PYE T9 A.C. SUPERHET

Circuit. The combined first-detector oscillator valve, A80A or FC4 met. (V1), is preceded by a band-pass aerial coupling. Oscillator tuning is in the grid circuit with a harmonic suppressor R5.

The pentode section is biased by A.V.C. and limiting cathode resistance R4, while a variable resistance R3 (at the back of the chassis) provides a sensitivity and noise control.

Coupling of the pentode to the next valve is by band-pass I.F. transformer (frequency 127KC).

The I.F. valve, A50N or VP4A (V2), is also biased by A.V.C. with limiting cathode resistance and is followed by a second band-pass I.F. transformer. A tuning indicator is connected in the anode circuit.

The second detector and L.F. valve, A23A or AD4 met. (V3), is a double diode triode of which one anode is used for L.F. purposes and the other for A.V.C. The I.F. coupling to the A.V.C. diode anode is taken from the primary of the transformer through C21, while R14 forms the A.V.C. load resistance. The biasing arrangement for the triode section forms a muting system, for details of which see "Special Notes."

Between the triode section and the output valve is a resistance capacity filter with a special tone correction circuit and transformer—R25, C28 and T3.

Tone control of the top notes is provided by a variable condenser C30 across the secondary of the transformer. A switch (ganged with the condenser) allows the condenser C29 to be placed in series with the primary, allowing attenuation of the low notes to be effected.

The output valve, S30C or AC044 (V4), is a directly heated triode. Bias is obtained from a resistance in the centre tap lead of the heater winding, which is common to all the valves. This method causes the cathodes of V1, V2 and V3 to be at a positive potential with relation to the heaters, a point which might lead to confusion.

Mains equipment consists of: Transformer with screened primary, full-wave indirectly heated rectifier type A11B or 1W3, the speaker field in the positive H.T. lead for smoothing, and electrolytic condensers. The pilot lamps have a separate L.T. winding.

Special Notes.—The principle utilised in the tuning indicator is as follows: An inductance, consisting of two windings, is wound on the same core as a choke connected in the H.T. feed to one of the controlled valves, and is placed in series with an indicator lamp across the heater winding of the mains transformer.

As the voltage is A.C., the brilliance of the illumination of the lamp will depend on the impedance of the inductance, which in turn depends on the degree of saturation of the core brought about by the D.C. current to the controlled valve.

When the valve current decreases, as on reception of a signal, the core is demagnetised

