EKCO PB510, C511 PB515, RG516

PB510 and C511 are table and console models of a four-valve, plus rectifier, three waveband, motor-tuned push-button A.C. superhet. PB515 and RG516 are table and radiogram models of a basically similar chassis with a tuning indicator and push-pull output. Made by E. K. Cole, Ltd., Southend-on-Sea.

Circuit.—On S.W. the aerial is transformer coupled to V1, the frequency-changer, through iron-cored coils. On M.W. and L.W. inductively coupled band-pass coils are employed. The oscillator section of V1 is conventional with coupled anode reaction coils; M. and L.W. coils are iron cored. R5 and R6 are in series with the S.W. and M.W. reaction coils.

There are individual trimmers across each tuned coil on all three wavebands. There is no padding condenser on S.W. On the other two bands fixed padding condensers are used.

Permeability-tuned I.F. transformers link V2, the I.F. amplifier, and V3, the double-diode triode. R11 is a damping resistance across the secondary of I.F.1

The A.V.C. diode is fed from V2. anode through C15. A.V.C. arrangements are absolutely straightforward. The demodulation diode circuit is also very simple, consisting only of R21, R20 between the I.F.2 secondary and cathode, with C17, C18 in shunt across these resistors.

Tone control and negative feed-back arrangements complicate the grid circuit of the triode section of V3. The volume control is in the grid circuit in the usual way. The top end is fed from the diode load through C19. Between the two, however, are R23 and C20 in parallel, forming a top boost. The side of C19, remote from the diode load, is also taken to the live pick-up terminal and to the pick-up switch. From the same point C21 feeds the tone control.

Inverse feed-back is obtained by a third winding on the output transformer and is applied *via* R27 to the bottom of the tone control. Across bottom to slider of tone control are R28 and C25 in shunt. The slider also picks up the bottom of the volume control and a resistance, R17, from this point goes to chassis. A switch can connect R27 to chassis.

V4, the output pentode, has C23 between anode and cathode, and a tone circuit consisting of C24 and a choke between anode and H.T.

The full-wave rectifier, V5, is in a conventional circuit with a smoothing choke, the speaker being a P.M. type.

Wavebands: 13–50, 190–550, 1,000–2,000 metres. Consumption, 51 watts; tuning motor, 60 watts extra. Provision for P.U. and 3–4 ohm extension speaker.

CIRCUIT DIAGRAM

E. K. COLE, Ltd., do not permit us to publish the circuit diagram of this receiver. The material on this page, however, has been specially prepared 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 valves, and are grouped stage-by-stage.

PB515 and RG516

Push-pull output pentodes, V4 and V5, replace the single output pentode, V4. They are fed by a push-pull transformer. An electronic tuning indicator, V7, is energised from the demodulation diode.

RG516 has a further push-button switch and a resistance, R34, across the P.U.

Consumption: 69 watts; tuning motor, 60 watts; gram. motor, 14 watts.

GANGING

I.F. Circuits.—Tune to L.W. maximum and adjust I.F. cores at 126.5 kc.

S.W. Band.—See that pointer is on 50 m. with gang at maximum.

Adjust T1 at 14 m., using lowest capacity peak, and T2 at 15 m.

M.W. Band.—Adjust L1 (M.W. oscillator coil core) at 500 m.

Adjust T3 at 190 m. and T4 and T5 at 250 m.

Repeat all these adjustments.

L.W. Band.—Adjust L2 (L.W. oscillator coil core) at 1,700 m.

Adjust T6 at 1,000 m. and T7 and T8 at 1,300 m.

Image Rejection.—Inject strong 300 m. signal. Tune-in image at about 406.5 m. Adjust T9 for *minimum*.

BUTTON MECHANISM

Automatic wave-changing is obtained by using a wave-change commutator as well as a station selector commutator. All the buttons (except the on-off) have an earthed bar and two contacts. One contact links up all buttons of the same waveband (6 M.W., 2 L.W.) and also the corresponding wave button. This connection continues to a contactor on the wave-switch commutator. The remaining points of each station switch go to contactors on the station commutator.

The wave commutators continue the circuit through an electro-magnet clutch and the motor windings to the other side of the special winding on the mains transformer.

