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MAINTENANCE AND SERVICE GUIDE

COMPAQ Contura Family of Personal Computers

First Edition (June 1992)
Text Number 139661-001

Preface

This MAINTENANCE AND SERVICE GUIDE is a troubleshooting guide that can be used for reference when servicing the COMPAQ Contura Family of Personal Computers. Additional information is available in the SOFTWARE SUPPORT MAINTENANCE AND SERVICE GUIDE and the TECHNICAL REFERENCE GUIDE.

Compaq Computer Corporation reserves the right to make changes to the COMPAQ Contura 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 represents commentary, sidelights, or interesting points of information.

Technician Notes

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

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

>>>

Locating Additional Information

- USER'S GUIDE
- TECHNICAL REFERENCE GUIDE
- SUPPORT SOFTWARE MAINTENANCE AND SERVICE GUIDE
- OPTIONS AND PERIPHERALS MAINTENANCE AND SERVICE GUIDE

- COMPAQ SERVICE QUICK REFERENCE GUIDE
- Service Training Guides
- COMPAQ SERVICE ADVISORIES AND BULLETINS
- COMPAQ QuickFind

Chapter 1 - Illustrated Parts Catalog

Introduction

This chapter provides illustrated parts breakdowns and identifies the spare parts for the standard features of the COMPAQ Contura Family of Personal Computers.

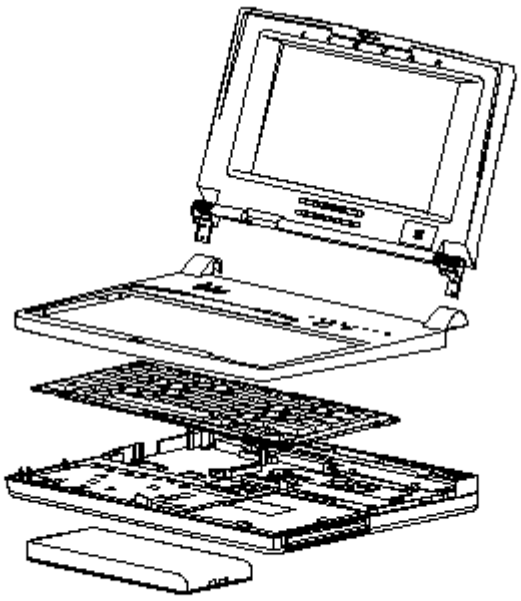

Figure 1-1. COMPAQ Contura 3/25 and COMPAQ Contura 3/20 Personal Computers

Chapter 1.1 ILLUSTRATED PARTS BREAKDOWN

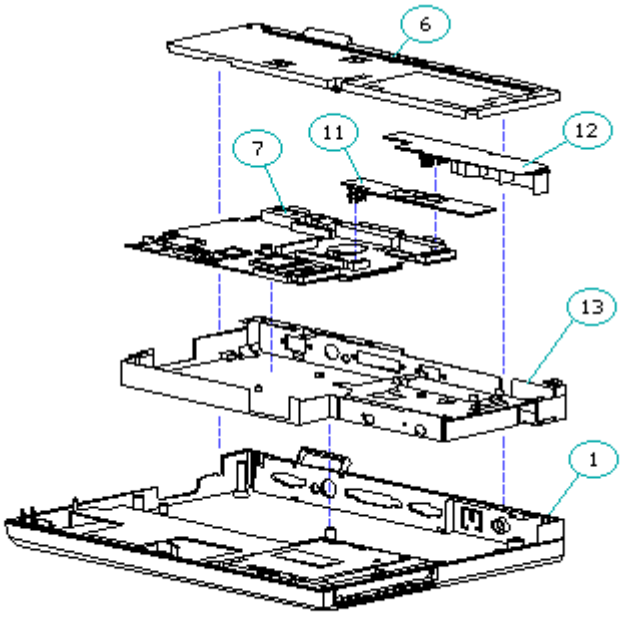

Figure 1-2. System Unit

Table 1-1. System Unit

Description	Spare Part Number
1. Base Enclosure	139644-001
2. Top Cover	139645-001 *
3. Enhanced NiCd Battery Pack	139626-001 *
4. Battery Shield	142997-001 *
5. Communication Access Bezel	139640-001 *
6. Sheet Metal Cover	139646-001
7. Processor Board (COMPAQ Contura 3/20)	139649-001
(COMPAQ Contura 3/25)	139648-001
8. Keyboard ROM	142991-001 *
9. System ROM	139651-001 *
10. Real-Time Clock Battery	139650-001 *
11. User Interface Board	139643-001
12. Power Supply	139642-001
13. System Chassis	139647-001
14. Rear Connector Cover	139641-001 *
15. Coprocessor (80386SL)	139344-001 *

* Not Shown

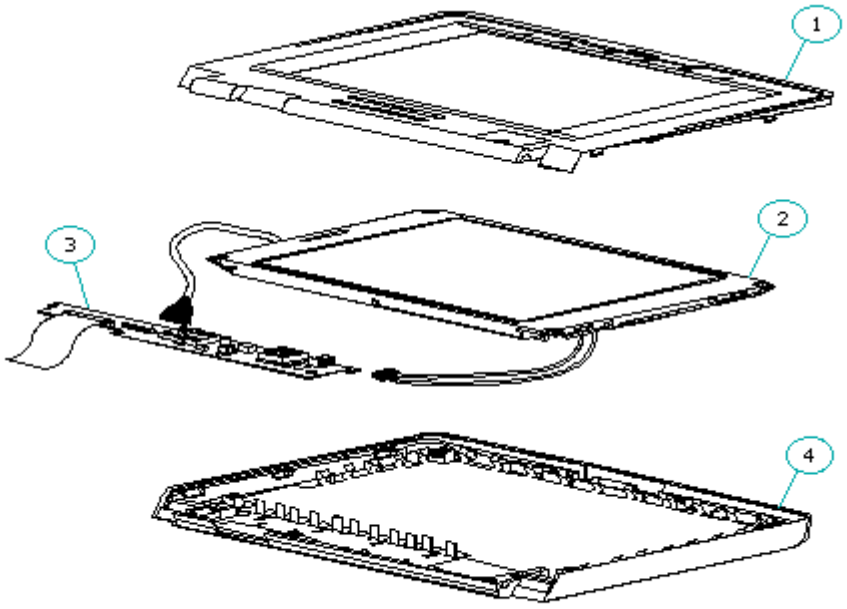

Figure 1-3. VGA Edgelit Display

Table 1-2. VGA Edgelit Display

Description	Spare Part Number
1. Display Bezel	139635-001
2. LCD Display Panel	139638-001
3. Display Inverter Board	139637-001
4. Display Enclosure	139634-001

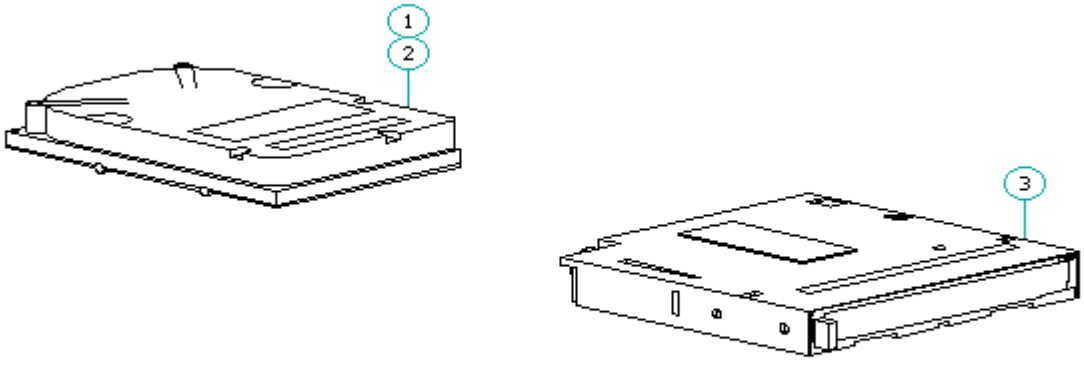

Figure 1-4. Mass Storage Devices

Table 1-3. Mass Storage Devices (COMPAQ Contura 3/25)

Description	Spare Part Number
1. 120-Megabyte Hard Drive	139653-001
2. 60-Megabyte Hard Drive	139655-001
3. 3 1/2-Inch 1.44-Megabyte Diskette Drive	139652-001
4. Diskette Drive Cable	142770-001

Table 1-4. Mass Storage Devices (COMPAQ Contura 3/20)

Description	Spare Part Number
1. 84-Megabyte Hard Drive	139654-001
2. 40-Megabyte Hard Drive	139656-001
3. 3 1/2-Inch 1.44-Megabyte Diskette Drive	139652-001
4. Diskette Drive Cable	142770-001

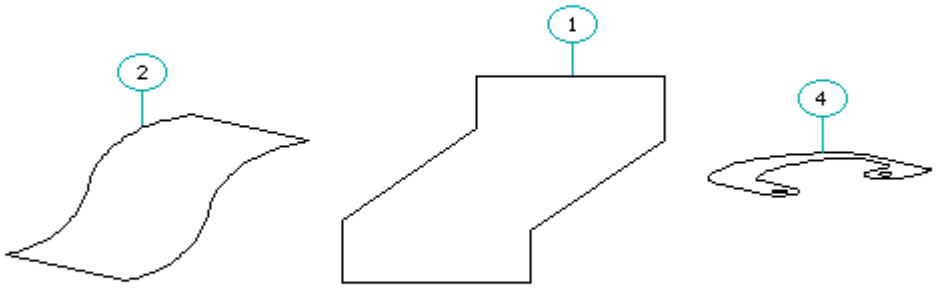

Figure 1-5. Cables

Table 1-5. Miscellaneous Cables

Description	Spare Part Number
1. Diskette Drive Cable	142770-001
2. Display Cable (Data)	139633-001
3. Signal Display Cable	142799-001 *
4. Flex Cable Ground Strap	139605-001
5. Phone Cable	112666-001 *

* Not shown

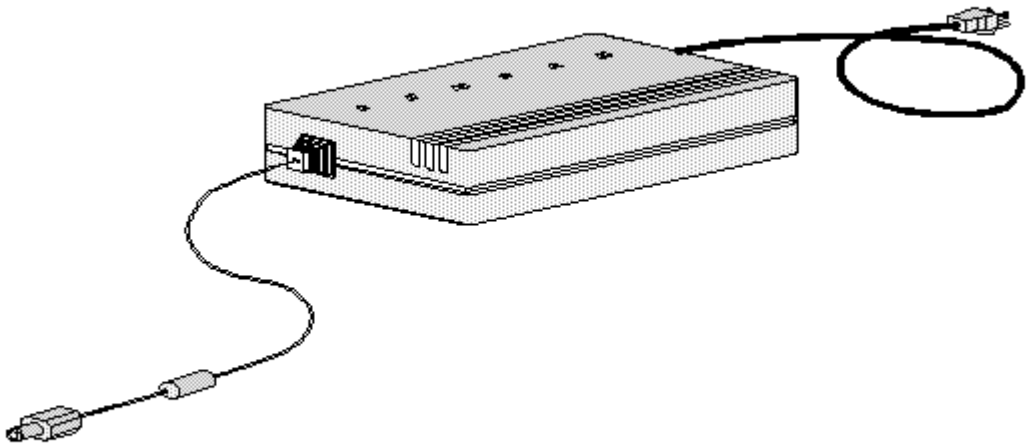

Figure 1-6. AC Adapter

Table 1-6. AC Adapter

Description	Spare Part Number
1. AC Adapter	139622-001
2. Power Cord (U.S./Canada)	142766-001
Power Cord (U.K.)	121259-001 *

* Not shown

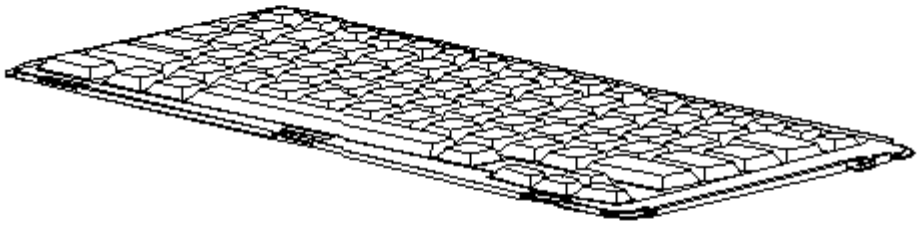

Figure 1-7. Keyboard

Table 1-7. Keyboards

Description	Spare Part Number
1. U.S. English	139658-001
2. U.K. English	139658-003 *
3. German	139658-004 *
4. French	139658-005 *
5. Italian	139658-006 *
6. Spanish	139658-007 *
7. Danish	139658-008 *
8. Norwegian	139658-009 *
9. Swedish/Finnish	139658-010 *
10. Swiss	139658-011 *
11. French Canadian	139658-012 *
12. Belgian	139658-018 *
13. Portuguese	139658-013 *
14. Latin American	139658-016 *
15. Japanese	139658-019 *

* Not shown

Table 1-8. Spare Parts List

Description	Spare Part Number
System Unit:	
Base Enclosure	139644-001
Top Cover	139645-001
Enhanced NiCd Battery Pack	139626-001
Battery Shield	142997-001
Communication Access Bezel	139640-001
Sheet Metal Cover	139646-001
Processor Board (COMPAQ Contura 3/20)	139649-001

(COMPAQ Contura 3/25)	139648-001
Keyboard ROM	142991-001
System ROM	139651-001
Real-Time Clock Battery	139650-001
User Interface Board	139643-001
Power Supply	139642-001
System Chassis	139647-001
Rear Connector Cover	139641-001
VGA Edgelit Display:	
Display Bezel	139635-001
Display Enclosure	139634-001
LCD Display Panel	139638-001
Inverter Board	139637-001
Display Cable (Data)	139633-001
Signal Display Cable	142799-001
Flex Cable Ground Strap	139605-001
Contrast Actuator	139636-001
Mass Storage Devices:	
120-Megabyte Hard Drive	139653-001
84-Megabyte Hard Drive	139654-001
60-Megabyte Hard Drive	139655-001
40-Megabyte Hard Drive	139656-001
3 1/2-Inch 1.44-Megabyte Diskette Drive	139652-001
Miscellaneous Cables:	
Diskette Drive Cable	142770-001
Phone Cable	112666-001
Display Cable, Data	139633-001
Signal Display Cable	142799-001
Flex Cable Ground Strap	139605-001
Memory:	
2-Megabyte Memory Expansion Board	139618-001
4-Megabyte Memory Expansion Board	139620-001
8-Megabyte Memory Expansion Board	139621-001
AC Adapter:	
AC Adapter	139622-001
Power Cord (U.S./Canada)	142766-001
Power Cord (U.K.)	121259-001
Keyboards:	
U.S. English	139658-001
U.K. English	139658-003
German	139685-004
French	139658-005
Italian	139658-006
Spanish	139658-007
Danish	139658-008
Norwegian	139658-009
Swedish/Finnish	139658-010
Swiss	139658-011
French Canadian	139658-012
Belgian	139658-018
Portuguese	139658-013
Latin American	139658-016
Documentation:	

MAINTENANCE AND SERVICE GUIDE	139661-001
SUPPORT SOFTWARE MAINTENANCE AND SERVICE GUIDE	120576-003
COMPAQ CONTURA FAMILY OF PERSONAL COMPUTERS USER'S GUIDE	141989-001
COMPAQ SERVICE QUICK REFERENCE GUIDE	106854-001
OPTIONS AND PERIPHERALS MAINTENANCE AND SERVICE GUIDE	
MASS STORAGE DEVICES	137010-002
VIDEO AND PROCESSING OPTIONS	137011-002
COMMUNICATION DEVICES AND ACCESSORIES	137012-002

Table 1-9. Miscellaneous Kits (Plastics)

Description	Spare Part Number
Rubber Foot	142950-001
Base Enclosure	139644-001
Top Cover	139645-001
Communication Access Bezel	139640-001
Rear Connector Cover	139641-001
Display Logo (COMPAQ Contura 3/20)	142769-001
Display Logo (COMPAQ Contura 3/25)	142990-001
Latch, Battery System	142998-001

Table 1-10. Miscellaneous Kits (Hardware)

Description	Spare Part Number
Clutches	129928-001
Spring, Leaf Battery Eject	142998-001

Chapter 2 - Removal and Replacement Procedures

INTRODUCTION

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

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

Chapter 2.1 ELECTROSTATIC DISCHARGE INFORMATION

A sudden discharge of static electricity from a finger or other conductor can destroy static-sensitive devices or microcircuitry. Often the spark is neither felt nor heard, but damage occurs. An electronic device exposed to electrostatic discharge (ESD) may not be affected at all and will work perfectly throughout a normal cycle. Or it may function normally for awhile, 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 methods generate static electricity and at different electrostatic voltage levels.

Table 2-1. Typical Electrostatic Voltages

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

NOTE: 700 volts can degrade a product.

Preventing Electrostatic Damage to Equipment

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

- To avoid hand contact, transport products in static-safe containers such as tubes, bags, or boxes.
- Protect all electrostatic parts and assemblies with conductive or approved containers or packaging.
- Keep electrostatic sensitive parts in their containers until they arrive at static-free stations.
- Place items on a grounded surface before removing them from their container.
- Always be properly grounded when touching a sensitive component or assembly.
- Place reusable electrostatic-sensitive parts from assemblies in protective packaging or 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 diskette drives and hard drives, use the following precautions:

- Handle drives gently, using static-guarding techniques.
- Store them in the original shipping containers.
- Avoid dropping them from any height onto any surface.
- Handle drives on surfaces that have at least one inch of shock-proof foam.
- Always place drives PCB assembly side down on the foam.

Grounding Methods

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

Table 2-2 lists different antistatic materials and their shielding protection levels.

