MURPHY
SERVICE
INSTRUCTIONS

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

SPECIFICATION

B47

B47C

BASIC DESIGN:	4 valve superhet. With Q.P.P. output stage.
INTERMEDIATE FREQUENCY:	465 Kc/s.
WAVE RANGES:	16.7 to 50 metres (18 Mc/s to 6 Mc/s). 200 to 550 „ (1500 Kc/s to 545 Kc/s). 950 to 2000 „ (316 Kc/s to 150 Kc/s).
VALVES:	TP23, VP22, L22DD, QP230.
PILOT LAMPS:	2.5 v 0.2 amp Globular Frosted.
SPEECH COIL IMPEDANCE:	Table 3 ohms. Console 4.5 ohms.
TOTAL WEIGHT:	Table 30 lb. (without batteries). Console 47 lb. („ „).
OVERALL DIMENSIONS:	Table $18\frac{1}{2}'' \times 19\frac{1}{4}'' \times 12\frac{1}{4}''$. Console $31\frac{1}{2}'' \times 22'' \times 10\frac{3}{4}''$.
CONSUMPTION:	H.T. 8.5 mA on M.W. and L.W. 12 mA on S.W. L.T. 1.1 amps.

B45

BASIC DESIGN:	3 valve Straight set with constant reaction.
WAVE RANGES:	200 to 550 metres. 950 to 2000 „
VALVES:	VP22, HL2 or HL22, Pen24.
SPEECH COIL IMPEDANCE:	3 ohms.
TOTAL WEIGHT:	19 lb. 6 oz. (without batteries).
OVERALL DIMENSIONS:	$21\frac{3}{4}'' \times 13\frac{3}{4}'' \times 5\frac{3}{4}''$.
CONSUMPTION:	H.T. 7 mA. L.T. .5 amps.

B47 Circuit Analysis

THE tuning circuits in the B47 receiver are similar to those of the "48," apart from the small details following the use of a triode-pentode type frequency changer instead of a triode-hexode, and switching introduced in the interests of saving the H.T. current.

A local-distant switch (S3) is fitted to prevent overloading on powerful local transmissions. When closed (local) it places a one hundred ohm resistance (R4) in parallel with the aerial coupling coils (L1, L2, and L3).

The signals from the aerial are fed through an aerial coupling coil (L2 or L3) to an inductively coupled band-pass unit on medium and long waves (L6, 7, 8, and 9) but on the short wave band the aerial coil (L1) is directly coupled to the single tuned grid coil (L4) to give maximum gain. The long wave aerial coil (L3) is short circuited on medium waves by the switch (S1h) to prevent loss of gain on medium waves. The tuned coils are connected to a common low potential point and the high potential ends are taken to the contacts of the wave range switch (S1b and S1c) which connects the coils selected to the tuning condensers (C1a and C1b).

The long wave coils have fixed parallel trimmers (C3 and 4). The medium wave aerial circuit trimmer (C6) is mounted on the variable condenser frame, and the medium wave grid coil trimmer (C2) is on the chassis. The trimmer (C7) mounted on the second section of the variable condenser (C16) aligns the short wave tuning coil (L4). All the trimmers are identified on the chassis plan view.

The tuned R.F. signals are fed into a triode pentode valve (V1) where they are mixed with the signals from the local oscillator circuit.

The oscillator circuit employs a similar coil arrangement and each coil has a separate trimmer. All the coils have a common low potential connection, and their high potential ends are taken to a section of the wave range switch (S1e). Another section of the switch (S2f) is used to short circuit the long wave coil (L16) during medium wave reception, to prevent energy absorption by the coil and its associated padder (C18). The condensers (C15 and C18) in parallel with the medium and long wave trimmers are included so that small value trimmers can be used to reduce frequency drift.

The medium and long wave coils have padding condensers (C22 and C23) in series with them, to maintain correct alignment.

The H.T. supply to the oscillator circuit is through a 9,000 and a 50,000 ohms resistance (R2 and R3), but on short waves, to increase the gain the 50,000 ohms resistance (R3) is short circuited by the switch (S1f). This increases the current taken by the set and therefore alters the voltage drop across the biasing resistances (R14 and R16). To compensate for this an additional resistance (R23) is switched in parallel with them on short waves by the switch (S1h).

The resistances and condensers in the oscillator grid circuit are included to maintain constant oscillator volts over the wave bands and it is important that the resistances should be of the non-inductive type.

The oscillator circuit is tuned to 465 Kc/s ABOVE the signal frequency on all bands in this receiver. (This is an important point to remember, as the "46" and "48" oscillator circuits are tuned to below the signal frequency on short waves.) This is one of the differences in circuit arrangements which are required when a triode-pentode is used instead of a triode-hexode for the frequency changer valve.

The two I.F. transformers (L17, 18, and L19, 21) have coils wound on iron dust cores and stranded wire is used to increase the efficiency in order to raise the gain obtained from the battery valves. The capacities tuning the transformers are made up of fixed con-

densers with small trimmers in parallel. The fixed condensers, which are of a particularly constant type, form the greater part of the capacity, and the effect of any drift which may occur in the trimmer is therefore reduced to a minimum.

The signals, amplified by the I.F. valve (V2) are fed on to the signal diode of the valve (V3) and the rectified signal is developed across the load resistances (R12 and 13).

The rectified carrier voltage, smoothed by the resistance and condenser (R11 and C8) is fed to the first two valves to give automatic volume control.

