"TRADER" SERVICE SHEET

1407

ALBA 3422

A.M./F.M. Table Receiver for A.C. or D.C. Mains

PERMEABILITY tuning is used throughout the Alba 3422, a 5-valve (plus rectifier) A.M./F.M. superhet table receiver designed to operate from A.C. or D.C. mains of 200-250V. Waveband ranges are 190-550m (M.W.) and 87.5—101Mc/s (F.M.). It is housed in a two-tone plastics cabinet, and the whole of the internal construction, including the printed circuit, is mounted on a vertical metal pressing.

Release date and original price: August 1958; £14 15*s* 9*d*. *Purchase tax extra.*

CIRCUIT DESCRIPTION

Aerial input on A.M. is via **C16** to permeability-tuned circuit **L9, C18, C19,** which precedes triode-heptode valve **V2** operating as frequency changer. Triode oscillator circuit is permeability-tuned by **L10, L11, L12, C23** and **C24,** the manually variable core of **L11** being ganged with that of **L9. L10** and **L12** are preset trimming coils to secure satisfactory tracking.

Tuned-primary, tuned-secondary transformers **L15, L16** and **L20, L21** couple the pentode intermediate frequency amplifying valve **V3** between the frequency changer and the diode detector valve, section **c** of **V4.** Like the aerial and oscillator stages, the I.F. transformers are permeability-tuned.

A.M. Intermediate frequency 470kc/s.

Audio frequency component in the output from detector diode **V4c** is developed across load resistance **R17** and passed via switch **S6, C41,** manual volume control **R19** and **C42** to the control grid circuit of the triode section of **V4,** which operates as A.F. amplifier.

I.F. filtering by **C37, R16, C38.** D.C. potential developed along **R17** is fed back via decoupling circuit to frequency changer and I.F. amplifying valves, giving automatic gain control.

Resistance-capacitance coupling by **R22, C43, R24, C44** between **V4d** and pentode output valve **V5, C43, R24, C44** at the same time comprising a tone control circuit. Fixed tone correction by **C48,** and by negative feed-back from **V5** cathode via **C47, R23** and **R20** to the volume control circuit.

F.M. Circuit

The F.M. aerial input circuit is designed for a 300Ω balanced feeder, which is coupled to the aerial tuning coil **L2** by **L1.** The triode R.F. amplifier **V1a** operates in the earthed-grid mode, its anode circuit being permeability-tuned by **L4, C6.** The amplified output is coupled to the oscillator circuit at the junction of the series-connected tuning capacitors **C8, C9** as part of the usual neutralizing system to prevent oscillator radiation from the aerial.

The grid circuit of the self-oscillating mixer valve **V1b** is permeability-tuned by **L5,** whose core is ganged with that of **L4.** Fixed tuning capacitance is provided by temperature-compensating capacitor **C11** in series with pre-set capacitor **C12,** together with **C8, C9, C10.** Reaction coupling by **L6** via **C13.**

