

# PHILCO 237 SUPERHET

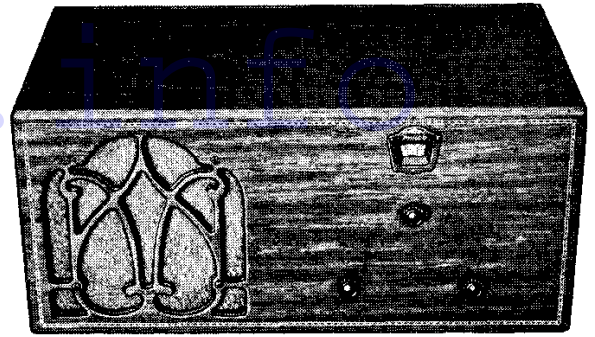
**Circuit.**—The first detector oscillator, type "15" (V1), is an H.F. pentode, and is preceded by a bandpass aerial circuit. Volume is controlled by means of a potentiometer between aerial and earth, ganged with a potentiometer controlling the bias of the I.F. valve. As this is an indirectly heated two-volt valve, oscillations are maintained by coupling with a winding directly in the cathode lead. The anode of this valve is coupled to the I.F. by a tuned secondary I.F. transformer (frequency 125 kc.).

The I.F. valve, "32" (V2) obtains its bias from a potentiometer across the G.B. battery (V.C.), and is coupled to the second detector by a bandpass I.F. transformer.

A screen-grid valve forms the second detector, "32" (V3), and operates on the anode bend principle. The anode is decoupled

