"TRADER" SERVICE SHEET

1269

EKCO C273,

F.M. Table and Console Receivers

EMPLOYING 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 14*s* 6*d; A274, June* 1956, £20 7*s* 10*d; A277, July* 1956, £23 8*s* 4*d. 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.**

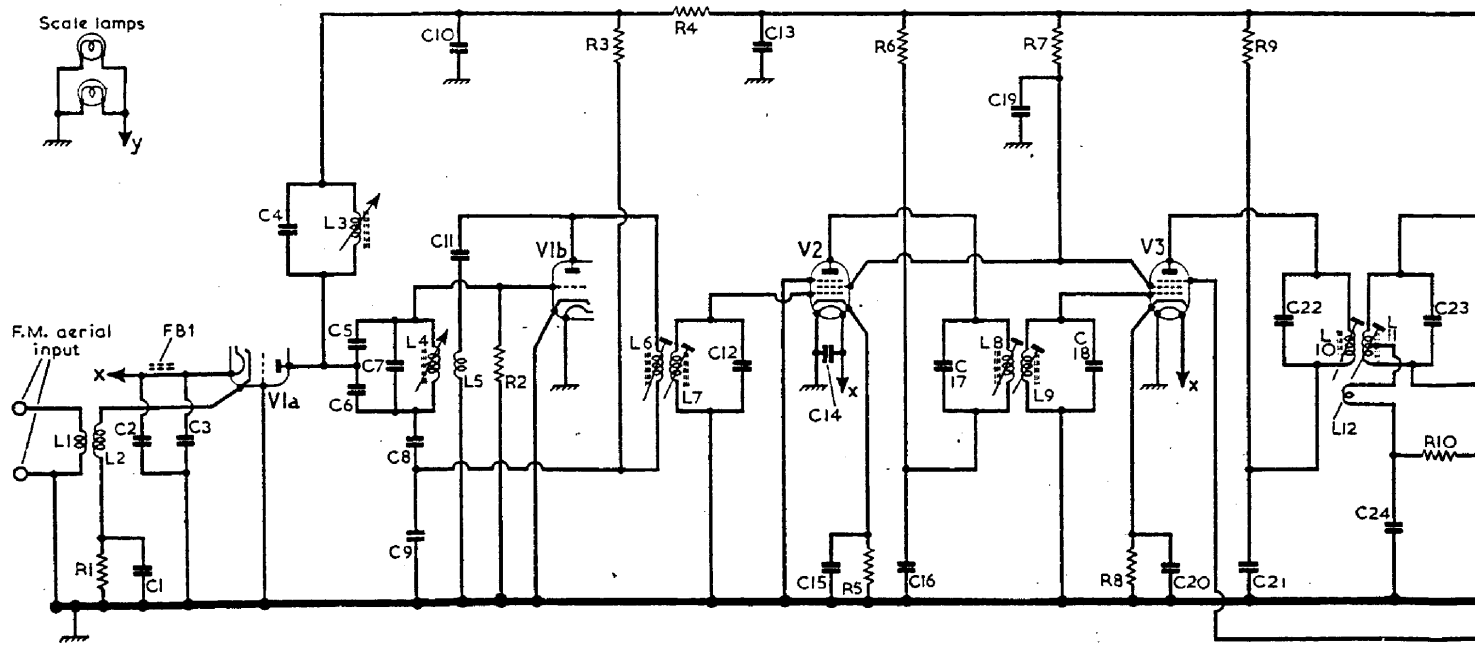
GENERAL NOTES

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.

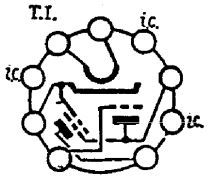
S4 is the screw-type internal speaker switch and is mounted below the external L.S. sockets on the rear of the chassis.

