"TRADER" SERVICE SHEET

735

EKCO RS3

AC RECEIVER

AN ingenious device which permits combined tuning and switching in a single control is a feature of the Ekco RS3, a 4-valve, 2-band TRF receiver designed for AC mains of 200-250 V. The chassis is divided into six screened compartments, three above the deck and three below.

Release date and original price: 1931; £25 4s.

CIRCUIT DESCRIPTION

Aerial input from socket **A1** or **A2** is via coupling coils **L1, L2** to single-tuned circuit **L3** (MW), plus **L4** (LW) and **C24** which precedes tetrode RF amplifying valve **(V1, Mullard S4VA).**

Second valve **(V2, Mullard S4VB)** is a second tetrode RF amplifier with tuned-secondary RF transformer couplings **L5, L6, L7, L8, C27** and **L9, L10, L11, L12, C30.**

Gain is controlled by potentiometer **R1,** whose slider is connected to chassis. The cathodes of **V1** and **V2** are connected to one end of **R1,** and the **A1** aerial socket is connected to the other end. As the bias potential to **V1** and **V2** is increased, the aerial circuit is thus increasingly heavily damped.

Third valve **(V3, Mullard 354V)** is a triode operating on the grid leak system with **C9** and **R7.** Provision is made for the connection of a gramophone pick-up in the control grid circuit, and a second potentiometer **R6,** ganged with **R1,** forms the input volume control. GB on gram is automatically applied from **R8** by returning, **R6** slider to chassis, **R7** being returned to cathode. RF filtering in anode circuit by **C10, L13** and **C11.**

Reaction coupling is provided on MW by **C31, C4** between **V1** and **V3** anodes, **C31** being pre-set. On LW, **S5** closes and connects **C5** to the earthy end of the circuit, shunting **C4, C5** across **L5, L6** and reducing the effect of reaction.

Transformer AF coupling by **T1** between **V3** and pentode output valve **(V4, Mullard PM24B).** Fixed tone correction by **C16** in anode circuit, and two-position tone control by **C15, S9. V4** screen derives its current from a tapping on the speaker input transformer **T2** primary. Provision is made for connecting a high impedance speaker across **T2** primary.

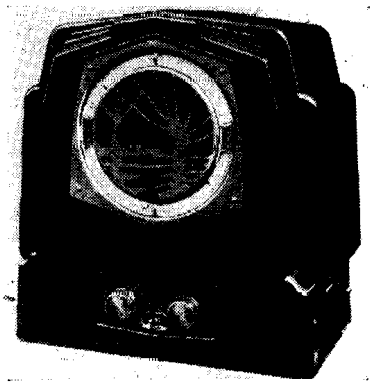
HT current is supplied by full-wave rectifying valve **(V5, Mullard DW3).** Smoothing by iron-cored choke **L16** (in positive lead), speaker field **L15** (in negative lead), and capacitors **C17, C18, C19,** the first being electrolytic. Power circuit RF filtering by **C20, C21** and **C22,** each consisting of two capacitors in series to secure safe high-voltage operation. GB for **V4** is obtained from the junction of **R14 R15** which form a potential divider across **L15.**

VALVE ANALYSIS

Valve voltages and currents given in the table below are approximate values only for an average chassis, but they serve as a reliable guide to the readings to be expected in an average chassis.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 S4VA	175	4·0	85	Very low
V2 S4VB	175	4·0	85	
V3 354V	90	2·0	—	—
V4 PM24B	240	38·0	245	7·0
V5 DW3	270†	—	—	—

† Each anode, A.C.

