equipment on computer models with config. codes "BS81" through "BS86"		
4	Armada 7000 Hard Drive MultiBay Adapter	296586-002	267868-001
5	Cellular phone cable		
	GE & Ericson CT7000	212035-001	185272-001
	Motorola-MT/Elite	212031-001	185268-001
	Motorola-MicTac	212030-001	185267-001
	Nokia-232	212034-001	185271-001
	Nokia-2120	212033-001	185270-001
6	Hard drive (spare part number includes Armada 7700 and 7800 hard drive trays; option part number includes hard drive MultiBay adapter and hard drive carrying case; hard drive size varies depending on model)		
	14.1 GB (use only on computers with config. codes starting with "CD" and "CH")	400132-001	342670-B21
	10.0 GB (Configure to order (CTO) option only, use only on computers with config. code "CDJZ")	342676-001	387434-B21
	8.1 GB (use only on computers with config. codes "BZ8Z", "CB41" through "CB43", "CB61" through "CB63", and "CDJZ")	315081-001	315043-B25
	5.0 GB (use only on computers with config. codes "BZ8Z", "BS81" through "BS86", and "CB64" through "CB69")	315140-001	297189-B25
7	Headset	273139-001	220460-001
8	Battery charger	277734-001	220461-001
9	Battery pack, Li-ion		
	use only on computers with config. code starting with "CD" and "CH"	400130-001	
	use only on computers with config. code starting with "B" and "CB"	314939-001	220463-B25

10a	SpeedPaq Cellular PC Card Kit, includes:	221227-001	221202-001
10b	SpeedPaq Cellular PC Card		
10c	computer interconnect block		
10d	modem interconnect block		
10e	interconnect cable		
10f	remote antenna base		
	antenna		
	cellular PC Card software (not illustrated)		
11	External Diskette Drive Kit External diskette drive cable	290837-001 258575-002	297186-B21 n/a
12	SuperDisc LS-120 drive	327456-002	296502-B25
13	Portable Video Conferencing Kit	298450-001	296954-001
14	DVD-ROM drive (standard equipment on computer models with config. codes "CB61" through "CB63" and config. codes starting with "CHR", "CDJ3", and "CDJ4") DVD-ROM drive MultiBay adapter	202837-001 319665-001	314914-B25 n/a

3.8 Mass Storage Devices

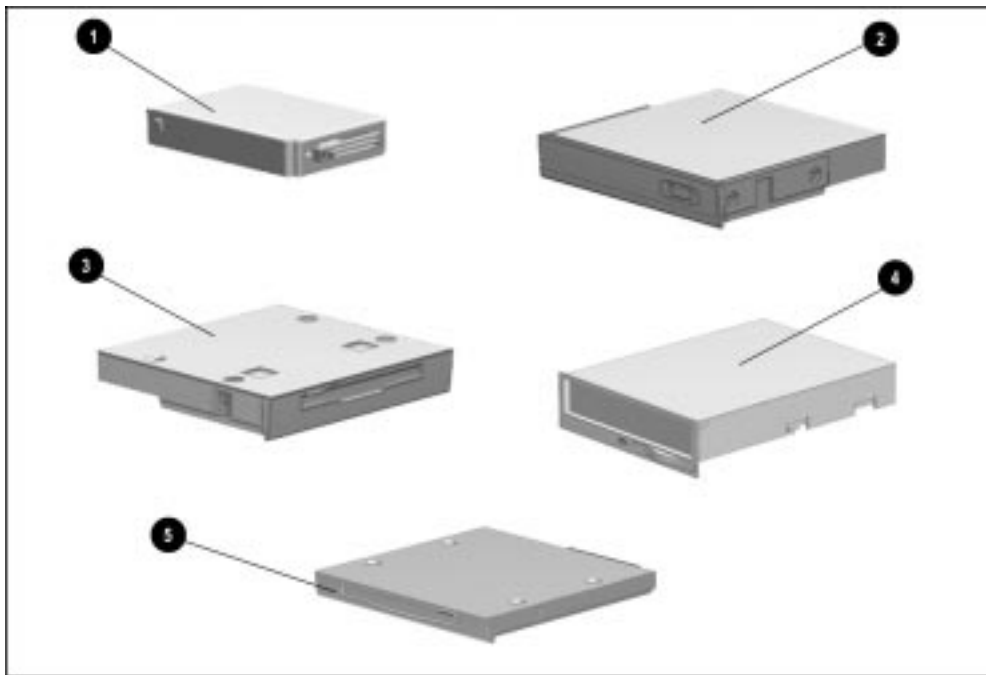


Figure 3-8. Mass Storage Devices

Table 3-7
Spare Parts: Mass Storage Devices

Item	Description	Spare Part Number
1	Hard drive (includes Armada 7700 and 7800 hard drive trays; drive size varies depending on model)	

	14.1 GB (use only on computers with config. codes starting with "CD" and "CH")	400132-001
	10.0 GB (Configure to order (CTO) option only, use only on computers with config. code "CDJZ")	342676-001
	8.1 GB (use only on computers with config. codes "BZ8Z", "CB41" through "CB43", "CB61" through "CB63", and "CDJZ")	315081-001
	5.0 GB (use only on computers with config. codes "BZ8Z", "BS81" through "BS86", and "CB64" through "CB69")	315140-001
2	CD-ROM drive (CD-ROM drive speed varies by model) 24-speed Max (requires use of removable drive MultiBay adapter) standard equipment on computer models with config. codes "CB41" through "CB43" and "CB64" through "CB69"	100044-001
	20-speed Max standard equipment on computer models with config. codes "BS81" through "BS86"	314936-001
3	Diskette drive, 1.44-megabyte, 3.5-inch (standard equipment)	314941-001
4	External Diskette Drive Kit (available only as an option) External diskette drive cable (not illustrated)	290837-001 258575-002
5	SuperDisc LS-120 drive (available only as an option)	327456-002
6	DVD-ROM drive (standard equipment on computer models with config. codes "CB61" through "CB63" and config. codes starting with "CHR", "CDJ3", and "CDJ4") DVD-ROM drive MultiBay adapter	202837-001 319665-001

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3.9 Miscellaneous

Table 3-8
Spare Parts: Miscellaneous (not illustrated)

Description	Spare Part Number
Country Kit, Windows 95	
Domestic	400129-001
	315084-001
International	400129-021
	315084-002
Miscellaneous Screw Kit (includes keyboard label kit)	314958-001

3.10 Documentation

Table 3-9
Spare Parts: Documentation (not illustrated)

Description	Spare Part Number
<i>Armada 7800 Maintenance & Service Guide</i>	314960-001
<i>Armada 7800 Illustrated Parts Map*</i>	314961-001
<i>ArmadaStation and Armada MiniStation Maintenance & Service Guide</i>	296390-001
<i>ArmadaStation and Armada MiniStation Illustrated Parts Map*</i>	296391-001
<i>Armada 7800 Setup Poster & Reference Guide: available in country kits or through fulfillment</i>	

*Not available in Europe, Middle East, or Africa

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
- Torx T-8 screwdriver (for all screws unless otherwise specified)
- Torx T-10 screwdriver (for memory expansion slot cover screw)
- 3/16-inch nut driver (for all screwlocks and standoffs)
- 7-mm hex socket (for bushing guides)
- Security wrench included in the security kit (for tamper-resistant memory compartment cover screws and/or tamper-resistant hard drive security plate have been installed)
- Tool kit (includes connector removal tool, loopback plugs, and case utility tool)
- X-acto knife or scraper (to remove thermal pad residue from audio assembly bracket and processor module assembly.) Refer to Section 5.15.

4.2 Service Considerations

Listed below are some of the considerations that you should keep in mind during disassembly and assembly procedures.

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.

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

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; they tear easily.



CAUTION: When servicing the computer, ensure that cables are placed in their proper location 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. A hard drive carrying case and a MultiBay device carrying case are supplied with the computer to protect drives when they out of the drive bays. To prevent damage to the computer, damage to a removable drive, or loss of information, observe these precautions:

- Before removing or inserting a hard drive, shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, then shut it down.
- Before removing a diskette drive or CD-ROM drive, ensure that a diskette or disc is *not* in the drive. Ensure that the CD-ROM 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, place it into the hard drive carrying case. Do not place a hard drive into the MultiBay device carrying case.
- After removing a CD-ROM drive or a diskette drive, place it into the MultiBay device carrying case.
- Do not use excessive force when inserting a drive into a drive bay.
- After inserting a hard drive into the hard drive bay, always reinsert either the original hard drive security plate or the tamper-resistant security plate to prevent the hard drive from accidentally disconnecting.
- 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, do the following. Place the drive into its carrying case. Place the carrying case into a bubble pack mailer or other suitable form of protective packaging. Label the package “Fragile: Handle With Care.”

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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 it may function normally for a while, then degrade in the internal layers, reducing its life expectancy.

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 they arrive at static-free workstations.
- Place items on a grounded surface before removing them from their container.
- Always be properly grounded when touching a sensitive component or assembly.
- Place reusable electrostatic-sensitive parts from assemblies in protective packaging or non-conductive 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 were selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

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Workstation Precautions

Use the following grounding precautions at workstations:

- Cover the workstation with approved static-dissipative material (refer to Table 4-2 later in this chapter).
- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.
- Use field service tools, such as cutters, screwdrivers, and vacuums that are conductive.
- When using fixtures that must directly contact dissipative surfaces, use fixtures made of static-safe materials only.
- Keep 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 them 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.

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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, a strap must be worn snug against the skin. 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 them 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 include:

- Antistatic tape
- Antistatic smocks, aprons, or sleeve protectors
- Conductive bins and other assembly or soldering aids
- Non-conductive foam
- Conductive tabletop workstations with ground cord of one-megohm resistance
- Static-dissipative table or floor mats with hard tie to ground
- Field service kits
- Static awareness labels
- Material-handling packages
- Non-conductive 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.

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

NOTE: 700 volts can degrade a product.

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

Material	Use	Voltage Protection Level
Antistatic plastic	Bags	1,500 V
Carbon-loaded plastic	Floor mats	7,500 V
Metallized laminate	Floor mats	15,000 V

Removal and Replacement Procedures

5.1 Serial Number

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

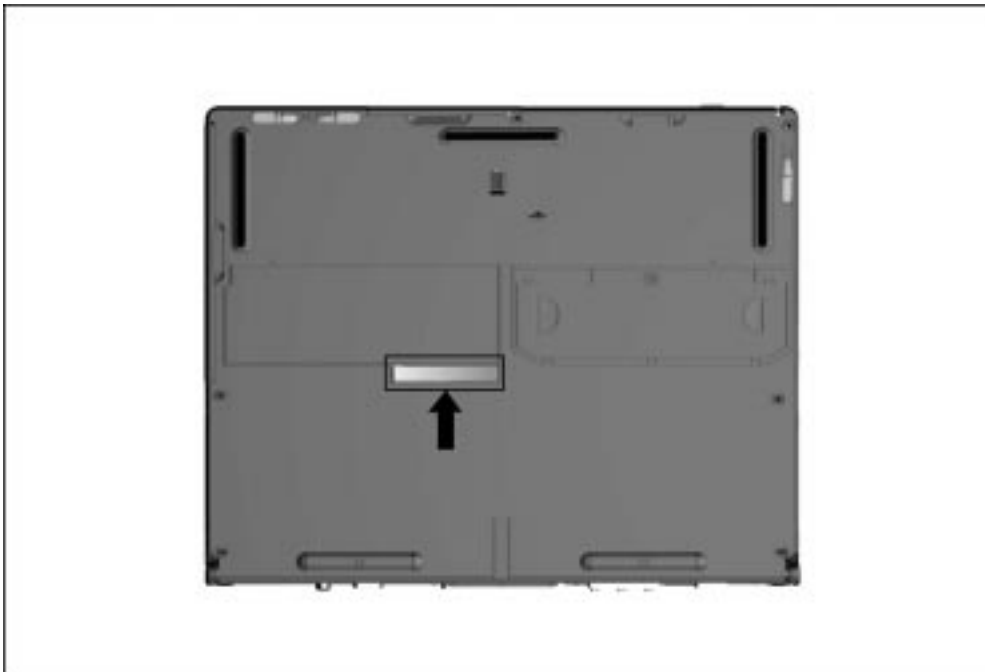


Figure 5-1. Serial Number Location

5.2 Disassembly Reference Chart

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

5.3	Preparing the Computer for Disassembly
	Undocking the Computer from the ArmadaStation
	Undocking the Computer from the Armada MiniStation
	Disconnecting the Computer
5.4	Computer Logo
5.5	Computer Feet
5.6	Battery Packs
	Removing a Battery Pack from the Battery Bay
	Removing a Battery Pack from the MultiBay
	Inserting a Battery Pack into the Battery Bay
	Inserting a Battery Pack into the MultiBay
5.7	Hard Drives
	Removing a Hard Drive from the Hard Drive Bay
	Inserting a Hard Drive into the Hard Drive Bay
	Inserting a Hard Drive into the MultiBay
	Removing a Hard Drive from the MultiBay
5.8	MultiBay Devices
	Removing MultiBay Devices
	Inserting MultiBay Devices
5.9	Memory Expansion
	Removing the Memory Expansion Slot Cover
	Removing a Memory Expansion Board
	Installing a Memory Expansion Board
	Replacing the Memory Expansion Slot Cover
5.10	Keyboard Assembly
5.11	Auxiliary Battery
	Removing the Auxiliary Battery
	Installing the Auxiliary Battery
5.12	Power Supply
5.13	Fan Assembly
5.14	Audio/USB Board
5.15	Modem Board
5.16	Audio Assembly Bracket
5.17	Lithium Disc Cell Battery
5.18	Processor Module Assembly
5.19	Display Assembly and Auxiliary Battery
	Removing the Display Assembly
	Installing the Display Assembly
	Display Bezel
	Display Panel
	Speaker Assemblies
	Inverter
	Display Video Cable
	Display Audio Cable/Microphone Assembly
5.20	PC Card Eject Levers
	Installing the PC Card Eject Levers
5.21	System Board

5.22 PC Card Assembly
5.23 I/O Bracket

Figure 5-2. Computer Disassembly Sequence Chart

5.3 Preparing the Computer for Disassembly

1. Undock the computer from the ArmadaStation or Armada MiniStation.
2. Disconnect power and external devices.
3. Remove battery packs inserted into the battery bay or MultiBay (Section 5.6).
4. Remove PC Cards.

If the computer is not docked in an ArmadaStation or Armada MiniStation, go to the "Disconnecting the Computer" section. If the computer is docked, go to the "Undocking the Computer from the ArmadaStation" or "Undocking the Computer from the Armada MiniStation" section.

Undocking the Computer from the ArmadaStation

1. Unlock the ArmadaStation keylock.
2. Shut down the computer
3. Close the computer.
4. Press the eject button **1**. The computer separates from the docking connector on the ArmadaStation **2** (Figure 5-3).



.....

Figure 5-3. *Undocking the Computer from the ArmadaStation*

5. Slide the computer out of the ArmadaStation.

.....

Undocking the Computer from the Armada MiniStation

1. Shut down the computer.
2. Close the computer.
3. Lift the docking lever and slide it forward ①. The computer separates from the docking connector on the Armada MiniStation ② (Figure 5-4).



Figure 5-4. Undocking the Computer from the Armada MiniStation

4. Slide the computer away from the Armada MiniStation and remove it.

.....

Disconnecting the Computer

If the computer is docked in an ArmadaStation or Armada MiniStation, refer to the "Undocking the Computer" section. If the computer is not docked in an ArmadaStation or Armada MiniStation, refer to Figure 5-5 and follow these steps to disconnect the computer:

1. Shut down the computer.
2. Close the computer.
3. Position the computer so the rear panel faces forward.
4. Disconnect the power cord from the wall outlet ①.
5. Disconnect the power cord from the computer ②.



Figure 5-5. *Disconnecting the Computer*

6. Turn off and disconnect external devices.

5.4 Computer Logo

The computer logo has an adhesive backing for installation. Remove the protective covering from the adhesive back and install the logo (Figure 5-6). The logo is upside down when viewed from the back of the computer with the display open.



Figure 5-6. *Installing the Computer Logo*

.....

5.5 Computer Feet

The computer feet are oblong, adhesive-backed rubber pads. The computer feet are included in the Miscellaneous Hardware Spare Kit.

Install the feet by removing the protective covering from the adhesive back and attaching the feet to the bottom of the computer (Figure 5-7).

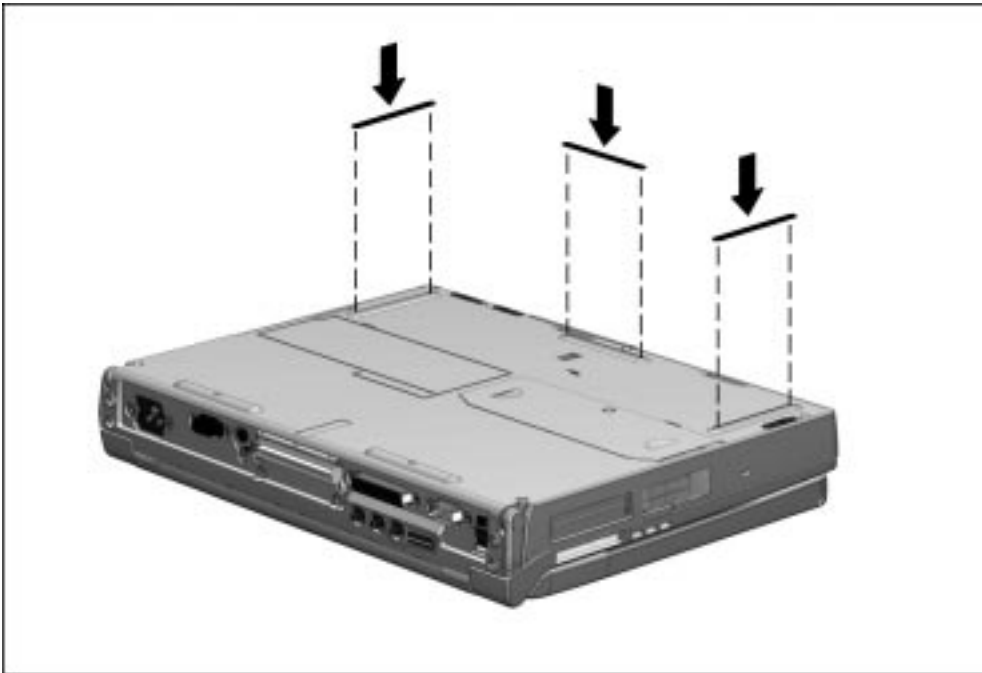


Figure 5-7. *Installing the Computer Feet*

5.6 Battery Packs



WARNING: To reduce the risk of injury or damage to the battery pack, do not crush, puncture, or incinerate the battery pack or short the metal contacts. Do not attempt to open or service the battery pack.

Removing a Battery Pack from the Battery Bay

Follow these steps to remove a battery pack from the battery bay:

1. If the computer is turned on, press the suspend button. If there is hard drive or diskette drive activity, Suspend may not occur immediately. The computer screen clears and the power/suspend light begins to flash when Suspend is initiated.

If the computer is turned off or in Suspend or Hibernation, proceed to Step 2.

2. Tilt the computer at an angle ❶ so the bottom of the computer is accessible (Figure 5-8).
3. Slide the battery release latch to the right ❷.
4. Grasp battery pack using the recess ❸ beneath the battery bay.

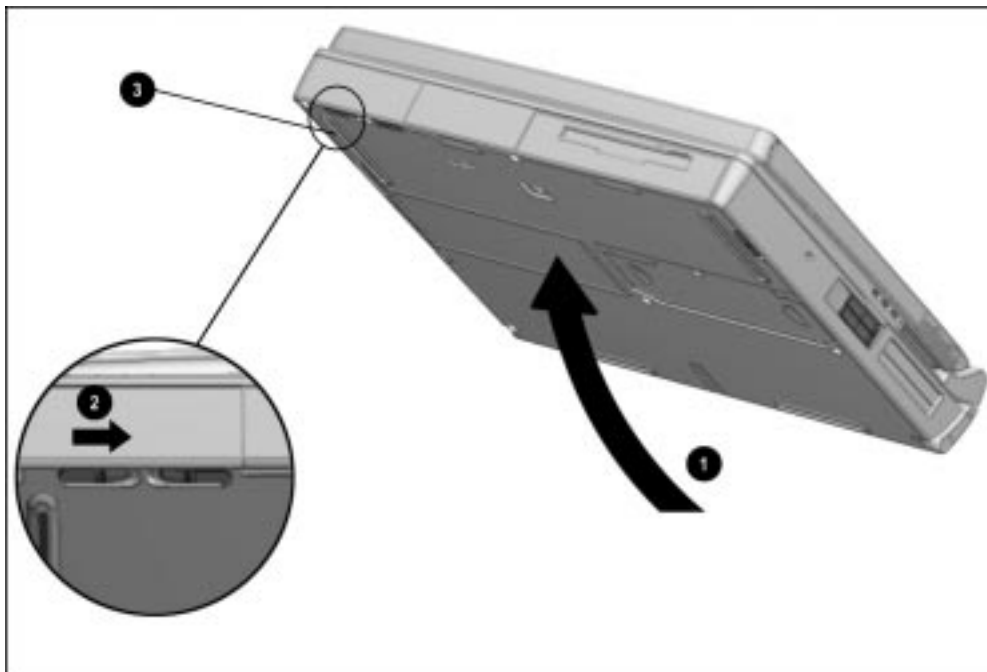


Figure 5-8. Releasing a Battery Pack from the Battery Bay

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5. Pull the battery pack out of the battery bay (Figure 5-9).



Figure 5-9. Removing a Battery Pack from the Battery Bay

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Removing a Battery Pack from the MultiBay

1. If the computer is turned on, press the suspend button. If there is hard drive or diskette drive activity, Suspend may not occur immediately.

The computer screen clears and the power/suspend light begins to flash when Suspend has been initiated.

2. Tilt the computer at an angle ❶ so the bottom of the computer is accessible (Figure 5-10).
3. If the battery pack has been secured in the MultiBay with a single- or dual-bay security screw ❷, remove the screw with the security wrench included with the computer.
4. Slide the MultiBay release latch toward the rear of the computer ❸.
5. Grasp the battery pack using the recess ❹ beneath the MultiBay.

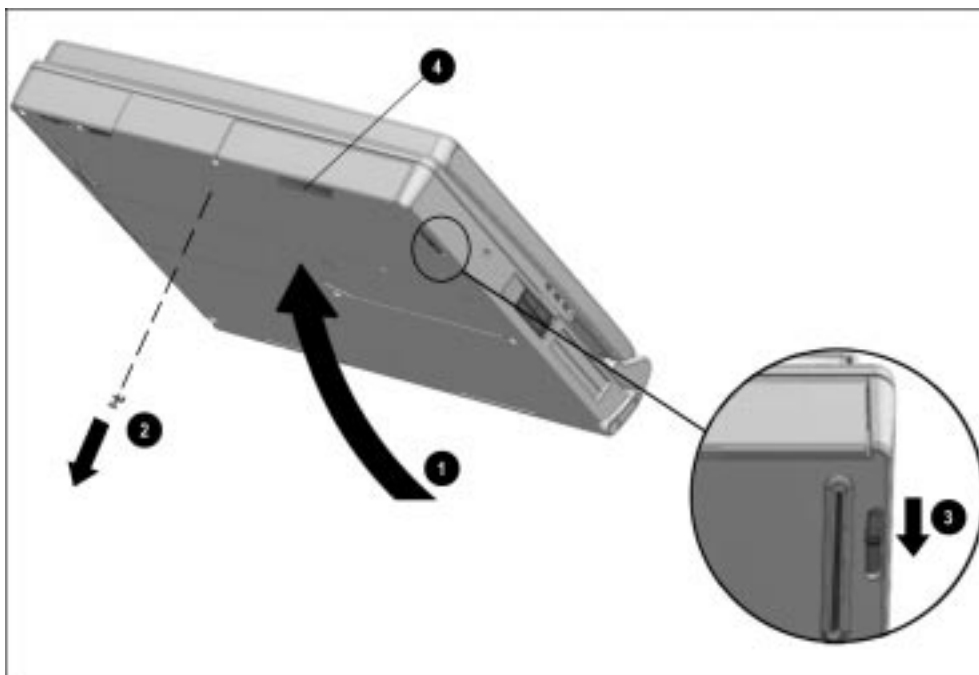


Figure 5-10. Releasing a Battery Pack from the MultiBay

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6. Pull the battery pack out of the MultiBay (Figure 5-11).

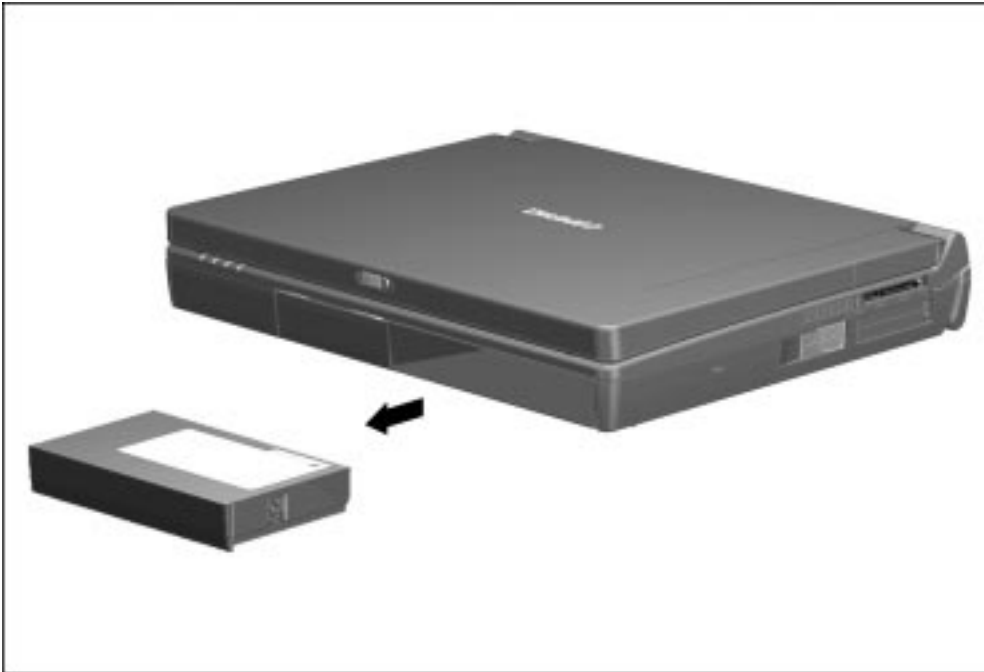


Figure 5-11. Removing a Battery Pack from the MultiBay

Inserting a Battery Pack into the Battery Bay



WARNING: To prevent damage to the computer, do not insert a battery pack into the battery bay until the computer is fully reassembled.

1. With the battery pack label facing up and the battery pack contacts facing the computer, slide the battery pack into the battery bay until it clicks into place (Figure 5-12).



Figure 5-12. *Inserting a Battery Pack into the Battery Bay*

2. If the computer is in Suspend, press the suspend button to return to your work.

Inserting a Battery Pack into the MultiBay



WARNING: To prevent damage to the computer, do not insert a battery pack into the MultiBay until the computer is fully reassembled.

1. With the battery pack label facing up and the battery pack contacts facing the computer, slide the battery pack into the MultiBay until it clicks into place.
2. If the battery pack was secured in the MultiBay using a single- or dual-bay security screw, replace the screw (Figure 5-13).

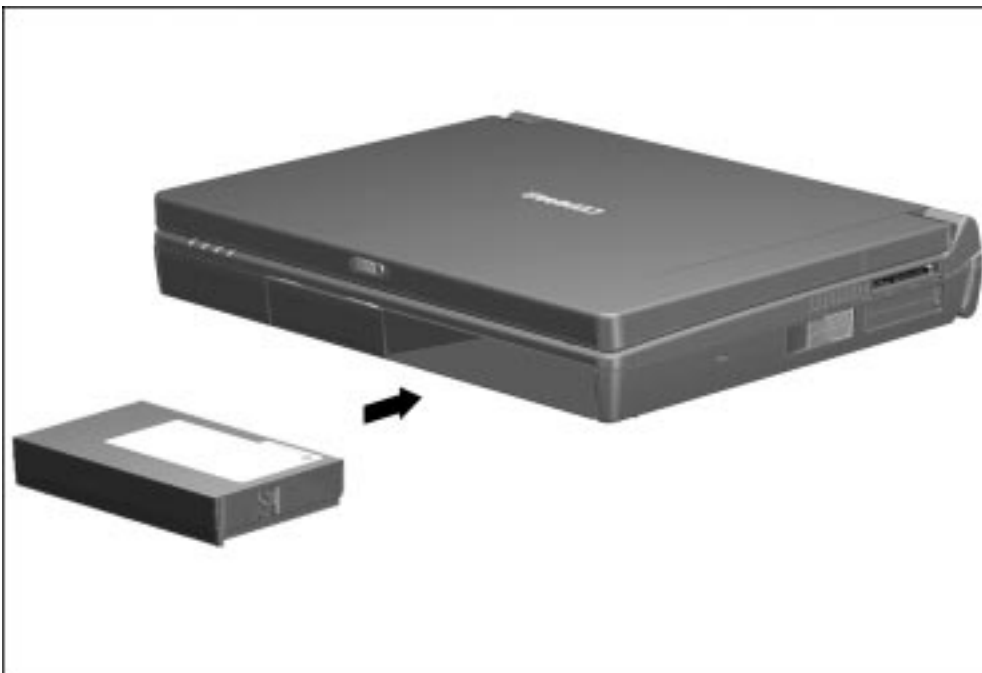


Figure 5-13. *Inserting a Battery Pack into the MultiBay*

3. If the computer is in Suspend, press the suspend button to return to your work.

5.7 Hard Drives

Removing a Hard Drive from the Hard Drive Bay

Before removing a hard drive, back up all information on the hard drive.

1. Save all work, exit all applications, and shut down the computer.
2. Tilt the computer at an angle ❶ so the bottom of the computer is accessible (Figure 5-14).
3. If the hard drive has been secured in the hard drive bay with a single- or dual-bay security screw ❷, remove the screw with the security wrench included with the computer.
4. Slide the hard drive release latch to the left ❸.
5. Grasp the hard drive using the recess beneath the hard drive bay ❹.

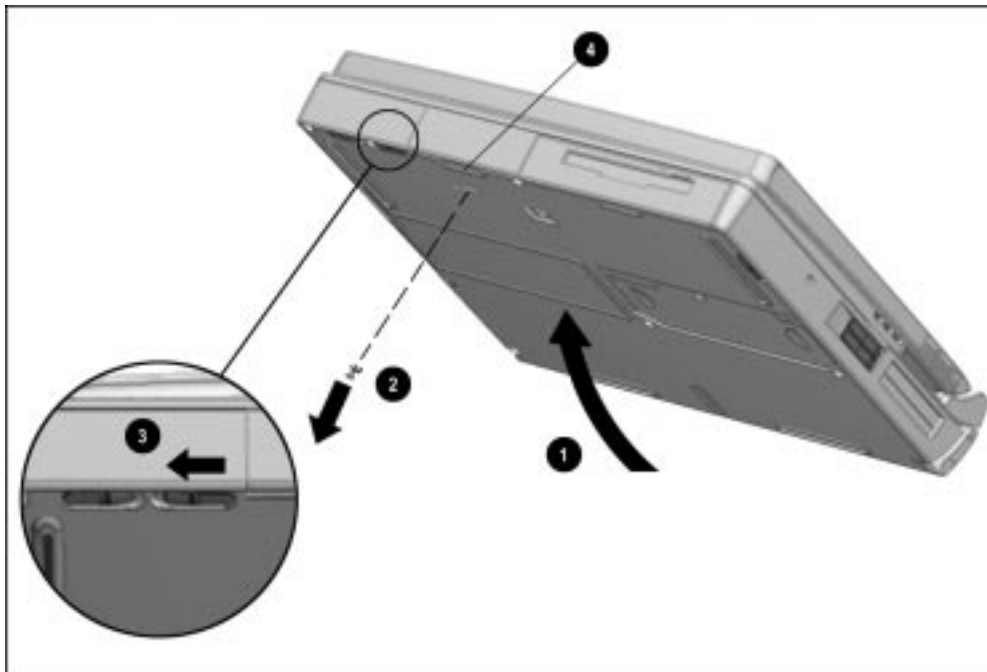


Figure 5-14. Releasing a Hard Drive from the Hard Drive Bay

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6. Pull the hard drive out of the hard drive bay (Figure 5-15).



