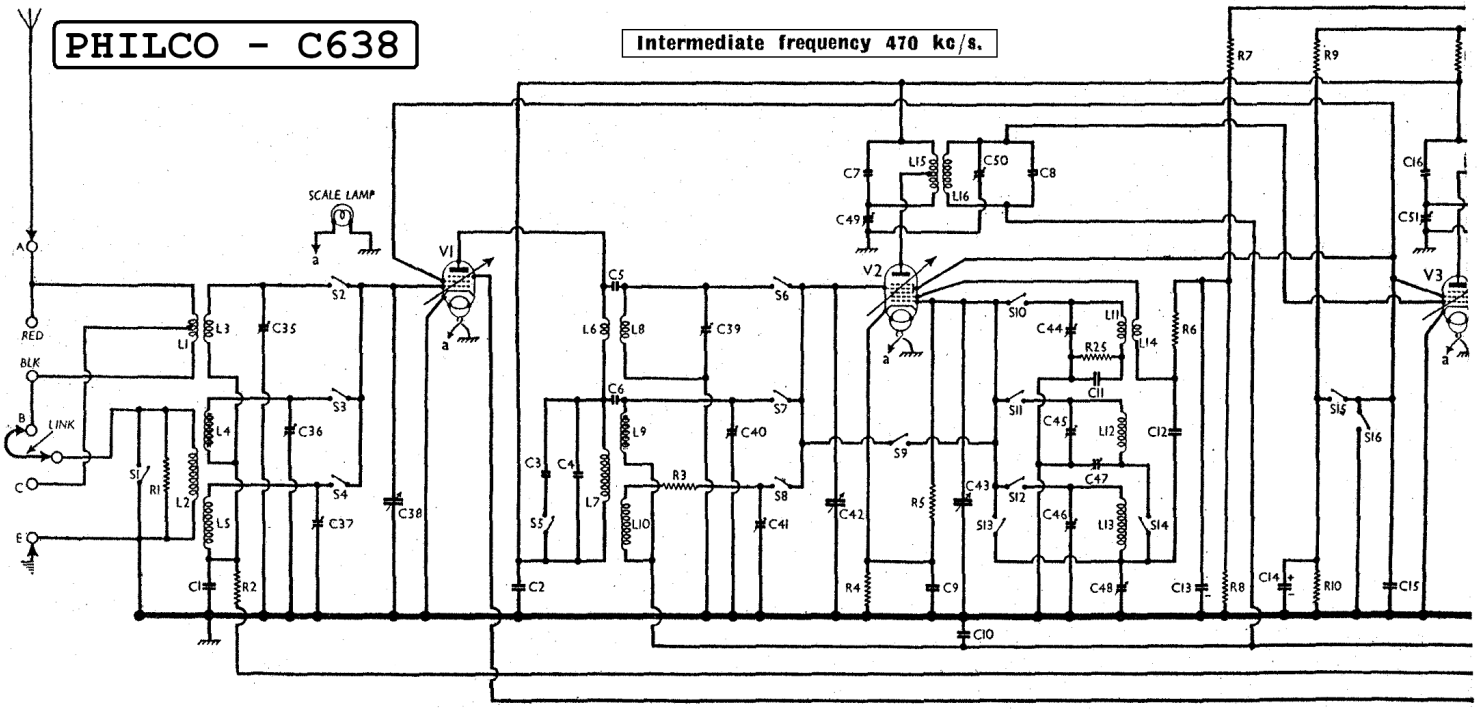
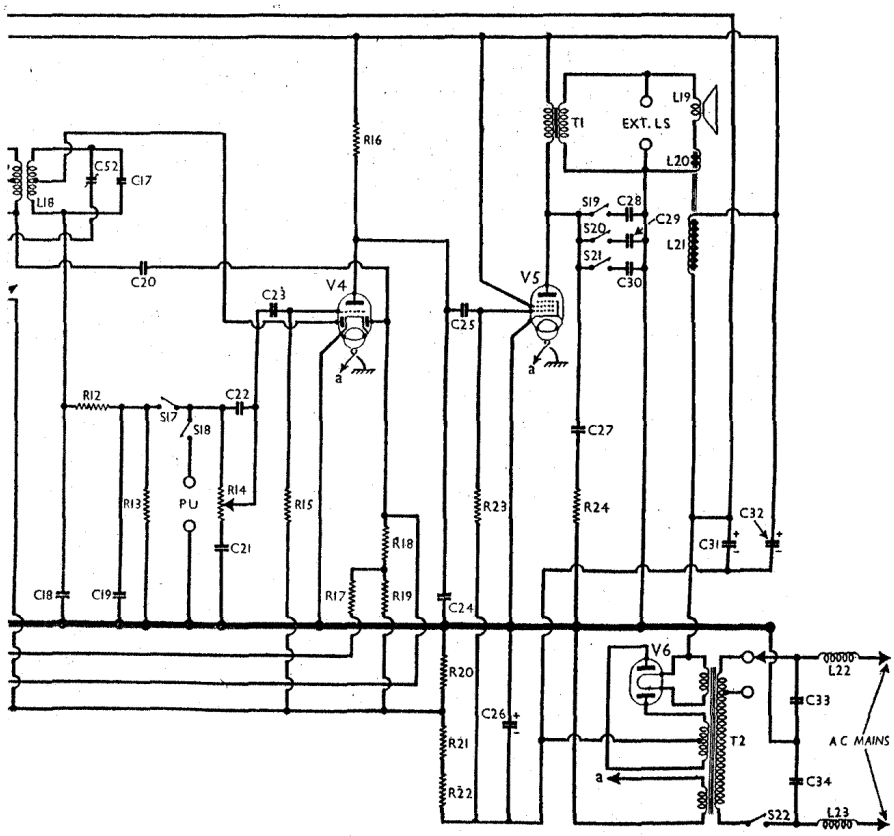
PHILCO - C638

