

NUMBER FORTY - FOUR
(VOLUME TWO)

'TRADER' SERVICE SHEETS

R.A.P. CONTINENTAL A.C./D.C. SUPERHET

THE R.A.P. Continental receiver is a 4-valve superhet for use on A.C. or D.C. mains. The fifth valve is a rectifier, which acts as a resistance when the set is used on D.C. The medium and long wavebands are covered, and 2nd detection, A.V.C. and first stage L.F. amplification is performed by an American double diode-pentode valve.

CIRCUIT DESCRIPTION

Aerial input via D.C. blocking condenser C1 and coupling coils L1, L2 to single-tuned circuit L3, L4, C19.

First valve (V1, Tungfram 6A7) is a heptode operating as frequency-changer with electron coupling. Oscillator grid tuning coils L5, L6; anode reaction coils L7, L8; L.W. tracking by pre-set condenser C24.

Second valve, a variable-mu H.F. pentode (V2, Tungfram 78), operates as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings L9, L10 and L11, L12.

Intermediate frequency 473 KC/S.

Diode second detector forms part of double diode pentode (V3, Majestic metallised 6B7). Second diode, fed from V2 anode by C12, provides D.C. potential which is fed back through decoupling circuit R7, C5 as G.B. to I.F. amplifier, giving automatic volume control. Delay voltage is obtained from drop along R6.

Audio-frequency output from rectifier diode is developed across load resistance R4, and passed by way of coupling condenser C8, and manual volume control R5, to control grid of V3 pentode section which operates as L.F. amplifier. Provision for connection of pick-up.

Resistance-capacity coupling to output

pentode (V4, Tungfram 43). Fixed tone correction in anode circuit by condenser C16. Provision for connection of high-resistance external speaker across primary of T1.

When the receiver is used with A.C. mains, H.T. current is supplied by a half-wave rectifier which takes the form of a special full-wave valve (V5, Tungfram 25Z5) with its anodes and cathodes strapped. With a D.C. supply in use the valve behaves as a resistance of low value.

Smoothing by choke L16 and dry electrolytic condensers C17, C18. Speaker field winding across main H.T. supply.

The heaters of the valves are connected in series together with the scale lamp and a tapped ballast resistance R14. Additional ballast resistance R15 is incorporated in mains lead.

DISMANTLING THE SET

Removing Chassis.—Remove knobs (grub screws). Remove the two small wood screws and the central nut and bolt in the back flange of the chassis which hold it to the base of the cabinet. Chassis is now free, but can only be withdrawn after unsoldering the four speaker leads from the tags on the speaker transformer. When replacing, the black lead goes to the left-hand tag, the yellow to the second tag from the left, the red to the second tag from the right and the green to the right-hand tag. The central tag has no connection.

Removing Speaker.—This is held to its sub-baffle by three nuts and bolts, and removal of the nuts frees the speaker. (It should be replaced with the transformer at the top.

