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## MAINTENANCE AND SERVICE GUIDE

Compaq Armada €700 Series of Personal Computers

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**Compaq Computer Corporation**



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# *preface*

## USING THIS GUIDE

This *Maintenance and Service Guide* is a troubleshooting reference that can be used when servicing the Compaq Armada E700 Series of Personal Computers.

Compaq Computer Corporation reserves the right to make changes to the Compaq Armada E700 Series of Personal Computers without notice.

### 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.

---

## 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 E700 Series of Personal Computers documentation set
- Compaq Armada E700 Series of Personal Computers *Technical Reference Guide*
- Microsoft Operating System Manual
- Compaq Service Training Guides
- Compaq Service Advisories and Bulletins
- *Compaq QuickFind*
- *Compaq Service Quick Reference Guide*
- Compaq Internet site at <http://www.Compaq.com>



# *chapter 1*

## PRODUCT DESCRIPTION

### 1.1 Computer Features and Models

The Compaq Armada E700 Series of Personal Computers offers advanced modularity, Intel Pentium III or II processors 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 Compaq expansion base and Compaq convenience base.



**Figure 1-1.** *Compaq Armada E700 Personal Computer*

## Models

The Armada E700 models are shown in Table 1-1. The computer model designation is composed of a group of characters that define each model's features.

<b>Table 1-1</b> <b>Models and Model Naming Convention</b> <b>Compaq Armada E700 Series of Personal Computers</b>																
<b>Key</b>																
<b>A</b>	<b>€</b>	<b>7</b>		<b>P3</b>	<b>500</b>	<b>T</b>	<b>5</b>	<b>X</b>	<b>18</b>	<b>V</b>	<b>C</b>	<b>128</b>	<b>95</b>	<b>N</b>	<b>S</b>	<b>F</b>
1	2	3	4	5-6	7-9	1	1	1	13-	1	1	17-	20-	2	2	2
						0	1	2	14	5	6	19	21	2	3	4
<b>Key</b>	<b>Description</b>		<b>Options</b>													
1	Brand designator		A = Armada													
2	Segment designator		€ = Expansion													
3	Series		7 = 700													
4	Blank															
5-6	Processor type		P3 = Intel Pentium III							P2 = Intel Pentium II						
7-9	Processor speed		500 = 500 MHz							400 = 400 MHz						
10	Panel type		T = TFT													
11	Panel size		5 = 15.x"							4 = 14.x"						
12	Panel resolution		X = XGA													
13-14	Hard drive size (in GB, 1-2 digits)		18 = 18.0 GB				15 = 15.0 GB				10 = 10.0 GB					
15	Optical drive		V = DVD-ROM drive													
16	Integrated communication		C = mini-PCI combination modem/NIC				M = mini-PCI modem card				0 = none					
17-19	RAM (in MB, 2-3 digits)		128 = 128 MB													
20-21	Operating system		95 = Windows 95							N4 = Windows NT 4.0						
			98 = Windows 98							2K = Windows 2000						
			58 = Windows 95/98 dual install							N2 = Windows NT 4.0/2000 dual install						
22	NAFTA		N = NAFTA													
23	Pointing device		S = Pointing stick							P = TouchPad						
24	Security		F = Fingerprint													

1	2	3	4	5-6	7-9	10	11	12	13-14	15	16	17-19	20-21	22	23	24	SKU#
A	€	7		PIII	50 0	T	5	X	18	V	C	128	3		S		140146- xxx
A	€	7		PIII	50 0	T	5	X	18	V	O	128	3		S		140148- xxx
A	€	7		PIII	50 0	T	5	X	18	V	C	128	5		S		140353- xxx
A	€	7		PIII	50 0	T	5	X	18	V	O	128	5		S		140199- xxx
A	€	7		PIII	50 0	T	5	X	18	V	C	128	4		S		140205- xxx
A	€	7		PIII	50 0	T	5	X	18	V	O	128	4		S		140255- xxx
A	€	7		PII	40 0	T	4	X	15	V	C	128	3		S		113363- xxx
A	€	7		PII	40 0	T	4	X	15	V	M	128	3		S		113364- xxx
A	€	7		PII	40 0	T	4	X	15	V	O	128	3		S		113365- xxx
A	€	7		PII	40 0	T	4	X	15	V	C	128	1		S		113366- xxx
A	€	7		PII	40 0	T	4	X	15	V	M	128	1		S		113367- xxx
A	€	7		PII	40 0	T	4	X	15	V	O	128	1		S		113368- xxx

## Features

The computer has the following standard features:

- Intel Mobile 500-MHz Pentium III or Intel Mobile 400-MHz Pentium II processors with 64-bit architecture, MMX technology, and 512-Kbyte, level-2 cache memory
- Industry-leading portable computer AGP implementation, featuring:
  - 66-MHz dedicated graphics bus
  - frame made AGP
- 4-MB SGRAM (synchronous graphics)
- 128-MB of SDRAM (synchronous) on system board; expandable to 640 MB
- Upgradable flash ROM BIOS
- 15.1- or 14.1-inch XGA (1024 × 768) TFT color displays, true color (24-bit) support
- Keyboard with built-in EasyPoint IV pointing device and mouse buttons or touchpad and touchpad mouse buttons
- Lithium ion (Li-ion) battery pack
- Removable 18.0-, 15.0-, or 10.0-GB hard drive
- 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 port<sup>1</sup> (4-Mbps standard) for wireless file transfer, printing, and file synchronization
- Built-in stereo speakers featuring 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 expansion base and Compaq convenience base
- Domestic and international modem and Ethernet connectivity
- Integrated AC Adapter
- Integrated V.90 56-Kbps data/fax modem

---

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

## 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 unauthorized access to data and components.
- **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 [www.compaq.com/support/portables](http://www.compaq.com/support/portables).

**NOTE:** For further help with Intelligent Manageability, select Start → Compaq Information Center → Intelligent Manageability

## Accessing the Web Agent

The computer may have a preinstalled Web Agent that allows computer configuration information to be viewed using Web technology. To access this feature, select Start → Compaq Information Center → Insight Web Management.

If the computer does not have a preinstalled Web Agent, it can be downloaded from the Compaq Web site at [www.compaq.com](http://www.compaq.com).

# Asset Management

AssetControl enables component information to be retrieved 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. Asset control 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 information on hard drives, ports, and video, sound, and other components. This application also allows the user to run multithreaded tests on hardware components. If problems are found, recommendations are provided.

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

## Fault Management

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

- **Hard drive alert**—provides 72-hour advance warning 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. 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 pop up on the computer display and are simultaneously reported to the network console.
- **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.
- When the computer is not connected to a network, the user will receive a local alert.

To set alerts, select the Intelligent Manageability icon in the system tray.

## Security Management

Security Management features customize system security.

- **Power-On and Setup Passwords**—prevent unauthorized access to information and computer configuration.
- **DriveLock**—prevents unauthorized 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 CD-ROM subscription. Support software can also be downloaded from the Compaq Web site at [www.compaq.com/support/portables](http://www.compaq.com/support/portables).

## Managing Power

The computer comes with a collection of power management features that allow battery operating time to be extended and power to be conserved. Use power management to monitor most computer components such as the hard drive, processor, and display.

### Accessing Power Management

In Windows 95, select Start→Settings→Control Panel→Power to view or adjust settings in Power Properties.

**NOTE:** If Windows NT 4.0 is running, select Compaq Power instead of Power. If Windows 98 is running, select Power Management.

### Power Management Levels

To extend the life of batteries, use the Battery Conservation tab in Power Properties. If Windows 95 is running, select Start → Settings → Control Panel → Power to access Power Properties.

**NOTE:** If Windows NT 4.0 is running, select Compaq Power instead of Power. If Windows 98 is running, select Power Management.

The level of battery conservation or selection of preset power management levels can be customized.



## 1.2 Computer Components

### System Memory Options

The main memory subsystem supports a minimum standard 128 MB of Synchronous SDRAM, expandable to 640 MB. The minimum standard Synchronous SDRAM is integrated on the system board. The upgrade SDRAM is accomplished with memory expansion boards that are available in 32-, 64-, 128-, and 256-MB.

The memory expansion slot cover is secured to the computer by a slotted Torx T-8 screw. A tamper-resistant security screw, included with the computer, can be used to provide added security. A 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 1-2.

<b>Base Memory on System Board</b>	<b>Memory Expansion Board</b>	<b>Total Memory</b>
128 MB	512 (2 × 256 MB)	640 MB
128 MB	384 (1 × 256 MB + 1 × 128 MB)	512 MB
128 MB	320 (1 × 256 MB + 1 × 64 MB)	448 MB
128 MB	288 (1 × 256 MB + 1 × 32 MB)	416 MB
128 MB	256 (1 × 256 MB or 2 × 128 MB)	384 MB
128 MB	192 (1 × 128 MB + 1 × 64 MB)	320 MB
128 MB	160 (1 × 128 MB + 1 × 32 MB)	288 MB
128 MB	128 (1 × 128 MB or 2 × 64 MB)	256 MB
128 MB	96 (1 × 64 MB + 1 × 32 MB)	224 MB
128 MB	64 (1 × 64 MB or 2 × 32 MB)	192 MB
128 MB	32 (1 × 32 MB)	160 MB

## **Power Equipment**

The following battery options are available:

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

### **Lithium Ion Battery Pack**

The battery pack can be used in the computer dedicated battery bay, computer MultiBay, Compaq expansion base MultiBays, and Compaq convenience base 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

### **Automobile Power Adapter/Charger and Aircraft Power Adapter**

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

## Mass Storage Devices

The following mass storage devices are available for the computer.

<b>Device</b>	<b>Capacity</b>
Diskette drive	3.5-inch, 1.44 MB, 720 Kbyte, and 1.2 MB (Japanese format)
Hard drive	18.0, 15.0, and 10.0 GB (also available as an option)
CD-ROM drive	24-Speed Max (available as an option)
DVD-ROM	4.7 GB
SuperDisk LS-120 drive	120 MB (available as an option)
External diskette drive	3.5-inch, 1.44 MB

### Diskette Drive

The computer uses a 3.5-inch diskette drive that fits into the computer, Compaq expansion base, or Compaq convenience base MultiBays. The diskette drive is a three-mode type that is compatible with 1.44-MB, 1.2-MB, and 720-Kbyte (formatted) AT drive types. The system supports a maximum of two diskette drives: one in the computer MultiBay and one in the Compaq expansion base or Compaq convenience base MultiBay.

### Hard Drive

The dedicated hard drive bay supports a removable 18.0-, 15.0-, or 10.0-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.

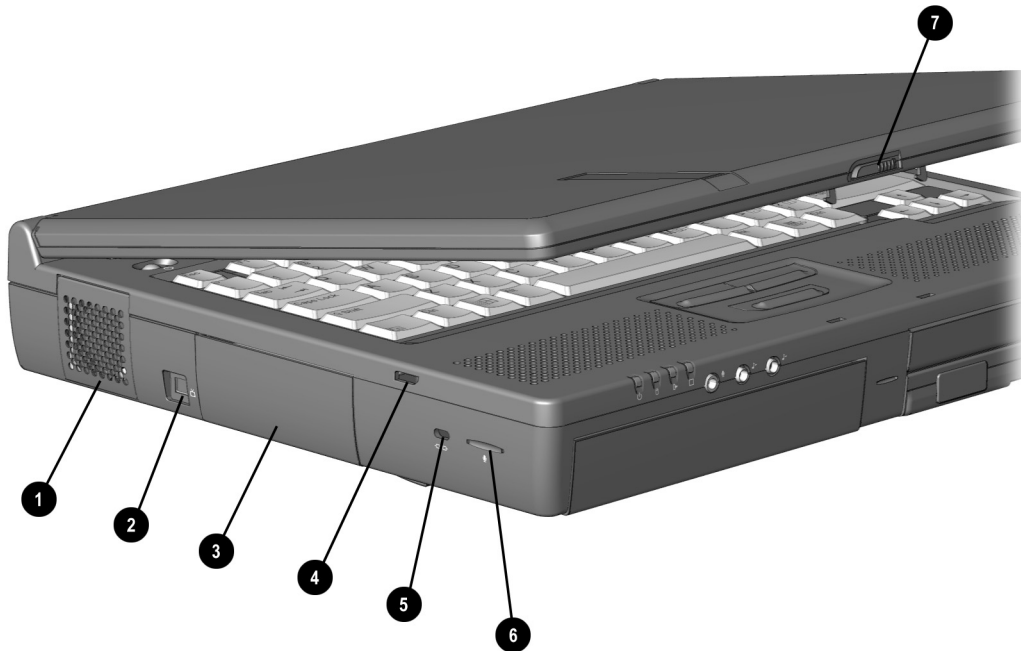
### CD-ROM Drive

A 24-speed Max CD-ROM drive is 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 and left side of the computer are shown in Figure 1-2 and described in Table 1-4.

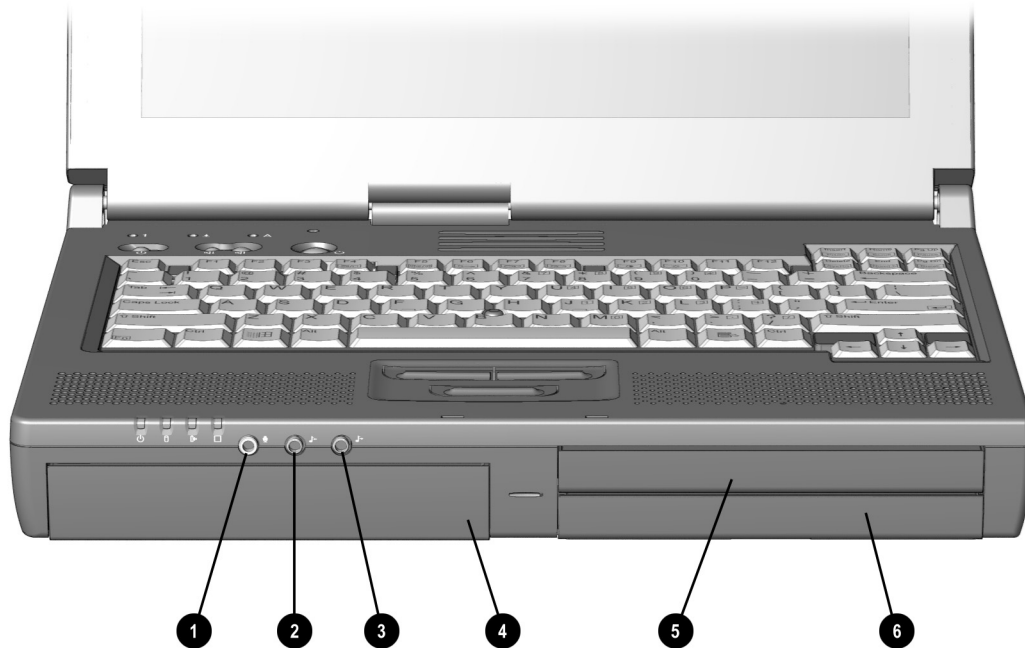


**Figure 1-2.** Display and Left Side Components

**Table 1-4**  
**Display and Left Side Components**

Item	Component	Function
1	Fan	Provides airflow exhaust.
2	Video out jack	Connects a television, VCR, camcorder, overhead projector, or video capture card. <b>NOTE:</b> These connections require the use of optional videl cables and the video out adapter included with the computer.
3	Hard drive bay	Accepts removable hard drive. Holds primary hard drive.
4	Audio bass port	Enhances sound.
5	Security slot	Attaches an optional security cable to the computer.
6	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.
7	Display release latch	Opens the computer.

The external components on the front panel of the computer are shown in Figure 1-3 and are described in Table 1-5.

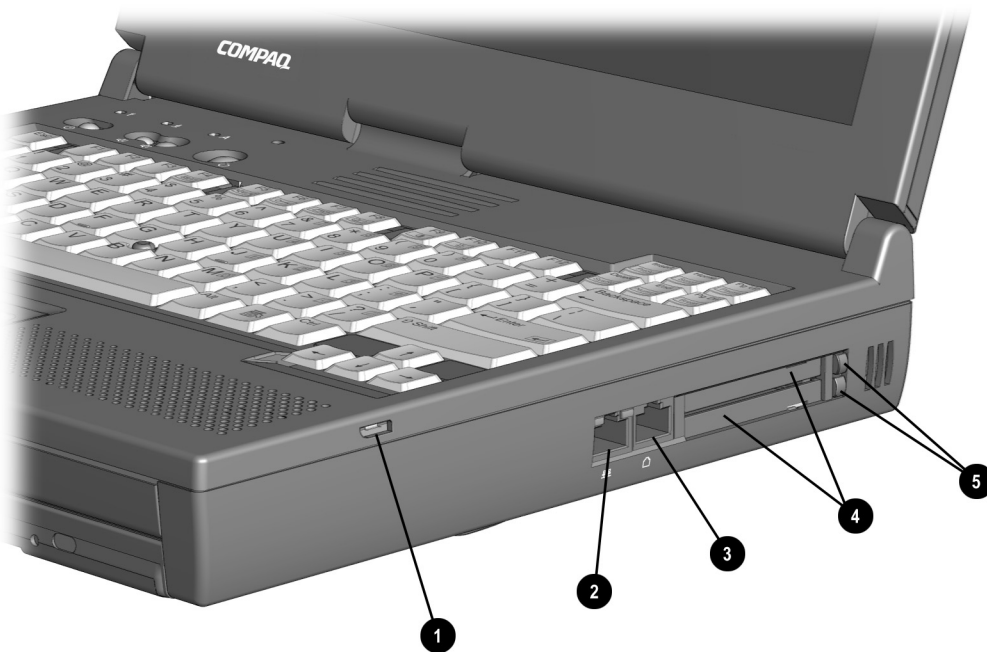


**Figure 1-3.** Front Panel Components

**Table 1-5**  
**Front Panel Components**

Item	Component	Function
1	Mono microphone jack	Connects mono microphone, disabling the built-in microphone.
2	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.
3	Stereo line-in jack	Connects external device such as a CD player, tuner, or tape deck.
4	Battery bay	Accepts Lithium ion battery pack.
5	Top MultiBay	Supports a 12.7-mm Armada drive or a MultiBay battery pack.
6	Bottom MultiBay	Supports a 12.7-mm Armada drive or a MultiBay battery pack. Also supports a 17-mm Armada hard drive or a Dual-MultiBay battery pack, which fills both the top and bottom MultiBays.

The external components on the right side of the computer are shown in Figure 1-4 and are described in Table 1-6.

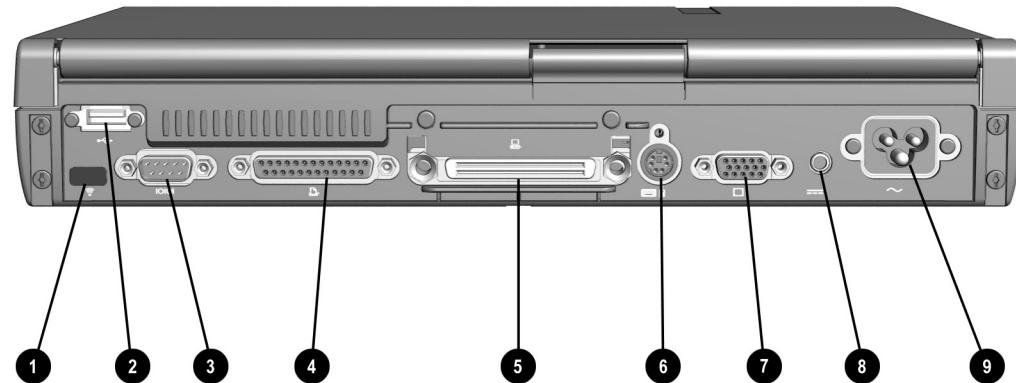


**Figure 1-4.** Right Side Components

**Table 1-6**  
**Right Side Components**

Item	Component	Function
1	Audio bass port	Enhances sound.
2	RJ-45 jack (network models only)	Connects the network cable. <b>NOTE:</b> A network cable is included with network models.
3	RJ-11 jack (internal modem models only)	Connects the modem cable to an internal modem. <b>NOTE:</b> A modem cable is included with internal modem models. Connects a standard telephone cable for a modem in North America, Latin America, Japan, China, and Hong Kong only.
4	PC Card slots	Accepts 16- and 32-bit CardBus PC Cards.
5	PC Card eject levers (2)	Eject PC Cards from the slots.

The external components on the rear panel of the computer are shown in Figure 1-5 and described in Table 1-7.



**Figure 1-5.** Rear Panel Components

**Table 1-7**  
**Rear Panel Components**

Item	Component	Function
1	Infrared port	Provides wireless communication between the computer and another infrared-equipped device using an infrared beam.
2	Universal serial bus (USB) connector	Connects USB devices, such as cameras for video conferencing, or hubs which connect multiple USB devices. This 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. When running a lower version of Windows or Windows NT, or a different operating system, up to two hubs can be connected.
3	Serial connector	Connects optional serial devices such as a mouse.
4	Parallel connector	Connects optional parallel devices such as a printer.
5	Docking connector	Connects optional Compaq expansion base or Compaq convenience base.
6	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.
7	External monitor connector	Connects an optional external monitor or a television adaptor.
8	DC power connector	Connects an AC Adapter (external adapter models only), an optional Automobile Power/Adapter Charger, or an optional Aircraft Power Adapter.

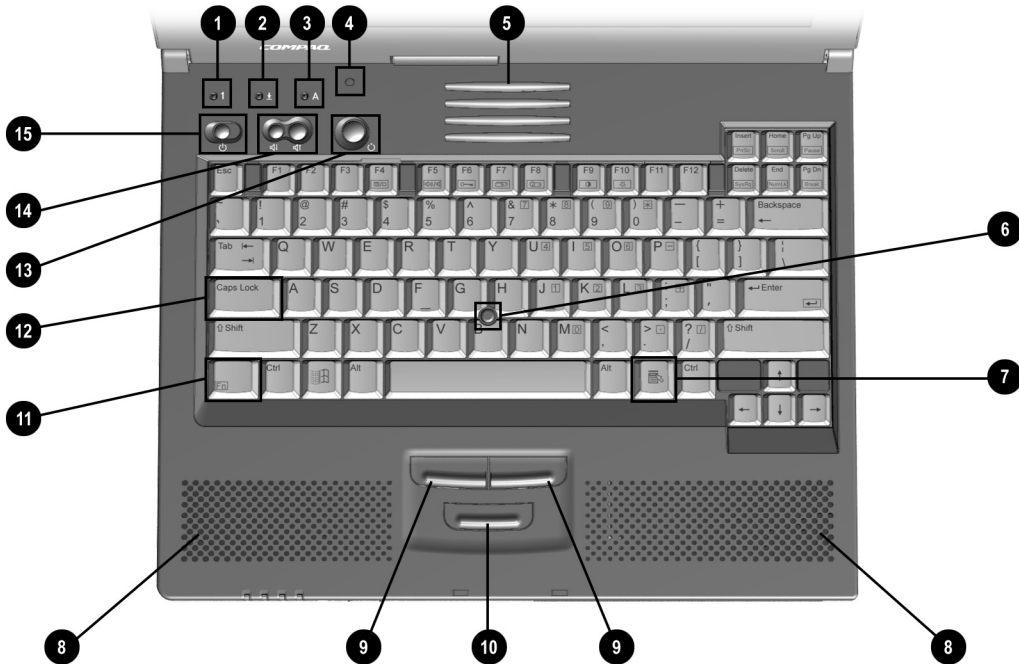
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9	Power cord connector	Connects external (AC) power.
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Computer keyboard components are shown in Figure 1-6 and described in Table 1-8.

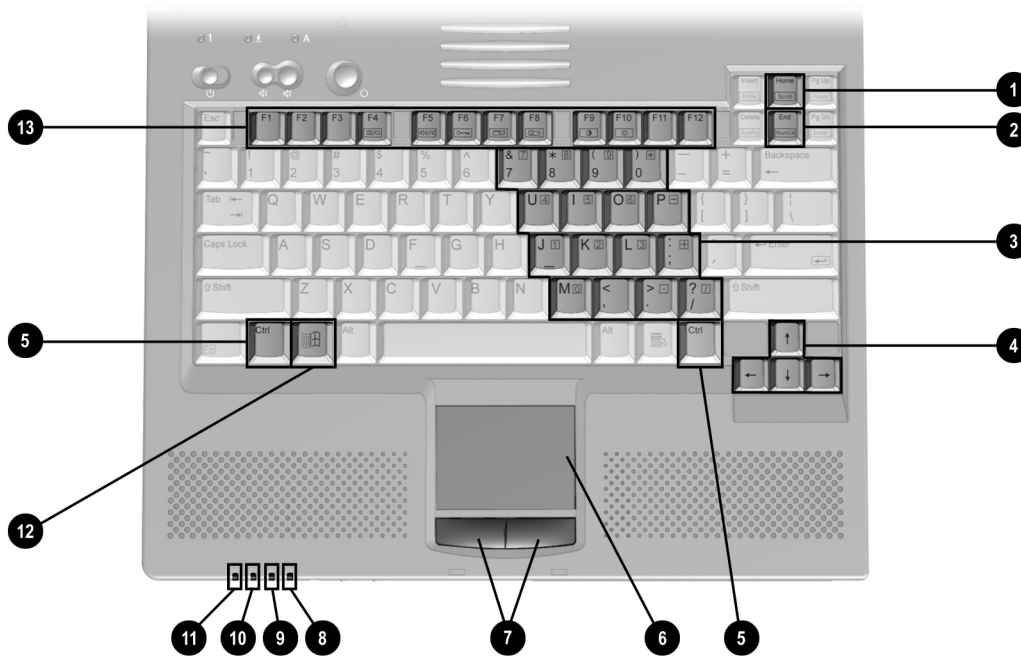


**Figure 1-6.** Computer Components: Keyboard

**Table 1-8**  
**Keyboard Components**

Item	Component	Function
1	Numeric lock light	Turns on when the Numeric Lock function is on.
2	Scroll lock light	Turns on when the Scroll function is on.
3	Caps lock light	Turns on when the Caps Lock function is on.
4	Display switch	Turns off the display if it is closed while the computer is turned on. The computer beeps unless audio has been disabled.
5	Vents	Allow airflow to cool the computer.
6	EasyPoint IV pointing stick (pointing stick models only)	Moves the mouse cursor.
7	Windows application key	Displays shortcut menu for item beneath mouse cursor.
8	Stereo speakers	Produce stereo sound.
9	Left and right mouse buttons (pointing stick models only)	Function like left and right mouse buttons on an external mouse.
10	Scroll pointing stick button (pointing stick models only)	Can be set to scroll, magnify, or function like the third button on an external mouse.
11	Fn key	Used with hotkeys to perform preset hotkey functions.
12	Caps lock key	Turns on the caps lock function.
13	Power switch	Turns the computer on or off or exits Suspend <sup>1</sup> .
14	Volume control	Adjusts volume of stereo speakers.
15	Suspend button <sup>2</sup>	Initiates or exits Suspend <sup>1</sup> . When pressed with the <b>Fn</b> key, initiates Hibernate.

Additional computer keyboard components are shown in Figure 1-7 and described in Table 1-9.