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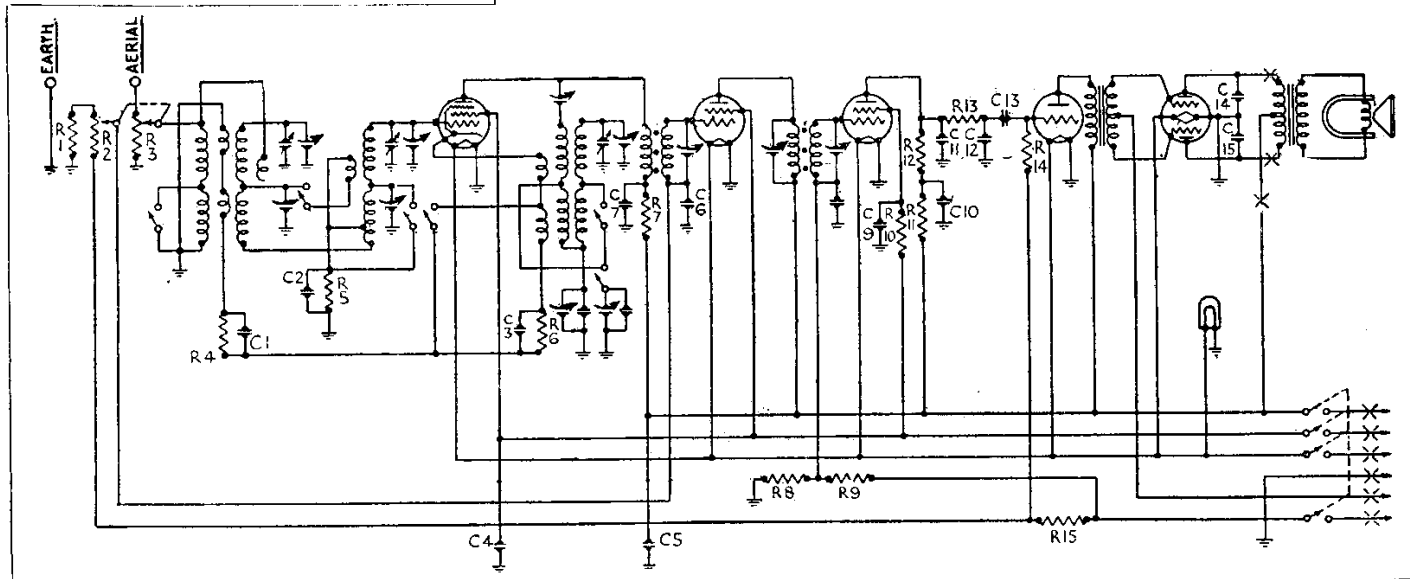
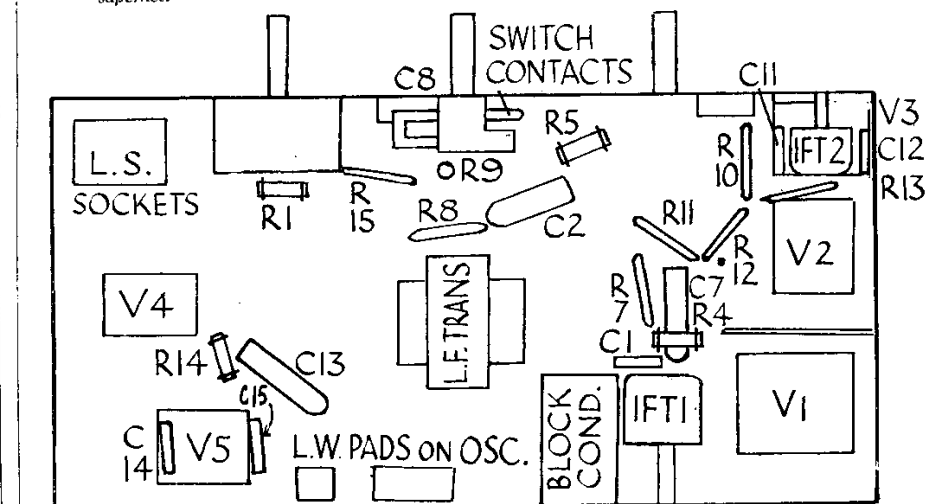
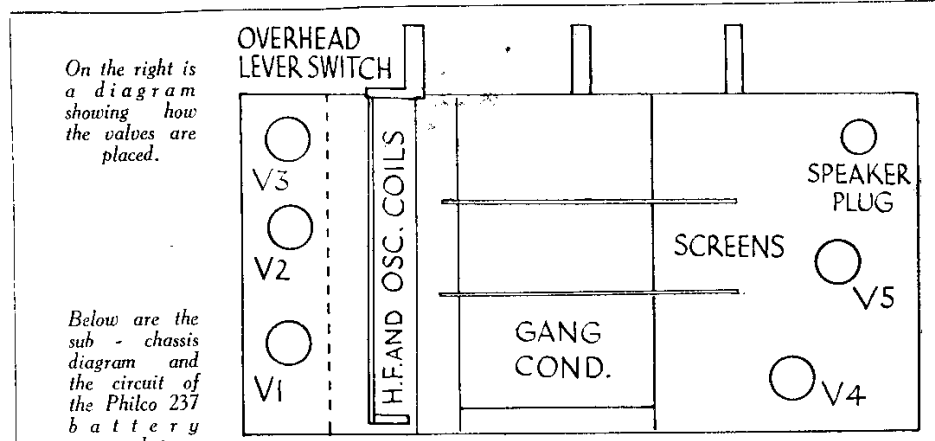
The 237 receiver was the first battery set introduced by Philco in this country—and one of the first Class B instruments on the market.



RESISTANCES		
R.	Purpose.	Ohms.
1	Part of bias ptr. ....	2,900
2	Variable part of bias ptr. (Vc) ...	5,000
3	Ptr. across A and E (Vc) ...	5,000
4	Part of suppression circuit ...	3,300
5	Part of band pass coupling ...	1 meg.
6	V1 cathode bias ...	5,000
7	V1 anode decoupling ...	1,000
8	Part of bias ptr. to V3 ...	51,000
9	Part of bias ptr. to V3 ...	25,000
10	V3 screen decoupling ...	99,000
11	V3 anode decoupling ...	99,000
12	L.F. coupling V3, V4 ...	240,000
13	H.F. stopper anode V3 ...	99,000
14	V4 grid leak ...	490,000
15	Part of bias ptr. ...	1,000

CONDENSERS		
C.	Purpose.	Mfd.
1	Part of suppression circuit ...	.0007
2	Band pass coupling ...	.45
3	V1 cathode ...	.006
4	Decoupling screening grids from H.T.*	.1
5	Decoupling V1 and V2 anodes from H.T.*	.15
6	Decoupling bias to V2* ...	.25
7	Decoupling V1 anode from V2 ...	.5
8	Decoupling V3 grid ...	.05
9	Decoupling V3 screen* ...	.5
10	Decoupling V3 anode* ...	.5
11	H.F. by-pass anode V3 ...	.00025
12	H.F. by-pass anode V3 ...	.00025
13	L.F. coupling V3 to V4 ...	.01
14	Tone compensation anode V5 ...	.001
15	Tone compensation anode V5 ...	.001

\* In block.



