

CLIMAX T.C. III MAINS RECEIVER (Cont.)

cable from cleat in top of cabinet. Hold knobs firmly while removing octagonal headed screws, then pull them off.

Remove four screws underneath (two under felt supports) and lifting slightly to right to allow electrolytic condensers to clear, lift chassis out.

To remove speaker (when necessary) undo the four outside wood screws on the baffle.

General Notes.—Switch contacts are of the wiping type. To clean them turn the rotating contacts outwards.

Connections on mains transformer (counting from front in each case):—

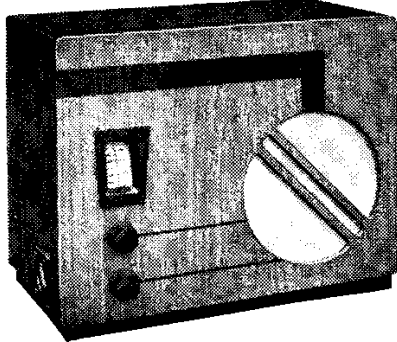
Next base plate (1) and (2) rectifier filaments.

Second row:—(1) 240 volt. mains tapping; (2) 230 volt tap; (3) 220 volt tap; (4) 210 volt tap; (5) 200 volt tap; (6) mains 0 to switch.

Third row: (1) and (3) rectifier anodes; (2) C.T. (H.T. -).

Outer row:—(1) and (2) set filaments. The trimmers are mounted on the sides of the tuning condensers but can be reached by inserting a thin insulated screwdriver beside the electrolytic condensers.

Replacing Chassis.—Lay chassis inside cabinet and insert holding screws. Before tightening them fit the control knobs and make sure that they are not rubbing against the cabinet before tightening the holding screws. Clip the speaker cable as it will foul the condenser rotors.



Notes on the 1933 model of this receiver, the 333, are also given in this review. On the right are the circuit and layouts.

Circuit.—The H.F. valve, VS24 (V1) is preceded by a band pass filter with capacitive coupling. As usual, the aerial coil is suitable for "rejectostatic" reception or with ordinary connections.

Coupling to the next valve is by tuned secondary H.F. transformer. The variable mu characteristic is used for controlling volume by a potentiometer across the G.B. battery.

A screen-grid detector valve, S23 (V2) operates on the leaky grid principle, with low values of condenser and leak. Reaction is applied to the grid coil, and coupling to the output valve is by "straight" transformer.

The output valve, P.T.2 (V3), a pentode, has a stabilising resistance in the grid lead, and optional tone control is provided by a condenser between the anode and chassis. A permanent magnet M.C. speaker is used.

Special Notes.—Differences between the 1933 (333) model and the 1934 model (333A):—

In the 333 the small components were mounted on a panel at the side of the chassis.

An H.F. choke was included in the detector (V2) anode circuit, but is omitted in the 333A.

A resistance of 50,000 ohms was connected in series with a .01 mfd. condenser between the high (A.C.) potential end of the L.F. transformer primary and chassis. In the early models of the 333A the resistance R3 is, instead, connected across the primary terminals of the transformer and is of 100,000 ohms. This improves quality and is recommended for inclusion when servicing 333s.

