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"TRADER" SERVICE SHEET
1269

EKCO C273,

F.M. Table and Console Receivers

EMPLYING dual speakers and a tuning indicator, the Ekco A274 is a single-band table receiver for F.M. reception. It is designed to operate from A.C. mains of 200-250 V, 50 c/s. The frequency range is 87.5-100 Mc/s.

Model C273 is a console receiver and model A277 is a table receiver housed in a more expensive cabinet than the A274. Both the C273 and the A277 employ a basic A274 chassis.

Release dates and original prices: C273, July 1956, £31 14s 6d; A274, June 1956, £20 7s 10d; A277, July 1956, £23 8s 4d. Purchase tax extra.

CIRCUIT DESCRIPTION

Co-axial 75Ω aerial input is coupled via L1, L2 to cathode of earthed-grid R.F. amplifier V1a. R.F. tuning by C4, L3. Output of V1a is coupled via C5, C6 to V1b which operates as mixer/oscillator with tuned oscillator circuit L4, C5, C6, C7, C8.

Radiation of oscillator voltages from the R.F. and aerial circuits is kept to a minimum by means of C5, C6, C8 and C9, which together with the inter-electrode

capacitances of V1b form a bridge neutralizing circuit. The I.F. gain of V1b is increased by means of positive feed-back across the common impedance of C9. Tuning is by means of the ganged cores of L3 and L4.

V2 and V3 operate as the two-valve intermediate frequency amplifier with tuned transformers L6, L7; L8, L9; and L10, L11.

Intermediate frequency 10.7 Mc/s.

Diode sections a and b of triple diode triode valve V4 are connected in a ratio detector circuit whose A.F. output is developed across C24 and is passed via de-emphasis circuit R10, C25 and via C26, volume control R15 and C30 to triode section c which operates as A.F. amplifier.

D.C. potential developed across discriminator D.C. load R13 is fed back as bias to V3 suppressor grid giving automatic gain control. Tuning indicator T.I. is also fed from the D.C. load circuit via step-down potential divider R11, R12.

The A.F. output of the ratio detector is brought out to a pair of sockets that can be used to feed a tape recorder. Provision is also made for the connection of a gramophone pick-up across the volume control circuit via S3 which closes in the gram position of the radio/gram switch. S1

closes and S2 opens in this position to prevent radio break-through.

Resistance-capacitance coupling by R17, C31, R19, R20 between V4c and pentode output valve V5. Negative feed-back tone correction between T1 secondary winding and V5 cathode circuit, and between the anodes of V5 and V4c via C32, R18. Negative feed-back tone control by C33, R20. Provision is made for the connection of an external low-impedance speaker across T1 secondary winding. Speaker switch S4 mutes the internal speakers.