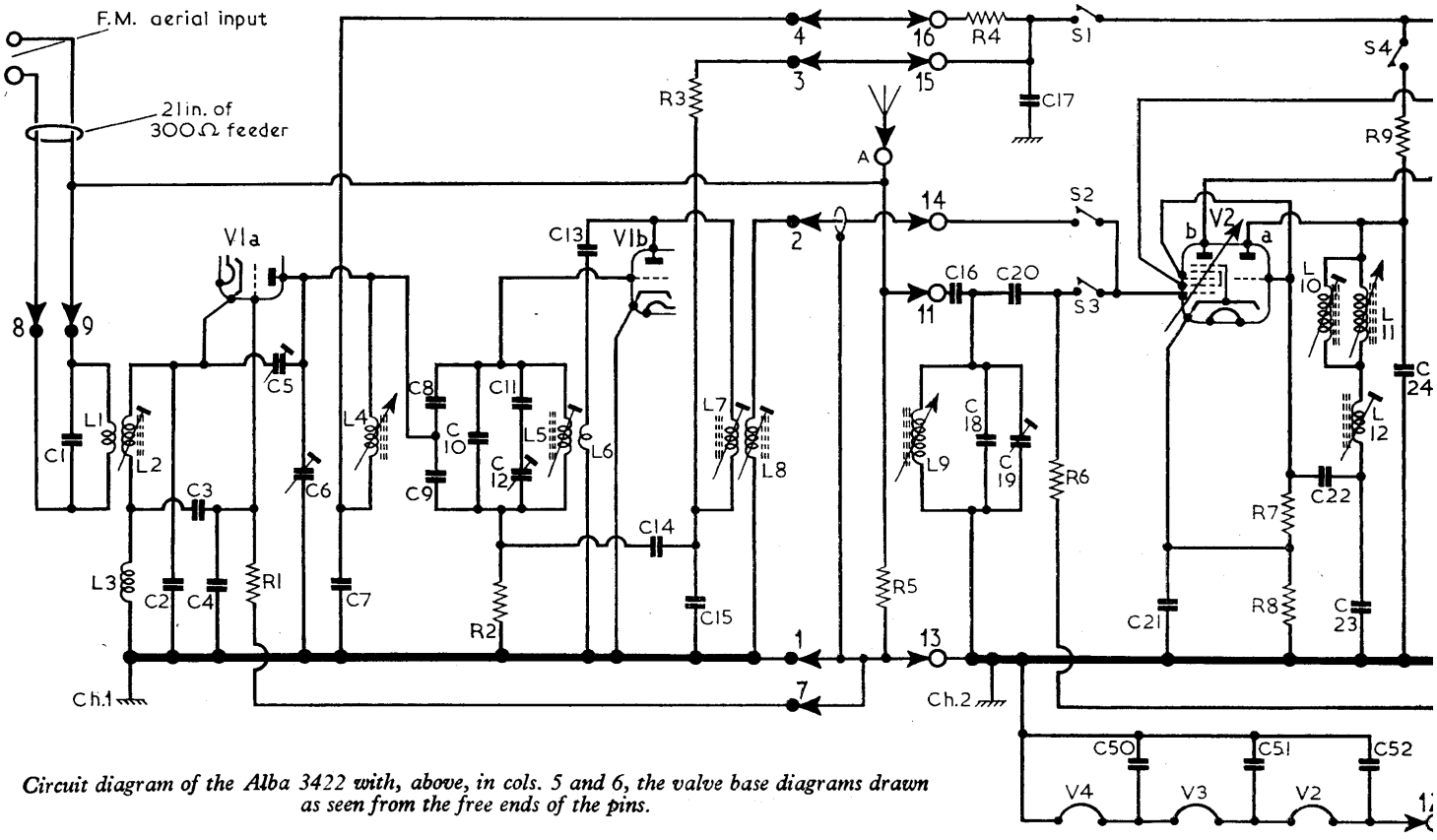
Mixer output at intermediate frequency is selected by tuned transformer coupling **L7, L8** and amplified by heptode section of **V2,** which operates as an I.F. amplifier and is, in turn, coupled by **L13, L14** to a second I.F. amplifier **V3.**

F.M. intermediate frequency 10.7Mc/s.

Output from **V3** is coupled via discriminator transformer **L17, L18, L19** to ratio detector circuit associated with diode sections **a** and **b** of **V4.** Audio frequency output is developed across A.F. load capacitor **C34** and passed via **R15, S5** and **C41** to the volume control, after which the circuit is the same as has been described for A.M. operation.

CIRCUIT ALIGNMENT

Equipment Required.—An accurately calibrated A.M. signal generator, modulated 30 per cent at 400c/s; an A.C. voltmeter for use as audio output meter; a 0-50μA meter for use as D.C. output



Circuit diagram of the Alba 3422 with, above, in cols. 5 and 6, the valve base diagrams drawn as seen from the free ends of the pins.

meter; a 100kΩ resistor and a non-metallic screwdriver type trimming tool.

If two peaks are obtained when adjusting the iron-dust coil cores, the correct peak is the one nearer the adjusting end of the coil former.

Allow the receiver and signal generator to warm up for at least 10 minutes before commencing the alignment procedure. It is important to maintain the signal generator output as low as possible to avoid A.G.C. action.

