PHILIPS

1101U, 1200U

Nineteen-valve five-channel television receiver with 12-in. tube giving a 10 by 7½-in. picture. Model 1101U is in walnut finished table cabinet and 1200U in a similarly finished console. Suitable for 200-250V AC/DC. Manufactured by Philips Electrical, Ltd., Century House, Shaftesbury Avenue, London, WC2.

THE receiver employs a superheterodyne circuit, operating on lower sideband of vision carrier, in which the RF and frequency-changer stages are common to vision and sound channels. Vision interference and sound noise suppression circuits are incorporated and EHT is obtained from line flyback. Channel selection is by plugging in an appropriate set of aerial, RF and oscillator coils and retuning oscillator trimmer.

Mains consumption approximately 150W.

Aerial input is for use with screened 75-ohm balanced feeder, which is isolated from chassis by C1 C2 C3, but coupled to the earth terminal through static drain resistors R1 R2. Aerial signal is fed either direct, or through a 10 to 1 attenuator consisting of R3 to R7, to L3, which is inductively coupled to tuned input tranformer L1 L2 in grid of RF amplifier V1.

RF stage. Signal is amplified by RF amplifier V1, the gain of which is pre-set by **Sensitivity** control R17 in its cathode. Parallel-fed bandpass transformer L4 L5 leads through C10 to frequency-changer V2. Damping by R11 R18 provides bandwidth covering both vision and sound frequencies.

Oscillator. A Colpitts type tuned circuit L6 C11 C12 C13 TC3 is connected between screen and grid of frequency-changer V2 through L5, C10. Automatic bias for V2 is developed on C10 with R20 as leak. The circuit operates 12 mc/s lower than the vision carrier.

Frequency-changer. Aerial and oscillator signals are mixed in V2 and produce in the anode, across L15 and L17, intermediate frequencies of 12 mc/s vision and 8.5 mc/s sound.

Vision channel. Vision IF is coupled by double-tuned bandpass transformer L15 L16 to first vision IF amplifier V7, the gain of which is controlled by **Contrast** control R23 in its cathode, and is thence bandpass transformer coupled by L21 L18 to a second IF amplifier V8, the output of which is finally bandpass transformer coupled by L19 L20 to diode rectifier V9A.

Transformer L21 L18 is over-coupled to resonate at approximate 13.5 mc/s with 6dB response peaks at 9.6 mc/s and 17 mc/s, whilst L19 L20 is arranged to resonate with the valve capacitance at about 30 mc/s to increase the rate of attenuation at the higher frequencies to increase undesirable harmonic and beat-frequency discrimination. Sound on vision rejection is by L17 C17 in anode V7 and by L22 C19 in anode V8.

Rectified vision signal at cathode of diode V9A is DC coupled through R38 to video amplifier V10, the output of which is DC coupled to cathode of CRT. L23, L43 in anode V10 are 3 mc/s peaking coils.

Interference limiter is diode V9B connected with its cathode to anode V10 and its anode to R31, which forms part of potential dividing network R93 R32 R33 across boosted HT line.

Setting of R31, **Picture interference limiter,** is adjusted so that the diode remains cut-off up to, and just above, peak white amplitude of video signal. Pulses greater in amplitude than peak white cause V9B to conduct and are short-circuited to chassis through C21.

Sound channel. Sound IF signal at anode of V2 is coupled by L7 L8 to first sound IF amplifier V3. Amplified signal at its anode is shunt auto-transformer fed by L9 L10 to a second IF amplifier V4A, the output of which is single peak transformer coupled by L11 L12 to detector diode V5A.

Audio signal across R62 is fed by C36 through series noise suppressor diode V5B, **Volume control** R64 and C39 to grid of triode AF amplifier V4B. Amplified signal is fed to pentode amplifier V6, which is transformer coupled by OP1 to a 5-in. PM speaker L44.

An anti-parasitic device consisting of a Ferrox-cube magnetic ring, through which grid lead to V6 passes, is fitted close to valveholder tag. The magnetic field surrounding the grid lead couples directly with the magnetic field of the ring and the ring functions as a magnetic short circuit damping out any RF oscillation.