Intermediate frequency 470 kc/s.





CONDENSERS		Values (μF)
C1	V1 CG decoupling ...	0·05
C2	V1–V3 anodes decoupling	0·1
C3	RF trans. primary shunt condensers ...	0·00007
C4		0·00005
C5	RF trans. "top" coupling condensers ...	0·000014
C6		0·000005
C7	1st IF trans. fixed tuning condensers ...	0·00007
C8		0·00007
C9	V2 cathode by-pass ...	0·1
C10	AVC line decoupling ...	0·05
C11	Osc. circ. SW tracker ...	0·003
C12	Osc. reaction coupling ...	0·001
C13*	V2 osc. anode decoupling	16·0
C14*	V1–V3 SG's decoupling...	4·0
C15	V1–V3 SG's RF by-pass	0·01
C16	2nd IF trans. fixed tuning condensers ...	0·00007
C17		0·00007
C18	IF by-pass condensers...	0·00011
C19		0·00011
C20	Coupling to V4 AVC diode	0·00011
C21	Bass compensator ...	0·02
C22	High note compensator...	0·00011
C23	V4 triode CG condenser	0·01
C24	IF by-pass	0·00011
C25	V5 CG condenser ...	0·05
C26*	Auto GB circuit by-pass	10·0
C27	Part fixed tone corrector	0·002
C28	Tone control condensers	0·006
C29		0·01
C30		0·02
C31*	HT smoothing condensers ...	16·0
C32*		16·0
C33	Mains RF filter condensers ...	0·09
C34		0·09
C35‡	Aerial circ. SW trimmer	0·00003
C36‡	Aerial circ. MW trimmer	0·00003
C37‡	Aerial circ. LW trimmer	0·00011
C38†	Aerial circuit tuning ...	—
C39‡	RF trans. sec. SW trimmer	0·00003
C40‡	RF trans. sec. MW trimmer	0·000015
C41‡	RF trans. sec. LW trimmer	0·00008
C42†	RF trans. sec. tuning ...	—
C43†	Osc. circuit tuning ...	—
C44‡	Osc. circ. SW trimmer...	0·00003
C45‡	Osc. circ. MW trimmer...	0·00003
C46‡	Osc. circ. LW trimmer...	0·00011
C47‡	Osc. circ. MW tracker ...	0·000375
C48‡	Osc. circ. LW tracker ...	0·000120
C49†	1st IF trans. pri. tuning	—
C50†	1st IF trans. sec. tuning	—
C51‡	2nd IF trans. pri. tuning	—
C52‡	2nd IF trans. sec. tuning	—

* Electrolytic. † Variable. ‡ Pre-set.

