PHILIPS 218B

Five-valve, battery-operated, three waveband superhet with separate triode oscillator and Q.P.P. output. Made by Philips Lamps, Ltd., Century House, Shaftesbury Avenue, London, W.C.2.

Circuit. — The input circuits are band-pass on medium and long waves and transformer on short waves. The familiar Philips' combined capacity and inductance band-pass coupling is used.

V1 is a combined amplifier and mixer, and a separate triode, V2 is the oscillator. This used in a tuned anode arrangement and the generated frequency is injected to V1 via C13 and a screen grid.

Coupling between V1 and V3, the I.F. amplifier is by a trimmer-tuned I.F. transformer, and a similar coupling with tapped secondary leads to V4, the double-diode triode.

The A.V.C. diode is fed from the anode of V3 and the load, R19 is returned to a potentiometer, R2 and R3, between H.T. negative and L.T. positive, for delay bias. A.V.C. is connected back to both V3 and V1, being applied on all bands.

The R2-R3 point is also used to bias the triode section of V3. Demodulated signals are introduced by C29 and tapped off by the volume control R24, which is also the signal diode load.

V4 feeds a push-pull inter-valve transformer through resistance and capacity, R22 and C31 being tone modifiers.

V5 is a Q.P.P. valve. Harmonic suppressors are included in each grid, and bias is obtained from the full voltage drop across R2–R3. The output transformer has tone condensers across the centre-tapped primary.

Notes.—The switch indications in the circuit represent the actual construction of the wafers, the dots and circles being fixed contacts, and the radial lines the moving contacts. When arcs are attached to the radial lines these are shorting pieces which also move. The diagram is shown in the S.W. position.

Batteries.—The accumulator is a 2v. type, and the valve voltages are given for a 120v. battery. There are only four battery connections.

Connections are provided for a pick-up and for a low-impedance speaker.

GANGING

I.F. Circuits. — With receiver tuned to bottom of the L.W. band, inject 128 kc. via small capacity to V1 grid. Adjust T1 and T2 for maximum.

Connect a 10,000 ohm resistance across I.F.I. primary, and adjust T3. Remove resistance.

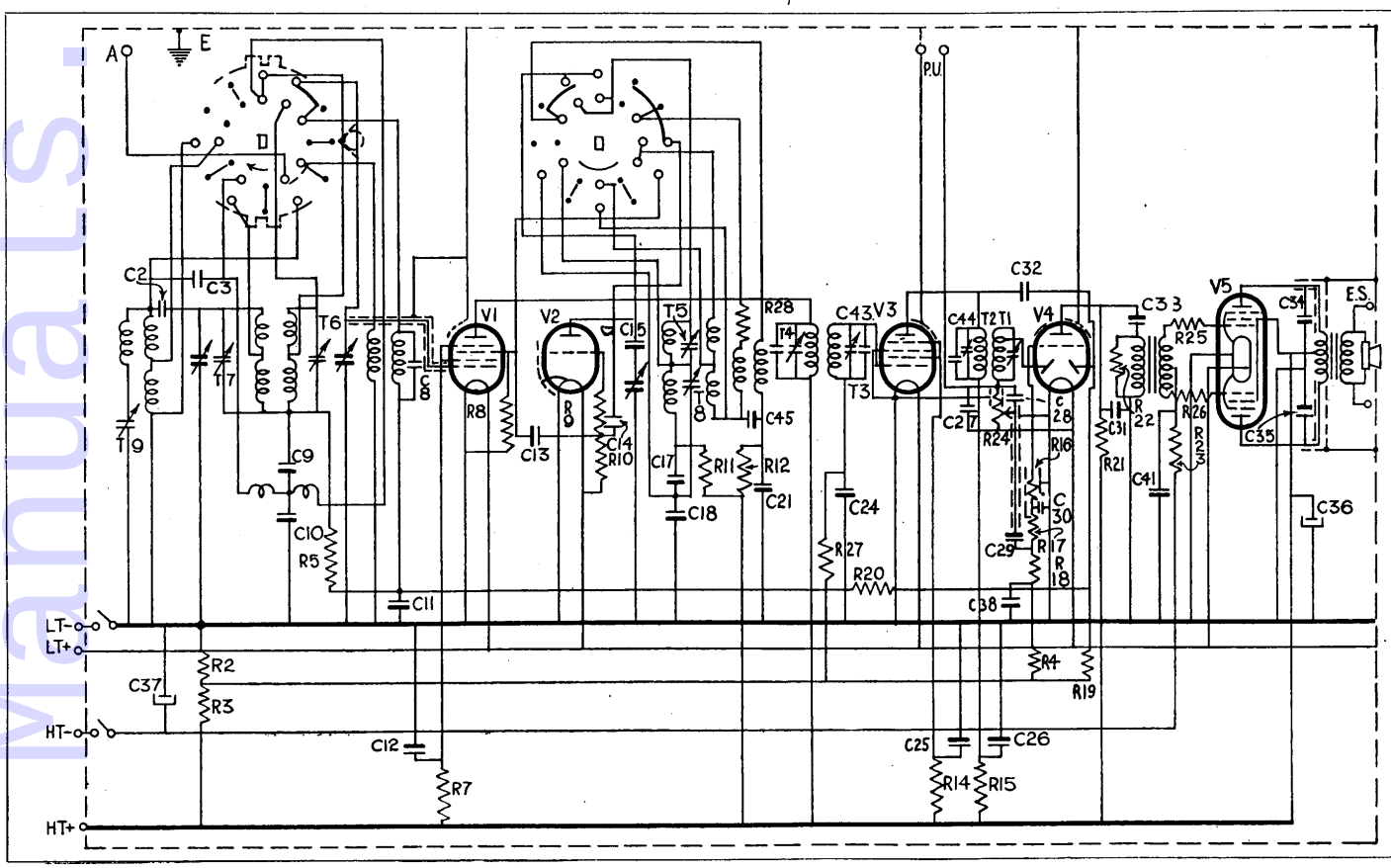
Connect 10,000 in series with .1 mfd. across I.F.1 secondary, and adjust T4.

