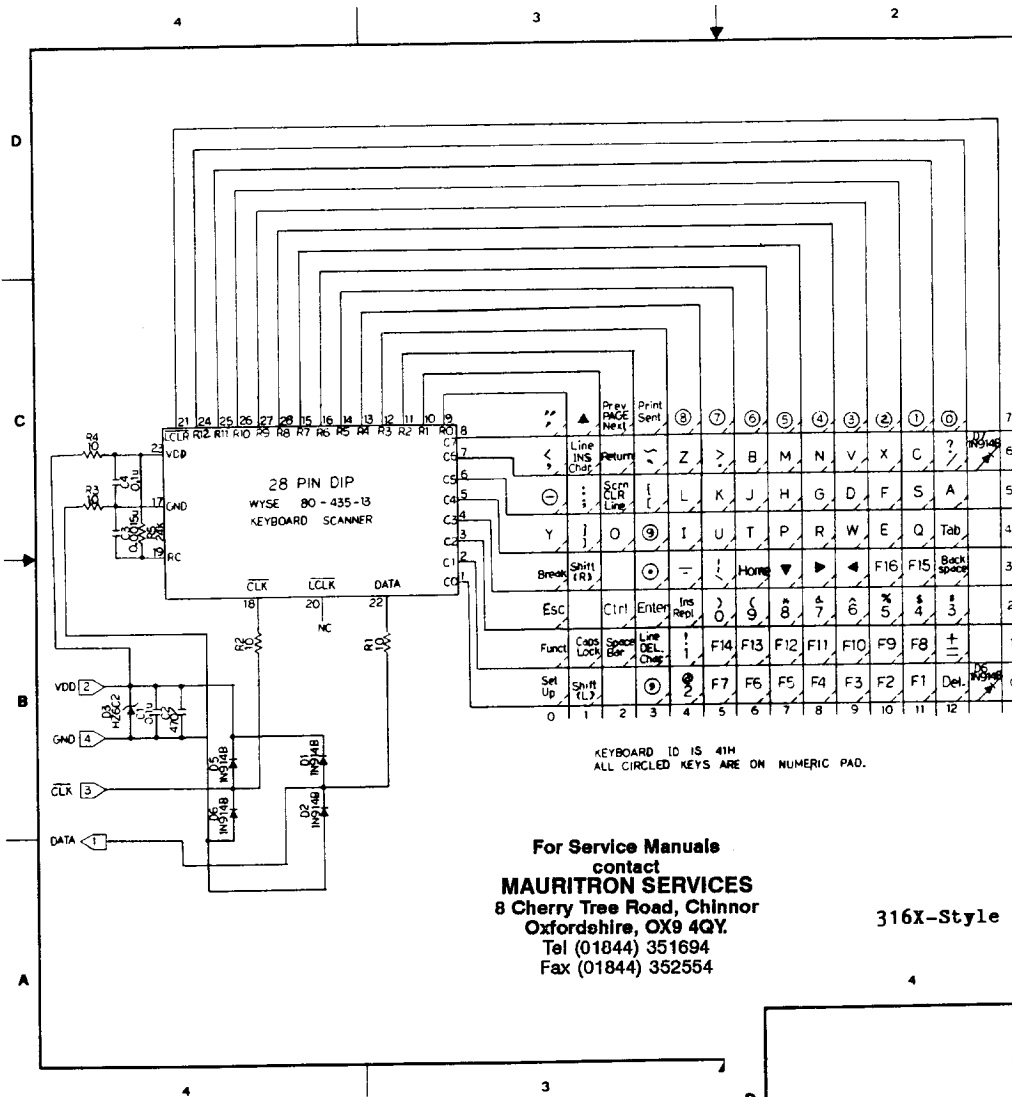
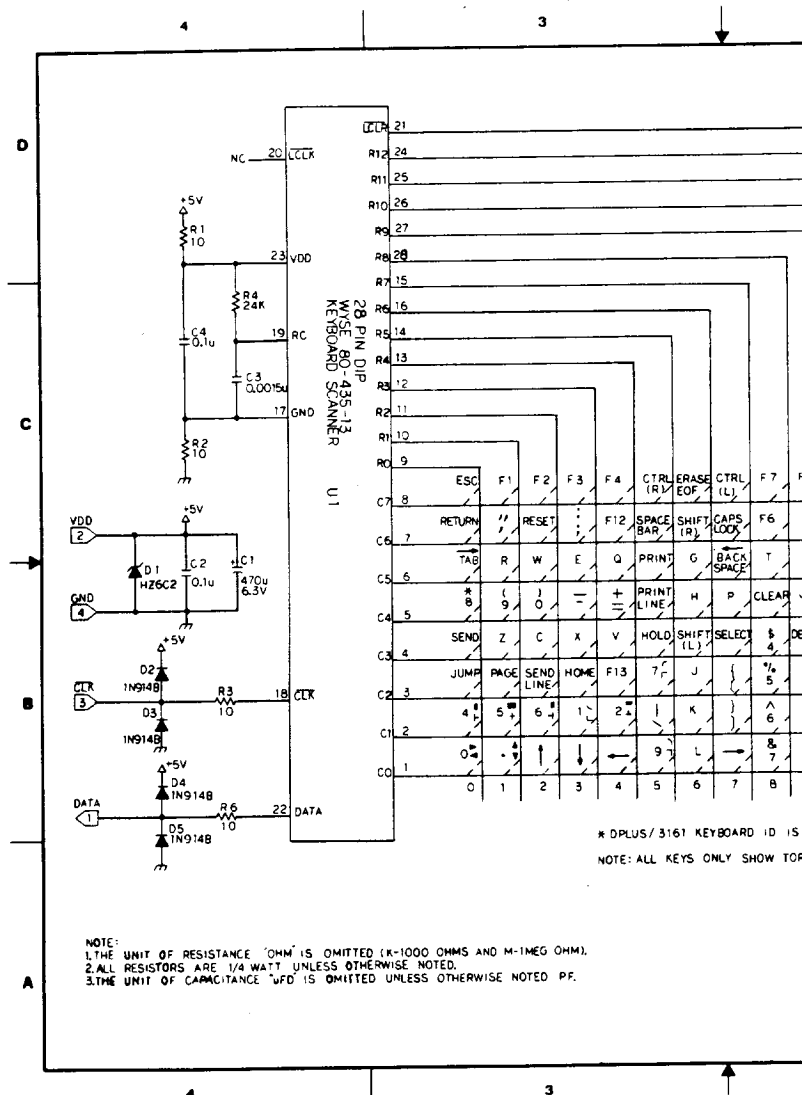


