

ELIMINATING KEYBOARD LOCKUP BY MODIFYING THE CRYSTAL

To eliminate keyboard lockup caused by excessive loading on crystal Y1, an additional crystal can be installed in location Y3 opt. The procedure consists of installing this additional crystal, removing two capacitors and two resistors, and relocating the crystal Y1.

TOOLS REQUIRED

1. 25-watt soldering iron
2. Solder
3. Needle nose pliers
4. Solder sucker

PARTS REQUIRED

1. One 1.8432-MHz crystal
2. Double-sided tape (to secure crystal)

PROCEDURE

NOTE!

Use care when modifying or repairing any high-density logic board. ANY DAMAGE INCURRED WHILE PERFORMING THIS MODIFICATION MAY RESULT IN INCREASED COST FOR FACTORY REPAIR.

1. Remove crystal Y1 from the logic board. Also remove the solder from the feed throughs on the logic board (indicated in Figure 2-1 as A, B, C, and D).
2. Remove capacitors C31 and C32 and resistors R28 and R18.
3. Install the original crystal (which was removed from location Y1) in location Y1 OPT and install the new crystal in location Y3 OPT.
4. Solder both crystals to the printed circuit board.
5. Remove the backing from the double-sided tape and use it to secure both crystals to the printed circuit board.

The revised schematic is shown in Figure 2-2.

925

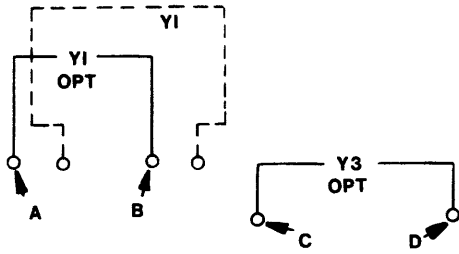


Figure 2-1 Feed Throughs

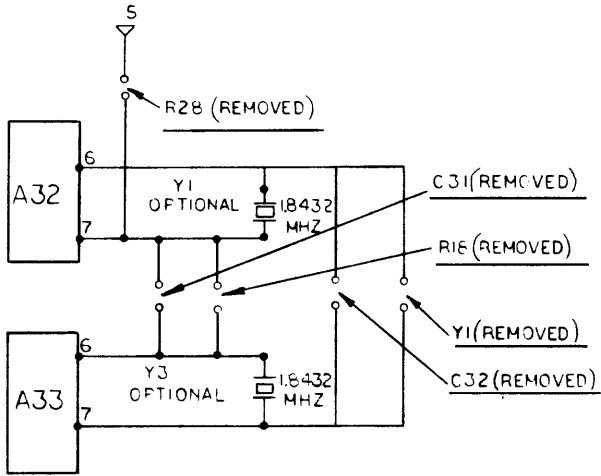


Figure 2-2 Revised Schematic (Page 5 of 7)

ELIMINATING LOSS OF VIDEO BY UPGRADING THE POWER SUPPLY

If you suspect that the power supply is causing loss of video, upgrading the power supply may correct the problem. To determine whether the power supply is the cause, measure the voltage on pin 5 of plug P5 on the logic board when the terminal is in the fail mode. (Refer to Figure 4-1).

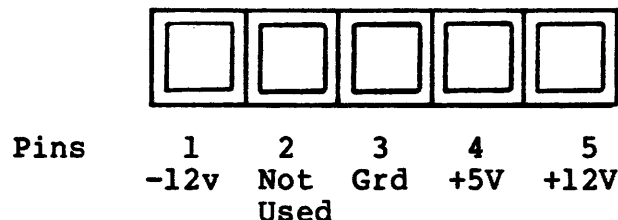


Figure 4-1 Top View of P5

The reading should be between 11.4V and 12.6V. If the P5-5 reading is below 11.4V, modify the power supply using this procedure.

TOOLS REQUIRED

1. Volt meter
2. 25-watt soldering iron
3. Solder
4. Needle nose pliers
5. Medium Phillips-head screwdriver

PARTS REQUIRED

1. One 0.22uf/35V Tantalum capacitor

PROCEDURE

1. Make sure the power has been turned off.
2. Remove the power supply from the terminal.
3. Separate the printed circuit board from the heat sink by removing plug K2 and the four screws and spacers from the corners of the board. Set the printed circuit board aside.
4. Inspect the capacitors which are mounted on the socket used for the 13.8V regulator (either LAS15CB or LAS16CB). If two 0.22uf capacitors are in place, remove the one on the output and proceed to Step 6. Remove all other capacitors which you find. Refer to Figure 4-2.

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NOTE!

Do not perform any modifications to the other regulator, as it is the 5 volt supply and does not need to be changed.