Table 2-2. Static-Shielding Protection Levels
==========

Method	Voltages
Antistatic plastic	1,500
Carbon-loaded plastic	7,500
Metallized laminate	5,000

Grounding Workstations

- Cover workstations with approved static dissipative material. Provide a wrist strap connected to work surface and properly grounded tools and equipment.
- Use static dissipative mats, heel straps, or air ionizers to give added protection.
- Handle electrostatic sensitive components, parts, and assemblies by the case or PCB laminate. Handle them only at static-free workstations.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting and removing connectors or test equipment.
- Use fixtures made of static-safe materials when fixtures must directly contact dissipative surfaces.
- Keep work area free of nonconductive materials such as ordinary plastic assembly aids and styrofoam.
- Use field service tools, such as cutters, screwdrivers, vacuums, that are conductive.
- Use a portable field service kit with a static dissipative vinyl pouch that folds out to 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 equipment:

Wrist Straps are flexible straps with a minimum of 1 megohm +/- 10% resistance in 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 shoes or boots. 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 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
  - Conductive plastic bags
  - Conductive plastic tubes
  - Conductive tote boxes
  - Metal tote boxes
  - Opaque shielding bags
  - Transparent metallized shielding bag
  - Transparent shielding tubes

Chapter 2.2 SERVICE CONSIDERATIONS

Listed below are some of the considerations that should be kept in mind during the disassembly and assembly of the COMPAQ Contura Family of Personal Computers.

Tools and Software Requirements

To service the COMPAQ Contura 3/25 and COMPAQ Contura 3/20 Personal Computers, you need the following:

- o Phillips screwdriver, sizes P-0, P-1
- o Torx screwdriver, size T-8
- o Flat-bladed screwdriver
- o Hex socket driver
- o ROM removal tool
- o Modem terminating plug
- o Diagnostics software
- o Formatted scratch diskettes
- o COMPAQ 5-in-1 Service Tool, spare part number 130619-001
- o COMPAQ Case Utility Tool, spare part number 119070-001

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 disassembly 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 inadvertent damage.

Cables and Connectors

Most cables used throughout the unit are ribbon cables and flex cables (Figure 2-1). 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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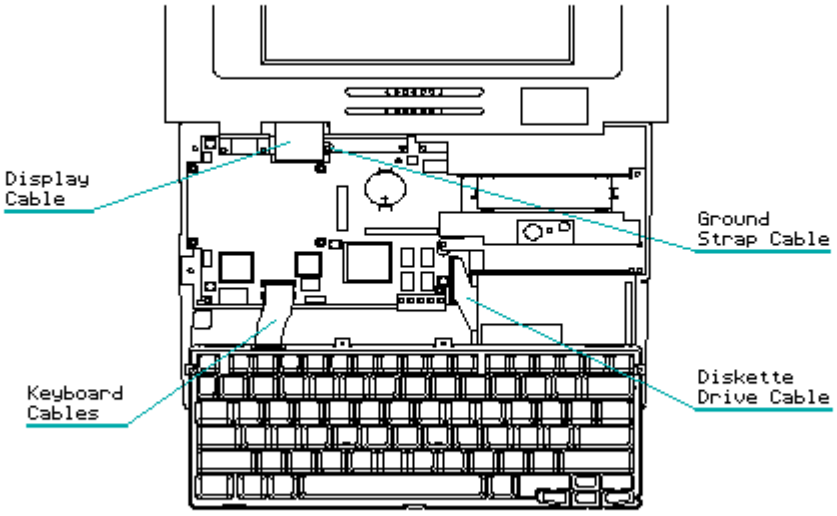


Figure 2-1. ZIF Connectors, LIF Connector, and Cables

Plastics

The plastics used for the COMPAQ Contura Family of Personal Computers can be damaged by the use 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 appropriate disassembly and reassembly procedures.

Chapter 2.3 DISASSEMBLY/ASSEMBLY SEQUENCE CHART

This section provides instructions for removing and replacing these components:

```
2.4     PREPARATION PROCEDURES
2.5    |---BATTERY PACK
2.6    |---TOP COVER
2.7    |---SHEET METAL COVER
2.8    |---KEYBOARD
2.9    |---VGA EDGELIT DISPLAY
       |---|---Display Bezel
       |       |---LCD Panel
       |           |---Display Inverter Board
       |               |---Latch, Clutches, and Display Shield
       |
2.10   |---POWER SUPPLY
2.11   |---USER INTERFACE BOARD
2.12   |---HARD DRIVE
2.13   |---DISKETTE DRIVE
2.14   |---PROCESSOR BOARD
       |   |---Keyboard ROM
       |       |---System ROM
       |           |---Coprocessor
       |               |---Real-Time Clock Battery
2.15   |---SYSTEM CHASSIS
```

Chapter 2.4 PREPARATION PROCEDURES

Before beginning the removal and replacement procedures, complete the following steps:

1. Turn off the computer.

2. Disconnect all external devices (printer, monitor, and other devices) from the computer.

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

The computer power should be off before any cables are connected or disconnected.

>>>

3. Disconnect the AC power cord from the AC outlet, then from the computer (Figure 2-2).

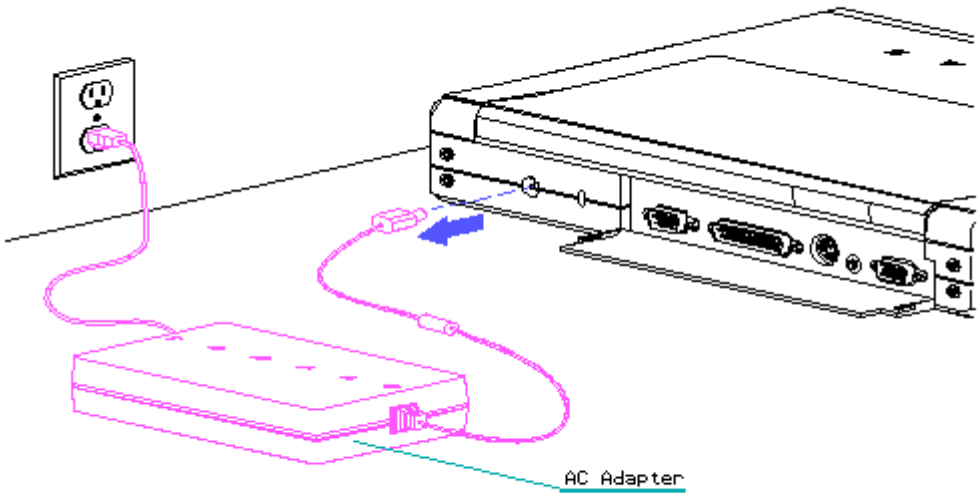


Figure 2-2. Disconnecting the AC Power

4. Disconnect the installed battery pack from the bottom of the computer (Section 2.5).

5. Lower the display to the latched position (Figure 2-3).

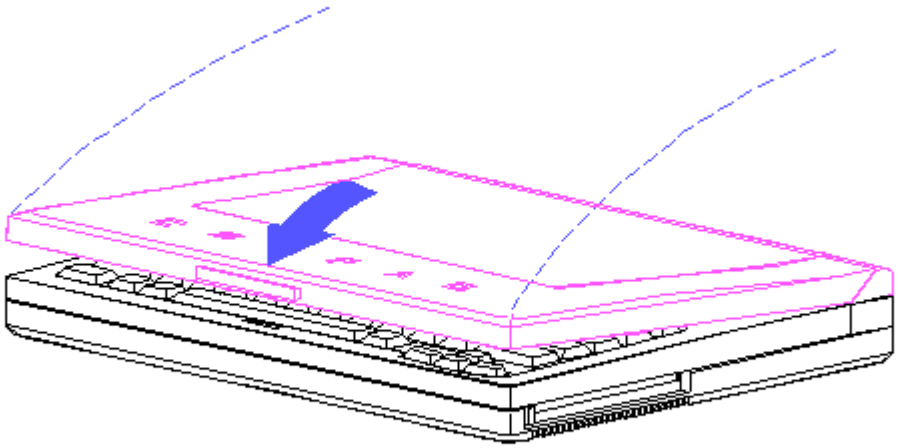


Figure 2-3. Closing the Computer

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

Static electricity can damage the CMOS components. Be sure that you are properly grounded before performing any of the following procedures.

The screws used in these systems are not interchangeable within the COMPAQ Contura product line or with other COMPAQ products. As you remove screws, place them with the component you removed. Damage may occur if you insert these screws in the wrong place.

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

Chapter 2.5 BATTERY PACK

To remove an installed battery pack, complete the following steps:

1. Turn the computer upside down.

2. Pull back on the battery release latch located to the left of the battery compartment (Figure 2-4). The battery pack springs upward.

3. Remove the battery pack by lifting it out of the battery compartment.

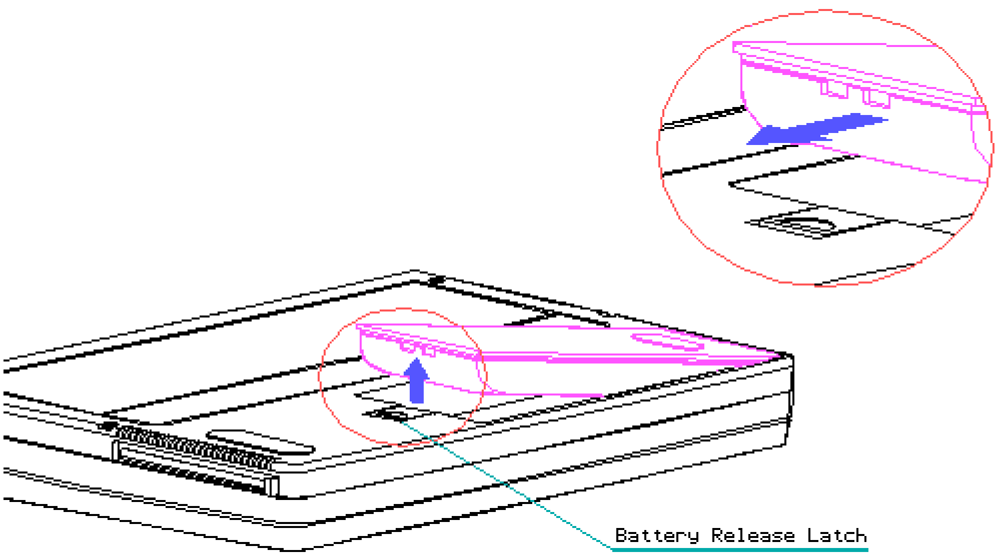


Figure 2-4. Removing the Battery Pack

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

Metal objects can 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 or battery replica in the battery compartment.

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

To replace the battery pack, complete the following steps:

1. Insert the battery pack, with the battery contacts facing to the

inside of the battery compartment.

2. Push firmly on the battery pack until it snaps into place.

Disposal of a Used Battery Pack

Battery components are considered environmentally harmful. Disposal of either an Enhanced Nickel Cadmium (NiCd) or 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 their depleted COMPAQ Rechargeable Battery Packs used in COMPAQ laptop and notebook personal computers.

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

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 1-800-524-9859 in the US, and 1-800-263-5868 in Canada. 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 Resellers or Authorized COMPAQ Service Providers (except in the case of service or in warranty exchanges) nor to any Compaq address other than the permitted address on the preaddressed Battery Mailer envelope.

Chapter 2.6 TOP COVER

To remove the top cover, complete the following steps:

1. Turn the computer upside down.

2. Remove the battery pack (Figure 2-4).

3. Remove the five screws from the bottom of the computer (Figure 2-5).

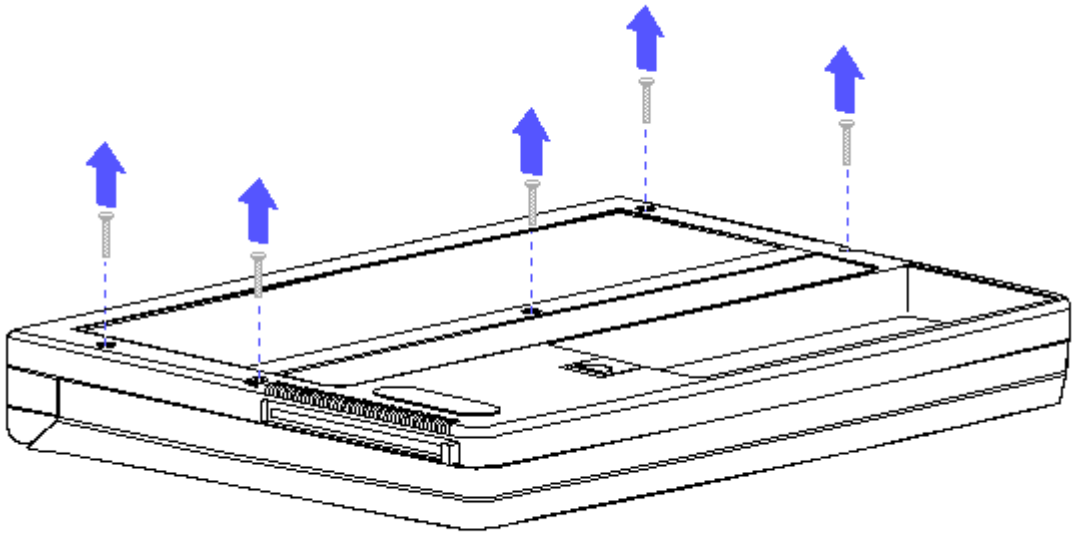


Figure 2-5. Removing Five Screws

4. Turn the computer right-side up.

5. Lift up on the latch located on the front of the computer and rotate the display to the fully open position (Figure 2-6).

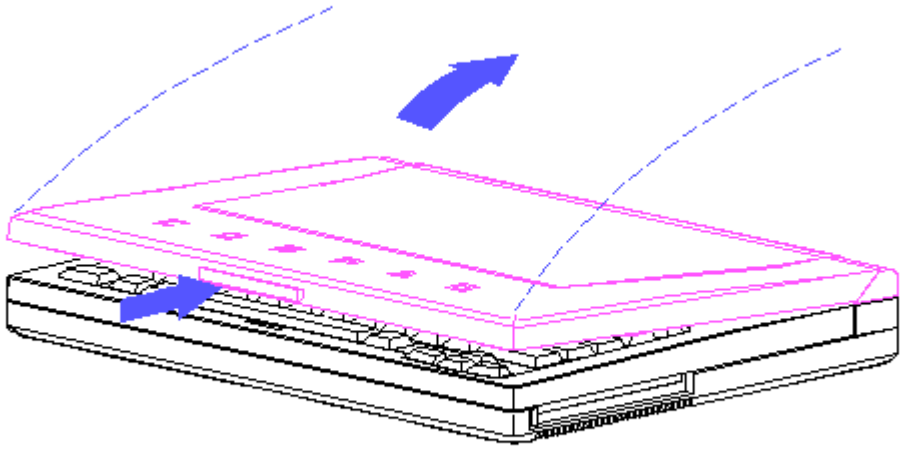


Figure 2-6. Rotating the Display to Open Position

6. Unsnap the top cover and lift it out of the computer (Figure 2-7).

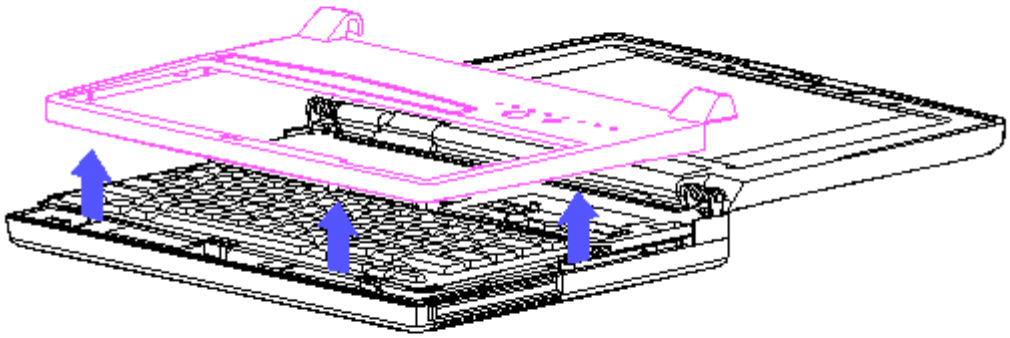


Figure 2-7. Removing the Top Cover

Chapter 2.7 SHEET METAL COVER

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

Before removing the sheet metal 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, you could damage the power supply.

>>

To remove the sheet metal cover, complete the following steps:

1. Remove the battery pack (Figure 2-4).

2. Remove the five screws on the bottom of the computer (Figure 2-5).

3. Remove the top cover (Figure 2-7).

4. Remove the four screws that secure the sheet metal cover and lift the sheet metal cover out of the computer (Figure 2-8).

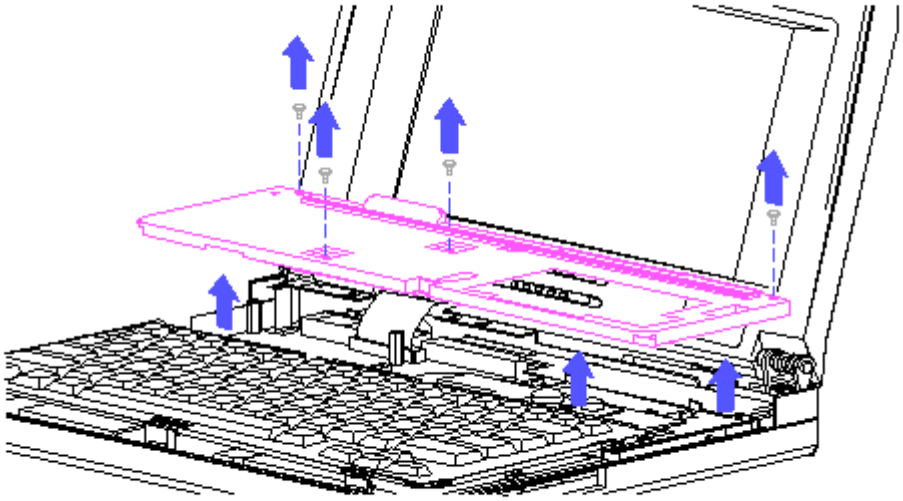


Figure 2-8. Removing the Sheet Metal Cover

To replace the sheet metal cover, complete the following steps:

1. Position the sheet metal cover over the portion of the processor board that houses the modem, expanded memory board, and real-time battery (Figure 2-9).

