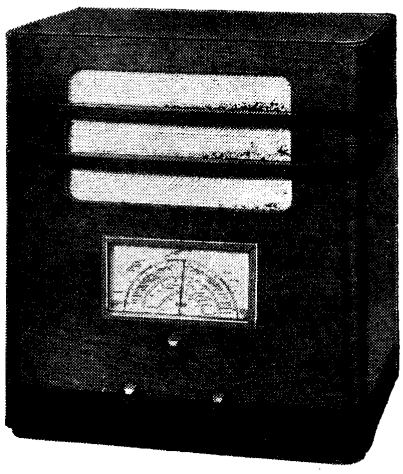
LISSEN 8321 A.C.-D.C. THREE BAND



The Lissen model 8321 is a four-valve plus rectifier, superhet covering three wavebands and for use on either A.C. or D.C.

CIRCUIT.—The aerial input to the grid of V1, a triode hexode frequency changer, is by a set of band-pass coils on the medium and long bands. On the short band coupling is effected by an additional condenser to a single tuned circuit. Arrangements are made whereby a series aerial resistance may be brought into circuit.

The output of the frequency changer passes *via* an I.F. transformer, tuned to 455 kc., to V2, an H.F. pentode. Another transformer leads to the demodulating diode of V3, a double-diode valve. The other diode of V3, fed by coupling condenser C30, provides a potential fed back to the grids of V1 and V2 for A.V.C.

The demodulated signal passes *via* an L.F. coupling condenser to the volume control R15 and a grid stopper resistance R19 to the grid of V4, the output pentode. A pentode compensator condenser is connected between the anode of V4 and chassis.

Mains equipment consists of a tapped mains adjustment resistance, a half-wave rectifying valve, electrolytic smoothing condensers and a separate smoothing choke. Both mains leads are protected by 1-amp. fuses.

Chassis Removal.—Remove two screws securing back of cabinet and the three control knobs (spring fixed). Take out the four chassis-securing bolts from the base. Uncleat the speaker leads from the side of the cabinet.

If the speaker leads are unsoldered from the speaker panel : the black lead is connected to a tag on the frame, the blue is connected to the second tag from the top, and the red to the second tag from the bottom.

Special Notes.—The single dial light, located on a bracket behind the dial, is mounted in a screw-in holder and is rated at 6.2 volts 0.3 amp.

The A2 socket places a series aerial resistance in circuit.

The speaker is of a permanent magnet type, and a separate choke is used for smoothing purposes. The smoothing choke is mounted on the rear of the chassis deck near the mains adjustment resistance.

No provision is made for an extension speaker, but the speech coil of a permanent magnet speaker may be connected to the secondary of the internal speaker transformer, *i.e.*, to the two outside tags of the panel.

One-amp. fuses are connected in both mains leads. These are fixed in the two-pin plug, and can be replaced by removing the two bolts from the cable end of the plug. The fuses are of the short cartridge type rated at 1 amp.

R11 and R12 are contained in the oscillator coil can.

Circuit Alignment Notes

I.F. Circuits.—Connect an output meter with a 2 mfd. condenser in one lead across the primary of the speaker transformer. Short out the oscillator section of the gang. Switch set to M.W., maximum capacity and maximum volume. Connect a service oscillator between the top grid cap of V1 and chassis.

