

# SERVICE ENGINEER

## PHILIPS MODEL 940A TWO VALVE A.C. SET

**CIRCUIT.**—A two-valve A.C. receiver for use on medium and long wavelengths.

The input to V1, an H.F. pentode used as a detector, is through a variable series aerial condenser acting as a sensitivity control and a tuned aerial coil. Reaction is applied by varying the coupling between the aerial and reaction coils.

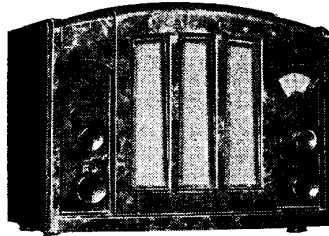
The output of V1 is passed to V2, the output pentode, which is directly heated, through a choke and capacity stage and, after amplification, to the speaker through a matching transformer.

Mains equipment consists of transformer, full wave rectifier, and a resistance smoothing system, consisting of two very large condensers (32 mfd.) and a 4,000 ohm resistance. The main high tension, however, is connected directly to the anode circuit of the output pentode. All the other H.T. voltages are taken from the smoothed side.

A moulded headed screw is located at the back of the chassis for the purpose of short circuiting the condenser C7. This acts as a local-distance switch.

There is also a special circuit consisting of a choke, L1, and a resistance, R9, which acts as a by-pass to earth for any low frequency induction which might reach the aerial via the mains. The resistance R9 also serves to prevent the aerial from becoming permanently charged.

There is a special filter circuit consisting of a resistance R10, and a condenser C13, in shunt with the detector anode circuit. The load for this valve



The 940A is a very compact two-valve A.C. mains receiver housed in a moulded case. It was introduced by Philips Lamps, Ltd., for the 1935-6 season.

The diagrams giving the details of the chassis design of the 940A are given on the opposite page.

comprises a coupling choke instead of the more usual transformer or resistance.

As a directly heated pentode is used, a series bias resistor is fitted between the centre-tap of the heater winding and the negative H.T. line.

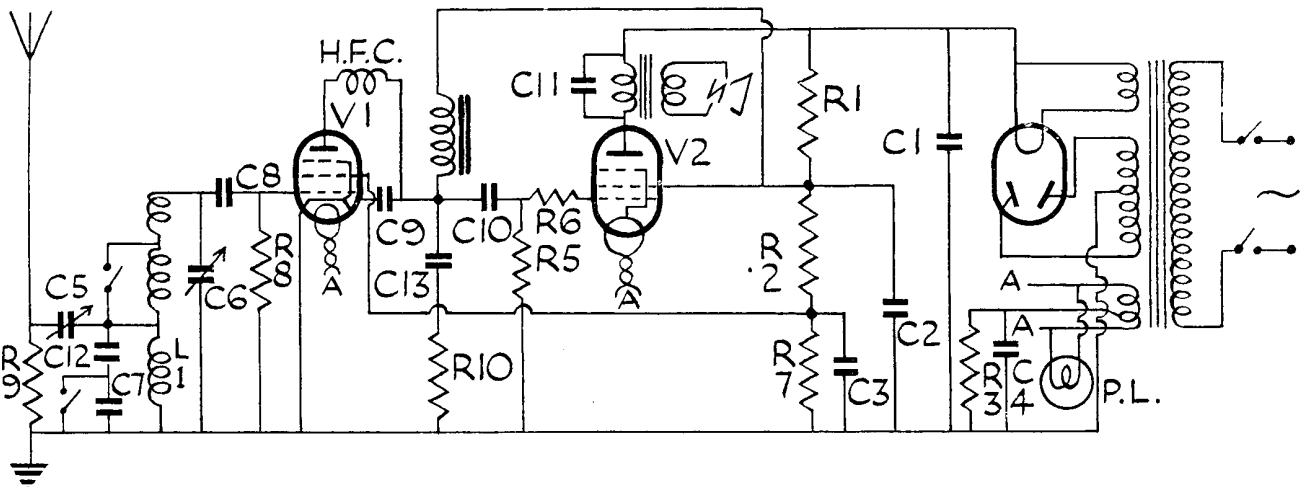
**Special Notes.**—The dial lamp is rated at 6 volts .5 amp., and is easily removed.

