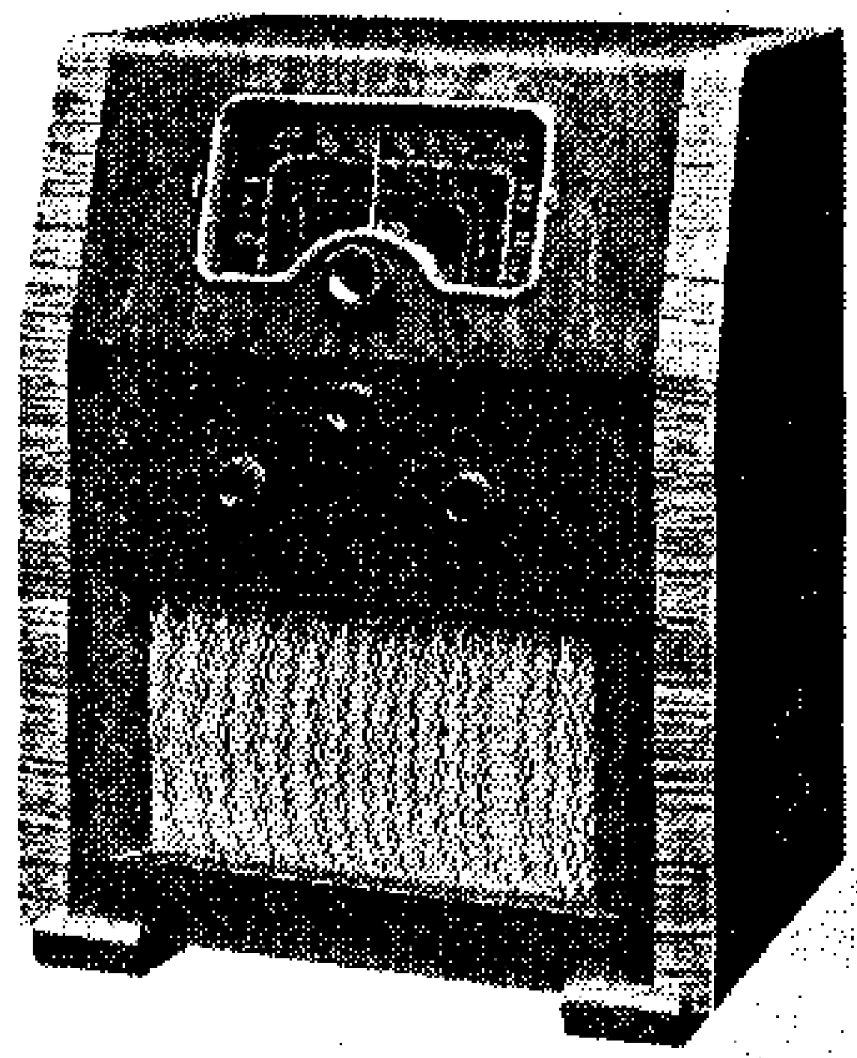
*Supplement to The Wireless & Electrical Trader, December 3, 1938*



# ALBA 820,
## 620, 670 AND 725 (AC)



The Alba 820.

SHORT-WAVE ranges of 12·5-32 m (referred to below as SW1) and 28-85 m are covered by the Alba 820 4-valve (plus rectifier) AC 4-band superhet.

Identical chassis are fitted in the 620 armchair console and the 670 console, while the chassis of the 725 radio-gramophone is very similar, the differences being explained under "725 Modifications."

It should be noted that there are AC/DC models bearing the same model numbers but this *Service Sheet* covers only the AC models and was prepared on an 820 table receiver.

*Release date for* 620, 670 *and* 820 (*AC*) *: March,* 1938.

*Release date for* 725 (*AC*) *: July,* 1938.

### CIRCUIT DESCRIPTION

Aerial input on MW and LW is via SW coupling coils **L9, L10** and MW and LW coupling coils **L1, L2** to inductively-coupled band-pass filter. Primary coils **L3, L4** are tuned by **C20**; secondaries **L13, L14** by **C23**; coupling by coils **L5, L6, L7, L8.** On SW, input is via coupling coils **L9** (SW1) and **L10** (SW2) to single tuned circuits **L11, C23** (SW1) and **L12, C23** (SW2).

