

DIAGRAMS AND CIRCUIT BOARD ILLUSTRATIONS

Symbols

Graphic symbols and class designation letters are based on ANSI Standard Y32.2-1975.

Logic symbology is based on ANSI Y32.14-1973 in terms of positive logic. Logic symbols depict the logic function performed and may differ from the manufacturer's data.

The overline on a signal name indicates that the signal performs its intended function when it is in the low state.

Abbreviations are based on ANSI Y1.1-1972.

Other ANSI standards that are used in the preparation of diagrams by Tektronix, Inc. are:

- Y14.15, 1966 Drafting Practices.
- Y14.2, 1973 Line Conventions and Lettering.
- Y10.5, 1968 Letter Symbols for Quantities Used in Electrical Science and Electrical Engineering.

American National Standard Institute
1430 Broadway
New York, New York 10018

Component Values

Electrical components shown on the diagrams are in the following units unless noted otherwise:

Capacitors = Values one or greater are in picofarads (pF).
Values less than one are in microfarads (μF).

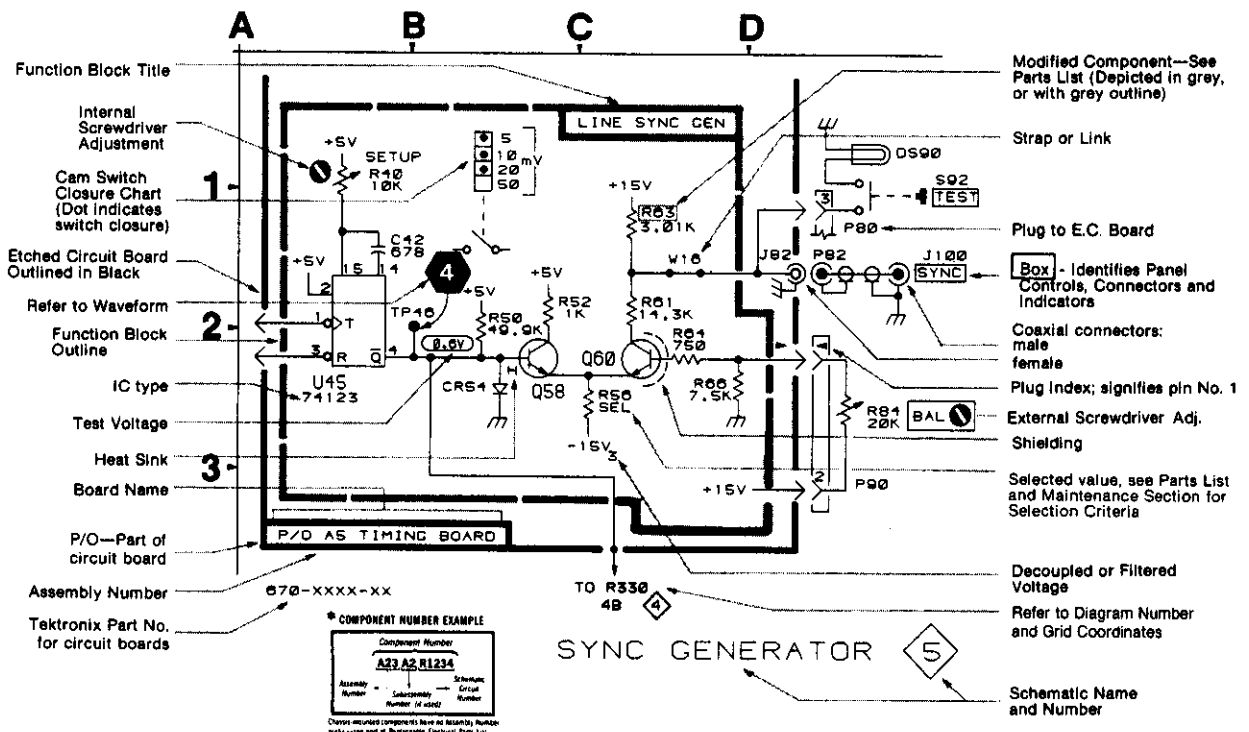
Resistors = Ohms (Ω).

———— The information and special symbols below may appear in this manual. ————

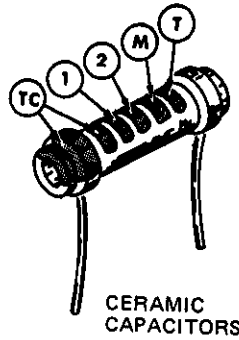
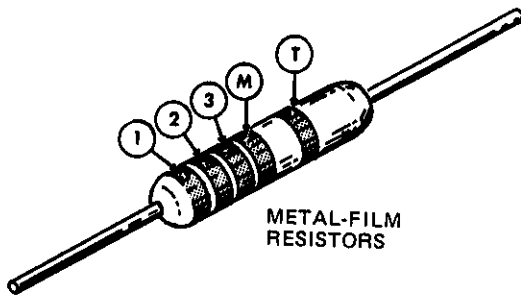
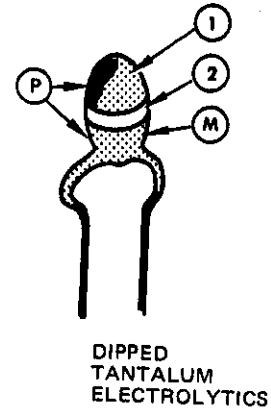
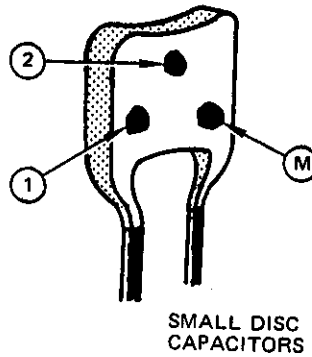
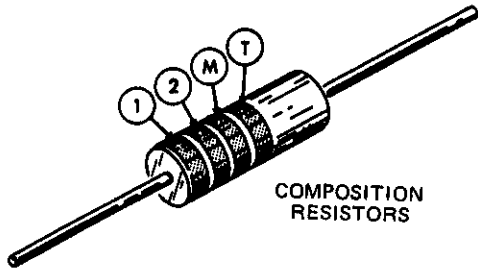
Assembly Numbers and Grid Coordinates

Each assembly in the instrument is assigned an assembly number (e.g., A20). The assembly number appears on the circuit board outline on the diagram, in the title for the circuit board component location illustration, and in the lookup table for the schematic diagram and corresponding component locator illustration. The Replaceable Electrical Parts list is arranged by assemblies in numerical sequence; the components are listed by component number *(see following illustration for constructing a component number).

The schematic diagram and circuit board component location illustration have grids. A lookup table with the grid coordinates is provided for ease of locating the component. Only the components illustrated on the facing diagram are listed in the lookup table. When more than one schematic diagram is used to illustrate the circuitry on a circuit board, the circuit board illustration may only appear opposite the first diagram on which it was illustrated; the lookup table will list the diagram number of other diagrams that the circuitry of the circuit board appears on.



COLOR CODE



① ② and ③ - 1st, 2nd, and 3rd significant figures

Ⓜ - multiplier Ⓣ - tolerance

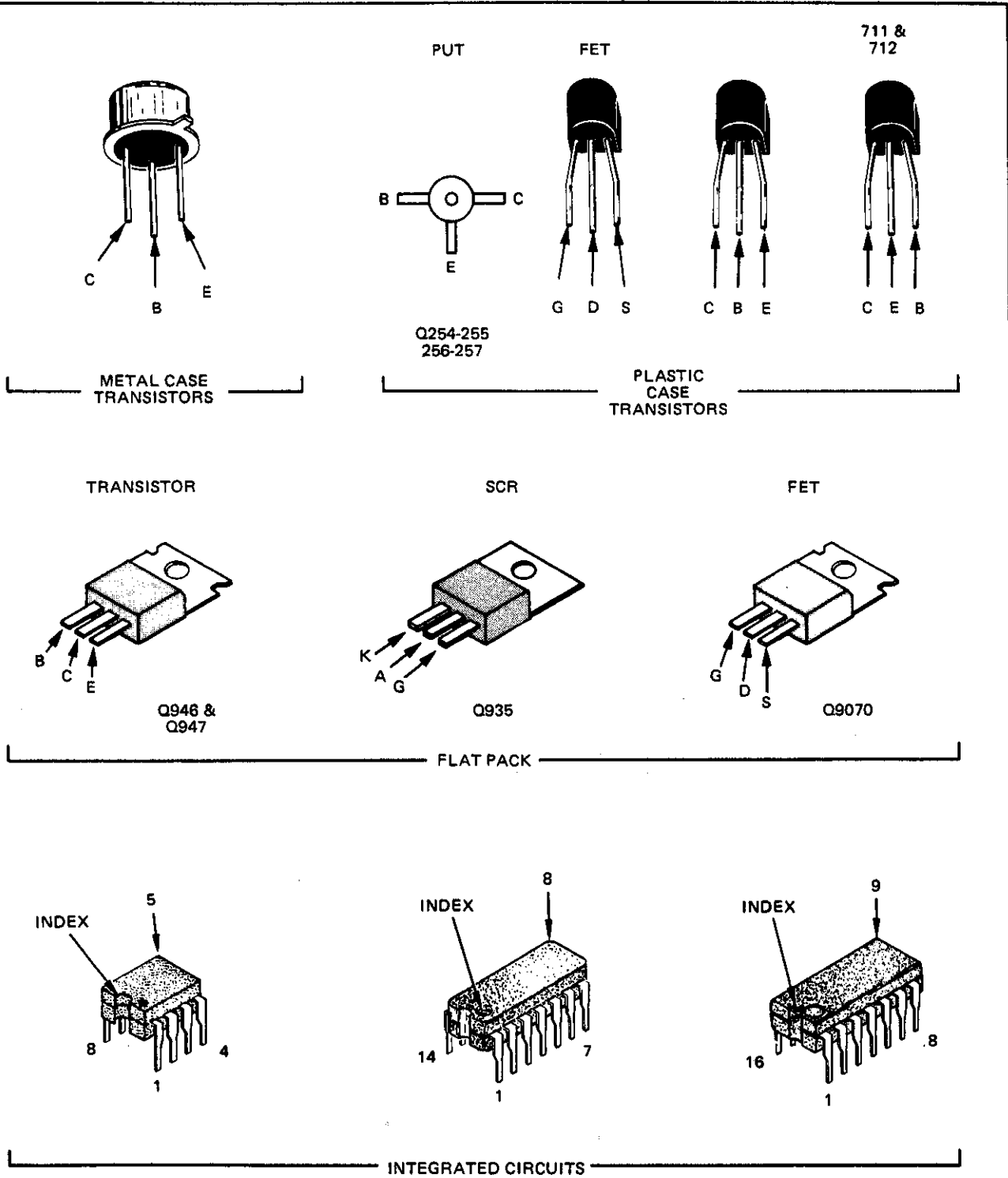
ⓉⓈ - temperature coefficient

Ⓟ - polarity and voltage rating

Ⓣ and/or ⓉⓈ color code may not be present on some capacitors

COLOR	SIGNIFICANT FIGURES	RESISTORS		CAPACITORS			DIPPED TANTALUM VOLTAGE RATING
		MULTIPLIER	TOLERANCE	MULTIPLIER	TOLERANCE		
					over 10 pF	under 10 pF	
BLACK	0	1	---	1	±20%	±2 pF	4 VDC
BROWN	1	10	±1%	10	±1%	±0.1 pF	6 VDC
RED	2	10 ² or 100	±2%	10 ² or 100	±2%	---	10 VDC
ORANGE	3	10 ³ or 1 K	±3%	10 ³ or 1000	±3%	---	15 VDC
YELLOW	4	10 ⁴ or 10 K	±4%	10 ⁴ or 10,000	+100% -9%	---	20 VDC
GREEN	5	10 ⁵ or 100 K	±½%	10 ⁵ or 100,000	±5%	±0.5 pF	25 VDC
BLUE	6	10 ⁶ or 1 M	±½%	10 ⁶ or 1,000,000	---	---	35 VDC
VIOLET	7	---	±1/10%	---	---	---	50 VDC
GRAY	8	---	---	10 ⁻² or 0.01	+80% -20%	±0.25 pF	---
WHITE	9	---	---	10 ⁻¹ or 0.1	±10%	±1 pF	---
GOLD	-	10 ⁻¹ or 0.1	±5%	---	---	---	---
SILVER	-	10 ⁻² or 0.01	±10%	---	---	---	---
NONE	-	---	±20%	---	±10%	±1 pF	---

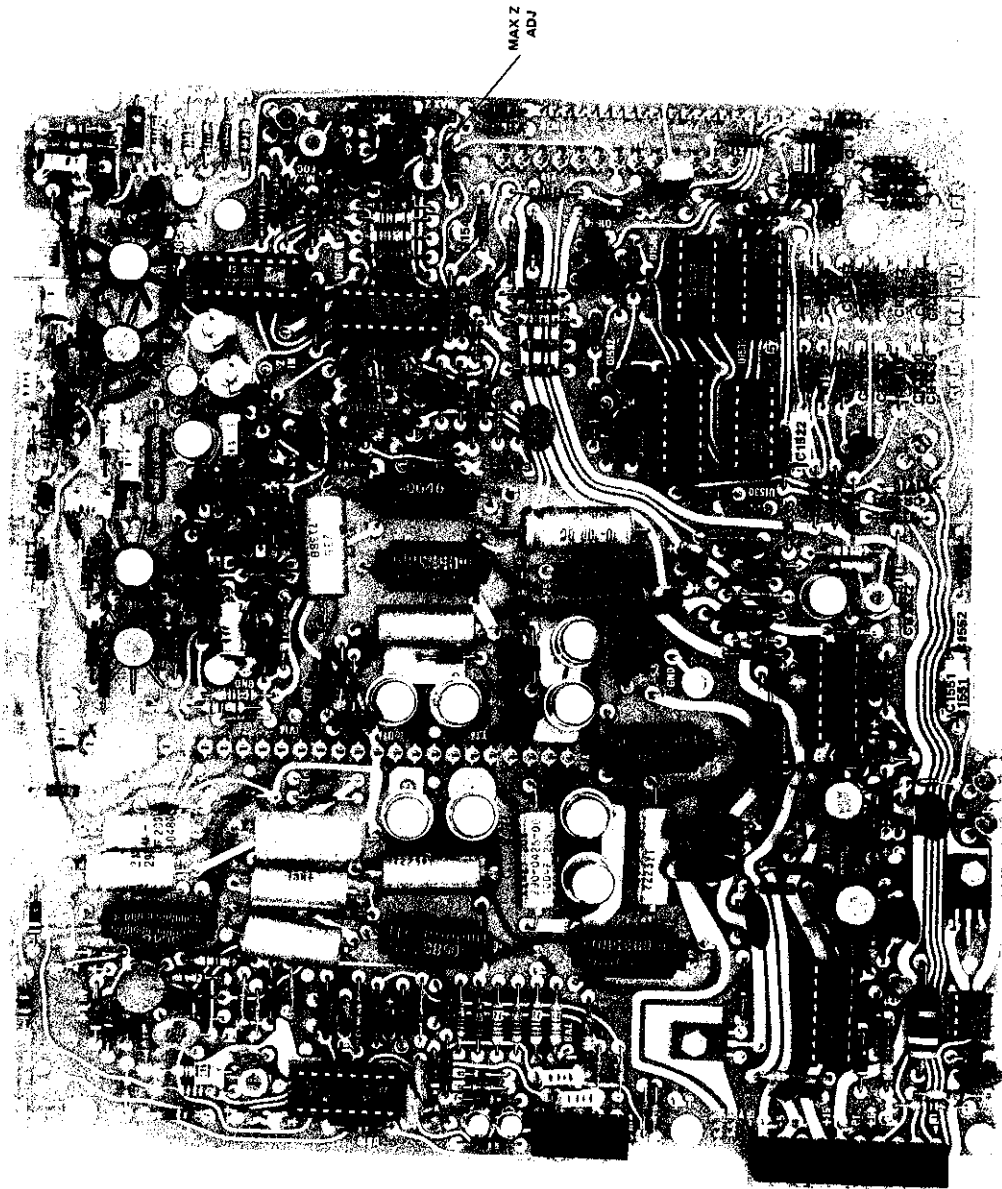
Figure 9-1. Color codes for resistors and capacitors.



LEAD CONFIGURATIONS AND CASE STYLES ARE TYPICAL, BUT MAY VARY DUE TO VENDOR CHANGES OR INSTRUMENT MODIFICATIONS.

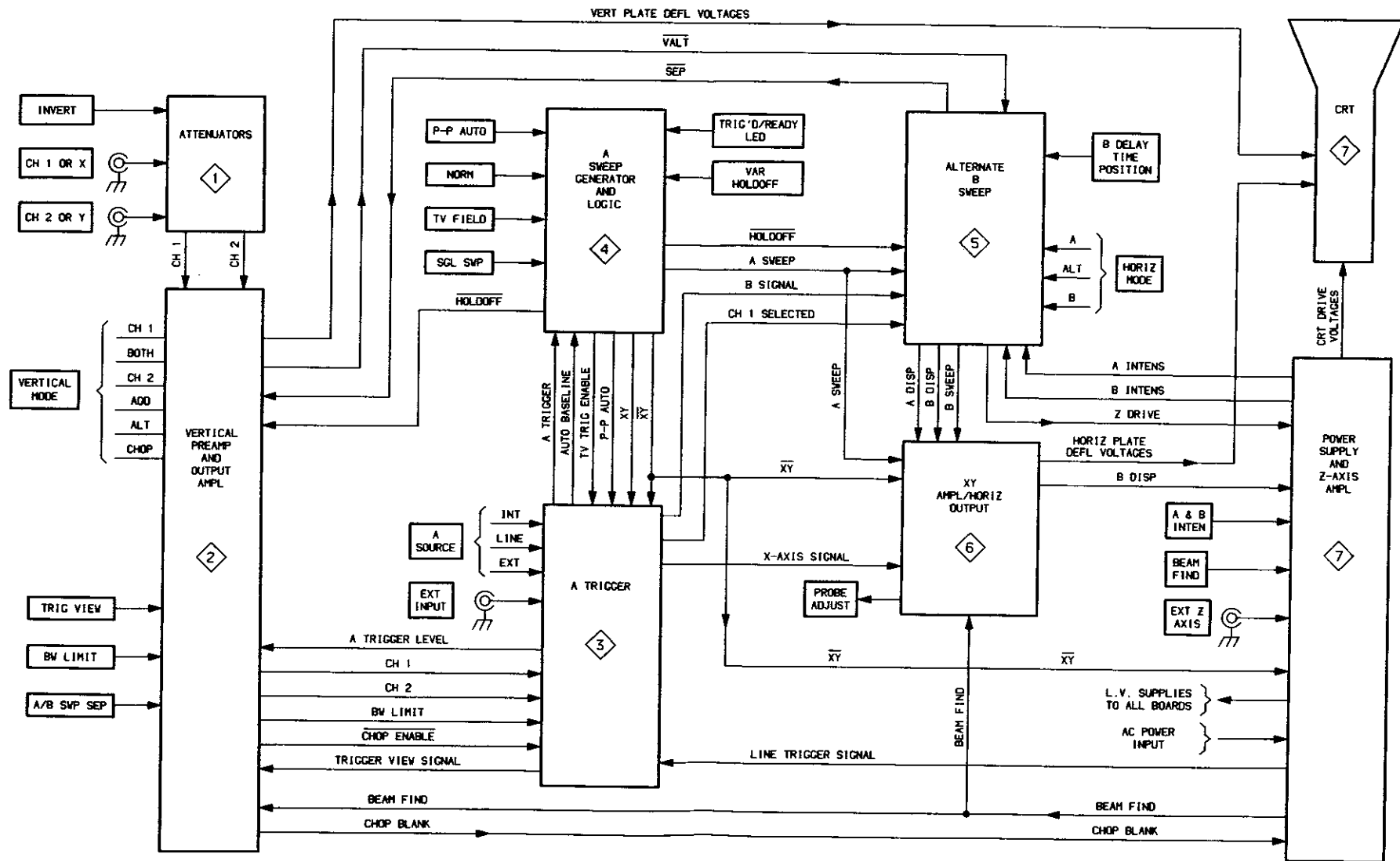
(3826-17)4206-32

Figure 9-2. Semiconductor lead configurations.



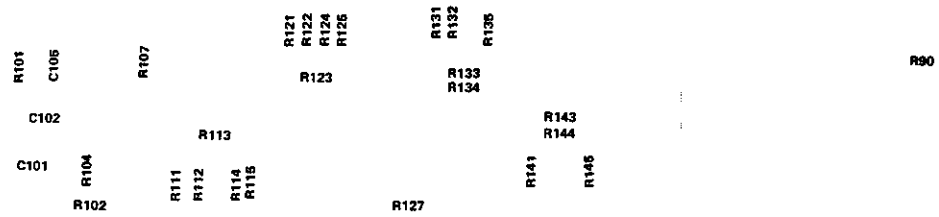
1 Relocated on back of board
at SN B1-4000-up

Fig. 8-14. A13 Pentax Power supply board.



BASIC BLOCK DIAGRAM FIG. 9-4

Figure 9-4. Basic block diagram.



Note:
R127 not used on A6 board.

1193-20
Located on back of board:
S125
C104

Fig. 8-1. A5 & A6 50 Ohm Attenuator board.

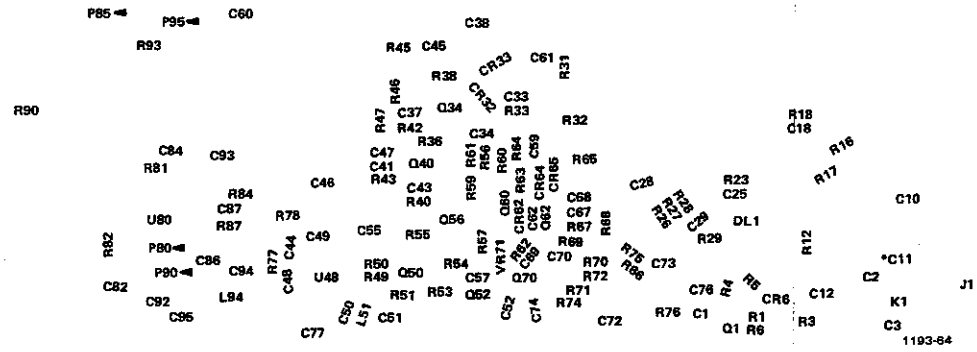


Fig. 8-2A. A3 Hi Z Attenuator board (485 & 485-1 only) SN B155790-up.

*See Parts List for serial number ranges.