A.M. I.F. Alignment

1.—Remove the chassis from the cabinet, then remove the printed circuit board from the metal chassis panel as described in "Dismantling" overleaf. Connect the audio output meter across **T1** secondary winding and connect

(*Continued overleaf, col.* 1)

Resistors

R1	270kΩ	E4
R2	1MΩ	E5
R3	22kΩ	E4
R4	6·8kΩ	B2
R5	1MΩ	B3
R6	1MΩ	B2
R7	100kΩ	B1
R8	220Ω	B1
R9	33kΩ	B1
R10	2·2kΩ	B1
R11	56kΩ	B1
R12	22kΩ	C1
R13	1MΩ	B2
R14	2·2kΩ	C1
R15	10kΩ	C1
R16	100kΩ	C1
R17	330kΩ	C2
R18	56kΩ	C1
R19	500kΩ	C2
R20	1kΩ	C2
R21	10MΩ	C1
R22	220kΩ	D1
R23	2·2kΩ	D2
R24	100kΩ	D2
R25	470kΩ	D1
R26	10kΩ	D1
R27	220Ω	D1
R28	2·5kΩ	C3
R29	300Ω	B3
R30	3·3kΩ	C3
R31	70Ω	C3

Capacitors

C1	40pF	E5
C2	20pF	E5
C3	0·001μF	E4
C4	10pF	E5
C5	—	E4
C6	—	E4
C7	0·001μF	E5
C8	8·2pF	E5
C9	8·2pF	E5
C10	14pF	E5
C11	9pF	E5
C12	—	E4
C13	21pF	E5
C14	8pF	E5
C15	75pF	E5
C16	47pF	A2
C17	0·002μF	B2
C18	100pF	A1
C19	—	A1
C20	0·001μF	B2
C21	0·05μF	B1
C22	100pF	B1
C23	600pF	B1
C24	123pF	B1
C25	0·05μF	B1
C26	12pF	B1
C27	200pF	B1
C28	200pF	B1
C29	0·1μF	C2
C30	0·01μF	C1
C31	0·01μF	C1
C32	12pF	C1
C33	30pF	C1
C34	0·002μF	C1
C35	200pF	C1
C36	200pF	C1
C37	100pF	C1
C38	100pF	B2
C39	0·002μF	D1
C40	4μF	D1
C41	0·02μF	C2
C42	0·01μF	C1
C43	0·05μF	D1
C44	0·005μF	D1
C45	100μF	C2
C46	100μF	C2
C47	0·02μF	D1
C48	0·002μF	D1
C49	0·02μF	D2
C50	0·002μF	C1
C51	0·002μF	C1
C52	0·002μF	B2
C53	0·001μF	E5
C54	0·001μF	E5
C55	0·002μF	A1

