Radio Manuals Info

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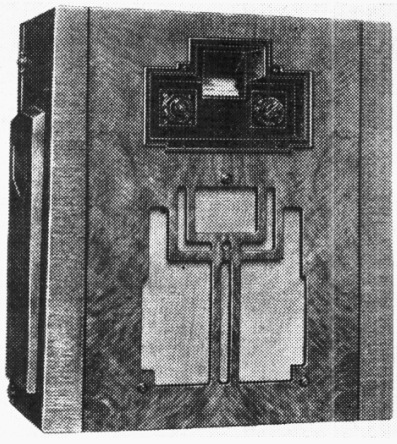
"TRADER" SERVICE SHEET 546

MARCONIPHONE 269 AND HMV 462



The appearance of the Marconiphone 269 portable battery superhet.

TWO pentodes working in QPP in the output stage, a two-element Westector as second detector and AVC rectifier, and filament circuit reaction coils are employed in the Marconiphone 269, a 6-valve, 2-band battery superhet portable.

Provision is made for the connection of a gramophone pick-up and an external speaker, and in the gramophone position of the control economy of HT current is effected by cutting off the HT feed to **V1** and **V2** anodes, while **V1** screen current is reduced by the application of cut-off bias.

With the exception of its external appearance, the HMV 462 is similar in every respect, but this *Service Sheet* was prepared from a Marconiphone 269.

Release date, both models: 1934.

CIRCUIT DESCRIPTION

Tuned frame aerial input **L1** (MW) plus **L2** (LW) and **C19** to RF tetrode valve **(V1, Marconi metallised S21** or **S23)** which operates as variable-mu signal frequency amplifier. Provision by means of variable condenser **C20** for final manual trimming of frame aerial circuit on both wavebands. Provision also for connection of an external aerial if required, via the small series condenser **C1,** and an earth.

Tuned-anode RF coupling by **L3** (MW) plus **L4** (LW), tuned by **C22,** between **V1** and first detector valve **(V2, Marconi clear S21** or **S23),** a second RF tetrode, operating as frequency changer, in which oscillator coupling occurs between anode and cathode (filament) circuits.

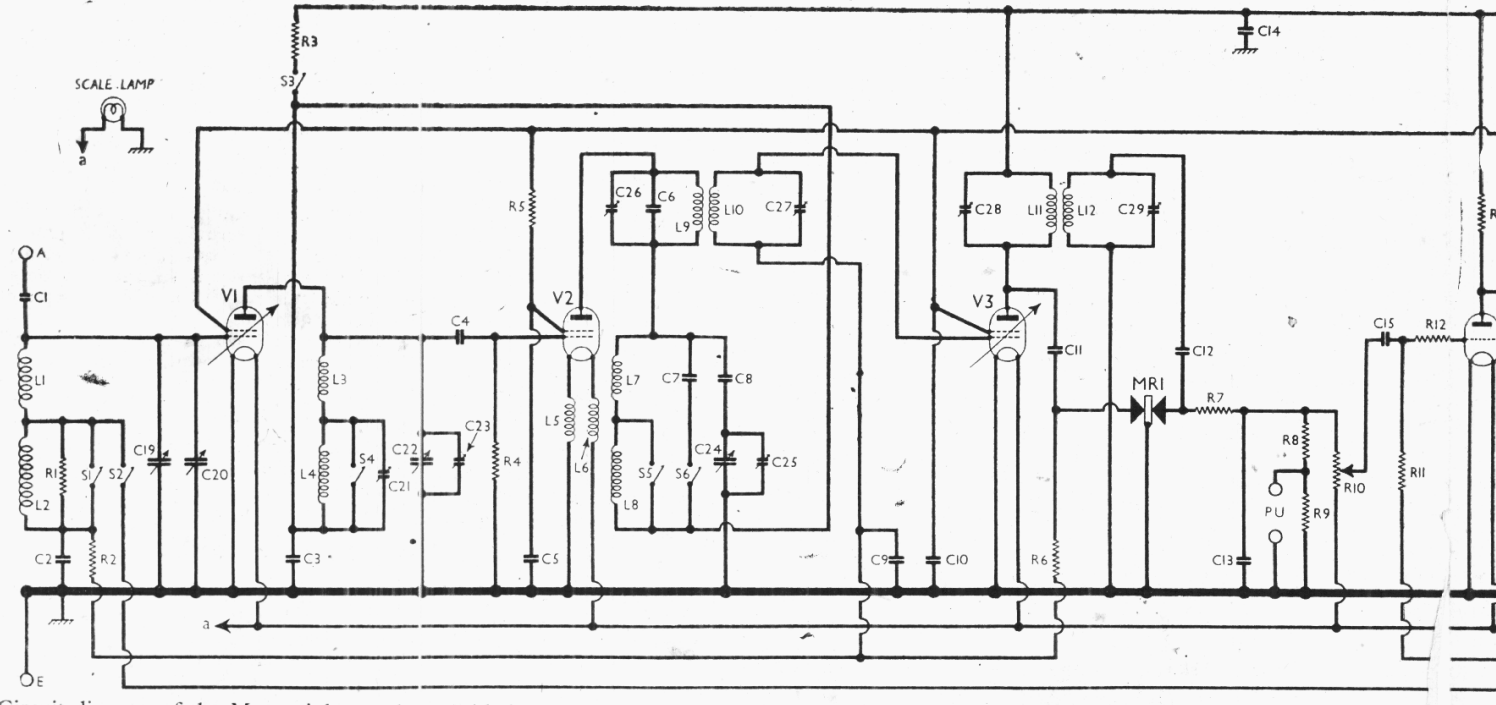
Oscillator anode coils **L7** (MW) plus **L8** (LW) are tuned by **C24** via **C8,** which isolates the tuning condenser from the HT circuit. Parallel trimming by **C25** (MW) and **C7,** via **S6** (LW). Reaction coupling by coils **L5, L6** in filament circuit. The second reaction coil is necessary to raise the filament above earth potential, as otherwise it would short-circuit the reaction circuit.

