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Maintenance and Service Guide

Compaq Armada 7400 Family of Personal Computers

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Compaq Computer Corporation

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Preface

This *Maintenance and Service Guide* is a troubleshooting reference that can be used when servicing the Compaq Armada 7400 Family of Personal Computers.

Compaq Computer Corporation reserves the right to make changes to the Compaq Armada 7400 Family of Personal Computers without notice.

Additional information is available on the *Compaq Armada 7400 Family of Personal Computers Illustrated Parts Map*. Information for the Compaq ArmadaStation and Armada MiniStation E and EX is available in the *Compaq ArmadaStation and Armada MiniStation E and EX Maintenance and Service Guide* and *Illustrated Parts Map*.

Symbols

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



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



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

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

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

Technician Notes



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



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



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

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

In addition to this guide, the following documentation provides information for the computer:

- Compaq Armada 7400 Family of Personal Computers documentation set
- Microsoft *Windows 95/Windows NT 4.0 User's Guide*
- Compaq Service Training Guides
- Compaq Service Advisories and Bulletins
- *Compaq QuickFind*
- *Compaq Service Quick Reference Guide*
- *Compaq Armada 7400 Family of Personal Computers Illustrated Parts Map*
- *Compaq ArmadaStation and Armada MiniStation E and EX Maintenance and Service Guide*
- *Compaq ArmadaStation and Armada MiniStation E and EX Illustrated Parts Map*
- Compaq Internet site at <http://www.Compaq.com>

Product Description

1.1 Computer Features and Models

The Compaq Armada 7400 Family of Personal Computers offers advanced modularity, an Intel Pentium II processor with 64-bit architecture, an industry-leading Accelerated Graphics Port (AGP) implementation, and extensive multimedia support. The computer provides desktop functionality and connectivity through the optional ArmadaStation II and Armada MiniStation.



Figure 1-1. Compaq Armada 7400 Personal Computer

Features

The computer has the following standard features:

- Intel Mobile 300- and 266-MHz Pentium II processor with 64-bit architecture, MMX technology, and 512-KB, level-2 cache memory
- Industry-leading portable computer AGP implementation, featuring:
 - 66-MHz dedicated graphics bus
 - frame made AGP
- 4-MB SGRAM (synchronous graphics)

-
- 32- or 64-MB of SDRAM (synchronous): populated in one slot; expandable to 256 megabytes
 - Upgradable flash ROM BIOS
 - 13.3 XGA (1024 × 768) TFT color display, true color (24-bit) support
 - Keyboard with built-in EasyPoint III pointing device and mouse buttons
 - Euro symbol provided on Europe/Middle East/Africa keyboards
 - External AC adapter
 - Lithium ion (Li-ion) battery pack
 - Removable 4.0- and 6.4-GB hard drives
 - MultiBay that supports a diskette drive, CD-ROM drive, SuperDisk LS -120 drive, DVD-ROM drive, or second hard drive (in Hard Drive MultiBay Adapter)
 - Two PC Card slots that accept 32- and 16-bit Type I, II, and III PC Cards, with zoomed video interface in the bottom slot
 - IrDa-compliant infrared port¹ (4-Mbps standard) for wireless file transfer, printing, and file synchronization
 - Built-in stereo speakers providing Compaq PremierSound, microphone, and jacks for stereo audio sound with electronic equalization and wave table synthesis
 - Energy Star-compliant power saving features
 - Ports and connectors for external equipment, including universal serial bus (USB), serial, parallel, external monitor, and PS/2-compatible pointing device or keyboard
 - Security features
 - Desktop functionality available with the optional Compaq ArmadaStation II and Armada MiniStation E/EX
 - Integrated 33.6-Kbps data/14.4-Kbps fax modem (on modem models only; availability varies by region)

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

Models

The Armada 7400 models are shown in Table 1-1. The computer model designation is composed of a group of characters that define each model's characteristics.

Table 1-1
Models and Model Naming Convention
Compaq Armada 7400 Family of Personal Computers

Model											
Armada 7400 6300 T 6400 D M 1 (64-MB RAM standard)											
Armada 7400 6300 T 6400 D 0 1 (64-MB RAM standard)											
Armada 7400 6300 T 6400 D 0 2 (64-MB RAM standard)											
Armada 7400 6300 T 6400 D 0 3 (64-MB RAM standard)											
Armada 7400 6266 T 4000 D 0 3 (32-MB RAM standard) [Europe, Middle East, Africa only]											
Armada 7400 6266 T 4000 D 0 1 (32-MB RAM standard)											
Armada 7400	7	4	0	0	6	300	T	6400	D	M	1
Key	A	B			C	D	E	F	G	H	I
Key	Description		Options								
A	Line designator		7 = Performance								
B	Family designator		4 = Armada 7400								
C	Processor type		6 = Intel Pentium II processor with MMX technology								
D	Processor speed		300 = 300-MHz processor 266 = 266-MHz processor								
E	Panel type		T = 13.3-inch XGA TFT 1024 × 768								
F	Hard drive capacity		6400 = 6.4 GB 4000 = 4.0 GB								
G	Drive type		D = 24X Max CD-ROM V = DVD 0 = none								
H	Modem		M = Integrated modem 0 = No integrated modem, audio only								
I	Operating system & software version		0 = No operating system 1 = Windows 95 2 = Windows 98 3 = Windows NT 4.0 4 = Windows NT 5.0								

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Intelligent Manageability

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

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

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

Asset Management

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

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

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

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

Changing the Asset Tag Number

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

Fault Management

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

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

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

Fault Management Alerts

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

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

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

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

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

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Security Management Overview

Security Management features customize system security.

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

Configuration Management

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

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

Power Management Utility

The Power Management utility (Power) allows you to monitor how AC and battery power are used. It controls most computer components, including the hard drive, processor, and display.

Power Management also allows you to preset or customize conservation of power under the following tabs:

- Power
- Disk Drives
- PC Card Modems
- Resume Timer
- Battery Status
- Battery Conservation
- Hibernation

To access Power Management, click Start → Settings → Control Panel → double-click the Power icon.

The following table describes the actions that can be performed under each tab. A description of each tab follows.

<i>If You Want To:</i>	<i>Click This Tab:</i>
Show the battery meter on the taskbar; show the status of batteries; show the Suspend command on the Start menu	Power
Select how long Windows will wait before switching the disk drive to low power mode	Disk Drives
Turn off power to PC Card modems when not in use	PC Card Modems
Select a date and time to be used to reset the computer when all power is turned off	Resume Time
Display the remaining life and status of installed batteries	Battery Status
Set battery conservation levels and settings; enable/disable warning beeps	Battery Conservation Settings
Select Hibernation Settings	Hibernation

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Power Tab

The Power Tab allows a shortcut to be created enabling the battery meter to appear on the task bar. The current power status of the computer as well as the status of all battery is also displayed.

Advanced Power Tab features include the ability to show the Suspend command on the Start menu, whether the Suspend command appears when the computer is docked or undocked, and whether the computer will wake up when the telephone rings (for computers connected to phone lines). Troubleshooting options are also available under the Advanced Power Tab features.

Disk Drives

The Disk Drives Tab is used to set up the time the Windows operating system waits before switching the disk drive to low power mode when the computer is powered by AC power and battery.

PC Card Modems Tab

When PC Card modems are installed, they draw power from the system even when they are not in use. For optimum power conservation, follow this guideline when using PC Card modems: if PC Card modems are kept in the computer, set the PC Card Modems tab to turn off power to PC Card modems when they are not in use. Otherwise, remove PC Card modems when they are not being used.

Resume Time Tab

When all power sources (AC power, battery pack, auxiliary battery, and real time clock (RTC) battery) to the computer are disconnected, the system date and time are reset to the settings established in this tab.

Battery Status Tab

The Battery Status tab provides the following information:

- The position of possible battery pack locations in the computer
- An illustration of each battery pack and the bay where it is installed in the computer
- The status (high, low, critical, and charging) of each battery pack
- The percentage of charge remaining in each battery pack
- Which battery pack, if any, is currently charging

Battery Conservation Tab

The Battery Conservation tab allows you to select the level of battery conservation: High, Medium, None (Drain), or Custom. Medium conservation is the default setting.

In addition to accessing this tab through the Power menu and Power Management, you can press hotkeys **Fn+F7** in any application. A popup window displays the current battery level. Use the left or right arrow to select a different level.

- ❶ **High Conservation**—Provides maximum battery conservation and the most battery life from a single charge.
- ❷ **Medium Conservation (Default Setting)**—Provides a balance between system performance and battery life.
- ❸ **None (Drain)**—Turns off the battery conservation features, which allows the system to run at full speed. This setting also causes the computer to fail to initiate Hibernation. At other conservation settings, the computer automatically initiates Hibernation when it reaches a low-battery condition, even if Hibernation has been manually disabled.



CAUTION: Before setting the battery conservation level to None (Drain), ensure that the Hibernation feature has not been disabled.

- ❹ **Custom**—Allows you to specify conservation settings for Suspend, system idle, screen save, processor speed, and brightness. Refer the following section for information on timeouts.

Hibernation Tab

The Hibernation tab allows you to enable or disable Hibernation and to set the timeout periods after which the system initiates Hibernation. For Hibernation to work, it must allocate space on the hard drive equal to the amount of system memory. Turning off Hibernation is not recommended by Compaq; however, it is possible to free up this disk space by disabling Hibernation.



CAUTION: Turning off Hibernation is not recommended. If the computer reaches a low-battery condition and Hibernation has been disabled, unsaved information is lost.

When the computer is restarted after adding memory, the system first upgrades the memory, then allocates or updates the disk space to adjust to the new amount of memory.

NOTE: If you experience problems with Hibernation after upgrading the memory, go to the Power icon and click the Hibernation tab to reset the system memory.

Timeouts are specified periods of system or component inactivity designed to conserve power. When a timeout period expires, battery conservation shuts down the system or the specified components to save power.

For example, the hard drive idle default timeout is two minutes. If an application does not access information on the hard disk for two minutes, the hard drive shuts down until it is accessed again.

These guidelines can aid in choosing the most appropriate timeouts for the computer:

1. The preset timeout provides the medium (default) or high level of battery conservation.
2. Customized timeouts, which are set through the custom level of battery conservation, allow the computer to work more efficiently with applications on the computer.

1.2 Computer Components

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

<i>Component</i>	<i>Ships with Computer</i>	<i>Available as Option</i>
Battery pack	■	■
Modem (not available in all locations)	■	
Modem cable (country specific; modem models only)	■	■
Diskette drive	■	
MultiBay weight saver	■	
Slipcase (Europe, Middle East, Africa, Latin America, and Japan only)	■	
EasyPoint III caps	■	
Power cable	■	■
Quick Restore CD-ROM	■	
Security kit	■	
AC Adapter	■	
24X CD-ROM drive	■	
4.0- and 6.4-GB hard drives	■	■
Armada 7000 Removable Drive MultiBay Adapter	■	
ArmadaStation II		■
Armada MiniStation E and EX		■
Memory expansion boards	■	■
Battery charger		■
Automobile/aircraft adapter		■
Headset		■
Hard Drive MultiBay Adapter		■
DVD-ROM drive		■
SuperDisk LS-120 drive		■
External Diskette drive		■
USB Cardbus PC Card		■
Cellular phone cables (available in North America only)		■
Portable Video Conferencing Kit		■
SpeedPaq Cellular PC Card Kit		■
External infrared transceiver		■
Security lock		■

The computer options are described in the following sections.

System Memory Options

The main memory subsystem supports a minimum standard 32 or 64 megabytes of Synchronous SDRAM, expandable to 256 megabytes. The minimum standard Synchronous SDRAM is installed in the memory expansion compartment. The upgrade SDRAM is accomplished with memory expansion boards that are available in 16-, 32-, 64- and 128-megabytes.

The memory expansion slot cover is secured to the computer by Torx T-10 screws. Tamper-resistant security screws, included with the computer, can be used to provide added security. The security screwdriver, also included with the computer, must be used to remove the tamper-resistant security screws.

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

Table 1-3
Memory Upgrade

Base Memory	Memory Expansion Board	Total Memory
32 MB	16 MB (1 × 16 MB)	48 MB
32 MB	32 MB (1 × 32 MB)	64 MB
32 MB	64 MB (1 × 64 MB)	96 MB
32 MB	128 MB (1 × 128 MB)	160 MB
64 MB	16 MB (1 × 16 MB)	80 MB
64 MB	32 MB (1 × 32 MB)	96 MB
64 MB	64 MB (1 × 64 MB)	128 MB
64 MB	128 MB (1 × 128 MB)	192 MB
128 MB	128 MB (1 × 128 MB)	256 MB

Armada 7400 models are shipped with 32- and 64-MB of memory installed in the system memory compartment, depending on the model.

Mass Storage Devices

The following mass storage devices are available for the computer.

Table 1-4
Mass Storage Devices

Device	Capacity
Diskette drive	3.5-inch, 1.44 MB
Hard drive	6.4 and 4.0 GB (also available as an option)
CD-ROM drive	24-Speed Max (also available as an option)
DVD-ROM	4.7 GB, 20-Speed Max
SuperDisk LS-120 drive	120 MB
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, ArmadaStation II, or Armada MiniStation EX MultiBays. The diskette drive is a three-mode type that is compatible with 1.44 megabytes, 1.2 megabytes, and 720 kilobytes (formatted) AT drive types. The system supports a maximum of two diskette drives: one in the computer MultiBay and one in the ArmadaStation II or Armada MiniStation EX MultiBay.

Hard Drive

The dedicated hard drive bay supports removable 6.4- and 4.0-GB hard drives and 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.

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CD-ROM Drive

A 24-Speed Max CD-ROM drive comes as standard equipment with the typical configuration of the computer. 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

Power Equipment Options

The following power options are available:

- AC Adapter
- Ten-foot power cord (a 6-foot cord ships with the computer as standard equipment)
- Automobile/Aircraft Adapter
- Lithium ion battery pack
- Battery Charger

AC Adapter

The AC Adapter is field replaceable and ships with the computer and is available as an option. The 44-watt AC Adapter converts 100/220 volts AC into low-voltage DC to drive the DC-DC converter and to recharge the battery pack. The output of this AC/DC supply is the battery voltage, approximately 10 to 19 volts.

Automobile/Aircraft Adapter

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

Lithium Ion Battery Pack

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

Battery Charger

The external Battery Charger has the following features:

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

1.3 Computer External Components

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

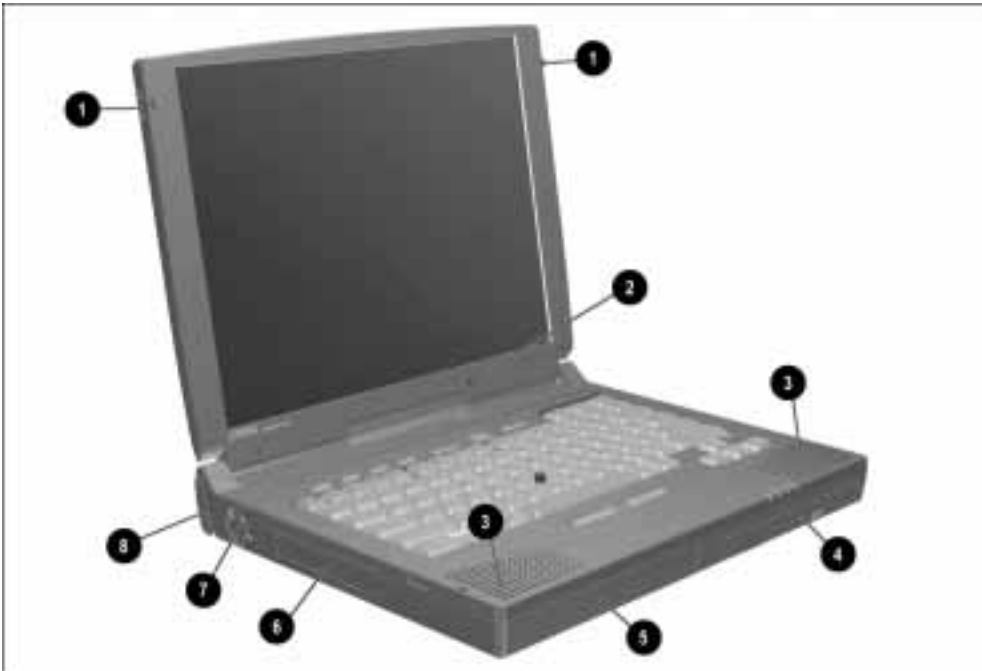


Figure 1-2. Display, Front, and Left Side Components

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

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

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



Figure 1-3. *Right Side Components*

Table 1-6
Right Side Components

<i>Item</i>	<i>Component</i>	<i>Function</i>
1	Stereo speaker/headphone jack	Connects external stereo speakers and headphones to the computer. This jack is driven by an amplifier and has volume control. The internal speakers are turned off when external speakers or headphones are plugged into this jack.
2	Microphone jack	Connects an external monophonic microphone.
3	Stereo line-in jack	Connects a CD player, tuner, or tape deck to the computer.
4	25-pin modem connector	Connects a country-specific 25-pin telephone cable to the computer in all countries except North America, Latin America, and Japan. (North America, Latin America, and Japan refer to the RJ-11 jack.) Also connects a cellular phone to the computer in the United States only.
5	Security slot	Secures the computer to a fixed object to prevent theft.
6	RJ-11 jack	Connects a standard telephone cable to the computer in North America, Latin America, and Japan. (This jack may be blocked out in other countries.)
7	PC Card slots	Accepts 16- and 32-bit CardBus PC Cards. Supports Type I, II, and III PC Cards such as modem or network cards.

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



Figure 1-4. Rear Panel Components

Table 1-7
Rear Panel Components

Item	Component	Function
1	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. Also connects a hub which allows multiple USB devices to be connected to the computer.
3	Parallel connector	Connects optional parallel devices such as a printer.
4	Docking connector	Connects optional ArmadaStation or Armada MiniStation E or EX.
5	External monitor connector	Connects an optional external monitor. Also connects a television adapter.
6	Serial connector	Connects optional serial devices such as a mouse.
7	Keyboard/mouse connector	Connects an optional full-sized keyboard or a mouse. Both external mouse and computer pointing device are active. An optional splitter/adapter allows both an external keyboard and mouse to be used at the same time.
8	Power connector	Connects the AC Adapter to the computer.

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

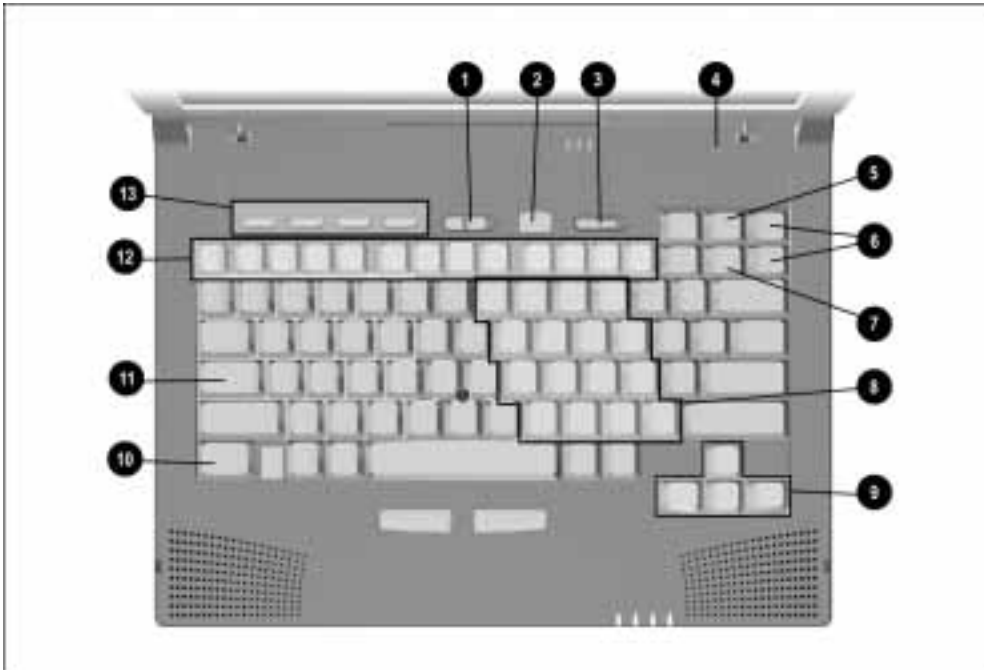


Figure 1-5. Keyboard Components

Table 1-8
Keyboard Components

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

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



Figure 1-6. Keyboard Components (continued)

Table 1-9
Keyboard Components (continued)

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

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

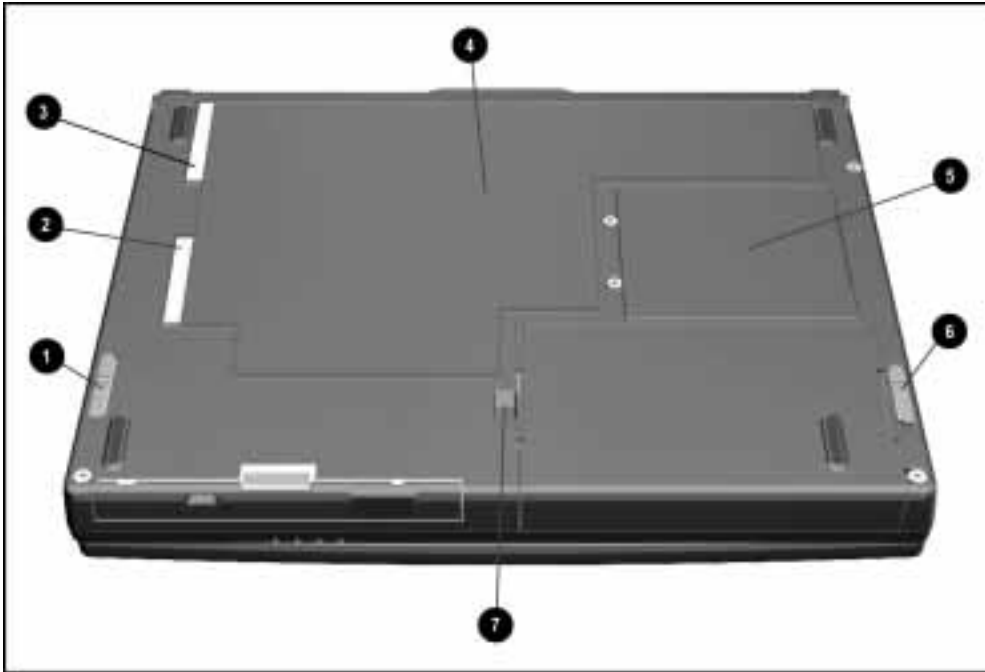


Figure 1-7. *Bottom Components*

Table 1-10
Bottom Components

<i>Item</i>	<i>Component</i>	<i>Function</i>
1	MultiBay release latch	Releases devices from the MultiBay.
2	Serial number	Numerical identification for the computer.
3	Model configuration number	Identifies model information
4	Labels area	Contains labels that describe the computer model and provide agency and modem information.
5	Memory expansion slot cover	Covers the memory expansion compartment.
6	Battery release latch	Releases the battery from the battery bay.
7	Docking restraint latch recess	Secures the computer to the ArmadaStation.

1.4 Design Overview

This section presents a design overview of key parts and features of the computer. Refer to Chapter 3 for the illustrated parts catalog and Chapter 5 for removal and replacement procedures.

System Board

The system board provides the following device connections:

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

The computer is equipped with a 3.1-volt, Intel Mobile Pentium II 300- or 266-MHz processor. For ventilation, an electrical fan is installed. The fan operates on from 5 to 12 volts and is controlled by a temperature sensor. The fan is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software applications. Exhaust air is displaced through the ventilation grill located on the left side of the computer.



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

Troubleshooting

Follow these basic steps when beginning the troubleshooting process:

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

Follow these guidelines when troubleshooting:

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

The following table describes the troubleshooting actions:

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

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2.1 Preliminary Steps

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

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

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

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

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

Follow these steps to run Compaq Utilities:

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

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

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

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2.2 Clearing Passwords

1. Turn off the computer.
2. Disconnect the AC Adapter (refer to Section 5.4).
3. Remove the battery pack (Section 5.8).
4. Remove the keyboard/CPU cover assembly (Section 5.13).
5. Disconnect and remove the auxiliary battery (Section 5.14).
6. Disconnect and remove the Real Time Clock (RTC) battery (Section 5.15).
7. Wait five minutes.
8. Reconnect the auxiliary battery.
9. Reconnect the RTC battery.
10. Install the keyboard/CPU cover assembly.
11. Reconnect the AC Adapter. Do **not** reinstall the battery pack yet.
12. Turn on the computer.

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

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2.3 Power-On Self-Test (POST)

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

To run POST, complete the following steps:

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

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

2.4 POST Error Messages

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

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

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

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

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

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

**Table 2-1
Warning Messages**

Message	Description	Recommended Action
CMOS checksum invalid, run SCU	CMOS RAM information has been corrupted.	Run Computer Setup to reinitialize CMOS-RAM.
CMOS failure, run SCU	CMOS RAM has lost power.	Run Computer Setup to reinitialize CMOS-RAM.
Diskette controller error	The diskette drive controller failed to respond to the recalibrate command.	If there is no diskette drive in the system, run Computer Setup to properly configure the CMOS-RAM to show no diskette drive present. If the problem persists, or if a diskette drive is present, complete these steps until the problems is solved: 1. Check diskette drive connections. 2. Replace diskette drive. 3. Replace system board.
Diskette track 0 failed	The diskette drive cannot read track 0 of the diskette in the drive.	Try another diskette. If the problem persists, you may need to replace the diskette drive.
Hard disk controller error	The hard drive controller failed to respond to the reset command.	Check the drive parameters. Turn off the system and check all related connections.
Keyboard controller failure	The keyboard failed the self-test command.	Replace the system board.
Keyboard failure	The keyboard failed to respond to the RESET ID command.	Replace the keyboard. If the problem persists, replace the system board.
No interrupts from Timer 0	The periodic timer interrupt is not occurring.	Replace the system board.
ROM at xxxx (LENGTH yyyy) with nonzero checksum (zz)	An illegal adapter ROM was located at the specified address.	Check the external adapter (such as a video card) to determine if it is causing the conflict.
Time/Date corrupt - run SCU	The time and date stored in the real time clock have been corrupted, possibly by a power loss.	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. If the problem persists, refer to Table 2-10.

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

Table 2-2
Fatal Error Messages

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

*Beep codes are defined in Table 2-3.

Table 2-3
Fatal Error Beep Codes

Beep Code	Beep Sequence	Description	Recommended Action
0	S-S-S-P-S-S-L-P	The DMA page registers are faulty.	Replace system board.
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

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2.5 Compaq Utilities

Compaq Utilities contain several functions that

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

Compaq Utilities include the following programs:

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

To access Compaq Utilities:

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

Computer Setup

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

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

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

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

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

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Categories by type:

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

Categories by connection:

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

Running Computer Setup

1. Turn on or restart the computer by clicking Start → Shut Down → Restart the computer.
2. Press **F10** when the blinking cursor appears in the upper-right corner of the screen.
NOTE: If a power-on password is enabled, it must be used to access Computer Setup.
3. Click a language and press **Enter**.
4. Click Computer Setup and press **Enter**.
5. When you are finished, click **Exit**.

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Exiting Computer Setup

1. Click **Exit**.
2. Select one of the following Exit options:
 - **Save**—Saves the new settings and exits Computer Setup.
NOTE: Some settings may not take effect until the computer is restarted.
 - **Ignore**—Exits Computer Setup and restores previous settings.
 - **Cancel**—Returns to Computer Setup.

Computer Checkup (TEST)

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

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

Running Computer Checkup (TEST)

1. Plug the computer into an external power source. A low battery condition can interrupt the program.
2. Connect a printer if you want to print a log of error messages.
3. Turn on the external devices that you want to test.
4. Turn on or restart the computer.
5. Access Compaq Utilities by pressing **F10** when the blinking cursor appears in the upper-right corner of the display.
6. Click Computer Checkup → View the Device List.
 - If the list of installed devices is correct, click **OK**.
 - If the list is incorrect, ensure that any new devices are installed properly.

