"TRADER" SERVICE SHEET

1657

EKCO U428 : FERRA

A.M./F.M. Table Radio Receivers with Pre-set Press-bu

FEATURING four pre-set press-buttons which can be set to the local f.m transmissions, Ekco U428 and Ferranti U1103 are five-valve, plus rectifier, a.c./d.c. table radio receivers. Covering long, medium and f.m. bands the chassis uses a printed circuit panel for the main receiver, and a combined f.m. tuner and press-button unit for the v.h.f. band. Medium and long wave signals are received by an internal ferrite rod aerial and sockets are provided for the connection of an external f.m. aerial and external loudspeaker. Manual tone control is provided.

Release date and original price: June 1963. £22 12*s* 5*d*. *Purchase tax extra.*

VALVE ANALYSIS

Valve voltages given in the table in col. 2 were taken from information supplied by the manufacturer. They were measured on a model 8 Avometer with the receiver switched as indicated in the table.

CIRCUIT ALIGNMENT

Calibration marks at 91.3Mc/s, 1,400kc/s and 214kc/s are provided on the horizontal front bracket beneath the scale backing assembly.

F.M. Circuits

Two methods of f.m. i.f. alignment are given, a visual method and a meter method.

I.F. Circuits (Visual Method)

Equipment Required.—A sweep generator with a centre frequency of 10.7 Mc/s; an oscilloscope; a 0.01μF capacitor and a non-metallic trimming tool.

Valve Table

Valve		Anode (V)	Screen (V)	Cathode (V)
V1a UCC85	*	—	—	—
	†	67	—	—
V1b UCC85	*	—	—	—
	†	147	—	—
V2a UCH81	*	63	—	—
	†	27	—	—
V2b UCH81	*	165	105	—
	†	130	90	—
V3 UF89	*	142	127	1·4
	†	120	95	1·2
V4d UABC80	*	61	—	—
	†	55	—	—
V5 UL84	*	216	175	9·6
	†	200	142	10·0
V6 UY85		—	—	232·0

**Receiver switched to a.m.*
†Receiver switched to f.m.

1.—Connect the sweep generator to **V3** control grid (pin 2). Disconnect one end of **C60** (location reference D2) by breaking the link between pins 17 and 18 on the printed panel, and connect the oscilloscope across **R20.**

