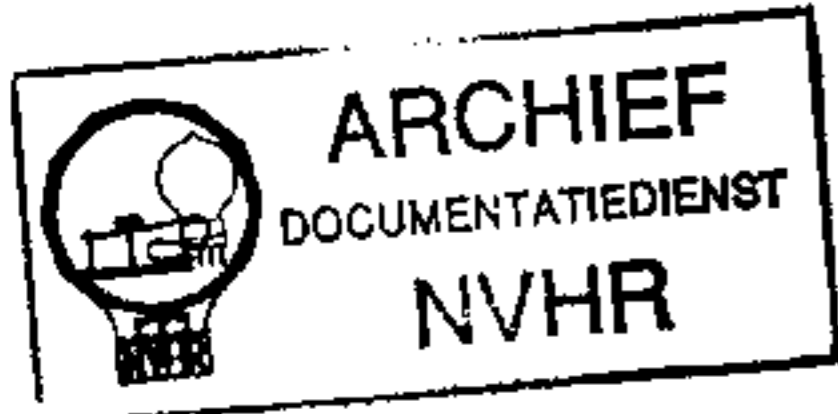


Ned. Ver. v. Historie v/d Radio



BURGOYNE AWS

AWSG AND AWSG/RG

A SHORT-WAVE range of 19-56 metres is covered by the Burgoyne AWS 4-valve (plus rectifier) A.C. 3-band superhet. It is suitable for mains of 200-250 V, 40-60 C/S, and is provided with a sensitivity switch and sockets for a gramophone pick-up and an extension speaker.

An identical chassis is fitted in the AWSG radio-gramophone and the AWSG/RG automatic radio-gramophone, but this Service Sheet was prepared on an AWS.

CIRCUIT DESCRIPTION

Aerial input from A1 via series condenser C1, L.W. second channel rejector L1, C3, S2 and coupling coils L4 (S.W.), L5 (M.W.), and via L3, L6 (L.W.) to single tuned circuits L7, C33 (S.W.), L8, C33 (M.W.) and L9, C33 (L.W.). An I.F. filter circuit L2, C30 is connected across aerial circuit. Second aerial input socket A2 feeds the signal to A1 via small condenser C2.

First valve (V1, Tungram metallised V04) is an octode operating as frequency changer with electron coupling. Oscillator grid coils L11 (S.W.), L12 (M.W.) and L13 (L.W.) are tuned by C34; parallel trimming by C35 (S.W.); C10, C36 (M.W.) and C11, C37 (L.W.); series tracking by C8, C38 (M.W.) and C9, C39 (L.W.). An additional adjustment on S.W. is by a series connected coil L10. Anode reaction is by coils L14 (S.W.), L15 (M.W.) and L16 (L.W.). The alternative resistances R4 and R5 connected in the cathode circuit via switches S18 or S19 provide the appropriate fixed G.B. voltages for the three positions of the sensitivity switch control.

Second valve (V2, Tungram metallised VP4B) is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings C40, L17, L18, C41 and C42, L19, L20, C43. Two more resistances here form a second part of the sensitivity control. R3, connected across L17 by switch S20 and R7 across L18 via S21 reduce the gain in this stage and broaden tuning when the switches close, on the "Local" position of the control.

Intermediate frequency 473KC.S.

Diode second detector is part of double diode triode valve (V3, Tungram metallised DDT4). Audio frequency component in rectified output is developed across load resistance R14 and passed via I.F. stopper R15, coupling condenser C18 and manual volume control R16 to C.G. of triode section which operates as A.F. amplifier. I.F. filtering by R15, C20 and C21. Provision for connection of gramophone pick-up across R16 via switch S17. The final section of the sensitivity control is provided here by means of the G.B. resist-

F.C. and I.F. valves, giving automatic volume control. Delay voltage is obtained from R17, R18.

Resistance-capacity coupling by R20, C24 and R24 between V3 triode and pentode output valve (V4, Tungram APP4C). Provision for connection of high impedance external speaker across the leads to the primary of the internal speaker input transformer T1, which can be disconnected by turning the special external speaker plug slightly anti-clockwise in its socket, opening S25 and thus muting the internal speaker. Variable R.C. tone control in anode circuit by C26 and R26.

