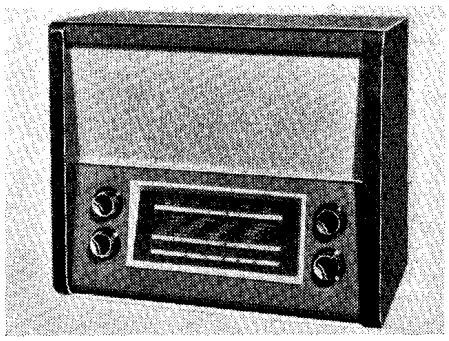
"TRADER" SERVICE SHEET

1137

EKCO A160

3-Band A.C. Superhet



CIRCUIT DESCRIPTION

AERIAL input via coupling coils **L2, L3** and **L4** to single-tuned circuits, which precede triode hexode valve **(V1, Mullard UCH42)** operating as frequency changer with internal coupling. I.F. rejection by **L1, C1.**

Second valve **(V2, Mullard UF41)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C8, L14, L15, C9** and **C18, L16, L17, C19.**

Intermediate Frequency 460 k/cs.

Diode signal detector is part of double diode triode valve **(V3, Mullard UBC41).** Audio frequency component in its rectified output is developed across diode load resistor **R11,** and is passed via volume control **R15** and **C25** to grid of triode section.

Resistance-capacitance coupling by **R17, C28** and **R20** between **V3** and pentode output valve **(V4, Mullard UL41).** Provision is made for the connection of a low impedance external speaker across **T1** secondary winding.

(*Continued col.* 1 *overleaf*)