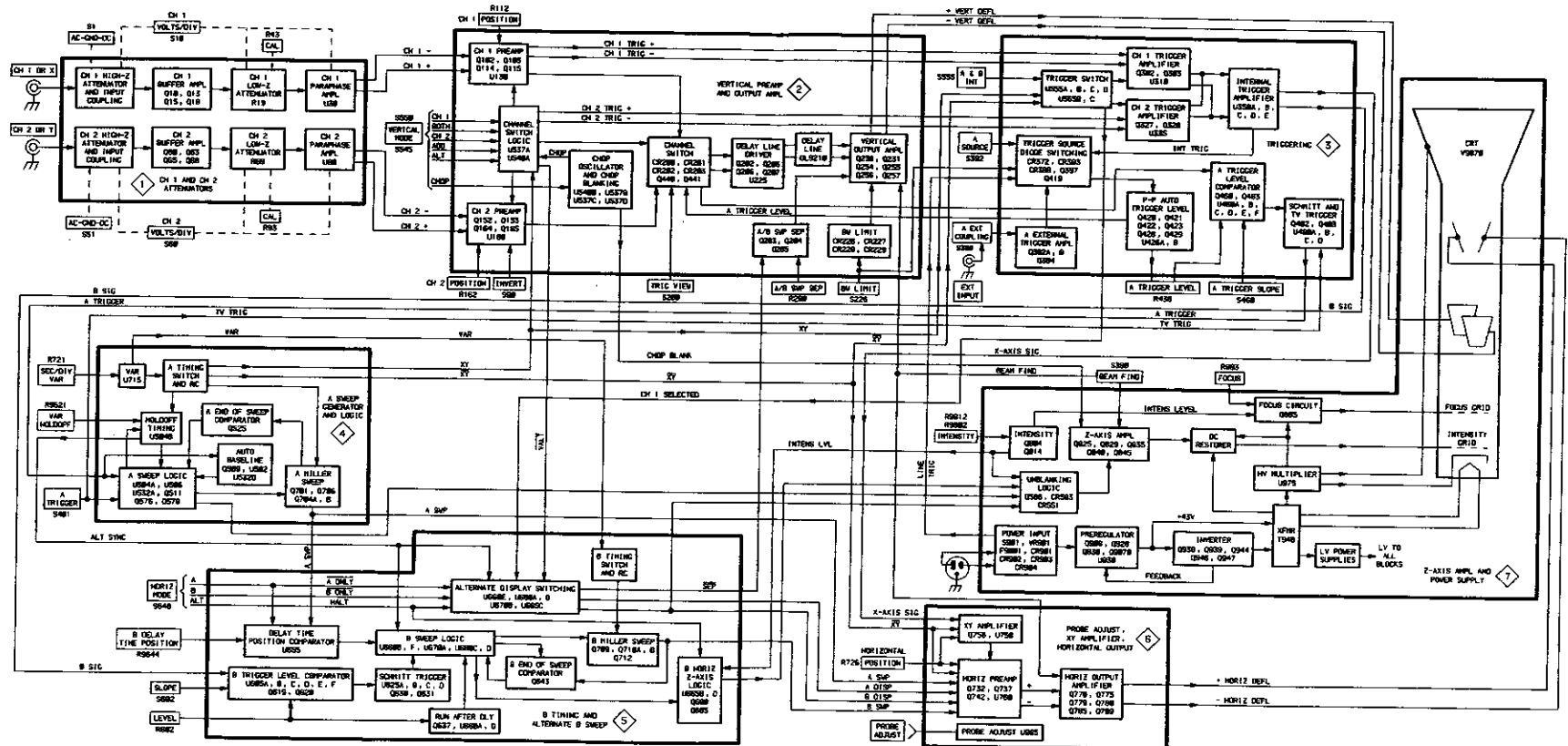


Figure 9-5. Detailed block diagram.

BLOCK DIAGRAM FIG. 9-5

TEST WAVEFORM AND VOLTAGE SETUPS

WAVEFORM MEASUREMENTS

On the left-hand pages preceding the schematic diagrams are test waveform illustrations that are intended to aid in troubleshooting the instrument. To test the instrument for these waveforms, make the initial control settings as follows:

Vertical (Both Channels)

POSITION	Midrange
VERTICAL MODE	CH 1
BW LIMIT	Off (button out)
VOLTS/DIV	10 mV
VOLTS/DIV Variable	CAL detent
INVERT	Off (button out)
AC-GND-DC	GND

Horizontal

POSITION	Midrange
HORIZONTAL MODE	A
A and B SEC/DIV	0.5 ms
SEC/DIV Variable	CAL detent
X10 Magnifier	Off (knob in)
B DELAY TIME POSITION	5.0

TRIGGER

LEVEL	Fully clockwise
SLOPE	OUT

TRIGGER

VAR HOLDOFF	Minimum (fully ccw)
Mode	P-P AUTO
LEVEL	Midrange
A&B INT	VERT MODE
A SOURCE	INT

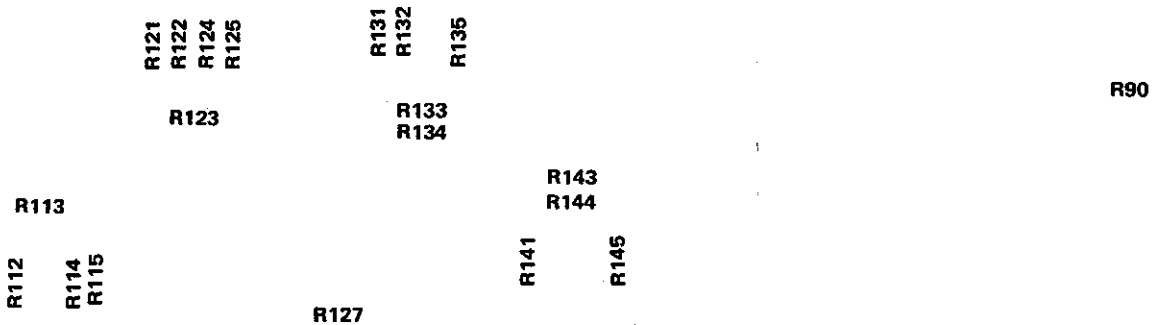
Changes to the control settings for specific waveforms are noted at the beginning of each set of waveforms. Input signals and hookups required are also indicated, if needed, for each set of waveforms.

DC VOLTAGE MEASUREMENTS

Typical voltage measurements, located on the schematic diagram, were obtained with the instrument operating under the conditions specified in the Waveforms Measurements setup. Control-setting changes required for specific voltages are indicated on each waveforms page. Measurements are referenced to chassis ground with the exception of the Preregulator and Inverter voltages on Diagram 7. These voltages are referenced as indicated on the schematic diagram.

RECOMMENDED TEST EQUIPMENT

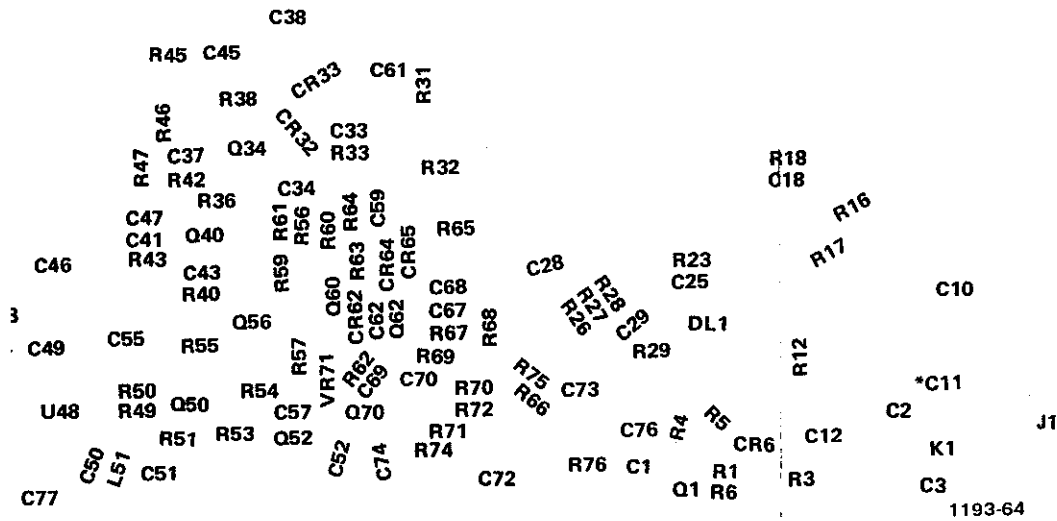
Test equipment in Table 4-1 in the "Performance Check Procedure", section 4 of this manual, meets the required specifications for testing this instrument.



Note:
R127 not used on A6 board.

1193-20
Located on back of board:
S125
C104

Fig. 8-1. A5 & A6 50 Ω Attenuator board.



*See Parts List for
serial number ranges.

3-2A. A3 Hi Z Attenuator board (485 & 485-1 only) SN B155790-up.

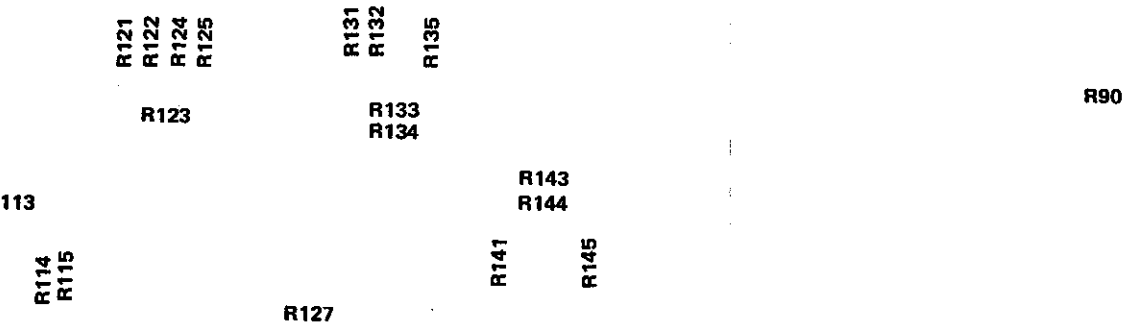
POWER SUPPLY ISOLATION PROCEDURE

Each regulated supply has numerous feed points to various loads throughout the instrument. The power distribution diagram is used in conjunction with the schematic diagrams to determine those loads that can be isolated by removing service jumpers and those that cannot.

The power distribution and circuit board interconnections diagrams are divided into circuit boards. Each power supply to a circuit board is indicated by the schematic diagram number on which the voltage appears. The schematic diagram grid location of a service jumper or component is given adjacent to the component number on the power distribution and circuit board interconnect diagrams.

If a power supply comes up after lifting one of the main jumpers from the power supply to isolate that supply, it is very probable that a short exists in the circuitry on that supply line. By lifting jumpers farther down the line, the circuit in which a short exists may be located.

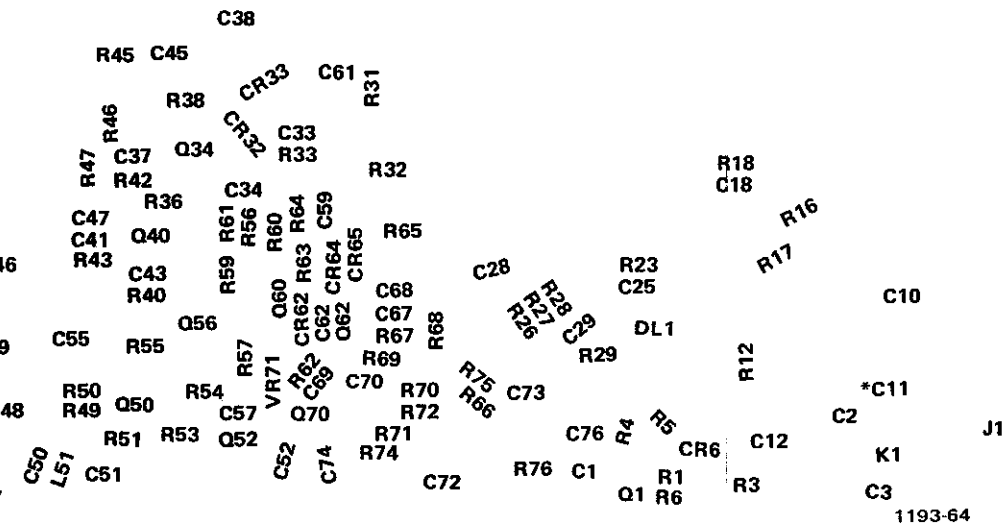
Always set the POWER switch to OFF before soldering or unsoldering service jumpers or other components and before attempting to measure component resistance values.



Note:
R127 not used on A6 board.

1193-20
Located on back of board:
S125
C104

Fig. 8-1. A5 & A6 50 Ω Attenuator board.

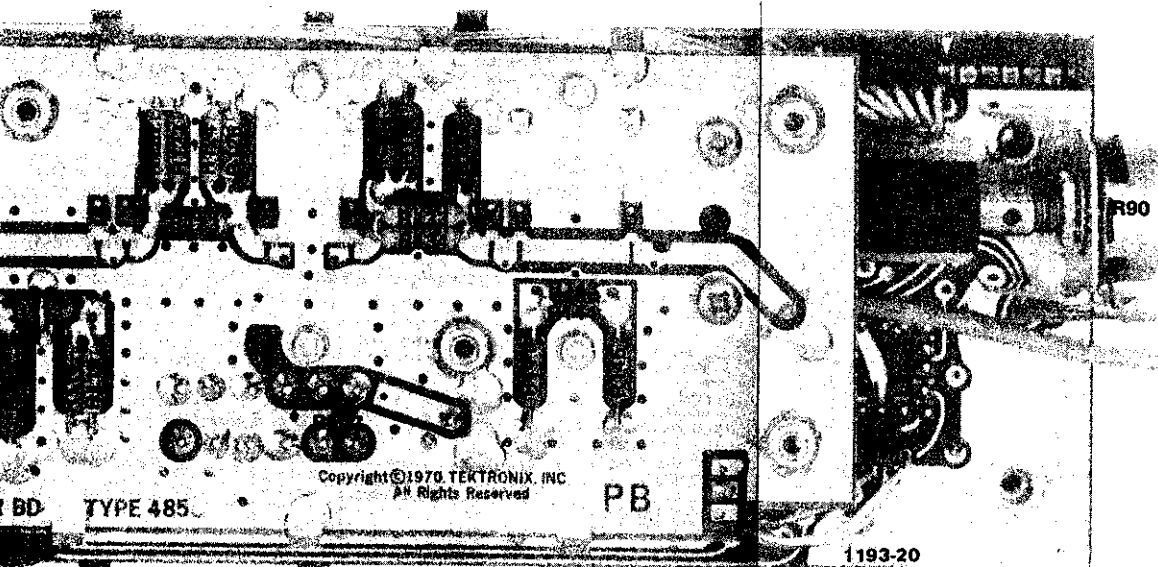


*See Parts List for
serial number ranges.

A3 Hi Z Attenuator board (485 & 485-1 only) SN B155790-up.

CHASSIS MOUNTED PARTS

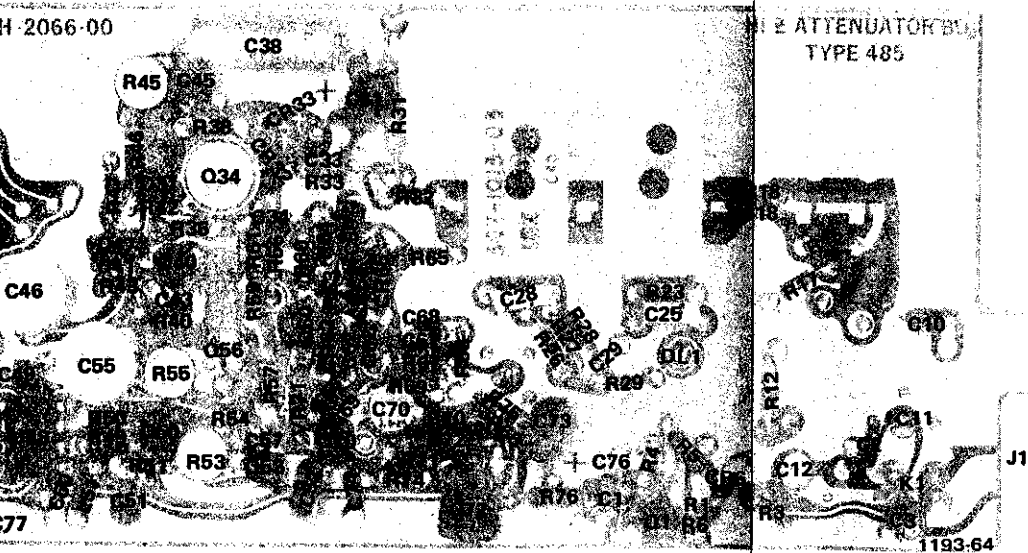
CIRCUIT NUMBER	SCHEM NUMBER	SCHEM LOCATION	CIRCUIT NUMBER	SCHEM NUMBER	SCHEM LOCATION
C9272	2	8S	P9870-14	7	8P
C9273	2	2S	P9870-1	7	8P
			P9870-2	7	8N
DL9210	2	5K	P9870-3	7	7N
			P9870-4	7	7N
DS9150	7	8A	P9870-5	7	6P
			P9870-7	7	5P
F9001	7	5A	P9870-8	7	7P
FL9001	7	5A	Q9070	7	8J
J9100	1	1A	R9100	1	1A
J9378	3	5A	R9272	2	8S
J9510	1	6A	R9273	2	2S
J9800	7	4A	R9376	3	5A
J9900	6	2E	R9510	1	6A
			R9521	4	3A
P9272	7	5P	R9644	5	5D
P9273	7	5P	R9802A	7	2A
P9778	7	4P	R9802B	7	3A
P9788	7	4P			
P9070-1	7	8J	V9870	7	2P
P9070-2	7	8J			
P9070-3	7	8J	W9272	2	8S
P9870-10	7	4P			
P9870-12	7	3N			



Note:
R127 not used on A6 board.

Located on back of board:
S125
C104

Fig. 8-1. A5 & A6 50 Ω Attenuator board.



*See Parts List for
serial number ranges.

A. A3 Hi Z Attenuator board (485 & 485-1 only) SN B155790-up.

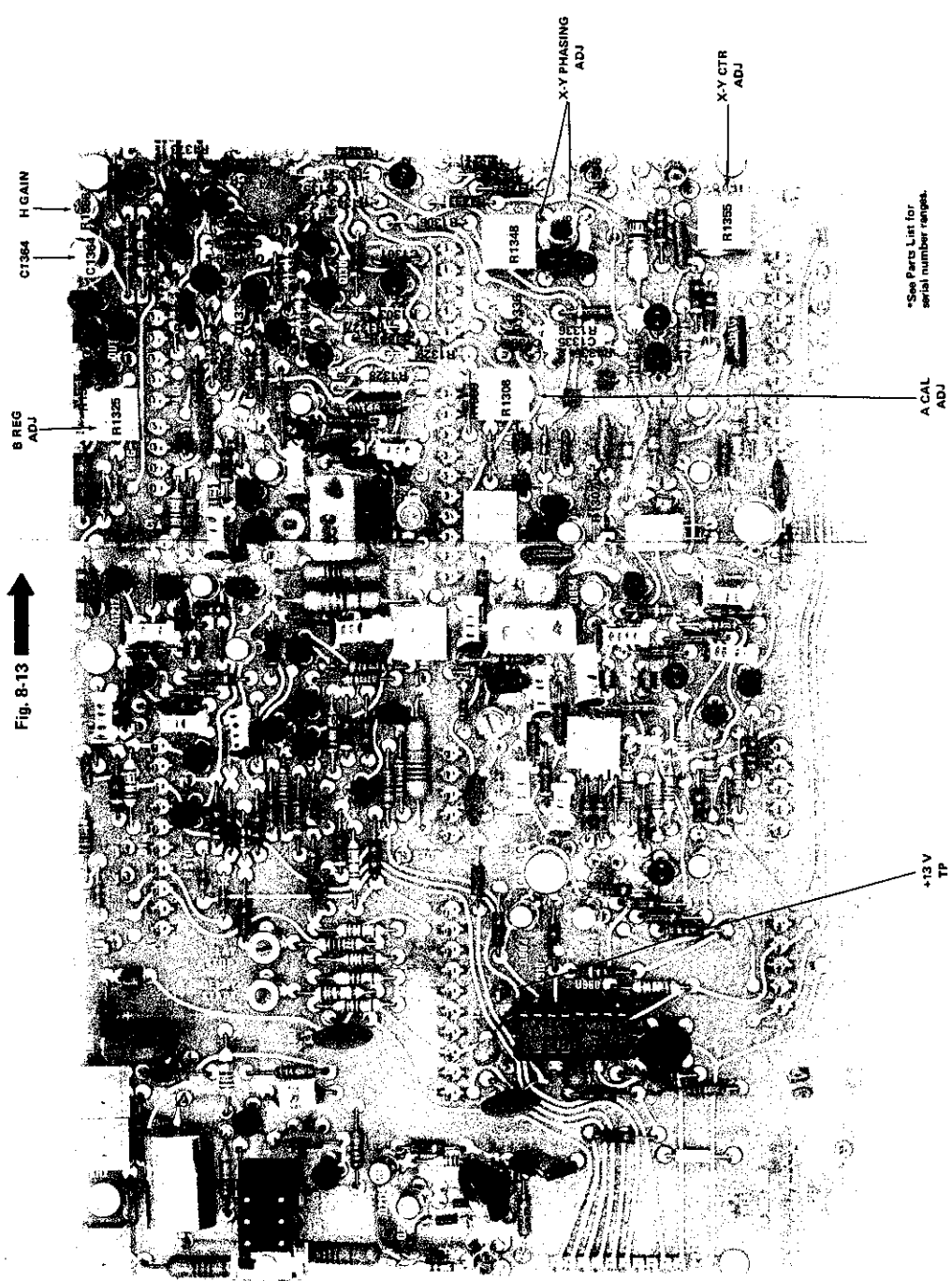
W9001 (A1 TO A3)					
WIRE NO.	LINE NAME	DIAG NO. & GRID COORDINATES	WIRE NO.	LINE NAME	DIAG NO. & GRID COORDINATES
1	BEAM FIND	7,4F	21	HORIZ POS	6,3B
2	CH 1 POS CW	2,2D	22	+AUTO LEVEL CW	3,8M
3	CH 1 POS CCW	2,3D	23	-AUTO LEVEL CCW	3,8M
4	A/B SWP SEP	2,2L	24	P-P	4,8B
5	+8.6 V _G	8,4P	25	SS RESET	4,5B
6	TRIG VIEW	2,7B	26	B ONLY	5,2E
7	CH 2 POS CW	2,8D	27	HALT	5,2E
8	CH 2 POS CCW	2,9D	28	B SLOPE	5,8F
9	CH 2	2,6B	29	TRIG'D LED	4,9K
10	BW LIMIT	2,4K	30	SS	4,9B
11	CHOP ENABLE	3,4C	31	GND	3,6C
12	-8.6 V _H	8,5P	32	CH 1 T	3,2C
13	VALT	5,2E	33	CH 2 T	3,3C
14	CH 1	2,5B	34	V MODE T	3,3C
15	A ONLY	5,1E	35	EXT	3,7C
16	B LEVEL	5,9F	36	LINE	3,6C
17	TV TRIG ENABLE	4,9B	37	INT	3,7C
18	XY	3,2C	38	GND	3,6C
19	A SLOPE	3,8N	39	EXT INPUT	3,5C
20	A TRIGGER LEVEL	3,8M			

P9700 (A4 TO A1)		
PIN NO.	LINE NAME	DIAG NO. & GRID COORDINATES
1	A DISP	6,5E
2	B DISP	6,5E
3	B SWP	5,6E
4	H.O. 2	4,4D
5	H.O. 1	4,4D
6	H.O. COM	4,4D
7	A SWP	4,8N
8	GND	5,7E
9	B RETRACE	5,7E
10	A GATE	4,7N

W9700 (A1 TO A4)		
WIRE NO.	LINE NAME	DIAG NO. & GRID COORDINATES
1	A DISP	6,5D
2	B DISP	6,5D
3	B SWP	5,6F
4	H.O. 2	4,4D
5	H.O. 1	4,4D
6	H.O. COM	4,4D
7	A SWP	4,8M
8	GND	8,2N
9	B RETRACE	5,6F
10	A GATE	4,7M

W9400 (A1 TO A5)					
WIRE NO.	LINE NAME	DIAG NO. & GRID COORDINATES	WIRE NO.	LINE NAME	DIAG NO. & GRID COORDINATES
1	B SIGNAL	5,9F	15	GND	8,6N
2	B SLOPE	5,9F	16	GND	8,6N
3	GND	8,6N	17	B RETRACE	5,6F
4	B LEVEL	5,9F	18	GND	8,6N
5	A DISP	5,1S	19	VALT	5,2F
6	B ONLY	5,2F	20	A SWP	5,5F
7	SEP	5,2S	21	ALT SYNC	5,1F
8	B INTENSITY LEVEL	7,3C	22	B SWP	5,6F
9	Z DRIVE	7,3E	23	GND	8,6N
10	HALT	5,2F	24	GND	8,6N
11	B DISP	5,2S	25	-8.6 V _A	8,6N
12	CH 1 SELECTED	5,2F	26	+5.2 V _A	8,5N
13	A ONLY	5,1F	27	+8.6 V _A	8,5N
14	DT WIPER	5,5F			

Fig. 8-13 



*See Parts List for serial number ranges.