Figure 5-15. Removing a Hard Drive from the Hard Drive Bay

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7. Pull the metal hard drive up and out of the plastic hard drive tray (Figure 5-16).

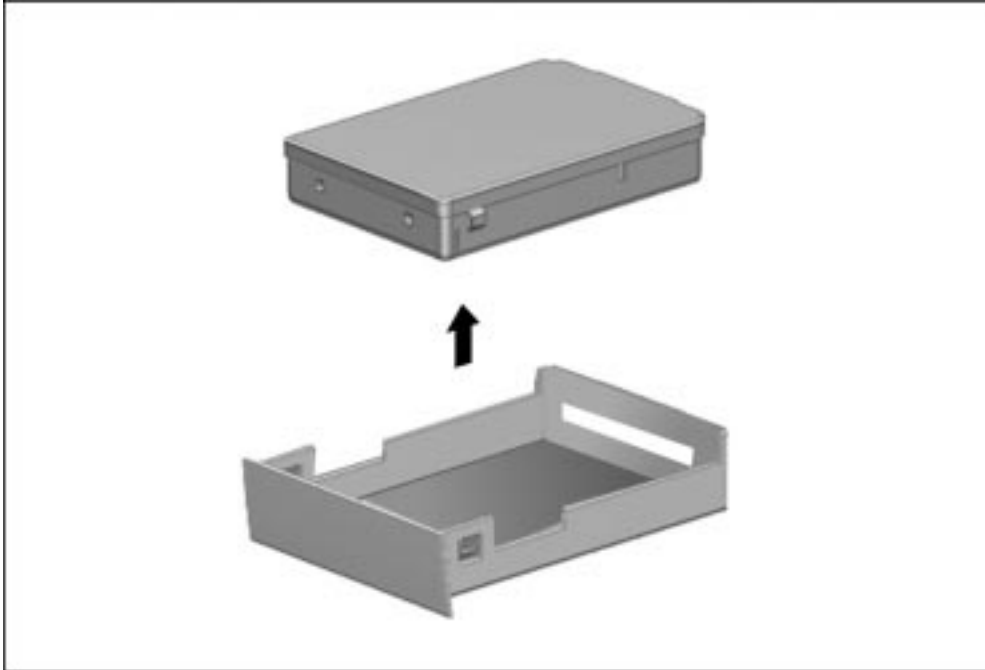


Figure 5-16. Removing the Hard Drive from the Hard Drive Tray

8. If you are not inserting another hard drive, insert the hard drive tray into the hard drive bay until it is seated.

.....

Inserting a Hard Drive into the Hard Drive Bay

1. Save all work, exit all applications, and shut down the computer.
2. Release the hard drive tray from the hard drive bay by sliding the hard drive release latch to the left.
3. Grasp the hard drive tray using the recess beneath the hard drive bay.
4. Pull the hard drive tray out of the hard drive bay.
5. Insert the metal hard drive into the plastic hard drive tray with the connectors protruding through the opening in the rear of the tray (Figure 5-17).

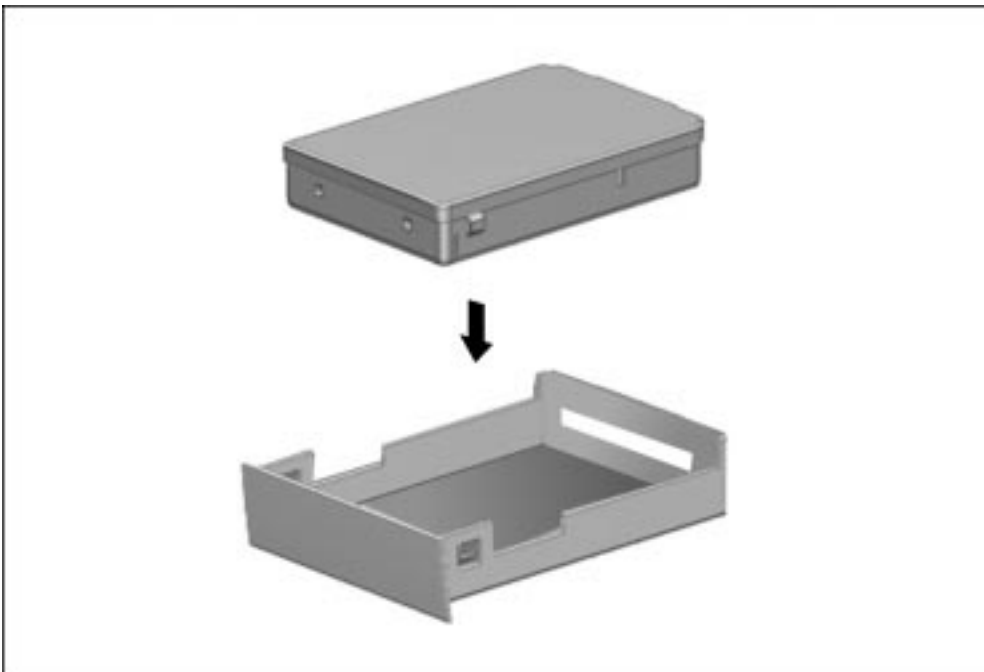


Figure 5-17. Inserting a Hard Drive into the Hard Drive Tray

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6. Slide the hard drive assembly into the hard drive bay (Figure 5-18).



Figure 5-18. *Inserting a Hard Drive into the Hard Drive Bay*

7. If the hard drive was secured in the hard drive bay using a single- or dual-bay security screw, replace the screw.

Inserting a Hard Drive into the MultiBay

If you are moving a hard drive from the hard drive bay to the MultiBay, remove the hard drive from the hard drive tray. Refer to the “Removing a Hard Drive from the Hard Drive Bay” section in this chapter for more information.

An Armada 7000 Hard Drive MultiBay Adapter is needed to insert a hard drive into the MultiBay. This adapter is included with the purchase of an optional hard drive.

1. Save all work, exit all applications, and shut down the computer.
2. Push back the slide tab ❶ on the Armada 7000 Hard Drive MultiBay Adapter (Figure 5-19).
3. Lower the hard drive ❷ into the adapter.
4. Slide the hard drive toward the connector ❸ in the adapter until the connectors are seated.

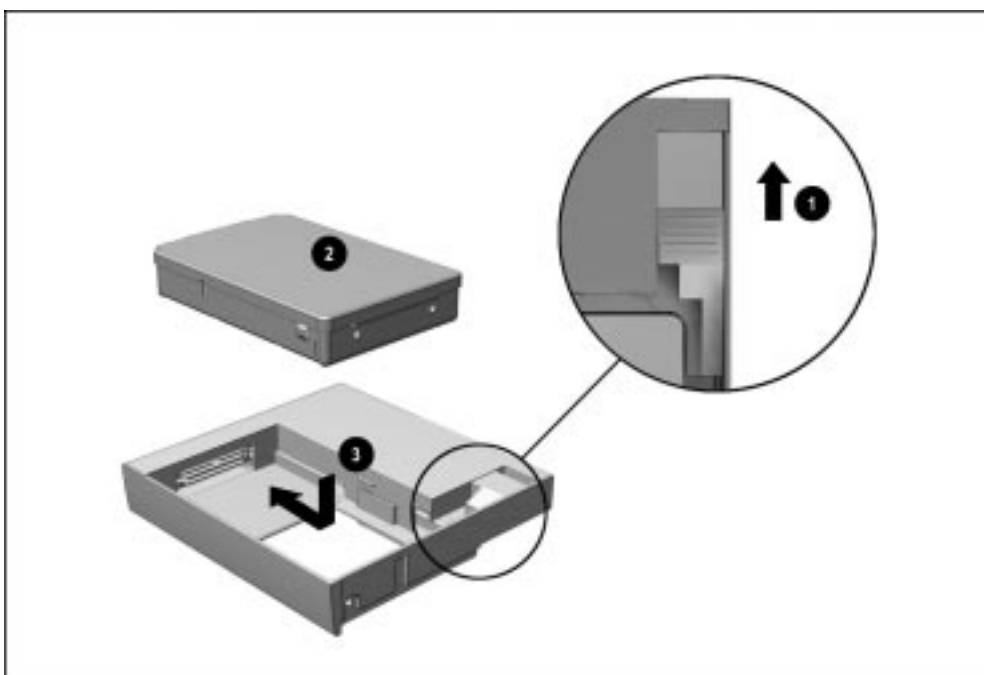


Figure 5-19. Inserting a Hard Drive into an Armada 7000 Hard Drive MultiBay Adapter

5. Release the slide tab.
6. Slide the hard drive assembly into the MultiBay with the bezel facing out.

NOTE: You can secure the hard drive assembly in the MultiBay using a single- or dual-bay security screw included with the computer.

.....

Removing a Hard Drive from the MultiBay

Before removing a hard drive, back up all information on the hard drive.

1. Save all work, exit all applications, and shut down the computer.
2. Tilt the computer at an angle ❶ so the bottom of the computer is accessible (Figure 5-20).
3. If the hard drive assembly is secured in the MultiBay with a single- or dual-bay security screw ❷, remove the screw with the security wrench included with the computer.
4. Slide the MultiBay release latch ❸ toward the rear of the computer.
5. Grasp the hard drive assembly using the recess ❹ beneath the MultiBay.

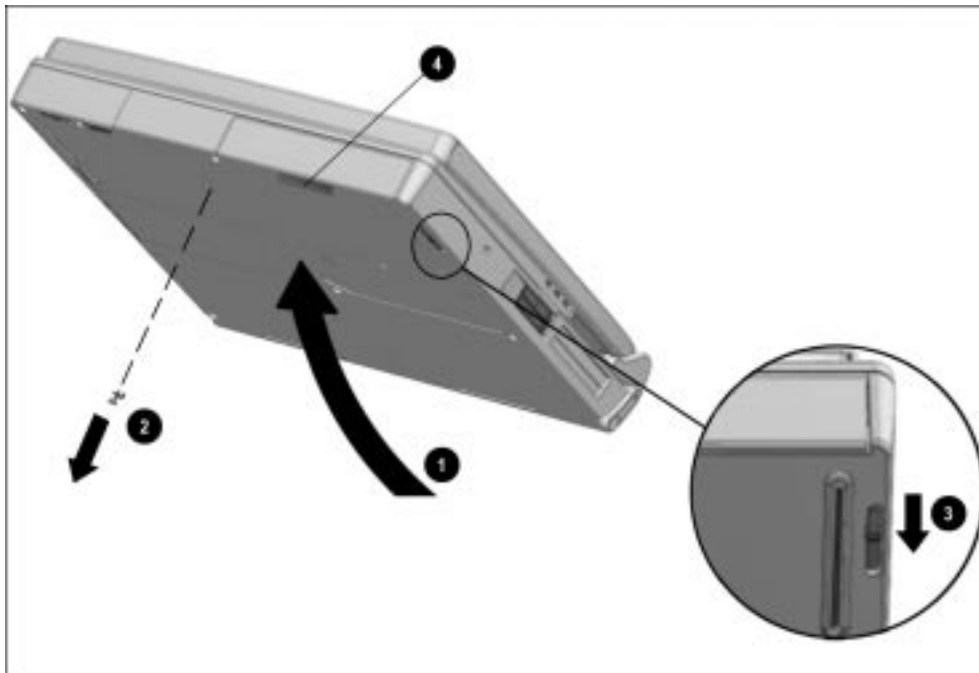


Figure 5-20. Releasing the Hard Drive Assembly from the MultiBay

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6. Pull the hard drive assembly out of the MultiBay (Figure 5-21).



Figure 5-21. Removing the Hard Drive Assembly from the MultiBay

If you are not inserting another drive or a battery pack into the MultiBay, insert the MultiBay weight saver included with the computer.

.....

5.8 MultiBay Devices

Removing MultiBay Devices

1. Save all work, exit all applications, and shut down the computer.
2. Remove the media (diskettes, CD-ROMs, etc.) from the drive. Ensure that the CD tray is closed.
3. Tilt the computer at an angle ❶ so the bottom of the computer is accessible (Figure 5-22).
4. If the drive has been secured in the MultiBay with a single- or dual-bay security screw ❷, remove the screw with the security wrench included with the computer.
5. Slide the MultiBay release latch ❸ toward the back of the computer.
6. Grasp the drive using the recess ❹ beneath the MultiBay.

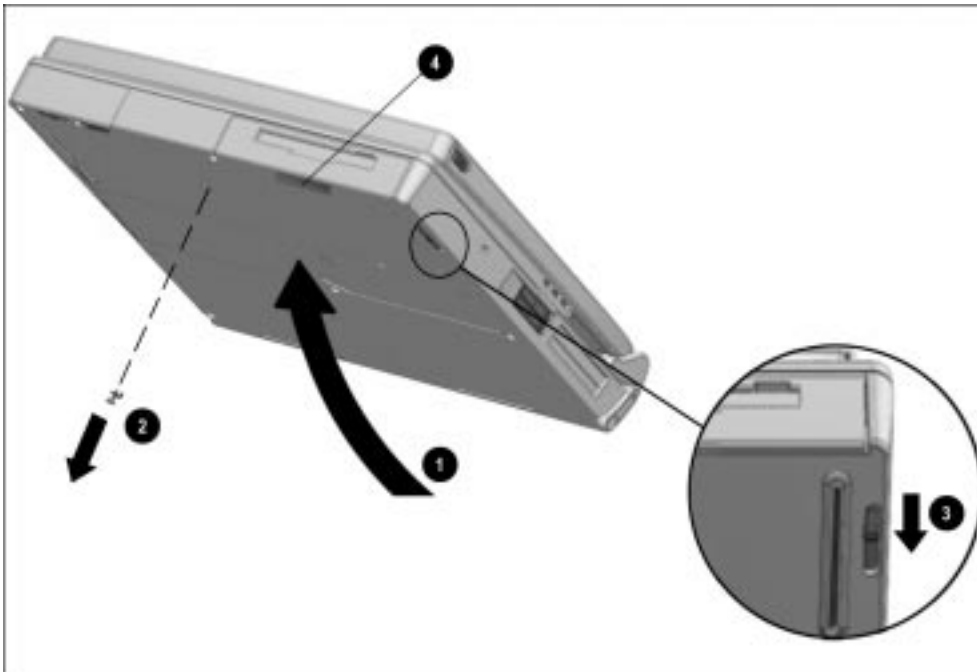


Figure 5-22. Releasing a Drive from the MultiBay

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7. Pull the drive out of the MultiBay (Figure 5-23).



Figure 5-23. *Removing a Drive from the MultiBay*

If you are not inserting another drive or a battery pack into the MultiBay, insert the MultiBay weight saver included with the computer.

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Inserting MultiBay Devices

1. Save all work, exit all applications, and turn off the computer.
2. Remove the media (diskettes, CD-ROM's, etc.) from the drive to be inserted in the MultiBay. Ensure that the CD tray is closed.
3. With the bezel facing out, slide the drive into the MultiBay until it clicks into place (Figure 5-24).



Figure 5-24. *Inserting a Drive into the MultiBay*

5.9 Memory Expansion

Removing the Memory Expansion Slot Cover

The memory expansion compartment is located on the bottom of the computer. Either one or two memory expansion boards can be installed at a time.



CAUTION: Electrostatic discharge (ESD) can damage electronic components. Before beginning this procedure, ensure that you are properly grounded. For more information, refer to Appendix C, “Electrostatic Discharge.”

1. Prepare the computer for disassembly (Section 5.3).
2. Remove any battery packs (Section 5.6).



WARNING: Failure to unplug the power cord and remove the battery pack before installing a memory expansion board can damage the equipment and expose you to the risk of electrical shock.

3. Turn the computer upside down and position it so the rear panel faces forward.

-
4. Remove the screw that secures the memory expansion slot cover to the computer ① (Figure 5-25). A security wrench is needed to remove the screw securing the cover.
 5. Slide the cover to the right ② and lift it straight up to remove it.

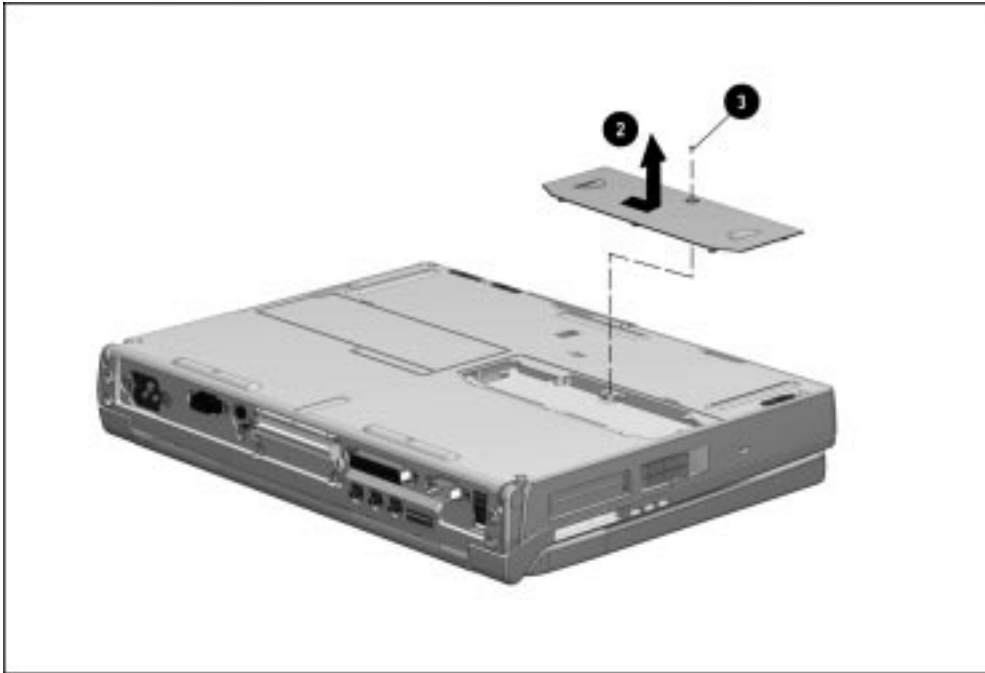


Figure 5-25. Removing the Memory Expansion Slot Cover

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Removing a Memory Expansion Board

1. Lift and hold back the memory insulator ❶. The insulator is not removable (Figure 5-26).
2. Spread the retaining tabs apart.
3. Lift up the edge of the memory expansion board ❷.
4. Pull the memory expansion board out of the memory expansion slot at a 45-degree angle ❸.

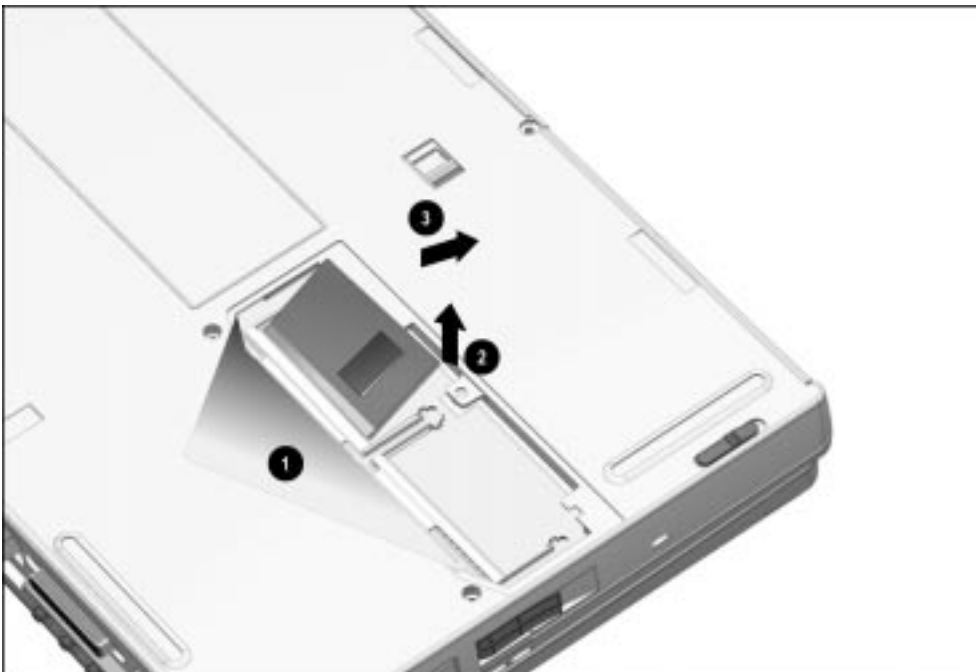


Figure 5-26. Removing a Memory Expansion Board

5. Place the memory expansion board in an electrostatic-safe container.
6. If no memory expansion board is to be installed, reset the memory insulator.
7. Replace the memory expansion slot cover and install the screw.

Inserting a Memory Expansion Board

The memory expansion boards are asymmetrically keyed (notched) to ensure correct positioning.

1. Insert the memory expansion board into an empty memory expansion slot at a 45-degree angle ❶ (Figure 5-27).
2. Push the board into place until it is seated.
3. Push the memory expansion board down until the board is seated in the plastic retention clips ❷.

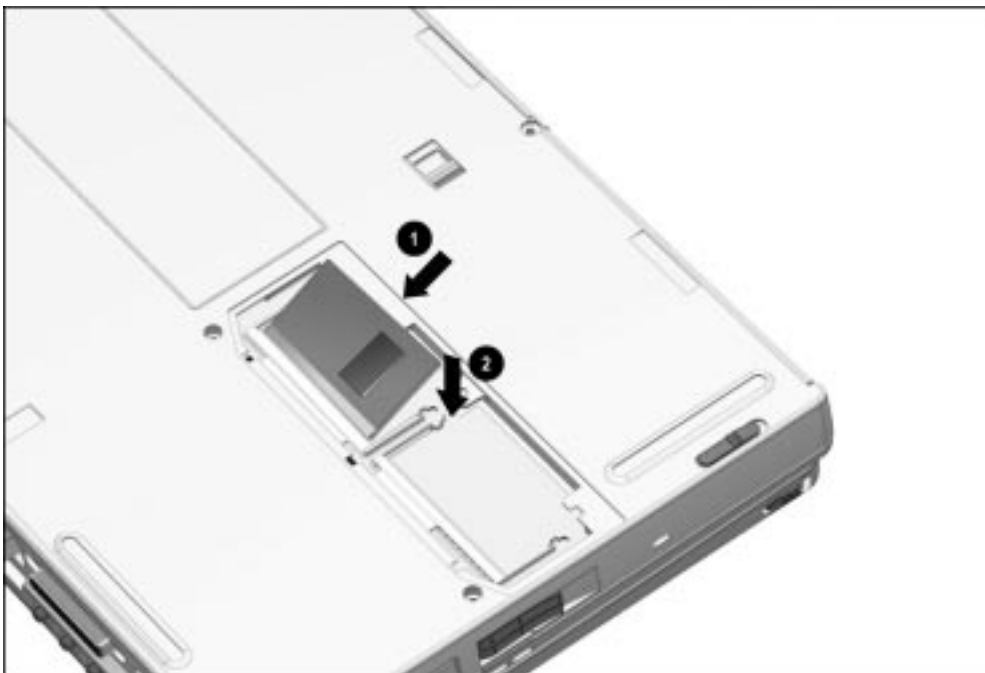


Figure 5-27. inserting a Memory Expansion Board

4. Run Computer Setup (Section 2.5).

.....

Replacing the Memory Expansion Slot Cover

1. Reset the memory insulator ❶ over the installed memory expansion board(s), ensuring that all edges of the memory insulator are tucked inside the memory expansion compartment (Figure 5-28).
2. Replace the memory expansion slot cover ❷ by placing it flush over the memory expansion compartment, then sliding it left until it is seated.
3. Secure the memory expansion slot cover to the computer with a memory expansion slot cover security screw ❸ or a standard Torx T-10 screw.

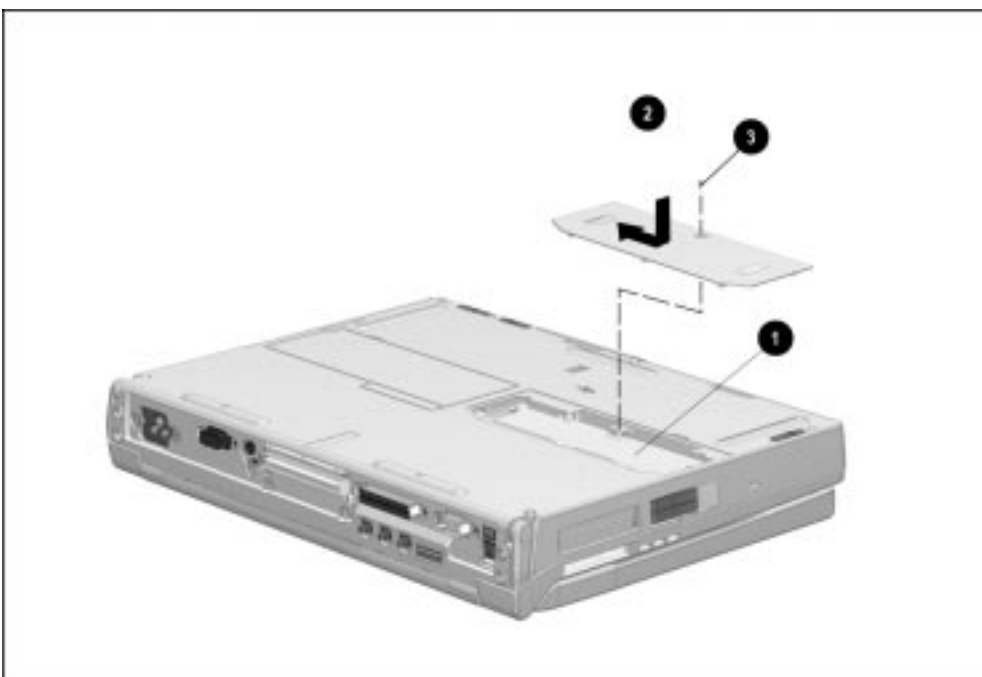


Figure 5-28. Replacing the Memory Expansion Slot Cover

5.10 Keyboard Assembly

The keyboard assembly consists of the keyboard, keyboard bezel, and the pointing device, and is spared as a unit. This assembly must be removed to gain access to the interior components of the computer.

1. Prepare the computer for disassembly (Section 5.3).
2. Remove any battery packs (Section 5.6).
3. Turn the computer upside down with the rear panel facing forward.
4. Remove the nine screws from the bottom of the computer (Figure 5-29).



CAUTION: The two screws removed from the highlighted screw holes are shorter than the other seven screws. Make sure these shorter screws are installed in the same locations when replacing the keyboard assembly. Failure to follow this caution can result in damage to the computer.

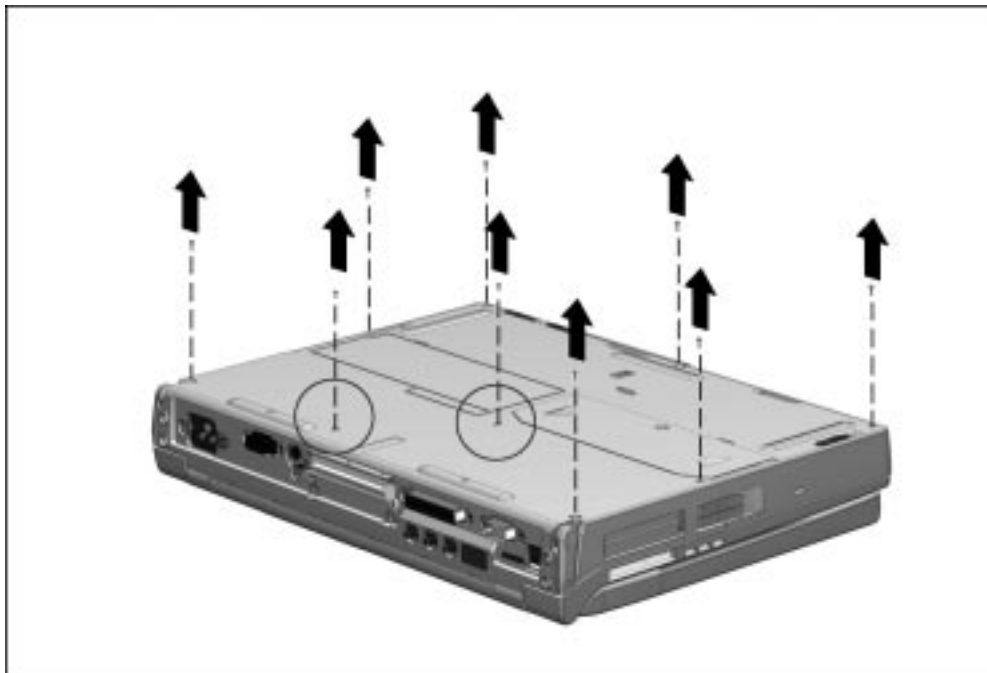


Figure 5-29. Removing the Keyboard Assembly Screws

-
5. Turn the computer right side up with the front of the computer facing forward.
 6. Open the computer as far as it will open.

NOTE: With the display open and the battery pack and hard drive removed, the weight of the display makes the computer susceptible to being easily tipped over.

7. Remove the keyboard warning label from the keyboard and remove the two screws securing the keyboard to the computer (Figure 5-30).



Figure 5-30. Removing the Keyboard Warning Label and Screws

.....

8. Lift the keyboard assembly straight up and away from the computer (Figure 5-31).



Figure 5-31. *Removing the Keyboard Assembly*

Reverse the above procedure to reinstall the keyboard assembly.

IMPORTANT: A set of keyboard warning labels is included with each keyboard assembly spare part kit and various other spare part kits and spare parts that require removal of the keyboard assembly. Select a language from the set and place the label in the upper right corner of the keyboard assembly. This label contains a warning message to prevent physical discomfort and harm. This label is essential.

5.11 Auxiliary Battery

NOTE: These instructions apply only to computer models with config. codes beginning with “CD”, “CH”, and “CZ”. Refer to Section 5.19, “Display Assembly and Auxiliary Battery”, for instructions on removing the auxiliary battery from computers with other config. codes.

Removing the Auxiliary Battery

1. Prepare the computer for disassembly (Section 5.3).
2. Remove any battery packs (Section 5.6).
3. Remove the keyboard assembly (Section 5.10).
4. Disconnect the auxiliary battery cable ❶ (Figure 5-32).
5. Remove the auxiliary battery from the base enclosure ❷.

