LISSEN

SERVICE MANUAL FOR BATTERY 3-BAND SUPERHET RECEIVER MODEL 8318

TECHNICAL SPECIFICATION

The Model 8318 is a three-band superhet receiver for battery operation.

Valves are as follows :—

Frequency changer,
Ever Ready K80B (Heptode).

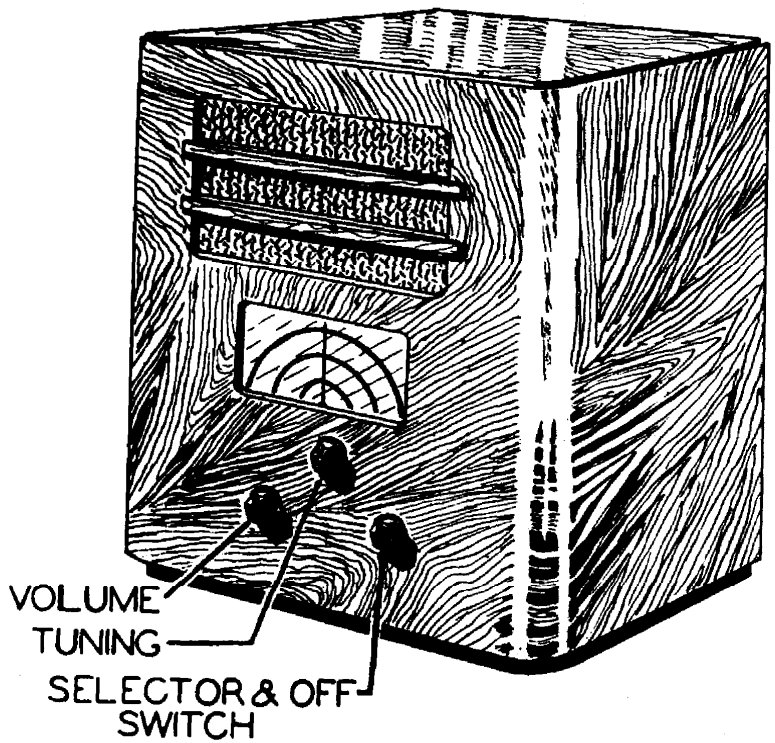
I.F. amplifier,
Ever Ready K50N (Variable-mu H.F. Pentode).

Detector A.V.C. and L.F. Amplifier,
Ever Ready K23B (Duo-diode-triode).

Output valve,
Ever Ready K70B (L.F. Pentode).

An inductively coupled band-pass filter precedes the frequency changer on long and medium waves; on short waves the aerial is coupled direct to the signal frequency coil through a condenser (C14).

The grid coils in the oscillator circuits are tuned, and the oscillator frequency is higher than the signal frequency on medium and long waves, and lower on short waves.



The primary of the first I.F. transformer forms the anode load of the frequency changer, and this winding, in common with the other I.F. coils, is tuned to 455 Kc/s. The anode circuit of the I.F. amplifier includes the primary of the second I.F. transformer, the secondary of which is connected direct to the signal diode, and through a small condenser (C28) to the A.V.C. diode. The latter applies the A.V.C. potential via decoupled circuits to the grids of the frequency changer and I.F. amplifier valves. A resistance—capacitance combination (€29, R10) couples the triode in the duo-diode-triode valve to the output pentode. The latter is capable of giving an undistorted output of 250 milliwatts.

The grid bias section of the H.T. battery is discharged at a suitable rate whilst the receiver is switched on.

Wavelengths covered by the 8318 receiver are as follows :—

Long waves	...	850 to 1,920 metres.
Medium waves	...	198 to 580 metres.
Short waves	...	19 to 50 metres.

The wavechange switches are in position "A" on short waves, "B" on medium waves, and "C" on long waves.

SERVICE DATA FOR BATTERY RECEIVER MODEL 8318.

OPERATING CONDITIONS OF VALVES

Electrode	K80B		K50N	
	Volts	mA.	Volts	mA.
Anode ..	130–135	0.8–1.2	130–135	1.8–2.5
Screen ..	50– 55	1.5–2.0	35– 45	0.8–1.0
Osc. anode ..	50– 60	1.0–2.0	—	—

Electrode	K23B		K70B	
	Volts	mA.	Volts	mA.
Anode ..	85–95	0.5–1.0	127–135	4.0–5.0
Screen ..	Grid Bias	—	130–135	0.5–1.0
Osc. anode ..	—1.5	—	Grid Bias 4.5 v.	

