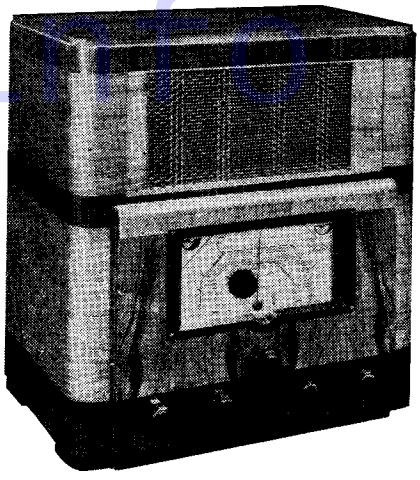
MARCONIPHONE 538 A.C. EIGHT



The 538 is a seven-valve, plus rectifier, four-band superhet.

CIRCUIT.—The aerial input circuit consists of a set of transformer aerial coils on all wavebands. Connections are provided for either a single-wire aerial or one of the all-wave type incorporating a transmission line.

V1 is a pentode operating as an H.F. amplifier, and is tuned anode coupled to V2, the anode lead being tapped into the medium and long-wave inductances of the heptode.

V3, the separate oscillator valve of the frequency changing arrangements, is incorporated in a Hartley type circuit, an additional reaction coil being included to ensure constant oscillation. The oscillator voltage is injected into the heptode mixer *via* C11.

The signal, converted to the I.F., passes by a transformer of the variable band width type to the I.F. amplifier, V4, a pentode working on a frequency of 465 kc.

The output of V4 passes by another I.F. transformer of similar construction to the demodulating diode of V5, a double diode valve. The other diode provides the potential operating the A.V.C. network to V1, V2 and V4, and also for operating the visual tuning indicator.

Coupling arrangements to the grid of V6, an H.F. pentode connected so as to operate as a triode L.F. amplifier, include a manual volume control and an I.F. filter circuit.

V6 is parallel transformed coupled to V7, the output valve. A bass control circuit is in series with the primary of the transformer, and a variable resistance and condenser treble control circuit is arranged across the secondary of the transformer.

The output valve also has a negative feed back circuit consisting of C37 and R2, designed to obtain level frequency response and low harmonic distortion.

Mains equipment consists of a mains transformer, a full-wave rectifying valve, V8, electrolytic smoothing condensers, and two smoothing chokes, one being the speaker field.

(*Continued on opposite page.*)

QUICK TESTS

Quick tests are available on the tags on the speaker panel, the second reading being the voltage across the speaker field.

Voltage between tag 6 and chassis, 310 volts.
Voltage between tag 6 and tag 7, 55 volts.
Voltage between tag 7 and chassis, 256 volts.
Voltage between tag 5 and chassis, 330 volts.

