PHILIPS 735L

Four-valve, plus rectifier, barretter and tuning indicator, superhet, covering three wavebands, suitable for A.C./D.C. supplies and made by Philips Lamps, Ltd., Shaftesbury Avenue, London, W.C.2

Circuit.—As this is an A.C./D.C. receiver, both aerial and earth leads contain isolating capacities, C1 and C2. Between them is a static discharge resistance R1. The input tuning circuit comprises a transformer on S.W., and a band-pass arrangement on M. and L.W. A.V.C. is applied via R2 on M. and L.W. only.

V1 is the frequency-changer. The oscillator anode load, R6, shunt feeds the tuned circuits through C10. There are separate grid coupling coils on each band, R4 and C11 being the oscillator grid leak and condenser.

The first I.F. transformer coupling V1 to V2, the I.F. amplifier, is a trimmer tuned type, including additional windings which are switched in to widen the tuning band.

The second I.F.T. is tapped for high selectivity. The A.V.C. diode is fed from the primary via C17. R22 and R23 comprises the split load from which control voltages are taken off to V1 and V2.

From the I.F.T. secondary, the signal is taken to V3 cathode by C18 and the demodulated voltages are developed across R13, an I.F. filter, R12, the volume control and R11. Various connections are made to a third winding on the output transformer for negative feedback for tone improvement.

The carrier component of the rectified voltage is applied via R10 to the cathode-ray type tuning indicator.

L.F. is taken to V3 triode grid via C20. R15 is the grid leak and various other tone connections are provided, including a variable control, R20.

The switched pick-up connection includes an L.F. transformer to isolate the pick-up from the live chassis.

R24 is the triode anode load, R25 is V5 grid leak, and R26 a "stopper" of parasitic H.F. oscillation. V5 is the pentode output valve and C24, C26 are tone compensators.

The mains connection includes two chokes and C39 to filter out "noise." H.T. is drawn via R44, a current limiter from V6, a full-wave rectifier with strapped anodes and used in the usual half-wave arrangement. The current is taken off through a R40 and a smoothing choke and associated smoothing condensers.

Heater current is drawn via a barretter and a pilot lamp, all the heaters being in series.

A special feature protects the pilot lamp from the surge of current when switching on. Across the lamp is a relay (R43) and switch. The relay is closed and the lamp shorted out until the rectifier warms up and H.T. current begins to flow.

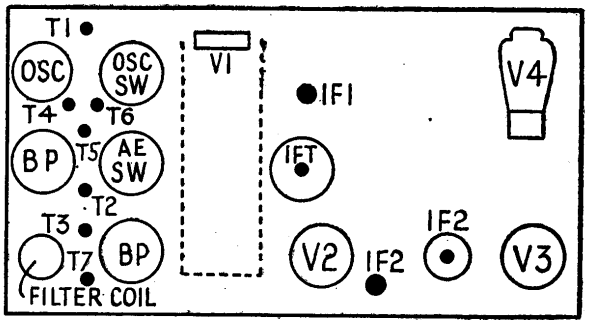
The relay coil, R43, is connected between two halves of the smoothing choke. When current is flowing the relay is energised, and the switch opened, thus putting the pilot lamp in circuit.