**Removing Chassis.**—Remove the four knobs from the front of the cabinet (grub screws) and four bolts from underneath. The chassis and speaker assembly will then completely remove from the cabinet.

VALVE READINGS				
		No signal.	No reaction.	200 volt A.C. mains.
V.	Type.	Electrode.	Volts.	M/a.
1	Mullard SP4 ...	anode ...	180	.7
	(5) Met ...	screen ...	20	.25
2	Mullard PM24m ...	anode ...	220	.20
	(5) ...	screen ...	210	4.1
3	Philips 1821 (4)	filament	240	—

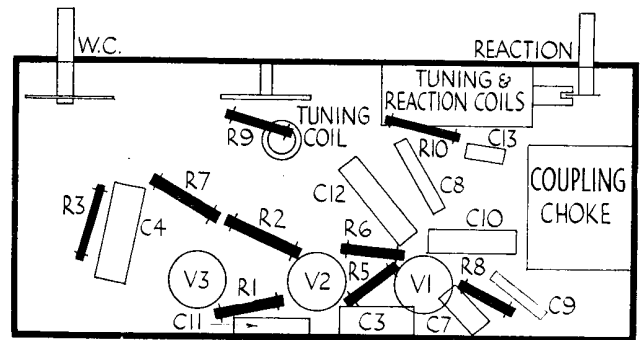
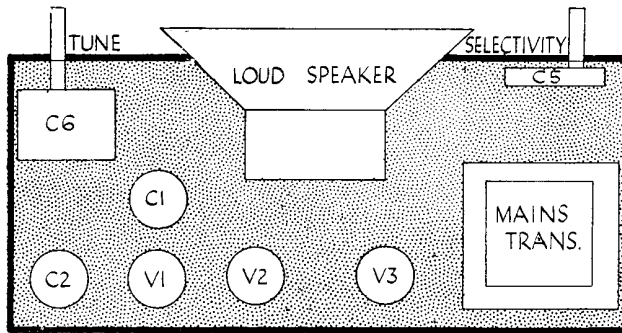
RESISTANCES		
R.	Purpose.	Ohms.
1	Series smoothing ...	4,000
2	V1 screen decoupling potr. ...	.2 meg.
3	V2 bias ...	640
5	V2 grid leak ...	1 meg.
6	Grid stopper ...	.1 meg.
7	V1 screen decoupling potr. ...	40,000
8	V1 grid leak ...	2 meg.
9	Aerial discharge and filter ...	.2 meg.
10	Tone compensation ...	.4 meg.

CONDENSERS		
C.	Purpose.	Mfd.
1	H.T. smoothing ...	32
2	Do. ...	32
3	V1 screen decoupling ...	.1
4	V2 bias shunt ...	.25
5	Series aerial ...	.0005
6	Aerial tuning ...	.00063
7	Sensitivity control ...	.001
8	V1 grid ...	.00005
9	V1 anode decoupling ...	.000125
10	J. F. coupling ...	.02
11	Pentode compensating ...	.001
12	Input filter ...	.01
13	Tone compensating ...	.0008



The circuit of the model 940A is simple but contains some interesting features. Only one 32 mfd. smooths the H.T. current to the output valve. The coupling between V1 and V2 is choke-capacity, the choke helping to smooth the H.T. supply to V1.

## CHASSIS LAYOUTS OF PHILIPS MODEL 940A RECEIVER



These diagrams show (left) the arrangement of parts on the top of the Philips chassis, and (right) the "below-deck" design.

## TELSEN SIX-VALVE SUPERHET

**CIRCUIT.**—The H.F. valve (V1) is preceded by a tuned secondary aerial transformer, which is iron cored. Bias is controlled from the full A.V.C. line and is limited by a cathode resistance. Coupling to the next valve is by a second iron-cored H.F. transformer, and tuning indication is effected by a meter in series with the anode lead.

The combined detector-oscillator valve (V2), is an H.F. pentode-triode and uses cathode injection. The coupling includes a harmonic stopper (R7) in the grid circuit of the oscillator section.

