

WANG

8101

PROFESSIONAL COMPUTER

Model: PC 380

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**Customer Engineering
Product Maintenance Manual**

741-1793

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PREFACE

This document is the Illustrated Product Maintenance Manual for the Wang PC 380 computer. The manual's purpose is to provide the Customer Engineer with information to install, operate, troubleshoot, and repair the PC 380 computer in the field.

First Edition (July, 1987)

This is the first edition of the PC 380 Product Maintenance Manual. The material in this document may only be used for the purpose stated in the preface. Updates and/or changes to this document will be published as Publication Update Bulletins (PUBs) or subsequent revised editions.

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INTRODUCTION

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1.1 Scope and Purpose

This manual contains installation, operation, troubleshooting, and repair information for the Wang PC 380 IBM-compatible computer.

The manual's purpose is to provide Customer Engineering personnel with the information necessary to install and repair the PC 380 computer in the field.

1.2 Organization and Layout

Each section of this manual describes a separate maintenance subject. Every section is preceded by the section number and a section table of contents. Within each section, information pertaining to a specific task is contained in a frame or frames. Each frame comprises illustrations, numbered steps, and/or text to describe the actions required to accomplish each task. References to other frames are indicated by an arrow (▶), followed by the section number(s) being referenced. The manual's sections and frames are arranged in numerical sequence from left-to-right and from top-to-bottom on the microfiche cards.

SECTION

2

IDENTIFICATION

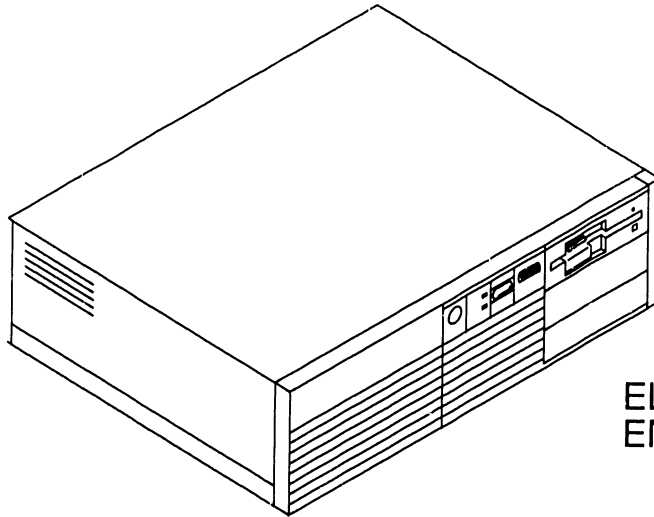
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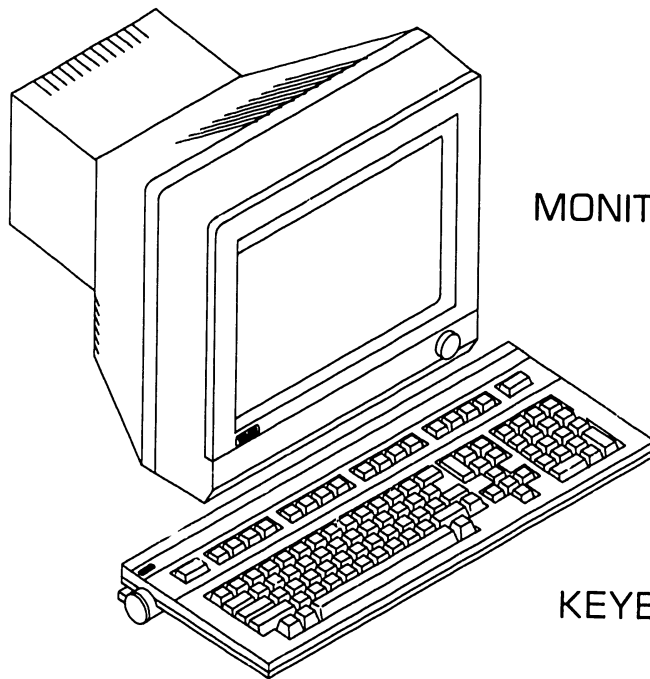
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2.1 Major Assemblies

IDENTIFICATION



ELECTRONICS
ENCLOSURE



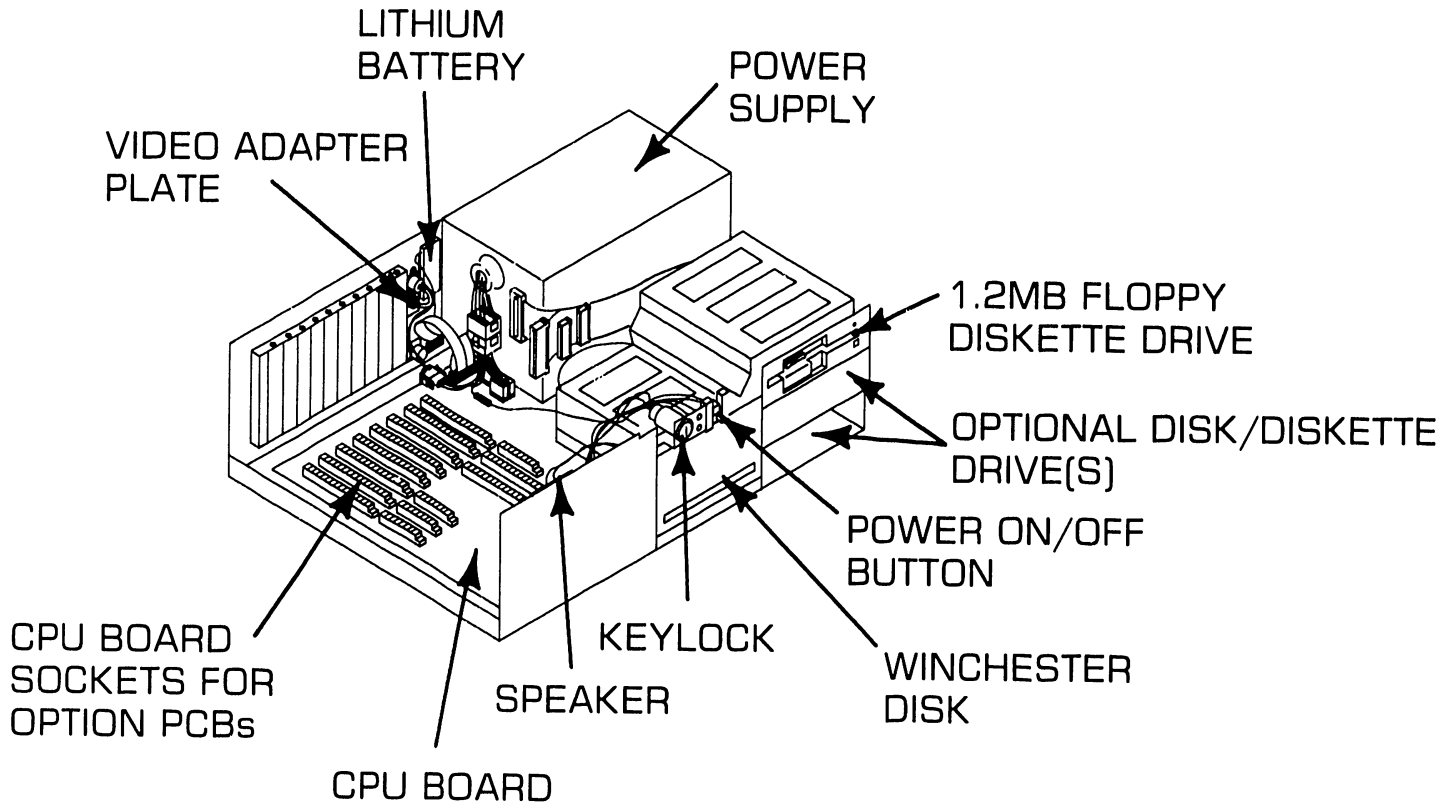
MONITOR

KEYBOARD

2.2

Electronics Enclosure Major Parts

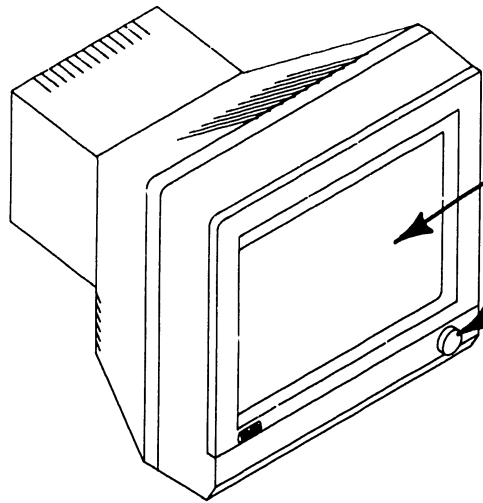
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2.3

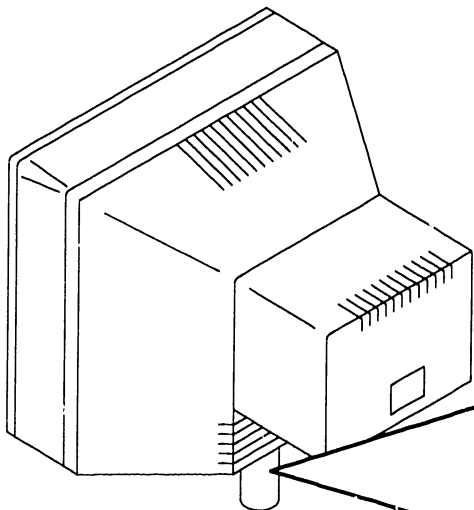
Workstation Monitor Major Parts

IDENTIFICATION



CRT MONITOR SCREEN

MONITOR POWER AND BRIGHTNESS CONTROL KNOB (POWER ON= PRESS SO BUTTON PROTRUDES-GREEN RING ENCIRCLING INSIDE OF BUTTON WILL SHOW)



PHILLIPS SCREW (CONTROLS TENSION OF TILT CONTROL STICK)

CONTRAST CONTROL KNOB

TILT CONTROL STICK

SECTION

3

**CONTROLS AND
INDICATORS**

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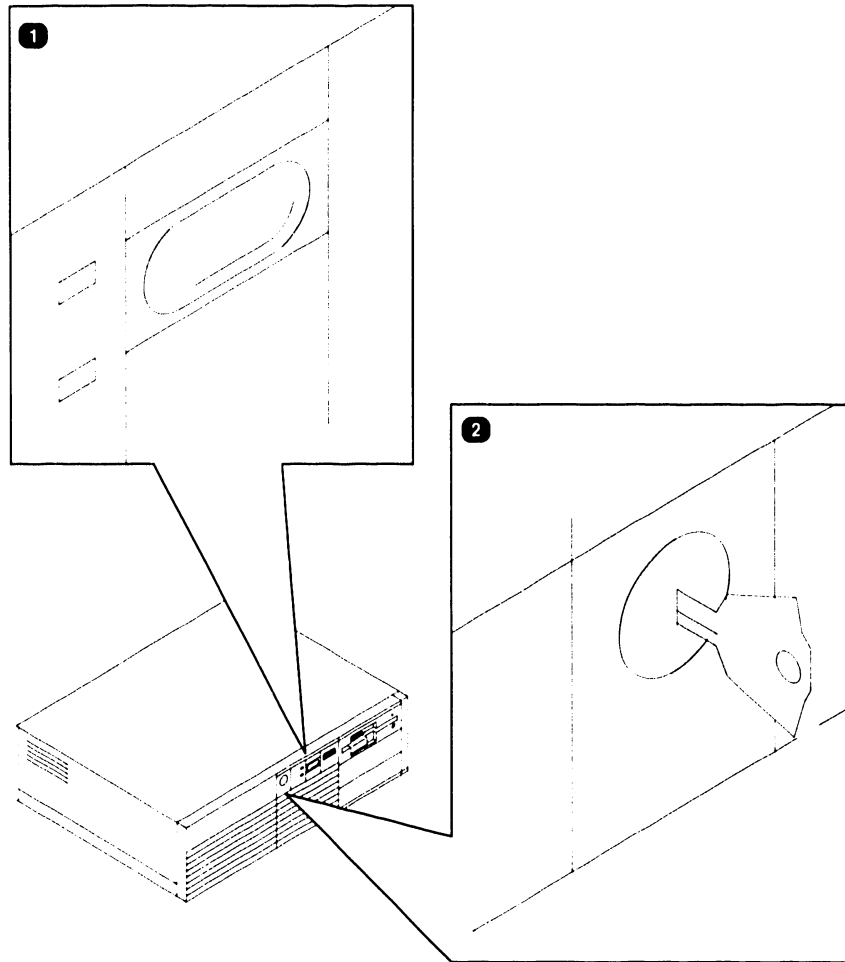
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3.1 CONTROLS AND INDICATORS

3.1.1 Operator Controls

3.1.1 Electronics Enclosure Front Panel Controls

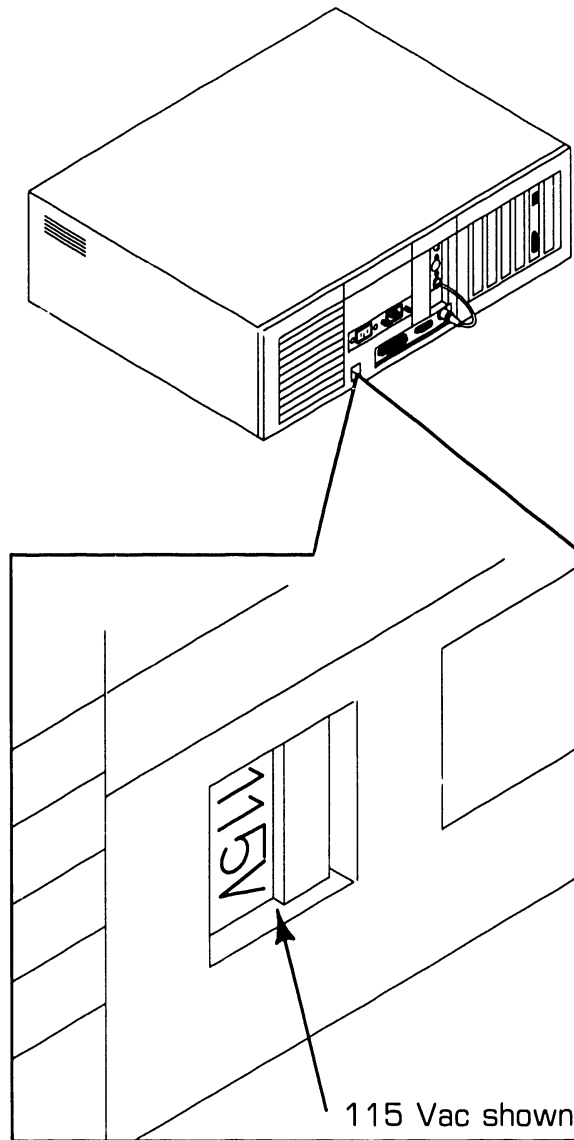


<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	Power On/Off Switch	Push button; applies or removes power from the system, initiates B.I.T. power-up diagnostics and Initial Program Load.
2	Keylock	Locked position -- prevents removal of top/front cover and locks keyboard. Unlocked position -- permits removal of top/front cover and allows keyboard communication with system.

3.1 CONTROLS AND INDICATORS

3.1.1 Operator Controls

3.1.2 Electronics Enclosure Rear Panel Controls

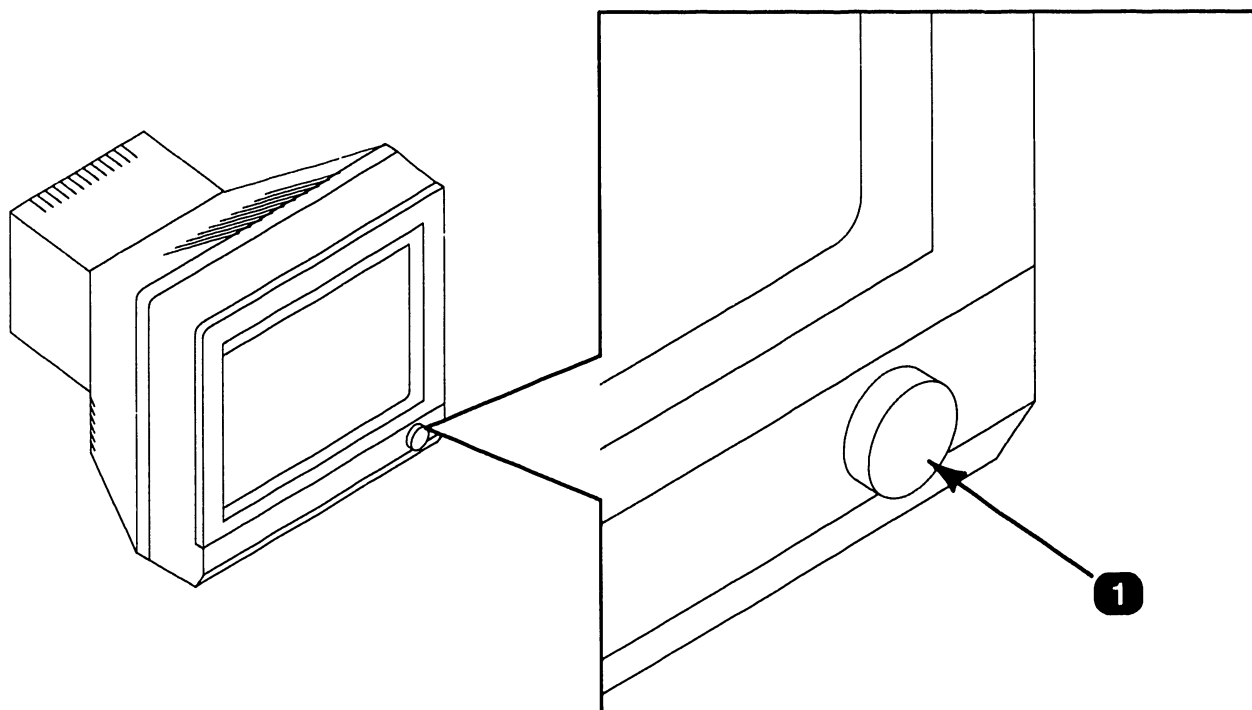


<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	Voltage Select Switch	Slider-type switch; selects ac operating voltage of 115V or 220V (determined by available line voltage).

3.1 CONTROLS AND INDICATORS

3.1.1 Operator Controls

3.1.3 Workstation Monitor Controls: Front

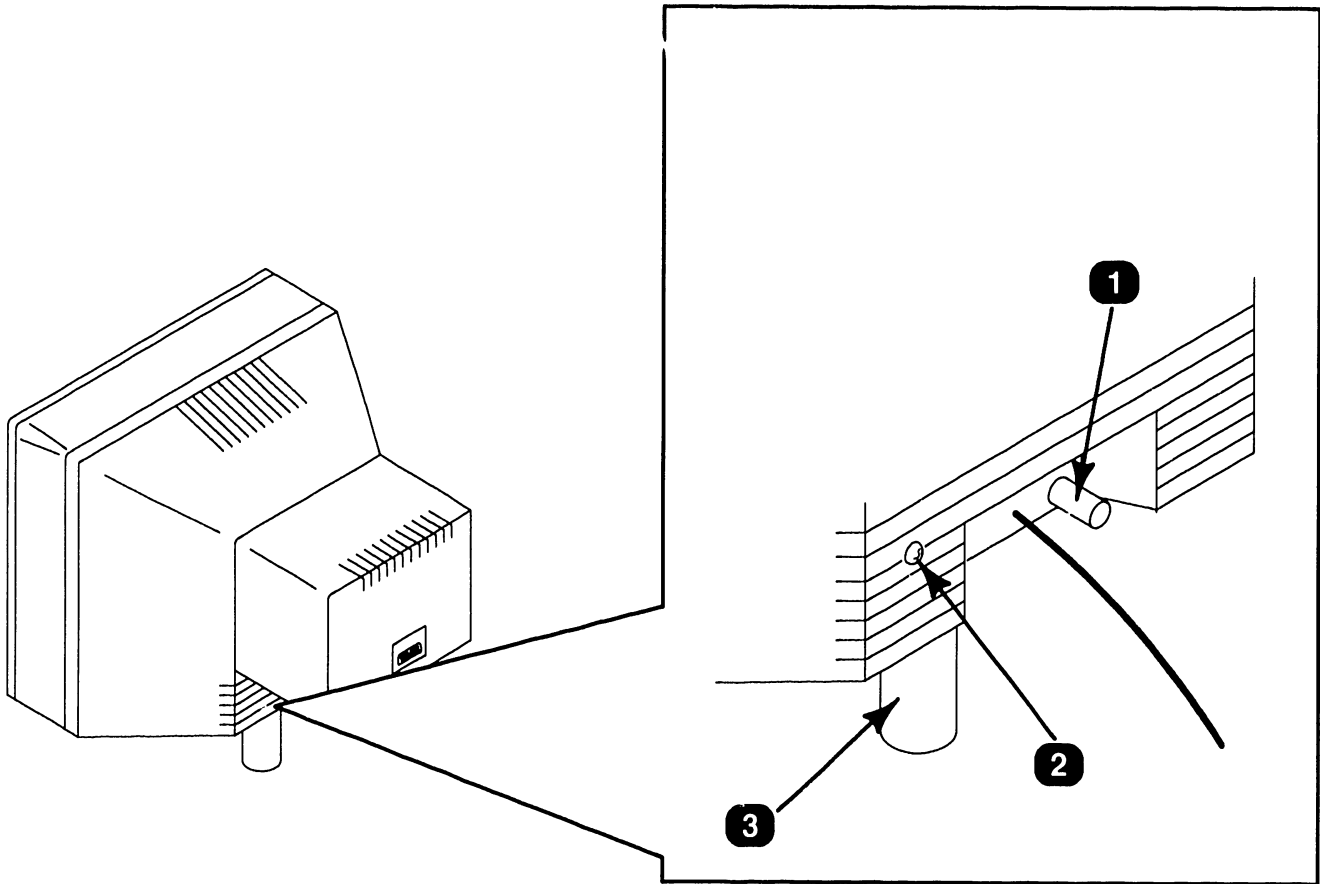


<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	Power Switch and Brightness Control	Push-button, potentiometer-type control; applies and removes power from monitor and adjusts display brightness.

3.1 CONTROLS AND INDICATORS

3.1.1 Operator Controls

3.1.4 Workstation Monitor Controls: Rear

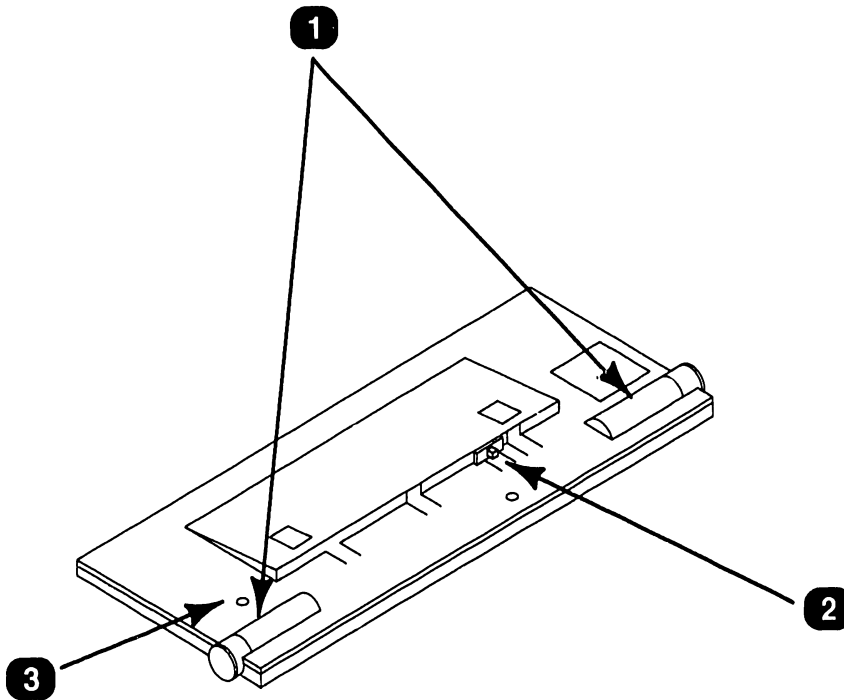


<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	Contrast Control	Potentiometer-type control; adjusts contrast of monitor display.
2	Tilt Control Screw	Phillips-head screw; adjusts spring-loaded tension of monitor tilt control stick.
3	Tilt Control Stick	Variable-length stick; may be adjusted to alter angle of monitor screen.

3.1 CONTROLS AND INDICATORS

3.1.1 Operator Controls

3.1.5 Workstation Keyboard Controls

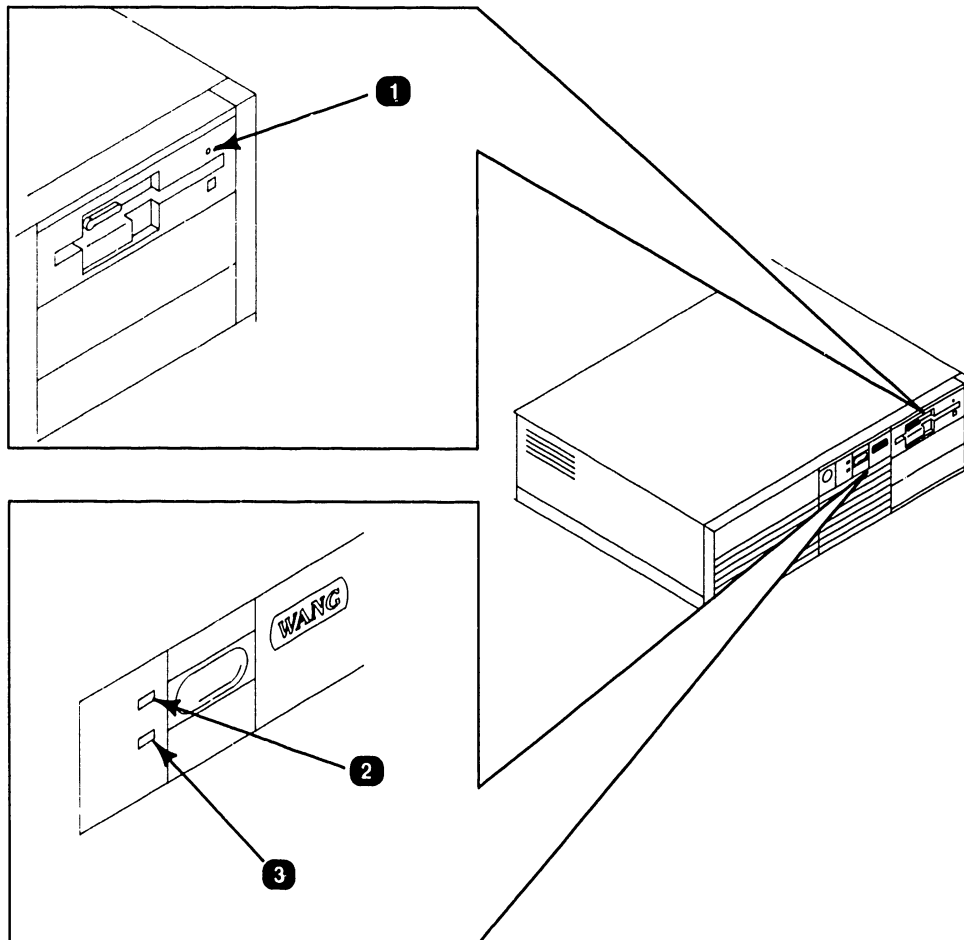


<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	Keyboard Tilt Controls	Potentiometer-type controls; adjusts keyboard tilt and height.
2	Keyboard Mode Control	Slider-type switch; sets keyboard compatibility mode (AT or PC XT). (Mode control not present on all keyboards.)
3	Keyboard Clicker Control	Potentiometer-type control; adjusts volume of keystroke clicking when keys are pressed.

3.2 CONTROLS AND INDICATORS

3.2 Operator Indicators

3.2.1 Electronics Enclosure Front Panel Indicators

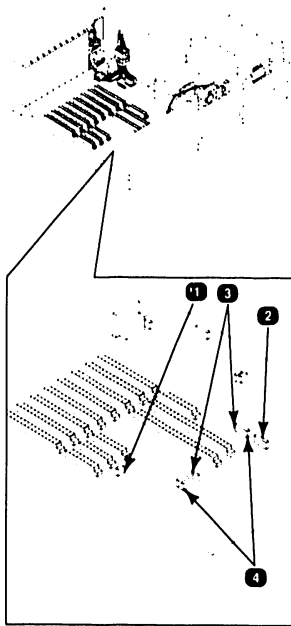


<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	1.2MB Floppy Disk Drive Activity LED	LED (amber); illuminates to indicate activity on floppy disk drive.
2	Winchester Disk Drive Activity LED	LED (red); illuminates to indicate activity on Winchester drive.
3	System Power LED	LED (green); illuminates when power is applied to system.

3.3 CONTROLS AND INDICATORS

3.3 Service Controls

3.3.1 Electronics Enclosure: CPU Board Controls (Sheet 1 of 2)

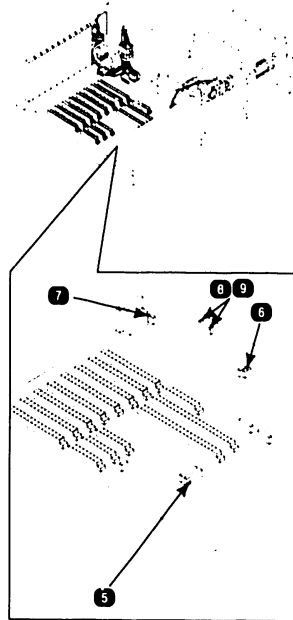


<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	Monitor-Type Jumper	Jumper block containing pins E10-E12; used to configure system for use with monochrome or color monitor. (This jumper is ignored when monochrome/color (EGA) video board is installed.)
2	Memory Configuration Jumper	Jumper block containing pins E28-E36; used to identify number and size of expanded memory boards installed in CPU board's 32-bit sockets. (No jumper configurations are used for 16-bit memory boards.)
3	Serial Communications Port Selection Jumpers	Jumper blocks; pins E40-E42 select port, E19-E21 enable/disable serial port, and pins E37-E39 select interrupt request line.
4	Parallel Printer Port Selection Jumpers	Jumper blocks; pins E22-E25 select parallel printer port, E43-E45 select interrupt request line.

3.3 CONTROLS AND INDICATORS

3.3 Service Controls

3.3.1 Electronics Enclosure: CPU Board Controls (Sheet 2 of 2)

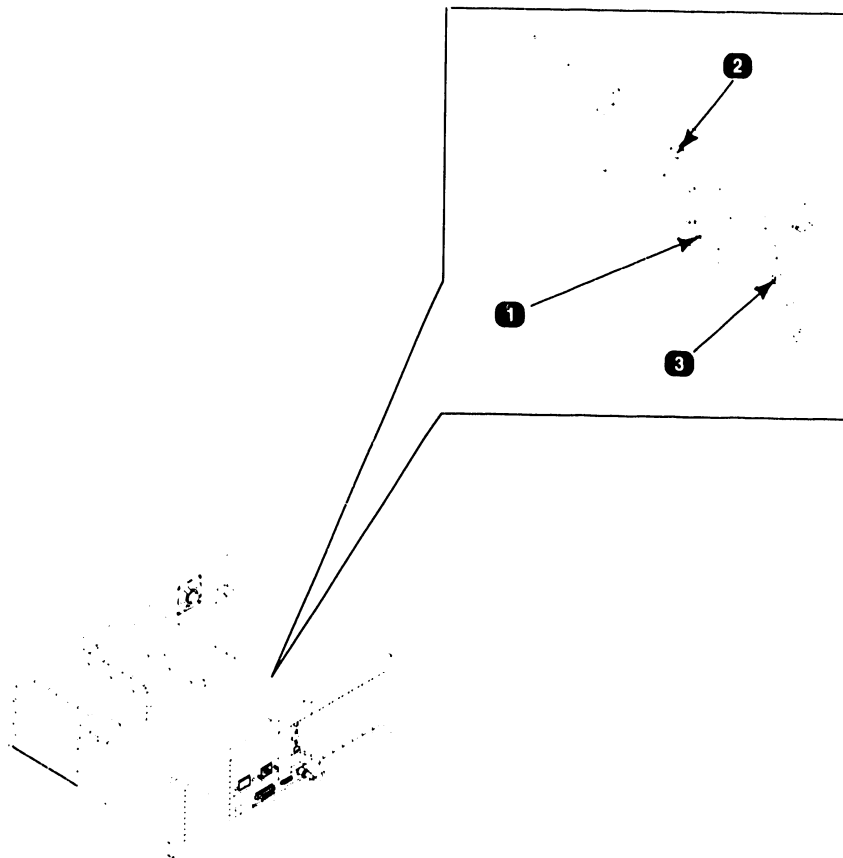


<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
5	Math Coprocessor Jumper	Jumper block; pins E46-E49 select whether math coprocessor is installed.
6	ROM Size Selection Jumper	Jumper block; pins E13-E18 identify ROM size.
7	Keyboard Reset Jumper	Jumper block; pins E1-E3 select whether "reset" signal is sent to keyboard when system is reset.
8	Real-Time Clock Jumper	Jumper block; pins E4-E6 select which type of real-time clock is installed in CPU board.
9	Printer Acknowledge Signal Jumper	Jumper block; pins E7-E9 select whether leading or trailing edge of "printer acknowledge" signal will trigger interrupt line for parallel printer port.

3.3 CONTROLS AND INDICATORS

3.3.3 Service Controls

3.3.2 Electronics Enclosure: Winchester Disk/Floppy Diskette Controller Board Controls

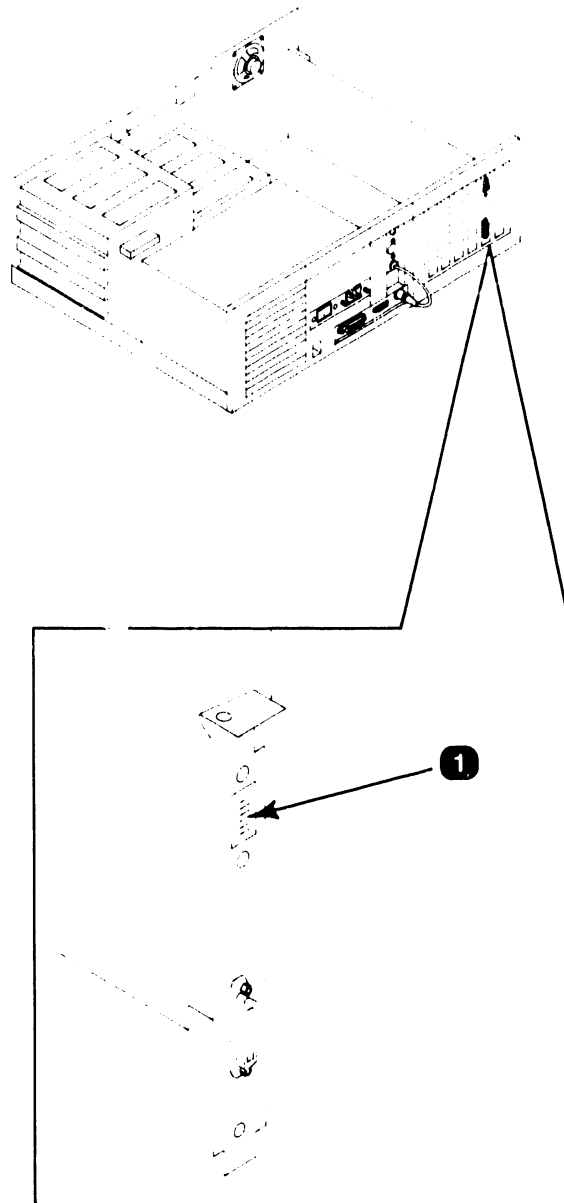


<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	Device Control Switch (SW1)	Slider-type, 8-bit switch bank; may be set so board controls Winchester and floppy drives, or Winchester only.
2	Disk Address Selection Jumpers	Jumper block containing pins E1-E6; used for selecting disk addresses.
3	Drive-Type Jumpers	Jumper block containing pins E7-E9; used for designating drive types.

3.3 CONTROLS AND INDICATORS

3.3 Service Controls

3.3.3 Electronics Enclosure: Monochrome/Color (EGA) Video Board Controls

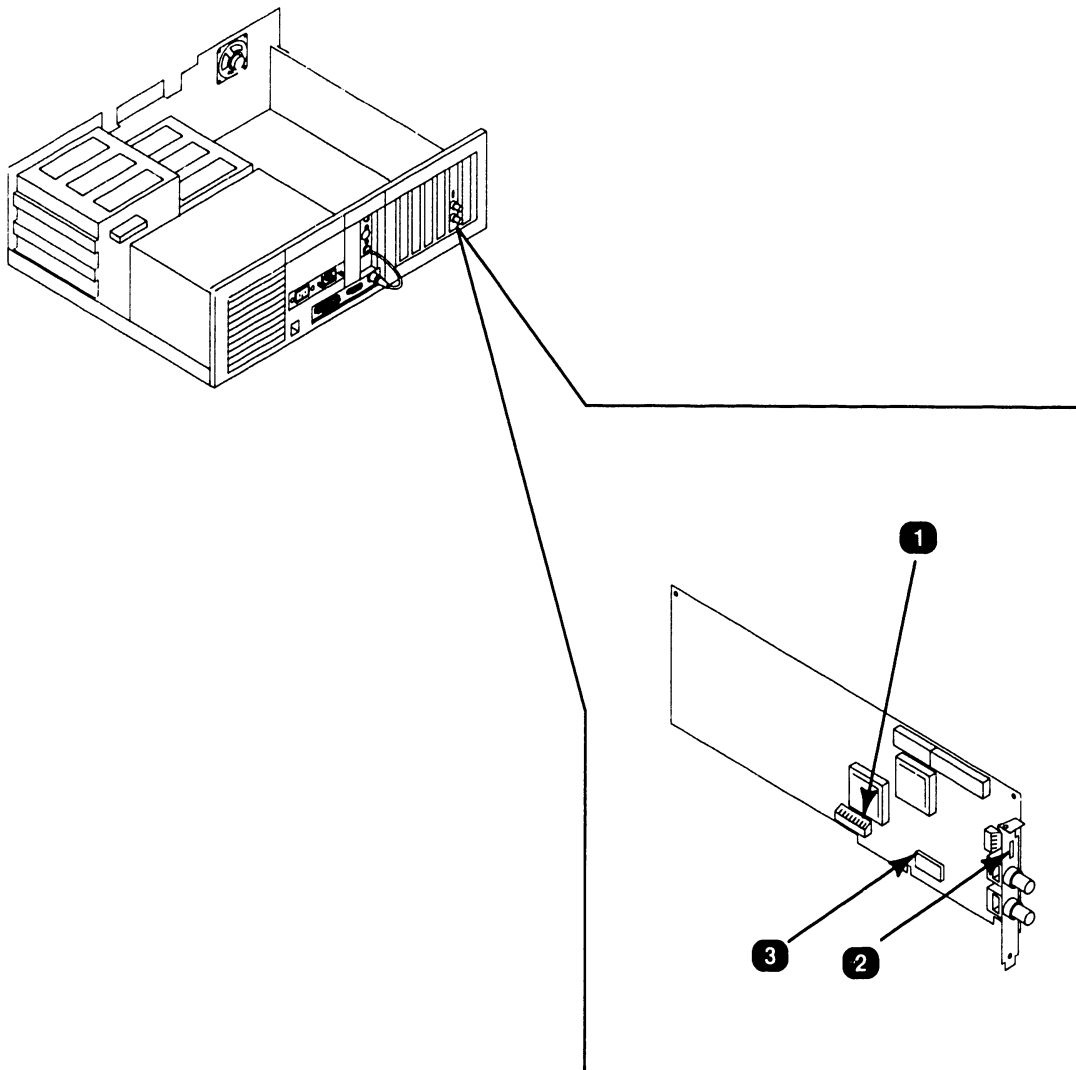


<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	Monitor Identification Switch	6-bit, rocker-type switch bank; designates type of workstation monitor used (monochrome, standard color, enhanced color).

3.3 CONTROLS AND INDICATORS

3.3 Service Controls

3.3.4 Electronics Enclosure: Wang Local Office Connection (WLOC) Board Controls

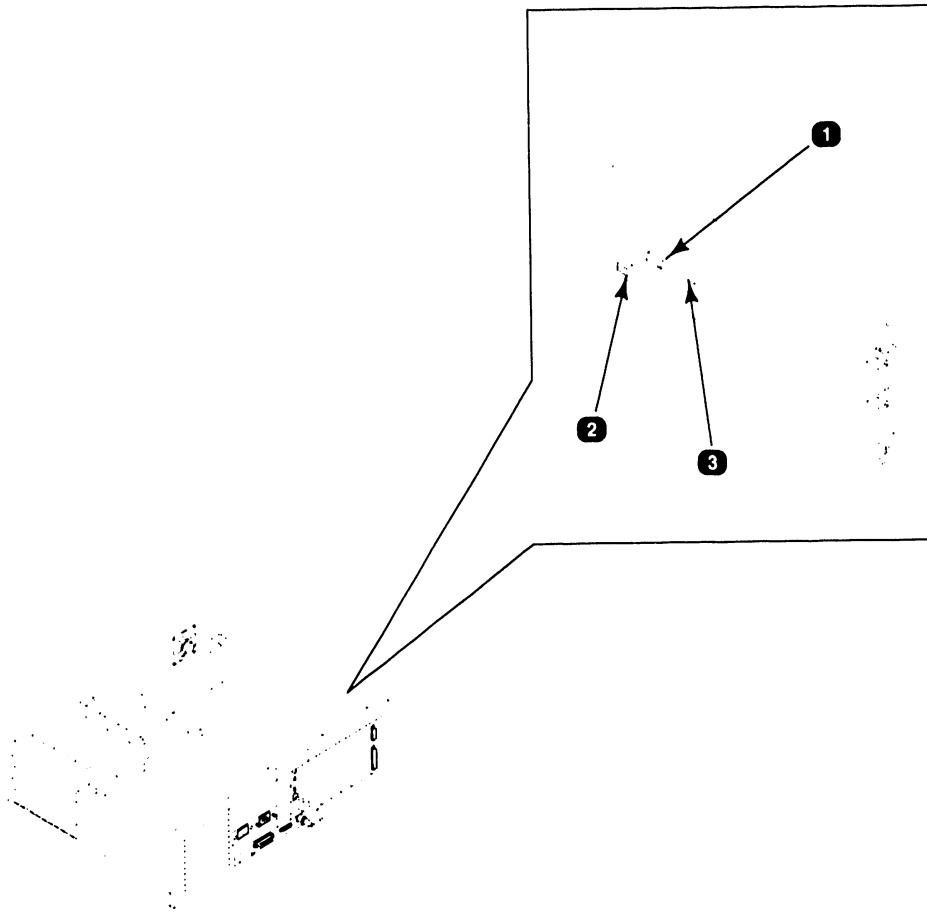


<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	Board Address Switch (SW1)	10-bit, rocker-type switch; sets board address.
2	PROM Enable Switch (SW2)	5-bit, rocker-type switch; enables/disables PROM, and sets PROM address.
3	Interrupt Jumper	11-position jumper; sets interrupt level.

3.3 CONTROLS AND INDICATORS

3.3 Service Controls

3.3.5 Electronics Enclosure: Synchronous/Asynchronous Communications Board Controls

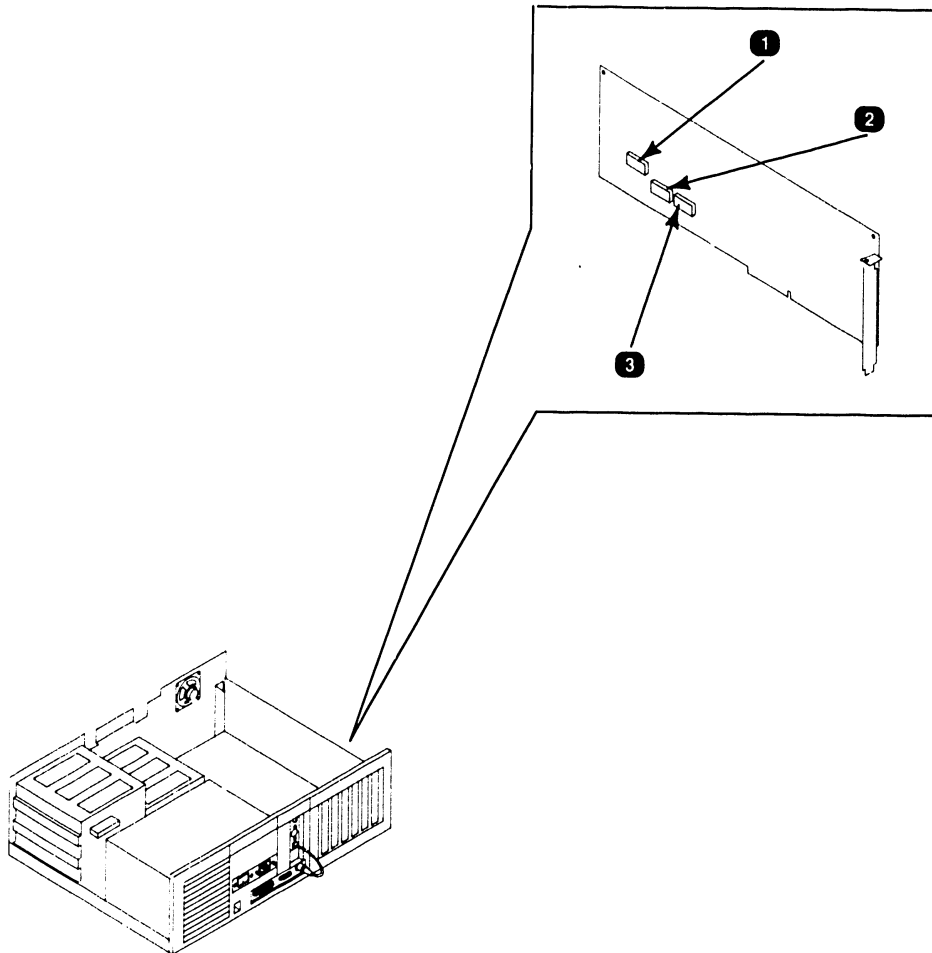


<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	Serial Port Address Switch (SW1)	10-bit, rocker-type switch; sets synchronous/asynchronous serial port bus I/O address.
2	Asynchronous Serial Port and Interrupt Level Switch (SW1A)	4-bit, rocker-type switch; sets bus I/O address and interrupt level for asynchronous serial port.
3	Interrupt Level Jumper	10-position jumper; sets interrupt level for Wang synchronous/asynchronous serial port.