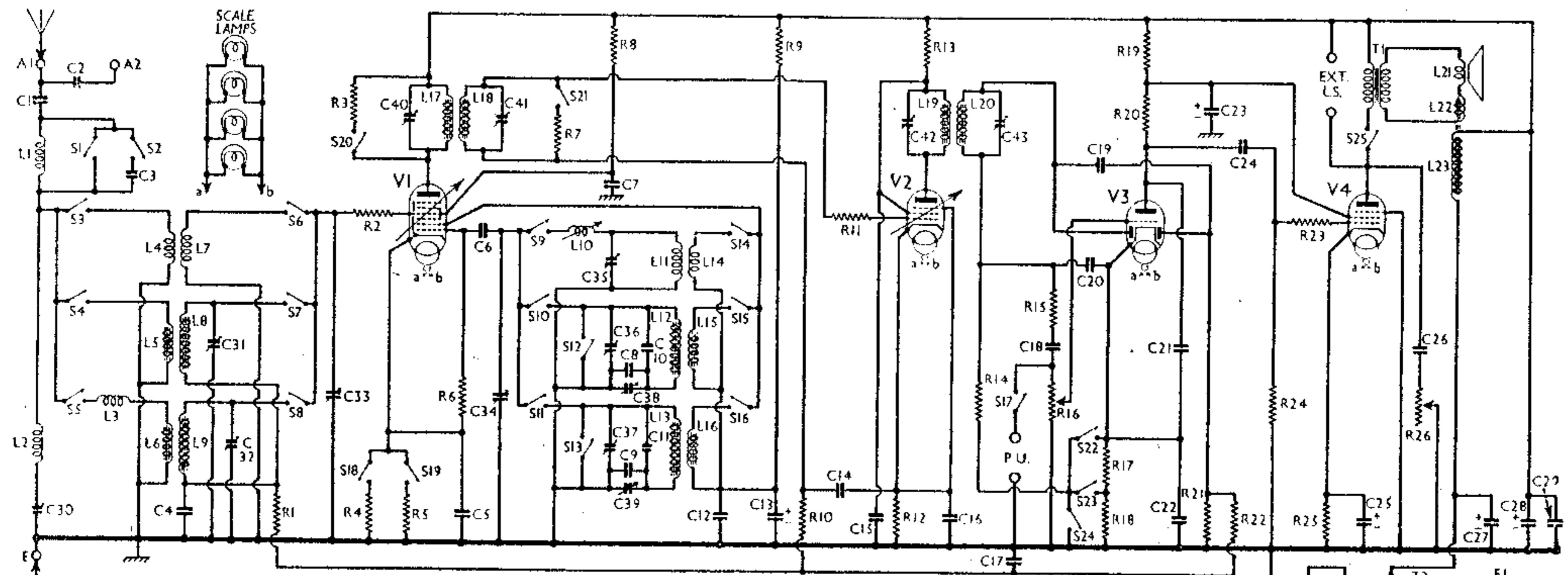
H.T. current is supplied by an I.H.C. full-wave rectifying valve (V5, Tungram APV4). Smoothing by speaker field L23 and dry electrolytic condensers C27, C28. Fuses F1 and F2, located in the mains connector plug, protect the mains input circuit. H.T. circuit R.F. filtering by C29.

COMPONENTS AND VALUES

RESISTANCES		Values (ohms)
R1	V1 pentode C.G. decoupling ..	100,000
R2	V1 pentode C.G. stabiliser ..	100
R3	L17 sensitivity shunt resistance ..	50,000
R4	V1 fixed G.B. and sensitivity control resistances ..	200
R5	V1 osc. C.G. resistance ..	500
R6	V1 osc. C.G. resistance ..	50,000
R7	L18 sensitivity shunt resistance ..	50,000
R8	V1 S.G. H.T. feed ..	40,000
R9	V1 osc. anode H.T. feed ..	40,000
R10	V2 C.G. decoupling ..	250,000
R11	V2 C.G. stabiliser ..	500
R12	V2 fixed G.B. resistance ..	100
R13	V2 S.G. and anode H.T. feed ..	5,000
R14	V3 signal diode load resistance ..	250,000
R15	I.F. stopper ..	250,000
R16	Manual volume control ..	500,000
R17	V3 G.B. and sensitivity control resistances ..	500
R18	V3 triode anode and V4 S.G. H.T. feed ..	5,000
R19	V3 triode anode load ..	30,000
R20	V3 A.V.C. diode load ..	500,000
R21	A.V.C. line decoupling ..	250,000
R22	V4 C.G. I.F. stopper ..	50,000
R23	V4 C.G. resistance ..	250,000
R24	V4 G.B. resistance ..	140
R25	Variable tone control ..	10,000

