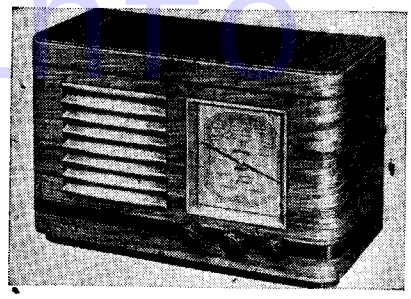
Radio Manuals.info

Pilot Little Maestro AC-DC Superhet

Four valve and rectifier, two waveband, AC/DC superhet with separate models for 200-240 and 100-120 volt mains. Price 5 gns.



CIRCUIT OUTLINE

THE set is supplied with an attached aerial which is taken through a series condenser to the input circuit. This consists of a coupling coil which works in conjunction with the tuned MW and LW coils. There is, in addition, a tuned series IF trap. V1 is a typical American mixer with conventional oscillator circuits.

Coupling from the anode circuit of V1 to the grid of V2, the IF amplifier, is by a trimmer-tuned transformer. Both the first and second valves have AVC control.

A further transformer couples V2 to the diode section of V3, the double-diode triode. An interesting feature is the running of this valve without a cathode bias resistance. The triode section derives its input from the volume control through a coupling condenser and grid leak.

Resistance capacity coupling is used between V3 and V4, the output pentode. This valve drives the speaker through the usual transformer, a compensating condenser being fitted between the anode and earth.

Smoothing is obtained from the speaker field and the usual smoothing condensers. The connection to the mains is made through V5, a series-connected rectifier with strapped anodes. Excess mains voltage is dropped through a resistive line cord.

CONSTRUCTIONAL FEATURES

THE receiver is so simple that little difficulty should be experienced with any part. It is important to realise, however, that the mains cord is of the special resistive type, embodying the voltage dropping resistance. No attempt to shorten the cord must be made as it would reduce the value of the resistance and cause the valves to burn out or be damaged.

Another point to remember is that the two gang condenser used in this set is of the special tracking type with unusually shaped vanes. This obviates the use of a medium wave padder.

Wavechange Switches

The switching is very simple and is accomplished by a single wafer with two wipes.

The first wipe is used to connect the LW aerial trimmer across the coil in one position, while in the other it short circuits the lower portion of the inductance, that is, L4. This leaves L3 in operation on the MW band.

The second wipe shorts out the lower portion of the oscillator coil for MW operation and in the LW position connects a shunt condenser across the primary winding of the aerial circuit.

Chassis Removal

The knobs are of the slip-on spring type, and these must be taken off before removing the chassis. This is held by quick thread bolts from below, and after taking them out the chassis can be readily withdrawn from the cabinet.

Alignment

I.F. Circuits (451 kcs.)

Connect a signal generator to the grid of V1 and an output meter to the set. As the set is a universal type, the connection to the grid of V1 should be made through isolating condensers of the order of .1 mfd.

Adjust the generator to 451 kcs. and tune T1, T2, T3 and T4 for maximum, using a low value below the A.V.C. level.

Medium Waves (200 to 550 metres)

Connect the generator to the input of the set and tune set and generator to 200 metres and adjust T6 and T7 for maximum. (There is no padding operation.)

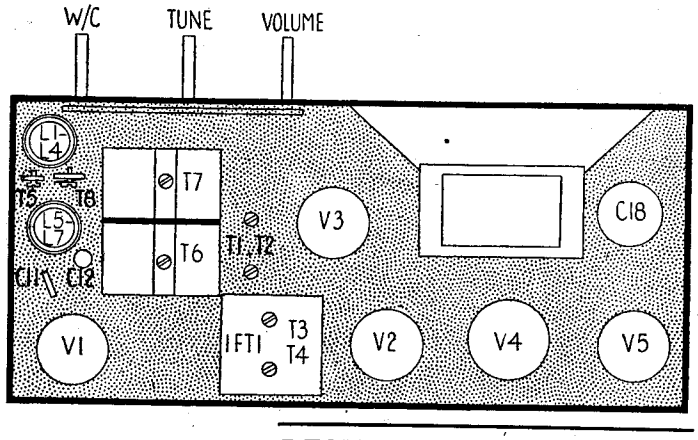
Long Waves (800 to 2,000 metres)

Tune set and generator to 2,000 metres and adjust P1 for maximum output. Then tune set and generator to 1,000 metres and adjust T8 for maximum.