P9705 (A4 TO A1)		
PIN NO.	LINE NAME	DIAG NO. & GRID COORDINATES
1	GND	6,9E
2	+SWP	6,5K
3	-SWP	6,7K
4	GND	6,9E
5	X AXIS SIG	6,4E
6	-8.6 Vc	6,9E
7	+8.6 Vb	6,8E
8	+30 Vb	6,8E

W9705 (A1 TO A4)		
WIRE NO.	LINE NAME	DIAG NO. & GRID COORDINATES
1	GND	8,3N
2	+SWP	6,5L
3	-SWP	6,7L
4	GND	8,3N
5	X AXIS SIG	6,4E
6	-8.6 Vc	8,3N
7	+8.6 Vb	8,3N
8	+30 Vb	8,2N

W9000 (A3 TO A1)					
WIRE NO.	LINE NAME	DIAG NO. & GRID COORDINATES	WIRE NO.	LINE NAME	DIAG NO. & GRID COORDINATES
1	BEAM FIND	7,4F	21	HORIZ POS	6,3B
2	CH 1 POS CW	2,2D	22	+AUTO LEVEL CW	3,8L
3	CH 1 POS CCW	2,3D	23	-AUTO LEVEL CCW	3,9L
4	A/B SWP SEP	2,2L	24	<u>P-P</u>	4,8C
5	+8.6 Vg	8,4N	25	SS RESET	4,5B
6	TRIG VIEW	2,6B	26	<u>B ONLY</u>	5,2E
7	CH 2 POS CW	2,8D	27	HALT	5,2E
8	CH 2 POS CCW	2,9D	28	B SLOPE	5,9E
9	<u>CH 2</u>	2,6B	29	TRIG'D LED	4,9K
10	<u>BW LIMIT</u>	2,4K	30	<u>SS</u>	4,9B
11	<u>CHOP ENABLE</u>	3,4C	31	GND	3,6C
12	-8.6 Vh	8,5N	32	<u>CH 1 T</u>	3,2C
13	<u>VALT</u>	5,2E	33	<u>CH 2 T</u>	3,3C
14	<u>CH 1</u>	2,5B	34	<u>V MODE T</u>	3,3C
15	<u>A ONLY</u>	5,1E	35	<u>EXT</u>	3,7C
16	B LEVEL	5,9E	36	<u>LINE</u>	3,6C
17	TV TRIG ENABLE	4,9B	37	<u>INT</u>	3,7C
18	<u>XY</u>	3,2C	38	GND	3,6C
19	A SLOPE	3,8N	39	EXT INPUT	3,5C
20	A TRIGGER LEVEL	3,8M			

W9401 (A5 TO A1)					
WIRE NO.	LINE NAME	DIAG NO. & GRID COORDINATES	WIRE NO.	LINE NAME	DIAG NO. & GRID COORDINATES
1	B SIGNAL	5,9G	15	GND	5,4G
2	B SLOPE	5,9G	16	GND	5,4G
3	GND	5,4G	17	B RETRACE	5,6G
4	B LEVEL	5,9G	18	GND	5,4G
5	A DISP	5,1S	19	<u>VALT</u>	5,2G
6	<u>B ONLY</u>	5,2G	20	A SWP	5,5G
7	<u>SEP</u>	5,2S	21	ALT SYNC	5,1G
8	B INTENSITY LEVEL	5,4P	22	B SWP	5,6G
9	Z DRIVE	5,5S	23	GND	5,4G
10	HALT	5,2G	24	GND	5,4G
11	B DISP	5,2S	25	-8.6 VA	5,4G
12	CH 1 SELECTED	5,2G	26	+5.2 VA	5,3G
13	<u>A ONLY</u>	5,1G	27	+8.6 VA	5,3G
14	DT WIPER	5,5G			

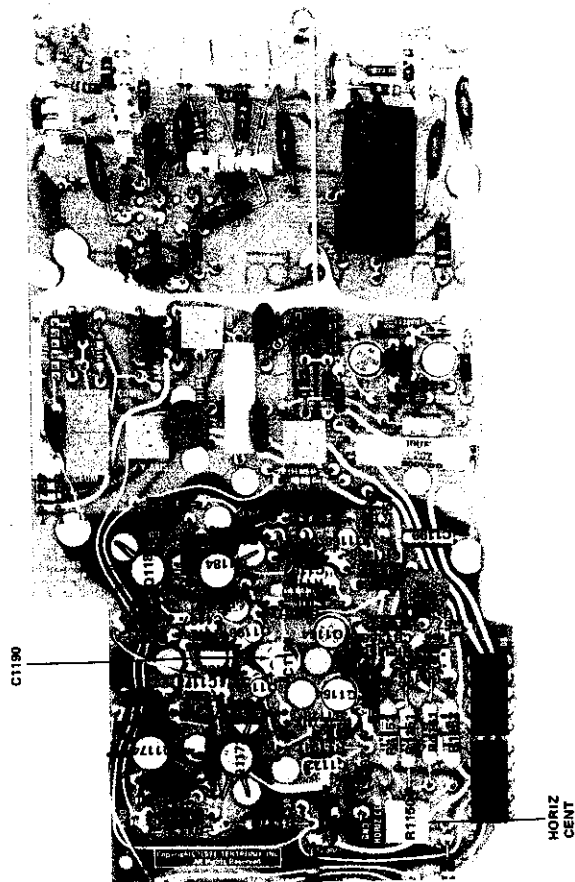
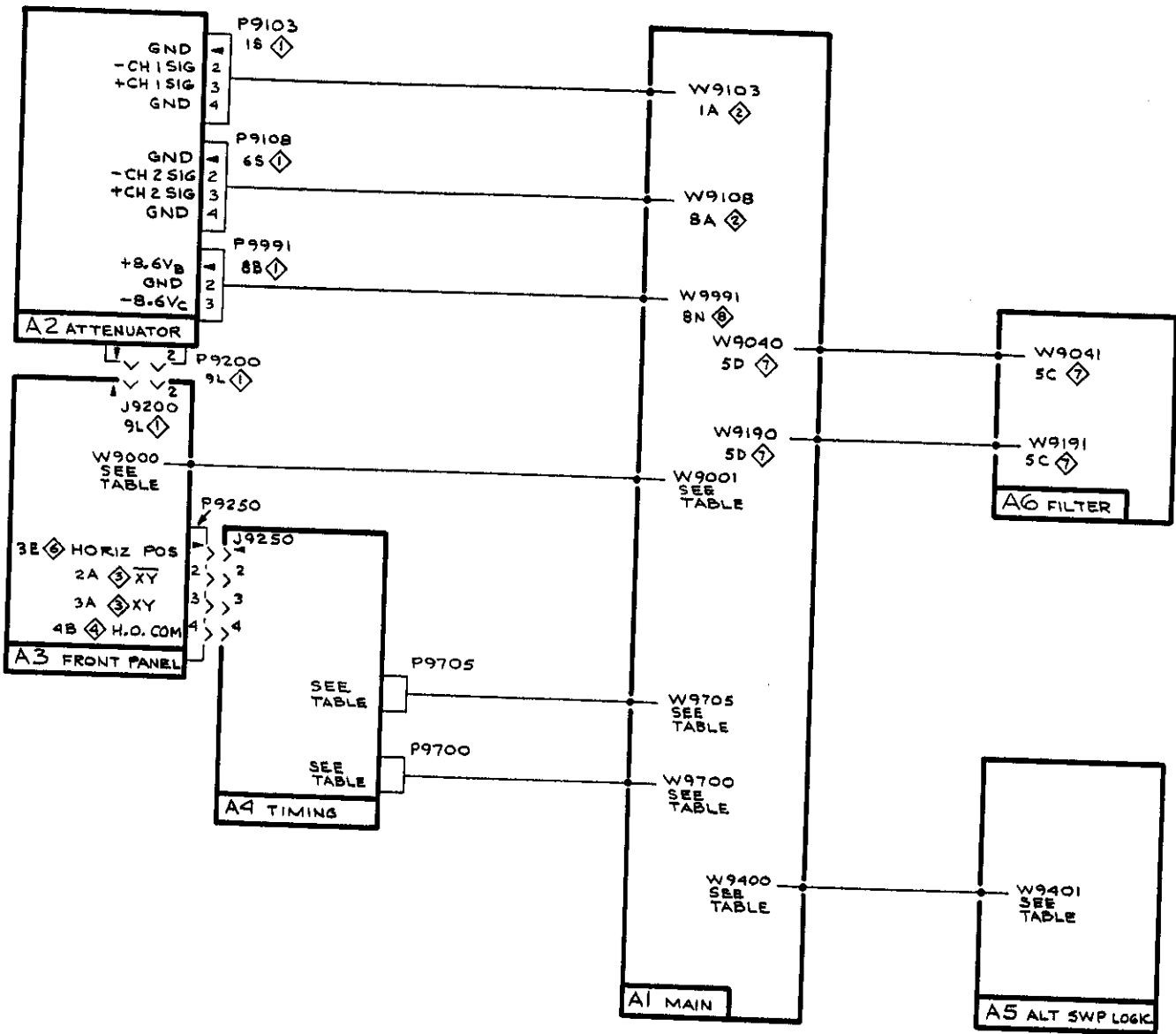


Fig. 8-13. A11 Partial Horizontal amplifier board.

REV. 8, SEPT 1974

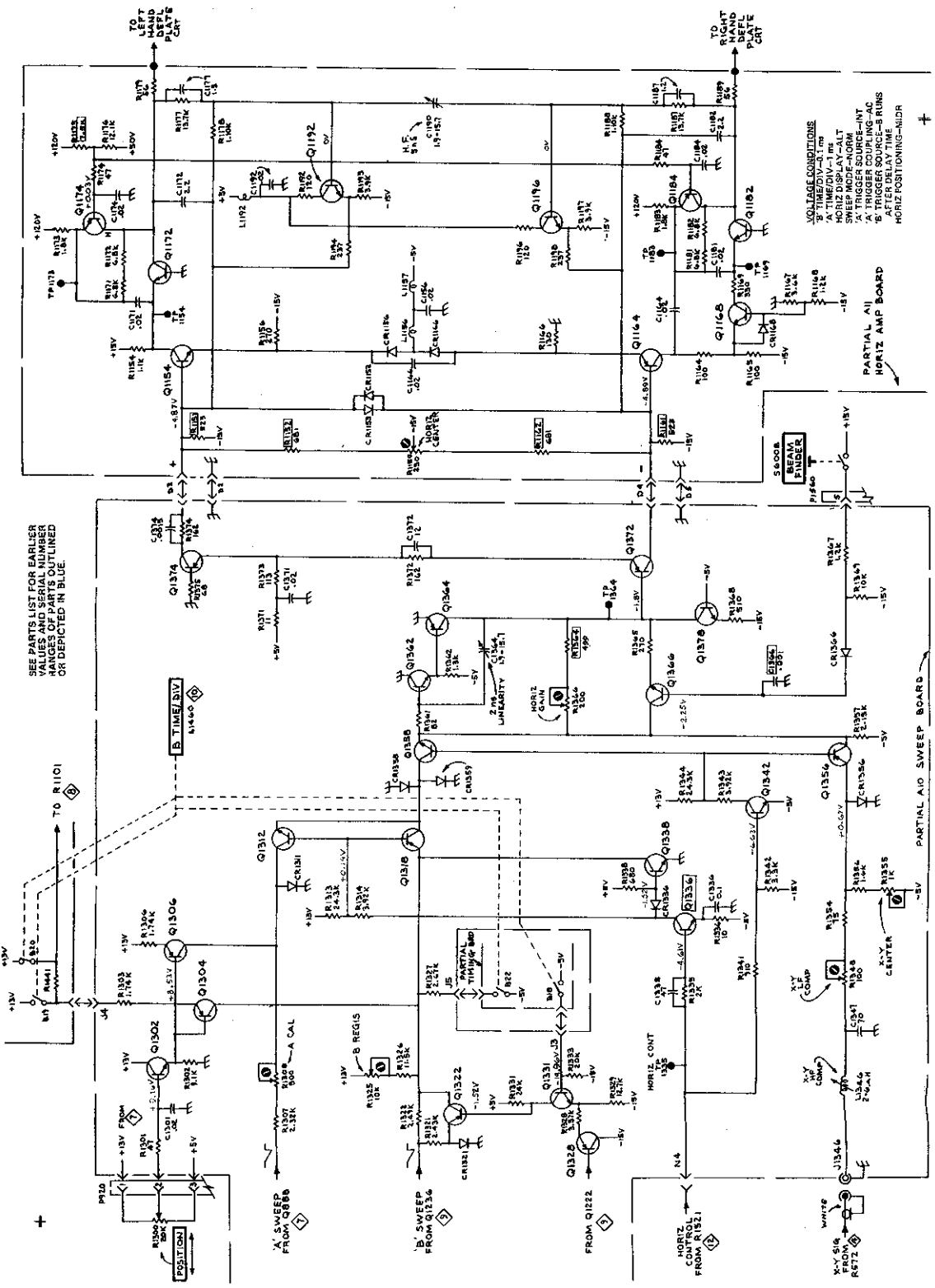


2235

4206-22

CIRCUIT BOARD INTERCONNECTIONS

CIRCUIT BOARD INTERCONNECTIONS



SEE PARTS LIST FOR EARLIER VALUES AND SERIAL NUMBER OR DEPICTED IN BLUE

VOLTAGE CONDITIONS
 2 TIME/DIV-3.1 cm
 HORIZ DISPLAY-NORM
 SWEEP MODE-NORM
 A TRIGGER SOURCE-NORM
 B TRIGGER SOURCE-NORM
 AFTER DELAY TIME
 HORIZ POSITIONING-NORM

HORIZONTAL AMPLIFIER

1193-145
 REV. D, AUG 1976

4.85 OSCILLOSCOPE

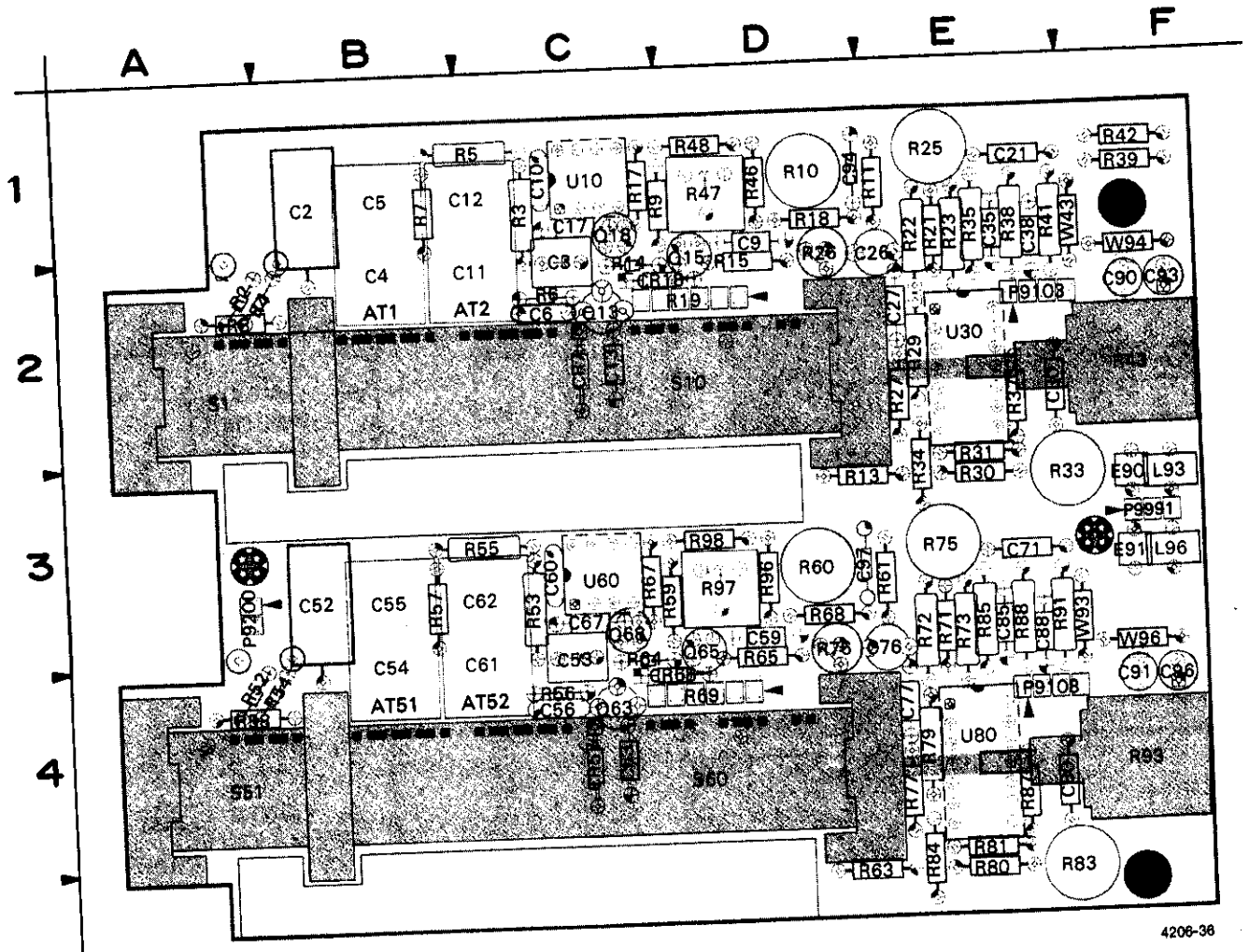


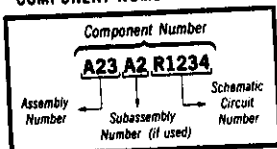
Figure 9-6. A2—Attenuator board.

4206-36

FIG. 9-6

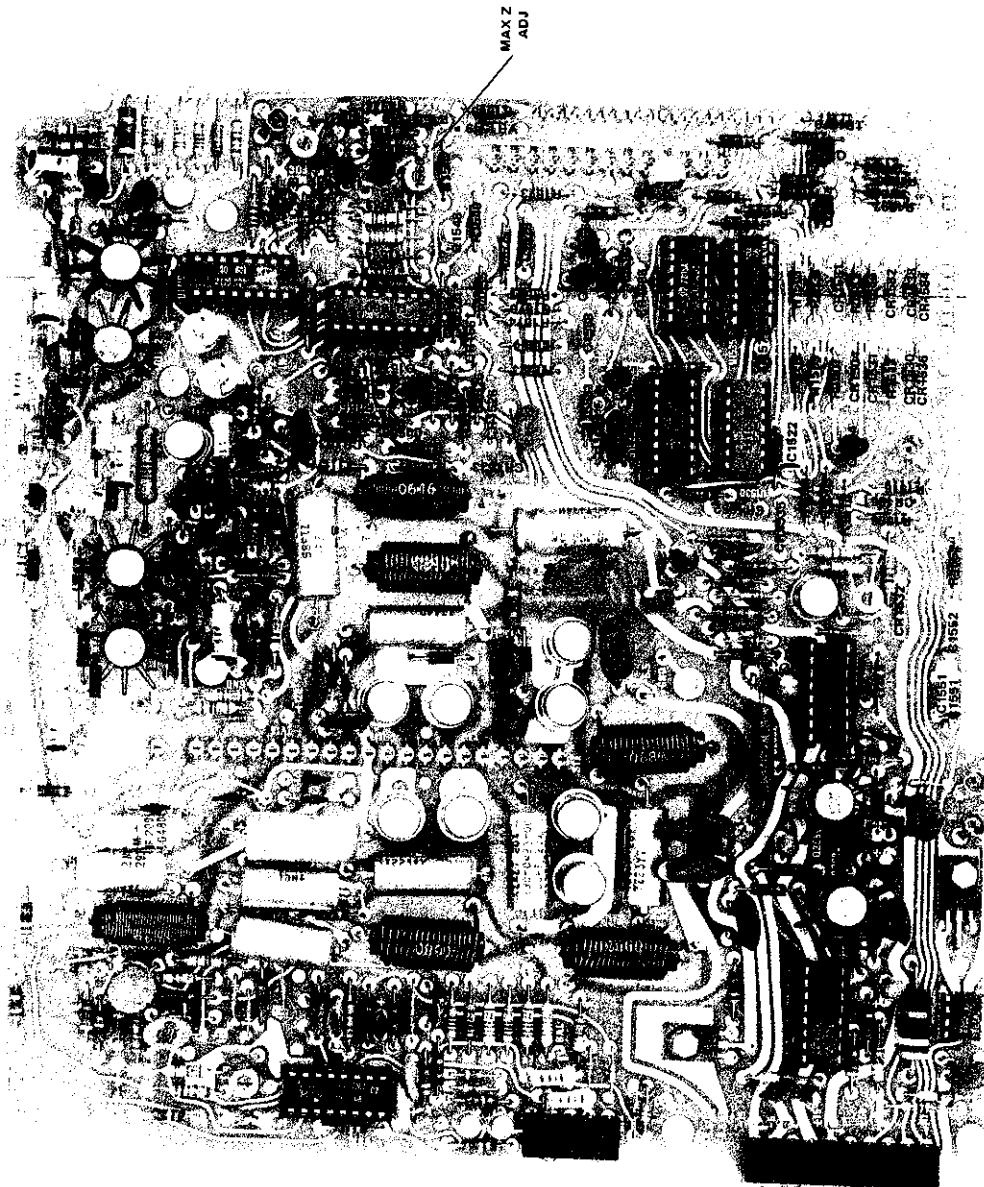
 Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.

A2-ATTENUATOR BOARD

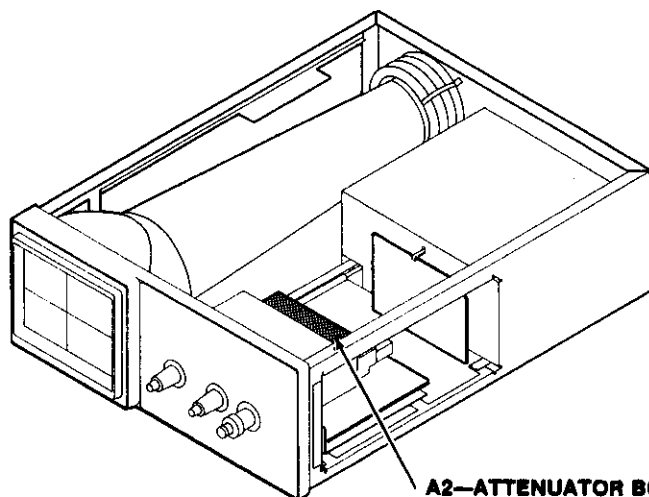


†Relocated on back of board at SN B74000-up

Fig. 8-14. A13 Partial Power supply board.