When a station button is pressed current passes through a wave commutator, energises the clutch and the motor. The clutch engages the wave-switch drive and interrupts the station commutator circuit. When the wave position is reached, current ceases, the clutch disconnects the wave drive and completes the station commutator circuit. The motor is then energised again until the station point is reached.

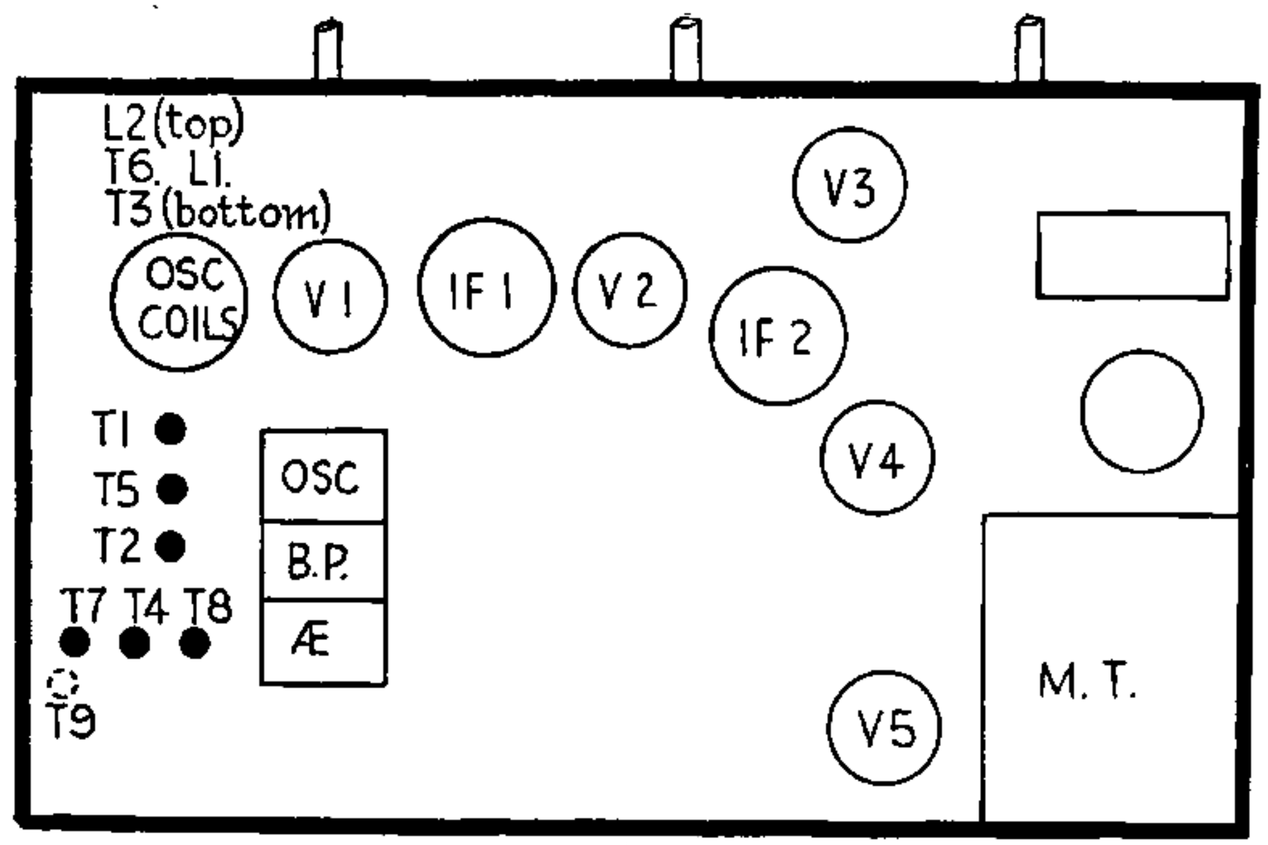
A tapping on the mains winding and a switch provide for a setting-up light.

BUTTON ADJUSTMENT

The stations on each waveband can be set in any order. Select correct waveband with M.W. or L.W. button. Move the station setting plug, at back of cabinet, from socket N. to socket S.

Depress selected station button and tune manually to required station. Move corresponding contactor on rail to bar between two small rollers and adjust till station setting lamp goes out.

Modifications.—In later models, R7=47,000, R9=510, R18=two 470,000 with V2 fed from junction, R15=3,300 and forms V1, as well as V3, anode feed.



