PYE 812 THREE-BAND FIVE CONSOLE

A Soloscale tuning dial, which shows only the band in use, and a combined tuning and wave-change knob are features of the 812.

CIRCUIT. — H.F. transformer coils couple the aerial to the signal grid of V1, an octode frequency changer. Arrangements are made whereby a doublet aerial may be connected for short-wave work. A coupling condenser having a very small capacity is introduced between the signal and oscillator grids.

V1 is coupled to V2, the I.F. amplifier, by a transformer tuned to 465 kc. The transformer does not incorporate trimming condensers, and is tuned by variation of coupling.

Another I.F. transformer of similar construction leads to the demodulating diode load of V3, a double diode triode. The rectified potentials feed the visual tuning indicator and also pass via an L.F. coupling condenser to the tone-compensated volume control R14 and thence to the triode grid.

Automatic volume control is obtained by the rectified potential from the other diode of V3, and is applied to the grids of V1 and V2.

V3 is resistance-capacity coupled to the output valve V4, an output pentode. By means of negative feed back to the cathode of V3, and the grid of V4 from the secondary of the speaker transformer, a switch enables different tone variations to be obtained. An expander indicator light enables the amount of constrast to be adjusted.

Mains equipment consists of a transformer, full-wave rectifying valve, V5, electrolytic smoothing condensers, and two smoothing chokes, one of which is the speaker field.

Chassis Removal.—Remove back of cabinet and the three spring-fixed control knobs. Uncleat the leads to the expander indicator light and remove the indicator and holder from the front (inside) of the cabinet.

Withdraw the speaker plugs from their sockets at the rear of the chassis and also the supply plug from its socket on the chassis deck and the earthing lead from the frame of the output transformer. Then remove the six wood screws securing the chassis mounting shelf to the cabinet.

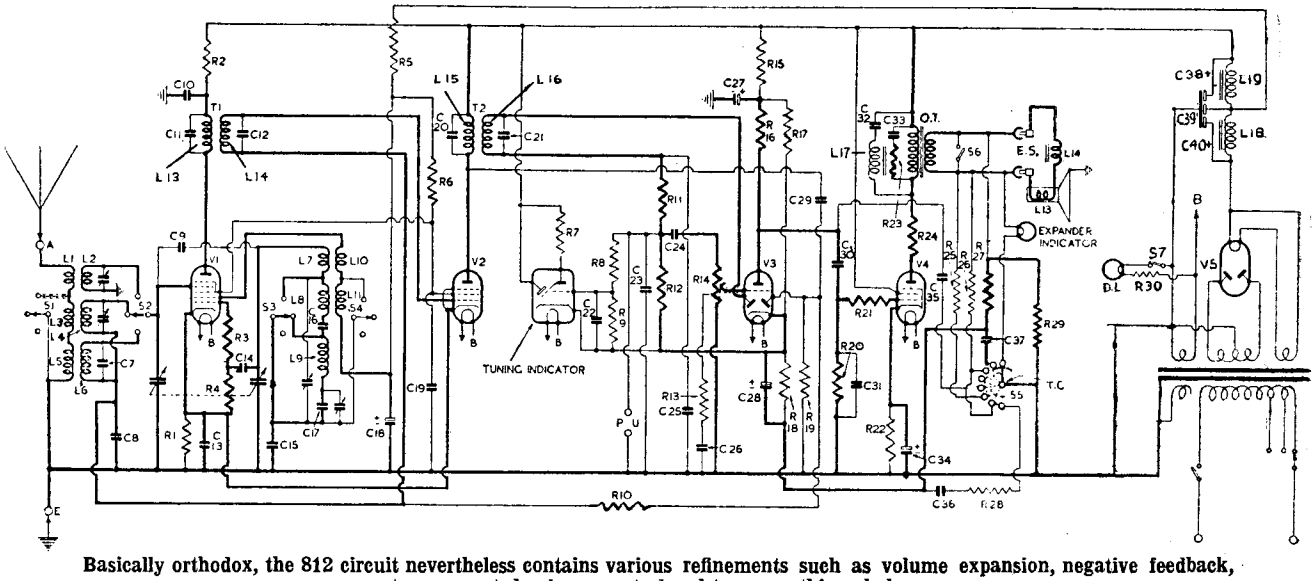
The chassis, with mounting shelf, can be completely removed free of all leads.

