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1. FRONT PANEL ASSEMBLY A13

The RF-590 Front Panel Assembly A13 contains control circuits which permit all operator-receiver local interface functions such as tuning, channel selection, AF gain, system status indications, etc.

All operator controls (AF Gain, Squelch, Keypad, Tuning knob, etc) are accessed from the front of the assembly. Figure 3-1 of the Operations section details the location and functions of these controls, and figure 1 is a photograph of the front panel (included for reference).

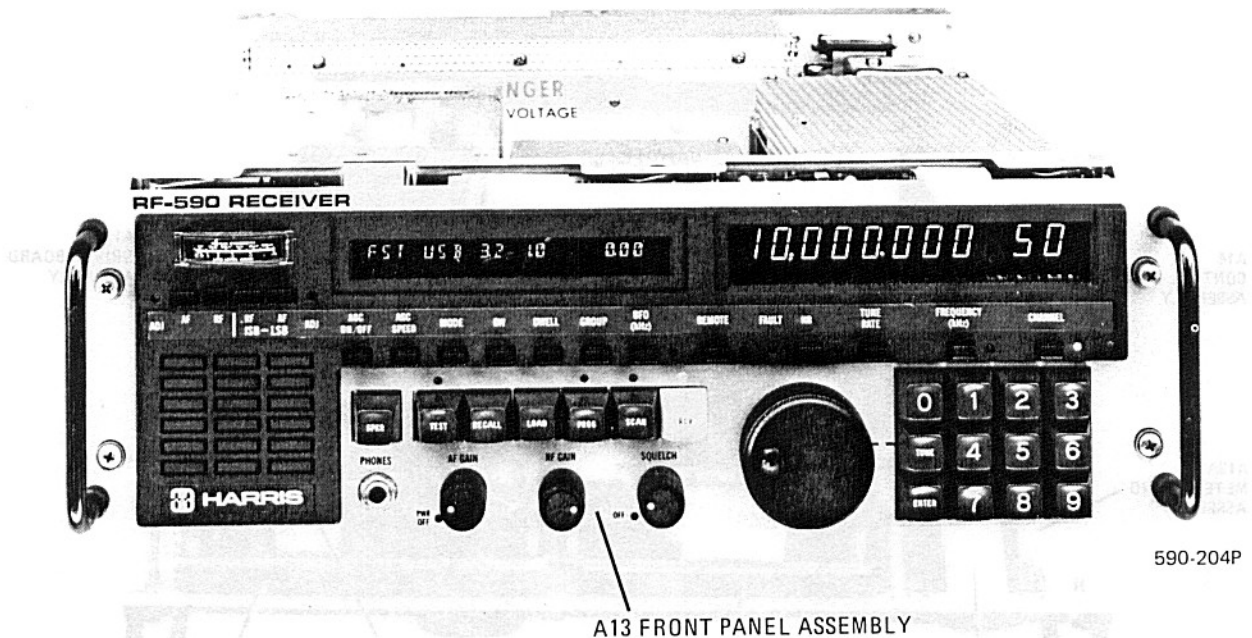


Figure 1. RF-590 Front Panel A13 (Front View)

Six major interface assemblies are mounted to the rear of the Front Panel Assembly. They are shown in figure 2. These assemblies are described in section 2 through 7 and listed below.

- Switch Board A13A1
- Driver Board A13A2
- Meter Board A13A3
- Display Board (Alphanumeric) A13A4

- Display Board (Numeric) A13A5
- Converter Assembly A13A6

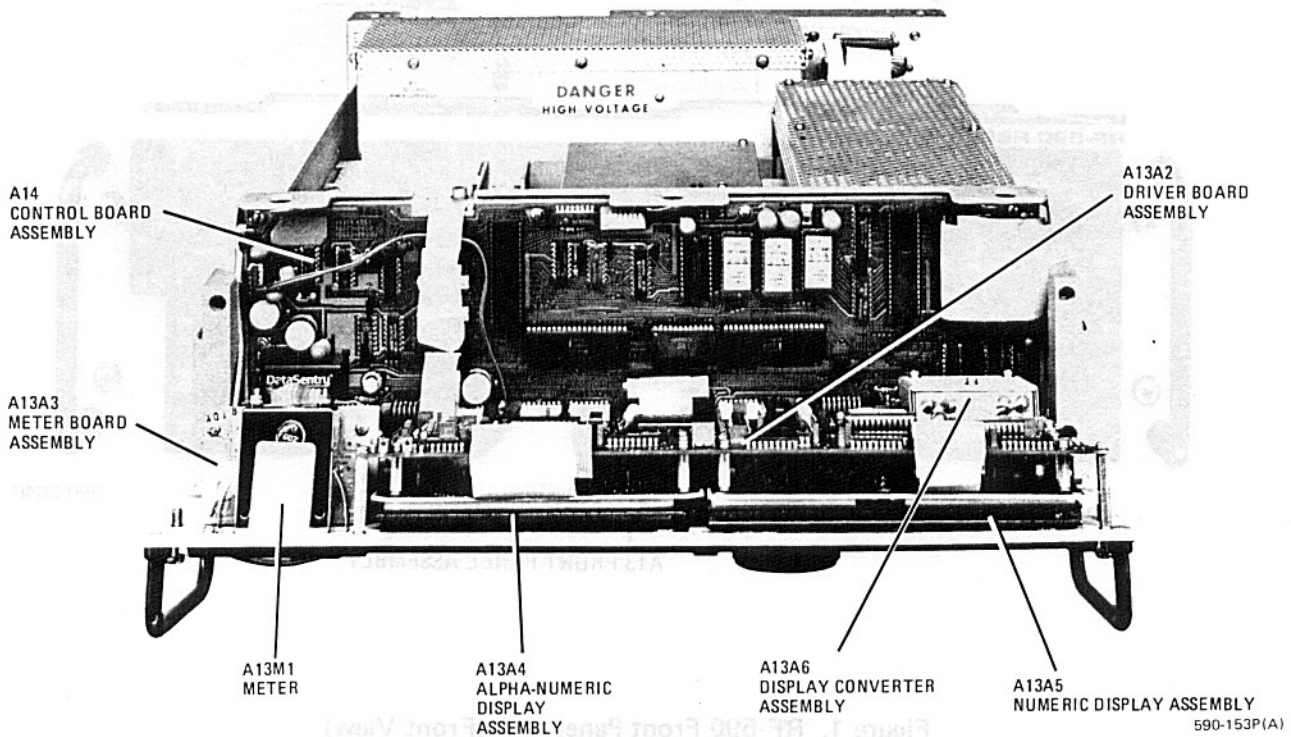


Figure 2. RF-590 Front Panel Assembly A13 (Rear View)

The Front Panel Assembly is normally secured to the RF-590 chassis by four front panel captive screws. Loosening these screws allows the entire assembly to pivot down on hinges (located at two corners). This permits access to any of the items listed above as well as to Control Board Assembly A14 which is mounted behind the front panel.

Table 1 is the Front Panel Assembly A13 parts list.

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Table 1. Front Panel Assembly A13 Parts List (PL 10073-2000)

Ref. Desig.	Part Number	Description
	10073-2605	FRONT PANEL,RF-590
	10073-2021	FILTER, POLARIZED DISPLAY
	10073-2020	FILTER, POLARIZED DISPLAY
	10073-2018	BRACKET, PIVOT RIGHT
	10073-2019	BRACKET, PIVOT LEFT
	Z03-0001-004	HDL ALUM BLK 10-32X4.00IN
	Z03-0004-002	FER ALUM BLK .221 I.D.
	10073-2506	KNOB
	MP-1481	KNOB PLASTIC .713 DIA
A1	10073-2700	PWB ASSY,SWITCH&LED
A2	10073-2200	PWB ASSY, FRONT PANEL
A3	10073-2300	METER PWB ASSY
A4	10073-2400	PWB ASSY,DISPLAY
A5	10073-2500	PWB ASSY,DISPLAY
A6	10073-2250	CONVERTER MDL ASSY
G1	10073-2075	OPTICAL ENCODER PANEL MT
J1	J62-0001-007	JACK FONE CLOSED CKT
LS1	10073-2081	SPEAKER
M1	10073-2311	METER
P1	J46-0016-014	CONN HOUSING 14 POS 24AWG
P2	J40-0005-003	CONN,FEMALE,3CIR
P3	MP-0648	HOUSING, CONN, 5 CIRCUIT
P4	J40-0002-003	HOUSING, CONN, 3 CIRCUIT
P5	J40-0002-002	HOUSING, CONN, 2 PIN
P6	MP-0647	HOUSING, CONN, 6 CIRCUIT
R1	10073-2071	POT
R2	10073-2073	RES,VAR,5K,10%,LIN.TAPER
R3	10073-2072	RES,VAR,5K,10%,MOD.LOG

2. FRONT PANEL SWITCHBOARD A13A1

2.1 General Description

Front Panel Switchboard A13A1 consists of all RF-590 front panel pushbutton switches excluding the four-position meter select switch. It also includes all the discrete LED displays on the receiver front panel. Signals generated by switch closures are routed for processing to Control Board Assembly A14 via Front Panel Driver Board A13A2. The discrete LED displays are also driven from Front Panel Driver Board A13A2.

2.2 Interface Connections

Table 2 lists Front Panel Switchboard A13A1 interface connections.

Table 2. A13A1 Switchboard Interface Connections

Connector	Description
J1 to/from A13A2	
J1-1	Gnd
-2	Scan LED
-3	Test LED
-4	Program LED
-5	COL 7
-6	Receive LED
7	BFO LED
-8	Fault LED
-9	PB3
-10	Remote LED
-11	TWA
-12	TWB
-13	COL 2
-14	COL 0
-15	Tune Enable LED
-16	PB2
-17	COL 3
-18	N/C
-19	COL 5
-20	PB1
-21	N/C
-22	N/C
-23	COL 1
-24	Frequency LED
-25	N/C
-26	COL 6

Table 2. A13A1 Switchboard Interface Connections (Cont.)

Connector	Description
J1-27	PB0
-28	COL 4
-29	Channel LED
30	+5V
J2 to/from Panel coder	
J2-1	Gnd
-2	TWB
-3	Key
-4	TWA
-5	+5V
J3 to/from A13A3	
J3-1	N/C
-2	N/C
-3	Speaker on/off
-4	Speaker on/off

2.3 Functional Description

2.3.1 Switch Matrix

The pushbutton switches on the RF-590 Receiver front panel are arranged in a matrix of eight columns by four rows. The eight column signals (COL 0 through COL 7) are inputs from Front Panel Driver Board A13A2 while the four row signals are outputs to the Driver board. The microprocessor on the Control board detects switch activity by enabling all the column outputs while reading back the row inputs (PB0-PB3) looking for a connection between any row and any column. If a closure is detected, it enables the column lines selectively while reading back the row lines again to determine the exact location of the switch closure. The microprocessor then performs the activity indicated by the closure, including display update.

2.3.2 LED Circuits

The discrete LEDs on the Switchboard are driven directly from the front panel driver board. (See the description for Driver Board A13A2). Table 3 provides a listing of LED display by reference designator and function:

Table 3. A13A1 Switchboard LED Indicators

Indicator	Function	Description
DS1	Frequency	Indicates frequency display field will be modified by any tuning knob or keypad activity.
DS2	Fault	Indicates BITE, Power Supply, PLL Synthesizer faults, or Antenna Overhead faults.
DS3	Test	Indicates Test mode of operation.
DS4	Scan	Indicates receiver is in Scan mode of operation.
DS5	Receive	Indicates the RF-590 is in the standard Receive mode of operation.
DS6	BFO	Indicates BFO display field will be modified by any tuning knob or keypad activity.
DS8	Program	Indicates Receiver is in Channel or Group programming mode.
DS10	Remote	Indicates Receiver is under Remote control.
DS11	Tune	Indicates the tuning knob is enabled. If off, tuning knob rotation has no effect on the receiver.
DS12	Channel	Indicates the channel display field will be modified by any keypad or tuning knob activity.

2.4 Maintenance

The advanced design of the A13A1 assembly eliminates the need for regular maintenance. However, when replacing components on this assembly, observe the following caution.

CAUTION

Cleaning fluids normally used to remove flux will damage switches used on this assembly. Cleaning of the A13A1 assembly is not recommended.

Table 4 is the Front Panel Switchboard A13A1 parts list. Figures 3 and 4 are the Front Panel Switchboard A13A1 component location diagram and schematic diagram.

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Table 4. Front Panel Switchboard A13A1 Parts List (PL 10073-2700)

Ref. Desig.	Part Number	Description
	10073-2700	PWB, FRONT PANEL
	10073-2050	BUTTON,SW,0,CUSTOM MOLD
	10073-2051	BUTTON,SW,1,CUSTOM MOLD
	10073-2052	BUTTON,SW,2,CUSTOM MOLD
	10073-2053	BUTTON,SW,3,CUSTOM MOLD
	10073-2054	BUTTON,SW,4,CUSTOM MOLD
	10073-2055	BUTTON,SW,5,CUSTOM MOLD
	10073-2056	BUTTON,SW,6,CUSTOM MOLD
	10073-2057	BUTTON,SW,7,CUSTOM MOLD
	10073-2058	BUTTON,SW,8,CUSTOM MOLD
	10073-2059	BUTTON,SW,9,CUSTOM MOLD
	10073-2060	BUTTON,SW,TUNE,CUSTOM MLD
	10073-2061	SW BTN ENTR
	10073-2062	BUTTON,TEST
	10073-2063	BUTTON,SW,RECALL,CSTM MLD
	10073-2064	BUTTON,SW,LOAD,CSTM MOLD
	10073-2065	SW BTN PROG
	10073-2066	BUTTON,SCAN
	10073-2067	BUTTON SPK ON/OFF
	10073-2068	BUTTON RCV
	10073-2069	BUTTON,SW,CUSTOM MOLD
	10073-2022	SHIELD SWITCH
DS1	N21-0002-000	LED GRN T-1 2.0MCD
DS2	N21-0001-000	LED RED T-1 2.5MCD
DS3	N21-0002-000	LED GRN T-1 2.0MCD
DS4	N21-0002-000	LED GRN T-1 2.0MCD
DS5	N21-0002-000	LED GRN T-1 2.0MCD
DS6	N21-0002-000	LED GRN T-1 2.0MCD
DS8	N21-0002-000	LED GRN T-1 2.0MCD
DS10	N21-0002-000	LED GRN T-1 2.0MCD
DS11	N21-0002-000	LED GRN T-1 2.0MCD
DS12	N21-0002-000	LED GRN T-1 2.0MCD
DS14	N21-0002-000	LED GRN T-1 2.0MCD
J2	J46-0033-006	HDR 6 PIN 0.100" RT ANG
J3	J46-0033-005	HDR 5 PIN 0.100" RT ANG
S1 - S6	S05-0004-001	SWITCH
S9 - S16	S05-0004-001	SWITCH
S17, S18	S05-0004-002	SWITCH
S19	S05-0004-001	SWITCH
S20 - S29	S05-0004-002	SWITCH
S30	S05-0004-001	SWITCH
S31	S05-0004-001	SWITCH
S32	S05-0004-001	SWITCH
S33	S05-0005-001	SWITCH

