SUPERHET

ing is obtained on the output meter, reconnect the oscillator gang temporarily and adjust C28 for maximum reading on output meter.

With the .0005 mfd. again connected in place of the oscillator section, inject and tune in a signal of 2,150 metres, and when maximum output is obtained, reconnect the oscillator section and trim C29 for maximum reading on output meter.

Repeat as before at 1,000 metres, and when satisfied that no further adjustment is possible resolder the lead to the oscillator section of the gang condenser.

CONDENSERS

C.	Purpose.	Mfd.
1	Aerial isolating	.01
2	V1 cathode bias shunt ...	.05
3	Chassis isolating	.1
4	V1 A.V.C decoupling	.05
5	V1 osc. grid	.0001
6	L.F. coupling	.02
7	V1 screen decoupling	.05
8	V2 A.V.C. decoupling... ...	.05
9	A.V.C. decoupling	.05
10	V2 cathode bias shunt ...	.1
11	A.V.C. diode coupling... ...	.0001
12	H.F. by-pass	.0003
13	H.F. by-pass	.003
14	Tone control	.02
15	L.F. coupling	.02
16	V4 cathode bias shunt ...	35
17	V2 screen decoupling	3
18	V4 screen decoupling	2
19	H.T. smoothing	24
20	H.T. smoothing	3
21	V1 osc. anode decoupling ...	8
22	Mains H.F. by-pass	.01
23	Long-wave padding	.0005

RESISTANCES

R.	Purpose.	Ohms.
1	V1 cathode bias	250
2	V1 osc. grid leak	99,000
3	V1 A.V.C. decoupling... ...	220,000
4	V1 osc. anode and screen decoupling pot.	5,500
5	Do.	7,000
6	Do.	15,000
7	V2 cathode bias	250
8	V3 A.V.C. diode load pot. ...	660,000
9	Do.	220,000
10	Volume control	500,000
11	V3 and V4 cathode bias pot.	150
12	V4 grid leak	440,000
13	V3 and V4 cathode bias pot....	90
15	V4 screen decoupling ...	3,300
16	V4 anode stabiliser	100
17	V4 grid stopper	77,000
18	V2 screen decoupling	33,000
19	Tone control	50,000
20	A.V.C. decoupling	440,000
21	V1 osc. anode control... ...	2,500
23	V3 demodulator diode load ...	440,000

QUICK TESTS

Quick tests are available on the termina strip on the speaker transformer, volts measured between this and the chassis should be :—

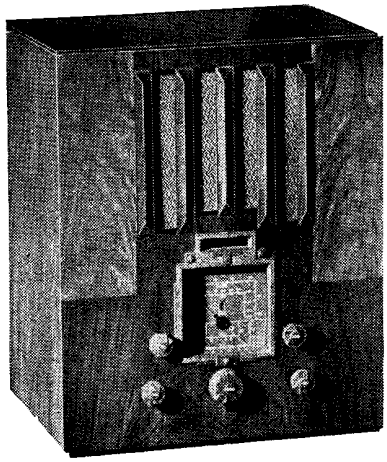
Red-white lead, unsmoothed H.T., 210 volts.
Orange lead, smoothed H.T., 170 volts.
Red lead, smoothed H.T., 185 volts.

Sets for Review

Suggestions as to receivers which should be dealt with in the "Service Engineer" section are welcomed.

Efforts are made to meet all requests providing the receivers are of wide enough interest, and, in the case of old models, examples are still available from the makers.

PYE T10A ALL-WAVE SUPERHET



Four wavebands—ultra-short, short, medium and long—are covered by the 4-valve plus receiver Pye T10 A. The receiver is different from the T10 chiefly in that it does not use a radio-frequency amplifier before the frequency changer.

CIRCUIT.—Use is made of a four-valve, plus rectifier arrangement, for A.C. mains operation only. Four wavebands—long, medium, short and ultra short—are selected by the range switch. On long and medium waves, the aerial is coupled to V1, a frequency changer, via a band-pass filter. On short waves, it is connected through a single tuned circuit inductively coupled to the aerial coils.