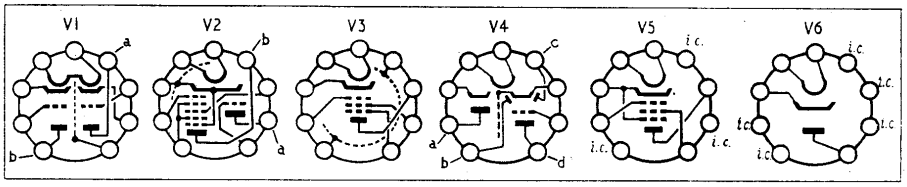
Coils*

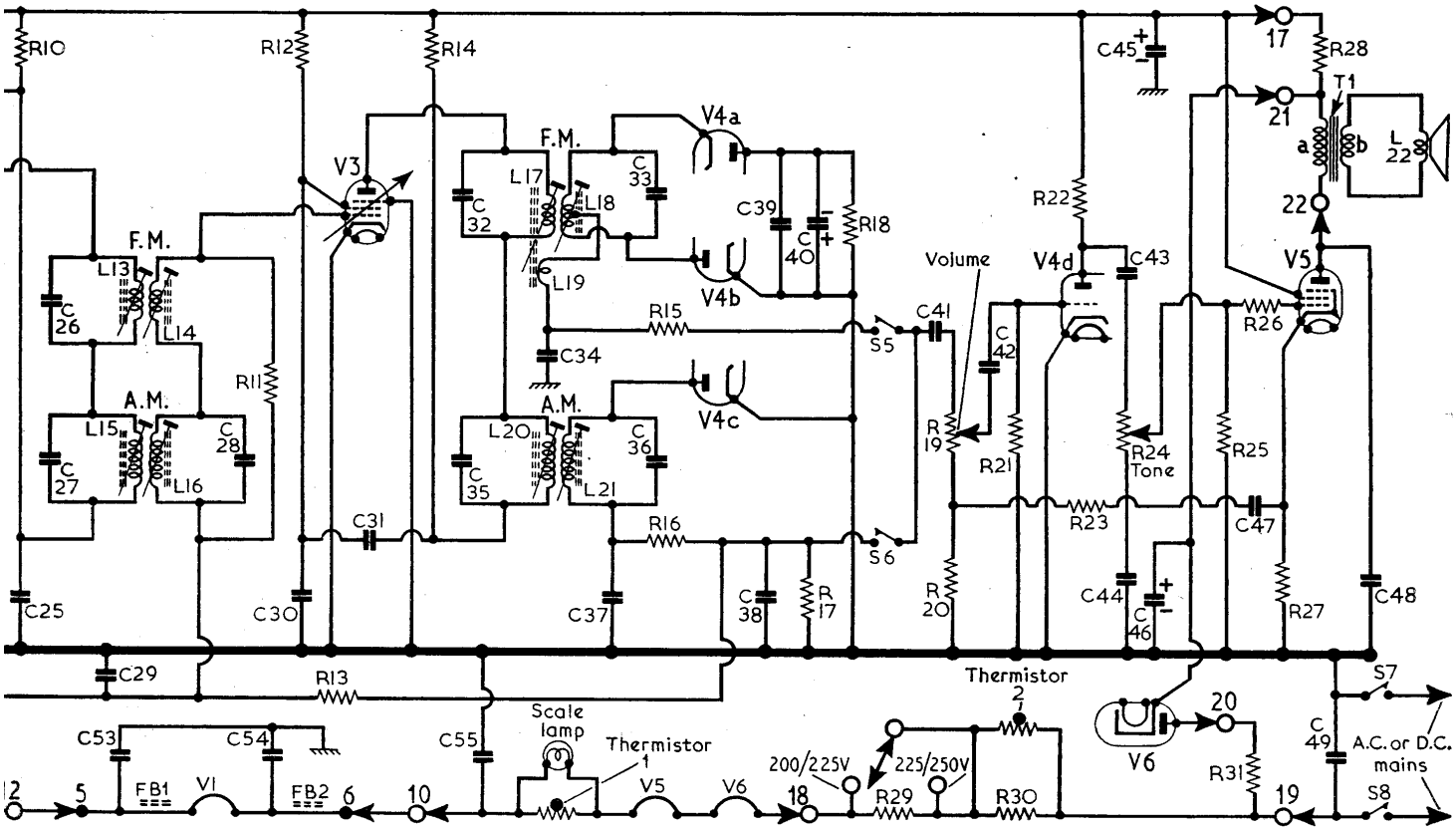
L1	—	E5
L2	—	E5
L3	—	E4
L4	—	E5
L5	—	E5
L6	—	E5
L7	—	E5
L8	—	E5
L9	5·5	A2
L10 (total) L11	2·5	B1 / B2
L12	0·75	B1
L13	0·6	B1
L14	1·0	B1
L15	10·0	B1
L16	10·0	B1
L17	0·6	C1
L18	0·4	C1
L19	—	C1
L20	10·0	C1
L21	10·0	C1
L22	2·5	C3