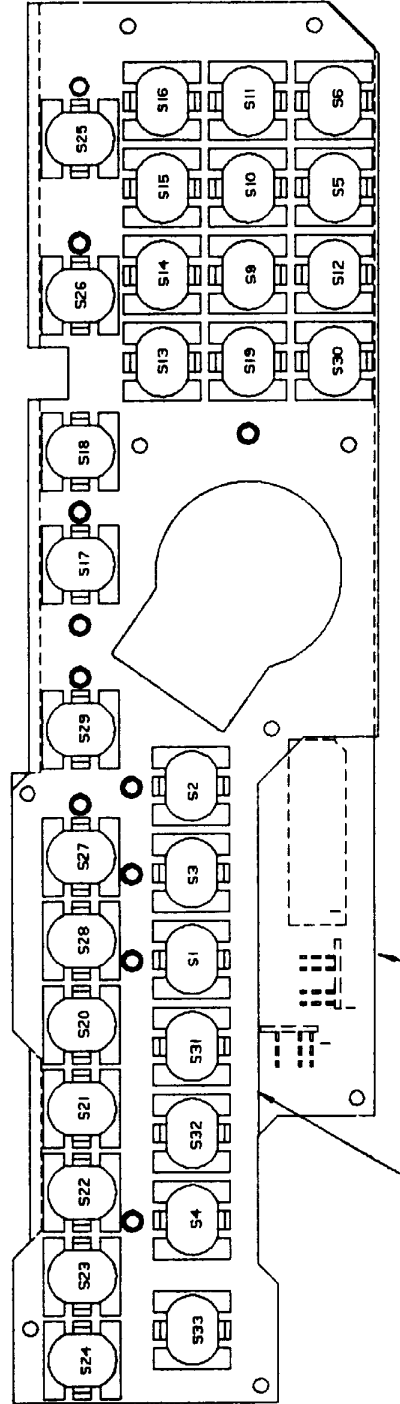
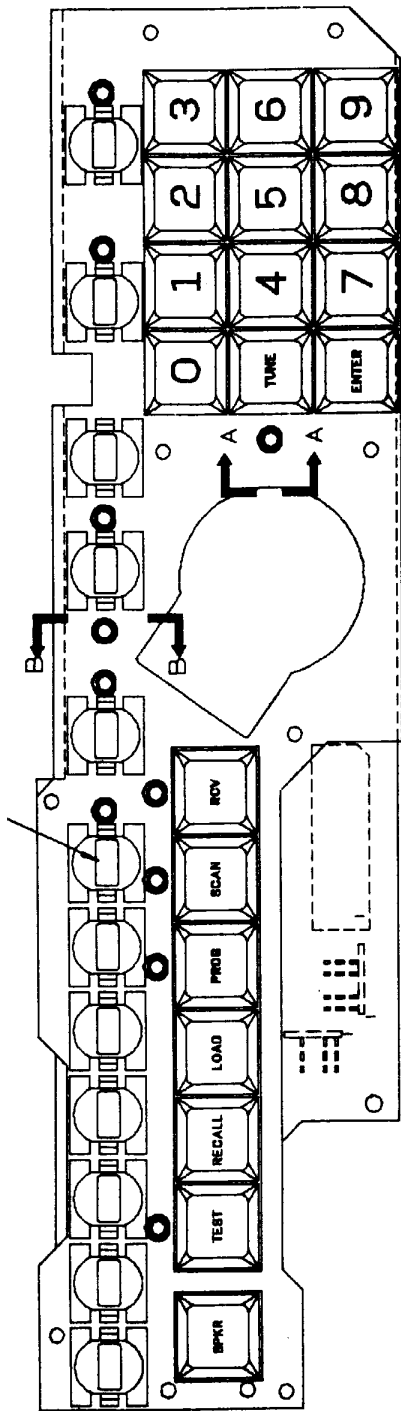


Figure 3. Front Panel Switchboard A13A1 Component Location Diagram (10073-2700, Rev. C)

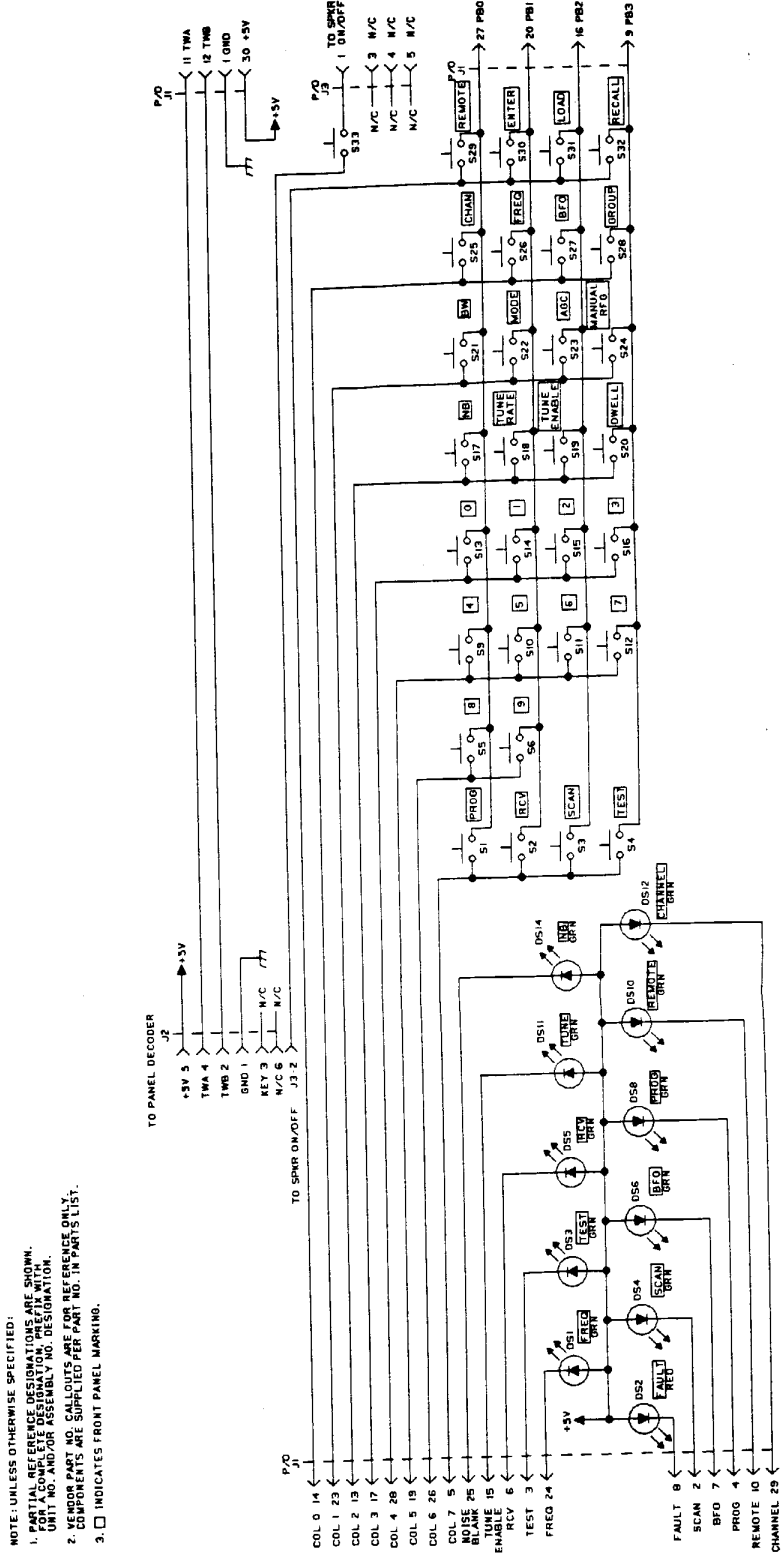
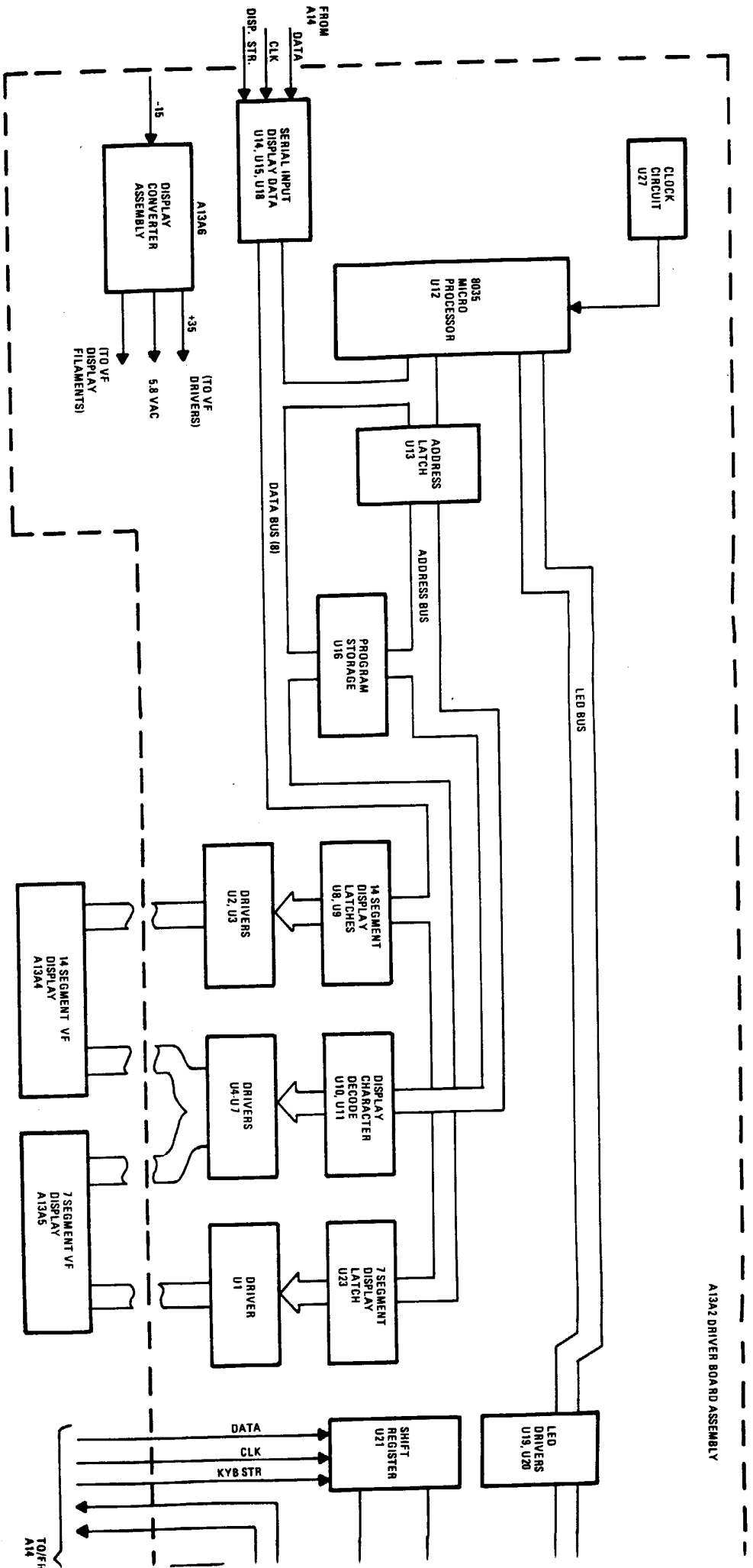
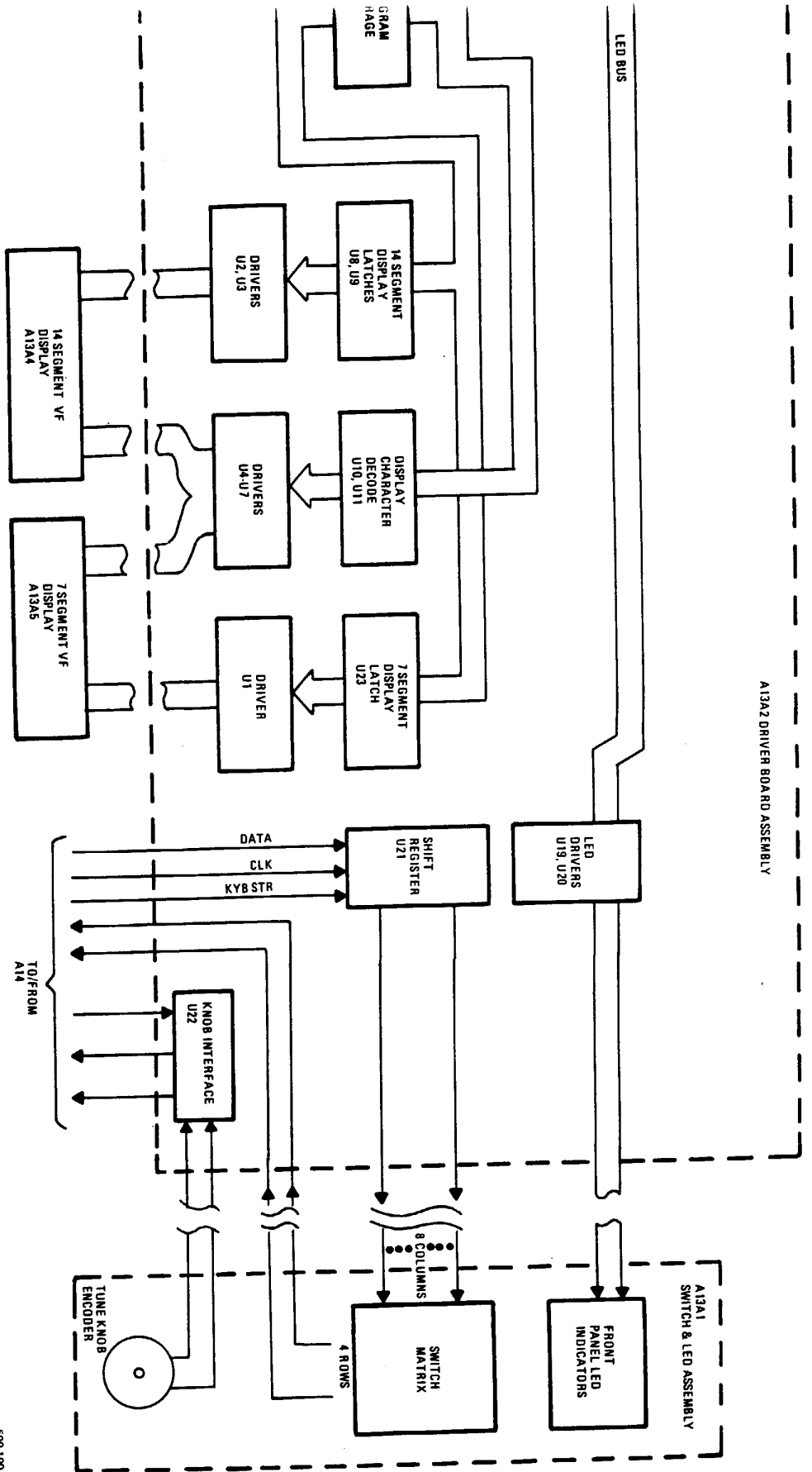


Figure 4. Front Panel Switchboard A13A1
Schematic Diagram (10073-2701,
Rev. B)



Front Panel Driver Board A13A2
Functional Block Diagram

A13A2 DRIVER BOARD ASSEMBLY



3. FRONT PANEL DRIVER BOARD A13A2

3.1 General Description

The RF-590 Front Panel Driver Board serves four basic functions, all associated with controlling the front panel of the receiver. It generates the drive signals for the vacuum fluorescent displays, drives the discrete LED displays, generates signals indicating Tune Knob rotation and routes the signals to the Front Panel Switchboard associated with detecting pushbutton activity.