NOTE.—All measurements made with Avometer on 1,200-volt range for all voltages over 50-volt. Wavechange switch in M.W. position, and no signal applied to set.

Total H.T. current—12.0 mA. on M.W. and L.W., and 13.5 mA. on S.W.

Total L.T. current—0.45—0.55 amp.

SWITCHES

Code	Description	Part No.	
S1, S2, S3, S4	Wave Range Switch ..	83,504	—
S5	Grid Bias Switch	—	—
S6	L.T. Switch	—	—

VALVES

Code	Description	Part No.	
V1	Frequency Changer ..	4,094	Ever Ready K80B
V2	I.F. Amplifier	4,091	Ever Ready K50N
V3	Double Diode Triode ..	4,048	Ever Ready K23B
V4	Output Pentode	4,058	Ever Ready K70B

RESISTANCES

Code	Description	Part No.	Values
R1	A.V.C. Decoupling ..	71,962	110,000 ohm, ½ watt
R2	A.V.C. Decoupling ..	71,962	110,000 ohm, ½ watt
R3	Oscillator Grid Leak ..	71,966	16,000 ohm, ½ watt
R4	M. and L.W. Oscillator Anode Feed ..	71,968	51,000 ohm, ½ watt
R5	I.F. Valve Screen Feed..	71,962	110,000 ohm, ½ watt
R6	Signal Diode Load ..	71,944	510,000 ohm, ½ watt
R7	I.F. Stopper	71,968	51,000 ohm, ½ watt
R8	Volume Control Potentiometer	81,501	500,000 ohm
R9	A.V.C. Decoupling ..	71,962	110,000 ohm, ½ watt
R10	L.F. Amplifier Anode Load	71,968	51,000 ohm, ½ watt
R11	A.V.C. Diode Load ..	71,944	510,000 ohm, ½ watt
R12	A.V.C. Diode Load ..	71,945	260,000 ohm, ½ watt
R13	A.V.C. Decoupling ..	71,944	510,000 ohm, ½ watt
R14	Output Grid Leak ..	71,944	510,000 ohm, ½ watt
R15	Bias Discharge ..	71,992	430 ohm, ½ watt
R16	A2 Potentiometer ..	71,962	110,000 ohm, ½ watt
R17	A2 Potentiometer ..	71,963	11,000 ohm, ½ watt

INDUCTANCES

Code	Description	Part No.	
L1	M. and L.W. Primary Coil	78,505	Signal Frequency Coil
L2	M.W. B.P.1 Coil		
L3	L.W. B.P.1 Coil		
L4	S.W. Signal Frequency Coil		
L5	M.W. B.P.2 Coil		
L6	L.W. B.P.2 Coil		
L7	S.W. Grid Coil	78,512	Oscillator Frequency Coil
L8	M.W. Grid Coil		
L9	L.W. Grid Coil		
L10	S.W. Tickler Coil ..		
L11	M.W. Tickler Coil ..		
L12	L.W. Tickler Coil ..		
L13	1st I.F. Primary Coil ..	77,501	1st I.F. Transformer
L14	1st I.F. Secondary Coil ..		
L15	2nd I.F. Primary Coil ..	77,503	2nd I.F. Transformer
L16	2nd I.F. Secondary Coil ..		
T1	Output Transformer ..	(Part of Speaker)	

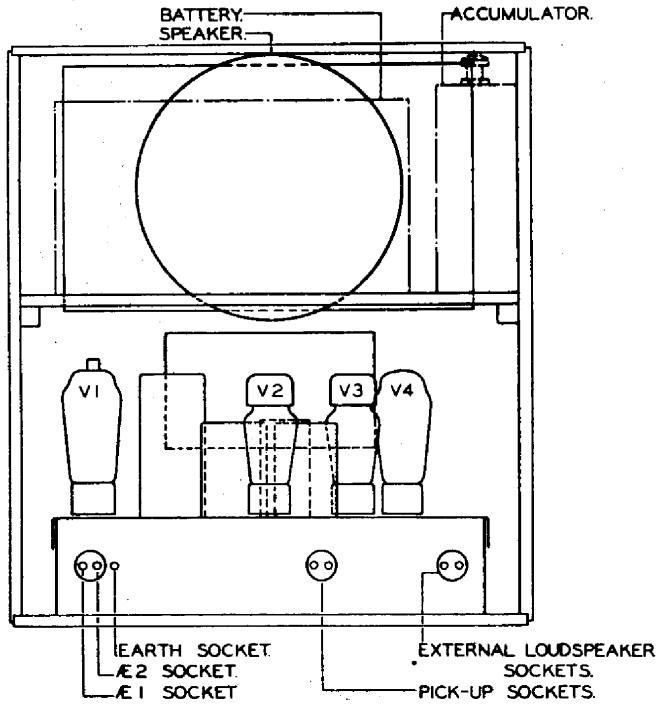
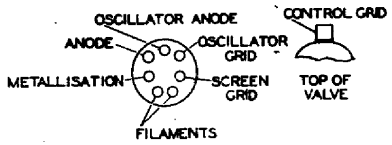