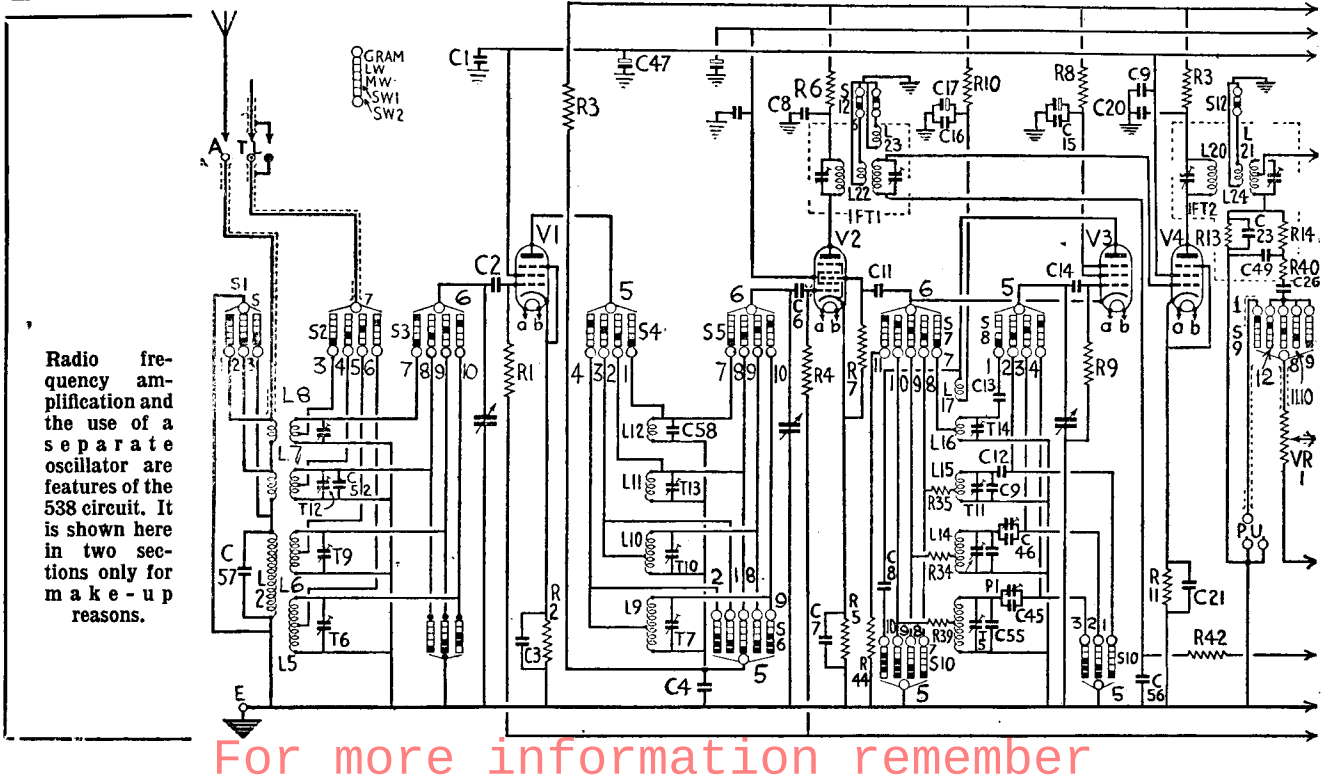
VALVE READINGS

No signal. Volume maximum. M.W. band 230 volt A.C. mains.

V.	Type.	Electrode.	Volts.	Ma.
	All Marconi.			
1	W63	Anode	200	6.5
		Screen	95	2
2	X64	Anode	210	3.5
		Screen	130	7.5
3	Z63	Anode	195	8
		Screen	190	3
4	W63	Anode	215	5
		Screen	95	1.2
5	D63	Diodes only.	—	—
6	Z63	Anode	95	1.9
7	KT66	Anode	230	32
		Screen	240	5
8	U50	Heater	320	—

WINDINGS (D.C. Resistances)

Winding.	Ohms.	Winding.	Ohms.
L2	39	L20	6.7
L3	8	L21	6.7
L4	1	L22	4
L5	19	L23	4.5
L6	6	L24	4
L7	.2	Inter valve trans. prim.	350
L8	.1	Inter. valve trans. sec.	2,730
L9	19	Output valve trans. prim.	150
L10	6	Mains trans. prim.	8.8
L11	.2	Total H.T. sec.	180
L12	.1	CK1	170
L13	5.	Field coil	400
L14	6.		
L15	.1		
L16	.1		
L17	8.5		
L18	6.7		
L19	6.7		



Radio frequency amplification and the use of a separate oscillator are features of the 538 circuit. It is shown here in two sections only for make-up reasons.

Chassis Removal.—Remove the back and the four smaller knobs from the front (grub screws). Uncleat the speaker cable from the baffle and the mains lead from the rear of the cabinet. Then remove the four chassis securing bolts from the base. The chassis can then be withdrawn.

The elliptical speaker with associated electrolytic condensers can be removed by detaching the four wood screws securing the speaker and the extension speaker sockets from the side of the cabinet. Alternatively, the leads to the speaker panel may be unsoldered.

(*Continued on next page.*)

RESISTANCES

R.	Purpose.	Ohms.
1	V1 A.V.C. feed	500,000
2	V1 cathode bias	150
3	V1 anode decoupling	5,000
4	V2 A.V.C. feed	500,000
5	V2 cathode bias	350
6	V2 anode decoupling	5,000
7	V2 grid leak	50,000
8	V3 screen decoupling	15,000
9	Oscillator grid leak	50,000
10	V3 anode decoupling	5,000
11	V4 cathode bias	500
13	Demodulating diode load	350,000
14	H.F. filter	100,000
15	V1 A.V.C. decoupling	500,000
16	A.V.C. diode load (part)	500,000
18	T.I. anode feed	1 meg.
20	V6 cathode bias (part)	1,500
21	V6 cathode bias (part)	500
22	V6 anode decoupling	23,000
23	V6 anode load	50,000
25	V2 screen decoupling	5,000
26	V1 and V4 screen potr. (part)	9,000
27	T.I. cathode bias	75
28	V7 cathode bias	200
29	Negative feed back	5 meg.
33	Tone control	10,000
34	M.W. regeneration modifier	500
35	S.W. regeneration modifier	150
37	V4 anode decoupling	3,500
38	V1 and V4 screen potr. (part)	3,100
39	L.W. regeneration modifier	230
40	H.F. filter	100,000
41	A.V.C. diode load (part)	500,000
42	V4 A.V.C. decoupling	1 meg.
44	V3 cathode	50
VR1	Volume control	2 meg.
VR2	Bass control	2 meg.
VR3	Brilliance control	1 meg.

