LISSEN

SERVICE MANUAL FOR A.C. MAINS OPERATED SUPERHETERODYNE RECEIVER MODEL 8214

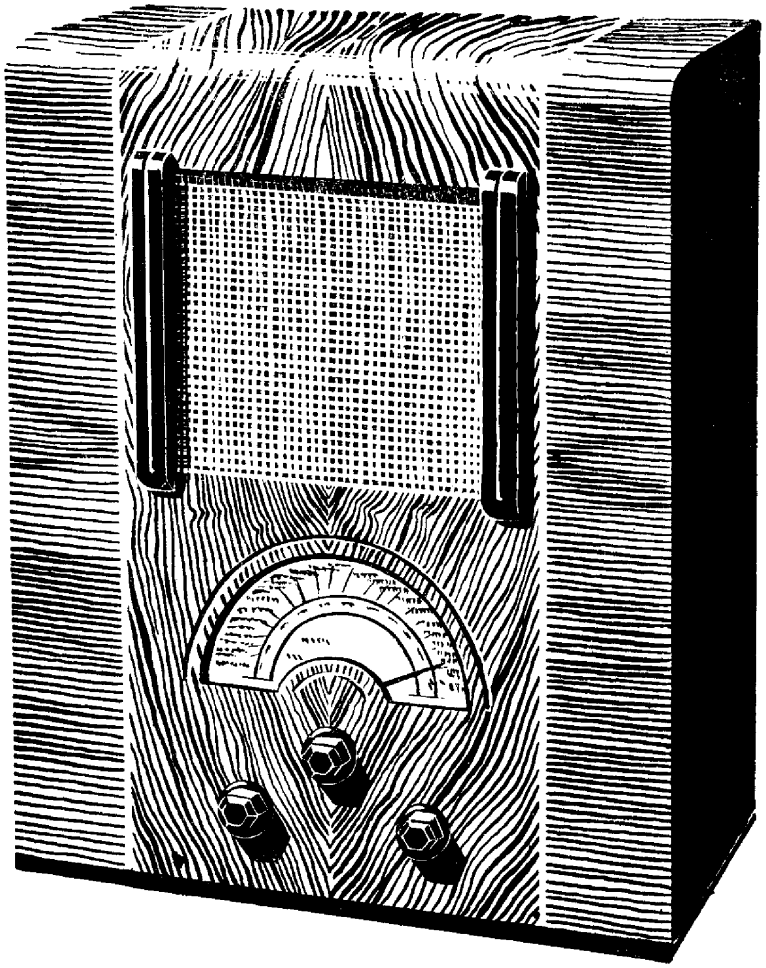
TECHNICAL SPECIFICATION

THE Lissen model **8214** is an A.C. mains operated superheterodyne receiver, for operation with an external elevated aerial.

This model utilises an unique circuit. The usual I.F. amplifier valve is not used, but instead, fixed I.F. reaction is employed with a triode detector.

The first valve (V1) is an octode, which functions as a true electron coupled frequency changer of high efficiency and is non-radiating. It is preceded by a tuned grid circuit with a specially designed aerial coupler. A two section gang condenser tunes this and the oscillator circuit.

The intermediate frequency transformer is tuned to a frequency of 465 kcs. (645 metres).



The second detector valve (V2) is a triode with reaction, this being pre-set by means of condenser C8. By a suitable arrangement of the reaction coupling and the detector operating conditions, a simple form of *Automatic Tone Control* is effected : the reaction automatically decreases on the stronger transmissions, thus ensuring the best reproduction of high notes when the background level allows this.

Automatic volume control is applied from the rectified grid voltage of the detector valve to the grid of V1.

The detector valve is resistance capacity coupled to the high slope output pentode (V3) which in turn is transformer coupled to the energised moving coil speaker.

A two position switch provides a manual adjustment of tone.

SERVICE DATA FOR A.C. MAINS OPERATED SUPERHETERODYNE RECEIVER MODEL 8214

GENERAL REMARKS

In the event of trouble check the following details :—

(1) Power supply : If the pilot lamp lights it is certain that the power supply is not at fault, otherwise check :—

(*a*) Mains leads, plugs and sockets.

(*b*) Mains switch.

(*c*) Receiver correctly adjusted for power supply.

(2) Valves :—

(*a*) Check characteristics, or

(*b*) Substitute known good valves.

