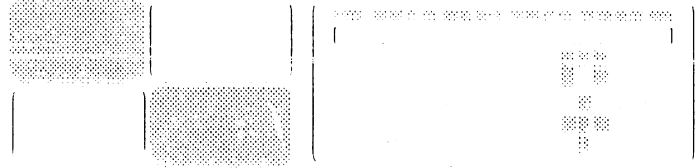




CUSTOMER SERVICE DOCUMENTATION



VS 5000 Series Workstation

Model: 4430

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Product Maintenance Manual

741-1875

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PREFACE

This document is the Product Maintenance Manual (PMM) for the Model 4430-VS Workstation. The manual is organized in accordance with Customer Engineering Technical Documentation's approved PMM outline. The scope of this manual reflects the type of maintenance philosophy selected for this product.

The purpose of this manual is to provide the Wang-trained Customer Engineer (CE) with instructions to operate, troubleshoot, and repair the 4430-VS workstation in the field. Familiarity with Wang workstations is recommended for the effective use of this manual.

This manual contains installation, operation, troubleshooting, and repair information for the 4430-VS workstation. It is divided into 12 sections numbered 1 through 12. Each section describes a separate maintenance subject and is arranged to minimize references to other sections. The information within a section consists of illustrations, numbered steps, and/or text describing the individual steps required to accomplish a task. The steps within a frame are numbered in sequence in a clockwise direction around the various illustrations. Each section is preceded by a section number and a section table of contents. The sections and associated frames are arranged in numerical sequence from left to right and from top to bottom on the individual fiche cards.

This manual will be updated on a regular schedule or as necessary. These updates will be published as Publication Update Bulletins (PUB's) or as full revisions.

First Edition (October, 1988)

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TABLE OF CONTENTS

SECTION 1 INTRODUCTION

	Page
1.1 EQUIPMENT IDENTIFICATION	1-2
1.2 REQUIRED SPECIAL SERVICE EQUIPMENT	1-3
1.3 REQUIRED PUBLICATIONS	1-4
1.4 MEANING OF NON-STANDARD SYMBOLS	1-5

SECTION 2 SETTINGS

	Page
2.1 SETTINGS (Not Applicable)	2-2

SECTION 3 CONTROLS AND INDICATORS

	Page
3.1 FRONT PANEL AND BIT	3-2
3.2 REAR PANEL	3-3
3.3 KEYBOARD	3-4

TABLE OF CONTENTS

SECTION 4 OPERATION

	Page
4.1 POWER-UP AND BIT TEST	4-2

SECTION 5 PREVENTIVE MAINTENANCE

	Page
5.1 CLEANING	5-2

SECTION 6 TROUBLESHOOTING

	Page
6.1 SPECIAL TOOLS AND EQUIPMENT	6-2
6.2 TROUBLESHOOTING APPROACH	6-3
6.3 TROUBLESHOOTING TABLE	6-4
6.4 ERROR CODES	6-5
6.5 KEYBOARD TEST	6-7
6.5.1 Test Description	6-7
6.5.2 Keyboard Data Table	6-8
6.6 DIAGNOSTIC OVERRIDE	6-10

TABLE OF CONTENTS

SECTION 7 PARTS REPLACEMENT

	Page
7.1 COVER REMOVAL AND REPLACEMENT	7-2
7.2 CPU BOARD REMOVAL AND REPLACEMENT	7-3
7.3 RF SHIELD REMOVAL AND REPLACEMENT	7-4

SECTION 8 ADJUSTMENTS

	Page
8.1 TOOLS AND TEST EQUIPMENT	8-2
8.2 ALIGNMENT PROCEDURE	8-3

TABLE OF CONTENTS

SECTION 9 INSTALLATION

	Page
9.1 INSTALLATION SITE CHECK	9-2
9.2 SPECIAL TOOLS	9-3
9.3 UNPACKING	9-4
9.4 CONNECTIONS	9-5

SECTION 10 FUNCTIONAL DESCRIPTION

	Page
10.1 OVERVIEW	10-2
10.2 BLOCK DIAGRAM DESCRIPTION	10-3

TABLE OF CONTENTS

SECTION 11 SPECIFICATIONS

	Page
11.1 EQUIPMENT	11-2

SECTION 12 ILLUSTRATED PARTS

	Page
12.1 WORKSTATION COMPONENTS	12-2
12.2 MONITOR SUBASSEMBLY	12-3

SECTION 1
INTRODUCTION

SECTION 1 CONTENTS

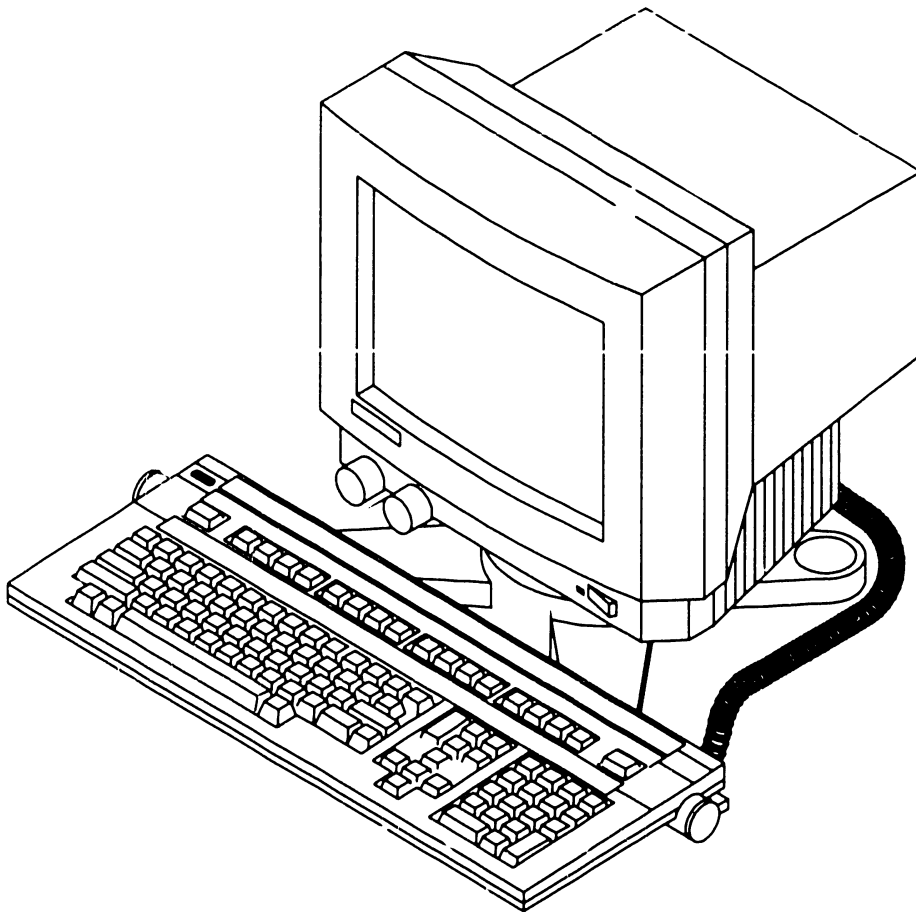
SECTION 1 INTRODUCTION

	Page
1.1 EQUIPMENT IDENTIFICATION	1-2
1.2 REQUIRED SPECIAL SERVICE EQUIPMENT	1-3
1.3 REQUIRED PUBLICATIONS	1-4
1.4 MEANING OF NON-STANDARD SYMBOLS	1-5

INTRODUCTION

1.1 Equipment Identification

This manual contains installation, troubleshooting, and repair information for the 4430 workstation. It also contains a functional description of the 4430 and an illustrated breakdown of replaceable parts.



VS 5000 SERIES WORKSTATION, MODEL 4430

● END

INTRODUCTION

1.2 Required Special Service Equipment

There is no special service equipment required to maintain the 4430 workstation.

● END

1.3 Required Publications

For additional information, refer to the 4430-VS workstation installation and instruction guide (WLI# 715-2283).

● END

1.4 Meaning of Non-standard Symbols

The non-standard symbols used in this manual are defined as follows:

(▶X.X): The arrow symbol followed by a section paragraph number denotes the section of the manual the user should reference to obtain the information necessary to accomplish a specific task. The symbol is used to reference previous as well as subsequent sections.

▶NEXT: The arrow symbol followed by "NEXT" indicates that the task is continued on the next page.

● END: The stop symbol followed by "END" indicates that the task is completed on that page.

● END

SECTION

2

SETTINGS

SECTION 2 CONTENTS

SECTION 2 SETTINGS

Page

2.1	SETTINGS	2-2
-----	----------------	-----

2.1

SETTINGS

The 443C workstation has no external or internal switch settings or jumpers.