The Driver Board controls the vacuum fluorescent displays by providing filament voltages, display segment information, and digit select information to them. The filament voltages are generated in Display Converter Assembly A13A6 and routed to the display connectors. The Driver Board multiplexes the VF Displays by providing information for the segments to be lit within a character while enabling that character. This is done at a rapid rate to give the appearance of continuous illumination. (See sections 5 and 6 for drawings showing the display segment location.) The information to be displayed is provided to the Driver Board (A13A2) by the Control Board (A14) in serial fashion using the signals DATA, CLK, and DISP STR ON J1P1 pins 2, 4, and 14 respectively.

The discrete LED displays of the Front Panel are lit by the Driver Board using information provided by the Control Board.

Rotating the tune knob generates two pulsing signals which are squared up by the Driver Board, A13A2, and routed to the Control Board for service.

Driver Board A13A2 outputs eight column strobes to the switches in the front panel and inputs four row lines from the switches. The row lines are routed to the Control board where a switch closure is detected as a connection from a column to a row.

3.2 Interface Connections

Table 5 summarizes the A13A2 interface connections.

Table 5. A13A2 Driver Board Interface Connections

Connector	Name	Description
J1 to/from A14		
J1-1	TWHL INT	Tune Knob Interrupt to Control Board
-2	Data	Serial Display Data from Control Board
-3	DIR	Tune Knob Direction to Control Board
-4	CLK	Clock for display Data from Control Board
-5	TWHL RESET	Interrupt Reset from Control Board
-6	-15V	
-7	+5V	
-8	BITE IN	Power Supply Fault Indicator

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Table 5. A13A2 Driver Board Interface Connections (Cont.)

Connector	Name	Description
J1-9	PB3	Switch row readback to Control Board
-10	KYBSTR	Keyboard Strobe from Control Board
-11	PB2	Switch Row readback to Control Board
-12	Fault	Output to Rear Panel (via Control Board)
-13	PB1	Switch Row readback to Control Board
-14	DISP STR	Display Strobe from Control Board
-15	PB0	Switch Row readback to Control Board
-16	N/C	
-17	N/C	
-18	GND	
-19	N/C	
-20	GND	
J2 to/from A13A1		
J2-1	GND	
-2	Scan LED	
-3	Test LED	
-4	Program LED	
-5	COL 7	
-6	Receive LED	
-7	BFO LED	
-8	Fault LED	
-9	PB3	
-10	Remote LED	
-11	TWA	Tuning knob encoder output
-12	TWB	Tuning knob encoder output
-13	COL 2	
-14	COL 0	
-15	Tune LED	
-16	PB2	
-17	COL 3	
-18	N/C	
-19	COL 5	
-20	PB1	
-21	N/C	
-22	N/C	
-23	COL 1	
-24	Frequency LED	
-25	N/C	
-26	COL 6	
-27	PB0	
-28	COL 4	

Table 5. A13A2 Driver Board Interface Connections (Cont.)

Connector	Name	Description
J2-29	Channel LED	
-30	+5V	
J3 to/from A13A4		
J3-1	a Segment	
-2	b Segment	
-3	c Segment	
-4	d Segment	
-5	m Segment	
-6	n Segment	
-7	e Segment	
-8	f Segment	
-9	J Segment	
-10	k Segment	
-11	g Segment	
-12	h Segment	
-13	Decimal Point	
-14	Comma	
-15	N/C	
-16	G1 Digit	
-17	p Segment	
-18	r Segment	
-19	G2 Digit	
-20	G3 Digit	
-21	G20 Digit	
-22	G4 Digit	
-23	G5 Digit	
-24	G6 Digit	
-25	G19 Digit	
-26	G7 Digit	
-27	G8 Digit	
-28	G9 Digit	
-29	G18 Digit	
-30	G10 Digit	
-31	G11 Digit	
-32	G12 Digit	
-33	G17 Digit	
-34	G13 Digit	
35	G14 Digit	
-36	N/C	
-37	G16 Digit	

Table 5. A13A2 Driver Board Interface Connections (Cont.)

Connector	Name	Description
J3-38	G15 Digit	
-39	Filament	
-40	Filament	
J4 to/from A13A5		
J4-1	G11 10 MHz Digit	
-2	G10 1 MHz Digit	
-3	G9 100 kHz Digit	
-4	G3 1/2 Segments	
-5	G7 1 kHz Digit	
-6	G8 10 kHz Digit	
-7	Filament	
-8	Decimal Point	
-9	G5 10 Hz Digit	
-10	G6 100 Hz Digit	
-11	N/C	
-12	Comma	
-13	G4 1 Hz Digit	
-14	c Segment	
-15	G2 CH10 Digit	
-16	G1 CH1 Digit	
-17	b Segment	
-18	a Segment	
-19	g Segment	
-20	Filament	
-21	Underline Segments	
-22	d Segment	
-23	e Segment	
-24	f Segment	

3.3 Circuit Description

3.3.1 Microprocessor Operation

The heart of Front Panel Driver Board A13A2 operation is the 8035 microprocessor (U12). The execution of the software program stored in the 2716 type EPROM (U16) causes the microprocessor to perform the display update functions as described in paragraph 2. To execute the program, the microprocessor must continuously get instructions from U16 and process them. To accomplish this, the microprocessor (at the start of an instruction cycle) outputs the address of the instruction to be obtained into its address/data bus at pins U12-12 to U12-19. The address latch (U13) latches it to the EPROM. The EPROM (U16) outputs

the instruction to the data bus which is read by the microprocessor and executed. The microprocessor uses the Address Latch Enable, active high (ALE) signal to indicate the presence of a valid address on the bus. The Program Store Enable ($\overline{\text{PSEN}}$) signal is used to enable the EPROM to output the obtained instruction while the $\overline{\text{RD}}$ (read) and $\overline{\text{WR}}$ (write) signals are used to read from and write to other external devices. The $\overline{\text{RD}}$ signal is used to read display data sent by Control Board A14 from the shift registers U14 and U15 while the $\overline{\text{WR}}$ signal is used to write the display information to the VF display segment latches U8, U9, and U23. These functions are explained in greater detail below.

3.3.2 Display Data Input

Front Panel Driver Board A13A2 at power up lights all LEDs and all segments of the vacuum fluorescent displays. After completion of the power on self-test, the display is updated to the last receive setting used before power off using display data provided by Control Board A14. The Control board provides the information for all display updates to the Driver board in serial fashion via J1-2. This information is clocked into serial shift registers U14 and U15 to be read in parallel by microprocessor U12. The clock signal is 750 kHz and is provided by the Control board at J1-4 and routed to the shift registers at pin 3. When the shift registers have been loaded with display data, the Control board generates an interrupt to the Driver board microprocessor (U12) using the signal display strobe at J1-14. The display strobe pulse serves to trigger monostable U24, which in turn generates the interrupt, causing the microprocessor to read the display data from the shift registers U14 and U15. U18 provides buffering of the display data onto the microprocessor data bus. The act of reading the shift registers causes resetting of the interrupt by the microprocessor read control line at U24-3 which is the reset in to the monostable.

3.3.3 Vacuum Fluorescent Display Drive

Display data read in from the Control board is converted by microprocessor U12 into formats required for driving the VF displays. The displays are driven in multiplexed fashion so that only one character is driven at a given instant. Each character in the VF displays has a unique address which is output by the microprocessor to the bus and latched into the address latch (U13) during a display character update. The address is decoded by U10 or U11 into a character enable pulse. During the output instruction, the segment information for the character to be lit is latched into U23 for seven segment characters or into U8 and U9 for 14 segment characters. Each character is enabled for approximately 640 microseconds after which, the microprocessor processes the next character in a similar manner.

3.3.4 LED Drive

The discrete LEDs on the front panel are driven from the parallel ports on microprocessor U12. These outputs are buffered by U19 and U20 and are routed to the switchboard via J2. An LED is lit by an active low output. The information to be written to the LEDs originates in Control Board A14 and is input to the Driver board in the manner described in paragraph 3.3.2.

3.3.5 Tuning Knob

Rotating the front panel tuning knob causes two pulsing signals to be generated which are 90 degrees out of phase. These are input to the Driver board at J2-11 and J2-12. The pulses are squared by Schmitt Trigger Inverters (U28) and used to generate an interrupt to the Control board via U22. The interrupt (active high) is output at J1-1 while J1-3 provides direction of rotation information to Control Board A14. When the Control board receives Tuning knob interrupts indicating rotation, it outputs new display information to the Driver board as described in paragraph 3.3.2, so that the indicated display field is increased or decreased.

3.3.6 Pushbutton Circuitry

The Driver board serves primarily to route the signals associated with detection of pushbutton activity to and from the Control and Switchboards. The switches are arranged in a matrix of eight columns by four rows. Switch activity is detected by sensing a closure between a column line to a row line. The column outputs are written serially from the Control board to the Driver board via P3-2, clocked via J1-4, and latched into shift register U21 by the signal KYB STR (keyboard strobe) at J1-10. The parallel outputs of the shift register are routed to the Switchboard via J2 signals COL 0 through COL 7. The rows are routed back to the Control board as signals PB 0 to PB 3 (see J1-9, 11, 13, and 15).

3.4 Maintenance

3.4.1 Adjustments

The only adjustment on the Front Panel Driver Board is the VF display brightness adjust potentiometer located at the top center of the PWB. Turn clockwise for brighter displays (single turn potentiometer).

3.4.2 Troubleshooting

To make a quick assessment of Driver Board functions, the four test points should be checked with an oscilloscope.

- TP1 – Microprocessor Write Line. Should be active low pulses repeated approximately every 600 to 700 microseconds.
- TP2 – Character Strobe to U10. Active high pulse every 600 to 700 microseconds indicates display is being updated.
- TP3 – Character Strobe to U11. Same as TP2. Also indicates display being updated. Both signals are required.
- TP5 – Interrupt to microprocessor from Control board. Active low approximately 50u seconds pulse every 1 second, (faster with Tuning Knob Rotating).

If the above signals are incorrect, more fundamental checks are indicated. Perform the checks in the following order.

- a. Verify +5V at J1-7 and -15V at J1-6.
- b. Verify display converter voltages at E7-E12 of Driver PWB and integrity of connections to converter module according to table 6.

Table 6. Converter Voltages

Driver	Converter	Function
E7	C1	-15 Vdc
E8	C5	5.8 Vac
E9	C3	+35 Vdc
E10	C4	Bias \approx 6 Vdc
E11	C2	5.8 Vac
E12	E1	GND

- c. Verify integrity of connections E1 through E6. The 10073-2400 alphanumeric display module requires connections E1 to E2 and E5 to E4.
- d. Verify 6 MHz clock at U12-2 and U12-3.
- e. Verify approximately +5V at U12-4. (Microprocessor reset in).
- f. Verify ALE signal, approximately 60-40 duty cycle square wave at U12-11.
- g. Verify activity on bus AD0 - AD7 (zero to five volt random square waves).
- h. Verify that all socketed ICs are installed correctly with no pins bent underneath the IC.

3.5 Parts List and Schematic Diagram

Table 7 is the Driver Board A13A2 parts list. Figures 5 and 6 are the Driver Board A13A2 component location diagram and schematic diagram.

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Table 7. Driver Board A13A2 Parts List (PL 10073-2200)

Ref. Desig.	Part Number	Description
	10073-2200	PWB, FRONT PANEL
C1	M39014/02-1310	CAP .1UF 10% 100V CER-R
C2	M39014/02-1310	CAP .1UF 10% 100V CER-R
C3	M39014/02-1310	CAP .1UF 10% 100V CER-R
C4	M39014/02-1310	CAP .1UF 10% 100V CER-R
C5	M39014/02-1310	CAP .1UF 10% 100V CER-R
C6	M39014/02-1310	CAP .1UF 10% 100V CER-R
C7	M39014/02-1310	CAP .1UF 10% 100V CER-R
C8	M39014/02-1310	CAP .1UF 10% 100V CER-R
C10	M39014/02-1310	CAP .1UF 10% 100V CER-R
C12	M39014/02-1310	CAP .1UF 10% 100V CER-R
C14	M39014/02-1310	CAP .1UF 10% 100V CER-R
C15	M39014/02-1310	CAP .1UF 10% 100V CER-R
C19	M39014/02-1310	CAP .1UF 10% 100V CER-R
C22	M39014/02-1310	CAP .1UF 10% 100V CER-R
C23	M39014/02-1310	CAP .1UF 10% 100V CER-R
C24	M39014/02-1310	CAP .1UF 10% 100V CER-R
C25	M39014/02-1310	CAP .1UF 10% 100V CER-R
C26	M39014/02-1310	CAP .1UF 10% 100V CER-R
C27	M39014/02-1310	CAP .1UF 10% 100V CER-R
C29	M39014/01-1535	CAP .01UF 20% 100V CER
C31	M39014/02-1310	CAP .1UF 10% 100V CER-R
C32	CK05BX102M	CAP 1000PF 20% 200V CER
C37	C26-0025-470	CAP 47UF 20% 25V TANT
C38	C26-0050-479	CAP 4.7UF 20% 50V TANT
C39	CK05BX330M	CAP 33PF 20% 200V CER
C40	CK05BX330M	CAP 33PF 20% 200V CER
CR1	1N4454	DIODE 200mA 75V SW
CR2	1N4454	DIODE 200mA 75V SW
CR3	1N4454	DIODE 200mA 75V SW
CR4	1N4454	DIODE 200mA 75V SW
J2	J46-0013-030	HDR 30 PIN 0.100" DR SHRD
P1	10073-7050	RIBBON CABLE, 24 COND
P2	10073-7051	RIBBON CABLE, 40 COND
P3	10073-7053	RIBBON CABLE, 20 COND
R3	R50-0010-472	RES,10SIP,4.7K,2.0%, 9RES
R14	R65-0003-224	RES 220K 5% 1/4W CAR FILM
R15 - R18	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R22	R51-0010-121	RES 10P SIP 120 2% 5RES
R23	R51-0010-121	RES 10P SIP 120 2% 5RES
R25	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R26	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R27	R65-0003-204	RES 200K 5% 1/4W CAR FILM
R28	R65-0003-393	RES 39K 5% 1/4W CAR FILM
R29	R-2232	RES,VAR,PCB 100K .5 20%

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Table 7. Driver Board A13A2 Parts List (PL 10073-2200) (Cont.)