2. Replace the four screws that secure the sheet metal cover.

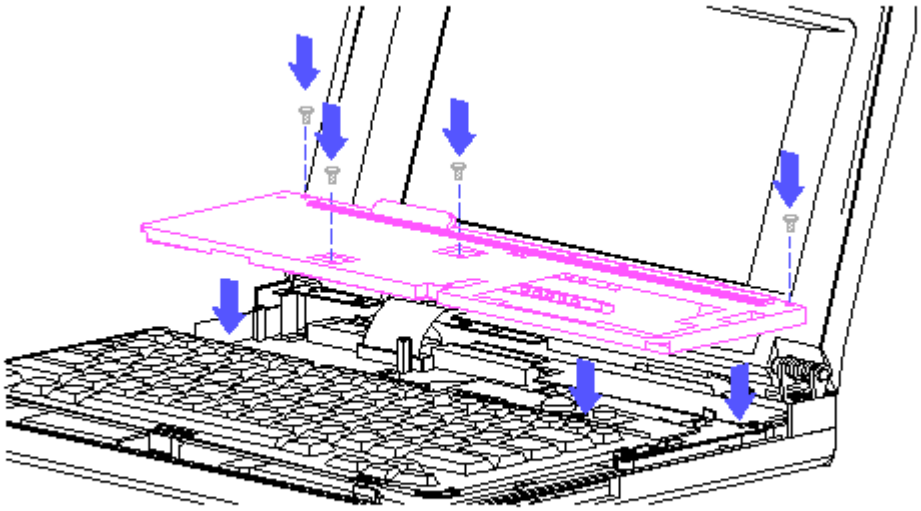


Figure 2-9. Replacing the Sheet Metal Cover

Chapter 2.8 KEYBOARD

To remove the keyboard, complete the following steps:

1. Remove the top cover (Section 2.6).
2. Remove the sheet metal cover (Figure 2-8).
3. Gently lift up on the keyboard and move it toward you until the ZIF cables are exposed.
4. Using the case utility tool, carefully lift up on the ZIF connector to release the ZIF cables (Figure 2-10).
5. Carefully lift the keyboard out of the computer.

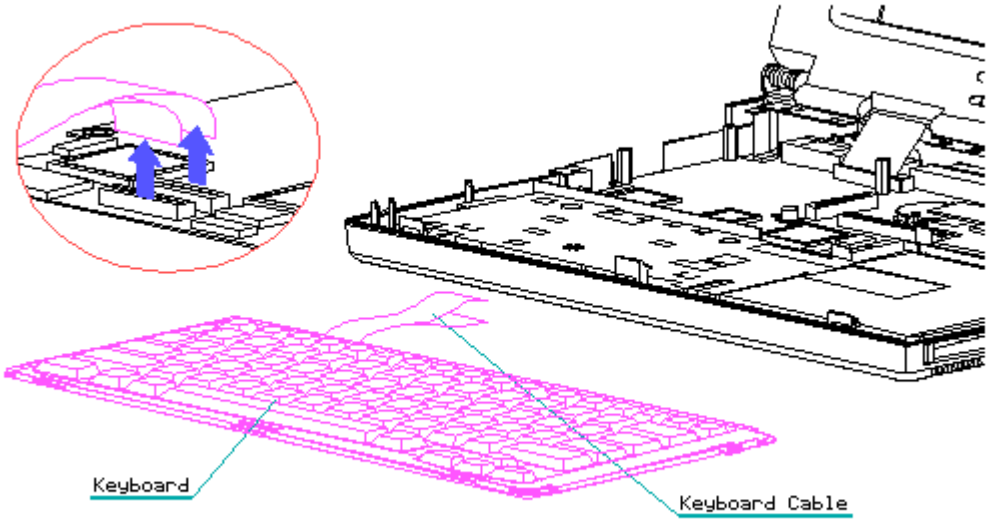


Figure 2-10. Removing the Keyboard

NOTE: The battery shield is located under the keyboard. You do not need to remove this part unless you are replacing the system chassis. To remove the battery shield, lift it out of the computer base (Figure 2-10).

You may not have to remove the keyboard to have access to the component you want to remove and/or replace. In this case, you would complete the following steps:

1. Remove the top cover (Section 2.6).
2. Remove the sheet metal cover (Figure 2-8).
3. Gently lift up on the keyboard and move it toward you until the ZIF cables are exposed.
4. Slide the keyboard, with the ZIF cables attached to the keyboard and

ZIF connector, forward or backward enough to have access to the component you want to remove and/or replace (Figure 2-11).

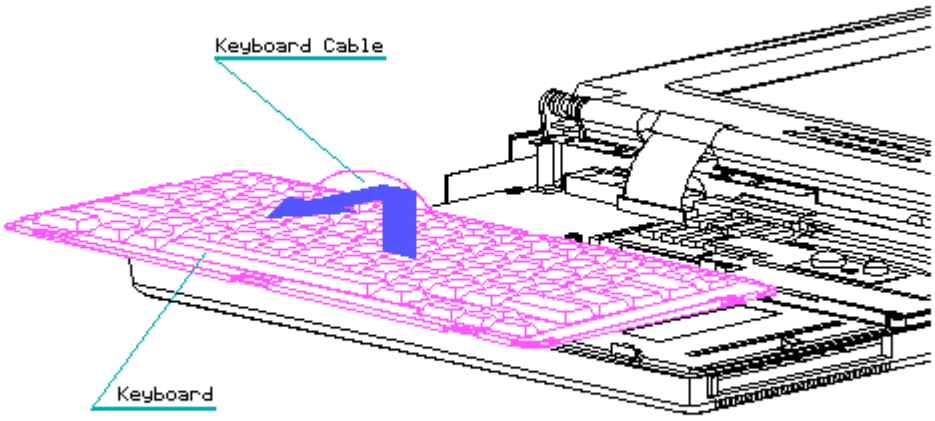


Figure 2-11. Moving the Keyboard

To replace the keyboard, reverse the previous steps.

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

If your computer has a modem installed, be sure you tuck the ZIF cables underneath the keyboard before you move the keyboard back into place. Otherwise, you could tear the ZIF cables.

>>

Chapter 2.9 VGA EDGELIT DISPLAY

To remove the edgelit liquid crystal display (LCD), complete the following steps:

1. Remove the top cover (Section 2.6).

2. Remove the sheet metal cover (Figure 2-8).

3. Using the case utility tool, carefully lift up on the ZIF connector to release the display cable (data) from the processor board (Figure 2-12). (Note that the end of the display cable that connects into the processor board is labeled with the letters "CPU," and the end of the cable that connects into the display inverter board is labeled with the letters "INV.")

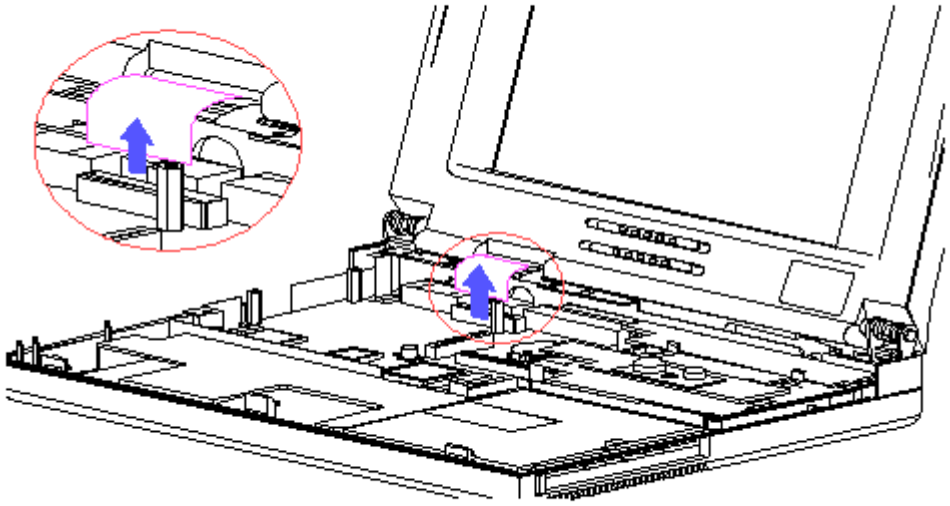


Figure 2-12. Removing the Display Cable (Data) from the Processor Board

4. Using a Phillips screwdriver, remove the screw that attaches the flex cable ground strap to the system chassis (Figure 2-13).

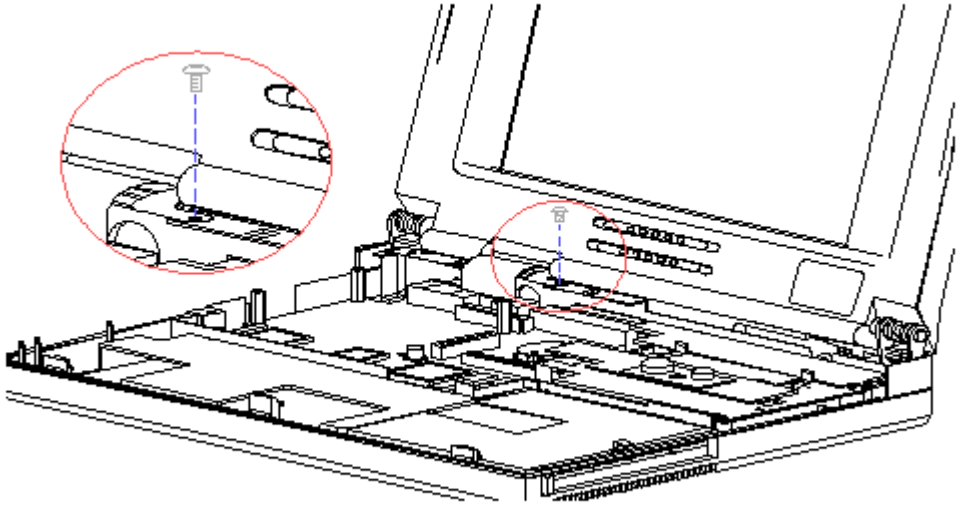


Figure 2-13. Removing Flex Cable Ground Strap from System Chassis

5. Using a Torx T-8 screwdriver, remove the 4 screws from the display panel assembly (Figure 2-14).

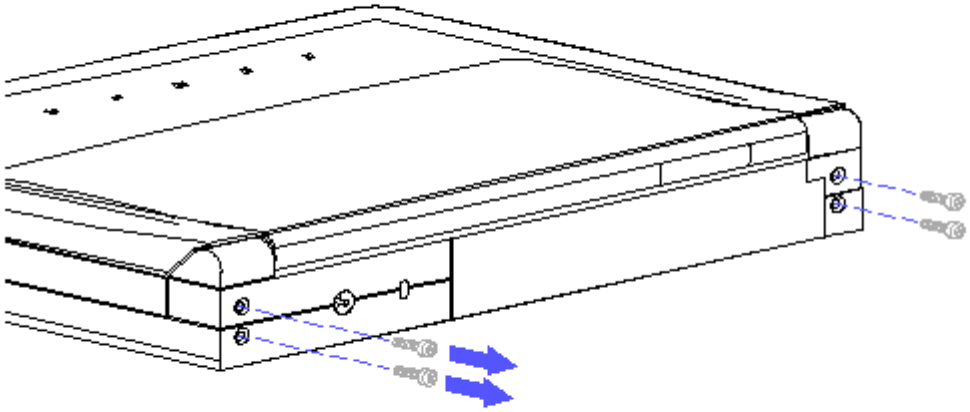


Figure 2-14. Removing the Four Screws

6. Lift the display out of the computer (Figure 2-15).

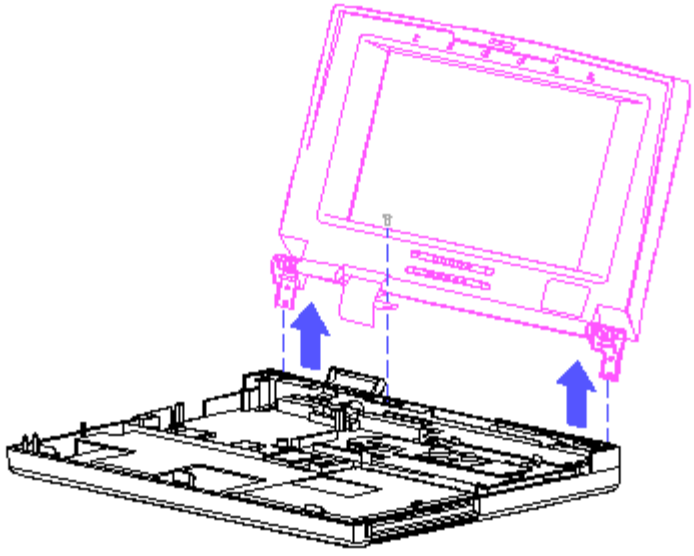


Figure 2-15. Lifting the Display Panel Assembly Out of the Computer

To replace the display panel assembly, complete the following steps:

1. Position the display panel by aligning the display clutches with the base enclosure (Figure 2-16).

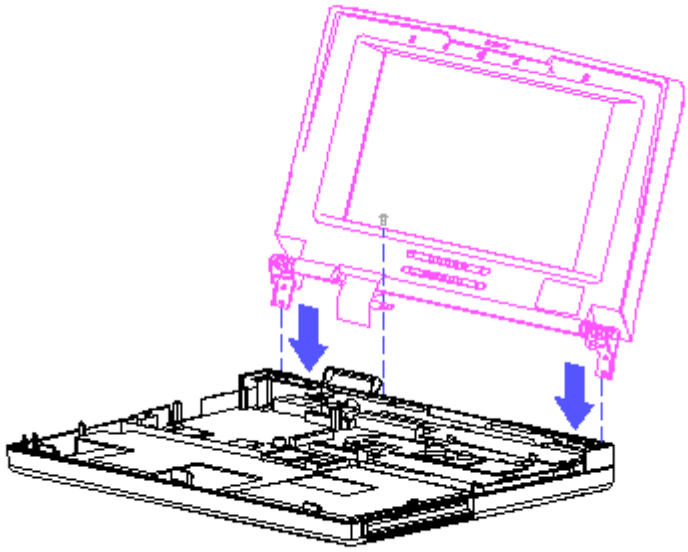


Figure 2-16. Aligning the Display Clutches with the Base Enclosure

2. Reattach the four screws to the base enclosure.

3. Reconnect the display cable (data) and press down to lock the ZIF connector.

Display Bezel

To remove the display bezel, complete the following steps:

1. Remove the display assembly (Section 2.9).

2. Remove the logo plate located at the bottom-right corner of the display panel assembly by placing your fingernail under it and popping it out.

3. Using a Phillips screwdriver, remove the screw located at the bottom-right corner of the display panel assembly (Figure 2-17).

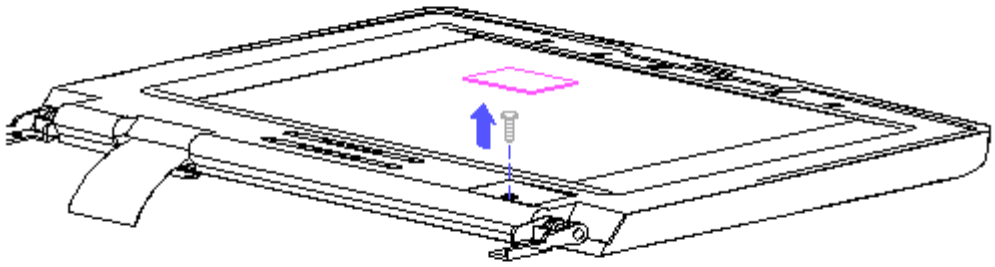


Figure 2-17. Removing the Logo Plate and Screw on the Display Panel Assembly

4. Remove the display bezel from the display panel assembly by gently pulling the bezel frame and working from the bottom up (Figure 2-18).

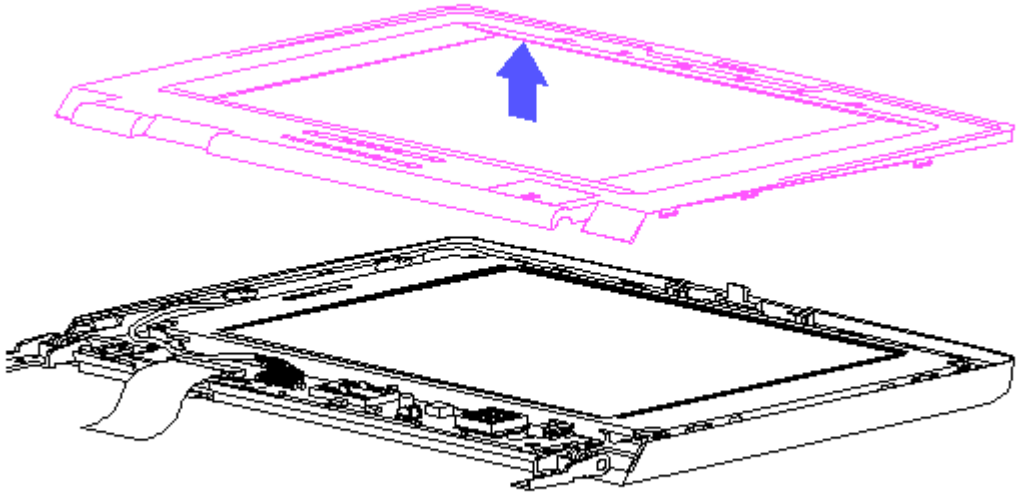


Figure 2-18. Removing the Display Bezel

To replace the display bezel, complete the following steps:

1. Line up the display bezel with the display panel assembly and snap it in, beginning at the top and working down.

2. Secure the display bezel with the screw, which is inserted in the

bottom-right corner of the display panel assembly.