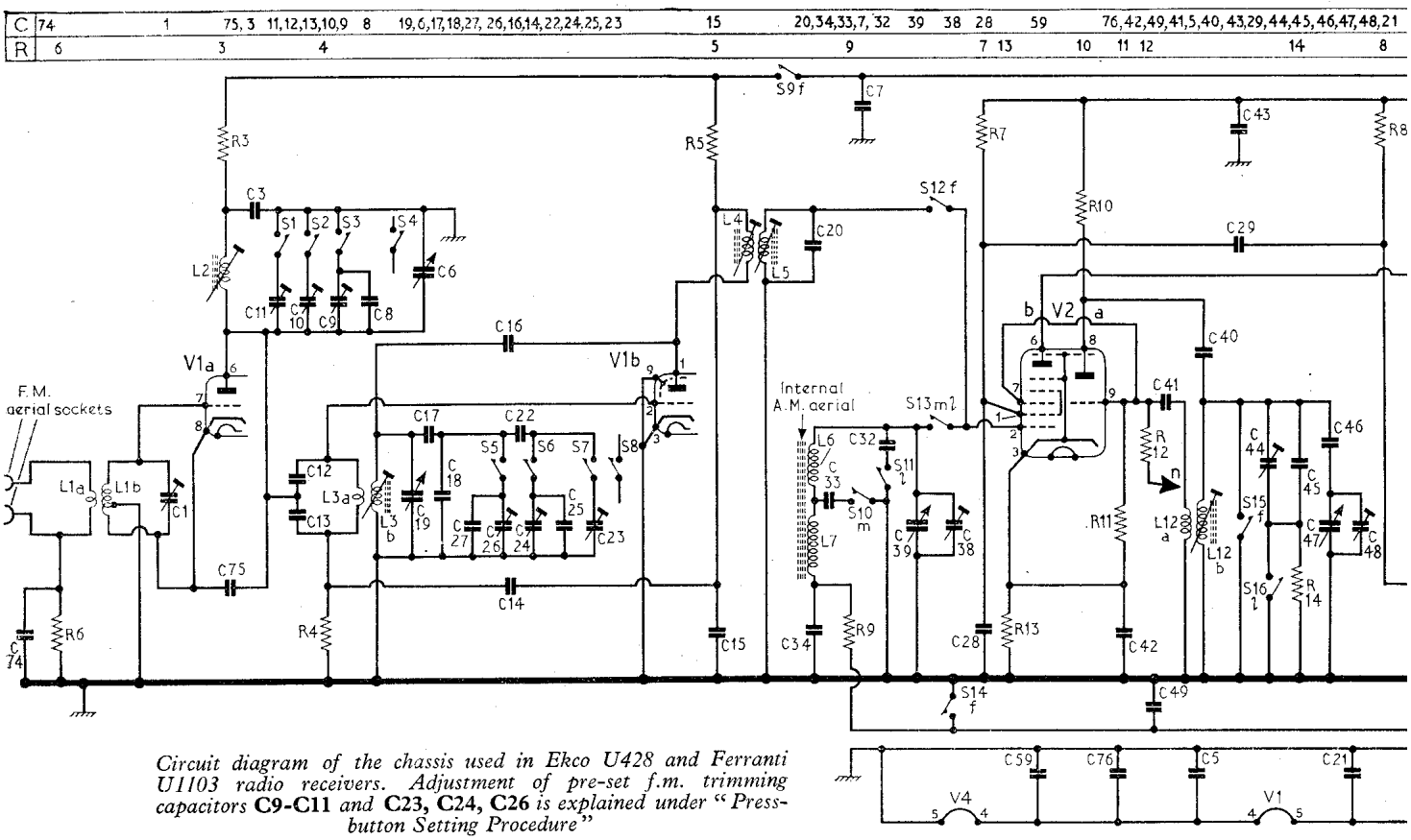
2.—Switch receiver to f.m. and set the cursor to the mid-band position. Set the volume control at minimum.

3.—Feed in a 10.7Mc/s signal and adjust the core of **L15** (D2) for maximum response.

4.—Re-connect **C60** and transfer the oscilloscope to the junction of **R19** and **S19.** Adjust the core of **L16** (D3) for a symmetrical "S" curve, readjusting **L15** if necessary for the best "S" curve.

5.—Transfer the sweep generator to **V2** control grid (pin 2). Disconnect one end of **C60** and connect the oscilloscope across **R20** as in operation **1.** Adjust the cores of **L11** (C3) and **L10** (C2) for maximum response ensuring that a symmetrical curve is maintained.

6.—Connect the sweep generator via the 0.01μF capacitor across the f.m. aerial section of the tuning gang **C6.** Adjust the cores of **L5** (J7) and **L4** (J7) for maximum response with best response shape. Re-connect **C60.**



Circuit diagram of the chassis used in Ekco U428 and Ferranti U1103 radio receivers. Adjustment of pre-set f.m. trimming capacitors **C9-C11** *and* **C23, C24, C26** *is explained under "Press-button Setting Procedure"*

ment to Wireless &
Trader, 20 June 1964

ANTI U1103

·button F.M. Station Selection

I.F. Circuits (Meter Method)

Equipment Required.—An f.m. signal generator; an audio output meter; a 0.01μF capacitor and a non-metallic trimming tool.