CONDENSERS		Values (μF)
C1	Aerial series condenser ..	0.0001
C2	A2 socket aerial series condenser ..	0.000035
C3	L.W. second channel rejector tuning ..	0.00005
C4	V1 pentode C.G. decoupling ..	0.1
C5	V1 cathode by-pass ..	0.1
C6	V1 osc. C.G. condenser ..	0.0001
C7	V1 S.G. decoupling ..	0.1
C8	Osc. circuit M.W. fixed tracker ..	0.00048
C9	Osc. circuit L.W. fixed tracker ..	0.00013
C10	Osc. circuit M.W. fixed trimmer ..	0.00002
C11	Osc. circuit L.W. fixed trimmer ..	0.00005
C12	Osc. anode R.F. by-pass ..	0.1
C13*	Oscillator anode decoupling ..	2.0
C14	V2 C.G. decoupling ..	0.001
C15	V2 S.G. and anode decoupling ..	0.1
C16	V2 cathode by-pass ..	0.1
C17	A.V.C. line decoupling ..	0.1
C18	A.F. coupling to V3 triode ..	0.005
C19	V3 A.V.C. diode coupling ..	0.0001
C20	I.F. by-pass ..	0.0004
C21	V3 triode anode I.F. by-pass ..	0.0001
C22	V3 cathode by-pass ..	0.1
C23*	V3 triode anode and V4 S.G. decoupling ..	4.0
C24	V3 to V4 A.F. coupling ..	0.01
C25*§	V4 cathode by-pass ..	50.0
C26	Part variable tone control ..	0.05
C27*	H.T. smoothing ..	8.0
C28*	H.T. smoothing ..	12.0
C29	H.T. circuit R.F. filter ..	0.1
C30†	Aerial I.F. filter tuning ..	—
C31†	Aerial circuit M.W. trimmer ..	—
C32†	Aerial circuit L.W. trimmer ..	—
C33†	Aerial circuit tuning ..	0.0005
C34†	Oscillator circuit tuning ..	0.0005
C35†	Oscillator circuit S.W. trimmer ..	—
C36†	Oscillator circuit M.W. trimmer ..	—
C37†	Oscillator circuit L.W. trimmer ..	—
C38†	Oscillator circuit M.W. tracker ..	—
C39†	Oscillator circuit L.W. tracker ..	—
C40†	1st I.F. trans. pri. tuning ..	—
C41†	1st I.F. trans. sec. tuning ..	—
C42†	2nd I.F. trans. pri. tuning ..	—
C43†	2nd I.F. trans. sec. tuning ..	—

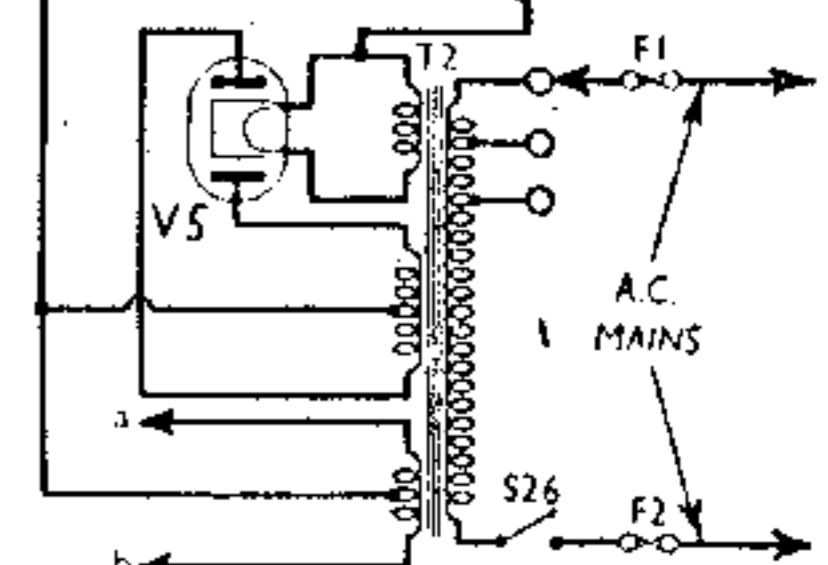
* Electrolytic. † Variable. ‡ Pre-set. § Two 25 μF in parallel.



