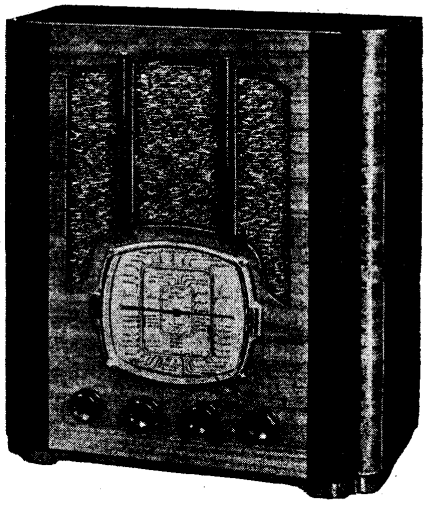
LISSEN 8402 THREE-BAND SIX



The Lissen 8402 is a five-valve, plus rectifier, manually tuned superhet covering three bands. A feature is the large "aeroplane" type dial.

CIRCUIT.—Coupled aerial circuits, selected by two switch wafers controlling tuned and untuned windings, precede the first valve, VI, an H.F. pentode. A.V.C. is provided on all bands through the usual decoupling network.

Transformers with tuned secondaries and untuned primaries couple V1 to V2, a triode-hexode. A.V.C. is again provided on all bands. The transformer network has a number of modifying resistances in both primary and secondary circuits.

The oscillator circuit of V2 utilises a tuned grid and untuned reaction arrangement. Another pair of switch wipes select the various windings. The regeneration voltages are modified by parallel and series damping resistances.

Trimmer tuned I.F. transformers lead to V3, another H.F. pentode, and to V4, a double diode triode. One diode is used for demodulation with a standard network. The other is used for the A.V.C., the load having two tappings to give suitable control for the various stages.

The grid circuit of the triode portion of V4 comprises the volume control, which is fed through a coupling condenser from the diode load. Resistance coupling is used between this valve and V5, the output pentode. Negative feedback is provided by a high resistance connected between the anodes of V4 and V5.

The last valve, V6, is a full-wave rectifier, and a separate smoothing choke is employed.

Chassis Removal.—The chassis is released by withdrawing the four retaining bolts from the bottom and removing the knobs. The knobs are anchored by a special spring clip and pull off. The retaining bolts have washers and work in conjunction with large rubber grommets, acting as a spring suspension, fixed in the bottom of the cabinet.

The tuning scale assembly comes away with the chassis, but for complete removal of the chassis from the cabinet the speaker leads must be disconnected. These leads go to the tags on the speaker transformer and choke, which are mounted on the platform at the side of the speaker. The earthing lead is soldered to a tag on the speaker chassis. Numbers are used on

