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MAINTENANCE AND SERVICE GUIDE COMPAQ CONTURA 400 FAMILY OF PERSONAL COMPUTERS

Second Edition (June 1995) First Edition (September 1994) Part Number 147951-002

Preface

This Maintenance and Service Guide is used for reference when servicing the Compaq Contura 400 Family of Personal Computers.

Compaq Computer Corporation reserves the right to make changes to the Compaq Contura 400 Family of Personal Computers without notice.

Symbols

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

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

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

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.

Locating Additional Information

The following documentation is available:

- o Compaq Contura 400 Family 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
- o Compaq QuickFind

Chapter 1. Illustrated Parts Catalog

Introduction



Figure 1-1. Compaq Contura 400 Personal Computer with Docking Base and Monitor Support Cover (All Models)

Chapter 1.1 Illustrated Parts Breakdown

The computer combines a display assembly and system unit module. The display and system unit module are joined together by clutches on either side secured by screws in the chassis and display enclosure allowing it to open and close. The system unit module is secured to the CPU base by screw locks in the rear and screws in the bottom of the system unit enclosure. The display assembly is secured by screws installed in the front bezel of the display enclosure.

This chapter provides a description of the system unit module, display assembly, docking base, and monitor support cover. It includes a complete parts breakdown.



Figure 1-2. Display Assembly, Keyboard Assembly, and CPU Base (All Models)

Chapter 1.2 Serial Number

The computer serial numbers should be provided to Compaq whenever requesting information or ordering spare parts. The serial number is located on the bottom of the computer.

The serial number on the Docking Base is located on the rear of the base.

Chapter 1.3 System Unit Module Overview

The system unit module (Figure 1-4) contains the following upgradable components:

o Hard drive

o Memory expansion board

o Processor upgrade (Contura 400 only)

A complete list of replaceable parts is included in Table 1-1. Major components include:

o Battery pack and compartment components

o Keyboard assembly

o Integrated trackball assembly

o Diskette drive

o System board

o PC Card (PCMCIA) ejector rails and components

The hard drive, memory expansion board, and battery pack are accessed from the bottom of the computer. To service the remaining system unit module components, the keyboard assembly must be removed. Most major components connect directly to the system board by connectors. The only cables in this unit are the display assembly cable, the display ground cable, and diskette drive cable.

Compaq Contura Models

Table 1-1 lists the Compaq Contura 400 Family of Personal Computer Models and standard features.

Model		Proc	cessor		Haro	l Drive	=== Ме	enory	Disp	==== lay	======	
Contura	400	486	DX2/40	MHz	170	 MB	4	 MB	9.5	==== in M	onochro	ome
Contura	400	486	DX2/40	MHz	250	MB	4	MB	9.5	in M	onochro	ome
Contura	400C	486	DX2/40	MHz	250	MB	4	MB	9.5	in C	olor ST	ΓN
Contura	400CX	486	DX2/40	MHz	250	MB	4	MB	8.4	in.	Color 5	$\Gamma F T$
Contura	410	486	DX2/50	MHz	250	MB	4	MB	9.5	in M	onochro	ome
Contura	410C	486	DX2/50	MHz	250	MB	4	MB	9.5	in C	olor ST	ΓN
Contura	410C	486	DX2/50	MHz	350	MB	4	MB	9.5	in C	olor SI	ΓN
Contura	410CX	486	DX2/50	MHz	350	MB	4	MB	8.4	in.	Color :	ΓFT
Contura	420C	486	DX4/75	MHz	350	MB	4	MB	10.4	in.	Color	STN
Contura	420C	486	DX4/75	MHz	420	MB	8	MB	10.4	in.	Color	STN
Contura	420CX	486	DX4/75	MHz	420	MB	8	MB	10.4	in.	Color	TFT
Contura	430C	486	DX4/100) MHz	420	MB	8	MB	10.4	in.	Color	STN
Contura	430C	486	DX4/100) MHz	720	MB	8	MB	10.4	in.	Color	STN
Contura	430CX	486	DX4/100) MHz	720	MB	8	MB	10.4	in.	Color	TFT

Table 1-1. Compaq Contura 400 Family of Personal Computer Models

Note: Processor, hard drive and memory upgrades are available for most models

Models 400 and 410

This section provides a description of the system unit module components for Models 400 and 410. These components are accessed from the bottom of the computer:

- o Hard drive -- The hard drive is easily replaced or upgraded from the bottom of the computer. Remove two screws from the hard drive compartment cover to access the hard drive. The hard drive mounts to the system chassis with a hard drive bracket and connects directly to the system board with no intervening cables. The hard drive bracket attaches to the hard drive with four screws.
- o Memory expansion -- System memory can be upgraded with optional memory expansion boards. An expansion board is added or replaced from the bottom of the computer through the memory compartment cover. The memory expansion board connects directly to the system board with two connectors.
- o Battery pack -- The Nickel Metal Hydride battery pack is accessed through the battery compartment.

To access the remaining system unit components, open the computer and remove the keyboard assembly. These components include the following:

- o Integrated trackball assembly -- The mechanical trackball is centrally located at the bottom of the keyboard assembly. The assembly consists of the trackball, retaining ring, and connector. The trackball assembly connects directly to the system board and is secured by one screw. It cannot be replaced with the optical trackball used in the Models 420 and 430. The mechanical trackball and optical trackball are not interchangeable.
- o System board -- The system board is mounted directly to the system chassis. All removable components connected to the system board, except for the PC Card rails, must be removed prior to removing the system board. The system board is unique and cannot be replaced by the one used in the Models 420 and 430.
- o Processor upgrade -- Systems that come with the DX2/40 MHz processor can be upgraded to the DX2/50 MHz processor. Place the upgrade processor into the two connectors on the system board (Refer to "Removal and Replacement Procedures, Section 3.11). Once installed, the processor overrides control of the system board processor. The system board processor is not removable.
- o Real-Time Clock Battery -- This battery is located directly behind the Trackball.
- o PC Card rails -- The PC Card rails are replaceable and are secured by two screws from the bottom of the system board and a clip on top of the rails. The rails are not interchangeable with those used in Models 420 and 430. The clip is common between all models. The header attaches directly to the system board and cannot be removed. The top and bottom

PC Card ejection levers are replaceable, but are not interchangeable with those used in the Models 420 and 430.

o Diskette drive -- The diskette drive attaches to the system board by a bracket and three screws. It is connected by a diskette drive cable and LIF connector. The bracket attaches to the drive with four screws. The drive is protected by an insulator between the system board and the drive.



Figure 1-3. System Unit Module for Models 400 and 410

Models 420 and 430

This section provides a description of the system unit module components for Models 420 and 430. These components are accessed from the bottom of the computer:

- o Hard drive -- The hard drive is easily replaced or upgraded from the bottom of the computer. Remove two screws from the hard drive compartment cover to access the hard drive. The hard drive mounts to the system chassis with a hard drive bracket and connects directly to the system board with no intervening cables. The hard drive bracket attaches to the hard drive with four screws.
- o Memory expansion -- System memory can be upgraded with optional memory expansion boards. An expansion board is added or replaced from the bottom of the computer through the memory compartment cover. The memory expansion board connects directly to the system board with two connectors.

o Battery pack -- The Nickel Metal Hydride battery pack is accessed through the battery compartment.

To access the remaining system unit components, open the computer and remove the keyboard assembly. These components include the following:

- o Integrated trackball assembly -- This optical trackball is centrally located at the bottom of the keyboard assembly. The assembly consists of the trackball, retaining ring, and connector. The trackball assembly connects directly to the system board and is secured by two screws. It cannot be replaced with the mechanical trackball used in the Compaq Models 400 and 410. The optical trackball and mechanical trackball are not interchangeable among computer models.
- o System board -- The system board is mounted directly to the system chassis. All removable components connected to the system board, except for the PC Card rails, must be removed prior to removing the system board. The system board is unique and cannot be replaced by the one used in the Compaq Models 400 and 410.
- o Processor upgrade -- Models 420 and 430 are equipped with either a DX4/75 MHz or a DX4/100 MHz processor on the system board. There are no upgrade provisions for these models.
- o Real-Time Clock Battery -- This battery is located in the left rear area of the system board.
- o PC Card rails -- The PC Card rails are replaceable and are secured by two screws from the bottom of the system board and a clip on top of the rails. The rails are not interchangeable with those used in Models 420 and 430. The clip is common between all models. The header attaches directly to the system board and cannot be removed. The top and bottom PC Card ejection levers are replaceable, but are not interchangeable with those used in the Models 400 and 410.
- o Diskette drive -- The diskette drive attaches to the system board by a bracket and three screws. It is connected by a diskette drive cable and LIF connector. The bracket attaches to the drive with four screws. The drive is protected by an insulator between the system board and the drive.



Figure 1-4. System Unit Module for Models 420 and 430

Chapter 1.4 Display Assembly Overview

Display Assembly Description

This section provides a description of the display assembly and components.

All display assemblies (Figure 1-5 and Figure 1-6) include the following replaceable parts:

o Bezel

- o Enclosure latches
- o Inverter board
- o Liquid crystal display (LCD) panel
- o Shield
- o Enclosure
- o Display cable and display ground cable

To replace the display assembly, the assembly must be removed from the system unit module. This is done by removing the keyboard assembly, disconnecting the display cable and display ground cable from the system unit module, removing the tilt feet and handle brackets, removing the rear clutch screws, and lifting off the display assembly.

To service display components, do not remove the display assembly from the system unit module (unless the display enclosure or clutch replacement is required). Access display components (inverter board or latches) by removing the bezel secured with four screws on the front of the display.

The display cable is a prefolded, flex cable that connects to the display inverter board with a low insertion force (LIF) connector. The other end of the display cable is exposed at the bottom of the display enclosure and connects to the system board with a zero insertion force (ZIF) slide connector.

The display ground cable connects to the display shield on one end, and the other end clips to a LIF-type spring clip located above the serial port between the system board and system chassis.

The display inverter board is aligned to the right of the display enclosure with pins. One end connects to the display cable; the other end connects to the backlight cable of the LCD panel.



Figure 1-5. Display Assembly for Models 400 and 410



Figure 1-6. Display Assembly for Models 420 and 430

Chapter 1.5 Docking Base

The docking base includes the following replaceable parts:

- o Battery door
- o Feet
- o Handle



Figure 1-7. Docking Base (All Models)

Chapter 1.6 Monitor Support Cover

The monitor support cover is used with the docking base. The foot on the monitor support cover is the only replaceable part.



Figure 1-8. Monitor Support for All Models

Chapter 1.7 System Unit Module Parts



Figure 1-9. System Unit Module Parts for Models 400 and 410

Table 1-2. System Unit Module Models 400 and 410				
Description	Spare Part Number	Notes		
1. Base enclosure	147856-001	<pre>Includes: a. PC Card eject levers, pin, door, and spring b. battery latch button and spring c. handle bracket, screws and washers d. battery shield, insulator e. tilt foot and screws f. warning label * g. anti-skid pads * h. memory door *</pre>		
2. System board - 486 DX2/40 MHz - 486 DX2/50 MHz	147944-001 147621-001	Include PC Card ejector rails, hard drive insulators, and gasket.		
3. Diskette drive bracket	147857-001			
4. Diskette drive	147963-001			

^ IN(ot 5110WI1 ====================================		
 15.	Screws kit *	147885-001	
14.	NiMH battery pack *	190626-001	
13.	Memory expansion board * - 4 MB - 8 MB - 16 MB - 24 MB	147654-001 147656-001 147658-001 189261-001	
12.	Hard drive bracket *	147872-001	
11.	Hard drive * - 350 MB - 250 MB - 170 MB	189111-001 199233-001 169685-001	Does not include hard drive bracket.
10.	Clutches	147858-002	Includes: a. left b. right
9.	Chassis	147865-001	
8.	PC Card ejection assembly	147871-001	Includes the following and screws *. a. rails b. clip c. screws *
7.	Mechanical Trackball	147876-001	
6.	Real-time clock battery	117099-001	
5.	Processor upgrade 486 DX2/50 MHz	169644-001	



Figure 1-10. System Unit Module Parts for Models 420 and 430

Table 1-3. System Unit Module Models 420 and 430				
Description	Spare Part Number	Notes		
1. Base enclosure	189239-001	<pre>Includes: a. PC Card eject levers, pin, door, and spring b. battery latch button and spring c. handle bracket, screws and washers d. battery shield, insulator e. tilt foot and screws f. warning label * g. anti-skid pads * h. memory door *</pre>		
2. System board - 486 DX4/75 MHz 4 MB	189115-001	Includes PC Card ejector rails, hard drive insulators, and gasket		
- 486 DX4/75 MHz 8 MB	189116-001			
- 486 DX4/100 MHz 8 MB	189134-001			

3.	Diskette drive bracket	189240-001	
4.	Diskette drive	147963-001	
5.	Real-time clock battery	117099-001	
б.	Optical Trackball assembly	189197-001	
7.	PC Card ejection assembly	189242-001	<pre>Includes the following and screws *. a. rails b. clip c. screws *</pre>
8.	Chassis	189241-001	
9.	Clutches	147858-001	Includes: a. left b. right
10.	Hard drive * - 720 MB - 540 MB - 420 MB - 350 MB	189156-001 189132-001 189112-001 189111-001	Does not include hard drive bracket.
11.	Hard drive bracket *	147872-001	
12.	Memory expansion board * - 4 MB - 8 MB - 16 MB - 24 MB	147654-001 147656-001 147658-001 189261-001	
13.	NiMH battery pack *	190626-001	
14.	Screws kit *	147885-001	
* No	ot Shown		

Chapter 1.8 Monochrome Display Assembly Parts



Figure 1-11. Monochrome Display Assembly for Models 400 and 410

Table 1-4. Monochrome Di	splay Assembly Model	ls 400 and 410
Description	Spare Part Number	Notes
1. Display bezel	147882-001	
2. Backlight inverter board	147622-001	
3. Display panel	147877-001	Includes labels and shield
4. Display cables	147884-001	Includes: a. display cable b. display ground cable
5. Display clutch (left and right)	147858-001	Includes screws for handle bracket, washer, tilt feet
6. Display enclosure kit	147880-001	Includes enclosure, latch, spring, and logo
7. Screw kit *	147885-001	
* Not Shown		

Chapter 1.9 Color STN (9.5 inch) Display Assembly Parts



Figure 1-12. CSTN (9.5 inch) Display Assembly for Models 400 and 410

Tal	ble 1-5. CSTN (9.5 inc	h) Display Assembly	Models 400 and 410
== De	scription	Spare Part Number	Notes
==: 1.	Display bezel	147883-001	
2.	Backlight inverter board	147624-001	
3.	Display panel	147878-001	Includes labels and shield
4.	Display cables	147884-001	Includes: a. display cable b. display ground cable
5.	Display clutch (left and right)	147858-001	Includes screws for handle bracket, washer, tilt feet
6.	Display enclosure kit	147881-001	Includes enclosure, latch, spring, and logo
7.	Screw kit *	147885-001	
*]	Not Shown		

Chapter 1.10 Color STN (10.4 inch) Display Assembly Parts



Figure 1-13. CSTN (10.4 inch) Display Assembly for Models 420 and 430

 Table 1-6. CSTN (10.4 inch) Display Assembly -- Models 420 and 430

 Spare Part

 Description
 Number

 Notes

 1. Display bezel
 189246-001

 2. Backlight inverter
 189135-001

3. Display panel	189113-001	Includes labels and shield
4. Display cables	189247-001	Includes: a. display cable b. display ground cable c. XOVER board
5. Display clutch (left and right)	147858-001	Includes screws for handle bracket, washer, tilt feet

6. Display enclosure kit	189245-001	Includes enclosure, latch, spring, logo and pad for Sharp CSTN
7. Screw kit *	147885-001	
* Not Shown		

Chapter 1.11 Color TFT (8.4 inch) Display Assembly Parts



Figure 1-14. CTFT (8.4 inch) Display Assembly for Models 400 and 410

Table 1-7. CTFT (8.4 inc	h) Display Assembly	Models 400 and 410
Description	Spare Part Number	Notes
1. Display bezel	147869-001	
2. Backlight inverter board	147624-001	
3. Display panel	147879-001	Includes labels and shield
4. Display cables	147884-001	Includes:

*]	Not Shown		
7.	Screw kit *	147885-001	
6.	Display enclosure kit	147881-001	Includes enclosure, latch, spring, and logo
5.	Display clutch (left and right)	147858-001	Includes screws for handle bracket, washer, tilt feet
			a. display cable b. display ground cable

Chapter 1.12 Color TFT (10.4 inch) Display Assembly Parts



Figure 1-15. CTFT (10.4 inch) Display Assembly for Models 420 and 430

 Table 1-8. CTFT (10.4 inch) Display Assembly -- Models 420 and 430

 Spare Part

 Description
 Number

 Notes

 1. Display bezel
 189244-001

2. Backlight inverter

* 1 ===	Not Shown		
7.	Screw kit *	147885-001	
6.	Display enclosure kit	189243-001	Includes enclosure, latch, spring, and logo.
5.	Display clutch (left and right)	147858-001	Includes screws for handle bracket, washer, tilt feet
4.	Display cables	189247-001	Includes: a. display cable b. display ground cable
3.	Display panel	189114-001	Includes labels and shield
	board	189136-001	

Chapter 1.13 Keyboards



Figure 1-16. Keyboard Assembly (All Models)

Table 1-9. Contura Notebook KeyboardsDescriptionSpare Part Number

1.	CPU Cover Includes: a. PC Card door b. spring * c. indicator panel d. light deflector	147860-001			
2.	U.S.	147875-001			
3.	U.K.	147875-003 *			
4.	German	147875-004 *			
5.	French	147875-005 *			
6.	Italian	147875-006 *			
7.	Spanish	147875-007 *			
8.	Danish	147875-008 *			
9.	Norwegian	147875-009 *			
10.	Swedish/Finnish	147875-010 *			
11.	Swiss	147875-011 *			
12.	French Canadian	147875-012 *			
13.	Portuguese	147875-013 *			
14.	Latin American	147875-016 *			
15.	Belgian	147875-018 *			
16.	Japanese	147875-019 *			
17.	Korean	147875-033 *			
18.	Brazilian	147875-035 *			
* Not Shown					



Figure 1-17. Enhanced Keyboards (All Models)

```
Table 1-10. Contura Enhanced Keyboards
_____
Description
                                          Spare Part Number
_____
1. Enhanced II Keyboard - Domestic
                                          140536-101
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	*
26.	Enhanced	III	Keyboard -	Beijing	140536-132	*
27.	Enhanced	III	Keyboard -	Segul	140536-133	*
28.	Enhanced	III	Keyboard -	Taipei	140536-134	*
29.	Enhanced	III	Keyboard -	Brazil	140536-135	*
* Not Shown						
** Bosnia-Herzegovina, Croatia, Slovenia, and Yugoslavia						
===:						

Chapter 1.14 Cables (Models 400 and 410)



Figure 1-18. Cables for Models 400 and 410

```
Table 1-11. Cables for Models 400 and 410DescriptionSpare Part Number1. Display cables147884-001a. CSTN (9.5 in) Models 400 and 410147884-001b. MSTN (9.5 in) (Model 400 only)C. CTFT (8.4 in) Models 400 and 410d. Ground cable for Models 400 and 410147866-001
```

Chapter 1.15 Cables (Models 420 and 430)



Figure 1-19. Cables for Models 420 and 430

Table 1-12. Cables for Models 420 and 430DescriptionSpare Part Number1. Display cables189247-001a. CTFT (10.4 in) Models 420 and 4300b. CSTN (10.4 in) Models 420 and 4300c. XOVER board for CSTN (10.4 in) only0d. Ground cable for Models 420 and 430147866-001

Chapter 1.16 Ac Adapter and Power Cord



Figure 1-20. AC Adapter (All Models)

```
Table 1-13. Contura AC Adapter and Power Cord
_____
Description (All Models)
                                  Spare Part Numbers
_____
1. AC adapter with wallprongs
                                  147679-001
2. AC adapter
                                  147679-002
3. Power cord (U.S./Canada)
                                  197230-001
4. Power cord (U.K.)
                                  197232-001 *
5. Power cord (Europe)
                                  197231-001 *
6. Power cord (Japan)
                                  197233-001 *
7. Power cord (Australia)
                                  197234-001 *
_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
                                            _ _ _ _ _ _ _ _ _ _ _ _ _
* Not shown
_____
```

Chapter 1.17 Memory and Processor



Figure 1-21. Memory and Processor Boards (All Models)

```
Table 1-14. Contura Memory and Processor
_____
Description (All Models)
                           Spare Part Numbers
_____
1. Memory expansion board
 a. 4 MB
                           147654-001
 b. 8 MB
                           147656-001
 c. 16 MB
                           147658-001
 d. 24 MB *
                           189261-001
2. Processor upgrade (Model 400 only)
 486 DX2/50 MHz
                           169644-001
-----
* Not Shown
_____
```

Chapter 1.18 Miscellaneous Carrying Devices



Figure 1-22. Miscellaneous Carrying Devices (All Models)

Chapter 1.19 Docking Base and Monitor Support Cover



Figure 1-23. Docking Base and Monitor Support Cover (All Models)