3.3 CONTROLS AND INDICATORS

3.3 Service Controls

3.3.6 Electronics Enclosure: 16-Bit Expanded Memory Board Controls

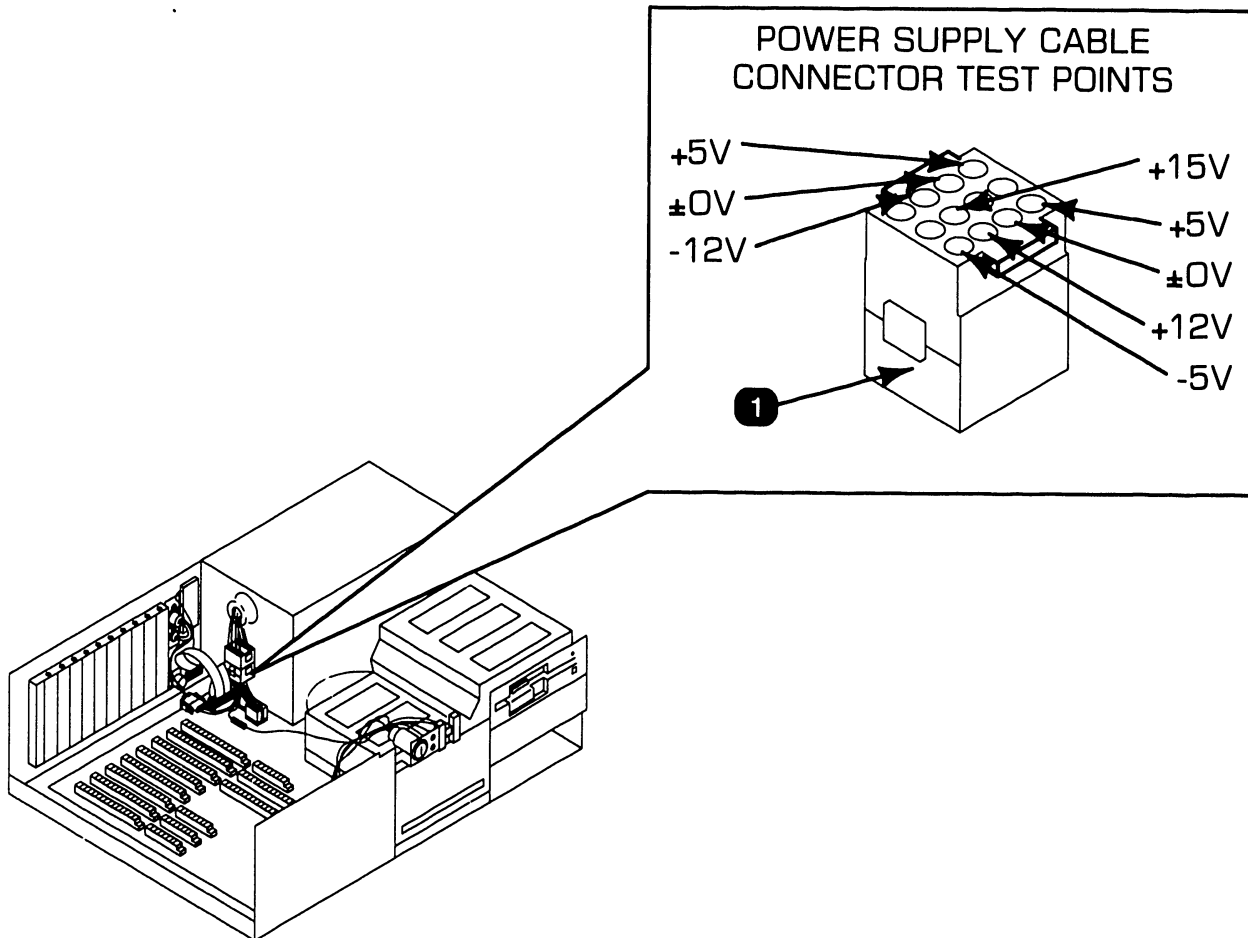


<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	Hex. Address Switch (SW1)	10-bit, rocker-type switch; sets board I/O hex. address.
2	Memory Allocation Switch (SW3)	4-bit, rocker-type switch; used to allocate expanded memory as non-paged and paged memory.
3	Existing Memory Switch (SW2)	8-bit, rocker-type switch; set to correspond to amount of memory present in system prior to installing Expanded Memory PCB.

3.4 CONTROLS AND INDICATORS

3.4 Service Indicators

3.4.1 Power Supply DC Voltage Test Points

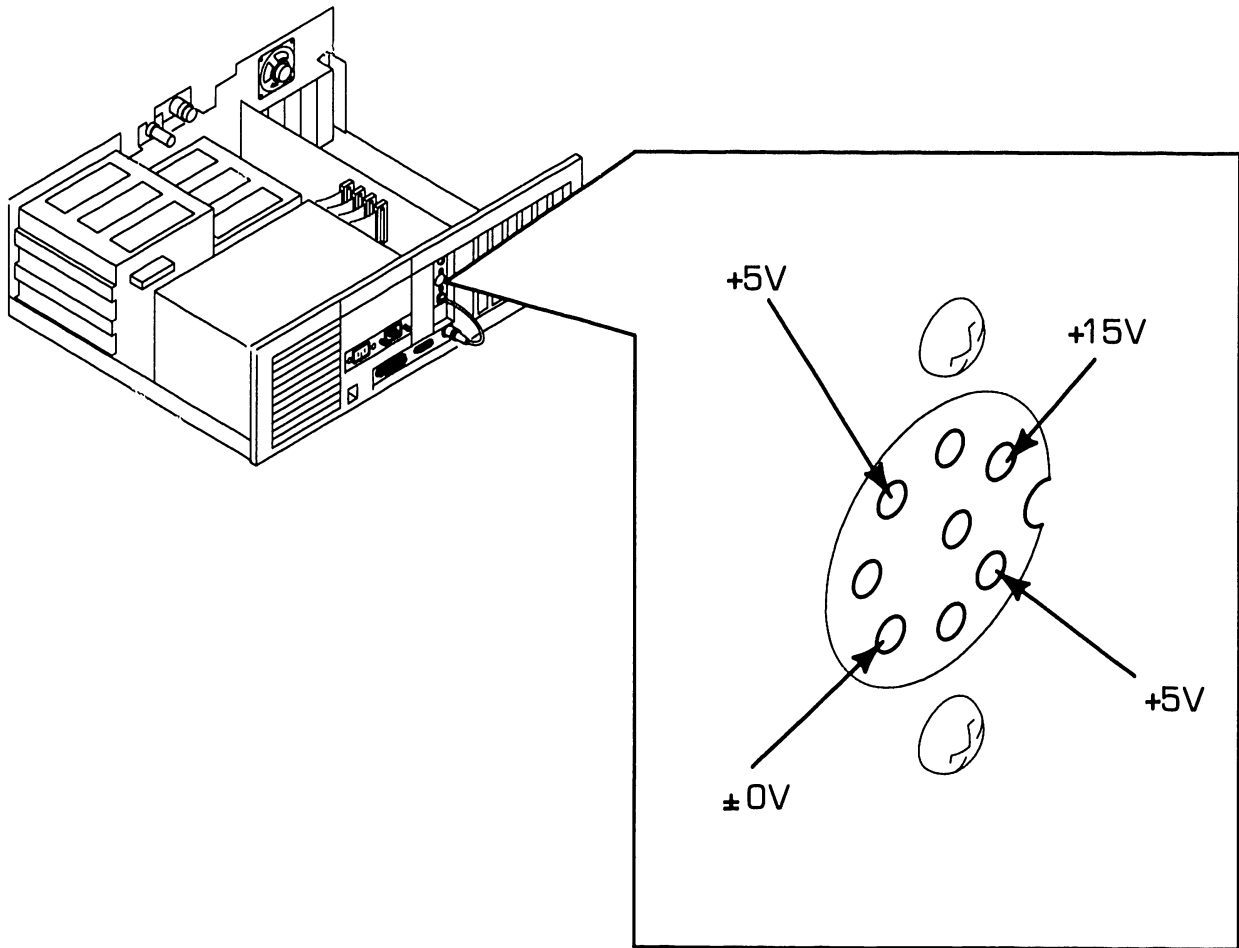


<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	Power Supply DC Voltage Test Points	Power supply cable connector that attaches to power supply adapter harness.

3.4 CONTROLS AND INDICATORS

3.4.1 Service Indicators

3.4.2 Video Adapter Plate: Monitor and Keyboard Test Points

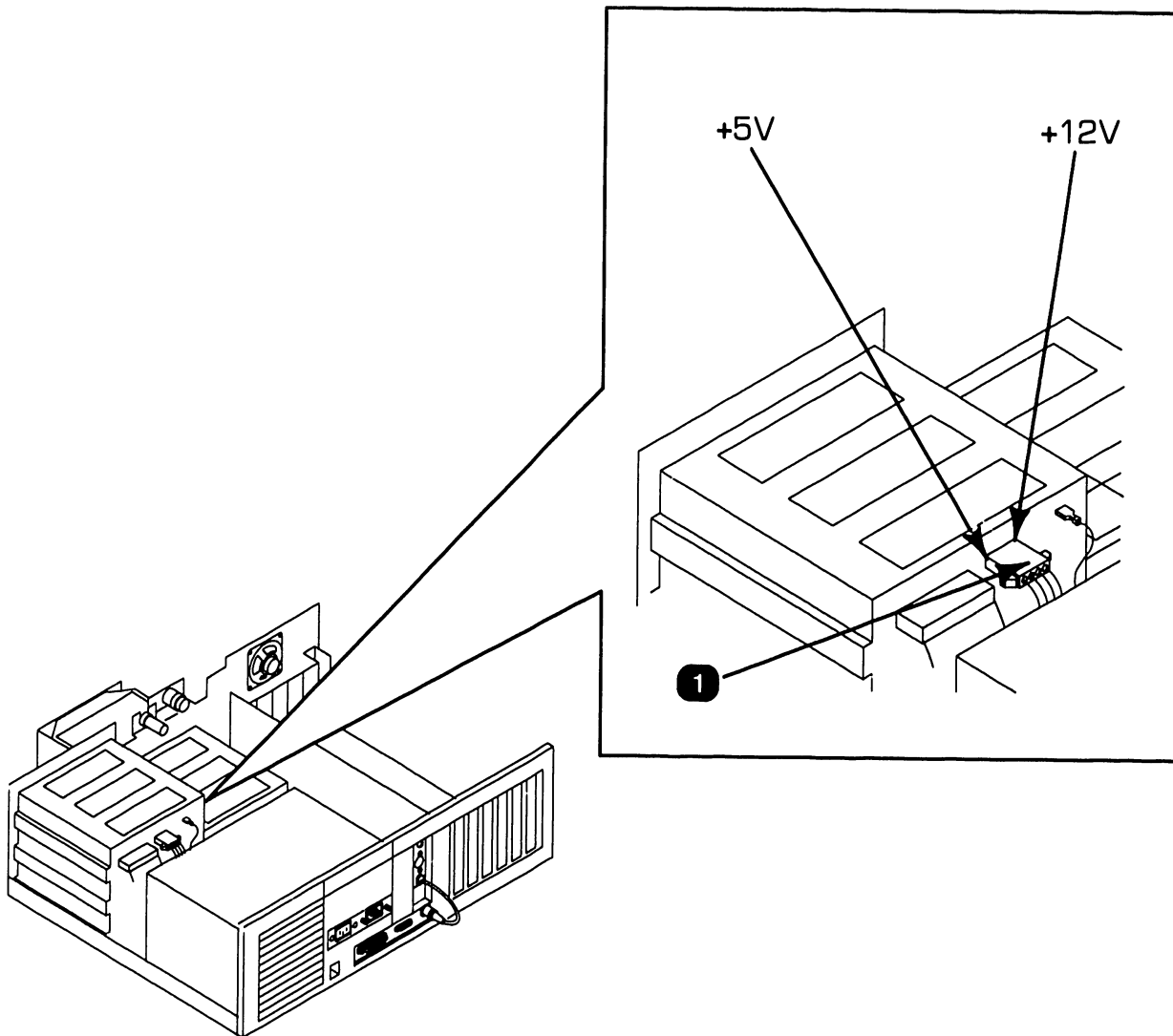


<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	Monitor and Keyboard Voltage Test Points	8-pin connector on video adapter plate; contains voltage test points for checking keyboard voltage (+5V) and monitor voltage (+15V).

3.4 CONTROLS AND INDICATORS

3.4 Service Indicators

3.4.3 Floppy Drive Voltage Test Points

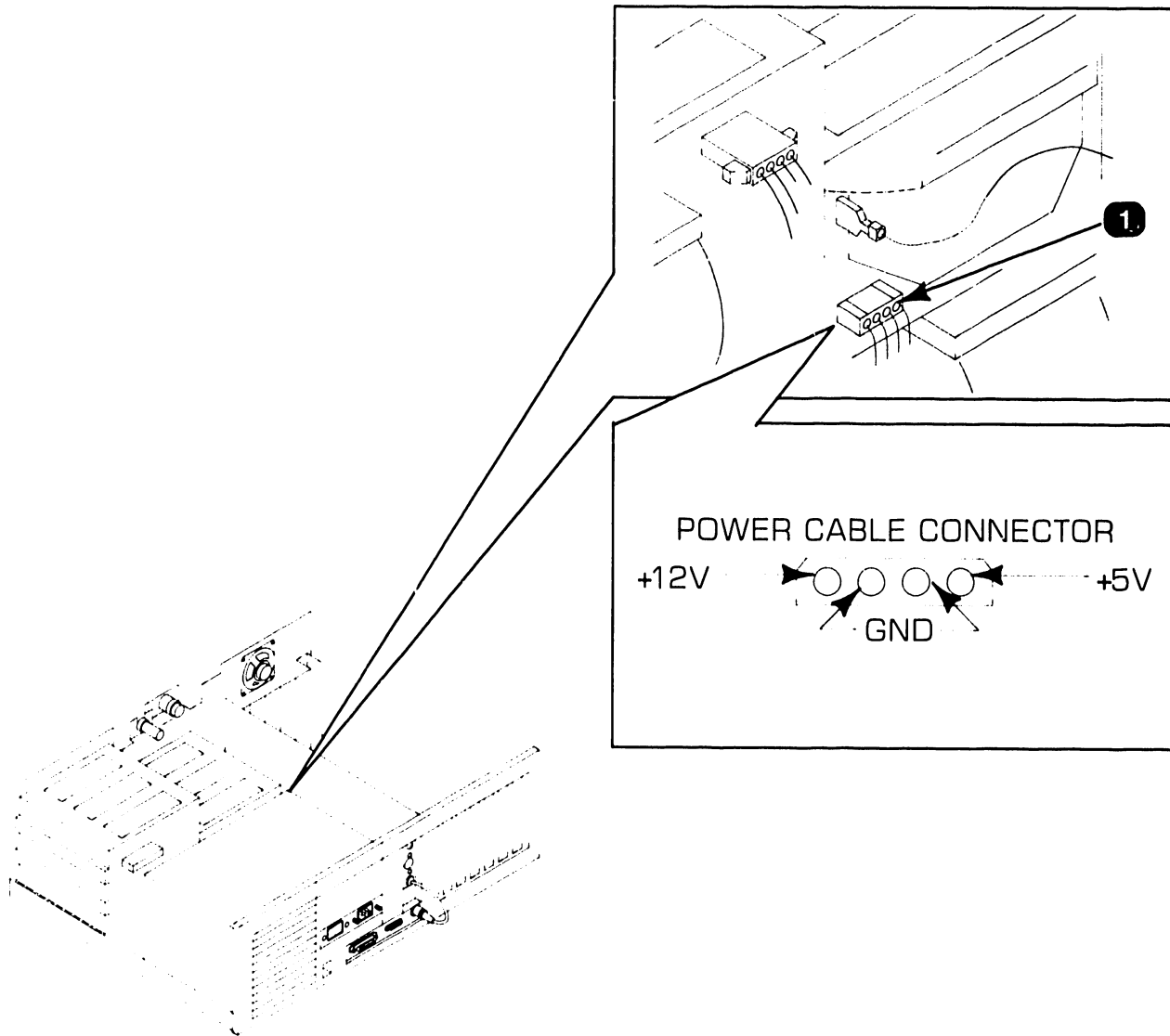


<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	Floppy Drive Voltage Test Points	Power cable connector on floppy drive; contains voltage test points for checking floppy drive voltages (+5V, +12V).

3.4 CONTROLS AND INDICATORS

3.4.1 Service Indicators

3.4.4 Winchester Drive Voltage Test Points



Item	Name	Type and Function
1	Winchester Drive Voltage Test Points	Power cable connector; contains voltage test points for checking Winchester drive voltages (+5V, +12V)

SECTION

4

OPERATION

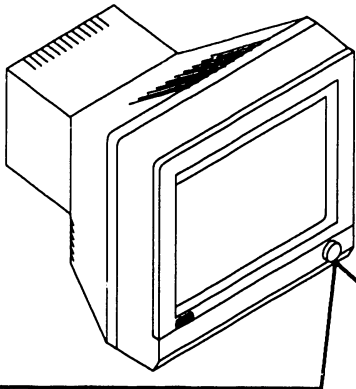
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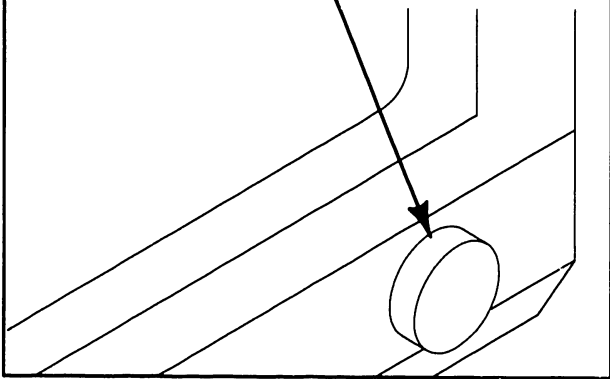
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4.3 POWER-DOWN PROCEDURE	4-4

OPERATION

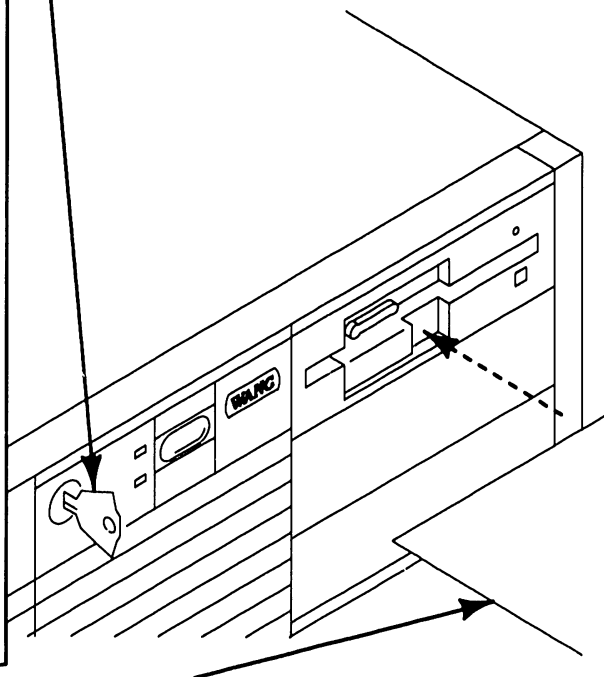
4.1 Power-Up and B.I.T. Diagnostic Procedure (Sheet 1 of 2)



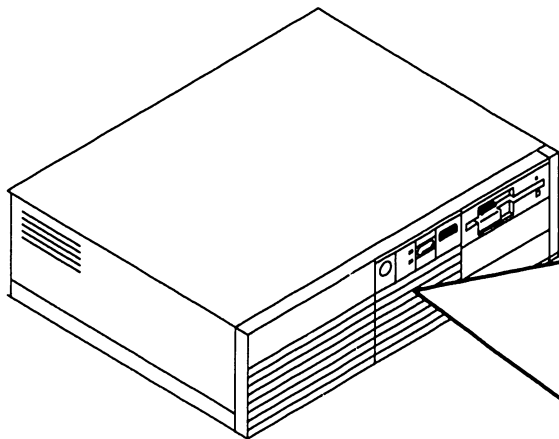
1 Set power and monitor brightness control to "out" setting (green ring around power and brightness control shows).



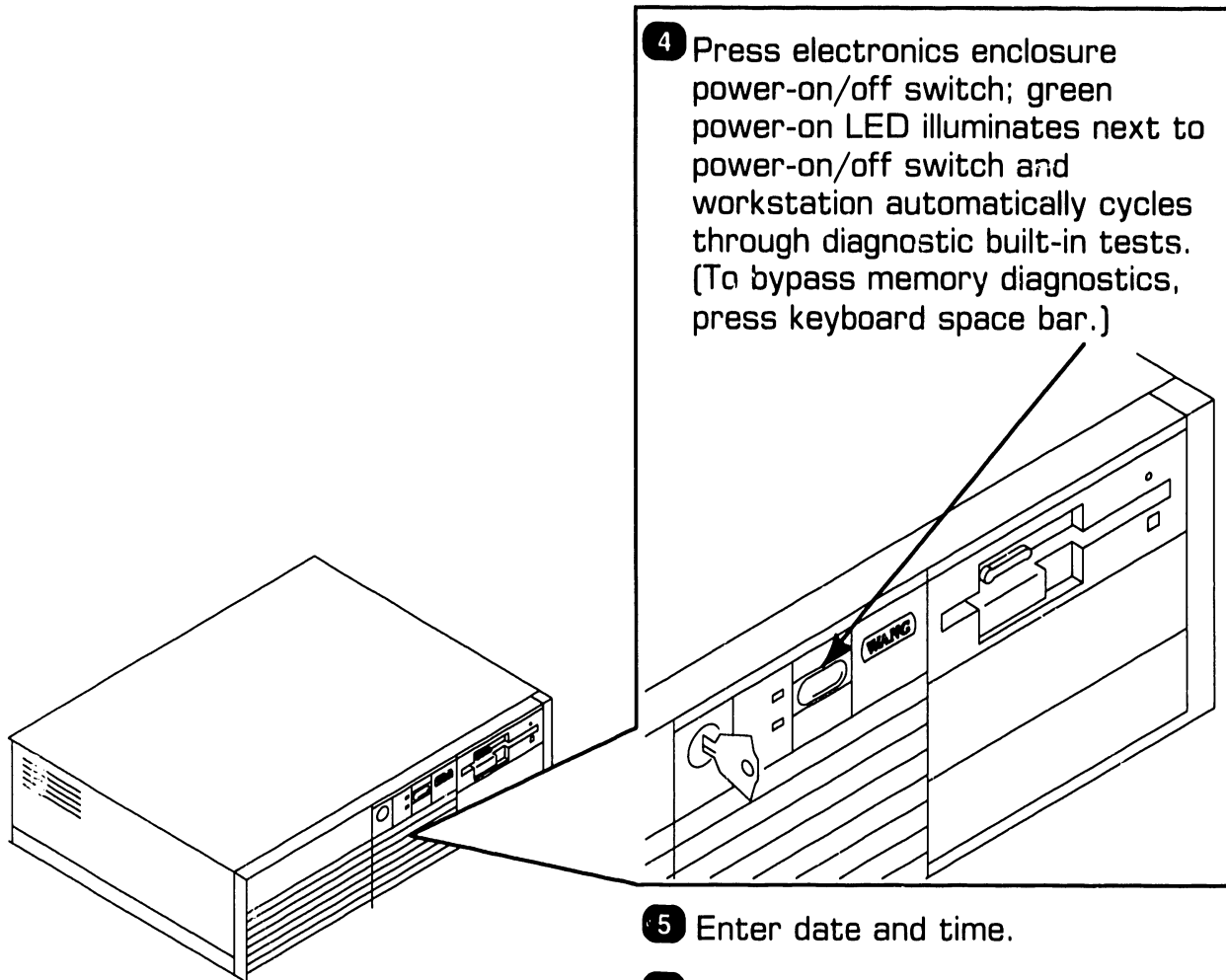
2 Turn key clockwise to unlocked position.



3 Insert diskette into floppy drive "A" if starting from floppy drive; leave floppy drive door open if starting system from Winchester drive.



4.1 Power-Up and B.I.T. Diagnostic Procedure (Sheet 2 of 2)



- 4 Press electronics enclosure power-on/off switch; green power-on LED illuminates next to power-on/off switch and workstation automatically cycles through diagnostic built-in tests. (To bypass memory diagnostics, press keyboard space bar.)

- 5 Enter date and time.

- 6 Power-on peripherals.

NOTE

Upon successful B.I.T. completion, system generates one beep and start-up screen appears on monitor, followed by date and time display. If an error occurs during power-up, a message shows on monitor screen and/or speaker emits a beep code (refer to section 6).

4.2 Changing System Speed

The PC380 computer's 80386 microprocessor runs at a 16 MHz clock speed; 8 MHz ('deturbo' mode) system operation is available however, for applications requiring a slower clock speed.

To enable 'deturbo' mode, simultaneously press the following keys:

CTRL ALT 1

To disable 'deturbo' mode, simultaneously press:

CTRL ALT 2

NOTE

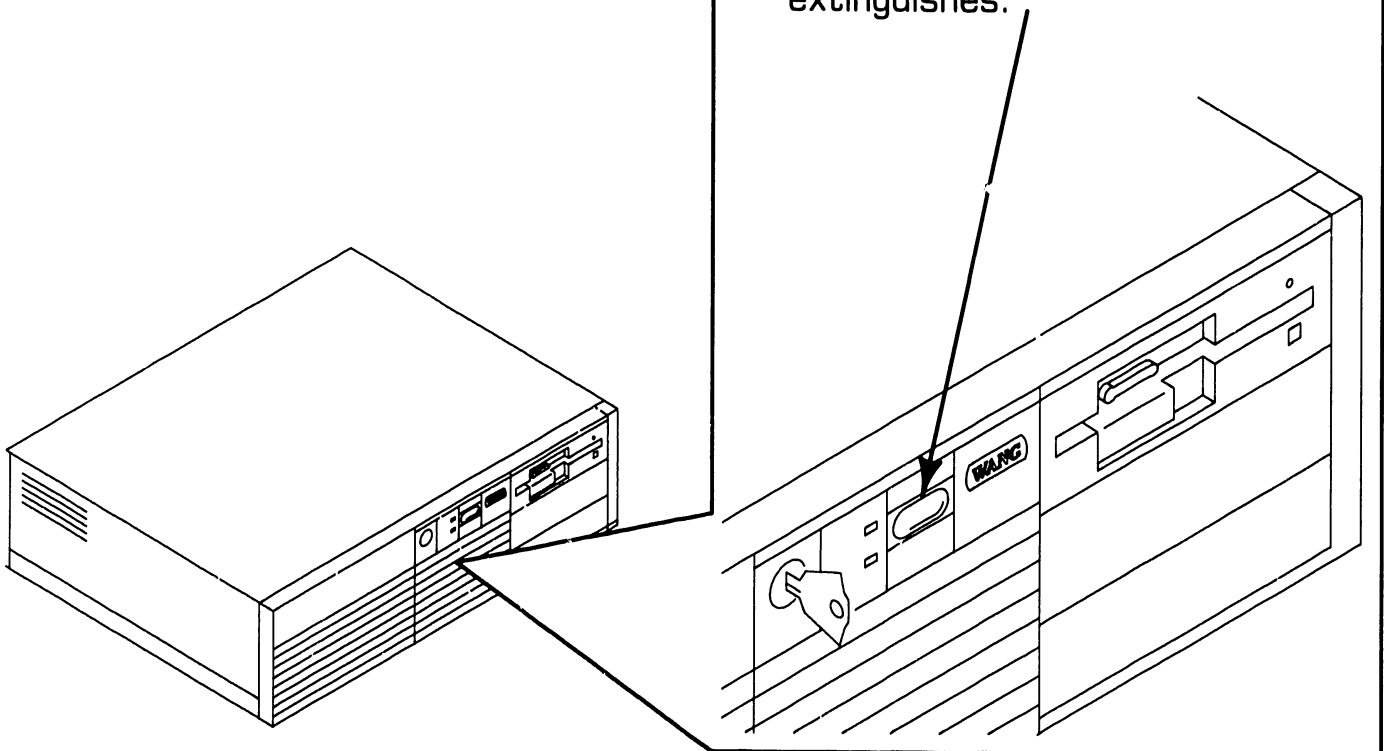
System resumes 16 MHz operation after every reboot.

4.3 Power-Down Procedure

CAUTION

To ensure file integrity, exit from program; i.e., cancel back to main menu before executing power-down procedure.

- 1 Power-off peripherals.
- 2 Press power-on/off switch on electronics enclosure; green LED next to power-on/off control extinguishes.



SECTION

5

**PREVENTIVE
MAINTENANCE**

SECTION 5 CONTENTS

SECTION 5 PREVENTIVE MAINTENANCE

Page

5.1	PM SCHEDULE	5-1
-----	-------------------	-----

5.1 PREVENTIVE MAINTENANCE

PM Schedule

Replace the lithium battery every two years (▶7.2.8).

SECTION

6

TROUBLESHOOTING

SECTION 6 CONTENTS

SECTION 6 TROUBLESHOOTING

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6.1 Tools and Equipment

Equipment and tools required to troubleshoot the PC 380 computer include: a standard CE tool kit, a DVM, and diagnostic test routines. The diagnostic routines are contained on diskettes and should be used when troubleshooting at the customer's site as an aid in isolating system problems.

6.2 Power-Up Diagnostic (Built-In Test)

6.2.1 Built-In Test (B.I.T.) Description

The built-in test (B.I.T.) checks basic system hardware and provides fatal and non-fatal error indications that allow isolation of subassembly failures. The B.I.T. executes automatically when the PC 380 is powered-on. Invalid configuration data or hardware malfunctions are displayed on the monitor screen (►6.2.2) or as audible codes generated by the system speaker (►6.2.3).

6.2

TROUBLESHOOTING

Power-Up Diagnostic (Built-In Test)

6.2.2 B.I.T. Error Messages (Sheet 1 of 2)

<i>B.I.T. Error Message</i>	<i>Suspected Failure</i>
Diskette drive 0 seek to track 0 failed	Floppy drive
Diskette drive reset failed	Floppy drive
Diskette read failure -- strike F1 to retry boot	Floppy drive, drive cable
Display adapter failed; using alternate	Video board
Gate A20 failure	CPU board
Hard disk controller failure	Winchester/floppy controller board
Hard disk failure	Winchester drive cables, Winchester drive
Hard disk read failure -- strike F1 to retry boot	Winchester cables, Winchester drive
Invalid configuration information -- please run SETUP program	Lithium battery
Keyboard clock line failure	Keyboard
Keyboard controller failure	CPU board
Keyboard data line failure	Keyboard
Keyboard stuck key failure	Keyboard
Memory address line failure at XXXXX, read XXXXX expecting XXXXX	CPU board, expanded memory board
Memory data line failure at XXXXX, read XXXXX expecting XXXXX	CPU board, expanded memory board
Memory high address line failure at XXXXX	CPU board, expanded memory board

6.2 TROUBLESHOOTING

6.2 Power-Up Diagnostic (Built-In Test)

6.2.2 B.I.T. Error Messages (Sheet 2 of 2)

<i>B.I.T. Error Message</i>	<i>Suspected Failure</i>
Memory odd/even logic failure at XXXXX, read XXXXX expecting XXXXX	CPU board, expanded memory board
Memory parity failure at XXXXX	CPU board, expanded memory board
Memory write/read failure at XXXXX, read XXXXX expecting XXXXX	CPU board, expanded memory board
No boot device available -- strike F1 to retry boot	Winchester/floppy drive cables
No boot sector on hard disk -- strike F1 to retry boot	Winchester drive (format), drive cables
No timer tick	CPU board
Not a boot diskette -- strike F1 to retry boot	Diskette
XXXXX optional ROM bad checksum = XXXXX	BIOS PROM on CPU board
Shutdown failure	CPU board
Time-of-day clock stopped	CPU board
Timer chip counter 2 failed	CPU board
Timer of interrupt controller bad	CPU board
Unexpected interrupt in protected mode	CPU board

6.2 Power-Up Diagnostic (Built-In Test)

TROUBLESHOOTING

6.2.3 B.I.T. Error Beep Codes (Sheet 1 of 2)

<i>B.I.T. Error Beep Code Sequence</i>	<i>Suspected Failure</i>
1-1-3	CPU board
1-1-4	BIOS PROM on CPU board
1-2-1	CPU board
1-2-2	CPU board
1-2-3	CPU board
1-3-1	CPU board
1-3-3	CPU board
1-3-4	CPU board
1-4-1	CPU board
1-4-2	CPU board
2-1-1	CPU board
2-1-2	CPU board
2-1-3	CPU board
2-1-4	CPU board
2-2-1	CPU board
2-2-2	CPU board
2-2-3	CPU board
2-2-4	CPU board
2-3-1	CPU board
2-3-2	CPU board

6.2 Power-Up Diagnostic (Built-In Test)

6.2.3 B.I.T. Error Beep Codes (Sheet 2 of 2)

<i>B.I.T. Error Beep Code Sequence</i>	<i>Suspected Failure</i>
2-3-3	CPU board
2-4-1	CPU board
2-4-2	CPU board
2-4-3	CPU board
2-4-4	CPU board
3-1-1	CPU board
3-1-2	CPU board
3-1-3	CPU board
3-1-4	CPU board
3-2-4	CPU board
3-3-4	Video board
3-4-1	Video board
3-4-2	Video board
4-2-1	CPU board
4-2-2	CPU board
4-2-3	CPU board
4-2-4	CPU board
4-3-1	Expanded memory board
4-3-3	CPU board
4-3-4	CPU board

6.3 Diagnostic Utility

6.3.1 Diagnostic Utility Description

The diagnostic utility is a diskette-based troubleshooting aid designed to run with minimal user intervention.

The utility resides on a non-bootable diskette. To make the diskette bootable in systems configured with a Winchester drive, perform the following steps:

1. Boot system from Winchester drive.
2. Insert diagnostic diskette into drive "A."
3. Type "SYS A:" when DOS prompt appears.
4. Press RETURN key.

To make the diagnostic diskette bootable in systems configured with 2 floppy diskette drives, but without a Winchester drive, proceed as follows:

1. Boot system from system diskette 1 in drive "A."
2. Insert diagnostic diskette into drive "B."
3. Type "SYS B:" when DOS prompt appears.
4. Press RETURN key.

6.3 Diagnostic Utility

6.3.2 Running Diskette Diagnostic Utility

NOTE

Single options ship with a diskette that contains diagnostics for that option only.

1. Install system files onto diagnostic diskette (►6.3.1).
 2. Boot system from diagnostic diskette.
 3. Press keyboard "y" key after disclaimer screen appears. Pressing "y" key causes test selection screen to appear.
 4. Use keyboard INSERT and DELETE keys to deselect unwanted tests. (INSERT key positions arrow in front of test to be deselected; DELETE key deselects test.)
 5. Press keyboard EXEC key. (While test executes, test status information shows on screen.)
-

NOTE

If an error is detected, a message specifying failed hardware appears on screen. To continue running diagnostic program, press EXEC key.

6. After system executes all selected tests, comprehensive test results appear on screen. Press SHIFT and CANCEL keys to exit diagnostic utility.
-

6.4 Troubleshooting Strategy (Sheet 1 of 3)

6.4 TROUBLESHOOTING

Fault Condition	Troubleshooting Action
Fan does not run after system power-up and proper ac voltage not present at input to power supply.	<ul style="list-style-type: none">•Check voltage at electrical outlet.•Source voltage O.K.: Check continuity of ac power cord; replace if bad.•Source voltage incorrect: Try another outlet; if voltage still bad inform customer.
Fan does not run after system power-up and proper ac voltage is present at input to power supply.	<ul style="list-style-type: none">•Unplug monitor cable from CPU board; if fan runs replace monitor.•If fan still does not run: Check for bad power switch on electronics enclosure.•Replace power supply if power switch operational.
B.I.T. fails after system powered-on and error message or beep code present.	<ul style="list-style-type: none">•Refer to section 6.2.2 (error messages) or section 6.2.3 (error beep codes).
B.I.T. fails after system powered-on and no error messages or beep codes present.	<ul style="list-style-type: none">•Check all cable connections.•Secure or replace cable(s).
B.I.T. fails after system powered-on, no error messages or beep codes present, but all cable connections O.K.	<ul style="list-style-type: none">•Check voltages (►9.5).•Voltages wrong: Replace power supply.•Voltages correct: Check hardware for visible physical damage (e.g., bent pins, broken components). Replace damaged hardware.
B.I.T. fails after system powered-on, no error messages or beep codes present, and no visible damage to hardware.	<ul style="list-style-type: none">•Remove all non-Wang option boards; replace boards one-at-a-time until faulty board isolated.

6.4 Troubleshooting Strategy (Sheet 2 of 3)

TROUBLESHOOTING

Fault Condition	Troubleshooting Action
B.I.T. fails after system powered-on, no error messages or beep codes present, no visible damage to hardware, and removal of all non-Wang boards fails to correct problem.	<ul style="list-style-type: none">•Remove all Wang boards except CPU board.•Replace CPU board if system does not emit error beep codes.•If system emits beep codes after all Wang boards (except CPU board) have been removed, replace Wang boards one-at-a-time until faulty board isolated.
Diagnostic utility detects faulty FRU.	<ul style="list-style-type: none">•Check configuration of FRU (►9.3).•Replace FRU if configuration correct.
Problem with system, and diagnostic utility fails to detect faulty FRU.	<ul style="list-style-type: none">•If diagnostic menu contains tests for all FRUs present, suspect software.•If menu does not contain required test(s): Are files for desired test(s) on utility? Yes -- check FRU I/O addresses; no -- replace diskette with diagnostic that contains necessary file(s).
System powered-on, B.I.T. completes successfully, but diagnostic menu does not appear on monitor.	<ul style="list-style-type: none">•Remove all option boards except Winchester/floppy controller and video board.•If diagnostic menu appears, replace option boards one-at-a-time until faulty board isolated.•Check configuration of faulty board; replace if necessary.
System powered-on, B.I.T. completes successfully, but diagnostic menu still does not appear, even after all option boards (except Winchester/floppy controller and video board) are removed.	<ul style="list-style-type: none">•Replace diskette in drive "A" with system diskette 1. If MS-DOS loads properly, diagnostic diskette was faulty.

6.4 Troubleshooting Strategy (Sheet 3 of 3)

6.4 TROUBLESHOOTING

Fault Condition	Troubleshooting Action
<p>Diagnostic menu does not appear after power-up and MS-DOS does not load properly even after drive "A" diskette is replaced by system diskette 1.</p>	<p>If system contains Winchester drive:</p> <ul style="list-style-type: none">•Unplug drive "A" and boot from hard disk.•Replace diskette drive "A" if MS-DOS loads properly.•Replace Winchester/floppy controller if MS-DOS does not load.•Replace CPU board. <p>If system not configured with Winchester drive:</p> <ul style="list-style-type: none">•Swap diskette drive "A" and "B" cables, insert system diskette 1 into drive "B" and boot system.•Replace diskette drive "A" if MS-DOS loads properly.•Replace Winchester/floppy controller if MS-DOS does not load properly.•Replace CPU board.

SECTION

7

REPAIR

SECTION 7 CONTENTS

SECTION 7

REPAIR

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7.1 Tools and Test Equipment

- Wang CE tool kit, WLI No. 726-9401
- Diagnostic disk, P/N 732-8098 (package number 195-5537-9)

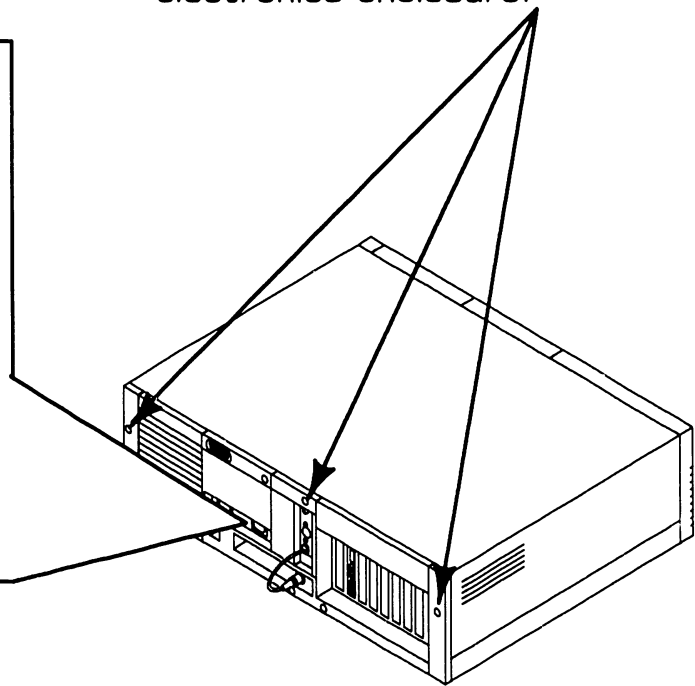
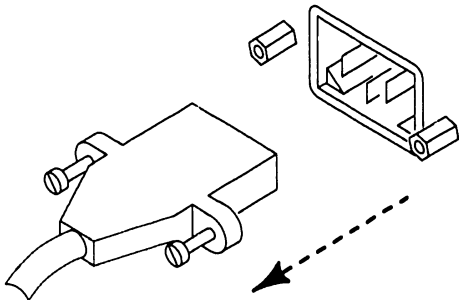
7.2 Removal Procedures

7.2.1 Electronics Enclosure Top/Front Cover Removal (Sheet 1 of 2)

1 Power-down workstation (➔ 4.3).

3 Unscrew Phillips-head screws that secure top cover to electronics enclosure.

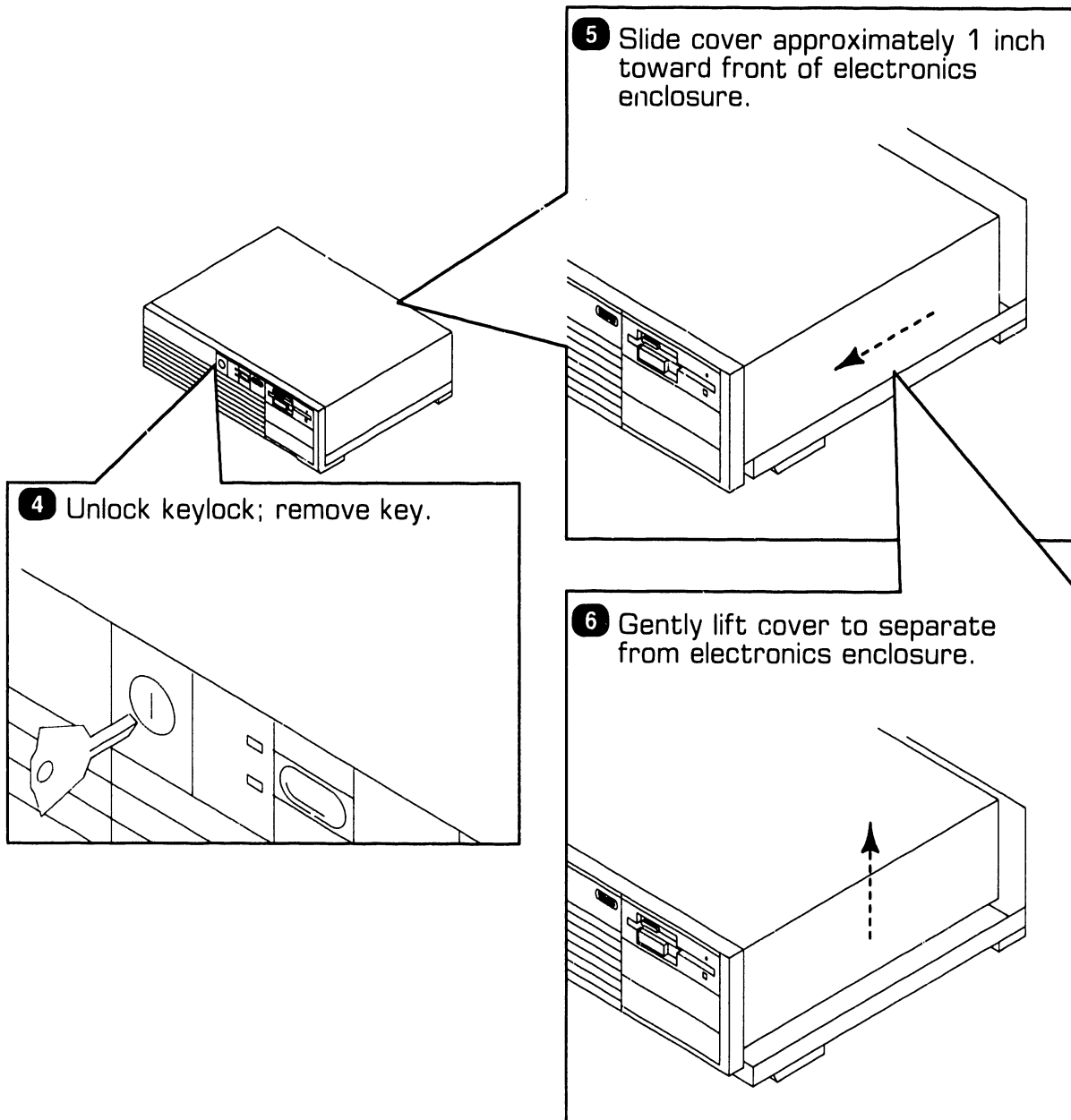
2 Disconnect workstation ac power cord (420-2040) from inlet.



7.2 Removal Procedures

REPAIR

7.2.1 Electronics Enclosure Top/Front Cover Removal (Sheet 2 of 2)

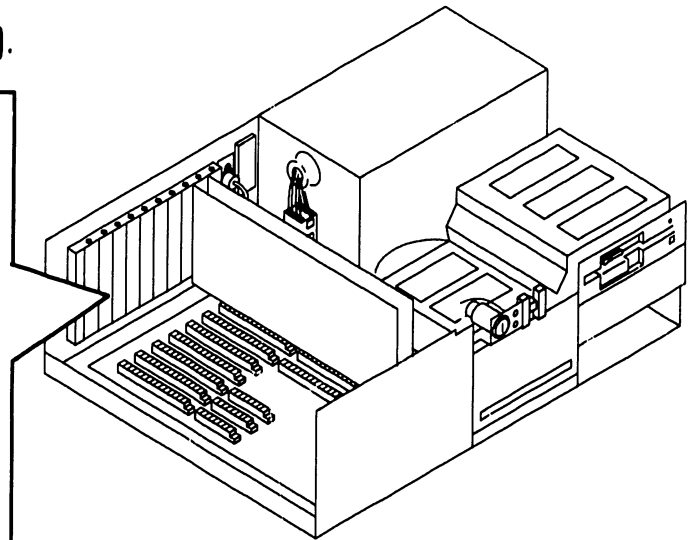
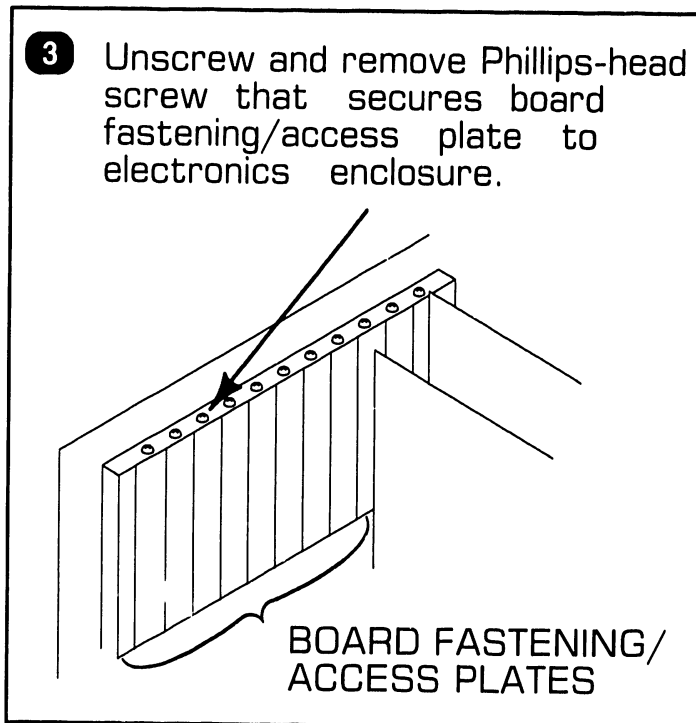


7.2 Removal Procedures

7.2.2 General Board Removal (Sheet 1 of 2)

- 1 Power-down workstation(➡ 4.3).
- 2 Remove top/front cover(➡ 7.2.1).