A small initial bias is supplied to these valves by returning the A.V.C. line to H.T. minus, through the 8 megohm resistance (R17).

An I.F. filter is provided by the resistance and condenser (R12, C39) and the L.F. voltage is passed through C37 (and the pickup jack) to the volume control. The condenser (C39) is omitted in the console model because the pickup leads are extended and screened to bring them out to a panel on the back of the cabinet, and the capacity between the leads and the screening takes the place of the condenser.

The L.F. signal amplified by the L.F. valve (V3) is passed through a whistle filter to the intervalve transformer (T1). This feeds the Q.P.P. output valve (V4), which supplies the power through the output transformer (T2) to the loudspeaker.

An eight microfarad dry electrolytic condenser (C29) is placed across the H.T. supply and this combined with the special precautions taken in the oscillator stage allows a 120 volt H.T. battery to be used until the voltage has dropped below 80 volts. The first sign of lack of voltage, apart from a falling off in output, is that the oscillator circuit will cease to function at the top end of the short and medium wave bands.

B45 Circuit Analysis

THE B45 receiver incorporates a local distant switch (S1) which puts a resistance (R1) in series with the aerial for local station listening to prevent overloading and to provide a wide range of volume control.

The signals are passed to the single tuned circuit by the aerial coupling coil (L1) which is tuned by a condenser (C2) for long waves. The low potential end of the tuned circuit (L2 and L3) is returned to chassis by the condenser (C3) but a D.C. path is provided through the resistance (R2) to the volume control (R19) which operates by varying the bias to the first valve. The anode circuit of this valve is tuned and the amplified signal is passed on to the detector valve (V2) by the condenser (C9).

The anode circuit of the detector valve has a special circuit arrangement which combined with the reaction coils (L6 and L7) and the differential reaction condenser (C10) gives constant reaction over both wave bands. The rectified signal is passed through the condenser (C12) to a 3:1 intervalve transformer.

The bias for the output valve is provided by the voltage drop across the resistances (R8 and R9) and as these resistances are common to the grid and output circuits of the output valve (V3) low frequency voltages are developed across them which give antiphase feed back. To compensate for this the primary of the intervalve transformer is connected in reversed phase to a suitable point (the junction of R8 and R9) and the additional voltage thus applied counterbalances the antiphase feed back voltages.

The signals are fed from the output valve (V3) to the loudspeaker by the output transformer (T2) across the primary of which is a tone compensating condenser (C13).