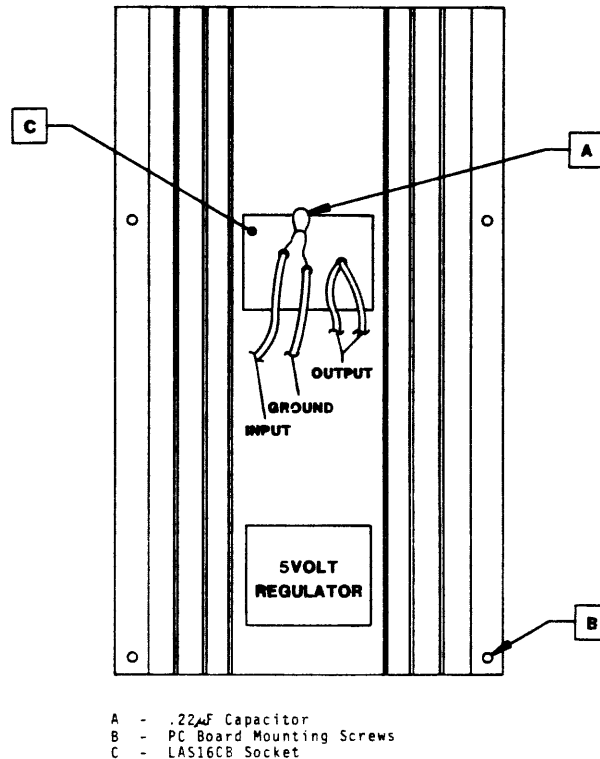


Figure 4-2 Power Supply Heat Sink with PCB Removed

5. Install the 0.22uf capacitor on the input side of the regulator, observing polarity requirements. (Refer to Figure 4-2.)
6. Reassemble the power supply board and mount it in the terminal.
7. Reconnect all cables.

The modification is now complete.

Service Bulletin

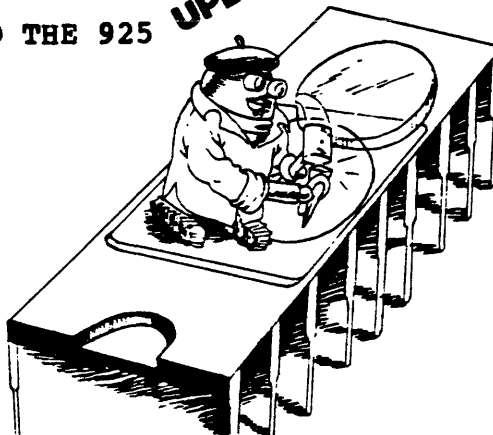
Issue No 5

ADDING ADDITIONAL PAGES OF MEMORY TO THE 925

UPDATED

The 925 is normally shipped with one page of memory.

However, you can add one additional 24-line page of memory by adding a memory chip.



PARTS REQUIRED

2K x 8 Static RAM, 150 ns. memory chip (TeleVideo Part No. 2001500)

PROCEDURE

1. Measure the logic board to determine its type.
2. Depending on the type of board, install the additional memory chip on the logic board in the location listed. Make sure that the notch in the top of the chip points in the same direction as that in the other ICs.

For your convenience, we recommend that you install a socket (if it is not already installed on the board).

Type of Board	Approximate Size	Location
925 TTL Logic Board	10" x 12"	A48
925 Gate Array Board	7" x 12"	A33

925

0120982 SB5 925

MODIFYING THE 925 GATE ARRAY BOARD

The gate array board on some early Model 925 terminals may have a fault which causes the Data Terminal Ready (DTR) line (P3 pin 20) to be held low at all times. This condition prevents data from being transmitted. Making the modification described here will allow the DTR line to function properly.

TOOLS REQUIRED

1. Soldering iron
2. Solder
3. X-ACTO knife or razor blade

PARTS REQUIRED

0.31-gauge jumper wire

PROCEDURE

1. Cut the trace between A30 pin 3 to A40 pin 9, as shown in Figure 10-1.
2. Add the following jumpers (also shown in Figure 10-1):
 - A35 pin 9 to A30 pin 1
 - A35 pin 10 to A30 pin 2
 - A35 pin 8 to A40 pin 9

Figure 10-2 shows the resulting changes to page 4 of the schematic.

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ELIMINATING NOISE ON THE 925 SYSTEM RESET LINE

Noise present on the 925 system reset line may produce intermittent problems. Possible symptoms may include (but are not limited to) the following examples:

Video changes from normal to reverse

Cursor changes from a block to an underline

Keyclick is activated

TOOLS REQUIRED

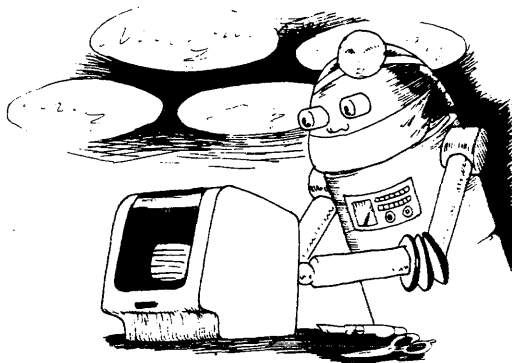
1. 25-watt soldering iron
2. Solder
3. Solder sucker

PARTS REQUIRED

1. One 1uF 16 volt electrolytic capacitor

PROCEDURE

1. Install the capacitor between A46 pin 1 and the feedthrough hole as shown in Figure 14-1.
2. Connect the negative lead to A46 pin 1.



925

CURRENT LOOP INSTALLATION INSTRUCTIONS

Introduction

Install the current loop when the terminal is located more than 50 feet and less than 1000 feet from the computer, or when the device connected to the RS232 port (P3) requires current loop.

Configuration

The current loop feature must be configured for either half or full duplex mode, and for an active or passive terminal state.

Either the terminal or the computer must provide a 20mA current source to drive a current loop signal. If the terminal provides the current source, configure the current loop board for an active state. If the computer provides the current source, configure the current loop board for a passive state.

The full duplex mode requires two current sources, one for the transmit loop and one for the receive loop. The half duplex mode requires only one current source for the single transmit and receive loop.