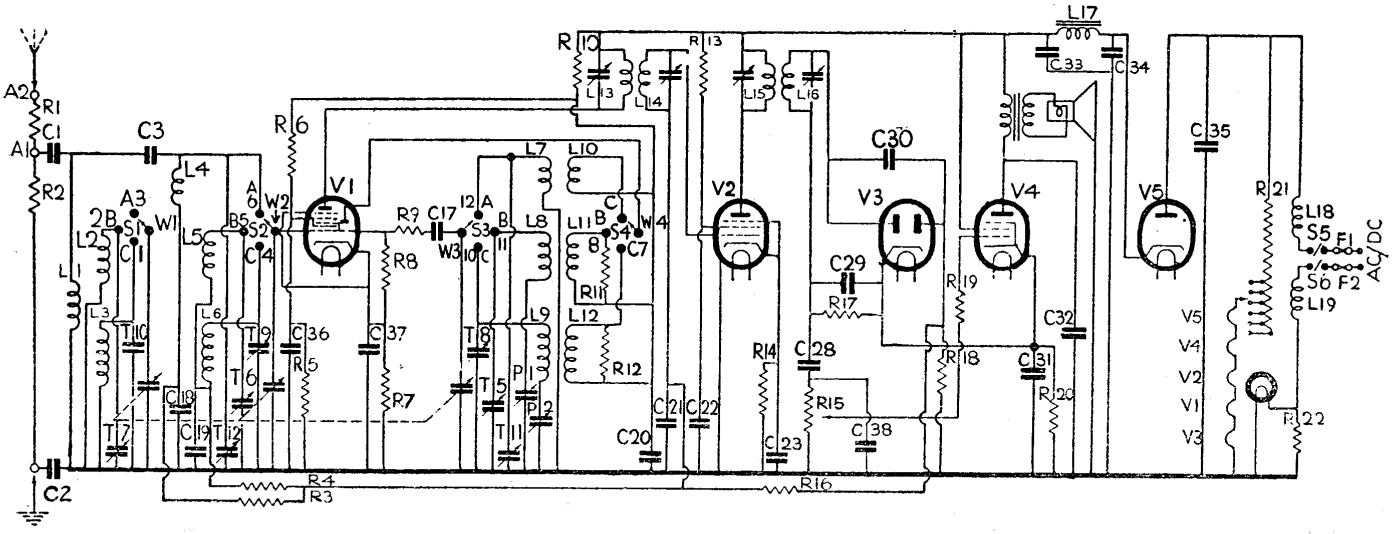
Tune the oscillator to 455 kc. and adjust T1, T2, T3 and T4 in that order for

RESISTANCES

R.	Purpose.	Ohms.
1	Series aerial	110,000
2	Aerial shunt	11,000
3	S.W. V1 A.V.C. decoupling	110,000
4	V1 A.V.C. decoupling	110,000
5	V1 screen potr. (part).	20,000
6	V1 screen potr. (part).	5,000
7	V1 cathode bias	150
8	Oscillator grid leak	26,000
9	Oscillator grid stabiliser	200
10	Oscillator anode decoupling	10,000
11	M.W. regeneration modifier	1,000
12	L.W. regeneration modifier	2,100
13	V2 screen decoupling	25,000
14	V2 cathode bias	100
15	Volume control	500,000
16	V2 A.V.C. decoupling	110,000
17	Demodulating diode load	510,000
18	A.V.C. diode load	510,000
19	V4 grid stopper	21,000
20	V4 cathode bias	150
21	Mains adjustment	677
22	Dial light shunt	40

CONDENSERS

C.	Purpose.	Mfds.
1	Aerial coupling	.001
2	Chassis isolating	.01
3	S.W. aerial coupling	.00001
17	Osc. grid	.0001
18	S.W. A.V.C. decoupling	.01
19	A.V.C. decoupling	.1
20	Osc. anode decoupling	.1
21	V2 A.V.C. decoupling	.1
22	V2 screen decoupling	.1
23	V2 cathode bias shunt	.1
28	L.F. coupling	.05
29	H.F. bypass	.0002
30	A.V.C. diode coupling	.00001
31	V4 cathode bias shunt	50
32	Pentode compensator	.01
33	H.T. smoothing	16
34	H.T. smoothing	8
35	Rectifier H.F. bypass	.01
36	V1 screen decoupling	.1
37	V1 cathode bias shunt	.1
38	Tone modifier	.0005



Band-pass input to a triode hexode frequency changer is found in the 8321. A double diode feeds a high-slope output pentode.

maximum response, reducing the input as the circuits come into line to render the A.V.C. inoperative.