CONDENSERS

C.	Purpose.	Mfds.
1	V1 screen decoupling (part)	.01
2	V1 grid isolator	.00005
3	V1 cathode bias	.1
4	V1 anode decoupling	.1
5	V2 screen decoupling (part)	.01
6	V2 grid coupling	.00005
7	V2 cathode bias shunt	.01
8	V2 anode decoupling	.1
9	S.W.1 oscillator fixed trimmer	.000015
11	V2 injection coupling	.00005
12	S.W.1 fixed padder	.0023
13	S.W.2 fixed padder	.007
14	V3 grid	.0001
15	V3 screen decoupling (part)	.001
16	V3 anode decoupling (part)	.005
17	V3 anode decoupling (part)	2
18	Decoupling	.001
19	V4 screen decoupling	.1
20	V4 anode decoupling	.1
21	V4 cathode bias shunt	.5
22	V1 and V2 A.V.C. decoupling	.05
23	H.F. by-pass	.00005
24	A.V.C. diode coupling	.00005
25	V5 cathode by-pass	.01
26	L.F. coupling	.1
33	V6 anode decoupling	2
34	V6 cathode bias shunt	25
35	L.F. coupling	.5
36	V7 cathode bias shunt	25
37	Negative feed back condenser	.05
39	H.T. smoothing	32
40	H.T. smoothing	12
41	H.T. smoothing	16
42	Bass control	.15
43	Top control	.005
45	L.W. oscillator fixed padder	.00015
46	M.W. oscillator fixed padder	.00035
47	V1 screen decoupling (part)	1
48	V3 screen decoupling (part)	2
49	H.F. by-pass	.00005
50	V2 screen decoupling (part)	8
52	S.W.1 aerial coil fixed trimmer	.00001
55	L.W. oscillator fixed trimmer	.000023
56	V4 A.V.C. decoupling	.05
57	L.W. aerial shunt	.00005
58	S.W.2 H.F. coil fixed trimmer	.000005
59	M.W. oscillator fixed trimmer	.00001

Marconi 538 on Test

MODEL 538.—Standard model for A.C. mains operation, 200-225 volts, 40-100 cycles. Price, 19 gns.

DESCRIPTION.—Four-band, eight-valve, including rectifier, table superhet.

FEATURES. — Full - vision scale marked in metres and station names, concentric tuning with micro dial for short waves. Wave selection switch operates an indicator on the wavelength dial. Separate tone controls for brilliance and bass with high fidelity switch operated by brilliance control. Visual tuning indicator. Sockets for external speakers and pick-up and for all-wave anti-static aerial. Elliptical speaker.

LOADING.—127 watts.

Selectivity and Sensitivity

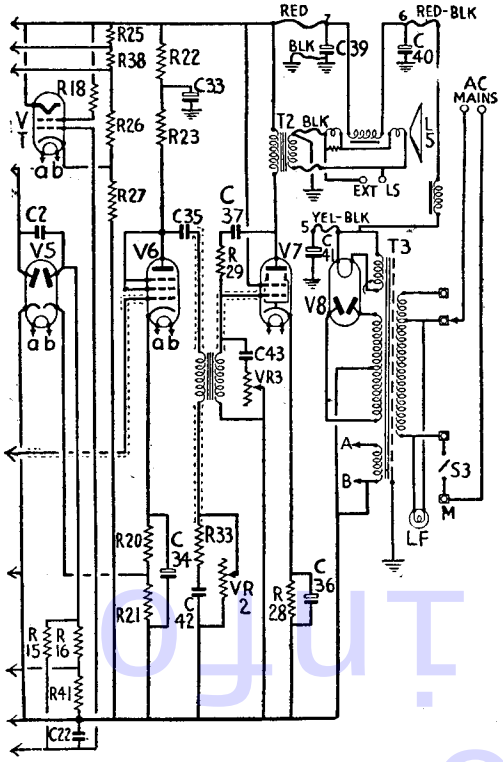
SHORT WAVES (35-100 and 11-35 metres).—Excellent gain and selectivity. No drift and very nice control.

MEDIUM WAVES (195-580 metres).—Excellent gain and selectivity, with good background and good A.V.C. action.

