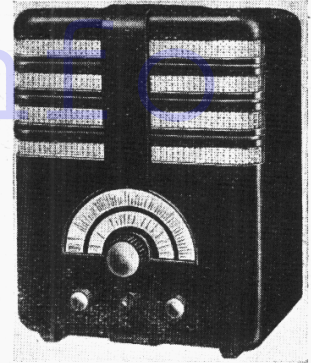


"TRADER" SERVICE SHEET

653

# EKCO AD38

## AC/DC TRF RECEIVER



REVISED ISSUE OF  
SERVICE SHEET No. 237

**T**HREE pentodes (and a rectifier) comprise the valve complement in the Ekco AD38, a 2-band TRF receiver designed to operate from AC or DC mains of 200-250 V, 50-80 c/s in the case of AC.

Release date and original prices: February, 1937; walnut, £8 8s.; black and chromium, £8 13s.

### CIRCUIT DESCRIPTION

Aerial input is developed across coupling condensers C1, C2, and that across C2 is passed on via coupling coils L1, L2 to single-tuned circuit L3 (MW), plus L4 (LW), and C20, which precedes a variable-mu RF pentode valve (V1, Mullard metallised VP13C or Ekco VPU1) operating as signal frequency amplifier, with gain control by a variable resistance R4 and limiter R3; the two, with R2, forming a potential divider across the HT circuit. R1 shunts the A, E sockets to maintain DC continuity between them.

Tuned-secondary RF transformer coupling by L5, L7 (MW), plus L6, L8 (LW), and C24, between V1 and fixed-mu RF pentode valve (V2, Mullard metallised SP13C), which operates as grid leak detector with C6, R6. Reaction coupling is effected and controlled by compression-type condenser C23, between V1 and V2 anode circuits. RF filtering by C10, R10 and C9 in V1 anode circuit.

Resistance-capacity coupling by R9, C11 and R11 between V2 and pentode

output valve (V3, Mullard Pen36C). Tone correction by C12, R13, C13 in anode circuit. Provision for connection of low impedance external speaker across output transformer T1 secondary.

When the receiver is used on AC mains, HT current is supplied by a half-wave rectifying valve (V4, Mullard UR1C) which, with DC supplies, behaves as a low resistance. Smoothing is effected by iron-cored choke L10 and electrolytic condensers, C15 (wet tubular type) and C16. To prevent damage to V4 in the case of a short-circuit, a current-limiting resistor R14 is included in its anode circuit, together with the fuse F1, while F2, F3 protect the mains input circuit.

Valve heaters, together with scale lamp (and shunt R15) and ballast resistor R16, are connected in series across mains input circuit. As both HT and heater current pass through the scale lamp circuit, the lamp will dim somewhat after the initial surge, but will brighten up a little when HT current begins to flow. A filter circuit comprising air-cored chokes L11, L12 and condensers C3, C17 (connected to E socket) suppresses mains-borne interference.

### 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 230 V, using

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 VPU1	125	4.5	125	1.9
V2 SP13C	40	0.9	65	0.3
V3 Pen36C	165	42.0	190	6.7
V4 UR1C†	—	—	—	—

† Cathode to chassis, 215 V, DC.

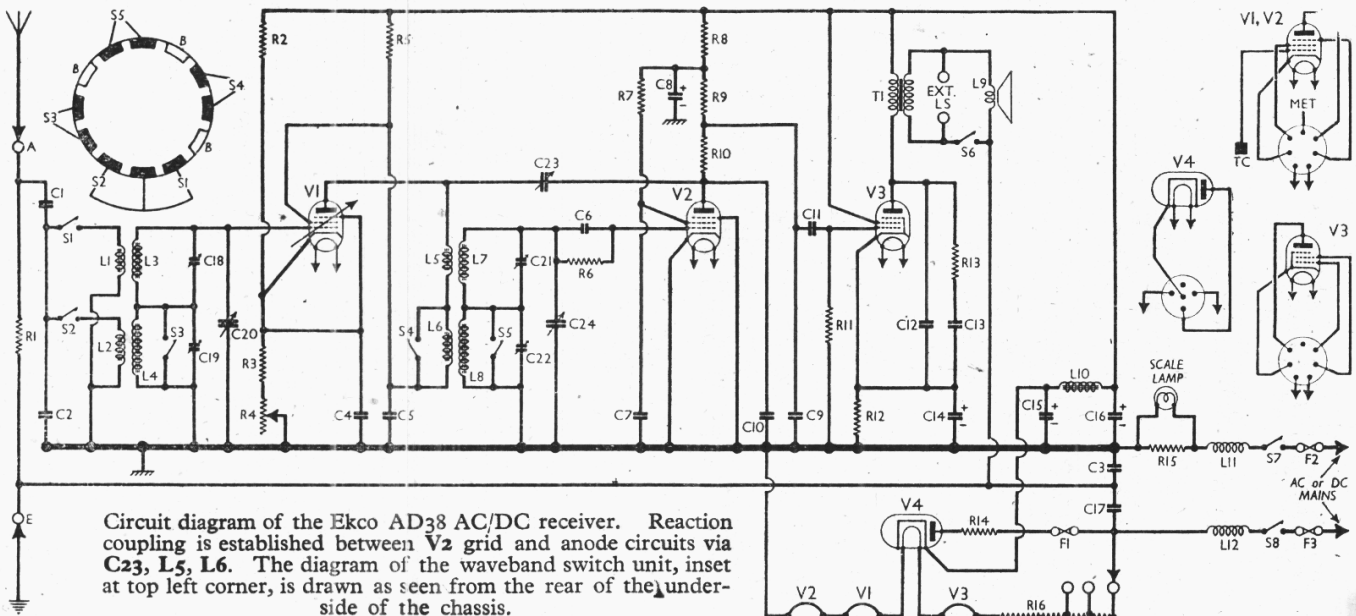
the 220-230 V tapping on the mains resistance. The receiver was tuned to the lowest wavelength on the medium band and the volume control was at maximum, but the reaction control was at minimum. There was no signal input.