VALVE READINGS

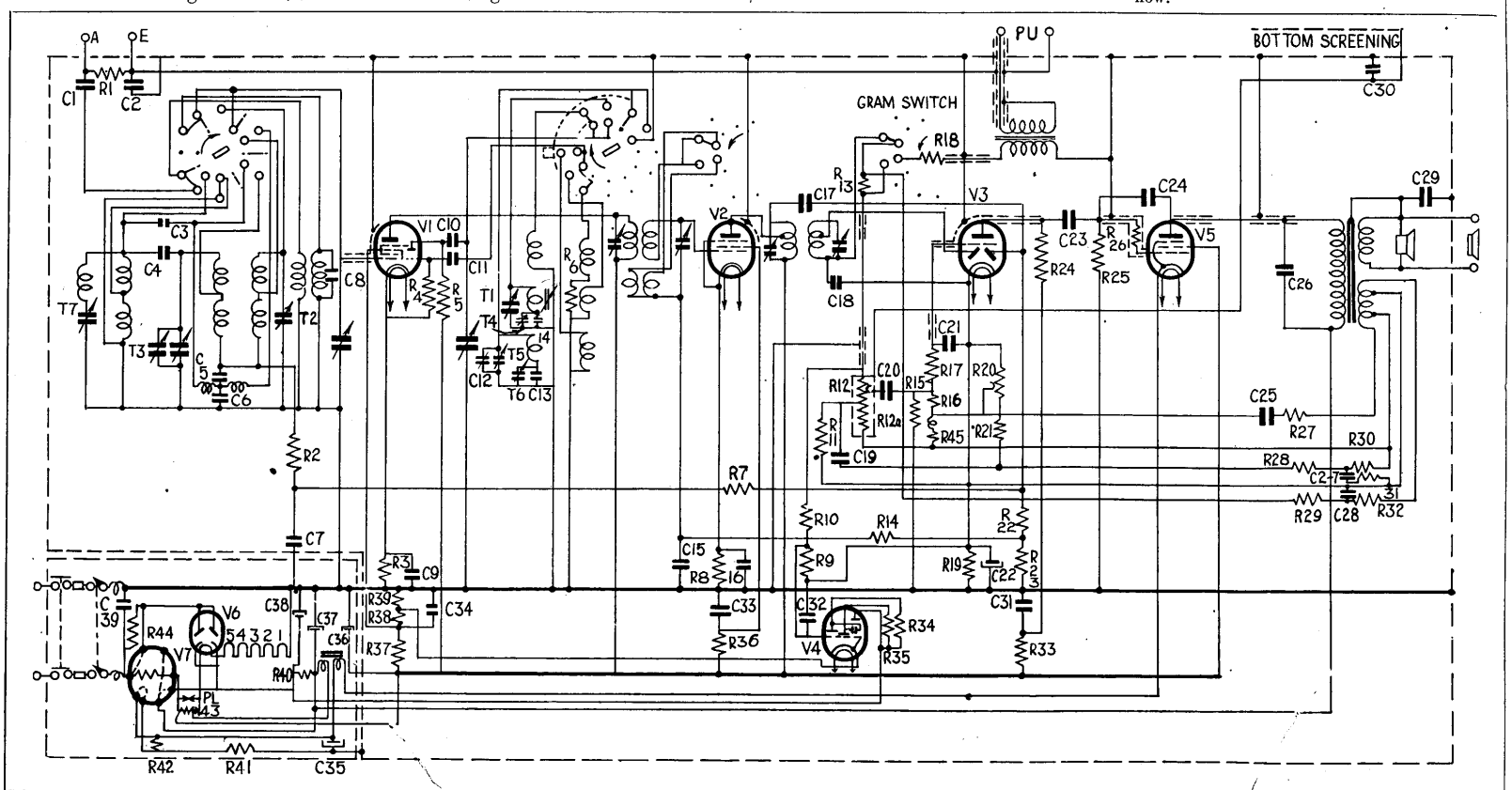
Measured with 222 v. input.

V	Type	Electrode	Volts	Ma.
1	ECH3	Anode	130	2.42
		Screen	78	1.49
		Osc. anode	65	2.5
2	EF9	Anode	128	5.5
		Screen	114	1.95
3	EBC3	Anode	65	.45
4	EM4	First anode	—	.06
		Second anode	—	.07
5	CL6	Anode	120	47
		Screen	120	7.75
6	CY2	Across C38	204	—
7	C1	Barretter		

Pilot lamp, 10 v., 200 ma.



Simplified layout drawing of the top of the 735 L chassis identifying the trimmers.