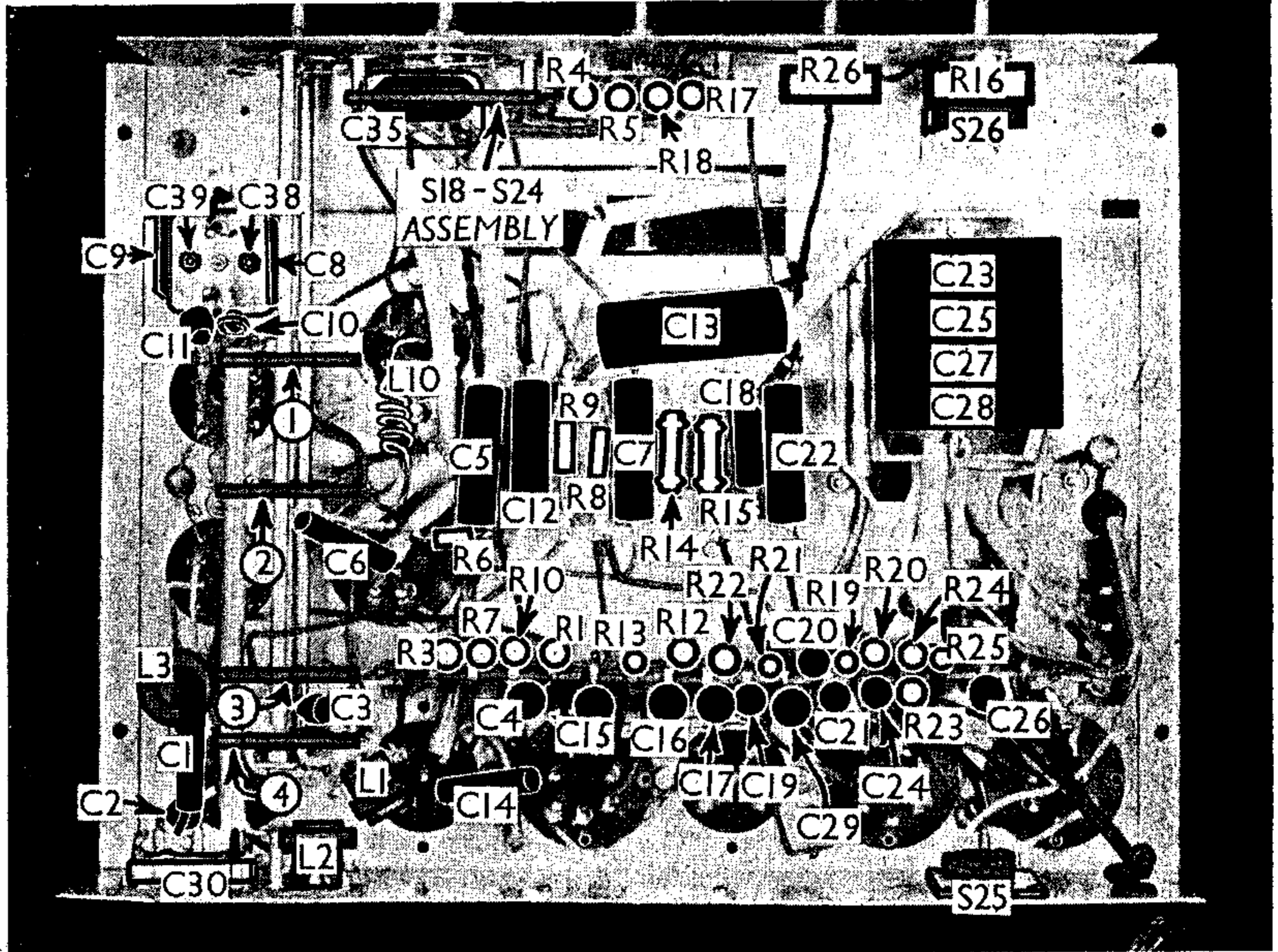
ances R17, R18 in the cathode circuit which bias the signal diode via switches S22 (distant) which returns direct to cathode, S23 (medium) which connects to junction of R17, R18 and S24 (local) which is connected to chassis.