3. Snap in the logo plate into the bottom-right corner of the display panel assembly.

Liquid Crystal Display Panel

To remove the Liquid Crystal Display (LCD) panel, complete the following steps:

1. Remove the display bezel (Figure 2-18).

2. Remove the four screws that secure the LCD panel to the display enclosure (Figure 2-19).

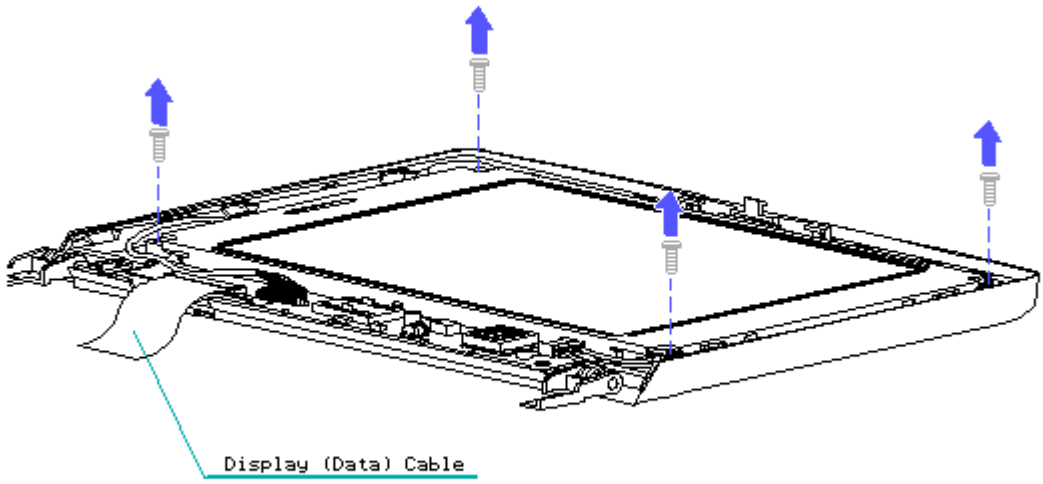


Figure 2-19. Removing the Four Screws

3. Rotate the LCD panel out of the display enclosure (Figure 2-20).

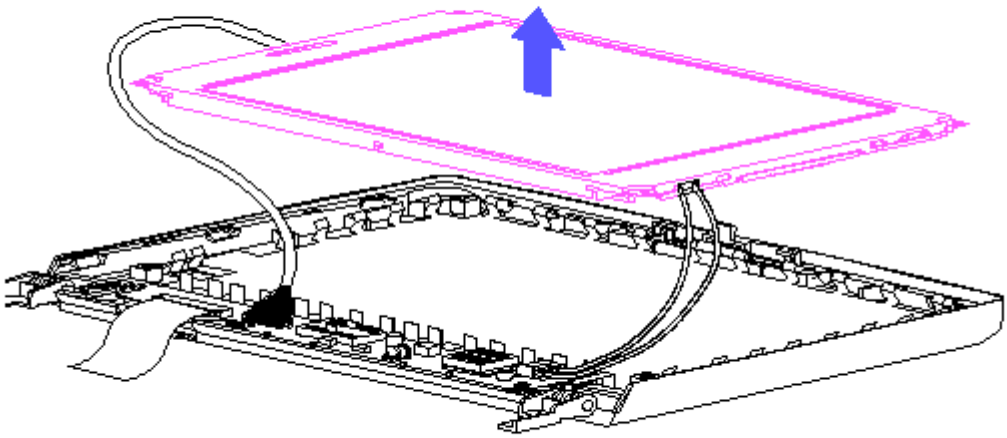


Figure 2-20. Removing the LCD Panel

4. Disconnect the backlight power cable and signal cable (Figure 2-21).

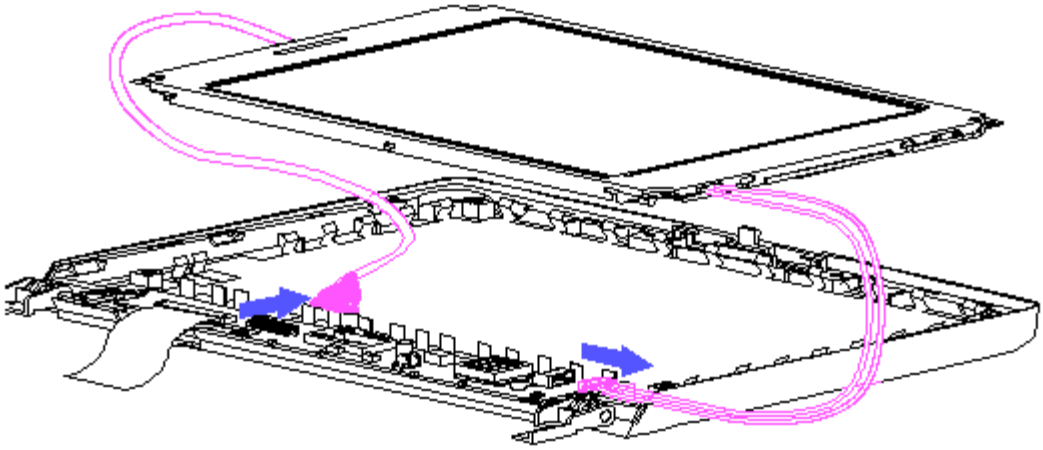


Figure 2-21. Disconnecting Backlight Power Cable and Signal Cable

To replace the LCD panel, complete the following steps:

1. Rotate the LCD panel into the display enclosure.
2. Secure the display panel with the four screws and two cables.

Display Inverter Board

To remove the display inverter board, complete the following steps:

1. Remove the display bezel (Figure 2-18).

2. Disconnect the backlight power cable and the signal cable (Figure 2-21).

3. Remove the display cable from the display inverter board by gently pulling the cable toward you (Figure 2-22). (Note that the end of the display cable that connects into the display inverter board is labeled with the letters "INV," and the end of the display cable that connects into the processor board is labeled with the letters "CPU.")

4. Using a Phillips P-0 screwdriver, remove the screw that attaches the flex cable ground strap to the display inverter board and then remove the ground strap (Figure 2-22).

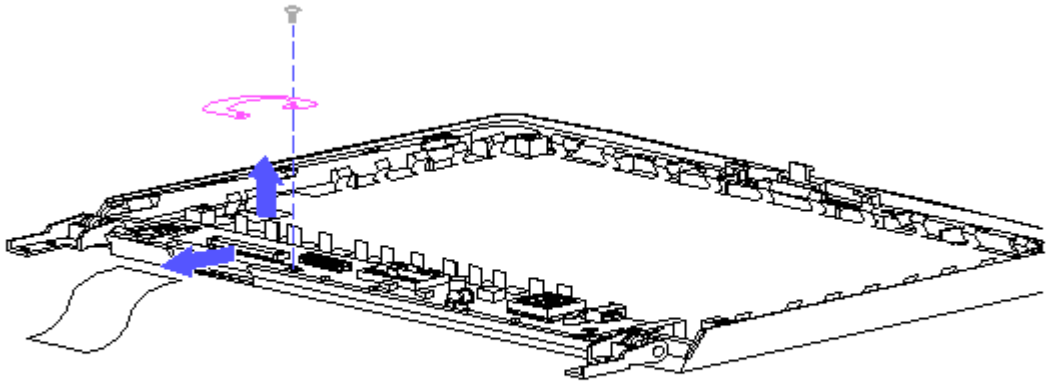


Figure 2-22. Removing Display Cable and Flex Cable Ground Strap from Display Inverter Board

5. Using a Phillips P-0 screwdriver, remove the screw securing the display inverter board to the display enclosure and lift the display inverter board out of the display enclosure (Figure 2-23).

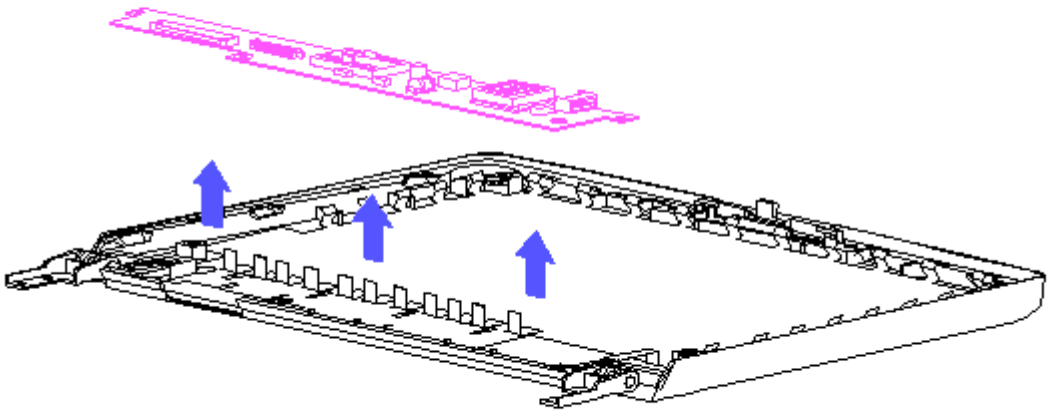


Figure 2-23. Removing the Display Inverter Board

To replace the inverter board, reverse the previous steps.

Latch, Clutches, and Display Shield

To remove and replace the latch, the right and left clutches from the side of the display enclosure, and the display shield, complete the following steps:

NOTE: The clutches are designated left and right parts. The clutches used on the COMPAQ Contura Family of Personal Computers are labeled L (left) and R (right). When removing the clutches, keep the left parts and right parts separated to ease replacement.

1. Remove the display bezel. Refer to the "Display Bezel" section.

2. Using a small flat-bladed screwdriver, gently separate both ends of the latch from the display enclosure and pull up on the latch in the middle to remove it from the display enclosure (Figure 2-24).

3. Using a Phillips screwdriver, remove the two screws from each clutch and then remove each clutch out of the display enclosure (Figure 2-24).

4. Remove the display shield by lifting it out of the display enclosure (Figure 2-24).

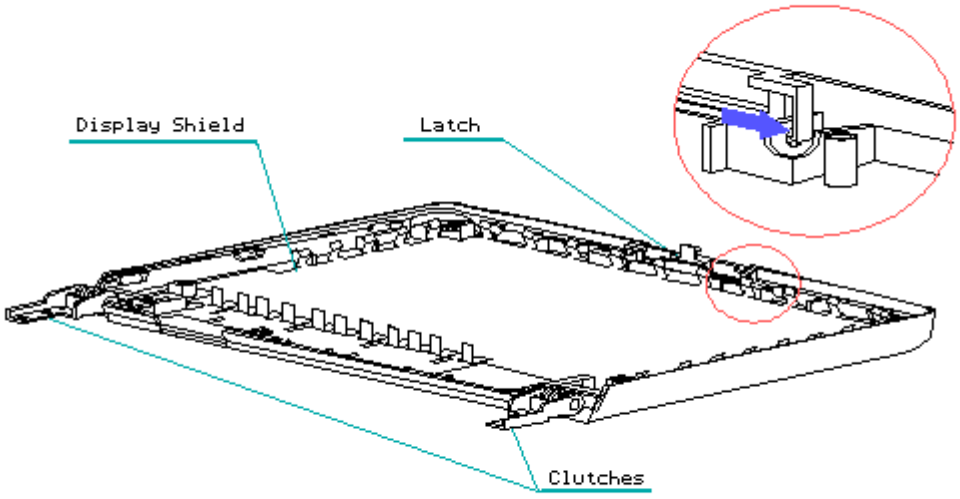


Figure 2-24. Locating the Display Panel Latch, Clutches, and Display Shield

To replace the latch, snap it into the display enclosure.

To replace the clutches, reverse the previous steps.

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

Chapter 2.10 POWER SUPPLY

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

Before removing the sheet metal 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, you could damage the power supply.

>>

To remove the power supply, complete the following steps:

1. Remove the battery pack (Section 2.5).

2. Remove the top cover (Section 2.6).

3. Remove the sheet metal cover (Section 2.7).

4. Using a screwdriver, remove the screw from the right side of the power supply and then remove the power supply by gently pulling the power supply straight up at the connector (Figure 2-25).

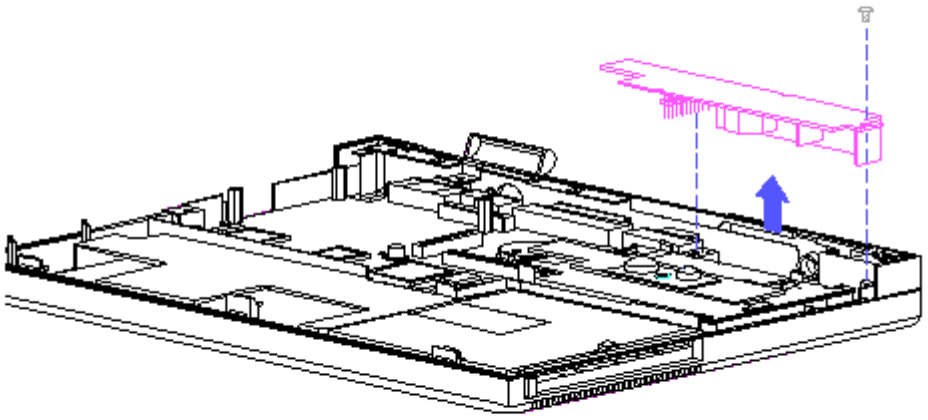


Figure 2-25. Removing the Power Supply

To replace the power supply, reverse the previous steps.

Chapter 2.11 USER INTERFACE BOARD

To remove the user interface board, complete the following steps:

1. Remove the battery pack (Section 2.5).
2. Remove the top cover (Section 2.6).
3. Remove the sheet metal cover (Section 2.7).
4. Using a screwdriver, remove the screw from the top of the user interface board and remove the board from the hard drive bracket by gently pulling up on the connector end of the user interface board (Figure 2-26).

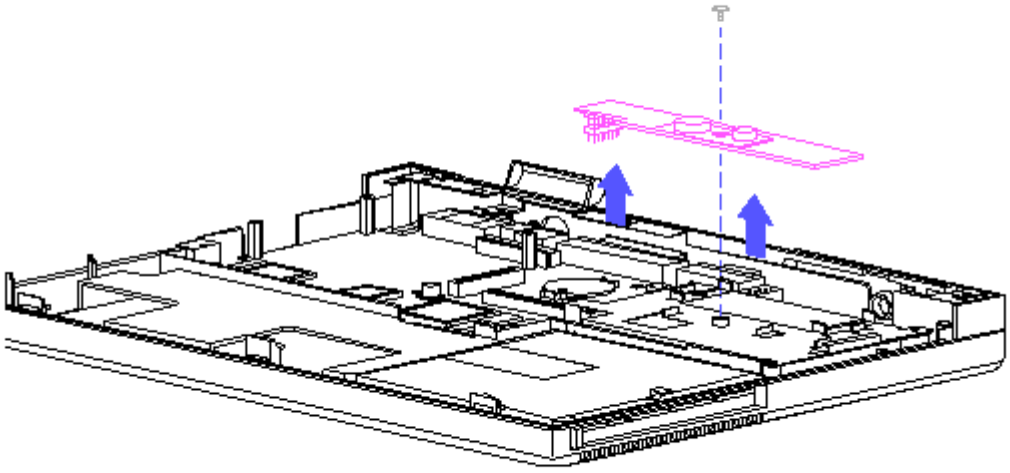


Figure 2-26. Removing the User Interface Board

To replace the user interface board, reverse the previous steps.

Chapter 2.12 HARD DRIVE

To remove the hard drive, complete the following steps:

1. Remove the sheet metal cover (Section 2.7).

2. Move the keyboard (Section 2.8).

3. Remove the user interface board (Section 2.11).

4. Remove the auxiliary battery, if applicable. (Refer to the OPTIONS MAINTENANCE AND SERVICE GUIDE for more information.)

5. Remove the hard drive bracket, which contains the hard drive, from the system chassis by gently pushing the hard drive bracket in a backward direction. The hard drive bracket pops out and disconnects from the processor board (Figure 2-27).

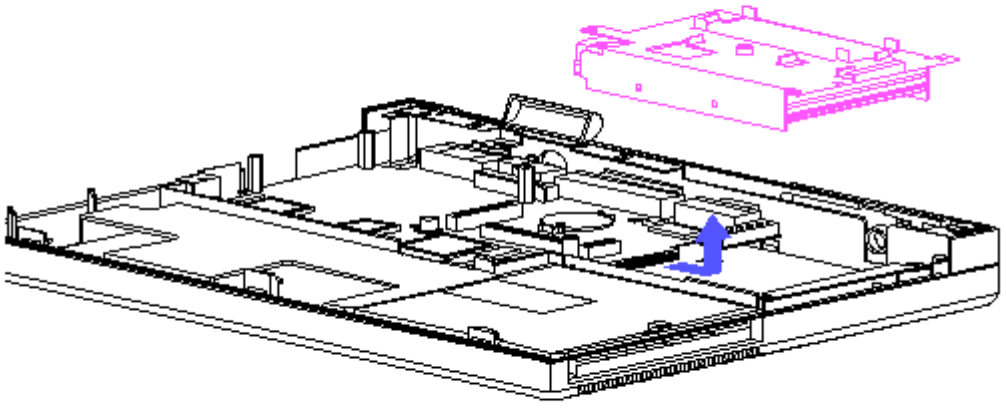


Figure 2-27. Removing the Hard Drive

6. To remove the hard drive from the hard drive bracket, remove the two screws from each side of the bracket and slip the hard drive out of the bracket (Figure 2-28).

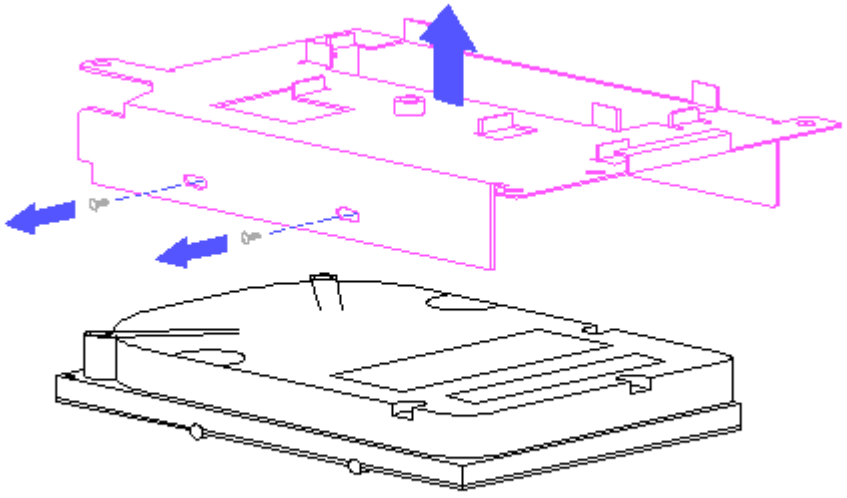


Figure 2-28. Removing the Hard Drive from the Hard Drive Bracket

To replace the hard drive, complete the following steps:

1. Place the hard drive inside the hard drive bracket and line up the one hole and the three slots.

2. Insert the screw into the hole to properly align the hard drive inside the bracket. (The other screws should then be properly aligned with the slots.)

3. Slide the hard drive bracket into the system chassis by pushing on the tab located on the top of the bracket.

Chapter 2.13 DISKETTE DRIVE

To remove the diskette drive, complete the following steps:

1. Remove the sheet metal cover (Section 2.7).

2. Remove the keyboard (Section 2.8).

3. Disconnect the diskette drive cable from the LIF connector located on the processor board (Figure 2-29). (Note that the end of the cable that connects into the processor board is labeled with the letter "B," and the end of the cable that connects into the diskette drive is labeled with the letter "R.")