Tools Required

1. 25-watt soldering iron
2. Solder sucker
3. Solder
4. Medium Phillips screwdriver
5. Jumper wire

Parts Required

Depending on your terminal model, one of two current loop kits is enclosed.

1. For the 910, 910 PLUS terminals (Part No. 2131000)

This kit includes: Current loop board
Installation instructions
Nylon space
Screw
Hex nut
Nylon washers (2)

2. For 925 models (Part No. 2131100)

This kit includes: Contents of 910, 910 PLUS kit
Ribbon cable

ALL

Procedure

1. Inspect the current loop board for damage caused by shipping (i.e., bent pins, cracked circuit board, etc.).
2. Configure the current loop board to match the requirements of the system you want to interface with. See Figure 1 for jumper locations and Table 1 for configuration combinations. Note that the half duplex mode requires jumpers in the connector pins of the cable, as well as on the current loop board.
3. Remove the the screws beneath the terminal that hold the terminal cover in place. Remove the cover.
4. **910, 910 PLUS (TTL and gate array logic boards):** Insert the current loop board connector pins into the 16-pin socket* at P6 on the logic board, as shown in Figure 2. Secure with mounting hardware.

925, TTL Logic Board: Mount the current loop board on the logic board, as shown in Figure 3. Connect it to 16-pin socket at P6* with a 16-pin ribbon. Secure with mounting hardware.

925, Gate Array Logic Board: Insert the current loop board connector pins into the 16-pin socket at P6 on the logic board, as shown in Figure 4. Secure with mounting hardware.
6. Replace the terminal cover and the screws that hold it in place. Be careful not to overtighten the screws.
7. Connect the computer to the terminal at the RS232 port (P3), using a RS232 cable. See Table 1 for the necessary pin connector assignments.

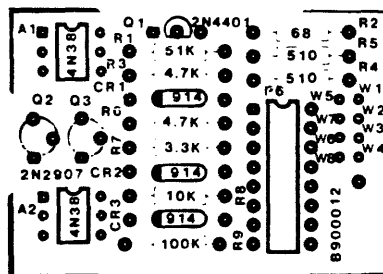
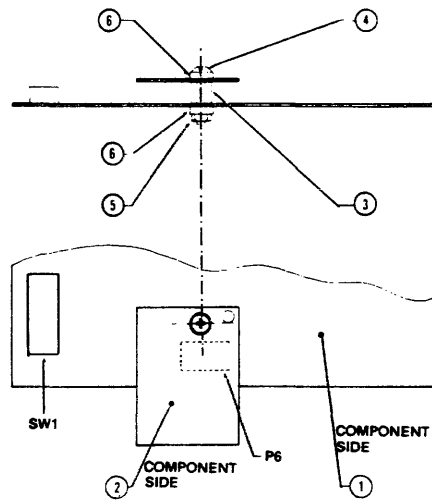


Figure 1 Location of Jumpers on Current Loop Board

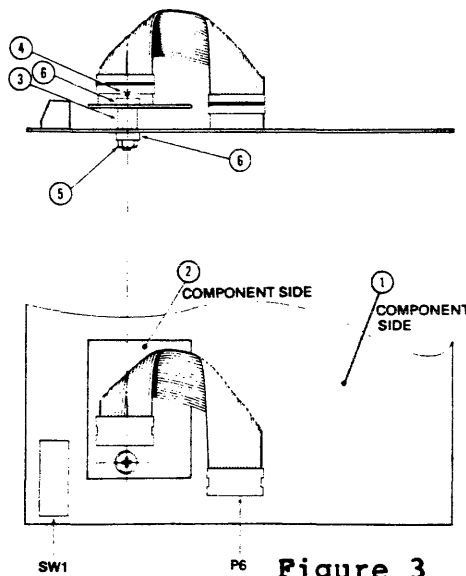
- * Some early models were shipped without a 16-pin IC socket in location P6. If your terminal doesn't have a socket at P6, install a standard 16-pin IC socket. These sockets are available from most computer vendors or from TeleVideo (Part No. 2098405)



1. 910, 910 PLUS BOARD
2. CURRENT LOOP BOARD
5. NYLON SPACER
4. SCREW
5. HEX NUT
6. NYLON WASHER

Figure 2

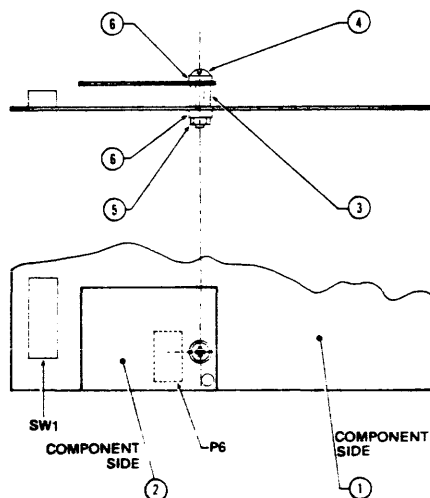
**Current Loop Board in Socket
on 910, 910 PLUS TTL or Gate Array Logic Board**



1. 925 TTL BOARD
2. CURRENT LOOP BOARD
5. NYLON SPACER
4. SCREW
5. HEX NUT
6. NYLON WASHER

Figure 3

Current Loop Board Installed with Cable on 925 TTL Logic Board



1. 925 GATE ARRAY BOARD
2. CURRENT LOOP BOARD
5. NYLON SPACER
4. SCREW
5. HEX NUT
6. NYLON WASHER

Figure 4

Current Loop Board in Socket on 925 Gate Array Logic Board

Table 1 lists the possible current loop configurations and the correct pin connector assignments for the RS232 cable.

