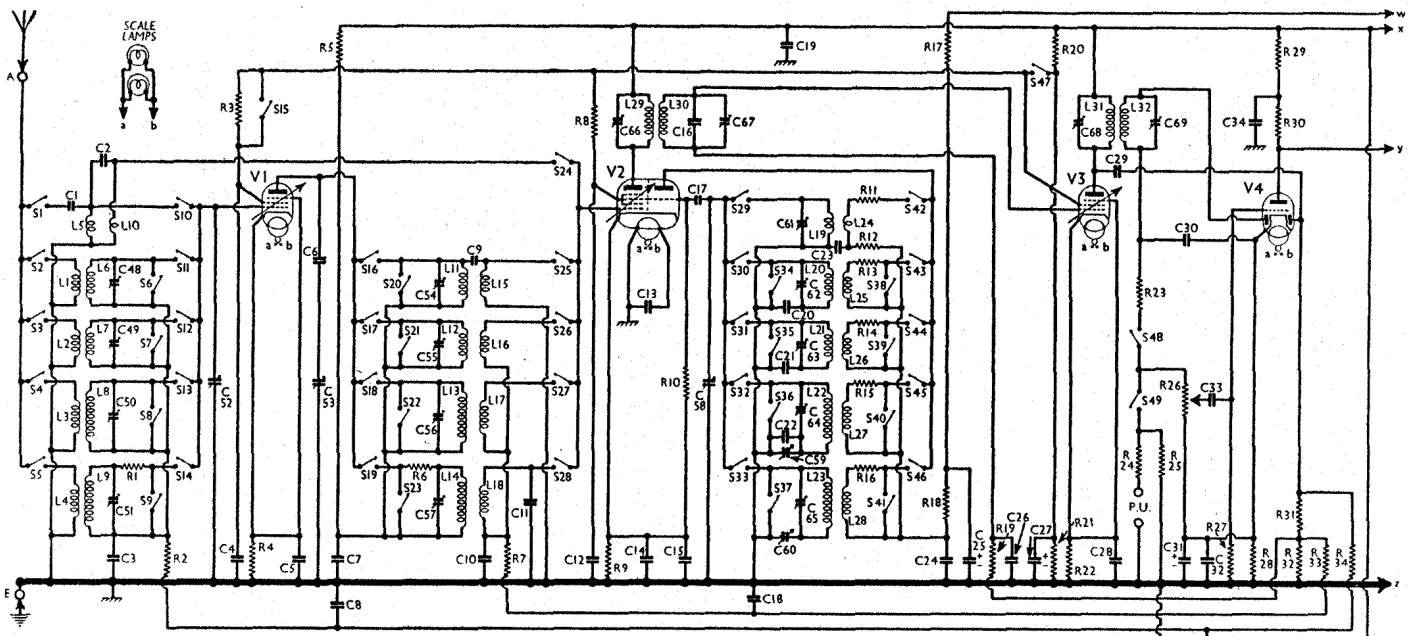


Similar chassis are used in several other models, some having the minor difference that the tuning indicator is omitted.