```
Table 1-16. Docking Base and Monitor Support Cover
_____
Description (All Models)
              Spare Part Numbers
1. Docking Base - Ethernet
                  147675-001
2. Docking Base - pass-thru
                   147699-001
3. Docking base miscellaneous
                  169666-001
 a. Battery door
 b. Feet
 c. Handle
 d. Screws (Quantity = 2)
4. Monitor support cover
                   147676-001
5. Monitor support cover foot
                   169681-001
* Not Shown
```

Chapter 1.20 Miscellaneous CPU Kits

Table 1-17. Miscellaneous Contura CPU Kits

Description	Spare Part Models 400	Number & 410	Spare Part Models 420	Number & 430
Handle	147678-001	*	147678-001	*
Automobile adapter	190551-002	*	190551-002	*
Memory door assembly includes hard drive tray	169713-001	*	169713-001	
Carton, (Quantity = 5)	147862-001	*	147862-001	*
Carton and buns, (Quantity = 1)	147863-001	*	147863-001	*
Clutches (left and right)	147858-001	*	147858-001	*
Anti-skid feet	147859-001	*	147859-001	*
Plate logo	197251-001	*	189292-001	*
Box, 420C			189265-001	*
SpeedPaq 192 Data Fax Cellular Modem			187123-001	
PC Card (PCMCIA) 288 Fax/Modem			189661-001	*
PC Card (PCMCIA) 192 Fax/Modem			188512-001	*
PC Card (PCMCIA) modem pouch			194133-001	*
CA, TEL MED			187145-001	*
Keyboard Warning Label, English			189288-001	*
Country Kit			140204-001	*
Trackball removal tool	147779-001	*	147779-001	*
Miscellaneous Includes: Trough Battery latch Battery tray PC Card door PC Card ejection levers and pin Extension spring (battery eject display latches) Lock plate provision Keyboard ground clips Left clutch ground clip Right clutch ground clip Flex ground clip Hard Drive Tray	147874-001 button,	*	189262-001	*
* Not Shown				

Chapter 1.21 Fastener List

Table 1-18. F	astener Kit	for All Models			
Description:		Spare Part Number			
Screws and Fa	stners Kit	(Quantity = 25 each)	147885-001		
Description	Туре	Where Used	Part Number	Drive	Qty
M2.5 x 4.0	Truss	Ground tabs on display shields	144864-001	SL/T8	3 *
		Diskette bracket to system board			3
		Hold down system board to base and chassis			5 * 4 **
		Trackball assembly to base			1 * 2 **
		Battery contracts to base/through system board			2
		CPU cover to keyboard			7
		Clutches to display enclosure (Models 400 and 410)			4 *
M2.5 x 5.0	Truss	CPU base to clutches Display bezel to display enclosure	144865-007	SL/T8 Blk	4 4
		Ground tabs on display shields (Models 420 and 430)			2 **
		Clutches to display enclosure (Models 420 and 430)			4 **
		Display to display enclosure			4 **
Description	Туре	Where Used	Part Number	Drive	Qty

M3.0 x 8.0 Pan Display to display 121187-007 SL/T8 4 ** enclosure _____ M2.5 x 24.0 Truss CPU cover to CPU 144865-006 SL/T8 7 base _____ M2.6 x 2.0 Fillister Diskette drive 121188-001 T8 4 to FDD bracket M3.0 x 3.6 Truss Hard drive to HDD 121187-001 T8 4 bracket Fillister PC Card Header 126790-004 T8 2 ** M2.0 x 6.0 _____ M2.0 x 15.5 Fillister PCMCIA rails 126790-010 Т8 2 _____ PC Card door 147758-001 2 Spring, torsion actuation _____ 147759-001 Battery latch Spring, 1 extension return spring Display latch 2 return spring Washer Under handle 147923-001 2 bracket _____ Т8 Shoulder Handle bracket to M2.5 147760-001 2 clutch/through CPU base _____ M2.5 Shoulder CPU foot to 147778-001 T8 2 clutch/through CPU base _____ 4-40 Screw Three connectors 106902-001 3/16 6 locks at rear of unit Alignment Shoulder Alignment screws 169643-001 T8 2 for docking base screws connector _____ * Models 400 and 410 ** Models 420 and 430 ______

Chapter 1.22 Documentation and Software

Table 1-19. Documentation and Software Description (All Models) Spare Part Number MAINTENANCE AND SERVICE GUIDE 147861-001 Online USER'S GUIDE English 147990-001
147990-041 German French 147990-051 Italian 147990-061 Spanish 147990-071 Netherlands 147990-331 Swedish 147990-101 _____ Manuals - English 147989-001 OUICK SETUP BEYOND SETUP _____ Manuals - German 147989-041 OUICK SETUP BEYOND SETUP KEYBOARD REFERENCE _____ Manuals - French 147989-051 QUICK SETUP BEYOND SETUP KEYBOARD REFERENCE _____ Manuals - Italian 147989-061 QUICK SETUP BEYOND SETUP KEYBOARD REFERENCE _____ Manuals - Spanish 147989-071 QUICK SETUP BEYOND SETUP KEYBOARD REFERENCE _____ Manual - TABWORKS QUICK START GUIDE English 195866-001 German 195866-041 French 195866-051 Italian 195866-061 Spanish 195866-071 Swedish 195866-101 Netherlands 195866-331 _____ Manual - AMERICA ONLINE 181194-001 _____ Manual - MS WORKS 196077-001 _____ Manual - ESSENTIALS OF MS-DOS AND MS-WINDOWS English 144958-001 German 144958-041 French 144958-051 Italian 144958-061 Spanish 144958-071 Swedish 144958-101 Portuguese 144958-131 Dutch 144958-331 _____ Manual - MS-DOS GUIDE, 6.0 and MS Windows 195973-001 English German 195973-041 French 195973-051 Italian 195973-061 Spanish 195973-071

Danish	195973-081
Norwegian	195973-091
Swedish	195973-101
Portuguese	195973-131
Dutch	195973-331
Finnish	195973-351
Manual - LOTUS ORGANIZER	
English	137885-001
German	137885-041
French	137885-051
Italian	137885-061
Spanish	137885-071
Danish	137885-081
Norwegian	137885-091
Swedish	137885-101
Dutch	137885-331
Finnish	137885-351
COMPAQ SERVICE QUICK REFERENCE GUIDE	106854-001
ROMPaq diskette	181088-001

Chapter 2. Preparing the Computer for Service

Introduction

This chapter provides general service information necessary to prepare the computer for service in the following areas:

o Electrostatic discharge

o Service preliminaries

o Battery disposal

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

Chapter 2.1 Electrostatic Discharge

Static electricity can damage electronic components. Before beginning these procedures, make sure you are grounded (discharged of static electricity) by briefly touching a grounded, unpainted, metal object or surface.

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 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 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.

This section details methods of generating, preventing, and grounding static electricity.

Generating Static

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

Table 2-1. Typical Electrostatic VoltagesRelative HumidityRelative HumidityEvent10%40%55%State of the state of the

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. 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 anti-static 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

 Anti-static Plastic
 1,500

 Carbon-Loaded Plastic
 7,500

 Metallized Laminate
 15,000

Grounding Workstations

To prevent static damage at the workstation, follow these 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.

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 straps on both feet with a minimum of 1 megohm of resistance between operator and ground. To be effective, the conductive strips must be worn in contact with the skin.

Field service tools, such as cutters, screwdrivers, vacuums, that are conductive.

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.

Recommended Materials and Equipment

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

o Anti-static tape

- o Anti-static 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

Chapter 2.2 Service Preliminaries

Some of the service preliminaries that should be kept in mind during the disassembly and assembly of the computer include:

o Tool requirements

- o Screws
- o Cable and connectors
- o Plastics

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 Trackball removal tool (spare part number 147779-001)

- o Case Utility tool (spare part number 119070-001 and included in 100767-001))
- o Preloaded application diskettes (Compaq Order Center, 1-800-952-7689)

Cables and Connectors

Most cables used throughout the unit are flex cables. 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.

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

Display

Excess flexing and bending of the shield tabs and fingers can damage the shield.

Keyboard

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened at a 90-degree angle.

Memory Expansion Board

To prevent damage to the memory expansion board, do not apply pressure to the middle of the board. Press only in the area directly over each connector.

Plastics

The plastics can be damaged by applying 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.

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.

Real-Time Clock Battery

Do not touch the bottom of the battery during replacement.

Chapter 2.3 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, recycle the battery components.

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.

There is a danger of explosion and risk of personal injury if the battery is incorrectly replaced or mistreated. Do not attempt to recharge the battery, disassemble it, or immerse it in water or dispose of it in fire. Replacement is to be done by Authorized Compaq Service Provider using the Compaq spare designated for this product.

Compaq offers its portable product customers in North America 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 Compaq laptop and notebook customers.

```
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. To safely dispose of a depleted Compaq rechargeable battery pack, follow these steps:

- 1. 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.
- 2. Place the Compaq rechargeable battery pack into the battery mailer.
- 3. Mail it to the Compaq address shown on the mailer.
- NOTE: 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

Introduction

This chapter provides complete removal and replacement procedures for the Compaq Contura 400 Family of Personal Computers. Procedures that apply to specific models are indicated in parenthesis.

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

For replacement procedures, follow the removal procedures in reverse order unless otherwise specified.

Chapter 3.1 Disassembly/Assembly Sequence Chart

This chart shows the order in which disassembly procedures are provided:

```
-- 3.2 PREPARING THE COMPUTER
  |-- AC Adapter
   |-- Battery pack
-- 3.3 HANDLE BRACKET
-- 3.4 TILT FEET
-- 3.5 HARD DRIVE
-- 3.6 MEMORY EXPANSION BOARD
-- 3.7 KEYBOARD ASSEMBLY
   -- CPU cover
   -- Keyboard
-- 3.8 BATTERY COMPARTMENT COMPONENTS
   |-- Battery compartment
   |-- Anti-skid pad
   |-- Battery release spring and button
-- 3.9 REAL-TIME CLOCK BATTERY (Models 400 and 410)
-- 3.10 REAL-TIME CLOCK BATTERY (Models 420 and 430)
-- 3.11 PROCESSOR UPGRADE OPTION (Model 400 Only)
-- 3.12 INTEGRATED MECHANICAL TRACKBALL ASSEMBLY
   -- (Model 400 and 410)
-- 3.13 INTEGRATED OPTICAL TRACKBALL ASSEMBLY
-- 3.14 DISKETTE DRIVE (All Models)
   -- Diskette drive
   -- Diskette drive bracket
-- 3.15 THE SYSTEM BOARD (All Models)
```

-- 3.16 PC Card (PCMCIA) ASSEMBLY -- 3.17 PC Card (PCMCIA) EJECTION LEVERS AND PIN -- 3.18 PC Card (PCMCIA) DOORS AND SPRINGS -- 3.19 SYSTEM CHASSIS -- Trough -- 3.20 CPU BASE |-- Battery shield clip |-- Lock provision plate -- Anti-skid pads -- 3.21 DISPLAY ASSEMBLY COMPONENTS (Models 400 and 410) -- Bezel -- Latches |-- Inverter board -- 3.22 MONOCHROME DISPLAY (Models 400 and 410) |-- LCD Panel with Shield attached |-- Display cable |-- Display ground cable -- 3.23 COLOR STN (9.5") DISPLAY (Models 400 and 410) -- LCD Panel -- Shield |-- Display cable |-- Display ground cable -- 3.24 COLOR TFT (8.4") DISPLAY (Models 400 and 410) |-- LCD Panel |-- Shield -- Display cable |-- Display ground cable -- 3.25 DISPLAY COMPONENTS (Models 420 and 430) -- Bezel |-- Latches |-- Inverter board -- 3.26 COLOR STN (10.4") DISPLAY (Models 420 and 430) |-- LCD Panel -- Shield -- Display cable |-- Display ground cable -- 3.27 COLOR TFT (10.4") DISPLAY (Models 420 and 430) -- LCD Panel |-- Shield |-- Display cable |-- Display ground cable -- 3.28 DISPLAY ENCLOSURE -- 3.29 CLUTCHES AND GROUND CLIPS -- 3.30 DOCKING BASE |-- Feet |-- Battery door

| |-- Handle | |-- 3.31 MONITOR SUPPORT COVER

Chapter 3.2 Preparing the Computer

There is a danger of explosion and risk of personal injury if the battery is incorrectly replaced or mistreated. Do not attempt to recharge the battery, disassemble it, or immerse it in water or dispose of it in fire. Replacement is to be done by Authorized Compaq Service Provider using the Compaq spare designated for this product.

Ensure that the power cord is disconnected from the electrical outlet and that the battery pack is removed from the computer before beginning replacement procedures. Failure to disconnect power could result in serious injury or damage to the equipment.

Static electricity can damage electronic components. Before beginning these procedures, make sure you are grounded (discharged of static electricity) by briefly touching a grounded, unpainted, metal object or surface.

Before beginning the removal and replacement procedures, follow these steps to disconnect all power to the computer and remove the diskette or PC Card, if installed:

- 1. Save all files and exit all applications.
- Turn off the computer by pressing the left Ctrl+Alt keys and power button.
- 3. Disconnect all external equipment.
- 4. Disconnect the AC Adapter from the electrical outlet (Figure 3-1).



Figure 3-1. Disconnecting the AC Adapter from the Electrical Outlet

- 5. Disconnect the AC Adapter power cord from the computer (Figure 3-2).
- 6. Eject the diskette (Figure 3-2) and PC Card, if installed.



Figure 3-2. Disconnecting the AC Adapter and Ejecting the Diskette

7. Open the battery compartment by lifting up the front of the computer [1] and sliding the battery compartment release button to the right [2]. The battery compartment opens slightly. Lower the compartment [3] (Figure 3-3).



Figure 3-3. Opening the Battery Compartment

8. Remove the battery pack (Figure 3-4).



Figure 3-4. Removing the Battery Pack

Metal objects can damage the battery pack and the connectors inside 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.

9. Close the battery compartment.

Chapter 3.3 Handle Bracket

This procedure is necessary if replacing the handle bracket or if separating the display assembly from the system unit module.

Removing the Handle Bracket

To remove the handle bracket, follow these steps:

1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).

- 2. Close the computer and turn it top-side down.
- 3. Move the tilt foot toward the front of the computer, exposing the handle bracket screw on either side of the computer (Figure 3-5).



Figure 3-5. Positioning the Tilt Foot

- 4. Using a Torx T8 , remove the screw and washer from each handle bracket. These screws are not reusable and must be discarded.
- 5. Remove the handle bracket (Figure 3-6).



Figure 3-6. Removing the Handle Bracket

6. To install the handle bracket, reverse the previous steps. Discard the old screws and replace with new screws.

Chapter 3.4 Tilt Feet

This procedure is necessary if replacing the tilt feet or if separating the display assembly from the system unit module.

Removing the Tilt Feet

To remove the tilt feet, follow these steps:

- 1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).
- 2. Using a Torx T8 , remove the tilt foot screw (Figure 3-7). Screws from the tilt feet are not reusable and must be discarded.
- 3. Remove the tilt foot (Figure 3-7).



Figure 3-7. Removing the Tilt Foot

4. To install the tilt foot, reverse the previous steps. Discard the old screws and replace with new screws.

Chapter 3.5 Hard Drive

This section contains removal procedures for the following hard drive components:

- o Hard drive compartment cover
- o Hard drive
- o Hard drive bracket

Removing the Hard Drive Compartment Cover

To remove the hard drive compartment cover, follow these steps:

1. Disconnect all power from the computer and remove the battery pack, diskette, and PC Card, if installed (Section 3.2).

- 2. Close the computer and turn it top-side down.
- 3. Using a Torx T-8 or flat-bladed screwdriver, remove the two screws from the hard drive compartment cover (Figure 3-8).
 - NOTE: These two screws also secure the CPU base to the keyboard and must be removed in order to remove the keyboard and access system components.



Figure 3-8. Removing Screws from the Hard Drive Compartment Cover (All Models)

4. Use a Case utility tool to remove the hard drive compartment cover (Figure 3-9).



Figure 3-9. Removing the Hard Drive Compartment Cover (All Models)

5. To replace the hard drive compartment cover, reverse the previous steps making sure to insert the bracket's tab under the plastic edge.

Removing the Hard Drive

- 1. Remove the hard drive compartment cover. Refer to "Removing the Hard Drive Compartment Cover" in this section.
- 2. Remove the hard drive by grasping the hard drive bracket and sliding it toward the front of the computer [1] (Figure 3-10).
- 3. Lift the hard drive and bracket [2] up and out of the computer (Figure 3-10).



Figure 3-10. Removing the Hard Drive and Hard Drive Bracket (All Models)

4. To replace the hard drive, reverse the previous steps.

Removing the Hard Drive Bracket

- 1. Remove the hard drive compartment cover. Refer to "Removing the Hard Drive Compartment Cover" in this section.
- 2. Remove the hard drive and bracket. Refer to "Removing the Hard Drive" in this section.
- 3. Using a Torx T8 , remove the four screws from the hard drive bracket and separate the bracket from the hard drive (Figure 3-11).



Figure 3-11. Separating the Hard Drive Bracket from the Hard Drive (All Models)

4. To replace the hard drive bracket, reverse the previous steps.

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

IMPORTANT: The hard drive bracket has four screw holes, one of which is elongated and one is small. When replacing the hard drive into the hard drive bracket, replace the screw in the small hole first [1], then insert the second screw into the elongated screw hole [2] (Figure 3-12).



Figure 3-12. Replacing the Hard Drive Bracket (All Models)

Chapter 3.6 Memory Expansion Board

This section contains removal and replacement procedures for the memory compartment cover and the memory expansion board.

The memory compartment cover and the bottom of the CPU base are embossed with arrows and two icons that indicate whether the memory compartment cover is unlocked [1] or locked [2].



Figure 3-13. Memory Compartment Cover Icons (All Models)

Removing and Replacing the Memory Compartment Cover

To remove the memory compartment cover, follow these steps:

- 1. Disconnect all power from the computer and remove the battery pack, diskette, and PC Card, if installed (Section 3.2).
- 2. Close the computer and turn it top-side down.
- 3. Slide the memory compartment cover toward the rear of the computer and lift up (Figure 3-14).
- IMPORTANT: Be sure to maintain the same orientation of the cover to the computer when removing and replacing.



Figure 3-14. Removing the Memory Compartment Cover (All Models)

4. To replace the memory compartment cover, reverse the previous steps.

Removing the Memory Expansion Board

To remove the memory expansion board, follow these steps:

- 1. Remove the memory compartment cover. Refer to "Removing and Replacing the Memory Compartment Cover" in this section.
- 2. Gently rock the memory expansion board back and forth, disconnecting the board from both connectors (Figure 3-15).



Figure 3-15. Disconnecting the Memory Board from the Connectors (All Models)

Replacing the Memory Expansion Board

To replace the memory expansion board, follow these steps:

1. Align the two connectors on the memory expansion board with the corresponding connectors on the system board.

To prevent damage to the memory expansion board, do not apply pressure to the middle of the board. Press only in the area directly over each connector.

 Insert the memory expansion board into the compartment and press the memory expansion board down. Apply pressure directly over each connector. Ensure that both connectors snap into place (Figure 3-16).



Figure 3-16. Replacing the Memory Expansion Board (All Models)

3. Replace the memory compartment cover. Refer to " Removing and Replacing the Memory Compartment Cover" in this section.

Chapter 3.7 Keyboard Assembly

This section contains removal and replacement procedures for the following the keyboard assembly components:

- o CPU cover
- o Keyboard
- o Top PC Card door and spring

NOTE: The bottom PC Card door and spring are part of the CPU base.

Removing the Keyboard Assembly

To remove the keyboard assembly, follow these steps:

1. Disconnect all power from the computer and remove the AC Adapter and

battery pack (Section 3.2).

2. Close the computer and turn it top-side down.

Screws in the computer are not interchangeable. As you remove screws, place them with the components you removed. Damage may occur if you insert the screws in the wrong place.

3. Using a Torx T-8 or flat-bladed screwdriver, remove the five screws from the bottom of the computer and two screws from the hard drive compartment cover (Figure 3-17).



Figure 3-17. Removing the Screws from the Bottom of the Computer and Hard Drive Compartment Cover (All Models)



Figure 3-18. Removing the Hard Drive Compartment Cover (All Models)

- 4. Use a case utility tool to remove the hard drive compartment cover (Figure 3-18).
- 5. Carefully, turn the computer top-side up and open the display to its fully opened position (135-degree angle) (Figure 3-19).



Figure 3-19. Opening the Display to a 135-degree Angle (All Models)

- 6. Using the case utility tool, lift up the outside rear corners of the keyboard assembly to release the keyboard snaps [1], and tilt the keyboard assembly toward you to release the keyboard connector [2] (Figure 3-20).
- IMPORTANT: When using the case utility tool, use care to keep it out of the diskette drive area.



Figure 3-20. Releasing the Keyboard Assembly (All Models)

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, be sure to support the computer when opening the display.

7. Remove the keyboard assembly by lifting it up [1] and off the front of the computer [2] (Figure 3-21).



Figure 3-21. Removing the Keyboard Assembly (All Models)

8. Position the display to a 90-degree angle (Figure 3-22).



Figure 3-22. Returning the Display to a 90-degree Angle (All Models)

Removing the CPU Cover

To remove the CPU cover for replacement, follow these steps.

- 1. Remove the keyboard assembly from the computer. Refer to "Removing the Keyboard Assembly" in this section.
- 2. Turn the keyboard assembly top-side down.

Note the position of the screws removed from the bottom of the keyboard assembly. The remaining screws holes are for the screws that go through the keyboard assembly to the CPU base.

- 3. Using a Torx T-8 or flat-bladed screwdriver, remove the seven screws on the bottom of the keyboard assembly (Figure 3-23).
- IMPORTANT: Some computers will have a light director located in the status panel. When removing the CPU cover from the keyboard, the light director will come loose. Be sure to replace the light director in the status panel when replacing the CPU cover to the keyboard.

4. Separate the CPU cover from the keyboard (Figure 3-23).



Figure 3-23. Removing the CPU Cover from the Keyboard (All Models)

5. To replace the CPU cover, reverse the previous steps.

Removing the Top PC Card (PCMCIA) Door and Spring

To remove the top PC Card door and spring from the keyboard assembly, follow these steps:

- 1. Remove the keyboard assembly from the computer. Refer to "Removing the Keyboard Assembly" in this section.
- 2. Turn the keyboard assembly top-side down.
- 3. Remove the PC Card door from the keyboard assembly, unsnap the PC Card door [1] from the posts, and remove the door (Figure 3-24).
- 4. Remove the spring [2] from the PC Card door (Figure 3-24).



Figure 3-24. Removing the PC Card Door and Spring from the Keyboard Assembly (All Models)

Replacing the Top PC Card (PCMCIA) Door and Spring

To replace the top PC Card Door and Spring to the keyboard assembly, follow these steps:

 Install the PC Card spring on the door post, ensuring that the bent arm of the spring is placed against the rib on the PC Card door (Figure 3-25).


Figure 3-25. Replacing the PC Card Spring (All Models)

2. Install the PC Card (PCMCIA) door, ensuring that the spring is placed between the post [1] and the rib [2] (Figure 3-26).