● END

SECTION

3

**CONTROLS AND
INDICATORS**

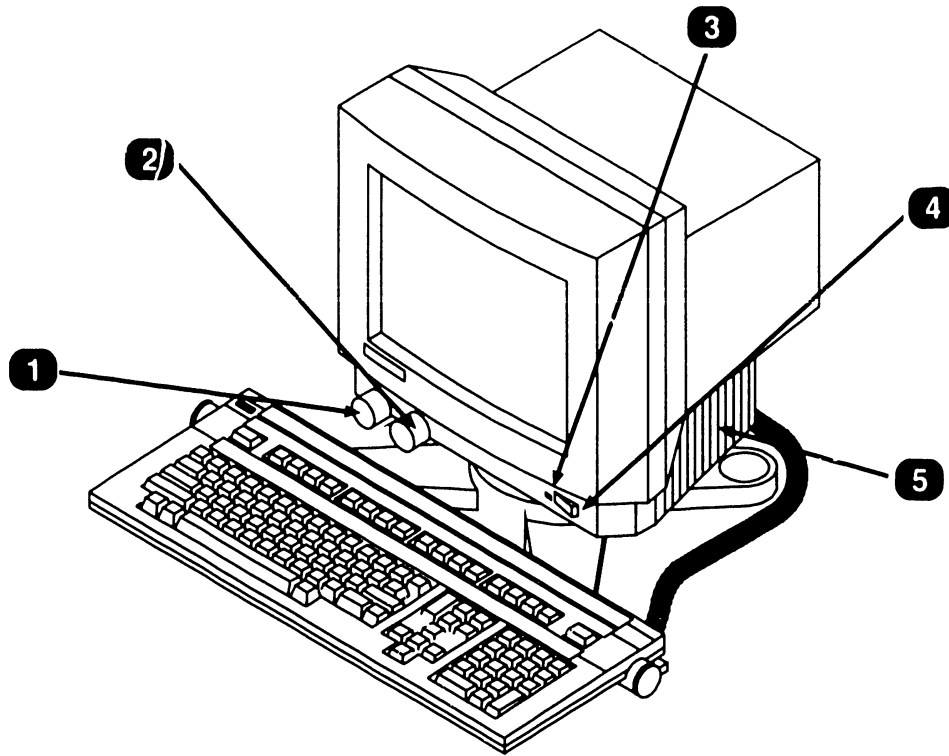
SECTION 3 CONTENTS

SECTION 3 CONTROLS AND INDICATORS

	Page
3.1 FRONT PANEL AND BIT	3-2
3.2 REAR PANEL	3-3
3.3 KEYBOARD	3-4

3.1 CONTROLS AND INDICATORS

3.1 Front Panel and BIT

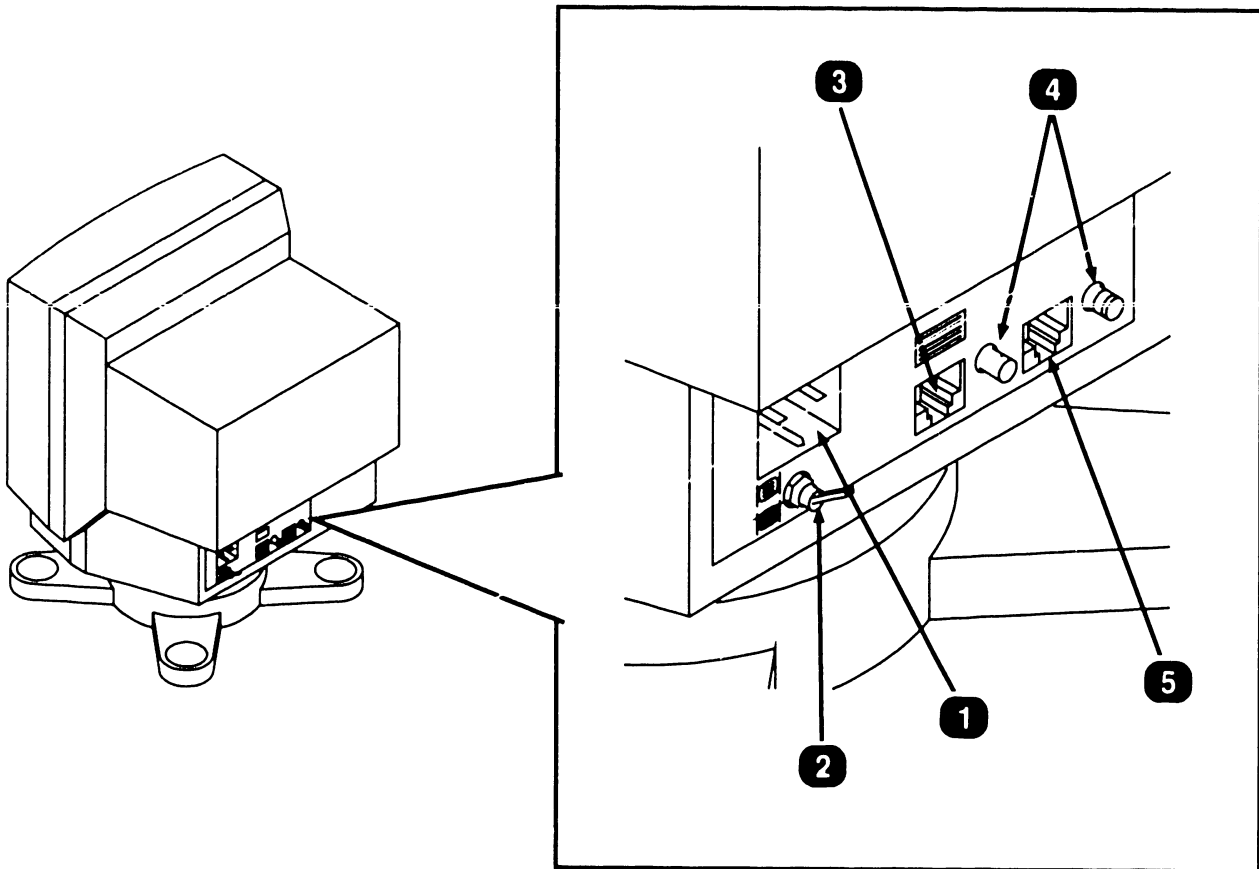


<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	Contrast	Potentiometer; controls contrast of video display.
2	Brightness	Potentiometer; adjusts brightness of video display.
3	Power-On Indicator	LED; illuminates when workstation is powered on.
4	Power-On Control	Switch; turns workstation on (1) and off (0).
5	BIT Diagnostic Indicator	LED; indicates status of BIT and data link. Illuminates when an error is detected.

END

3.2 CONTROLS AND INDICATORS

Rear Panel

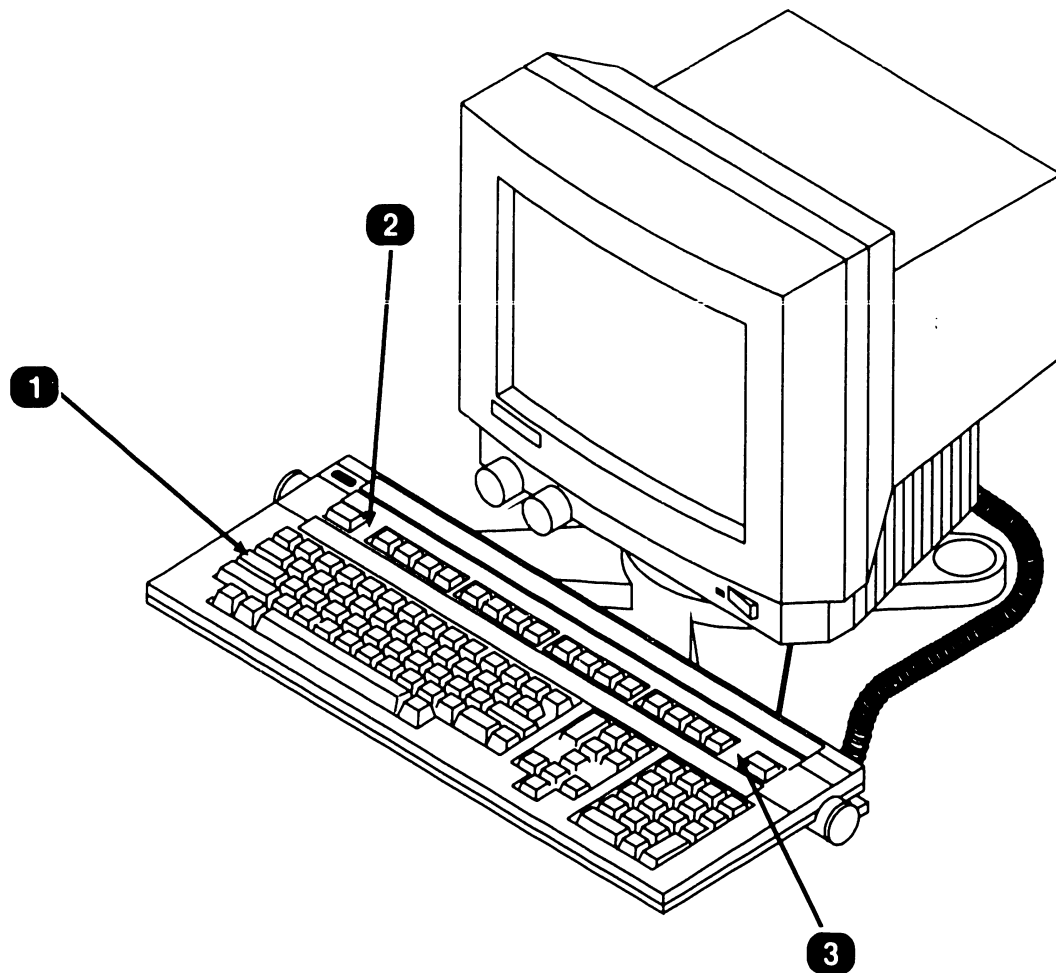


<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	AC Receptacle	3-pin connector; AC cable input receptacle.
2	Inverse Video Control	Toggle switch; selects normal or inverse video (white on black) display.
3	Keyboard Connector	RJ-11 jack; keyboard cable input connector.
4	CPU Connectors	Coaxial connectors; provides 928 coaxial connection to VS 5000 system.
5	CPU Connector	RJ-11 jack; provides 928 twisted pair connection to VS 5000 system.

● END

3.3 CONTROLS AND INDICATORS

3.3 Keyboard



<i>Item</i>	<i>Name</i>	<i>Type and Function</i>
1	SHIFT (Lock)	LED; indicates keyboard is in shift (caps lock) mode when lit.
2	HELP	LED; responds to a variety of control commands for message signaling when lit.
3	NUM LOCK	LED; indicates IBM "NUM LOCK" condition when lit.