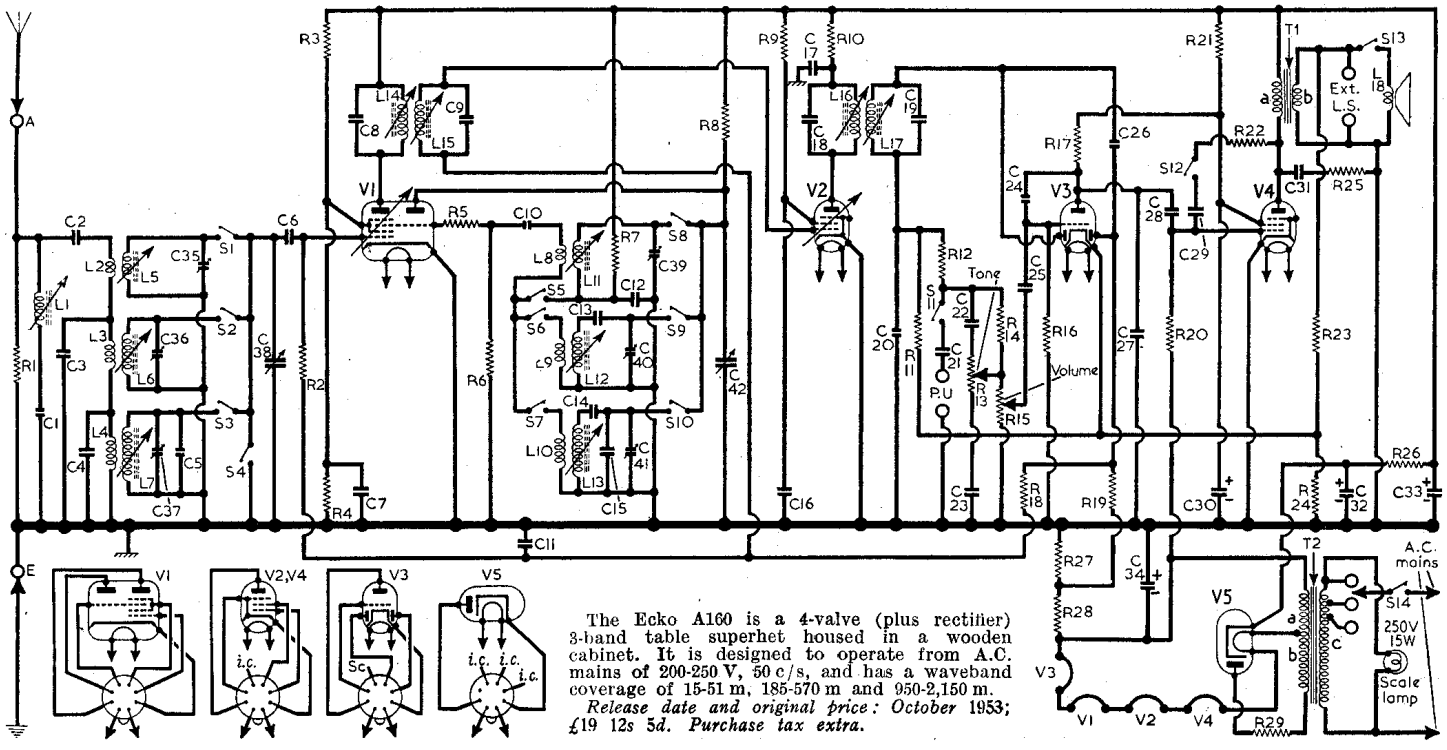
CAPACITORS		Values	Locations
C1	I.F. filter tuning ...	68pF	H4
C2	Aerial coupling ...	0·002μF	A2
C3	M.W. aerial shunt...	0·001μF	A1
C4	L.W. aerial shunt...	0·001μF	A2
C5	L.W. aerial trim. ...	56pF	A2
C6	V1 C.G.	100pF	H3
C7	V1 S.G. decoup. ...	0·1μF	H4
C8	1st I.F. trans.	100pF	B2
C9	tuning	100pF	B2
C10	V1 osc. C.G. ...	68pF	H3
C11	A.G.C. decoupling	0·1μF	G4
C12	S.W. osc. tracker...	0·0047μF	G3
C13	M.W. osc. tracker...	607pF	G3
C14	L.W. osc. tracker...	230pF	G3
C15	L.W. osc. trimmer	110pF	G3
C16	V2 S.G. decoup. ...	0·1μF	G4
C17	V2 anode decoup....	0·1μF	G4
C18	2nd I.F. trans.	100pF	C2
C19	tuning	100pF	C2
C20	I.F. by-pass ...	82pF	F4
C21	P.U. coupling ...	0·05μF	G4
C22	Parts tone control	470pF	D1
C23		0·002μF	D1
C24	Neg. feed-back ...	4·7pF	F4
C25	A.F. coupling ...	0·01μF	F4
C26	A.G.C. coupling ...	15pF	F4
C27	I.F. by-pass ...	0·001μF	F4
C28	A.F. coupling ...	0·002μF	F4
C29	Gram tone corrector	0·003μF	F4
C30*	H.T. smoothing ...	8μF	E4
C31	Part tone corrector	0·02μF	F3
C32*	H.T. smoothing ...	50μF	C1
C33*		50μF	C1
C34*	G.B. by-pass ...	50μF	E4
C35‡	S.W. aerial trim. ...	—	A2
C36‡	M.W. aerial trim....	—	A1
C37‡	L.W. aerial trim....	—	A2
C38†	Aerial tuning ...	—	B1
C39‡	S.W. osc. trim. ...	—	H4
C40‡	M.W. osc. trim. ...	—	G4
C41‡	L.W. osc. trim. ...	—	G4
C42†	Oscillator tuning ...	—	B1

* Electrolytic. † Variable. ‡ Pre-set.

RESISTORS		Values	Locations
R1	Aerial shunt ...	1MΩ	H4
R2	V1 C.G.	680kΩ	H4
R3	V1 screen grid	18kΩ	H4
R4	potential divider	27kΩ	H4
R5	Osc. C.G. stopper...	220Ω	H4
R6	V1 osc. C.G. ...	47kΩ	H4
R7	Osc. anode feeds ...	22kΩ	H4
R8		68kΩ	H4
R9	V2 S.G. feed ...	47kΩ	F4
R10	V2 anode decoup....	2·2kΩ	F4
R11	Signal diode load...	680kΩ	F4
R12	I.F. stopper ...	47kΩ	F4
R13	Tone control ...	1MΩ	D1
R14	Part tone control...	220kΩ	D1
R15	Volume control ...	1MΩ	E3
R16	V3 C.G.	10MΩ	F4
R17	V3 anode load ...	220kΩ	F4
R18	A.G.C. decoupling	1MΩ	F4
R19	A.G.C. diode load...	1MΩ	F4
R20	V4 C.G.	680kΩ	F3
R21	H.T. smoothing ...	10kΩ	F4
R22	Part tone corrector	4·7MΩ	F3
R23	Neg. feed-back ...	220Ω	F4
R24		10Ω	E4
R25	Part tone corrector	3·3kΩ	E3
R26	H.T. smoothing ...	680Ω	F3
R27	G.B. potential	33Ω	E3
R28*	divider	84Ω	E3
R29	V5 surge limiter ...	100Ω	E4