Mixing occurs in the anode circuit **C26, C6, L9,** which is tuned to the intermediate frequency, and a variable-mu RF tetrode **(V3, Marconi metallised VS2)** operates as intermediate frequency amplifier with tuned-primary, tuned-secondary transformer couplings **C26, C6, L9, L10, C27** and **C28, L11, L12, C29.**

Intermediate frequency 125 KC/S.

One element of a dual metal rectifier unit **(MR1, Westinghouse type WM26)** is employed as the second detector, which is parallel-fed via **C12** from **L12.** Audio-frequency component in rectified output is developed across load resistance formed by **R8, R9** in parallel with the manual volume control **R10,** and passed via AF coupling condenser **C15,** CG resistance **R11** and grid stopper **R12** to control grid of triode AF amplifying valve **(V4, Marconi metallised HL2).**

Since **R9, R8** and **R10** are connected in series across the LT circuit, a positive bias potential of about 1 V is applied to



Circuit diagram of the Marconiphone 269 portable battery superhet. The HMV 462 employs an identical chassis. **MR1** is the metal rectifi for to **V1** and **V2,** while **S2** closes to bias up **V1** and reduce screen current. **L5, L6** are the oscillator reaction coils, in the filament circuit of **V:** Th

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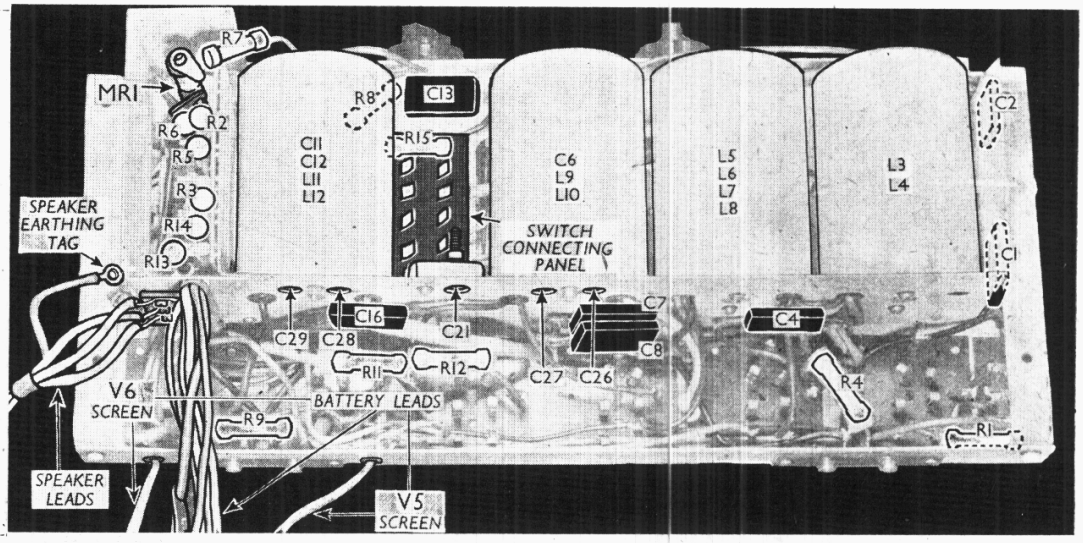
Under - chassis view. Each of the coil cans can be removed upon releasing a nut. The condenser block sketch in col. 4 and the switch diagrams in col. 6 are both drawn as seen with the chassis in this position. The switch panel is indicated here, but the position of the condenser block is seen only in the plan view.