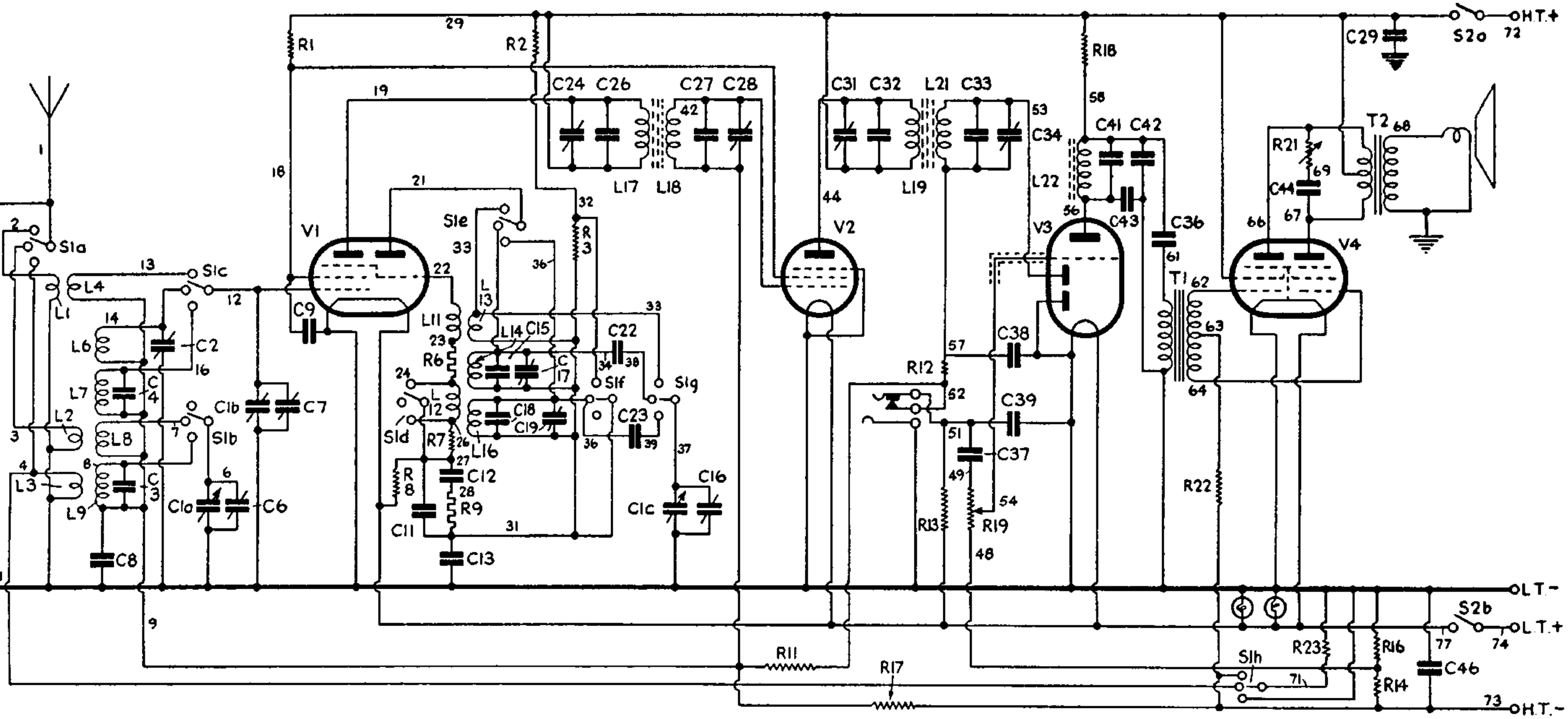


TABLE OF VOLTAGES

B47

VALVE	TYPE	ELECTRODE	TEST POINT	SQUARE	VOLTAGE
V1	Mazda TP23	Pentode Anode	19	13 J	111
		Pentode Screen	18	13 H	65
		Triode Anode	21	12 J	S.W. 90 M.W.60 L.W. 70
V2	Mazda VP22	Anode	44	9 H	111
		Screen	18	9 H	65
V3	Mazda L22DD	Anode	56	7 G	65
V4	Mazda QP230	Anode 1	66	6 K	111
		Anode 2	67	6 J	111
		Screen	29	6 K	111
	H.T. negative		73	4 G	—9

Total H.T. current (with no signal) M.W. and L.W. 8.5 m/A S.W. 12 m/A

TABLE OF COMPONENTS

CODE	VALUE	TEST From	TEST To	SQUARE
C1a	Variable	6	11	22 O
C1b	„	11	12	22 Q
C1c	„	11	37	22 R
C2	Trimmer	11	14	21 Q
C3	50 mmf	8	9	14 D
C4	62 „	9	16	15 E
C6	Trimmer	6	11	22 P
C7	„	11	12	22 Q
C8	0·1	9	11	15 E
C9	·05	11	18	12 K
C11	100 mmf	27	31	17 G
C12	100 „	27	28	16 G
C13	·007	11	31	15 H
C15	20 mmf	31	34	23 Z
C16	Trimmer	11	37	22 R
C17	„	31	34	20 S
C18	220 mmf	31	36	12 E
C19	Trimmer	31	36	21 R
C22	703 mmf	34	38	11 F
C23	386 mmf	36	39	12 G
C24	Trimmer	19	29	24 V
C26	75 mmf	19	29	25 Y
2C7	75 mmf	9	42	25 Y
C28	Trimmer	9	42	24 U
C29	8 (175v)	11	29	3 H
C31	Trimmer	29	44	27 V
C32	75 mmf	29	44	28 Y
C33	75 „	53	57	28 Y
C34	Trimmer	53	57	27 U
C36	·05	58	61	5 G
C37	·01	49	51	8 H
C38	50 mmf	11	57	28 Y
*C39	50 „	11	51	8 K
C41	300 „	56	58	6 G
C42	·002	58	59	5 G
C43	·002	56	11	5 H
C44	·01	67	69	6 J
C46	50 (50v)	11	73	4 K

**Deleted on Console model*

R1	40,000	18	29	12 J
R2	9,000	29	32	11 K
R3	50,000	31	32	12 E
R4	100	5	11	14 K
R6	60	23	24	15 G
R7	850	26	27	16 G
R8	20,000	27	77	17 F
R9	500	28	31	16 H
R11	2 MΩ	9	52	9 K
R12	50,000	52	57	28 Y
R13	1 MΩ	51	77	7 K
R14	200	11	48	5 H
R16	800	48	73	4 H
R17	8 MΩ	9	73	9 K
R18	75,000	29	58	5 F
R19	2 MΩ	48	49	6 B
R21	150,000	66	69	29 M
R22	150,000	63	73	4 G
R23	2,000	11	71	13 C