COMPONENTS AND VALUES

	CONDENSERS	Values (μF)
C1	Aerial S.W.1 coupling	0·00001
C2	Part V2 C.G. S.W.1 coupling	0·00023
C3	V1 C.G. decoupling	0·05
C4	V1 S.G. decoupling	0·1
C5	V1 cathode by-pass	0·1
C6	H.T. blocking condenser	0·1
C7	V1 anode decoupling	0·1
C8	A.V.C. line decoupling	0·001
C9	Part V2 hex. S.W.2 coupling	0·000005
C10	V2 hex. C.G. decoupling	0·05
C11	R.F. trans. sec. L.W. shunt	0·0003
C12	V2 S.G. decoupling	0·1
C13	V2 heater R.F. by-pass	0·002
C14	V2 cathode by-pass condensers	0·0023
C15		0·1
C16	1st I.F. trans. sec. fixed trimmer	0·0001
C17	V2 osc. C.G. condenser	0·00005
C18	A.V.C. line decoupling	0·05
C19	H.T. circuit R.F. by-pass	0·23
C20	Osc. circuit S.W.2 tracker	0·00285
C21	Osc. circuit S.W.3 tracker	0·00184
C22	Osc. circ. M.W. fixed tracker	0·00035
C23	V2 osc. anode S.W.1 decoupling	0·0023
C24	V2 osc. anode decoupling	0·05
C25*	V2 osc. anode H.T. smoothing	8·0
C26	V3 C.G. decoupling	0·05
C27*	V1, V2, V3 S.G.'s decoupling	4·0
C28	V3 cathode by-pass	0·1
C29	Coupling to V4 A.V.C. diode	0·0001
C30	I.F. by-pass	0·00035
C31*	V4 cathode by-pass condensers	4·0
C32		0·1
C33	A.F. coupling to V4 triode	0·05
C34	V4 triode anode decoupling	0·5
C35	"Bass" tone control condensers	0·0015
C36		0·05
C37	V4 triode to V5 A.F. coupling	0·001
C38	"Brilliant" tone control condensers	0·0023
C39		0·005
C40		0·02
C41		0·05
C42	V5 cathode by-pass	0·1
C43	Fixed tone corrector	0·0023
C44	Speaker field R.F. by-pass	0·05
C45*	H.T. smoothing	8·0
C46*		16·0
C47	T.I. C.G. decoupling	0·00023
C48‡	Aerial circuit S.W.2 trimmer	—
C49‡	Aerial circuit S.W.3 trimmer	—
C50‡	Aerial circuit M.W. trimmer	—
C51‡	Aerial circuit L.W. trimmer	—
C52†	Aerial circuit tuning	—
C53†	R.F. trans. pri. tuning	—
C54‡	R.F. trans. pri. S.W.2 trimmer	—
C55‡	R.F. trans. pri. S.W.3 trimmer	—
C56‡	R.F. trans. pri. M.W. trimmer	—
C57‡	R.F. trans. pri. L.W. trimmer	—
C58†	Oscillator circuit tuning	—
C59‡	Osc. circuit M.W. tracker	—
C60‡	Osc. circuit L.W. tracker	—
C61‡	Osc. circuit S.W.1 trimmer	—
C62‡	Osc. circuit S.W.2 trimmer	—
C63‡	Osc. circuit S.W.3 trimmer	—
C64‡	Osc. circuit M.W. trimmer	—
C65‡	Osc. circuit L.W. trimmer	—
C66‡	1st I.F. trans. pri. tuning	—
C67‡	1st. I.F. trans. sec. tuning	—
C68‡	2nd I.F. trans. pri. tuning	—
C69‡	2nd I.F. trans. sec. tuning	—

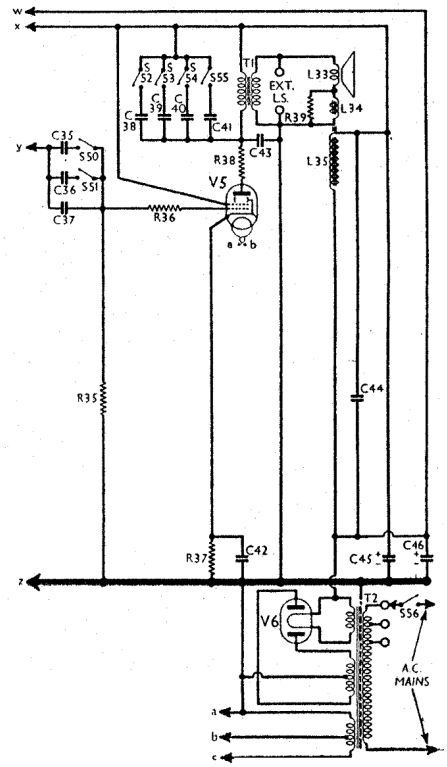
* Electrolytic. † Variable. ‡ Pre-set.

