

MARCONIPHONE 535, 536

Six-valve, plus rectifier, two-waveband superhet for use on AC 100-160 v, 200-260 v, 50-60 cycles. Model 535 is a radiogram and 536 an autoradiogram. Released in 1931-2 by Marconiphone Co., Ltd., Hayes, Middlesex.

Circuit.—The aerial socket is automatically connected to the mains via C3 but upon inserting the aerial jack S1 opens and disconnects the mains aerial device. The signal is fed to the primaries L1 (MW) and L2 (LW) of the band-pass coils through the series aerial trimmer, T8, which is in effect the trimmer of VC1 and is adjusted to suit individual aerials.

The secondary coils L3, L4 are tuned by VC2, and feed the grid of the HF amplifier V1.

A local-distant switch, S2 connects R1 across L3 and L4 for strong signals, but in some early instruments S2 connected C1 (shown dotted in the circuit diagram) from aerial to earth for local reception.

V1 is choke capacity coupled by L5 and C4 to the mixer valve V3, the grid of which is connected to coils L6 and L7, tuned by VC3.

The triode oscillator valve V2 has its grid circuit tuned by L8, L9 and VC4, with a series grid resistance R2; R3 and C6 are the grid leak and condenser. Anode reaction windings are L10 and L11, with C7 as HF by-pass. V2 is biased by R4 decoupled by C8.

L6, L8 and L10 are on one former; while L7, L9 and L11 are all on another former, so that the coils electro-magnetically couple the signal and the oscillator output to the mixer valve, which is also biased by R4.

V3 is coupled to the IF amplifier V4 by the IF transformer, comprising L12, L13. The sensitivity of V4 and V1 is controlled by variable bias supplied to them by the volume control R5, which is in their common cathode circuit. R6 (decoupled by C10) is the standing cathode bias resistance for V4 and R7 (decoupled by C2) for V1.

The common cathode circuit is broken by contacts on the wavechange switch when in the gram position, thereby preventing radio break through.

The screens of V4, V3 and V1 are fed from the junction of the potential divider resistances R8 and R9.

V4 is coupled by a second IF transformer L14, L15, to the anode bend second detector triode V5, which is cathode biased on radio by R13 and R14, decoupled by C14. R14 is shorted out on gram to alter the bias, so that V5 becomes an LF amplifier.

Also on gram, resistances R10, R11 and R12 are switched into V5's grid circuit. R11 is the volume control for gram and is ganged with R5. PU sockets are connected across R10 and R11, with grid to cathode decoupling effected by R12 and C11.

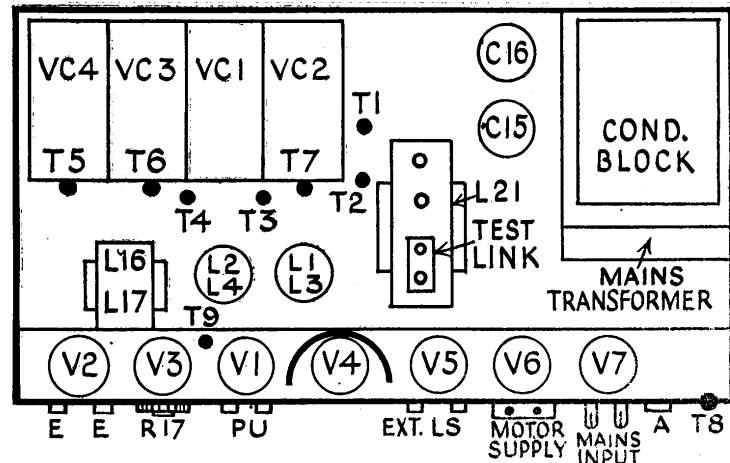
A test link TL is incorporated in the anode circuit of V5. The link is mounted on top of L21 (to which it is not electrically connected) and when opened up enables a milliammeter to be inserted in the anode circuit for trimming purposes.

V5 is resistance capacity coupled by R15 and C12 to the primary of L16 of the intervalve transformer. C13 is an anode to cathode HF by-pass condenser.

