

PHILIPS MODEL 794A SUPERHET

CIRCUIT.—An inductively and capacitatively coupled band-pass filter couples the aerial to V1, a frequency changer. A small series resistance is incorporated in the grid lead to cut out any parasitic oscillations which might occur while the receiver is working on short waves.

Coupling to V2, an H.F. pentode, is through an I.F. transformer tuned to 123 kc. and to V3, a double diode triode, through a second I.F. transformer.

The coupling between the windings of the first I.F. transformer is manually adjustable and provides variable selectivity. It is ganged with the tone control.

The cathode ray visual tuning indicator is operated by part of the rectified output of V3.

One diode of V3 is used for demodulation and the other to supply A.V.C. bias to the preceding valves in the orthodox manner. The rectified output of the demodulator diode is resistance and capacity coupled to the grid of the triode portion, the volume control operating by varying the input to the grid.

A further resistance and capacity stage couples the L.F. output to V4, the output pentode, which is tone controlled in the grid circuit by C42 and R22.

Part of the low frequency current from the secondary of the output transformer is back coupled via R21, R27, CK1 and

CK2 to balance out distortion that might be introduced by the output valve.

Mains equipment consists of transformer, full-wave rectifier, electrolytic condensers and a smoothing choke.

Special Notes.—The dial lights are Philips type 8042. To remove them, pull the dial upright and then slacken the bolts in each end of the lamp carrier, which will then pivot and allow the lights to be removed.

Connections are provided for an extension speaker; these being on the primary of the output transformer an extension speaker should have its own matching transformer.

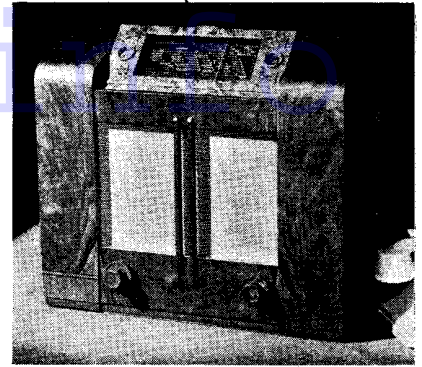
R32 will be found inside the screened connecting cap to V1.

Switching Explanation.—In the circuit diagram there are two concentric rings of dots and circles in each diagram. The small circles represent contact springs on the stators, and the dots are used where there are no contacts.

The short radial lines between the two concentric rings represent shorting contacts on the rotor. Where there is a solid line joining two or more of these short radial lines the shorting contacts are actually connected together.

The dotted arcs show that adjacent contacts are shorted together (not permanently, but according to the position of the rotor).

