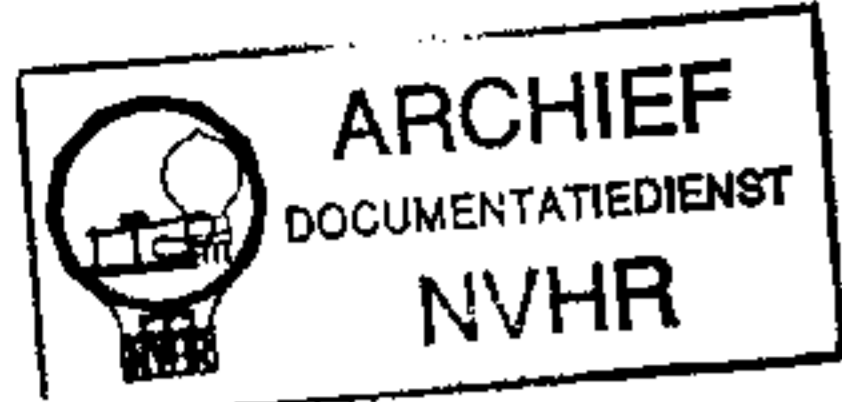


Ned. Ver. v. Historie v/d Radio



REVISED ISSUE OF SERVICE SHEET No. 86

A REFLEX circuit is employed in the Burgoyne "Dragon" series, which includes a "Dragon" and a "Dragonette" table receiver, a "Dragon" radiogram and a "Recordagraph" home recorder. The chassis is a 4-valve (plus rectifier) 2-band superhet designed for 200-250v mains of 40-100 c/s.

Release date and original prices: 1935; Dragon table, £11 11s.; Dragonette, £9 19s. 6d.; Radiogram, £19 8s. 6d.; Recordagraph, £22 1s.

CIRCUIT DESCRIPTION

Aerial input from socket A1 is via the series R1, S1 (which forms part of the local/distant control), L1 (which improves performance at upper end of MW band), C2 (which forms a second channel rejector with L1 on LW), series capacitor C3, and MW anti-break through choke L2 (LW only) to coupling coils L4, L5 and single-tuned circuit L6, L7, C22. Alternative input socket A2 is coupled via C1 to A1. Aerial IF filtering by L3, C21.

First valve (V1, Mullard metallised FC4 or Tungram V04) is an octode operating as frequency changer with electron coupling. Oscillator grid coils L8 (MW) and L9 (LW) are tuned by C24. Parallel

BURGOYNE 'DRAGON' SERIES

tuned-primary, tuned-secondary transformer IF couplings C28, L12, L13, C29 and C30, L14, L15, C31.

Intermediate frequency 473 kc/s.

Diode second detector is part of double diode valve (V3, Mullard metallised 2D4A or Tungram DD4). Audio frequency component in rectified output is developed across load resistor R14 and fed back via S9 to V2 control grid circuit. IF filtering by C13, R9 and C9. DC potential developed across R14 is fed back via R9 to IF valve and via further decoupling circuits to FC valve, giving automatic volume control.

Second diode of V3 is connected via R15, R16 and R17 across the HT circuit, R16, R17 forming a muting bias to weak signals to give a degree of silent tuning between strong transmissions. S10, which forms part of the local/distant control, reduces the bias in the "distant" position by short-circuiting R17.

AF output from V2 anode is developed across load resistor R12, the IF content being by-passed by C10, and passed via R18, C15 and manual volume control R19 to pentode output valve (V4, Mullard Pen4VB). Variable tone control by C18, R22 in V4 anode circuit. Provision for connection of gramophone pick-up via S8 in V2 CG circuit.