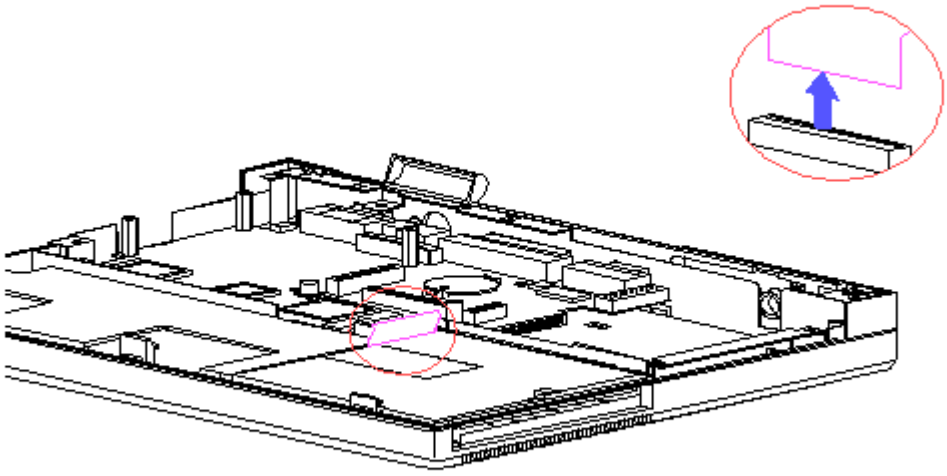


Figure 2-29. Removing the Diskette Drive Cable and LIF Connector

4. Carefully lift the diskette drive out of the system chassis (Figure 2-30).

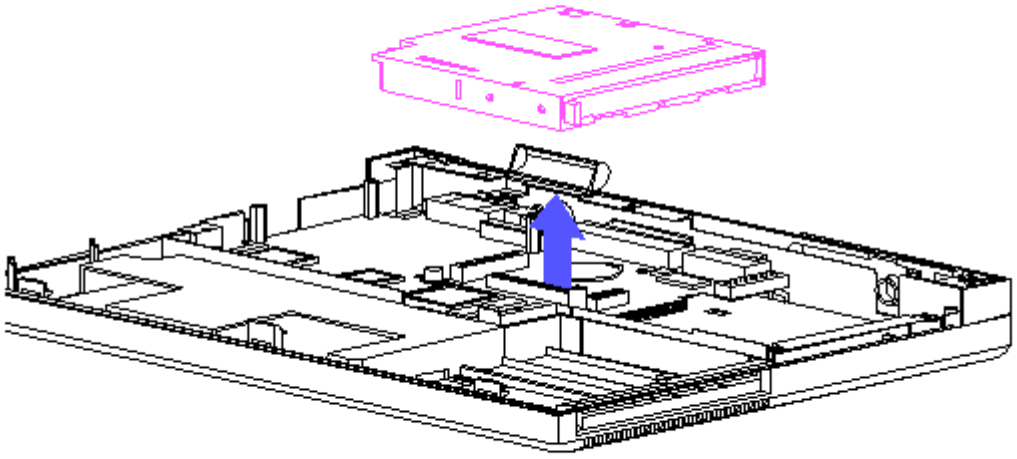


Figure 2-30. Removing the Diskette Drive

To replace the diskette drive, reverse the previous steps. (Note that when you are reconnecting the diskette drive cable, the end of the cable that is labeled with the letter "B" goes into the LIF connector on the processor board; the end of the cable labeled with the letter "R" goes into the diskette drive.)

Chapter 2.14 PROCESSOR BOARD

Before you can remove the processor board, you must remove the optional modem and its serial interface board, if applicable, and the optional expanded memory board, if applicable. Refer to the OPTIONS MAINTENANCE AND SERVICE GUIDE for more information.

To remove the processor board, complete the following steps:

1. Remove the power supply (Section 2.10).

2. Remove the user interface board (Section 2.11).

3. Remove the hard drive (Section 2.12).

4. Remove the diskette drive (Section 2.13).

5. Remove the display cable from the processor board (Figure 2-12).

6. Remove the three screws from the processor board with a Torx T-8 screwdriver and remove the four standoffs from the processor board with a hex socket driver (Figure 2-31).

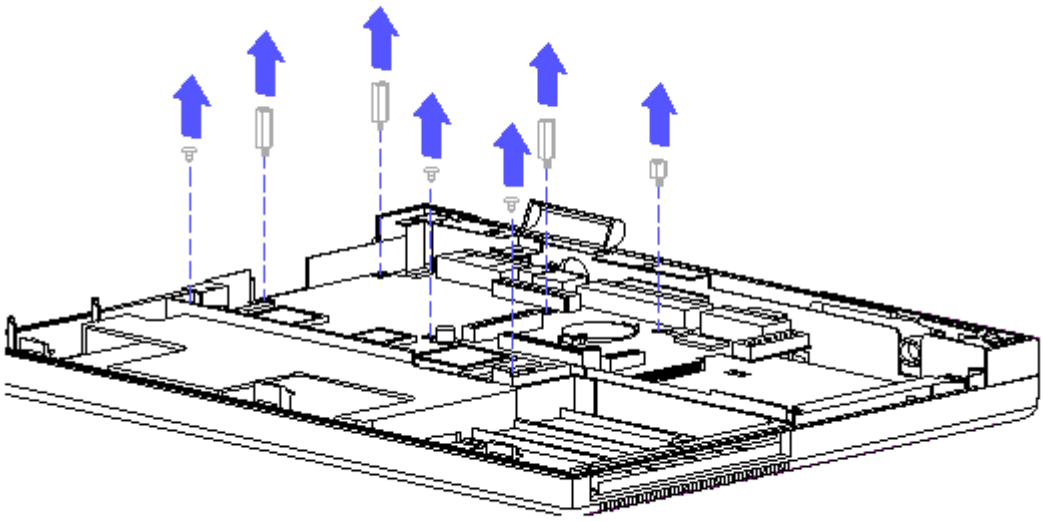


Figure 2-31. Removing Screws and Standoffs

7. Using a hex socket driver, remove the six screw locks from the rear of the computer (Figure 2-32).

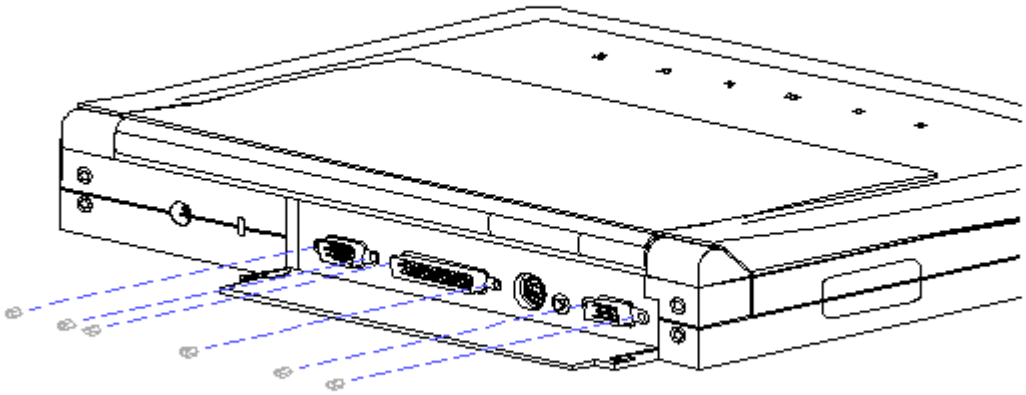


Figure 2-32. Removing the Six Screw Locks

8. Rotate the processor board out of the system chassis (Figure 2-33).

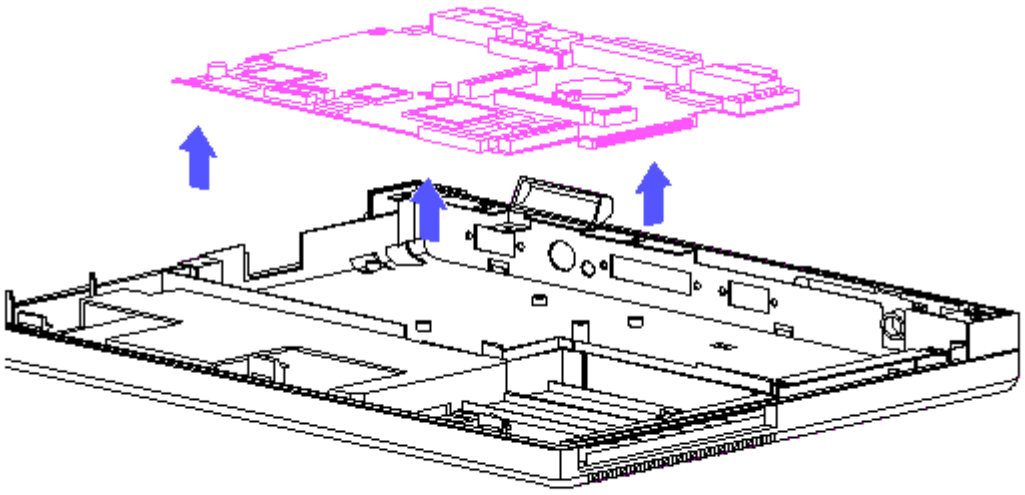


Figure 2-33. Processor Board

When replacing the processor board, first line up the hole in the center of the processor board with the screw on the system chassis, and then reverse the previous steps.

Keyboard ROM

To remove the keyboard ROM, complete the following steps:

1. Move the keyboard (Section 2.8).

2. Remove the keyboard ROM from the processor board by gently lifting up on the keyboard ROM with the ROM removal tool (Figure 2-34).

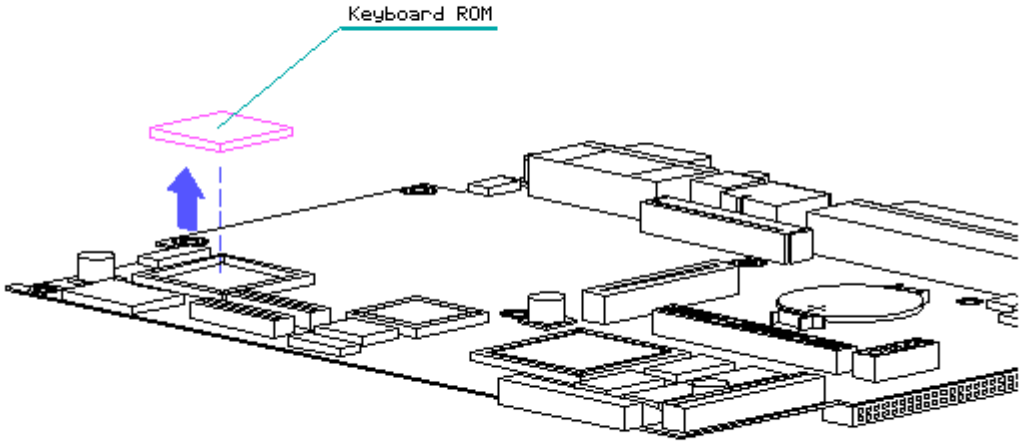


Figure 2-34. Removing the Keyboard ROM from the Processor Board

To replace the keyboard ROM, reverse the previous steps.

System ROM

To remove the system ROM, complete the following steps:

1. Move the keyboard (Section 2.8).

2. Remove the system ROM from the processor board by gently lifting up on the system ROM with the ROM removal tool (Figure 2-35).

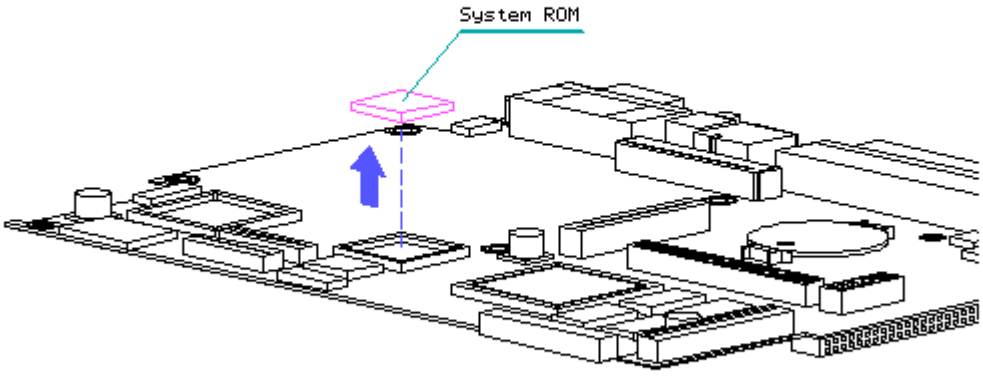


Figure 2-35. Removing the System ROM from the Processor Board

To replace the system ROM, reverse the previous steps.

Coprocessor

To remove the coprocessor, complete the following steps:

1. Move the keyboard (Section 2.8).

2. Remove the coprocessor from the processor board by gently lifting up on the coprocessor with the ROM removal tool (Figure 2-36).

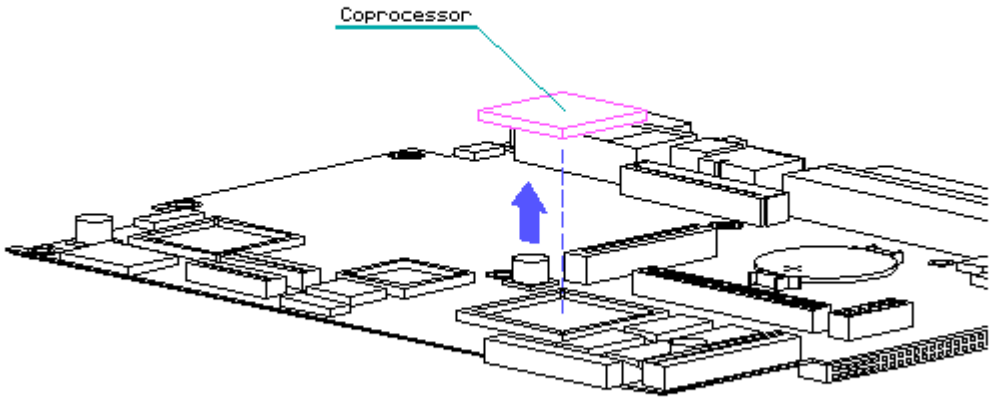


Figure 2-36. Removing the Coprocessor from the Processor Board

To replace the coprocessor, snap the coprocessor into the coprocessor socket.

Real-Time Clock Battery

To remove the real-time clock battery, complete the following steps:

1. Remove the memory expansion board, if applicable. (Refer to the OPTIONS MAINTENANCE AND SERVICE GUIDE for more information.)

2. Remove the real-time clock battery from the processor board by inserting a nonconductive probe into the battery holder and pushing back on the battery to release it (Figure 2-37).

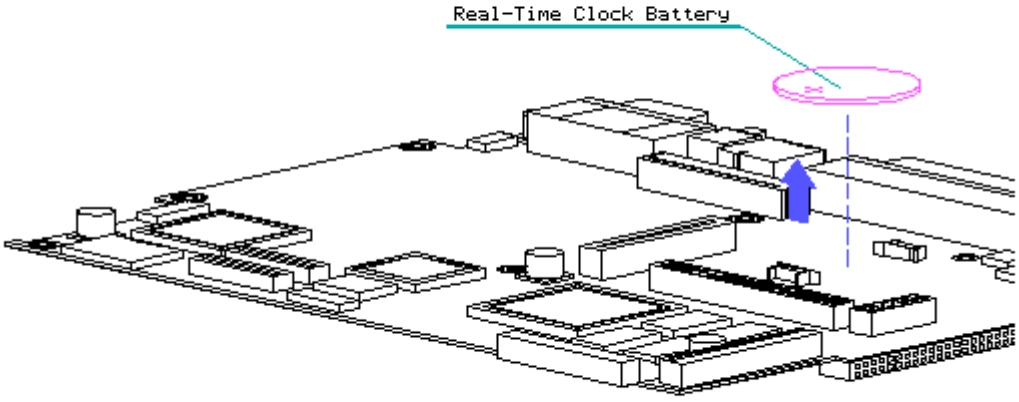


Figure 2-37. Removing the Real-Time Clock Battery

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

Chapter 2.15 SYSTEM CHASSIS

To remove the system chassis, complete the following steps:

1. Remove the battery pack (Section 2.5).
2. Remove the top cover (Section 2.6).
3. Remove the sheet metal cover (Section 2.7).
4. Remove the keyboard (Section 2.8).
5. Remove the VGA edgelit display (Section 2.9).
6. Remove the power supply (Section 2.10).
7. Remove the user interface board (Section 2.11).
8. Remove the hard drive (Section 2.12).
9. Remove the diskette drive (Section 2.13).
10. Remove the processor board (Section 2.14).
11. Remove the system chassis by gently separating it from the computer base and pulling up on the system chassis (Figure 2-38).

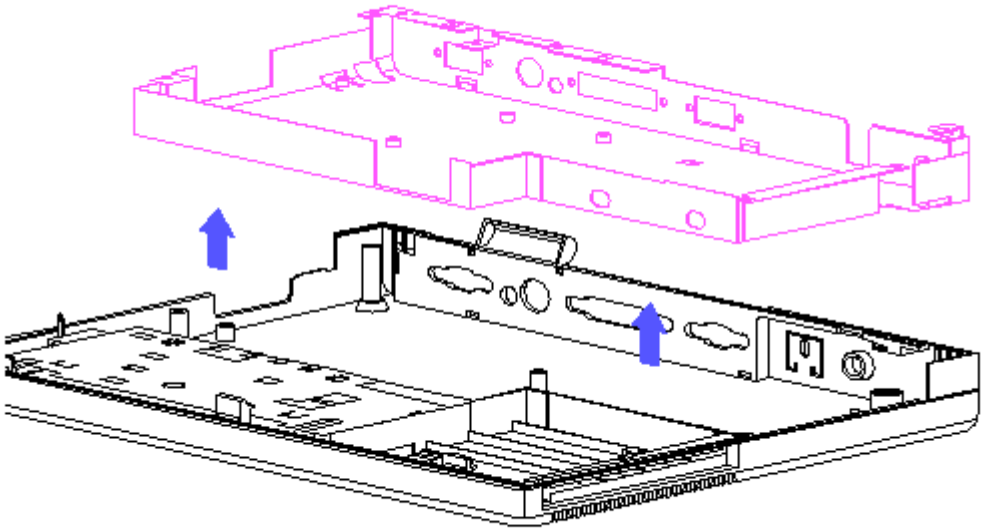


Figure 2-38. Removing the System Chassis

To replace the system chassis, reverse the previous steps.