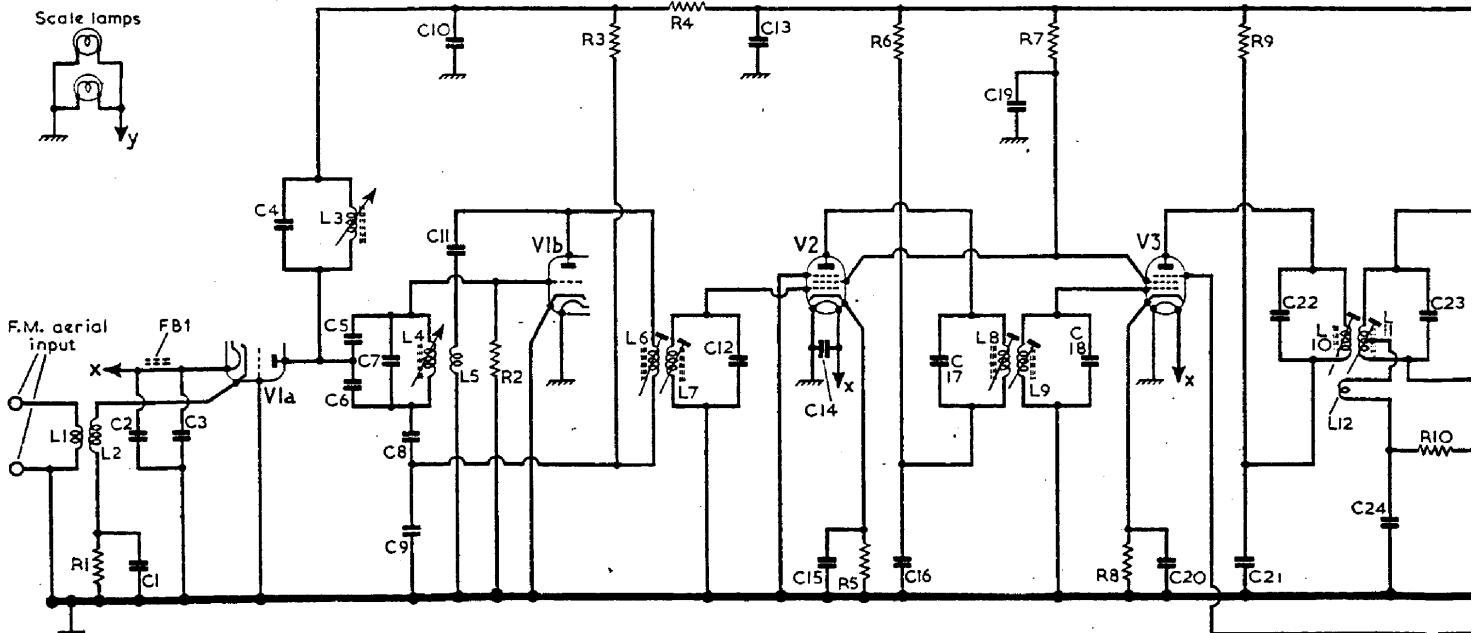
H.T. current is supplied by I.H.C. full-wave rectifying valve V6. H.T. smoothing by choke L15 and electrolytic capacitors C36, C37.

GENERAL NOTES

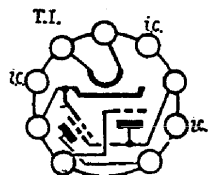
Switches.—S1-S3 are the radio/gram switches ganged in a single rotary unit at the rear of the chassis. This unit is indicated in the underside illustration of the chassis (location reference F4) where the switch contacts are identified.

S4 is the screw-type internal speaker switch and is mounted below the external L.S. sockets on the rear of the chassis.

Scale Lamps.—These are 6.5 V, 0.3 A
(Continued col. 1 overleaf)

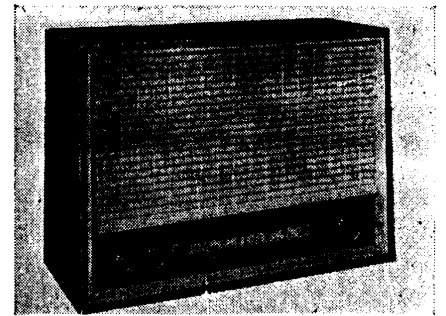


Circuit diagram of the Ekco A274. The same basic circuit is used in models C273 and A277. Small differences between these two models and the A274 are explained under "Associated Models" overleaf. The T.R. sockets in the volume control circuit provide a suitable output for connection to a tape recorder. Ferrite bead FB1 on V1 heater lead operates as an R.F. stopper in conjunction with C2, C3.