(3) Locate trouble to a particular stage :

(*a*) Check valve operating conditions, or

(*b*) Test the A.F., I.F. and R.F. stages with a signal generator or oscillator and check the alignment of the tuned circuits.

(4) Locate faulty component by testing with a suitable instrument, or, if necessary, by substitution.

(5) Check trimming with the help of an oscillator, if not attended to under 3(*b*).

The charts are given in the order they will usually be required.

OPERATING CONDITIONS OF THE VALVES

Valve	Circuit	Operating Condition
F.C. and Osc. valve (V1), Ever Ready A80A (Metallized).	F.C. anode voltage F.C. anode current F.C. screen voltage F.C. screen current Oscillator anode voltage Oscillator anode current	244 volts 1.4 m.a. 78 volts 4.3 m.a. *78 volts ‡2.2 m.a.
2nd Detector valve (V2), Ever Ready A30D (Metallized).	Anode voltage Anode current	85 volts 3.9 m.a.
A.F. Pentode valve (V3), Ever Ready A70C (Clear).	Anode voltage Anode current Aux. grid voltage Aux. grid current	220 volts 32 m.a. 244 volts 3.5 m.a.
Rectifier valve (V4), Ever Ready A11B.	Voltage between anodes	734 volts
Power consumption		60 watts approx.
Output		2.5 watts

*Selector switch at "M."

If a particular reading should vary considerably from the above table, a systematic check of the circuits associated with the particular valve should be made. All voltages are measured to chassis with a 1,000 ohms per volt meter.

CIRCUIT ANALYSIS

Valve	Circuit	Associated Components
F.C. and Osc. valve (V1), Ever Ready A80A (Metallized).	F.C. anode circuit F.C. Screen circuit F.C. Grid circuit Osc. Anode circuit Osc. Grid circuit Cathode circuit	T1 primary. C5. R4, R5. C14. Screened cable. L3, L4. C1, C3, C11. R6. S3. L5. R4, R5. C14. C2, C4, C13. L7, L6. R3. C7. S4, S5. R2. C12.
2nd Detector valve (V2), Ever Ready A30D (Metallized).	Anode circuit Grid circuit Cathode circuit	R1, R9, R10. C19, C17, C16, C8. L11. T1 secondary. R7. C15, C6 and P.U. sockets. R8. C18.
A.F. Pentode valve (V3), Ever Ready A70C (Clear).	Anode circuit Aux. grid circuit Grid circuit Cathode circuit	T2 primary. C20, C22. S6. C20. R11, R1. R12, C21.

INDUCTANCES AND TRANSFORMERS

Circuit Indication	Specification	Location	Component Number
L1	Medium wave coupling coil, 1.6 ohms	Fig. 5	78,083
L2	Long wave coupling coil, 140 ohms	Fig. 5	78,083
L3	Medium wave aerial coil, 2.2 ohms	Fig. 5	78,083
L3, L4	Long wave aerial coil, 16.2 ohms	Fig. 5	78,083
L5	Oscillator anode coil, 21 ohms	Fig. 5	78,082
L6	Medium wave oscillator grid coil, 1.5 ohms	Fig. 5	78,082
L6, L7	Long wave oscillator grid coil, 20 ohms	Fig. 5	78,082
L8	Voice coil 1.8 ohms	Fig. 7	85,000
L9	Hum balancing coil ohms	Fig. 7	85,000
L10	Field coil, 3,000 ohms	Fig. 5	77,048
L11	Reaction coil, 1.8 ohms	Fig. 5	77,048
T1	I.F. transformer primary, 7.6 ohms; secondary, 7.6 ohms	Fig. 5	77,515
T2	Output transformer: primary 700 ohms; secondary, 0.3 ohms	Fig. 5	77,515
T3	Mains transformer— Primary 36+4+4 ohms Secondary A–B, 0.1 ohms Rectifier heater, 0.2 ohms Rectifier anodes 160+190 ohms	Fig. 5	77,089

SWITCH POSITIONS

Circuit Indication	Medium Waves	Long Waves
S1	Closed	Open
S2	Open	Closed
S3	Closed	Open
S4	Closed	Open
S5	Open	Closed
S6	Tone control switch	
S7	Mains switch	