Negative feedback from anode to grid V6 is provided by C42 R68.

AVC. DC potential across R61 is divided by R57 R51 and applied through L8 to grid of first sound IF amplifier V3. AVC control characteristic is modified by connecting earthy end of R61 to cathode V4A.

Noise suppressor. Diode V5B is maintained conducting by negative cathode bias obtained through R63 from R61 whilst signal is being received. With V5B conducting rectified audio signal fed to its cathode by C36 is passed through to volume control R64. When an interference pulse appears with audio signal, cathode V5B is driven heavily positive but due to comparatively long time-constant of R65, in conjunction with screened lead capacity, the anode is unable to change as rapidly and the diode cuts off.

Sync separator. Video signal at anode V10 is fed through R40 C24, to grid of sync separator V14A. The positive sync pulses drive valve into grid current and a negative charge is built up on C24 sufficient to place video signal below cut-off, thus sync pulses appear at anode.

Frame sync pulses are integrated by R94 C60 and fed by C55 through R100 to grid of pentode frame clipper V19A. This valve is operated with low anode and screen voltages to provide short grid base and its grid is positively biased from junction R96, R97 to give efficient grid clamping. Negative integrated frame sync pulses cut off V19A and its anode voltage rises to half the full HT line voltage (this is determined by voltage drop across R98, which form one section of a potential divider across HT line). The sudden increase of current through primary L33 of FT1 produces a positive triggering voltage at the grid of frame scan oscillator V19B.

Line sync pulses are fed by C25 R47 to grid of line clipper triode V14B. The negative-going pulse cuts off the valve, thus removing any noise occuring during the duration of synchronising pulse. The positive pulse at anode V14B is differentiated by C26 R50 and fed through C27 to grid of a further triode line clipper V15A. This valve has a short grid base and only the positive sync pulses will cause anode current flow. Negative sync pulses developed at anode are fed by C45 to anode of line scan oscillator V15B.

Frame scan oscillator is triode V19B operated as a grid blocking oscillator with anode to grid back-coupling by transformer FT1. Scan voltage is developed on C61. Variation of oscillator HT by R92 gives **Frame amplitude** control and adjustment of R102 in grid gives **Frame hold** control.

Frame amplifier. Scan voltage on C61 is fed by C60 through waveform correcting network R107 C59 to grid of pentode V20, the amplified output of which is transformer coupled by FT2 to frame deflector coils L38 L39 on neck of CRT. Negative feedback to improve linearity is provided by C62 R105 R106 C58.

Line scan oscillator is pentode V15B operated as a grid-blocking oscillator with anode to grid back-coupling by transformer LT1. Scan voltage is developed on C46. Variation of series charging resistance by R76 gives **Line hold** control.

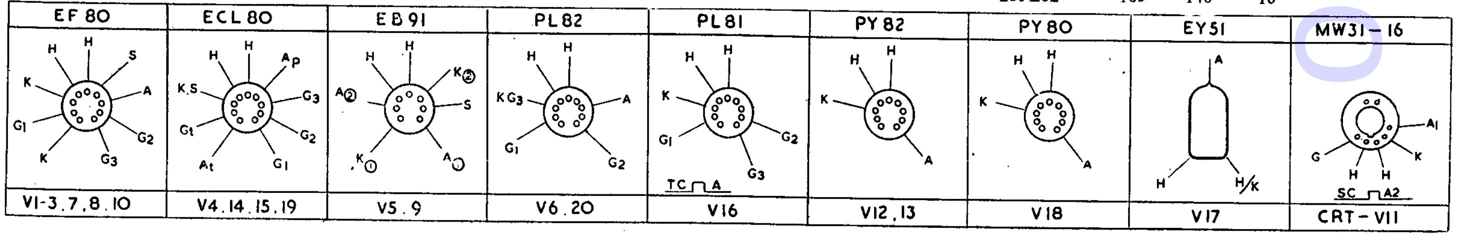
Line amplifier. Scan voltage is taken from screen of V15B and applied through C48 R81 to grid of pentode line amplifier V16 the amplified output of which is fed by transformer LT2 to line deflector coils L40, L41 on neck of CRT. **Line amplitude** is controlled by variation of inductance of series coil L42. R85 C51 damp out ringing in L42 during flyback and also assist linearity.