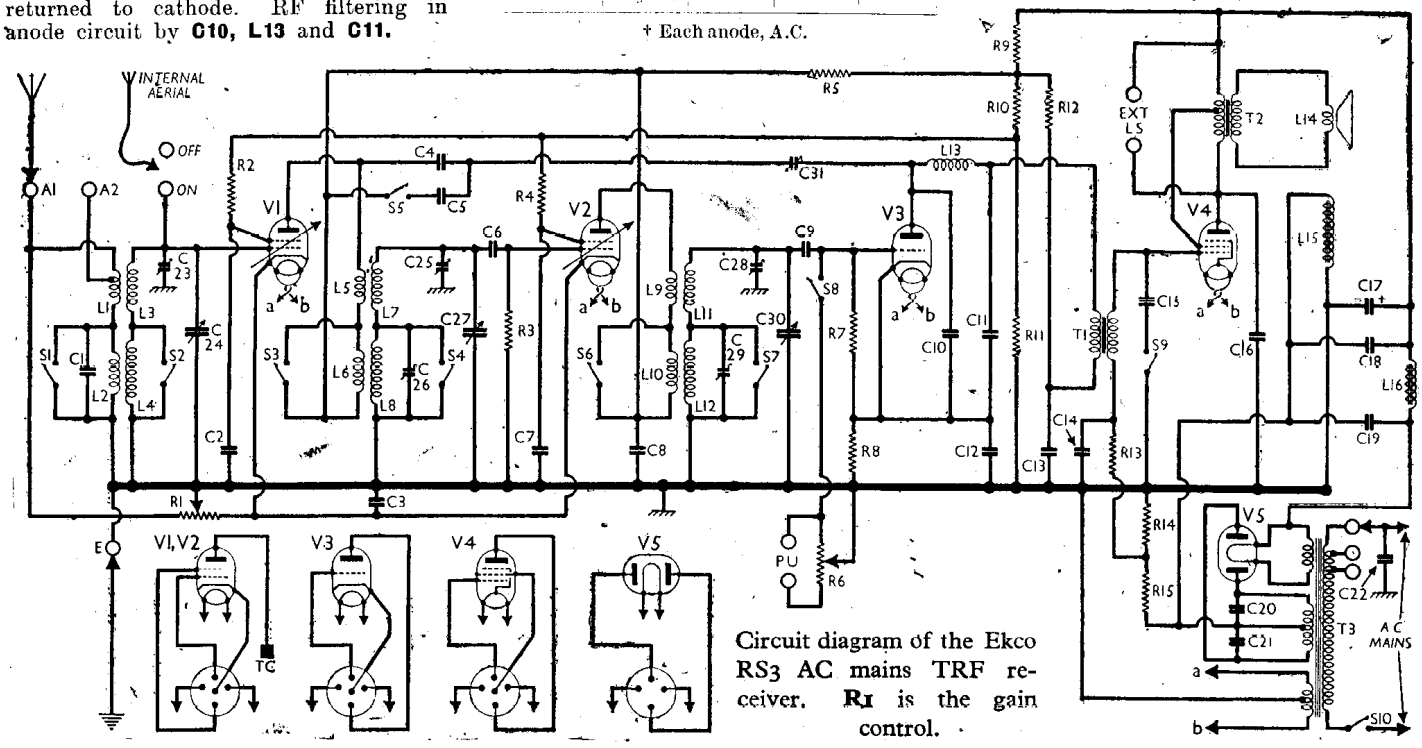


Voltages should be measured with a high-resistance meter whose negative lead is connected to chassis.

COMPONENTS AND VALUES

	RESISTORS	Values (ohms)
R1	Gain control	5,000
R2	V1 SG HT feed	2,800
R3	V2 CG resistor	2,000,000
R4	V2 SG HT feed	2,800
R5	V1, V2 anodes HT feed ...	1,000
R6	PU input control ...	10,000
R7	V3 CG resistor	1,000,000
R8	V3 gram GB resistor ...	250
R9	HT circuit potential divider	2,000
R10		5,000
R11		5,000
R12	V3 anode HT feed ...	9,000
R13	V4 CG decoupling ...	100,000
R14	V4 GB potential divider	40,000*
R15		60,000*

* Parts of a single 100,000 Ω tapped resistor.



Circuit diagram of the Ekco RS3 AC mains TRF receiver. **R1** is the gain control.

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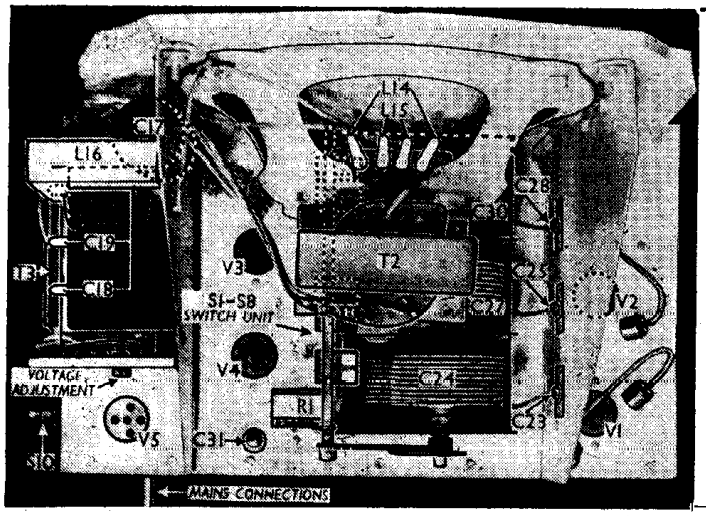


Plan view of the chassis. The switch spindle and contact plates are indicated in the centre compartment. On the left is the power compartment, and on the right is a compartment for V1 and V2.

