Notice

The information in this guide is subject to change without notice.

Preface

This Maintenance and Service Guide is used for reference when servicing the
Compaq Contura Aero Family of Personal Computers. Additional information
is available in the following publications:

o Compaq Contura Aero Documentation:
  - QUICK SETUP
  - BEYOND SETUP
  - Online USER'S GUIDE

o COMPAQ SERVICE QUICK REFERENCE GUIDE

o Service Training Guides

o Compaq Service Advisories and Bulletins

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

Symbols

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

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> WARNING <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

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

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>><<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> CAUTION <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

Text set off in this manner indicates that failure to follow directions
could result in damage to equipment or loss of data.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>><<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

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 circuit
board. Improper repairs can create a safety hazard. Any indications of
component replacement or printed circuit board modifications may void any
warranty.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>><<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

Chapter 1. Illustrated Parts Catalog
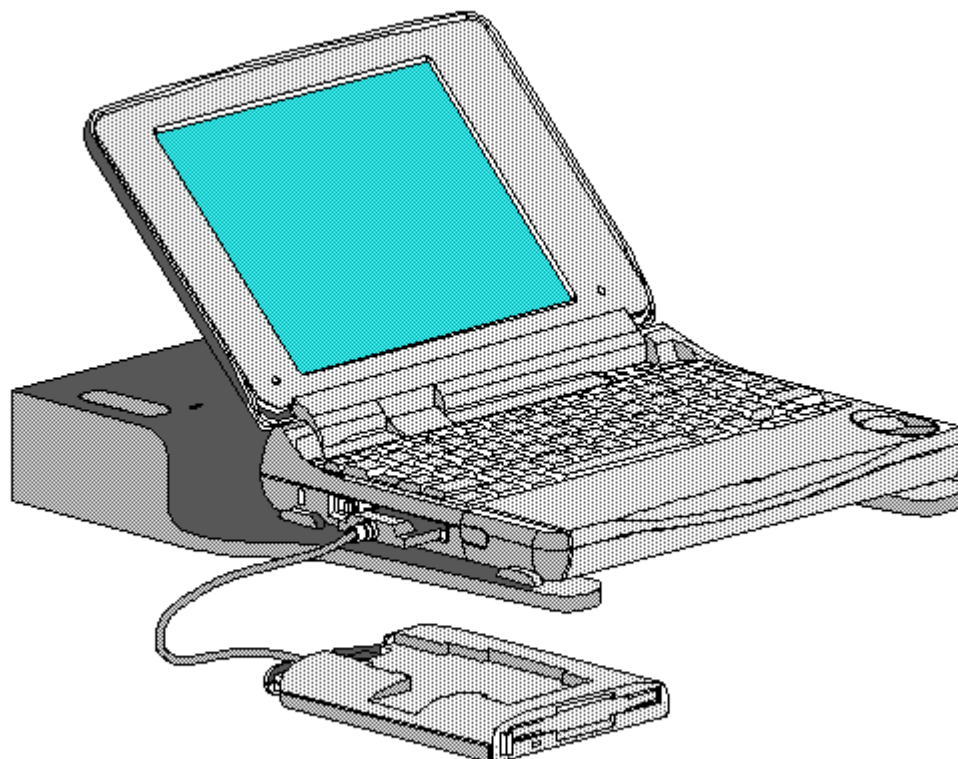
Chapter 1.0 Introduction

Figure 1-1. Compaq Contura Aero Family of Personal Computers with the
PCMCIA External Diskette Drive and the Base Unit

Chapter 1.1 Illustrated Parts Breakdown: Compaq Contura Aero Family Of Personal Computers

```
The Compaq Contura Aero Family of Personal Computers joins a display
assembly and system unit together with a clutch secured by screws in the
chassis, display enclosure, and a display pin allowing it to open and
close. The display assembly is secured by screws installed in the front of
the display enclosure.  The system unit is secured to the system unit
enclosure by screwlocks in the rear and screws in the bottom of the system
unit enclosure.

SYSTEM UNIT MODULE DESCRIPTION

The system unit (Figure 1-4) includes the following replaceable parts:


o Battery and spacer
o Base enclosure
o Keyboard
o Hard drive
o Power supply
```

o PCMCIA ejector rails
o Trackball assembly
o Memory expansion board (optional)
o System board

The keyboard is secured to the system unit with four screws and a hook
latch in the front. Once the screws are removed, the keyboard must be
rotated from the rear forward to disengage it from the hook latch. The
keyboard must be removed to allow access to any of the system board
components. The keyboard is connected to the system board with two ribbon
cables and zero insertion force (ZIF) connectors. The cables do not
necessarily have to be disconnected to service the system board. The
keyboard may be laid on top of the battery compartment to access the system
board.

The hard drive is connected directly to the system board with no
intervening cables. It is mounted to the chassis with a hard drive bracket.
The hard drive bracket is secured to the hard drive with three screws.

The power supply is secured to the system board with one threaded standoff.
There is no cable between the power supply and the system board; the power
supply connects directly to the system board.

The trackball assembly consists of the trackball, buttons, flex cable, and
speaker. The trackball plugs directly into the cable with a low insertion
force (LIF) connector and mounts with two screws in the right front corner
of the base enclosure. The flex cable includes the buttons and speaker. The
buttons fit in a recessed area on the right side of the base enclosure and
control the functions of the trackball. The speaker is connected to the
flex cable with two wires and fits in a narrow area in the right front
corner of the base enclosure. Sound is directed through the enclosure. The
remainder of the flex cable is routed behind and over the hard drive
assembly and plugs with a LIF connector directly into the system board.

The system board is mounted directly to the chassis. All system module
components connected to the system board must be removed prior to removing
the system board.

The PCMCIA rails are secured to the system board header with two screws at
the top. The rails plug directly into the system board connector.

The memory expansion board plugs into the system board in the bottom of the
base enclosure. Remove the door, and the memory expansion board plugs into
a single connector. System memory can be increased to a maximum 12 MB by
adding an 8 MB Memory Expansion Board. A 4 MB Memory Expansion Board is
also available.

DISPLAY ASSEMBLY MODULE DESCRIPTION

The display assembly (Figures 1-5 and 1-6) includes the following
replaceable parts:

o Display bezel
o Liquid crystal display (LCD) panel
o Display inverter board
o Display cable
o Display shield
o Display enclosure

Compaq Contura Aero 4/25

The display assembly is secured with two screws in the bottom corners of
the display bezel and by a screw in a clutch and a pin to the base
enclosure. To remove the display assembly from the base enclosure, the
display bezel must be removed first. Then the CPU cover is removed to allow
access to the system board.

The monochrome LCD is secured to the display enclosure with two screws in
the top left corner and one screw in the top right corner. The bottom
right corner has two small cables attached to a connector for the backlight
and the inverter board.

The display cable is a flex cable plugged into a connector on the left side
of the LCD, folded, and secured to the display shield with a pressure
sensitive adhesive. One end of the display cable is exposed at the bottom
of the display enclosure and is connected to the system board with a zero
insertion force (ZIF) slider. The other end is connected with a low
insertion force (LIF) connector to the display inverter board.

The display inverter board is aligned in the bottom of the display
enclosure with pins. One end connects to the display cable; the other end
plugs into the backlight cable of the LCD panel and is held in place with
pressure sensitive adhesive tape.

The display shield lays in the display enclosure.

Compaq Contura Aero 4/33C

The display assembly is secured with two screws in the bottom corners of
the display bezel and by a screw in a clutch and a pin to the base
enclosure. To remove the display assembly from the base enclosure, the
display bezel must be removed first. Then the CPU cover is removed to allow
access to the system board.

The color LCD is secured to the display enclosure with four screws in the
corners of the LCD panel. The top right corner has two small cables
attached to a connector for the backlight and the inverter board.

The display cable is a flex cable plugged into a ZIF connector on the left
side of the LCD, folded, and secured to the display shield with a pressure
sensitive adhesive. One end of the display cable is exposed at the bottom
of the display enclosure and is connected to the system board with a ZIF
connector. The other end plugs into a LIF connector on the display inverter
board in the lower right hand corner of the display enclosure.

The display inverter board is aligned on the right side of the display
enclosure and mounted component side down. One end connects to the display
cable; the other end plugs into the backlight cable of the LCD panel.

The display shield lays in the display enclosure and has tabs that bend
over the screw holes of the LCD and secure the display shield to the LCD.
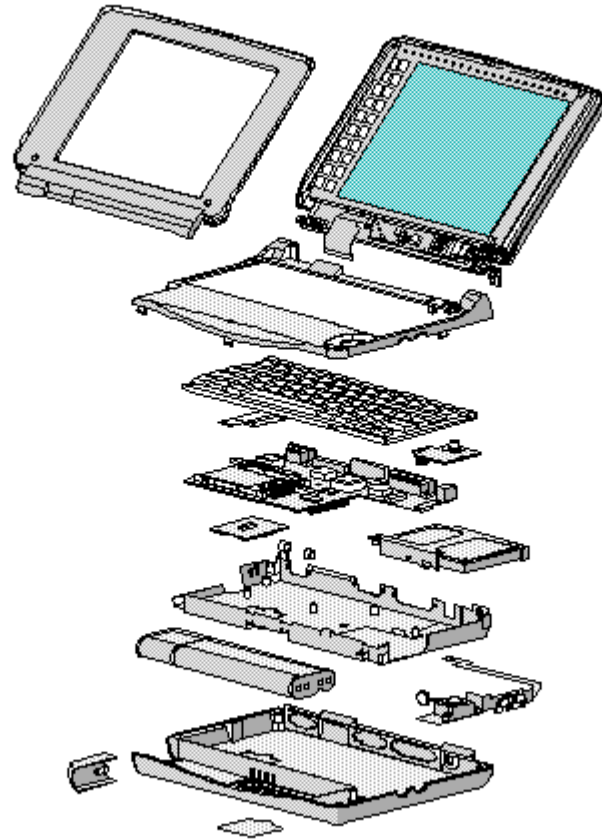
Figure 1-2. Compaq Contura Aero 4/25 Personal Computer
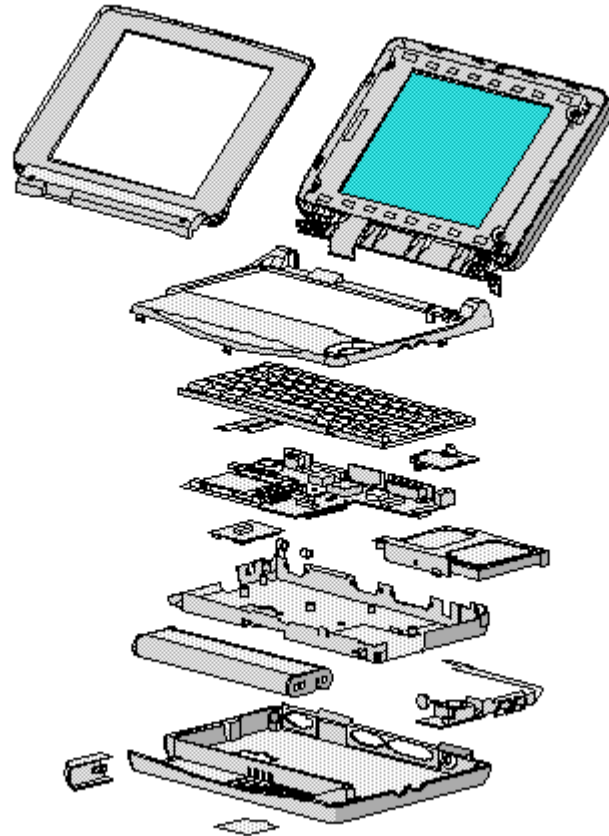
Figure 1-3. Compaq Contura Aero 4/33C Personal Computer

Chapter 1.2 System Unit Module
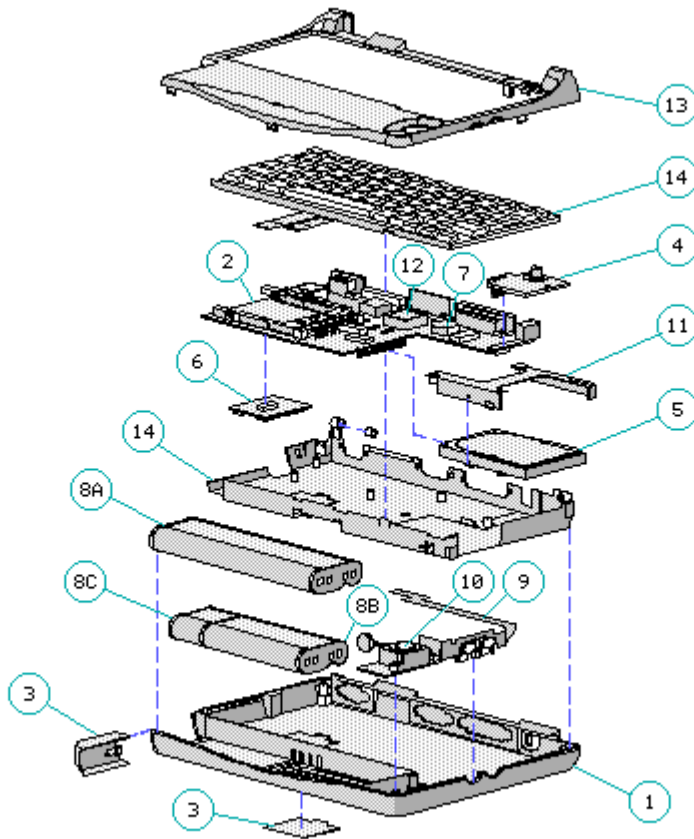
Figure 1-4. System Unit Module

Table 1-1. System Unit

```
==========================================================================
Description              Spare Part No.   Notes
==========================================================================
 1  Base enclosure       197253-001       Includes screw covers.
--------------------------------------------------------------------------
 2  System board, 4 MB                    Does not include PCMCIA ejector
                                          rails.

    Compaq Contura       197241-001       Includes screw covers.
    Aero 4/25
    Compaq Contura       199222-001
    Aero 4/33C
--------------------------------------------------------------------------
 3  Door assembly        197239-001       Includes battery and memory
                                          expansion board doors.
--------------------------------------------------------------------------
 4  Power supply, DC-DC  190521-001       Includes screw covers.
--------------------------------------------------------------------------
 5  Hard drive
    - Model 250          199233-001       Does not include hard drive
    - Model 170          190661-001       bracket. Includes screw covers.
    - Model 84           190660-001
--------------------------------------------------------------------------
 6  Memory expansion
    board
```

```
    - 4 MB                   190565-001
    - 8 MB                   190596-001
-------------------------------------------------------------------------
 7  Real time clock         117099-001
    battery
-------------------------------------------------------------------------
 8  NiMH Battery Pack
    - 8A: Extended Life      190626-001      Extended Life battery does not
    - 8B: Standard           190697-001      include spacer. Standard battery
    - 8C: Spacer             197317-001      includes spacer.
-------------------------------------------------------------------------
 9  Trackball cable and      197312-001      Includes screw covers.
    speaker assembly
-------------------------------------------------------------------------
10  Trackball assembly       197286-001      Includes screw covers.
-------------------------------------------------------------------------
11  Hard drive bracket       197236-001      Includes screws and screw
                                             covers.
-------------------------------------------------------------------------
12  System ROM               197229-001      Includes screw covers.
-------------------------------------------------------------------------
13  CPU cover                197311-001      Includes screw covers.
-------------------------------------------------------------------------
14  CPU chassis              199276-001      Includes clip and screw covers.
=========================================================================
```

Chapter 1.3 VGA Display
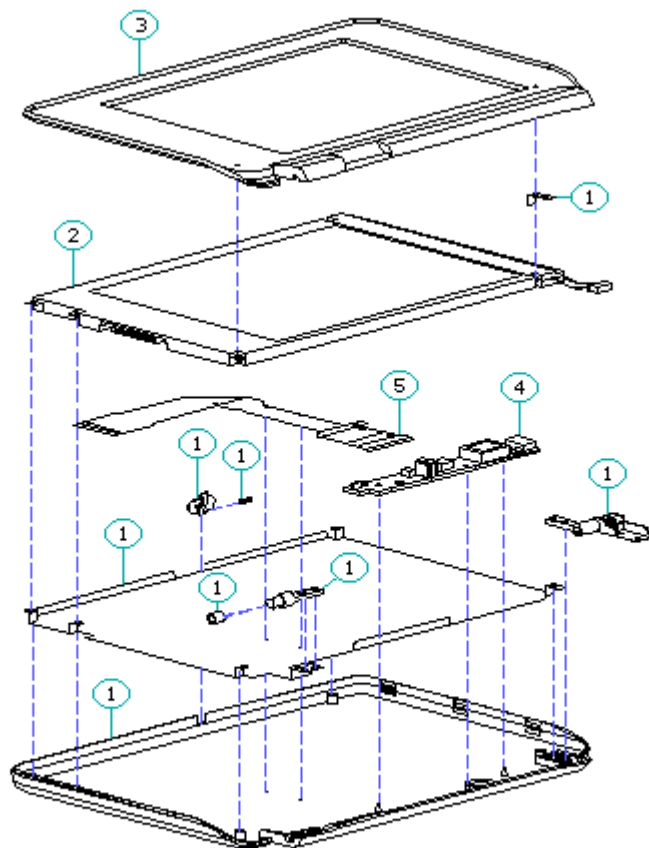
Figure 1-5. Compaq Contura Aero 4/25 Monochrome VGA Display

Table 1-2. Compaq Contura Aero 4/25 Monochrome VGA Display
==
Description   Spare Part No.   Notes
==
1 Display enclosure   197237-001   Includes enclosure, clutch, pin,
   kit   latch, spring, screws, display
                                           shield, slotted bushing, ground
                                           clip, screw covers and logo.
----
2 Display panel   190624-001   Includes labels, screw covers.
----
3 Display bezel   197344-001   Includes screw covers.
----
4 Backlight inverter   190522-001   Includes adhesive tape, screw
   board   covers.
----
5 Display cable   197238-001   Includes ZIF slider and screw
                                           covers.
----
6 Display hardware *   197316-001   Includes screws, ground clip,
                                           and screw covers.
----
* Not Shown
==
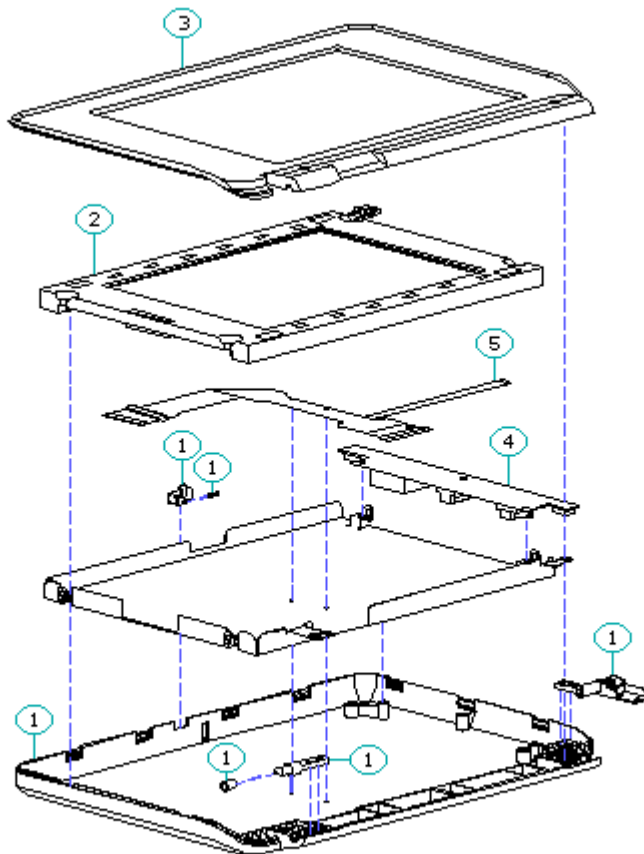
Figure 1-6. Compaq Contura Aero 4/33C Color VGA Display

Table 1-3. Compaq Contura Aero 4/33C Color VGA Display
===
Description   Spare Part No.   Notes
===
1 Display enclosure   199257-001   Includes enclosure, clutch, pin,
   kit   latch, spring, screws, display
                                           shield, slotted bushing, screw
                                           covers and logo.
----
2 Display panel   199232-001   Includes labels, screw covers.
----
3 Display bezel   199260-001   Includes screw covers.
----
4 Backlight inverter   199223-001   Includes screw covers.
   board
----
5 Display cable   199258-001   Includes ZIF slider and screw
                                          covers.
----
6 Display hardware *   197316-001   Includes screws and screw
                                          covers.
----
* Not Shown
===

Chapter 1.4 Keyboards
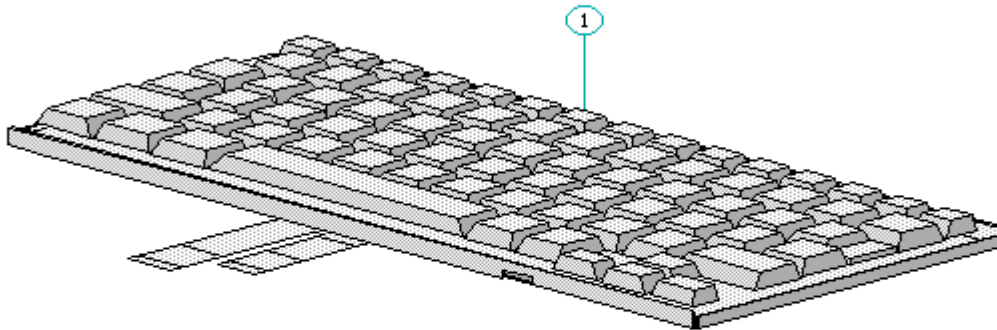
Figure 1-7. Keyboard

Table 1-4. Notebook Keyboards
```
===========================================================================
Description                      Spare Part Number
===========================================================================
 1  U.S.                         190620-001
 2  U.K.                         190620-003 *
 3  German                       190620-004 *
 4  French                       190620-005 *
 5  Italian                      190620-006 *
 6  Spanish                      190620-007 *
 7  Danish                       190620-008 *
 8  Norwegian                    190620-009 *
 9  Swedish/Finnish              190620-010 *
10  Swiss                        190620-011 *
11  French Canadian              190620-012 *
12  Portuguese                   190620-013 *
13  Latin American               190620-016 *
14  Belgium                      190620-018 *
15  Japanese                     190620-019 *
---------------------------------------------------------------------
* Not Shown
===========================================================================
```

Table 1-5. Enhanced Keyboards

```
===========================================================================
Description                               Spare Part Number
===========================================================================
 1  Enhanced II Keyboard U.S.             112573-001 (No longer
                                          available)*
 2  Enhanced III Keyboard U.K.            140536-103 *
 3  Enhanced III Keyboard German          140536-104 *
 4  Enhanced III Keyboard French          140536-105 *
 5  Enhanced III Keyboard Italian         140536-106 *
 6  Enhanced III Keyboard Spanish         140536-107 *
 7  Enhanced III Keyboard Danish          140536-108 *
 8  Enhanced III Keyboard Norwegian       140536-109 *
 9  Enhanced III Keyboard Swedish/Finnish 140536-110 *
10  Enhanced III Keyboard Swiss           140536-111 *
11  Enhanced III Keyboard French Canadian 140536-112 *
12  Enhanced III Keyboard Portuguese      140536-113 *
13  Enhanced III Keyboard Turkish         140536-114 *
14  Enhanced III Keyboard Greek           140536-115 *
15  Enhanced III Keyboard Latin American  140536-116 *
16  Enhanced III Keyboard Arabic          140536-117 *
17  Enhanced III Keyboard Belgian         140536-118 *
18  Enhanced III Keyboard Japanese        140536-119 *
19  Enhanced III Keyboard BHCSY **        140536-120 *
20  Enhanced III Keyboard Hungarian       140536-121 *
21  Enhanced III Keyboard Polish          140536-122 *
22  Enhanced III Keyboard Slovakian       140536-123 *
23  Enhanced III Keyboard Russian         140536-124 *
24  Enhanced III Keyboard Czech           140536-129 *
25  Enhanced III Keyboard Thai            140536-130 *
---------------------------------------------------------------------------
*  Not Shown
** Bosnia-Herzegovina, Croatia, Slovenia, and Yugoslavia
===========================================================================
```

Chapter 1.5 Cables
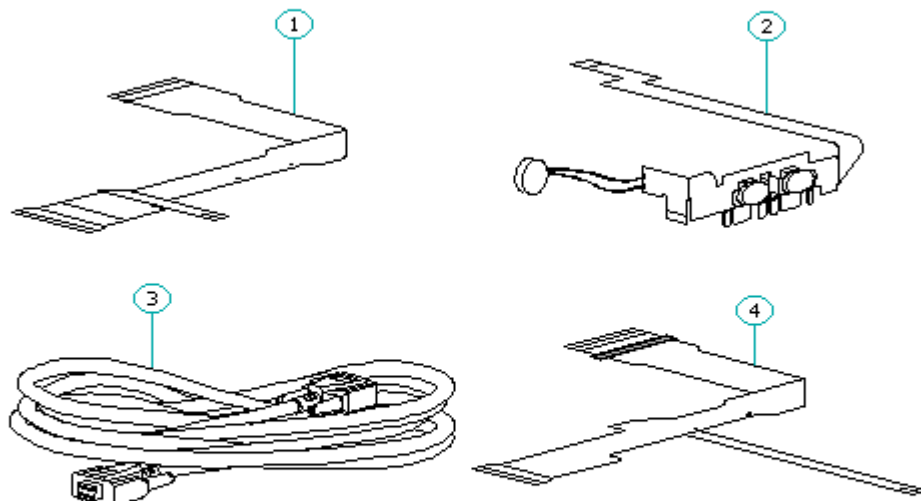
Figure 1-8. Cables

```
Table 1-6. Cables
=============================================================================
Description                                         Spare Part Number
=============================================================================
1  Display Cable (Compaq Contura Aero 4/25)         197238-001
2  Trackball/Speaker Cable                          197312-001
3  Communication Cable                              197318-001
4  Display Cable (Compaq Contura Aero 4/33C)        199258-001
=============================================================================
```