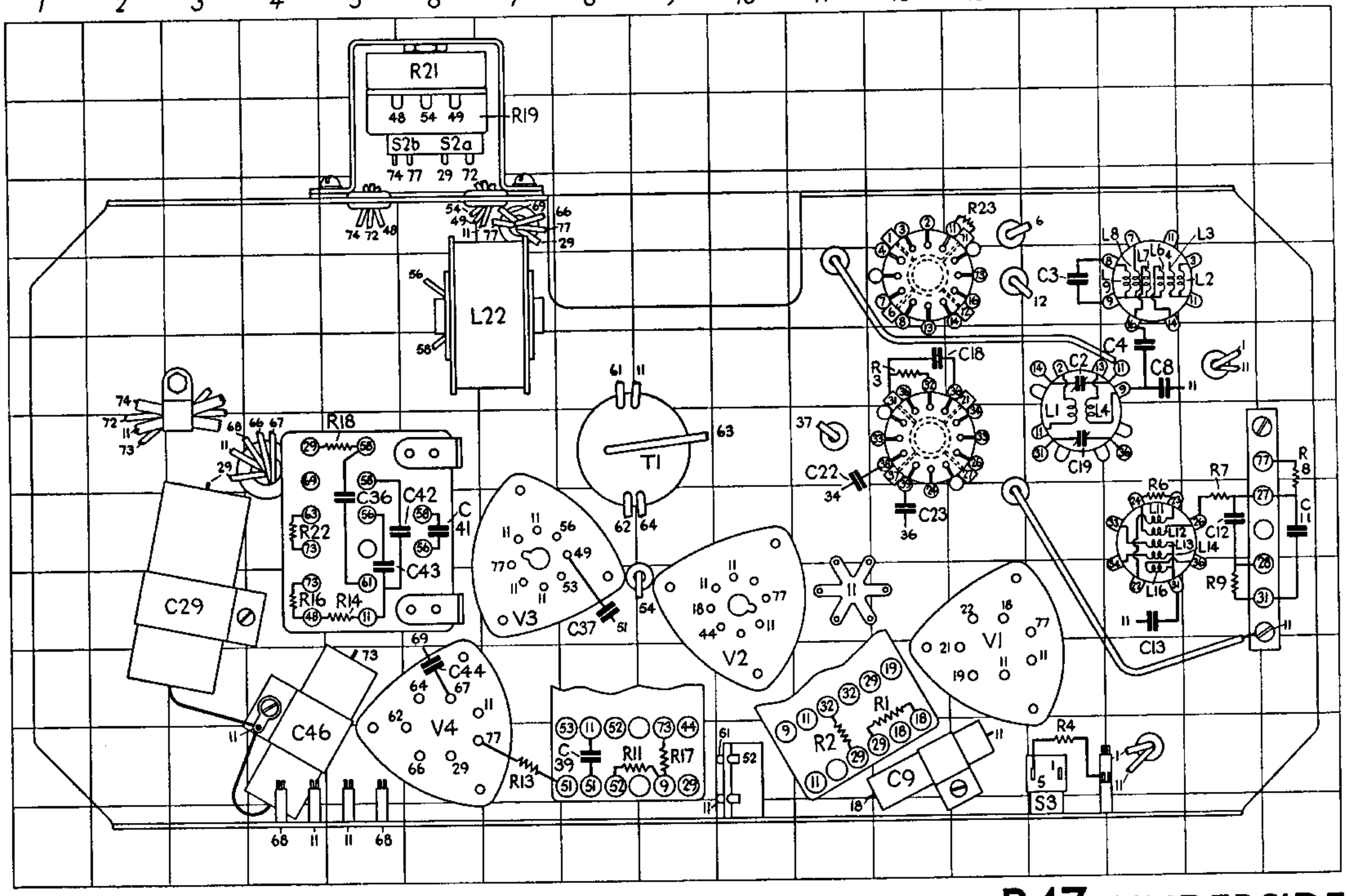
CODE	VALUE	TEST From	TEST To	SQUARE
L1	——	2	11	14 F
L2	1·25	3	11	16 D
L3	10	4	11	15 D
L4	——	9	13	14 F
L6	4	9	14	15 D
L7	12	9	16	15 D
L8	4	7	9	15 D
L9	12	8	9	15 D
L11	——	22	23	15 G
L12	1·25	24	26	15 G
L13	——	31	33	15 G
L14	2·5	31	34	15 G
L16	4	31	36	15 H
L17	6	19	29	25 X
L18	6	9	42	25 Y
L19	6	29	44	28 X
L21	6	53	57	28 Y
L22	300	56	58	7 D

T1 prim.	180	11	61	9 F
sec.	700	62	63	9 F
	+850	63	64	9 F
T2 prim.	180	29	66	31 Q
	+190	29	67	31 Q
sec.	——	11	68	31 Q
L.S. speech coil	3	11	68	

B47 TOPVIEW

R21
R19
S2a S2b
C1a
C6
M.W. AERIAL
C1b
C7
S.W. GRID
C1c
C16
S.W. OSC.
M.W. GRID
C2
C19
L.W. OSC.
M.W. OSC.
C17
T1
T2
V1
V2
V3
V4
54
1ST. I.F.
C28
SEC.
C24
PRIM.
2ND. I.F.
C34
SEC.
C31
PRIM.
L8 INSIDE
L7
L9
L3
L2
L6
L11
L13
L14
L12
L16
C15
L17
L18
C26
C27
C28
C24
R1
R2
R11
C39
R12
C38
L19
L21
C33
C32
C34
C31

