EKCO PB505, PB506, C509

Three valve, plus rectifier and tuning indicator, superhet for 200-250v., 40-100 cycles.

Circuit.—Input to VI, an ECH3, is through transformer coils on each of the three bands. The aerial windings are shunted by a trap circuit, C12 and L1, and the M.W. and L.W. windings have parallel capacities C13, C14 respectively. The input secondaries have a trimmer C8 across the S.W. primary and fixed and variable capacities, C15 and C9, across the L.W. section.

The input secondary coils go to push-buttons 9, 8, 7, which are the S.W., M.W. and L.W. band switches, and thence to the grid of V1. Buttons 6 to 2 switch parallel pre-set capacities across the normal aerial coils for automatic tuning. No. 1 is the mains on-off switch.

V1 is a triode-heptode frequency changer on basically orthodox lines, all switching being carried out, of course, by the P.B. bank. On P.B. tuning, the normal oscillator coils are replaced by two other coupled coils, the grid coil being fixed tuned by C25. For each station a permeability-tuned coil is switched across this grid circuit.

V2 is a conventional EF9 intermediate frequency amplifier coupled by the second I.F. transformer to V3, an EBL1 double-diode output valve.

The A.V.C. diode is fed by C33 from V2 anode. The diode load is returned to chassis and the control voltages tapped off to V2 and V1 in the usual manner. The signal diode is returned to V3 cathode and the L.F. output is taken through the volume control to the grid of the tetrode section.

V5, a type EM1 electronic tuning indicator, connected in the usual way, is also operated by the signal diode.

The output section of V3 has a parallel capacity, C45, and an anode stopper, R22. A third winding on the output transformer provides a negative feedback voltage introduced through a resistance-condenser network to the bottom of the volume control.

The full-wave rectifier circuit incorporating V4, an AZ1, is entirely conventional.

Descriptions of the purpose of each component are given in aerial-to-mains order in the tables of values.

Wavebands: 16.7—51, 190—560, 1,000—2,000 metres. P.B. tuning by pre-set condensers and permeability coils for 3 M.W. and 2. L.W. stations.

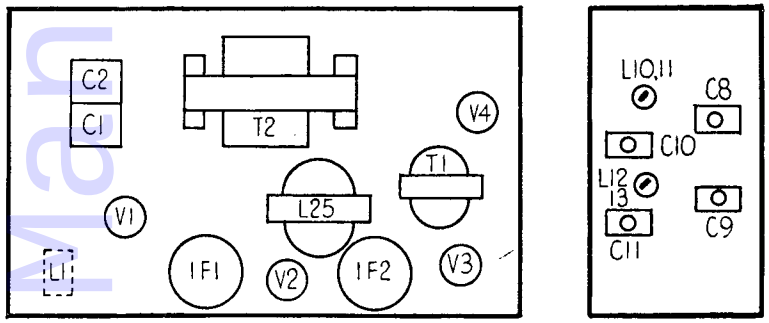
Dial lamps are 6.5 v. .35 amp type (A5767). Mains consumption is 48.5 watts. Provision is made for P.U. and for a 3-4 ohm. extension speaker.

DRIVE CORD

The cord is about 45 in. long. Attach centre to cursor by clove hitch knot. Fully mesh gang and adjust large drive wheel so that hole in rim corresponds to 4 o'clock. Hold cursor to 50 metres.

Pass half cord over righthand pulley, clockwise along drive wheel down to drive spindle. After 1½ turns round spindle, up and clockwise round wheel and through hole in rim. Fasten soldering tag to cord so that ¼ in. of cord protrudes.

Other half of cord goes over lefthand pulley, under drive wheel, anti-clockwise to same hole. Finish similarly with tag and fix both tags to one end of tension spring. Other end of spring goes over hook in drive wheel. Any pointer error up to ½ in. adjust by slackening drive wheel.



A layout diagram identifying parts on top of the chassis is given on the left and details of the under-chassis trimmer assembly on the right. The trimmers for the push-button circuits are not indicated as they adjoin the respective buttons.

CIRCUIT DIAGRAM

WE are unable to give a circuit diagram with this review, since its publication is not permitted by E. K. Cole, Ltd. The text has been specially prepared in view of this and engineers will be able to follow the theoretical arrangement sufficiently to carry out practically all service jobs.

The circuit contains few unorthodox features, as will be seen from the detailed description. The purpose or situation of each component is included in the lists of parts.

GANGING

I.F. Circuits.—Align at 477 kc., unless the receiver has a red serial number, in which case the I.F. is 465 kc.

I.F. Filter.—Inject I.F. to aerial and adjust L1 core for minimum.

See that pointer lines with 560 m. at full mesh.

Calibration.—Adjust gang trimmer C2 at 20 m. Image should be at approx. 21.4 m.

Adjust C10 at 200 m. and cores of L10, L11 at 500 m. Repeat these adjustments, then trim C1 gang trimmer at 250 m.

Adjust C8 at 20 m.

Adjust C11 for calibration and C9 for output at 1,300 m. Adjust cores of L12, L13 at 1,700. Repeat operations.

BUTTON ADJUSTMENT

Remove panel with tool provided. Fully unscrew lower key of button to be reset. Press station button and turn lower key clockwise the number of turns indicated in the guide.

