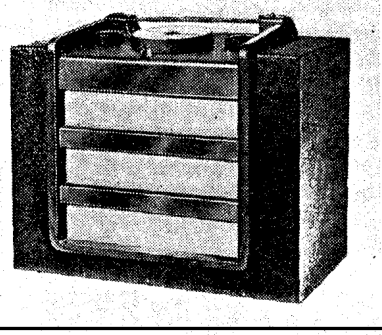
EKCO - PUI48

AC/DC TRANSPORTABLE



We regret that permission to publish a circuit diagram of this set is not available, but the information given here should be adequate to enable most faults to be traced and corrected.

THE Ekco PU148 "Pick-Me-Up" portable is a 3-valve (plus rectifier) AC/DC 2-band receiver, enclosed in a cabinet of small dimensions and including separate frame aerials for each band. It is suitable for mains of 105-115 and 200-250 V. Features are a local-distant switch, and provision for an external aerial and earth.

CIRCUIT DESCRIPTION

Separate MW or LW tuned frame aerial input **L1, C16,** via **S1** (MW) or **L2, C16,** via **S2** (LW) to variable-mu pentode valve (**V1, Ekco metallised VPU1** or **Mullard VP13C**) operating as RF amplifier with gain control by variable potentiometer **R11** in cathode circuit, the resistance element of which forms the GB resistance of **V3** in its cathode lead to chassis. Additional resistances in **V1** cathode lead are **R1** (connected to cathode) fixed minimum GB resistance, and **R2** (connected between **R1** and **R11** slider), which, with **S6** connected across it, forms the "Local-distant" control, **S6** opening on "Local" for reception of local transmissions.

Provision for connection of external aerial to **V1** CG via small condenser **C2,** and earth via isolating condenser **C1** to chassis. **C3** is a fixed trimmer across LW frame winding, which is short-circuited on MW by **S3.**

Tuned-secondary RF transformer coupling by **L3, L4** (primaries, in series), **L7, L8** (secondaries, in series) and **C19, L4** and **L8** each being short-circuited on MW by **S4** and **S5** respectively, between **V1** and detector valve (**V2, Mullard metallised SP13C**), an RF pentode operating on grid leak system with **C6** and **R5,** the latter being returned to chassis. RF filtering in anode circuit by RF choke **L9,** condenser **C9** and resistance **R9.** Reaction is applied from anode, via damping resistance **R4,** by coils **L5, L6** coupled back to RF transformer, and controlled by variable condenser **C18,** with which is also ganged **R11** slider. HT feed resistance **R7,** besides feeding **V2** anode, also feeds **V1** SG directly, and **V2** SG via a further resistance **R6.**

Parallel-fed auto-transformer coupling by **R8, C11** (via **R9**) and **T1** (via **R10**) between **V2** and pentode output valve (**V3, Mullard Pen36C**). Fixed tone correction in anode circuit by **C13.** Speaker frame and speech coil together with **T2** secondary are connected to chassis and therefore "live."

When the receiver is used with AC mains, HT current is supplied by IHC half-wave rectifying valve (**V4, Mullard URIC**) which, with DC supplies, behaves as a low resistance. Smoothing is effected by iron-cored choke **L11** and dry electrolytic condensers **C14, C15.**

Valve heaters are connected in series, together with ballast resistance **R12** across mains input in the following order: **L13** to tap on **R12;** voltage adjustment lead end of **R12** to:—**V3, V4, V1** and **V2** heaters and chassis. The tap to **L13** on **R12** is not quite at the "top" end of **R12,** about 50 Ω extending beyond it, and forming a surge resistance, at the end of which is connected, via fuse **F1, V5** anode. Air-cored chokes **L12, L13** in mains input leads form a filter which suppresses mains-borne interference, **L12** being connected directly to chassis. To the outward ends of **L12, L13** are connected the mains circuit switches **S7, S8** and beyond them, via mains connection plugs, are mains circuit fuses **F1, F2,** located in the mains connection socket.