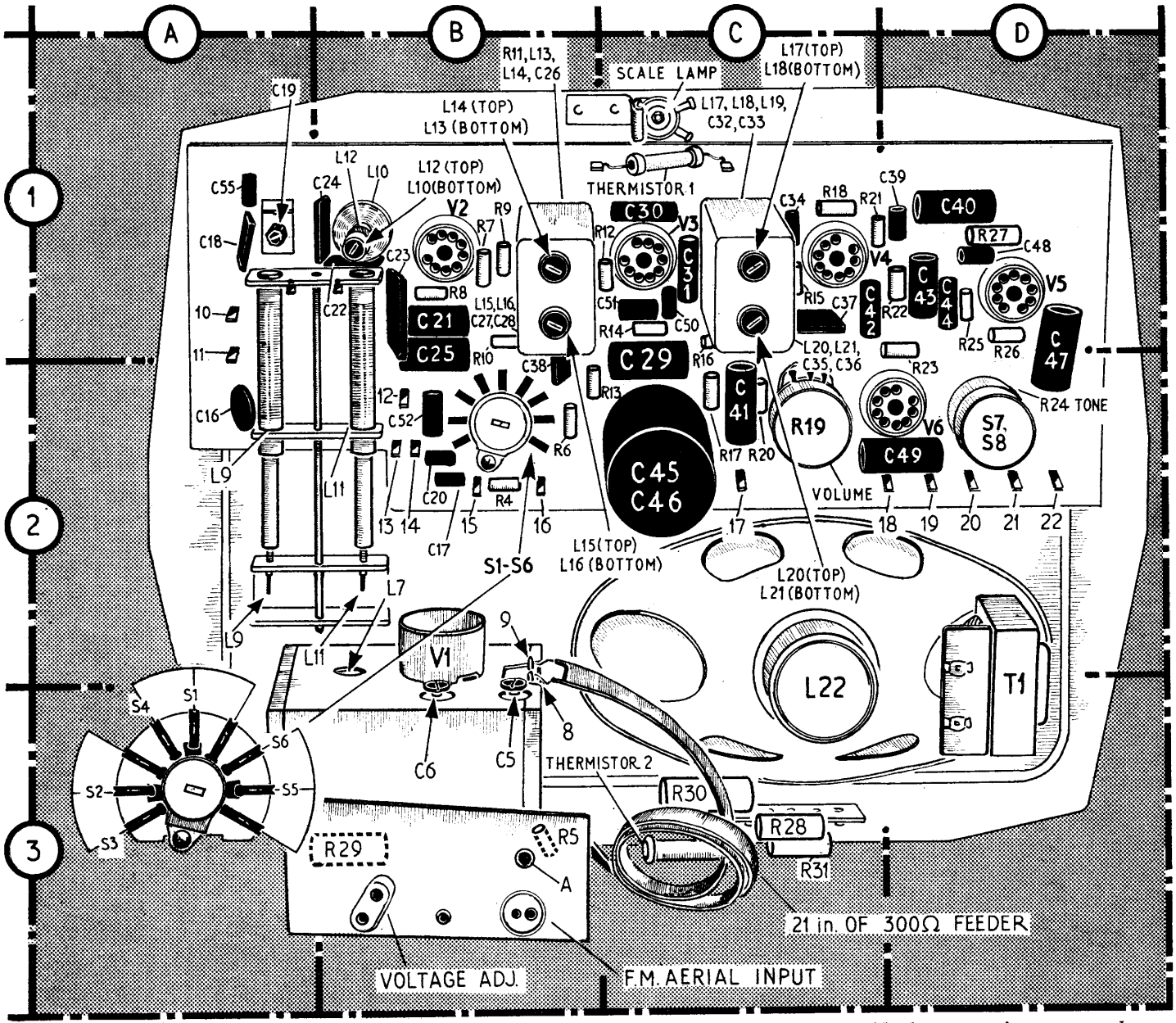
Miscellaneous*

T1 a	300·0	D3
T1 b	0·5	D3
Therm. 1[1]	1010	C1
Therm. 2[1]	1005	C3
FB1, FB2		E5
S1–S6	—	B2
S7, S8	—	D2

**Approximate D.C. resistance in ohms.* [1]*Mullard.*







Rear view of the vertical chassis as seen when removed from the cabinet. Most of the components outside the tuner unit are mounted on a printed circuit panel which occupies the upper half of the chassis in this view. A diagram of switches **S1-S6** *appears in location A3.*

Circuit Alignment—*continued*

signal generator, via a dummy aerial, across **L9** (A2).

2.—Switch the receiver to M.W., turn volume control to maximum and tone control fully clockwise. Feed in a modulated 470kc/s signal and adjust the cores of **L20** (C1), **L21** (C1), **L15** (B1) and **L16** (B1) in that order for maximum output.

3.—Repeat operation 2 until no further improvement in output can be obtained. Disconnect signal generator.

F.M. I.F. Alignment

4.—Disconnect the yellow lead from tag 16 on the printed circuit panel (location reference B2), connect signal generator output between the yellow lead and chassis. Connect the 0-50μA meter with the 100kΩ resistor in series across **C40,** positive lead to chassis.

5.—Switch the receiver to F.M. and tune it to 100Mc/s. Feed in an unmodulated 10.7Mc/s signal and adjust the cores of **L17** (C1), **L13** (B1), **L14** (B1), **L7** (E4) and **L8** (E5) for maximum reading on the D.C. output meter.

6.—Repeat operation 5.

7.—Feed in a modulated 10.7Mc/s signal and adjust the core of **L18** (C1) for *minimum* reading on the audio output meter.

8.—Readjust **L17** as described in operation 4, then repeat operation 7. Disconnect signal generator and D.C. output meter.

