OPERATING INSTRUCTIONS FOR

SYLVANIA

Type 108
Cathode-Ray Oscilloscope

Sylvania Electric Products Inc.

Industrial Apparatus Plant

Emporium, Pennsylvania

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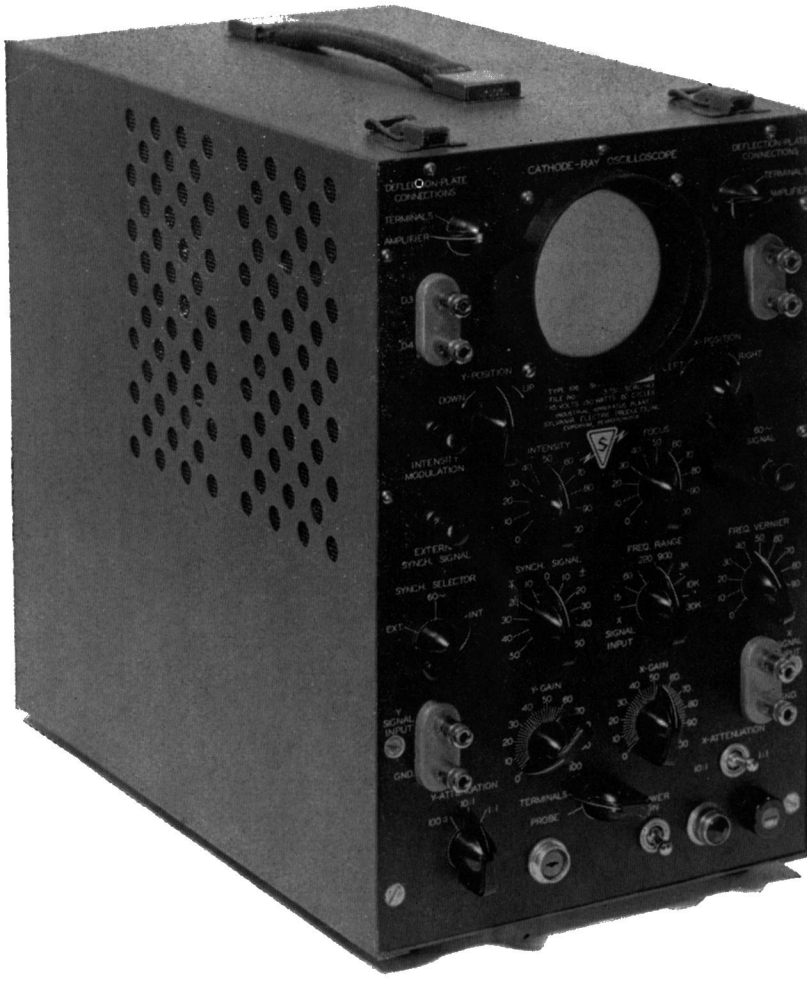
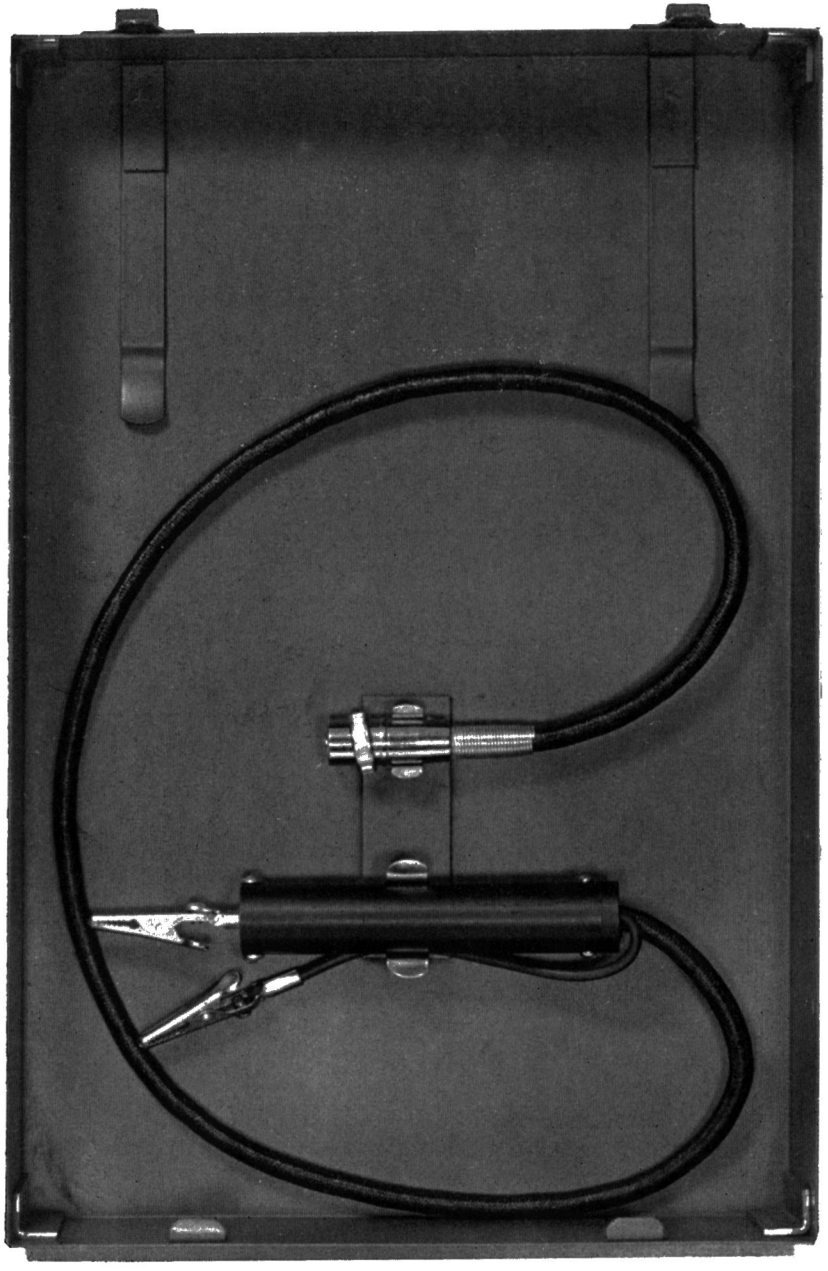

