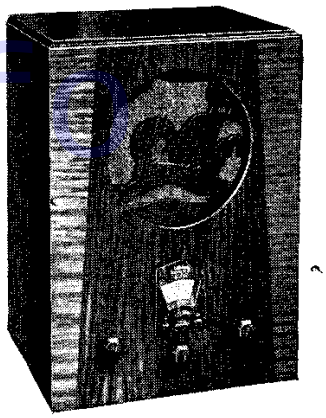
VARLEY SUPERHET "FIVE"



The AP48 by Varley is very compact although in all 6 valves are used.

Circuit.—The H.F. valve, VP4 met (V1), follows a single tuned aerial circuit, and an H.F. transformer couples it to the next valve.

This, a combined first detector oscillator, SP4 met (V2), has the reaction coil in its cathode circuit, and is coupled to the following valve by a tuned secondary I.F. transformer (frequency 110 kc.).

The I.F. valve, VP4 met (V3), is linked to the second detector by a band-pass I.F. transformer, and volume is controlled by varying the bias resistance common to V1 and V3.

The next valve, 354V (V4), works as a power grid second detector, and the correct L.F. working bias is used for gramophone reproduction. Coupling to the output valve is by straight transformer.

The output pentode, AC/Pen (V5), is compensated by a condenser and resistance (actually mounted on the speaker). The feed to the external speaker connections is through a condenser, and a switch is included to disconnect the internal reproducer. A separate filament winding provides for this valve, and an artificial centre point is obtained by a potentiometer across the winding.

All the necessary H.T. and G.B. circuits are adequately decoupled.

Mains equipment consists of transformer, full wave rectifier, D.W.3, and both a choke and the speaker field in the H.T.+ lead for smoothing.

Special Notes.—Some models of this receiver are fitted with A.V.C., obtained by means of a Westector fed from the anode circuit of the second detector, the H.F. and I.F. valves being controlled.

(*Continued from previous page.*)

from the H.F. valve to chassis, the filament wiring appears complicated.

The volume control and the reaction condenser are ganged and mounted as a unit. To change them remove the two (self-threading) screws holding the switch bearer to the chassis and ease the switch back far enough to allow the V.C. unit to be withdrawn after the fixing nut has been removed.

Replacing Chassis.—Lay chassis in position and resolder speaker leads. Replace three holding screws underneath. Press knobs on (spring on flat side of spindles) and replace switch control.

Place battery platform on edge of grooves and clip the battery leads. Slide platform home and replace bolts.

In this case the manual control consists of a 50,000 ohm variable resistance across the primary of the L.F. transformer, the screen-grid and bias voltages for the H.F. and I.F. valves being derived from a fixed potential divider. The bias voltage is, of course, varied by the A.V.C. action.

When the tuning condenser is turned to maximum position the rear end of the spindle operates the "gram" switch. The mains switch works *anti-clockwise.*

Quick Tests.—Between terminals on output transformer and chassis (looking from rear and counting from left):—

(1) H.T.+ smoothed by choke	345 volts.
(2) H.T.+ smoothed by choke and L.S. field	210 ,,
(3) V5 anode	190 ,,
(4) Connected to 2 inside chassis Terminals on smoothing choke Top	345 ,,
Terminals on smoothing choke Bottom	370 ,,

Removing Chassis.—Pull off knobs, remove two screws from underneath and pull a sufficient length of the flex through the clamping block.

Remove four wood screws holding rear panel to cabinet and two inner screws hold-

(*Continued on next page.*)

RESISTANCES

R	Purpose.	Ohms.
1	V 1 cathode bias (fixed portion)	200
2	Low potential end of H.F. trans. sec.	1,000
3	V 1 anode decoupling	10,000
4	Top part of V 1 and V 3 aux. grid ptr.	10,000
5	Lower part of V 1 and V 3 aux. grid ptr.	5,000
6	Var. volume control	5,000
7	Top part of V 2 aux. grid ptr. ...	25,000
8	Lower part of V 2 aux. grid ptr.	50,000
9	V 2 cathode bias	2,000
10	V 2 anode decoupling	5,000
11	V 3 fixed part of cathode bias	300
12	V 4 grid leak	250,000
13	Across P.U. connections ...	10,000
14	V 4 cathode bias on "gram."	800
15	V 4 anode decoupling	30,000
16	V 5 grid decoupling	50,000
17	V 5 cathode bias	300
18	Voltage dropping to V 5 aux. grid	10,000
19	Filament ptr. of V 5	
20	Tone compensating V 5 ...	5,000
	L.S. field	2,250
	Output transformer primary ...	750
	Smoothing choke	440

VALVE READINGS

(V.C. Maximum.)

