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PHILCO BEF 2

Four valve superhet midget portable covering two wavebands, and for operation from all-dry batteries. Made by Philco Radio and Television Corp. of G. B., Ltd., Perivale, Greenford, Middlesex.

Circuit.—The grid coils of V1 form the loop aerial. A tapped connection is made to these through a small capacity when it is required to use an external aerial. The common connection of the windings is taken back to the A.V.C. winding through a third winding on the first I.F. transformer.

The oscillator section of V1 is tuned grid. The oscillator anode voltage is developed across R7 and fed back through C6 to the tops of the padding condensers. As these are in the grid circuit the necessary feed-back of energy from anode to grid to maintain oscillation is obtained.

V2 is the I.F. amplifier. While the first I.F. transformer is a conventional two-tuned circuit type with capacity trimming, the second transformer has a tuned secondary and aperiodic primary.

The single diode of V3 provides both demodulated L.F. and the rectified carrier for automatic volume control.

VR1, the volume control, is the diode load. L.F. is taken off to the grid of the triode section of V3, which runs into grid current and thereby develops its own bias across the leak R3.

The D.C. due to rectification of the carrier is tapped off by the potentiometer, R4-R5, and applied for A.V.C.

Resistance-capacity coupling leads to V4, the output pentode. R2, the grid leak, is returned for bias to the negative end of R1 through which the H.T. current flows on its way from the filaments (L.T. negative) to H.T. negative.

EC1 is an electrolytic decoupling the H.T. battery and EC2 decouples the bias.

Batteries.—Combined 1.5 v. L.T. and 90 v. H.T. battery measuring approximately 11 in. long, 5¾ in. wide, and 2¾ in. high. Suitable types: Drydex H1157; Ever Ready, No. 3; G.E.C., BB395; Siemens, No. 1438, or Sterling, 2242. No bias battery is needed.

L.T. consumption 0.25 amp.; H.T. current, 10 ma.

GANGING

The pointer should be vertical in the space between the medium and long-wave scales when a .006 in. feeler gauge is inserted under the heel of the moving vanes of the gang condenser.

I.F. Circuits.—Feed modulated 465 kc. signal from signal generator via a standard dummy to the grid cap of V1 (with lead left in position) and chassis. Adjust the three I.F. trimmers for maximum reading on an output meter, keeping the input low so that the A.V.C. does not operate.

M.W. Band.—Tune to 200 m. Inject 1,500 kc. to aerial and earth, and adjust T1 for maximum.

Tune to 500 m., inject 600 kc. and pad with T2 (screw) while rocking gang. Repeat both T1 and T2 adjustments until no further improvement results.

L.W. Band.—Tune to 1,034.4 m. (dot at right of 1,000 m. on scale) and inject 290 kc. Adjust T3.

Tune to 1,293 m. (Luxembourg), inject 232 kc. and adjust T4.

Tune to 1,875 m., inject 160 kc. and pad with T5.

Repeat T3, T4 and T5 adjustments until no further improvement is obtained.

If sufficient attenuation of the signal cannot be obtained when injecting to the aerial and earth connections, the signal can be fed in by connecting the generator to a short length of wire placed a few inches from the frame aerial.

RESISTANCES

R.	Ohms.	R.	Ohms.
1 ..	800	7 ..	10,000
2 ..	2 meg.	8 ..	65,000
3 ..	2 meg.	9 ..	100,000
4 ..	2 meg.	VR1 ..	350,000 or
5 ..	2 meg.	..	500,000
6 ..	1 meg.		

CONDENSERS

C.	Mfds.	C.	Mfds.
EC1 ..	8	5 ..	.0065
EC2 ..	50	7 ..	250 mmfds.
1 ..	40 mmfds.	8 ..	.0065
2 ..	.0025	9 ..	100 or 150
3 ..	.0065		mmfds.
4 ..	.065	10 ..	15 mmfds.