Chapter 3 - Power-On Self-Test (Post)

INTRODUCTION

This chapter lists the assemblies checked by the Power-On Self-Test (POST) and briefly describes the types of error codes that can occur. The chapter also includes problem isolation procedures and a flowchart for quick reference.

Chapter 3.1 POST

POST is a series of diagnostic tests that run automatically on the COMPAQ Contura Family of Personal Computers when the system is turned on.

POST checks the following assemblies to ensure that the computer system is functioning properly:

- System Board
- I/O Board
- Memory Expansion Boards
- Keyboard
- Controller Circuitry
- VGA Edgelit Display
- Hard Drive
- Diskette Drive

POST also detects the type of mass storage devices installed in the computer.

If POST finds an error in the system, an error condition is indicated by an audible and/or visual message. See Chapter 4, "Error Messages and Codes," for an explanation of the error codes and a recommended course of action.

Chapter 3.2 PRELIMINARY STEPS

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

1. Turn off the computer. Do not remove the battery pack.

2. Disconnect any external devices (leave the AC Adapter attached). Do not disconnect 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. Clear the power-on password, if it is 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. To delete the password, type the current password immediately followed by a backslash (\ ) and press the Enter key.

If you do not have access to the password, you must disable the power-on password. Refer to Section 3.3, "Clearing Power-on Password," for information on how to disable the power-on password.

5. Position the brightness and contrast controls approximately in the center of their range.

6. Insert the Diagnostics diskette into drive A.

7. Turn on the computer.

8. Follow the procedures of the Problem Isolation Flowchart, Section 3.4.

Refer to Chapter 4, "Error Messages and Codes," for detailed information on problem isolation.

Chapter 3.3 CLEARING POWER-ON PASSWORD

To clear the power-on password feature, you must disable the power-on password by removing the clock/calendar battery from the system module, waiting at least 60 seconds, then replacing it. To do so, complete the following steps:

1. Disconnect the AC power.

2. Remove the keyboard.

3. Remove the memory expansion board, if applicable. (Refer to the OPTIONS MAINTENANCE AND SERVICE GUIDE for more information.)

4. Locate the clock/calendar battery on the system board (Figure 3-1).

5. Remove the battery by inserting a nonconductive probe into the battery holder and push back on the battery to release it.

When the battery is removed, wait at least 60 seconds to clear CMOS; then replace the battery.

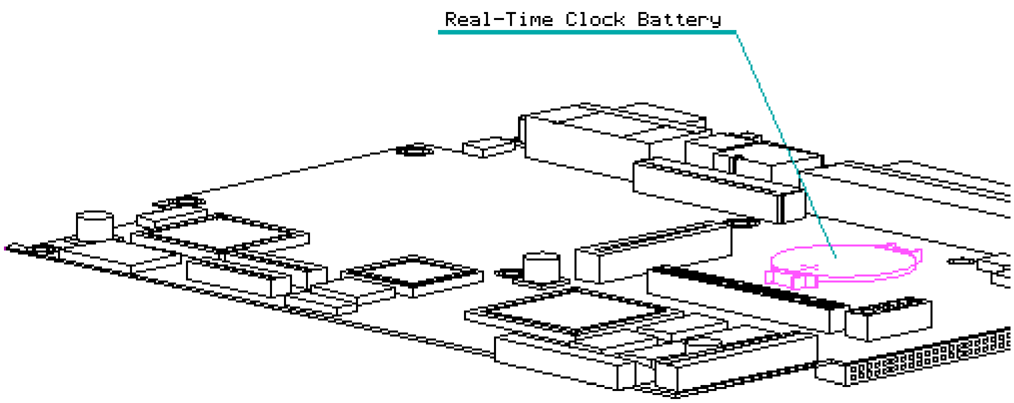


Figure 3-1. Clock/Calendar Battery on the COMPAQ Contura Family of Personal Computers

6. Reassemble the computer (refer to Chapter 2, "Removal and Replacement Procedures") then, reconnect the AC power.

7. Turn on the computer and allow it to complete POST. If the key icon (o--m) does not appear when POST completes, the power-on password was erased.

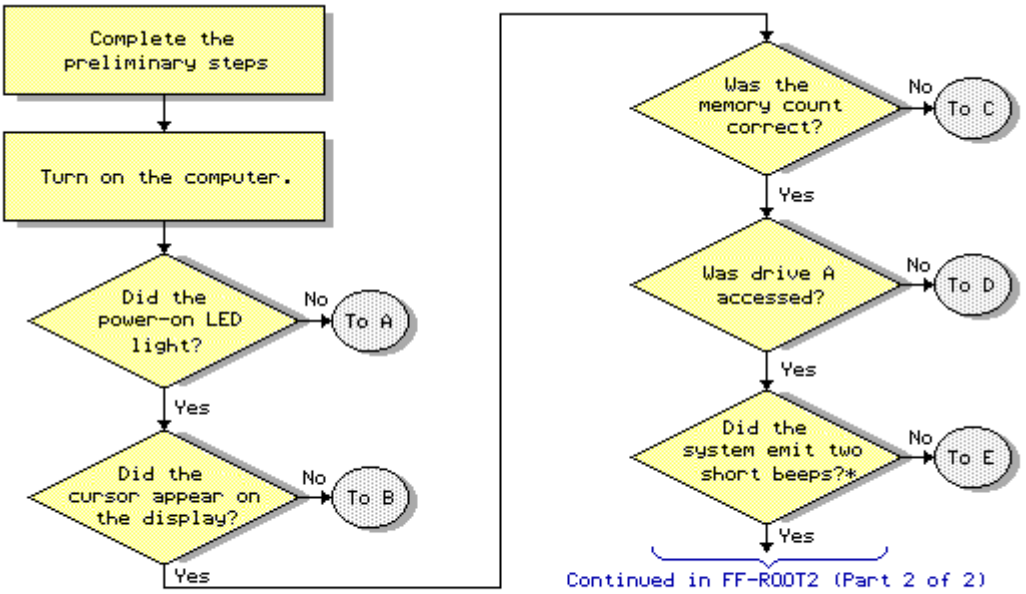
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> WARNING <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<

The clock/battery contains lithium. Do not abuse, disassemble, recharge, or dispose of a lithium battery cell in fire. It may explode if mishandled. Disposal of the lithium battery cell should be done in compliance with local regulations. Use only replacement battery packs supplied by Compaq Computer Corporation (spare part numbers 129948-001 or 129894-001).

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

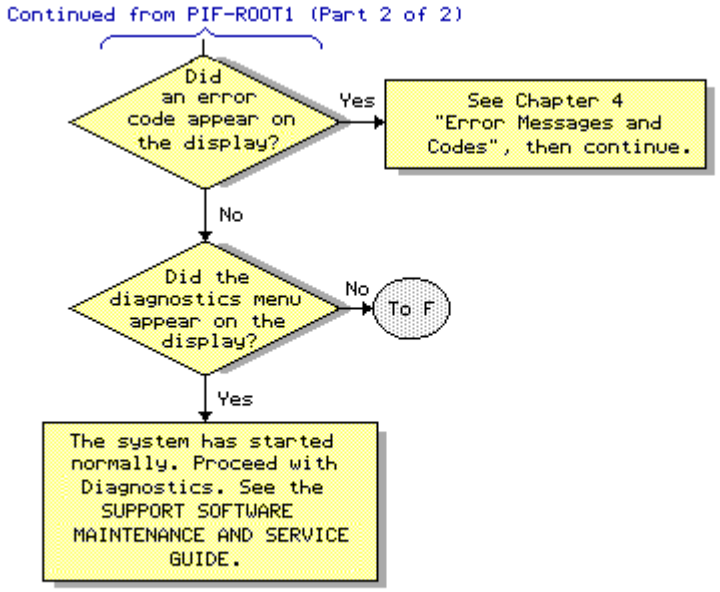
Chapter 3.4 PROBLEM ISOLATION FLOWCHART

The problem isolation flowchart provides a quick reference for identifying and correcting problems that may occur during POST. The flowchart gives troubleshooting procedures for identifying malfunctions. It also directs you to the MAINTENANCE AND SERVICE GUIDE SUPPORT SOFTWARE and to Chapter 4, "Error Messages and Codes," for more detailed troubleshooting information.

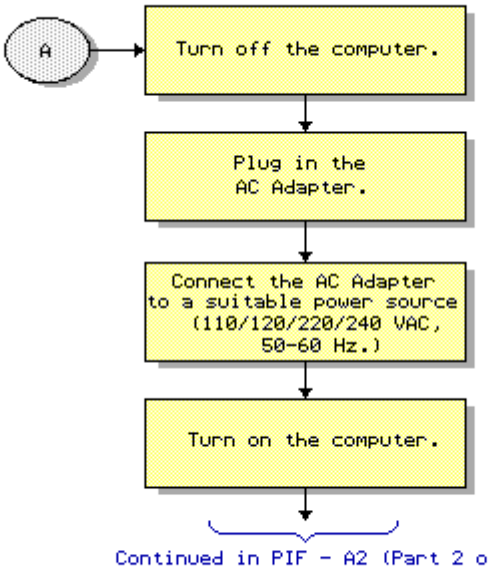


* Beeps can be disabled by the user during the SETUP program or through the PWRCON Utility from the USER PROGRAMS diskette.

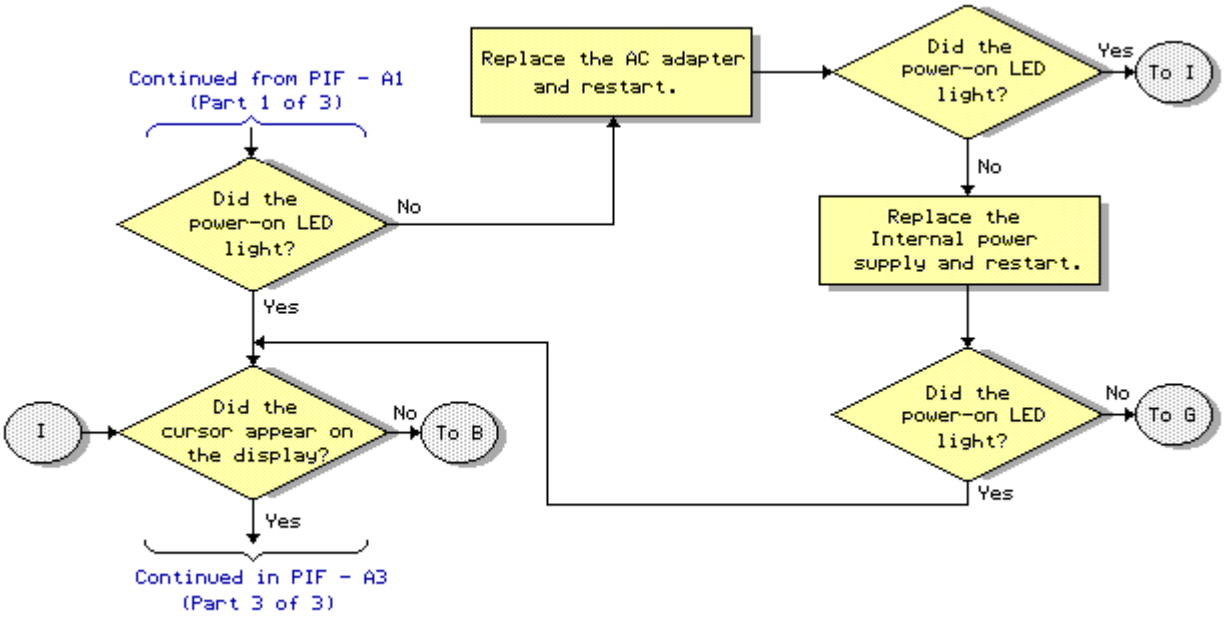
Problem Isolation Flowchart - ROOT1 (Part 1 of 2)



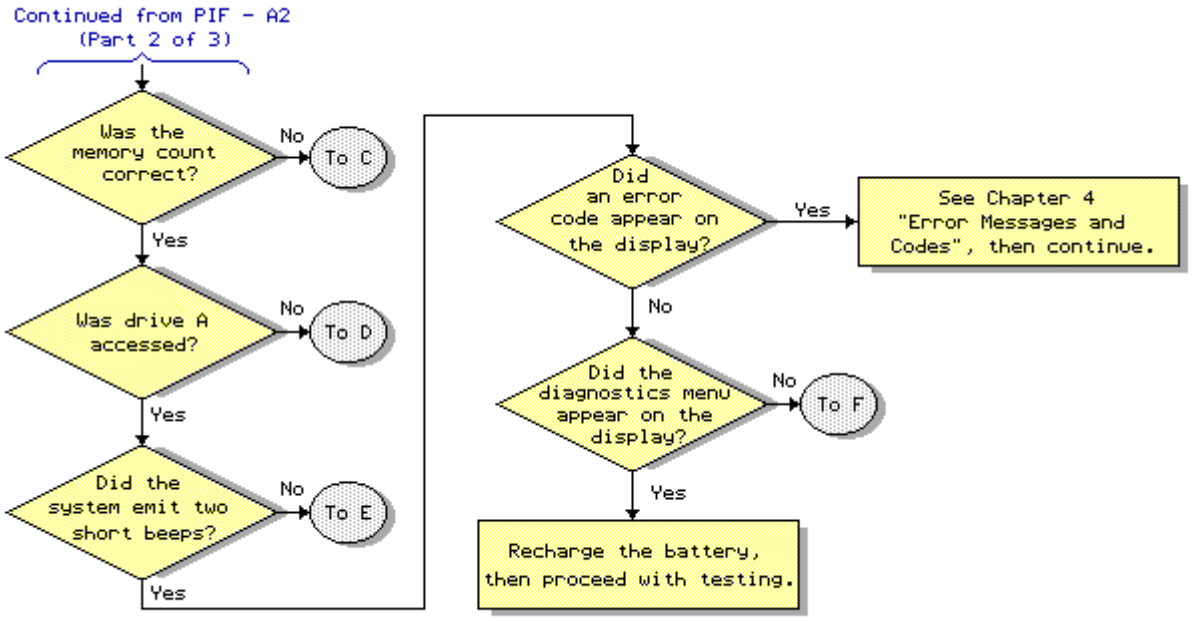
Problem Isolation Flowchart - ROOT2 (Part 2 of 2)



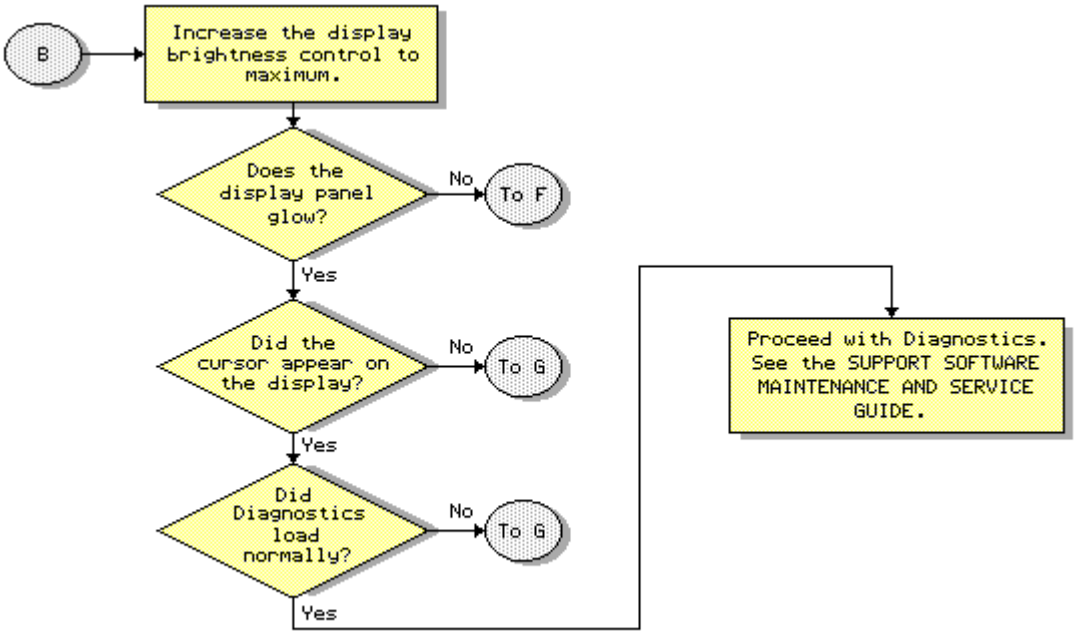
Problem Isolation Flowchart - A1 (Part 1 of 3)



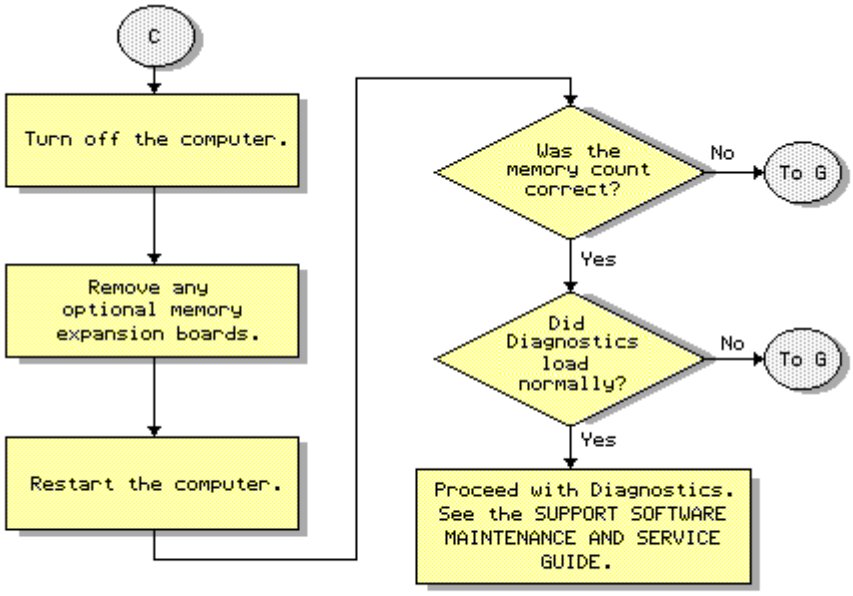
Problem Isolation Flowchart - A2 (Part 2 of 3)



