EKCO P150

Four-valve battery operated superhet portable receiver covering medium and long wavebands.

CIRCUIT DIAGRAM

E. K. Cole, Ltd., do not permit us to publish the circuit diagram of this receiver. The material below has been specially prepared, however, so that few difficulties should arise on this account.

The circuit description is particularly detailed and the component tables give the purposes as well as the values of the parts.

Circuit.—There are separate frame aerial windings for M.W. and L.W. Each is shunted by a trimmer condenser (T2 and T4 respectively), and the L.W. winding is shorted out on M.W. The first section of the gang condenser tunes the frame and across this input circuit is an I.F. filter, consisting of C2 and L1 in series. The A.V.C. connection is through R2, decoupled by C3, to the bottom of the frame windings.

V1 is a triode-hexode frequency-changer with a tuned grid oscillator circuit. The M.W. and L.W. windings are trimmed by T1 and T3 respectively, the fixed padding condensers being C9 and C10. There is also a fixed condenser C8 across the L.W. winding.

The two I.F. transformers have adjustable cores and fixed parallel capacities. The secondaries of each have extra sections closely coupled to the primaries. V2 is the I.F. valve and both its input and output circuits are conventional.

V3 is a double-diode triode used in a straightforward manner for demodulation, A.V.C. and L.F. amplification. The signal diode load resistors R4 and R5 are returned to L.T.+, the rectified signal being tapped off through C18 to VR1, the volume control. The slider goes, of course, to the triode grid.

The A.V.C. diode is fed from V2 anode through C13. The load, R8, together with the bottom of VR1, goes for bias to between R11 and R12, two resistors in the negative H.T. lead.

V4 is a Q.P.P. output valve consisting of two assemblies in one bottle. A centre-tapped secondary feeds the two grids, the centre point going to L.T.—, while the filament is at chassis potential.

The centre-tapped primary of the output transformer has a parallel tone condenser, C20 and others, C21 and C22, from each end down to chassis.

A condenser, C23, is connected between H.T.+ and L.T.+, and both H.T.— and L.T.— circuits are broken by the off switch.

Batteries.—The recommended batteries are an Exide CYU3K 2-v. accumulator, and a Drydex H1146 90-v. battery. (Bias is automatic.) L.T. consumption is .5 amp.; H.T., 8.5 ma.

Chassis Removal.—The frame aerial and output transformer leads have to be unsoldered. To avoid confusion it is advised to connect a 12-in. extension to each lead as it is disconnected and to immediately reconnect. This will also make the chassis ready for testing.

The order of connections on the output transformer is: yellow, black, blue, red, blue.

It is not necessary to remove the handle. When reassembling, close the gang and make sure pointer registers on 1,000 metres.

GANGING

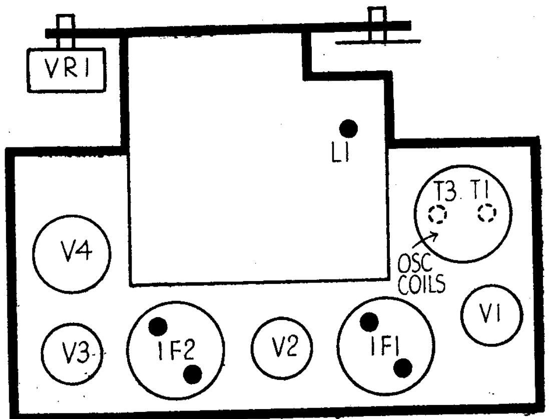
I.F. Circuits.—Adjust cores at 465 kc.

I.F. Filter.—Tune to 500 m. and inject 465 kc. signal by means of loop of wire placed near frame aerial. Adjust L1 core for minimum reading.

M.W. Band (190–550 m.).—Tune to and inject (by means of external loop) 250-m. signal. Adjust T1 while rocking gang and then T2.

L.W. Band (1,000–2,000 m.).—Tune to and inject 1,200-m. signal and adjust T3 for calibration and T4 for maximum output.

The two aerial trimmers are at the top, inside the cabinet.



This diagram identifies the parts on top of the P150 chassis and indicates the positions of the oscillator trimmers, which are underneath. The aerial trimmers are at the top of the cabinet.