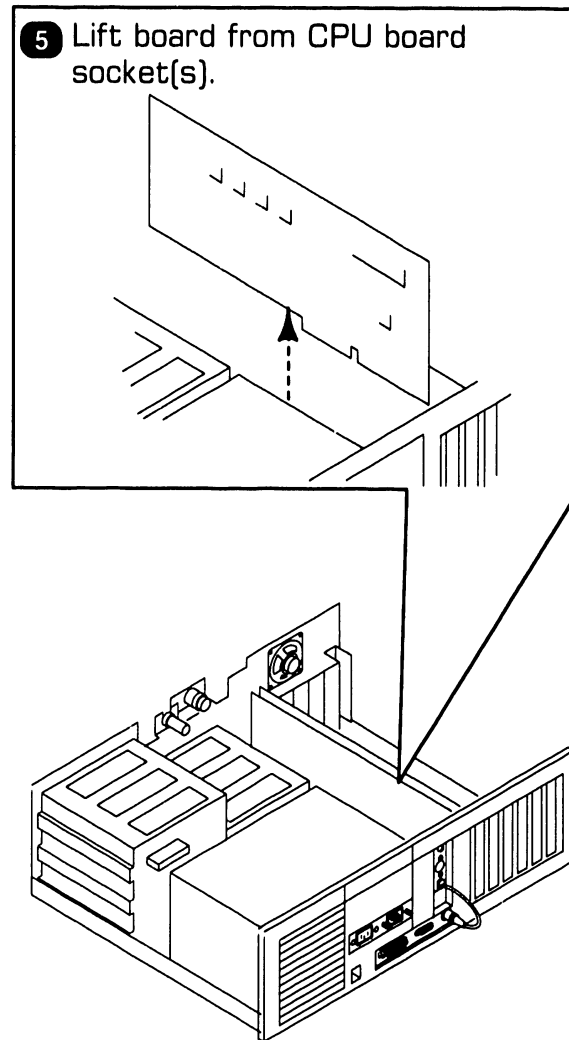
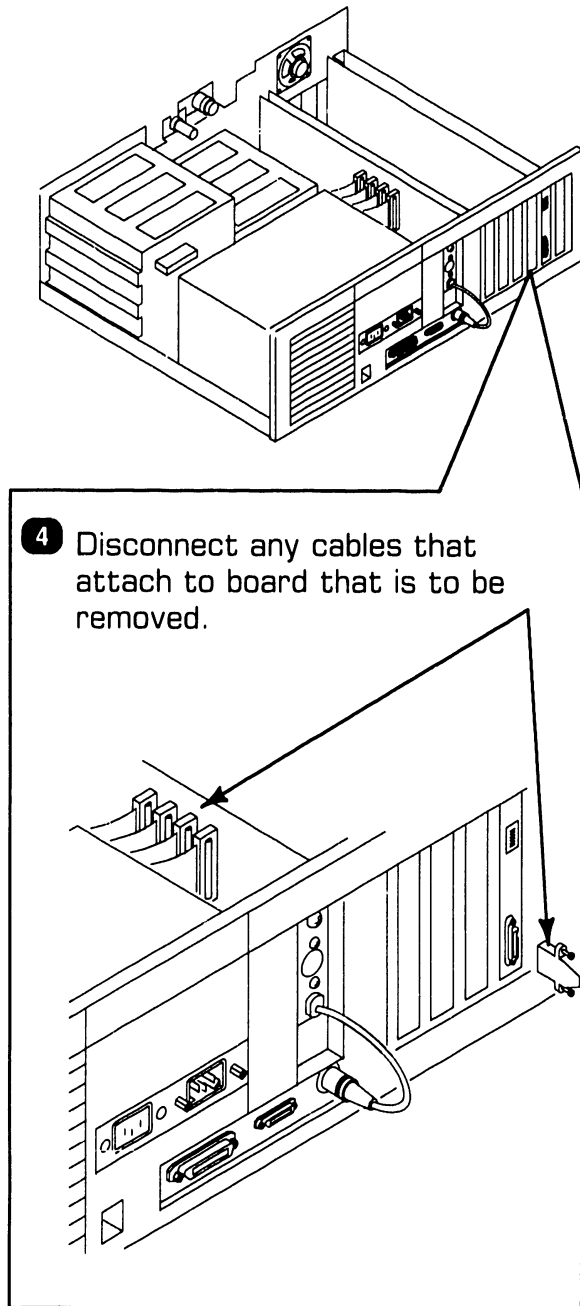
- 3 Unscrew and remove Phillips-head screw that secures board fastening/access plate to electronics enclosure.



7.2 Removal Procedures

REPAIR

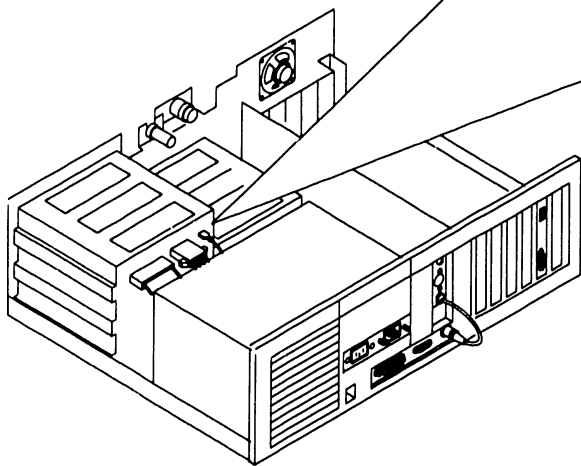
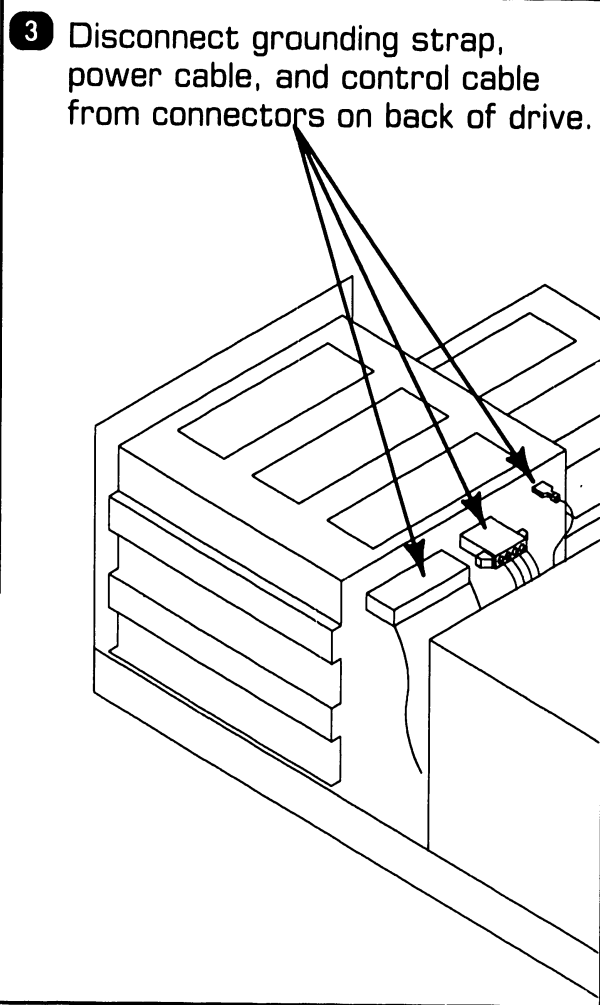
7.2.2 General Board Removal (Sheet 2 of 2)



7.2 Removal Procedures

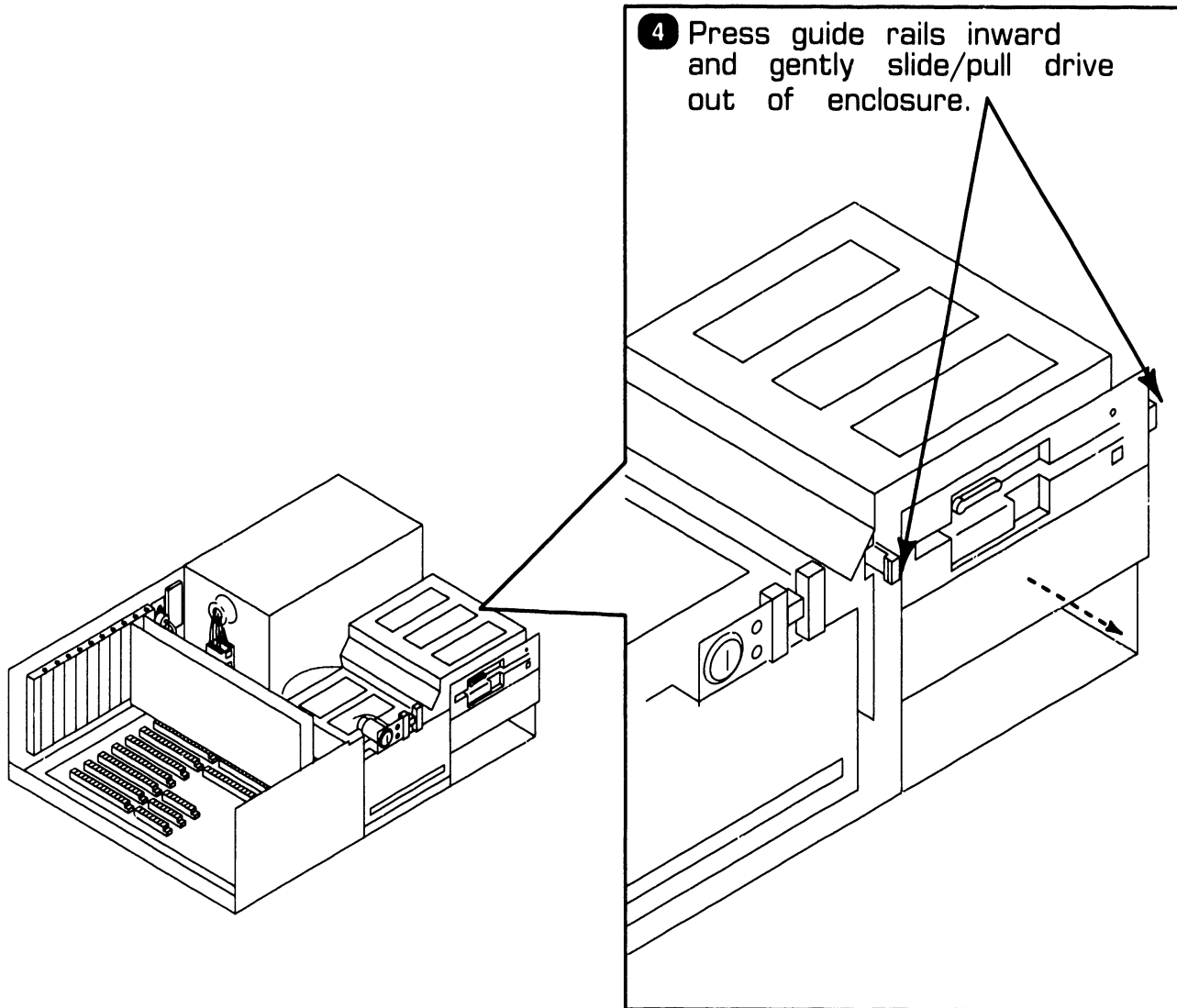
7.2.3 Floppy Diskette Drive Removal (Sheet 1 of 2)

- 1 Power-down workstation (▶ 4.3).
- 2 Remove top/front cover (▶ 7.2.1).



7.2 Removal Procedures

7.2.3 Floppy Diskette Drive Removal (Sheet 2 of 2)

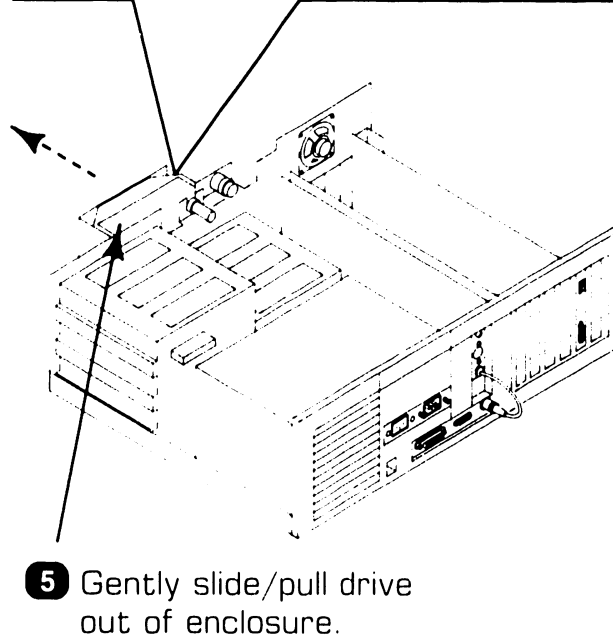
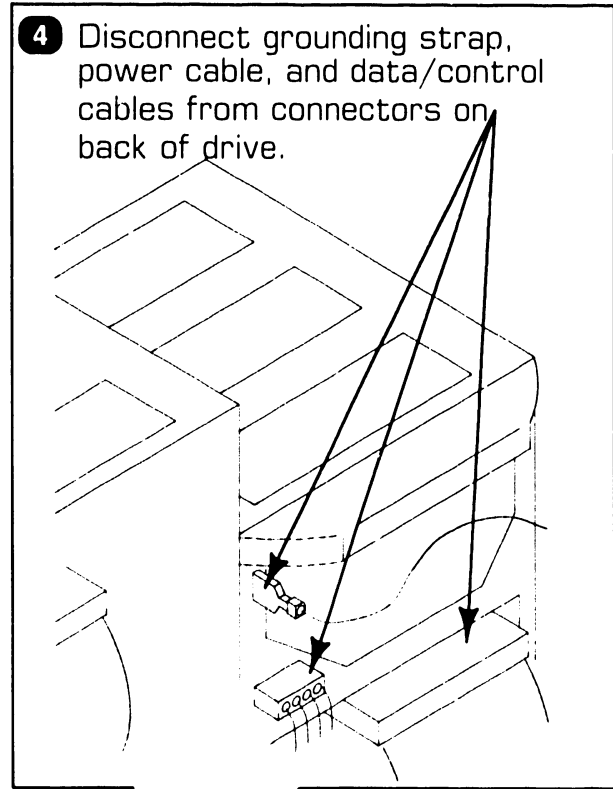
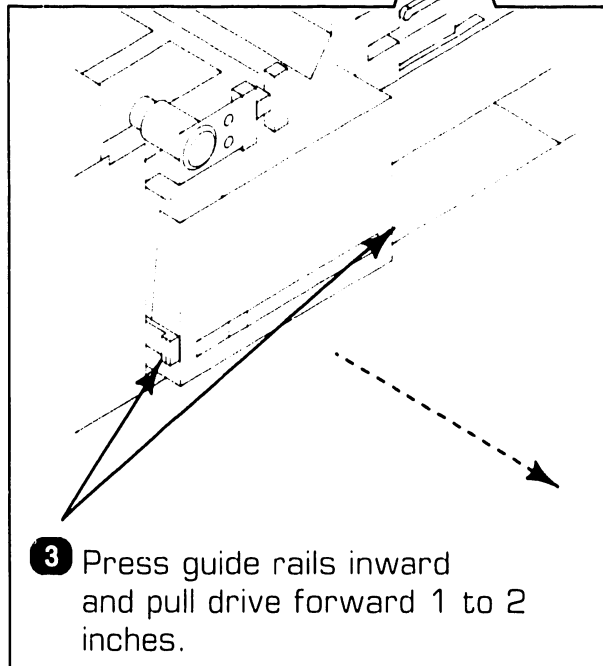
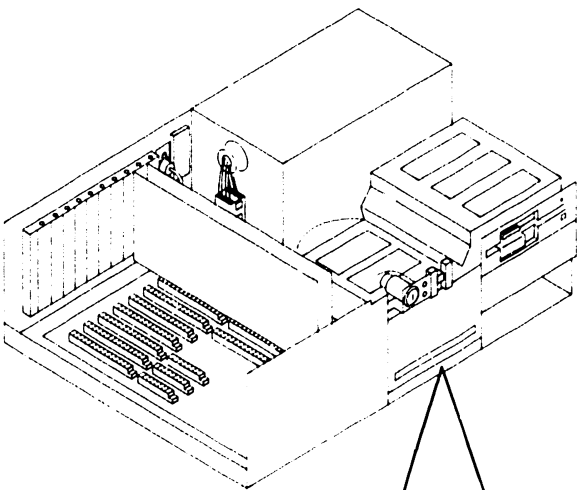


7.2 Removal Procedures

REPAIR

7.2.4 Winchester Disk Removal

- 1 Power-down workstation (▶ 4.3).
- 2 Remove top/front cover (▶ 7.2.1).

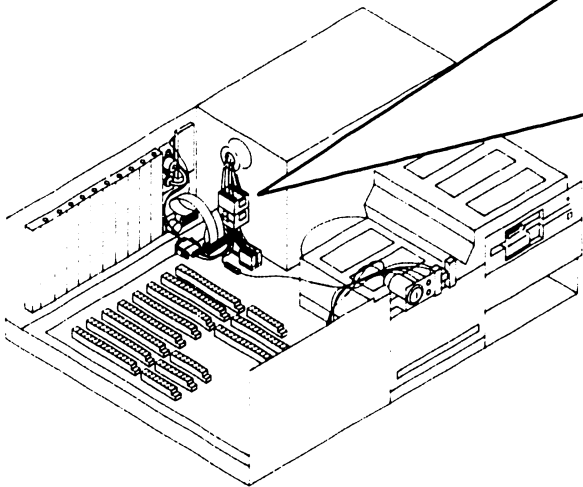


7.2 Removal Procedures

REPAIR

7.2.5 Power Supply Removal (Sheet 1 of 2)

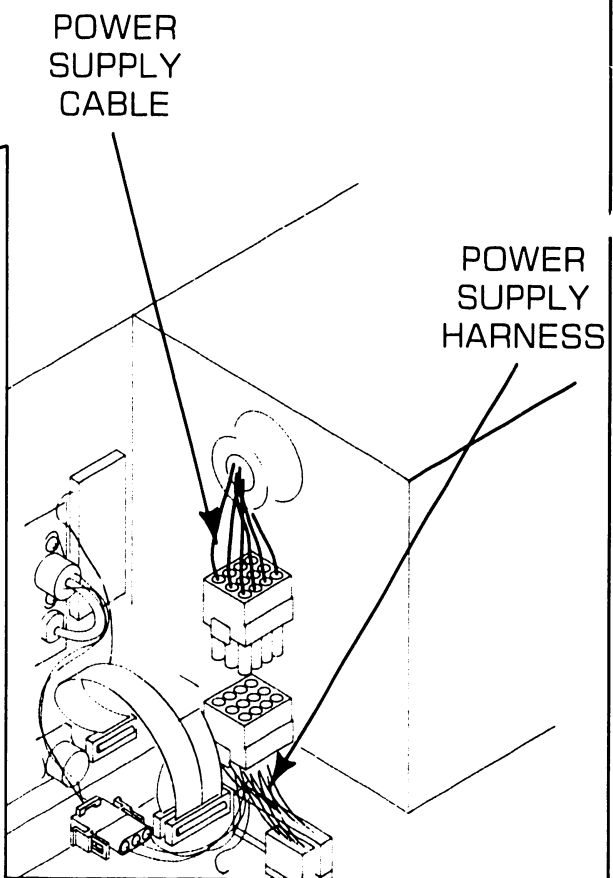
- 1 Power-down workstation (➡ 4.3).
- 2 Remove top/front cover (➡ 7.2.1).
- 3 Disconnect power supply cable from connectors on rear of floppy drive(s) and Winchester disk unit. (Disconnecting cable from drives might require partial removal of drives from enclosure (➡ 7.2.3, 7.2.4).)



NOTE

If accessing power supply connectors is difficult, remove board closest to drive location "C" (➡ 7.2.2).

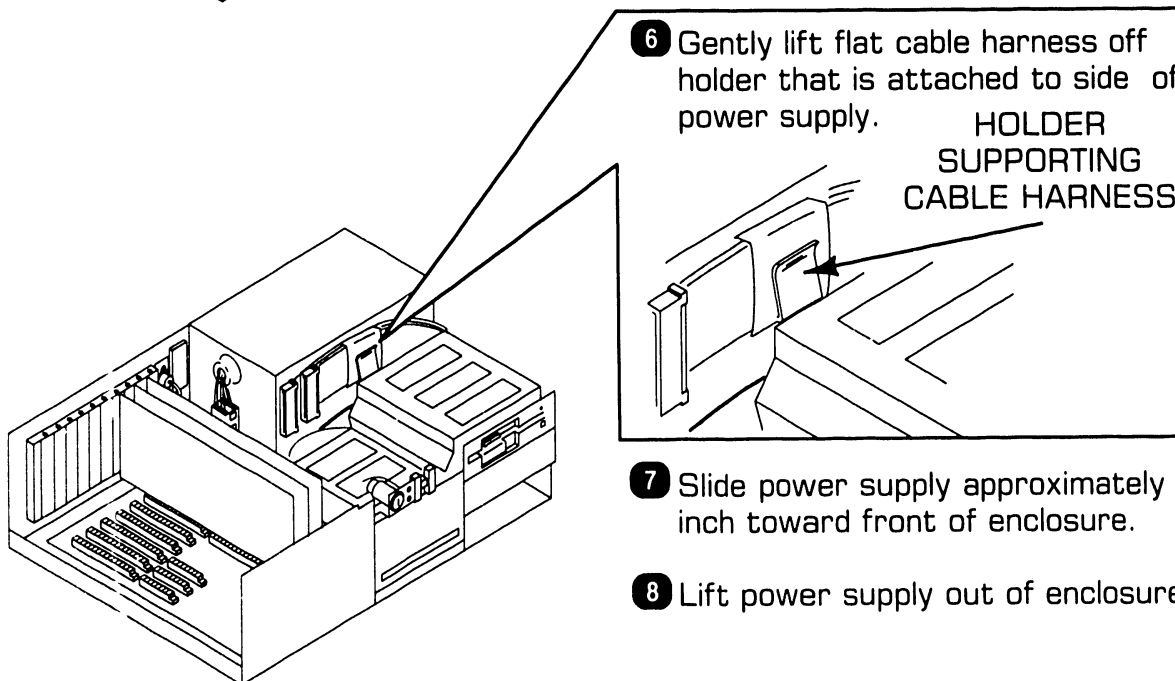
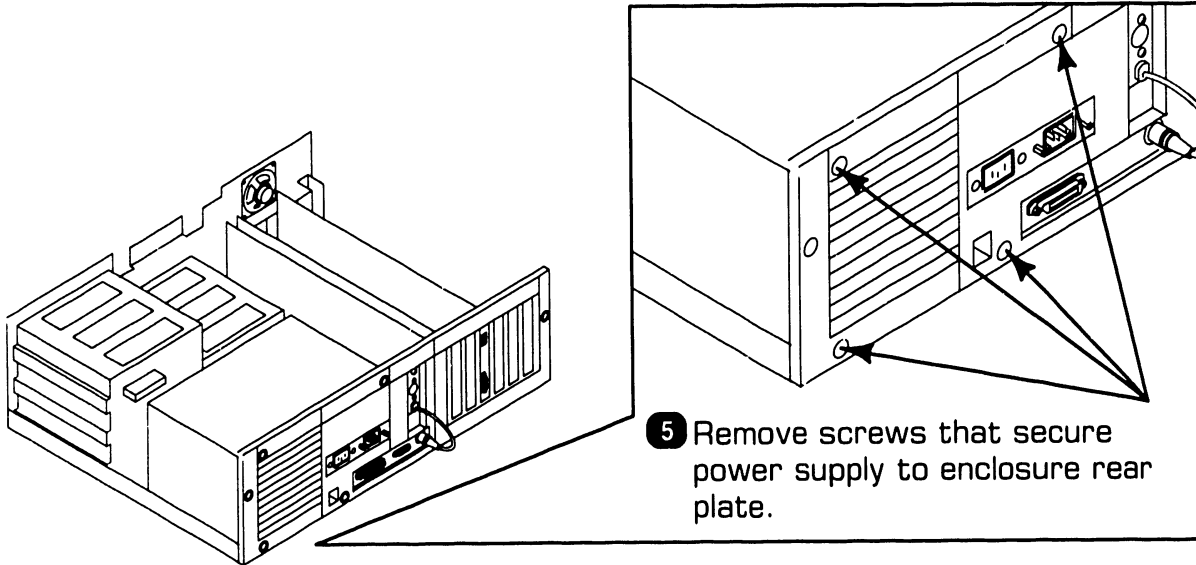
- 4 Disconnect power supply cable from power supply harness.



7.2 Removal Procedures

REPAIR

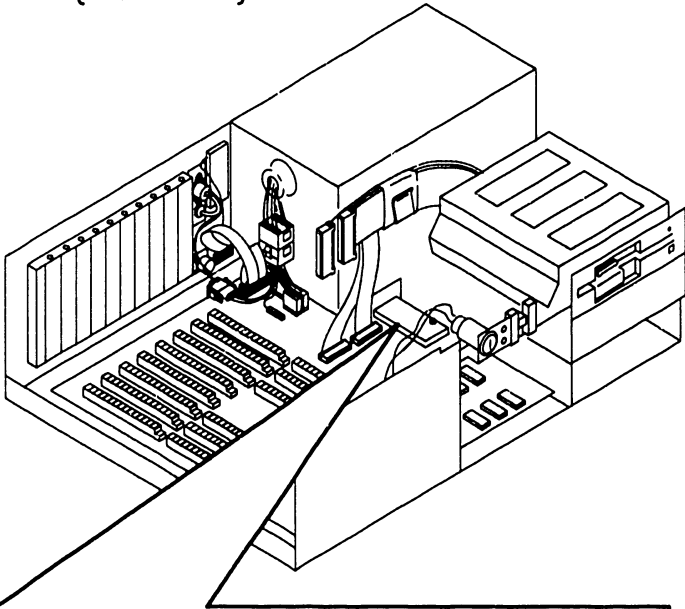
7.2.5 Power Supply Removal (Sheet 2 of 2)



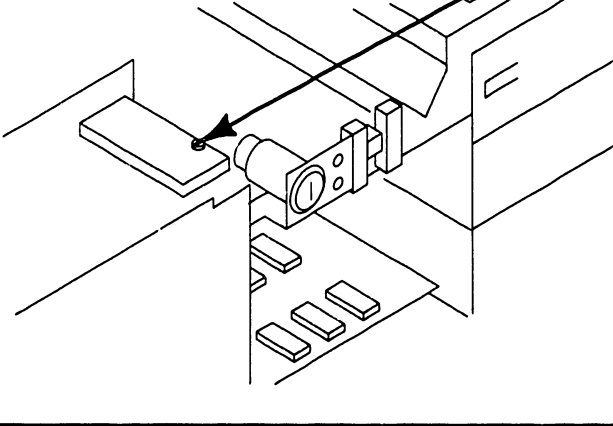
7.2 Removal Procedures

7.2.6 80287 Coprocessor Removal

- 1 Power down workstation(➡ 4.3).
- 2 Remove top front cover(➡ 7.2.1).
- 3 Remove Winchester drive "C"
(➡7.2.4).
- 5 Lift coprocessor from CPU board socket by pulling directly upward on module to ensure that coprocessor pins do not bend or break; i.e., lift module at 90-degree angle from board.



- 4 Unscrew screw that secures coprocessor to CPU board.

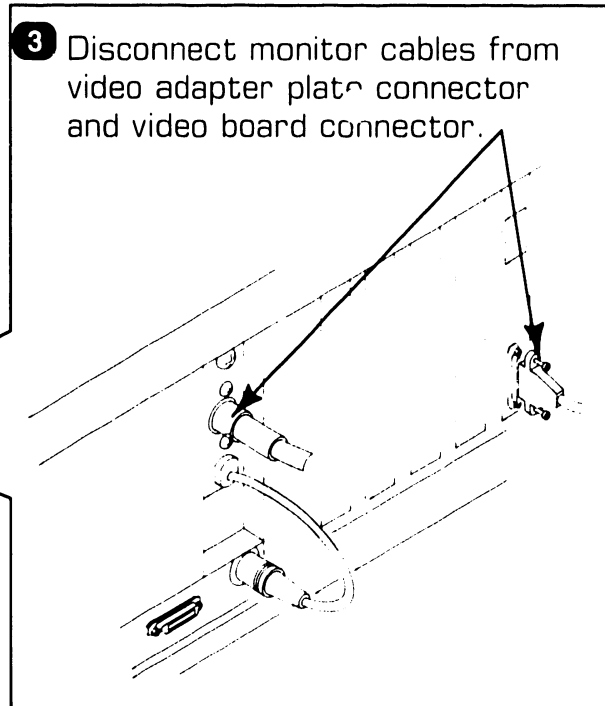
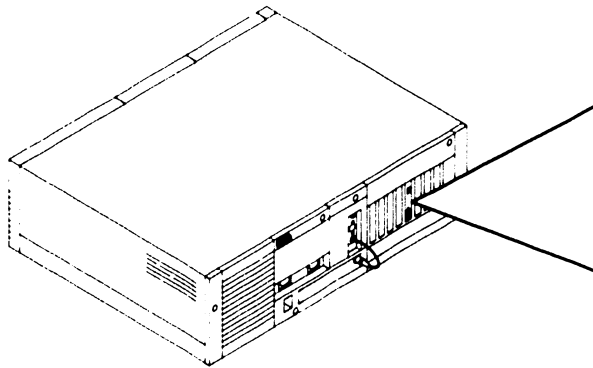


7.2 Removal Procedures

REPAIR

7.2.7 CPU Board Removal (Sheet 1 of 2)

- 1 Power-down workstation (➤ 4.3).
- 2 Remove top/front cover (➤ 7.2.1).



- 3 Disconnect monitor cables from video adapter plate connector and video board connector.

- 4 Disconnect video adapter plate cable from CPU board connector J1 (➤ 7.2.11).

- 5 Remove boards from CPU board sockets (➤ 7.2.2).

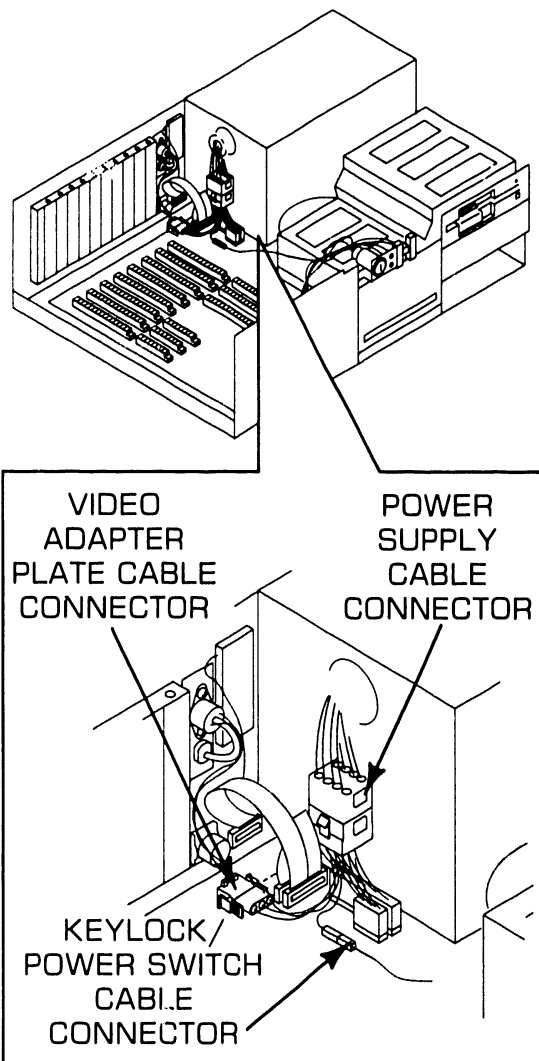
- 6 Disconnect lithium battery cable at CPU board connector J10 (➤ 7.2.8).

7.2 Removal Procedures

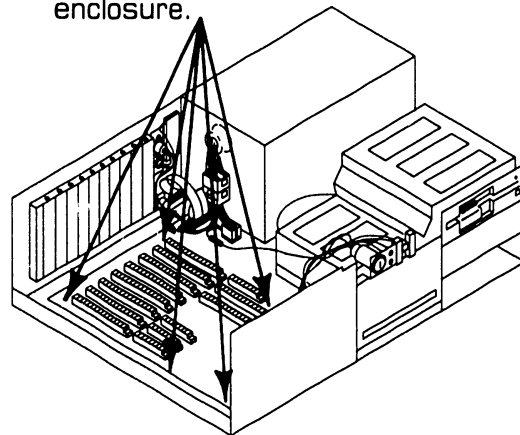
REPAIR

7.2.7 CPU Board Removal (Sheet 2 of 2)

- 7 Disconnect power supply cable, video adapter plate cable, and keylock/power switch cable from power supply adapter harness.



- 8 Disconnect speaker cable from CPU board connector J22 (►7.2.9).
- 9 Disconnect keylock/power switch harness cable from CPU board connector J23 (►7.2.10).
- 10 Disconnect serial/parallel port panel cables from CPU board connectors J12 and J11 (►7.2.12).
- 11 Remove screws (6) that secure CPU board to bottom of enclosure and gently slide CPU board out of enclosure.



CAUTION

If 80287 coprocessor module is installed, slide disk drive in location "C" out of enclosure (►7.2.4) to ensure that module does not contact bottom of drive as CPU board is removed.

7.2 Removal Procedures

REPAIR

7.2.8 Lithium Battery Removal

- 1 Power-down workstation (➔ 4.3).
- 2 Remove top/front cover (➔ 7.2.1).

CAUTION

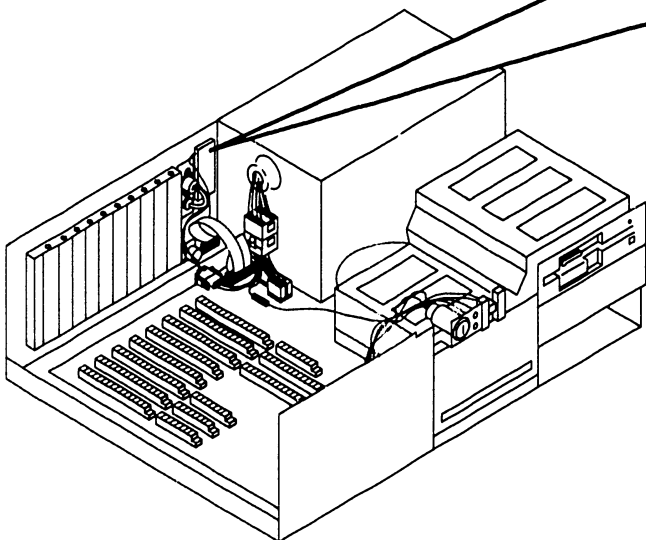
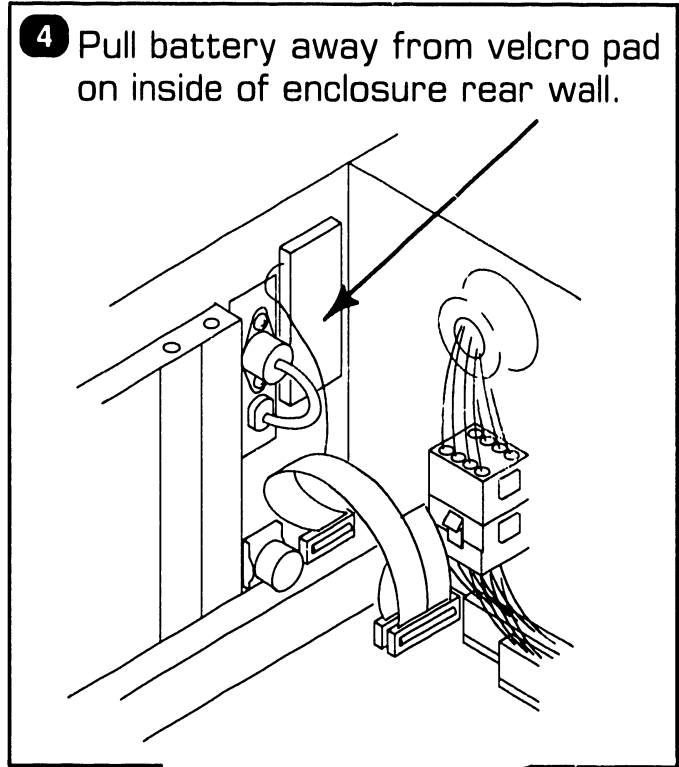
Disconnecting lithium battery cable will result in erasure of CPU CMOS RAM. Run SETUP program.

- 3 Disconnect lithium battery cable from CPU board connector J10.

NOTE

If accessing connector proves difficult, remove board closest to drive location "C" for more room.

- 4 Pull battery away from velcro pad on inside of enclosure rear wall.

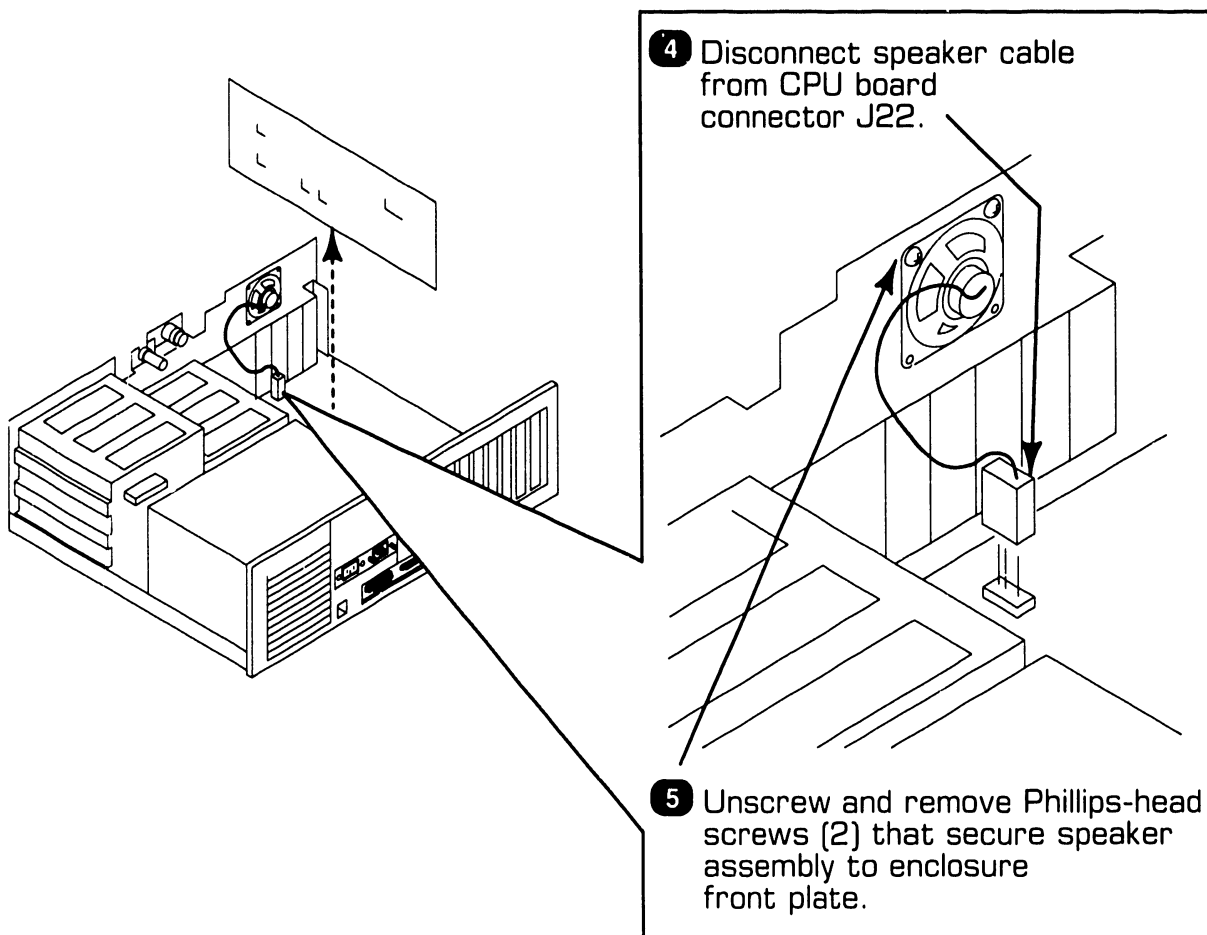


7.2 Removal Procedures

REPAIR

7.2.9 Speaker Removal

- 1 Power-down workstation (▶ 4.3).
- 2 Remove top/front cover (▶ 7.2.1).
- 3 Remove board closest to Winchester disk to access speaker cable connector (▶ 7.2.2).



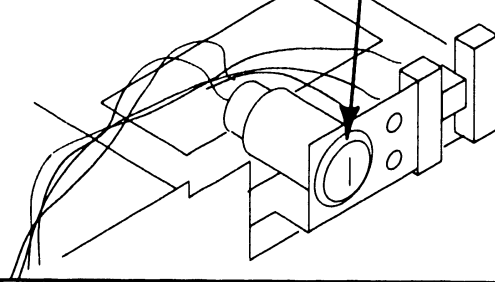
7.2 Removal Procedures

REPAIR

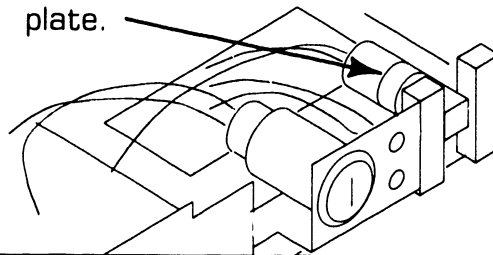
7.2.10 Keylock/Power Switch Assembly Removal

- 1 Power-down workstation (▶ 4.3).
- 2 Remove top/front cover (▶ 7.2.1).
- 3 Remove Winchester disk/floppy diskette controller board (▶ 7.2.2).
- 4 Disconnect keylock/power switch assembly cable from CPU board connector J23.

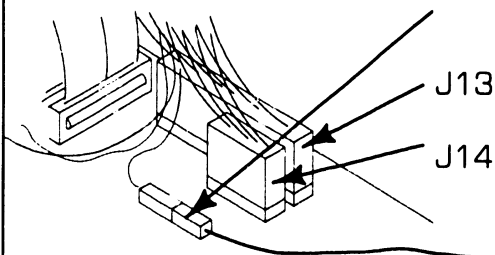
6 Disconnect keylock from enclosure front plate by unscrewing nut that secures keylock to plate.



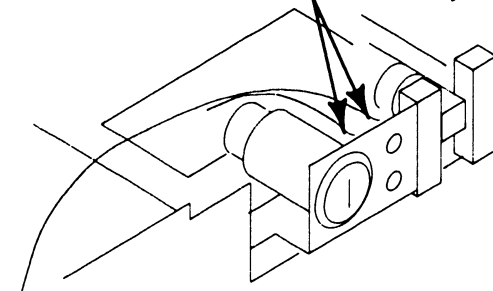
7 Unscrew plastic nut that secures power switch to enclosure front plate.



5 Disconnect keylock/power switch assembly cable from power supply adapter harness connector.



8 Gently pull LED cable connectors from LEDs; remove assembly.

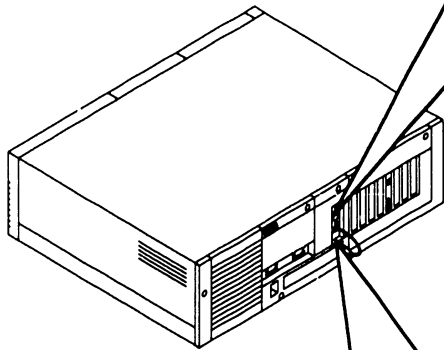


7.2 Removal Procedures

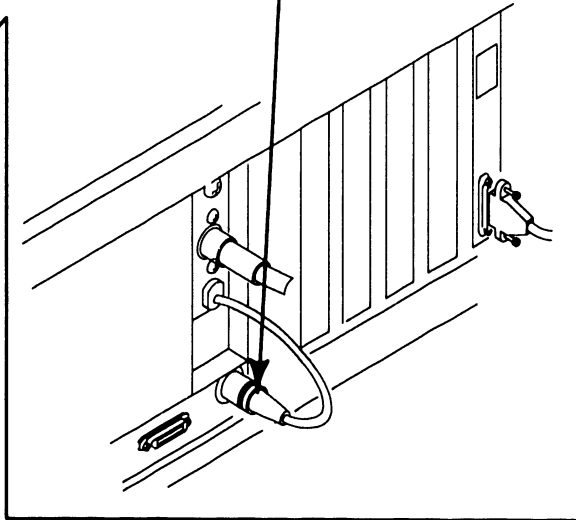
REPAIR

7.2.11 Video Adapter Plate Removal (Sheet 1 of 2)

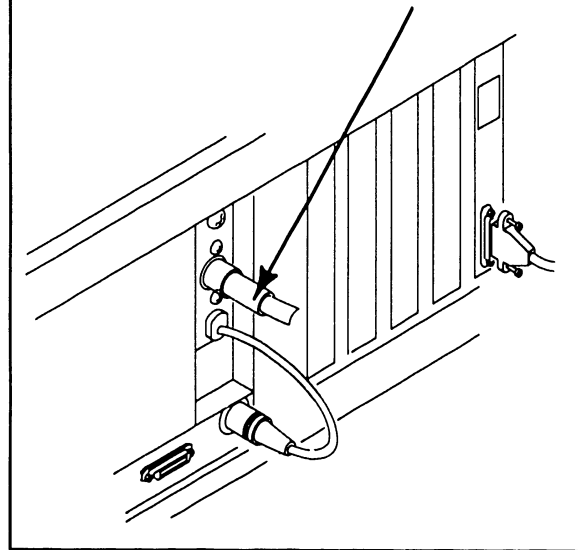
1 Power-down workstation (► 4.3).



3 Disconnect video adapter plate external cable from CPU board connector J1.



2 Disconnect monitor cable from video adapter plate connector.

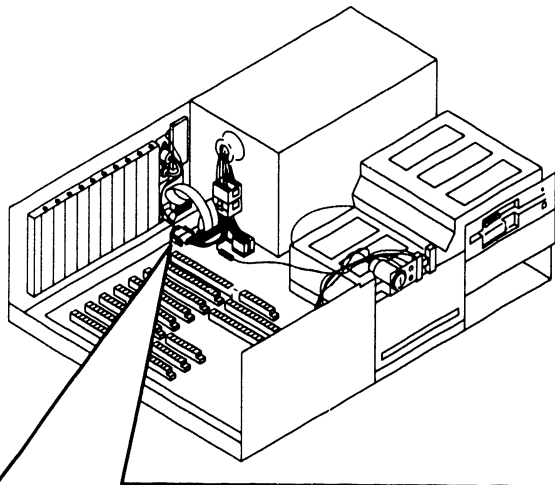


7.2 Removal Procedures

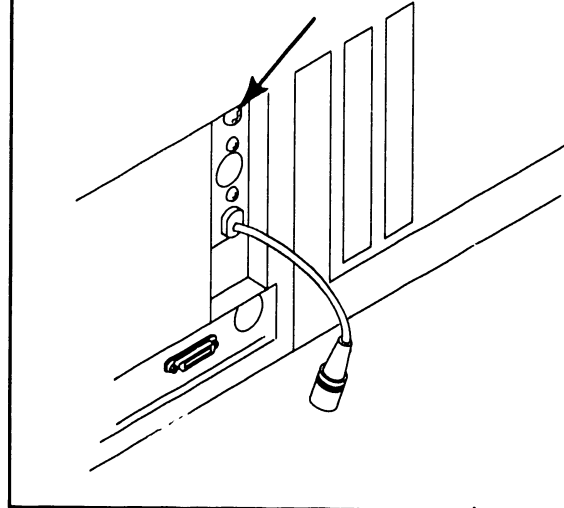
REPAIR

7.2.11 Video Adapter Plate Removal (Sheet 2 of 2)

4 Remove top/front cover (➔ 7.2.1).

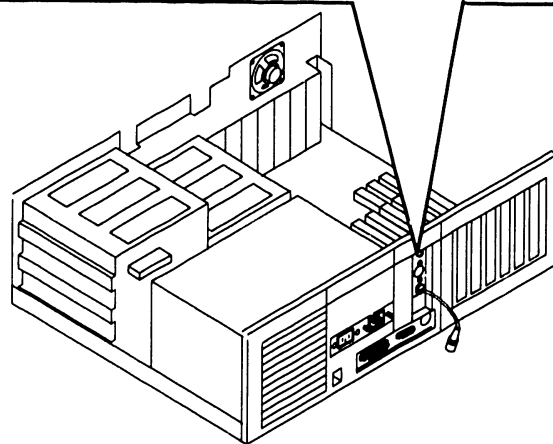
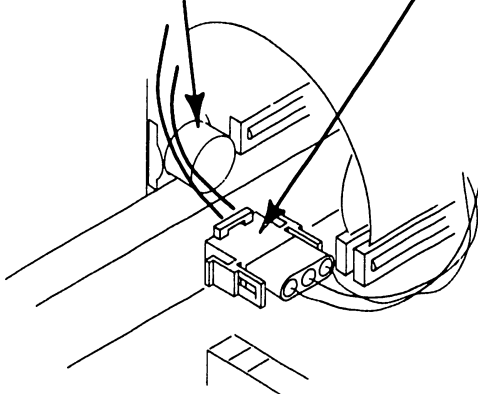


6 Unscrew screw that secures video adapter plate to enclosure rear panel; remove adapter plate.



5 Disconnect video adapter plate cable from connector on power supply adapter harness.

CPU BOARD J1
CONNECTOR



7.2 Removal Procedures

REPAIR

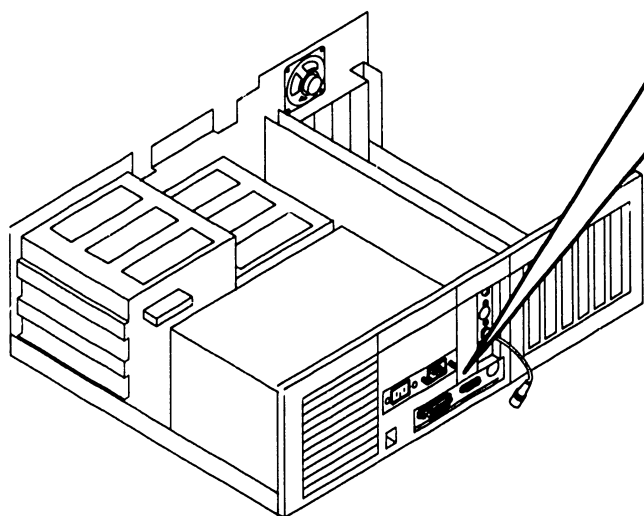
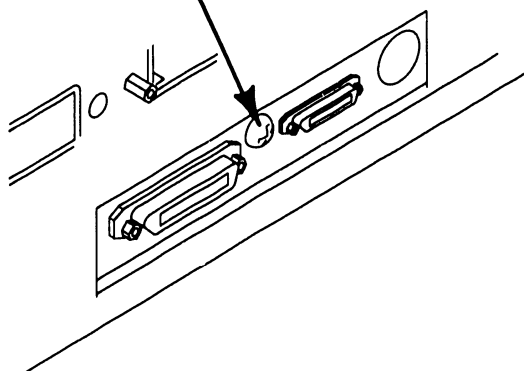
7.2.12 Serial/Parallel Port Panel Removal

- 1 Power-down workstation (▶ 4.3).
- 2 Remove enclosure top/front cover (▶ 7.2.1).
- 3 Remove boards from CPU board sockets (▶ 7.2.2).
- 4 Remove CPU board from enclosure (▶ 7.2.7).

