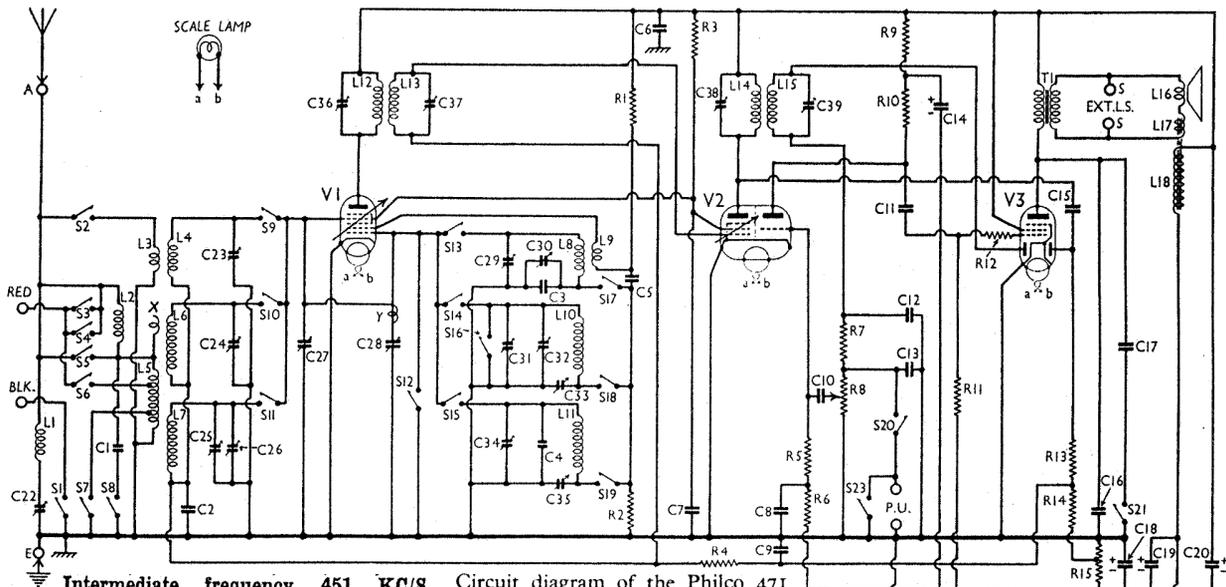


PHILCO - 471



Intermediate frequency 451 KC/S. Circuit diagram of the Philco 471 3-band A.C. superhet. Note that V2 is a triode-pentode, used for I.F. and A.F. amplification. In Run 1 models, there is a 3-point tone control circuit in place of the 2-point type shown (C17, S21).

COMPONENTS AND VALUES

RESISTANCES		Values (ohms)
R1	V1 osc. anode resistance	15,000
R2	V1 osc. C.G. resistance	51,000
R3	V1 and V2 S.G.'s H.T. feed	20,000
R4	A.V.C. line decoupling	1,000,000
R5	V2 triode C.G. resistance	490,000
R6	V2 triode C.G. decoupling	1,000,000
R7	I.F. stopper	51,000
R8	Manual volume control	350,000
R9	V2 triode anode decoupling	10,000
R10	V2 triode anode load	51,000
R11	V3 C.G. resistance	490,000
R12	V3 C.G. I.F. stopper	99,000
R13	V3 A.V.C. diode load	330,000
R14	V2 and V3 G.B. resistance	490,000
R15	V2 and V3 G.B. resistance	100*

* 40 ± 60 Ω.

CONDENSERS		Values (μF)
C1	L5 L.W. trimmer	0.00005
C2	V1 tetrode C.G. decoupling	0.05
C3	Osc. S.W. tracker	0.000225
C4	Osc. L.W. trimmer	0.00007
C5	Osc. anode condenser	0.00025
C6	H.T. supply R.F. by-pass	0.1
C7	V1 and V2 S.G.'s by-pass	0.1
C8	V3 triode C.G. decoupling	0.1
C9	A.V.C. line decoupling	0.05
C10	A.F. decoupling to V2 triode	0.01
C11	V2 to V3 A.F. coupling	0.01
C12	I.F. by-passes	0.00011
C13	I.F. by-passes	0.00011
C14*	V2 triode anode decoupling	8.0
C15*	V3 A.V.C. diode feed	0.00011
C16	Fixed tone corrector	0.01
C17	Tone control condenser	0.05
C18*	G.B. circuit by-pass	35.0
C19*	H.T. smoothing	8.0
C20*	H.T. smoothing	8.0
C21	Mains circuit R.F. by-pass	0.015
C22†	Aerial I.F. filter tuning	0.000375
C23†	Aerial circuit S.W. trimmer	0.000035
C24†	Aerial circuit M.W. trimmer	0.000025
C25†	Aerial circuit L.W. trimmers	0.000035
C26†	Aerial circuit L.W. trimmers	0.000035
C27†	Aerial circuit tuning	—
C28†	Osc. circuit tuning	—
C29†	Osc. circuit S.W. trimmer	—
C30†	Osc. circuit S.W. tracker	0.00006
C31†	Osc. circuit S.W. trimmers	—
C32†	Osc. circuit M.W. trimmers	—
C33†	Osc. circuit M.W. tracker	0.0015
C34†	Osc. circuit L.W. trimmer	—
C35†	Osc. circuit L.W. tracker	0.000045
C36†	1st I.F. trans. pri. tuning	—
C37†	1st I.F. trans. sec. tuning	—
C38†	2nd I.F. trans. pri. tuning	—
C39†	2nd I.F. trans. sec. tuning	—