* Two resistors, 190Ω and 150Ω, in parallel.

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	I.F. filter coil ...	15	H4
L2	Aerial coupling coils	—	A2
L3		6.5	A1
L4		15.0	A2
L5	Aerial tuning coils	—	A2
L6		3·0	A1
L7		23·0	A2
L8	Oscillator reaction coils	—	H3
L9		0·8	G3
L10		3·0	G3
L11	Oscillator tuning coils	—	H3
L12		2·3	G3
L13		7·5	G3
L14	1st I.F. trans. Pri.	12·0	B2
L15	1st I.F. trans. Sec.	12·0	B2
L16	2nd I.F. trans. Pri.	12·0	C2
L17	2nd I.F. trans. Sec.	12·0	C2
L18	Speech coil ...	2·5	—
T1	O.P. trans. a ...	400·0	F2
	O.P. trans. b ...	—	
T2	Mains trans. a ...	40·0	D2
	Mains trans. b ...	85·0	
	Mains trans. c, total	40·0	
S1-S12	Waveband switches	—	H3
S13	Speaker switch ...	—	G4
S14	Mains sw., g'd R15	—	E3



The Ecko A160 is a 4-valve (plus rectifier) 3-band table superhet housed in a wooden cabinet. It is designed to operate from A.C. mains of 200-250 V, 50 c/s, and has a waveband coverage of 15-51 m, 185-570 m and 950-2,150 m.

Release date and original price: October 1953; £19 12*s* 5*d. Purchase tax extra.*

1137 EKCO A160

Supplement to Wireless & Electrical Trader, 20 March 1954

Circuit Description—*continued.*

Variable tone control by **C22, R13, C23** and **R14** in **V3** grid circuit. Fixed tone correction by **C31, R25** in **V4** anode circuit and negative feed-back capacitor **C29** in **V3** anode circuit. A proportion of the speech coil voltage, that developed across **R24** in potential divider **R23, R24,** is fed to **V3** cathode circuit giving a further degree of negative feed-back.

GENERAL NOTES

Switches.—**S1-S12** are the waveband switches, ganged in two rotary units beneath the chassis. These units are indicated in our under chassis illustration and shown in detail below col. 3 where they are drawn as seen from the control knob end of an inverted chassis. In the associated switch table above, a dash indicates open and **C** closed.

Switch	S.W.	M.W.	L.W.	Gram
S1 ...	C	—	—	—
S2 ...	—	C	—	—
S3 ...	—	—	C	—
S4 ...	—	—	—	C
S5 ...	C	—	—	—
S6 ...	—	C	—	—
S7 ...	—	—	C	—
S8 ...	C	—	—	—
S9 ...	—	C	—	—
S10 ...	—	—	C	—
S11 ...	—	—	—	C
S12 ...	—	—	—	C

Modification.—In earlier receivers the valves were biased individually by means of cathode bias resistors as follows: **V1** cathode was returned to chassis via a 330Ω resistor shunted with an 0.1 μF capacitor; **V4** cathode was returned to chassis via a 150Ω resistor shunted with a 50 μF electrolytic capacitor; **R27, R28** and **C34** were not fitted, and the top end of winding **a** on **T2** was returned to chassis together with the low potential end of the heater chain.

Drive Cord Replacement.—About 24 inches of fine-gauge Bowden cable and 34 inches of high-grade flax fishing line, plaited and waxed, are required for a new drive cord. Soldered end loops should be made on the Bowden cable so that it measures 21¾ inches overall. One end of the length of drive cord should be tied to one of these soldered loops, and the complete drive then run as shown in the sketch beneath the plan view on this page.

