

# PILOT MODEL U225 SUPERHET SIX



The Pilot U225 is an American-type five-valve plus rectifier all-wave superhet for A.C. or D.C. supplies. A large "aeroplane" dial is an attractive feature.

**CIRCUIT.**—An inductively coupled H.F. transformer couples the aerial to V1, an H.F. pentode, a series isolating condenser being included in the aerial lead.

A second transformer is used to couple the signal to V2, the frequency changer, capacity coupling being employed on the short-wave band. Attention is drawn to the series resistance R25, included on long waves.

Coupling to V3, an H.F. pentode is through an I.F. transformer tuned to 456 kc. and to V4, a double diode triode, through a second I.F. transformer.

Both these transformers have a third winding between the two main winds. They are tuned by the usual pre-set condensers and form simple tuned circuits, the object being to increase the selectivity.

The diodes of V4 are strapped and are used for both demodulation and to supply A.V.C. bias to the preceding valves in the orthodox manner. The rectified output is passed to the grid of the triode section through a resistance and capacity stage which includes the volume control R11.

A further resistance and capacity stage couples V4 to the output pentode V5, which is tone-controlled by C25 and R21.

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

**Special Notes.**—Connections are provided for an extension speaker, which should have its own matching transformer. It should be noted that isolating condensers C45 and C46 are included in each lead, so that the extension leads carry no D.C.

A jack provides connections for a pick-up, which is then connected *via* the volume control to the grid of the double diode triode V4. Insertion of the plug in the jack breaks the L.F. coupling circuit between the demodulator diode and the grid.

The four dial lights are rated at 6.3 volts .15 amp., and are each fixed to brackets on the dial assembly by means of the usual spring clip holders.

**Removing Chassis.**—Remove the four control knobs and the felt washers from the front of the cabinet. The tuning knob has a grub screw, and the others are fixed by spring clips and pull off. Disconnect the speaker plug from its socket on the top of the chassis.

Next take out four bolts from underneath the cabinet and the chassis may be removed to the extent of the leads to the voltage dropper mounted on the speaker baffle. These leads are very long, and there should be no need to disconnect them.

## Circuit Alignment Notes

The chassis must be removed before the alignment of the short, medium and long-wave bands can be proceeded with. The speaker connecting plug must, of course, be replaced in its socket before the set is connected to the mains.

**I.F. Circuits.**—Connect a modulated oscillator to the grid of V3, *via* a .1 mfd. condenser, and an output meter across the external speaker terminals, and set the gang condenser at maximum capacity on the medium-wave band.

The earth lead of the oscillator should be

connected to the chassis, but as this is alive to earth it is advisable to include a further series condenser of about .1 mfd.

Inject a signal of 456 kc. and trim T1, T2 and T3 for maximum output.

Transfer the oscillator lead to the control grid of V2, and adjust T4, T5 and T6 for maximum.

Finally, with the oscillator connected to V2, readjust T's 1 to 6 for maximum.

**Medium Waves.**—Connect the oscillator to the aerial and earth leads, this time with a .0002 mfd. series condenser in the aerial lead. Tune the receiver and the oscillator to 200 metres (1,500 kc.) and adjust T7, T8 and T9 for maximum.

Inject and tune in a signal of 500 metres (600 kc.), and while rocking the gang condenser trim T10 for maximum.

Return to 200 metres and repeat the above procedure, finishing up by checking T10 again at 500 metres.

**Long Waves.**—Tune the receiver to 800 metres (375 kc.), and inject a signal of this wavelength. Trim T11, T12 and T13 for maximum.

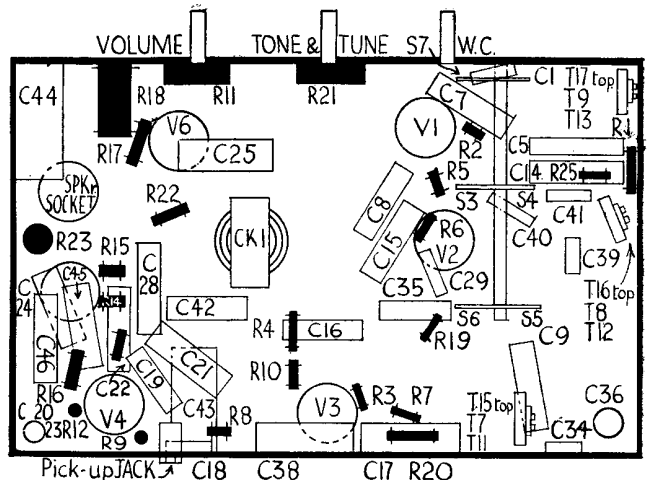
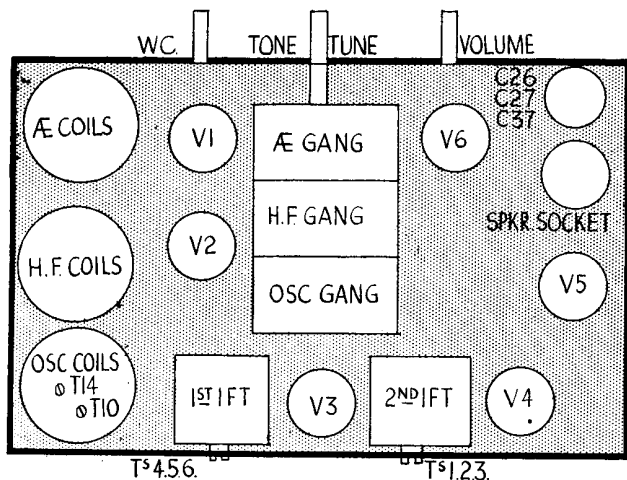
Inject and tune in a signal of 1,875 metres (160 kc.), rock the gang condenser, and trim T14 for maximum.