Ref. Desig.	Part Number	Description
R33	R65-0003-471	RES 470 5% 1/4W CAR FILM
R34	R65-0003-471	RES 470 5% 1/4W CAR FILM
R35	R65-0003-471	RES 470 5% 1/4W CAR FILM
R36	R65-0003-471	RES 470 5% 1/4W CAR FILM
R37	R65-0003-161	RES 160 5% 1/4W CAR FILM
R38	R50-0008-103	RES,8 SIP, 10K,2.0%, 7RES
R50	R65-0003-100	RES 10 5% 1/4W CAR FILM
R52	R65-0003-100	RES 10 5% 1/4W CAR FILM
R53	R65-0003-332	RES 3.3K 5% 1/4W CAR FILM
TP1	J-0392	TP PWB BRN RA SIDE ACCESS
TP2	J-0387	TP PWB RED RA SIDE ACCESS
TP3	J-0390	TP PWB ORN RA SIDE ACCESS
TP5	J-0389	TP PWB GRN RA SIDE ACCESS
U1	I75-0009-001	IC NE594 DISPLAY DRIVER
U2	I75-0009-001	IC NE594 DISPLAY DRIVER
U3	I75-0009-001	IC NE594 DISPLAY DRIVER
U4	I75-0009-001	IC NE594 DISPLAY DRIVER
U5	I75-0009-001	IC NE594 DISPLAY DRIVER
U6	I75-0009-001	IC NE594 DISPLAY DRIVER
U7	I75-0009-001	IC NE594 DISPLAY DRIVER
U8	I07-0013-001	IC 74C373 PLASTIC CMOS
U9	I07-0013-001	IC 74C373 PLASTIC CMOS
U10	I01-0000-202	IC 4514B PLASTIC CMOS
U11	I01-0000-202	IC 4514B PLASTIC CMOS
U12	IC-0347	IC 8035 MICRO 8-BIT
U13	I07-0013-001	IC 74C373 PLASTIC CMOS
U14	I01-0000-156	IC 4094B PLASTIC CMOS
U15	I01-0000-156	IC 4094B PLASTIC CMOS
U16	10073-8302	SOFTWARE KIT
U17	I05-0001-000	IC 4098B PLASTIC CMOS
U18	I05-0000-244	IC 74LS244 PLASTIC TTL
U19	I05-0000-244	IC 74LS244 PLASTIC TTL
U20	I05-0000-244	IC 74LS244 PLASTIC TTL
U21	I01-0000-156	IC 4094B PLASTIC CMOS
U22	I05-0000-074	IC 74LS74 PLASTIC TTL
U23	I07-0013-001	IC 74C373 PLASTIC CMOS
U24	I05-0001-000	IC 4098B PLASTIC CMOS
U25	I01-0056-001	IC 74C02 PLASTIC CMOS
U26	I05-0000-027	IC 74LS27 PLASTIC TTL
U27	I02-0015-000	IC 7404 PLASTIC TTL
U28	I18-0006-001	IC 74C14 PLASTIC CMOS
VR1	1N5234B	DIODE 6.2V 5% .5W ZENER
XU12	J77-0008-007	SKT IC MACH 40 PIN
XU16	J77-0008-005	SKT IC MACH 24 PIN
Y1	Y15-0004-060	CRYSTAL, 6MHZ

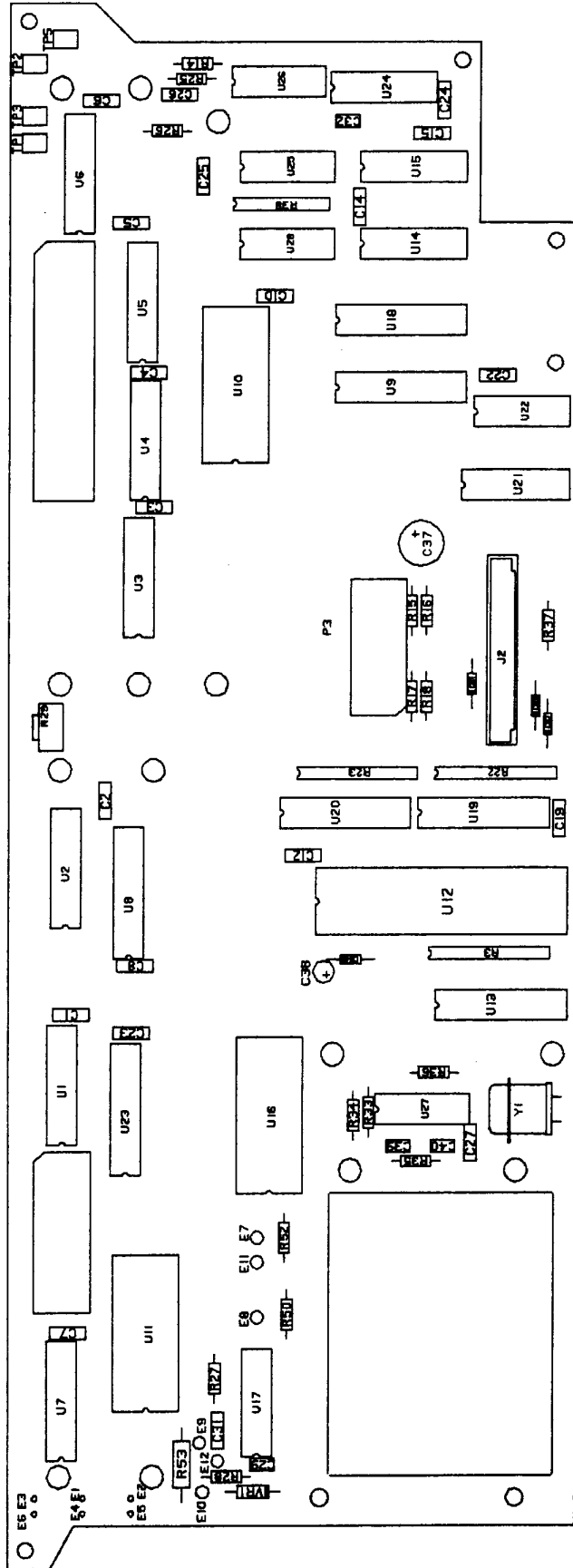
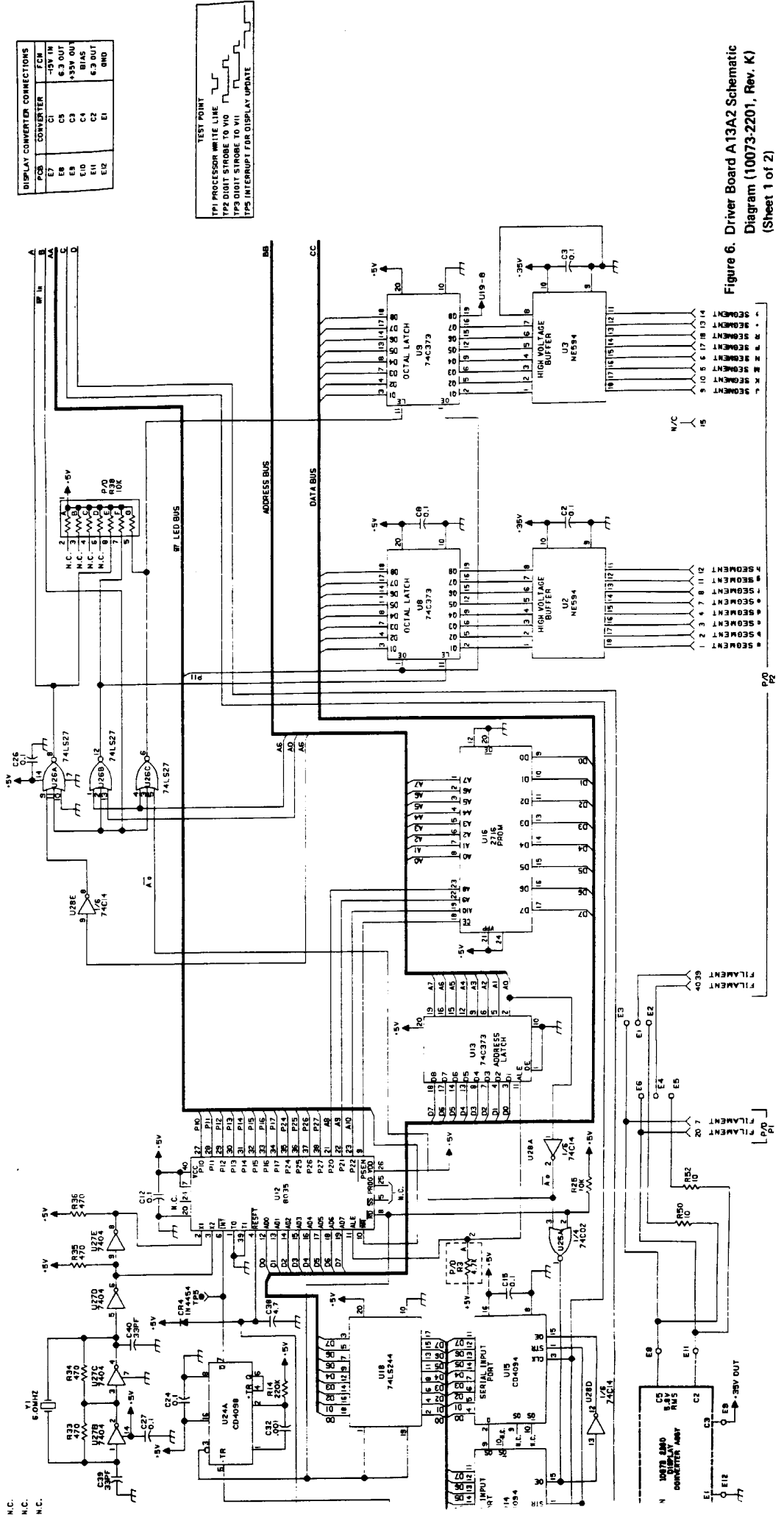


Figure 5. Driver Board A13A2 Component Location Diagram (10073-2200, Rev. G)



DISPLAY CONVERTER CONNECTIONS		FCW
PC5	E7	-15V IN
	C1	6.3 OUT
	C5	+35V OUT
	C3	BIAS
	C4	6.3 OUT
	C2	6.3 OUT
	E1	0ND

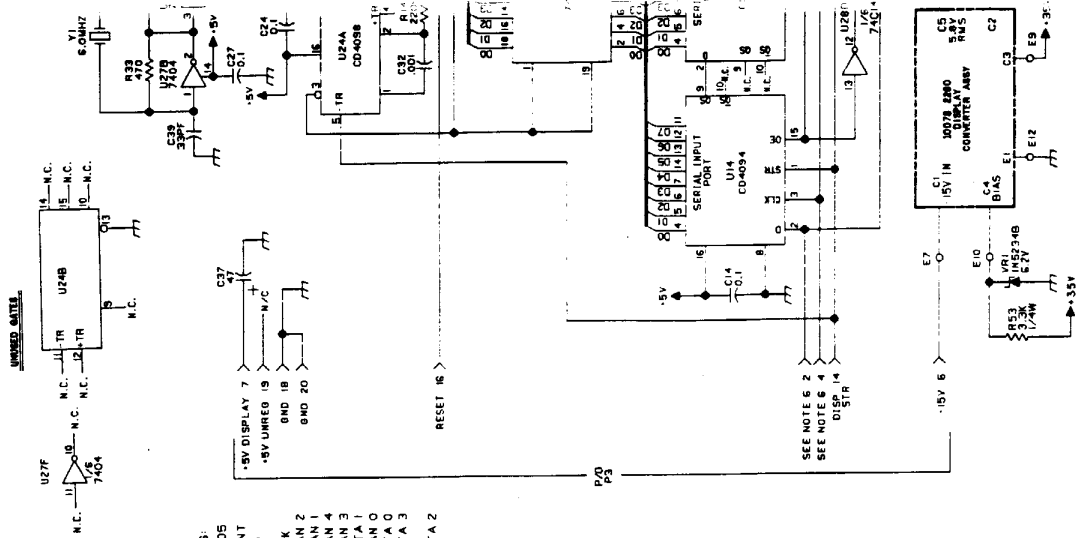
TEST POINT
TPI PROCESSOR WRITE LINE
TP2 DIGIT STROBE TO V10
TP3 DIGIT STROBE TO V11
TP5 INTERRUPT FOR DISPLAY UPDATE

Figure 6. Driver Board A13A2 Schematic
Diagram (10073-2201, Rev. K)
(Sheet 1 of 2)

NOTE: UNLESS OTHERWISE SPECIFIED:

- PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR A COMPLETE DESIGNATION, REFER TO THE UNIT NO. AND/OR ASSEMBLY NO. DESIGNATION.
- ALL RESISTOR VALUES ARE IN OHMS, 1/4W, 5%. ALL CAPACITOR VALUES ARE IN MICROFARADS.
- VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY. COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.
- CONNECT E4 TO E5 AND E1 TO E2 FOR FABRICATION OF A NUMERIC DISPLAY FOR PART 10075-24001.
- SIGNALS ARE PRODUCT SPECIFIC FOR THE FOLLOWING PINS:

PIN	RF-550	RF-1310	RF-7110	RF-7405
P3-1	TUNE WHL INT	N/C	N/C	TWHLINT
P3-2	DATA	N/C	N/C	DATA
P3-3	FR SER DATA	N/C	N/C	DIR
P3-4	CLK	N/C	N/C	CLOCK
J2-2	SCAN	FR SER CLK	DATA CLOCK	LED SCAN 2
J2-3	TEST	OPER	SOUELCH	LED SCAN 1
J2-4	PROG	AMP OFF	START LOA	LED SCAN 4
J2-5	REC	STBY	SCAN	LED SCAN 3
J2-6	REC	POWER	REMOTE	LED SCAN 0
J2-7	REC	READY	SILENT	LED SCAN 1
J2-10	REMODE	CLIP	CALL AUTO	LED DATA 0
J2-15	TUNE	N/C	N/C	LED DATA 3
J2-24	NOISEBLANK	N/C	N/C	LED DATA 2
J2-25	N/C	N/C	N/C	N/C
J2-28	N/C	N/C	N/C	LED DATA 2



