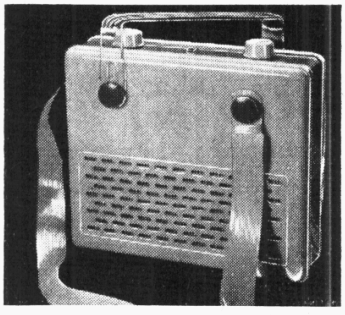
Supplement to The Wireless & Electrical Trader, August 21, 1948

"TRADER" SERVICE SHEET

875

EKCO "PRINCESS"

PERSONAL PORTABLE P63



FOUR small all-dry valves and miniature components are used in the Ekco P63 "Princess" personal receiver, a two-band superhet equipped with alternative plastic hand or strap carriers.

Dismantling is a fairly straightforward matter, and the whole chassis is then easily accessible. The waveband ranges were 190-530 m and 820-1,920 m, but are now 197-552 m and 1,000-1,910 m. In export versions the ranges are 1,520-543 kc/s and 300-157 kc/s.

Release date and original price: May, 1948; £13 13s including battery, plus purchase tax.

CIRCUIT DESCRIPTION

Tuned frame aerial input by **L1**, **C24** (M.W.) with the addition of loading coil **L2** (L.W.) precedes a heptode valve **(V1, Mullard DK91)** operating as frequency changer with electron coupling.

Triode oscillator grid coils **L3** (M.W.) and **L4** (L.W.) are tuned by **C25,** with parallel trimming by **C7, C26** (M.W.) and **C10** (L.W.), and series tracking by **C6** (M.W.) and **C9** (L.W.). Inductive reaction coupling from anode by coils **L5** (M.W.) and **L6** (L.W.).

Second valve **(V2, Mullard DF91)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned-transformer couplings **C3, L7, L8, C4** and **C12, L9, L10, C13,** in which the tuning capacitors are fixed and alignment adjustments are effected by varying the positions of the iron-dust cores.

Intermediate frequency 465 kc/s.

Diode second detector is part of single diode pentode valve **(V3, Mullard DAF91).** Audio frequency component in rectified output is developed across manual volume control **R5,** which is the diode load resistor, and passed via A.F. coupling capacitor **C16** and C.G. resistor **R6** to control grid of pentode section, operating as A.F. amplifier. I.F. filtering by **C14, R3, C15** in diode circuit, and **C19** in **V3** pentode anode circuit.

The D.C. potential developed across **R5** is tapped off and fed back, via a decoupling circuit **R4, C1,** as G.B. to F.C. and I.F. valves, giving A.V.C.

Resistance-capacitance coupling by **R10, C20, R11** between **V3** pentode and pentode output valve **(V4, Mullard DL92),** the dual filament sections of which are wired in parallel. Fixed tone correction in anode circuit by **C22.**

Positive voltage feed-back from **V4** anode to **V3** pentode C.G. circuit, via **C17** and the potential divider **R7, R8,** to give bass boost, and negative voltage feedback from **V4** anode to **V4** C.G. circuit via **C21, R12.**