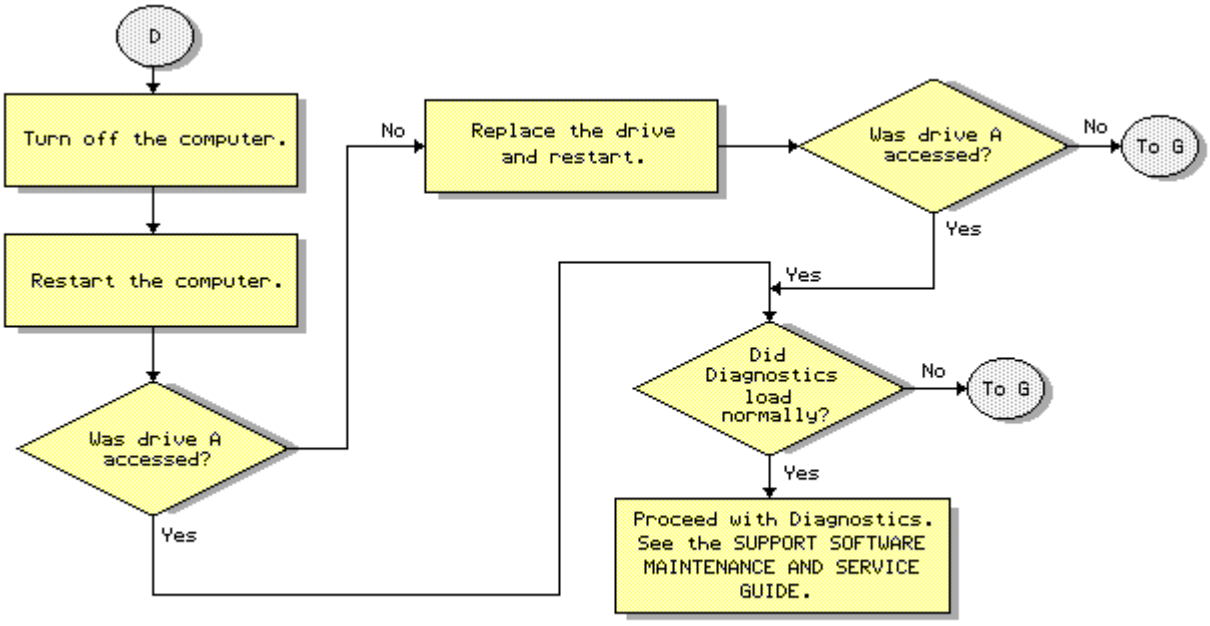
Problem Isolation Flowchart - A3 (Part 3 of 3)



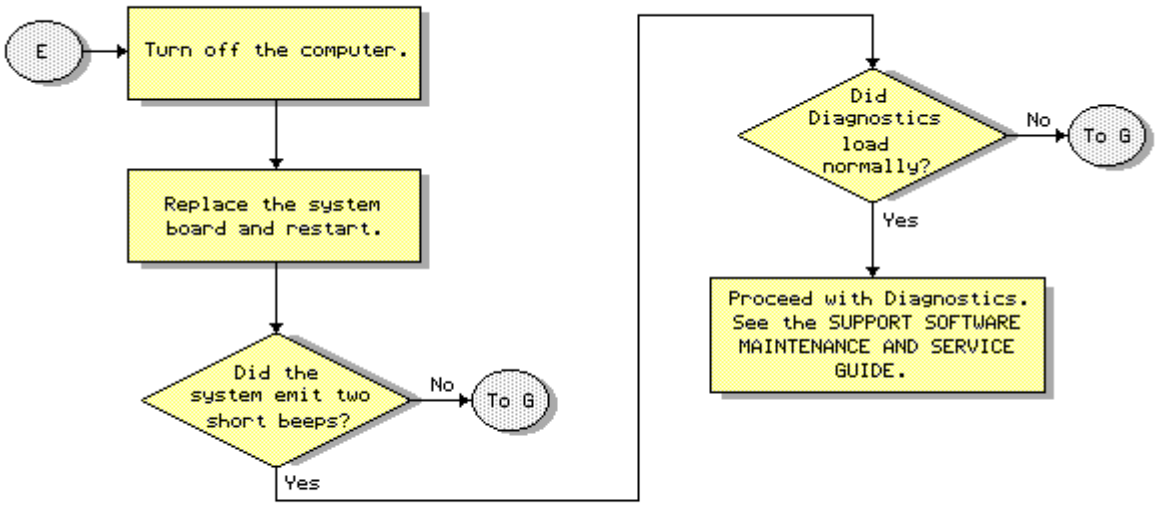
Problem Isolation Flowchart - B



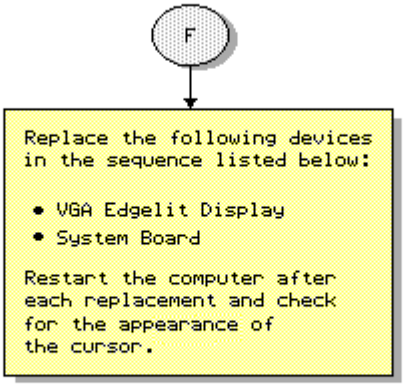
Problem Isolation Flowchart - C



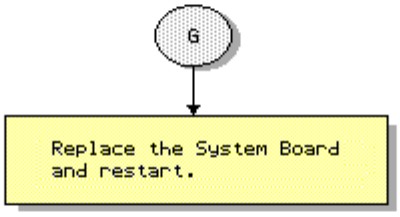
Problem Isolation Flowchart - D



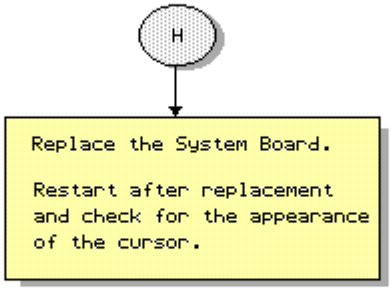
Problem Isolation Flowchart - E



Problem Isolation Flowchart - F



Problem Isolation Flowchart - G



Problem Isolation Flowchart - H

Chapter 4 - Error Messages and Codes

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 4.1 POWER-ON SELF-TEST MESSAGES

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

Table 4-1 lists the messages for POST, the audible (beep) message, probable cause, and recommended action.

Table 4-1. Power-On Self-Test Messages

Message	Beeps	Probable Cause	Recommended Action
101-ROM Error	1 Long, 1 Short	ROM Checksum option	1. Inspect the ROM placement. 2. Verify the correct ROM. 3. Replace the ROM.
101-I/O ROM Error	1 Long, 1 Short	System ROM	1. Inspect the ROM placement. 2. Verify the correct ROM. 3. Replace the ROM.
102-System Board or System Memory Failure	None	System board	Replace the system module.
162-System Options Error	2 Short	Configuration error	Run SETUP.
162-System Options Error	2 Short	Configuration incorrect	Run SETUP.
163-Time & Date Not Set	2 Short	Invalid time or date configuration memory	Run SETUP.
164-Memory Size Error	2 Short	Configuration memory incorrect	Run SETUP.
167-RTC Lost Power	2 Short	Real-time clock/ calendar battery	Replace the clock/ calendar battery.

Message	Beeps	Probable Cause	Recommended Action
XX000Y ZZ * 201-Memory Error	None	RAM failure	1. Replace the memory card. 2. Replace the system board.
XX000Y ZZ *	None	RAM failure	Replace the system board.
205-Memory Error	None	Cache Memory error	Run Diagnostics.
301-Keyboard Error	None	Keyboard	Replace the keyboard.
301-Keyboard Error or Test Fixture Installed	None	Keyboard	Replace the keyboard.
303-Keyboard Controller Error	None	System board keyboard controller	Replace the system board.
304-Keyboard or System Unit Error	None	Keyboard	1. Replace the keyboard. 2. Replace the system board.
601-Diskette Controller Error	None	Diskette Controller circuitry or no drive attached or, if attached, drive is defective	1. Check and/or replace the cable. 2. Run Diagnostics. 3. Replace the system board.
605-Diskette Drive Error	None	Mismatch in drive type	Run SETUP.
702-Coprocessor Detection Error	None	Coprocessor problem; added or removed the coprocessor	1. Run SETUP. 2. Check the coprocessor installation. 3. Replace the coprocessor.
1125-Internal Serial Port Failure	None	Defective internal port	Replace the system board.
1150-Comm Port Configuration Error	2 Short	Added or removed modem, or second serial interface board	Run SETUP.
1780-Disk 0 Failure	None	Hard drive/ format error	1. Run Diagnostics. 2. Replace the drive.
1781-Disk 1 Failure	None	Hard drive/ format error	1. Run Diagnostics. 2. Replace the drive.

Message	Beeps	Probable Cause	Recommended Action
1782-Disk Controller Failure	None	Hard drive controller error	1. Run Diagnostics. 2. Replace the drive.
1790-Disk 0 Error	None	Hard drive error	1. Run Diagnostics. 2. Replace the drive.
1791-Disk 1 Error	None	Hard drive 1 error	1. Run Diagnostics. 2. Replace the drive.
XX000Y ZZ Parity Check 2	None	Parity RAM failure	Run Diagnostics.
Audible	1 Short	Power-on successful	None.
Audible	2 Short	Power-on successful	None.
(RESUME=F1 key)	None	As indicated to continue	Press F1 key.

* Beeps can be disabled by the user during the SETUP program.

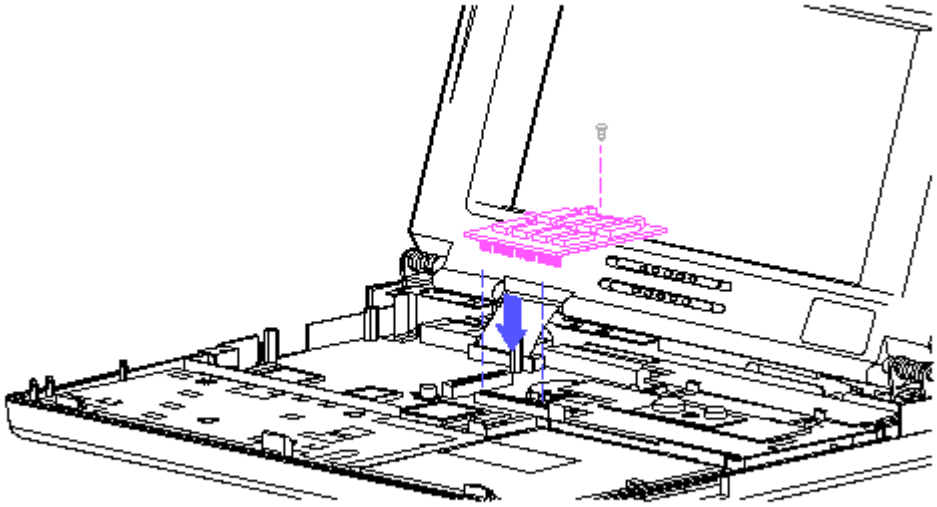


Figure 4-1. Memory Expansion Board Location

Chapter 4.2 DIAGNOSTIC ERROR CODES

Diagnostic error codes occur if the system recognizes a problem while running the Diagnostics program (refer to the MAINTENANCE AND SERVICE GUIDE

SUPPORT SOFTWARE for additional information on running the Diagnostics software). These error codes help identify possible defective subassemblies. Table 4-2 through Table 4-12 list possible error codes, a description of the error condition, and the action required to resolve the error condition.

In each case, the Recommended Action column lists steps necessary to correct the problem. After completing each step, run the Diagnostics program to verify whether the condition has been corrected. If the error code reappears, perform the next step, then run the Diagnostics program again. Follow this procedure until the Diagnostics program no longer detects an error condition.

The error codes appear in an AYY-XX or AAYY-XX format.

A or AA = number that represents faulty assembly

YY = test or action that failed

XX = a specific problem

For assistance in the removal and replacement of a particular subassembly, refer to Chapter 2, "Removal and Replacement Procedures."

Table 4-2. Processor Test Error Codes

Error Code	Description	Recommended Action
101-01	CPU test failed	Replace the system board and retest for error code 101-01.
102-01	Coprocessor initial status word incorrect	The following steps apply to error codes 102-xx: 1. Run SETUP. 2. Replace the coprocessor and retest. 3. Replace the system board and retest.
102-02	Coprocessor initial control word incorrect	
102-03	Coprocessor tag word not all ones	
102-04	Coprocessor tag word not all zeros	
102-05	Coprocessor exchange command failed	
102-06	Coprocessor masked exception incorrectly handled	
102-07	Coprocessor unmasked exception incorrectly handled	
102-08	Coprocessor wrong mask	

	bit set in status register	
102-09	Coprocessor unable to store real number	
102-10	Coprocessor real number calculation test failed	
102-11	Coprocessor speed test failed	
102-12	Coprocessor pattern test failed	
102-15	Coprocessor is inoperative or socket is unoccupied	

Error Code	Description	Recommended Action
103-01	DMA page registers test failed	Replace the system board and retest for error codes 103-xx through 114-xx.
103-02	DMA byte controller test failed	
103-03	DMA word controller test failed	
104-01	Interrupt controller master test failed	
104-02	Interrupt controller slave test failed	
104-03	Interrupt controller software RTC is inoperative	
105-01	Port 61 bit 6 not at zero	
105-02	Port 61 bit 5 not at zero	
105-03	Port 61 bit 3 not at zero	
105-04	Port 61 bit 1 not at zero	
105-05	Port 61 bit 0 not at zero	
105-06	Port 61 bit 5 not at one	
105-07	Port 61 bit 3 not at one	
105-08	Port 61 bit 1 not at one	
105-09	Port 61 bit 0 not at one	
105-10	Port 61 I/O test failed	
105-11	Port 61 bit 7 not at zero	

105-12	Port 61 bit 2 not at zero	
106-01	Keyboard controller self-test failed	

Error Code	Description	Recommended Action
107-01	CMOS RAM test failed	Replace the system board and retest for error codes 103-xx through 114-xx.
108-02	CMOS interrupt test failed	
108-03	CMOS interrupt test, CMOS not properly initialized	
109-01	CMOS clock load data test failed	
109-02	CMOS clock rollover test failed	
109-03	CMOS clock test, CMOS not properly initialized	
110-01	Programmable timer load data test failed	
110-02	Programmable timer dynamic test failed	
111-01	Refresh detect test failed	
112-01	Speed test slow mode out of range	
112-02	Speed test mixed mode out of range	
112-03	Speed test fast mode out of range	
112-04	Speed test unable to enter slow mode	
112-05	Speed test unable to enter mixed mode	
112-06	Speed test unable to enter fast mode	
112-07	Speed test system error	

Error Code	Description	Recommended Action

112-08	Speed test unable to enter auto mode	Replace the system board and retest for error codes 103-xx through 114-xx.
112-09	Speed test unable to enter high mode	
112-10	Speed test high mode out of range	
112-11	Speed test auto mode out of range	
113-01	Protected mode test failed	
114-01	Speaker test failed	

Table 4-3. Memory Test Error Codes

Error Code	Description	Recommended Action
201-01	Memory machine ID test failed	The following steps apply to error codes 201-xx through 202-xx: 1. Replace the system ROM and retest. 2. Replace the system board and retest.
202-01	Memory system ROM checksum failed	
202-02	Failed RAM/ROM map test	
202-03	Failed RAM/ROM protect test	
203-01	Memory write/read test	The following steps apply to error codes 203-xx through 211-xx: 1. Replace the memory card and retest. 2. Replace the system board and retest.
203-02	Error during saving program memory in write/read test	
203-03	Error during restore of program memory in write/read test	
204-01	Memory address test failed	
204-02	Error during saving program memory in address test	
204-03	Error during restore of program memory in address test	
204-04	A20 address test failed	
204-05	Page hit address test failed	
205-01	Walking I/O test failed	
205-02	Error during saving program memory in walking I/O test	

205-03 Error during restore of program memory in walking I/O test

210-xx Increment Pattern Test

211-xx Random Pattern Test

Table 4-4. Keyboard Test Error Codes

Error Code	Description	Recommended Action
301-01	Keyboard short test, 8042 self-test failed	The following steps apply to error codes 301-xx through 304-xx: 1. Check the keyboard connection. If disconnected, turn off the computer and connect the keyboard. 2. Replace the keyboard and retest. 3. Replace the system board and retest.
301-02	Keyboard short test, interface test failed	
301-03	Keyboard short test, echo test failed	
301-04	Keyboard short test failed	
302-01	Keyboard long test failed	
303-01	Keyboard LED test, 8042 self-test failed	
303-02	Keyboard LED test, reset test failed	
303-03	Keyboard LED test, reset test failed	
303-04	Keyboard LED test, LED command test failed	
303-05	Keyboard LED test, LED command test failed	
303-06	Keyboard LED test, LED command test	
303-07	Keyboard LED test, LED command test failed	
303-08	Keyboard LED test, command byte restore test failed	
303-09	Keyboard LED test, LEDs failed to light	
304-01	Keyboard typematic test failed	
304-02	Unable to enter mode 3	
304-03	Incorrect scan code from	

	keyboard	
304-04	No make code observed	
304-05	Unable to disable typematic feature	
304-06	Unable to return to normal mode	

Table 4-5. Parallel Printer Test Error Codes

Error Code	Description	Recommended Action
401-01	Printer failed or not connected	The following steps apply to error codes 401-xx through 498-xx: 1. If a printer is connected, be sure it is turned ON and in the ONLINE mode. 2. Replace the printer and/or the printer cable and retest. 3. Replace the system board and retest.
402-01	Printer data register failed	
402-02	Printer control register failed	
402-03	Printer data and control register failed	
402-04	Printer loopback failed	
402-05	Printer loopback and data failed	
402-06	Printer loopback and control register failed	
402-07	Printer loopback, data, and control register failed	
402-08	Printer interrupt test failed	
402-09	Printer interrupt and data register failed	
402-10	Printer interrupt and control register failed	
402-11	Printer interrupt and loopback failed	
402-13	Printer interrupt loopback, and data register failed	
402-14	Printer interrupt, loopback, and control register failed	
402-15	Printer interrupt, loopback, data, and control register failed	

402-16	Printer unexpected interrupt received
403-01	Printer pattern test failed
498-00	Printer failed or not connected

Table 4-6. Diskette Drive Test Error Codes

Error Code	Description	Recommended Action
600-xx	Diskette ID drive types test failed	The following steps apply to error codes 600-xx through 610-xx: 1. Replace the diskette and retest. 2. Check and/or replace the drive cable and retest. 3. Replace the diskette drive and retest. 4. Replace the system board and retest.
601-xx	Diskette format failed	
602-xx	Diskette read test failed	
603-xx	Diskette write, read, compare test failed	
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	
01	Exceeded maximum soft error limit	
02	Exceeded maximum hard error limit	
03	Previously exceeded maximum soft error limit	
04	Previously exceeded maximum hard error limit	
05	Failed to reset controller	
06	Fatal error while reading	
07	Fatal error while writing	

Error Code	Description	Recommended Action
610-08	Failed compare of write/read buffers	The following steps apply to error codes 600-xx through 610-xx: 1. Replace the diskette and retest. 2. Check and/or replace the drive cable and retest. 3. Replace the diskette drive and retest. 4. Replace the system board and retest.
09	Failed to format a track	
10	Failed sector wrap test	
20	Failed to get drive type	
21	Failed to get change line status	
22	Failed to clear change line status	
23	Failed to set drive type in ID media	
24	Failed to read diskette media	
25	Failed to verify diskette media	
26	Failed to read media in speed test	
27	Failed speed limits	
28	Failed write protect test	
697-00	Diskette type error	The following steps apply to error codes 697-xx through 698-xx: 1. Replace the diskette and retest. 2. Check and/or replace the diskette limits drive cable and retest. 3. Replace the diskette drive and retest. 4. Replace the system module and retest
698-00	Diskette drive speed not within	
699-00	Diskette drive/media ID error, rerun SETUP	1. Replace the media. 2. Run SETUP.

