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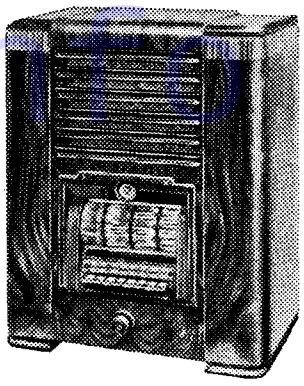
Pilot T63 Three-Band Five

Four valve, plus rectifier and tuning indicator, three waveband table model superhet for 200-250 volt, 50-100 cycle AC supplies, price 12½ gns.



A distinctive feature of the Pilot model T63 is the use of 'organ-keys' for waveband and tone switching, while tuning is manual. The circuit, shown divided below solely for presentation reasons, is basically orthodox, but has several interesting details.

CIRCUIT OUTLINE

COUPLED aerial circuits for the three wavebands, forming the input to the first valve, are selected by the switch gear, operated by levers. The first valve is a mixer, actually a triode hexode. This is provided with AVC and a standard oscillator circuit.

Coupling to the intermediate valve, V2, is by a permeability tuned transformer. Here a screened pentode is used provided with AVC, and a trimmer-tuned transformer for coupling to the next valve.

This valve, V3, is a double diode triode which has the two diodes strapped. The filter is a simple resistance capacity combination, the grid of the triode section deriving its voltages from the common diode load through a coupling condenser.

The next valve, V4, the output pentode, is resistance-capacity coupled through two condensers in series, one being shorted out for normal reception, "Speech" being obtained through a smaller effective capacity.

A normal output circuit is used with a filter on the anode of the valve either in the form of a simple condenser or a condenser-resistance combination controlled by a switch.

Power supply is through a full-wave rectifier, V5, the speaker field and two smoothing condensers. The only other feature in the circuit is a tuning indicator operated from the common diode load.

CONSTRUCTIONAL FEATURES

THERE is nothing very unusual either in the circuit or the constructional arrangement of this receiver. We found that our particular chassis conformed in every detail to the makers' specification.

It should be observed that the receiver has a cabinet with a solid bottom, and accordingly the chassis must be removed for ganging. The speaker cable is sufficiently long to enable this to be done without removing the speaker.

The makers' leaflet states that the escutcheon must be removed before taking out the chassis, but we did not find that was actually necessary.

The chassis is fitted with switch type two-pin sockets for the external speaker and the pick-up. The correct impedance for the speaker is 4 ohms.

Wavechange Switches.

All the switching in this set is carried out by a large multiple switch similar to that used in a push-button receiver.

There are eight switches. S1 and S2 are simple pairs of contacts controlling respectively "bass" and "mellow." The third switch has no contacts, being simply a mechanical trip.

S4 is again a simple pair of contacts controlling the coupling condenser between V3 and V4.

The first wave switch is S5, which has five effective pairs of contacts. This controls preselector and oscillator circuits and also shorts out the two tuned windings when the set is in operation on the other bands. Similarly S6 controls the medium band.

On the short band, S7 has only three pairs of contacts for selection, the short wave coils not being shorted out on the other two bands.

The last, S8, is mains snap switch.

Chassis Removal.

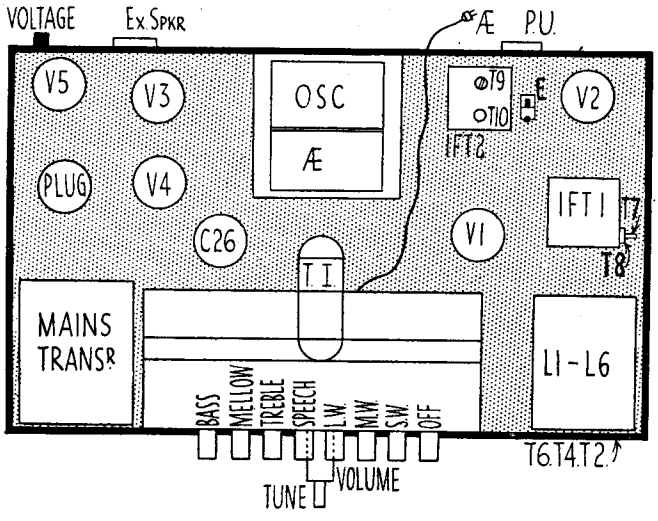
Chassis removal is a very simple and rapid operation. First of all, pull off the two concentric knobs from the front of the cabinet which control the tuning and volume. Then release the four chassis retaining bolts from the bottom and pull out the speaker plug.