Chapter 1.6 AC Adapter And Power Cord
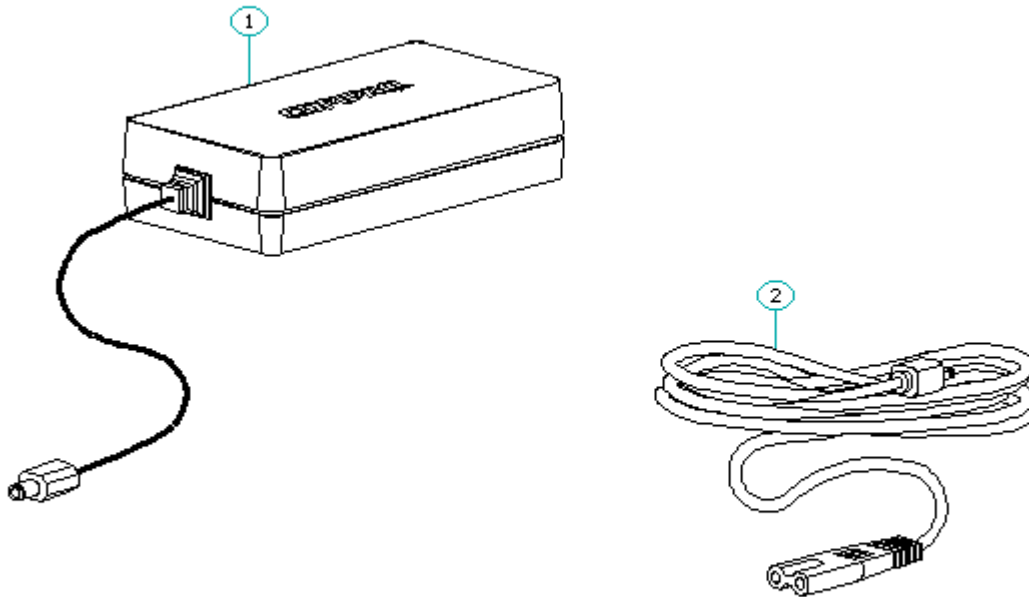
Figure 1-9. AC Adapter

Table 1-7. AC Adapter and Power Cord
===
Description   Spare Part Number
===
1 AC Adapter   190621-001
2 Power Cord (U.S./Canada)   197230-001
3 Power Cord (U.K.)   197232-001 *
4 Power Cord (Europe)   197231-001 *
5 Power Cord (Japan)   197233-001 *
6 Power Cord (Asia Pacific)   197234-001 *
----
* Not shown
===

Table 1-8. Documentation and Software
===
Description   Spare Part Number
===
MAINTENANCE AND SERVICE GUIDE   197235-001

QUICK SETUP CARD, BEYOND SETUP
  English   197243-001
  German   197243-041
  French   197243-051
  Italian   197243-061
  Spanish   197243-071

```
--------------------------------------------------------------------------
COMPAQ SERVICE QUICK REFERENCE GUIDE          106854-001
--------------------------------------------------------------------------
LOTUS ORGANIZER MANUAL
  English                                     137885-001
  German                                      137885-041
  French                                      137885-051
  Italian                                     137885-061
  Spanish                                     137885-071
--------------------------------------------------------------------------
Online USER'S GUIDE
  English                                     190512-001
  German                                      190512-041
  French                                      190512-051
  Italian                                     190512-061
  Spanish                                     190512-071
--------------------------------------------------------------------------
WINLINK (diskettes)
  English                                     197330-001
  German                                      197330-041
  French                                      197330-051
  Italian                                     197330-061
  Spanish                                     197330-071
==========================================================================

Table 1-9. Accessories
==========================================================================
Description                                   Spare Part Number
==========================================================================
Automobile adapter                            190551-001

Memory expansion board
  4 MB                                        190565-001
  8 MB                                        190596-001

Base unit                                     190568-001

PCMCIA external diskette drive                190563-001

Mobile port expander                          197364-001

Carrying case                                 121423-001

Briefcase                                     129930-001

Slipcase cover                                197242-001
==========================================================================

Table 1-10. Mounting Hardware
==========================================================================
Description                                   Spare Part Number
==========================================================================
Kit, CPU base screws and screwlocks           197315-001

Kit, display screws                           197316-001

Trackball removal tool                        194041-001
==========================================================================

Table 1-11a. Fastener List for CPU Base Screws and Screwlocks
```

```
===============================================================================
Description      Type    Where Used            Part Number    Drive    Qty
===============================================================================
M2.5 x 7.0 *     Hex     System board to       139576-004     3/16     2
                         chassis
-------------------------------------------------------------------------------
M2.5 x 3.55 *    Hex     Power supply board to 197257-001     3/16     1
                         chassis
-------------------------------------------------------------------------------
#4-40 *          Hex     I/O connector         106902-004     3/16     4
-------------------------------------------------------------------------------
M3.0 x 3.0       Pan     Hard drive bracket to 139574-001     PH/1     3
                         hard drive
-------------------------------------------------------------------------------
M2.0 x 7.0       Pan     PCMCIA rails to       144762-002     PH/1     2
                         chassis
-------------------------------------------------------------------------------
M2.0 x 2.5       Truss   Keyboard to chassis   144863-002     T8/SL    3
-------------------------------------------------------------------------------
M2.5 x 12.0      Truss   Hard drive to keyboard 144864-005    T8/SL    1
                         to chassis
-------------------------------------------------------------------------------
M2.5 x 6.0       Truss   Clutch, system board  144865-003     T8/SL    7
-------------------------------------------------------------------------------
M2.5 x 16.0      Truss   Base                  144865-005     T8/SL    4
-------------------------------------------------------------------------------
* Screwlocks
===============================================================================

Table 1-11b. Fastener List for the Compaq Contura Aero 4/25 Display
===============================================================================
Description      Type    Where Used            Part Number    Drive    Qty
===============================================================================
M2.0 x 4.0       Truss   Pin                   144863-001     T8/SL    2

M2.5 x 4.5       Truss   Clutch                144864-001     T8/SL    2

M2.0 x 6.0       Pan     Bezel                 197341-002     PH/1     2

M2.0 x 2.5       Truss   Panel to enclosure    144863-002     T8/SL    3
===============================================================================

Table 1-11c. Fastener List for the Compaq Contura Aero 4/33C Display
===============================================================================
Description      Type    Where Used            Part Number    Drive    Qty
===============================================================================
M2.0 x 4.0       Truss   Pin and inverter board 144863-001    T8/SL    2

M2.5 x 4.5       Truss   Clutch                144864-001     T8/SL    2

M2.0 x 6.0       Pan     Bezel                 197341-002     PH/1     2

M3.0 x 6.0       Truss   Panel to enclosure    198889-001     T8/SL    4
===============================================================================

Table 1-12. Miscellaneous Kits
===============================================================================
Description                        Spare Part Number
===============================================================================
Base unit tilt feet                197346-001
```

```
CPU enclosure feet                 197345-001

Battery and memory doors           197239-001

PCMCIA eject rails                 197314-001

Carton, quantity 5                 137863-001

Carton and buns, quantity 1        137864-001

Display connector slider           140071-001

Plate logo                         197251-001

Battery spacer                     197317-001
=========================================================================
```

Chapter 2. Service Preliminaries

Chapter 2.0 Introduction

This chapter provides general service information for the computer and the base unit.

Adherence to the procedures and precautions described in this chapter is essential for proper service.

Chapter 2.1 Electrostatic Discharge (International)

A sudden discharge of static electricity from a finger or other conductor can destroy static sensitive devices or micro circuitry. Often the spark is neither felt or heard, but damage occurs. An electronic device exposed to electrostatic discharge (ESD) may not be affected at all and will work perfectly throughout a normal cycle. Or it may function normally for a while, then degrade in the internal layers, reducing its life expectancy.

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.

Generating Static

Table 2-1 shows how different activities generate static electricity and at different electrostatic voltage levels.

```
Table 2-1. Typical Electrostatic Voltages
===========================================================================
                                       Relative Humidity
Event                           10%            40%            55%
===========================================================================
Walking across carpet           35,000V        15,000V        7,500V

Walking across vinyl floor      12,000V        5,000V         3,000V

Motions of bench worker         6,000V         800V           400V

Removing DIPS from plastic tubes 2,000V        700V           400V

Removing DIPS from vinyl trays  11,500V        4,000V         2,000V

Removing DIPS from styrofoam    14,500V        5,000V         3,500V

Removing bubble pack from PCBs  26,000V        20,000V        7,000V

Packing PCBs in foam lined box  21,000V        11,000V        5,000V
---------------------------------------------------------------------------
NOTE: 700 volts can degrade a product.
===========================================================================
```

Preventing Electrostatic Damage To Equipment

Many electronic components are sensitive to ESD. Circuitry design and

structure determine the degree of sensitivity. The following proper
packaging and grounding precautions are necessary to prevent damage:

o Protect all electrostatic parts and assemblies with conductive or
  approved containers or packaging.

o Keep electrostatic sensitive parts in their containers until they arrive
  at static free stations.

o Place items on a grounded surface before removing them from their
  container.

o Always be properly grounded when touching a sensitive component or
  assembly.

o Place reusable electronic sensitive parts from assemblies in protective
  packaging or conductive foam.

Use transporters and conveyors made of antistatic belts and metal roller
bushings. Mechanized equipment used for moving materials must be wired to
ground and proper materials selected to avoid static charging. When
grounding is not possible, use an ionizer to dissipate electric charges.

Preventing Damage to Drives

To prevent static damage to hard drives, use the following precautions:

o Handle drives gently, using static guarding techniques.

o Store drives in the original shipping containers.

o Avoid dropping drives from any height onto any surface.

o Handle drives on surfaces that have at least one inch of shock proof
  foam.

o Always place drives PCB assembly side down on the foam.

Grounding Methods

The method for grounding must include a wrist strap or a foot strap at a
grounded workstation. When seated, wear a wrist strap connected to a
grounded system. When standing, use footstraps and a grounded floor mat.

Table 2-2. Static Shielding Protection Levels
===
Method   Voltages
===
Antistatic Plastic   1,500
Carbon Loaded Plastic   7,500
Metallized Laminate   15,000
===

Grounding Workstations

To prevent static damage at the workstation, use the following precautions:

o Cover the workstation with approved static dissipative material. Provide a wrist strap connected to the work surface and properly grounded tools and equipment.

o Use static dissipative mats, heel straps, or air ionizers to give added protection.

o Handle electrostatic sensitive components, parts, and assemblies by the case or PCB laminate. Handle them only at static free workstations.

o Avoid contact with pins, leads, or circuitry.

o Turn off power and input signals before inserting and removing connectors or test equipment.

o Use fixtures made of static safe materials when fixtures must directly contact dissipative surfaces.

o Keep work area free of nonconductive materials such as ordinary plastic assembly aids and Styrofoam.

o Use field service tools, such as cutters, screwdrivers, vacuums, that are conductive.

o Use a portable field service kit with a static dissipative vinyl pouch that folds out of a work mat. Also use a wrist strap and a ground cord for the work surface. Ground the cord to the chassis of the equipment undergoing test or repair.

Grounding Equipment

Use the following equipment to prevent static electricity damage to the equipment:

Wrist Straps are flexible straps with a minimum of 1 megohm +/- 10% resistance to the ground cords. To provide proper ground, a strap must be worn snug against the skin. On grounded mats without banana plug connectors, connect a wrist strap with alligator clips.

Heelstraps/Toestraps/Bootstraps can be used at standing workstations and are compatible with most types of boots and shoes. On conductive floors or dissipative floor mats, use them on both feet with a minimum of 1 megohm resistance between operator and ground. To be effective, the conductive strips must be worn in contact with the skin.

Recommended Materials and Equipment

Other materials and equipment that are recommended for use in preventing static electricity include:

o Antistatic tape

o Antistatic smocks, aprons, or sleeve protectors

o Conductive bins, and other assembly or soldering aids

o Conductive foam

o Conductive table top workstations with ground cord of 1 megohm of
  resistance

o Static dissipative table or floor mats with hard tie to ground

o Field service kits

o Static awareness labels

o Wrist straps and footwear straps providing 1 megohm +/- 10% resistance

o Material handling packages

o Conductive plastic bags

o Conductive plastic tubes

o Conductive tote boxes

o Metal tote boxes

o Opaque shielding bags

o Transparent metallized shielding bags

o Transparent shielding tubes

SERVICE CONSIDERATIONS

Listed below are some of the considerations that should be kept in mind
during the disassembly and assembly of the computer.

Tool Requirements:

o Flat bladed screwdriver

o Torx T8 screwdriver (included in 130619-001)

o Hex socket driver (3/16)

o 25 Pin printer loopback plug (included in 100767-001)

o 9 Pin serial loopback plug (included in 100767-001)

o Cross recess (Phillips) screwdriver (included in 130619-001)

o Trackball tool (spare part number 194041-001)

o Case utility tool (spare part number 119070-001 and included in
  10076-001)

o PCMCIA external diskette drive (part number 190533-001)
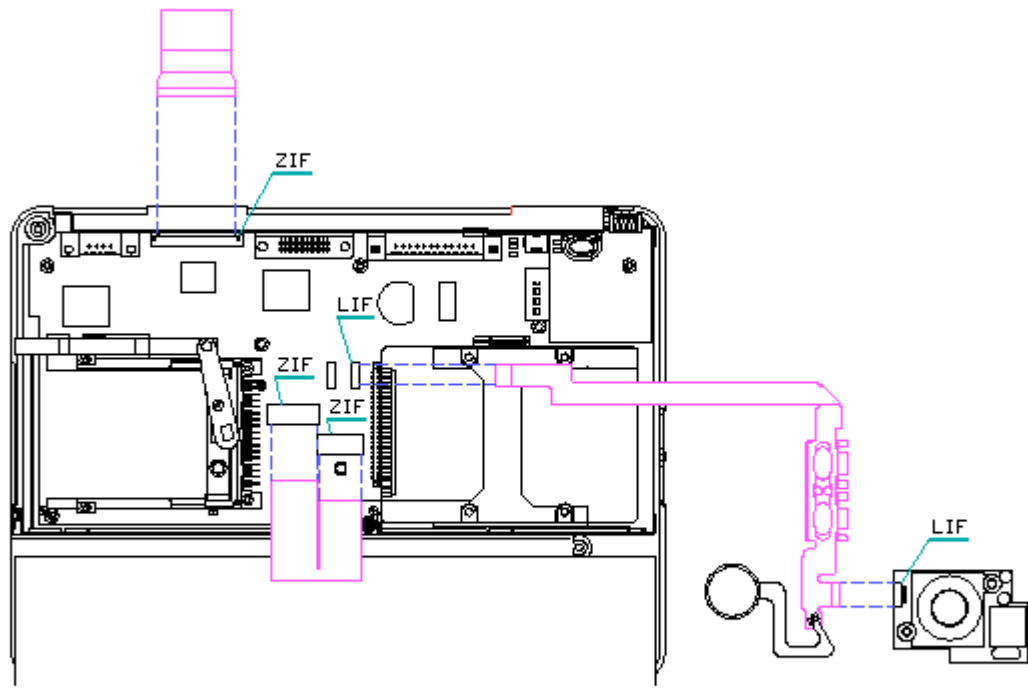
o Preloaded application diskettes

Screws

The screws used in these products are not interchangeable. If an incorrect
screw is used during the reassembly process, it could cause damage to the
unit. Compaq strongly recommends that all screws removed during the
disassembly process be kept with the part that was removed, then returned
to their proper locations.

IMPORTANT: As each subassembly is removed from the computer, it should be
          placed away from the work area to prevent damage.

Cables and Connectors

Most cables used throughout the unit are flex cables (Figures 2-1, 2-2,
2-3). These cables must be handled with extreme care to avoid damage. Apply
only the tension required to seat or unseat the cables during insertion or
removal from the connector. Handle cables by the connector or pull tabs
whenever possible. In all cases, avoid bending, twisting, or tearing the
cables, and ensure that cables are placed in such a way that they cannot be
caught or snagged by parts being removed or replaced.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> CAUTION <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

When servicing these units, ensure that cables are placed in their proper
location during the reassembly process. Improper cable placement can cause
severe damage to the unit.

>><<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

Figure 2-1. ZIF and LIF Connectors and Cable - System Unit

ZIF

LIF

Figure 2-2. ZIF and LIF Connectors and Cable - Compaq Contura Aero 4/25 Display

Figure 2-3. ZIF and LIF Connectors and Cable — Compaq Contura Aero 4/33C Display

Plastics

The plastics used can be damaged by application of excessive force during disassembly and reassembly. When handling the plastic cases and housing assemblies, use care. Do not use screwdrivers or similar tools to pry apart plastics. Where necessary, use the Case utility tool (spare part number 119070-001). Proper handling of this tool is illustrated in the disassembly and reassembly procedures.

Disposal of a Used Battery

Battery components are considered environmentally harmful. Disposal of a Nickel Metal Hydride (NiMH) Battery Pack should comply with country, state, province, or local regulations. Whenever possible, battery components should be recycled.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> CAUTION <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

Never attempt to open or service a battery pack. Opening a battery pack not only damages the pack and makes it unusable, but also exposes potentially harmful battery components.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>><<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

Chapter 2.1 Electrostatic Discharge (U.S. and Canada)

A sudden discharge of static electricity from a finger or other conductor can destroy static sensitive devices or micro circuitry. Often the spark is neither felt or heard, but damage occurs. An electronic device exposed to electrostatic discharge (ESD) may not be affected at all and will work perfectly throughout a normal cycle. Or it may function normally for a while, then degrade in the internal layers, reducing its life expectancy.

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.

Generating Static

Table 2-1 shows how different activities generate static electricity and at different electrostatic voltage levels.

Table 2-1. Typical Electrostatic Voltages
==
                                       Relative Humidity
Event   10%   40%   55%
==
Walking across carpet   35,000V   15,000V   7,500V

Walking across vinyl floor   12,000V   5,000V   3,000V

Motions of bench worker   6,000V   800V   400V

Removing DIPS from plastic tubes 2,000V   700V   400V

Removing DIPS from vinyl trays   11,500V   4,000V   2,000V

Removing DIPS from styrofoam   14,500V   5,000V   3,500V

Removing bubble pack from PCBs   26,000V   20,000V   7,000V

Packing PCBs in foam lined box   21,000V   11,000V   5,000V

NOTE: 700 volts can degrade a product.
==

Preventing Electrostatic Damage To Equipment

Many electronic components are sensitive to ESD. Circuitry design and structure determine the degree of sensitivity. The following proper packaging and grounding precautions are necessary to prevent damage:

o Protect all electrostatic parts and assemblies with conductive or
  approved containers or packaging.

o Keep electrostatic sensitive parts in their containers until they arrive
  at static free stations.

o Place items on a grounded surface before removing them from their
  container.

o Always be properly grounded when touching a sensitive component or
  assembly.

o Place reusable electronic sensitive parts from assemblies in protective
  packaging or conductive foam.

Use transporters and conveyors made of antistatic belts and metal roller
bushings. Mechanized equipment used for moving materials must be wired to
ground and proper materials selected to avoid static charging. When
grounding is not possible, use an ionizer to dissipate electric charges.

Preventing Damage to Drives

To prevent static damage to hard drives, use the following precautions:

o Handle drives gently, using static guarding techniques.

o Store drives in the original shipping containers.

o Avoid dropping drives from any height onto any surface.

o Handle drives on surfaces that have at least one inch of shock proof
  foam.

o Always place drives PCB assembly side down on the foam.

Grounding Methods

The method for grounding must include a wrist strap or a foot strap at a
grounded workstation. When seated, wear a wrist strap connected to a
grounded system. When standing, use footstraps and a grounded floor mat.

Table 2-2. Static Shielding Protection Levels
===
Method   Voltages
===
Antistatic Plastic   1,500
Carbon Loaded Plastic   7,500
Metallized Laminate   15,000
===

Grounding Workstations

To prevent static damage at the workstation, use the following precautions:

o Cover the workstation with approved static dissipative material. Provide
  a wrist strap connected to the work surface and properly grounded tools
  and equipment.

o Use static dissipative mats, heel straps, or air ionizers to give added
  protection.

o Handle electrostatic sensitive components, parts, and assemblies by the
  case or PCB laminate. Handle them only at static free workstations.

o Avoid contact with pins, leads, or circuitry.

o Turn off power and input signals before inserting and removing connectors or test equipment.

o Use fixtures made of static safe materials when fixtures must directly contact dissipative surfaces.

o Keep work area free of nonconductive materials such as ordinary plastic assembly aids and Styrofoam.

o Use field service tools, such as cutters, screwdrivers, vacuums, that are conductive.

o Use a portable field service kit with a static dissipative vinyl pouch that folds out of a work mat. Also use a wrist strap and a ground cord for the work surface. Ground the cord to the chassis of the equipment undergoing test or repair.

Grounding Equipment

Use the following equipment to prevent static electricity damage to the equipment:

Wrist Straps are flexible straps with a minimum of 1 megohm +/- 10% resistance to the ground cords. To provide proper ground, a strap must be worn snug against the skin. On grounded mats without banana plug connectors, connect a wrist strap with alligator clips.

Heelstraps/Toestraps/Bootstraps can be used at standing workstations and are compatible with most types of boots and shoes. On conductive floors or dissipative floor mats, use them on both feet with a minimum of 1 megohm resistance between operator and ground. To be effective, the conductive strips must be worn in contact with the skin.

Recommended Materials and Equipment

Other materials and equipment that are recommended for use in preventing static electricity include:

o Antistatic tape

o Antistatic smocks, aprons, or sleeve protectors

o Conductive bins, and other assembly or soldering aids

o Conductive foam

o Conductive table top workstations with ground cord of 1 megohm of resistance

o Static dissipative table or floor mats with hard tie to ground

o Field service kits

o Static awareness labels

o Wrist straps and footwear straps providing 1 megohm +/- 10% resistance

o Material handling packages

o Conductive plastic bags

o Conductive plastic tubes

o Conductive tote boxes

o Metal tote boxes

o Opaque shielding bags

o Transparent metallized shielding bags

o Transparent shielding tubes

SERVICE CONSIDERATIONS

Listed below are some of the considerations that should be kept in mind
during the disassembly and assembly of the computer.

Tool Requirements:

o Flat bladed screwdriver

o Torx T8 screwdriver (included in 130619-001)

o Hex socket driver (3/16)

o 25 Pin printer loopback plug (included in 100767-001)

o 9 Pin serial loopback plug (included in 100767-001)

o Cross recess (Phillips) screwdriver (included in 130619-001)

o Trackball tool (spare part number 194041-001)

o Case utility tool (spare part number 119070-001 and included in
  10076-001)

o PCMCIA external diskette drive (part number 190533-001)

o Preloaded application diskettes (Compaq Order Center, 1-800-952-7689)

Screws

The screws used in these products are not interchangeable. If an incorrect
screw is used during the reassembly process, it could cause damage to the
unit. Compaq strongly recommends that all screws removed during the
disassembly process be kept with the part that was removed, then returned
to their proper locations.

IMPORTANT: As each subassembly is removed from the computer, it should be
           placed away from the work area to prevent damage.

Cables and Connectors

Most cables used throughout the unit are flex cables (Figures 2-1, 2-2,
2-3). These cables must be handled with extreme care to avoid damage. Apply
only the tension required to seat or unseat the cables during insertion or
removal from the connector. Handle cables by the connector or pull tabs
whenever possible. In all cases, avoid bending, twisting, or tearing the
cables, and ensure that cables are placed in such a way that they cannot be
caught or snagged by parts being removed or replaced.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> CAUTION <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

When servicing these units, ensure that cables are placed in their proper
location during the reassembly process. Improper cable placement can cause
severe damage to the unit.

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Figure 2-1. ZIF and LIF Connectors and Cable - System Unit

Figure 2-2. ZIF and LIF Connectors and Cable - Compaq Contura Aero 4/25 Display

Figure 2-3. ZIF and LIF Connectors and Cable - Compaq Contura Aero 4/33C Display

Plastics

The plastics used can be damaged by application of excessive force during
disassembly and reassembly. When handling the plastic cases and housing
assemblies, use care. Do not use screwdrivers or similar tools to pry apart
plastics. Where necessary, use the Case utility tool (spare part number
119070-001). Proper handling of this tool is illustrated in the
disassembly and reassembly procedures.

Disposal of a Used Battery

Battery components are considered environmentally harmful. Disposal of a
Nickel Metal Hydride (NiMH) Battery Pack should comply with country, state,
province, or local regulations. Whenever possible, battery components
should be recycled.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> CAUTION <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

Never attempt to open or service a battery pack. Opening a battery pack not
only damages the pack and makes it unusable, but also exposes potentially
harmful battery components.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>><<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

Compaq offers its portable product customers an environmentally sound
method for disposing of depleted Compaq rechargeable battery packs used in
Compaq laptop and subnotebook personal computers.

In the interest of our customers and the protection of our environment, Compaq has initiated a disposal/recycling program for these battery packs. Further, because Compaq is funding all costs associated with the program, it is offered at no cost to the Compaq laptop and notebook customer.

IMPORTANT: Toll Free Number (U.S) 1-800-524-9859, (Canada) 1-800-263-5868

Customers in North America can take advantage of this program immediately. If you want to safely dispose of a depleted Compaq rechargeable battery pack, call the Compaq toll free telephone number. A recorded message asks you to provide your name, mailing address, and information about the battery pack. Within approximately two to three weeks, Compaq will send a postage paid "battery mailer" envelope preaddressed to the reclamation facility. Place the Compaq rechargeable battery pack into the battery mailer and mail it to the Compaq address shown on the mailer. Do not return Compaq rechargeable battery packs to Authorized Compaq Service Providers (except in the case of service or warranty exchanges) nor to any Compaq address other than the address on the preaddressed battery mailer envelope.

Chapter 3. Removal and Replacement Procedures

Chapter 3.0 Introduction

This chapter provides subassembly/module level removal and replacement
procedures for the Compaq Contura Aero Family of Personal Computers.

After completing all necessary removal and replacement procedures, run the
diagnostics program to verify that all components operate properly.

Chapter 3.1 Replacement Procedures

For replacement procedures, follow the removal procedures in this chapter
in reverse order.

Chapter 3.2 Disassembly/Assembly Sequence Chart

This section provides instructions for removing and replacing these
components:

```
        |
  3.4   |---BATTERY PACK
        |
  3.5   |---CPU COVER
        |
  3.6   |---KEYBOARD
        |
  3.7   |---VGA BACKLIT DISPLAY
        |    |--Compaq Contura Aero 4/25
        |    |----Bezel
        |    |----Inverter Board
        |    |----LCD Panel
        |    |--Compaq Contura Aero 4/33C
        |    |----Bezel
        |    |----Inverter Board
        |    |----LCD Panel
        |
  3.8   |---POWER SUPPLY
        |
  3.9   |---TRACKBALL
        |
 3.10   |---HARD DRIVE
        |
 3.11   |---SYSTEM BOARD
        |    |---Real time Clock Battery
        |
 3.12   |---CHASSIS
```

Chapter 3.3 Preparation Procedures

Before beginning the removal and replacement procedures, follow these
steps (Figure 3-1):

1. Turn off the power switch on the computer.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> CAUTION <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

Turn off the computer before any cables are connected or disconnected.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>><<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

2. Disconnect all external devices (diskette drive, base unit, printer, and other devices) from the computer.

3. Disconnect the power cord from the electrical outlet.

4. Disconnect the AC adapter cable from the computer.

Figure 3-1. Disconnecting the Power Cord and AC Adapter Cable

Chapter 3.4 Removing The Battery Pack

To remove an installed battery pack, follow these steps (Figure 3-2):

1. Press the battery release latch on the cover of the battery compartment

2. Slide the door forward. The battery will spring out slightly

3. Remove the battery pack by gently pulling it out of the battery
   compartment

Figure 3-2. Removing the Battery Pack

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> CAUTION <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

Metal objects will damage the battery pack as well as the connectors in the
compartment. To prevent damage, do not let metal objects touch any of the
connectors. Do not place any objects other than the battery pack in the
battery compartment.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>><<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

NOTE: Be careful not to misplace the battery door or battery spacer (if
      applicable).