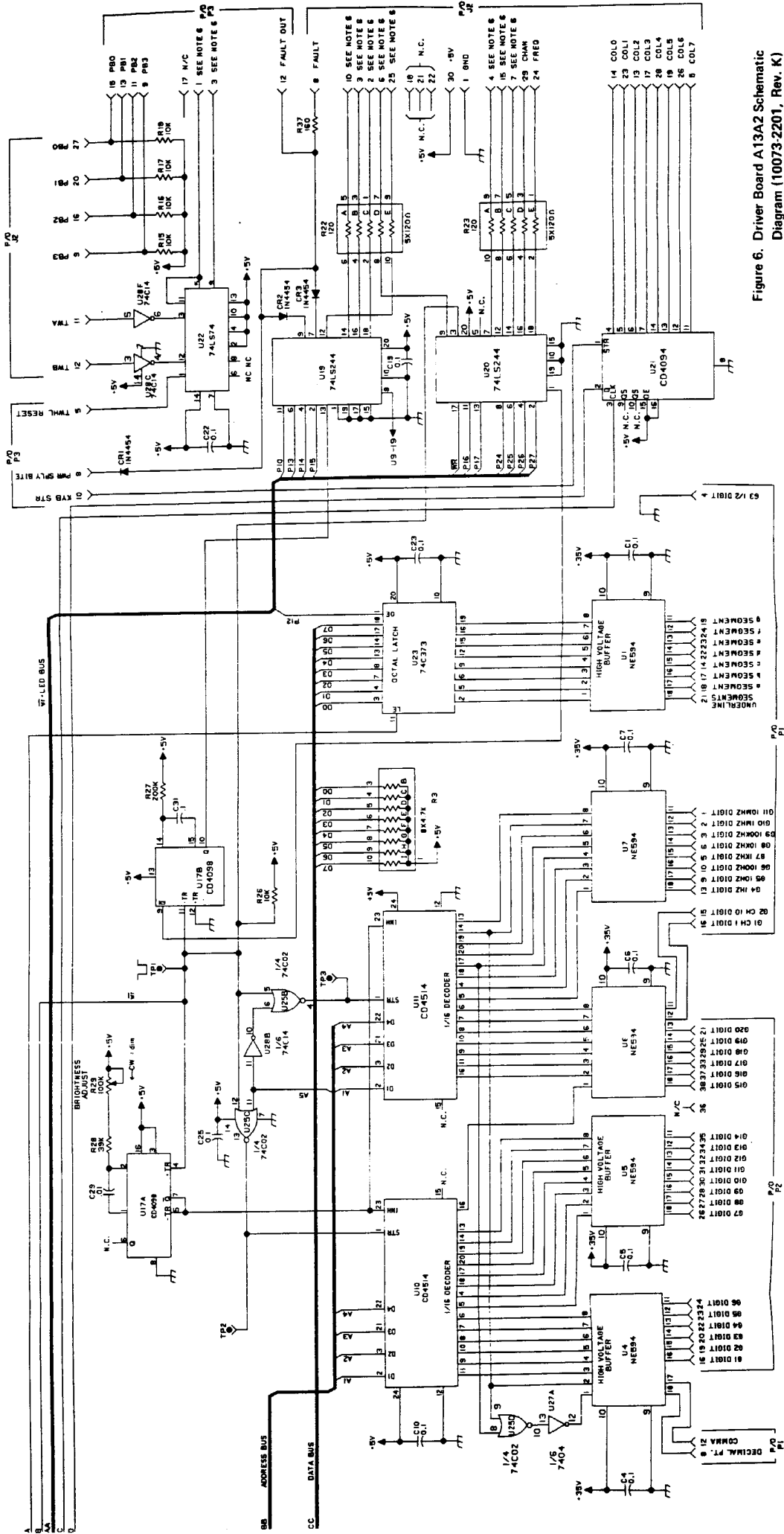
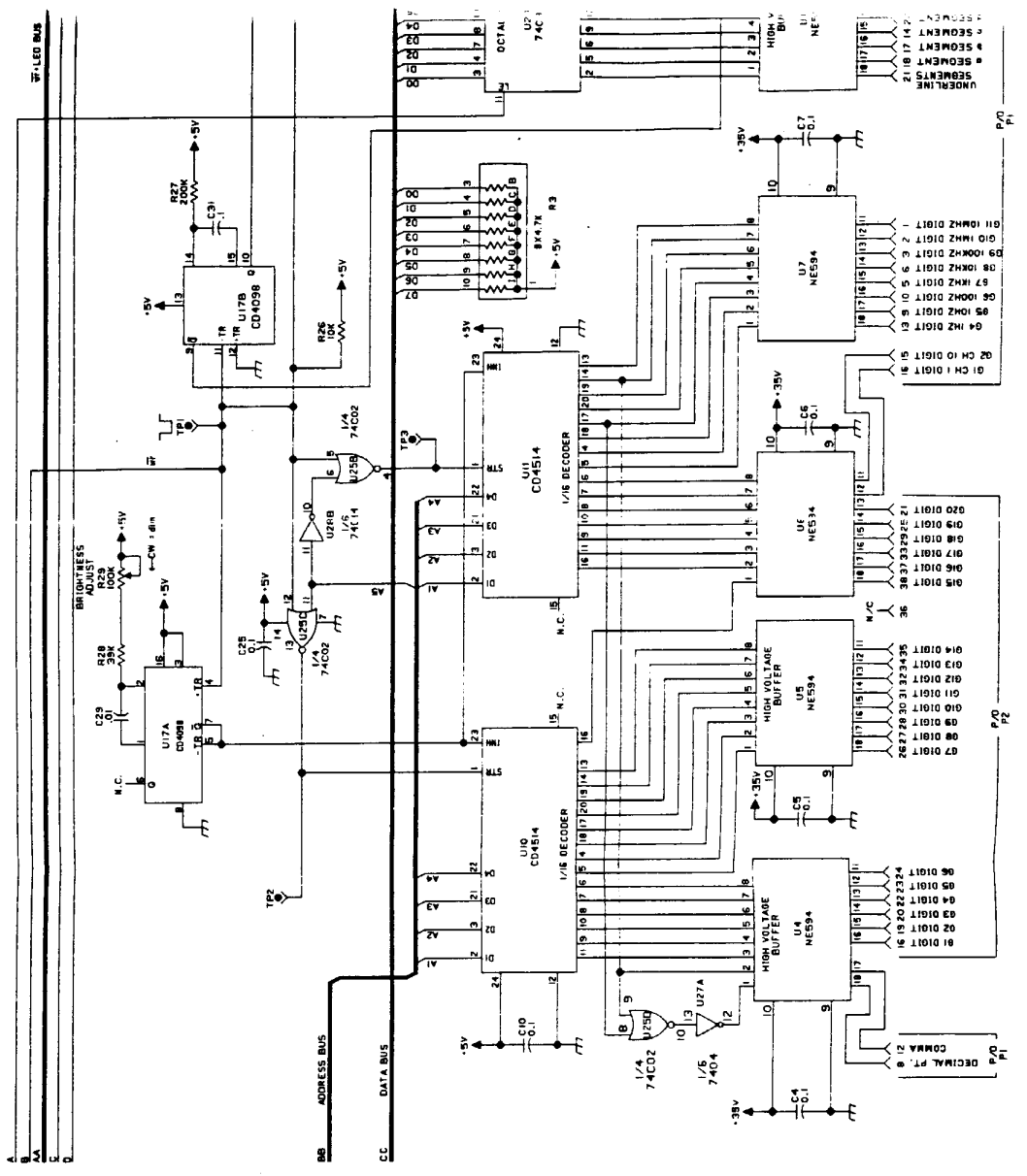


Figure 6. Driver Board A13A2 Schematic
Diagram (10073-2201, Rev. K)
(Sheet 2 of 2)



7-LED BUS

CC ADDRESS BUS

DD DATA BUS

EE ADDRESS BUS

FF DATA BUS

00 ADDRESS BUS

01 DATA BUS

02 ADDRESS BUS

03 DATA BUS

04 ADDRESS BUS

05 DATA BUS

06 ADDRESS BUS

07 DATA BUS

08 ADDRESS BUS

09 DATA BUS

0A ADDRESS BUS

0B DATA BUS

0C ADDRESS BUS

0D DATA BUS

0E ADDRESS BUS

0F DATA BUS

10 ADDRESS BUS

11 DATA BUS

12 ADDRESS BUS

13 DATA BUS

14 ADDRESS BUS

15 DATA BUS

16 ADDRESS BUS

17 DATA BUS

18 ADDRESS BUS

19 DATA BUS

1A ADDRESS BUS

1B DATA BUS

1C ADDRESS BUS

1D DATA BUS

1E ADDRESS BUS

1F DATA BUS

20 ADDRESS BUS

21 DATA BUS

22 ADDRESS BUS

23 DATA BUS

24 ADDRESS BUS

25 DATA BUS

26 ADDRESS BUS

27 DATA BUS

28 ADDRESS BUS

29 DATA BUS

2A ADDRESS BUS

2B DATA BUS

2C ADDRESS BUS

2D DATA BUS

2E ADDRESS BUS

2F DATA BUS

30 ADDRESS BUS

31 DATA BUS

32 ADDRESS BUS

33 DATA BUS

34 ADDRESS BUS

35 DATA BUS

36 ADDRESS BUS

37 DATA BUS

38 ADDRESS BUS

39 DATA BUS

3A ADDRESS BUS

3B DATA BUS

3C ADDRESS BUS

3D DATA BUS

3E ADDRESS BUS

3F DATA BUS

40 ADDRESS BUS

41 DATA BUS

42 ADDRESS BUS

43 DATA BUS

44 ADDRESS BUS

45 DATA BUS

46 ADDRESS BUS

47 DATA BUS

48 ADDRESS BUS

49 DATA BUS

4A ADDRESS BUS

4B DATA BUS

4C ADDRESS BUS

4D DATA BUS

4E ADDRESS BUS

4F DATA BUS

50 ADDRESS BUS

51 DATA BUS

52 ADDRESS BUS

53 DATA BUS

54 ADDRESS BUS

55 DATA BUS

56 ADDRESS BUS

57 DATA BUS

58 ADDRESS BUS

59 DATA BUS

5A ADDRESS BUS

5B DATA BUS

5C ADDRESS BUS

5D DATA BUS

5E ADDRESS BUS

5F DATA BUS

60 ADDRESS BUS

61 DATA BUS

62 ADDRESS BUS

63 DATA BUS

64 ADDRESS BUS

65 DATA BUS

66 ADDRESS BUS

67 DATA BUS

68 ADDRESS BUS

69 DATA BUS

6A ADDRESS BUS

6B DATA BUS

6C ADDRESS BUS

6D DATA BUS

6E ADDRESS BUS

6F DATA BUS

70 ADDRESS BUS

71 DATA BUS

72 ADDRESS BUS

73 DATA BUS

74 ADDRESS BUS

75 DATA BUS

76 ADDRESS BUS

77 DATA BUS

78 ADDRESS BUS

79 DATA BUS

7A ADDRESS BUS

7B DATA BUS

7C ADDRESS BUS

7D DATA BUS

7E ADDRESS BUS

7F DATA BUS

80 ADDRESS BUS

81 DATA BUS

82 ADDRESS BUS

83 DATA BUS

84 ADDRESS BUS

85 DATA BUS

86 ADDRESS BUS

87 DATA BUS

88 ADDRESS BUS

89 DATA BUS

8A ADDRESS BUS

8B DATA BUS

8C ADDRESS BUS

8D DATA BUS

8E ADDRESS BUS

8F DATA BUS

90 ADDRESS BUS

91 DATA BUS

92 ADDRESS BUS

93 DATA BUS

94 ADDRESS BUS

95 DATA BUS

96 ADDRESS BUS

97 DATA BUS

98 ADDRESS BUS

99 DATA BUS

9A ADDRESS BUS

9B DATA BUS

9C ADDRESS BUS

9D DATA BUS

9E ADDRESS BUS

9F DATA BUS

A0 ADDRESS BUS

A1 DATA BUS

A2 ADDRESS BUS

A3 DATA BUS

A4 ADDRESS BUS

A5 DATA BUS

A6 ADDRESS BUS

A7 DATA BUS

A8 ADDRESS BUS

A9 DATA BUS

AA ADDRESS BUS

AB DATA BUS

AC ADDRESS BUS

AD DATA BUS

AE ADDRESS BUS

AF DATA BUS

B0 ADDRESS BUS

B1 DATA BUS

B2 ADDRESS BUS

B3 DATA BUS

B4 ADDRESS BUS

B5 DATA BUS

B6 ADDRESS BUS

B7 DATA BUS

B8 ADDRESS BUS

B9 DATA BUS

BA ADDRESS BUS

BB DATA BUS

BC ADDRESS BUS

BD DATA BUS

BE ADDRESS BUS

BF DATA BUS

C0 ADDRESS BUS

C1 DATA BUS

C2 ADDRESS BUS

C3 DATA BUS

C4 ADDRESS BUS

C5 DATA BUS

C6 ADDRESS BUS

C7 DATA BUS

C8 ADDRESS BUS

C9 DATA BUS

CA ADDRESS BUS

CB DATA BUS

CC ADDRESS BUS

CD DATA BUS

CE ADDRESS BUS

CF DATA BUS

D0 ADDRESS BUS

D1 DATA BUS

D2 ADDRESS BUS

D3 DATA BUS

D4 ADDRESS BUS

D5 DATA BUS

D6 ADDRESS BUS

D7 DATA BUS

D8 ADDRESS BUS

D9 DATA BUS

DA ADDRESS BUS

DB DATA BUS

DC ADDRESS BUS

DD DATA BUS

DE ADDRESS BUS

DF DATA BUS

E0 ADDRESS BUS

E1 DATA BUS

E2 ADDRESS BUS

E3 DATA BUS

E4 ADDRESS BUS

E5 DATA BUS

E6 ADDRESS BUS

E7 DATA BUS

E8 ADDRESS BUS

E9 DATA BUS

EA ADDRESS BUS

EB DATA BUS

EC ADDRESS BUS

ED DATA BUS

EE ADDRESS BUS

EF DATA BUS

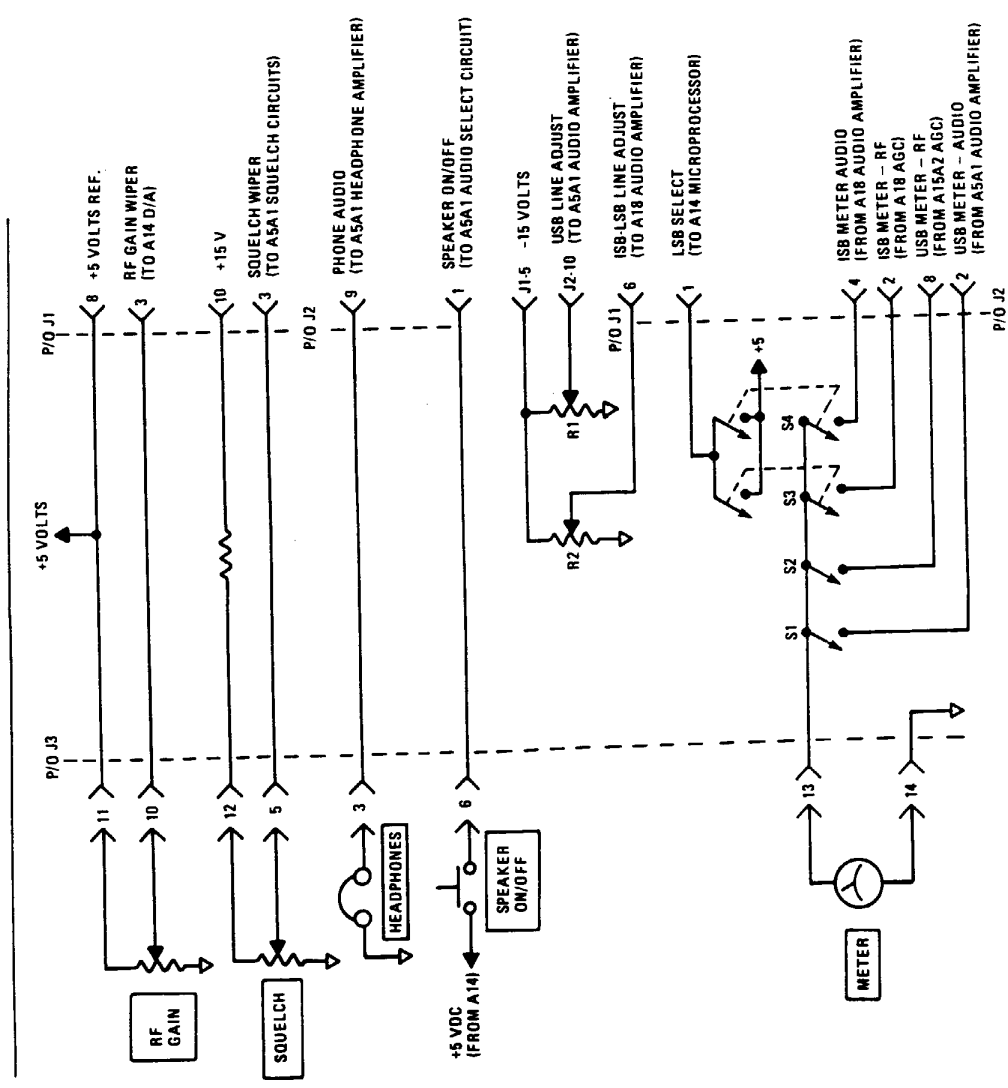
F0 ADDRESS BUS

F1 DATA BUS

F2 ADDRESS BUS

F3 DATA BUS

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Front Panel Meter Board A13A3
Functional Block Diagram

4. FRONT PANEL METER BOARD A13A3

4.1 General Description

Meter Board A13A3 contains the circuitry required to monitor selected RF and AF signals on the RF-590 front panel meter (M1). The following signals may be monitored via pushbutton front panel control.

