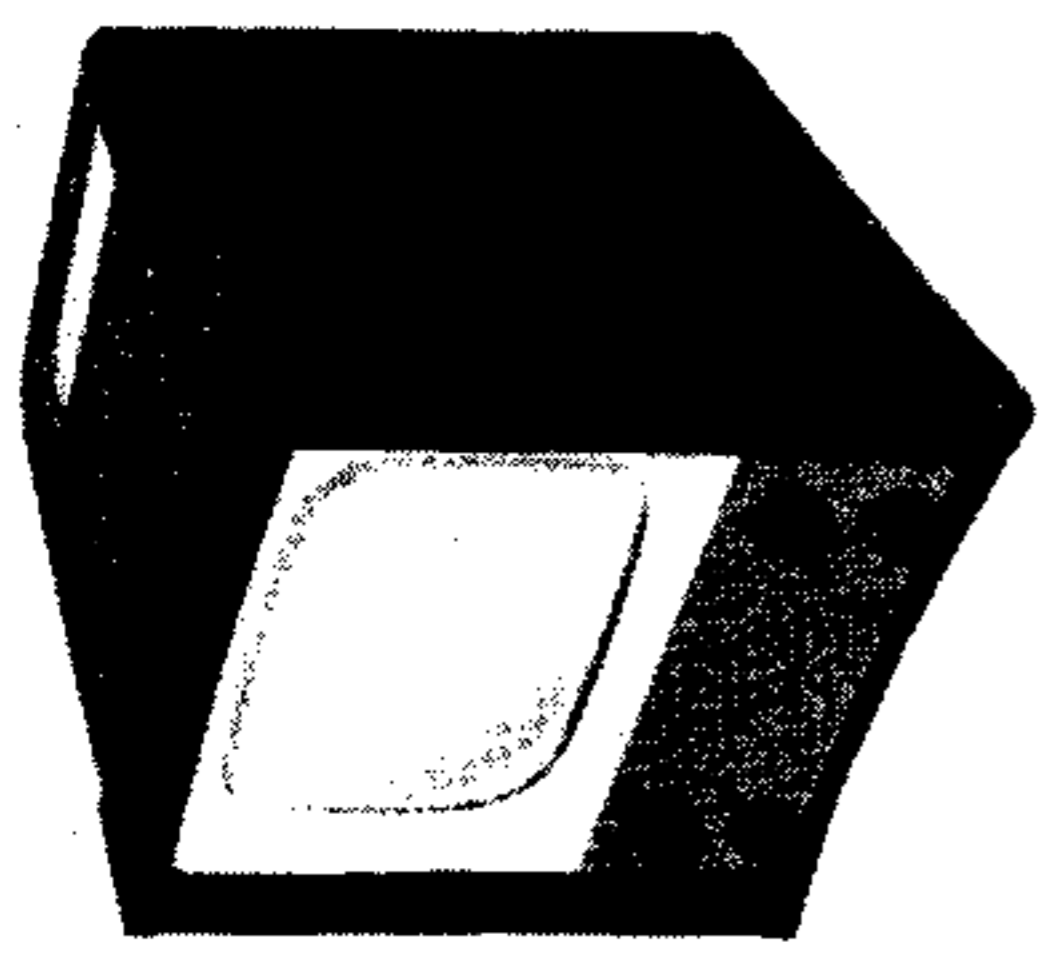


ACE "ASTRA"

Eighteen-valve five-channel television receiver with 14in. flat-screen rectangular tube giving an 11½ by 8½in. picture.

Two-section cabinet comprising black-finished proscenium and one-piece mahogany-finished chassis cover. For 200-250V 50c/s mains. Manufactured by Ace Radio Ltd., Tower Works, Tower Road, London, NW10



THE receiver employs a superhet circuit, with two RF stages designed to operate on lower side-band of vision carrier. Aerial, RF and oscillator circuits are tunable to any of the five BBC channels. Sound noise and vision interference suppression circuits are fitted, the latter being provided with a continuously variable control for optimum setting. Mains consumption is approximately 120W.

Aerial input is designed for use with 80-ohm coaxial feeder which is coupled to receiver through primary L1 of aerial input transformer RFT1. Outer screen of coaxial and earthy side of aerial input circuit are DC isolated from chassis by C1.

RF amplifiers. Aerial signal is coupled by secondary L2 of RFT1 to grid of first RF amplifier V1, the gain of which is controlled, with that of first vision IF amplifier V4, by R6 and R7 the series connected Contrast and Sensitivity controls in the common cathode return to chassis. Negative feedback across R4 preserves shape of input response curve with variation of gain of V1. Sensitivity control R7 gives coarse control of gain and is located at rear of chassis.

Amplified signals at anode V1 are bandpass transformer coupled by RFT2 to a second RF amplifier V2. Signals at anode V2 are developed across R10 and L6 which is connected in series with oscillator anode HT feed to V3.