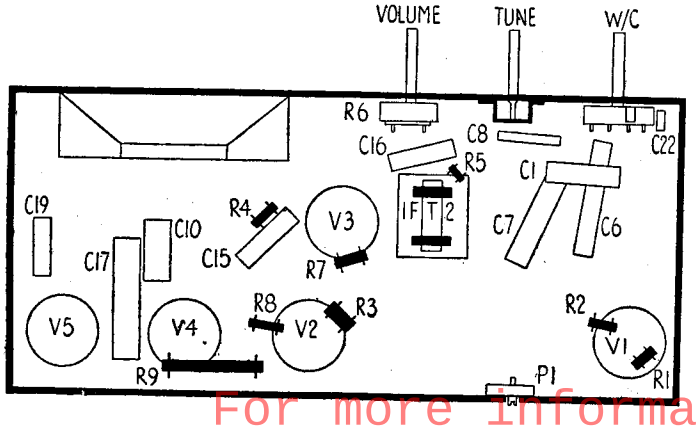
Wave Trap.

With the generator accurately tuned to 451 kcs. adjust T5 for *minimum* output.

If the set tends to be unstable it may be corrected by slight adjustment of T5 when it is in the cabinet, for which purpose a long, thin screwdriver is necessary.



Right, is the diagram showing the disposition of components on the upper side of the chassis.



Left, the underside arrangement of the chassis. Simple switching is a feature.

RESISTANCES

		Ohms.
1	V1 osc. grid leak	39,000
2	V1 osc. anode load	22,000
3	V1, V2 screen feed	22,000
4	V3 anode load	270,000
5	Diode load	1 meg.
6	Volume control	250,000
7	V3 grid leak	9.5 meg.
8	V4 grid leak	470,000
9	V4 cathode bias	470

CONDENSERS

		Mfd.
1	Aerial coupling	.001
6	V1, V2 screen decouple	.05
7	AVC decouple	.05
8	HF filter	.00025
10	V4 anode shunt	.025
11	Osc. grid	.00006
12	Osc. anode	.002
15	IF coupling	.025

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10-MINUTE FAULT-FINDER

Power Test

Voltages : V5 cathode, 188; H.T line, 148.

Resistance : L13,700 ohms.
Current is 188 – 148 ÷ 700 = 57 ma.

Output Stage, V4

Inject 2 volts A.F. at V4 grid. If defective, check :—
Voltages : V4 anode, 135; screen, 148.
Resistances : Anode-H.T., 220; grid-chassis, 470,000 ohms.

A.F. Stage, V3

Inject .5-volt A.F. V3 grid. If defective, check :—
Voltages : Anode, 60.
Resistances : Anode-H.T., 270,000 ohms; grid-chassis, 9.5 megohms.

Demodulation

Inject modulated 451 kcs. signal V2 anode. If defective, check :—
Resistances : L10, 30; L11, 30; diode-chassis, 250,000 ohms.

I.F. Stage, V2

Inject modulated 451 kcs. signal V2 grid. If defective, check :—
Voltages : Anode, 148; screen, 55.
Resistances : Grid-chassis, 1.25 megohms.

