PHILCO 269 THREE-VALVE A.C. SUPERHET

CIRCUIT.—A three-valve superhet for operation on A.C. mains and working on the usual medium and long wavelengths.

Aerial signals are fed to V1, a frequency changer, through an inductively coupled aerial coil and a small series condenser. This coil has an iron dust core.

Attention is drawn to the single turn of wire coupling the oscillator coils to the H.F. coils, the purpose of which is to increase the regeneration.

Coupling to V2, an H.F. pentode, is through an I.F. transformer tuned to 451 kc. The suppressor grid of this valve is connected to the cathode resistance of V1.

A second I.F. transformer, the windings of which are untuned, is used between V2 and the diode section of V3, a double-diode output pentode. The diodes are strapped and used both for demodulation and for A.V.C., the bias generated being applied to the preceding valves in the orthodox manner.

The rectified output from the diodes is fed through a resistance and capacity stage which incorporates the volume control to the pentode section for amplification.

Mains equipment consists of transformer, full-wave rectifier, electrolytic condensers and the speaker field.

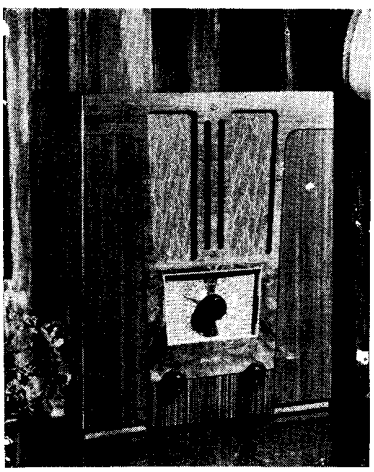
Special Notes.—The dial lamp has the usual rating of 6 volts, but is of a special type which can only be obtained from the manufacturers. It is fixed to the top of the dial assembly by a spring clip which can be removed by a direct vertical pull.

Removing Chassis.—First remove three knobs from the front of the cabinet (spring clips), and then four bolts from underneath. Next unsolder the leads to the speaker. Reconnection is as follows :—

Top tag, green lead with white tracer.
Middle tag, green lead.
Bottom tag, white lead.

The chassis will then be free for removal from the cabinet.

Should it be desired to test the chassis



The 269 is the walnut cabinet form of the Philco three-valve plus rectifier superhet chassis. A feature is direct tuning by the knob in the centre of the dial.

CONDENSERS

C.	Purpose.	Mfds.
1	V1 cathode bias shunt ..	.1
2	H.F. filter	.00011
3	L.F. coupling	.01
4	V1 and V2 screen decoupling	.05
5	Pentode compensating ..	.003
6	V1 cathode bias shunt ..	.09
7	V1 osc. anode coupling ..	.0008
8	V1 A.V.C. decoupling ..	0.5
9	Long-wave padding	.00005
10	Mains filter	.015
11	Aerial coupling	.00025
12	H.T. smoothing	8
13	H.T. smoothing	8
14	V2 cathode bias shunt ..	.09
15	H.F. filter	.00011
16	V2 A.V.C. decoupling ..	.05

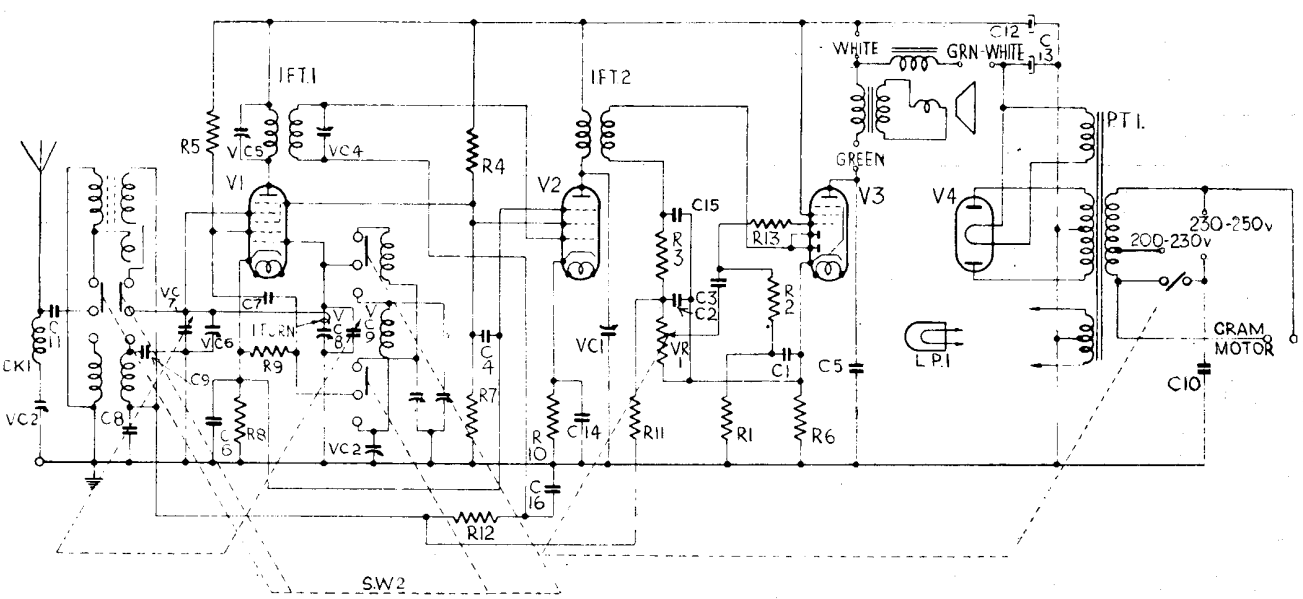
VALVE READINGS

No signal. Volume maximum. 200 volt A.C. mains.