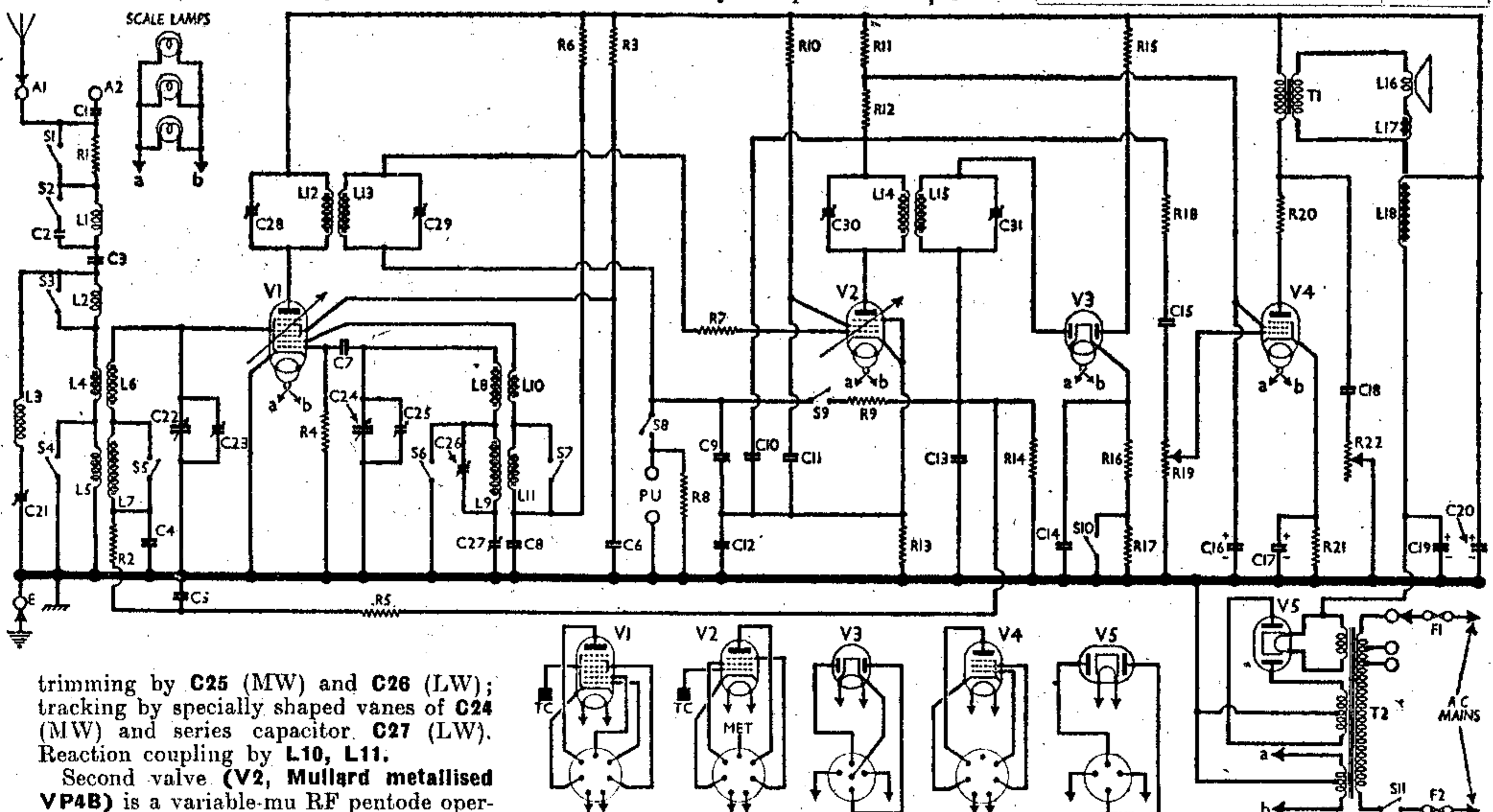
HT current is supplied by IHC full-wave rectifying valve (V5, Brimar R3 or Mullard IW3). Smoothing by speaker field L18 and electrolytic capacitors C19, C20.



The Burgoyne Dragon table superhet.