the signal section of the rectifier **MR1.** 'F filtering by **R7, C13** in detector circuit, and by **R12** in the control grid circuit and **C16** in the anode circuit of **V4.**

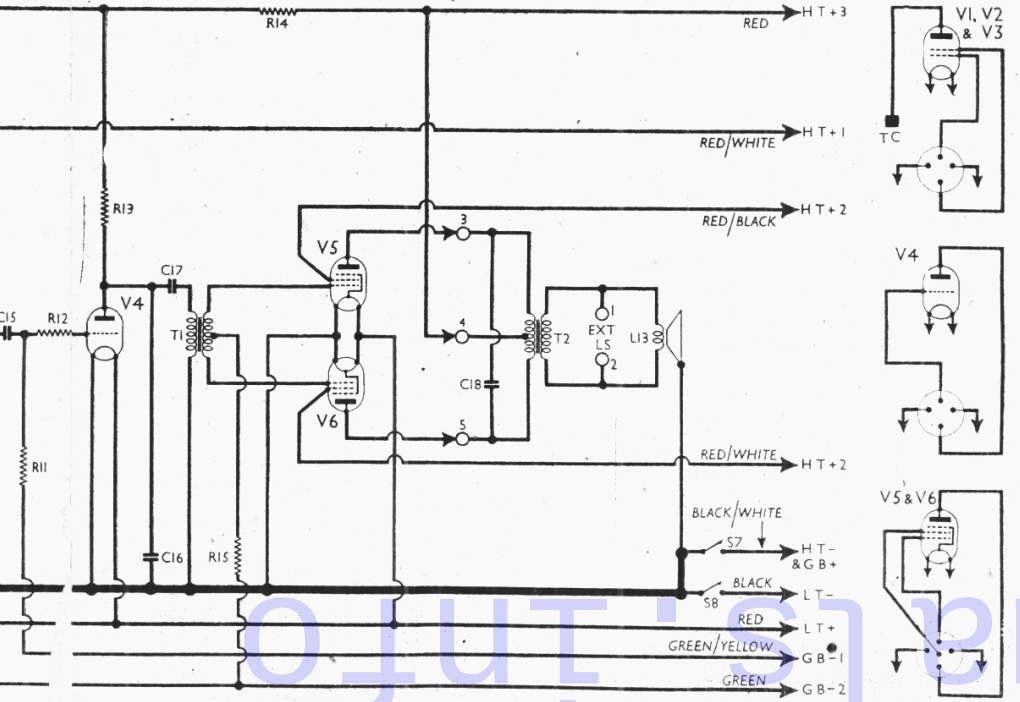
Second element of **MR1,** fed from **V3** anode via **C11,** provides DC potential (developed across the impedance of the rectifying element) which is fed back through decoupling circuits as GB to RF and IF amplifying valves, giving automatic volume control.

Parallel-fed transformer coupling by **R13, C17** and **T1** between **V4** and double-pentode quiescent push-pull stage **(V5, V6, Marconi PT2's** or **KT2's).** Fixed tone correction by **C18** between anodes. Provision for connection of high impedance external speaker across primary of internal speaker input transformer **T2** (terminals 3 and 5), or for a low impedance one across **T2** secondary winding (terminals 1 and 2).

V5 and **V6** screen HT leads are brought out separately via leads marked "HT+2" to appropriate tappings on the HT battery, according to a lettered code mark on the valves. The code is explained under "General Notes."

Two fixed GB potentials are obtained from tappings on the GB section of the HT battery. GB for **V5, V6** is obtained via decoupling resistance **R15** from GB2 tapping, and the cut-off bias for **V1** on gram is obtained from the same tapping; GB1 provides the operating bias for **V4** only.