7. Select one of the following from the Test Option menu:

- Quick Check Diagnostics
- Automatic Diagnostics
- Prompted Diagnostics

8. Follow the instructions on the screen as the devices are tested.

9. Click Exit Diagnostics → Exit from this utility.

Computer Checkup (TEST) Error Codes

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

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

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

A or AA = Number that represents the faulty assembly

YY = Test or action that failed

XX = Specific problem

Table 2-4
Processor Test Error Codes

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

Table 2-5
Memory Test Error Codes

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

Table 2-6
Keyboard Test Error Codes

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

Table 2-7
Parallel Port Test Error Codes

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

Table 2-8
Diskette Drive Error Codes

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

Table 2-9
Serial Test Error Codes

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

Table 2-10
Hard Drive Test Error Codes

Error Code	Description	Recommended Action
1701-xx	Hard drive format test failed.	The following steps apply to error codes 1701-xx through 1736-xx: <ol style="list-style-type: none">1. Run Compaq Utilities and verify drive type.2. Verify that all secondary drives have secondary drive capability.3. Replace the hard drive and retest.4. Replace the system board and retest.
1702-xx	Hard drive read test failed.	
1703-xx	Hard drive write/read/compare test failed.	
1704-xx	Hard drive random seek test failed.	
1705-xx	Hard drive controller test failed.	
1706-xx	Hard drive ready test failed.	
1707-xx	Hard drive recalibration test failed.	
1708-xx	Hard drive format bad track test failed.	
1709-xx	Hard drive reset controller test failed.	
1710-xx	Hard drive park head test failed.	
1715-xx	Hard drive head select test failed.	
1716-xx	Hard drive conditional format test failed.	
1717-xx	Hard drive ECC* test failed.	
1719-xx	Hard drive power mode test failed.	
1724-xx	Network preparation test failed.	
1736-xx	Drive monitoring test failed.	

*ECC = Error Correction Code

Table 2-11
Video Test Error Codes

Error Code	Description	Recommended Action	
501-xx	Video controller test failed.	The following actions apply to error codes 501-xx through 516-xx: 1. Disconnect external monitor and test with internal LCD display. 2. Replace the display assembly and retest. 3. Replace the system board and retest.	
502-xx	Video memory test failed.		
503-xx	Video attribute test failed.		
504-xx	Video character set test failed.		
505-xx	Video 80 × 25 mode 9 × 14 character cell test failed.		
506-xx	Video 80 × 25 mode 8 × 8 character cell test failed.		
507-xx	Video 40 × 25 mode test failed.		
511-xx	Video screen memory page test failed.		
512-xx	Video gray scale test failed.		
514-xx	Video white screen test failed.		
516-xx	Video noise pattern test failed.		
2402-xx	Video memory test failed.		The following actions apply to error codes 2402-xx through 2456-xx: 1. Run Compaq Utilities. 2. Disconnect external monitor and test with internal LCD display. 3. Replace the display assembly and retest. 4. Replace the system board and retest.
2403-xx	Video attribute test failed.		
2404-xx	Video character set test failed.		
2405-xx	Video 80 × 25 mode 9 × 14 character cell test failed.		
2406-xx	Video 80 × 25 mode 8 × 8 character cell test failed.		
2411-xx	Video screen memory page test failed.		
2412-xx	Video gray scale test failed.		
2414-xx	Video white screen test failed.		
2416-xx	Video noise pattern test failed.		
2418-xx	ECG/VGC memory test failed.		
2419-xx	ECG/VGC ROM checksum test failed.		
2421-xx	ECG/VGC 640 × 200 graphics mode test failed.		
2422-xx	ECG/VGC 640 × 350 16 color set test failed.		
2423-xx	ECG/VGC 640 × 350 64 color set test failed.		
2424-xx	ECG/VGC monochrome text mode test failed.		
2425-xx	ECG/VGC monochrome graphics mode test failed.		
2431-xx	640 × 480 graphics test failed.		
2448-xx	Advanced VGA Controller test failed.		

Continued

Table 2-11 *Continued*

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

NOTE: Refer to Table 2-29 for information about other video errors.

Table 2-12
Audio Test Error Codes

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

Table 2-13
Pointing Device Interface Test Error Codes

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

Table 2-14
CD-ROM Test Error Codes

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

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Running View System Information (INSPECT)

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

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

Running Compaq Diagnostics

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

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

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

Boot Sequencing

1. Run Computer Setup.
2. Click the System Features icon.
3. Click the Boot Management box.
4. Select the MultiBoot tab.
5. Specify the desired boot order by arranging the available bay names.
6. Click **OK** to accept the changes.

Factory Default Settings

Table 2-15
Initialization

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 ArmadaStation II or Armada MiniStation E/EX half-height/MultiBay
4	Hard drive in the ArmadaStation II or Armada MiniStation E/EX MultiBay
Boot display	Auto
Language	Language of country

Table 2-16
Ports

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

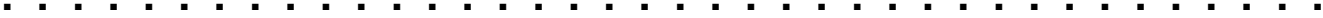


Table 2-17
Power

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 2-18
Security

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

2.6 Troubleshooting Without Diagnostics

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

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

Before Replacing Parts

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

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

Checklist for Solving Problems

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

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

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

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

Solving Audio Problems

Table 2-19
Solving Audio Problems

Problem	Probable Cause	Recommended Action(s)
Computer does not beep after the Power-On Self-Test (POST).	Speaker volume has been turned down.	Adjust the volume with the volume control buttons located at the top-right corner of the computer.
Computer beeped five times and battery light is blinking.	Computer has entered a low-battery condition.	Immediately save open files and resolve the low-battery condition.
Computer does not beep to indicate a low-battery condition.	Low-battery warning beeps have been turned off.	Enable low-battery warning beeps in Windows 95 Power Properties Power Management.
	System beeps have been turned down too low.	Press Fn+F5 , then press the right arrow key to increase the volume of the system beeps.
Audio playback is too low or too loud.	The computer volume control and/or the software volume control needs to be adjusted.	In Windows 95, adjust the computer volume control buttons and adjust the volume control in Multimedia Properties. NOTE: The volume control in Multimedia Properties only affects the "Wave" audio sources such as system sounds and *.wav file playback. To change other sources such as MIDI, video sound, and game effects, use the Volume Control application in Accessories/Multimedia. In Windows NT, adjust the multimedia volume control under the Accessories folder.
Internal speakers produce no sound.	Volume has been muted.	Press the right volume control button to increase the volume.
	External speakers or headphones are connected to the computer, or the computer is docked in the ArmadaStation.	Use the external speakers or headphones or use the ArmadaStation speakers. To use the internal speakers, disconnect the external speakers or headphones or undock the computer.
	Speaker wires are not connected.	Make sure the speaker wires are connected properly.
	Speakers are bad.	Replace the speakers.

Continued

Table 2-19 *Continued*

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

Continued



Table 2-19 *Continued*

Problem	Probable Cause	Recommended Action(s)
No sound from headphones.	Volume or mixing controls set incorrectly.	<ul style="list-style-type: none">■ Adjust the volume with the volume control buttons located at the top-right corner of the computer.■ Use the volume control and mixing features available in Control Panel → Multimedia.
	Sound source not selected.	Verify that the sound source is selected in Control Panel → Multimedia.
	Volume or mixing controls set incorrectly.	<ul style="list-style-type: none">■ Adjust the volume with the volume control buttons located at the top-right corner of the computer.■ Check the volume and mixer controls in Control Panel → Multimedia.

Solving Battery Problems

The following table lists some common battery problems and recommended actions to take when they occur. The "Solving Power Problems" section in this chapter also may be applicable.

Table 2-20
Solving Battery and Battery Gauge Problems

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

Continued

Table 2-20 *Continued*

Problem	Probable Cause	Recommended Action(s)
Battery pack is warm to the touch after charging.	Warming occurs during charging.	No action is required.
Computer turned off and information in memory was lost when the battery pack was replaced.	Hibernation was disabled, Suspend was not initiated, or a charged battery pack was not inserted immediately after the discharged battery pack was removed.	To prevent loss of information next time, initiate Suspend or enable Hibernation, remove the discharged battery pack, and immediately insert a fully charged battery pack.
	Auxiliary battery charge is low because the computer was not connected to a power source for an extended period of time.	Connect the computer to an external power source for approximately 24 hours to fully charge the auxiliary battery.
You have to set the date and time every time you turn on the computer.	Auxiliary battery charge is low.	Connect the computer to an external source for approximately 24 hours to fully charge the auxiliary battery.
	Auxiliary battery is at the end of its life.	Replace the auxiliary battery.
Battery pack charge does not last as long as expected.	Battery pack is being exposed to high temperatures or extremely cold temperatures.	Keep the battery pack within the recommended operating temperature range 50°F to 104°F (10°C to 40°C) or recommended storage range -4°F to 86°F (-20°C to 30°C). Recharge the battery pack.
	Battery pack has partially self-discharged.	If the computer is disconnected from the external power for more than two weeks, remove the battery pack to reduce the self-discharge rate.
	Power management is disabled.	Press Fn+F7 and set the power conservation level.
	An external device or PC Card is draining the battery.	Turn off or disconnect external devices when not using them.
Computer is beeping and battery power light is blinking.	Battery pack charge is low.	Do one of the following: <ul style="list-style-type: none">■ Charge the battery pack.■ Replace the battery pack.■ Connect the computer to an external power source.■ Initiate Hibernation.

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Solving CD-ROM Drive Problems

Table 2-21
Solving CD-ROM Drive Problems

Problem	Probable Cause	Recommended Action(s)
CD-ROM drive cannot read a compact disc.	Compact disc is not properly seated in the CD-ROM drive.	Open the CD loading tray, lay the compact disc on it, then close the tray.
	Compact disc in the CD loading tray is loaded upside down.	Open the CD loading tray, turn over the compact disc (label facing up), then close the tray.
	Compact disc has a scratch on its surface.	Insert a different compact disc.
CD-ROM drive is not recognized by the computer.	CD-ROM drive is not connected properly.	If you are running Windows 95, turn off the computer. Remove the CD-ROM drive from the MultiBay, then reinsert it.
		If you are running Windows NT, turn off the computer or initiate Suspend. Remove the CD-ROM drive from the MultiBay, then reinsert it.

Solving Diskette and Diskette Drive Problems

Table 2-22
Solving Diskette and Diskette Drive Problems

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

Solving Hard Drive Problems



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

Table 2-23
Solving Hard Drive Problems

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

Solving Hardware Installation Problems

Table 2-24
Solving Hardware Installation Problems

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

Solving Infrared Connection Problems

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

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

NOTE: Windows NT does not support infrared communication.

Table 2-25
Solving Infrared Connection Problems

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

Solving Modem Problems

Table 2-26
Solving Modem Problems

Problem	Probable Cause	Recommended Action(s)
Modem loses connection.	The connection from the phone line to the modem is loose.	Check to make sure the telephone cable is properly connected.
	Call Waiting has not been disabled.	Disable Call Waiting. 1. Click Start → Control Panel → double-click Modems. 2. From the General tab of the Modems Properties page, click Dialing Properties. 3. From the My Locations tab of the Dialing Properties page, check the box labeled This location has call waiting . Select *70, 70#, or 1170 from the drop-down list to disable call waiting for your dialing area.
Noisy telephone line	Phone line noise causing garbled or missing characters, or slow data transfer speeds.	Check your telephone and modem cable connections. If they are a little loose, they can cause noise on the line. Check with your local telephone company for a phone line filter.
Phone line noise causing a disconnection.	Hang-up Delay S Register (S10) set too low.	Change S10 default to 150. 1. Click Start → Programs → Accessories → HyperTerminal. 2. Go to Command Mode. 3. Type ATS10=150 and press Enter . This command causes the modem to take longer to disconnect even if there is noise on the line.

Continued

Table 2-26 *Continued*

Problem	Probable Cause	Recommended Action(s)
No dial tone	Phone service is not connected to the telephone wall jack.	Verify service from the local phone company: <ol style="list-style-type: none">1. Unplug the telephone cable from the telephone wall jack.2. Connect a telephone to the jack, pick up the handset, and listen for a dial tone. If there is a dial tone, reconnect the modem to the telephone wall jack with the telephone cable and make sure all connections are secure.3. If there is still no dial tone, contact your local phone company or building manager.
	The modem is not responding to commands from the computer keyboard.	Verify the modem and computer are connected: <ol style="list-style-type: none">1. Click Start → Programs → Accessories → HyperTerminal.2. Go to Terminal Mode.3. Type AT and press Enter. 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 1.3. Type ATDT and listen for a dial tone.4. Type ATH0 (zero) to hang up.
	Speaker Control AT Command (ATM) is set to 0.	Set the Speaker Control to 1: <ol style="list-style-type: none">1. Click Start → Programs → Accessories → HyperTerminal.2. Go to Command Mode, type ATM1 and press Enter.3. Type ATH1 and listen for a dial tone.4. Type ATH0 (zero) to hang up.
	The modem is plugged into a digital PBX line rather than an analog line.	Plug the modem into an analog line. If you are in an office, the analog line is often the one connected to a fax machine or modem. To get an analog line in a hotel, request a room with a "data" line.
Characters are garbled and transfer rates are slow.	There is noise in the telephone line.	<ul style="list-style-type: none">■ Check your telephone and modem cable connections. If they are loose, they can cause noise on the line.■ Check with your local telephone company for a phone line filter.

Continued

Table 2-26 *Continued*

Problem	Probable Cause	Recommended Action(s)
Phone line noise causes a disconnection.	Hang-Up Delay S Register (S10) set too low.	Change S10 default to 150. 1. Click Start → Programs → Accessories → HyperTerminal. 2. Go to Command Mode. 3. Type ATS10=150 and press Enter . This command causes the modem to take longer to disconnect even if there is noise on the line.
Cellular connection doesn't work (United States only).	Environmental factors are interfering with the cellular connection.	Refer to "How the Environment Affects Cellular Performance" in the Reference Guide for more information.
Ten-digit dialing does not work correctly under Windows 95.	Ten-digit dialing doesn't work correctly under Windows 95, making it difficult to dial numbers in a different area code that are not long distance calls.	Since Windows 95 does not limit the number of digits you can enter in the Phone Number field, set the Area Code field to match your local area code. Then type the ten-digit telephone number in the Phone Number field.
Modem cable disables/interferes with other telephony devices (Germany, Austria, and Switzerland only).	The modem cable does not provide the additional 4-wire connection required in Germany, Austria, and Switzerland to form the serial pass-through necessary so that other devices can work on the same phone line.	To use another telephony device on the same line in these countries, unplug the modem cable from the wall jack first.
Modem does not dial correctly under Windows 95 (Switzerland and Germany only).	The "Wait for dial tone before dialing" check box is checked. This causes Windows 95 to issue an ATDT; command. A typical dial string would look like this: ATDT; ATDTnnn-nnnn In Germany and Switzerland, the ";" dial modifier is not permitted to be used in this fashion by regulatory agencies since ATDT; takes the modem off-hook without dialing. Therefore, the modem returns an error message when attempting to dial. The error message reads: "The computer is not receiving a response from the modem. Check that the modem is plugged in, and if necessary, turn the modem off, then turn it back on."	1. Click Start → Settings → Control Panel. 2. Double-click the Modems icon. 3. Click the Properties button. 4. Select the Connection tab. 5. Click the "Wait for dial tone before dialing" check box to clear it. 6. Click OK → Close.

Solving PC Card Problems

Table 2-27
Solving PC Card Problems

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

Solving Power Problems

Table 2-28
Solving Power Problems

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

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Solving Screen Problemstroubleshooting:

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

Table 2-29
Solving Screen Problems

Problem	Probable Cause	Recommended Action(s)
Characters are dim.	The brightness or contrast control (if applicable) is not set properly.	Adjust the control(s) with the hotkeys: Fn+F9 and Fn+F10 .
	Computer screen is in direct light.	Tilt the display or move computer.
	Display is damaged.	Replace the display.
Screen is blank.	QuickLock/QuickBlank was initiated.	Enter the password to exit QuickLock/QuickBlank.
	Screen save was initiated after the Power Management timeout period.	Press any key or click the mouse.
	Brightness or contrast needs adjusting.	Adjust the control(s) with the hotkeys: Fn+F9 and Fn+F10 .
	Screen has overheated.	If computer is in direct sunlight, move it and allow it to cool.
Computer screen is blank and the screen on an external monitor displays information.	Display was switched to the external monitor.	Press the Fn+F4 hotkeys to display information on the computer screen.
Screen is blank and the power/suspend light is blinking.	System initiated Suspend.	Press the suspend button to exit Suspend. Enter the power-on password if prompted.
Screen is blank and the power/suspend light and the battery light are blinking.	System has entered a critical low-battery condition.	Immediately connect the computer to an external power source or replace the battery pack.

Continued

Table 2-29 *Continued*

Problem	Probable Cause	Recommended Action(s)
External monitor does not display information.	External monitor was connected after the computer was turned on.	Press the Fn+F4 hotkeys to switch to the external monitor.
	The external monitor signal cable or power cord is not properly connected.	Ensure that the cables are properly connected.
Small red, green, or blue spots appear on the computer CTFT display.	Small spots, called on-pixels, often appear on CTFT screens. Compaq limits the number of these on-pixels to 0.003 percent.	No action is required.
Display on an external monitor is distorted.	Incorrect display device drivers are installed or incorrect resolution is set.	Double-click the Display icon in Control Panel, click the Settings tab, and set the correct display type and resolution for the external monitor.
	The external monitor is not Energy Star compliant, but monitor energy saving feature is enabled.	Complete these steps: <ol style="list-style-type: none">1. Press any key or move the pointing device to restore the display.2. If display remains distorted, turn off the monitor, then turn it on again.3. Disable the monitor energy saving feature in Display Properties or in Computer Setup Power Management.
The image has a black border and does not fill the screen.	The Desktop Area setting is smaller than the Resolution setting.	Adjust the settings for the Desktop Area and Resolution. Double-click Control Panel Display → Settings → Compaq.
		Press the Fn+T keys to expand the image.

Solving USB Problems

Table 2-30
Solving USB Problems

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

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 7400 Family 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). Refer to Table 1-1 for an explanation of the model number.

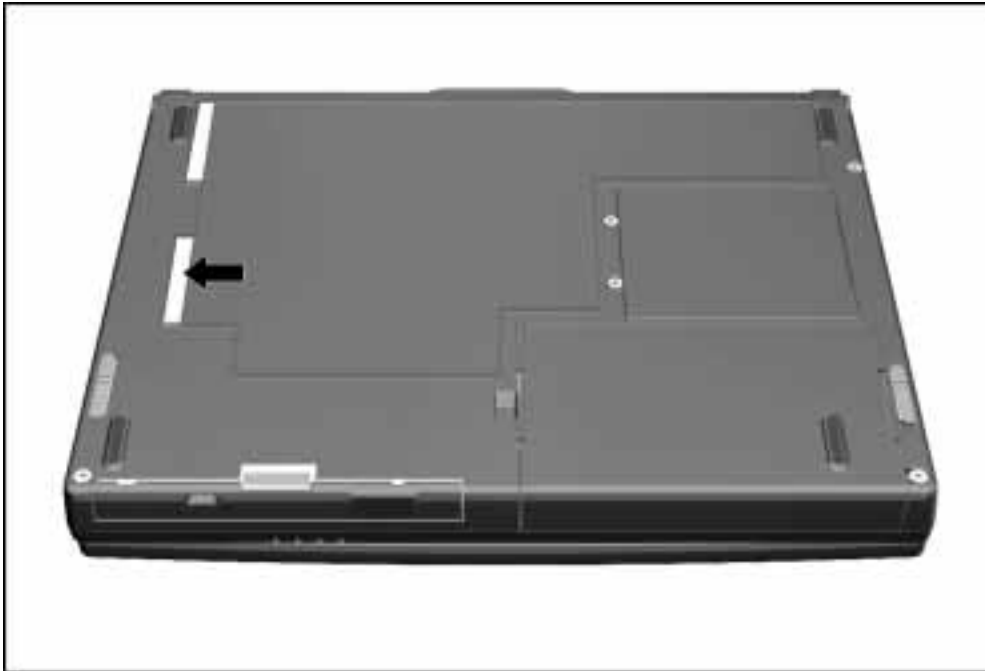


Figure 3-1. Serial Number Location

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3.2 Computer System Major Components

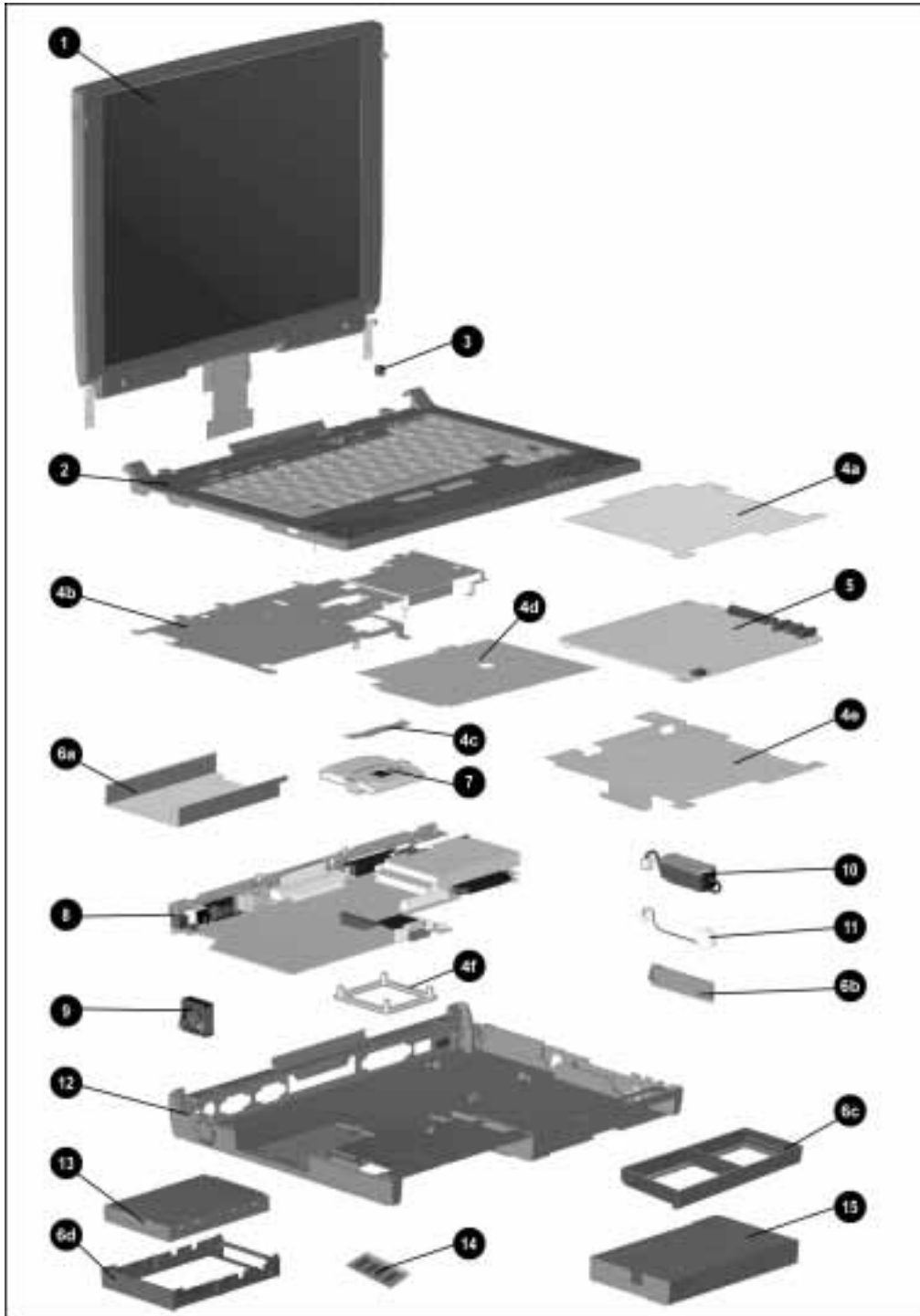


Figure 3-2. Computer System Major Components

Table 3-1
Spare Parts: Computer System Major Components

Item	Description	Spare Part Number
1	Display assembly, 13.3-inch, XGA, CTFT (spared as "hingeup" assembly, includes logo kit and screw covers); refer to Section 3.3 for individual display component spare kits	204274-001
2	Keyboard/CPU cover assembly (includes keyboard label kit)	204278-XXX
	Belgian -181 International -002 Spanish -071	
	Danish -081 Japanese -291 Swedish -101	
	French -051 Korean -AD1 Swiss -111	
	French Canadian -121 Latin American -161 U.K. English -031	
	German -041 Norwegian -091 U.S. English/ -001	
	Italian -061 Portuguese -131 Canadian	
3	EasyPoint III pointing device caps	314938-001
	Miscellaneous Hardware Kit	204260-001
4a	Audio/modem board insulator	
4b	EMI shield (with heatpipe)	
4c	Heatpipe mount leaf spring	
4d	Battery bay insulator	
4e	MultiBay shield	
4f	Processor attach bracket	
5	Audio/modem (33-Kbps) board assembly	
	U.S.	313864-001
	International	313864-002
	Audio only board (includes DAA cover and RJ11 cover)	204264-001
	Miscellaneous Plastics Kit	204262-001
6a	Hard drive guide/rail	not illustrated:
6b	PC Card door	DAA cover
6c	MultiBay weight saver	RJ11 cover
6d	Hard drive tray	Computer feet
		Left and right tilt feet with covers
7	Processor board assembly (includes 4 spacers)	
	Intel Mobile Pentium II 300-MHz with MMX technology	204266-001
	Intel Mobile Pentium II 266-MHz with MMX technology	204267-001
8	System board (includes U-channel, insulator, expansion connector shield, and processor spacers)	204268-001
9	Fan assembly (includes 2 isolators)	204457-001
10	Auxiliary battery	220807-001
11	Real Time Clock (RTC) battery	258634-002
12	CPU base assembly (includes memory compartment cover and PC Card door)	204258-001
13	Hard drive	
	6.4 GB	204272-001
	4.0 GB	204271-001
14	Memory expansion board (memory size varies depending on model)	
	128 MB	310345-001
	64 MB	313918-001
	32 MB	313911-001
	16 MB	313917-001
15	Battery pack, Li-ion	204263-001
	Miscellaneous Screw Kit (not illustrated; refer to Appendix C)	204261-001

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3.3 Display Components

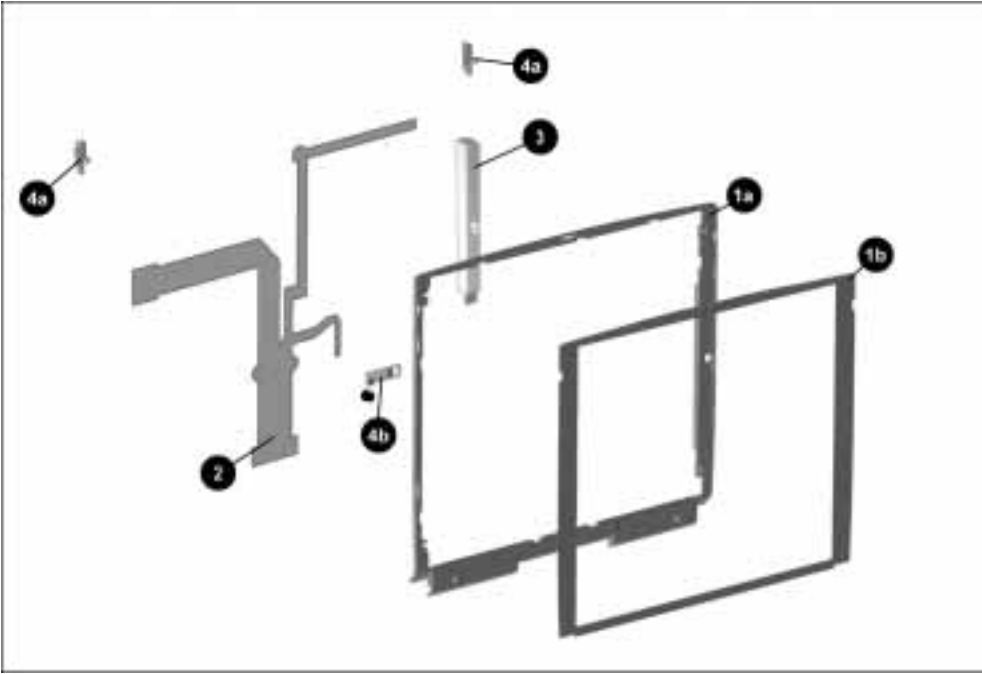


Figure 3-3. Display Components

Table 3-2
Spare Parts: Display Components

Item	Description	Spare Part Number
1a	Display Bezel Kit	204393-001
1b	Bezel Overlay Screw covers (2, not illustrated)	
2	Miscellaneous Cable Kit	204390-001
	Display cable Bezel (illustrated in Item 1, above) Overlay (illustrated in Item 1, above) Screw covers (2, not illustrated)	
3	Inverter Kit	204391-001
	Bezel (illustrated in Item 1, above) Overlay (illustrated in Item 1, above) Insulator (not illustrated) Screw covers (2, not illustrated)	
	Miscellaneous Display Kit	204392-001
4a	Left and right latches with springs (4, not illustrated)	
4b	Microphone assembly (includes microphone board, microphone, isolator, screen, and adhesive pad) Screw covers (2, not illustrated)	