CAUTION

If 80287 coprocessor module is installed, slide disk drive "C" out of enclosure (▶ 7.2.4) to ensure coprocessor module does not contact bottom of drive as CPU board is removed.

- 5 Remove Phillips-head screw that secures serial/parallel port panel to enclosure rear plate; remove port panel.



SECTION

8

ADJUSTMENTS

SECTION 8 CONTENTS

SECTION 8 ADJUSTMENTS

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8.1.1 Special Tools	8-1
8.2 MECHANICAL ADJUSTMENTS	8-2
8.2.1 Mating Arm Adapter Plate to Monitor Arm	8-2

8.1 Tools and Equipment

8.1.1 Special Tools

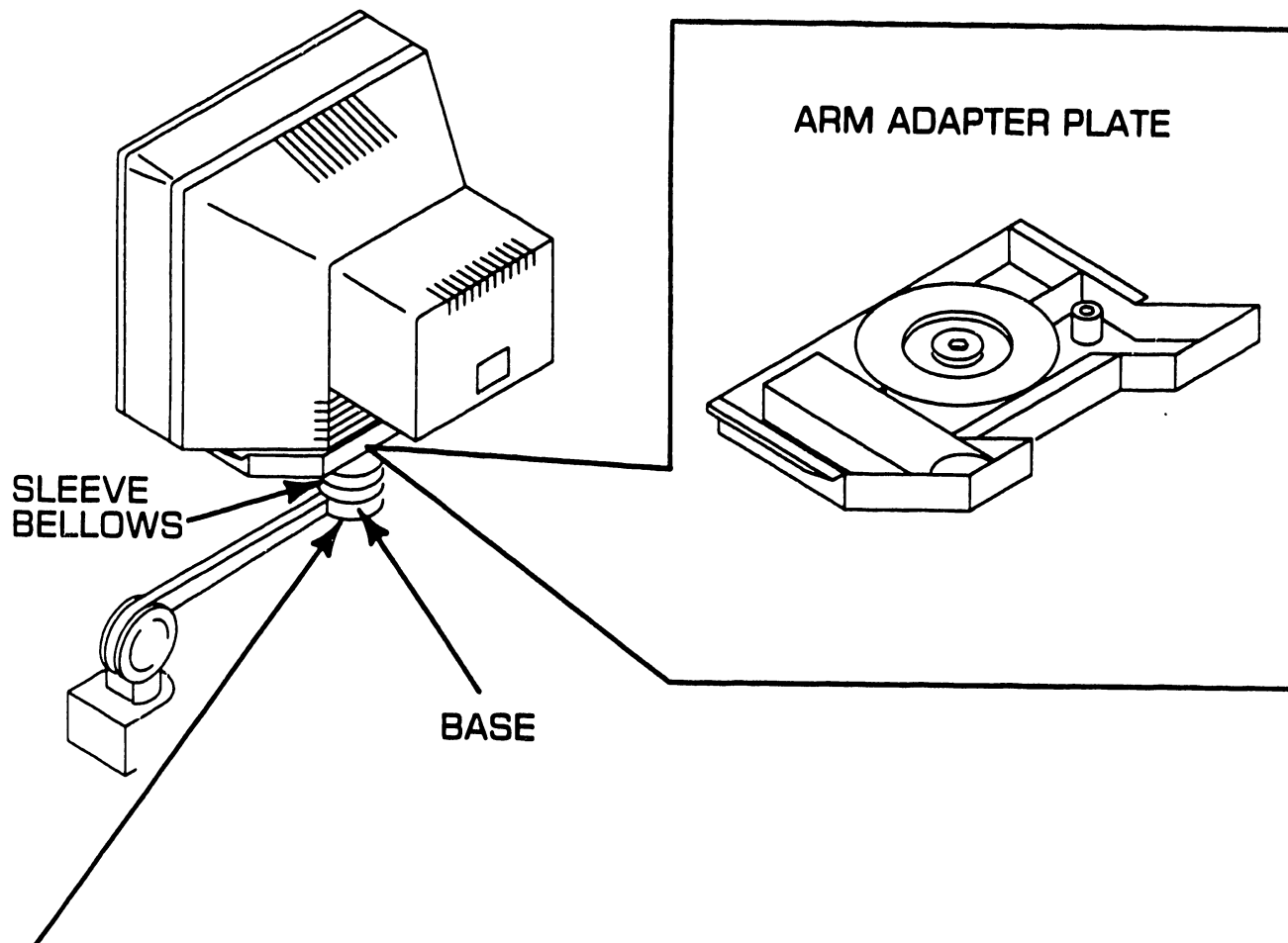
Special equipment or tools are not required to perform adjustments on the PC 380 computer.

ADJUSTMENTS

8.2 Mechanical Adjustments

8.2.1 Mating Arm Adapter Plate To Monitor Arm

A simple mechanical adjustment secures the arm adapter plate to the monitor arm. (The arm adapter plate connects the workstation monitor to the monitor arm.)



- 1 Sufficiently tighten locknut on base underneath sleeve bellows.

SECTION

9

UNPACKING

AND

SETUP

SECTION 9 CONTENTS

SECTION 9 UNPACKING AND SETUP

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9.1 UNPACKING AND SETUP

Tools and Equipment

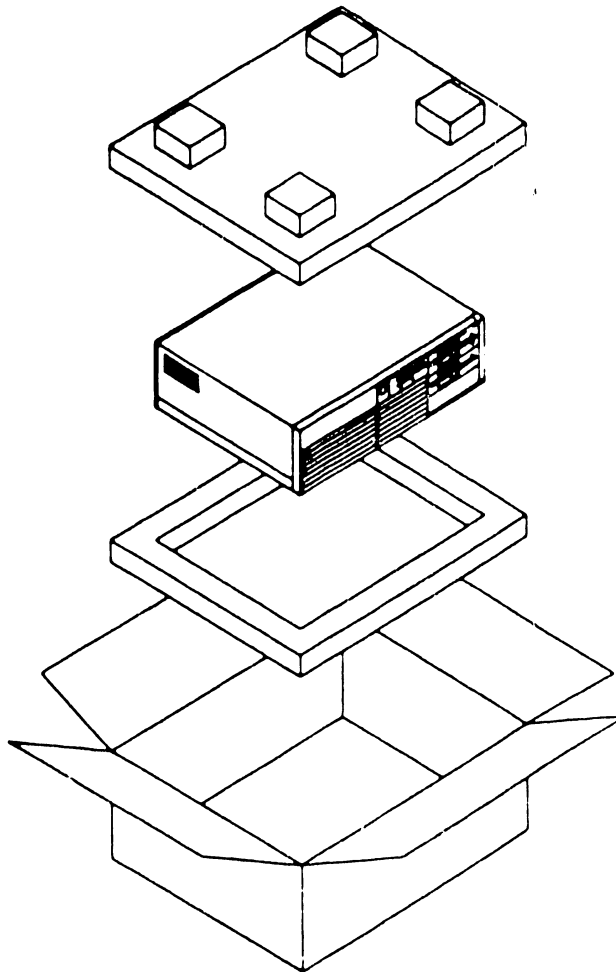
- Standard CE tool kit, P/N 726-9401
- Digital multimeter
- Customer-runnable diagnostic

9.2 UNPACKING AND SETUP

9.2 Unpacking Procedures

9.2.1 Unpacking and Inspecting Electronics Enclosure

1. Remove electronics enclosure from shipping carton.
2. Inspect unit for external damage.
3. Remove electronics enclosure top/front cover.
4. Inspect for internal damage and loose parts.
5. Remove shipping protector from diskette drive(s).

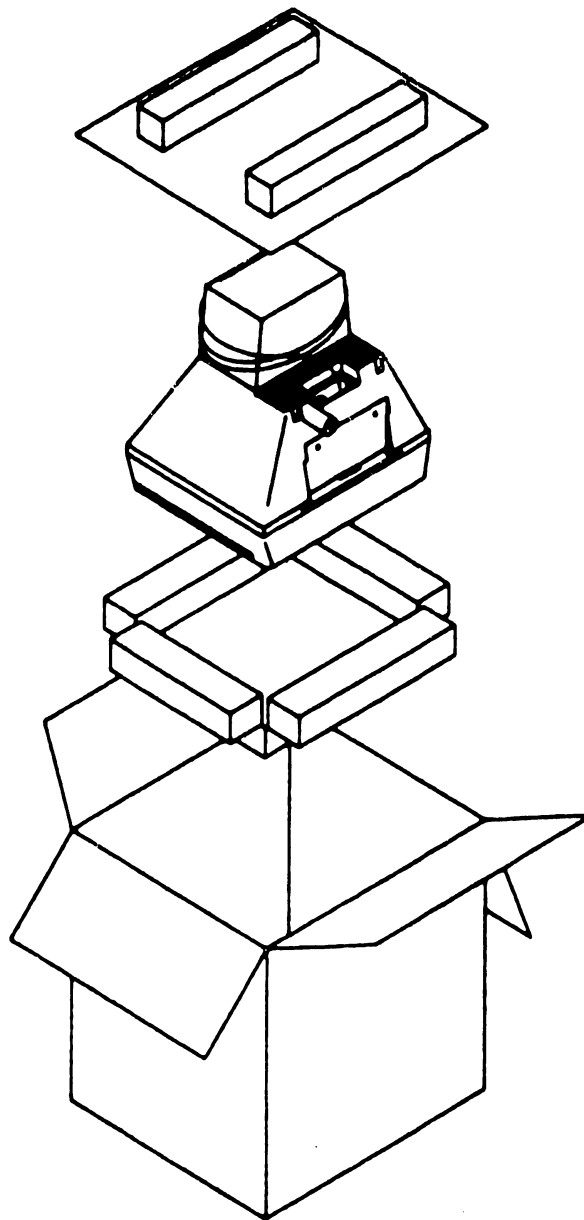


UNPACKING AND SETUP

9.2 Unpacking Procedures

9.2.2 Unpacking Workstation Monitor

1. Remove monitor from shipping carton.
2. Inspect unit for external damage.



UNPACKING AND SETUP

9.2 Unpacking Procedures

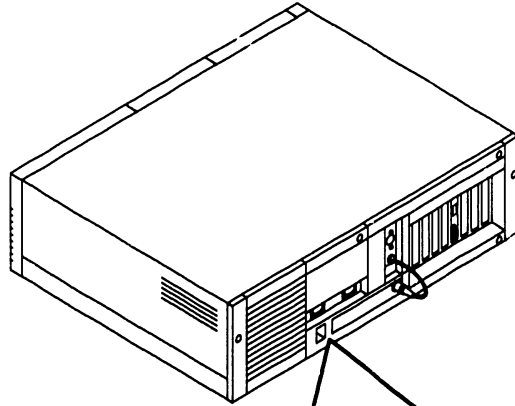
9.2.3 Options Overpack Box

The Options Overpack box can include: Winchester disk and floppy diskette drives, option boards, cabling, and keyboard country kit. (Keyboard country kit contains keyboard, set-up utilities, diagnostics, and literature.)

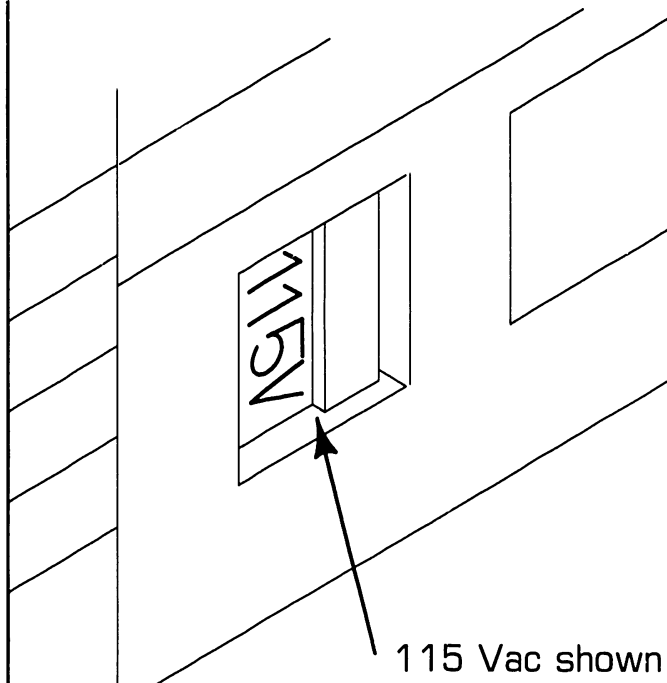
9.3 UNPACKING AND SETUP

9.3 Switch Settings and Jumpers

9.3.1 Electronics Enclosure Line Voltage Select Switch



- 1 Set electronics enclosure voltage selection switch to correct line voltage setting (115/220 Vac).

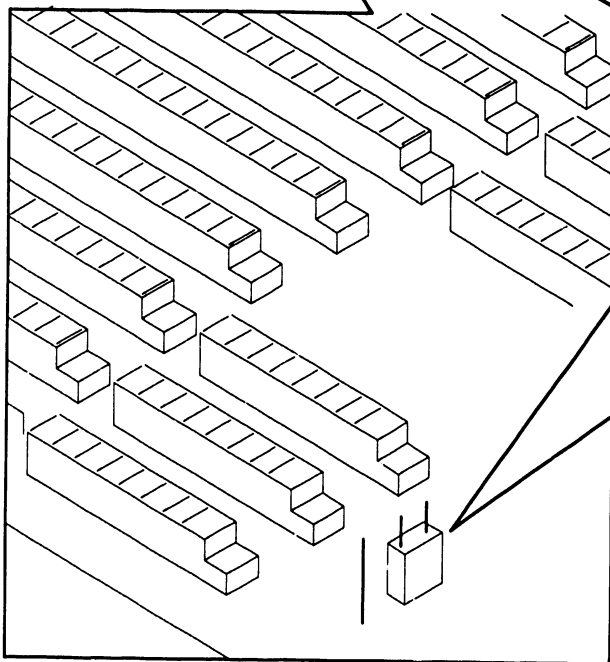
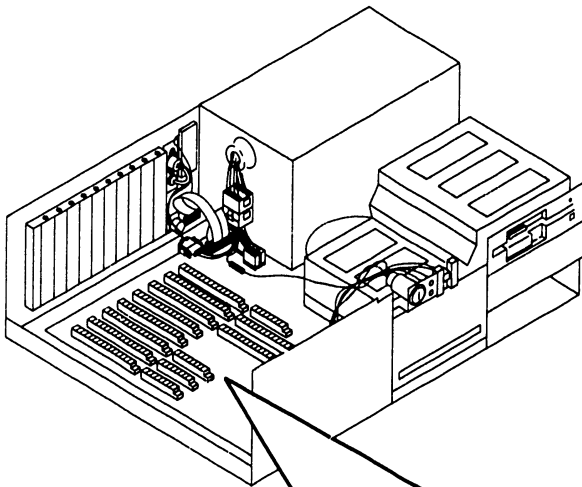


9.3 UNPACKING AND SETUP

9.3 Switch Settings and Jumpers

9.3.2 CPU Board: Monitor Type Jumper

- 1 Remove top/front cover (▶ 7.2.1).
- 2 Remove appropriate option board (▶ 7.2.2).



NOTE

Monitor type jumper is not used when system is configured with monochrome/color(EGA)video board.

- 3 Set monitor type jumper to appropriate setting (monochrome or color video operation).

MONOCHROME
(E10-E11)

COLOR
(E11-E12)

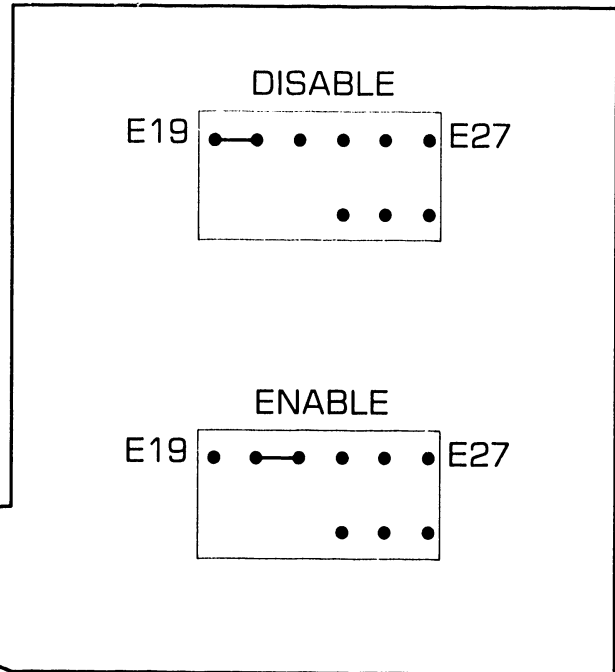
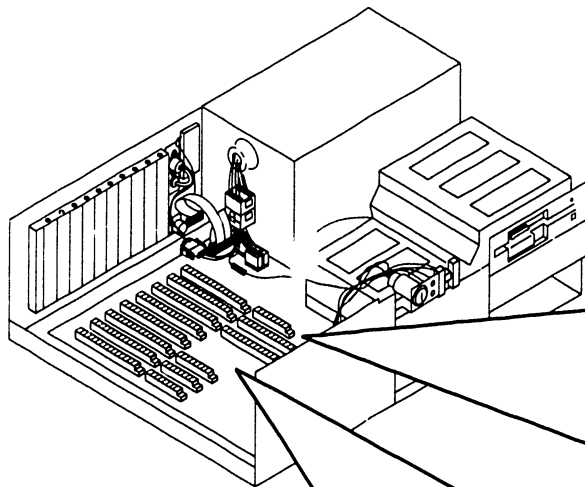


9.3 UNPACKING AND SETUP

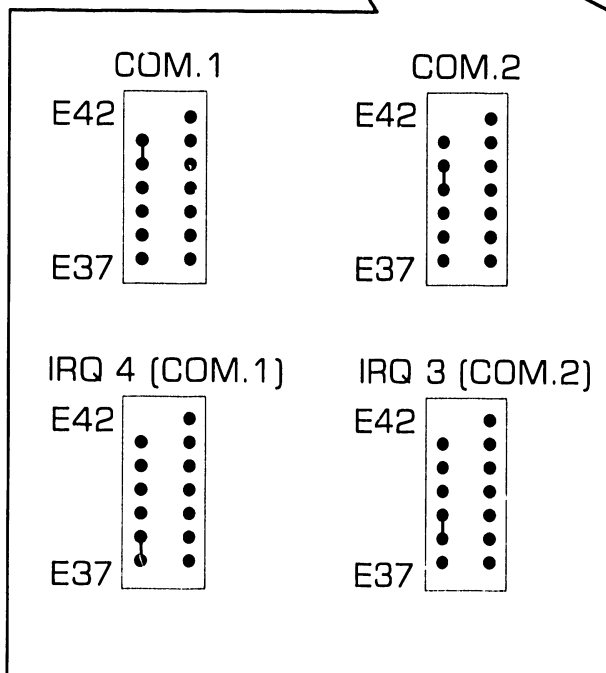
9.3 Switch Settings and Jumpers

9.3.3 CPU Board: Serial Port Jumper Settings

- 1 Remove top/front cover (➔ 7.2.1).
- 2 Remove boards from CPU board sockets (➔ 7.2.2).



- 3 Verify proper serial port jumper settings.

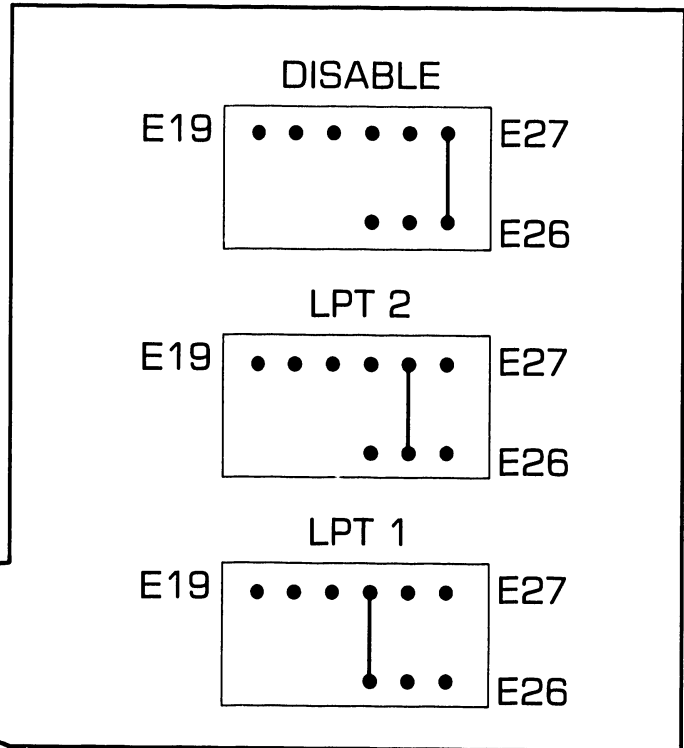
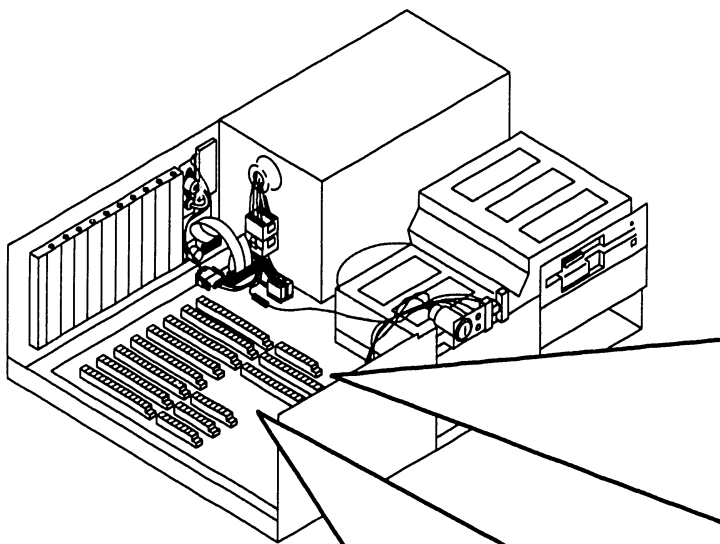


9.3 UNPACKING AND SETUP

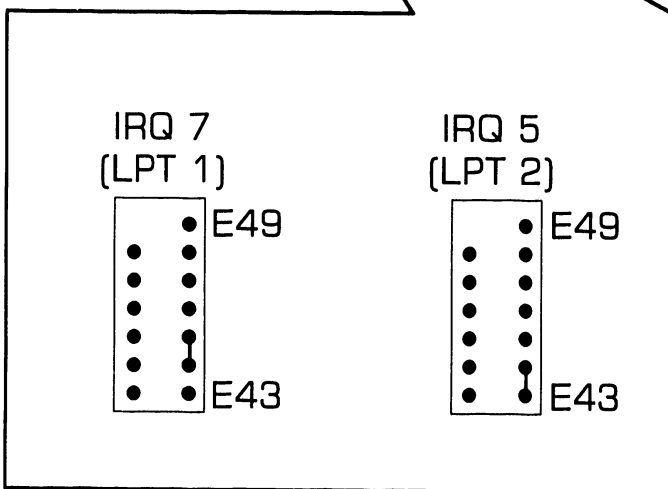
9.3 Switch Settings and Jumpers

9.3.4 CPU Board: Parallel Port Jumper Settings

- 1 Remove top/front cover (▶ 7.2.1).
- 2 Remove boards from CPU board sockets (▶ 7.2.2).



- 3 Verify proper parallel port jumper settings.



CAUTION

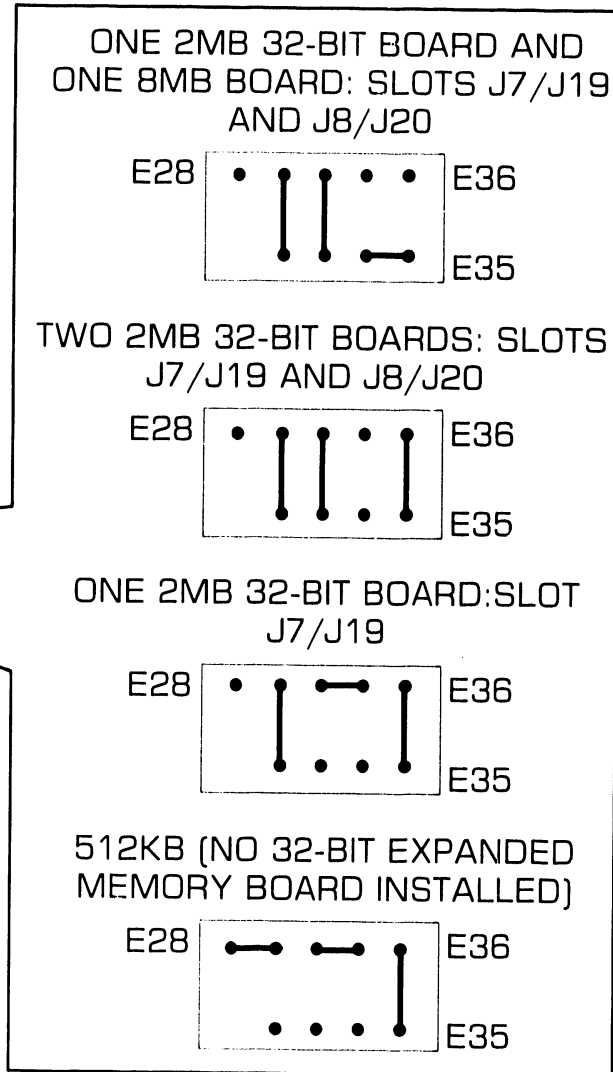
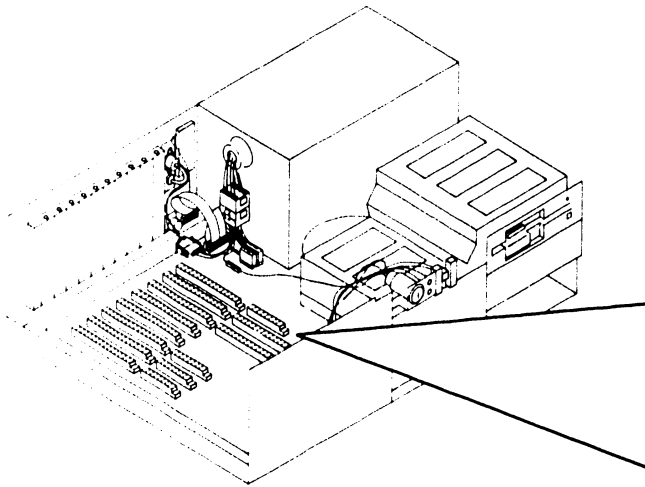
Only one jumper configuration at one time allowed on jumper block E19-E27.

9.3 UNPACKING AND SETUP

9.3 Switch Settings and Jumpers

9.3.5 CPU Board: Memory Configuration Jumper Settings

- 1 Remove top/front cover (▶ 7.2.1).
- 2 Remove board closest to disk drive location "C" (▶ 7.2.2).



- 3 Verify proper jumper settings for memory configuration.

NOTE

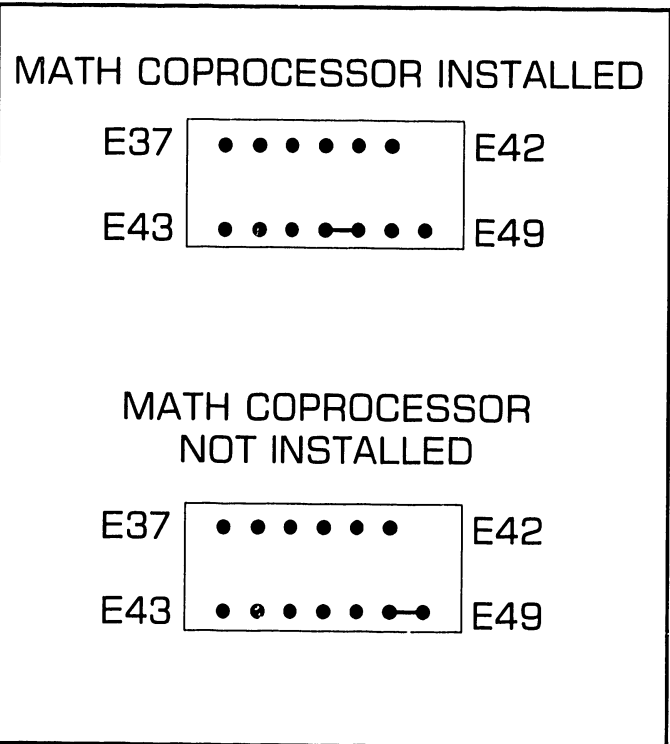
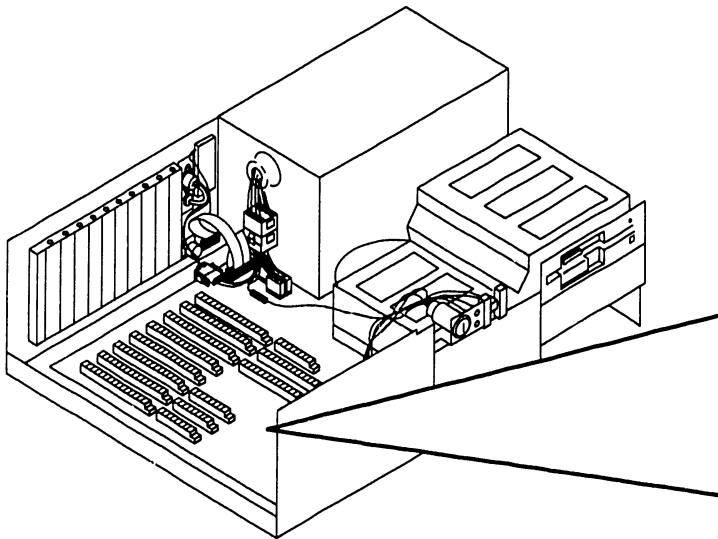
Jumper block containing pins E28-E36 used to identify number and size of expanded memory boards in 32-bit slots.

9.3 UNPACKING AND SETUP

9.3 Switch Settings and Jumpers

9.3.6 CPU Board: Math Coprocessor Jumper Settings

- 1 Remove top/front cover (➡ 7.2.1).
- 2 Remove boards from CPU board sockets (➡ 7.2.2).



- 3 Verify proper jumper settings at E43-E49.

CAUTION

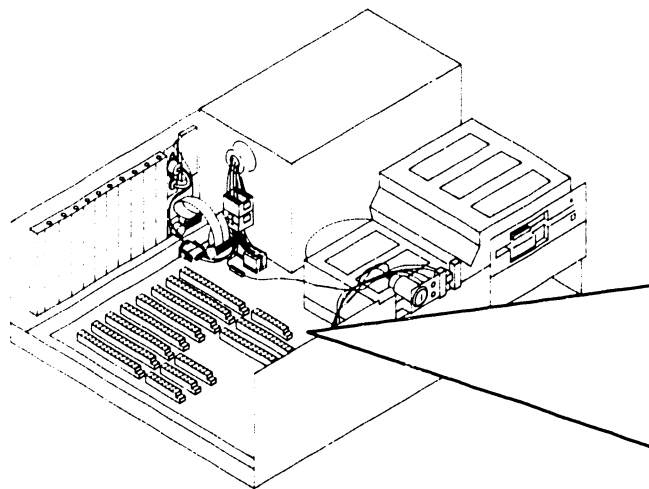
Install jumper in one position only or damage to board could result.

9.3 UNPACKING AND SETUP

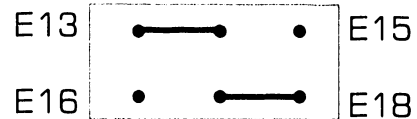
9.3.3 Switch Settings and Jumpers

9.3.7 CPU Board: ROM Size Selection Jumper Settings

- 1 Remove top/front cover (➔ 7.2.1).
- 2 Remove disk drive from location "C" (➔ 7.2.4).



ROM SIZE JUMPER CONFIGURATION (DEFAULT)



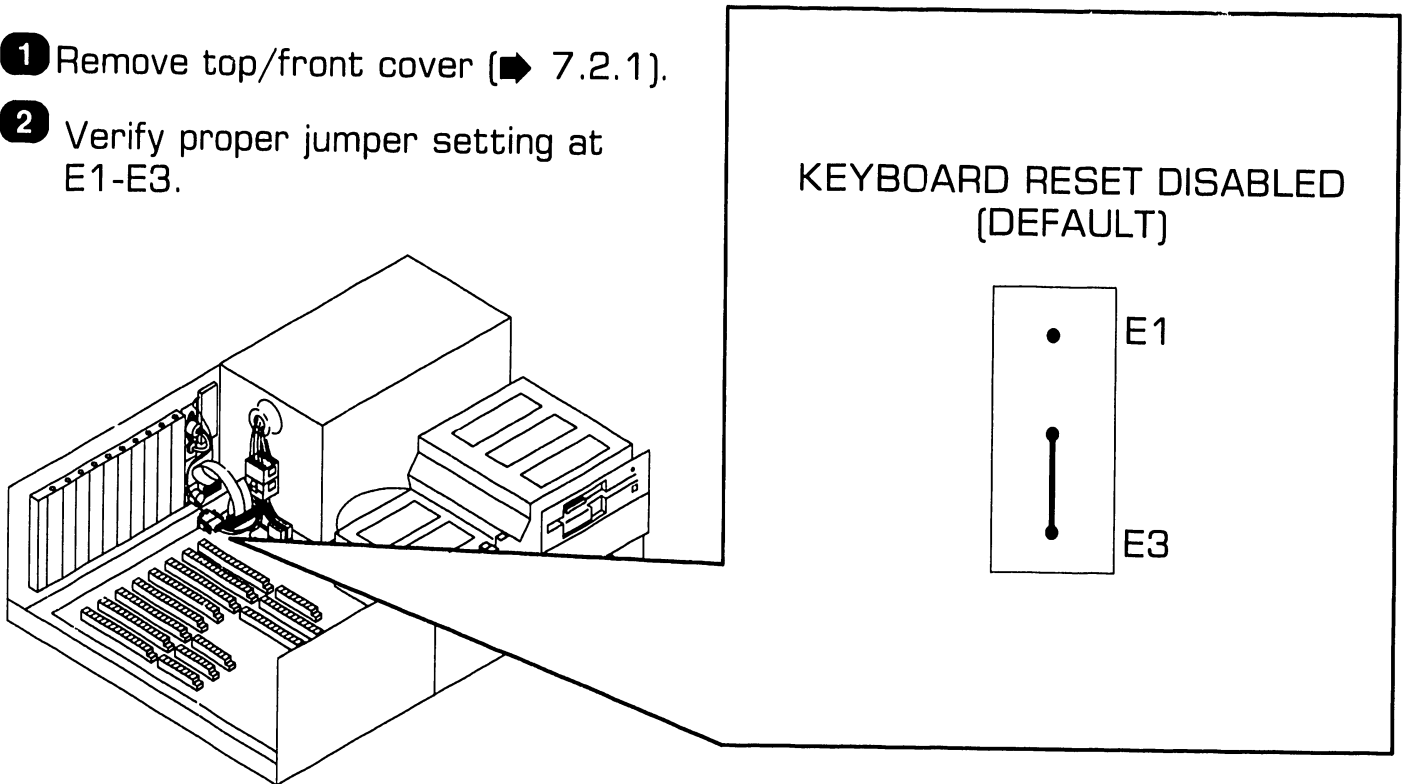
- 3 Verify proper jumper settings at E13-E18.

9.3 UNPACKING AND SETUP

9.3 Switch Settings and Jumpers

9.3.8 CPU Board: Keyboard Reset Jumper Settings

- 1 Remove top/front cover (► 7.2.1).
- 2 Verify proper jumper setting at E1-E3.

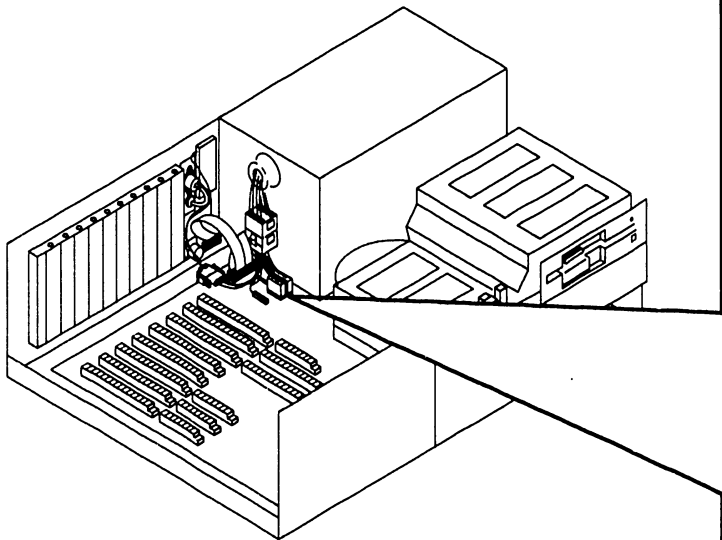


9.3 UNPACKING AND SETUP

9.3.3 Switch Settings and Jumpers

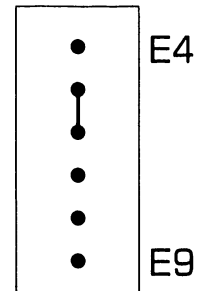
9.3.9 CPU Board: Real-Time Clock and Printer Acknowledge Signal Jumper Settings

- 1 Remove top/front cover (► 7.2.1).
- 2 Remove power supply (► 7.2.5).

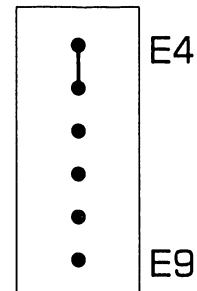


- 3 Verify proper switch settings.

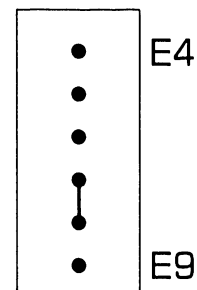
MC146818P CHIP INSTALLED



MC146818AF CHIP INSTALLED



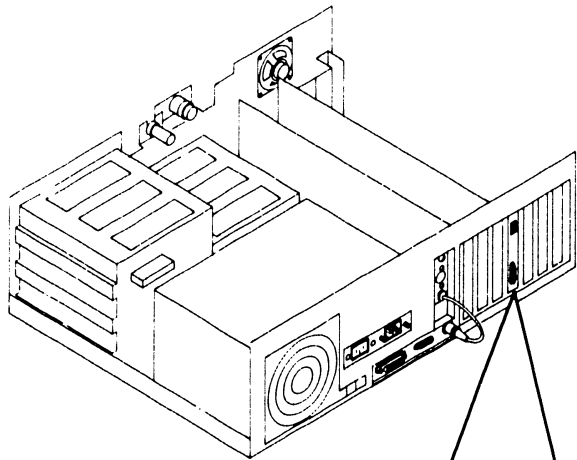
TRAILING EDGE OF PRINTER
ACKNOWLEDGE SIGNAL(DEFAULT)



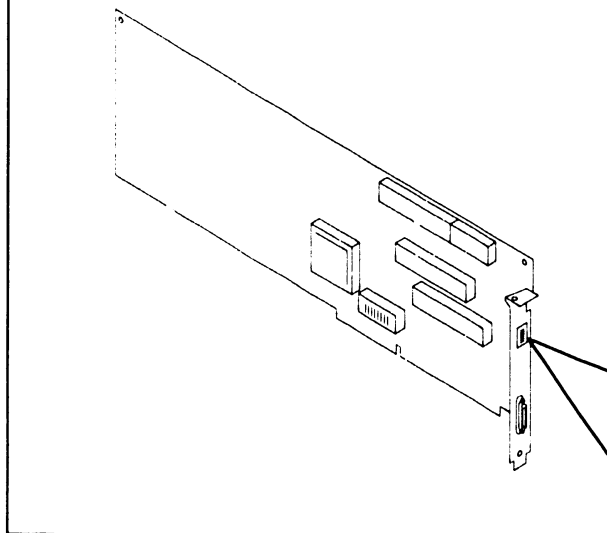
9.3 UNPACKING AND SETUP

9.3.10 Monochrome/Color (EGA) Video Board: Switch Settings (Sheet 1 of 2)

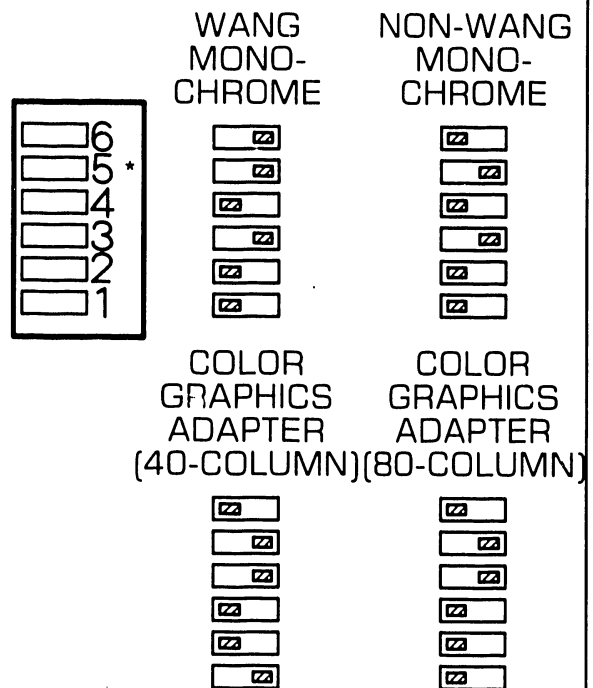
1 Remove top/front cover (▶ 7.2.1).



2 Remove monochrome/color(EGA) video board (▶ 7.2.2).



3 Verify proper switch settings.



* Switch 5 enables/disables Auto-switch feature;

= automatic mode switching feature enabled,

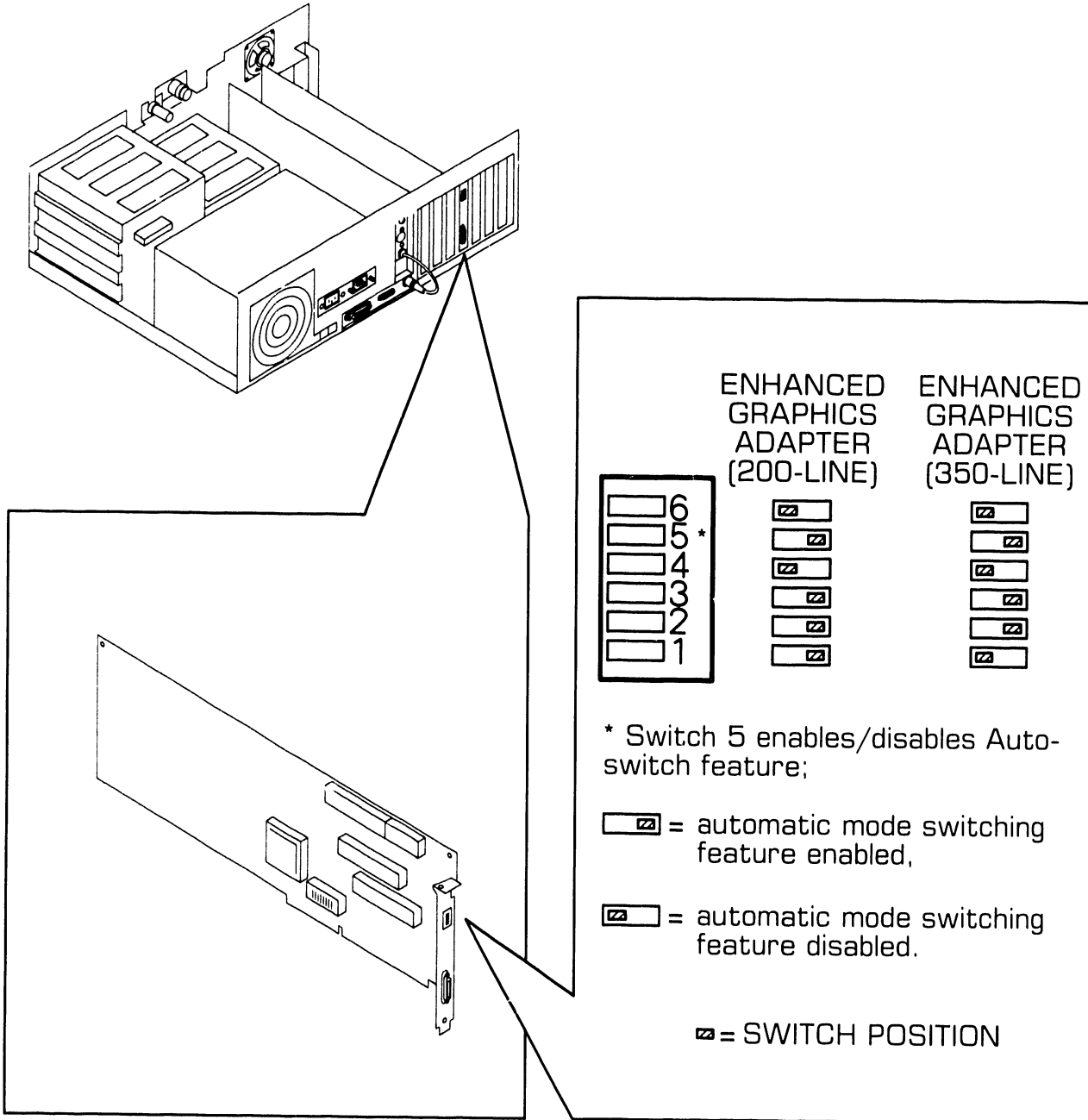
= automatic mode switching feature disabled.