Booster diode is V18, the anode of which is fed

Continued overleaf

VOLTAGE READINGS

V	Type	A	G2	K	Remarks
1	EF80	130 to 175	165 to 180	2.5 to 6.2	R17 max to min.
2	EF80	170	135	0	—4V at G1
3	EF80	145	165	3	No signal.
4A, 4B	ECL 80	135, 60, 60	140, —, —	3.3	
5A, 5B	EB 91	—, —	—, —	—, —	
6	PL82	115 to 150	130 to 160	5 to 10.5	R71 Min to Max.
7	EF80	155 to 175	155 to 175	1.8 to 5.8	R23 Max to min.
8	EF80	165	163	1.9	
9A, 9B	EB91	—	—	—	
10	EF80	130	160	2.2	No signal.
11	MW31–16	8.5 to 11KV	380	130	
12, 13	PY82, PY82	210 RMS	—	200	Total cathode current = 240MA
14A, 14B	ECL 80	40, 40	9	0	No signal.
15A, 15B	ECL 80	25, 185	—, 165	0	No signal but V15B oscillating.
16	PL81	380	90	0	
17	EY51	—	—	8.5 to 11KV	
18	PY80	—	—	380	
19A, 19B	ECL 80	5, 90	15, —	0	
20	PL82	165	140	10	



from separate secondary L30 of line output transformer LT2. During line scan the constant voltage set up on L30 charges up capacitor C52 through V18 and this voltage is added to main HT line voltage to supply higher HT to anode of line amplifier V16 and first anode of CRT.

EHT of approximately 9kV is obtained by rectification by V17 of the high surge voltage set up across primary L27 and its over-wind L26 when V16 is cut-off. EHT is smoothed by C50 and fed through R84 to final anode of CRT. Capacity between inner and outer coatings of CRT provides additional smoothing.

HT is provided by a pair of half-wave indirectly-heated rectifiers V12 V13 connected in parallel and fed from the mains through surge limiters R114, R115 and droppers R116, R117 on 245V; R116 on 220V; and direct on 200V supplies.

Choke-capacity smoothing is by R45 C71 C73. Additional smoothing for HT feed to V4—V6 of sound channel is given by section L36 of focus coil with C40. HT line is RF decoupled by C74. Reservoir smoothing capacitor C71 should be rated to handle 500mA ripple.

Heaters of all valves except EHT rectifier V17 are connected in series and obtain their current from the mains through thermal surge limiter R121 shunted by R118 and droppers R119 R120 on 245V, R120 on 220V and direct on 220V supplies. Heater line is RF decoupled by C67 to C70. S3, which is ganged to volume control R64, is on/off switch. Mains input incorporates a 2A fuse in each lead and is fitted with filter coil L46.

CRT is a 12in. tetrode with electromagnetic focusing. Video signal is fed to its cathode and picture **brightness** is controlled by variation of grid voltage by R33.

Focusing of CRT is accomplished by electromagnetic coil L36 L37. Section L37 is connected from HT line through R72 to cathode of sound output valve V6. The cathode bias of V6 is variable from 5 to 11V by means of **Focus** control R71 and the anode plus screen current of V6, which is drawn through section L36 of focus coil is varied accordingly from 65 to 40mA.

ALIGNMENT INSTRUCTIONS

Preliminary adjustments: place R31 fully anti-clockwise and R17 R23 R64 fully clockwise. Set attenuator plug to Direct position. Connect 5 ohm output meter across secondary L14 of OP1.

Connect high-impedance 10V FSD valve voltmeter between cathode of CRT and chassis.

Rough IF. Feed sig/gen. output, 37.5 ohms impedance, to gl V2. Apply 11.5 mc/s and trim core L19 (top); 9.6 mc/s and trim core L21 (top); 10.6 mc/s, core L16 (bottom); and 10.3 mc/s, core L15 (top).

Sound IF. Feed 8.5 mc/s to gl V2 and trim L11 L9 L8 for maximum on sound output meter.

Sound rejectors. Feed 8.5 mc/s to gl V2. Short circuit L17 and trim L22 (bottom core) for minimum video output. Short L22 and trim L17 (bottom) for minimum.