Fig. 8.

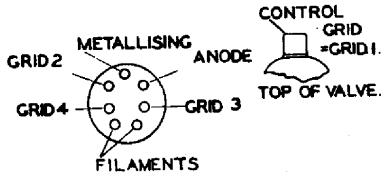
CONDENSERS

Code	Description	Part No.	Values
C1	L.W. B.P.1 Trimmer ..	82,501	40/100 mmfd.
C2	M.W. B.P.1 Trimmer ..	82,500	5/40 mmfd.
C3	L.W. B.P.2 Trimmer ..	82,501	40/100 mmfd.
C4	M.W. B.P.2 Trimmer ..	82,500	5/40 mmfd.
C5	Signal Circuit S.W. Trimmer	82,500	5/40 mmfd.
C6	Oscillator Circuit S.W. Trimmer	82,500	5/40 mmfd.
C7	Oscillator Circuit M.W. Trimmer	82,500	5/40 mmfd.
C8	Oscillator Circuit L.W. Trimmer	82,501	40/100 mmfd.
C9	M.W. Oscillator Circuit Padder	82,502	300/600 mmfd.
C10	L.W. Oscillator Circuit Padder		200/400 mmfd.
C11, C12, C13	Triple Gang ..	80,503	540 mmfd. Max.
C14	S.W. Aerial Coupling ..	71,262	10 mmfd.
C15	S.W. Tracking	68,005	.01 mfd.
C16	A.V.C. Decoupling ..	68,020	.1 mfd.
C17	Frequency Changer Screen By-pass	68,020	.1 mfd.
C18	Oscillator Grid Condenser..	66,035	.0001 mfd.
C19	Oscillator Anode By-pass ..	68,020	.1 mfd.
C20	A.V.C. Decoupling ..	68,020	.1 mfd.
C21, C22, C23, C24	I.F. Trimmers on I.F.T. Assembly	—	—
C25	I.F. Screen By-pass	68,020	.1 mfd.
C26	L.F. Coupling Condenser ..	68,014	.05 mfd.
C27	Signal Diode Load By-pass ..	66,038	.0002 mfd.
C28	A.V.C. Coupling Condenser	71,262	10 mmfd.
C29	L.F. Coupling Condenser ..	68,014	.05 mfd.
C30	Tone Correction	68,003	.005 mfd.
C31	Battery Decoupling.. ..	13,511	2 mfd.
C32	I.F. Filter	66,035	.0001 mfd.



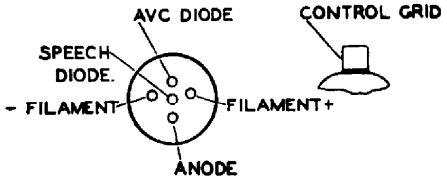
UNDERSIDE OF HOLDER
FOR K80B VALVE

Fig. 1



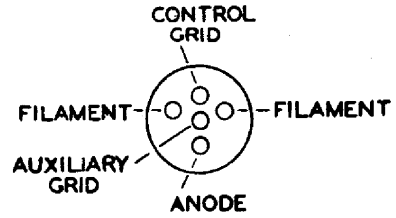
UNDERSIDE OF HOLDER
FOR K.50.N VALVE

Fig 2.



UNDERSIDE OF HOLDER
FOR K.23.B. VALVE.