● END

SECTION

4

OPERATION

SECTION 4 CONTENTS

SECTION 4 OPERATION

Page

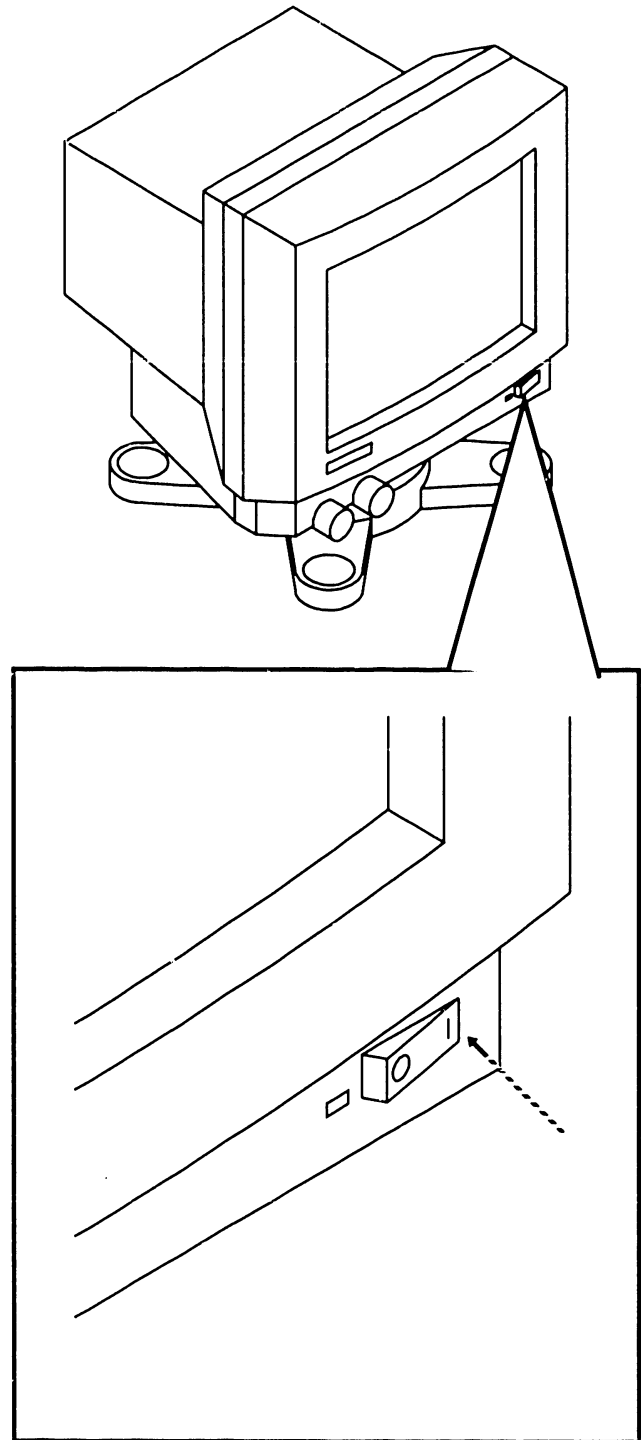
4.1	POWER-UP AND BIT TEST	4-2
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4.1 Power-Up and BIT Test

The workstation is powered-up by setting the power switch to on (1). The BIT test is performed automatically whenever the workstation is powered-up and consists of a series of separate hardware tests which check the integrity of the workstation prior to logging on to the VS system. If no errors are detected during the power-up sequence, the BIT releases control to the data link which loads and runs the operational software. If an error is detected, the BIT test is interrupted and an error code is generated and displayed on the workstation screen. The hardware tested by the BIT consists of main memory, CRT memory, parity generation, CRT control circuit, keyboard, USART, and TC drivers.

There are a number of tests other than the normal power-up sequence which can be performed during power-up to exercise other workstation circuits, the keyboard, and the keyboard interface circuit. These tests are accomplished by interrupting the normal power-up mode using specific keystroke sequences. The normal power-up mode, the additional BIT tests and their screen displays are:

- Normal BIT power-up sequence
- Loop on BIT test
- Video test patterns
- Refresh test
- Keyboard test



● END

4.1 Power-Up and BIT Test

Normal BIT power-up sequence

The normal power-up sequence is initiated whenever the workstation power switch is set to (1). This starts the BIT test which runs a series of hardware tests and displays a video attributes screen to allow the operator to adjust the brightness. The BIT then queries the keyboard to determine if the CANCEL key has been pressed. If it has, the keyboard will beep a second time allowing the operator to select one of the special tests listed on the previous page.

If no input is received from the keyboard, the BIT executes an additional hardware test and if no errors are detected (and no loopback connector is connected to the keyboard), the BIT releases control to the data link and the VS Logon screen is displayed.

If an error is detected, however, the BIT test stops and an error code is displayed to the operator. Also, the IPL is inhibited unless overridden by pressing the SHIFT/HELP keys. This override allows the workstation to be used although the unit has a non-fatal hardware fault (▶6.6).

```

REV55A0 (c) COPR WANG LABORATORIES INC
IN07=4C IN08=58

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6
7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7

PAL CW NP JS PH DR DH TB LK JF WR DC MS WN BH WV JR JER

```

VIDEO ATTRIBUTES DISPLAY

```

      * * Wang VS Logon * *
Workstation 49  9:37am  Tuesday September 6, 1988

      Hello new user
      Welcome to VS5450

Please identify yourself by supplying the following information

      Logon ID = ____
      Password =

```

VS LOGON DISPLAY

● END

4.1 Power-Up and BIT Test

Loop-on-BIT Test

The loop-on-BIT test is selected by pressing CANCEL after the first keyboard beep and then pressing PF2 immediately following the sound of the second keyboard beep. This mode causes the BIT tests to repeat until an error is detected. A loop count is displayed and incremented on the screen each time the test is repeated. The test mode is exited by setting the power switch to off (O).

Video Test Patterns

This mode is selected by pressing CANCEL after the first keyboard beep and then pressing PF3 immediately following the sound of the second keyboard beep. The test generates a video attributes test pattern on the screen and is designed to verify that the video controller logic in the workstation is functioning properly. The test also allows the user to select a video alignment display for alignment purposes. The alignment pattern is obtained by pressing any key after entering the video test patterns mode.

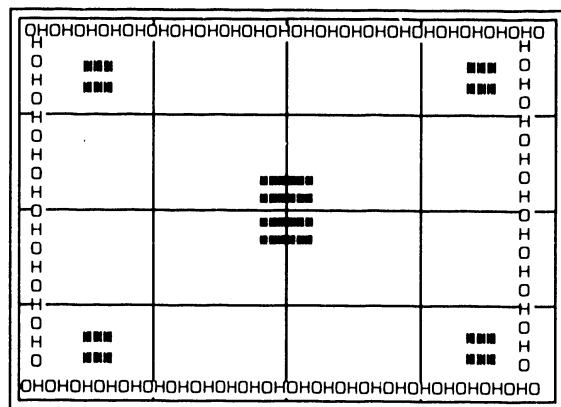
Pressing the CANCEL key in this mode will release you to the BIT and pressing SHIFT/CANCEL to the operating system. Pressing the PF8 key starts and stops the motion of the attributes display.

```
REV55A0 (c) COPR WANG LABORATORIES INC
IN07=4C IN08=58
0010
```

LOOP-ON-BIT DISPLAY

```
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6
7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
```

VIDEO ATTRIBUTES TEST PATTERN



VIDEO ALIGNMENT DISPLAY

● END

4.1 Power-Up and BIT Test

Refresh Test

The refresh test is selected by pressing CANCEL after the first keyboard beep and then pressing PF4 immediately following the sound of the second keyboard beep. When entered, the test writes a 55 pattern in a section of memory, pauses 15 seconds, and tests for data integrity. The test is run in the loop-on-test mode with a loop counter being incremented on the screen. Pressing the CANCEL key releases the workstation back to the BIT.

```
REV55A0 (c) COPR WANG LABORATORIES INC
IN07=4C IN08=58
0010
REFRESH TEST WILL UPDATE COUNT EVERY 15 SEC.
```

REFRESH TEST DISPLAY

Keyboard Test

The keyboard test is selected by pressing CANCEL after the first keyboard beep and then pressing PF9 immediately following the sound of the second keyboard beep. The test checks the keyboard and the keyboard interface. Pressing a key in this mode generates a keycode which is displayed as a hexadecimal number in the center of the screen. Pressing the SHIFT/CANCEL key releases the workstation to the BIT. The keyboard test and associated keycodes are covered in detail in the troubleshooting section (▶6.5) of the manual.

```
REV55A0 (c) COPR WANG LABORATORIES INC
IN07=4C IN08=58
```

4F

KEYBOARD TEST DISPLAY

● END

SECTION

5

**PREVENTIVE
MAINTENANCE**

SECTION 5 CONTENTS

SECTION 5 PREVENTIVE MAINTENANCE

	Page
5.1 CLEANING	5-2

5.1 PREVENTIVE MAINTENANCE

Cleaning

Other than periodic cleaning of the workstation external cover and screen, no preventive maintenance is required. The keyboard should be dusted periodically using a soft-bristled brush.

- Clean the monitor cover using a slightly moistened (mild soap and water solution) lint-free cloth.
- Clean the screen using a good quality glass cleaner or a mild soap water solution.

● END

SECTION

6

TROUBLESHOOTING

SECTION 6 CONTENTS

SECTION 6 TROUBLESHOOTING

	Page
6.1 SPECIAL TOOLS AND EQUIPMENT	6-2
6.2 TROUBLESHOOTING APPROACH	6-3
6.3 TROUBLESHOOTING TABLE	6-4
6.4 ERROR CODES	6-5
6.5 KEYBOARD TEST	6-7
6.5.1 Test Description	6-7
6.5.2 Keyboard Data Table	6-8
6.6 DIAGNOSTIC OVERRIDE	6-10

6.1 Special Tools and Equipment

TROUBLESHOOTING

No special tools or test equipment are required to troubleshoot the workstation.

◆ END

6.2 Troubleshooting Approach

The Field Replaceable Unit's (FRU's) in the workstation consist of the CRT subassembly, the CPU logic board and the keyboard. The information in this section is directed toward analyzing failures to determine which of these assemblies is causing the problem. When one of the suspected assemblies has been isolated, the CE should replace it and retest the workstation. The information in this section is presented as a guide and is intended to complement sound troubleshooting principles to minimize customer downtime.