COMPONENTS AND VALUES

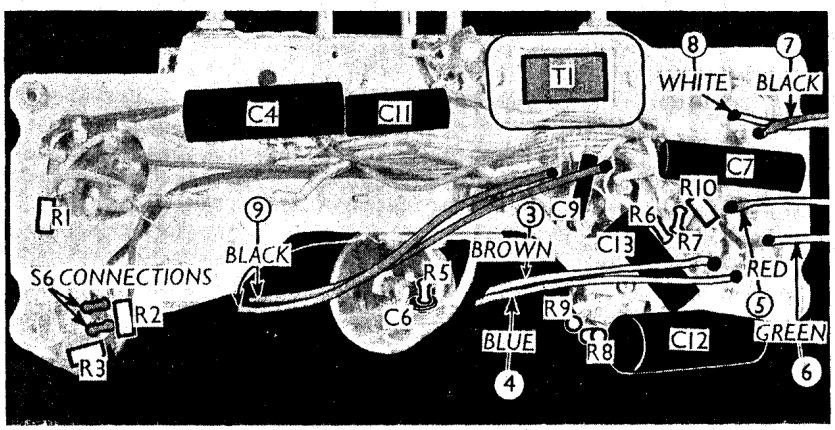
	RESISTANCES	Values (ohms)
R1	V1 "Distant" fixed GB ..	250
R2	V1 "Local" fixed GB ..	50,000
R3	V1 anode HT feed	10,000
R4	Reaction circuit damping ..	200
R5	V2 CG resistance	1,000,000
R6	V2 SG HT feed	250,000
R7	V1 SG and V2 anode HT feed	25,000
R8	V2 anode load	100,000
R9	RF stopper resistances	15,000
R10	RF stopper resistances	100,000
R11	V3 GB: V1 gain control, ganged C18	148
R12	Heater circuit ballast: V4 anode current limiter, approx. total	875*

* 100 Ω + 100 Ω + 500 Ω + 125 Ω + 50 Ω from V3 heater end.

	CONDENSERS	Values (μF)
C1	Earth isolating condenser ..	0·1
C2	Aerial series condenser ..	0·000005
C3	LW frame aerial trimmer ..	0·000045
C4	V1 cathode by-pass	0·25
C5	V1 anode decoupling	0·25
C6	V2 CG Condenser	0·000015
C7	V2 SG decoupling	0·1
C8	Mains RF by-pass	0·1
C9	V2 anode RF by-pass.. ..	0·0005
C10*	V1 SG and V2 anode decoupling	2·0
C11	AF coupling to T1	0·04
C12*	V3 cathode by-pass	50·0
C13	Fixed tone corrector	0·007
C14*	HT smoothing ..	8·0
C15*	HT smoothing ..	24·0
C16†	Frame aerial tuning	—
C17‡	MW frame aerial trimmer ..	—
C18†	Reaction control, ganged R11	—
C19†	RF trans. sec. tuning ..	—
C20‡	RF trans. sec. MW trimmer ..	—

* Electrolytic. † Variable. ‡ Pre-set.

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Frame aerial windings	1·1
L2	Frame aerial windings	24·0
L3	RF trans. primary coils	5·0
L4	RF trans. primary coils	18·0
L5	Reaction coils, total	200·0
L6	Reaction coils, total	
L7	RF trans. secondary coils	5·0
L8	RF trans. secondary coils	20·0
L9	V1 anode RF choke	275·0
L10	Speaker speech coil	2·1



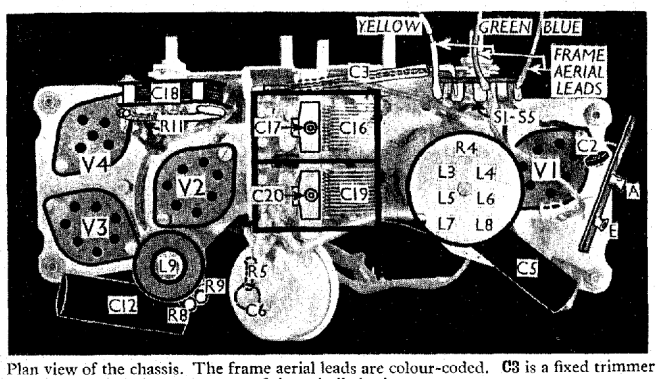
Under-chassis view. Note the coding of the various leads connecting to the power unit and speaker.

	OTHER COMPONENTS (*Continued*)	Approx. Values (ohms)
L11	HT smoothing choke	353·0
L12	Mains filter chokes ..	2·5
L13	Mains filter chokes ..	2·5
T1	Intervalve auto trans., total..	3,680·0
T2	Output trans. Pri. ..	660·0
T2	Output trans. Sec. ..	0·4
S1-S5	Waveband switches	—
S6	Local-distant switch	—
S7, S8	Mains switches..	—
F1	V1 anode fuse ..	—
F2, F3	Mains circuit fuses (in plug connector)	—

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on AC mains of 228 V, using the 220-230 V tapping on the mains resistance. The receiver was tuned to the lowest wavelength on the medium band, and the combined volume and reaction control was advanced to a point just short of oscillation, the local-distant switch being in the distant position. There was no signal input as the frame aerial connections were shorted.

Voltages were measured on the 400 V scale of a model 7 Universal Avometer, chassis being negative.