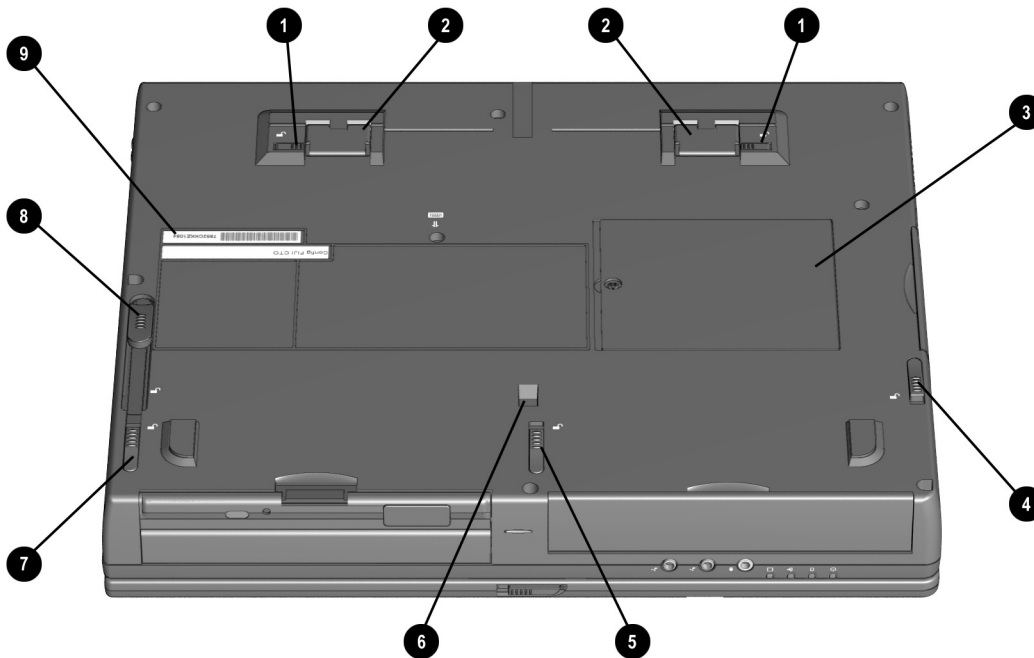
**Figure 1-7.** Keyboard Components (continued)

**Table 1-9**  
**Keyboard Components (continued)**

Item	Component	Function
1	Page up key	Moves image to previous screen.
2	Page down key	Moves image to following screen.
3	Embedded numeric keypad	Converts keys to numeric keypad.
4	Cursor-control keys	Move the cursor around the screen.
5	Control key	Used with selected alphabetic keys to access File and Edit menu options.
6	Touchpad (touchpad models only)	Moves the mouse cursor, selects, and activates.
7	Left and right touchpad buttons (touchpad models only)	Function like the left and right mouse buttons on an external mouse.
8	MultiBay drive light (green)	Turns on when a MultiBay device is being accessed or a battery pack in the MultiBay is charging or waiting to be charged.
9	Hard drive light (green)	Turns on when the hard drive is being accessed.
10	Power/suspend light (green)	Turns on when computer is turned on; blinks in Suspend; turns off when computer is in Hibernation or turned off.
11	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 six 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).
12	Microsoft logo key	Displays the Windows Start menu.
13	F1 through F12 function keys	Perform preset functions.



The external components on the bottom of the computer are shown in Figure 1-8 and are described in Table 1-10.



**Figure 1-8.** Bottom Components

**Table 1-10**  
**Bottom Components**

Item	Component	Function
1	Tilt foot latches	Release the tilt feet. <b>NOTE:</b> To close the tilt feet, press the feet against the bottom of the computer.
2	Tilt feet	Tilt the computer for ease of use.
3	Memory expansion compartment cover	Covers the memory expansion compartment.
4	Hard drive release latch	Releases the hard drive from the hard drive bay.
5	Battery release latch	Releases the battery from the battery bay.
6	Docking restraint latch recess	Secures the computer to the expansion base.
7	Front MultiBay release latch	Releases a MultiBay device from the bottom MultiBay or a device which occupies both the top and bottom MultiBays.
8	Rear MultiBay release latch	Releases a MultiBay device from the top MultiBay.
9	Serial number	Identifies the computer; needed when calling Compaq customer support.

## 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
- MultiBay device
- Hard drive
- Display
- Keyboard/EasyPoint IV pointing device or touchpad
- Audio
- Pentium II processor
- Fan
- PC Cards
- Modem

The computer is equipped with an Intel Mobile Pentium III 500-MHz or Intel Mobile Pentium II 400-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.

---

# *chapter* 2

## 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 2.2.
3. Run Computer Setup as described in Section 2.4.
4. If you are unable to run POST or if the problem persists after running POST, perform the recommended actions described in the diagnostic tables in Section 2.4.

Follow these guidelines when troubleshooting:

- Complete the recommended actions in the order in which they are given.
- Repeat POST 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 recommended removal and replacement procedures.
- If the problem is intermittent, check the computer several times to verify that the problem is solved.

The following table describes the troubleshooting actions:

<b>If You Want To:</b>	<b>Then Run:</b>
Check for POST error messages	POST
Perform any of the following: <ul style="list-style-type: none"><li>■ Check the system configuration</li><li>■ Set the system power management parameters</li><li>■ Return the system to its original configuration</li><li>■ Check system configuration of installed devices</li></ul>	Computer Setup

## 2.1 Preliminary Steps

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

Before running POST, complete the following steps:

1. Obtain established passwords.
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 2.4). 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 Prompted Diagnostics.
- d. After “Identifying System Hardware” completes, select Interactive Testing and follow the instructions on the screen.

## **2.2 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.



## 2.3 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 2.5.

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.

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 problem is solved: 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.

*Continued*

**Table 2-1** *Continued*

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.
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 xxx (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.	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.	1. Run ScanDisk. 2. Check disk in DOS and Windows 95.

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**

<b>Message</b>	<b>Description</b>	<b>Beep code</b>
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 xxx	RAM error occurred during memory test.	None

\*Beep codes are defined in Table 2-3.

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

<b>Beep Code</b>	<b>Beep Sequence</b>	<b>Description</b>	<b>Recommended Action</b>
0	S-S-S-P-S-S-L-P	The DMA page registers are faulty.	Replace system board.
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.	Replace memory board or system board if memory on system board is faulty.

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

## 2.4 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
- Compaq Diagnostics

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.

## Selecting Computer Setup or Compaq Diagnostics for Windows

The computer features two system management utilities:

- **Computer Setup** is a system information and configuration utility that can be used even when your operating system is not working or will not load. It includes custom settings that are not available in Windows.

To configure a device in Windows NT 4.0, you must use Computer Setup.

- **Compaq Diagnostics for Windows** is a system information and diagnostic utility that is used within the Windows operating system. Use Compaq Diagnostics for Windows to test system components and to display system information whenever possible.

To configure a device in Windows 95 or 98 use the operating system itself. Windows 95 and 98 can be used to add and remove programs, and provide Wizards to ensure proper device drivers are installed. Diagnostics for Windows is NOT a configuration tool and might only test devices that are properly configured by the operating system.

**NOTE:** It is not necessary to configure a device connected to a USB connector on the computer or an optional docking base.

### Using Computer Setup

All information and settings in Computer Setup are accessed from the File, Security, or Advanced menus.

**NOTE:** Your settings in Computer Setup are not affected by updating the system ROM.

To view information or change a setting in Computer Setup:

1. Turn on or restart the computer. When the blinking cursor appears in the upper-right corner of the screen, press **F10**.
  - To change the language, press **F2**.
  - To view navigation information, press **F1**.
  - To return to the Computer Setup menu from anywhere in Computer Setup, press **Esc**.
2. Select the File, Security, or Advanced menu.
3. To close Computer Setup and restart the computer
  - Select File→Ignore Changes and Exit, then press **Enter**.
  - or
  - Select File→Save Changes and Exit, then press **Enter**.
4. To confirm your choice, press **F10**.

## File Menu

Begin here	To do this
System information	<ul style="list-style-type: none"><li>■ View identification information about the computer, docking base, and battery packs.</li><li>■ View specification information about the processor, memory and cache size, and ROM date and family.</li></ul>
Save to floppy	Save system configuration to a diskette.
Restore from floppy	Restore system configuration from a diskette. (The diskette contains your personal configuration, so you should restore from the diskette before using the System Recovery CD-ROM.)
Restore defaults	Replace configuration settings in Computer Setup with factory default settings. (Identification information is retained.)
Ignore changes and exit	Cancel changes entered during the current Computer Setup session, then exit and restart the computer.
Save changes and exit	Save changes, then exit and restart the computer.

## Security Menu

Begin here	To do this
Setup password	Enter, change, or delete a setup password.
Power-On password	Enter, change, or delete a power-on password.
Password options	Enable/disable: <ul style="list-style-type: none"><li>■ QuickLock/QuickBlank.</li><li>■ Lock keyboard and pointing stick or touchpad at startup.</li></ul> (These features can be enabled only when a power-on password is set.)
DriveLock passwords	Enter, change, or delete a DriveLock password.
Device security	Enable/disable <ul style="list-style-type: none"><li>■ Ports or diskette drives.</li><li>■ Diskette write.</li><li>■ CD-ROM or diskette startup.</li></ul> <b>NOTE:</b> Settings for a DVD-ROM can be entered in the CD-ROM field.
System IDs	Enter identification numbers for the computer, a docking base, and battery packs.

## Advanced Menu

<b>Begin here</b>	<b>To do this</b>
Language (or press <b>F2</b> )	Change the Computer Setup language.
Boot Options	Enable/disable <ul style="list-style-type: none"><li>■ QuickBoot, which starts the computer more quickly by eliminating some startup tests. (If you suspect a memory failure and want to test memory automatically during startup, you may want to disable QuickBoot.)</li><li>■ MultiBoot, which enables you to set a startup sequence that can include any drives in the system.</li></ul>
Device Options	<ul style="list-style-type: none"><li>■ Enable/disable the embedded numeric keypad at startup.</li><li>■ Enable/disable multiple standard pointing devices at startup. When this feature is disabled, only one pointing device is activated at startup.</li><li>■ Enable/disable USB legacy support for one USB mouse and one USB keyboard. (When USB legacy support is enabled, the keyboard and mouse work without a loaded USB driver.)</li><li>■ Set an optional external monitor or overhead projector connected to a video card in a docking base as the primary device. (When the computer display is set as secondary, the computer must be shut down before undocking.)</li><li>■ Set video-out mode to NTSC (default), NTSC-J, PAL, or PAL-M.</li></ul> Change the parallel port mode to or from EPP, standard, bidirectional, or ECP.

# Using Compaq Diagnostics for Windows

1. Access Compaq Diagnostics for Windows by selecting Start→Settings→Control Panel→Compaq Diagnostics.
2. To select a category, choose one of two methods:
  - Select the Categories menu, then select a category from the drop-down list.
  - Select a category icon on the toolbar.
3. To run diagnostic tests
  - a) Select the Test tab.
  - b) In the scroll box, select the category or device you want to test.
  - c) Select the Quick, Complete, or Custom test type.
  - d) Select the Interactive or Unattended test mode.
  - e) Select the Begin Testing button.
  - f) View test information by selecting a report from the Status, Log, or Error tab.
4. To print the information or save it to a drive, select the File menu, then select Print or Save As.
5. To exit, select the File menu→Exit.

## Factory Default Settings

Enable POST Memory Test	Checked (enabled)
Keyboard Num Lock	Unchecked (Off)
Hard drive boot sequence	
1	Hard drive in the computer MultiBay
2	Hard drive in the computer hard drive bay
3	Hard drive in the expansion base or convenience base half-height/MultiBay
4	Hard drive in the expansion base or convenience base MultiBay
Boot display	Auto
Language	Language of country

---

**Table 2-5  
Ports**

Serial port	3F8, IRQ4
Infrared port	2F8, IRQ9
Parallel port	378, IRQ7
Ethernet port	300, IRQ11

**Table 2-6  
Power**

Low Battery Warning Beep	Checked (enabled)
External Energy Saving Monitor Connected	Unchecked (not connected)
Power Management	
Enabled	While operating on battery power
Conservation Level	High
Level Definition	
High	Suspend Time: 3 minutes Hibernation Timeout: Immediate Drive Timeout: 1 minute Screen Timeout: 1 minute
Medium	Suspend Time: 5 minutes Hibernation Timeout: 1 hour Drive Timeout: 2 minutes Screen Timeout: 3 minutes
Custom	Suspend Time: disabled Hibernation Timeout: low battery Drive Timeout: always on Screen Timeout: always on

---

**Table 2-7  
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)



## 2.5 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.

### Obtaining Update Information with Info Messenger

Compaq Info Messenger allows you to set a customized search of the Compaq Web site. By registering for this utility, you can stay up to date with software and hardware information specific to your system.

- To access Compaq Info Messenger, go to [www.compaq.com](http://www.compaq.com) and select Info Messenger.
- To register, follow the instructions on the Info Messenger page. When your registration is complete, you can
  - Implement your customized search whenever you prefer from the Info Messenger page.
  - Set Info Messenger to send you the information by email as it becomes available.

Info Messenger will also inform you if there are updates to the system ROM for your computer.

## 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 2-8**  
**Solving Audio Problems**

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Computer does not beep after the Power-On Self-Test (POST).	System beeps have been turned down.	Use the <b>Fn+F5</b> hotkeys to turn up the system volume.
Internal speaker does not produce sound when an external audio source is connected to the stereo line-jack.	Volume may be turned off or set too low.	<ul style="list-style-type: none"> <li>■ Adjust the overall volume by pressing the Fn+F5 hotkeys.</li> <li>■ Adjust the sliding mixer controls by double-clicking the speaker icon on the Windows taskbar.</li> </ul>
	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 head-phones or speakers to enable the internal speakers.
	Volume may be muted	Uncheck the mute box in the volume properties.

*Continued*

**Table 2-8** *Continued*

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
External microphone does not work.	You are using the wrong type of microphone or microphone plug for the computer.	Check to see if you are using a monophonic electret condenser micro-phon e with a 3.5-mm plug.
	The microphone may not be connected properly.	Ensure that the micro-phon e plug is properly connected to the mono microphone jack.
	Sound source not selected.	Ensure that microphone is selected as the recording source in Control Panel → Multimedia and that the recording level is adjusted.
	Audio settings are not set correctly.	Check the game program's audio settings.
	Volume control on the computer is turned down.	Adjust the computer volume with the <b>Fn+F5</b> hotkeys.
No sound from headphones	Volume or mixing controls set incorrectly.	<ul style="list-style-type: none"> <li>■ Adjust the overall volume with the <b>Fn+F5</b> hotkeys.</li> <li>■ Use the mixing features available by double-clicking the speaker icon on the Windows taskbar.</li> </ul>
	Sound source not selected.	Verify that the sound source is selected in Control Panel → Multimedia.
	The headphones are connected to the wrong jack.	Check the connection.
Volume too low or too loud	Volume or mixing controls set incorrectly.	<ul style="list-style-type: none"> <li>■ Adjust the overall volume with the <b>Fn+F5</b> hotkeys.</li> <li>■ Check the mixing features available by double-clicking the speaker icon on the Windows taskbar.</li> </ul>

**Table 2-9**  
**Solving Battery/Battery Gauge Problems**

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Computer is beeping and battery power light is blinking	Battery pack charge is low.	<ul style="list-style-type: none"> <li>■ Recharge the battery pack by connecting to an external power source.</li> <li>■ Replace the battery pack with another fully charged battery.</li> <li>■ Initiate Hibernation or turn the computer off until AC power or a fully charged battery is available.</li> </ul>
Computer battery charge light blinks to indicate low battery condition, but computer does not beep.	Volume turned down too low.	Turn up the volume using the <b>Fn+F5</b> hotkeys.

*Continued*

**Table 2-9** *Continued*

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Battery pack will not charge.	Battery pack was exposed to temperature extremes.	Allow time for the battery pack to return to room temperature.
	Battery pack is already charged.	No action required.
	Battery pack has exceeded its useful life cycle.	Use a different battery pack.
Computer shut down and memory was lost when replacing the battery pack.	Hibernation was not initiated before removing the battery pack.	Work is lost.
Battery charge does not last very long.	Battery is exposed to higher temperatures.	Put the computer in a cooler place and recharge the battery pack.
	Battery is exposed to extremely cold temperatures.	Put the computer in a warmer place and recharge the battery pack. <b>NOTE:</b> The recommended operating temperature range for the battery is from 10°C to 40°C (50°F to 104°F). The recommended storage temperature range for the battery is from 0°C to 30°C (32°F to 86°F).
	Battery conservation is disabled or set to drain.	Reset the battery conservation level.
	An external device is draining the battery.	Turn off or remove any external device or PC Cards when not in use.
	Battery gauge may be inaccurate and require recalibration.	Recalibrate the gauge.
Date and time must be set every time computer is turned on.	The Real Time Clock battery has reached the end of its useful life.	<ul style="list-style-type: none"> <li>■ Restore power, then turn on the computer with the power switch</li> <li>■ Contact your Compaq authorized service provider to replace the Real Time Clock battery.</li> </ul>
Battery gauge seems inaccurate.	The battery pack may need calibration.	Recalibrate the battery.
	The battery pack has reached the end of its useful life.	Replace the battery pack.
Battery pack is warm after charging.	Warming occurs during charging.	No action required.

**Table 2-10**  
**Solving Compact Disc and DVD-ROM Problems**

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Drive cannot read a disc	Disc is not properly seated in the drive.	Open the loading tray, insert the disc, then close the tray.
	Disc is loaded in the loading tray upside down.	Open the loading tray, turn over the disc (label facing up), then close the tray.
	Disc has a scratch on its surface.	Insert a different disc.
CD-ROM drive or DVD-ROM drive is not detected by the computer.	Drive is not connected properly.	If you are running a version of Windows that was pre-installed by Compaq, remove the drive from the MultiBay and reinsert it.  If you are running a version of Windows that was not pre-installed by Compaq, turn off the computer. Then remove the drive from the MultiBay and reinsert it.

**Table 2-11**  
**Solving Diskette Drive/SuperDisk LS-120 Drive Problems**

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Drive cannot write to a diskette.	Diskette is not formatted.	Format the diskette: If you are using Windows 95 or Windows 98: 1.From the Windows desktop, select My Computer. 2.Select 3.5-in. Floppy (A). 3.Select File, then Format. 4.Fill in the appropriate information, then select Start. If you are using Windows NT 4.0, format the diskette by entering <b>format a:</b> 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.
	Drive is disabled.	Enable the proper drive through Device Manager.
	Disable diskette write ability is turned on.	Run Computer Setup. Select the Storage icon. Make sure Disable diskette write ability is not checked.
	System cannot start up from diskette or SuperDisk LS-120 drive.	A bootable diskette is not in the drive.
Diskette bootability is disabled in Computer Setup.		Enable diskette bootability in Computer Setup, Security menu.

**Table 2-12**  
**Solving Hard Drive Problems**

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Accessing information on the hard drive is much slower than usual.	Hard drive entered low power state due to timeout and is now exiting from it.	Wait for the system to restore the previously saved data to its state prior to initiating a low power state.
	Hard drive is fragmented/not optimized or has errors.	Run ScanDisk and Disk Defragmenter.
Hard drive does not work.	Hard drive is not seated properly.	Turn off and unplug the computer, remove the hard drive, and reinsert the hard drive.
Errors occur after starting from an additional hard drive.	Additional hard drive has not been specially prepared with necessary software.	Boot from the original hard drive or a specially prepared hard drive.
System does not recognize a hard drive.	The drive is not seated properly.	Remove, then reinsert the drive.
	The drive is damaged.	Try using the hard drive in another bay to verify that the problem is with the drive. Run ScanDisk on the drive.
	The drive was inserted while system was on or in Suspend or Hibernation.	Shut down the computer before inserting removing a hard drive.
DriveLock settings cannot be accessed in Computer Setup.	The DriveLock settings are accessible only when you enter Computer Setup by turning on (not restarting) the computer.	Completely turn off the computer. Turn the computer back on, then run Computer Setup by pressing <b>F10</b> when the blinking cursor light appears upper-right on the screen.

**Table 2-13  
Solving Infrared Problems**

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Cannot communicate with another computer.	The appropriate software is not running on both computers.	Install the appropriate software on the second device, start the second device, and start the program on both computers.
	The other computer does not have an IrDA-compliant infrared port. Your Compaq computer uses the IrDA communications protocol.	Communication between infrared devices must use the same communications protocol. Check the manufacturer's instructions for connecting with infrared devices or try connecting with a device you know to be IrDA-compliant.
Cannot communicate with another computer (cont.)	The pathway between the infrared ports is obstructed, one port is more than 30 degrees (plus or minus 15 degrees off the center line) from the other, or the ports are more than one meter apart.	Remove the obstruction, align the infrared ports to within 30 degrees, and position computers within 1.5 feet (about 0.5 meter) of each other.
	There is an interrupt request (IRQ) conflict.	Check for IRQ conflicts in the Device Manager. If two devices have the same IRQ address, reassign one of the devices.
	There is a baud rate conflict.	Select the same baud rate for both computers.
	There is a conflict with the # bits.	Select the same # bits setting for both computers.
	There is a stop byte conflict.	Select the same stop byte for both computers.
	There is a parity conflict.	Select the same parity setting for both computers.
	Cannot transmit data.	Direct sunlight, fluorescent light, or flashing incandescent light is close to the infrared connections.
There is interference from other wireless devices.		Keep remote control units such as wireless headphones and other audio devices away from the infrared connections.
There is a physical obstruction in the way.		Do not place objects that will interfere with a line-of-sight data transmission between the two units.
One of the units was moved during data transmission.		Do not move either unit during data transmission.
The orientation of the units is wrong.		Adjust the devices so that they point directly at each other.
The distance between the units is too great.		Verify that devices are not more than 1.5 feet (0.5 meter) apart.

*Continued*

**Table 2-13** *Continued*

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Infrared port doesn't work.	Direct sunlight, fluorescent light, or flashing incandescent light is close to the infrared connections.	Remove the interfering light source(s).
	There is interference from other wireless devices.	Keep remote control units such as wireless headphones and other audio devices away from the infrared connections.
	IR has been disabled.	Run IR configuration utility in Control Panel.

**Table 2-14**  
**Solving Keyboard Problems**

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Screen is blank and keyboard is working.	A screen timeout has been initiated.	Press any key to refresh the screen.
	QuickLock/QuickBlank has been initiated	To enable the keyboard and return your information to the screen, enter your power-on password.
	LCD has been disabled.	Press <b>Fn+F4</b> to cycle from external monitor to internal LCD.
Embedded numeric keypad on computer keyboard is disabled.	Num Lock function is not turned on	Press <b>Fn+Num Lk</b> to enable the Num Lock function and embedded numeric keypad.

**Table 2-15**  
**Solving Modem Problems**

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Modem loses connection.	The cable 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.	Disable Call Waiting: 1. Select Start → Setting → Control Panel → select Modems. 2. From the General tab of the Modems Properties page, select Dialing Properties. 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.
	There is noise or excessive traffic on the phone line.	Try connecting at a later time.
Modem not responding	Modem is not set up correctly in system BIOS.	Check the computer BIOS setup. If it requires specific settings for modems, be sure that they have been enabled.

*Continued*



**Table 2-15** *Continued*

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Modem does not dial correctly.	Telephone number is not entered correctly in the modem's dialing software.	<ul style="list-style-type: none"> <li>■ Make sure the telephone number you dialed is correct if you are using the dialing directory or the terminal mode.</li> <li>■ Dial 1 if using dialing long distance.</li> <li>■ The other line could be busy or not answering.</li> <li>■ Make sure call waiting is disabled.</li> <li>■ The modem may not recognize an international dial tone. Try the ATX3DT command and the telephone number.</li> </ul>
Characters are garbled/transfer rates are slow.	There is noise in the telephone line.	<ul style="list-style-type: none"> <li>■ Check your telephone and modem cable connections. If they are a little loose, they can cause noise on the line.</li> <li>■ Check with your local telephone company for a phone line filter.</li> </ul>
Phone line noise causing a disconnection.	Hang-up Delay S Register (S10) set too low.	<p>Change S10 default to 150. To set S10=150:</p> <ol style="list-style-type: none"> <li>1. Select Start → Programs → Accessories → HyperTerminal, then go to Command Mode.</li> <li>2. Type <b>ATS10=150</b> and press <b>Enter</b>.</li> </ol> <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 that service from the local phone company by following these steps:</p> <ol style="list-style-type: none"> <li>1. Unplug the telephone cable from the telephone wall jack.</li> <li>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.</li> <li>3. If there is still no dial tone, contact your local phone company or building manager.</li> </ol>
	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"> <li>1. Select Start → Programs → Accessories → HyperTerminal, then go to Terminal Mode.</li> <li>2. Type <b>AT</b> and press the <b>Enter</b> key. 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.</li> <li>3. Type <b>ATDT</b> and listen for dial</li> </ol>

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tone.

4. Type **ATHO** to hang up.

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*Continued*

**Table 2-15** *Continued*

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Modem does not connect at highest speed.	Line conditions in your area or in the area you are calling may not support the highest connect speeds.	Have your telephone line checked by your local telephone service provider. Try dialing an alternate telephone number for the service you are using.
	Another device on your telephone line may be causing interference.	Hang up an extension telephone and disconnect any other devices that may be using the same telephone line, then redial.
	The service or site called does not support 56K or supports an incompatible 56K implementation.	An internal modem supports K56flex. To find an Internet service provider (ISP) that supports K56flex, go the Compaq Web site at <a href="http://www.compaq.com">www.compaq.com</a> .
	There is noise on the telephone line.	The 56K protocol of an internal modem will fall back to lower speeds if the telephone line is too noisy for a high-speed connection. Try using another telephone line. Change the Hang-up Delay S Register: 1. Select Start → Programs → Accessories → HyperTerminal. 2. Go to Command Mode, type <code>ATS10=150</code> , then press <b>Enter</b> . <b>NOTE:</b> This command causes the modem to take longer to disconnect even if there is no noise on the line.
	The telephone line does not support 56K implementation.	The 56K protocol requires that the telephone line contain no more than one analog-to-digital conversion. Try connecting from an alternate site.

**Table 2-16**  
**Solving PC Card Problems**

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Computer does not beep when a PC Card is inserted.	PC Card is not inserted properly.	Try reinserting the card. Ensure that the PC Card is inserted in the correct orientation. Insert the card gently to prevent damage to the pins.
	Speakers are turned off or volume is turned down.	Adjust the volume control on the computer.
	PC Card or card driver is not PCMCIA compliant.	Contact your Compaq authorized dealer, reseller, or service provider for a list of PC Cards tested successfully in Compaq PC Card platforms.

*Continued*

**Table 2-16** *Continued*

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Computer beeps only once when a PC Card is inserted.	The computer beeps once to indicate that a PC Card is recognized but not properly configured.	Before a new PC Card can be used, it may be necessary to perform an initial setup procedure. Follow the PC Card manufacturer's instructions for formatting a hard drive card or installing PC Card-specific drivers for a network card.
Network PC Card does not work.	Necessary drivers are not installed (turned on).	Refer to the instructions that came with the PC Card or contact the vendor for information on installing the correct drivers.
	PC Card is not fully inserted or is upside down.	Ensure the PC Card is inserted correctly.
	Network PC Card or driver is not PCMCIA compliant.	Contact your Compaq authorized dealer, reseller, or service provider for a list of PC Cards tested successfully in Compaq PC Card platforms.
Storage PC Card does not work.	SRAM and flash memory PC Cards require the memory card driver to be loaded.	Memory cards can only be accessed using DOS real mode drivers.
	You are trying to access the storage PC Card using the wrong drive letter.	If you are running Windows 95, change the drive letter assignment in Device Manager. If you are running Windows NT 4.0, change the drive letter assignment through the Control Panel.
	The PC Card is not formatted.	For memory cards, run MCFORMAT in MS-DOS Mode to format the PC Card. For ATA cards, run ATAINIT, then run MCFORMAT in MS-DOS Mode to format the PC Card.
	The card is not supported.	Contact your Compaq authorized dealer, reseller, or service provider for a list of PC Cards tested successfully in Compaq PC Card platforms.
	Storage cards, such as SRAM, do not work in the expansion base.	Use the storage card in the computer.