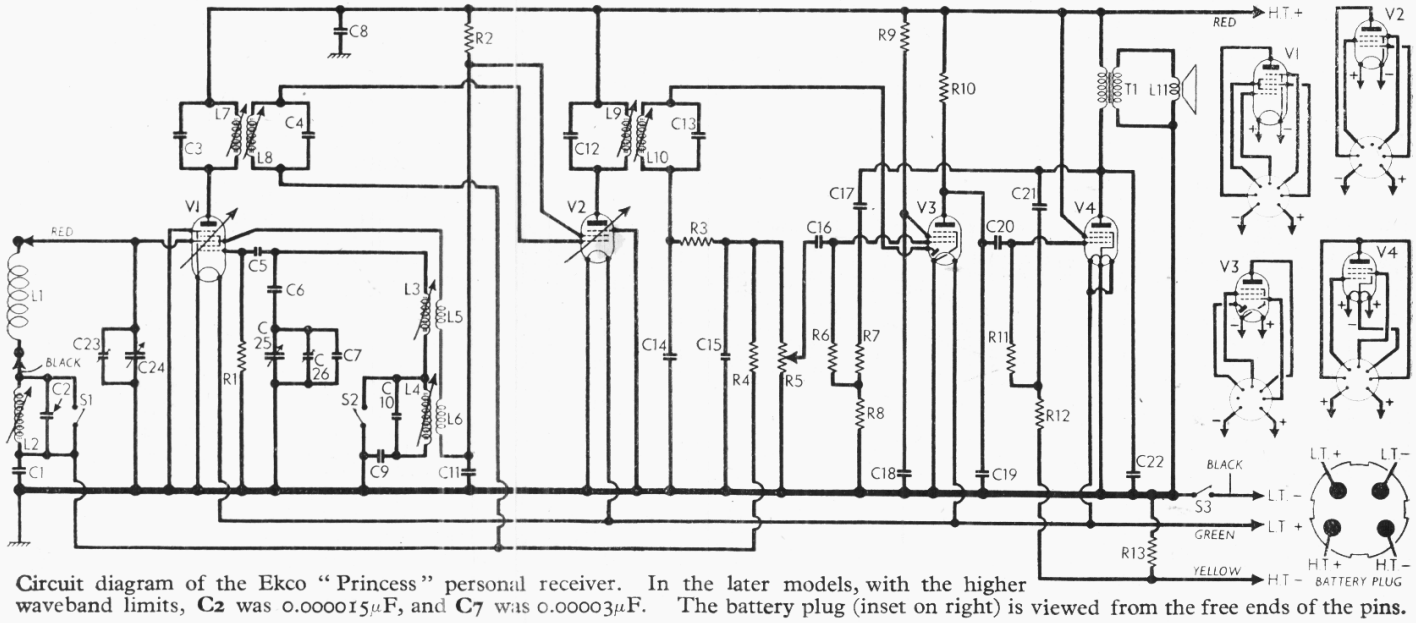
G.B. potential for **V4** is obtained from the drop across **R13** in the H.T. negative lead to chassis.

COMPONENTS AND VALUES

	RESISTORS	Values (ohms)	Locations
R1	V1 osc. C.G. ...	100,000	H4
R2	V1 osc., V2 S.G. H.T feed	10,000	I3
R3	I.F. stopper ...	47,000	J3
R4	A.V.C. decoupling	3,300,000	I4
R5	Volume control ...	500,000	E1
R6	V3 pent. C.G. ...	10,000,000	J4
R7	V3 feed-back potential divider ...	2,700,000	E2
R8		150,000	F2
R9	V3 S.G. feed ...	4,700,000	J3
R10	V3 pent. load ...	1,000,000	J3
R11	V4 C.G.	3,300,000	K3
R12	F-B coupling ...	220,000	J3
R13	V4 G.B.	820	K3

	CAPACITORS	Values (μF)	Locations
C1	A.V.C. decoupling	0·05	H4
C2	L.W. fixed trim. ...	0·0001	H4
C3	1st I.F. transformer tuning	0·0001	D1
C4		0·0001	D1
C5	V1 osc. C.G. ...	0·00005	C1
C6	Osc. M.W. tracker	0·00047	A2
C7	Osc. fixed trim. ...	0·000015	A1
C8	H.T. R.F. by-pass	0·1	K4
C9	Osc. L.W. tracker...	0·00025	C2
C10	Osc. L.W. trim. ...	0·00006	B2
C11	H.T. feed decoup....	0·25	C2
C12	2nd I.F. transformer tuning ...	0·0001	E2
C13		0·0001	E2
C14	I.F. by-passes ...	0·0001	K3
C15		0·00005	E1
C16	A.F. coupling ...	0·002	F1
C17	F.-B. coupling ...	0·01	F1
C18	V3 S.G. decoup. ...	0·1	I3
C19	I.F. by-pass ...	0·0001	J4
C20	A.F. coupling ...	0·001	K4
C21	F.-B. coupling ...	0·001	F1
C22	Tone corrector ...	0·005	K3
C23‡	Aerial M.W. trim....	—	A1
C24†	Aerial tuning ...	0·0004	B1
C25†	Oscillator tuning ...	0·0004	B1
C26‡	Osc. M.W. trim. ...	—	A1

† Variable. ‡ Pre-set.



