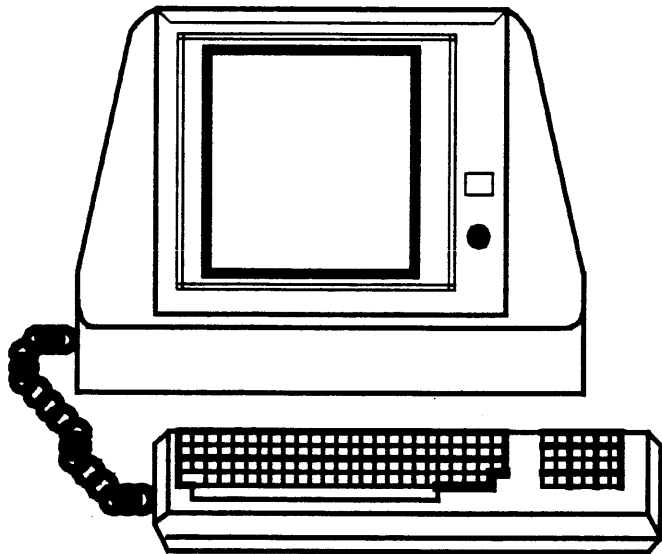


MDT 20 TERMINAL SERVICE MANUAL SUPPLEMENT

SBXMDS040



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**MDT 20 TERMINAL SERVICE MANUAL SUPPLEMENT
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CHAPTER 1 GENERAL DATA
MDT 20 TERMINAL SERVICE MANUAL SUPPLEMENT
(REFER TO THE OEM MDT 20 SERVICE MANUAL)

CHAPTER 2 INSTALLATION

MDT 20 TERMINAL SERVICE MANUAL SUPPLEMENT

(REFER TO THE OEM MDT 20 SERVICE MANUAL FOR MORE DETAILED INFORMATION)