COMPONENTS AND VALUES

RESISTORS		Values (ohms)
R1	Aerial series resistor ...	50,000
R2	V1 hex. CG decoupling ...	100,000
R3	V1 SG HT feed ...	50,000
R4	V1 osc. CG resistor ...	50,000
R5	AVC line decoupling ...	500,000
R6	V1 osc. anode HT feed ...	50,000
R7	V2 grid stopper ...	500
R8	PU shunt ...	750,000
R9	IF stopper ...	100,000
R10	V2 SG HT feed ...	100,000
R11	V2 anode decoupling ...	5,000
R12	V2 AF anode load ...	30,000
R13	V2 fixed GB resistor ...	200
R14	V3 signal diode load ...	500,000
R15	V3 diode anode feed ...	5,000,000
R16	Signal diode muting resistors ...	20,000
R17		20,000
R18	IF stopper ...	100,000
R19	Manual volume control ...	500,000
R20	V4 anode stopper ...	100
R21	V4 GB resistor ...	160
R22	Variable tone control ...	10,000



trimming by C25 (MW) and C26 (LW); tracking by specially shaped vanes of C24 (MW) and series capacitor C27 (LW). Reaction coupling by L10, L11.

Second valve (V2, Mullard metallised VP4B) is a variable-mu RF pentode operating as intermediate frequency amplifier and reflex circuit AF amplifier, with

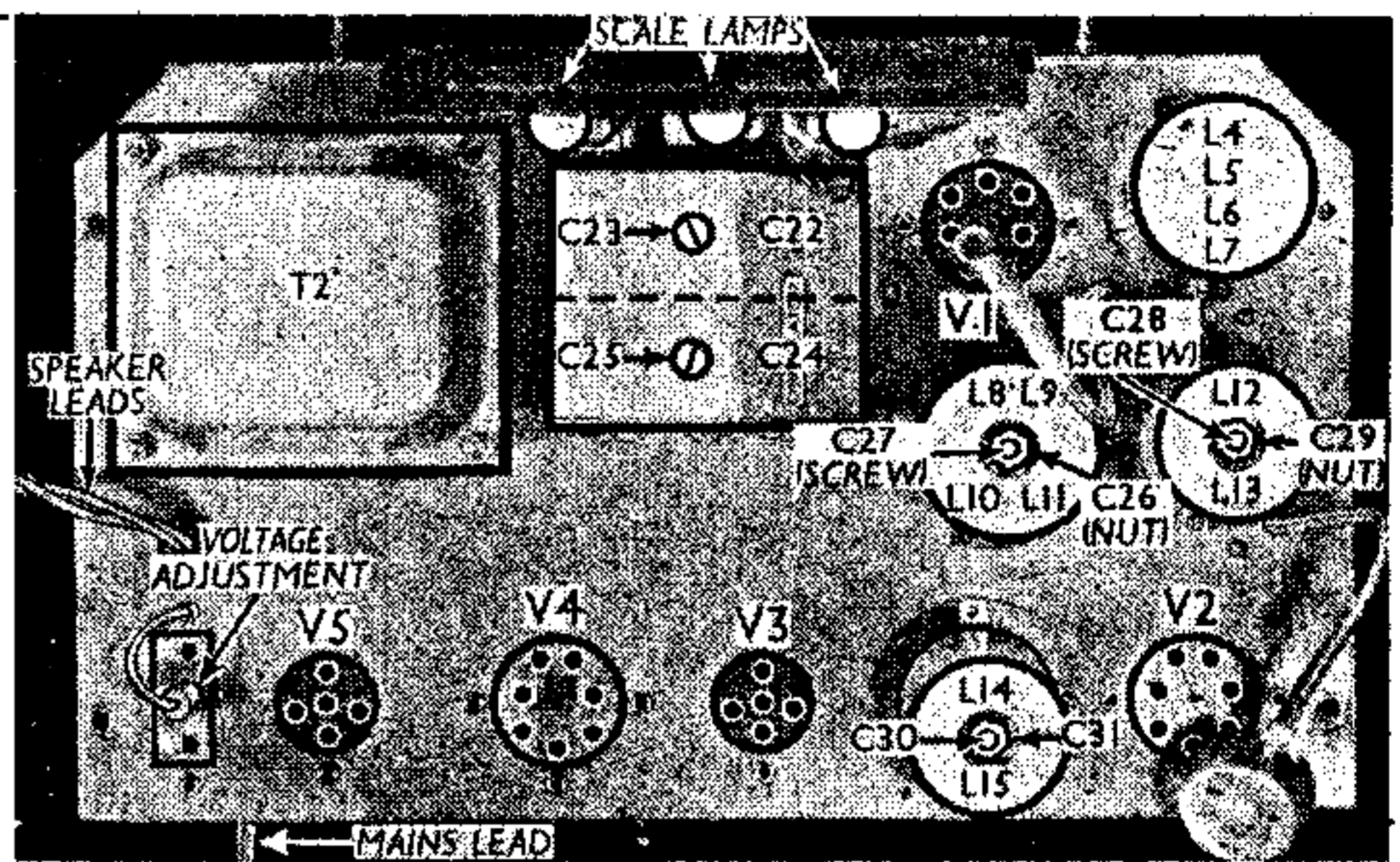
Circuit diagram of the Burgoyne Dragon AC superhet series chassis.