The chassis can then be completely removed from the cabinet. To avoid damage to the tuning indicator it is preferable to remove it from its clip and then take it right out of the holder or socket.

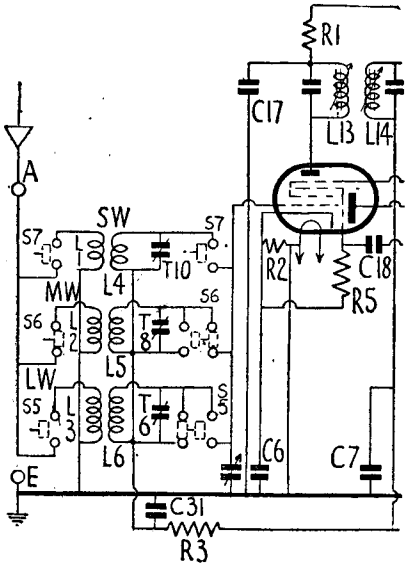
(*Continued on page* 17.)

VALVE READINGS

V.	Type.	Electrode.	Volts
	Osram.		
1 ..	X65	Anode ..	245
		Screen ..	90
		Osc. anode ..	104
		Cathode ..	2.9
2 ..	6U7-G ..	Anode ..	245
		Screen ..	90
		Cathode ..	3.4
3 ..	6Q7-G ..	Anode ..	90
		Cathode ..	1.5
4 ..	6F6-G	Anode ..	245
		Screen ..	265
		Cathode ..	18
5 ..	5Z4-G	Heater ..	380
T.I..	6U5	—	
Pilot Lamps.		Ever Ready M.B.C.	7.3 v. 250 ma.



Left, the layout diagram of the top of the chassis indicating valve, coil and some trimmer positions. The underside diagram is with the alignment notes on page 17.



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10-MINUTE FAULT-FINDER — PILOT T63

Power Test.—First check the main operating conditions as follows :—

Unsmoothed volts : 380 (pin 6 on speaker plug); smoothed volts, 265 (pin 1 on speaker plug).

Field resistance : L18, 1,400 ohms.

Total feed = 380 – 265 ÷ 1,400 = 82 ma.

Output Stage, V4.

Inject 2 volts AF V4 grid. If defective, check :—

Voltages : Anode, 245; screen, 265; cathode, 18 volts.

Resistances : Anode – HT, 800; grid – chassis, 470,000 ohms.

AF Stage, V3.

Inject .5 volt AF V3 grid. If defective, check :—

Voltages : Anode, 90; cathode, 1.5 volts.

Resistances : Anode – HT, 350,000 ohms; grid – chassis, 1 megohm.

Demodulation.

Inject 451 kcs. modulated signal at V2 anode.

Trim T1 and T2.

If defective, check :—

Resistance : Diode – chassis, 517,000; L15, 10.5; L16, 11 ohms.

IF Stage, V2.

Inject 451 kcs. signal V2 grid. If defective, check :—

Voltages : Anode, 245; screen, 90; cathode, 3.4 volts.

Resistances : Anode – HT, 1,000; screen – HT, 20,000 ohms; grid – chassis, 1 megohm.

Mixer Stage, V1.

Inject 451 kcs. signal V1 anode. If defective, check :—

Resistances : L13, 4.7; L14, 4.7 ohms.

Inject 451 kcs. signal V1 grid. If defective, check :—

Voltages : Anode, 245; screen, 90; cathode, 2.9 volts.

Resistances : Anode – HT, 1,000; screen, 20,000 ohms.