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3.4 Miscellaneous Hardware Kit Components

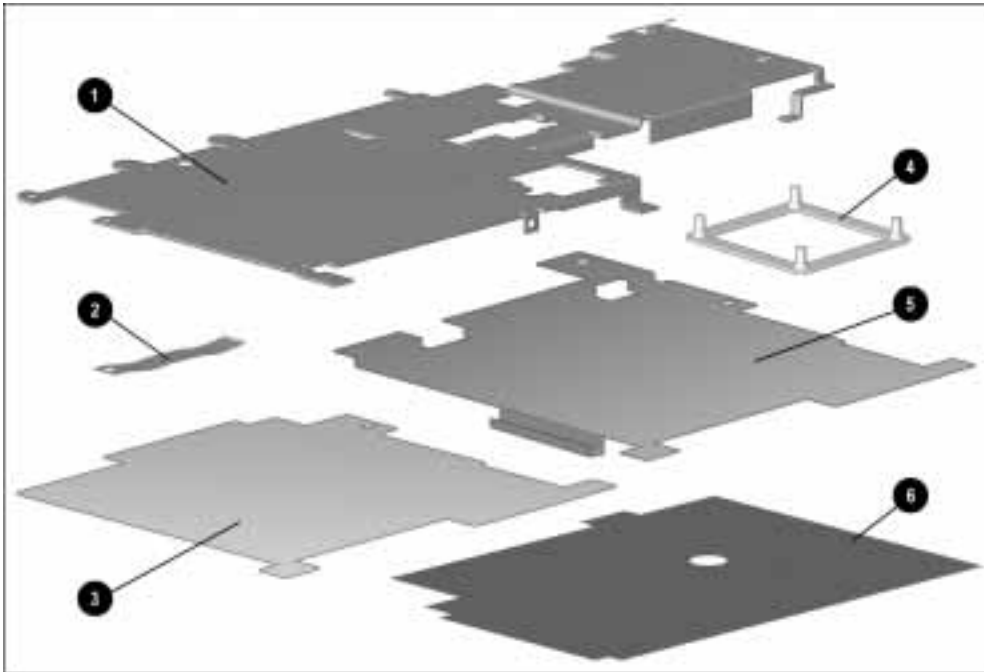


Figure 3-4. Miscellaneous Hardware Kit Components

Table 3-3
Miscellaneous Hardware Kit Components
Spare Part Number 204260-001

Item	Description
1	EMI shield (with heatpipe)
2	Heatpipe mount leaf spring (with spring, not illustrated)
3	Audio/modem board insulator
4	Processor attach bracket
5	MultiBay shield
6	Battery insulator

3.5 Miscellaneous Plastics Kit Components

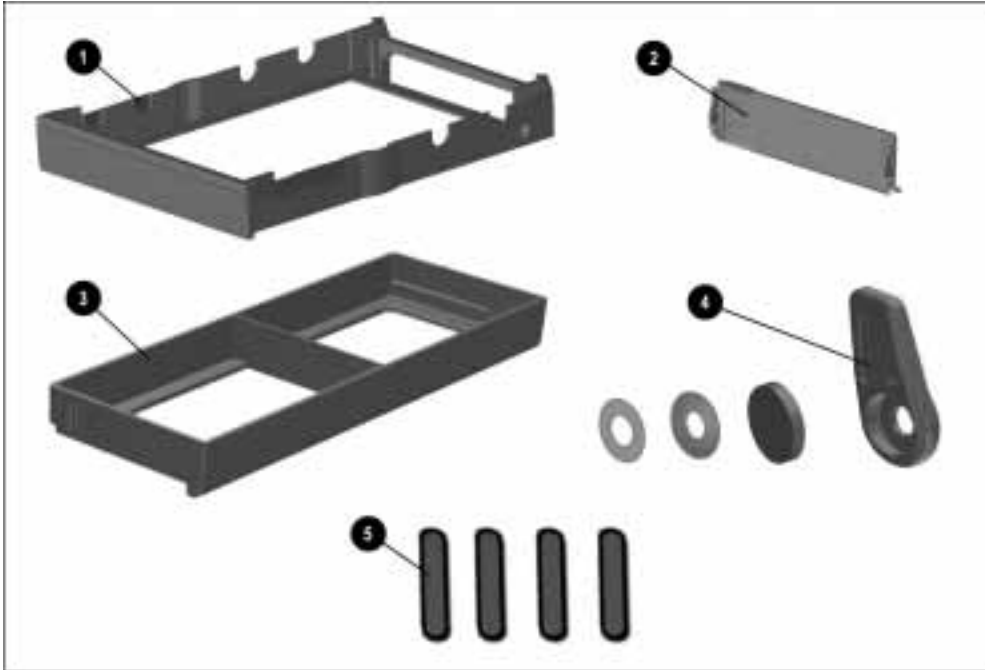


Figure 3-5. Miscellaneous Plastics Kit Components

Table 3-4
Miscellaneous Plastics Kit Components
Spare Part Number 204262-001

Item	Description
1	Hard drive tray (with insulator)
2	PC Card door
3	MultiBay weight saver
4	Left and right tilt feet, covers, washers (2)
5	Computer feet
	Not illustrated: Hard drive guide/rail DAA cover RJ11 cover

3.6 Power Equipment

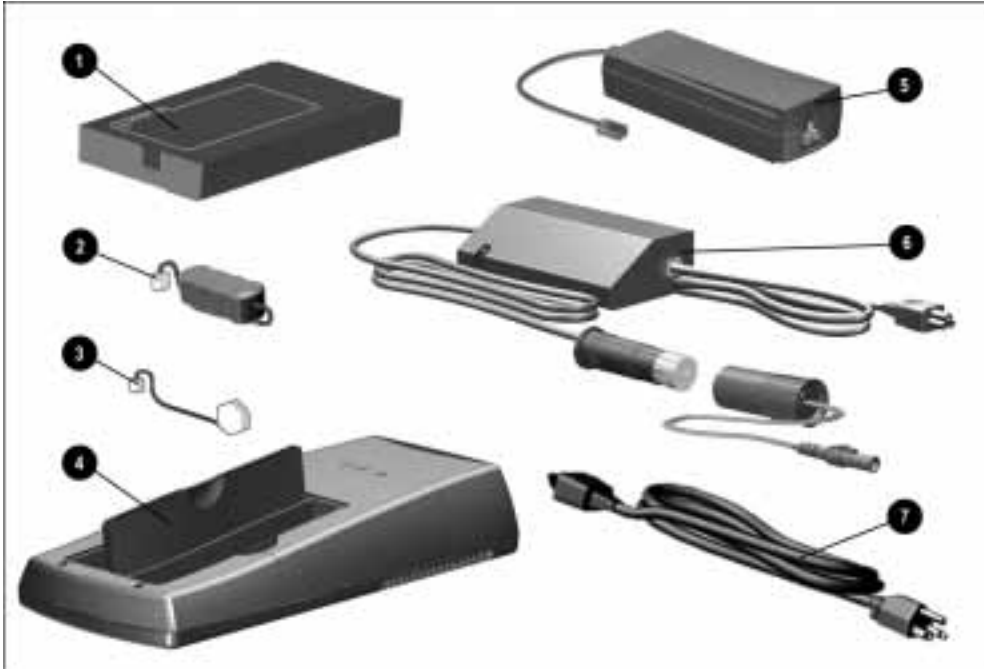


Figure 3-6. Power Equipment

Table 3-5
Spare Parts: Power Equipment

Item	Description	Spare Part Number
1	Battery pack, Li-ion	204263-001
2	Auxiliary battery	220807-001
3	Real Time Clock (RTC) battery	258634-002
4	Battery charger	277734-001
5	AC Adapter	204434-001
6	Automobile/aircraft adapter	313919-001
	Automobile/aircraft adapter cable	315083-001
7	Power cord	
	Australian	246959-008
	Danish	246959-005
	European	246959-002
	Italian	246959-004
	Japanese	246959-007
	Korean	246959-009
	French/German/ Swiss	246959-006
	U.K. English/Asia Pacific/Hong Kong	246959-003
	U.S. English	246959-001

3.7 Mass Storage Devices

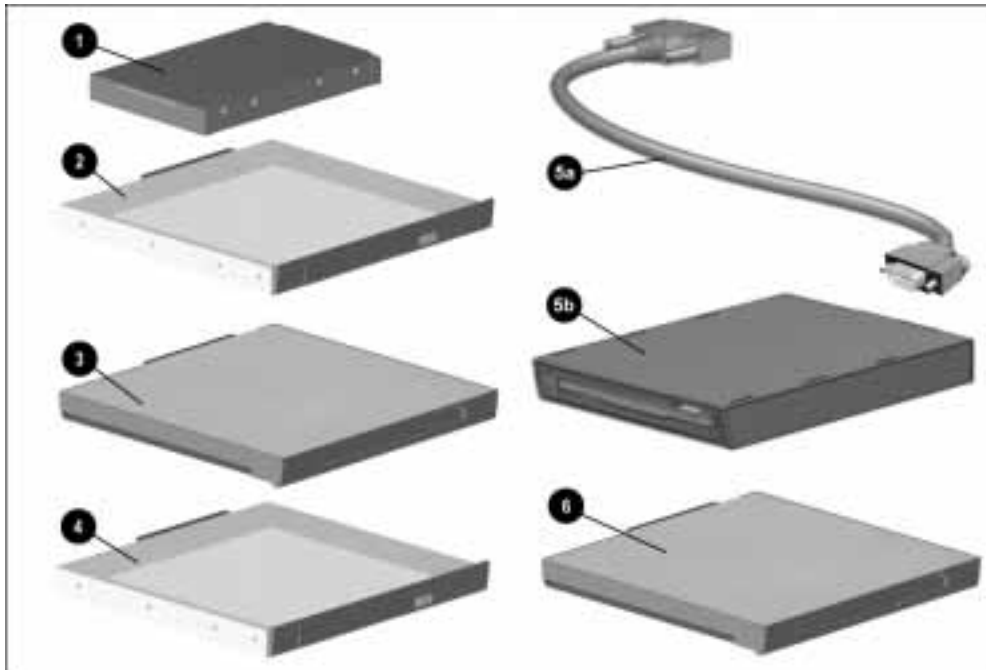


Figure 3-7. Mass Storage Devices

Table 3-6
Spare Parts: Mass Storage Devices

Item	Description	Spare Part Number
1	Hard drive 6.4 GB 4.0 GB	204272-001 204271-001
2	24X Max CD-ROM drive	204270-001
3	Diskette drive, 1.44-megabyte, 3.5-inch (standard equipment)	204265-001
4	DVD-ROM drive	202837-001
5a	External Diskette Drive cable	258575-002
5b	External Diskette Drive (available only as an option)	290837-001
6	SuperDisc LS-120 drive	327456-002

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3.8 Items that Ship with the Computer

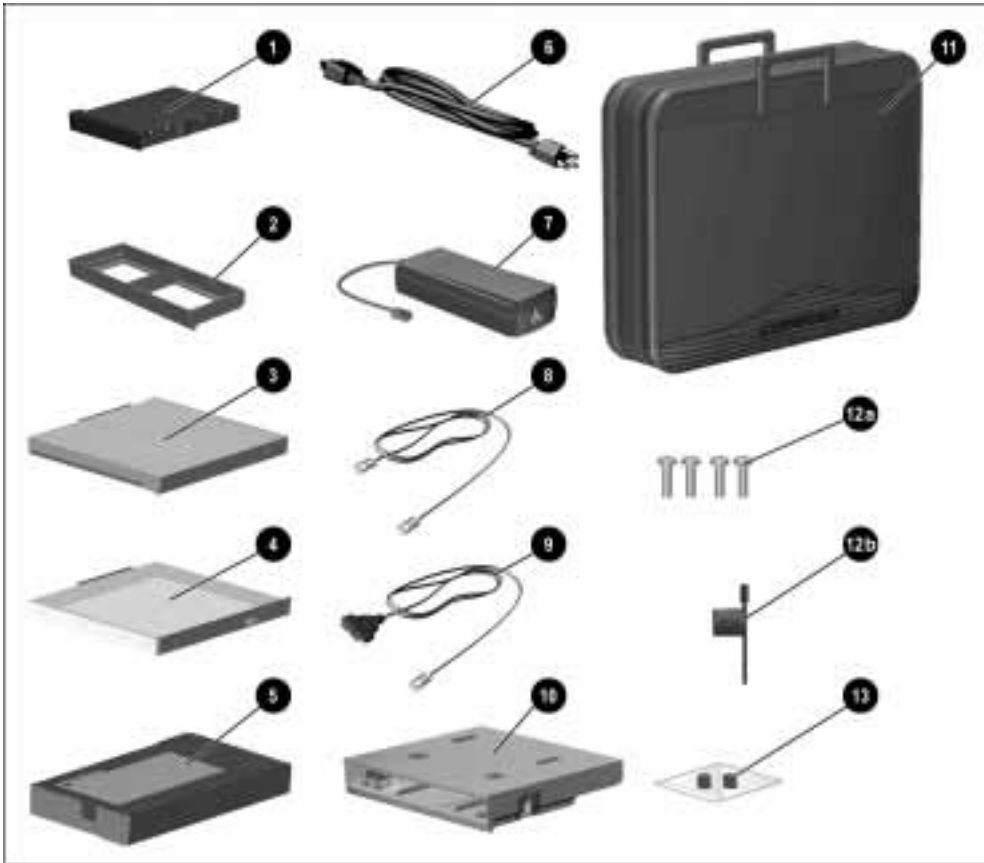


Figure 3-8. Items that Ship with the Computer

Table 3-7
Items that Ship with the Computer

Item	Description	Spare Part Number
1	Hard drive 6.4 GB 4.0 GB	204272-001 204271-001
2	MultiBay weight saver (ships in accessory box)	spared in Miscellaneous Plastics Kit, spare part number 204262-001 (refer to Section 3.5)
3	Diskette drive, 1.44-megabyte, 3.5-inch (ships in accessory box)	204265-001
4	24X Max CD-ROM drive	204270-001
5	Battery pack, Li-ion	204263-001
6	Power cable	
	Australian 246959-008 Korean	246959-009
	Danish 246959-005 French/German/ Swiss	246959-006
	European 246959-002	
	Italian 246959-004 U.K. English/Asia	246959-003
	Japanese 246959-007 Pacific/Hong Kong U.S. English	246959-001
7	AC Adapter	204434-001
8	Telephone cable (country specific, modem models only)	137256-001
9	Modem DAA cable (country specific, modem models only)	234409-003
10	Armada 7000 Removable Drive MultiBay Adapter	296589-002
11	Slipcase (Europe/Middle East/Africa, Latin America, and Japan only)	315108-001
	Security kit	204394-001
12a	Security screws (4)	
12b	Security screwdriver	
13	EasyPoint III pointing device caps (2)	314938-001

3.9 Options

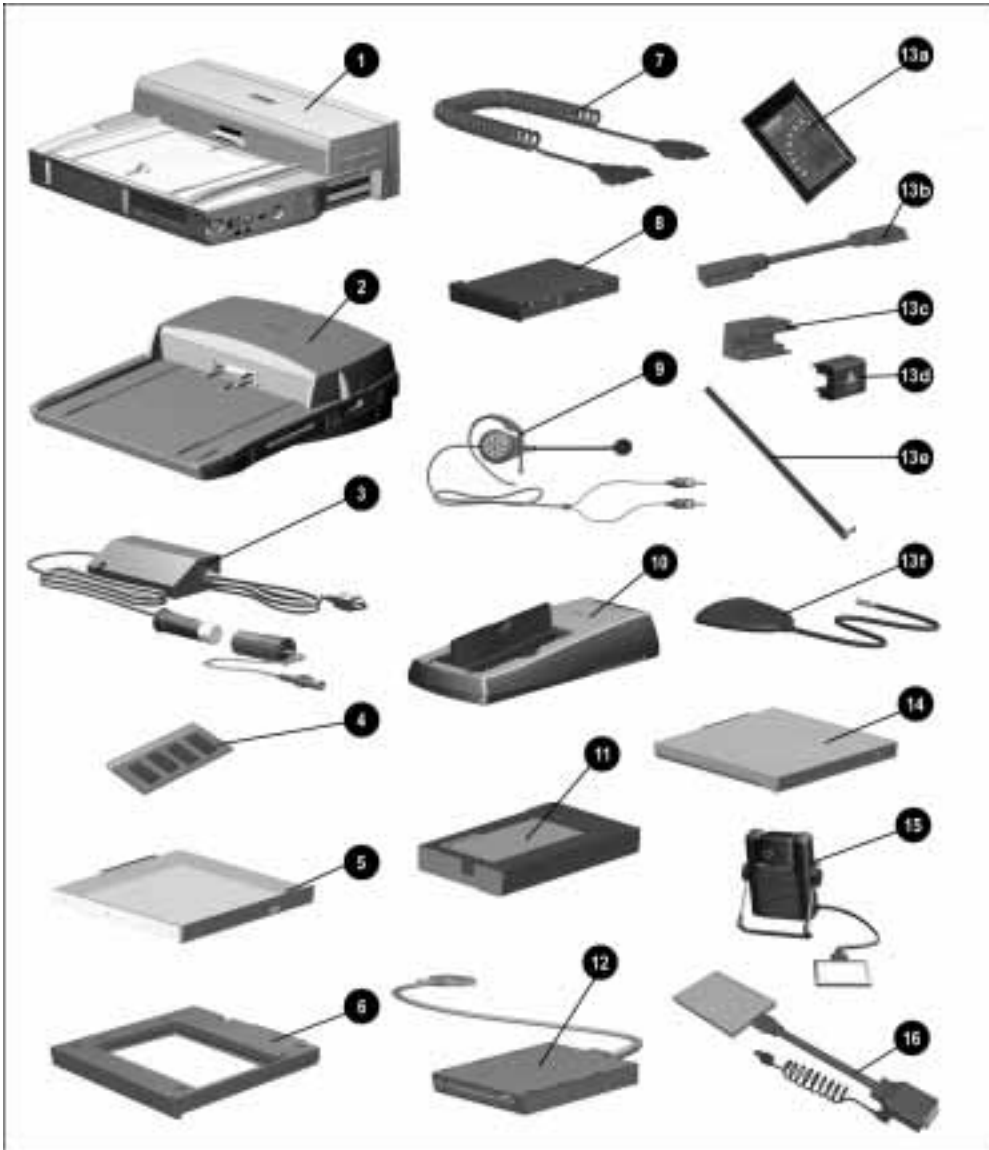


Figure 3-9. Options

Table 3-8
Spare Parts: Options

Item	Description	Spare Part Number	Option Part Number
1	ArmadaStation II	n/a	203100-XXX
2	Armada MiniStation E (opal) Armada MiniStation EX (opal)	n/a	327137-XXX 327138-XXX
3	Automobile/aircraft adapter Automobile/aircraft adapter cable	313919-001 315083-001	296537-B21
4	Memory expansion board 128 MB 64 MB 32 MB 16 MB	310345-001 313918-001 313911-001 313917-001	315177-B25 314891-B21 314890-B21 314889-B21
5	DVD-ROM drive	202837-001	314914-B25
6	Hard Drive MultiBay Adapter	296587-002	267867-B25
7	Cellular phone cable GE & Ericsson CT7000 Motorola-MT/Elite Motorola-MicTac Nokia-232 Nokia-2120	212035-001 212031-001 212030-001 212034-001 212033-001	185272-001 185268-001 185267-001 185271-001 185270-001
8	6.4-GB hard drive	204272-001	204220-B25
9	Headset	273139-001	220460-001
10	Battery charger	277734-001	220461-001
11	Battery pack, Li-ion	204263-001	267865-B25
12	External Diskette Drive Kit (includes cable) External Diskette Drive cable	290837-001 258575-002	297186-B21 325157-001
13a	SpeedPaq Cellular PC Card Kit	221227-001	221202-001 (for models with an internal modem)
13b	SpeedPaq Cellular PC Card interconnect cable		
13c	modem interconnect block		221200-001 (includes a PC Card modem)
13d	computer interconnect block*		
13e	antenna		
13f	remote antenna base cellular PC Card software (not illustrated)		
	* This component is included in the kit but does not work on the Armada 7400.		
14	SuperDisc LS-120 drive	327456-002	296502-B25
15	Portable Video Conferencing Kit (includes PC Card)	298450-001	296954-001
16	USB Cardbus PC Card	296864-001	296501-B21

3.10 *Miscellaneous*

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

Description	Spare Part Number
Country Kit (WIN95)	
Domestic	313865-001
European	313865-002
Miscellaneous Screw Kit	204261-001

3.11 *Documentation*

Table 3-10
Spare Parts: Documentation (not illustrated)

Description	Spare Part Number
Armada 7400 <i>Maintenance & Service Guide</i>	204275-001
Armada 7400 <i>Illustrated Parts Map*</i>	204276-001
ArmadaStation and Armada MiniStation <i>Maintenance & Service Guide</i>	296390-001
ArmadaStation and Armada MiniStation <i>Illustrated Parts Map*</i>	296391-001
Armada 7400 <i>Setup Poster & Reference Guide</i> : available in country kits or through fulfillment	
*Not available in Europe, Middle East, or Africa	

Removal and Replacement Preliminaries

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

4.1 Tools Required

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

- Magnetic Torx T-8 screwdriver (for all screws unless otherwise specified)
- Torx T-10 screwdriver (for memory expansion slot cover screw)
- Security screwdriver included in the security kit (for tamper-resistant memory compartment cover screws)

4.2 Service Considerations

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

Plastic Parts

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

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

Cables and Connectors

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



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

4.3 Preventing Damage to Removable Drives

Removable drives are fragile components that must be handled with care. 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.

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

NOTE: 700 volts can degrade a product.

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

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

Removal and Replacement Procedures

5.1 Serial Number

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

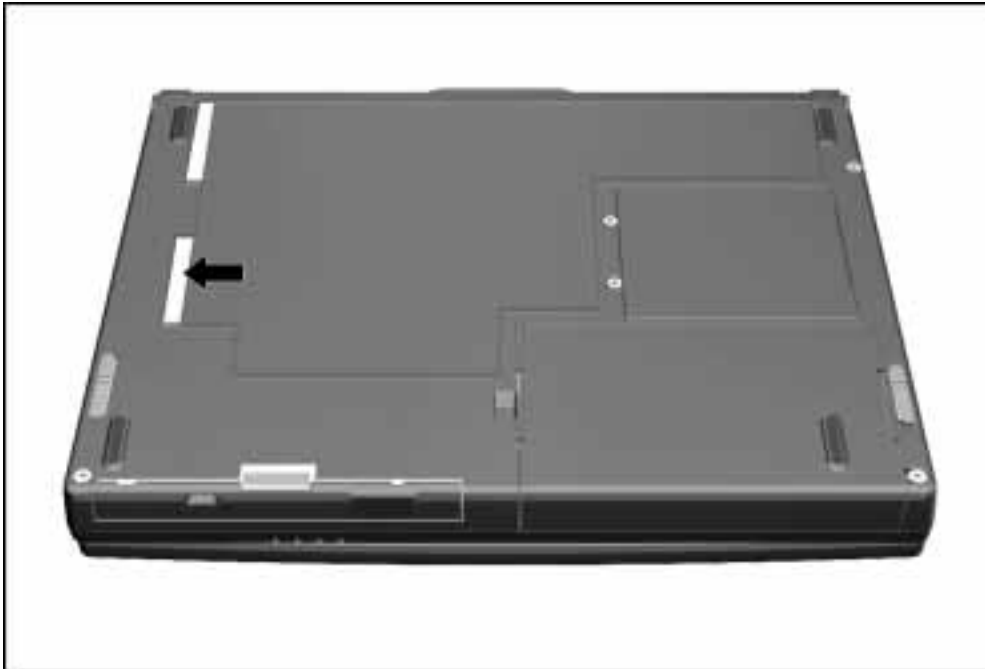


Figure 5-1. Serial Number Location

5.2 Disassembly Reference Chart

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

5.3 Undocking the Computer	
	Undocking the Computer from the ArmadaStation
	Undocking the Computer from the Armada MiniStation
5.4 Disconnecting the Computer	
5.5 Computer Logo	
5.6 Computer Feet	
5.7 Preparing the Computer for Disassembly	
5.8 Battery Packs	
	Removing a Battery Pack
	Inserting a Battery Pack
5.9 Hard Drives	
	Removing a Hard Drive
	Inserting a Hard Drive
5.10 MultiBay Devices	
	Removing MultiBay Devices
	Inserting MultiBay Devices
5.11 PC Cards	
	Removing a PC Card When the Computer is Off
	Removing a PC Card When the Computer is On
	Inserting a PC Card
5.12 Memory Expansion	
	Removing the Memory Compartment Cover and Memory Board
	Removing a Memory Expansion Board
	Installing a Memory Expansion Board
5.13 Keyboard/CPU Cover Assembly	
	Removing the Keyboard/CPU Cover Assembly
	Installing the Keyboard/CPU Cover Assembly
5.14 Auxiliary Battery	
5.15 RTC Battery	
5.16 Audio/Modem or Audio Only Board	
5.17 Fan Assembly	
5.18 Processor Board	
5.19 Display Assembly	
	Removing the Display Assembly
	Display Assembly Internal Components
	Bezel
	Panel
	Display Cable
	Inverter
	Microphone
5.20 System Board	
	Removing the System Board
	Installing the System Board

Figure 5-2. Computer Disassembly Sequence Chart

5.3 Undocking the Computer

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

Undocking the Computer from the ArmadaStation

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



Figure 5-3. Undocking the Computer from the ArmadaStation

5. Slide the computer out of the ArmadaStation.

.....

Undocking the Computer from the Armada MiniStation

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



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

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

5.4 Disconnecting the Computer

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

1. Shut down the computer.
2. Close the computer.
3. Position the computer so the rear panel faces forward.
4. Disconnect the power cord from the AC Adapter ❶.
5. Disconnect the power cord from the wall outlet ❷.
6. Disconnect the AC Adapter cord from the computer ❸.



Figure 5-5. *Disconnecting the Computer*

7. Turn off and disconnect external devices.

.....

5.5 Computer Logo

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



Figure 5-6. *Installing the Computer Logo*

5.6 Computer Feet

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

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

NOTE: The front left computer foot adheres to the bottom of the battery pack.