WY-60 ASCII Keyboard PCB Schematic

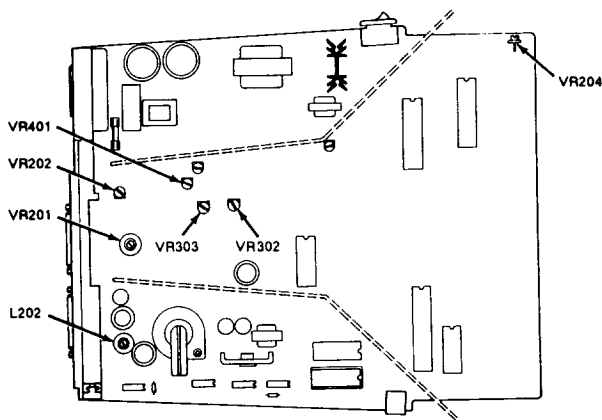


For Service Manuals
contact
MAURITRON SERVICES
8 Cherry Tree Road, Chinnor
Oxfordshire, OX9 4QY.
Tel (01844) 351694
Fax (01844) 352554

316X-Style Keyboard PCB Schematic

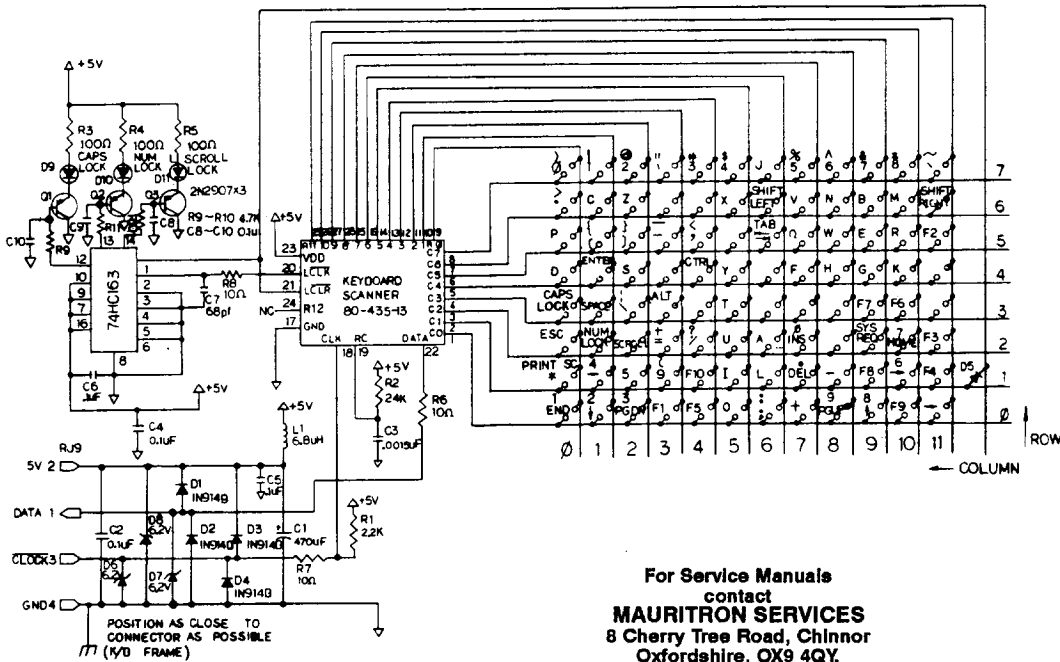


Adjustment Locations

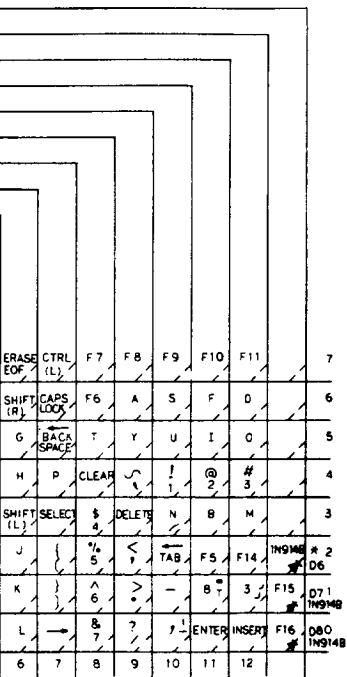


MAURITRON
170
01844-351694

Model 60
WY-60
WY-60-01-02

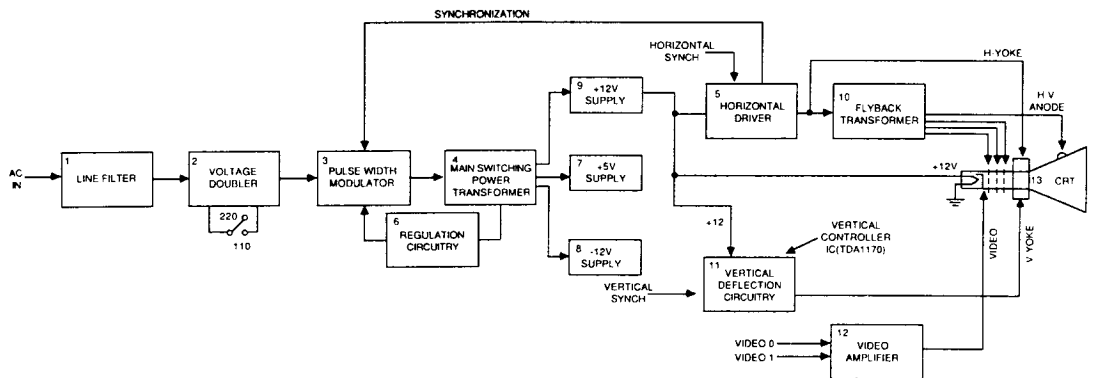


For Service Manuals
contact
MAURITRON SERVICES
8 Cherry Tree Road, Chinnor
Oxfordshire, OX9 4QY.
Tel (01844) 351694
Fax (01844) 352554