RESISTANCES

R.	Purpose.	Ohms.
1	V1 and V2 cathode bias	150
2	V1 anode decoupling	1,000
3	Regeneration modifier	50
4	Osc. grid leak	50,000
5	Osc. anode decoupling	20,000
6	V1 and V2 screens decoupling	10,000
7	T.I. anode feed	1.1 meg.
8	T.I. grid potr. (part)	2.1 meg.
9	T.I. grid potr. (part)	1.1 meg.
10	V1 A.V.C. decoupling	1.1 meg.
11	H.F. stopper	110,000
12	Demodulating diode load	510,000
13	Tone modifier	50,000
14	Volume control	1.1 meg.
15	V3 anode decoupling	30,000
16	V3 anode load	160,000
17	V3 cathode network	100,000
18	V3 cathode bias	500
19	A.V.C. diode load	1.1 meg.
20	V4 grid leak	510,000
21	V4 grid stopper	25,000
22	V4 cathode bias	110
23	Tone modifier	5,000
24	V4 anode stabiliser	50
25	Tone network	40
26	Tone network	20
27	V3 cathode network	200
28	Tone network	25
29	V3 cathode network	3
30	Series dial light resistance	5

CONDENSERS

C.	Purpose.	Mfds.
7	L.W. aerial fixed padder	.00005
8	V1 A.V.C. decoupling	.5
9	V1 signal grid to osc. grid coupling	.000001
10	V1 anode decoupling	.1
11	I.F.T.1 prim. fixed trimmer	.00014
12	I.F.T.1. sec. fixed trimmer	.00014
13	V1 and V2 cathode bias shunt	.25
14	Osc. grid	.0001
15	Osc. fixed padder	.005
16	M.W. osc. fixed padder	.00072
17	L.W. osc. fixed padder	.00019
18	Osc. anode decoupling	8
19	V1 and V2 screens decoupling	.1
20	I.F.T.2 prim. fixed trimmer	.00012
21	I.F.T.2 sec. fixed trimmer	.00014
22	T.I. grid decoupling	.1
23	H.F. bypass	.0001
24	L.F. coupling	.01
25	H.F. bypass	.0001
26	Tone modifier	.025
27	V3 anode decoupling	2
28	V3 cathode bias shunt	20
29	A.V.C. diode coupling	.00002
30	L.F. coupling	.01
31	V4 grid shunt	.0002
32	Tone modifier	.005
33	Tone modifier	.01
34	V4 cathode bias shunt	20
35	Feed back condenser	.002
36	Cathode coupling	9
37	Expansion	.25
38	H.T. smoothing	8
39	H.T. smoothing	8
40	H.T. smoothing	8



Basically orthodox, the 812 circuit nevertheless contains various refinements such as volume expansion, negative feedback, tone corrected volume control and two smoothing chokes.

The four bolts and washers can be then removed from the mounting board, leaving the chassis fully accessible.

Special Notes.—Sockets at the rear of the chassis enable a pick-up to be connected.

A low impedance, 2 to 4 ohms, extension speaker can be operated by inserting wander-plugs into the socket-plugs at the rear of the chassis. To cut out the internal speaker connect the extension speaker plugs directly into the chassis sockets with the socket-plugs removed.

WINDINGS (D.C. Resistances)

L.	Ohms.	Range	Where measured.
1	.8	S.W.	Aerial socket and chassis.
3+5	121	L.W.	Aerial socket and chassis.
2	Below .1	S.W.	Top grid V1 and chassis.
4	2.9	M.W.	Top grid V1 and C8.
6	12	L.W.	Top grid V1 and C8.
7	Below .1	S.W.	C14 and C15.
8	1.8	M.W.	C14 and C16.
9	5	L.W.	C16 and C17.
10	23	S.W.	Osc. anode and C15.
10+11	32	M.W.	Osc. anode and C18.
13	6.7	—	Tags.
14	6.7	—	Tags.
15	6.6	—	Tags.
16	6.6	—	Tags.
17	120	—	Tags.
18	97	—	Tags.
19	1100	—	Tags.
O.T.prim.	310	—	R24 and screen V4.
M.T.prim.	19	—	Mains plug pins.

The electrolytic smoothing condensers C38, C39 and C40, together with the first smoothing choke, are located near the speaker.

R7 is connected across the visual tuning indicator valve-holder.