Figure 3-26. Replacing the PC Card Door (All Models)

Replacing the Keyboard Assembly

If installing a new keyboard assembly, the hook and loop fastener will have to be attached to the diskette drive bracket:

To attach the hook and loop fastener to the diskette drive bracket, follow these steps:

- 1. Separate the new hook and loop fastener.
- Attach the opposite color of the hook and loop fastener to the existing hook and loop fastener on the tab on the diskette drive bracket [1] (Figure 3-27).
- Remove the top layer from the hook and loop fastener to expose the adhesive strip prior to replacing the keyboard assembly [2] (Figure 3-27).



Figure 3-27. Attaching the Hook and Loop Fastener (All Models)

To replace the existing keyboard assembly in the computer, follow these steps:

 Open the display to its fully opened position of 135-degrees (Figure 3-28).



Figure 3-28. Opening the Display to a 135-degree Angle (All Models)

- 2. Angle the front end of the keyboard assembly into place at the front edge of the system unit module.
- 3. Ensure that the front plastic seams of the keyboard assembly and the front of the system unit module are aligned and flush with each other.
- Carefully lower the rear of the keyboard assembly to the system unit module and press the outside rear corners until the keyboard assembly snaps into place.
- 5. Verify the alignment of the keyboard assembly to the computer base. Check the seams between the front and side edges of the computer base and the keyboard assembly. If the seam is uneven, remove the keyboard assembly and correctly align the tabs and recesses.
- Press firmly in the center of the keyboard assembly below the status panel [1] to connect the keyboard connector [2] to the system board [3] (Figure 3-29).



Figure 3-29. Connecting the Keyboard Assembly Connector (All Models)

Chapter 3.8 Battery Compartment Components

This section contains removal procedures for the following battery compartment components:

o Battery compartment

o Anti-skid pad

- o Battery release button spring
- o Battery release button

Removing the Battery Compartment

To remove the battery compartment components, follow these steps:

1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).

2. Turn the computer top-side down.

3. Gently squeeze in the sides of the compartment, rocking it back and

forth, then lifting it up from the bottom of the base (Figure 3-30).



Figure 3-30. Removing the Battery Compartment (All Models)

4. To replace the battery compartment, reverse the previous steps.

Attaching the Anti-Skid Pads

If installing a new battery compartment, two anti-skid pads must be attached to the bottom of the battery compartment. To attach the anti-skid pads, follow these steps:

- 1. Peel off the top layer of one of the anti-skid pads to expose the adhesive.
- 2. With the adhesive-side down, place the anti-skid pad into the raised oval outline on the battery compartment (Figure 3-31).



Figure 3-31. Attaching Anti-Skid Pads on the Battery Compartment (All Models)

Removing the Battery Release Spring and Button

To remove the battery release spring and button, follow these steps:

1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened to a 90-degree angle.

- 2. Remove the keyboard assembly (Section 3.7).
- 3. From the battery enclosure, remove the battery release button spring by unhooking the spring from the post on the CPU base [1], then releasing it from the hook on the battery release button [2] (Figure 3-32).



Figure 3-32. Removing the Battery Release Button Spring (All Models)

 Rotate the battery release button counterclockwise, until it bows slightly, and lift it up to clear the hook on the computer base (Figure 3-33).



Figure 3-33. Removing the Battery Release Button (All Models)

5. To replace the battery release button and spring, reverse the previous steps.

Chapter 3.9 Real-Time Clock Battery (Models 400 and 410)

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

1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened to a 90-degree angle.

2. Remove the keyboard assembly (Section 3.7).

3. Remove the real-time clock battery from the system board by inserting a

non conductive probe into the battery holder and pushing back on the battery to release it (Figure 3-34).

NOTE: Refer to Chapter 2 "Preparing the Computer for Service" for battery disposal procedures.



Figure 3-34. Removing the Real-Time Clock Battery (Models 400 and 410)

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

Chapter 3.10 Real-Time Clock Battery (Models 420 and 430)

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

1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened to a 90-degree angle.

- 2. Remove the keyboard assembly (Section 3.7).
- 3. Remove the real-time clock battery from the system board by inserting a non conductive probe into the battery holder and pushing back on the battery to release it (Figure 3-35).
- NOTE: Refer to Chapter 2 "Preparing the Computer for Service" for battery disposal procedures.



Figure 3-35. Removing the Real-Time Clock Battery (Models 420 and 430)

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

Chapter 3.11 Processor Upgrade Option (Model 400 Only)

This section provides installation and replacement procedures for the processor upgrade. The Compaq Contura 400 is the only model with the DX2/40 MHz Processor that can be upgraded to a DX2/50 MHz processor. Once the processor is installed, the upgraded processor overrides control of the processor on the system board. You do not have to remove the system board processor.

NOTE: Use only the DX2/50 MHz processor in the upgrade option slot.

To install the processor upgrade option, do the following:

1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened at a 90-degree angle.

- 2. Remove the keyboard assembly (Section 3.7).
- 3. Disconnect the processor board from the two connectors on the system board (Figure 3-36).



Figure 3-36. Installing the Processor Board (Model 400 Only)

4. To remove the processor upgrade, reverse the previous steps.

Chapter 3.12 Integrated Mechanical Trackball Assembly (Models 400 and 410)

IMPORTANT: The mechanical trackball assembly is not interchangeable with the optical trackball assembly in Models 420 and 430.

To remove the integrated mechanical trackball assembly, follow these steps:

1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened at a 90-degree angle.

- 2. Remove the keyboard assembly (Section 3.7).
- 3. Using a Torx T-8 or flat-bladed screwdriver, remove the screw from the front right-hand corner of the integrated mechanical trackball assembly (Figure 3-37).



Figure 3-37. Removing the Screw from the Integrated Mechanical Trackball Assembly (Models 400 and 410)

- Disconnect the integrated mechanical trackball assembly from the system board by pulling forward on the integrated mechanical trackball assembly until it stops.
- 5. Tilt up the front of the integrated mechanical trackball assembly and lift it up to clear the connectors and the system board (Figure 3-38).



Figure 3-38. Disconnecting the Mechanical Trackball from the System Board (Models 400 and 410)

6. To replace the integrated mechanical trackball assembly, reverse the previous steps.

Trackball Cleaning Procedures

- 1. Turn off the computer by pressing the left Ctrl+Alt keys and the power button. Disconnect the AC power and remove the battery pack.
- 2. Loosen the trackball retaining ring by placing the trackball tool over the retaining ring and turning the tool counterclockwise one quarter turn.
- 3. Carefully remove the retaining ring. This is a delicate part and repetitious handling of this piece may cause it to tear.
- 4. Remove the ball from its cage by gently lifting the computer and turning it over so that the ball falls into your hand.

Do not soak components, and do not use any solvents other than isopropyl (rubbing) alcohol!

5. Clean the trackball with isopropyl (rubbing) alcohol only. Dry it with a clean, lint-free cloth. DO NOT USE AN ABRASIVE CLEANER.

If a foam-tipped swap is not available, you can use a cotton swab. But use a cotton swap only once and then discard it as it may scratch the trackball.

- 6. Gently wipe the cage to remove residue from the surface. Clean the ball bearings by rubbing with the swab. Do not attempt to remove the bearings. Next, gently swab the rollers from side to side until all buildup is removed. Rotate rollers to ensure that all surfaces are cleaned.
- 7. Be sure not to leave any cotton fibers on any part of the trackball components. Use tweezers to remove any fibers that may have accumulated on or around the cage, rollers, or support post.
- 8. Let the unit air dry before reassembling it.
- 9. To reassemble, place the computer right side up and place the cleaned ball into its cage.
- 10. Gently replace the retaining ring by aligning the notches; then use the trackball tool to turn it clockwise one quarter turn until it locks into place.
- 11. Use the trackball to verify that it works properly without skipping or sticking.

Chapter 3.13 Integrated Optical Trackball Assembly (Models 420 and 430)

IMPORTANT: The optical trackball assembly is not interchangeable with the mechanical trackball assembly in Models 400 and 410.

To remove the integrated optical trackball assembly, follow these steps:

1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened at a 90-degree angle.

- 2. Remove the keyboard assembly (Section 3.7).
- 3. Using a Torx T-8 or flat-bladed screwdriver, remove the screw from the front right-hand corner and the left rear corner of the trackball assembly (Figure 3-39).



Figure 3-39. Removing the Screw from the Integrated Optical Trackball Assembly (Models 420 and 430)

4. Disconnect the integrated optical trackball assembly from the system board by pulling upward on the trackball assembly.



Figure 3-40. Disconnecting the Optical Trackball Assembly from the System Board (Models 420 and 430)

5. To replace the integrated mechanical trackball assembly, reverse the previous steps.

Trackball Cleaning Procedures

- 1. Turn off the computer, disconnect AC power, and remove the battery pack.
- 2. Remove the Integrated trackball.
- 3. Remove any large particles of debris that have fallen into the trackball housing.
- 4. Dip a cotton swab in isopropyl alcohol and squeeze off excess liquid.
- 5. Carefully wipe inside the cage to remove residue from surfaces. Clean the ball bearings by rubbing with the swab. Do not attempt to remove the bearings. Do not use alcohol on the sensor window. Instead, gently wipe the sensor window with a soft, dry, lint-free cloth until all debris is removed. Allow enough time for the parts to air dry before reassembling.
- 6. Replace the ball and gently secure the retaining ring by rotating it clockwise.

7. Replace the battery pack and reconnect the AC power.

Chapter 3.14 Diskette Drive (All Models)

This section contains removal and replacement procedures for the following diskette drive components:

o Diskette Drive

o Diskette Drive Bracket

o Diskette Drive Insulator Strip

Removing the Diskette Drive

To remove the diskette drive, follow these steps:

 Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened to a 90-degree angle.

2. Remove the keyboard assembly (Section 3.7).

3. Disconnect the diskette drive cable from the LIF connectors on the diskette drive and the system board (Figure 3-41).



Figure 3-41. Disconnecting the Diskette Drive Cable from the LIF Connectors (All Models)

Screws in the computer are not interchangeable. As you remove screws, place them with the components you removed. Damage may occur if you insert the screws in the wrong place.

4. Using a Torx T-8 or flat-bladed screwdriver, remove the three diskette drive bracket screws that screw into the system board (Figure 3-42).



Figure 3-42. Removing the Diskette Drive Bracket Screws (All Models)

When removing or replacing the diskette drive, hold it by grasping the vertical sides. Pressure to the front drive door area of the diskette drive will cause the drive door to pop out from the mounting.

5. Tilt up the diskette drive bracket, then lift it up and out of the system chassis (Figure 3-43).



Figure 3-43. Removing the Diskette Drive from the System Chassis (All Models)

Removing the Diskette Drive from the Diskette Drive Bracket

- 1. Remove the diskette drive from the system chassis. Refer to "Removing the Diskette Drive" in this section.
- 2. Remove the diskette drive from the bracket by removing the four screws from both sides of the bracket (Figure 3-44).



Figure 3-44. Removing the Diskette Drive Bracket Screws (All Models)

3. Separate the diskette drive from the bracket (Figure 3-45).



Figure 3-45. Removing the Diskette Drive (All Models)

4. To replace the diskette drive into the bracket, reverse the previous steps.

Applying the Diskette Drive Hook and Loop Fastener

If installing a new diskette drive bracket, the hook and loop fastener must be attached to the bracket.

To attach the hook and loop fastener, follow these steps:

1. Separate the new hook and loop fastener.

- 2. Remove the backing from the adhesive on the hook and loop fastener that is the opposite color of the hook and loop fastener attached to the keyboard assembly (for example, white to black or black to white).
- 3. Attach the new hook and loop fastener of the opposite color of the hook and loop fastener on the keyboard assembly to the tab on the diskette drive bracket (Figure 3-46).



Figure 3-46. Attaching the Hook and Loop Fastener to the Diskette Drive Bracket (All Models)

Replacing the Diskette Drive

To replace the diskette drive into the system chassis, follow these steps:

When removing or replacing the diskette drive, hold it by grasping the vertical sides. Pressure to the front drive door area of the diskette drive will cause the drive door to pop out from the mounting.

- 1. Replace the diskette drive into the diskette drive bracket. Use the four screws to secure the diskette drive to the bracket.
- 2. Tow in the back end of the diskette drive into the system chassis.
 - IMPORTANT: Ensure that the diskette drive door does not catch on the outside edge of the system unit module.
- 3. Close the diskette drive door slightly while lowering the front of the diskette drive into the system chassis (Figure 3-47).



Figure 3-47. Replacing the Diskette Drive (All Models)

4. Reconnect the Diskette Drive Cable and reinstall the three screws.

Chapter 3.15 The System Board (All Models)

To remove the system board, follow these steps:

- 1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).
- 2. Remove the hard drive (Section 3.5).
- 3. Remove the memory expansion board, if installed (Section 3.6).
- 4. On the rear of the computer, use a hex socket driver to remove the six screw locks (Figure 3-48).
- 5. Using a Torx-T8 driver, remove the two alignment screws from the docking base connector (Figure 3-48).



Figure 3-48. Removing the Screw Locks and Alignment Screws (All Models)

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened at a 90-degree angle.

- 6. Remove the keyboard assembly (Section 3.7).
- 7. Remove the processor upgrade, if installed (Section 3.11).
- 8. Remove the integrated trackball assembly (Section 3.12 for Models 400 and 410 and Section 3.13 for Models 420 and 430).

9. Remove the diskette drive (Section 3.14).

The ZIF connector and its attached cable can be damaged easily. Handle only the connector slide when disconnecting the ZIF connector. Never pull or twist the cable itself while it is seated in the ZIF connector.

- Disconnect the display cable from the system board by pulling up both ends of the ZIF connector slide simultaneously [1], carefully opening the slide [2] (Figure 3-49).
- 11. Lift the display cable out of the connector slide [3], being careful not to pull or twist the cable (Figure 3-49).



Figure 3-49. Removing the Display Cable from the System Board (All Models)

12. Disconnect the display ground cable [1] from the LIF clip above the serial port connector (Figure 3-50).



Figure 3-50. Disconnecting the Display Ground Cable (All Models)

13. Remove the three keyboard ground clips from the system board (Figure 3-51).



Figure 3-51. Removing the Keyboard Ground Clips from the System Board

14. Remove the left clutch ground clip from the system chassis (Figure 3-52).



Figure 3-52. Removing the Left Clutch Ground Clip (All Models)

15. For Models 400 and 410, using a Torx T8 or slotted driver, remove the five screws from the system board and the two screws from the battery contact (Figure 3-53).



Figure 3-53. Removing the Five System Board and the Two Battery Contact Screws (Models 400 and 410)

16. For Models 420 and 430, using a Torx T8 or slotted driver, remove the four screws from the system board and the two screws from the battery contact (Figure 3-54).



Figure 3-54. Removing the Four System Board and the Two Battery Contact Screws (Models 420 and 430)

17. From the front of the computer, tilt the system board up then lift the system board out of the system chassis (Figure 3-55).



Figure 3-55. Removing the System Board (All Models)

18. Remove the LIF clip from above the serial port connector between the system board and the system chassis (Figure 3-56).



Figure 3-56. Removing the LIF Clip (All Models)

19. To replace the system board, reverse the previous steps.

To replace the System Board, follow these steps:

- IMPORTANT: When installing a new system board, make sure that the insulator is placed between the system board and the diskette drive. The gasket over the Keyboard connector must be tucked under the Chassis.
- IMPORTANT: When replacing the system board, the screws must be replaced as follows:
- 1. Replace the two alignment screws on the rear of the system unit module to align the system board (Figure 3-57).



Figure 3-57. Replacing the Alignment Screws (All Models)

 Install screws [1] and [2] on the system board before replacing the remaining system board and battery contact screws for Models 400 and 410 (Figure 3-58) and for Models 420 and 430 (Figure 3-59).


Figure 3-58. Replacing the Five System Board Screws and Two Battery Contact Screws (Models 400 and 410)



Figure 3-59. Replacing the Four System Board Screws and Two Battery Contact Screws (Models 420 and 430)

NOTE: If installing a new system board, ensure that the insulator is installed between the system board and diskette drive. The gasket over the keyboard connector must be tucked under the Chassis.

Chapter 3.16 PC Card (PCMCIA) Assembly

The PC Card assembly consists of the PC Card clip and PC Card rails. To remove the PC Card assembly or to remove part of the assembly, follow these steps:

Removing the PC Card Clip

To remove the PC Card clip, follow these steps:

1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened at a 90-degree angle.

- 2. Remove the keyboard assembly (Section 3.7).
- 3. Remove the system board (Section 3.15).
- 4. Remove the two screws [1] of the PC Card rails from the bottom of the system board (Figure 3-60).
- 5. Loosen the Header screws [2] from the bottom of the system board. (Figure 3-60).
- 6. Remove the clip from the top of the PC Card (PCMCIA) header (Figure 3-60).



Figure 3-60. Removing the PC Card Clip (All Models)

7. Replacement clips and rails on Models 420 and 430 will look different but removal and replacement procedures will be the same. To replace the PC Card clip, reverse the previous steps, making sure that the PC Card rails are assembled properly into the PC Card Header. The rail goes under the edge of the header. Tighten the header screws from the bottom of the system board.

Removing the PC Card (PCMCIA) Rails

NOTE: The rails for the 400 and 410 models are not interchangeable with the rails for the 420 and 430 models.

To remove the PC Card rails, follow these steps.

- 1. Remove the PC Card clips. Refer to "Removing the PC Card Clip" in this section.
- 2. Slide the rails out of the header (Figure 3-61).



Figure 3-61. Removing the PC Card Rails from the Header (All Models)

3. To replace the PC Card rails, reverse the previous steps. The PC Card rails go under the edge of the Header.

Chapter 3.17 PC Card (PCMCIA) Ejection Levers and Pin

This section contains removal and replacement procedures for the PC Card ejection levers and pin.

To remove the PC Card ejection levers and pin, follow these steps:

- 1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).
- 2. Remove the PC Card ejection lever pin from the system chassis (Figure 3-62).



Figure 3-62. Remove the PC Card Ejection Lever Pin (All Models)

3. Remove the top PC Card (PCMCIA) ejection lever (Figure 3-63).



Figure 3-63. Removing the Top PC Card Ejection Lever (All Models)

4. Remove the bottom PC Card ejection lever from the boss on the CPU base (Figure 3-64)



Figure 3-64. Remove the Bottom PC Card Ejection Lever (All Models)

5. To replace the PC Card ejection levers and pin, reverse the previous steps.

Chapter 3.18 PC Card (PCMCIA) Doors and Springs

This section contains removal and replacement procedures for the PC Card doors and springs. The top PC Card door and spring are located on the keyboard assembly and the bottom PC Card door and spring are located on the CPU base.

Top PC Card Door and Spring

To remove the top PC Card door and spring, follow these steps:

1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened at a 90-degree angle.

- 2. Remove the keyboard assembly (Section 3.7).
- 3. Unsnap the PC Card door [1] from the post and remove the door (Figure 3-65).
- 4. Remove the spring [2] from the PC Card door (Figure 3-65).



Figure 3-65. Removing the Top PC Card Door and Spring (All Models)

To replace the top PC Card (PCMCIA) door and spring, follow these steps:

1. Install the PC Card spring on the door rib, making sure the bent arm of the spring is placed against the rib on the PC Card door (Figure 3-66).



Figure 3-66. Replacing the PC Card Spring (All Models)

2. Install the PC Card door, making sure the spring is placed between the notch [1] and the rib [2] (Figure 3-67).



Figure 3-67. Replacing the PC Card Door on the Keyboard Assembly (All Models)

Bottom PC Card (PCMCIA) Door and Spring

The bottom PC Card door and spring are located on the CPU base. To remove the bottom PC Card door and spring, follow these steps:

1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened at a 90-degree angle.

- 2. Remove the keyboard assembly (Section 3.7).
- 3. Unsnap the PC Card door from the post and remove the door [1] (Figure 3-68).
- 4. Remove the spring [2] from the PC Card door (Figure 3-68).



Figure 3-68. Removing the Bottom PC Card Door and Spring (All Models)

To replace the bottom PC Card (PCMCIA) spring and door, follow these steps:

 Install the PC Card spring on the door post, making sure the bent arm of the spring is placed against the rib on the PC Card door (Figure 3-69).



Figure 3-69. Replacing the PC Card Spring (All Models)

2. Install the PC Card door, making sure the spring is placed between the notch [1] and the rib [2] (Figure 3-70).



Figure 3-70. Replacing the PC Card Door on the CPU Base (All Models)

Chapter 3.19 System Chassis (All Models)

To remove the system chassis, follow these steps:

- 1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).
- 2. Remove the handle bracket on either side of the computer (Section 3.3).

3. Remove the tilt feet on either side of the computer (Section 3.4).

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened at a 90-degree angle.

- 4. Remove the keyboard assembly (Section 3.7).
- 5. Remove the system board (Section 3.15).
- 6. Close the display.

7. Remove the four clutch screws from the rear of the system unit module (Figure 3-71).



Figure 3-71. Removing the Rear Clutch Screws (All Models)

8. Remove the display assembly from the system unit module (Figure 3-72).



Figure 3-72. Removing the Display Assembly (All Models)

9. Slide the trough at the rear of the CPU base to the right, then lift up to remove (Figure 3-73).



Figure 3-73. Removing the Trough from the CPU Base (All Models)

10. Remove the system chassis by gently separating it from the CPU base and lifting out the system chassis (Figure 3-74).



Figure 3-74. Removing the System Chassis (All Models)

11. To replace the system chassis, reverse the previous steps.

Chapter 3.20 CPU Base (All Models)

This section provides removal and replacement procedures for the following CPU base components:

- o Battery shield clip
- o Lock provision plate
- o Anti-skid pads

Removing and Replacing the Battery Shield Clip

To remove the battery shield clip, follow these steps:

1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened at a 90-degree angle.

- 2. Remove the keyboard assembly (Section 3.7).
- 3. Remove the battery shield clip located between the battery enclosure and the right interior wall of the CPU base (Figure 3-75).



Figure 3-75. Removing the Battery Shield Clip (All Models)

4. To replace the battery shield clip, reverse the previous steps.

Removing and Replacing the Lock Provision Plate

To remove the lock provision plate, follow these steps:

1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened at a 90-degree angle.

- 2. Remove the keyboard assembly (Section 3.7).
- Remove the lock provision plate located between the battery enclosure and the right interior wall of the CPU base. The lock provision plate looks different for Models 420 and 430 as depicted in the insert (Figure 3-76).