To replace the battery pack, follow these steps:

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> CAUTION <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

To prevent damage to the battery contacts, do not force the battery pack
into the battery compartment.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>><<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

1. Align the slot in the battery pack with the rib inside the computer.

2. Insert the battery pack, with the battery contacts facing to the inside of the battery compartment.

3. Push firmly on the battery pack until it slides into place.

4. Slide the battery door on until the lock snaps into place.

Chapter 3.5 Removing The Cpu Cover

To remove the CPU cover, follow these steps:

1. Remove the battery pack (Figure 3-2).

2. Turn the computer upside down.

3. Remove the four screws from the bottom of the computer (Figure 3-3).

4. Remove the screw from the clutch on the display enclosure in the rear of the computer (Figure 3-3).

5. Turn the computer right side up.
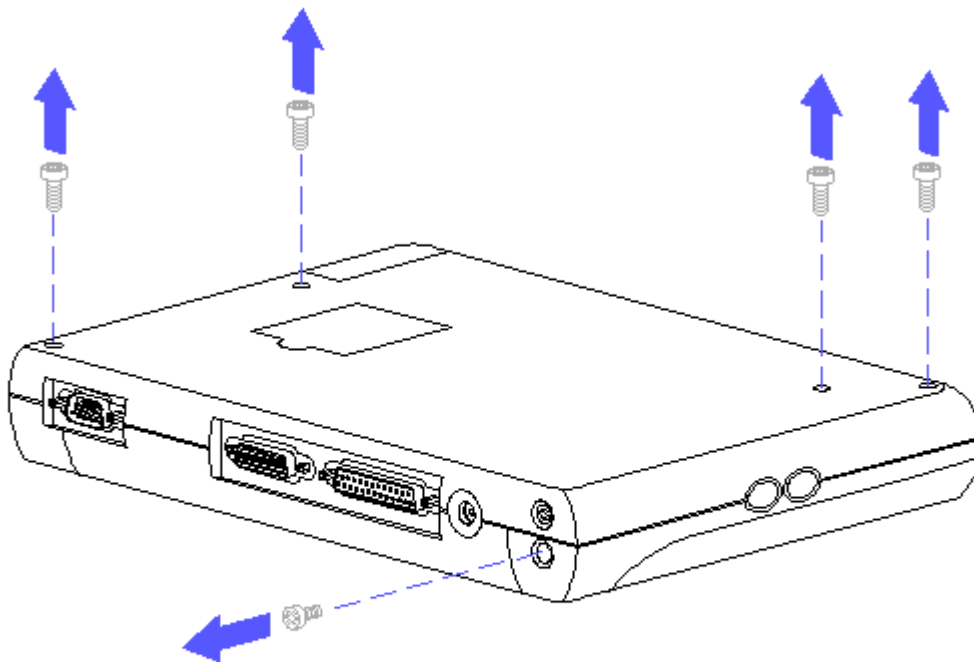
Figure 3-3. Removing the Screws from the Bottom and the Rear Panel

6. Slide the latch on the front of the computer to the right and open the display (Figure 3-4).
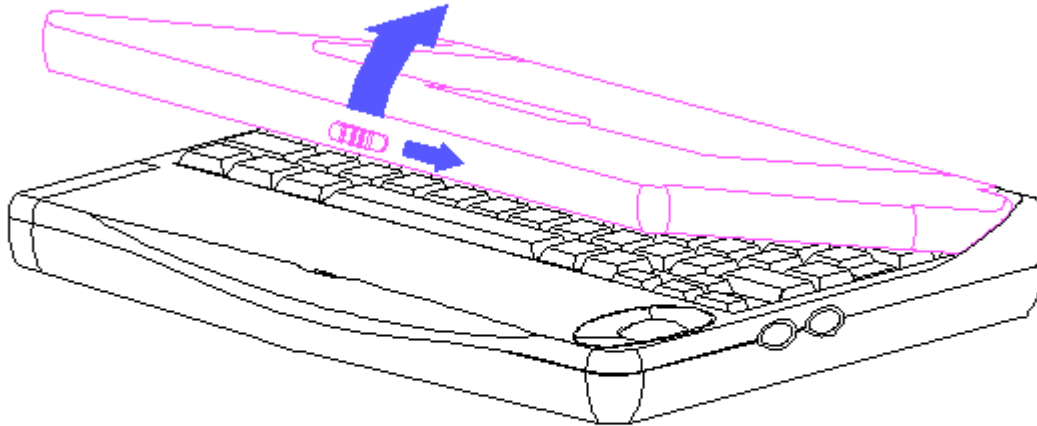
Figure 3-4. Opening the Display

7. Remove the screw covers from the bottom right and left corners of the display panel assembly. Using a Phillips screwdriver, remove the two screws (Figure 3-5).
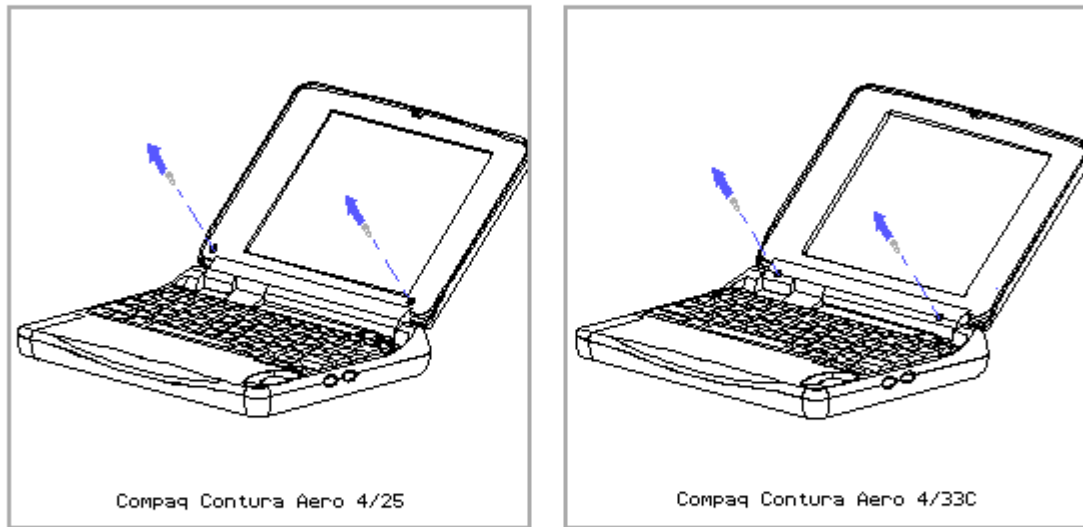
Figure 3-5. Removing Screws from the Display Assemblies

8. Remove the bezel from the display assembly by gently pulling the
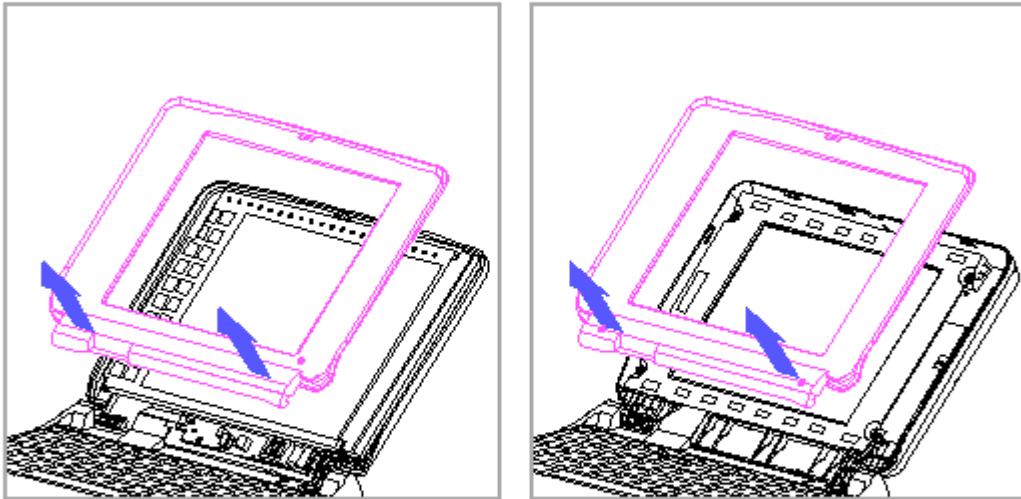   bezel frame and working from the bottom up (Figure 3-6).

Figure 3-6. Removing the Display Bezel

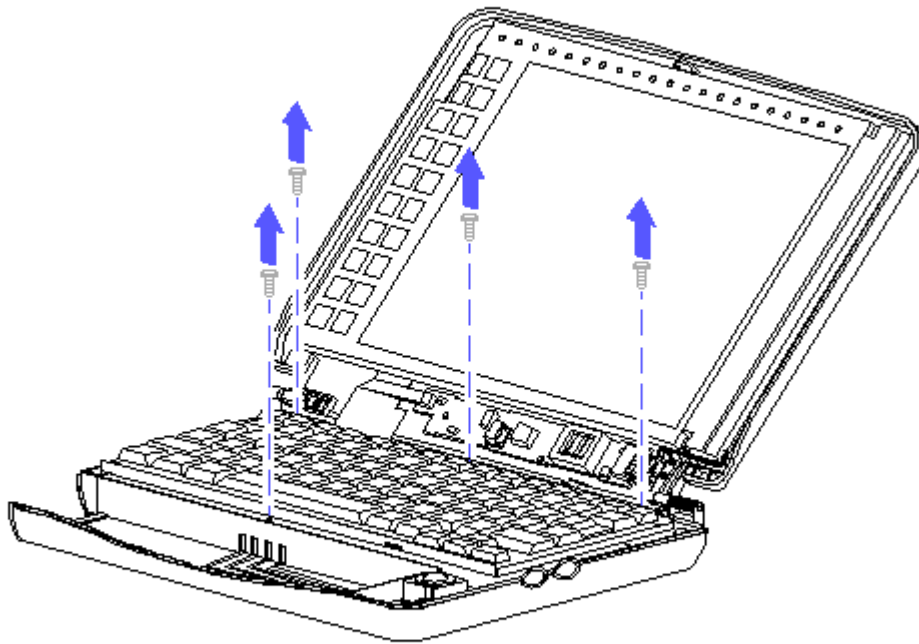9. Unsnap the CPU cover with the Case utility tool and lift it off of the computer (Figure 3-7).

Figure 3-7. Removing the CPU Cover

To replace the CPU cover, reverse the previous steps.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> CAUTION <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

When replacing the CPU cover, be sure not to pinch the trackball cables on the right side of the cover (see Figure 3-41).

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>><<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

Chapter 3.6 Removing The Keyboard

To remove the keyboard, follow these steps:

1. Remove the battery pack (Section 3.4).

2. Remove the display bezel and the CPU cover (Section 3-5).

3. Remove the four screws that secure the keyboard (Figure 3-8).

Figure 3-8. Removing Screws from the Keyboard

4. Gently lift up on the rear of the keyboard and unhook it from the hook
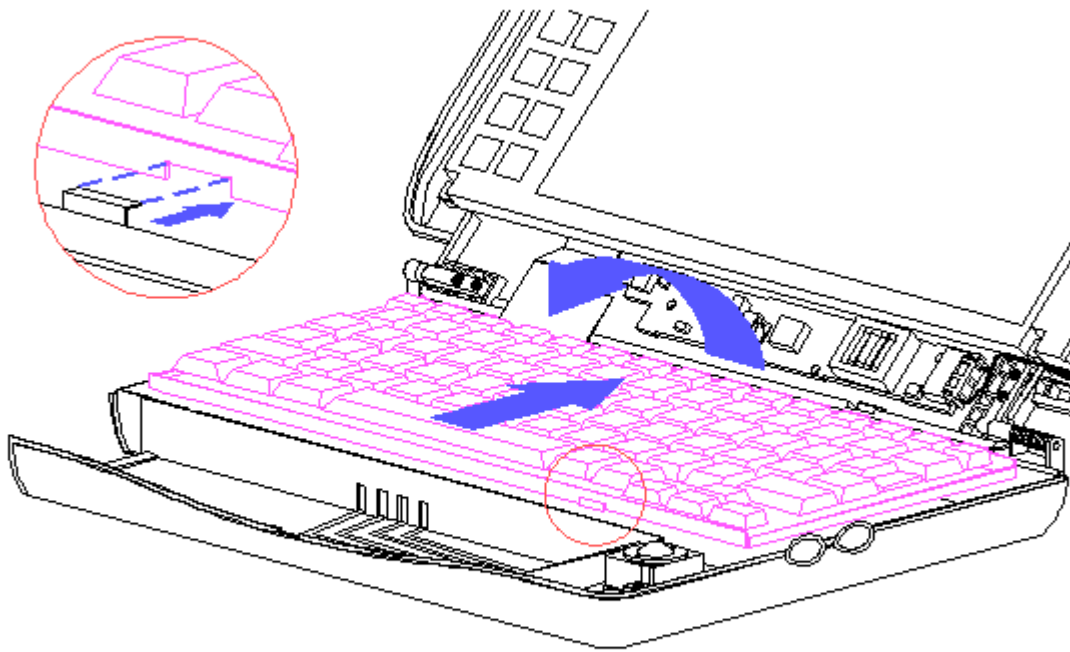   latches in the front (Figure 3-9).

Figure 3-9. Removing the Keyboard

5. Rotate the rear of the keyboard toward you until the two ZIF connectors
   are exposed and lay the keyboard upside down on top of the battery
   compartment (Figure 3-10).

NOTE: You may not have to disconnect the cables from the keyboard to have
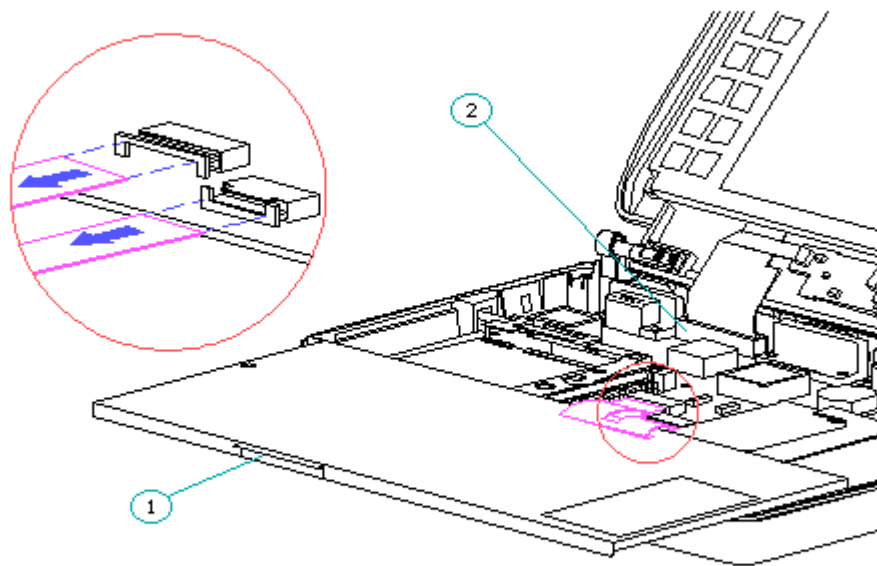   access to the component you want to remove and/or replace.

Figure 3-10. Laying the Keyboard Upside Down on Top of the Battery Compartment
and Disconnecting the Keyboard Cables

6. Using the Case utility tool, carefully lift up on the two ZIF sliders
   one at a time to release the keyboard cables (Figure 3-10).

7. Carefully lift the keyboard out of the computer.

To replace the keyboard, reverse the previous steps.

NOTE: When replacing the keyboard, position the clip on the rear of the
      keyboard [1] on top of the display cable ZIF slider [2]
      (Figure 3-10).

Chapter 3.7 Removing The VGA Backlit Display

Compaq Contura Aero 4/25 Display

To remove the monochrome VGA backlit display from the Compaq Contura
Aero 4/25 Personal Computer, follow these steps:

1. Remove the battery pack (Section 3.4).

2. Remove the display bezel and the CPU cover (Section 3.5).

3. Remove the keyboard (Section 3.6).

4. Release the ZIF slider attaching the display cable to the system board.
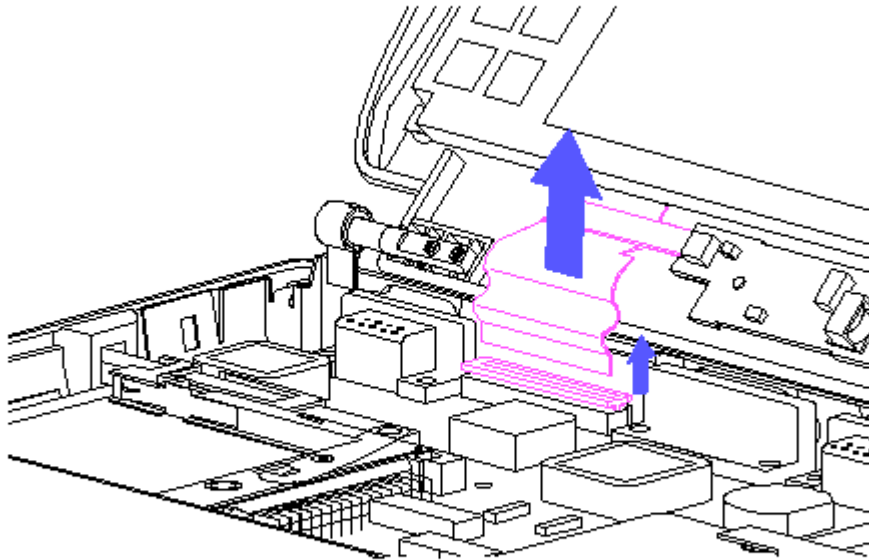

Figure 3-11. Releasing the Display Cable from the System Board

NOTE: It may not be necessary to remove the display assembly from the base
      enclosure to service the system board. The display will support
      itself in an open position without falling over.

5. Remove the remaining screw on the back of the display assembly to
   release the clutch from the base enclosure (Figure 3-12).

Figure 3-12. Removing the Screw from the Clutch

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> CAUTION <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

Do not bend the support loop.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>><<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

6. Lift the display assembly out of the computer by sliding it to the right
   to pull the display pin out of the support loop. (Figure 3-13).
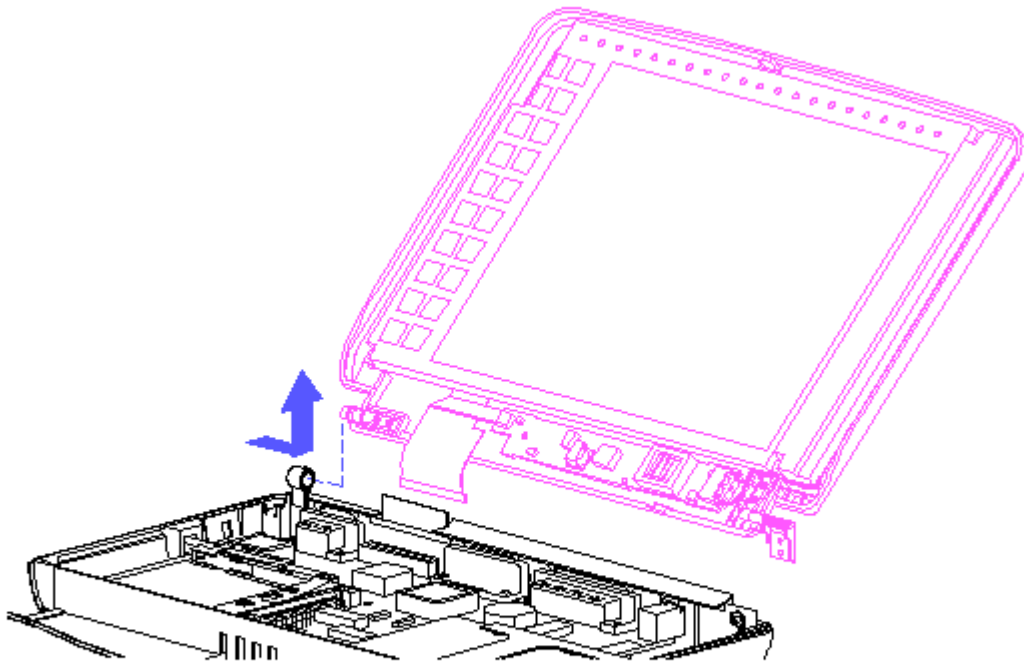
Figure 3-13. Sliding the Display Panel Assembly Out of the Computer

To replace the display assembly, follow these steps:

1. Position the display assembly by aligning the display clutch and pin with the support loop and keyed bushing (Figure 3-14).
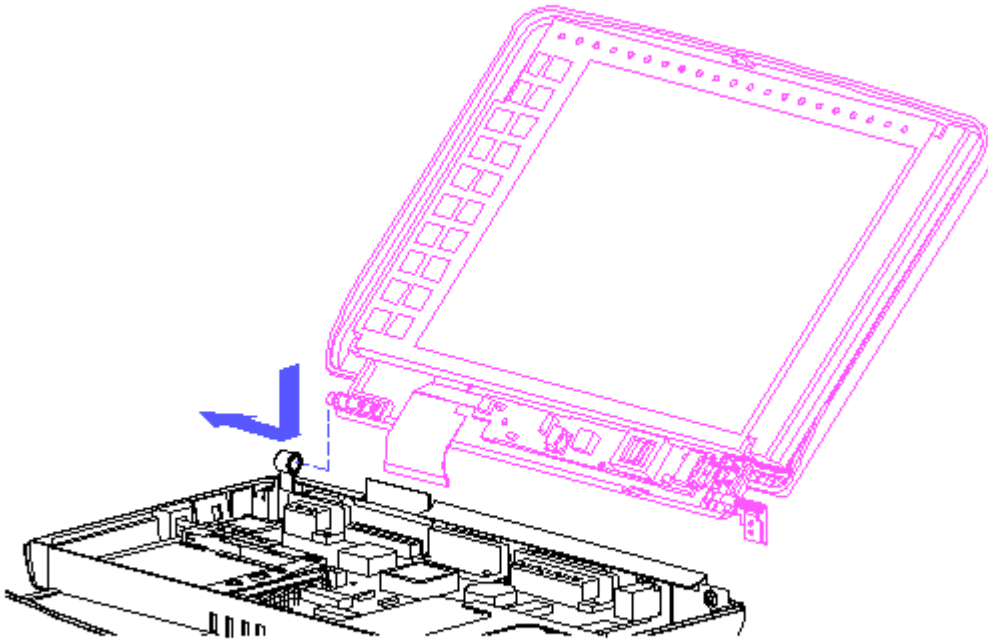
Figure 3-14. Aligning the Display Clutch with the Base Enclosure

2. Reattach the screw to the base enclosure and clutch.

To reconnect the display cable to the system board, follow these steps
(Figure 3-15):

1. Insert the display cable into the ZIF connector and lightly press the
   slider down to lock the connector.

2. Push the curved portion of the display cable inward with your finger,
   remove your finger, close the computer, and immediately reopen.