First valve (**V1, Mullard metallised TH4**) is a triode hexode operating as frequency changer with internal coupling. Triode oscillator grid coils **L15** (SW1), **L16** (SW2), **L17** (MW) and **L18** (LW) are tuned by **C24**; parallel trimming by **C26** (SW2), **C27** (MW) and **C28** (LW); series tracking by **C5** (MW) and **C25** (LW). Reaction by coils **L19** (SW1), **L20** (SW2), **L21** (MW) and **L22** (LW).

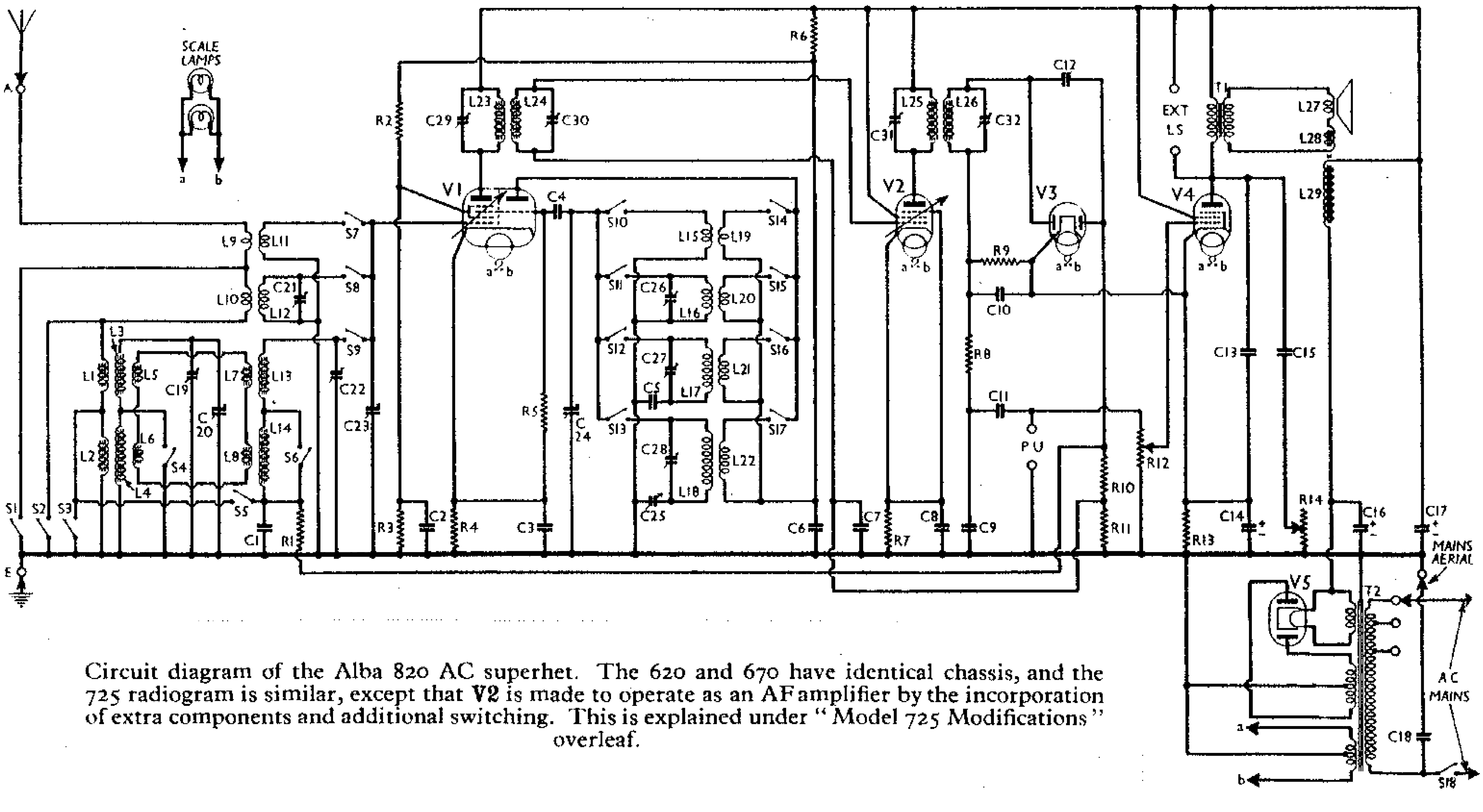
Second valve (**V2, Mullard metallised VP4B**) is a variable-mu RF pentode operating as intermediate frequency amplifier with tuned-primary tuned-secondary iron cored transformer couplings **C29, L23, L24, C30** and **C31, L25, L26, C32.**