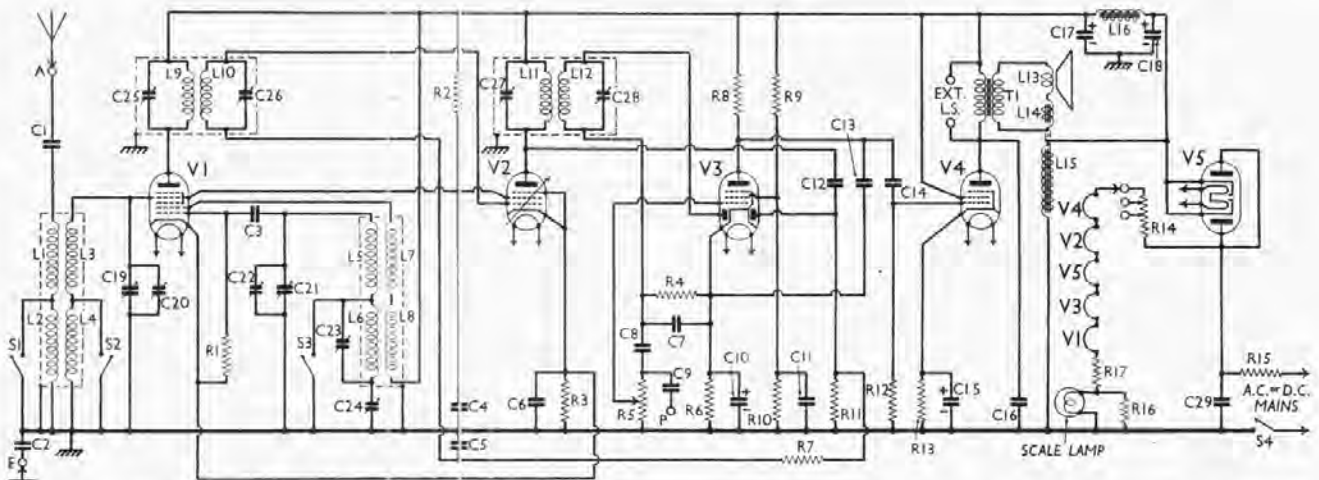
COMPONENTS AND VALUES

Resistances		Values (ohms)
R1	V1 oscillator grid resistance ..	30,000
R2	V1 and V2 S.G.'s H.T. feed ..	30,000
R3	V1 and V2 fixed G.B. resistance ..	150
R4	V3 rectifier diode load ..	500,000
R5	Manual volume control ..	500,000
R6	V3 G.B. resistance ..	10,000
R7	A.V.C. circuit decoupling ..	500,000
R8	V3 pent. anode resistance ..	500,000
R9	V3 S.G. pot. divider ..	500,000
R10	V3 A.V.C. diode load ..	100,000
R11	V4 grid resistance ..	500,000
R12	V4 grid resistance ..	500,000
R13	V4 G.B. resistance ..	500
R14	Tapped ballast resistance, total ..	375*
R15	Ballast resistance in mains lead ..	190
R16	Scale lamp shunt ..	45
R17†	Scale lamp series resistance ..	30

* Tapped at 125 and 250 O.
† In our chassis.

Condensers		Values (μF)
C1	Aerial blocking condenser ..	0.01
C2	Earth blocking condenser ..	0.01
C3	V1 oscillator grid condenser ..	0.0001
C4	V1 and V2 S.G.'s by-pass ..	0.25
C5	A.V.C. circuit decoupling ..	0.25
C6	V1 and V2 cathodes by-pass ..	0.05
C7	L.F. by-pass ..	0.0001
C8	L.F. coupling to V3 pent. ..	0.01
C9	Gram. circuit blocking condenser ..	0.01
C10	V3 cathode by-pass ..	10.0
C11	V3 S.G. by-pass ..	0.25
C12	Coupling to A.V.C. diode ..	0.0001
C13	V3 anode I.F. by-pass ..	0.0002
C14	L.F. coupling to V4 ..	0.01
C15	V4 cathode by-pass ..	10.0
C16	V4 anode tone compensator ..	0.01
C17	H.T. smoothing ..	5.0
C18	H.T. smoothing ..	16.0
C19	Aerial circuit tuning ..	—
C20	Aerial circuit trimmer ..	—
C21	Oscillator tuning ..	—
C22	Oscillator main trimmer ..	—
C23	Oscillator L.W. trimmer ..	—
C24	Oscillator L.W. tracker ..	—
C25	1st I.F. trans. pri. tuning ..	—
C26	1st I.F. trans. sec. tuning ..	—
C27	2nd I.F. trans. pri. tuning ..	—
C28	2nd I.F. trans. sec. tuning ..	—
C29*	Mains by-pass ..	0.001

* In our chassis.



The circuit diagram of the R.A.P. Continental receiver. R15 is incorporated in the special mains lead. V3 is a double-diode pentode. R14 is adjustable for various mains voltages. A pick-up can be connected between socket P and earth.