Frequency-changer is V3 operated as a combined oscillator and mixer. Oscillatory tuned circuit L7 C10 is connected between screen and grid through C11, the oscillator anode voltage being obtained through L6. Bias for oscillator grid is developed on C11 with R15 as leak. RF signals via L6 are mixed with oscillator signal on L7 and produce, across primary L9 of IFT1 in anode V3, a vision IF of 13.3mc/s and a sound IF of 9.8mc/s.

Wide bandwidth in aerial RF and mixer stages to cover both sound and vision frequencies is ensured by damping resistors R1 R3 R8 and R14.

Vision channel consists of two IF amplifiers V4 V5, signal rectifier V6A, video amplifier V7, and interference suppressor V6B. Bandpass transformers, with bottom-end capacity coupling, are employed between anode of mixer V3 and first vision IF amplifier V4, and between V4 and second vision amplifier V5. Anode V5, however, is

resistance-capacity coupled by R24 C21 to tuned coil L15 in cathode of signal rectifier V6A. Vision bandwidth is maintained by damping resistors R17 R18 R22.

Gain of V4 is controlled, with that of first RF amplifier, by R6 R7 the Contrast and Sensitivity controls. Negative feedback across R20 preserves shape of vision IF response curve with variation of gain.

Sound-on-vision rejection at 9.8mc/s is given by sound channel input coil L19 and by L14 C23 which are loosely coupled to L15 in cathode of vision signal rectifier V6A.

Rectified video signal is fed through peaking choke L16 and developed across R29 in grid of video amplifier V7. Amplified video output at anode is developed across R30 R31 and applied through L18 R32 C30 to grid of CRT. Frequency correction is given by peaking coils L17 L18. DC restoration is effected by action of V8.

Interference suppression is by diode V6B. Its anode is connected to anode of video amplifier V7 and its cathode is provided with variable positive bias from R26 the Interference Suppressor control. R26 is normally adjusted so that V6B remains just cut-off. When a high-frequency positive-going interference pulse appears with video signal V6B conducts to short circuit the pulse to chassis through C24.

Sound channel consists of IF amplifier V10, signal rectifier and AF amplifier V11, noise suppressor V12, and output amplifier V13. Sound IF of 9.8mc/s is taken from anode of mixer V3 and fed by C14 to L19 C39 in grid of sound IF amplifier V10.

Amplified signal at anode is bandpass transformer coupled by IFT3 to one diode anode of V11. Rectified audio signal across R46 C44 is fed by C45 to triode AF section of V11. Amplified signal at anode is fed by C46 through series noise limiter V12 and IF filter R51 C49 C50 and coupled by C51 to Volume Control R52 in grid of pentode output amplifier V13.

Audio output is transformer fed by OPI to a 5in. elliptical speaker L24. Fixed tone correction is by R56 C22.

Noise suppressor is diode V12 the anode of which

is biased positively from HT line through R50 and decoupling network R49 C47. The time constant of R50 C49 is such that voltage on C49 follows that of the audio signal fed to cathode V12 by C46. When a large-amplitude high-frequency interference pulse is passed by C46 then, due to comparatively long time constant of R50 C49, the cathode is driven more positive than the anode and V12 cuts off.

Sync separator. Video signal is fed through L18 R32 C30 R34 to cathode of triode V8A. This valve has its grid earthed to chassis, its anode biased from potential divider R36 R37 and, in effect, operates as a diode detector. Negative sync pulses increase current flow through V8A and build a positive charge up on C30, thus providing positive DC restoration of video signal applied to CRT grid. Negative sync pulses at anode V8A are DC coupled to grid of amplifier and phase reverser V8B.

Frame sync pulses are taken from anode V8B, integrated by C34 R60 and fed by C55 to anode V14A of frame scan oscillator. Line sync pulses are obtained from cathode V8B and fed by C32 to grid V19B of line scan multivibrator oscillator.

Frame oscillator is double triode V14. The first half is connected as a grid blocking oscillator with anode-grid coupling by transformer FT1. Adjustment of grid-circuit time constant by R64 gives **Frame Hold**.

Grid circuit waveform is directly coupled by R62 to second triode. HT voltage is adjusted by R66 to give **Height control**. Frame scan voltage is developed on C57 C58.

Frame amplifier. Scan voltage is fed through C59 R68 to grid of pentode frame amplifier V15. Amplified waveform at anode is transformer coupled by FT2 to frame deflector coils L29 L30 on neck of CRT. Line oscillations appearing on frame coils due to mutual inductance are damped by R74 R75.

Waveform correction is provided by anode-grid negative feedback by C60 R72 and by cathode coupling through R67 to C58. **Frame Linearity** is controlled by R70, connected through R69 to negative feedback network.

Line oscillator is double triode V19 in a multivibrator circuit with cathode coupling by common cathode resistor R86 and capacitive coupling C72 between anode V19B and grid V19A.