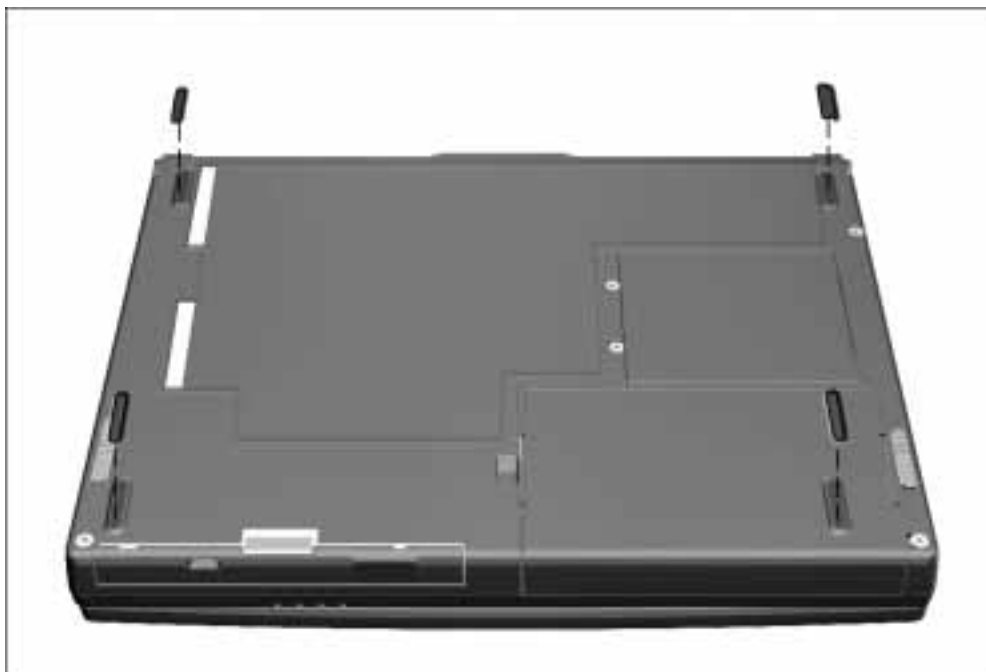


Figure 5-7. *Installing the Computer Feet*

5.7 *Preparing the Computer for Disassembly*

1. Undock the computer from the ArmadaStation or Armada MiniStation.
2. Shut down the computer.
3. Disconnect the AC Adapter and all external devices connected to the computer.
4. Remove the battery pack inserted into the battery bay (Section 5.8).



CAUTION: Failure to disconnect the AC Adapter from the computer and remove the battery pack before removing and installing internal components can damage the equipment.

5. Remove the hard drive (Section 5.9).
6. Remove MultiBay devices (Section 5.10).

NOTE: MultiBay devices may be left inside the MultiBay to provide balance when the computer is open.

7. Remove all PC Cards (Section 5.11).

5.8 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

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

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

2. Tilt the computer at an angle **1** so the bottom of the computer is accessible (Figure 5-8).
3. Slide the battery release latch forward **2**.
4. Pull the battery pack out of the battery bay **3**.

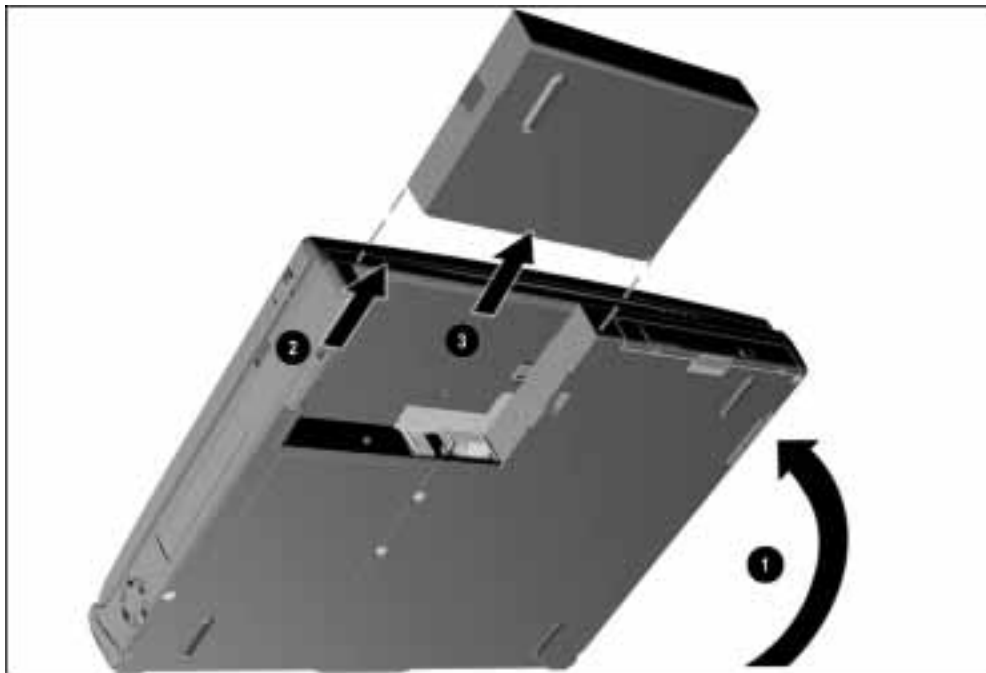


Figure 5-8. Removing a Battery Pack

Inserting a Battery Pack



WARNING: To prevent damage to the computer, do not insert a battery pack 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 5-9).

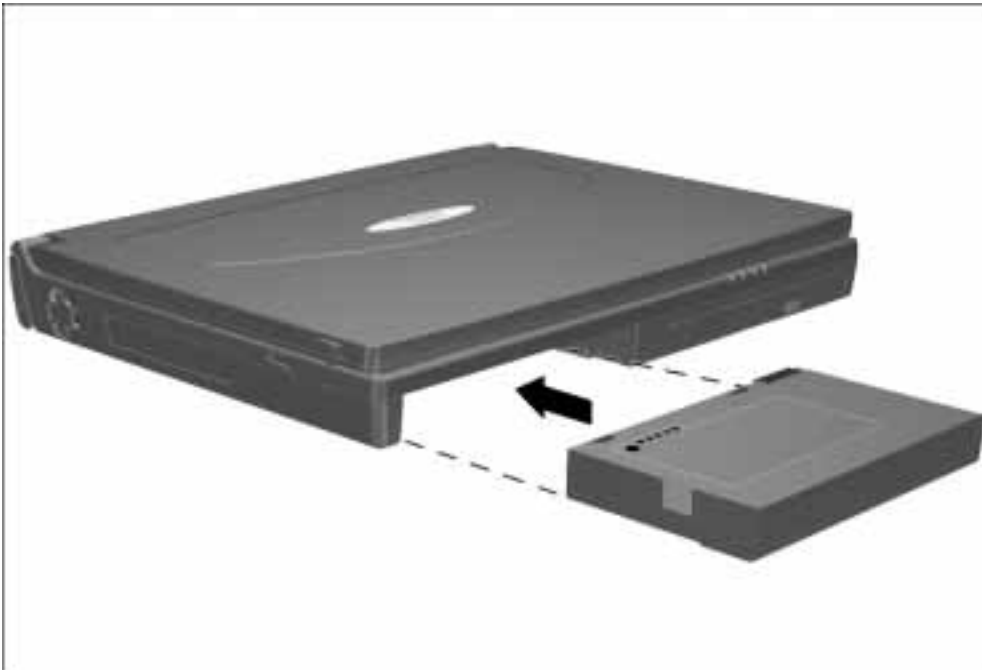


Figure 5-9. Inserting a Battery Pack

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

5.9 Hard Drives

Removing a Hard Drive

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. Remove the battery pack (Section 5.8).
3. Tilt the computer at an angle **1** so the bottom of the computer is accessible (Figure 5-10).
4. If the hard drive has been secured in the hard drive bay with a security screw **2**, remove the screw using the security screwdriver provided with the computer.
5. Press the hard drive release button **3**.
6. Remove the hard drive from the hard drive bay **4**.

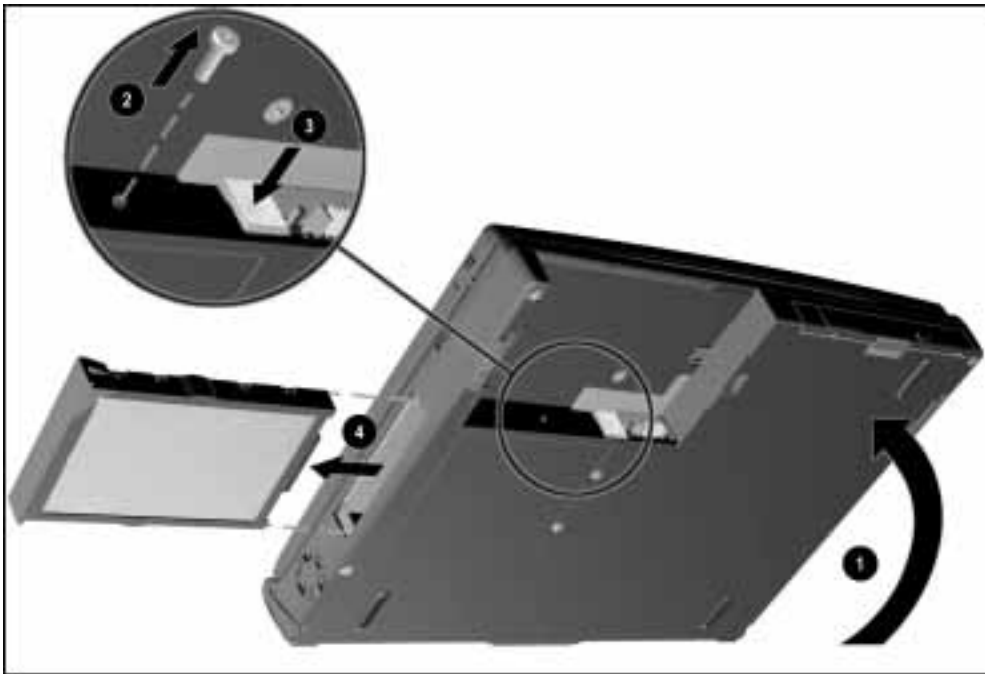


Figure 5-10. Removing a Hard Drive

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Inserting a Hard Drive

1. Slide the hard drive into the hard drive bay (Figure 5-11).

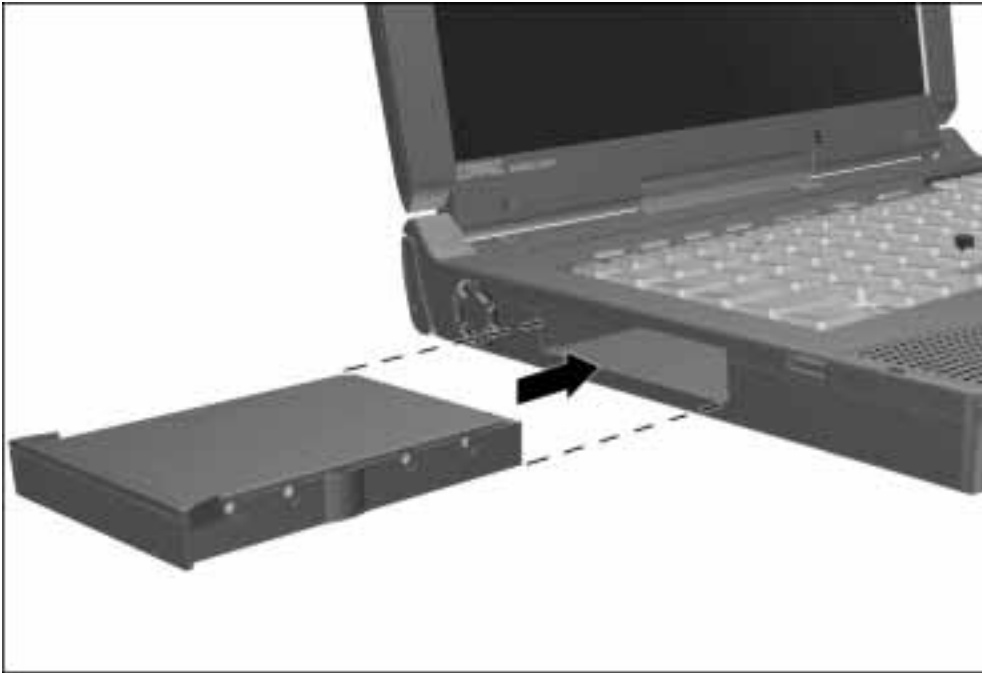


Figure 5-11. Inserting a Hard Drive

2. If the hard drive was secured in the hard drive bay using a security screw, replace the screw.

5.10 MultiBay Devices

Removing MultiBay Devices

1. Save all work, exit all applications, and shut down the computer.
2. Remove the media (diskette, CD-ROM, DVD-ROM) from the drive. Be sure the drive tray is closed.
3. Tilt the computer at an angle **1** so the bottom of the computer is accessible (Figure 5-12).
4. Slide the MultiBay release latch **2** forward.
5. Pull the device out of the MultiBay **3**.



Figure 5-12. Releasing a Device from the MultiBay

NOTE: If you are not inserting another device into the MultiBay, insert the MultiBay weight saver included with the computer.

.....

Inserting MultiBay Devices

1. Remove the media (diskette, CD-ROM, etc.) from the drive to be inserted in the MultiBay. Ensure that the CD tray is closed.
2. With the bezel facing out, slide the device into the MultiBay until it clicks into place (Figure 5-13).

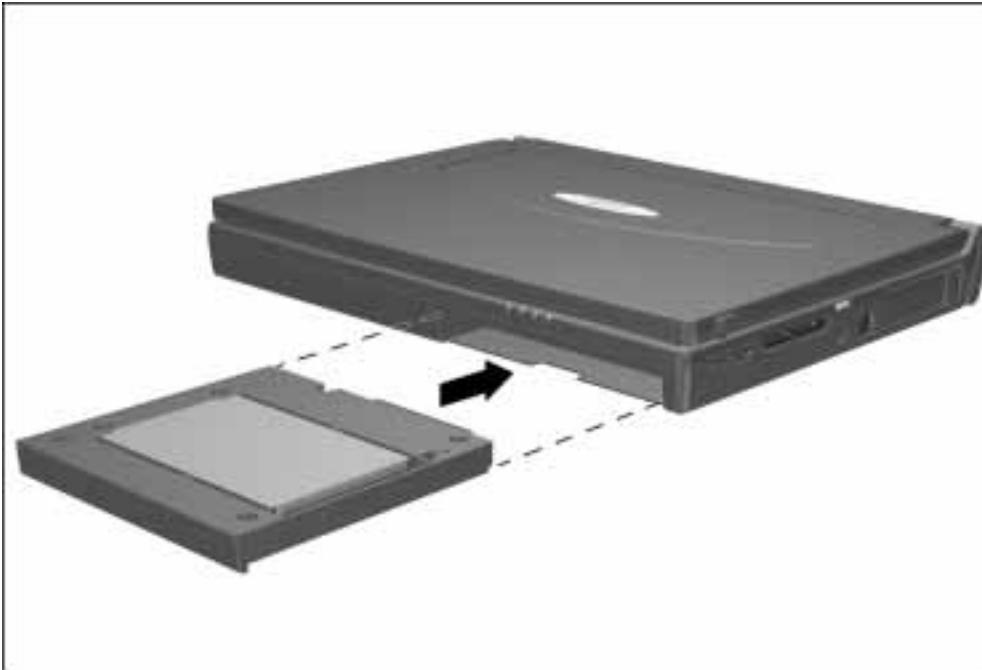


Figure 5-13. Inserting a Device into the MultiBay

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5.11 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 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.

.....

Removing a PC Card When the Computer is Off

1. Open the PC Card door by flipping it down ❶ (Figure 5-14).
2. Press the PC Card eject button ❷ for the card to be ejected. The eject button extends.
3. Press the eject button a second time ❸. The PC Card partially ejects from the PC Card slot.
4. Remove the PC Card from the PC Card slot ❹.

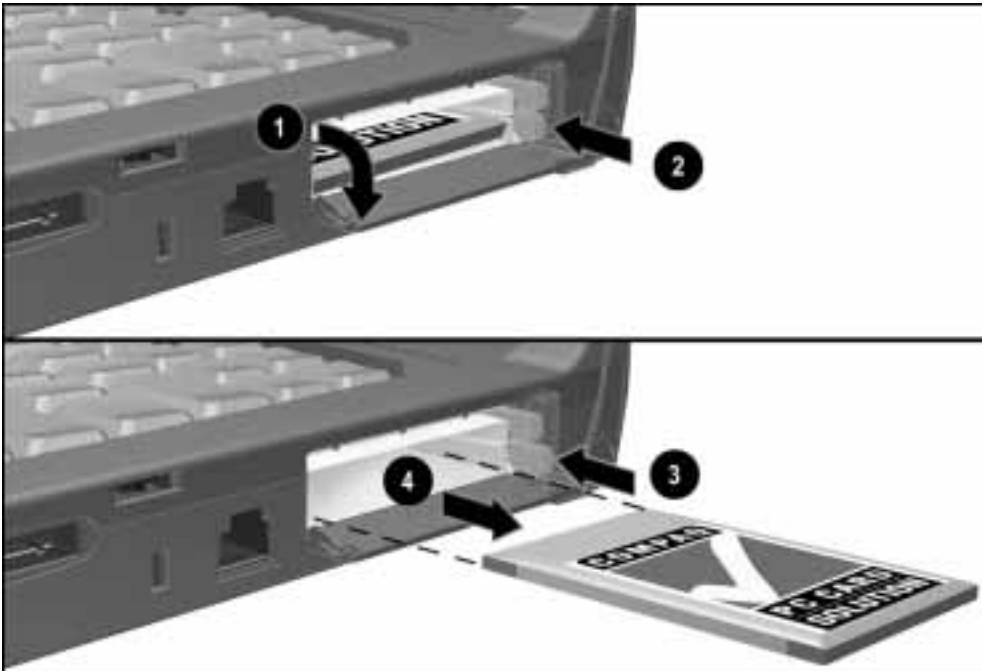


Figure 5-14. Removing a PC Card

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Removing a PC Card When the Computer is On

1. Click the PC Card icon on the system tray on the Windows taskbar. A list of PC Cards running in the system appears.
2. Click the PC Card to be stopped.

IMPORTANT: Always stop a LAN, ATA, or SCSI card before removing it.

3. When a message appears that it is safe to remove the card, follow the procedures in the section, “Removing a PC Card When the Computer is Off.”

NOTE: A computer running Windows 95 beeps twice when the card is removed. A computer running Windows NT beeps three times in descending tones when the card is removed.

Inserting a PC Card

1. Save all work, exit all applications, and turn off the computer.
2. Open the PC Card door by flipping it down (Figure 5-15).
3. Align the edges of the PC Card with the rails on the sides of one of the PC Card slots.
4. Insert the PC Card into the PC Card slot.



Figure 5-15. Inserting a PC Card

5.12 Memory Expansion

The memory compartment is located on the bottom of the computer and contains two memory slots. The computer standard memory is contained in one slot. Computer memory can be expanded by installing a memory board in the empty slot and/or replacing the standard memory board. SDRAM memory boards are available in 16-, 32-, 64-, and 128-MB increments.

The memory compartment cover and screws are spared with the computer base.

Removing the Memory Compartment Cover



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

1. Prepare the computer for disassembly (Section 5.7).



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.

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

-
3. Use a Torx T-10 screwdriver or the security screwdriver to remove the factory-installed screws that secure the memory compartment cover to the computer ❶ (Figure 5-16). If the security screws have been installed, use the security screwdriver to remove them.
 4. Lift the right side of the cover and swing it away from the computer ❷.

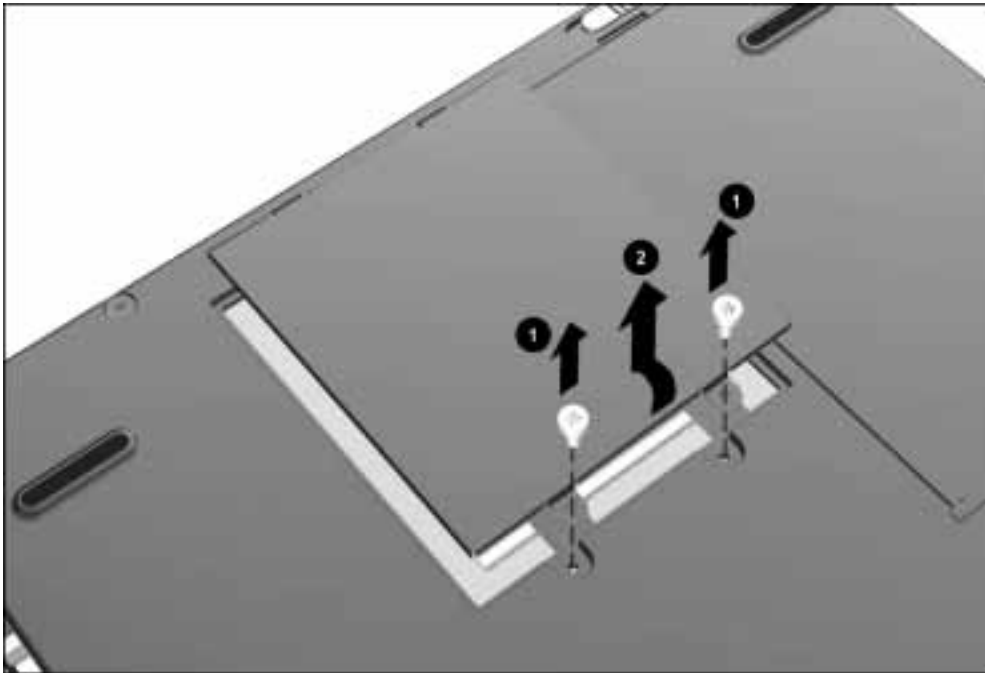


Figure 5-16. *Removing the Memory Compartment Cover*

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Removing a Memory Expansion Board

1. Push the spring retention tabs away from both sides of the memory board to release the board ❶ (Figure 5-17).
2. Lift up the edge of the memory board and slide the board out of the slot at a 45-degree angle ❷.

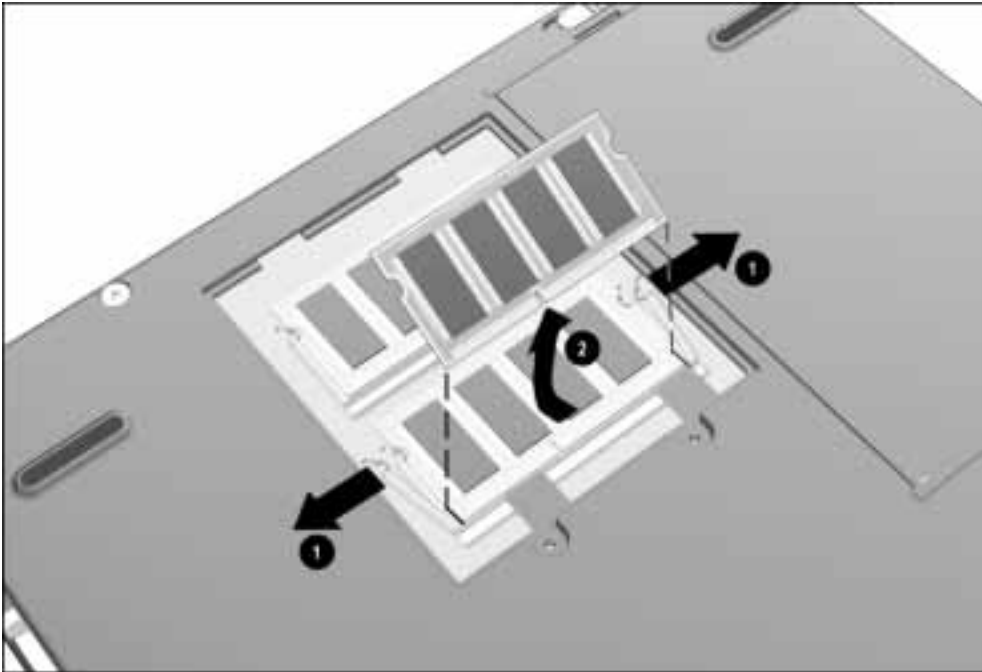


Figure 5-17. Removing a Memory Expansion Board

3. Place the memory board in an electrostatic-safe container.
4. If no memory expansion board is to be installed, replace the memory compartment cover and install the screws.

Installing a Memory Expansion Board

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

1. Insert the memory expansion board into an empty memory expansion slot at a 45-degree angle ❶ (Figure 5-18).
2. Push the board into place until it is seated.
3. Push the memory expansion board down until the board is seated in the retention clips ❷.

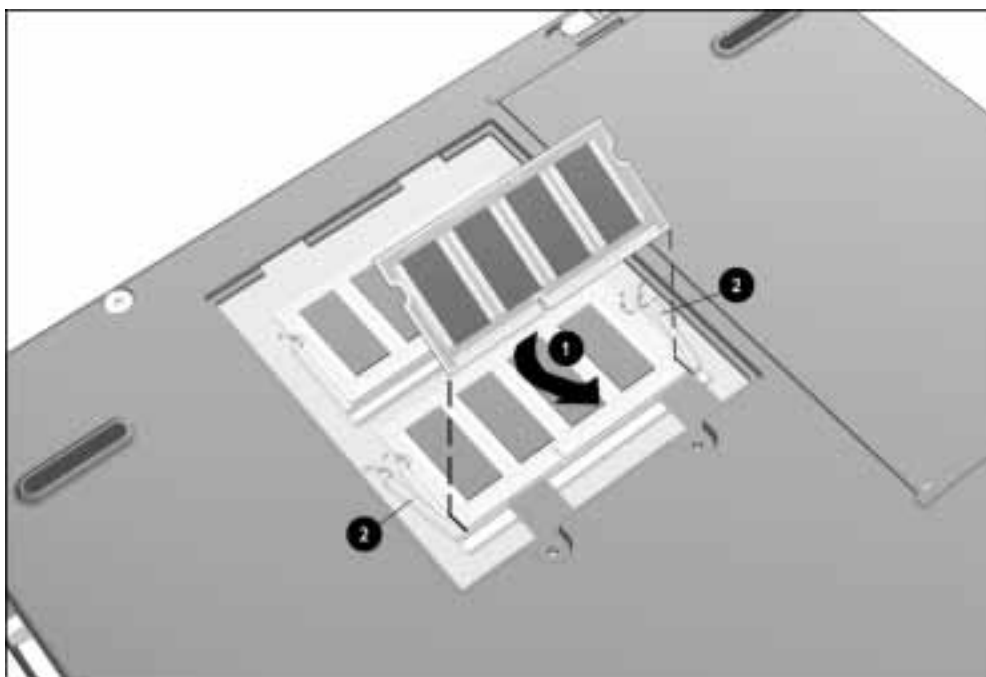


Figure 5-18. *Installing a Memory Expansion Board*

4. Slide the memory compartment cover into position and insert the two screws.
5. Run Computer Setup (Section 2.5).

NOTE: If, after installation, a memory expansion board fails to be recognized, remove the board and make sure the memory expansion slot is clean and free of debris. Reinsert the card.

5.13 Keyboard/CPU Cover Assembly

The keyboard/CPU cover assembly is spared as a unit. Two spare pointing device caps are included with the assembly. Remove the keyboard/CPU cover assembly to gain access to the internal components of the computer.

Removing the Keyboard/CPU Cover Assembly

1. Prepare the computer for disassembly (Section 5.7).
2. Turn the computer upside down with the front of the computer facing forward.
3. Remove the nine screws from the bottom of the computer (Figure 5-19).



CAUTION: The screw removed from the MultiBay area of the computer (circled in Figure 5-19) is shorter than the other screws removed in Step 3. When installing the keyboard/CPU cover assembly, be sure this shorter screw is installed in the proper location. Failure to follow this caution can result in damage to the computer.