GANGING

I.F. Circuits.—Switch to "narrow," medium waves, gang at minimum, volume maximum. Inject 128 kc. modulated to signal grid of V1 and adjust four I.F. trimmers.

Philips recommend that when adjusting one half of a transformer the other half should be detuned by temporarily connecting 80 mmfds. in parallel.

Continued end column, opposite page

CONDENSERS

C	Mmfds.	C	Mmfds.
1	1,000	21	100
2	4,700	22	25 mfds.
3	39	23	56,000
4	10	24	165
5	12,000	25	8,200
6	39,000	26	4,700
7	.1 mfd.	27	33,000
8	2.2	28	5,600
9	47,000	29	4,700
10	470	30	4,700
11	47	31	.18 mfd.
12	12	32	47,000
13	325	33	47,000
14	1,362	34	47,000
15	47,000	35	25 mfds.
16	47,000	36	50 mfds.
17	3.9	37	50 mfds.
18	56	38	15 mfds.
19	39,000	39	22,000
20	.12 mfd.		

RESISTANCES

R	Ohms	R	Ohms
1	.1 meg.	23	.56 meg.
2	.1 meg.	24	.1 meg.
3	220	25	.56 meg.
4	47,000	26	1,000
5	22,000	27	1,500
6	15	28	12,000
7	1 meg.	29	1 meg.
8	330	30	1,500
9	3.9 meg.	31	820
10	4.7 meg.	32	10,000
11	47,000	33	22,000
12	.65 meg.	34	1.5 meg.
12A	.2 meg.	35	1.5 meg.
13	.39 meg.	36	8,200
14	1.8 meg.	37	18,000
15	3.9 meg.	38	47,000
16	1.2 meg.	39	3,900
17	82,000	40	820
18	.1 meg.	41	100
19	18,000	42	82
20	50,000	43	150+180
21	4,700	44	180
22	.56 meg.	45	3,300

EVER READY 5104 LISSEN 8401

Three-valve, plus rectifier, table model superhet covering two wavebands and for operation from 200-250 volt A.C. supplies. Marketed by Ever Ready Radio, Ltd., and Lissen, Ltd., Eley's Estate, London, N.18.

Circuit.—The aerial is coupled to V1, the frequency-changer, by band-pass circuits on both wavebands. The arrangement is simple with transformers for the first section and inductive coupling between the coils to the grid circuit.

The oscillator section of V1 is tuned grid with anode reaction coils. There are trimmers and padders for both bands in this stage. The band-pass section has trimmers for M.W. only, these being on the gang condenser.

R6 and R7 modify the feed-back and give more stable results.

Trimmer-tuned intermediate-frequency transformer link up V2, the I.F. amplifier, and V3, the double-diode output pentode.

R11 is the signal diode load with C24 as the H.F. by-pass and C23 to pass the L.F. on to R12, the volume control. The slider goes to the pentode grid via a parasitic oscillation stopper, R10. Bias is provided by R13.

The A.V.C. diode is fed by C25 and the control voltage is developed across R14 and R15. The cathode bias now acts as A.V.C. delay. It will be seen that V2 is provided with a lower control voltage than V1.

There are a fixed tone corrector, C27, and a variable adjustment, C28–R16, in parallel with the output valve.

H.T. is drawn from a full-wave rectifier, V4, which uses L16, the speaker field, and two electrolytics for smoothing.

GANGING

I.F. Circuits.—Short circuit the oscillator (front) section of the gang condenser. Switch to M.W. Inject 452 kc. via .1 mfd. to V1 grid (i.e., across centre section of gang).

Adjust the four I.F. trimmers for peak on an output meter, keeping the signal always as low as possible to prevent operation of the A.V.C.

M.W. Band.—This band should be adjusted first. See that pointer registers with 180° line with the gang at maximum.

Set T1 approximately two-thirds in. Tune to 214 m., inject 214 m. to A and E, and adjust T2. Then adjust T3 and T4.

Tune to 500 m., inject 500 m. and adjust T1.