### PHILCO 237 BATTERY SUPERHET (Cont.)

from the H.T. and its resistance capacity coupled to the first L.F. valve. The circuit contains an H.F. stopper, with the necessary by-pass condensers.

The L.F. valve, "30" (V4), is coupled by a Class B driver transformer to the output valve. This is a Class B "19," working with bias. Tone compensation is obtained by a small condenser between each anode and H.T. +.

A large permanent magnet speaker is employed.

**Special Notes.**—In earlier models the chassis has to be removed to allow the valve screen to be unscrewed, but in later types the side of the cabinet can be opened to facilitate changing valves.

The battery leads have tags with the required voltages, but in case these are missing, the braids are coded:—

- White with black tracer L.T. +.
- Black with white tracer L.T. -.

Yellow with black tracer H.T. + 67½ v.  
 Yellow, H.T. + 126v.  
 Blue, -3v. G.B.  
 Green, -9v. G.B.

**Quick Tests.**—Raise the "30" valve slightly in its socket and with a test prod on the H.T.+ lead of the voltmeter touch the inner rear valve leg (anode). The voltage should be practically full H.T.

Touching the outer rear leg (grid) should produce a loud pop in the speaker if the L.F. section is operating.

Touching the stator vanes of the rear tuning condenser (aerial tuner) should produce a loud click if the set is correct.

#### VALVE READINGS

Valve.	Type.	Electrode.	Volts.
1	...	15 anode	120
2	...	32 aux. grid	70
3	...	32 anode	120
		screen	70
		anode	50
4	...	30 anode	110
5	...	19 each anode	120

**Removing Chassis.**—To reach valves, it is advisable to remove the chassis by first removing the back board, pulling off the knobs, and removing the three holding screws underneath. The inclusion of long leads with the screen removed makes the H.F. side unstable.

**General Notes.**—C3 and R6 are mounted in the oscillator coil container.

Leads to the L.S. are green and white, H.T. +; green, anode; white, anode.

The valves have American bases, and the terminals are as follows (looking from underneath the valve-holder and counting clockwise from the two filament pins, which are the large ones together):—

- "15," anode, screen, cathode, grid at top.
- "32," anode, screen, grid at top.
- "30," anode, grid.
- "19," anode, grid; anode, grid (paired in this order).

**Replacing Chassis.**—Lay chassis into cabinet, and replace three holding screws and knobs. Replace back strut after fixing batteries and aerial and earth leads.

## MURPHY A4 SUPERHET

**Circuit.**—A combined first detector-oscillator, an A.C./Pen. (V1), is preceded by a band-pass aerial tuner. Reaction is brought about by coupling between the anode and the auxiliary grid. Bias is obtained from a potentiometer across the L.S. field in the negative H.T. lead. V1 is coupled to the L.F. valve by a band-pass L.F. transformer (frequency 120 K.C.).

The L.F. valve, AC/SG/VM (V2), is a variable-mu type, and volume control is by a variable resistance, R7, in the cathode lead. The aerial is connected to the other end of the potentiometer so that the aerial coil is "damped" as the bias on the L.F. valve is increased. This valve is coupled to the next by a second band-pass L.F. transformer.

The second detector valve, AC/HL (V3), is used as an anode-bend detector. The anode circuit is decoupled and its resistance capacity coupled to the grid of the output valve.

The output valve is another AC/Pen (V4). In the grid circuit is a stabilising resistance R12, used in conjunction with R11 and C25 as an H.F. stopper. The grid leak R10 is of very low value (150,000 ohms).

Tone compensation, included in the anode circuit, consists of (1) a fixed condenser, and (2) a fixed condenser and a resistance in series, between the anode and earth.

A full-wave rectifier, a Philips 1807, is utilised, and smoothing is provided by a choke and the L.S. field in the negative H.T. lead. This is used in conjunction with 8, 4 and J mfd. electrolytic condensers. The choke is tuned by C31 to form a 100 cycle trap.

**Special Notes.**—The condenser C7 consists of two wires held together by systoflex.

All the biasing potentials are obtained from four resistances in series across the L.S. field. The bias lead for "gram." is actually taken to one side of the jack.