Table 4-7. Serial Test Error Codes

Error Code	Description	Recommended Action
1101-01	Serial Port Test; UART DLAB bit failure	The following steps apply to error codes 1101-xx through 1109-xx: 1. Replace the modem and retest. 2. Check the modem line. 3. Replace the system board and retest.
1101-02	Serial Port Test; line input or UART fault	
1101-03	Serial Port Test; address	

line fault

1101-04 Serial Port Test; data line fault

1101-05 Serial Port Test; UART control signal failure

1101-06 Serial Port Test; UART THRE bit failure

1101-07 Serial Port Test; UART DATA READY bit failure

1101-08 Serial Port Test; UART TX/RX buffer failure

1101-09 Serial Port Test; INTERRUPT circuit failure

1101-10 Serial Port Test; COM1 set to invalid interrupt

1101-11 Serial Port Test; COM2 set to invalid interrupt

1101-12 Serial Port Test; DRIVER/RECEIVER control signal failure

1101-13 Serial Port Test; UART control signal interrupt failure

1101-14 Serial Port Test; DRIVER/RECEIVER data failure

1109-01 Clock register initialization failure

1109-02 Clock register rollover failure

1109-03 Clock reset failure

1109-04 Input line or clock failure

1109-05 Address line fault

1109-06 Data line fault

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Table 4-8. Modem Communications Test Error Codes

Error Code	Description	Recommended Action
1201-xx	Modem Internal Loopback Test	The following steps apply to error codes 1201-xx through 1210-xx: 1. Refer to the modem documentation for SETUP procedures and retest. 2. Check the modem line. 3. Replace the modem and retest.
01	UART DLAB bit failure	
02	Line input or UART failure	
03	Address line fault	
04	Data line fault	
05	UART control signal failure	
06	UART THRE bit failure	
07	UART DATA READY bit failure	
08	UART TX/RX buffer failure	
09	INTERRUPT circuit failure	
10	COM1 set to invalid interrupt	
11	COM2 set to invalid interrupt	
12	DRIVER/RECEIVER control signal failure	
13	UART control signal interrupt failure	
14	DRIVER/RECEIVER data failure	
15	Modem detection failure	
16	Modem ROM; checksum failure	
17	Tone detection failure	

1202-xx	Internal Modem Test	
Error Code	Description	Recommended Action
1202-01	Modem timed-out waiting for SYNC (local loopback mode)	The following steps apply to error codes 1201-xx through 1210-xx: 1. Refer to the modem documentation

		for SETUP procedures and retest.
02	Modem time-out waiting for response (local loopback mode)	2. Check the modem line. 3. Replace the modem and retest.
03	Modem exceeded data block retry limit (local loopback mode)	
11	Modem timed-out waiting for SYNC (analog loopback originate mode)	
12	Modem timed-out waiting for modem response (analog loopback originate mode)	
13	Modem exceeded data block retry limit (analog loopback originate mode)	
13	Modem timed out waiting for SYNC (analog loopback answer mode)	
22	Modem timed out waiting for modem response (analog loopback answer mode)	
23	Modem exceeded data block retry limit (analog loopback answer mode)	
1203-xx	Modem External Termination test	
01	Modem external TIP/RING failure	
02	Modem external DATA TIP/RING failure	
03	Modem line termination failure	
1204-xx	Modem Auto Originate test	

Error Code	Description	Recommended Action
1205-xx	Modem Auto Answer test	The following steps apply to error codes 1201-xx through 1210-xx:
1206-xx	Dial Multifrequency Tone test	1. Refer to the modem documentation for SETUP procedures and retest. 2. Check the modem line.
1210-xx	Modem Direct Connect test	3. Replace the modem and retest.
01	Modem timed out waiting	

	for SYNC
02	Modem timed out waiting for response
03	Modem exceeded data block retry limit
04	RCV exceeded carrier lost limit
05	XMIT exceeded carrier lost limit
06	Time-out waiting for dial tone
07	Dial number string too long
08	Modem timed out waiting for remote response
09	Modem exceeded maximum redial limit
10	Line quality prevented remote connection
11	Modem timed out waiting for remote connection
17	Tone detection failure

Table 4-9. Hard Drive Test Error Codes

Error Code	Description	Recommended Action
1700	Hard drive ID drive types test failed	The following steps apply to error codes 1700-xx through 1719-xx: 1. Replace the hard drive and retest. 2. Replace the system board and retest.
1701-xx	Hard drive format test failed	
1702-xx	Hard drive read test failed	
1703-xx	Hard drive write/read compare test failed	
1704-xx	Hard drive random seek test failed	
1705-xx	Hard drive controller test failed	
1706-xx	Hard drive ready test failed	

1707-xx Hard drive recalibrate 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

01 Exceeded maximum soft error limit

Error Code	Description	Recommended Action
1719-02	Exceeded maximum hard error limit	The following steps apply to error codes 1700-xx through 1719-xx: 1. Replace the hard drive and retest. 2. Replace the system board and retest.
03	Previously exceeded maximum soft error limit	
04	Previously exceeded maximum hard error limit	
05	Failed to reset controller	
06	Fatal error while reading	
07	Fatal error while writing	
08	Failed compare of write/read/compare	
09	Failed to format a track	

Error Code	Description	Recommended Action
10	Failed sector wrap test	
19	Controller failed to deallocate bad sector	
40	Failed cylinder 0	
41	Drive not ready	
42	Recalibrate failed	
43	Failed to format bad track	
44	Failed disk controller diagnostics	
45	Failed to get drive parameters from ROM	
46	Invalid drive parameters found in ROM	
47	Failed to park heads	
48	Failed to move disk table to RAM	The following steps apply to error codes 1700-xx through 1719-xx: 1. Replace the hard drive and retest. 2. Replace the system board and retest.
49	Failed to read media in file write test	
50	Failed file I/O write test	
51	Failed file I/O read test	
52	Failed file I/O compare test	
53	Failed drive/head register test	
54	Failed digital input register test	
55	Failed cylinder 1	
56	Hard drive controller RAM diagnostics failed	
57	Hard drive controller to drive test failed	
58	Failed to write sector buffer	
59	Failed to read sector	

	buffer	
60	Failed to compare sector buffer	
61	Failed uncorrectable ECC * error	
62	Failed correctable ECC * error	
63	Failed soft error rate	
65	Exceeded maximum bad sector per track	

Error Code	Description	Recommended Action
1719-66	Failed initial drive parameter	The following steps apply to error codes 1700-xx through 1719-xx: 1. Replace the hard drive and retest. 2. Replace the system board and retest.
67	Failed to write long	
68	Failed to read long	
69	Failed to read drive size from controller	
70	Failed translate mode	
71	Failed nontranslated mode	
72	Bad track limit exceeded	
73	Previously exceeded bad track limit	
74	Failed sleep mode	
75	Failed idle mode	
76	Failed standby mode	
77	Failed to change mode	
78	Exceeded spinup time limit	

* Error Correction Code

Table 4-10. Video Test Error Codes

Error Code	Description	Recommended Action
2402-01	Video memory test failed	The following steps apply to error codes 2402-xx through 2432-xx:
2403-01	Video attribute test failed	Replace the system board and retest.

2404-01	Video character set test failed
2405-01	Video 80x25 mode 9x14 character cell test failed
2406-01	Video 80x25 mode 8x8 character cell test failed
2407-01	Video 40x25 mode test failed
2408-01	Video 320x200 mode color set 0 test failed
2409-01	Video 320x200 mode color set 1 test failed
2410-01	Video 640x200 mode test failed
2411-01	Video screen memory page test failed
2412-01	Video gray scale test failed
2414-01	Video white screen test failed
2416-01	Video noise pattern test failed
2418-01	Video memory test failed
2418-02	Video shadow RAM test failed
2419-01	Video ROM checksum test failed
2420-01	Video attribute test failed

Error Code	Description	Recommended Action
2421-01	Video 640x200 graphics mode test failed	The following steps apply to error codes 2402-xx through 2432-xx: Replace the system board and retest.
2422-01	Video 640x350 16 color set test failed	
2423-01	Video 640x350 64 color set test failed	

2424-01	Video monochrome text mode test failed	
2425-01	Video monochrome graphics mode test failed	
2431-xx	Video 640x480 graphics mode test failed	
2432-xx	Video 320x200 graphics mode test failed	
3601-xx	Pointing Device Interface test	1. Replace with a working pointing device and retest. 2. Replace the system board and retest.

Chapter 5 - Specifications

INTRODUCTION

This chapter provides physical, environmental, and performance specifications for the COMPAQ Contura Family of Personal Computers and the following subsystems:

- VGA Edgelit Display
- 3 1/2-Inch 1.44 Megabyte Diskette Drive
- Hard Drive
- Internal Power Supply
- Battery Pack

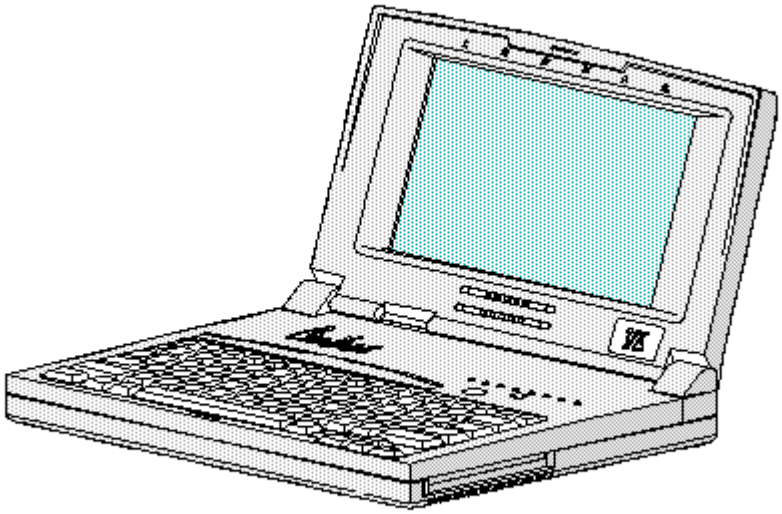

Figure 5-1. COMPAQ Contura Family of Personal Computers

Chapter 5.1 SYSTEM UNITS

Dimensions:		
Height	8.9 in	22.6 cm
Width	11.7in	29.7 cm
Depth	1.9 in	4.8 cm
Weight:		
Model 120	6.2 lb	2.80 kg
Model 84	6.2 lb	2.80 kg
Model 60	6.2 lb	2.80 kg
Model 40	6.2 lb	2.80 kg

Standalone (Battery Pack)		
Power Requirements:		
Nominal Operating Voltage	12 VDC	
Average Power	10.0 W	
Peak Power	21.0 W	
Environmental Requirements:		
Temperature		
Operating	50oF to 104oF	10oC to 40oC
Nonoperating	-4oF to 140oF	-20oC to 60oC
Relative Humidity (noncondensing):		
Operating	10% to 90%	
Nonoperating	5% to 95% #	
Acoustic Noise:		
Power	3.7 Bels (A)	4.8 Bels (A)
Pressure	33 dBA	42 dBA
Shock and Vibrations:		
Shock	10 G, 11 ms, half sine (operating) 60 G, 11 ms, half sine (nonoperating)	
Vibration	0.25 G, 5-500 Hz 1/2 octave/min sweep (operating) 1 hr. duration 1.0 G, 5-500 Hz 1/2 octave/min sweep (nonoperating) 1 hr. duration	
Maximum Unpressurized Altitude:		
Operating	10,000 ft	3,658 m
Nonoperating	30,000 ft	12,192 m

* This may be limited by the number of options installed.
# 38.7o maximum wet bulb.

Chapter 5.2 VGA EDGELIT DISPLAY

Dimensions (image area):		
Height	5.67 in	14.30 cm
Width	7.56 in	19.20 cm
Diagonal Size	9.5 in	24.0 cm
Mounting	Internal	
Display	STN-Edgelit LCD	
Gray Scales	16 (640 x 480) 64 (320 x 240)	
Brightness/Contrast	Adjustable	
Maximum Pixel Resolution	640 x 480	

Character Display	80/40 x 25
Horizontal Frequency	30 kHz
Vertical Frequency	125 Hz
Display Inverter Board:	
Operating Voltage (Backlight)	350Vrms typical @1.76 W, 25oC
Maximum Input Power	2.4 W
Maximum Output Power (Backlight)	1.76 W

Chapter 5.3 DISKETTE DRIVE

	1.44 MB
Diskette Size	3 1/2 in
Light Indicators:	
Read/Write (high density)	Green
Read/Write (low density)	Green
Capacity Per Diskette (high/low)	1.44 MB/720 KB
Drives Supported	One
Drive Height	0.6 in (1.55 cm)
Drive Rotation (rpm)	300
Transfer Rate (bps) (high/low)	500 K/250 K
Bytes Per Sector	512
Sectors Per Track (high/low)	18/9
Tracks Per Side (high/low)	80/80
Access Times:	
Track-to-Track (ms)	3/3
Average (ms)	94/94
Settling Time (ms)	15.6
Latency Average (ms)	100
Cylinders (high/low)	80/80
Read/Write Heads	2

Chapter 5.4 HARD DRIVES

COMPAQ Contura 3/25 Personal Computer

	120 MB	60 MB
Standard Configurations	Model 120	Model 60
Light Indicators	Green	Green
Formatted Capacity Per Drive:		
Physical	121.8	63.8 MB
Logical	121.4	63.8 MB
Drives Supported	One	One
Drive Height	.75 in 1.9 cm	.75 in 1.9 cm
Drive Size	2.75 in 6.98 cm	2.75 in 6.98 cm
Drive Type	50	60
Transfer Rate (Mbits/sec):		
Head	18	12
Interface	6.5	4.5
Sector Interleave	1:1	1:1
Bytes Per Sector	512	512
Sectors Per Track:		
Physical	54	39
Logical	39	38
Number of Surfaces:		
Physical	4	4
Logical	8	4
Access Times (including settling):		
Track-to-Track (ms)	5	5
Average (ms)	17	19
Maximum (ms)	40	40
Physical Cylinders	1122	823
Physical Read/Write Heads	4	4
Logical Cylinders	760	820
Logical Read/Write Heads	8	4

COMPAQ Contura 3/20 Personal Computer

	84 MB	40 MB
Standard Configurations	Model 84	Model 40
Light Indicators	Green	Green
Formatted Capacity Per Drive:		
Physical	85.37 MB	42.68 MB
Logical	84.34 MB	42.65 MB
Drives Supported	One	One
Drive Height	.75 in 1.9 cm	.75 in 1.9 cm
Drive Size	2.75 in 6.98 cm	2.75 in 6.98 cm
Drive Type	27	53
Transfer Rate (Mbits/sec):		
Head	12	12
Interface	6.5	6.5
Sector Interleave	1:1	1:1
Bytes Per Sector	512	512
Sectors Per Track:		
Physical	39	39
Logical	38	38
Number of Surfaces:		
Physical	4	2
Logical	6	4
Access Times (including settling):		
Track-to-Track (ms)	5	5
Average (ms)	19	19
Maximum (ms)	40	40
Physical Cylinders	97	1097
Physical Read/Write Heads	4	2
Logical Cylinders	832	548
Logical Read/Write Heads	6	4

Chapter 5.5 INTERNAL POWER SUPPLY

Input Requirements:	
Input Voltage	10-18 Vdc

```
  Standby                              6.0-10.0 Vdc
  Input Fuse                           5.0 A

Power Output:
  Steady State                         15.0 W
  Peak                                 15.0 W

Cooling                                Convection
-------------------------------------------------------------------------
VDC Output:
                          Nominal
                          Continuous     Maximum
Nominal     Current       Current        Peak        Regulation
Voltage     Minimum       Maximum        Current     Tolerance
-------------------------------------------------------------------------
+ 5.10      0.5 A         3.0 A          >3.0 A      +/- 3%
- 28.0      0.006 A       3.0 A          >0.03 A     +/- 10%
=========================================================================
```

Chapter 5.6 ENHANCED NICKEL CADMIUM (NiCd) BATTERY PACK

```
=========================================================================
Dimensions:
  Height                               0.85 in         2.16  cm
  Length                               5.6 in          14.2  cm
  Width                                3.8 in          9.65  cm

Weight                                 1.2 lb          545.5 gr

Power Supply:
  Nominal Open Circuit Voltage         20.4 VDC
  Capacity                             1.7 Ah

Environmental Requirements:
  Temperature
    Operating                          10oC to 40oC
    Nonoperating                       -20oC to 50oC (no time limit)
=========================================================================
```

Chapter 5.7 NICKEL METAL HYDRIDE (NiMH) BATTERY PACK

```
=========================================================================
Dimensions:
  Height                               0.85 in         2.16 cm
  Length                               6.87 in         17.4 cm
  Width                                2.97 in         7.53 cm

Weight                                 1.24 lb         562.5 gr

Power Supply:
  Nominal Open Circuit Voltage         12.0 VDC
  Capacity                             2.2 Ah

Environmental Requirements:
```

Temperature	
Operating	10oC to 40oC
Nonoperating	-20oC to 30oC (no time limit) -20oC to 40oC (< 3 months) -20oC to 50oC (< 1 month)