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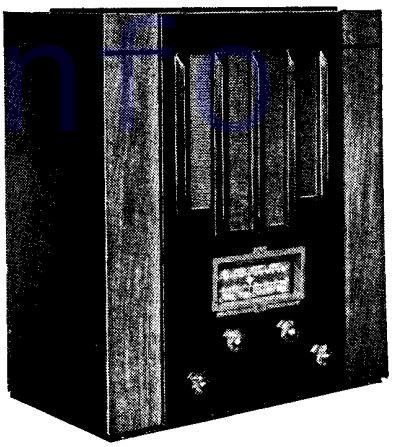
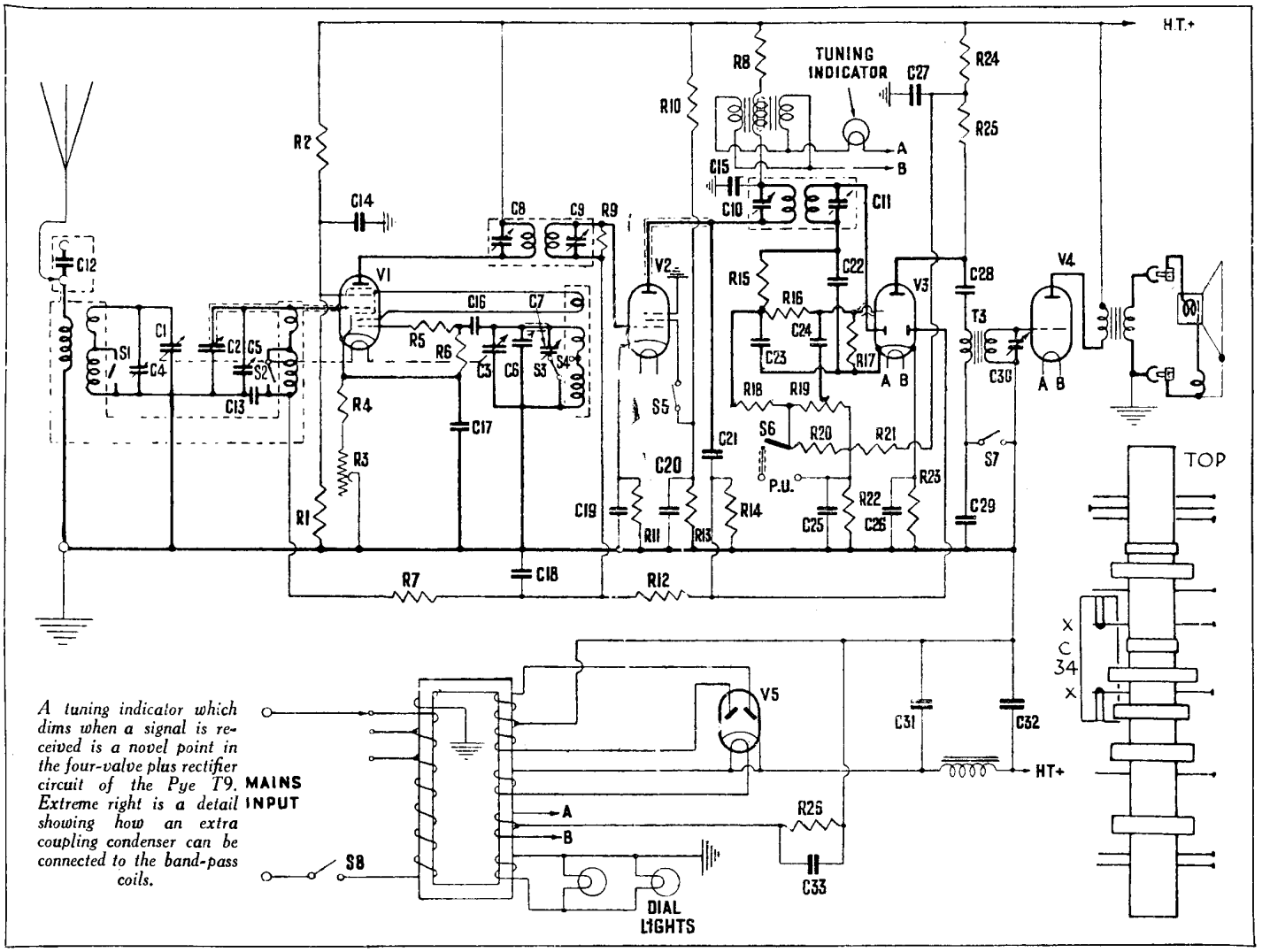


The Pye model T9.

VALVE READINGS

No signal. First-named valves are Ever Ready. The alternatives are Mullard.

Valve.	Type.	Electrode.	Volts.	M.a.
1	A80A met. (7)	anode ..	300	1.1
	or			
	FC4 met. (7)	aux. grid	83	4.8
		osc. anode	83	3.3
2	A50N met. (7)	anode ..	240	4.6
	or			
	VP4A met. (7)	aux. grid	78	2.1
3	A23A met (7)	anode ..	130	3.6
	or			
	TDD4 met (7)			
4	S30C (4) or ..	anode ..	292	39
	AC044 (4) ..			



A tuning indicator which dims when a signal is received is a novel point in the four-valve plus rectifier circuit of the Pye T9. Extreme right is a detail showing how an extra coupling condenser can be connected to the band-pass coils.

(*Continued from previous page.*)

(or desaturated), causing the impedance of the choke to increase. This effects a dimming of the lamp on receipt of a carrier.

The lamp used is a Philips 2 v. .1 amp. type, and can be reached by undoing the metal screen on the base of the cabinet and removing the bracket in the front of the cabinet by unscrewing the milled nut on the inner side of the front edge.

The muting system operates by decreasing the negative bias on the signal diode when a carrier is received, and is achieved by the use of three different potentiometers.

CONDENSERS

C.	Purpose.	Mfd.
12	Series aerial	.000015 (350)
13	Preventing short circuit of A.V.C. to V1.	.1 (350)
14	V1 aux. grid by-pass	.25 (350)
15	Decoupling H.T. to V2	2 el. (300)
16	V1 osc. grid reservoir	.001 (350)
17	V1 cathode by-pass	.1 (350)
18	Decoupling A.V.C. line	.1 (350)
19	V2 cathode by-pass	.1 (350)
20	V2 aux. grid by-pass	.1 (350)
21	I.F. feed to A.V.C. diode anode.	.0001 (350)
22	H.F. by-pass from L.F. signal diode.	.0001 (350)
23	H.F. by-pass	.0001 (350)
24	L.F. coupling to V3 grid	.05 (350)
25	Decoupling bias for V3 signal diode.	10 el. (20)
26	V3 cathode by-pass	10 el. (20)
27	Decoupling V3 anode	2 el. (300)
28	L.F. coupling to transformer	.25 (350)
29	Optional bass tone control condenser.	.1 (450)
31	H.T. smoothing	8 el. (450)
32	H.T. smoothing	8 el. (450)
33	By-pass across V4 bias resistor.	20 el. (30)
	Bracketed figures give working voltage.	