## VALVE READINGS

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

V.	Type.	Electrode.	Volts.	Ma.
1	All Pilot. 6D6 (6)	Anode ..	100	4
		Screen ..	85	1.15
2	6A7 (7)	Anode ..	100	1
		Screen ..	70	*
		Osc. anode ..	90	
3	6D6 (6)	Anode ..	100	3.3
		Screen ..	90	—
4	75 (6)	Anode ..	20	—
5	43 (6)	Anode ..	150	*
		Screen ..	100	*
6	25Z5 (6)	Cathode ..	170	—

\* Inaccessible.



Compact construction is found in the U225, but with these two diagrams all components can be identified. Resistors are shown in black.

For more information remember  
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Repeat the above adjustments at the wavelengths stated until no further improvement results.

**Short Waves.**—Tune the oscillator and the receiver to 16.9 metres (17,800 kc.) and adjust T15, T16 and T17 for maximum on the output meter.

Replacement condensers available from A. H. Hunt, Ltd., of Garratt Lane, Wandsworth, London, S.W.18, are: block containing Cs 26, 27, 44, list 2991 (10s.); C37, list 2992 (2s. 3d.); block containing Cs 20, 23, list 2990 (2s. 9d.).

### CONDENSERS

C.	Purpose.	Mfds.
1	Aerial isolating	.0005
5	V1 A.V.C. decoupling	.05
7	V1 cathode bias shunt	.1
8	V1 screen decoupling	.05
9	V2 osc. grid (l.w.)	.01
14	V2 A.V.C. decoupling	.05
15	V2 cathode bias shunt	.1
16	V3 A.V.C. decoupling	.05
17	V3 cathode bias shunt	.1
18	H.F. filter	.00025
19	L.F. coupling	.01
20	V4 cathode bias shunt	10
21	V4 anode decoupling	.01
22	L.F. coupling	.01
23	V5 cathode bias shunt	10
24	Pentode compensating	.005
25	Tone control	.05
26	H.T. smoothing	12
27	H.T. smoothing	16
28	Mains suppressor	.01
29	V2 osc. grid	.00005
34	S.W. osc. padding	.0025
35	V2 screen decoupling	.05
36	V2 osc. anode decoupling	.05
37	V2 osc. anode decoupling	4
38	H.T. shunt	.1
39	Neutralising	—
40	L.W. H.F. coupling	.00001
41	L.W. H.F. coil shunt	.00025
42	Chassis isolating	.005
43	Pick up isolating	.5
44	H.T. shunt	4
45	External speaker connections	.05
46	External speaker connections	.05

### RESISTANCES

R.	Purpose.	'Ohms.
1	V1 A.V.C. decoupling	100,000
2	V1 cathode bias	400
3	V1 screen decoupling	6,000
4	V2 A.V.C. decoupling	100,000
5	V2 cathode bias	400
6	V1 osc. grid leak	50,000
7	V3 cathode bias	400
8	Diode load (part)	50,000
9	Diode load (part)	300,000
10	V3 A.V.C. decoupling	1 meg.
11	Volume control	750,000
12	V4 cathode bias	12,000
13	V4 anode load	500,000
14	V5 grid leak	500,000
15	V4 anode decoupling	50,000
16	V5 cathode bias	600
17	Rectifier anode safety resistance	100
18	Pilot light shunt	80
19	V2 screen decoupling	6,000
20	V2 osc. anode decoupling	3,000
21	Tone control	100,000
22	Rectifier anode safety resistance.	100
23	H.T. decoupling	2,500
24	Voltage dropper	450
25	L.W. H.F. coil modifier	250
26	Voltage dropper	72

### Mains Adjustment Effect

**I**F a superhet stops operating correctly and everything else appears correct, frequently changer trouble is indicated. If it stops with a click or crackling sound, the trouble is almost certain to be elsewhere.