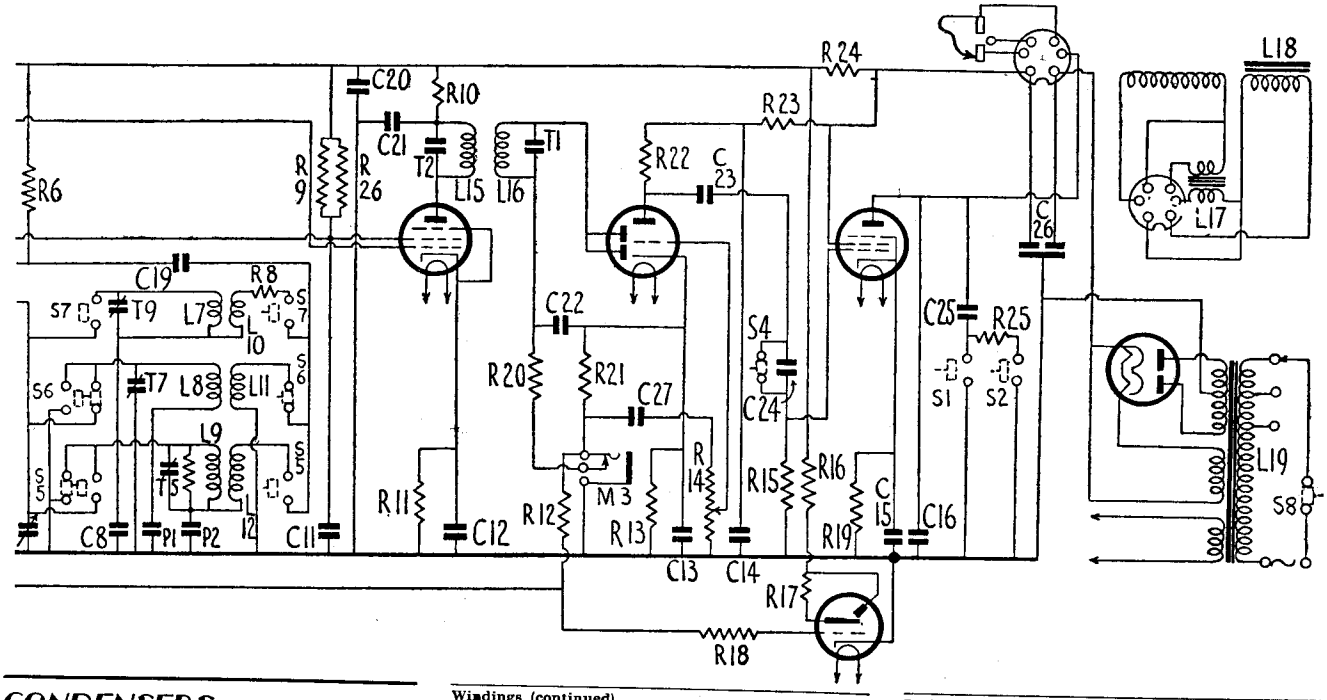
Oscillator Test.

If no signals, tune to local station and inject that frequency plus 451 kcs. If defective, check :—

Voltage : Osc. anode, 104.

Resistances : Osc. anode – HT, 30,000; osc. grid – cathode, 100,000 ohms.

If still no signals, check preselector circuits and switching.



CONDENSERS

		Mfds.
6	V1 cathode shunt	.1
7	V2 AVC decouple	.1
8	SW padder	.00325
11	V1 and V2 screen decouple	.1
12	V2 cathode shunt	.1
13	V3 cathode shunt	10
14	V3 anode decouple	.1
15	V4 cathode shunt	10
16	V4 anode shunt	.003
17	V1 anode decouple	.01
18	Osc. grid	.0001
19	Osc. anode couple	.002
20	HT line shunt	.01
21	V2 anode decouple	.01
22	HF filter	.00025
23	LF coupling	.01
24	LF coupling	.01
25	Tone control	.03
26	HT smoothing	16+8
27	LF coupling	.01

WINDINGS (D.C. Resistances)