CAPACITORS		Values (μF)
C1	A2 series capacitor ...	0.00005
C2	Part image reflector ...	0.00005
C3	A1 series capacitor ...	0.0001
C4	V1 hex. CG decoupling ...	0.1
C5	AVC line decoupling ...	0.1
C6	V1 SG decoupling ...	0.1
C7	V1 osc. CG capacitor ...	0.0001
C8	V1 osc. anode decoupling ...	0.1
C9	IF by-pass capacitors ...	0.001
C10		0.0005
C11		0.1
C12	V2 cathode by-pass ...	0.1
C13	IF by-pass ...	0.001
C14	V3 cathode by-pass ...	0.1
C15	AF coupling to V4 ...	0.01
C16*	V2 anode decoupling ...	2.0
C17*	V4 cathode by-pass ...	25.0
C18	Part variable tone control ...	0.025
C19*	HT smoothing capacitors ...	8.0
C20*		12.0
C21†	IF filter tuning ...	0.0001
C22†	Aerial circuit tuning ...	0.0005
C23†	Aerial MW trimmer ...	—
C24†	Oscillator circuit tuning ...	—
C25†	Osc. circ. MW trimmer ...	—
C26†	Osc. circ. LW trimmer ...	0.00007
C27†	Osc. circ. LW tracker ...	0.00055
C28†	1st IF trans. pri. tuning ...	—
C29†	1st IF trans. sec. tuning ...	—
C30†	2nd IF trans. pri. tuning ...	—
C31†	2nd IF trans. sec. tuning ...	—

* Electrolytic. † Variable. ‡ Pre-set.

OTHER COMPONENTS		Values (ohms)
L1	Aerial loading coil ...	8.75
L2	Anti-break through choke ...	23.0
L3	Aerial IF filter coil ...	30.0
L4	Aerial coupling coils ...	0.8
L5		5.8
L6	Aerial tuning coils ...	2.0
L7	Oscillator tuning coils ...	10.7
L8		1.0
L9	Oscillator reaction coils ...	2.8
L10	1st IF trans. { Pri. ...	21.5
L11		65.0
L12	2nd IF trans. { Pri. ...	5.2
L13		5.2
L14	2nd IF trans. { Sec. ...	7.0
L15		5.0
L16	Speaker speech coil ...	2.5
L17	Hum neutralising coil ...	0.1
L18	Speaker field coil ...	2,000.0
T1	Speaker input { Pri. ...	500.0
	{ Sec. ...	0.4
T2	Mains { Pri. total ...	28.5
	{ Heater sec. ...	0.05
	{ Rect. heat. sec. ...	0.1
	{ HT sec., total ...	620.0
S1, S10	Local/distant switches ...	—
S2-S7	Waveband switches ...	—
S8, S9	Radio/gram switches ...	—
S11	Mains switch, ganged R19 ...	—
F1, F2	Mains circuit fuses, 1A ...	—

Plan view of the chassis. The screw and nut adjustments of the dual trimmers on the oscillator and IF units are indicated.



DISMANTLING THE SET

Removing Chassis.—Remove the four control knobs (recessed grub screws); free the speaker leads from their cleat; remove the four chassis fixing bolts (with nuts and washers).