= SWITCH POSITION

9.3 UNPACKING AND SETUP

9.3.10 Monochrome/Color (EGA) Video Board: Switch Settings (Sheet 2 of 2)

9.3.10 Monochrome/Color (EGA) Video Board: Switch Settings (Sheet 2 of 2)



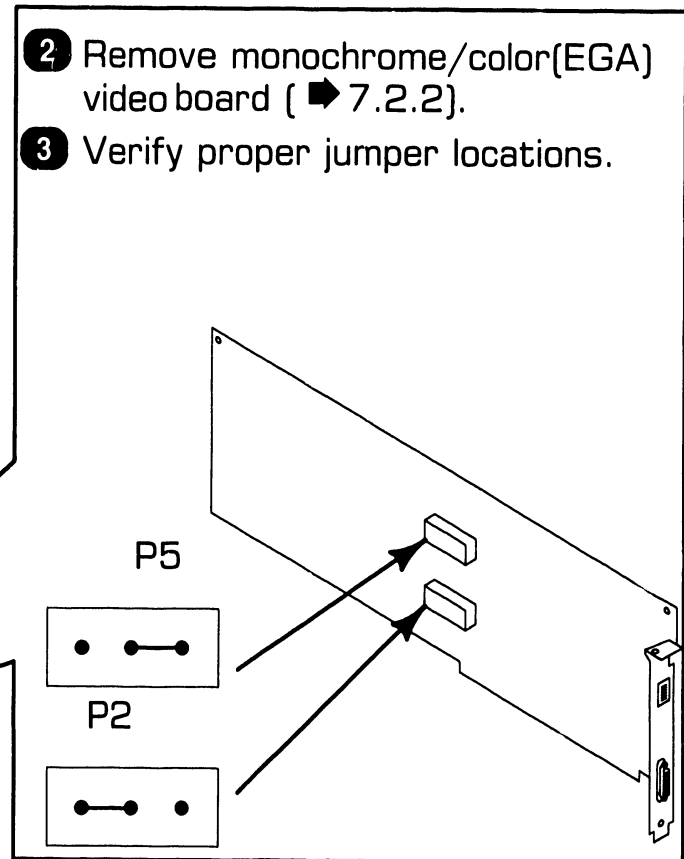
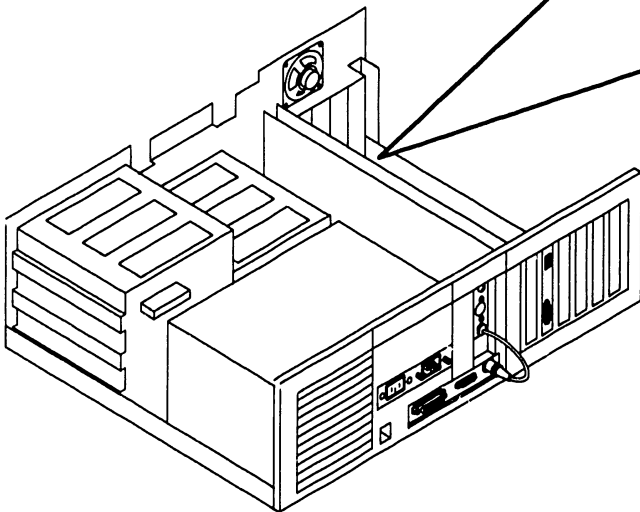
9.3 UNPACKING AND SETUP

9.3.11 Switch Settings and Jumpers

9.3.11 Monochrome/Color (EGA) Video Board: Jumper Settings

1 Remove top/front cover (➡ 7.2.1).

- 2 Remove monochrome/color(EGA) video board (➡ 7.2.2).
- 3 Verify proper jumper locations.

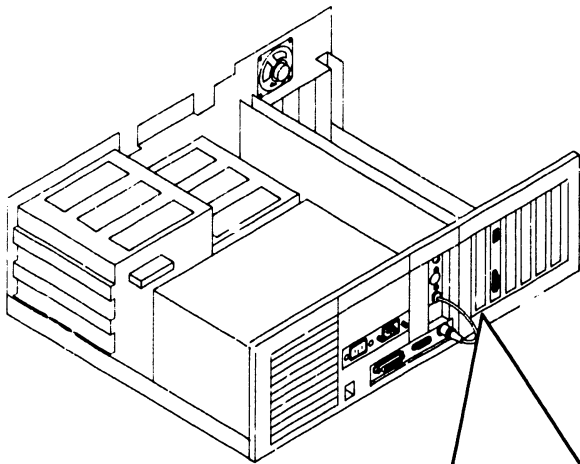


9.3 UNPACKING AND SETUP

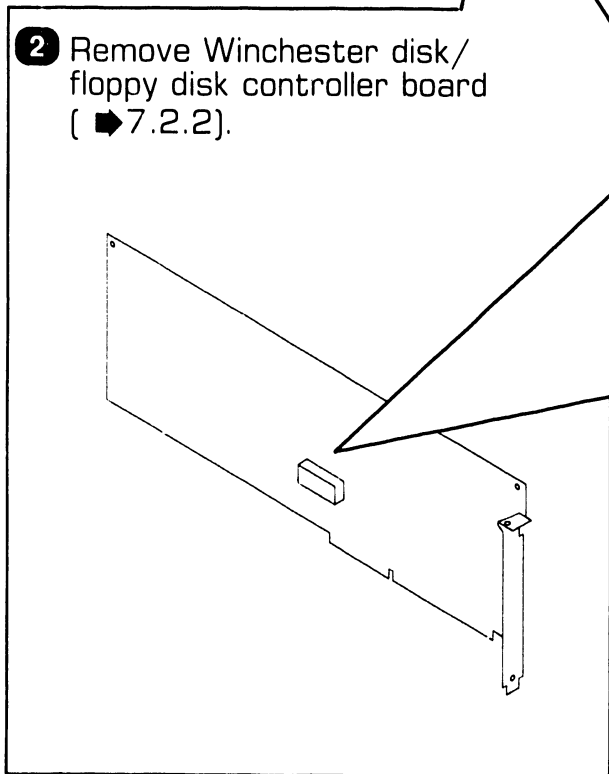
9.3.3 Switch Settings and Jumpers

9.3.12 Winchester Disk/Floppy Diskette Controller Board: Switch Settings

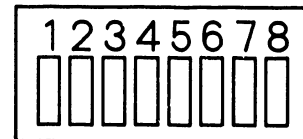
1 Remove top/front cover (▶ 7.2.1).



2 Remove Winchester disk/floppy disk controller board (▶ 7.2.2).



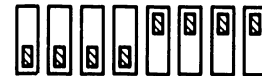
3 Verify proper switch settings.



WINCHESTER
AND
FLOPPY



WINCHESTER
ONLY



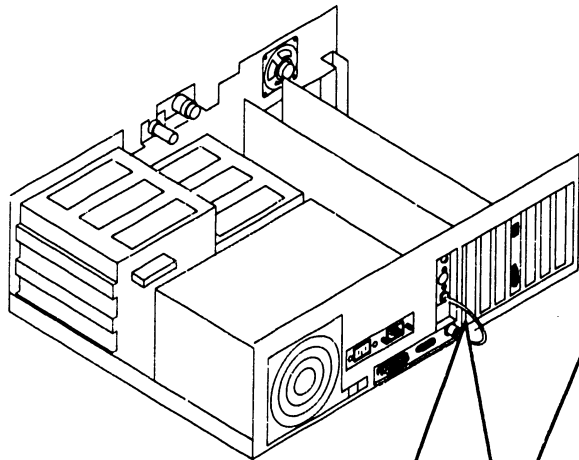
☒ = SWITCH POSITION

9.3 UNPACKING AND SETUP

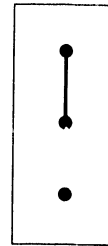
9.3 Switch Settings and Jumpers

9.3.13 Winchester Disk/Floppy Diskette Controller Board: Jumper Settings

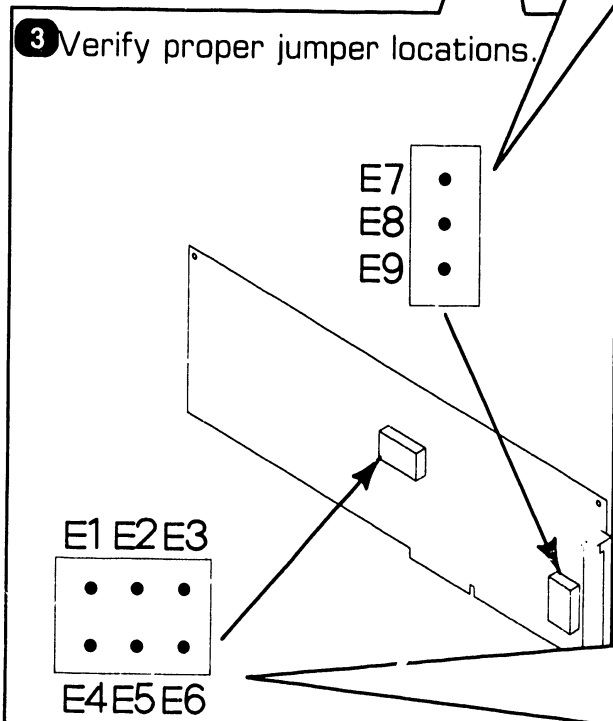
- 1 Remove top/front cover (▶ 7.2.1).
- 2 Remove Winchester disk/floppy diskette controller board (▶ 7.2.2).



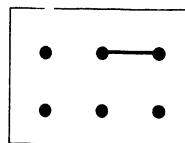
DRIVE-TYPE JUMPER;
WANG AND IBM COMPATIBLE
FLOPPY DRIVES (E7-E8)



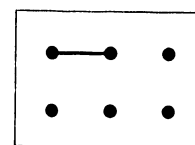
- 3 Verify proper jumper locations.



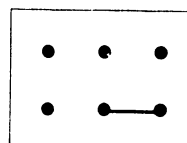
FLOPPY
DRIVE
PRIMARY
ADDRESS
(E2-E3)



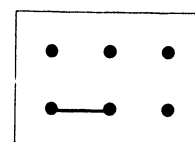
FLOPPY
DRIVE
SECONDARY
ADDRESS
(E1-E2)



WINCHESTER
DRIVE
PRIMARY
ADDRESS
(E5-E6)



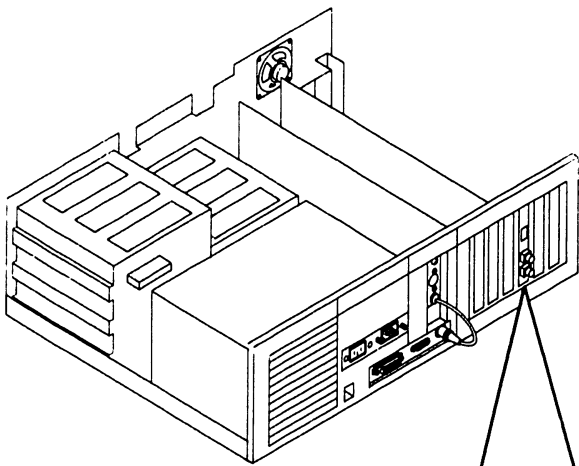
WINCHESTER
DRIVE
SECONDARY
ADDRESS
(E4-E5)



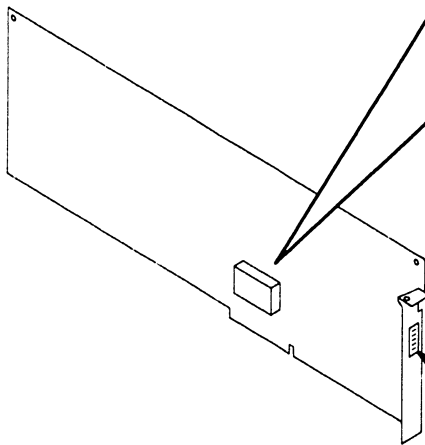
9.3 UNPACKING AND SETUP

9.3.14 Wang Local Office Connection (WLOC) Board: Switch Settings

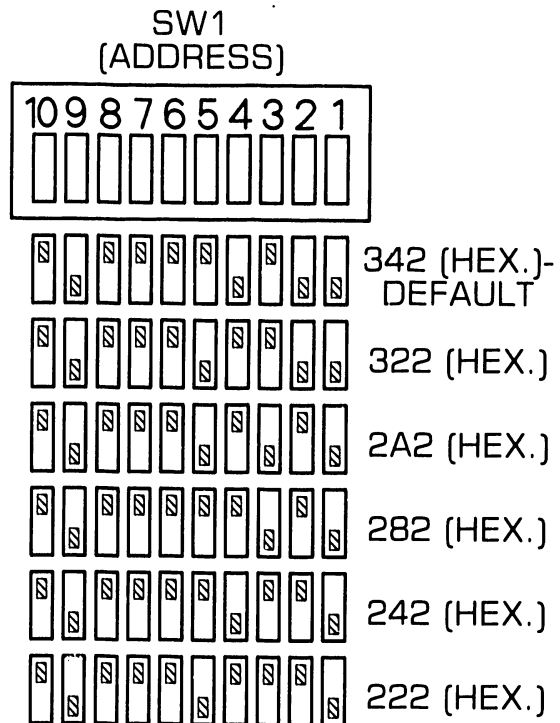
1 Remove top/front cover (► 7.2.1).



2 Remove WLOC board (► 7.2.2).

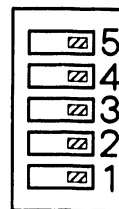


3 Verify SW1 (address) settings.



4 Verify SW2 (Prom Enable) settings.

SW2
(PROM ENABLE)



☑ = SWITCH POSITION

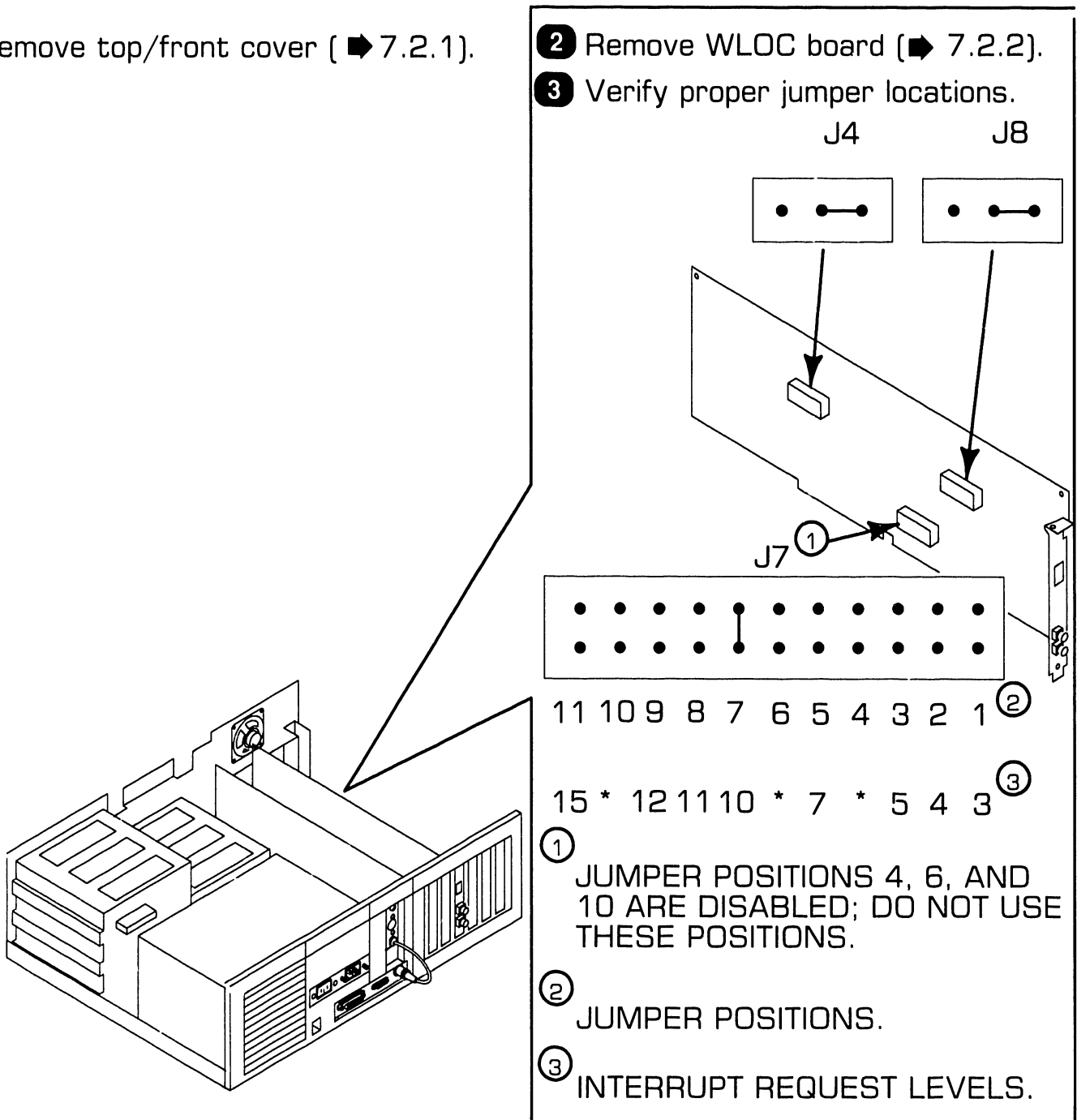
9.3 UNPACKING AND SETUP

9.3.15 Wang Local Office Connection (WLOC) Board: Jumper Settings

1 Remove top/front cover (➡ 7.2.1).

2 Remove WLOC board (➡ 7.2.2).

3 Verify proper jumper locations.

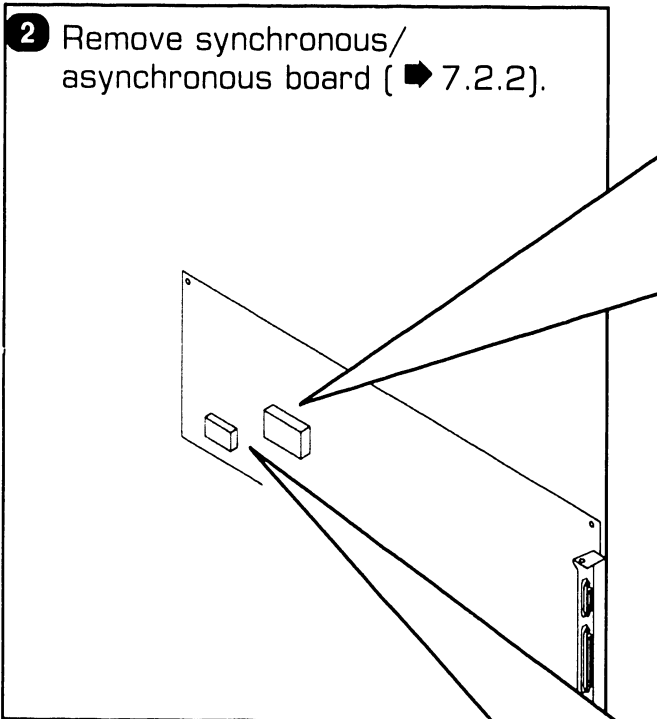


9.3 UNPACKING AND SETUP

9.3.16 Synchronous/Asynchronous Communications Board: Switch Settings

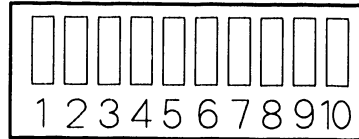
1 Remove top/front cover (➔ 7.2.1).

2 Remove synchronous/asynchronous board (➔ 7.2.2).



3 Verify SW1 settings.

SW1 (SYNC/ASYNCR SERIAL PORT ADDRESS)

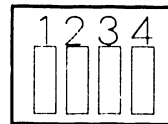


<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	340 (HEX.)- DEFAULT
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	320 (HEX.)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2A0 (HEX.)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	280 (HEX.)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	240 (HEX.)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	220 (HEX.)

= SWITCH POSITION

4 Verify SW1A settings.

SW1A(SERIAL PORT, ADDRESS/
INTERRUPT LEVEL)



<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	COM. PORT 1*
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	COM. PORT 2*

*PORT CAN BE DISABLED BY
SETTING SWITCH 10 ON BANK
SW1 TO POSITION.



9.3 UNPACKING AND SETUP

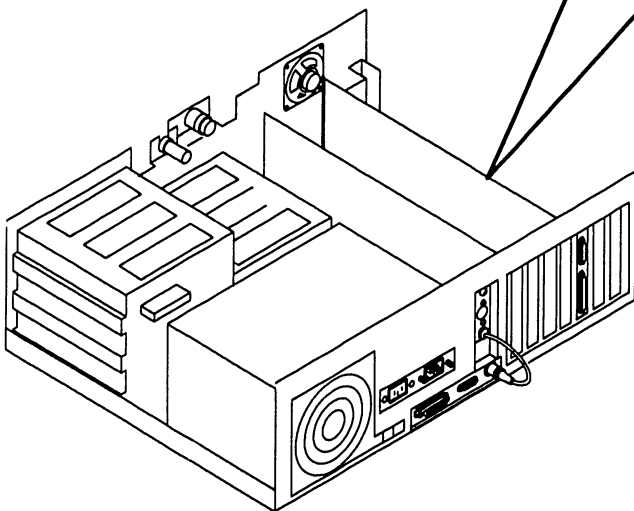
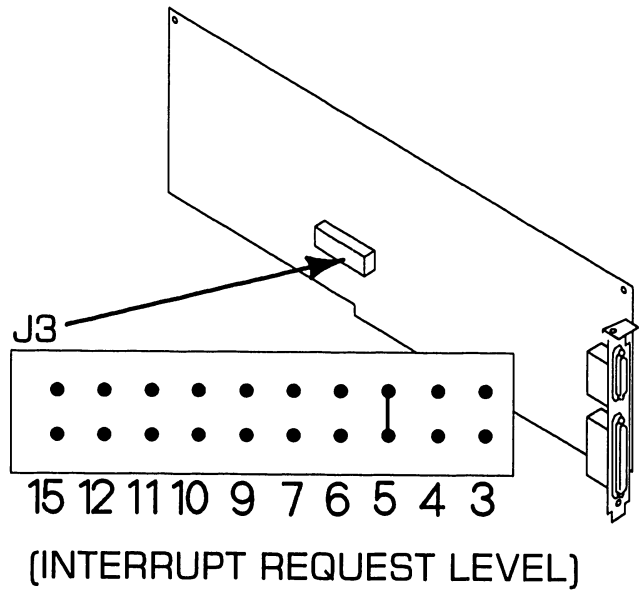
9.3.17 Switch Settings and Jumpers

9.3.17 Synchronous/Asynchronous Communications Board: Jumper Settings

1 Remove top/front cover (▶ 7.2.1).

2 Remove synchronous/asynchronous board. (▶ 7.2.2).

3 Verify proper jumper location.



9.3 UNPACKING AND SETUP

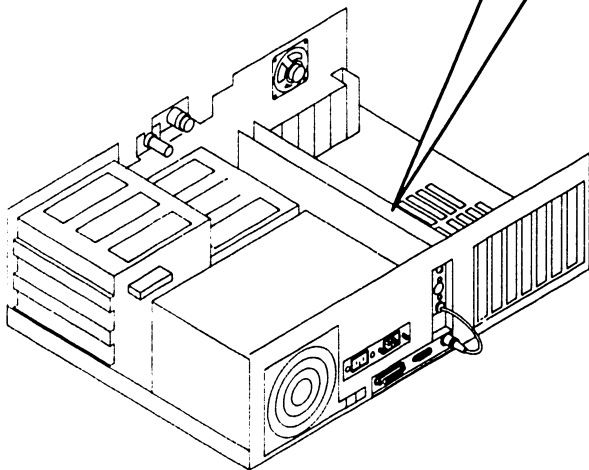
9.3.18 Switch Settings and Jumpers

9.3.18 Expanded Memory Board: Switch Settings (Sheet 1 of 7)

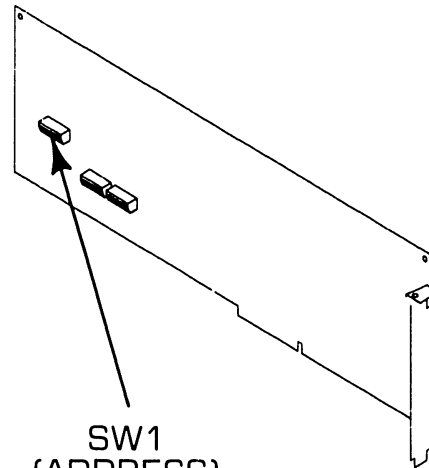
NOTE

An Expanded Memory Card Installation Assistant program is available to help switches on expanded memory board(s). Insert diskette containing Assistant program into floppy drive "A" and type "ASSIST" after "A >" appears on screen. Press "RETURN" and follow prompts.

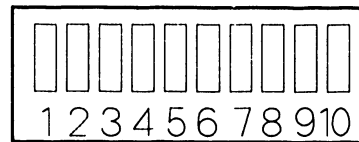
- 1 Remove top/front cover (➔ 7.2.1).



- 2 Remove expanded memory board (➔ 7.2.2).
- 3 Verify proper switch settings.



SW1
(ADDRESS)



<table border="1"> <tr> <td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td> </tr> </table>	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	344 (HEX.)
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗		
<table border="1"> <tr> <td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td> </tr> </table>	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	324 (HEX.)
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗		
<table border="1"> <tr> <td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td> </tr> </table>	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	2A4 (HEX.)
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗		
<table border="1"> <tr> <td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td> </tr> </table>	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	284 (HEX.)
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗		
<table border="1"> <tr> <td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td> </tr> </table>	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	244 (HEX.)
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗		
<table border="1"> <tr> <td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td><td>⊗</td> </tr> </table>	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	224 (HEX.)
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗		

⊗ = SWITCH POSITION

9.3 UNPACKING AND SETUP

9.3.18 Switch Settings and Jumpers

9.3.18 Expanded Memory Board: Switch Settings (Sheet 2 of 7)

1 Remove top/front cover (▶ 7.2.1).

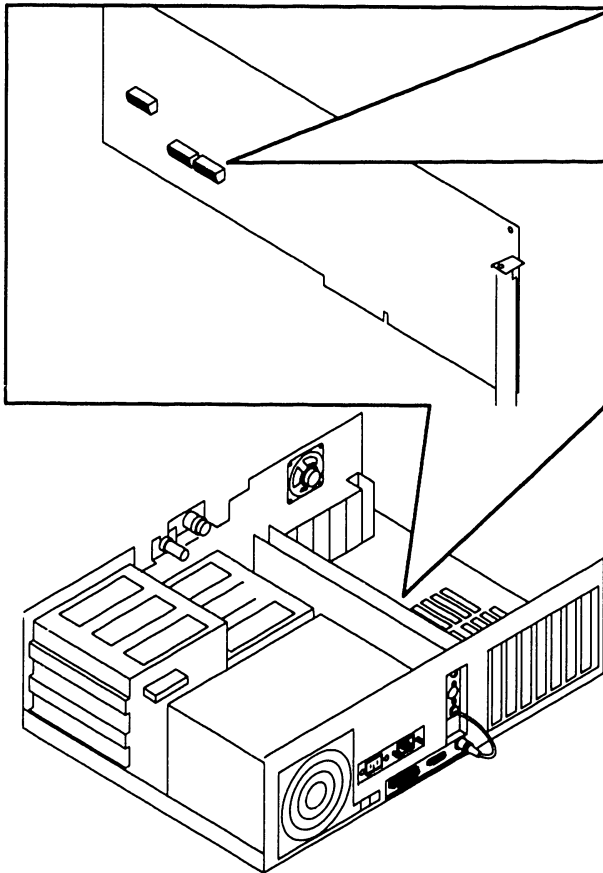
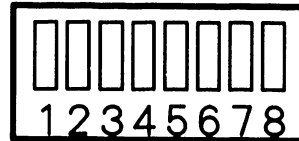
NOTE

SW2 specifies amount of direct (non-paged) memory already residing in system before expanded memory board is installed. Setting switch specifies that a certain amount of memory has already been installed. These values are: SW1 = 8192KB, SW2 = 4096KB, SW3 = 2048KB, SW4 = 1024KB, SW5 = 512KB, SW6 = 256KB, SW7 = 128KB, SW8 = parity enable/disable.

2 Remove expanded memory board (▶ 7.2.2).

3 Verify proper switch settings (▶ 9.3.18 sheets 3, 4 & 5).

SW2 (EXISTING MEMORY)



9.3 UNPACKING AND SETUP

9.3.3 Switch Settings and Jumpers

9.3.18 Expanded Memory Board: Switch Settings (Sheet 3 of 7)

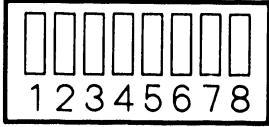
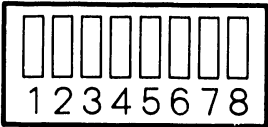
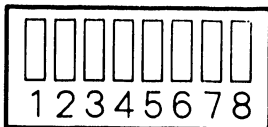










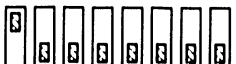


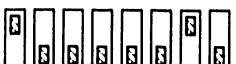












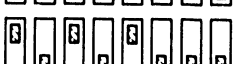


















SW2 (EXISTING MEMORY)		SW2 (EXISTING MEMORY)		SW2 (EXISTING MEMORY)	
1 2 3 4 5 6 7 8		1 2 3 4 5 6 7 8		1 2 3 4 5 6 7 8	
0KB		2048KB		3968KB	
128KB		2176KB		4096KB	
256KB		2304KB		4224KB	
384KB		2432KB		4352KB	
512KB		2560KB		4480KB	
640KB		2688KB		4608KB	
768KB		2816KB		4736KB	
896KB		2994KB		4864KB	
1024KB		3072KB		4992KB	
1152KB		3200KB		5120KB	
1280KB		3328KB		5248KB	
1408KB		3456KB		5376KB	
1536KB		3584KB		5504KB	
1664KB		3712KB		5632KB	
1792KB		3840KB		5760KB	
1920KB					


= switch position

9.3 UNPACKING AND SETUP

9.3.18 Switch Settings and Jumpers

9.3.18 Expanded Memory Board: Switch Settings (Sheet 4 of 7)

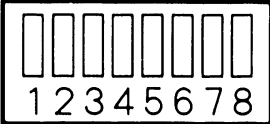
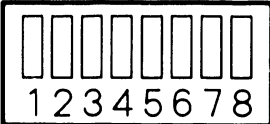
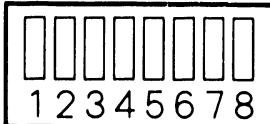
SW2 (EXISTING MEMORY)		SW2 (EXISTING MEMORY)		SW2 (EXISTING MEMORY)	
					
5888KB		7808KB		9728KB	
6016KB		7936KB		9856KB	
6144KB		8064KB		9984KB	
6272KB		8192KB		10112KB	
6400KB		8320KB		10240KB	
6528KB		8448KB		10368KB	
6656KB		8576KB		10496KB	
6784KB		8704KB		10624KB	
6912KB		8832KB		10752KB	
7040KB		8960KB		10880KB	
7168KB		9088KB		11008KB	
7296KB		9216KB		11136KB	
7424KB		9344KB		11264KB	
7552KB		9472KB		11392KB	
7680KB		9600KB		11520KB	

 = switch position

9.3 UNPACKING AND SETUP

9.3.18 Switch Settings and Jumpers

9.3.18 Expanded Memory Board: Switch Settings (Sheet 5 of 7)

SW2 (EXISTING MEMORY)		SW2 (EXISTING MEMORY)		SW2 (EXISTING MEMORY)	
					
11648KB		13568KB		15488KB	
11776KB		13696KB		15616KB	
11904KB		13824KB		15744KB	
12032KB		13952KB		15872KB	
12160KB		14080KB			
12288KB		14208KB			
12416KB		14366KB			
12544KB		14464KB			
12672KB		14592KB			
12800KB		14720KB			
12928KB		14848KB			
13056KB		14976KB			
13184KB		15104KB			
13312KB		15232KB			
13340KB		15360KB			

☐ = switch position

9.3 UNPACKING AND SETUP

9.3.3 Switch Settings and Jumpers

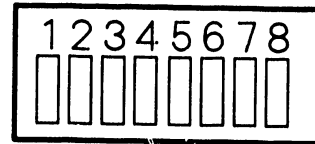
9.3.18 Expanded Memory Board: Switch Settings (Sheet 6 of 7)

1 Remove top/front cover (➔ 7.2.1).

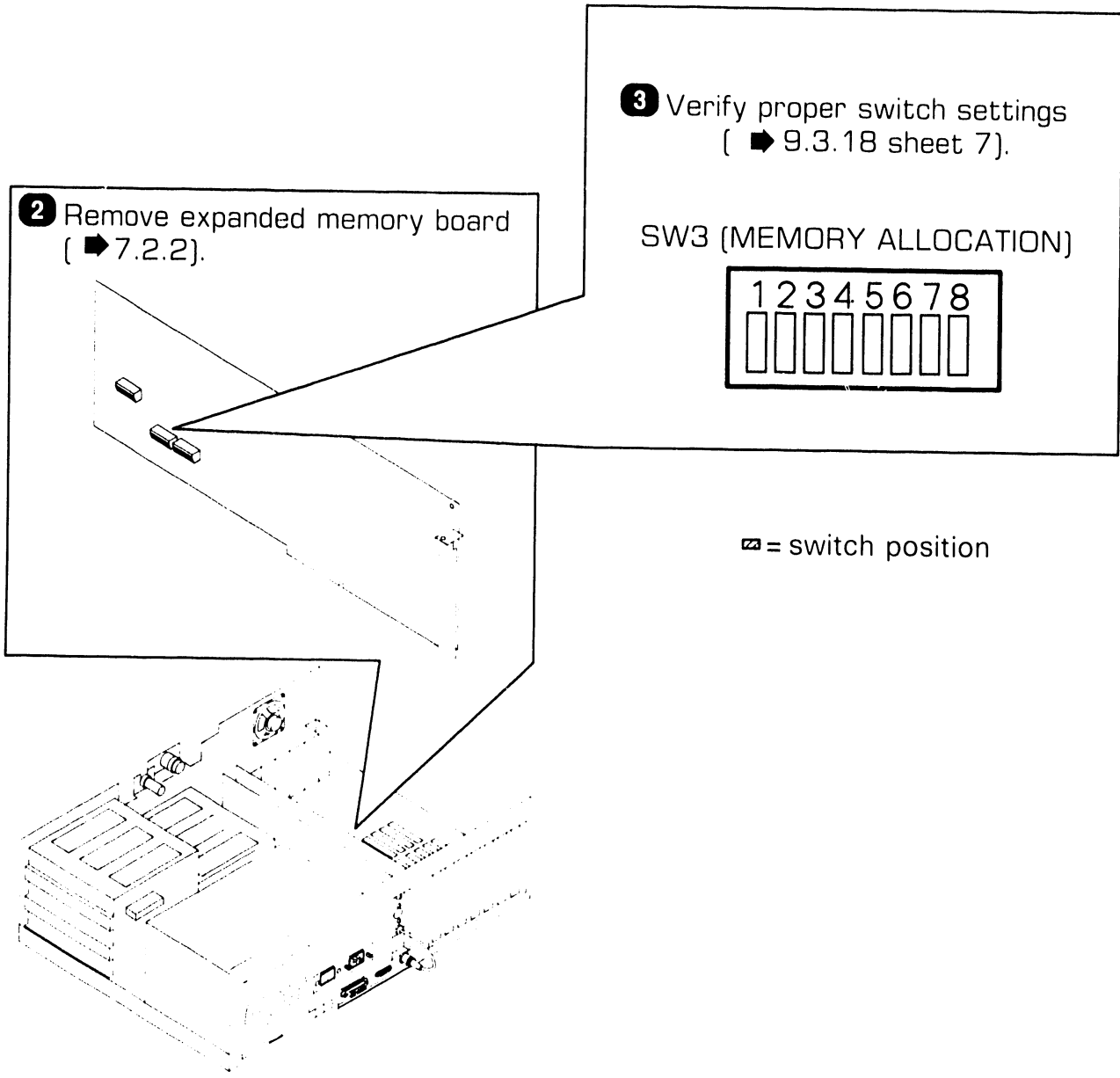
2 Remove expanded memory board (➔ 7.2.2).

3 Verify proper switch settings (➔ 9.3.18 sheet 7).

SW3 (MEMORY ALLOCATION)



☐ = switch position



9.3 UNPACKING AND SETUP

.3 Switch Settings and Jumpers

9.3.18 Expanded Memory Board: Switch Settings (Sheet 7 of 7)

SW3(MEMORY ALLOCATION)



128KB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
256KB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
384KB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
512KB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
640KB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
768KB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*SWITCHES 5 AND 6 NOT USED; SET TO <input type="checkbox"/>
896KB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1024KB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	**SW3-8 ENABLES/DISABLES CPU DIRECT MODE ADDRESSING OF MEMORY ON EXPANDED MEMORY BOARD. DEFAULT SETTING IS <input type="checkbox"/> ; TO OVERRIDE
1152KB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1280KB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SW3-1 THROUGH SW3-4, SW3-8 IS SET <input type="checkbox"/>
1408KB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1536KB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1664KB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1792KB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1920KB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2048KB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

DIRECT MEMORY (NON-PAGED) ALLOCATION (SW3-1 THROUGH SW3-4)***

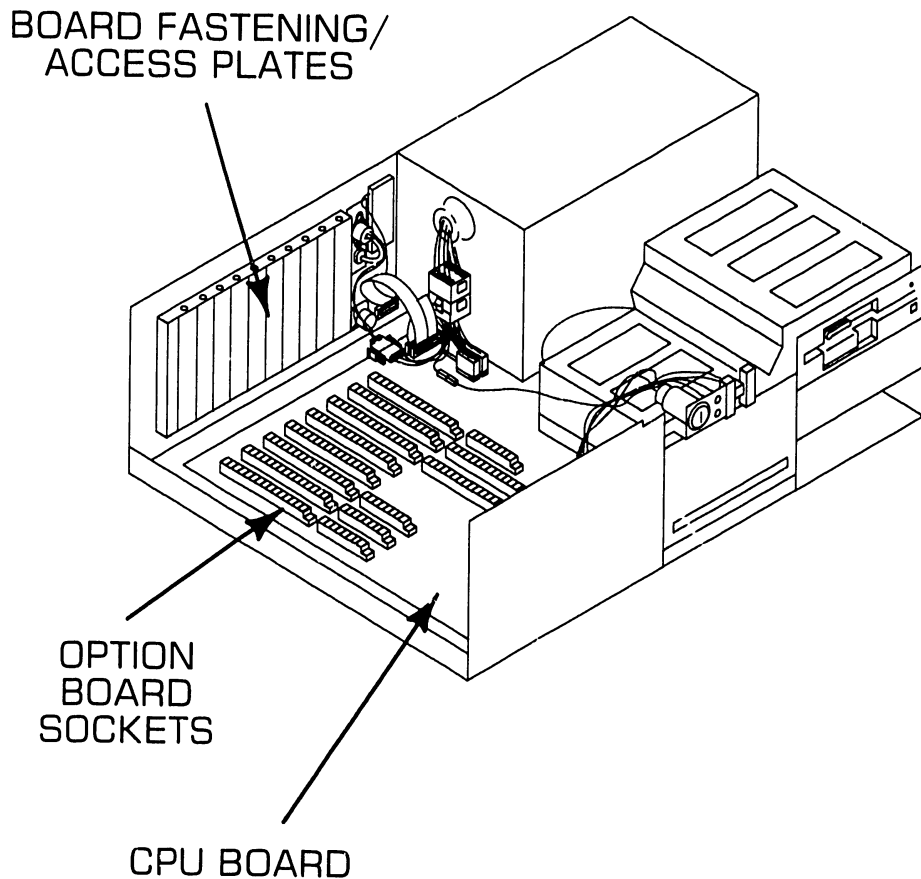
***SW3-1 through SW3-4 define amount of memory allocated as direct(non-paged) memory.

☐ = switch position

9.4 UNPACKING AND SETUP

9.4.1 Connections

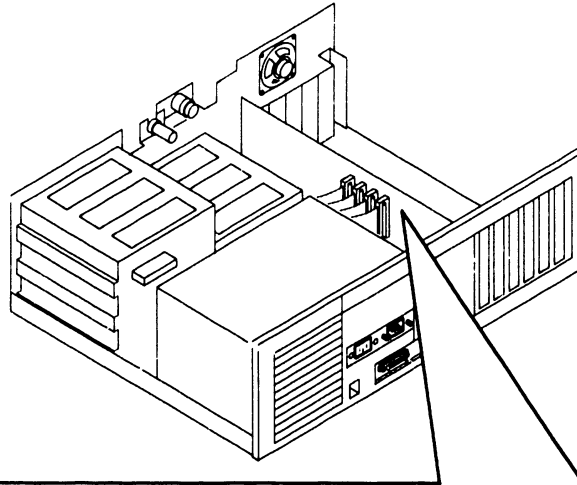
9.4.1 Electronics Enclosure: Board Locations



9.4 UNPACKING AND SETUP

9.4 Connections

9.4.2 Winchester Disk/Floppy Diskette Cabling Connections



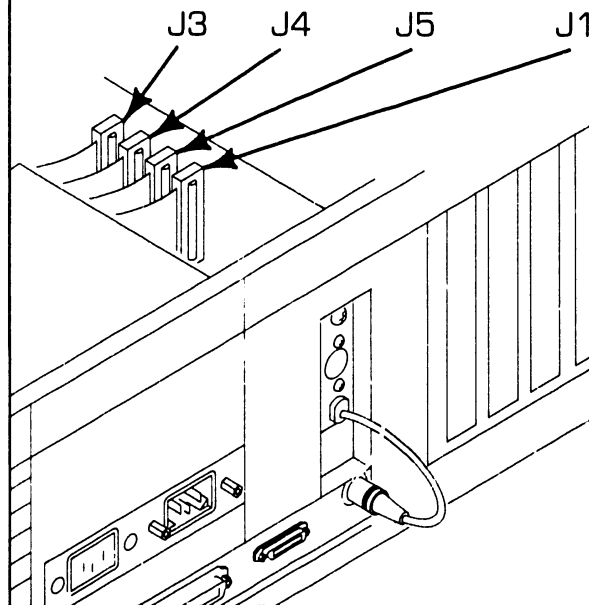
WINCHESTER/FLOPPY DISK
CONTROLLER BOARD CABLING
CONNECTIONS:

J1-FLOPPY DATA CABLES
CONNECTOR

J3-DRIVE "D" CONNECTOR

J4-DRIVE "C" CONNECTOR

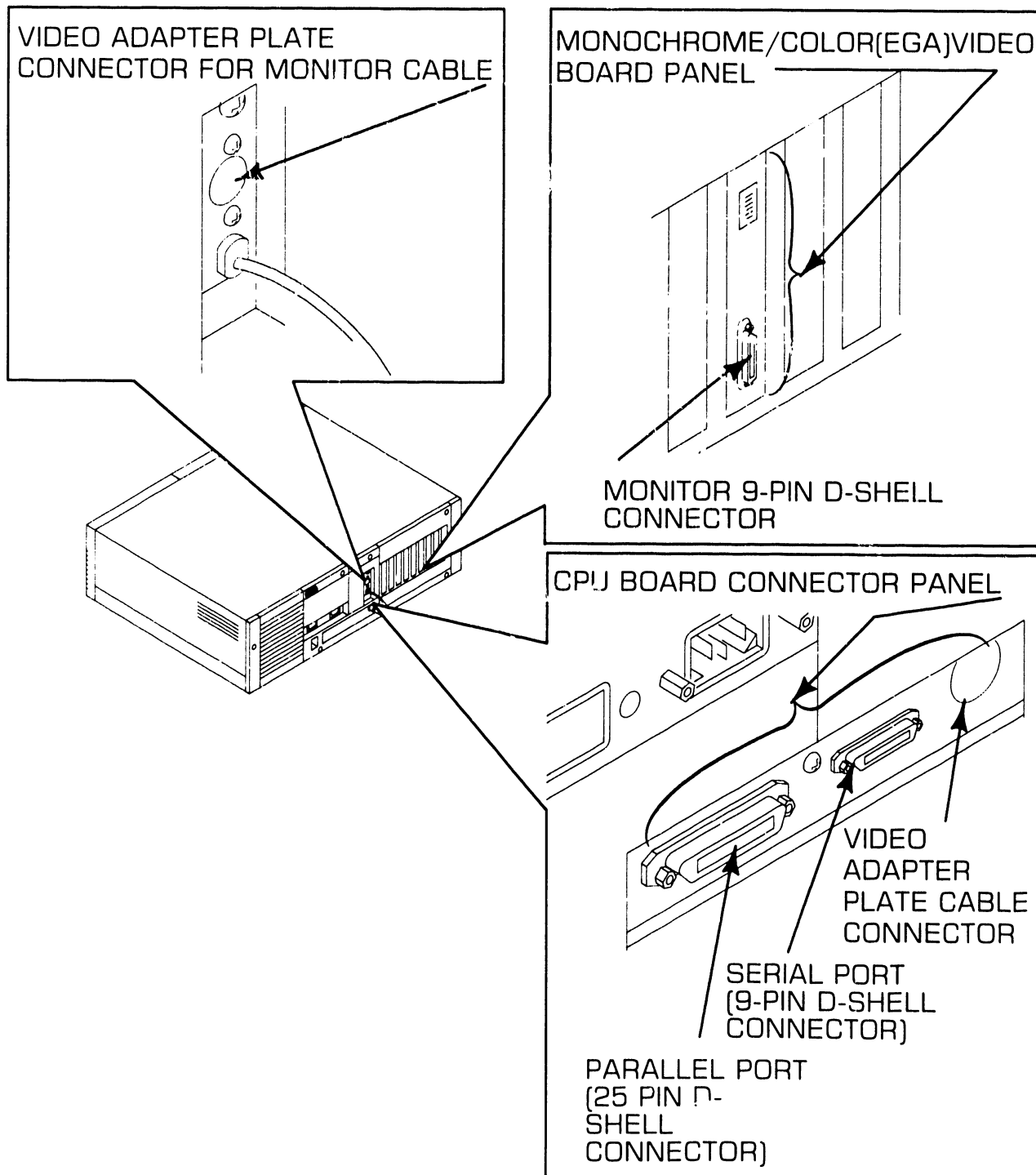
J5-WINCHESTER DATA CABLES
CONNECTOR (DRIVES "C" AND "D")



9.4 UNPACKING AND SETUP

9.4.3 Connections

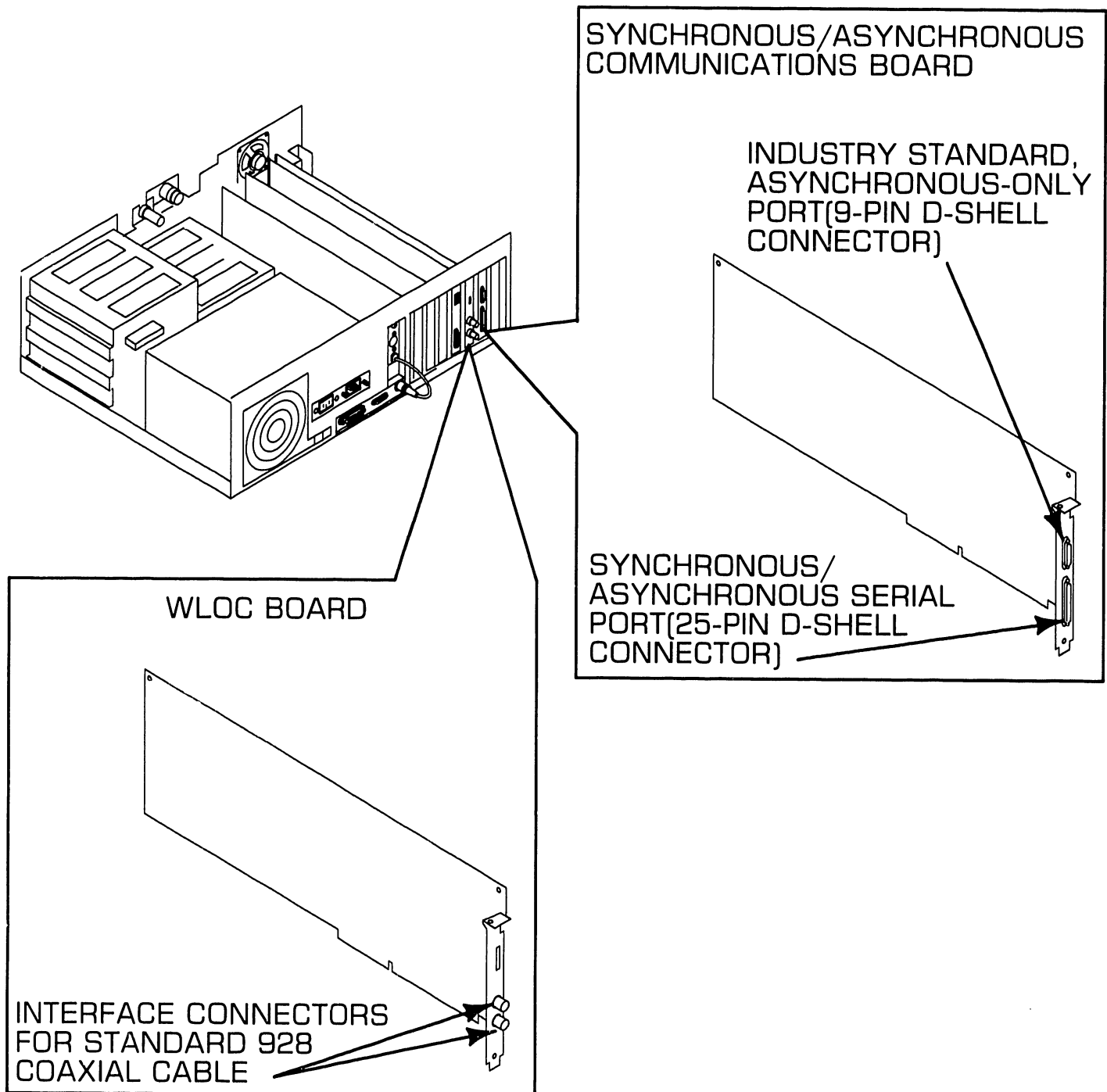
9.4.3 Electronics Enclosure: I/O Connections (Sheet 1 of 2)