This valve is also capable of super-

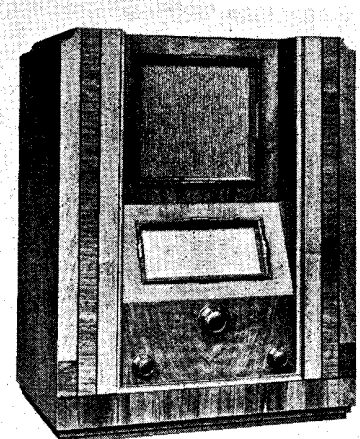
imposing the output from a gramophone pick-up on the I.F.

Coupling to the next valve is by band-pass I.F. transformer, and bias is by A.V.C. and cathode resistance.

The I.F. valve, A.C./VP1 met. (V3), is biased from a point of lower A.V.C. potential and by cathode resistance. It is followed by a second I.F. transformer.

A V914 (V4) high-voltage double-diode without a triode element is the detector. The A.V.C. diode is fed through a condenser from the anode of V3, and potentials

(Continued on next page.)



This set was introduced by Telsen for the 1934-5 season. These service notes will be found all the more valuable as the original manufacturing company is no longer in existence.

### QUICK TESTS

If an H.F. signal is applied, the visual tuning indicator shows if the H.F. stages are working.

Volts between the following terminals on the output transformer and chassis (no signal) are:—

Left (1) grey with yellow-red tracer, H.T. smoothed, 395 volts.

(2) Yellow, output valve anode, 250 volts.

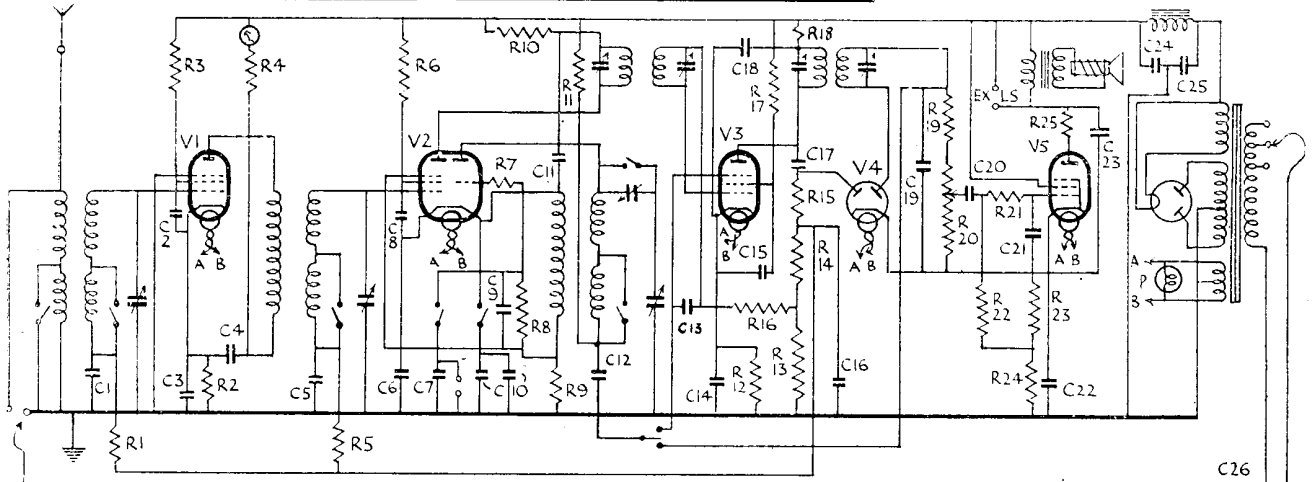
(3) Red, H.T. smoothed, 270 volts.

### VALVE READINGS

No signal.

V.	Type.	Electrode.	Volts.	M/a.
1	AC/VP1 met. (7)	anode ...	160	.6
		aux. grid ...	200	
2	AC TP met. (9)	anode ...	220	*
		aux. grid ...	205	*
		osc. anode ...	105	*
3	AC/VP1 met. (7)	anode ...	270	1.1
		aux. grid ...	200	
4	V914 (5)	...	...	...
5	A.C. 2 Pen. ...	anode ...	250	42
		aux. grid ...	270	10

\* The inclusion of meter leads causes erroneous readings.



The five-valve plus rectifier superhet circuit of the Telsen receiver. One point of interest is that cathode injection is used for the oscillator. Another is the connection of the pick-up to the oscillator triode.