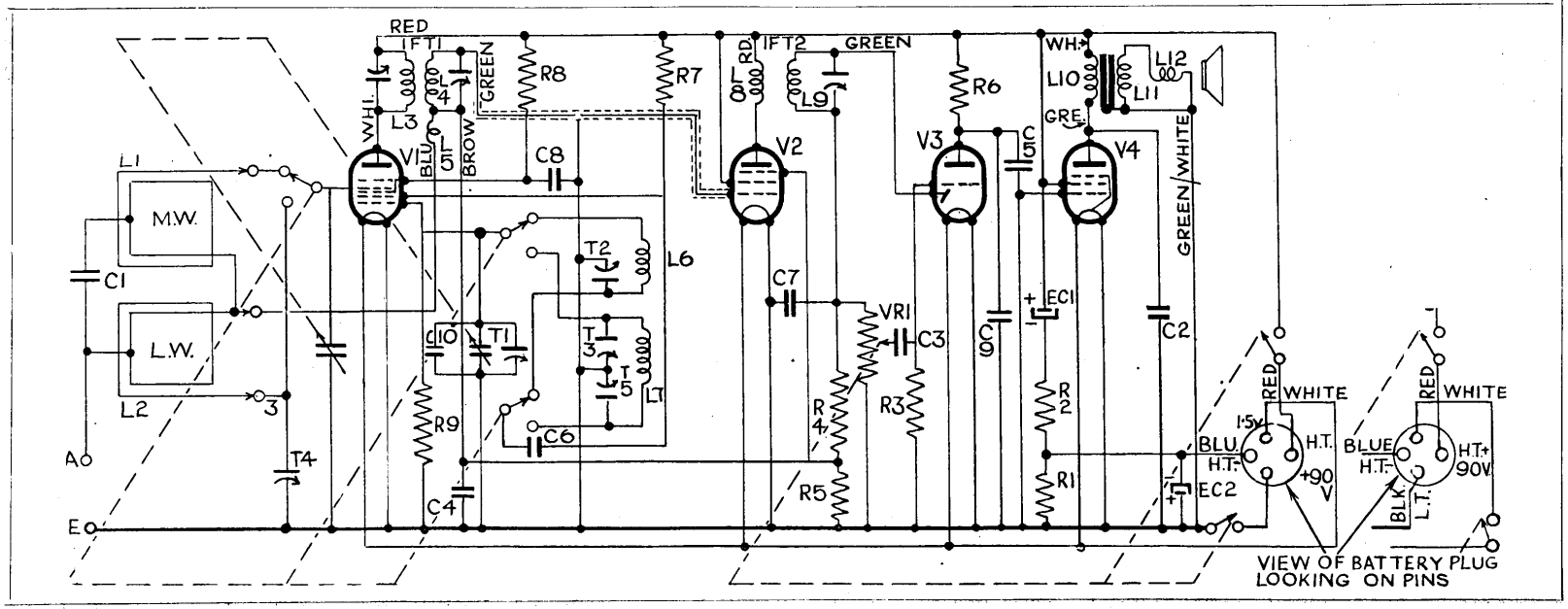
WINDINGS

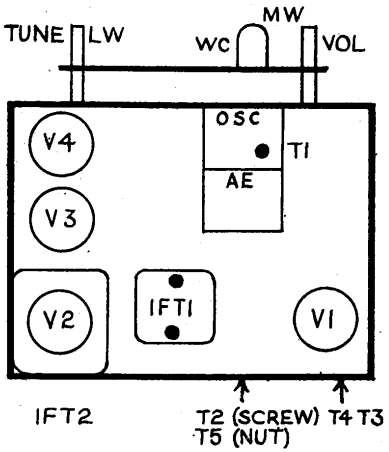
L.	Ohms.	L.	Ohms.
1 ..	1	7 ..	16.5
2 ..	25	8 ..	40
3 ..	8	9 ..	6
4 ..	12	10 ..	500
5 ..	less than .1	11 ..	.2
6 ..	3	12 ..	2

VALVE READINGS

V.	Type.	Electrode.	Volts.
1	1A7EG	Anode	90
		Screen	40
		Osc. anode	75
2	1N5EG	Anode	90
		Screen	90
3	1H5G	Anode	25
4	1C5EG	Anode	85
		Screen	90

Bias 7 volts.





Above, the top of chassis layout. In the circuit below the alternative switch connections shown are those used when part number 339-5003 is employed instead of the standard 33-5213.

Coupling Condenser Faults

Continued from opposite page

current-grid volts characteristic. A cathode bias resistor is generally used for the purpose.

Since C 8 has to transfer the low audio frequencies its reactance must be low in comparison with the resistance of the grid leak. The capacity may be between .001 and .05 mfd.

The final coupling is probably that between the anode of the first L.F. amplifier and the grid of the output valve (C 9) and was described last month.

It will be apparent that coupling condensers constitute the path by which the signal passes through a receiver from stage to stage. If they are "open" the signal will fail to pass through the set, but the static operating conditions—that is, the D.C. currents to the valves—will not be affected in any way.

Coupling condensers are suspect, then, whenever a set is silent or noisy but meter readings fail to show anything out of the ordinary. The best test is to tap the finger on successive signal points working back from the output valve grid or the injection of signals from a generator to these points.

Next month, decoupling condensers will be discussed.