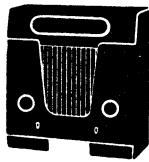


74

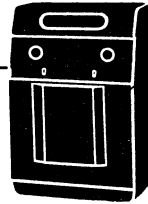
74

MURPHY SERVICE INSTRUCTIONS

ISSUED BY
MURPHY RADIO LTD, WELWYN GARDEN CITY
TELEPHONE: WELWYN GARDEN 800



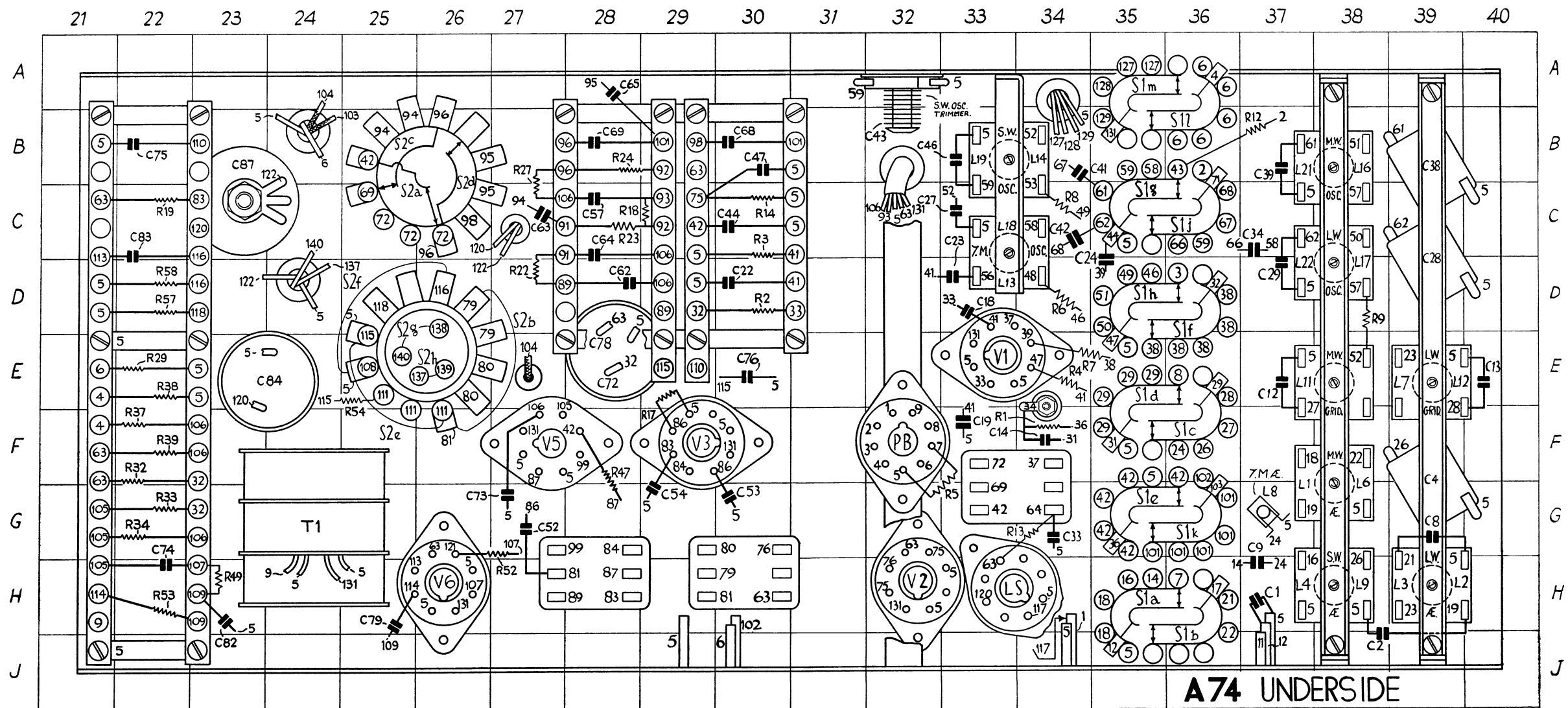
A74



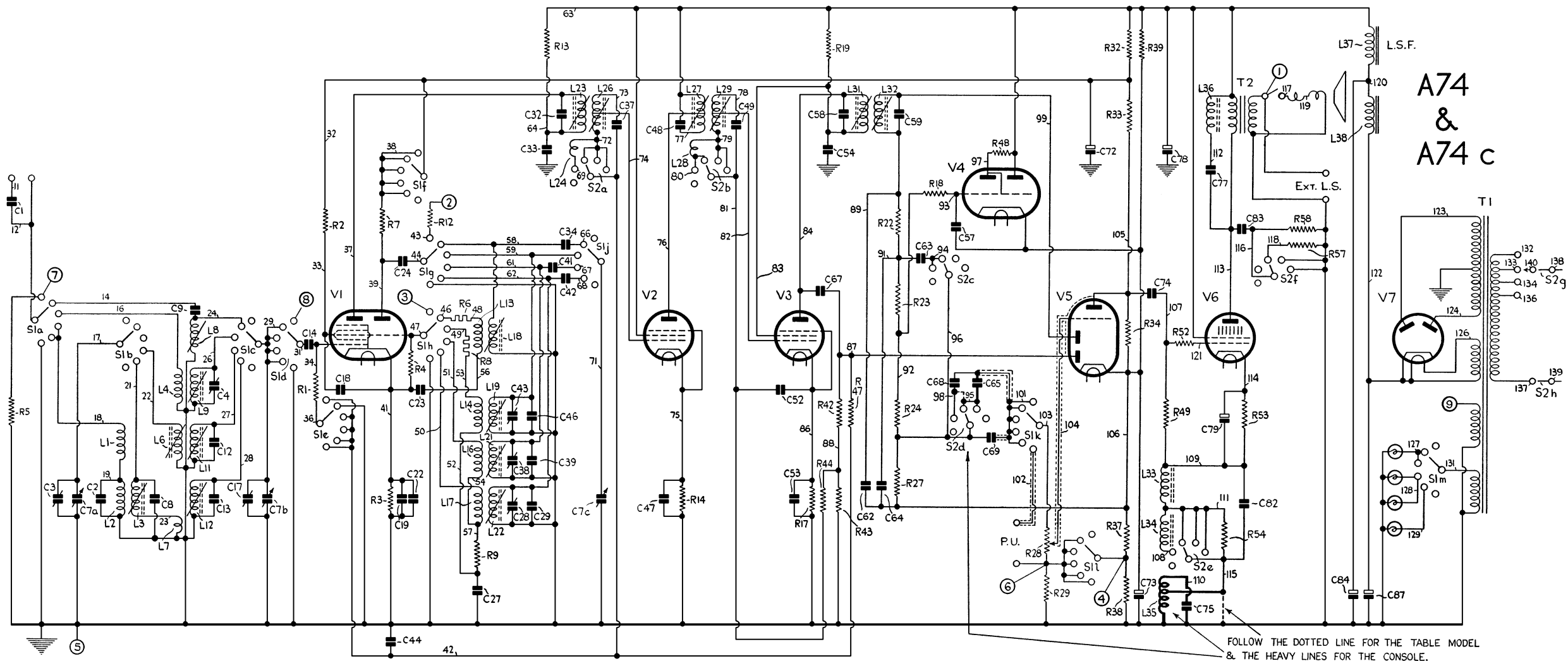
A74C

BASIC DESIGN:	Triode Hexode Frequency changer: two pentode I.F. amplifiers with variable selectivity. Double Diode triode: detector, A.V.C., and A.F. amplifier. Beam tetrode output, with negative feed back.
INTERMEDIATE FREQUENCY:	465 Kc/s.
WAVE RANGES:	Television Sound 16.7—50 metres. 190—550 metres. 970—2000 metres.
VALVES:	Mazda. TH41, VP41, VP41, HL42DD, Pen 45, UU6.
PILOT LAMPS:	6.2 volts, 0.3 amps., globular frosted.
SPEECH COIL IMPEDANCE:	4 ohms.
TOTAL WEIGHT:	Table: 48 lb. Console: 62 lb.
CABINET DIMENSIONS:	Table: $23 \times 21\frac{1}{2} \times 10\frac{1}{2}$ inches. Console: $36 \times 24 \times 13\frac{1}{2}$ inches.
MAINS SUPPLY:	200—250 volt, 50—100 cycle A.C.
CONSUMPTION	Approximately 85 watts.
RECEIVER RELEASED:	May, 1939.