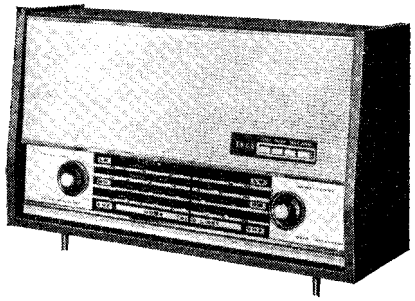
1.—Connect the signal generator to **V3** control grid (pin 2). Connect the audio output meter to the external loudspeaker sockets. Set volume and tone controls at maximum, switch to f.m. and set the cursor to the mid-band position.

2.—Feed in a 10.7Mc/s signal with a deviation frequency of ±75kc/s and adjust the cores of **L16** (D3) and **L15** (D2) for maximum output. Check the quality of the output and if necessary readjust **L16** for minimum distortion.

3.—Transfer the signal generator to **V2** control grid (pin 2). Adjust the cores of **L11** (C3) and **L10** (C2) for maximum output consistent with absence of distortion.

4.—Connect the signal generator via the 0.01μF capacitor across the f.m. aerial section of the tuning gang **C6.** Feed in 10.7Mc/s deviation ±75kc/s signal and adjust the cores of **L5** (J7) and **L4** (J7) for maximum output consistent with absence of distortion.

(*Continued overleaf, col.* 1)



Appearance of the Ekco U428. The f.m. station press-buttons can be seen above the right-hand control knob

Resistors

R1	—	†
R2	—	†
R3	10kΩ	J6
R4	1MΩ	J7
R5	4·7kΩ	J6
R6	1·5MΩ	A3
R7	12kΩ	B2
R8	2·2kΩ	C2
R9	100kΩ	C2
R10	47kΩ	B2
R11	47kΩ	B2
R12	220kΩ	C2
R13	100Ω	B2
R14	47kΩ	D3
R15	12kΩ	D2
R16	2·2kΩ	D3
R17	82Ω	D3
R18	100Ω	D2
R19	10kΩ	C2
R20	47kΩ	D2
R21	47kΩ	C2
R22	330kΩ	C2
R23	2·2MΩ	C2
R24	220kΩ	D2
R25	100kΩ	E2
R26	10MΩ	D2
R27	220Ω	E2
R28	220kΩ	D3
R29	47kΩ	E2
R30	150Ω	E2
R31	1kΩ	D3
R32	5·6kΩ	E2
R33	820Ω	D3
R34	100kΩ	D3
R35	39Ω	E3
R36	VA1010	E3
R37	VA1005	D3
R38	300Ω	E3
RV1	5kΩ	D2
RV2	1MΩ	E2
RV3	500kΩ	E2

Capacitors

C1	40pF	J6
C2	—	†
C3	1,000pF	J6
C4	—	†
C5	0·01μF	J6
C6	15pF	A3
C7	0·01μF	B3
C8	4·7pF	J7
C9	8pF	J7
C10	8pF	J7
C11	5pF	J7
C12	8·2pF	J6
C13	8·2pF	J7
C14	15pF	J7
C15	68pF	J7
C16	10pF	J6
C17	36pF	J6
C18	68pF	J6
C19	15pF	A3
C20	3·3pF	J7
C21	0·01μF	J6
C22	100pF	B1
C23	30pF	J6
C24	30pF	J6
C25	25pF	J6
C26	30pF	J6
C27	33pF	J6
C28	3,300pF	B2
C29	0·01μF	B2
C30	100pF	C2
C31	8·2pF	C2
C32	100pF	A2
C33	0·01μF	B3
C34	0·01μF	C2
C35	100pF	C3
C36	12pF	C3
C37	0·01μF	B3
C38	—	A2
C39	392pF	A3
C40	100pF	B3
C41	100pF	B3
C42	0·1μF	B2
C43	0·01μF	C2
C44	40pF	D3
C45	375pF	D3
C46	445pF	B3
C47	392pF	A3
C48	—	A2
C49	0·03μF	C2
C50	3,300pF	C2
C51	0·01μF	D3
C52	100pF	D2
C53	0·01μF	C3
C54	250pF	D3
C55	56pF	D3
C56	220pF	D2
C57	0·03μF	C3
C58	220pF	D3
C59	0·03μF	D3
C60	2μF	D2
C61	0·03μF	C2
C62	100pF	D2
C63	100pF	C2
C64	1,000pF	D2
C65	0·01μF	E2
C66	0·01μF	D2
C67	0·01μF	E2
C68	32μF	D3
C69	40μF	D3
C70	40μF	D3
C71	0·1μF	E2
C72	470pF	E3
C73	0·01μF	A2
C74	470pF	J6
C75	8·2pF	J6
C76	0·01μF	J6