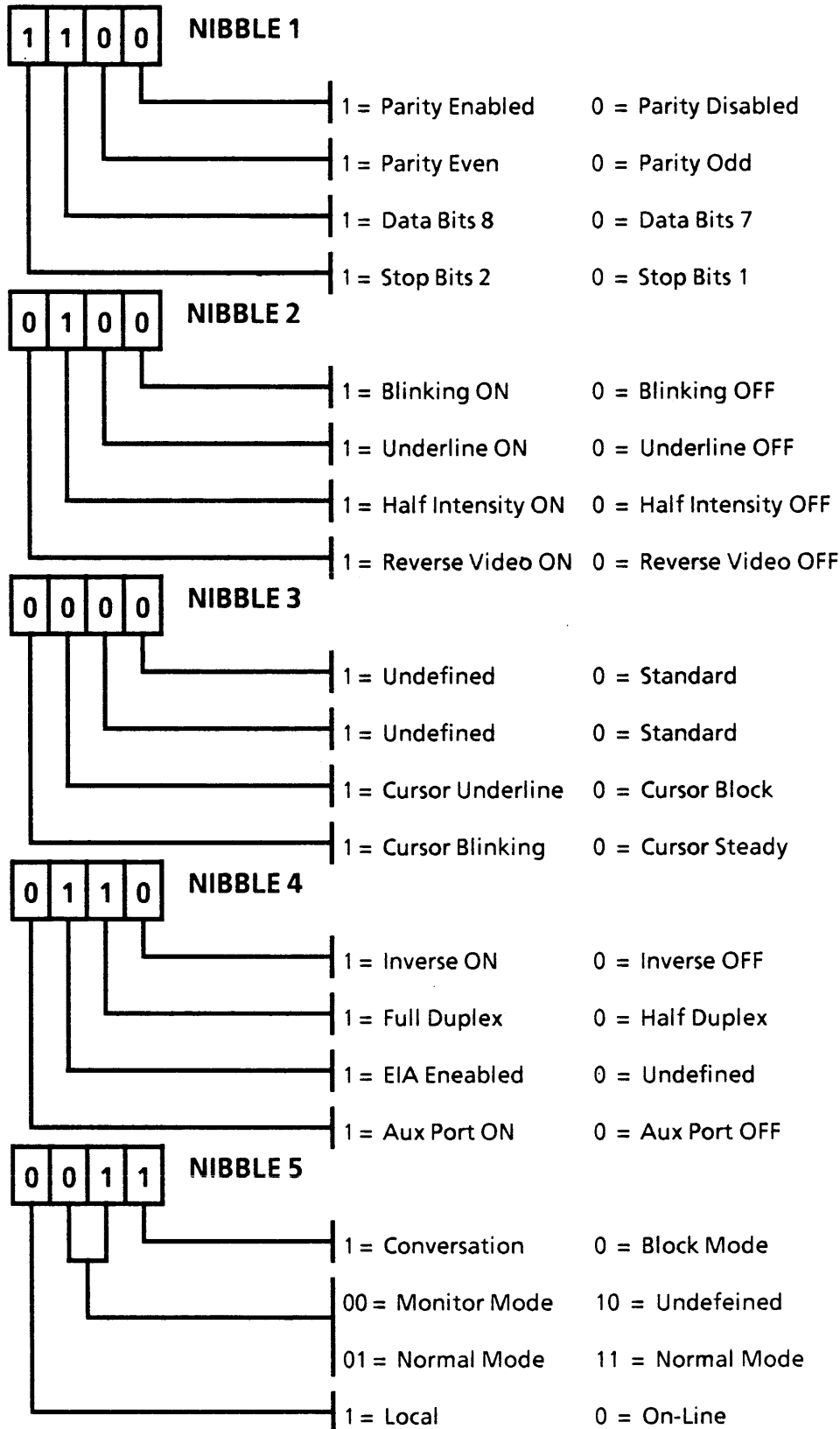


Figure 2-1 MDT 20 Terminal Set-Up Functions

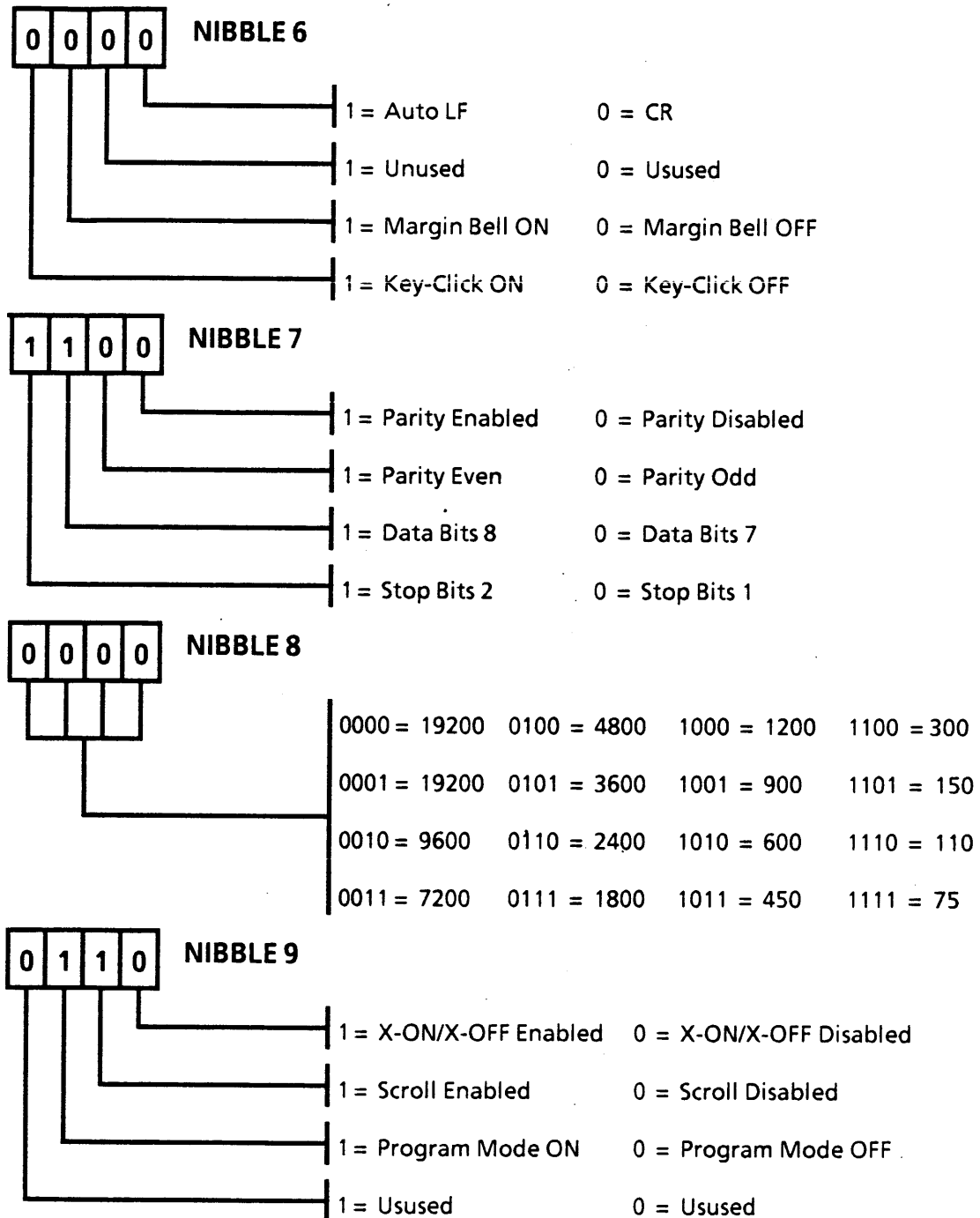


Figure 2-2 MDT 20 Terminal Set Up Functions (Continued)

CHAPTER 3 REPAIR DATA

MDT 20 TERMINAL SERVICE MANUAL SUPPLEMENT

**(REFER TO THE OEM MDT 20 SERVICE MANUAL FOR REMOVAL/REPLACEMENT
AND THE SUPPLEMENT FOR MONITOR ADJUSTMENT PROCEDURE)**

3.1 MONITOR ASSEMBLY
REF PL 4.2

ADJUSTMENT (FIGURES 3-1, 3-2, 3-3)

Purpose

The purpose of this adjustment is to obtain an image of the correct size and focus, aligned in the center of the display.

Procedure

CAUTION

DO NOT adjust any of the controls other than those included in this procedure.

1. SWITCH OFF MDT 20 TERMINAL POWER.
2. REMOVE REAR COVER FROM TERMINAL.
3. INSTALL LOOPBACK TOOL.

WARNING

Be careful of high-voltage charges on CRT, yoke, and PWAs. Remove all jewelry before performing the terminal adjustments. When power is applied, use only one hand to make adjustments. Touching the terminal with both hands can cause a dangerous electrical shock.

4. MARK FACE OF CRT FOR ALIGNMENT.
 - a. Using a felt tip pen, mark face of CRT as shown in Figure 3-1.
 - b. Switch ON power to terminal.

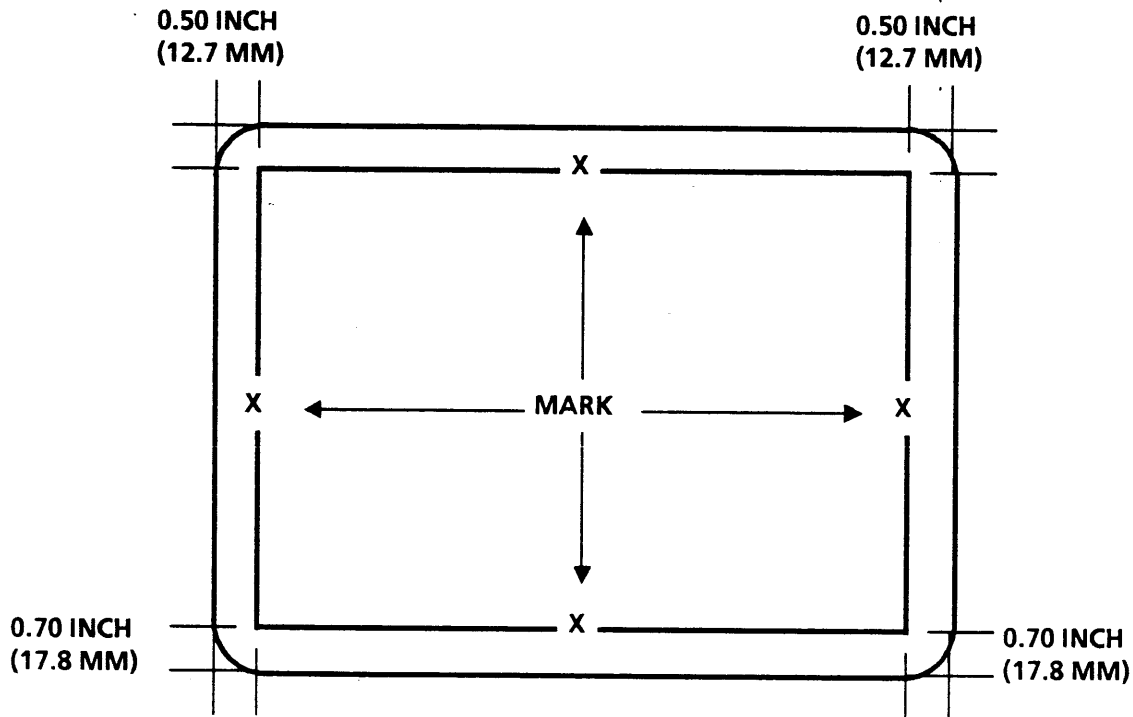


Figure 3-1 Marking Face of Terminal

5. SETUP THE TERMINAL FOR INVERSE VIDEO (FIGURE 3-2).
 - a. Press the **SET UP** key.
 - b. Press the **RIGHT ARROW** key to move the cursor to bit 0 of nibble 4.
 - c. Press the **UP ARROW** key to change the bit to a "1".
 - d. Press the **SAVE** key.