A2—ATTENUATOR BOARD

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
AT1	1	C90	1	R8	1	R60	1
AT2	1	C91	1	R9	1	R61	1
AT51	1	C93	1	R10	1	R63	1
AT52	1	C94	1	R11	1	R64	1
C2	1	C96	1	R13	1	R65	1
C3	1	C97	1	R14	1	R67	1
C4	1	CR7	1	R16	1	R68	1
C5	1	CR18	1	R17	1	R69	1
C6	1	CR57	1	R18	1	R71	1
C9	1	CR68	1	R19	1	R72	1
C10	1	E90	1	R21	1	R73	1
C11	1	E91	1	R22	1	R75	1
C12	1	L93	1	R23	1	R76	1
C13	1	L96	1	R25	1	R77	1
C17	1	P9103-1	1	R26	1	R79	1
C21	1	P9103-2	1	R27	1	R80	1
C26	1	P9103-3	1	R29	1	R81	1
C27	1	P9103-4	1	R30	1	R83	1
C30	1	P9108-1	1	R31	1	R84	1
C35	1	P9108-2	1	R33	1	R85	1
C38	1	P9108-3	1	R34	1	R87	1
C52	1	P9108-4	1	R35	1	R88	1
C53	1	P9200-1	1	R37	1	R91	1
C54	1	P9200-2	1	R38	1	R93	1
C55	1	P9991-1	1	R39	1	R96	1
C56	1	P9991-2	1	R41	1	R97	1
C59	1	P9991-3	1	R42	1	R98	1
C60	1	Q13	1	R43	1	S1	1
C61	1	Q15	1	R46	1	S10	1
C62	1	Q18	1	R47	1	S51	1
C63	1	Q63	1	R48	1	S60	1
C67	1	Q65	1	R52	1	U10	1
C71	1	Q68	1	R53	1	U30	1
C76	1	R2	1	R54	1	U60	1
C77	1	R3	1	R55	1	U80	1
C80	1	R4	1	R56	1	W43	1
C85	1	R5	1	R57	1	W93	1
C85	1	R6	1	R58	1	W94	1
C88	1	R7	1	R59	1	W96	1



A2—ATTENUATOR BOARD

CH 1 & CH 2 ATTENUATORS

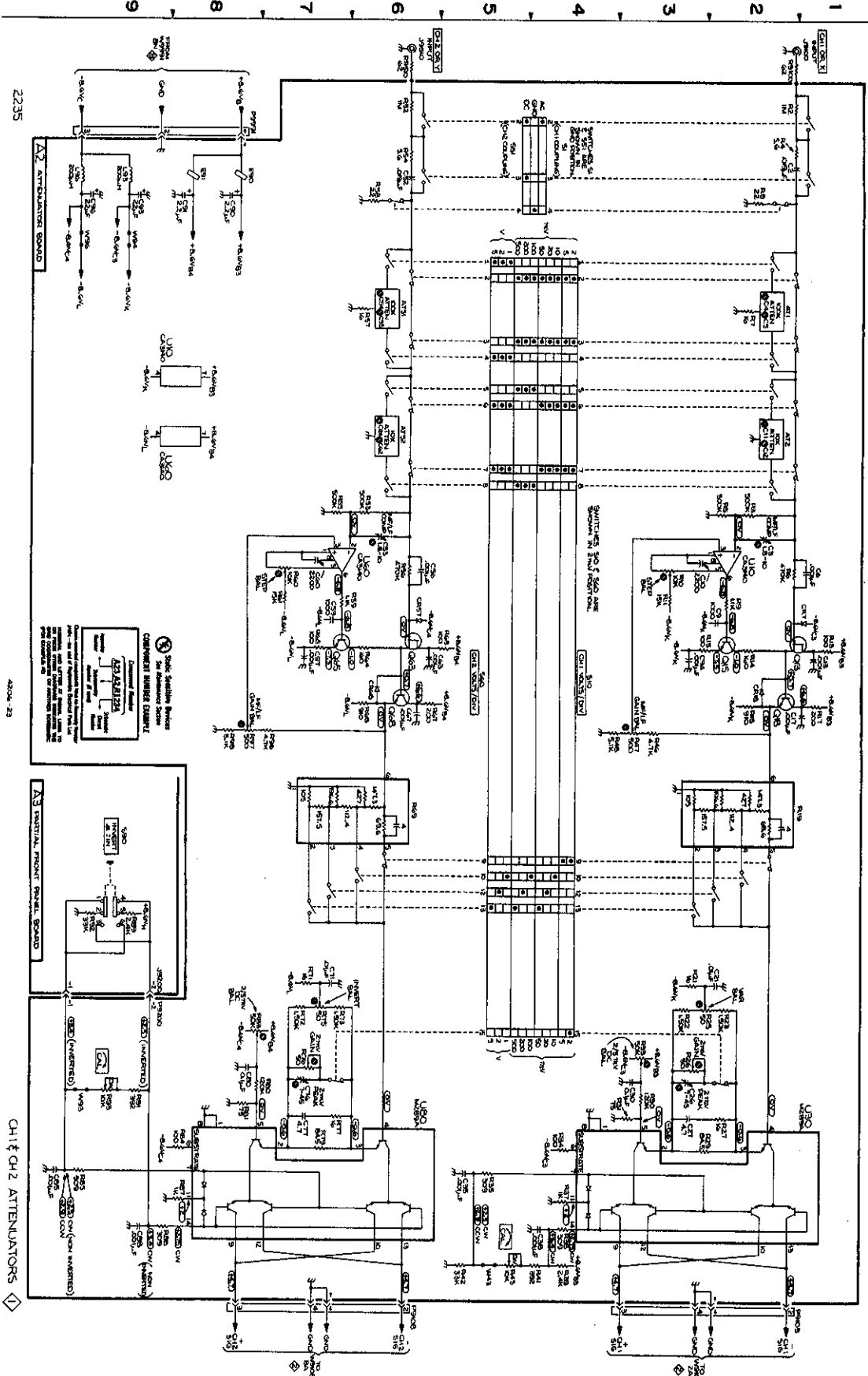


ASSEMBLY A2											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
A700001	2D	2B	C93	9B	2F	R7	2D	1B	R63	5G	4D
AT2	2E	2C	C94	3H	1D	R8	2B	2A	R64	6G	4C
AT61	6D	4B	C96	9B	4F	R9	2G	1C	R66	7G	4D
AT52	6E	4C	C97	7H	3D	R10	3G	1D	R67	6H	3C
						R11	3G	1E	R68	6H	3D
C2	2B	1B	CR7	1G	2C	R13	1G	3D	R69	6J	4D
C3	2F	2C	CR18	2H	2C	R14	2H	2C	R71	7L	3E
C4	2D	2B	CR67	6G	4C	R16	2G	2D	R72	5L	3E
C5	2D	1B	CR68	6H	4C	R17	1H	1C	R73	5L	3E
C8	1G	2C				R18	2H	1D	R75	5L	3E
C9	2G	2D	E90	8B	3F	R19	1J	2D	R76	7M	3D
C10	3G	1C	E91	8B	3F	R21	3L	1E	R77	7N	4E
C11	2E	2C				R22	3M	1E	R79	7N	4E
C12	2E	1C	L93	9B	3F	R23	2M	1E	R80	7N	4E
C13	1H	2C	L96	9B	3F	R25	2M	1E	R81	8N	4E
C17	2H	1C				R26	3M	2D	R83	8M	4E
C21	2L	1E	P9103-1	2S	2F	R27	2N	2E	R84	8N	4E
C26	3M	2E	P9103-2	2S	2F	R29	2N	2E	R86	9N	3E
C27	3N	2E	P9103-3	3S	2F	R30	3M	3E	R87	8N	4E
C30	3M	2E	P9103-4	3S	2F	R31	3N	3E	R88	9P	3E
C35	5N	1E	P9108-1	7S	4E	R33	3M	3E	R91	9M	3E
C38	4P	1E	P9108-2	6S	4E	R34	4N	3E	R93	9M	4F
C52	6B	3B	P9108-3	8S	4E	R36	5N	1E	R96	7H	3D
C53	6F	3C	P9108-4	7S	4E	R37	4P	2E	R97	8H	3D
C54	6D	4B	P9200-1	9L	3A	R38	4P	1E	R98	8H	3D
C55	6D	3B	P9200-2	9L	3A	R39	4P	1F			
C56	6G	4C	P9991-1	8B	3F	R41	4P	1E	S1	4B	2A
C59	7G	3D	P9991-2	9B	3F	R42	5P	1F	S10	4H	2D
C60	7G	3C	P9991-3	9B	3F	R43	5P	2F	S51	5B	4A
C61	6E	4C				R46	3H	1D	S60	5H	4D
C62	6E	3C	Q13	1H	2C	R47	3H	1D			
C63	6H	4C	Q15	2H	2D	R48	3H	1D	U10	2F	1C
C67	6H	3C	Q18	2H	1C	R52	6A	4A	U30	1N	2E
C71	7L	3E	Q63	6H	4C	R53	6F	3C	U60	6F	3C
C76	7M	3E	Q65	7G	3D	R54	6B	4A	U80	6N	4E
C77	7N	4E	Q68	6H	3C	R55	7F	3C			
C80	8M	4E				R56	6G	4C	W43	5P	1F
C85	9N	3E	R2	2A	2A	R57	6D	3B	W93	9M	3F
C86	9N	3E	R3	2F	1C	R58	6B	4A	W94	9C	2F
C88	9P	3E	R4	2B	2A	R59	7G	3C	W96	9C	4F
C90	8B	2F	R5	2F	1C	R60	7G	3D			
C91	8B	4F	R6	2G	2C	R61	7G	3E			

ASSEMBLY A3											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
J9200-1	9L	3C	R89	9K	2C	S90	9K	2C			
J9200-2	9L	3C	R92	9K	2C						

Partial A3 also shown on diagrams 2, 3, 4, 5, 6, 7 and 8.

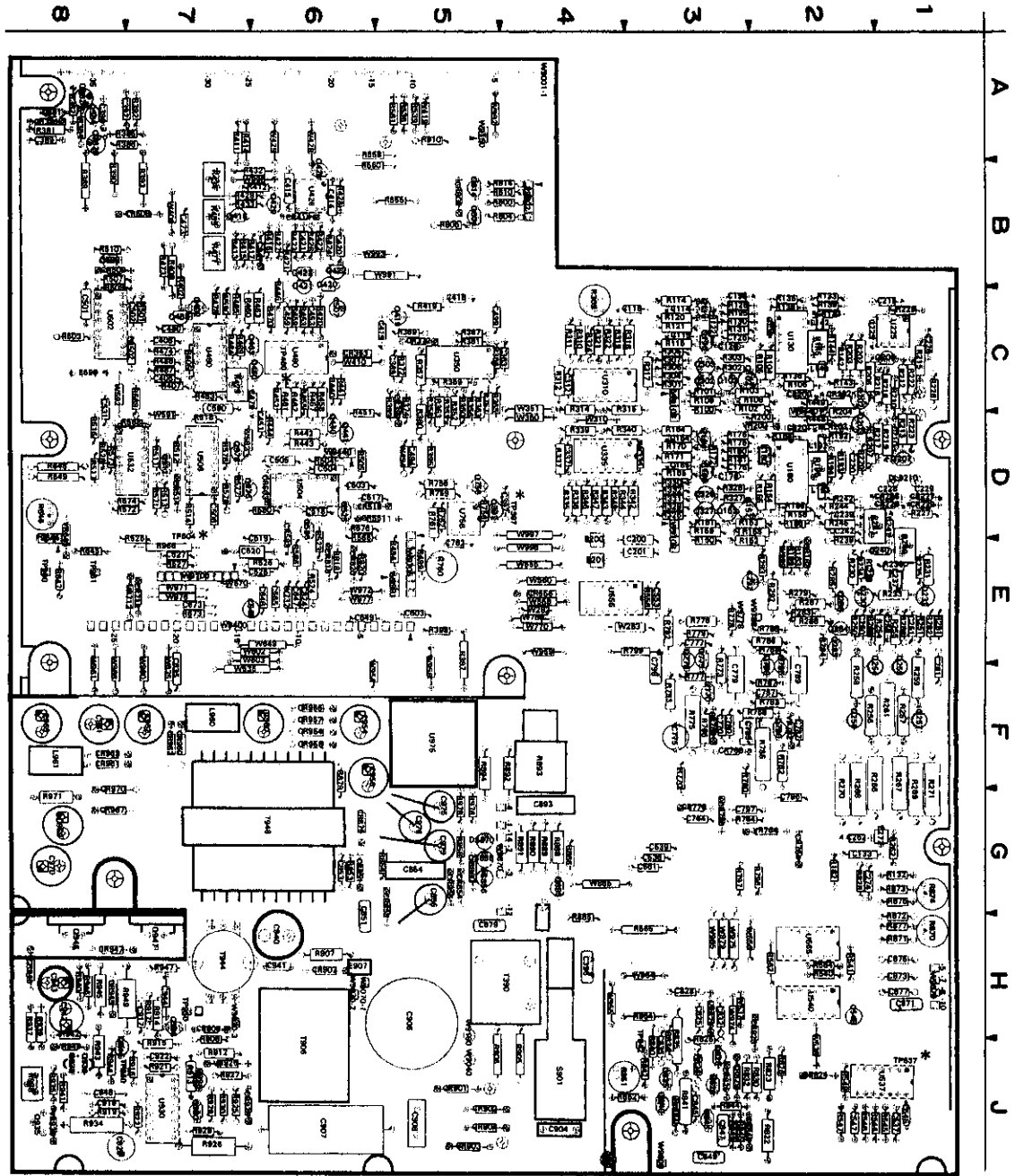
CHASSIS MOUNTED PARTS											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
J9100	1A	CHASSIS	R9100	1A	CHASSIS						
J9510	6A	CHASSIS	R9510	6A	CHASSIS						



2235

4300 - 23

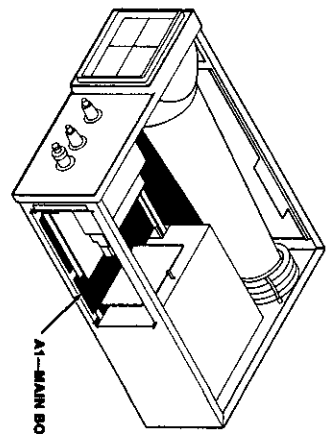
CH1 & CH2 ATTENUATORS



These components are located on the reverse side of the circuit board.

Figure 9-7. A1—Main board.

4200-37



A1—MAIN BOARD

Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE

Component Number	4231 A2 B1234
Model	4231 A2 B1234
Revision	4231 A2 B1234
Quantity	4231 A2 B1234
Number of Pins	4231 A2 B1234

These numbers are used to identify the components in the maintenance section of the Maintenance Manual, Part 101.

A1—MAIN BOARD

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C114	2	C561	3	CR414	3	Q203	2	R131	2	R266	2
C115	2	C565	3	CR415	3	Q206	2	R132	2	R267	2
C116	2	C590	8	CR503	4	Q207	2	R133	2	R268	2
C125	2	C603	6	CR508	4	Q230	2	R136	2	R269	2
C126	2	C635	5	CR509	4	Q231	2	R136	2	R270	2
C130	2	C646	5	CR514	4	Q254	2	R138	2	R271	2
C133	2	C647	5	CR518	4	Q255	2	R139	2	R279	2
C184	2	C648	5	CR551	7	Q256	2	R142	2	R281	2
C165	2	C649	5	CR556	3	Q257	2	R143	2	R282	2
C175	2	C673	5	CR583	7	Q283	2	R144	2	R283	2
C176	2	C762	6	CR712	5	Q284	2	R145	2	R284	2
C180	2	C764	6	CR784	6	Q285	2	R150	2	R285	2
C198	2	C770	6	CR765	6	Q302	3	R151	2	R286	2
C200	8	C775	6	CR768	6	Q303	3	R152	2	R287	2
C201	8	C777	6	CR770	6	Q327	3	R153	2	R288	2
C210	2	C779	6	CR780	6	Q328	3	R154	2	R289	2
C215	2	C780	6	CR806	7	Q382	3	R155	2	R292	2
C220	8	C782	6	CR818	7	Q382	3	R156	2	R293	2
C225	2	C785	6	CR820	7	Q384	3	R158	2	R301	3
C226	2	C787	6	CR823	7	Q397	3	R159	2	R302	3
C228	2	C789	6	CR824	7	Q402	3	R164	2	R303	3
C229	2	C796	8	CR825	7	Q403	3	R165	2	R304	3
C237	2	C797	8	CR829	7	Q413	3	R170	2	R305	3
C239	2	C799	8	CR840	7	Q419	3	R171	2	R306	3
C240	2	C824	7	CR845	7	Q420	3	R172	2	R307	3
C241	2	C825	7	CR851	7	Q421	3	R175	2	R309	3
C242	2	C828	7	CR853	7	Q422	3	R176	2	R310	3
C250	2	C832	7	CR854	7	Q423	3	R180	2	R311	3
C251	2	C835	7	CR855	7	Q428	3	R181	2	R312	3
C255	2	C845	7	CR879	7	Q429	3	R182	2	R314	3
C262	2	C847	7	CR901	7	Q440	2	R183	2	R315	3
C274	8	C849	7	CR902	7	Q441	2	R185	2	R317	3
C281	2	C851	7	CR903	7	Q460	3	R186	2	R318	3
C292	2	C853	7	CR904	7	Q463	3	R188	2	R319	3
C312	3	C854	7	CR907	7	Q509	4	R189	2	R321	3
C337	3	C855	7	CR908	7	Q511	4	R192	2	R322	3
C363	3	C871	7	CR920	7	Q525	4	R193	2	R324	3
C369	3	C873	7	CR945	7	Q576	4	R194	2	R326	3
C381	3	C875	7	CR946	7	Q578	4	R195	2	R327	3
C389	3	C877	7	CR947	7	Q586	7	R200	2	R328	3
C390	3	C879	7	CR954	7	Q756	6	R202	2	R329	3
C392	3	C893	7	CR955	7	Q770	6	R203	2	R330	3
C396	7	C904	7	CR956	7	Q775	6	R204	2	R331	3
C397	3	C906	7	CR957	7	Q779	6	R206	2	R332	3
C405	3	C907	7	CR960	7	Q780	6	R207	2	R335	3
C408	3	C908	7	CR961	7	Q785	6	R210	2	R336	3
C414	3	C917	7	CR962	7	Q789	6	R212	2	R337	3
C415	3	C919	7	CR963	7	Q804	7	R213	2	R339	3
C418	3	C922	7	CR967	7	Q814	7	R215	2	R340	3
C419	3	C925	7	CR970	7	Q825	7	R216	2	R342	3
C420	3	C940	7	DS856	7	Q829	7	R217	2	R343	3
C421	3	C941	7	DS858	7	Q835	7	R218	2	R344	3
C451	8	C942	7	DS870	7	Q840	7	R219	2	R346	3
C453	3	C943	7	E200	8	Q845	7	R220	8	R347	3
C459	3	C944	7	E201	8	Q885	7	R222	2	R349	3
C473	3	C945	7	E272	8	Q908	7	R223	2	R350	3
C479	3	C954	7	E590	8	Q928	7	R225	2	R351	3
C480	3	C956	7	E907	7	Q930	7	R226	2	R352	3
C494	8	C960	7	L142	2	Q935	7	R227	2	R353	3
C499	8	C961	7	L143	2	Q938	7	R230	2	R356	3
C501	4	C962	7	L192	2	Q939	7	R231	2	R357	3
C502	4	C963	7	L193	2	Q944	7	R233	2	R358	3
C503	4	C968	7	L960	7	Q946	7	R234	2	R359	3
C504	4	C970	7	L961	7	Q947	7	R235	2	R360	3
C505	4	C975	7	P9644-1	5	R100	2	R236	2	R361	3
C506	4	C976	7	P9644-2	5	R101	2	R239	2	R363	3
C507	8	C979	7	P9644-3	5	R102	2	R240	2	R365	3
C517	4	CR133	2	P9802-1	7	R103	2	R241	2	R366	3
C518	4	CR183	2	P9802-2	7	R104	2	R242	2	R367	3
C519	4	CR200	2	P9802-3	7	R105	2	R244	2	R369	3
C520	4	CR201	2	P9802-4	7	R106	2	R245	2	R372	3
C525	4	CR202	2	P9802-5	7	R108	2	R250	2	R374	3
C527	4	CR203	2	Q102	2	R109	2	R251	2	R381	3
C531	4	CR226	2	Q103	2	R114	2	R254	2	R382	3
C537	2	CR227	2	Q114	2	R115	2	R255	2	R384	3
C538	2	CR228	2	Q115	2	R120	2	R256	2	R385	3
C539	2	CR229	2	Q152	2	R121	2	R257	2	R386	3
C540	2	CR372	3	Q153	2	R122	2	R258	2	R389	3
C545	2	CR381	3	Q164	2	R125	2	R259	2	R390	3
C547	2	CR393	3	Q165	2	R126	2	R261	2	R392	3
C553	3	CR399	3	Q202	2	R130	2	R262	2	R393	3



A1—MAIN BOARD (cont)