Mixer, V1

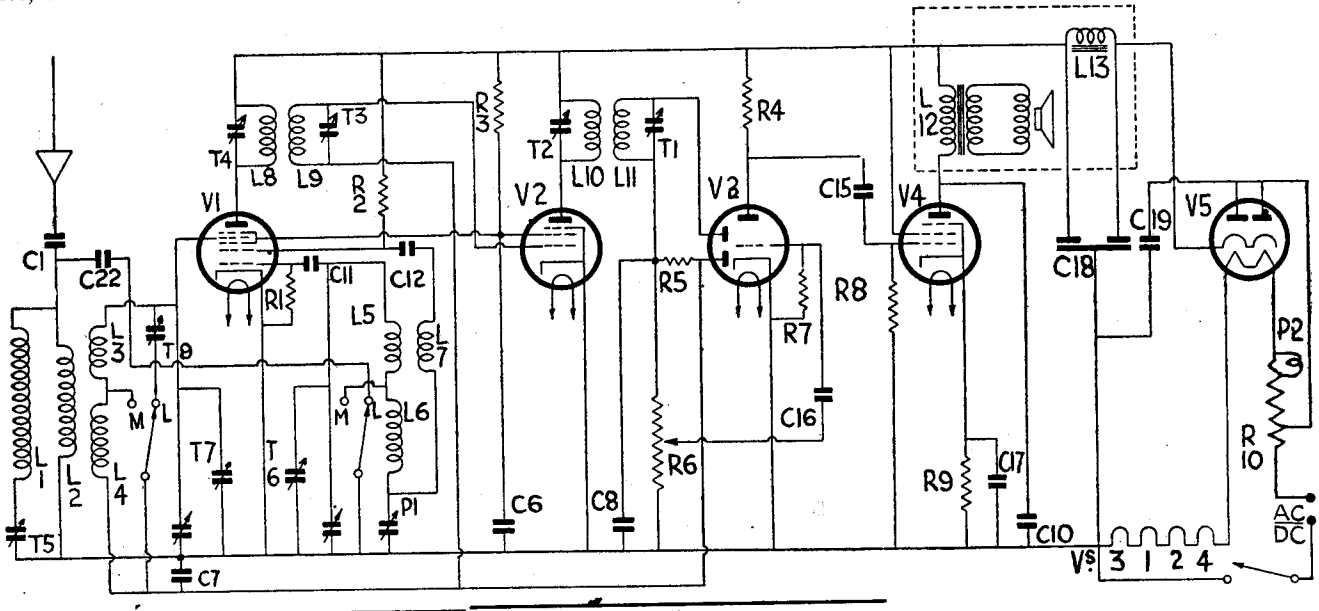
Inject modulated 451 kcs. signal V1 grid. If defective, check :—
Voltages : Anode, 148; screen, 55.
Resistances : L8, 7 L9, 7; screen-H.T., 22,000 ohms.

Oscillator Test

Tune to local frequency and inject that frequency plus 451 kcs at osc. grid. If no signals, check :—
Voltages : Osc. anode, 80.
Resistances : Osc. anode-H.T., 22,000; osc. grid-chassis, 39,000 ohms.

If still no signals, check oscillator and preselector coils and switching.

LITTLE MAESTRO



An interesting feature of the Pilot Little Maestro circuit is the running of the double diode triode without a cathode bias resistor. Resistance coupling is used between V3 and V4.

Condensers (continued)

16 ..	LF coupling	.005
17 ..	V4 cathode bias shunt	10
18 ..	HT smoothing	20-20
19 ..	Mains filter	.025
22 ..	LW aerial primary shunt ..	.00015

WINDINGS

L.	Ohms.	Range.	Where measured.
1 ..	24 ..	— ..	C1 and T5.
2 ..	12 ..	— ..	C1 and chassis.
3 ..	2.8 ..	MW ..	V1 grid and C7.
3+4..	19 ..	LW ..	V1 grid and C7.
5 ..	2.4 ..	MW	Osc. gang and chassis.
5+6..	10 ..	LW ..	Osc. gang and P1.
7 ..	93 ..	— ..	C12 and P1.
8 ..	7 ..	— ..	V1 anode and HT positive.
9 ..	7 ..	— ..	V2 grid and R5.
10 ..	30 ..	— ..	V2 anode and HT positive.
11 ..	30 ..	— ..	Signal diode and R6.
12 ..	220 ..	— ..	V4 anode and HT positive.
13 ..	700 ..	— ..	V5 cathode and HT positive.