Scale Lamps.—These are 6.5 V, 0.3 A

(Continued col. 1 overleaf)

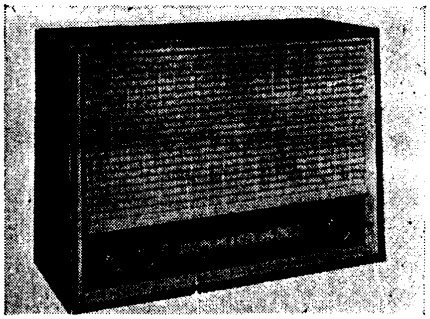


Circuit diagram of the Ekco A274. The same basic circuit is used in models C273 and A277. Small differences between these two models and the A274 are explained under "Associated Models" overleaf. The T.R. sockets in the volume control circuit provide a suitable output for connection to a tape recorder. 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.

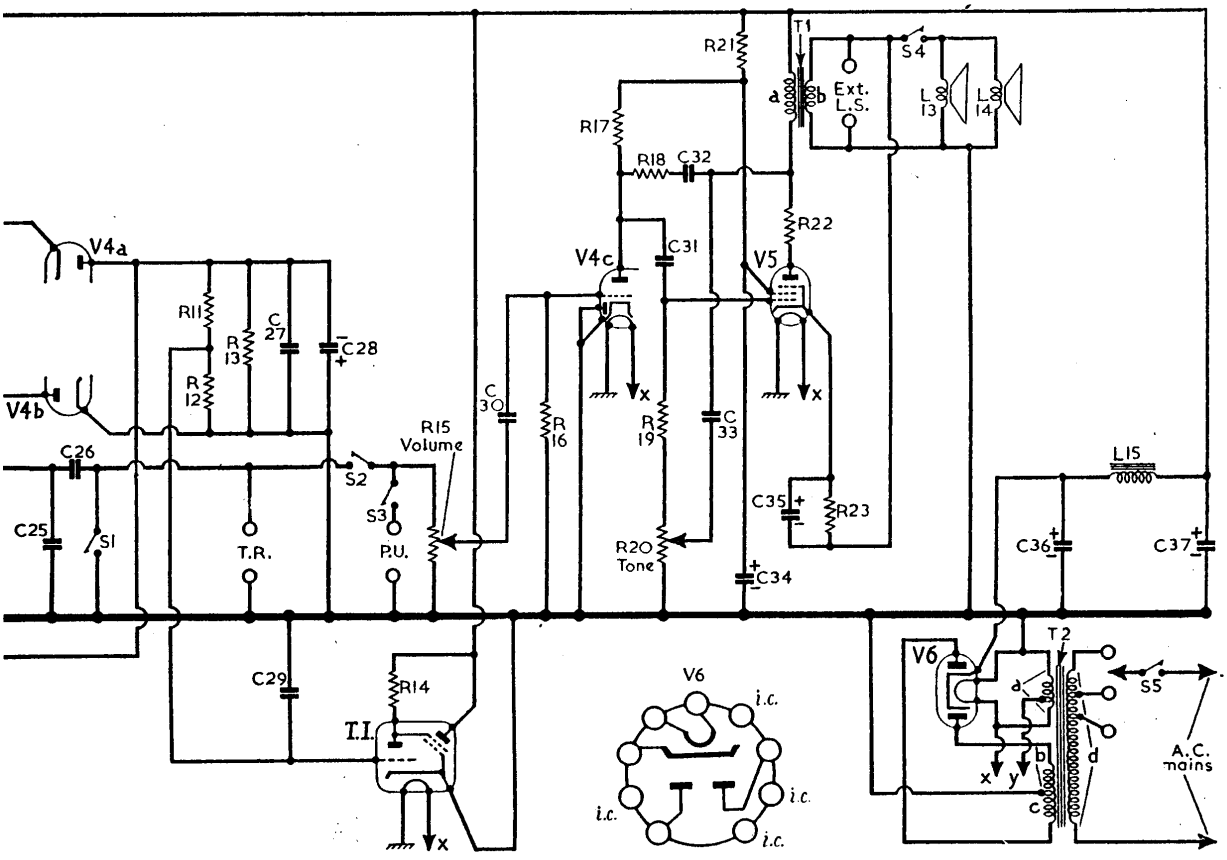
CAPACITORS		Values	Locations
C1	V1a cath. by pass	0·001μF	G4
C2	Heater by-passes	0·01μF	G3
C3	Heater by-passes	0·001μF	G3
C4	R.F. tuning ...	3pF	G3
C5	Oscillator tuning	6pF	G3
C6	Oscillator tuning	6pF	G3
C7	Oscillator tuning	20pF	G3
C8	Oscillator tuning	12pF	G3
C9	Oscillator tuning	100pF	G4
C10	H.T. decoupling	0·001μF	G3
C11	Reaction coupling	20pF	G3
C12	1st I.F.T. tuning	22pF	G4
C13	H.T. by-pass ...	0·01μF	G4
C14	Heater by pass ...	0·01μF	G4
C15	V2 cath. by pass	0·01μF	G5
C16	V2 anode decoup.	0·01μF	G4
C17	2nd I.F T tuning	22pF	A2
C18	2nd I.F T tuning	17pF	A2
C19	H.T. decoupling	0·01μF	G4
C20	V3 cath. by-pass	0·01μF	G4
C21	V3 anode decoup.	0·01μF	F4
C22	3rd I.F.T tuning	22pF	B2
C23	3rd I.F.T tuning	22pF	B2
C24	A.F. load ...	100pF	F4
C25	De-emphasis ...	0·001μF	F4
C26	A.F. coupling ...	0·01μF	F4
C27	I.F. by-pass ...	0·01μF	F4
C28	D.C. reservoir ...	8μF	G3
C29	T.I. decoupling ...	0·01μF	F3
C30	A.F. couplings ...	0·01μF	F4
C31	A.F. couplings ...	0·01μF	F4
C32	Neg. feed-back ...	0·001μF	E4
C33	Part tone control	220pF	F4
C34	H.T. smoothing ...	8μF	B2
C35	V5 cath. by-pass	50μF	E4
C36	H.T. smoothing ...	50μF	E3
C37	H.T. smoothing ...	50μF	E3