	RESISTANCES	Values (ohms)
R1	Aerial circuit L.W. stabiliser	100
R2	V1 C.G. decoupling	100,000
R3	V1 S.G. H.T. feed	230,000
R4	V1 fixed G.B. resistance	150
R5	V1 anode H.T. feed	5,000
R6	V1 anode circ. L.W. stabiliser	100
R7	V2 hex. C.G. decoupling	100,000
R8	V2 S.G. H.T. feed	23,000
R9	V2 hex. fixed G.B. resistance	150
R10	V2 osc. C.G. resistance	50,000
R11	Osc. circuit S.W.1 stabiliser	6
R12	V2 osc. anode S.W.1 decoupling	5,000
R13	Osc. circuit S.W.2 stabiliser	150
R14	Osc. circuit S.W.3 stabilier	500
R15	Osc. circuit M.W. stabiliser	2,300
R16	Osc. circuit L.W. stabiliser	15,000
R17	V2 oscillator anode H.T. feed resistances	35,000
R18		15,000
R19	V3 C.G. decoupling	1,000,000
R20	V1, V2, V3 S.G.'s H.T. feed potential divider	7,666*
R21		3,750†
R22	V3 fixed G.B. resistance	150
R23	I.F. stopper	50,000
R24	P.U. feed resistances	23,000
R25		50,000
R26	Manual volume control and V4 signal diode load	250,000
R27	V4 triode C.G. resistance	1,000,000
R28	V4 G.B. and A.V.C. delay resistance	1,000
R29	V4 triode anode decoupling	50,000
R30	V4 triode anode load	35,000
R31	V4 A.V.C. diode load resistances	350,000
R32		230,000
R33	A.V.C. line decoupling resistances	750,000
R34		1,500,000
R35	V5 C.G. resistance	230,000
R36	V5 grid stopper	1,000
R37	V5 G.B. resistance	100
R38	V5 anode stopper	500
R39	Hum neut. coil shunt	0·6
R40	T.I. C.G. feed resistance	500,000
R41	T.I. anode H.T. feed	1,000,000

* Three 23,000 Ω 3W resistances in parallel.
† Two 7,500 Ω 3W resistances in parallel.

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Aerial S.W.2 coupling coil	2·5
L2	Aerial S.W. 3 coupling coil	16·0
L3	Aerial M.W. coupling coil	50·0
L4	Aerial L.W. coupling coil	150·0
L5	Aerial S.W.1 tuning coil	Very low
L6	Aerial S.W.2 tuning coil	0·1
L7	Aerial S.W.3 tuning coil	0·75
L8	Aerial M.W. tuning coil	5·5
L9	Aerial L.W. tuning coil	30·0
L10	V2 C.G. S.W.1 coupling coil	0·7
L11	R.F. trans. S.W.2 primary	0·1
L12	R.F. trans. S.W.3 primary	0·75
L13	R.F. trans. M.W. primary	5·5
L14	R.F. trans. L.W. primary	30·0
L15	R.F. trans. S.W.2. secondary	3·0
L16	R.F. trans. S.W.3 secondary	27·0
L17	R.F. trans. M.W. secondary	95·0
L18	R.F. trans. L.W. secondary	145·0
L19	Osc. circuit S.W.1 tuning coil	Very low
L20	Osc. circuit S.W.2 tuning coil	0·1
L21	Osc. circuit S.W.3 tuning coil	0·5
L22	Osc. circuit M.W. tuning coil	5·0
L23	Osc. circuit L.W. tuning coil	10·0
L24	Oscillator S.W.1 reaction	0·1
L25	Oscillator S.W.2 reaction	0·4
L26	Oscillator S.W.3 reaction	0·7
L27	Oscillator M.W. reaction	2·0
L28	Oscillator L.W. reaction	7·0
L29	1st I.F. trans. Pri.	12·0
L30	1st I.F. trans. Sec.	8·0
L31	2nd I.F. trans. Pri.	12·0
L32	2nd I.F. trans. Sec.	12·0
L33	Speaker speech coil	4·0
L34	Hum neutralising coil.	0·5
L35	Speaker field coil	1,100·0
T1	Speaker input trans. Pri.	580·0
	Speaker input trans. Sec.	0·5

	OTHER COMPONENTS (suite)	Approx. Values (ohms)
T2	Mains trans. Pri., total	15·0
	Mains trans. Heater sec., total	0·2
	Mains trans. Rect. heat. sec.	0·1
	Mains trans. H.T. sec., total	300·0
S1-S46	Waveband switches	—
S47-49	Radio-gram. change switches	—
S50-51	"Bass" tone control switches	—
S52-55	"Brilliant" tone control switches	—
S56	Mains switch	—



VALVE ANALYSIS

Valve voltages and currents given in the table overleaf are those measured in our receiver when it was operating on mains of 225 V, using the 211-230 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.