VALVE ANALYSIS

Valve voltages and currents in the table (next col.) are those measured in our receiver when it was operating from A.C. mains of 235 V, the voltage adjustment being set to the 240-250 V tapping. The receiver was switched to M.W. and the gang turned to maximum capacitance, but there was no signal input.

Voltages were measured on an Avo Electronic TestMeter, and as this instrument has a high internal resistance, allowance should be made for the current drawn by other types of meter. Chassis was the negative connection in every case. The negative voltage measured across **R27** was 1.8 V, and across **C34**, 10 V.

Valve	Anode V	Anode mA	Screen V	Screen mA	Cath. V
V1UCH42	174	2·9	88	2·4	—
	Oscillator				
	62	1·7			
V2UF41	162	5·5	88	1·7	—
V3UBC41	62	0·23	—	—	—
V4UL41	160	34·0	110	6·0	—
V5UY41	200*	—	—	—	206†

* A.C. reading. † Cathode current, 55mA

CIRCUIT ALIGNMENT

I.F. Stages.—Switch receiver to M.W. and turn gang to maximum capacitance. Connect output of signal generator, via an 0.1 μF capacitor in each lead, to control grid (pin 6) of **V1** and chassis. Feed in a 460kc/s (652.1 m) signal and adjust the cores of **L17** (location reference C2), **L16** (F4), **L15** (B2) and **L14** (G4) for maximum output.

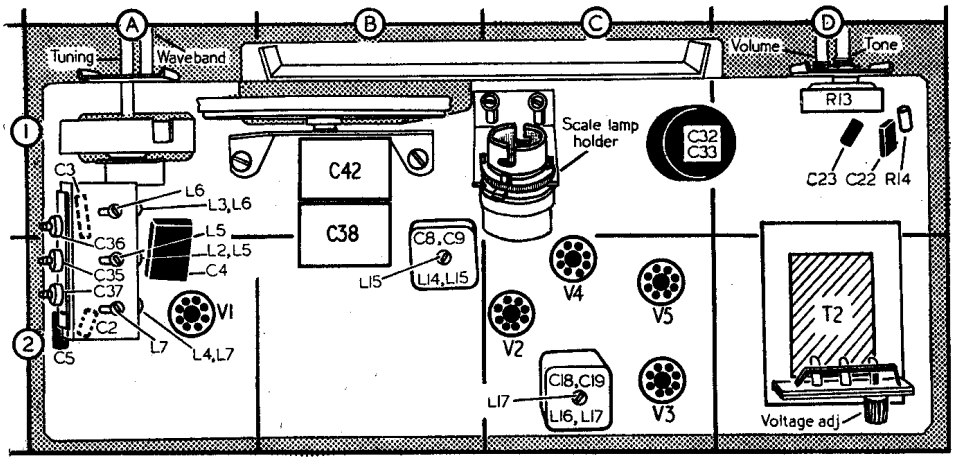
R.F. and Oscillator Stages.—Check that with the gang at maximum capacitance, the cursor coincides with the vertical lines at the high wavelength ends of the S.W. and L.W. tuning scales. Transfer signal generator to **A** and **E**.

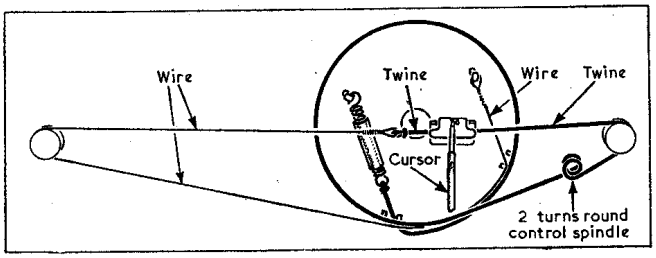
I.F. Filter.—Feed in a 460 kc/s signal and adjust the core of **L1** for minimum output.