Fig. 3



UNDERSIDE OF HOLDER
FOR K70B VALVE

Fig. 4

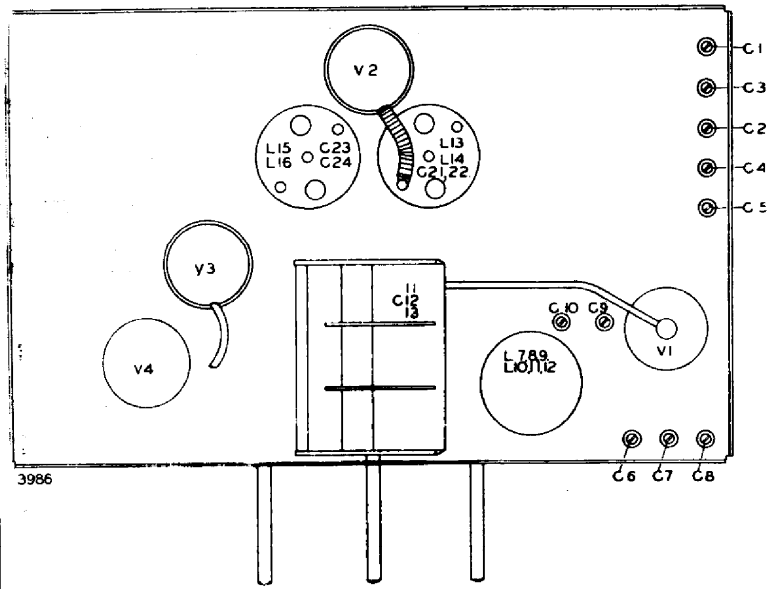


Fig. 5

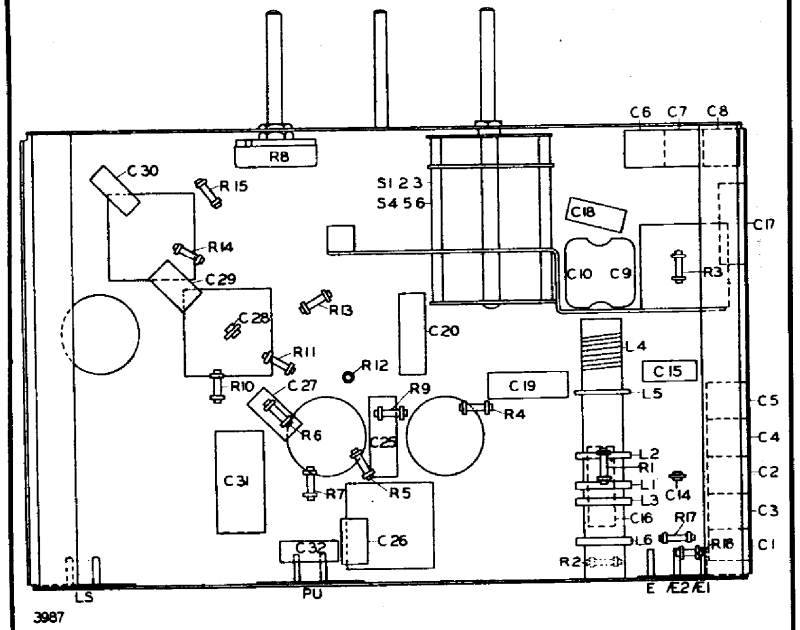
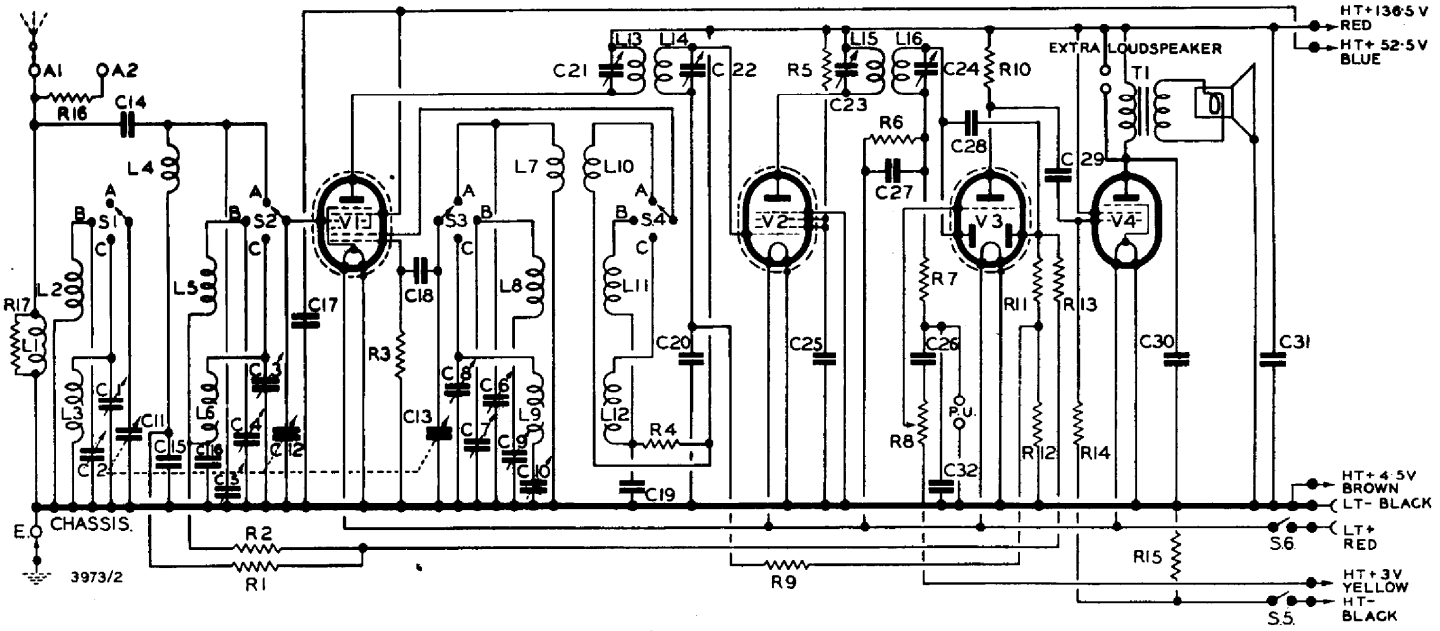