In full duplex mode, you must select a transmit and a receive state. That means that four pins will be connected. The terminal can supply the voltage (i.e. active state) for either or both loops. If the computer supplies it, the terminal is in the passive state.

In half duplex mode, there is a single transmit and receive loop. Therefore, only two pins need to be connected. The terminal can supply the voltage (i.e. active state) for this loop. If the computer provides it, the terminal is in the passive state.

Table 1
Cuts, Jumpers, and P3 Configuration

Mode	State	Cuts	Jumpers	P3 Assigns.
Full Duplex	Active Transmit	W2 to W3	W1 to W2 W3 to W4	13+ 25-
	Active Receive	W6 to W7	W5 to W6 W7 to W8	24+ 12-
	Passive Transmit	None	None	25+ 13-
	Passive Receive	None	None	12+ 24-
Half Duplex	Active Transmit/Receive	None	W1 to W2 P3-12 to P3-13	24+ 07-
	Passive Transmit/Receive	None	P3-12 to P3-13	25+ 24-

If you have any questions, call the Terminal Support Group at 408 745-7760.

Service Bulletin

Issue No. 19

925 JUMPER OPTIONS AND PORT CONNECTORS

The 925 logic board contains many jumpers and several ports. This bulletin gives you information about them in tabular form. For more information, refer to the User's Guide and Maintenance Manual.

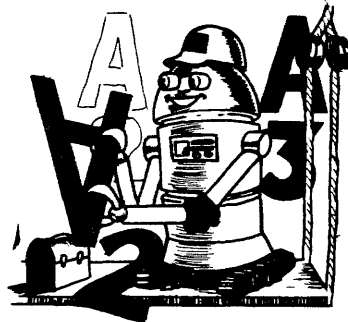


Table	Description
19-1	Lists the jumpers which are called out on the logic board, the schematic page where they can be found, and a description of the purpose of the jumper
19-2	Lists the ports on the logic board, their use, and the pin assignments

Table 19-1a Logic Board Jumpers

Jumper No.*	Schematic Page No.	Description
E1, E2 E3, E4	4 of 7	Enables composite video
E5 through E7	5 of 7	Enables P4 pin 4 for handshaking
E8, E9	5 of 7	Connects P3 pin 18 to internal test line (RTS)
E10, E11	5 of 7	Enables Data Terminal Ready on the printer port
E12, E13	7 of 7	Cut to use external crystal
E14 through E16	5 of 7	Enables connection between P3 pin 4 and P3 pin 20 (RTS to DTR)
E17 through E19	1 of 7	Allows 2, 4, or 8K ROMS to be used in Position A50

Note: *See Table 19-1b for jumpers which are traced/not traced

Table 19-1a Continued

Jumper No.*	Schematic Page No.	Description
E20 through E22	1 of 7	Allows 2, 4, or 8K ROMS to be used in Position A50
E23 through E25	1 of 7	Allows 2, 4, or 8K ROMS to be used in Position A40
E26 through E28	1 of 7	Allows 2, 4, or 8K ROMS to be used in Position A40

Note: *See Table 19-1b for jumpers which are traced/not traced

Table 19-1b Jumpers Traced/Not Traced

Traced	Not Traced
E3 to E4	E1 to E2
E6 to E7	E3 to E4
E14 to E15	E6 to E7
E18 to E19	E10 to E11
E21 to E22	E12 to E13
E24 to E25	E15 to E16
E27 to E28	E17 to E18
	E20 to E21
	E23 to E24
	E26 to E27

Table 19-2 Ports and Associated Pin Assignments

Port No.	Description	Pin No.	Function
P0	Optional keyboard input	1	+12 volt supply
		2	Ground
		3	Data input from keyboard
		4	Speaker output

Table 19-2 Continued

Port No.	Description	Pin No.	Function
P1*	Standard keyboard input	1	+12 volt supply
		2	Ground
		3	Data input from keyboard
		4	Speaker output
P2	Video output	1	Horizontal sync
		2	Index pin (not installed)
		3	Ground
		4	Video output
		5	Vertical sync
		6	Composite video output (not installed)
P3	RS232C	1	Frame ground
		2	Transmit data output
		3	Receive data input
		4	Request to Send output
		5	Clear to Send input
		6	Data Set Ready input
		7	Signal ground
		8	Data Carrier Detect input
		9	20mA source (+12 volt, no load)
		10	Detected current loop data
		11	Alternate Data Terminal Ready line
		12	Current loop, + receive
		13	Current loop, - transmit
		14	20mA source (+12 volt, no load)
18	Internal test line (not used)		
20	Data Terminal Ready output		
24	Current loop, - receive		
25	Current loop, + transmit		

*May be labeled P6 on rear of terminal.