If, as in our case, **V1** and **V3** should become unstable when measurements are being made of the screen and anode current respectively, they can be stabilised

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by connecting a non-inductive condenser of about 0·1 μF from the test electrode to chassis.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 VMP4G	253	0·6	15	0·2
V2 X41	257	0·8	42	1·4
	Oscillator			
	84	7·3		
V3 VMP4G	257	6·0	73	3·1
V4 MHD4	103	1·6	—	—
V5 KT41	212	40·0	257	9·3
V6 U12	365†	—	—	—
T.I. Y63	18	0·2	—	—
	Target			
	257	0·5		

† Each anode, A.C.

GENERAL NOTES

Switches.—**S1-S46** are the wavechange switches, in six rotary units beneath the chassis. They are indicated in our under-chassis view, and shown in detail in the diagrams on this page, where each unit is as seen looking from the rear of the underside of the chassis. The table (col. 3) gives the switch positions for the five control settings, starting from fully anti-clockwise. Note that our S.W.1 band (lowest wavelengths) is designated by the makers as S3, our S.W.2 as S2 and our S.W.3 as S1.

S47-S49 are the Q.M.B. radio-gram switches in a lever type unit at the rear of the chassis, indicated in our under-chassis view. **S47** and **S48** are closed on radio and open on gram; **S49** is open on radio and closed on gram.

S50 and **S51** are the bass control switches. They are in a rotary unit at the front of the chassis, and are indicated in our under-chassis view (unit 7), and shown in detail in the diagram in col. 3. In the fully anti-clockwise position of the control, both switches are open; in the next position, **S50** is closed; and in the third position **S51** is closed.

S52-S55 are the brilliance control switches, ganged in another rotary unit at the front of the chassis, and indicated in our under chassis view (unit 8), and shown in detail in the diagram in col. 3. In the fully anti-clockwise position of the control **S55** is closed;

DIAGRAMS AND TABLE OF THE SWITCH UNITS

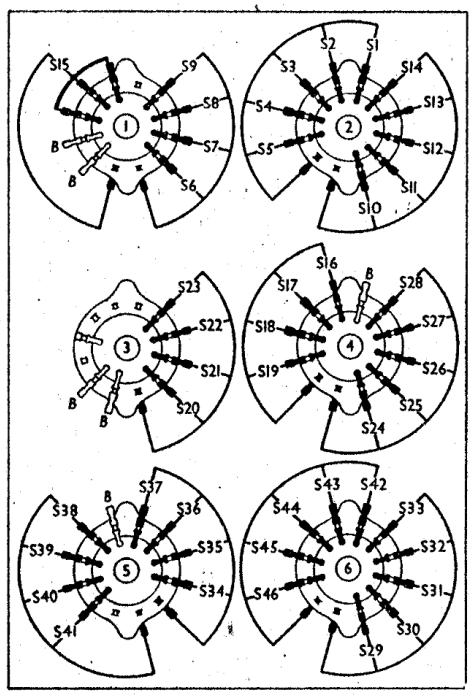


Diagram of the six wavechange switch units, as seen looking from the rear of the underside of the chassis.

Switch	S.W.1 (S3)	S.W.2 (S2)	S.W.3 (S1)	M.W.	L.W.
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	C	C	—	—
S16	—	C	—	—	—
S17	—	—	C	—	—
S18	—	—	—	C	—
S19	—	—	—	—	C
S20	C	—	—	—	—
S21	—	C	—	—	—
S22	—	—	C	—	—
S23	—	—	—	C	—
S24	C	—	—	—	—
S25	—	C	—	—	—
S26	—	—	C	—	—
S27	—	—	—	C	—
S28	—	—	—	—	C
S29	C	—	—	—	—
S30	—	C	—	—	—
S31	—	—	C	—	—
S32	—	—	—	C	—
S33	—	—	—	—	C
S34	C	—	—	—	—
S35	—	C	—	—	—
S36	—	—	C	—	—
S37	—	—	—	C	—
S38	C	—	—	—	—
S39	C	C	—	—	—
S40	—	C	C	—	—
S41	—	—	C	C	—
S42	C	—	—	—	—
S43	—	C	—	—	—
S44	—	—	C	—	—
S45	—	—	—	C	—
S46	—	—	—	—	C

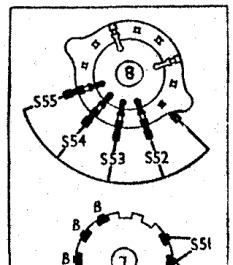
in the second, **S54** is closed; in the third, **S53**; in the fourth, **S52**; while in the fifth position all the switches are open.