Figure 3-76. Removing the Lock Provision Plate (All Models)

4. To replace the lock provision plate, reverse the previous steps.

Attaching the Anti-Skid Pads

If replacing the CPU base, two anti-skid pads for the battery tray and the two for the CPU base must be attached to the bottom of the base. To attach the anti-skid pads, follow these steps:

- 1. Peel off the top layer of one of the anti-skid pads to expose the adhesive.
- 2. With the adhesive-side down, place the anti-skid pad into the raised oval outline on the CPU base and the battery tray (Figure 3-77).



Figure 3-77. Attaching Anti-Skid Pads on the CPU Base (All Models)

Chapter 3.21 Display Assembly Components (Models 400 and 410)

This section contains removal and replacement procedures for the following display assembly components:

- o Bezel
- o Latches
- o Inverter board

Removing and Replacing the Display Bezel

Ensure that the power cord is disconnected from the electrical outlet and that the battery pack is removed from the computer before beginning replacement procedures. Failure to disconnect power could result in serious injury or damage to the equipment.

To remove the display bezel, follow these steps:

- 1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).
- 2. Open the computer.
- 3. Remove the four screws from the display bezel (Figure 3-78).



Figure 3-78. Removing the Display Bezel Screws (Models 400 and 410)

4. Separate the display bezel from the display assembly (Figure 3-79).



Figure 3-79. Removing the Display Bezel (Models 400 and 410)

5. To replace the bezel, reverse the previous steps.

Removing the Display Enclosure Latches and Springs

To remove the display enclosure latches and springs from either side of the display enclosure, follow these steps:

- 1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).
- 2. Open the computer.
- 3. Remove the display bezel. Refer to "Removing and Replacing the Display Bezel" in this section.
- Hold the bottom of the latch near the spring. Flex the hook end of the display latch away from the display enclosure [1] (Figure 3-80).
- Full the display latch from the top, then out of the display enclosure
 [2] (Figure 3-80).



Figure 3-80. Removing the Display Latch from the Display Enclosure (All Models)

6. Remove the display latch spring from the latch (Figure 3-81).



Figure 3-81. Removing the Display Latch Spring from the Latch (Models 400 and 410)

Replacing the Display Enclosure Springs and Latches

To replace the display springs and latches, follow these steps:

 Hook the display latch spring on to the display latch [1] and place the display latch spring over the post in the display enclosure [2] (Figure 3-82).



Figure 3-82. Replacing the Display Latch Spring (Models 400 and 410)

2. Slide the display latch into place on either side of the display enclosure (Figure 3-83).



Figure 3-83. Replacing the Display Latch (Models 400 and 410)

Removing the Display Inverter Board

To remove the inverter board, follow these steps:

- 1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).
- 2. Open the computer.
- 3. Remove the display bezel. Refer to "Removing and Replacing the Display Bezel" in this section.

Ensure that the power cord is disconnected from the electrical outlet and that the battery pack is removed from the computer before beginning replacement procedures. Failure to disconnect power could result in serious injury or damage to the equipment.

When servicing the computer, 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.

4. Lift up the inverter board until it clears the three posts on the display enclosure (Figure 3-84).



Figure 3-84. Removing the Inverter Board from the Display Enclosure (Models 400 and 410)

Ensure that the power cord is disconnected from the electrical outlet and that the battery pack is removed from the computer before beginning replacement procedures. Failure to disconnect power could result in serious injury or damage to the equipment.

- 5. Unplug the backlight cable [1] from the display inverter board to free the inverter board from the display enclosure (Figure 3-85).
- 6. Remove the display cable [2] from the inverter board by gently lifting up the inverter board and disconnecting it from the display cable and the display enclosure (Figure 3-85).



Figure 3-85. Unplugging the Backlight Cable and Disconnecting the Display Cable (Models 400 and 410)

Replacing the Display Inverter Board

To replace the inverter board, follow these steps:

Ensure that the power cord is disconnected from the electrical outlet and that the battery pack is removed from the computer before beginning replacement procedures. Failure to disconnect power could result in serious injury or damage to the equipment.

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.

When servicing the computer, 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.

- 1. Insert the inverter board LIF connector into the display cable.
- 2. Plug in the backlight cable to the inverter board.
- 3. Mount the inverter board into the display enclosure, aligning the inverter board with the three mounting posts.

Chapter 3.22 Monochrome Display (Models 400 and 410)

IMPORTANT: The Monochrome, CSTN, and CTFT displays have different removal and replacement procedures. Be sure to follow the procedures for the specific display.

This sections contains removal and replacement procedures for the following monochrome display components:

o Display panel

o Shield

o Display cable

o Display ground cable

Removing the Monochrome Panel, the Shield, the Display Cable and the Display Ground Cable

To remove the Monochrome liquid crystal display (LCD) panel, the shield, the display cable and the display ground cable follow these steps:

1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).

2. Open the computer.

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened at a 90-degree angle.

3. Remove the keyboard assembly (Section 3.7).

The ZIF connector and its attached cable can be damaged easily. Handle only the connector slide when disconnecting the ZIF connector. Never pull or twist the cable itself while it is seated in the ZIF connector.

- Remove the display cable from the system board by pulling up both ends of the ZIF connector slide simultaneously [1], carefully opening the slide [2] (Figure 3-86).
- 5. Lift the display cable out of the connector slide [3], being careful not to pull or twist the cable (Figure 3-86).



Figure 3-86. Removing the Display Cable form the System Board (Models 400 and 410)

6. Disconnect the display ground cable [1] from the LIF clip above the serial port connector (Figure 3-87).



Figure 3-87. Disconnecting the Display Ground Cable (Models 400 and 410)

7. Remove the display bezel (Section 3.21).

Power must be disconnected before handling the Inverter Board

- 8. Remove the inverter board (Section 3.21).
- 9. Remove the display cable and backlight cable from the inverter board (Section 3.21).

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, be sure to support the display assembly when it is fully opened at a

135-degree angle.

10. Open the display to its fully open position of 135-degrees (Figure 3-88).



Figure 3-88. Opening the Display to a 135-Degree Angle (Models 400 and 410)

When servicing the computer, 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.

11. Remove the nine screws that secure the monochrome LCD panel and the shield to the display enclosure (Figure 3-89).



Figure 3-89. Removing the Screws from the Monochrome LCD Panel and the Shield (Models 400 and 410)

12. Carefully remove the Monochrome LCD panel, display cable, and shield from the display enclosure (Figure 3-90).



Figure 3-90. Removing the Monochrome LCD Panel and Shield (Models 400 and 410)

- 13. Lay the Monochrome LCD panel face down on a clean surface.
- 14. Grasp the sides of the shield near the backlight cable. Flex the shield away from the Monochrome LCD panel. Ensure that the shield tabs and finger grips clear the LCD panel (Figure 3-91).



Figure 3-91. Removing the Shield from the Monochrome LCD Panel (Models 400 and 410)

When servicing the computer, 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.

- 15. Remove the display cable from the Monochrome LCD panel by pulling up both ends of the ZIF connector slide simultaneously [1], carefully opening the slide [2] (Figure 3-92)
- 16. Lift the display cable out of the connector slide [3], being careful not to pull or twist the cable (Figure 3-92).



Figure 3-92. Removing the Display Cable from the Monochrome LCD Panel (Models 400 and 410)

17. Lift the display ground cable out of the display enclosure (Figure 3-93).


Figure 3-93. Removing the Display Ground Cable from the Display Enclosure (Models 400 and 410)

Replacing the Display Ground Cable, the Display Cable, the Shield, and the Monochrome Panel

To replace the display ground cable, the display cable, the shield, and the Monochrome LCD panel, follow these steps:

When servicing the computer, 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.

1. Position the display ground cable in the display enclosure, aligning the cable with the bosses in the display enclosure (Figure 3-94).



Figure 3-94. Replacing the Display Ground Cable (Models 400 and 410)

- 2. Replace the display cable on the monochrome LCD panel by carefully inserting the end of the display cable into the ZIF connector slide on the LCD panel (Figure 3-95).
 - IMPORTANT: Ensure that the ZIF connector slide is in its fully upward position and that it remains so while you are inserting the cable into it. Before closing the slide, ensure that the cable is fully seated in the ZIF connector.
- 3. While holding the end of the display cable inside the ZIF connector slide, press down both ends of the slide simultaneously to secure the cable in the ZIF connector (Figure 3-95).



Figure 3-95. Replacing the Display Cable to the Monochrome LCD Panel (Models 400 and 410)

Excess flexing and bending of the shield tabs and fingers can damage the shield.

4. Replace the display shield on the Monochrome LCD panel by slightly flexing the display shield tabs and fingers on the Monochrome LCD panel. Ensure that the LIF connector end of the display cable is exposed on the right side of the Monochrome LCD panel (Figure 3-96).



Figure 3-96. Placing the Shield on the Monochrome LCD Panel (Models 400 and 410)

5. Place the shield tabs in the indentations on the right side of the Monochrome LCD panel (Figure 3-97).



Figure 3-97. Positioning the Display Shield Tabs (Models 400 and 410)

6. Align the Monochrome LCD panel, shield, and cable in the display enclosure and replace the screws. Ensure that the ZIF connector end of the display cable and the end of the display ground cable are exposed at the bottom of the display enclosure (Figure 3-98).



Figure 3-98. Aligning the Monochrome LCD Panel and the Display Shield (Models 400 and 410)

- 7. Connect the display cable and the backlight cable to the inverter board (Section 3.21).
- 8. Replace the inverter board (Section 3.21).
- 9. Replace the bezel (Section 3.21).
- 10. Connect the display ground cable [1] to the LIF clip above the serial port connector (Figure 3-99).
- Carefully insert the end of the display ground cable into the ZIF connector slide on the system board (Figure 3-99).
 - IMPORTANT: Ensure that the ZIF connector slide is in its fully upward position and that it remains so while you are inserting the cable into it. Before closing the slide, ensure that the cable is fully seated (to the white insertion line) in the ZIF connector.



Figure 3-99. Connecting the Display Ground Cable (Models 400 and 410)

12. While holding the end of the display cable inside the ZIF connector slide, press down both ends of the slide simultaneously to secure the cable in the ZIF connector (Figure 3-100).



Figure 3-100. Connecting the Display Cable to the System Board (Models 400 and 410)

- 13. Ensure that the cable has been seated evenly and that the white line on the cable is level.
- 14. Replace the keyboard assembly (Section 3.7).

Chapter 3.23 Color STN (9.5 inch) Display (Models 400 and 410)

IMPORTANT: The Monochrome, CSTN and the CTFT displays have different removal and replacement procedures. Be sure to follow the procedures for the specific display.

This sections contains removal and replacement procedures for the following CSTN (9.5 inch) display components:

- o Display panel
- o Shield
- o Display cable
- o Display ground cable

Removing the CSTN (9.5 inch) Panel, Shield, Display Cable, and the Display Ground Cable

To remove the liquid crystal display CSTN (9.5 inch) panel, the shield, the display cable and the display ground cable, follow these steps:

- 1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).
- 2. Open the computer.

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened at a 90-degree angle.

3. Remove the keyboard assembly (Section 3.7).

The ZIF connector and its attached cable can be damaged easily. Handle only the connector slide when disconnecting the ZIF connector. Never pull or twist the cable itself while it is seated in the ZIF connector.

- Remove the display cable from the system board by pulling up both ends of the ZIF connector slide simultaneously [1], carefully opening the slide [2] (Figure 3-101).
- Lift the display cable out of the connector slide [3], being careful not to pull or twist the cable (Figure 3-101).



Figure 3-101. Removing the Display Cable from the System Board (Models 400 and 410)

6. Disconnect the display ground cable [1] from the LIF clip above the serial port connector (Figure 3-102).



Figure 3-102. Disconnecting the Display Ground Cable (Models 400 and 410)

To prevent damage to the trough, ensure that the trough does not tilt forward into the CPU base when the bezel is removed.

- 7. Remove the display bezel (Section 3.23).
- 8. Remove the inverter board (Section 3.23).
- 9. Remove the display cable and backlight cable from the inverter board (Section 3.23).

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, be sure to support the display assembly when it is fully opened at approximately 135-degree angle.

10. Open the display to its fully open position of approximately

135-degrees (Figure 3-103).



Figure 3-103. Opening the Display to Approximately 135-Degree Angle (Models 400 and 410)

When servicing the computer, 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.

11. Remove the screws that secure the CSTN (9.5 inch) panel and the shield to the display enclosure (Figure 3-104).



Figure 3-104. Removing the Screws from the CSTN (9.5 inch) Panel and Shield (Models 400 and 410)

12. Carefully remove the CSTN (9.5 inch) panel, display cable, and shield from the display enclosure (Figure 3-105).



Figure 3-105. Removing the CSTN (9.5 inch) Panel and the Shield (Models 400 and 410)

Excess flexing and bending of the shield tabs and fingers can damage the shield.

13. On the right side of display shield, slide the two shield tabs from the face of the CSTN (9.5 inch) panel to the back (Figure 3-106).



Figure 3-106. Removing the Display Shield Tabs (Models 400 and 410)

14. Lay the CSTN (9.5 inch) panel face down on a clean surface.15. Slide the display shield off the CSTN (9.5 inch) panel (Figure 3-107).



Figure 3-107. Removing the Display Shield from the CSTN (9.5 inch) Panel (Models 400 and 410)

16. Disconnect the display cable from the connector on the back of the CSTN (9.5 inch) panel (Figure 3-108).



Figure 3-108. Removing the Display Cable from the CSTN (9.5 inch) Panel (Models 400 and 410)

17. Lift the display ground cable out of the display enclosure (Figure 3-109).



Figure 3-109. Removing the Display Ground Cable from the Display Enclosure (Models 400 and 410)

Replacing the Display Ground Cable, Display Cable, Shield, and the CSTN (9.5 inch) Panel

To replace the display ground cable, the display cable, the shield, and the CSTN (9.5 inch) panel, follow these steps:

1. Position the display ground cable in the display enclosure, aligning the cable with the bosses in the display enclosure (Figure 3-110).



Figure 3-110. Replacing the Display Ground Cable (Models 400 and 410)

2. Connect the display cable to the connector on the back of the CSTN (9.5 inch) panel (Figure 3-111).



Figure 3-111. Replacing the Display Cable to the CSTN (9.5 inch) Panel (Models 400 and 410)

3. Slightly lift the tabs on the left side of the display shield and slide the shield onto the CSTN (9.5 inch) panel. Ensure that the LIF connector end of the display cable is exposed on the right side of the CSTN (9.5 inch) panel (Figure 3-112).



Figure 3-112. Placing the Display Shield on the CSTN (9.5 inch) Panel (Models 400 and 410)

4. Place the display shield tabs in the indentations on the sides of the CSTN (9.5 inch) panel (Figure 3-113).



Figure 3-113. Positioning the Display Shield Tabs (Models 400 and 410)

5. Align the CSTN (9.5 inch) panel, display cable, and shield in the display enclosure and replace the screws. Ensure that the ZIF connector end of the display cable and the end of the display ground cable are exposed at the bottom of the display enclosure (Figure 3-114).



Figure 3-114. Aligning the CSTN (9.5 inch) Panel and the Display Shield (Models 400 and 410)

- 6. Connect the display cable and the backlight cable to the inverter board (Section 3.23).
- 7. Replace the inverter board (Section 3.23).
- 8. Replace the bezel (Section 3.23).
- 9. Connect the display ground cable [1] from the LIF clip above the serial port connector (Figure 3-115).



Figure 3-115. Connecting the Display Ground Cable (Models 400 and 410)

- 10. Carefully insert the end of the display cable into the ZIF connector slide on the system board.
 - IMPORTANT: Ensure that the ZIF connector slide is in its fully upward position and that it remains so while you are inserting the cable into it. Before closing the slide, ensure that the cable is fully seated (to the white insertion line) in the ZIF connector.
- 11. While holding the end of the display cable inside the ZIF connector slide, press down both ends of the slide simultaneously to secure the cable in the ZIF connector (Figure 3-116).



Figure 3-116. Connecting the Display Cable to the System Board

- 12. Ensure that the cable has been seated evenly and that the white line on the cable is level.
- 13. Replace the keyboard assembly (Section 3.7).

Chapter 3.24 Color TFT (8.4 inch) Display (Models 400 and 410)

IMPORTANT: The Monochrome, CSTN and the CTFT displays have different removal and replacement procedures. Be sure to follow the procedures for the specific display.

This sections contains removal and replacement procedures for the following color CTFT (8.4 inch) display components:

- o Display panel
- o Display cable
- o Shield
- o Display ground cable

Removing the CTFT (8.4 inch) Liquid Crystal Display Panel To remove the CTFT (8.4 inch) panel, follow these steps:

1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).

2. Open the computer.

To prevent damage to the trough, ensure that the trough does not tilt forward into the CPU base when the bezel is removed.

3. Remove the display bezel (Section 3.21).

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, be sure to support the display assembly when it is fully opened at approximately 135-degree angle.

4. Open the display to its fully open position of approximately 135-degrees (Figure 3-117).



Figure 3-117. Opening the Display to Approximately 135-Degree Angle (Models 400 and 410)

- 5. Remove the inverter board (Section 3.21).
- 6. Remove the display cable and backlight cable from the inverter board (Section 3.21).

When servicing the computer, 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.

7. Remove the four screws that secure the CTFT (8.4 inch) panel to the display enclosure (Figure 3-118).



Figure 3-118. Removing the Screws from the CTFT (8.4 inch) Panel (Models 400 and 410)

8. Carefully rotate the CTFT (8.4 inch) panel down and out of the display enclosure, laying the CTFT (8.4 inch) panel gently on the keyboard assembly (Figure 3-119).



Figure 3-119. Removing the CTFT (8.4 inch) Panel from the Display Enclosure (Models 400 and 410)

9. Remove the display cable from the connector on the back of the panel by pulling the tabs at the back of the connector (Figure 3-120).



Figure 3-120. Removing the Display Cable from the CTFT (8.4 inch) Panel (Models 400 and 410)

Replacing the CTFT (8.4 inch) Display Panel

To replace the CTFT (8.4 inch) panel, follow these steps:

1. Connect the display cable to the connector on the back of the CTFT (8.4 inch) panel (Figure 3-121).



Figure 3-121. Connecting the Display Cable to the CTFT (8.4 inch) Panel (Models 400 and 410)

2. Position the CTFT (8.4 inch) panel into the display enclosure, ensuring that the ZIF connector end of the display cable is exposed on the right side of the CTFT (8.4 inch) panel (Figure 3-122).



Figure 3-122. Placing the CTFT (8.4 inch) Panel into the Display Enclosure (Models 400 and 410)

3. Secure the CTFT (8.4 inch) panel with four screws to the display enclosure.

Removing the CTFT (8.4 inch) Display Cable

To remove the CTFT (8.4 inch) display cable, follow these steps:

- 1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).
- 2. Open the computer.

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened at a 90-degree angle.

3. Remove the keyboard assembly (Section 3.7).

The ZIF connector and its attached cable can be damaged easily. Handle only the connector slide when disconnecting the ZIF connector. Never pull or twist the cable itself while it is seated in the ZIF connector.

- Remove the display cable from the system board by pulling up both ends of the ZIF connector slide simultaneously [1], carefully opening the slide [2] (Figure 3-123).
- 5. Lift the display cable out of the connector slide [3], being careful not to pull or twist the cable (Figure 3-123).



Figure 3-123. Removing the Display Cable from the System Board (Models 400 and 410)

The ZIF connector and its attached cable can be damaged easily. Handle only the connector slide when disconnecting the ZIF connector. Never pull or twist the cable itself while it is seated in the ZIF connector.

8. Remove the display cable and backlight cable from the inverter board (Section 3.21).

When servicing the computer, 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.

- 9. Remove the CTFT (8.4 inch) display panel. Refer to "Removing the CTFT (8.4 inch) Display Panel" in this section.
- 10. Disconnect the CTFT (8.4 inch) display cable. Refer to "Removing the CTFT (8.4 inch) Panel" in this section.

Replacing the CTFT Display Cable

To replace the CTFT (8.4 inch) display cable, follow these steps:

- 1. Connect the display cable to the CTFT (8.4 inch) panel. Refer to "Replacing the CTFT (8.4 inch) Display Panel" in this section.
- 2. Connect the display cable and the backlight cable to the inverter board (Section 3.21).
- 3. Replace the inverter board (Section 3.21).
- 4. Replace the bezel (Section 3.21).
- 5. Carefully insert the end of the display cable into the ZIF connector slide on the system board (Figure 3-124).
- IMPORTANT: Ensure that the ZIF connector slide is in its fully upward position and that it remains so while you are inserting the cable into it. Before closing the slide, ensure that the cable is fully seated (to the white insertion line) in the ZIF connector.
- 6. While holding the end of the display cable inside the ZIF connector slide, press down both ends of the slide simultaneously to secure the cable in the ZIF connector (Figure 3-124).



Figure 3-124. Connecting the Display Cable to the System Board (Models 400 and 410)

- 7. Ensure that the cable has been seated evenly and that the white line on the cable is level.
- 8. Replace the keyboard assembly (Section 3.7).

Removing and Replacing the CTFT (8.4 inch) Display Shield

To remove the CTFT (8.4 inch) display shield, follow these steps:

- 1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).
- 2. Open the computer.

To prevent damage to the trough, ensure that the trough does not tilt forward into the CPU base when the bezel is removed.

3. Remove the display bezel (Section 3.21).

- 4. Remove the inverter board (Section 3.21).
- 5. Remove the display cable and backlight cable from the inverter board (Section 3.21).

When servicing the computer, 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.

- 6. Remove the CTFT (8.4 inch) panel from the display enclosure. Refer to "Removing the CTFT (8.4 inch) Display Panel" in this section.
- 7. Remove the remaining five screws from the display shield (Figure 3-125).



Figure 3-125. Removing Screws from the CTFT (8.4 inch) Display Shield (Models 400 and 410)

 Lift the display shield up and away from the display enclosure (Figure 3-126).


Figure 3-126. Removing the CTFT (8.4 inch) Display Shield (Models 400 and 410)

9. To replace the display shield, reverse the previous steps.

Removing and Replacing the Display Ground Cable

To remove the display ground cable, follow these steps:

- 1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).
- 2. Open the computer.