Table 19-2 Continued

Port No.	Description	Pin No.	Function
P4	Printer	1	Protect ground
		2	Receive data input
		3	Transmit data output
		4	Request to Send input
		5	Clear to Send output
		6	Data Set Ready output
		7	Signal ground
		8	Data Carrier Detect output
		11	Alternate Data Terminal Ready line
		20	Data Terminal Ready input
P5	Power supply	1	-12 volt supply
		2	Index pin (not installed)
		3	Ground
		4	+5 volt supply
		5	+12 volt supply
P6	Optional current loop or modem	0	Current loop, -receive
		1	+12 volt supply
		2	Transmit data to modem
		3	Receive data from modem
		4	Current loop, - transmit
		5	-12 volt supply
		6	+5 volt supply
		7	Ground
		8	Ground
		9	+5 volt supply
		10	-12 volt supply
		11	Current loop, + transmit
		12	Data clock input to modem
		13	Speaker output from modem
		14	+12 volt supply
15	Current loop + receive		
P7	Optional speaker	1	Ground
		2	Speaker output

Table 19-2 Continued

Port No.	Description	Pin No.	Function
P8	Optional ground (not used)	1	Ground
		2	Ground

091382 SB19 925

HOW TO TELL A TTL LOGIC BOARD FROM A GATE ARRAY LOGIC BOARD

TeleVideo® now uses new gate array logic boards in the 910, 910 PLUS, 925, and 950 terminals. Since these boards have fewer components, they are more reliable. Troubleshooting is also simplified.

Although the components are laid out differently, gate array boards are completely interchangeable with TTL boards.

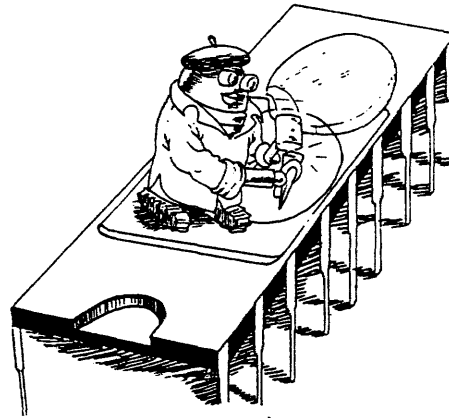


Table 23-1 gives the part number and the location of the gate array chips for each of the models.

Table 23-1 Location of Gate Array Chip(s)

Model No.	Part Number	Location
910, 910 PLUS	2057400	A22
925	2057400	A39
950, Chip A	2057600	A34
Chip B	2057800	A37

Table 23-2 shows the quickest way to determine which type of board is installed in your terminal.

Table 23-2 Determining Type of Logic Board

Model No.	Type of Board	Look for
910, 910 PLUS	TTL Gate Array	Chip in A22 (14-pin package) Chip in A22 (40-pin package)
925	TTL Gate Array	Size (10" x 12") Size (7" x 12")
950	TTL Gate Array	Color (Blue) Color (Green)

You can also determine the type of board you have by comparing it to the illustrations that follow.

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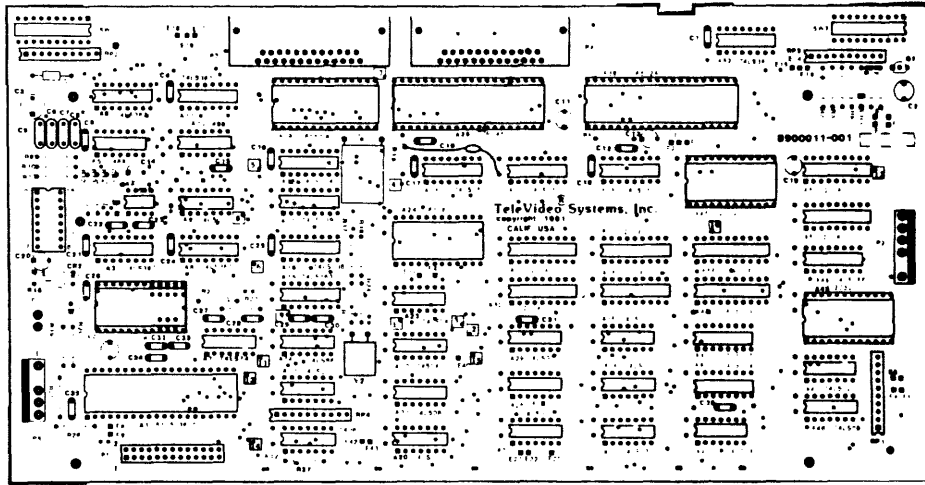
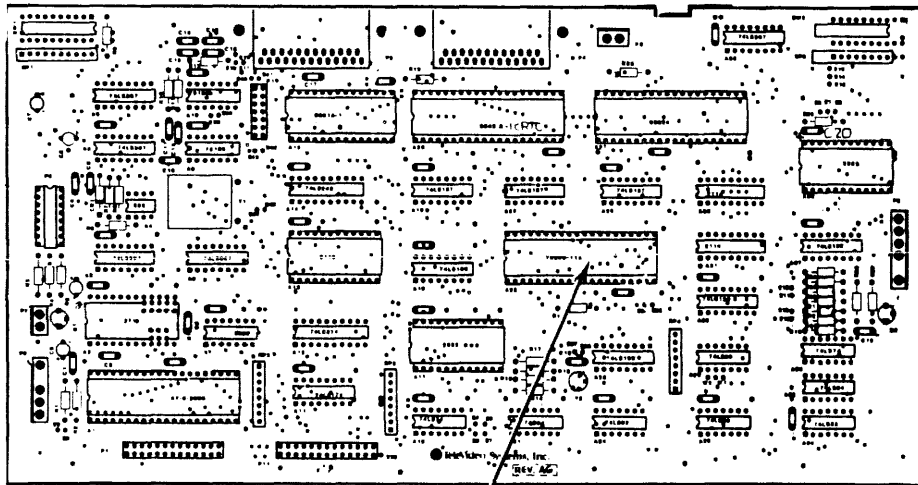