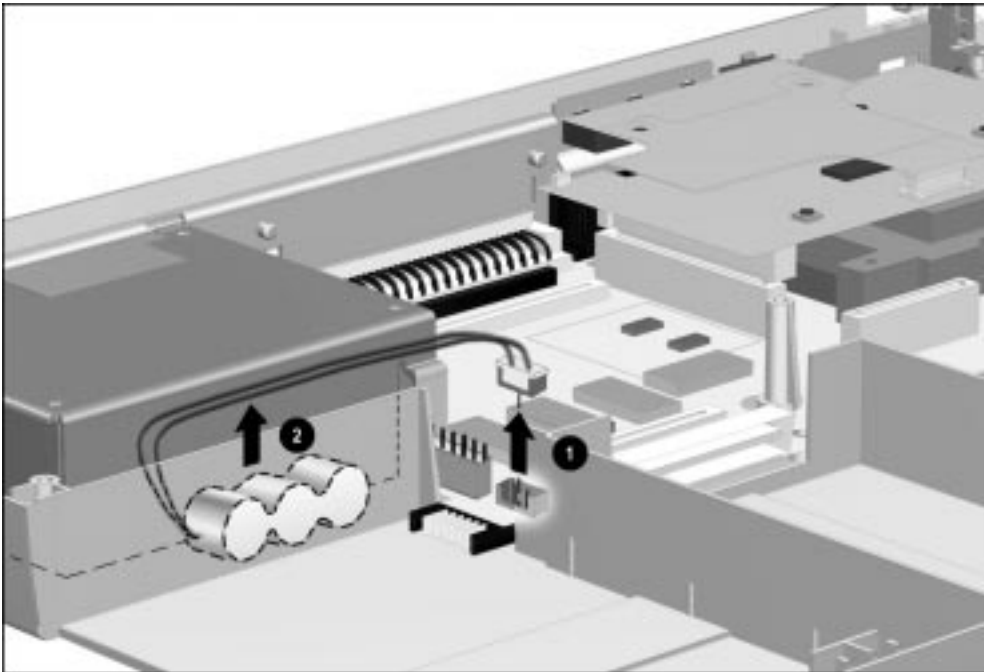


Figure 5-32. Removing the Auxiliary Battery

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Installing the Auxiliary Battery

NOTE: These instructions apply only to computer models with config. codes beginning with “CD”, “CH”, and “CZ”. Refer to Section 5.19, “Display Assembly and Auxiliary Battery”, for instructions on installing the auxiliary battery on computers with other config. codes.

1. Remove the protective backing from the insulator.
2. With the auxiliary battery cable positioned to the left, attach the insulator to the auxiliary battery ❶. Align the left edge of the insulator with the spot on the auxiliary battery where the cable is attached (Figure 5-33).
3. Fold the right side of the insulator over the auxiliary battery ❷. Make sure the insulator adheres to and covers the top surface of the battery.
4. Fold up the two side flaps on the insulator ❸. Make sure the insulator adheres to the sides of the auxiliary battery.

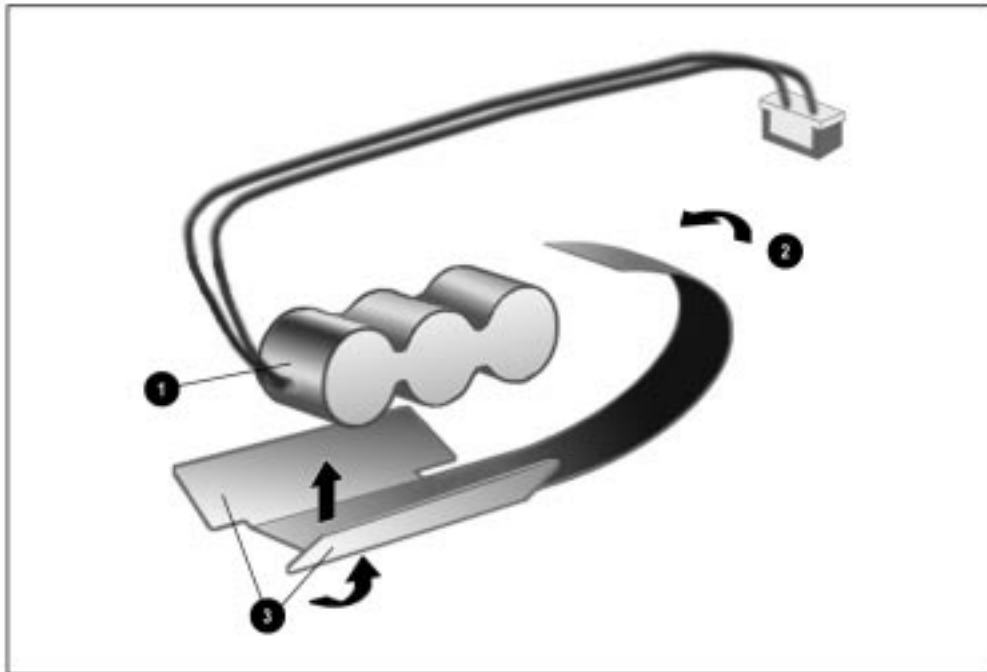


Figure 5-33. Attaching the Insulator to the Auxiliary Battery

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5. Remove the protective backing on one of the velcro strips and attach it to the box that appears on the system board in front of the power supply ❶ (Figure 5-34).
 6. Use the hook and loop feature of the velcro strips to attach the second velcro strip to the velcro strip attached to the system board ❷. Remove the protective backing on the second velcro strip.
 7. Attach the auxiliary battery and insulator ❸ to the top of the second velcro strip. Make sure the left edge of the insulator is aligned with the left edge of the velcro strips attached to the system board.
 8. Route the auxiliary battery cable behind the battery and connect the cable to the connector on the system board ❹.

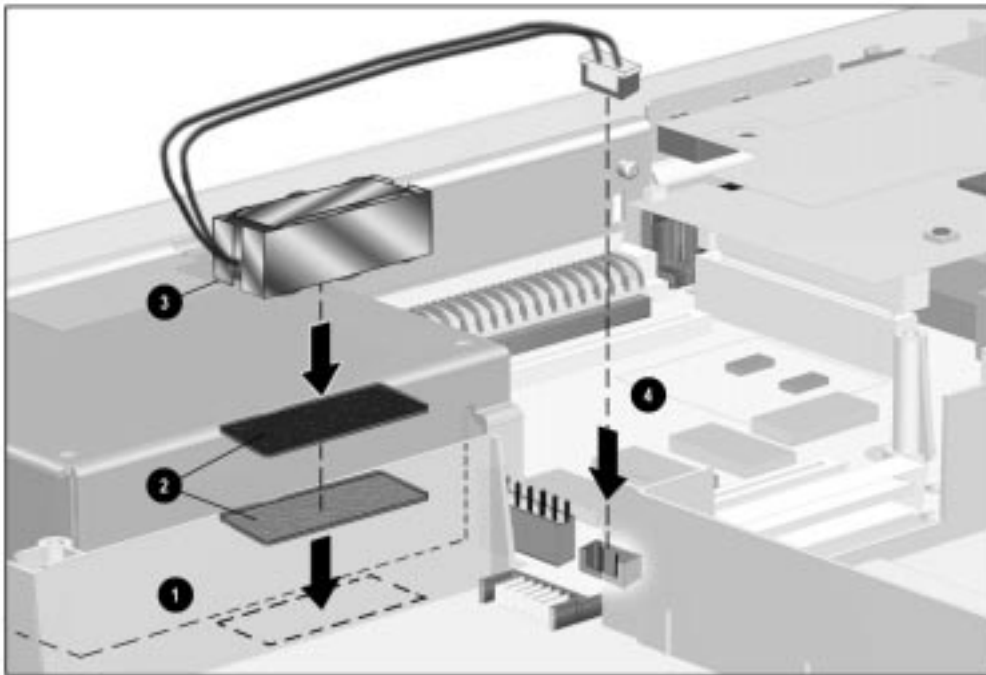


Figure 5-34. *Installing the Auxiliary Battery*

5.12 Power Supply

The power supply is located in the rear left side of the computer. The power supply attaches and connects to the system board.

1. Prepare the computer for disassembly (Section 5.3).
2. Remove any battery packs (Section 5.6).
3. Remove the keyboard assembly (Section 5.10).
4. Remove the left rear cover ❶ by sliding the cover toward the front of the computer and lifting it off the power supply (Figure 5-35).
5. Use the connector removal tool to disconnect the power supply cable ❷ from the system board.
6. Remove the two screws that secure the power supply to the system board and the screw that secures the ground clip to the processor module assembly ❸. Make sure the ferrite beads on the power supply cable do not obstruct the removal of the inboard screw.

NOTE: Make special note of the alignment and orientation of the ground clip. The longer horizontal plane should be on top when it is replaced.

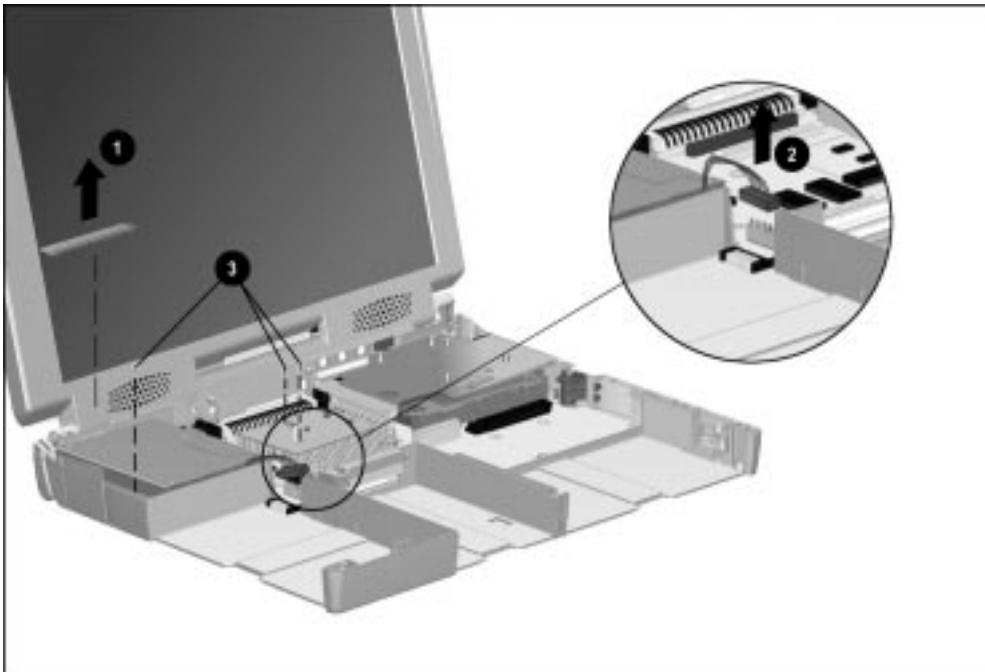


Figure 5-35. Removing the Left Rear Cover and Disconnecting the Power Supply Cable

-
7. Position the computer so the rear panel faces forward.
 8. Remove the two screws ❶ that secure the power supply to the I/O bracket (Figure 5-36).
 9. Position the computer so the front faces forward.
 10. Lift up on the front of the power supply ❷ and swing it up and away until it clears the computer.

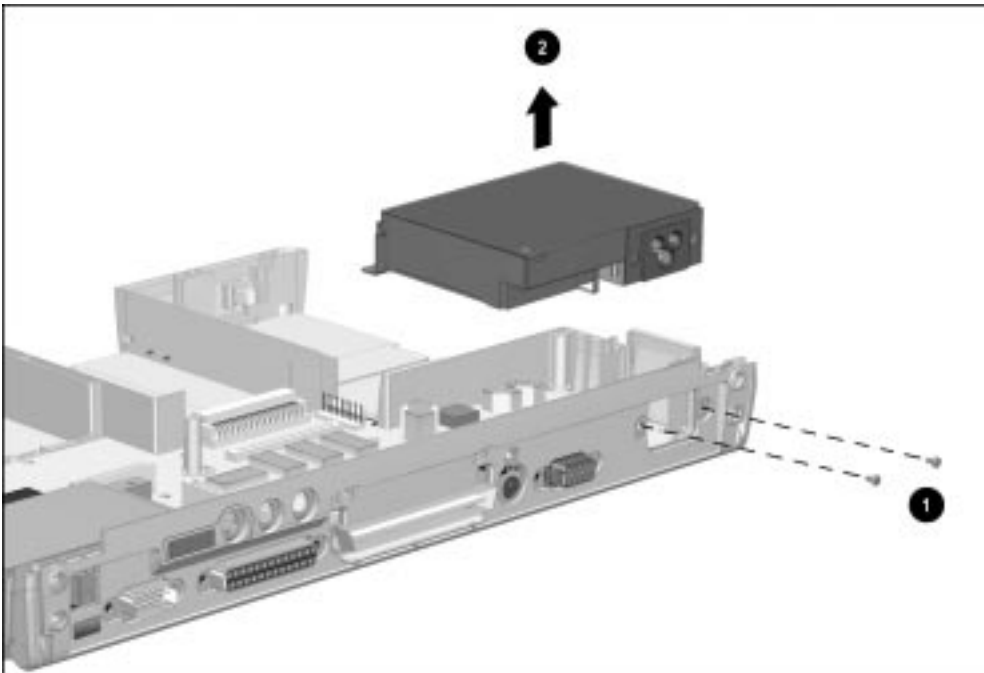


Figure 5-36. Removing the Power Supply

Reverse the above procedure to install the power supply.



CAUTION: Make sure the fan cable is not pinched when installing the power supply. Also make sure the power supply cable is tucked away from the battery connector and battery charging bay. Failure to follow these cautions can result in damage to the fan and power supply.

5.13 Fan Assembly

The fan assembly consists of the motorized fan and a rubber mounting sleeve. The fan assembly is mounted on the left side of the computer and is connected to the system board.

1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.6).
3. Remove the keyboard assembly (Section 5.10).
4. Use the connector removal tool to disconnect the cable ❶ connecting the fan assembly to the system board (Figure 5-37).
5. Release the fan assembly from the brackets ❷ that secure either side of the assembly by pulling the brackets apart.
6. Lift the fan assembly out of the computer ❸.

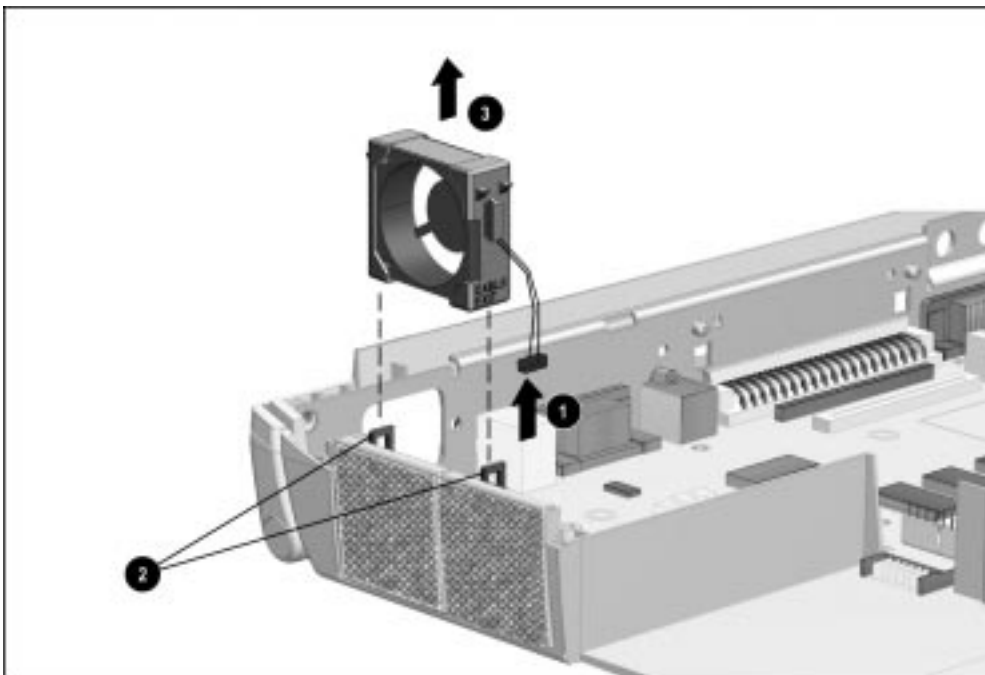


Figure 5-37. Removing the Fan Assembly

Reverse the above procedure to install the fan assembly. When installing it, make sure the alignment tabs on the sides of the rubber mounting sleeve slide into the slots on the fan mounting rails on the computer base assembly. Also make sure the fan cable is routed between the power supply and the base assembly.

IMPORTANT: When installing the fan, make sure it is oriented with the airflow arrow (located on the side of the fan) pointing to the outside of the computer.

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5.14 Audio/USB Board

The audio/USB board is located in the right rear area of the computer and connects to the modem or audio only board. The keyboard assembly must be removed to access the audio/USB board.

1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.6).
3. Remove the keyboard assembly (Section 5.10).
4. Position the computer so the rear panel faces forward.
5. Remove the two screws on either side of the USB connector (Figure 5-38).

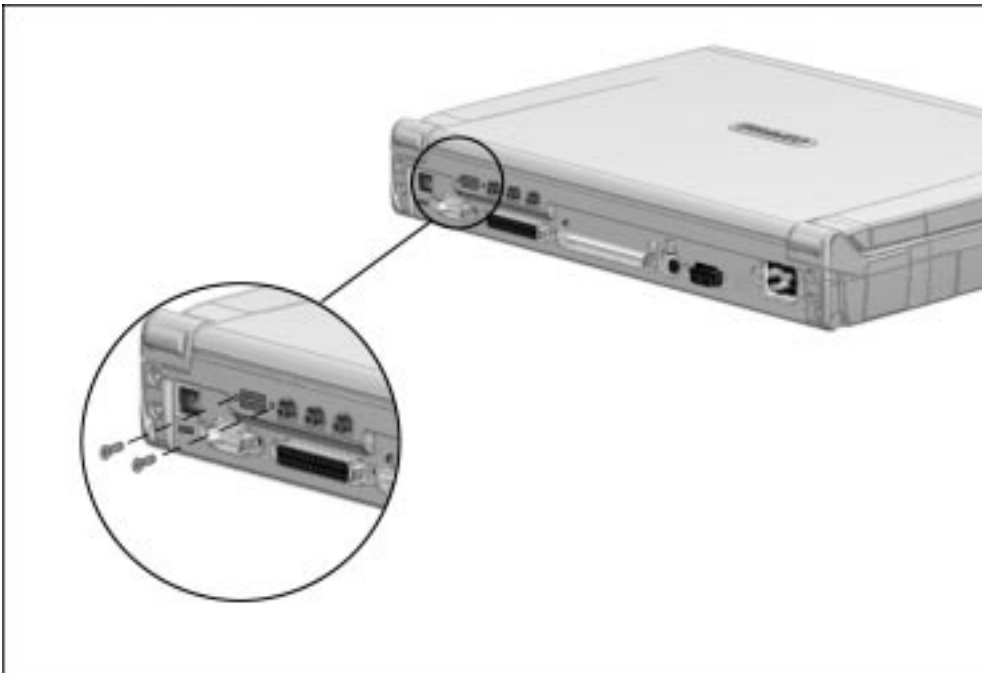


Figure 5-38. Removing the Audio/USB Board Screws

-
6. Position the computer so the front faces forward.
 7. Remove the screw that secures the right rear cover to the modem board and remove the right rear cover ❶ (Figure 5-39).
 8. Lift up on the front of the audio/USB board ❷ until the connector disconnects and swing the board up and away from the computer.
 9. Remove the audio/USB board insulator ❸.

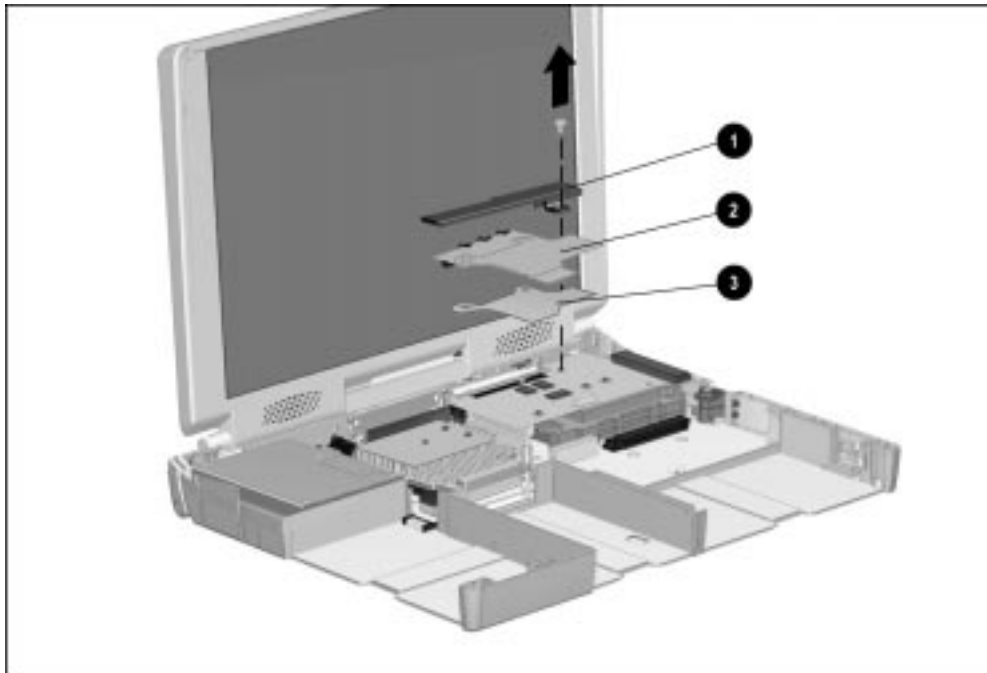


Figure 5-39. Removing the Audio/USB Board

Reverse the above procedure to install the audio/USB board.

5.15 Modem Board

The modem board is located in the right rear area of the computer and connects to the audio/USB and system boards. The keyboard assembly and audio/USB board must be removed to access the modem board. Computers not equipped with a modem contain an audio only board in the same location. Removal procedures are the same for the audio only board.

1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.6).
3. Remove the keyboard assembly (Section 5.10).
4. Remove the audio/USB board (Section 5.14).
5. Disconnect the display audio cable from the modem board ❶ (Figure 5-40).



CAUTION: The display audio cable and its connector are fragile. Handle the cable by the stiffener material on the connector and lift the connector straight up. Failure to follow this caution can result in damage to the cable and connector on the modem/audio only board.

6. Remove the screw ❷ that secures the modem board to the audio assembly bracket.
7. Lift up on the left side of the modem board until the connection to the system board disconnects. Lift the modem board out of the computer ❸.

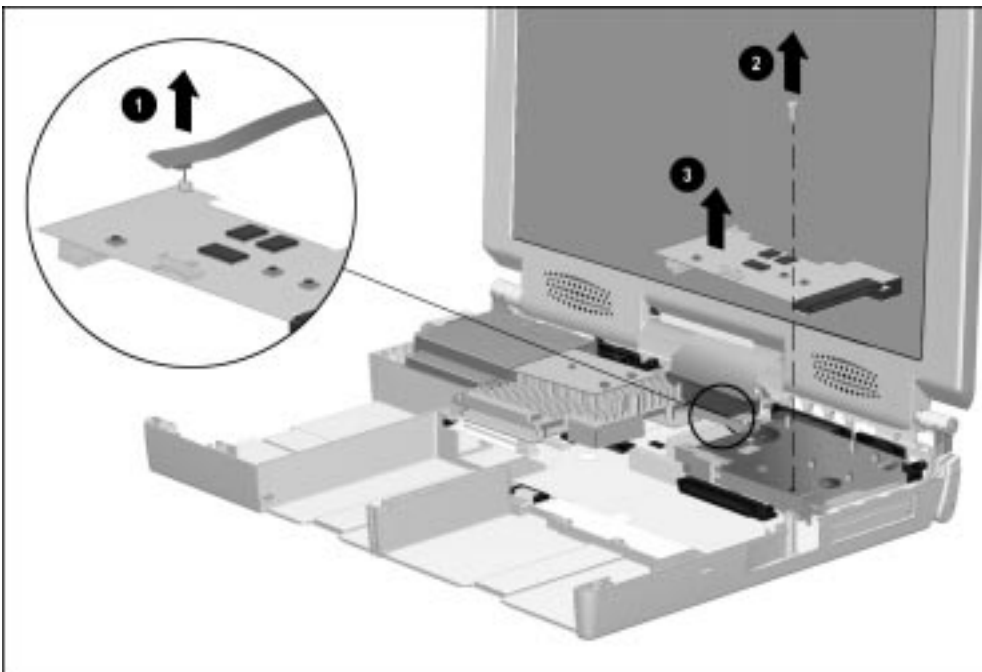


Figure 5-40. Removing the Modem Board

Reverse the above procedure to install the modem board or audio only board.

5.16 Audio Assembly Bracket

The audio assembly bracket is located in the right rear area of the computer and covers the PC Card assembly. The audio/USB board and modem board are secured to the audio assembly bracket.

1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.6).
3. Remove the keyboard assembly (Section 5.10).
4. Remove the audio/USB board (Section 5.14).
5. Remove the modem board (on modem models, Section 5.15).
6. Remove the three screws ❶ that secure the audio assembly bracket to the system board and the screw ❷ that secures the audio assembly bracket to the processor module assembly (Figure 5-41).

NOTE: Computer models with config. codes beginning with “CD”, “CH”, and “CZ” do not have the screw ❷ securing the audio assembly bracket to the processor module assembly or a thermal pad attached to the processor module assembly, as described in Step 7. Additionally, these computer models have a shorter screw in the location circled in the illustration below.

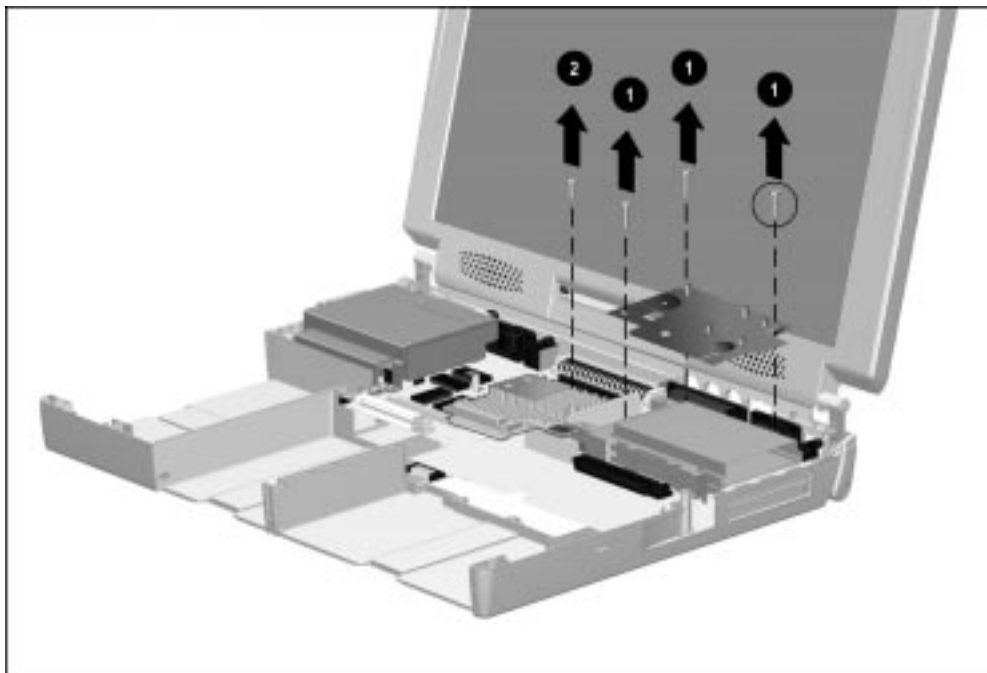


Figure 5-41. Removing the Audio Assembly Bracket

7. Lift the audio assembly bracket out of the computer. Firm pressure is required to remove it as it is attached to the processor module assembly by a thermal pad.



CAUTION: To avoid damaging the PC Card assembly, lift the bracket straight up. Failure to follow this caution can result in damage to the PC Card assembly.

Reverse the above procedure to install the audio assembly bracket.

IMPORTANT: This step applies only to computer models with config. codes beginning with “BS”, “BZ”, and “CB”.

When the audio assembly bracket is removed, the thermal pad ❶ that separates the bracket from the processor module assembly can leave residue on the underside of the audio assembly bracket ❷ and the top of the heat sink on the processor module assembly ❸ (Figure 5-42).

Scrape any residue from both components. Install a new thermal pad on the processor module assembly ❸ before replacing the audio assembly bracket. A new thermal pad is spared with the processor module assembly and in the Miscellaneous Hardware Kit.

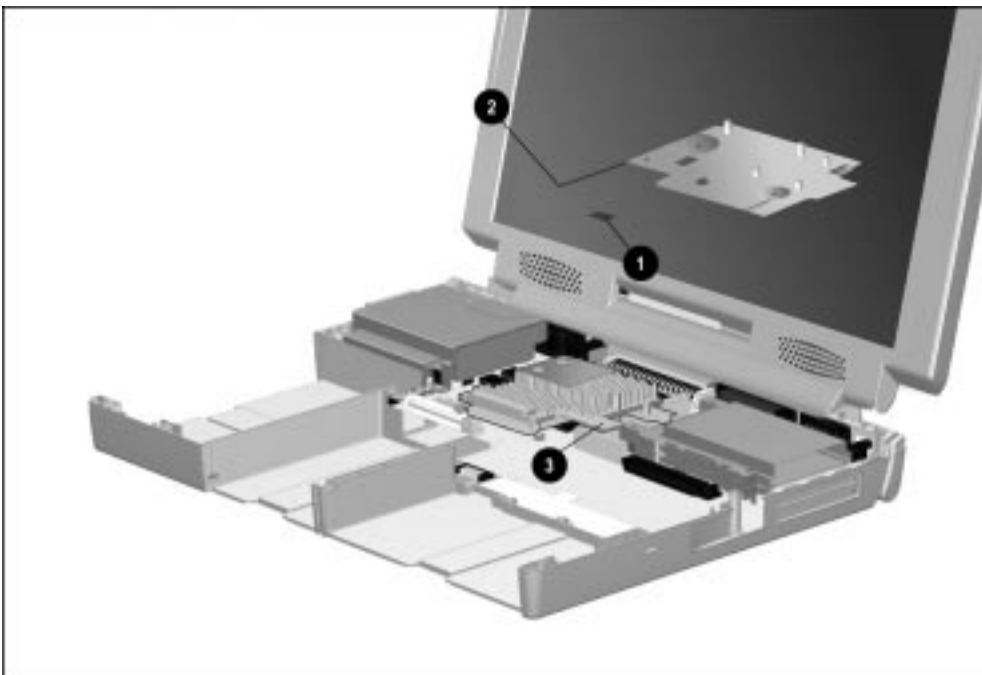


Figure 5-42. Location of Thermal Pad on the Processor Module Assembly



CAUTION: When installing the audio assembly bracket, make sure the auxiliary battery cable is routed between the modem connector ❶ and the audio assembly bracket ❷. Make sure the cable is not pinched by the screw standoff on the audio assembly bracket (Figure 5-43).

NOTE: This caution applies only to computer models with config. codes beginning with “BS”, “BZ”, and “CB”. Refer to Section 5.11, “Auxiliary Battery”, for instructions on routing the auxiliary battery cable on computer models with other config. codes.

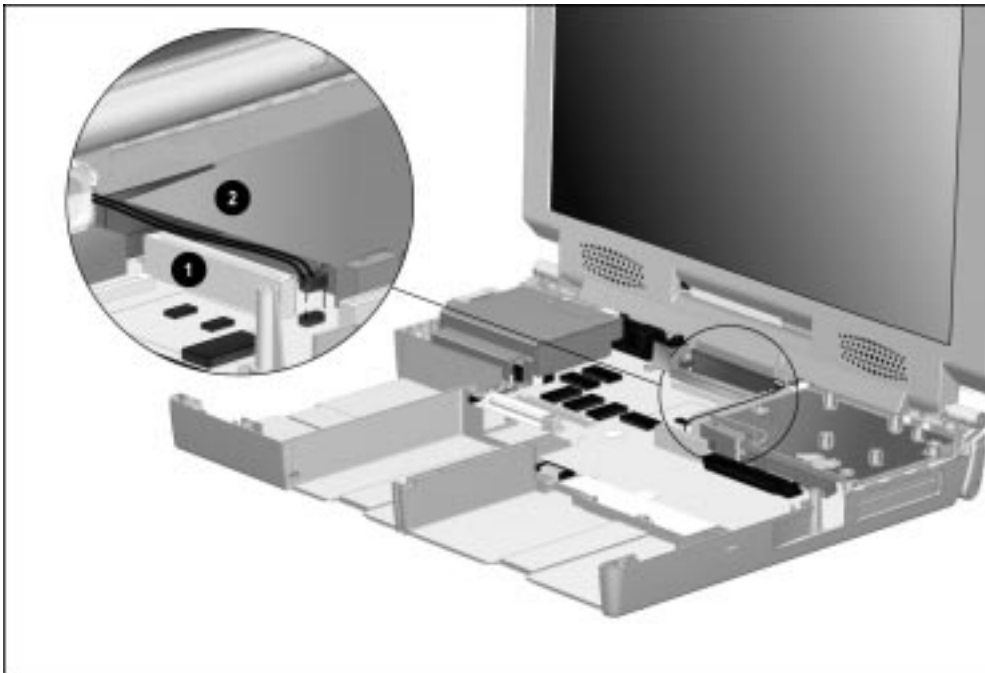


Figure 5-43. Routing the Auxiliary Battery Cable

5.17 Lithium Disc Cell Battery

The lithium disc cell battery is located underneath the audio assembly bracket. The battery attaches to the system board inside a clip.