Readjust T2, T3 and T4 at 214 m.

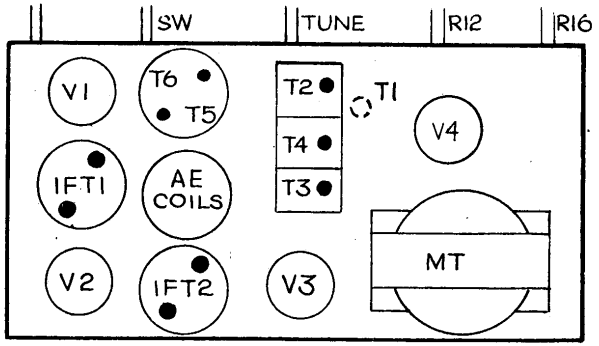
L.W. Band.—Set T5 approximately three-quarters in. Tune to 1,200 m., inject 1,200 m. and adjust T6.

Tune to 1,700 m., inject 1,700 m. and adjust T5.

Readjust T6 at 1,200 m.

WINDINGS

L.	Ohms	L.	Ohms
1	11.8	10, 11, 12, 13	6.7
2	2.7	14	200
3	13.4	15	V. low
4	2.7	16	1,500
5	13.4	17	V. low
6	2	18	530
7	6.4	19	V. low
8	3.8	20	36
9	11.7		



Layout of the top of the Ever Ready chassis, identifying the trimmers and main features.

VALVE READINGS

V.	Type	Electrode	Volts	Ma.
1	A36B	Anode	246	1.7
		Screen	79	4.7
		Osc. Anode	108	6
		Cathode	1.9	12.4
2	A50P	Anode	246	8.3
		Screen	172	2.9
		Cathode	1.7	11.2
3	A27D	Anode	238	35
		Screen	246	5.4
		Cathode	5.8	40.4
4	A11D	Anode to anode	622 A.C.	—
		Cathode	346	64

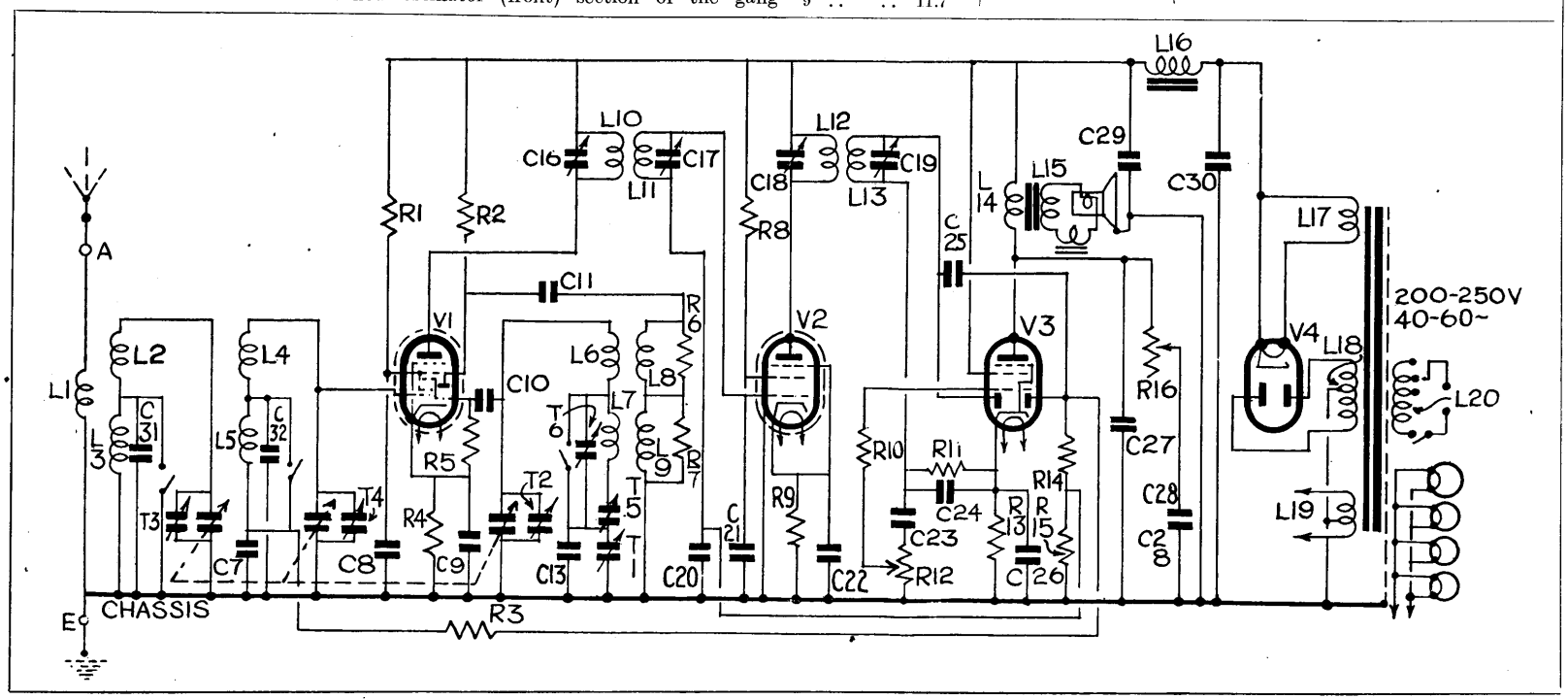
Pilot lamp, 12 mm., 5.5 v., .3 amp.