Figure 23-1A 910 or 910 PLUS TTL Logic Board



Gate Array Chip

Figure 23-1B 910 or 910 PLUS Gate Array Logic Board

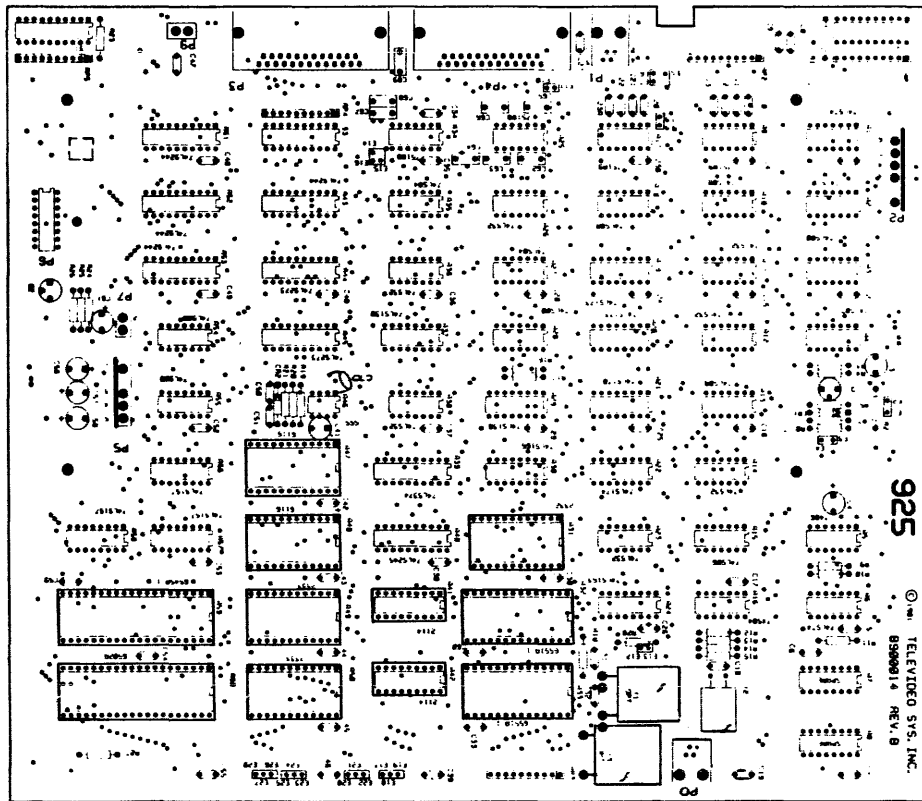
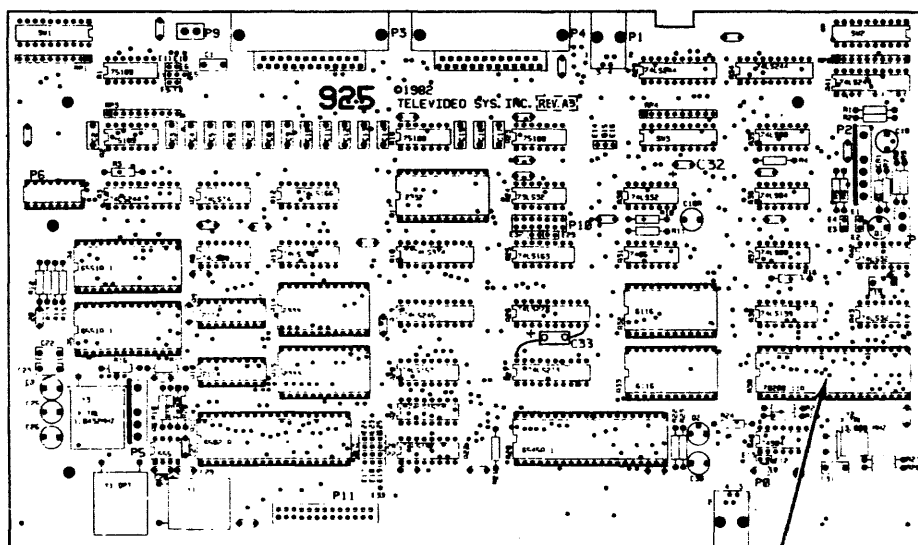