The switches are shown in the open

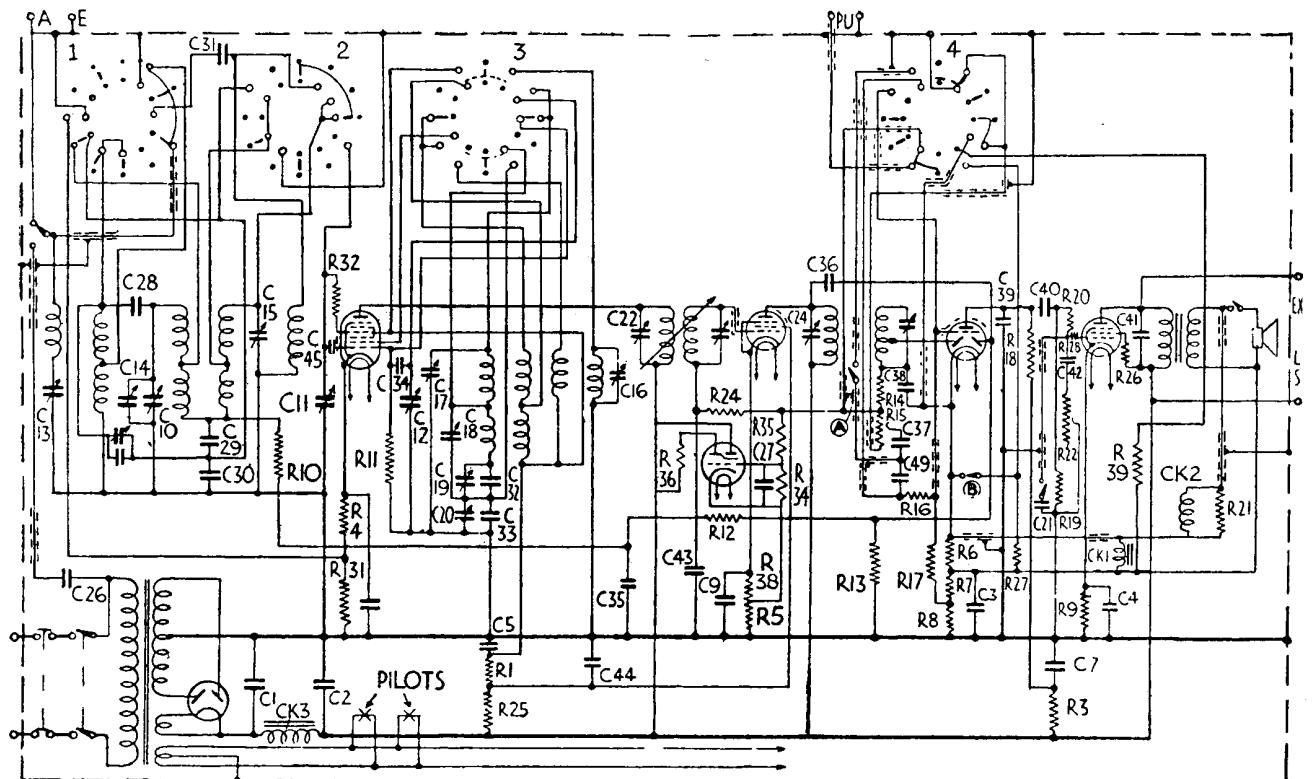


Features of the 794A by Philips Lamps, Ltd., are a "magic eye" indicator and an Audioscopic tone circuit.

VALVE READINGS

No signal. Volume maximum. 200 volt A.C. mains.

V.	Type.	Electrode.	Volts.	Ma.
1	FC4 met. (7)	Anode ..	260	2.4
		Screen ..	70	2
		Osc. anode ..	70	5
2	VP4B met. (7)	Anode ..	260	6.2
		Screen ..	150	2.25
3	TDD4 met. (7)	Anode ..	70	1.2
4	Pen A4 (7) ..	Anode ..	250	34
		Screen ..	260	3.75
5	Above are Mullard. 1821 (4) Philips	Filament ..	285	—



The Audioscopic reverse feed-back arrangements are an interesting detail in the 794A circuit. The switch diagrams are explained in the text.

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position. They work in a clockwise direction, the order of operation being: short, medium, long waves, gramophone. With each new position, of course, all the shorting strips move along one set of contacts clockwise.

Removing Chassis.—Practically all the work necessary on this receiver can be done without removing the chassis by taking off the false bottom to the cabinet, which is secured by four small bolts.

Complete removal of the chassis is as follows:—

Remove the four knobs from the front of the cabinet by slackening the grub screws, the two large knobs having two each; next free the Bowden cable to the wavechange switch by removing the adjusting screw and locknut, and the pointer drive cable, by taking out the two wood screws in each of the brackets on either side of the dial, undoing the slotted nuts that hold the copper pressure plates and slackening the small bolt fixing the pointer to the cable.

Unsolder the leads from the chassis to

the terminal strip on the speaker—these will have to be carefully marked for reconnection, as they are not colour coded—and then the earth link between the chassis and the metallised paper under the chassis. Finally, take out the four bolts from underneath the cabinet.

Circuit Alignment Notes

I.F. Circuits.—Connect a modulated oscillator to the grid cap of V1, and an output meter across the external speaker terminals.

Shunt C24 with a 25,000 ohm resistance and set the selectivity control to maximum. Inject a signal of 128 kc., trim C25 for maximum reading on output meter. Remove the shunt.

Shunt C23 with a 10,000 ohm resistance and a .1 condenser in series. Trim C22 for maximum reading on the output meter. Remove the shunt.

Shunt C25 with a 25,000 ohm resistance. Trim C24 for maximum reading. Remove the shunt.

(Continued on page 49.)