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

### COMPONENTS AND VALUES

CONDENSERS	Values (μF)	
C1	Aerial input potential	0.0012
C2	divider	0.00015
C3	Earth isolating condenser	0.1
C4	V1 cathode by-pass	0.25
C5	V1 HT decoupling	0.15
C6	V2 CG condenser	0.000015
C7	V2 SG decoupling	0.1
C8*	V2 anode decoupling	2.0
C9	V2 anode RF by-pass cond.	0.0003
C10	densers	0.0002
C11	V2 to V3 AF coupling	0.1
C12	Parts of TC filter	0.01
C13		0.01
C14*	V3 cathode by-pass	50.0
C15*	HT smoothing condensers	8.0
C16*		24.0
C17	Mains RF by-pass	0.1
C18†	Aerial circuit MW trimmer	—
C19†	Aerial circuit LW trimmer	—
C20†	Aerial circuit tuning	—
C21†	RF trans. MW trimmer	—
C22†	RF trans. LW trimmer	—
C23†	Reaction control	—
C24†	RF trans. tuning	—

\* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Ekco AD38 AC/DC receiver. Reaction coupling is established between V2 grid and anode circuits via C23, L5, L6. The diagram of the waveband switch unit, inset at top left corner, is drawn as seen from the rear of the underside of the chassis.



RESISTORS		Values (ohms)
R1	Aerial-earth shunt	50,000
R2	Parts V1 variable gain control potentiometer	30,000
R3	V1 variable gain control	140
R4	V1 anode and SG HT feed	10,000
R5	V2 grid leak	10,000
R6	V2 SG HT feed	2,000,000
R7	V2 anode decoupling	250,000
R8	V2 anode load	25,000
R9	RF stopper	100,000
R10	V3 CG resistor	10,000
R11	V3 GB resistor	500,000
R12	Part of TC filter	165
R13	V4 surge limiter	10,000
R14	Scale lamp by-pass	100
R15	Heater circuit ballast	50
R16		775*

\*Tapped at 575Ω + 100Ω + 100Ω from V3 heater end.

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial circuit MW coupling coil	16-0
L2	Aerial circuit LW coupling coil	74-0
L3	Aerial MW tuning coil	2-0
L4	Aerial LW tuning coil	13-0
L5	RF transformer primary coils	2-0
L6	RF transformer secondary coils	9-5
L7	Speaker speech coil	2-4
L8	HT smoothing choke	12-5
L9	Mains circuit filter chokes	2-8
L10		375-0
L11		2-5
L12		2-5
T1	Output trans. { Pri. ...	650-0
	{ Sec. ...	0-3
S1-S5	Waveband-switches	—
S6	Internal speaker switch	—
S7, S8	Mains switches, ganged	R4
F1	HT circuit fuse, 0.5A	—
F2	Mains input fuses, 1.0A	—
F3		—

### DISMANTLING THE SET

**Removing Chassis.**—Remove the four control knobs (recessed grub screws) from the front of the cabinet;

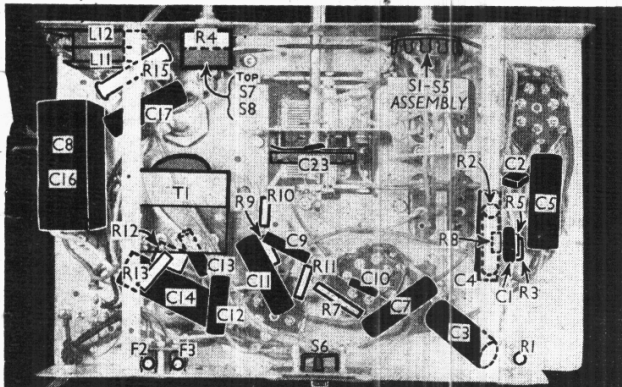
remove the four cheese-head screws (with washers) holding chassis to base of cabinet. The chassis may now be withdrawn to the extent of the speaker leads; or, if these are unsoldered from the speaker, it can be removed entirely.