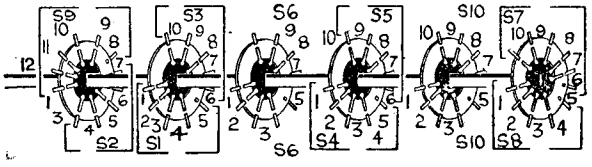
LONG WAVES (725-2,000 metres).—Good gain and selectivity. All the main stations easily received, Deutschlandsender coming through with only a trace of side band splash.

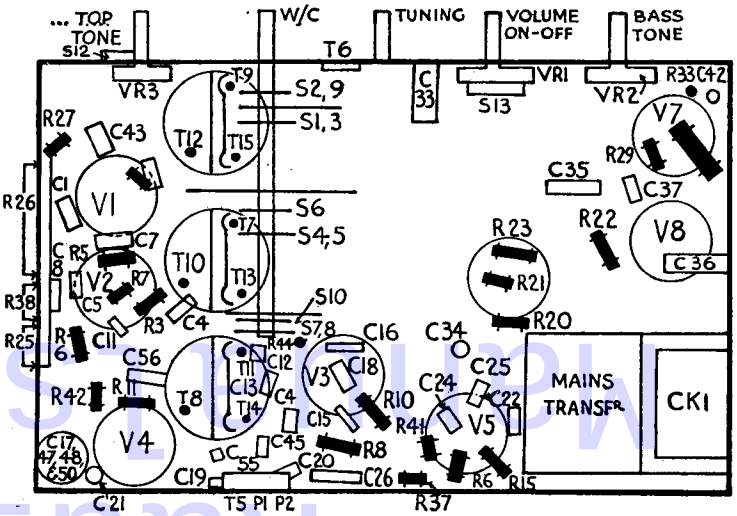
Acoustic Output

Ample volume for a large room, with a well-balanced tone in the high fidelity position. Good low-note radiation and very crisp, clean attack.



Right, the switch banks numbered corresponding to the circuit diagram. Below, the under - chassis layout (see page 55 for top deck diagram).





Marconiphone Model 538

For reconnection, the red lead is connected to tag 7, red lead with black dot to tag 6, black to tag 3, yellow to 1, yellow with black to 5, and the black rubber lead to the earthing tag on the electrolytic condenser support.

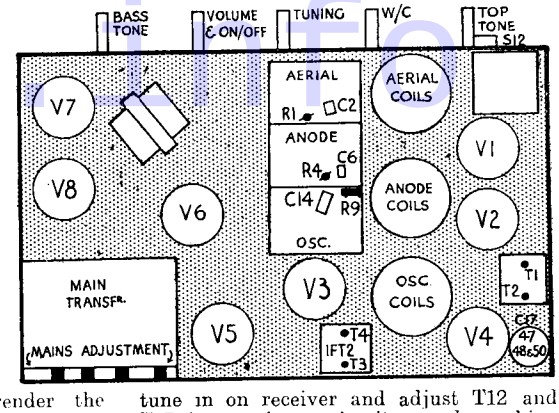
Special Notes.—The receiver has, in addition to ordinary aerial and earth sockets, a specially designed input circuit to match the line impedance of the Marconiphone Static-free aerial, type 72. This aerial equipment is provided with a non-reversible plug attached to the transmission line. This fits into two special sockets on the receiver, and a link plug is inserted between the aerial and earth sockets.

Sockets are provided for a high-resistance pick-up.

The receiver will operate up to four extension speakers without greatly reducing the volume from the internal speaker. The total speech coil impedance of extra speakers should be approximately 5 ohms. The extension speaker sockets are on the side of the cabinet at the back.

Electrolytic smoothing condensers C39, C40 and C41 are mounted on a bracket near the speaker. C52 and C57 are located inside the aerial coils can, C58 in the anode coils can, R34, R35, R39, C9 and C59 in the oscillator coils can, and R13, R14, R40, C23 and C49 inside IFT2. R18 is mounted on the visual tuning indicator holder.

The single dial light is connected across the mains supply. It is rated at 230 volts 15 watts and mounted in a bayonet holder.



The "top deck" arrangement of components on the Marconiphone model 538 is shown by this drawing. It will be seen some resistors and condensers are near the tuning condensers. Others are in coil cans (see Special Notes).

Circuit Alignment Notes

I.F. Circuits.—Connect an output meter across the primary of the speaker transformer and a service oscillator to the top grid cap of V2 via a 0.1 mfd. condenser and chassis. Set receiver to SW2 band, gang condenser to maximum, volume control to maximum, bass tone control fully anti-clockwise and top tone control as far anti-clockwise as possible without switching to high fidelity.

Tune service oscillator exactly to 465 kc. and adjust T1, T2 and T3 and T4 in that order for maximum response, using a non-metallic trimming tool and reducing the input from the service oscillator as the circuits come into line to render the A.V.C inoperative.