Scan voltage is developed on C71. Adjustment of grid-circuit time constant of V19A by R84 gives **Line Hold**. Variation of HT to oscillator anodes by R80 adjusts amplitude and gives **Line Drive control**.

Line amplifier. Scan voltage on C71 is fed by C70 through R77 to grid of beam-tetrode line amplifier V17. Amplified waveform is auto-transformer fed by section L32 of L71 to line deflector coils L37 L38. Width is controlled by variable inductance L36, shunted by C64, connected across L31 of L71.

Efficiency diode. Additional HT for anodes of line oscillator V19, line amplifier V17 and anode V14B of frame oscillator is provided by voltage on C63 C77. These are charged by V16 when it rectifies and damps shock oscillation set up on L71 when V17 is cut off at end of line scan. Variable inductance L43 in series with HT feed to V16 gives control of **Line Linearity** and with C67 C78 gives smoothing to additional HT.

EHT for anode of CRT is provided by V18 which rectifies high voltage flyback pulse across L33 and overwinds L34 of line auto-transformer L71 when

V17 is cut-off. C68 C69, between top of line transformer L71 and junction of R77 R78, function as a flyback pulse peaking circuit.

Heater current for rectifier is obtained from tertiary winding L35. EHT is fed direct to anode of CRT, smoothing being provided by capacity between inner and outer coatings of tube.

HT is provided by metal rectifier MR which is fed from 240V tapping on mains input primary L41 of valve heater transformer MT1. Choke-capacity smoothing is by L39 C74 C75-76. Further smoothing is provided by focus coil L40 with C36. Reservoir smoothing capacitor formed by C75 C76 in parallel should be rated to handle 300mA ripple current.

Heaters V1-17, V19 are parallel connected and obtain their current from 6.3V secondary L42 of MT1. Heaters of V1-8 and V10 are each fitted with decoupling capacitors. Primary L41 of MT1 is tapped for 200-250V 50c/s AC. S1, ganged to sound volume control, is on/off switch. Live mains lead incorporates a 2A fuse.

CRT is a triode Brimar C14BM with 14in. rectangular screen. Electromagnetic focus is employed, the focus coil L40 being connected in series with HT supply. Control of focus is by **Pre-set Focus R87** and **Focus R89** which are connected in series with R88 across L40.

Video signal is fed to grid of tube and R41 by varying cathode potential gives **Brightness control**.

Modification. In latest releases of this receiver R86 is changed to 1.5K, C55 to 68pF and R63 to 150K.

ALIGNMENT

IF stages. These are factory-adjusted using extremely accurate crystal controlled equipment and, in view of the fact that valve and minor component replacements can in no way materially affect coil alignment, the makers do not issue any IF alignment instructions.

RF stages. Check that appropriate coil cores and oscillator capacity C10 is fitted for the Channel to which receiver is to be tuned.

COIL	Channel				
	1	2	3	4	5
L7	Iron Core 47pF	Iron Core 47pF	Iron Core 22pF	Iron Core 22pF	Iron Core 22pF
C10	Iron Core 47pF	Iron Core	Iron Core	Iron Core	Iron Core
L6	Iron Core	Iron Core	Iron Core	Brass Core	Brass Core
L5	Iron Core	Iron Core	Iron Core	Brass Core	Brass Core
L3/4	Iron Core	Iron Core	Iron Core	Iron Core	Brass Core
L1/2	Iron Core	Iron Core	Brass and Iron	Brass and Iron	Brass and Iron

Adjust oscillator coil L7 for maximum sound. Sensitivity control R7 may require adjustment to avoid overloading.

Adjust L6 and L1/2 alternately to give maximum bandwidth consistent with maximum sensitivity.

Continued on page 23.

RESISTORS

R	Ohms	Watts
1	4.7K	1/4
2	4.7K	1/4
3	5.1K	1/4
4	5.1K	1/4
5	100	1/4
6	5K	1/4
7	25K	1/4
8	10K	1/4
9	1K	1/4
10	4.7K	1/4
11	150	1/4
12	100	1/4
13	4.7K	1/4
14	5.1K	1/4
15	100K	1/4
16	10K	1/4
17	10K	1/4
18	5.1K	1/4
19	4.7K	1/4
20	32	1/4
21	10K	1/4
22	10K	1/4
23	33K	1/4
24	22K	1/4
25	6.8K	1/4
26	100K	1/4
27	100K	1/4
28	22K	1/4
29	5.1K	1/4
30	10K	1/4
31	10K	1/4
32	22K	1/4
33	47	1/4
34	5.1K	1/4
35	220K	1/4
36	1M	1/4
37	3.3M	1/4
38	10K	1/4
39	3.3K	1/4
40	100K	1/4
41	100K	1/4
42	470K	1/4
43	100K	1/4
44	68K	1/4
45	33K	1/4
46	22K	1/4
47	22K	1/4
48	47K	1/4
49	47K	1/4
50	2.2M	1/4
51	33K	1/4
52	500K	1/4
53	470K	1/4
54	150	1/4
55	1.5K	1/4
56	10K	1/4
57	270	1/4
58	220K	1/4
59	10K	1/4
60	100K	1/4
61	470K	1/4
62	10K	1/4
63	100K	1/4
64	100K	1/4
65	470K	1/4
66	2M	1/4
67	6.8K	1/4
68	220K	1/4
69	47K	1/4
70	100K	1/4
71	2.2M	1/4
72	3.3M	1/4
73	220	1/4
74	470	1/4
75	470	1/4
76	10K	1/4
77	47	1/4
78	1M	1/4
79	22K to 47K	1/4
80	100K	1/4
81	220K	1/4
82	47K	1/4