A274 & A277

for Operation from A.C. Mains



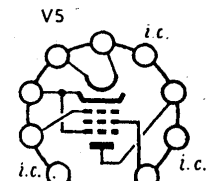
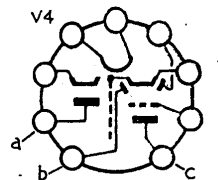
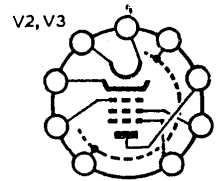
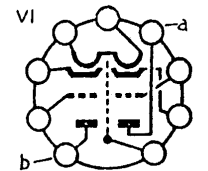
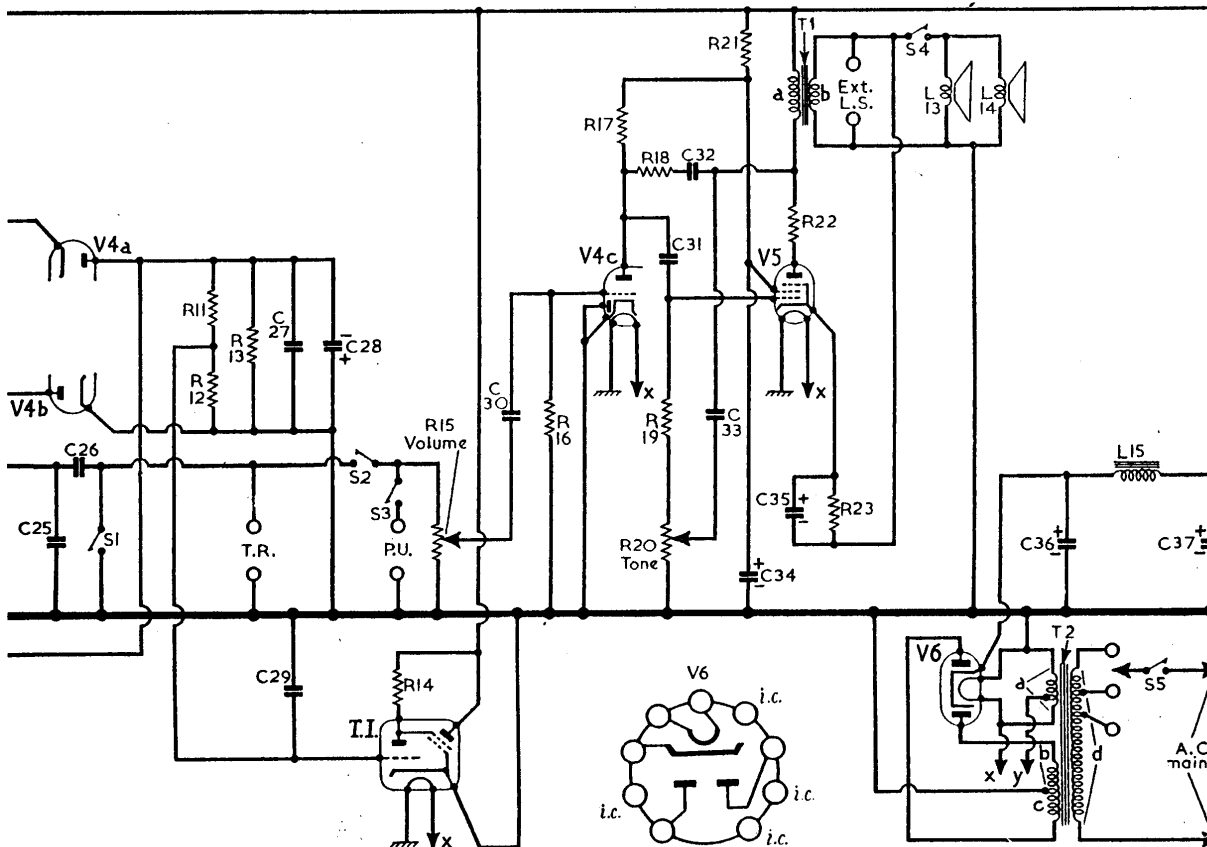
Appearance of the Ekco A274.