Second diode of V3, fed from L20 via C19, provides D.C. potential which is developed across load resistance R21 and fed back via decoupling circuits as G.B. to

Circuit diagram of the Burgoyne AWS 3-band A.C. superhet, taken from our own chassis. Slight divergencies may occur in early models. The AWSG and AWSG/RG radio-grams have similar chassis.



Under - chassis view. L10 is a S.W. inductive trimmer. C35, C38 and C39 are adjusted through holes in the chassis deck. The numbers in circles refer to the four wave-change switch units, while S18-S24 is the sensitivity switch unit. Diagrams of these are on page VIII. C25 in the condenser block is made up of two units in parallel, so there are actually five units in the block.



OTHER COMPONENTS		Approx. Values (ohms)	
L1	Second channel L.W. rejector	8.5	
L2	Aerial I.F. filter coil ..	22.0	
L3	Aerial L.W. choke ..	58.0	
L4	Aerial S.W. coupling coil ..	0.15	
L5	Aerial M.W. coupling coil ..	0.4	
L6	Aerial L.W. coupling coil ..	3.0	
L7	Aerial S.W. tuning coil ..	0.1	
L8	Aerial M.W. tuning coil ..	2.6	
L9	Aerial L.W. tuning coil ..	12.5	
L10	Osc. S.W. trimming coil ..	Very low	
L11	Oscillator S.W. tuning coil ..	Very low	
L12	Oscillator M.W. tuning coil ..	1.25	
L13	Oscillator L.W. tuning coil ..	3.9	
L14	Oscillator S.W. reaction ..	0.1	
L15	Oscillator M.W. reaction ..	0.9	
L16	Oscillator L.W. reaction ..	1.3	
L17	1st I.F. trans. { Pri. ..	5.4	
L18		Sec. ..	9.5
L19	2nd I.F. trans. { Pri. ..	5.6	
L20		Sec. ..	5.0
L21	Speaker speech coil ..	1.7	
L22	Hun neutralising coil ..	0.1	
L23	Speaker field coil ..	2,000.0	
T1	Speaker input trans. { Pri. ..	700.0	
		Sec. ..	0.3
	Pri. total ..	27.0	
T2	Mains trans. { Heat. sec. total ..	0.075	
		Rec. heat. sec. ..	0.1
		H.T. sec. total ..	560.0
S1-S16	Waveband switches ..	—	
S17	Radio-gram. change switch ..	—	
S18-S24	Sensitivity switches ..	—	
S25	Internal speaker switch ..	—	
S26	Mains switch, ganged R16 ..	—	
F1, F2	Mains circuit fuses, 1 amp. ..	—	

DISMANTLING THE SET

A detachable bottom is fitted to the cabinet, and upon removal (eight countersunk-head wood screws) gives access to most of the components beneath the chassis.

Removing Chassis.—If it is necessary to remove the chassis from the cabinet, remove the five control knobs (recessed grub screws) and the four bolts (with nuts and washers) holding the chassis to the bottom of the cabinet. Now free the speaker leads from the

cleat holding them to the sub-baffle, when the chassis can be withdrawn to the extent of the leads, which should be just sufficient for normal purposes.

When replacing the chassis, note that the medium-sized wave knob with a white dot goes on the spindle of the wave-change switch, while the small knob with a white dot goes on the spindle of the sensitivity switch.

To free the chassis entirely, unsolder the speaker leads, and when replacing, connect them as follows, numbering the tags from bottom to top:—1 and 2 joined together, red; 3, white; 4, yellow. The black lead goes to the tag on the bottom left-hand speaker fixing screw.