Watts	Ohms	Ohms
1/4	41	100K
1/4	42	68K
1/4	43	33K
1/4	44	22K
1/4	45	150
1/4	46	6.8K
1/4	47	10M
1/4	48	47K
1/4	49	47K
1/4	50	2.2M
1/4	51	33K
1/4	52	500K
1/4	53	470K
1/4	54	150
1/4	55	1.5K
1/4	56	10K
1/4	57	270
1/4	58	220K
1/4	59	10K
1/4	60	100K
1/4	61	470K

Watts	Ohms	Ohms
1/4	62	10K
1/4	63	100K
1/4	64	100K
1/4	65	470K
1/4	66	2M
1/4	67	6.8K
1/4	68	220K
1/4	69	47K
1/4	70	100K
1/4	71	2.2M
1/4	72	3.3M
1/4	73	220
1/4	74	470
1/4	75	470
1/4	76	10K
1/4	77	47
1/4	78	1M
1/4	79	22K to 47K
1/4	80	100K
1/4	81	220K
1/4	82	47K

Watts	Ohms	Ohms
1/4	83	47K
1/4	84	100K
1/4	85	330
1/4	86	2.2K
1/4	87	500
1/4	88	500
1/4	89	500
1/4	90	6.8
1/4	91	1M

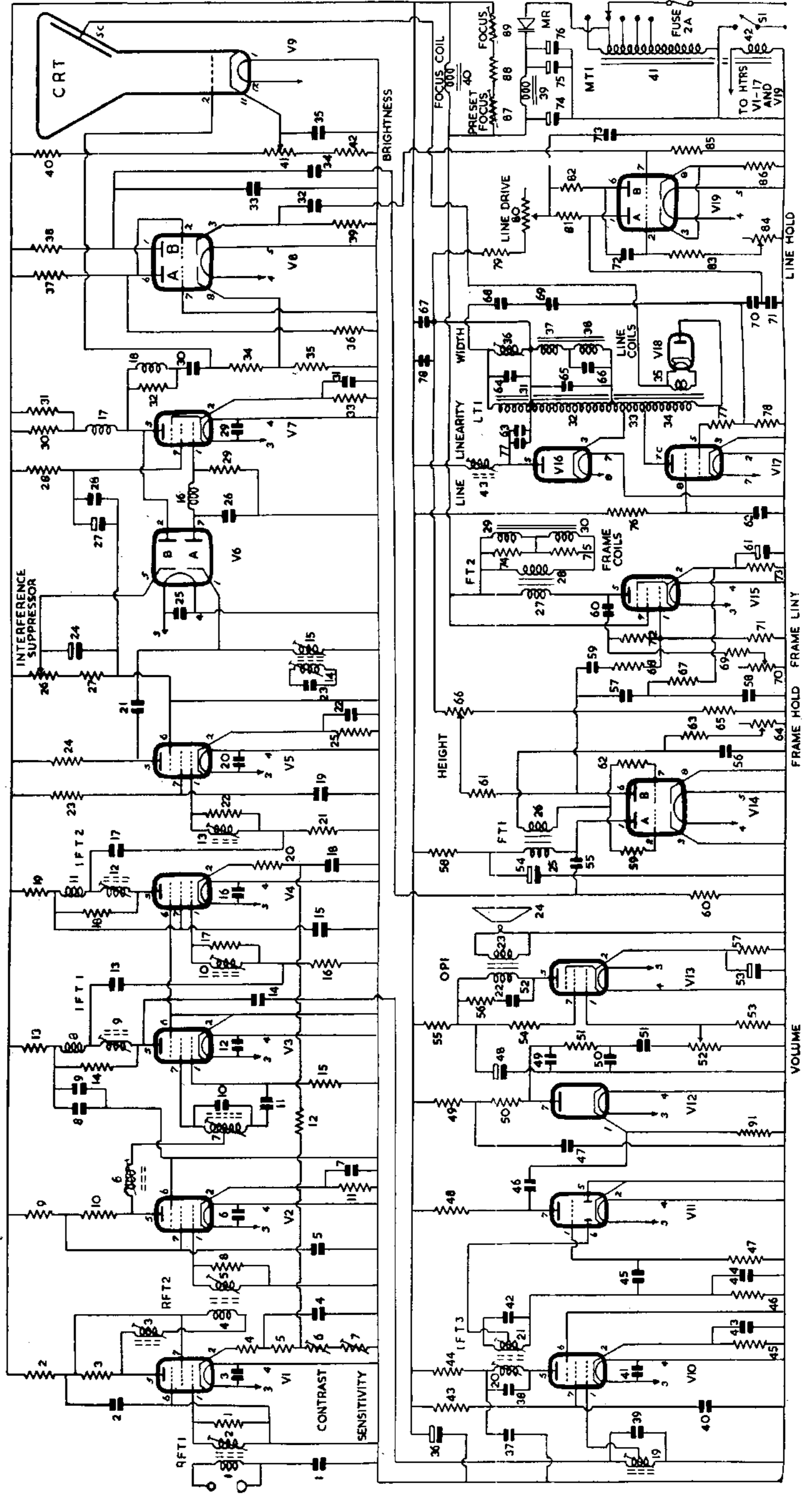
Watts	Ohms	Ohms
1/4	92	100K
1/4	93	100K
1/4	94	100K
1/4	95	100K
1/4	96	100K
1/4	97	100K
1/4	98	100K
1/4	99	100K
1/4	100	100K