The display cable should pop into place around the hinge forming an "S"
shape.
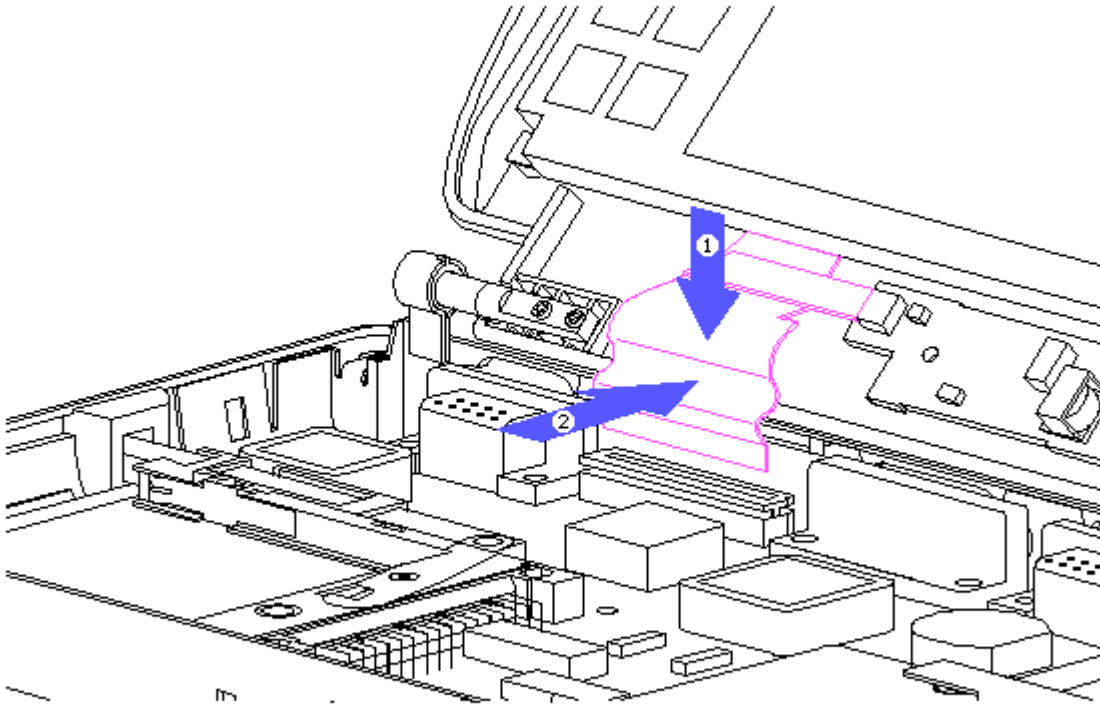
Figure 3-15. Inserting the Display Cable into the System Board and Pushing in
the Curved Portion

Display Inverter Board

To remove the display inverter board, follow these steps:

1. Remove the display bezel (Figures 3-5 and 3-6).

2. Remove the display cable and the backlight cable from the display
   inverter board in the bottom of the display enclosure by gently pulling
   the cables toward you, then unplugging from the inverter board LIF
   connector (Figure 3-16).
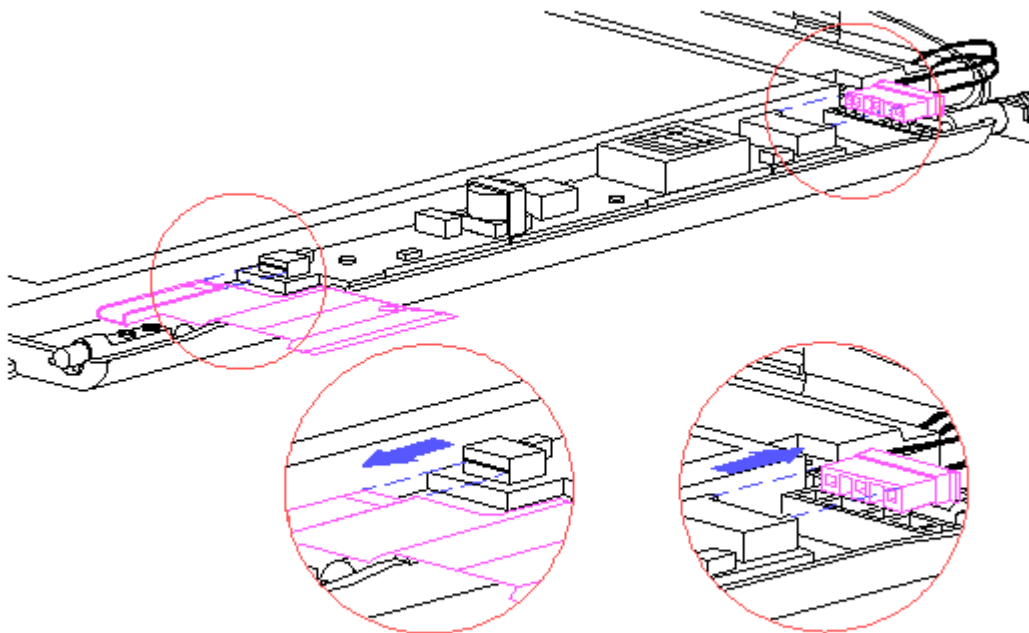
Figure 3-16. Unplugging the Display Cable and Backlight Cable from the
Inverter Board

3. Lift the inverter board out of the display enclosure (Figure 3-17).

Figure 3-17. Removing the Inverter Board from the Display Enclosure

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> CAUTION <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

When servicing these units, ensure that cables are placed in their proper
location to avoid pinching during the reassembly process. Improper cable
placement can cause severe damage to the unit.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>><<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

To replace the inverter board, follow these steps:

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> CAUTION <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

These steps must be followed whenever replacing any component in the
display assembly because of high susceptibility to electrostatic discharge,
which will damage the LCD panel.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>><<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

1. Attach the inverter board LIF connector to the display cable.

2. Attach the backlight cable to the inverter board.

3. Align the inverter board with the three mounting posts.

Liquid Crystal Display Panel

To remove the backlit liquid crystal display (LCD) panel, follow these steps:

1. Remove the display bezel (Figures 3-5 and 3-6).

2. Remove the remaining two top left screws and the one top right screw that secure the LCD panel to the display enclosure (Figure 3-18).

3. Remove the top clutch screw and ground clip bracket in the bottom right corner of the display enclosure (Figure 3-18).
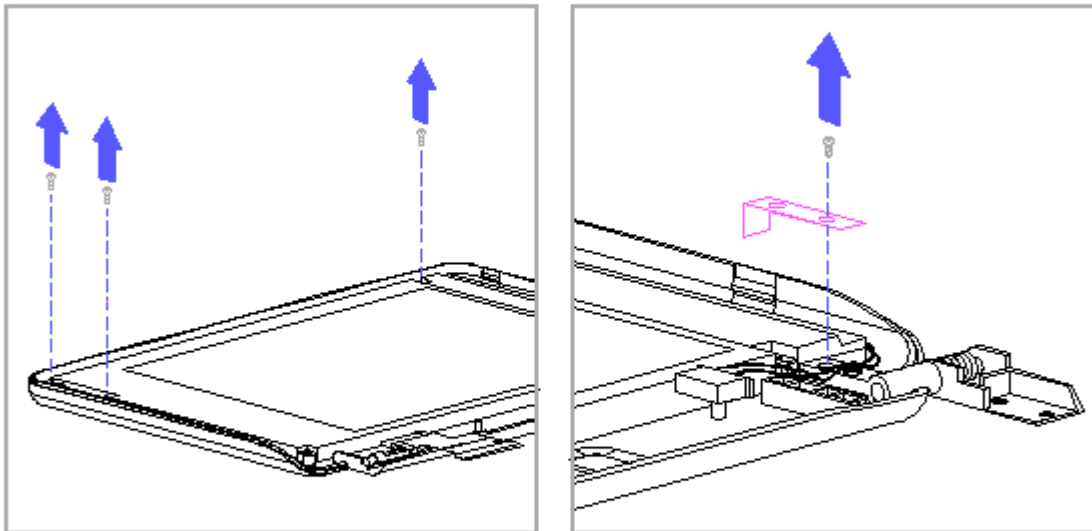
Figure 3-18. Removing Screws and Ground Clip Bracket from the LCD

4. Carefully rotate the LCD panel to the left and out of the display enclosure (Figure 3-19).
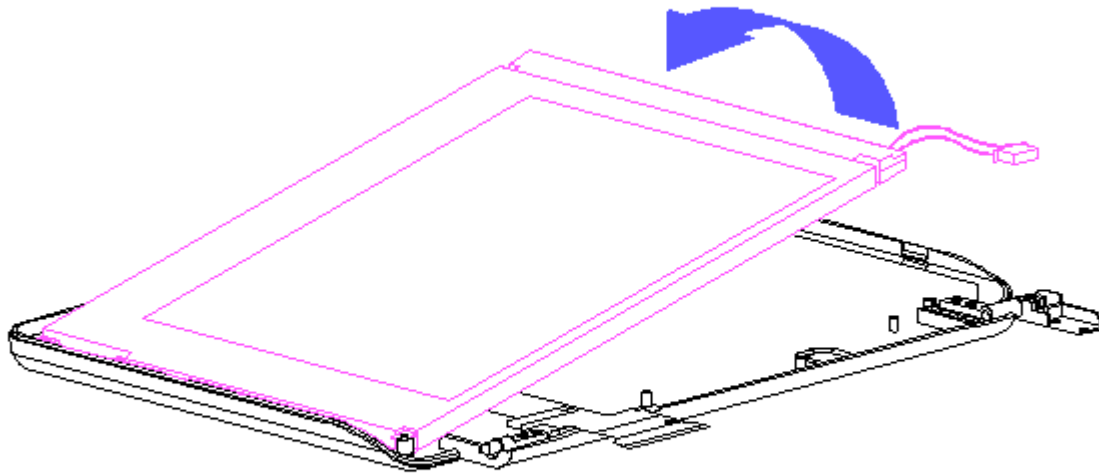
Figure 3-19. Lifting the LCD Panel out of the Display Enclosure

5. Remove the display cable from the rear of the LCD panel by gently
   pulling the cable toward you (Figure 3-20).

6. Carefully lift up on the ZIF connector to release the display cable from
   the side of the LCD panel (Figure 3-20).
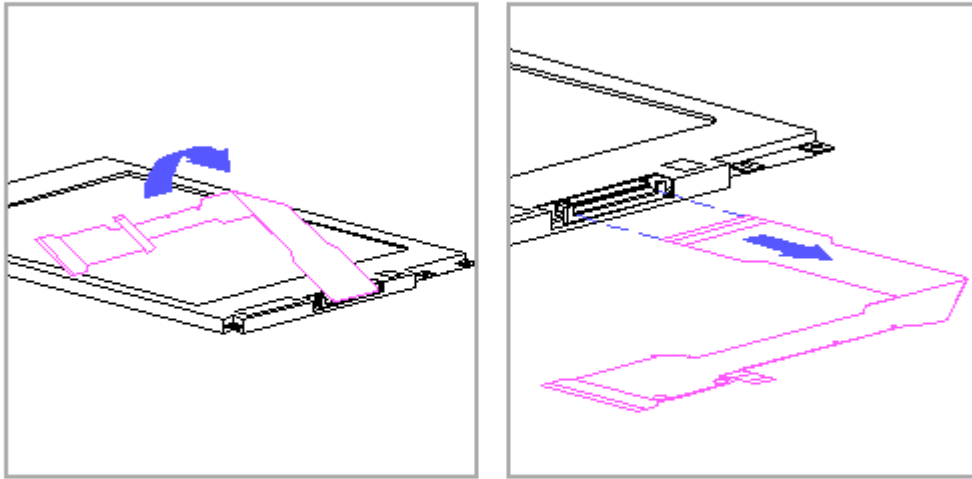
Figure 3-20. Removing the Display Cable from the Rear of the LCD Panel

To replace the LCD panel, follow these steps:

1. Remove the pressure sensitive adhesive backing from the back of the
   display cable. Align the holes in the cable with the mounting pins on
   the display enclosure.

2. Connect the display cable to the LCD panel with the ZIF connector.

3. Lay the LCD panel into the display enclosure with the bottom of the
   display cable exposed.

4. Secure the LCD panel with three screws to the display enclosure.

5. Secure the support bracket with one screw in the bottom right corner of
   the display enclosure.

Latch, Clutch, Pin, and Display Shield

To remove and replace the latch from the middle of the display enclosure,
the clutch, pin, and the display shield, follow these steps (Figure 3-21):

1. Remove the display bezel (Section 3.5).

2. Using a small flat bladed screwdriver, remove the spring from the latch.

Pry the latch away from the display enclosure.

3. Using a Phillips screwdriver, remove the remaining screw from the clutch and then remove the clutch out of the display enclosure.

4. Remove the two screws from the pin and remove the pin from the display enclosure.
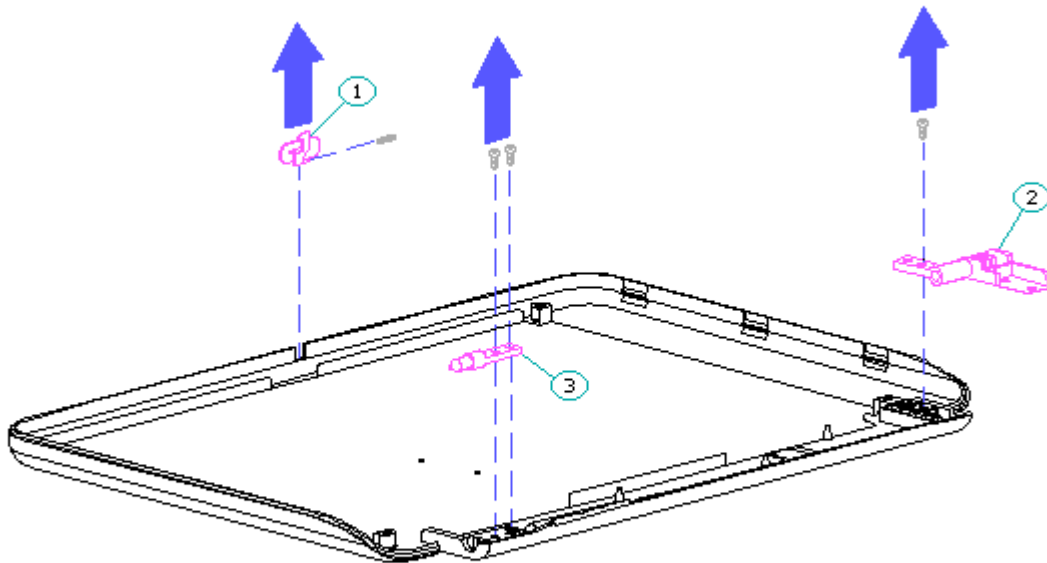
Figure 3-21. Removing the Display Latch, Clutch, and Pin

5. Remove the display shield by lifting it out of the display enclosure (Figure 3-22).
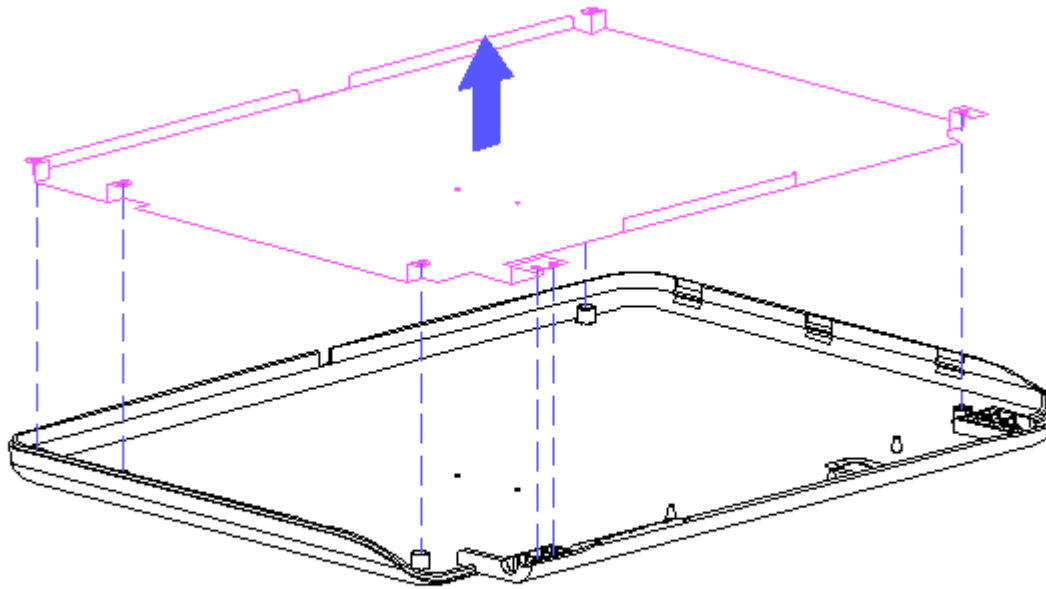
Figure 3-22. Removing the Display Shield

To replace the display shield, lay it inside of the display enclosure.

To replace the latch, attach the spring to the latch and snap them into the display enclosure.

To replace the clutch and pin, reverse the previous steps.

Compaq Contura Aero 4/33C Display

To remove the color VGA backlit display assembly from the Compaq Contura Aero 4/33C Personal Computer, follow these steps:

1. Remove the battery pack (Section 3.4).

2. Remove the display bezel (Figures 3-5 and 3-6).

3. Remove the CPU cover (Section 3.5).

4. Remove the keyboard (Section 3.6).

5. Release the ZIF connector attaching the display cable to the system board (Figure 3-23).
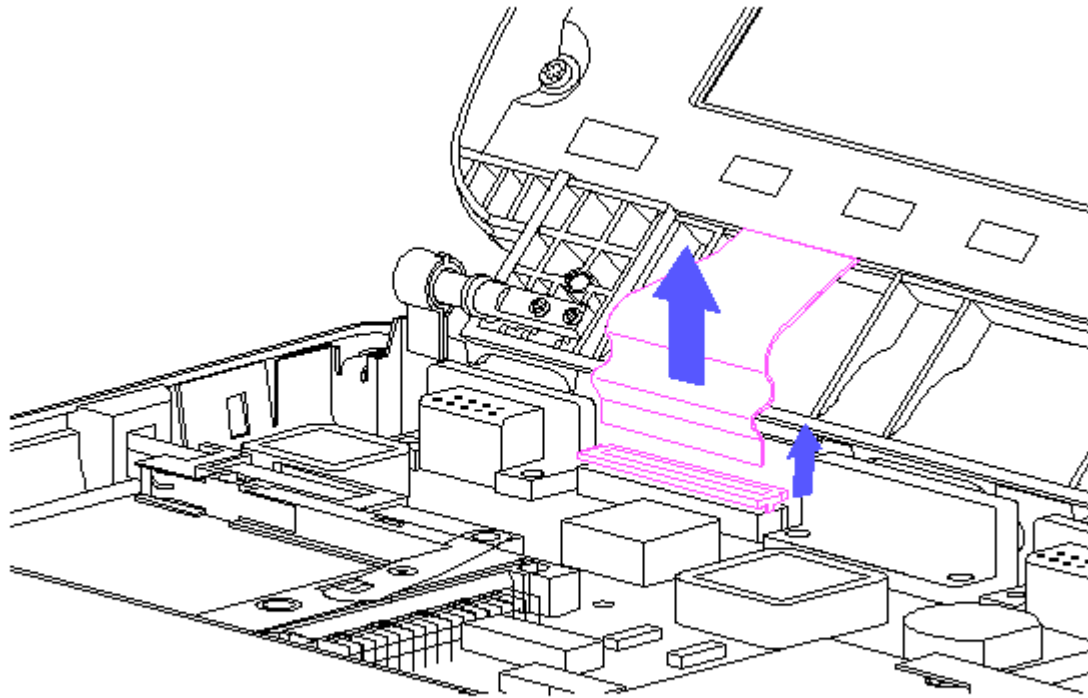
Figure 3-23. Releasing the Display Cable from the System Board

6. Release the clutch from the display enclosure by removing the remaining
   screw on the back of the base enclosure (Figure 3-24).

Figure 3-24. Releasing the Clutch from the Base Enclosure

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> CAUTION <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

Do not bend the support loop.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>><<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

7. Lift the display panel assembly out of the computer by sliding it to
    the right to pull the display pin out of the support loop
    (Figure 3-25).
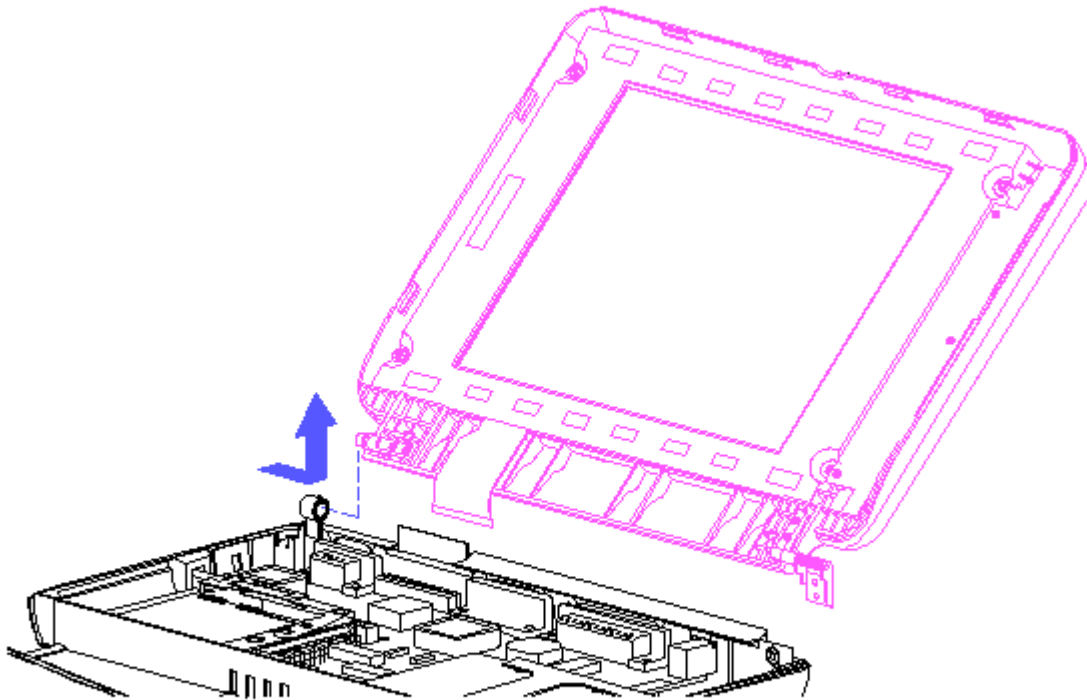
Figure 3-25. Removing the Display Assembly out of the Computer

To replace the display panel assembly, follow these steps:

1. Position the display assembly by aligning the display clutch and pin
   with the support loop and keyed bushing (Figure 3-26).
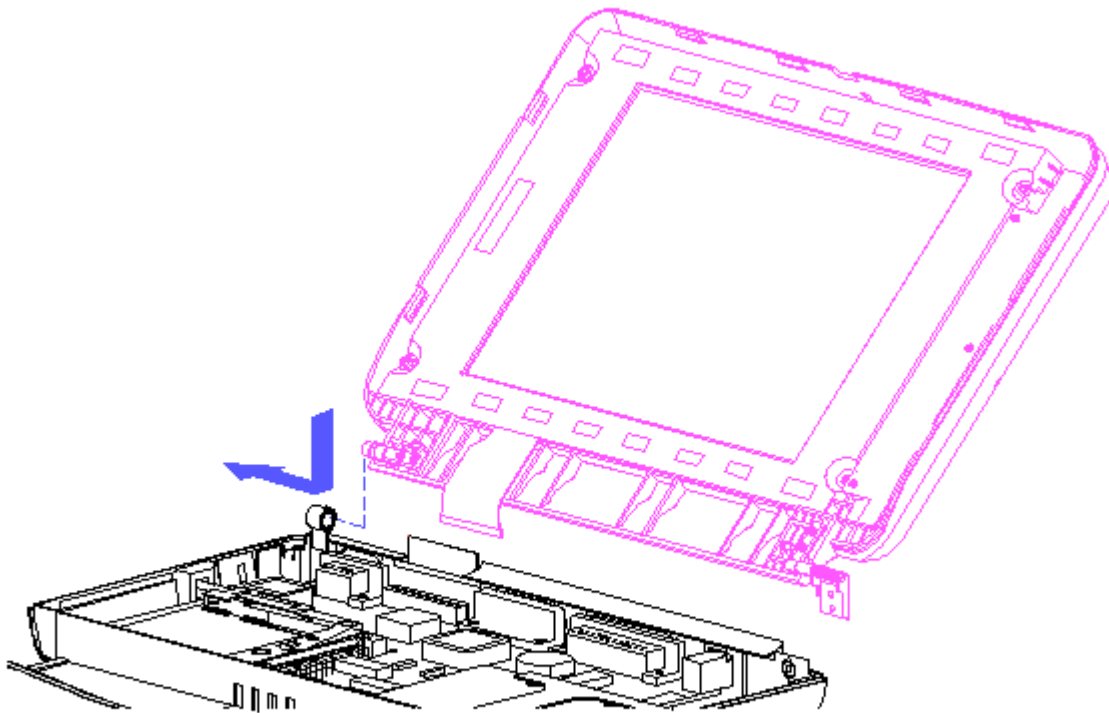
Figure 3-26. Aligning the Display Clutch with the Base Enclosure

2. Reattach the screw to the base enclosure and clutch.

To reconnect the display cable to the system board, follow these steps (Figure 3-27):

1. Insert the display cable into the ZIF connector and lightly press the slider down to lock the connector.

2. Push the curved portion of the display cable inward with your finger, remove your finger, close the computer, and immediately reopen.

The display cable should pop into place around the hinge forming an "S" shape.
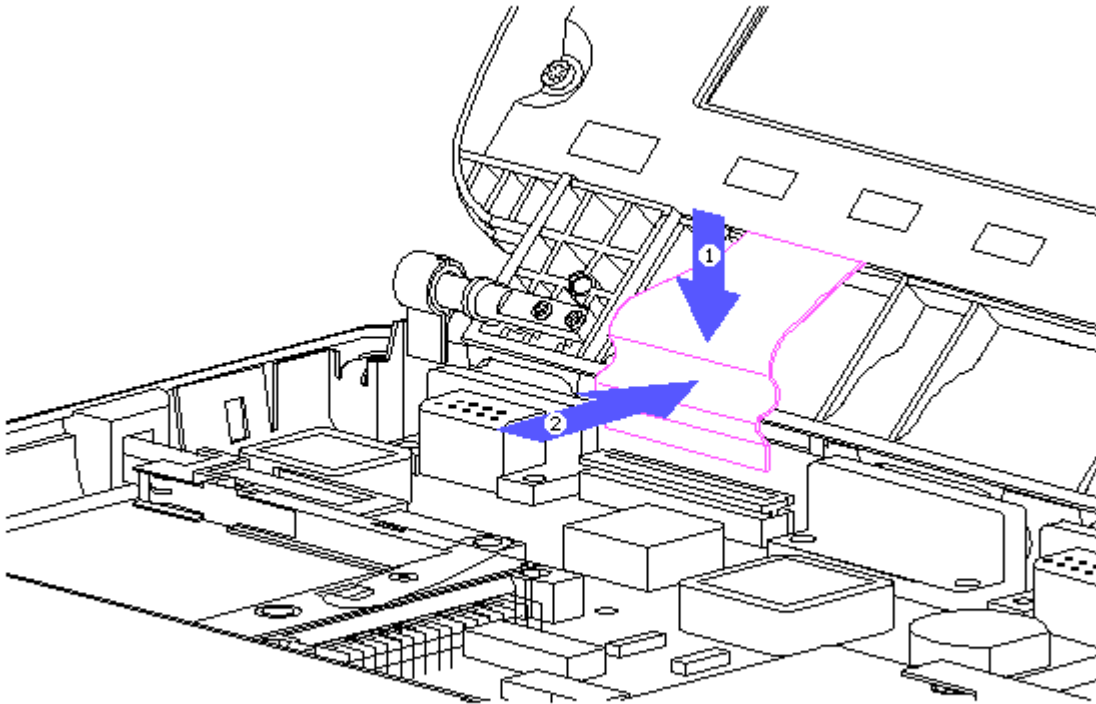
Figure 3-27. Inserting the Display Cable into the System Board and Pushing in the Curved Portion

Display Inverter Board

To remove the display inverter board, follow these steps:

1. Remove the display bezel (Figures 3-5 and 3-6).

2. With a Phillips screwdriver, remove the three screws that secure the inverter board to the display enclosure (Figure 3-28).
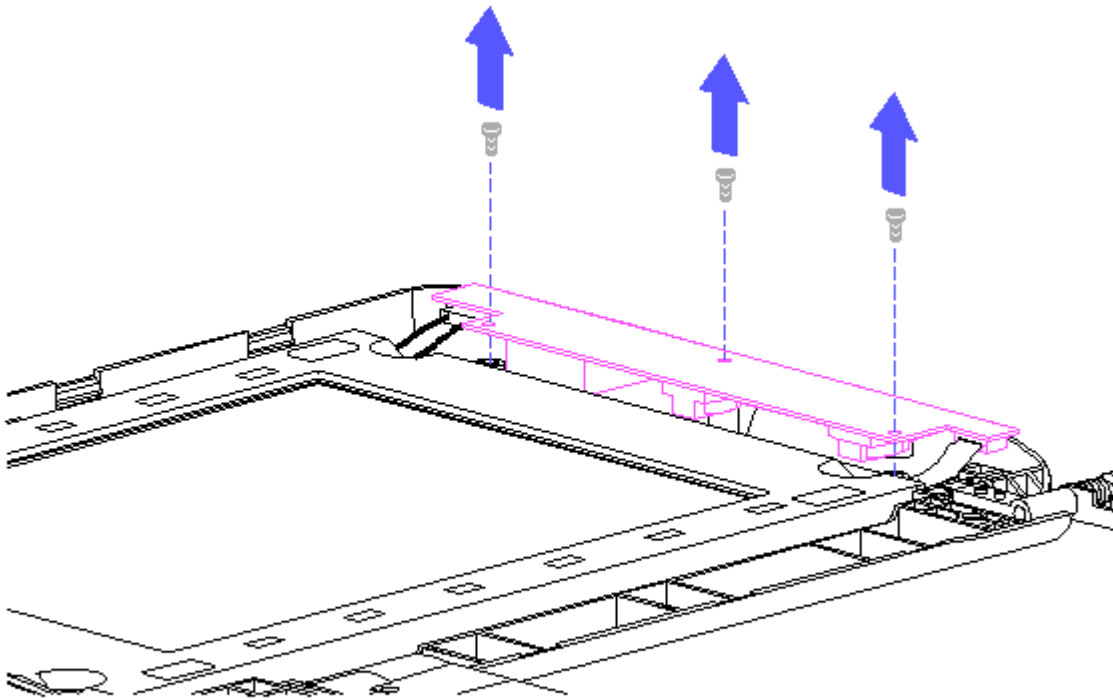
Figure 3-28. Removing Screws from the Inverter Board

3. Gently lift the inverter board out of the display enclosure and unplug
   the display cable and the backlight cable (Figure 3-29).