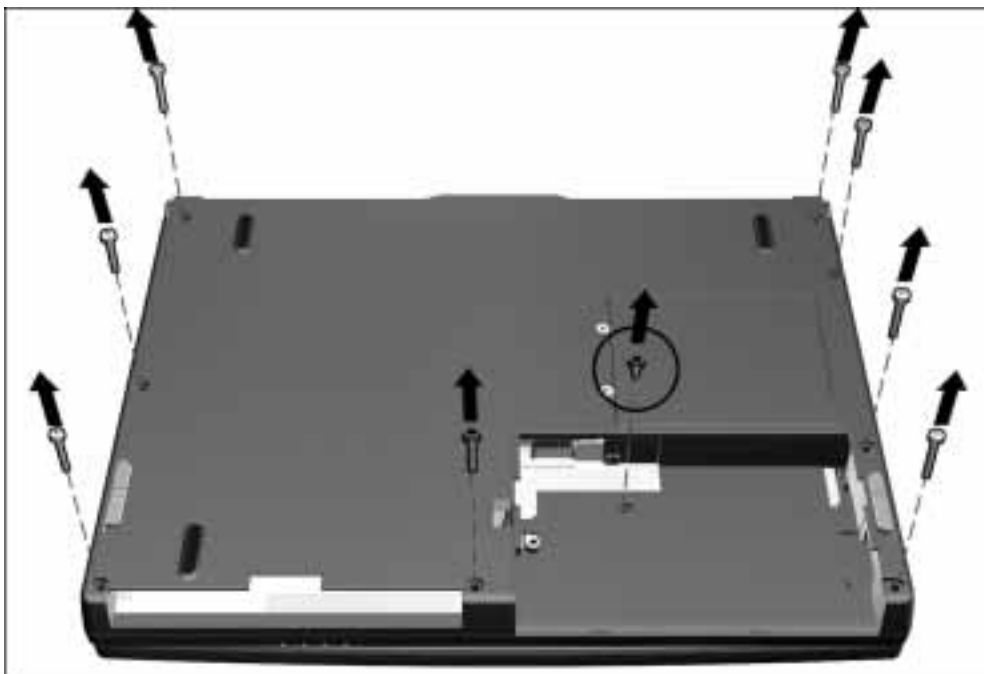


Figure 5-19. *Removing the Keyboard/CPU Cover Assembly Screws*

-
4. Turn the computer right side up with the front of the computer facing forward.
 5. 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.

6. Unsnap the back of the keyboard/CPU cover assembly.
7. Lift the keyboard/CPU cover assembly straight up and away from the computer (Figure 5-20).

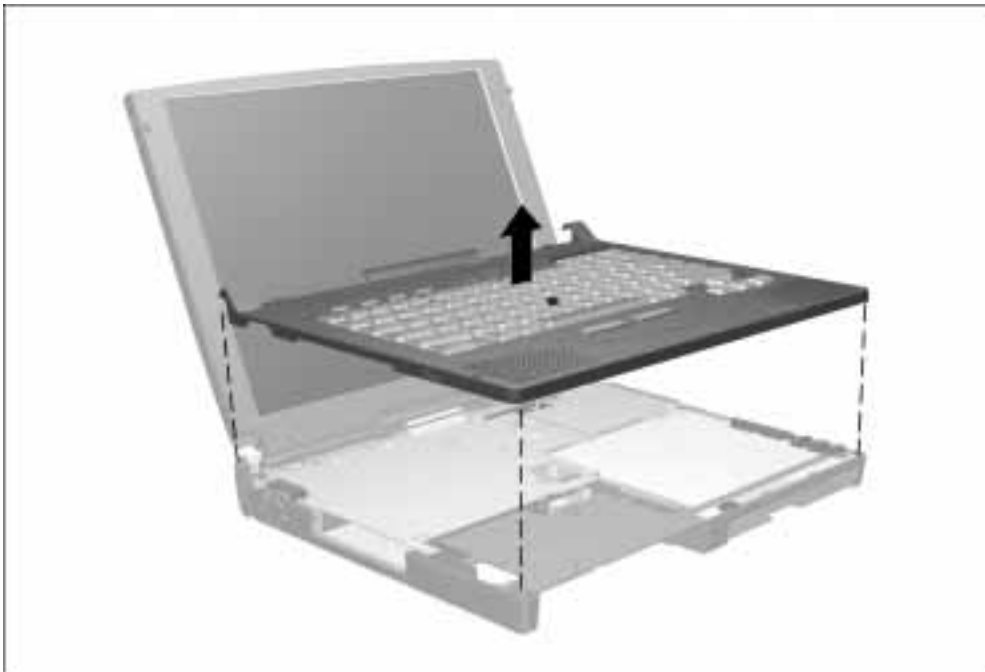


Figure 5-20. *Removing the Keyboard/CPU Cover Assembly*

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8. Remove the six screws securing the EMI shield to the base assembly ❶ (Figure 5-21).
 9. Remove the screw ❷ that secures the heatpipe mount leaf spring ❸ to the processor assembly.

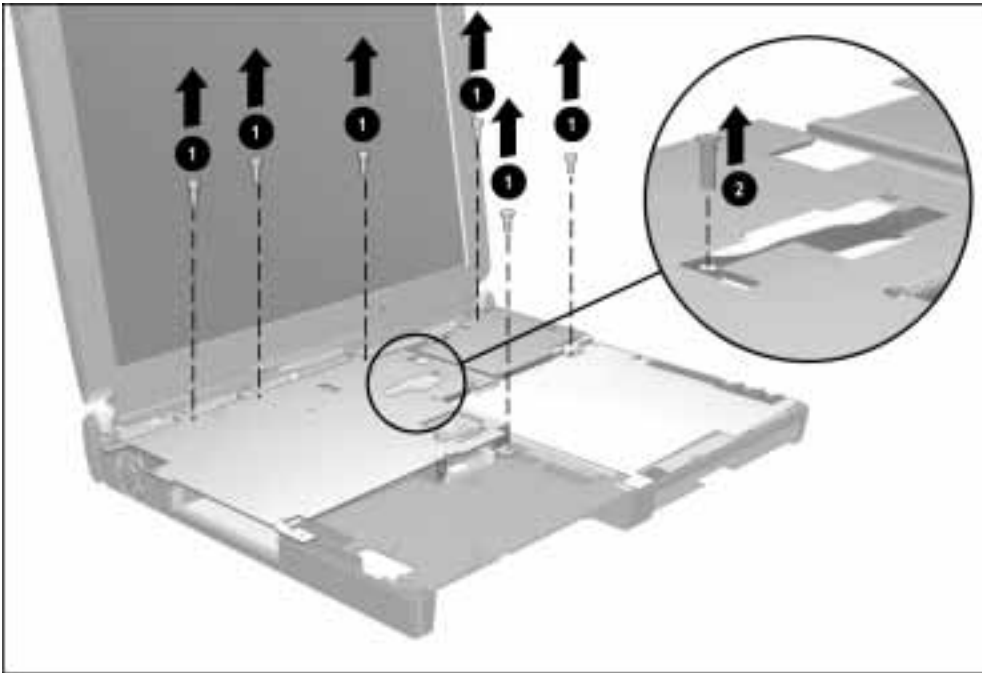


Figure 5-21. Removing the Heatpipe Mount Leaf Spring and EMI Shield Screws

-
10. Swing the left side of the heatpipe mount leaf spring up and away from the base assembly ❶ (Figure 5-22).
 11. Lift the front edge of the EMI shield up and remove the shield from the computer ❷.



CAUTION: Make sure the auxiliary battery cable ❸ does not interfere with the removal of the EMI shield. Failure to follow this caution can result in damage to the auxiliary battery cable.

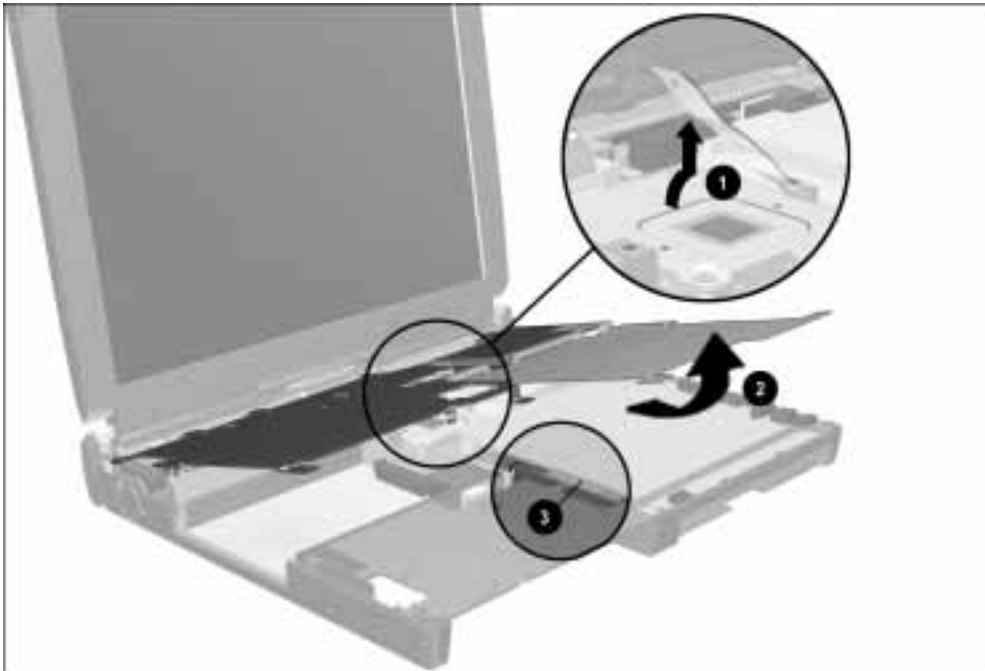


Figure 5-22. Removing the EMI shield

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Installing the Keyboard/CPU Cover Assembly

NOTE: Make sure the PC Card door is open when installing the keyboard/CPU cover assembly.

1. Replace the EMI shield, making sure the four tabs on the back of the shield **1** fit into the appropriate slots **2** on the U-channel (Figure 5-23). Install the six screws that secure the shield to the base assembly.

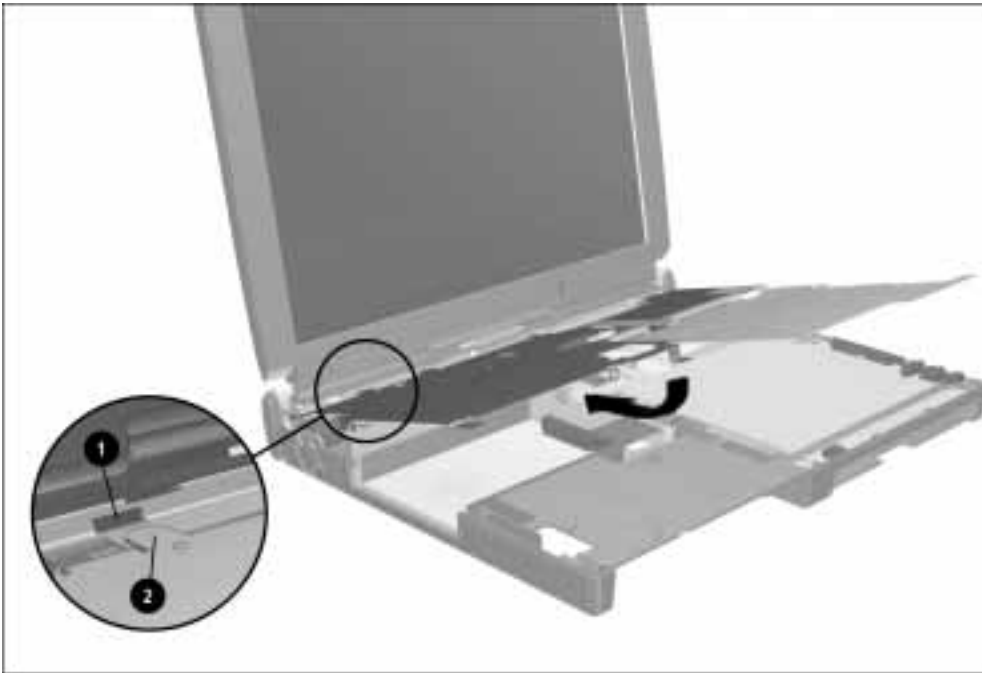


Figure 5-23. *Installing the EMI shield*

2. Insert the notched end of the heatpipe mount leaf spring ❶ into the slot on the thermal catch bracket on the processor (Figure 5-24).
3. Swing down the left side of the heatpipe mount leaf spring ❷.
4. Install the screw that secures the heatpipe mount leaf spring ❸.

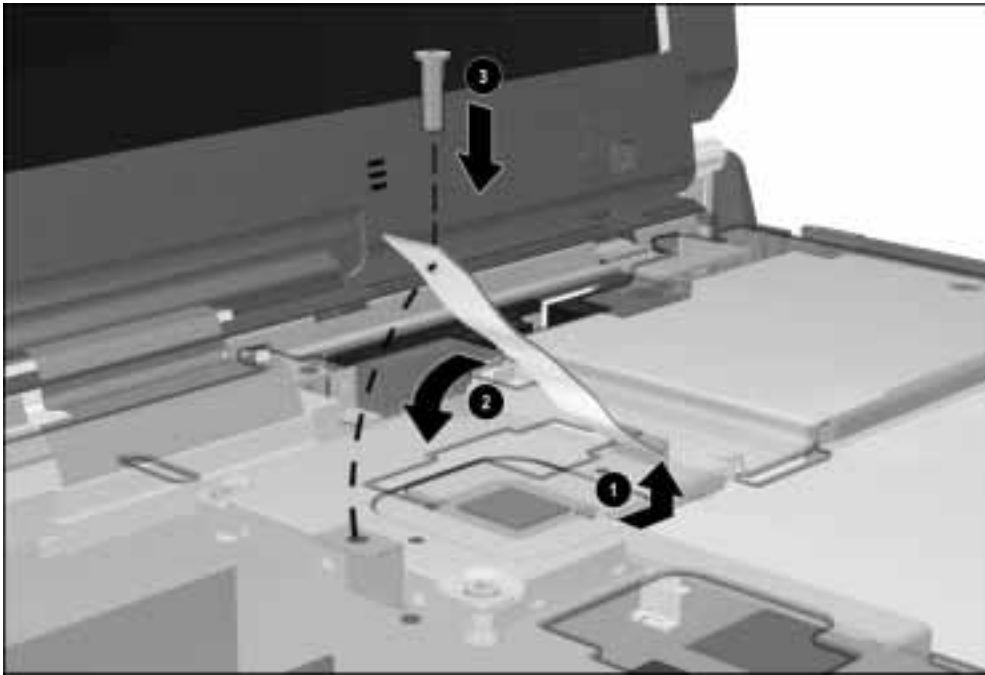


Figure 5-24. *Installing the Heatpipe Mount Leaf Spring*

5. Hold the keyboard/CPU cover assembly at a downward angle and push the right rear corner of the cover onto the right display clutch.
6. Press down on the cover in the area above the keyboard connector to seat the connector.
7. Push the left rear corner of the cover onto the left display clutch.
8. Lower the front of the cover.
9. Close the display.
10. Turn the computer upside down and install the eight screws that secure the keyboard/CPU cover assembly to the CPU base assembly.



CAUTION: To avoid damaging the computer, do not pinch or deform cables when installing the keyboard/CPU cover assembly.

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5.14 Auxiliary Battery

1. Prepare the computer for disassembly (Section 5.7).
2. Remove the keyboard/CPU cover assembly (Section 5.13).
3. Use the connector removal tool to disconnect the auxiliary battery cable from the system board ❶ (Figure 5-25).
4. Lift and remove the auxiliary battery ❷.

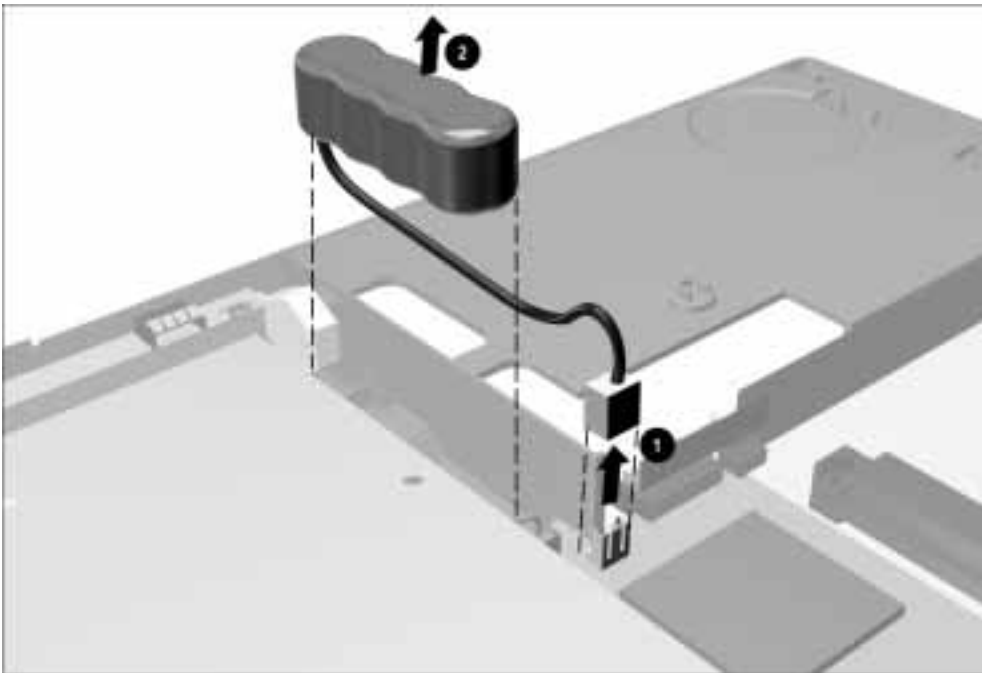


Figure 5-25. *Removing the Auxiliary Battery*

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NOTE: The RTC battery should be installed before installing the auxiliary battery. Refer to Section 5.15.

When installing the auxiliary battery, connect the battery to the system board ❶, route the cable as illustrated in Figure 5-26, and then place the battery into the channel ❷ in the front of the base assembly, with the cable underneath the battery.

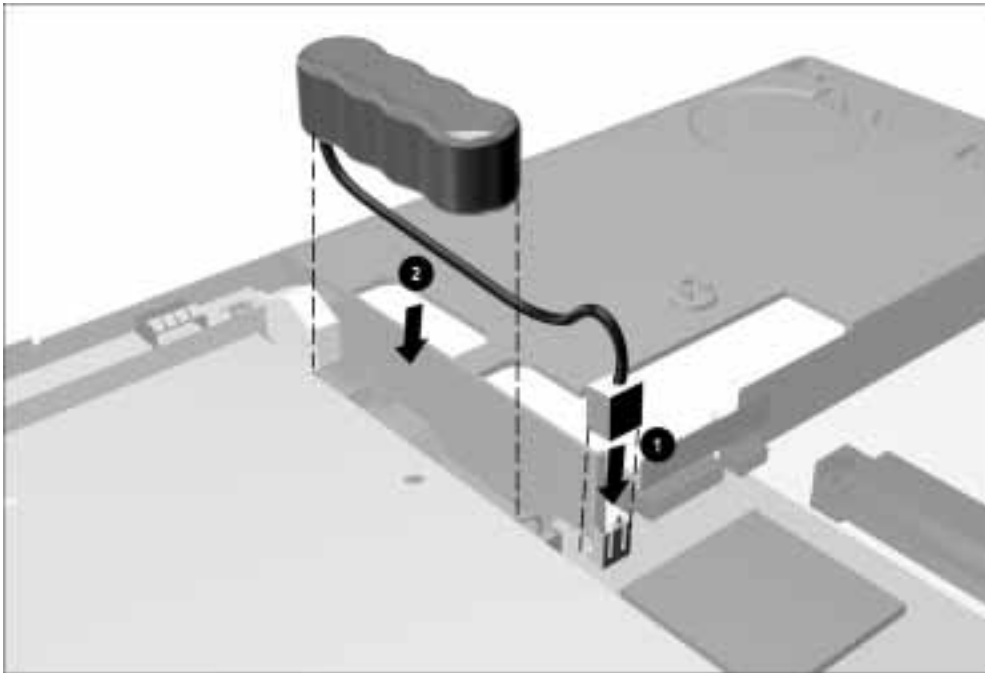


Figure 5-26. *Installing the Auxiliary Battery*

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5.15 RTC Battery

1. Prepare the computer for disassembly (Section 5.7).
2. Remove the keyboard/CPU cover assembly (Section 5.13).
3. Use the connector removal tool to disconnect the RTC battery cable from the system board ❶ (Figure 5-27).
4. Lift and remove the RTC battery ❷.

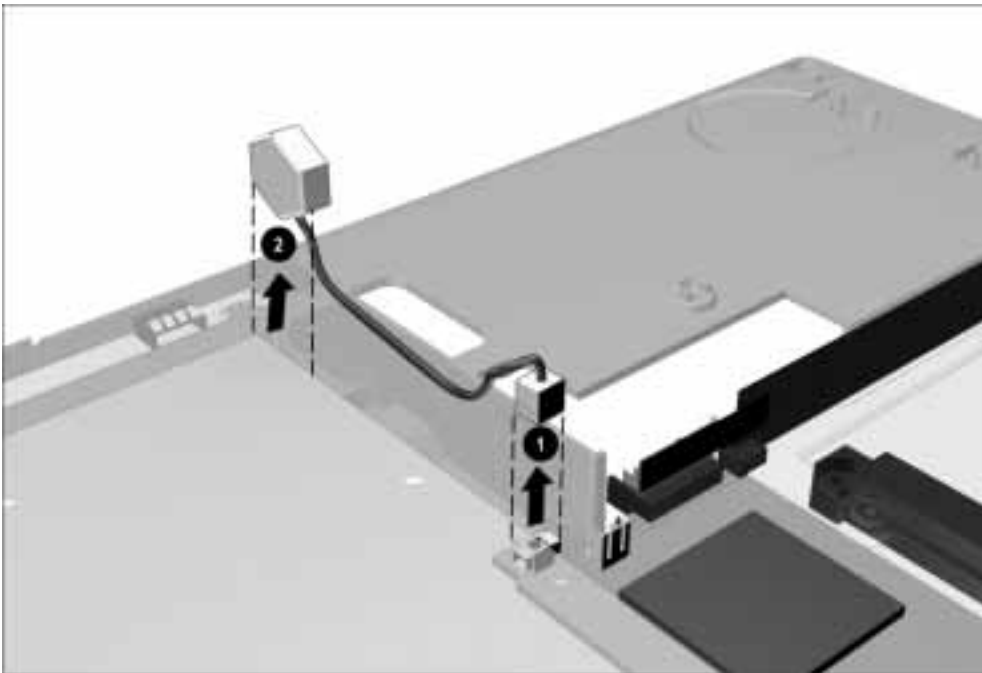


Figure 5-27. Removing the RTC Battery

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When installing the RTC battery, connect the battery to the system board ❶, route the cable as illustrated in Figure 5-28, and then place the battery into the slot in the front of the base assembly ❷.

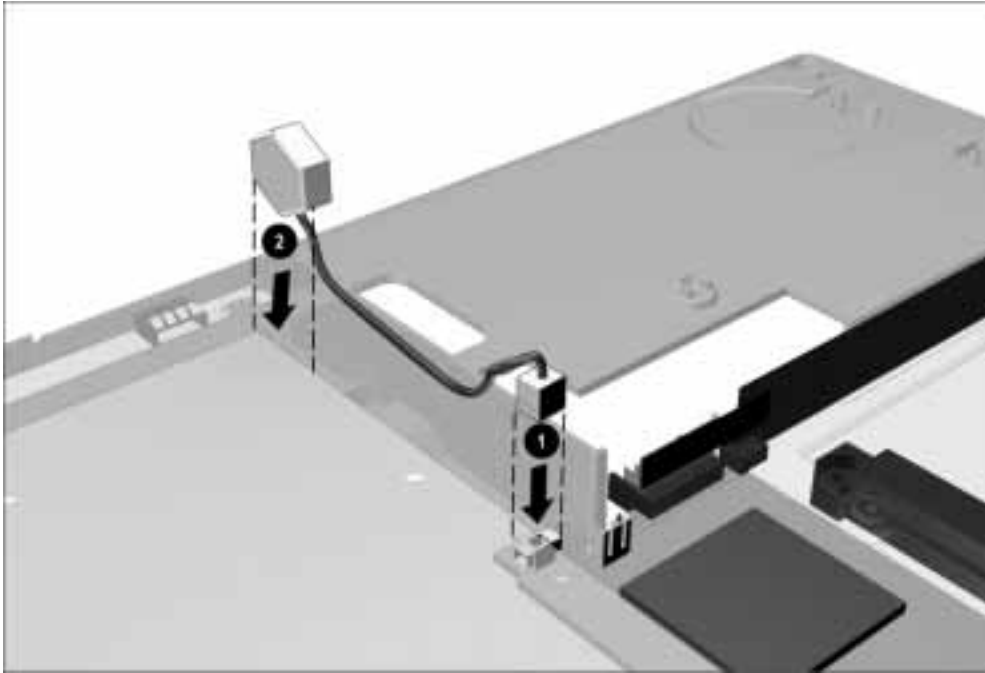


Figure 5-28. *Installing the RTC Battery*

5.16 Audio/Modem or Audio Only Board

Depending on the model, the computer contains either an audio/modem or an audio only board. The audio board is located in the right front area of the computer and connects to the system board. The audio/modem or audio only board is spared as a unit.

1. Prepare the computer for disassembly (Section 5.7).
2. Remove the keyboard/CPU cover assembly and EMI shield (Section 5.13).
3. Lift up on the rear left corner of the audio/modem board ❶ to disconnect the board from the system board (Figure 5-29).
4. Remove the audio/modem board from the computer ❷.
5. Remove the MultiBay shield from the computer ❸.

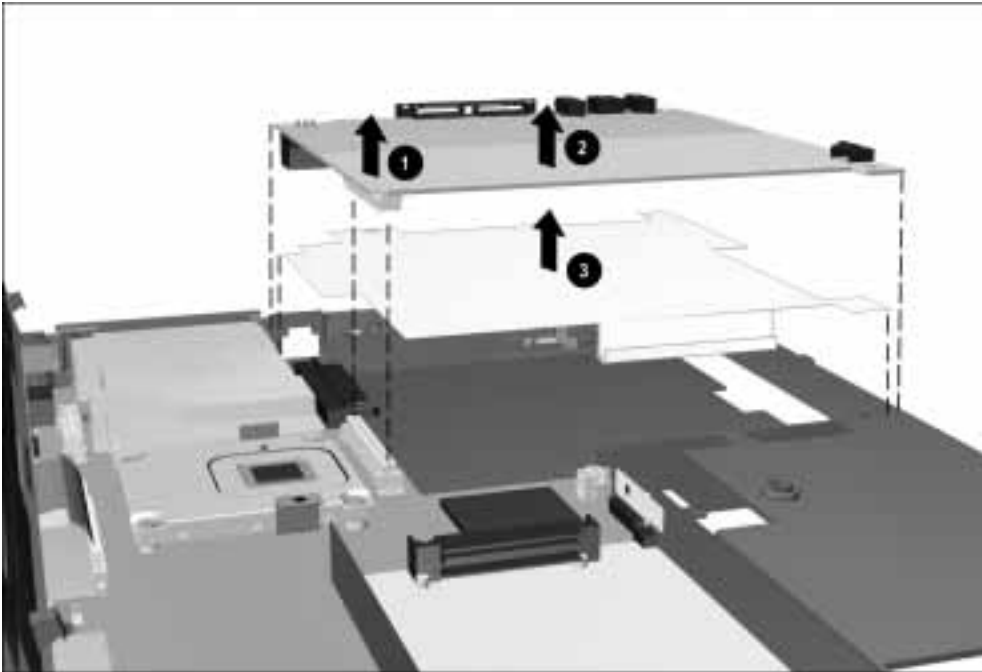


Figure 5-29. Removing the Audio/Modem Board and MultiBay Shield

Reverse the above procedure to install the audio/modem or audio only board and MultiBay shield.



CAUTION: When installing the MultiBay shield, make sure the tabs on the left and right sides of the shield are placed on the outside of the wall in the base assembly. Failure to follow this caution can result in damage to the MultiBay shield and any devices inserted into the MultiBay.

5.17 Fan Assembly

The fan assembly is mounted at the air vent on the left side of the computer and is connected to the system board.

1. Prepare the computer for disassembly (Section 5.7).
2. Remove the keyboard/CPU cover assembly and EMI shield (Section 5.13).
3. Disconnect the fan cable from the system board ❶ (Figure 5-30).
4. Lift the fan from the housing molded into the base assembly ❷.