The secondary L17 feeds the grid of the triode output valve V6, which is biased by R18 and R19 in parallel decoupled by C18. A humdinger R17 is connected across the filament of V6.

An output transformer L18, L19 couples V6 to the PM moving coil speaker. Extra LS sockets are pro-

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CONDENSERS

C	Mfd's	C	Mfd's
1	.005	11	.5
2	.1	12	.1
3	.0003	13	.002
4	50 mmfds	14	.5
5	.002	15	.8
6	.0003	16	.8
7	.1	17	.1
8	.5	18	.4
9	.1	19	.8
10	.1		

VALVE READINGS

Taken with volume control at max. Set switch to MW.

V	Type	Electrode	Volts	Ma
1	MS4	Anode	190	1.3
		Screen	49	.35
		Cathode	1.7	—
2	MHT4	Anode	42	3.9
3	MS4	Anode	200	.1
		Screen	50 very low	—
		Cathode	4	—
4	MS4	Anode	190	1.2
		Screen	49	.35
		Cathode	2	—
5	MH4	Anode	50	.9
		Cathode	2.8	—
6	PX4	Anode	300	45
		Fil.	42	—
7	U12	Each anode	—	28

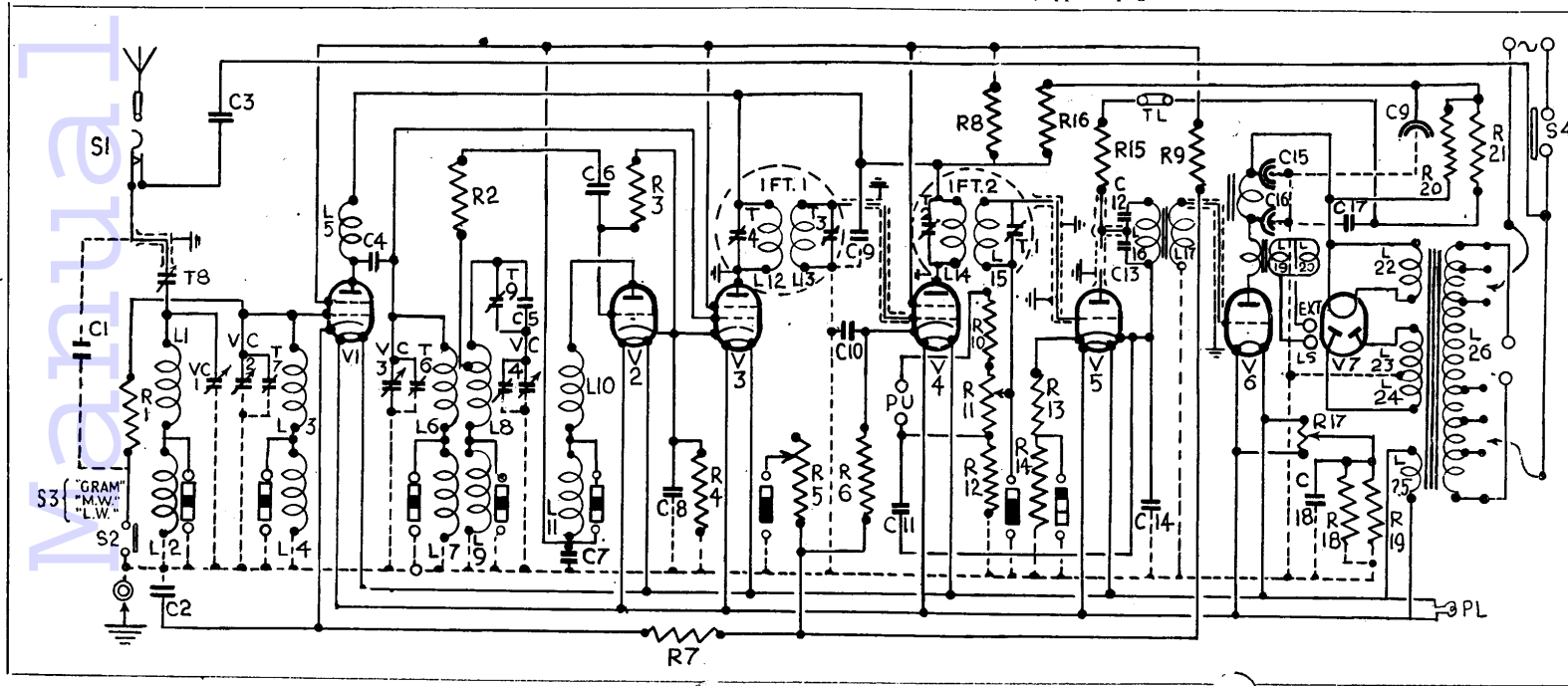
Pilot lamp Gr. 3 amp. M.E.S.