If a rough check fails to provide any clue, it is a sound scheme to check the mains voltage adjustment before actually taking the chassis out. Where the tapping is set for a considerably higher voltage than the actual mains voltage, frequency changer trouble may be experienced on certain sets. Apart from trouble of this kind, however, it is advisable to use the mains adjustment on the high side, rather than on the low side.

## Pilot U225 on Test

**M**ODEL U225.—Standard model for 220-250 volt A.C. or D.C. mains (adaptable for 200 volts). 14 gns.

**DESCRIPTION.**—Three-waveband five-valve, plus rectifier superhet. American type walnut cabinet.

**FEATURES.**—Aeroplane type dial, calibrated in names and wavelengths. Switch-selected tone control, push-pull concentric slow-motion tuning knob, giving two ratios. All controls work well, electrically and mechanically.

Extra speaker and pick-up connections, a jack being used for the pick-up.

**LOADING.**—80 watts.

### Sensitivity and Selectivity

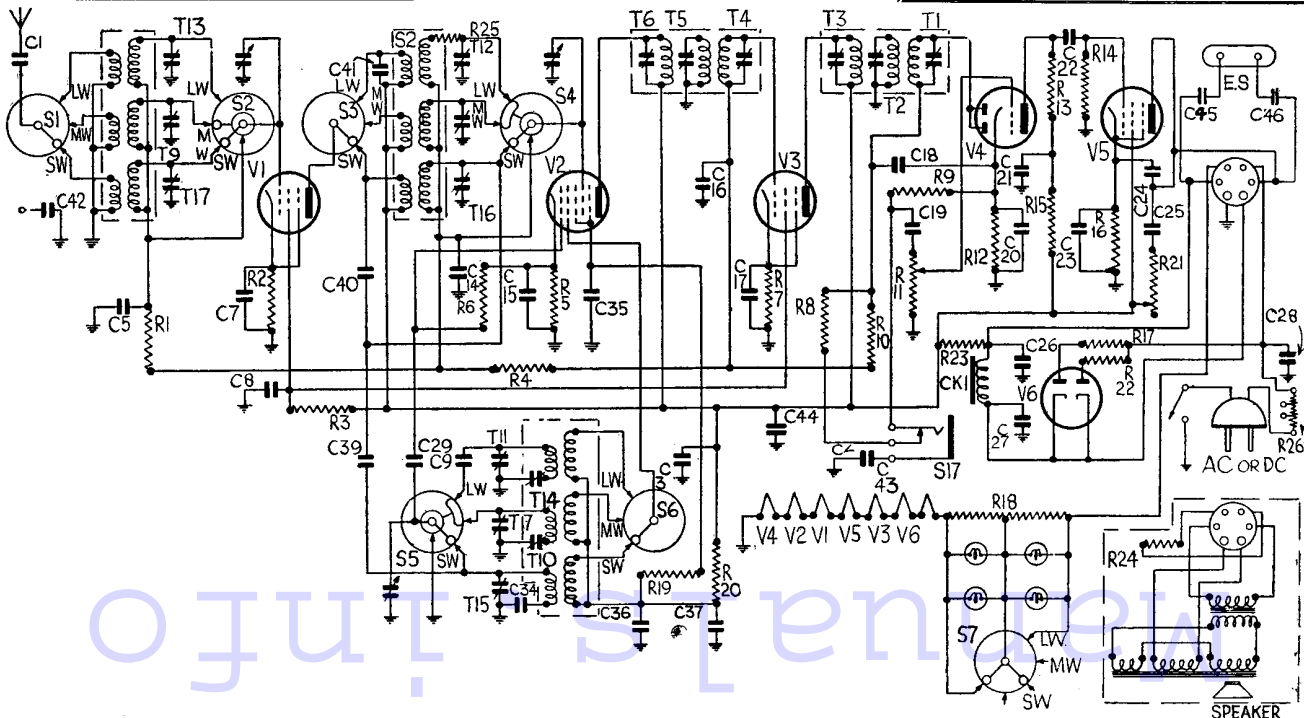
**SHORT WAVES** (15-51 metres).—Gain well maintained, no noticeable drift, and handling quite easy due to dual slow-motion.

**MEDIUM WAVES** (180-550 metres).—Sensitivity and selectivity up to standard. Background is reasonably free from whistles, the spread of local stations being on adjacent channels only.

**LONG WAVES** (745-2,100 metres).—Sensitivity satisfactory and selectivity such that the usual stations are easily separated. The wave range is rather greater than usual.

### Acoustic Output

Adequate volume for an ordinary room, with only very slight colouration. In the brilliant tone position there is good radiation of upper frequencies.



A signal amplifier precedes the frequency changer and the L.F. transformers contain three tuned circuits, instead of two, in the Pilot U225. The set is suitable for A.C.-D.C. operation.