CATHODE-RAY OSCILLOSCOPE
DEFLECTION-PLATE CONNECTIONS
TERMINALS
AMPLIFIER
Y-POSITION
UP
DOWN
INTENSITY MODULATION
INTENSITY
FOCUS
LEFT
RIGHT
X-POSITION
60~ SIGNAL
EXTERN. SYNCH. SIGNAL
SYNCH. SELECTOR
EXT.
INT.
SYNCH. SIGNAL
FREQ. RANGE
FREQ. VERNIER
X SIGNAL INPUT
Y SIGNAL INPUT
GND.
Y-GAIN
X-GAIN
Y-ATTENUATION
X-ATTENUATION
PROBE
POWER



Sylvania Oscilloscope Type 108

GENERAL SPECIFICATIONS

INSTRUCTIONS

GENERAL SPECIFICATIONS

I. Cathode-Ray Tube:

Type 3GP1
Accelerating Potential ..... 1000 Volts

II. Input Impedance:

	Terminals	Probe	Direct (Balanced)	Direct (Unbalanced)
a. Y-Axis	2 meg. 25 mmf.	1 meg. 16 mmf.	10 meg. 20 mmf.	5 meg. 25 mmf.
b. X-Axis	2 meg. 25 mmf.		10 meg. 20 mmf.	5 meg. 25 mmf.