**Intermediate frequency 117·5 KC/S.**

Diode second detector is part of separate double diode (**V3, Mullard metallised 2D4A**). Audio frequency component in rectified output is developed across load resistance **R9** and passed via IF stopper **R8,** AF coupling condenser **C11** and manual volume control **R12** to CG of pentode output valve (**V4, Mullard Pen A4**). IF filtering by **C10, R8** and **C9.** Provision for connection of gramophone pick-up across **R12.** Fixed tone correction by **C13,** and variable tone control by **C15, R14,** both in anode circuit. Provision for connection of high impedance external speaker by terminals across primary of internal speaker input transformer **T1.**

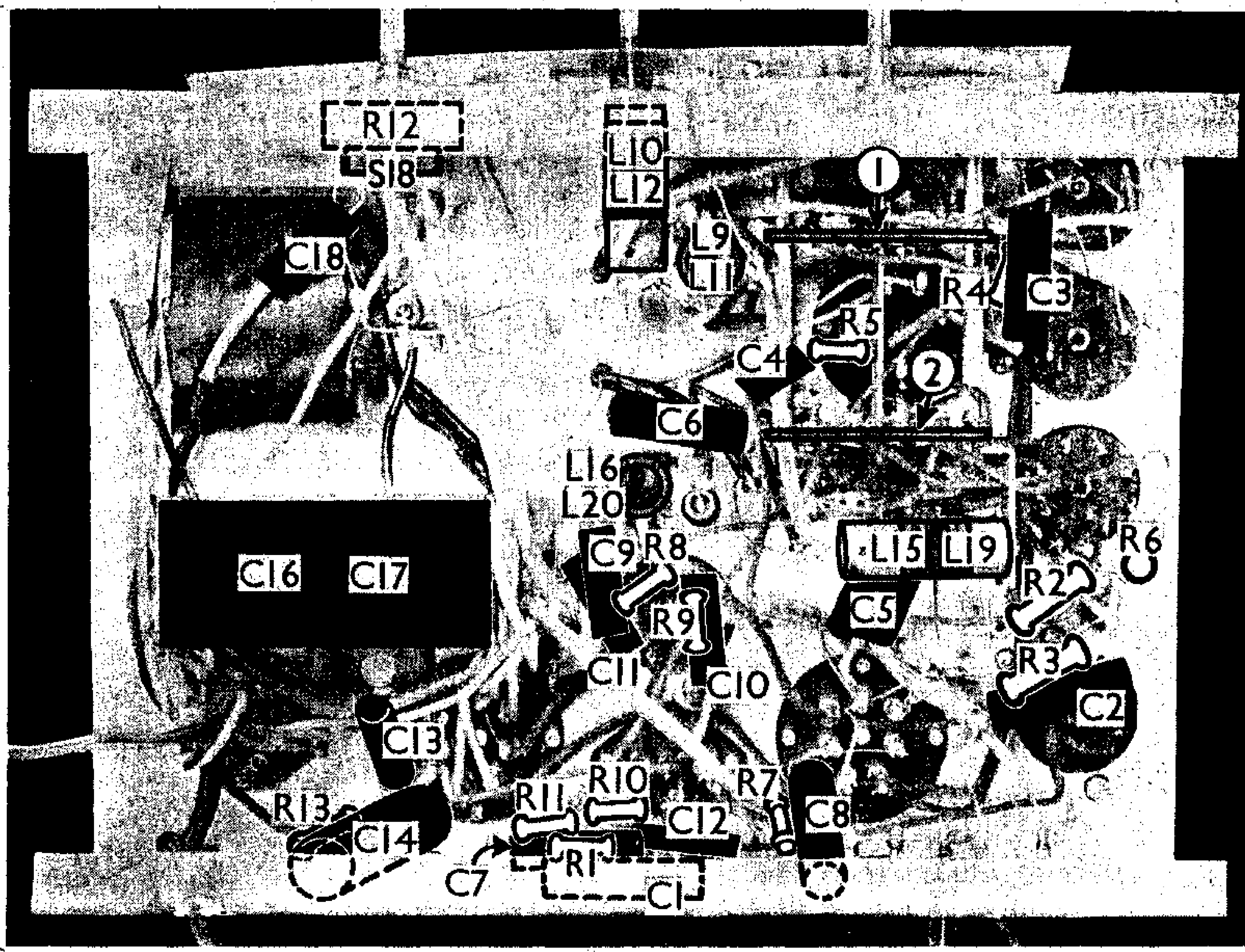
Second diode of **V3,** fed from **L26** via **C12,** provides DC potentials which are developed across load resistances **R10, R11** and fed back through decoupling circuits as GB to FC (except on the two SW bands) and IF valves, giving automatic volume control. Delay voltage is obtained from drop along **R13** in **V4** cathode circuit.