1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.6).
3. Remove the keyboard assembly (Section 5.10).
4. Remove the audio/USB board (Section 5.14).
5. Remove the modem board (on modem models, Section 5.15).
6. Remove the audio assembly bracket (Section 5.16).
7. Use the connector removal tool to push the left edge of the battery to the right and lift it out of the clip (Figure 5-44).

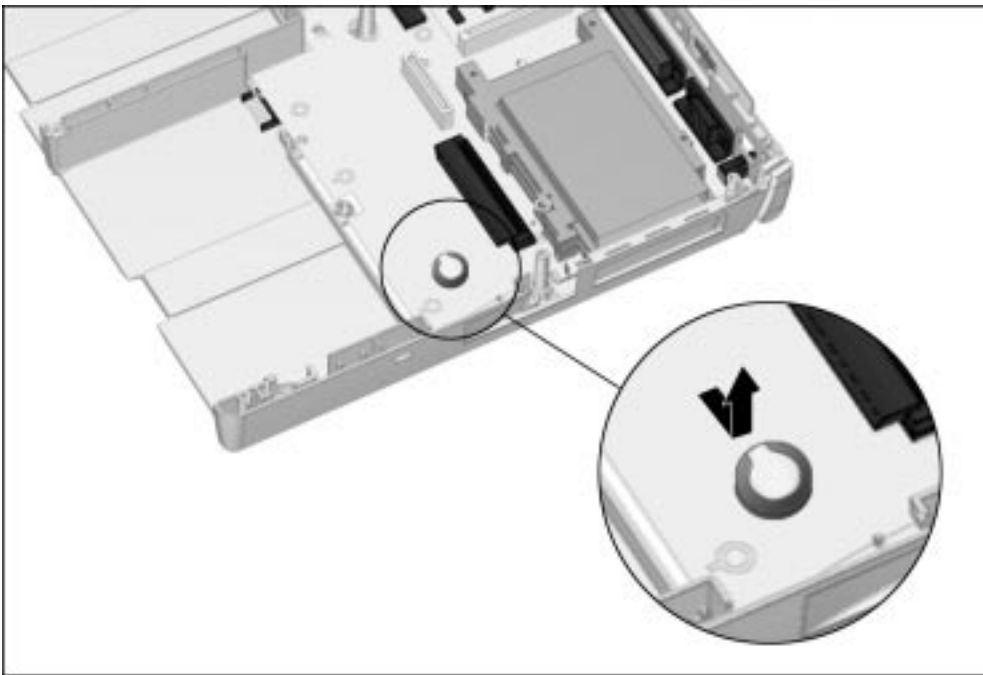


Figure 5-44. Removing the Lithium Disc Cell Battery

Reverse the above procedure to install the lithium disc cell battery.

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5.18 Processor Module Assembly

The processor module assembly is located in the center of the computer. It consists of the processor board, the interposer board (with memory), a heat sink, a heat spreader, and two ground clips. The assembly attaches to the system board by two multipin connectors and two screws.

1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.6).
3. Remove the keyboard assembly (Section 5.10).
4. Remove the audio/USB board (Section 5.14).
5. Remove the modem board (on modem models, Section 5.15).
6. Remove the audio assembly bracket (Section 5.16)

-
7. Remove the two screws ❶ that secure the processor module assembly to the system board (Figure 5-45).
 8. Lift up on the front of the processor module assembly until the connection to the system board disconnects ❷. Once disconnected, lift up on the back of the processor module assembly to remove it.

IMPORTANT: When removing and replacing the processor module assembly, make sure the power supply cables are clear from the front left side of the assembly ❸.

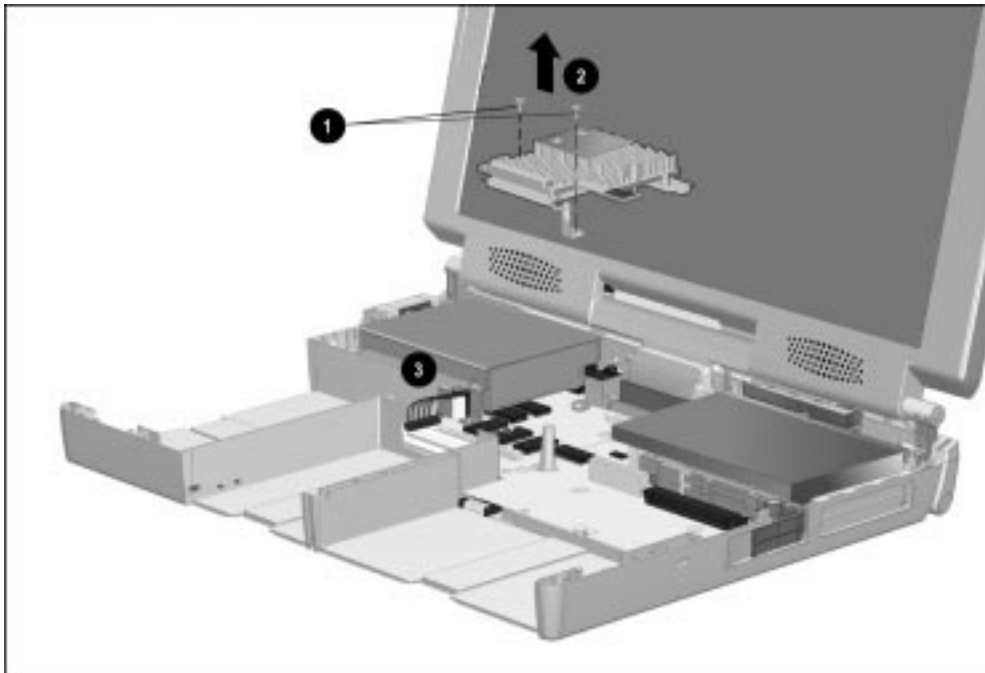


Figure 5-45. Removing the Processor Module Assembly

Reverse the removal procedure to install the processor module assembly. Before installing the two screws on the processor module assembly, make sure the connectors are properly seated.

NOTE: The following ground clip information applies only to computer models with config. codes beginning with “BS”, “BZ”, and “CB”.

When replacing the processor module assembly, remove the two ground clips ① and ② that are attached to the assembly and retain them for use with the new processor module assembly (Figure 5-46).

IMPORTANT: Make note of the alignment and orientation of each ground clip when replacing the processor module assembly.



CAUTION: The screws used to secure the ground clips to the processor module assembly are shorter than the screws used to secure the processor module assembly to the system board. Do **not** interchange these screws. Failure to follow this caution can result in damage to the computer.

Refer to Tables C-5 and C-6 in Appendix C, “Screw Matrix,” for part number and specification information on these screws.

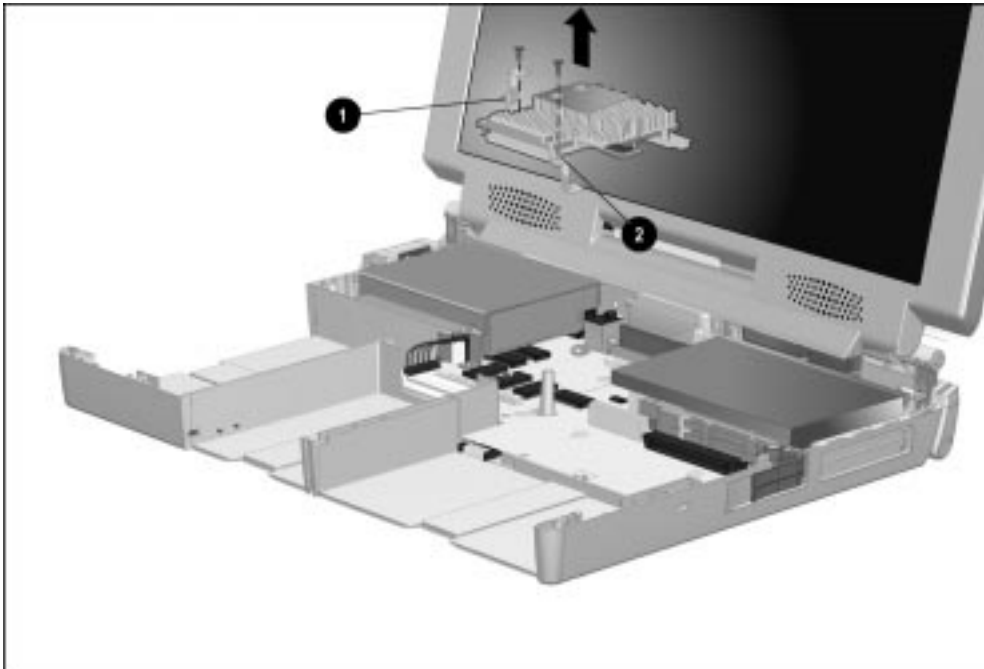


Figure 5-46. Processor Module Assembly Ground Clip Locations and Alignment

NOTE: Refer to Section 5.16, “Audio Assembly Bracket,” for information on replacing the thermal pad when servicing the processor module assembly.

5.19 Display Assembly and Auxiliary Battery

IMPORTANT: The instructions provided in this section for removing and installing the auxiliary battery apply only to computer models with config. codes beginning with “BS”, “BZ”, and “CB”. Refer to Section 5.11, “Auxiliary Battery”, for instructions on removing and installing the auxiliary battery on computer models with other config. codes.

Removing the Display Assembly

1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.6).
3. Remove the keyboard assembly (Section 5.10).
4. Remove the audio/USB board (Section 5.14).
5. Remove the modem board (on modem models, Section 5.15).
6. Remove the audio assembly bracket (Section 5.16)
7. Remove the processor module assembly (Section 5.18).
8. Position the computer so the front faces forward.

-
9. Remove the screw that secures the display video cable connector to the system board (Figure 5-47).

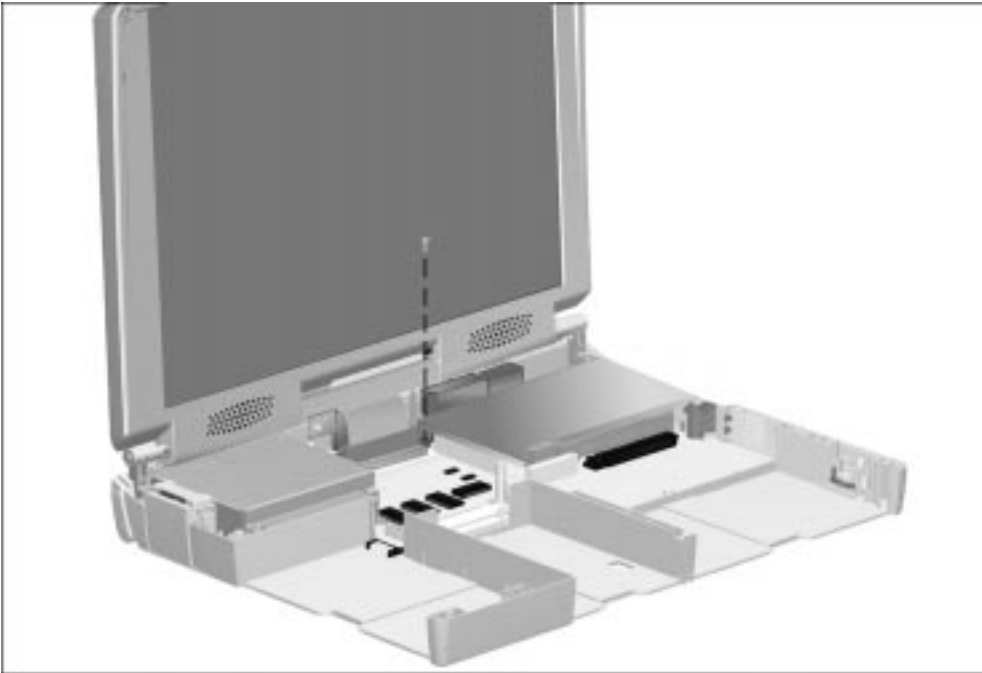


Figure 5-47. *Removing the Display Video Cable Connector Screws*

-
10. Grasp the tabs on the display video connector ❶ and disconnect the connector from the system board ❷ (Figure 5-48).

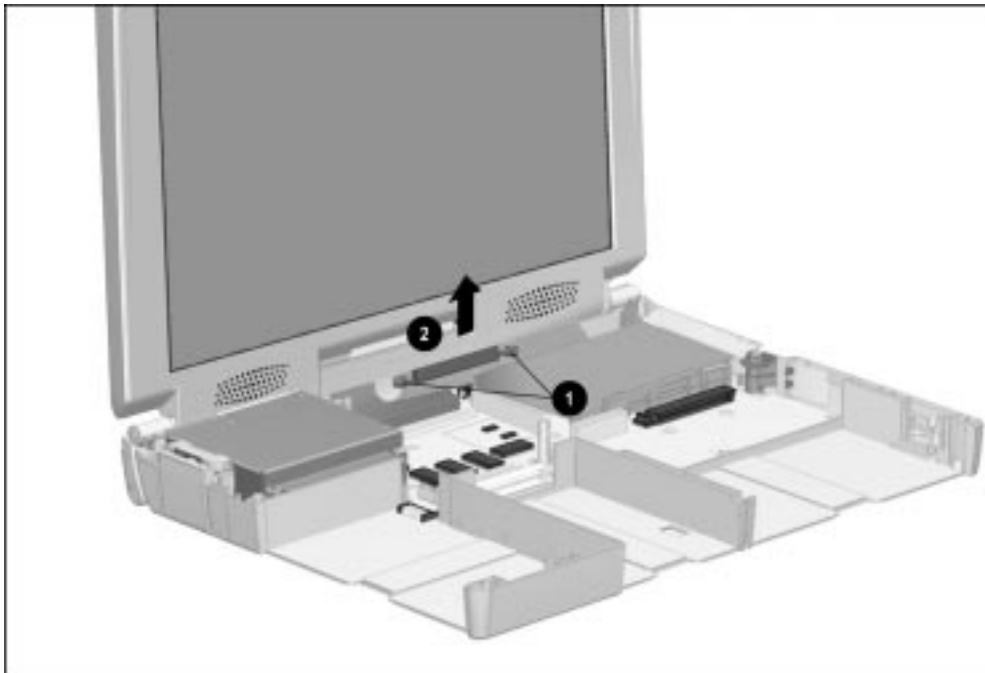


Figure 5-48. *Disconnecting the Display Video Cable*

.....

11. Disconnect the auxiliary battery cable from the system board (Figure 5-49).

NOTE: This step applies only to computer models with config. codes beginning with “BS”, “BZ”, and “CB”. Refer to Section 5.11, “Auxiliary Battery”, for instructions on disconnecting the auxiliary battery cable on computer models with other config. codes.

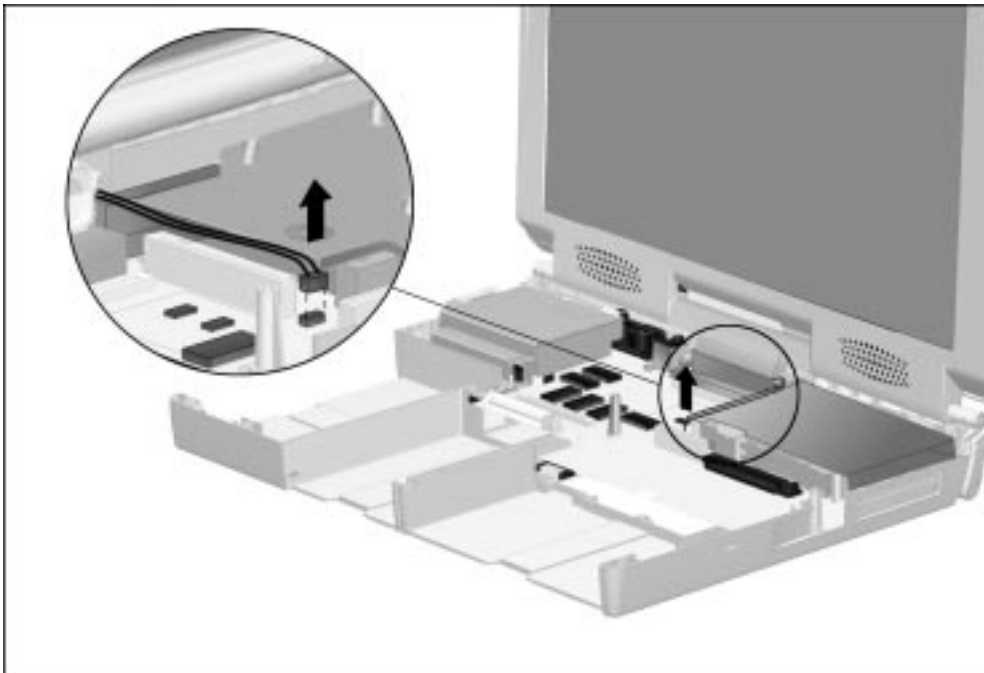


Figure 5-49. *Disconnecting the Auxiliary Battery Cable*

-
12. Position the computer so the rear panel faces forward.
 13. Remove the six screws from the rear panel (Figure 5-50). The four screws on the far left and right sides of the computer ① secure the display assembly to the computer. The two screws in the middle ② secure the display ground cable and auxiliary battery assembly (only on computer models with config. codes beginning with “BS”, “BZ”, and “CB”) to the computer.

NOTE: The screws that secure the auxiliary battery assembly to the computer base assembly are shorter than the four screws that secure the display assembly to the base assembly.



Figure 5-50. Removing the Display Assembly and Auxiliary Battery Assembly Screws

-
14. Position the computer so the front faces forward.
 15. Lift the display assembly straight up from the computer (Figure 5-51).

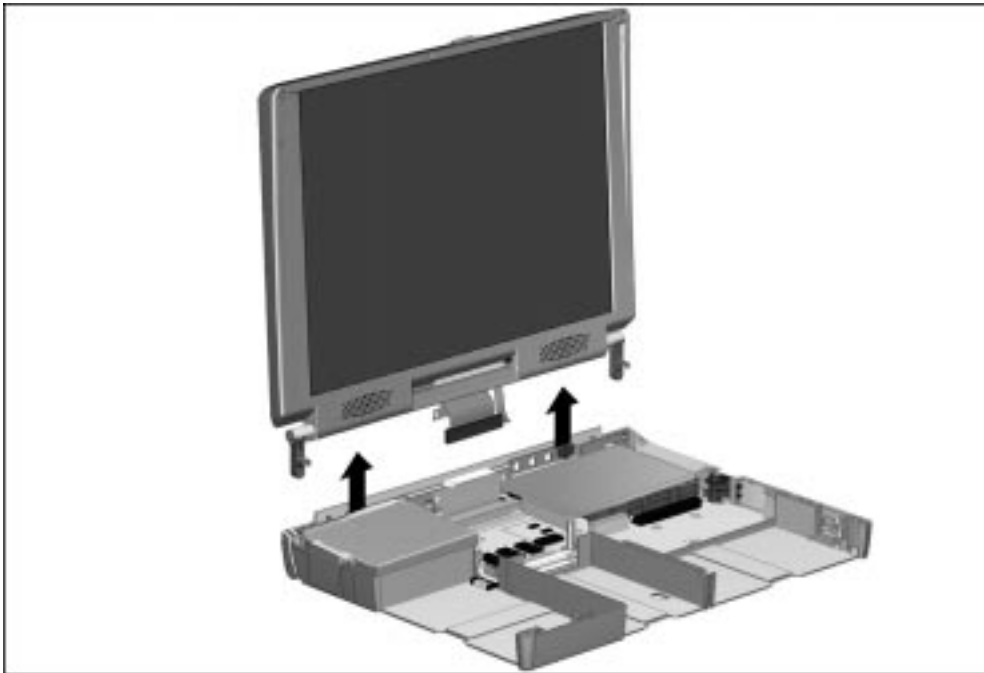


Figure 5-51. *Removing the Display Assembly*

16. Disconnect the auxiliary battery assembly from the display ground cable (Figure 5-52).

NOTE: This step applies only to computer models with config. codes beginning with “BS”, “BZ”, and “CB”. Refer to Section 5.11, “Auxiliary Battery”, for instructions on removing the auxiliary battery from computer models with other config. codes.

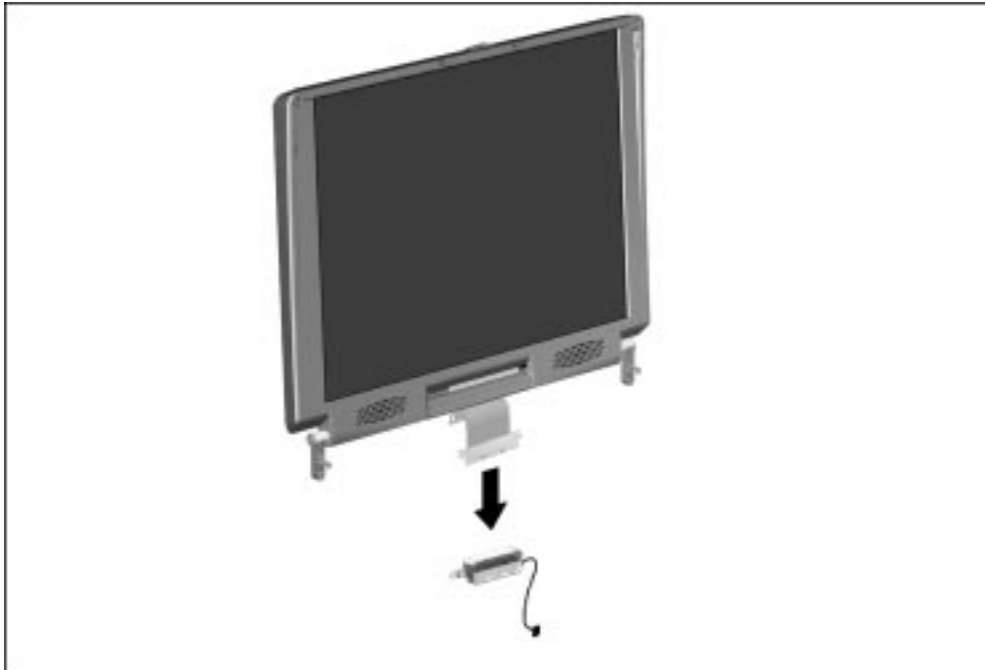


Figure 5-52. Disconnecting the Auxiliary Battery Assembly from the Display Ground Cable

.....

Installing the Display Assembly

1. Attach the auxiliary battery assembly to the display ground cable. The tabs on the ends of the ground cable ❶ fit into the slots on the end of the auxiliary battery bracket ❷; the pins on the bottom of the bracket ❸ fit into the holes on the bottom of the ground cable ❹ (Figure 5-53).

NOTE: This step applies only to computer models with config. codes beginning with “BS”, “BZ”, and “CB”. Refer to Section 5.11, “Auxiliary Battery”, for instructions on installing the auxiliary battery on computer models with other config. codes.

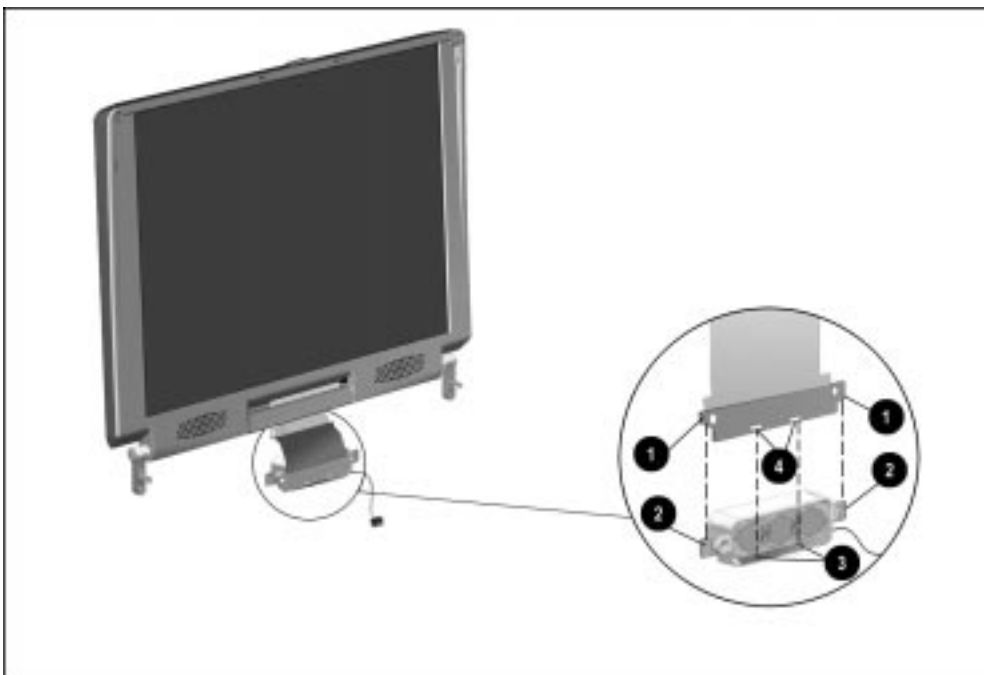


Figure 5-53. Attaching the Display Ground Cable to the Auxiliary Battery Assembly

-
2. Position the display clutches so the display assembly is fully upright when it is installed in the computer (Figure 5-54).



Figure 5-54. *Proper Position of the Display Clutches*

-
3. Hold the display assembly approximately one to two inches above the base assembly, parallel to the computer ❶ (Figure 5-55).
 4. Roll the auxiliary battery assembly and display ground cable counterclockwise toward the computer ❷ and place the tabs on the auxiliary battery bracket on the hooks on the base assembly ❸.

NOTE: This step applies only to computer models with config. codes beginning with “BS”, “BZ”, and “CB”. Refer to Section 5.11, “Auxiliary Battery”, for instructions on installing the auxiliary battery on computer models with other config. codes.

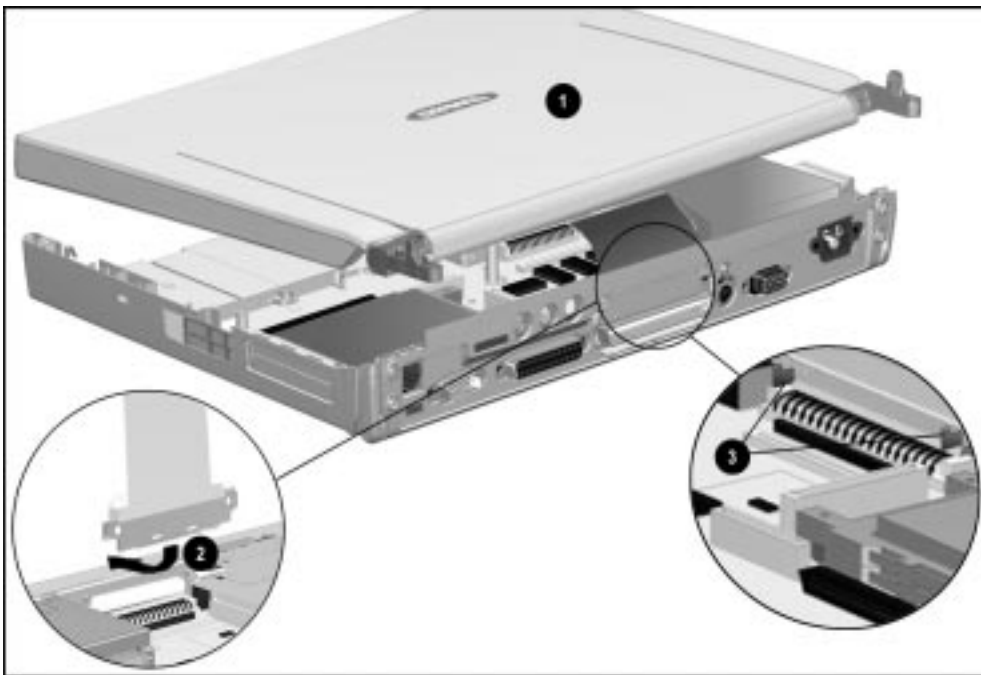


Figure 5-55. Attaching the Display Ground Cable/Auxiliary Battery Assembly to the Computer Base Assembly

5. Tilt the display assembly upright and position the display clutches in the proper locations in the base assembly.
6. Position the computer so the rear panel faces forward.
7. Install the two screws that secure the display ground cable and auxiliary battery assembly (only on computer models with config. codes beginning with “BS”, “BZ”, and “CB”) to the computer.
8. Install the four screws that secure the display assembly to the base assembly.

-
9. Connect the display video cable ❶ to the system board and install the screw ❷ that secures the cable to the system board (Figure 5-56).

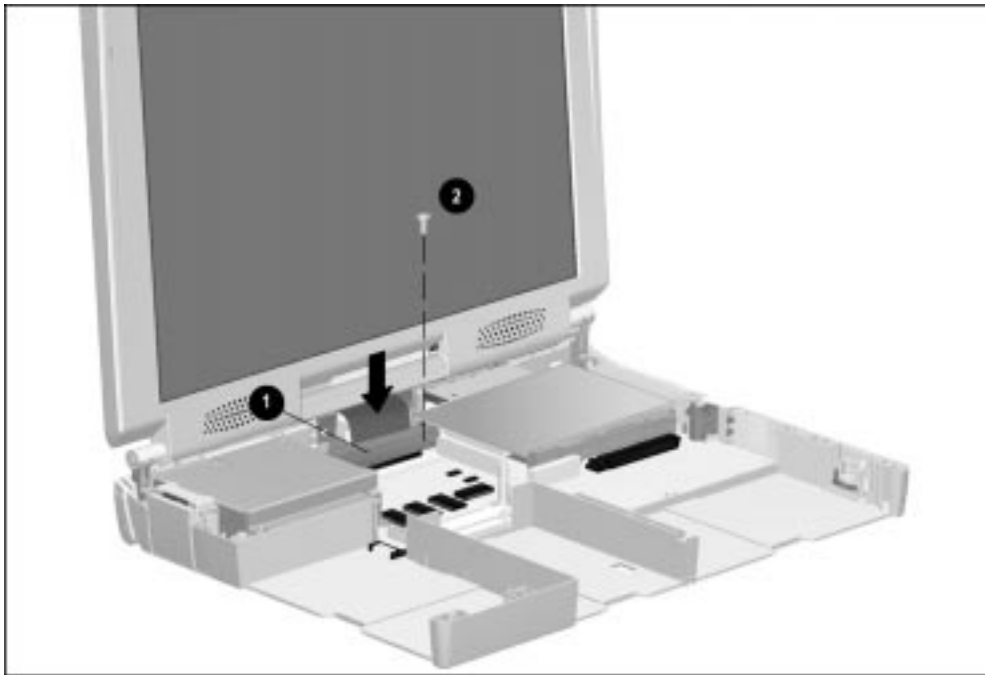


Figure 5-56. *Connecting the Display Video Cable*

10. Position the computer so the front of the computer faces forward.

-
11. Route the auxiliary battery cable between the modem connector ❶ and the audio assembly bracket ❷ (Figure 5-57).

NOTE: Steps 11 and 12 apply only to computer models with config. codes beginning with “BS”, “BZ”, and “CB”. Refer to Section 5.11, “Auxiliary Battery”, for instructions on disconnecting the auxiliary battery cable on computer models with other config. codes.