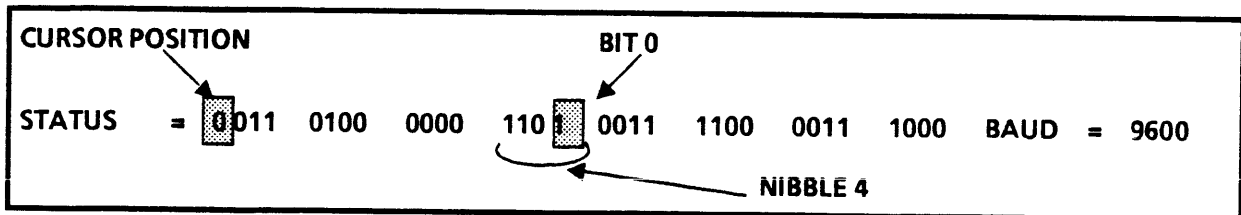


Figure 3-2 Inverse Video Setup

6. ADJUST BRIGHTNESS (FIGURE 3-3).
 - a. Move the operator **CONTRAST CONTROL** to minimum (fully counterclockwise).
 - b. Move the **SUB-BRIGHT** control clockwise until raster is visible.
 - c. Move the **SUB-BRIGHT** control counterclockwise until the raster is not visible.
 - d. Using the setup and arrow keys, switch off inverse video.
7. ADJUST FOCUS (FIGURE 3-3).
 - a. Move the operator **CONTRAST** control to the desired setting (approximately mid-range).
 - b. Fill a portion of the screen with characters by pressing random keys on the keyboard.
 - c. Adjust the **FOCUS** control for the best overall quality.
8. ADJUST VERTICAL HEIGHT (FIGURE 3-3).
 - a. Ensure that operator **CONTRAST** control is at mid-range.
 - b. Press the **HOME** key to move the cursor to the upper left corner of the screen.
 - c. Press the **CAP LOCK** key for upper case characters.
 - d. Press and hold the **H** key, until there are 4 lines of H's at the top of the screen.
 - e. Press the **LINE FEED** key 7 times.
 - f. If necessary, press the **BACKSPACE** key until the cursor is at the beginning of the line.
 - g. Press and hold the **H** key, until there are 3 lines of H's at the center of the screen.
 - h. Press the **LINE FEED** key 6 times.
 - i. If necessary, press the **BACKSPACE** key until the cursor is at the beginning of the line.
 - j. Press and hold the **H** key, until the last line is filled with H's without scrolling the top lines of the screen.

NOTE: There is a slight interaction between the V-Size and V-Line controls. Move the controls at small interval, alternating between the two controls.

- k. Adjust the **V-SIZE** and **V-LINE** controls (alternating between the two controls) until the desired size is obtained.
9. ADJUST HORIZONTAL WIDTH (FIGURE 3-3).
 - a. Adjust the **H-WIDTH** control until the desired width is obtained.
10. ADJUST/CHECK HORIZONTAL LINEARITY (FIGURE 3-3).
 - a. Check for characters located on the same row that are different in width.
 - b. If there are characters with different width, adjust the **H-LINE** control to make the characters the same width.