Provision is made for the connection of a gramophone pick-up across **R9,** and a fourth position is provided on the switch control for gramophone operation. In the gram position of the control, **S2** closes, applying a cut-off bias to **V1,** and **S3** opens, cutting off the HT feed to **V1** and **V2** anodes, so that radio is effectively muted.



rectif for signal demodulation and AVC. Switch S_3 opens on gram and interrupts the HT feed of V: The value of voltage to be applied to the two HT + 2 tappings is described in col. 5 overleaf.

COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	LW frame damping ...	15,000
R2	V1 CG decoupling ...	1,000,000
R3*	V1, V2 anodes HT feed ...	1,000
R4	V2 CG resistance... ...	1,000,000
R5	V2 SG HT feed	15,000
R6	AVC line decoupling ...	500,000
R7	IF stopper	23,000
R8	Westector signal load ...	230,000
R9	Pick-up shunt	23,000
R10	Manual volume control ...	250,000
R11	V4 CG resistance... ...	2,300,000
R12	V4 grid stopper	100,000
R13	V4 anode load	50,000
R14	V1-V4 HT feed	7,500
R15	V5, V6 CG's decoupling	230,000

	CONDENSERS	Values (μF)
C1	Ext. aerial series	0·00005
C2	V1 CG decoupling ...	0·01
C3	V1, V2 anodes decoupling	0·4
C4	V2 CG condenser... ...	0·0001
C5	V2 SG decoupling ...	0·2
C6	1st IF trans. pri. tuning...	0·0001
C7	Osc. circuit LW trimmer	0·00015
C8	HT isolating condenser...	0·0017
C9	V3 CG decoupling ...	0·1
C10	V1, V3 SG's decoupling ...	0·2
C11	Westector AVC coupling	0·0002
C12	Westector signal coupling	0·0002
C13	IF by-pass	0·0001
C14	HT line decoupling ...	2·0
C15	AF coupling to V4 ...	0·01
C16	IF by-pass	0·002
C17	AF coupling to T1 ...	0·1
C18	Fixed tone corrector ...	0·001
C19†	Frame aerial tuning ...	—
C20†	Frame manual trimmer ...	0·0001
C21‡	V1 anode LW trimmer ...	0·00007
C22†	V1 anode circuit tuning ...	—
C23‡	V1 anode MW trimmer ...	—
C24†	Oscillator circuit tuning ...	—
C25‡	Osc. circ. MW trimmer ...	—
C26‡	1st IF trans. pri. tuning...	0·0001
C27‡	1st IF trans. sec. tuning...	0·0001
C28‡	2nd IF trans. pri. tuning...	0·0001
C29‡	2nd IF trans. sec. tuning...	0·0001

† Variable. ‡ Pre-set.

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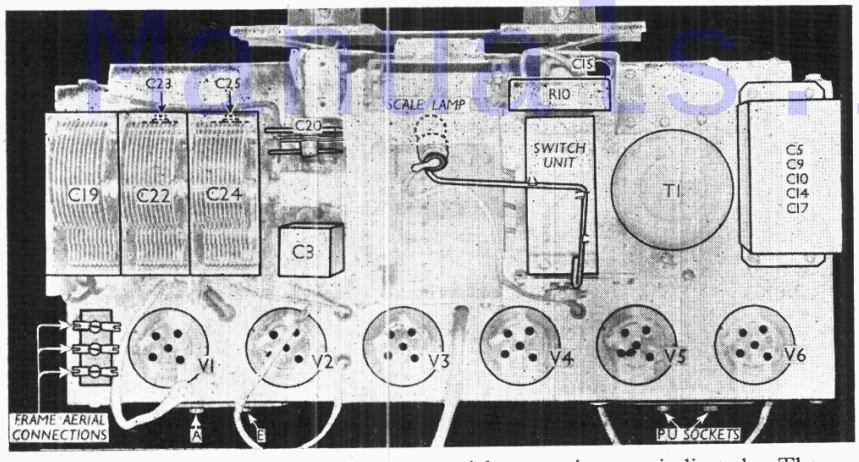

Plan view of the chassis. The frame aerial connections are indicated. The upper side of the condenser block is seen on the right. A diagram of the connections, viewed from the underside, appears in col. 4 opposite.