12. Connect the auxiliary battery cable to the system board.

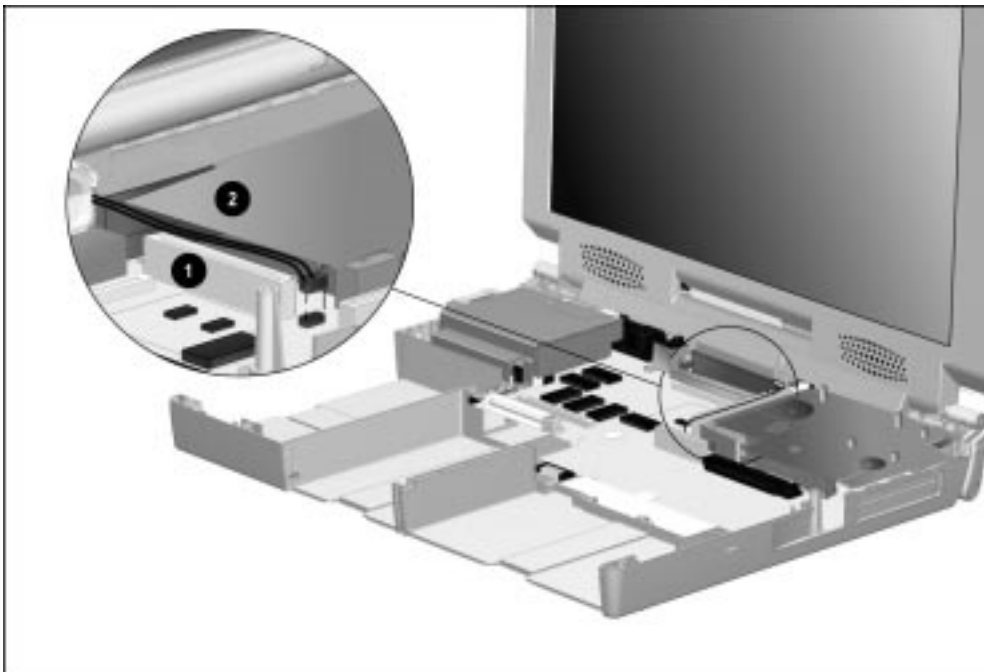


Figure 5-57. Connecting the Auxiliary Battery Cable to the System Board

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Display Bezel

NOTE: There are some differences in the disassembly of the 14.1- and 13.3-inch display assemblies. These differences are pointed out in the following sections.

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the keyboard assembly (Section 5.10).
3. Remove the audio/USB board (Section 5.14).
4. Remove the modem board (on modem models, Section 5.15).
5. Remove the processor module assembly (Section 5.18).
6. Remove the display assembly (Section 5.19).
7. Remove the four screw covers and screws (13.3-inch display only, Figure 5-58).

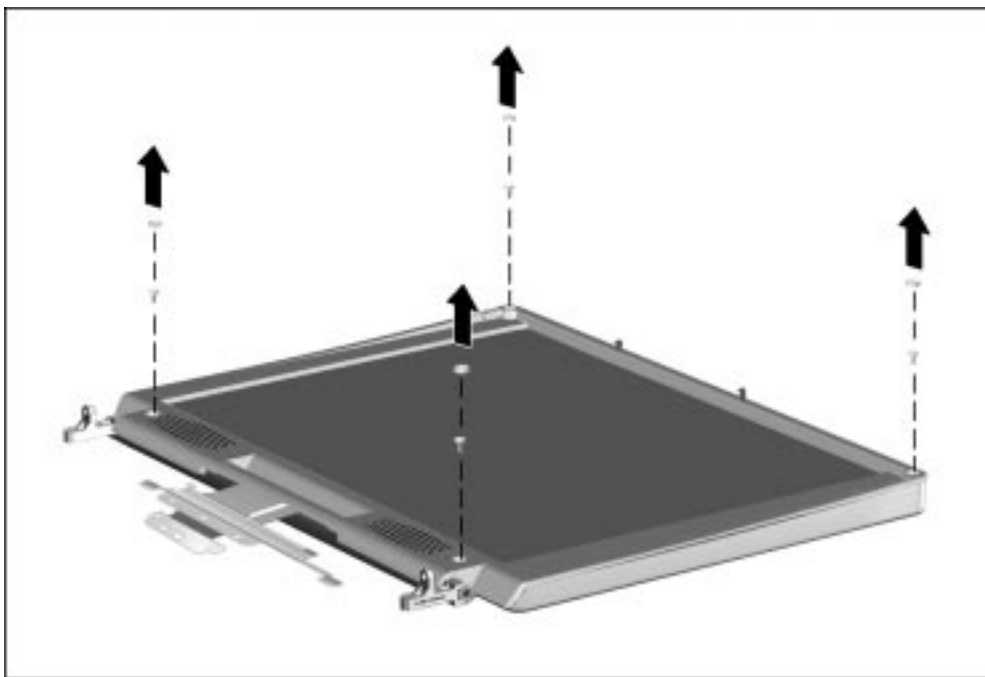


Figure 5-58. Removing the Display Bezel Screw Covers and Screws on the 13.3-inch Display

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8. Remove the three screw covers and screws (14.1-inch display only, Figure 5-59).

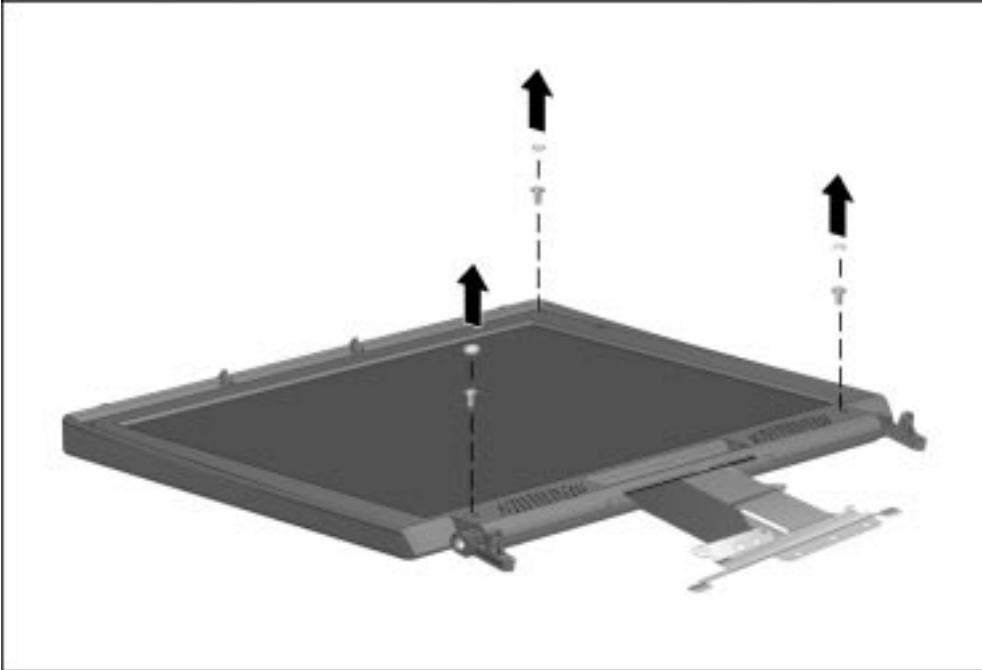


Figure 5-59. Removing the Display Bezel Screw Covers and Screws on the 14.1-inch Display

-
9. Beginning at the bottom inside edge of the display bezel, pry the bezel loose (Figure 5-60). Continue separating the bezel from the enclosure along the inside edges of the two sides and then slide the bezel off the top of the display enclosure.

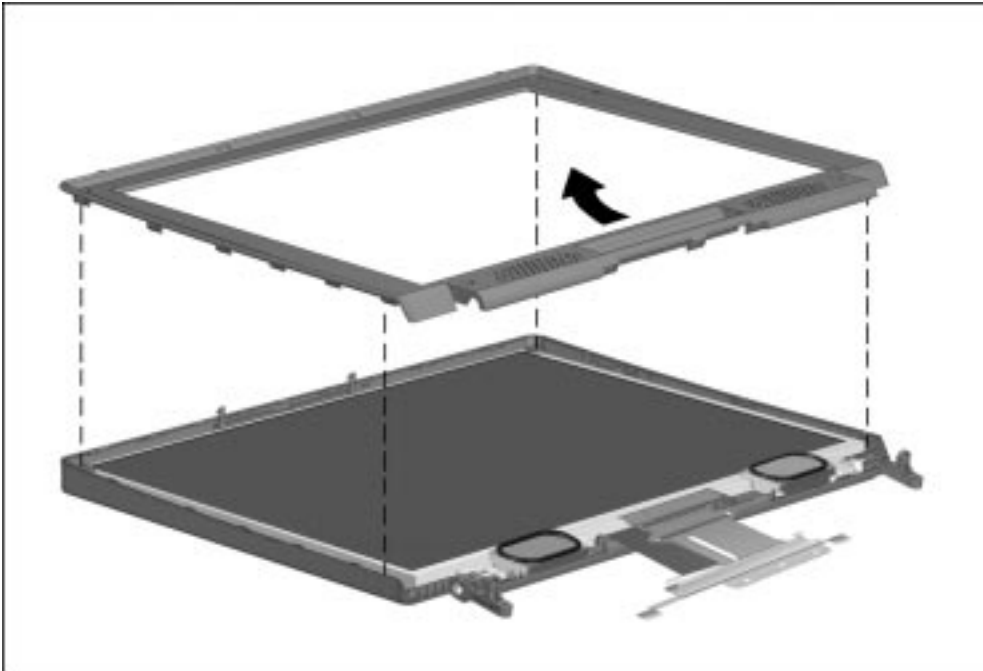


Figure 5-60. *Removing the Display Bezel*

Reverse the above procedure to install the display bezel.

.....

Display Panel

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the keyboard assembly (Section 5.10).
3. Remove the audio/USB board (Section 5.14).
4. Remove the modem board (on modem models, Section 5.15).
5. Remove the processor module assembly (Section 5.18).
6. Remove the display assembly (Section 5.19).
7. Remove the display bezel.
8. Remove the four screws that secure the display panel to the display enclosure (13.3-inch display only, Figure 5-61).

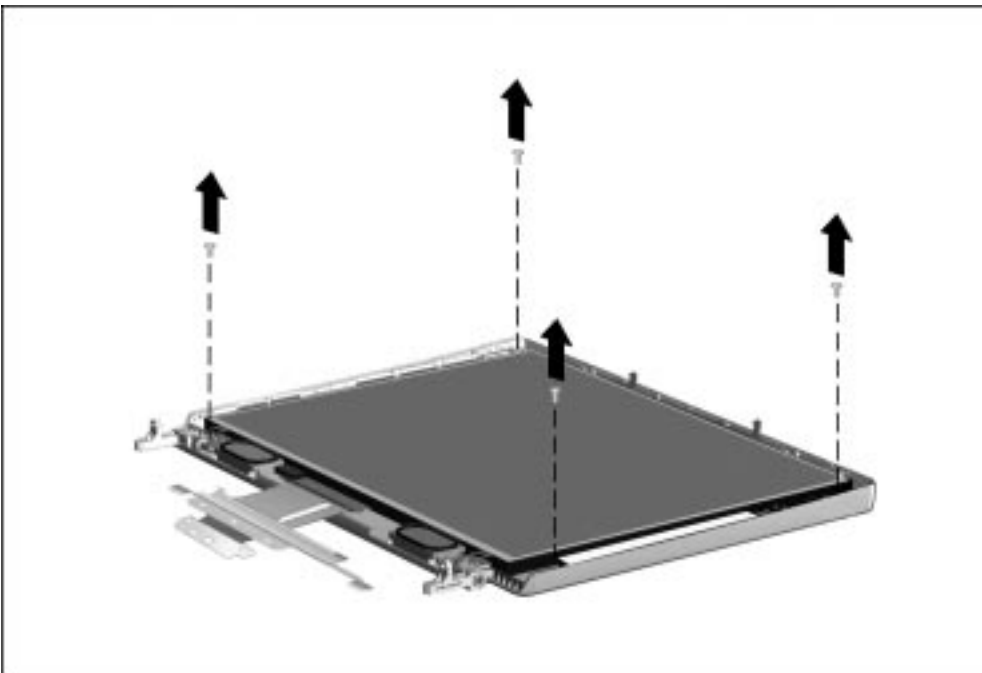


Figure 5-61. Removing the Display Panel Screws on the 13.3-inch Display

-
9. Remove the two screw covers on the left side of the display bezel and the four screws that secure the display panel to the display enclosure (14.1-inch display only, Figure 5-62).

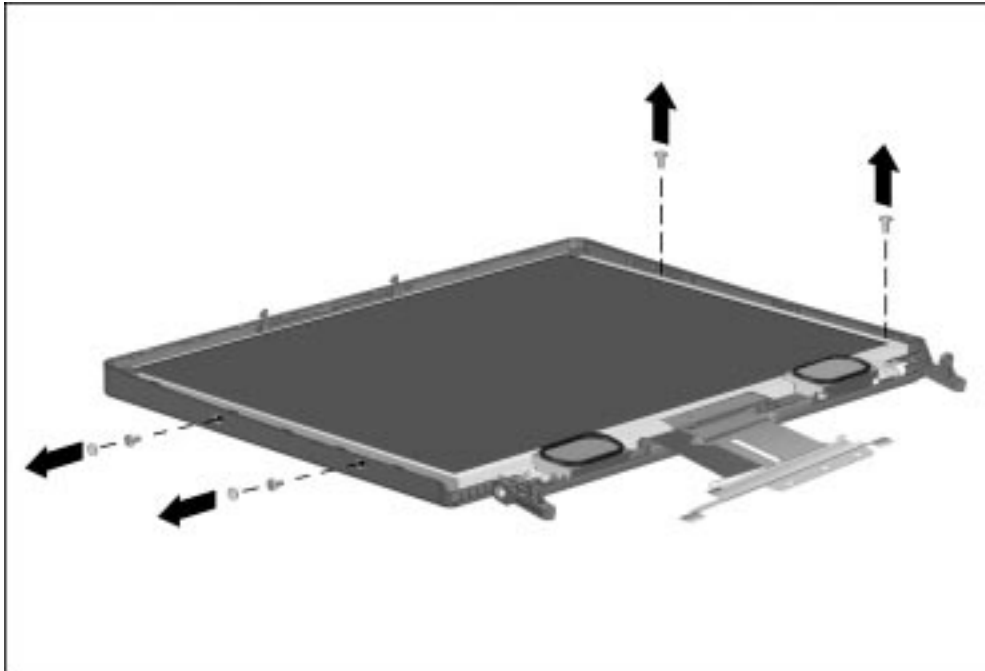


Figure 5-62. Removing the Display Panel Screws on the 14.1-inch Display

-
10. Lift the inverter shield to uncover the inverter ❶. Disconnect the power cable from the inverter ❷ (Figure 5-63).

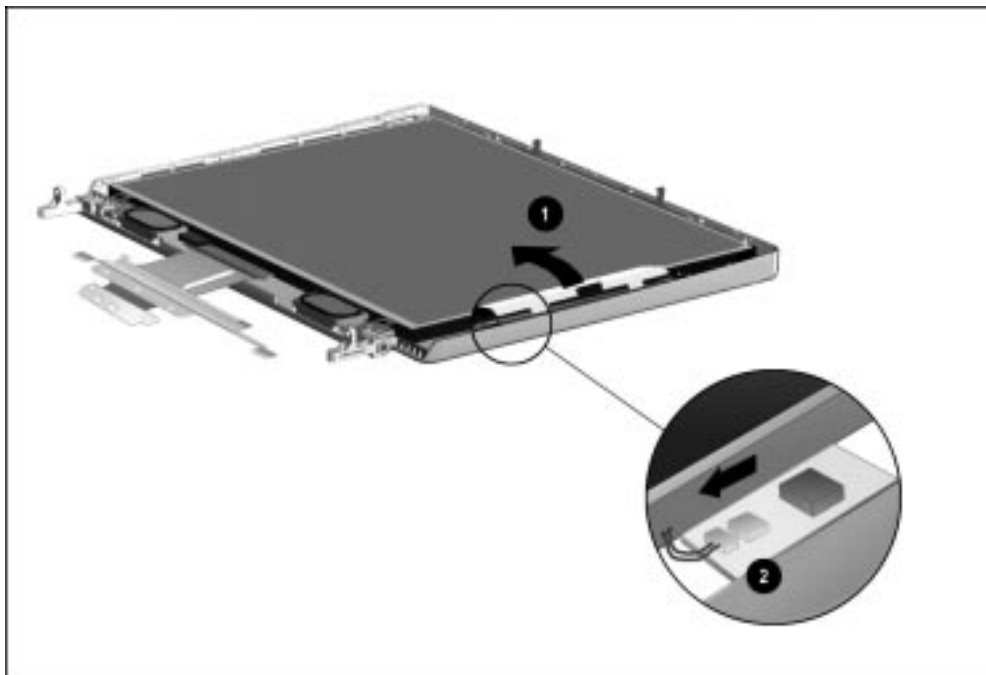


Figure 5-63. *Disconnecting the Inverter Power Cable*

-
11. Partially lift the left side of the display panel out of the display enclosure ❶ (13.3-inch display only, Figure 5-64).
 12. Disconnect the display video cable ❷ from the side of the display panel (13.3-inch display only).

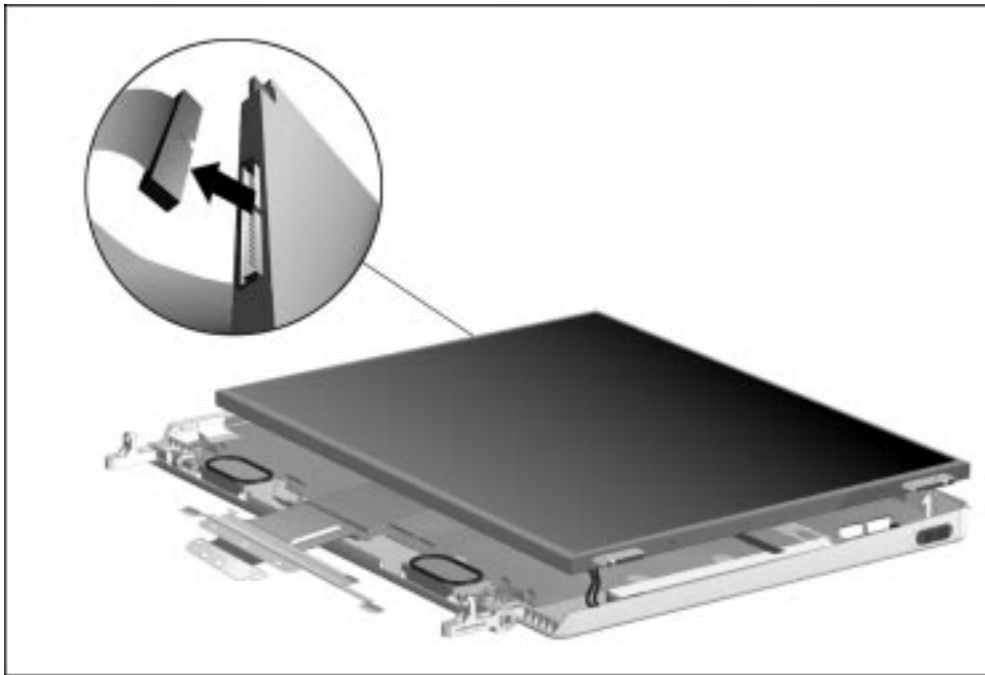


Figure 5-64. Disconnecting the Display Video Cable on the 13.3-inch Display

-
13. Lift the display panel away from of the display enclosure and disconnect the display video cable from the back-center area of the display panel (14.1-inch display only, Figure 5-65).

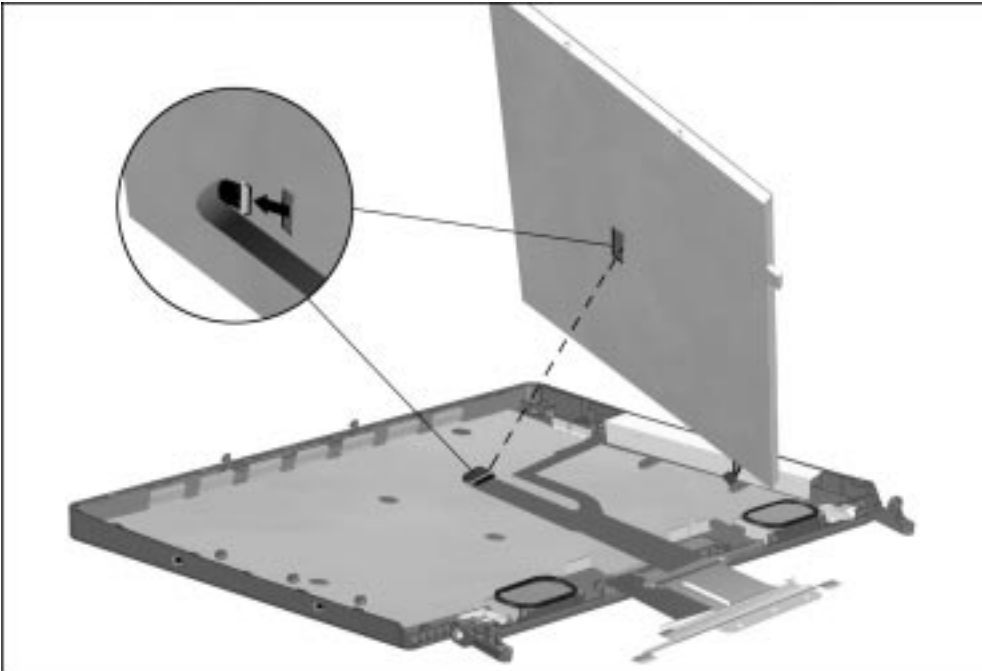


Figure 5-65. *Disconnecting the Display Video Cable on the 14.1-inch Display*

14. Remove the display panel and set it aside.



CAUTION: When installing the display panel, make sure the tabs on the inverter shield ① are inserted between the sheet metal ② and the outside plastic edge ③ of the display enclosure (Figure 5-66). Failure to properly insert the inverter shield can result in damage to the display assembly.

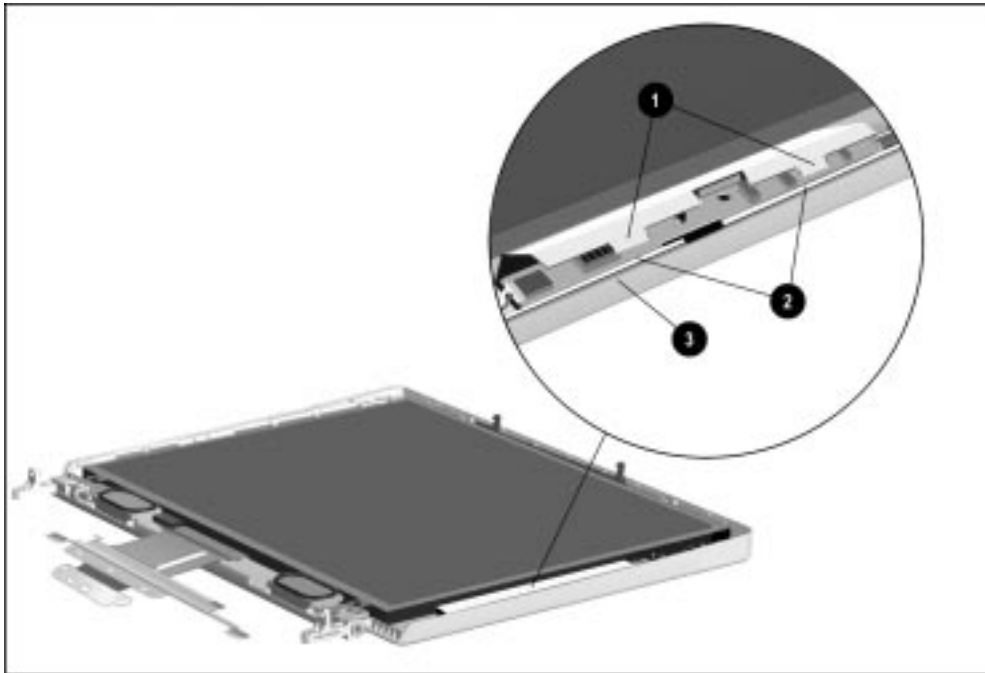


Figure 5-66. *Replacing the Inverter Shield*

Reverse the above procedure to install the display panel. Be sure to first install the top of the panel under the display latch at the top of the display enclosure.

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Speaker Assemblies

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the keyboard assembly (Section 5.10).
3. Remove the audio/USB board (Section 5.14).
4. Remove the modem board (on modem models, Section 5.15).
5. Remove the processor module assembly (Section 5.18).
6. Remove the display assembly (Section 5.19).
7. Remove the display bezel.
8. Disconnect the speaker cable ❶ from the display audio cable and remove the speaker from the display enclosure ❷ (Figure 5-67).

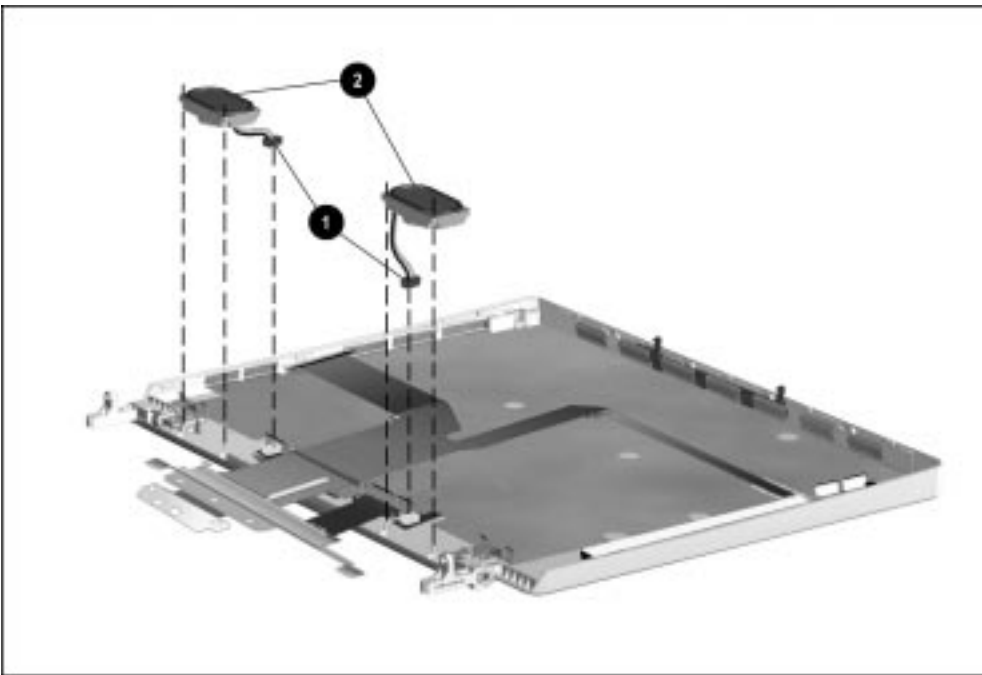


Figure 5-67. Removing the Speaker Assemblies

Reverse the above procedure to install the speaker assemblies.

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Inverter

NOTE: The inverter shield is attached to the display enclosure by an adhesive backing. Pull firmly on the shield when removing it. The shield must be replaced if the display enclosure is damaged.

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the keyboard assembly (Section 5.10).
3. Remove the audio/USB board (Section 5.14).
4. Remove the modem board (on modem models, Section 5.15).
5. Remove the processor module assembly (Section 5.18).
6. Remove the display assembly (Section 5.19).
7. Remove the display bezel.
8. Remove the display panel.

-
9. Remove the screw ❶ that secures the inverter to the display enclosure (Figure 5-68).
 10. Lift the inverter ❷ out of the display enclosure. Disconnect the display video cable from the inverter ❸.
 11. Remove the inverter and set it aside.

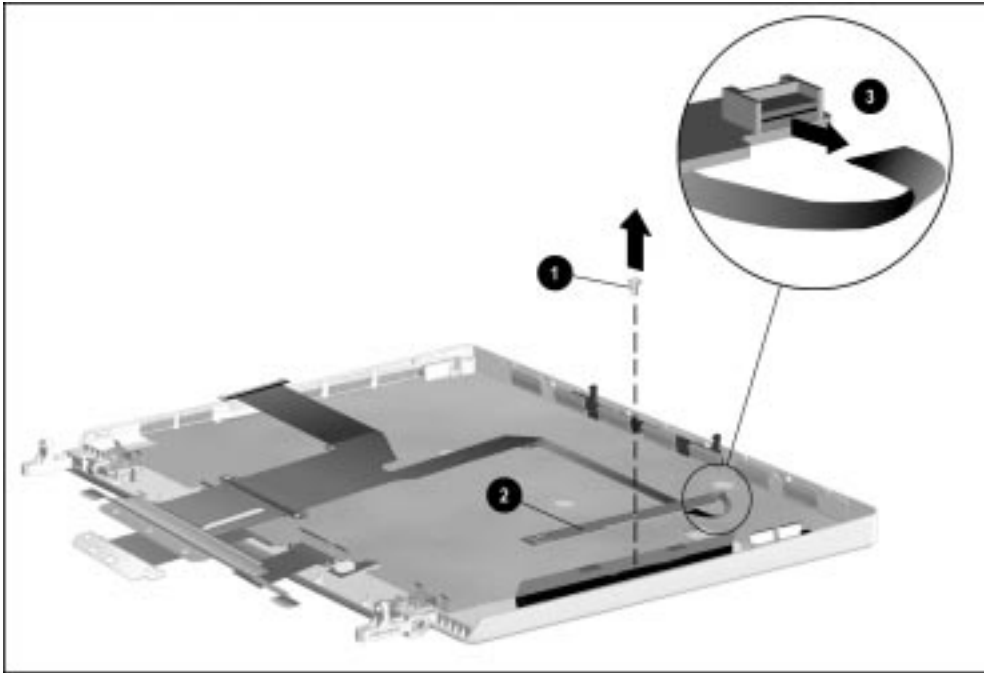


Figure 5-68. *Removing the Inverter*

Reverse the above procedure to install the inverter. Be sure to connect the display cable to the connector on the inverter before securing the inverter to the display enclosure.

.....

Display Video Cable

IMPORTANT: Make note of the routing of the display video cable in the display assembly to ensure proper routing at reassembly.

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the keyboard assembly (Section 5.10).
3. Remove the audio/USB board (Section 5.14).
4. Remove the modem board (on modem models, Section 5.15).
5. Remove the processor module assembly (Section 5.18).
6. Remove the display assembly (Section 5.19).
7. Remove the display bezel.
8. Remove the display panel.
9. Remove the inverter.
10. Lift the display video cable out of the display enclosure (Figure 5-69).

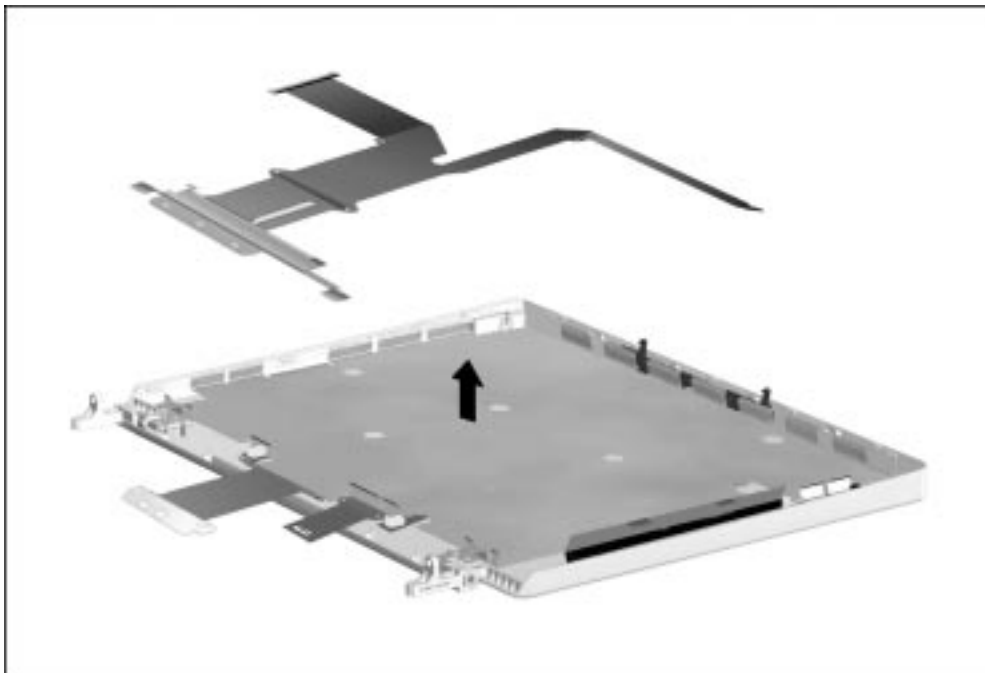


Figure 5-69. Removing the Display Video Cable

Reverse the above procedure to install the display video cable.

