PHILCO 450

Four - valve, three - waveband battery superhet with permanent-magnet moving-coil loudspeaker. Provision is made for a high resistance pickup, which may be left in circuit on radio. Manufactured by the Philco Radio and Television Corporation of Great Britain, Ltd., Perivale, Greenford, Middx.

THE aerial input either from a Philco all-wave aerial or from open aerial and earth system is via the coupling coils L1 (LW), L3 (MW), L5 (SW), to their respective grid tuning coils L2, L4 and L6. A rejector coil L7 is in circuit on LW.

The coils are tuned by VC1 section of the two-gang condenser and the signals are passed straight to the control grid of the variable-mu heptode valve V1.

The oscillator section of the valve employs tuned grid circuits L8 (LW), L9 (MW) and L10 (SW) with reaction coil L11 in the oscillator anode feed circuit.

The IF output from the anode of V1 is coupled by an IF transformer L12, L13 to the grid circuit of the IF amplifier valve V2. A degree of IF reaction or feedback for varying the amount of IF gain is effected by the small winding L13a which is in the suppressor grid circuit of V2 and inductively coupled to L12.

In the first production run of chassis this reaction was fixed and was varied by means of a variable resistance VR2 controlling the potential to the screening grids of V2. In later productions a fixed resistance R18 was used in place of VR2 and the reaction coil L13a was made variable in relation to L12.

A second IF transformer L14, L15 couples V2 to the signal diode of the double diode triode V3. Filtering is effected by R16, C17 and C18, R15 being the load resistance. LF signals are coupled by C11 to the volume control VR3, the slider of which feeds the grid of the triode section of V3 through a blocking condenser C10.

The volume control is tapped at the mid point and the condenser resistance network R12, C14 for tone correction purposes is introduced between the tapping point and earth. A pickup input may be switched across the volume control when desired.

AVC is also obtained from the load resistance R15 and applied to the grids of V1 and V2 via the filter resistance R17.

A variable tone control comprising VR1 and C4 is connected between the anode of V3 and earth and HF filtering is effected by C13. The anode load resistance of V3 is R5 and the LF signals are passed via C3 to the primary L16 of the inter-valve transformer.

The centre tap secondary L17 feeds the two grids of the quiescent pentode output valve, V4, which is coupled by the output transformer L18, L19 to the permanent magnet moving coil loudspeaker, of which L20 is the speech coil.

GANGING

IF Circuits.—Inject a 451 kc signal into the grid of V1 with the grid lead connected. Adjust T1, T2, T3 and T4 for maximum output. If instability occurs adjust the IF reaction control (VR2 on run 1, and L13A (the reaction coil) on run 2 models). When stability is attained, re-trim.

LW Band.—The link on the aerial panel must be placed in socket B. With gang condenser fully open check that the pointer coincides with index line above 1,750 kc.

Switch to LW and set gang to 290 kc. Inject a 290 kc signal and adjust T5 and T6 (underneath the chassis) for maximum output.

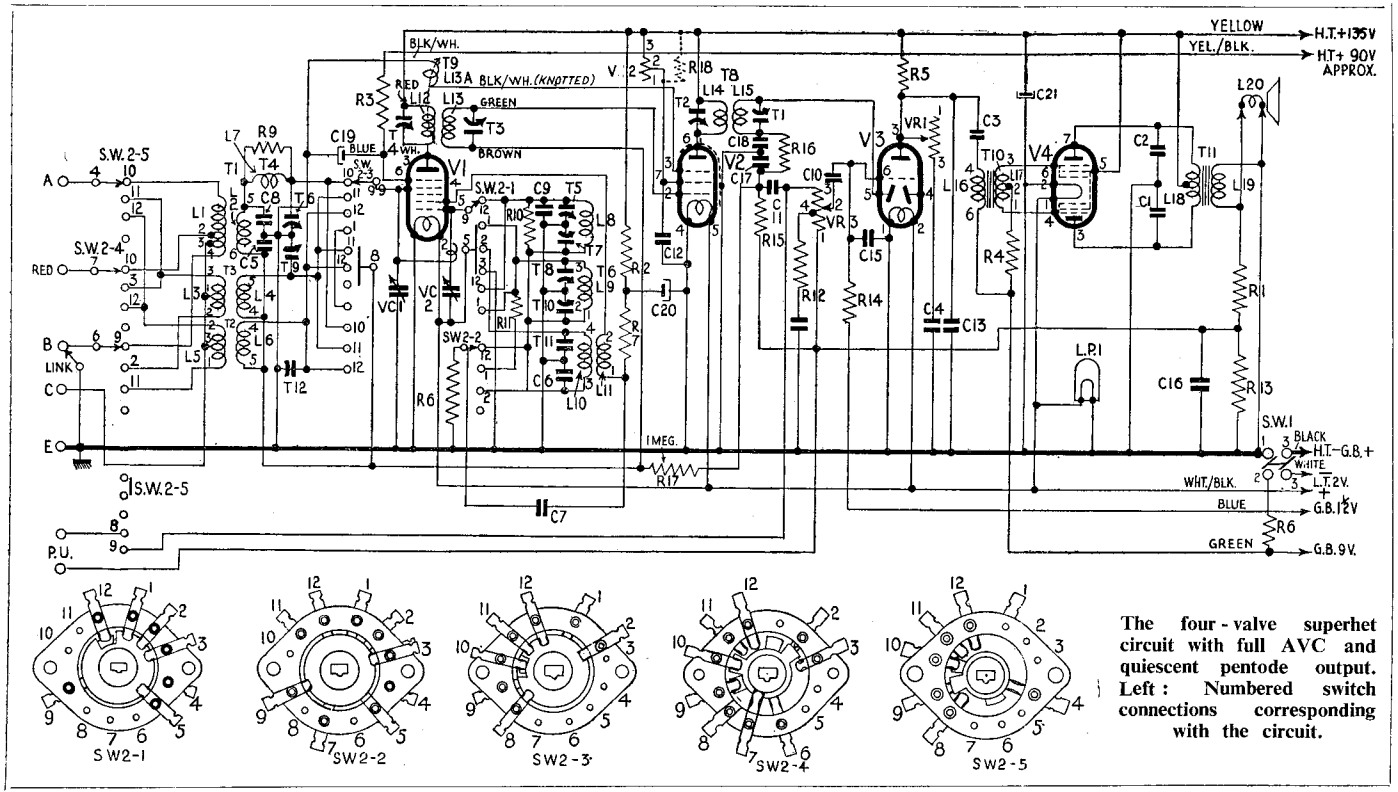
Inject and tune in a 160 kc signal and adjust T7 (nut), while rocking gang.