- RF Signal strength - All modes
- AF Line Audio level - All modes
- ISB - LSB RF Signal strength
- ISB - LSB Line Audio Level

The four switches controlling these functions are spring loaded so that only one of them may be active at any time.

Additionally, other signal data relating to the following functions flow through this board to the following RF-590 front panel controls.

- Headphone Audio
- RF Gain
- Squelch
- Speaker ON/OFF

4.2 Interface Connections

Table 8 summarizes the A13A3 interface connections.

Table 8. A13A3 Interface Connections

Connector	Function
J1 to/from A14	
J1-1	LSB Select
-2	LSB Meter - AGC
-3	RF Gain
-4	LSB Meter - Audio
-5	-15V
-6	LSB Line Adjust
-7	Spare

Table 8. A13A3 Interface Connections (Cont.)

Connector	Function
J1-8	+5 Vdc
-9	Ground
-10	+15 Vdc
J2 to/from A5	
J2-1	Speaker ON/OFF
-2	USB Meter - Audio
-3	Squelch Wiper
-4	Key
-5	Spare
-6	Speaker Audio
-7	Audio Ground
-8	USB Meter - AGC
-9	Phone Audio
-10	USB Line Adjust
J3 to/from Front Panel	
J3-1	Spare
-2	Key
-3	Phone Audio
-4	Audio Ground
-5	Squelch Wiper
-6	Speaker ON/OFF
-7	Spare
-8	Speaker Audio
-9	Ground
-10	RF Gain
-11	+5 Vdc
-12	+15 Vdc
-13	Meter +
-14	Meter -

4.3 Circuit Description

4.3.1 Meter Control

RF signal strength and line audio level signals are normally supplied by AGC assembly A15A2 and IF/ Audio Assembly A15A1 respectively. S2 connects the RF signal to the meter when pressed, and S1 connects the line audio signal. If optional ISB Assembly A18 has not been installed, there will be no ISB RF signal strength or ISB Line audio signals present to be selected. Consequently, pressing either S3 or S4 will result in a zero meter reading.

If the ISB option is installed; however, the RF (S1) and AF (S2) switches channel the USB components of the ISB signal to M1. The ISB LSB RF (S3) and ISB LSB AF (S4) switches route the LSB components of the ISB signal to the meter. Whenever an ISB switch (S3 or S4) is selected, +5 Vdc is switched on to the LSB select line (J1-1) which informs Control Board Assembly A14 that an ISB function has been selected.

4.3.2 Line Level Control

Line audio output level adjustments are provided on the A13A3 assembly. They are accessed through small front panel holes to the left of the meter (USB line audio) and to the right of the meter (ISB-LSB line audio). R1 adjusts USB adjustments under normal receiver operation, while R2 will control the LSB audio portion of the ISB signal if the A18 ISB option is installed. Either control will vary the 600 ohm line audio outputs level (available at RF-590 rear panel connector TB1 and J7) from approximately -16 dBm to +10 dBm.

The adjustment of R1 controls line audio level by varying the bias and consequently the on resistance of an FET in the A5A1 line audio amplifier circuit. The FET therefore acts as an electronic attenuator for the line level. (See subsection A5A1). R2 functions identically for the optional ISB Assembly A18.

4.3.3 Front Panel Control Signals

- **RF GAIN**

5 Vdc is applied to the top of the front panel RF GAIN control, and a portion is fed back via the wiper to Control Assembly A14 A/D converter. This signal is used to manually control the receiver gain.

- **SQUELCH**

+15 Vdc is fed through R4, which results in 5 Vdc at the top of the front panel SQUELCH CONTROL. The wiper arm returns a portion of this to act as a squelch threshold signal for squelch circuits on the A5A1 assembly.

- **HEADPHONES**

Headphone Audio from the A5A1 assembly is passed through the A13A3 assembly to a front panel HEADPHONE CONNECTOR. Headphone volume is adjustable via the AF GAIN control.

- **SPEAKER ON/OFF**

The Front Panel SPEAKER ON/OFF switch applies 5 Vdc to the audio select circuit on the A5A1 assembly whenever the switch is pushed in. This signal then gates audio to the speaker.

4.3.4 Parts Lists and Schematic Diagram

Table 9 is the Front Panel Meter Board A13A3 parts list. Figures 7 and 8 are the Front Panel Meter Board A13A3 component location diagram and schematic diagram.

Table 9. Front Panel Meter Board A13A3 Parts List (PL 10073-2300)

Ref. Desig.	Part Number	Description
J1	10073-2300	PWB, METER
J2	10073-2313	SW DPDT 4SEC INTLOCKING
J3	J-0870	CONN , 10 PIN
R1	J46-0032-010	HDR 10 PIN 0.100" SR
R2	J46-0032-014	HDR 14 PIN 0.100" SR
R3	R30-0001-103	RES,VAR,10K 3/4W 20%
R4	R30-0001-103	RES,VAR,10K 3/4W 20%
	R65-0003-103	RES 10K 5% 1/4W CAR FILM
	R65-0003-103	RES 10K 5% 1/4W CAR FILM

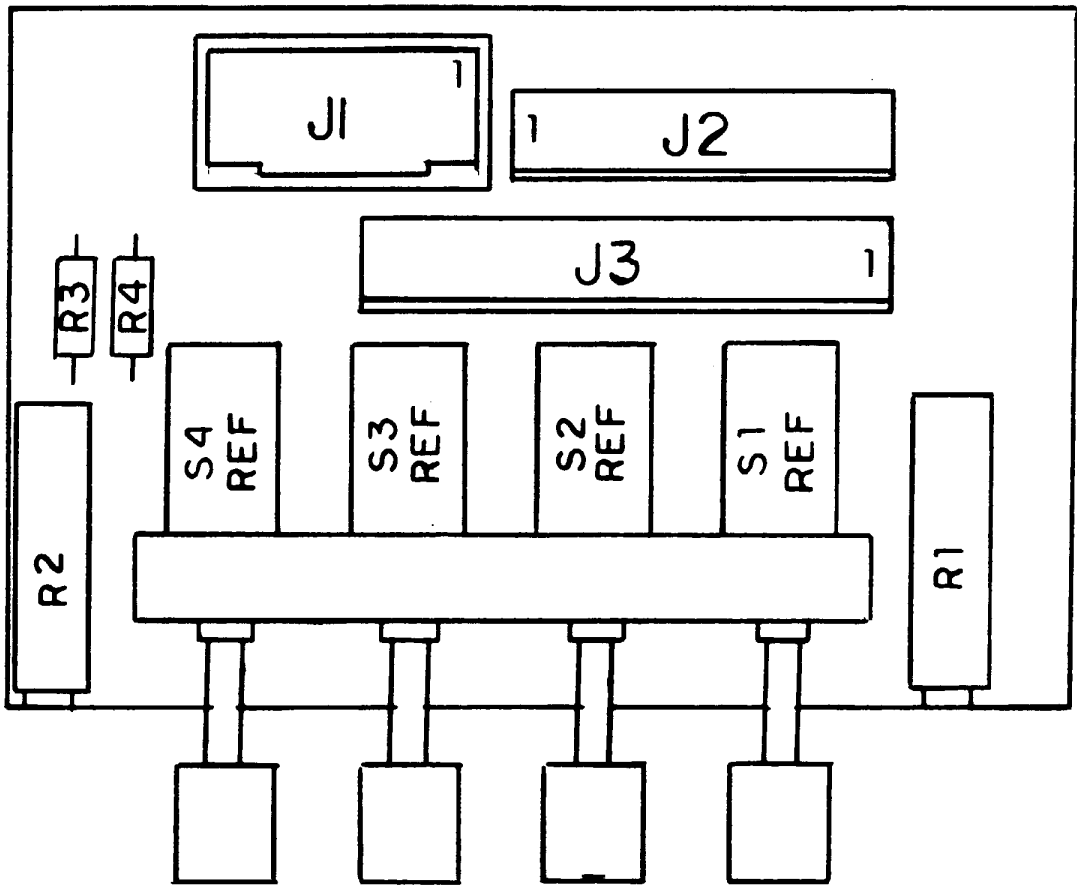


Figure 7. Front Panel Meter Board A13A3 Component Location Diagram (10073-2300, Rev. D)

NOTE: UNLESS OTHERWISE SPECIFIED:
 1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN.
 FOR A COMPLETE DESIGNATION, PREFIX WITH
 UNIT NO. AND/OR ASSEMBLY NO. DESIGNATION.
 2. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, ±5%.
 3. VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY.
 COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.
 4. INDICATES FRONT PANEL MARKING.
 5. S1-S4 SHOWN USB AF SELECTED.

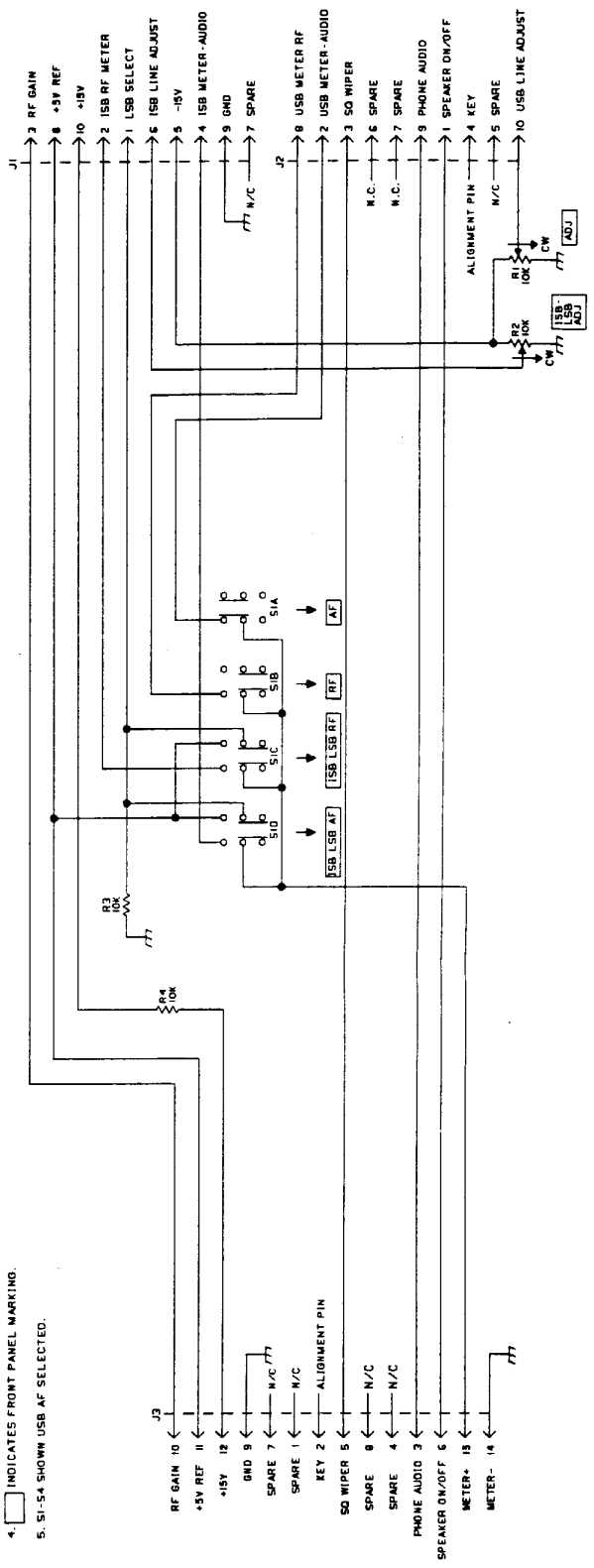


Figure 8. Front Panel Meter Board A13A3
 Schematic Diagram (10073-2301,
 Rev. D)

5. ALPHANUMERIC DISPLAY ASSEMBLY A13A4

5.1 General Description

Alphanumeric Display Assembly A13A4 consists of a single vacuum fluorescent display which contains twenty four segment (British flag) characters. The alpha display is used to provide indications of AGC, Mode, Bandwidth, and Dwell time in Scan Mode, Scan Group and BFO frequency. Additionally the alphanumeric display is used to prompt the operator for programming and scan related function selections. It is also used to provide fault indications, if any, at the completion of the BITE test.

5.2 Interface Connections

Table 10 lists the A13A4 interface connections.

Table 10. A13A4 Interface Connections

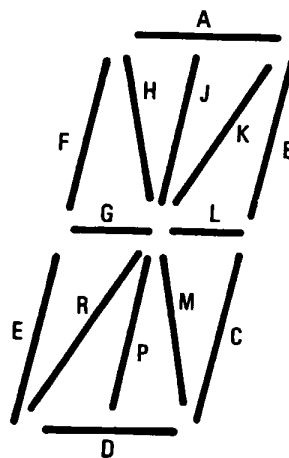
Connector	Description
J1 to/from A13A2	
J1-1	a Segment
-2	b Segment
-3	c Segment
-4	d Segment
-5	m Segment
-6	n Segment
-7	e Segment
-8	f Segment
-9	J Segment
-10	k Segment
-11	g Segment
-12	h Segment
-13	Decimal Point
-14	Comma
-15	N/C
-16	G1 Digit
-17	p Segment
-18	r Segment
-19	G2 Digit
-20	G3 Digit
-21	G20 Digit
-22	G4 Digit
-23	G5 Digit
-24	G6 Digit
-25	G19 Digit
-26	G7 Digit

Table 10. A13A4 Interface Connections (Cont.)

Connector	Description
J1-27	G8 Digit
-28	G9 Digit
-29	G18 Digit
-30	G10 Digit
-31	G11 Digit
-32	G12 Digit
-33	G17 Digit
-34	G13 Digit
-35	G14 Digit
-36	N/C
-37	G16 Digit
-38	G15 Digit
-39	Filament
-40	Filament

5.3 Functional Description

The alphanumeric vacuum fluorescent display is very similar in principle to the vacuum tube. Front Panel Driver Board A13A2 provides all required voltages and timing to properly drive the display. The 10073-2400 twenty character VF display requires a 4.7 Vac filament voltage and 35 Vdc grid and anode voltages. The grids (20 of them) are essentially character enable signals which are driven in multiplexed fashion, enabled one at a time as the segment data for that character is provided to the anode pins. The anode pins are inputs for the 14 segments plus dot and comma signals. Figure 9 shows the display's segment location. See paragraphs 3.1 and 3.3.3 for additional details.