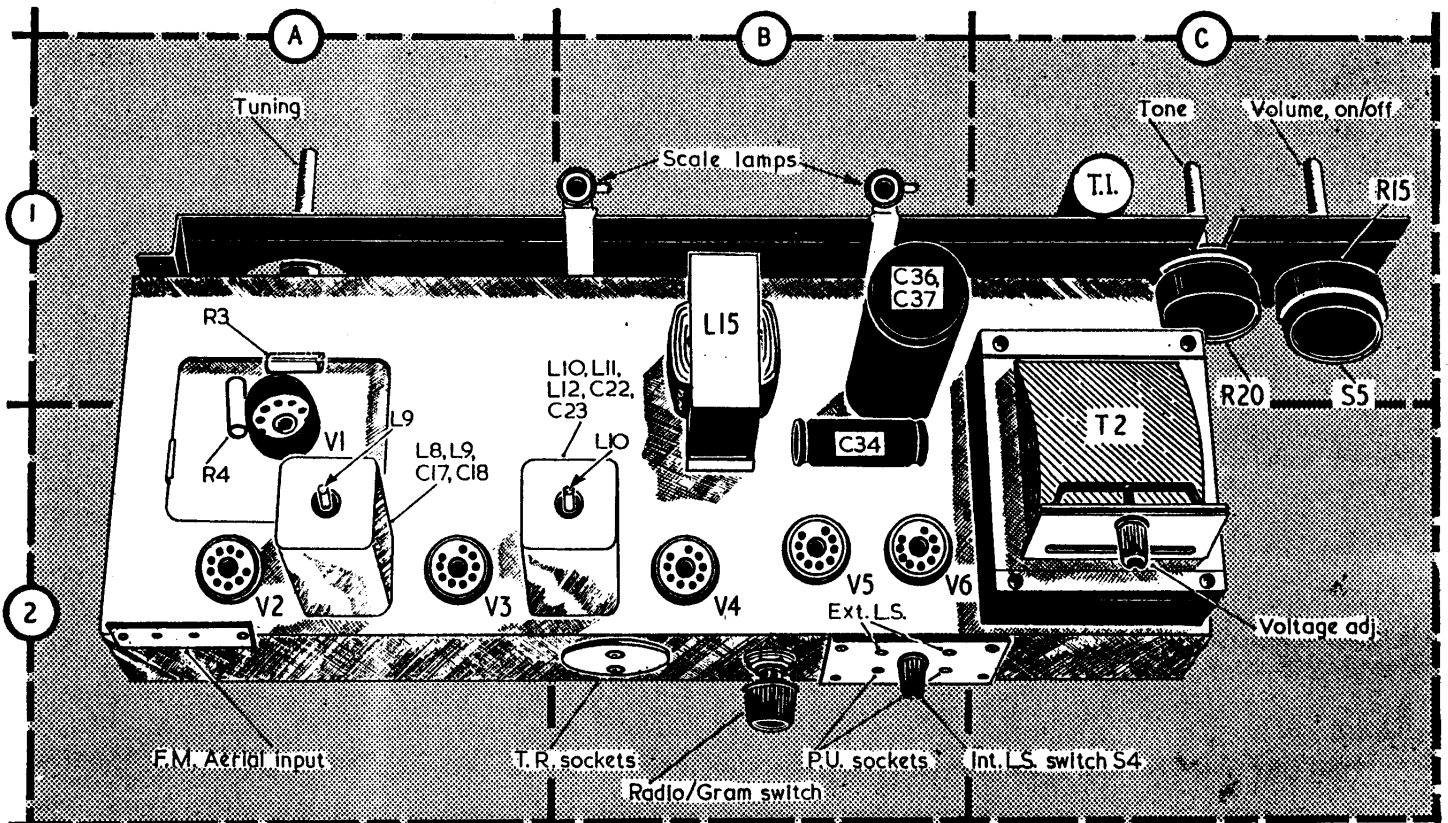
CAPACITORS		Values	Locations
C1	V1a cath. by pass	0.001 μ F	G4
C2	Heater by-passes	0.01 μ F	G3
C3		0.001 μ F	G3
C4	R.F. tuning	3pF	G3
C5		6pF	G3
C6	Oscillator tuning	6pF	G3
C7		20pF	G3
C8	H.T. decoupling	12pF	G3
C9		100pF	G4
C10	Reaction coupling	0.001 μ F	G3
C11		20pF	G3
C12	1st I.F.T. tuning	22pF	G4
C13		0.01 μ F	G4
C14	H.T. by-pass	0.01 μ F	G1
C15	V2 cath. by pass	0.01 μ F	G5
C16	V2 anode decoup.	0.01 μ F	G4
C17	2nd I.F.T. tuning	22pF	A2
C18		17pF	A2
C19	H.T. decoupling	0.01 μ F	G4
C20	V3 cath. by-pass	0.01 μ F	G4
C21	V3 anode decoup.	0.01 μ F	F4
C22	3rd I.F.T. tuning	22pF	B2
C23		22pF	B2
C24	A.F. load	100pF	F4
C25	De-emphasis	0.001 μ F	F4
C26	A.F. coupling	0.01 μ F	F4
C27	I.F. by-pass	0.01 μ F	F4
C28	D.C. reservoir	8 μ F	G3
C29	T.I. decoupling	0.01 μ F	F3
C30	A.F. couplings	0.01 μ F	F4
C31		0.01 μ F	F4
C32	Neg. feed-back	0.001 μ F	E4
C33	Part tone control	220pF	F4
C34	H.T. smoothing	8 μ F	B2
C35	V5 cath. by-pass	50 μ F	B4
C36	H.T. smoothing	50 μ F	E3
C37		50 μ F	E3