B47 UNDERSIDE



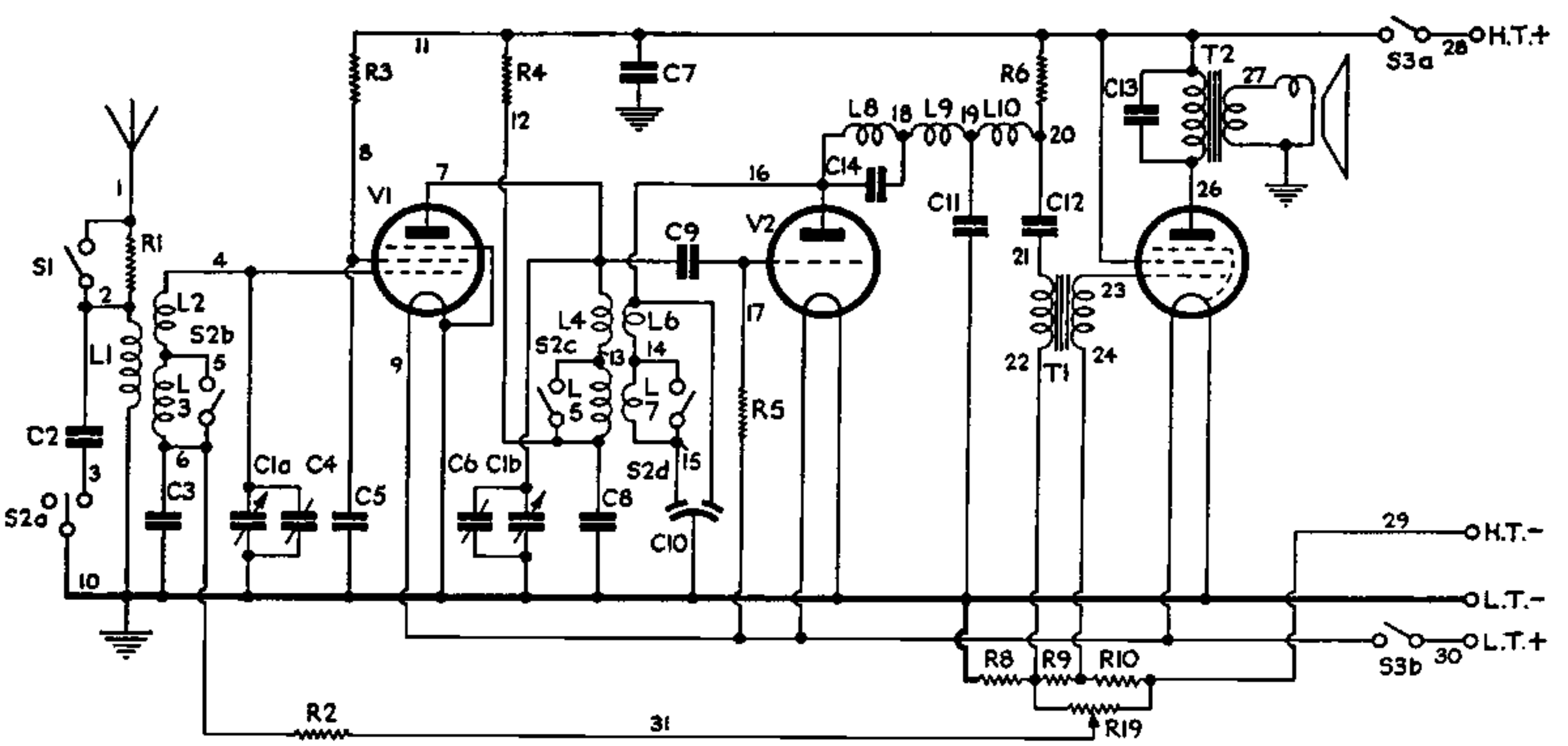


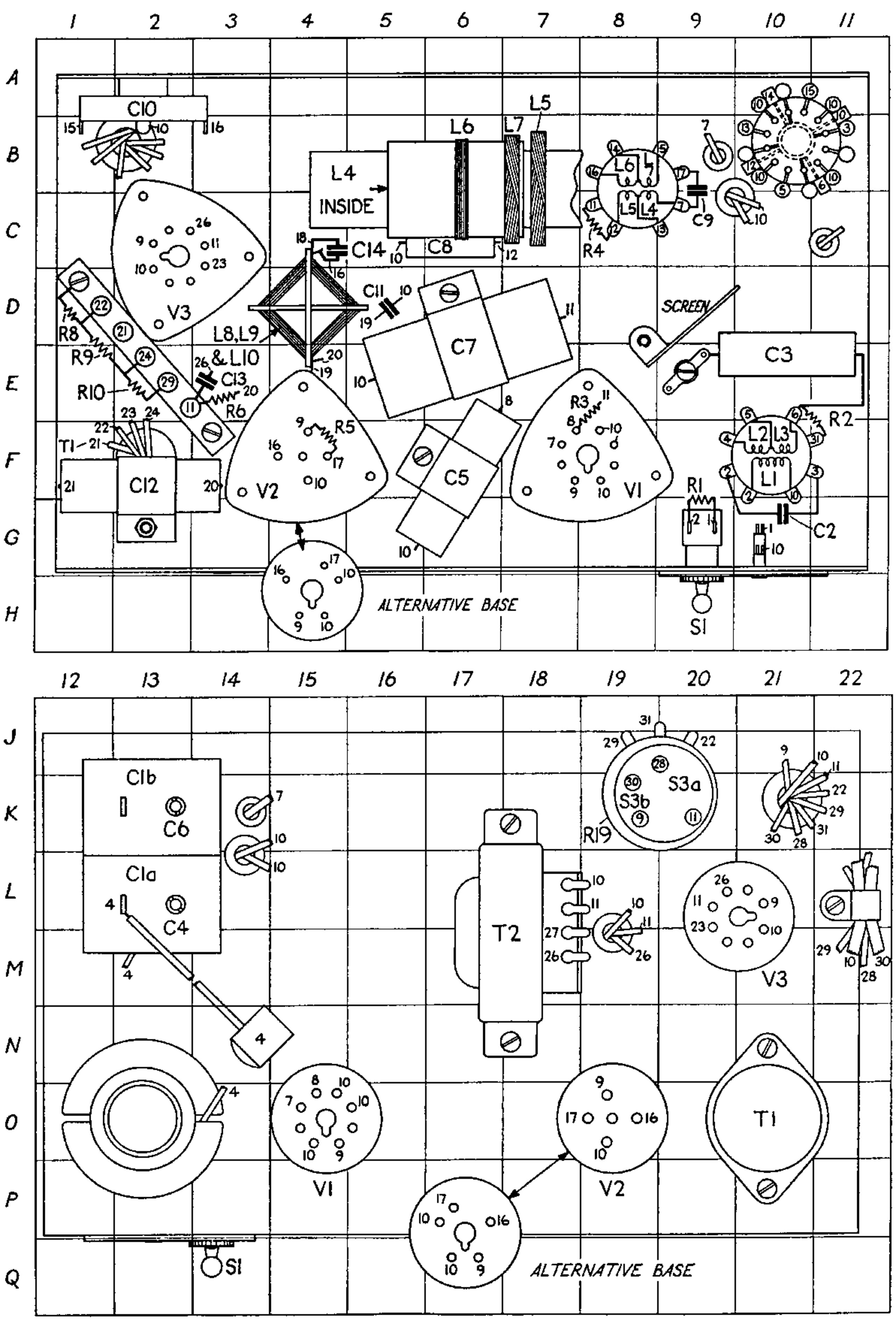
TABLE OF COMPONENTS B45

CODE	VALUE	SQUARE	CODE	VALUE	SQUARE	CODE	VALUE	SQUARE
C1a	Variable	13 L	R1	100,000	9 G	L1	15	10 F
C1b	„	13 K	R2	1 M	11 F	L2	4	10 F
C2	·001	10 G	R3	100,000	8 E	L3	12	10 F
C3	·1	10 E	R4	20,000	8 C	L4	4	8 C
C4	Trimmer	13 L	R5	2 M	4 F	L5	12	8 C
C5	·1	6 F	R6	100,000	3 F	L6	1	8 B
C6	Trimmer	13 K	R8	140	1 D	L7	6	8 B
C7	8 (175v)	6 E	R9	280	1 E	L8	5	4 D
C8	·1	6 C	R10	850	2 E	L9	2	4 D
C9	100 mmf	9 C	R19	100,000	2 O	L10	50	4 D
C10	Differential	2 A						
C11	225 mmf	5 D						
C12	·1	2 F	T1 prim.	300		T2 prim.	300	
C13	·002	3 E	T1 sec.	1300	2 F	T2 sec.	——	18 M
C16	125 mmf	4 C						

L.S. speech coil. 3 ohms.

TABLE OF VOLTAGES B45

VALVE	TYPE	ELECTRODE	TEST PT.	SQ.	VOLTS	VALVE	TYPE	ELECTRODE	TEST PT.	SQ.	VOLTS
V1	Mazda VP22	Anode				V2	Mazda HL2	Anode	16	4 F	42
		(V/C Max)	7	7 F	62		or HL22				
		(V/C Min)			95						
		Screen									
		(V/C Max)	8	7 F	50	V3	Mazda Pen24	Anode	26	2 C	110
		(V/C Min)			78			Screen	11	3 C	108
H.T. negative			29	2 E	−10	H.T. current			7m A		


C10
L6
L7
L5
L4
INSIDE
C14
C8
R4
C9
L10
V3
L8,L9
& L10
C13
R8
R9
R10
R6
C11
C7
SCREEN
C3
R5
V2
C5
R3
V1
R2
L2
L3
L1
R1
C2
T1
C12
C6
C1b
C1a
C4
S3a
S3b
R19
T2
ALTERNATIVE BASE
S1

B47 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 method described on page 10 of the Service Manual for the "28" series.

THE SERVICE OSCILLATOR

Checking points for the higher I.F. range were not given in these instructions but the stations listed below can be used and as they will beat with the second harmonic of the service oscillator in each case it should be quite easy to adjust the two inputs to give the required beat.

STATION	FREQUENCY	SERVICE OSCILLATOR FREQUENCY
	Kc/s	Kc/s
Milan	814	407
Berlin	841	420.5
London Regional	877	438.5
Hamburg	904	452
Radio Toulouse	913	456.5
Brussels, No. 2	932	466
Breslau	950	475
Post Parisien	959	479.5
North Ireland Reg.	977	488.5
Hilversum, No. 2	995	497.5