Figure 23-2A 925 TTL Logic Board



Gate Array Chip

Figure 23-2B 925 Gate Array Logic Board

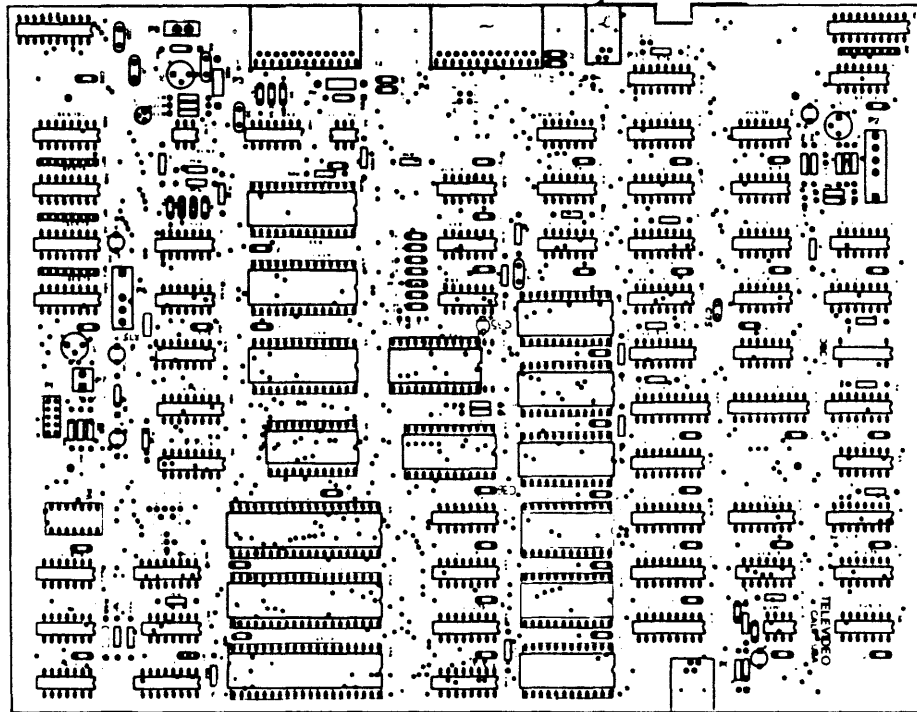
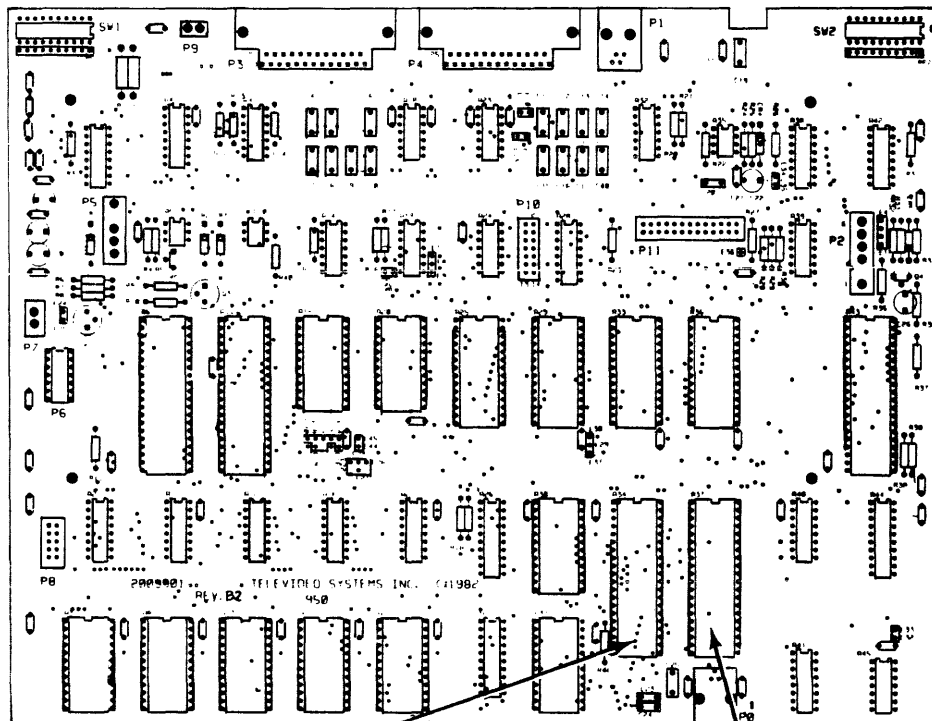


Figure 23-3A 950 TTL Logic Board



Gate Array Chip A

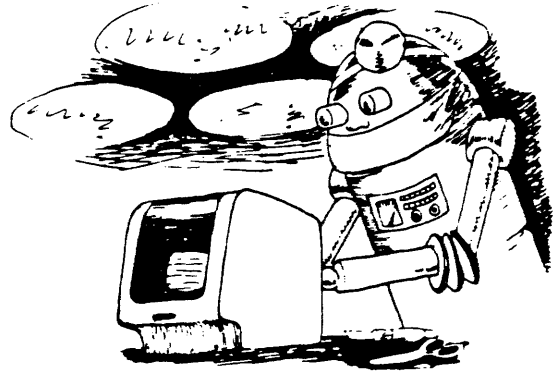
Gate Array Chip B

Figure 23-3B 950 Gate Array Logic Board

TESTING THE 6502 ADDRESS LINE

With a 6502 address line tester, you can test all address lines on any logic board that uses a 6502 chip.

When the 6502 receives instruction hex EA (a NOP), it does nothing except increment the program counter and read the next instruction. If the next instruction is also a NOP, the microprocessor is forced to count through all 65,536 possible addresses on its 16-bit address bus.



If you then monitor the address bus lines with an oscilloscope, each address line will display a square wave, with a period twice that of the next lower address line. This gives you a predictable set of signals to trace.

TOOLS REQUIRED

1. Wire cutters
2. Soldering iron
3. Solder

PARTS REQUIRED

1. 40-pin wire wrap socket (not available from TeleVideo)
2. 6502 microprocessor (Part No. 2049600)
3. Jumper wire

PROCEDURE

Construction of test assembly:

1. Cut pins 26 through 33 on the bottom of the wire wrap socket by about 1/4 inch. This will prevent them from making contact with the pins in the socket of the pcb (see Figure 24-1).
2. Wire pins 29, 31, and 33 to pin 1 (ground), and pins 26, 27, 28, 30, and 32 to pin 8 (+5V) to force the hex EA instruction on the data bus (see Figure 24-1).
3. Plug the 6502 into the wire wrap socket. Make sure that its notch faces in the same direction as the notch on the wire wrap socket (see Figure 24-1).