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Figure 9. Alphanumeric Display Segment Location

5.3.1 Parts List and Schematic Diagram

Table 11 is the Alphanumeric Display A13A4 Assembly parts list. Figures 10 and 11 are the Alphanumeric Display A13A4 component location diagram and schematic diagram

Table 11. Alphanumeric Display Assembly A13A4 Parts List (PL 10073-2400)

Ref. Desig.	Part Number	Description
DS1 J1	10073-2400 N50-0006-001 J46-0031-040	PWB, DISPLAY DSPL FLR VAC 14SEG 20-DIG HDR 40 PIN 0.100" RT ANG

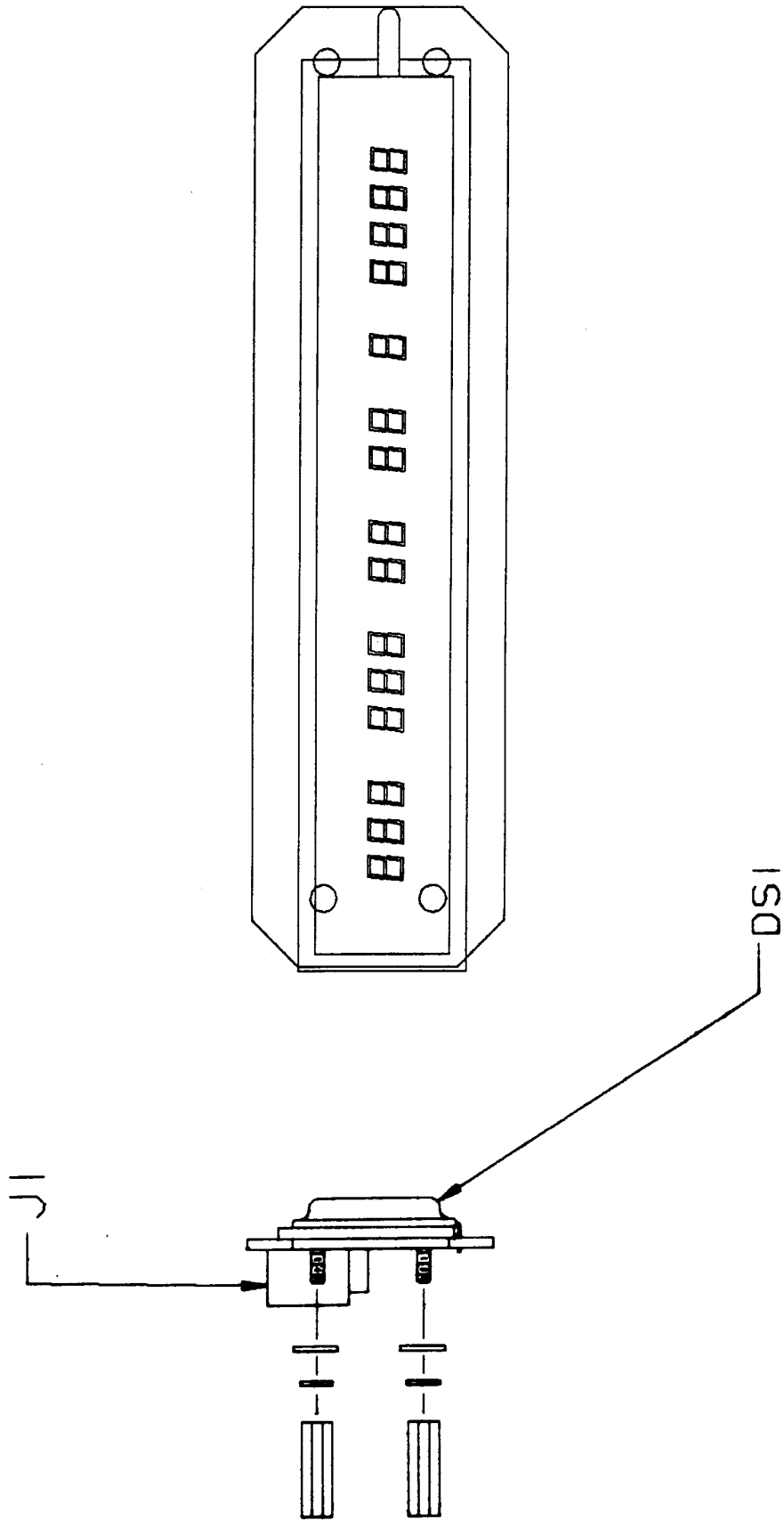


Figure 10. Alphanumeric Display Board A13A4 Component Location Diagram (10073-2400, Rev. B)

NOTE: UNLESS OTHERWISE SPECIFIED:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR A COMPLETE DESIGNATION, PREFIX WITH UNIT NO. AND/OR ASSEMBLY NO. DESIGNATION.

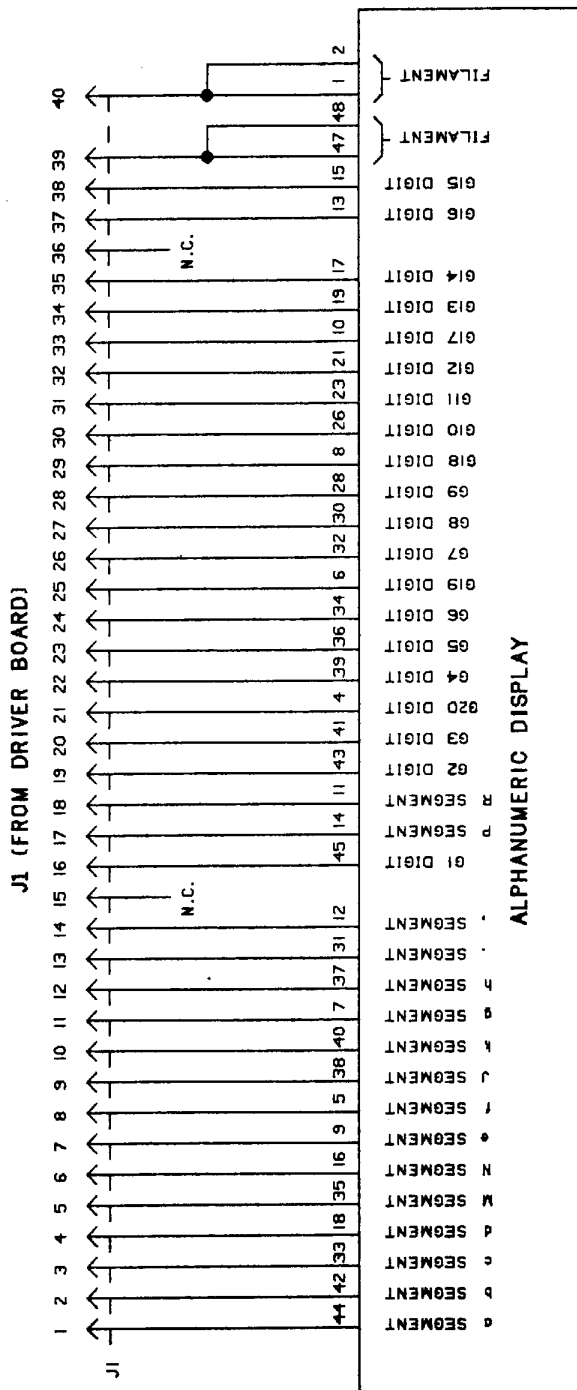


Figure 11. Alphanumeric Display Board A13A4 Schematic Diagram (10073-2401, Rev. B)

6. NUMERIC DISPLAY ASSEMBLY A13A5

6.1 General Description

Numeric Display Assembly A13A5 consists of a single vacuum fluorescent display which contains eight seven segment characters used for frequency display and two seven segment characters used for the channel display.

6.2 Interface Connections

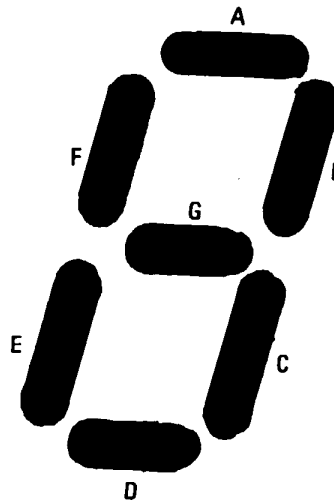
Table 12 lists the A13A5 interface connections.

Table 12. A13A5 Interface Connections

Connector	Description
J1 to/from A13A2	
J1-1	G11 10 MHz Digit
-2	G10 1 MHz Digit
-3	G9 100 kHz Digit
-4	G3 1/2 Segments
-5	G7 1 kHz Digit
-6	G8 10 kHz Digit
-7	Filament
-8	Decimal Point
-9	G5 10 Hz Digit
-10	G6 100 Hz Digit
-11	N/C
-12	Comma
-13	G4 1 Hz Digit
-14	c Segment
-15	G2 CH10 Digit
-16	G1 CH1 Digit
-17	b Segment
-18	a Segment
-19	g Segment
-20	Filament
-21	Underline Segments
-22	d Segment
-23	e Segment
-24	f Segment

6.3 Functional Description

The numeric vacuum fluorescent display is very similar in principle to the vacuum tube. Front Panel Driver Board A13A2 provides all required voltages and timing signals to properly drive the display. The 10073-2500 VF display operates by using a 5.8 Vac filament voltage and 35 Vdc grid and anode voltages. The grids (ten of them) are character enable signals which are driven in a multiplexed fashion. The grids are enabled one at a time as the seven segment data plus underline, if required, are provided to the anode pins. Each digit is enabled for approximately 600 to 700u seconds. Figure 12 shows the displays segment's location.



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Figure 12. Numeric Display Segment Location

6.3.1 Parts List and Schematic Diagram

Table 13 is the Numeric Display Assembly A13A5 parts list. Figures 13 and 14 are the Numeric Display Assembly A13A5 component location diagram and schematic diagram.

Table 13. Numeric Display Assembly A13A5 Parts List (PL 10073-2500)

Ref. Desig.	Part Number	Description
DS1 J1	10073-2500 N50-0005-001 J46-0031-024	PWB, DISPLAY DSPL FLR VAC 7SEG 11-DIG HDR 24 PIN 0.100" RT ANG

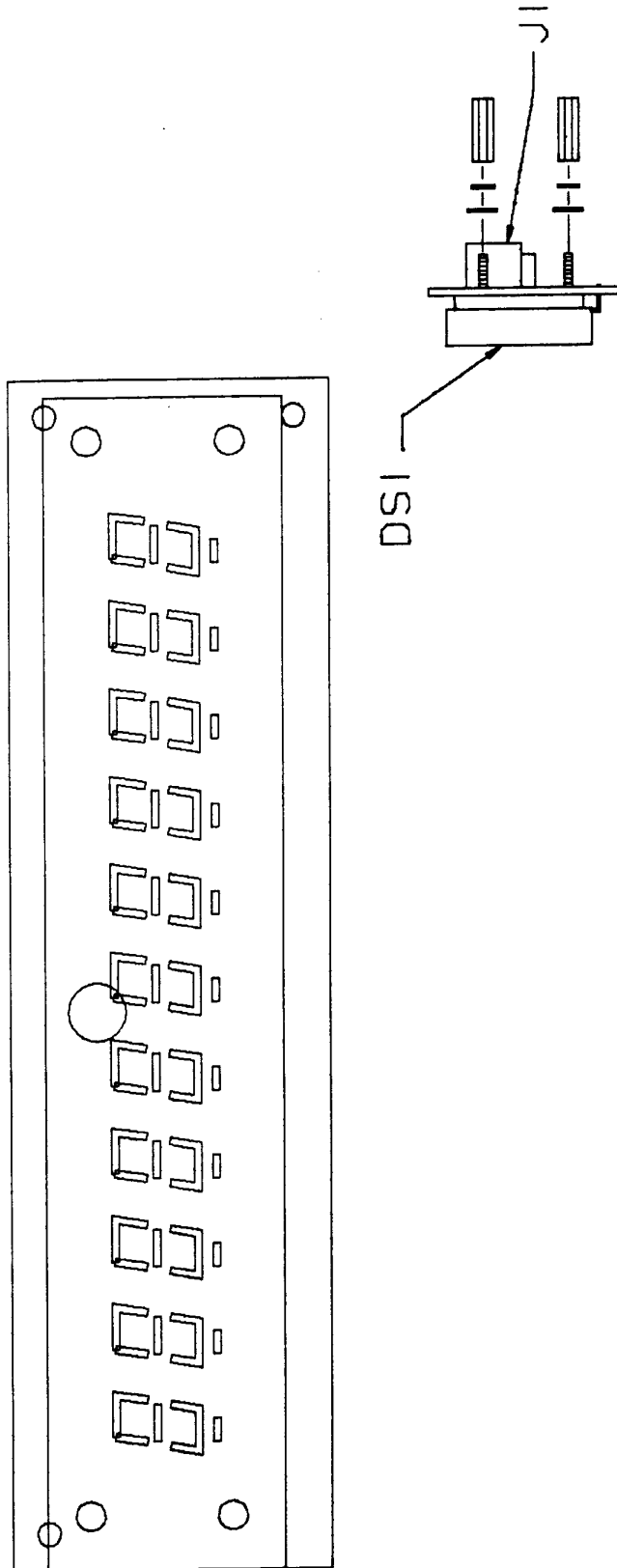


Figure 13. Numeric Display Board A13A5 Component Location Diagram (10073-2500, Rev. B)

NOTE: UNLESS OTHERWISE SPECIFIED:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN FOR A COMPLETE DESIGNATION, PREFIX WITH UNIT NO. AND/OR ASSEMBLY NO. DESIGNATION.

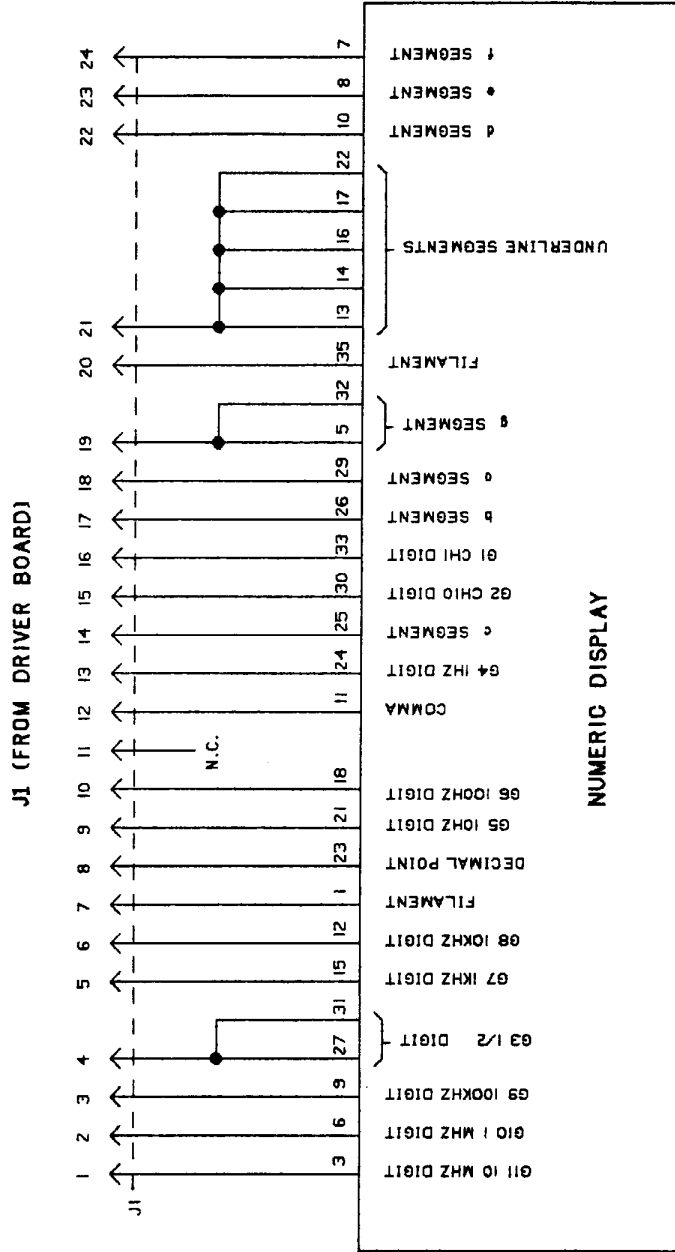


Figure 14. Numeric Display Board A13A5 Schematic Diagram (10073-2501, Rev. B)

7. CONVERTER ASSEMBLY A13A6

7.1 General Description

Converter Assembly A13A6 is a self contained dc to dc converter type power supply. It supplies anode and filament voltages to the A13A4 and A13A5 front panel vacuum fluorescent displays from the available -15 Vdc supply. Anode voltage output is 35 Vdc at 100 mA and filament output voltage is 5.8 Vac at 200 mA.