● END

6.3 Troubleshooting Table

TROUBLESHOOTING

<i>Problem</i>	<i>Corrective Action</i>	<i>Suspected Faulty Assy</i>
No raster or video on screen.	If power LED is off check AC source.	1. AC source, power cord. 2. CPU Logic board. 3. CRT subassembly.
Error code displayed.	Interpret error code (▶6.4)	CPU logic board.
Keyboard malfunction.	Run keyboard test (▶6.5).	Keyboard.
Display distortion/misalignment	Perform alignment procedure (▶8.2).	CRT subassembly.
Passes BIT but fails logon to VS 5000.	1. Check system data link cable(s). 2. Ensure system data link port is configured properly.	Cable(s).

◆ END

6.4 Error Codes (Sheet 1 of 2)

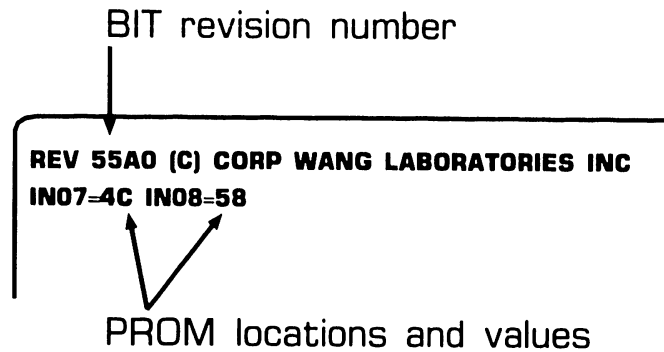
TROUBLESHOOTING

The BIT performs a series of circuit checks during the power-up sequence and then (if successful) releases control to the data link which loads and runs the operational software. The BIT is executed automatically each time the workstation is powered on. If the BIT test passes, the ID field is displayed along with the normal VS logon screen.

If the BIT detects an error, however, the power-up sequence stops and an error code is generated and displayed on the third line of the screen. The error code represents a failed circuit or abnormal circuit condition. When a code is displayed, the BIT is inhibited until the circuit/condition is repaired or overridden (►6.6).

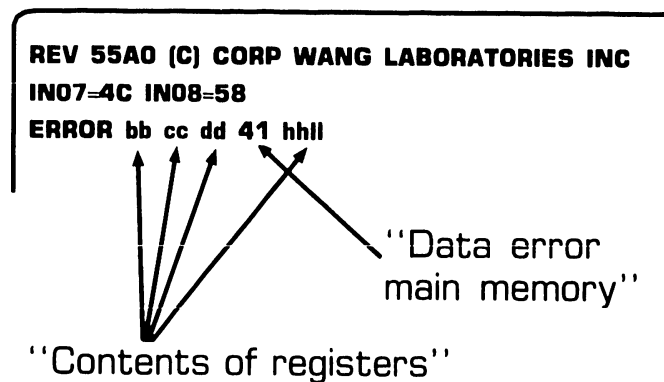
The ID field and an example of a specific error code (41) is shown in the adjacent screens. A complete listing of the BIT error codes follows (►6.4, 2 of 2). The suspected faulty FRU during an error code condition is the CPU logic board.

ID Field Definition:



Main Memory Error Code (41)

Example:



►NEXT

TROUBLESHOOTING

6.4 Error Codes (Sheet 2 of 2)

<i>Error Code</i>	<i>Test Name</i>	<i>Failure or Condition</i>
None	Keystroke	Interrupt logic
21	Checksum test	EPROM
31	Force bad parity	Bad data with good parity set.
32		Could not force bad parity.
33		Bad parity, good parity set.
41	Macho test	Data error in main memory.
42		Add error.
43		Parity error.
51	Men select	Bit 7 (IN 07) is set.
52		Data error.
53		Could not select main memory.
54		Bit 7 (IN 07) is set.
55		Could read main memory.
56		Main memory still selected.
57		Bit 7 (IN 07) is set.
58		Screen memory selected.
59		Main memory selected.
5A		Data error font memory.
5B		Could read "s" font.
5c		Could not verify font selected.
5D		128 font selected.
5E		128 font selected.
5F		256 font selected.
61	Screen memory test	Data error.
62		Add error.
71	Font memory test	Data error.
72		Add error.
A1	Protocol test	Invalid protocol.
B1	Keyboard test	No returned data.
B2		Data error.
B4		No keyboard interrupt.
91	Refresh test	Data error.
93		Parity error.

● END

6.5 Keyboard Test

6.5.1 Test Description

The keyboard test yields a visual check of the individual key coordinates (X,Y) on the keyboard. The test is initiated by first pressing CANCEL, then the PF9 key following a successful BIT power-up sequence. Then, pressing a key generates a keycode which is applied to CRT subassembly and displayed in hexadecimal notation in the center of the screen. The correct key coordinates can then be checked by comparing the keycode to its corresponding keyboard character, number or function. The keyboard table (▶6.5.2) lists the codes and their corresponding keyboard characters.

● END

6.5 Keyboard Test

TROUBLESHOOTING

6.5.2 Keyboard Data Table (Sheet 1 of 2)

Hex	Hex	Hex	Hex
00	20 Int'l	40 S (P)	60 Unuseable
01 Query Response	21 Int'l	41 4 (P)	61 Prev
02	22 Int'l	42 - (P)	62 Insert
03	23 Int'l	43 + (P)	63 x(P)
04	24 Control	44 Return	64 =
05	25 2 nd	45 '	65 0
06	26 Home	46 ;	66 9
07	27 Unusable	47 L	67 8
08	28 S Cursor	48 K	68 7
09	29 N Cursor	49 J	69 6
0A	2A .	4A H	6A 5
0B	2B Backspace	4B G	6B 4
0C	2C Spacebar	4C F	6C 3
0D	2D W Cursor	4D D	6D 2
0E	2E E Cursor	4E S	6E 1
0F	2F -	4F A	6F Tab
10 3(P)	30 2 (P)	50 7 (P)	70 Blank Key
11 Go to	31 1 (P)	51 Next	71 Sub/super
12 Cancel	32 Unuseable	52 Delete	72 Command
13 Unuseable	33 Period (P)	53 Execute	73 Move
14 Unuseable	34 O (P)	54 Glossary	74 Copy
15 8 (P)	35 Right Shift	55]	75 Replace
16 9 (P)	36 Help	56 P	76 Search
17 6 (P)	37 /	57 O	77 Stop
18 Divide (P)	38 .	58 I	78 Note
19 Print	39 M	59 U	79 Merge
1A Erase	3A N	5A Y	7A Format
1B Left Shift	3B B	5B T	7B Dec Tab
1C Return (P)	3C V	5C R	7C Center
1D Int'l	3D C	5D E	7D Page
1E Lock	3E X	5E W	7E Indent
1F Back Tab	3F Z	5F Q	7F Unused

6.5 Keyboard Test

6.5.2 Keyboard Data Table (Sheet 2 of 2)

NOTES

1. Keys marked "Unuseable" are in defined locations.
 2. Codes 00 to 0F are reserved for control functions. These codes cannot be sent by pressing a key on the keyboard.
 3. Codes marked "Int'l" are reserved for the international keyboard and are present only on the expanded keyboard. The keys are: 1D, 20, 21, 22, and 23.
 4. The keyboard defaults to having the left and right shift keys generate make and break codes. The break code is the hex value of the pressed key or'd with an 80 bit.
-

● END

6.6 Diagnostic Override

CAUTION

The diagnostic override function should only be invoked if an error code is determined to be non-fatal and will not cause fatal data errors. The CE should also notify the customer as to the nature of the problem and the risks associated with overriding the BIT test.

1. Power-up the workstation and wait until the error code is displayed on the screen.
2. Override the BIT by pressing the SHIFT and HELP keys simultaneously. The BIT should be overridden allowing the system to load and run the operational software.

◆ END

SECTION

7

PARTS

REPLACEMENT

SECTION 7 CONTENTS

SECTION 7 PARTS REPLACEMENT

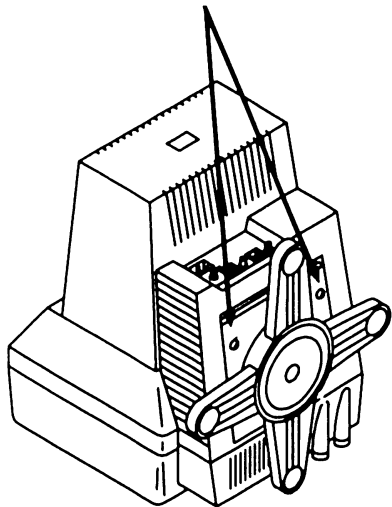
	Page
7.1 COVER REMOVAL AND REPLACEMENT	7-2
7.2 CPU BOARD REMOVAL AND REPLACEMENT	7-3
7.3 RF SHIELD REMOVAL AND REPLACEMENT	7-4

7.1 PARTS REPLACEMENT

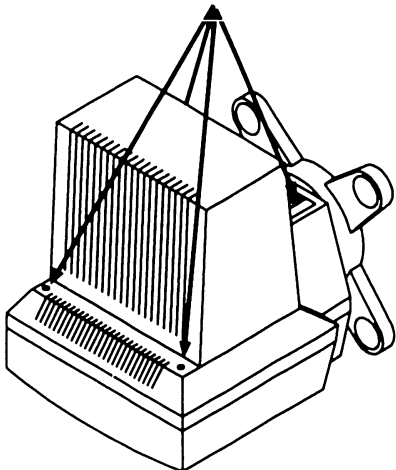
7.1 Cover Removal and Replacement

To Remove:

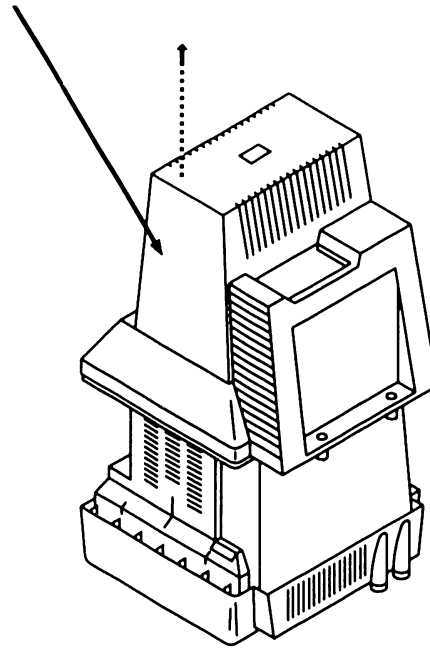
- 1 Power-off workstation and disconnect cables from rear panel.
- 2 Carefully place workstation on front bezel, loosen captive screws, and remove adjustable base.



