

"TRADER" SERVICE SHEET
1657

EKCO U428 : FERRA

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

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 12s 5d. 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.

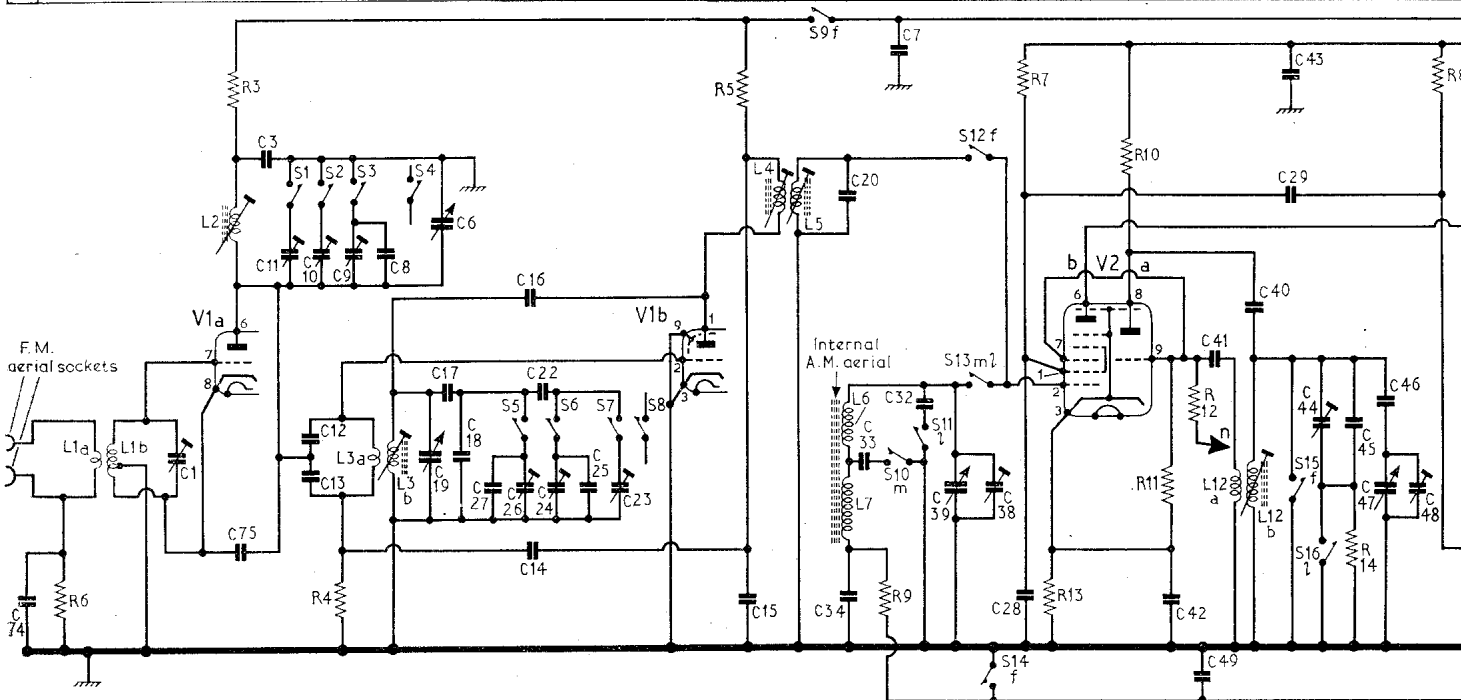
Valve Table

Valve	Anode (V)	Screen (V)	Cathode (V)
V1a UCC85	67	—	—
V1b UCC85	147	—	—
V2a UCH81	63	—	—
V2b UCH81	27	—	—
V3 UF89	165	105	—
	130	90	1.4
V4d UABC80	142	127	1.2
	120	95	—
V5 UL84	61	—	—
	55	—	—
V6 UY85	216	175	9.6
	200	142	10.0
	—	—	232.0

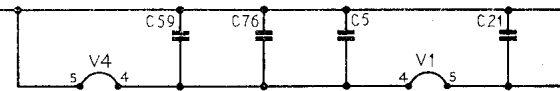
*Receiver switched to a.m.
†Receiver switched to f.m.

- 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.