	CAPACITORS	Values (μF)
C1	Aerial LW shunt ...	0·001
C2	V1 SG decoupling ...	0·1
C3	V1, V2 cathodes decoupling	0·1
C4	Reaction coupling ...	0·0001
C5	Reaction LW muter ...	0·0001
C6	V2 CG capacitor ...	0·0001
C7	V2 SG decoupling ...	0·1
C8	V1, V2 anodes decoupling	0·1
C9	V3 CG capacitor ...	0·0003
C10, C11	RF by-pass capacitors ...	0·0005
C12	V3 cathode by-pass ...	0·1
C13	V3 anode decoupling ...	1·0
C14	V4 CG decoupling ...	1·0
C15	Tone control capacitor	0·0003
C16	Fixed tone corrector ...	0·004
C17*	HT smoothing capacitors	8·0
C18		1·0
C19		3·0
C20	RF by-pass capacitors	0·05§
C21		0·05§
C22		0·001§
C23‡	Aerial MW trimmer ...	—
C24†	Aerial circuit tuning ...	—
C25‡	1st RF trans. MW trimmer	—
C26‡	1st RF trans. LW trimmer	—
C27†	1st RF trans. tuning ...	—
C28‡	2nd RF trans. MW trimmer	—
C29‡	2nd RF trans. LW trimmer	—
C30†	2nd RF trans. tuning ...	—
C31‡	Reaction control ...	—

* Electrolytic. † Variable. ‡ Pre-set.
§ Two in series: see "General Notes."

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Aerial coupling coils ...	3·0
L2		5·0
L3	Aerial tuning coils ...	4·5
L4		16·0
L5	1st RF trans. pri. coils	5·5
L6		8·5
L7	1st RF trans. sec. tuning coils ...	4·5
L8		16·0
L9	2nd RF trans. pri. coils	5·5
L10		8·5
L11	2nd RF trans. sec. tuning coils ...	4·5
L12		16·0
L13	RF filter choke	100·0
L14	Speaker speech coil ...	0·5
L15	Speaker field coil ...	2,000·0
L16	HT smoothing choke ...	500·0
T1	Intervalve trans. Pri....	650·0
	Sec....	10,000·0
T2	Speaker input trans. Pri., total	800·0
	Sec.	0·1
T3	Mains trans. Pri., total	40·0
	Heater sec.	0·1
	Rect. heat sec.	0·1
	HT sec., total	1,000·0
S1—S7	Waveband switches ...	—
S8	Pick-up switch	—
S9	Tone control switch ...	—
S10	Mains switch	—

DISMANTLING THE SET

Removing Chassis.—Remove the detachable fibre bottom cover (four 2BA screws through rubber feet with metal cups), when access can be gained to all compartments beneath the chassis;
remove the two control knobs (recessed grub screws);
remove fixing ring from mains switch on side of cabinet, and push in the switch;
lay the set face-down on bench and remove the four 4 BA screws (with washers), round the speaker, holding sub-baffle to the front of the cabinet;
remove the six 4 BA screws holding the chassis to the bottom flanges of the cabinet, when the chassis, complete with speaker, may be lifted out.

GENERAL NOTES

Switches.—S1-S7 are the waveband switches, and **S8** the pick-up switch, all ganged in a spring-leaf assembly mounted on the tuning gang on the chassis deck. The springy blades are fixed to the gang frame, their tops being wiped by the contact plates on the control spindle.

Connections to the switches are made to the blades beneath the chassis, and directly to metal tips on the plates above it.

The control spindle is operated by a cam disc on the gang spindle, a spring-loaded lever lying on the cam operating the control spindle as the gang is rotated. The gang can be rotated continuously, and as it passes through maximum and minimum capacitance positions, the switches change over from one band to the other. In doing this, they pass through the gram position, so that the entire waveband and gram switching operation is carried out by turning the tuning control knob, which operates normally at positions other than minimum or maximum on the gang.

The switch assembly is indicated in our plan view of the chassis, but the switch numbers are shown only against the connecting tags of the spring blades beneath the chassis. **S1-S4** and **S6, S7** close on MW and open on LW; **S5** closes on LW and opens on MW; **S8** closes only in the gram position, midway between LW and MW or vice versa.

