

PYE "CAMBRIDGE" A.C. SUPERHET (Cont.)

tains its bias from a potentiometer, R20, and R21 across the speaker field and a resistance R22 in the negative H.T. lead. A variable condenser, C35, connected between the grid and chassis acts as a tone control.

The output circuit is conventional, except that the jack for the external speaker can operate a switch to cut out the internal speaker, making its use optional.

Mains equipment, as usual, consists of transformer, metal rectifier on voltage doubler principle, and electrolytic condensers.

Special Notes.—The tuning indicator consists of a meter movement in series with the H.T. lead to the two controlled valves V1 and V3.

The amplified delayed A.V.C. is obtained by the delay bias from R22 and from the change in voltage drop across R15 and R16 in parallel. The cathode is connected through these and the bias resistor, R14, to negative of the H.T. supply.

Quick Tests.—Between end (+) plate of rectifier and chassis (earth socket or rivet) 280 volts (H.T. smoothed).

The output transformer is not accessible in this set, and so valve tests should be used.

The local-distance switch at the back operates by connecting R1 and C4 across the aerial coil.

Removing Chassis.—Remove ten wood screws round the top panel and pull off the knobs.

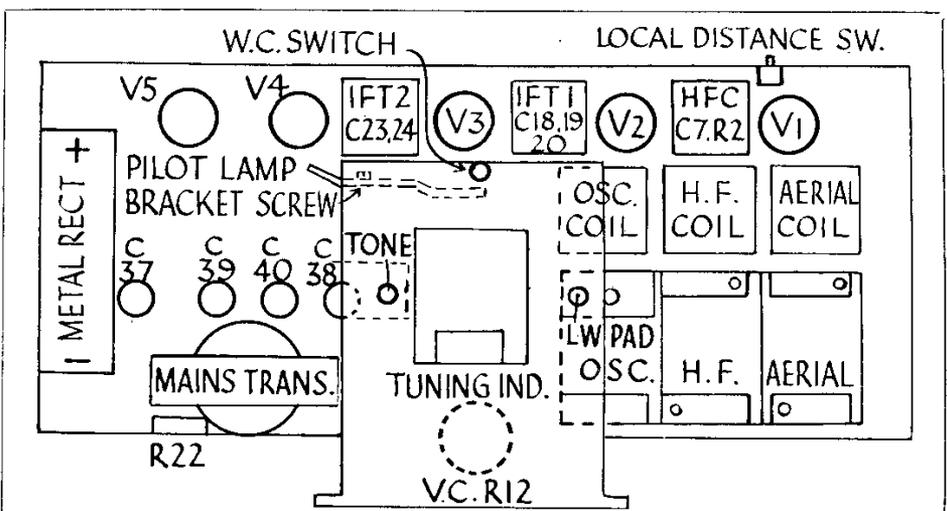
Removing the inside top panel is rather tricky, as the lid stops must be freed from the springs inside. One very easy method appears to be to face the back of the set and force the left-hand spring apart with the right hand while easing the stop upwards with the left hand (on the upper side), in which position the rear part of the spring will engage against the end of the "stop" lever.

Holding the lid steady, open the spring on the right side, and the stop levers will come clear of the springs. Alternatively, wood blocks can be used to keep the springs apart.

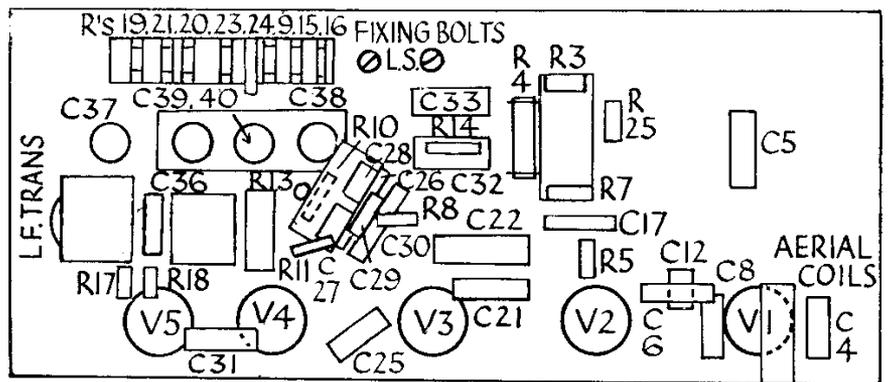
After removing the panel, undo the cleats holding the various leads to the cabinet, remove the extra speaker panel and the mains switch. Slacken, but do not remove, the two long screws fixing the speaker (these can be reached through the holes in the bottom of the cabinet), and ease the speaker away from the baffle.

