SERVICE ENGINEER

PILOT 650 ALL-WAVE SIX SUPERHET

CIRCUIT.—A five-valve plus rectifier superhet for operation on A.C. mains and working on the usual medium and long wavelengths and two short bands.

An inductively coupled aerial transformer precedes V1, an H.F. pentode, which is coupled through a further transformer to V2, the frequency changer Top capacity coupling is employed on the first short wave band.

An I.F. transformer tuned to 456 kc. is used to couple the signal to V3, an H.F. pentode, and through a second H.F. pentode to V4, a double diode triode. Both these transformers have a third winding interposed between the main winds and taking the form of a simple tuned circuit, the effect being to increase the selectivity.

The cathode ray tuning indicator is operated from this stage by the rectified signal from V4.

The volume control, R11, also operates at this stage by regulating the input to the grid. The pick-up, when connected, breaks the coupling between the diode and the grid and is coupled via C29 to the grid.

The diodes of V5 are strapped and used for both demodulation and to provide A.V.C. bias, which is fed to V1 and V2 in the orthodox manner. V3 is not controlled by A.V.C.

L.F. signals from V4 are resistance and capacity coupled to the output pentode V5, and then to the moving-coil speaker through a matching transformer. V5 is tone-controlled by C36 and R18.

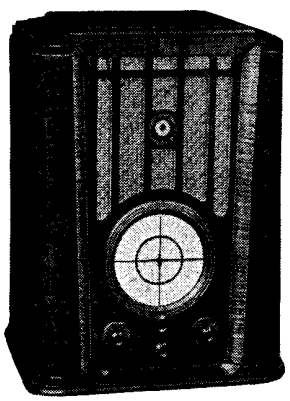
Mains equipment consists of transformer, full-wave rectifier, electrolytic condensers and the speaker field.

Special Notes.—The six dial lights are of the miniature bayonet-cap type, and replacements should be obtained from the manufacturers. The holders are secured to the dial assembly by spring clips and are easily removed.

The external speaker is connected on the primary of the output transformer and should have its own matching transformer.

Removing Chassis.—Remove four knobs from the front of the cabinet, the tuning knob being secured by a grub screw and the others by spring clips, unplug the speaker from its socket on the back of the chassis and then remove four bolts from underneath the cabinet.

The chassis may then be partly withdrawn and the tuning indicator plug removed from the front of the chassis. The chassis will then be entirely free.



An electronic tuning indicator is incorporated in this five-valve plus rectifier all-wave American-type superhet marketed by Pilot Radio Ltd.

VALVE READINGS

No signal. Volume maximum. 200 volts A.C. mains.

V.	Type.	Electrode.	Volts.	Ma.
	All Pilot.			
1	6D6 (6) ..	Anode ..	250	6.25
		Screen ..	95	1.
2	6A7 (7) ..	Anode ..	250	3.5
		Screen ..	65	2.9
		Osc.anode	145	2.8
3	6D6 (6) ..	Anode ..	225	5.9
		Screen ..	95	1.1
4	75 (6).. ..	Anode ..	50	.3
5	42 (6).. ..	Anode ..	230	37
		Screen ..	250	6.5
6	80 (4).. ..	Filament ..	340	—

ALIGNMENT NOTES

I.F. Circuits.—Switch the receiver to the medium wave band and fully mesh the condenser plates. Connect an output meter, to read 1.5 volts, across the external speaker terminals.

Inject a signal of 456 kc. and about .5 volt via a dummy aerial to the grid of V3, and adjust T1, T2, T3 for maximum.

Transfer the oscillator to the grid of V2, and trim T5, T4 and T6 for maximum.

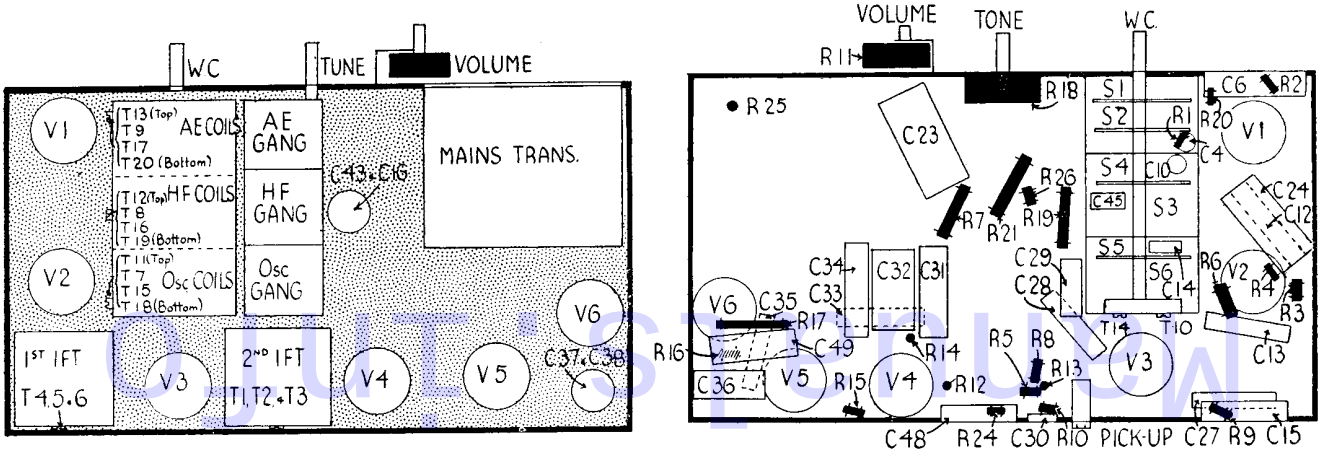
Medium Waves.—Tune the receiver to 200 metres and inject a signal of this wavelength to the aerial and earth terminals. Adjust T7, T8 and T9 for maximum reading on the output meter.