Replacement Condensers.—Exact replacement condensers available from A. H. Hunt, Ltd., are : For C17, No. 3723, at 1s. 6d.; and for C18, No. 1576, at 9s.

VALVE READINGS

V.	Type.	Electrode.	Volts.
	All Brimar.		
1 ..	6A8G ..	Anode	148
		Screen	55
		Osc. anode ..	80
		Cathode	—
2 ..	6K7G ..	Anode	148
		Screen	55
		Cathode	—
3 ..	6Q7G ..	Anode	60
		Cathode	—
4 ..	25A6G ..	Anode	135
		Screen	148
		Cathode	18
5 ..	25Z6G ..	Anode	175
		Cathode	188

Ultra Model 301

(*Continued from page* 32.)

The speaker is held both by clips and two screws.

Should it at any time be necessary to remove the speaker there is a terminal plate with six coloured coded leads. Reading from left to right the colours are : Black, green, white, blue, red and yellow.

Alignment

IF Circuits (470 kc.)

Connect the generator to the grid of V1 and an output meter to the set. Adjust the generator to 470 kc., and tune T1, T2, T3 and T4 for maximum, using an input always below the AVC level.

Short Waves (16.5 to 50 metres)

Connect the generator to the aerial and earth and tune set and generator to 19 mc., adjusting T5 and T6 for maximum.

Check the calibration at 30 and 50 metres. If there is a slight error advance or retard the gang slightly and retrim at 19 mc.

Medium Waves (200 to 550 metres)

Tune set and generator to 200 metres and adjust T7 and T8 for maximum.

Long Waves (900 to 2,100 metres)

Tune set and generator to 1,000 metres and adjust T9 and T10 for maximum.

Tune set and generator to 1,700 metres and adjust P1, simultaneously rocking the gang.

Aerial Trap

Connect the generator to the aerial and earth terminals and inject a powerful 470 kc. modulated signal.

Adjust T11 for *minimum* response.

PILOT
LITTLE MAESTRO

Four-valve, plus rectifier, two-waveband superhet. For operation from AC or DC mains of 200–240v. An aerial is permanently connected to the receiver, and no earth must be used. Made by Pilot Radio, Ltd., 31–33, Park Royal Road, London, NW10.

THE aerial input is *via* a small isolating condenser C1 to the coupling coil L2. On LW condenser C2 is in parallel with L2 to obviate any undesirable resonance. Also across L2 is an IF acceptor filter comprising L1 and its trimmer.

The tuning coils are L3 (MW) and L4 (LW) tuned by the aerial section of the gang condenser, and signals are fed direct to the grid of the heptode frequency changer V1.

The oscillator section of this valve employs tuned grid circuits L5 (MW) L6 (LW) with the reaction winding L7 fed from the oscillator anode via C5. R1 and C4 are the grid leak and condenser.

IF signals from V1 are transferred by L8 and L9 to the grid of the IF amplifier V2, and a second IF transformer L10, L11 hands on the signals to the detector diode of the double diode triode V3. A point of interest is that none of the first three valves has a cathode biasing resistance.

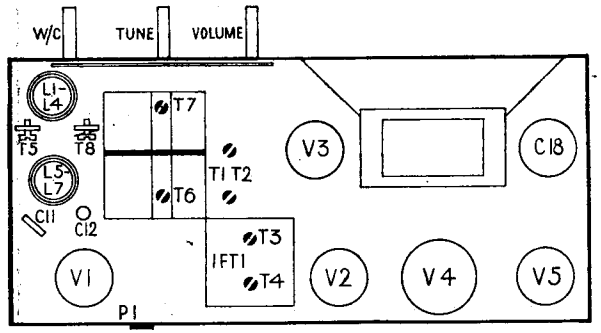
The volume control R6 is the signal diode load which is HF filtered by C7, the LF signal being coupled by C8 to the grid of the triode section of V3.