MW Band.—Switch receiver to MW and set gang to 1,750 kc. Inject a 1,750 kc signal and adjust T8 and T9 (underneath the chassis).

Inject and tune in a 600 kc signal and adjust T10 (screw) for maximum output, rocking gang.

SW Band.—Switch receiver to SW and substitute a 400 ohm resistance for the standard dummy aerial. Set gang at 18 mc, inject an 18 mc signal and adjust T11 for the second signal heard from tight. The two peaks are very closely spaced and care must be exercised in establishing the correct peak. The adjustment of T12 will have a tendency to "pull" the frequency of the oscillator and it is recommended that a 21 plate variable condenser (approximately .00035 mfd) is shunted across the oscillator section of the gang and tuned so that the second harmonic instead of the fundamental beats with the incoming signal. This minimises the "pull."

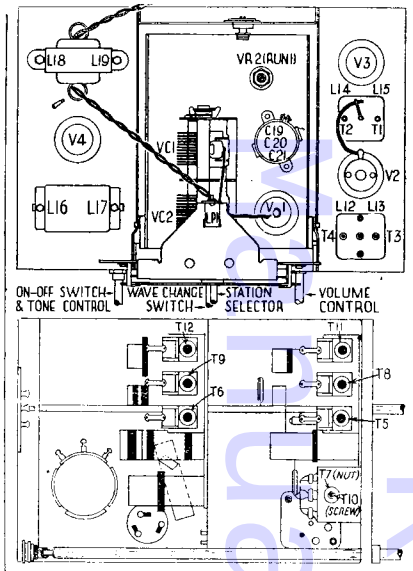
Connect the shunt condenser between T11 tag and chassis and tune it (about half open) at 18 mc. Adjust T12 (underneath chassis) for maximum output. Disconnect the shunt condenser and readjust T11.



The four - valve superhet circuit with full AVC and quiescent pentode output. Left: Numbered switch connections corresponding with the circuit.

RESISTANCES

R		Ohms
1	..	2,000
2	..	2,000
3	..	45,000
4	..	160,000
5	..	51,000
6	..	1,000
7	..	10,000
8	..	32,000
9	..	490,000
10	..	160,000
11	..	51,000
12	..	51,000
13	..	200
14	..	1 meg.
15	..	330,000
16	..	51,000
17	..	1 meg.
18	..	240,000
VR1	..	100,000
VR2 (Run 1 only)		1 meg.
VR3	..	1+1 meg.



Chassis layout showing IF trimmers on top and, below, underneath location of other trimmers.

VALVE READINGS

V	Type	Electrode	Volts
1	1C6	Anode	135
		Osc. Anode	100
		Screen	50
2	VP21	Anode	135
		Screen	40
3	2102	Anode	90
4	2103	Anodes	135
		Screens	135

Voltage readings with no aerial connected, receiver switched to MW, volume control at maximum.

CONDENSERS

C		Mfd	C		Mfd
1	..	.002	12	..	.1
2	..	.002	13	..	110 mmfd.
3	..	.09	14	..	.01
4	..	.03	15	..	110 mmfd.
5	..	.05	16	..	.25
6	..	.0035	17	..	110 mmfd.
7	..	250 mmfd.	18	..	110 mmfd.
8	..	.03	19	..	2
9	..	50 mmfd.	20	..	4
10	..	.01	21	..	2
11	..	.01			

WINDINGS

L		Ohms	L		Ohms
1	..	80+10+5	11	..	.5
2	..	5	12	..	8
3	..	2+1	13	..	12
4	..	5	13A	..	.1
5	..	.2+.1	14	..	12
6	..	.1	15	..	8
7	..	20	16	..	650
8	..	16.5	17	..	3,000+3,000
9	..	8	18	..	250+250
10	..	.1	19	..	.2
			20	..	2