Figure 3-29. Removing the Inverter Board from the Display Enclosure

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> CAUTION <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

When servicing these subassemblies, ensure that cables are placed in their proper location to avoid pinching during the reassembly process. Improper cable placement can cause severe damage to the computer.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>><<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

To replace the inverter board, follow these steps:

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> CAUTION <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

Because of high susceptibility to electrostatic discharge that will damage the LCD panel, these steps must be followed whenever replacing any component in the display assembly.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>><<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

1. Connect the inverter board connector to the display cable.

2. Connect the backlight cable to the inverter board.

3. Place the inverter board with the component side down on the right side
   of the display enclosure and secure with three screws.

Liquid Crystal Display Panel

To remove the backlit liquid crystal display (LCD) panel, follow these
steps:

1. Remove the display bezel (Section 3.5).

2. Remove the remaining four screws that secure the LCD panel to the
   display enclosure and carefully bend back the tabs that secure the
   display shield to the LCD panel (Figure 3-30).
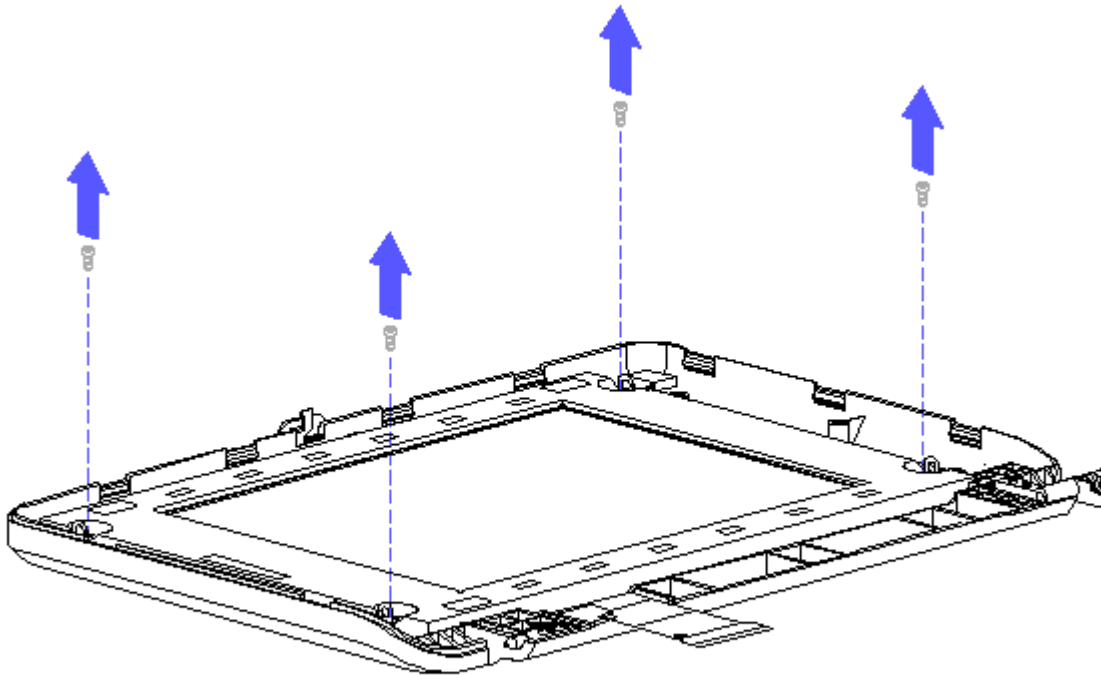
Figure 3-30. Removing Screws from the LCD Panel

3. Carefully rotate the LCD panel to the left and out of the display
   enclosure (Figure 3-31).
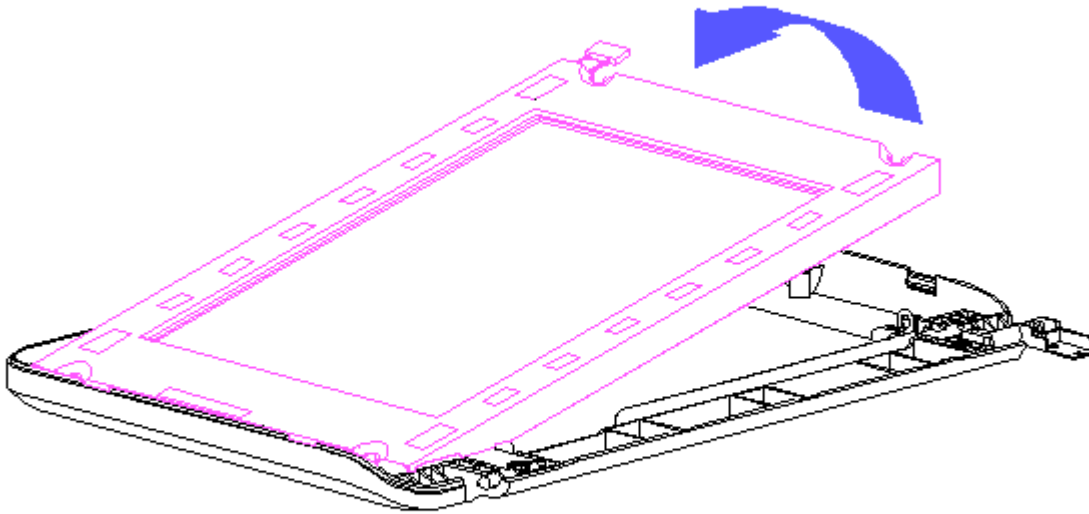
Figure 3-31. Lifting the LCD Panel out of the Display Enclosure

4. Remove the display cable from the rear of the LCD panel by gently
   pulling the cable toward you (Figure 3-32).

5. Carefully lift up on the ZIF connector to release the display cable from
   the side of the LCD panel (Figure 3-32).
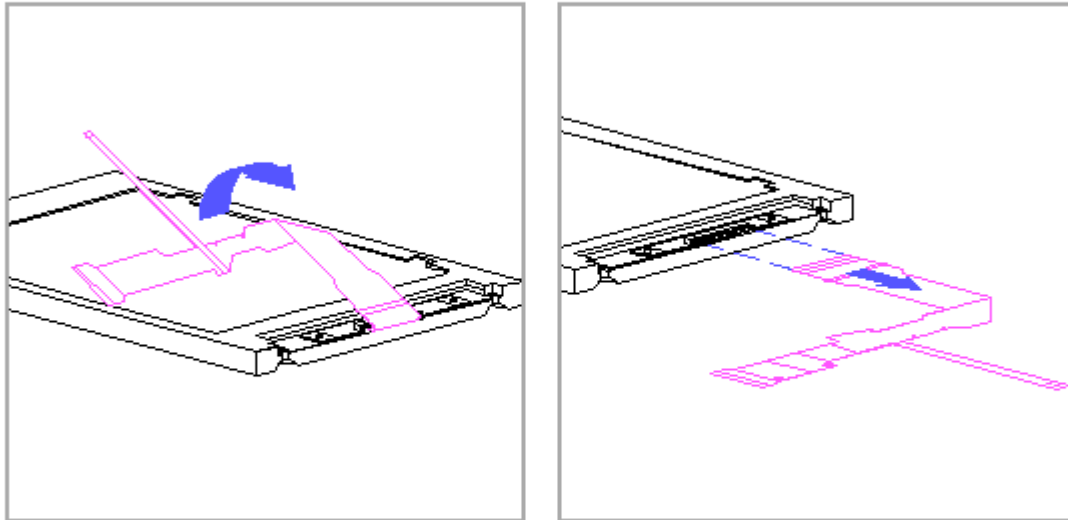
Figure 3-32. Removing the Display Cable from the Rear of the LCD Panel

To replace the LCD panel, follow these steps:

1. Remove the pressure sensitive adhesive backing from the back of the display cable. Align the holes in the cable with the mounting pins on the display enclosure.

2. Connect the display cable to the LCD panel by inserting it into the ZIF connector.

3. Lay the LCD panel into the display enclosure with the bottom of the display cable exposed.

IMPORTANT: Ensure that the ferrite [1] on the display cable is not pinched between the display enclosure and the ZIF connector [2] (Figure 3-33).
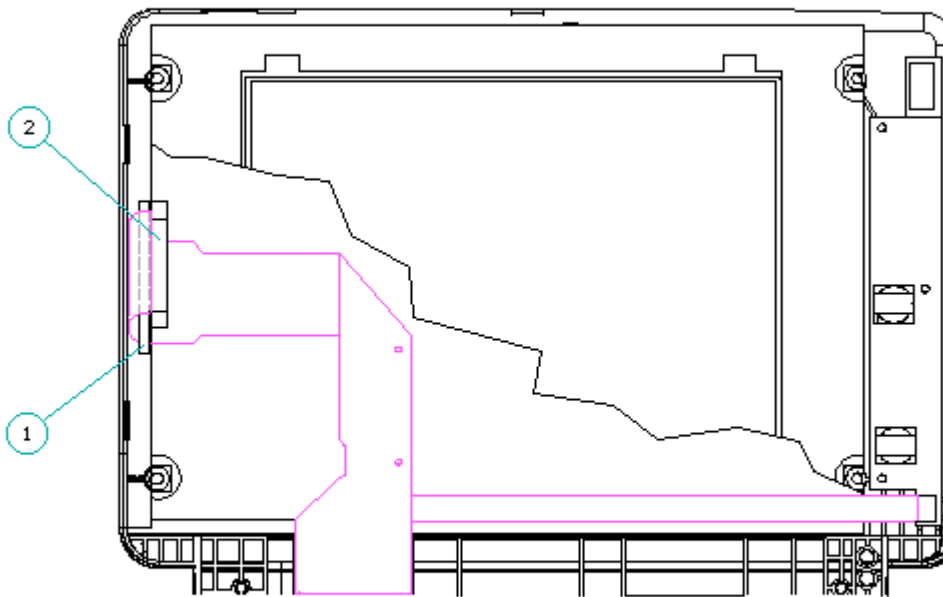
Figure 3-33. Positioning the Display Cable in the Display Enclosure

4. Carefully press down the tabs of the display shield back into place.

5. Secure the LCD panel with four screws to the display enclosure.

Latch, Clutch, Pin, and Display Shield

To remove and replace the latch, the clutch, and display shield from the display assembly, follow these steps:

1. Remove the remaining four screws that secure the LCD panel to the display enclosure and carefully bend back the tabs that secure the display shield to the LCD panel and remove the LCD panel (Figures 3-30, 3-31).

2. Using a Phillips screwdriver, remove the screws from the clutch and the pin (Figure 3-34).

3. Lift the display shield out of the display enclosure (Figure 3-34).
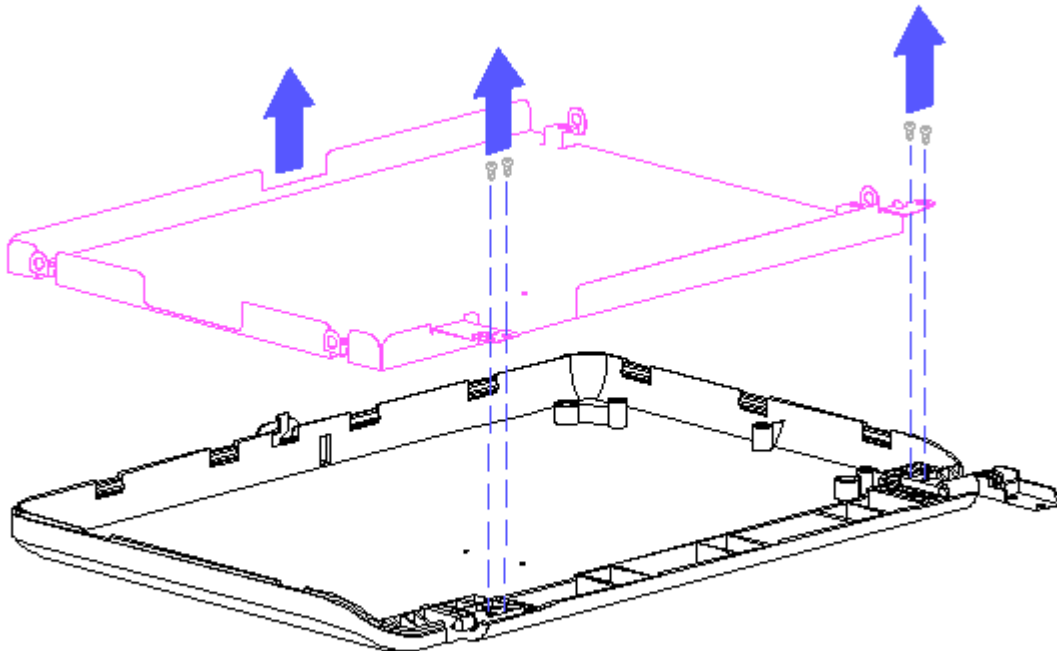
Figure 3-34. Removing the Display Shield

4. Using a small flat bladed screwdriver, remove the spring from the latch.
   Pry the latch away from the display enclosure [1] (Figure 3-35).

5. Remove the clutch [2] and the pin [3] out of the display enclosure
   (Figure 3-35).

Figure 3-35. Removing the Display Panel Latch, Clutch, and Pin

To replace the display shield, lay it inside of the display enclosure.

To replace the latch, attach the spring to the latch and snap them into the display enclosure.

Chapter 3.8 Removing The DC-DC Power Supply

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> CAUTION <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

Before removing the CPU cover, be sure the AC Adapter is unplugged and the battery pack is removed from the battery compartment. If the battery pack remains in the battery compartment, it will damage the power supply.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>><<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

To remove the power supply, follow these steps:

1. Remove the battery pack (Section 3.4).

2. Remove the display bezel (Figures 3-5 and 3-7).

3. Remove the CPU cover (Section 3.5).

4. Remove the keyboard (Section 3.6).

5. Remove the threaded standoff that secures the power supply
   (Figure 3-36).

6. Gently grasp the power supply and pull up to unplug (Figure 3-36).
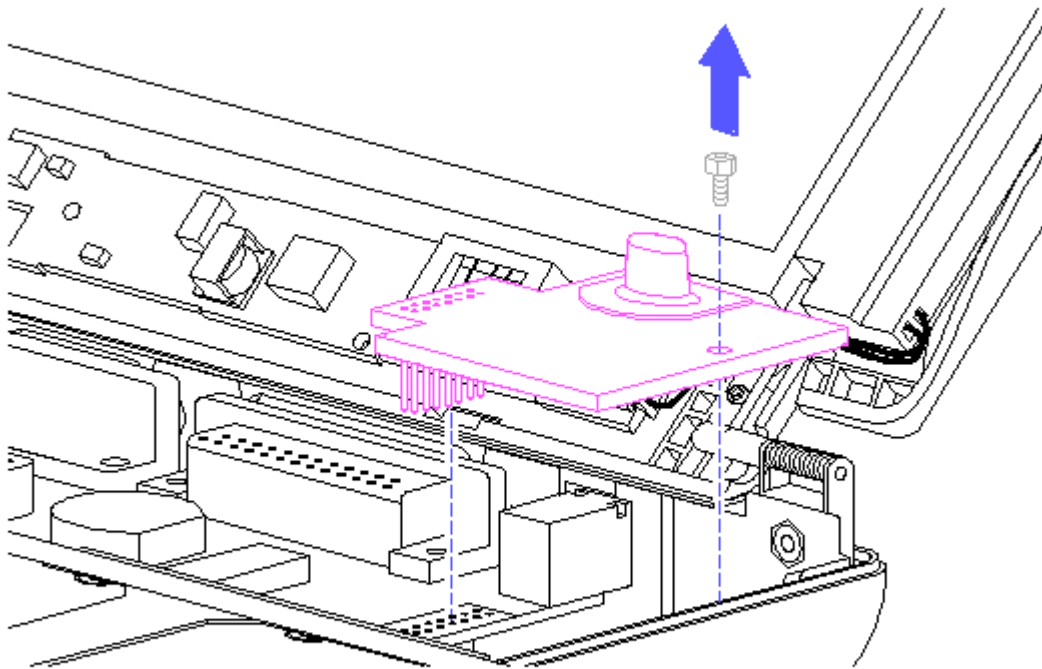
Figure 3-36. Unplugging the Power Supply

To replace the power supply, reverse the previous steps.

Chapter 3.9 Removing The Trackball/Buttons/Speaker Assembly

To remove the trackball, follow these steps:

1. Remove the battery pack (Section 3.4).

2. Remove the display bezel (Figures 3-5 and 3-6).

3. Remove the CPU cover (Section 3.5).

4. Remove the keyboard (Section 3.6).

5. Using a small screwdriver, remove the two screws that secure the
   trackball to the base (Figure 3-37).
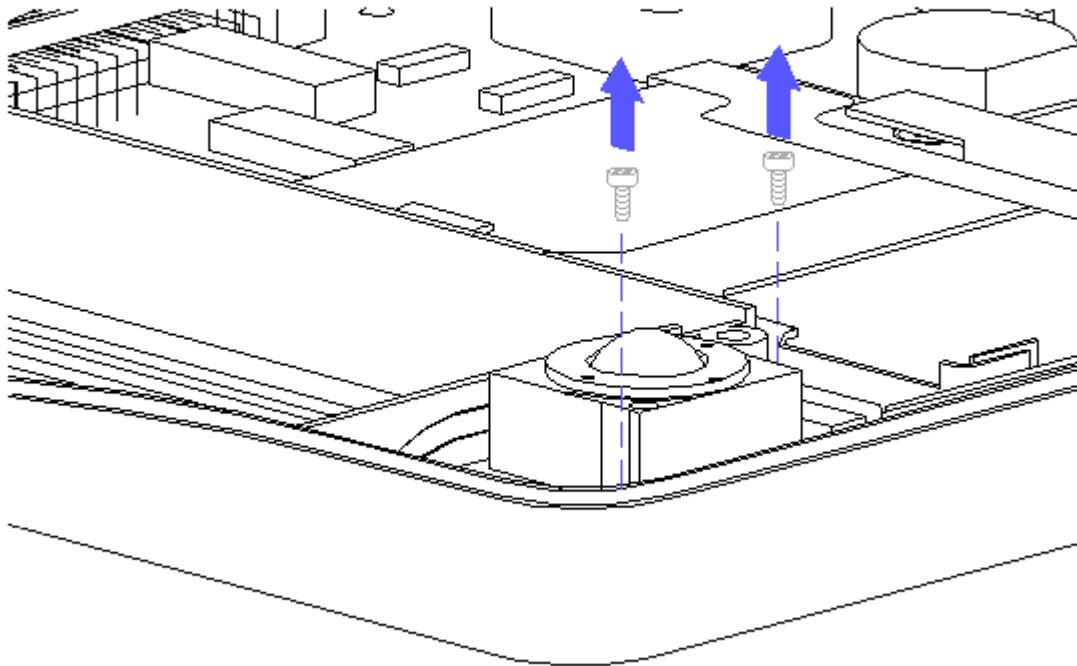
Figure 3-37. Removing Screws from the Trackball

6. With the Case utility tool, disconnect the trackball cable from the system board connector. (Figure 3-38).
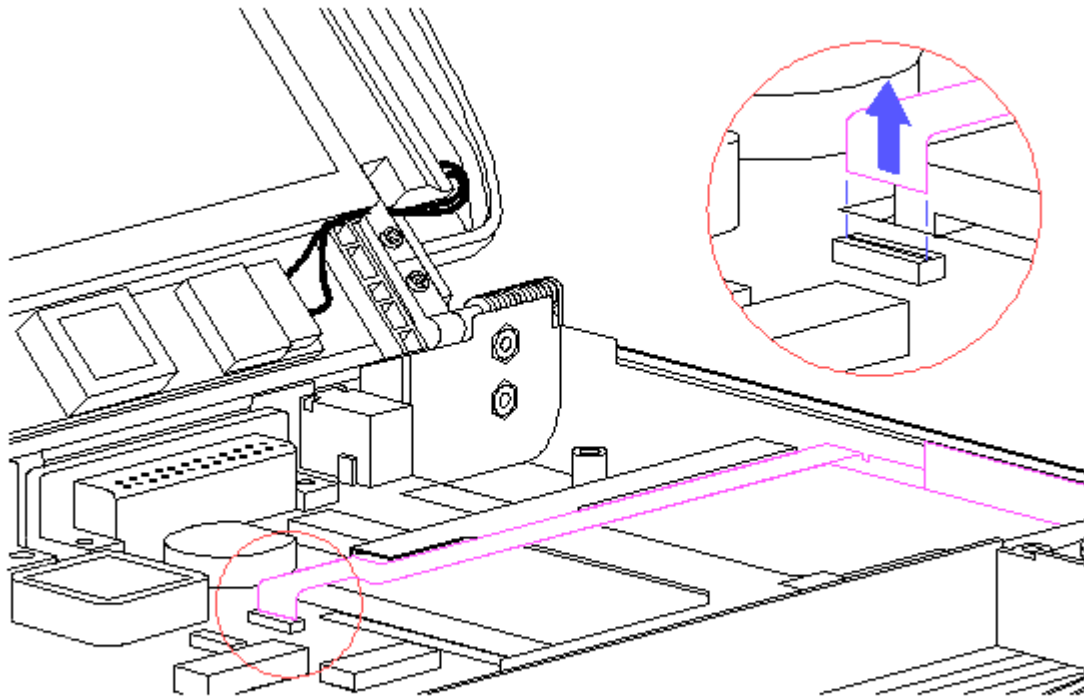
Figure 3-38. Disconnecting the Trackball Cable from the System Board

7. Remove the trackball, speaker, and cable assembly. Unplug the trackball
   from the cable/buttons/speaker assembly (Figure 3-39).
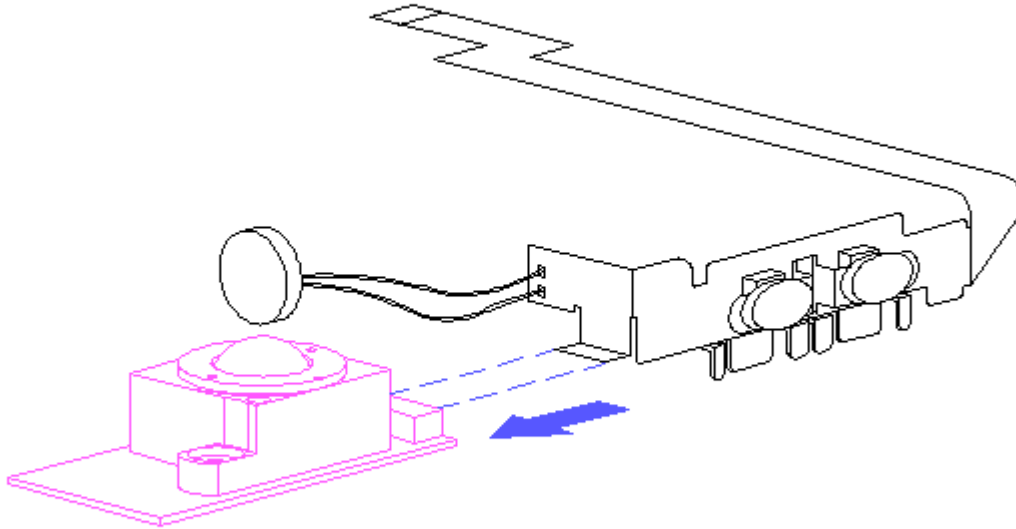
Figure 3-39. Unplugging the Trackball

To replace the trackball/cable assembly, follow these steps:

1. Connect the trackball to the small tab on the cable assembly
   (Figure 3-40).
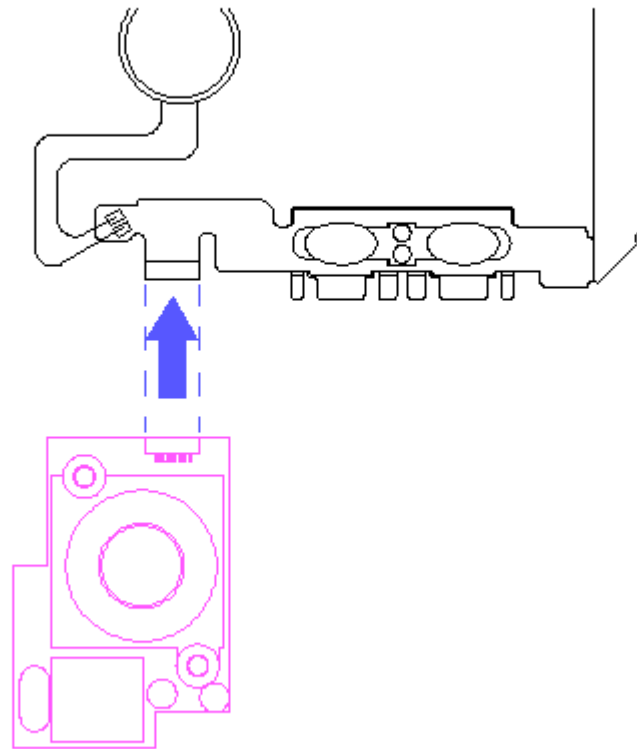
Figure 3-40. Connecting the Trackball to the Cable Assembly

2. Fold up the trackball and fold back the button section of the cable
   (Figure 3-41).

3. Place the speaker in the recessed area in the right front corner of the
   base enclosure and the buttons in the recessed area on the right and
   secure with two screws (Figure 3-41).