THE OUTPUT METER

We suggest the use of a 0 to 3 volt rectifier type voltmeter, placed across the loud-speaker sockets, for measuring the output of the receiver when trimming, as this method is both simple and straightforward.

The input from the service oscillator, when the output meter is used, should always be kept sufficiently low to keep the reading below 0.5 volt. It is therefore necessary to reduce the input as each stage is brought into tune.

All the trimmers are on top of the chassis and they should be adjusted with an insulated screwdriver having a blade approximately 3/16" wide.

The correct sequence for completely retrimming is I.F.'s (465 Kc/s) S.W., M.W., and L.W., but small errors in calibration occurring at the lower end of the bands may be corrected by adjusting the oscillator trimmers only.

The trimmer positions are marked on the chassis plan view and may also be located by the square numbers in brackets which are marked on the diagram sheets.

I.F. TRIMMING

The characteristics of the I.F. transformers make it essential 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 a 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.

1. Connect the output meter across L.S. terminals.

2. Clip the flexible lead of the damping unit to chassis and the resistance end to the signal diode anode of V3 (square 8G, test point 56).

3. Tune the receiver to the top end of the long wave scale.

4. Connect the service oscillator between the control grid of V2 (square 24T, test point 42) and chassis, through a fixed condenser of 0.1 mfd.

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

6. Adjust C31 (square 27V) for maximum reading on the output meter.

7. Remove the damping unit from V3 diode anode and clip it to anode of V2 (square 10H,

test point 44). Adjust C34 (square 27U).

8. Connect the service oscillator between the control grid of V1 (square 23T, test point 12) and chassis via the dummy aerial, switch the receiver to medium waves.