Capacity	Type	Capacity	Type
6	1000pF Tub. Ceramic	25	1000pF Tub. Ceramic
7	10000pF	26	10pF
8	10000pF	27	8 Electrolytic 375V
9	1 Tubular 500V	28	1000pF Tub. Ceramic
10	25+22pF Silver Mica	29	1000pF
11	100pF Silver Mica	30	1 Tubular 350V
12	1000pF Tub. Ceramic	31	2200pF Tubular Ceramic
13	1000pF Tub. Ceramic	32	47pF Silver Mica
14	8.2pF Silver Mica	33	500pF
15	1000pF Tub. Ceramic	34	500pF
16	1000pF	35	.001 Mica
17	1000pF	36	1 Tubular 350V
18	10000pF	37	32 Electrolytic 350V
19	1000pF	38	1000pF Tubular Ceramic
20	1000pF	39	10pF Silver Mica
21	47pF Silver Mica	40	47pF
22	10000pF Tubular Ceramic	41	1000pF Tub. Ceramic
23	320pF Silver Mica	42	15pF Silver Mica
24	8 Electrolytic 375V		

Capacity	Type	Capacity	Type
43	10000pF Tub. Ce	57	1 Tubular 500V
44	47pF Tub. Ceramic	58	750V
45	.01 Tubular 500V	59	500V
46	.05	60	500V
47	.25	61	500V
48	32 Electrolytic 350V	62	50 Electrolytic 12V
49	220pF Tub Ceramic		
50	220pF		
51	.01		
52	.01		
53	50 Electrolytic 12V		
54	32 Electrolytic 350V		
55	22pF Ceramic		
56	1 Tubular 500V		
57	750V		
58	500V		
59	500V		
60	500V		
61	50 Electrolytic 12V		
62	.05 Tubular 500V		

CAPACITORS

Capacity	Type
1	1000pF Tub. Ceramic
2	1000pF
3	1000pF
4	10000pF
5	1000pF



VOLTAGE READINGS

V	Type	A	G2	K
1	6AM6	164	167	8-2.8 R6,R7 Max.-Min.
2	6AM6	120	160	1.1
3	6AM6	145	115	0
4	6AM6	162	165	8-2.8 R6,R7 Max.-Min.
5	6AM6	135	100	.8
6A	6AL5	—	—	—
6B	N78	100	110	110-170 R26 Max.-Min.
7	—	100	—	.6
8A	12AU7	—	—	27
8B	—	55	—	10.5
9	CI4BM	10.5kV	—	50-85
10	6AM6	60	110	1
11	6AM6	120	—	0
12	6AL5	12	150	3.5
13	N78	145	—	0
14A	12AU7	50	—	—
14B	—	10-60	—	0
15	N78	205	240	5.8
16	6U4GT	165V	—	300
17	6CD6G	—	95	0
18	R12 or R16	—	—	—
19A	—	—	—	—
19B	12AU7	—	—	10.5kV

Total HT Current = 190mA.