S.W. Band.—There are no adjustments.

M.W. Band.—Connect 10,000 ohms across I.F.1 secondary. Inject 1,442 kc., tune to 208 m. and adjust T5, T6 and T7.

L.W. Band.—Connect 10,000 ohms across L.W. anode oscillator coil, tune receiver and oscillator to 396 kc. and adjust T8.

I.F. Filter.—Tune to top of L.W., inject 128 kc. to aerial and adjust T9 for minimum.



An interesting characteristic of this receiver is the use of a separate triode as oscillator. Otherwise the set follows usual mains superhet lines with a Q.P.P. output valve replacing the pentode. The L.F. transformer is parallel fed.

RESISTANCES

R		Ohms.
2	..	50
3	..	1,000
4	..	.22 meg.
5	..	.1 meg.
7	..	.18 meg.
8	..	.82 meg.
9	..	47
10	..	15,000
11	..	47,000
12	..	18,000
14	..	.15 meg.
15	..	4,700
16	..	.18 meg.
17	..	.18 meg.
18	..	1 meg.
19	..	1 meg.
20	..	1 meg.
21	..	47,000
22	..	33,000
23	..	.1 meg.
24	..	.5 meg.
25	..	10,000
26	..	10,000
27	..	1 meg.
28	..	15 meg.

VALVE READINGS

V	Type	Electrode	Volts	Ma.
1	VP2B	Anode	110	.5
		Screen	32.5	.42
2	PM1HL	Anode	45	1.4
		Anode (S.W.)	64	2
3	VP2B	Anode	104	1.32
		Screen	36.5	.48
4	TDDA	Anode	70	.85
5	QP22B	Anodes	110	2
		Screens	111	.55

CONDENSERS

C		Mfds.	C		Mfds.
2	..	15 mmfds.	27	..	47 mmfds.
3	..	39 mmfds.	28	..	47 mmfds.
8	..	27 mmfds.	29	..	.01
9	..	.015	30	..	.0001
11	..	.027	31	..	.00047
10	..	.047	32	..	10 mmfds.
12	..	.047	33	..	.22
13	..	.00047	34	..	.001
14	..	.0001	35	..	.001
15	..	.047	36	..	8
17	..	.000725	37	..	50
18	..	.001615	38	..	.047
20	..	30 mmfds.	39	..	30 mmfds.
21	..	.0027	41	..	.1
22	..	30 mmfds.	42	..	68 mmfds.
24	..	.047	44	..	47 mmfds.
25	..	.047	45	..	.01
26	..	.01			

Frequency Drift

RADIOGRAMS of one particular type repeatedly required service calls. Each time the report was I.F.s badly out of adjustment. On investigating the cause it was found that the I.F. trimmers on top of the I.F. cans came very close to the 'gram motor and this became very warm after running for a considerable time, thus causing warping of the trimmers.

The trouble was cured, to a great extent, by adjusting the I.F. trimmers after the 'gram had been running for a period.

Temperature variations still gave slight trouble, due to the bad design of this receiver, but running the set with its back off made a further improvement.

It may be mentioned that the oscillator circuit is the one which generally causes most trouble due to temperature variations. In some U.S.A. commercial receivers temperature-compensation is carried out by shunting the oscillator trimmer with a bimetallic condenser. Another method is to use two trimmers in parallel, one having a negative temperature co-efficient, while the other has a positive temperature coefficient.

In installing radio sets the effects of temperature should be considered. Putting the set on a high shelf or with its back to a window or flush up against a wall should be avoided.—ALFRED ROSE, London, N.4.