S56 is the Q.M.B. mains switch, mounted on the plate at the left-hand side of the cabinet.

Coils.—All the coils except **L5, L10, L19** and **L24** are in eight screened units on the chassis deck, some of the units containing one or two other components. No trimmers are inside the tops of the cans, but all are reached from beneath the chassis, most of them being beneath their respective coil units.

L5, L10 and **L19, L24**, the coils for the lowest wavelength band, are beneath the chassis, on two small tubular formers.

Scale Lamps.—These are two Osram 6·2 V, 0·3 A M.E.S. types, with tubular bulbs.



The two tone control switch units, which are mounted at the front of the chassis.

CIRCUIT ALIGNMENT

I.F. Stages.—Set bass tone control to minimum cut, brilliance control to maximum cut, waveband switch to M.W., volume control to maximum, and gang condenser about half-way in mesh. Connect signal generator to control grid (top cap) of **V2** and chassis, see that the screen is on the I.F. valve, and then short circuit **C58.**

Feed in a 460 KC/S signal and adjust **C66, C67, C68** and **C69,** in that order, for maximum output. Recheck these settings, then remove short from **C58.**

R.F. and Oscillator Stages.—Tone and volume controls should be set as above. Connect signal generator to **A** and **E** sockets. With gang fully meshed, pointer should cover 0 and 50 calibration marks on vernier scale (or 25 and 75 in the radiogram models).

The calibration mark for 46 m. on the S1 (our S.W.3) range is used as a ganging point on all bands. Where instructed, see that pointer is over this calibration mark, but that the waveband switch is set correctly for the range being aligned. A dummy aerial of 400 Ω resistance should be used.

L.W.—Adjust receiver to ganging point, switch to L.W., and feed in a 750 m. (400 KC/S) signal. Adjust **C65** for maximum output. Feed in a 775 m. (387 KC/S) signal, tune it in, and adjust **C57** and **C51,** while rocking the gang.

Feed in a 1,700 m. (176 KC/S) signal, tune it in, and adjust **C60** for maximum output while rocking the gang.

Repeat these adjustments. It may be necessary to desensitize **V2** by temporarily including an additional 2,000 Ω resistance in its cathode circuit to make the receiver stable while ganging.

M.W.—Adjust receiver to ganging point, switch to M.W. and feed in a 185 m. (1,620 KC/S) signal. Adjust **C64** for maximum output. Feed in a 205 m. (1,460 KC/S) signal, tune it in, and adjust **C56** and **C50** for maximum output.

Feed in a 500 m. (600 KC/S) signal and tune it in. Adjust **C59** for maximum output, while rocking the gang.

Repeat these adjustments.

S.W.3 (S1).—Adjust receiver to ganging point, switch to S.W.3 (S1) band, and feed in a 46 m. (6·5 MC/S) signal. Adjust **C63** for maximum output. Feed in a 50 m. (6 MC/S) signal, tune it in, and adjust **C55** and **C49** for maximum output, rocking the gang.

Repeat these adjustments.

S.W.2 (S2).—Adjust receiver to ganging point, switch to S.W.2 (S2) band, and feed in a 16·7 m. (18 MC/S) signal. Adjust **C62** for maximum output. Two resonance points will be found, and the correct one is that requiring the least capacity. Feed in a 17·8 m. (16·8 MC/S) signal, tune it in, and adjust **C54** and **C48** for maximum output, rocking the gang very carefully for optimum results. The adjustment of **C54** is particularly critical. Repeat all these adjustments several times to ensure that correct results have been obtained.

S.W.1 (S3).—Switch set to S.W.1 (S3) range, feed in a 16 m. (18·75 MC/S) signal, and having set **C61** approximately half way between maximum and minimum capacity, tune in the signal. If two tuning points are found, use that received with the greater capacity of the gang condenser.

The inductance of **L19** must now be adjusted for maximum output. This is done by altering the length of the return lead from the coil tag to the chassis. This lead (of thick tinned copper wire) is in two parts; unsolder them, and slide that from the chassis up and down that from the coil tag until a point is reached where the maximum output reading is obtained; finally, solder the two wires together at this point.

Feed in a 7 m. (43 MC/S) signal, and tune to 7 m. on scale. Adjust **C61** for maximum output. If two peaks are obtained, use that requiring the greater trimmer capacity. Now while rocking the gang slightly very carefully re-adjust **C61** for optimum results.