Figure 3-41. Placing the Trackball, Speaker, and Buttons in the Base Enclosure

4. Route the speaker wires over the trackball and around the base enclosure
   screw hole (Figure 3-42).

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> CAUTION <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

The trackball cable and speaker wires must be routed carefully to prevent
them from being pinched when the CPU cover is replaced.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>><<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
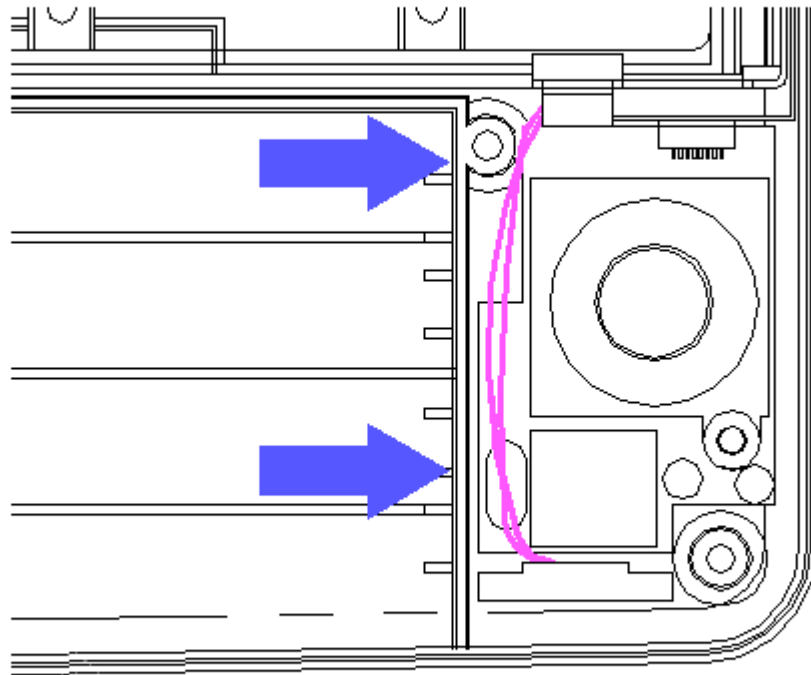
Figure 3-42. Routing the Speaker Wires

5. Route the folded portion of the trackball cable behind and over the hard
   drive. Plug the cable into the system board LIF connector (Figure 3-43).
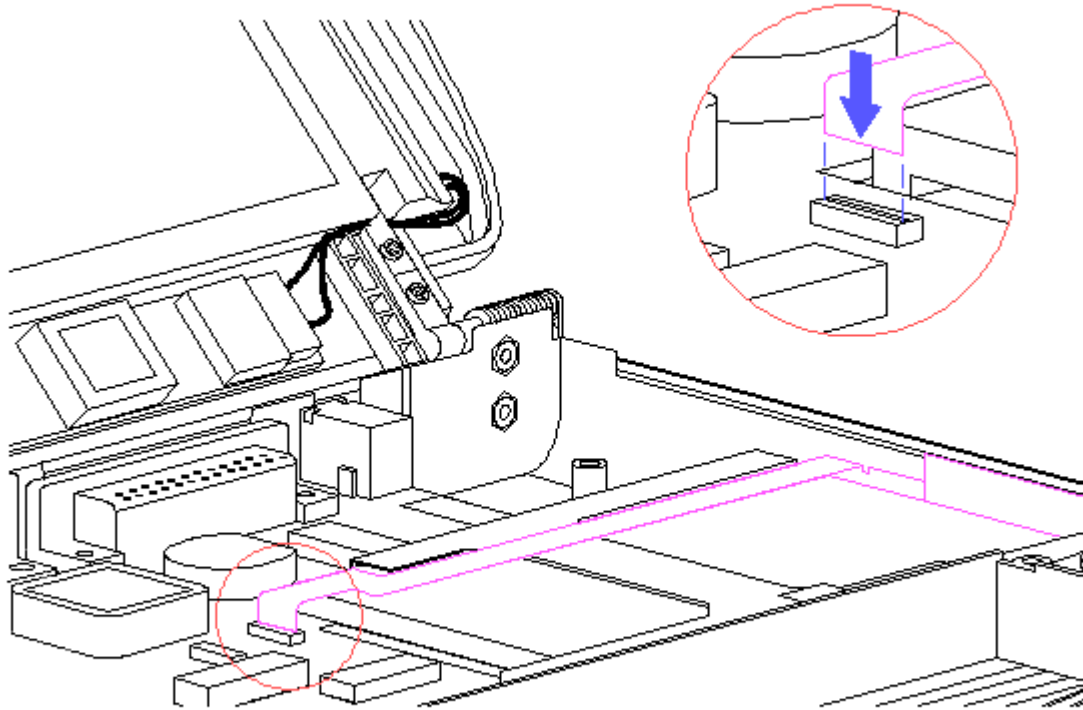
Figure 3-43. Routing and Connecting the Trackball Cable

Chapter 3.10 Removing The Hard Drive

To remove the hard drive, follow these steps:

1. Remove the battery pack (Section 3.4).

2. Remove the display bezel (Figures 3-5 and 3-7).

3. Remove the CPU cover (Section 3.5).

4. Remove the keyboard (Section 3.6).

5. Disconnect the trackball cable from the system board, but do not remove
   the trackball cable assembly completely (Section 3.9).

6. Remove the hard drive and bracket assembly from the system chassis by
   gently sliding the hard drive bracket horizontally off the system board
   connector (Figure 3-44).

IMPORTANT: Do not pull up on the hard drive before the system board
           connector and drive connector are disengaged.

7. After the connectors separate, lift the hard drive and the bracket
   straight up and out of the computer (Figure 3-44).
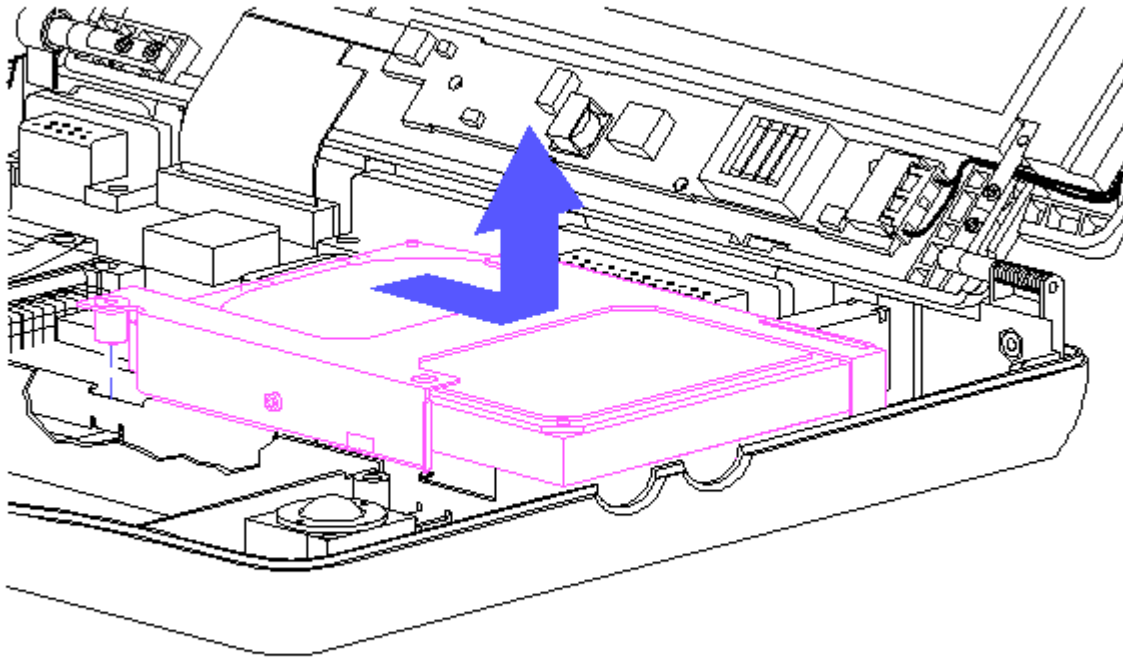
Figure 3-44. Removing the Hard Drive

8. To remove the hard drive bracket from the hard drive, with a P1
   screwdriver, remove the three screws from the sides of the bracket and
   slip the hard drive out of the bracket. (Figure 3-45).

IMPORTANT: Ensure that the screwdriver tip fits the recess properly or
           damage may occur to the screw head.

Figure 3-45. Removing the Hard Drive Bracket from the Hard Drive

To replace the hard drive, follow these steps:

1. Place the hard drive inside the hard drive bracket and align the holes
   on the side.

2. Align the hard drive inside the bracket by inserting the screws into the
   holes, then tightening the screws.

3. Slide the hard drive bracket into the system chassis.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> CAUTION <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

To prevent damage to the system board connectors ensure that the hard drive
is aligned correctly.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>><<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

Chapter 3.11 Removing The System Board

Before you can remove the system board, you must remove the optional memory
expansion board, optional base unit, and the optional PCMCIA external
drive, if applicable.

To remove the system board, follow these steps:

1. Remove the battery pack (Section 3.4).

2. Remove the display bezel (Figures 3-5 and 3-6)

3. Remove the CPU cover (Section 3.5).

4. Remove the keyboard (Section 3.6).

5. Remove the power supply (Section 3.8).

6. Remove the trackball (Section 3.9).

7. Remove the hard drive (Section 3.10).

8. Using a hex socket driver, remove the six screw locks from the rear of
    the computer that secure the connectors to the chassis (Figure 3-46).
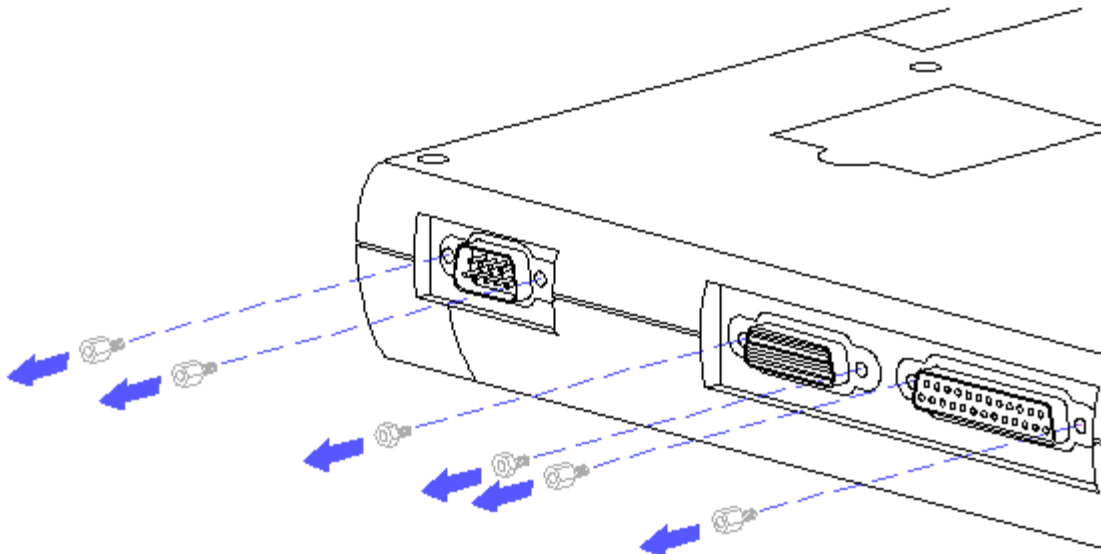
Figure 3-46. Removing the Six Screw Locks

9. Open the computer and remove the two remaining standoffs from the system
    board with a hex socket driver (Figure 3-47).
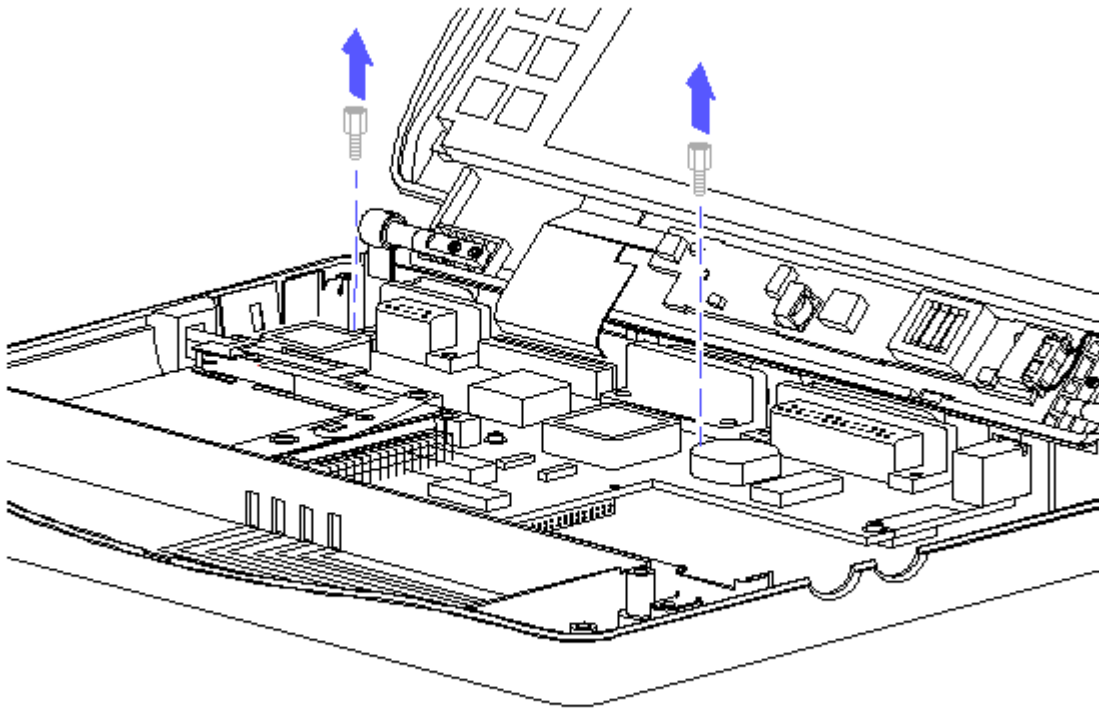
Figure 3-47. Removing the Standoffs

10. Remove the two Phillips screws from the PCMCIA rails (Figure 3-48).
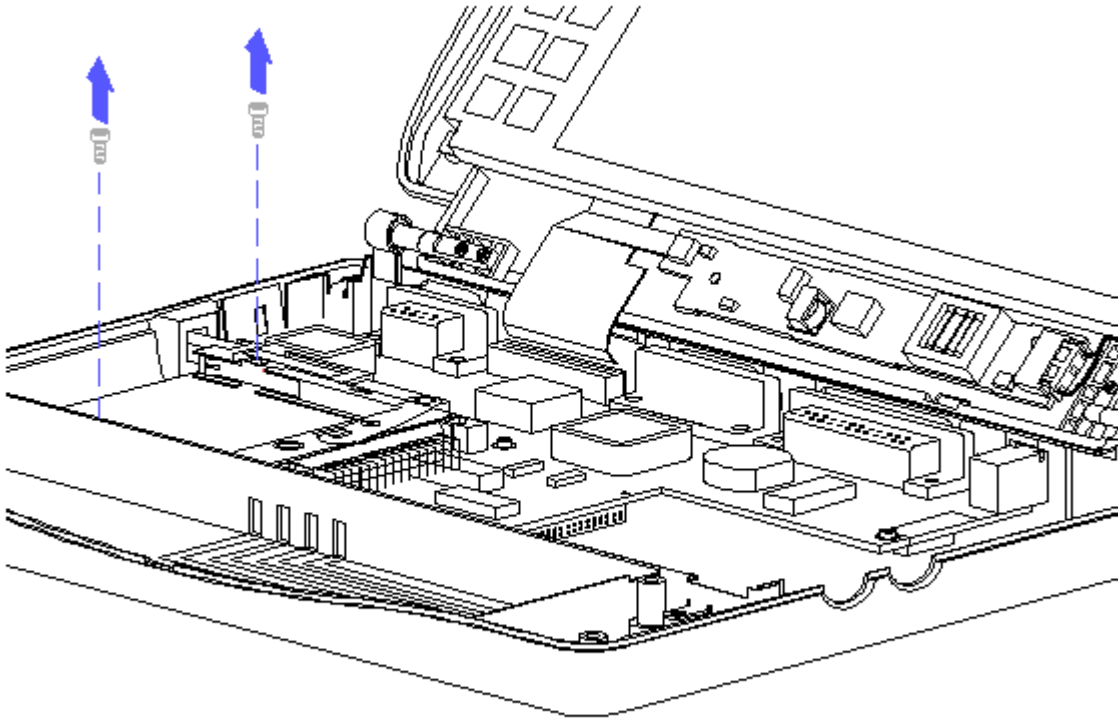
Figure 3-48. Removing the Screws from the PCMCIA Rails

11. Remove the three remaining screws from the system board (Figure 3-49).

NOTE: An insulator must be present under the center screw. If the insulator
      is not present, order a new system board.
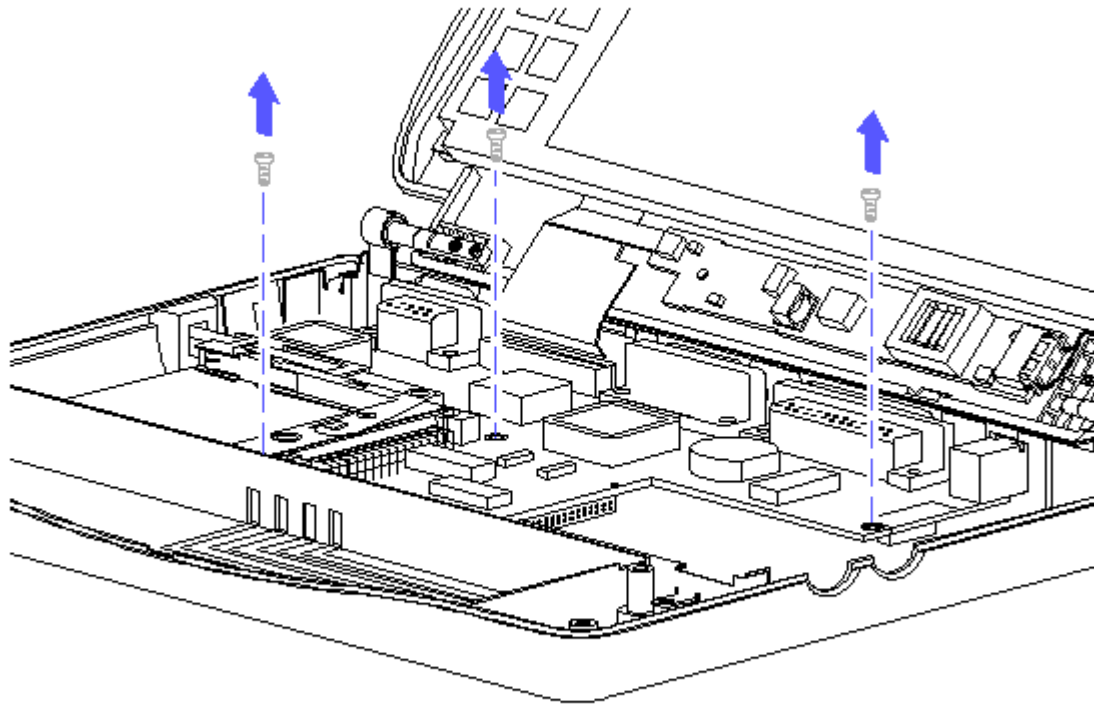
Figure 3-49. Removing the Remaining Screws from the System Board

12. Rotate the system board out of the system chassis (Figure 3-50).
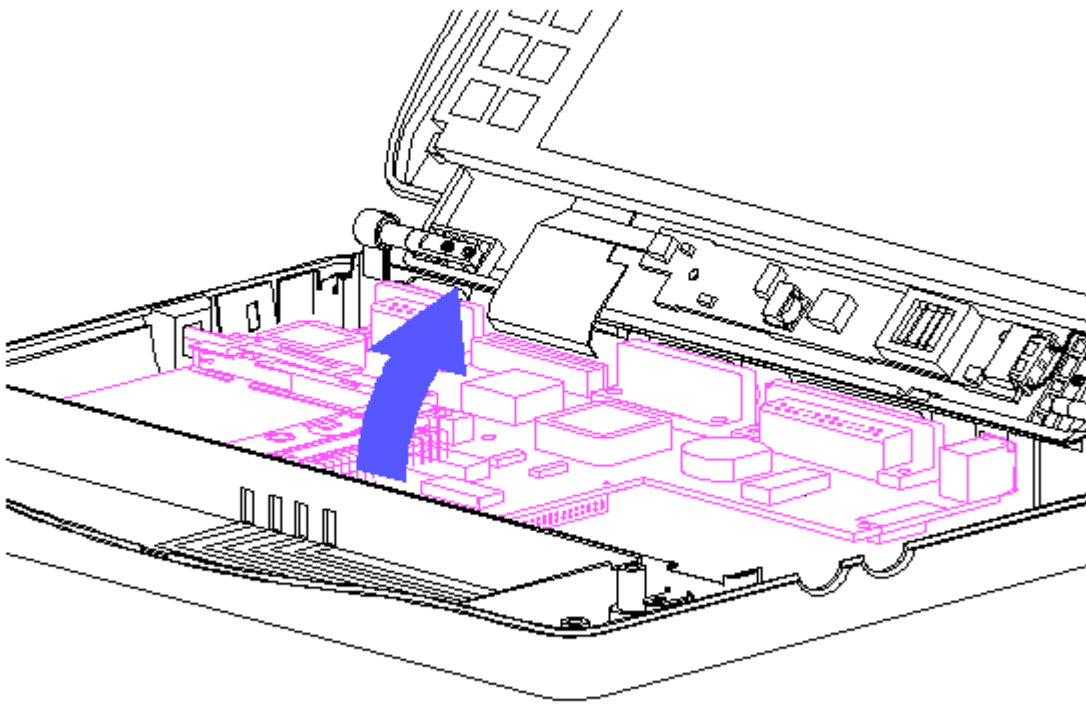
Figure 3-50. Removing the System Board

13. Slide the PCMCIA rails out of the system board (Figure 3-51).
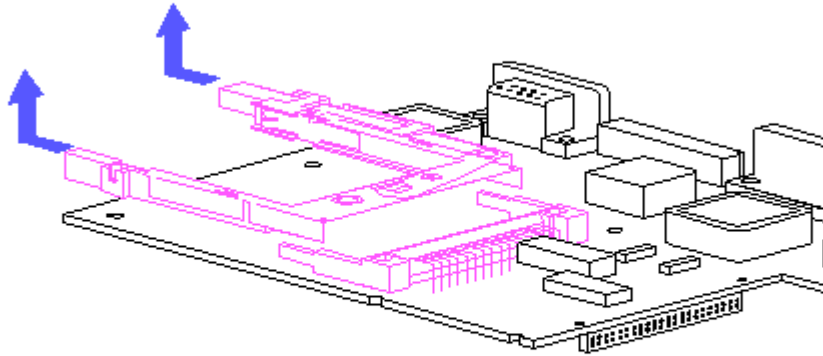
Figure 3-51. Removing the PCMCIA Rails

To replace the system board, reverse the previous steps.

Real Time Clock Battery

To remove the real time clock battery, follow these steps:

1. Remove the display bezel (Figures 3-5 and 3-6).

2. Remove the CPU cover (Section 3.5).

3. Remove the keyboard (Section 3.6).

4. Remove the real time clock battery from the system board by inserting a
   nonconductive probe into the battery holder and pushing back on the
   battery to release it (Figure 3-52).
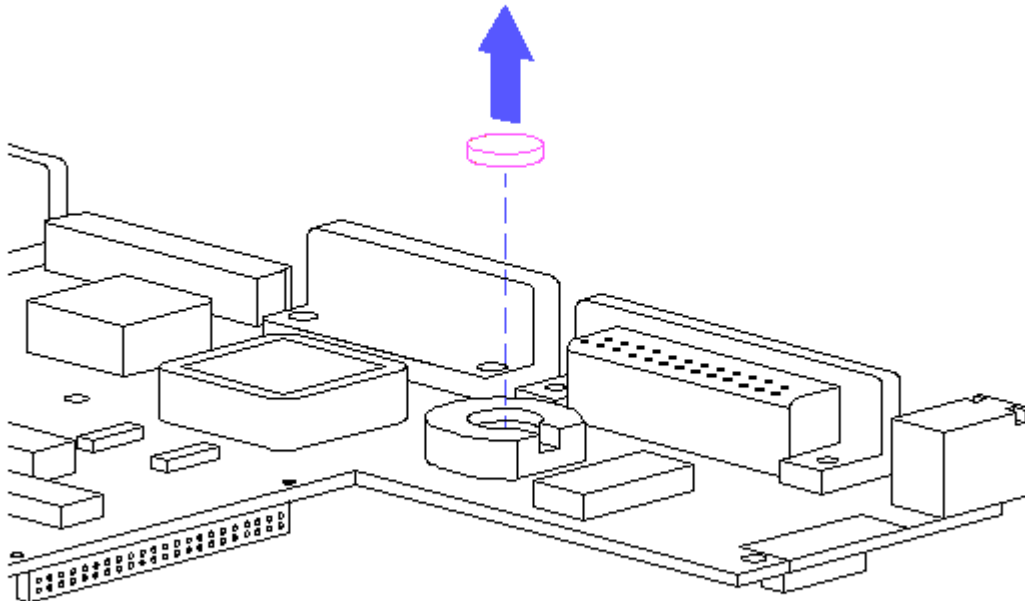
Figure 3-52. Removing the Real Time Clock Battery

To replace the real time clock battery, reverse the previous steps.