HT current is supplied by IHC full-wave rectifying valve (**V5, Mullard IW4/350**). Smoothing by speaker field **L29** and dry electrolytic condensers **C16, C17.** The mains aerial plug, when inserted in the aerial socket, couples one side of the mains to the aerial via **C18.** When it is not being used as such the plug is inserted in an extra earth socket, so that **C18** becomes a mains RF by-pass condenser.




Circuit diagram of the Alba 820 AC superhet. The 620 and 670 have identical chassis, and the 725 radiogram is similar, except that **V2** is made to operate as an AF amplifier by the incorporation of extra components and additional switching. This is explained under "Model 725 Modifications" overleaf.

Under-chassis view. Diagrams of the two switch units are overleaf. The tone control components **R14, C15** are wired to the speaker input panel inside the cabinet, and are therefore not shown in this or the plan chassis view.




## COMPONENTS AND VALUES

| RESISTANCES | | Values (ohms) |
|---|---|---|
| R1 | V1 hexode CG decoupling .. | 1,000,000 |
| R2 | V1 SG HT feed potential divider resistances.. | 10,000 |
| R3 | | 25,000 |
| R4 | V1 fixed GB resistance .. | 200 |
| R5 | V1 osc. CG resistance .. | 25,000 |
| R6 | V1 SG and osc. anode HT feed | 13,000 |
| R7 | V2 fixed GB resistance .. | 150 |
| R8 | IF stopper .. .. .. | 50,000 |
| R9 | V3 signal diode load .. | 500,000 |
| R10 | V3 AVC diode load resistances | 500,000 |
| R11 | | 500,000 |
| R12 | Manual volume control .. | 500,000 |
| R13 | V4 GB and AVC delay .. | 150 |
| R14 | Variable tone control .. | 50,000 |

| CONDENSERS | | Values (μF) |
|---|---|---|
| C1 | V1 hexode CG decoupling .. | 0·1 |
| C2 | V1 SG decoupling .. .. | 0·1 |
| C3 | V1 cathode by-pass .. | 0·1 |
| C4 | V1 osc. CG condenser .. | 0·0001 |
| C5 | Osc. circuit MW tracker .. | 0·002 |
| C6 | V1 osc. anode decoupling .. | 0·1 |
| C7 | V2 CG decoupling .. .. | 0·1 |
| C8 | V2 cathode by-pass .. | 0·1 |
| C9 | IF by-pass condensers .. | 0·0002 |
| C10 | | 0·0002 |
| C11 | AF coupling to V4 .. .. | 0·005 |
| C12 | Coupling to V3 AVC diode .. | 0·0002 |
| C13 | Fixed tone corrector .. | 0·005 |
| C14* | V4 cathode by-pass .. .. | 25·0 |
| C15 | Part of variable tone control | 0·05 |
| C16* | HT smoothing .. .. | 6·0 |
| C17* | | 6·0 |
| C18 | Mains aerial coupling .. | 0·0001 |
| C19‡ | Band-pass pri. MW trimmer | 0·00003 |
| C20† | Band-pass primary tuning .. | — |
| C21‡ | Aerial SW2 trimmer .. | 0·00003 |
| C22‡ | Band-pass sec. MW trimmer | 0·00003 |
| C23† | SW aerial and band-pass secondary tuning .. .. | — |
| C24† | Oscillator circuit tuning .. | — |
| C25‡ | Osc. circuit LW tracker .. | 0·0007 |
| C26‡ | Osc. circuit SW2 trimmer .. | 0·00003 |
| C27‡ | Osc. circuit MW trimmer .. | 0·00003 |