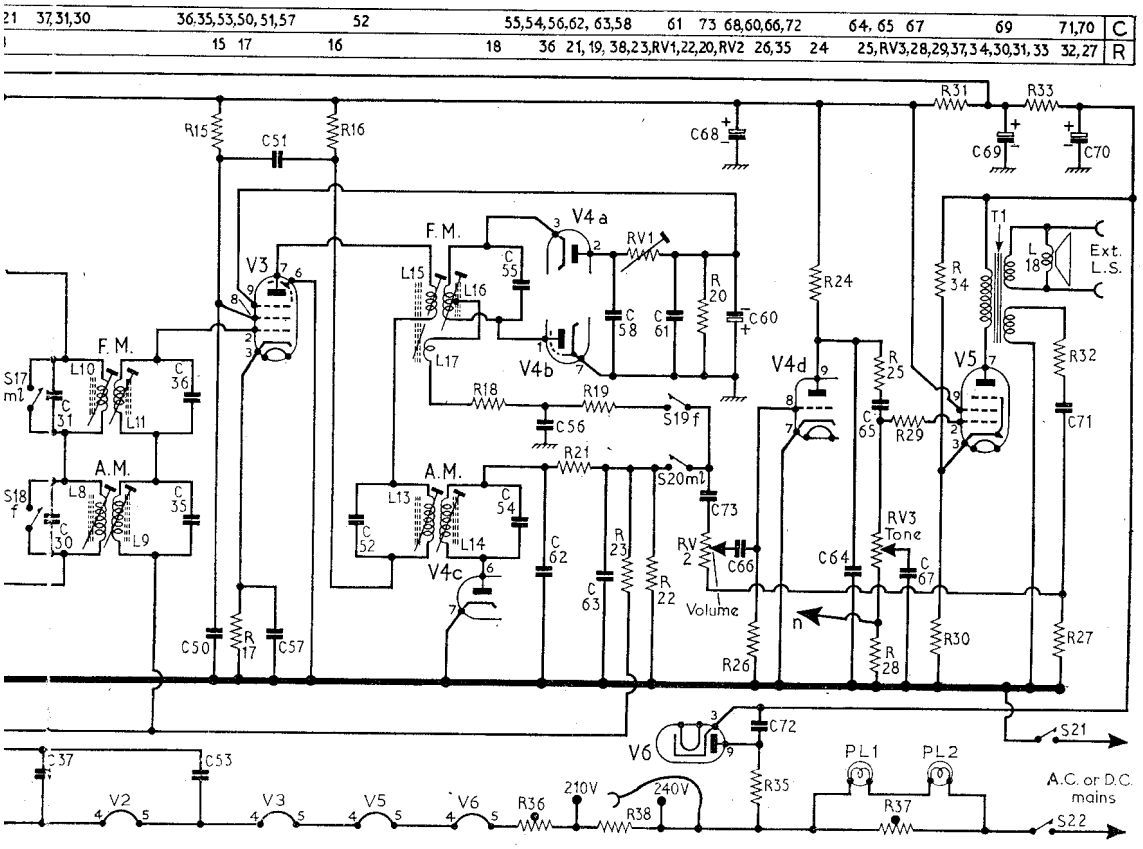
Coils

L1a	—	J6
L1b	—	J6
L2	—	J7
L3a	—	J6
L3b	—	J6
L4	—	J7
L5	—	J7
L6	—	A3
L7	—	C3
L8	—	C2
L9	—	C3
L10	—	C2
L11	—	C3
L12	—	B3
L13	—	D2
L14	—	D3
L15	—	D2
L16	—	D3
L17	—	D3
L18	3Ω	—