Chapter 3.12 Removing The Chassis

To remove the system chassis, follow these steps:

1. Remove the battery pack (Section 3.4).

2. Remove the display bezel (Figures 3-5 and 3-6).

3. Remove the CPU cover (Section 3.5).

4. Remove the keyboard (Section 3.6).

5. Remove the VGA backlit display.

6. Remove the power supply (Section 3.8).

7. Remove the trackball (Section 3.9).

8. Remove the hard drive (Section 3.10).

9. Remove the system board (Section 3.10).

10. Remove the system chassis by gently separating it from the computer

base and lifting it out (Figure 3-53).
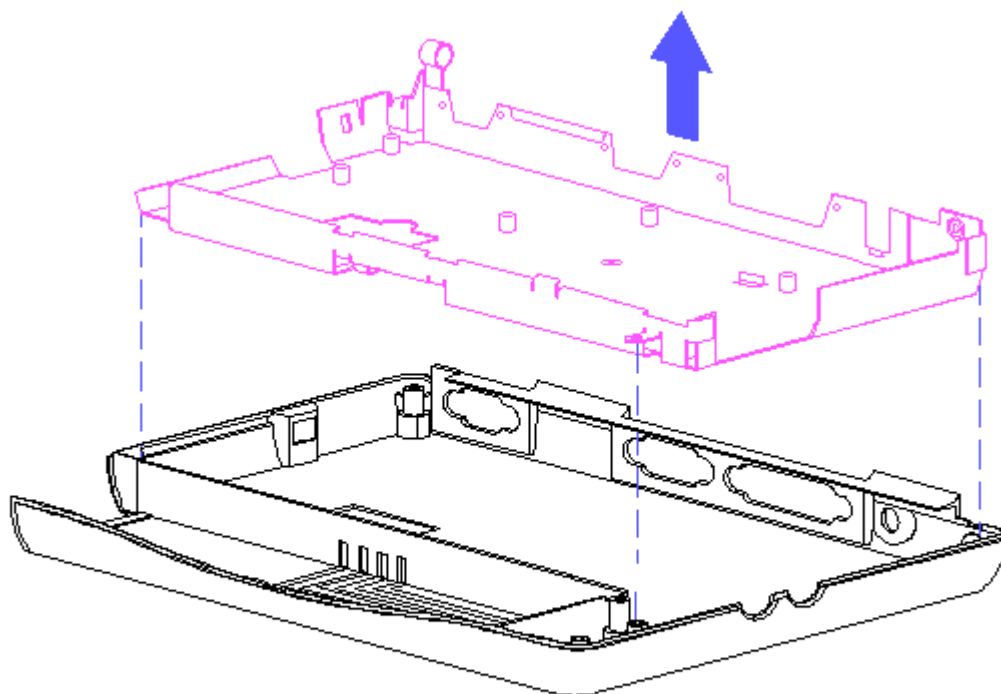
Figure 3-53. Removing the System Chassis

To replace the system chassis, reverse the previous steps.

Chapter 4. Power On Self Test (POST)

Chapter 4.0 Introduction

This section lists the assemblies checked by the Power On Self Test (POST).
The section also includes procedures for clearing the power on password.

Chapter 4.1 POST

POST is a series of diagnostic tests that run automatically when the system
is turned on. POST checks the following assemblies to ensure that the
computer system is functioning properly:

o Keyboard
o Power supply
o System board
o System memory
o Memory expansion board
o Controller circuitry
o VGA display
o Hard drive

POST also detects the type of mass storage device installed in the
computer. If POST finds an error in the system, an error condition is
indicated by an audible and/or visual message. Refer to Chapter 5, "Error
Messages and Codes," for more information about the error codes and a

recommended course of action.

Chapter 4.2 Preliminary Steps

If you encounter an error condition, complete the following steps before
starting troubleshooting procedures:

1. Turn off the computer by holding down the FN key and pressing the power
   button. Do not remove the battery pack.

2. Remove the computer from the base unit, if applicable. Connect the AC
   Adapter. Connect the printer if you want to test it or use it to log
   error messages.

3. Install all appropriate loopback plugs and terminating plugs for
   complete testing.

4. Turn on the computer by pressing the power button.

5. Clear the power on password, if preset by the user.

   You will know that the power on password is set when a key icon (o--m)
   appears on the screen when POST completes. If this occurs, you must
   enter the password to continue. If you enter the password incorrectly,
   a broken key icon (o-x-m) is displayed. Try again. After three
   unsuccessful tries, you must turn off the computer, then on again before

you can continue. To delete the password, type the current password immediately followed by a backslash (\) and press the Enter key.

NOTE: If you don't have access to the power on password, you must disable the power on password by removing the real time clock battery. Refer to section 3.11, "Real Time Clock Battery," for removal procedures. Once the real time clock battery is removed, short the real time clock battery terminals in the processor board by touching the battery terminals with two ends of a wire. Replace all components, and resume POST.

Chapter 5. Error Messages and Codes

Chapter 5.0 Introduction

This chapter contains Power On Self Test (POST) messages, Diagnostic error codes, and memory error codes.

The messages and codes appear in tables that include a description of the error, the probable cause, and the recommended action that should be taken to resolve the error condition.

Chapter 5.1 Power On Self Test Messages

An error message results if a problem is encountered from the Power On Self Test utility. This utility runs automatically when the system is turned on.

Table 5-1 lists the messages for POST, the audible (beep) message, probable cause, and recommended action.

```
Table 5-1. Power On Self Test Messages
===========================================================================
Message:            101 ROM Error

Beeps:              1 Long, 1 Short (Beeps can be disabled by the user from
                    the Computer Setup utility.

Probable Cause:     ROM checksum option

Recommended Action: 1. Verify the correct ROM.
                    2. Replace the system board.
---------------------------------------------------------------------------
Message:            101 ROM Error

Beeps:              1 Long, 1 Short (Beeps can be disabled by the user from
                    the Computer Setup utility.

Probable Cause:     System ROM

Recommended Action: 1. Verify the correct ROM.
                    2. Replace the system board.
---------------------------------------------------------------------------
Message:            101 ROM Error

Beeps:              1 Long, 1 Short (Beeps can be disabled by the user from
                    the Computer Setup utility.

Probable Cause:     VDU ROM checksum error

Recommended Action: 1. Verify the correct ROM.
                    2. Replace the system board.
---------------------------------------------------------------------------
Message:            101 ROM Error

Beeps:              1 Long, 1 Short (Beeps can be disabled by the user from
                    the Computer Setup utility.
```

```
Probable Cause:      System, ROM checksum error

Recommended Action:  1. Verify the correct ROM.
                     2. Replace the system board.
--------------------------------------------------------------------------
Message:             101 ROM Error

Beeps:               1 Long, 1 Short (Beeps can be disabled by the user from
                     the Computer Setup utility.

Probable Cause:      Second system ROM does not pass the checksum

Recommended Action:  1. Verify the correct ROM.
                     2. Replace the system board.
--------------------------------------------------------------------------
Message:             101 ROM Error

Beeps:               1 Long, 1 Short (Beeps can be disabled by the user from
                     the Computer Setup utility.

Probable Cause:      Option ROM does not pass the checksum

Recommended Action:  1. Verify the correct ROM.
                     2. Remove PCMCIA card and retest.
                     3. Replace the system board.
--------------------------------------------------------------------------
Message:             102 System Board Failure

Beeps:               None (Beeps can be disabled by the user from the
                     Computer Setup utility.

Probable Cause:      System Board

Recommended Action:  Replace the system board.
--------------------------------------------------------------------------
Message:             102 System Board Failure

Beeps:               None (Beeps can be disabled by the user from the
                     Computer Setup utility.

Probable Cause:      Counter zero check failed

Recommended Action:  Replace the system board.
--------------------------------------------------------------------------
Message:             102 System Board Failure

Beeps:               None (Beeps can be disabled by the user from the
                     Computer Setup utility.

Probable Cause:      Refresh bit does not toggle

Recommended Action:  Replace the system board.
--------------------------------------------------------------------------
Message:             102 System Board Failure

Beeps:               None (Beeps can be disabled by the user from the
                     Computer Setup utility.

Probable Cause:      CMOS read/write failed
```

```
Recommended Action: Replace the system board.
-------------------------------------------------------------------------------
Message:            102 System Board Failure

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     DMA register read/write test failed

Recommended Action: Replace the system board.
-------------------------------------------------------------------------------
Message:            102 System Board Failure

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Protected mode test failed enabling/disabling A20 or
                    entering/existing protected mode

Recommended Action: Replace the system board.
-------------------------------------------------------------------------------
Message:            102 System Board Failure

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Failed entering protected mode for memory test

Recommended Action: Replace the system board.
-------------------------------------------------------------------------------
Message:            102 System Board Failure

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Test of timer zero interrupt failed (no interrupt
                    occurred)

Recommended Action: Replace the system board.
-------------------------------------------------------------------------------
Message:            162 System Options Not Set

Beeps:              2 Short (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Configuration incorrect

Recommended Action: Run Computer Setup.
-------------------------------------------------------------------------------
Message:            162 System Options Not Set

Beeps:              2 Short (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     CMOS reflects that an invalid configuration has been
                    set

Recommended Action: Run Computer Setup.
-------------------------------------------------------------------------------
```

```
Message:             164 Memory Size Error

Beeps:               2 Short (Beeps can be disabled by the user from the
                     Computer Setup utility.

Probable Cause:      Increase in the memory size found compared to the one
                     stored in CMOS

Recommended Action: Run Computer Setup.
-----------------------------------------------------------------------------
Message:             164 Memory Size Error

Beeps:               2 Short (Beeps can be disabled by the user from the
                     Computer Setup utility.

Probable Cause:      Decrease in the memory size found compared to the one
                     stored in CMOS

Recommended Action: Run Computer Setup.
-----------------------------------------------------------------------------
Message:             167 Lost Power

Beeps:               2 Short (Beeps can be disabled by the user from the
                     Computer Setup utility.

Probable Cause:      Real time clock/calendar battery

Recommended Action: Replace real time clock battery.
-----------------------------------------------------------------------------
Message:             167 Lost Power

Beeps:               2 Short (Beeps can be disabled by the user from the
                     Computer Setup utility.

Probable Cause:      RTC has lost power. This only shows up on a cold boot,
                     no beeps

Recommended Action: Replace real time clock battery.
-----------------------------------------------------------------------------
Message:             XX000YZZ 201 Memory Error

Beeps:               None (Beeps can be disabled by the user from the
                     Computer Setup utility.

Probable Cause:      RAM failure

Recommended Action: 1. Replace the memory expansion board (Figure 5-1).
                    2. Replace the system board.
-----------------------------------------------------------------------------
Message:             XX000YZZ 201 Memory Error

Beeps:               None (Beeps can be disabled by the user from the
                     Computer Setup utility.

Probable Cause:      Memory test data error

Recommended Action: 1. Replace the memory expansion board (Figure 5-1).
                    2. Replace the system board.
-----------------------------------------------------------------------------
Message:             XX000YZZ 201 Memory Error
```

```
Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     XX000YZZ RAM failure

Recommended Action: Replace the system board.
-------------------------------------------------------------------------
Message:            203 Memory Address Error

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Memory test high address line error

Recommended Action: Replace the memory expansion board (Figure 5-1).
-------------------------------------------------------------------------
Message:            205 Memory Error

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Cache memory error

Recommended Action: 1. Remove PCMCIA card and retest.
                    2. Remove memory expansion board and retest
                       (Figure 5-1).
                    3. Replace the system board.
-------------------------------------------------------------------------
Message:            205 Memory Error

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Cache memory data error

Recommended Action: 1. Remove PCMCIA card and retest.
                    2. Remove memory expansion board and retest
                       (Figure 5-1).
                    3. Replace the system board.
-------------------------------------------------------------------------
Message:            208 Invalid Memory Expansion Board

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Memory expansion board is an invalid type


Recommended Action: Replace memory expansion board (Figure 5-1).
-------------------------------------------------------------------------
```
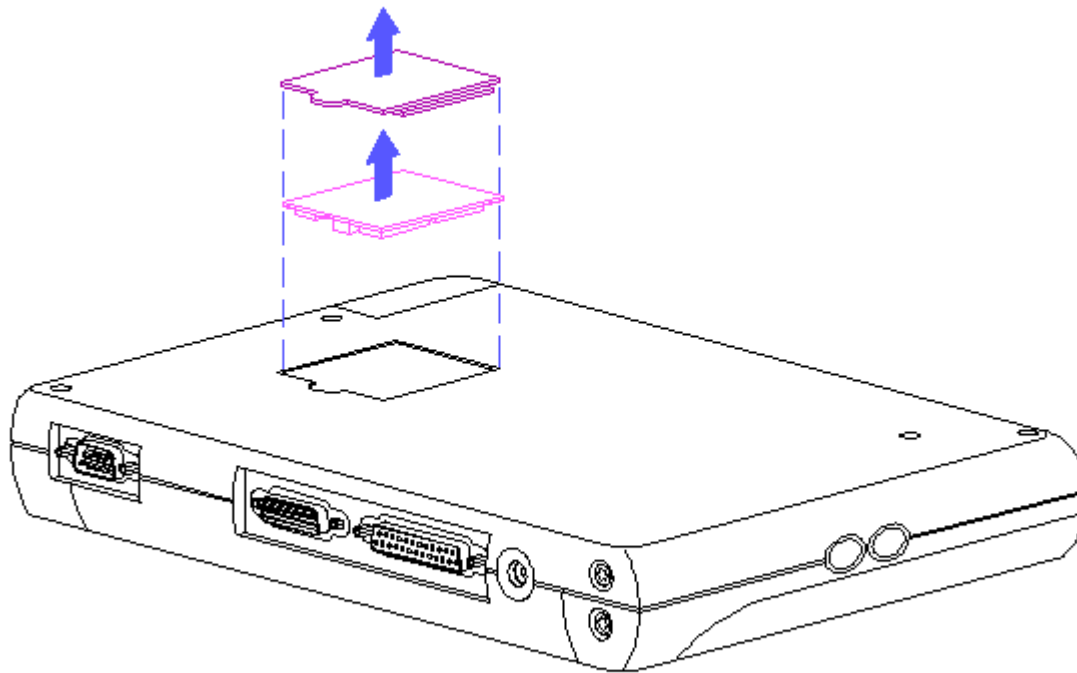
Figure 5-1. Memory Expansion Board Location

```
-----------------------------------------------------------------------------
Message:             301 Keyboard Error

Beeps:               None (Beeps can be disabled by the user from the
                     Computer Setup utility.

Probable Cause:      Keyboard

Recommended Action: Replace the keyboard.
-----------------------------------------------------------------------------
Message:             301 Keyboard Error

Beeps:               None (Beeps can be disabled by the user from the
                     Computer Setup utility.

Probable Cause:      Keyboard or test fixture installed

Recommended Action: Replace the keyboard.
-----------------------------------------------------------------------------
Message:             301 Keyboard Error

Beeps:               None (Beeps can be disabled by the user from the
                     Computer Setup utility.

Probable Cause:      Keyboard loopback plug installed
```

```
Recommended Action: Replace the keyboard.
------------------------------------------------------------------------
Message:            301 Keyboard Error

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Bad results from keyboard test

Recommended Action: Replace the keyboard.
------------------------------------------------------------------------
Message:            301 Keyboard Error

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Keyboard failed interface test

Recommended Action: Replace the keyboard.
------------------------------------------------------------------------
Message:            303 Keyboard Controller Error

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     8042 error clearing the output buffer

Recommended Action: 1. Replace the keyboard
                    2. Replace the trackball and trackball cable.
                    3. Replace the system board.
------------------------------------------------------------------------
Message:            303 Keyboard Controller Error

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Keyboard controller (8042) self test failed

Recommended Action: 1. Replace the keyboard.
                    2. Replace the trackball and trackball cable.
                    3. Replace the system board.
------------------------------------------------------------------------
Message:            303 Keyboard Controller Error

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     System board keyboard controller

Recommended Action: 1. Replace the keyboard.
                    2. Replace the trackball and trackball cable.
                    3. Replace the system board.
------------------------------------------------------------------------
Message:            303 Keyboard Controller Error

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Reset of A20 failed
```

```
Recommended Action: 1. Replace the keyboard.
                    2. Replace the trackball and trackball cable.
                    3. Replace the system board.
-------------------------------------------------------------------------------
Message:            304 Keyboard of System Unit Error

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Keyboard

Recommended Action: 1. Replace the keyboard.
                    2. Replace the trackball and trackball cable.
                    3. Replace the system board.
-------------------------------------------------------------------------------
Message:            304 Keyboard of System Unit Error

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Reset of keyboard failed

Recommended Action: 1. Replace the keyboard.
                    2. Replace the trackball and trackball cable.
                    3. Replace the system board.
-------------------------------------------------------------------------------
Message:            601 Diskette Controller Error

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Diskette controller circuitry

Recommended Action: 1. Run Computer Checkup (TEST).
                    2. Replace PCMCIA external diskette drive.
                    3. Replace the system board.
-------------------------------------------------------------------------------
Message:            1125 Internal Serial Port Failure

Beeps:              2 Short (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Internal serial port failed to respond

Recommended Action: Replace the system board.
-------------------------------------------------------------------------------
Message:            1780 Primary Hard Drive 0 Failure

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Disk 0 failed to respond

Recommended Action: 1. Run Computer Checkup (TEST).
                    2. Replace the hard drive.
-------------------------------------------------------------------------------
Message:            1780 Primary Hard Drive 0 Failure

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.
```

```
Probable Cause:     Hard drive format error

Recommended Action: 1. Run Computer Checkup (TEST).
                    2. Replace the hard drive.
-----------------------------------------------------------------------------
Message:            1781 Disk 1 Failure

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Disk 1 failed to respond

Recommended Action: 1. Run Computer Checkup (TEST).
                    2. Replace the drive.
-----------------------------------------------------------------------------
Message:            1781 Disk 1 Failure

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Hard drive format error

Recommended Action: 1. Run Computer Checkup (TEST).
                    2. Replace the drive.
-----------------------------------------------------------------------------
Message:            1782 Disk Controller Failure

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Reset of the hard drive subsystem failed

Recommended Action: 1. Run Computer Checkup (TEST).
                    2. Replace the drive.
                    3. Replace the system board.
-----------------------------------------------------------------------------
Message:            1790 Disk 0 Error

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Disk 0 responded with an error

Recommended Action: 1. Run Computer Checkup (TEST).
                    2. Replace the drive.
                    3. Replace the system board.
-----------------------------------------------------------------------------
Message:            1790 Disk 0 Error

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Hard Drive Error

Recommended Action: 1. Run Computer Checkup (TEST).
                    2. Replace the drive.
                    3. Replace the system board.
-----------------------------------------------------------------------------
Message:            1791 Disk 1 Error
```

```
Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Disk 1 responded with an error

Recommended Action: 1. Run Computer Checkup (TEST).
                    2. Replace the drive.
                    3. Replace the system board.
------------------------------------------------------------------------------
Message:            1791 Disk 1 Error

Beeps:              None (Beeps can be disabled by the user from the
                    Computer Setup utility.

Probable Cause:     Hard Drive 1 Error

Recommended Action: 1. Run Computer Checkup (TEST).
                    2. Replace the drive.
                    3. Replace the system board.
------------------------------------------------------------------------------
Message:            None

Beeps:              1 Short or 2 Short (Beeps can be disabled by the user
                    from the Computer Setup utility.

Probable Cause:     Power on successful

Recommended Action: None
------------------------------------------------------------------------------
Message:            None

Beeps:              1 Short or 2 Short (Beeps can be disabled by the user
                    from the Computer Setup utility.

Probable Cause:     Resume= "F1" key as indicated to continue


Recommended Action: None
==============================================================================
```

Chapter 5.2 Diagnostic Error Codes

```
Diagnostic error codes occur if the system recognizes a problem while
running the Computer Checkup (TEST). These error codes help identify
possible defective subassemblies.

Tables 5-2 through 5-15 list possible error codes, a description of the
error condition, and the action required to resolve the error condition.


IMPORTANT: Retest the system after completing each step. If the problem has
           been resolved, do not proceed with the remaining steps.


For assistance in the removal and replacement of a particular subassembly,
see Chapter 3, "Removal and Replacement Procedures."
```

Table 5-2. System Test Error Codes
===
Error Code   Description   Recommended Action
===
101 - xx   CPU test failed   Replace the system board and retest.
----
103 - xx   DMA page registers test Replace the system board and retest.
              failed
----
104 - xx   Interrupt controller   The following steps apply to
              master test failed   104 - xx through 105 - xx error
                                       codes:
105 - xx   Port 61 error
                                       Replace the system board and retest.
----
106 - xx   Keyboard controller   Replace the system board and retest.
              self test failed
----
107 - xx   CMOS RAM test   The following steps apply to
              failed   107 - xx through 113 - xx error
                                       codes:
108 - xx   CMOS interrupt test
              failed   Replace the system board and retest.

109 - xx   CMOS clock load data
              test failed

110 - xx   Programmable timer
              load data test failed

111 - xx   Refresh detect test
              failed

112 - xx   Speed test slow mode
              out of range

113 - xx   Protected mode test
              failed
----
114 - 01   Speaker test failed   1. Check system configuration.
                                       2. Verify cable connections.
                                       3. Replace the system board and
                                          retest.
----
116 - xx   Cache test failed   Replace the system board and retest.
===

Table 5-3. Memory Test Error Codes
===
Error Code   Description   Recommended Action
===
200 - xx   Invalid memory   Reinsert memory expansion board
              configuration   (Figure 5-1).
----
201 - xx   Memory machine ID test   The following steps apply to
              failed   201 - xx through 202 - xx error
                                       codes:
202 - xx   Memory system ROM
              checksum failed   1. Replace the memory expansion
                                          board and retest (Figure 5-1).

```
                                     2. Replace the system board and
                                        retest.
---------------------------------------------------------------------
203 - xx      Memory write/read test   The following steps apply to
              failed                   203 - xx through 211 - xx error
                                       codes:
204 - xx      Memory address test
              failed                   If you don't have a memory expansion
                                       board, replace the system board.
210 - xx      Increment pattern test
              failed                   If you have a memory expansion
                                       board:
211 - xx      Random pattern test
              failed                   Replace the memory expansion board
                                       and retest (Figure 5-1).
=====================================================================

Table 5-4. Keyboard Test Error Codes
=====================================================================
Error Code    Description              Recommended Action
=====================================================================
301 - xx      Keyboard short test      The following steps apply to
              8042 self test failed    301 - xx through 304 - xx error
                                       codes:
302 - xx      Keyboard long test
              failed                   1. Check the keyboard connection.
                                          If an external keyboard is
303 - xx      Keyboard LED test,          disconnected, turn off the
              8042 self test failed       computer and connect the
                                          keyboard.
304 - xx      Keyboard typematic       2. Replace the keyboard and retest.
              test failed              3. Replace the system board and
                                          retest.
=====================================================================

Table 5-5. Parallel Printer Test Error Codes
=====================================================================
Error Code    Description              Recommended Action
=====================================================================
401 - xx      Printer failed or not    The following steps apply to
              connected                401 - xx through 498 - xx error
                                       codes:
402 - xx      Printer data register
              failed                   1. Connect the printer.
                                       2. Check the power to the printer.
403 - xx      Printer pattern test     3. Install the loopback connector
              failed                      and retest.
                                       4. Replace the printer cable and
498 - xx      Printer failed or not       retest.
              connected                5. Replace the system board.
=====================================================================

Table 5-6. PCMCIA External Diskette Drive Test
=====================================================================
Error Code    Description              Recommended Action
=====================================================================
600 - xx      Diskette ID drive types  The following steps apply to
              test failed              600 - xx through 698 - xx error
                                       codes:
601 - xx      Diskette format failed   1. Replace the diskette and retest.
```

```
                                         2. Check and/or replace the diskette
602 - xx     Diskette read test             power and signal cables and
             failed                         PCMCIA external diskette drive.
                                         3. Replace the diskette drive and
603 - xx     Diskette write, read,          retest.
             compare test failed        4. Replace the system board and
                                            retest.
604 - xx     Diskette random seek
             test failed

605 - xx     Diskette ID media
             failed

606 - xx     Diskette speed test
             failed

607 - xx     Diskette wrap test
             failed

608 - xx     Diskette write protect
             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     1. Replace diskette.
             ID error                 2. Run Computer Setup.
=========================================================================

Table 5-7. Serial Test Error Codes
=========================================================================
Error Code   Description                 Recommended Action
=========================================================================
1101 - xx    Serial Port test            The following steps apply to
                                         1101 - xx through 1109 - xx error
1109 - xx    Clock Register test         codes:

                                         Replace the system board and retest.
=========================================================================

Table 5-8. PCMCIA Modem Test Error Codes
=========================================================================
Error Code   Description                 Recommended Action
=========================================================================
1201 - xx    Modem Internal              The following steps apply to
             Loopback Test               1201 - xx through 1210 - xx error
                                         codes:
1202 - xx    Modem Time Out Test
                                         1. Refer to modem documentation for
1203 - xx    Modem External                 correct Computer Setup
             Termination Test              procedures.
                                         2. Check the modem line.
```

```
1204 - xx    Modem Auto Originate    3. Replace the modem and retest.
             Test

1206 - xx    Dial Multifrequency
             Tone Test

1210 - xx    Modem Direct Connect
             Test
========================================================================

Table 5-9. Hard Drive Test Error Codes
========================================================================
Error Code   Description              Recommended Action
========================================================================
1700 - xx    Hard ID drive types      The following steps apply tm
             test failed              1700 - xx through 1799 - xx error
                                      codes:
1701 - xx    Hard drive format
             test failed              1. Run Computer Setup and verify
                                         drive type.
1702 - xx    Hard drive read          2. Replace the hard drive and
             test failed                 retest.
                                      3. Replace the system board and
1703 - xx    Hard drive write/read/      retest.
             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

1714 - xx    Hard drive file write
             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

1799 - xx     Invalid hard drive
                 type failed
---------------------------------------------------------------------------
* Error Correction Code
===========================================================================

Table 5-10. Video Test Error Codes
===========================================================================
Error Code   Description                Recommended Action
===========================================================================
2402 - xx     Video memory test          The following recommendation applies
                 failed                      to 2402 - xx through 2456 - xx error
                                              codes:
2403 - xx     Video attribute test
                 failed                      Replace the system board.

2404 - xx     Video character set
                 test failed

2405 - xx     Video 80 x 25 mode
                 9 x 14 character
                 cell test failed

2406 - xx     Video 80 x 25 mode
                 8 x 8 character
                 cell test failed

2407 - xx     Video 40 x 25 mode
                 test failed

2408 - xx     Video 320 x 200 mode
                 color set 0 test
                 failed

2409 - xx     Video 320 x 200 mode
                 color set 1 test failed

2410 - xx     Video 640 x 200 mode
                 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 x 200
              graphics mode test
              failed

2422 - xx     ECG/VGC 640 x 350
              16 color set test
              failed

2423 - xx     ECG/VGC 640 x 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 x 480 graphics
              test failure

2432 - xx     320 x 200 graphics
              (256 color mode)
              test failure

2448 - xx     Advanced VGA
              Controller test
              failed

2451 - xx     132 column Advanced
              VGA test failed

2456 - xx     Advanced VGA 256 color
              test failed
-------------------------------------------------------------------------
2458 - xx     Advanced VGA BitBLT       The following recommendation applies
              test                      to 2458 - xx through 2480 - xx error
                                        codes:
2468 - xx     Advanced VGA DAC test
                                        Replace the system board and retest.
2477 - xx     Advanced VGA data path
              test

2478 - xx     Advanced VGA BitBLT
              test

2480 - xx     Advanced VGA Linedraw
              test
=========================================================================

Table 5-11. Pointing Device Interface Test Error Codes
=========================================================================
Error Code    Description               Recommended Action
=========================================================================
8601 - xx     Pointing Device           1. Replace with a working pointing
              Interface test failed        device and retest.
```

```
                              2. Replace the system board and
                                 retest.
===========================================================================

Table 5-12. Audio Test Error Codes
===========================================================================
Error Code    Description                Recommended Action
===========================================================================
3206 - xx     Audio System Internal      Replace the system board and retest.
              Error
===========================================================================
```