51 KEYBOARD ID IS #4.#5.#6.#7.
EYES ONLY SHOW TOP LEGEND.

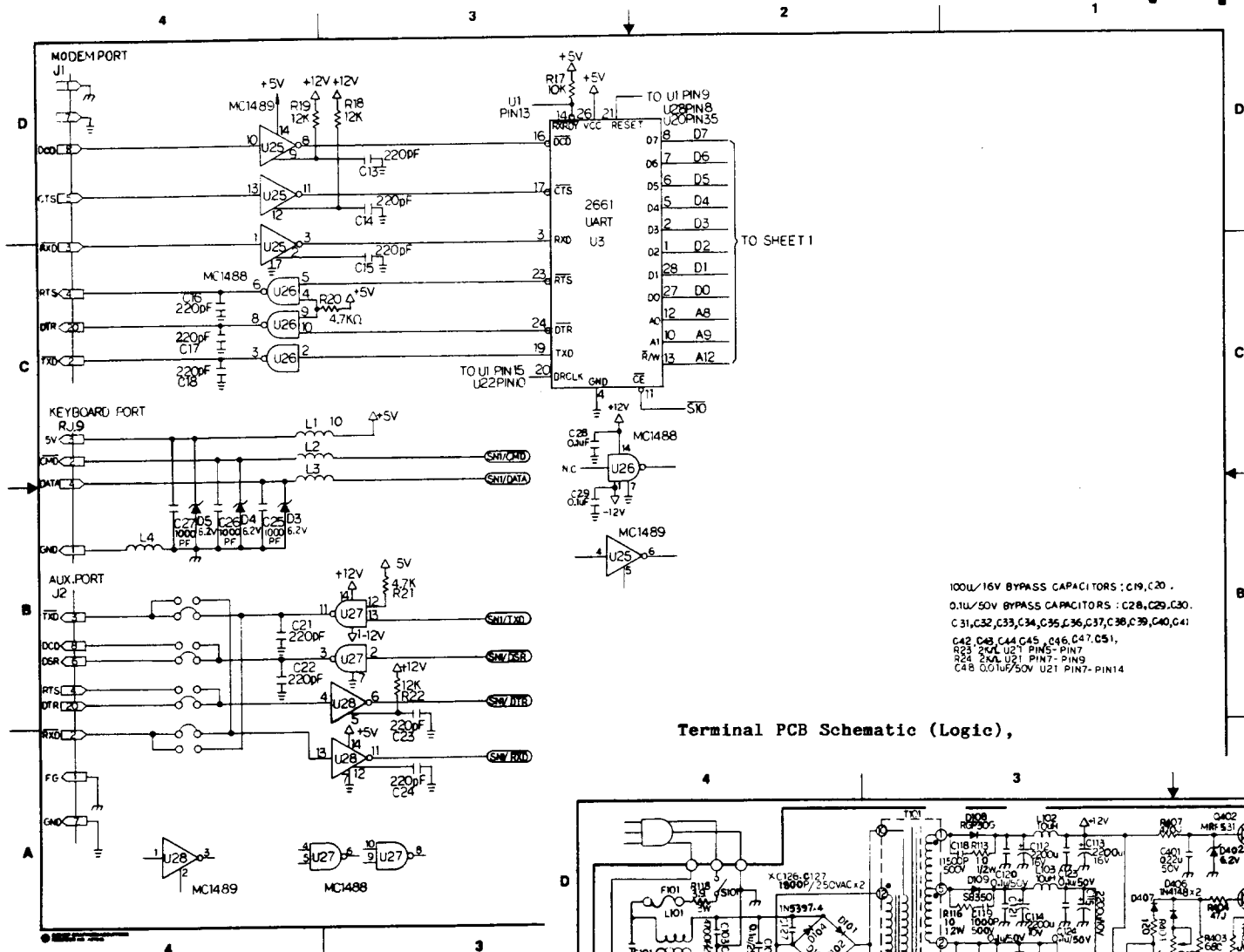
For Service Manuals
contact
MAURITRON SERVICES
8 Cherry Tree Road, Chinnor
Oxfordshire, OX9 4QY.
Tel (01844) 351694
Fax (01844) 352554