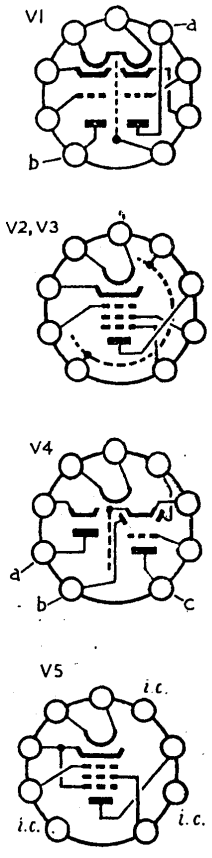
RESISTORS		Values	Locations
R1	V1a G.B. ...	220Ω	G4
R2	V1b C.G.	1MΩ	G3
R3	V1b H.T. feed ...	4·7kΩ	A1
R4	H.T. feed	1·5kΩ	A2
R5	V2 G.B.	150Ω	G4
R6	V2 H.T. feed ...	2·2kΩ	G4
R7	V2, V3 S.G. feed	27kΩ	F4
R8	V3 G.B.	150Ω	G4
R9	V3 H.T. decoup.	2·2kΩ	F4
R10	De-emphasis ...	39kΩ	F4
R11	T.I. potential divider	2·2MΩ	F3
R12	T.I. potential divider	1MΩ	F3
R13	D.C. load ...	33kΩ	F4
R14	T.I. load	470kΩ	E3
R15	Volume control ...	1MΩ	D3
R16	V4c C.G.	10MΩ	F4
R17	V4c anode load ...	220kΩ	F4
R18	Neg. feed-back ...	1·5MΩ	F4
R19	Part tone control	100kΩ	F4
R20	Tone control ...	1MΩ	D3
R21	H.T. feed	10kΩ	F4
R22	V5 anode stopper	27Ω	E4
R23	V5 G.B.	150Ω	E4

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	Aerial coup. coils...	—	G4
L2	Aerial coup. coils...	—	G4
L3	R.F. tuning coil ...	—	G3
L4	Osc. tuning coil ...	—	G3
L5	Osc. reaction coil...	—	G3