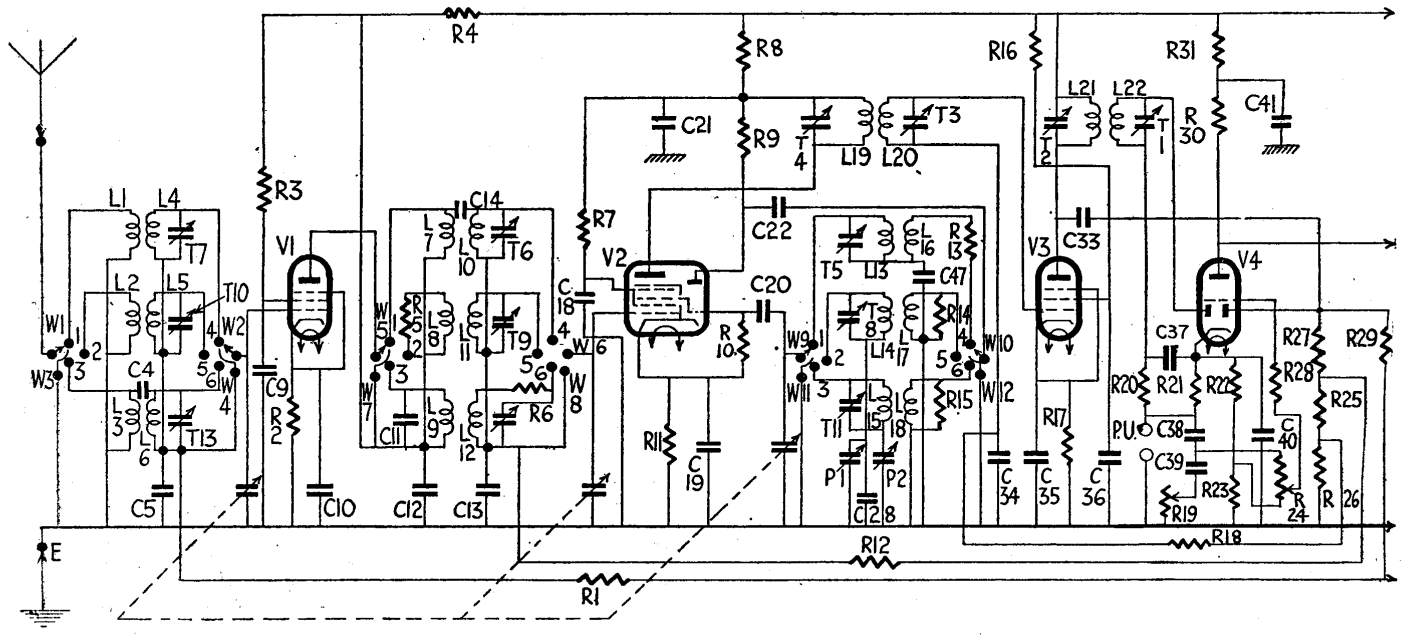
VALVE READINGS

No signal. Volume maximum. M.W. min. cap. 200 volt A.C. mains.

V.	Type.	Electrode.	Volts.	Ma.
	(All Ever Ready)			
1	A50P ..	Anode ..	150	4.8
		Screen ..	120	1.7
2	A36B ..	Anode ..	170	1.2
		Screen ..	65	3
		Osc. anode	75	4.5
3	A50P ..	Anode ..	225	5.2
		Screen ..	145	1.8
4	A23A ..	Anode ..	140	2
5	A70D ..	Anode ..	212	27
		Screen ..	225	4
6	A11D ..	Heater ..	250	—
Pilot lamps	Ever Ready MES.	Filament	5.5	300

RESISTANCES

R.	Purpose.	Ohms.	R.	Purpose.	Ohms.
1	V1 A.V.C. decoupling ..	110,000	19	Tone control	2 meg.
2	V1 cathode bias	100	20	Demodulating diode load (part).	510,000
3	V1 screen decoupling ..	25,000			
4	V1 anode decoupling ..	10,000	21	Demodulating diode load (part).	260,000
5	M.W. H.F. primary damping	2,100			
6	L.W. H.F. secondary decoupling.	100	22	V4 cathode bias (part) ..	800
			23	V4 cathode bias (part) ..	1,500
7	V2 screen decoupling ..	41,000	24	Volume control	500,000
8	V2 anode and osc. anode decoupling.	5,000	25	A.V.C. diode load (part) ..	260,000
			26	A.V.C. diode load (part) ..	510,000
9	V2 osc. anode load	20,000	27	A.V.C. diode load (part) ..	260,000
10	V2 osc. grid leak	51,000	28	V4 grid stopper	111,000
11	V2 cathode bias	200	29	A.V.C. decoupling	510,000
12	V2 A.V.C. decoupling ..	260,000	30	V4 anode load	41,000
13	S.W. regeneration modifier ..	200	31	V4 anode decoupling ..	11,000
14	M.W. regeneration modifier. .	1,500	32	Feed back coupling	250,000
15	L.W. regeneration modifier ..	5,100	33	V5 grid stopper	51,000
16	V3 screen decoupling ..	30,000	34	V5 grid leak	510,000
17	V3 cathode bias	250	35	V5 bias	150
18	V3 A.V.C. decoupling ..	260,000			



the tags, embossed on the paxolin strip, and the order of colours is as follows: light brown, tag 1; red, tag 2; blue, tag 3. Tag 4 is blank.