VALVE VOLTAGES

V.	Type.	Electrode.	Volts.	Ma.
1	TP25	Anode	76	.3
		Screen	42	.76
		Osc. anode	75	1.82
2	VP23	Anode	76	1.05
		Screen	42	.3
3	HL23DD	Anode	62	.4
4	QP25	Anodes	83	1.3
	(*All Mazda octals.*)	Screens	84	.82

CONDENSERS

C.	Purpose.	Mfds.
1	H.T. decouple (with R9)	4
2	I.F. filter tune	40 mmfds.
3	V1 A.V.C. decouple	.06
4	I.F.1 primary tune (returned to chassis)	140 mmfds.
5	Aerial tuning	—
6	V1 screen decouple	.1
7	V1 Osc. grid	50 mmfds.
8	L.W. Osc. grid coil shunt	140 ,,
9	M.W. padding	590 ,,
10	L.W. padding	305 ,,
11	I.F.1 secondary tune	140 ,,
12	V2 A.V.C. decouple (with R7)	.04
13	A.V.C. diode feed	15 cm.
14	I.F.2 primary tune	140 mmfds.
15	Diode circuit H.F. filter	140 ,,
16	I.F.2 secondary tune	140 ,,
17	Diode circuit H.F. filter	.0002
18	L.F. coupling to V.C.	.01
19	L.F. coupling V3–V4	.1
20	O.T. primary shunt	.003
21	V4 anode-chassis	.003
22	V4 anode-chassis	.003
23	H.T. + L.T. + shunt	.1
24	Bias shunt (across R11, 12)	50
25	V3 anode-chassis	.0003

WINDINGS

L.	Purpose.	Ohms.
1	I.F. filter	13
2	M.W. frame	4
3	L.W. frame	23
4	M.W. Osc. coil	4
5	L.W. Osc. coil	7.5
6 + 7	Osc. anode coils	3.5
8	I.F.1 primary	5
9+10	I.F.1 secondary	5
11	I.F.2 primary	5
12+13	I.F.2 secondary	5

RESISTANCES

R.	Purpose.	Ohms.
1	V1 screen feed	33,000
2	V1 A.V.C. feed	270,000
3	V1 Osc. grid leak	100,000
4	Signal diode H.F. filter	56,000
5	Signal diode load	680,000
6	V3 anode load	47,000
7	V2 A.V.C. feed	680,000
8	A.V.C. diode load	1 meg.
9	H.T. feed to V1, V2, V3	1,800
10	V4 grid return to H.T.—	100,000
11	Part bias pot'meter (chassis—H.T.—)	75
12	Part bias pot'meter (chassis—H.T.—)	620
VR1	Volume control	850,000

Principles of Diode Rectification

Continued from page iii

It is important to keep the radio-frequency signals from passing into the L.F. stages. Actually the condenser C forms a low impedance to these frequencies and so little R.F. voltage is developed across R. What little there is is minimised with regard to chassis potential by having R in the cathode lead rather than the anode.

Even so, it is usual to include a stopper resistance and by-pass condenser to filter these frequencies from the L.F. output. Examples of these are C34 and R13 in the P.S. circuit, page v.

A diode for providing A.V.C. operates exactly as a signal diode, the values of the load resistance and shunt condenser being chosen, however, so that even the low-frequency voltages are largely smoothed out. The decoupling resistances and condensers to the grids of the controlled valves also assist in this.

Finally, a word about polarity. It has been explained how electrons flow across the valve to the anode and hence into the reservoir condenser. The anode and the plate of the condenser connected to it are therefore negative while the opposite plate and the cathode are positive.

Switched Outlets and Fuse Plugs

FROM J. H. Tucker & Co., Ltd., of Birmingham, we have received the following comments on a service engineer's contribution published on page vii. of the February issue:—

"Although we acclaim Mr. Mander Barnett's policy in fitting fused plugs to radio receivers, we must point out that the opening statement in his letter, 'Although no longer permissible on new installations, . . . ' is incorrect, and we wish you to draw your readers' attention to Regulation 209 of the I.E.E. Regulations, 11th Edition, which states:—

"'Where the supply is alternating current, a socket-outlet need not be controlled by a switch in the final sub-circuit to which it is connected.

"'Note.—In situations where a socket-outlet may be misused by children or others, it is desirable to instal a type in which the contact tubes cannot remain live after, or, alternatively, are automatically screened by, the withdrawal of the plug.'

"We take this opportunity of drawing attention to a further point in Mr. Mander Barnett's letter which implies that a fused plug to be used should be fused on both poles, whereas, in fact, appendix A of B.S. 546 makes it quite clear that such a plug shall only be fused on the live pole."

Intermittent Working

SEVERAL Marconiphone 855 models have come in for intermittent working, and the fault has been caused in the same way.

In the first case I traced the fault to an I.F. transformer primary. On testing with an ohmmeter everything seemed in order.

After some searching I found that the trimming condenser had an intermittent high resistance short which only occurred when there was a high voltage across it.

The fault is due to the construction of the trimmers which have two claws on the free ends. These in time cut through the dielectric.—F. L. Drummer, Drummer's Radio, Southampton.

Testing Earth Resistance

RADIO engineers will be interested in an article by Mr. T. C. Gilbert in the accompanying issue of Electrical Trading and Radio Marketing on a simple method of measuring the resistance of an earth system.