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
R395	3	R527	4	R832	7	TP537	2	W570	6	W9070-2	7
R397	7	R528	4	R834	7	TP842	7	W582	4	W9070-3	7
R398	7	R538	2	R835	7	TP900	7	W590	8	W9103-1	2
R399	3	R539	2	R836	7	TP940	7	W591	8	W9103-2	2
R402	3	R540	2	R840	7	TP950	7	W592	8	W9103-3	2
R405	3	R541	2	R841	7	TP961	8	W602	5	W9103-4	2
R407	3	R544	2	R842	7	U130	2	W603	5	W9108-1	2
R408	3	R545	2	R844	7	U180	2	W635	5	W9108-2	2
R411	3	R547	2	R845	7	U225	2	W649	5	W9108-3	2
R412	3	R548	2	R849	7	U310	3	W732	6	W9108-4	2
R413	3	R549	2	R851	7	U335	3	W770	6	W9150-1	7
R414	3	R555	3	R852	7	U350	3	W780	6	W9150-2	7
R415	3	R556	3	R853	7	U350	3	W885	8	W9400-10	5
R416	3	R558	3	R854	7	U350	3	W954	8	W9400-11	5
R417	3	R560	3	R858	7	U350	3	W955	8	W9400-12	5
R419	3	R561	3	R880	7	U350	3	W956	8	W9400-13	5
R420	3	R562	3	R870	7	U428	3	W959	8	W9400-14	5
R421	3	R564	3	R871	7	U428	3	W980	8	W9400-15	8
R422	3	R565	3	R872	7	U480	3	W981	8	W9400-16	8
R423	3	R566	6	R873	7	U460	3	W984	8	W9400-17	5
R424	3	R568	4	R874	7	U460	3	W965	8	W9400-18	8
R426	3	R569	4	R875	7	U480	3	W988	8	W9400-19	5
R427	3	R571	4	R877	7	U460	3	W971	8	W9400-1	5
R428	3	R572	4	R879	7	U460	3	W972	8	W9400-20	5
R429	3	R573	4	R885	7	U480	3	W974	8	W9400-21	5
R432	3	R574	4	R886	7	U480	3	W975	8	W9400-22	5
R433	3	R576	4	R888	7	U480	3	W976	8	W9400-23	8
R434	3	R577	4	R889	7	U480	3	W977	8	W9400-24	8
R435	3	R578	4	R890	7	U502	4	W979	8	W9400-25	8
R440	2	R580	4	R891	7	U504	4	W991	8	W9400-26	8
R441	2	R586	7	R892	7	U504	4	W992	8	W9400-27	8
R442	2	R645	5	R893	7	U506	4	W993	8	W9400-2	5
R443	2	R646	5	R894	7	U506	4	W995	8	W9400-3	8
R444	2	R647	5	R905	7	U532	4	W997	8	W9400-4	5
R446	3	R648	5	R906	7	U532	4	W998	8	W9400-5	5
R448	2	R649	5	R907	7	U532	4	W999	8	W9400-6	5
R449	2	R673	5	R908	7	U532	4	W9040	7	W9400-7	5
R451	8	R676	6	R910	7	U537	2	W9190	7	W9400-8	7
R452	3	R758	6	R912	7	U537	2	W9778	6	W9400-9	7
R453	3	R757	6	R913	7	U537	2	W9788	6	W9440-1	2
R455	3	R758	6	R914	7	U537	2	W9800	7	W9440-2	2
R457	3	R759	6	R915	7	U540	2	W9001-10	2	W9440-3	2
R458	3	R760	6	R916	7	U540	2	W9001-11	3	W9440-4	2
R459	3	R761	6	R917	7	U555	3	W9001-12	8	W9700-10	4
R460	3	R762	6	R919	7	U555	3	W9001-13	5	W9700-1	6
R461	3	R764	6	R921	7	U555	3	W9001-14	2	W9700-2	6
R462	3	R766	6	R922	7	U555	3	W9001-15	5	W9700-3	5
R463	3	R768	6	R925	7	U565	3	W9001-16	6	W9700-4	4
R464	3	R770	6	R926	7	U565	3	W9001-17	4	W9700-5	4
R465	3	R773	6	R927	7	U565	3	W9001-18	3	W9700-6	4
R489	3	R775	6	R928	7	U758	6	W9001-19	3	W9700-7	4
R470	3	R776	6	R929	7	U930	7	W9001-1	7	W9700-8	8
R471	3	R777	6	R930	7	U975	7	W9001-20	3	W9700-9	5
R473	3	R778	6	R934	7	VR200	2	W9001-21	6	W9705-1	8
R474	3	R779	6	R935	7	VR645	5	W9001-22	3	W9705-2	6
R478	3	R780	6	R937	7	VR712	5	W9001-23	3	W9705-3	6
R479	3	R782	6	R938	7	VR764	6	W9001-24	4	W9705-4	8
R483	3	R783	6	R939	7	VR782	6	W9001-25	4	W9705-5	6
R486	3	R785	6	R940	7	VR828	7	W9001-26	5	W9705-6	8
R487	3	R786	6	R941	7	VR925	7	W9001-27	5	W9705-7	8
R494	8	R787	6	R942	7	VR935	7	W9001-28	6	W9705-8	8
R499	8	R788	6	R943	7	VR943	7	W9001-29	4	W9870-10	7
R501	4	R789	6	R944	7	W282	2	W9001-2	2	W9870-12	7
R502	4	R792	6	R945	7	W283	2	W9001-30	4	W9870-14	7
R503	4	R793	6	R946	7	W310	3	W9001-31	3	W9870-1	7
R504	4	R796	8	R947	7	W335	3	W9001-32	3	W9870-2	7
R505	4	R797	8	R949	7	W350	3	W9001-33	3	W9870-3	7
R507	4	R799	8	R964	8	W351	3	W9001-34	3	W9870-4	7
R509	4	R800	7	R966	8	W408	8	W9001-35	3	W9870-5	7
R510	4	R804	7	R971	7	W410	3	W9001-36	3	W9870-7	7
R511	4	R805	7	R976	7	W419	3	W9001-37	3	W9870-8	7
R512	4	R810	7	R978	7	W428	3	W9001-38	3	W9991-1	8
R513	4	R814	7	RT236	2	W429	3	W9001-39	3	W9991-2	8
R514	4	R818	7	S901	7	W494	8	W9001-3	2	W9991-3	8
R516	4	R820	7	T390	7	W535	2	W9001-4	2		
R517	4	R822	7	T906	7	W537	2	W9001-5	8		
R518	4	R823	7	T944	7	W538	2	W9001-6	2		
R523	4	R825	7	T948	7	W555	3	W9001-7	2		
R524	4	R826	7	TP397	3	W556	8	W9001-8	2		
R525	4	R828	7	TP460	3	W558	3	W9001-9	2		
R526	4	R830	7	TP504	4	W560	3	W9070-1	7		

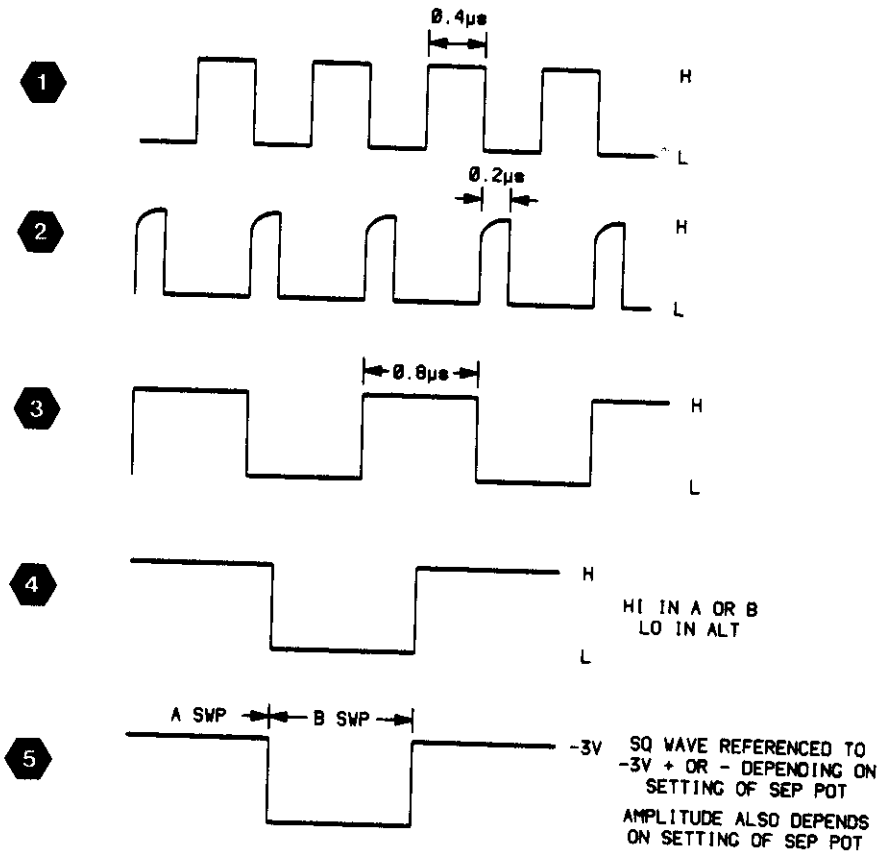
2235 CONTROL SETTINGS

DC Voltages

AC-GND-DC (both) GND
 VOLTS/DIV (both) 0.1V

AC Waveforms

VERTICAL MODE BOTH, CHOP
 A TRIGGER Mode P-P AUTO



VERTICAL PREAMP & OUTPUT AMPLIFIER



ASSEMBLY A1											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C114	2D	3C	Q206	4J	1C	R186	7F	2D	R289	2N	2E
C115	3D	3C	Q207	6J	1D	R188	5F	2D	R292	1N	2E
C116	2E	3C	Q230	7N	2E	R189	6F	2E	R293	1N	2E
C125	3E	3C	Q231	3N	1E	R192	8H	2D	R440	7H	6C
C126	3F	3C	Q254	7P	1F	R193	9H	2D	R441	7G	6C
C130	3F	2C	Q255	3P	1F	R194	8H	2D	R442	6G	6D
C133	5F	2G	Q256	8P	2F	R195	9H	2D	R443	6G	6D
C164	8D	3D	Q257	2P	1F	R200	5G	2D	R444	6G	6D
C165	9D	3D	Q283	3M	2E	R202	5H	2C	R448	5H	2D
C175	9E	3D	Q284	2N	2E	R203	5H	2C	R449	5H	2C
C178	9F	3D	Q285	2P	2E	R204	5H	2D	R538	5E	5A
C180	9F	2D	Q440	6G	6D	R208	4H	2C	R539	6C	5A
C198	5F	3C	Q441	6G	6D	R207	6J	2D	R540	5E	2H
C210	5J	1D				R210	5J	1C	R541	5E	2H
C215	5J	1C	R100	2A	3C	R212	5J	1C	R544	5C	1J
C225	8J	2C	R101	3A	3C	R213	5J	1D	R545	5C	1J
C226	4K	1C	R102	2B	2D	R215	5J	1C	R547	4D	2J
C228	4L	1D	R103	3B	2C	R216	4J	1C	R548	4D	2J
C229	3L	1D	R104	2B	2C	R217	6J	1D	R549	4E	2J
C237	4N	1E	R105	3B	2C	R218	4J	1C			
C239	5M	2D	R106	2B	2C	R219	6J	1D	RT236	5N	2E
C240	5M	1E	R108	2B	2C	R222	5K	1C			
C241	6M	1D	R109	3B	3C	R223	5K	1D	TP537	4D	1J
C242	5M	2D	R114	2D	3C	R225	7J	1C			
C250	7N	2E	R115	3D	3C	R226	4L	1C	U130	1F	2C
C251	3N	1E	R120	2E	3C	R227	4M	1D	U180	9F	2D
C255	3N	1E	R121	3E	3C	R230	7M	2E	U225	7J	1C
C262	5P	2G	R122	3E	3C	R231	3M	1E	U537A	5D	1J
C281	2M	1F	R125	2E	3C	R233	5N	1E	U537B	4E	1J
C292	1N	2E	R126	2E	3C	R234	6M	2E	U537C	6D	1J
C537	9M	1J	R130	2F	3C	R235	4M	1E	U537D	5C	1J
C538	5D	3G	R131	3F	3C	R236	5N	1E	U540A	5E	2H
C539	6D	3G	R132	5F	1G	R239	5M	2E	U540B	5C	2H
C540	9M	2H	R133	5F	2C	R240	5M	1E			
C545	5C	1J	R135	4F	2C	R241	5M	1D	VR200	5G	2D
C547	4D	2J	R136	4F	2C	R242	6M	2D			
			R138	5F	2C	R244	5L	2D	W282	3L	4E
CR133	5F	2C	R139	5G	2C	R245	6L	2D	W283	3M	3E
CR183	5F	2E	R142	2H	2C	R250	7N	2E	W535	5D	7F
CR200	5G	2C	R143	4H	2C	R251	3N	1E	W537	5D	3H
CR201	6H	2D	R144	2H	2C	R254	7N	1E	W538	5E	2J
CR202	5H	2C	R145	3H	2C	R255	3N	1E	W9001-10	4K	5A
CR203	6H	2D	R150	8B	3E	R256	8P	2F	W9001-14	5B	5A
CR226	4L	1D	R151	9B	3D	R257	2P	1F	W9001-2	2D	4A
CR227	4L	1D	R152	8B	2E	R258	7P	2F	W9001-3	3D	4A
CR228	4L	1D	R153	9B	2D	R259	3P	1F	W9001-4	2L	4A
CR229	4L	1D	R154	8B	2D	R261	5P	1F	W9001-6	7B	5A
			R155	9B	2D	R262	5P	1G	W9001-7	8D	5A
			R156	9B	2D	R266	7P	1F	W9001-8	9D	5A
L142	1G	2C	R158	9B	2D	R267	3P	1F	W9001-9	6B	5A
L143	3G	2C	R159	9B	3D	R268	6P	2F	W9103-1	2A	3C
L182	8G	2D	R164	8D	3D	R269	4P	1F	W9103-2	3A	3C
L193	9G	2D	R165	9D	3D	R270	6P	2F	W9103-3	2A	3C
			R170	9E	3D	R271	5P	1F	W9103-4	3A	3C
Q102	2B	2C	R171	9D	3D	R279	3M	2E	W9108-1	8A	3D
Q103	3B	3C	R172	9E	3D	R281	2L	1E	W9108-2	9A	3D
Q114	2E	3C	R175	9E	3D	R282	2M	1E	W9108-3	8A	3D
Q115	3E	3C	R176	8F	3D	R283	3M	2E	W9108-4	9A	3D
Q152	8B	2D	R180	8F	3D	R284	2N	2E	W9440-1	5G	6D
Q153	9B	3D	R181	9F	3D	R285	2P	2E	W9440-2	5G	6D
Q164	8E	3D	R182	6F	2G	R286	2N	2E	W9440-3	5G	6D
Q165	9E	3D	R183	6F	2E	R287	2P	2E	W9440-4	5G	6D
Q202	5H	2C	R185	7F	2D	R288	2N	1E			
Q203	6J	2D									

Partial A1 also shown on diagrams 3, 4, 5, 6, 7 and 8.



VERTICAL PREAMP & OUTPUT AMPLIFIER

2 (cont)

ASSEMBLY A3											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
CR534	4A	2B	R162	9D	1C	W534	5B	3B	W9000-7	8D	4B
CR537	4B	2B	R280	2L	1C	W9000-10	4K	4B	W9000-8	9D	4B
CR538	6B	2B				W9000-14	5B	4B	W9000-9	6B	4B
R111	2D	1B	S200	6A	2B	W9000-2	2D	4A			
R112	3D	1B	S226	3K	2C	W9000-3	3D	4A			
R161	9D	1C	S545	4A	2C	W9000-4	2L	4A			
			S550	5A	2B	W9000-6	7B	4B			
<i>Partial A3 also shown on diagrams 1, 3, 4, 5, 6, 7 and 8.</i>											
CHASSIS MOUNTED PARTS											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C9272	8S	CHASSIS	DL9210	5K	CHASSIS	R9273	2S	CHASSIS	W9273	2S	CHASSIS
C9273	2S	CHASSIS	R9272	8S	CHASSIS	W9272	8S	CHASSIS			

VERTICAL PREAMP &
OUTPUT AMPL

2

TRIGGERING



ASSEMBLY A1

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C312	2H	4C	R305	3G	3C	R395	6F	5D	TP397	6E	5D
C337	5H	4D	R306	1G	3C	R399	6E	5C	TP460	7J	6C
C363	1M	4C	R307	3G	3C	R402	5N	7C			
C369	7F	5C	R309	2G	4C	R405	5P	7C	U310	1G	4C
C381	5C	8A	R310	2G	4C	R407	5P	7C	U336	4H	4D
C389	5D	8A	R311	2G	4C	R408	5N	7B	U350A	1L	5C
C390	4E	8A	R312	2H	4C	R411	8H	7A	U350B	3M	5C
C392	7D	7A	R314	3J	4C	R412	9H	6B	U350C	3L	5C
C397	6F	4D	R315	1J	3D	R413	9H	7B	U350D	3K	5C
C405	5P	7C	R317	1F	3C	R414	8H	7A	U350E	1K	5C
C408	5P	7C	R318	1G	3C	R415	9J	7B	U426A	8K	6B
C414	8J	6B	R319	2H	4C	R416	8H	6B	U426B	9K	6B
C415	9J	6B	R321	3J	4C	R417	9J	6B	U460A	7L	6C
C418	8E	5C	R322	3J	4C	R419	8F	5C	U460B	7L	6C
C419	7F	5C	R324	3H	4C	R420	7G	6C	U460C	7L	6C
C420	7J	6B	R326	5G	3D	R421	9J	6B	U460D	7K	6C
C421	9K	6B	R327	4G	3D	R422	8J	6B	U460E	7K	6C
C453	7M	6C	R328	5G	3D	R423	9J	6B	U460F	7K	6C
C459	7N	6C	R329	4G	3D	R424	7J	6B	U480A	6P	7C
C473	4P	7B	R330	5G	3D	R426	8J	6B	U480B	5S	7C
C479	6M	6C	R331	4G	3D	R427	9J	6B	U480C	5L	7C
C480	1P	7C	R332	5G	3D	R428	8K	6B	U480D	5M	7C
C553	3P	3E	R335	5H	4D	R429	9K	7B	U555A	2D	4E
C561	4D	3G	R336	5H	4D	R432	9K	6B	U555B	1E	4E
C565	4F	6E	R337	5H	4D	R433	9K	7B	U555C	3E	4E
			R339	5J	4D	R434	9K	7B	U555D	3E	4E
CR372	7G	5C	R340	4J	3D	R435	9K	7B	U565B	3F	2H
CR381	5C	8A	R342	3F	3D	R446	7M	6C	U665C	2F	2H
CR393	7F	6C	R343	3G	4D	R452	8K	6C	U665D	4F	2H
CR399	7F	5C	R344	5J	4D	R453	7L	6C			
CR414	8J	6B	R346	6J	4D	R455	8L	6C	W310	1J	4D
CR415	9J	6B	R347	6J	4D	R457	6K	6C	W336	4J	3D
CR556	2D	4E	R349	6H	4D	R458	7L	6C	W350	1K	4D
			R350	1K	5C	R459	7N	6C	W351	3K	4D
Q302	2G	3C	R351	3K	5C	R460	4K	7C	W410	7G	6C
Q303	3G	3C	R352	2K	5C	R461	7P	6C	W419	8E	6A
Q327	4G	3D	R353	2K	5C	R462	7P	6C	W428	8K	6A
Q328	5G	3D	R356	1L	5C	R463	4L	6C	W429	9K	6A
Q382A	5D	8A	R357	3L	5C	R464	5L	7C	W555	2D	4E
Q382B	5D	8A	R358	2K	5C	R465	5M	7C	W558	2D	4E
Q384	5E	8A	R369	2L	5C	R469	5M	7C	W560	3D	4E
Q397	6F	5D	R360	3L	5D	R470	5L	6C	W9001-11	4C	5A
Q402	5N	7C	R361	3K	5C	R471	5L	7B	W9001-18	2C	6A
Q403	5N	7C	R363	1L	5C	R473	6P	7B	W9001-19	8N	6A
Q413	9J	7B	R365	2M	5C	R474	6N	7C	W9001-20	8M	6A
Q419	8F	5C	R366	3L	5C	R478	5N	7C	W9001-22	8L	6A
Q420	7J	6C	R367	4M	5C	R479	6M	7C	W9001-23	9L	6A
Q421	9J	6C	R369	7F	5C	R483	6M	7C	W9001-31	6C	8A
Q422	7J	6B	R372	7G	5C	R486	5S	7C	W9001-32	2C	8A
Q423	9K	6B	R374	7G	5C	R487	6P	7C	W9001-33	2C	8A
Q428	8K	6B	R381	5C	8A	R555	1C	5B	W9001-34	3C	8A
Q429	9K	6B	R382	5D	8A	R556	1D	3E	W9001-35	7C	8A
Q460	4K	6C	R384	5D	8A	R558	2C	6A	W9001-36	6C	8A
Q463	4L	6C	R385	5E	7A	R560	3C	6B	W9001-37	7C	8A
			R386	6D	7A	R561	4D	5A	W9001-38	6C	8A
R301	2G	3C	R389	6D	8B	R562	2E	2H	W9001-39	4C	8A
R302	2G	3C	R390	4D	8B	R564	4F	2H			
R303	3G	3C	R392	7D	7A	R565	4F	3H			
R304	2G	3C	R393	7E	7B						

Partial A1 also shown on diagrams 2, 4, 5, 6, 7 and 8.