Standing the set with alternate corners projecting over the bench, remove the four nuts underneath. Remove the two screws holding the front of the chassis to the cabinet, taking care of the rubber washers.

The chassis can then be manoeuvred out of the cabinet by raising the rectifier end in advance of the other.



The positions of the escutcheon and the various controls are indicated in this plan of the "Cambridge" chassis.



Most of the larger components are situated on top of the chassis, and consequently the resistances and components underneath are accessibly spaced.

General Notes.—Despite its complicated appearance this set is remarkably simple.

The wiring is coded as follows:—Aerial, white; H.T. + and screen, red; A.V.C. circuit, black with red tracer; heaters, black; mains, A.C. H.T., red with yellow tracer.

Valve circuit code:—V1, grid, violet; V2, grid, blue; anode, blue with yellow tracer; V3, grid, green; V4, anode, pink with yellow tracer; diode anodes, yellow; V5, grid, brown; anode, brown with yellow tracer.

The tuning indicator is shunted by the resistance, R24, which is, adapted to the resistance of the particular meter movement. In our model the value was 2,600 ohms to give the requisite deflection.

Replacing Chassis.—Lower H.F. end of chassis first, and let holding bolts fall into holes. Replace nuts underneath. Clip the leads under the cleats and replace the speaker and switch panels.

Replace the two screws with metal centring pieces on the front of the chassis above the speaker. Slide the speaker forward and, keeping it pressed against the baffle, tighten the holding screws underneath. Replace the top panel and ten wood screws.

To engage the lid stops lift the lid up and arrange the pulley wheels on the springs so that the curved under side of the stops are resting in the tops of the grooves. A gentle pressure on the lid will open the springs and allow the lid to close.

PHILIPS MODEL 834 C FOUR-STAGE RECEIVER FOR D.C. MAINS

Circuit.—The first H.F. valve, SP20 (V1), is preceded by a single tuned aerial circuit with a coil identical with those in other Superinductance models. Bias is limited by a fixed cathode resistance and is varied by a potentiometer forming part of a screen feed potential divider.

Coupling to the next valve is by a tuned secondary coil of similar dimension to the aerial coil.

The second H.F. valve, SP20 (V2), is used with fixed bias. The grid lead is taken from a tapping on the coil and a grid stabiliser is included immediately in the grid lead. Coupling to the detector is by another H.F. transformer with a semi aperiodic secondary. Next, an H20 (V3) operates as an anode

bend detector. The leads to the pick-up terminals include blocking condensers.

The L.F. coupling is by resistance capacity filter and the anode circuit is properly decoupled.

Two Pen. 20 output valves are connected in parallel in both grid, cathode and anode circuits though the filaments are in series.

CALIBRATION SCHEME.

Subscribers may have their oscillators and own standard components calibrated at THE BROADCASTER laboratory. The charges are the lowest possible. Write for details.

Bias is obtained by resistance in the common cathode lead.

To protect the leads to the extra speaker the feed is taken through two D.C. blocking condensers. The speaker is the usual permanent magnet type.

D.C. mains equipment consists of a barretter lamp in the positive lead and a smoothing choke with reservoir condensers.

Special Notes.—The chassis is at mains negative potential though the speaker is at earth. C31 is the condenser connecting the two potentials.

The valves are of the 20-volt, .18 amp. type, and the current is limited by means of

(Continued on next page.)

PHILIPS FOUR-STAGE D.C. SET (Cont.)

a barretter. The types necessary for different voltages are:—

- 200-250-volt, type 1928.
- 150-volt, " 1927.
- 110-volt, " 1926.