RESISTANCES

R.	Purpose.	Ohms.
1	Lower part of V1 aux. grid ptr.	40,000 (¼ w.)
2	Upper part of V1 aux. grid ptr.	30,000 (1 w).
3	Sensitivity control, V1 cathode.	2,000
4	V1 cathode bias, fixed (may be 150 ohms).	300 (¼ w).
5	V1 osc. grid suppressor	1,000 (½ w.)
6	V1 osc. grid leak	100,000 (¼ w.)
7	Decoupling A.V.C. to V1	10,000 (¼ w.)
8	Decoupling V2 anode	10,000 (½ w.)
9	Across I.F.T.1 secondary	260,000 (¼ w.)
10	Upper part of V2 aux. grid. ptr.	80,000 (½ w.)
11	V2 cathode bias	200 (¼ w).
12	Decoupling A.V.C. line	1.1. meg. (¼ w.)
13	Lower part of V2 aux. grid. ptr.	100,000 (¼ w.)
14	A.V.C. diode load	510,000 (¼ w.)
15	H.F. stopper from diode	100,000 (¼ w.)
16	Part of Q.A.V.C. ptr.	1.1 meg. (¼ w.)
17	V3 grid leak	2.2 meg. (¼ w.)
18	Part of Q.A.V.C. ptr.	160,000 (¼ w.)
19	V.C.	250,000
20	Across V.C.	260,000 (¼ w.)
21	Part of H.T. ptr. for Q.A.V.C.	100,000 (¼ w.)
22	Part of H.T. ptr. for Q.A.V.C.	3,000 (¼ w.)
23	V3 cathode bias for A.V.C.	3,000 (¼ w.)
24	V3 anode decoupling	10,000 (½ w.)
25	V3 anode L.F. coupling	30,000 (¼ w.)
26	Bias resistance for V4	750 (1 w.)
	Speaker field	1,650.

First is the H.T. "pot" formed by R24, V3, and the cathode resistance R23. Under no signal conditions the cathode is 10 volts positive with relation to earth.

The second is the H.T. potentiometer R24, R21 and R22. The junction of R21 and R22 is 6 volts positive in relation to earth, making it 4 volts negative in relation to the cathode.

The third is the potentiometer formed by R19 and R20 (in parallel), R18, R16 and R17. It will be seen that this is across the points that are 4 volts different in potential, and thus the bias on the control grid is 2.5 volts, while that on the signal diode anode is 3.8 volts.

On receipt of a signal the D.C. of the rectified carrier is developed across R18, R19-R20, R22 and R23, and as the latter two resistances are low in value compared with R18, R19 and R20, the largest part of the voltage will be developed across R18, R19 and R20 and the grid of the triode. This increases the bias on the grid and decreases the anode current, and consequently the voltage drops across R23. Whenever the voltage across R22 and R23 is the same, the signal diode will operate with zero bias, and full rectification of the signal will be obtained.

The sensitivity control has been modified in later models to include a switch for removing the "Q" bias from the signal diode. Details of the alteration are given in "General Notes," and wherever the sensitivity of the receiver is not great enough engineers should first ascertain whether or not the modification is included. This can easily be seen by undoing the metal screen on the bottom of the cabinet.

Quick Tests.—Between the two lower terminals on the speaker and chassis (looking from the back): Right, (1) H.T. smoothed, 300 v.; left, (2) H.T. unsmoothed, 420 v.

Removing Chassis.—To reveal the components underneath the chassis it is necessary to remove only the screening plate at the bottom of the cabinet.

To remove the chassis completely, pull off the knobs, remove the speaker plugs, and undo the four holding bolts.