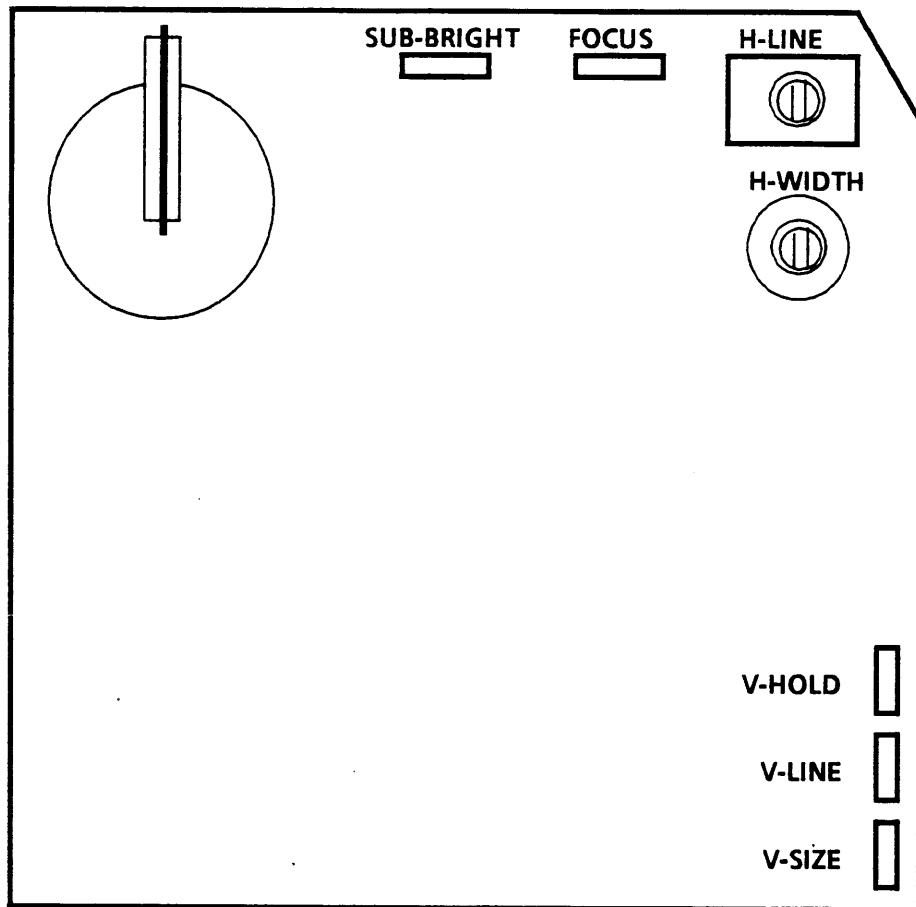


Figure 3-3 Adjustment Controls Locations

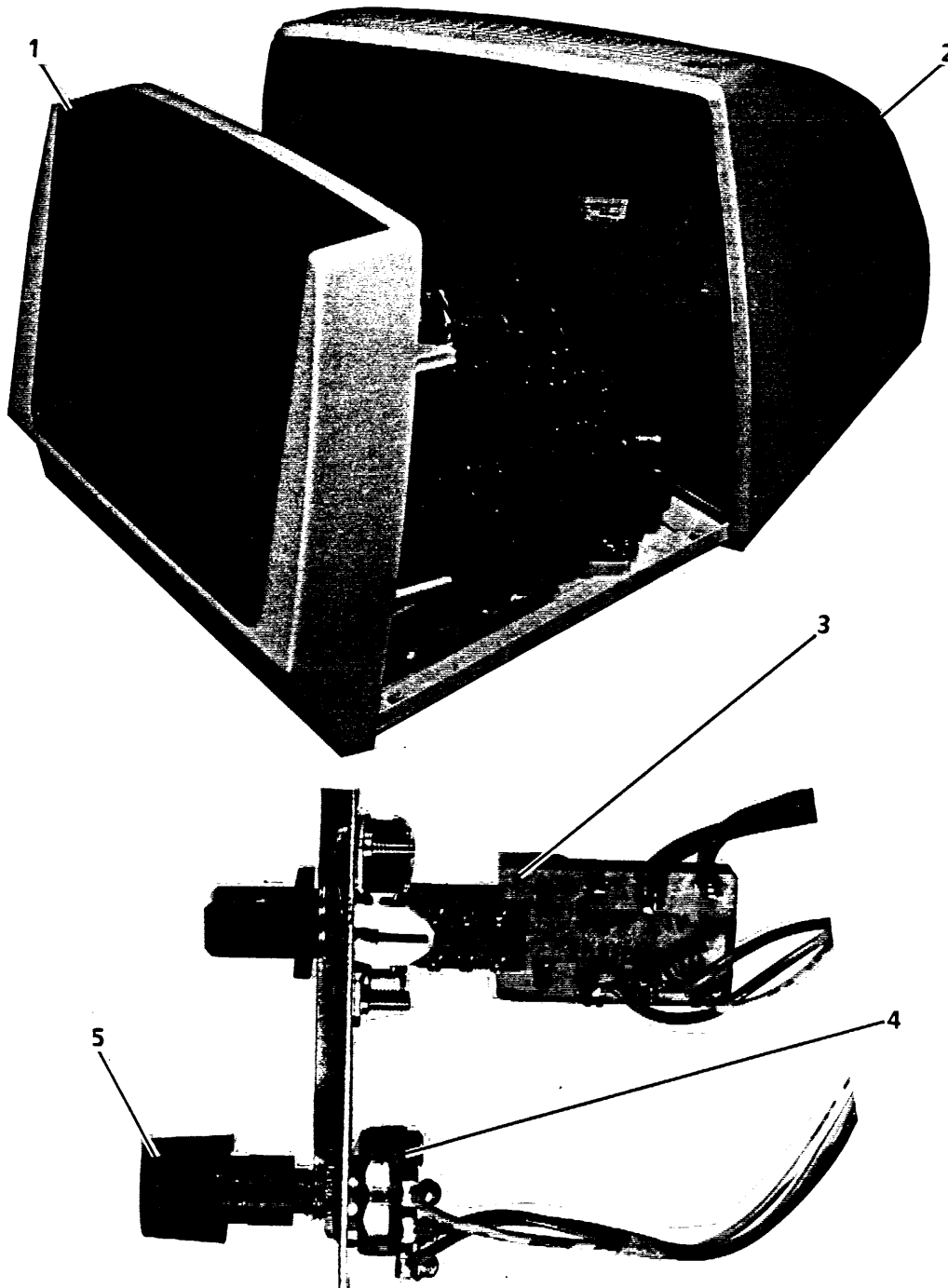
**CHAPTER 4 PARTS IDENTIFICATION
MDT 20 TERMINAL SERVICE MANUAL SUPPLEMENT**

4. PARTS IDENTIFICATION

MDT 20
SBXMDS040

PL 4.1 MDT 20 TERMINAL MECHANICAL PARTS

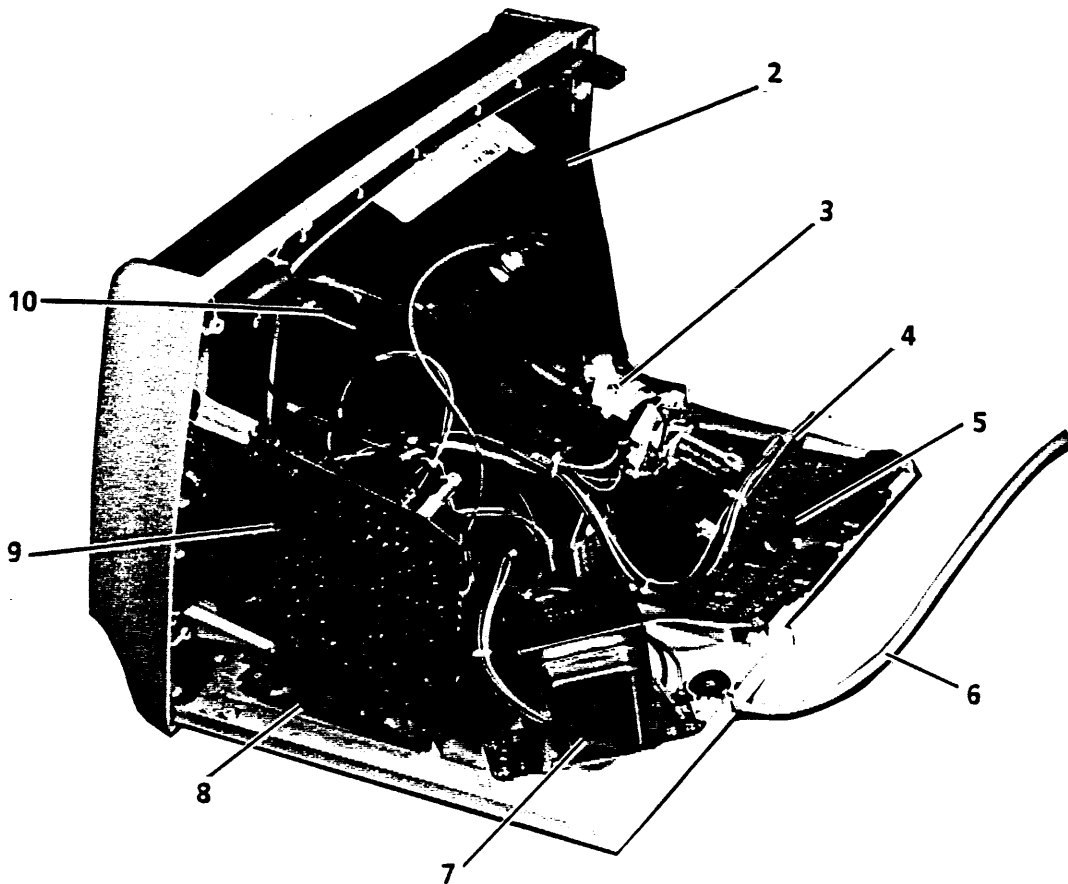
ITEM	XEROX PART NO.	MDT 20 PART NO.	DESCRIPTION
1	- -	900100-001	Bezel, Front
2	101N00205	900101-001	Cover, Rear
3	110N00113	902019	Switch, On/Off
4	109N00036	901044	Pot, Contrast
5	003N00105	940017	Knob, Contrast Pot
6	017N00022	902544	Foot, Rubber (Not Shown)