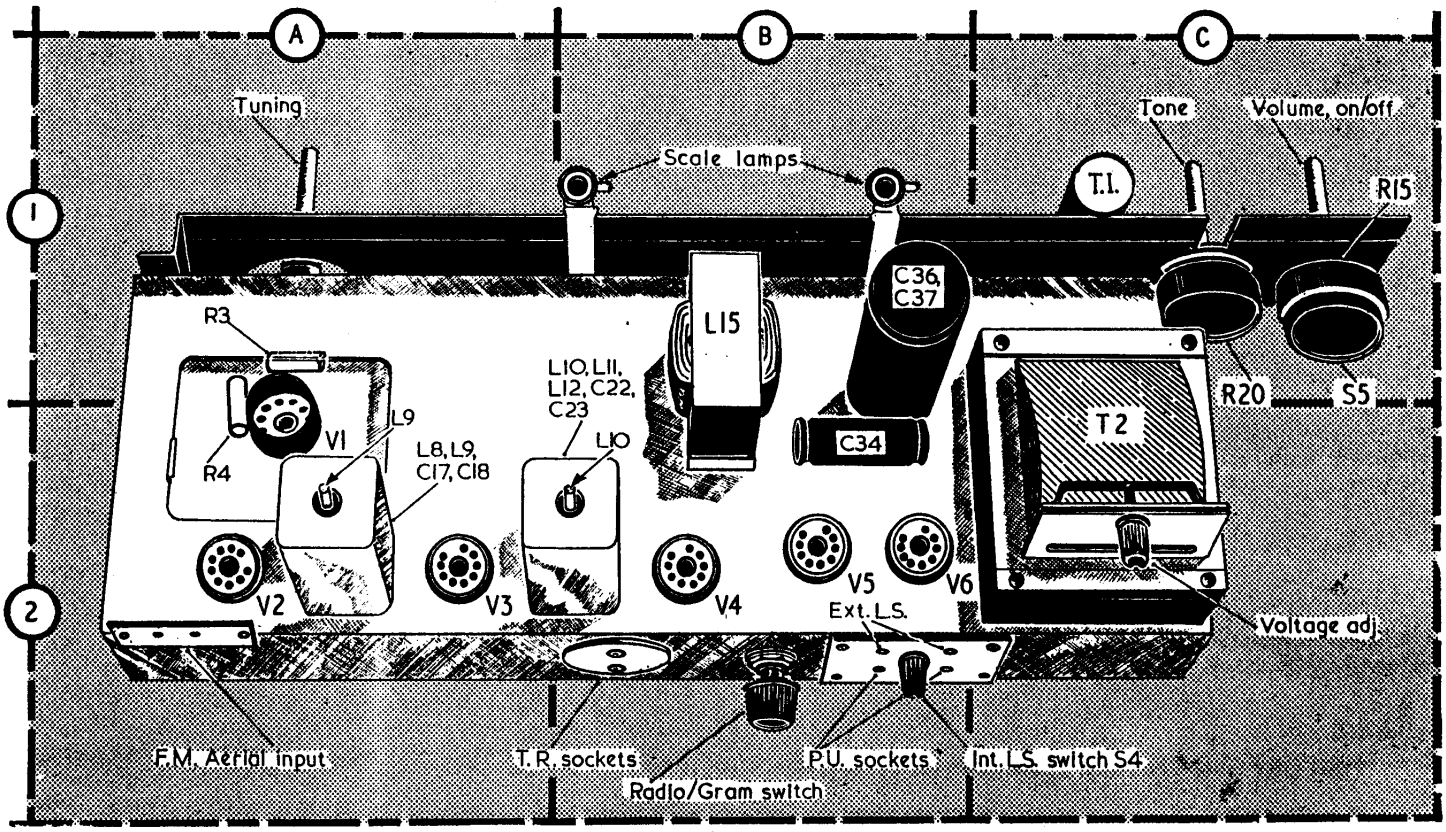
(*Continued in next column*)

OTHER COMPONENTS (*continued*)		Approx. Values (ohms)	Locations
L6	1st I.F.T. Pri. ...	—	G4
L7	1st I.F.T. Sec. ...	—	G4
L8	2nd I.F.T. Pri. ...	—	A2
L9	2nd I.F.T. Sec. ...	—	A2
L10	3rd I.F.T. Pri. ...	—	A2
L11	3rd I.F.T. Sec. ...	—	A2
L12	3rd I.F.T. 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 ...	160·0	F3
	O.P. trans. b ...	—	
T2	Mains trans a ...	—	
	Mains trans b ...	120·0	C2
	Mains trans c ...	130·0	
	Mains trans d ...	127·0	
FB1	Ferrite bead R.F. stopper	—	G3
S1-S3	Radio/Gram. sw. ...	—	F4
S4	Int. L.S. switch ...	—	E4
S5	Mains sw., g'd R15	—	D3





Supplement to Wireless & Electrical Trader, 29 September 1956



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.