The chassis may now be withdrawn to the extent of the speaker leads; or, if these are unsoldered, it may be removed entirely.

When replacing, the speaker leads should be connected as follows, using the markings on the tags: F, green; 3, white; 2, blank; 1 and 2, joined together, green/white.

The large control knob goes on the tuning control, and the one with a white spot on the waveband switch spindle.

Removing Speaker.—Remove the nuts from the four bolts holding speaker to sub-baffle.

When replacing, the transformer should be on the right, and if the leads have been unsoldered they should be connected as previously described.

VALVE ANALYSIS

Valve voltages and currents given in the table below were measured with the receiver operating on mains of 220 V. and with the transformer adjusted to the 220-230 V tapping. The volume control was at maximum, as was the sensitivity switch (in the "down" position). The receiver was tuned to the lowest wavelength on the M.W. band, but there was no signal input.

Voltages were measured on the 1,200 V scale of an Avometer, with chassis as negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 FC4	280	4.4	110	3.4
	125	2.9		
V2 VP4B	95	4.3	100	1.6
V3 2D4A	—	—	—	—
V4 Pen 4VB	260	83.0	235	3.7
V5 R3	335†	—	—	—

† Each anode, AC.

GENERAL NOTES

Switches.—S2-S7 are the waveband switches, and S8, S9 the radio/gram switches, ganged in a single unit, and their positions are given in the table below for the three control settings. A dash indicates open, and C, closed. S1, S10 are the local/distant switches, in a QMB unit. Both close in the "distant" position (knob down), and open in the "local" position. S11 is the QMB mains switch, ganged with R19. All these switches are mounted beneath the chassis and indicated in our illustration.

Switch	MW	LW	Gram
S2	—	C	—
S3	C	—	—
S4	C	—	—
S5	C	—	—
S6	C	—	C
S7	C	—	C
S8	—	—	C
S9	C	C	—

Coils.—L1, L2, L3 are mounted in two units beneath the chassis. The remainder are dust-iron cored and in four screened units on the chassis deck, with dual nut and screw trimmer adjustments in three of them.

Scale Lamps.—There are three MES types, rated at 6 V. Suitable replacements would be 6.2 V, 0.3 A.

External Speaker.—No provision is made for this, but one of high impedance (about 8,000 Ω) could be connected to tags 1 and 3 on the internal speaker transformer. Alternatively, a low impedance type (about 4.6 Ω) could be connected to the secondary tags.

Capacitors C17, C19, C20.—These are in a single unit beneath the chassis with a common negative (black) lead. The positive of C17 (25 μF) is green, C19 (8 μF) yellow, and C20 (12 μF) red.

Chassis Divergencies.—Apart from the alternative valves quoted in "Circuit Description," R4 and R10 may be 250,000 Ω, and R16 may be omitted where V3 is a DD4. R21 may be 140 Ω.

Fuses F1, F2.—These are included in the special "Goltone" connecting plug. The rated values were not marked on our samples, but 1A, as quoted in our table, would be suitable.