RESISTANCES

R.	Purpose.	Ohms.
1	V1 screen and osc. anode decoupling.	20,000
3	V3 anode decoupling	50,000
4	V1 cathode bias	250
5	V2 cathode bias	800
6	V3 cathode bias network	32
7	V3 cathode bias network	3,200
8	V3 cathode bias network	4,000
9	V4 cathode bias	160
10	V1 A.V.C. decoupling	.1 meg.
11	V1 osc. grid leak	50,000
12	V1 A.V.C. decoupling	1 meg.
13	A.V.C. diode load	.5 meg.
14	Demodulator diode load (part)	.1 meg.
15	Volume control	.5 meg.
16	V3 series grid	1.6 meg.
17	V3 grid leak	1.6 meg.
18	V3 anode load	.1 meg.
19	V4 grid leak	.8 meg.
20	V4 grid stopper	.1 meg.
21	Audioscopic tone filter	500
22	Tone control	.04+2.5+
24	V2 A.V.C. decoupling	1.6 meg.
25	V2 screen decoupling	160,000
26	V4 screen decoupling	200
27	Audioscopic tone filter	32
28	V4 grid stabiliser	1,000
31	V1 cathode bias	2,500
32	V1 grid stabiliser	50
34	TV4 grid filter	1.6 meg.
35	TV4 grid filter	5 meg.
36	TV4 triode anode load	2 meg.
38	V2 cathode bias	320
39	Audioscopic tone filter	10

CONDENSERS

C.	Purpose.	Mfds.
1	H.T. smoothing	32
2	H.T. smoothing	32
3	V3 cathode bias shunt	50
4	V4 cathode bias shunt	50
5	V1 osc. anode and screen decoupling.	.1
7	V3 anode decoupling	.5
8	V1 cathode bias shunt	.05
9	V2 cathode bias shunt	.1
21	Muting	.1
26	Mains aerial	.0005
27	TV4 grid filter	.05
28	Band pass coupling	.00001
29	V1 A.V.C. decoupling	.016
30	Band-pass coupling	.025
31	Short-wave coupling	.000016
32	Padding	.00065
33	Padding	.001375
34	V1 osc. grid	.0001
35	V1 A.V.C. decoupling	.1
36	A.V.C. diode coupling	.00001
37	L.F. coupling	.002
38	H.F. filter	.0001
39	V3 anode shunt	.0004
40	L.F. coupling	.02
41	Pentode compensating	.004
42	Tone control	.008
43	V2 A.V.C. decoupling	.1
44	V2 screen decoupling	.1
45	Osc. regeneration control	.000002
47	Image suppressor	.00002
49	L.F. coupling	.000025

Philips 794A on Test

MODEL 794A.—Standard model, 110-250 volt, 50 cycle A.C. mains. 15 gns.

DESCRIPTION.—A four-valve, plus rectifier, three-waveband A.C. superhet table receiver. Modern, well-finished walnut cabinet.

FEATURES.—Full vision name and wavelength scale. "Magic eye" tuning indicator and waveband indicator operated by selector switch. Variable selectivity and tone control concentric with variable knob. Tune knob concentric with range selector.

LOADING.—65 watts.

Sensitivity and Selectivity.

SHORT WAVES (16.5-52 metres).—Excellent sensitivity, no appreciable oscillator drift. Good A.V.C. tuning easy with convenient reduction gear.

MEDIUM WAVES (190-585 metres).—Sensitivity and selectivity excellent. The waveband is wide and variable selectivity enables practically any working channel to be obtained with almost no interference.

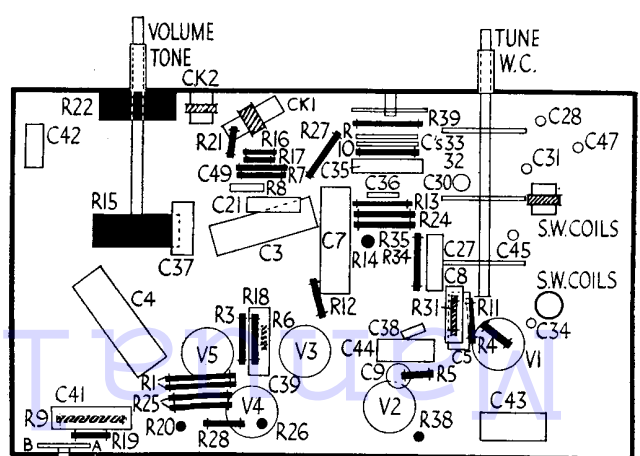
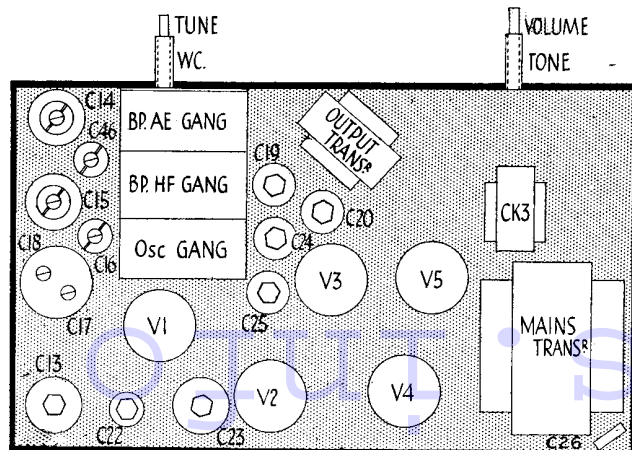
LONG WAVES (725-2,000 metres).—Gain and selectivity are comparable with medium-wave performance. Deutchlandsender is received with substantially no interference in maximum selectivity position.