As the total voltage taken by the valves is 100 volts a special shorting plug, type

RESISTANCES		
R.	Purpose.	Ohms.
1	Part of screen ptr.	50,000
2	Variable screen ptr. (V.C.)...	6,200
3	Part of screen ptr.	16,000
4	Part of screen ptr.	16,000
5	Part of screen ptr.	16,000
6	V 3 anode decoupling	32,000
7	V 1 anode decoupling	1,000
8	V 1 cathode bias	2,000
9	V 2 cathode bias	800
10	V 3 cathode bias	10,000
11	V 5 grid H.F. stopper ....	.32 meg.
12	V 3 anode L.F. coupling ....	.32 meg.
13	V 4 and V 5 grid leak ....	.6 meg.
14	HF stopper in common grid lead, V 4 and V 5 ....	.2 meg.
15	V 4 grid HF stopper ....	.32 meg.
16	V 4 and V 5 cathode bias	320
17	Across P.U. leads ....	.2 meg.
18	Across secondary of 2nd HF trans.	40,000
19	Across LW winding of 1st HF trans. ....	.4 meg.
20	V 2 grid stabiliser	50

4198, is required for use on 100-volt mains, but if mains fluctuation is likely to cause an appreciable rise the type 1926 lamp should be used.

Special Precaution.—As the speaker and its brackets are at earth potential and the chassis, including the screening cap on V2, are at mains negative, care must be

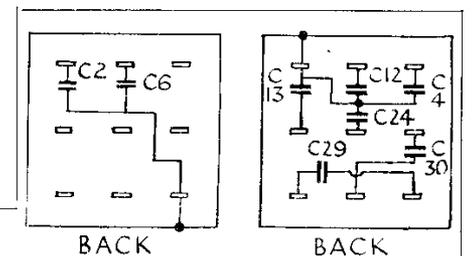
CONDENSERS		
C.	Purpose.	Mfd.
1	HF by-pass across mains ....	.1
2	HT smoothing	2
3	V 1 aux. grid ....	.1
4	V 2 aux. grid ....	.25
5	V 3 anode decoupling ....	.1
6	Across filaments	2
7	V 1 anode decoupling ....	.1
8	V 4 and V 5 tone compensating ....	.005
9	V 1 cathode ....	.1
10	HF by-pass from V1 filament wires ....	.02
11	V 2 cathode ....	.25
12	V 3 cathode ....	.25
13	V 4 and V 5 common cathode	50 el.
14	V 4 and V 5 common cathode ....	.02
15	Between A 2 and chassis ....	.0002
16	Series Aerial... ..	.00002
17	Series with P.U. ....	.5
24	V 3 anode by-pass... ..	.0004
25	L.F. coupling V 3 to V 4 ....	.0064
26	HF by-pass V 4 and V 5 grids ....	.00005
27	Feed to extra LS ....	.2
28	Linking mains negative to earth... ..	.1
29	V 3 cathode, parallel to C13 ....	.5

taken not to cause a short circuit between the chassis and speaker in the case of mains with the positive side earthed. Insulating strips are provided on the brackets to prevent possible damage.