CONDENSERS

Circuit Indication	Specification	Location	Component Number
C1	Aerial tuning	Fig. 5	80,025
C2	Oscillator tuning	Fig. 5	80,025
C3	Aerial tuning trimmer	Fig. 5	80,025
C4	Oscillator tuning trimmer	Fig. 5	80,025
C5	I.F. transformer T1 primary tuning	Fig. 5	80,001
C6	I.F. transformer T1 secondary tuning	Fig. 5	80,001
C7	Oscillator coil long wave trimmer	Fig. 5	80,001
C8	Reaction adjuster	Fig. 6	80,001
C9	.0001 mfd. mica	Fig. 5	66,035
C10	.002 mfd. mica	Fig. 5	66,971
C11	0.1 mfd. tubular 350 volts D.C. working	Fig. 6	68,020
C12	0.1 mfd. tubular 350 volts D.C. working	Fig. 6	68,020
C13	.0001 mfd. mica	Fig. 6	66,966
C14	0.1 mfd. tubular 350 volts D.C. working	Fig. 6	68,020
C15	.0001 mfd. mica	Fig. 6	66,966
C16	.001 mfd. mica	Fig. 6	66,970
C17	.002 mfd. mica	Fig. 6	66,971
C18	0.1 mfd. tubular 350 volts D.C. working	Fig. 6	68,020
C19	.05 mfd. tubular 350 volts D.C. working	Fig. 6	68,014
C20	.0025 mfd. tubular, 450 volts D.C. working	Fig. 6	68,002
C21	50 mfd. dry electrolytic, 12 volts peak	Fig. 6	67,005
C22	.01 mfd. tubular, 450 volts D.C. working	Fig. 6	68,005
C23	8 mfd. Electrolytic condenser block	Fig. 6	67,031
C24	8 mfd. Electrolytic condenser block	Fig. 6	67,031

RESISTANCES

Circuit Indication	Specification	Colour Code Body	Tip	Dot	Location	Component Number
R1	Volume control, 250,000 ohms	—	—	—	Fig. 6	81,017
R2	250 ohms (½ watt)	Red	Grn.	Brn.	Fig. 6	71,960
R3	100,000 ohms (½ watt)	Brn.	Blk.	Yel.	Fig. 6	71,910
R4	20,000 ohms (2 watt)	Red	Blk.	Org.	Fig. 6	71,951
R5	40,000 ohms (½ watt)	Yel.	Blk.	Org.	Fig. 6	71,918
R6	2.1 megohms (½ watt)	Red	Brn.	Grn.	Fig. 6	71,902
R7	510,000 ohms (½ watt)	Grn.	Brn.	Yel.	Fig. 6	71,944
R8	100 ohms (½ watt)	Brn.	Blk.	Brn.	Fig. 6	71,957
R9	40,000 ohms (½ watt)	Yel.	Blk.	Org.	Fig. 6	71,955
R10	15,000 ohms (½ watt)	Brn.	Grn.	Org.	Fig. 6	71,917
R11	26,000 ohms (½ watt)	Red	Blue	Org.	Fig. 6	71,974
R12	150 ohms (½ watt)	Brn.	Grn.	Brn.	Fig. 6	71,976

ADJUSTING THE TUNED CIRCUITS

Tuned circuits :—

(*a*) Tuned primary and secondary of I.F. transformer T1.

(*b*) Tuned oscillator circuit.

(*c*) Preselector circuit, one tuned stage.

I.F. Circuits (465 kcs., 645 metres).

The I.F. transformer should be adjusted before the oscillator and tuned grid circuit.

A modulated signal of 465 kcs. (645 metres) is applied between the frequency changer control grid and the chassis via a .002 mfd. condenser. The lead to the control grid terminal is removed and a ½ megohm resistance is connected between this valve terminal and chassis. To stop the valve from oscillating, connect a 0.25 mfd. condenser between the oscillator anode and chassis. An output meter is connected across the primary of the output transformer T2. Adjust the trimmers in the following order for maximum reading on the output meter.

(*a*) T1 secondary trimmer C6.

(*b*) T1 primary trimmer C5.

Pre-selector and Oscillator Circuits

Rotate the gang until the pointer is at the higher wavelength end of the scale. Push a flat-ended rod through the hole in the side of the gang cover and against the vanes. Now rock the vanes by means of the rotor drive until it is felt that the rotors are fully in mesh. If the pointer does not coincide with the two horizontal lines at the higher wavelength end of the scale, release the centre fixing screw and move the pointer to this position.

Apply a modulated signal of 200 metres to the aerial terminal A2, switch the receiver to medium waves and rotate the gang condenser until the pointer indicates 200 metres on the scale. Adjust the trimmers C4 and C3 for a maximum reading on the output meter.