A.M. R.F. Alignment

9.—Refit the printed circuit panel to the metal chassis panel and replace chassis in cabinet. Feed signal into the A.M. aerial socket. Turn tuning spindle fully anti-clockwise and, ensuring that the cores of **L9** and **L11** are fully out, check that the cursor coincides with the 101Mc/s calibration mark on the F.M. tuning scale.

10.—Switch the receiver to M.W. Feed in a 600kc/s (500m) signal and tune it in on the receiver. If it is necessary to adjust the calibration, tune the receiver accurately to 500m, then remove the core of **L12** (B1). Still feeding in a 600kc/s signal, adjust the core of **L10** (B1) for maximum output.

11.—Replace the core of **L12** and adjust it, together with **C19** (A1), for maximum output.

12.—The cores of **L9** (A2) and **L11** (B2) will be properly adjusted at the works, and should not require re-adjustment.

F.M. R.F. Alignment

13.—Switch the receiver to F.M. and connect F.M. aerial. Tune to one of the F.M. transmissions and check calibration. The calibration will normally be correct when the tuning spindle is turned fully clockwise and the grub screw securing the F.M. tuning drive pulley is resting against the stop on the F.M. tuner unit. Should adjustment be required, however, tune to an F.M. transmission and loosen the grub screw

on the F.M. tuning drive pulley; then adjust the tuning control so that the cursor coincides with the appropriate calibration point. Retighten grub screw.

14.—While still receiving a transmission, adjust the core of **L2** (E4) and readjust **L7** (E4) and **L8** (E5) for optimum results.

DISMANTLING

Removing Chassis.—Remove control knobs (pull off);

place receiver face-down on a protected surface and remove back cover (four self-tapping screws);

remove four self-tapping screws from the edges of the metal chassis panel. The chassis complete with speaker may now be lifted clear of the front cabinet moulding.

Removing Printed Circuit Panel.—Remove scale lamp holder (pull-off); turn tuning spindle fully clockwise and release the tuning drive cord from the A.M. tuning core carrier by loosening the self-tapping screw accessible through a hole in the front of the metal chassis panel just below the tuning spindle.

The printed circuit panel may then be removed to the limit imposed by the pull-off inter-chassis connections.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those derived from information supplied by the manufacturers. Voltages were measured with a model 7 Avometer, whose negative lead was connected to the chassis pressing, which is also H.T. negative. It was operating from A.C. mains of 235V with the voltage adjustment suitably set.

Total H.T. current was 91mA on A.M. (35mA through R28 and 56mA to V5 anode), and 91.5mA on F.M. (41.5mA through R28 and 50mA to V5 anode).

Valve		Anode (V)	Screen (V)	Cathode (V)
V1a UCC85	†	98	—	—
V1b UCC85	†	70	—	—
V2a UCH81	*	80	—	3·2
V2b UCH81	*	140	140	3·2
	†	122	122	2·9
V3 UF89	*	140	85	—
	†	130	80	—
V4d UABC80	*	59	—	—
	†	55	—	—
V5 UL84	*	240[1]	167	12·0
	†	235[2]	150	10·8
V6 UY85		230[3]	—	255·0[4]

[1] *Anode current 56 mA.*
[2] *Anode current 50 mA.*
[3] *A.C. reading.*
[4] *Cathode current 90 mA. approximately.*
* *Receiver switched to A.M.*
† *Receiver switched to F.M.*

GENERAL NOTES

Switches.—**S1-S6** are the M.W./F.M. change-over switches ganged in a single rotary unit and shown in the rear-view illustration of the chassis in location reference B2. **S3, S4** and **S6** close on M.W.; **S1, S2** and **S5** close on F.M.