RESISTANCES

R	Ohms	R	Ohms
1	2,000	11	100,000
2	5,000	12	100,000
3	25,000	13	1,000
4	2,000	14	5,000
5	10,000	15	50,000
6	900	16	6,000
7	900	17	—
8	25,000	18	2,000
9	50,000	19	2,000
10	150,000	20	10,000
		21	7,000

WINDINGS

L	Ohms	L	Ohms
1	2.7	14	50
2	20	15	50
3	2.7	16	1,500
4	20	17	5,000
5	85	18	210
6	2.7	19	1.5
7	20	20	.8
8	2.6 (tap 1.6)	21	770
9	11	22	.1
10	6	23	190
11	4	24	275
12	50	25	.1
13	50	26	23.1



PHILIPS 830 A

Four-valve, plus rectifier, TRF receiver covering medium and long wavebands. Suitable for operation from AC supplies between 100-260 v. 40-100 cycles. Marketed in 1932 by Philips Lamps, Ltd., Service Department, 74/94, Cherry Orchard Road, Croydon.

Circuit.—The aerial is coupled to the special low-loss tuning coils L1 and L2 through C1, with C2 as a fixed aerial trimming capacity. A1 is the normal aerial socket, but where local transmissions are very strong and interfere with transmissions on adjacent wavelengths A2 may be used. A2 is coupled to A1 by the mutual capacity of the two sockets.

A tapping on the MW aerial coil feeds the grid of V1, which has a tuned anode coupling L3, L4, with L3, the MW coil, tapped for maximum selectivity.

The tuning condensers VC1 and VC2 are of Philips special design, and are

totally screened by metal cans, which are not directly earthed. The screen of VC2 is at HT potential due to its position in the anode circuit of V1.

Bias for V1 is obtained by a resistance network between HT negative and chassis. R8 provides a minimum bias, while VR1, the volume control, allows the bias and hence the gain of V1 to be varied.

Signals are passed from the anode circuits of V1 to the grid of V2 via the low capacity coupling condenser C5 with R5 the grid to earth resistance for V2. Bias is obtained by the cathode resistance R4, which is decoupled by C6.

V2 is coupled to V3 by a periodic HF anode choke L5, coupling condenser C9, and HF grid choke L6. On LW, S3, which is ganged to S1 and S2, switches condenser C7 across the choke.

V3 acts as a triode grid detector with C10 and R7 as the grid condenser and "leak."

A high impedance pick-up may be connected to the PU sockets across the grid circuit of V3. Bias for LF amplifier operation of V3 is obtained by the PU being connected to the bias line to V1.

As there is no PU switch, the tuning control should be adjusted away from the tuning point of any powerful transmission in order to prevent radio interference on gram, which may occur even with V3 biased. For best results on radio, the pick-up should be disconnected after

use, as the change of bias on V3 with the pick-up in circuit will upset the grid rectification conditions.

An LF transformer (L7, L8) couples V3 to the pentode output valve V4. C11 by-passes HF from the primary L7 of the transformer, while R6, decoupled by C8, drops the voltage for the anode of V3 and the screen of V2.

V4 is coupled to the loudspeaker by an LF choke L9, in its anode circuit and the coupling condenser C13. C12 is the high note tone correcting condenser for the pentode anode circuit.

C13 feeds the primary of the PM speaker matching transformer with extra loudspeaker sockets connected across the primary for a high impedance speaker of about 10,000 ohms.