Acoustic Output.

The bass compensating device and feed-back circuit gives very high quality reproduction. It is as good as that of any receiver yet tested.

Volume for an ordinary room is ample without distortion. Reproduction is very crisp with excellent attack, and is combined with a very marked low note radiation, giving exceptionally pleasing overall effects.

REPLACEMENT condensers for the Philips 794A, available from A. H. Hunt, Ltd., of Garratt Lane, Wandsworth, London, S.W.18, are: C.s 3 and 4, list 2915 (1s. 9d. each), and C.s 1 and 2, list 2989 (7s. 6d. each).



As these diagrams show, the trimmers are arranged on the top of the Philips chassis. All resistors are indicated in solid black.

sufficiently, probably without disconnecting the speaker leads.

Should it be desired to disconnect these reconnection will be as follows (reading from left to right): 1. black lead; 2. blank; 3. green; 4. yellow; and 5, red.

Circuit Alignment Notes

I.F. Circuits.—Connect a modulated oscillator to the aerial and earth terminals via a dummy aerial and place an output meter across the external speaker terminals

Inject a signal of 456 kc. and trim T1, T2, T3 and T4 for maximum output, reducing the oscillator output as the circuits come into line in order to prevent the A.V.C. from working.

Medium Waves.—Tune the receiver and the oscillator to 200 metres and adjust T5 and T6 for maximum.

Inject and tune in a signal of 210 metres and adjust T7 for maximum.

Tune the set and the oscillator to 500 metres, rock the gang condenser and trim T8 for maximum.

Long Waves.—Inject a signal of 1,000 metres and tune the receiver to 950 metres and adjust T9, T10, and T11 for maximum.

Inject and tune in a signal of 1,700 metres, rock the gang condenser and adjust T12 for maximum.

Short Waves.—Tune the set and the oscillator to 17.1 metres (17.55 megacycles), screw T13 right in, and then slowly unscrew it until the second peak is reached. Adjust for maximum output. Then trim T14 and T15 for maximum.

Calibration.—With the gang condenser at maximum capacity the pointer should coincide with the top left-hand white line of the scale.

Exact replacement condensers for the Ultra 48, made by A. H. Hunt, Ltd. of Garratt Lane, Wandsworth, London, S.W.18, are: C21, list 3058 (9s. 6d.); C22, list 3053 (6s.); C17, list 2915 (1s. 9d.).

(Continued from page 37.)

Shunt C22 with a 10,000 ohm resistance. Trim C24 for maximum reading. C23 for maximum reading. Remove the shunt.

Medium Waves.—Inject a signal of 208 metres via a dummy aerial to the aerial and earth terminals, and tune it in; a template is available from the manufacturers so that correct adjustment of the tuning condenser can be made.

Adjust C17, C14 and C15 for maximum reading on output meter.

If the oscillator coils are badly out of gang, use should be made of an amplifier connected to the anode of V1 via a .00025 mfd. condenser and to the chassis.

The amplifier may be the gramophone side of any reliable receiver, and care should be taken to see that the amplifier grid lead is taken to the anode of V1. The anode lead of V1 is bared, and can be reached through a hole in the chassis to the right of the valve.

Having satisfactorily connected the amplifier, the procedure is as follows: Shunt C22 with a 2,000 ohm resistance and a .1 mfd. condenser in series and inject a strong signal of 545 metres to the aerial and earth terminals.

Tune the receiver until it is heard from the amplifier, remove the amplifier, and shunt and trim C20 for maximum reading on output meter.

The above should be repeated until the best results are obtained.

Ultra Model 48 on Test

MODEL 48.—Standard model for A.C. mains, 200-250 volts, 40-100 cycles. Price 13 gns.

DESCRIPTION.—Four-valve plus rectifier table model superhet for three wavebands.