*Continued in next column*

| CONDENSERS (*Continued*) | | Values (μF) |
|---|---|---|
| C28‡ | Osc. circuit LW trimmer .. | 0·00003 |
| C29‡ | 1st IF trans. pri. tuning .. | — |
| C30‡ | 1st IF trans. sec. tuning .. | — |
| C31‡ | 2nd IF trans. pri. tuning .. | — |
| C32‡ | 2nd IF trans. sec. tuning .. | — |

* Electrolytic. † Variable. ‡ Pre-set.

| OTHER COMPONENTS | | | Approx. Values (ohms) |
|---|---|---|---|
| L1 | Aerial MW and LW coupling coils .. .. .. | | 60·0 |
| L2 | | | 10·0 |
| L3 | Band-pass primary coils .. | | 1·6 |
| L4 | | | 18·5 |
| L5, L6 | Band-pass coupling coils, total | | 47·0 |
| L7, L8 | Band-pass coupling coils, total | | 45·0 |
| L9 | Aerial SW1 coupling coil .. | | 0·1 |
| L10 | Aerial SW2 coupling coil .. | | 0·2 |
| L11 | Aerial SW1 tuning coil .. | | Very low |
| L12 | Aerial SW2 tuning coil .. | | 0·1 |
| L13 | Band-pass secondary coils .. | | 1·6 |
| L14 | | | 21·0 |
| L15 | Osc. circuit SW1 tuning coil.. | | 0·05 |
| L16 | Osc. circuit SW2 tuning coil | | 0·1 |
| L17 | Osc. circuit MW tuning coil | | 2·5 |
| L18 | Osc. circuit LW tuning coil | | 13·0 |
| L19 | Oscillator SW1 reaction .. | | 17·0 |
| L20 | Oscillator SW2 reaction .. | | 0·4 |
| L21 | Oscillator MW reaction .. | | 44·0 |
| L22 | Oscillator LW reaction .. | | 87·0 |
| L23 | 1st IF trans. | Pri. .. | 33·0 |
| L24 | | Sec. .. | 33·0 |
| L25 | 2nd IF trans. | Pri. .. | 33·0 |
| L26 | | Sec. .. | 33·0 |
| L27 | Speaker speech coil .. .. | | 1·9 |
| L28 | Hum neutralising coil .. | | 0·1 |
| L29 | Speaker field coil .. .. | | 1,200·0 |
| T1 | Speaker input trans. | Pri. .. | 450·0 |
| | | Sec. .. | 0·4 |
| T2 | Mains trans. | Pri., total .. | 24·0 |
| | | Heater sec. .. | 0·05 |
| | | Rect. heat. sec.. | 0·1 |
| | | HT sec., total .. | 470·0 |
| S1-17 | Waveband switches .. | | — |
| S18 | Mains switch, ganged R12 .. | | — |

## DISMANTLING THE SET

**Removing Chassis.**—Remove the two lowest knobs and the tuning knob (recessed screws) and the four bolts (with washers and rubber washers) holding the chassis to the shelf. The chassis can now be withdrawn from the cabinet to the extent of the speaker leads, which is sufficient for normal purposes.

If it is desired to free the chassis entirely, unsolder the speaker leads and *when replacing*, connect them as follows, noting that the tags are numbered :—F and 3 joined, red ; 1, black and one side of **C15** ; F, blue. The white lead and the yellow lead from the tone control go to the earthing tag on the speaker frame.

**Removing Speaker.**—The speaker can be removed from the cabinet by unsoldering the leads and removing the nuts, washers and rubber washers from the four screws holding it to the sub-baffle.

*When replacing*, see that there is a rubber washer on each of the fixing screws, between the sub-baffle and the speaker, place the transformer on the right and connect the leads as above.

## VALVE ANALYSIS

| Valve | Anode Voltage (V) | Anode Current (mA) | Screen Voltage (V) | Screen Current (mA) |
|---|---|---|---|---|
| V1 TH4 | 250<br>Oscillator 112 | 2·4<br>Oscillator 5·0 | 52 | 3·9 |
| V2 VP4B | 250 | 8·0 | 250 | 3·1 |
| V3 2D4A | — | — | — | — |
| V4 PenA4 | 236 | 38·0 | 250 | 6·6 |
| V5 IW4/350 | 310† | — | — | — |

† Each anode, AC.