- 3 Loosen captive screws from workstation cover.



- 4 Slowly lift cover straight-up and clear of workstation.



To Replace:

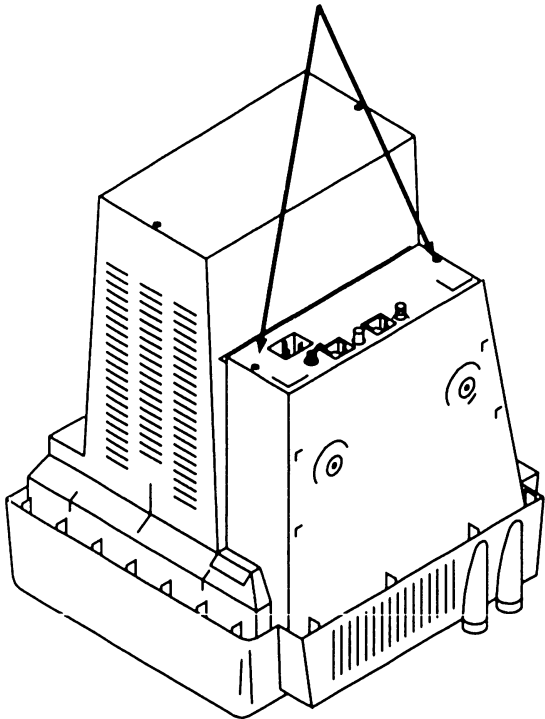
Reverse steps of removal procedure.

● END

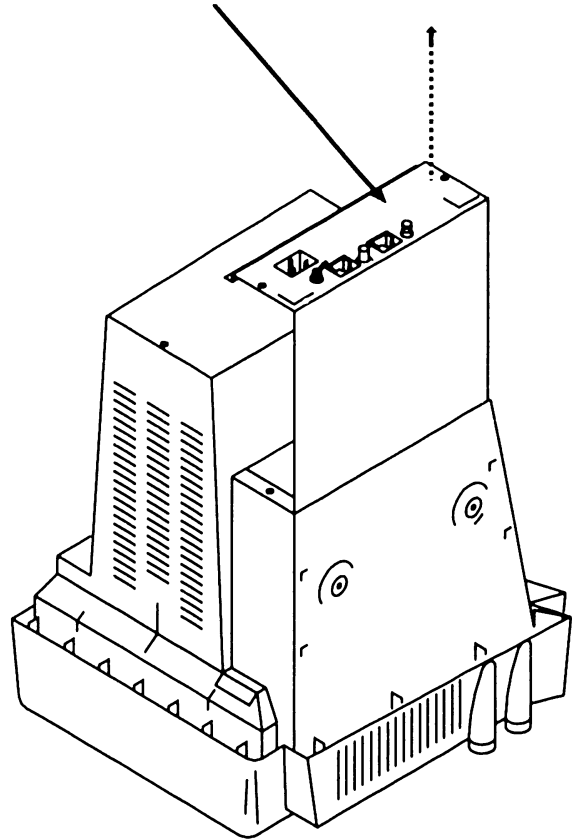
7.2 CPU Board Removal and Replacement

To Remove:

- 1 Remove workstation cover (➔7.1).
- 2 Remove screws from CPU PCA.



- 3 Lift PCA until clear of chassis.



To Replace:

Reverse steps of removal procedure.

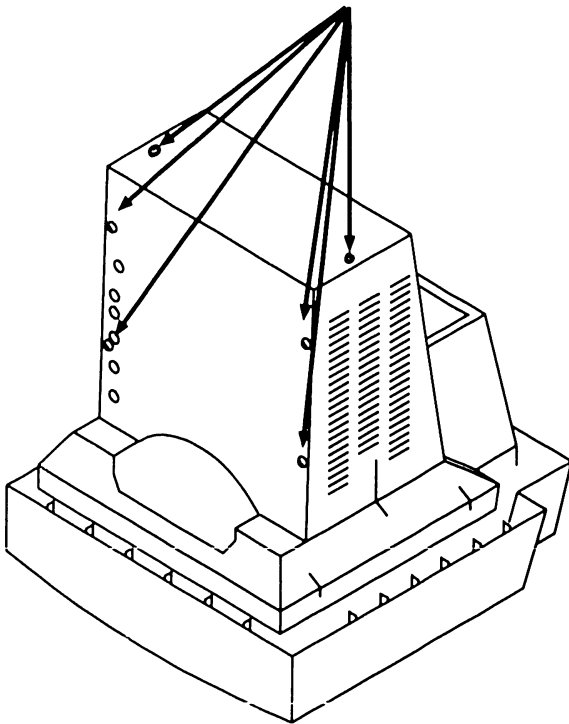
● END

7.3 PARTS REPLACEMENT

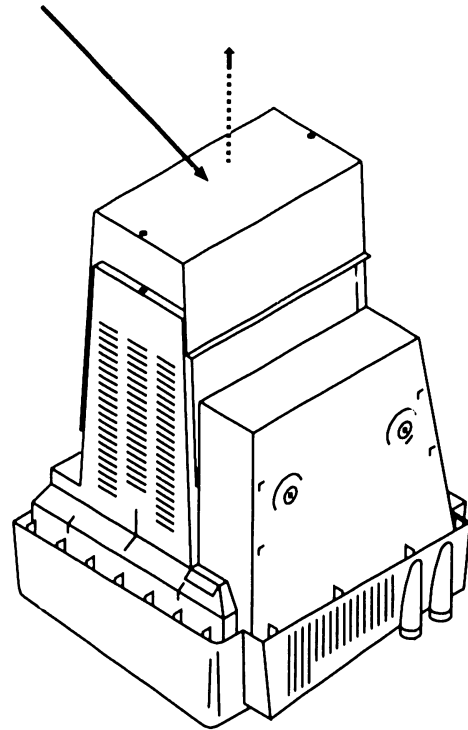
RF Shield Removal and Replacement

To Remove:

- 1 Remove workstation cover (➔7.1).
- 2 Remove CPU PCA (➔7.2).
- 3 Remove screws.



- 4 Slowly lift RF shield until clear of chassis.



To Replace:

Reverse steps of removal procedure.

◆ END

SECTION

8

ADJUSTMENTS

SECTION 8 CONTENTS

SECTION 8 ADJUSTMENTS

	Page
8.1 TOOLS AND TEST EQUIPMENT	8-2
8.2 ALIGNMENT PROCEDURE	8-3

ADJUSTMENTS

8.1 Tools and Test Equipment

No special tools or test equipment are required to make adjustments in the workstation monitor subassembly. Only plastic tuning tools and a plastic scale are required to properly adjust and align the monitor display.

● END

8.2 Alignment Procedure (Sheet 1 of 3)

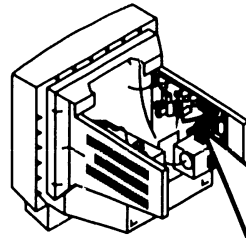
ADJUSTMENTS

CAUTION

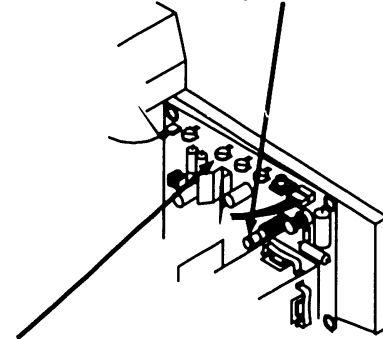
The following adjustments should only be performed when the diagnostic test pattern parameters are out of tolerance or the geometric characteristics of the display are in question. The adjustments are slightly interactive and must be rechecked to ensure the display parameters remain within the limits specified.

WARNING

High voltages are present while making adjustments to the display in the following procedure. Use extreme care not to contact the video driver board on the neck of the CRT while adjusting the width coil.

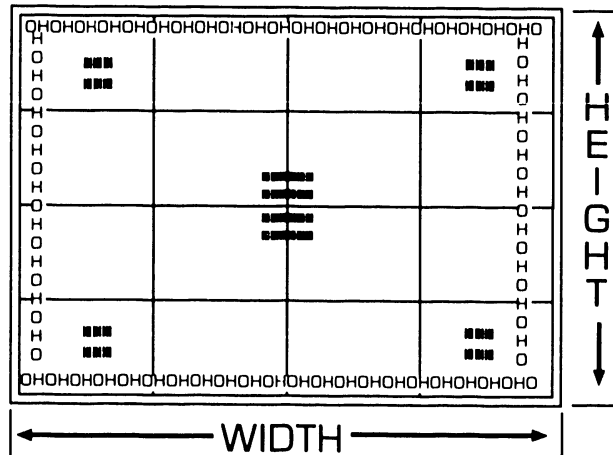


4 Using a plastic scale to measure the display, adjust the horizontal width coil for a horizontal width of 8.75 ± 0.125 in. (222 ± 3.2 mm).



5 Adjust the vertical height potentiometer for a vertical height measurement of 6.5 ± 0.125 in. (165 ± 3.2 mm).

- 1 Power-off the workstation.
- 2 Remove the monitor cover and the RF shield (►7.1).
- 3 Power-up the workstation and select the video test pattern during the BIT power-up sequence (►4.1). Allow a few minutes for the unit to warm-up and stabilize.