A special diagram of the condenser unit is given.

**Quick Tests.**—Voltage between containers of C28 (-) and C30 (+) 120 volts.

This represents voltage drop across choke and field coil with bias potentiometer (C28 is insulated from chassis).

**Removing Chassis.**—Remove knobs by holding them firmly and unscrewing the nipple nuts. Remove three screws from underneath, pull out the L.S. field plugs and the L.S. plugs and lift out the chassis.

When the repair is finished and it is necessary to test components with the field and speech coil connected, release the leads from the clips and stand the chassis on the output transformer end.

To remove the speaker, lay the cabinet on

its face, and remove the four round-headed screws on the oval plates.

**General Notes.**—The resistance and condenser unit is the W907 assembly, and whenever a component is defective the complete unit may be replaced.

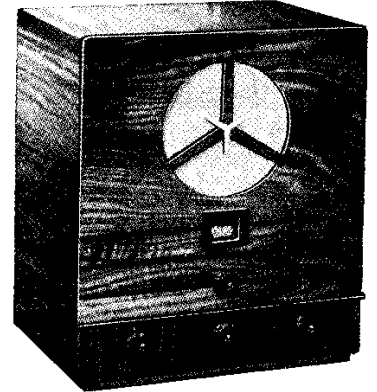
As a temporary measure an external resistance of the same rating or a condenser of the same capacity and working voltage may be used. It will, however, be necessary to check the remaining components particularly the resistances, as an open circuit or great increase in value of R14, 15, 16 or 17 might result in zero bias being applied to the valves.

The important sockets and terminals on the components are labelled so that there should be no confusion.

#### VALVE READINGS

V.C. max. no signal.

Valve.	Type.	Electrode.	Volts.	M.A.
1	AC/Pen	anode	100	1.5 to 2
		aux. grid	40	—
2	AC/SG/VM	anode	200	7 to 8
		screen	80	—
3	AC/HL	anode	140	.2
4	AC/Pen	anode	190	.30
		aux. grid	210	5.5



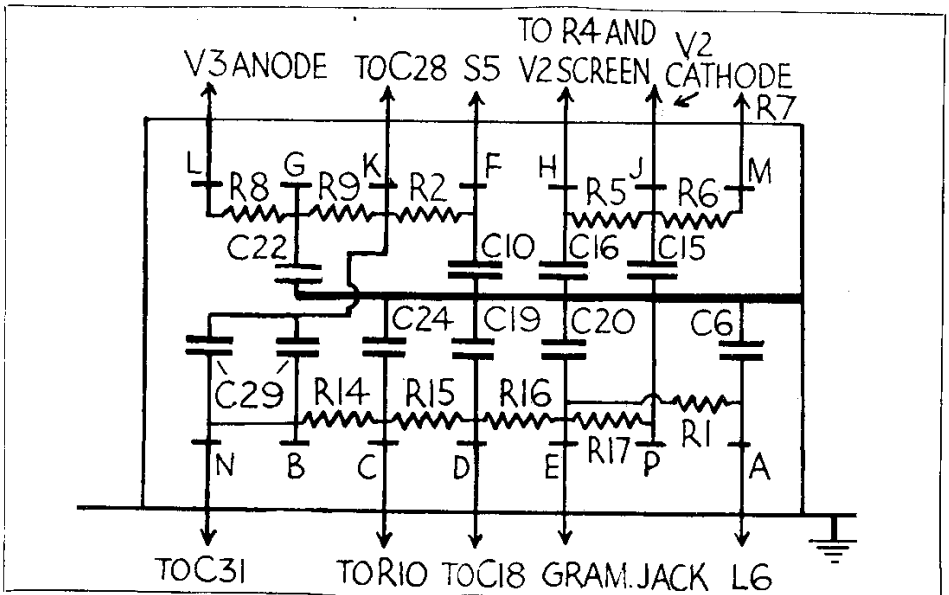
The A4 four-valve plus rectifier mains super-heterodyne by Murphy Radio Ltd.

The + field lead is the inner one which is at chassis potential.

Between the rectifying valve and the detector (V3) is a small insulating strip supporting several components. These are:—

On rectifier side, C25 and R10, R11 and R12. On V3 side, C21 (next base), and C23 (tubular).

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The connections of the condenser block in the Murphy A4 receiver. The letters are those actually on the unit.