CONDENSERS

C.	Mfds.	C.	Mfds.
7 ..	.1	24 ..	100 mmfds.
8 ..	.1	25 ..	10 mmfds.
9 ..	.1	26 ..	50
10 ..	100 mmfds.	27 ..	.005
11 ..	300 mmfds.	28 ..	.04
13 ..	300 mmfds.	29 ..	8
20 ..	.1	30 ..	8
21 ..	.1	31 ..	50 mmfds.
22 ..	.1	32 ..	50 mmfds.
23 ..	.05		

RESISTANCES

R.	Ohms	R.	Ohms
1 ..	41,000	9 ..	150
2 ..	20,000	10 ..	110,000
3 ..	1.1 meg.	11 ..	510,000
4 ..	150	12 ..	500,000
5 ..	51,000	13 ..	150
6 ..	1,000	14 ..	260,000
7 ..	2,100	15 ..	260,000
8 ..	25,000	16 ..	50,000



PHILIPS —Continued from opposite page

M.W. Band.—Tune to 180 m. Fit special trimming jig to rear of spindle and turn back manual control until condenser rests against jig. Alternatively, check dial position and calibration, and see that pointer registers correctly at maximum or minimum positions of gang.

Inject modulated 1,600 kc. signal to aerial and earth via standard dummy aerial. Adjust T1, T2, T3, T2, T1 for maximum on an output meter.

Keep input low to prevent operation of A.V.C.

Remove jig and inject 546 kc. Connect the aerial socket of another receiver through 25 mmfds. to the anode of the mixer section of V1. Connect the output meter to the additional receiver.

Tune both receivers to about 550 m. Disconnect auxiliary set and reconnect output meter to 735L. Without touching tuning knob adjust T4 for maximum.

Readjust T1 at 1,600 kc. (180 m.).

Instead of this special padding method, one can simply tune to 550 m., inject 546 kc. and adjust T4.

L.W. Band.—Trim with T5 at 750 m. (400 kc.) either in the usual way or by using the additional receiver.

Pad with T6 at 1,875 m. (160 kc.) either in the usual way or by using the extra set.

Repeat T5 adjustments.

S.W. Band—There are no adjustments.

Filter Circuit.—Inject to 128 kc., tune for maximum (top of L.W.) and adjust T7 for *minimum*.