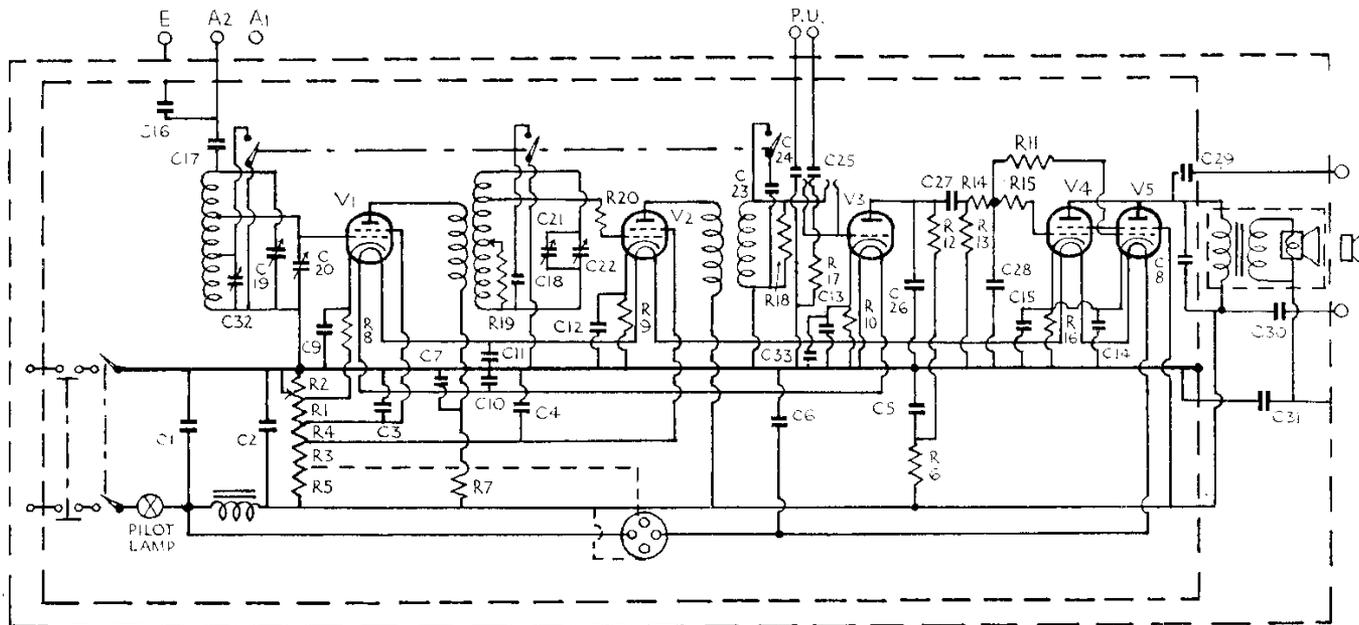
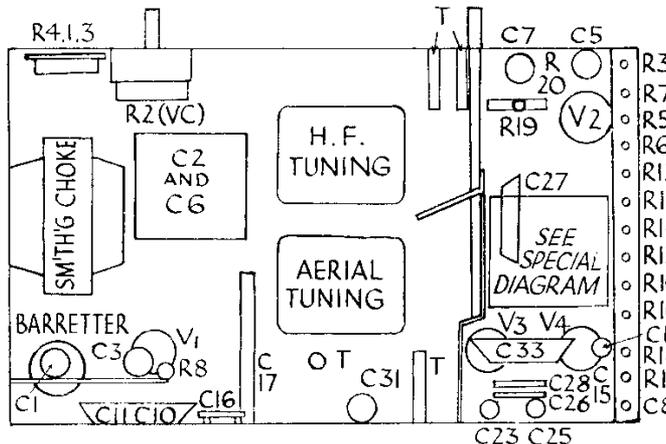
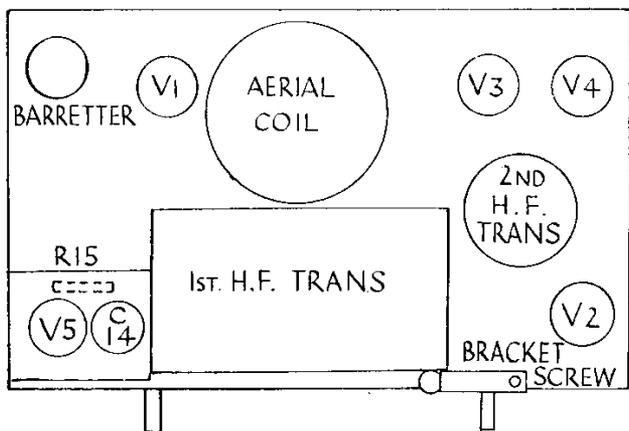
To change the pilot lamp, switch off the mains, remove V2 and take out lamp bracket by undoing screw in front of valve holder.

The valve filaments are in series in the following (Continued on opposite page.)

VALVE READINGS				
(For 200 and 250 volt mains.)				
Volume control maximum.				
Valve.	Type.	Electrode.	Volts.	M.A.
1	SP20	anode	(200) (250)	.75-1
		aux. grid	175-210	
			72-88	
2	SP20	anode	175-210	2-2.5
		aux. grid	94-115	
3	H20	anode	165-200	1.7-2.1
4 & 5	Pen20	anodes	150-180	15-19
		aux. grids	165-200	



The two small diagrams on the right give the details of the condenser block indicated in the "below-deck" layout given underneath them. The use of parallel output valves will be noted in the circuit.