Monitor/Power Supply Circuitry Functional Block

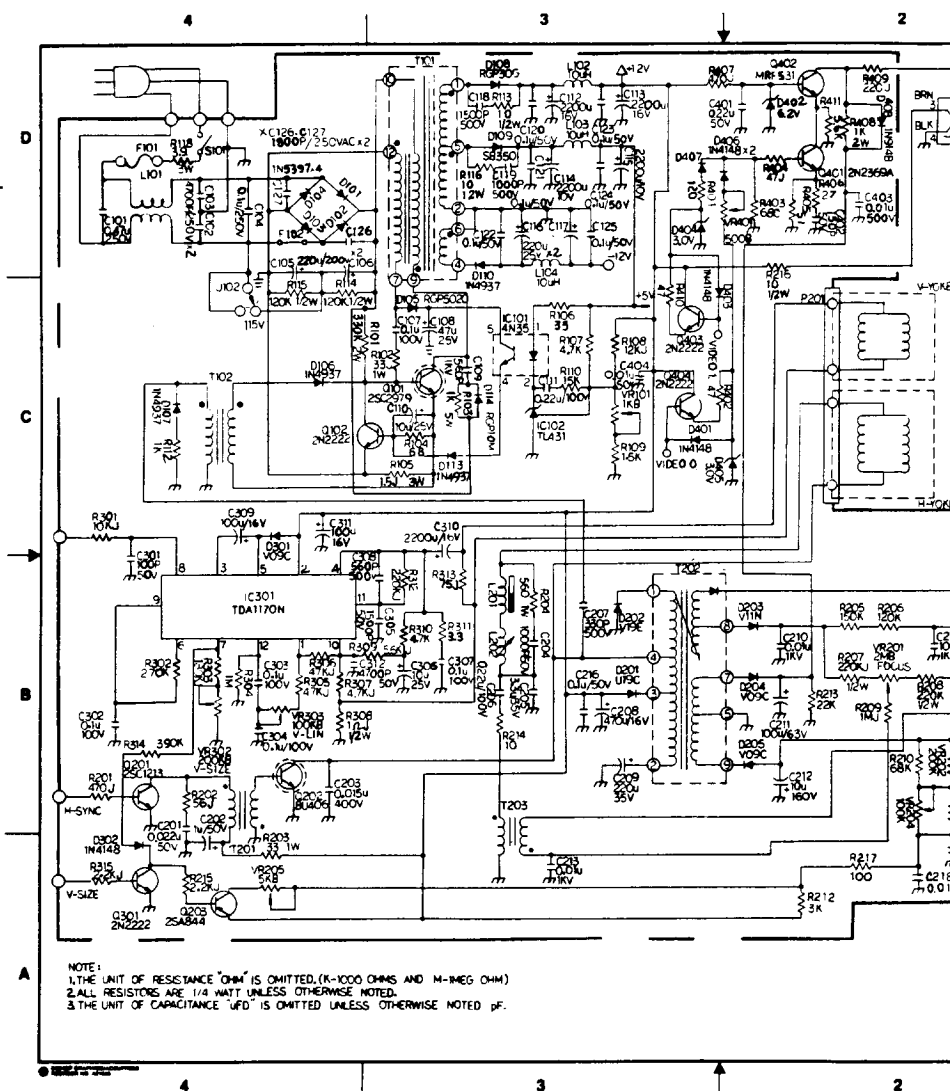
MAURITRON
170
01844-351694

Terminal PCB Schematic (Monitor/Power Supply),

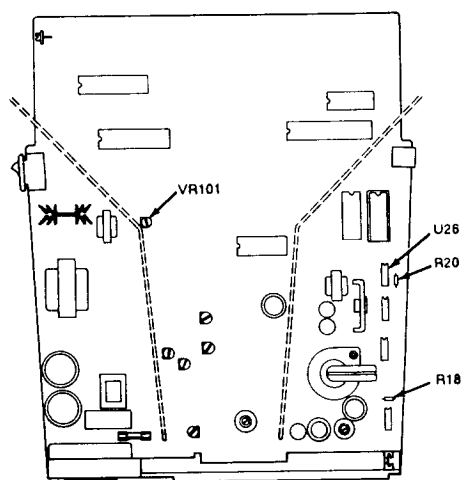


MAURIT
8 Cherry 1
Oxford
Tel (0
Fax (0

Terminal PCB Schematic (Logic),

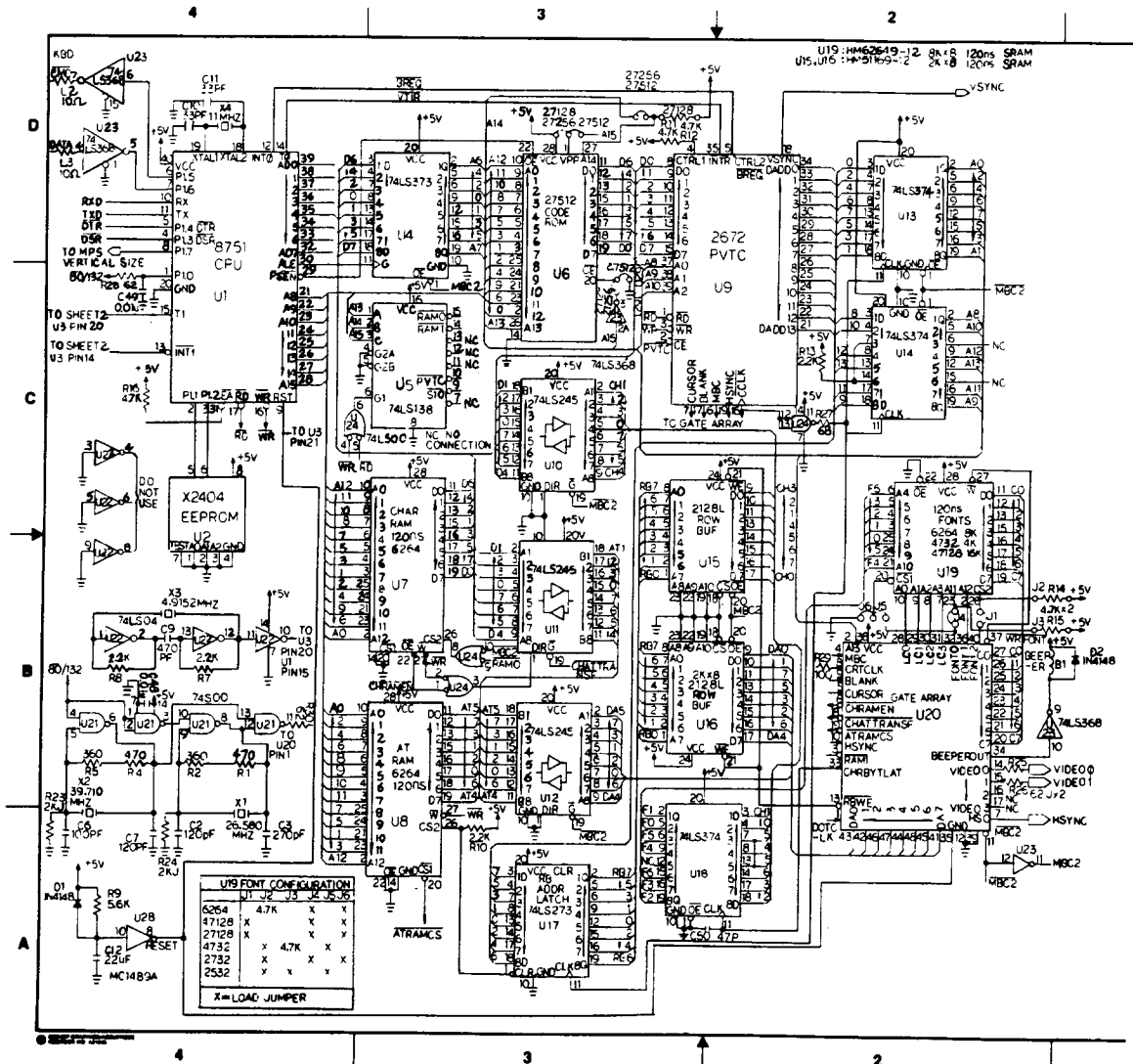


Power Supply Component Layout

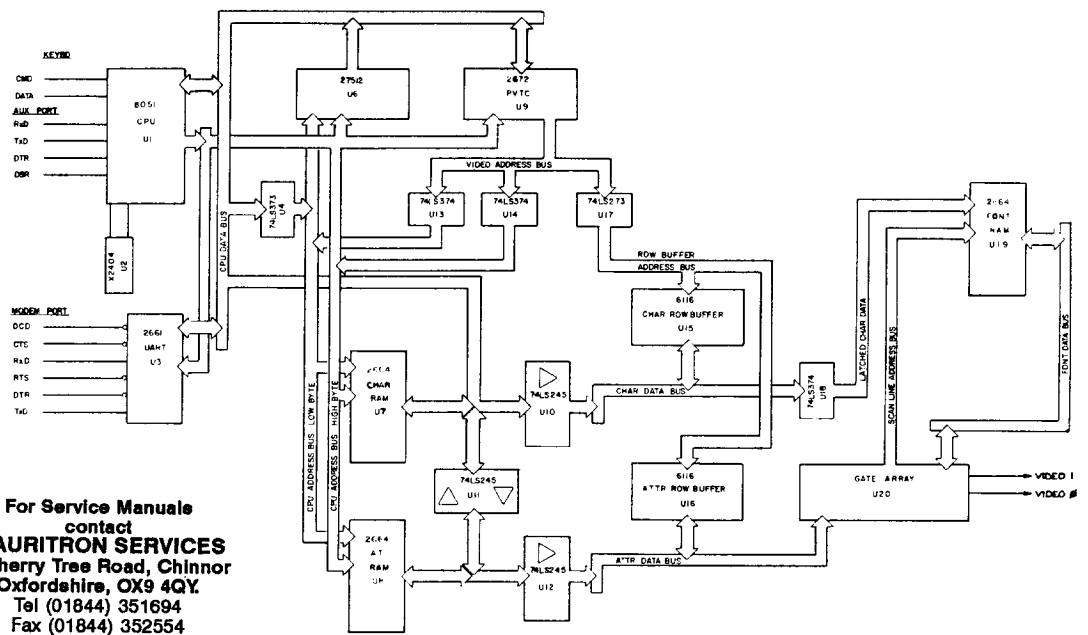


Terminal PCB Schematic (Logic),

For Service Manuals
contact
MAURITRON SERVICES
8 Cherry Tree Road, Chinnor
Oxfordshire, OX9 4QY.
Tel (01844) 351694
Fax (01844) 352554



For Service Manuals
contact
MAURITRON SERVICES
8 Cherry Tree Road, Chinnor
Oxfordshire, OX9 4QY.
Tel (01844) 351694
Fax (01844) 352554



Terminal PCB Logic Circuitry Functional Block Diagram

Before You Start	3-1
Safety	3-1
Required Tools	3-2
Primary Troubleshooting Procedures	3-2
Preparing the Terminal for Troubleshooting	3-2
Power-On Self Test	3-3
Diagnostic Self-Test	3-3
Back-to-Back Diagnostic Self-Test	3-4
Troubleshooting Quick Reference Guide	3-4
Troubleshooting Flowchart	3-5
No Video/No Beep	3-7
Dim Video	3-10
Other Video Problems	3-10
Fails Self-Test of Diagnostic Tests	3-10
Miscellaneous Symptoms	3-12
Additional Troubleshooting Procedures	3-12
Installation Checklist	3-13
Checking for Continuity	3-14
Power Supply Check on the Terminal PCB	3-14
Checking the Keyboard	3-15
Isolating Circuits	3-15

BEFORE YOU START

Read the following safety information carefully before you attempt to troubleshoot your unit.

Safety

Warning--This terminal contains high voltage. Don't attempt to service the terminal without taking all the precautions necessary for working with high voltage, including the following:

- o If you must open the terminal for any reason, turn off the power, disconnect any communication cables, and unplug the terminal.
- o Remove any jewelry, especially from your hands and wrists.
- o Avoid wearing clothing that holds a static charge.
- o Use only insulated or nonconductive tools.
- o Whenever you disconnect the anode from the anode lead, make sure to discharge the anode as directed in Chapter 2.
- o If you need to remove or replace the CRT/yoke assembly, remember that the CRT can implode if you drop it or break the neck. The flying glass can injure anyone within a radius of six to ten feet.

Required Tools

Before you start to repair in the terminal, make sure you have the tools and materials listed below.

- o No. 2 Phillips screwdriver
- o 3/16-inch flat-bladed screwdriver
- o Digital multimeter (DMM) or a voltmeter
- o Test connectors for the MODEM and AUX ports (See Appendix C for instructions to make them or Chapter 5 for ordering information.)
- o Nonconductive video alignment tool
- o Tie-wraps and diagonal cutters to cut tie-wraps

PRIMARY TROUBLESHOOTING PROCEDURES

You should begin troubleshooting by preparing the terminal properly and running the Power-On Self-Test and the Diagnostic Self-Tests. These tests generate error messages, which are identified in the "Fails Power-on or Diagnostic Self Tests" section of Figure 3-1.

Preparing the Terminal for Troubleshooting

To prepare the terminal for troubleshooting, follow these steps:

1. Turn off the terminal.
2. Disconnect the computer's communication cables.
3. Unplug the power cord from its power source.
4. Remove the terminal bucket and back bezel.
5. Plug the power cord back into it's power source.
6. Turn on the terminal.