Fig. 6



CIRCUIT DIAGRAM.

Fig. 7

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SPARE PARTS PRICE LIST FOR MODEL 8318.

Prices are subject to alteration without notice. Postage and Packing extra.

Part No.	Description and Circuit Indication	List Price
63533	Cabinet, complete with Baffle, etc....	30/–
73636	Card Back for Cabinet	1/6
78505	Coil, Aerial (L1, L2, L3, L4, L5, L6)	6/6
78512	,, Anode (L7, L8, L9, L10, L11, L12)...	5/–
68020	Condenser, Tubular, ·1 mfd. (C16) (C17) (C19) (C20) (C25) ...	1/4
68005	,, ,, ·01 mfd. (C15)	1/–
68014	,, ,, ·05 mfd. (C26) (C29)	1/–
71262	,, Mica, 10 mmfd. (C14) (C28)	1/6
66035	,, ,, ·0001 mfd. (C18) (C32)	8d.
66038	,, ,, ·0002 mfd. (C27)	8d.
13511	,, 2 mfd. (C31)	7/–
80503	Gang Condenser, 3-stage (C11) (C12) (C13)	18/9
55006	Knob, Tuning	3d.
55019	,, Volume	3d.
57041	,, L.M.S. and Off	3d.
71012	Plug for Earth	3d.
71013	,, ,, Aerial	3d.
4094	Valve (V1) Ever Ready K80B	14/–
4091	,, (V2) ,, ,, K50N	—
4048	,, (V3) ,, ,, K23B	9/–
4058	,, (V4) ,, ,, K70B	13/6
82500	Trimmer 5–40 mmfd. (C2) (C4) (C5) (C6) (C7)	8d.
82501	,, 40–100 mmfd. (C1) (C3) (C8)	1/–
82502	Padder 300–600 200–400 mmfd. (C9) (C10)	3/–
77501	1st I.F. Transformer (L13) (L14)	7/–
71945	Resistor, 260,000 ohms, ½ watt (R12)	1/–
68003	Condenser, ·005 mfd. (C30)	1/–
77503	2nd I.F. Transformer (L15) (L16)	7/–
71962	Resistor, 110,000 ohms, ½ watt (R1) (R2) (R5) (R9) (R16) ...	1/–
71968	,, 51,000 ohms, ½ watt (R4) (R7) (R10)...	1/–
71966	,, 16,000 ohms, ½ watt (R3)	1/–
71944	,, 510,000 ohms, ½ watt (R6) (R11) (R14) (R13) ...	1/–
71963	,, 11,000 ohms, ½ watt (R17)	1/–
71992	,, 430 ohms, ½ watt (R15)	1/–
81504	Volume Control, 500,000 ohms (R8)	5/6
50060	Scale Pointer	6d.
73603	,, Window (Glass)	3d.
90006	Socket Plate, P.U.	3d.
90002	,, ,, L.S.	3d.
75516	,, ,, Aerial	3d.
5412	Speaker	27/6
83504	Switch, Wavechange...	6/–
75506	Valve Holder, 5-pin	4d.
75507	,, ,, 7-pin	6d.
74000	Instruction Booklet	1/–
69516/7	Carton and Liner	6/6
60500	Battery Cable	1/6
60501	Accumulator Cable	1/–
3049	H.T. Battery	13/9
2002	L.T. Accumulator	10/5