RESISTORS		Values	Locations
R1	V1a G.B.	220 Ω	G4
R2	V1b C.G.	1M Ω	G3
R3	V1b H.T. feed	4.7k Ω	A1
R4	H.T. feed	1.5k Ω	A2
R5	V2 G.B.	150 Ω	G4
R6	V2 H.T. feed	2.2k Ω	G4
R7	V2, V3 S.G. feed	27k Ω	F4
R8	V3 G.B.	150 Ω	G4
R9	V3 H.T. decoup.	2.2k Ω	F4
R10	De-emphasis	39k Ω	F4
R11	T.I. potential divider	2.2M Ω	F3
R12		1M Ω	F3
R13	D.C. load	33k Ω	F4
R14	T.I. load	470k Ω	E3
R15	Volume control	1M Ω	D3
R16	V4c C.G.	10M Ω	F4
R17	V4c anode load	220k Ω	F4
R18	Neg. feed-back	1.5M Ω	F4
R19	Part tone control	100k Ω	F4
R20	Tone control	1M Ω	D3
R21	H.T. feed	10k Ω	F4
R22	V5 anode stopper	27 Ω	E4
R23	V5 G.B.	150 Ω	E4

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	Aerial coup. coils	—	G4
L2		—	G4
L3		—	G3
L4		—	G3
L5		—	G3
L6	1st I.F.T.	Pri. ...	G4
L7		Sec. ...	G4
L8	2nd I.F.T.	Pri. ...	A2
L9		Sec. ...	A2
L10	3rd I.F.T.	Pri. ...	A2
L11		Sec. ...	A2
L12	Tert.	—	A2
L13	Elliptical L.S. speech coil	3.0	—
L14	Round L.S. speech coil	2.5	—
L15	H.T. smoothing choke	220.0	B1
T1	O.P. trans.	a ...	F3
		b ...	—
		c ...	—
		d ...	—
T2	Mains trans.	a ...	C2
		b ...	120.0
		c ...	130.0
		d ...	127.0
FB1	Ferrite bead stopper	R.F.	G3
S1-S3	Radio/Gram. sw.	—	F4
S4	Int. L.S. switch	—	E4
S5	Mains sw., g'd	R15	D3

(Continued in next column)





Plan illustration of chassis. The various controls and sockets are all identified in this view of the chassis.

General Notes—continued

lamps with small clear spherical bulbs and M.E.S. bases.

T.R. Sockets.—These are connected to the A.F. output of the ratio detector and are provided as a convenient output point to feed a tape recorder.