Removing Speaker.—To remove the speaker from the cabinet, remove the nuts from the four screws holding it to the sub-baffle, and when replacing see that the transformer is on the left, and do not forget to replace the tag for the earthing lead on the bottom left-hand screw.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 230 V, using the 220-230 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the medium band and both the volume and sensitivity controls were at maximum (the latter fully anti-clockwise). There was no signal input. Voltages were measured on the 1,200 V scale of an Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 VO4*	255	5.3	85	1.2
V2 VP4B	180	10.7	180	3.1
V3 DDF4	110	3.3	—	—
V4 APP4C	230	35.0	220	3.6
V5 APV4	350†	—	—	—

* Oscillator anode (G2) 100 V, 3.4 mA.
† Each anode, A.C.

GENERAL NOTES

Switches.—S1-S17 are the wavechange and gramophone switches, ganged in four rotary units beneath the chassis. These are indicated by numbers in circles

in our under-chassis view, and shown in detail in the diagrams on page VIII.

S18-S24 are the sensitivity switches, in a single rotary unit beneath the chassis, also indicated in our under-chassis view, and shown in the diagrams on page VIII.

The tables (p. VIII) give the switch positions for the various control settings, starting from fully anti-clockwise in each case. A dash indicates open, and C, closed.

S25 is the internal speaker switch, combined with the external speaker sockets. When the special external speaker plug is inserted, and rotated anti-clockwise, S25 opens and mutes the internal speaker.

S26 is the Q.M.B. mains switch, ganged with the volume control, R16.

Coils.—L1-L3 are on separate small tubular formers beneath the chassis, while L10 is a small self-supporting inductance, also beneath the chassis. The remaining coils are in six screened units on the chassis deck. Some of these, including the I.F. transformers, contain also two associated trimmers.

Scale Lamps.—These are four M.E.S. types, each rated at 6.2 V, 0.3 A.

Fuses.—These are two 1 A types fitted in the special mains plug. They are 1/2 in. long, with 1/8 in. diameter metal end caps.

External Speaker.—A special combined external speaker socket and internal speaker switch (S25) is provided at the rear of the chassis. The speaker should be of the high impedance (7,000-8,000 O) type.

Resistances R2, R11.—These are fitted inside the screened top cap connectors of V1 and V2 respectively.

Condensers C23, C25, C27, C28.—These are all included in a dry electrolytic block beneath the chassis, with a common negative (black) lead. The blue lead is the positive of C23 (4 µF); C25 (50 µF) consists of two 25 µF types in parallel (two green leads form the positive connection); the yellow lead is the positive of C27 (8 µF), and the red lead is the positive of C28 through (12 µF).

Trimmers C35, C38, C39.—These are adjustable holes in the chassis deck.

V5 Holder.—The centre socket of this is used as a bearer in our chassis. V5, of course, only has four pins.

Chassis Divergencies.—C13 is not included in the makers' diagram. V4 suppressor grid is shown com-

BURGOYNE AWS (Continued)

ected to cathode by the makers, while there is another switch connecting the junction of L1, L2 to chassis on gram. C29 is not shown by the makers.
Several of the components may have values different from those shown by us. Thus C20 may be 0.0005 μ F, R15 may be 100,000 Ω and R25 may be 150 Ω .