Circuit diagram of the Ekco "Princess" personal receiver. In the later models, with the higher waveband limits, **C2** was 0.000015μF, and **C7** was 0.00003μF. The battery plug (inset on right) is viewed from the free ends of the pins.

OTHER COMPONENTS		Approx. Values (ohms)	Location
L1	Frame aerial ...	0·4	—
L2	L.W. loading coil ...	16·8	G4
L3	Oscillator tuning coils ...	2·0	C2
L4	Oscillator tuning coils ...	6·4	C2
L5	Oscillator reaction coils ...	0·5	C2
L6	Oscillator reaction coils ...	1·8	C2
L7	1st I.F. trans. Pri.	13·0	D1
L8	1st I.F. trans. Sec.	13·0	D1
L9	2nd I.F. trans. Pri.	13·0	E2
L10	2nd I.F. trans. Sec.	13·0	E2
L11	Speech coil ...	2·5	—
T1	Output trans. Pri.	370·0	F2
	Output trans. Sec. ...	0·4	F2
S1, S2	W/band switches ...	—	H4
S3	L.T. circuit switch	—	K3

VALVE ANALYSIS

Valve voltages given in the table below are those measured in our receiver when it was operating from a new battery, measuring 64 V on load. The receiver was tuned to the lowest wavelength on the M.W. band and the volume control was at maximum, but there was no signal input.

Voltages were measured on the 400 V scale of a model 7 Avometer, chassis being the negative connection, but no individual electrode currents have been quoted, since it is inadvisable to disturb the wiring in such a compact assembly. The total H.T. current, however, was 9.0 mA.

Valve	Anode Voltage (V)	Screen Voltage (V)
V1 DK91	57	37
V2 DF91	57	37
V3 DAF91	5	2
V4 DL92	55	57

DISMANTLING THE SET

Removing Chassis.—Remove the four plastic button-headed screws, shoulder-strap, and carrying handle;

draw open the top edge of each side cover and slide cover downwards so that its metal tongues, on the bottom edge, disengage from their retaining holes;

remove two countersunk-head screws (with washers) securing top edge of frame aerial to the chassis member, lift aerial out of its retaining clips, and unsolder its two connecting leads;

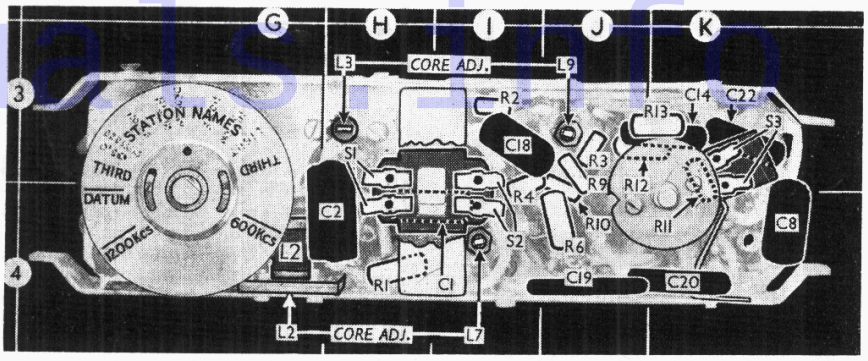
remove two countersunk-head screws securing top edge of speaker sub-baffle to chassis member, and two countersunk-head wood screws securing bottom edge of sub-baffle to plastic frame, and unsolder the two speaker leads;

remove the two control knobs (recessed grub screws);

lay assembly flat on the bench, remove the two long screws (with two washers beneath head and one beneath fixing nut of each) securing the ends of chassis members to top corners of plastic frame, turn chassis, and lift it out.

When replacing, lay plastic frame on the bench with the metal frame aerial retaining claws pointing upwards, and insert chassis with the gang on the right. The red lead should be soldered to the upper tag on the frame aerial, and the black lead to the lower tag.

When refitting side covers, ensure that their metal tongues have engaged with the locating holes before pressing home, and note that the cover which is provided with a small felt pad goes on the speaker side of the assembly.



Upperside of the chassis. The calibration marks on the tuning scale are identified.