III. Amplifier Frequency Response:

Y-Axis ..... Sine wave response uniform within 3 db from 10 cycles to 2 megacycles at any attenuator setting.
X-Axis ..... Uniform within 3 db from 10 cycles to 100 kilocycles at any attenuator setting.

IV. Deflection Factor:

a. With Amplifier
Y-Axis Terminals ..... 0.1 volts r.m.s./inch deflection
Y-Axis with Probe ..... 0.4 volts r.m.s./inch deflection
X-Axis Terminals ..... 0.7 volts r.m.s./inch deflection

b. To Deflection Plates
Y-Axis ..... 25 volts r.m.s./inch deflection
X-Axis ..... 28 volts r.m.s./inch deflection

V. Horizontal Sweep:

Frequency Range ..... 15 to 30,000 c.p.s.
Direction of Sweep ..... Left to right
Synchronizing Signal Sources ..... Internal (Y-Signal)
60 cycles
External
Synchronizing Polarity ..... Either polarity of synch. signal

VI. Power Supply Source:

Potential ..... 115 volts
Frequency ..... 60 cycles
Power Consumption ..... 150 Watts
Fuse Protection ..... 2 Amps.

VII. Physical Specifications:

Height ..... 14 inches overall
Width ..... 8¾ inches overall
Depth ..... 16¾ inches overall
Weight ..... 49 pounds

INSTRUCTIONS

I. POWER SUPPLY:

a. Precautions:

Due to potential differences as high as 1500 volts in the Sylvania Type 108 Oscilloscope, great care should be exercised when operating this piece of equipment out of its cabinet, and this only when necessary.

b. Characteristics:

The Sylvania Type 108 Oscilloscope is designed for operation on 115 V. 50-60 cycles only. The high voltage section of the power supply delivers approximately 1000 volts negative with respect to ground to the cathode of the 3GP1. The low voltage section delivers approximately 400 volts positive and a regulated EMF of 200 volts to the low-level stages.

c. Regulated Supply:

Adjustment of the regulated voltage is made by varying a potentiometer available through a hole in the side of the base chassis. A voltmeter should always be used when this adjustment is made to return the output to 200 volts.

II. Operation:

a. Cathode-Ray Tube Controls:

To place the oscilloscope into operation the power switch is thrown upward to the Power-On position, making certain the pilot light comes on. Set the X and Y-Positioning Controls so that the knobs point upward, and advance the focus and intensity controls to about ⅔ of their maximum rotation. Final adjustment of controls is made after the tubes reach their operating temperature. For general use, the intensity should be kept at as low a level as permits sufficient viewing. A spot or trace of high intensity, stationary on the screen for any appreciable length of time, will result in burning of the screen.

b. Sweep Circuit:

1. Frequency Adjustments:

Controls for the sweep oscillator circuit are the Snych. Selector and Frequency Range Switches and the Synch.

Signal and Frequency Vernier Potentiometers. Adjustment of the Frequency Range Switch gives an approximate frequency, while the exact frequency is obtained through variation of the Frequency Vernier Control. The range of the linear sweep is from 15 to 30,000 cycles per second. The letter K on the panel represents Kilo, or one thousand.

2. Synchronizing Controls:

The Synch. Selector Switch makes it possible to use synchronizing voltages from one of three sources: internal, 60 cycles, or external. A binding post is placed on the panel for introduction of the external voltage. The amount of synchronizing voltage applied to the oscillator is controlled by the Synch. Signal Control. The minimum synchronizing voltage necessary to keep the pattern stationary on the screen should be used to prevent non-linearity of the sweep. This prevents waveform distortion from this source. Polarity of the synchronizing voltage is controlled by selecting the desired side of the zero setting of the Synchronizing Signal Control. With the potentiometer set on the $\pm$ side of zero, the sweep synchronizes on the negative half-cycle of an external synchronizing signal or the positive half-cycle of an internal synchronizing signal. On the $\mp$ side, the reverse is true.