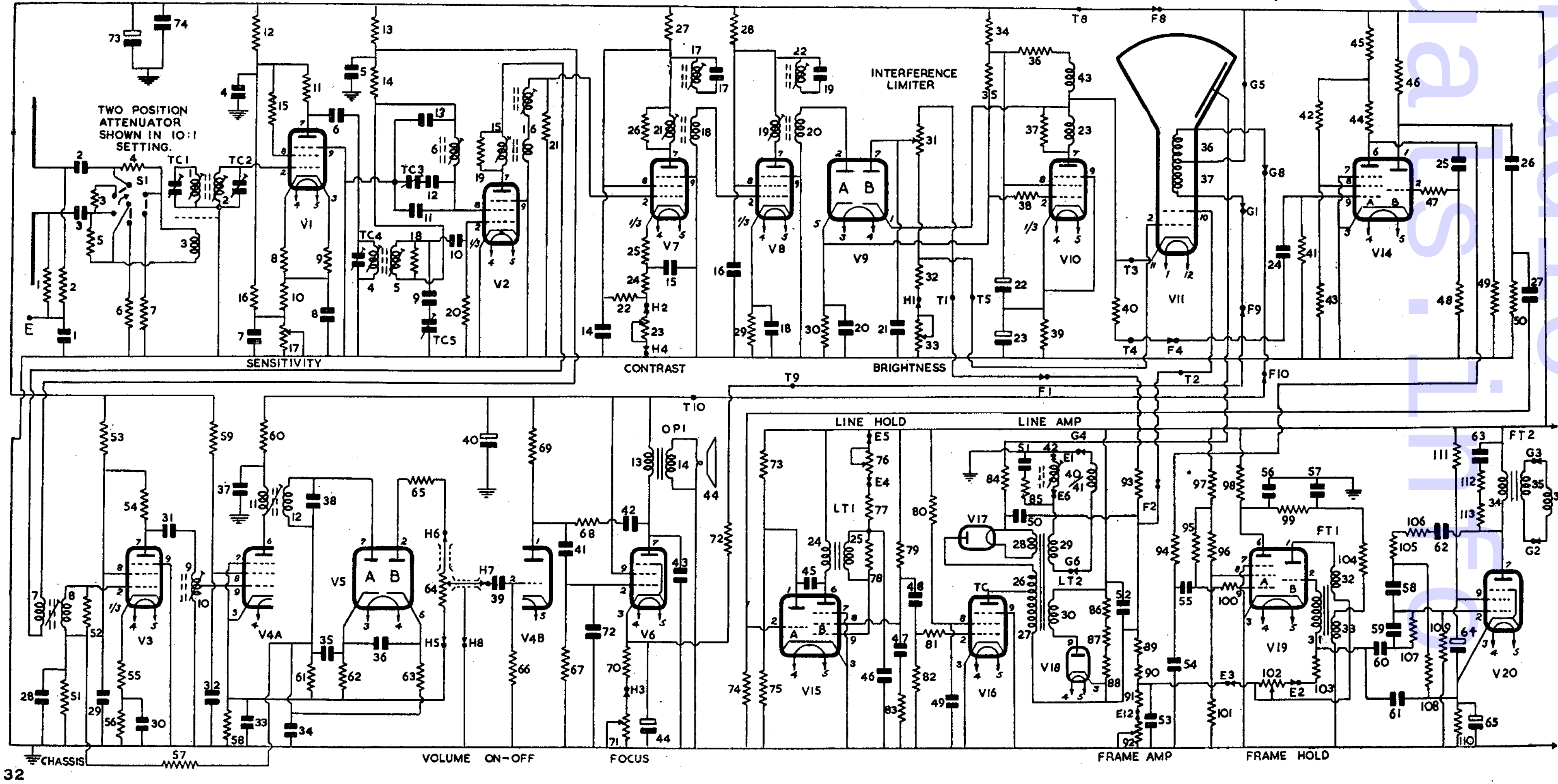
Vision IF. Feed sig/gen. output to gl V2. 11.5 mc/s and trim L19 (top); 9.6 mc/s, trim L21 (top); 10.6 mc/s, connect 680-ohm resistor in series with 1,000 pF between anode V2 and chassis, and trim L16 (bottom). Finally, connect damper between gl V7 and chassis, and trim L5 (top).