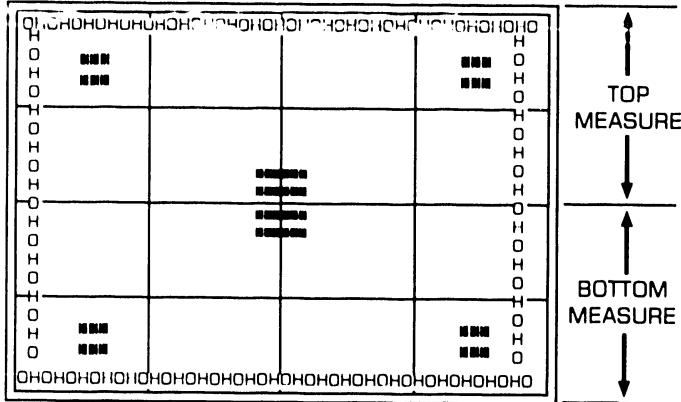
DISPLAY SIZE ADJUSTMENT

►NEXT

8.2 Alignment Procedure (Sheet 2 of 3)

ADJUSTMENTS

- 6 Measure from the top of the alignment pattern to the center line and then from the bottom of the pattern to the center line and record the measurements.

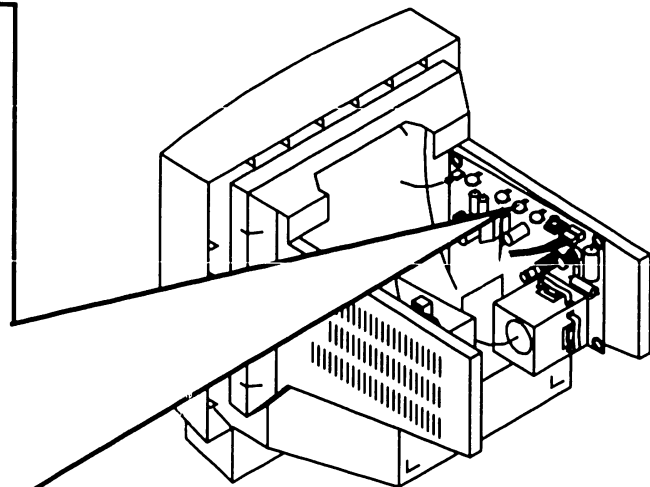
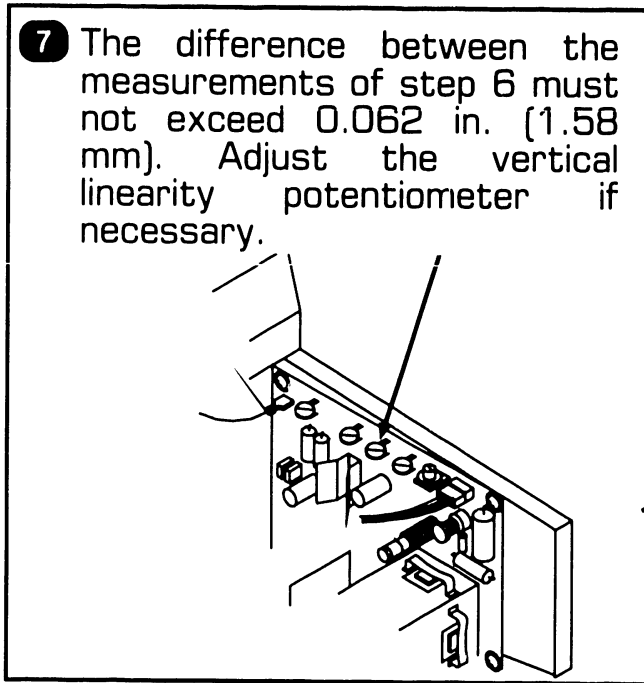


NOTE

If the vertical linearity was adjusted in step 7, recheck the horizontal width and the vertical height parameters (steps 4 and 5). Always adjust the width before the vertical height if necessary.

VERTICAL LINEARITY MEASUREMENT

- 7 The difference between the measurements of step 6 must not exceed 0.062 in. (1.58 mm). Adjust the vertical linearity potentiometer if necessary.



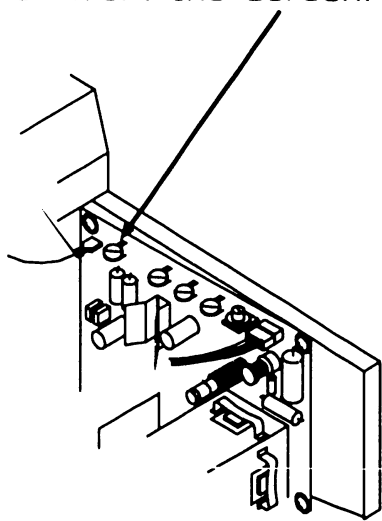
▶NEXT

ADJUSTMENTS

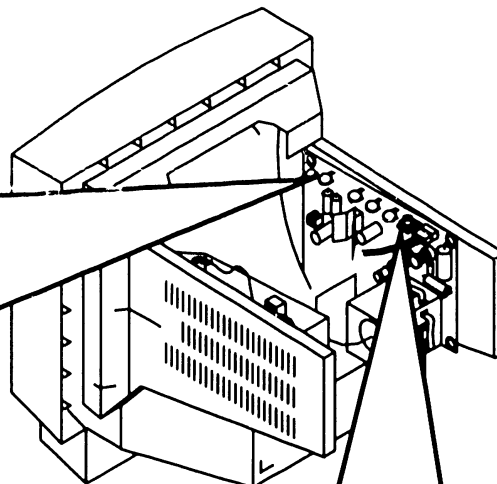
8.2 Alignment Procedure (Sheet 3 of 3)

- 8 Adjust the front panel BRIGHTNESS control fully counterclockwise (minimum brightness).

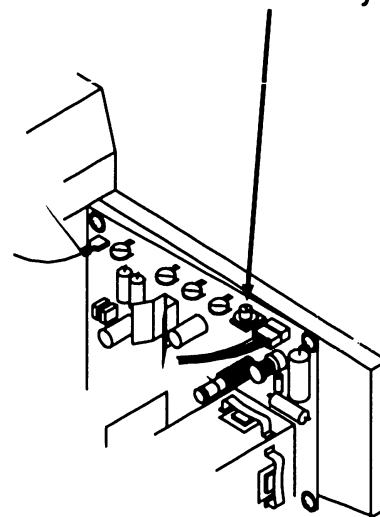
- 9 Adjust the brightness potentiometer so that only the high density characters are visible at a distance of 18 inches from the screen.



- 10 Adjust the front panel BRIGHTNESS control fully clockwise (maximum brightness). The raster should not be visible on the display.



- 11 Check the focus of the HO characters using a black on white background on the display. Adjust the focus potentiometer for sharp characters if necessary.



● END

SECTION

9

INSTALLATION

SECTION 9 CONTENTS

SECTION 9 INSTALLATION

	Page
9.1 INSTALLATION SITE CHECK	9-2
9.2 SPECIAL TOOLS	9-3
9.3 UNPACKING	9-4
9.4 CONNECTIONS	9-5

9.1 Installation Site Check

The workstation location should be easily accessible, relatively dust free and temperature and humidity controlled. A dedicated, noise free AC power outlet should be provided to minimize electromagnetic interference. There is no surge current. Ensure adequate clearance is provided at the rear of the workstation to allow for cable connections and periodic repositioning by the operator. To ensure adequate ventilation, do not block the sides or top of the workstation cover.

● END

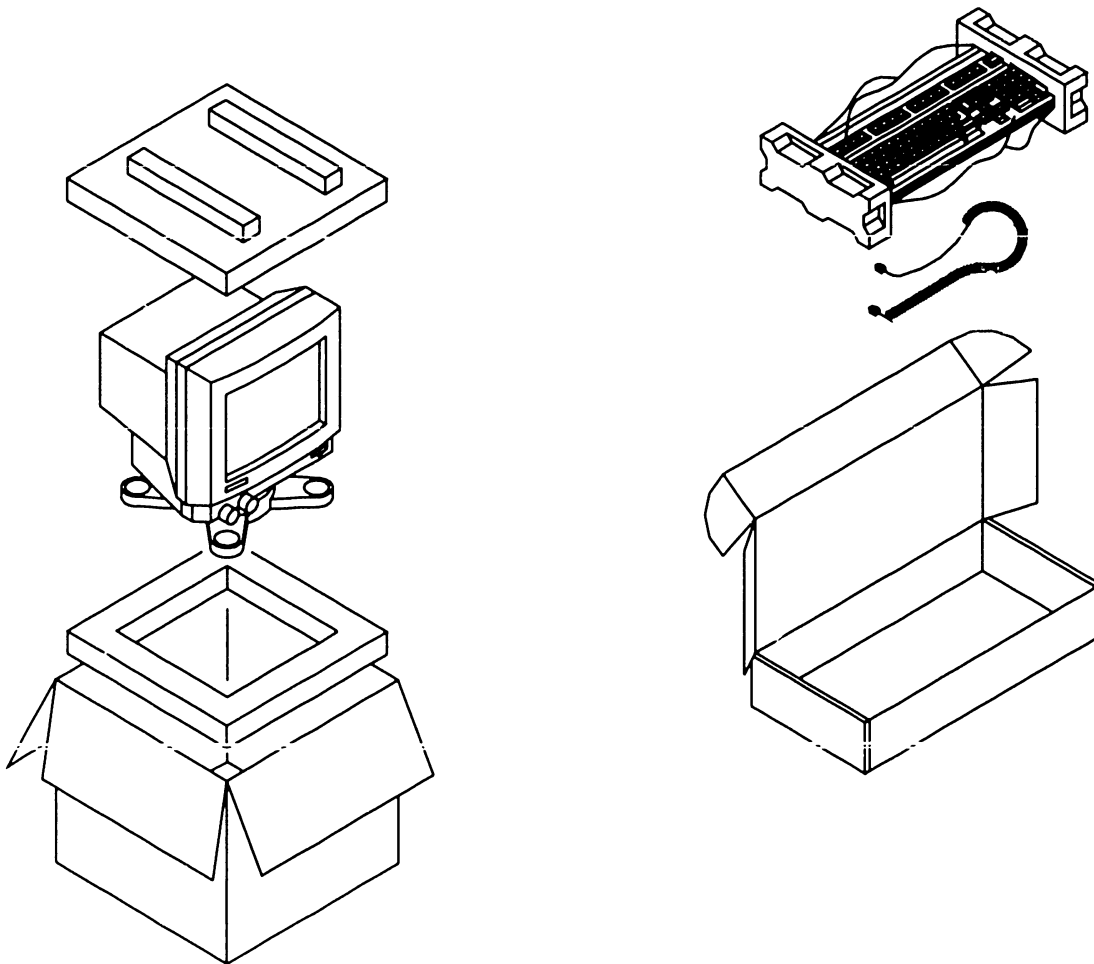
9.2 Special Tools

No special tools are required to unpack and install the workstation.