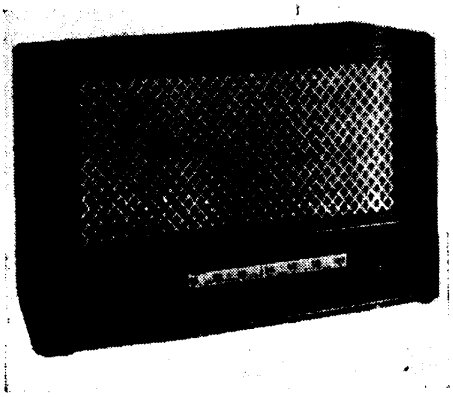
Drive Wire Replacement.—About 32in of 7-strand steel wire is required for a new drive, which should be run as shown in the sketch of the tuning drive system at the foot of columns 4 and 5.

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.



Appearance of the Ekco A277.

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	V
V1 ECC85	a	227	9·5	—	—	2·1
	b	195	11·5	—	—	—
V2 EF89		227	9·0	79	3·0	1·8
V3 EF89		227	9·0	79	3·0	1·8
V4 EABC80	a,b	—	—	—	—	—
	c	35	0·6	—	—	—
V5 EL84		245	35·0	200	4·0	6·0
V6 EZ80		253[1]	—	—	—	270·0[2]
T.I. EM80		35[3]	—	—	—	—

[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.

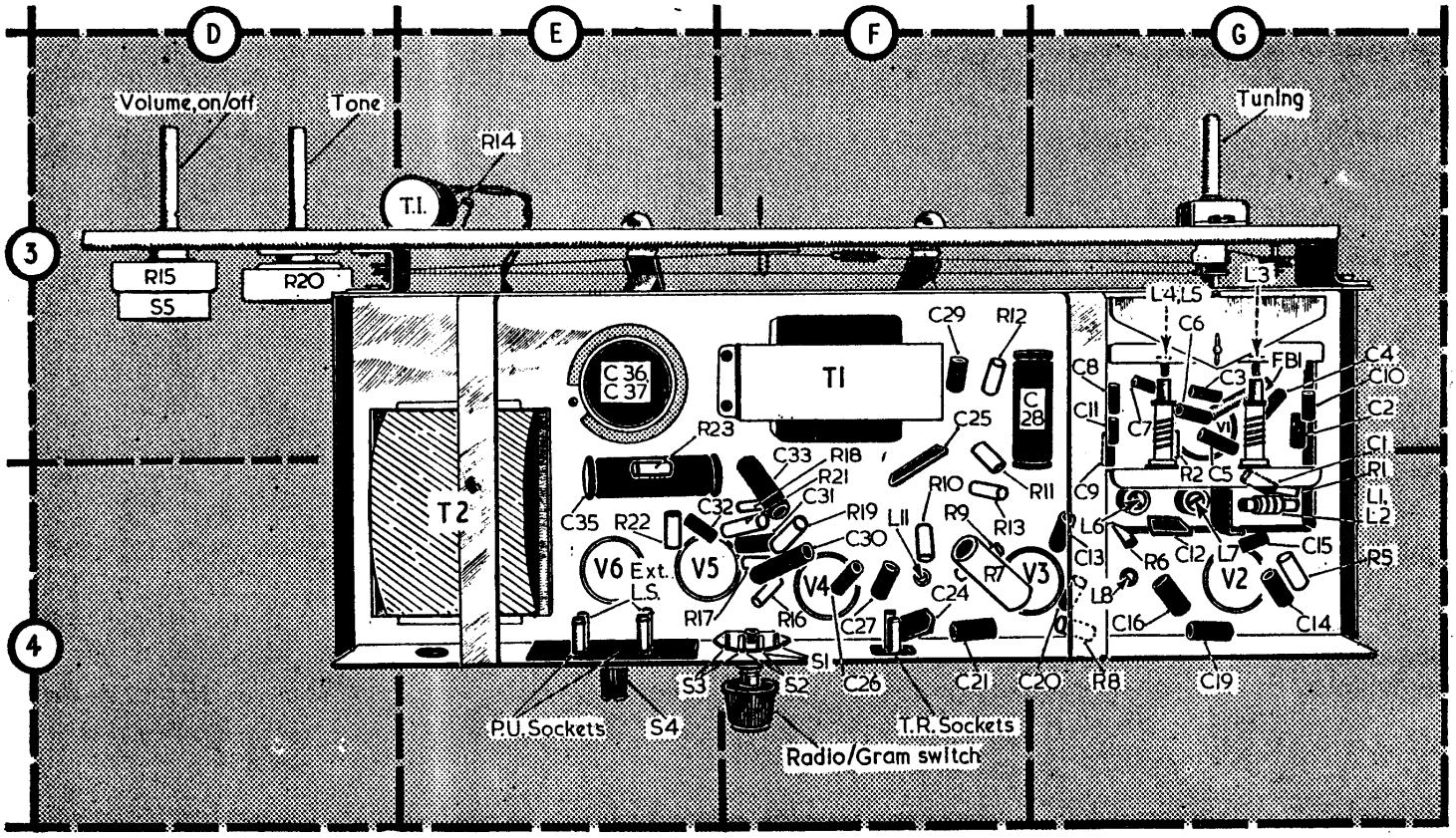
4.—Transfer meter lead from chassis to the junction of **C24, R10** (F4), so that the meter is connected between the junction of the 220kΩ resistors and the junction of **R10, C24.**