Plan view of the chassis. The frame aerial leads are colour-coded. C3 is a fixed trimmer of the spiralled-wire type.

EKCO PU148—*Continued*

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 VPU1	158	5·1	133	2·2
V2 SP13C	43	0·8	50	0·3
V3 Pen36C	190	41·0	220	6·8
V4 URIC†	—	—	—	—

† Cathode to chassis, 246 V DC.

GENERAL NOTES

Switches.—**S1-S5** are the waveband switches, in a single rotary unit indicated in our plan chassis view. The individual switches are shown in the diagram on page IV. The table (page IV) gives the switch positions for the two control settings, starting from the anti-clockwise position. A dash indicates *open*, and **C** *closed*.

S6 is the QMB local-distant switch, mounted on the control panel, and not shown in our chassis illustrations, though its two connection points are indicated in the under-chassis view. The switch is *closed* in the "distant" position.

S7, S8 are the QMB mains switches, in a single unit mounted above the mains input connector on the power pack.

Coils.—**L1** and **L2** are the frame aerial windings. **L1** is wound on a wooden framework on the right, looking at the back of the cabinet, while **L2** is concealed in the woodwork of the cabinet itself. **L3-L8** are in a single tubular screened unit on the chassis deck, which also contains **R4.** The choke **L9** is also on the chassis deck, and is partially screened by turns of copper foil wound round its periphery, between insulation tape, and connected to chassis by a short flexible lead.

L11-L13 are in the power pack.

External Speaker.—No provision is made for this.

Fuses.—**F1,** the **V4** anode fuse, is mounted in a holder above **L11** on the power pack. It is a standard 1¼ in. glass tubular type, rated at 500 mA. **F2, F3,** the mains circuit fuses, are mounted inside the special plug connector fitting on the pins at the rear of the power pack. Before they can be removed, the connector must be completely dismantled into its three moulded parts (one screw, one hollow screw). The fuses are 1 in. glass types, rated at 1A each.

CIRCUIT ALIGNMENT

Set local-distant switch to "distant," advance gain/reaction control until receiver is just short of oscillation, and tune to a weak station between 220 and 300 m. Adjust **C17** and **C20** for maximum output, taking care not to turn receiver on its turntable.

If pointer indication is not correct, loosen centre screw and move the celluloid disc through the necessary angle.

Inter-Connections.—All the interconnecting leads are colour-coded in the chassis pictures and, except for the three frame leads, are also numbered to agree with the dismantling instructions.

Condensers C10, C14, C15.—These are three dry electrolytics in a single carton on the power pack, having a common negative (black) lead. The positive leads are: blue, **C10** (2μF); red, **C14** (8μF) and yellow, **C15** (24 μF).

Components R5, C6.—These are inside the top cap connector of **V2.**

Components R11, C18.—The gain and reaction controls are ganged. During the first half of the travel of the knob, the gain is being increased, but **C18** does not mesh. During the second half, the gain remains at maximum (the thicker portion of the **R11** winding having

Inter-Connections.—All the interconnecting leads are colour-coded in the chassis pictures and, except for the three frame leads, are also numbered to agree with the dismantling instructions.

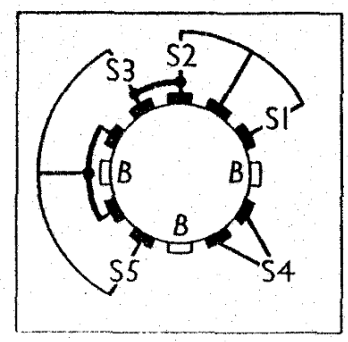
Condensers C10, C14, C15.—These are three dry electrolytics in a single carton on the power pack, having a common negative (black) lead. The positive leads are: blue, **C10** (2μF); red, **C14** (8μF) and yellow, **C15** (24 μF).

Components R5, C6.—These are inside the top cap connector of **V2.**

Components R11, C18.—The gain and reaction controls are ganged. During the first half of the travel of the knob, the gain is being increased, but **C18** does not mesh. During the second half, the gain remains at maximum (the thicker portion of the **R11** winding having

SWITCH TABLE AND DIAGRAM

Switch	MW	LW
S1	C	—
S2	—	C
S3	C	—
S4	C	—
S5	C	—



Switch diagram, looking from the rear of the chassis deck.

a negligible resistance) and **C18** introduces reaction.

Condenser C3.—This fixed trimmer consists of a special wire winding on an insulated straight wire core, the whole being covered by large bore insulating sleeving. It is shown in our plan view.

Chassis Divergency.—The makers show a 0·02μF tubular paper RF by-pass condenser in parallel with **C14,** but it was not included in our chassis.