**Table 2-17**  
**Solving Power Problems**

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Computer will not turn on.	Battery is discharged and computer is not connected to a power source.	<ul style="list-style-type: none"> <li>■ Charge the battery pack.</li> <li>■ Replace the battery pack.</li> <li>■ Connect the computer to an external power source.</li> </ul>
	Battery is discharged and cables to the external power source are unplugged.	Ensure that cables connecting the computer and the external power source are plugged in properly.
Computer turned off while it was left unattended.	Computer initiated because of a critical low battery condition.	<ul style="list-style-type: none"> <li>■ Charge the battery pack.</li> <li>■ Replace the battery pack.</li> <li>■ Connect the computer to an external power source.</li> </ul>
	The computer initiated Hibernation after a user-defined timeout expired.	Turn on the computer.

**Table 2-18**  
**Solving Screen Problems**

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Characters on computer display are dim.	Computer is in direct light.	Move the computer or adjust the screen.
	The brightness control is not set properly.	Adjust the brightness control by pressing the <b>Fn+F10</b> hotkeys.
	You may have a screen saver or screen blanking utility installed.	Press any key to refresh the screen.
	Screen timeout was initiated.	Press any key to light the screen.
	System initiated Suspend after a user-defined timeout expired.	Press the suspend button to exit Suspend.
	Computer initiated a low battery Suspend or Hibernation.	<ul style="list-style-type: none"> <li>■ Replace the battery pack and exit Suspend or Hibernation.</li> <li>■ Connect the computer to an external power source and exit Suspend or Hibernation.</li> </ul>
Computer screen is blank and external monitor displays information.	Power Management, which controls Suspend and Hibernation, is disabled and the battery pack has discharged.	<ul style="list-style-type: none"> <li>■ Replace the battery pack and turn on the computer.</li> <li>■ Connect the computer to an external power source and turn on the computer.</li> </ul>
	Display was switched to the external monitor.	Press <b>Fn+F4</b> to display information on the computer screen; press <b>Fn+F4</b> again to display information simultaneously on both screens.
<b>Fn+F4</b> hotkey combination does not switch between internal and external displays.	Display switch is stuck.	Tap the switch.
	CRT or other display device is not connected properly.	Check your connections to ensure that an external device is connected properly.

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**Table 2-19**  
**Solving USB Problems**

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<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
External device connected to a USB connector does not work.	The operating system limits external devices connected by USB to two tiers which 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 USB connector does not work during startup (before Windows 95 loads).	During startup, only two tiers are supported by the USB port. 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.	Use the external device only after Windows 95 or Windows 98 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.	Use only powered hubs. Make sure that all unpowered hubs are immediately preceded by powered hubs in the USB chain.

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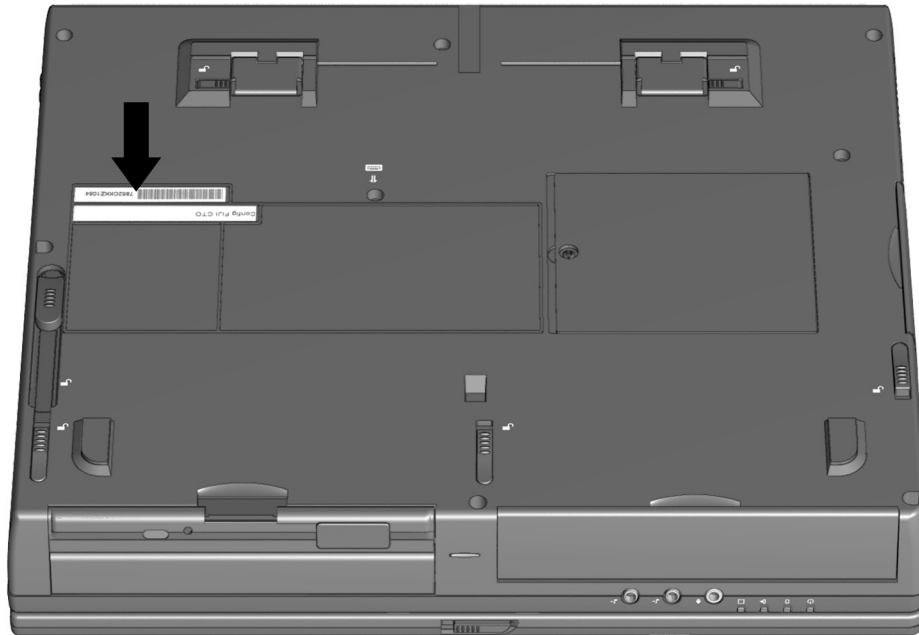
# chapter 3

## ILLUSTRATED PARTS CATALOG

This chapter provides an illustrated parts breakdown and a reference for spare part numbers and option part numbers for the Compaq Armada E700 Series of Personal Computers.

### 3.1 Serial Number Location

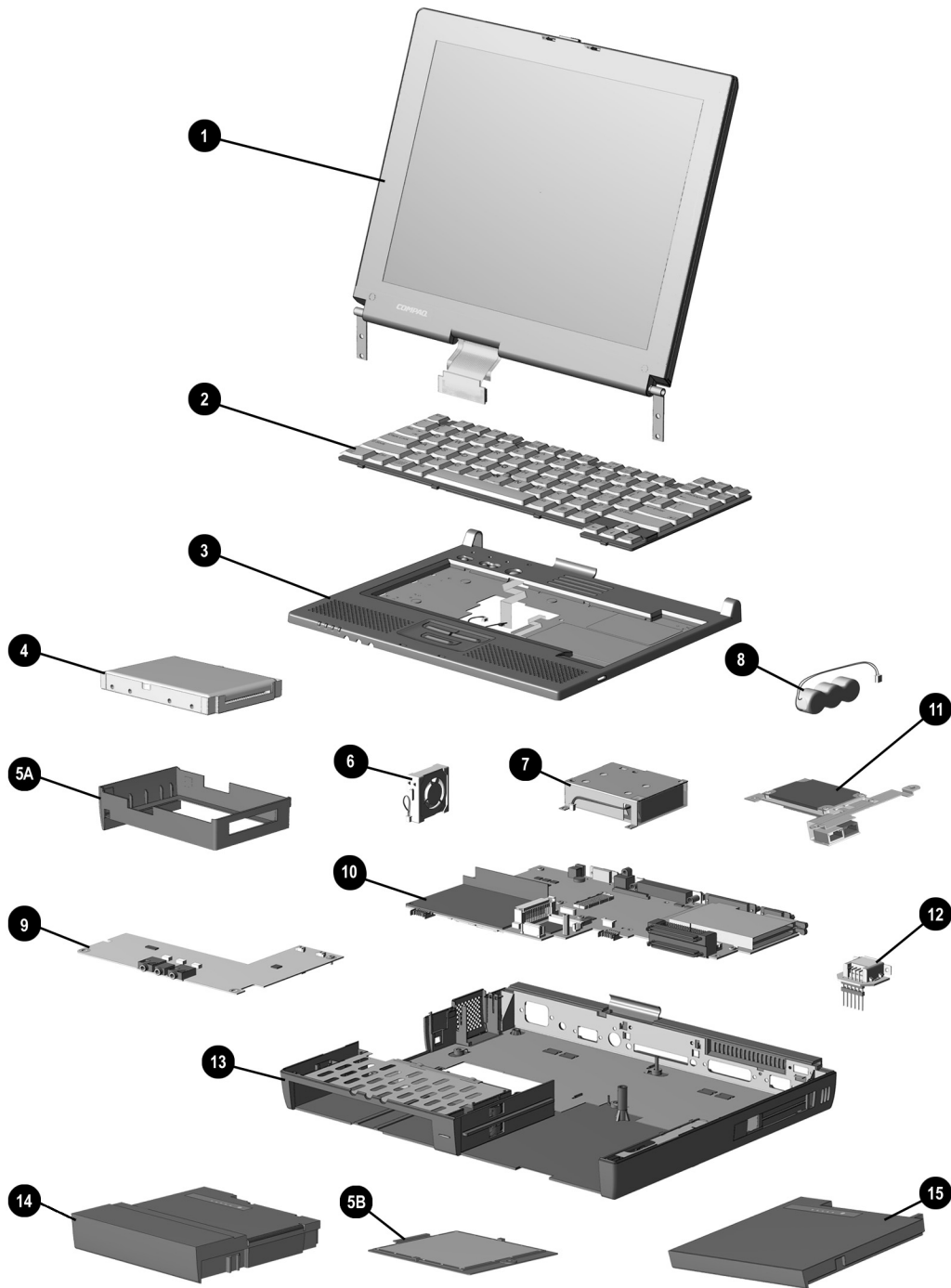
When ordering parts or requesting information, provide the computer serial number and model number located on the bottom of the computer (Figure 3-1).



**Figure 3-1.** Serial Number Location



## 3.2 Computer System Major Components

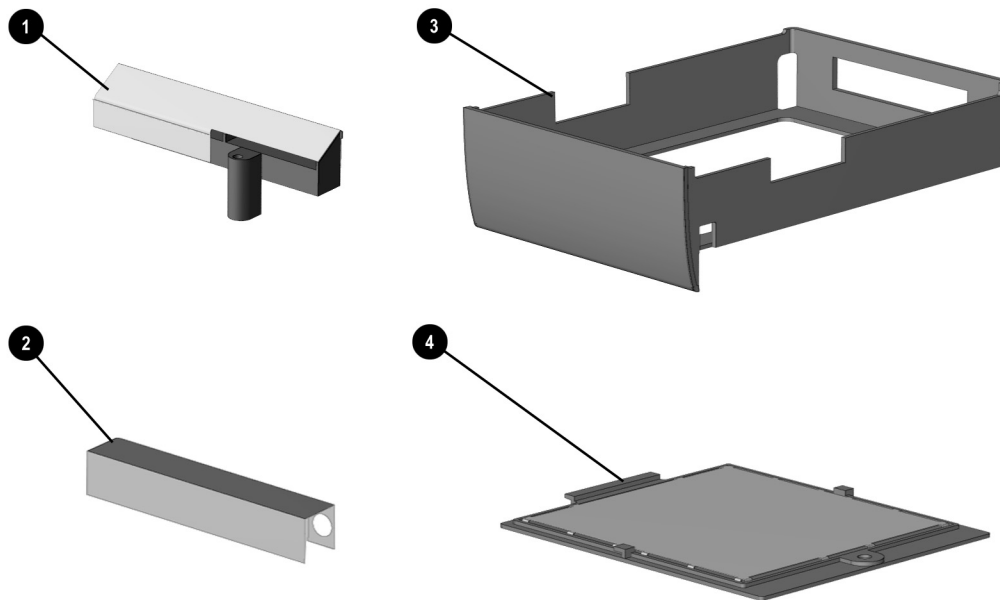


*Figure 3-2. Computer System Major Components*

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

<b>Item</b>	<b>Description</b>	<b>Spare Part Number</b>
1	Display assembly 15.1-inch, TFT, XGA 14.1-inch, TFT, XGA	127224-001 127223-001
2	Keyboard assembly with TouchPad Belgian -181 International -021 Spanish -071 Brazilian -201 Italian -061 Swedish -101 Danish -081 Japanese -291 Swiss -111 French -051 Latin American Taiwanese -AB1 French -121 Spanish -161 U.K. English -031 Canadian -041 Norwegian -091 U.S. English -001 German -211 Portuguese -131 Hungarian Keyboard assembly with EasyPoint IV pointing device Belgian -182 International -022 Spanish -072 Brazilian -202 Italian -062 Swedish -102 Danish -082 Japanese -292 Swiss -112 French -052 Latin American Taiwanese -AB2 French -122 Spanish -162 U.K. English -032 Canadian -042 Norwegian -092 U.S. English -002 German -212 Portuguese -132 Hungarian	122279-001 122279-002
3	CPU cover without TouchPad	127226-001
4	Removable hard drive 18.0 GB 15.0 GB 10.0 GB	164657-001 172805-001 341841-001
	Miscellaneous Plastics/Hardware Kit, includes:	127230-001
5a	hard drive tray	
5b	memory expansion expansion cover expansion connector shield (not illustrated) display ground clip (not illustrated)	
6	Fan (includes isolator)	127225-001
7	Power supply, 50W, internal Power supply, 50W, external	354234-001 101898-001
8	Auxiliary battery	220807-001
9	Audio board	386958-001
10	System board and Intel 500-MHz Pentium III processor board with MMX technology (includes heat sink) System board and Intel 400-MHz Pentium II processor board with MMX technology (includes heat sink)	386959-003 386959-001
11	Mini PCI riser board	386954-001
12	Universal Serial Bus (USB) board	386956-001
13	Base assembly (includes base assembly, I/O bracket, PC Card doors, hard drive release latch, battery bay release latch, and front and rear MultiBay release latches)	149812-001
14	Battery pack, Li-ion (8 cell)	354233-001
15	MultiBay battery pack (6 cell) Dual-MultiBay battery pack (12 cell) 3-volt lithium disk cell battery (not illustrated)	100680-001 354232-001 117099-001
	Power cord (not illustrated)	314957-000
	Australian -011 French/German/ Danish -081 Swiss -111 Korean -AD1 European -002 Italian -061 U.K. English/Asia Japanese -291 Pacific/Hong -031 Kong -001 U.S. English	

### 3.3 Miscellaneous Plastics/Hardware Kit Components

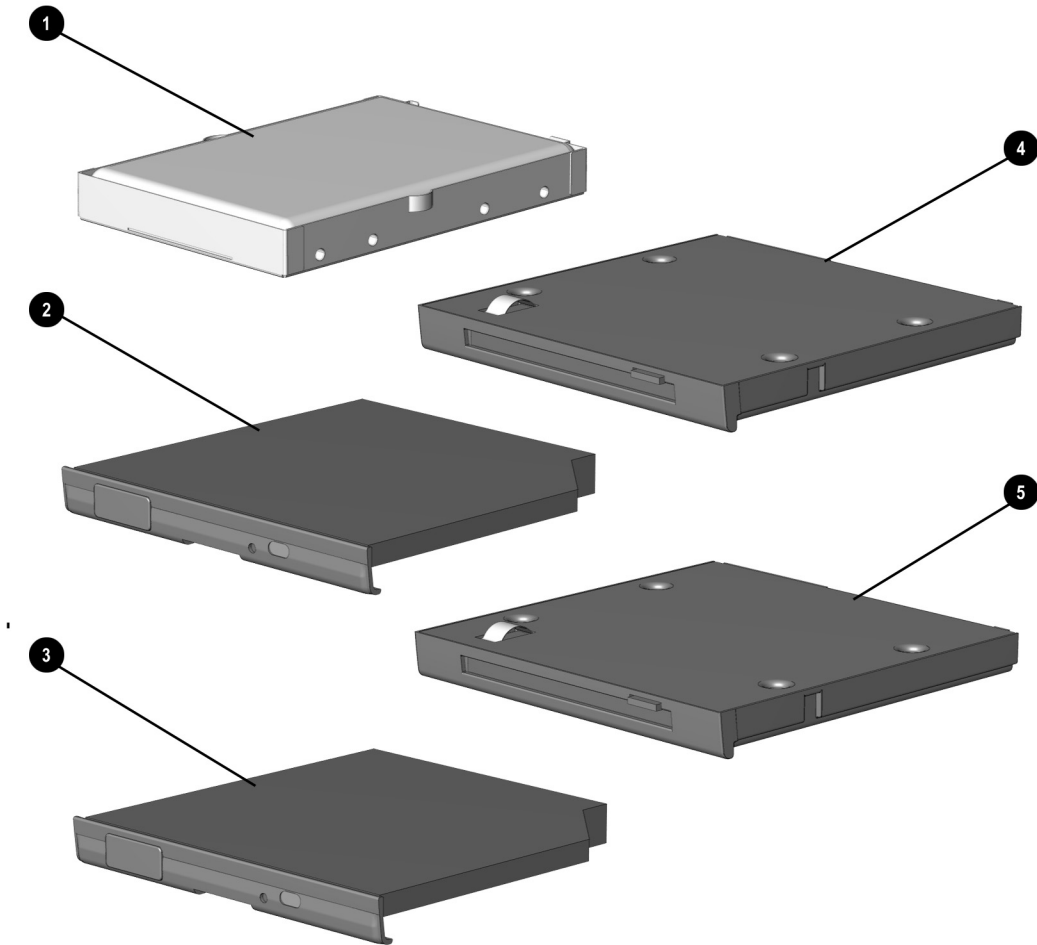


*Figure 3-3. Miscellaneous Plastics/Hardware Kit Components*

**Table 3-2**  
**Miscellaneous Plastics/Hardware Kit Components**  
**Spare Part Number 127230-001**

<b>Item</b>	<b>Description</b>
1	Display ground clip
2	Expansion connector shield
3	Hard drive tray
4	Memory expansion cover

## 3.4 Mass Storage Devices



**Figure 3-4.** Mass Storage Devices

**Table 3-3**  
**Spare Parts: Mass Storage Devices**

Item	Description	Spare Part Number
1	Hard drive 18.0 GB 15.0 GB 10.0 GB	164657-001 172805-001 341841-001
2	24-speed Max CD-ROM drive	315082-002
3	4-speed Max DVD-ROM drive	102266-001
4	Diskette drive, 1.44 MB, 3.5 inch	135233-001
5	LS-120 SuperDisc drive (available only as an option)	327456-003

## 3.5 Miscellaneous

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

<b>Description</b>	<b>Spare Part Number</b>
MultiBay battery pack	100680-001
Dual MultiBay battery pack	100045-001
Memory expansion board	
256 MB	167136-001
128 MB	135244-001
64 MB	135243-001
32 MB	135242-001
Type II V.90 56Kbps Mini PCI modem card	127735-001
Type II V.90 56Kbps Mini PCI combination modem/network interface card (NIC)	127736-001
Cables	
Automobile Power Adapter/Charger cable	102257-001
Aircraft Power Adapter cable	102259-001
Composite TV cable	102260-001
Armada €700 <i>Maintenance &amp; Service Guide</i>	127233-001
Miscellaneous Screw Kit	127232-001

# *chapter* 4

## REMOVAL AND REPLACEMENT PRELIMINARIES

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

### 4.1 Tools Required

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

- Magnetic Torx T-8 screwdriver (for all screws unless otherwise specified)
- 9/32-inch socket for bushing guides
- 3/16-inch socket for standoff and screwlocks

### 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.

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## 4.3 Preventing Damage to Removable Drives

Removable drives are fragile components that must be handled with care. To prevent damage to the computer or 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, CD-ROM drive, SuperDisk LS-120 drive, or a DVD-ROM drive, ensure that a diskette or disc is *not* in the drive. Ensure that the drive tray is closed.
- Before handling a drive, ensure that you are discharged of static electricity. While handling a drive, avoid touching the connector.
- Handle drives on surfaces that have at least one inch of shock-proof foam.
- Avoid dropping drives from any height onto any surface.
- Do not use excessive force when inserting a drive into a drive bay.
- 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, ship it in a suitable form of protective packaging. Shipping the drive in standard packaging may not cushion it from destructive shock, vibration, temperature, or humidity. Place a mailing label with the wording “Fragile: Handle With Care” on the mailer.
- After the hard drive has been removed from the computer, avoid turning the hard drive and tray upside down. The drive is not secured to the tray and can fall out.
- Do not place labels on the ventilation area on the hard drive.
- Heed the labels on the hard drive.

## 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.



## 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.

## 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.

<b>Event</b>	<b>Relative Humidity</b>		
	<b>10%</b>	<b>40%</b>	<b>55%</b>
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.

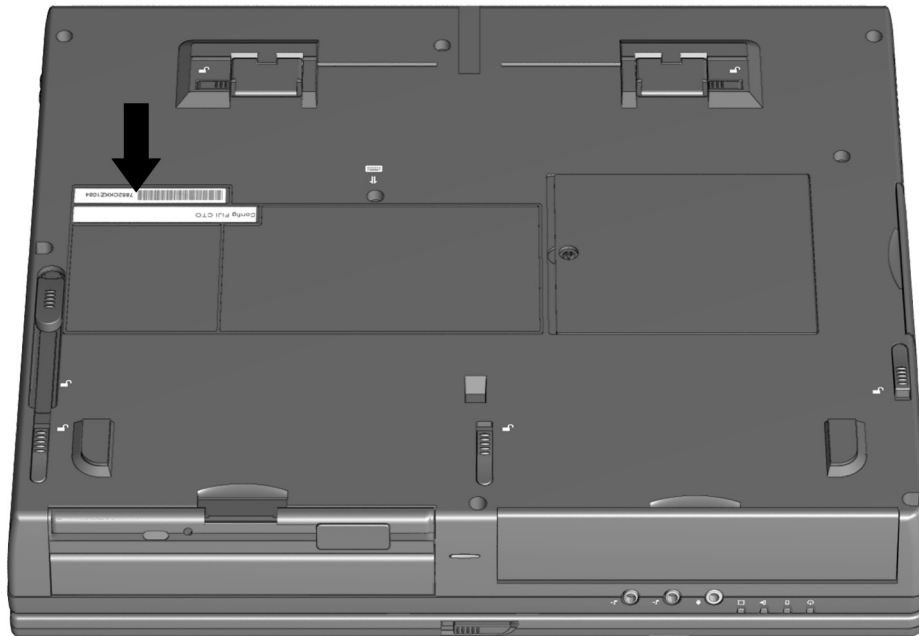
<b>Material</b>	<b>Use</b>	<b>Voltage Protection Level</b>
Antistatic plastic	Bags	1,500 V
Carbon-loaded plastic	Floor mats	7,500 V
Metallized laminate	Floor mats	15,000 V

# chapter 5

## 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 Compaq Expansion Base
	Undocking the Computer from the Compaq Convenience Base
	Disconnecting the Computer
5.4 Computer Feet	
5.5 Battery Packs	
	Removing a Battery Pack from the Battery Bay
	Removing a Battery Pack from the MultiBay
	Removing a MultiBay Battery Pack
	Removing a Dual-MultiBay Battery Pack
	Inserting a Battery Pack into the Battery Bay
	Inserting a MultiBay Battery Pack
	Inserting a Dual-MultiBay Battery Pack
5.6 Hard Drives	
	Removing a Hard Drive from the Hard Drive Bay
	Inserting a Hard Drive into the Hard Drive Bay
	Removing a Hard Drive from the MultiBay
	Inserting a Hard Drive into the MultiBay
5.7 MultiBay Devices	
	Removing MultiBay Devices
	Inserting MultiBay Devices
5.8 PC Cards	
	Removing a PC Card
	Inserting a PC Card
5.9 Memory Expansion	
	Removing the Memory Expansion Compartment Cover
	Removing a Memory Expansion Board
	Installing a Memory Expansion Board
	Replacing the Memory Expansion Compartment Cover
5.10 Keyboard Assembly	
5.11 CPU Cover	
5.12 Power Supply	
5.13 Fan Assembly	
5.14 Audio Board	
5.15 Lithium Disk Cell Battery	
5.16 Auxiliary Battery	
5.17 Mini PCI Riser Board	
	Installing a Modem, LAN, or Combo Board
5.18 USB Board	
5.19 Display Assembly	
5.20 System Board	

**Figure 5-2.** Computer Disassembly Sequence Chart

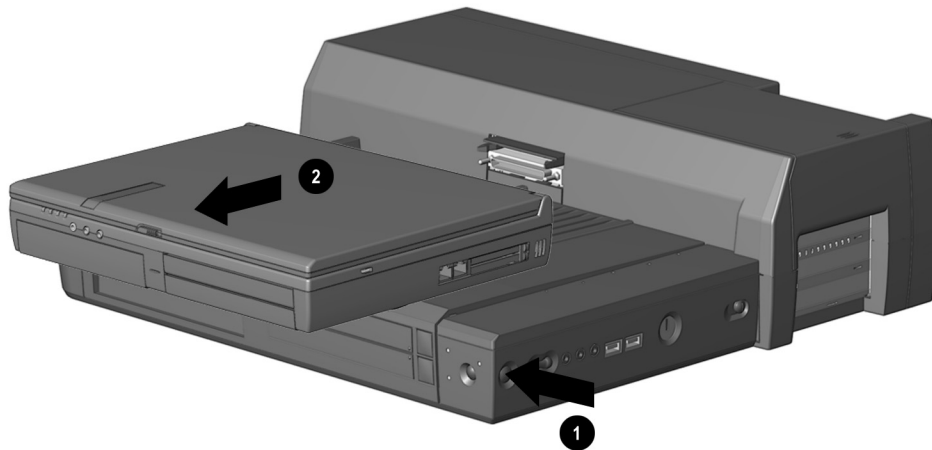
## 5.3 Preparing the Computer for Disassembly

1. Undock the computer from the Compaq Expansion Base or Compaq Convenience Base.
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 Compaq Expansion Base or Compaq Convenience Base, go to the "Disconnecting the Computer" section. If the computer is docked, go to the "Undocking the Computer from the Compaq Expansion Base" or "Undocking the Computer from the Compaq Convenience Base" section.

### Undocking the Computer from the Compaq Expansion Base

1. Unlock the Compaq Expansion Base 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 Compaq Expansion Base **2** (Figure 5-3).

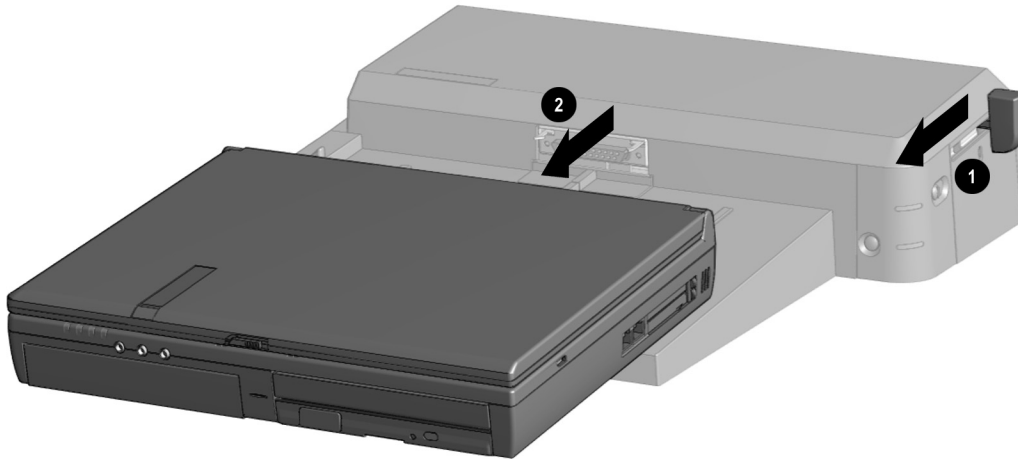


**Figure 5-3.** Undocking the Computer from the Compaq Expansion Base

5. Slide the computer out of the Compaq Expansion Base.

## Undocking the Computer from the Compaq Convenience Base

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 Compaq Convenience Base **2** (Figure 5-4).