**When replacing,** note that the speaker earthing lead goes directly to the earth socket.

Do not omit to replace the two washers, on the rear chassis fixing screws, between chassis and base of cabinet.

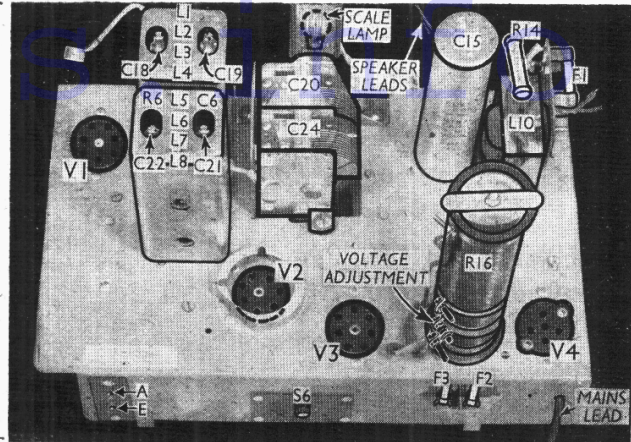
Finally, rewire the heads of the chassis fixing screws and those in the three small control knobs.

**Removing Speaker.**—First remove sub-baffle (four cheese-head bolts with washers), then remove the four cheese-head bolts (with washers) holding speaker to sub-baffle.



Under-chassis view. The waveband switch unit is indicated. The unit is shown in detail in the diagram inset in the circuit diagram overleaf.

Plan view of the chassis. The positions of the three fuses are clearly indicated. S6 is the screw knob of the speaker muting switch.



When replacing, the terminal panel should be on the right. Do not omit to replace the washers between sub-baffle and front of cabinet.

### GENERAL NOTES

**Switches.**—S1-S5 are the waveband switches, in a single rotary unit beneath the chassis. The unit is indicated in our under-chassis view, and shown in detail in the diagram inset in the top left-hand corner of the circuit diagram, where it is drawn as seen when viewed from the rear of the underside of the chassis.

The table below gives the switch positions for the two control settings, starting from fully anti-clockwise. A dash indicates open, and C, closed.

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

S6 is the internal speaker muting switch, operated by the small knob at the rear of the chassis. It opens when the knob is unscrewed, breaking the internal speaker speech coil circuit.

S7 and S8 are the QMB mains switches, ganged with the gain control R4. Looking from beneath the chassis, the upper two tags (yellow wires) belong to S7, and the lower two (blue wires) to S8.

**Coils.**—L1-L4 and L5-L8 are in two screened units on the chassis deck, and each unit contains its two associated trimmers at the tops of the cans. In addition, the second unit also contains R6 and C6. The smoothing choke L10 is on the chassis deck, while the RF filter chokes L11, L12 are beneath the chassis.

**Scale Lamp.**—This is a Mazda MES type, rated at 6.2 V, 0.3 A. It can be reached by sliding off the box-like indicator mask.

**Fuses.**—F1 is the HT circuit fuse, mounted in clips on the paxolin panel on L10. It is a "Truwind," rated at 500 mA, and is 1 3/8 in. long and 1/4 in. in diameter.

F2 and F3 are the mains circuit fuses, in clips at the back of the chassis. They are Ekco types, each rated at 1 A, and are 1 in. long and 1/4 in. in diameter.

**External Speaker.**—Two sockets are provided at the rear of the chassis for a low impedance (3-4 Ω) external speaker. The internal speaker may be muted by unscrewing S6.

**Condensers C8, C16.**—These are two dry electrolytics in a single carton beneath the chassis, with a common negative (black) lead. The yellow lead is the positive of C8 (2 μF) and the blue the positive of C16 (24 μF).

**Condenser C23.**—This is the reaction control, of the flat plate compression type, with mica insulation.

**Chassis Divergencies.**—In the makers' diagram, C12 and C13 are shown returned to chassis, but in our set they were returned to cathode of V3.

### CIRCUIT ALIGNMENT

With the gang at maximum, pointer should cover the 500 m. mark on the scale. If it does not, loosen the two small screws in the front of the pointer mounting plate, and turn the pointer through the desired angle, subsequently tightening up the screws again. Connect a signal generator to A and E sockets via a 0.0002 μF condenser.

**MW.**—Switch set to MW, and tune to 250 m on scale. Set volume (gain) control to maximum, and sensitivity (reaction) control to a point at which receiver is just short of oscillation. Feed in a 250 m (1,200 kc/s) signal, adjusting C21 and C18 for maximum output.

**LW.**—Switch to LW, tune to 1,090 m on scale, and readjust C23 (reaction) until receiver is just short of oscillation. Feed in a 1,090 m (275 kc/s) signal, and adjust C22 and C19 for maximum output.

If during these operations receiver breaks into oscillation, reduce the reaction setting slightly to avoid this.