PL 4.2 MDT 20 TERMINAL PWBs

ITEM	XEROX PART NO.	MDT 20 PART NO.	DESCRIPTION
1	152N00146	919022	Monitor Assembly (Includes items 2, 3, 4, and 9)
2	--	--	CRT
3	--	--	Yoke
4	--	--	PWB, CRT
5	140N00444	136421-001	PWB, Main Logic
6	117N00140	902050-001	Cord, AC Power
7	105N00123	916990-1	Transformer
8	105N00122	916009-001	PWB, Power Supply
9	140N00443	916008-001	PWB, Monitor Control
10	116N00049	902541	Clip, Ground
11	--	--	Fuse, F1, 1.25A (slow blow) (Not Shown)
12	--	--	Fuse, F601, 2A (Not Shown)
13	--	--	Fuse, F602, 2A (Not Shown)

1 { INCLUDES 2, 3, 4, AND 9

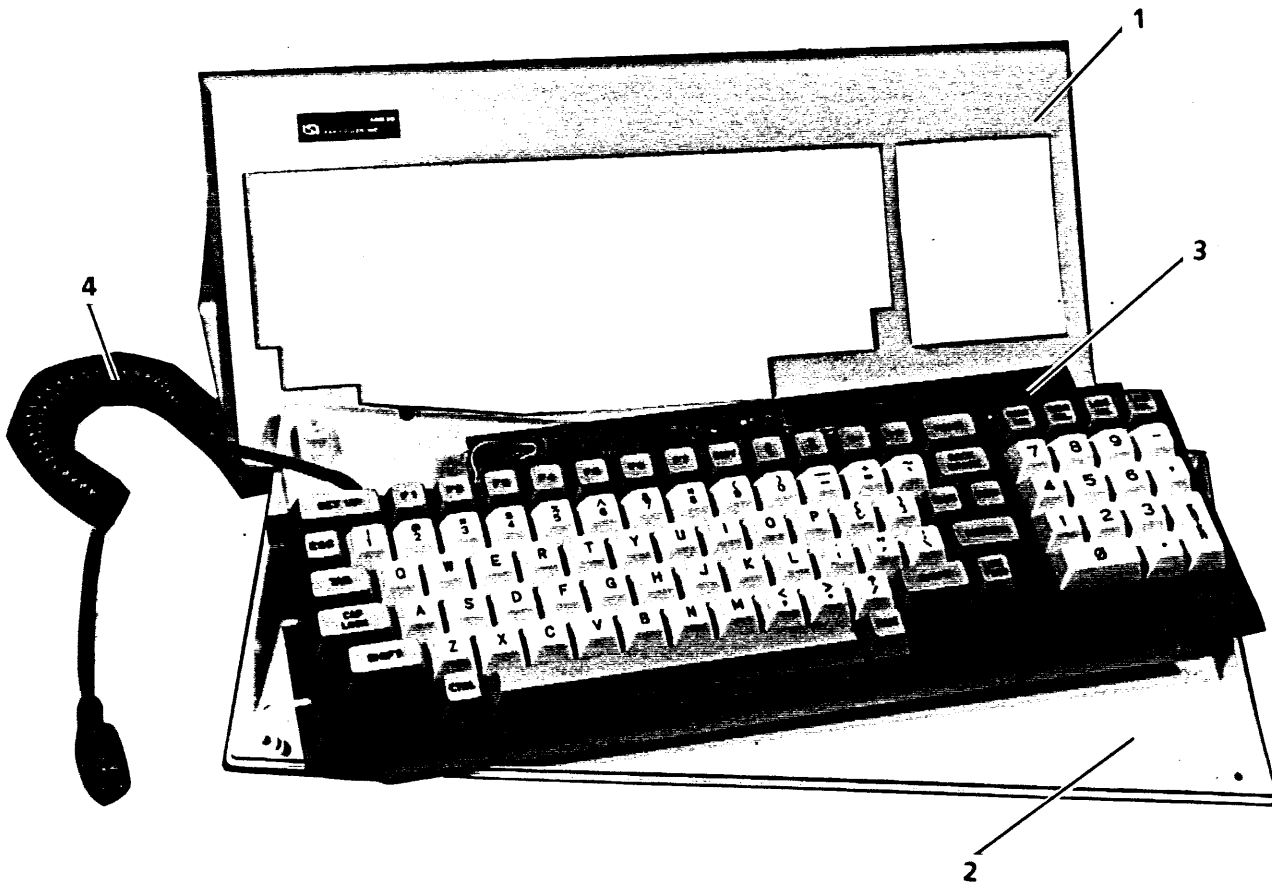


4. PARTS IDENTIFICATION

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PL 4.3 KEYBOARD ASSEMBLY

ITEM	XEROX PART NO.	MDT 20 PART NO.	DESCRIPTION
1	101N00208	900102-001	Cover, Top
2	101N00207	900103-001	Cover, Bottom
3	110N00114	136420-001	PWB, Keyboard
4	152N00239	902060	Cable, Keyboard
5	017N0022	902544	Foot, Rubber (Not shown)



CHAPTER 5 DISPLAY QUALITY

MDT 20 TERMINAL SERVICE MANUAL SUPPLEMENT

(REFER TO CHAPTER 6)

CHAPTER 6 TROUBLESHOOTING
MDT 20 TERMINAL SERVICE MANUAL SUPPLEMENT

INTRODUCTION TO MDT 20 TERMINAL TROUBLESHOOTING
--

MDT 20 Terminal Service Strategy

Steps required for isolation of the MDT 20 Terminal are provided in sequence below.