Switch the receiver to the long waveband, and apply a signal of 1,300 metres to the A2 Terminal. Now adjust the trimmer C7, at the same time swinging the gang condenser around the 1,300 metres mark till maximum output is obtained.

Pre-set Reaction Condenser

It should be unnecessary to alter the setting of the pre-set reaction condenser C8, but if it is found necessary to adjust, it will be noted that screwing the trimmer in slightly will increase the sensitivity to weak signals but may unduly limit the output for a stronger signal. If so, a compromise must be made between the range desired and the output necessary. It is essential if the setting of C8 is altered, to realign the I.F. circuits.

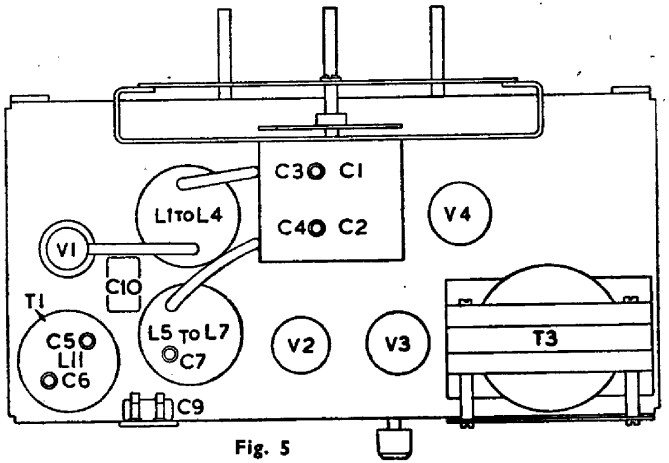


Fig. 5

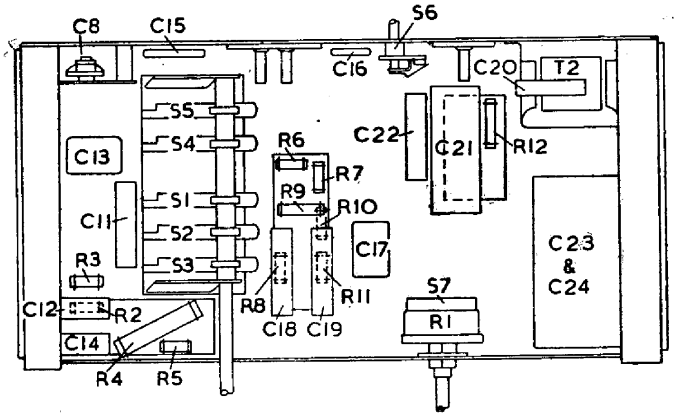
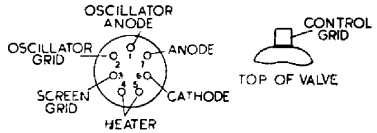
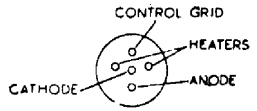