L.	Ohms.	Range.	Where measured.
1	Very low	SW	Aerial and chassis.
2	18	MW	Aerial and chassis.
3	97	LW	Aerial and chassis.
4	Very low	SW	V1 grid and C31
5	2.8	MW	V1 grid and C31
6	24	LW	V1 grid and C31.
7	Very low	SW	Osc. gang and C8
8	5.3	MW	Osc. gang and P1.
9	9.3	LW	Osc. gang and P2.
10	(60)	SW	C19 and C8.
11	Very low	MW	C19 and chassis.
12	Very low	LW	C19 and P2
13	4.7	—	V1 anode and R1
14	4.7	—	V2 grid and R4
15	10.5	—	V2 anode and R10.
16	11	—	Diodes and R20.
17	800	—	Pin 1 and pin 5 on speaker plug.
18	1,400	—	Pin 1 and pin 6 on speaker plug.
19	20	—	Mains plug.

RESISTANCES

		Ohms.
1	V1 anode decouple	1,000
2	V1 cathode bias.	250
3	V1 AVC decouple	100,000
4	V2 AVC decouple	100,000
5	Osc. grid leak	100,000
6	Osc. anode load	30,000
7	LW het. volt control	33,000
8	SW het. volt control	60
9	V1 and V2 screen feed (part)	40,000
10	V2 anode decouple	1,000
11	V2 cathode bias.	390
12	AVC decouple	1 meg.
13	V3 cathode bias.	4,000
14	Volume control	1 meg.
15	V4 grid leak	470,000
16	TI feed	22,000
17	TI anode feed	1 meg.
18	TI grid feed	1 meg.
19	V4 cathode bias.	440
20	HF filter	47,000
21	Diode load	470,000
22	V3 anode load	250,000
23	V3 anode decouple	100,000
24	HT line volt drop	1,000
25	Tone control	10,000
26	V1 and V2 screen feed (part)	40,000

Replacement Condensers

EXACT electrolytic replacements are available from A. H. Hunt, Ltd., Garratt Lane, Wandsworth, London, S.W.18.

For either C 13 or C 15 there is unit list number 3,721, price 1s. 9d., and for the H.T. smoothing unit, C 26, type 1,014, price 9s.

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Bush BA61 Battery Four

(Continued fr om page 12.)

No damping circuit is necessary for these adjustments. Both adjustments are best made with the receiver tuned to about 300 metres.

Short Waves (16.5 to 51 metres).
Connect generator to aerial and earth through dummy aerial and tune set and generator to 18 metres.
Adjust T8 and T2 for maximum.
Check the calibration at 50 metres.

Medium Waves (198 to 560 metres).
Tune set and generator to 300 metres and adjust T7 and T1 for maximum.
There is no padding operation, but check the calibration at 500 metres.

Long Waves (850 to 2,000 metres).
Tune set and generator to 1,500 metres and adjust T9 and T3 for maximum.
There is no padding operation, but check the calibration at 1,900 metres.

Press Buttons

Provision is made for one long-wave station and two medium waves as follows :—

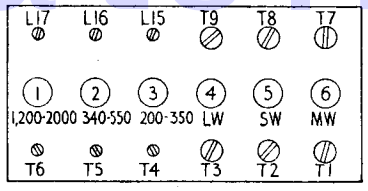
Button 1, 1,200-2,000 metres; Button 2, 340-450 metres; Button 3, 200-350 metres.

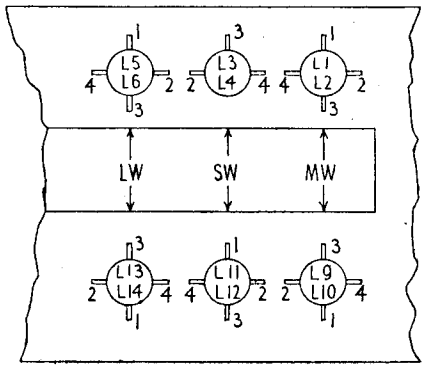
The oscillator controls, L15, L16 and L17, have approximately calibrated scales showing the position of the adjusting screw for any particular wavelength.

The oscillator adjustments, selection buttons and pre-selector trimmers are arranged in vertical lines as shown on the diagram.