1. Perform LEVEL 1 CHECKOUT Procedure. Level 1 Checkout includes preparation for diagnostics and performance of diagnostics.
2. Perform any LEVEL 2 CHECK CHART procedures indicated by Level 1 Checkout.
3. If corrective action does not correct the problem, ask for assistance from the Dallas Service Center Technical Support Hot Line.

Check Charts are designed to include dependency on specific visible indications. If specific indications occur, several areas of the display are eliminated as a cause of failure. As a result, the LEVEL 1 CHECKOUT must be performed in the specific sequence in the procedure.

Use the appropriate amount of time to troubleshoot a problem. If a correction cannot be made, ask for assistance from the Lead Service Center Technician. Additional assistance is available from the Dallas Service Center Technical Support Hot Line. Telephone numbers for the Dallas Service Center Technical Support Hot Line are provided below:

OUTSIDE TEXAS	1-800-527-0483
IN TEXAS	1-214-422-4731

LEVEL 1 CHECKOUT EXPLANATION

Figure 6-1 provides a sample of the format of a Level 1 Checkout procedure. An explanation of the three columns is provided below.

1. The PROCEDURE column describes the actions required to perform the step.
2. In the INDICATIONS column, statements marked with letters describe indications of the correct operation. Check and verify the indications in the sequence provided. If the sequence is not observed, the Level 2 Access will not be valid for the correct isolation of faults.
3. The LEVEL 2 ACCESS column identifies the number of the appropriate Level 2 Check Chart procedure for corrective action for conditions described below:
 - a. One of the indications does not occur.
 - b. An incorrect indication occurs.

Level 1 Checkout provides appropriate references to diagnostic procedures or other appropriate service documentation.

PROCEDURE	INDICATIONS	LEVEL 2 ACCESS
POWER 1	2	3
2. Ensure System power is on, and look for following conditions.	a. Desktop Enclosure 2 fan operate. b. Floppy Disk Enclosure fan operate. c. Cursor appears on Terminal.	6.1 6.2 6.3

Figure 6-1 Sample Level 1 Checkout

LEVEL 2 CHECK CHART EXPLANATION

Figure 6-2 provides a sample of the format of a Level 2 Check Chart. Content of the various sections is described below.

STEP	PROCEDURE	TEST POINT	INDICATION	
			CORRECT	INCORRECT
	6.1 DESKTOP FANS INOPERATIVE	1		
2	1. Voltage at in-line connectors going to transformer is 103 to 127 VAC.	TB-1 to TB2	Replace fans	Step 2
3		4	5	6

Figure 6-2 Sample Level 2 Check Chart

1. Within section 1 is the number and name of the Level 2 Check Chart.
2. The STEP column provides the number sequence of steps in the check chart. Since some steps may not be required, the check charts provide reference to the required steps for isolation of a fault.
3. The PROCEDURE column describes any required preparations. AC or DC voltage tolerances are specified within the procedure. All AC voltages are identified with VAC, and all DC voltages are identified with V. Negative DC voltages include the negative symbol (-); the positive symbol (+) is not used. Always switch off system power if it is necessary to connect or disconnect plugs or remove or install PWAs. If a required preparation can cause an electrical shock, the procedure will specify instructions to switch off power.

4. The TEST POINT column identifies how and where to check the procedure statement. If a voltage reading is required, the first point is for the RED (+) lead, and the second point is for the BLACK (-) lead. If no second point is provided, the BLACK lead must be connected to frame ground. Chapter 7 provides component or plug/jack location diagrams to assist in locating the test points.
5. If the voltage or visible indication was CORRECT (or occurred as specified), the CORRECT INDICATION column provides instructions to continue troubleshooting, to replace a component, or to perform an adjustment.
6. If the voltage or visible indication was INCORRECT (or did not occur as specified), the INCORRECT INDICATION column provides instructions to continue trouble-shooting, to replace a component, or to perform an adjustment.

STEP	PROCEDURE	INDICATIONS	LEVEL 2 ACCESS
------	-----------	-------------	----------------

LEVEL 1 CHECKOUT

PREPARATION

1. Check for an obvious problem (loose connections, broken parts), and repair according to Chapter 3 (OEM MDT 20 Service Manual).
2. Switch OFF Terminal power. Move operator CONTRAST control to mid-range. Disconnect interface cable from terminal and install Loopback tool.

DIAGNOSTICS SEQUENCE

- | | | |
|---|--|------|
| 3. Switch ON terminal power. | a. After 10 seconds, buzzer sounds and cursor appears in the upper left corner of screen. | 6.01 |
| 4. Press and hold the X key, and look for conditions in the Indications column. | a. Several Xs appear on the screen. | 6.02 |
| | b. Several Xs appear on the screen, and display quality is good. | 6.03 |
| | c. Display quality is good, but customer complaint indicates that problem exists with host computer or auxiliary device. | 6.04 |

STEP	PROCEDURE	TEST POINT	INDICATION	
			CORRECT	INCORRECT
6.01 CURSOR NOT DISPLAYED				
1.	Cursor appeared on the screen but the buzzer did not sound.	Visual	Replace Main Logic PWB	Step 2
2.	The following voltages are present on the Logic PWB (Figure 6-3).	Logic PWA		
	a. 4.75V to 5.25V.	P2 to P1	Step 2b	6.05
	b. 14.25V to 15.75V.	P4 to P1	Step 2c	6.05
	c. -11.4V to -12.6V.	P3 to P1	Step 3	6.05
3.	With operator CONTRAST control at maximum, screen has video (displays other than black).	Visual	Step 4	6.06
4.	Screen displays condensed horizontal or diagonal lines (loss of horizontal sync).	Visual	6.07	Step 5
5.	Picture does not roll (loss of vertical sync).	Visual	6.07	Step 6
6.	Picture size and position are correct.	Visual	Return to Level 1 Checkout.	6.03

6.02 KEYBOARD NOT RESPONDING

1.	Loopback Tool is installed on terminal main port.	Visual	Step 2	Install Loopback Tool
2.	Keyboard Cable is properly connected to rear of keyboard.	Visual	Step 3	Connect Keyboard Cable
3.	Voltage at Keyboard PWB is 4.75V to 5.25V.	Red wire to Black wire	Replace in order: Main Logic PWB Keyboard	Replace Keyboard Cable