Inject and tune in a signal of 500 metres and, while rocking the gang condenser, adjust T10 for maximum.

Carefully repeat the above adjustments until no further improvement is possible.

Long Waves.—Tune the receiver to 750 metres and inject a signal of this frequency

(*Continued on next page.*)



The orderly construction of the chassis of the Pilot set is shown by these layout diagrams. Resistors are indicated in solid black to speed reference.

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(*Continued from previous page.*)

to the aerial and earth terminals. Adjust T11, T12 and T13 for maximum.

Inject and tune in a signal of 2,000 metres and, while rocking the gang condenser, adjust T14 for maximum output.

Repeat the above until the best results are obtained.

Short Wave 2.—Set the pointer to the 49 metre index mark, inject a signal of this frequency and trim T15, T16 and T17 for maximum.

Short Wave 1.—Tune to 16.6 metres and inject a signal of 16.6 metres to the aerial and earth terminals. Trim T18, T19 and T20 for maximum, rocking the gang condensers while adjusting T19.

RESISTANCES

R.	Purpose.	Ohms.
1	V1 A.V.C. decoupling	100,000
2	V1 cathode bias	400
3	V2 cathode bias	400
4	V2 osc. grid leak	50,000
5	Diode load (part)	100,000
6	V2 screen decoupling	30,000
7	V2 screen and osc. anode decoupling.	10,000
8	V2 A.V.C. decoupling	1 meg.
9	V3 cathode bias	600
10	Diode load (part)	50,000
11	Volume control	1 meg.
12	Diode load (part)	200,000
13	V4 cathode bias	40,000
14	V4 anode load	250,000
15	V4 anode decoupling	100,000
16	V5 grid leak	500,000
17	V5 cathode bias	410
18	Tone control	100,000
19	V1 and V3 screen decoupling potr.	30,000
20	V1 and V3 screen decoupling potr.	40,000
21	V2 screen and osc. anode decoupling.	10,000
22	V2 long-wave modifier	250
23	Long-wave aerial coil modifier	50,000
24	Tuning indicator grid	1 meg.
25	Tuning indicator feed	1 meg.
26	V3 anode decoupling	4,000
	Field coil	1,400

CONDENSERS

C.	Purpose.	Mfd.
4	V1 A.V.C. decoupling	.05
6	V1 cathode bias shunt	.1
10	V2 A.V.C. decoupling	.05
12	V2 cathode bias shunt	.1
13	V2 screen decoupling	.05
14	V2 osc. grid	.00005
15	V2 screen and osc. anode decoupling.	.05
16	V2 screen and osc. anode decoupling	2
20	Short-wave padding	.00137
22	Short-wave padding	.00287
23	V1 anode decoupling	.25
24	V1 screen decoupling	.1
25	Neutralising	—
27	V3 cathode bias shunt	.1
28	V3 anode decoupling	.05
29	L.F. coupling	.01
30	H.F. filter	.00025
31	V4 cathode bias shunt	10
32	V4 anode decoupling	.1
33	L.F. coupling	.01
34	V5 cathode bias shunt	10
35	Pentode compensating	.005
36	Tone control	.05
37	H.T. smoothing	8
38	H.T. smoothing	8
43	V2 screen and osc. anode decoupling	2
44	S.W.H.F. coupling	.00001
45	Long-wave shunt	.00025
46	Mains suppressor	.01
47	Mains suppressor	.01
48	Tuning indicator decoupling	.05
49	External speaker coupling	.05

* Not in receiver examined.

McMICHAEL 366 R.G. ALIGNMENT

(*Continued from page 43.*)

Connect a modulated oscillator to the grid cap of V1 and an output meter across the external speaker terminals. The speaker plug should be pushed in just far enough to make contact, while leaving the internal speaker in circuit—about ¼-in. is far enough. Connect a .1 mfd. condenser across the oscillator section of the gang condenser to stop the valve oscillating.