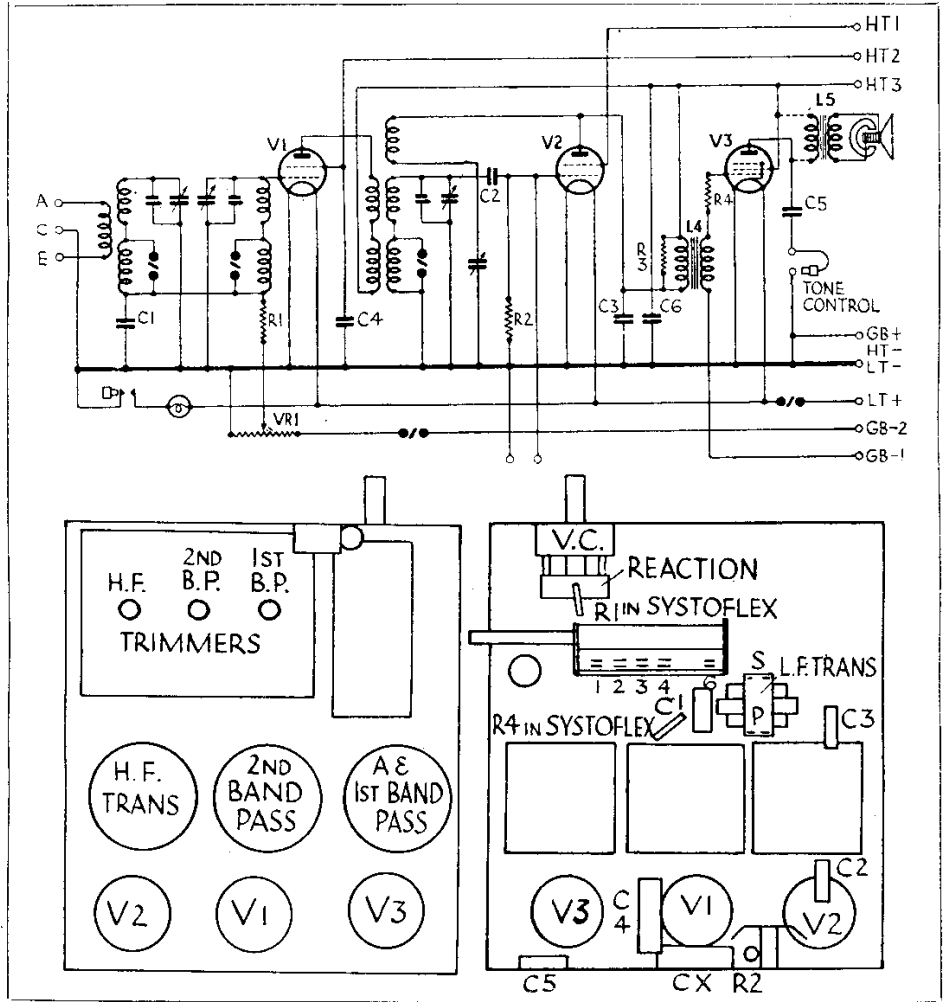
In late models of the 333A this resistance is omitted, but an additional refinement is included. The L.T.+ lead from the switch is connected to the pentode (V3) filament, from which it passes to an extra winding on the L.F. transformer (resistance only .13 ohm) to the L.T.+ sockets of V1 and V2. The flow of current through the winding is in the opposite direction to that of the V2 anode current in the primary and prevents the lowering of the primary inductance.

As H.F. impulses are present in the L.T. leads, a condenser CX of .1 mfd. is connected directly between the L.T.+ of the H.F. valve and negative filament. This prevents H.F. being transferred to the compensating winding.

Removing Chassis.—Remove batteries and valves, undo two bolts holding battery platform, and pull off knobs and switch control (at side).

Remove three screws underneath cabinet.

K.-B. 333A BATTERY SET



Slide battery compartment half out and undo cleat holding cable. Unsolder leads from speaker and lift chassis out.

To remove speaker, when necessary, undo four wood screws holding baffle to front.

General Notes.—Owing to the transformer winding being interposed in the L.T.+ lead to the detector and H.F. valves and the precaution of taking a separate negative lead (Continued in col. 1, page 72.)

VALVE READINGS

Battery connections:—HT— and GB+, black. HT+1 (light blue), 60v.; HT+2 (brown), 72 v.; HT+3 (royal blue), 120 v.; GB—1 (green), —4.5 v.; GB—2 (yellow), in—6 or —9 v.

Valve	Type	V.C. Max	Electrode	Volts.	M.A.
1	VS24	...	anode	120	.4
			screen	99	
2	S 23	...	anode	115	2
			screen	60	
3	PT 2	...	anode	115	3.2
			aux. grid	120	.8

Alternative valves:—
V 1, PM12 M.
V 2, PM 12A, 215SG, 5B1.
V 3, PM 22A, 220 HPT, Pen. 220, Pen. B1.