STEP	PROCEDURE	TEST POINT	INDICATION	
			CORRECT	INCORRECT

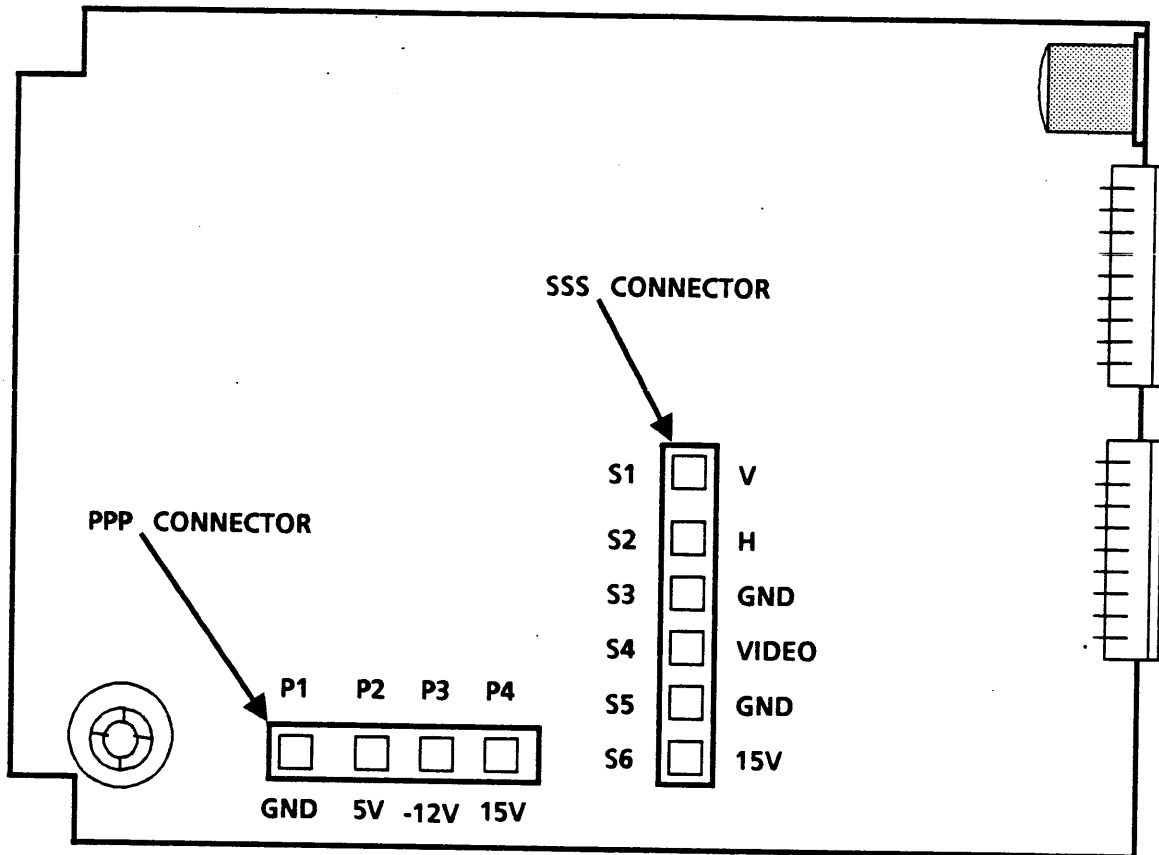


Figure 6-3 Main Logic PWB Test Points and Connectors

6. TROUBLESHOOTING

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STEP	PROCEDURE	TEST POINT	INDICATION	
			CORRECT	INCORRECT
6.03 DISPLAY QUALITY				
1.	Picture quality problem is incorrect brightness.	Visual	Step 2	Step 5
2.	Perform brightness and focus adjustments (Procedure 3.1, MDT 20 Service Manual Supplement). Brightness and focus were successful.	Visual	Step 5	Step 3
3.	Switch off terminal power and disconnect AC power cord from wall outlet. Disconnect CONTRAST control from Monitor Control PWB. Resistance is 0 to 100K Ohms while adjusting CONTRAST control minimum to maximum.	Contrast control connector Pins 1 to 2	Replace in order: Monitor Control PWB Monitor Assy	Contrast control
4.	With On/Off switch in the ON position, resistance is less than 5 ohms.	On/Off switch terminals red wire to yellow wire	Replace in order: Monitor Control PWB Monitor Assy	Replace On/Off switch
5.	Picture quality problem is vertical size.	Visual	Step 6	Step 7
6.	Perform vertical size adjustment (Procedure 3.1, MDT 20 Service Manual Supplement). Vertical size adjustment was successful.	Visual	Step 7	Replace in order: Monitor Control PWB Monitor Assy
7.	Perform horizontal width and horizontal linearity adjustments (Procedure 3.1, MDT 20 Service Manual Supplement). Adjustments were successful.	Visual	----	Replace in order: Monitor Control PWB Monitor Assy

STEP	PROCEDURE	TEST POINT	INDICATION	
			CORRECT	INCORRECT
6.04 INTERFACE FAULT ISOLATION				
1.	Problem is with the Main port.	Visual	Step 2	Ask customer to verify that SET-UP is correct. If setup is correct, replace Main Logic PWB.
2.	Connect interface cable to rear of terminal and install loopback tool at end of cable. Press hold the x key. Xs are displayed on the screen.	Visual	Ask customer to verify that setup is correct. If setup is correct, replace Main Logic PWB.	Inform customer that Interface Cable is bad.
6.05 AC/DC POWER FAULT ISOLATION				
1.	All DC voltages are incorrect.	Visual	Step 9	Step 2
2.	Fuses F601 and F602 on Power Supply PWB are good (Figure 6-4).	Visual	Step 3	Replace fuse. If fuse opens again, refer to schematics to isolate problem.
3.	Disconnect PPP connector from Main Logic PWB. Voltage in question is within tolerance.	P2 to P1, or P3 to P1, or P4 to P1	Step 4	Replace Power Supply PWB
4.	Voltage in question is 5V.	Visual	Step 6	Step 5