Miscellaneous

PL1, PL2	12V 0·3A	C1, D1
S1-S8	—	A1
S9-S2	—	B2
S21, S22	—	E1
T1	—	E3

†*No component.*



Circuit Alignment—*continued.*

F.M. R.F. Circuits

Equipment Required.—As for "I.F. Circuits (Meter Method)."

1.—Check that with the tuning gang fully meshed, the cursor aligns with the l.f. ends of the tuning scale.
2.—Switch to f.m. and tune to 91.3Mc/s. Set volume and tone controls at maximum. Connect the signal generator to the f.m. aerial sockets.
3.—Feed in a 91.3Mc/s signal, deviation frequency ±25kc/s and adjust the cores of **L3b** (J6) and **L2** (J7), and **C1** (J6) for maximum output, limiting the output to about 500mW at the loudspeaker.

A.M. Circuits

Equipment Required.—An a.m. signal generator; an audio output meter; a 0.01μF capacitor; a 1,000pF capacitor and a non-metallic trimming tool.

1.—Connect the signal generator via the 0.01μF capacitor to **V2** control grid (pin 2). Connect the audio output meter to the external loudspeaker sockets. Switch receiver to m.w. and tune to the l.f. end of the band. Set volume and tone controls at maximum.
2.—Feed in a 470kc/s 30 per cent modulated signal and adjust the cores of **L14** (location reference D3), **L13** (D2), **L9** (C3) and **L8** (C2) for maximum output.
3.—Connect the signal generator via the 1,000pF capacitor to the junction of **L6** and **L7**. Tune receiver to 500m, feed in a 600kc/s signal and adjust the core of **L12** (B3) and position of **L6** on the ferrite rod for maximum output.
4.—Tune receiver to 214m, feed in a 1,400kc/s signal and adjust **C48** (A2) and **C38** (A2) for maximum output.
5.—Repeat operations 3 and 4 for correct calibration and tracking.
6.—Switch receiver to l.w. and tune to 1,400m. Feed in a 214kc/s signal to **V2** control grid (pin 2) and adjust **C44** for maximum output. Then transfer the signal generator to the junction of **R9** and **C34** via the 1,000pF capacitor and adjust the position of **L7** on the ferrite rod for maximum output at 1,400m.

PRESS-BUTTON SETTING PROCEDURE

The majority of v.h.f. transmitters in Band II have a standard spacing of 2.2Mc/s between programmes and the chassis has been designed so that the four press-buttons can be pre-tuned at intervals of 2.2Mc/s. Once set up, each of the programmes available may be selected simply by turning the tuning control knob until the station cursor coincides with the red indicator below the tuning scale, switching to "VHF" and depressing the appropriate button.

All receivers leave the factory with the first three buttons only pre-tuned to Wrotham frequencies, as follows: LIGHT — 89.1Mc/s. THIRD — 91.3Mc/s. HOME 1—93.5Mc/s. Thus, no adjustment is needed in areas served by transmitters using these frequencies.

For all other transmitters except **Swingate, Sandale, Beckley, Wenvoe** and **Les Platons,** switch on, remove back cover and check that chassis is not "live." Then switch to "VHF" and, after allowing a few minutes for the receiver to warm up, proceed as follows:

1.—Bring cursor into line with indicator and press "LIGHT" button.
2.—Tune to local Light Programme by moving cursor to the *left* if frequency of this station is *higher* than 89.1Mc/s, or to the *right* if *lower* than 89.1Mc/s. Carefully adjust tuning for optimum result, taking care that set is tuned to the "wanted" station and not to an inferior transmission.
3.—With the aid of a screwdriver, slide indicator along scale until its position coincides with that of cursor.
4.—Press "THIRD" button and carefully adjust **C24.**
5.—Press "HOME 1" button and likewise adjust **C23.**

The five exceptions mentioned earlier do not conform to the normal pattern and the procedures given below should be carried out:

Swingate (Dover). Spacing not standard for Third Programme.