Coupling between V1 and V2, an H.F. pentode, is through an air-cored I.F. transformer tuned to 465 kc. A second I.F. transformer is used between V2 and V3, a double diode triode. The coupling between the windings of both I.F. transformers is manually variable, the arrangement acting as a variable selectivity control.

With selectivity at maximum a switch is closed which connects a condenser, C39, between the anode of V4 and earth and reduces the high note response, thus eliminating heterodyne whistles.

One diode of V3 works as a signal demodulator, and, by means of small bias applied to it, supplies the inter-carrier suppression. This bias is removed when the sensitivity control is tuned fully clockwise. The other diode supplies A.V.C. in the orthodox manner.

The L.F. output of V3 is then passed via a resistance and capacity stage to the output pentode V4.

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

Special Notes.—An external speaker should have a speech coil resistance of about 2 ohms.

The dial lamps are rated at 4 volts 3 amps. To remove, slacken the slotted nuts securing the holder to the back of the dial assembly, and the holder will then slide out.

Exposing Chassis.—Practically all the work necessary on this receiver can be done without taking out the chassis, by removing the board from underneath the cabinet. This is secured by four wood screws.

To remove the chassis, remove five knobs from the front of the cabinet and four bolts from underneath. Free the speaker field leads from its cleats and the speech coil leads from the cleat on the rear of the mains transformer. The chassis will then slide out.

ALIGNMENT NOTES

On medium and long wavebands, the variable selectivity control is turned fully anti-clockwise.

In all cases where more than one peak is found, the nearest the minimum capacity of the trimmer is the correct setting.

I.F. Circuits.—Connect a modulated oscillator, tuned to 465 kc. via a .002 mfd. condenser to the grid cap of V1, the grid lead being connected to the chassis through a ½ meg. resistance, and an output meter across the speaker terminals.

Connect a .25 mfd. condenser between the osc. anode of V1 and earth to stop the valve from oscillating.

Adjust T1, T2, T3 and T4 for maximum reading on output meter.

Long-wave Band.—Remove the .25 mfd. condenser and replace the grid lead. Connect the oscillator to the aerial and earth terminals.

Tune oscillator and set to 876 metres. Adjust T5, and T6, and T7 for maximum reading on output meter.

Tune oscillator and receiver to 1950 metres and adjust T8 for maximum.

(*Continued on next page.*)

QUICK TESTS

Quick tests are available on the terminal board on the back of the speaker. Volts measured between this and the chassis should be :—

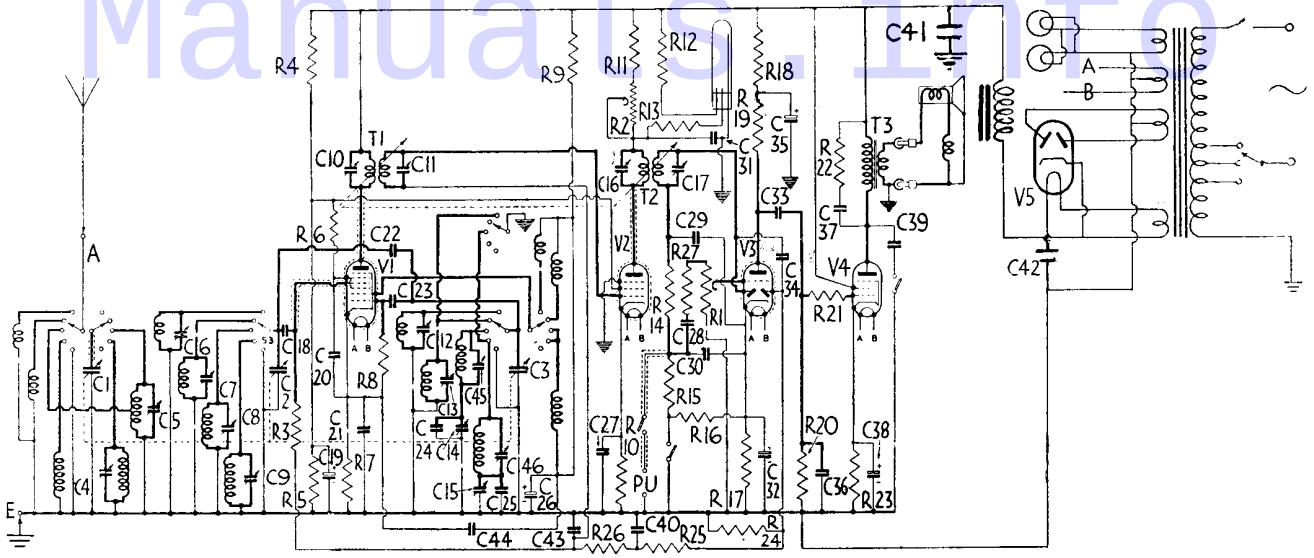
Red lead, smoothed H.T., 252 volts.
Black lead, unsmoothed H.T., 420 volts.