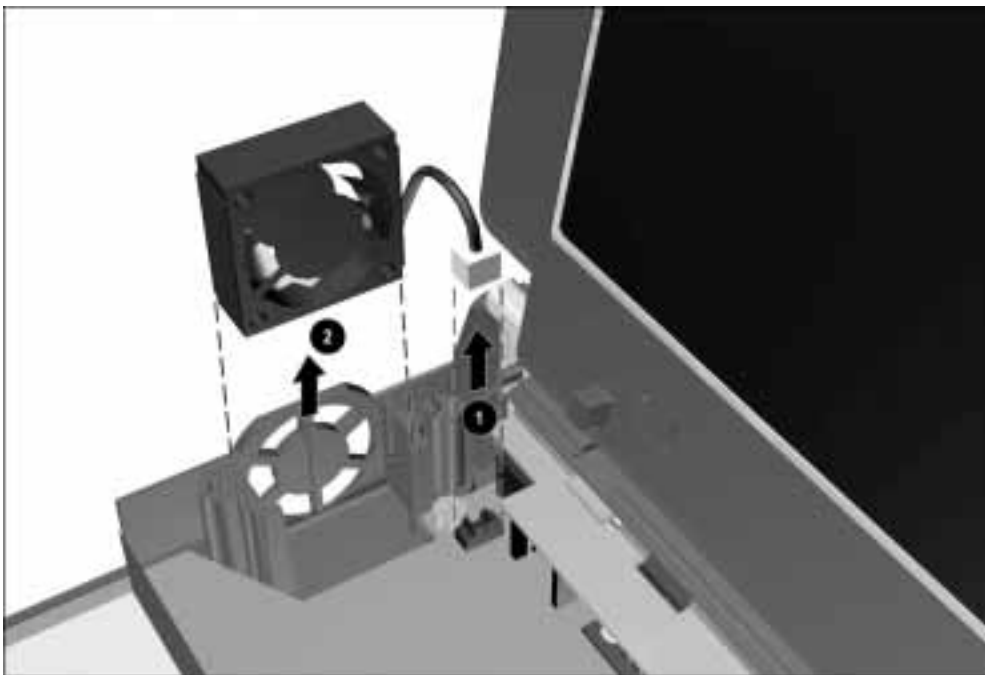


Figure 5-30. Removing the Fan Assembly

Reverse the above procedure to install the fan. Make sure the fan cable is routed through the slot in the back of the fan housing in the base assembly.



CAUTION: To maintain proper air flow, be sure the fan label faces outward and the fan cable faces the rear panel of the computer.

5.18 Processor Board

The processor board is spared as a unit.



CAUTION: When the processor assembly is removed, make sure the processor spacers either remain in place on the processor mounting bracket protruding through the system board or are removed.

When installing the processor assembly, make sure the processor spacers, processor assembly, and screws are installed in the proper sequence. Refer to Figures 5-31 and 5-32 for the proper installation sequence.

Failure to follow this caution can result in damage to the processor and system board.

1. Prepare the computer for disassembly (Section 5.7).
2. Remove the keyboard/CPU cover assembly and EMI shield (Section 5.13).
3. Remove the four screws ❶ that secure the processor board to the system board. Lift up on the back edge of the processor board ❷ and swing it forward to disconnect it from the system board and remove the processor board (Figure 5-31).

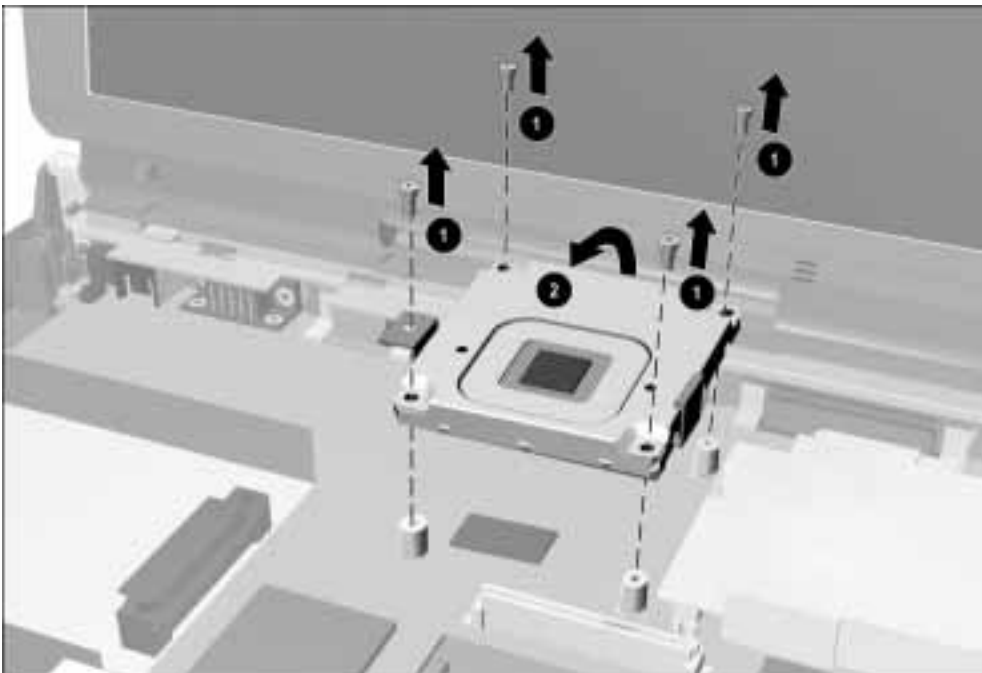


Figure 5-31. Removing the Processor Board

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4. Remove the four spacers from the mounting posts on the processor mounting bracket (Figure 5-32).

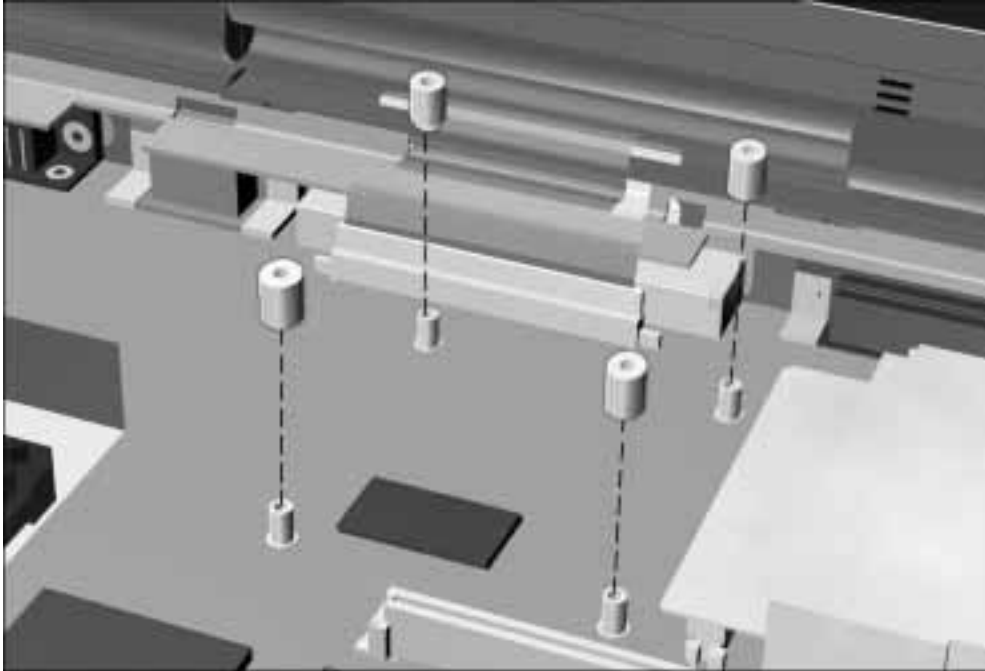


Figure 5-32. *Removing the Processor Board Spacers*

Reverse the above procedure to install the processor board. Make sure the four spacers are replaced before the processor board is secured to the system board.

NOTE: Make sure the processor assembly is fully seated on its connector on the system board before installing the screws.

.....

5.19 Display Assembly

The display assembly is spared as a unit. The Compaq logo is included with the assembly.

Removing the Display Assembly

1. Prepare the computer for disassembly (Section 5.7).
2. Remove the keyboard/CPU cover assembly and EMI shield (Section 5.13).
3. Position the computer so the rear panel faces forward.
4. Remove the four screws that secure the display assembly to the base assembly (Figure 5-33).

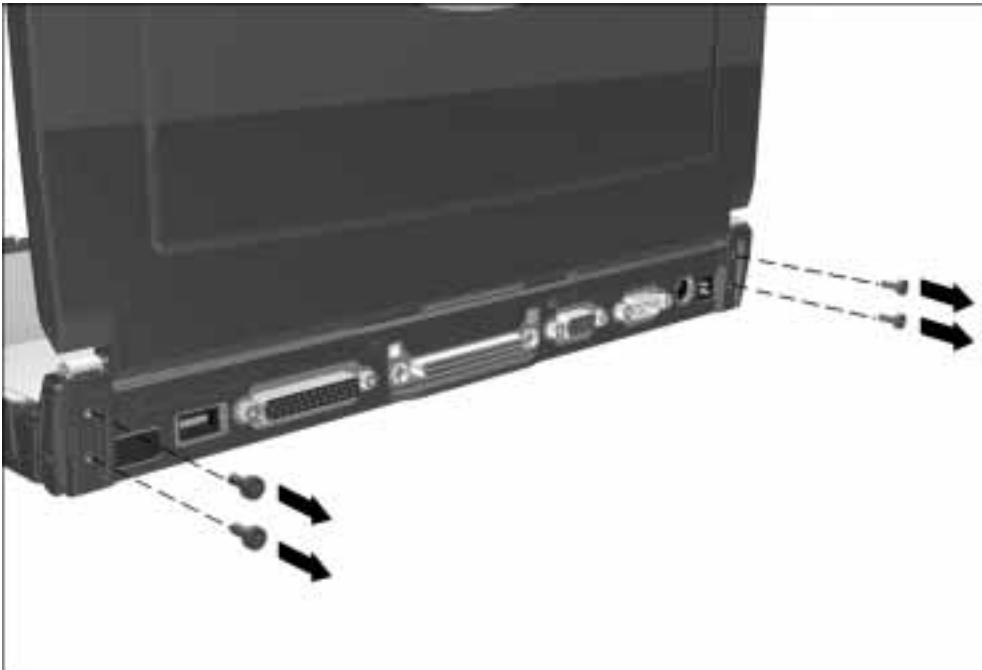


Figure 5-33. *Removing the Display Assembly Screws*

5. Position the computer so the front faces forward.
6. Open the computer.

-
7. Disconnect the display cable from the system board (Figure 5-34).

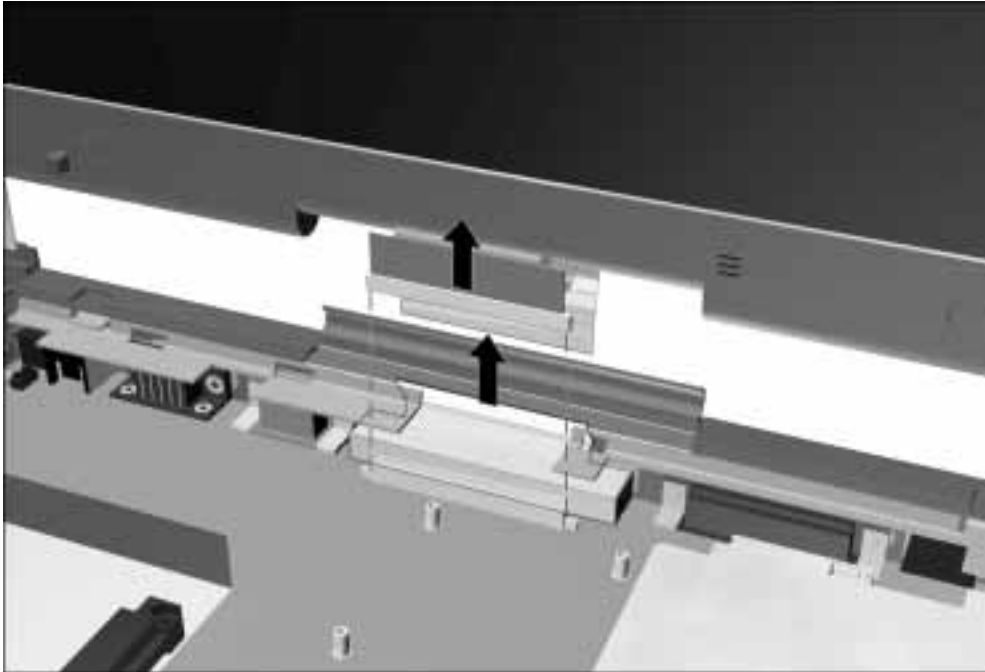


Figure 5-34. *Disconnecting the Display Cable*

8. Lift up and remove the display assembly from the base assembly.

As the display assembly is removed, the display ground cable disconnects from the base assembly.

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Reverse the above procedure to install the display assembly. Insert the display ground cable into the clip in the base assembly as you lower the display clutches into their slots on the base assembly (Figure 5-35).

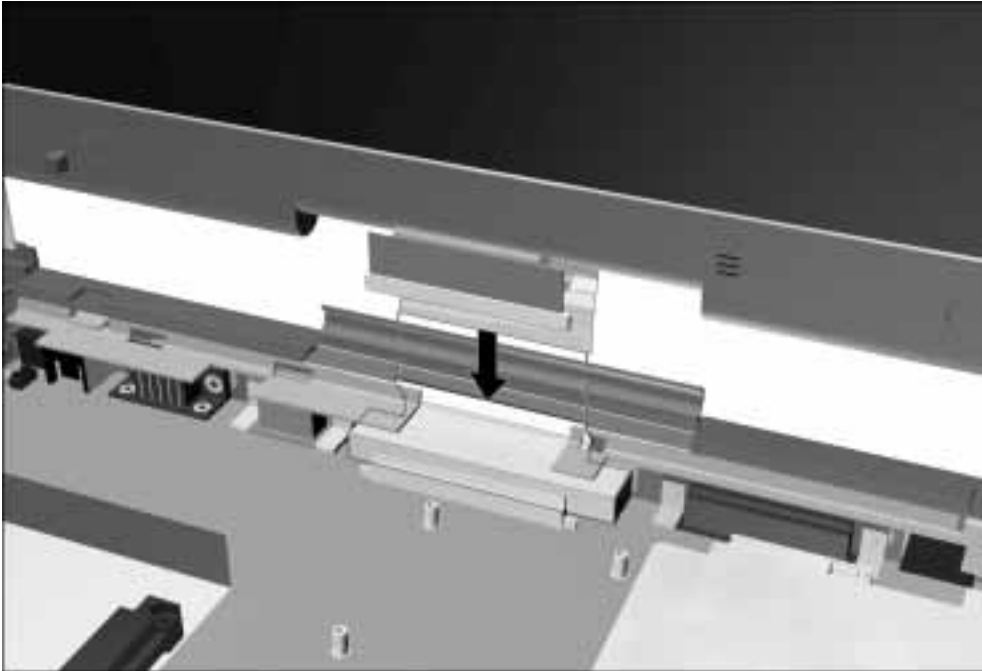


Figure 5-35. *Connecting the Display Ground Cable*

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Display Assembly Internal Components

The display assembly is spared as a hinge-up subassembly in certain geographical regions. In other regions, individual components inside the assembly are spared separately. Refer to the following sections for display assembly disassembly instructions.

Bezel

1. Prepare the computer for disassembly (Section 5.7).
2. Remove the keyboard/CPU cover assembly and EMI shield (Section 5.13).
3. Remove the display assembly (Section 5.19).
4. Peel off the adhesive-backed overlay **1** (Figure 5-36).
5. Remove the two screw covers **2** and six screws **3** that secure the bezel to the enclosure.
6. Remove the bezel **4**.

NOTE: The bezel is used to hold the display release latches in place. When the bezel is removed, the display release latches are loose. Make sure the latches and their springs are not misplaced when removing the bezel.

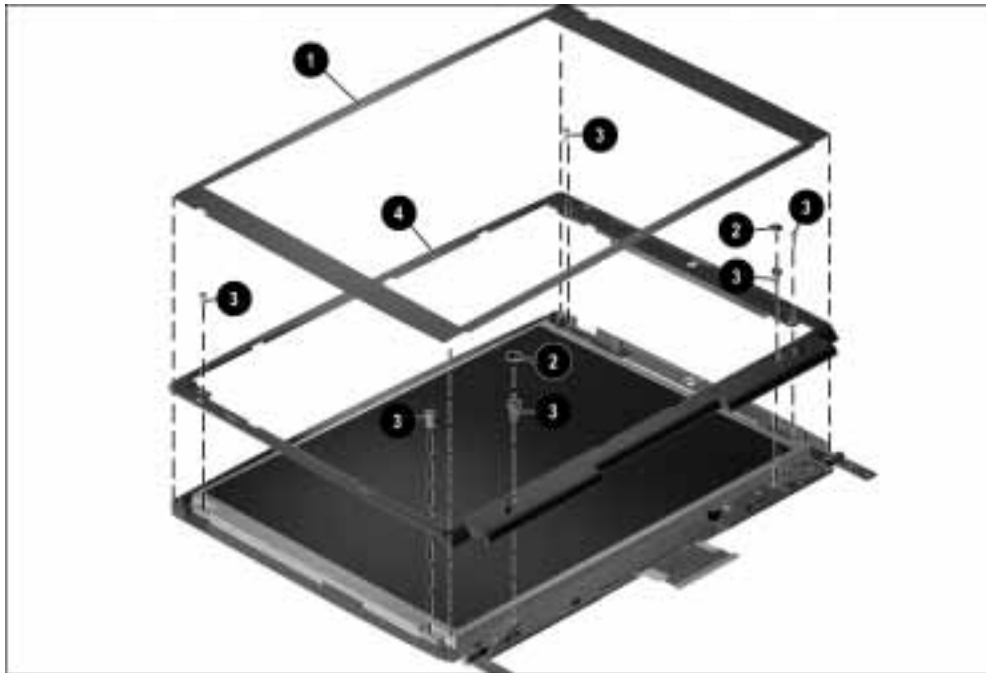


Figure 5-36. Removing the Display Overlay And Bezel

Panel

1. Prepare the computer for disassembly (Section 5.7).
2. Remove the keyboard/CPU cover assembly and EMI shield (Section 5.13).
3. Remove the display assembly (Section 5.19).
4. Remove the overlay and bezel.
5. Disconnect the backlight cable from the inverter ❶ (Figure 5-37).
6. Lift the right side of the panel out of the enclosure.
7. Remove the tape that secures the display cable to the back of the panel ❷.



CAUTION: Do not remove the tape from the display cable. Failure to follow this caution can result in damage to the display cable.

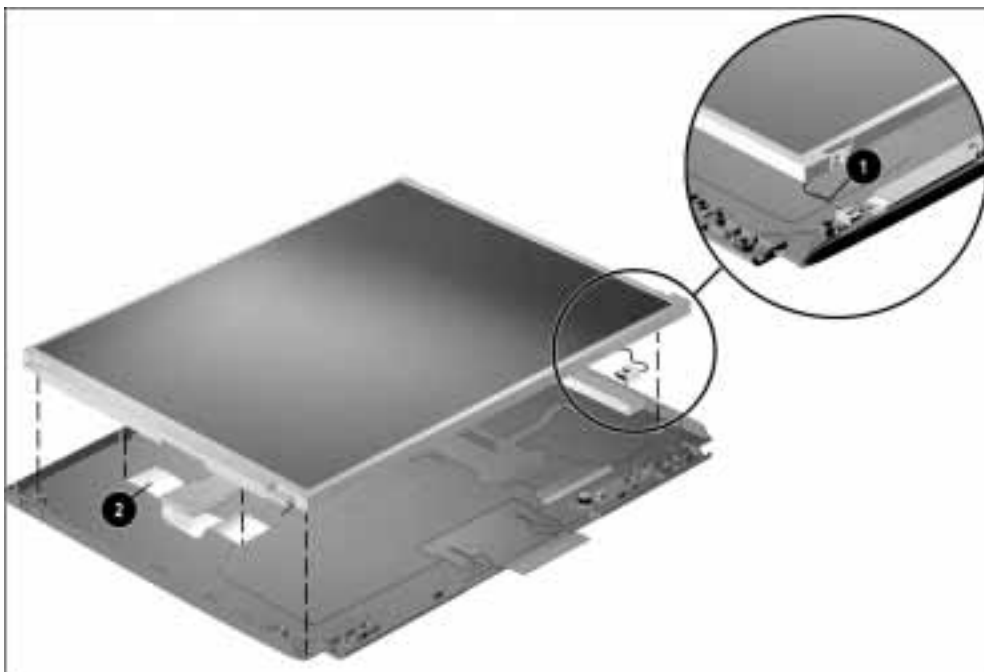


Figure 5-37. *Disconnecting the Backlight Cable and Removing the Display Cable Tape*

8. Disconnect the display cable from the panel.



CAUTION: Exercise caution when disconnecting the cable from the panel. Pull the cable away from the panel on a horizontal plane ❶ (Figure 5-38). Failure to follow this caution can result in damage to the cable and panel.

9. Remove the panel from the enclosure ❷.

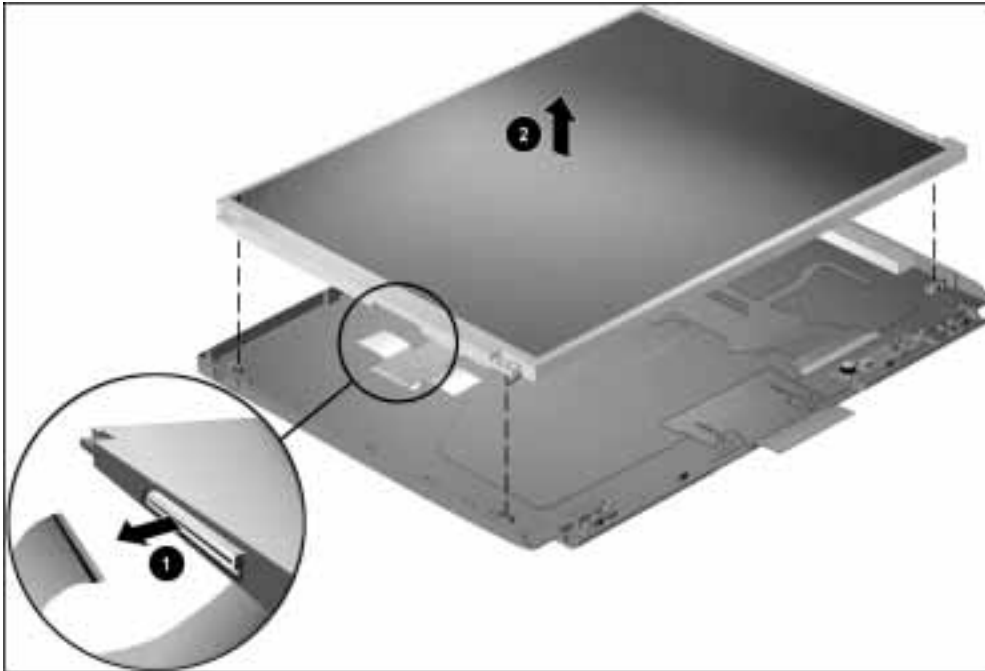


Figure 5-38. *Disconnecting the Display Cable and Removing the Display Panel*

Reverse the above procedure to install the panel.

.....

Display Cable

1. Prepare the computer for disassembly (Section 5.7).
2. Remove the keyboard/CPU cover assembly and EMI shield (Section 5.13).
3. Remove the display assembly (Section 5.19).
4. Remove the overlay and bezel.
5. Remove the panel.
6. Disconnect the display cable from the inverter **1** and microphone board **2** (Figure 5-39).
7. Remove the display cable from the enclosure **3**.

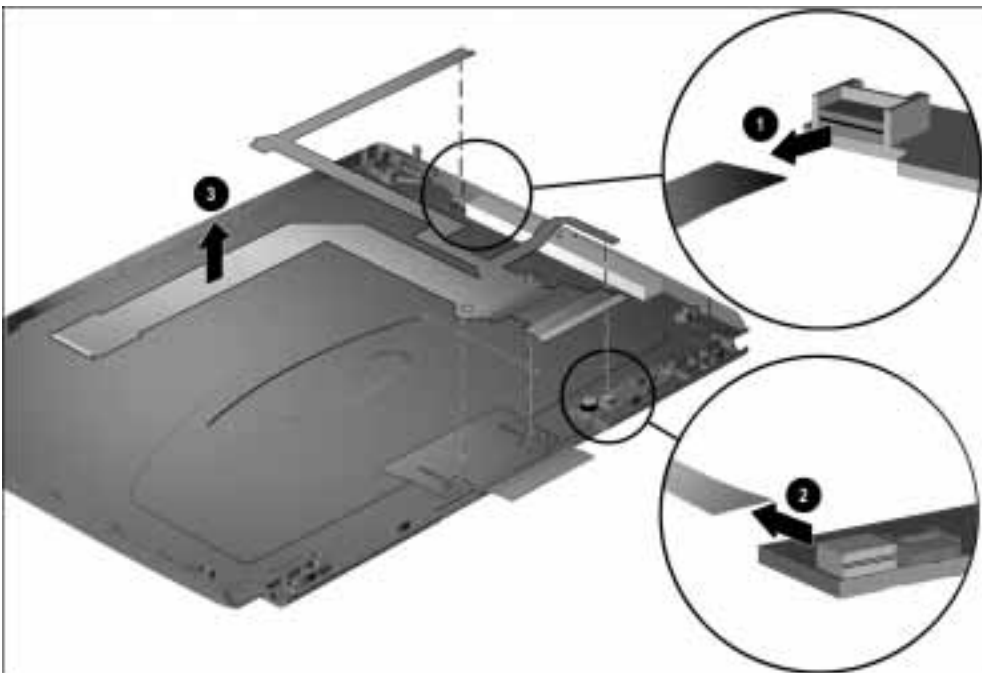


Figure 5-39. Removing the Display Cable

Reverse the above procedure to install the display cable. Be sure the alignment holes on the cable are placed over the alignment pegs on the enclosure.

.....

Inverter

The display inverter is spared with the inverter insulator.

1. Prepare the computer for disassembly (Section 5.7).
2. Remove the keyboard/CPU cover assembly and EMI shield (Section 5.13).
3. Remove the display assembly (Section 5.19).
4. Remove the overlay and bezel.
5. Remove the panel.
6. Remove the display cable.
7. Remove the screw that secures the inverter to the enclosure ❶ (Figure 5-40).
8. Remove the inverter from the enclosure ❷.

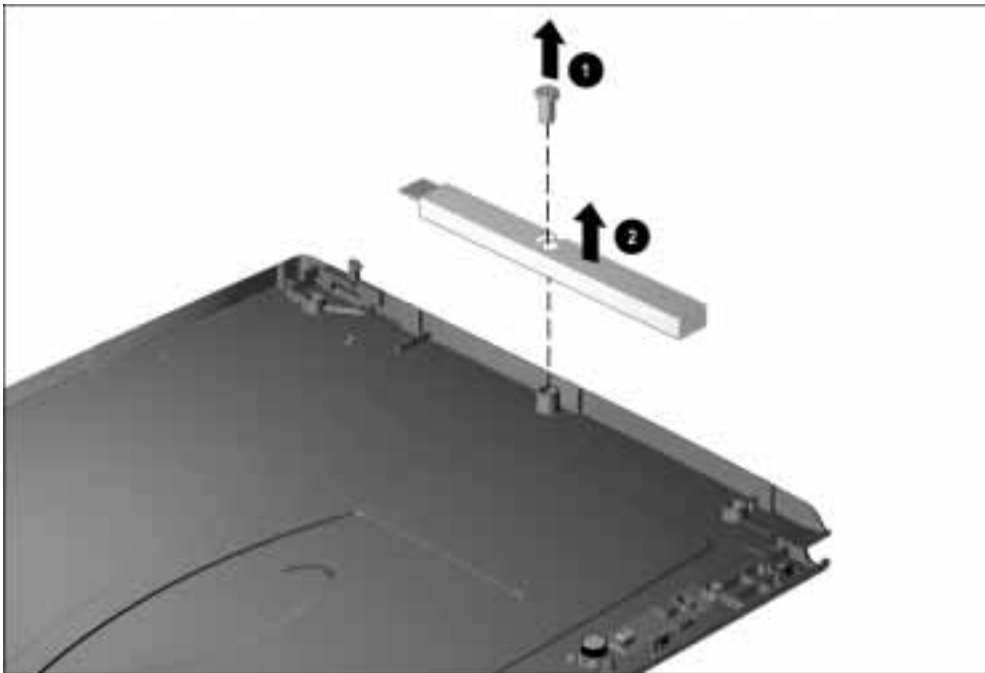


Figure 5-40. Removing the Display Inverter

Reverse the above procedure to install the inverter.