Oscillator. Apply sound frequency of channel concerned to aerial socket and trim TC3 for maximum sound output.

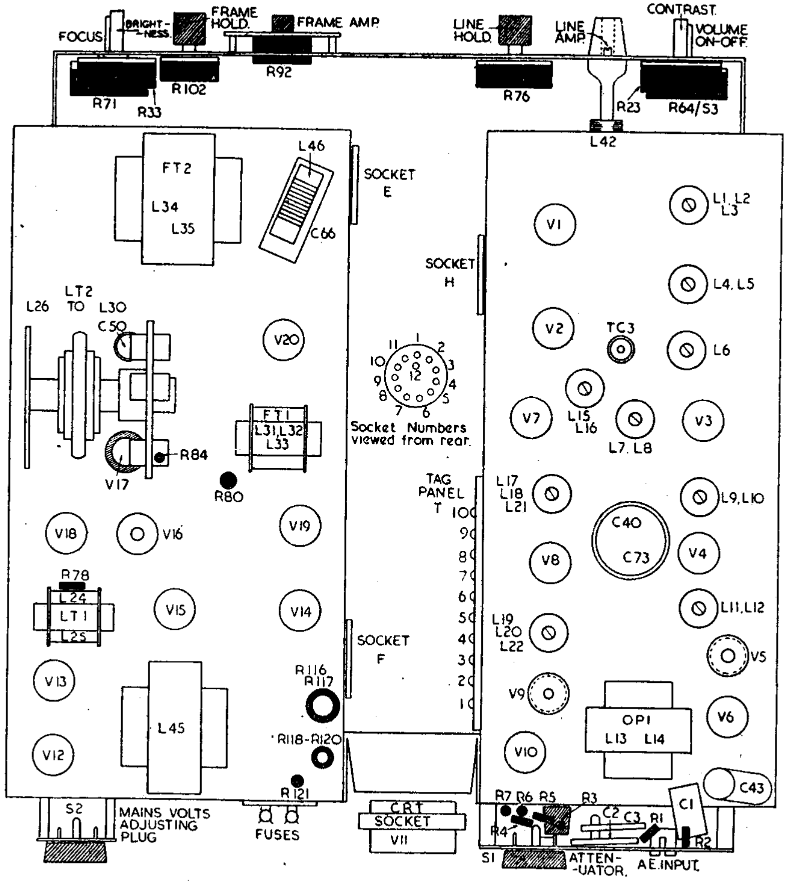
RF Circuits. With input to aerial socket apply a frequency 1.5 mc/s lower than vision carrier frequency of channel in use. Damp and trim for maximum video output as follows: damp to chassis the junction L4 C6 and trim TC5; damp to chassis gl V2 and trim TC4; damp to chassis junction L1 TC1 and trim TC2; damp to chassis gl V1 and trim TC1.