VALVE READINGS

No signal. Volume at maximum. 200 v. A.C. mains.

V.	Type.	Electrode.	Volts.	M.a.
1	All Ever-Ready. A80A Met. (7)	anode ...	245	1
		screen ...	40	1.5
		osc. anode	130	2.6
2	A50N Met. (7)	anode ...	120	4
		screen ...	80	2
3	A23A Met. (7)	anode ...	70	2
4	A70C (7) ...	anode ...	210	35
		screen ...	250	3.5
5	A11B ...	filament...	420	—

PYE T10A ALL-WAVE SUPERHET CIRCUIT



The circuit of the Pye T10A is built round a four-valve plus rectifier superhet circuit. Frequency-changer, I.F., double diode and output valves are employed. The I.F. coupling is variable to provide selectivity control.

(*Continued from previous page.*)

Medium-wave Band.—Tune oscillator and receiver to 198 metres and adjust T9, T10 and T17 for maximum.

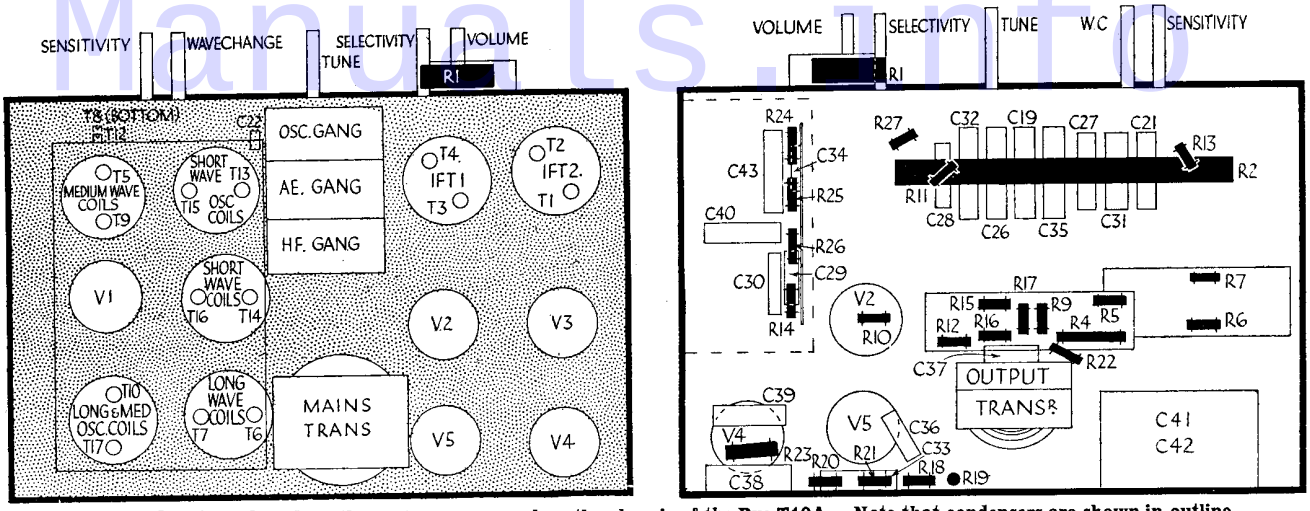
Tune oscillator and receiver to 520 metres and adjust T12 for maximum.