PHILIPS FOUR-STAGE D.C. SET (Cont.)

lowing order from the barretter lamp: V5, V4, V2, V1, V3.

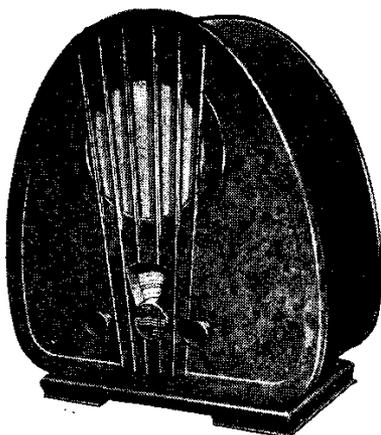
Removing any valve will break the L.T. circuit.

Quick Tests.—Owing to the fact that this is a D.C. mains receiver there are no easily accessible points for voltage measurement. To test the filament circuit for continuity remove V3 (the detector, HL20) and switch on. Approximately the full mains voltage should be recorded between the rear filament socket and chassis when the filaments of all the other valves are intact.

Practically the same voltage should exist between the anode socket and chassis when the H.T. circuit is in order.

Removing Chassis.—Remove the insulating compound from the grub screw holes in the control knobs and, after slacking the screws, remove the knobs. Remove four screws underneath—also covered by insulating compound.

Disconnect earth wire from speaker, un-



The Philips 834C is a "straight" four-stage receiver designed to operate on D.C. mains of even as low a voltage as 100. Parallel output valves ensure adequate volume.

solder L.S. leads from transformer and lift chassis out

General Notes.—In handling this receiver take care that an accidental short circuit is not caused by the bare connecting wires being pressed together.

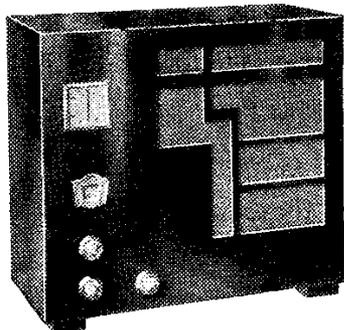
If volume control trouble develops the simpler method of replacing it is to remove the element alone. Unsolder the leads to the ends and undo the screws, taking care that the nuts are not lost (the compartments behind are shaped to take the nuts).

After working with the receiver it is advisable to check the resistance readings between the mains leads before connecting to the mains.

With all valves in position, 250 ohms. With all valves in position, but without barretter, 100,000 ohms.

Replacing Chassis.—Lay chassis inside cabinet and replace earthing plate between rubber buffer and left rear corner of chassis with the convex side downwards so as to make contact with the screen on the bottom.

Reconnect speaker leads and earthing wire. Replace fixing bolts and knobs and see that insulating compound covers exposed metal parts.



The "Raven" detector and 2 L.F. battery receiver produced by Aerodyne Radio, Ltd., is both simple and straightforward. It forms a useful service guide to the many similar receivers that are in use.

AERODYNE "RAVEN"

Circuit.—The leaky-grid detector PM1HL met (V1) is preceded by a tuned secondary aerial transformer. Selectivity is obtained by optional series aerial condensers C1 and C2.

To increase sensitivity, the grid leak is connected to a potentiometer R3 and R4 across the filament circuit. Straight transformer coupling with anode decoupling (R2, C7) is used.

The L.F. valve, PM1LF (V2), is followed by a second L.F. transformer.

The output valve, PM2A (V3), is compensated for top-note accentuation in the speaker by a condenser, C8, between the grid and earth.

The speaker is a moving-iron type.

Special Notes.—H.T. —, G.B. +, and L.T. — are broken by the switch.

The series aerial condenser C2 is inside systoflex mounted on the A2 terminal.

Removing Chassis.—Pull off the knobs, remove three screws underneath (one is under a felt), and lift chassis out.

General Notes.—The beginner to service can easily trace this simple circuit. The small condensers and resistances are supported in

the wiring, and the L.F. transformers are bolted to the chassis, though the remainder of the components are riveted.