S.W.—Switch receiver to S.W., tune to 16.67 m, feed in a 16.67 m (18 Mc/s) signal and adjust **C39** (H4) and **C35** (A2) for maximum output. Tune receiver to 33.34 m, feed in a 33.34 m (9 Mc/s) signal and adjust cores of **L11** (H3) and **L5** (A2) for maximum output.

M.W.—Switch receiver to M.W., tune to 214.3 m, feed in a 214.3 m (1,400 kc/s) signal and adjust **C40** (G4) and **C36** (A1) for maximum output. Tune receiver to 333.4 m, feed in a 333.4 m (800 kc/s) signal and adjust the cores of **L12** (G3) and **L6** (A1) for maximum output.

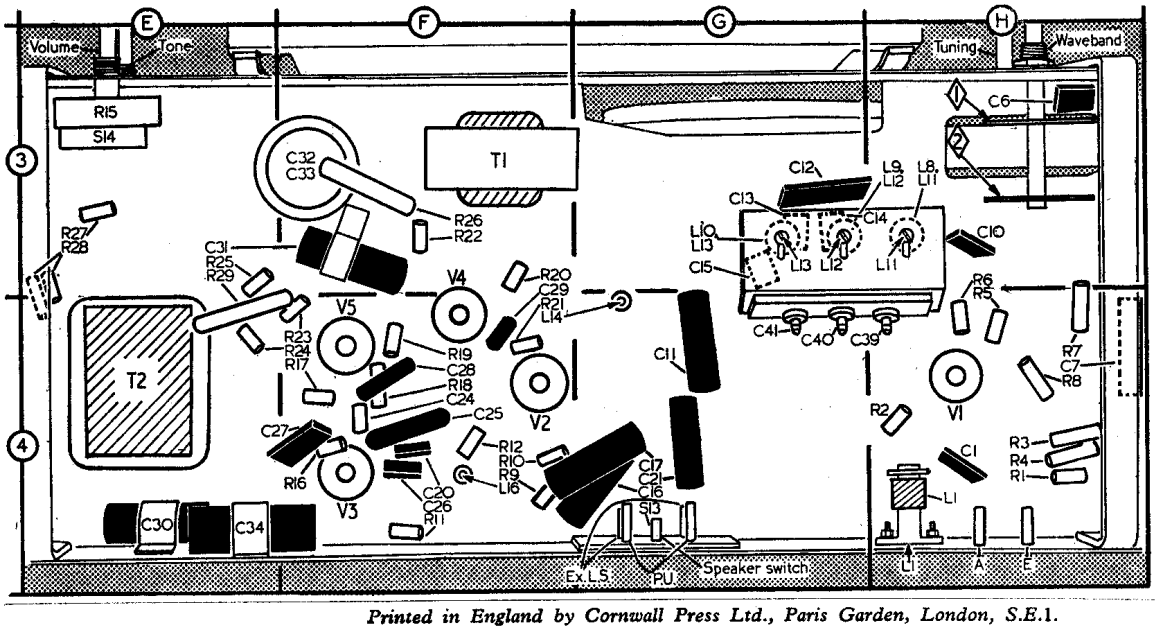
L.W.—Switch receiver to L.W., tune to 1,000 m, feed in a 1,000 m (300 kc/s) signal and adjust **C41** (G4) and **C37** (A2) for maximum output. Tune receiver to 1,429 m, feed in a 1,429 m (210 kc/s) signal and adjust the cores of **L13** (G3) and **L7** (A2) for maximum output.

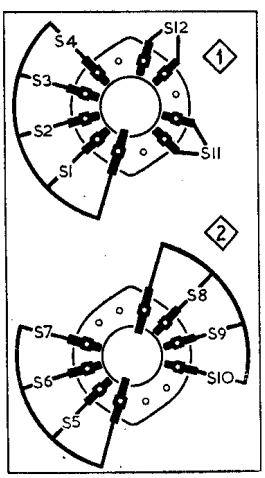




Above: Plan view of chassis. The tuning scale must be detached and placed over the scale backing plate for alignment.

Left: Sketch of the drive cord system with gang at maximum.





Above: Waveband switches.

Left: Underside view of chassis.

Printed in England by Cornwall Press Ltd., Paris Garden, London, S.E.1.