Drive Wire Replacement.—About 32in of 7-strand steel wire is required for a new drive, which should be run as shown in the sketch of the tuning drive system at the foot of columns 4 and 5.

ASSOCIATED MODELS

This *Service Sheet* was prepared from a sample A274 table receiver.

Model C273.—This is a console version of the A274. It employs the same basic chassis as the A274, but R18, C32 are omitted.

Model A277.—This is a table receiver employing the same chassis as the A274, but it is housed in a more expensive cabinet.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured on our receiver when it was operating from A.C. mains of 230 V. The receiver was tuned to the highest frequency end of the band, but there was no signal input.

Voltages were measured on the 10 V and 400 V ranges of a Model 7 Avometer, chassis being the negative connection in every case. Total mains consumption was 55 watts.

Valve	Anode		Screen		Cath
	V	mA	V	mA	
V1 ECC85 { a ...	227	9.6	—	—	2.1
{ b ...	195	11.5	—	—	—
V2 EFS9 ...	227	9.0	79	3.0	1.8
V3 EFS9 ...	227	9.0	79	3.0	1.8
V4 EABC80 { a, b	35	0.6	—	—	—
{ c	245	35.0	200	4.0	6.0
V5 EL84 ...	253 ¹	—	—	—	270.0 ¹
V6 EZ80 ...	253 ¹	—	—	—	—
T.I. EM80 ...	35 ²	—	—	—	—

¹ A.C. reading, each anode.

² Cathode current 82 mA.

³ Target 250 V.

CIRCUIT ALIGNMENT

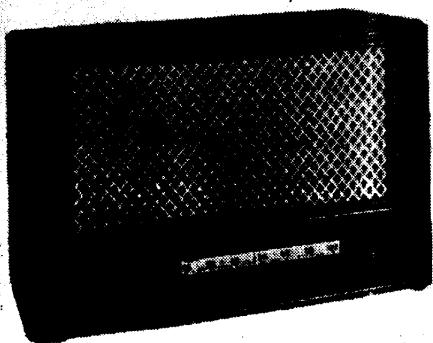
Apparatus Required.—An accurately calibrated signal generator covering 10.7 Mc/s and 78-100 Mc/s (unmodulated in both cases); an 0.50μA microammeter; two 220kΩ resistors.