To prevent damage to the trough, ensure that the trough does not tilt forward into the CPU base when the bezel is removed.

3. Remove the display bezel (Section 3.21).

4. Remove the inverter board (Section 3.21).

5. Remove the display cable and backlight cable from the inverter board (Section 3.21).

When servicing the computer, 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.

- 6. Remove the CTFT (8.4 inch) panel from the display enclosure. Refer to "Removing the CTFT (8.4 inch) Display Panel" in this section.
- 7. Remove the display cable. Refer to "Removing the CTFT (8.4 inch) Display Cable" in this section.
- Remove the display shield. Refer to "Removing and Replacing the CTFT (8.4 inch) Display Shield" in this section.
- 9. Disconnect the display ground cable [1] from the LIF clip above the serial port connector on the system unit module (Figure 3-127).



Figure 3-127. Disconnecting the Display Ground Cable (Models 400 and 410)

10. Lift the display ground cable out of the display enclosure (Figure 3-128).



Figure 3-128. Removing the Display Ground Cable (Models 400 and 410)

11. To replace the display ground cable, reverse the previous steps.

Chapter 3.25 Display Components (Models 420 and 430)

This section contains removal and replacement procedures for the following display assembly components:

- o Bezel
- o Latches
- o Inverter board

Removing and Replacing the Display Bezel

To remove the display bezel, follow these steps:

1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).

- 2. Open the computer.
- 3. Remove the four screws from the display bezel (Figure 3-129).



Figure 3-129. Removing the Display Bezel Screws (Models 420 and 430)

4. Separate the display bezel from the display assembly (Figure 3-130).



Figure 3-130. Removing the Display Bezel (Models 420 and 430)

5. To replace the bezel, reverse the previous steps.

Removing the Display Enclosure Latches and Springs

To remove the display enclosure latches and springs from either side of the display enclosure, follow these steps:

- 1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).
- 2. Open the computer.
- 3. Remove the display bezel. Refer to "Removing and Replacing the Display Bezel" in this section.
- 4. Hold the bottom of the latch near the spring. Flex the hook end of the display latch away from the display enclosure [1] (Figure 3-131).
- Full the display latch from the top, then out of the display enclosure
 [2] (Figure 3-131).



Figure 3-131. Removing the Display Latch from the Display Enclosure (Models 420 and 430)

6. Remove the display latch spring from the latch (Figure 3-132).



Figure 3-132. Removing the Display Latch Spring from the Latch (Models 420 and 430)

Replacing the Display Enclosure Springs and Latches

To replace the display springs and latches, follow these steps:

 Hook the display latch spring on to the display latch [1] and place the display latch spring over the post in the display enclosure [2] (Figure 3-133).



Figure 3-133. Replacing the Display Latch Spring (Models 420 and 430)

2. Slide the display latch into place on either side of the display enclosure (Figure 3-134).



Figure 3-134. Replacing the Display Latch (Models 420 and 430)

Removing the Display Inverter Board for the CSTN (10.4 inch) Display

Ensure that the power cord is disconnected from the electrical outlet and that the battery pack is removed from the computer before beginning replacement procedures. Failure to disconnect power could result in serious injury or damage to the equipment.

To remove the inverter board for the CSTN (10.4 inch) Display, follow these steps:

- 1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).
- 2. Open the computer.
- 3. Remove the display bezel. Refer to "Removing and Replacing the Display Bezel" in this section.

location to avoid pinching during the reassembly process. Improper cable placement can cause severe damage to the unit.

4. Lift up the inverter board until it clears the three posts on the display enclosure (Figure 3-135).



Figure 3-135. Removing the Inverter Board of the CSTN (10.4 inch) Display (Models 420 and 430)

Ensure that the power cord is disconnected from the electrical outlet and that the battery pack is removed from the computer before beginning replacement procedures. Failure to disconnect power could result in serious injury or damage to the equipment.

- 5. Unplug the backlight cable [1] from the display inverter board to free the inverter board from the display enclosure (Figure 3-136).
- 6. Remove the display cable [2] from the inverter board by gently lifting up the inverter board and disconnecting it from the display cable and the display enclosure (Figure 3-136).
- 7. Remove the screw in the lower right corner of the display to release

the ground wire which is attached to the inverter board.



Figure 3-136. Unplugging the Backlight Cable and Disconnecting the Display Cable (Models 420 and 430)

Removing the Display Inverter Board for the CTFT (10.4 inch) Display

Ensure that the power cord is disconnected from the electrical outlet and that the battery pack is removed from the computer before beginning replacement procedures. Failure to disconnect power could result in serious injury or damage to the equipment.

NOTE: The CTFT (10.4 inch) display is different than all other displays. The inverter board fits partially behind the display. Loosen the screws (as indicated by the circles in Figure 3-137) on the display to slide the inverter out from behind the display.



Figure 3-137. Sliding the Inverter Board from behind the CTFT (10.4 inch) Display (Models 420 and 430)

To remove the inverter board for the CTFT (10.4 inch) Display, follow these steps:

- 1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).
- 2. Open the computer.
- 3. Remove the display bezel. Refer to "Removing and Replacing the Display Bezel" in this section.

When servicing the computer, 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.

4. Lift up the inverter board until it clears the three posts on the display enclosure (Figure 3-138).



Figure 3-138. Removing the Inverter Board of the CTFT (10.4 inch) Display from the Display Enclosure (Models 420 and 430)

Ensure that the power cord is disconnected from the electrical outlet and that the battery pack is removed from the computer before beginning replacement procedures. Failure to disconnect power could result in serious injury or damage to the equipment.

- 5. Unplug the backlight cable [1] from the display inverter board to free the inverter board from the display enclosure (Figure 3-139).
- 6. Remove the display cable [2] from the inverter board by gently lifting up the inverter board and disconnecting it from the display cable and the display enclosure (Figure 3-139).



Figure 3-139. Unplugging the Backlight Cable and Disconnecting the Display Cable (Models 420 and 430)

Replacing the Display Inverter Board

To replace the inverter board, follow these steps:

Ensure that the power cord is disconnected from the electrical outlet and that the battery pack is removed from the computer before beginning replacement procedures. Failure to disconnect power could result in serious injury or damage to the equipment.

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.

When servicing the computer, 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.

- 1. Insert the inverter board LIF connector into the display cable.
- 2. Plug in the backlight cable to the inverter board.
- 3. Mount the inverter board into the display enclosure, aligning the inverter board with the three mounting posts.
- 4. For the CSTN (10.4 inch) models, reconnect the inverter ground wire the lower right corner of the display.
- 5. For the CTFT (10.4 inch) models, the inverter board slides partially underneath the CTFT Display.

Chapter 3.2 Color STN (10.4 inch) Display (Models 420 and 430)

IMPORTANT: The Monochrome, CSTN and CTFT displays have different removal and replacement procedures. Be sure to follow the procedures for the specific display.

This section contains removal and replacement procedures for the following CSTN (10.4 inch) display components:

- o Display panel
- o Shield
- o Display cable
- o Display ground cable

Removing the CSTN (10.4 inch) Panel, Shield, Display Cable, and the Display Ground Cable

To remove the liquid crystal display CSTN (10.4 inch) panel, shield, display cable and the display ground cable, follow these steps:

- 1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).
- 2. Open the computer.

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened at a 90-degree angle.

3. Remove the keyboard assembly (Section 3.7).

The ZIF connector and its attached cable can be damaged easily. Handle only the connector slide when disconnecting the ZIF connector. Never pull or twist the cable itself while it is seated in the ZIF connector.

- Remove the display cable from the system board by pulling up both ends of the ZIF connector slide simultaneously [1], carefully opening the slide [2] (Figure 3-140).
- 5. Lift the display cable out of the connector slide [3], being careful not to pull or twist the cable (Figure 3-140).





6. Disconnect the display ground cable [1] from the LIF clip above the serial port connector (Figure 3-141).



Figure 3-141. Disconnecting the Display Ground Cable (Models 420 and 430)

To prevent damage to the trough, ensure that the trough does not tilt forward into the CPU base when the bezel is removed.

- 7. Remove the display bezel (Section 3.25).
- 8. Remove the inverter board (Section 3.25).
- 9. Remove the display cable and backlight cable from the inverter board (Section 3.25).

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, be sure to support the display assembly when it is fully opened at approximately 135-degree angle.

10. Open the display to its fully open position of approximately

135-degrees (Figure 3-142).



Figure 3-142. Opening the Display to Approximately 135-Degree Angle (Models 420 and 430)

When servicing the computer, 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.

11. Remove the screws that secure the CSTN (10.4 inch) panel and the shield to the display enclosure (Figure 3-143).



Figure 3-143. Removing the Screws from the CSTN (10.4 inch) Panel and Shield (Models 420 and 430)

12. Carefully remove the CSTN (10.4 inch) panel, display cable, and shield from the display enclosure (Figure 3-144).



Figure 3-144. Removing the CSTN (10.4 inch) Panel and Shield (Models 420 and 430)

13. On the right side of display shield, slide the two shield tabs from the face of the CSTN (10.4 inch) panel to the back (Figure 3-145).



Figure 3-145. Removing the Display Shield Tabs (Models 420 and 430)

14. Lay the CSTN (10.4 inch) panel face down on a clean surface.15. Slide the display shield off the CSTN panel (Figure 3-146).



Figure 3-146. Removing the Display Shield from the CSTN (10.4 inch) Panel (Models 420 and 430)

16. Only Sharp panels require the XOVER Board. Remove the ground wire connecting the XOVER Board with the CSTN (10.4 inch) Panel (Figure 3-147).



Figure 3-147 Removing the XOVER Board Ground Wire from the CSTN (10.4 inch) Panel (Models 420 and 430)

17. Disconnect the display cable from the connector on the back of the CSTN (10.4 inch) panel (Figure 3-148).



Figure 3-148. Removing the Display Cable from the CSTN (10.4 inch) Panel (Models 420 and 430)

17. Lift the display ground cable out of the display enclosure (Figure 3-149).



Figure 3-149. Removing the Display Ground Cable from the Display Enclosure (Models 420 and 430)

Replacing the Display Ground Cable, Display Cable, Shield, and the CSTN (10.4 inch) Panel

To replace the display ground cable, display cable, shield, and the CSTN (10.4 inch) panel, follow these steps:



Figure 3-150. Replacing the Display Ground Cable (Models 420 and 430)

- 1. Position the display ground cable in the display enclosure, aligning the cable with the bosses in the display enclosure (Figure 3-151).
- 2. If the CSTN panel is manufactured by Sharp complete this step. If not, continue to step 4. Connect the display cable to the XOVER Board. Then connect the XOVER Board to the connector on the back of the CSTN (10.4 in) panel. Attach the ground wire of the XOVER Board to the display panel as indicated in (Figure 3-151).



Figure 3-151. Replacing the Display Cable to the CSTN (10.4 inch) Panel (Models 420 and 430)

3. If the CSTN panel is manufactured by Sharp complete this step. If not, continue to the next step. Peel off the adhesive from the back of the rubber pad found in the spare kit. Place this pad on the display enclosure indicated by the embossed area (Figure 3-152).



Figure 3-152. Adding the Rubber Pad for the Sharp CSTN (10.4 inch) Panel (Models 420 and 430)

4. Slightly lift the tabs on the left side of the display shield and slide the shield onto the CSTN (10.4 inch) panel. Ensure that the LIF connector end of the display cable is exposed on the right side of the CSTN (10.4 inch) panel (Figure 3-153).



Figure 3-153. Placing the Display Shield on the CSTN (10.4 inch) Panel (Models 420 and 430)

5. Place the display shield tabs in the indentations on the sides of the CSTN (10.4 in) panel (Figure 3-154).



Figure 3-154. Positioning the Display Shield Tabs (Models 420 and 430)

6. Align the CSTN (10.4 inch) panel, display cable, and shield in the display enclosure and replace the screws. Ensure that the ZIF connector end of the display cable and the end of the display ground cable are exposed at the bottom of the display enclosure (Figure 3-155).



Figure 3-155. Replacing the CSTN (10.4 inch) Panel and the Display Shield (Models 420 and 430)

- 7. Connect the display cable and the backlight cable to the inverter board (Section 3.25).
- 8. Replace the inverter board (Section 3.25).
- 9. Replace the bezel (Section 3.25).
- 10. Connect the display ground cable [1] from the LIF clip above the serial port connector (Figure 3-156).



Figure 3-156. Connecting the Display Ground Cable (Models 420 and 430)

- 11. Carefully insert the end of the display ground cable into the ZIF connector slide on the system board.
 - IMPORTANT: Ensure that the ZIF connector slide is in its fully upward position and that it remains so while you are inserting the cable into it. Before closing the slide, ensure that the cable is fully seated (to the white insertion line) in the ZIF connector.
- 12. While holding the end of the display cable inside the ZIF connector slide, press down both ends of the slide simultaneously to secure the cable in the ZIF connector (Figure 3-157).



Figure 3-157. Connecting the Display Cable to the System Board (Models 420 and 430)

- 13. Ensure that the cable has been seated evenly and that the white line on the cable is level.
- 14. Replace the keyboard assembly (Section 3.7).

Chapter 3.27 Color TFT (10.4 inch) Display (Models 420 and 430)

IMPORTANT: The Monochrome, CSTN and the CTFT displays have different removal and replacement procedures. Be sure to follow the procedures for the specific display.

This sections contains removal and replacement procedures for the following CTFT (10.4 inch) display components:

- o Display panel
- o Display cable
- o Shield
- o Display ground cable

Removing the CTFT Display Panel

To remove the CTFT (10.4 inch) panel, follow these steps:

1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).

2. Open the computer.

To prevent damage to the trough, ensure that the trough does not tilt forward into the CPU base when the bezel is removed.

3. Remove the display bezel (Section 3.25).

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, be sure to support the display assembly when it is fully opened at approximately 135-degree angle.

4. Open the display to its fully open position of approximately 135-degrees (Figure 3-158).



Figure 3-158. Opening the Display to Approximately 135-Degree Angle

- NOTE: The CTFT (10.4 inch) display is different than all other displays. The inverter board fits partially behind the display. Loosen the screws on the display to slide the inverter out from behind the display.
- 5. Remove the inverter board (Section 3.25).
- 6. Remove the display cable and backlight cable from the inverter board (Section 3.25).
- 7. Remove the four screws that secure the CTFT (10.4 inch) panel to the display enclosure (Figure 3-159).



Figure 3-159. Removing the Screws from the CTFT (10.4 inch) Panel (Models 420 and 430)

8. Carefully rotate the CTFT (10.4 inch) panel down and out of the display enclosure, laying the CTFT (10.4 inch) panel gently on the keyboard assembly (Figure 3-160).


Figure 3-160. Removing the CTFT (10.4 inch) Panel from the Display Enclosure (Models 420 and 430)

9. Remove the display cable from the connector on the back of the panel (Figure 3-161).



Figure 3-161. Removing the CTFT (10.4 inch) Display Cable from the Panel (Models 420 and 430)

10. The CTFT Display Cable is disconnected by pulling upward on the tabs on the back of the Connector.

Replacing the CTFT (10.4 inch) Display Panel

When servicing the computer, 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.

1. Connect the display cable to the connector on the back of the CTFT (10.4 inch) panel (Figure 3-162).



Figure 3-162. Connecting the Display Cable to the CTFT (10.4 inch) Panel (Models 420 and 430)

2. Position the CTFT (10.4 inch) panel into the display enclosure, ensuring that the ZIF connector end of the display cable is exposed on the right side of the CTFT (10.4 inch) panel (Figure 3-163).



Figure 3-163. Placing the CTFT (10.4 inch) Panel into the Display Enclosure (Models 420 and 430)

3. Secure the CTFT (10.4 inch) panel with four screws to the display enclosure.

Removing the CTFT (10.4 inch) Display Cable

To remove the CTFT (10.4 inch) display cable, follow these steps:

- 1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).
- 2. Open the computer.

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened at a 90-degree angle.

3. Remove the keyboard assembly (Section 3.7).

The ZIF connector and its attached cable can be damaged easily. Handle only the connector slide when disconnecting the ZIF connector. Never pull or twist the cable itself while it is seated in the ZIF connector.

To prevent damage to the trough, ensure that the trough does not tilt forward into the CPU base when the bezel is removed

- Remove the display cable from the system board by pulling up both ends of the ZIF connector slide simultaneously [1], carefully opening the slide [2] (Figure 3-164).
- 5. Lift the display cable out of the connector slide [3], being careful not to pull or twist the cable (Figure 3-164).



Figure 3-164. Removing the Display Cable from the System Board (Models 420 and 430)

6. Remove the display bezel (Section 3.25).

7. Remove the inverter board (Section 3.25).

The ZIF connector and its attached cable can be damaged easily. Handle only the connector slide when disconnecting the ZIF connector. Never pull or twist the cable itself while it is seated in the ZIF connector.

8. Remove the display cable and backlight cable from the inverter board (Section 3.25).

When servicing the computer, 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.

- 9. Remove the CTFT (10.4 inch) display panel. Refer to "Removing the CTFT (10.4 inch) Display Panel" in this section.
- 10. Disconnect the CTFT (10.4 inch) display cable. Refer to "Removing the CTFT (10.4 inch) Panel" in this section.

Replacing the CTFT Display Cable

To replace the CTFT (10.4 inch) display cable, follow these steps:

- 1. Connect the CTFT (10.4 inch) display cable to the (10.4 inch) panel. Refer to "Replacing the CTFT (10.4 inch) Display Panel" in this section.
- 2. Connect the display cable and the backlight cable to the inverter board (Section 3.25).
- 3. Replace the inverter board (Section 3.25).

4. Replace the bezel (Section 3.25).

- 5. Carefully insert the end of the display cable into the ZIF connector slide on the system board.
 - IMPORTANT: Ensure that the ZIF connector slide is in its fully upward position and that it remains so while you are inserting the cable into it. Before closing the slide, ensure that the cable is fully seated (to the white insertion line) in the ZIF connector.
- 6. While holding the end of the display cable inside the ZIF connector slide, press down both ends of the slide simultaneously to secure the cable in the ZIF connector (Figure 3-165).



Figure 3-165. Connecting the Display Cable to the System Board (Models 420 and 430)

- 7. Ensure that the cable has been seated evenly and that the white line on the cable is level.
- 8. Replace the keyboard assembly (Section 3.7).

Removing and Replacing the CTFT (10.4 inch) Display Shield

To remove the CTFT (10.4 inch) display shield, follow these steps:

- 1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).
- 2. Open the computer.

To prevent damage to the trough, ensure that the trough does not tilt forward into the CPU base when the bezel is removed.

3. Remove the display bezel (Section 3.25).

- 4. Remove the inverter board (Section 3.25).
- 5. Remove the display cable and backlight cable from the inverter board (Section 3.25).

When servicing the computer, 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.

- 6. Remove the CTFT (10.4 inch) panel from the display enclosure. Refer to "Removing the CTFT (10.4 inch) Display Panel" in this section.
- 7. Remove the remaining five screws from the display shield (Figure 3-166).



Figure 3-166. Removing the Screws from the CTFT (10.4 inch) Display Shield (Models 420 and 430)

 Lift the display shield up and away from the display enclosure (Figure 3-167).



Figure 3-167. Removing the CTFT (10.4 inch) Display Shield (Models 420 and 430)

9. To replace the display shield, reverse the previous steps.

Removing and Replacing the Display Ground Cable

To remove the display ground cable, follow these steps:

- 1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).
- 2. Open the computer.

To prevent damage to the trough, ensure that the trough does not tilt forward into the CPU base when the bezel is removed.

3. Remove the display bezel (Section 3.25).

4. Remove the inverter board (Section 3.25).

5. Remove the display cable and backlight cable from the inverter board (Section 3.25).

When servicing the computer, 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.

- 6. Remove the CTFT (10.4 inch) panel from the display enclosure. Refer to "Removing the CTFT (10.4 inch) Display Panel" in this section.
- 7. Remove the display cable. Refer to "Removing the CTFT (10.4 inch) Display Cable" in this section.
- 8. Remove the display shield. Refer to "Removing and Replacing the CTFT (10.4 inch) Display Shield" in this section.
- 9. Disconnect the display ground cable [1] from the LIF clip above the serial port connector on the system unit module (Figure 3-168).



Figure 3-168. Disconnecting the Display Ground Cable (Models 420 and 430)

10. Lift the display ground cable out of the display enclosure (Figure 3-169).



Figure 3-169. Removing the Display Ground Cable (Models 420 and 430)

11. To replace the display ground cable, reverse the previous steps.

Chapter 3.28 Display Enclosure

This section provides replacement procedures for the display enclosure.

Replacing the Display Enclosure

To replace the display enclosure, follow these steps:

- 1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).
- 2. Remove the handle brackets (Section 3.3).
- 3. Remove the tilt feet (Section 3.4).

the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened at a 90-degree angle.

- 4. Remove the keyboard assembly (Section 3.7).
- 5. Remove the right clutch ground clip located between the clutch and the CPU base.
 - NOTE: The right clutch clip for Models 420 and 430 is different than for Models 400 and 410, and is illustrated in the circular insert (Figure 3-170).



Figure 3-170. Removing the Right Clutch Ground Clip (All Models)

- Life up both ends of the ZIF connector slide simultaneously [1], carefully opening the slide [2] (Figure 3-171).
- 7. Lift the display cable out of the connector slide [3], being careful not to pull or twist the cable (Figure 3-171).



Figure 3-171. Disconnecting the Display Cable from the System Board (All Models)

 Disconnect the display ground cable [1] from the LIF clip (Figure 3-172).



Figure 3-172. Disconnecting the Display Ground Cable from the LIF Clip (All Models)

- 9. Gently lower the display.
- 10. Using a Torx T8 or slotted driver, remove the four clutch screws from the rear panel of the computer (Figure 3-173).



Figure 3-173. Removing the Rear Clutch Screws (All Models)

11. Lift the display assembly off the system unit module (Figure 3-174).



Figure 3-174. Removing the Display Assembly from the System Unit Module (All Models)

12. Position the display assembly top-side up.

- 13. Remove the display bezel (Section 3.25).
- 14. Remove the display latches and springs (Section 3.25).
- 15. Remove the inverter board (Section 3.21).