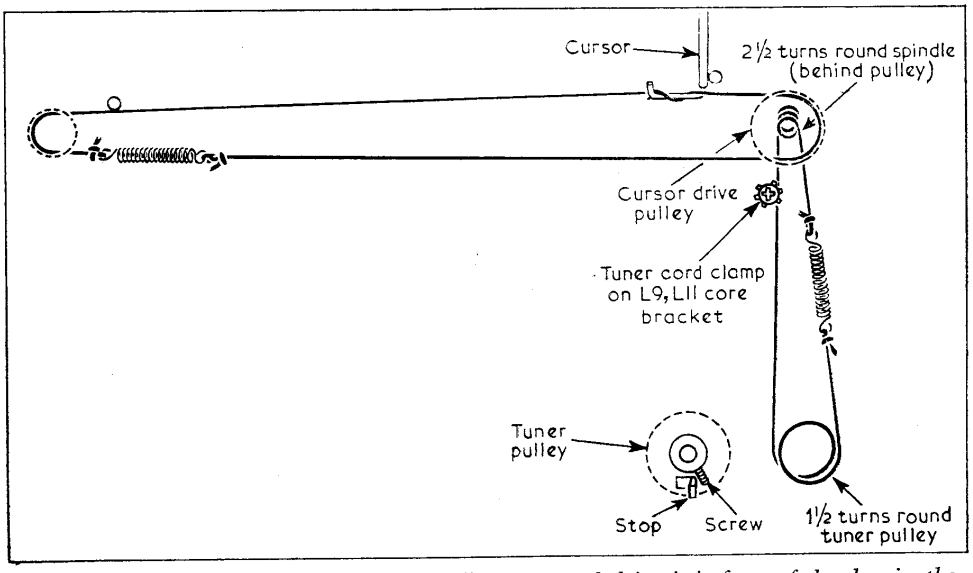
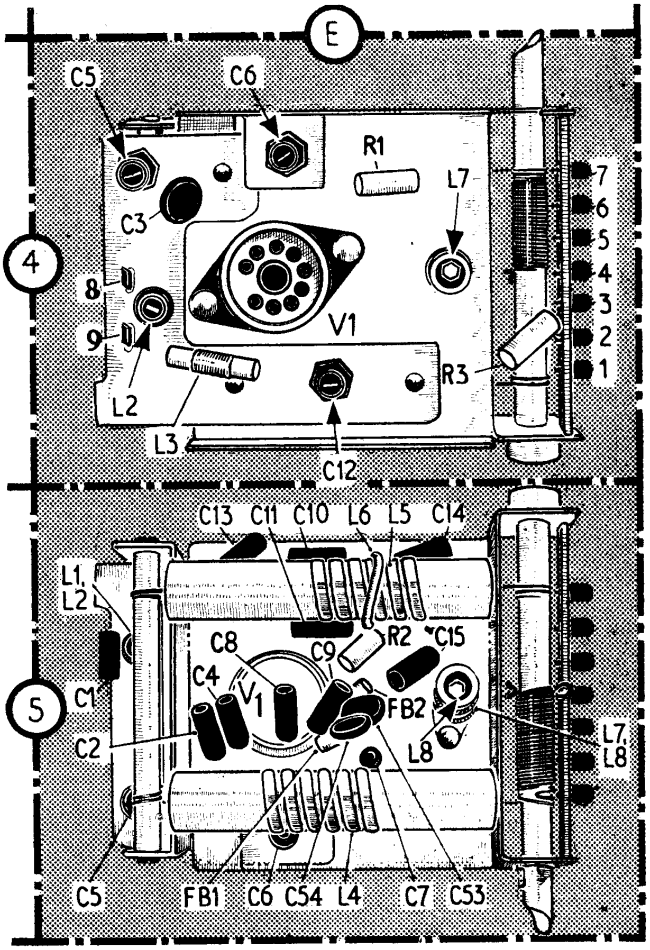


Diagram of the drive cord assembly. The horizontal drive is in front of the chassis; the vertical one is behind. A sketch of the tuner pulley shows the position of its stop.

Scale Lamp.—This is a 24V, 3W lamp with a clear tubular bulb and an M.E.S. base.

Drive Cord Replacement.—About 22in of nylon braided glass yarn is required for a new cursor drive cord and about 14in of similar cord is required for a new tuning drive cord. They should be run as shown in the sketch above, which is drawn as seen from the front of the receiver. The replacement of the cursor drive is a simple matter, but to replace the tuning drive it is necessary first to remove the printed circuit board (four Philips screws and two claws).

Access is then readily obtained to fit the new cord, but the clamping screw which holds the **L9, L11** core bracket to the cord can be reached only when the cores are fully inserted in their coils, after the printed circuit panel has been replaced. It is then reached through a hole in the metal front pressing; the cord can be pushed under it with a screwdriver.



Two views of the F.M tuner unit as seen with the screening cover removed. The tuner drive pulley is fitted on the spindle shown on the right. The movement of the cores of **L4** *and* **L5, L6** *is controlled by cords which are clearly shown passing round the spindle*

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