OTHER COMPONENTS		Approx. Values (ohms)
L1	Frame aerial windings	2·0
L2	Frame aerial windings	15·0
L3	V1 anode MW tuning	4·0
L4	V1 anode LW tuning	13·0
L5	V1 filament reaction coils	1·4
L6	V1 filament reaction coils	1·4
L7	Osc. circ. MW tuning	3·5
L8	Osc. circ. LW tuning	6·4
L9	1st IF trans. Pri.	63·0
L10	1st IF trans. Sec.	90·0
L11	2nd IF trans. Pri.	73·0
L12	2nd IF trans. Sec.	82·0
L13	Speaker speech coil	4·0
T1	Intervalve trans. Pri.	465·0
	Intervalve trans. Sec., total	7,800·0
T2	Speaker input trans. Pri., total	465·0
	Speaker input trans. Sec.	1·0
S1-S6	Waveband switches	—
S7	HT circuit switch	—
S8	LT circuit switch	—
MR1	Westector rectifier	—

DISMANTLING THE SET

Removing Chassis.—Remove the three small cheese head screws holding the frame aerial connecting panel to the left-hand end of the chassis deck; or, alternatively, unsolder the four frame leads;

disconnect the three coloured leads from their terminals on the speaker input transformer, and unsolder the fourth (black) earthing lead from its tag on the transformer casing;

remove the four slotted hexagon head bolts (with metal plates and lock-washers) holding the chassis to the wooden mounting blocks on the sides of the carrying case. The control knobs need not be removed.

To obtain access to the underside of the valve holders, remove the metal screening plate (five self-tapping screws);

similarly, the smaller vertical screen may be removed (four self-tapping screws) to give access to the resistance panel beneath the condenser block.

When replacing, do not omit to fit the tag at the chassis end of the black speaker earthing lead to one of the fixing bolts, so that it is in contact with the chassis;

replace the frame connecting panel with the *soldered* ends of the tags toward the end of the chassis, so that the frame leads run up conveniently; or, if the leads have been unsoldered, connect them as follows, numbering the three tags from front to rear of chassis:

1, maroon lead from MW frame, in front of case;
2, two green leads with yellow tracer, one from each frame;
3, maroon lead from LW frame, in back cover.

Connect the speaker leads as follows, using the terminal numbers as marked on the connecting panel on the speaker transformer, and reading from top to bottom:

5, yellow;
4, red;
3, yellow.

The black lead goes to the earthing tag at the bottom of the connecting panel. The two remaining terminals on the right are the low impedance external speaker terminals, and otherwise have no external connections.

Removing Speaker.—Disconnect the leads from the input transformer, as described previously, and remove the three ornamental headed screws holding the speaker mounting lugs to the front of the case.

When replacing, the transformer should be on the right, and the leads should be connected as previously indicated.

VALVE ANALYSIS

Valve currents given in the table below are those quoted in the makers' manual. Voltages have been computed on the assumption that the meter resistance is 200,000 ohms (such as the 400 V scale of the Model 7 Universal Avometer), and that the negative lead is connected to chassis.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 S21	122	1·9	60	1·5
V2 S21	122	1·0	40	0·6
V3 VS2	127	0·9	60	0·7
V4 HL2	66	0·6	—	—
V5 PT2	166	1·0	*	0·4
V6 PT2	166	1·0	*	0·4

* V5, V6 screen voltage depends upon the code letters on the valves (see "General Notes").

The values given are approximately correct when the receiver is operating with a new HT battery reading 175 V overall, the receiver is switched to LW and an earth wire is connected to the chassis. It is important that there should be no signal input.

GENERAL NOTES

Switches.—**S1-S6** are the waveband and radio/gram change switches, and **S7, S8** the battery switches, in a leaf-type unit mounted on the chassis deck. The unit is indicated in our plan view, but the connecting tags project through the deck into the underside of the chassis, where all the connections to the unit are made.

The connecting panel is indicated in our under-chassis view, and a sketch showing this panel, as seen in our under-chassis view, is given in col. 6. The table below gives the switch positions for the four control settings, starting from the "Off" position and rotating the control in a clockwise direction. A dash indicates open, and **C**, closed.