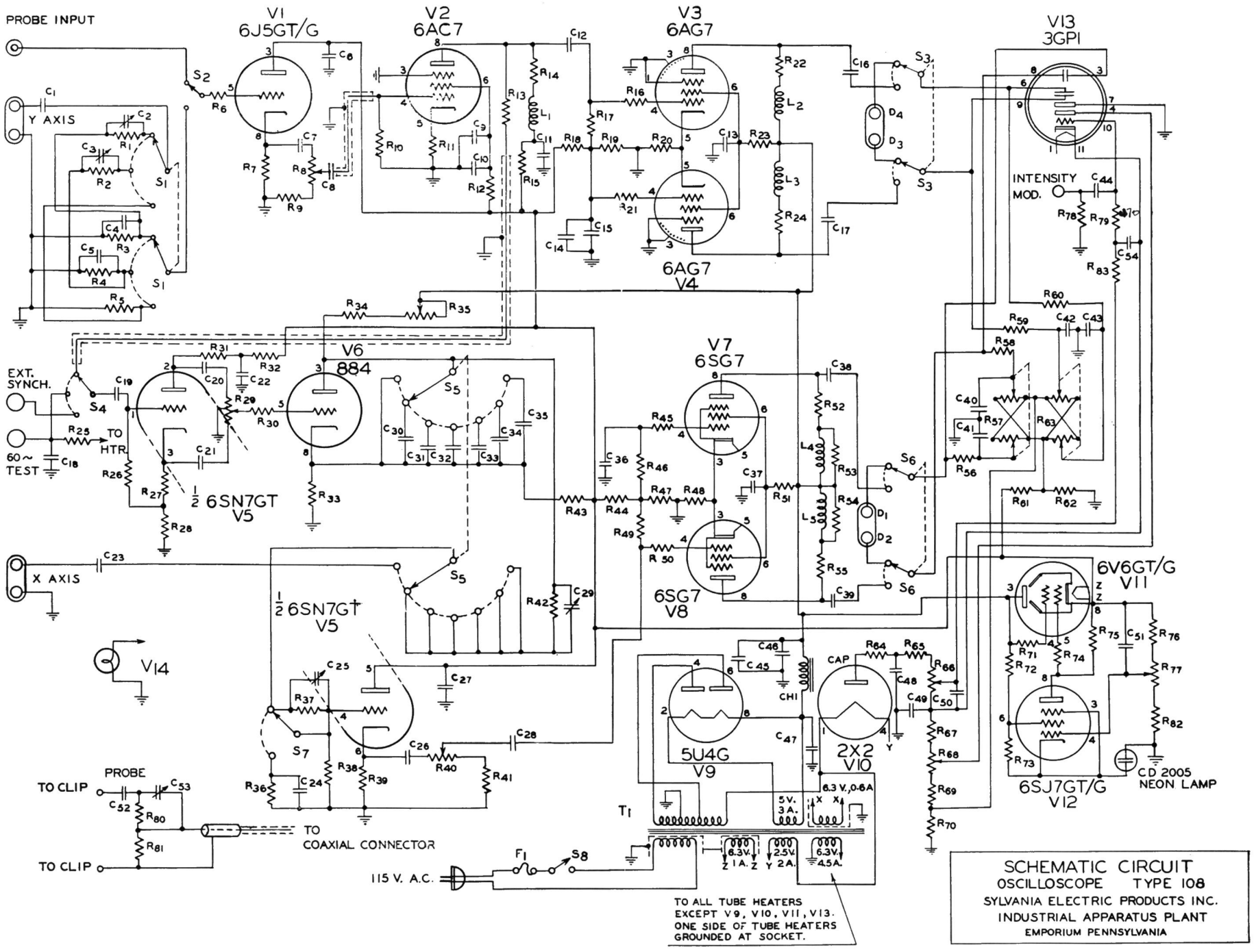
c. Y-Axis:

1. Deflection Plates:

The Y-Axis, or vertical, inputs are: direct input to the deflection plates, direct input to the amplifiers, and probe input to amplifiers. For direct input to the deflection plates, the input is brought to binding posts D3 and D4 and the Deflection-Plate Connections Switch is turned to Terminals. Connections are made directly to the deflection plates when the frequency of the applied signal is too high for distortionless amplification by the amplifiers.