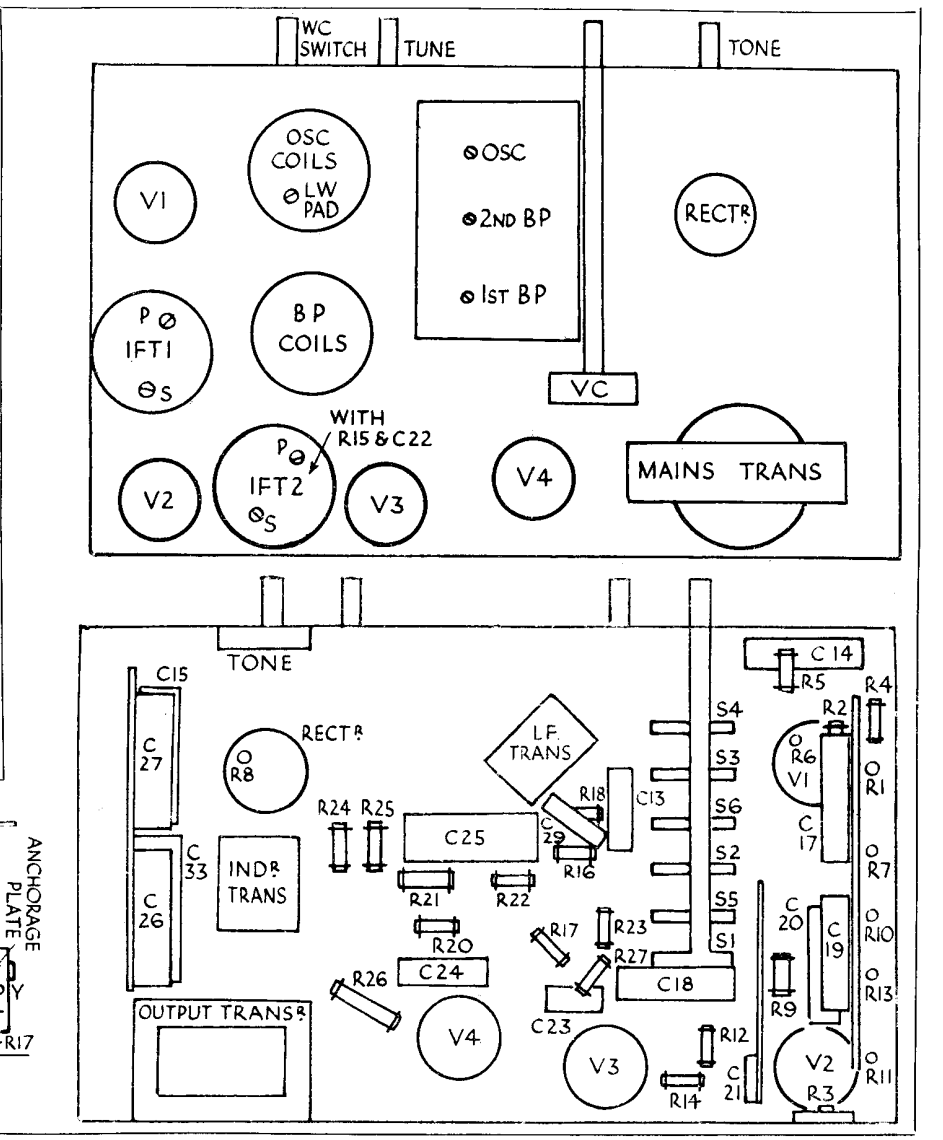
(*Continued in col. 1, page 96.*)

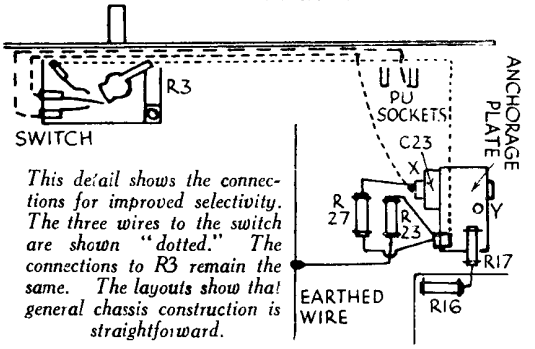
RESISTANCES OF WINDINGS

Description	Ohms.
Aerial coil, L1	24
Band pass (each), M.W.	2.3
Band pass (each), L.W.	17.3
Osc. grid coil, M.W.	1.7
Osc. grid coil, L.W.	5
I.F.T.1, pri. and sec.	93
I.F.T.2, pri. and sec.	42
Intervalve transformer, pri.	600
Intervalve transformer, sec.	2,100
Output transformer, pri.	190

SWITCH POSITIONS

S.	M.W.	L.W.	Gram.
1	Closed	Open	Closed
2	Closed	Open	Closed
3	Open	Closed	Closed
4	Closed	Open	Open
5	Closed	Closed	Open
6	Open	Open	Closed





This detail shows the connections for improved selectivity. The three wires to the switch are shown "dotted." The connections to R3 remain the same. The layouts show that general chassis construction is straightforward.