C	74	1	75, 3	11, 12, 13, 10, 9	8	19, 6, 17, 18, 27, 26, 16, 14, 22, 24, 25, 23	15	20, 34, 33, 7, 32	39	38	28	59	76, 42, 49, 41, 5, 40, 43, 29, 44, 45, 46, 47, 48, 21			
R	6	3	4				5	9		7	13	10	11	12	14	8



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"



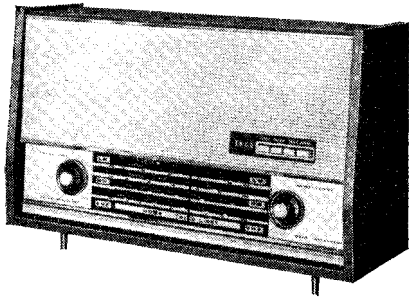
ANTI U1103

button F.M. Station Selection

I.F. Circuits (Meter Method)

Equipment Required.—An f.m. signal generator; an audio output meter; a 0.01 μ F 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 loud-speaker sockets. Set volume and tone



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

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 ± 75 kc/s and adjust the cores of L16 (D3) and L15 (D2) for maximum output. Check the quality of the output and if necessary re-adjust 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 0.01 μ F capacitor across the f.m. aerial section of the tuning gang C6. Feed in 10.7Mc/s deviation ± 75 kc/s signal and adjust the cores of L5 (J7) and L4 (J7) for maximum output consistent with absence of distortion.

(Continued overleaf, col. 1)

Resistors

R1	—	+
R2	—	+
R3	10k Ω	J6
R4	1M Ω	J7
R5	4.7k Ω	J6
R6	1.5M Ω	A3
R7	12k Ω	B2
R8	2.2k Ω	C2
R9	100k Ω	C2
R10	47k Ω	B2
R11	47k Ω	B2
R12	220k Ω	C2
R13	100 Ω	B2
R14	47k Ω	D3
R15	12k Ω	D2
R16	2.2k Ω	D3
R17	82 Ω	D3
R18	100 Ω	D2
R19	10k Ω	C2
R20	47k Ω	D2
R21	47k Ω	C2
R22	330k Ω	C2
R23	2.2M Ω	C2
R24	220k Ω	D2
R25	100k Ω	E2
R26	10M Ω	D2
R27	220 Ω	E2
R28	220k Ω	D3
R29	47k Ω	E2
R30	150 Ω	E2
R31	1k Ω	D3

Capacitors

R32	5.6k Ω	E2
R33	820 Ω	D3
R34	100k Ω	D3
R35	39 Ω	E3
R36	VA1010	E3
R37	VA1005	D3
R38	300 Ω	E3
RV1	5k Ω	D2
RV2	1M Ω	E2
RV3	500k Ω	E2
C1	40pF	J6
C2	—	+
C3	1,000pF	J6
C4	—	+
C5	0.01 μ F	J6
C6	15pF	A3
C7	0.01 μ F	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	0.01 μ F	J6
C22	100pF	B1
C23	30pF	J6
C24	30pF	J6
C25	25pF	J6
C26	30pF	J6
C27	33pF	J6
C28	3,300pF	B2
C29	0.01 μ F	B2
C30	100pF	C2
C31	8.2pF	C2
C32	100pF	A2
C33	0.01 μ F	B3
C34	0.01 μ F	C2
C35	100pF	C3
C36	12pF	C3
C37	0.01 μ F	B3
C38	—	A2
C39	392pF	A3
C40	100pF	B3
C41	100pF	B3
C42	0.1 μ F	B2
C43	0.01 μ F	C2
C44	40pF	D3
C45	375pF	D3
C46	445pF	B3
C47	392pF	A3
C48	—	A2
C49	0.03 μ F	C2
C50	3,300pF	C2
C51	0.01 μ F	D3
C52	100pF	D2
C53	0.01 μ F	C3
C54	250pF	D3
C55	56pF	D3
C56	220pF	D2
C57	0.03 μ F	C3
C58	220pF	D3
C59	0.03 μ F	D3
C60	2 μ F	D2
C61	0.03 μ F	C2
C62	100pF	D2
C63	100pF	C2
C64	1,000pF	D2
C65	0.01 μ F	E2
C66	0.01 μ F	D2
C67	0.01 μ F	E2
C68	32 μ F	D3
C69	40 μ F	D3
C70	40 μ F	D3
C71	40 μ F	D3
C72	0.1 μ F	E2
C73	470pF	E3
C74	0.01 μ F	A2
C75	470pF	J6
C76	8.2pF	J6
C76	0.01 μ F	J6