Signal Circuits.—Connect the service oscillator to A. and E. sockets and remove short from oscillator section of gang. See that the scale pointer registers with the 180-degree line on the scale with the gang at maximum.

Only feed sufficient input from the service oscillator to obtain reliable peaks in the output meter.

Medium Waves.—Set P1 approximately two-thirds in, tune set and oscillator to 214 metres (1,400 kc.) and adjust T5, T6 and T7 in that order for maximum.

Tune set and oscillator to 500 metres (600 kc.) and adjust P1 for maximum, simultaneously rocking the gang.

Repeat until no further improvement results.

Long Waves.—Set P2 approximately one-third in, tune set and oscillator to 1,200 metres (250 kc.), and adjust T8, T9 and T10 in that order for maximum.

Tune set and oscillator to 1,700 metres (177 kc.) and adjust P2 for maximum, simultaneously rocking the gang.

WINDINGS

Winding.	Ohms.	Winding.	Ohms.
L1 ..	.. 11	L11	5
L2 ..	.. 2.6	L12 ..	8.3
L3 ..	.. 11	L13 ..	7
L4 ..	.. very low	L14 ..	7
L5 ..	.. 2.4	L15 ..	7
L6 ..	.. 11.5	L16 ..	7
L7 ..	.. very low	L17 ..	2,200
L8 ..	.. 1.75	T1 prim. ..	300
L9 ..	.. 5		
L10	.. .2		

VALVE READINGS

No signal. Volume maximum. M.W. min. cap. 230 volt A.C. mains.

V.	Type.	Electrode.	Volts	Ma.
1	*All Ever-Ready* C36B (7 met.) ..	Anode ..	221	1.2
		Screen ..	61	2.6
		Osc.anode	88	6.8
2	C5ON (7 met.)	Anode ..	221	7.5
		Screen ..	141	2.6
3	C20C (5 met.) ..	Diodes only ..	—	—
4	C70 (7)	Anode ..	200	5.1
		Screen ..	221	7.2
5	C10B (5) ..	Cathode	230	—

Repeat until no further improvement results.

Short Waves.—Tune set and oscillator to 20 metres (15 mc.), screw T8 right up, then slowly unscrew until the first peak is heard. Then adjust T11 for maximum response.

Apply a signal of 7.5 mc., tune in signal on receiver, and then adjust the end turn of L4 to give maximum output.

Readjust T11 and T12 on a 20-metre (15 mc.) signal with receiver set to 20 metres.

Replacement Condensers

Two exact replacement condensers for the Lissen model 8321 are available from A. H. Hunt, Ltd., of Garratt Lane, Wandsworth, London, S.W.18.

These are: For the block containing C33 and C34, unit 3800, price 8s. 9d.; and for C31, unit 2915, 1s. 9d.

INTERMITTENT FADE-OUT

ENGINEERS are sometimes puzzled by receivers which fade out but are set going again if a control is moved or even if a lighting circuit is switched on or off.

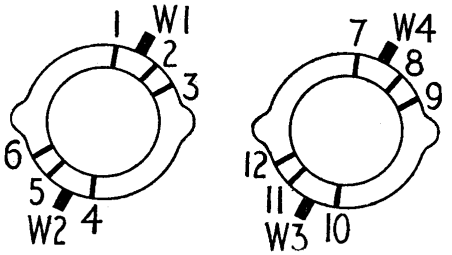
Such troubles are caused by some variable mechanical or electrical failure which is susceptible to "shock" voltages.

Wound components, particularly those with iron cores, should always be suspected. Often a wire has fractured, and a sudden surge of current and consequent magnetic flux is sufficient to cause minute mechanical movement of the adjoining ends.

L.F. inter-valve transformers, smoothing chokes and even mains transformers have been known to produce this fault. Electrical surges also produce mechanical stress in condensers and any fractured connection in them can be disturbed.