ALL

Operation of test assembly:

1. Remove the 6502 CPU from the board to be tested and set it aside.
2. Install the test assembly (with a known good 6502) in the wire wrap socket. Make sure that the notch faces in the same direction as that on the other chips.
3. Apply power to the logic board.
4. Inspect the address lines for the wave forms listed in Table 1.
5. If you do not detect any pulses on the address lines, check for the following signals:

Pin	2	Ready (should be high)
	8	+5V
	37	Phase 0 clock
	38	Set overflow (should be high)
	40	Reset (should be high)

If any of these inputs are held in an incorrect state, the microprocessor will not work. Before continuing, correct any problems with these lines.

Figure 24-1 shows a top and a bottom view of the wire wrap socket.

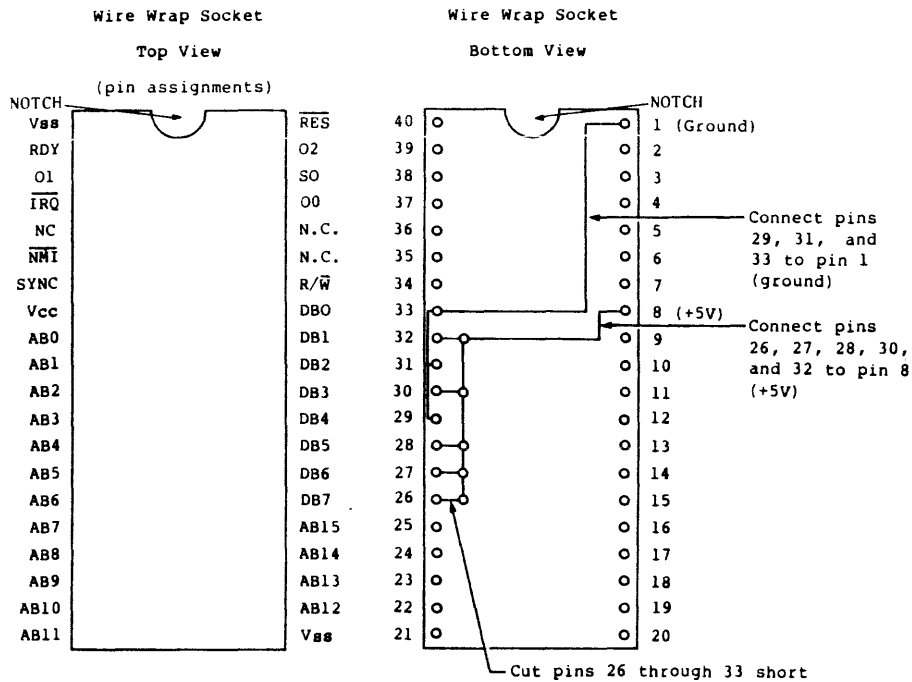


Figure 24-1 Wire Wrap Socket

Table 1

Expected Wave Forms

Pin No	Name	Wave form
1	Vss	Ground
2	RDY	+5V
3	O1 (out)	.6u second period square wave
4	IRQ	+5V noisy
5	N.C.	Ground
6	NMI	+5V noisy
7	SYNC	1.2u second period square wave
8	Vcc	+5V
9	AB0	2.4u second period square wave
10	AB1	4.8u second period square wave
11	AB2	9.6u second period square wave
12	AB3	19.2u second period square wave
13	AB4	38.4u second period square wave
14	AB5	76.8u second period square wave
15	AB6	150u second period square wave
16	AB7	.3m second period square wave
17	AB8	.6m second period square wave
18	AB9	1.2m second period square wave
19	AB10	2.4m second period square wave
20	AB11	4.8m second period square wave
21	Vss	Ground
22	AB12	9.6m second period square wave
23	AB13	19.2 second period square wave
24	AB14	38.4m second period square wave
25	AB15	76.8m second period square wave
26	DB7	Tied high
27	DB6	Tied high
28	DB5	Tied high
29	DB4	Tied low
30	DB3	Tied low
31	DB2	Tied low
32	DB1	Tied high
33	DB0	Tied low
34	R/W	4V to 4.5V noisy
35	N.C.	Ground noisy
36	N.C.	Ground noisy
37	O0 (in)	.6u second period square wave with ringing
38	S.O.	+5V noisy
39	O2 (out)	.6u second period square wave
40	RES	+5V noisy

Service Bulletin

Issue No. 26

C306 RELATED FAILURES

Some TeleVideo® terminals shipped during the latter months of 1982 may experience a problem with capacitor C306 on the video module. The symptoms include, but are not limited to:

- No video
- Bad video
- No horizontal deflection
- Blowing fuse F102 on the power supply

The suspect capacitor is blue in color and is rated at 20uF, 50V. This capacitor must be replaced with TSI Part No. 2280000 (16uF, 25V nonpolarized capacitor).

If your terminal has experienced one of these symptoms and the suspect capacitor is installed, contact Customer Service, Terminal Division (800/438-8725 x 439 outside California, or 408/745-7760 x 439 in California).

We will have a replacement capacitor sent to you at no charge, or arrange for the module or terminal to be returned to TeleVideo for warranty repair.

ALL

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