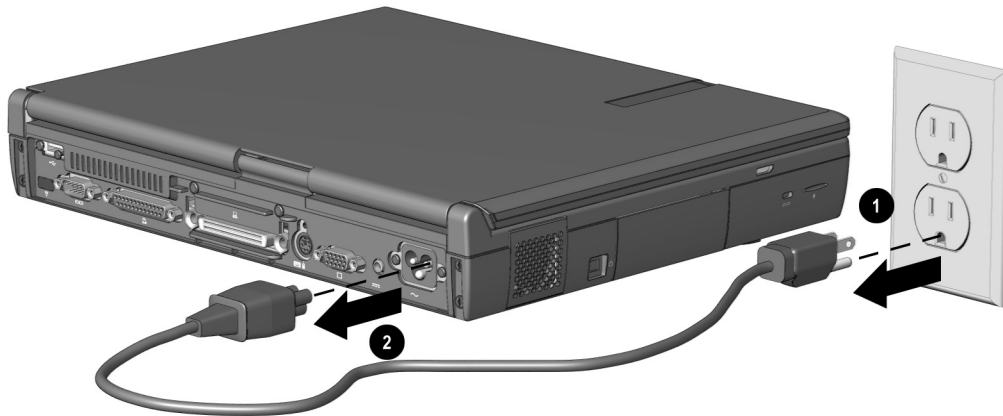
**Figure 5-4.** Undocking the Computer from the Compaq Convenience Base

4. Slide the computer away from the Compaq Convenience Base and remove it.

## Disconnecting the Computer

If the computer is docked in an Compaq Expansion Base or Compaq Convenience Base, refer to the "Undocking the Computer" section. If the computer is not docked in an Compaq Expansion Base or Compaq Convenience Base, 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*

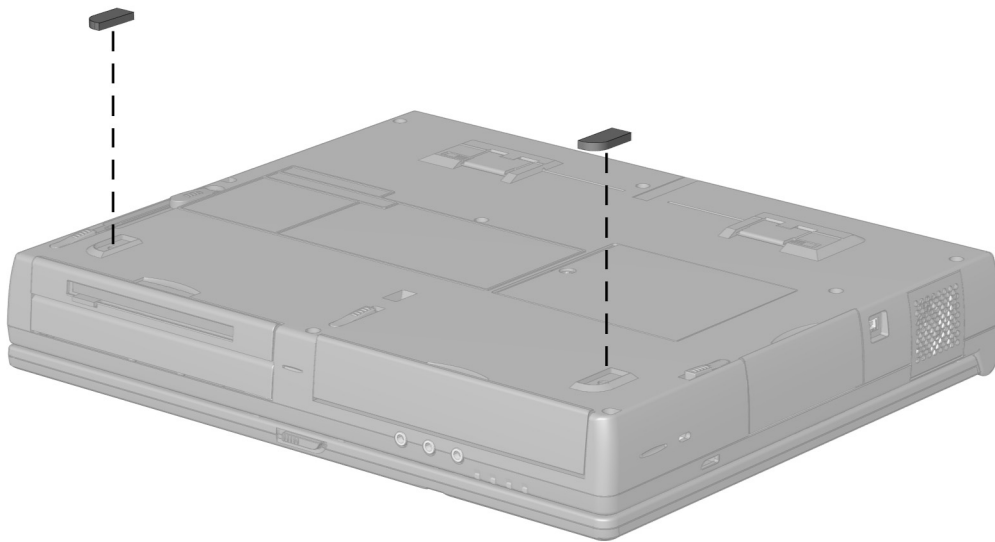
6. Turn off and disconnect external devices.



## 5.4 Computer 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 5-6).



**Figure 5-6.** *Installing the Computer Feet*

## 5.5 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



**CAUTION:** To prevent loss of work while replacing a battery pack that is the only power source available to the system:

- Press the suspend button before removing the discharged battery pack.
  - Insert the replacement battery within five minutes after removing the discharged battery pack.
- 

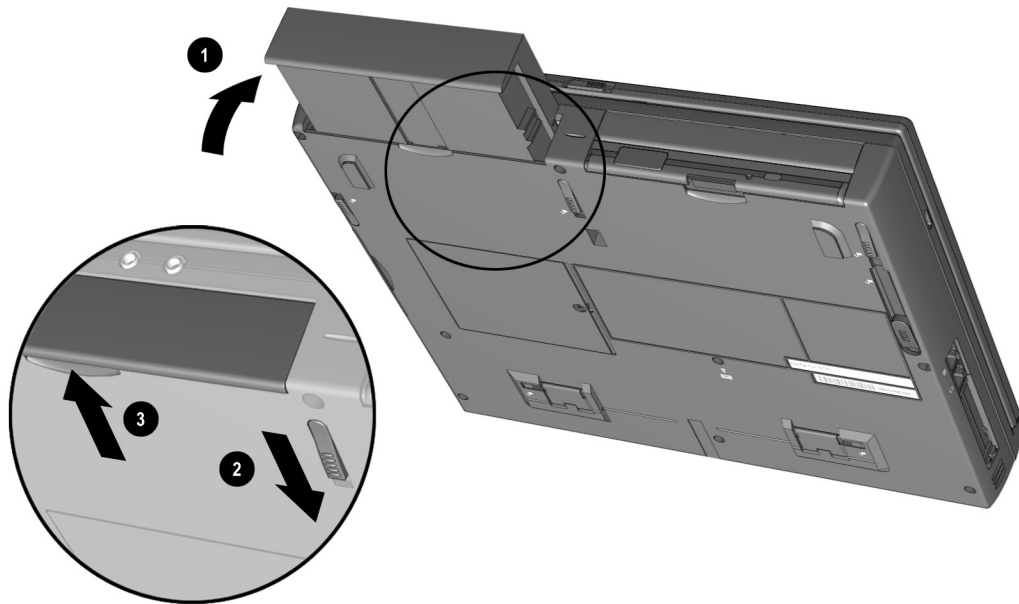
**NOTE:** Only the primary battery pack and an Armada 7800 primary battery pack can be used in the battery bay.

1. If the computer is turned on, the MultiBay does not contain a charged battery pack, and the system is not connected to external power, initiate Suspend (Standby) by pressing the suspend button.

**NOTE:** Extensive drive activity may delay Suspend (Standby). The computer screen clears and the power/suspend light begins to flash when Suspend (Standby) is initiated.

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

2. Tilt the computer at an angle **1** so the bottom of the computer is accessible (Figure 5-7).
3. Slide the battery release latch toward the back of the computer **2**.
4. Grasp the device using the recess **3** beneath the battery bay and remove the battery pack.



**Figure 5-7.** Removing a Battery Pack from the Battery Bay

## Removing a Battery Pack from the MultiBay



**CAUTION:** To prevent loss of work while replacing a battery pack that is the only power source available to the system:

- Press the suspend button before removing the discharged battery pack.
  - Insert the replacement battery within five minutes after removing the discharged battery pack.
- 

**NOTE:** A MultiBay battery pack can be used in the bottom MultiBay. A Dual-MultiBay battery pack can also be used in the MultiBay, occupying both the top and bottom MultiBays. A primary battery pack cannot be used in the MultiBay.

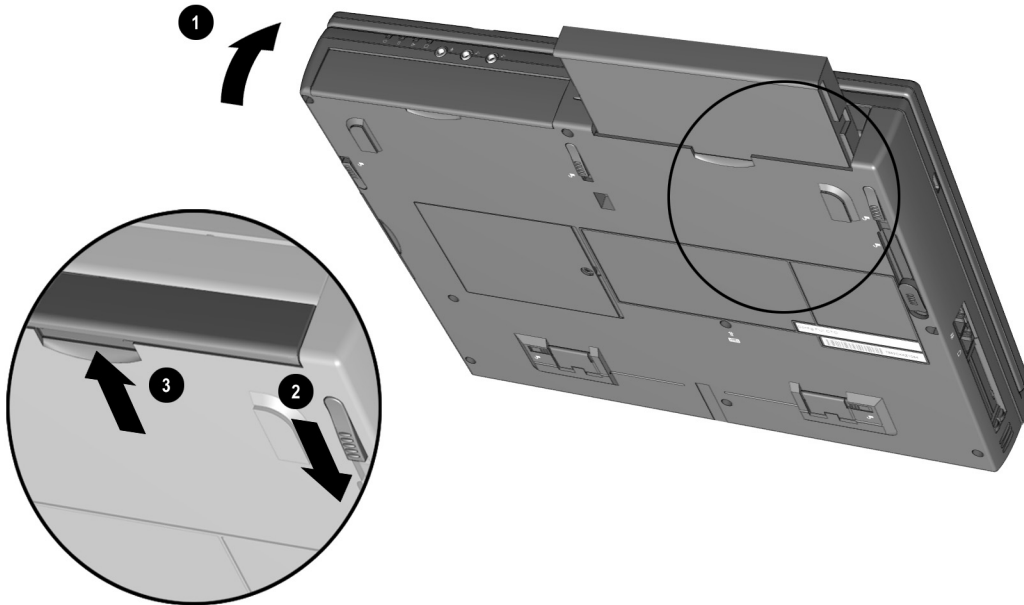
### Removing a MultiBay Battery Pack

1. If the computer is turned on, the battery bay does not contain a charged battery pack, and the system is not connected to external power, initiate Suspend (Standby) by pressing the suspend button.

**NOTE:** Extensive drive activity may delay Suspend (Standby). The computer screen clears and the power/suspend light begins to flash when Suspend (Standby) 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 front MultiBay release latch ❷ toward the back of the computer.
4. Grasp the MultiBay battery pack using the recess ❸ beneath the battery bay and remove the MultiBay battery pack.



*Figure 5-8. Removing a MultiBay Battery Pack*

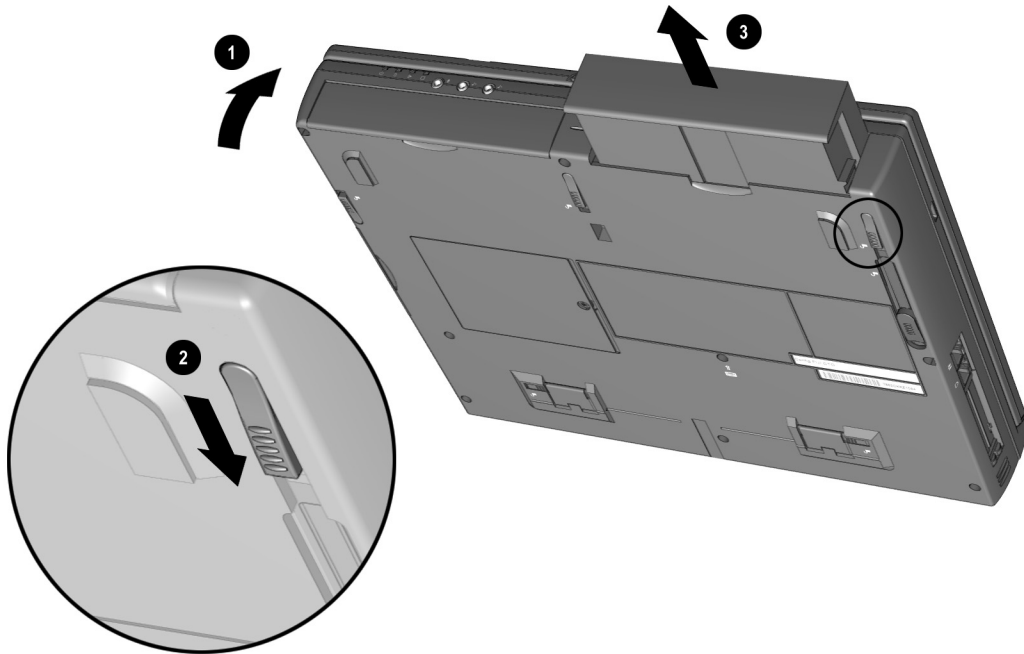
### **Removing a Dual-MultiBay Battery Pack**

1. If the computer is turned on, the battery bay does not contain a charged battery pack, and the system is not connected to external power, initiate Suspend (Standby) by pressing the suspend button.

**NOTE:** Extensive drive activity may delay Suspend (Standby). The computer screen clears and the power/suspend light begins to flash when Suspend (Standby) 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 5-9).
3. Slide the front MultiBay release latch ❷ toward the back of the computer.
4. Grasp the Dual-MultiBay battery pack using the recess ❸ beneath the battery bay and remove the Dual-MultiBay battery pack.



**Figure 5-9.** Removing a Dual-MultiBay Battery Pack

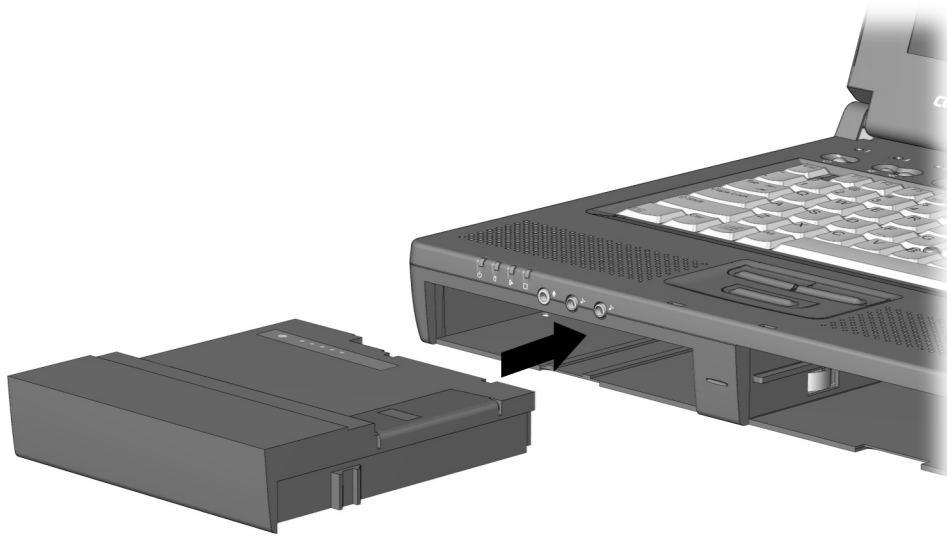
## Inserting a Battery Pack into the Battery Bay



**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 5-10).



**Figure 5-10.** 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 MultiBay Battery Pack

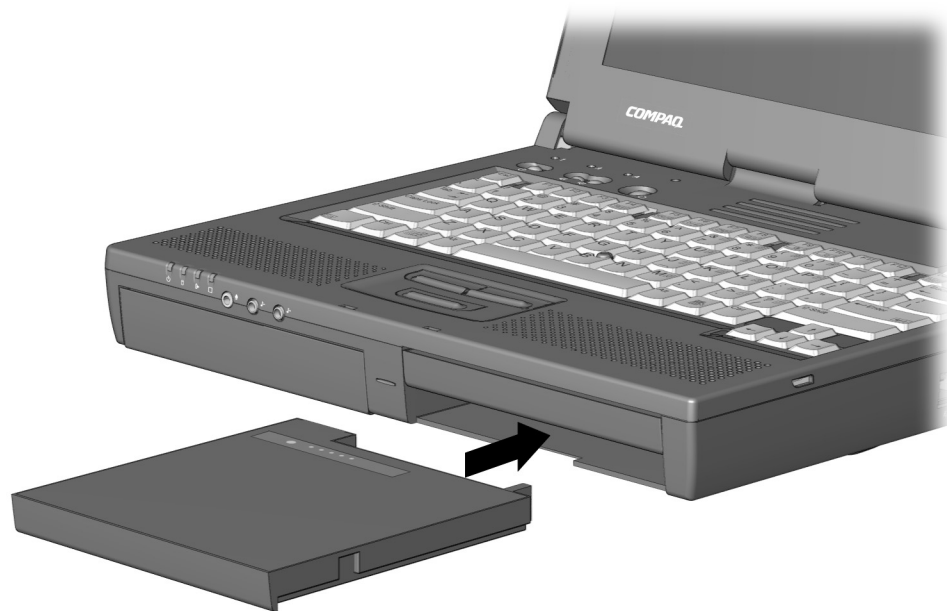


**WARNING:** To prevent damage to the computer, do not insert a MultiBay battery pack into the MultiBay until the computer is fully reassembled.

---

**NOTE:** The MultiBay battery pack can only be used in the bottom MultiBay.

1. With the battery pack label facing up and the battery pack contacts facing the computer, slide the MultiBay battery pack into the bottom MultiBay until it clicks into place (Figure 5-11).



**Figure 5-11.** *Inserting a MultiBay Battery Pack*

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



## Inserting a Dual-MultiBay Battery Pack

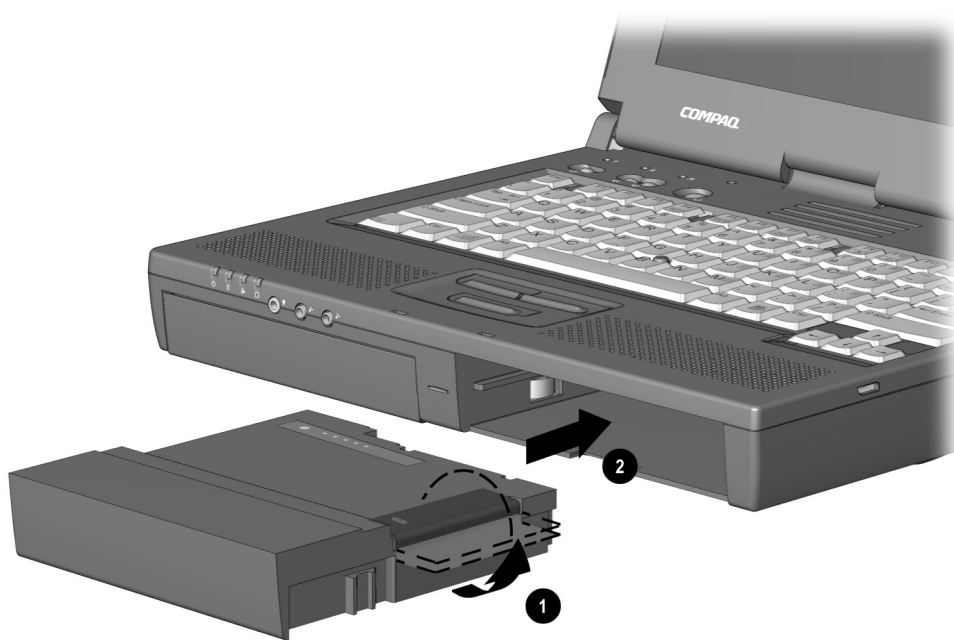


**WARNING:** To prevent damage to the computer, do not insert a Dual-MultiBay battery pack into the MultiBay until the computer is fully reassembled.

---

**NOTE:** The Dual-MultiBay battery pack can only be used in the bottom MultiBay.

1. Rotate the flap onto the top of the Dual-MultiBay battery pack and snap the flap into place **1** (Figure 5-12).
2. With the battery pack label facing up and the battery pack contacts facing the computer, align the battery pack with the bottom MultiBay, and slide the battery pack into the bottom MultiBay until it clicks into place **2**.



**Figure 5-12.** Inserting a Dual-MultiBay Battery Pack

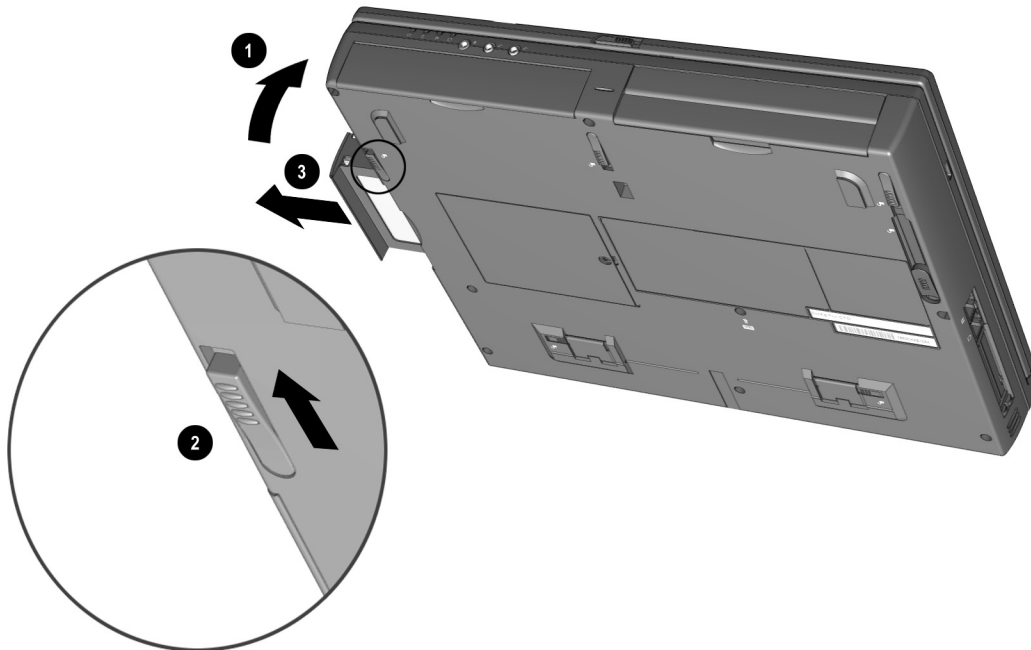
3. If the computer is in Suspend, press the suspend button to return to your work.

## 5.6 Hard Drives

### Removing a Hard Drive from the Hard Drive Bay

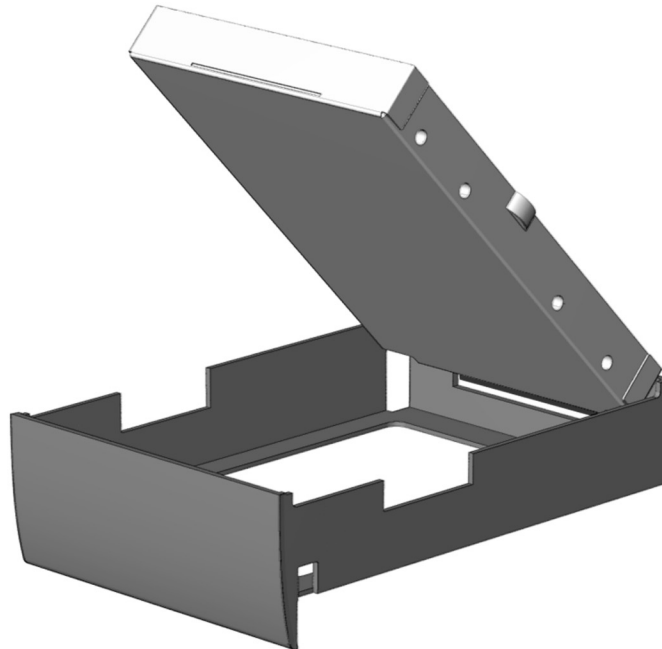
Before removing a hard drive, back up all information on the hard drive.

1. Save all work, exit all applications, and shut down the computer.
2. Tilt the computer at an angle **1** so the bottom of the computer is accessible (Figure 5-13).
3. Slide the hard drive release latch toward the front of the computer **2**.
4. Grasp the hard drive using the recess **3** beneath the hard drive bay and remove the hard drive.



**Figure 5-13.** Removing a Hard Drive from the Hard Drive Bay

5. Lift the front edge of the metal hard drive and swing the drive out of the plastic hard drive tray (Figure 5-14).

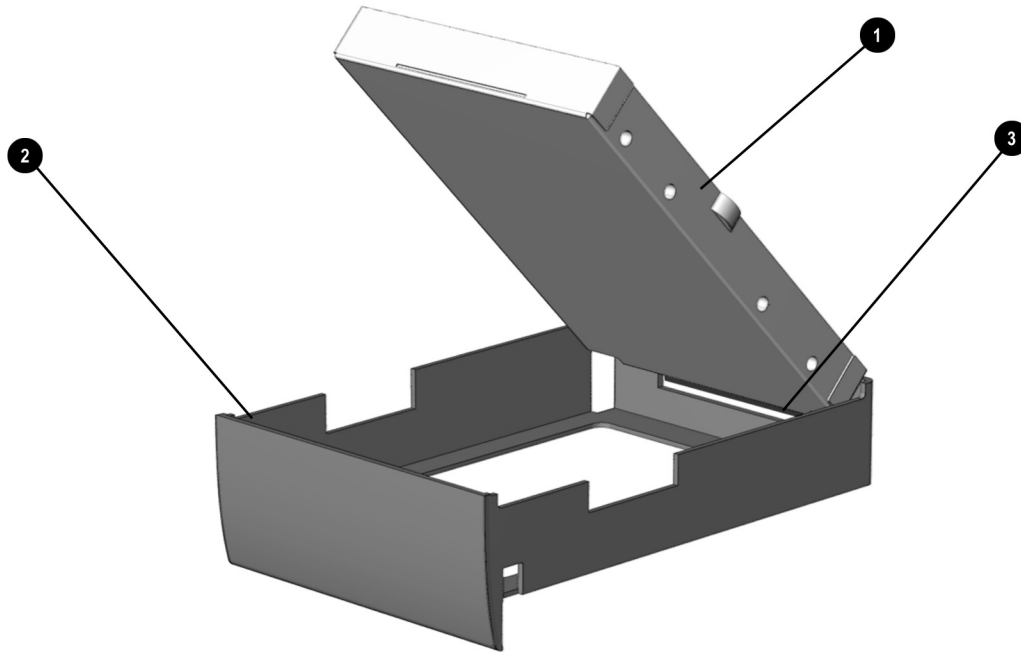


**Figure 5-14.** *Removing the Hard Drive from the Hard Drive Tray*

6. 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. Remove the hard drive tray from the hard drive bay.
3. Insert the metal hard drive ① into the plastic hard drive tray ② with the connectors protruding through the opening in the rear of the tray ③ (Figure 5-15).



**Figure 5-15.** *Inserting a Hard Drive into the Hard Drive Tray*

4. Slide the hard drive assembly into the hard drive bay (Figure 5-16).

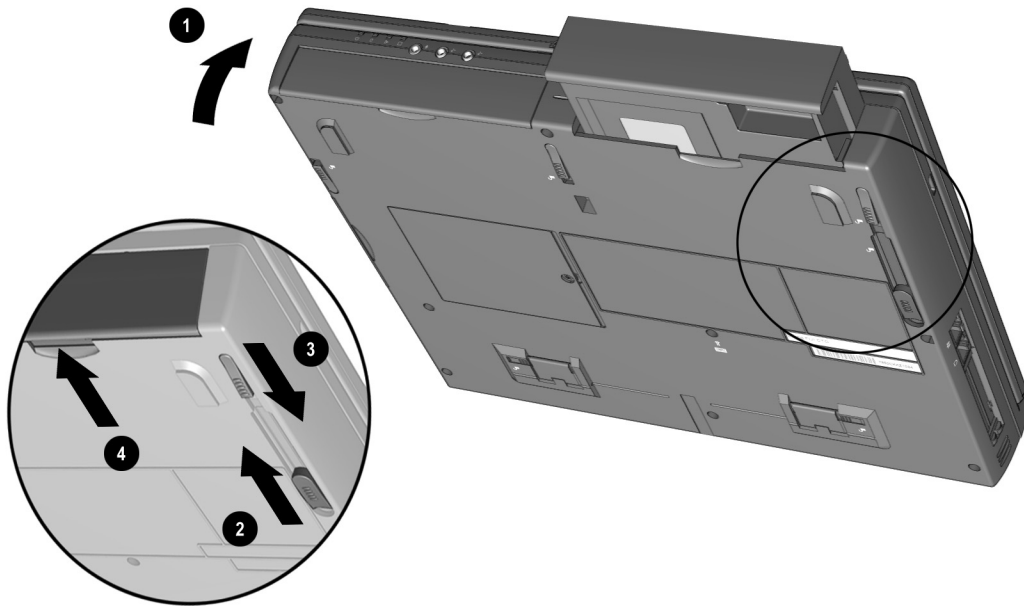


**Figure 5-16.** *Inserting a Hard Drive into the Hard Drive Bay*

## 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 **1** so the bottom of the computer is accessible (Figure 5-17).
3. If a 12.7-mm Armada MultiBay hard drive adapter is being removed from the top MultiBay, slide the rear MultiBay release latch **2** toward the front of the computer.
4. Grasp the hard drive assembly using the recess **4** beneath the MultiBay and remove the hard drive assembly from the computer.
5. If a 17-mm Dual-MultiBay Hard Drive Adapter is being removed, or if a 12.7-mm Armada MultiBay hard drive adapter is being removed from the bottom MultiBay, slide the front MultiBay release latch **3** toward the back of the computer.
6. Grasp the hard drive assembly using the recess **4** beneath the MultiBay and remove the hard drive assembly from the computer.