For Service Manuals
contact
MAURITRON SERVICES
8 Cherry Tree Road, Chinnor
Oxfordshire, OX9 4QY.
Tel (01844) 351694
Fax (01844) 352554

Power-on Self-Test

The power-on self-test checks the terminal's random access memory (RAM), read-only memory (ROM), electrically eraseable read-only memory (EEROM), and external communication ports.

Each time you turn the terminal on, the power-on self-test occurs. If the test detects an error, an error message appears on the display. The "Fails Power-on or Diagnostic Self-Tests" section in Figure 3-1 identifies these errors. If any of these messages appear, replace or troubleshoot the terminal PCB.

Diagnostic Self-Test

The terminal diagnostic self-test starts in setup mode. This procedure includes communications circuitry tests, read/write tests, and row buffer tests. Two special test connectors allow the diagnostic test to function (see Appendix C for connector definitions or Chapter 5 for ordering information). After you start it, the diagnostic test continues to run until you stop it. If the test detects an error, an error message appears in the lower right-hand corner of the screen (see "Fails Power-on or Diagnostic Self-Tests" in Figure 3-1).

Follow these steps to start the diagnostic self-test:

1. Turn the terminal off.
2. Detach any communications cables on the back of the terminal.
3. Attach the test connectors to the MODEM and AUX ports on the rear of the terminal.

Note--See Appendix C for a description of these test connectors and instructions to make them. See Chapter 5 to order them.

4. Turn the terminal on.
5. Hold the SHIFT key, then press the SETUP key.
6. Press the F2 key. Look for to the TEST:OFF field in the setup menu.
7. Use the cursor keys to highlight the TEST:OFF field.
8. Press the SPACEBAR. This toggles the TEST field ON.
9. Press the F10 key, then CUSOR RIGHT, then F10 again. You will see a flashing test pattern.
10. If the test stops, the terminal beeps, and a letter or number appears on the screen go to the "Fails Power-on or Diagnostic Self-Tests" section of Figure 3-1.

Note--To fully test the terminal, let the diagnostic self-test run five minutes.

11. If you see an error message, replace or troubleshoot the terminal PCB; if you don't see an error, press the SPACEBAR, then the SETUP key.
12. Turn the terminal off. Remove the test connectors, and reattach the communications cables.

For Service
conta
MAURITRON
8 Cherry Tree R
Oxfordshire,
Tel (01844)
Fax (01844)

Back-to-Back Diagnostic Self-Test

The back-to-back diagnostic self-test also starts in setup mode. This test checks communications circuitry. A special test harness allows the test to function (see Appendix C for harness definition or Chapter 5 for ordering information). After you start it, the back-to-back diagnostic test continues to run until you stop it. If the test detects an error, an error message appears in the lower right-hand corner of the screen (see "Fails Power-on or Diagnostic Self-Tests" in Figure 3-1).

To start the back-to-back diagnostic self-test, follow the same steps as for the diagnostic self-test (previous page), with the exception of step 3:

3. Attach the test harness to the MODEM and AUX ports on the rear of the terminal.

Note--See Appendix C for a description of the test harness and instructions to make it. See Chapter 5 to order it.

TROUBLESHOOTING QUICK REFERENCE GUIDE

Table 3-1 is a troubleshooting reference guide. Once you discover the major symptoms, this table can quickly direct you to the most likely problem area. However, don't automatically replace the suggested modules until you've studied the problem or checked related details in the troubleshooting flowchart.

Table 3-1 Module-Level Troubleshooting Quick Reference Guide

Symptom	Possible Problem Area(s)
No display	Terminal PCB, CRT/yoke assembly
Poor display quality	Adjustments, terminal PCB
Wrong size display Crooked Too bright Not in focus	Adjustments, terminal PCB, yoke
Fails self-test	Terminal PCB
Fails diagnostic test	Terminal PCB, wrong diagnostic setup, faulty test connectors
Inoperative keys	Keyboard, terminal PCB, keyboard cable
Can't communicate with computer	Setup parameters, terminal PCB, communication cable
Letters or error codes on the screen	Terminal PCB

TROUBLESHOOTING FLOWCHART

Read the troubleshooting flowchart and match the symptoms with the suggested solutions. Use the schematics and assembly drawings in Chapter 7 to help you interpret this flowchart.

Service Manuals
contact
RITRON SERVICES
ry Tree Road, Chinnor
ordshire, OX9 4QY.
l (01844) 351694
x (01844) 352554

Table 3-3 Terminal PCB Circuit Isolation Jumpers

Jumper	Areas Isolated
J681	Power supply from logic
J682	+5 volt supply
J759	Video circuit
J760	Logic from monitor circuitry
J532	Video 0
J533	Video 1
J665	Vertical synchronization
J535	Logic from monitor circuitry
J583	Horizontal synchronization
J749	Logic from monitor circuitry

Figure 3-1 Troubleshooting Flowchart, page 1 of 7

Start

Prepare terminal
for troubleshooting 3-2

Symptom: No beep 3-7

Symptom: No video 3-7, 3-10

Symptom: Dim video 3-10

Symptom: Single line
of video on screen 3-10

Symptom: Vertical
roll 3-10

Symptom: Raster,
no video 3-10

Symptom: Letter
on screen before
diagnostic self-test 3-10

Run diagnostic self-test 3-3

Symptom: Letter
on screen after
diagnostic self-test 3-10

Symptom: Poor display
quality Chapter 4,
Perform full
alignment

Symptom: Keyboard not
operating 3-12

Symptom: Communication
problems 3-12

Symptom: Characters
scrambled or degraded,
dots missing 3-12

Symptom: Characters
don't appear on the
screen 3-12

End

Figure

No Vi

7.

