

PILOT TWIN MIRACLE

*Four valve, plus rectifier, trans-
portable superhet covering two
wavebands and for operation from
all - dry batteries or A.C. or D.C.
mains. Made by Pilot Radio, Ltd.,
31-33, Park Royal Road, London,
N.W.10.*

Circuit.—This receiver operates from either A.C.-D.C. mains or all-dry batteries. A relay is incorporated which automatically switches the batteries in circuit if the mains are not connected or cuts the battery out when the mains are switched on.

Frame aerials are fitted and a rather unusual detail is the use of primary and secondary windings on each of the two bands. Bias is applied to the mixer section of the frequency-changer (V1), by means of a resistance (R2), the grid being isolated, as far as D.C. is concerned, by C5.

The oscillator circuit is straightforward with tuned grid windings and a single reaction coil

from the anode. The anode load is an H.F. choke instead of the usual resistance.

Iron-core I.F. transformers are fitted, I.F.2 being permeability adjusted. V2 is an A.V.C. controlled I.F. amplifier, and V3 a single-diode-triode. The diode provides both the A.V.C. voltage via R10, and the demodulated signal via C27 to R7, the volume control. R6 is the diode load.

The L.F. output of V3 is resistance-capacity coupled to V4, the output pentode.

On mains operation, H.T. is obtained via the relay switch, relay coil and the voltage adjuster R14. The coil and R14, in conjunction with C21, C22 and C25, also provide smoothing. The filament current is taken from the H.T. line via lower part of R14 and flows through V4, through V3 and V2 in parallel, through V1 and R13 in parallel, and so through the indicator lamp, and R11 to negative. Bias for V4 is obtained by returning the grid to a point on this filament circuit (R11) which is less positive than V4 filament.

If the mains are disconnected, current ceases to flow through the relay coil and the relay switches click over. The H.T. line is then connected direct to the H.T.+ battery plug. The H.T. milliamperes return from the chassis via R13, the indicator lamp (the current is not sufficient to light the lamp) and R12 to the negative battery plug.

All four filaments are in parallel across the 1.5v. dry battery plugs via the on-off switch. The chassis is given a positive potential due to the H.T. volt drop across R13, the indicator lamp, and R12. As V4 grid is returned to H.T. negative, this biases the valve.

The rectifier V5 has a separate heater volt drop in R15, which is the line cord.

This model is different from the first model, which had a separate smoothing choke, in several details.

VALVES.—A table of valve voltages is not given because these vary so considerably according to the mains and battery voltages. The total H.T. drain is about 10 ma.

The valves are:—

V	Type	V	Type
1 ..	1A7G	4 ..	1C5G
2 ..	1N5G	5 ..	1D5
3 ..	1H5G		

Indicator lamp: 0.3v., .15 amp.
Battery: Ever-Ready All-dry 3.

GANGING

I.F. CIRCUITS.—These are adjusted at 451 kc. by means of trimmers on I.F.1 and a permeability core on I.F.2.

M.W. BAND.—Trim with T1 and T2 at 200 metres. Pad with T3 at 500 metres.

L.W. BAND.—Trim with T4 and T5 at 1,200 metres. Pad with T6 at 1,900 metres.

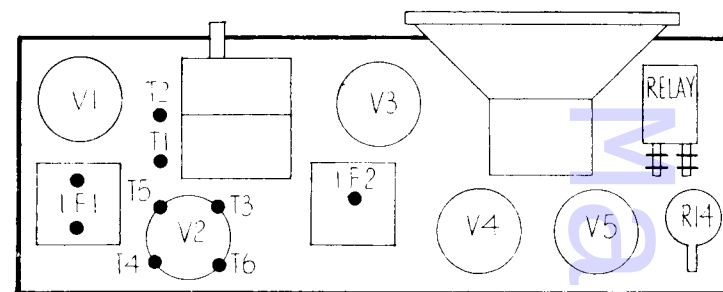
Repeat operations on both bands, two or three times, finishing with L.W.

RESISTANCES

R	Ohms.	R	Ohms.
1 ..	56,000	9 ..	3.3 meg.
2 ..	2.2 meg.	10 ..	3.3 meg.
3 ..	1 meg.	11 ..	47
4 ..	220,000	12 ..	910
5 ..	47,000	13 ..	25
6 ..	3.2 meg.	14 ..	140 + 760
7 ..	2 meg.	15 ..	+ 900
8 ..	2.2 meg.	16 ..	910
			H.F. choke 130

CONDENSERS

C	Mfds.	C	Mfds.
1 ..	.0004	18 ..	.000075
2 ..	.00006	19 ..	10
3 ..	.0004	20 ..	.001
4 ..	.002	21 ..	40
5 ..	.000075	22 ..	16
6 ..	.05	23 ..	.001
7 ..	.01	24 ..	.05
8 ..	.000075	25 ..	16
9 ..	.25	26 ..	.000075



A relay in the main H.T. lead automatically switches over to mains operation when either A.C. or D.C. mains are connected. In the unpolarised position the relay connects an all-dry battery.

The only complexity introduced by the relay change-over is due to the alteration of the order of filament wiring. This is explained in the text.

KOLSTER-BRANDES MODEL 860

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RESISTANCES

R	Ohms.	R	Ohms.
1 ..	10,000	11 ..	50,000
2 ..	2,000	12 ..	.5 meg.
3 ..	.5 meg.	13 ..	50,000
4 ..	20,000	14 ..	150,000
5 ..	25,000	15 ..	7,000
6 ..	150	16 ..	.5 meg.
7 ..	300	17 ..	.5 meg.
8 ..	50,000	18 ..	.5 meg.
9 ..	50,000	19 ..	400
10 ..	300	VC ..	.5 meg.
		TC ..	50,000

WINDINGS

L	Ohms.	L	Ohms.
3 ..	2.5	15 ..	1.5
4 ..	37	16 ..	1.8
5 ..	2.5	17 ..	2.1
6 ..	3.6	18 ..	2.5
7 ..	4.8	19 ..	4.3
8 ..	6.5	20 ..	4.8
9 ..	18	21 ..	3.7
10 ..	22	22 ..	3.7
13 ..	5.2	23 ..	3.8
14 ..	11.5	24 ..	2.7
		26 ..	1,900

Cleaning Wavechange Switches

ROTARY-cam point-to-point contact switches can be cleaned with gauge 00 sandpaper, followed by methylated spirit, and then sealed with vaseline. A blob between contacts is needed so that it will "pull out" but not break when the contacts open. There you have a grease-sealed switch; the vaseline may get dirty but the contacts will not.

Some engineers clean switch contacts with nail-file emery boards, but I find these too coarse; it is too easy to wipe off the plated contact metal with one stroke.—J. B.