Special Notes.—R17, the cathode resistance on V3 in our receiver, had a value of 450 ohms instead of 250 ohms.

A number of components in the list will not be found in the diagram, as these are located inside the coil cans. These include C11 and C14, and the four damping resistances R5, R6, R14 and R15. It should also be observed that R28, the V4 grid stopper, is located inside the grid cap of that valve.

Certain of the resistance values of the windings are those of the coil and the associated resistance which is inside the can.

Wavechange Switches.—The switching system is very simple and is provided by three wafers, each having a similar arrangement of wipes and contacts. The tuned and untuned windings corresponding to each wafer are respectively connected to two wipes, and, in addition, there are two further wipes which short circuit the unused coils.

On the oscillator bank W11 and W12 are joined together and earthed. On the aerial and high-frequency banks, however, the shorting wipes go to the bottom of the coil and not to the earth, with the exception of W3. The diagram shows the switch wafers as they appear when looked at from an angle with the click plate to the left.

Alignment Notes

I.F. Circuits.—Short circuit the oscillator section of V2, connect an output meter to the extension speaker sockets and a signal generator to grid circuit of V2 through a .1-mfd. condenser.

Inject at 473 kc. and, using a low input, adjust T1 and T2, and then T3 and T4. Tune these for a single peak and recheck the adjustment of T1, T2, T3 and T4 in that order. Keep the signal below the A.V.C. value.

Short Waves.—Connect the generator to the aerial and earth sockets of the receiver and set the wave switch to the short wave position. See that the pointer registers

(*Continued on page viii.*)

CONDENSERS

C.	Purpose.	Mfds.	C.	Purpose.	Mfds.
4	L.W. aerial top coupling ..	.000005	35	V3 cathode bias shunt ..	.1
5	V1 A.V.C. decoupling ..	.05	36	V3 screen decoupling ..	.1
9	V1 screen decoupling ..	.1	37	H.F. bypass	.00005
10	V1 cathode bias shunt ..	.1	38	L.F. coupling	.05
11	H.F. L.W. primary tune ..	.0002	39	Tone control	.002
12	V1 anode decoupling ..	.1	40	V4 cathode bias shunt ..	50
13	V2 A.V.C. decoupling ..	.05	41	V4 anode decoupling ..	2
14	H.F. S.W. coupling	.000005	42	L.F. coupling	.05
18	V2 screen decoupling ..	.1	43	A.V.C. decoupling	.025
19	V2 cathode bias shunt ..	.1	44	V5 cathode bias shunt ..	50
20	V2 osc. grid	.0001	45	H.T. smoothing	8
21	V2 anode and osc. anode ..	8	46	H.T. smoothing	8
22	V2 osc. anode coupling ..	.0003	47	S.W. osc. fixed padder ..	.0033
28	M.W. fixed padder	.0004	48	H.T. line H.F. bypass ..	.005
33	A.V.C. coupling	.00001	49	Mains filter	.005
34	V3 A.V.C. decoupling ..	.1			

Lissen 8402 on Test

MODEL 8402.—For A.C. mains operation, 200-250 volts, 40-100 cycles. Price, £11 19s. 6d.

DESCRIPTION. — Five-valve, plus rectifier, three-band manually tuned table model superhet.

FEATURES.—Full-vision scale with an aeroplane type pointer with calibrations in names and wavelengths. Separate controls for tuning, range, tone, and volume combined with switching. Sockets for aerial and earth, pick-up and high impedance extension speaker.

LOADING.—64 watts.

Sensitivity and Selectivity

SHORT WAVES (18-52 metres).—Very good gain and selectivity, with well maintained sensitivity. No drift trouble and easy handling.