The dial light is rated at 6.2 volts .5 amp. and has an M.E.S. base. The expander indicator bulb is rated at 4 volts .06 amp.

The mains voltage adjustment consists of sockets on the mains transformer and a threaded member terminating a flying lead.

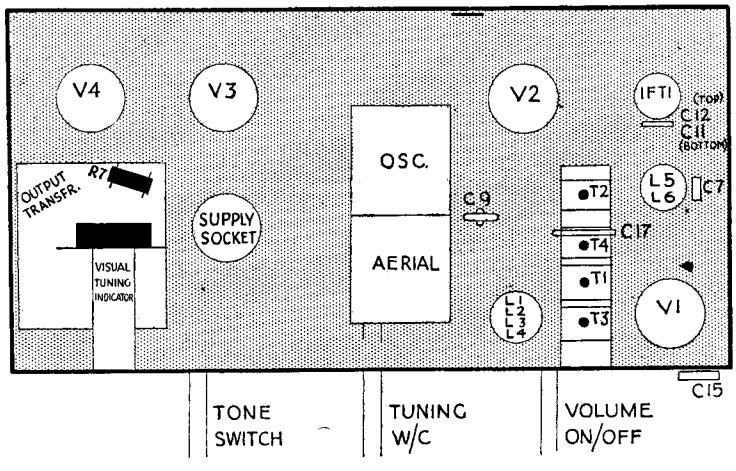
Alignment Notes

I.F. Circuits.—It should not be found necessary to adjust the I.F. transformers, except when one is replaced, because there are no trimmers to drift and the coils are sealed to the formers by special coil dope.

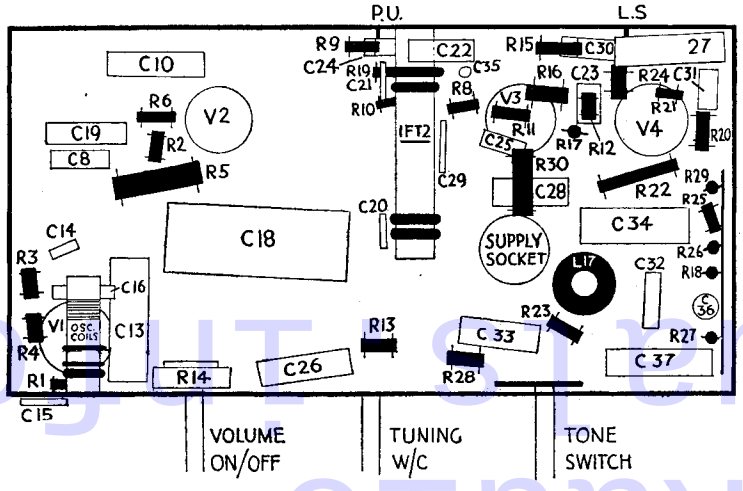
VALVE READINGS

No signal. Volume maximum. M.W. min. cap.

V.	Type.	Electrode.	Volts.	Ma.
	(All Mullard)			
1	6A8G	Anode ..	251	8.1
		Screen ..	80	3.8
		Osc.anode	136	5.6
2	6K7G ..	Anode ..	258	10
		Screen ..	80	1.7
3	6Q7G	Anode ..	60	.7
4	EL6	Anode ..	242	60
		Screen ..	260	5
5	5Y3G ..	Heater ..	360	—



The "tinted" diagram on the left shows the parts located on the top of the 812 chassis. There are no I.F. trimmers.



Mains transformer and rectifying valve are on the floor of the cabinet. Layout of parts underneath the chassis is shown on the right.

Pye 812 on Test

MODEL 812.—For A.C. mains operation, 200-250 volts, 40-100 cycles. Price 15 gns.

DESCRIPTION.—Four-valve, plus rectifier, three-waveband console.

FEATURES.—Novel Soloscale with one knob which combines two-speed tuning and wave changing. Scale changed according to waveband. Combined volume and master switch. Tone switch for speech, top-cut, fidelity and contrast expansion. Contrast expansion circuit operating indicator lamp. Sockets for pick-up and extension speaker, with control of internal speaker. Visual tuning indicator. Large, high fidelity speaker.

LOADING.—82 watts.

Sensitivity and Selectivity

SHORT WAVES (13.8-52 metres).—Good gain and selectivity with easy handling and no drift.