2. Amplifier:

Direct input to the amplifier is made to the binding posts on the lower left of the panel, with the Terminals-Probe Switch in the Terminals position, and the Deflection-Plate Connections Switch in the Amplifier position.


PROBE INPUT
V1
6J5GT/G
V2
6AC7
V3
6AG7
V13
3GP1
Y AXIS
S2
S1
S3
S4
S5
S6
S7
S8
INTENSITY MOD.
EXT. SYNCH.
60~ TEST
TO HTR
V6
884
½ 6SN7GT
V5
V7
6SG7
V8
6AG7
V4
X AXIS
V14
6V6GT/G
V11
6SJ7GT/G
V12
CD 2005
NEON LAMP
5U4G
V9
2X2
V10
CAP
CH1
T1
PROBE
TO CLIP
TO CLIP
TO COAXIAL CONNECTOR
115 V. A.C.
F1
6.3 V.,0.6A
5V. 3A.
6.3V. 1A. Z
2.5V 2A. Y
6.3V. 4.5A.
TO ALL TUBE HEATERS EXCEPT V9, V10, V11, V13. ONE SIDE OF TUBE HEATERS GROUNDED AT SOCKET.
SCHEMATIC CIRCUIT
OSCILLOSCOPE TYPE 108
SYLVANIA ELECTRIC PRODUCTS INC.
INDUSTRIAL APPARATUS PLANT
EMPORIUM PENNSYLVANIA

PARTS LIST

C Sub.		C Sub.	
1	0.25-400V	28	0.5-200V
2	3-12 μμfd.	29	4-30 μμfd.
3	3-12 μμfd.	30	0.15-400V
4	0.001 mica	31	0.04-400V
5	0.0001 mica	32	0.01-600V
6	0.25-400V	33	0.0025-400V
7	100 μfd. 50V Electrolytic	34	0.0006 mica
8	0.25-400V	35	0.0002 mica
9	0.5-400V	36	0.25-200V
10	0.5-400V	37	0.5-600V
11	4-600V	38	0.1-600V
12	0 1-400V	39	0.1-600V
13	0.5-600V	40	0.01-600V
14	0.25-200V	41	0.01-600V
15	50 μfd. 50V Electrolytic	42	0.01-600V
16	0.1-600V	43	0.01-600V
17	0.1-600V	44	0.05-2000V
18	0.5-200V	45	4-600V
19	0.05-400V	46	4-600V
20	0.1-400V	47	4-600V
21	0.1-400V	48	0.5-1500V
22	0.5-600V	49	0.5-1500V
23	0.5-200V	50	0.5-200V
24	0.0001 mica	51	0.5-600V
25	3-12 μμfd.	52	0.05-400V
26	100 μfd. 50V Electrolytic	53	4-30 μμfd.
27	0.25-400V	54	0.005 μfd.-600V

S1	D.P.3.T.	F1	Fuse Ext.
S2	S.P.D.T.	L1	0.175 mh. choke
S3	D.P.D.T.	L2	0.175 mh. choke
S4	S.P.3.T.	L3	0.175 mh. choke
S5	D.P.7.T.	L4	10 mh. choke
S6	D.P.D.T.	L5	10 mh. choke
S7	S.P.D.T.		
S8	S.P.S.T.		
T1	Pwr. Trans.		
Ch1	Filter choke		

Note:—All cond. values in μfds. & all resistor values in ohms unless otherwise specified.