Negative feed back components for the console are shown on this drawing



A74
&
A74 c

TABLE OF VOLTAGES

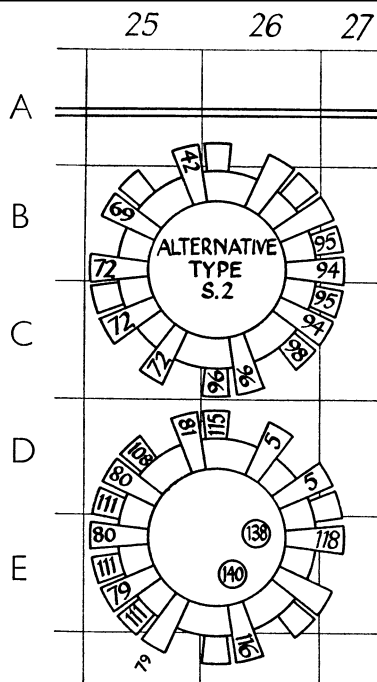
Valve	Type	Electrode	Test Point	Square	Voltage	Valve	Type	Electrode	Test Point	Square	Voltage
V1	Mazda TH4I	Pentode Anode	37	33 D	226	V4	Mazda ME4I	Target	63	11 C	223
		Pentode Screen	33	33 E	75			Triode Anode	97	11 C	40
		Triode Anode	39	34 E	78	V5	Mazda HL42DD	Anode	105	27 F	80
		Cathode	41	33 D	2.2			Cathode	106	27 F	16.5
V2	Mazda VP4I	Anode	76	32 H	226	V6	Mazda Pen 45	Anode	113	25 H	212
		Screen	63	32 G	223			Screen	63	26 G	223
		Cathode	75	32 H	3.7			Cathode	114	25 H	8.5
V3	Mazda VP4I	Anode	84	29 F	190	V7	Mazda UU6	Cathode	122	18 F	360
		Screen	83	29 F	190						
		Cathode	86	29 F	2.2						

TABLE OF COMPONENTS					A74				
Code	Value	Test	Pts	Square	Code	Value	Test	Pts	Square
C1	50 p.f.	11	12	37 H	C79	{ C. 25	109	114	25 H
C2	500 p.f.	19	5	38 J		{ T. 75			
C3	Trimmer	17	5	5 E	C82	.6	109	115	23 H
C4	Trimmer	26	5	39 G	C83	.05	113	116	22 C
C7a	Gang	17	5	4 E	C84	8	120	5	24 E
C7b	Gang	29	5	4 D	C87	8	122	5	23 B
C7c	Gang	71	5	5 B					
C8	85 p.f.	21	23	39 G					
C9	20 p.f.	14	24	37 H	R1	470,000	34	36	34 F
C12	10 p.f.	27	5	37 E	R2	27,000	32	33	30 D
C13	85 p.f.	28	5	40 E	R3	220	41	5	30 C
C14	500 p.f.	31	34	34 F	R4	22,000	41	47	34 E
C17	Trimmer	29	5	5 D	R5	22,000	7	5	33 G
C18	.025	33	41	33 D	R6	6	48	50	34 D
C19	.01	41	5	33 F	R7	33,000	38	39	34 E
C22	.05	41	5	30 D	R8	47	49	53	34 C
C23	50 p.f.	41	56	33 C	R9	470	52	57	38 D
C24	100 p.f.	39	44	35 D	R12	8,200	2	43	37 B
C27	200 p.f.	52	5	33 C	R13	4,700	63	64	34 G
C28	Trimmer	62	5	39 D	R14	390	75	5	30 C
C29	260 p.f.	62	5	37 D	R17	390	86	5	29 E
C32	139 p.f.	37	64	5 L	R18	1.5MΩ	92	93	29 C
C33	.05	64	5	34 G	R19	3,900	63	83	22 C
C34	30 p.f.	58	66	37 C	R22	100,000	89	91	27 D
C37	160 p.f.	42	73	7 K	R23	270,000	91	92	28 C
C38	Trimmer	61	5	39 B	R24	120,000	90	92	28 B
C39	20 p.f.	61	5	37 B	R27	68,000	90	106	27 B
C41	676 p.f.	61	67	34 B	R28	1 MΩ	6	103	17 B
C42	375 p.f.	62	68	34 C	R29	22,000	6	5	22 E
C43	Trimmer	59	5	32 B	R32	2,700	32	63	22 F
C44	.05	42	5	30 C	R33	47,000	32	105	22 G
C46	10 p.f.	59	5	33 B	R34	150,000	105	106	22 G
C47	.025	75	5	30 B	R37	180	4	106	22 F
C48	160 p.f.	63	77	11 L	R38	2,700	4	5	22 E
C49	160 p.f.	78	81	12 K	R39	47,000	63	106	22 F
C52	.05	81	86	27 G	R42	680,000	87	88	15 L
C53	.025	86	5	30 G	R43	820,000	88	5	15 M
C54	.05	83	5	29 G	R44	1 MΩ	81	88	15 M
C57	.05	93	106	28 C	R47	2.2MΩ	42	87	28 F
C58	139 p.f.	83	84	13 L	R48	1 MΩ	97	98	11 B
C59	150 p.f.	89	99	16 L	R49	470,000	107	109	23 H
C62	100 p.f.	89	106	28 D	R52	47,000	107	121	27 G
C63	75 p.f.	91	94	27 C	R53	180 lw	109	114	22 H
C64	100 p.f.	91	106	28 C	R54	12	111	115	24 D
C65	500 p.f.	101	98	28 A	R57	18,000	118	5	22 D
C67	50 p.f.	84	87	14 M	R58	22,000	116	5	22 D
C68	C. .002	95	101	30 B					
	T. .01								
C69	500 p.f.	90	101	28 B	L1	1	18	19	37 G
C72	8	32	5	28 E	L2	25	19	5	39 H
					L3	15	21	23	39 H
C73	20	106	5	27 G	L4	*	16	5	37 H
C74	.05	105	107	22 H	L6	3	22	5	38 G
C75	.6	110	5	22 B	L7	1	23	5	39 E
C76	.05	115	5	30 E	L8	*	24	5	37 G
C77	850 p.f.	112	113	3 E	L9	*	26	5	38 H
C78	8	63	5	28 E					