Circuit Alignment Procedure for Lissen 8318.

NOTE.—C1 and C2, etc., refer to trimmers as indicated in Service Manual, Figs. 5, 6 and 7.

I.F. Circuit Alignment.

(1) Short circuit the oscillator by clip leads across front section of gang condenser, C13.

(2) Apply a signal of 455 Kc/s. between frequency changer (V1) control grid and chassis. Trim each I.F. circuit to peak in the following order :—
C24, C23, C22, C21.

(3) Check each circuit by going over the trimmers in the same order again.

(4) Remove shorting clip from gang.

R.F. Circuit Alignment.

The three bands short, medium and long waves are quite independent of each other and any adjustment to trimmers or padders on any one band affects only that particular band.

Medium Waveband Alignment.

(1) See that scale pointer registers with the 180° line on the scale with the gang at maximum capacity.

(2) Set condenser C9 approximately two-thirds in.

(3) Set the pointer against the 214-metre mark on scale.

(4) Apply a signal of 214 metres to A1 and E sockets of the receiver and adjust condenser C7 to receive the signal, then adjust condenser C4 to give maximum output, then adjust condenser C2 to give maximum output.

(5) Set pointer against 500-metre mark on scale.

(6) Apply a signal of 500 metres and adjust condenser C9 to give maximum output on that signal.

(7) Re-set pointer against 214-metre mark and re-adjust condensers C7, C4, C2 to give maximum output on the 214-metre signal.

(8) Check again at 500 metres and see that the pointer is at the 500-metre mark when receiving the 500-metre signal. If it is not make slight adjustment to condenser C9.

(9) Check calibration at 214 metres, 300 metres, and 500 metres.

Long Waveband Alignment.

(1) See that the pointer registers with 180° line on the scale, with the gang at maximum capacity.

(2) Set condenser C10 approximately one-third in.

(3) Set pointer against 1,200-metre mark on scale.

(4) Apply a signal of 1,200 metres to the A1 and E sockets of the receiver and adjust condenser C8 to receive the signal, then adjust condenser C3 to give maximum output, then adjust condenser C1 to give maximum output.

(5) Set pointer against 1,700-metre mark on scale.

(6) Apply a signal of 1,700 metres and adjust condenser C10 to give maximum output on that signal.

(7) Re-set pointer against 1,200-metre mark and re-adjust condensers C8, C3 and C1 to give maximum output on the 1,200-metre signal.

(8) Check again at 1,700 metres and see that the pointer is at the 1,700-metre mark when receiving the 1,700-metre signal. If it is not, make slight adjustment to condenser C10.

(9) Check calibration at 1,200 metres and 1,700 metres.

Short Waveband Alignment.

(1) See that the scale pointer registers with the 180° line on the scale with the gang at maximum capacity.

(2) Set the pointer against the 15 Mc/s. mark on the scale.

(3) Screw condenser C6 right in and then apply a signal of 15 Mc/s. Slowly unscrew C6 until the signal is heard. Care should be taken that the right peak is selected. Two peaks will be found on this trimmer. The correct one is the one with condenser C6 at the higher capacity, in other words, it is the first peak found when unscrewing the trimmer. Having selected the right peak adjust condenser C5 to peak.

(4) Apply a signal of 7.5 Mc/s. and tune the receiver to this signal and adjust the end turn of inductance L4 (on signal frequency coil) to give maximum output on this signal.

(5) Re-set pointer to 15 Mc/s. mark and re-adjust condensers C6 and C5 to give maximum output on the 15 Mc/s. signal.

(6) Check calibration at 15 Mc/s.

NOTE.—On the short waveband the oscillator runs at the lower frequency and performance on this band depends upon the selection of the right peak of condenser C6 when aligning at 15 Mc/s.