PARTS LIST

Continued

R Sub.		
1	1 meg.	½W 5%
2	1 meg.	½W 5%
3	10K	½W 5%
4	110K	½W 5%
5	1 meg.	½
6	47	½
7	1K	½
8	2K	Pot.
9	220	½
10	470K	½
11	150	½
12	56K	1W
13	100K	½
14	4700	½
15	10K	2W
16	47	½
17	470K	½
18	100K	1W
19	15K	½
20	500	5WNI
21	47	½
22	3500	10WNI
23	12.5K	10W
24	3500	10WNI
25	33K	½
26	470K	½
27	1500	½
28	8200	½
29	200K	C. T. Pot.
30	22K	½
31	10K	1W
32	10K	1W
33	1.5K	½
34	680K	1W
35	4 meg.	Pot.
36	120K	½W 5%
37	1 meg.	½W 5%
38	1 meg.	½
39	10K	½
40	10K	Pot.
41	1K	½
42	1 meg.	½

R Sub.		
43	68K	2W
44	100K	1
45	47	½
46	1 meg.	½
47	15K	½
48	2.2K	1W
49	1 meg.	½
50	47	½
51	82K	2W
52	39K	2W
53	22K	½
54	22K	½
55	39K	2W
56	4.7 meg.	½
57	4 meg.	dual pot.
58	4.7 meg.	½
59	4.7 meg.	½
60	4.7 meg.	½
61	100K	½
62	100K	½
63	4 meg.	dual pot.
64	10K	1W
65	100K	1W
66	100K	Pot.
67	150K	1W
68	500K	Pot.
69	680K	1W
70	220K	½
71	1K	½
72	330K	1W
73	47K	½
74	150	½
75	470K	½
76	68K	½
77	75K	Pot.
78	1 meg.	2W
79	470K	1W
80	750K	1W 5%
81	240K	½W 5%
82	33K	½
83	22K	½

3. Probe:

Probe input to the amplifier is made through the Probe with the Terminals-Probe Switch in Probe position. The Test Probe consists of a frequency compensated 4:1 attenuator in an insulated probe supplied with a length of coaxial cable and a connector. The input capacitance of the Test Probe is about 16 mmf. This permits connection to relatively high-impedance points without serious loading effects on these circuits.

4. Sensitivity:

Y-Axis gain is controlled by the Y-Gain potentiometer and Y-Attenuation Switch. The frequency compensated Y-Axis Attenuator gives ratios of 1:1, 10:1, and 100:1. The cathode-follower input stage is so designed that the extreme counter-clockwise position of the gain control does not reduce the signal amplitude to zero, but to approximately 10 per cent of the "full gain" position. By using the Y-Attenuator in conjunction with the Y-Gain control, a continuous adjustment of input gain is had of input voltages ranging from about 0.1 to 300 volts. Maximum voltages for the 1:1, 10:1, and 100:1 ratios of the Y-Attenuator are about 3, 30, and 300 volts R.M.S. respectively. Overloading of the amplifier is prevented as long as the entire pattern is kept on the screen.

d. X-Axis:

1. Deflection Plate:

The X-Axis, or horizontal, inputs are: direct input to the deflection plates and direct input to the X-Amplifiers. For direct input to the deflection plates, the input is brought to binding posts D1 and D2, and the Deflection-Plate Connections Switch is turned to Terminals.

2. Amplifiers:

Direct input to the amplifiers is made to the binding posts on the lower right of the panel, with the Deflection-Plate Connections Switch in the Amplifier position, and the Frequency Range Switch turned to its extreme counter-clockwise, or X-Signal Input, position.