MEDIUM WAVES (196-567 metres).—Representative gain for the valve combination employed. Excellent selectivity, well maintained over the band.

LONG WAVES (900-2,035 metres).—All main stations easily received with very slight interference on Deutschlandsender. Clean background.

Acoustic Output

In the highest fidelity position high and low note radiation is excellent, with a very pleasing general balance and natural speech. The expander circuit functions well and gives noticeable contrast.

However, replacement of a faulty I.F. transformer will call for the following procedure.

Connect an output meter across the primary of the speaker transformer. Switch the receiver to the M.W. band, set the gang to maximum capacity and tone control to "high." Connect a service oscillator between the top grid of V1 (via a .002 mfd. condenser) and chassis, removing the normal connection and connecting a 500,000 ohms resistance between the grid of the valve and chassis. Turn volume to maximum.

Tune the service oscillator to 465 kc. (645 metres) and by means of an insulated spacer adjust the outer coils only of each transformer until maximum is obtained. Reduce the input as the circuits come into line so as to keep the A.V.C. inoperative.

After adjustment the coils should be sealed to the former by coil dope and left to dry before carrying out any signal circuit adjustments.

Signal Circuits. — Connect the service oscillator to the A. and E. sockets via a dummy aerial. Replace normal grid connection to V1 and remove the 500,000 ohms resistance. Only feed sufficient input from the service oscillator to obtain reliable peaks in the output meter and reduce the input as the circuits come into line.

Short Waves.—Tune set and oscillator to

(Continued on page 43)

Cossor 396 Three-band Six

(Continued from page 31)

turn. The bulbs are rated at 6.5 volts .3 amp., and have M.E.S. bases.

C14, C15, C16 and C19 are contained inside the corresponding I.F. transformer can.

Alignment Notes

It should not be found necessary to adjust the I.F. transformers except when one is replaced, as there are no trimmers to drift.

Connect an output meter across the primary of the speaker transformer. Switch receiver to M.W. band, turn gang to maximum capacity, volume to maximum and tone to "high" position. Connect a service oscillator between the top grid cap of V1 and chassis.

Tune the service oscillator to 465 kc., and adjust first the iron cores of I.F.T.2 and then I.F.T.1 for maximum response. Reduce the input from the service oscillator as the circuits come into line to keep below the A.V.C. point. The cores are sealed with wax compound and should be re-sealed after adjustment.

Signal Circuits.—The pointer should coincide with the last calibration mark on the scale when the gang is at maximum.

Connect the service oscillator to the aerial and earth sockets *via* a dummy aerial. Only feed sufficient input to obtain reliable peaks in the output meter, and progressively reduce the input as the circuits come into line.

Medium Wave.—Tune set and oscillator to 214 metres (1,400 kc.), and adjust T1, T2 and T3 for maximum response.

The medium wave padding is fixed, but check at 214 metres.

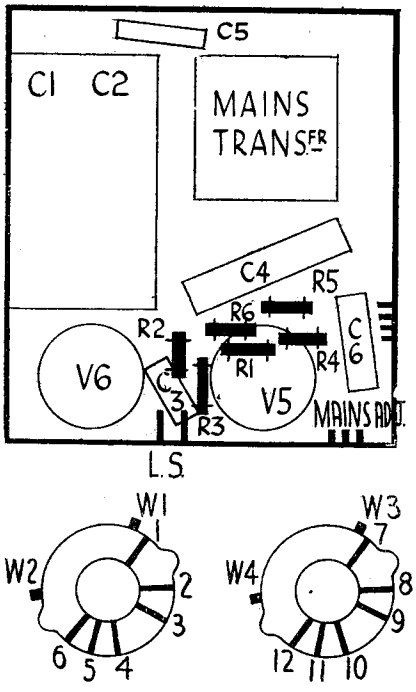
Long Wave.—Tune set and oscillator to 1,200 metres (250 kc.) and adjust T4, T5 and then T6 for maximum response.

Long Waves.—Tune set and oscillator to 1,875 metres (160 kc.) and adjust P1 for maximum simultaneously rocking the gang.