9.4 UNPACKING AND SETUP

9.4 Connections

9.4.3 Electronics Enclosure: I/O Connections (Sheet 2 of 2)

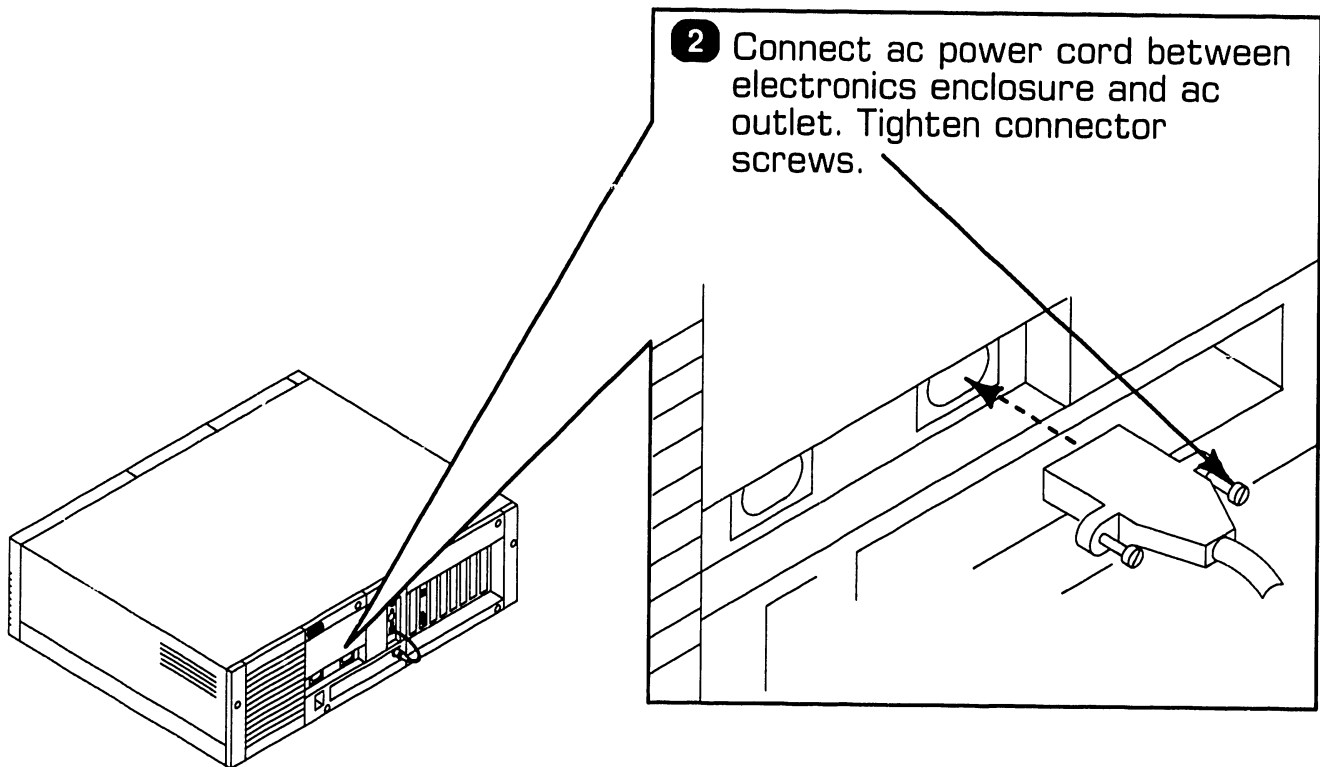


9.4 UNPACKING AND SETUP

9.4 Connections

9.4.4 Electronics Enclosure: AC Power Connection

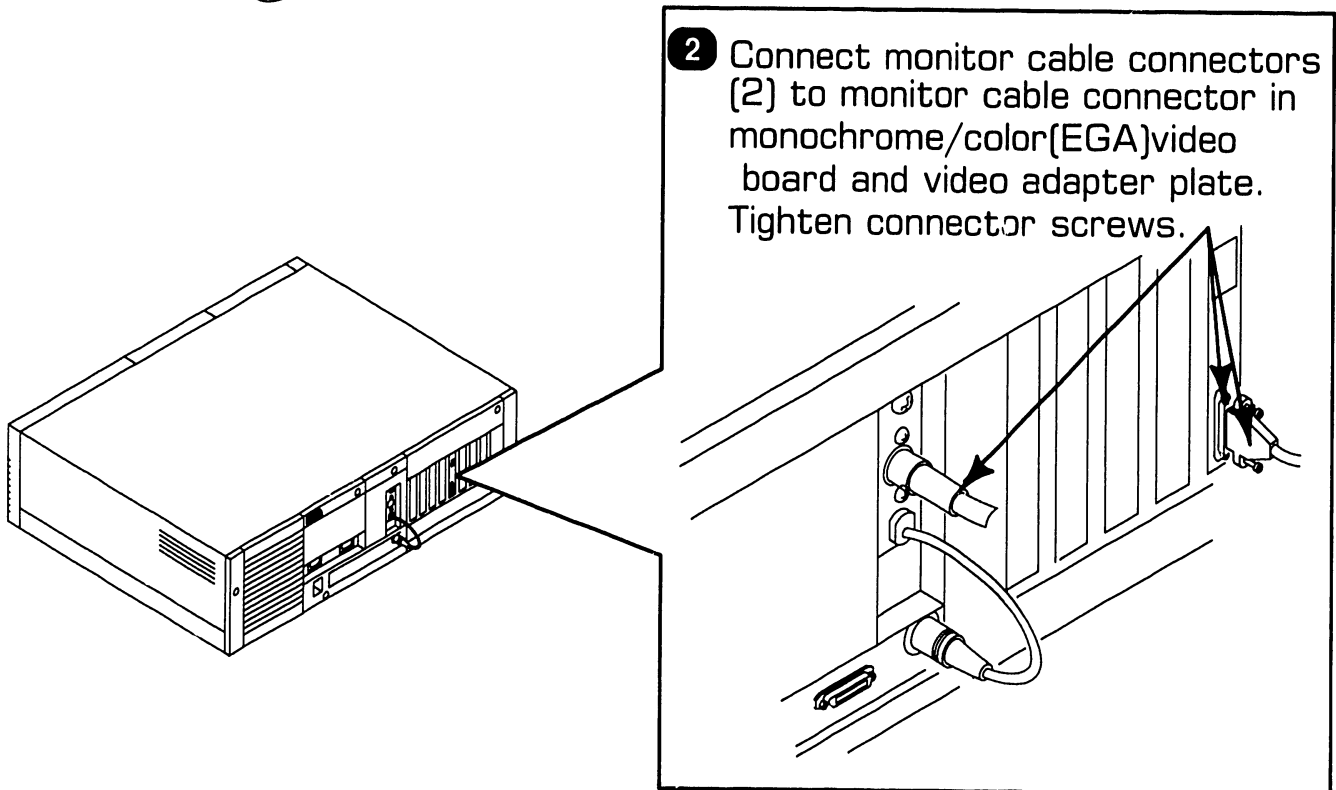
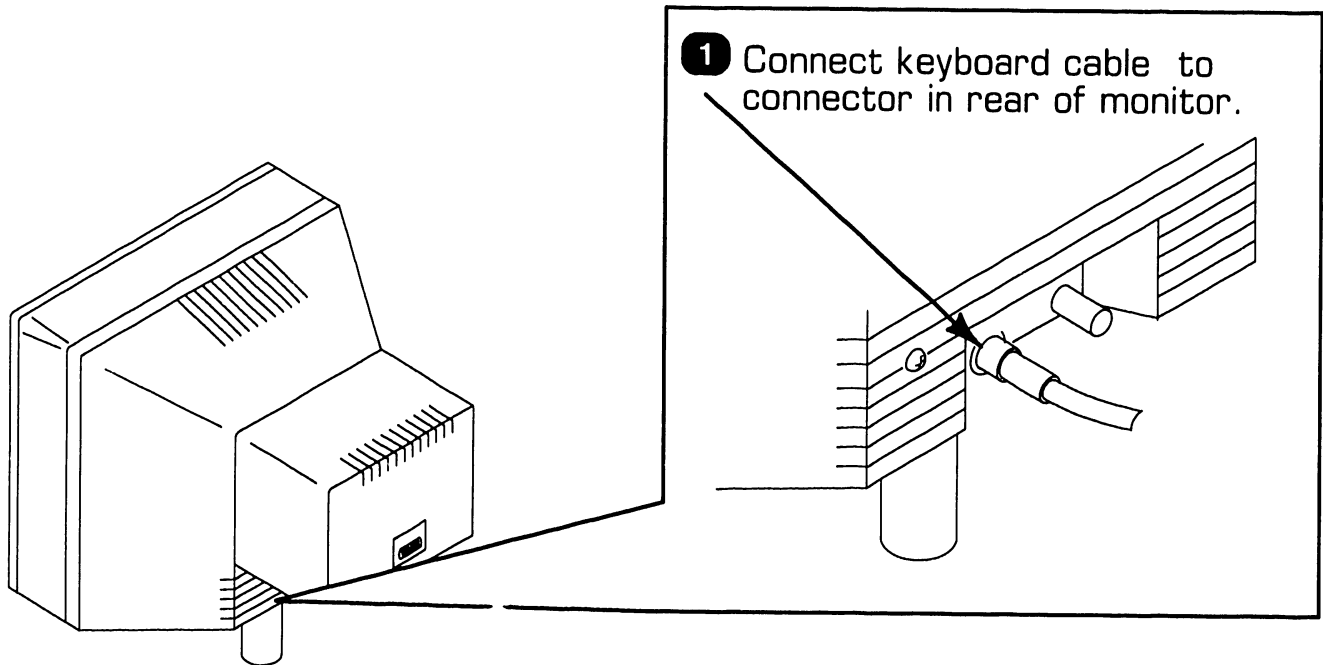
- 1 Set voltage selection switch to proper line voltage (▶9.3.1).



9.4 UNPACKING AND SETUP

9.4 Connections

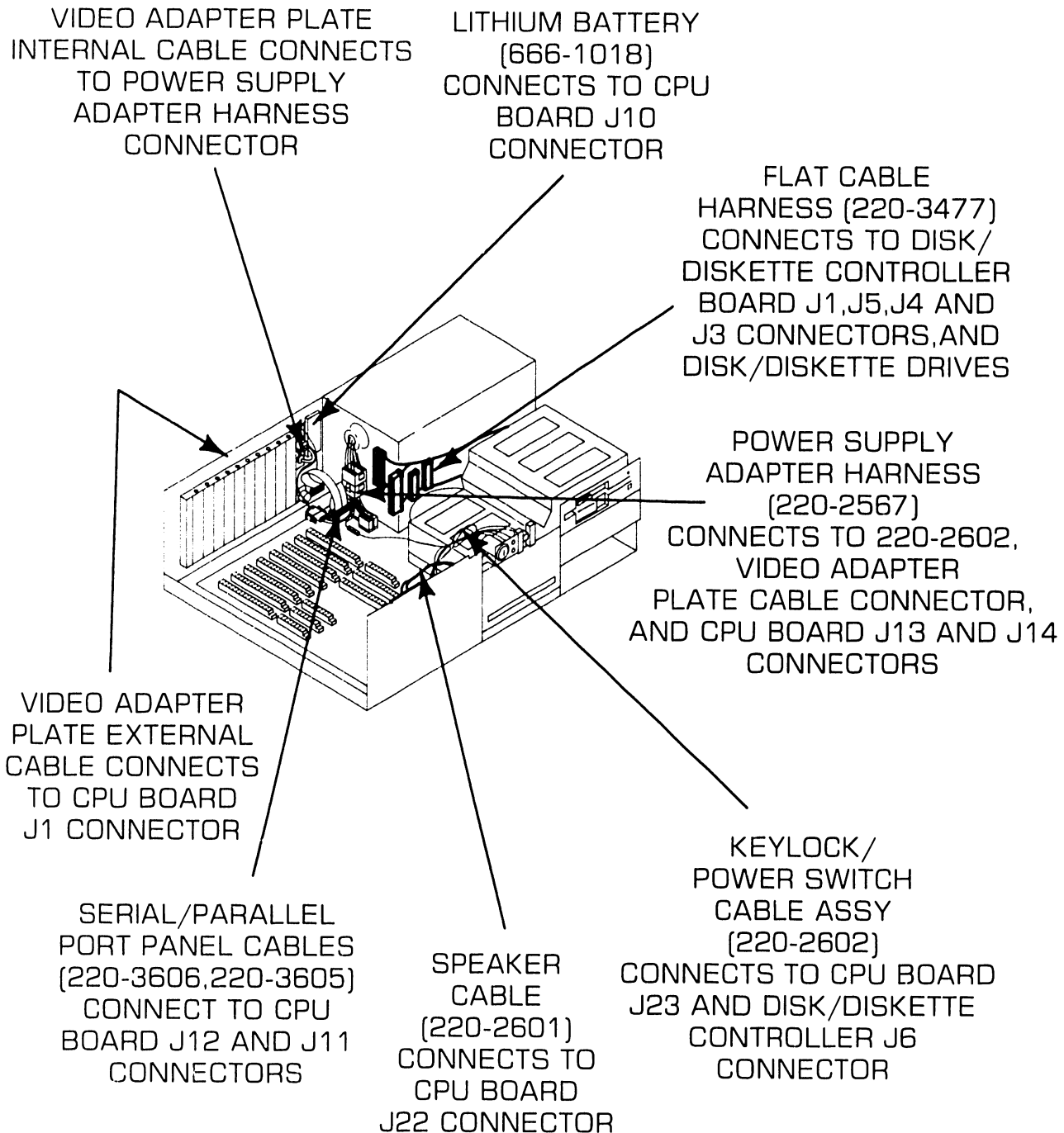
9.4.5 Monochrome Monitor Connections



9.4 UNPACKING AND SETUP

9.4.1 Connections

9.4.6 Electronics Enclosure: Intra-Unit Cabling



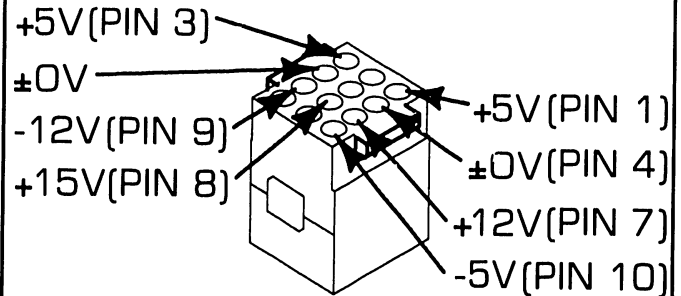
9.5 UNPACKING AND SETUP

9.5 Voltage Checks

9.5.1 CPU Board: DC Voltage and Ripple Checks

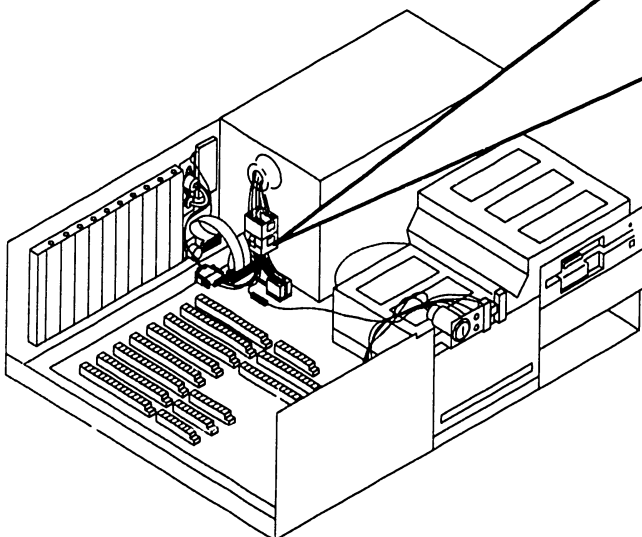
- 1 Remove top/front cover (▶ 7.2.1).
- 2 Set electronics enclosure power-on/off button to ON position (▶ 3.1.1).

POWER SUPPLY CABLE CONNECTOR TEST POINTS



- 3 Connect common lead of DVM to $\pm 0V$ test point on power supply cable connector.
- 4 Connect positive lead of DVM to -5V, -12V, +12V, +5V test points on power supply cable connector and verify dc voltage limits.

Test Point Voltage	Limits(Vdc)
-5V	-4.75 -5.25
-12V	-11.4 -12.6
+12V	+11.4 +12.6
+5V	+4.75 +5.25
+15V	+14.25 +15.75

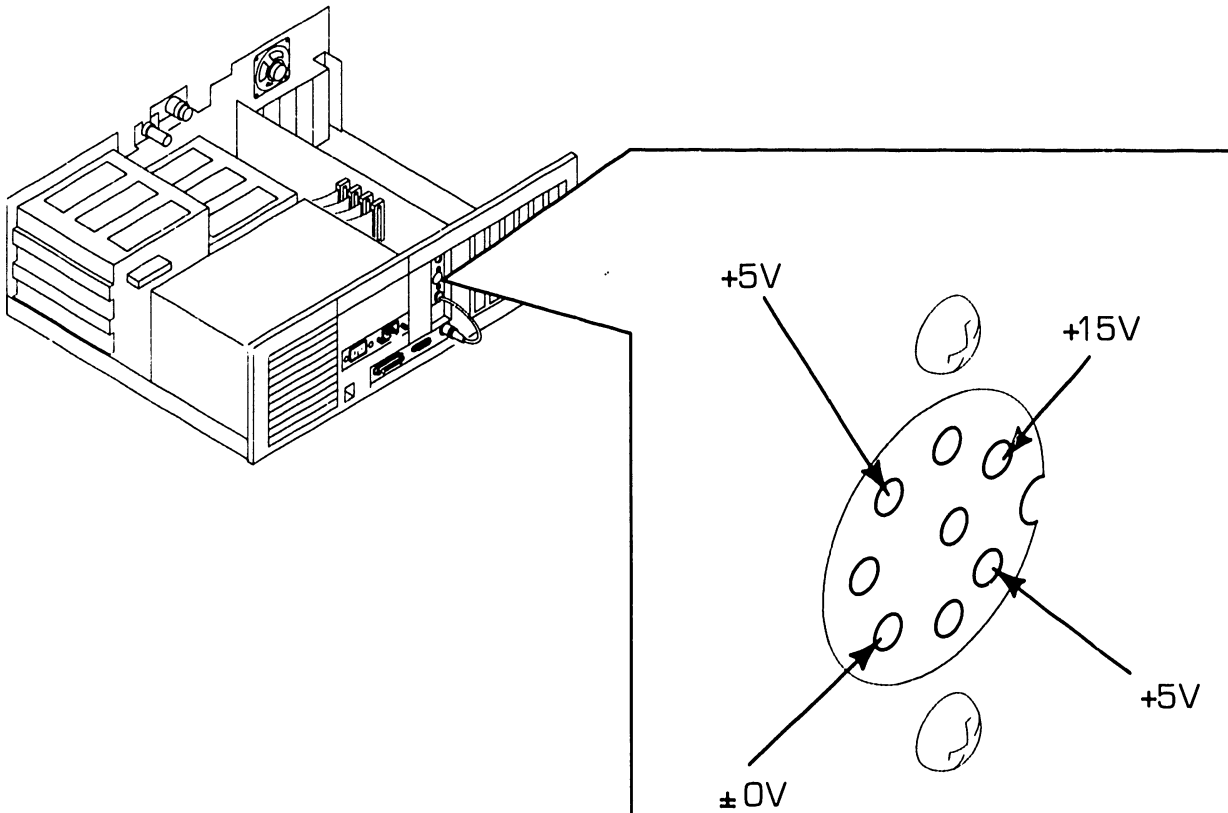


9.5 UNPACKING AND SETUP

9.5.1 Voltage Checks

9.5.2 Video Adapter Plate: Monitor and Keyboard DC Voltage and Ripple Checks

- 1 Remove top/front cover (► 7.2.1).
- 2 Set electronics enclosure power-on/off button to ON position (► 3.1.1).
- 3 Connect common lead of DVM to $\pm 0V$ test point on video adapter plate connector.



- 4 Connect positive lead of DVM to +5V, +12V test points on video adapter plate connector and verify dc voltage limits.

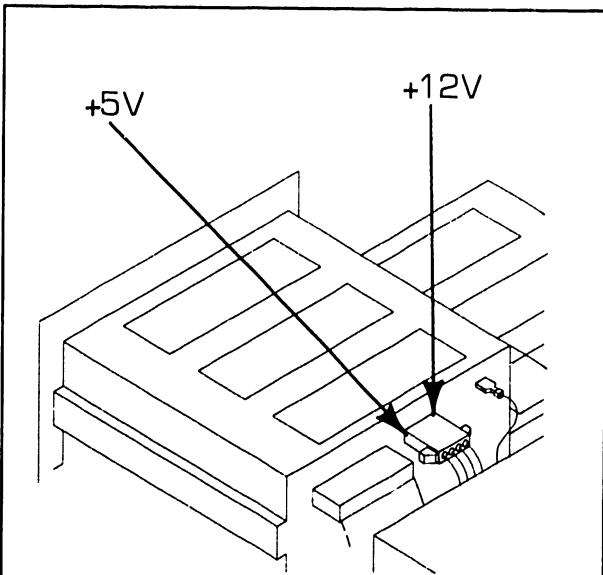
Test Point	Voltage	Limits(Vdc)
+5V		+4.75 +5.25
+15V		+14.25 +15.75

9.5 UNPACKING AND SETUP

9.5.1 Voltage Checks

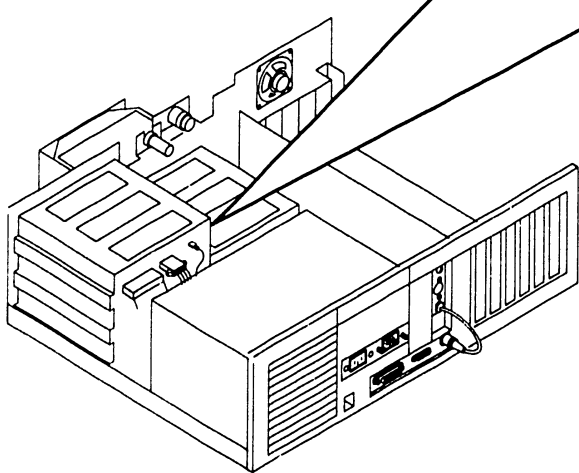
9.5.3 Floppy Diskette Drive: DC Voltage and Ripple Checks

- 1 Remove top/front cover (► 7.2.1).
- 2 Press guide rails inward and partially slide diskette drive out of enclosure to access voltage test points on power cable connector.
- 3 Set electronics enclosure power on/off button to ON position (► 3.1.1).



- 4 Connect common lead of DVM to one of ground test points on power cable connector (ground pins are the two inner pins of connector).
- 5 Connect positive lead of DVM to +5V, +12V test points on power cable connector and verify dc voltage limits.

Test Point Voltage	Limits(Vdc)
+5V	+4.75 +5.25
+12V	+11.4 +12.6

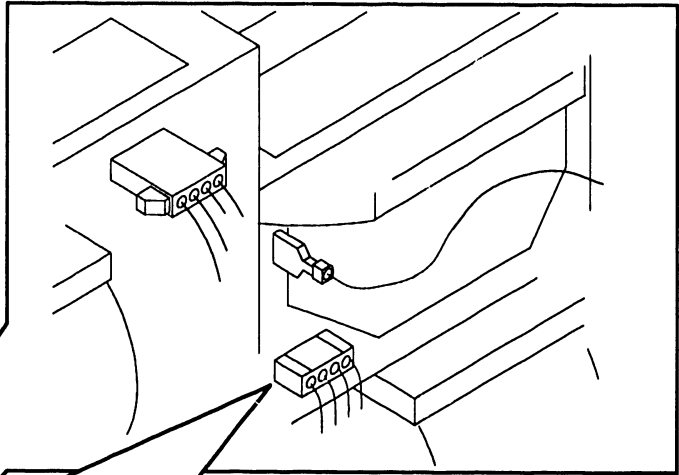


9.5 UNPACKING AND SETUP

9.5 Voltage Checks

9.5.4 Winchester Disk Drive: DC Voltage and Ripple Checks

- 1 Remove top/front cover (▶ 7.2.1).
- 2 Disconnect power cable from rear of Winchester disk drive (▶ 7.2.4).
- 3 Set electronics enclosure power-on/off button to ON position (▶ 3.1.1).

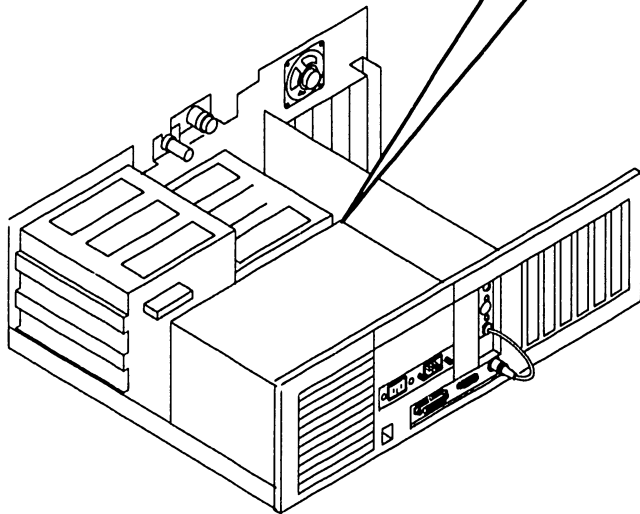


POWER CABLE CONNECTOR



- 4 Connect common lead of DVM to one of ground test points on power cable connector.
- 5 Connect positive lead of DVM to +5V, +12V test points on power cable connector and verify dc voltage limits.

Test Point Voltage	Limits(Vdc)
+ 5V	+4.75 +5.25
+12V	+11.4 +12.6



9.6 UNPACKING AND SETUP

9.6.1 Installing Options

9.6.1 80287 Coprocessor Installation

1. Remove top/front cover (►7.2.1)
2. Remove disk drive in location "C" (►7.2.4).
3. Position coprocessor over CPU board socket U54.
4. Align coprocessor pins with socket holes; press coprocessor firmly into place.
5. Install plastic screw to secure module to CPU board.
6. Remove any option boards that hinder access to jumper block containing pins E46-E49 (►7.2.2); position jumper on CPU board properly (►9.3.6).
7. Reinstall disk drive and option board(s).
8. Secure top/front cover to enclosure.

UNPACKING AND SETUP

9.6 Installing Options

9.6.2 Option Board Installation

1. Remove top/front cover (►7.2.1).
2. Remove screw that secures fastening/access plate to enclosure.
3. Lift fastening/access plate out of slot.
4. Align board connectors with CPU board sockets.
5. Gently push down on top of board so board connectors firmly mate with option sockets; board should slide between grooves of card guide that is attached to inside front of enclosure.
6. Replace screw that secures option board to enclosure.
7. Connect cables (if applicable).
8. Secure top/front cover to enclosure.

9.6 UNPACKING AND SETUP

9.6 Installing Options

9.6.3 Floppy Diskette Drive "B" Installation

1. Remove terminating resistor pack from optional "B" drive (3 1/2-inch drives do not have removable terminator).
2. Remove top/front cover (►7.2.1).
3. Press in on floppy drive "A" guide rails; pull drive "A" slightly forward.
4. Partially slide optional floppy drive into location "B" of enclosure.
5. Attach drive cable harness connector to floppy drive "B."
6. Connect power supply cable and grounding strap to floppy drive "B."
7. Slide floppy drives "A" and "B" completely into enclosure.
8. Remove drive "B" plastic cover plate by pushing outward on tabs that secure plate to top/front cover.
9. Secure top/front cover to electronics enclosure.

UNPACKING AND SETUP

9.6 Installing Options

9.6.4 Winchester Drive "C" Installation

NOTE

First Winchester drive (full-height or half-height) must be installed in location "C." Install second Winchester in location "D." (If second Winchester is full-height drive, a diskette "B" drive cannot be configured.)

1. Remove top/front cover (►7.2.1).
2. Partially slide drive into location "C."
3. Attach drive cable harness connectors, power supply cable, and grounding strap to drive "C."
4. Completely slide drive into enclosure.
5. Secure top/front cover to enclosure.

UNPACKING AND SETUP

9.6 Installing Options

9.6.5 Full-Height Winchester Drive "D" Installation

1. Place drive bottom side up.
2. Loosen captive screws at rear of drive.
3. Carefully lift board up, exposing inside of drive.
4. Remove terminating resistor pack. Use small flat blade screwdriver to gently pry resistor pack out of socket. (If terminating resistor is a switch bank, set all switches on bank to off (open) position.)
5. Screw board back into drive.
6. Remove top/front cover (►7.2.1).
7. Turn drive right side up and partially slide it into location "D."
8. Attach drive cable harness connectors, power supply cable, and grounding strap to drive "D."
9. Completely slide drive into enclosure.
10. Secure top/front cover to enclosure.

UNPACKING AND SETUP

9.6 Installing Options

9.6.6 Half-Height Winchester Drive "D" Installation

1. Place drive bottom side up.
2. Set terminating resistor switches to off position. (If terminating resistor pack is present instead of switch bank, use small flat blade screwdriver to gently pry pack out of socket.)
3. Set switch 2 of drive select (DS) bank to "on" position; all other switches on DS bank should be "off."
4. Remove top/front cover (►7.2.1).
5. Turn drive top side up and partially slide it into location "D."
6. Attach drive cable harness connectors, power supply cable, and grounding strap to drive "D."
7. Completely slide drive into enclosure.
8. Secure top/front cover to enclosure.

9.6 UNPACKING AND SETUP

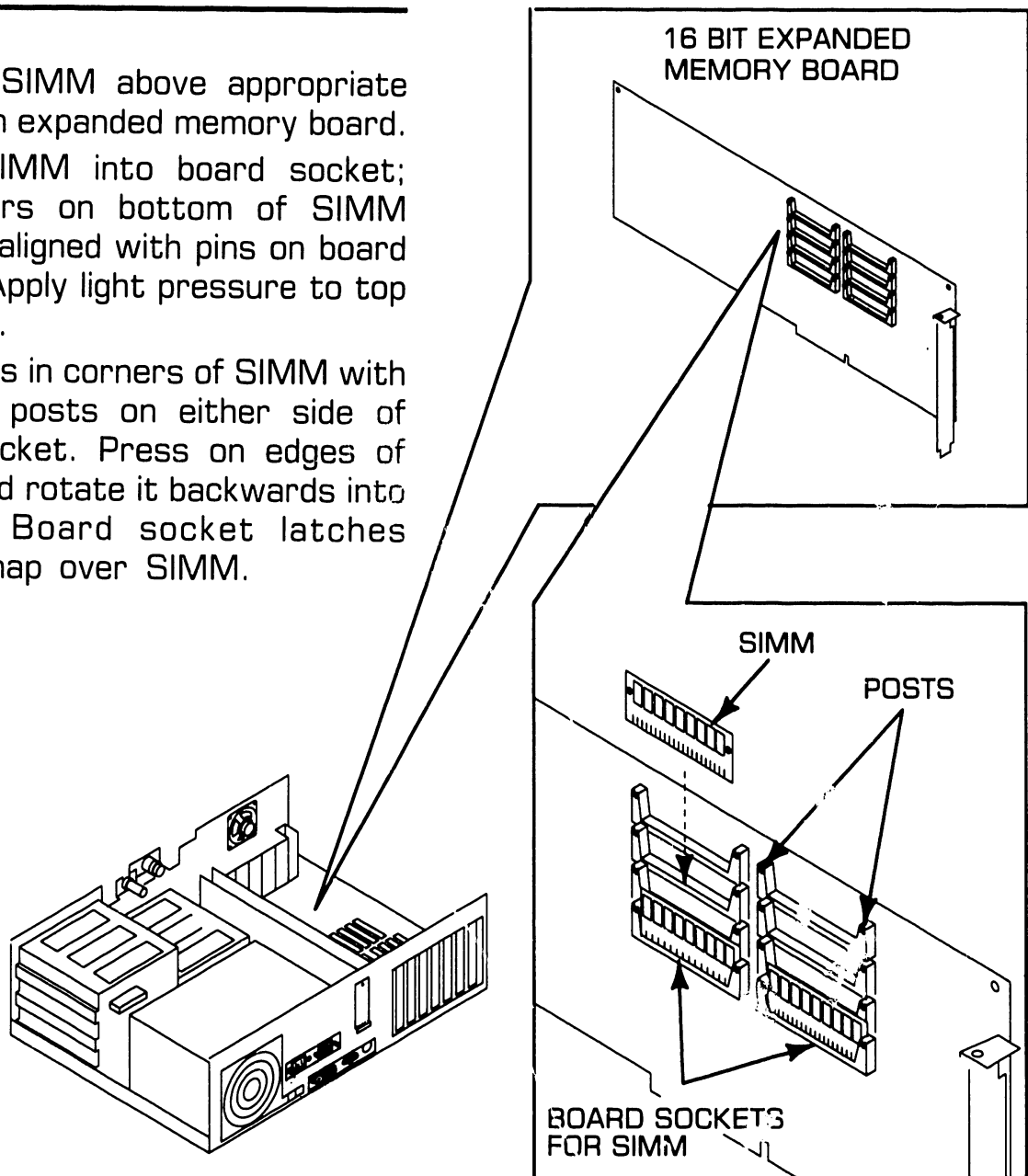
9.6.6 Installing Options

9.6.7 Installing Single In-Line Memory Module (SIMM)

CAUTION

SIMMs are sensitive to static electricity. Handle carefully and do not touch component side of the SIMM.

1. Position SIMM above appropriate socket on expanded memory board.
2. Insert SIMM into board socket; connectors on bottom of SIMM must be aligned with pins on board socket. Apply light pressure to top of SIMM.
3. Align holes in corners of SIMM with the two posts on either side of board socket. Press on edges of SIMM and rotate it backwards into socket. Board socket latches should snap over SIMM.



9.7 UNPACKING AND SETUP

9.7 Software Installation

9.7.1 INSTALL Program: Description

The INSTALL program consists of four utilities: SETUP, HDINIT (Winchester or hard disk initialization), FDISK (Winchester partition), and FORMAT (partition format). These utilities are executed from a file on system diskette 1.

SETUP is a software program that identifies the options installed on the system. This utility must be executed after all internal and external options have been configured. If the CPU board or lithium battery is replaced, or if any new options are added, SETUP must be run again.

The HDINIT (Winchester initialization) utility formats the hard disk drive and detects and marks any defective tracks on the disk.

The FDISK (Winchester partition) utility creates the largest MS-DOS partition acceptable on the hard disk drive (operating system will recognize a disk partition of up to 32MB).

The FORMAT (partition format) program sets up an MS-DOS boot sector in the partition created by FDISK. FORMAT also prepares the partition to accept files by setting up a file allocation table and root directory.

Any of the INSTALL utilities may be run singly by entering the utility's name when the command processor

prompt appears on the monitor screen. After the utility's name has been entered, the RETURN key must be pressed. For example, if the prompt "A>" is on the screen, the SETUP utility may be run by typing "SETUP" after the prompt; i.e., "A> SETUP"

The INSTALL program has two operational modes: an interaction mode that permits the operator to skip steps when executing a utility; and an automated mode that initiates automatic system execution of all INSTALL utilities without user intervention.

CAUTION

Use of automated mode destroys all data on the hard disk drive.

9.7 UNPACKING AND SETUP

9.7 Software Installation

9.7.2 Preparing Winchester Drive

CAUTION

Preparing Winchester drive results in destruction of all data already present on hard disk.

1. Run "HDINIT" utility.*
2. Run "FDISK" utility.
3. Run "FORMAT" utility.
4. Type "SYS C:" to copy system files to Winchester.
5. Copy files from system diskettes to Winchester drive.

*Executing "HDINIT" utility can take 2 to 4 hours.

SECTION

10

**FUNCTIONAL
DESCRIPTION**

SECTION 10 CONTENTS

SECTION 10 FUNCTIONAL DESCRIPTION

(UNAVAILABLE AT PRESENT TIME)

SECTION

11

SPECIFICATIONS

SECTION 11 CONTENTS

SECTION 11 SPECIFICATIONS

	Page
11.1 HARDWARE	11-1

SPECIFICATIONS

11 .1 Hardware

Electronics Enclosure Dimensions (resting flat, no stand)

Height: 6.6 in. (16.8 cm)
Width: 21.38 in. (54.3 cm)
Depth: 16.25 in. (41.3 cm)

Electronics Enclosure Weight

52 lb (23.6 kg)

Electronics Enclosure Power Requirements

Voltage: 90 to 132 Vac
(115 Vac nominal)
180 to 264 Vac (220 Vac nominal)

Frequency: 47 to 63 Hz (60 Hz nominal)

Current (operating): 3A @ 115 Vac;
1.5A @ 220 Vac

Monochrome Monitor Dimensions

Height: 11.4 in. (29.0 cm)
Width: 12.5 in. (31.8 cm)
Depth: 12.4 in. (31.5 cm)

Monochrome Monitor Weight

14 lb (6.36 kg)

Color Monitor Dimensions

Height: 13.5 in. (34.3 cm)
Width: 14 in. (35.6 cm)
Depth: 15.7 in. (39.9 cm)

Color Monitor Weight

29.5 lb (13.4 kg)

Keyboard Dimensions

Height: 1.65 in. (4.19 cm)
Width: 19.9 in. (50.5 cm)
Depth: 7.6 in. (19.3 cm)

Keyboard Weight

3.25 lb (1.48 kg)

System Environmental Requirements

Relative Humidity: 20% to 80% (non-condensing)

Ambient Temperature: 60°F to 90°F
(15°C to 32°C)

Maximum Altitude: 6562 ft (2000 m)

SECTION 12
ILLUSTRATED
PARTS

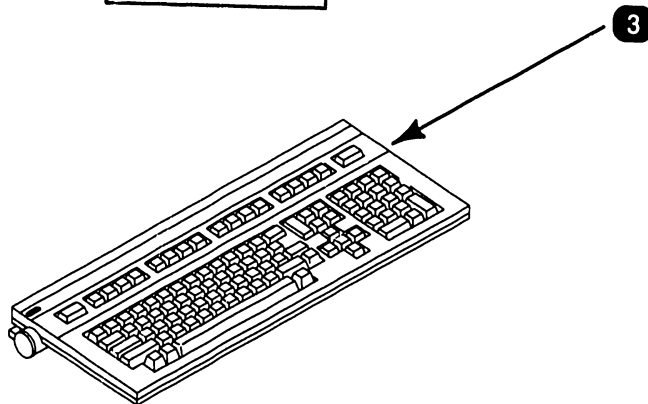
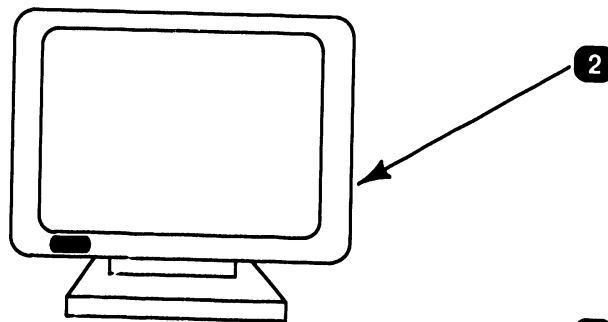
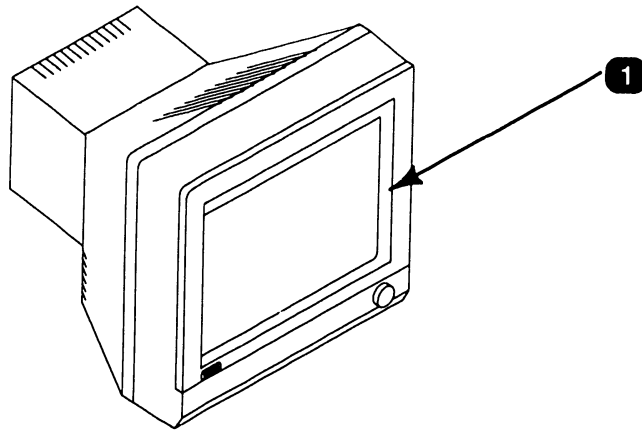
SECTION 12 CONTENTS

SECTION 12 ILLUSTRATED PARTS

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12.1 SYSTEM COMPONENTS	12-1

12.1 ILLUSTRATED PARTS

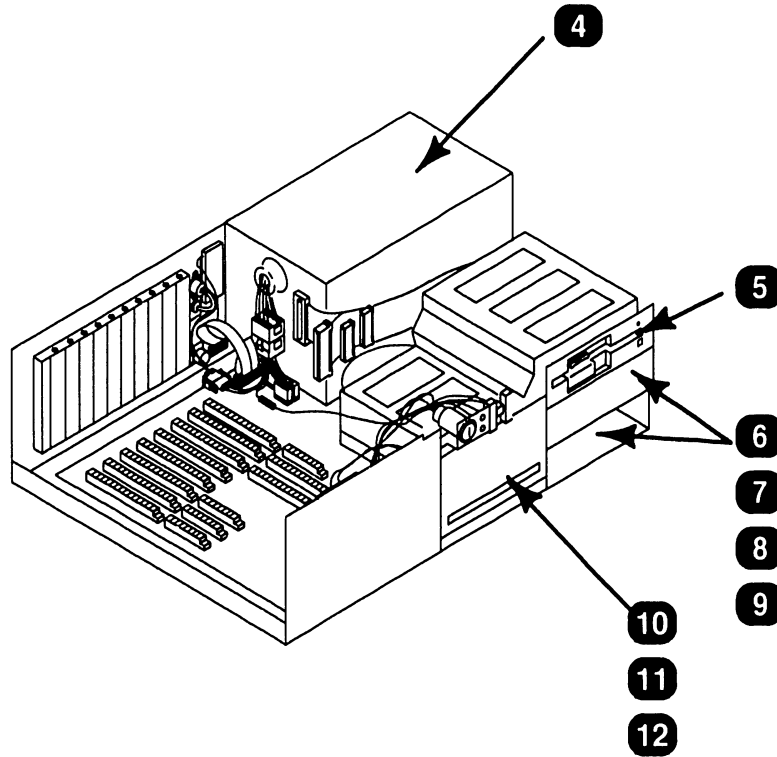
System Components (Sheet 1 of 5)



<i>Item</i>	<i>Part Number</i>	<i>Description</i>
1	279-0757	Monochrome monitor
2	725-3446	Color monitor
3	725-3401-US	Keyboard

12.1 ILLUSTRATED PARTS

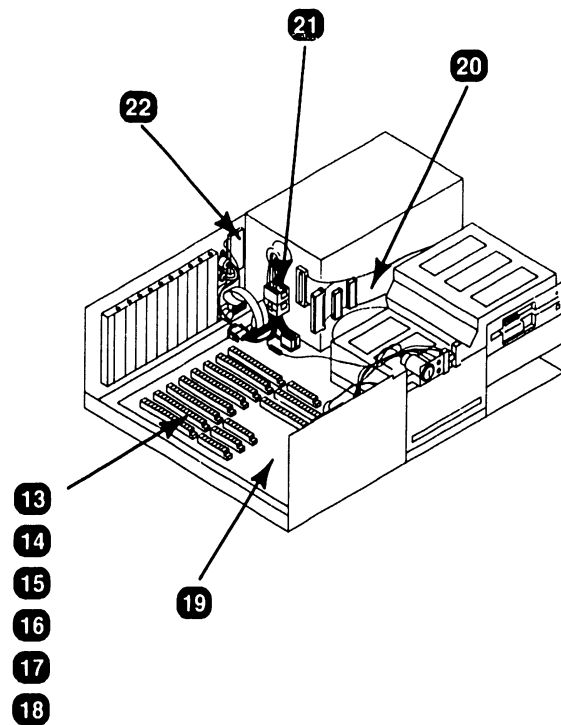
System Components (Sheet 2 of 5)



<i>Item</i>	<i>Part Number</i>	<i>Description</i>
4	270-1078	SPS-229 power supply
5	279-0760	1.2MB, 5.25-in. diskette drive
6	279-0765	360KB, 5.25-in. diskette drive
7	279-0766	720KB, 3.5-in. diskette drive
8	279-0767	20MB Winchester disk drive (half-height)
9	279-0773	40MB Winchester disk drive (half-height)
10	279-0768	33MB Winchester disk drive
11	279-0769	42MB Winchester disk drive
12	279-0770	67MB Winchester disk drive

12.1 ILLUSTRATED PARTS

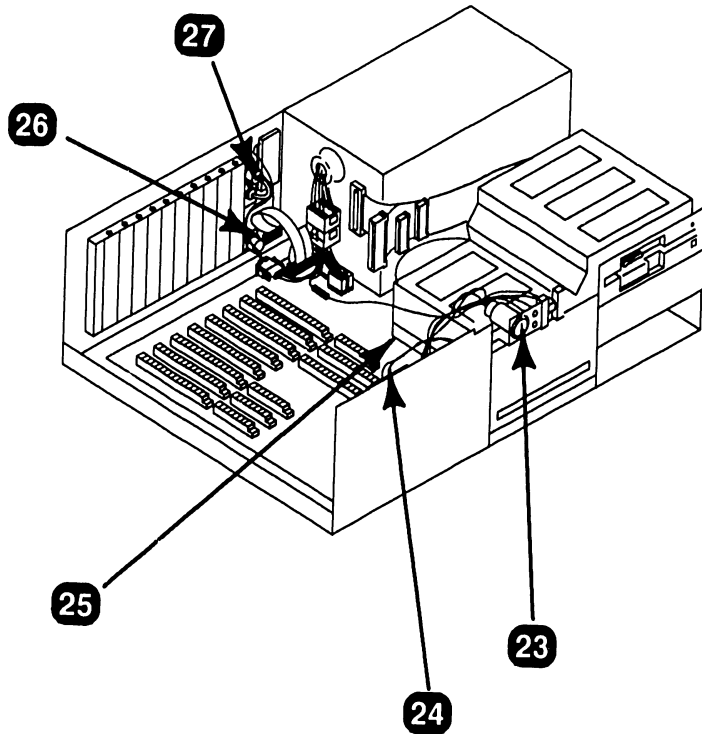
System Components (Sheet 3 of 5)



<i>Item</i>	<i>Part Number</i>	<i>Description</i>
13	210-8770-A	Winchester disk/floppy diskette controller board (will replace Western Digital controller, P/N 725-3359)
14	725-8986-A	Monochrome/color (EGA) video board (will replace video board, P/N 725-3358)
15	210-9454-A	Wang local office connection (WLOC) board
16	210-9453-A	16-bit expanded memory board
17	725-3467	32-bit expanded memory board
18	210-9455	Synchronous/asynchronous communications board
19	725-3466	PC 380 CPU board
20	220-3477	Flat cable harness
21	220-2567	Power supply adapter harness
22	666-1018	Lithium battery

12.1 ILLUSTRATED PARTS

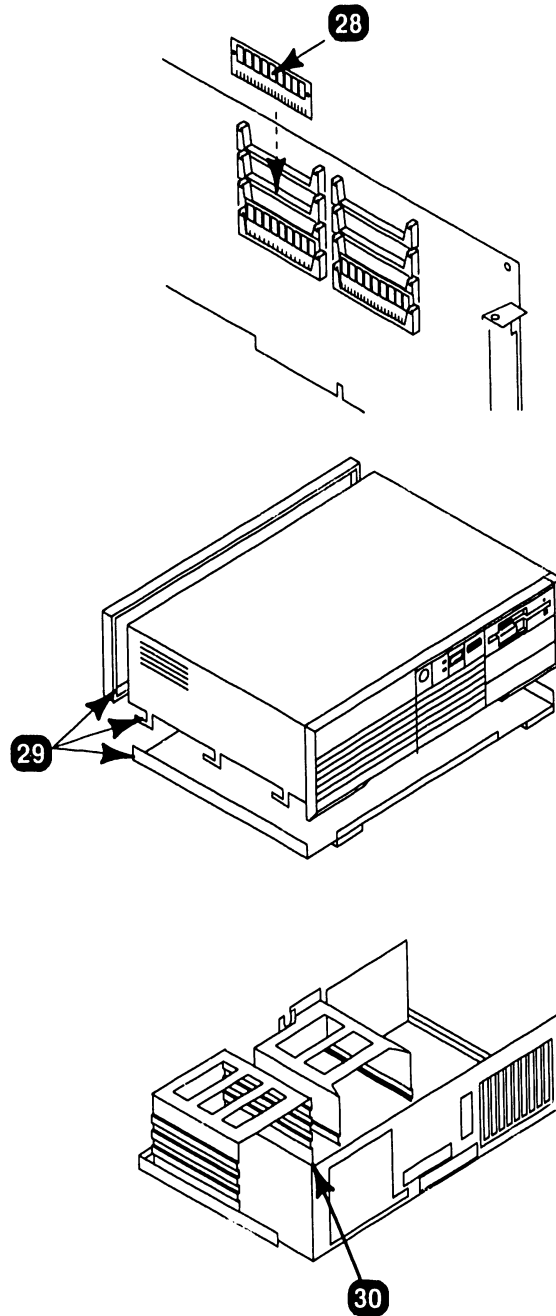
System Components (Sheet 4 of 5)



<i>Item</i>	<i>Part Number</i>	<i>Description</i>
23	220-2602	Keylock and power switch cable assembly
24	220-2601	Speaker and cable
25	725-3468	80287 math coprocessor module (located on CPU board underneath drive "C")
26	458-3731	Serial/parallel port panel (comprises 220-3606 (serial cable) and 220-3605 (parallel cable))
27	220-2570	Video adapter plate

12.1 ILLUSTRATED PARTS

System Components (Sheet 5 of 5)



<i>Item</i>	<i>Part Number</i>	<i>Description</i>
28	376-6050	Single in-line memory module (SIMM)
29	279-1055	Cover/base assembly
30	458-3974	Chassis weldment



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END

SECTION 6

1940 CONTROLLER

1940 MONITOR CONTROLLER

SECTION 6

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1940 MONITOR CONTROLLER

6.1 Introduction

NOTE

This section contains information pertaining only to the Two Page 1940 Monitor Controller PCA. For information about the Two Page 19-inch Monitor (MON-1940), refer to manual 741-1878.