FEATURES.—V-type tuning scale calibrated in wavelengths and station names. Vertical speaker opening by side of scale. Concentric tuning control. Local-distance switch on back of chassis. External speaker, but no pick-up connections. R.F. stage preceding pentode frequency changer.

LOADING.—80 watts.

Sensitivity and Selectivity

SHORT WAVES (16-54.5 metres).—Representative selectivity and sensitivity. Tuning easy, no noticeable drift.

MEDIUM WAVES (195-555 metres).—Good sensitivity and reasonable selectivity. Slight overlap with local stations on average aerial. Whistles not unduly noticeable.

LONG WAVES (875-2,100 metres).—Similar gain and selectivity capable of giving the usual stations.

Acoustic Output.

Ample volume for an ordinary room. Slightly noticeable colouration. Tone generally pleasing.

Long Waves.—Inject and tune in a signal of 760 metres (using template if available). Adjust C18 for maximum response.

Connect up the amplifier as before and the shunt across C22; inject a strong signal of 1.875 metres, and tune it in. Then remove the amplifier and shunt and trim C19 for maximum reading.

Short Waves.—Inject and tune in a signal of 17.6 metres (using template if available), and trim C16 for maximum reading on output meter.

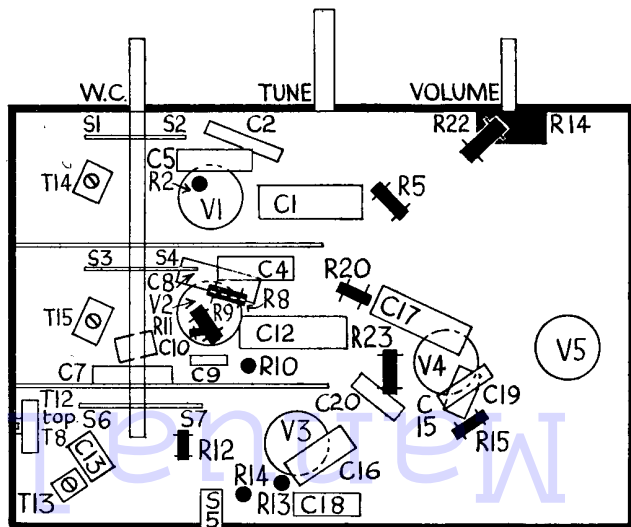
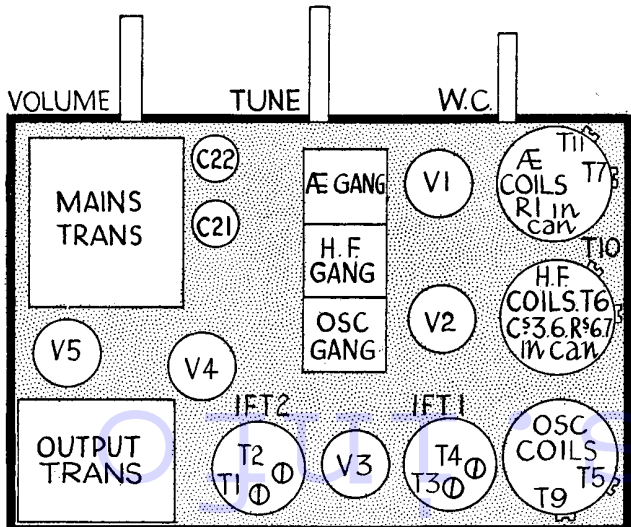
Aerial Filter.—Switch the receiver to long waves and tune the condenser to maximum. Apply a strong signal of 128 kc. (the intermediate frequency) and trim C15 for minimum.

Image Filter.—Inject a signal of 403 metres, and tune it in. Leaving the tuning condenser at this setting, inject a strong signal of 300 metres and adjust C46 for minimum.

VALVE READINGS

No signal. Volume and selectivity controls max. 200 volt A.C. mains.

V.	Type.	Electrode.	Volts.	Ma.
1	(All Mazda) AC/VP1 met. (7)	Anode ..	225	3.1
		Screen ..	205	.55
2	AC/TH1 met. (7)	Anode ..	250	3.25
		Screen ..	170	2.1
		Osc.anode	80	5.1
3	AC/VP1 met. (7)	Anode ..	250	9.75
		Screen ..	250	7
4	AC2/Pen/DD (7)	Anode ..	240	58
		Screen ..	250	7.1
5	UU3 (4)	Filament	335	—



Layout of the chassis of Ultra's model 48. Left, the tinted diagram, is the top view; right is the underside.