**Figure 5-17.** Removing a Hard Drive Assembly from the MultiBay

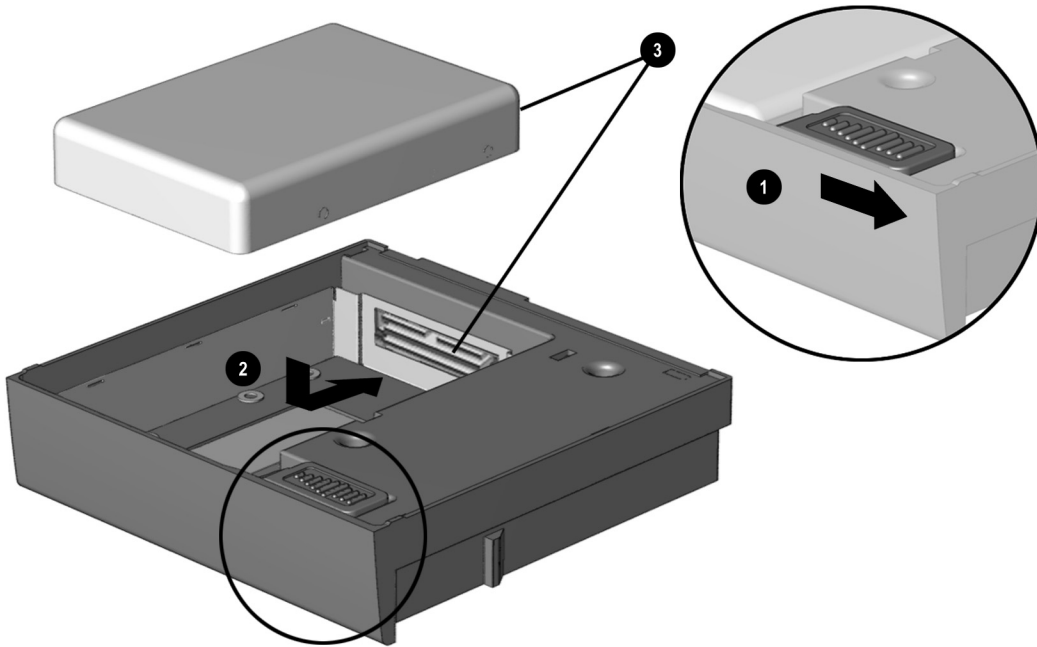
If you are not inserting another drive or a battery pack into the MultiBay, insert the MultiBay weight saver included with the computer.

## Inserting a Hard Drive into the MultiBay

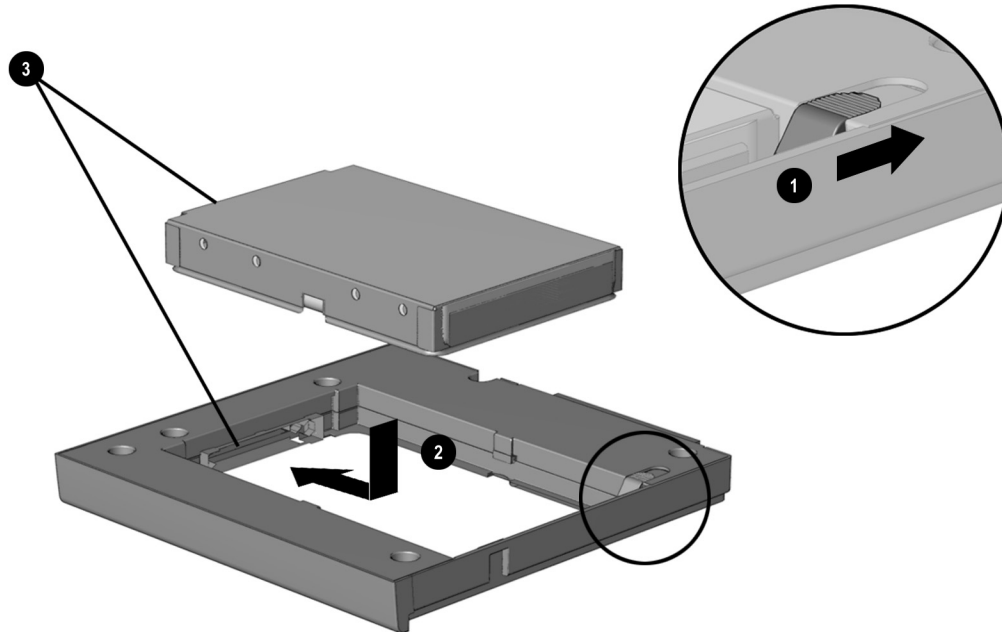
If you are moving a hard drive from the hard drive bay to the MultiBay, remove the hard drive from the hard drive tray. Refer to the “Removing a Hard Drive from the Hard Drive Bay” section in this chapter for more information.

A 17-mm hard drive must be inserted into a Dual-MultiBay Hard Drive Adapter before being inserted into the computer MultiBay. A 12.7-mm hard drive can be inserted into either a Dual-MultiBay Hard Drive Adapter or an Armada MultiBay hard drive adapter before being inserted into the computer MultiBay(s).

1. Save all work, exit all applications, and shut down the computer.
2. Push back and hold the slide tab **1** on the hard drive MultiBay adapter (Figures 5-18 and 5-19).
3. Lower the hard drive **2** into the adapter.
4. Slide the hard drive toward the connector **3** in the adapter until the connectors are seated.



**Figure 5-18.** Inserting a 17-mm Hard Drive into a Dual- MultiBay Hard Drive Adapter



**Figure 5-19.** Inserting a 12.7-mm Hard Drive into a 12.7-mm Armada MultiBay Hard Drive Adapter

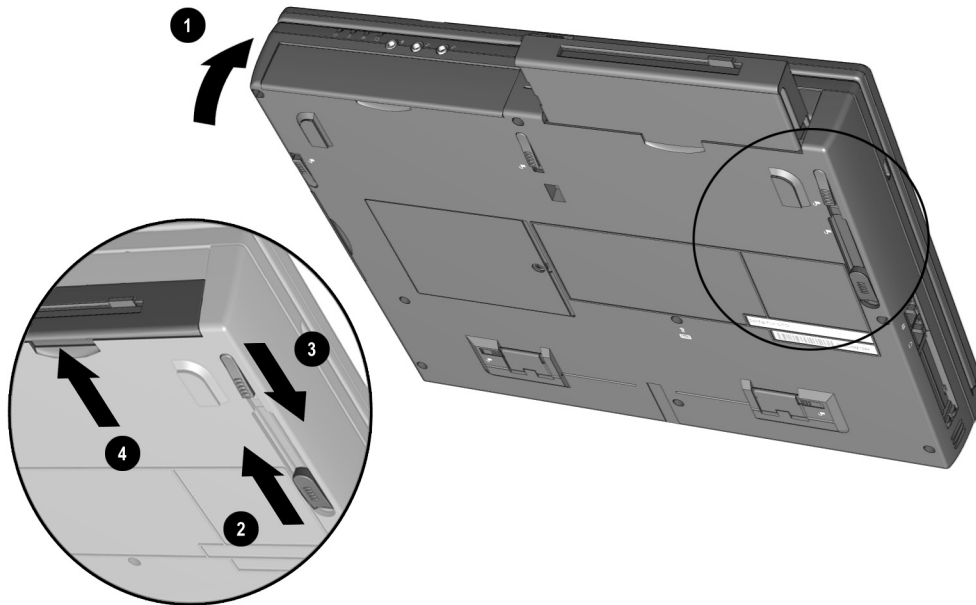
5. Release the slide tab.
6. Slide the hard drive assembly into the MultiBay with the bezel facing out.



## 5.7 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 **1** so the bottom of the computer is accessible (Figure 5-20).
4. To remove a device from the top MultiBay, slide the rear MultiBay release latch toward the front of the computer **2**.
5. To remove a device from the bottom MultiBay or to remove a device that occupies both MultiBays, slide the front MultiBay release latch **3** toward the back of the computer.
6. Grasp the device using the recess **4** beneath the MultiBay and remove the device.



**Figure 5-20.** Removing a Device from the MultiBays

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

## 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 5-21).



**Figure 5-21.** *Inserting a Device into a MultiBay*

## 5.8 PC Cards

The procedure for removing PC Cards varies with the operating system being used and with the kind of PC Card being removed.

If Windows 95/98 is running:

- A PC Card can be removed while the computer is on or off.
- The PC Card icon appears in the system tray on the Windows taskbar only while a PC Card is inserted.

If Windows NT is running:

- Some PC Cards, such as modem, ATA, flash, and SRAM cards, can be removed while the computer is on. However, the computer must be shut down before removing other PC Cards, such as LAN and SCSI cards. For removal information about a particular PC Card, refer to the documentation that came with the card and the Help program with CardWare.

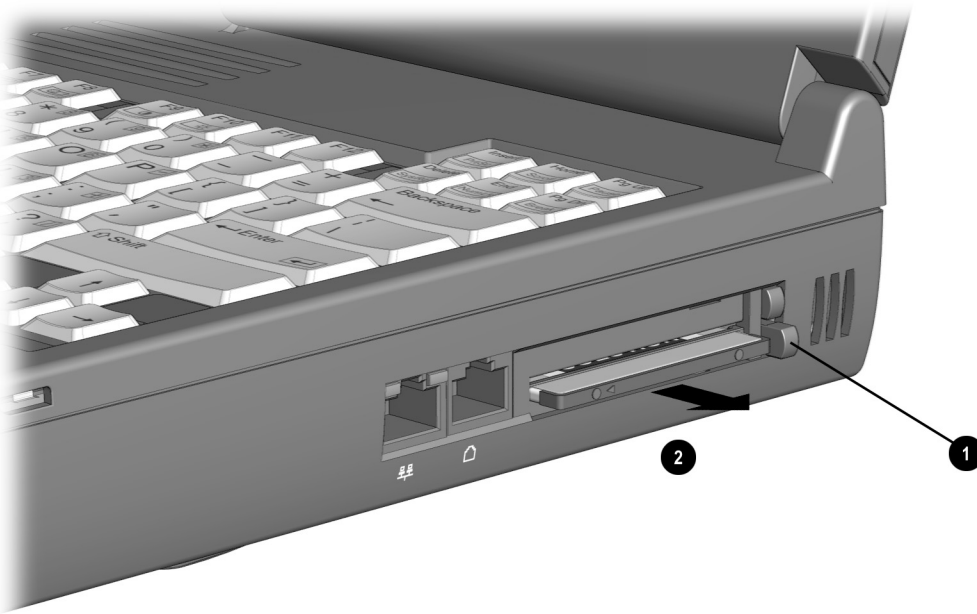
CardWare displays the PC Card icon on the system tray on the Windows taskbar whether or not a PC Card is inserted. The CardWare program is available on your Windows NT Workstation 4.0 system if you need Plug and Play functionality for PC Cards.

To install Cardware, select > Programs > CardWare Setup > Install CardWare. Follow the instructions on the screen.

If you are using third party PC Cards that have enablers or if you do not require Plug and Play functionality, then you do not need to install CardWare.

## Removing a PC Card

1. Prepare the computer for PC Card removal.  
If Windows 95 or 98 is running and the computer is turned on, you must stop the PC Card before removing it.
  - Select the PC Card icon on the taskbar,
  - Select the PC Card to be stopped. A message displays when the PC Card can be safely removed.If Windows NT 4.0 with CardWare from Compaq is running and the computer is turned on, you must turn off the computer before removing some PC Cards. Refer to the PC Card documentation for removal requirements.
2. Push the PC Card eject button **1** that corresponds to the slot containing the PC Card to be ejected. The eject button extends (Figure 5-22).
3. Push the eject button a second time. The PC Card partially ejects from the PC Card slot.
4. Remove the PC Card from the PC Card slot **2**.



**Figure 5-22.** Removing a PC Card

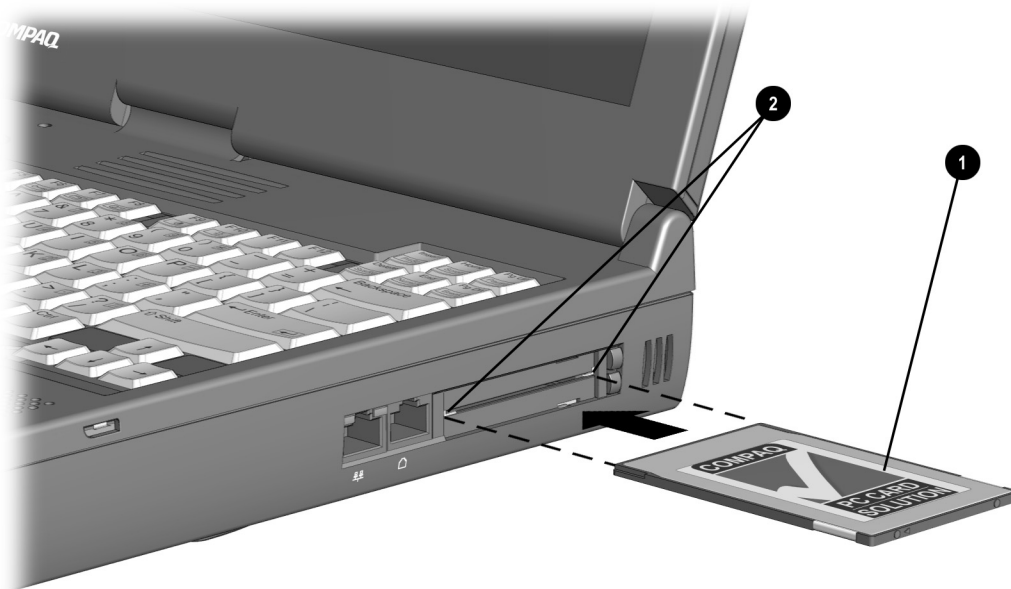
## Inserting a PC Card



**CAUTION:** To prevent damage to the PC Card connectors, use minimal pressure when inserting a PC Card into a PC Card slot.

---

1. With the PC Card connector facing the computer and the label facing up **1**, align the edges of the card with the rails **2** in the PC Card slot (Figure 5-23).
2. Push the PC Card into the PC Card slot until the connector is seated.



**Figure 5-23.** Inserting a PC Card

3. If Windows NT 4.0 with CardWare from Compaq is running and the computer is turned on, restart the computer if you are instructed to do so by the PC Card documentation or an on-screen prompt.
  - If you are inserting a LAN, SCSI, or multifunction PC Card, you must restart the computer.
  - If you are inserting a modem, ATA, flash, or SRAM PC Card, it is usually not necessary to restart the computer.

## 5.9 Memory Expansion

### Removing the Memory Expansion Compartment 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.



**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.



**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."

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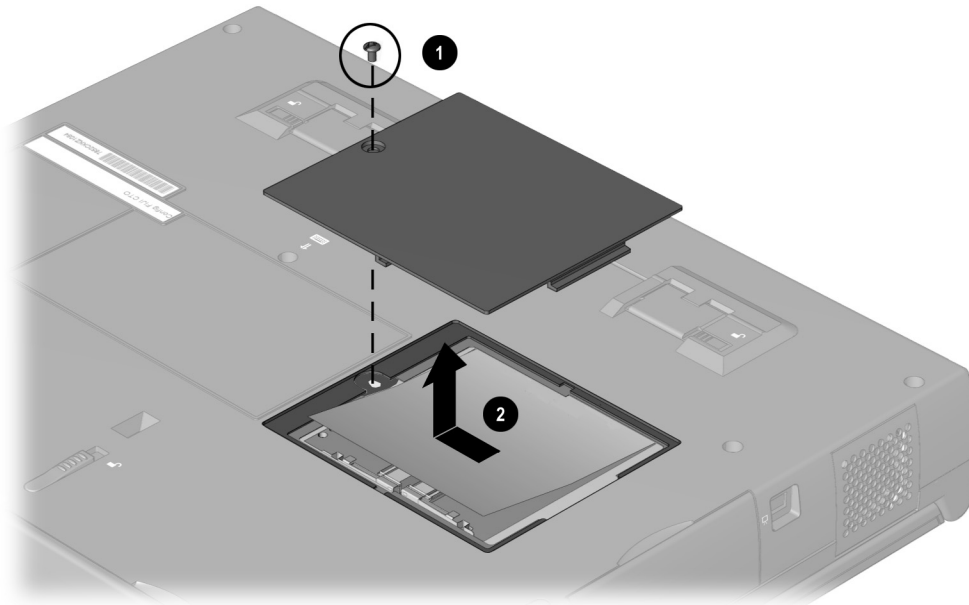
1. Prepare the computer for disassembly (Section 5.3).
2. Remove any battery packs (Section 5.5).
3. Turn the computer bottom side up with the front of the computer facing forward.

4. Remove the screw that secures the memory expansion compartment cover to the computer ❶ (Figure 5-24).

**NOTE:** If the computer was shipped with a preinstalled memory expansion board, the cover is attached with a tamper-resistant Torx T-10 memory security screw. Use the Torx T-10 screwdriver included with the computer to remove and reinsert this screw.

If the computer was not shipped with preinstalled memory expansion boards, the cover is attached with a standard Torx T-8 screw. Use a Torx T-8 screwdriver to remove and reinstall the screw.

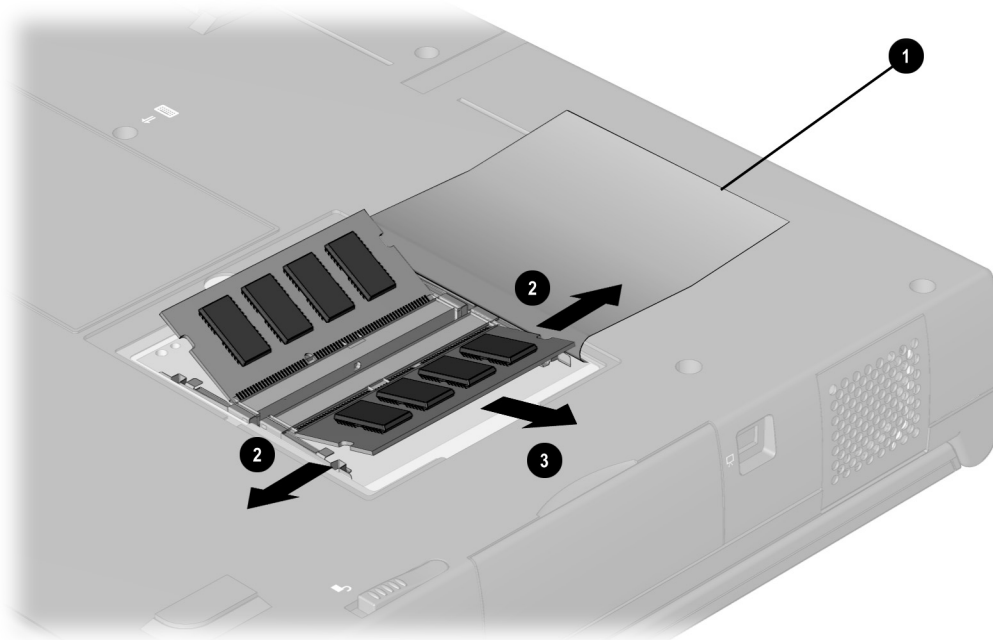
5. Slide the cover to the left ❷ and lift the left edge up to remove it.



**Figure 5-24.** Removing the Memory Expansion Compartment Cover

## Removing a Memory Expansion Board

1. Lift and hold back the memory insulator ❶. The insulator is not removable (Figure 5-25).
2. Spread the retaining tabs apart ❷. The memory expansion board tilts upward.
3. Lift the edge of the memory expansion board and slide it gently out of the memory expansion slot at a 45-degree angle ❸.



**Figure 5-25.** *Removing a Memory Expansion Board*

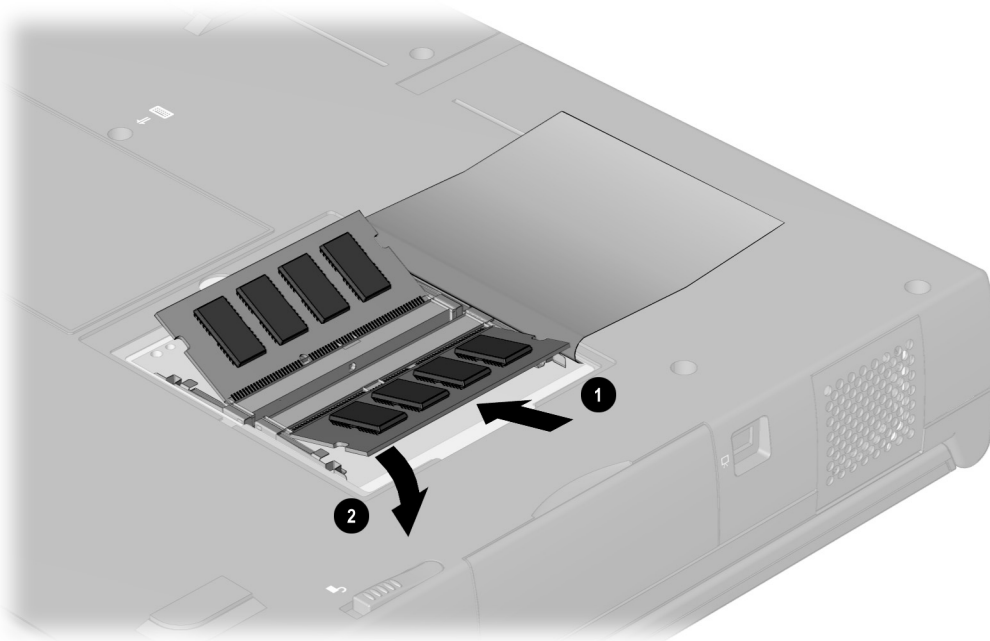
4. Place the memory expansion board in an electrostatic-safe container.
5. If no memory expansion board is to be installed, reset the memory insulator.
6. Replace the memory expansion compartment cover and install the screw.



## Installing a Memory Expansion Board

All memory expansion boards are asymmetrically keyed (notched) to ensure correct positioning. Memory expansion boards can be used in either memory expansion slot.

1. Insert the memory expansion board into an empty memory expansion slot at a 45-degree angle ❶ (Figure 5-26).
2. Push the board into place until it is seated.
3. Push the memory expansion board down ❷ until the board is seated in the plastic retention clips.

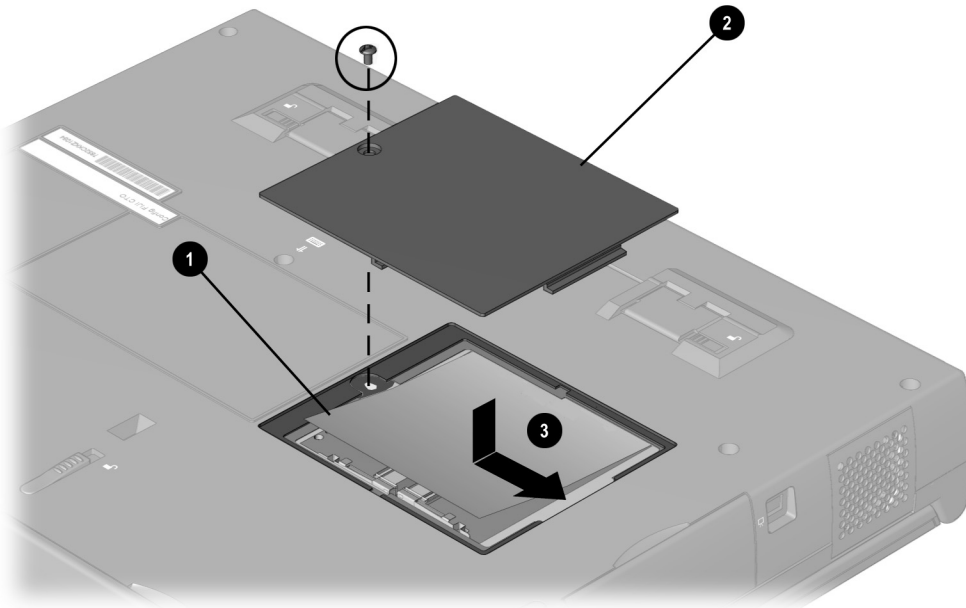


**Figure 5-26.** *Inserting a Memory Expansion Board*

4. Run Computer Setup (Section 2.5).

## Installing the Memory Expansion Compartment 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 5-27).
2. Replace the memory expansion compartment cover ❷ by placing it flush over the memory expansion compartment, then sliding it to the right ❸ until it is seated.
3. Secure the memory expansion compartment cover to the computer with a memory expansion compartment cover security screw or a standard Torx T-10 screw.



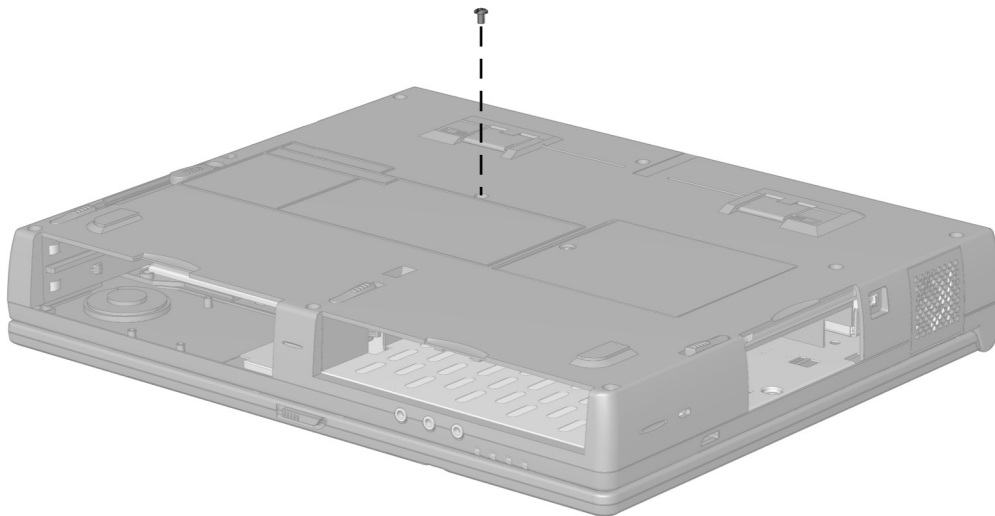
**Figure 5-27.** Replacing the Memory Expansion Compartment Cover

## 5.10 Keyboard Assembly

The Armada E700 Series of Personal Computers can be equipped with a keyboard with either a EasyPoint IV pointing device or a touchpad. The removal procedures are the same for both keyboards.