TABLE OF COMPONENTS (contd.) A74

Code	Value	Test	Pts	Square	Code	Value	Test	Pts	Square
L11	2.5	27	5	37 E	L34	2	108	111	3 E
L12	15	28	5	39 E	L35	300+20	110	5	11 F
L13	*	48	56	33 D	L36	650	63	112	3 E
L14	*	52	53	34 B	L37	1,400	63	120	L.S.F.
L16	1	51	54	38 B	L38	280	120	122	14 B
L17	1	50	57	38 D					
L18	*	58	5	33 C	T2	Prim. 400	63	113	2 H
L19	*	59	5	33 B		Sec. *	5	1	
L21	1.5	61	5	37 B	T1				
L22	2	62	5	37 D	200-205	18	137	136	18 H
L23	6	37	64	6 L	210-220	20	137	134	
L24	*	69	72	6 M	230-240	23	137	133	
L26	6	72	73	6 K	250	25	137	132	
L27	6	63	77	11 M	H.T. Sec.	140	5	123	
L28	*	79	80	11 L		+160	5	124	
L29	6	78	79	11 K	All values marked * less than 1 ohm				
L31	6	83	84	15 L					
L32	6	89	99	15 K					
L33	2	109	111	3 E					

MODIFICATIONS



The accompanying drawing shows the tag arrangement and test point numbers for the alternative type of selectivity switch which has been fitted to some of the A74 and A74C receivers. This type of switch is also supplied as a replacement and when this is the case, certain wires will have to be lengthened.

It will be noticed that a single pole mains-switch is illustrated. In this case, wires 137 and 139 are connected together and taped.

A further modification on the A74C is the addition of a condenser C76, .05 mfd. in the cathode of V6 between test points 5 and 115.

Trimming

TRIMMING on this receiver is very critical and must be carried out carefully as small inaccuracies may completely spoil the performance of the receiver.

It is also important to ensure that the service oscillator is accurately calibrated, and it is advisable to check this regularly by the "beat" method.

CHECKING THE TRIMMING

The I.F. circuits in this receiver are tuned by varying the inductances, the variation being affected by turning a small screw at the end of the coil, which moves an iron core within the coil. The setting of these inductances should be very constant over a period of time and I.F. trimming should thereby rarely be required.