The desired button is set up by depressing it, adjusting the corresponding oscillator inductance and then the pre-selector coil trimmer. It is important to note that adjustment of the LW oscillator trimmer, T9, will affect the push-button settings, and if this trimmer is moved the push-button adjustments must be readjusted.

Similarly, adjustment of T1 may affect T4 and T5, while adjustment of T3 may affect T6.





Details of the push-button trimmer panel and the coil assembly are given in these diagrams. The coil connections are numbered for reference in conjunction with the Windings table on page 13.

Pick-ups on AC-DC

INSTALLING pick-ups for use on AC-DC receivers sometimes involves certain difficulties, as the possibility of shocks exists where a direct connection is made to one side of the mains supply.

A moulded bakelite pick-up and tone-arm is preferable to a metal one in such cases. A fixed condenser should be inserted in series with each pick-up lead, if they are not already fitted on the chassis.

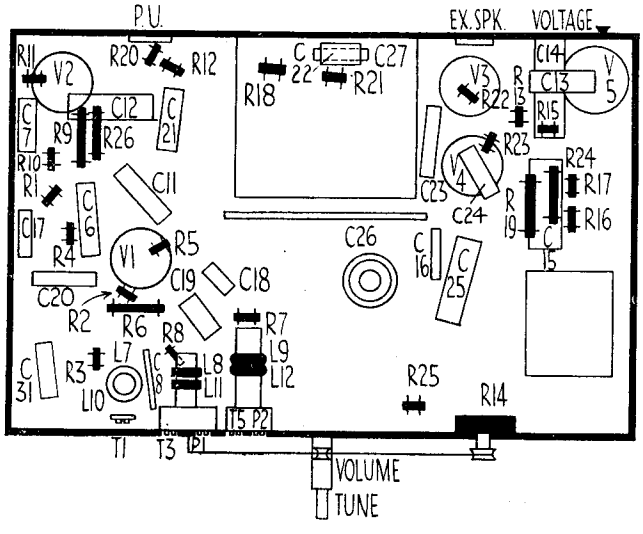
Where a screened cable is used to reduce hum, it will generally be found that the hum is actually increased when the screening is connected direct to earth. The only satisfactory way in most cases is to connect the screening to the chassis.

If the cable has to be installed in such a position where the user can come into contact with the screening, a cable which has a layer of insulation over the outer metal screening should be used.—M.B.

Pilot Model T63—*Alignment*

(Continued from page 10.)

IF Circuits (Frequency 451 kcs.)
Connect generator to V1 grid and tune gang to maximum on MW and connect output meter to the receiver.



Underside layout diagram of the Pilot T63 showing the orderly construction. Trimmers are situated both above and below the chassis. The top "deck" view is on page 10.

Inject a low value modulated 451 kcs. signal and adjust T1, T2, T3, and T4 for maximum in that order.

Make sure the value of the injected signal is below the point at which the AVC begins to operate.

Long Waves (900 to 2,100 metres.)
Connect generator through dummy aerial to the aerial and earth of the set and tune set and generator to 1,100 metres and adjust T5 and T6 for maximum.

Tune set and generator to 1,900 metres and adjust P2 simultaneously rocking the gang.

Repeat the two operations until no improvement results.

Medium Waves (200 to 550 metres.)
Tune set and generator to 200 metres and adjust T7 and T8 for maximum.

Tune set and generator to 500 metres and adjust P1 for maximum simultaneously rocking the gang.

Repeat the operations until no improvement results.

Short Waves (16 to 55 metres.)
Tune set and generator to 18 megacycles and adjust T9 and T10 for maximum. Check the calibration through the scale and make a slight compromise if necessary. There is no padding operation.

Note that the 18 mcs. point is marked on the scale which is calibrated elsewhere in metres.

Interference Cure

A COMPLAINT of bad interference was investigated and it was found that by switching the main switch on and off and also certain other light switches the noice ceased and was caused to come on again.

The house wiring was disconnected from the mains and with a low range Ohmmeter in circuit lamps and switches were tapped for loose connections. A fault was found at a lead near the meter which altered the resistance of the circuit when pulled. Opening the rubber showed a fractured wire which had apparently caused sparking as the building vibrated.

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