RESISTORS		Values (ohms)
R1	Aerial circuit shunt ...	10,000
R2	V1 CG decoupling ...	1,000,000
R3	RF trans. LW damping	100
R4	V2 fixed GB resistor ...	400
R5	V2 osc. CG resistor ...	99,000
R6	V2 osc. anode HT feed...	32,000
R7	V2 osc. anode HT feed potential divider ...	25,000
R8		70,000
R9	V1, V2, V3 SG's HT potential divider ...	25,000
R10		35,000
R11	V1, V2, V3 anodes HT feed	2,000
R12	IF stopper	51,000
R13	V4 signal diode load ...	240,000
R14	Manual volume control...	1,000,000
R15	V4 triode CG resistor ...	1,500,000
R16	V4 triode anode load ...	160,000
R17	AVC line decoupling ...	490,000
R18	V4 AVC diode load resistors	490,000
R19		240,000
R20	V1–V5 GB and AVC delay potential divider resistors	18
R21		200
R22		126*
R23	V5 CG resistor	240,000
R24	Part fixed tone corrector	5,000
R25	Osc. SW damping ...	32,000

* Made up of two 63Ω resistors connected in series.

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial SW coupling coil...	0·1
L2	Aerial MW and LW coupling	60·0
L3	Aerial SW tuning coil ...	Very low
L4	Aerial MW tuning coil ...	2·5
L5	Aerial LW tuning coil ...	40·0
L6	RF trans. SW pri. coil ...	2·0
L7	RF trans. MW and LW pri.	60·0
L8	RF trans. SW sec. coil ...	Very low
L9	RF trans. MW sec. coil ...	2·5
L10	RF trans. LW sec. coil ...	50·0
L11	Osc. SW tuning coil ...	Very low
L12	Osc. MW tuning coil ...	2·5
L13	Osc. LW tuning coil ...	16·5
L14	Osc. SW reaction coil ...	0·1
L15	1st IF trans. Pri., total ...	8·0
L16	Sec. ...	8·0
L17	2nd IF trans. Pri., total ...	8·0
L18	Sec., total ...	8·0
L19	Speaker speech coil ...	2·0
L20	Hum neutralising coil ...	0·1
L21	Speaker field coil ...	1,140·0
L22	Mains RF filter chokes...	2·5
L23		2·5
T1	Speaker input trans. Pri. ...	265·0
	Sec. ...	0·2
T2	Mains trans. Pri., total ...	35·0
	Heater sec. ...	0·2
	Rect. heat, sec.	0·1
	HT sec., total	480·0

S1–S14	Waveband switches ...	—
S15–S18	Radio/gram. change switches	—
S19–S21	Tone control switches ...	—
S22	Mains switch, ganged S19–S21	—

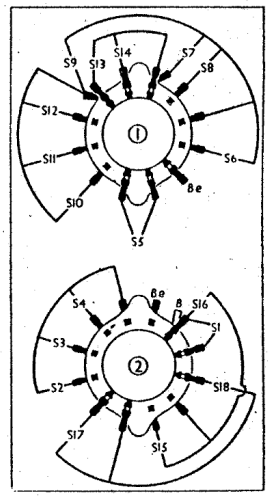
PHILCO - C638

VALVE ANALYSIS

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 78E	245	4·1	75	1·1
V2 6A7	245	0·8	75	2·3
	Oscillator			
	120	2·5		
V3 78E	245	4·3	75	1·2
V4 75	140	0·9	—	—
V5 42E	265	40·0	275	8·0
V6 80	320†	—	—	—

† Each anode, AC.

Diagrams of the two wave-band switch units, as seen from the rear of the underside of the chassis. ***B*** indicates a blank tag, and ***Be*** a bearer. The switch table is given below the diagrams.



Switch	LW	MW	SW	Gram
S1	—	—	C	—
S2	—	—	C	C
S3	—	C	—	—
S4	C	—	—	—
S5	C	—	C	—
S6	—	—	C	—
S7	—	C	—	—
S8	C	—	—	—
S9	—	—	—	C
S10	—	—	C	—
S11	—	C	—	—
S12	C	—	—	—
S13	—	—	—	C
S14	—	C	C	C
S15	C	C	C	—
S16	—	—	—	C
S17	C	C	C	—
S18	—	—	—	C

CIRCUIT ALIGNMENT

IF Stages.—Switch set to MW, turn tone control to first "On" position, turn volume control to maximum and insert aerial link to socket **B.** Connect signal generator leads to control grid (top cap) of **V2,** leaving existing connector in position, via a MW dummy aerial, and chassis, feed in a 470 kc/s (638.3 m) signal, and adjust **C51, C52,** then **C49, C50,** for maximum output.