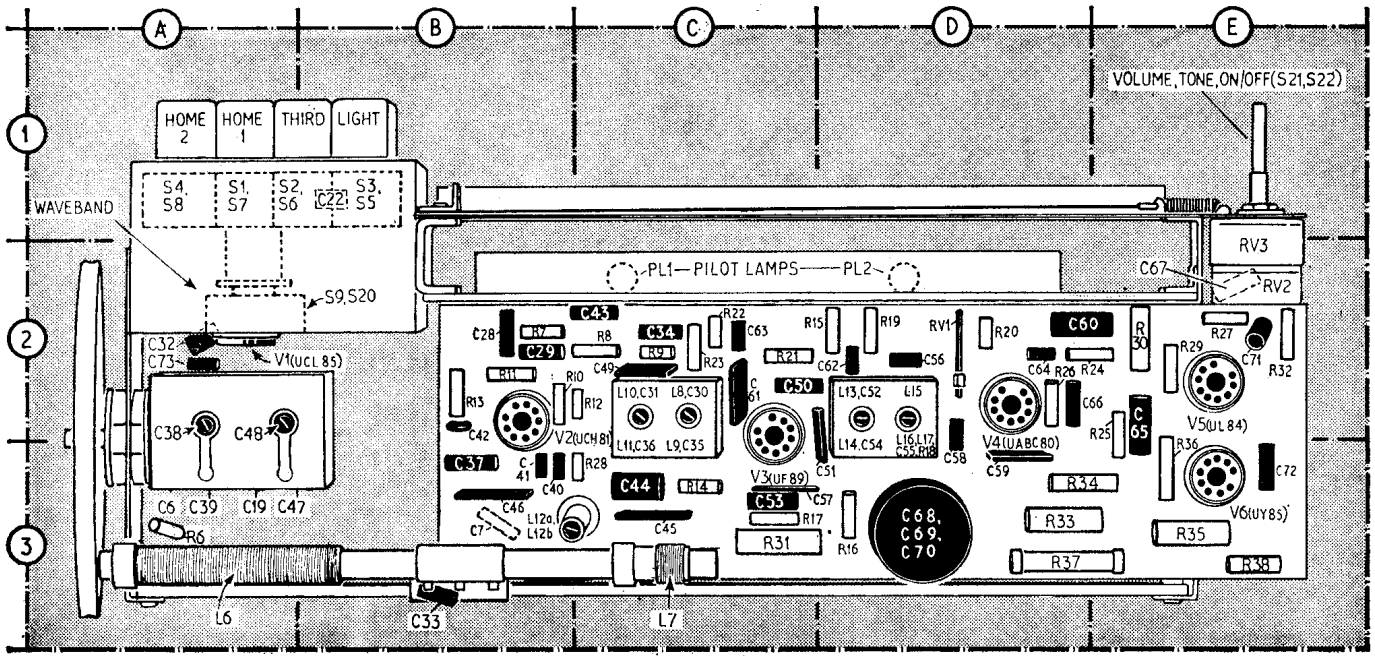
1.—Carry out steps 1-3 above.
2.—Press "THIRD" button and appreciably unscrew **C24** to bring in programme.
3.—Follow on with step 5 above.

Sandale (Carlisle) Standard spacing, but two Home Programmes available.