Coils

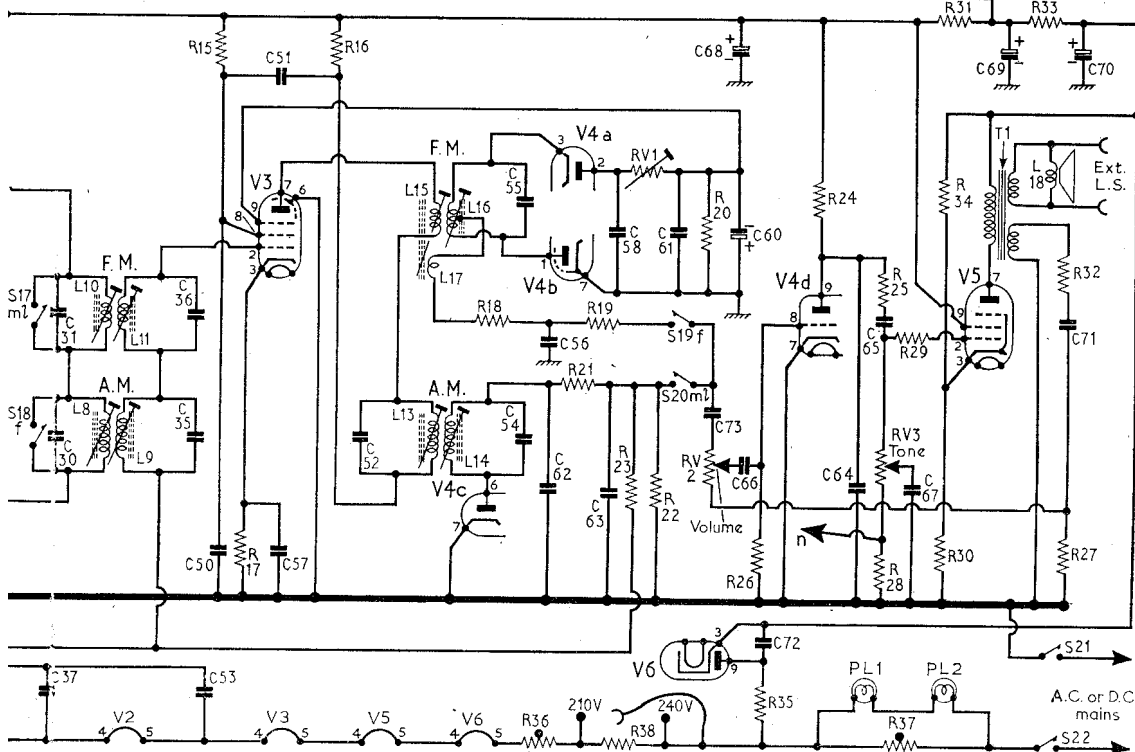
L1a	—	J6
L1b	—	J6
L2	—	J7
L3a	—	J6
L3b	—	J6
L4	—	J7
L5	—	J7
L6	—	A3
L7	—	C3
L8	—	C2
L9	—	C3
L10	—	C2
L11	—	C3
L12	—	B3
L13	—	D2
L14	—	D3
L15	—	D2
L16	—	D3
L17	—	D3
L18	3 Ω	—

Miscellaneous

PL1	—	C1
PL2	12V 0.3A	D1
S1-S8	—	A1
S9-S2	—	B2
S21, S22	—	E1
T1	—	E3

†No component.

21	37,31,30	36,35,53,50,51,57	52	55,54,56,62, 63,58	61	73	68,60,66,72	64, 65	67	69	71,70	C
1		15 17	16	18	36	21, 19, 38,23,RV1,22,20,RV2	26,35	24	25, RV3,28,29,37,34,30,31,33	32,27	R	



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 ± 25 kc/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 0.01 μ F capacitor; a 1,000pF capacitor and a non-metallic trimming tool.

- 1.—Connect the signal generator via the 0.01 μ F 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.

