



PHILCO



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Model C-638.

TYPE CIRCUIT: Six valve Superheterodyne Unit-constructed Receiver with full A.V.C. and Pentode output (4 watts) for operation on Short, Medium and Long wave-bands. Built-in connections for di-pole or Philco All-wave Noise Reducing Aerial, automatic bridge-balanced aerial selector and alternative link connections—"C" for di-pole aerial and "B" for Philco All-wave Noise Reducing Aerial. Provision is made for connecting a pick-up which may be left permanently connected to the Receiver if desired, as the gramophone operation is controlled by the extreme clockwise rotation of the wave-change switch. Provision is also made for connecting an external speaker of the permanent magnet moving-coil type, having an impedance of 2-3 ohms.

POWER SUPPLY: Alternating current mains of 200-229 volts or 230-250 volts, 50-100 cycles, when the voltage adjusting plug is fully screwed into the correct socket on the rear-of-cabinet panel.

WAVE-BANDS: COVERAGE: Three; (a) Long, 2,000-930 metres (150-322.5 kc.); (b) Medium, 550-200 metres (545.4-1,500 kc.); (c) Short, 5.8-18 mc. (51.7-16.6 metres).

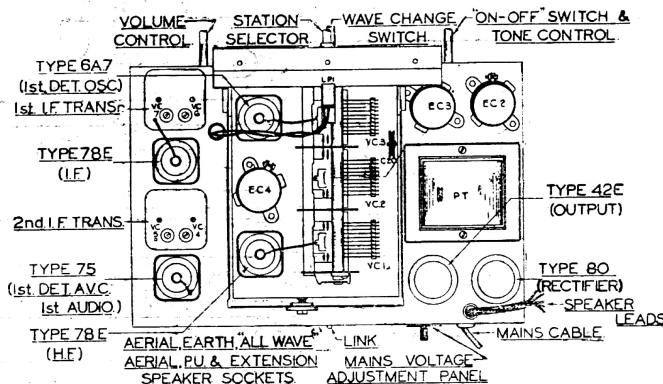
TUNING DRIVE: Two-speed drive-ratios 8-1 and 40-1 for slow and accurate tuning and new full vision spread band scale.

TONE CONTROL: Four positions, enabling a fine degree of tone between brilliant and mellow to be obtained. The "On-off" switch is combined with this control, thus enabling a particular setting of the separate volume-control to be maintained.

LOUD SPEAKER: A 10-inch diameter fully energised moving-coil speaker is used, which gives the highest efficiency audio output, and greater bass response is obtained due to the large baffle.

INTERMEDIATE FREQUENCY: 470 kc.

POWER CONSUMPTION: 65 watts (approx.).



TOP CHASSIS DIAGRAM.

TABLE I—VOLTAGES

Valve socket readings to chassis taken with an 065 or 077 Philco Set Tester using the 500, 250 and 10 volts ranges. Volume control at minimum, tone control fully brilliant, wave-change switch in M.W. position and no aerial connected. A.C. line 230 volts 50 cycles.

Position.	Valve.	Anode.	Screen.	Bias.
H.F. Amplifier, S.3	78E	Pin 3. 245 v.	Pin 4. 75 v.	Pin 5. -1.25 v.
1st Detector and Oscillator, S.4	6A7	Pin 3. 245 v. Pin 5. 120 v.*	Pin 4. 75 v.	Pin 7. 2.5 v.
I.F. Amplifier, S.6	78E	Pin 3. 245 v.	Pin 4. 75 v.	Pin 5. -1.25 v.
2nd Detector, A.V.C. and 1st L.F. Amplifier S.5	75	Pin 3. 140 v.	—	—
Pentode Output, S.2... ..	42E	Pin 3. 265 v.	Pin 4. 375 v.	-20 v.†
Full-wave Rectifier, S.1	80	Pin 3. 320 v. A.C. Pin 4. 320 v. A.C.	—	—

* Oscillator Anode Volts.

† Bias measured between TB.2/1 and chassis.

‡ Total D.C. 380 volts, measured between V.2/2 and B.2/1.

V.2 filament, 5 volts A.C.; V.1, 3, 4, 5, 6, and L.F.1 filaments, each 6.3 volts A.C.; measured between Pins 1 and 2 on each socket.

TABLE 2—RESISTANCES OF COILS.