S9 is the QMB tone control switch, fitted to the front member of the chassis, and **S10** is the QMB mains switch, fitted to the side of the cabinet.

Coils.—All the tuning coils are enclosed in three screening cans beneath the chassis. **L13** is an RF choke fitted beneath the chassis between **V3** and **V4** holders. **L16** is mounted in the power supply compartment on the chassis deck.

External Speaker.—Two sockets are provided at the rear of the chassis for a high impedance (about 8,000Ω) external speaker. A low impedance type (about 1Ω) could be connected to the speech coil tags, which are easily accessible.

Capacitors C17, C18, C19.—C18, C19 are two paper insulated types in a single container mounted on the mains transformer. Both are isolated from the container. **C17** is a tubular wet electrolytic mounted in a clip in the front corner of the power compartment. It is rated at 460 V DC working max.

Capacitors C20, C21, C22.—These are all tubular types beneath the chassis near the mains switch, and each consists of two capacitors in series. **C20, C21** consist of two 0.1 μF each, and **C22** consists of two 0.002 μF capacitors.

Replacement Valves.—The original valves are now mostly out of date, and the following modern types are suitable for replacements: **V1, V2,** SP4 (5-pin); **V4,** PM24M; **V5,** DW4/350.

When changing over to PM24M, **R14** and **R15** should be changed to 18,000Ω and 82,000Ω respectively, using wartime standard values.

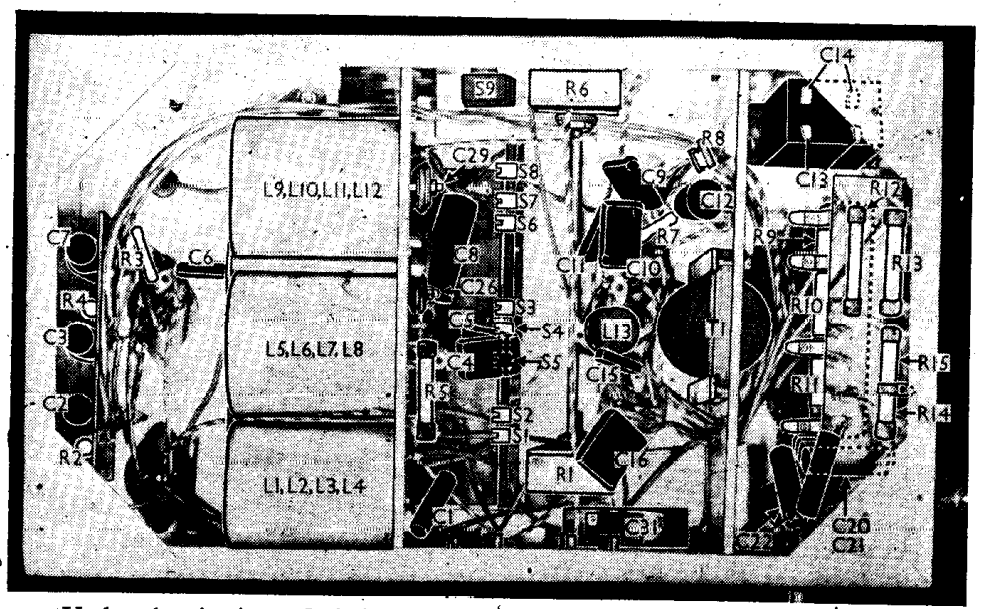
CIRCUIT ALIGNMENT

With the gang at maximum, the pointer should coincide with the division, at the LW ends, between the two scale plates. At this position, the receiver is switched to gram.

MW.—Connect signal generator leads to **A** and **E** sockets via a dummy aerial, tune to 200 m on scale, feed in a 200 m (1,500 kc/s) signal, and adjust **C25, C28** and **C23** for maximum output. Turn the volume control to maximum, reducing input as required, and adjust **C31** to a point short of oscillation. Check that oscillation occurs nowhere over the MW band, then return to 200 m and readjust **C25** and **C28**. Finally, check again for oscillation.

LW.—Tune to 1,000 m on scale, feed in a 1,000 m (300 kc/s) signal, and adjust **C26** and **C29** for maximum output; then check that oscillation does not occur anywhere in the band with the gang at maximum.

If modern valves are fitted it may be necessary to disconnect **C31** to secure stability with the volume control advanced.



Under-chassis view. Switch numbers are shown against the spring blade tags.

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