Fig. 6



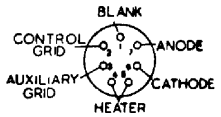
V1
TOP SIDE OF VALVE HOLDER
1H OCTODE

Fig. 1



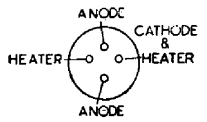
V2
TOP SIDE OF VALVE HOLDER
1H TRIODE

Fig. 2



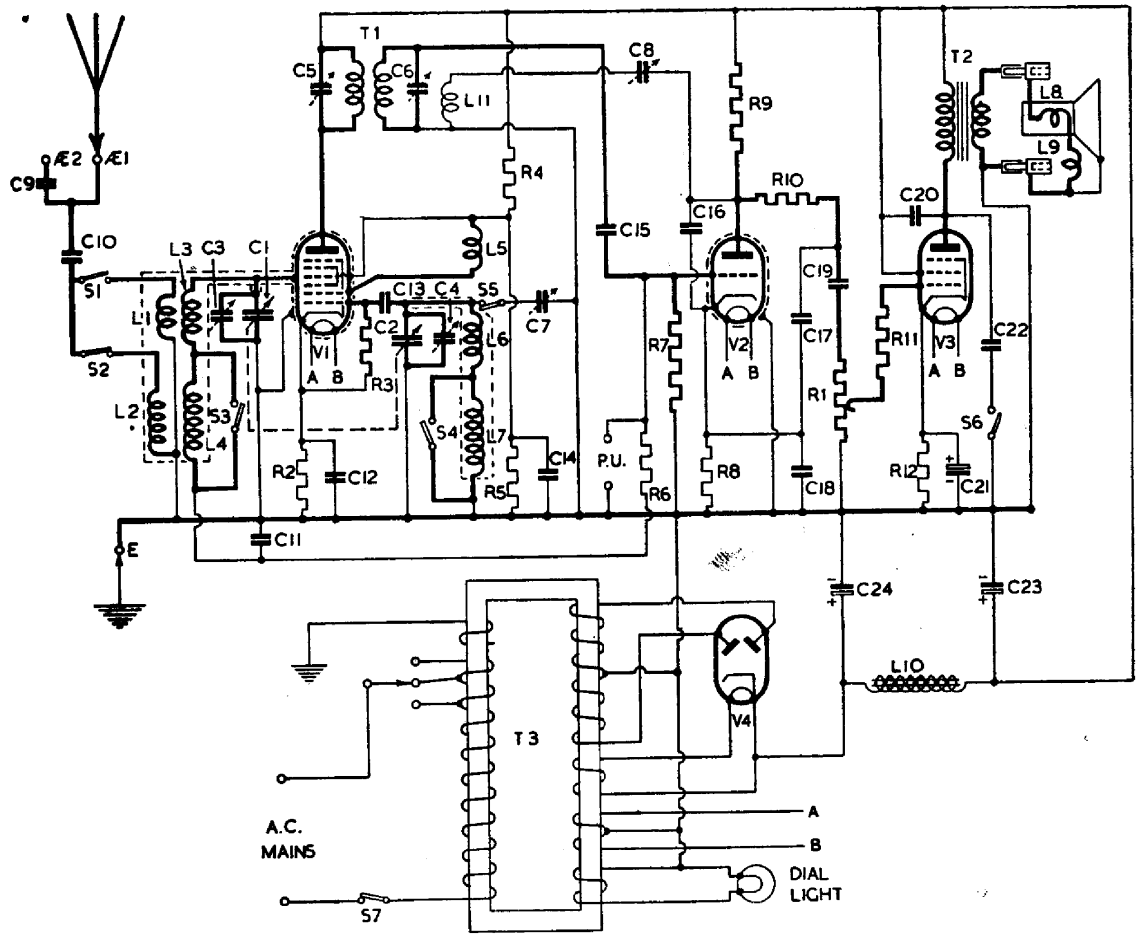
V3
TOP SIDE OF VALVE HOLDER
1H OUTPUT PENTODE

Fig. 3



V4
TOP SIDE OF VALVE HOLDER
1H RECTIFIER

Fig. 4



ALL RESISTANCES ARE COMPOSITE

SCREENED LEAD

CIRCUIT DIAGRAM

REMOVING THE CHASSIS FROM THE CABINET

The knobs must first be removed by a direct forward pull, and the speaker plugs taken from the sockets and the field leads disconnected at the speaker end by removing two screws.

Next the four fixing bolts (A in Fig. 7) should be removed and the chassis withdrawn from the cabinet.

The loudspeaker may also be removed by taking out the four cheese-headed screws after releasing the cleats holding the speech coil leads.

It should be noted that to get access to the underside of the chassis it is only necessary to remove the cabinet base; the chassis need not be removed from the cabinet.

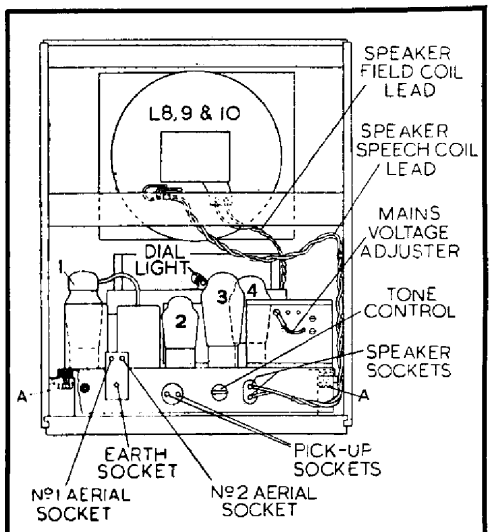


Fig. 7

NOTES

This space is reserved for recording any further information you may find useful. If advice is required at any time the Lissen Service Dept. will be pleased to help you.