3. Sensitivity:

X-Axis gain is controlled by the X-Gain potentiometer and the X-Attenuation Switch. The X-Attenuation Switch

gives ratios of 1:1 and 10:1. To prevent overloading the amplifiers, the voltage input to the X-Amplifier should not exceed 5 volts with the attenuator switch in the 1:1 position, nor exceed 50 volts in the 10:1 position.

e. Precautions:

Care should be taken to prevent exceeding the D-C ratings of the input condensers to the horizontal and vertical amplifiers. The horizontal amplifier input condenser is rated at 200 volts D-C, and the vertical input condenser at 400 volts D-C.

f. Intensity Modulation:

The Intensity Modulation Binding Post connects to the grid of the cathode-ray tube, permitting the introduction of blanking pulses of any desired magnitude or waveform. Caution: The modulation voltage should be kept low enough to prevent cathode-ray grid current from flowing on positive peaks.

g. 60 Cycle Test Signal:

A signal of power line frequency having an amplitude of approximately 2.2 volts peak to peak is provided at the front panel as a source of test signal.

III. MAINTENANCE:

a. Components:

All electrical components of the Type 108 Oscilloscope are hermetically sealed; all paper condensers being of the oil-filled, sealed can type. Should replacement of any components become necessary, use only units meeting the above requirements.

b. Parts Placement:

Tube and filter condenser placement is shown on the chassis label cemented to the side of the base chassis.

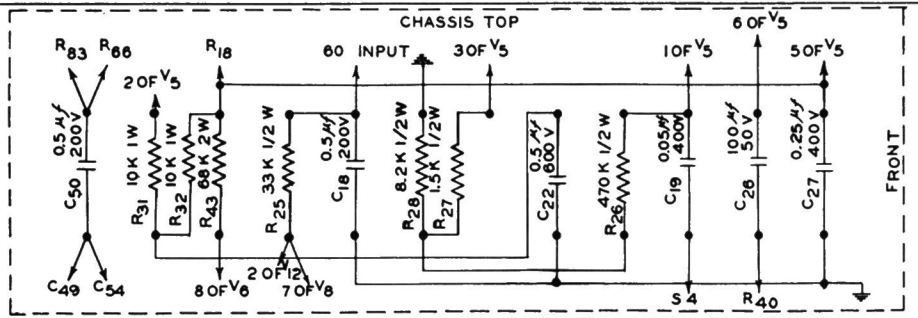
c. Removal of Unit from Cabinet:

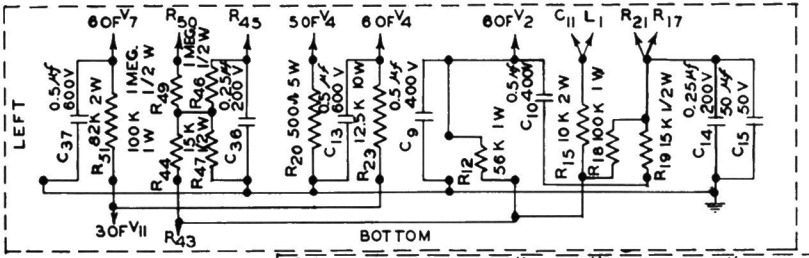
Removal of the chassis from the cabinet is accomplished by removing seven retaining screws from the top of the panel and two from the rear of the cabinet.

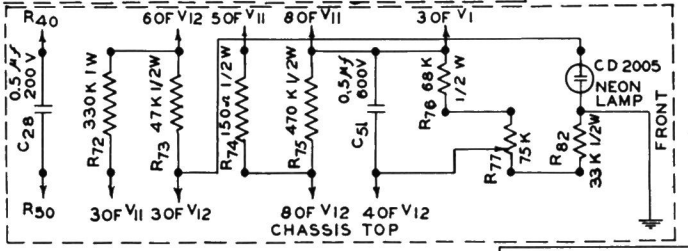
d. Mounting Strip Assemblies:

The following page is a drawing of the mounting strip schematics giving the circuit number and electrical value of each part.

A-237







REVISIONS

WIRED TERMINAL ASS'Y
FOR - TYPE 108
SYLVANIA ELECTRIC PRODUCTS INC.

SCALE	JOB 1A-26	REF.
DRAWN E.B. 5-12-43	Pc. 4749	A-237
CHECKED		