Although damping is required for adjusting these circuits, they may be **checked** without the damping applied and consequently without removing the chassis from the cabinet, by connecting a service oscillator between the chassis and the grid of the frequency changer valve and feeding in signals between 450 Kc/s and 480 Kc/s. The set should be tuned to 550 metres and adjusted for maximum selectivity, and an output meter connected across the L.S. sockets. If the I.F. circuits are correctly adjusted the reading in the output meter, as the oscillator is tuned between 450 Kc/s and 480 Kc/s, should rise to a peak at 465 Kc/s and fall steadily on either side.

Variable inductances as well as trimming condensers are used in the R.F. and oscillator circuits and the former should be adjusted at the top (wavelength) end of each band. Here again readjustment of the inductances should rarely be required and in most cases trimming can be carried out entirely by varying the trimmer capacities at the bottom of the wave-band and merely checking at the top end to see that the alignment is correct. In the instructions given below we assume, of course, that the inductances

do require adjustment, but the procedure can be shortened accordingly if this is found unnecessary.

It is important that the tuning scale is set to the top marking on the dial when the variable condenser is adjusted to maximum before R.F. trimming is commenced, and as any strain on the flexible drive may alter the calibration a little, it is advisable to do the final condenser adjustment with the chassis in the cabinet.

Calibration errors at the top end of the wave-band can be due to incorrect adjustment of the I.F. circuits, or to incorrect adjustment of the oscillator inductance. It is therefore essential to check the I.F. circuits carefully before making any adjustment to the oscillator, or R.F. inductances.

The correct sequence for completely trimming is I.F.'s (465 Kc/s) M.W., L.W., S.W., and 7-metre sound. Small errors in calibration occurring at the lower end of the bands may be corrected by adjusting the trimmer condensers only, and on this receiver these can be adjusted without affecting the calibration of the other bands.

THE OUTPUT METER

An 0 to 3-volt rectifier type voltmeter, placed across the loudspeaker sockets is suggested for measuring the output of the receiver when trimming.

The input from the service oscillator, when the output meter is used, should always be kept sufficiently low to keep the reading below 1 volt with volume control at maximum and L.S. in circuit. It is therefore necessary to reduce the input as each stage is brought into tune.

DAMPING

The characteristics of the I.F. transformers make it essential, unless an oscilloscope is used, to damp one of each pair of coupled circuits as the

other is trimmed, and a unit for this purpose should be made up with a 20,000 ohms (quarter watt) resistance and an 0.1 mfd. condenser. Attach a crocodile clip to one end of the resistance and connect the other end to the condenser; then attach a short flexible lead terminated with a crocodile clip to the free end of the condenser.

Some of the S.W. trimmers will have two setting points. In all cases the "minimum" setting is the correct one, i.e. the second point when unscrewing the adjusting screw. This also applies to the inductance adjustment. In the R.F. circuits, if the inductances are adjusted to the "inner" setting the coupling between the tuned and coupling coils will be incorrect.

I.F. TRIMMING 465 Kc/s

1. Connect the output meter across EXT.L.S. sockets.

2. Clip the flexible lead of the damping unit to chassis and the other end to V5 signal diode anode (test point 99, Square 27G).

3. Connect the positive side of a 9-volt battery to chassis, and the negative side to the A.V.C. line (test point 42, Square 28F).

4. Switch the set for maximum selectivity. Tune to 500 metres and connect the service oscillator between the control grid of V2 (test point 74, Square 9F) and chassis through a fixed condenser of 0.1 mfd.

5. Tune the service oscillator to exactly 465 Kc/s and switch on internal modulation.

6. Adjust L31 (Square 15L) for maximum reading on the output meter.

7. Remove the damping unit from V5 and clip it to the anode of V3 (test point 84, Square 28G).

8. Trim L32 (Square 15J).

9. Remove damping unit from V3 anode and connect it to V3 grid (test point 82, Square 12E).

10. Trim L27 (Square 11M).

11. Remove damping unit from V3 grid and connect it to V2 anode (test point 76, Square 30G).

12. Trim L29 (Square 11K).

13. Disconnect the service oscillator from the grid V2 and connect it to grid V1 (34, Square 8C). Remove damping unit from V2 anode and connect it to the grid of V2 (test point 74, Square 9F).