The ZIF connector and its attached cable can be damaged easily. Handle only the connector slide when disconnecting the ZIF connector. Never pull or twist the cable itself while it is seated in the ZIF connector.

16. Remove the display cable and backlight cable from the inverter board (Section 3.21).

When servicing the computer, 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.

- 17. Remove the LCD panel, the display cable, the shield, and the display ground cable from the display enclosure as follows:
 - If removing a Monochrome panel and shield, refer to Section 3.22.
 - If removing a CSTN (9.5 in) panel and shield, refer to Section 3.23.
 - If removing a CTFT (8.4 in) panel and shield, refer to Section 3.24.
 - If removing a CSTN (10.4 in) panel and shield, refer to Section 3.26.
 - If removing a CTFT (10.4 in) panel and shield, refer to Section 3.27.
- 18. Remove the display clutches from the display enclosure (Figure 3-175).



Figure 3-175. Removing the Display Clutches (All Models)

- 19. Place the new display enclosure top-side up.
- 20. Replace the display clutches on either side of the display enclosure (Figure 3-176).



Figure 3-176. Replacing the Display Clutches (All Models)

- 21. Replace the display ground cable, the LCD panel, the shield, and the display cable into the display enclosure as follows:
 - If replacing a Monochrome panel and shield, refer to Section 3.22.
 - If removing a CSTN (9.5 in) panel and shield, refer to Section 3.23.
 - If removing a CTFT (8.4 in) panel and shield, refer to Section 3.24.
 - If removing a CSTN (10.4 in) panel and shield, refer to Section 3.26.
 - If removing a CTFT (10.4 in) panel and shield, refer to Section 3.27.
- 22. Connect the display cable and backlight cable to the inverter board (Section 3.25).
- 23. Replace the inverter board (Section 3.25).
- 24. Replace the display latches and springs (Section 3.25).
- 25. Replace the bezel (Section 3.25).
- 26. Position the display clutches at a 90-degree angle (Figure 3-177).



Figure 3-177. Positioning Display Clutches (All Models)

27. Align the clutches with the system unit module, ensuring that the display ground cable and the display cable are positioned on top of the system unit module (Figure 3-178).



Figure 3-178. Replacing the Display Assembly (All Models)

28. Replace the four rear clutch screws (Figure 3-179).



Figure 3-179. Replacing the Rear Clutch Screws (All Models)

29. Open the display to a 90-degree angle (Figure 3-180).



Figure 3-180. Opening the Display (All Models)

30. Connect the display ground cable [1] to the LIF clip above the serial port connector between the system board and the system chassis (Figure 3-181).



Figure 3-181. Connecting the Display Ground Cable to the LIF Clip on the System Unit Module (All Models)

- 31. Carefully insert the end of the cable into the ZIF connector slide on the system unit.
 - IMPORTANT: Ensure that the ZIF connector slide is in its fully upward position and that it remains so while you are inserting the cable into it. Before closing the slide, ensure that the cable is fully seated (to the white insertion line) in the ZIF connector.
- 32. While holding the end of the display cable inside the ZIF connector slide, press down both ends of the slide simultaneously to secure the cable in the ZIF connector (Figure 3-182).



Figure 3-182. Connecting the Display Cable to the System Unit Module (All Models)

- 33. Ensure that the cable has been seated evenly and that the white line on the cable is level.
- 34. Replace the right clutch ground clip located between the clutch and the CPU base. The right clutch clip for Models 420 and 430 is different and is illustrated in the insert Figure 3-183).



Figure 3-183. Replacing the Right Clutch Ground Clip (All Models)

- 35. Replace the keyboard assembly (Section 3.7).
- 36. Replace the tilt feet (Section 3.4).
- 37. Replace the handle bracket (Section 3.3).

Chapter 3.29 Clutches and Ground Clips

This section contains removal and replacement procedures for the clutch ground clips located between the system chassis and CPU base, and for the clutches that join the system unit module and the display enclosure.

Removing and Replacing the Clutch Ground Clips

To remove the left and right clutch ground clips, follow these steps:

- 1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).
- 2. Remove the keyboard assembly (Section 3.7).
- 3. Remove the left clutch ground clip from the system chassis (Figure 3-184).



Figure 3-184. Removing the Left Clutch Ground Clip (All Models)

4. Remove the right clutch ground clip located between the clutch and the CPU base. The right clutch clip for Models 420 and 430 is different and is illustrated in the insert (Figure 3-185).



Figure 3-185. Removing the Right Clutch Ground Clip (All Models)

5. To replace the clutch ground clips, reverse the previous steps.

Removing and Replacing the Clutches

To remove the clutches, follow these steps:

- 1. Disconnect all power from the computer and remove the AC Adapter and battery pack (Section 3.2).
- 2. Remove the handle brackets from each side of the computer (Section 3.3).

3. Remove the tilt feet from each side of the computer (Section 3.4).

The computer becomes top heavy when the keyboard assembly is removed and the display is opened. To prevent damage to the display and the computer, ensure that the display assembly is opened at a 90-degree angle.

4. Remove the keyboard assembly (Section 3.7).

- 5. Remove the left and right clutch ground clips (see "Removing and Replacing Clutch Ground Clips" in this section).
- Pull up both ends of the ZIF connector slide simultaneously [1], carefully opening the slide [2] (Figure 3-186).
- Lift the display cable out of the connector slide [3], being careful not to pull or twist the cable (Figure 3-186).



Figure 3-186. Disconnecting the Display Cable from the System Board (All Models)

 Remove the display ground cable [1] away from the LIF clip (Figure 3-187).



Figure 3-187. Disconnecting the Display Ground Cable from the LIF Clip (All Models)

9. Using a Torx T8 or slotted driver, remove the four clutch screws on the rear of the system unit module (Figure 3-188).



Figure 3-188. Removing the Rear Clutch Screws (All Models)

10. Lift the display assembly off the system unit module (Figure 3-189).



Figure 3-189. Removing the Display Assembly from the System Unit Module (All Models)

- 11. Place the display assembly top-side up.
- 12. Remove the display bezel (Section 3.21).
- 13. Remove the screws from the clutches on either side of the display enclosure.
- 14. On either side of the display enclosure, slide the clutches from underneath the display shield tabs (Figure 3-190).



Figure 3-190. Removing the Clutches from Underneath the Display Shield (All Models)

15. Slide the clutches out of the display enclosure.

16. To replace the clutches, reverse the previous steps.

IMPORTANT: When replacing the display clutch screws, ensure proper alignment of the display clutches on either side of the display enclosure with the shield (Figure 3-191).



Figure 3-191. Replacing the Display Clutches (All Models)

Chapter 3.30 Docking Base

This section contains removal procedures for the following docking base components:

- o Battery Door
- o Feet
- o Handle

Removing the Battery Door

To remove the battery door, follow these steps:

1. Open the battery door until it is perpendicular to the docking base (Figure 3-192).



Figure 3-192. Opening the Battery Door (All Models)

- Hold the door upright, applying pressure to the door at the base of the front hinge [1]. This creates a pivot point [2] to rotate the door out of the base (Figure 3-193).
- 3. Flex the front end of the door until the retaining pin [3] clears the hinge slot on the docking base (Figure 3-193).



Figure 3-193. Unhinging the Battery Door from the Docking Base (All Models)

4. Remove the battery door from the docking base (Figure 3-194).



Figure 3-194. Removing the Battery Door from the Docking Base (All Models)

5. To replace the battery door, reverse the previous steps.

Replacing the Docking Base Feet

To replace the docking base feet, follow these steps:

- 1. Remove the top layer from the foot to expose the adhesive strip (Figure 3-195).
- 2. Place the foot adhesive-side down into the circular indentation on the bottom of the docking base (Figure 3-195).


Figure 3-195. Replacing the Docking Base Feet (All Models)

Replacing the Handle

To replace the docking base handle, follow these steps:

1. Using a Torx T8, remove the screw from the rear of the handle (Figure 3-196).



Figure 3-196. Removing the Handle Screw (All Models)

2. Slide the handle off the crankshaft (Figure 3-197).



Figure 3-197. Removing the Docking Base Handle (All Models)

- 3. Slide the new handle on the crankshaft until the handle seats.
- 4. To secure the new handle to the crankshaft, replace the screw behind the handle.

Chapter 3.31 Monitor Support Cover

This section contains replacement procedures for the foot on the monitor support cover.

To replace the foot, follow these steps:

- 1. Turn the monitor support cover top-side down.
- Remove the top layer from the foot to expose the adhesive strip (Figure 3-198).
- 3. Position the foot adhesive-side down on the exposed metal and press (Figure 3-198).



Figure 3-198. Replacing the Monitor Support Cover Foot (All Models)

Chapter 4. Running POST and Test

Introduction

This chapter covers troubleshooting information for the computer. The basic steps in troubleshooting include:

- 1. Follow the preliminary steps listed in Section 4.1.
- 2. Run the Power-On Self-Test (POST) as described in Section 4.2.
- 3. Run Computer Checkup (TEST) as described in Section 4.3.
- 4. Follow the recommended action described in the diagnostic tables in Chapter 5, Section 5.1, 5.2, and 5.3 if you are unable to run POST or Computer Checkup, or if the problem still persists after they are run.

When taking the recommended actions given in Section 5.2, 5.3, and 5.4, take them one at a time in the given order until the problem is solved and no error messages occur. Refer to Chapter 3 for any recommended removal and replacement procedures.

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

Chapter 4.1 Preliminary Steps

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

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

- 1. If a power-on password has been established, type the password and press the Enter key.
- NOTE: If the key symbol (ohm) appears on the screen when the computer is turned on, a power-on password has been established. If the password is unknown, it must be cleared (refer to "Clearing the Power-On Password" in this chapter).
- 2. Verify that Computer Setup has been run. If not, run Computer Setup.
- 3. Simultaneously press the Fn+F9 keys to adjust the brightness and the Fn+F8 keys to adjust contrast on the MSTN and CSTN displays.
- 4. Turn off the computer and external devices.

- Disconnect any external devices that you do not want to test. (Do not disconnect the printer if you want to test it or use it to log error messages.)
- 6. Install loopback and terminating plugs in the serial and parallel connectors if you would like to test these ports.
- 7. Ensure that the hard drive is installed in the computer.
- 8. Connect the computer to an external AC power source with the battery pack inserted.

When the preliminary steps are complete, you are ready to run POST (Section 4.2.) and Computer Checkup (Section 4.3).

Clearing the Power-on Password

IMPORTANT: Clearing the power-on password also clears the setup password and the CMOS that contains configuration information for all external devices. After clearing the power-on password, reset the setup password and run Computer Setup to restore the configuration information.

If the password is unknown, clear it by completing the following steps:

- 1. Turn off the computer by simultaneously pressing the left Ctrl+Alt keys and power button.
- 2. Disconnect the power cord.
- 3. Remove the battery pack (Section 3.2).
- 4. Remove the keyboard cover (Section 3.7).
- 5. Disable the power-on password by removing the real-time clock battery as referenced in the following removal procedures:
 - Section 3.9, "Real-Time Clock Battery for Models 400 and 410"
 - Section 3.10, "Real-Time Clock Battery for Models 420 and 430"
- 6. Short the real-time clock battery terminals in the processor board by touching the battery terminals with two ends of a wire.
- 7. Replace all components.
 - IMPORTANT: Ensure that the battery pack is charged, since a low battery condition could initiate Hibernation and interrupt the procedure.
- 8. Replace the battery pack (Section 3.2).

9. Connect the power cord (Section 3.2).

10. Connect the power cord to the external outlet.

- 11. Turn on the computer by pressing the power button.
- 12. Verify that the power-on password has been cleared. If it has not been cleared, repeat steps 1 through 7. If the password is still not cleared refer to the following section for removal procedures.

- Section 3.15, "System Board for Models 400, 410, 420 and 430"

13. Run Computer Setup to reconfigure the system.

Chapter 4.2 Power-On Self-Test (POST)

The Power-On Self-Test (POST) is a series of diagnostic tests that run automatically when the system is turned on. POST detects which type of mass storage devices are installed in the computer and checks that the following assemblies are functioning properly:

o System board

- o Processor board
- o Memory expansion board
- o Internal keyboard controller (self-test, report error if failed)

o External keyboard (self-test, report error if failed)

- o Display
- o Video controller circuitry
- o Trackball assembly (identifies the trackball, but no actual test)
- o Hard drive
- o Diskette drive
- o System memory

Running POST

To run POST, complete the following steps:

- 1. Turn off the computer by simultaneously pressing the left Ctrl+Alt keys and power button.
- 2. Turn on the computer.
 - If POST does not detect any errors, the computer beeps one or two times to indicate that POST has successfully run, and the computer

boots from the hard drive (or from a bootable diskette if installed in the diskette drive). However, diskette drive may be disabled, and the computer cannot boot from the diskette drive.

- If POST detects errors, the errors are indicated by screen and/or audible messages. Refer to "Power-On Self-Test (POST) Error Messages" in this section for a list of POST error messages, probable causes, and recommended actions.
- 3. Take the recommended action for each error code, then repeat steps 1 and 2 until POST runs successfully.

After POST runs successfully, run Computer Checkup (Section 4.3).

NOTE: If the system is not functioning well enough to run POST, or if the display is not functioning well enough to show POST error messages, refer to the troubleshooting tables in Section 5.4. Take the recommended actions, then repeat steps 1 and 2 until POST runs successfully.

Chapter 4.3 Computer Checkup (TEST)

After POST runs successfully, run the latest version of Computer Checkup (TEST). Computer Checkup determines if the computer assemblies and options are recognized by the system and functioning properly. Run Computer Checkup after installing or connecting a new assembly or option.

Computer Checkup is installed on the hard drive. If the hard drive is nonfunctional, you can run it from a diskette.

NOTE: It is recommended that you make diskette copies of Computer Checkup and keep them available for future need. A current copy can be obtained from the Compaq Customer Support Center.

Running Computer Checkup

To run Computer Checkup from the hard drive, complete the following steps:

- 1. Turn off the computer by simultaneously pressing the left Ctrl+Alt keys and power button.
- 2. Turn on the computer.
- 3. When the cursor moves to the right side of the screen, press F10.

The Configuration and Diagnostics menu is displayed.

- 4. From the Configuration and Diagnostics menu, select Computer Checkup (TEST).
 - A test option menu is displayed.

5. Select the option to view the device list.

A list of the installed hardware devices is displayed.

NOTE: Computer Checkup does not detect all non-Compaq devices.

6. Verify that Computer Checkup correctly detected the installed devices.

If the list is correct, select OK. The Computer Checkup option menu is displayed again.

If the list is incorrect, verify that the new devices are installed properly.

7. Select one of the following from the test option menu:
Quick Check Diagnostics -- This option runs a quick, general test on each device with a minimal number of prompts. If errors occur, they

are displayed when the testing is complete.

- Automatic Diagnostics -- This option runs an unattended, maximum test of each device with minimal prompts. You can choose how many times to run the tests, to stop on errors, or to print or file a log of errors.
- Prompted Diagnostics -- This option allows maximum control over the device testing process. You can choose attended or unattended testing, decide to stop on errors, or choose to print or file a log of errors.
- 8. Follow the instructions on the screen as the diagnostic tests are run on the devices.

When the testing is complete, the test option menu is displayed again.

- 9. Exit the test option menu.
- 10. Exit the Configuration and Diagnostics menu.

NOTE: Exiting the Configuration and Diagnostics menu restarts the computer and saves your changes.

- 11. Look up the Computer Checkup error codes that were displayed by referring to "Computer Checkup (TEST) Error Codes" and take the recommended action.
- 12. Rerun POST and Computer Checkup, taking the recommended actions in given order until the problem is solved and no error messages occur.

Computer Checkup (TEST) Error Codes

Computer Checkup (TEST) error codes (Section 5.2) occur if the system recognizes a problem while running Computer Checkup. These error codes

help identify possible defective assemblies. Tables 5-2 through 5-13 list Computer Checkup error codes, a description of the error condition, and the recommended action for resolving the condition. For removal and replacement procedures, refer to Chapter 3.

- IMPORTANT: Rerun Computer Checkup each time you complete a recommended action step. If the problem is resolved when POST and Computer Checkup are rerun (i.e., with no error codes), do not perform the remaining recommended action steps.
- NOTE: The error codes in the following tables are listed in an AYY-XX format, where:

A or AA	=	Number that represents the faulty assembly.
YY	=	Test or action that failed.
XX	=	Specific problem.

Chapter 5. Error Messages and Codes

Introduction

This chapter provides tables covering possible errors messages for the Power-On Self-Test (POST) and the Computer Checkup (TEST) diagnostics.

Chapter 5.1 Power-On Self-Test (POST)

Table 5-1. Power-On Self-Test Messages

POST error messages occur when problems are discovered during POST. Table 5-1 lists visual error messages for POST, audible (beep) error messages, probable causes, and recommended actions.

_____ Message Beeps Probable Cause Recommended Action _____ 101 - ROM1 Long,System ROMError1 Shortchecksum 1. Inspect the ROM placement. 2. Replace the ROM. 3. Flash the ROM. 4. Replace the system board. _____
 101 - I/0
 None
 Option ROM
 1. Inspect the ROM

 Inspect the ROM
 Inspect the ROM
 Inspect the ROM
 ROM Error placement. checksum 2. Verify the correct ROM. 3. Replace the ROM. _____ 102 - SystemNoneDMA, timers,
etc. Unsupported1. Replace the processor
board.Boardetc. Unsupported
processor2. Replace the system board.Failureupgrade installed _____ 162 - System2 ShortNo diskette drive1. Run Computer Setup.Optionsor mismatch in2. Check diskette cable.Errordrive type3. Check diskette drive. _____ 162 - System 2 Short Configuration Run Computer Setup. Options Not incorrect Set _____ 163 - Time & 2 Short Invalid time or Run Computer Setup. Date Not Set date in configuration memory _____ 164 - Memory2 ShortConfigurationThe following steps apply toIncreasememory incorrect164 Memory Increase Detected and 164 Memory Decrease Detected Detected error messages: 164 - Memory 2 Short Configuration memory incorrect 1. Autosetup will correct. Decrease Detected 2. Verify that memory board is installed correctly. 3. Replace memory board. 4. Replace system board.

Message	Beeps	Probable Cause	Recommended Action
168 - CMOS CheckSUM Invalid			 Autosetup will configure to the default settings. Run Computer Setup if configuration settings are other than default.
201 - Memory Error	None	RAM failure	 If installed, make sure the memory expansion board is installed correctly. If installed, clean the contacts of the memory expansion board and system board. Replace the memory expansion board (if applicable). Make sure the memory PC card is installed correctly by running PC card service and Computer Setup. Replace the memory PC card.
203 - Memory Address Error	None	RAM failure	See Message 201 above.
205 - Memory Error	None	Cache memory error	 Run Computer Checkup. Replace the system board.
207 - Invalid Memory Configuration Module	None	Memory module installed incorrectly	Verify placement of memory.
209 - NCA RAM Error	None	RAM Failure	Run Computer Checkup.
211 - Memory Failure	None	RAM Failure	Run Computer Checkup.
301 - Keyboard Error	None	Keyboard Failure	 Check external keyboard for stuck key or loose cable. Replace system board.
Message	Beeps	Probable Cause	Recommended Action
301 -	None	Keyboard Failure	1. Check external keyboard.

Keyboard 2. Replace system board. Error or Text Fixture Installed _____ 303 -NoneSystem boardReplace the system board.Keyboardkeyboard controller Controller Error _____ 304 - Keyboard None Keyboard 1. Check external keyboard. 2. Replace system board. or System Unit Error _____ 401 - PrinterNonePrinterErrorcontroller Replace the system board, if applicable. _____ Replace the monochrome 402 -1 Long,MonochromeMonochrome2 Shortdisplay display controller. controller Adapter Failure 501 - Display 1 Long, Video display Replace the display panel. Adapter 2 Short controller Failure _____ 601 - Diskette None Diskette 1. Make sure diskette drive cable is seated. Controller controller 2. Replace the diskette Error circuitry drive cable. 3. Replace the diskette drive. 4. Replace the system board. _____ 602 - Diskette None Diskette in drive 1. Replace the diskette. A not bootable 2. Replace the diskette Boot drive. 3. Replace the system board. Message Beeps Probable Cause Recommended Action _____ 605 - Diskette 2 Short Mismatch in drive Run Computer Setup. type Drive Error _____ None Coprocessor 702 -1. Replace the processor Coprocessor upgrade. Detection 2. Replace the system board. Error _____ 702A - 2 Short Coprocessor 1. Replace the processor Coprocessor upgrade. Detection 2. Replace the system board. Error _____ 703 - CMOS 2 Short Coprocessor or 1. Run the Configuration configuration error utility. Reports A 2. Replace the processor Coprocessor That Has Not upgrade.

Been Detected 3. Replace the system board. by POST _____ Defective1. Run Computer Setup andinternal serialCheck it.port2. Replace the system board. 2 Short Defective 1125 -Internal Serial Port Failure _____ 1780 - Disk 0 None Hard drive/format 1. Run Computer Checkup. error 2. Replace the drive. Failure _____ 1782 - DiskNoneHard drive1. Run Computer Checkup.Controllercircuitry error2. Replace the drive. Controller _____ 1790- Disk 0 None Hard drive error 1. Run Computer Setup and Hald driveComputer checkup.or wrong drive2. Change drive type.type2. Change drive type. Failure 3. Replace the drive. _____ 1 Short Power-on Audible None. successful _____ 2 Short Power-on Audible None. successful _____ (RESUME = F1 None As indicated to Press the F1 key. KEY) continue _____

Chapter 5.2 Computer Checkup (TEST) Error Codes

Computer Checkup (TEST) error codes occur if the system recognizes a problem while running Computer Checkup. These error codes help identify possible defective assemblies. Tables 5-2 through 5-12 list Computer Checkup error codes, a description of the error condition, and the recommended action for resolving the condition. For removal and replacement procedures, refer to Chapter 3.

- IMPORTANT: Rerun Computer Checkup each time you complete a recommended action step. If the problem is resolved when POST and Computer Checkup are rerun (i.e., with no error codes), do not perform the remaining recommended action steps.
- NOTE: The error codes in the following tables are listed in an AYY-XX format, where:

A or	AA	=	Number that represents the faulty assembly.
	YY	=	Test or action that failed.
	XX	=	Specific problem.