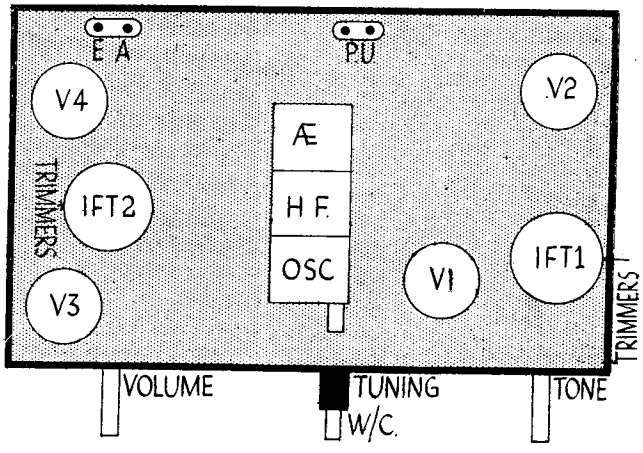
Repeat both operations until no further improvement results.

Short Waves.—Tune set and oscillator to 18 megacycles and adjust T7, T8 and T9 in that order for maximum response.

There are no padding adjustments, but check calibration throughout the band.



Right: The layout diagram identifying parts on top of the Cossor radio chassis. The underneath diagram of the power chassis is on the left. Below are the switch banks lettered according to the circuit.



Philips 470A Four

(Continued from page 47)

top grid cap of V1 (*via* a .032 mfd. condenser) and chassis.

Connect a 50,000 ohms resistance across points 1 and 2 and an 80,000 ohms resistance across points 3 and 4 (see underside of chassis drawing).

Tune service oscillator to 128 kc., and adjust T1 and then T2 for maximum.

Remove resistances and connect the 50,000 ohms resistance across points 5 and 6 and the 80,000 ohms resistance across 7 and 8.

Then adjust T3 and then T4 for maximum. Remove resistances.

I.F. Wavetrap.—Connect the service oscillator to the aerial and earth sockets *via* a dummy aerial.

Tune receiver to upper end of long waves (about 2,000 metres), inject a fairly strong 128 kc. signal and adjust T5 for *minimum* response.

Signal Circuits.—Only feed sufficient input from the service oscillator (connected to the aerial and earth sockets *via* a dummy aerial) to obtain reliable peaks in the output meter and progressively reduce the input as the circuits come into line. This is to prevent operation of the A.V.C.

Medium Waves.—Fit 15 deg. jig on gang and set the gang to the jig. Tune service oscillator to 208 metres (1,442 kc.), and adjust the trimmers T6, T7 and T8 in that order for maximum. Then repeat with T6 and T7. Remove jig.

Long Waves.—Connect the output meter to output terminals of a GM2404 aperiodic amplifier and then connect amplifier to the anode of V1. Earth the oscillator grid *via* a .1 mfd. condenser.

Tune service oscillator to 750 metres (400 kc.) and rotate the gang for maximum on output meter.

Disconnect aperiodic amplifier, remove shorting condenser from oscillator grid, reconnect output meter to receiver and, without altering the tuning control, adjust P1 for maximum response.

P1 consists of an insulating bush internally sprayed with metal and covered on the outside with a winding of copper wire. In trimming, turns are removed until the output indicator begins to drop back, some of the wire is replaced until a maximum output is obtained, when the surplus wire is clipped off

Short Waves.—There are no separate adjustments to be effected on this band.

Pye 812 Console

(Continued from page 49)

15 metres (20 mc.) and adjust T1 for maximum response.

Tune set and oscillator to 50 metres (6 mc.) and move the yellow lead to the gang condenser in relation to the short wave winding on the oscillator coil for maximum response.

Then move the black lead to the aerial coil short wave winding in relation to this winding for maximum.

The gang must be retuned each time a lead is moved. If much adjustment is required it will be necessary to readjust T1.

Medium Waves.—Tune set and oscillator to 210 metres (1,425 kc.) and adjust T2 and then T3 for maximum.

Long Waves.—Tune set and oscillator to 1,800 metres (1,166 kc.) and adjust P1 for maximum while rocking the gang.

Replacement Condensers

Exact replacement condensers, available from A. H. Hunt, Ltd., Garratt Lane, Wandsworth, London, S.W.17, are: For C18, unit list number 4,107, 3s.; C27, 2,964, 1s. 10d.: C28. 4,105, 1s. 6d.; C34, 2,935, 1s. 9d.: C36, 4,137, 1s. 6d.: and for the block containing Cs 38, 39 and 40, unit 4,200, 9s. 3d.