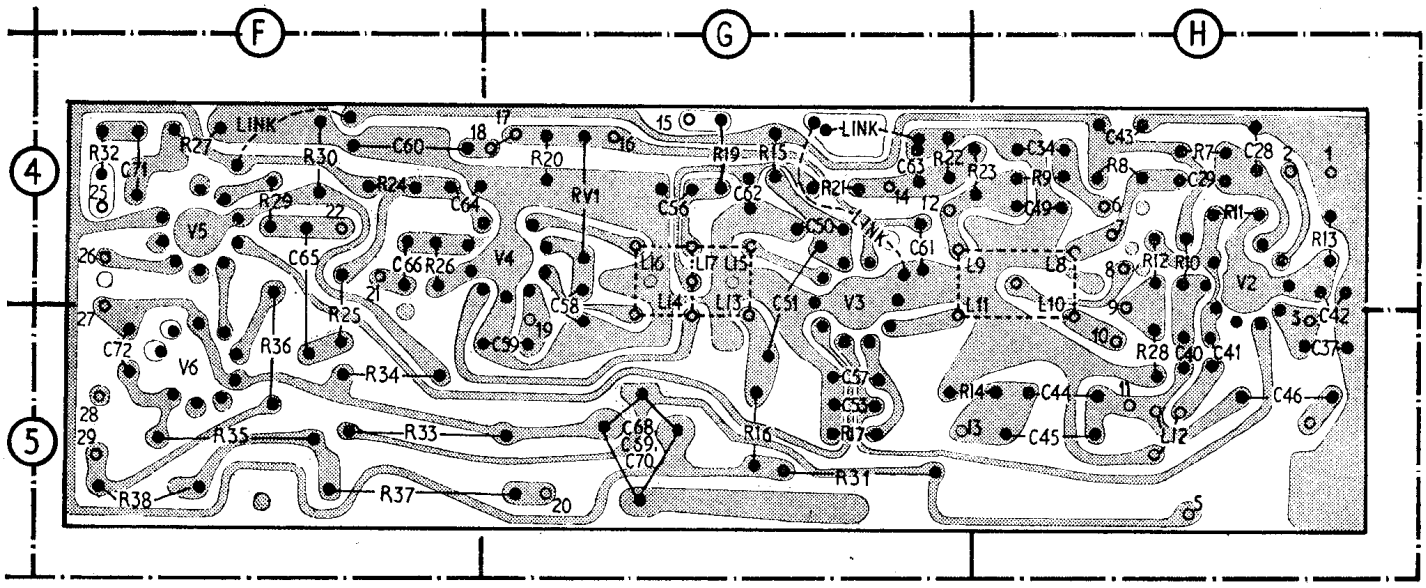
1.—Press "HOME 2" button and tune well to the right of indicator for North of England Home Service.
2.—Carefully adjust tuning for best performance and bring indicator into line with cursor.
3.—Press in turn the "HOME 1," "THIRD" and "LIGHT" buttons, setting-up the corresponding trimmer in sequence, i.e. **C23, C24** and **C26.**

Beckley (Oxon). Non-standard spacing between the two available Home Programmes.

1.—Press "HOME 2" button and tune slightly to the left of indicator for West Home Service.
2.—Bring indicator into line with cursor.
3.—Re-tune the other three buttons as for Sandale transmitter, noting that the oscillator trimmers **C23, C24** and **C26** must be *unscrewed.* If screwed



Plan view of the chassis giving component locations and alignment adjustments



Foil-side view of the printed circuit panel showing component connections

in, Wrotham transmissions may be received.

Wenvoe (Glam.). Non-standard spacing and two Home Programmes available.

Due to abnormal frequency allocation, it is unavoidable that West Home Service will be received on the "THIRD" button and the Third Programme will appear on "HOME 2" button.

1.—Press "HOME 2" button and tune in *Third* Programme by moving cursor to left of indicator.
2.—Bring indicator into line with cursor.
3.—Re-tune the other three buttons as for Sandale transmitter, noting that the oscillator trimmers should be *screwed in;* furthermore, the *West of England* Home Service will appear on the "THIRD" button.

Les Platons (Channel Is.). Completely non-standard spacing and "HOME 1" button vacant.