Microphone

The microphone assembly consists of the microphone, the microphone board, and the isolator.

1. Prepare the computer for disassembly (Section 5.7).
2. Remove the keyboard/CPU cover assembly and EMI shield (Section 5.13).
3. Remove the display assembly (Section 5.19).
4. Remove the overlay and bezel.
5. Remove the panel.
6. Remove the display cable.
7. Disconnect the microphone cable from the microphone board ❶ and remove the microphone ❷ (Figure 5-41).
8. Remove the microphone board from the enclosure ❸.

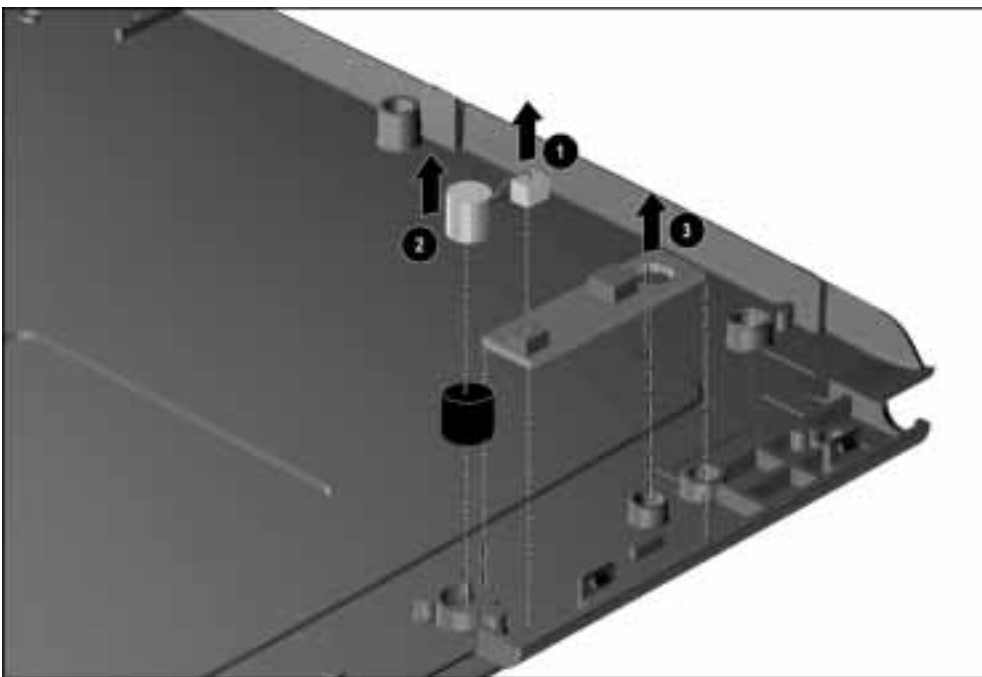


Figure 5-41. *Removing the Microphone*

Reverse the above procedure to install the microphone. The microphone board is secured to the display enclosure by an adhesive pad. If this pad needs to be replaced, install it on the microphone board first, then install the board on the display enclosure.

5.20 System Board

The system board is located beneath the major components in the computer. Those components must be removed to remove the system board. The system board is spared with the U-channel and expansion connector shield.

1. Prepare the computer for disassembly (Section 5.7).
2. Remove the keyboard/CPU cover assembly and EMI shield (Section 5.13).
3. Remove the auxiliary battery (Section 5.14).
4. Remove the RTC battery (Section 5.15).
5. Remove the audio/modem or audio only board and shield (Section 5.16).
6. Remove the fan assembly (Section 5.17).
7. Remove the processor board (Section 5.18).
8. Remove the display assembly (Section 5.19).

NOTE: Once the display assembly has been removed, MultiBay devices left inside the MultiBay for balance purposes can be removed (Section 5.8).

-
9. Position the computer so the rear panel faces forward.
 10. Remove the two screws that secure the U-channel to the base assembly (Figure 5-42).



Figure 5-42. *Removing the U-channel Screws*

-
11. Position the computer so the front faces forward.
 12. Remove the four screws ❶ that secure the system board to the base assembly (Figure 5-43).
 13. Lift up on the front edge of the system board ❷. Once the front edge of the system board clears the battery bay housing, pull the system board forward and remove it from the computer ❸.

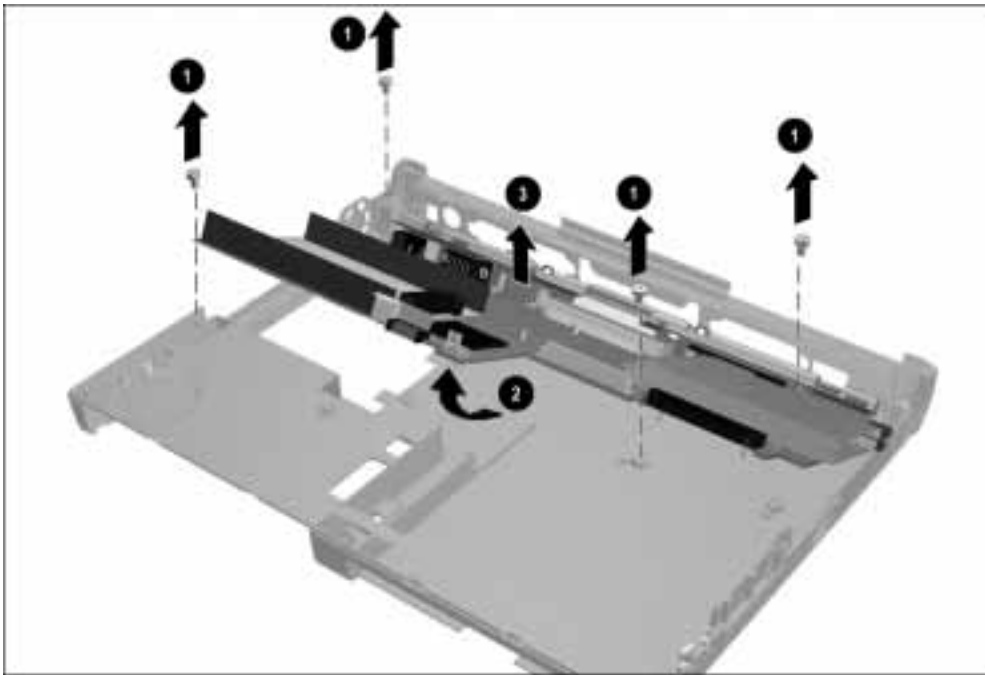


Figure 5-43. Removing the System Board

NOTE: When the system board is removed, the processor attach bracket loosely fits between the system board and the system board insulator. If the processor attach bracket is removed, the processor board spacers may be lost. Ensure that the spacers are not lost and are replaced before the processor is installed.

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Installing the System Board

1. Insert and hold the processor attach bracket in place on the bottom of the system board (Figure 5-44).

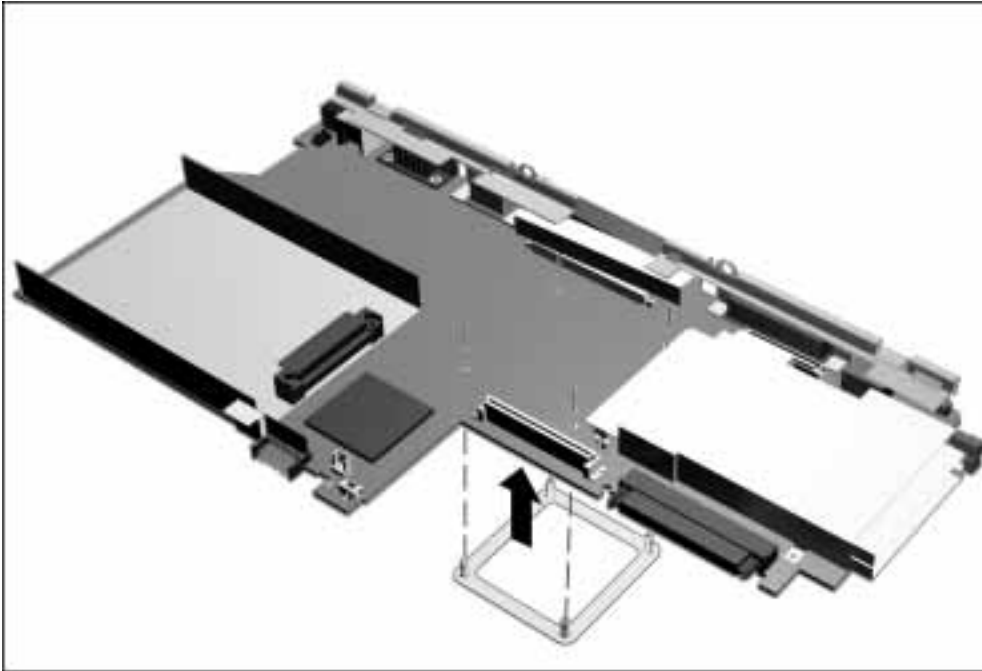


Figure 5-44. *Installing the Processor Attach Bracket*

2. Position the base assembly so the front of the computer faces forward.

3. With the back edge of the system board leaning downward, insert the system board into the base assembly ❶ (Figure 5-45).

NOTE: Make sure the PC Card door is open when inserting the system board into the base assembly.

4. When the back edge is in place, push the front edge down ❷ into the base assembly.
5. Install the six screws that secure the system board.



Figure 5-45. *Installing the System Board*



CAUTION: When the processor assembly is removed, make sure the processor spacers either remain in place on the processor mounting bracket protruding through the system board or are removed.

When installing the processor assembly, make sure the processor spacers, processor assembly, and screws are installed in the proper sequence. Refer to Figures 5-31 and 5-32 for the proper installation sequence.

Failure to follow this caution can result in damage to the processor and system board.

Specifications

6.1 Physical and Environmental

Table 6-1 Computer		
	U.S.	Metric
Dimensions		
Height	1.6 in	4.06 cm
Depth	9.6 in	24.38 cm
Width	12.5 in	31.75 cm
Weight		
modem installed		
with CD-ROM drive		
without AC adapter	6.8 lb	3.0 kg
with AC adapter (total carrying weight)	7.7 lb	3.5 kg
with diskette drive		
without AC adapter	6.6 lb	3.0 kg
with AC adapter (total carrying weight)	7.5 lb	3.4 kg
with MultBay weight saver		
without AC adapter	6.3 lb	2.8 kg
with AC adapter (total carrying weight)	7.0 lb	3.2 kg
no modem installed		
with CD-ROM drive		
without AC adapter	6.8 lb	3.0 kg
with AC adapter (total carrying weight)	7.7 lb	3.5 kg
with diskette drive		
without AC adapter	6.5 lb	2.9 kg
with AC adapter (total carrying weight)	7.4 lb	3.4 kg
with MultBay weight saver		
without AC adapter	6.0 lb	2.7 kg
with AC adapter (total carrying weight)	6.9 lb	3.1 kg
Standalone (Battery) Power Requirements		
Nominal operating voltage	14.4 VDC	
Average operating power	20 W	
Peak operating power	28 W	
AC Adapter Power Requirements		
Operating voltage	100-120/220-240	
Operating current	1.2/0.6 Amp	
Operating frequency range	50 to 60 Hz AC	
Maximum output voltage	+18.85 volts	
Maximum transient	1kV for 50 ns	
Automobile Adapter DC Input Requirements		
Operating voltage	10.5 to 15.2 VDC	
Temperature		
Operating	50 to 104° F	10 to 40°C
Nonoperating	-4 to 140° F	-20 to 60°C

continued

Table 6-1 *continued*

Relative Humidity (noncondensing)		
Operating	10 to 90%	
Nonoperating ($t_w = 38.7^\circ\text{C}$ max)	5 to 90%	
Altitude (nonpressurized environment)		
Operating	0 to 10,000 ft	0 to 3.05 km
Nonoperating	0 to 30,000 ft	0 to 9.14 km
Shock		
Operating	10 G, 11 ms, half sine	
Nonoperating	240 G, 2 ms, half sine	
Vibration		
Operating	0.25 G, 50-500 Hz sine, 1/2 octave/minute sweep	
Nonoperating	1.00 G, 50-500 Hz sine, 1/2 octave/minute 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
13.3-inch XGA, CTFT Display

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

6.3 Hard Drive

**Table 6-3
Hard Drive**

	4.0 GB	6.4 GB
Formatted Capacity per Drive (MB)	4.0 GB²	6.4 GB²
Drive Type	65	65
Drive Height (with drive frame, in mm)	12.7	12.7
2.5-Inch Form Factor	Yes	Yes
Sector Interleave	1:1	1:1
Integrated Controller	Yes	Yes
Seek Times (typical, including settling)		
Track to track	4 ms	4 ms
Average	13 ms	12 ms
Maximum	23 ms	23 ms
Physical Configuration		
Cylinders	6975	9279
Heads	6	6
Sectors per Track	144-240	168-280
Bytes per Sector	512	512
Logical Configuration		
Cylinders	7944	13424
Heads	16	15
Sectors per Track	63	62
Bytes per Sector	512	512
Buffer Size	512K	512K
Disk Rotational Speed (RPM)	4009	4009
Transfer Rate		
Interface (MB/sec)	16.6	16.6
Media (MB/sec)	51.7-83.4	61.5-102.6

6.4 Diskette Drive

Table 6-4
Diskette Drive

Diskette Size	3.5 inch
High Density	1.44 MB/1.2 MB
Low Density	720 KB
Light	None
Height	0.50 in (12.7 mm)
Bytes per Sector	512
Sectors per Track	
High Density	18 (1.44 MB)/15 (1.2 MB)
Low Density	9
Tracks per Side	
High Density	80 (1.44 MB)/80 (1.2 MB)
Low Density	80
Read/Write Heads	2
Average Seek Times	
Track-to-Track (high/low)	3 ms/6 ms
Average (high/low)	94 ms/174 ms
Settling Time	15 ms
Latency Average	100 ms

6.5 CD-ROM Drive

**Table 6-5
DVD-ROM Drive**

Applicable Disc	CD-ROM (Mode 1, 2, and 3) CD-XA ready (Mode 2, Form 1 and 2) CD-I ready (Mode 2 (Form 1 and Form 2)) CD-R (read only) CD Plus Photo CD (single/multisession) CD Extra Video CD CD-WO (fixed packets only) CD-Bridge
Center Hole Diameter	.59 in/15 mm
Disc Diameter	12 cm, 8 cm
Disc Thickness	1.2 mm
Track Pitch	1.6 μ m
Laser	
Beam Divergence	53.5 \pm 1.5 degrees
Output Power	0.24 \pm 0.1 mw
Type	Semiconductor Laser GaAlAs
Wave Length	780nm \pm 25nm
Access Time	
Random	< 150 ms
Full Stroke	< 300 ms
Audio Output Level	
Line Out	0.7V rms
Headphone	none
Cache Buffer	128 KB
Data Transfer Rate	
Sustained, 24X	3.6 MB/sec (outer diameter) 1500 MB/sec
Sustained, 1X	150 KB/sec
Burst	8.3 MB/sec
Startup Time	< 10 seconds typical
Capacity	
Mode 1, 12 cm	550 MB
Mode 2, 12 cm	640 MB
8 cm	180 MB

6.6 DVD-ROM Drive

Table 6-6
DVD-ROM Specifications

Applicable Disc	DVD-5, DVD-9, DVD-10 CD-ROM mode 1, mode 2 CD-Digital Audio CD-XA mode 2 (Form 1, Form 2) CD-I mode 2 (Form 1 and Form 2) CD-I Ready CD-Bridge CD-R Photo CD (single/multisession)
Center Hole Diameter	.59 in/15 mm
Disc Diameter	12 cm, 8 cm
Disc Thickness	1.2 mm
Track Pitch	.74 μ m
Capacity	
DVD-5	4.7 GB
DVD-9	8.5 GB
DVD-10	9.4 GB
Mode 1, 12	550 MB
Mode 2, 12 cm	640 MB
8 cm	180 MB
Laser	
Output Power	5 mw
Type	Semiconductor Laser GaAlAs
Wave Length	650 nm \pm 25 nm (DVD-ROM mode) 795 nm \pm 25 nm (CD-ROM mode)
Access Time	
Random	< 200 ms
Full Stroke	< 250 ms
Audio Output Level	
Line Out	0.7V rms
Headphone	none
Cache Buffer	128 KB
Data Transfer Rate	
Sustained, 1x (CD-ROM mode)	150 KB/sec
Sustained, 20x (CD-ROM CAV mode)	1200-1300 KB/sec
Sustained, (DVD-ROM 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 6-7
LS-120 Drive**

	120 MB	1.7 MB DMF	1.44 MB	1.2 MB	1.2 MB	720.KB	640 KB
Formatted capacity (bytes)	125,958,144	1,720,320	1,474,560	1,261,568	1,228,800	737,280	655,360
Sector size (bytes)	512	512	512	1,024	512	512	512
Sectors	246,527	3,360	2,880	1,232	2,400	1,440	1,280
Magnetic tracks surface	1,736	80	80	77	80	80	80
Optical servo tracks/surface	900	N/A	N/A	N/A	N/A	N/A	N/A
Sectors/track	51-92	21	18	8	15	9	8
Sector interleave	1:1	2:1	1:1	1:1	1:1	1:1	1:1
Spare sectors	170	0	0	0	0	0	0
Zones (each side)	55	1	1	1	1	1	1
Average random seek	70 ms	70 ms	70 ms	70 ms	70 ms	70 ms	70 ms
Track-to-track seek	20 ms	25 ms	25 ms	25 ms	25 ms	25 ms	25 ms
Max single seek	120 ms	170 ms	170 ms	170 ms	170 ms	170 ms	170 ms
Average latency	41.67 ms	41.67 ms	41.67 ms	41.67 ms	41.67 ms	41.67 ms	41.67 ms
Motor RPM	720±0.5%	720±0.5%	720±0.5%	720±0.5%	720±0.5%	720±0.5%	720±0.5%
Motor start time	800 ms	800 ms	800 ms	800 ms	800 ms	800 ms	800 ms
Track density	2,490 TPI	135 TPI	135 TPI	135 TPI	135 TPI	135 TPI	135 TPI
Track width	8 µm	125 µm	125 µm	125 µm	125 µm	125 µm	125 µm
Encoding method	(1,7)RLL	MFM	MFM	MFM	MFM	MFM	MFM
Max flux density	33,660 FCI	17,334 FCI	17,334 FCI	17,334 FCI	17,334 FCI	17,334 FCI	17,334 FCI
Recording density	44,880 BPI	17,334 BPI	17,334 BPI	17,334 BPI	17,334 BPI	17,334 BPI	17,334 BPI
Nominal transfer rate	375-680 KB/sec	150 KB/sec	150 KB/sec	125 KB/sec	125 KB/sec	75 KB/sec	75 KB/sec
Nominal sustained transfer rate across interface	313-565 KB/sec	65 KB/sec read, 32 KB/sec write	55 KB/sec read, 28 KB/sec write	49 KB/sec read, 25 KB/sec write	46 KB/sec read, 23 KB/sec write	28 KB/sec read, 14 KB/sec write	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	4.0 MB/sec	4.0 MB/sec

6.8 Battery Pack

Table 6-8
Lithium Ion Battery Pack

	U.S.	Metric
Dimensions		
Height	0.79 in	2.00 cm
Length	5.43 in	13.82 cm
Weight	3.46 in	8.80 cm
Weight	0.92 lb	0.40 kg
Recharge times		
while computer is turned on	3-4 hours (depending on system activity during recharging period)	
while computer is turned off	2 hours	
Energy		
Voltage	14.4V	
Capacity	3.0 Ah	
Environmental Requirements		
Operating Temperatures	50° F to 104° F	10° C to 40° C
Charging Temperatures	50° F to 104° F	10° C to 40° C
Recommended Storage Temperatures		
No longer than 1 month	32° F to 140° F	0° C to 60° C
No longer than 3 months	32° F to 113° F	0° C to 45° C
No longer than 1 year	32° F to 68° F	0° C to 20° C

6.9 System Interrupts

Table 6-9
System Interrupts

Hardware IRQ	System Function
IRQ1	Timer Interrupt
IRQ2	Cascaded
IRQ3	PCMCIA
IRQ4	Modem (COM1)
IRQ5	Audio (default)*
IRQ6	Diskette drive
IRQ7	Parallel
IRQ8	RTC
IRQ9	Infrared
IRQ10	PCMCIA
IRQ11	Network Interface on ArmadaStation/Armada MinStation**
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 MinStation

Notes:

PCMCIA cards may assert IRQ3, IRQ4, IRQ5, IRQ7, IRQ9, IRQ10, IRQ11, or IRQ15.

Either the infrared or the serial port may assert IRQ3 or IRQ4.

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

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

6.10 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.

6.11 System I/O Addresses

Table 6-11
System I/O Addresses

I/O Address (Hex)	System Function (Shipping Configuration)
<i>000 - 00F</i>	DMA Controller no. 1
<i>010 - 01F</i>	Unused
<i>020 - 021</i>	Interrupt Controller no. 1
<i>022 - 024</i>	Opti/Chipset Configuration registers
<i>025 - 03F</i>	Unused
<i>02E - 02F</i>	87334 "SuperIO" configuration for CPU
<i>040 - 043</i>	Counter/Timer Registers
<i>044 - 05F</i>	Unused
<i>060</i>	Keyboard Controller
<i>061</i>	Port B
<i>062 - 063</i>	Unused
<i>064</i>	Keyboard Controller
<i>065 - 06F</i>	Unused
<i>070 - 071</i>	NMI Enable/Real Time Clock
<i>072 - 07F</i>	Unused
<i>080 - 08F</i>	DMA Page Registers
<i>090 - 091</i>	Unused
<i>092</i>	Port A
<i>093 - 09F</i>	Unused
<i>0A0 - 0A1</i>	Interrupt Controller no. 2
<i>0A2 - 0BF</i>	Unused
<i>0C0 - 0DF</i>	DMA Controller no. 2
<i>0E0 - 0EF</i>	Unused
<i>0F0 - 0F1</i>	Coprocessor Busy Clear/Reset
<i>0F2 - 0FF</i>	Unused
<i>100 - 16F</i>	Unused
<i>170 - 177</i>	Secondary Fixed Disk Controller
<i>178 - 1EF</i>	Unused
<i>1F0 - 1F7</i>	Primary Fixed Disk Controller
<i>1F8 - 200</i>	Unused
<i>201</i>	Joystick (Decoded in ESS 1688)
<i>202 - 21F</i>	Unused
<i>220 - 22F</i>	Entertainment Audio
<i>230 - 26D</i>	Unused

Continued

Table 6-11 *Continued*

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

6.12 System Memory Map

Table 6-12
System Memory Map

<i>Size</i>	<i>Memory Address</i>	<i>System Function</i>
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	SuperExtended Memory
58 M	04800000 - 07FFFFFF	Unused
2 M	08000000 - 080FFFFFF	Video Memory (Direct Access)
4 G	08200000 - FFFFFFFF	Unused
64 K	FFFF0000 - FFFFFFFF	System BIOS

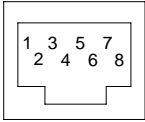
6.13 Modem Chipset

Table 6-13
Modem Chipset

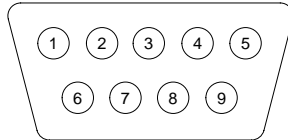
<i>Component</i>	<i>Manufacturer</i>	<i>Part Number</i>
Primary DSP	Lucent	16345T48-AE23-DB
Secondary DSP	Lucent	1635T08-BA23-DB
ASIC	Lucent	VALV34-T-DB
Hybrid	Lucent	D2560BBL-DT
Controller	Motorola	MC68LC302PU

Connector Pin Assignments

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

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

**Table A-2
Serial Connector**



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

**Table A-3
Microphone Jack**

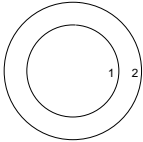
Connector	Pin	Signal
	1	Audio in
	2	Ground

Table A-4
Stereo Speaker/Headphone Jack

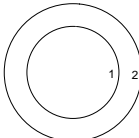
Connector	Pin	Signal
	1	Audio out
	2	Ground

Table A-5
Stereo Line-in Jack

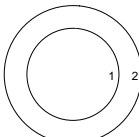
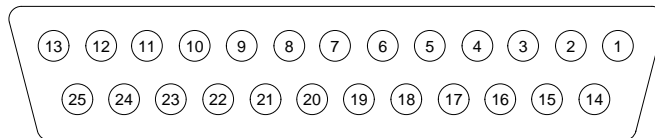
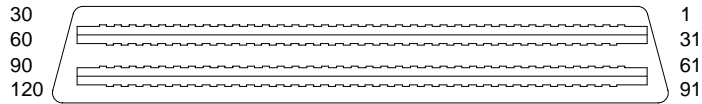
Connector	Pin	Signal
	1	Audio in
	2	Ground

Table A-6
Parallel Connector



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

Table A-7
Docking Connector



Pin	Signal	Pin	Signal
1	EBOXL	34	XA1/R OUT
2	AGND	35	GND
3	EBOXS1	36	GND
4	RED	37	EXPCLK2
5	AGND	38	+3.3V
6	GREEN	39	EXPCLK0
7	AGRD	40	+5V (8051VCC)
8	BLUE	41	EXPCLK
9	AGND	42	EBOXS2
10	VSYNC	43	GND
11	HSYNC	44	EBOXL
12	DDC DAT	45	EBOXL /GND
13	DDC CLK	46	SRDY
14	GND	47	EBOXS1 /GND
15	INDEX	48	RI1 EX
16	RDATA	49	GND
17	TRK0	50	SLCT LDO
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 LD 10
30	MIDO/MIC IN	63	PDATA3 LD 11
31	AUGND	64	GND
32	XAO/L OUT	65	PDATA4 LD 12
33	XSD/MIC SN	66	PDATA5 LD 13

Continued

Table A-7 *Continued*

Pin	Signal	Pin	Signal
67	PDATA6 LD 14	105	AD[16]
68	PDATA7 LD 15	106	GND
69	GND	107	AD[15]
70	ERROR LCLK	108	AD[13]
71	RXD1 LVREQ	109	AD[11]
72	TXD1 LCREQ	110	AD[09]
73	RTS1 LEN	111	GND
74	GND	112	AD[06]
75	CTS1 LIIC CLK	113	AD[04]
76	DTR1 LIIC DAT	114	AD[02]
77	DSR1 EX	115	AD[00]
78	DCD1 EX	116	GND
79	12C DATA	117	FRAME
80	GND	118	TRDY
81	12C CLK	119	STOP
82	GND	120	PAR
83	HDSEL	121	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	EXP/GNT
97	AD[30]	135	VBATT
98	AD[28]	136	GND
99	AD[26]	137	VBATT
100	GND	138	PS2 DATA
101	AD[24]	139	VBATT
102	AD[22]	140	AD[25]
103	AD[20]	141	VBATT
104	AD[18]	142	AD[27]

Continued

Table A-7 *Continued*

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

Table A-8
External Keyboard/Mouse Connector

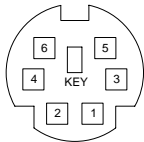
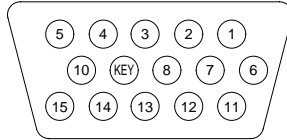
Connector	Pin	Signal
	1	Keyboard/Mouse DATA
	2	Keyboard/Mouse DATA
	3	Ground
	4	+5 VDC
	5	Keyboard/Mouse CLK
	6	Keyboard/Mouse CLK

Table A-9
External Monitor Connector



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

Power Cord Set Requirements

3-Conductor Power Cord Set

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

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

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

General Requirements

The requirements listed below are applicable to all countries:

1. The length of the power cord set must be at least 5.00 feet (1.5 m) and a maximum of 6.50 feet (2.0 m).
2. All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country where the power cord set will be used.
3. The power cord set must have a minimum current capacity of 10A and a nominal voltage rating of 125 or 250 volts AC, as required by each country's power system.
4. The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector, for mating with appliance inlet on the back of the computer.