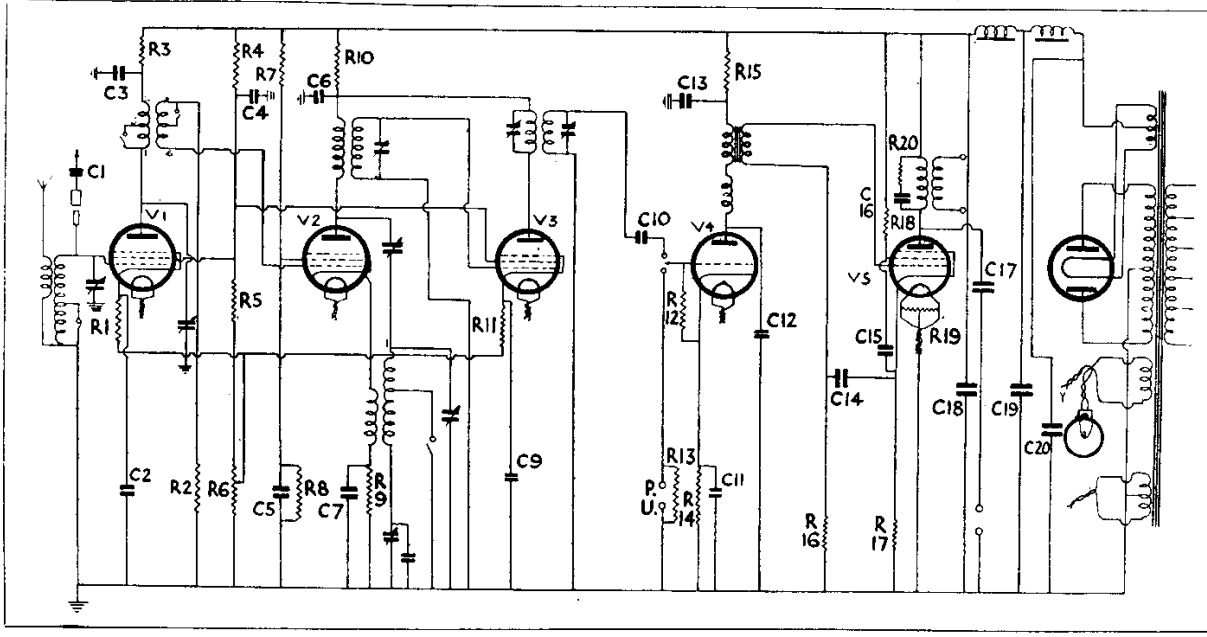
Valve.	Type.	Electrode.	Volts.	M.A.
1	VP4 Met	... anode ...	150	2.9
		aux. grid	90	
2	S.P. 4 Met	... anode ...	170*	3.6
		aux. grid	90	
3	VP4 Met.	... anode ...	185	3.5
		aux. grid	90	
4	354 V...	... anode ...	90	3.4
5	AC/Pen	... anode ...	187	22.5
		aux. grid.	160	4.5

* Connect A. and E. terminals together while making this test, otherwise current reads from 4.5 to 5.5 m.a.