The A13A6 assembly itself is a sealed unit to provide EMI protection. Input/output connections to the internal A13A6A1 PWB is via feedthrough capacitors.

7.2 Circuit Descriptions

The -15 Vdc is applied to push/pull square wave oscillator Q1 and Q2 operating at approximately 15 kHz. T1 is a saturating transformer used to provide feedback and two output voltages. One output is rectified by fullwave bridge CR2-CR5 and filtered by pi-network C2-L1-C3 to provide 35 Vdc at 100 mA for display anode power. The second output is filtered by L2, C5, T2, and C6 to provide 5.8 Vac at 200 mA for display filament power. A bias voltage of approximately 6 Vdc is also supplied to the filaments. This bias voltage originates on the Driver Board Assembly A13A2 and is applied via a center tap at T2.

7.2.1 Parts List and Schematic

Table 14 is the Converter Assembly A13A6 parts list. Figure 15 is the Converter Assembly A13A6 component location diagram. Table 15 is the Converter Board Assembly A13A6A1 parts list. Figure 16 is the Converter Board Assembly A13A6A1 component location diagram and figure 17 is the A13A6 and A13A6A1 schematic diagram.

Table 14. Converter Assembly A13A6 Parts List (PL 10073-2250)

Ref. Desig.	Part Number	Description
A13A6	10073-2250	CONVERTER ASSY
A13A6A1	10073-2260	PWB ASSY, CONVERTER
C1	10073-7035	CAP,FEED-THRU 100
C2	10073-7035	CAP,FEED-THRU 100
C3	10073-7035	CAP,FEED-THRU 100
C4	10073-7035	CAP,FEED-THRU 100
C5	10073-7035	CAP,FEED-THRU 100
E1	E58-0004-000	LUG SLDR RIGHT ANGLE

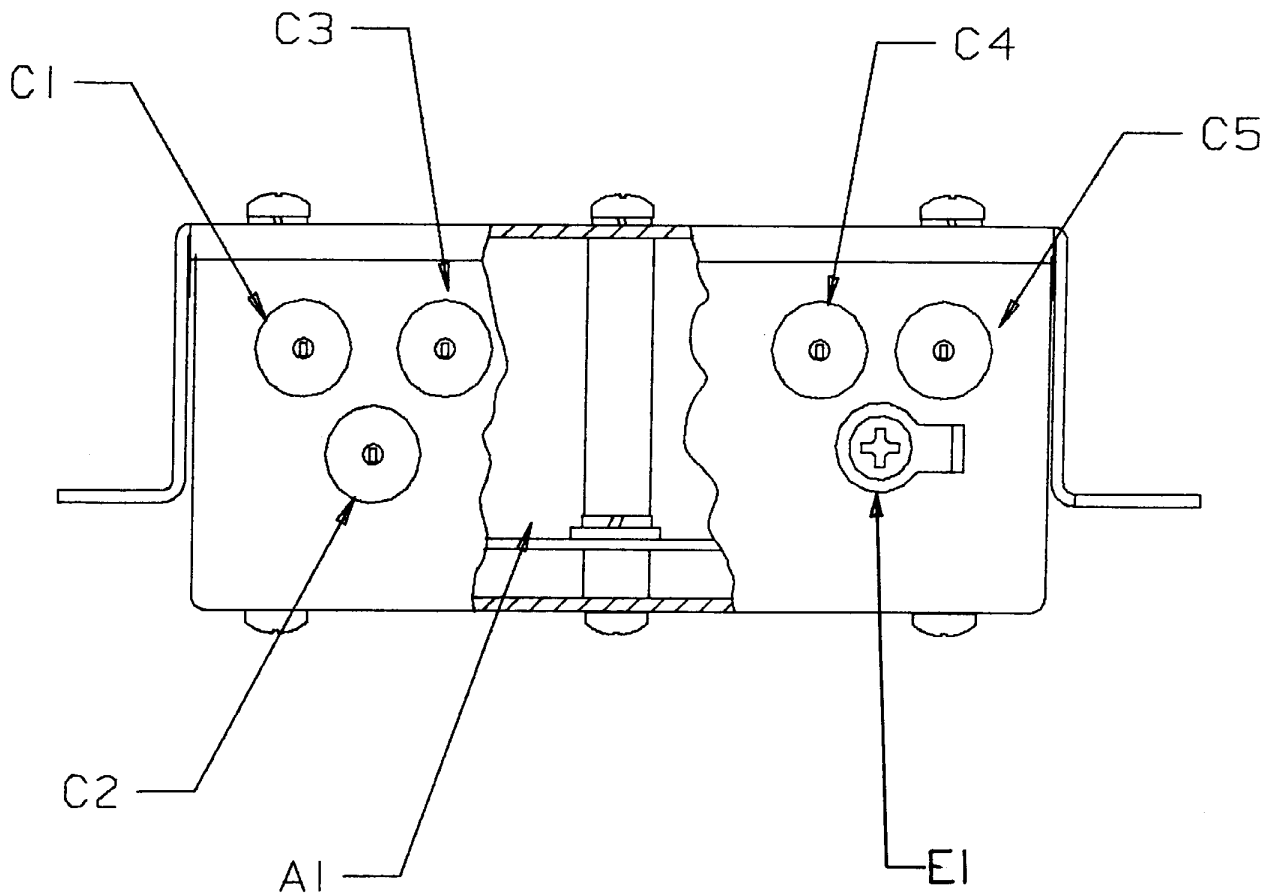


Figure 15. Converter Assembly A13A6 Component Location Diagram (10073-2250, Rev. E)

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Table 15. Converter Board Assembly A13A6A1 Parts List (PL 10073-2260)

Ref. Desig.	Part Number	Description
	10073-2260	PWB, CONVERTER
C1	M39014/02-1305	CAP .047UF 10% 100V CER
C2	C26-0050-100	CAP 10UF 20% 50V TANT
C3	C26-0050-100	CAP 10UF 20% 50V TANT
C4	C18-0025-101	CAP 100UF 25V ELEC
C5	M39014/02-1318	CAP .33UF 10% 50V CER-R
C6	M39014/02-1318	CAP .33UF 10% 50V CER-R
C7	C26-0025-680	CAP 68UF 20% 25V TANT
CR1	1N4007	DIODE 1A 1000V RECT GP
CR2	D22-0007-002	DIODE 1A 100V RECT GP
CR3	D22-0007-002	DIODE 1A 100V RECT GP
CR4	D22-0007-002	DIODE 1A 100V RECT GP
CR5	D22-0007-002	DIODE 1A 100V RECT GP
CR6	D22-0007-002	DIODE 1A 100V RECT GP
CR7	D22-0007-002	DIODE 1A 100V RECT GP
L1	MS90538-12	COIL 100UH 5% FXD RF
L2	10073-7029	INDUCTOR, FILTER CHOKE
L3	10073-7029	INDUCTOR, FILTER CHOKE
Q1	2N5193	XSTR POWER PNP TO-205AA
Q2	2N5193	XSTR POWER PNP TO-205AA
R1	R65-0003-272	RES 2.7K 5% 1/4W CAR FILM
R2	R65-0003-270	RES 27 5% 1/4W CAR FILM
R3	R65-0003-101	RES 100 5% 1/4W CAR FILM
R4	R65-0003-223	RES 22K 5% 1/4W CAR FILM
T1	10073-7027	TRANSFORMER, POWER
T2	10073-7028	TRANSFORMER, RF, FIXED

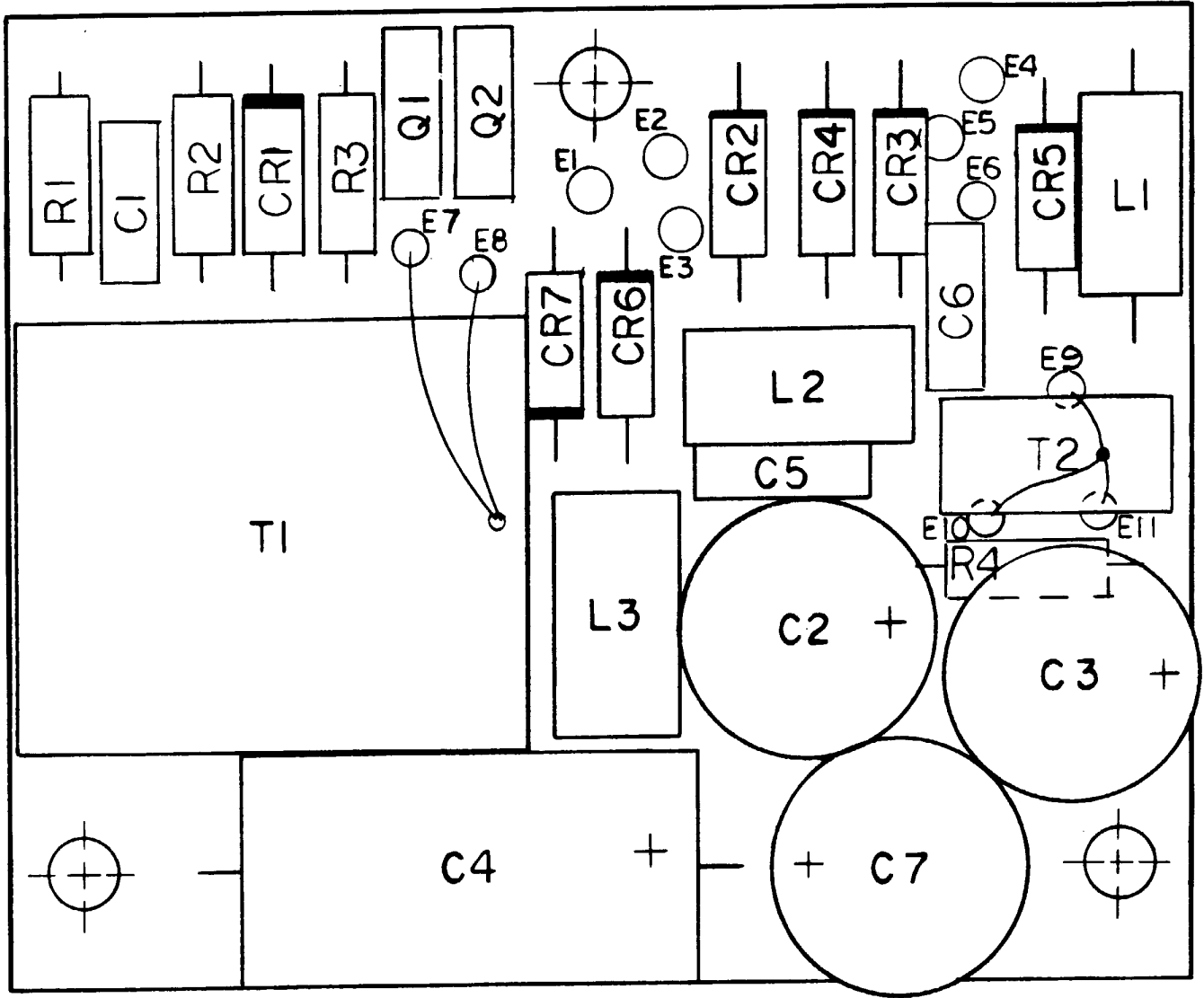


Figure 16. Converter Board Assembly A13A6A1 Component Location Diagram (10073-2260, Rev. D)

- NOTE: UNLESS OTHERWISE SPECIFIED:
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. PARTIAL REFERENCE DESIGNATIONS ARE: UNIT NO., AND/OR ASSEMBLY NO., DESIGNATION.
 2. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, 15%.
 3. ALL CAPACITOR VALUES ARE IN MICROFARADS.
 4. VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY. COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.

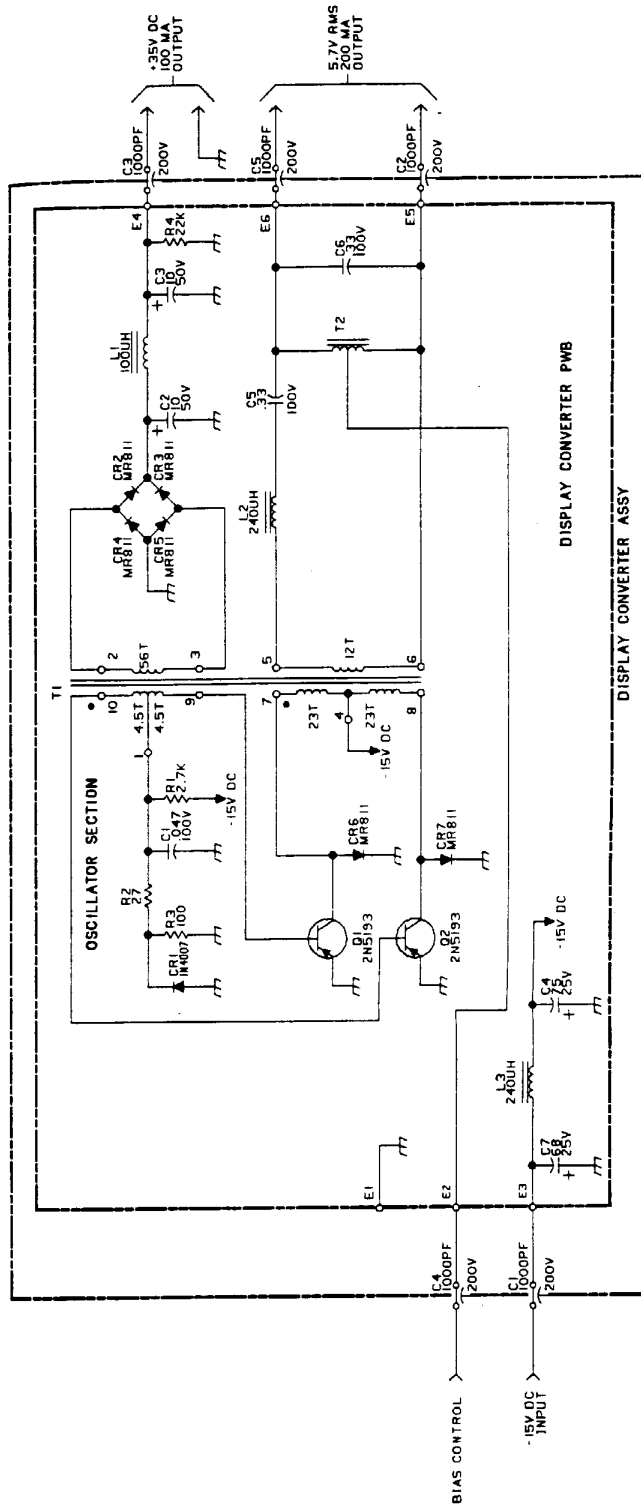


Figure 17. Converter Assembly A13A6 and Converter Board Assembly A13A6A1 Schematic Diagram (10073-2251, Rev. F)