Country-Specific Requirements

3-Conductor Power Cord Set Requirements —By Country		
Country	Accredited Agency	Applicable Note Numbers
<i>Australia</i>	<i>EANSW</i>	1
<i>Austria</i>	<i>OVE</i>	1
<i>Belgium</i>	<i>CEBC</i>	1
<i>Canada</i>	<i>CSA</i>	2
<i>Denmark</i>	<i>DEMKO</i>	1
<i>Finland</i>	<i>FIMKO</i>	1
<i>France</i>	<i>UTE</i>	1
<i>Germany</i>	<i>VDE</i>	1
<i>Italy</i>	<i>IMQ</i>	1
<i>Japan</i>	<i>JIS</i>	3
<i>The Netherlands</i>	<i>KEMA</i>	1
<i>Norway</i>	<i>NEMKO</i>	1
<i>Sweden</i>	<i>SEMKO</i>	1
<i>Switzerland</i>	<i>SEV</i>	1
<i>United Kingdom</i>	<i>BSI</i>	1
<i>United States</i>	<i>UL</i>	2

Notes

1. The flexible cord must be <HAR> Type HO5VV-F, 3-conductor, 1.0 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.
2. The flexible cord must be Type SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15A, 125V) or NEMA 6-15P (15A, 250V) configuration.
3. The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 0.75mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (15A, 125V) configuration.

Screw Listing

This appendix contains information for all screws used when servicing the Armada 7400 Computer. An illustration appears below each listing indicating where the screw is used.

Table C-1



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144865-022	Screw, M2.5 × 3.00	T10/slot	3.0 Lb.-in.	Black	2	5.12 (memory expansion door to base assembly)

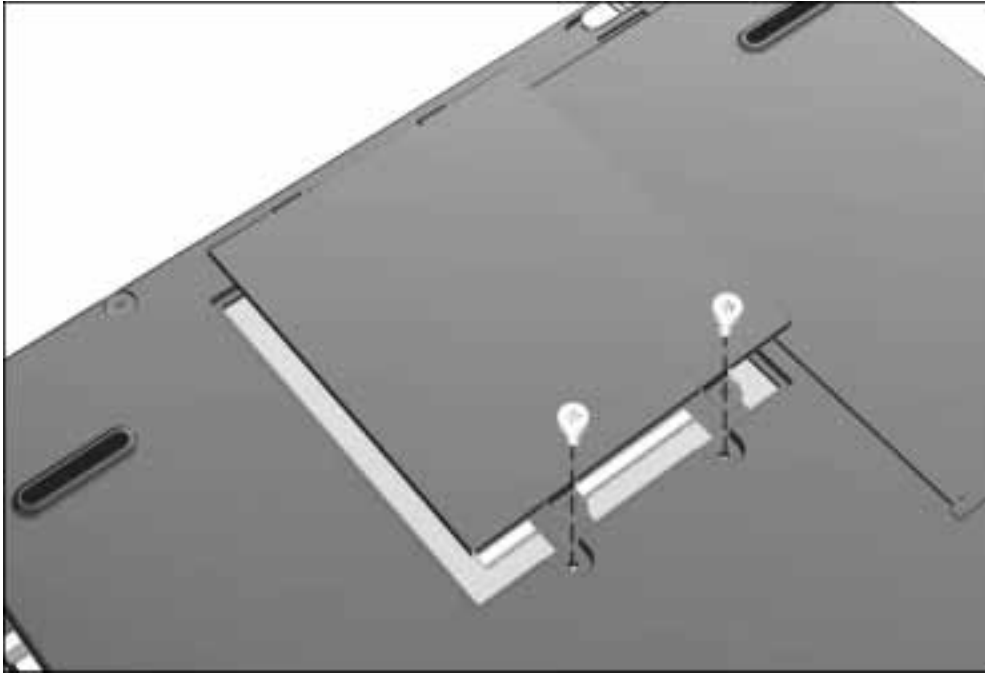


Table C-2



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144865-021	Screw, M2.5 × 3.00	T8/slot	3.0 Lb.-in.	Black	4	5.13 (EMI shield to U-channel)

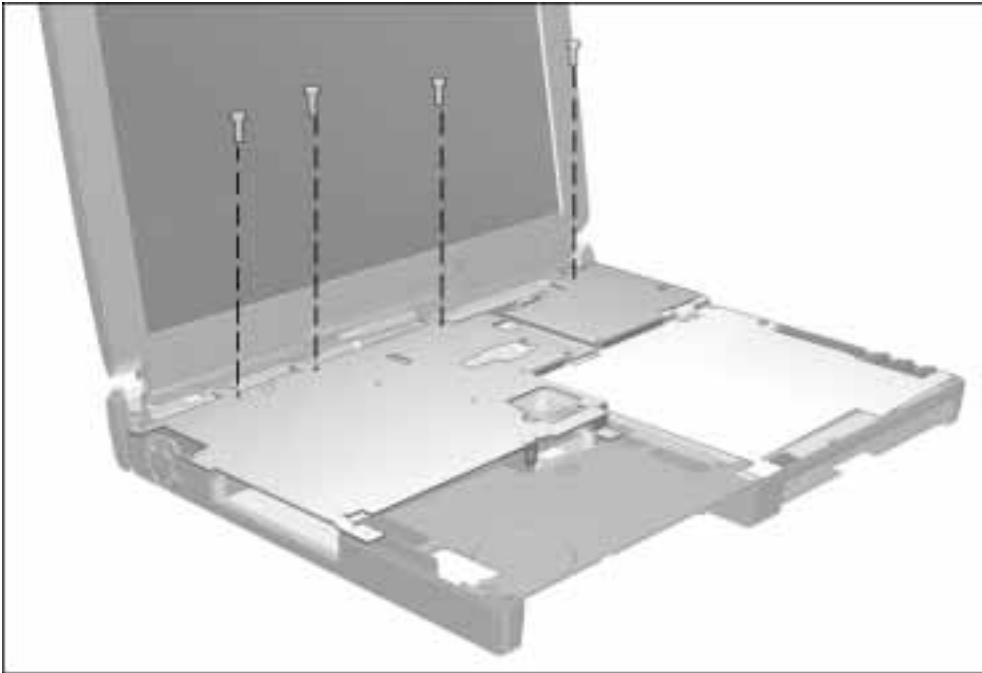


Table C-3



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144865-018	Screw, M2.5 × 23.25	T8/Slot	3.0 Lb.-in.	Black	8	5.13 (keyboard assembly to base assembly)

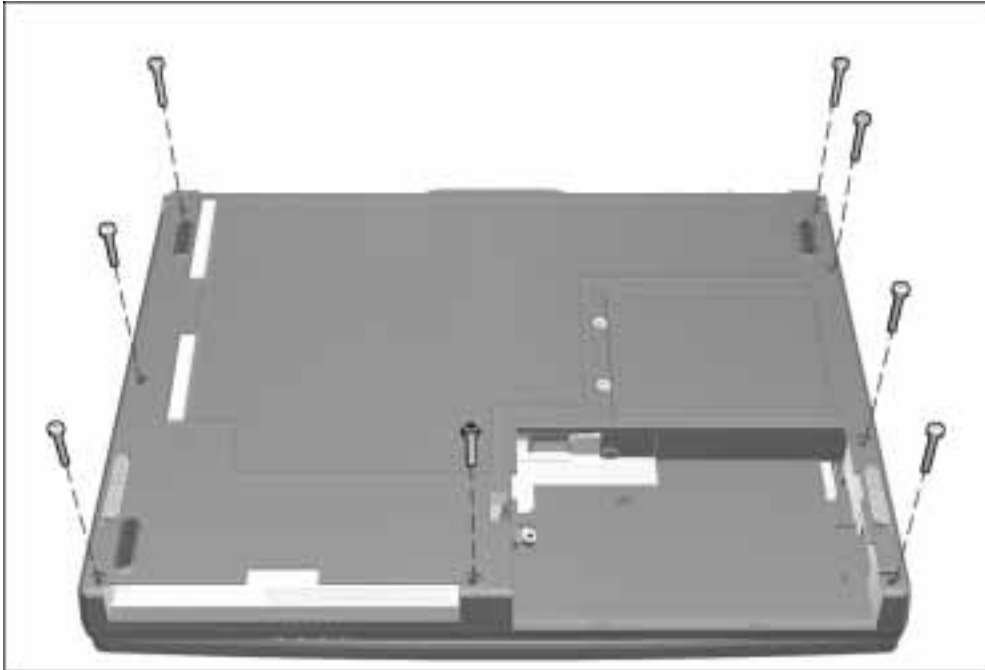


Table C-4



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144864-002	Screw, M2.5 × 5.0	T8/Slot	3.0 Lb.-in.	Silver	1	5.13 (keyboard assembly to base assembly in MultiBay)

continued

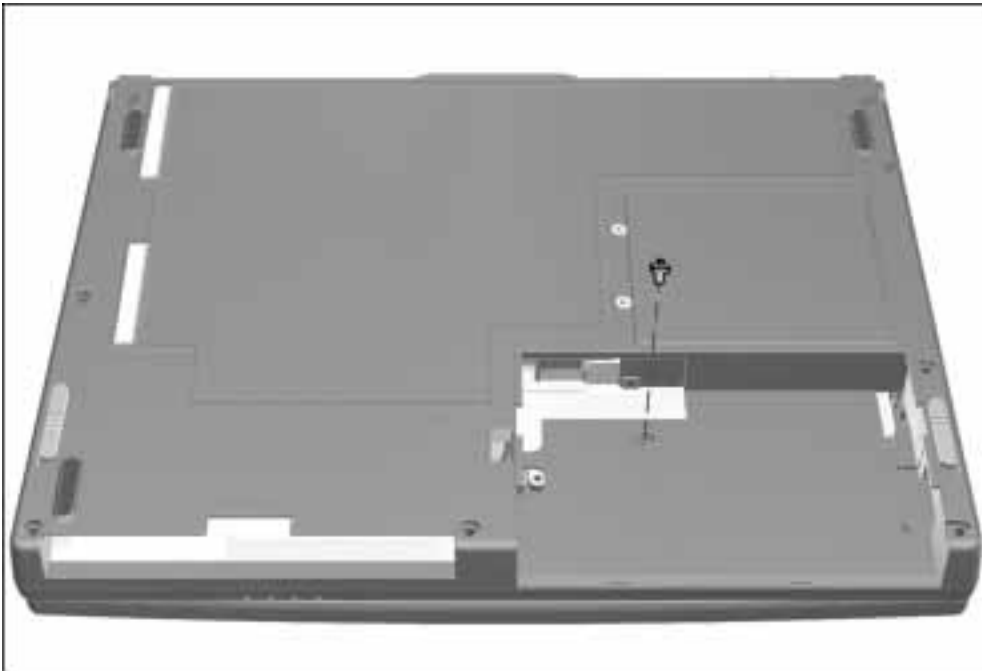


Table C-4 *continued*



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144864-002	Screw, M2.5 × 5.0	T8/Slot	3.0 Lb.-in.	Silver	2	5.13 (EMI shield to base assembly)

continued

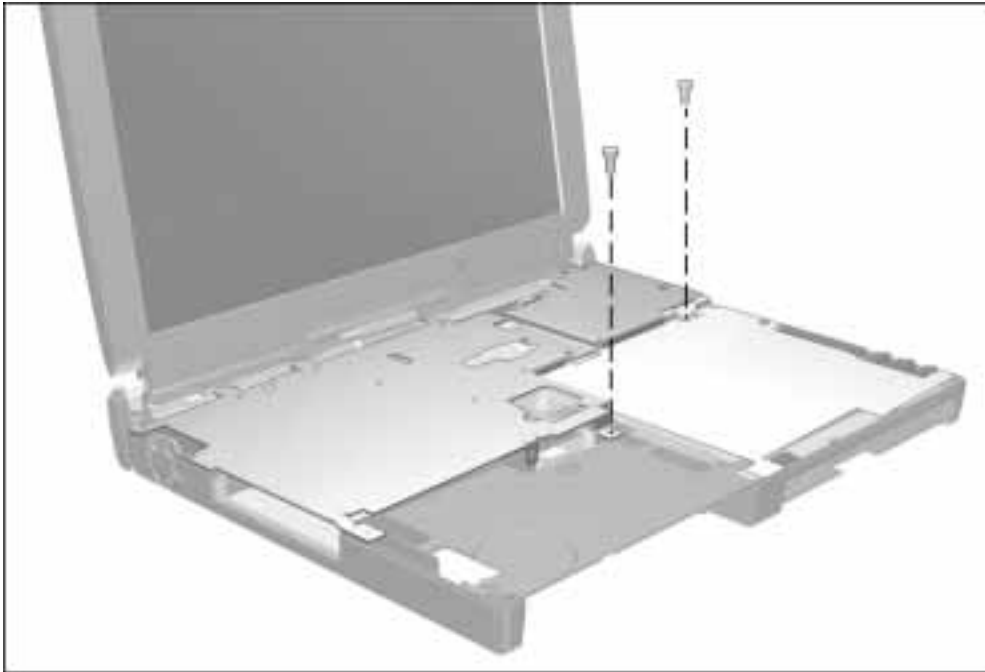


Table C-4 *continued*



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144864-002	Screw, M2.5 × 5.0	T8/Slot	3.0 Lb.-in.	Silver	3	5.20 (system board to base assembly)

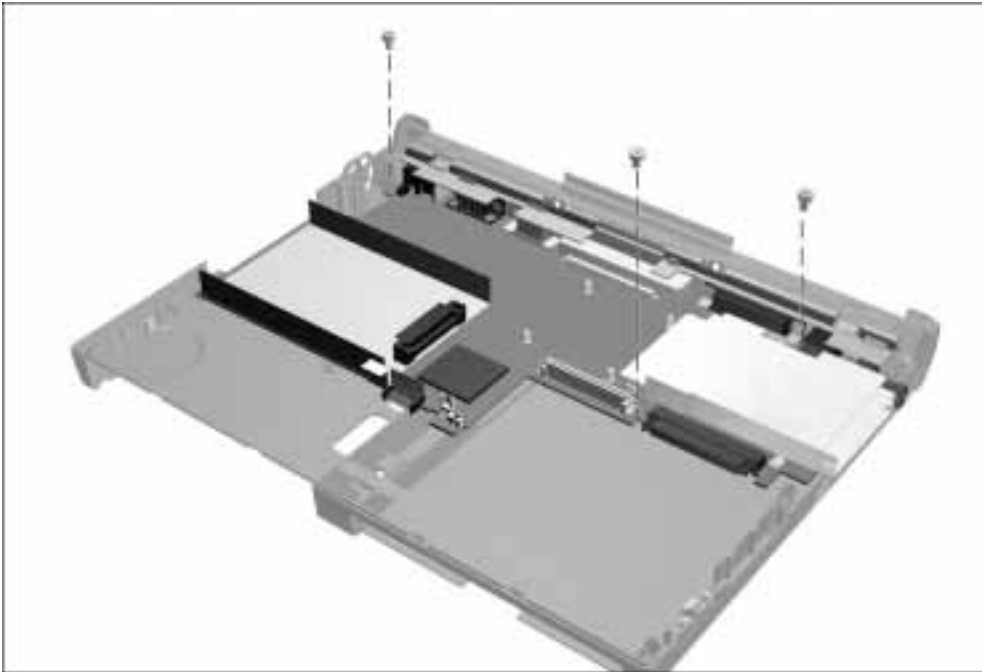


Table C-5



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
220747-001	Screw, M3.0 × 5.0, flat head	T8/Slot	3.0 Lb.-in.	Red	1	5.20 (system board to base assembly)

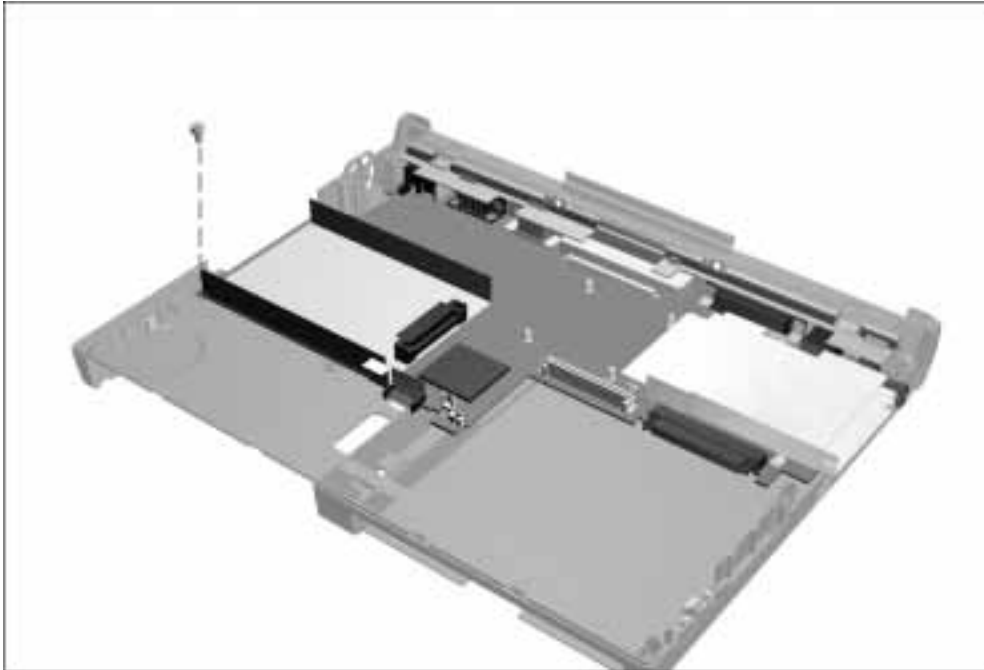
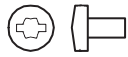


Table C-6



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144863-001	Screw, M2.0 × 4.0	T8/Slot	3.0 Lb.-in.	Silver	1	5.13 (heatpipe mount leaf spring to processor assembly)

continued

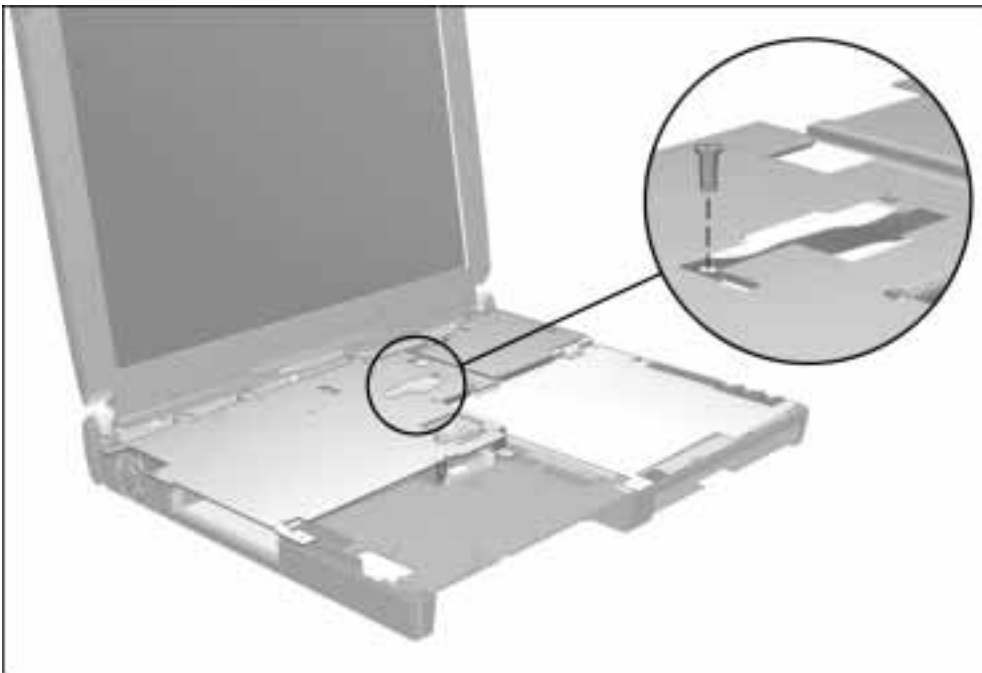
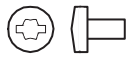


Table C-6 *continued*



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144863-001	Screw, M2.0 × 4.0	T8/Slot	4.0 Lb.-in.	Silver	4	5.18 (processor assembly to system board and base assembly)

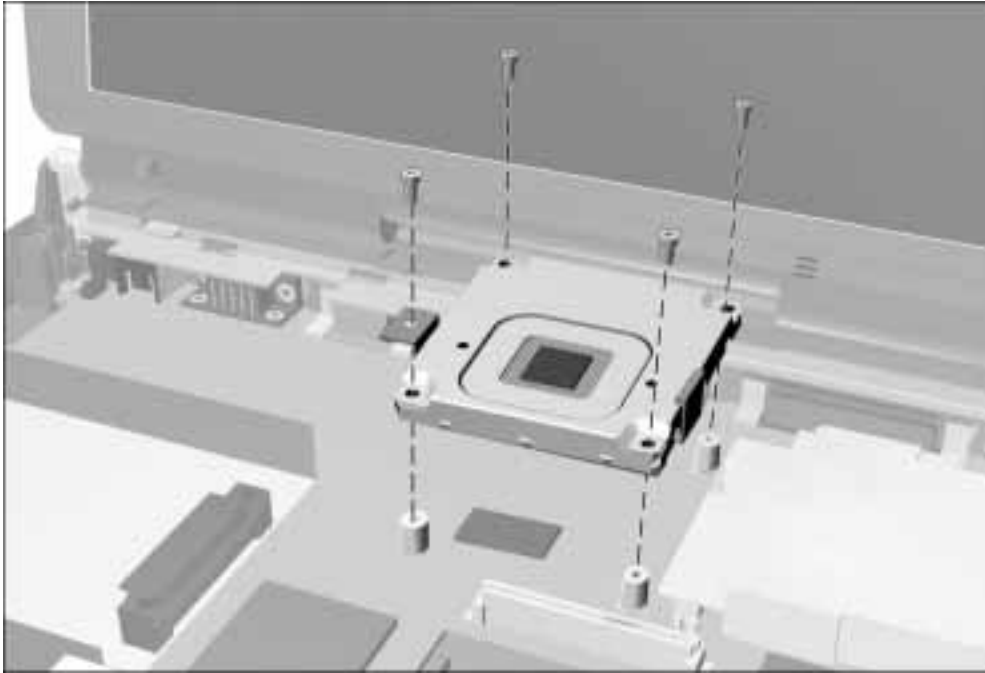


Table C-7



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144865-003	Screw, M2.5 × 6.0	T8/Slot	3.0 Lb.-in.	Black	4	5.19 (display clutches to base assembly)

continued

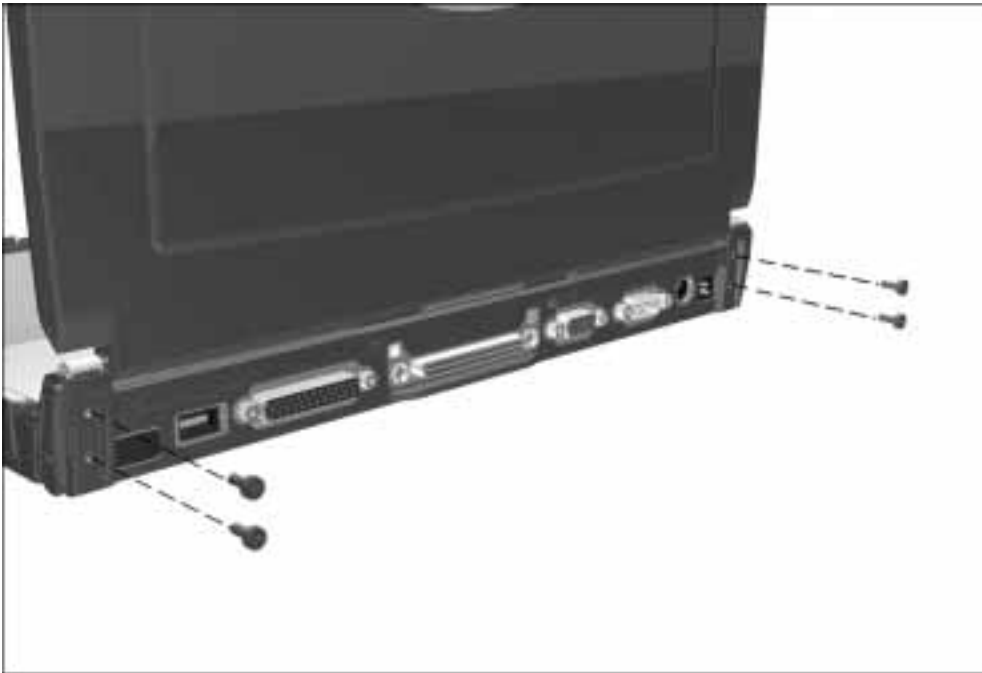


Table C-7 *continued*



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144865-003	Screw, M2.5 × 6.0	T8/Slot	3.0 Lb.-in.	Black	6	5.19 (inner display bezel to display enclosure)

continued



Table C-7 *continued*



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
144865-003	Screw, M2.5 × 6.0	T8/Slot	3.0 Lb.-in.	Black	1	5.19 (inverter to display enclosure)

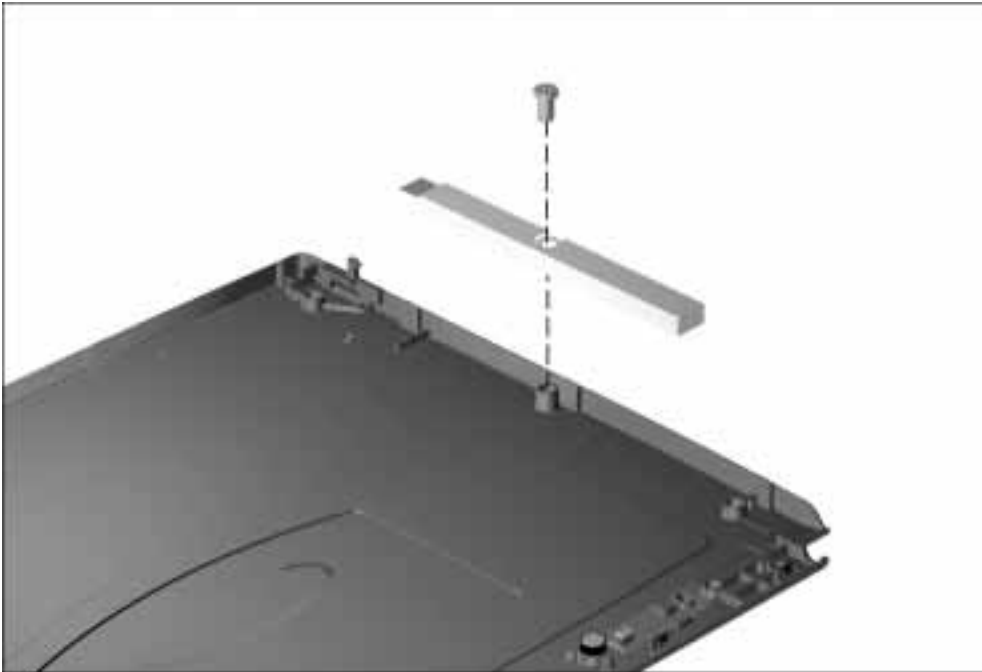


Table C-8



Part Number	Description	Head	Torque	Color	Qty	Section(s) Used
121187-007	Screw, M3.0 × 8.0	T8/Slot	3.0 Lb.-in.	Black	1	5.20 (U-channel to base assembly on rear panel)



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