A purely electrical cause is a tendency to instability. The decoupling arrangements may be insufficient to cope with the increased voltage swings set up by a sudden surge with the result that some stages of the set burst into oscillation.

The only way to trace these faults is by patient examination of the performance of each stage working back from output valve to aerial. Using an oscillator, L.F., I.F. and R.F. circuits can be tested in turn.



The switch banks of the 8321. Bank (1) is left and (2) right (see under-chassis diagram).

Lissen 8321 on Test

MODEL 8321.—Standard model for A.C.-D.C. operation on 200 to 250 volts. Price, £9 15s.

DESCRIPTION.—A three-band four-valve, plus rectifier, universal superhet.

FEATURES.—Full-vision scale calibrated in station names and metres; on the short band in metres and megacycles. Controls for combined volume and master switch, tuning and wave selection. Smoothing choke separate from speaker.

LOADING.—60 watts.

Sensitivity and Selectivity

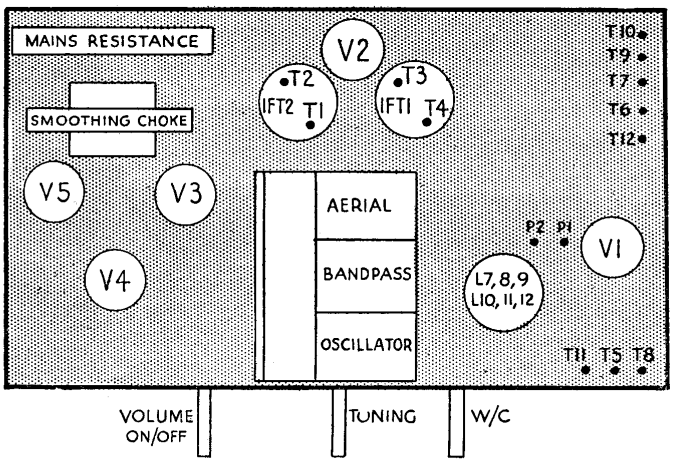
SHORT WAVES (19-50 metres).—Reasonable gain and good selectivity with very easy handling. Well-maintained sensitivity.

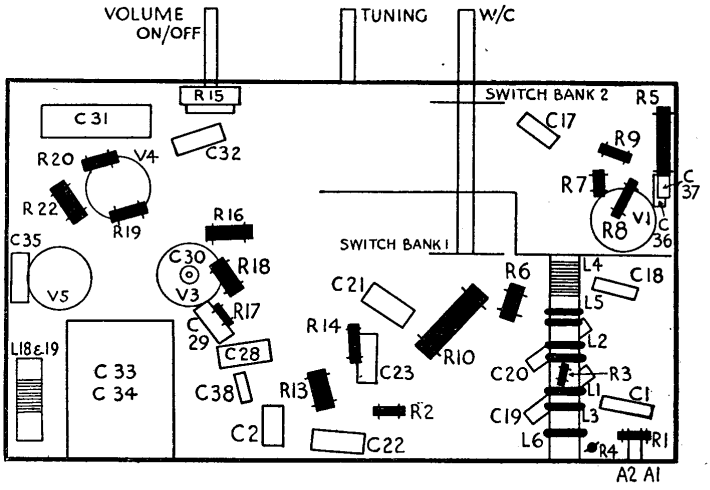
MEDIUM WAVES (198-580 metres).—Representative gain and selectivity with a good background. Local stations spread on adjacent channels only.

LONG WAVES (850-1,920 metres).—Excellent gain and good selectivity.

Acoustic Output

Well-balanced crisp tone, with good attack and very little colouration on speech. Adequate volume for an ordinary room. Musical reproduction of all types is well balanced and the general result is very pleasing.





Practical details of the Lissen chassis are given in these diagrams. The trimmers are all accessible from the top (see diagram on left).