The DC potential across the volume control R6 is fed *via* decoupling components R5 and C3 to the AVC diode of V3, from whence the AVC line is taken to the grid circuits of V1 and V2.

LF signals are resistance-capacity coupled by R4, C9, and R8 from V3 to the grid of the pentode output valve V4, which is cathode biased by R9, decoupled by C10. A permanent degree of tone correction is effected by C11, and the anode of V4 is coupled to the energised loudspeaker by the output transformer L12, L14.

The HT circuit comprises V5, which is a full-wave rectifier connected as a half-wave rectifier, the field winding L13 as a smoothing choke, and the two-section condenser bank C12. The mains are HF filtered by C13.

The heater circuit is of the usual AC/DC series arrangement with R10 the voltage dropper line-cord.



The top-of-chassis layout of the Little Maestro receiver. Valve, coil and trimmer positions are identified.

GANGING

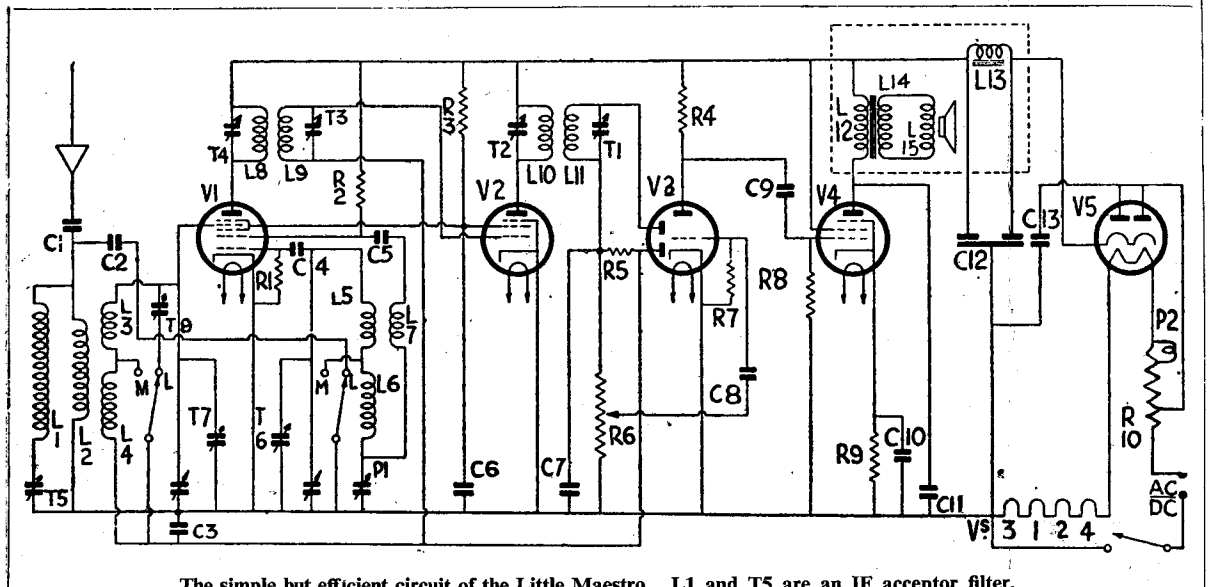
IF Circuits.—The output from the signal generator should be thoroughly isolated by .1 mfd condensers in accordance with the usual measures when handling AC-DC instruments.

Inject a 451 kcs signal into the grid of V1 and adjust T1, T2, T3, and T4 for maximum output. Keep the input low.

MW Band.—Inject a 200m signal into the aerial. Switch receiver to MW and set pointer to 200m mark. Adjust T6 and T7 for maximum output. There is no padding operation, as the oscillator section of the gang has shaped vanes.