For Service Manual
contact
MAURITRON SERV
8 Cherry Tree Road, C
Oxfordshire, OX9 4
Tel (01844) 35169
Fax (01844) 3525

Figure 3-1 Troubleshooting Flowchart, page 2 of 7

8. Check

No Video/No Beep

1. Check power cord,
on/off switch,
fuse
Check for continuity and correct
connections.
Make sure J102 is set for the
correct line voltage.
2. Check beeper B1 and
surrounding circuitry
3. Check brightness
Check the brightness slideswitch;
perform the brightness alignment.
(See "Brightness" in Chapter 4.)
4. Check all power
supplies
+5V, U1-40, (U1-20 is ground)
+12V, U27-14 (U27-7 is ground)
-12V, U27-1 (U27-7 is ground)
If one of the power supply voltages
is out of tolerance, use the
schematics found in Chapter 7 to
trace and fix the problem.
5. Check tube filament
Is it glowing? If not, check the
tube socket:
Is the socket plugged in?
Are any of the CRT's pins bent?
Check the continuity between the
socket and its board connections.
6. Check video
transistors
Q402, Q401, Q403, Q404. If any
aren't operating correctly, replace.

7. Check U20

Look for video output:
Video 0, U20-14
Video 1, U20-15

Check both lines with an oscilloscope, you should see toggling activity on both. If you don't, check these areas:

Dot Clock at U20-1. Look for a 50 percent duty cycle at 26.58 or 39.71 MHz.

If the waveform is missing or incorrect, remove U20 and troubleshoot the dot clock. Check U21 and the surrounding circuitry. Then check U20-1 again.

Figure 3-1 Troubleshooting Flowchart, page 3 of 7

No Video/No Beep, Continued

7. Check U20 (continued)

If the waveform is correct, check the character clock output at U20-8. Look for 2.658 or 4.4122 MHz. If the output is missing, replace U20.

Check for shorts on the video output lines: U20-14, U20-15, Q403, Q404, R25, and R26. Are these lines open?

Check the video blank line, U20-9.

Check HSYNC: Is U20-7 toggling? Look for 26.58 KHz. Is the line open or short? Check R201.

Is HSYNC present from the video controller at U20-10? If the signal is present, replace U20. If the signal isn't present, check U19-9.

Check MBC2 at U20-11, U23-11, and U20-4. Is the signal toggling? Is the MBC signal present at U20-4. If the signal is present, replace U20. If the signal isn't present, continue to step 8.

8. Check U9

Is U9 receiving power? Look for +5V at U9-40. U9-20 is ground.

Check character clock input. Use the schematics in Chapter 7 to check the circuitry between U20-8 and U9-16. Are there shorts? Is any portion of the circuitry open?

If the signal is missing and you find no open circuit, replace U20.

If the signal is missing and you find no shorts, replace U9.

Check controller select activity at U9-2. If no shorts and no open lines, go to step 9.

Check interrupt lines:
U9-5 (toggles at 1.5 KHz)
U9-35 (toggles every 16.6ms)
Are they short or open?

For Service Manuals
contact
MAURITRON SERVICES
8 Cherry Tree Road, Chinnor
Oxfordshire, OX9 4QY.
Tel (01844) 351694
Fax (01844) 352554

Figure 3-1 Troubleshooting Flowchart, page 4 of 7

No Video/No Beep, Continued

- | | |
|----------------------------|---|
| 8. Check U9
(continued) | <p>If U9 is being addressed by U1, but U9 is not toggling, replace it.</p> <p>If interrupts are active, but not toggling, go to step 9.</p> <p>If interrupts are active and toggling, check the soft font data path, U19- C0 to C7.</p> <p>Check MBC output: If there is no output, check U1, all read/write and data connections.</p> <p>If no output and selection functions occur, replace U9.</p> <p>Check HSYNC output U9-19. Look for 26.58 KHz.</p> |
| 9. Check U1 | <p>Check power to U1. U1-40, U1-20 is ground.</p> <p>Check the processor clock: U1-18, U1-19, and connected circuitry including X4, C10, and C11.</p> <p>Check signal PSEN, U1-29 to U6-22. If there is no activity present, check U6, U7, U4, U1, their interconnections and all address and data busses connected to U1.</p> <p>Check signal ALE, U1-30. Look for a signal at 1/12th the clock rate. If this signal is not present, check the reset line U1-9, and the processor clock, U1-18 and U1-19.</p> <p>Check U1-1. In standard operation in 80-column mode, this pin is low. If PSEN and ALE are functioning and this line is high, check all address and data busses.</p> <p>Is U6 plugged into its socket backwards?</p> |

**For Service Manuals
contact
MAURITRON SERVICES**
8 Cherry Tree Road, Chinnor
Oxfordshire, OX9 4QY.
Tel (01844) 351694
Fax (01844) 352554

Figure 3-1 Troubleshooting Flowchart, page 5 of 7

Dim Video

- | | |
|-------------------------------------|---|
| 1. Check user
brightness control | Adjust the brightness slideswitch. |
| 2. Adjust brightness | Perform the brightness alignment found in "Brightness", Chapter 4. |
| 3. Check brightness
circuitry | <p>Check VR202, VR203, VR204, D203, and D205.</p> <p>Pin 1 of the CRT (attached to the green wire) should vary between +12 and -100VDC when the brightness control slideswitch moves from its highest to its lowest points. Check all connected circuitry.</p> <p>Check video output pins on U20.</p> |

Model 60
WY-60
WY-60-01-02

Other Video Problems

- | | | |
|----|----------------------------|---|
| 1. | A vertical line of video | Check the vertical yoke and the vertical deflection circuit. |
| 2. | A horizontal line of video | Check the yoke. |
| 3. | Raster, no video | Check the video amplifier, U20, all open video lines, and the CRT socket. |

Fails Self-Test or Diagnostic Test

- | | | |
|----|---------------------------|---|
| 1. | Check setup | Make sure you correctly selected the diagnostic test. |
| 2. | Check loopback connectors | They may be missing, on the wrong ports or faulty. Check Appendix C to make sure all connections are correct. |

If a letter has appeared on the screen, before running the self-test, or you have run self-test, and one or more letters or numbers appear on the screen, check the error codes below and their corresponding recommended actions. All components referred to are found on the logic PCB unless otherwise stated.