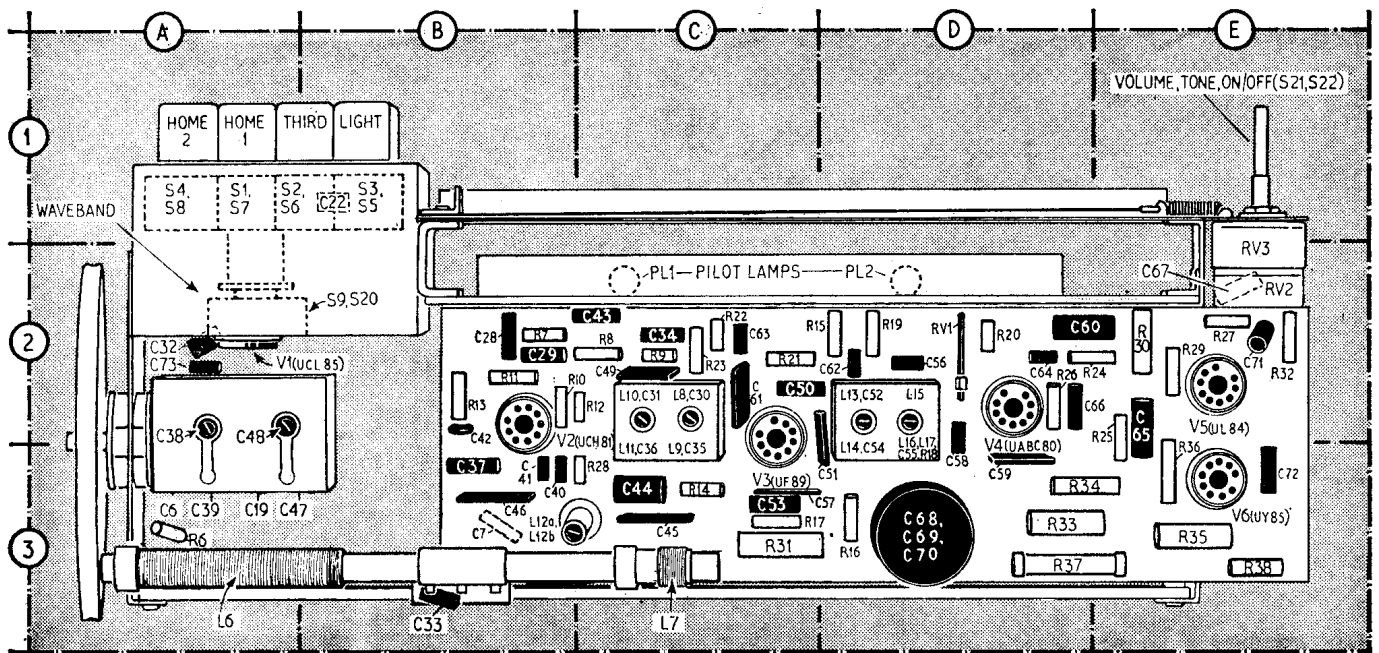
- 1.—Carry out steps 1-3 above.
- 2.—Press "THIRD" button and appreciably unscrew C24 to bring in programme.
- 3.—Follow on with step 5 above.

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

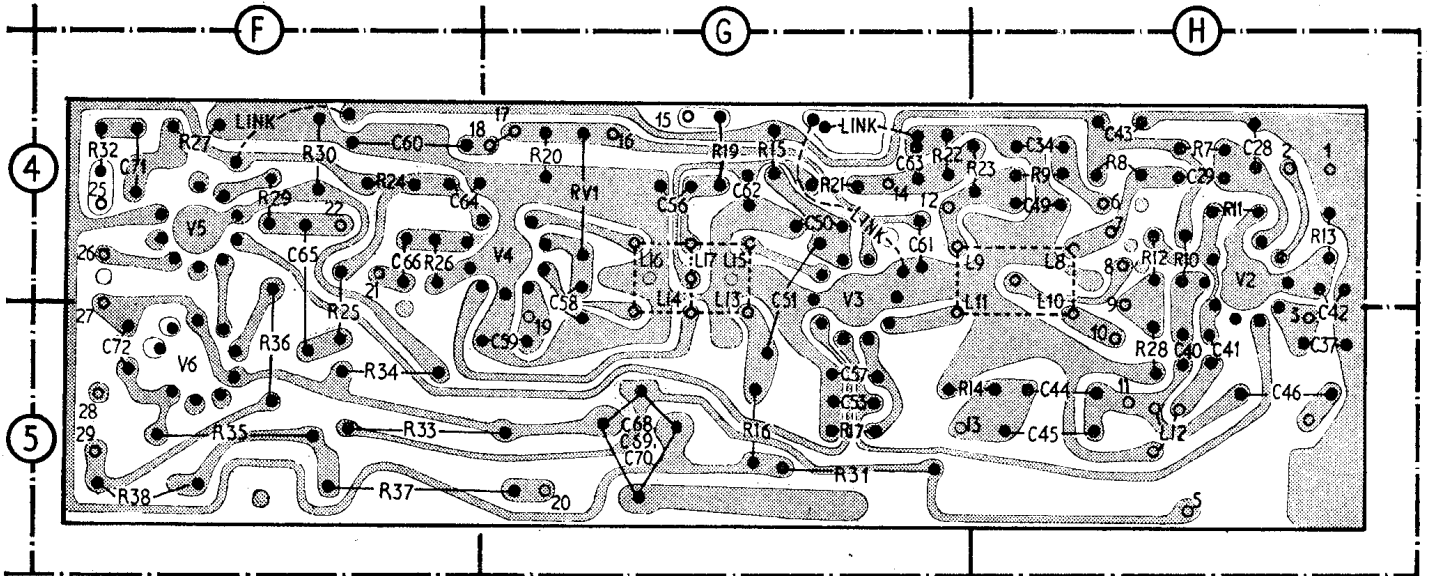
- 1.—Press "HOME 2" button and tune well to the right of indicator for North of England Home Service.
- 2.—Carefully adjust tuning for best performance and bring indicator into line with cursor.
- 3.—Press in turn the "HOME 1," "THIRD" and "LIGHT" buttons, setting-up the corresponding trimmer in sequence,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

nected 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