V.	Type.	Electrode.	Volts.	M.a.
	All Philco.			
1	6A7 (7) ..	Anode ..	215	3
		Screen ..	85	2.6
		Osc. anode	175	3.5
2	78E (7).. ..	Anode ..	215	6
		Screen ..	85	1.7
3	Pen DD61 (7)..	Anode ..	210	31
		Screen ..	220	6.2
4	80 (4)	Filament ..	320	—

RESISTANCES

R.	Purpose.	Ohms.
1	Part V3 grid leak	490,000
2	Part V3 grid leak	490,000
3	H.F. filter	51,000
4	V1 and V2 screen decoupling potr.	25,000
5	V1 osc. anode decoupling ..	10,000
6	V3 cathode bias	140
7	V1 and V2 screen decoupling potr.	5,000
8	V1 cathode bias	700
9	V1 osc. grid leak	51,000
10	V2 cathode bias	800
11	V1 and V2 A.V.C. decoupling	2 meg.
12	V2 A.V.C. decoupling ..	2 meg.
13	V3 grid stopper	100,000
VR1	Volume control	330,000



Frequency-changer, intermediate frequency and combined diode and pentode output valves form the basis of the conventional circuit of the Philco Model 269. An interesting point is that the second I.F. transformer is not tuned.

Internal Short of Transformer

FAULTS on mains transformers can at times be somewhat misleading. A recent example occurred where a receiver fitted with a transformer for 110 volts mains supply had been connected up to a 230-volt supply in error.

On test on 110 volts the receiver still worked perfectly, all voltages were reasonably correct, and neither rectifier valve nor smoothing condensers appeared to have suffered any damage. The only indication that anything was wrong was the fact that the mains transformer was running warmer than usual.

Actually, the high mains voltage had caused an internal short circuit between turns in the transformer. This, in itself, was not sufficiently serious to cause any noticeable alteration in the output voltages, but was causing the transformer to run warm.

A transformer can be tested for internal shorts by removing *all* valves from the set, including rectifier, and noting if it runs warm.

INTERMEDIATE frequency transformers have a habit of burning out just when no replacement is on hand. Practically always the plate coil goes whilst the grid coil remains intact.

Most transformers are wound to some special interweave pattern which precludes the possibility of rewinding by hand, but frequently enough the break occurs where the fine wire of the coil winding is joined to a multi-strand wire forming the

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(*Continued from opposite page.*)

under working conditions out of the cabinet, the speaker leads will have to be extended, as the field forms part of the smoothing equipment.

ALIGNMENT NOTES

I.F. Circuits.—Connect a modulated oscillator tuned to 451 kc. to the grid cap of V1, the grid lead being disconnected, and place an output meter across the speaker terminals (green and white leads).

Adjust T1, T2, T3, for maximum reading on the output meter.

I.F. Filter.—Transfer the oscillator leads to the aerial and earth terminals through a standard dummy aerial and inject a signal of 451 kc., the intermediate frequency. Adjust T4 for minimum reading.

Medium Waves.—Inject to the aerial and earth terminals and tune in a signal of 214 metres. Adjust T5 and T6 for maximum.

Inject and tune in signal of 500 metres, and while rocking the gang condenser adjust T7 for maximum reading.

Check all the above adjustments until no further improvement is possible.

Long Waves.—Inject and tune in a signal of 1,035 meters (290 kc.), and while rocking the gang condensers adjust T8 for maximum.

Inject and tune in a signal of 1,855 meters (290 kc.), rock the gang condenser and adjust T9 for maximum.

Repeat the above procedure until no further improvement results.

QUICK TESTS

Quick tests are available on this receiver on the terminal strip of the speaker transformer.

Volts measured between this and the chassis should be :—

Green and white ..	320v., unsmoothed H.T.
White	220v., smoothed H.T.

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lead to the soldering tag. This particular spot is generally bound over with a cloth tape of some sort.

Careful removal of the tape reveals a break, and a successful repair can be made. This appears to be the weak spot of many I.F. transformers. Corrosion at the joint sets in and a break occurs.

HOW many service-men make a definite point of cleaning and polishing all receivers which come in for repair? It is a small point but one which is calculated to impress the customer.

Removing accumulated dust from the chassis does no harm, and the customer is generally pleased to have it done. A little furniture cream applied to the cabinet will often make a tremendous difference.

In any case, it is not good business to return a cabinet smeared over with finger marks produced by the energetic serviceman.

Below are the two diagrams showing how the components are arranged on top and inside the Philco chassis. The top of chassis diagram is tinted.