NOTE: When installing the display video cable, make sure the pinholes ❶ in the cable fit over the alignment pins in the display enclosure ❷ (Figure 5-70).

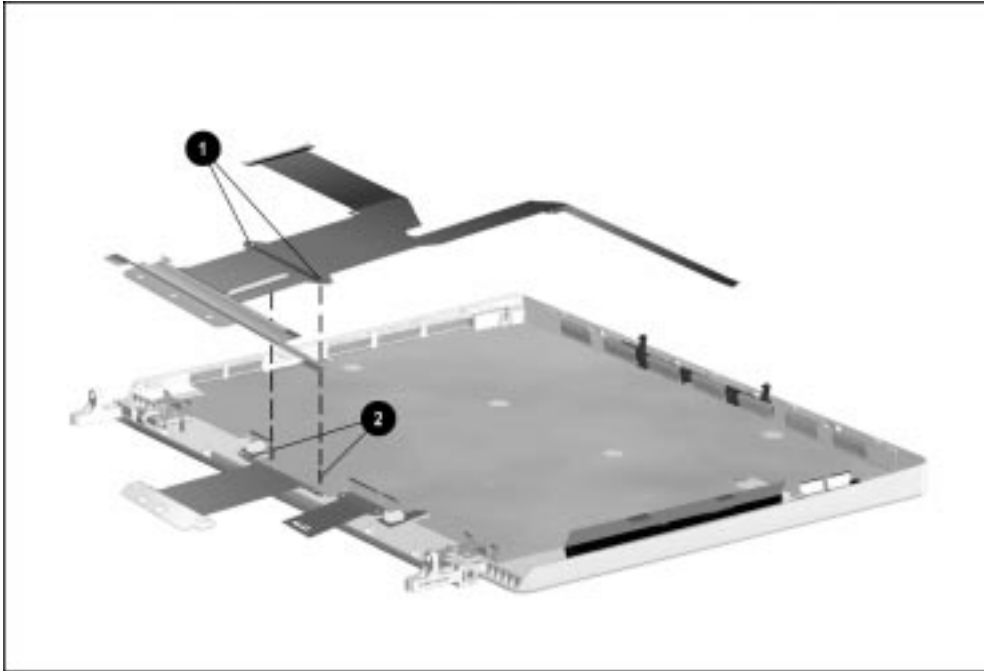


Figure 5-70. *Installing the Display Video Cable*

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Display Audio Cable/Microphone Assembly

IMPORTANT: Make note of the routing of the display audio cable in the display assembly to ensure proper routing at reassembly.

1. Prepare the computer for disassembly (Section 5.3).
2. Remove the keyboard assembly (Section 5.10).
3. Remove the audio/USB board (Section 5.14).
4. Remove the modem board (on modem models, Section 5.15).
5. Remove the processor module assembly (Section 5.18).
6. Remove the display assembly (Section 5.19).
7. Remove the display bezel.
8. Remove the display panel.
9. Remove the speaker assemblies.
10. Remove the inverter.
11. Remove the display video cable.
12. Remove the display shield and ground cable from the display enclosure (Figure 5-71).

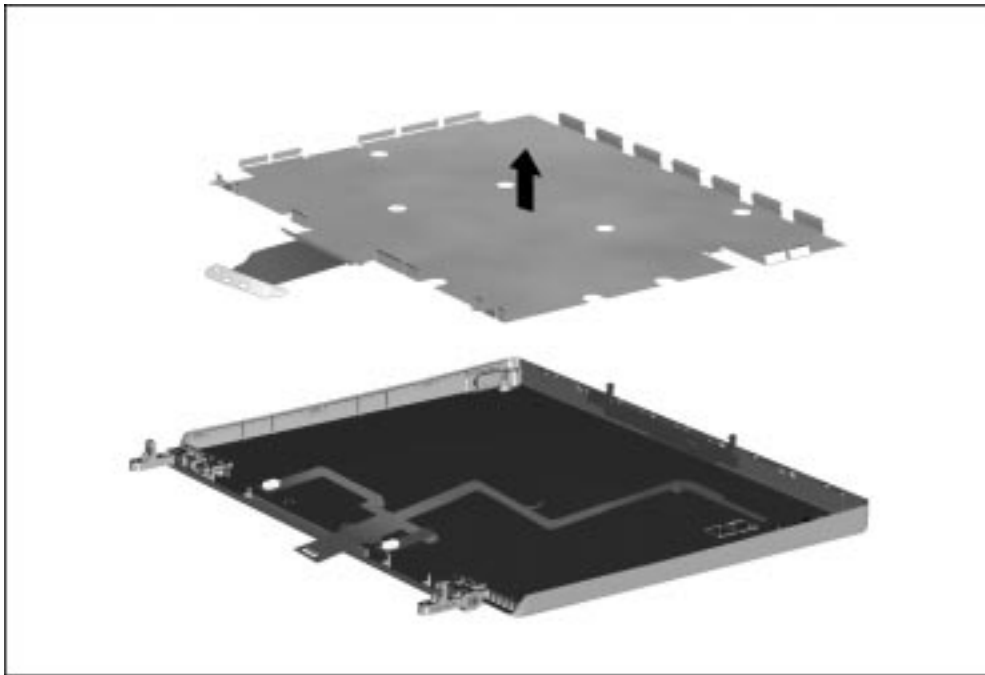


Figure 5-71. Removing the Display Shield and Ground Cable

-
13. Remove the screw securing the microphone assembly to the display enclosure ❶ (Figure 5-72).
 14. Remove the microphone assembly ❷ from the display enclosure.
 15. Disconnect the display audio cable from the microphone assembly ❸.
 16. Remove the display audio cable from the display enclosure ❹.

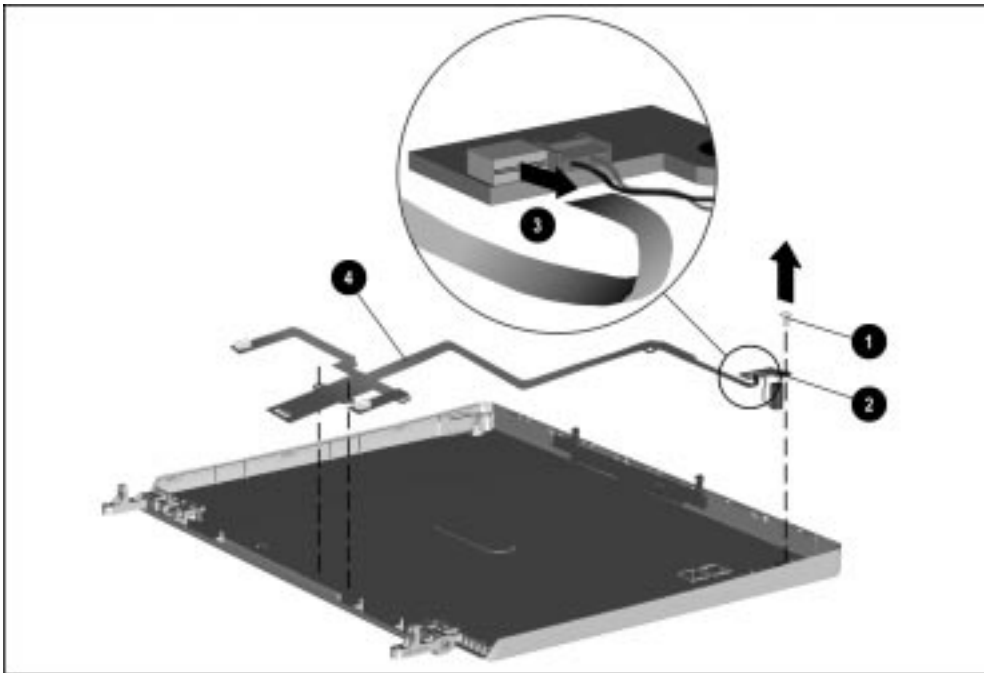


Figure 5-72. Removing the Display Audio Cable and Microphone Assembly

Reverse the above procedure to install the display audio cable and microphone assembly. Be sure the eight alignment pins on the display enclosure align with the holes in the audio cable.

5.20 PC Card Eject Levers

The PC Card eject levers are located on the right side of the computer.

1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.6).
3. Remove the keyboard assembly (Section 5.10).
4. Remove the audio/USB board (Section 5.14).
5. Remove the modem board (on modem models, Section 5.15).
6. Remove the audio assembly bracket (Section 5.16).
7. Pull out both PC Card eject levers ❶ (Figure 5-73).
8. Lift the PC Card eject levers off their mounting post ❷.

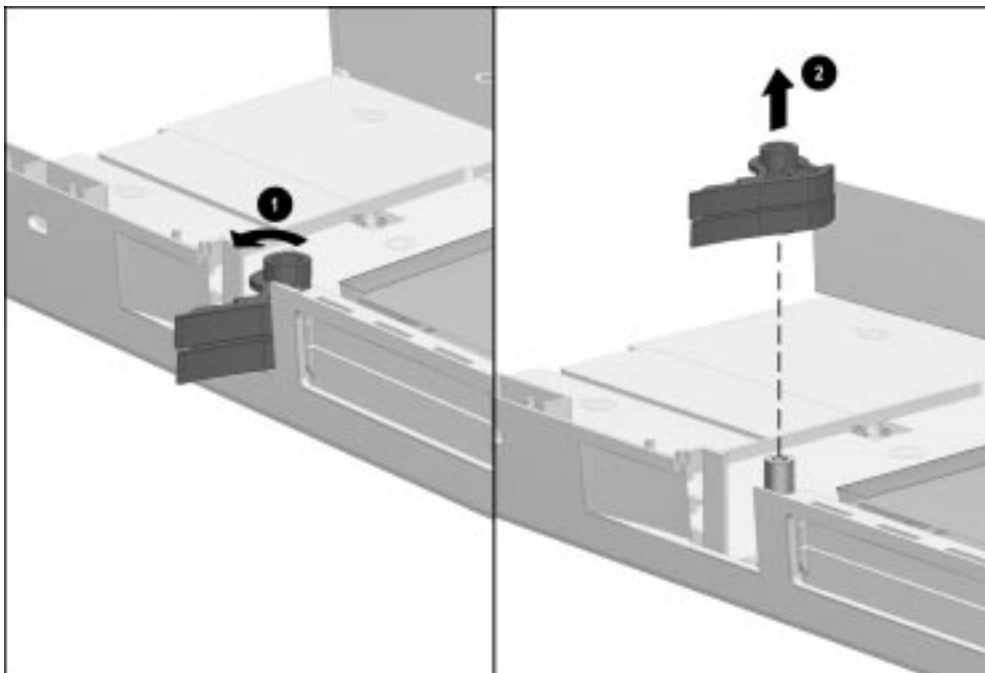


Figure 5-73. Removing the PC Card Eject Levers

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Installing the PC Card Eject Levers

NOTE: The top and bottom eject levers are not interchangeable. Take special precautions to note the proper position of each lever when installing the PC Card eject levers.

1. Use a narrow flat tool, such as a small flat-blade screwdriver or a “spoojer,” to hold back the PC Card eject buttons ❶ (Figure 5-74).
2. Align the PC Card eject levers with the flush edges of each lever located on the inside ❷.
3. Place the PC Card eject levers on the mounting post ❸.

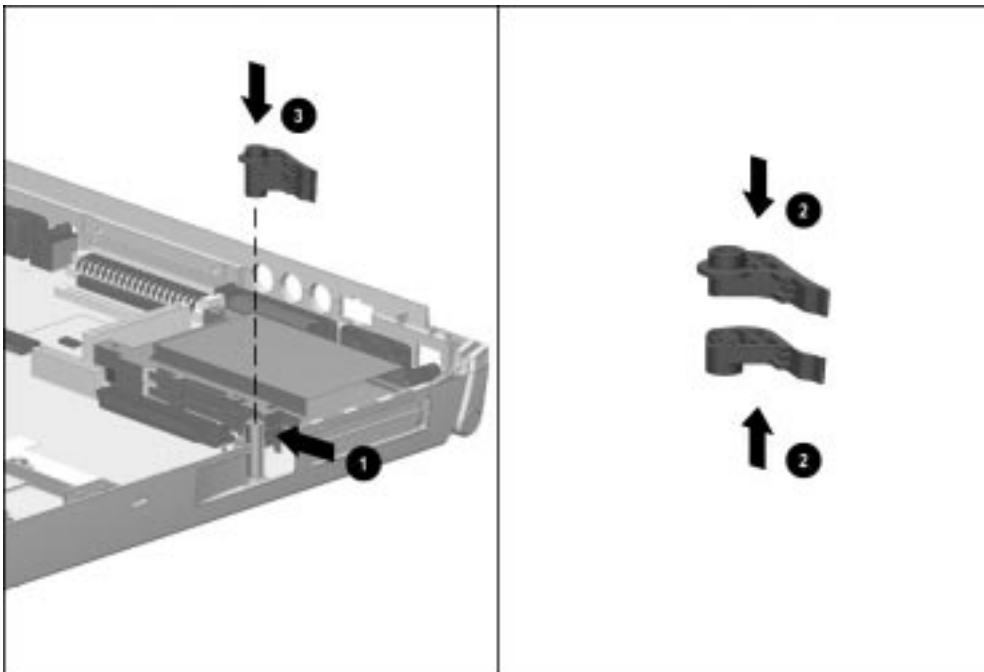


Figure 5-74. Installing the PC Card Eject Levers

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5.21 System Board

1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.6).
3. Remove the keyboard assembly (Section 5.10).
4. Remove the auxiliary battery (Section 5.11; this step applies only to computer models with config. codes beginning with “CD”, “CH”, and “CZ”).
5. Remove the power supply (Section 5.12).
6. Remove the fan assembly (Section 5.13).
7. Remove the audio/USB board (Section 5.14).
8. Remove the modem board (on modem models, Section 5.15).
9. Remove the audio assembly bracket (Section 5.16).
10. Remove the processor module assembly (Section 5.18).
11. Remove the display assembly (Section 5.19).
12. Remove the hard drive (Section 5.7).
13. Remove any MultiBay devices (Section 5.8).

-
14. Remove the expansion connector shield by lifting it from the computer base assembly (Figure 5-75). This step applies only to computer models with config. codes beginning with “BS”, “BZ”, and “CB”.

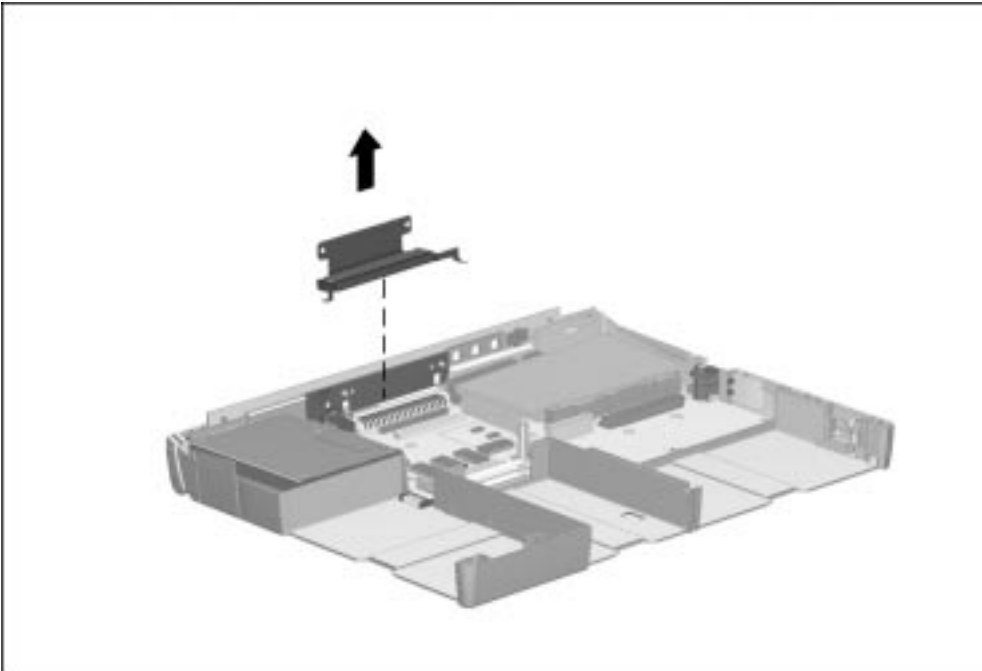


Figure 5-75. *Removing the Expansion Connector Shield*

Reverse the above procedure to install the expansion connector shield.



CAUTION: The connector shield must be present to prevent short circuits. Failure to install the connector shield can result in damage to the computer.

15. The keyboard connector insulator is attached to the back of the keyboard connector (Figure 5-76). If a new insulator must be installed, remove the old insulator, remove the tape backing from the new insulator, and attach the new insulator to the back of the keyboard connector.

NOTE: This step is not necessary if a new expansion connector shield is used. This shield is available in the Miscellaneous Hardware Kit, spare part number 314959-001.

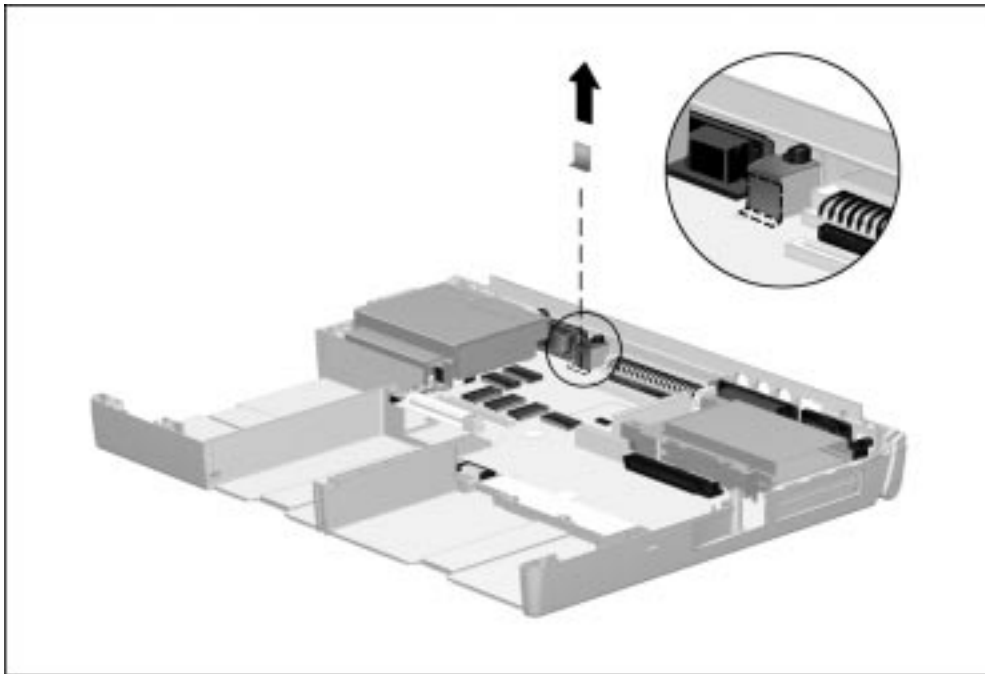


Figure 5-76. Removing the Keyboard Connector Insulator

Reverse the above procedure to install the keyboard connector insulator.



CAUTION: The keyboard connector insulator must be present to prevent short circuits. Failure to install the keyboard connector insulator can result in damage to the computer.

16. Remove the PC Card eject levers (Section 5.20).

-
17. Remove the four screws ❶ and ❷ that secure the system board to the computer base assembly (Figure 5-77).
 18. **NOTE:** Two of the four screws removed in this step are flathead screws ❷. When installing the system board, these flathead screws must be installed in the front/right section of the system board.
 19. Remove the standoff ❸ that secures the system board to the computer base.

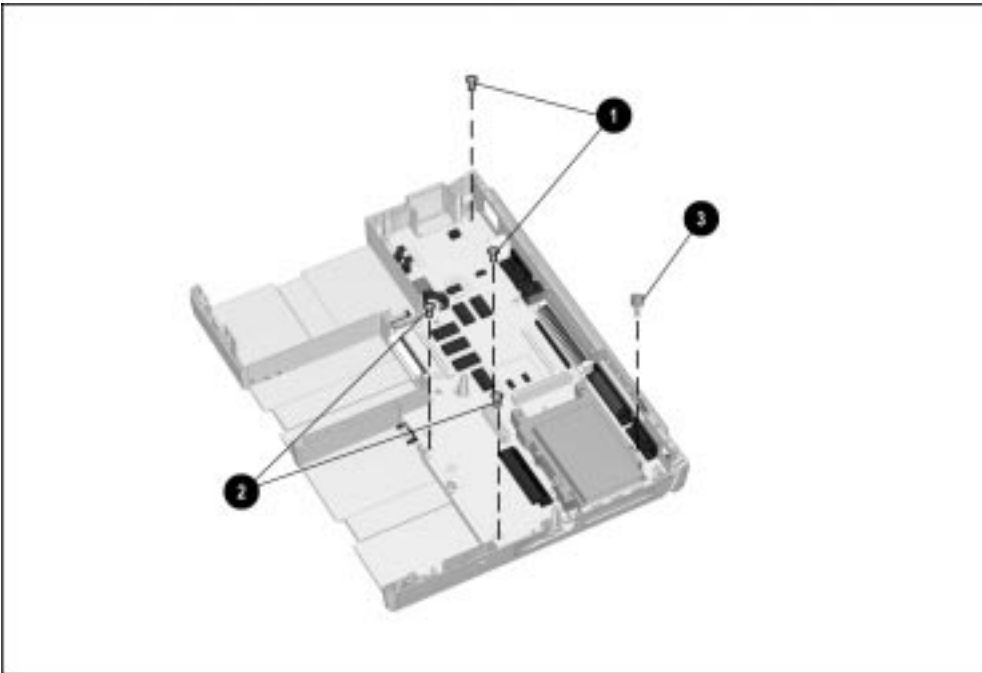


Figure 5-77. Removing the System Board Screws

-
20. Position the computer so the rear panel faces forward.
 21. Remove the six 3/16-inch screwlocks ❶ that secure the system board and I/O bracket to the CPU base assembly (Figure 5-78).
 22. Remove the two 7-millimeter guide bushings ❷ that secure the the system board and I/O bracket to the CPU base assembly.
 23. Remove the screw located above the external keyboard/mouse connector ❸.

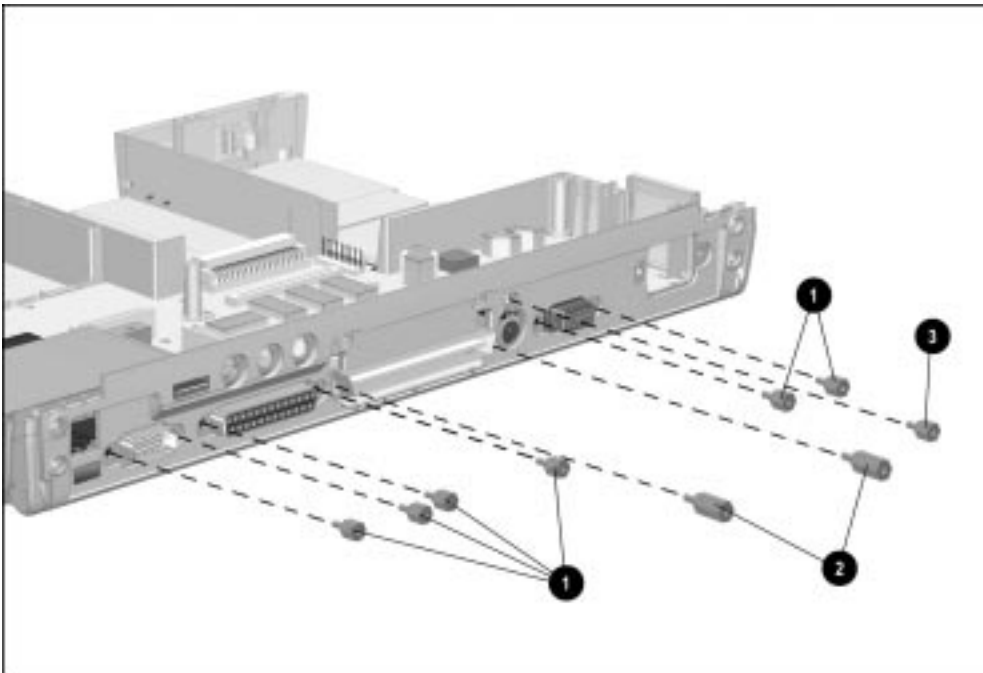


Figure 5-78. Removing the System Board Screwlocks and Keyboard/Mouse Connector Screw

-
24. Position the computer so the front faces forward.
 25. Lift the front of the system board. When the front edge of the system board clears the base assembly, lift the system board out of the base assembly (Figure 5-79).
 26. Remove the system board insulator from the base assembly.

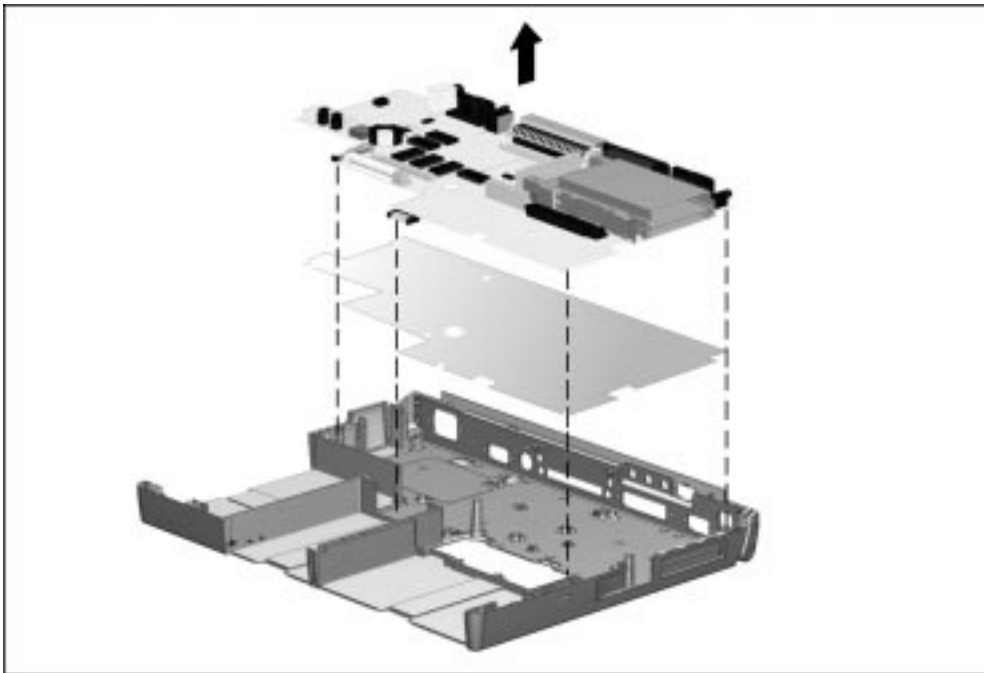


Figure 5-79. Removing the System Board and Insulator

Reverse the above procedure to install the system board and insulator.

IMPORTANT: When installing the system board, install and tighten the screwlock on the left side of the expansion connector first. This aligns the system board to the I/O bracket. Next, install and tighten the remaining screwlocks and screws. This procedure ensures proper alignment of the system board and I/O bracket in the computer base assembly.

.....

5.22 PC Card Assembly

1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.6).
3. Remove the keyboard assembly (Section 5.10).
4. Remove the auxiliary battery (Section 5.11; this step applies only to computer models with config. codes beginning with “CD”, “CH”, and “CZ”).
5. Remove the power supply (Section 5.12).
6. Remove the fan assembly (Section 5.13).
7. Remove the audio/USB board (Section 5.14).
8. Remove the modem board (on modem models, Section 5.15).
9. Remove the audio assembly bracket (Section 5.16).
10. Remove the processor module assembly (Section 5.18).
11. Remove the display assembly (Section 5.19).
12. Remove the PC Card eject levers (Section 5.20).
13. Remove the system board (Section 5.21).

-
14. Turn the system board upside down.
 15. Remove the two screws ❶ that secure the PC Card assembly to the system board (Figure 5-80).
 16. Lift the left side of the PC Card assembly to disconnect it from the system board ❷.

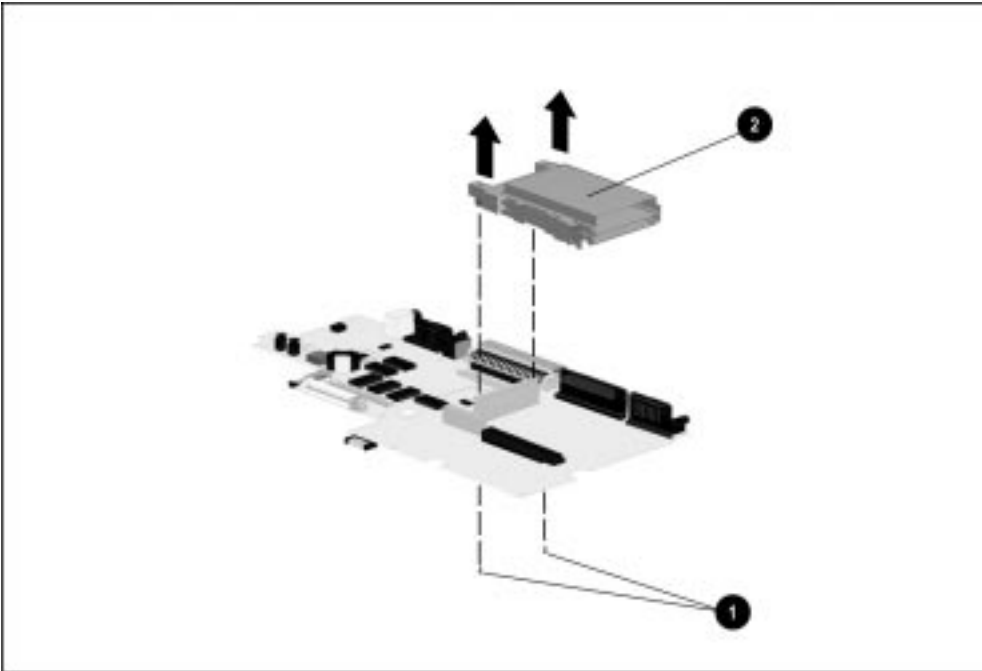


Figure 5-80. Removing the PC Card Assembly

Reverse the above procedure to install the PC Card assembly.

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5.23 I/O Bracket

The I/O bracket provides support for the connectors on the rear panel of the computer and serves as a shield.

1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.6).
3. Remove the keyboard assembly (Section 5.10).
4. Remove the auxiliary battery (Section 5.11; this step applies only to computer models with config. codes beginning with “CD”, “CH”, and “CZ”).
5. Remove the power supply (Section 5.12).
6. Remove the fan assembly (Section 5.13).
7. Remove the audio/USB board (Section 5.14).
8. Remove the modem board (on modem models, Section 5.15).
9. Remove the audio assembly bracket (Section 5.16).
10. Remove the processor module assembly (Section 5.18).
11. Remove the display assembly (Section 5.19).
12. Remove the PC Card eject levers (Section 5.20).
13. Remove the system board and insulator (Section 5.21).
14. Remove the PC Card assembly (section 5.22).