Switch Table

Switch	Off	MW	LW	Gram
S1	—	C	—	—
S2	—	—	—	C
S3	—	C	C	—
S4	—	C	—	C
S5	—	C	—	C
S6	—	—	C	C
S7	—	C	C	C
S8	—	C	C	C

Coils.—**L1, L2** are the frame aerial windings, on two separate frames. The MW winding **L1** is fitted on a frame at the front of the carrying case, while the LW winding **L2** is fitted in the hinged back cover. Each frame is connected to the frame aerial connecting panel on the chassis by two leads, the arrangement of which is described under "Dismantling the Set."

V1 anode circuit coils **L3, L4**; the oscillator circuit coils **L5-L8**; and the two IF transformers **L9, L10** and **L11, L12** are in four screened units mounted horizontally beneath the chassis. In the **L5-L8** unit, the filament coils **L5, L6** are situated between the other two windings. **C11** and **C12** are housed in the **L11, L12** unit.

Scale Lamp.—This is a low-consumption MES type lamp, with a spherical bulb. The type originally fitted was rated at 2 V, 0.06 A. It is fitted in a coil-spring type of holder, a continuation of the wire acting as the mounting support, which is shaped to fit into three lugs punched in the top plate of the switch unit.

To remove the lamp, it is only necessary to grip the hooked end of the wire and spring it out of the nearest lug. The lamp will not light after removal unless the support wire contacts the chassis, as the support forms the negative return connection.

Gramophone Pick-up.—Two sockets are provided at the rear of the chassis for a high impedance (over 1,000 Ω) pick-up, and a slot cut in the base of the carrying case permits the lead to enter without interfering with the movement of the hinged cover. If a low-resistance pick-up is used, it must be connected via a step-

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up transformer. An external volume control is not required.

External Speaker.—An external speaker may be connected to the terminals fitted on the internal speaker connecting panel, which is mounted on **T2.** A low impedance type (6-10 O) can be connected to the two terminals numbered 1 and 2, which are connected across the internal speech coil, or a high impedance type (25,000-35,000 O) could be connected between terminals 3 and 5, across **T2** primary. In the latter case, the insulation of the leads must be adequate, as otherwise there is a risk of damage to the transformer and HT battery.

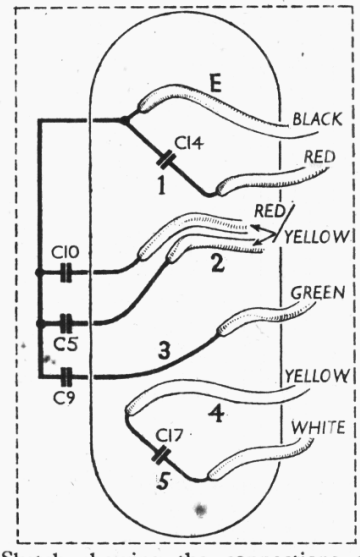
Condenser C3.—This is in a small rectangular metal container, mounted vertically on the chassis deck.

Condenser Block.—Five fixed condensers, **C5, C9, C10, C14, C17,** are contained in a large rectangular metal container, mounted at one end on the chassis deck. Their seven connecting leads, which are colour-coded, emerge from beneath the unit and enter the underside of the chassis through a large hole in the chassis deck immediately beneath the unit.

The diagram below shows the internal connections of the unit, with the colouring of the leads and the numbering of their outlets, as they appear when viewed from beneath the chassis. It will be observed that two leads of similar colouring emerge from outlet 2. These are the leads of **C5** and **C10,** and it is immaterial which is which, since the two condensers are also similar.

The black lead from the outlet marked **E** is the common chassis connection for **C5, C9, C10** and **C14,** while two separate leads are provided for **C17.**

Condenser C20.—This is an 0.0001 μF variable condenser of the solid dielectric type. It is connected across **C19,** and operates as a fine tuning device to compensate for tracking errors. Its control spindle is concentric with that of the main tuning control.



Sketch showing the connections of the condenser block, as seen when viewed from the rear of the underside of the chassis.

Westector MR1.—This is a Westinghouse type WM26 dual metal rectifier unit, the two halves of which are arranged in opposition. It is used like the conventional double-diode thermionic valve for AVC and signal rectification purposes.

If doubts are entertained as to the efficiency of one of these units, it can be tested by measuring the "forward" and "reverse" resistance with an ohmmeter.

The **forward** resistance should be measured on the 100,000-ohm scale of a Universal Avometer (using the stipulated 7.5 V external battery) with the *negative* lead of the meter connected to the *positive* (centre) terminal of the rectifier, when the indication should be 12,000 ohms for each half.