● END

9.3 Unpacking

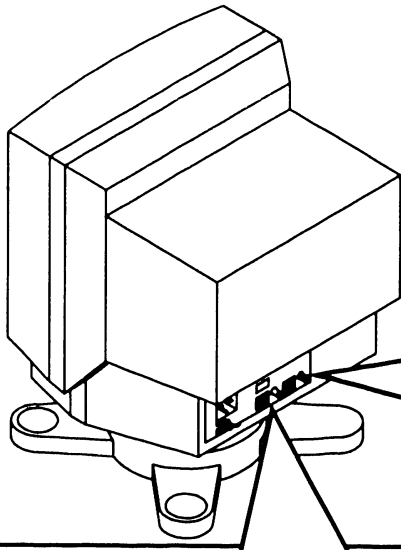
The workstation is packaged in two separate cardboard containers. One contains the monitor assembly and the other contains the keyboard. Unpacking is relatively straightforward; cut the adhesive tape at the seams of the packing container and remove the components by lifting them up and clear of the container. Visually inspect the units for external damage. If any damage is detected, promptly file a claim with the carrier and notify your branch manager.



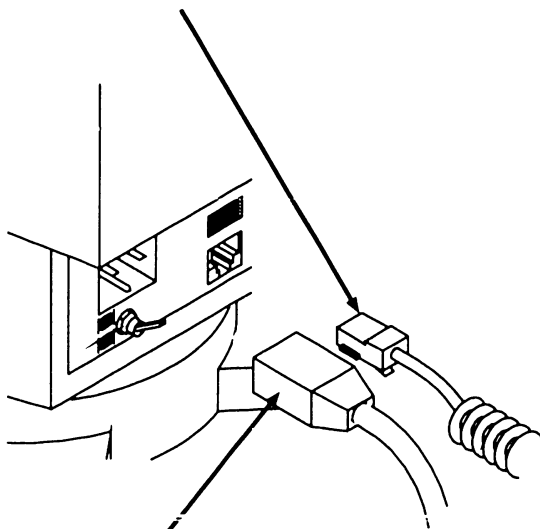
● END

9.4 Connections

- 1 Ensure the AC power switch is to "0".

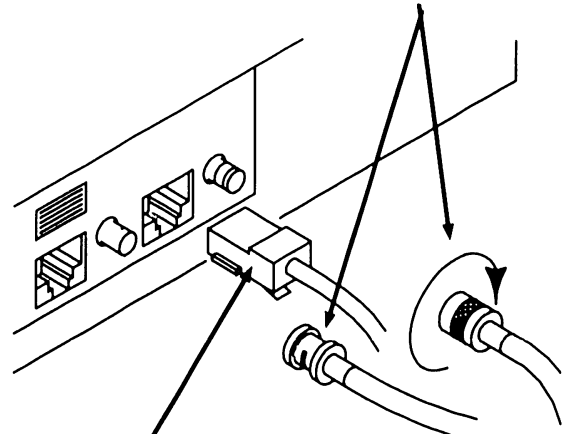


- 2 Connect the keyboard connector.



- 3 Connect the AC power cord between the monitor assembly and the AC outlet.

- 4 If the 928 data link is coaxial, connect the coaxial cable pair to the BNC/TNC connectors. Ensure the connections are tightened and seated.



- 5 If the 928 data link is twisted pair, connect the twisted pair cable to the RJ11 connector.

- 6 Refer to the operation section (4.1) to power-up the unit.

● END

SECTION

10

**FUNCTIONAL
DESCRIPTION**

SECTION 10 CONTENTS

SECTION 10 FUNCTIONAL DESCRIPTION

	Page
10.1 OVERVIEW	10-2
10.2 BLOCK DIAGRAM DESCRIPTION	10-3

FUNCTIONAL DESCRIPTION

10.1 Overview

The 4430-VS workstation is a versatile interactive terminal designed to operate with the VS 5000 series system. The 4430 is a full function and intelligent workstation that offers high performance and a comfortable ergonomic design. The workstation supports advanced functions and most standard character based applications including WP PLUS, PACE, Office Indexer, and WANG OFFICE, as well as SNA and 3270 emulation.

The 4430 consists of a CRT display unit and a separate detachable keyboard. The keyboard attaches to the rear of the monitor with a coiled cable. The operator can tilt and swivel the monitor to provide a comfortable viewing angle and adjust the front panel brightness and contrast controls to enhance the quality of the display. The workstation communicates over a direct, high speed 928 data link and connects to the host system with either standard TNC/BNC connectors, or RJ-11 twisted pair cable.

The workstation features a 14-inch monochrome monitor that produces a sharp and easy to read image. The monitor has an anti-glare CRT and a rear mounted display preference switch to choose either white characters on a black background or black characters on a white background (inverse video). The unit has a 70-Hz refresh cycle for flicker free viewing and a 25-row x 80-column display

that scrolls horizontally to display up to 159 characters. The monitor produces an 800 x 300 pixel medium resolution picture. A 10-pixel x 12-pixel character cell generates a high quality character font.

The workstation offers two keyboard options in the U.S. - the Wang standard keyboard or a new Wang ANSI 4.2 standard keyboard. Internationally, the workstation is equipped with the ANSI 4.2 standard keyboard. Both keyboards are low-profile, lightweight, and detachable. The standard keyboard has 101 keys; the ANSI 4.2 keyboard has 104 keys (105 or 107 international). Each keyboard contains the standard typewriter keyboard layout, 32 programmable function keys, a numeric keypad and cursor control keys. The keyboard's base has three adjustable support positions. Also included is an adjustable audio feedback and slots for three function-key identification strips.

● END

FUNCTIONAL DESCRIPTION

10.2 Block Diagram (Sheet 1 of 3)

The 4430 bus connects the various circuit elements of the workstation. The bus network, which contains signals representing address, data, and control information, allows the transfer of data and processing logic between the CPU and the other circuits in the workstation.

The CPU in the workstation consists of a Z-80 microprocessor. The Z-80 is responsible for decoding and executing software that is down loaded from the VS 5000 master by way of the 928 data link communication channel. The CPU is also responsible for performing various tasks such as controlling data transfers between registers and memory locations. The 4430 memory circuits consists of main memory (RAM), a diagnostic PROM circuit, and the display memory circuit.

A BIT diagnostic test is initialized whenever the workstation is turned on. The diagnostic BIT circuit PROM contains the code that runs the BIT test during the power-up sequence. If the BIT passes, the diagnostic code disables the BIT and instructs the CPU to enable the data link. This allows the VS 5000 master to IPL the workstation. A BIT LED monitors the diagnostic circuit during the test (flashes) and then goes out when the BIT test is successful.

The video control and display memory circuits control the video information stored in the display memory. These circuits generate the timing signals necessary to display video information on the CRT. The signals include dot matrix character outlines, horizontal and vertical scan, and the placement of characters in a given row or column. An inverse video switch allows the operator to select a black or white background on the CRT display.

The workstation communicates with the VS 5000 system through a serial 928 data link. Both a BNC/TNC coaxial pair or 4-wire RJ-11 connections are available. Data is sent and received through a data link circuit which supplies the CPU with the status and the operational state of signals.

The keyboard interfaces with the monitor subassembly through a UART circuit. Key codes are applied to the CPU via the UART which accepts and processes the information based on its priority. The keyboard clicker sounds when the key code is accepted. An I/O function produces and controls the error alarm signal to the workstation's speaker. A signal notifies the operator of prompts and special conditions during a processing program.

►NEXT

FUNCTIONAL DESCRIPTION

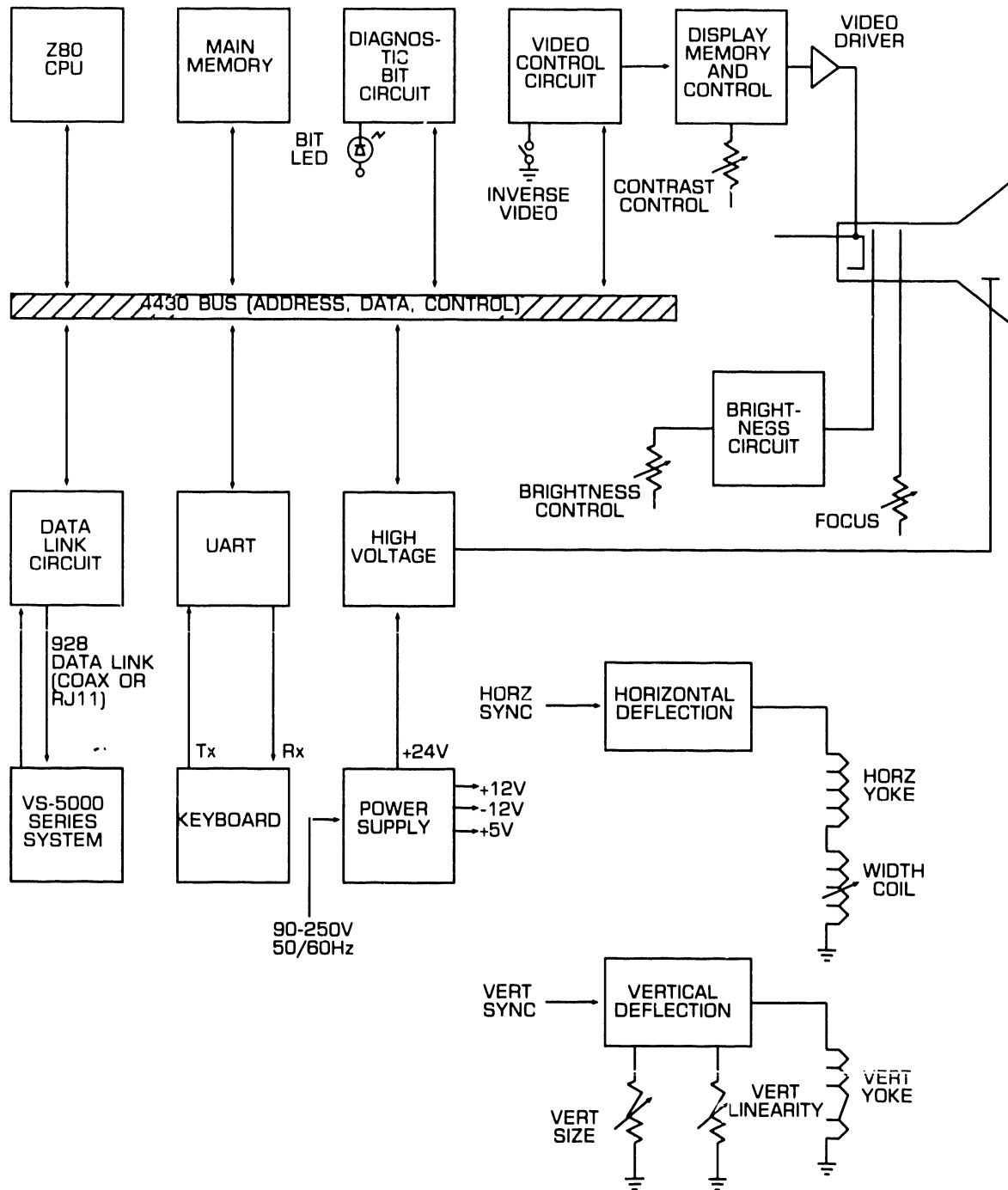
10.2 Block Diagram (Sheet 2 of 3)