The Two Page 1940 Monitor Controller board is an interface to the 19-inch monochrome monitor model MON-1940. It enhances user applications such as desktop publishing, low end CAD, and applications requiring multiple windows for the 200/300 Series PCs and WIIS. Features include the following:

- Fits Wang 200/300 Series PCs 8-bit or 16-bit slots
- Drives the MON-1940 Two Page Monitor
- Runs IBM Monochrome Display Adapter (MDA) software and emulates Hercules™ Monochrome Graphics PCA.

The minimum PC hardware requirements are as follows:

- 1.2 MB diskette
- 640 KB main memory
- 512K expanded memory module

- 928 WLOC card
- 1940 two page monitor controller

A list of software required for WIIS imaging is listed below.

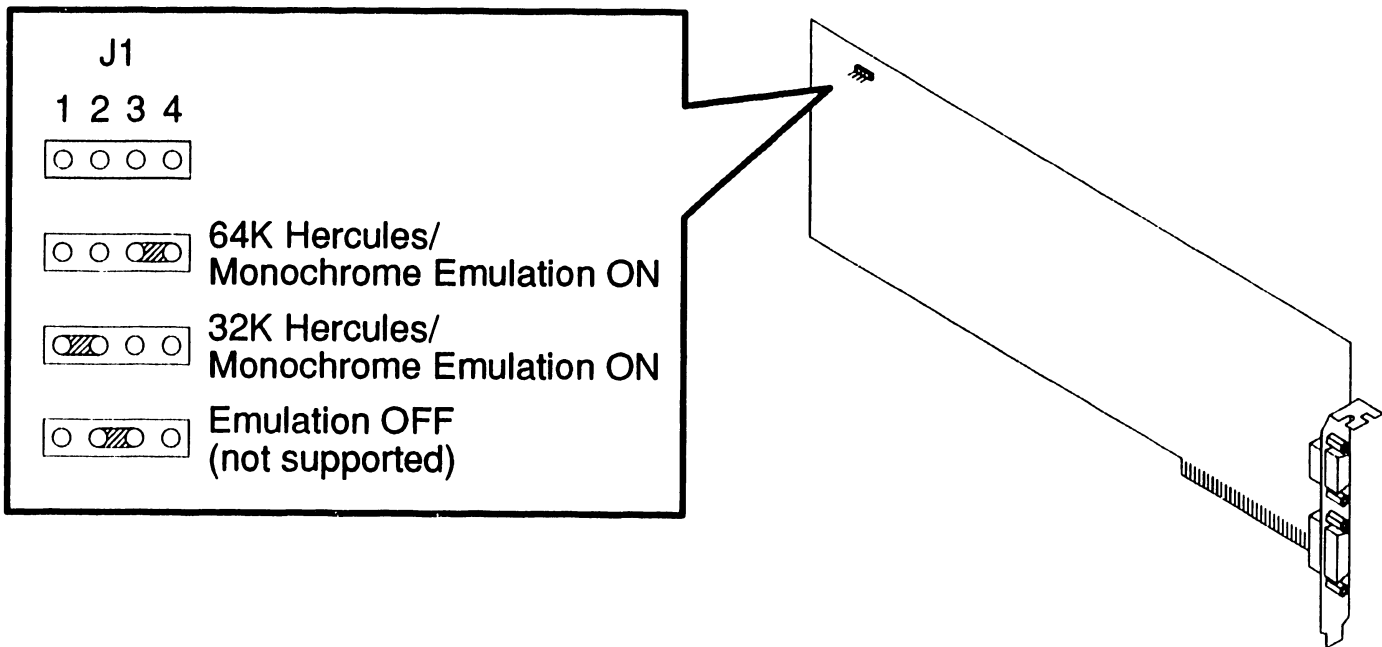
- MS DOS 3.2 or higher
- VS operating system 7.14 or higher
- VS WIIS environment 2.20 or higher
- 4250-IMG-SW-9 workstation software

Hercules is a trademark of Hercules Technology, Inc.

● END

1940 MONITOR CONTROLLER

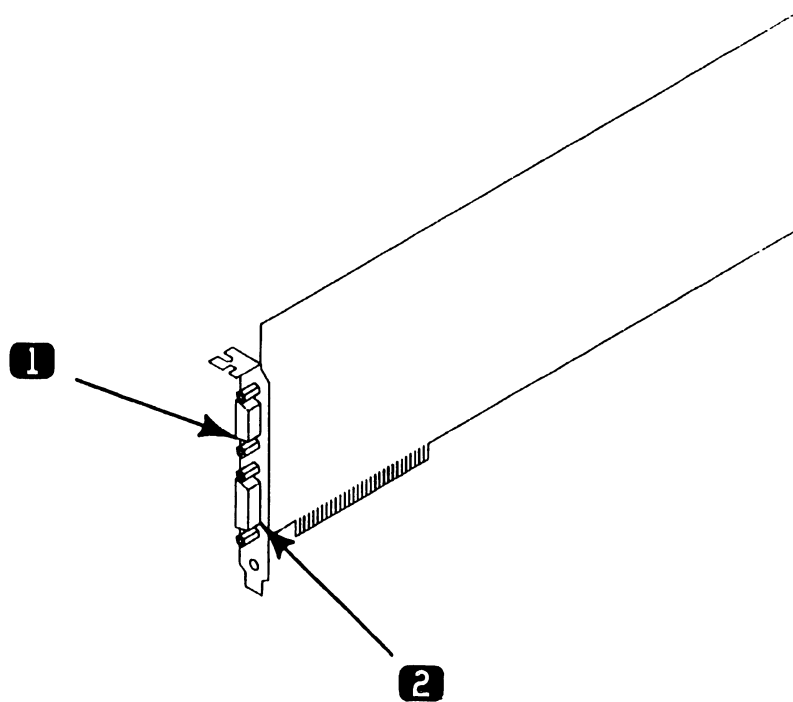
6.2 Settings



● END

1940 MONITOR CONTROLLER

6.3 Controls And Indicators



<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	J4 Interface Connector	26-pin connector, provides physical interface to MON-1940 Two Page Monitor
2	J3	DO NOT USE

● END

1940 MONITOR CONTROLLER

6.4 Troubleshooting

6.4.1 Tools and Equipment

Tools and Equipment required to troubleshoot the two page 1940 controller consist of BIT diagnostics and PC Diagnostic Utility.

NOTE

BIT diagnostic error messages and error message interpretation for PC 240, PC 280, and PC 380 are contained in Section 6 of their associated manuals.

■ END

1940 MONITOR CONTROLLER

6.4 Troubleshooting

6.4.2 Power-Up BIT Diagnostics

Power-up BIT Diagnostics perform diagnostic testing of the option system each time the PC is powered on. The Two Page 1940 Controller performs a basic memory BIT test, and in the event of an error, an audible tone (beep) will be sounded through the system speaker. If other circuitry on the board is not functional, the system either may hang or the monitor will not display information. If a problem is encountered, run the Diagnostic Utilities. (-6.4.3)

Prior to powering on the PC, perform the following hardware checks.

- Board is properly seated in an expansion slot
- Monitor cable is properly connected
- Monitor is powered on

■ END

1940 MONITOR CONTROLLER

6.4 Troubleshooting

6.4.3 Diagnostic Utility

Diagnostic Utility is a diskette-based troubleshooting aid that allows the user or CE to run extensive diagnostic testing. Diagnostic Utility 195-5537-9 Rev 2860 or higher supports the 1940 controller. Refer to the associated manual for Diagnostic Utility operating procedures.

■ END

1940 MONITOR CONTROLLER

6.4 Troubleshooting

6.4.4 Troubleshooting Procedures

The following table presents a list of possible faults and corrective actions.

<i>Fault Condition</i>	<i>Troubleshooting Action</i>
System will not power up with 1940 controller installed	1940 controller is defective. Remove 1940 controller and re-boot the system. If system powers up, 1940 controller may be defective. Run power-up diagnostics and Diagnostic Utility to verify system integrity. Replace 1940 controller (→ 6.5) and perform power-on procedures. If system does not power up with 1940 controller removed, refer to associated system manual for troubleshooting procedures.
System powers up, 1940 BIT error is encountered	Reseat board and re-boot the system. If error continues, replace 1940 controller (→ 6.5).
System powers up, monitor screen does not display raster or screen load	Monitor may be defective. Verify monitor cabling and that monitor is powered on. Check fuse. Refer to monitor manual for troubleshooting procedures.

■ END

1940 MONITOR CONTROLLER

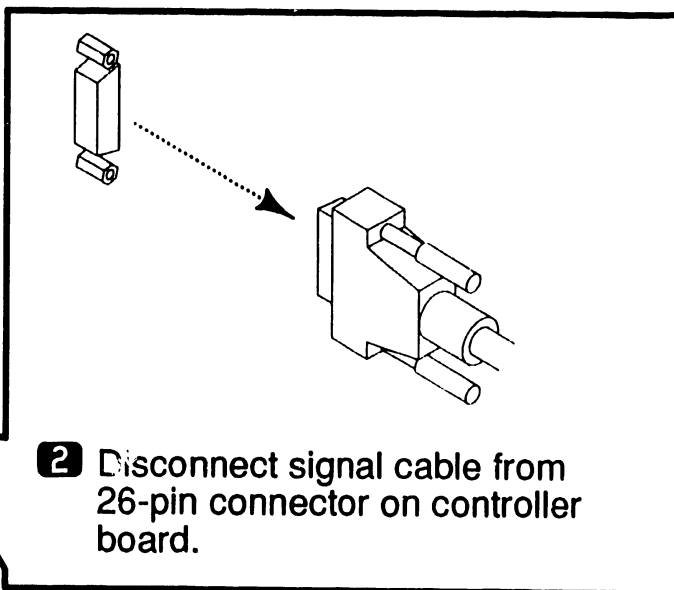
6.5 Parts Replacement (Sheet 1 of 2)

To Remove:

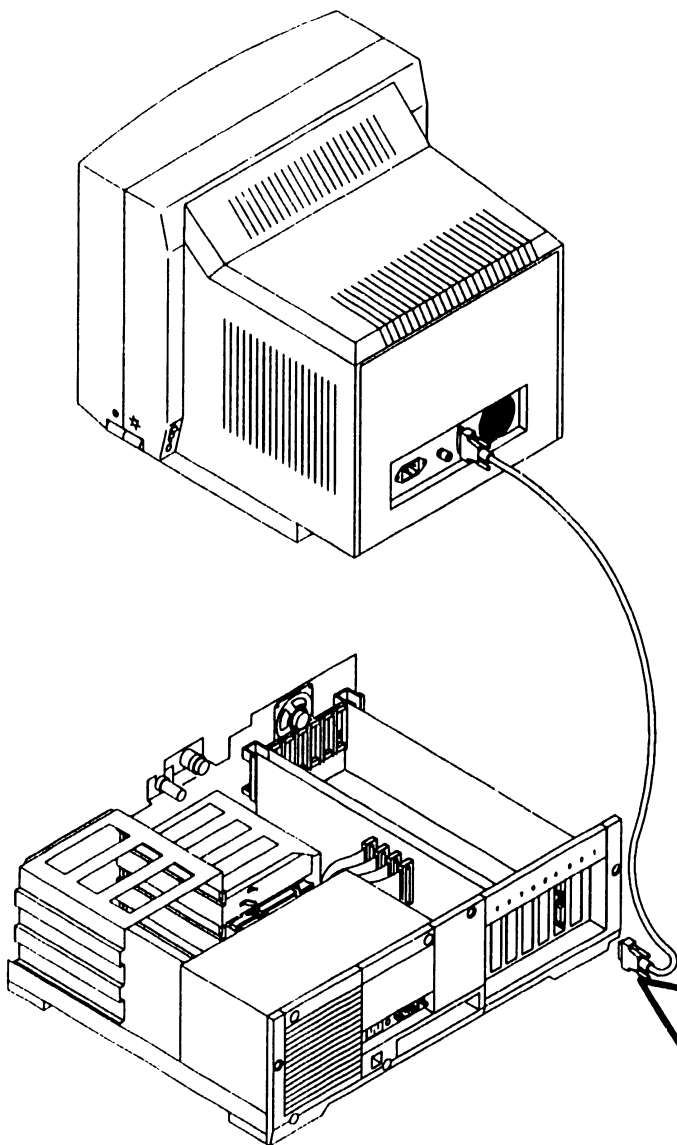
NOTE

Parts replacement illustrations use PC 280. Other PC parts replacement procedures for this option are similar.

- 1** Power off. Remove ac from unit.



- 3** Remove top/front cover.

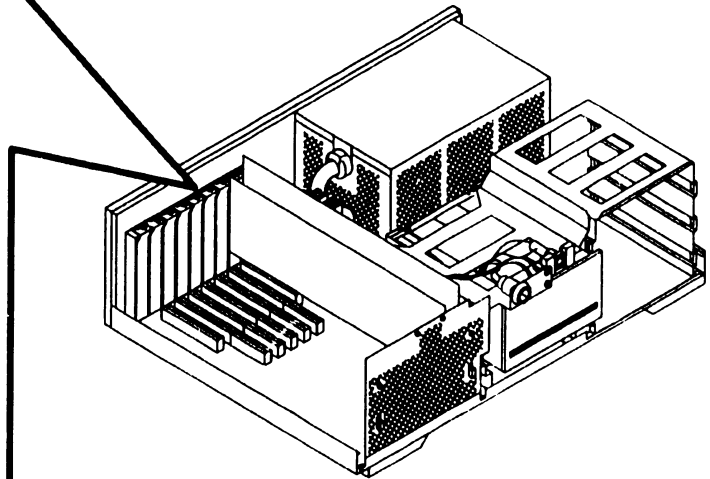
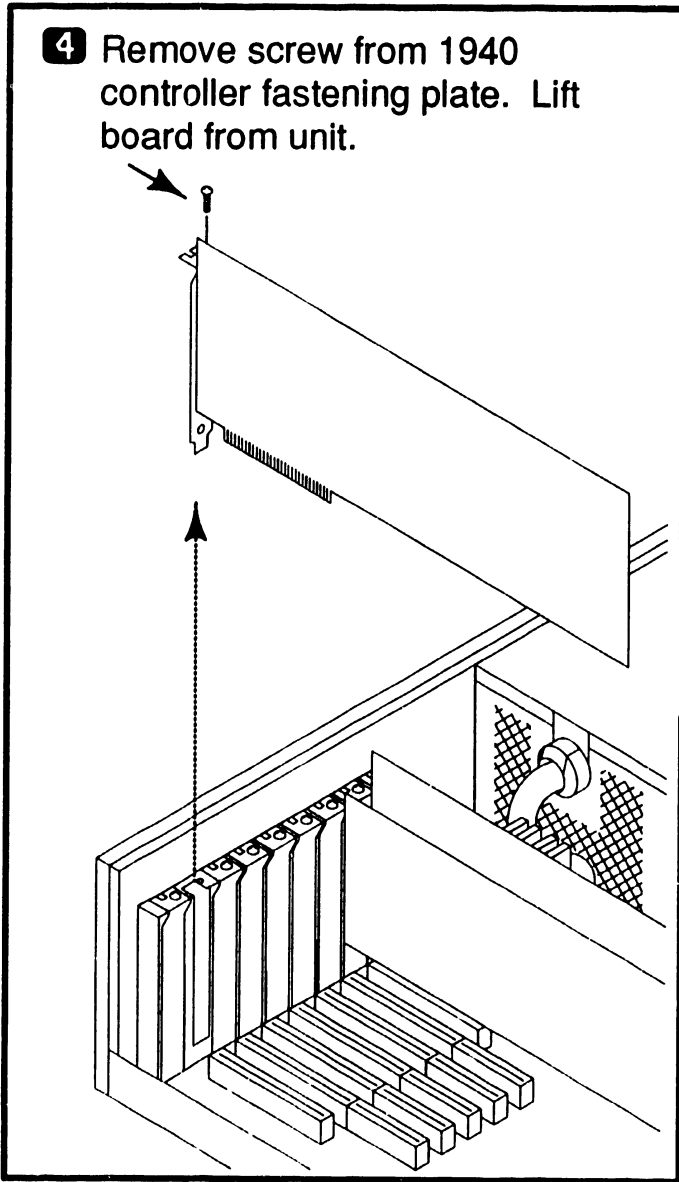


▶NEXT

1940 MONITOR CONTROLLER

6.5 Parts Replacement (Sheet 2 of 2)

- 4** Remove screw from 1940 controller fastening plate. Lift board from unit.



● END

1940 MONITOR CONTROLLER

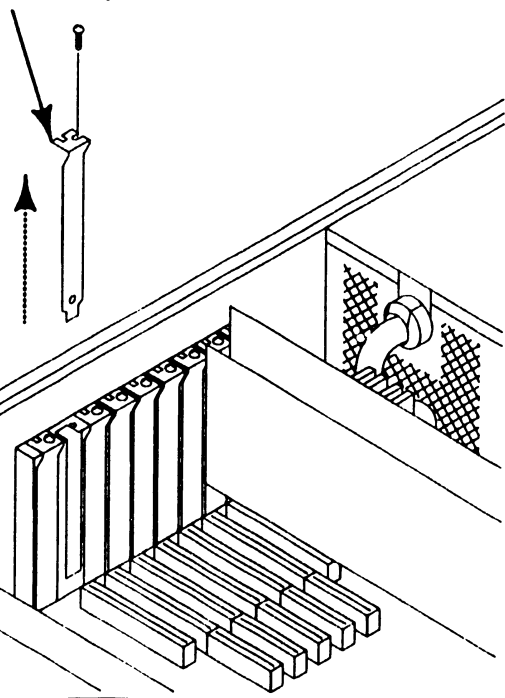
6.6 Installation

6.6.1 1940 Controller Installation

1 Power off. Remove ac from unit.

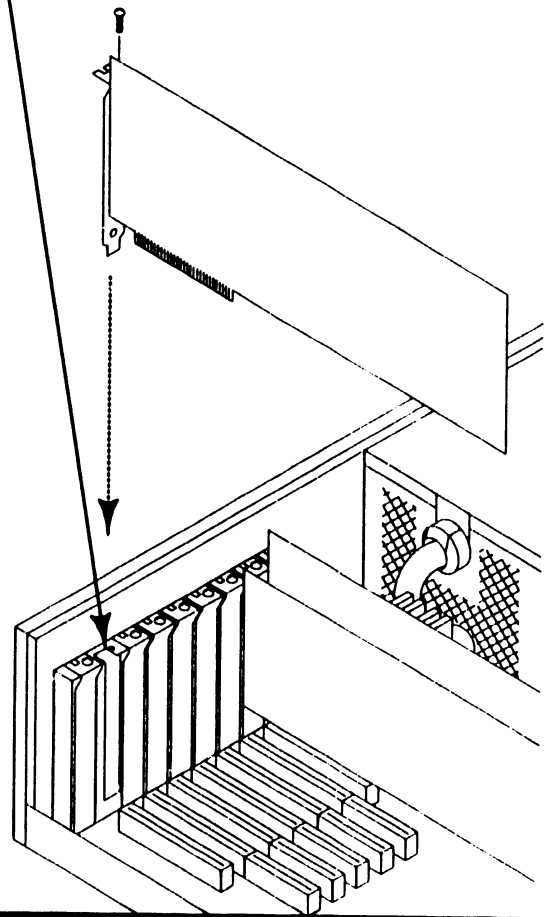
2 Remove top/front cover.

3 Remove screw securing fastening/ access plate to enclosure and remove plate.



4 Set J1 for appropriate emulation mode (➔ 6.2).

5 Install 1940 Controller into expansion slot and secure with screw removed previously.

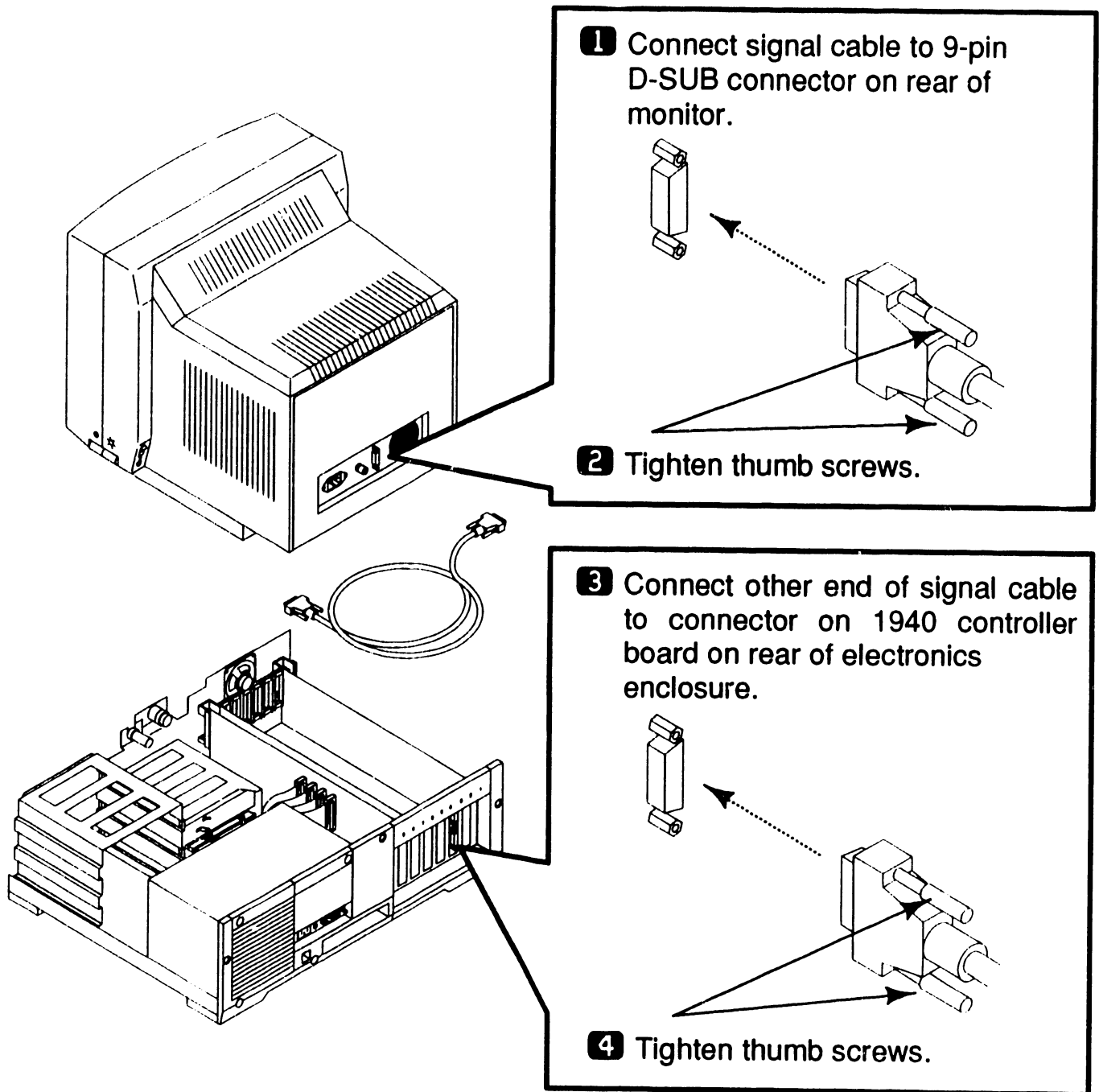


● END

1940 MONITOR CONTROLLER

6.6 Installation

6.6.2 1940 Controller Cabling



● END

1940 MONITOR CONTROLLER

6.7 Functional Description

6.7.1 General

The Wang 1940 Two Page Monitor Controller runs all software that runs on the IBM monochrome display adapter (MDA) card or the Hercules monochrome graphics card. When in Hercules or MDA mode, the 4:3 aspect ratio is maintained. This creates a window centered on the monitor screen. Vertical resolutions, normally 340 and 350, expand to 696 and 700 by double dotting vertically. When in MDA mode, high intensity is implemented by pairing ON pixels with ON pixels horizontally. A double frequency dot clock is maintained so that the size of the pixel is cut in half, resulting in a horizontal resolution of 720.

Address space consumed by the board is limited to 64K. A utility allows the base address of the memory map to be programmed. This utility runs in the AUTOEXEC.BAT file. It programs the expanded memory window address register on the card. Each software driver reads the expanded memory window address register and configures itself properly so that the user does not have to configure each driver separately.

The major features of the 1940 controller include the following:

- 32-bit Graphics System Processor that provides the high performance computer graphics applications, CRT

timing generation, CRT automatic display refresh, controls on-board memory, and provides direct communications with the system's CPU.

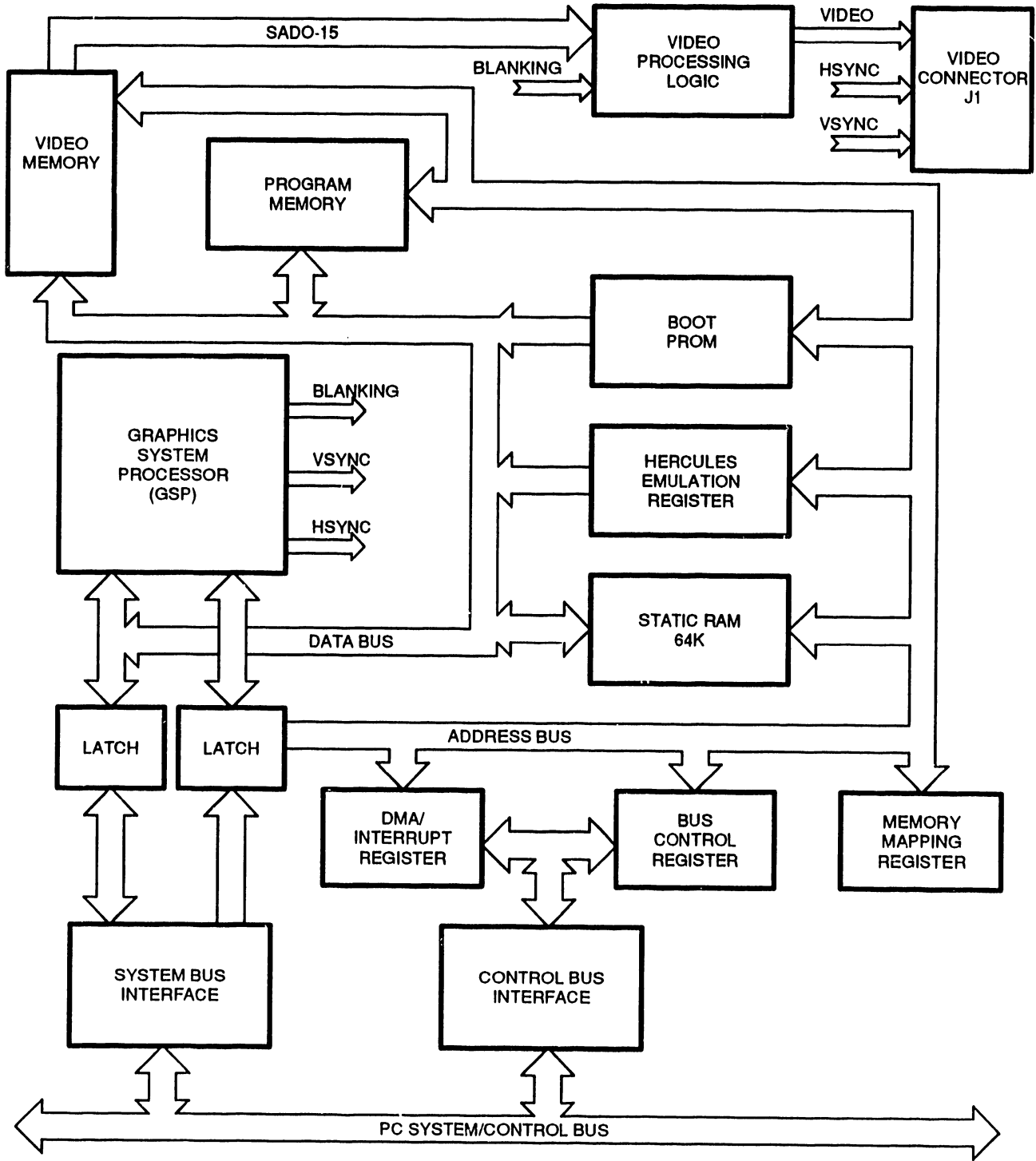
- Memory mapping control register that provides CPU memory mapping of 32K or 64K, PROM enable, Hercules enable, and Hercules clock speed.
- Up to 2MB of SIMM program memory
- 512KB video display memory
- 64KB static RAM
- DMA logic and interrupt logic that provides three interrupt levels and three DMA channels
- PC system address, data, and control bus interface logic.
- Power-On Boot PROM
- 26-pin video connector that provides monitor control signals--video, Hsync, and Vsync

■ END

1940 MONITOR CONTROLLER

6.7 Functional Description

6.7.2 1940 Controller Block Diagram



● END

1940 MONITOR CONTROLLER

6.7 Functional Description

6.7.3 Block Diagram Description (Sheet 1 of 2)

A 32-bit Graphics System Processor (GSP) supports the high performance computer graphics applications, CRT timing generation, CRT automatic display refresh, controls on-board memory, and provides direct communications with the system's CPU.

The GSP performs all general purpose processing tasks, and accesses memory and peripherals as either a 16-bit device (word transfer) or an 8-bit device (byte transfer). The GSP controls all CRT timing signals (VSync, HSync, Blank, Display Refresh). ON-board program memory, video memory, static memory, and boot PROM are accessed directly by the GSP or indirectly through the system CPU.

The GSP communicates with the system CPU via the system bus using one of three interrupt channels and one of three DMA channels. These are as follows.

- Interrupt Channel 15 (IRQ15)
- Interrupt Channel 12 (IRG12)
- Interrupt Channel 10 (IRQ10)

- DMA Channel 5 (DRQ5)
- DMA Channel 6 (DRQ6)
- DMA Channel 7 (DRQ7)

The GSP becomes master of the system bus by asserting a DMA channel request (DRQ5-7). The system CPU returns the DMA acknowledge and the GSP asserts the master line.

When the GSP is bus master, it can access system memory in 16-bit memory cycles. For the GSP to release control of the system bus, the DMA channel request is dropped and the master line is set to inactive.

Memory mapping and control circuitry allows the system CPU and GSP to access the 64K static RAM emulation, and/or select dot clock. The system CPU accesses this circuitry by either word or byte I/O instructions. The GSP accesses this circuitry as two 8-bit locations.

Program memory consists of two SIMMs and contains up to 2 MBytes of memory. The GSP accesses program memory directly. The system CPU can access this memory only through the GSP.

→ NEXT

1940 MONITOR CONTROLLER

6.7 Functional Description

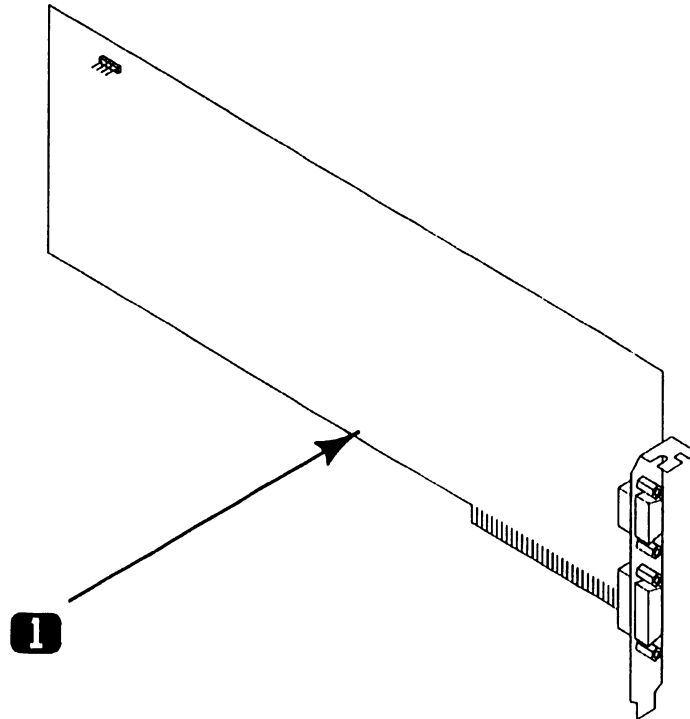
6.7.3 Block Diagram Description (Sheet 2 of 2)

The 512KBytes of video memory contain the contents that are displayed on the monitor with bit 0 of a word being the first dot on the screen. Several resolutions are available depending upon the dot clock selected and the internal programming of the GSP. On 200 dots per inch resolution, video memory is organized as 2048 lines of 128 sixteen-bit words. The video memory is output to a shift register in 16-bit parallel format and is shifted out at the selected clock speed (dot clock) in a serial bit format to the monitor display.

■ END

1940 MONITOR CONTROLLER

6.8 Illustrated Parts



<i>Item</i>	<i>Part Number</i>	<i>Description</i>
1	725-4005	1940 Two Page Monitor Controller PCA

● END

SECTION 7

SC4000 SCANNER CONTROLLER

SECTION 7
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7.2.2 SC4000 Scanner Controller 7-4

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7.1 Introduction

The SC4000 Scanner Controller (Model WIIS-INPUT-06) is a two board set consisting of an Image Processor board (210-8987) and a Scanner Controller board (210-9428).

The Image Processor board connects to the Scanner Controller board via an internal 60-pin cable. Image Processor board provides the Scanner Controller board with access to up to 2 Megabytes of shared memory.

Scanner Controller board contains the circuitry required to interface to the SC4000 scanner including circuitry for serial communications interface, system timing, address generation, and scanner operation.

~~~~~

### NOTES

PC 240 computer does not support the SC4000 Scanner Controller (WIIS-INPUT-06).

SC4000 Scanner Controller section does not contain Scanner SC4000 operating instructions or installation. Refer to the Document Scanner (Model SC4000) manual (741-1842) for scanner information.

~~~~~

Minimum PC hardware configuration required for Series 280 and 380 Professional Computer Imaging Workstations with Scanner Controller installed are PC Models 280 or 380 with:

- 1.2 MB Diskette
- 640KB Main Memory
- 512K Expanded Memory Module
- 928 WLOC Card

- 1640 Controller, 200 DPI (PC280 Only) or
- 1640 Controller, 100 DPI (PC280 and PC380) or
- 1940 Controller, 100 DPI (PC280 and PC380)

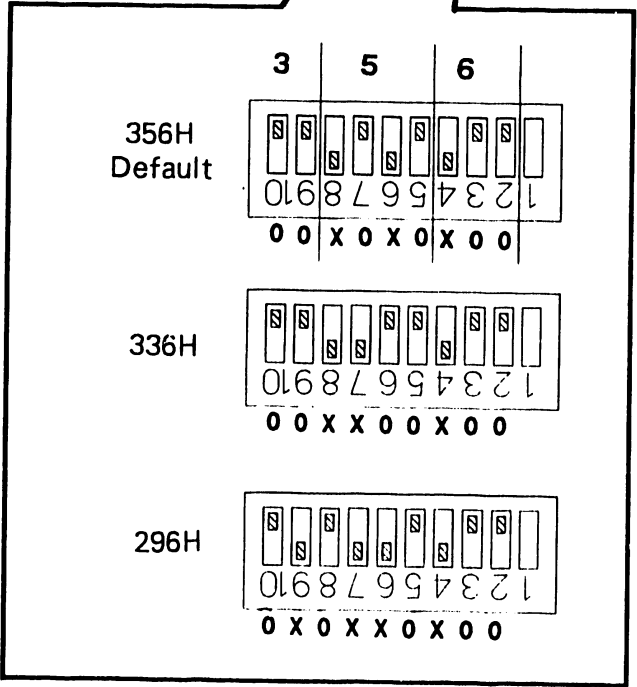
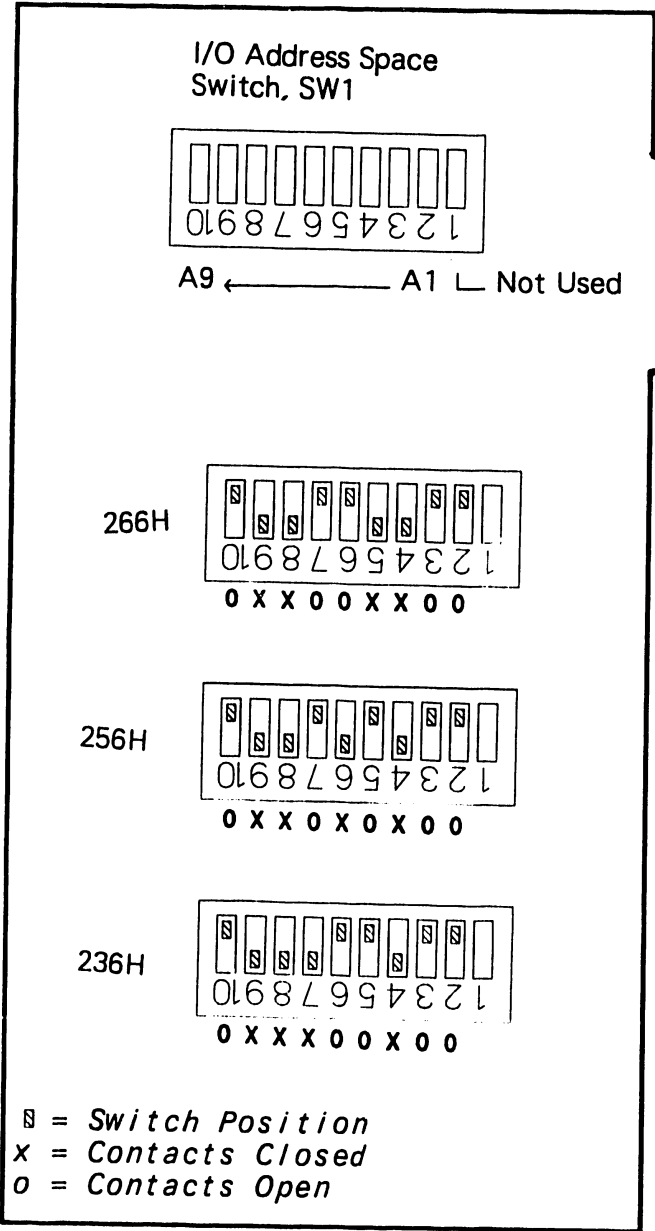
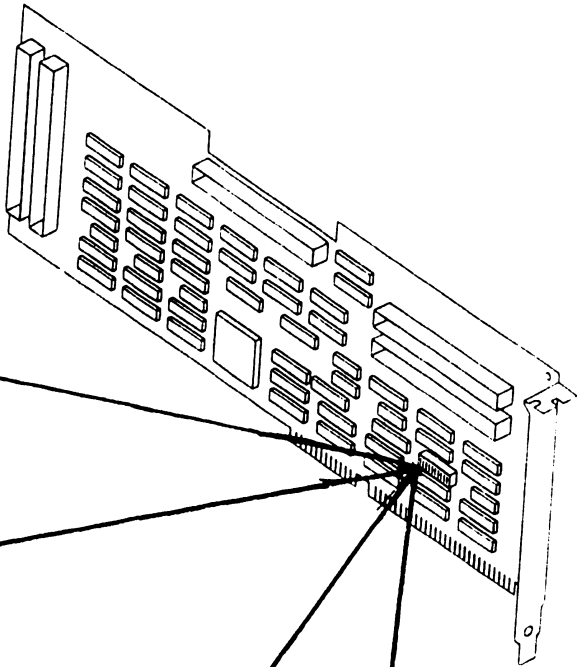
Software required for WIIS Imaging are:

- MS DOS 3.2 or Higher
- VS Operating System 7.14 or Higher
- VS WIIS Environment 2.20 or Higher
- 4250-IMG-SW-9 Workstation Software

END

7.2 Settings

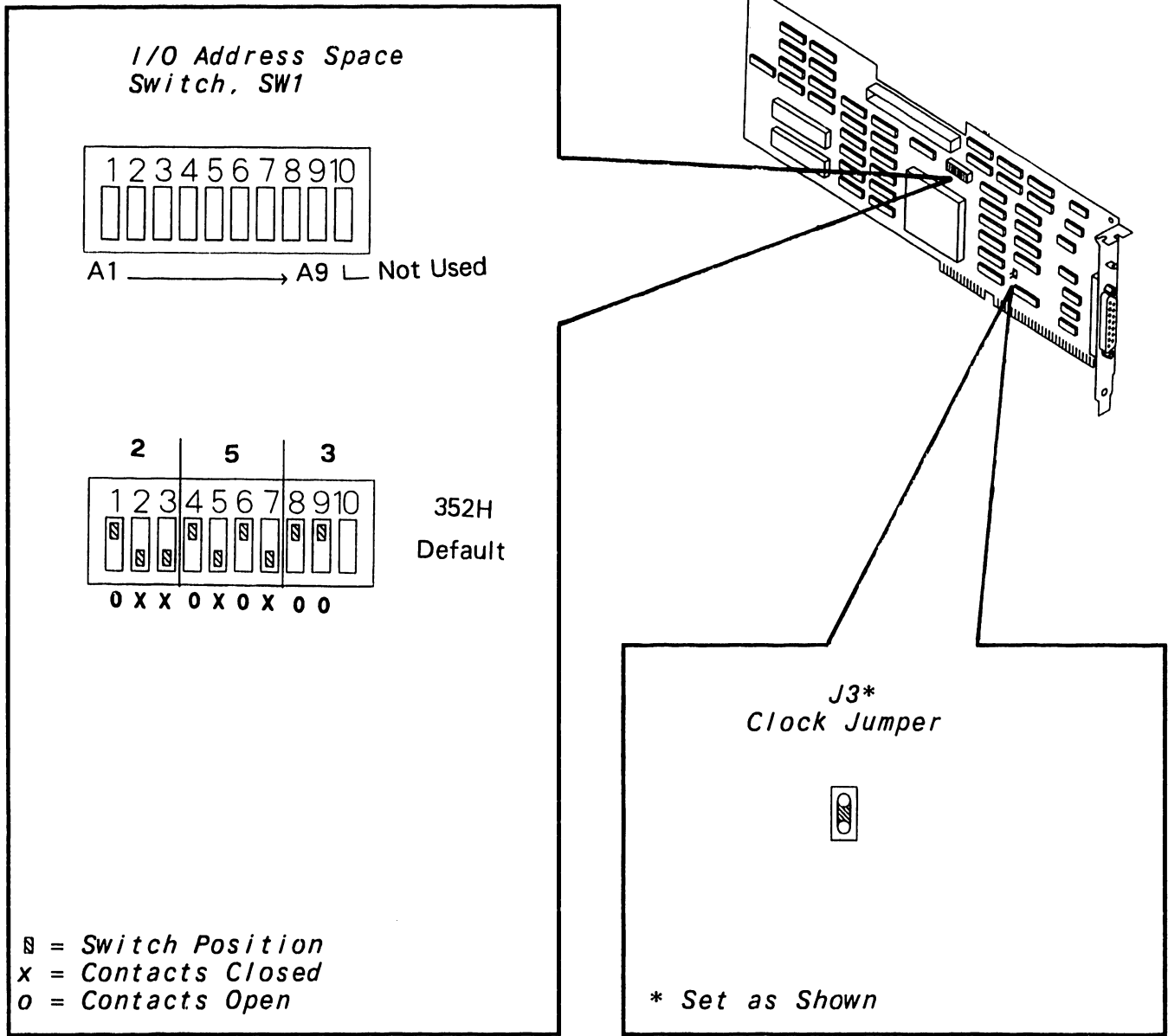
7.2.1 Image Processor Board



END

7.2 Settings

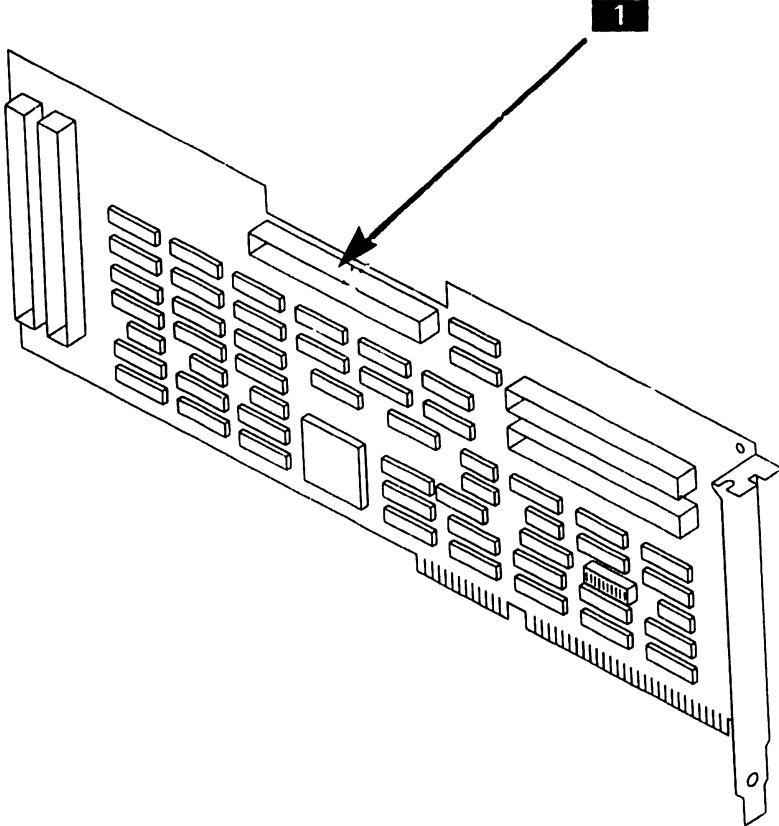
7.2.2 Scanner Controller Board



END

7.3 Controls And Indicators

7.3.1 Image Processor Board

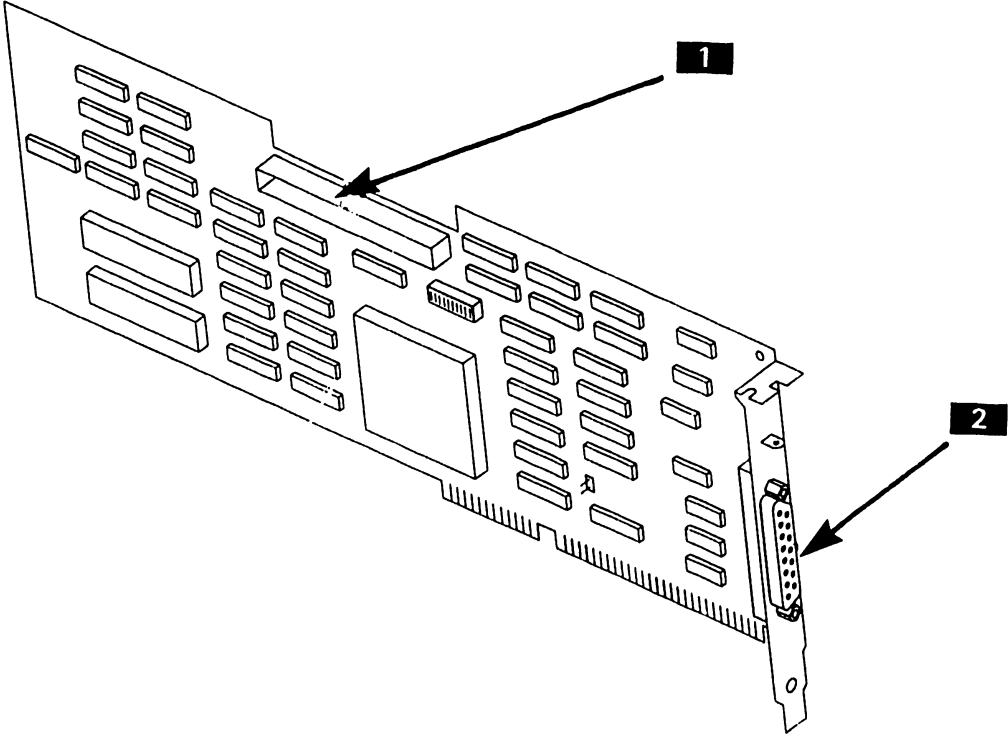


<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	Internal Connector, J1	Connector; 60-pin, provides interface signals, address, and data lines to Scanner Controller (or other optional controller).