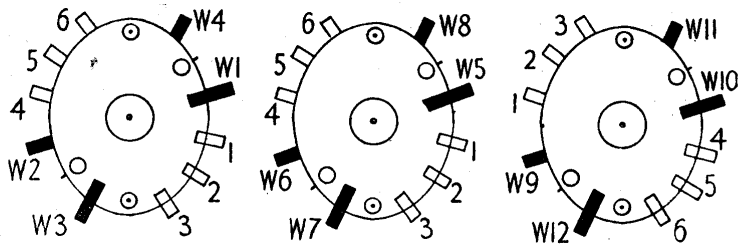
MEDIUM WAVES (197-575 metres).—Good gain and selectivity, with local station spread on adjacent channels only. A clean background.

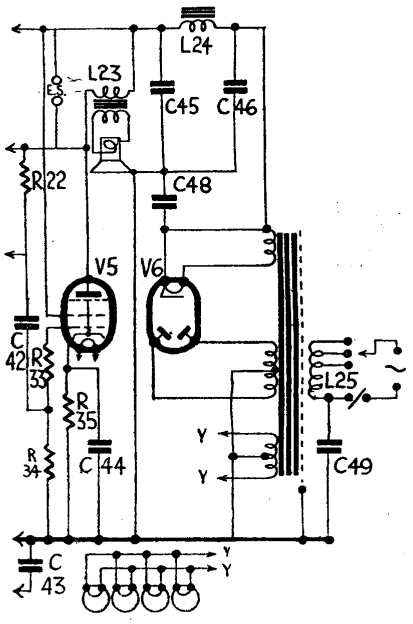
LONG WAVES (860-1,900 metres).—Excellent gain and selectivity, with very little interference on Deutschlandsender. Very clean background and well maintained sensitivity.

Acoustic Output

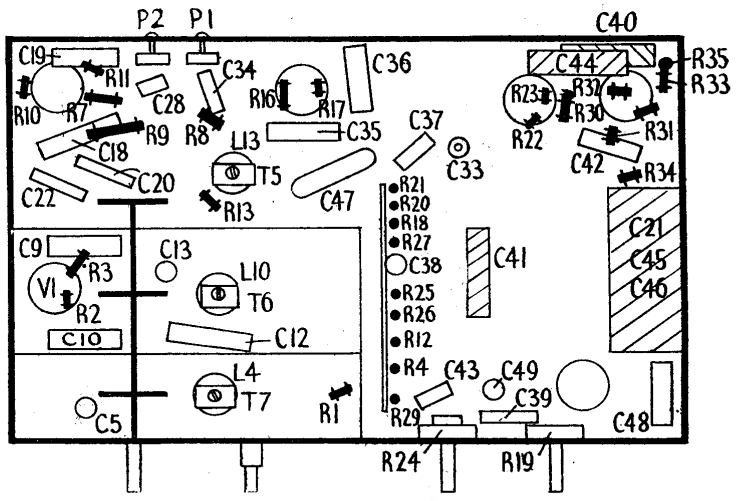
Ample volume for an ordinary room without overloading. The tone control is not too vigorous in action and in the minimum position there is good attack and crispness. Musical balance is pleasing.

Right, the switch banks, lettered as in the circuit. See also description under "Wavechange Switches."





The circuit, left, is shown divided only for presentation reasons. Right, the underside of the chassis. The top layout diagram is on page viii.



Lissen 8402 Three-Band

with the 180-degree line with the gang at maximum.

Tune set to 15 mc.