Other Components		Values (ohms)
L1	Aerial coupling coils ...	1·25
L2		15·0
L3		2·8
L4	Aerial tuning coils ...	11·4
L5		1·6
L6	Oscillator grid tuning coils	3·25
L7		3·7
L8	Oscillator anode reaction coils	4·0
L9		5·7
L10	1st I.F. trans. ...	5·7
L11		5·7
L12	2nd I.F. trans. ...	5·7
L13		5·7
L14	Speaker speech coil ...	1·5
L15	Hum neutralising coil ...	0·1
L16	Speaker field winding ...	6,500
	H.T. smoothing choke ...	460
T1	Speaker input trans. ...	570
		570
S1-S3	Waveband switches, ganged	0·25
S4		Mains switch, ganged R5

VALVE ANALYSIS

The voltage and current readings listed in the table were obtained from a representative chassis working with a 230 V 50 c.p.s. A.C. mains supply, and with no aerial or earth connected.

All voltages were measured on the 1,200 V scale of an Avometer, chassis being negative.

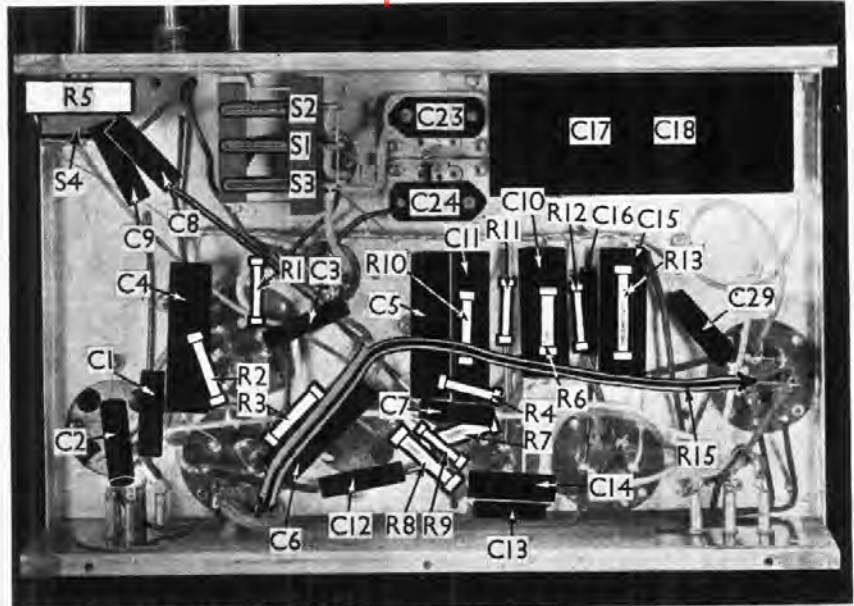
Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 6A7* ..	145	1·8	65	1·75
V2 78 ..	145	3·5	65	0·85
V3 6B7 ..	20	0·2	20	0·05
V4 43 ..	130	—	145	6·0
V5 25Z5† ..	—	—	—	—

* Osc. anode (G2) 145 V 3·0 mA.
 † Cathodes to chassis 170 V D.C.

GENERAL NOTES

Switches.—S1, S2 and S3 are the ganged waveband switches, indicated in the under-chassis view. They are all closed on the M.W. band and open on the L.W. band. S4 is the Q.M.B. mains switch, ganged with R5.

Coils.—The signal frequency and oscillator coils are in two screened units



Under-chassis view. C17, C18 are electrolytic condensers in one unit. The wavechange switches are clearly indicated. R15 is incorporated in the mains lead.

on the chassis deck. In our plan chassis view, the screens have been removed. They are fitted at their bases with two studs, and are held to the chassis by nuts and washers. In addition, at the top of each screen is a central screw, which must be removed before the screens can be taken off. This frees the coil units, which are then merely supported by their wiring.

All the coils are clearly indicated in our view. It should be noted that L8 is wound over L6.