Valve voltages and currents given in the table above are those measured in our receiver when it was operating on mains of 225 V, using the 220 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the medium band and the volume control was at maximum, but there was no signal input.

Voltages were measured on the 400 V scale of a model 7 Universal Avometer, chassis being negative.

## GENERAL NOTES

**Switches.**—**S1-S17** are the waveband switches, ganged in two rotary units beneath the chassis. These are indicated in our under-chassis view and are shown in detail in the diagrams in column 3, where they are drawn as seen from the front of the underside of the chassis. The table (column 2) gives the switch positions for the four control settings, starting from fully anti-clockwise. A dash indicates *open* and **C**, *closed*.

**S18** is the QMB mains switch, ganged with the volume control **R12**.

**Coils.**—**L1-L6**; **L7, L8, L13, L14**; **L17, L18, L21, L22**; and the IF transformers **L23, L24** and **L25, L26** are in five screened units on the chassis deck, the last two containing their trimmers.

**L9, L11**; **L10, L12**; **L15, L19** and **L16, L20** are in four unscreened tubular units beneath the chassis.

**External Speaker.**—Two terminals are provided on the internal speaker transformer panel for a high impedance (about 8,000 O) external speaker.

**Scale Lamps.**—These are two Osram MES types, rated at 6·2 V, 0·3 A.

**Condensers C16, C17.**—These are two 6 μF dry electrolytics in a single carton beneath the chassis, having a common negative (black) lead. The red lead is the positive of **C16** and the yellow the positive of **C17**.

**Chassis Divergencies.**—Our chassis differs in several respects from the makers' original diagram. This shows **R5** returned to chassis and no tone control circuit. The tone control components **C15, R14** are wired inside the cabinet to the speaker terminal strip and are therefore not shown in our chassis illustrations.

The values of the coil resistances in our chassis differ from those given by the makers, so that any discrepancies here may not indicate a fault, but merely that slightly different coils are in use.

The same applies to the resistances of the mains transformer windings.

## MODEL 725 MODIFICATIONS

In the radiogram model 725 **V2** is switched to provide AF amplification for the pick-up. The modifications are as follows.

One pick-up socket goes to chassis, while the other goes to a fixed contact on an extra switch bank. The bottom of **L24** is disconnected from the AVC line and taken to the moving contact of the switch. The AVC line goes to four other fixed contacts of this switch. In the SW1 SW2, MW and LW positions, **L24** is connected to the AVC line, while in the gram position it is connected to the upper pick-up socket. The pick-up is thus fed into the grid circuit of **V2.**