RESISTANCES

R.	Purpose	Ohms.
1	V1 cathode bias	200
2	V1 screen feed	47,000
3	V1 screen-chassis	68,000
4	V1 osc. grid leak	100,000
5	V1 osc. anode series	220
6	V1 anode on M.W.	1,000
7	V1 anode feed	56,000
8	V1 A.V.C. feed	1 meg.
9	V2 cathode bias	1,000
10	V2 screen feed	91,000
11	Across I.F.1 secondary	470,000
12	V2 A.V.C. feed	680,000
13	V3 cathode bias	1,000
14	V3 anode load	56,000
15	V3 anode feed	10,000
16	V3 grid leak (volume control)	1 meg.
17	V3 grid leak V.C.—chassis	820
18	A.V.C. diode load	1 meg.
19	A.V.C. feed to R8	150,000
20	Demodulation diode load	100,000
21	H.F. filter, series with R20	270,000
22	Feed to V3 grid coupling condenser	56,000
23	P.U. to V.C.	220,000
24	Tone control	500,000
25	V4 cathode bias	120
26	V4 grid leak	270,000
26	V4 grid stopper	100,000
27	Feed-back to R24	15,000
28	R27–R24 slider	47,000
29	L.W. aerial coil shunt	2.2 meg.
	L.F. choke	650
	MODELS PB515, RG516.	
29	Feed to L.F. trans. primary	10,000
30	V4, 5 cathode bias	120
31, 32	V4, V5 grid stoppers	100,000
33	P.U.–R23	100,000
34	Across P.U. (in RG516)	27,000
35, 36	V7 feeding targets	2.2 meg.
37	V7 grid feed	2.2 meg.
	L.F. choke	425

CONDENSERS

C.	Purpose	Mfds.
1	M.W. aerial feed	.001
2	V1 bias shunt	.1
3	V1 screen decouple	.1
4	V1 A.V.C. decouple	.1
5	V1 osc. grid	25 mmfds.
6	M.W. fixed pad	1,505 mmfds.
7	L.W. fixed pad	425 mmfds.
8	L.W. osc. shunt	20 mmfds.
9	V1 osc. anode decouple	.1
10	V2 bias shunt	.1
11	V2 screen decouple	.1
12	V2 A.V.C. decouple	.01
13	V3 bias shunt	25
14	V3 anode decouple	4
15	A.V.C. diode feed	15 cm.
16	A.V.C. decouple	.02
17, 18	H.F. filter with R21	.0002
19	L.F. coupling to R23	.01
20	R23 shunt	.0003
21	Feed to T.C.	.0025
22	V4 bias shunt	50
23	V4 anode-cathode	.0025
24	V4 tone circuit (part)	.005
25	V4 grid feed	.1
26	Across R28	.08
27	H.T. smoothing	10
28	H.T. smoothing	8
29	Shunt with C27	.1
30, 31	Across motor	.02
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32, 33	V4, V5 anode-cathode	.0025

VALVE READINGS

V	Type	Electrode	Volts	Ma.
1	ECH3	Anode	218	1.65
		Screen	65	2.2
		Osc. anode	82	2.7
		Cathode	1.4	6.6
		Heater	6.3	—
2	EF9	Anode	250	4.8
		Screen	110	1.4
		Cathode	3.3	6.2
		Heater	6.3	—
3	EBC3	Anode	100	2.2
		Cathode	2	2.2
		Heater	6.3	—
4	EL3	Anode	235	43
		Screen	250	4.8
		Cathode	5.7	4.8
		Heater	6.3	—
5	AZ1	Anodes	275 A.C.	—
		Cathode	290 D.C.	—
		Heater	4	—
	MODELS PB515, RG516.			
V	Type	Electrode	Volts	Ma.
1	ECH3	Anode	235	2
		Screen	75	2.5
		Osc. anode	70	3.6
		Cathode	1.4	8.1
2	EF9	Anode	285	4.7
		Screen	145	1.4
		Cathode	6.1	6.1
3	EBC3	Anode	110	2.5
		Cathode	2.5	2.5
4, 5	EL3	Anodes	278	33
		Screens	285	3.9
		Cathode	8	73.8
6	AZ1	Anodes	300 A.C.	—
		Cathode	330 D.C.	—
7	EM4	Anode	280	—

Pilot lamps, 6.3v., .35 amp.