TABLE (cont)

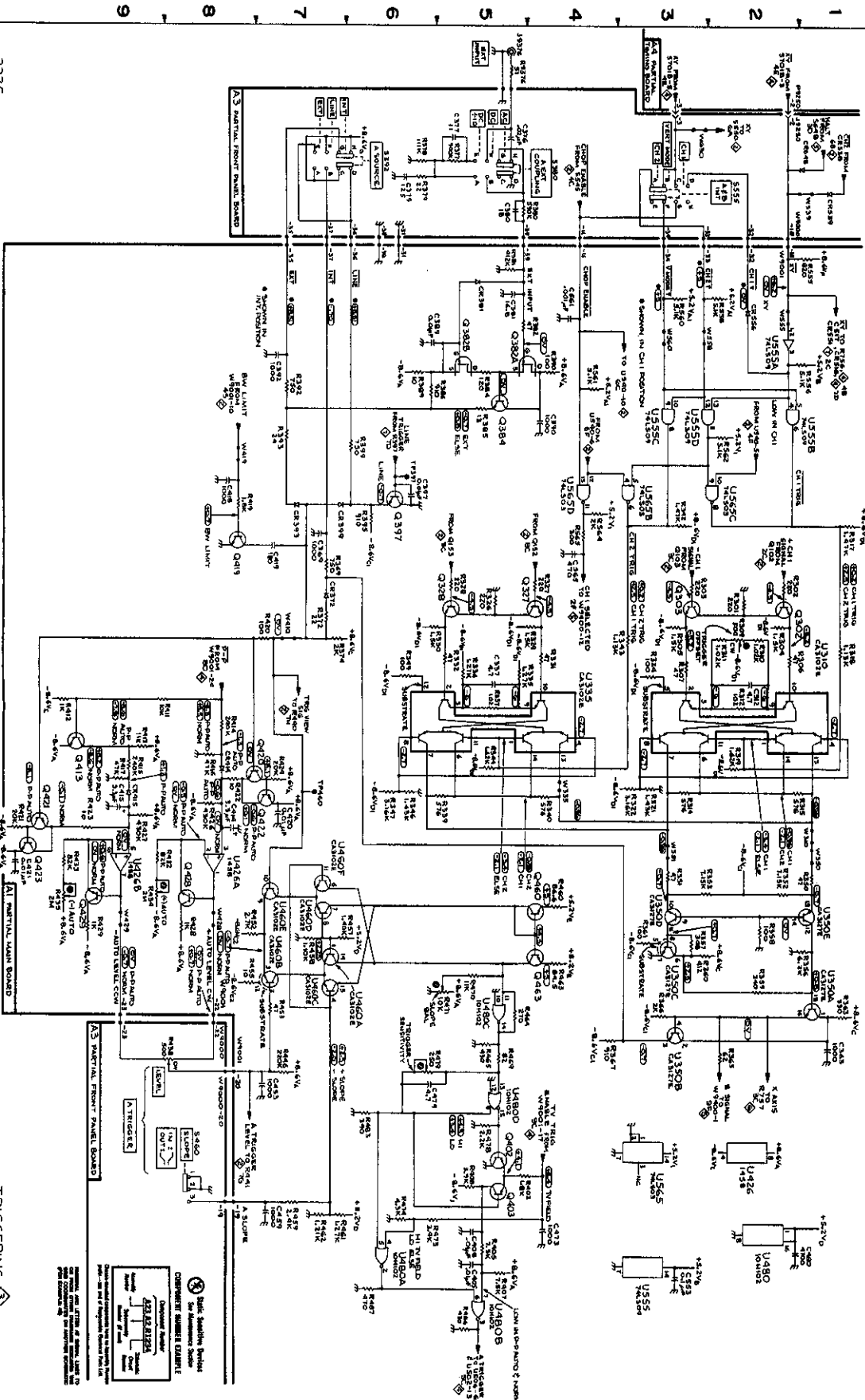


TRIGGERING



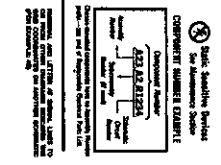
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ASSEMBLY A3											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C376	5B	3F	R377	5B	3F	W639	1B	3B	W9000-33	2C	4E
C377	5B	3F	R378	6B	2E	W630	2B	3B	W9000-34	3C	4E
C379	6B	2F	R379	6B	2E	W9000-11	4C	4B	W9000-35	7C	4E
C380	5B	3F	R380	5B	4F	W9000-18	2C	4C	W9000-36	6C	4E
CR539	1B	2B	R438	8M	2F	W9000-19	8N	4C	W9000-37	7C	4E
CR648	1B	3D	S380	4B	3F	W9000-20	9M	4C	W9000-38	6C	4E
J9250-2	2B	3D	S392	6B	3E	W9000-22	8M	4C	W9000-39	4C	4F
J9250-3	3B	3E	S480	8N	2E	W9000-23	9M	4C			
			S555	2B	3E	W9000-31	6C	4E			
						W9000-32	2C	4E			
<i>Partial A3 also shown on diagrams 1, 2, 4, 5, 6, 7 and 8.</i>											
ASSEMBLY A4											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
P9250-2	2A	2E	P9250-3	3A	2E						
<i>Partial A4 also shown on diagrams 4, 5 and 6.</i>											
CHASSIS MOUNTED PARTS											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
J9376	5A	CHASSIS	R9376	5A	CHASSIS						



2235

TRIGGERING



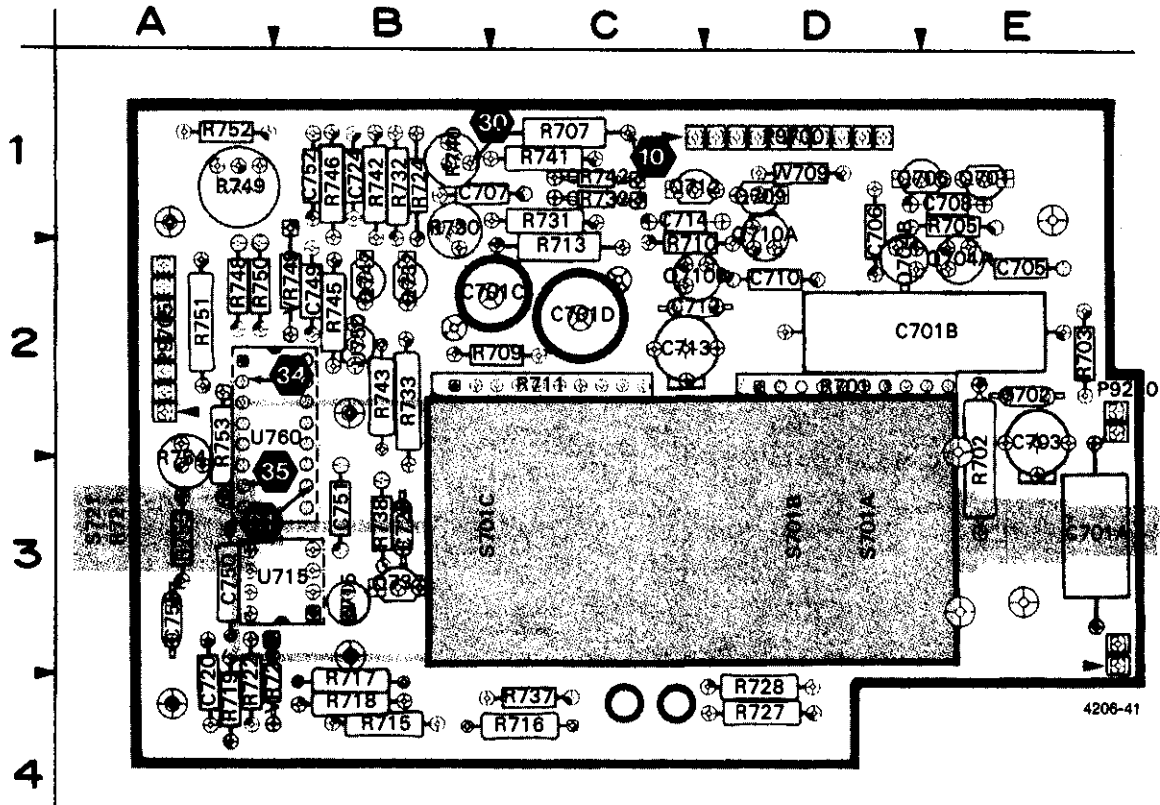
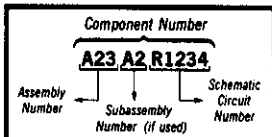


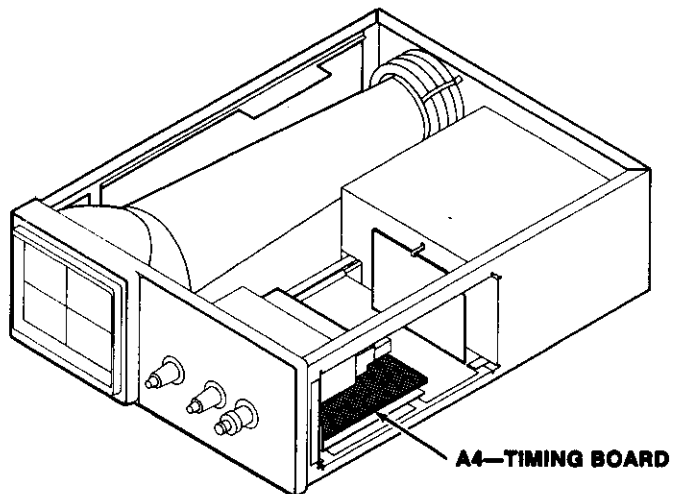
Figure 9-11. A4—Timing board.

 Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.



A4—TIMING BOARD

A4—TIMING BOARD

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C701	4	P9700-7	4	R721	4
C701	4	P9700-8	5	R722	4
C701	5	P9700-9	5	R724	6
C701	5	P9705-1	6	R727	6
C702	4	P9705-2	6	R728	6
C703	4	P9705-3	6	R730	6
C705	4	P9705-4	6	R731	6
C706	4	P9705-5	6	R732	6
C707	6	P9705-6	6	R733	6
C708	4	P9705-7	6	R737	6
C710	5	P9705-8	6	R738	6
C712	5	Q701	4	R740	6
C713	5	Q704	4	R741	6
C714	5	Q704	4	R742	6
C715	4	Q706	4	R743	6
C720	4	Q709	5	R745	6
C724	6	Q710	5	R746	6
C728	6	Q710	5	R748	6
C749	6	Q712	5	R749	6
C750	6	Q732	6	R750	6
C751	6	Q737	6	R751	6
C752	6	Q742	6	R752	6
C755	6	R701	4	R753	6
CR732	6	R702	4	R754	6
CR742	6	R703	4	R755	6
P9250-1	6	R705	4	S701	4
P9250-2	3	R707	4	S701	4
P9250-3	3	R709	5	S701	5
P9250-4	4	R710	5	S721	6
P9700-10	4	R711	5	U715	4
P9700-1	6	R713	5	U750	6
P9700-2	6	R715	4	U760	6
P9700-3	5	R716	4	VR720	4
P9700-4	4	R717	4	VR749	6
P9700-5	4	R718	4	W709	5
P9700-6	4	R719	4		

2235 CONTROL SETTINGS

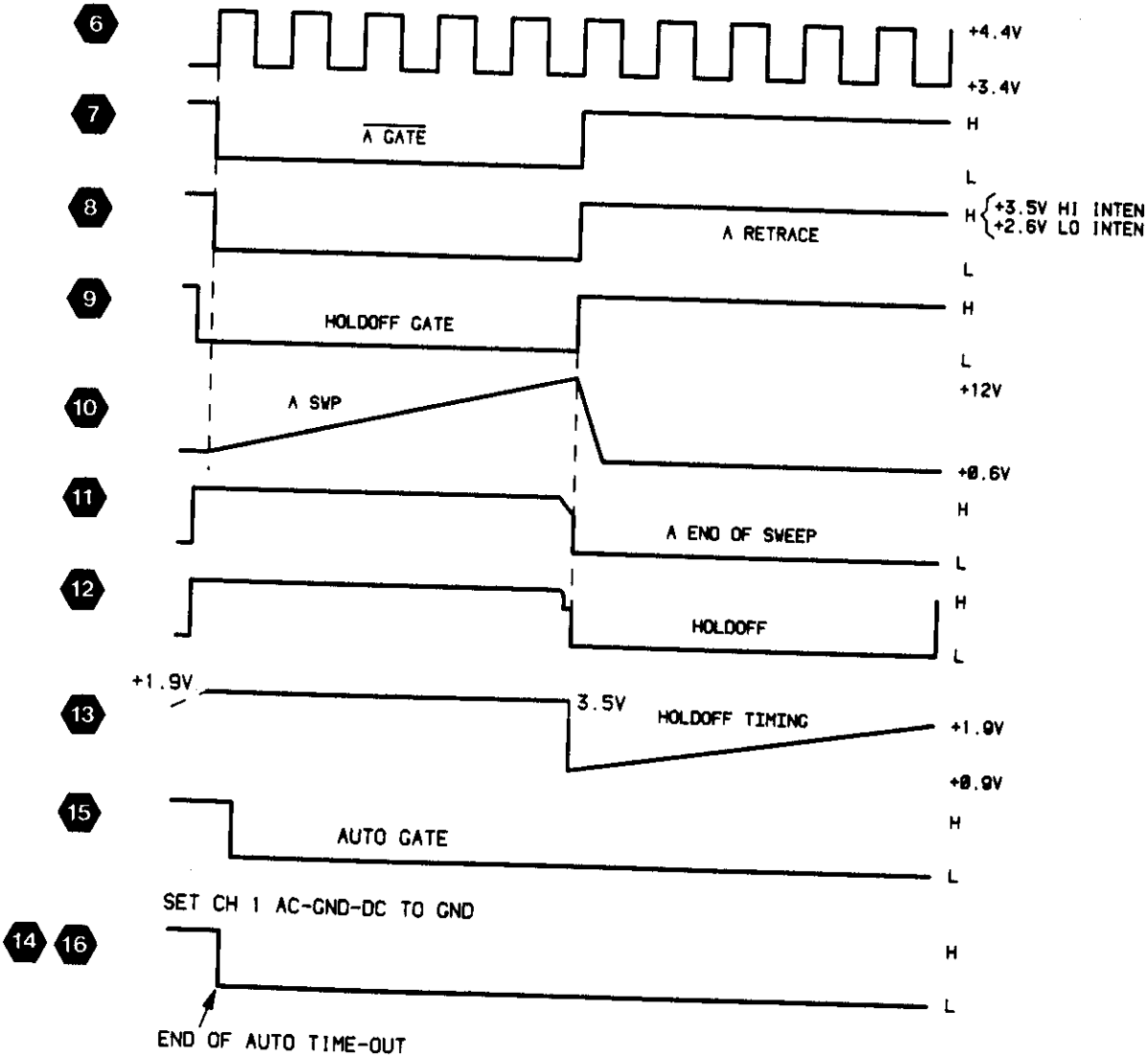
DC Voltages

A INTENSITY	Midrange
HORIZONTAL MODE	A
A SEC/DIV	0.1 ms
A TRIGGER Mode	P-P AUTO

AC Waveforms

VERTICAL MODE	CH 1
CH 1 VOLTS/DIV	1V
CH 1 AC-GND-DC	DC
HORIZONTAL MODE	A
A TRIGGER LEVEL	Midrange
A TRIGGER Mode	P-P AUTO
A SOURCE	INT
A&B INT	CH 1

CH 1 INPUT SIGNAL 1-kHz sine wave, 4V P-P



2235 CONTROL SETTINGS

DC Voltages

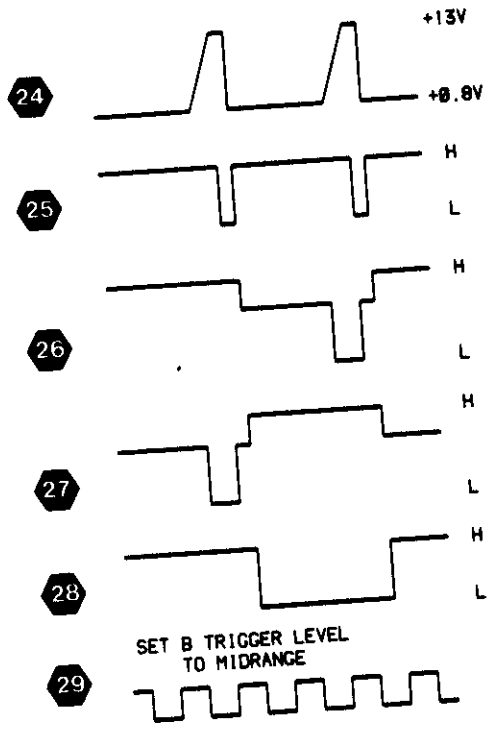
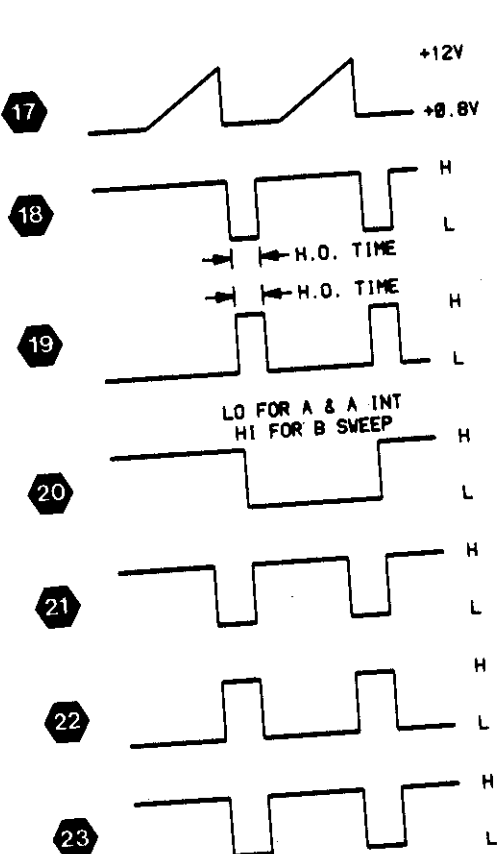
AC-GND-DC (both)
A TRIGGER Mode

GND
NORM (sweep
not running)

AC Waveforms

VERTICAL MODE
CH 1 VOLTS/DIV
AC-GND-DC (both)
HORIZONTAL MODE
A SEC/DIV
B SEC/DIV
B DELAY TIME POSITION
B TRIGGER LEVEL
A TRIGGER Mode
A&B INT
A SOURCE
CH 1 INPUT SIGNAL

CH 1
5mV
DC
ALT
50µs
5µs
5.0
CW-RUN AFTER DELAY
P-P AUTO
CH 1
INT
5-div, 1-kHz sine wave



HI IN A OR B
LO IN ALT

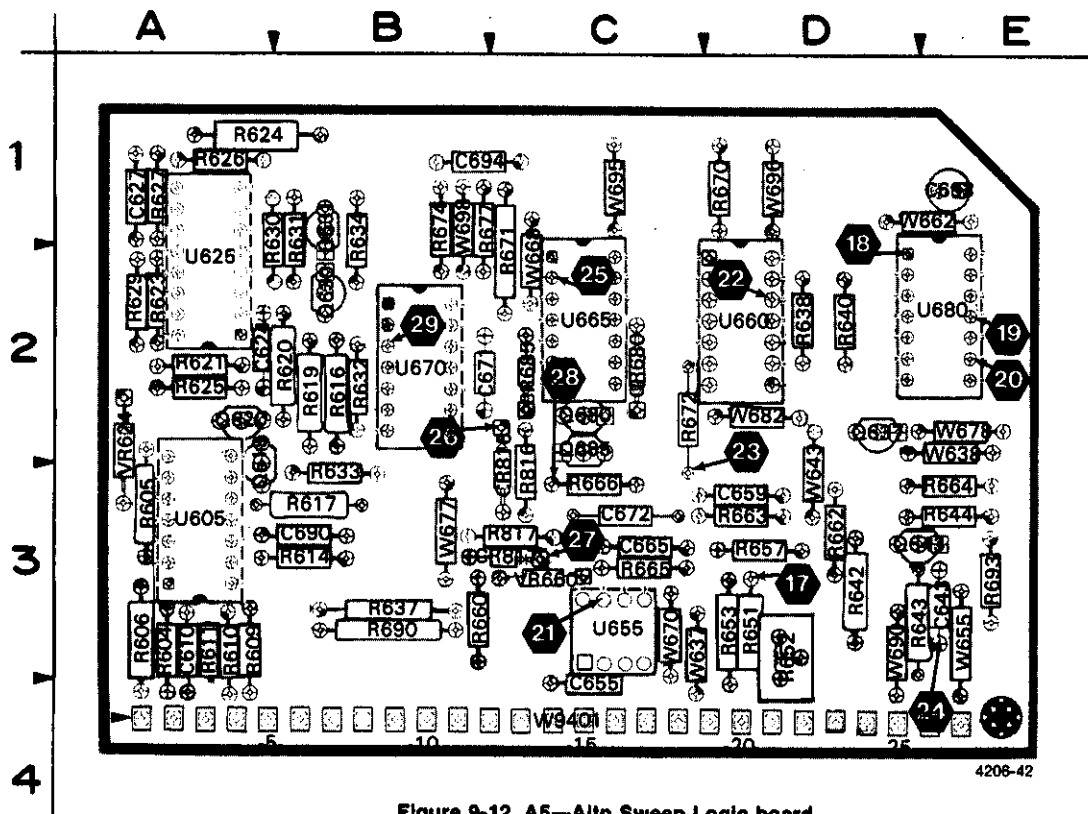
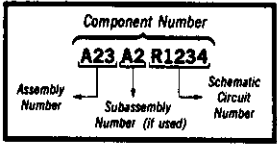


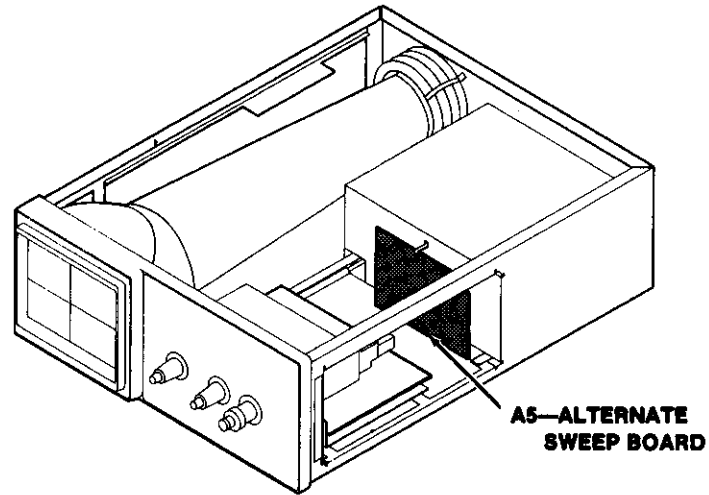
Figure 9-12. A5—Altn Sweep Logic board.

 Static Sensitive Devices
See Maintenance Section

COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.



A5—ALTERNATE SWEEP BOARD

A5—ALTERNATE SWEEP BOARD

CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C610	5	R623	5	U605	5	W677	5
C624	5	R624	5	U605	5	W678	5
C627	5	R625	5	U605	5	W682	5
C643	5	R626	5	U605	5	W690	5
C655	5	R627	5	U605	5	W695	5
C659	5	R629	5	U605	5	W696	5
C665	5	R630	5	U625	5	W698	5
C671	5	R631	5	U625	5	W9401-10	5
C672	5	R632	5	U625	5	W9401-11	5
C690	5	R633	5	U625	5	W9401-12	5
C693	5	R634	5	U655	5	W9401-13	5
C694	5	R637	5	U660	5	W9401-14	5
CR680	5	R638	5	U660	5	W9401-15	5
CR685	5	R640	5	U660	5	W9401-16	5
CR816	5	R642	5	U660	5	W9401-17	5
CR817	5	R643	5	U660	5	W9401-18	5
Q619	5	R644	5	U660	5	W9401-19	5
Q620	5	R651	5	U665	5	W9401-1	5
Q630	5	R652	5	U665	5	W9401-20	5
Q631	5	R653	5	U665	5	W9401-21	5
Q637	5	R657	5	U665	5	W9401-22	5
Q643	5	R660	5	U670	5	W9401-23	5
Q680	5	R662	5	U670	5	W9401-24	5
Q685	5	R663	5	U680	5	W9401-25	5
R604	5	R664	5	U680	5	W9401-26	5
R605	5	R665	5	U680	5	W9401-27	5
R606	5	R666	5	U680	5	W9401-2	5
R609	5	R670	5	VR624	5	W9401-3	5
R610	5	R671	5	VR660	5	W9401-4	5
R611	5	R672	5	W637	5	W9401-5	5
R614	5	R674	5	W638	5	W9401-6	5
R616	5	R677	5	W643	5	W9401-7	5
R617	5	R690	5	W655	5	W9401-8	5
R619	5	R693	5	W662	5	W9401-9	5
R620	5	R816	5	W668	5		
R621	5	R817	5	W670	5		

B TIMING & ALTERNATE B SWEEP



ASSEMBLY A1											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C603	9F	5E	R645	4E	8E	W9001-13	2E	5A	W9400-20	5F	7E
C635	2F	7F	R646	5E	8D	W9001-15	1E	6A	W9400-21	1F	7E
C646	5F	7E	R647	5F	8E	W9001-16	9F	6A	W9400-22	6F	7E
C647	3E	6E	R648	1F	8D	W9001-26	2E	7A	W9400-2	9F	5E
C648	1F	6E	R649	2E	8D	W9001-27	2E	7A	W9400-4	9F	6E
C649	3F	6E	R673	6F	7E	W9001-28	9F	7A	W9400-5	1S	6E
C673	7F	7E				W9400-10	2F	6E	W9400-6	2F	6E
			VR646	5E	8D	W9400-11	2S	6E	W9400-7	2S	6E
CR712	6F	7E	VR712	6F	7E	W9400-12	2F	6E	W9700-3	6F	7E
						W9400-13	1F	6E	W9700-9	6F	7E
P9644-1	4E	8E	W602	9F	6E	W9400-14	5F	7E			
P9644-2	5E	8E	W603	9F	6E	W9400-17	6F	7E			
P9644-3	5E	8E	W635	2E	7F	W9400-19	2F	7E			
			W649	2F	6E	W9400-1	9F	5E			

Partial A1 also shown on diagrams 2, 3, 4, 6, 7 and 8.



B TIMING & ALTERNATE B SWEEP

ASSEMBLY A3

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
R602	9E	1F	S648	2B	2D	W9000-15	1E	4C	W9000-27	2E	4D
S602	8D	1E	W9000-13	2E	4B	W9000-16	9E	4C	W9000-28	9E	4D
						W9000-26	2E	4D			

Partial A3 also shown on diagrams 1, 2, 3, 4, 6, 7 and 8.