Chapter 6. Specifications

Chapter 6.0 Introduction

This chapter provides physical, environmental, and performance
specifications for the following Compaq Contura Aero Family of Personal
Computer subsystems:

o Computer
o VGA Display
o Hard Drives
o Internal Power Supply
o NiMH Battery Pack
o AC Adapter
o Base Unit
o External Diskette Drive

Chapter 6.1 System Unit

```
===============================================================================
                                  U.S.                  Metric
===============================================================================
Dimensions:
  Contura Aero 4/25
    Height                        1.53 in               3.81 cm
    Width                         10.25 in              26 cm
    Depth                         7.5 in                19 cm
  Contura Aero 4/33C
    Height                        1.7 in                4.32 cm
    Width                         10.25 in              26 cm
    Depth                         7.5 in                19 cm
-------------------------------------------------------------------------------
Weight (approximate):
  Contura Aero 4/25
    Model 84 (standard battery)   3.5 lbs               1.59 kg
    Model 84 (extended life)      3.9 lbs               1.77 kg
    Model 170 (standard battery)  3.6 lbs               1.63 kg
    Model 170 (extended life)     4.0 lbs               1.81 kg
  Contura Aero 4/33C
    Model 170                     4.3 lbs               1.95 kg
-------------------------------------------------------------------------------
Power Requirements                10.8V                 10.8V
-------------------------------------------------------------------------------
Environmental Requirements:
  Temperature
    Operating                     50oF to 104oF         10oC to 40oC
    Nonoperating                  -4oF to 140oF         -20oC to 60oC
-------------------------------------------------------------------------------
Relative Humidity (noncondensing):
  Operating                       10% to 90%            10% to 90%
  Nonoperating                    5% to 95%             5% to 95%
-------------------------------------------------------------------------------
Shock and Vibration
  Shock
   Operating                      10g, 11ms, half sine
```

```
   Nonoperating                         60g, 11ms, half sine

  Vibration
   Operating                            0.25g, 5-500 Hz 1/2 octave/min sweep,
                                        1 hour duration
   Nonoperating                         1.00g, 5-500 Hz 1/2 octave/min sweep,
                                        1 hour duration
-----------------------------------------------------------------------
Maximum Altitude (unpressurized):
  Operating                            10,000 ft            3,658m
  Nonoperating                         30,000 ft            12,192m
=======================================================================
```

Chapter 6.2 VGA Display

```
=======================================================================
                                  U.S.                  Metric
=======================================================================
Dimensions
  Height                          4.82 in                122.4 mm/12.24 cm
  Width                           6.42 in                163.2 mm/16.32 cm
-----------------------------------------------------------------------
Diagonal Size                     8.03 in                20.4 cm
-----------------------------------------------------------------------
Mounting                          Internal
-----------------------------------------------------------------------
Display                           MSTN Backlit LCD
-----------------------------------------------------------------------
Gray Scales                       16 High Resolution (640 x 480)
                                  64 Low Resolution (340 x 200)
-----------------------------------------------------------------------
Brightness/Contrast               Adjustable
-----------------------------------------------------------------------
Maximum Pixel Resolution          640 x 480
-----------------------------------------------------------------------
Character Display                 80 x 25
-----------------------------------------------------------------------
Frequency:
  Horizontal                      31.2 KHz (CRT mode) 32 KHz (LCD mode)
  Vertical                        125 Hz (60 VGA/70 CGA)
-----------------------------------------------------------------------
Display Inverter Board:
  Operating Voltage (Backlight)   +5.1V, +9V , +18.7V
  Operating Output Voltage        310 Vrms
  Maximum Input Power             1.8W
  Maximum Output Power            1.25 Wrms
=======================================================================

Table 6-3. Compaq Contura Aero 4/33C Color VGA Display
=======================================================================
                                  U.S.                  Metric
=======================================================================
Dimensions (Image area):
  Height                          4.74 in                120.5 mm/12.05 cm
  Width                           6.34 in                161 mm/16.10 cm
-----------------------------------------------------------------------
Diagonal Size                     7.75 in                196.9 mm/19.69 cm
-----------------------------------------------------------------------
```

```
Mounting                        Internal
------------------------------------------------------------------------
Display                         CSTN Backlit LCD
------------------------------------------------------------------------
Color Resolution                256 Colors - low resolution
                                16 Colors - high resolution
------------------------------------------------------------------------
Brightness/Contrast             Adjustable through keyboard
------------------------------------------------------------------------
Maximum Pixel Resolution        640 x 480
------------------------------------------------------------------------
Character Display               80 x 25
------------------------------------------------------------------------
Frequency:
  Horizontal                    31.2 KHz (CRT mode) 32 KHz (LCD mode)
  Vertical                      125 Hz (70 VGA/70 CGA)
------------------------------------------------------------------------
Display Inverter Board:
  Operating Voltage (Backlight) +26V, +34V,+38V
  Maximum Input Power           2.8W
  Maximum Output Power
     (Backlight)                2.0 Wrms
========================================================================
```

Chapter 6.3 Hard Drives

```
========================================================================
Model                           170                   84
========================================================================
Standard Configurations         170                   84
------------------------------------------------------------------------
Formatted Capacity Per Drive (MB):
  Physical                      171.6                 85
  Logical                       171.6                 85
------------------------------------------------------------------------
Drives Supported                One                   One
------------------------------------------------------------------------
Drive Height (with drive frame) 12.7 mm               12.7 mm
------------------------------------------------------------------------
Drive Size (inches)             2.5 x 0.5             2.5 x 0.5
------------------------------------------------------------------------
Drive Type                      65                    65
------------------------------------------------------------------------
Transfer Rate (Mbps)            14.72 - 22.13         14.32 - 28.33
------------------------------------------------------------------------
Sector Interleave               1:1                   1:1
------------------------------------------------------------------------
Typical Seek Time
 (including settling):
  Track to Track (ms)           7                     8
  Average (ms)                  20                    19
  Maximum (ms)                  28                    27
------------------------------------------------------------------------
Physical Configuration:
  Cylinders                     1440                  1389
  Heads                         4                     2
  Sectors/Track                 48 - 72               44 - 75
  Bytes Per Sector              512                   512
```

```
----------------------------------------------------------------------------
Logical Configuration:
  Cylinders                              873                    722
  Heads                                  16                     10
  Sectors/Track                          24                     23
  Bytes Per Sector                       512                    512
============================================================================
```

Chapter 6.4 Internal Power Supply

```
============================================================================
Input Requirements:
  Input Voltage                    10.8 - 17.5 VDC
  Standby                          10.8 - 17.5 VDC
----------------------------------------------------------------------------
Power Output:
  Steady State                     10W
  Peak                             17W
----------------------------------------------------------------------------
VDC Output                         V01 (+5)      V02 (+12)      V03 (+40)
                                   ------------------------------------------
  Nominal Voltage                  5.10V         12.0V          43.0V
  Continuous Current               1.25A         60.0 mA        40.0 mA
  Peak Current                     3.0A          60.0 mA        40.0 mA
  Regulation Tolerance             +/- 3%        +/- 5%         +/- 5%
============================================================================
```

Chapter 6.5 Nickel Metal Hydride (NIMH) Battery Pack

```
============================================================================
                         Standard                 Extended Life
                         U.S.       Metric         U.S.          Metric
============================================================================
Dimensions:
  Height                 0.725 in   1.84 cm        0.725 in      1.84 cm
  Length                 5.37 in    13.64 cm       8.07 in       20.5 cm
  Width                  2.04 in    5.18 cm        2.04 in       5.18 cm
----------------------------------------------------------------------------
Weight (approximate)     0.696 lb   0.316 kg       1.09 lb       0.494 kg
----------------------------------------------------------------------------
Power Supply:
  Nominal Voltage        10.8                      10.8
  Capacity               1500 mAh                  2300 mAh
----------------------------------------------------------------------------
Battery Life *
  Contura Aero 4/25      2.5 to 4 hr               4 to 6 hr
  Contura Aero 4/33C                               2.5 to 4 hr
----------------------------------------------------------------------------
Environmental Requirements:
  Operating
    Standard (U.S.)        50oF to 104oF
    Standard (Metric)      10oC to 40oC
    Extended Life (U.S.)   50oF to 104oF
    Extended Life (Metric) 10oC to 40oC
  Nonoperating
    Standard (U.S.)        -4oF to 122oF
```

```
    Standard (Metric)        -20oC to 50oC
    Extended Life (U.S.)     -4oF to 122oF
    Extended Life (Metric)   -20oC to 50oC
-----------------------------------------------------------------------------
* Battery life is based on an estimated typical use pattern of an average
  user. Battery life will vary based on the configuration of the computer
  and the usage pattern of the individual user. To maximize battery life,
  Compaq recommends that power conservation be set to high.
=============================================================================
```

Chapter 6.6 AC Adapter

```
=============================================================================
                              U.S.                    Metric
=============================================================================
Dimensions:
  Height                      1.1 in                  2.79 cm
  Depth                       2.4 in                  6.10 cm
  Width                       2.24 in                 11.68 cm
-----------------------------------------------------------------------------
Weight (without cords)        6 oz                    0.227 kg
-----------------------------------------------------------------------------
Voltage                       17.5 - 20 volts, 1.4 amps
-----------------------------------------------------------------------------
Power (watts):
  Minimum                     17
  Maximum                     20
-----------------------------------------------------------------------------
Minimum Charge Time           1.0 hr
=============================================================================
```

Chapter 6.7 Base Unit

```
=============================================================================
                              US                      Metric
=============================================================================
Dimensions:
  Height                      2.63 in                 6.67 cm
  Width                       12.0 in                 30.5 cm
  Depth                       12.4 in                 31.6 cm
-----------------------------------------------------------------------------
Weight                        2.9 lbs                 1.32 kg
-----------------------------------------------------------------------------
Environmental Requirements:
  Temperature
    Operating                 50oF to 104oF           10oC to 40oC
    Nonoperating              -7.6oF to 140oF         -20oC to 60oC
-----------------------------------------------------------------------------
Relative Humidity:
  Operating                   10% to 90%, noncondensing
  Nonoperating                5% to 95%,  noncondensing
-----------------------------------------------------------------------------
Shock and Vibration:
  Shock
    Operating                 10g, 11 ms, half sine
    Nonoperating              60g, 11 ms, half sine
```

```
    Vibration
      Operating                       0.25g, 5-500 Hz/octave/min sweep
      Nonoperating                    1.00g, 5-500 Hz/octave/min sweep
--------------------------------------------------------------------------
Maximum Unpressurized Altitude:
  Operating                           10,000 ft               3,658 m
  Nonoperating                        40,000 ft               15,750 m
==========================================================================
```

Chapter 6.8 External Diskette Drive

```
==========================================================================
                                      US                      Metric
==========================================================================
Dimensions:
  Disk Drive
    Height                            1.10 in                 2.8 cm
    Width                             4.25 in                 10.8 cm
    Depth                             5.87 in                 14.9 cm
  PCMCIA Interface Card
    Height                            0.19 in                 0.48 cm
    Width                             2.13 in                 5.40 cm
    Depth                             4.37 in                 11.1 cm
--------------------------------------------------------------------------
Diskette Size                         3.5 in                  8.89 cm
--------------------------------------------------------------------------
Weight                                12.2 oz                 340 g
--------------------------------------------------------------------------
Led Indicator                         Green
--------------------------------------------------------------------------
Capacity Per Diskette                 1.44 MB/720 KBYTE
--------------------------------------------------------------------------
I/O Space Configuration:
  Primary                             3FX
  Secondary                           37X
--------------------------------------------------------------------------
PCMCIA Interface Card                 Type II
--------------------------------------------------------------------------
Read/Write Heads                      2
--------------------------------------------------------------------------
Voltage Requirement                   +5 Vdc
--------------------------------------------------------------------------
Environmental Requirements:
  Temperature
    Operating                         41oF to 113oF           5oC to 45oC
    Nonoperating                      -7.6oF to 140oF         -22oC to 60oC
--------------------------------------------------------------------------
Relative Humidity:
  Operating                           10% to 90%, noncondensing
  Nonoperating                        5% to 90%, noncondensing
--------------------------------------------------------------------------
Shock and Vibration:
  Shock
    Operating                         8g, 11 ms, half sine
    Nonoperating                      100g, 11 ms, half sine
  Vibration
    Operating                         1.0g, 5-500 Hz/octave/min sweep
    Nonoperating                      1.5g, 5-500 Hz/octave/min sweep
```

```
--------------------------------------------------------------------------
Acoustic Noise                      33 dBA
--------------------------------------------------------------------------
Maximum Unpressurized Altitude:
  Operating                         9,850 ft            3,077m
  Nonoperating                      50,000 ft           12,308m
==========================================================================
```

Appendix A.1 External Connectors
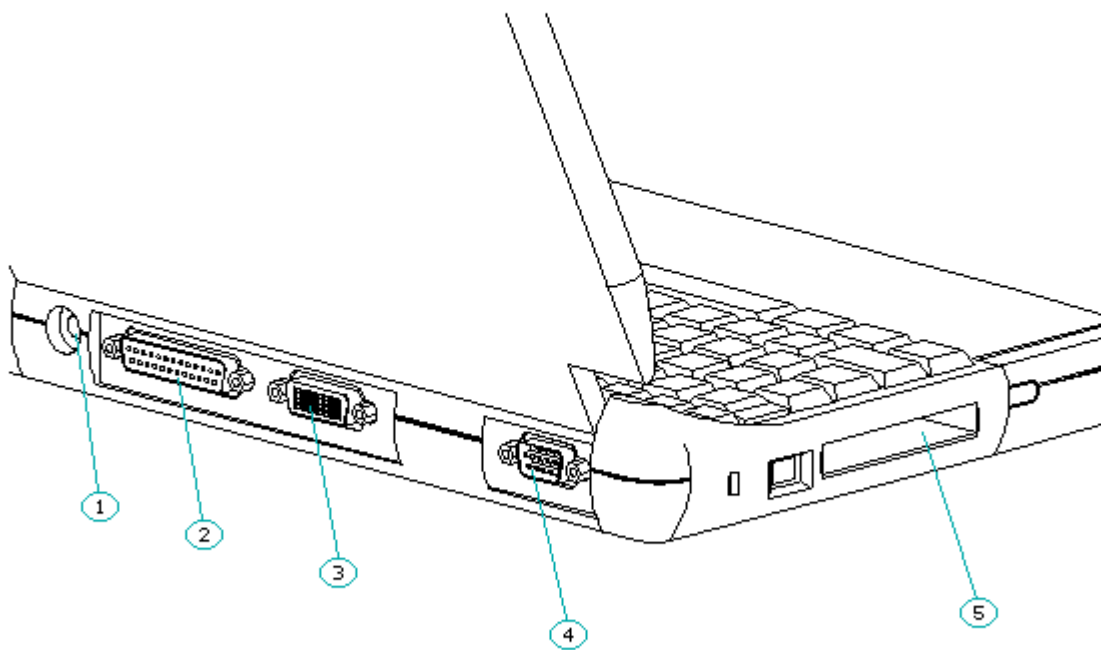
Figure A-1. Compaq Contura Aero External Connectors

```
Table A-1. Compaq Contura Aero and External Connectors
=============================================================================
Index       Description
=============================================================================
1           AC Adapter
2           Parallel (25 pin)
3           External Options (60 pin)
4           Serial (9 pin)
5           PCMCIA Slot
=============================================================================
```

Appendix B.1 Base Unit

This appendix contains information about the base unit that is available
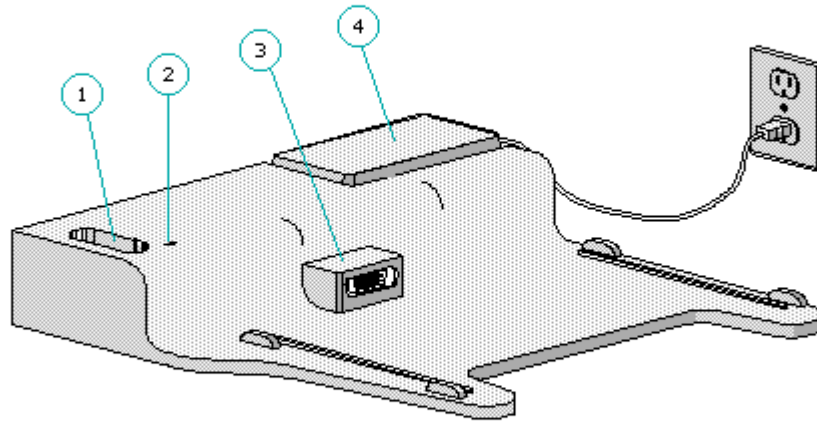for use with the Compaq Contura Aero Family of Personal Computers.

Figure B-1. Base Unit

Table B-1. Front View
```
===============================================================================
Index          Description
===============================================================================
1              Battery Charger Slot

2              Charger Light

3              External Options Connector

4              AC Adapter
===============================================================================
```
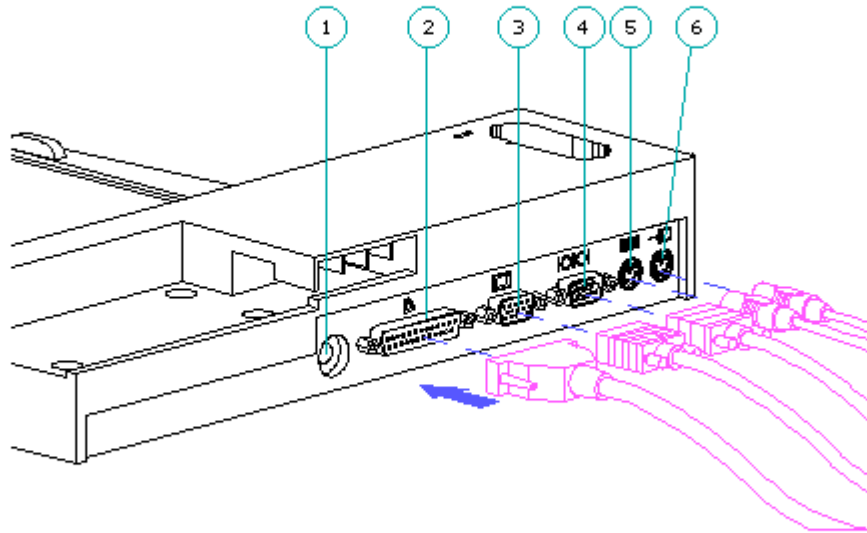
Figure B-2. Base Unit External Connectors

```
Table B-2. Base Unit External Connectors
===========================================================================
Index          Description
===========================================================================
1              DC Power

2              Parallel port

3              External VGA monitor

4              Serial port

5              External keyboard

6              PS/2 mouse
===========================================================================
```

Troubleshooting the Base Unit

If the battery charger does not work, follow these steps:

1. Disconnect the computer from the base unit and reinsert the battery pack
   in the charger.

2. Try another AC Adapter.

3. Check the battery slot and make sure it is clear.

If the mouse or keyboard does not work, check to make sure they are plugged
into the correct jack.

If the printer or serial ports do not work, follow these steps:

1. Disconnect the computer from the base unit.

2. Connect the cables to the printer and serial ports of the computer.

3. If the ports work on the computer, the base unit is defective.

Replacing the Tilt Feet

To replace the tilt feet on the base unit, follow these steps:

1. Remove the computer from the base unit.

2. Turn the base unit upside down.

3. Open up the foot and remove the screw that secures the foot to the base.

4. Pull out the foot, then press in a new one.
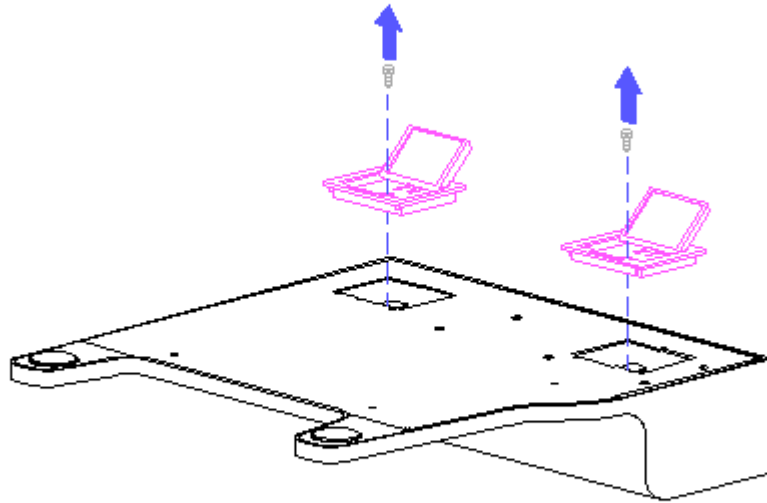
5. Replace the screw.

Figure B-3. Replacing the Tilt Feet

Appendix C.1 Connector Pin Assignments
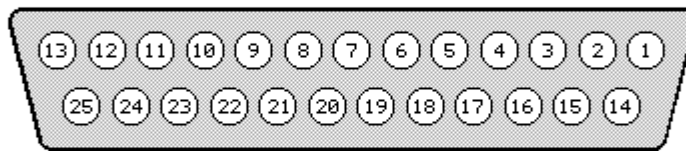
Parallel Connector

Figure C-1. Parallel Connector

C-1. Parallel Connector Pin Assignments

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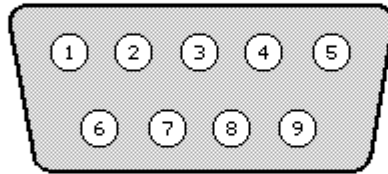
Serial Connector

Figure C-2. Serial Connector

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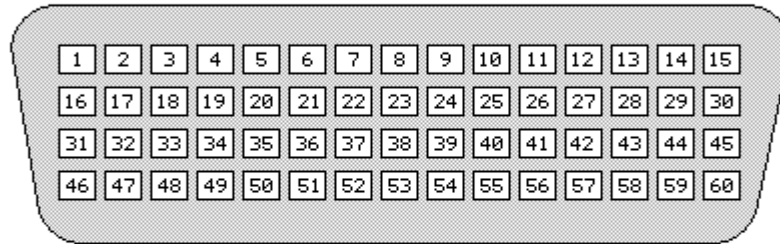8   Clear to Send
9   Ring Indicator
==

External Options Connector

```
┌─────────────────────────────────────────────────────────────┐
│  1  2  3  4  5  6  7  8  9  10 11 12 13 14 15                 │
│  16 17 18 19 20 21 22 23 24 25 26 27 28 29 30                 │
│  31 32 33 34 35 36 37 38 39 40 41 42 43 44 45                 │
│  46 47 48 49 50 51 52 53 54 55 56 57 58 59 60                 │
└─────────────────────────────────────────────────────────────┘
```

Figure C-3. External Options Connector

External Options Connector Pin Assignments
===
Pin   Signal
===
1   Not Connected
2   Ground
3   Ground
4   Serial Carrier Detect
5   Serial Ring Indicator
6   Serial Data Set Ready
7   Keyboard Data
8   Keyboard Clock
9   Mouse Clock
10   Printer Busy
11   Printer Paper Out *
12   Printer Auto Line Feed *
13   Printer Error *
14   Printer Select In *
15   Not Connected
16   Battery LED
17   CRT - Vertical Sync
18   CRT - Horizontal Sync
19   Ground
20   Serial Ready To Send
21   Ground
22   Ground

```
23          Ground
24          Printer Strobe *
25          Ground
26          Printer Select
27          Ground
28          Printer Initialize *
29          Ground
30          Not Connected
31          Ground
32          Ground
33          Ground
34          Serial Data Term Ready
35          Ground
----------------------------------------------------------------------------
* Active low
============================================================================
Pin         Signal
============================================================================
36          Serial Clear To Send
37          Ground
38          Ground
39          Ground
40          Printer Data Bit 7
41          Ground
42          Printer Data Bit 4
43          Ground
44          Printer Data Bit 1
45          Battery Voltage (Main DC Unit Voltage)
46          CRT - Blue Analog
47          CRT - Green Analog
48          CRT - Red Analog
49          Serial Transmit Data
50          Serial Receive Data
51          VCC
52          VCC
53          Mouse Data
54          Printer Acknowledge *
55          Printer Data Bit 6
56          Printer Data Bit 5
57          Printer Data Bit 3
58          Printer Data Bit 2
59          Printer Data Bit 0
60          Battery Voltage (Main DC Unit Voltage)
----------------------------------------------------------------------------
* Active low
============================================================================


Pcmcia Connector


PCMCIA Connector Pin Assignments
============================================================================
Pin         Signal
============================================================================
1           Ground
2           Data bit 3
3           Data bit 4
4           Data bit 5
5           Data bit 6
```

```
6          Data bit 7
7          Card enable 1
8          Address bit 10
9          Output enable
10         Address bit 11
11         Address bit 9
12         Address bit 8
13         Address bit 13
14         Address bit 14
15         Program/Write enable
16         Ready or busy/Interrupt request
17         Power
18         Programming and peripheral supply 1
19         Address bit 16
20         Address bit 15
21         Address bit 12
22         Address bit 7
23         Address bit 6
24         Address bit 5
25         Address bit 4
26         Address bit 3
27         Address bit 2
28         Address bit 1
29         Address bit 0
30         Data bit 0
31         Data bit 1
32         Data bit 2
33         Write protect/IO Port is 16 bit
34         Ground
35         Ground
36         Card detect 1
37         Data bit 11
38         Data bit 12
39         Data bit 13
40         Data bit 14
41         Data bit 15
42         Card enable 2
43         Refresh
44         IO Read
45         IO Write
46         Address bit 17
47         Address bit 18
48         Address bit 19
===========================================================================
Pin        Signal
===========================================================================
49         Address bit 20
50         Address bit 21
51         Power
52         Programming and peripheral supply 2
53         Address bit 22
54         Address bit 23
55         Address bit 24
56         Address bit 25
57         Reserved
58         Card reset
59         Extend bus cycle
60         Input port acknowledge
61         Register select and IO
62         Battery voltage detect 2/Audio digital waveform
```

```
63          Battery voltage detect 1/Card status changed
64          Data bit 8
65          Data bit 9
66          Data bit 10
67          Card detect 2
68          Ground
============================================================================
```