CIRCUIT ALIGNMENT

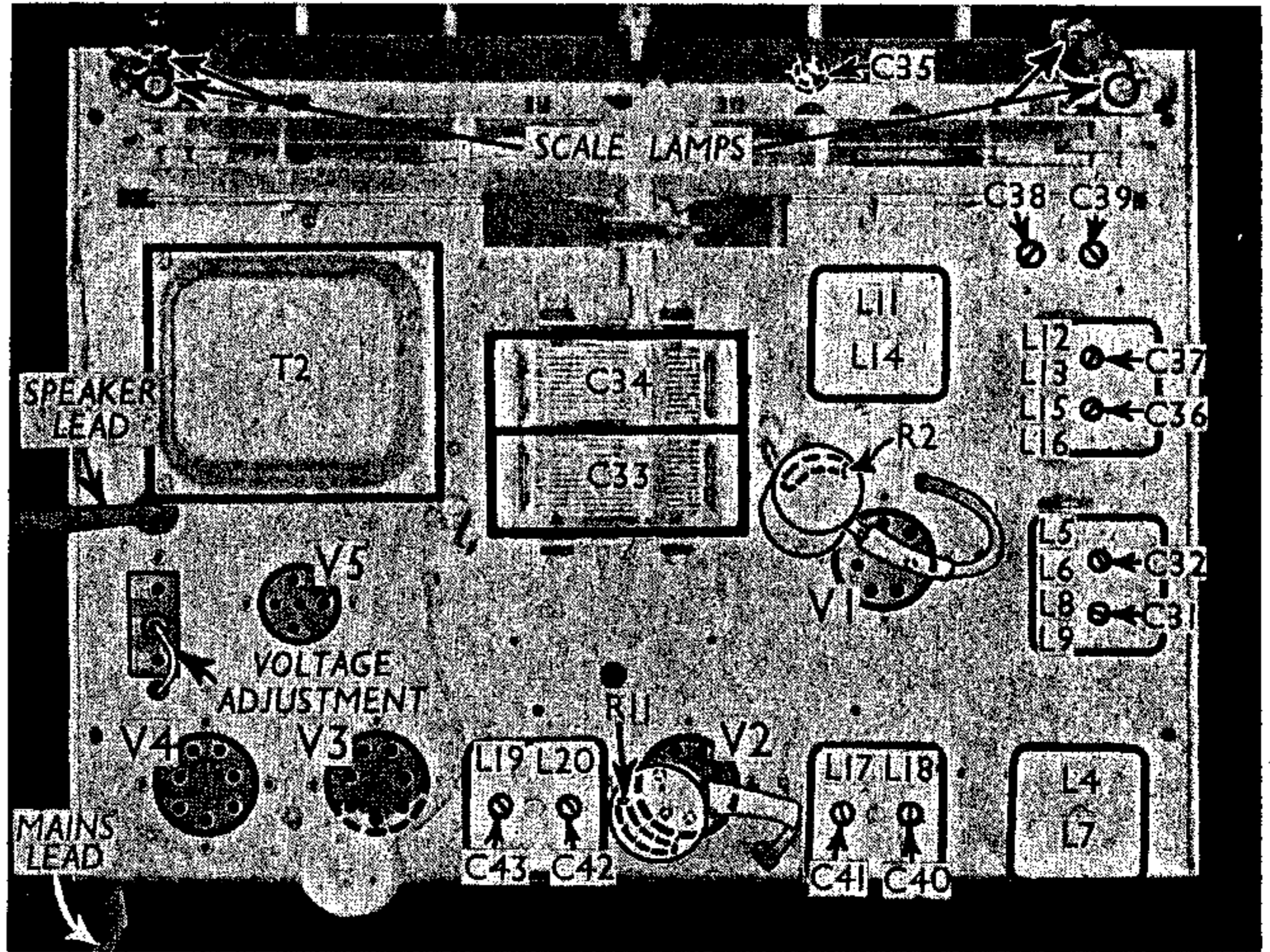
I.F. Stages.—Disconnect V1 top cap connector, and connect signal generator to top cap (via a 0.0002 μ F condenser) and chassis. Connect a 250,000 Ω resistance from top cap to chassis. Feed in a 473 KC/S signal, and adjust C43, C42, C41 and C40 for maximum output, the sensitivity switch being at "distant." Remove shunting resistance and replace top cap connector.

R.F. and Oscillator Stages.—Connect signal generator to A1 and E sockets. Switch set to L.W., tune to bottom of scale, turn volume control to maximum and sensitivity switch to "distant," and feed in a 473 KC/S signal. Adjust C30 for minimum output.

M.W.—Switch set to M.W., tune to 200 m. on scale, feed in a 200 m. signal, and adjust C36 and C31 for maximum output. Tune to 500 m. on scale, feed in a 500 m. signal, and adjust C38 for maximum output. Re-adjust C36 at 200 m. and C38 at 500 m. until no further improvement can be made. If necessary slightly re-adjust C31 in order to balance sensitivity at 200 and 500 m.