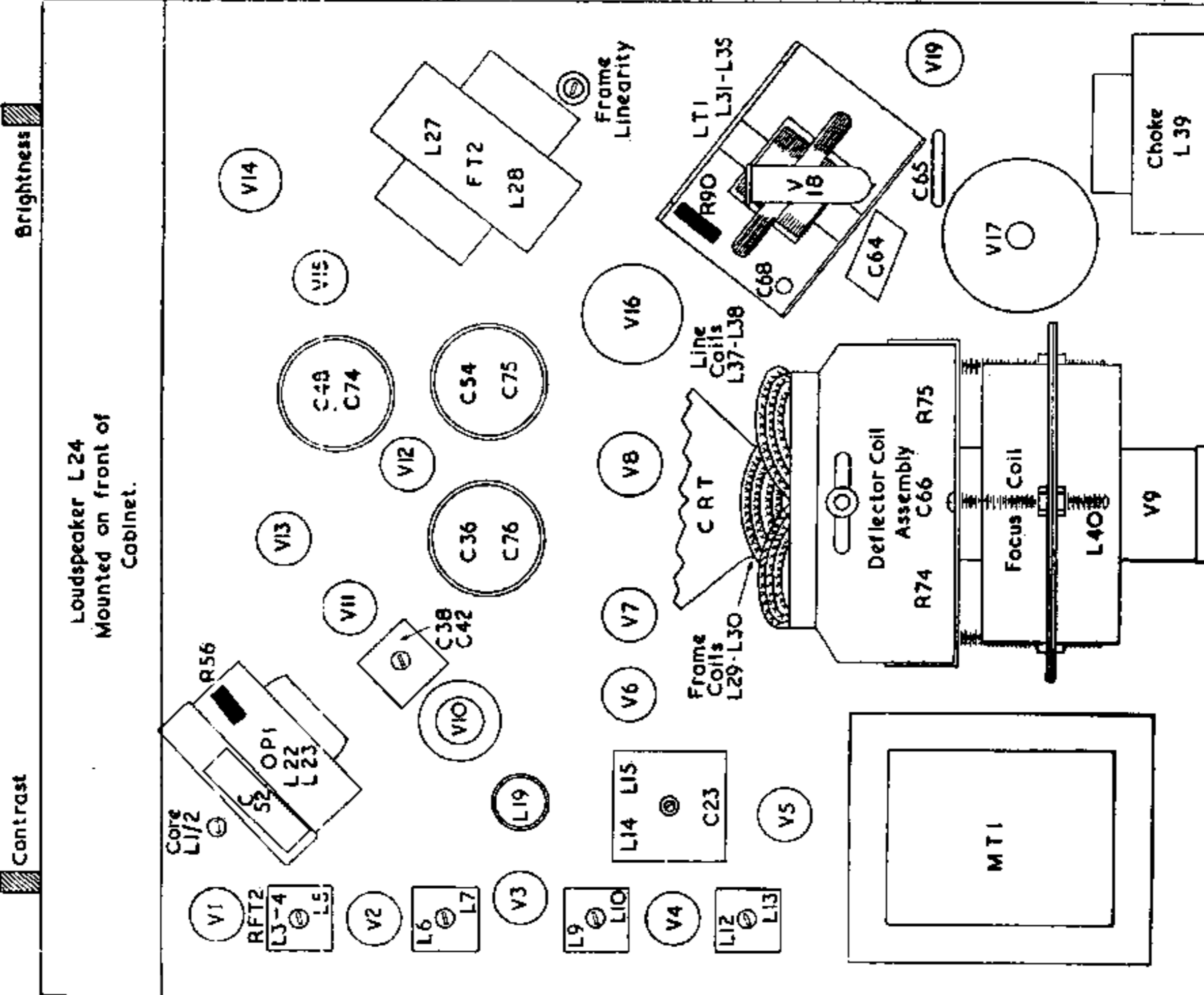
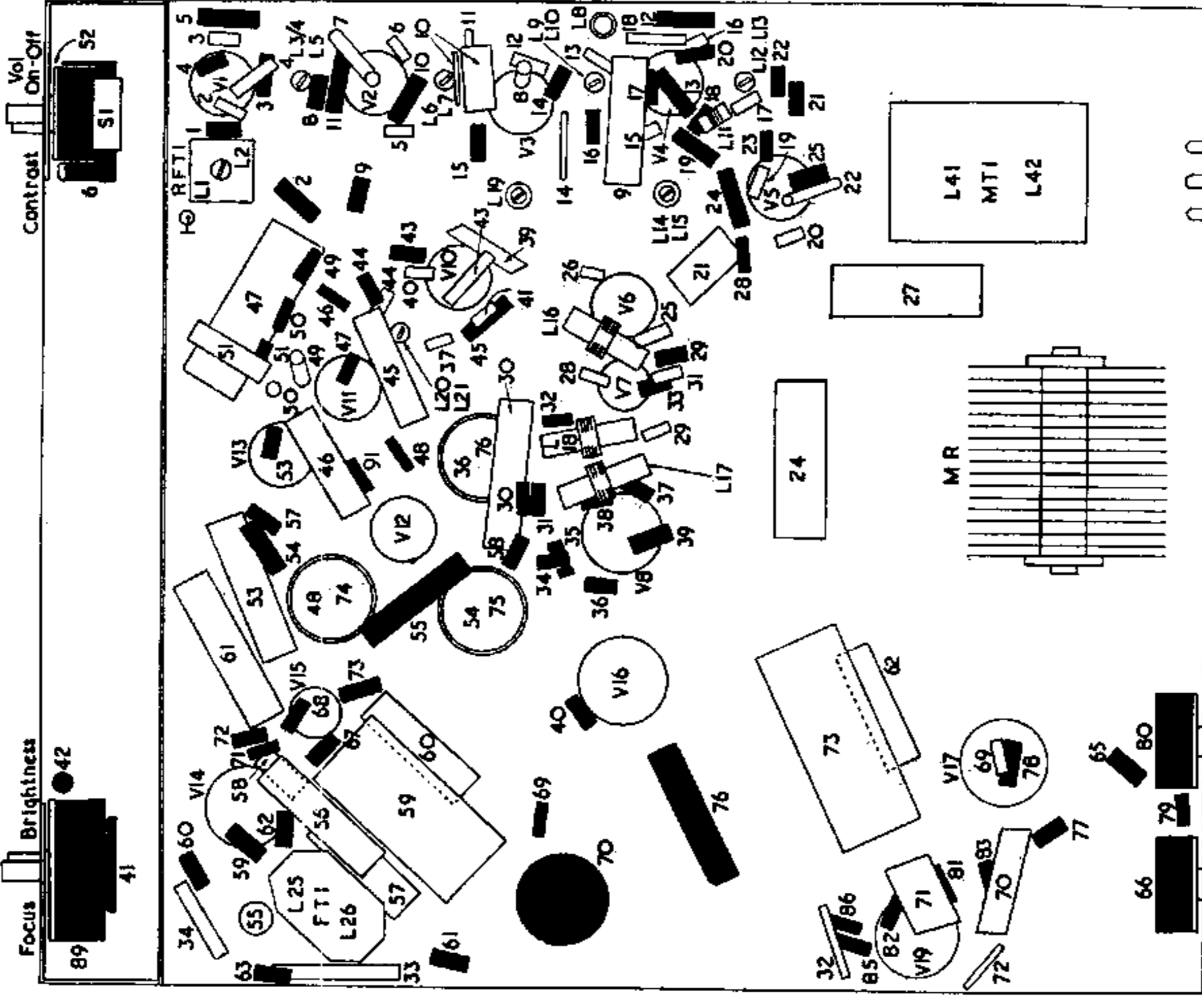
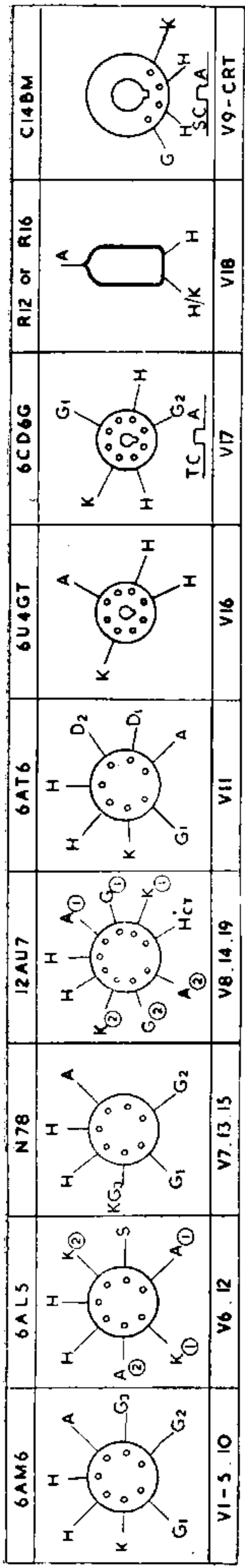
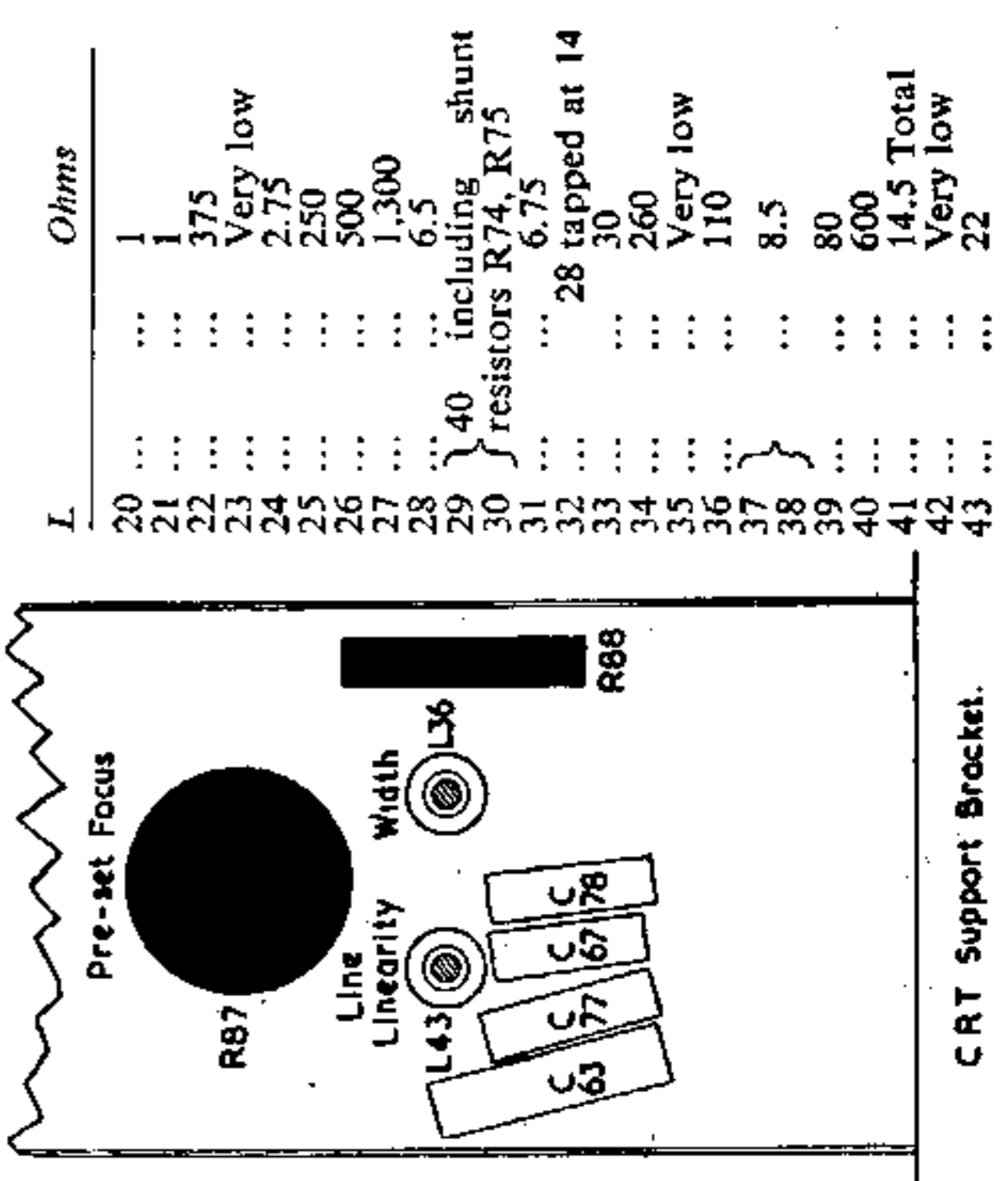
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Adjust L3/4 and L5 alternately to give maximum bandwidth consistent with maximum sensitivity. Finally repeat the last two operations for optimum results.