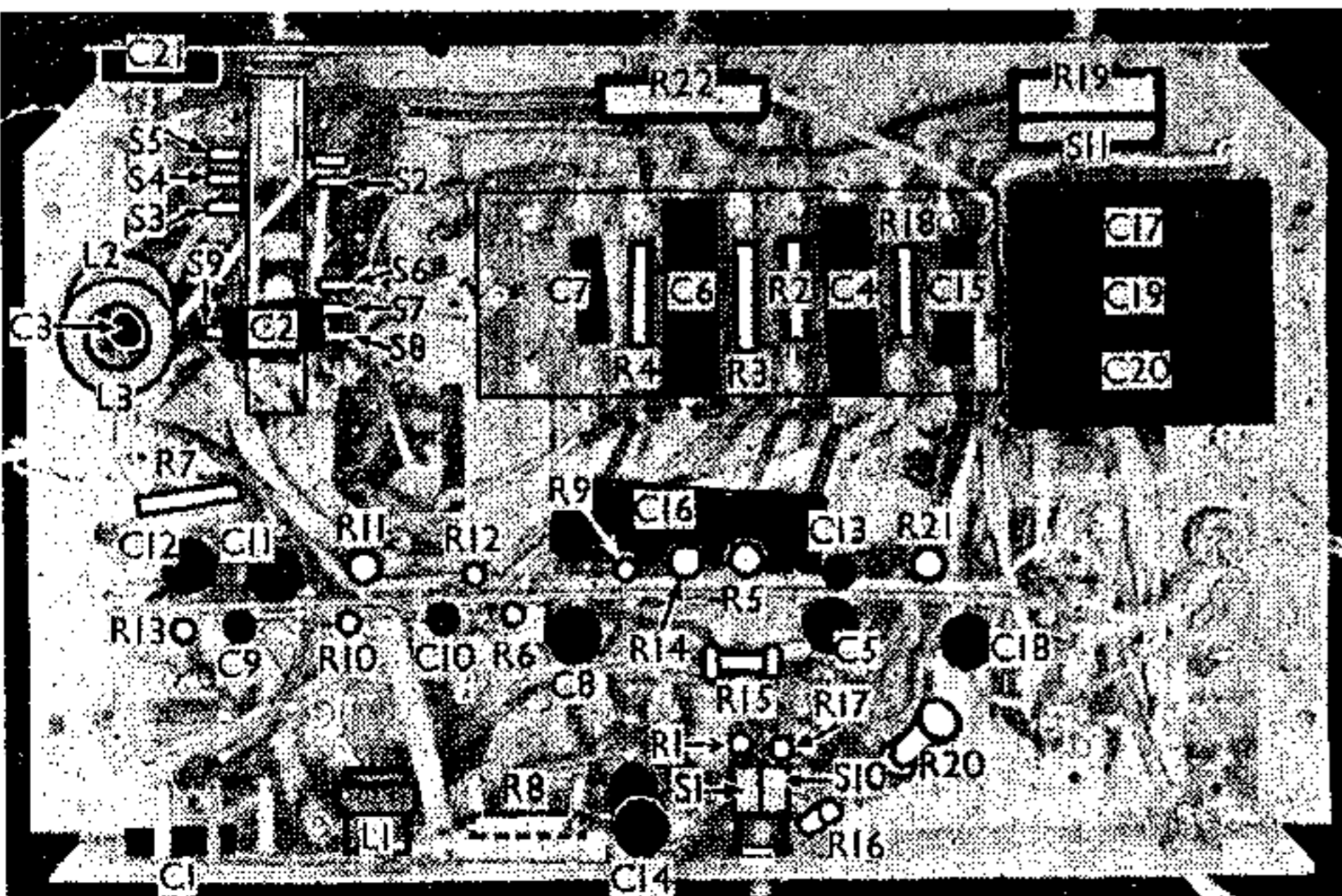
CIRCUIT ALIGNMENT

IF Stages.—Connect signal generator leads via a 0.0001 μF capacitor to control grid (top cap) of V1 and chassis, and connect a 250,000 Ω resistor between these two points, leaving the original cap connector off. Feed in a 473 kc/s (634.25 m.) signal, and C28, C29, C30, C31 for maximum output.

Replace the original connections, transfer signal generator leads to A and E sockets, switch set to LW, turn gang to minimum, and adjust C21 for minimum output with a strong 473 kc/s signal.

MW.—Switch set to MW, tune to 200 m. on scale, feed in a 200 m (1,500 kc/s) signal, and adjust C25, then C23, for maximum output.

LW.—Switch set to LW, turn to 1,700 m on scale, feed in a 1,700 m (176.5 kc/s) signal, and adjust C26 (nut) and C27 (screw) for maximum output. Tune to 1,200 m on scale, feed in a 1,200 m (250 kc/s) signal, and adjust C26 only for maximum output. Return to 1,700 m and readjust C27, then to 1,200 m and readjust C26, and so on in turn until no improvement results.



Under-chassis view. The waveband switch contacts are individually marked. One pair, next to S2, is unused. C3 is inside the L2, L3 coil unit.