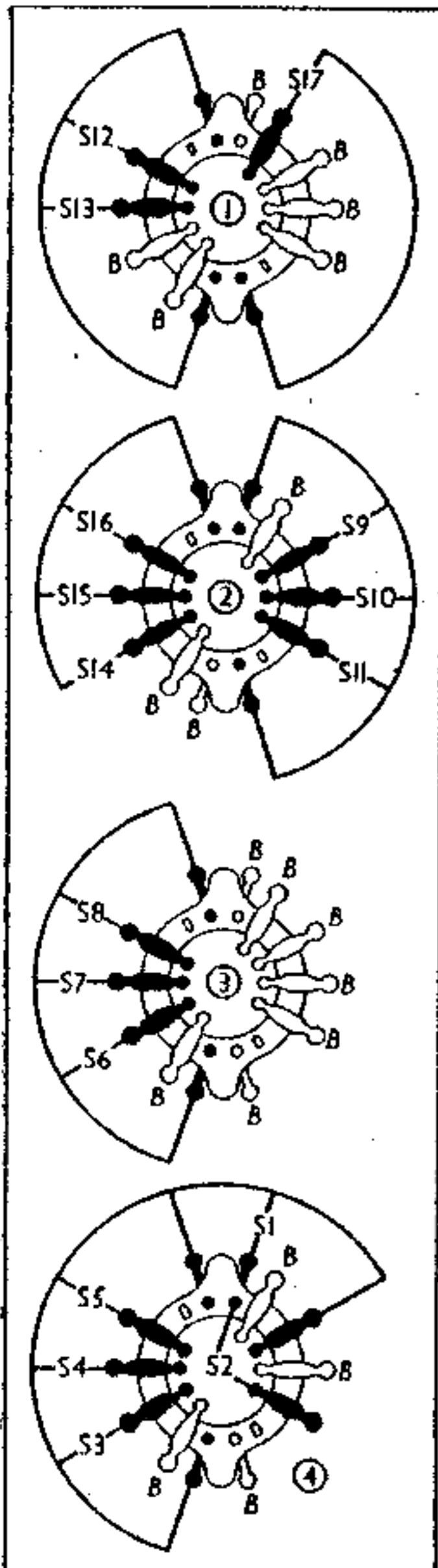
L.W.—Switch set to L.W., and set pointer to 1,700 m. on scale. Feed in a 1,700 m. signal, and adjust C32 and C39 for maximum output. Set pointer to 1,200 m., feed in a 1,200 m. signal, and adjust C37 only for maximum output. Continue adjusting C39 on 1,700 m. and C37 on 1,200 m. until no further improvement can be made.

S.W.—Switch set to S.W., tune to 21 m. on scale, feed in a 21 m. signal, and adjust C35 for maximum output. Set pointer to 48 m. on scale, feed in a 48 m. signal, and adjust L10 by closing up or opening up turns until maximum output is indicated. Continue adjusting C35 at 21 m. and L10 at 48 m. until no further improvement results.



Plan view of the chassis. Note the resistances R2 and R11 inside the top cap connectors of V1 and V2. C35, C38 and C39 are adjusted through holes in the chassis deck.

SWITCH DIAGRAMS AND TABLES



On the left are the four wavechange and gramophone switch diagrams, as seen looking from the rear of the underside of the chassis. At the bottom of the centre column is the sensitivity switch unit, viewed from the same position.

Switch	L.W.	M.W.	S.W.	Gram.
S1	—	—	C	—
S2	C	—	—	—
S3	—	—	C	—
S4	—	C	—	—
S5	C	—	—	—
S6	—	—	C	—
S7	—	C	—	—
S8	C	—	—	—
S9	—	—	C	—
S10	—	C	—	—
S11	C	—	—	—
S12	C	—	—	—
S13	—	C	—	—
S14	—	—	C	—
S15	—	C	—	—
S16	C	—	—	—
S17	—	—	—	C

Switch	Dist.	Med.	Local
S18	—	—	C
S19	C	C	—
S20	—	—	C
S21	C	—	—
S22	—	C	—
S23	—	—	C
S24	—	—	C