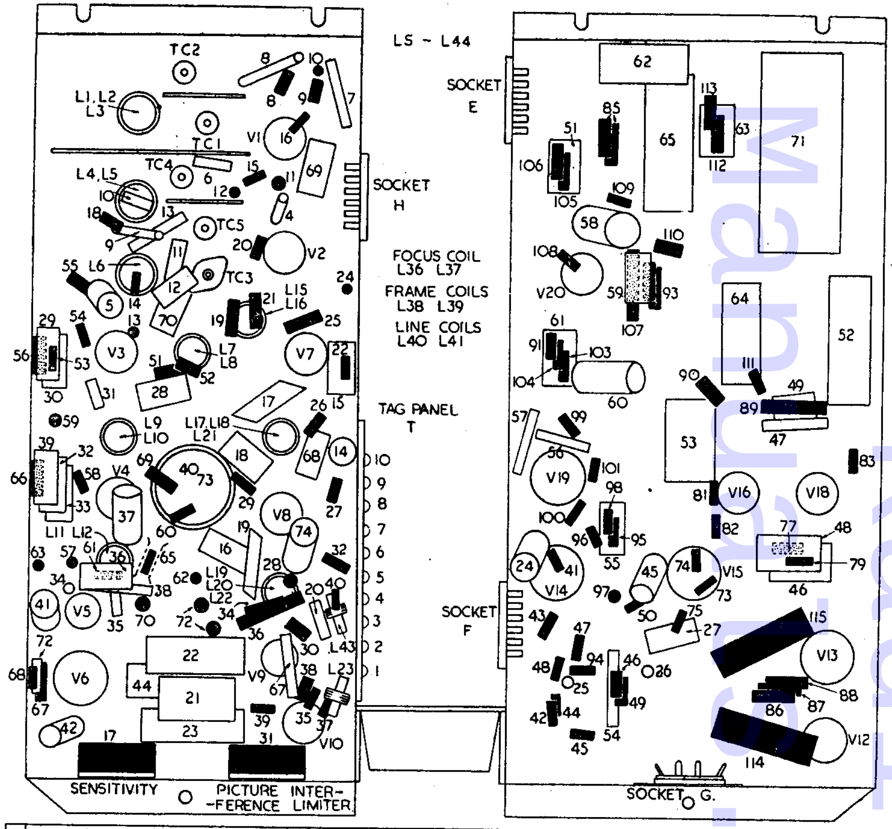
CAPACITORS

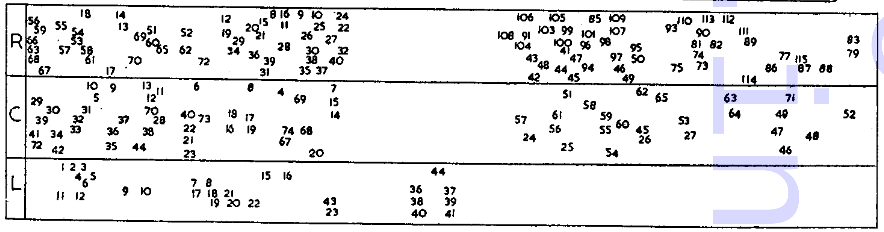
C	Capacity	Type	C	Capacity	Type
1	.0033	Tubular 800V	26	33pF	Ceramic
2	1000pF	Silver Mica	27	.0047	Tubular 400V
3	1000pF	Silver Mica	28	.047	Tubular 125V
4	560pF	Ceramic	29	.0047	Tubular 400V
5	.0047	Tubular 400V	30	.0047	Tubular 400V
6	100pF	Ceramic	31	100pF	Ceramic
7	470pF	Ceramic	32	.0047	Tubular 400V
8	470pF	Ceramic	33	.0047	Tubular 400V
9	22pF	Ceramic	34	47pF	Ceramic
10	100pF	Ceramic	35	47pF	Ceramic
11	56pF	Silver Mica	36	.068	Tubular 125V
12	39pF	Silver Mica	37	.01	Tubular 400V
13	390pF	Ceramic	38	22pF	Ceramic
14	.0047	Tubular 400V	39	.022	Tubular 125V
15	.0047	Tubular 400V	40	64	Electrolytic 250V
16	.0047	Tubular 400V	41	.015	Tubular 400V
17	330pF	Silver Mica	42	.0022	Tubular 400V
18	.068	Tubular 125V	43	.022	Tubular 800V
19	330pF	Silver Mica	44	50	Electrolytic 25V
20	8.2pF	Ceramic	45	.0022	Tubular 400V
21	.22	Tubular 400V	46	.001	Tubular 400V
22	10	Electrolytic 200V	47	470pF	Ceramic
23	100	Electrolytic 12V	48	.047	Tubular 400V
24	.01	Tubular 400V	49	.01	Tubular 400V
25	100pF	Ceramic	50	500pF	10 KV Type
			51	.015	Tubular 400V