A straightforward HT supply circuit employs a full-wave rectifier valve V5 with a smoothing choke L13 in the negative lead and two smoothing condensers C14 and C15.

All receiving valve heaters are fed from one LT secondary winding which is centre tapped.

GANGING

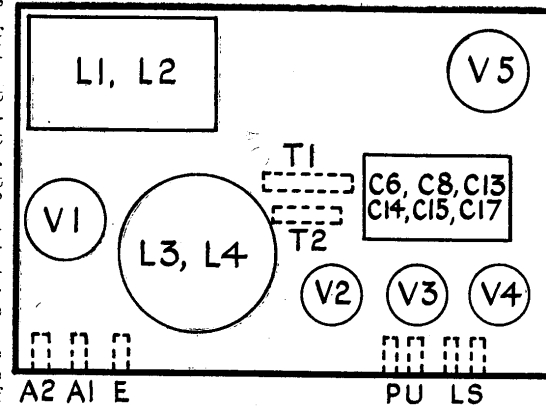
MW Band.—Inject a 230 m. signal into A1 and E, switch to MW (push in tuning knob) and turn volume control to maximum. Tune receiver to 230 m. and adjust trimmer T1 after breaking the paint which seals the two tubes comprising the condenser.

When maximum output has been

attained, connect "live" oscillator lead to A2 for final adjustment of T1 on weak signal.

LW Band.—Pull out tuning knob to set receiver to LW. Inject and tune in a 900 m. signal. If this cannot be heard, connect "live" oscillator lead to A1 socket and adjust trimmer T2 for maximum output. Connect oscillator lead to A2 for fine adjustment of T2.

After ganging, the trimmers should be resealed with a touch of shellac varnish.



CONDENSERS

C	Mfds	C	Mfds
1	20 mmfds	9	640 mmfds
2	.0001	10	125 mmfds
3	.5	11	.0032
4	.5	12	.008
5	20 mmfds	13	.1
6	.5	14	2.5
7	.001	15	3
8	1	16	.5
		17	.5

RESISTANCES

R	Ohms	R	Ohms
1	50,000	6	18,000
2	125,000	7	200,000
3	8,000	8	40
4	640	9	200,000
5	1 meg.	10	100,000
		VR1	600

VALVE READINGS

V	Type	Electrode	Volts	Ma
1	S4VB	Anode	170	2.0
		Screen	75	—
2	S4VB	Anode	170	2.0
		Screen	75	—
3	244V	Anode	80	4.8
4	PM24A	Anode	160	15
		Screen	160	—
5	1821	Cathode	to Chassis	165

Pilot lamp, Philips single-pole SBC, 6 v. 3 W

WINDINGS

L	Ohms	L	Ohms
1	3	9	1,000
2	22	10	400
3	2.75	11	1
4	22	12	6.5
5	37	13	1,000
6	125	14	900
7	400	15	.2
8	1,500	16	.1
		17	115

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vided for connection to a low impedance speaker of about 8 ohms DC resistance.

HT is provided by a full-wave rectifier V7. Smoothing to V8 is effected by L21, C15 and C16. R20 and C19 provide smoothing for the remainder of the valves with R21, decoupled by C17, reducing voltage for V5. R16 drops the voltage for the anodes of V1, V3 and V4.

GANGING

IF Circuits.—Remove V2 and connect milliammeter in place of test link or output meter to ext. LS sockets.

Switch to LW, adjust volume control to maximum and set gang to about half capacity. Connect service oscillator to A and E with aerial jack switch open to disconnect C3.

Inject 125.65 kc signal and peak T1, T2, T3, T4.

MW Band.—Switch set to MW, adjust gang to 215 m. and adjust T5, T6, T7 for maximum output on a 215 m. signal.

Inject and tune in 500 m. signal and adjust T9.

T8 should be adjusted on customer's aerial.

LW Band.—There are no trimmers.

NOTE.—With a short trimmer driver, ganging can be carried out with the chassis in the cabinet. A long flexible driver is helpful when adjusting T5 and T7, due to components immediately in front of trimmers.