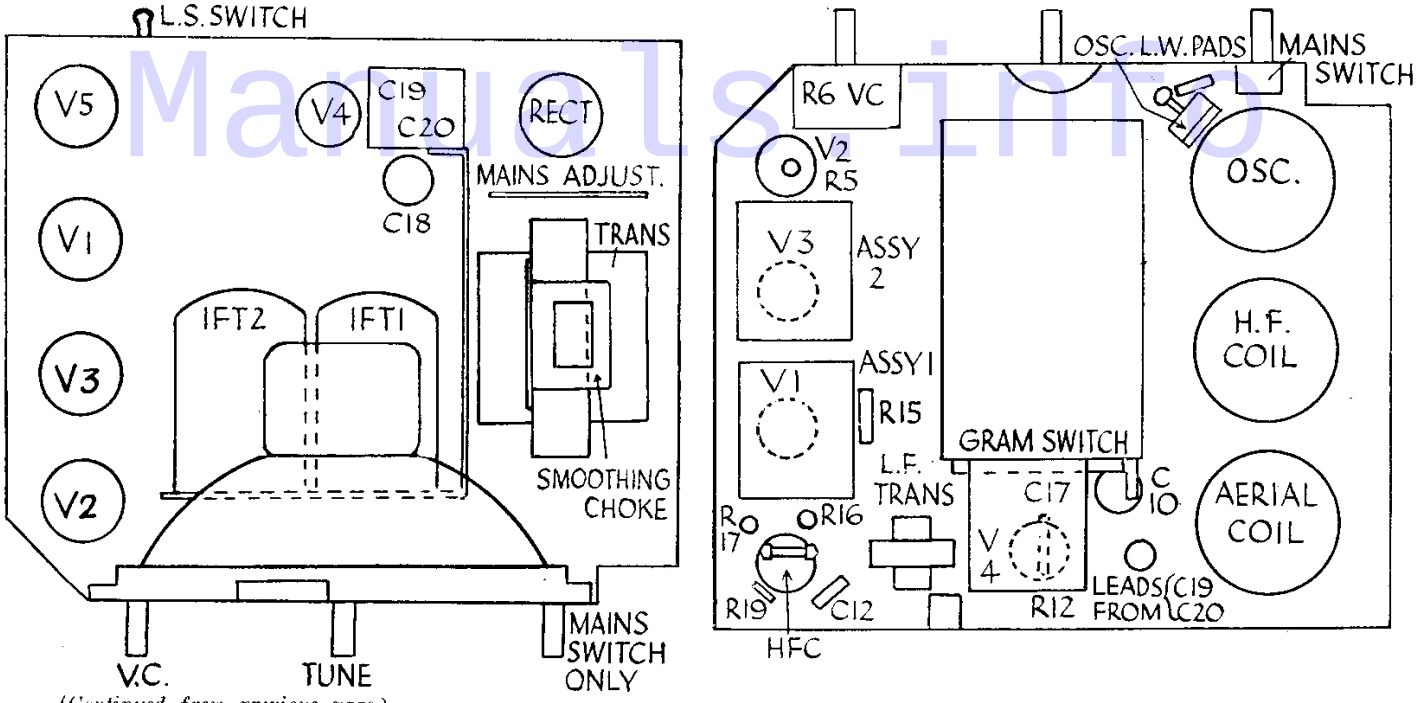
CONDENSERS

C.	Purpose.	Mfd.
1	Mains aerial	.0001
2	V 1 cathode	.1
3	V 1 anode decoupling	1*
4	V 1 aux. grid decoupling ...	1*
5	V 2 cathode	.1
6	V 2 anode decoupling	1*
7	V 2 cathode	.003
8	Fixed tracking on osc.	.001
9	V 3 cathode	.1
10	V 4 grid condenser	.0001
11	V 4 cathode	1*
12	V 4 anode by-pass	.001
13	V 4 anode decoupling	2*
14	V 5 grid decoupling	1*
15	V 5 aux. grid decoupling ...	1*
16	V 5 compensating (across L.S. trans.)	.01
17	Filter to ex. L.S.	1
18	H.T. smoothing	8 el.
19	H.T. smoothing	4
20	H.T. smoothing	8

* In condenser banks.



A VP4 H.F. amplifier precedes the detector-oscillator in the Varley AP 48. Then come an I.F. valve, a triode second detector and an output pentode.



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ing speaker clamps. Slacken the outer screws and release the speaker.

Hold the carrying handle up and slide the chassis out.

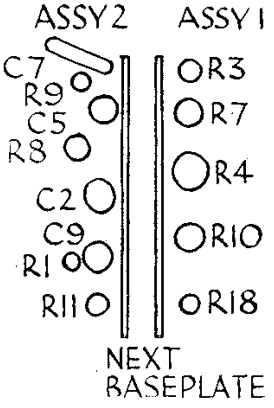
General Notes.—The connections on the two block condensers are given in the special diagram, as are the dispositions of the resistances on the two assemblies underneath the condensers.