C	Capacity	Type
52	10 Electrolytic 350V	
52	Or .047 Tubular 400V	
53	.22 Tubular 400V	
54	470pF Ceramic	
55	.01 Tubular 125V	
56	470pF Ceramic	
57	470pF Ceramic	
58	.047 Tubular 125V	
59	.015 Tubular 125V	
60	.1 Tubular 400V	
61	.022 Tubular 400V	
62	.22 Tubular 400V	
63	.22 Tubular 400V	
64	10 Electrolytic 200V	
65	100 Electrolytic 25V	
66	.01 Tubular 1000V	
67	390pF Ceramic	
68	.0047 Tubular 400V	
69	.0047 Tubular 400V	
70	.0047 Tubular 400V	
71	100 Electrolytic 275V	
72	220pF Ceramic	
73	64 Electrolytic 275V	
74	.0047 Tubular 400V	

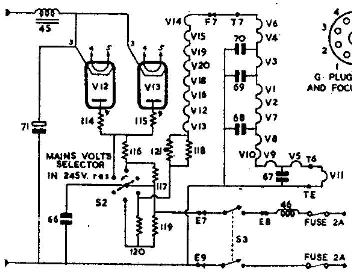


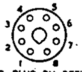




RESISTORS

R	Ohms	Watts
1	1M	½
2	1M	½
3	100	½
4	220	½
5	220	½
6	47	½
7	47	½
8	82	½
9	82	½
10	150	½
11	3.9K	1
12	1K	¼
13	1K	¼
14	22K	¼
15	27	¼
16	100K	¼
17	3K Linear WW	Potr.
18	4.7K	¼
19	8.2K	½
20	220K	¼
21	8.2K	½
22	120K	¼
23	3K Linear WW	Potr.
24	150	¼
25	47	½
26	12K	¼
27	1K	¼
28	1K	¼
29	180	¼
30	4.7K	¼
31	20K WW	Potr.
32	10K	¼
33	50K Linear	Potr.
34	2.7K	½
35	4.7M	¼
36	3.9K	1
37	47K	¼
38	1K	¼
39	270	¼
40	6.8K	¼
41	1M	¼
42	33K	¼
43	6.8K	½
44	47K	¼
45	68K	¼
46	47K	¼
47	100K	¼
48	1M	¼
49	47K	½
50	22K	¼
51	680K	¼
52	100K	¼
53	1K	¼
54	3.3K	¼
55	47	½
56	330	½
57	1.5M	¼
58	150	¼
59	18K	½
60	680	½
61	68K	¼
62	68K	¼
63	470K	¼
64	1M Log	Potr.
65	4.7K	¼
66	2.2M	¼
67	820K	½
68	680K	¼
69	220K	¼
70	68	½
71	200 Linear WW	Potr.
72	2×12K	½
73	220K	¼
74	1M	¼
75	47K	¼
76	500K Linear	Potr.
77	270K	¼
78	220K	¼
79	68K	¼
80	10K WW 10, W	
81	10K	¼
82	470K	¼
83	47K	¼
84	220K	¼
85	2×1.5K	½
86	10K or 12 K	½
87	10K or 12 K	½
88	10K or 12 K	½
89	47K	½
90	47K	½
91	22K	¼
92	20K Linear WW	Potr.
93	2×180K	½
94	100K	¼
95	2.2M	¼
96	22K	¼
97	39K	¼
98	100K	¼
99	47K	¼
100	470K	¼
101	10K	¼
102	1M Linear	Potr.
103	1.2M	½
104	47K	¼
105	180K	½
106	180K	½
107	470K HS	½
108	12K	¼
109	1M	¼
110	470	¼
111	15K	¼
112	10K	½
113	10K	½
114	40 WW	5W
115	40 WW	5W
116	27 WW	12W
117	24 WW	10W
118	530 WW	7W
119	53 WW	5W
120	60 WW	6W
121	Brimistor	CZ1




G. PLUG ON DEFLECTOR AND FOCUS COIL ASSEMBLY.

INDUCTORS

L	Ohms
1–7	Very low
8	2
9	1.5
10	1
11	1.5
12	1.5
13	230
14	.4
15	3
16	5
17	Very low
18	2
19	2.5
20	2.5
21	3
22	Very low
23	16
24	135
25	35
26	150
27	50
28	Very low
29	.5
30	20
31	210
32	180
33	250
34	1300
35	3.5
36	530
37	6800
38, 39	9.5
40, 41	4.6
42	2
43	23
44	3.5
45	50
46	.25