For Service Manuals
 contact
MAURITRON SERVICES
 8 Cherry Tree Road, Chinnor
 Oxfordshire, OX9 4QY.
 Tel (01844) 351694
 Fax (01844) 352554

Figure 3-1 Troubleshooting Flowchart, page 6 of 7

Fails Self-Test or Diagnostic Test, Continued

Error Code	Indication	Recommended Actions
0	Problems accessing character RAM U7	a. Check U1, U5. b. Check U7.
1	Problems accessing attribute RAM U8	a. Check U1, U5. b. Check U8.
9	Problems accessing U2	a. Check U1-2, -3. b. Check power at U2-8. Look for +5V. U2-4 is ground. c. Check clock and data signals at U2-5 and U2-6. d. Replace U2.
A, C	MODEM port loop-back error	a. Check signals DTR and DCD for signal levels at U3 (UART). b. Check receivers and transmitters U25 and U26. c. Check X3.
E	AUX port loop-back error, DSR-DTR	a. Check U1-4, U1-5. b. Check U27 and U28.
K	Nonvolatile RAM error	a. Turn the unit off. b. While pressing the SETUP key, turn the power on. Continue to press the SETUP key until the screen flashes.
P	External EPROM error	Replace U6 with appropriate part.
p	Internal ROM error	Replace U1.
W	Send error, MODEM to AUX	Check U28, U26, X31, and U3.
X	MODEM port data error	Check U25, U26, U3.
Y	AUX port data error	Check U28, U27.
Z	Send error, AUX to MODEM	Check U25, U27, X3, and U3.

Figure 3-1 Troubleshooting Flowchart, page 7 of 7

Miscellaneous Symptoms

- | | |
|------------------------|--|
| Keyboard not operating | a. Check keyboard cable for continuity.
b. Perform the keyboard test (see "Checking the Keyboard" in this chapter). |
|------------------------|--|



Communication
problems

- c. Check connector J1 on the keyboard PCB for shorts or breaks, repair if necessary.
- d. Check U1 (keyboard scanner) on the keyboard PCB for correct operation. Replace if necessary.
- e. Check U23 on the terminal PCB.

Characters scrambled
or degraded, dots
missing

Check U16, U19, U20.

Characters don't
appear on the screen

Check U19 and U20.

If the cursor and the status line appear, assume a communications problem. See the information related to communications error codes on page 3-11.

For Service Manuals
contact
MAURITRON SERVICES
8 Cherry Tree Road, Chinnor
Oxfordshire, OX9 4QY.
Tel (01844) 351694
Fax (01844) 352554

ADDITIONAL TROUBLESHOOTING PROCEDURES

This section contains a number of specialized procedures to help you repair the terminal. Some of them are referenced on the troubleshooting flowchart.

Installation Checklist

The checklist in Table 3-2 helps you to quickly determine if the terminal is installed correctly. If a user installs the terminal incorrectly, it may not function properly.

Table 3-2 Terminal Installation Checklist

o Environment

- ___ Room temperature is between +40 and +91 degrees Fahrenheit (5 and 33 degrees Celsius).
- ___ Terminal isn't near a magnetic field.

o Keyboard

- ___ Keyboard cable is in the keyboard connector jack on the left side of the terminal.
- ___ Keyboard cable is in the connector jack on the rear of the keyboard.

o AC Power Cord

- ___ Female end of the power cord is plugged into the AC power socket on the rear panel of the terminal.
- ___ Male end of the power cord is plugged into wall socket.

o Communication Interface Cable

- ___ One end of the RS-232C interface cable is connected to the MODEM port on the terminal's rear panel.
- ___ The other end of the interface cable is correctly connected to the computer.

o Computer Interface (You'll need to check the computer's documentation to determine the following information.)

- ___ Correct baud rate
- ___ Correct stop bits
- ___ Correct data bits
- ___ Correct parity type
- ___ Correct handshaking protocol

Checking for Continuity

Sometimes you can fix the problem without opening the terminal. The problem could be a damaged cable or power cord. Sometimes, you may need to open the terminal to check the fuse or internal connections. Check this list, then, with an ohmmeter, check the continuity of the components listed below.

Outside the terminal, check the

- o Power cord
- o Communication cable (supplied with the computer)

Inside the terminal, check the

- o Fuse
- o AC power input receptacle (on the rear panel of the terminal)
- o Terminal PCB to the CRT/yoke wiring harness

Hold the probes in place for five seconds, or until the ohmmeter settles, to ensure an accurate reading. If the part in question is open, replace it.

Power Supply Check on the Terminal PCB

You can quickly isolate problems if you check power supply voltages on the terminal PCB.

Tools required:

- o No. 2 Phillips screwdriver
- o Digital multimeter
- o Nonconductive video alignment tool

To check the voltages, follow these steps:

1. Turn the terminal off.
2. Remove the terminal enclosure.
3. Attach one lead from the DMM to the chassis as ground.
4. Turn the terminal on.
5. With the other lead from the DMM, look for the following voltages at the specified points on the terminal PCB:

Voltage	Point
+5V \pm 5%	U1-40 (U1-20 is ground)
+12V \pm 5%	U27-14 (U27-7 is ground)
-12V \pm 5%	U27-1 (U27-7 is ground)
6. If one or more of these voltages are not in tolerance, adjust VR101.
7. If you adjust VR101, and the voltage or voltages are still not within tolerance, replace or troubleshoot the terminal PCB.

Checking the Keyboard

If you suspect the keyboard is the source of the problem, follow this procedure to verify it:

1. Turn the terminal off.
2. Disconnect the communication cable.
3. Connect pins 2 and 3 on the MODEM port.
4. Turn the terminal on.
5. The terminal should be in FDX (full-duplex) mode. (If it isn't, go into setup mode, select the FDX parameter, then leave setup mode.)
6. Type on the keys. Test all the keys in shifted and unshifted positions. If the keys don't respond, see section E of "Troubleshooting Flowchart."

Isolating Circuits

If you troubleshoot to the component level using the schematics in Chapter 7, you may want to isolate the logic, monitor, or power supply circuitry. Table 3-6 is a list of jumpers on the terminal PCB and the areas they isolate. For an exact location, see the terminal PCB component layout in Chapter 5.