ASSEMBLY A4

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C701C	6C	2C	P9700-3	6E	1D	Q710B	7D	1D	R713	6D	2C
C701D	6D	2C	P9700-8	7E	1D	Q712	7E	1C	S701C	3B	3D
C710	7D	2D	P9700-9	6E	1D						
C712	7D	2C				R709	6C	2C			
C713	7D	2C	Q709	6D	1D	R710	7D	1C	W709	6E	1D
C714	7D	1C	Q710A	7D	1D	R711	6A	2C			

Partial A4 also shown on diagrams 3, 4 and 6.

ASSEMBLY A5

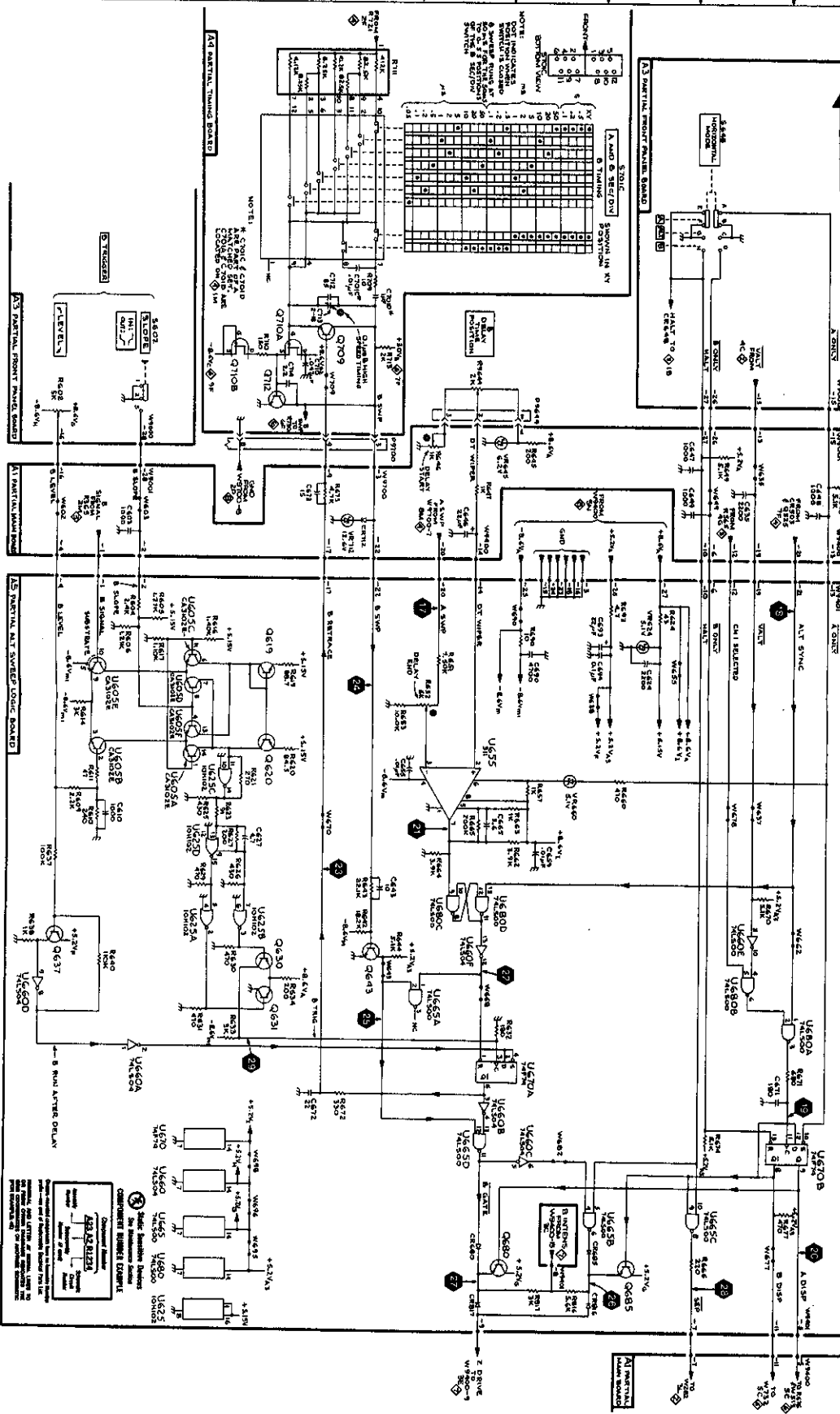
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C810	9J	3A	R620	7J	2B	R817	4P	3C	W662	1K	1E
C624	3H	2A	R621	7J	2A				W668	5L	1C
C627	7J	1A	R623	8J	2A	U605A	8J	3A	W670	7J	3C
C643	6K	3E	R624	3G	1A	U605B	9J	3A	W677	2P	3B
C655	6J	3C	R625	8J	2A	U605C	8G	3A	W678	2J	2E
C659	4K	3D	R626	7K	1A	U605D	8H	3A	W682	4N	2D
C665	5J	3C	R627	8J	1A	U605E	9H	3A	W690	4G	3D
C671	2M	2B	R629	8K	2A	U605F	8H	3A	W695	7P	1C
C672	7M	3C	R630	7L	1A	U625A	8K	2A	W696	7N	1D
C690	4H	3B	R631	8L	1B	U625B	7K	2A	W698	7N	1B
C693	4G	1E	R632	5M	2B	U625C	8J	2A	W9401-10	2G	4B
C694	4H	1B	R633	7M	3B	U625D	8K	2A	W9401-11	2S	4B
			R634	7L	1B	U655	5J	3C	W9401-12	2G	4C
CR680	5P	2C	R637	9K	3B	U660A	9M	2D	W9401-13	1G	4C
CR685	4P	2C	R638	9L	2D	U660B	5M	2D	W9401-14	5G	4C
CR816	4P	2C	R640	9L	2D	U660C	4N	2D	W9401-15	4G	4C
CR817	5P	3C	R642	8K	3D	U660D	9L	2D	W9401-16	4G	4C
			R643	6K	3E	U660E	2L	2D	W9401-17	6G	4C
Q619	7H	2A	R644	6L	3E	U660F	5L	2D	W9401-18	4G	4C
Q620	7J	2A	R651	5H	3D	U665A	5L	2C	W9401-19	2G	4D
Q630	7L	2B	R652	5H	3D	U665B	3P	2C	W9401-1	9G	4A
Q631	7L	1B	R653	6H	3D	U665C	2P	2C	W9401-20	5G	4D
Q637	9L	2D	R657	4J	3D	U665D	5N	2C	W9401-21	1G	4D
Q643	6L	3D	R660	3J	3B	U670A	4M	2B	W9401-22	6G	4D
Q680	5P	2C	R662	4K	3D	U670B	1N	2B	W9401-23	4G	4D
Q685	3P	2C	R663	4J	3D	U680A	1M	2E	W9401-24	4G	4D
			R664	5K	3E	U680B	2L	2E	W9401-26	4G	4D
R604	9G	3A	R665	5J	3C	U680C	5K	2E	W9401-26	3G	4E
R605	8G	3A	R666	2P	3C	U680D	5K	2E	W9401-27	3G	4E
R606	9G	3A	R670	2K	1D				W9401-2	9G	4A
R609	9J	3A	R671	1M	1C	VR624	3G	2A	W9401-3	4G	4A
R610	9J	3A	R672	6M	2C	VR660	4J	3C	W9401-4	9G	4A
R611	9J	3A	R674	2N	1B				W9401-5	1S	4A
R614	9H	3B	R677	1P	1B	W637	2J	3C	W9401-6	2G	4B
R616	8G	2B	R690	4G	3B	W638	4H	2E	W9401-7	2S	4B
R617	8G	3B	R693	3G	3E	W643	6L	2D	W9401-8	4P	4B
R619	7H	2B	R816	4P	2C	W655	3H	3E	W9401-9	5S	4B

CHASSIS MOUNTED PARTS

CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
R9644	5D	CHASSIS									

B TIMING & ALTERNATE B SWEEP

WAVEFORMS
 A B C D E F G H I J K L M N P T S



2235

B TIMING & ALTERNATE B SWEEP



B TIMING & ALTERNATE B SWEEP

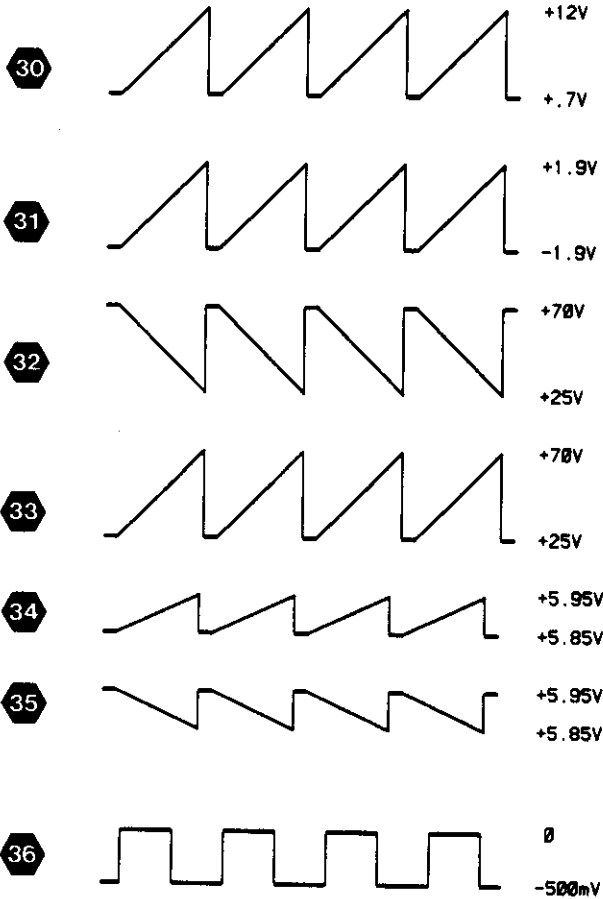
2235 CONTROL SETTINGS

DC Voltages

AC-GND-DC (both)	GND
HORIZONTAL MODE	A
A TRIGGER Mode	P-P AUTO

AC Waveforms

AC-GND-DC (both)	GND
HORIZONTAL MODE	A
X10 Magnifier	Off (knob in)
VAR HOLDOFF	MIN (fully ccw)
A TRIGGER Mode	P-P AUTO



PROBE ADJUST & XY AMPLIFIER / HORIZONTAL OUTPUT



ASSEMBLY A1											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C762	4D	5E	Q770	7M	3F	R770	7M	3F	VR764	6L	2G
C764	8M	3G	Q775	8P	3E	R773	8P	3F	VR782	5N	2F
C770	7M	3F	Q779	7P	3E	R775	8N	3F			
C775	8N	3F	Q780	5N	2F	R776	7P	3E	W570	5D	7E
C777	7S	3E	Q785	5P	2F	R777	8P	3F	W732	5C	6E
C779	7P	3F	Q789	4P	2F	R778	8S	3E	W770	7L	4E
C780	5N	3F				R779	7P	3E	W780	5L	4E
C782	5N	2F	R666	5D	6E	R780	5M	3F	W9778	8S	3E
C785	4N	2F	R676	5C	8D	R782	5N	2F	W9788	4S	2E
C787	4P	2F	R756	4C	5D	R783	5P	2F	W9001-21	3B	6A
C789	3P	2F	R757	3C	5C	R785	4N	2F	W9700-1	5E	7E
			R758	4C	5D	R786	3P	2E	W9700-2	5E	7E
CR764	6L	2G	R759	4C	5D	R787	5P	2F	W9705-2	5L	6E
CR765	6M	3F	R760	4D	5E	R788	4S	2E	W9705-3	7L	6E
CR768	6M	3F	R761	4C	5D	R789	4P	2E	W9705-5	4D	6E
CR770	6M	3G	R762	4C	5D	R792	5P	3E			
CR780	5L	3G	R764	6L	3G	R793	6P	3F			
			R766	6M	3F						
Q756	4C	5D	R768	6N	2F	U758	4C	5D			

Partial A1 also shown on diagrams 2, 3, 4, 5, 7 and 8.

ASSEMBLY A3											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C987	2B	1D	J9250-1	3E	3D	R987	2C	1D	U985	2C	1D
CR988	2C	1D	R726	3B	1D	R988	2C	1D			
CR989	2D	1D	R985	2B	1D	R989	2D	2D	W9900	2D	1A
			R986	1C	1D	R990	2D	1B	W9000-21	3B	4C

Partial A3 also shown on diagrams 1, 2, 3, 4, 5, 7 and 8.

ASSEMBLY A4											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C707	8E	1B	P9705-1	9E	2A	R728	3F	4D	R750	6J	2A
C724	8E	1B	P9705-2	5K	2A	R730	6F	1B	R751	3J	2A
C728	3F	3B	P9705-3	7K	2A	R731	6F	1C	R752	8F	1A
C749	2J	2B	P9705-4	9E	2A	R732	6G	1B	R753	4J	2A
C750	8J	3A	P9705-5	4E	2A	R733	7G	2B	R754	4K	2A
C751	3J	3B	P9705-6	9E	2A	R737	7G	4C	R755	4K	3A
C752	6K	1B	P9705-7	8E	2A	R738	7G	3B			
C755	4J	3A	P9705-8	8E	2A	R740	4F	1B	S721	3J	3A
						R741	4F	1C			
CR732	5F	1C	Q732	6G	2B	R742	4G	1B	U750	8H	2B
CR742	5F	1C	Q737	7G	3B	R743	5G	2B	U760	3H	2A
			Q742	5G	2B	R745	6G	2B			
P9250-1	3E	2E				R746	5G	1B	VR749	2J	2B
P9700-1	5E	1C	R724	8F	1B	R748	6J	2A			
P9700-2	5E	1D	R727	3F	4D	R749	6J	1A			

Partial A4 also shown on diagrams 3, 4 and 5.

CHASSIS MOUNTED PARTS											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
J9900	2E	CHASSIS									

PROBE ADJ & XY AMPL / HORIZONTAL OUTPUT



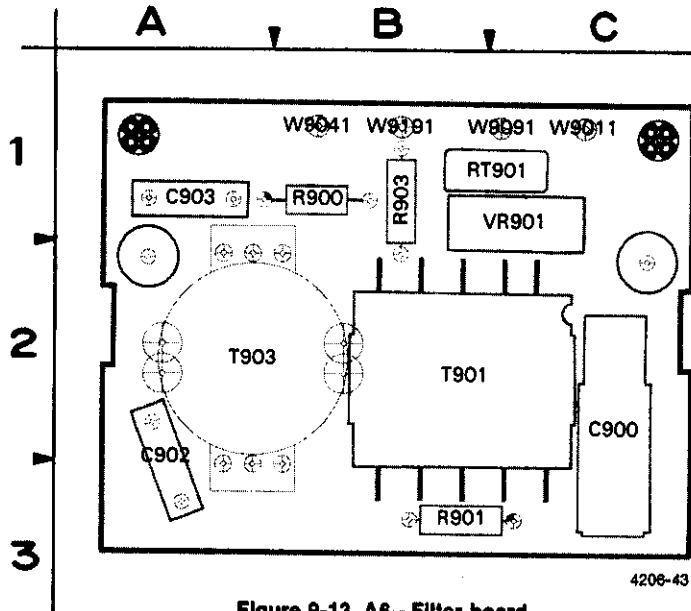


Figure 9-13. A6—Filter board.

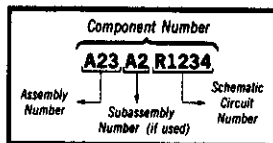
4206-43

A6—FILTER BOARD

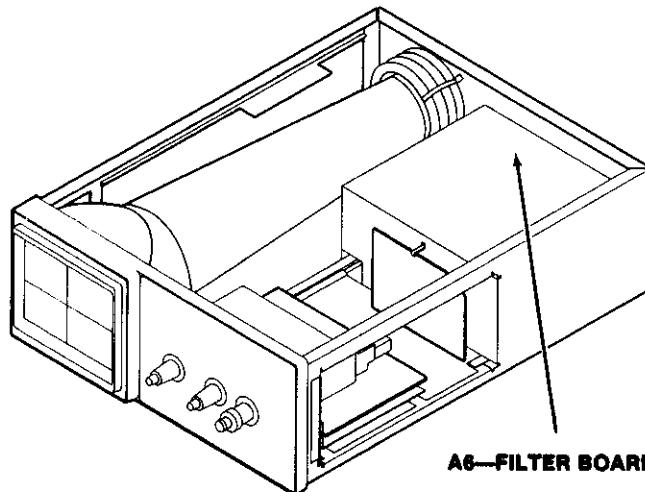
CIRCUIT NUMBER	SCHEM NUMBER	CIRCUIT NUMBER	SCHEM NUMBER
C900	7	T901	7
C902	7	T903	7
C903	7	VR901	7
R900	7	W9011	7
R901	7	W9041	7
R903	7	W9091	7
RT901	7	W9191	7

 **Static Sensitive Devices**
See Maintenance Section

COMPONENT NUMBER EXAMPLE



Chassis-mounted components have no Assembly Number prefix—see end of Replaceable Electrical Parts List.



A6—FILTER BOARD

POWER SUPPLY, Z AXIS & CRT



ASSEMBLY A1											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C396	6D	4H	CR901	5E	5J	R810	3B	4B	R929	6F	7J
C824	3E	6E	CR902	5E	5J	R814	3B	4B	R930	6F	7J
C825	3F	3H	CR903	5E	5J	R818	1D	6E	R934	9C	8J
C828	4F	3H	CR904	5E	5J	R820	2D	6E	R935	9C	8J
C832	2G	3H	CR907	7J	6H	R822	4E	2J	R937	9C	8H
C835	4H	3J	CR908	8H	7H	R823	3E	2J	R938	9C	8J
C845	3H	3J	CR920	8J	7J	R825	3E	3J	R939	9C	8H
C847	3J	3J	CR945	9F	8H	R826	3E	2J	R940	9C	8H
C849	3J	3J	CR946	9J	8H	R828	4F	2G	R941	9E	8J
C851	7M	6H	CR947	9J	8H	R830	3G	2J	R942	9D	8J
C853	7M	6G	CR954	6K	6F	R832	3G	3J	R943	9E	8J
C854	6M	5G	CR955	7K	6F	R834	4H	3J	R944	9F	8J
C855	3M	5G	CR956	7K	6F	R835	4G	3J	R945	9F	8H
C871	4S	1H	CR957	7K	6F	R836	4G	3J	R946	9H	8H
C873	5S	1H	CR960	8K	7F	R840	4H	3J	R947	9H	7H
C875	6S	1H	CR961	9K	8F	R841	3G	3J	R949	9H	8H
C877	7S	1H	CR962	9K	7F	R842	3J	3J	R971	9L	8G
C879	8N	5H	CR963	9K	8F	R844	3H	3J	R976	4L	5G
C893	7N	4G	CR967	9K	8G	R845	3H	3J	R978	4L	5G
C904	5D	4J	CR970	9K	8G	R849	3J	3J	S901	5D	4J
C906	5F	5H				R851	7M	3J			
C907	7J	6J	DS856	5M	5G	R852	7M	3J			
C908	6H	5J	DS858	5M	5G	R853	7M	6G	T390	6D	4H
C917	8D	7H	DS870	8L	5G	R854	6M	5G	T906	6J	8J
C919	8F	8J				R858	6M	5G	T944	9H	7H
C922	7F	7J	E907	8H	6H	R860	4M	5G	T948	4J	6G
C925	6E	8J				R870	4S	1H			
C940	9G	8H	L960	8L	7F	R871	4S	1H	TP842	3J	3J
C941	9G	6H	L961	9L	8F	R872	5S	1H	TP900	9L	8E
C942	9D	8H				R873	4S	1G	TP940	9D	8J
C943	9C	8H	P9802-1	3B	4B	R874	6S	1G	TP950	9C	7H
C944	9F	7H	P9802-2	3B	4B	R875	6S	1G			
C945	9F	8J	P9802-3	2B	4B	R877	7S	1H	U930	9G	7J
C954	6K	6F	P9802-4	3B	4B	R879	8N	6F	U975	4K	5F
C956	7K	6F	P9802-5	2B	4B	R885	1K	4H			
C960	9L	8F				R886	2L	4G	VR828	4F	3H
C961	9L	8F	Q686	1D	6D	R888	1L	4G	VR925	7F	7J
C962	9L	7F	Q804	2B	5B	R889	1M	4G	VR935	9C	8J
C963	9L	8F	Q814	3C	5B	R890	1M	4G	VR943	9E	8J
C968	9L	8G	Q825	3F	3J	R891	1M	4G			
C970	9L	8G	Q829	3G	3J	R892	6N	4F	W9040	5D	5J
C975	5L	5G	Q835	4H	3J	R893	6N	4F	W9190	5D	5H
C976	5L	5G	Q840	4J	3J	R894	6M	5F	W9800	4B	3J
C979	5M	5G	Q845	3J	3J	R905	6D	4J	W9001-1	4F	4A
			Q885	1L	4G	R906	6D	5J	W9070-1	8H	8H
CR551	2C	6D	Q908	8H	7H	R907	9J	6H	W9070-2	7H	6H
CR583	1C	6D	Q928	6F	7J	R908	8H	7J	W9070-3	8H	7H
CR805	2C	5B	Q930	6G	7J	R910	7B	5A	W9150-1	7B	5A
CR818	1D	6E	Q935	9B	8J	R912	9C	7J	W9150-2	8B	5A
CR820	2D	6E	Q938	9D	8J	R913	8C	7J	W9400-8	3C	6E
CR823	3E	2H	Q939	9E	8J	R914	8D	7H	W9400-9	3E	6E
CR824	2F	2J	Q944	9F	8J	R915	8D	7J	W9870-10	4S	1H
CR825	3G	3J	Q946	9H	8H	R916	8F	7J	W9870-12	3N	4G
CR829	3F	3J	Q947	9H	7H	R917	8D	7H	W9870-14	8N	4G
CR840	4H	3J				R919	8F	8J	W9870-1	8N	4G
CR845	3H	3J	R397	6D	5E	R921	8E	7J	W9870-2	8N	4G
CR851	7M	6G	R398	6D	5E	R922	8F	7J	W9870-3	7N	4G
CR853	6M	5G	R586	1C	6E	R925	6F	7J	W9870-4	7N	4G
CR854	5M	5G	R800	2B	4B	R926	5E	7J	W9870-5	6S	1H
CR855	5M	5G	R804	2B	4B	R927	7F	7J	W9870-7	5S	1H
CR879	8M	6G	R805	2B	5B	R928	6F	7J	W9870-8	7S	1H

Partial A1 also shown on diagrams 2, 3, 4, 5, 6 and 8.