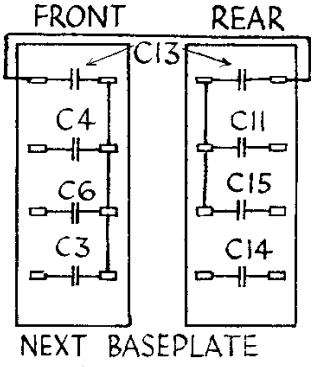
If it is necessary to reach any of the rear valve-holders undo the two screws holding the back panel and ease the latter outwards to the extent of the leads.

Replacing Chassis.—See that the switch lever is in the same relative position as the escutcheon. Hold carrying handle up and slide chassis into cabinet. Replace screws on speaker clamps, rear panel and underneath. Pull mains lead through the wooden block.

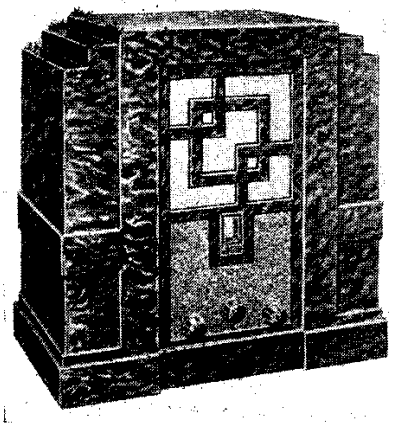
Above are the layouts of the AP48 five-valve plus rectifier receiver by Varley.

On the right are given the details of the two assemblies indicated in the main layout above, and the connections of the block condensers.





ZETAVOX S.T. RECEIVER



In all eight valves are used in the S.T. receiver by Zetavox.

Circuit.—The H.F. valve, VMS4 (V1), is preceded by a tuned secondary aerial transformer. Bias is applied to the grid from the A.V.C. system and from a resistance in the cathode lead. Coupling to the first detector is by tapped tuned anode coil, followed by a second tuned grid coil.

The first detector valve, AC/S2 (V2), operates as a detector mixer with a separate oscillator. Coupling to the I.F. valve is by tuned band-pass I.F. transformer (frequency kc.).

The oscillator valve, MHL4 (V3), operates with a tuned grid, and reaction is applied from a coil directly in the anode lead. The H.T. potential is derived from the screen feed to the other valves.

Another tapped band-pass I.F. transformer couples the I.F. valve VMS4 (V4) to the second detector, the tapping on the primary being used to supply the grid of an extra A.V.C. valve.

The second detector, MSGLA (V5), operates as an anode bend detector, and provision is made for decreasing the bias by short circuiting a portion of the cathode biasing resistance for use on pick-up. Resistance capacity L.F. coupling is employed.

The output valve is an MPT4 (V6).

Mains equipment consists of transformer, full-wave rectifier UU120/350, with the speaker field in the positive H.T. lead with two electrolytic condensers for smoothing.

VALVE READINGS

(V.C. max., no signal. See special notes.)

Valve.	Type	Electrode.	Volts.	M.A.
1	VMS4 (cat) ...	anode ...	155	9.3
		screen ...	80	
2	AC/S2 ...	anode ...	208	.5
		screen ...	80	
3	MHL4 ...	anode ...	80	5.5
4	VMS4 (cat) ...	anode ...	208	9.3
		screen ...	80	
5	MSG/LA ...	anode**	*	.35
		screen ...	0**	
6	MPT4 (cat.)	anode**...	190	34
		aux. grid	180	4.5

* Anode bend detector, voltages are misleading. Test by current.

** See special notes, these readings are taken to chassis.

For the correct valve readings add 80 volts to each.

Special Notes.—In some models the cathodes of V1 and V4 are connected directly to chassis and the V6 auxiliary grid condenser (C19) is returned to cathode instead of H.T.—. In addition, the grid decoupling condenser (C18) may be connected across the bias resistor (R17) in the conventional manner. A .01 mfd. condenser may be connected as a tone compensator on V6.

Though the speaker field is in the positive H.T. lead, the chassis is not at H.T.— potential as the current for the first four valves passes through R19 and R20, and the voltage drop across these is registered between the cases of the electrolytic condensers (—) and chassis (+).

There are two negative A.C. sections in the set—(1) for V1, V2, V3 and V4, and (2) V5, V6 and V7. As the latter have a separate filament winding to which the cathode returns are suitably connected (H.T.—), the difference in potential between H.T.— and chassis allows the screening grid of V5 to be connected to chassis, *i.e.*, at 85 volts positive

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