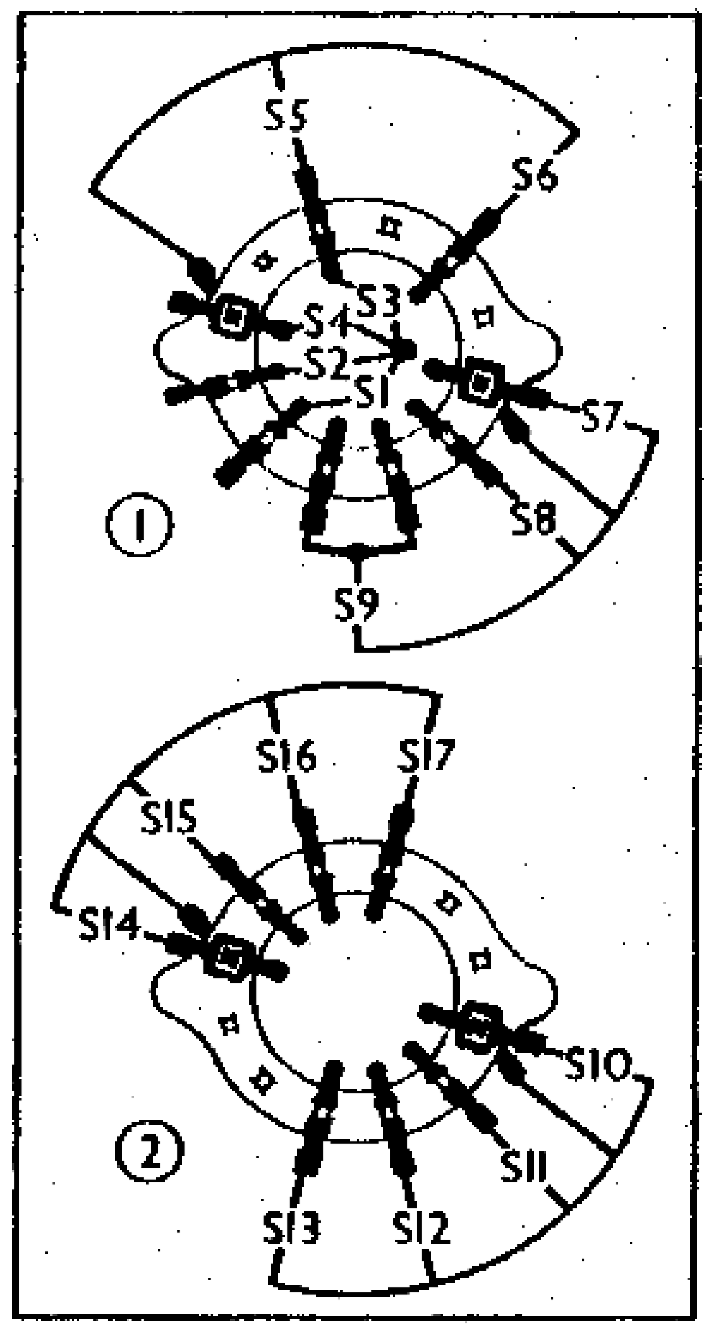
In the anode circuit of **V2**, between the top of **L25** and the HT line a 5,000 O load resistance is inserted. The junction of **L25** and this resistance goes to one side of a 0·002 μF by-pass condenser, the other side of which goes to chassis. The junction of **L25** and the load resistance also goes to a 0·005 μF AF coupling condenser, the other side of which goes to one fixed contact of another rotary switch.

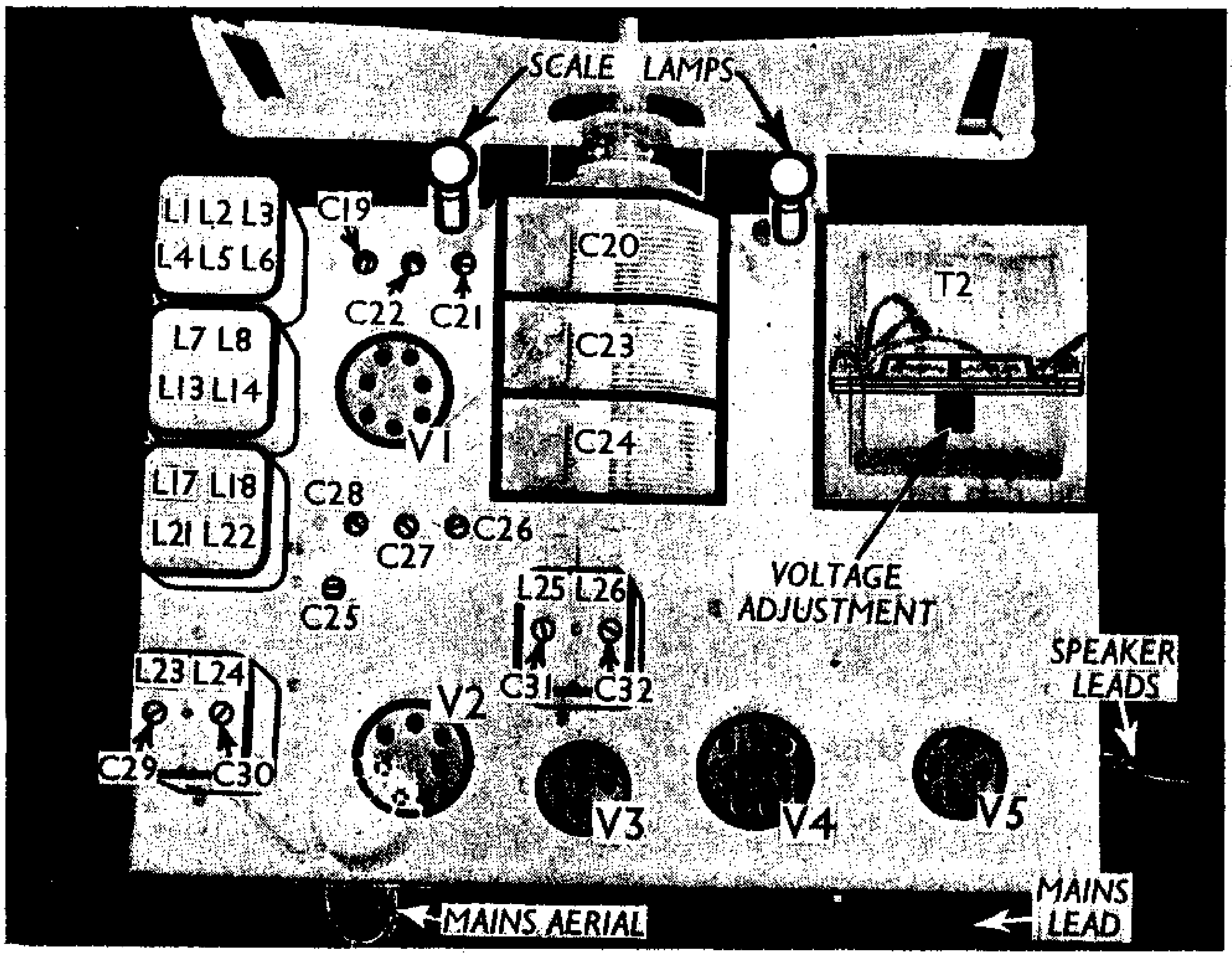
The junction of **C11** and **R12** is broken, and **R12** is taken to the moving contact of this second rotary switch. **C11** is taken to four fixed contacts of this switch. On SW1, SW2, MW and LW, **C11** is thus connected to **R12** as in our diagram, while on gram the AF coupling condenser goes to **R12, C11** being disconnected, and so muting radio.