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

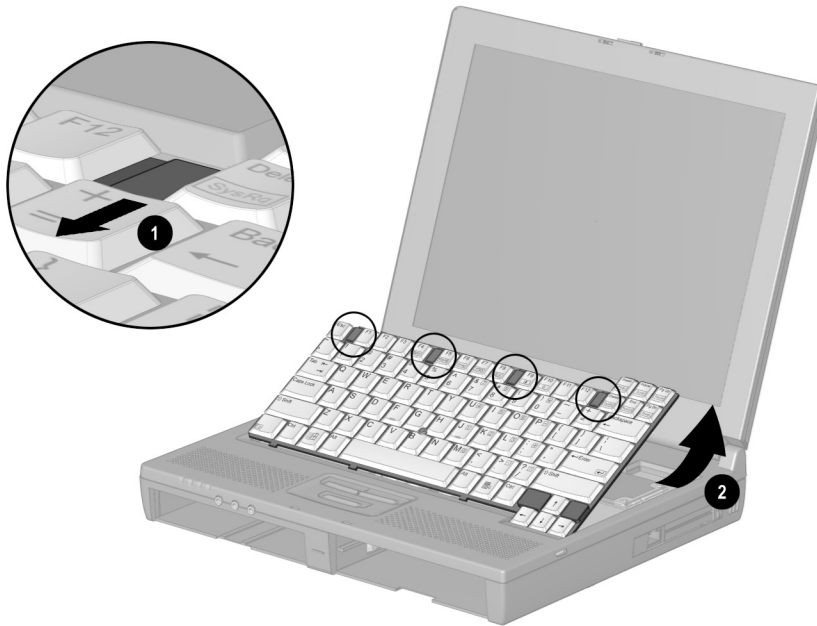
1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.5).
3. Remove all hard drives (Section 5.6).
4. Turn the computer bottom side up with the front facing forward.
5. Remove the screw from the bottom of the computer (Figure 5-28).



**Figure 5-28.** *Removing the Keyboard Assembly Screw*

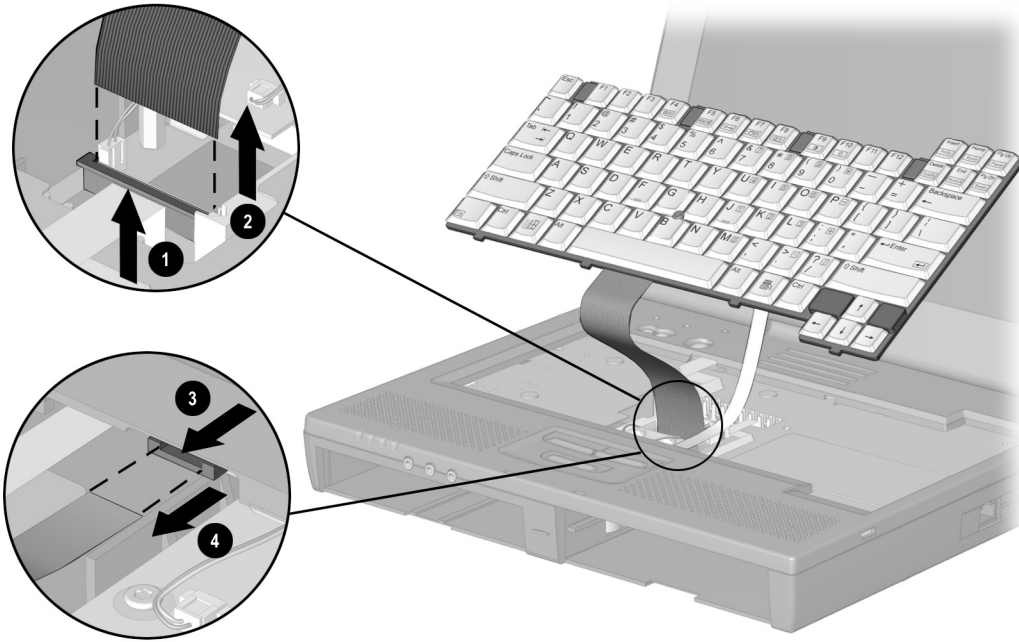
6. Turn the computer top side up with the front facing forward.
7. Open the computer.

8. Slide the four keyboard latches toward the front of the computer ❶ (Figure 5-29).
9. Lift the back edge of the keyboard up and swing it forward ❷.



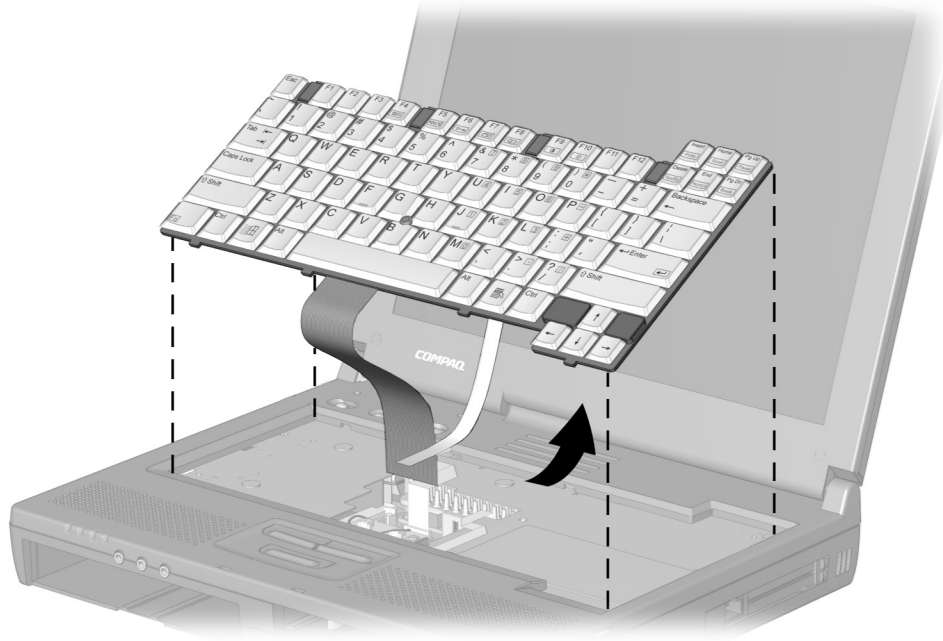
**Figure 5-29.** *Releasing the Keyboard Assembly*

8. Release the Zero Insertion Force (ZIF) connector to which the keyboard cable is connected ❶. Disconnect the keyboard cable ❷ (Figure 5-30).
9. Release the ZIF connector to which the pointing device cable is connected ❸ (EasyPoint IV pointing device keyboards only).
10. Disconnect the pointing device cable ❹.



**Figure 5-30.** *Disconnecting the Keyboard Cables*

11. Remove the keyboard assembly (Figure 5-31).



**Figure 5-31.** *Removing the Keyboard Assembly*

Reverse the above procedure to install the keyboard assembly.

## 5.11 CPU Cover

There are two CPU covers used with the Armada E700 Series of Personal Computers: one cover accommodates the EasyPoint IV-equipped keyboard; the other cover accommodates the keyboard with the touchpad.

The disassembly procedures for both CPU covers are identical. The cover must be removed to gain access to the interior components of the computer.

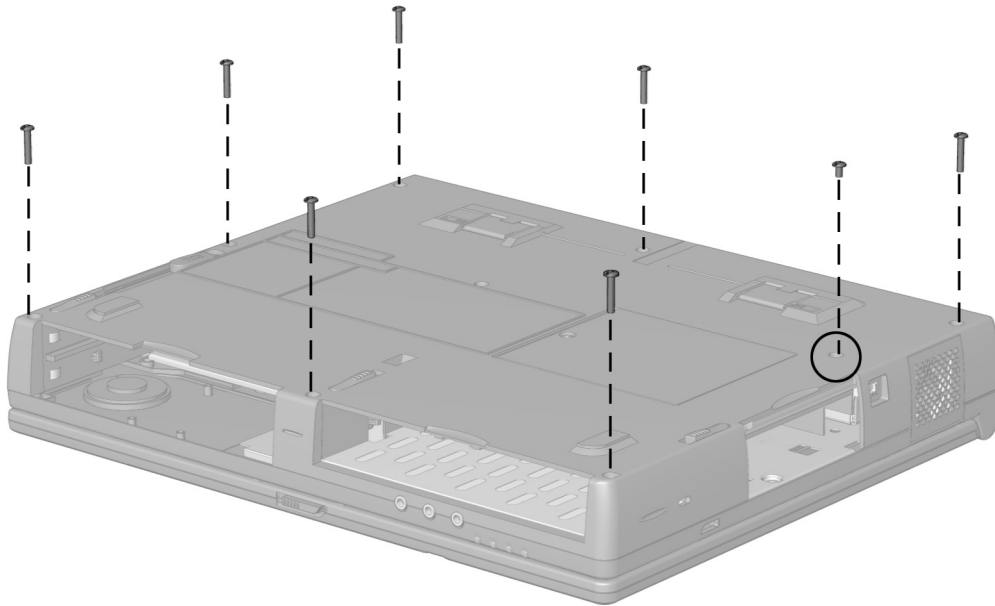
1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.5).
3. Remove all hard drives (Section 5.6).
4. Remove the keyboard assembly (Section 5.10).
5. Close the computer.
6. Turn the computer bottom side up with the front facing forward.

7. Remove the eight screws from the bottom of the computer (Figure 5-32).



**CAUTION:** The screw removed from the circled screwhole is shorter than the other seven screws. Make sure this screw is installed in the proper location when replacing the keyboard assembly. Failure to follow this caution can result in damage to the computer.

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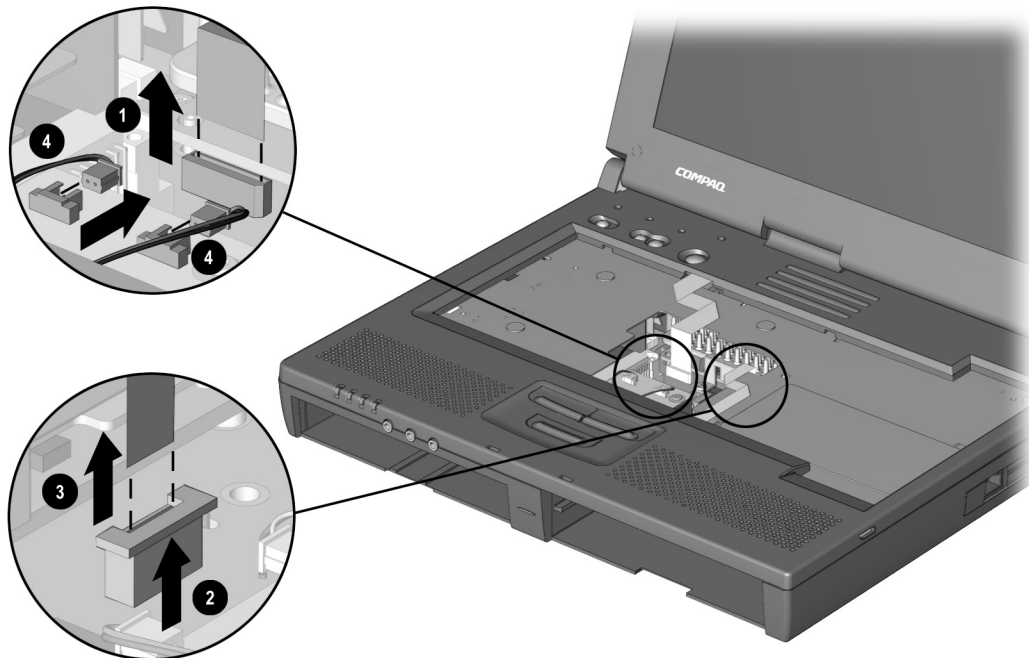


**Figure 5-32.** Removing the CPU Cover Screws

8. Turn the computer top side up with the front of the computer facing forward.
9. 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. MultiBay devices can be inserted in the MultiBay(s) to improve balance.

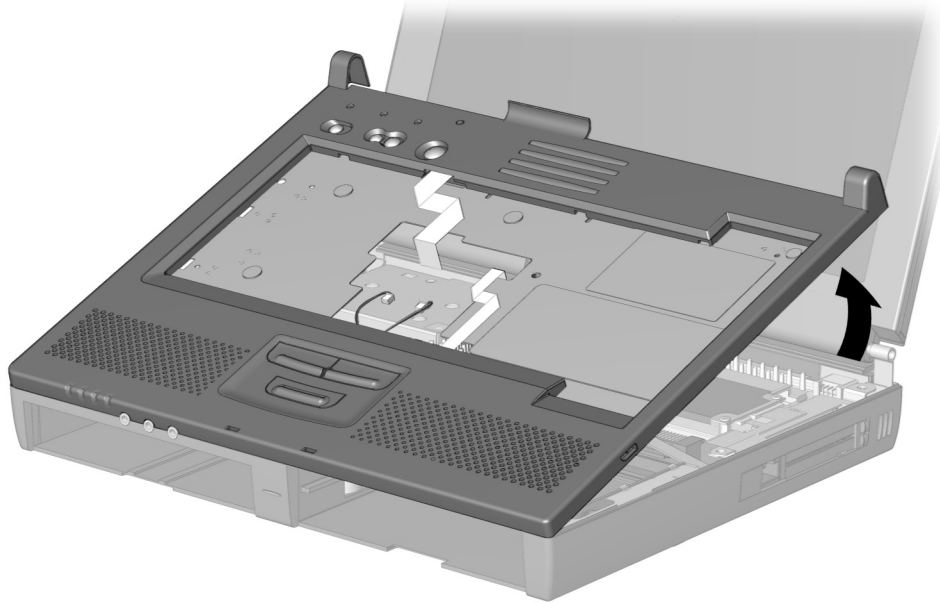
10. Release the ZIF connector to which the pick button cable is connected ❶ (Figure 5-33).
11. Disconnect the pick button cable ❷.
12. Disconnect the TouchPad cable ❸ from the system board (TouchPad models only).
13. Disconnect the left and right speaker cables ❹ from the audio board.



**Figure 5-33.** *Disconnecting the TouchPad, Pick Button, and Speaker Cables*



14. Lift the back edge of the CPU cover and swing it forward to remove it (Figure 5-34).



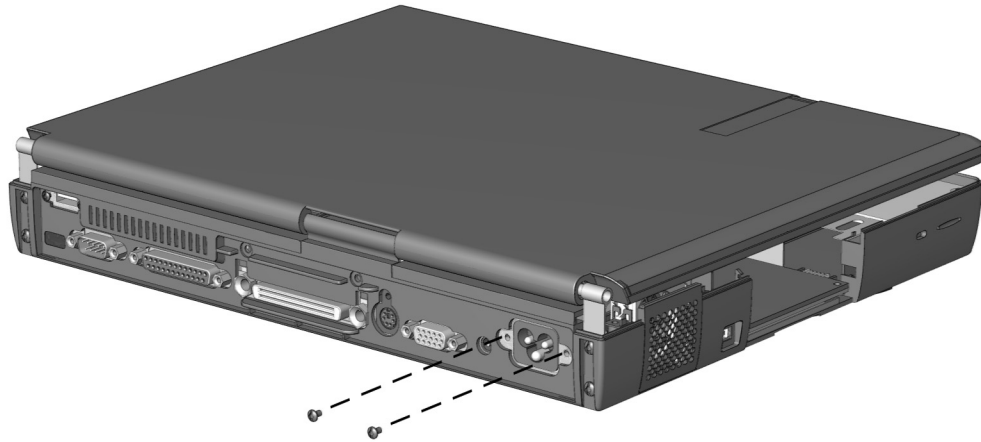
**Figure 5-34.** *Removing the CPU Cover*

Reverse the above procedure to install the CPU cover.

## 5.12 Power Supply

1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.5).
3. Remove all hard drives (Section 5.6).
4. Remove the keyboard assembly (Section 5.10).
5. Remove the CPU cover (Section 5.11).
6. Position the computer so the rear panel faces forward.

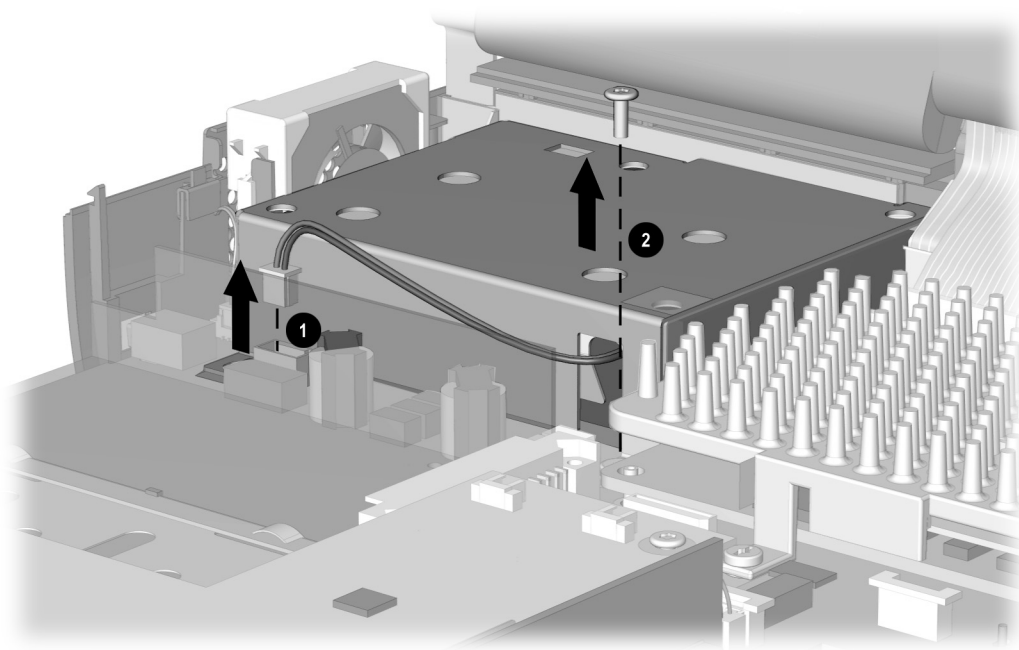
7. Remove the two screws that secure the power supply to the I/O bracket (Figure 5-35).



**Figure 5-35.** *Removing the Power Supply Screws.*

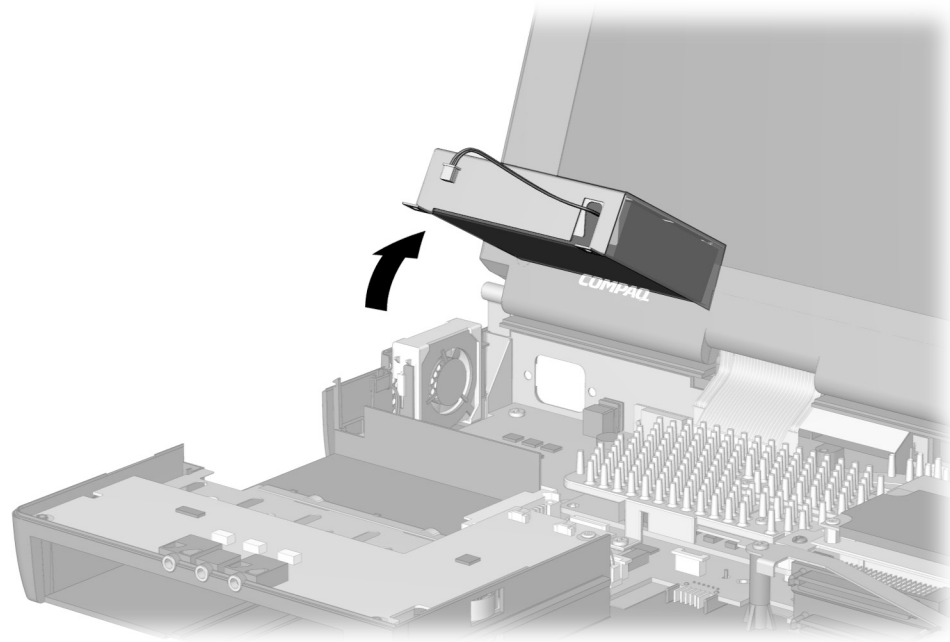
8. Position the computer so the front faces forward.
9. Open the computer.

10. Disconnect the power supply cable ❶ from the system board (Figure 5-36).
11. Remove the screw that secures the power supply to the system board ❷.



**Figure 5-36.** *Removing the Power Supply Screw and Disconnecting the Power Supply Cable*

12. Lift up on the front of the power supply and swing it up and away until it clears the computer (Figure 5-37).



**Figure 5-37.** *Removing the Power Supply*

Reverse the above procedure to install the power supply.

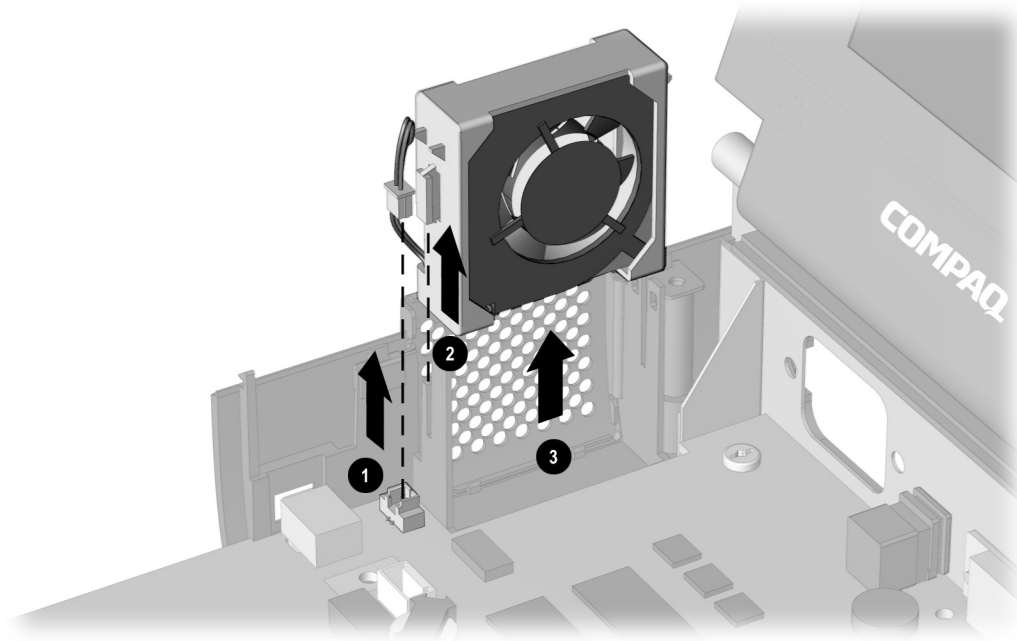


**CAUTION:** Make sure the fan cable is not pinched when installing the power supply. Failure to follow this caution can result in damage to the fan and power supply.

---

## 5.13 Fan Assembly

1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.5).
3. Remove all hard drives (Section 5.6).
4. Remove the keyboard assembly (Section 5.10).
5. Remove the CPU cover (Section 5.11).
6. Disconnect the cable ❶ connecting the fan assembly to the system board (Figure 5-38).
7. Release the fan assembly from the brackets ❷ that secure either side of the assembly by pulling the brackets apart.
8. Lift the fan assembly out of the computer ❸.



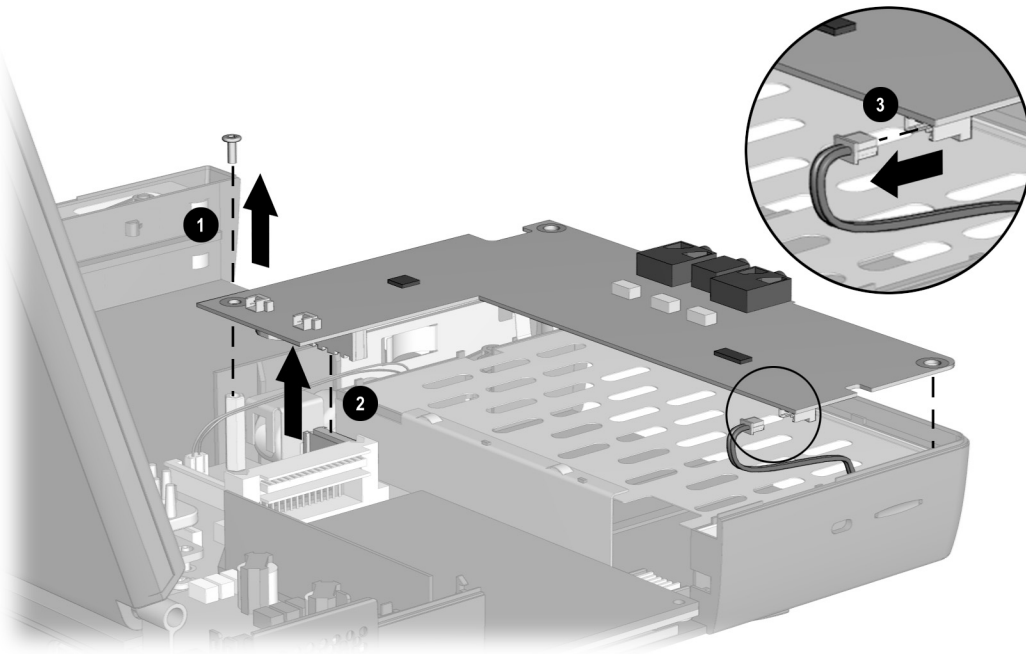
**Figure 5-38.** Removing the Fan Assembly

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.

**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.

## 5.14 Audio Board

1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.5).
3. Remove all hard drives (Section 5.6).
4. Remove the keyboard assembly (Section 5.10).
5. Remove the CPU cover (Section 5.11).
6. Remove the screw ❶ that secures the audio board to the standoff mounted on the system board. (Figure 5-39).
7. Partially lift up on the rear/right edge of the audio board ❷ to disconnect it from the system board. Hold the board slightly above the base assembly.
8. Disconnect the microphone cable ❸ from the audio board.



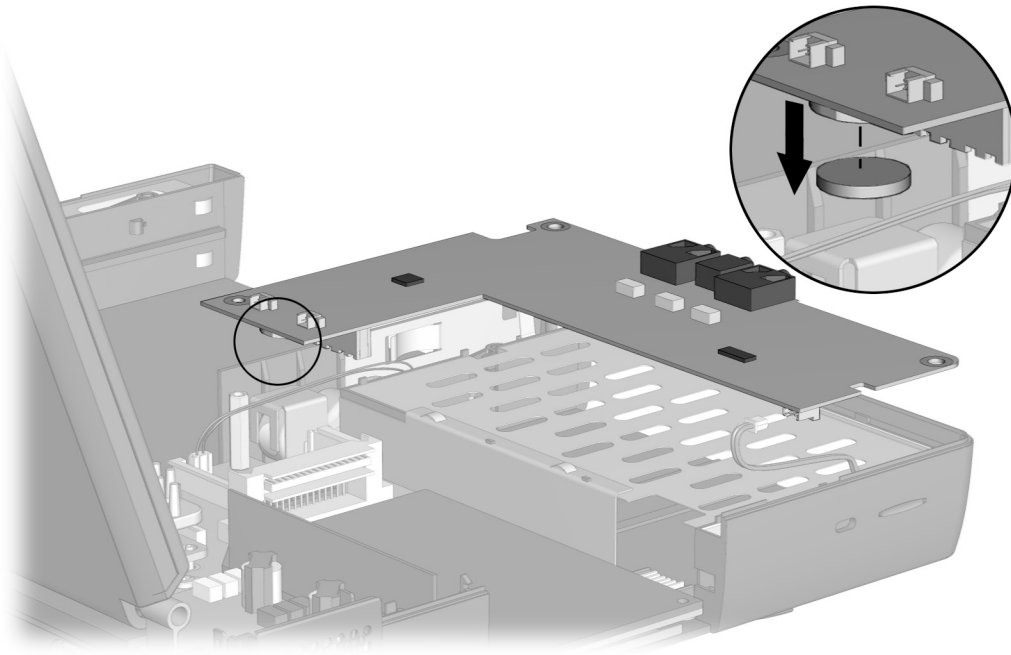
**Figure 5-39.** Removing the Audio Board Screw and Disconnecting the Audio Board

9. Remove the audio board.

Reverse the above procedure to install the audio board.