Signal Circuits.—Connect service oscillator to A. and E. sockets via a dummy aerial, only feeding sufficient input to obtain reliable peaks in the output meter so as to prevent operation of the A.V.C.

To check the wavelength scale, turn gang to minimum capacity and then turn the gang 10 degrees (on the vernier scale) in. The pointer should now register accurately on 725 metres. If it does not do so slacken the pointer fixing screws and adjust.

Long Waves.—Set receiver and oscillator to 725 metres (413.8 kc.) and adjust T5 for maximum.

Set oscillator to 850 metres (353 kc.), tune in on receiver and adjust T6 and T7 for maximum.

Set oscillator to 1,900 metres (157.9 kc.), tune in on receiver and adjust P1 for maximum simultaneously rocking the gang.

Repeat operations until no further improvement results.

Medium Waves.—Set receiver and oscillator to 194 metres (1,538 kc.) and adjust T8 for maximum.

Set oscillator to 210 metres (1,430 kc.) tune in on receiver and adjust T9 and T10 for maximum.

Set oscillator to 530 metres, tune in on receiver and adjust P2 for maximum simultaneously rocking the gang.

Repeat operations until no further improvement results.

Short Waves (35 to 100 metres).—Set pointer to read 725 metres on the L.W. scale, set oscillator to 35.2 metres, and adjust T11 for maximum.

Set oscillator to 37.5 metres (8 mc.), tune in on receiver and adjust T12 and T13 for maximum simultaneously rocking the gang.

Repeat until no improvement results.

Short Waves (11 to 35 metres).—Fully unscrew T15, set oscillator to 11.3 metres (26.6 mc.) tune in on receiver and adjust T14 for maximum at the same time rocking the gang. Adjust T15 for maximum.

If the tuning coils have been seriously disturbed, and not otherwise, set oscillator to 30 metres (10 mc.) and tune in signal on receiver.

Insert the Ferrocart end of a tuning wand into can containing L12. If output reading rises then L16 must be decreased by unsoldering the junction between C13 and its connecting wire and sliding the condenser tag down towards the coil base until the section of either end of the tuning wand into 12 produces a fall in output.

If reading falls when the Ferrocart end is inserted then increase inductance of L16 by sliding C13 upwards until the insertion of either end of the tuning wand produces a fall in output.

Then repeat the operation outlined for 11.3 metres calibration.

If two condensers are used for C13 it is important that when resoldering the tags to the wire a good connection is made between the tags of the two condensers as far up the moulded cases as possible.

Replacement Condensers

EXACT service replacements for the 538 are available from A. H. Hunt, Ltd. These are: For C39, unit 3,058, price 9s. 6d; for C41, 3,056 7s. 6d.; for either C34 or C36, 1,807, 2s. 3d.; C50 is unit 3,914, at 9s. 6d., and for C17, C33, or C48 there is 2,780, 3s.

ULTRA 150 RADIOGRAM

(*Continued from page* 47.)

tests. We have appended our usual list in order that in cases of partial dismantling the resistances can be checked.

C11 and C12 are inside IFT1, and C18, C19, C20, R10, R11, R12, and R13 inside IFT2.

Alignment Notes

I.F. Circuits.—Connect an output meter across the primary of the speaker transformer. Switch set to M.W., turn gang to maximum capacity and volume control to maximum. Connect a service oscillator between the top grid cap of V1 and chassis.

Tune service oscillator to 456 kc. and adjust the variable iron cores of IFT2 and then IFT1, reducing the input from service oscillator as the circuits come into line, so as to render the A.V.C. inoperative.

Signal Circuits.—Adjust the tuning pointer to coincide with the lower left black dial line when the gang is fully closed.

Connect the service oscillator to the A. and E. sockets, preferably *via* a dummy aerial or fixed condenser, only feeding sufficient input to obtain definite peaks in the output meter.

Medium Waves.—Tune set and service oscillator to 200 metres (1,500 kc.) and adjust T1, T2 and T3 in that order for maximum response.

Tune set and oscillator to 500 metres (600 kc.) and adjust P1 for maximum, simultaneously rocking the gang.

Repeat both operations.

Long Waves.—Tune set and service oscillator to 1,500 metres (200 kc.) and adjust T4, T5 and T6 in that order for maximum response.

Tune set and service oscillator to 1,700 metres (176.5 kc.) and adjust P2 for maximum, simultaneously rocking the gang.

Repeat both operations.

Short Waves.—Tune set and oscillator to 17 metres (17,647 kc.) and adjust T7 and then T8 for maximum response.