I.F. Stages

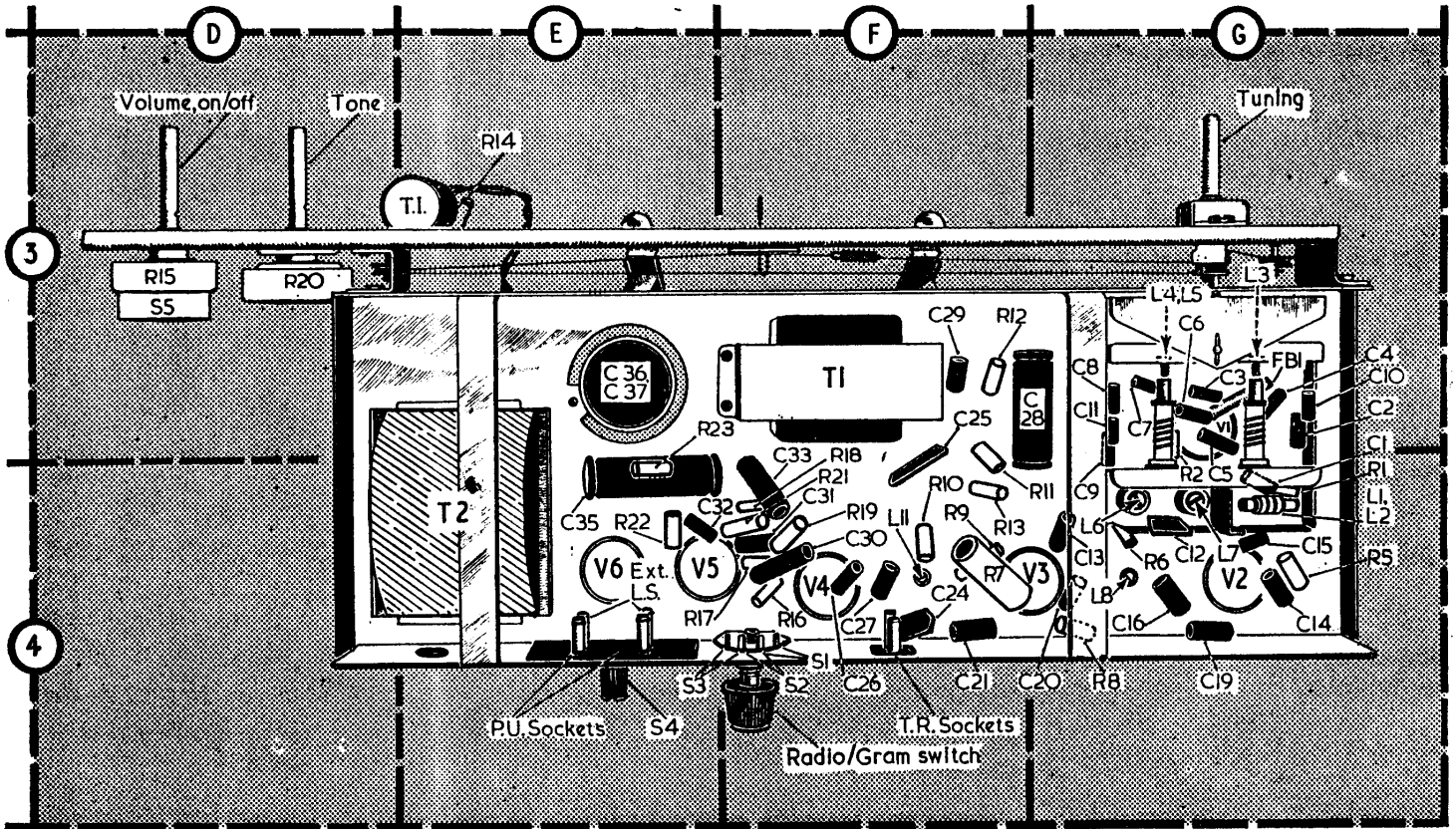
1.—Remove chassis from cabinet. Connect output meter to Ext. L.S. sockets (location reference B2). Connect the 220kΩ resistors in series across C28

(G3). Connect the meter between chassis and the junction of the two 220kΩ resistors. Connect signal generator between chassis and control grid (pin 2) of V3.

- 2.—Tune receiver to low frequency end of band and feed in a 10.7 Mc/s unmodulated signal.
- 3.—Adjust the core of L10 (B2) for maximum reading on microammeter.
- 4.—Transfer meter lead from chassis to the junction of C24, R10 (F4), so that the meter is connected between the junction of the 220kΩ resistors and the junction of R10, C24.
- 5.—Adjust the core of L11 (F4) for zero reading on meter. This will occur midway between a positive-going and a negative-going peak.
- 6.—Disconnect meter lead from junction of C24, R10 and connect it to chassis. Transfer live signal generator lead to control grid (pin 2) of V2. Feed in an unmodulated 10.7 Mc/s signal and adjust the cores of L8 (G4) and L9 (A2) for maximum output on meter. Re-adjust the core of L10 (B2) for maximum output.
- 7.—Note meter reading at 10.7 Mc/s, and without altering output of signal generator check that the meter reading at 10.54 Mc/s and 10.86 Mc/s are the same and are not less than half that at 10.7 Mc/s. The core of L10 may be adjusted, if necessary, to obtain a symmetrical bandwidth.
- 8.—Transfer signal generator leads to aerial socket. Feed in an unmodulated 10.7 Mc/s signal and adjust the core of L7 (G4) for maximum reading. Adjust



Appearance of the Ekco A277.