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



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 $\frac{3}{8}$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.

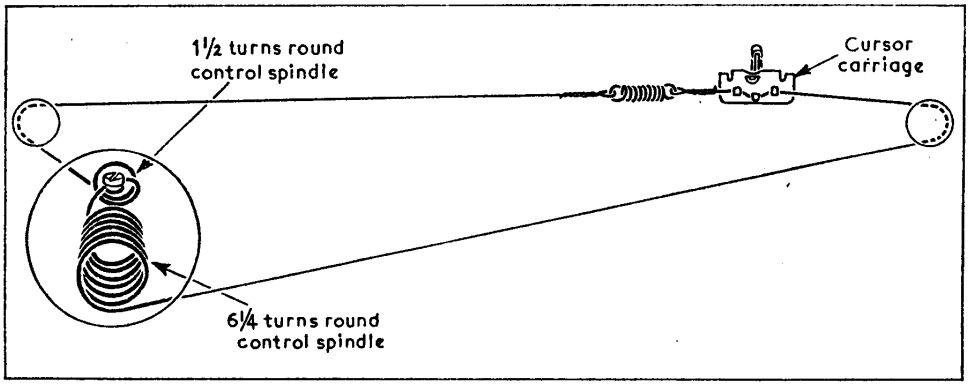
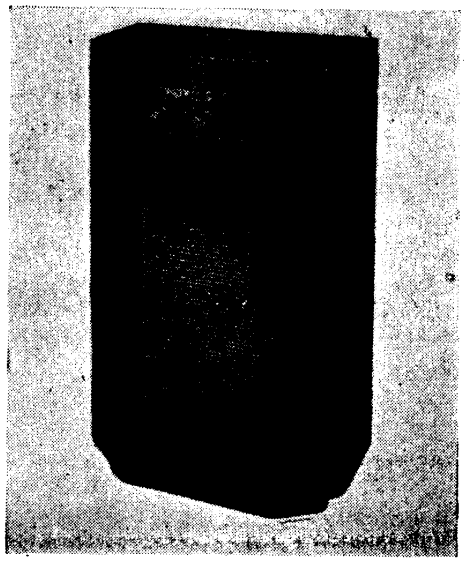


Diagram of the tuning drive system as viewed from the rear of an upright chassis with the receiver tuned to the lowest-frequency end of the Band. The section of drive round the tuning control spindle is enlarged for the sake of clarity.



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

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