## TABLE AND DIAGRAMS OF THE SWITCH UNITS

| Switch | SW1 | SW2 | MW | LW |
|---|---|---|---|---|
| S1 | C | — | — | — |
| S2 | — | C | — | — |
| S3 | — | — | C | — |
| S4 | C | — | C | — |
| S5 | C | — | — | — |
| S6 | — | — | C | — |
| S7 | C | — | — | — |
| S8 | — | C | — | — |
| S9 | — | — | C | C |
| S10 | C | — | — | — |
| S11 | — | C | — | — |
| S12 | — | — | C | — |
| S13 | — | — | — | C |
| S14 | C | — | — | — |
| S15 | — | C | — | — |
| S16 | — | — | C | — |
| S17 | — | — | — | C |

Diagrams of the switch units, as seen from the front of the underside of the chassis.




Plan view of the chassis. Note the six trimmers and the tracker which are adjustable through holes in the chassis deck.

## CIRCUIT ALIGNMENT

**IF Stages.**—Connect signal generator between control grid (top cap) of **V1** and chassis, and feed in a 117·5 KC/S signal, with the receiver switched to MW. Now adjust **C32, C31, C30** and **C29** in turn for maximum output, reducing the input progressively as the circuits come into alignment. Re-check these settings.

**RF and Oscillator Stages.**—See that the scale pointer is horizontal when the gang is at maximum. If it is not, adjust it by means of the pointer clip on the drive spindle. The volume control should be set at maximum, and the signal generator connected to the **A** and **E** sockets.

**MW.**—Switch set to MW, tune to 250 m on scale, feed in a 250 m (1,200 KC/S) signal, and adjust **C27**, then **C22** and **C19**, for maximum output.

**LW.**—Switch set to LW, tune to 1,200 m on scale, feed in a 1,200 m (250 KC/S) signal, and adjust **C28** for maximum output, rocking the gang for optimum results.

Feed in a 1,900 m (157 KC/S) signal, tune it in, and adjust **C25** for maximum output, while rocking the gang.

**SW2.**—Switch set to SW2 (28-85 m), tune to 31 m on scale and feed in a 31 m (9·67 MC/S) signal. Adjust **C26** for maximum output, choosing the peak obtained with **C26** nearest its minimum position. Now adjust **C21** for maximum output.

**SW1.**—No alignment adjustments are possible on this band.

Printed in Great Britain as a supplement to *The Wireless & Electrical Trader* by Sanders, Phillips & Co., Ltd., The Baynard Press, Chryssell Road, London, S.W.9