## 5.15 Lithium Disk Cell Battery

1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.5).
3. Remove all hard drives (Section 5.6).
4. Remove the keyboard assembly (Section 5.10).
5. Remove the CPU cover (Section 5.11).
6. Remove the audio board (Section 5.14).
7. Remove the lithium disk cell battery from the bottom of the audio board (Figure 5-40).



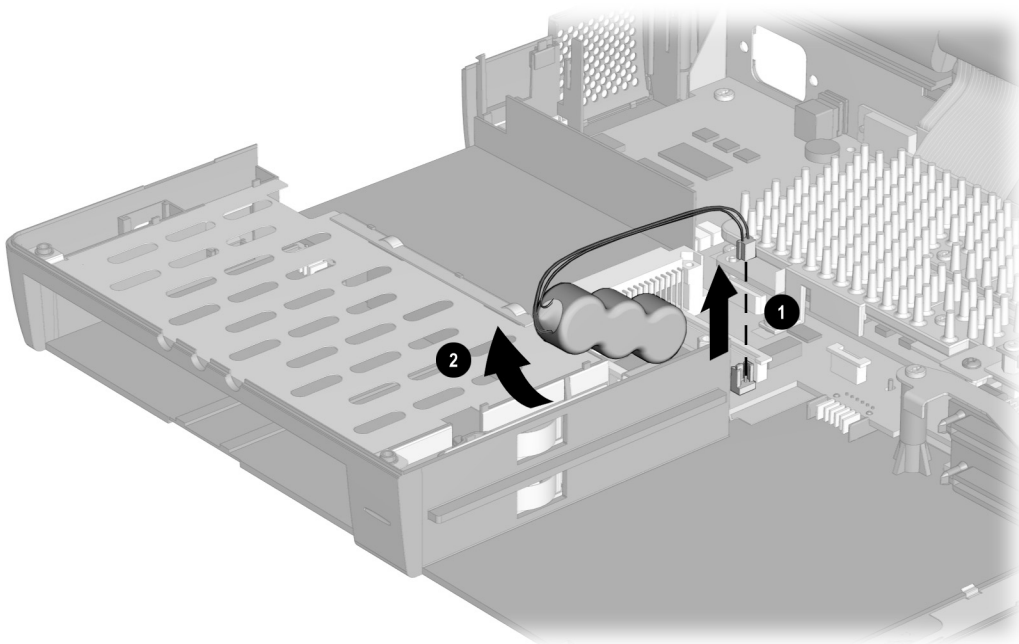
**Figure 5-40.** *Removing the Lithium Disk Cell Battery*

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

## 5.16 Auxiliary Battery

**NOTE:** Before removing the auxiliary battery, make note of the routing of the auxiliary battery cable.

1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.5).
3. Remove all hard drives (Section 5.6).
4. Remove the keyboard assembly (Section 5.10).
5. Remove the CPU cover (Section 5.11).
6. Remove the audio board.
7. Disconnect the auxiliary battery cable ❶ from the system board (Figure 5-41).
8. Lift the front edge of the battery and swing it out of the base assembly ❷.



**Figure 5-41.** Removing the Auxiliary Battery

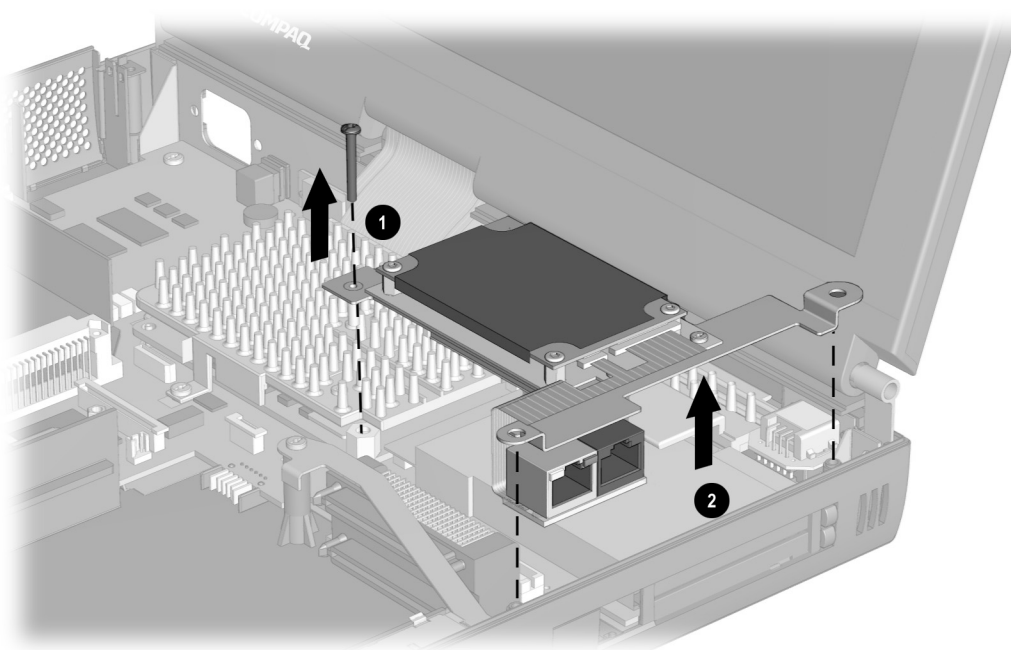
Reverse the above procedure to install the auxiliary battery.



## 5.17 Mini PCI Riser Board

The mini PCI riser board is used to connect a modem, network interface card (NIC), or combo card to the computer.

1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.5).
3. Remove all hard drives (Section 5.6).
4. Remove the keyboard assembly (Section 5.10).
5. Remove the CPU cover (Section 5.11).
6. Remove the screw that secures the mini PCI riser board to the base assembly ❶ (Figure 5-42).
7. Lift up on the front of the mini PCI riser board to disconnect it from the system board.
8. Remove the mini PCI riser board ❷.

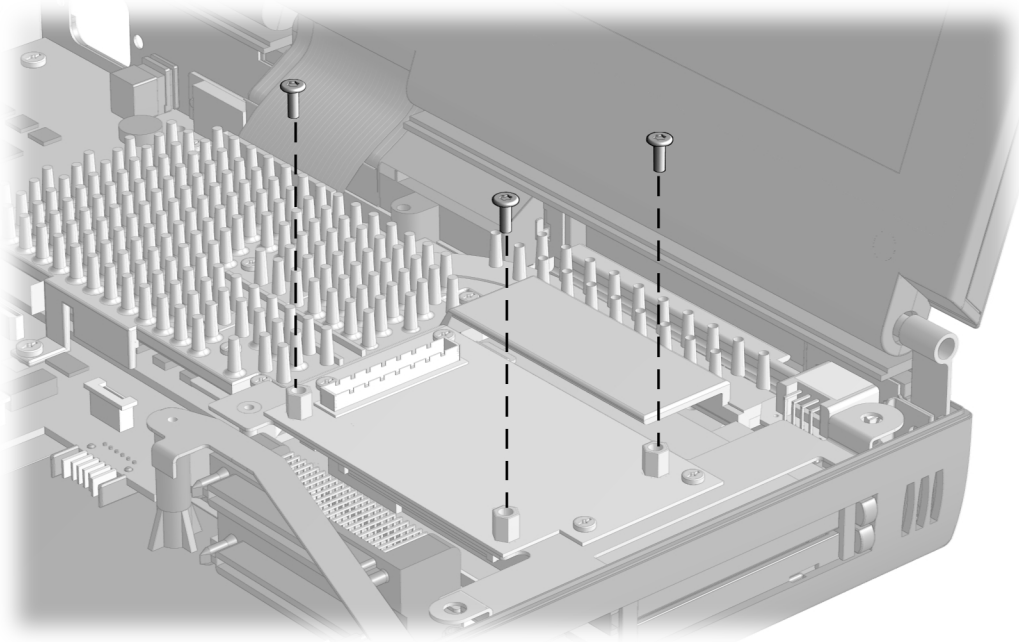


**Figure 5-42.** Removing the Mini PCI Riser Board

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

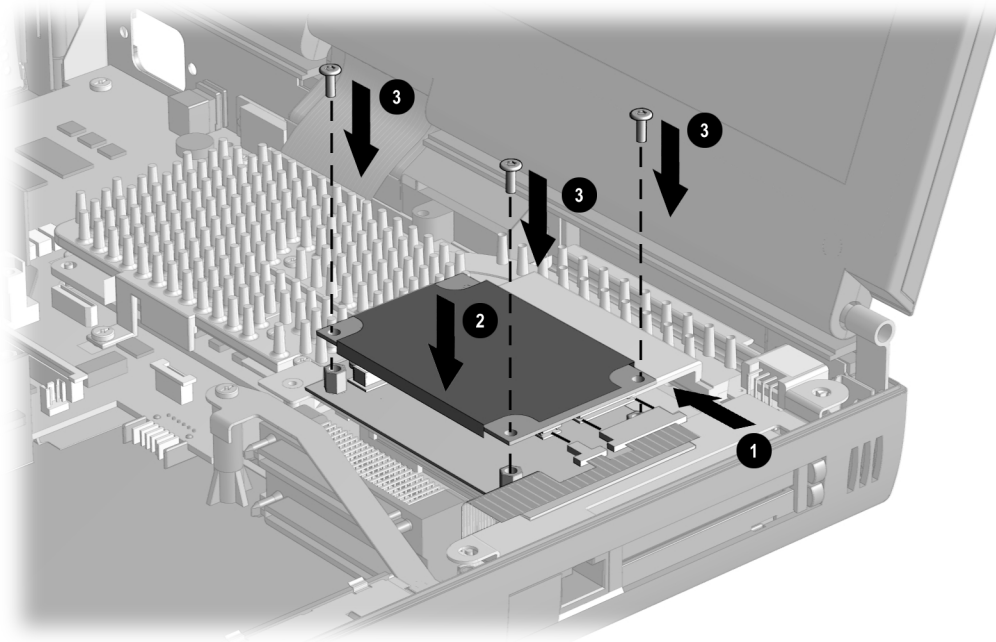
## Installing a Modem, LAN, or Combo Card

1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.5).
3. Remove all hard drives (Section 5.6).
4. Remove the keyboard assembly (Section 5.10).
5. Remove the CPU cover (Section 5.11).
6. Remove the three screws from the mini PCI riser board (Figure 5-43).



**Figure 5-43.** Removing the Mini PCI Riser Board Screws

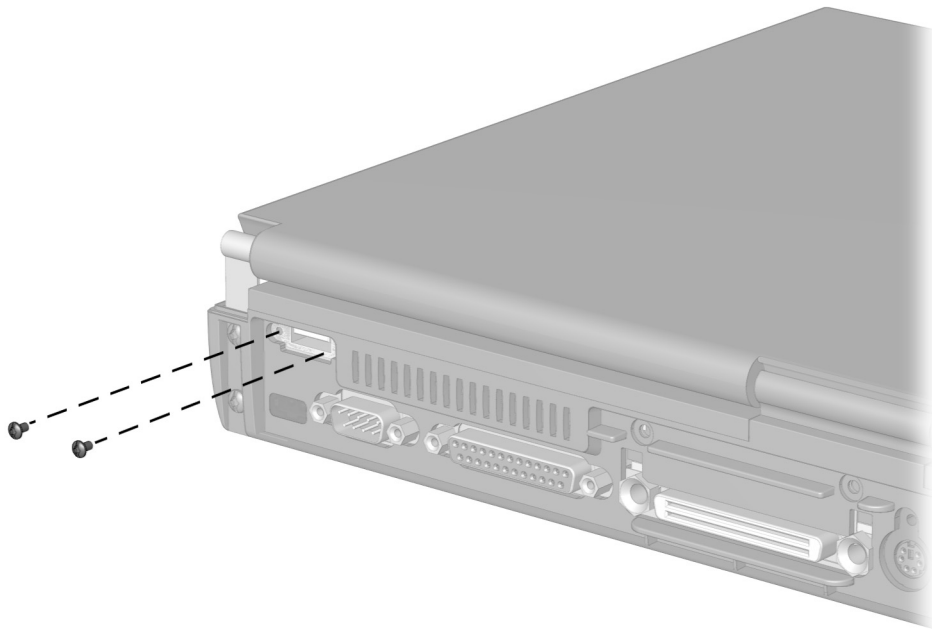
7. Connect the appropriate cable(s) from the RJ11 modem/RJ45 NIC connector assembly ❶ to the connectors on the modem/combo card (Figure 5-44).
8. Connect the modem/combo card to the mini PCI riser board ❷.
9. Install the three screws to secure the modem/combo board to the mini PCI riser board ❸.



**Figure 5-44.** *Installing a Modem/Combo Card*

## 5.18 USB Board

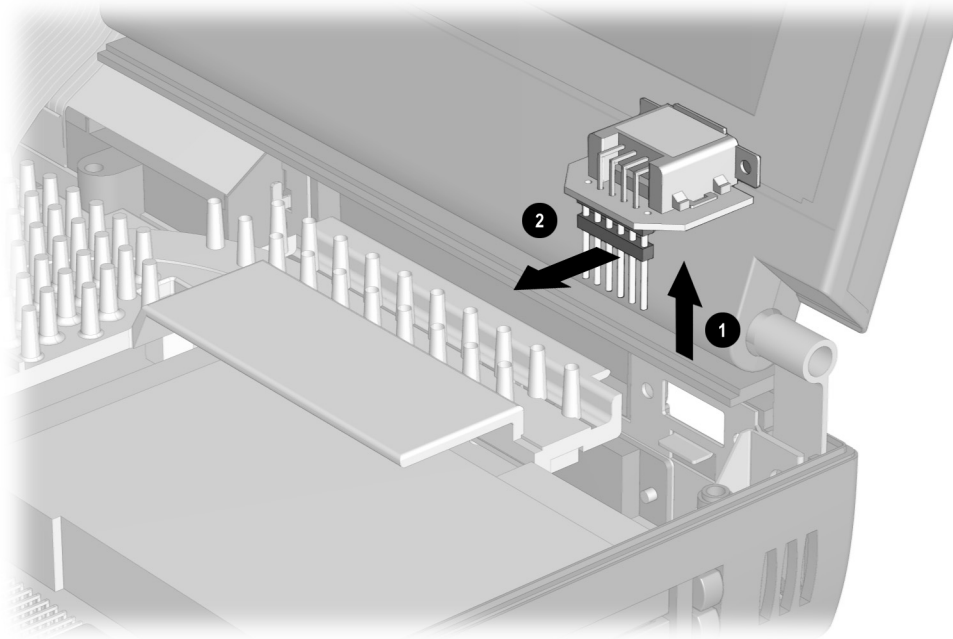
1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.5).
3. Remove all hard drives (Section 5.6).
4. Remove the keyboard assembly (Section 5.10).
5. Remove the CPU cover (Section 5.11).
6. Position the computer so the rear panel faces forward.
7. Remove the two screws that secure the USB assembly to the I/O bracket (Figure 5-45).



**Figure 5-45.** *Removing the USB Board Screws*

8. Position the computer so the front faces forward.
9. Open the computer.

10. Lift the USB assembly straight up ❶ to disconnect it from the system board (Figure 5-46).
11. Tilt the USB assembly toward the front of the computer and remove it ❷.

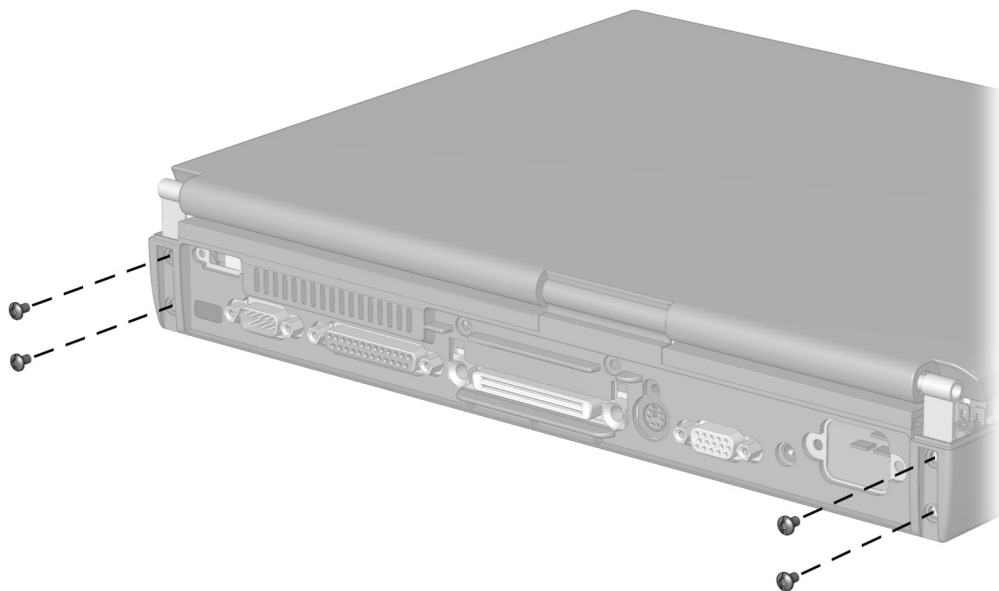


**Figure 5-46.** *Removing the USB Board*

Reverse the above procedure to install the USB board.

## 5.19 Display Assembly

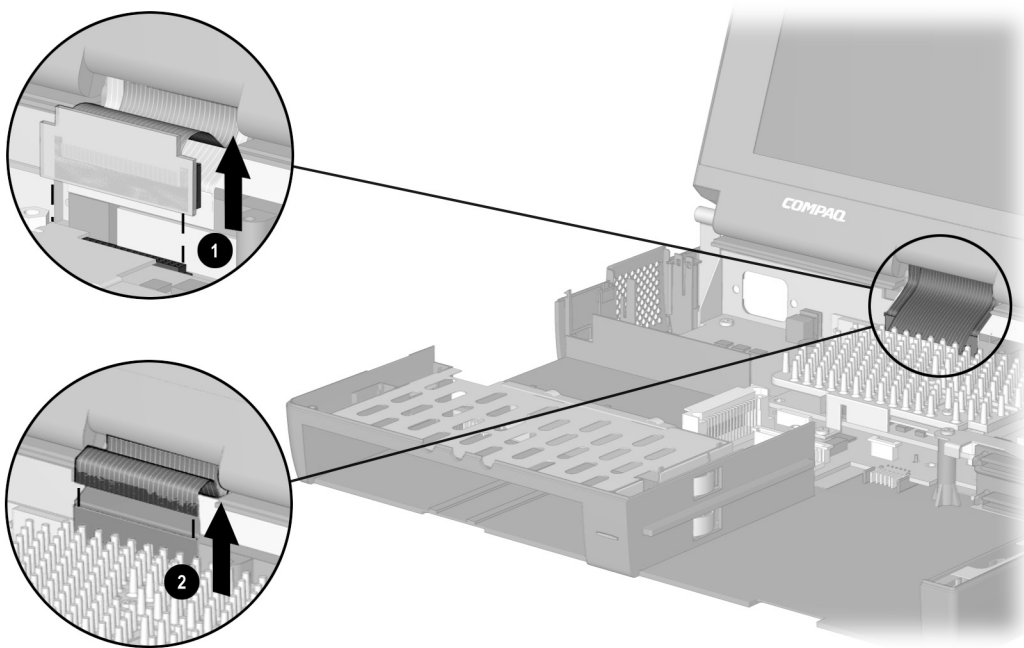
1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.5).
3. Remove all hard drives (Section 5.6).
4. Remove the keyboard assembly (Section 5.10).
5. Remove the CPU cover (Section 5.11).
6. Position the computer so the rear panel faces forward.
7. Remove the four screws that secure the display assembly clutches to the base assembly (Figure 5-47).



**Figure 5-47.** Removing the Display Assembly Screws

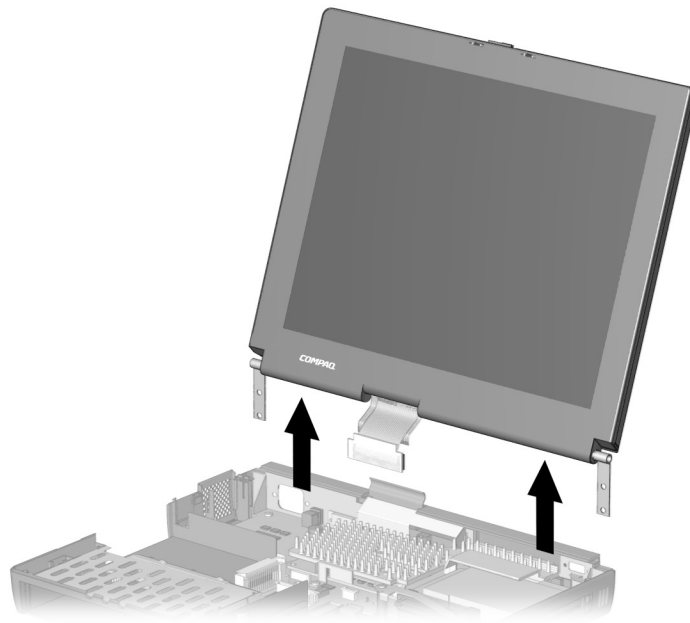
8. Position the computer so the front faces forward.
9. Open the computer.

10. Disconnect the display video cable ❶ from the system board (Figure 5-48).
11. Disconnect the display ground cable ❷ from the clip in the base assembly.



**Figure 5-48.** *Disconnecting the Display Video and Ground Cables*

12. Lift the display assembly straight up from the computer (Figure 5-49).



**Figure 5-49.** *Removing the Display Assembly*

Reverse the above procedure to install the display assembly.

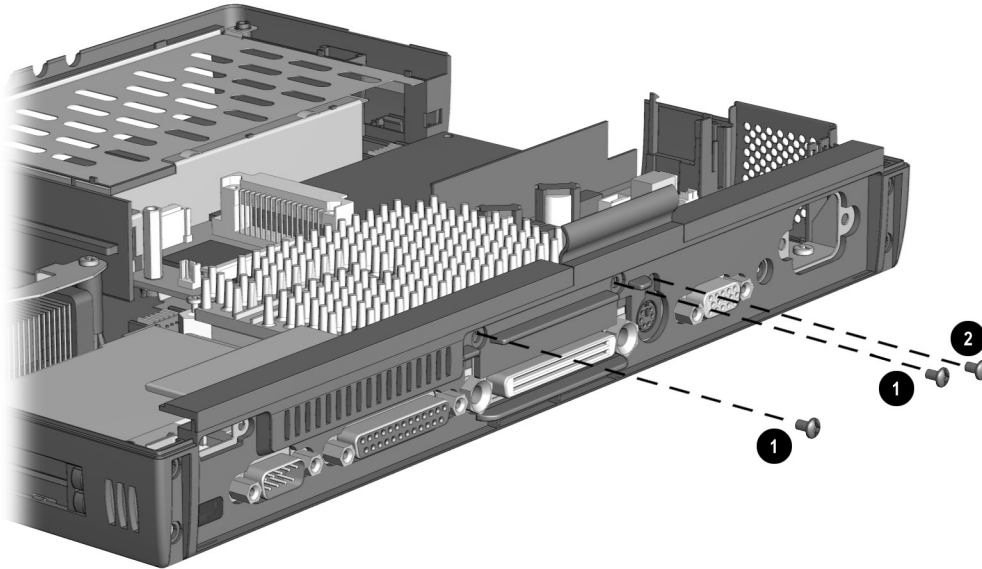


## 5.20 System Board

**NOTE:** Make sure the PC Card release buttons are in the “in” position before removing or installing the system board.

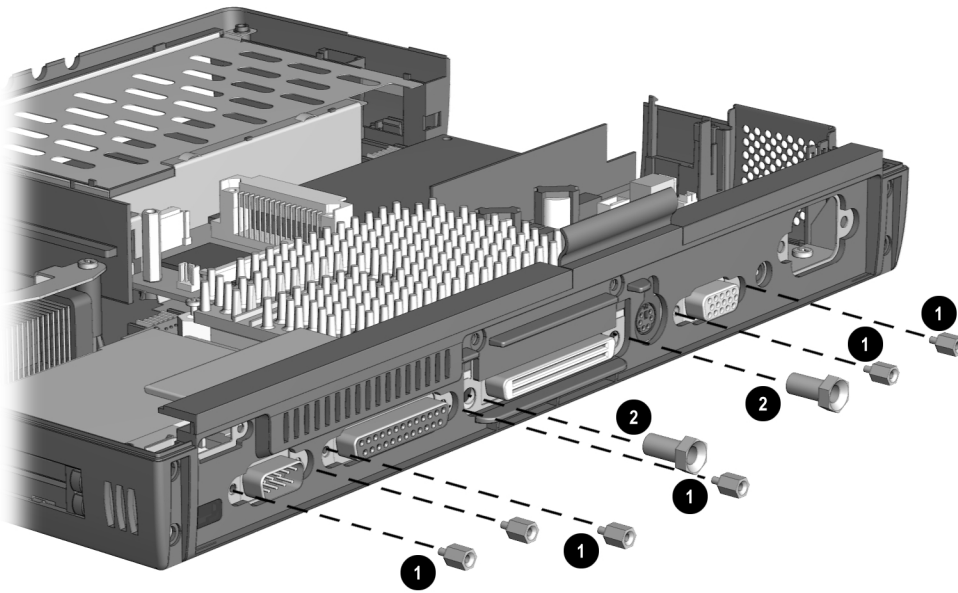
1. Prepare the computer for disassembly (Section 5.3).
2. Remove all battery packs (Section 5.5).
3. Remove all hard drives (Section 5.6).
4. Remove all MultiBay devices (Section 5.7).
5. Remove all PC Cards (Section 5.8).
6. Remove the keyboard assembly (Section 5.10).
7. Remove the CPU cover (Section 5.11).
8. Remove the power supply (Section 5.12).
9. Remove the fan assembly (Section 5.13).
10. Remove the audio board (Section 5.14).
11. Remove the auxiliary battery (Section 5.16).
12. Remove the mini PCI riser board (Section 5.17).
13. Remove the USB board (Section 5.19).
14. Remove the display assembly (Section 5.20).
15. Position the computer so the rear panel faces forward.

16. Remove the two screws that secure the display ground clip assembly ❶ and the screw above the keyboard connector ❷ (Figure 5-50).