The I.F. transformers are of conventional design, and on removing the push-on screens, the primary and secondary coils will be seen wound on a tubular former, the primary being the upper coil in each case.

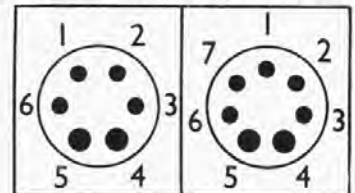
Scale Lamp.—This is an M.E.S. type, marked 6 V. The correct current consumption will be about 0·15 A, since the lamp is shunted by R16 to enable it to be used in series with the 0·3 A heater circuit.

Condensers C17, C18.—These are two electrolytics, with a common negative connection. C17 (yellow lead) is 8μF, and C18 (red lead) is 16μF.

Resistance R15.—This is the fixed ballast resistor, incorporated in the mains lead. It comprises a wire winding on an asbestos core. The lead becomes quite warm when the set is in use.

Valve Heaters.—The voltages and currents are: V1, V2, V3, 6·3 V, 0·3 A; V4, V5, 25 V, 0·3 A.

Valve Connections.—V1 and V3 have American 7-pin bases, while V2, V4, V5 are of the 6-pin type. Diagrams are given below with the pins numbered,



The 6- and 7-pin valve bases, from their undersides.

looking at the underside of the bases. Electrode connections are as follow, the numbers indicating the pins.

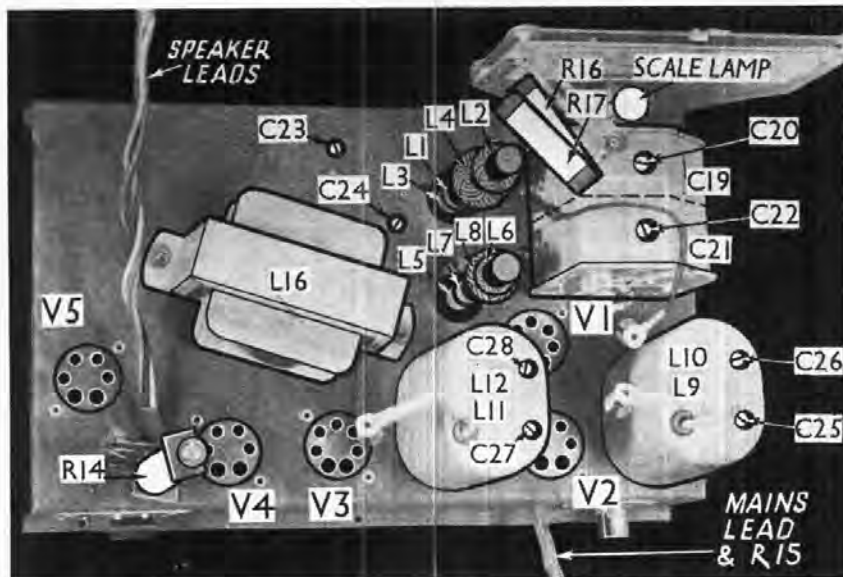
V1.—1, Osc. anode; 2, Osc. grid; 3, Cathode; 4 and 5, Heater; 6, Anode; 7, Scr. grids; Top Cap, Cont. grid.

V2.—1, Scr. grid; 2, Supp. grid; 3, Cathode; 4 and 5, Heater; 6, Anode; Top Cap, Cont. grid.

V3.—1, Diode anode; 2, Diode anode; 3, Cathode; 4 and 5, Heater; 6, Anode; 7, Scr. grid; Top Cap, Cont. grid.

V4.—1, Aux. grid; 2, Cont. grid; 3, Cathode; 4 and 5, Heater; 6, Anode.

V5.—1, Cathode 1; 2, Cathode 2; 3, Anode 2; 4 and 5, Heater; 6, Anode 1.



Plan view of the chassis. The signal frequency and oscillator coil screens have been removed, and the coils are clearly indicated. R14 is the tapped ballast resistor. C23 and C24 are the tracking adjustments.