6. TROUBLESHOOTING

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STEP	PROCEDURE	TEST POINT	INDICATION	
			CORRECT	INCORRECT
5.	Voltage in question is 15V.	Visual	Step 7	Replace Main Logic PWB
6.	Connect PPP connector to Main Logic PWB and disconnect Keyboard Cable from rear of terminal. Voltage is 4.75V to 5.25V at Logic PWB.	P2 to P1	Replace in order: Keyboard Keyboard Cable	Step 7
7.	Disconnect BBB connector form Power Supply PWB. Voltage is 4.75V to 5.25V.	P2 to P1	Replace Monitor Assy	Replace Main Logic PWB
8.	Connect PPP connector to Main Logic PWB and disconnect SSS connector from Logic PWB. Voltage is 14.25V to 15.75V.	P4 to P1	Replace in order: Monitor Control PWA Monitor Assy	Replace Main Logic PWB
9.	Fuse F1 on Power Supply PWB is good.	Visual	Step 10	Replace fuse. If fuse opens agains, refer to schematics to isolate problem.
10.	Voltage is 103 to 127 VAC at Power Supply PWB (Figure 6-4).	AC1 to AC2	Step 11	Step 12
11.	ALL of the the following transformer outputs are good. a. 34 to 44 VAC b. 13 to 21 VAC	Power Supply PWB A1 to A2 A5 to A6	Replace Power supply PWB	Replace Transformer
12.	Switch OFF terminal power and disconnect AC power cord from wall outlet. With the On/Off switch in the ON position, resistance is less than 5 ohms.	On/Off switch terminals black wire to Black wire	Replace AC Power Cord	Replace On/Off switch

STEP	PROCEDURE	TEST POINT	INDICATION	
			CORRECT	INCORRECT

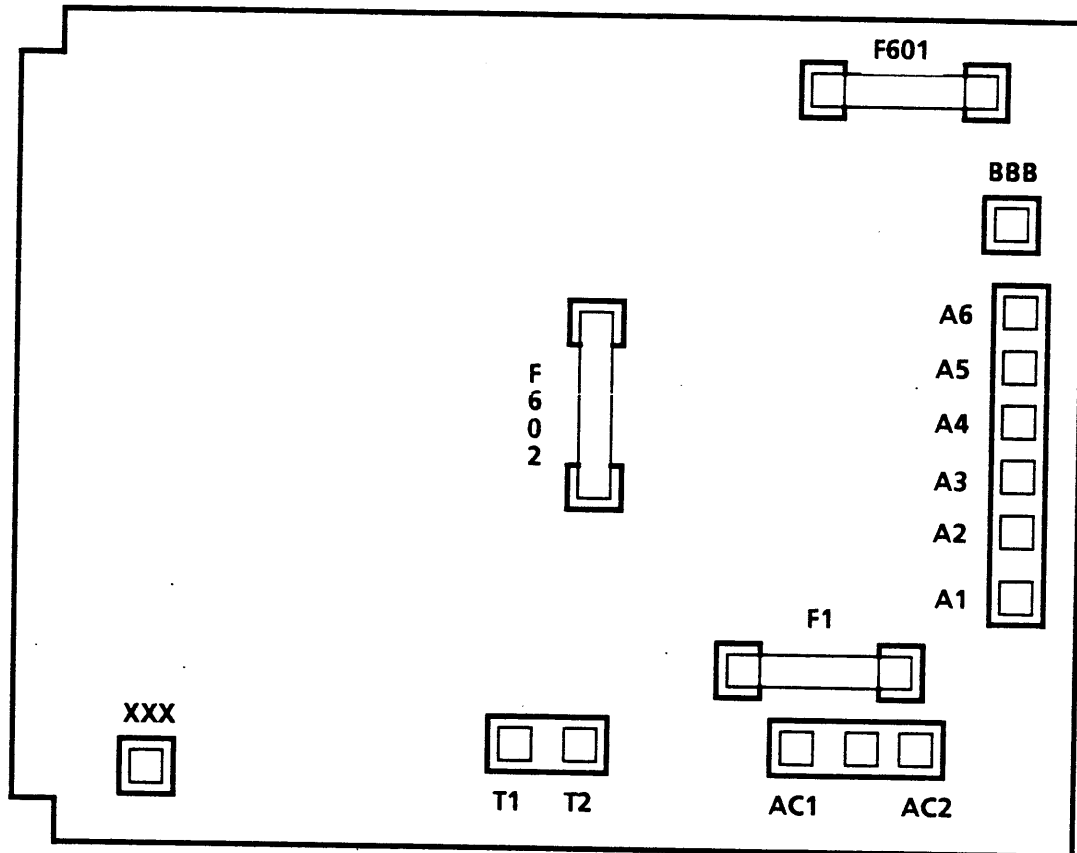


Figure 6-4 Power Supply PWB Fuses and Connectors

6. TROUBLESHOOTING

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STEP	PROCEDURE	TEST POINT	INDICATION	
			CORRECT	INCORRECT
6.06 NO VIDEO (BLACK SCREEN)				
1.	Voltage is greater than 0.4V at Main Logic PWB.	S4	Step 3	Step 2
2.	Disconnect SSS connector from Main Logic PWB. Voltage is greater than 0.4V at Logic PWB.	S4	Replace Monitor Control PWB	Replace Main Logic PWB
3.	Switch OFF terminal power, and disconnect AC power cord from wall outlet. Disconnect CONTRAST control from Monitor Control PWB. Resistance is 0 to 100K ohms while adjusting CONTRAST control minimum to maximum.	Contrast control Connector, pins 1 to 2	Replace in order: Monitor Control PWB Monitor Assy	Replace Contrast control
6.07 HORIZONTAL/VERTICAL SYNC CHECK				
1.	Problem is with Horizontal Sync.	Visual	Step 2	Step 4
2.	Voltage is greater than 0.7V at Main Logic PWB.	S2	Replace Monitor Control PWB	Step 3
3.	Disconnect SSS connector from Main Logic PWB. Voltage is greater than 0.7V at Logic PWB.	S2	Replace Monitor Control PWB	Replace Main Logic PWB
4.	Voltage is 3V to 5.25V at Logic PWB.	S1	Replace Monitor Control PWB	Step 5
3.	Disconnect SSS connector from Main Logic PWB. Voltage is 3V to 5.25V at Logic PWB.	S1	Replace Monitor Control PWB	Replace Main Logic PWB

CHAPTER 7 PLUG/JACK LIST

MDT 20 TERMINAL SERVICE MANUAL SUPPLEMENT

(REFER TO THE OEM MDT 20 TERMINAL SERVICE MANUAL)

CHAPTER 8 PRINCIPLES OF OPERATION

MDT 20 TERMINAL SERVICE MANUAL SUPPLEMENT

(REFER TO THE OEM MDT 20 TERMINAL SERVICE MANUAL)

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