END

7.3 Controls And Indicators

7.3.2 Scanner Controller Board



<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	Internal Connector, J2	Connector; 60-pin, provides interface signals, address, and data lines to Image Controller.
2	Interface Connector, J1	Connector 'D'; 37-pin, provides the physical interface between the scanner and Scanner Controller board.

END

7.4 Troubleshooting

7.4.1 Tools and Equipment

Tools and equipment required to troubleshoot the SC4000 Scanner Controller consists of BIT diagnostics and PC Diagnostic Utility.

~~~~~  
**NOTE**

*PC-280 and PC-380 BIT diagnostic error messages and error message interpretation are contained in Section 6 of their associated manuals.*  
~~~~~

END

7.4 Troubleshooting

7.4.2 Power-Up BIT Diagnostics

Power-up BIT Diagnostics perform diagnostics testing of the system every time the PC is powered-on. If a problem is encountered, run the Diagnostic Utilities. (→ 7.4.3)

Prior to powering-on, perform the following hardware checks.

- The two boards are properly seated in expansion slots.
- Internal cabling is properly connected.
- Image Processor Address I/O Space switch is set to a valid, non-conflicting address. (→ 7.2.1)
- SC4000 Scanner Controller Address I/O Space switch is set to a valid, non-conflicting address. (→ 7.2.2)
- Scanner interface cable is properly connected.
- Scanner is powered-on.

END

7.4 Troubleshooting

7.4.3 Diagnostic Utility

Diagnostic Utility is a diskette based troubleshooting aid that allows the user or CE to run extensive diagnostic testing.

Minimum hardware requirements for running Diagnostic Utility requires a PC 280 or PC 380 with the following PCAs installed:

- Image Processor Board
- SC4000 Scanner Controller
- 16" Monitor Controller Card (100 or 200 DPI, system dependent)

Additionally, a 16 inch monitor and a SC4000 Scanner is required. (The SC4000 Scanner is required to run Scanner Panel test, Automatic Document Feeder test, and Video Confidence tests.)

Diagnostic Utility part number 195-7330-0 Revision 2900 or higher supports the SC4000 Scanner Controller and Image Processor Controller. Refer to associated PC manual for Diagnostic Utility operating procedures and to the documentation supplied with the Diagnostic Utility.

END

7.4 Troubleshooting

7.4.4 Troubleshooting Procedures

Troubleshooting procedures are presented in the format: Fault Condition and Troubleshooting Actions.

<i>Fault Condition</i>	<i>Troubleshooting Action</i>
System will not power-up with SC4000 Scanner Controller and Image Processor installed	<ul style="list-style-type: none"> • SC4000 Scanner Controller or Image Processor may be defective: Remove SC4000 Scanner Controller and Image Processor and re-boot the system. If system powers-up, SC4000 Scanner Controller and/or Image Processor may be defective. Run power-up diagnostics and Diagnostic Utility to verify system integrity. Verify SC4000 Scanner Controller I/O Address Space switch settings (→ 7.2.2). Verify Image Processor Controller I/O Address Space switch settings (→ 7.2.1). Replace one of the two boards and perform power-on procedures. • If system still does not power up, replace other board and perform power-on procedures. Replace defective board(s).
System powers-up, BIT error is encountered.	<ul style="list-style-type: none"> • Verify boards I/O Address Space switch settings. Reseat boards and perform system power-on procedure. If error continues, replace one board at a time to determine the failing unit. Run Diagnostic Utility to verify system integrity.
System powers-up, BIT Test passes, scanner does not function	<ul style="list-style-type: none"> • Scanner Controller may be defective: Verify scanner cabling and that scanner is powered-on. (Refer to Document Scanner manual 741-1842.) • Run Diagnostic Utility to verify scanner integrity.

END

7.5 Parts Replacement

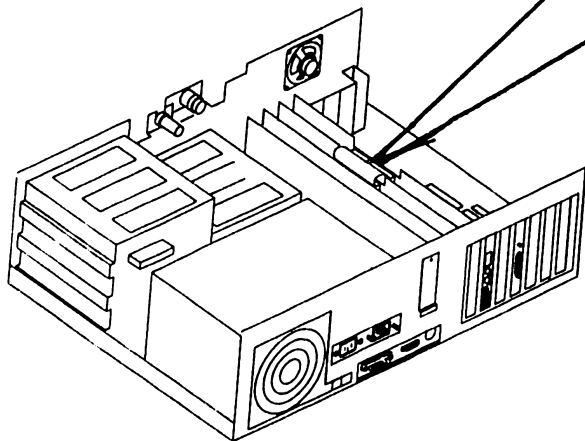
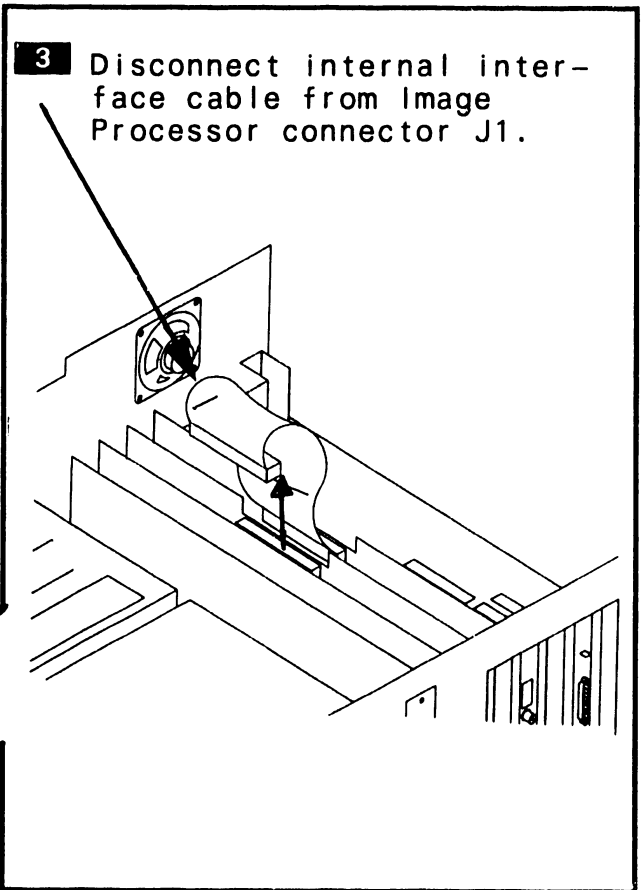
7.5.1 Image Processor (Sheet 1 of 2)

To Remove

~~~~~  
**NOTE**

Parts replacement illustrations use Professional Computer Model 280. PC Model 380 parts replacement procedure for this option are similar.  
~~~~~

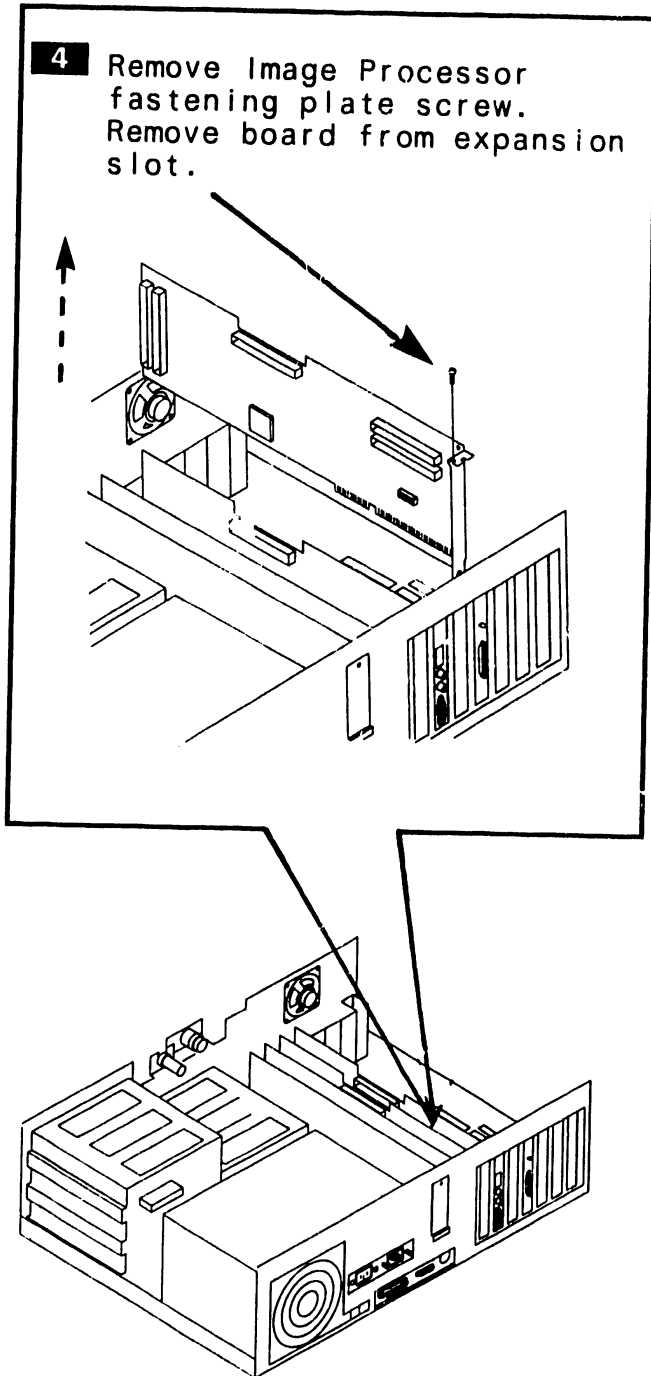
- 1** Power unit OFF and disconnect ac power.
- 2** Remove electronic enclosure top/front cover. (Refer to appropriate manual.)



->NEXT

7.5 Parts Replacement

7.5.1 Image Processor (Sheet 2 of 2)



To Install

- 1** Verify Image Processor I/O Address Space switch settings. (- 7.2.1)

NOTE

Image Processor must be installed in a 16-bit expansion slot adjacent to SC4000 Scanner Controller.

- 2** Reverse removal procedures to complete the installation.

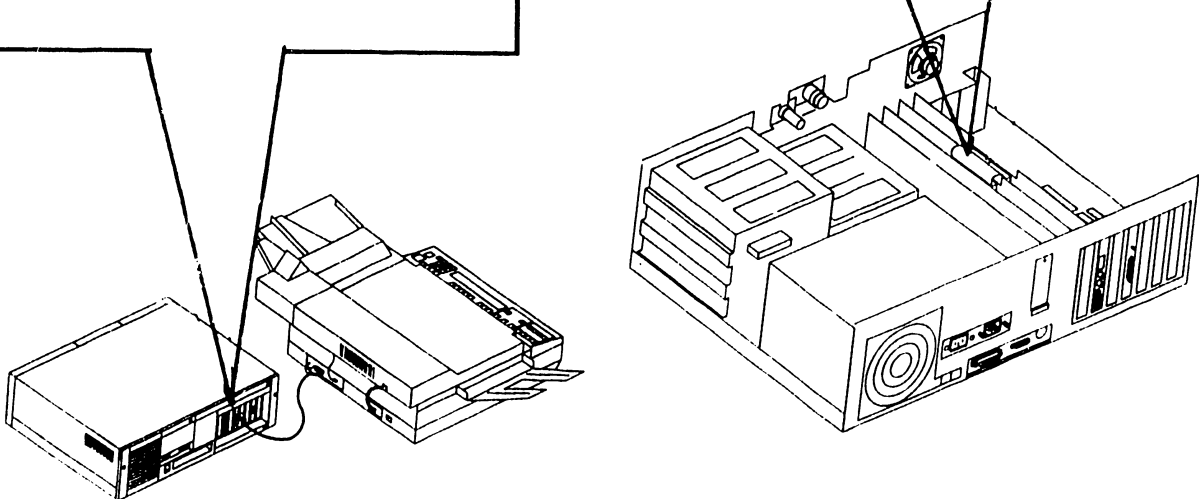
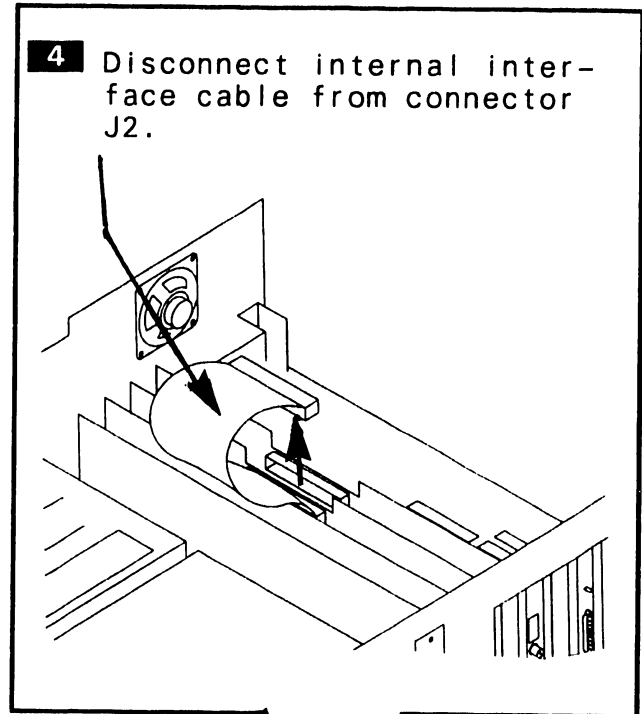
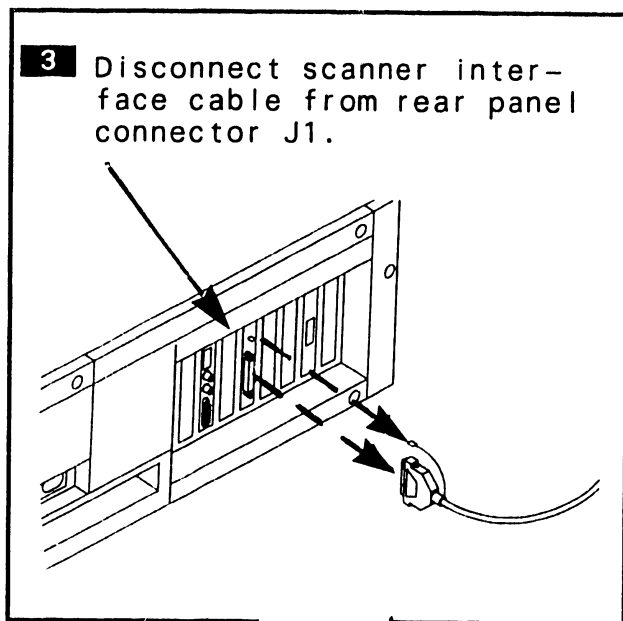
END

7.5 Parts Replacement

7.5.2 SC4000 Scanner Controller (Sheet 1 of 2)

To Remove

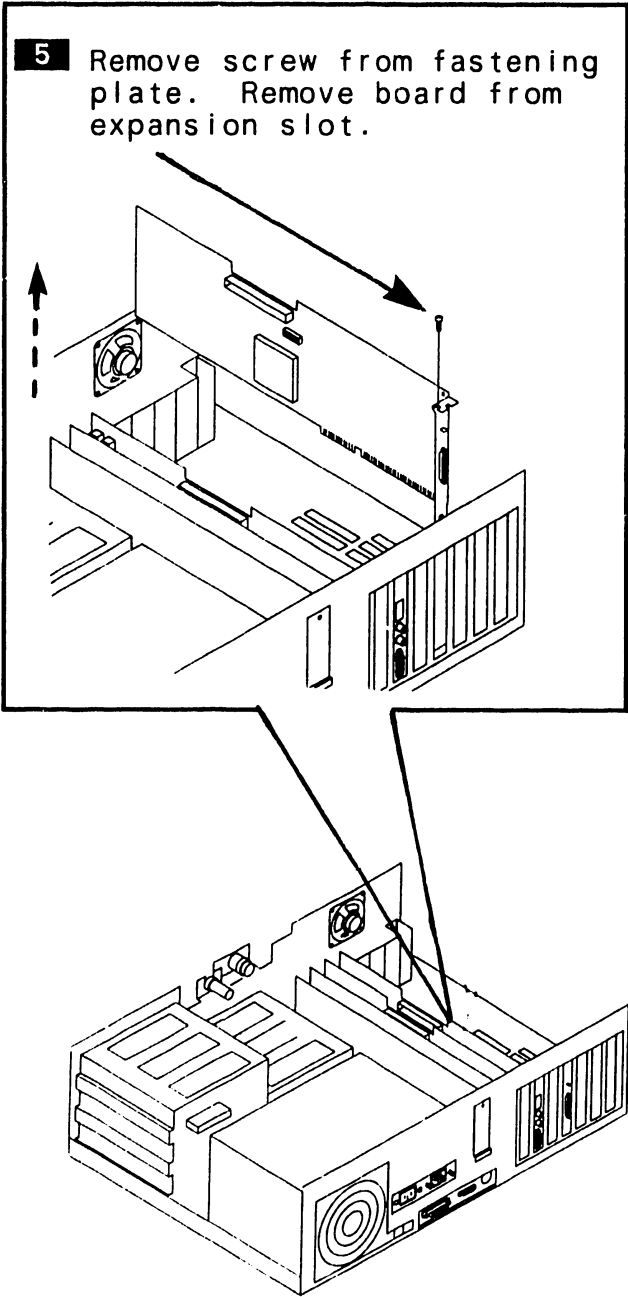
- 1** Power unit OFF and disconnect ac power.
- 2** Remove electronic enclosure top/front cover. (Refer to appropriate manual.)



->NEXT

7.5 Parts Replacement

7.5.2 SC4000 Scanner Controller (Sheet 2 of 2)



To Install

- 1** Verify SC4000 Scanner Controller Address Space switch setting. (→ 7.2.2)

~~~~~  
**NOTE**  
 SC4000 Scanner Controller must be installed in 16-bit expansion slot adjacent to the Image Processor.  
 ~~~~~

- 2** Reverse removal procedures to complete the installation.

END

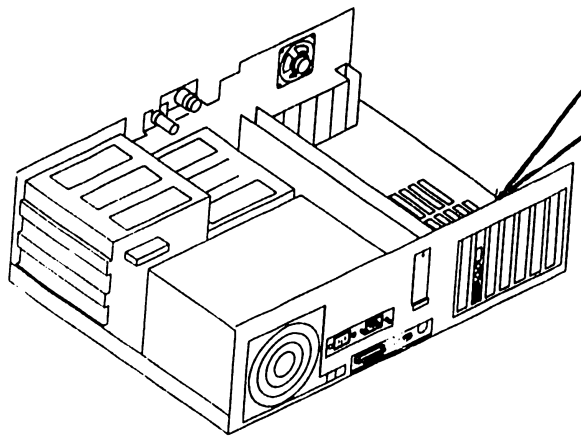
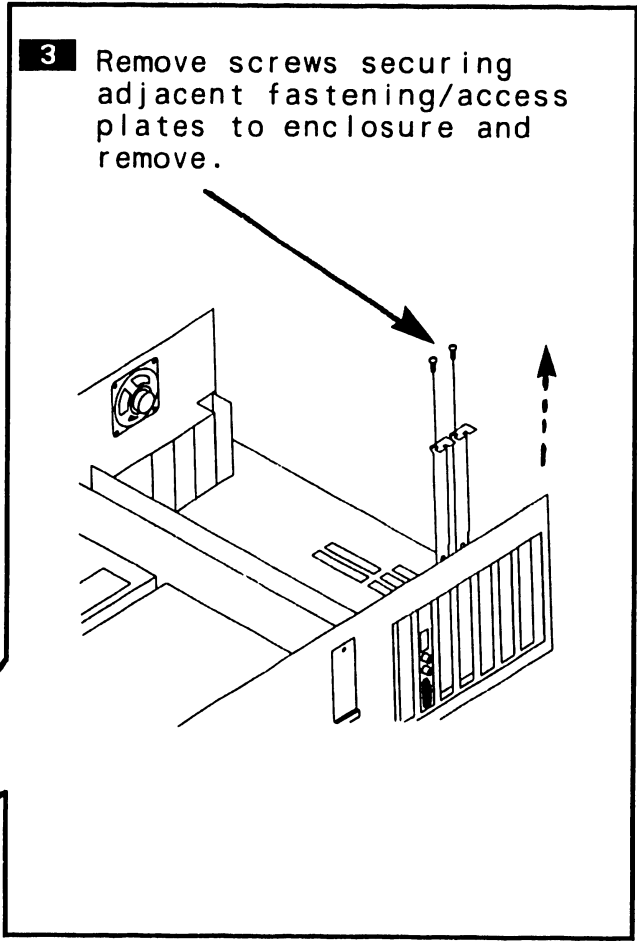
7.6 Installation

7.6.1 Image Processor/Scanner Controller Installation (Sheet 1 of 2)

NOTE

Series 240 Professional Computer does not support the SC4000 Scanner Controller option.

- 1 Power unit OFF and disconnect ac power.
- 2 Remove top/front cover. (Refer to associated manual.)



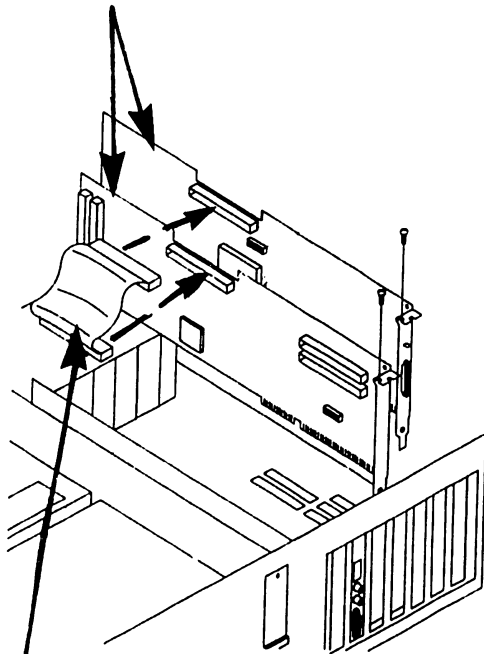
- 4 Verify Image Processor I/O Address Space switch settings. (- 7.2.1)
- 5 Verify SC4000 Scanner Controller I/O Address Space switch settings. (- 7.2.2)

->NEXT

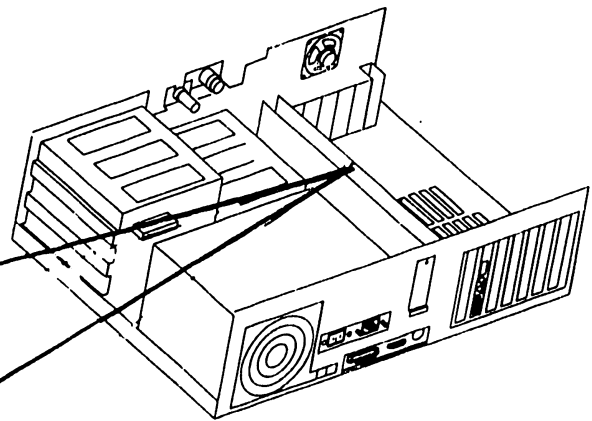
7.6 Installation

7.6.1 Image Processor/Scanner Controller Installation (Sheet 2 of 2)

- 6** Install Image Processor and Scanner Controller into adjacent slots and secure with screws removed in Step 3.



- 7** Install internal jumper cable from Image Processor connector J1 to Scanner Controller connector J2.

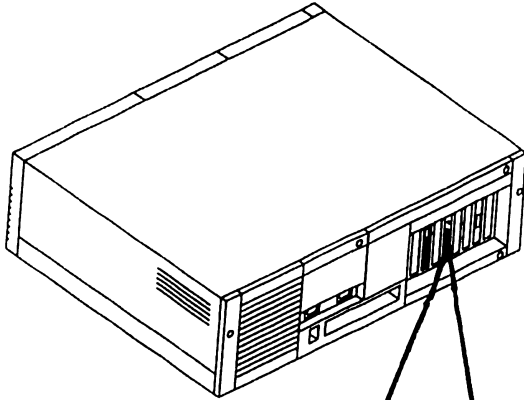


- 8** Replace top/front cover.

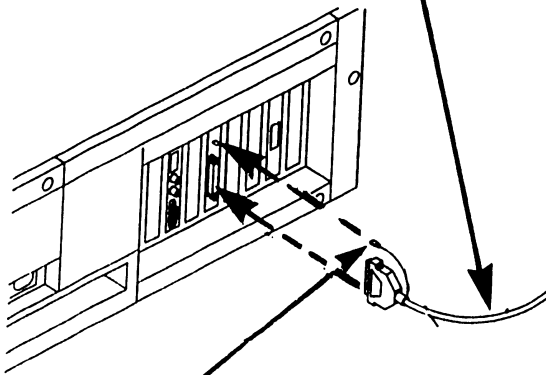
END

7.6 Installation

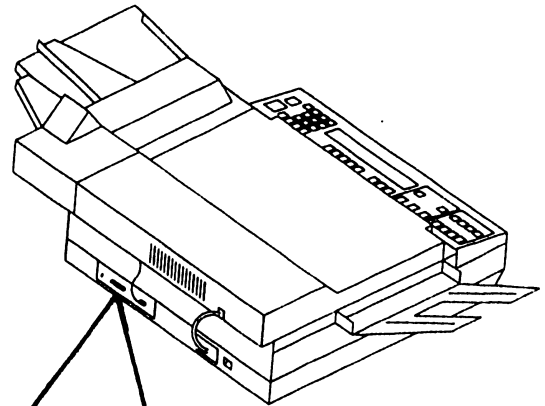
7.6.2 SC4000 Scanner Controller Cabling



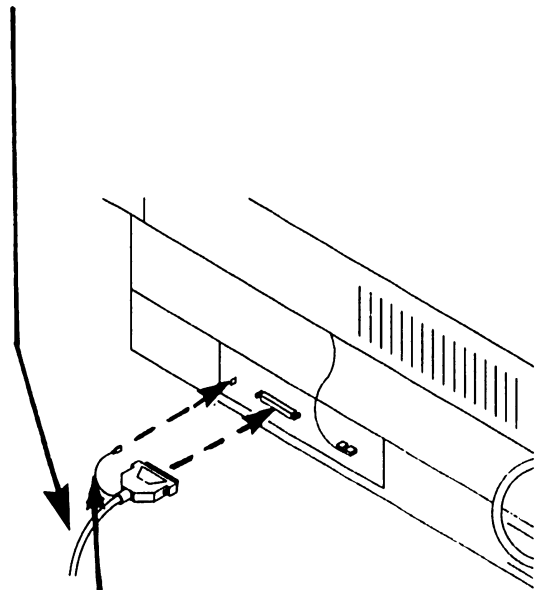
- 1** Connect scanner cable to scanner connector. Secure with two captive screws.



- 2** Connect scanner cable ground lead to controller ground tab.



- 3** Connect scanner cable to scanner.

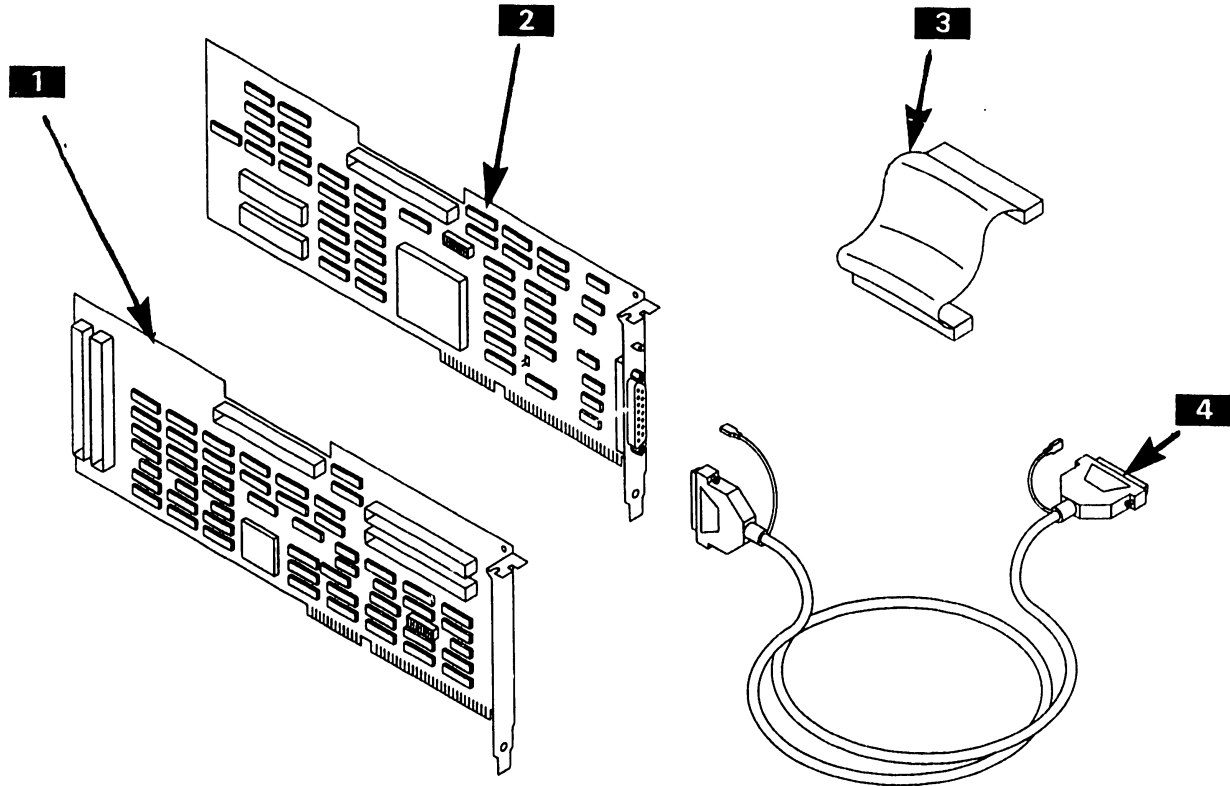


- 4** Connect scanner cable ground lead to ground tab on scanner chassis.

END

SC4000 SCANNER CONTROLLER

7.7 Illustrated Parts



Item	Part Number	Description
1	210-9428	Image Processor
2	210-8987	SC4000 Scanner Controller
3	220-3485	Internal Cable; 1-1/2 inch, 60 Position Socket-Socket
4	421-0121	Interface Cable, 6 feet, 37 Position Socket-Socket

END

SECTION 8

1.44-MB

DISKETTE DRIVE

SECTION 8
TABLE OF CONTENTS

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8.1 INTRODUCTION.....	8-2
8.2 SETTINGS.....	8-3
8.3 CONTROLS AND INDICATORS.....	8-4
8.4 TROUBLESHOOTING.....	8-5
8.4.1 Tools and Equipment.....	8-5
8.5 PARTS REPLACEMENT.....	8-6
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8.7 SPECIFICATIONS.....	8-9

8.1 Introduction

The 1.44-MB diskette drive is a half-height, 3.5-inch PC 200/300 series option that supports double-sided, 720-KB "microdisks" (P/N 725-2995 or equivalent) and high-density, 1.44-MB microdisks (P/N 725-3657). Each microdisk is sealed in a durable plastic holder that inserts easily into the diskette drive. The drive can be installed in any of the CPU/system unit's half-height enclosure compartments.

~~~~~  
**NOTE**

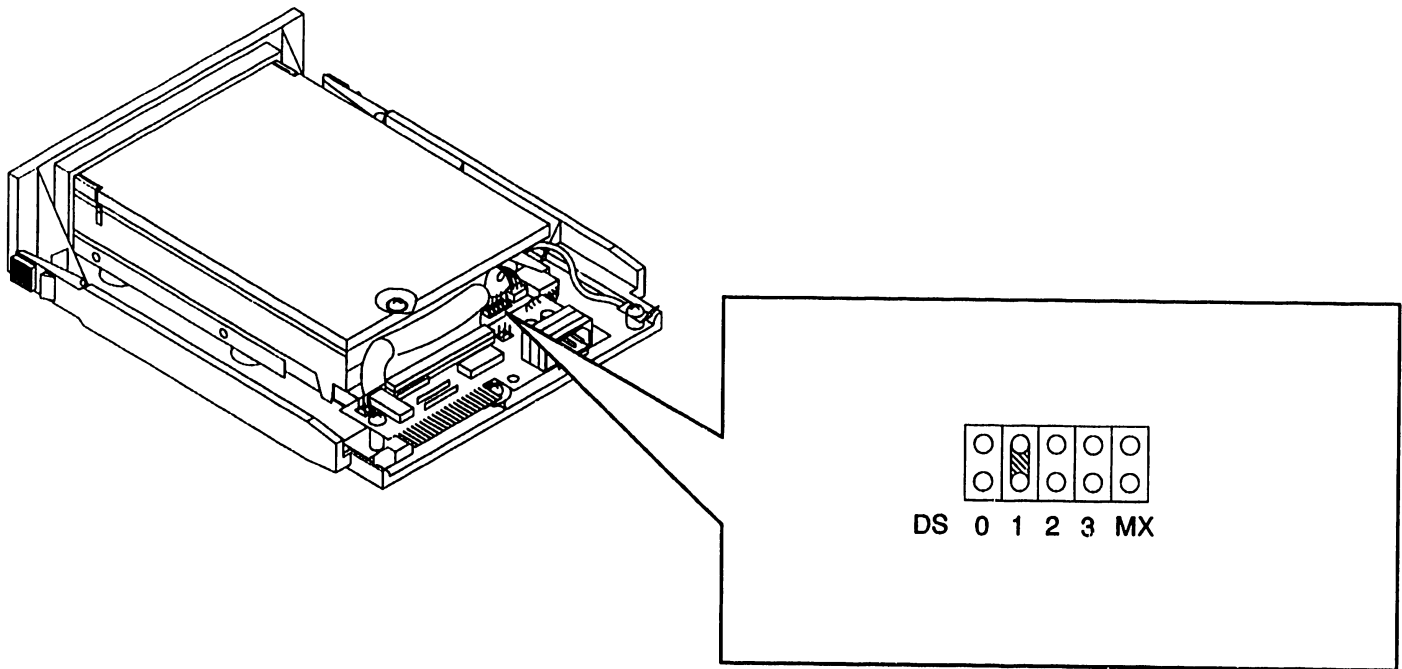
Refer to the Specifications section for a list of technical characteristics pertaining to the 1.44-MB drive.  
~~~~~

The 1.44-MB drive option package (model number DSK-0014-PC2) contains:

- 1.44-MB diskette drive (P/N 279-0824)
- Documentation

END

8.2 Settings



~~~~~

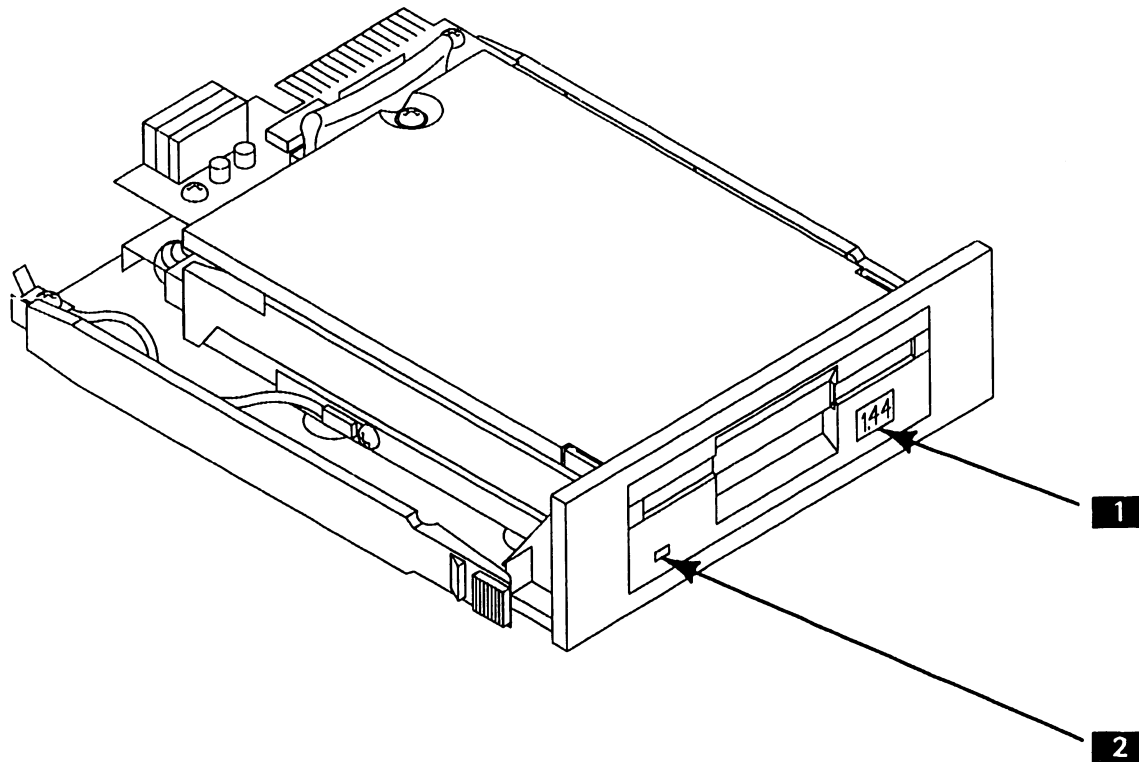
**NOTE**

Removable jumper should always be set on DS1. There are no other jumpers to check or set on 1.44-MB drive.

~~~~~

END

8.3 Controls and Indicators



<i>Item</i>	<i>Name</i>	<i>Description</i>
1	Disk cartridge eject button	Push-button; ejects microdisk from drive.
2	Activity LED	Bi-color LED; illuminates amber (1.44-MB operation) or red (720-KB operation) when drive read/write activity occurs.

END

8.4 Troubleshooting

8.4.1 Tools and Equipment

The PC 200/300 Diagnostic Utility Support Package (P/N 195-5537-9) Rev. 2860 or greater contains diagnostics that test the 1.44-MB diskette drive. The diagnostic tests in the support package that pertain specifically to the 1.44-MB drive are:

- 1.44-MB Diskette Ctrlr/Drive (for CE use)
- Mfg 1.44-MB Diskette Ctrlr/Drive (for Manufacturing use)

The field repair strategy for the 1.44-MB diskette option specifies replacement of the drive assembly and associated cabling as field-replaceable units (FRUs). No on-site repair of drive components is permitted.

~~~~~  
**NOTE**

PC built-in test (BIT) diagnostic error messages, error message interpretation, and system troubleshooting strategies are contained in the appropriate PC system manual.  
~~~~~

END

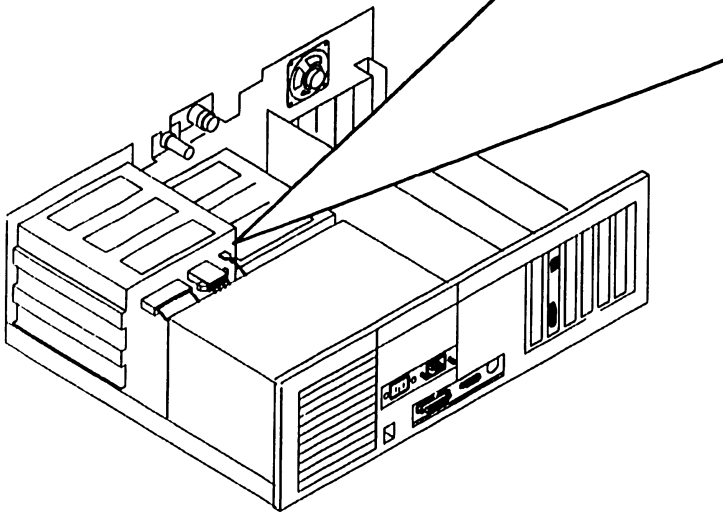
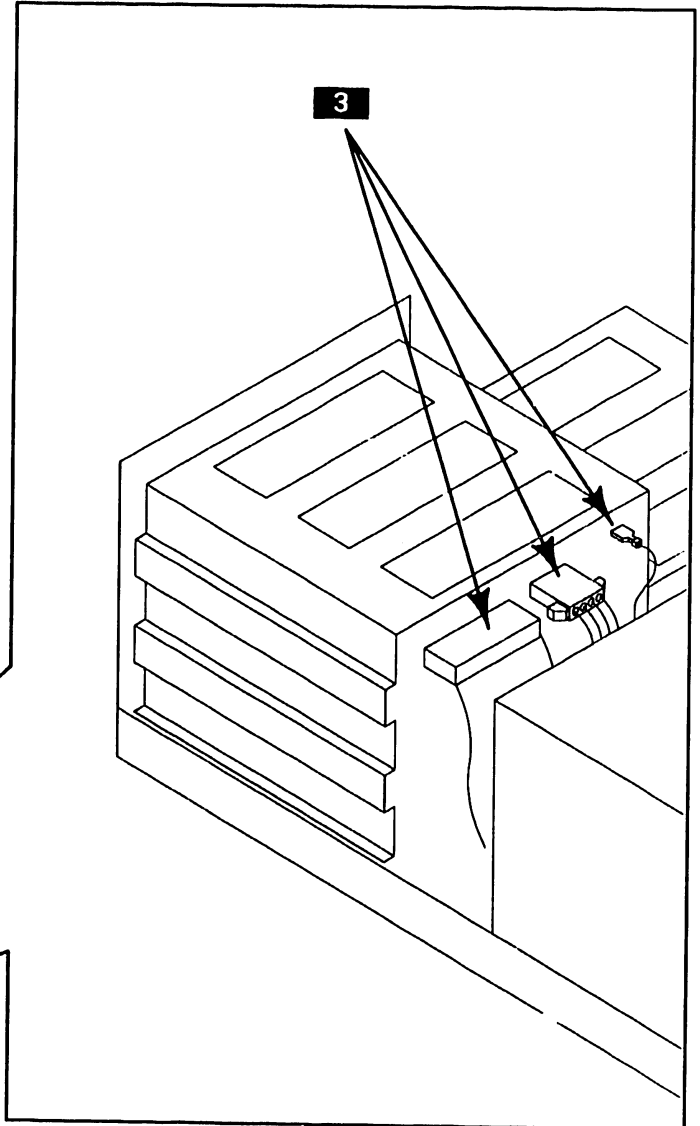
8.5 Parts Replacement (Sheet 1 of 2)

To Remove

~~~~~  
**NOTE**

Parts replacement illustrations show Professional Computer Model PC 280. (PC models 240 and 380 parts replacement procedures for the 1.44-MB diskette are similar.)  
~~~~~

- 1** Power down system and disconnect ac power.
- 2** Remove system unit top/front cover.
- 3** Disconnect cabling from rear of diskette drive.
- 4** Apply pressure to drive's guide rails and pull drive out of enclosure.



->NEXT

8.5 Parts Replacement (Sheet 2 of 2)

To Install

- 1** Verify jumper position on rear of diskette drive. [→ 8.2]
- 2** Slide diskette drive completely into desired half-height enclosure compartment until drive locks into place.
- 3** Connect signal and power cables to rear of diskette drive.
- 4** Reinstall system unit top/front cover.
- 5** Run SETUP (part of INSTALL program) to reconfigure system.

END

8.6 Installation

The 1.44-MB diskette drive may be installed in any of the system unit's half-height enclosure compartments. Because the 1.44-MB drive's termination resistor is built into the unit, the termination resistor cannot be removed.

NOTES

If a PC 200/300 series system contains a 1.44-MB drive and a 360-KB or a 1.2-MB drive, the 1.44-MB unit and the non-1.44-MB diskette drive retain their termination resistor.

Minimum PROM levels that support 1.44-MB diskette drive option on PC series 200 computers: 7002 R3 and 7003 R3, microcode revision 3.10.01 or greater. Minimum PROM levels that support 1.44-MB drive on PC series 300 computers: 7007 and 7008, microcode revision 1.10.03 or greater.

- 1 Power down the PC and disconnect ac power.

NOTE

Refer to appropriate PC system manual and diagnostic documentation for specifics concerning system disassembly and the PC 200/300 series diagnostic utility.

- 2 Remove system cover.

- 3 Verify proper jumper position on rear of drive [→ 8.2]

- 4 Slide diskette drive completely into desired half-height enclosure compartment.

- 5 Connect signal and power cables to rear of drive.

- 6 Reconnect system unit ac power.

NOTE

The 1.44-MB drive will read and write only in the density appropriate for the media installed in the drive. In order for the drive to read from or write to the diskette, a 1.44-MB microdisk must be formatted as 1.44 MB; a 720-KB diskette must be formatted as 720 KB.

- 7 Run SETUP (part of INSTALL program) to reconfigure system.

- 8 Run diagnostic utility to verify proper drive operation.

- 9 Reinstall system unit cover.

END

8.7 Specifications

Physical Dimensions

Height: 1.6 in. (4.06 cm)

Width: 5.8 in. (14.73 cm)

Depth: 8.0 in. (20.32 cm)

Weight

1.22 lb maximum (.55 kg)

Power Requirements

Power: +5 Vdc \pm 0.25 Vdc @ 0.32 A (typical)/0.7 A (maximum), 50 mV p-p ripple; +12 Vdc \pm 0.6 Vdc @ 0.20 A (typical)/0.21 A (maximum), 100 mV p-p ripple

Heat Dissipation: 3.5 Watts (max.)

Temperature Range

Ambient Operating Environment:
40°F to 122°F (4.4°C to 50°C)

Humidity Range

20% to 80%, no condensation

Altitude

500 feet below sea level to 10,000 feet above sea level

Performance Specifications

Recording Capacity:

High-density diskette -- 1.44 MB (formatted), 2 MB (unformatted)
Low-density diskette -- 720 KB (formatted), 1 MB (unformatted)

Recording Heads: two, double-sided recording

Tracks: 80 per side (160 total)

Sectors Per Track (formatted): 32 (high-density diskette), 16 (low-density diskette)

Bytes Per Sector: 256

Bytes Per Track: 8.2 KB (high-density diskette), 4096 (low-density diskette)

Bytes Per Surface: 656 KB (high-density diskette), 328 KB (low-density diskette)

Data Transfer Rate: 500 K bits per second (high-density diskette), 250 K bits per second (low-density diskette)

Disk Speed:

Rotation Speed -- 300 rpm \pm 1.5% (long term)

Average Rotational Latency -- 100 ms
Motor Start/Stop Time -- 500 ms

Access Times:

Track-To-Track -- 6 ms
Average Access Time -- 96 ms
Head Settle Time -- 15 ms (maximum)

END

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