-
15. Lift the back edge of the I/O bracket. When the bracket clears the computer base assembly, lift it out of the base assembly (Figure 5-81).

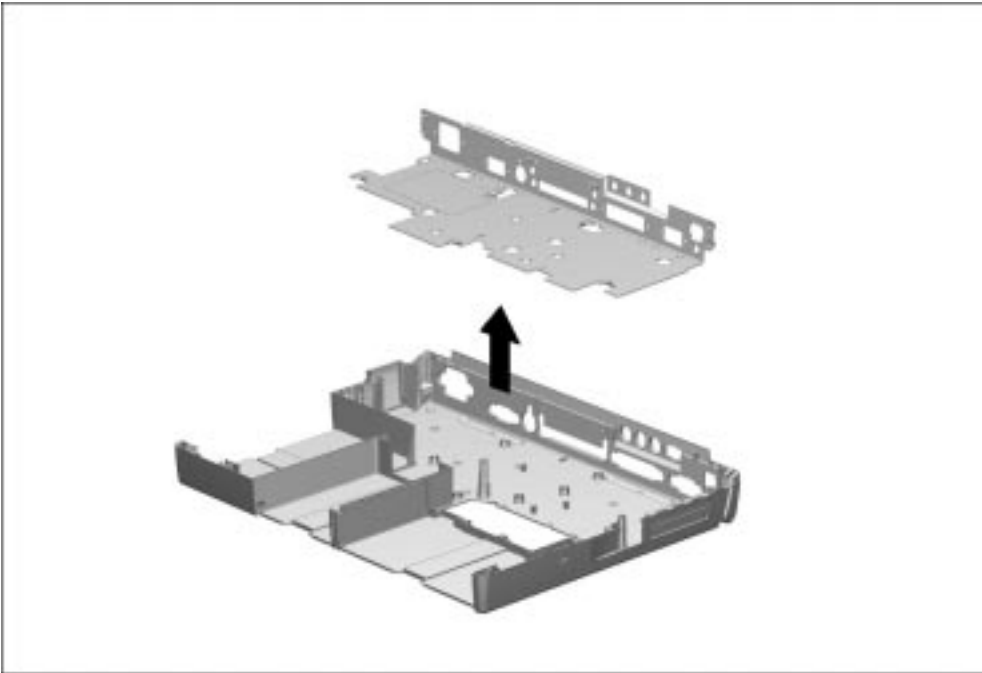


Figure 5-81. Removing the I/O Bracket

Reverse the above procedure to install the I/O bracket.

Specifications

This chapter provides physical and performance specifications for the:

6.1 Physical and Environmental

Table 6-1 Computer		
	U.S.	Metric
Dimensions		
Height	2.00 in	5.09 cm
Depth	9.65 in	24.16 cm
Width	12.60 in	32.05 cm
Weight	8.20 lb	3.72 kg
Standalone (Battery) Power Requirements		
Nominal Operating Voltage	12 VDC	
Maximum Operating Power	15 W	
Peak Operating Power	25 W	
AC Adapter Power Requirements		
Operating Voltage	90 - 240 VAC RMS	
Operating Current	0.4 - 0.8 A RMS	
Operating Frequency Range	47 to 63 Hz AC	
Maximum Transient	1kV for 50 ns	
Automobile Adapter DC Input Requirements		
Operating Voltage	10 to 24 VDC	
Operating Power	30 to 40 W	
Temperature		
Operating	50 to 104°F	10 to 40°C
Nonoperating	-4 to 140°F	-20 to 60°C
Relative Humidity (noncondensing)		
Operating	10 to 90%	
Nonoperating ($t_w = 38.7^\circ\text{C}$ max)	5 to 95% -- 38.7°C Maximum Wet Bulb	
Altitude		
Operating	0 to 10,000 ft	0 to 3.05 km
Nonoperating	0 to 30,000 ft	0 to 9.14 km
Shock		
Operating	10 G, 11 ms, half sine	
Nonoperating	240 G, 2 ms, half sine	
Vibration		
Operating	0.5 G	
Nonoperating	1.5 G	

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

6.2 Display

Table 6-2
13.3-inch XGA, CTFT Display

	U.S.	Metric
Dimensions		
Height	7.98 in	20.28 cm
Width	10.64 in	27.03 cm
Diagonal	13.30 in	33.79 cm
Number of Colors	256, 32K, 64K, 16M	
Contrast Ratio	150:1	
Brightness	125 CD/M ²	
Pixel Resolution		
Pitch		0.264 × 0.264 mm
Format	1024 × 768	
Configuration	RGB Stripe	
Backlight	Edge Lit, bottom	
Character Display	80 × 25	
Total Power Consumption	4.9 W / Inverter (max) 2.1 W / LCD (max)	

Table 6-3
14.1-inch XGA, CTFT Display

	U.S.	Metric
Dimensions		
Height	11.25 in	28.57 cm
Width	8.44 in	21.43 cm
Diagonal	14.10 in	35.71 cm
Number of Colors	256, 32K, 64K, 16M	
Contrast Ratio	150:1	
Brightness	125 nits	125 CD/M ²
Pixel Resolution		
Pitch		0.279 × 0.279 mm
Format	1024 × 768	
Configuration	RGB Stripe	
Backlight	Edge Lit, bottom	
Character Display	80 × 25	
Total Power Consumption	4.9 W / Inverter (max) 2.7 W / LCD (max)	

6.3 Hard Drive

**Table 6-4
Hard Drive**

	5.0 GB	8.1 GB	10.0 GB	14.1 GB
User capacity per drive	5.0 GB	8.1 GB	10.0 GB	14.1 GB
Drive type	65	65	65	65
Drive height (with drive frame, in mm)	17.0	17.0	12.7	17.0
2.5-inch form factor	Yes	Yes	Yes	Yes
Sector interleave	1:1	1:1	1:1	1:1
Interface type	ATA-3	ATA-3	ATA-4	ATA-4
Seek times (typical, including setting)	4 ms	4 ms	4 ms	4 ms
Single track	12 ms	12 ms	12 ms	12 ms
Average	23 ms	23 ms	23 ms	23 ms
Full stroke				
Physical configuration				
Cylinders	6975	8192	11968	11136
Heads	8	10	6	10
Sectors per track	137 - 225	150 - 230	190 - 330	180 - 297
Bytes per sector	512	512	512	512
Logical configuration				
Cylinders	10592	15880	16383	16383
Heads	15	16	16	16
Sectors per track	63	63	63	63
Total customer usable data sectors	10,009,440	16,007,040	19,640,880	27,609,120
Bytes per sector	512	512	512	512
Buffer size	512K	512K	512K	512K
Disk rotational speed (rpm)	4009	4200	4200	4900
Transfer rates				
Interface (mbytes/sec)	16.6	16.6	16.6	16.6
Media (mbits/sec)	60.2 - 98.5	64.3 - 100.4	69.0 - 118.0	76.55 - 125.49

6.4 Diskette Drive

Table 6-5
Diskette Drive

Diskette Size	3.5 inch
High Density	1.44 MB/1.2 MB
Low Density	720 KB
Light	None
Height	0.59 in (15 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 (1.44 MB)/80 (1.2 MB)
Low Density	80
Read/Write Heads	2
Average Seek Times	
Track-to-Track (high/low)	3 ms
Average (high/low)	95 ms
Settling Time	15 ms
Latency Average	100 ms

6.5 CD-ROM Drive

Table 6-6
CD-ROM Drive

Applicable Disc	CD-ROM mode 1, mode 2 CD-Digital Audio CD-XA mode 2 (Form 1, Form 2) CD-I mode 2 (Form 1, Form 2) Photo CD (single/multisession) CD-I Ready CD-Bridge CD-WO (fixed packets only)
Center Hole Diameter	15 mm
Disc Diameter	12 cm, 8 cm
Disc Thickness	1.2 mm
Track Pitch	1.6 μ m
Laser	
Divergence	53.5 \pm 1.5 degrees
Output Power	0.13 \pm 0.1 mw
Type	Semiconductor Laser GaA1As
Wave Length	780nm \pm 25nm
Access Time	
Random	< 150 ms
Full Stroke	< 600 ms
Audio Output Level	
Line Out	0.7 V rms
Headphone	none
Cache Buffer	256 KB
Data Transfer Rate	
Sustained, quad	300 MB/sec
Sustained, single	150 KB/sec
Burst	8.3 MB/sec
Startup Time	< 10 seconds typical
Capacity	
Mode 1, 12 cm	550 MB
Mode 2, 12 cm	640 MB
8 cm	180 MB

6.6 DVD-ROM Drive

**Table 6-7
DVD-ROM Drive**

Applicable Disc	DVD-5, DVD-9, DVD-10 CD-ROM mode 1, mode 2 CD-Digital Audio CD-XA mode 2 (Form 1, Form 2) CD-I mode 2 (Form 1 and Form 2) CD-I Ready CD-Bridge CD-R Photo CD (single/multisession)
Center Hole Diameter	.59 in/15 mm
Disc Diameter	12 cm, 8 cm
Disc Thickness	1.2 mm
Track Pitch	.74 μ m
Capacity	
DVD-5	4.7 GB
DVD-9	8.5 GB
DVD-10	9.4 GB
Mode 1, 12	550 MB
Mode 2, 12 cm	640 MB
8 cm	180 MB
Laser	
Output Power	5 mw
Type	Semiconductor Laser GaAlAs
Wave Length	650 nm \pm 25nm (DVD-ROM mode) 795 nm \pm 25 nm (CD-ROM mode)
Access Time	
Random	< 200 ms
Full Stroke	< 250 ms
Audio Output Level	
Line Out	0.7 V rms
Headphone	none
Cache Buffer	128 KB
Data Transfer Rate	
Sustained, 1x (CD-ROM mode)	150 KB/sec
Sustained, 20x (CD-ROM CAV mode)	1200-1300 KB/sec
Sustained, (DVD-ROM movd)	1352-2705 KB/sec sustained, DVD-ROM
Burst	mode
Startup Time	16.6 MB/sec <3 seconds, typical

6.7 LS-120 Drive

**Table 6-8
LS-120 Drive**

	120 MB	1.7 MB DMF	1.44 MB	1.2 MB	1.2 MB	720.KB	640 KB
Formatted capacity (bytes)	125,958,144	1,720,320	1,474,560	1,261,568	1,228,800	737,280	655,360
Sector size (bytes)	512	512	512	1,024	512	512	512
Sectors	246,527	3,360	2,880	1,232	2,400	1,440	1,280
Magnetic tracks surface	1,736	80	80	77	80	80	80
Optical servo tracks/surface	900	N/A	N/A	N/A	N/A	N/A	N/A
Sectors/track	51-92	21	18	8	15	9	8
Sector interleave	1:1	2:1	1:1	1:1	1:1	1:1	1:1
Spare sectors	170	0	0	0	0	0	0
Zones (each side)	55	1	1	1	1	1	1
Average random seek	70 ms	70 ms	70 ms	70 ms	70 ms	70 ms	70 ms
Track-to-track seek	20 ms	25 ms	25 ms	25 ms	25 ms	25 ms	25 ms
Max single seek	120 ms	170 ms	170 ms	170 ms	170 ms	170 ms	170 ms
Average latency	41.67 ms	41.67 ms	41.67 ms	41.67 ms	41.67 ms	41.67 ms	41.67 ms
Motor RPM	720±0.5%	720±0.5%	720±0.5%	720±0.5%	720±0.5%	720±0.5%	720±0.5%
Motor start time	800 ms	800 ms	800 ms	800 ms	800 ms	800 ms	800 ms
Track density	2,490 TPI	135 TPI	135 TPI	135 TPI	135 TPI	135 TPI	135 TPI
Track width	8 µm	125 µm	125 µm	125 µm	125 µm	125 µm	125 µm
Encoding method	(1,7)RLL	MFM	MFM	MFM	MFM	MFM	MFM
Max flux density	33,660 FCI	17,334 FCI	17,334 FCI	17,334 FCI	17,334 FCI	17,334 FCI	17,334 FCI
Recording density	44,880 BPI	17,334 BPI	17,334 BPI	17,334 BPI	17,334 BPI	17,334 BPI	17,334 BPI
Nominal transfer rate	375-680 KB/sec	150 KB/sec	150 KB/sec	125 KB/sec	125 KB/sec	75 KB/sec	75 KB/sec
Nominal sustained transfer rate across interface	313-565 KB/sec	65 KB/sec read, 32 KB/sec write	55 KB/sec read, 28 KB/sec write	49 KB/sec read, 25 KB/sec write	46 KB/sec read, 23 KB/sec write	28 KB/sec read, 14 KB/sec write	28KB/sec read, 14 KB/sec write

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Buffer transfer rate	4.0 MB/sec	4.0 MB/sec	4.0 MB/sec	4.0 MB/sec	4.0 MB/sec	4.0 MB/sec	4.0 MB/sec
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6.8 Battery Pack

Table 6-9 Lithium Ion Battery Pack		
	U.S.	Metric
Dimensions		
Height	0.92 in	2.34 cm
Length	5.44 in	13.82 cm
Weight	3.46 in	8.80 cm
Weight	0.89 lb	0.40 kg
Energy		
Voltage	14.4 V	
Capacity	2.7 Ah	
Environmental Requirements		
Operating Temperatures	50°F to 104°F	10°C to 40°C
Charging Temperatures	50°F to 104°F	10°C to 40°C
Recommended Storage Temperatures		
No longer than 1 month	32°F to 140°F	0°C to 60°C
No longer than 3 months	32°F to 113°F	0°C to 45°C
No longer than 1 year	32°F to 68°F	0°C to 20°C

6.9 System DMA

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 = DMA 0, none)
DMA4	DMA Controller Cascading (Not available)
DMA5	Available for PC Card
DMA6	Not Assigned
DMA7	Not Assigned
Note: PC Card controller can use DMA 1, 2, or 5.	

6.10 System Interrupts

**Table 6-11
System Interrupts**

Hardware IRQ	System Function
IRQ1	Timer Interrupt
IRQ2	Cascaded
IRQ3	PCMCIA
IRQ4	Modem (COM1)
IRQ5	Audio (default)*
IRQ6	Diskette drive
IRQ7	Parallel
IRQ8	RTC
IRQ9	Infrared
IRQ10	PCMCIA
IRQ11	Network Interface on ArmadaStation/Armada MiniStation**
IRQ12	Internal Point Stick or External Mouse
IRQ13	Coprocessor (Not available to any peripheral)
IRQ14	IDE Interface (Hard Disk and CD-ROM Drive)
IRQ15	Fixed Disk Drives on the ArmadaStation/Armada MiniStation

Notes:

PCMCIA cards may assert IRQ3, IRQ4, IRQ5, IRQ7, IRQ9, IRQ10, IRQ11, or IRQ15. Either the infrared or the serial port may assert IRQ3 or IRQ4.

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

** Default configuration; possible configurations for ArmadaStation or Armada MiniStation network interface adapter are IRQ9, IRQ10, IRQ11, or none.

6.11 System I/O Addresses

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 - 043	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
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

Continued

Table 6-12 *Continued*

I/O Address (Hex)	System Function (Shipping Configuration)
26E - 26	National 87334 "Super IO" Controller in ArmadaStation/Armada MiniStation
278 - 27F	Unused
280 - 2AB	Unused
2A0 - 2A7	ArmadaStation/Armada MiniStation PC Card DMA Selection, Hard Drive Reset, IDE Select, MultiBay Device Identification
2A8 - 2E7	Unused
2E8 - 2EF	Reserved Serial Port
2F0 - 2F7	Unused
2F8 - 2FF	Infrared port
300 - 31F	Network Interface in ArmadaStation/Armada MiniStation (Default; Alternate is 320, 340, or 360h)
320 - 36F	Unused
370 - 377	Secondary Floppy Controller (In ArmadaStation/Armada MiniStation when a floppy is installed in the CPU)
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	PC Card Controller in ArmadaStation/Armada MiniStation
3E8 - 3EF	Internal Modem
3F0 - 3F7	"A" Diskette Controller
3F8 - 3FF	Serial Port (COM1/Default)
CF8 - CFB	PCI Configuration Index Register (PCIDIV0-1)
CFC - CFF	PCI Configuration Data Register (PCIDIV0-1)

6.12 System Memory Map

Table 6-13
System Memory Map

Size	Memory Address	System Function
640 K	00000000 - 0009FFFF	Base Memory
128 K	000A0000 - 000BFFFF	Video Memory
48 K	000C0000 - 000CBFFF	Video BIOS
160 K	000C8000 - 000E7FFF	Unused
64 K	000E8000 - 000FFFFFF	System BIOS
15 M	00100000 - 00FFFFFF	Extended Memory
58 M	01000000 - 047FFFFFF	Super Extended Memory
58 M	04800000 - 07FFFFFF	Unused
2 M	08000000 - 080FFFFFF	Video Memory (Direct Access)
4 G	08200000 - FFFEFFFF	Unused
64 K	FFFF0000 - FFFFFFFF	System BIOS

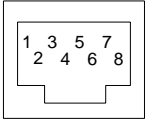
6.13 Modem Chipset

Table 6-14
Modem Chipset

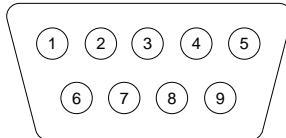
Component	Manufacturer	Part Number
Primary DSP	Lucent	16345T48-AE23-DB
Secondary DSP	Lucent	1635T08-BA23-DB
ASIC	Lucent	VALV34-T-DB
Hybrid	Lucent	D2560BBL-DT
Controller	Motorola	MC68LC302PU

Connector Pin Assignments

**Table A-1
Ethernet RJ-11**

Connector	Pin	Signal
	1	NC_J3A
	2	NC_J3B
	3	TIP
	4	RING
	5	NC_J3C
	6	NC_J3D
	7	Unused
	8	Unused

**Table A-2
Serial Connector**



Pin	Signal	Pin	Signal
1	Carrier Detect	6	Data Set Ready
2	Receive Data	7	Ready to Send
3	Transmit Data	8	Clear to Send
4	Data Terminal Ready	9	Ring Indicator
5	Ground		

**Table A-3
Microphone Jack**

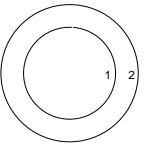
Connector	Pin	Signal
	1	Audio in
	2	Ground

Table A-4
Stereo Speaker/Headphone Jack

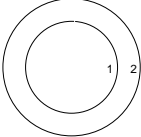
Connector	Pin	Signal
	1	Audio out
	2	Ground

Table A-5
Stereo Line-in Jack

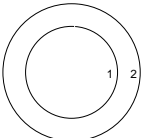
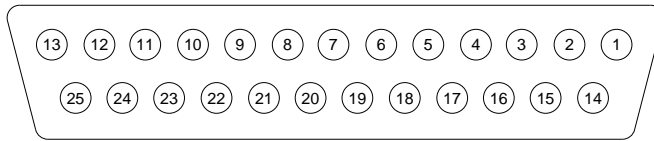
Connector	Pin	Signal
	1	Audio in
	2	Ground

Table A-6
Parallel Connector



Pin	Signal	Pin	Signal
1	Strobe	14	Auto Linefeed
2	Data Bit 0	15	Error
3	Data Bit 1	16	Initialize Printer
4	Data Bit 2	17	Select In
5	Data Bit 3	18	Ground
6	Data Bit 4	19	Ground
7	Data Bit 5	20	Ground
8	Data Bit 6	21	Ground
9	Data Bit 7	22	Ground
10	Acknowledge	23	Ground
11	Busy	24	Ground
12	Paper End	25	Ground
13	Select		

Table A-7
Docking Connector



Pin	Signal	Pin	Signal
1	EBOXL	34	XA1/R OUT
2	AGND	35	GND
3	EBOXS1	36	GND
4	RED	37	EXPCLK2
5	AGND	38	+3.3V
6	GREEN	39	EXPCLK0
7	AGRD	40	+5V (8051VCC)
8	BLUE	41	EXPCLK
9	AGND	42	EBOXS2
10	VSYNC	43	GND
11	HSYNC	44	EBOXL
12	DDC DAT	45	EBOXL /GND
13	DDC CLK	46	SRDY
14	GND	47	EBOXS1 /GND
15	INDEX	48	RI1 EX
16	RDATA	49	GND
17	TRK0	50	SLCT LD0
18	WDATA	51	PE LD1
19	WGATE	52	ACK LD2
20	STEP	53	BUSY LD3
21	DIR	54	GND
22	POWER ON	55	STRB LD4
23	SYS RESET	56	ALF LD5
24	GND	57	INIT LD6
25	DSKCHG	58	SLCTIN LD7
26	+5 V (VDD)	59	GND
27	AUGND	60	PDATA0 LD8
28	XA2/L IN	61	PDATA1 LD9
29	XA3/R IN	62	PDATA2 LD10
30	MID0/MIC IN	63	PDATA3 LD11
31	AUGND	64	GND
32	XA0/L OUT	65	PDATA4 LD12
33	XSD/MIC SN	66	PDATA5 LD13

Continued

Table A-7 Continued

Pin	Signal	Pin	Signal
67	PDATA6 LD14	105	AD[16]
68	PDATA7 LD15	106	GND
69	GND	107	AD[15]
70	ERROR LCLK	108	AD[13]
71	RXD1 LVREQ	109	AD[11]
72	TXD1 LCREQ	110	AD[09]
73	RTS1 LEN	111	GND
74	GND	112	AD[06]
75	CTS1 LIIC CLK	113	AD[04]
76	DTR1 LIIC DAT	114	AD[02]
77	DSR1 EX	115	AD[00]
78	DCD1 EX	116	GND
79	12C DATA	117	FRAME
80	GND	118	TRDY
81	12C CLK	119	STOP
82	GND	120	PAR
83	HDSEL	121	CBE0
84	GND	122	CBE1
85	WPROT	123	GND
86	EBOXS2 /GND	124	KB CLK
87	ERDY	125	RSVD1/M CTRL2
88	EBOXL /GND	126	XSC/L OUT SN
89	FLUSHREQ	127	RSVD2/M OFF HOOK
90	MEMACK	128	KB DATA
91	PS2 VCC	129	MGND
92	SERIRQ	130	STANDBY
93	PS2 CLK	131	M DRZP
94	EXPREQ	132	M DRXN
95	AD[29]	133	VBATT
96	AD[31]	134	EXPGNT
97	AD[30]	135	VBATT
98	AD[28]	136	GND
99	AD[26]	137	VBATT
100	GND	138	PS2 DATA
101	AD[24]	139	VBATT
102	AD[22]	140	AD[25]
103	AD[20]	141	VBATT
104	AD[18]	142	AD[27]

Continued

Table A-7 *Continued*

Pin	Signal	Pin	Signal
143	VBATT	160	CBE3
144	AD[23]	161	CBE2
145	GND	162	IRDY
146	AD[21]	163	DEVSEL
147	AD[19]	164	LOCK
148	AD[17]	165	OERR
149	GND	166	SERR
150	AD[14]	167	GND
151	AD[12]	168	RSVD3
152	AD[10]	169	M 12C CLK
153	AD[08]	170	M 12C DATA
154	GND	171	M RING
155	AD[07]	172	MGND
156	AD[05]	173	M DXTN
157	AD[03]	174	GND
158	AD[01]	175	M DXTP
159	GND	176	MSTRBAT

Table A-8
External Keyboard/Mouse Connector

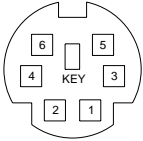
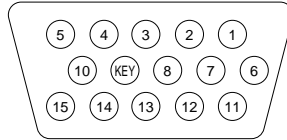
Connector	Pin	Signal
	1	Keyboard/Mouse DATA
	2	Keyboard/Mouse DATA
	3	Ground
	4	+5 VDC
	5	Keyboard/Mouse CLK
	6	Keyboard/Mouse CLK

Table A-9
External Monitor Connector



Pin	Signal	Pin	Signal
1	Red Analog	9	NC
2	Green Analog	10	Ground
3	Blue Analog	11	NC
4	NC	12	DDC Data
5	Ground	13	Horizontal Sync
6	Ground	14	Vertical Sync
7	Ground	15	DDC Clock
8	Ground		

Power Cord Set Requirements

3-Conductor Power Cord Set

The wide range input feature of the Broadway Family of Personal Computers 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:

1. 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).
2. 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.
3. The power cord set must have a minimum current capacity of 10A and a nominal voltage rating of 125 or 250 volts AC, as required by each country's power system.
4. The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector, for mating with appliance inlet on the back of the computer.

Country-Specific Requirements

3-Conductor Power Cord Set Requirements—By Country		
Country	Accredited Agency	Applicable Note Numbers
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	JIS	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, 0.75mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (15A, 125V) configuration.

Screw Listing

This appendix contains information for all screws, screwlocks, and bushing guides used when servicing the Armada 7800 Computer. An illustration appears below each listing indicating where the hardware is used.

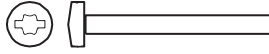
Table C-1



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
272326-001	Screw, M3.0 x 6.0	T10	4.0 Lb.-in.	Black	1	5.10 (memory expansion door to base assembly)



Table C-2



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144865-006	Screw, M2.5 x 24	T8/Slot	3.0 Lb.-in.	Black	7	5.11 (keyboard assembly to base assembly ①)

Table C-3



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144865-009	Screw, M2.5 x 17.75	T8/Slot	4.0 Lb.-in.	Black	2	5.11 (keyboard assembly to base assembly ②)

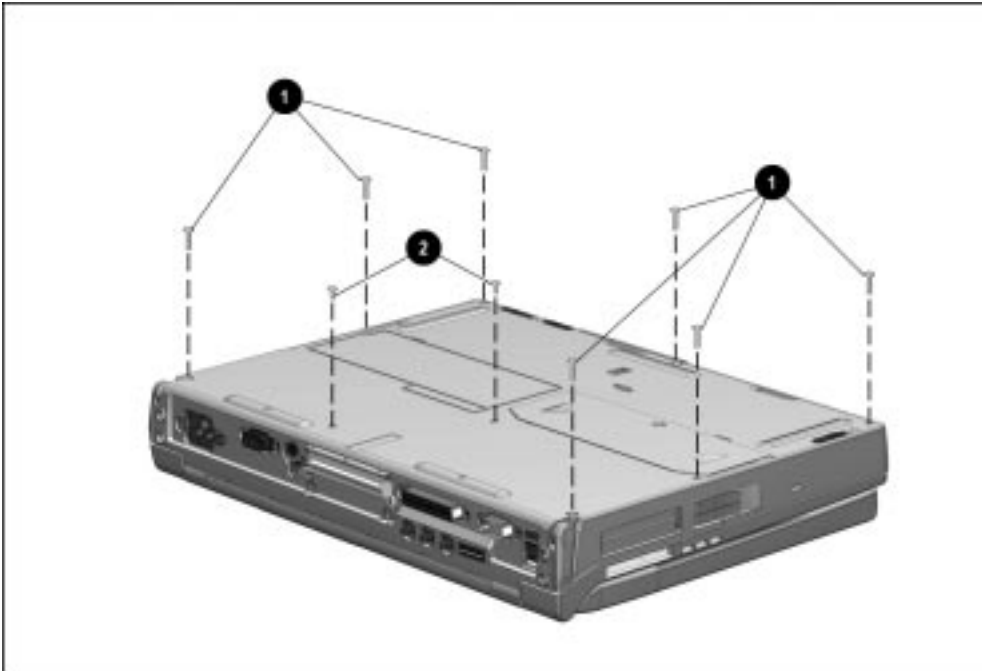


Table C-4



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
315724-001	Screw, M2.5 x 5.0	T8/Slot	4.0 Lb.-in.	Gold	2	5.11 (keyboard assembly to base assembly under keyboard label ❶)
					1	5.14 (audio/USB board and right rear cover to audio assembly bracket ❷)
					1	5.15 (modem board to audio assembly bracket ❸)
					2	5.16 (audio assembly bracket to standoff ❹ and processor module assembly ❺)

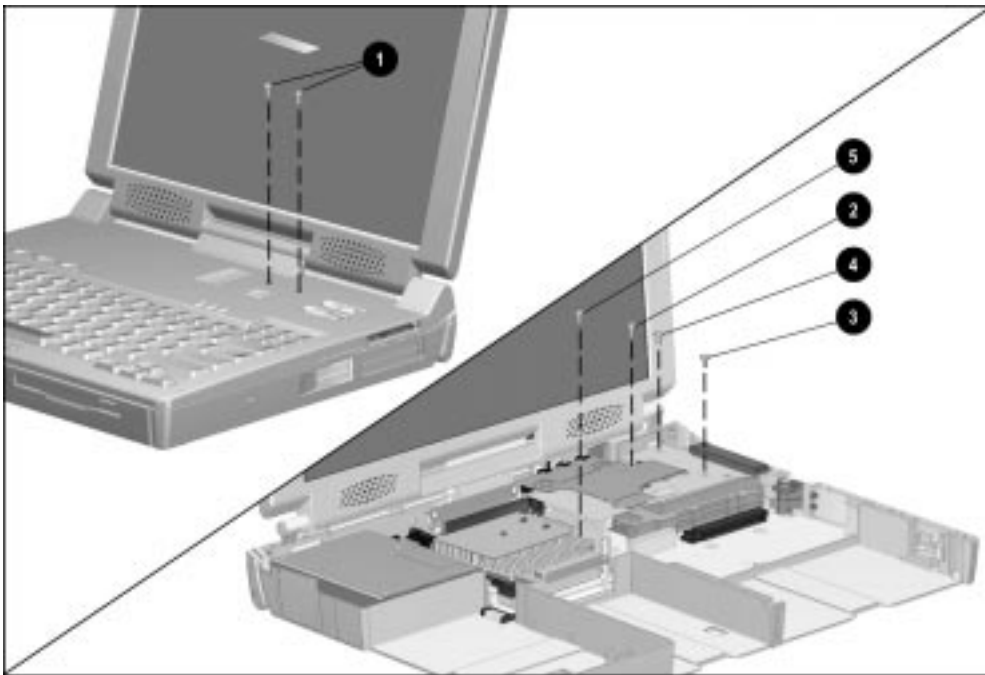


Table C-5



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144865-012	Screw, M2.5 x 6.5	T8/Slot	4.0 Lb.-in.	Black	4	5.12 (power supply to base assembly and I/O bracket ❶)
					2	5.18 (processor module assembly to base assembly ❷)
					2	5.19 (auxiliary battery bracket to base assembly ❸)
					1	5.22 (system board to I/O bracket over keyboard connector ❹)

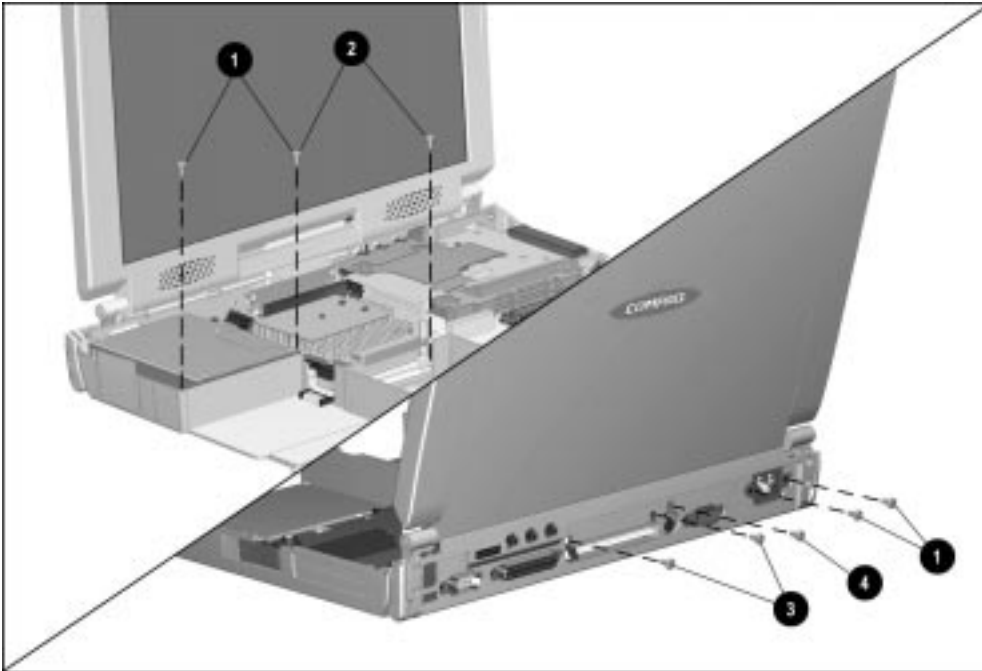


Table C-6



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144865-019	Screw, M2.5 x 20.5	T8/Slot	4.0 Lb.-in.	Black	2	5.16 (audio assembly bracket to base assembly ①)