* Electrolytic. † Variable. ‡ Pre-set

SWITCH TABLE

Switch	L.W.	M.W.	S.W.	Gram.
S1	O	C	C	C
S2	O	O	C	O
S3	O	O	C	O
S4	C	O	O	O
S5	O	C	O	O
S6	O	C	O	O
S7	O	C	O	O
S8	C	O	O	O
S9	O	C	O	O
S10	O	C	O	O
S11	O	C	O	O
S12	O	O	C	O
S13	O	O	C	O
S14	O	O	C	O
S15	C	O	O	O
S16	O	O	C	O
S17	O	O	C	O
S18	O	O	C	O
S19	C	O	O	O
S20	O	O	O	C
S21	O	O	O	C
S22	O	O	O	C

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial I.F. filter coil	15.0
L2	Aerial choke coil	55.0
L3	Aerial S.W. coupling coil	0.4
L4	Aerial S.W. tuning coil	0.2
L5	Aerial M.W. and L.W. coupling	95.0
L6	Aerial M.W. tuning coil	4.0
L7	Aerial L.W. tuning coil	15.0
L8	Osc. S.W. tuning coil	0.1
L9	Osc. reaction coil	0.4
L10	Osc. M.W. tuning coil	2.0
L11	Osc. L.W. tuning coil	6.0
L12	1st I.F. trans. Primary	8.0
L13	1st I.F. trans. Secondary	12.0
L14	2nd I.F. trans. Primary	8.0
L15	2nd I.F. trans. Secondary	12.0
L16	Speaker speech coil	2.0
L17	Hum neutralizing coil	0.1
L18	Speaker field coil	2,000.0
T1	Speaker input trans. Pri. Sec.	250.0 0.2
T2	Mains trans. Pri. total Heater sec. Rect. 60 sec. H.T. sec. total	35.0 0.2 0.1 480.0
S1-S19	Waveband and muting switches	—
S20, S23	Gram. pick-up switches	—
S21	Tone control switch	—
S22	Mains switch, ganged R8	—
x, y	Small couplings	—

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver (which was adjusted for mains of 200-230 V) when it was operating on mains of 230 V. The receiver was tuned to the lowest wavelength on the medium band and the volume control was at

maximum, but there was no signal input.

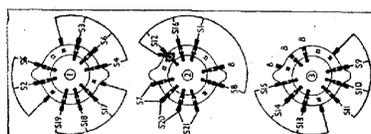
It will be noticed that two figures are given for the anode voltages and currents of V2. The first is for the pentode section of the valve, while the second is for the triode.

Voltages were measured on the 1,200 V scale of an Avometer, with chassis as negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 6A7E*	250	7.0	130	4.0
V2 6F7B	250	10.2	130	2.2
	105	2.2	—	—
V3 6X4	245	28.0	250	6.7
V4 80	360†	—	—	—

* Oscillator anode (G2) 150 V, 5.8 mA.

† Each anode, A.C.



GENERAL NOTES

Switches.—S1-S19 and S20, S23 are the wavechange and pick-up switches, in three ganged rotary units beneath the chassis. These units are indicated by numbers in circles and arrows in our under-chassis view, and diagrams are given on page VIII.

The table below gives the switch positions for the four control positions, starting from fully anti-clockwise. O indicates open, and C, closed.

S21 is the tone control switch at the front of the chassis, of the single pole shorting type (Run 2). In Run 1 a 3-point tone control was fitted. See under Chassis Divergencies.

S22 is the Q.M.B. mains switch, ganged with the volume control R8.

Coils.—L1 and L2 are on separate formers beneath the chassis. L3-L7 is an unscreened unit on a tubular former, also beneath the chassis. L8-L11 and the two I.F. transformers L12, L13 and L14, L15, are in three screened units on the chassis deck, the units also containing the associated trimmers.

Scale Lamp.—This is a Tung-Sol miniature centre contact bayonet cap type, rated at 6.3 V, 0.35 A (Philco Part No. 34-2141).

External Speaker.—Two sockets (S, S) are provided for the connection of a low impedance (2-3 Ω) external speaker.

Condensers C14, C20.—In our chassis these are two 8 μF dry electrolytic types in a single tubular container, which forms the negative connection. The tag marked with a red spot is the positive of C20. In some chassis, an 8+4 μF unit may be fitted, C14 then being 4 μF, its positive tag being marked green.

Couplings X, Y.—These are small capacity couplings, X being associated with L5 and L6, and Y consisting of a wire from C27 looped into a tag on C28.

Condensers C30, C33 and C22, C35.—These are two sets of dual trimmers, the first being adjustable through a hole in the chassis deck, and the second through a hole in the rear of the chassis. The nuts operate C30 and C35 respectively, and the screws, C33 and C22.

Condenser C21.—Note that the central tag on this unit is merely a bearer.

Condensers C12, C13.—The tag nearest the side of the chassis is common, the centre tag is the other connection of C13, and the remaining tag the other connection of C12.