POWER SUPPLY, Z AXIS & CRT

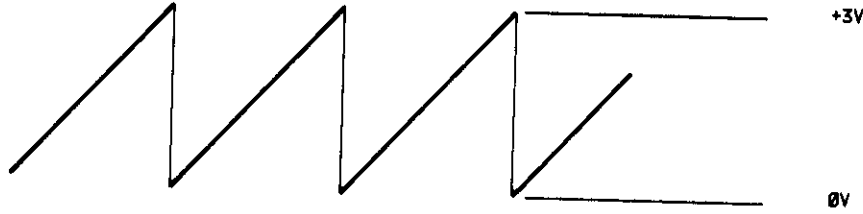


(cont)

ASSEMBLY A3											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
P9006-1	3S	2A	R982	3S	2A	S390	4E	2A			
P9006-2	3S	2A	R983	3S	2A	W9000-1	4F	4A			
<i>Partial A3 also shown on diagrams 1, 2, 3, 4, 5, 6 and 8.</i>											
ASSEMBLY A6											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C900	5B	2C	R901	5B	3B	T901	5B	2B	W9011	5A	1C
C902	5C	2A	R903	5C	1B	T903	5C	2A	W9041	5C	1B
C903	5C	1A				VR901	5B	1C	W9091	5A	1C
R900	5C	1B	RT901	5B	1B				W9191	5C	1B
CHASSIS MOUNTED PARTS											
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
DS9150	8A	CHASSIS	P9273	5P	CHASSIS	P9870-1	8P	CHASSIS	R9802A	2A	CHASSIS
F9001	5A	CHASSIS	P9778	4P	CHASSIS	P9870-2	8N	CHASSIS	R9802B	3A	CHASSIS
FL9001	5A	CHASSIS	P9788	4P	CHASSIS	P9870-3	7N	CHASSIS			
J9800	4A	CHASSIS	P9070-1	8J	CHASSIS	P9870-4	7N	CHASSIS	V9870	2P	CHASSIS
P9272	5P	CHASSIS	P9070-2	8J	CHASSIS	P9870-5	6P	CHASSIS			
			P9070-3	8J	CHASSIS	P9870-7	5P	CHASSIS			
			P9070-10	4P	CHASSIS	P9870-8	7P	CHASSIS			
			P9870-12	3N	CHASSIS						
			P9870-14	8P	CHASSIS	Q9070	8J	CHASSIS			

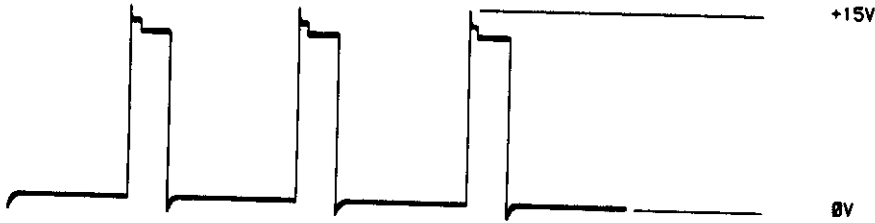
2235 CONTROL SETTINGS

37



PROBE GROUND
LEAD ON TP940

38



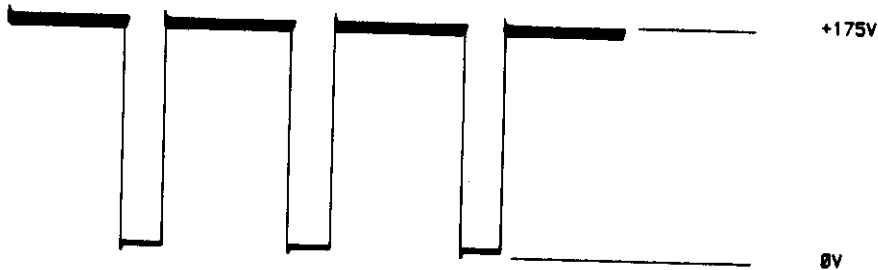
PROBE GROUND
LEAD ON TP940

39



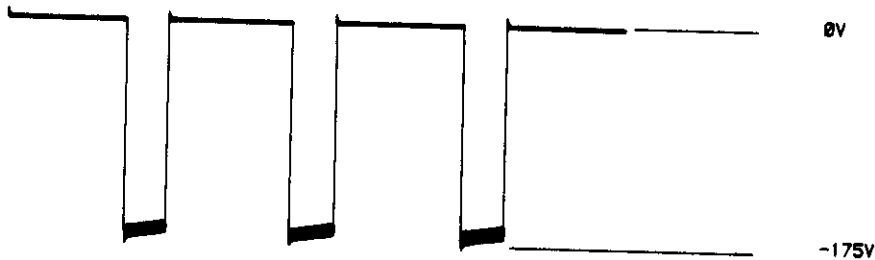
PROBE GROUND
LEAD ON TP940

40



PROBE GROUND
LEAD ON TP940

41



PROBE GROUND
LEAD ON TP940

VOLTAGE AND
DUTY CYCLE
VARY WITH
INPUT LINE
VOLTAGE

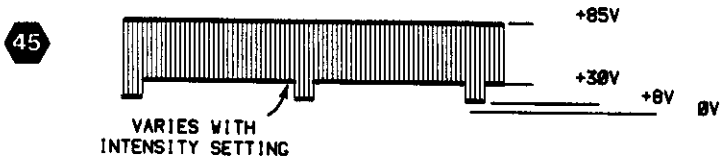
AC Waveforms

WARNING

Instrument must be connected to the ac-power source using a 1:1 isolation transformer. Do not connect the test oscilloscope probe ground lead to the inverter circuit test points if the instrument is not isolated. AC-source voltage exists on reference points TP940 and TP950.

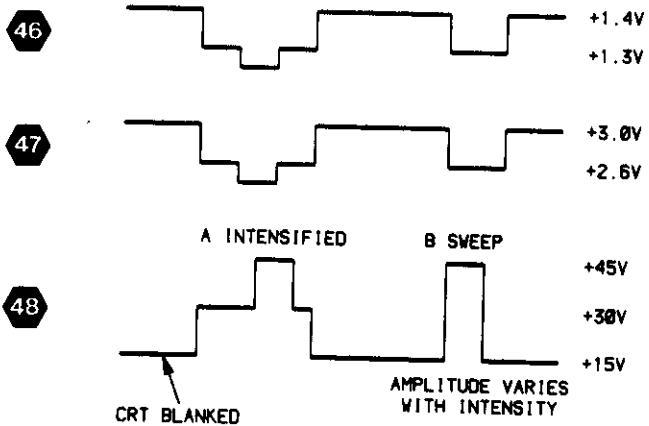
DC Voltages

Preregulator and Inverter voltages are referenced to test point noted adjacent to the voltage. Power supply output voltages are referenced to chassis ground.



AC Waveforms

VERTICAL MODE	CH 1
CH 1 VOLTS/DIV	5mV
AC-GND-DC	DC
HORIZONTAL MODE	ALT
A SEC/DIV	50 μ s
B SEC/DIV	5 μ s
B DELAY TIME POSITION	5.0
B TRIGGER LEVEL	RUN AFTER DELAY-CW
A TRIGGER Mode	P-P AUTO
A&B INT	CH 1
A SOURCE	INT
CH 1 INPUT SIGNAL	1-kHz sine wave, 5 div.



POWER DISTRIBUTION

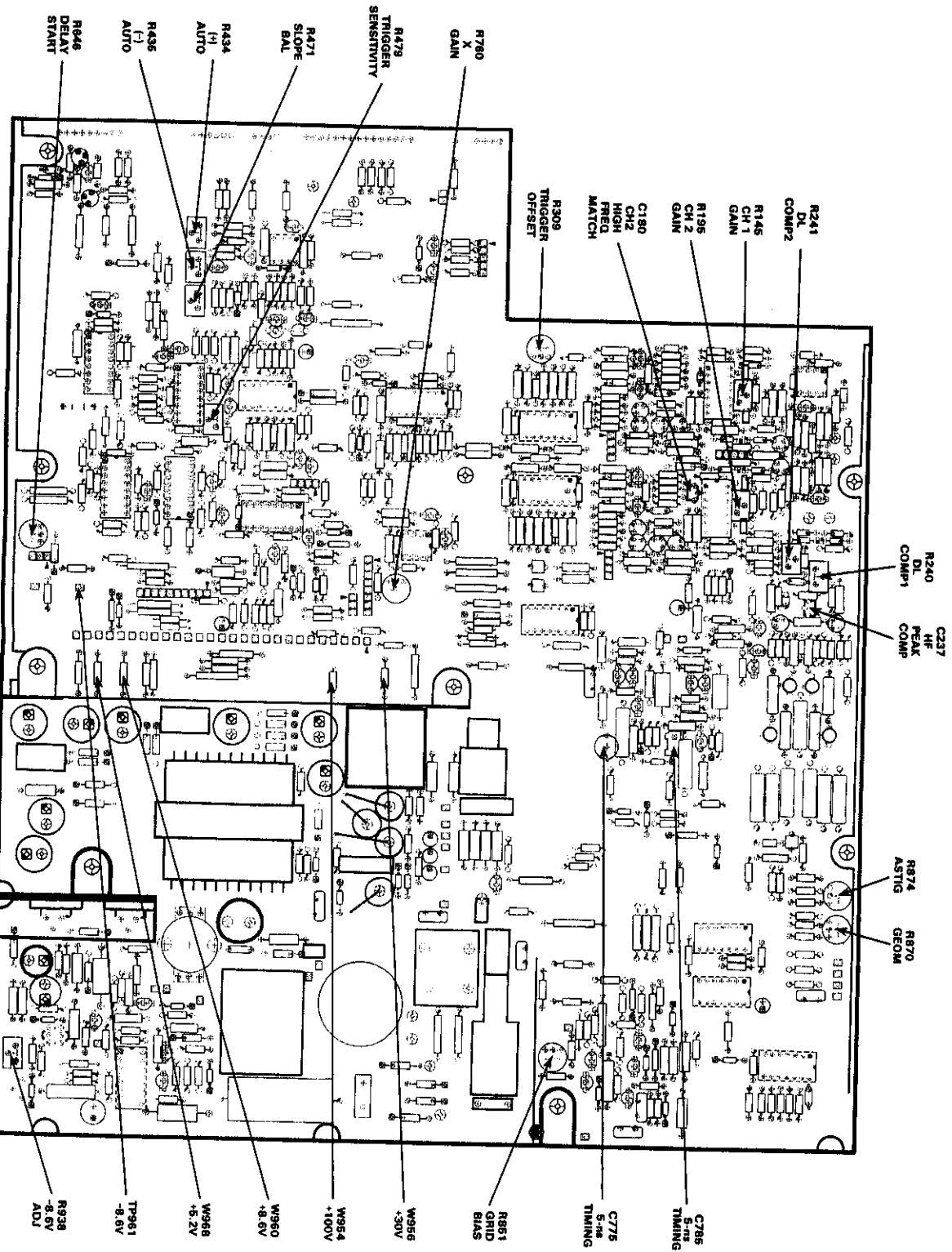


ASSEMBLY A1								
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
C200	4H	3E	TP961	7B	8E	W993	9C	5B
C201	8H	3E				W995	9C	6B
C220	4G	2D	W408	9D	7B	W997	4G	4D
C274	3C	2G	W494	4E	5D	W998	8G	4E
C451	8F	8D	W558	6C	2H	W999	8H	2E
C494	4E	5D	W590	7H	7C	W9001-12	5P	5A
C499	8E	5C	W591	6H	7D	W9001-5	4P	5A
C507	6E	6C	W592	6G	8C	W9400-15	6N	7E
C590	6H	7D	W885	7K	4G	W9400-16	6N	7E
C796	8L	2G	W954	1C	6F	W9400-18	6N	7E
C797	4K	3G	W955	1C	4H	W9400-23	6N	7E
C799	2D	3F	W958	2C	5F	W9400-24	6N	7E
			W959	1C	4E	W9400-25	6N	8E
E200	4G	4E	W960	3B	7F	W9400-26	6N	8E
E201	8H	4E	W961	7B	8F	W9400-27	5N	8E
E272	3D	1G	W964	2C	3H	W9400-3	6N	6E
E590	6G	8C	W965	2C	3H	W9700-8	2N	7E
			W968	6D	8F	W9705-1	3N	5E
R220	4H	2D	W971	3C	7E	W9706-4	3N	5E
R451	8E	6D	W972	3C	6E	W9706-6	3N	5E
R494	4D	5E	W974	4J	3H	W9706-7	3N	5E
R499	8E	5E	W975	4K	3H	W9706-8	2N	5E
R796	8K	2G	W976	7C	7E	W9991-1	8N	5E
R787	4K	3G	W977	7D	6E	W9991-2	9N	5E
R799	2C	3E	W979	8K	3H	W9991-3	9N	5E
R964	6B	3H	W991	4C	5B			
R966	6E	7E	W992	4C	5A			

Partial A1 also shown on diagrams 2, 3, 4, 5, 6 and 7.

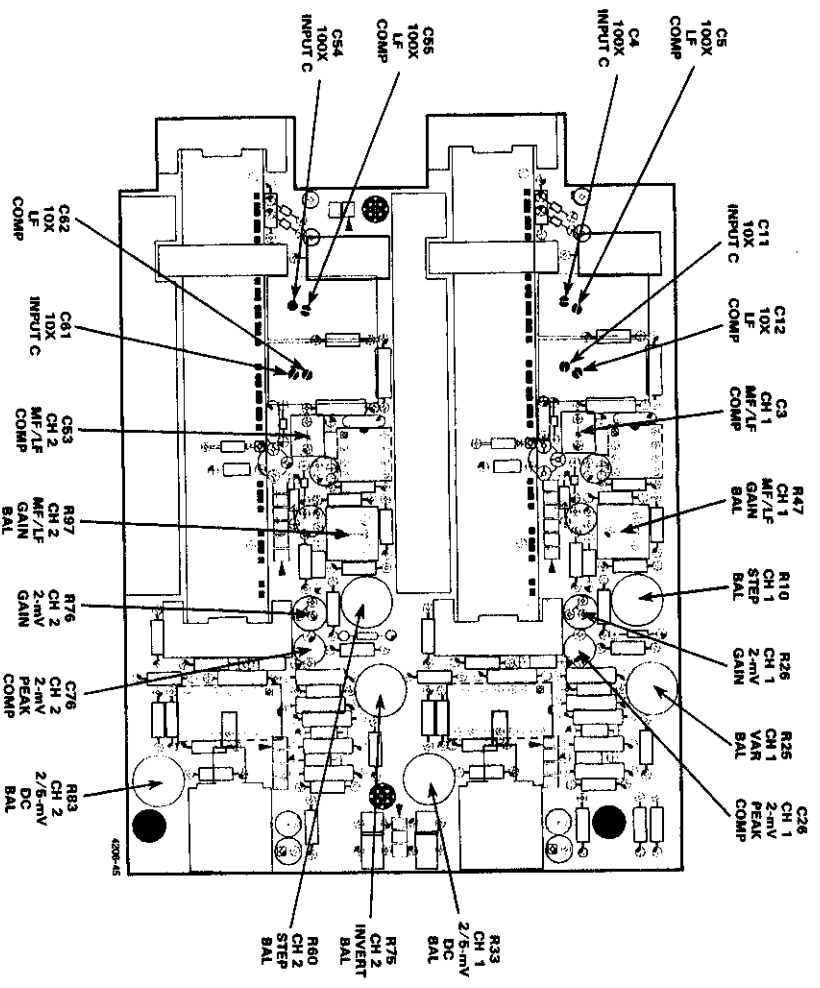
ASSEMBLY A3								
CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION	CIRCUIT NUMBER	SCHEM LOCATION	BOARD LOCATION
W89	4P	1C	W9000-12	5N	4B	W9000-5	4N	4A

Partial A3 also shown on diagrams 1, 2, 3, 4, 5, 6 and 7.



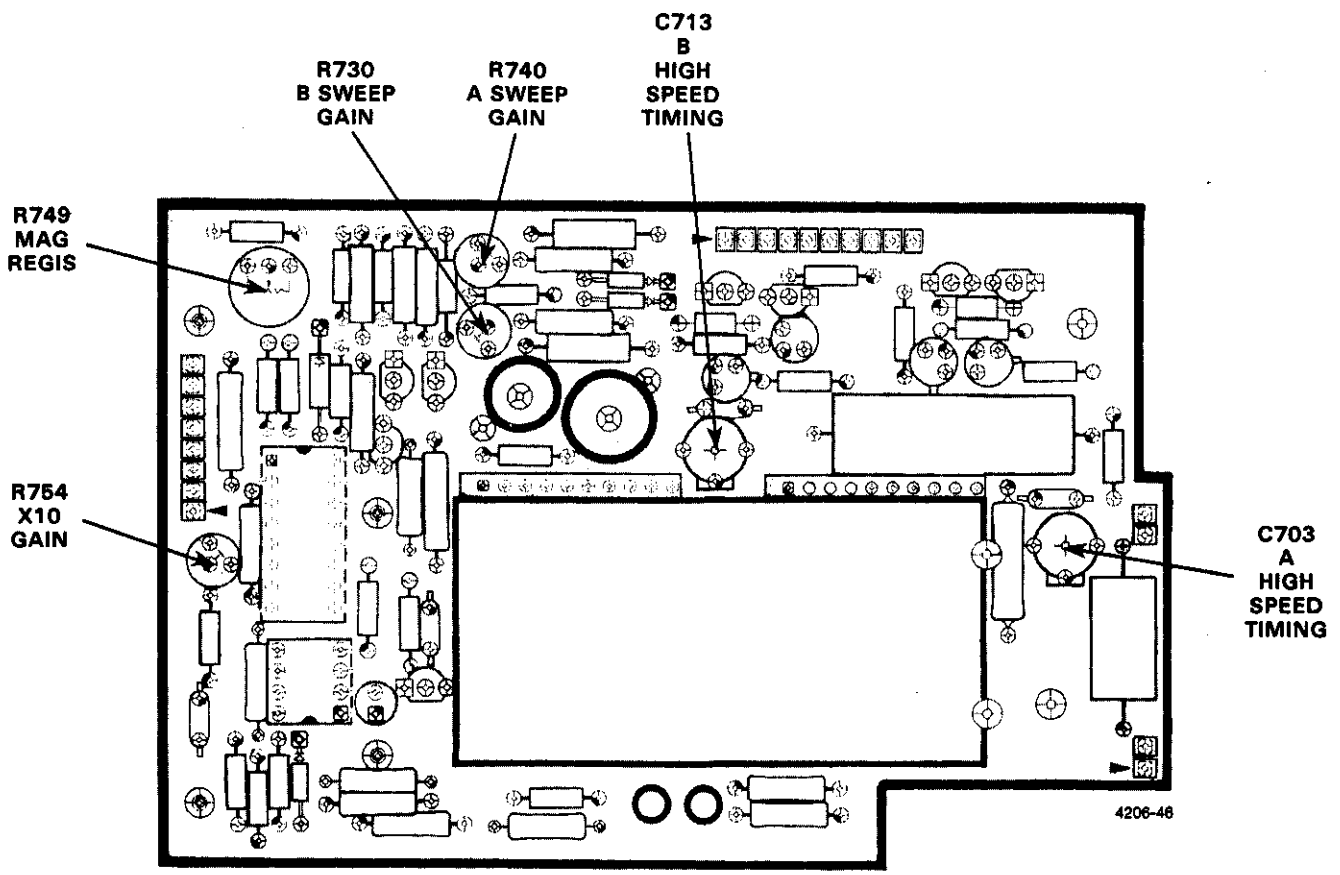
A1—MAIN BOARD ADJUSTMENT LOCATIONS

428-44

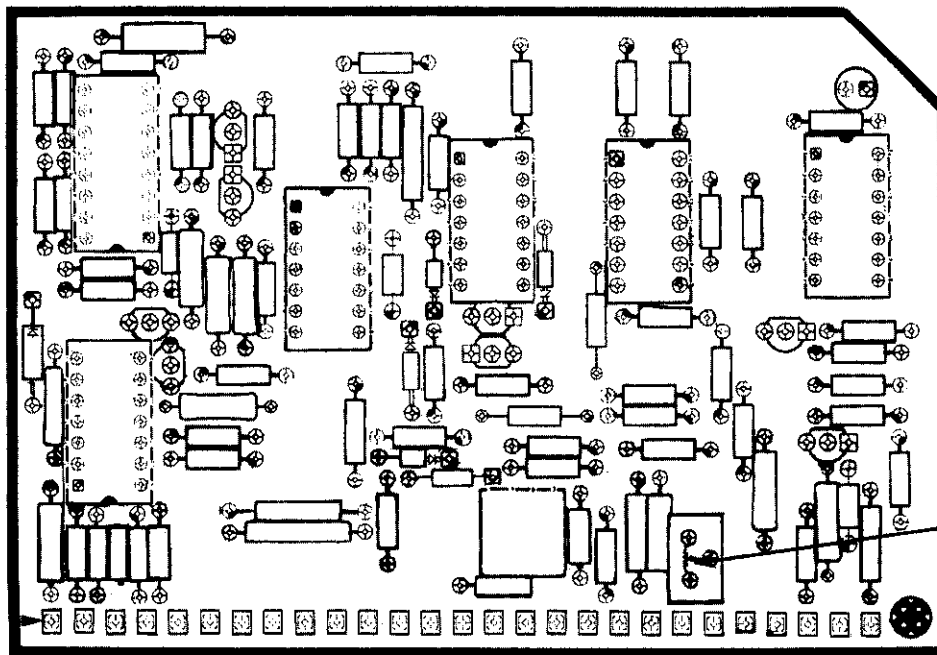


A2-ATTENUATOR BOARD ADJUSTMENT LOCATIONS

4200-45



A4—TIMING BOARD ADJUSTMENT LOCATIONS



4206-47

A5-ALT SWEEP LOGIC BOARD ADJUSTMENT LOCATIONS

GENERAL NOTES

- A. Use schematic diagrams, the overall block diagram, circuit board illustrations, and circuit descriptions when analyzing instrument malfunctions and locating test points. The schematic diagrams include typical waveforms and voltages that are intended as an aid in troubleshooting.
- B. Always set the POWER switch to OFF and unplug the line cord before swapping, removing, or replacing components, and before connecting or disconnecting instrument leads and cables.
- C. When analyzing circuit malfunctions, consider connectors and cables as possible causes of failure.

SPECIFIC NOTES

1. Set initial front-panel controls as follows:

POWER Switch	ON (button in)
A INTENSITY	Midrange
FOCUS	Midrange
Vertical POSITION	Midrange
VERTICAL MODE	CH 1
CH 1 VOLTS/DIV	0.1V
CH 1 VOLTS/DIV Variable	Cal detent
CH 1 AC-GND-DC	GND
Horizontal POSITION	Midrange
HORIZONTAL MODE	A
A SEC/DIV	0.1ms
A SEC/DIV Variable	Cal detent
X10 Magnifier	Off (knob in)
A TRIGGER Mode	P-P AUTO
A&B INT	VERT MODE
A SOURCE	INT

2. Verify the low-voltage power supplies at the following test points:

SUPPLY	TEST POINT	TOLERANCE
+5.2V	W968	5.04 to 5.36V
+8.6V	W960	8.43 to 8.77V
-8.6V	TP961	-8.56 to -8.64V
+30V	W956	29.1 to 30.9V
+100V	W954	97 to 103V

NOTE

A HV probe is required to measure the -2kV supply. Turn off the power and make the test equipment connections to the oscilloscope. Set the voltmeter to read at least -3kV, then turn the oscilloscope power back on to take the reading. After obtaining the reading, turn off the oscilloscope power to disconnect the test equipment connections, and replace the crt socket cover.

Verify the -2kV supply at pin 2 of the crt socket. The voltage should be between -1900 and -2100V.

3. **WARNING**

The Preregulator and Inverter circuits have a floating common reference with respect to chassis ground. Ac-source potential is present on the common reference points. Connect the instrument to the ac-power source through an isolation transformer to prevent the possibility of personal injury or equipment damage when troubleshooting these circuits.