Table C-7



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
314884-002	Standoff, 3/16 x 16.3	3/16" Hex	4.0 Lb.-in.	Silver	1	5.16 (audio assembly bracket to base assembly ②)

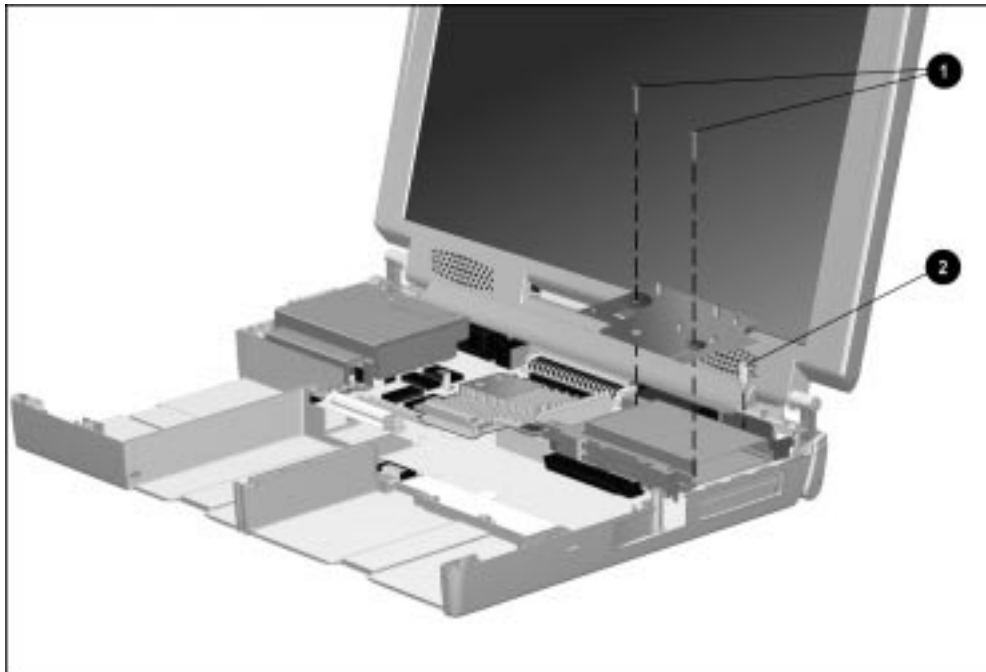


Table C-8



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144865-020	Screw, M2.5 x 3.5	T8/Slot	4.0 Lb.-in.	Black	2	5.18 (ground clips to processor module assembly)

continued

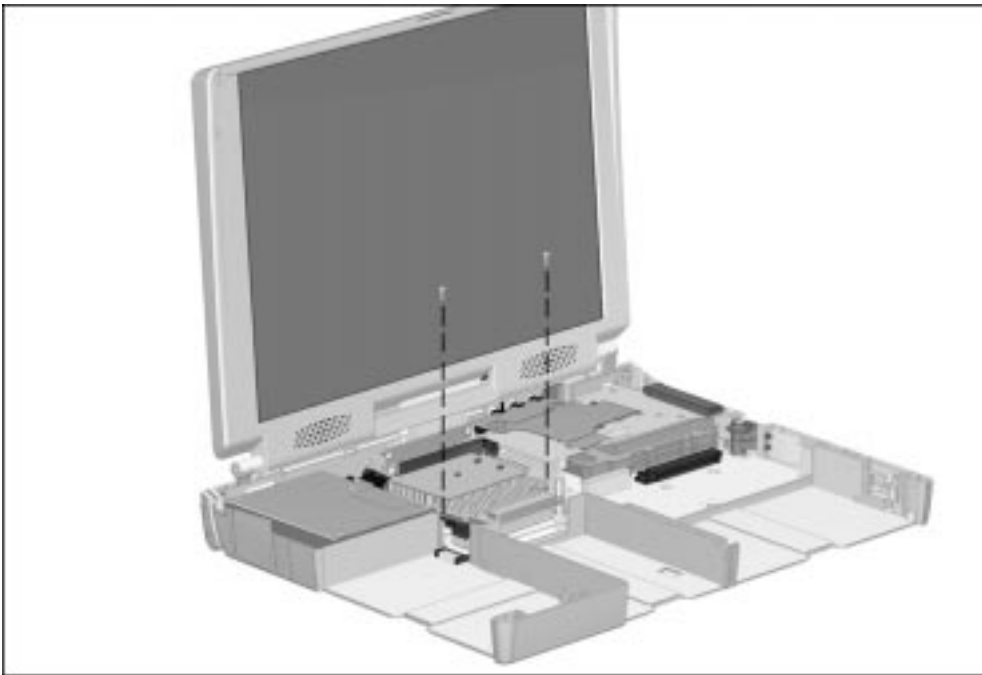


Table C-8 *continued*



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144865-020	Screw, M2.5 x 3.5	T8/Slot	4.0 Lb.-in.	Black	2	5.19 (display panel to display enclosure, 14.1-inch model only)

continued

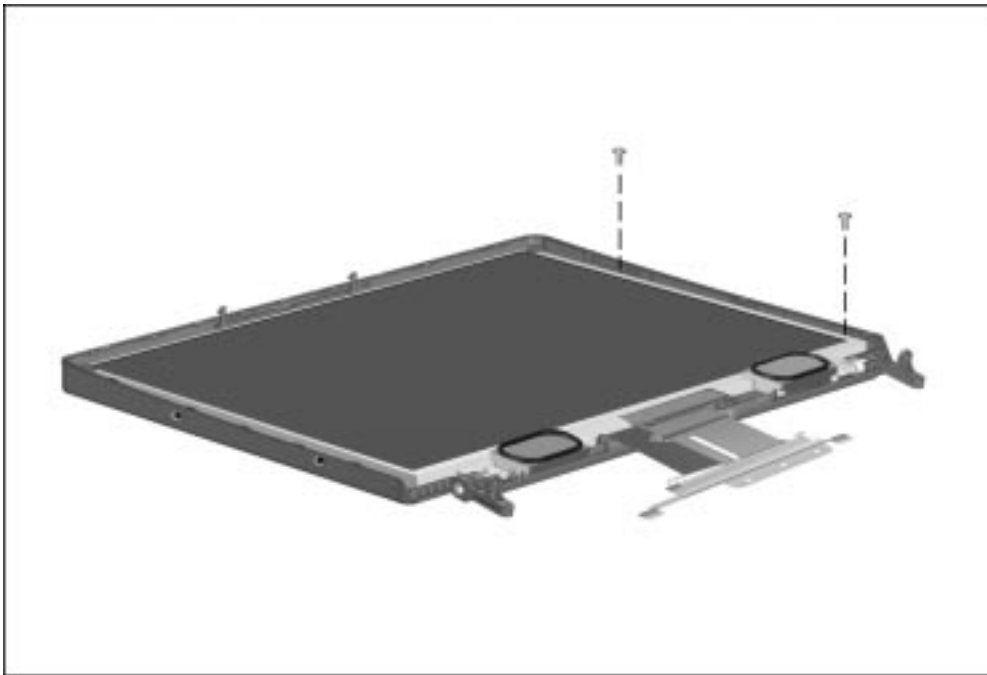


Table C-8 *continued*



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144865-020	Screw, M2.5 x 3.5	T8/Slot	4.0 Lb.-in.	Black	1	5.19 (inverter board to display enclosure)

continued

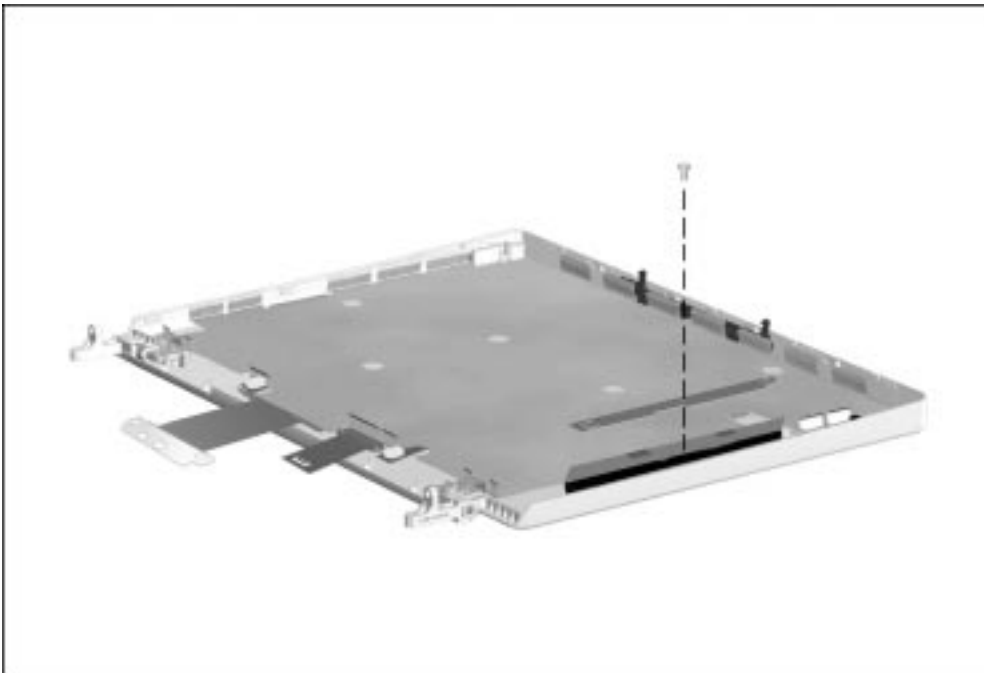


Table C-8 *continued*



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144865-020	Screw, M2.5 x 3.5	T8/Slot	4.0 Lb.-in.	Black	1	5.19 (microphone board to display enclosure)

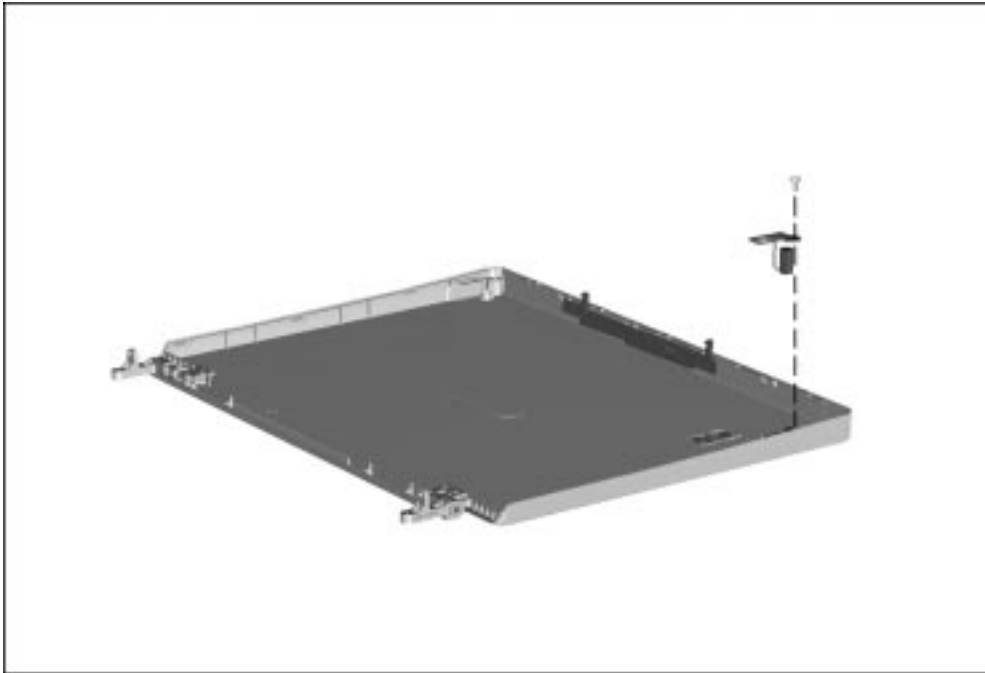


Table C-9



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144864-018	Screw, M2.5 x 12.0	T8/Slot	4.0 Lb.-in.	Green	1	5.19 (display video cable connector to system board)

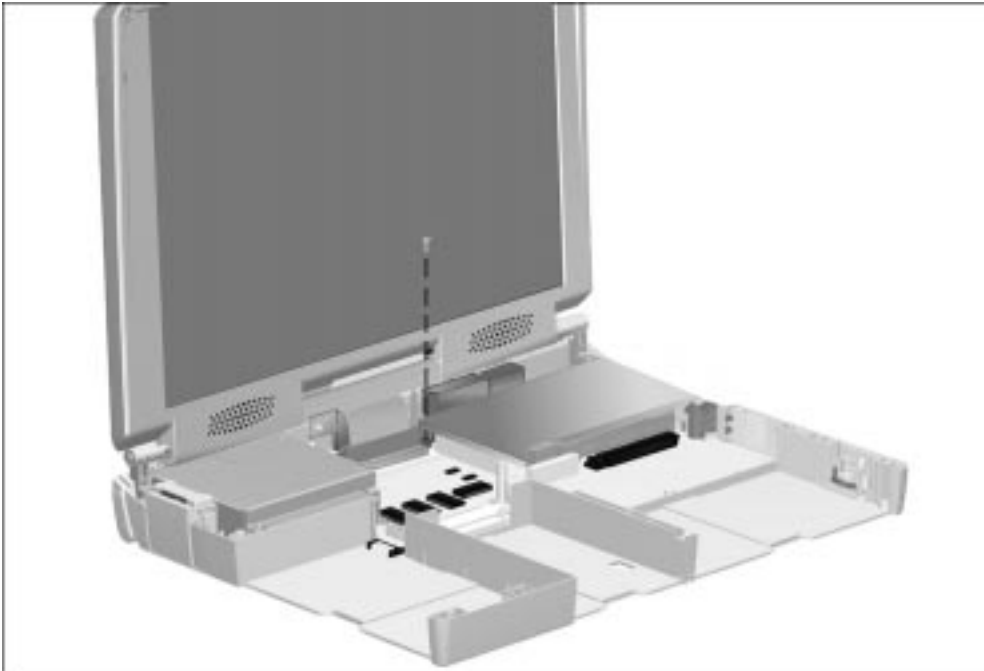


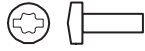
Table C-10



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
272240-003	Screw, M2.5 x 10.0	T8/Slot	4.0 Lb.-in.	Black	4	5.19 (display clutches to base assembly)



Table C-11



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144864-017	Screw, M2.5 x 7.7	T8/Slot	4.0 Lb.-in.	Blue	3	5.19 (display bezel to display enclosure; 14.1-inch model)

continued

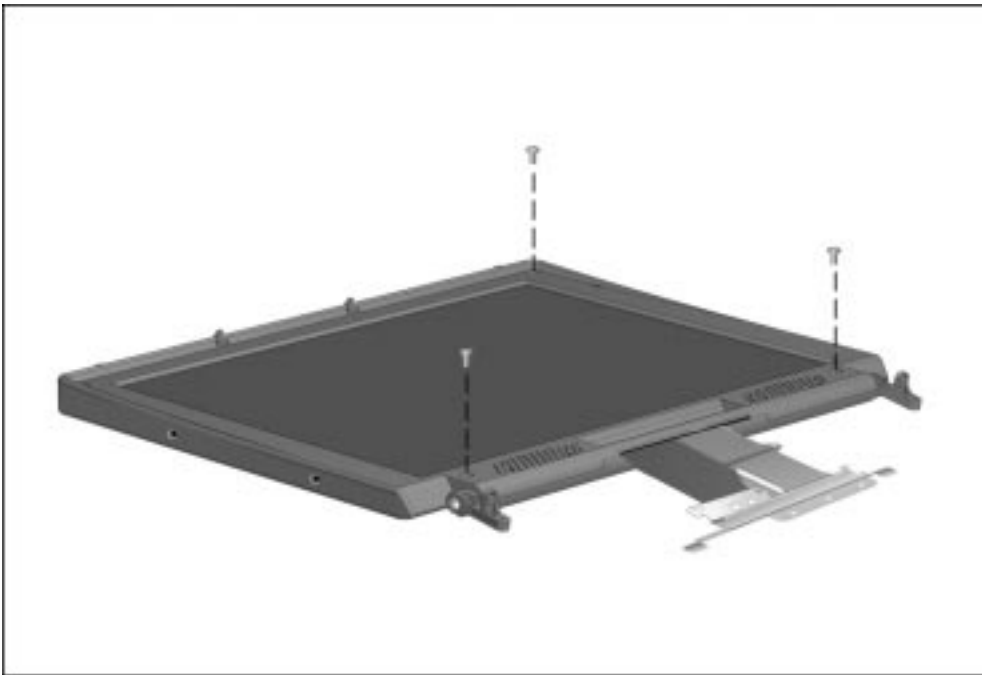
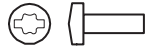


Table C-11 *continued*



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144864-017	Screw, M2.5 x 7.7	T8/Slot	4.0 Lb.-in.	Blue	4	5.19 (display bezel to display enclosure; 13.3-inch model)

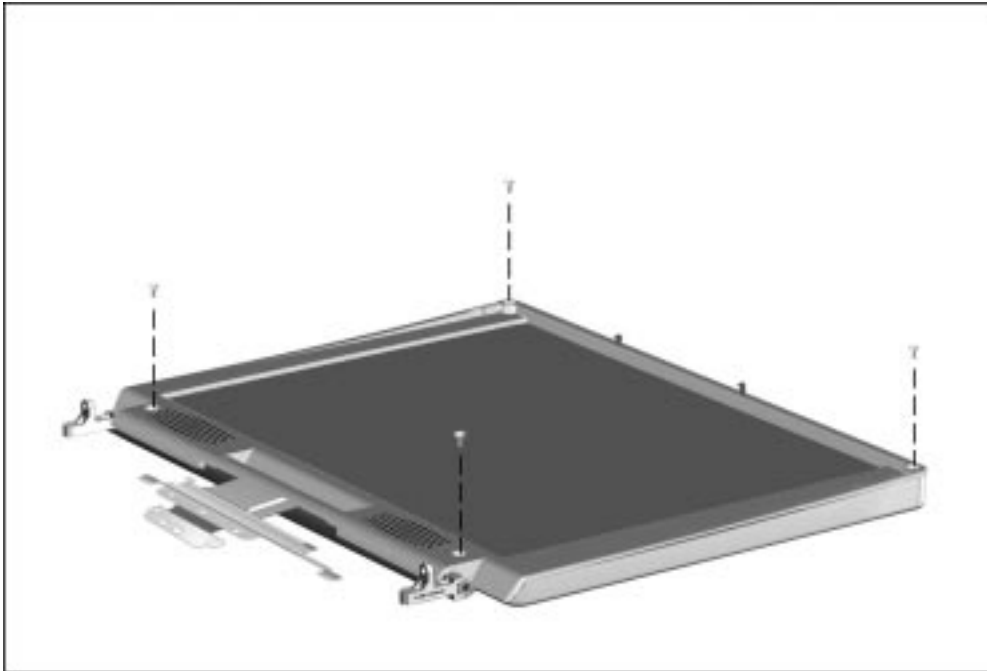


Table C-12



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144863-009	Screw, M2.0 x 0.40	T8/Slot	2.0 Lb.-in.		2	5.19 (display panel to display enclosure; 14.1-inch model only)

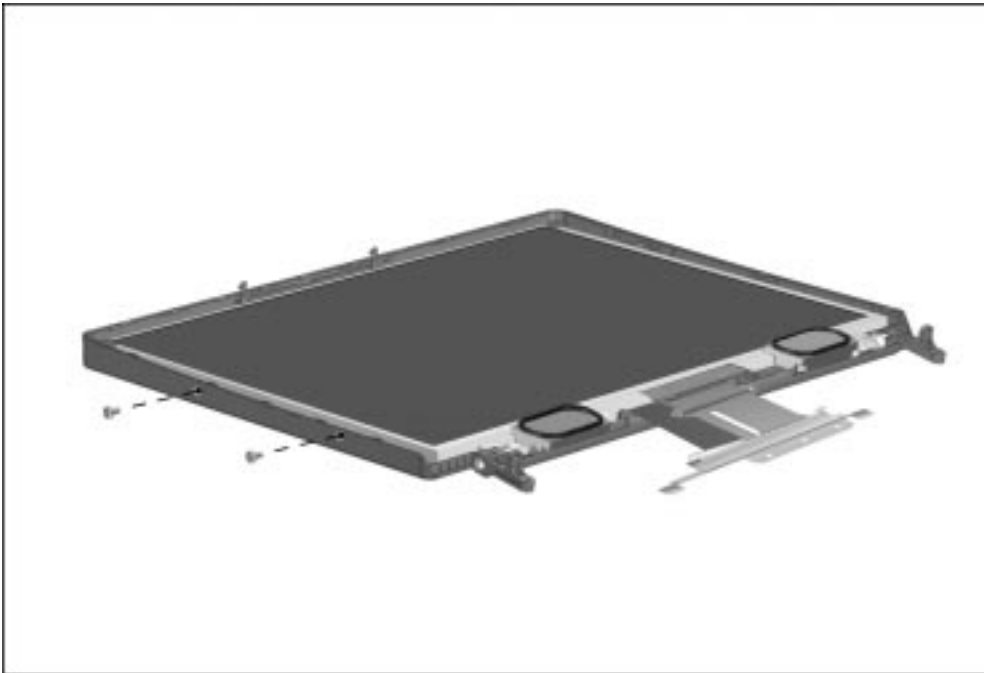
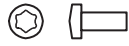


Table C-13



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
315766-001	Screw, M2.5 x .50	T8/Slot Socket Head	4.0 Lb.-in.	Black	4	5.19 (display panel to display enclosure, 13.3-inch model only)

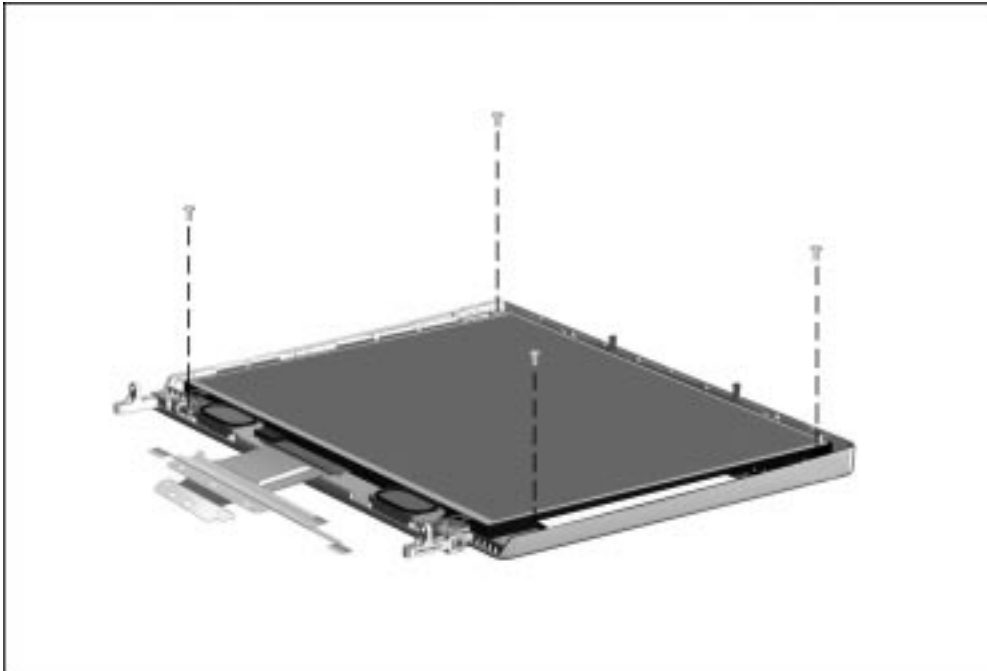


Table C-14



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144864-002	Screw, M2.5 x 5.0	T8/Slot	4.0 Lb.-in.	Silver	2	5.21 (System board to base assembly ❶)

Table C-15



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
220747-001	Screw, flathead, custom	T8	4.0 Lb.-in.	Red	2	5.21 (System board to base assembly at MultiBay ❷)

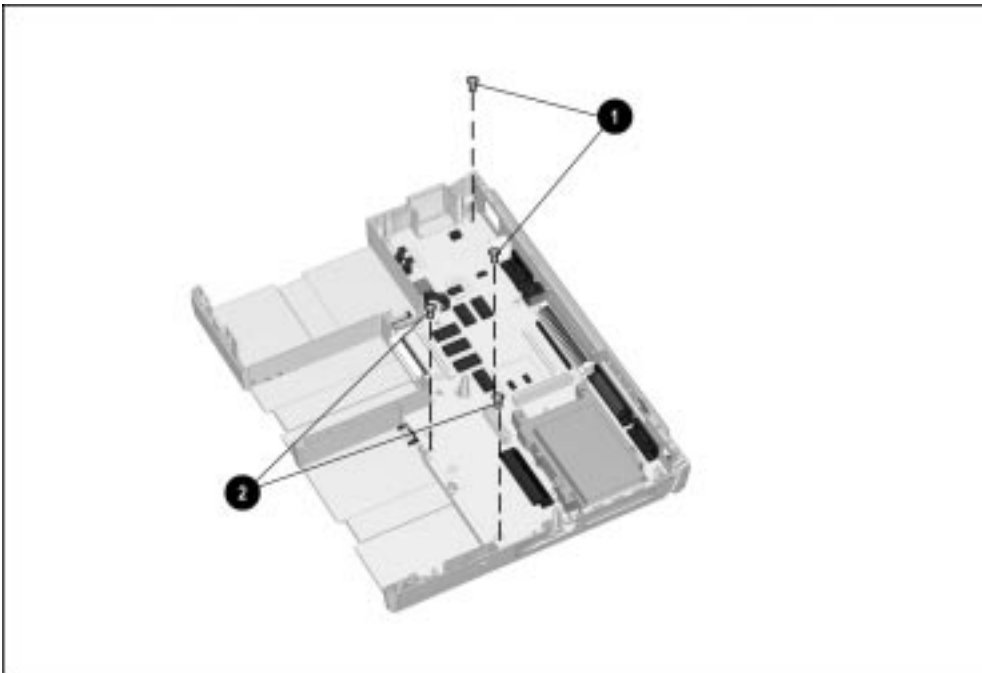


Table C-16



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
106902-005	Screwlock, 4-40 x .312	3/16"	6.0 Lb.-in.	Silver	6	5.21 (serial, parallel, and external monitor connectors to I/O bracket ①)

Table C-17



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
220508-001	Bushing guide	7mm	6.0 Lb.-in.	Silver	2	5.21 (expansion connector to I/O bracket ②)

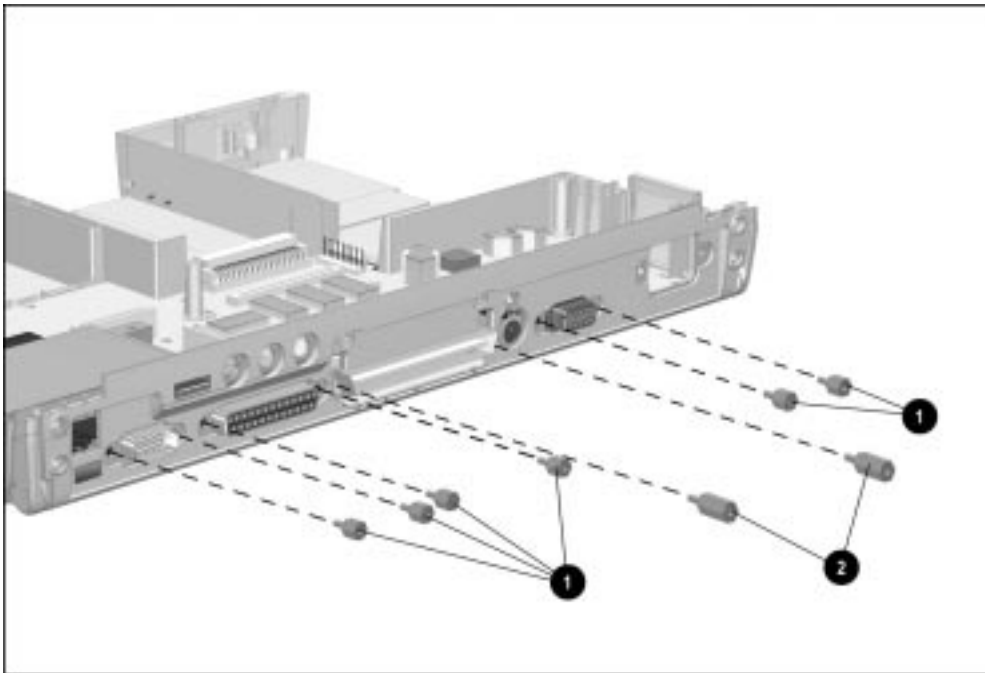
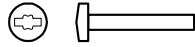
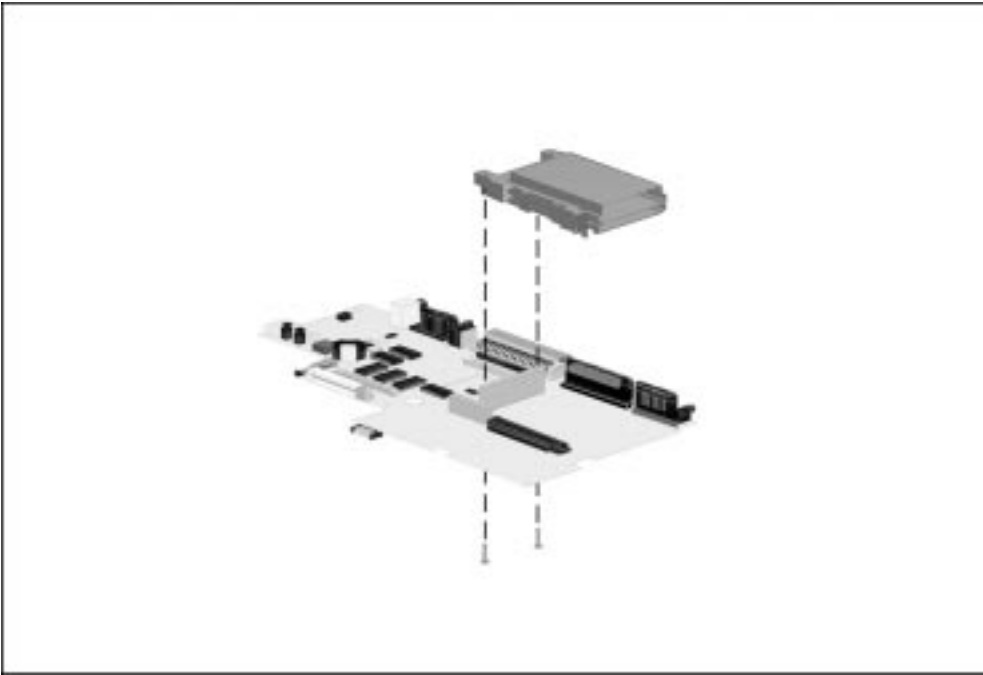


Table C-18



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144863-003	Screw, M2.0 x 0.40, flat top	T8/Slot	4.0 Lb.-in.	Silver	2	5.22 (PC Card assembly to system board)



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