9. Remove the damping from V2 anode and apply it to V2 control grid (square 24T, test point 42). Adjust C24 (square 24V).

10. Remove the damping from V2 grid and apply to V1 pentode anode (square 13J, test point 19). Adjust C28 (square 24U).

If the trimmers are found to require only a very small adjustment, the I.F. 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.

It is always advisable to check the R.F. circuits after I.F. adjustments.

The accuracy of long wave calibration depends upon the accuracy of the I.F. trimming.

S.W. TRIMMING

Connect the service oscillator between the aerial and earth sockets of the receiver and the output meter across the L.S. terminals. Tune both the oscillator and the receiver to 21 metres. Adjust C16 (square 22R). It will be found that the signal can be received at two settings of this condenser. The correct adjustment is the one with the *lower* capacity, that is, the *first* point when screwing in the trimmer screw. The other is the "image."

When the oscillator trimmer has been adjusted, set the trimmer on the centre section of the gang condenser C7 (square 22Q) to give maximum gain. A fairly accurate adjustment of the short wave trimmers can be made by tuning to a known station on about twenty metres and trimming for the best results judged by ear, but care should be taken to tune to the highest capacity setting on the oscillator trimmer.

After adjustment check that the 16 metre band still registers correctly at the bottom of the scale as too much trimmer capacity may throw it out.

M.W. TRIMMING

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

2. Tune the receiver and oscillator to 220 metres.

3. Adjust the oscillator trimmer C17 (square 20S), the grid trimmer C2 (square 21Q), and the aerial trimmer C6 (square 22P) in that order. Repeat for final adjustment.

4. If possible, check the calibration on the local broadcast station.

L.W. TRIMMING

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

2. Tune receiver and oscillator to 1000 metres.

3. Adjust the oscillator trimmer C19 (square 21R).

B45 Trimming

Trimming on the B45 receiver can be carried out quite effectively by using a weak station at the lower end of the medium wave-band.

Tune the receiver to the wave-length of the station. Advance the reaction control to just below oscillation point. Reduce the volume control, if necessary, to keep the output from the loudspeaker low. Then adjust the trimmers C6 (square 13K) and C4 (square 13L) to give maximum output.

B47 Mechanical Details

THE chassis is held in position by four bolts, and when these and the control knobs are removed it can be taken away without removing the loud-speaker. In the table model the flexible lead to the pilot lamps is cleated to the top of the cabinet and must be slipped out before the chassis is lifted out.

When replacing the chassis see that each fixing bolt has a square washer on it.

The loud-speaker is also held in by bolts and if this is removed, care should be taken to see that the front of it is pressing firmly against the cabinet when it is replaced.

Before the console chassis is removed, the pickup jack must be released from the panel at the back of the cabinet, by unscrewing the hexagon-headed bush.

EARTHING

Although in the circuit diagram many of the components are shown as earthed to chassis, it does not follow that they can be earthed at the nearest convenient point. It will be noticed that on the chassis, several of the earth connections, particularly for the S.W. components, are earthed in rather unexpected places. This is to prevent unwanted couplings between the circuits and it is therefore most important that the original wiring layout is adhered to if any components are replaced. It will also be noticed that the left-hand front screw securing the tuning assembly is insulated from the tuning frame by a bakelite washer. If this screw short circuits to the frame, second channel interference on short waves will be increased.

THE PILOT LAMPS

The pilot lamps can be replaced by pulling the bracket away from the tuning drum and pulling the flexible lead through the retaining clip until the lamps are accessible. When the bracket is replaced be careful that it is pushed right home, and that the soldering tags are pushed flat, otherwise there is a risk of short circuit to the tuning frame when the drum is rotated.

THE TUNING CONDENSER

To remove the tuning condenser, the leads should be unsoldered from the wave range switch and earth tags, as the tags of the tuning condenser itself are not accessible. The short lead above the chassis should be disconnected by unscrewing the earth tag. There are three earthing points, one above and two below the chassis. Remove the three fixing screws and drive pulley. The condenser can then be lifted out.

To fit a new condenser, first solder the leads to it. The leads must be kept as short as possible and it is particularly important that no loops of leads are left between the condenser tags and the top of chassis. These loops add to the stray capacities, alter the short wave inductances, and give feed back between the circuits. *The earth leads must be connected to the correct points*, otherwise gain and image suppression will be reduced.

THE CORD DRIVE

To fit a new cord drive take a piece of cord 25¼ inches long and thread it through the two holes near the top edge of the drum, pulling it through until the ends come together. Refit the drum in its frame. Pass the two ends of the cord around the drum, through the holes provided in the frame and thence over the pulleys and round the rim of the condenser drive pulley bringing them together at the small hole in the rim. Pass the ends through this hole and make fast through the smaller loop of the tension spring. The cord must be fastened so that the spring is tightly stretched when it is hooked on to the pulley or there will be backlash in the movement of the tuning drum.

THE TUNING DRUM

To remove the tuning drum, first remove the drive cord tension spring from its hook on the condenser drive pulley and detach the cord. Withdraw the pilot lamp carrier from the back of the drum (by giving it a sharp pull) and remove the top pivot screw. The drum can now be tilted back and lifted out.

THE CHART

The chart may be removed by taking off the clamping plate at the back of the drum. A new chart should be placed around the drum and held securely at each end with strong elastic bands or lengths of wire. It is important that it should be held tight against the drum, otherwise calibration errors will occur. See that the holes through which the drive cord is threaded are not covered by the chart and that the top and bottom edges of the chart are square with the ends of the frame.