RF and Oscillator Stages.—With gang at maximum capacity the pointer should coincide with the scale margin line. Transfer signal generator leads via a suitable dummy aerial (a 400 Ω resistor will serve on SW) to **A** and **E** sockets.

LW.—Switch set to LW, tune to 1,035 m on scale (calibration mark at about 14.6 Mc/s on outer edge of SW scale), feed in a 1,035 m (290 kc/s) signal, and adjust **C46, C37** and **C41** in that order for maximum output.

Tune to 1,875 m on scale (calibration mark at about 6.2 Mc/s on outer edge of SW scale), feed in a 1,875 m (160 kc/s) signal, and adjust **C48** (nut) for maximum output while rocking the gang for optimum results. Return to 1,035 m, readjust **C46,** and repeat the LW adjustments throughout.

MW.—Switch set to MW, tune to 214 m on scale (16 Mc/s on SW scale), feed in a 214 m (1,400 kc/s) signal, and adjust **C45, C36** and **C40** in that order for maximum output.

Tune to 500 m on scale, feed in a 500 m (600 kc/s) signal, and adjust **C47** (screw) for maximum output while rocking the gang for optimum results. Return to **C45** at 214 m and repeat the whole of the MW procedure until no improvement results.

SW.—Switch set to SW, tune to 18 Mc/s on scale, feed in a 18 Mc/s (16.67 m) signal, and adjust **C44** for maximum output. Two peaks will be found, and that used should be the one involving the lesser trimmer capacity. Now adjust **C35** and **C39** for maximum output.

Owing to the very small percentage difference between the signal and oscillator frequencies "pulling" may occur between them when adjusting **C35** and **C39.** It can be minimised by connecting a variable condenser in parallel with **C43** and tuning it (at about 0.00035 μF) to the second harmonic of the required oscillator frequency, using this instead of the fundamental to beat with the incoming signal.

If this has been done, remove the external condenser after adjustment and readjust **C44,** then check that the image appears at about 17.1 Mc/s on scale. If it does not, the wrong peak has been used.

CA638 MODIFICATIONS

The principal difference between the C638 and the CA638 lies in the addition of a "Shadow-meter" tuning indicator. Three scale lamps are used instead of one : one at each upper corner of the scale assembly, and one in the tuning indicator.

The meter winding has a DC resistance of 3,500 Ω, and it is inserted in the HT feed lead to **V1** anode, between **C2** and **L7,** and at its junction with **L7** a 0.02 μF by-pass condenser is taken off to chassis.

The top end of **R5** is connected to the bottom of **L13,** at its junction with **C48,** instead of directly to **V2** oscillator control grid. **R10** becomes 15,000 Ω instead of 35,000 Ω, and **C21** becomes 0.05 μF instead of 0.02 μF, but otherwise, except for a few alternative values such as 100,000 Ω for 99,000 Ω, or 0.00006 μF instead of 0.00005 μF which may be found in some chassis, the circuit and chassis are the same in both models.

Model A638ARG

In the main, this follows the design of the C638 with the modifications just described for the CA638 and one or two additional items. It is a radiogram with an automatic record changer.

A potential divider, consisting of a 2,000 Ω and a 1,000 Ω resistor, is shunted across **T1** secondary, the 1,000 Ω resistor going to the side connected to chassis. **V4** cathode is taken to the junction of the two resistors, and a 0.1 μF condenser goes from that point to chassis, introducing negative feed-back. The diode load resistor **R13** is returned to **V4** cathode.

The pick-up circuit is the same as in the other two models except for the introduction of an RC filter in the input circuit. This consists of a 490,000 Ω resistor shunted across the pick-up sockets, then a second 490,000 Ω series resistor between the high potential socket and **S18** followed by a 0.000765 μF condenser between **S18** and chassis. The bass compensator **C21** is omitted, **R14** going straight down to chassis.

The A638ARG must not be confused with the A638BG, which is very different in many ways, including the intermediate frequency which is 451 kc/s, from the three foregoing models. The chassis lay-out generally is very much like that of the other models, but it may be identified by the fact that **V5** and **V6,** according to the makers' manual, are transposed, and that only two electrolytic condensers are mounted on the chassis deck, a vacant hole being visible in the position which we show as being occupied by **C31.**