Table 5-2. Processor Computer Checkup Error CodesError CodeDescriptionRecommended Action101 - xxCPU test failedReplace the system board.102 - xxCoprocessor errorReplace the system board.

103 -	xx	DMA page registers test failed	Replace the system board.
104 -	xx	Interrupt controller master test failed	Replace the system board.
105 -	xx	Port 61 error	Replace the system board.
106 -	xx	Keyboard controller self-test failed	 If using an external keyboard, try another keyboard. If second keyboard passes, replace first one.
			2. Replace the system board.
107 -	xx	CMOS RAM test failed	Replace the system board.
108 -	xx	CMOS interrupt test failed	Replace the system board.
109 -	xx	CMOS clock load data test failed	Replace the system board.
110 -	xx	Programmable timer load data test failed	Replace the system board.
111 -	xx	Refresh detect test failed	Replace the system board.
112 -	xx	Speed test slow mode out of range	Replace the system board.
113 -	01	Protected mode test failed	Replace the system board.
114 -	01	Speaker test failed	 Check system configuration to verify that speaker is enabled. Replace the keyboard assembly. Replace the system board.
116 -	xx	Cache test failed	Replace the system board.
			·····
Table =====	5-3. Me	emory computer Cneckup Error Co	aes ====================================
Error	Code	Description	Recommended Action
200 -	xx	Invalid memory configuration	 Run Computer Setup. Replace the system board.
201 -	xx	Memory machine ID test failed	The following steps apply to 201 - xx through 202 - xx error codes:
202 -	xx	Memory system ROM checksum failed	 Run Computer Setup. Replace the system board.
203 -	xx	Memory write/read test failed	The following steps apply to 203 - xx through 210 - xx error codes:

204 - xx	Memory address test failed	If you don't have a memory expansion board, replace the system board.
206 - xx	Increment pattern tes failed	If you have a memory expansion board:
210 - xx	Random pattern test failed	 Remove the memory expansion board and reinstall a new board. Replace the memory expansion board.
Table 5-4	. Keyboard Computer Checkup Er	ror Codes
Error Cod	e Description	Recommended Action
301 - xx	Keyboard short test 8042 self-test failed	 Check the keyboard connection. If disconnected, turn off the computer and connect the keyboard. Replace the keyboard. Replace the system board.
302 - xx	Keyboard long test failed	 Check the keyboard connection. If disconnected, turn off the computer and connect the keyboard. Replace the keyboard. Replace the system board.
303 - xx	Keyboard indicator test, 8042 self-test failed	 Replace the system board. If an external keyboard is being used, replace the external keyboard.
304 - xx	Keyboard typematic te failed	 1. Check the keyboard connection. If disconnected, turn off the computer and connect the keyboard. 2. Replace the keyboard. 3. Replace the system board.
Table 5-5	. Parallel Printer Computer Ch	leckup Error Codes
====== Error Cod	e Description	Recommended Action
======== 401 - xx	Printer failed or not connected	The following steps apply to 401 - xx through 498 - xx error codes:
402 - xx	Printer data register failed	 Connect the printer. Check power to the printer. Install the loopback
403 - xx	Printer pattern test failed	connector. 4. Replace the system board.
498 - xx	Printer failed or not	

connected

Table 5-6. Diskette Drive Computer Checkup Error Codes				
Error	Code	Description	Recommended Action	
====== 600 -	xx	Diskette ID drive types test failed	The following steps apply to 600 - xx through 698 - xx error codes:	
601 -	xx	Diskette format failed	 Replace the diskette. Check and/or replace the 	
602 -	xx	Diskette read test failed	diskette cable.3. Replace the diskette drive.4. Replace the system board.	
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		
697 -	xx	Diskette type error		
698 -	xx	Diskette drive speed not within limits		
699 -	xx	Diskette drive/media ID error	1. Replace media. 2. Run Computer Setup.	
Table	5-7. Serial	Computer Checkup Error Co	les	
Error	Code	Description	Recommended Action	
1101 -	- xx	Serial Port test	Replace the system board.	
Table	5-8. Modem (Communications Computer Ch	eckup Error Codes	
Error	Code	Description	Recommended Action	
1201 -	- xx	Modem Internal Loopback	The following steps apply to	

	Test	1201 - xx through 1210 - xx
1202 - xx	Modem Timeout Test	 Refer to modem documentation for correct setup procedures.
1203 - xx	Modem External Termination Test	 Check the modem line. Replace the modem.
1204 - xx	Modem Auto Originate Test	
1206 - xx	Dial Multifrequency Tone Test	
1210 - xx	Modem Direct Connect Test	
Table 5-9. Hard D:	rive Computer Checkup Erro:	r Codes
Error Code	Description	Recommended Action
1700 - xx	Hard ID drive types test failed	The following steps apply to 1700 - xx through 1799 - xx error codes:
1701 - xx	Hard drive format test failed	 Run Computer Setup and verify drive type. Reset the hard drive.
1702 - xx	Hard drive read test failed	3. Try another hard drive. If first drive was defective, try to recover data.
1703 - xx	Hard drive write/read/ compare test failed	4. Replace the system board
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 - x	Hard drive power mode test failed	
1799 - xx	Invalid hard drive type failed	
* Error Correctio	on Code	
Table 5-10. Graph:	ics Computer Checkup Error	Codes
Error Code	Description	Recommended Action
2402 - xx	Video memory test failed	The following step applies to 2402 - xx through 2480 - 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	
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	
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	
Error Code	Description	Recommended Action
2422 - xx	ECG/VGC 640 x 350 16 color set test failed	The following step applies to 2402 - xx through 2480 - xx error codes:
2423 - xx	ECG/VGC 640 x 350 64 color set test failed	Replace the system board.
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 Graphics Controller test failed	
2451 - xx	132 - column Advanced Graphics test failed	
2456 - xx	Advanced Graphics 256 Color test failed	
2458 - xx	Advanced Graphics BitBLT test	
2468 - xx	Advanced Graphics DAC test	
2477 - xx	Advanced Graphics data path test	
2478 - xx	Advanced Graphics BitBLT test	
2480 - xx	Advanced Graphics Line draw test	
Table 5-11. Point:	ing Device Interface Comput	ter Checkup Error Codes
Error Code	Description	Recommended Action
8601 - xx	Pointing Device Interface test failed.	1. Run SETUP, check trackball settings.

2	2.	Clean trackball.
	3.	Ensure trackball connector
		is seated properly.
4	4.	Replace the trackball
		assembly.
5	5.	Replace the system board.

Chapter 5.3 Troubleshooting without Error Messages

This section contains troubleshooting information that provides a quick reference for diagnosing problems that cannot be identified by running POST or Computer Checkup (such as a non-functional display that does not allow viewing error messages). For additional information refer to the tables 5-12 through 5-27 in Section 5.3.

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

To avoid a potential shock hazard during troubleshooting procedures, disconnect all power sources before removing the keyboard assembly or the display bezel.

Before Replacing Parts When Troubleshooting

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

- o Verify that cables are connected properly to the suspected defective parts. Try reseating the cables even if they appear to be properly connected.
- o Run Computer Setup after connecting external devices.
- o Verify that all required device drivers are installed.
- o Verify that all required changes have been made to the CONFIG.SYS file.
- o Verify that all required changes have been made to the AUTOEXEC.BAT file.
- o Verify that printer drivers have been installed for each application.

Table 5-12. Solving Power Problems

ProblemProbable CauseSolution(s)Computer will not turnAC Adapter may be1. Replace AC Adapter.on when plugged in anddefective.2. Remove battery pack;battery pack isinsert another batteryinserted.pack and try to turn on
computer again.

Computer is beeping and battery indicator is flashing.	Computer has entered a low battery condition.	Immediately save any open file(s). Then do any one of the following:
		 Connect the computer to an external power source, then charge the battery pack. Replace the battery pack with a fully charged battery pack. Initiate Hibernation (press the Fn key and power button simultaneously) to completely halt the power consumption on the battery pack, or initiate Standby by pressing the power button once to reduce power consumption until the battery pack can be recharged or another power source can be connected.
Problem	Probable Cause	Solution(s)
Computer turned off while left unattended. Power indicator is off.	System initiated Hibernation due to a low battery condition.	Install a fully charged battery pack or connect the computer to an external power source, then turn on the computer.
	System initiated Hibernation according to Power Management settings.	Turn on the computer.
The computer has no power at all when the power switch is activated. All indicators are off. If the other indicators come on for any period	Power switch not functioning.	 Determine if the power switch is functioning by removing the battery and connecting the AC power cord to the unit. Replace the keyboard assembly.
of time (even for a momentary flash), this is not a "no power" problem.	Defective keyboard assembly.	Install a new keyboard assembly.
Unit powers up from AC power, but not from the battery.	Battery not charged.	Charge the battery fully.
	Defective battery.	Install another battery.

_____ Battery contactsRemove the keyboardnot making goodassembly and examine thecontact withbattery contacts. Ensure that the battery is making battery. good contact with all 4 contacts. Replace the system board. -----Defective system Replace the system board. board. _____ Problem Probable Cause Solution(s) _____ The computer has a Short circuit on 1. Remove the following crowbar condition: it one of the power parts one at a time until the short circuit of the power sup for a short supply outputs. until the short circuit period, then shuts off. is located: indicators flash on, then off (this takes NOTE: After verifying that a part is not the place in less than 3 cause of the short seconds). circuit, reinstall it before removing the next part. In addition, note that the first three parts can be checked by the user. a. PC card b. Battery pack c. Hard drive d. Diskette drive e. Internal AC power supply 2. Disconnect the display cable from the system board and power the unit up. If the unit powers up, the display cable or display assembly has failed. Plug the display cable back into the system board and attempt to find the defective part in the display assembly by completing the following steps one at a time until the short circuit is located: a. Disconnect the display cable from the inverter board

		<pre>and attempt to power the unit up. If the unit powers up, replace the inverter board. b. Disconnect the display cable from the display panel and power the unit up. If the unit powers up, replace the display panel. c. Replace the display cable. 3. Replace the system board.</pre>
Table 5-13. Solving System	Start Problems	
======================================	Probable Cause	Solution(s)
System powers up (LEDs on) but it does not begin POST.	Bad contacts between processor board and system board.	Replace system board.
	Defective processor board.	Replace system board.
	Defective system board.	Replace system board.
Table 5-14. Solving Standb	y Problems	
Problem	Probable Cause	Solution(s)
The power/standby button is pressed, but the unit	Defective keyboard assembly.	Replace the keyboard assembly.
standby.	Defective system board.	Replace the system board.
Table 5-15. Solving Batter	y Problems	
Problem	Probable Cause	Solution(s)
Battery indicator flashes to indicate low battery condition, but computer does not beep.	Low battery beeps were turned off.	Use Power Management to turn on the low battery warning beeps.
acc. not boop.	Volume is turned on/off.	Press the Fn + F5 keys.
Battery indicator doesn't light and battery pack won't fast	Battery pack is already charged.	No action is necessary.
charge.	Battery pack was	Allow time for the battery

	exposed to temperature extremes.	pack to return to room temperature.
	Battery pack is at end of its life.	Replace battery pack.
Battery charge does not last as long as expected.	Battery is being exposed to high temperatures. *	Keep computer at a cooler temperature and recharge the battery.
	Battery is being exposed to cold temperatures. *	Put computer in a warmer place and recharge the battery.
	Battery has partially self-discharged.	Recharge the battery.
	Power conservation is disabled or set to "None."	Set a power conservation level.
	An external device or PCMCIA card is draining the battery.	Turn off or remove the external device when not using it.
	Defective battery.	Condition the battery.
		Install another battery. If this fixes the problem, original battery is defective.
		Replace the battery.
Battery pack is warm to the touch after charging.	Normal warming has occurred due to charging.	No action is required.
Battery indicator does not come on and the battery gauge does not reflect a change in battery charge level.	Battery pack is trickle charging.	Allow battery pack to continue charging for 30 minutes and recheck the battery gauge.
	Battery contacts not making good contact with battery.	Remove the keyboard assembly and examine the battery contacts. Ensure that the battery is making good contact with all 4 contacts. If not, gently bend the contacts on the system board out to make good contact.
	Defective system board.	Replace the system board.

* The recommended storage temperature range for the battery pack is -4oF to 860F (-200C to 300C). The recommended operating temperature range is 50oF to 104oF (10oC to 40oC). Table 5-16. Solving Battery Gauge Problems _____ Problem Probable Cause Solution(s) _____ Battery gauge appears Battery pack has been Charge the battery pack * partially recharged (Appendix B). too many times or computer has been in Standby for an extended period of indicator the same amount inaccurate. time. of time. The battery gauge is based on voltage output from the battery. -* The battery pack needs to be conditioned every 60 days to maintain battery gauge accuracy. Table 5-17. Solving Display Problems _____ Probable Cause Solution(s) Problem _____ From MS-DOS: Power From MS-DOS: Change Power Characters are dim. Management settings Management settings to is set on high or medium. custom. From Windows: Adjust From Windows: Power brightness setting in Management brightness Power Management. setting is incorrect. -----Brightness orPress the Fn + F9 keys.contrast (ifUse arrows keys to adjustapplicable) is notthe brightness. Press the set properly. Fn + F8 keys. Use arrows keys to adjust the contrast. NOTE: Contrast adjustment is not applicable on models with Color TFT displays. -----Computer screen is in Tilt display or move direct light. computer. _____ Enter password to exit QuickBlank. Screen is blank. Quick Blank is initiated. Another screen Press any key and/or enter blanking utility may password. be installed. Screen save was Press any key or click the initiated by Power mouse. Management due to

lack of user activity. _____ Press the Fn + F9 keys to adjust the brightness. Use Brightness and contrast needs adjusting. the left and right arrow keys to adjust brightness. Press the Fn + F8 keys to adjust the contrast. Display has If computer is in direct sunlight, move it and allow overheated. it to cool off. _____ Display is blank and System is in Standby. Press the Power/standby the Power/standby button to exit Standby. indicator is flashing. _____ Problem Probable Cause Solution(s) _____ Screen is blank, the System has entered a If available, immediately connect the computer to an external power source or flashing, and the computer will next acharged battery battery indicator is flashing and the computer will next acharged battery pack. Then press the standby battery to an external power source or insert a charged battery pack. Then press the standby battery to avit if this feature is standby button to exit flashing. not disabled. Standby. If another power source is not immediately available and Hibernation is disabled, attempt to exit Standby and save any open files. However, the computer may not have enough power to do this. If you have not disabled Hibernation, the computer automatically hibernates. Do not interfere with the computer while it is hibernating. Once the computer has turned off, insert a charged battery pack or connect the computer to another power source, then turn the computer back on. -----Computer display is Display function was Press the Fn + F4 keys to blank and the screen switched to the activate the computer on an external external monitor. display. Press the keys monitor displays again to display information. information simultaneously. * * _____

Distorted or garbled The ANSI.SYS driver Add the ANSI.SYS driver to characters on theis not in thethe CONFIG.SYS file. Adddisplay are mixedCONFIG.SYS file orthe following line:with text.the path isDEVICE=C:\ANSI.SYS incorrect. _____ Computer displayUsing 800 x 600 orRestart the computer. Ifflashes or hashigher resolution onsimultaneous display isgarbled charactersexternal monitor anddesired, use 640 x 480when computer ishave toggled back toresolution. ** connected to external internal display, which only supports monitor. 640 x 480 resolution. _____ ** When using an external monitor and simultaneously displaying an image on the internal display, the image on the external monitor may not fill the screen. _____ Problem Probable Cause Solution(s) _____ Computer display and
external monitor doExternal monitor was
connected after the
computer was turnedTurn the computer off and
connect the external
monitor on, then turn on
the computer not display information on. the computer. simultaneously. Press the Fn + F4 keys to "toggle" through the three display possibilities. _____ The light tubes on External monitor was If an external monitor is detected during POST, only display panel do not computer was turned the external monitor will the external monitor will light up at all and turn on. Press the Fn + F4 on. Power-On Self-Test keys to activate the (POST) completes when Improper backlight or computer display. the unit is powered display cable 1. Reseat the display cable up. ** connections. to the system board. 2. Reseat the display cable to the inverter board. 3. Reseat the backlight cable to the inverter board. Defective inverter Replace the inverter board. board. -----Defective display Replace the display cable. cable. Defective display Replace the display panel. panel. Defective system Replace the system board. board. The light tubes onDefective systemthe edge of theboard. Replace the system board. display panel do not

light up at all and Power-On-Self-Test (POST) does not complete when the unit is powered up. **** ** When using an external monitor and simultaneously displaying an image on the internal display, the image on the external monitor may not fill the screen. **** Blocks usually appear in an even fraction of the display (1/2, 1/4), 1/6, 1/8, etc.)_____ Problem Probable Cause Solution(s) _____ BacklightPower conservationVerify that you are not in
a power conservation mode(brightness) cannotmode settings are
set high, causinga power conservation modebe adjusted withset high, causing
a dim display.that limits the output of
the backlight. Verify that you are not in pop-up Fn + F9 keys. * _____ Improper display 1. Reseat the display cable connections. cable to the inverter board. 2. Reseat the display cable to the system board. Defective inverter Replace the inverter board. * * * board. _____ Defective display Replace the display cable. * * * cable. Replace the system board. Defective system board. * * * _____ Contrast cannot beImproper displayReseat the display cableadjusted with thecable connections.to the following one at a to the following one at a Fn + F8 keys. * time until the problem is solved: a. Inverter board. b. System board. c. Display panel. Defective inverter Replace the inverter board. * * * board. -----Defective display Replace the display cable. * * * cable. Defective display Replace the display panel. * * * panel. _____ The display panel has Improper display Reseat the display cable a continuous pattern cable connections. the following until the problem is solved: Reseat the display cable to problem is solved: across it (e.g., a

"jailbars" pattern), a. System board has a single color b. Display panel on it, or has garbled c. Inverter board graphics across the entire panel. This Defective display Replace the display cable. failure is for cable ----patterns across the ------entire panel (not Defective inverter Replace the inverter board. just on one section). board. _____ Defective system Replace the system board. board. _____ A single line, small Defective display Replace the display panel. group of lines, or panel block appears on the display panel. This failure occurs in only a section of the display panel. **** _____ A number of single Acceptable according Check the number of pixels pixels are out or to specifications. Check the number of pixels that are out against Compaq dots of various specifications. A certain colors are visible number of pixels are on a black screen. allowed to be out, due to limitations in LCD technology. -----Defective display If the number of pixels panel. If the number of pixels Compaq specifications, replace the display panel. _____ Defective system Replace system board. board. _____ * Press the Fn + F9 keys to adjust the brightness, setting. Additionally, on the MSTN and CSTN models, press the Fn + F8 keys to adjust the contrast setting. ** When using an external monitor and simultaneously displaying an image on the internal display, the image on the external monitor may not fill the screen. *** This problem indicates that the backlight or its power circuitry has failed. Since you cannot observe the POST results on the display panel when the backlight is not functioning, connect the unit to an external monitor before powering the unit up. If an external monitor is not available, verify that POST completes by listening for the single or double beep, and watching for the indicators to turn on at the top of the keyboard. **** Blocks usually appear in an even fraction of the display (1/2, 1/4,1/6, 1/8, etc.). Table 5-18. Solving Diskette/Diskette Drive Problems

Problem Probable Cause Solution(s)

Diskette drive indicator stays on.	Diskette is damaged.	Run CHKDSK on the diskette. At the system prompt, type: CHKDSK A:
	Software program is damaged.	Check the program diskettes.
Diskette drive cannot write to a diskette.	Diskette is write-protected.	Disable the diskette's write-protect feature or use a diskette that is not write-protected.
	Computer is writing to the wrong drive.	Check the drive letter in the path statement.
	Drive error has occurred.	Run Computer Checkup.
	Diskette is not formatted.	Format the diskette.
Diskette drive cannot read a diskette.	The wrong type of diskette is being used.	Use the type of diskette required by the drive.
	Diskette has a bad sector.	Copy files to hard drive or another diskette. Reformat bad diskette.
	Drive error has occurred.	Run Computer Checkup.
	Diskette is not formatted.	Format the diskette.
Table 5-19. Solving Har	d Drive Problems	
Problem	Probable Cause	Solution(s)
Reading hard drive takes an unusually long time after restarting the computer.	System entered Hibernation due to low battery condition and is now exiting from it.	Give the system time to restore the previously saved data to its exact state before Hibernation.
Hard drive error occurs.	Hard drive has bad sectors or has failed.	Run Computer Checkup.
Hard drive does not work.	Hard drive is not seated properly.	Turn off and unplug the computer, remove the battery pack, and remove and then reinsert the hard drive.
	Hard drive was removed and replaced while computer was	Turn off computer then turn it on again. Before removing the hard drive,

on, in Standby, or in make sure computer is off, Hibernation. unplugged, and the battery pack is removed. _____ Table 5-20. Solving External Device Installation Problems _____ Probable Cause Solution(s) Problem _____ A new device is not Computer Setup has Run Computer Setup. recognized as part of not been run to the computer system. configure the new device. Cable(s) of new Ensure that all cables are external device are properly and securely loose or power cables connected. are unplugged. -----Power switch of new
external device was
not turned on whenTurn off the computer, turn
on the external device,
then turn on the computer
to integrate the device
with the computer system. -----Device is not seated Turn off the computer and reinsert the device. _____ Table 5-21. Solving Keyboard/Numeric Keypad Problems _____ Problem Probable Cause Solution(s) _____ Embedded numericNum Lock function isPress the Fn+End/Num Lockkeypad on computernot turned on.keys to enable the Num Lock keyboard is disabled. function and embedded numeric keypad. _____ Keyboard is locked. QuickLock is Enter password to exit initiated. QuickLock. QuickLock. initiated. _____ Table 5-22. Solving Trackball/Mouse Problems _____ Probable Cause Solution(s) Problem Trackball or mouse Incorrect or noInstall the device driverdevice driver isand add to the AUTOEXEC.BATinstalled.file or CONFIG.SYS file. does not work. _____ The device driver is Install the Compaq mouse not installed in driver in Windows. Windows. _____ Integrated trackball An external pointing Disconnect the external device is connected pointing device and restart to the computer and the computer. the system has disabled the integrated trackball.