When the chart is securely held the clamping plate can be replaced and the rubber bands removed.

THE CURSOR THREAD

The cursor thread is sprung at both ends and should normally be very durable, but if a breakage does occur, it is quite a simple matter to fit a new thread.

Remove the framing plate from the front of the tuning assembly and then remove the two brackets which hold the thread at either end. Unhook the small helical springs from these ready to attach to the new thread. The thread should have a small loop at either end and should have a total length of between $7\frac{3}{4}$" and $7\frac{7}{8}$" including the loops. The length is rather critical and the easiest way of making it correct is to drive two brads into a piece of wood eight inches apart.

Make a small loop at one end of the thread and place it over one of the brads. Place the other end around the other brad to form a loop, then slip it off the brad, holding it securely. Tie a single knot in the loop thus formed to make the second permanent loop. The amount of thread taken up by the knot will be just sufficient to give the correct overall length to the thread.

Hook a spring on to each loop and then attach the other end of each spring to the fixing brackets.

Replacing the brackets should then hold the thread under tension in front of the tuning drum. The holes in the brackets are slotted and they should be so adjusted that the thread is covering the end markings on the drum (just above 550m. and 50m.) when the condenser is set at maximum.

B45 Mechanical Details

THE B45 has the leads from the speech coil soldered to the output transformer on the chassis.

The wires are long enough to permit the chassis to be examined without removing the loudspeaker. Alternatively, the speaker clamps can be removed after the chassis fixing bolts have been withdrawn and both chassis and loudspeaker can be taken from the cabinet together.

THE TUNING SCALE

The frame which holds the tuning scale is secured by two screws. If these are slackened the frame may be lifted out forwards.

The frame when replaced on the tuning condenser assembly should be so adjusted that

the trolley carrying the pointer rests against the scale.

THE POINTER

To replace a damaged pointer, slip the tension spring off the lug on the condenser drive pulley. This will relieve the tension on the cord and allow the old pointer to be slipped out and a new one fitted. When the tension spring has been replaced on the lug see that the pointer trolley rests against the scale. If it does not, the screws holding the scale frame should be slackened and the scale eased forward.

THE TUNING CONDENSER

To remove the tuning condenser, the leads should be unsoldered from the coil assembly and earth tags, as the tags of the tuning condenser itself are not accessible. There are two earthing points below the chassis and they must both be used when the condenser is replaced, to obtain constant reaction. Remove the three fixing screws and drive pulley. The condenser can then be lifted out.

THE CORD DRIVE

Changing the drive cord is simplified by removing the tuning dial and the drive mechanism to make the condenser drive pulley more accessible.

Fit the pointer and trolley on to 24½" of cord and pass the cord over the two vertical pulleys and around the condenser drive pulley. Push the ends through the small hole in this pulley and pull them through from the inside until the ends are of equal length.

Attach the tension spring by threading it on to the cord, then double the cord back and clamp it.

Replace the tuning scale and drive mechanism and slip the free end of the tension spring over the lug on the condenser drive pulley.

Turn the tuning control to the left until the stop is reached and slide the pointer trolley down the cord until the pointer covers the end lines on the dial (550 metres).

THE B45 WAVE-TRAP

For listeners near Droitwich a wave-trap may be necessary with the B45 to permit the reception of the Luxembourg station. This can be supplied by our Service Department at cost of 2s. 6d. subject to 27½ per cent. discount.

There are two tapped holes in the receiver chassis between V1 and V2 for mounting the wave-trap, and a grommeted hole is provided to take the two leads under the chassis to the aerial and earth sockets, to which they should be soldered.

The wave-traps are sent out already adjusted, but in all cases they should be checked by tuning the set to Luxembourg and trimming the wave-trap for minimum interference from Droitwich.

The Diagram Sheets

THE diagrams on pages 4 to 9 of this book contain most of the information required for carrying out normal service work. The following information will help you to make full use of the sheets.

The circuit diagram is numbered at each "junction point," so that every component has a number at each terminal. These numbers are marked at the ends of the components in the underside and top views of the chassis so that the respective terminals may easily be identified with those on the circuit diagram.

The underside and top views of the chassis are divided into squares which are lettered horizontally and numbered vertically so that any section may be referred to by quoting the appropriate "square."

In the component tables, all resistances are

given in ohms, and capacities in microfarads, unless otherwise stated. The D.C. resistance of coils is quoted in ohms in all cases, except where the reading would be too small to be of use, when they are omitted altogether.

The voltage tables should only be taken as a guide, as considerable variations may occur without affecting the efficiency of the receiver.

The readings were taken to chassis unless otherwise stated with a 0-50v. and 0-500v. 1000 ohms-per-volt meter, using a new 120v. H.T. battery.

Fault Finding

THE table below is included to assist service men in recording systematically faults which develop in the "45" and "47" receivers.

Some known faults have been included to start the table, and these should be added to by the service man from information published in the MURPHY NEWS and from faults which develop in the field.

Symptoms	Cause
No signals or weak signals	Speech coil o/c.
Instability	C8 s/c or o/c
Distortion	T1 or T2 s/c turns. ½ Prim. or Sec. o/c
Crackle	Bad contact in slow motion drive

Modifications

The table below is intended to be filled in if and when any modification to the circuit or layout of the chassis is announced in the Murphy News.

Receiver	Serial no. of 1st Set Modified	Particulars of Modification