The transformers are a special low ratio type, T1 being 1.5 : 1 (brown), and T2, 2 : 1 (black). Their respective resistances are given in the table.

Replacing Chassis.—Lay chassis inside cabinet, replace three holding screws and the control knobs.

VALVE READINGS

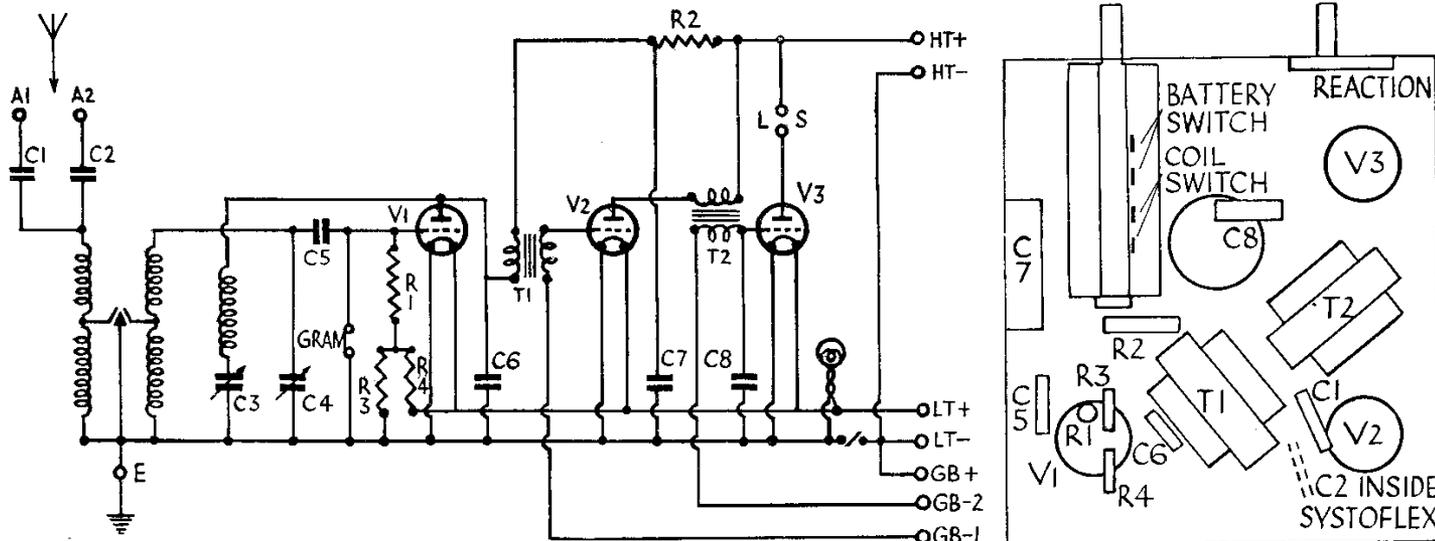
No signal. No reaction.

Valve.	Type.	Electrode.	Volts.	M.A.
1	PM1HL...	anode	80	2
2	PM1LF ...	anode	120*	4.1
3	PM2A ...	anode	118*	4

* With a new H.T. battery.

COMPONENT VALUES

	Purpose.	Value.
R1	V1 grid leak ...	1 meg.
R2	V1 anode decoupling ...	20,000ohms
R3	Ptr. across L.T. ...	1 meg.
R4	Ptr. across L.T. ...	2 meg.
C1	Aerial series ...	.0005 mfd.
C2	Aerial series ...	.0001 mfd.
C5	V1 grid ...	.0003 mfd.
C6	V1 anode by-pass ...	.0001 mfd.
C7	V1 anode decoupling ...	1 mfd.
C8	Across V3 grid ...	.001 mfd.
—	T1 primary resistance (DC)	1,100 ohms
—	T1 secondary resistance	1,500 ohms
—	T2 primary resistance ...	1,100 ohms
—	T2 secondary resistance ...	2,000 ohms
—	L.S. resistance ...	2,750 ohms



To increase the sensitivity of the detector the grid leak is taken to a potentiometer across the L.T. supply. On the right is the under-chassis layout of the "Raven."