CIRCUIT ALIGNMENT

It is necessary to remove the receiver from the carrying case and assemble it on the bench before the following operations can be carried out.

I.F. Stages.—Switch set to M.W. (green spot visible), turn gang and volume control clockwise to maximum, and remove the volume control indicator disc (two cheese-head screws and one felt washer). Connect signal generator via an 0.1 μF capacitor in the "live" lead, to control grid (pin 6) of **V1** and chassis, and feed in a 465 kc/s (645.16 m) signal. Using a non-metallic trimming tool, adjust the cores of **L10, L9, L8** and **L7** (location references E2, J3, D1, I3), in that order, for maximum output.

R.F. and Oscillator Stages.—In the absence of the tuning scale "window," which is on the casing, a fixed calibration mark is required as a pointer against the rotatory scale.

This may consist of a strip of metal which can be clipped across the chassis, with line scored across its centre, but for all practical purposes an imaginary centre-line along the length of the chassis is sufficiently accurate. This line would run through the centres of the two control spindles.

The scale is sketched into our upper chassis illustration, with the positions of the three alignment reference lines indicated when the gang is at maximum capacitance. The "Datum" line should lie exactly on the chassis centre-line. The scale is provided with slots for adjustment. Couple signal generator via a loop of wire on the bench.

M.W.—Still switched to M.W., tune to 250 m on scale (1,200 kc/s line on centre-line, pointing to switch), feed in a 250 m (1,200 kc/s) signal, and adjust **C26** and **C23** (A1) for maximum output. Tune to 500 m (600 kc/s mark) on scale, feed in a 500 m (600 kc/s) signal, and adjust the core of **L3** (H3) for maximum output. Repeat these adjustments.

L.W.—Switch set to L.W. (red spot visible), tune to 1,500 m on scale (Droit'w facing end of chassis on centre-line), feed in a 1,500 m (200 kc/s) signal, and adjust the cores of **L4** (C2) and **L2** (G4) for maximum output.

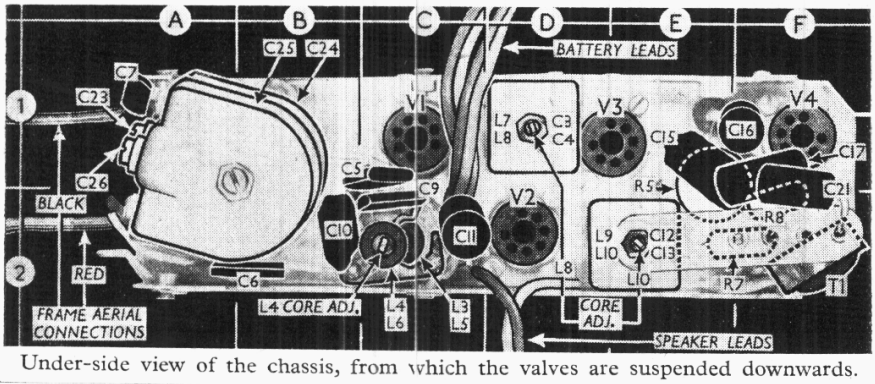
Volume Control.—To set the volume control indicator plate correctly, remove the two fixing screws, turn control anti-clockwise to its stop, see that the notch in the fibre disc engages with the locating spring, then replace fixing screws loosely. They should then be tightened up with the "OFF" mark on the plate facing outwards on the chassis centre-line.

GENERAL NOTES

Switches.—There are only two waveband switches, **S1** and **S2,** and both of them close on M.W., to which the receiver is switched when the green spot is visible.

Battery.—This is an Ever-Ready "Batrymax" type B114 layer-type combined all-dry H.T. and L.T. battery. The H.T. section is rated at 69 V, and the L.T. section at 1.5 V. The receiver makers say that the receiver will function until the H.T. voltage drops to 34 V, and the L.T. voltage to 1.1 V, and that this gives a working life of about 7-8 weeks at an average of one hour's use per day.

The battery is provided with a 4-pin socket outlet, and a diagram of the plug is inset on the right of the circuit diagram overleaf. The lead colours are indicated in the circuit diagram.



Under-side view of the chassis, from which the valves are suspended downwards.

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