Underside illustration of the chassis. The radio/gram switch contacts are identified in location reference F4.

the core of L6 (G4) for minimum reading.

9.—Check that meter readings at 10.55 Mc/s and 10.85 Mc/s are not less than half that at 10.7 Mc/s.

R.F. and Oscillator Stages

10.—As the tuning scale remains fixed to the cabinet when the chassis is withdrawn for alignment, it should be removed (six wood screws and brackets) and placed over the receiver spindles.

11.—Check that with the receiver tuned to the lowest frequency end of the band, the cursor coincides with the 87 Mc/s calibration mark and the bar ganging the cores of L3, L4 is about 1/8 in from the

adjustment ends of their coil formers.

12.—Feed in an unmodulated 87 Mc/s signal and adjust the core of L4 (G3) for maximum reading on meter.

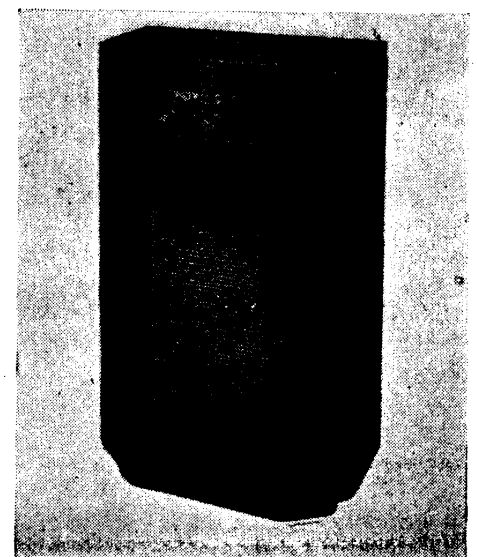
13.—Feed in a 94 Mc/s unmodulated signal and tune it in on receiver. Adjust the core of L3 (G3) for maximum meter reading.

14.—Check that the oscillator is operating on the low-frequency side of the signal by feeding in a 100 Mc/s signal and tuning the receiver to the image which should appear at 78.6 Mc/s.

I.F. Sensitivity Check

An F.M. signal generator and a sound output meter are required to check the

I.F. sensitivity. Connect the sound output meter across Ext. L.S. sockets and check that not more than 1 mV of 10.7 Mc/s signal, deviated by ±25 kc/s, is required at V2 control grid to produce an output of 500 mW. If the same signal is fed into the aerial sockets, not more than 3.2 mV should be required to produce the same output.



Appearance of the Ekco C273. Small differences between the C273 and A274 chassis are explained under "Associated Models" in column 1.

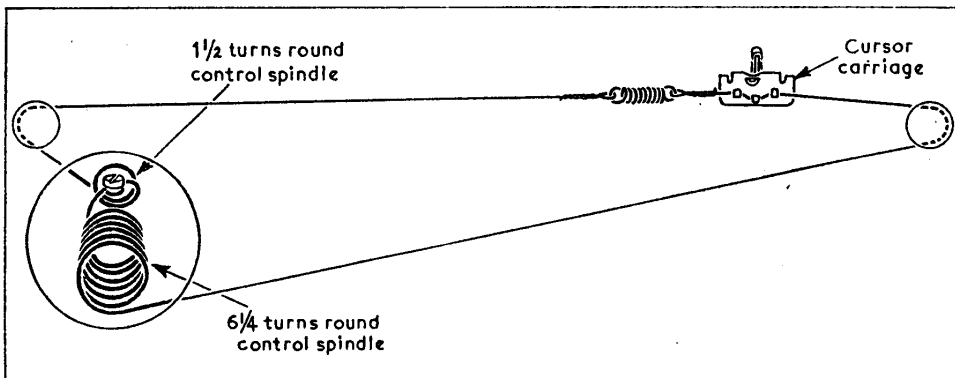


Diagram of the tuning drive system as viewed from the rear of an upright chassis with the receiver tuned to the lowest-frequency end of the Band. The section of drive round the tuning control spindle is enlarged for the sake of clarity.