Access to chassis. The receiver is housed in a cabinet formed by a front and base section on to which is bolted the chassis and a removable top cover which totally encloses the chassis and base of CRT. Practically all normal servicing can be carried out if top cover and bottom panel are removed.

Top cover is held in place by six screws around bottom edge. Cover should be raised rear end first, to allow anchor pins (ends of two screws which project up through forward edge of top cover) to be disengaged from under edge of front portion of cabinet.

If desired chassis can be removed from front and base section of cabinet by removing push-on type front control knobs and undoing the four chassis fixing bolts on underside of base.



Component	Value	Component	Value
R89	41 60	R58	54 57
R90	42 72 68	R59	54 58
R91	71 67 73	R60	55 34 35 38 37
R92	61 86 70 69	R61	36 39 27
R93	85 82 81 83 78	R62	64
R94	88 77 79	R63	65 80
R95	66 77 79	R64	61 48 53
R96	58	R65	46 50 49 51 44 47
R97	56 59	R66	36 76 45 37 41 26 39
R98	60	R67	54 75
R99	73	R68	24 29 31 25 21 20 22 19 17
R100	70	R69	72 -70
R101	69	R70	25
R102	25	R71	17 18 20 16
R103	26	R72	19 15 11 12 13

Capacity	Type	Capacity	Type	Ohms
63	.05	32	Electrolytic	350V
64	3000pF	32	Electrolytic	350V
65	500pF	32	Electrolytic	350V
66	47pF Tub.	.01	Tubular	500V
67	.02 Tubular	.02	"	500V
68	47pF Tub.	"	"	Very low
69	47pF	"	"	Very low
70	.005 Tubular	500V	"	5
71	680pF	Silver Mica	"	5
72	390pF	"	"	5
73	.5 Tubular	500V	"	5
74	32	Electrolytic	350V	Very low

INDUCTORS

L	Ohms
1	1
2	1
3	375
4	Very low
5	2.75
6	250
7	500
8	1,300
9	6.5
10	40 including shunt resistors R74, R75
11	6.75
12	28 tapped at 14
13	30
14	260
15	110
16	Very low
17	8.5
18	80
19	14.5 Total
20	Very low
21	42
22	42
23	22
24	—
25	—
26	—
27	—
28	—
29	—
30	—
31	—
32	—
33	—
34	—
35	—
36	—
37	—
38	—
39	—
40	—
41	—
42	—
43	—