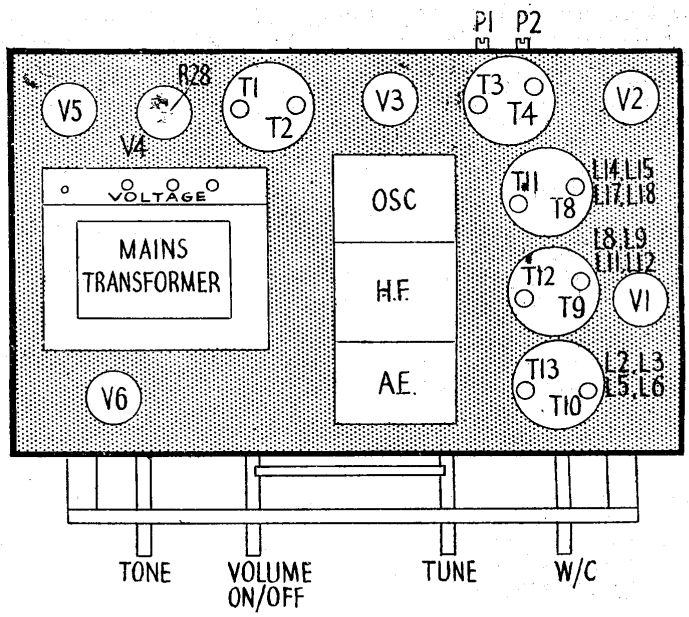
Inject a signal of 15 megacycles, previously having unscrewed T5 to the minimum. Slowly screw up T5 until a signal is heard.

Two positions will give a signal, and the one at the minimum capacity is correct.

Then adjust T6 and T7 for maximum.

The padding operation is carried out by altering the inductance of L13. Tune the set and oscillator to 6 mc. and adjust the position of the

(*Continued from page vii.*)



Top "deck" chassis layout diagram of the 8402 showing valve, trimmer and coil positions.

WINDINGS (D.C. RESISTANCES)

L.	Ohms.	Range.	Where measured.
1	2.2	S.W.	Aerial and chassis.
2	12	M.W.	Aerial and chassis.
3	140	L.W.	Aerial and chassis.
4	very low	S.W.	V1 grid and C5+R1.
5	2.6	M.W.	V1 grid and C5+R1
6	46	L.W.	V1 grid and C5+R1.
7	8.9	S.W.	V1 anode and C12+R4.
8	2,100	M.W.	V1 anode and C12+R4.
9	142	L.W.	V1 anode and C12+R4.
10	very low	S.W.	V2 grid and C13+R12.
11	2.2	M.W.	V2 grid and C13+R12.
12	100	L.W.	V2 grid and C13+R12.
13	very low	S.W.	W9 and C47+T5.
14	1.6	M.W.	W9 and P1.
15	4.7	L.W.	W9 and P2.
16	200	S.W.	W10 and C47.
17	3	M.W.	W10 and chassis.
18	9.3	L.W.	W10 and chassis.
19	7	—	V2 anode and C21+R8.
20	7	—	V3 grid and C34 and R18.
21	7	—	V3 anode and H.T. positive.
22	7	—	V4 demodulating diode and C37+R20.
23	615	—	On tags.
24	235	—	On tags.
25	16	—	Mains plug.

end turn of L13, simultaneously rocking the gang for maximum.

Then retune the set and the oscillator to 15 megacycles and check.

Any slight inaccuracy of the correct tuning setting should be adjusted by making a slight alteration to the position of the movable turn on L13 if incorrect at 6 megacycles.

Medium Waves.—Tune set to medium-wave position and adjust P1 to about two-thirds of maximum capacity. Tune set and oscillator to 214 metres and adjust T8, T9 and T10.

Tune set and oscillator to 500 metres and adjust P1. Retune set and oscillator to 214 metres and readjust T8, T9 and T10.

Recheck padding. If there is any inaccuracy make a further slight adjustment to P1.

Long Waves.—Inject a signal of 1,000 metres. Screw P2 to two-thirds of the maximum capacity and adjust T11 for maximum. Then adjust T12 and T13.

Tune the set and oscillator to 1,700 metres and adjust P2. Recheck the trimming at 1,000 metres and then recheck the padding.

If there is any inaccuracy between the dial position and the actual tuning position at 1,700 metres, readjust P2.

Replacement Condensers.—Electrolytics by A. H. Hunt, Ltd., Garratt Lane, Wandsworth, London, S.W.18, are used in the 8402. Replacements are: For C40 or C44, unit 2915, 1s. 9d.; C.41, 2954, 1s. 10d.; and for the block C21, 45 and 46, unit 4167, 7s. 6d.

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