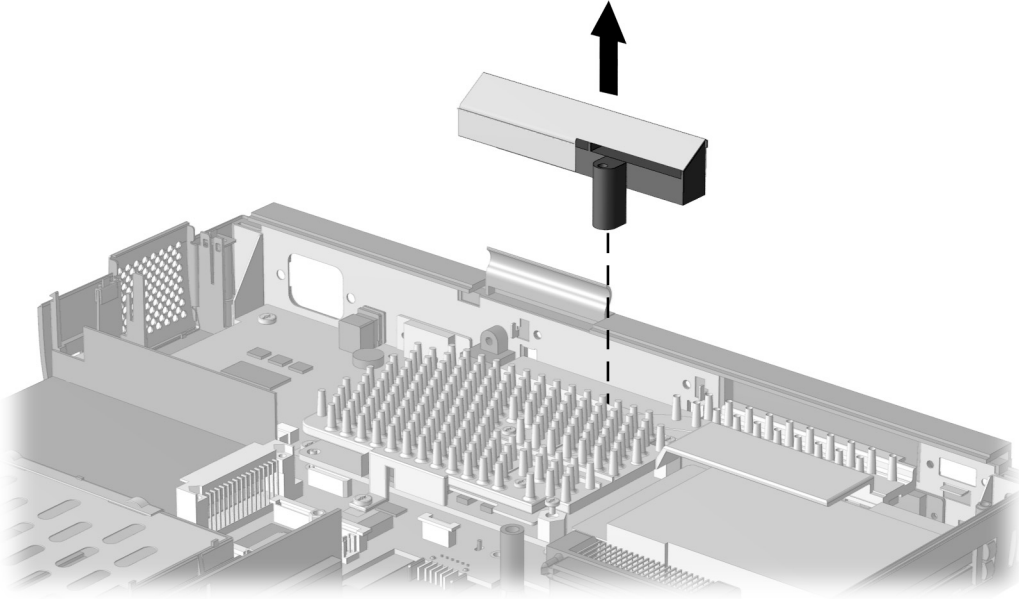
**Figure 5-50.** *Removing the System Board Screws*

17. Remove the six screwlocks ❶ and the two bushing guides ❷ (Figure 5-51).



**Figure 5-51.** *Removing the System Board Screwlocks and Bushing Guides*

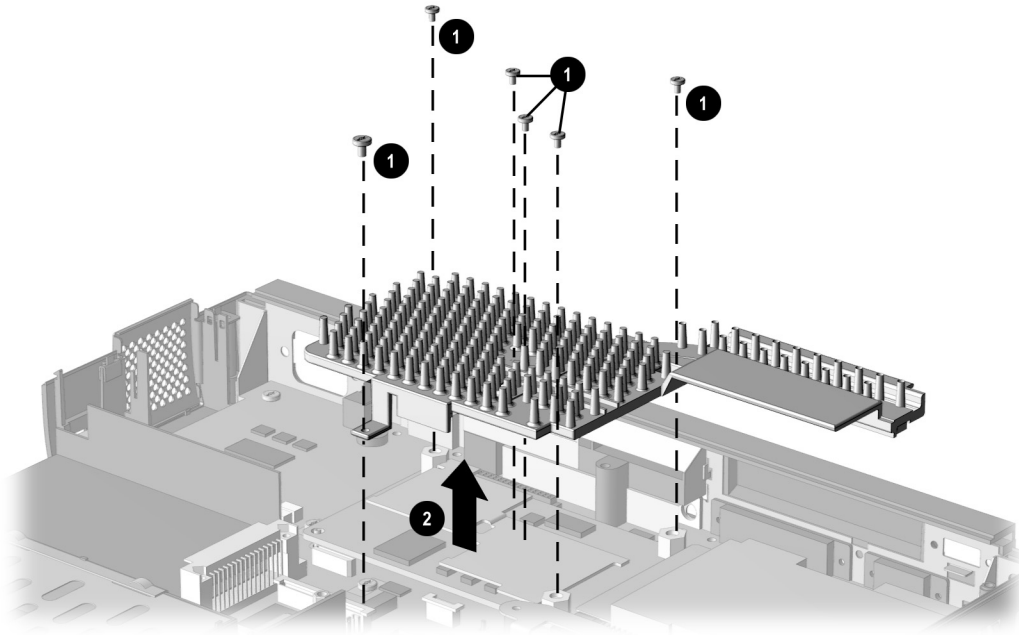
18. Position the computer so the front faces forward.
19. Remove the display ground clip assembly (Figure 5-52).



**Figure 5-52.** *Removing the Display Ground Clip*

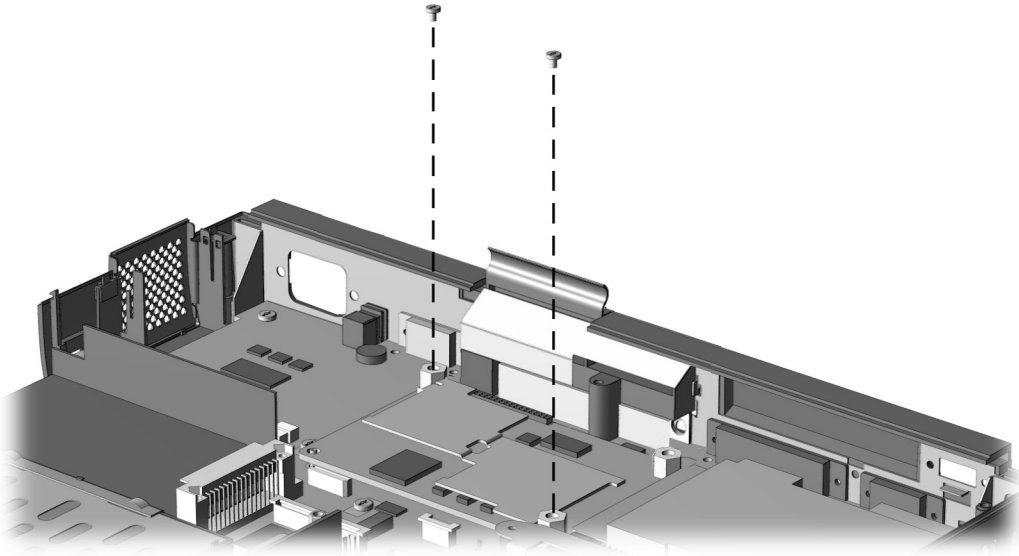
20. Remove the six screws that secure the heat sink to the system board ❶ (Figure 5-53).

21. Remove the heat sink ❷.



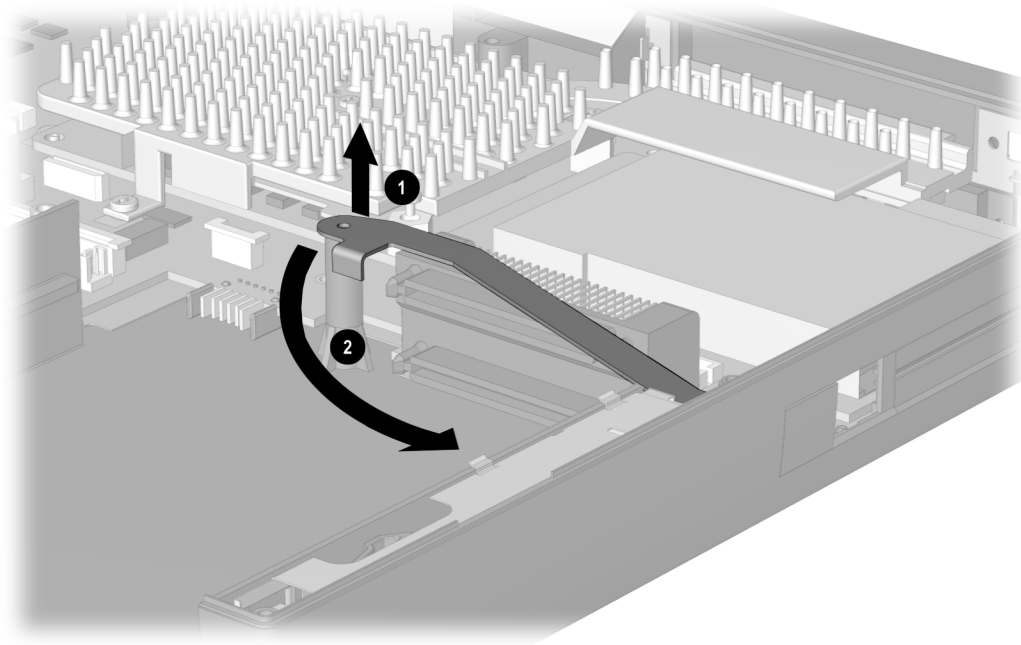
**Figure 5-53.** Removing the Heat Sink Screws

22. Install the two short screws removed in Step 20 into the upper/left and lower/right holes on the processor board (Figure 5-54). These screws are temporarily used to secure the processor board and processor spacers to the system board.



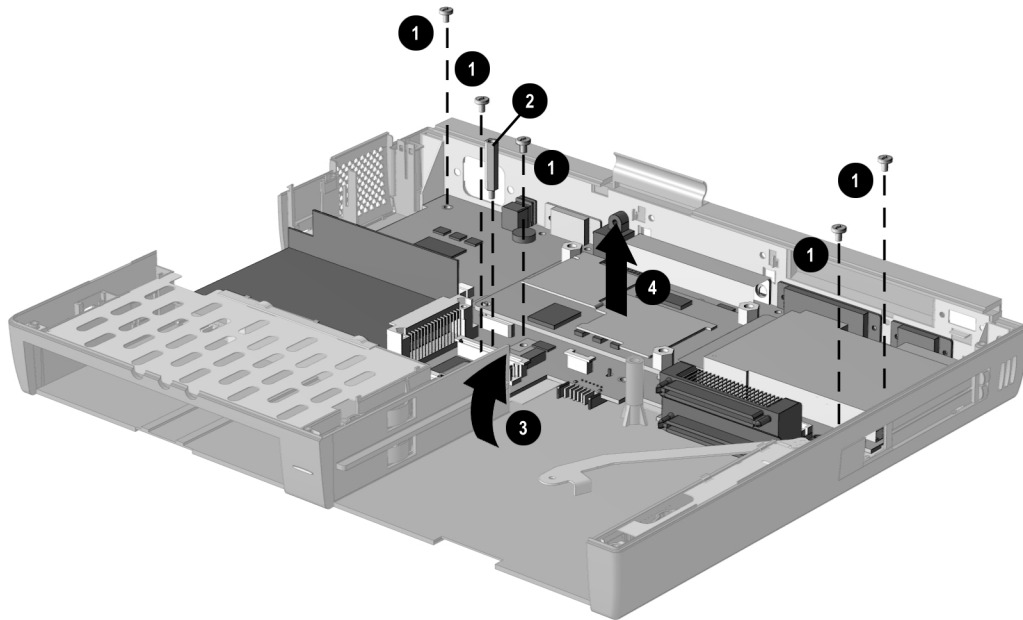
**Figure 5-54.** *Inserting the Short Screws in the Processor Board*

23. Lift the MultiBay release lever ❶ off the standby on which it rests and swing it forward and to the right ❷ (Figure 5-55).



**Figure 5-55.** *Removing the MultiBay Release Lever*

24. Remove the five screws ❶ and the standoff ❷ that secure the system board to the base assembly (Figure 5-56).
25. Slide and hold the battery pack release lever toward the front of the computer.
26. Lift the front edge of the system board ❸. When the front edge of the system board clears the base assembly, lift the board straight up and out of the base assembly ❹.

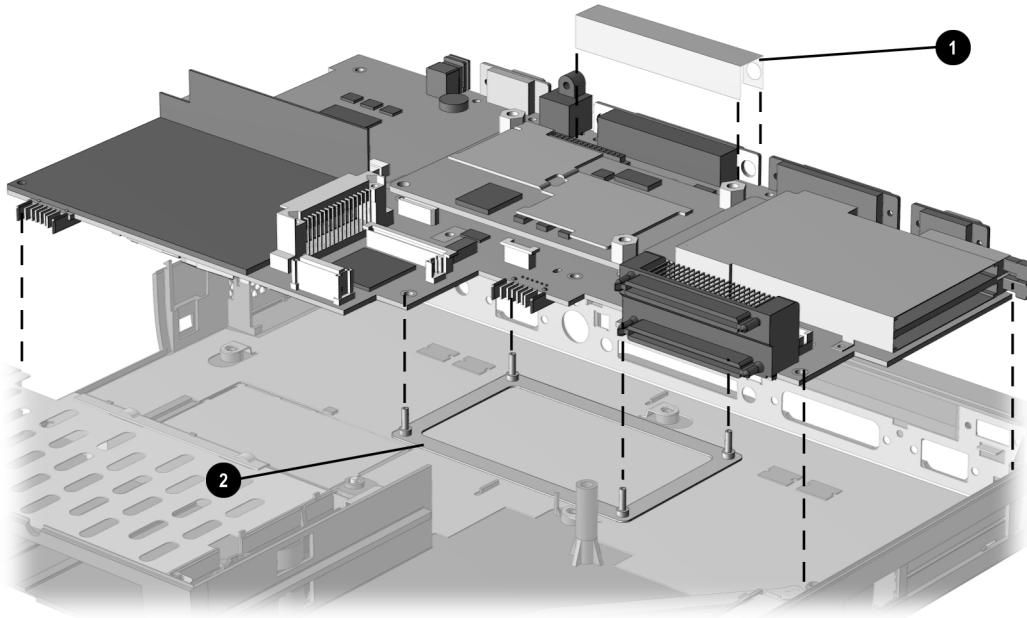


**Figure 5-56.** *Removing the System Board*

Reverse the above procedure to install the system board. After the system board has been replaced in the base enclosure, remove the short screws installed in Step 22 and reverse the disassembly steps to install the system board.



**NOTE:** When removing the system board, make sure the expansion connector shield ❶ and processor mount bracket ❷ are not dislodged (Figure 5-57).



**Figure 5-57.** Expansion Connector Shield and Processor Mount Bracket Locations

# chapter 6

## SPECIFICATIONS

This chapter provides physical and performance specifications for the Armada E700 Personal Computer.

### 6.1 Physical and Environmental

<b>Table 6-1 Computer</b>		
	<b>U.S.</b>	<b>Metric</b>
<b>Dimensions</b>		
Height	2.0 in	5.09 cm
Depth	10.2 in	26.96 cm
Width	12.6 in	32.05 cm
<b>Weight</b>	7 to 9 pounds depending on configuration	
<b>Standalone (Battery) Power Requirements</b>		
Nominal Operating Voltage	12 VDC	
Maximum Operating Power	15 W	
Peak Operating Power	25 W	
<b>AC Adapter Power Requirements</b>		
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	
<b>Temperature</b>		
Operating	50 to 104°F	10 to 40°C
Nonoperating	-4 to 140°F	-20 to 60°C
<b>Relative Humidity (noncondensing)</b>		
Operating	10 to 90%	
Nonoperating ( $t_w = 38.7^\circ\text{C}$ max)	5 to 95% -- 38.7°C Maximum Wet Bulb	
<b>Altitude</b>		
Operating	0 to 10,000 ft	0 to 3.05 km
Nonoperating	0 to 30,000 ft	0 to 9.14 km
<b>Shock</b>		
Operating	10 G, 11 ms, half sine	
Nonoperating	60 G, 11 ms, half sine	
<b>Vibration</b>		
	.25G, 5-50Hz, .5 Octave/min sweep	

**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**  
**15.0-inch XGA, CTFT Display**

	<b>U.S.</b>	<b>Metric</b>
<b>Dimensions</b>		
Height	9.82 in	24.05 cm
Width	12.89 in	31.58 cm
Diagonal	14.97 in	38.02 cm
<b>Number of Colors</b>	256, 32K, 64K, 16M	
<b>Contrast Ratio</b>	150:1	
<b>Brightness</b>	150 nits, (cd/m <sup>2</sup> )	
<b>Pixel Resolution</b>		
Pitch		.297 × 297 mm
Format	1024 × 768	
Configuration	RGB stripe	
<b>Backlight</b>	Edge Lit, Bottom	
<b>Character Display</b>	80 × 25	
<b>Total Power Consumption</b>	4.25 W (backlight & inverter)	
	1.90 W (panel logic)	

**Table 6-3**  
**14.1-inch XGA, CTFT Display**

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

## 6.3 Hard Drive

**Table 6-4  
Hard Drive**

	<b>10.0 GB</b>	<b>15.0 GB</b>	<b>18.0 GB</b>
<b>User capacity per drive</b>	10.0 GB	15.0 GB	18.0 GB
<b>Drive type</b>	65	65	65
<b>Drive height (with drive frame, in mm)</b>	12.7	17.0	17.0
<b>2.5-inch form factor</b>	Yes	Yes	Yes
<b>Sector interleave</b>	1:1	1:1	1:1
<b>Interface type</b>	ATA-4	ATA-4	ATA-4
<b>Seek times (typical, including setting)</b>			
Single track	2.3 ms	2.3 ms	2.3 ms
Average	12 ms	12 ms	12 ms
Full stroke	23 ms	23 ms	23 ms
<b>Physical configuration</b>			
Cylinders	11968	18081	21620
Heads	6	6	6
Sectors per track	190 - 330	290 - 505	345 - 580
Bytes per sector	512	512	512
<b>Logical configuration</b>			
Cylinders	16383	24662	29595
Heads	16	16	16
Sectors per track	63	63	63
Total customer usable data sectors	19,640,880	29,566,538	35,479,845
Bytes per sector	512	512	512
<b>Buffer size</b>	512K	512K	512K
<b>Disk rotational speed (rpm)</b>	4200	4900	4900
<b>Transfer rates</b>			
Interface (mbytes/sec)	16.6	16.6	16.6
Media (mbits/sec)	69.0 - 118.0	92.9 - 155.0	111.4 - 186.3

## 6.4 Diskette Drive

**Table 6-5**  
**Diskette Drive**

<b>Diskette Size</b>	3.5 inch
High Density	1.44 MB/1.2 MB
Low Density	720 KB
<b>Light</b>	None
<b>Height</b>	0.59 in (15 mm)
<b>Bytes per Sector</b>	512
<b>Sectors per Track</b>	
High Density	18 (1.44 MB)/15 (1.2 MB)
Low Density	9
<b>Tracks per Side</b>	
High Density	80 (1.44 MB)/80 (1.2 MB)
Low Density	80
<b>Read/Write Heads</b>	2
<b>Average Seek Times</b>	
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**

<b>Applicable Disc</b>	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)
<b>Center Hole Diameter</b>	15 mm
<b>Disc Diameter</b>	12 cm, 8 cm
<b>Disc Thickness</b>	1.2 mm
<b>Track Pitch</b>	1.6 $\mu$ m
<b>Laser</b>	
Divergence	53.5 $\pm$ 1.5 degrees
Output Power	0.13 $\pm$ 0.1 mw
Type	Semiconductor Laser GaAlAs
Wave Length	780nm $\pm$ 25nm
<b>Access Time</b>	
Random	< 150 ms
Full Stroke	< 600 ms
<b>Audio Output Level</b>	
Line Out	0.7 V rms
Headphone	none
<b>Cache Buffer</b>	256 KB
<b>Data Transfer Rate</b>	
Sustained, quad	300 MB/sec
Sustained, single	150 KB/sec
Burst	8.3 MB/sec
Startup Time	< 10 seconds typical
<b>Capacity</b>	
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**

<b>Applicable Disc</b>	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)
<b>Center Hole Diameter</b>	.59 in/15 mm
<b>Disc Diameter</b>	12 cm, 8 cm
<b>Disc Thickness</b>	1.2 mm
<b>Track Pitch</b>	.74 $\mu$ m
<b>Capacity</b>	
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
<b>Laser</b>	
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)
<b>Access Time</b>	
Random	< 200 ms
Full Stroke	< 250 ms
<b>Audio Output Level</b>	
Line Out	0.7 V rms
Headphone	none
<b>Cache Buffer</b>	128 KB
<b>Data Transfer Rate</b>	
Sustained, 1x (CD-ROM mode)	150 KB/sec
Sustained, 20x (CD-ROM CAV mode)	1200-1300 KB/sec
Sustained, (DVD-ROM mode)	1352-2705 KB/sec sustained, DVD-ROM mode
Burst	16.6 MB/sec
Startup Time	<3 seconds, typical

## 6.7 LS-120 Drive

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

	<b>1.68 MB DMF</b>	<b>1.44 MB</b>	<b>1.2 MB</b>	<b>1.2 MB</b>	<b>720 KB</b>
Formatted capacity (bytes)	1,720,320	1,474,560	1,261,568	1,228,800	737,280
Sector size (bytes)	512	512	1,024	512	512
Sectors	3,360	2,880	1,232	2,400	1,440
Magnetic tracks surface	80	80	77	80	80
Optical servo tracks/surface	N/A	N/A	N/A	N/A	N/A
Sectors/track	21	18	8	15	9
Sector interleave	2:1	1:1	1:1	1:1	1:1
Spare sectors	0	0	0	0	0
Zones (each side)	1	1	1	1	1
Average random seek	70 ms	70 ms	70 ms	70 ms	70 ms
Track-to-track seek	25 ms	25 ms	25 ms	25 ms	25 ms
Max single seek	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
Motor RPM	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
Track density	135 TPI	135 TPI	135 TPI	135 TPI	135 TPI
Track width	125 µm	125 µm	125 µm	125 µm	125 µm
Encoding method	MFM	MFM	MFM	MFM	MFM
Max flux density	17,334 FCI	17,334 FCI	17,334 FCI	17,334 FCI	17,334 FCI
Recording density	17,334 BPI	17,334 BPI	17,334 BPI	17,334 BPI	17,334 BPI
Nominal transfer rate	150 KB/sec	150 KB/sec	125 KB/sec	125 KB/sec	75 KB/sec
Nominal sustained transfer rate across interface	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
Buffer transfer rate	4.0 MB/sec	4.0 MB/sec	4.0 MB/sec	4.0 MB/sec	4.0 MB/sec



## 6.8 Battery Pack

**Table 6-9**  
**Lithium Ion Battery Pack**

	U.S.	Metric
<b>Dimensions</b>		
Battery Bay Battery Pack		
Height		
Length		
Weight		
MultiBay Battery Pack		
Height		
Length		
Weight		
Dual-MultiBay Battery Pack		
Height		
Length		
Weight		
Energy and Environmental Requirements are the same for all battery packs.		
<b>Energy</b>		
Voltage	14.4 V	
Capacity	2.7 Ah	
<b>Environmental Requirements</b>		
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**

<b>Hardware IRQ</b>	<b>System Function</b>
IRQ0	System timer
IRQ1	Keyboard controller
IRQ2	Cascaded
IRQ3	COM2
IRQ4	COM1
IRQ5	Audio (default)*
IRQ6	Diskette drive
IRQ7	Parallel port
IRQ8	Real Time Clock (RTC)
IRQ9	Infrared
IRQ10	System use
IRQ11	System use
IRQ12	Internal Point Stick or External Mouse
IRQ13	Coprocessor (Not available to any peripheral)
IRQ14	IDE Interface (Hard 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.

## 6.11 System I/O Addresses

**Table 6-12**  
**System I/O Addresses**

<b>I/O Address (Hex)</b>	<b>System Function (Shipping Configuration)</b>
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

*Continued*

**Table 6-12** *Continued*

<b>I/O Address (Hex)</b>	<b>System Function (Shipping Configuration)</b>
201	Joystick (Decoded in ESS1688)
202 - 21F	Unused
220 - 22F	Entertainment Audio
230 - 26D	Unused
26E - 26	National 87334 "Super IO" Controller in ArmadaStation EM
278 - 27F	Unused
280 - 2AB	Unused
2A0 - 2A7	Hard Drive Reset, IDE Select, MultiBay Device Identification
2A8 - 2E7	Unused
2E8 - 2CF	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

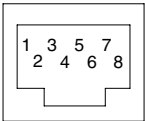
**Table 6-13**  
**System Memory Map**

<b>Size</b>	<b>Memory Address</b>	<b>System Function</b>
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 - 08FFFFFF	Video Memory (Direct Access)
4 G	08200000 - FFFFFFFF	Unused
64 K	FFFF0000 - FFFFFFFF	System BIOS

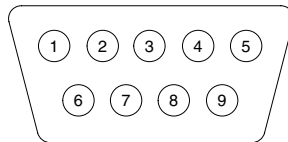
# *appendix* **A**

## CONNECTOR PIN ASSIGNMENTS

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

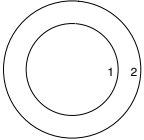
Connector	Pin	Signal
	1	NC_J3A
	2	NC_J3B
	3	TIP
	4	RING
	5	NC_J3C
	6	NC_J3D
	7	Unused
	8	Unused

**Table A-2**  
**Serial Connector**

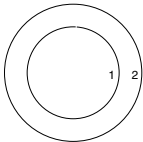


Pin	Signal	Pin	Signal
1	Carrier Detect	6	Data Set Ready
2	Receive Data	7	Ready to Send
3	Transmit Data	8	Clear to Send
4	Data Terminal Ready	9	Ring Indicator
5	Ground		

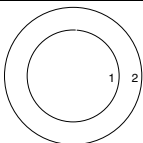
**Table A-3**  
**Microphone Jack**

Connector	Pin	Signal
	1	Audio in
	2	Ground

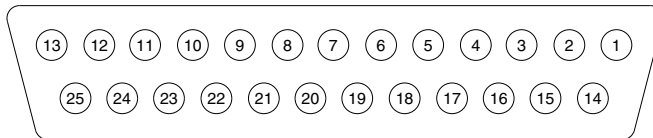
**Table A-4  
Stereo Speaker/Headphone Jack**

Connector	Pin	Signal
	1	Audio out
	2	Ground

**Table A-5  
Stereo Line-in Jack**

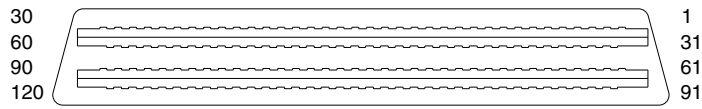
Connector	Pin	Signal
	1	Audio in
	2	Ground

**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	TRKO	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	MIDO/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*

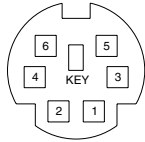
<b>Pin</b>	<b>Signal</b>	<b>Pin</b>	<b>Signal</b>
67	PDATA6 LD14	105	AD[16]
68	PDATA7 LD15	106	GND
69	GND	107	AD[15]
70	ERROR LCLK	108	AD[13]
71	RXD1 LVREQ	109	AD[11]
72	TXD1 LCREQ	110	AD[09]
73	RTS1 LEN	111	GND
74	GND	112	AD[06]
75	CTS1 UIC CLK	113	AD[04]
76	DTR1 UIC DAT	114	AD[02]
77	DSR1 EX	115	AD[00]
78	DCD1 EX	116	GND
79	12C DATA	117	FRAME
80	GND	118	TRDY
81	12C CLK	119	STOP
82	GND	120	PAR
83	HDSSEL	121	CBEO
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*

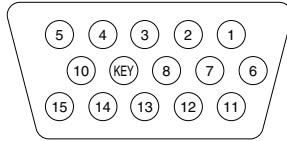
**Table A-7** *Continued*

Pin	Signal	Pin	Signal
143	VBATT	160	CBE3
144	AD[23]	161	CBE2
145	GND	162	IADY
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**



<b>Pin</b>	<b>Signal</b>	<b>Pin</b>	<b>Signal</b>
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		

# *appendix* **B**

## POWER CORD SET REQUIREMENTS

### **3-Conductor Power Cord Set**

The wide range input feature of the Armada E700 Series 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

<b>3-Conductor Power Cord Set Requirements—By Country</b>		
<b>Country</b>	<b>Accredited Agency</b>	<b>Applicable Note Numbers</b>
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 mm<sup>2</sup> 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, 0.75mm<sup>2</sup> conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (15A, 125V) configuration.

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