Inject a signal of 128.5 kc. and trim T1, T2, T3 and T4 for maximum reading on the output meter.

Medium Waves.—Inject a signal of 214 metres to the aerial and earth terminals and tune it in. Trim T5 for maximum reading on the output meter. A weak signal should be used and the peak nearest minimum capacity selected. Then adjust T6 and T7 for maximum.

Long Waves.—Inject and tune in a signal of 1,000 metres and adjust T8 for maximum on the output meter.

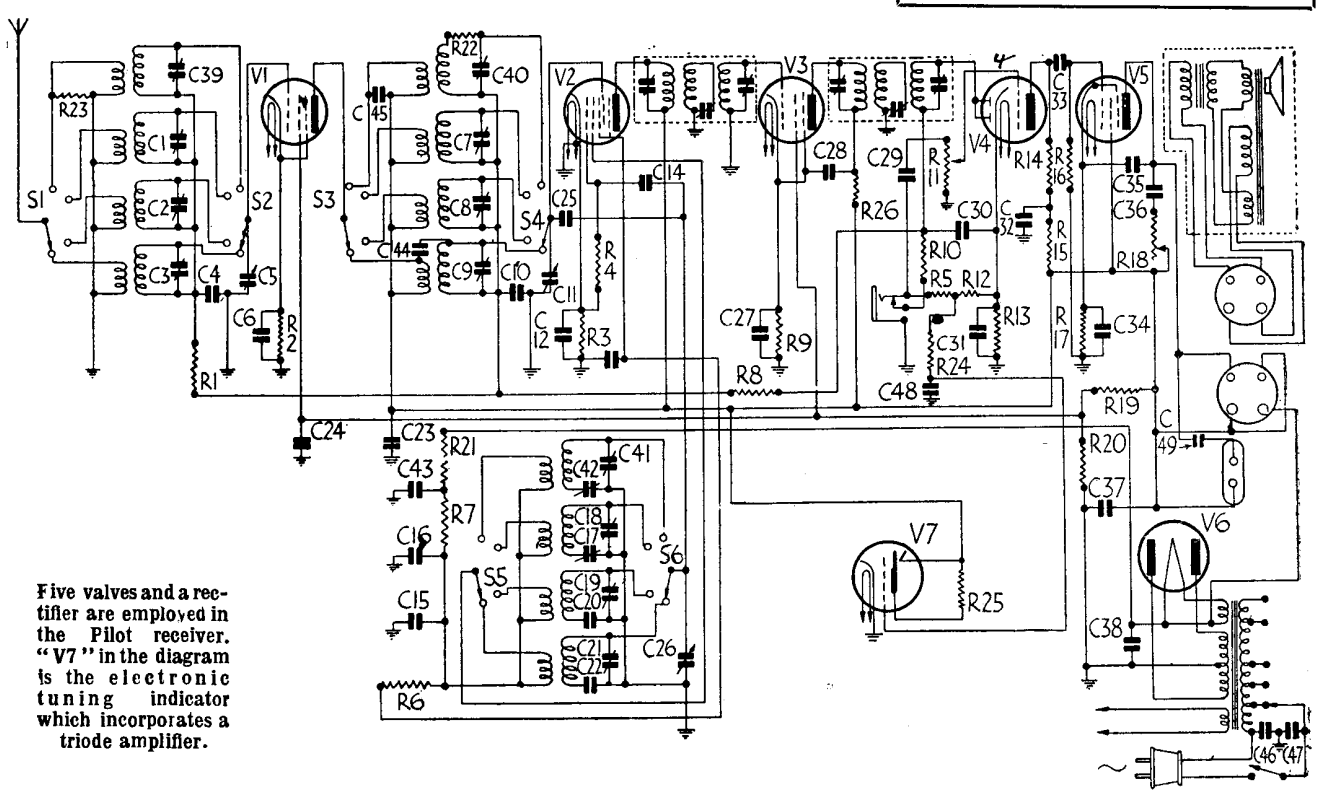
Calibration.—With the gang condenser vanes fully meshed the pointer should be resting over a black mark at the top end of the tuning scale and filling in the two lines forming the outer scale.

If this is not so, then the screw in the centre of the pivot must be slackened and the pointer moved to the correct position.

QUICK TESTS

Quick tests are available on this receiver on the terminal panel at the rear of the chassis shelf. Volts measured between this and the chassis should be:

Red, 220v., smoothed H.T.
Green, speech coil.
Blue, speech coil.
Black, 385v., unsmoothed H.T.



Five valves and a rectifier are employed in the Pilot receiver. "V7" in the diagram is the electronic tuning indicator which incorporates a triode amplifier.