14. Trim L23 (Square 6L).

15. Remove damping unit from V2 grid and connect it to the hexode anode of V1 (test point 37, Square 34 F).

16. Trim L26 (Square 6K).

If the inductances are found to require only very small adjustments the 465 Kc/s trimming may now be regarded as complete, but if large adjustments have been made it is advisable to repeat the whole procedure as a final adjustment.

M.W. TRIMMING

See that the tuning scale is set to the top mark (wavelength) on the dial when the tuning condenser is fully in mesh.

See also that the damping unit and the battery have been removed from the circuit, but leave the output meter connected across the EXT. L.S. sockets.

1. Connect the service oscillator between the aerial and earth terminals of the receiver through the dummy aerial.

2. Tune the service oscillator and the receiver to 500 metres.

3. Adjust L21 (Square 38B) and L11 (Square 37E) and L6 (Square 38G) in that order, for maximum gain.

4. Tune the service oscillator and the receiver to 220 metres.

5. Adjust C38 (Square 2B) and C17 (Square 5D) and C3 (Square 5E) in that order for maximum gain.

6. Repeat until alignment is correct.

7. Check calibration on a broadcast signal.

L.W. TRIMMING

See that the tuning scale is set to the top mark (wavelength) on the scale when the tuning con-

denser is fully in mesh, and that the output meter is connected.

1. Connect the service oscillator to the aerial and earth sockets and the output meter to the L.S. terminals.

2. Tune the service oscillator and receiver to 1,900 metres.

3. Adjust L22 (Square 37D) for maximum reading in output meter.

4. Connect the damping unit across L2 (Square 39H) and adjust L12 (Square 39E).

5. Connect the damping unit across L12 (Square 39E) and adjust L2 (Square 39H).

6. Tune the service oscillator and receiver to 900 metres.

7. Adjust the oscillator trimmer C28 (Square 2C) for maximum reading on the output meter.

8. Repeat the above procedure until alignment and calibration are correct.

9. Check on a broadcast signal.

S.W. TRIMMING

See that the tuning scale is set to the top mark on the dial (wavelength) when the condenser vanes are fully in mesh.

1. Connect the service oscillator between the aerial and earth sockets and the output meter to the L.S. terminals.

2. Tune the service oscillator and receiver to 49 metres.

3. Adjust the S.W. inductances L19 (Square 33B) and L9 (Square 38H) for maximum reading on the output meter.

4. Tune the service oscillator and receiver to 17 metres.

5. Adjust the S.W. oscillator trimmer C43 (Square 32B) and the S.W. aerial trimmer C4 (Square 2F) for maximum reading on the output meter.

6. Repeat the above procedure until no further readjustments are necessary.

7. Check on a broadcast signal, and see that

the 17-metre stations come in on the 17-metre mark on the tuning scale.

It should be noted that on this band the correct and the image settings are very close together, and care must be taken to adjust to the "outer" settings on the trimmers and iron cores.

7-METRE SOUND

When the 7-metre oscillator inductance is adjusted, great care must be taken not to tune to the image frequency. When the set is correctly tuned an image signal will be heard **below** the correct setting on the dial.

If the inductances are only slightly out of adjustment, set the dial to the correct tuning point on the dial (7M) and adjust the oscillator inductance L18 (Square 33C) so that the broadcast signal comes in at maximum strength. The adjustment is quite critical; care must therefore be taken not to pass the correct point.

When the oscillator inductance has been adjusted, release the lock nut on the adjusting screw of L8 (Square 4F) and adjust for maximum gain. Adjust both trimming screws again to make sure that they are adjusted to give the greatest gain, and finally check to see that the image signal is tunable **below** the correct setting.

If the trimming is completely out of adjustment tune the receiver until the station is heard, then tune back to the correct tuning point by small stages, readjusting both trimming screws at each stage. This procedure is recommended because the sensitivity on this band is very low, unless the two circuits are aligned, and if attempts are made to find the correct setting of the oscillator inductance, without simultaneously adjusting the other coil, no signal will be received, and adjustment will therefore become impossible.

Finally, tighten the locking nut on L8 (Square 4F). If this causes mis-trimming, this coil should be retrimmed, and the nut again tightened, so that the alignment is correct.