1.—Remove chassis from cabinet and take off tuner unit top cover.
2.—Disconnect **C25** (25pF), press "HOME 2" button and tune in Home Service (97.1Mc/s).
3.—Bring indicator into line with cursor.
4.—Press "THIRD" button and adjust **C24** to bring in Third Programme.
5.—Adjust **C10** for maximum output, with voltmeter across **C60** and minimum picked-up signal applied (achieved, if necessary, with short piece of wire connected to one aerial socket in lieu of internal aerial).
6.—Press "LIGHT" button and adjust **C9** for maximum output, as above.
7.—Reassemble receiver.

In certain areas where more than one transmitter is received, care should be taken to select the one known to give best reception.

The above instructions are based on the assumption that the receiver is tuned to Wrotham frequencies. They can be applied in other instances, however, once the Light Programme has been located by manual tuning and the indicator brought into line with the cursor.

GENERAL NOTES

Chassis Removal.—To remove the chassis from the cabinet, remove plugs from the rear of the chassis and take off the back cover.

Loosen the inner grub screws and pull off all four control knobs.

Remove four chassis securing screws and washers from the underside of the cabinet.

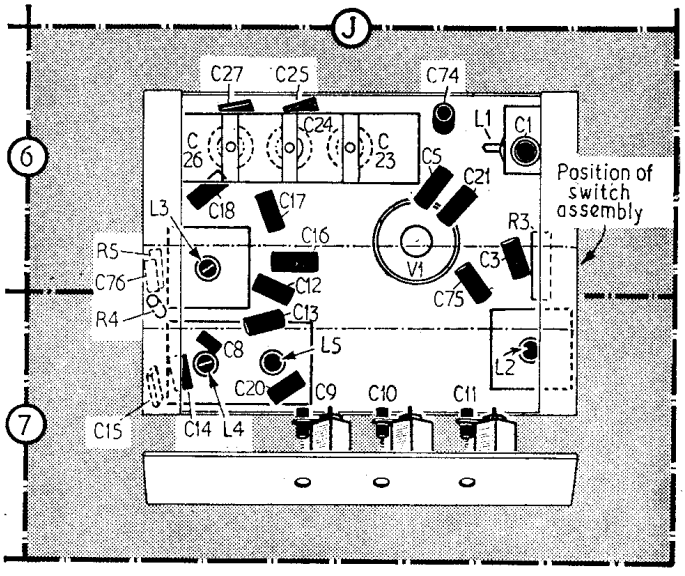
Switches.—S1-S8 are the v.h.f. press-button switches which are shown in location reference A1. They are for pre-set selection of f.m. programmes and are associated with the procedure described under "Press-Button Setting Procedure."

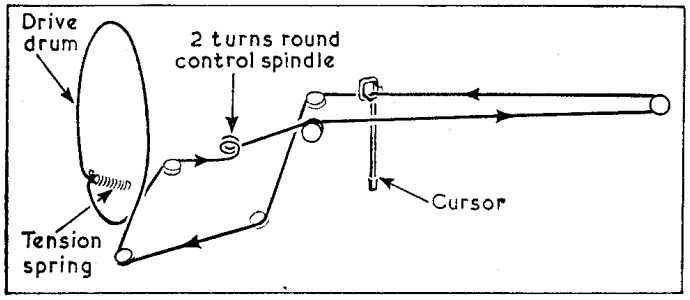
S9-S20 are the normal wavechange switches, housed in rotary unit shown in location reference A2. These switch numbers are given a suffix letter on the circuit diagram to correspond with the waveband on which they close, where *m, l and f* mean m.w., l.w. and f.m. respectively.

S21 and **S22** are the mains on/off switches and are ganged with the dual volume/tone controls.

Right: *Interior view of the f.m. tuner unit*

Below: *Rear view of the drive cord assembly with the tuning gang fully closed*





Printed in Great Britain by Cornwall Press, Ltd., Paris Garden, Stamford Street, London, S.E.1, and Published by Iliffe Electrical Publications, Ltd., Dorset House, Stamford Street, London, S.E.1.