_____ Trackball or mouseMouse device driverEnter MOUSE at the systemdoes not work evenis not activatedprompt to activate thethough the device(loaded into memory)mouse device driver. driver is in the in MS-DOS. PATH command of the Add a line in the AUTOEXEC.BAT file. AUTOEXEC.BAT file to automatically activate the mouse device driver each time the computer is turned on or restarted. -----Defective trackball Replace the trackball assembly. assembly. _____ Defective system Replace the system board. board. -----Mouse device driver From Windows, run Windows is not correctly Setup and select the proper installed in Windows. mouse driver. Cursor skips or moves The ball, rollers, or Clean the ball in the abnormally when using tracking post in the trackball or mouse. a trackball or mouse. trackball or mouse need cleaning. -----Defective trackball Replace trackball assembly. assembly. _____ Table 5-23. Solving Memory Problems _____ Probable Cause Solution(s) Problem _____ Memory count during
Power-On Self-TestOptional memory
board is installed1. Ensure that the
appropriate memory board
has been installed
correctly.(POST) is incorrect.incorrectly, is
incompatible with the
computer, or is con-
figure the2. Run Computer Setup figured incorrectly. _____ on the screen or insufficient memory Memory configuration Reconfigure the memory error occurs during is not set up using MS-DOS MEMMAKER. operation. correctly. _____ System ran out of 1. Check the application memory for the documentation for memory application. requirements. 2.Increase memory. _____ Table 5-24. Solving PC Card Problems _____ Problem Probable Cause Solution(s) _____

When turned on, the Card is not inserted Remove and reinsert the computer does not properly. card in the correct beep when a PC Card orientation. is inserted. _____ PC Card beeps are From MS-DOS: Run the PCCARD disabled. utility to re-enable PC Card beeps. From Windows: Select Computer Setup from the Compaq Control Center and select the PC Card option to re-enable PC Card beeps. -----Warning beeps are Press Fn+F5 keys to turn on turned off. warning beeps. -----PC Card drivers are Select Computer Setup from not loaded. the Compaq Control Center and select the PC Card option to enable the PC Card drivers. _____ The PC Card slot is From MS-DOS: Select disabled. Security Management from the Configuration and Diagnostics menu to enable the PC Card slot. Card or card driver From Windows: Select is not PC Card Security Management from compliant. the Compaq Control Center to enable the PC Card slot. Contact Compaq Reseller Support for a list of PC Cards tested successfully in Compaq PC Card platforms. The PC Card driversThe PC Card slot isFrom MS-DOS: Select(Socket Services,disabled.Security Management Security Management from Card Services, Card the Configuration and ID) fail with error Diagnostics menu to messages when the enable the PC Card slot. computer is turned From Windows: Select on. Security Management from the Compaq Control Center to enable the PC Card slot. _____ Probable Cause Problem Solution(s) PC Card modem orWrong COM portFrom MS-DOS: Run CARDINFOfax card does notbeing used to accessto determine which COM port work. the card. is assigned to the card. From Windows: Select Computer Setup from the Compaq Control Center to

		determine which COM port is assigned to the card.
	The card conflicts with the system board serial device.	From MS-DOS: Run PCCARD to select a different COM port for the PC Card.
		From Windows: Select Computer Setup from the Compaq Control Center, then select the PC Card option and choose a different COM port for the PC Card.
	The card is not PC Card compliant.	Contact Compaq Reseller Support for a list of PC Cards tested successfully in Compaq PC Card platforms.
Modem or network PC Card does not work.	Network driver is not set up properly.	Select Computer Setup from the Compaq Control Center and select the PC Card option; then view the Online help for detailed instructions on setting up network PC Cards.
Storage PC Card does not work.	SRAM and flash memory cards require the memory card driver to be loaded.	Select Computer Setup from the Compaq Control Center; then select the PC Card option to enable the memory card driver.
	Flash memory cards require the Microsoft FlashFile System to be loaded.	Select Computer Setup from the Compaq Control Center; then select the PC Card option to enable the flash file system.
	Hard disks on flash mass storage cards require the PC Card ATA driver to be loaded.	Select Computer Setup from the Compaq Control Center; then select the PC Card option to enable the PC Card ATA driver.
Problem	Probable Cause	Solution(s)
	You are trying to access the card using the wrong drive letter.	From MS-DOS: Run CARDINFO to determine which drive letter is assigned to the card.
		From Windows: Select Computer Setup from the Compaq Control Center to see which drive letter is assigned to the card.

The card is not From MS-DOS: For memory formatted. cards, run MEMCARD to format the card. For hard drive cards and flash mass storage cards, run ATACARD, then run FORMAT. From Windows: Select Computer Setup from the Compaq Control Center, then select MEMCARD or ATACARD from the PC Card option. -----The card is not Contact Compaq Reseller supported. Support for a list of PC Cards tested successfully in Compaq PC Card platforms. Table 5-25. Solving Printer Problems * _____ Probable Cause Solution(s) Problem _____ The device drivers Install the correct printer Printer does not for the application drivers for the application are not installed. to the CONFIG.SYS file. print. _____ Printer that is set Connect in up for a network is network. Connect the printer to the not connected to the network. _____ Printer cable is too Replace the cable. long, unshielded, or defective. _____ Printer is off-line. Paper tray is empty. Fill the paper tray and select Online. _____ Correct printer Printer prints Install the correct printer driver. garbled information. drivers are not installed. -----Cable is not Connect printer cable connected properly to properly to the computer. computer. _____ Printer cable is too Replace the cable. long, unshielded, or defective. * If you experience problems printing, run a printer self-test to determine if it is a printer-specific problem. Refer to the documentation provided with the printer and the application software.
Table 5-26. Solving Software Application Problems _____ Problem Probable Cause Solution(s) _____ The application has not been added to the PATH statement. 1. Add or edit the application entry in the AUTOEXEC.BAT file. 2. Run the program with the Cannot use an application. full path name. _____ Application fails or
does not workA conflict existsClose all applicationsbetween applications.being used. properly. _____ Too many TSRs are Delete any TSR applications Insufficient memory to run application. installed. that are not needed. _____ Application requires Exit Windows and enter Windows to be run in again using the following enhanced mode. command to run in enhanced mode: WIN/3 -----Memory configuration Re configure the memory is not set up using MS-DOS MEMMAKER. System ran out of memory for the application. 1. Check the application documentation for memory requirements. 2. Install addition _____ Table 5-27. Solving Sound Problems _____ Problem Probable Cause Solution(s) _____ Computer does not Beeps have been Press the Fn+F5 keys to beep after the turned off. turn the speaker on. Power-On Self-Test (POST). ______

Chapter 5.4 Contacting Compaq Support

Obtain the following information before contacting Compaq Support:

o Product name

o Product serial number (Section 1.2)

o Purchase date

o Conditions under which the problem occurred

o Any error messages that have occurred

o Hardware configuration

- o Type of printer connected
- o Hardware/software being used
- o Printed results of Computer Checkup (TEST) and View System Information (INSPECT), if possible
- o Printed copies of CONFIG.SYS and AUTOEXEC.BAT files, if possible

Chapter 5.5 Shipping Preparation

To ship the computer, complete the following steps:

- Back up the critical hard drive files. Ensure that backup tapes/diskettes are not exposed to electrical or magnetic fields while stored or in transit.
- 2. Turn off the computer and external devices.
- 3. Disconnect the external devices from their power sources, then from the computer.

IMPORTANT: Ensure that there is no diskette in the diskette drive and that there are no PC Cards in the PC Card slot.

- 4. Close the display and all exterior doors (external options, PC Card compartment, memory, and hard drive).
- 5. Pack the computer system with sufficient packing material to protect it. Use the original packing box or similar packaging.

Chapter 6. Specifications

Introduction

This chapter provides physical, environmental, and performance specifications for the computer and its subassemblies including the following:

- o Monochrome STN display
- o Color STN and TFT displays
- o Hard drives
- o Diskette drive
- o NiMH battery pack
- o AC Adapter
- o Docking Base

Chapter 6.1 Computer

Table 6-1. Computers Models 400 and 410

	English	Metric
Dimensions Online		
Monochrome (9.5 inch):		
Height	1.8 in	4.57 cm
Width	11.9 in	30.20 cm
Depth	8.9 in	22.70 cm
Weight (w/o battery)	5.6 lbs	2.53 kg
Weight (with battery)	5.95 lbs	2.69 kg
Color STN (9.5 inch):		
Height	8.9 in	22.70 cm
Width	11.9 in	30.20 cm
Depth	2.0 in	5.08 cm
Weight (w/o battery)	5.9 lbs	2.67 kg
Weight (with battery)	6.25 lbs	2.83 kg
Color TFT (8.4 inch):		
Height	8.9 in	22.70 cm
Width	11.9 in	30.20 cm
Depth	2.0 in	5.08 Cm
Weight (w/o battery)	5.9 lbs	2.67 kg
Weight (with battery)	6.25 lbs	2.83 kg
Stand-alone (Battery)		
Power Requirements:		
Nominal Operating Voltage	10.8 V	
Nominal Operating	11.0 W	
Peak Operating	24.0 W	

Environmental Requirements		
Temperature:		
Operating	500F to 1040F	1000 to 4000
Nonoperating	-40F to 1400F	-200C to 600C
Relative Humidity:		
(noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum Altitude:		
(nonpressurized)		
Operating	10,000 ft	3658 m
Nonoperating	30,000 ft	12192 m
Shock and Vibration		
Shock:		
Operating	10 g, 11 ms, half	sine
Nonoperating	60 g, 11 ms, half	sine
Vibration:		
Operating	0.25 g, 5-500 Hz	1/2 octave/min
	sweep, 1 hour dur	ation
Nonoperating	1.00 g, 5-500 Hz	1/2 octave/min
	sweep, 1 hour dur	ation
Mable () Computerer Madels ()	4 4 2 0	
	English	Metric
Dimensions (display size)		
Color STN (10.4 inch):		
Height	2.20 in	5.49 cm
Width	11.90 in	30.29 cm
Depth	8.90 in	22.83 cm
Weight (w/o battery)	5.9 1bs	2.67 kg
Weight (with battery)	6.25 lbs	2.83 kg
Color TFT (10.4 inch):		
Height	2.20 in	5.49 cm
Width	11.90 in	30.29 cm
Depth	8.90 in	22.83 cm
Weight (w/o battery)	5.9 lbs	2.67 kg
Weight (with battery)	6.25 lbs	2.83 kg
Stand-alone (Battery)		
Power Requirements:		
Nominal Operating Voltage	10.8 V	
Nominal Operating	11.0 W	
Peak Operating	24.0 W	
Environmental Requirements		
Temperature:		
Operating	50oF to 95oF	10oC to 35oC
Nonoperating	-40F to 1400F	-200C to 600C
Relative Humidity		
(noncondensing):		

Operating Nonoperating	10% to 90% 5% to 95%	
Maximum Altitude (unpressurized): Operating Nonoperating	10,000 ft 30,000 ft	3658 m 12192 m
Shock and Vibration Shock:		
Operating	10 g, 11 ms, ha	lf sine
Nonoperating	60 q, 11 ms, ha	lf sine
Vibration:	_	
Operating	0.25 g, 5-500 H sweep, 1 hour d	z 1/2 octave/min uration
Nonoperating	1.00 g, 5-500 H sweep, 1 hour d	z 1/2 octave/min uration

Chapter 6.2 Displays

Table 6-3. Monochrome (9.5 inch) Display Models 400 and 410		ł 410
	English	Metric
Dimensions (display size): Height Width	5.7 in 7.6 in	14.4 cm 19.2 cm
Mounting	Internal	
Gray Scales	16 shades	
Contrast Ratio	18:1	
Brightness	70 CD/MU2	
Pixel Size: Pitch Format	0.3 x 0.3 mm 640 x 480	
Backlight	CCFT-Edgelit at Top and Bottom	the
Character Display	80 x 25	
Total Power Consumption	3.0 W	
Frequency: Horizontal Vertical	31.2 kHz (CRT mc 32 kHz (LCD mode 60 Hz (VGA) 70 H	ode) e) Iz (CGA)
Display Inverter Board: Input Voltage Output Voltage Maximum Input Power Maximum Output Power	+5 Vdc, +18 Vdc 340 Vac 2.0 W 1.4 W	

Table 6-4. Color STN (9.5 inch) Display Models 400 and 410		
	English	Metric
Dimensions (display size): Height Width	5.7 in 7.6 in	14.4 cm 19.2 cm
Mounting	Internal	
Number of Colors	256 Colors	
Color Palette	4096	
Contrast Ratio	18:1	
Brightness	70 CD/MU2	
Pixel Size: Pitch Format Configuration	0.3 x 0.3 mm 640 x 480 RGB Stripe	
Backlight	CCFT-Edgelit at	Тор
Character Display	80 x 25	
Total Power Consumption	4 W	
Frequency: Horizontal Vertical	31.2 kHz (CRT mo 32 kHz (LCD mode 60 Hz (VGA) 70 H	ode)) z (CGA)
Display Inverter Board: Input Voltage Output Voltage Maximum Input Power Maximum Output Power	+5 Vdc, +18 Vdc 500 Vac 3.5 W 2.5 W	
Table 6-5. Color TFT (8.4 inch) Disp	olay Models 400 and	410
	English	Metric
Dimensions (Display Size): Height Width	5.1 in 6.7 in	12.9 cm 17.1 cm
Mounting	Internal	
Number of Colors	256 Colors	
Color Palette	27000	
Contrast Ratio	100:1	
Brightness	70 CD/MU2	

Pixel Size:	0 27 7 0 27 mm	
	0.27 x 0.27 mm	
Format	640 x 480	
Configuration	RGB Stripe	
Backlight	CCFT-Edgelit at Top	
Character Display	80 x 25	
Total Power Consumption	4 W	
Frequency:		
Horizontal	31.2 kHz (CRT mode)	
	32 kHz (LCD mode)	
Vertical	60 Hz (VGA) 70 Hz (C	GA)
Display Inverter Board:		
Input Voltage	+5 Vdc, +18 Vdc	
Output Voltage	500 Vac	
Maximum Input Power	3.5 W	
Maximum Output Power	2.5 W	
Table 6-6. Color STN (10.4 inch) Displ	ay Models 420 and 430	
	English	Metric
Dimensions (Display Size).		
Height	6 33 in	16 08 cm
Width	8 43 in	21 41 cm
width		
Mounting	Internal	
Number of Colors	256 Colors in 640 x	480 resolution
Color Palette	4096	
Contrast Ratio	20:1	
Brightness	70 CD/MU2	
Divol Cino.		
Pixel Size:	640 x 480	
	0.33 mm	
Format	RGB Stripe	
Configuration	Stripe	
Backlight	CCFT-Edge light	
Character Display	80 x 25	
Total Power Consumption	4.0 Watts (Max)	
Frequency:	· · · · · ·	
Horizontal	31.2 kHz (CRT mode)	
	32 kHz (LCD mode)	
Vertical	60 Hz (VGA) 70 Hz (C	GA)
Display Inverter Board:		
Input Voltage	+5 Vdc, +18 Vdc	

Output Voltage Maximum Input Power Maximum Output Power	500 Vac 3.5 W 2.5 W	
Table 6-7 Color TFT (10.4 inch) Displa	y Models 420 and 430	
	English	Metric
Dimensions (display size): Height Width	6.335 in 8.365 in	16.09 cm 21.25 cm
Mounting	Internal	
Number of Colors	256 in 640 x 480 res	olution
Color Palette	256 K	
Contrast Ratio	100:1	
Brightness	70 CD/MU2	
Pixel Size: Pitch Format Configuration	640 x 480 0.33 mm RGB Stripe Stripe	
Backlight	CCFT-Edge light	
Character Display	80 x 25	
Total Power Consumption	4 Watts (Max)	
Frequency: Horizontal Vertical	31.2 kHz (CRT mode) 32.0 kHz (LCD mode) 60 Hz (VGA) 70 Hz (CGA)	
Display Inverter Board: Input Voltage Output Voltage Maximum Input Power Maximum Output Power	+5 Vdc, +18 Vdc 500 Vac 3.5 W 2.5 W	

Chapter 6.3 Hard Drives

Table 6-8a. Hard Drives			
Model	170 MB	250 MB	350 MB
Formatted Capacity Per Drive (MB): Physical Logical	170.9 170.0	256.0 256.0	351.9 351.9

Drive Type	65 (soft)	65 (soft)	65 (soft)
Drive Height: With drive frame	12.7 mm	12.7 mm	12.7mm
Drive Size: Inches Centimeters	2.5 x 0.5 6.3 x 1.3	2.5 x 0.5 6.3 x 1.3	2.5 x 0.5 6.3 x1.3
Transfer Rate: Media (Mb/s)	21.07 to 35.9	21.07 to 35.9	26.9 to 39.5
Interface (MB/s)	4.0	4.0	11.1
Sector Interleave	1:1	1:1	1:1
Typical Seek Time (including settling): Single Track (ms) Average (ms) Full Stroke (ms)	5.0 17.0 24.0	5.0 17.0 24.0	4.0 14.0 24.0
Disk Rotational Speed	4500 rpm	4500 rpm	4000 rpm
Physical Configuration: Cylinders Data Heads Sectors/Track Bytes/Sector	1704 4 54 to 92 512	1704 4 54 to 92 512	3477 2 80 to 120 512
Logical Configuration: Cylinders Data Heads Sectors/Track Bytes/Sector	538 10 16 512	723 11 63 512	682 16 63 512
Buffer Size (KB)	96	96	64
Table 6-8b. Hard Driv	es		
Model	420 MB	540 MB	720 MB
Formatted Capacity Per Drive (MB): Physical Logical	421.1 421.1	541.9 541.9	722.5 722.5
Drive Type	 65 (soft)	65 (soft)	65 (soft)
Drive Height: With drive frame	12.7 mm	12.7 mm	12.7 mm
Drive Size: Inches Centimeters	2.5 x 0.5 6.3 x 1.3	2.5 x 0.5 6.3 x 1.3	2.5 x 0.5 6.3 x 1.3
Transfer Rate:			

Media (Mb/s) Interface (MB/s)	19 to 33 11.1	26.9 to 39.5 11.1	26.9 to 39.5 11.1
Sector Interleave	1:1	1:1	1:1
Typical Seek Time (including settling): Single Track (ms) Average (ms) Full Stroke (ms)	3.0 13.0 21.0	4.0 14.0 24.0	4.0 14.0 24.0
Disk Rotational Speed	3600 rpm	4000 rpm	4000 rpm
Physical Configuration: Cylinders Data Heads Sectors/Track Bytes/Sector	2393 4 60 to 107 512	3477 3 80 to 120 512	3477 4 80 to 120 512
Logical Configuration: Cylinders Data Heads Sectors/Track Bytes/Sector	816 16 63 512	1050 16 63 512	1400 16 63 512
Buffer Size (KB)	64	64	64

Chapter 6.4 Diskette Drive

Table 6-9. Diskette Drive (All Models)	
Diskettes: Size High Density (MB) Low Density (KB)	3.5 in (8.8 cm) 1.44 720
LED Indicator	Green
Height	One-third
Sectors per Track: High Density Low Density	18 9
Tracks per Side: High Density Low Density	80 80
Transfer Rate: Media (Mb/s) Interface (MB/s)	
Cylinder: High	

Low	
Rotational Speed	300 rpm
Read/Write Heads	2
Average Access Time (ms): Track-to-Track (high/low) Average (high/low) Settling Time (ms) Latency Average (ms)	3/3 94/94 15 100

Chapter 6.5 Nickel Metal Hydride (NiMH) Battery Pack

Table 6-10. Battery Pack (All Models) _____ English Metric _____ Dimensions: 0.7 in Height 1.8 Cm Length 8.2 in 20.8 cm Width 2.0 in 5.2 CM _____ Weight 1.0 lb 0.4 kg _____ Energy: Rated Capacity 10.8 V dc Nominal Open Circuit Volt. 12.0 V dc Rated Capacity 2.4 Ah Standard Recharge Rate 15 W Max. 7 W Min. _____ Battery Life * 4 to 6 h Environmental Requirements Temperature: Operating 50oF to 104oF 10oC to 40oC Storage No time limit -40F to 860F -200C to 300C No longer than 3 months -40F to 1040F -200C to 400C -40F to 1220F -200C to 50oC No longer than 1 month _____ * Battery life is based on an estimated typical use pattern of an average user and 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

Table 6-11. AC Adapter	(All Models)			
		English	Metric	==
======================================				==

Height Depth Width	1.3 in 3.0 in 5.0 in	3.3 cm 7.6 cm 12.7 cm
Weight (without cords)	6 oz	0.227 kg
Power Supply Ratings:		
Voltage Range	100-120 220 240 V	100-120 220 240 V
Input Current	0.8A/0.4 A	0.8A/0.4 A
Input Frequency	50 - 60 Hz	50 - 60 Hz
Maximum Output Voltage	16.5 V dc	16.5 V dc
Maximum Output Current	2.6 A	2.6 A
Maximum Output Power	27 W	27 W
Maximum Transient	1 kV for 50 nx	1 kV for 50 nx
Minimum Charge Time	1.0 hr	1.0 hr

Chapter 6.7 Docking Base

Table 6-12. Docking Base (All Models) _____ Without Monitor With Monitor Support Cover Support Cover _____ Dimensions: 2.75 in (7 cm)3.875 in (10 cm)15.75 in (30 cm)17.5 in (34 cm)11.75 in (40 cm)13.5 in (44 cm) Height Width Depth _____ 59.13 oz (1.7 kg) 130.86 oz (3.7 kg) Weight Power Supply: Input Voltage 18.5 Vdc Maximum Input Power 27 W Maximum _____ Environmental Requirements Temperature:
 Operating
 500F to 1040F
 100C to 400C

 Nonoperating
 -7.60F to 1400F
 -200C to 600C
Relative Humidity: Operating10% to 90%, noncondensingNonoperating5% to 95%, noncondensing _____ Shock and Vibration Shock: Operating 10 g, 11 ms, half sine Nonoperating 60 g, 11 ms, half sine Vibration: Operating0.25 g, 5-500 Hz/octave/min sweepNonoperating1.00 g, 5-500 Hz/octave/min sweep _____ Maximum Unpressurized Altitude: 10,000 ft 3658 m Operating Nonoperating 40,000 ft 15750 m _____