Increase V.C. Turn upper key for maximum. Tune manually to required station and note the programme. Press button and turn lower key until programme is heard.

Carefully adjust lower, then upper key, until EM1 opens widest.

VALVE VOLTAGES

V	Type	Anode	Screen	Cathode
1	ECH3	250 100 (Osc.)	100	1.95
2	EF9	255	104	2
3	EBL1	240	255	12.5

WINDINGS

L.	Position	Ohms
1	Aerial trap coil	15
2	Aerial S.W. primary	below 1
3	Aerial S.W. secondary	below 1
4	Aerial M.W. primary	9.5
5	Aerial M.W. secondary	2
6	Aerial L.W. primary	33
7	Aerial L.W. secondary	23
8	Osc. S.W. grid	below 1
9	Osc. S.W. anode	below 1
10	Osc. M.W. grid	2.5
11	Osc. M.W. anode	below 1
12	Osc. L.W. grid	3.5
13	Osc. L.W. anode	below 1
14	Button 6 osc. tune	2
15	Button 5 osc. tune	3.6
16	Button 4 osc. tune	4.5
17	Button 3 osc. tune	5.7
18	Button 2 osc. tune	6.4
19-22	I.F. windings	5
23	P.B. osc. anode	5
24	P.B. osc. grid	8.5
25	L.S. field coil	720

RESISTANCES

R.	Purpose	Ohms.
1	VI anode feed	1,500
2	VI screen feed	24,000
3	VI bias	200
4	VI Osc. grid leak	47,000
5	VI Osc. grid "stopper"	220
6	V2 screen feed	68,000
7	V2 bias	200
8	H.F. filter to VC	56,000
9	V5 anode feed	1.5 meg.
10	V5 grid leak	1 meg.
11	V5 grid feed	6.8 meg.
12	Signal diode load	750,000
13	A.V.C. diode load	560,000
14	A.V.C. feed to V1	1 meg.
15	A.V.C. diode load	470,000
16	Volume control	850,000
17	V3 bias (part)	150
18	V3 bias (part)	180
19	Negative feedback network	56,000
20	Negative feedback network	10,000
21	Tone control	20,000
22	V3 anode stopper	40

CONDENSERS

C.	Purpose	Mfds.
1,2	Gang condenser	—
3-7	Aerial pre-sets	—
8	S.W. aerial coil trimmer	—
9	L.W. aerial coil trimmer	—
10	M.W. Osc. trimmer	—
11	L.W. Osc. trimmer	—
12	Aerial trap circuit	40 mmfds.
13	M.W. aerial coil pri. shunt	.0003
14	L.W. aerial coil pri. shunt	.00085
15	L.W. aerial coil sec. shunt	80 mmfds.
16	V1 A.V.C. decouple	.1
17	I.F.1 primary shunt (part)	.04
18	I.F.1 primary shunt (part)	140 mmfds.

Continued in next column

CONDENSERS—*continued*

C.	Purpose	Mfds.
19	V1 screen decouple	.1
20	V1 bias decouple	.1
21	I.F.1 secondary shunt	140 mmfds.
22	Osc. grid	.001
23	Osc. grid series on M.W.	590 mmfds.
24	Osc. grid series on L.W.	305 mn fds.
25	Osc. grid tuning on P.B.	280 mmfds.
26	L.W. Osc. coil shunt	230 mmfds.
27	H.F. filter across smoothing	.1
28	V2 screen decouple	.1
29	V2 bias decouple	.1
30	V2 A.V.C. decouple	.04
31	I.F.2 primary shunt	140 mmfds.
32	I.F.2 secondary shunt	140 mmfds.
33	A.V.C. diode feed	15 cm.
34	V5 grid-to-cathode	.1
35	Signal diode H.F. filter	140 mmfds.
36	Signal diode H.F. filter	.0001
37	L.F. coupling to V.C.	.01
38	H.T. smoothing	16
39	H.T. smoothing	8
40	Top of V.C. to slider	.00004
41	V3 bias decouple	25
42	Negative feedback network	.08
43	S.W. fixed pad	3,750 mmfds.
44	Tone control (series R21)	.04
45	V3 shunt	.0025

Testing Universal Receivers

WHEN testing A.C./D.C. sets in which a valve is broken it is dangerous to fit a new valve before finding out the cause (if any) which broke the old one.

I find the following method safe. A variable wire-wound resistance of fairly low value is wired across the filament sockets of the valve-holder.

The resistance is put "all-in," an A.C. voltmeter connected across it, and the set switched on. The resistance is gradually reduced until the voltmeter reads the value which is normally across the valve heater.

Resistance Check

The voltage across the other heaters is then read and, if correct, it can be taken that the resistance in circuit is correct. The special resistance is then removed and its value taken.

If this compares well with the resistance of the valve heater it will be safe to fit the valve. If not, then something is wrong.

With 6.3 volt .3 amp. A.C./D.C. valves, the equivalent heater resistance is approximately 20 ohms. The variable resistance should have a maximum well in excess of this and must, of course, be a heavy duty type able to carry .3 amp.—F. DAY-LEWIS, Dublin.