LW Band.—Inject a signal of 2,000m into the aerial. Switch receiver to LW and adjust receiver pointer to the 2,000m mark. Adjust P1 for maximum output. Tune receiver and signal generator to 1,000m and adjust T8 for maximum output.

IF Filter Circuit.—Inject a 451 kcs signal into the aerial and adjust T5 for *minimum* output. If the receiver tends to be unstable, it may be corrected by slight adjustment of T5 when it is in the cabinet, for which purpose a long thin screwdriver is necessary.



The simple but efficient circuit of the Little Maestro. L1 and T5 are an IF acceptor filter. Long-wave oscillator feed-back is applied across P1.

VALVE READINGS

V	Type	Electrode	Volts	Ma
1	6A8G	Anode	148	3.6
		Osc-anode	80	2
		Screen	55	2.5
2	6K7G	Anode	148	5.4
		Screen	55	1.3
3	6Q7G	Anode	60	.4
4	25A6G	Anode	135	33
		Screen	148	5.8
		Cathode	18	—
5	25Z6G	Anode	175	—
		Cathode	188	—

Pilot lamp 7.3v, .25 amp MBC.

RESISTANCES

R	Ohms	R	Ohms
1	39,000	6	250,000
2	22,000	7	9.5 meg
3	22,000	8	470,000
4	270,000	9	470
5	1 meg	10	15+370+115

CONDENSERS

C	Mfds	C	Mfds
1	.001	8	.005
2	.00015	9	.025
3	.05	10	10
4	.00006	11	.025
5	.002	12	20+20
6	.05	13	.025
7	.00025		

WINDINGS

L	Ohms	L	Ohms
1	24	9	7
2	12	10	30
3	2.8	11	30
4	16.2	12	220
5	2.4	13	700
6	7.6	14	.3
7	93	15	3
8	7		

Cathode-heater Leak

AN elusive trouble occurred in a model 800 HMV radiogramophone, a 15-valve model with a pair of PX25 valves in push-pull, and a pair of MU12/14 valves as rectifiers.

The customer complained that the output valves and rectifiers lasted only a few months. The receiver and amplifier sections are on a separate chassis and, accordingly, it was expected that the trouble was most likely in the amplifier.

A careful test of all components and a long run with a milliammeter in circuit showed no fault. As the HT volts are somewhat high, 600 or so, and paper condensers are fitted, a 1 meg. bleeding resistance was fitted to the reservoir condenser for the avoidance of shock.

It was next decided to couple up the receiver chassis and check again. The HT current increased by a suitable amount for the additional 11 valves and the receiver performance was checked. After a while it was noticed that the receiver was still functioning perfectly but that the mAs were steadily increasing.

Reference to the service manual showed that all the receiver valves had a cathode-heater potential difference of about 40 volts (the amount of the PX25 bias) and were, in fact, run off the same 4v filament winding. Withdrawing the receiver valves one by one showed that the fault was a heater-cathode short on one of the receiver valves.

A new valve was fitted which thus removed the shortcircuit on the PX25 bias, and the old valve retested in the valve tester. It was found that the heater cathode insulation was OK until the valve had been running a long time.

It was thought advisable to modify the circuit and the PX25 valves are now fed from one 4v winding, and the receiver valves fed from the other 4v winding, the CT of which was now free to tie to ground, so removing the 40 volt heater-cathode potential. One common bias-resistor of half the ohmic value (the existing two paralleled) is now sufficient and the by-pass electrolytics eliminated.—W. Mayne.

* * *

TWICE recently in our service work a rather puzzling fault has been encountered. In each case the patient was a small battery portable set, and the symptoms were very weak signals.

The fault was caused by a decoupling electrolytic condenser used between a decoupling resistance and the HT end of a tuned anode coil in the plate of the first valve. This condenser had gone OC and completely upset the tuning.—A.W.L.

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