The **reverse** resistance should be measured on the 1,000,000-ohm scale (using the 75 V external battery) with the *positive* lead of the meter connected to the *positive* (centre) terminal of the rectifier, when the resistance reading should be infinity for each half (the makers' manual says the indication should be not less than 2,000,000 ohms).

Do not attempt to measure the forward resistance on the 1,000,000-ohm scale; or the reverse resistance with reversed polarity. Otherwise the rectifier may be rendered useless.

Batteries.—The batteries recommended by the makers are : LT, 2 V, 30 AH jelly type cell; HT, Marconiphone type B550, 175 V overall, including 9 V GB section.

Battery Leads and Voltages.—Rubber lead, black spade tag, LT negative; rubber lead, red spade tag, LT positive 2 V. Black/white lead, black plug, combined HT negative and GB positive, for the socket so marked on the recommended battery, or 9 V positive socket on an ordinary battery; green/yellow lead, black plug (GB−1), GB negative 1.5 V; plain green lead, black plug (GB−2), GB negative 9 V. Red/white lead, red plug (HT+1), HT positive 60 V; red/white and red/black leads, red plugs (HT+2), see below; red lead and plug (HT+3) HT positive 166 V.

HT+2 Tappings.—The two pentode output valves **V5, V6** are coded with letters to indicate their recommended screen grid voltages for QPP working, and are provided with separate screen feed HT battery leads, both of which are marked "HT+2." These leads should be inserted in the sockets of the HT battery which bear the same code letters as the two valves respectively. If both valves bear the same code letter, the plug of one lead can be inserted into a socket in the plug of the other lead, so that both plugs are connected to the same HT battery socket.

The code letters used are : V, W, X, Y and Z, and on the specified battery the appropriate sockets are so marked. Where other batteries are used, the equivalent sockets are : V, 132 V; W, 140 V; X, 147 V; Y, 155 V; Z, 162 V.

CIRCUIT ALIGNMENT

IF Stages.—Switch set to MW, turn the gang to minimum and the volume control to maximum. Short-circuit the frame aerial connections or remove **V1** anode (top cap) connector. Sufficient coupling between the signal generator and receiver should be obtained by connecting a coil of wire across the generator output and placing the coil near **V2** holder; otherwise, the signal generator leads may be connected via a 0.01 μF condenser to **V2** control grid and chassis.

Feed in a 125 KC/S (2,400 m) signal, and adjust **C27** for maximum output, then adjust **C26, C28** and **C29,** in that order, for maximum output. Replace **V1** top cap, or remove short-circuit.

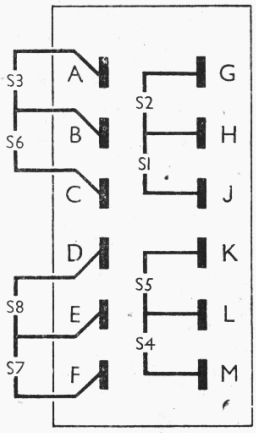


Diagram showing the connections to the switch unit, drawn as seen in the position indicated in our under-chassis view.

It is important that these adjustments are made with a trimming tool whose handle and blade are insulated. Serious damage may result from contact between the blade and chassis while the adjustment of **C26** or **C28** is being carried out. A piece of adhesive tape round the blade provides sufficient protection.

RF and Oscillator Stages.—With the gang at maximum, and the scale pointers at about the centres of their slots, the letters "MW" and "LW" should register with the pointers. If they do not, the scale drum can be adjusted after the two grub screws in the coupling between the drum and the gang spindle have been slackened.

Remove the frame aerial connecting panel (three set screws) from the end of the rear of the chassis, and transfer the signal generator leads to the two *outer* terminals from which the connecting panel has been removed.

MW.—Switch set to MW, slacken off **C23** and reset to a position just short of maximum, and fully unscrew **C25.** Tune to 220 m on scale, feed in 220 m (1,360 KC/S) signal, and adjust **C25** for maximum output. Then adjust **C23** for maximum output. Repeat these adjustments.

LW.—Switch set to LW, tune to 1,000 m on scale, feed in a 1,000 m (300 KC/S) signal, and adjust **C21** for maximum output.

Replace the frame connecting panel, and check the calibration at various scale settings, using broadcast signals or coupling the signal generator via a turn or two of wire round the case. Finally, adjust the scale points in their slots for the best compromise on each waveband.

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