CONDENSERS

C.	Purpose.	Mfd.
1	Band pass coupling	.02
2	Detector grid	.0001
3	Detector anode by-pass	.0002
4	V1 screen	.1
5	Pentode compensation anode V3	.005
6	Across HT	2 (el.)
CX	By-passing HF from compensating winding	.1

RESISTANCES

R.	Purpose.	Ohms.
1	Across C1 to bias V1	500,000
2	V2 grid leak	500,000
3	Across P of L.F. transformer*	100,000
4	Stabiliser in grid of V3	250,000
VR1	Volume control (across G.B.)	10,000
—	Intervalve transformer:—	
	Primary	1,400
	Secondary	6,400
—	Output transformer:—	
	Primary—Goodman	900
	Rola	780

* See special notes.

VARLEY SUPERHET "FIVE"

Circuit.—The H.F. valve, VP4 met (V1), follows a single tuned aerial circuit, and an I.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.

Main 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*.

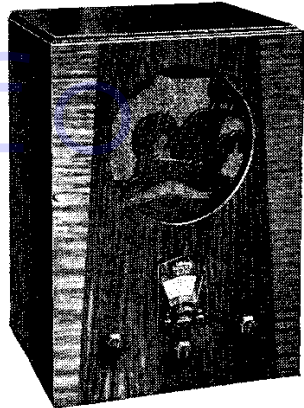
Quick Tests.—Between terminals on output transformer and chassis (looking from rear and counting from left):—

- (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 "
 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.)



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

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 ma.

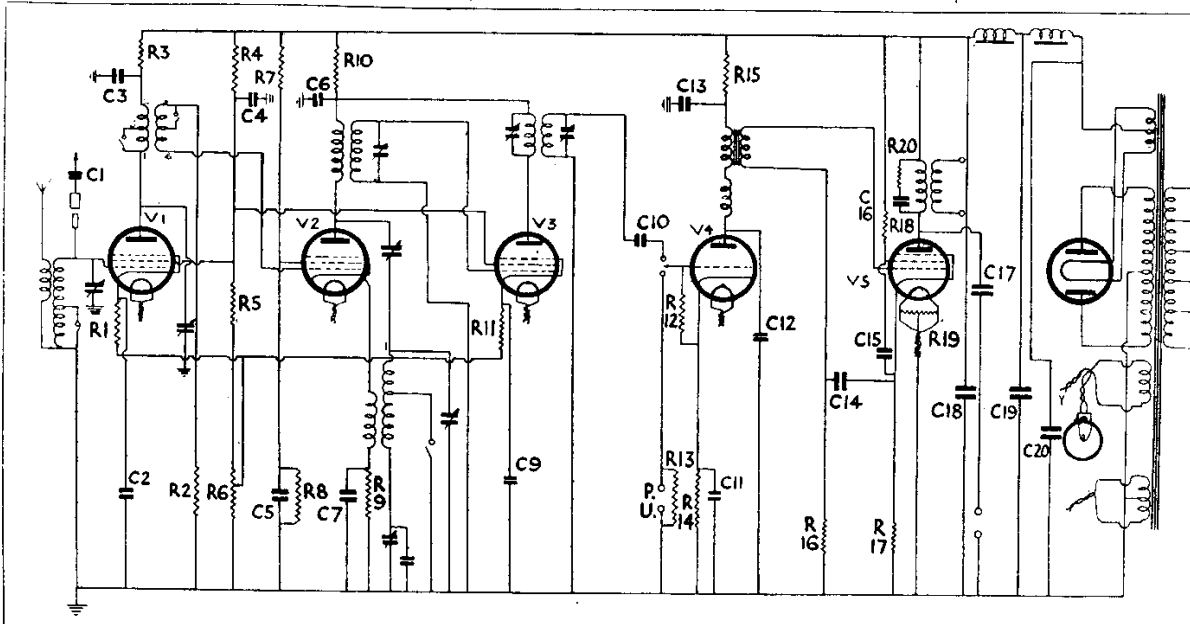
RESISTANCES

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 L.S. field	5,000
	Output transformer primary	750
	Smoothing choke	440

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 cl.
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.