The workstation contains a switching power supply which provides three regulated DC voltages (+12, -12, and +5 volts) and a +24-volt output to produce the high voltage for the CRT. The supply operates over a 50-250 VAC input voltage range at 50 or 60 Hz. The high voltage supply and its associated deflection circuits generate the CRT anode and beam deflection voltages. The brightness circuit in conjunction with the front panel brightness control adjusts the intensity of the display.

►NEXT

10.2 FUNCTIONAL DESCRIPTION

Block Diagram (Sheet 3 of 3)



● END

SECTION

11

SPECIFICATIONS

SECTION 11 CONTENTS

SECTION 11 SPECIFICATIONS

	Page
11.1 EQUIPMENT	11-2

SPECIFICATIONS

11.1 Equipment

Workstation Characteristics:

Screen Size: 14 in. (35.5 cm), diagonal
80 characters x 25 lines.
Line Width: 159 characters
800 x 300 pixel resolution.
10 x 12 pixel character cell.
Black and white display.
Inverse video capability.
Normal and intensified video.
Contrast and brightness controls.
Tilt and swivel mechanism for monitor subassembly.

Physical Characteristics

Height: 14.75 in. (37.5 cm)
Width: 13.75 in. (34.9 cm)
Depth: 14.85 in. (37.7 cm)
Weight: 27 lbs (12 Kg)

Power Requirements

90 to 250 vac (continuous),
50/60 Hz, 70 W.

Operating Environment

Ambient Temp: 60 - 90° F (16-32° C)
Relative Humidity: 20 - 80%,
non-condensing

Wang Standard Keyboard Characteristics

Height: 1.6 in. (4.3 cm), 2.7 in.
fully extended.
Width: 19 in. (48 cm)
Depth: 7.6 in. (19 cm)

Weight: 3.25 lbs. (1.5 Kg)
Detachable
Adjustable tilt (3 positions)
101 keys
Alphanumeric keys
Numeric keypad
Special function keys
Cursor control keys

Wang ANSI 4.2 Standard Keyboard

Except for number of keys, same as Wang standard keyboard. ANSI 4.2 keyboard has 104 keys (international version has 105 or 107 keys).

Host Communication Link

Asynchronous 928 data link with either coaxial or twisted pair wiring.

Optional Cabling (ordered separately)

Standard coaxial cable or RJ-11 twisted pair cable from monitor to host.

● END

SECTION 12
ILLUSTRATED
PARTS

SECTION 12 CONTENTS

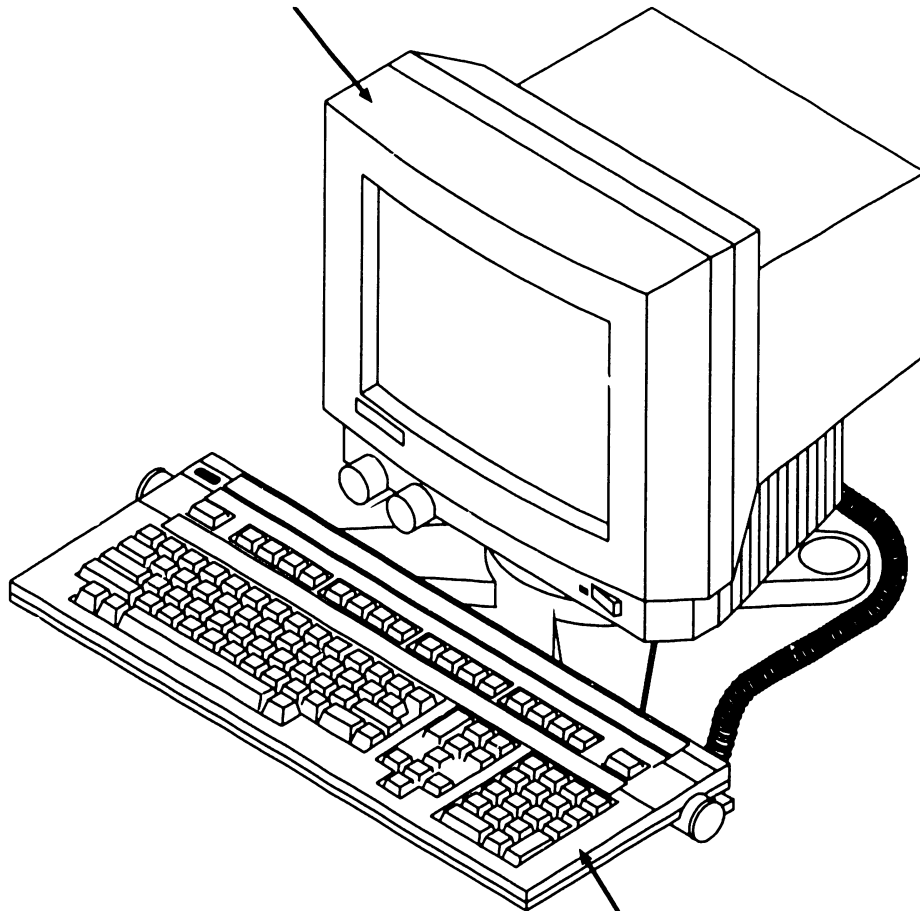
SECTION 12 ILLUSTRATED PARTS

	Page
12.1 WORKSTATION COMPONENTS	12-2
12.2 MONITOR SUBASSEMBLY	12-3

12.1 Workstation Components

ILLUSTRATED PARTS

MONITOR ASSEMBLY
289-1612



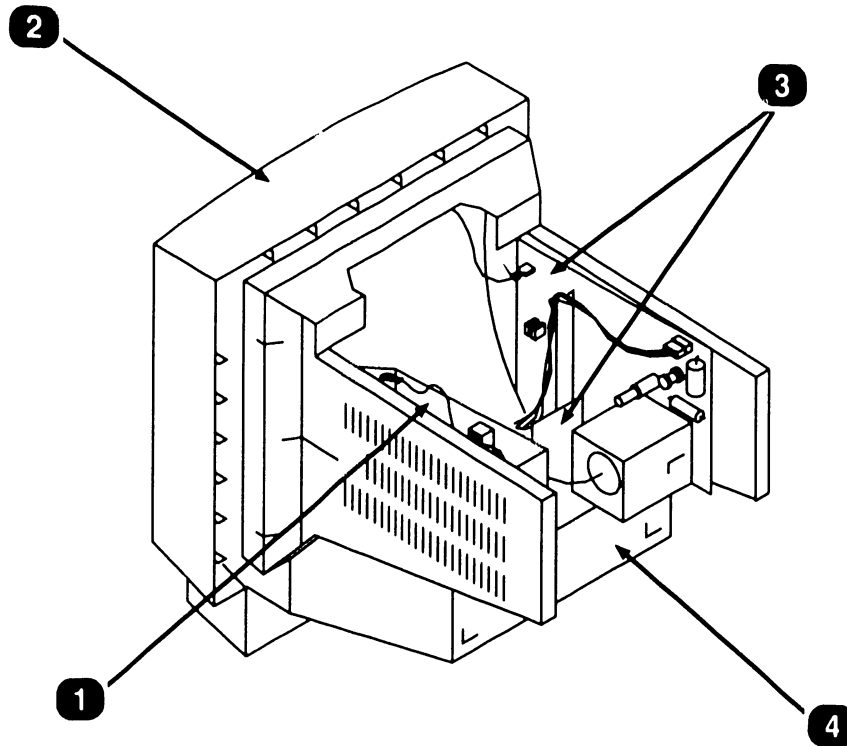
KEYBOARD*
725-3155 (US)
725-3488 (US UNIX Optional)
725-3488-XX (International)

*Field Replaceable Unit (FRU)

● END

12.2 Monitor Subassembly

ILLUSTRATED PARTS



<i>Item</i>	<i>Part Number</i>	<i>Description</i>
1	279-0878	Switching power supply PCA assembly
2*	279-0879	Monitor subassembly**
3	210-9936	Video/video driver PCA's
4*	210-9934	Central Processing Unit (CPU) PCA

*Field Replaceable Unit (FRU)

**Order model no. tag (615-3953) when replacing Monitor subassembly.

● END

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