Short-wave Band.—Tune oscillator and receiver to 30 metres and adjust T13 and T14 for maximum.

Ultra-short Wave Band.—Tune oscillator and receiver to 14.3 metres and adjust T15, and T6 for maximum.

WHEN inserting a current meter always consider the possibility of the initial current overloading the meter. For example, cut in a meter only *after* a converter has been run up to speed. When testing condensers first include a series safety resistance.

AND CHASSIS LAYOUT DIAGRAMS



These drawings show how the parts are arranged on the chassis of the Pye T10A. Note that condensers are shown in outline while resistors are in solid black.

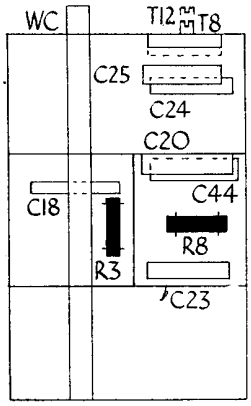
CONDENSERS

C.	Purpose.	Mfd.
18	V1 grid	.0001
19	V1 screen pot. decoupling ...	2
20	V1 screen decoupling	.1
21	V1 bias shunt	.1
22	Neutralising	—
23	V1 oscillator grid	.0001
24	Medium wave osc. padding ...	.0004
25	Long wave osc. padding ...	.0002
26	V1 osc. anode decoupling ...	2
27	V2 bias shunt	.1
28	V3 grid feed	.05
29	L.F. filter	.0001
30	L.F. filter	.0001
31	V2 anode decoupling	.1
32	V3 bias shunt	10
33	L.F. coupling	.05
34	Anode feed	.0001
35	V3 anode decoupling	2
36	V4 grid filter	.001
37	Tone correction	.01
38	V4 bias shunt	50
39	Tone correction	.01
40	A.V.C. decoupling	.025
41	H.T. smoothing	8
42	H.T. smoothing	8
43	A.V.C. decoupling	.025
44	V1 osc. anode decoupling ...	.1

RESISTANCES

R.	Purpose.	Ohms.
1	Volume control	500,000
2	Tuning indicator adjustor ...	15,000
3	A.V.C. feed	510,000
4	V1 and V2 screen pot. feed ...	30,000
5	V1 and V2 screen stabiliser	50,000
6	V1 screen decoupling	30,000
7	V1 cathode bias	150
8	V1 osc. grid leak	26,000
9	V1 osc. anode decoupling ...	40,000
10	V2 cathode bias	200
11	V2 anode feed	10,000
12	Tuning indicator feed... ...	2 meg.
13	V2 anode decoupling	50,000
14	L.F. filter	260,000
15	V3 diode load	260,000
16	Sensitivity control	11,000
17	V3 cathode bias	1,000
18	V3 anode decoupling	25,000
19	V3 anode load	50,000
20	V4 grid filter	260,000
21	V4 grid stabiliser	260,000
22	Tone correction	10,000
23	V4 cathode bias	150
24	V3 A.V.C.diode load	510,000
25	A.V.C. decoupling	510,000
26	A.V.C. decoupling	510,000

The diagram on the right represents the underside of the subsidiary chassis mounted on the left-hand side of the main chassis (see top chassis diagram on left above).



IF an interfering signal appears after a superhet receiver has been in use for some time and disappears if the set is shut off for a few minutes and then again switched on, the cause is probably oscillator frequency drift. The frequency of the oscillator changes after the set has been in use a little and, therefore, alters the effective tuning point. Things which may contribute to frequency drift include : defective (not necessarily open circuit) by-pass condensers associated with the oscillator; moisture absorption by trimmer condensers; poor earth connections; defective resistors; mechanically unsound oscillator coil construction (loose windings and cans) and variation in the valve as it warms up. Need for frequent retuning may be due to slip in the gang condenser rather than real frequency drift.