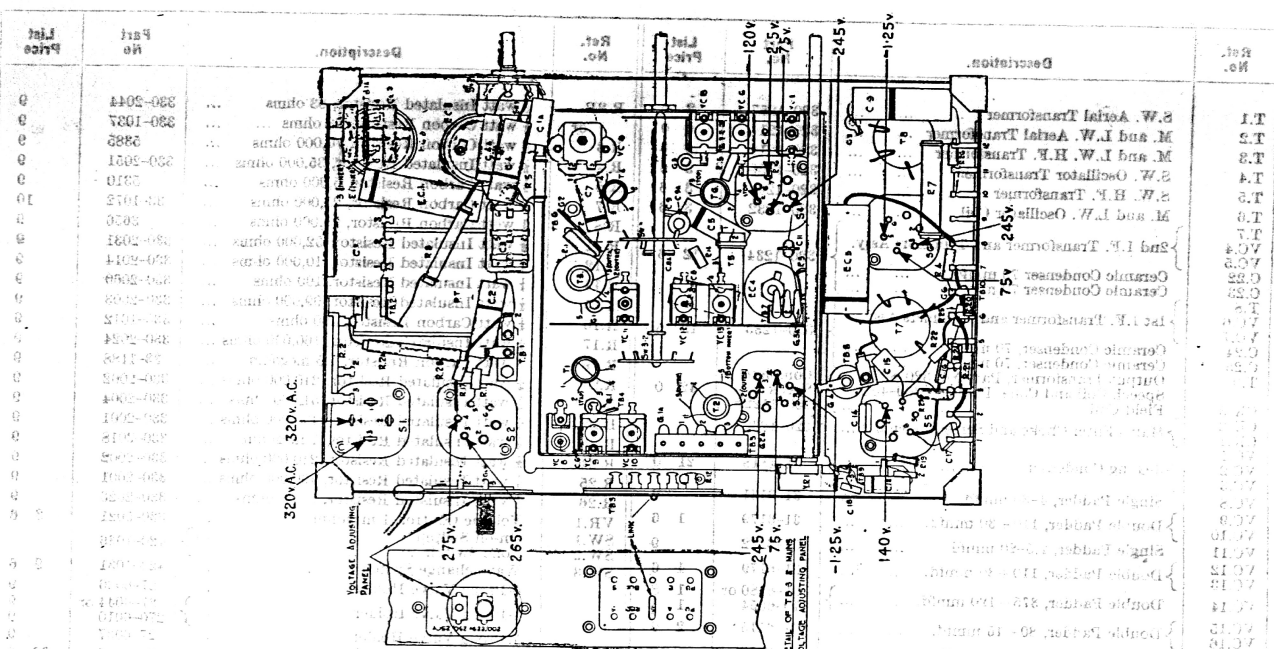
Link on TB3 to be in socket "B"

Ref. No.	Test Prod. 1.	Test Prod. 2.	Resistance (Ohms.)	Ref. No.	Test Prod. 1.	Test Prod. 2.	Resistance (Ohms.)
T.1 Primary	TB.3 Socket "A"	TB.3 Socket "Blk."	Less than 0.1	T.4 Secondary	V.4/5	TB.6/1	0.1
T.1 Primary tapping	TB.3 Socket "A"	TB.3 Socket "C"	" " 0.1	T.6	V.4/6	Sw.3/2 tag 1.A	Sw.3, L.W. 16.3 " M.W. 2.5
T.1 Secondary	V.3 Cap	TB.10/3	Sw.3, S.W. 0.1	T.7 Primary	TB.10/10	TB.8/1	8
			" Gram 0.1	T.7 Primary tapping	TB.10/10	V.8/3	4
T.2 Primary	TB.3 Socket "Blk"	Chassis	" L.W. 60	T.7 Secondary	TB.10/2	VC.5 tag (inside can)	8
			" M.W. 60			V.5/5	
			" S.W. Zero	T.9 Primary	V.1/3	TB.10/12	500 approx.
			" Gram 60				
T.2 Secondary	V.3 Cap	TB.10/8	" L.W. 40	T.9 Secondary	Output Transformer	Output Transformer	0.2**
			" M.W. 2.5				
T.3 Primary	Sw.3/2 tag 5	TB.10/10	60	Speech Coil	Lead 1	Lead 2	2 **
T.3 Secondary	V.4 Cap	TB.7/1	" L.W. 150 approx.	CK.3	V.2/2	TB.10/12	1,140
			" M.W. 2.5	P.T. Primary	C.1/2	200-229 v. tap	Sw.1 "ON" 30
T.5 Primary	V.3/3	Sw.3/2 tag 5	2	" "	C.1/2	230-250 v. tap	" "ON" 35
T.5 Secondary	V.4/Cap	Chassis	" S.W. 0.1				" "OFF" Infinity
			" Gram 100,000 approx.	H.T. Secondary	V.2/3	T.B.2/1	240
T.8 Primary	TB.10/10	VC.6 tag (inside can)	8	" "	V.2/4	T.B.2/1	240
T.8 Primary tapping	TB.10/10	V.4/3		Rectifier L.T. Secondary	V.2/1	V.2/2	0.1††
T.8 Secondary	V.6 Cap	TB.7/1	8	Heater L.T. Secondary ...	V.1/1	V.1/2	0.2††
T.4 Primary	V.4/6	C.20 tag	Sw.3 S.W. 0.1	CK.1	TB.1A/2	C.1/3	2.5
			" Gram Infinity	CK.2	TB.1A/3	C.1/2	2.5

** Resistance of T.9 secondary alone and Speech Coil alone (taken when disconnected).

†† Resistance of L.T. windings taken with all valves removed.

NOTE.—Reference numbers for valves should be read in conjunction with the socket numbers, e.g. V.1-S.1.



UNDER CHASSIS DIAGRAM—MODEL C-638.

ALIGNMENT PROCEDURE.

Before leaving the factory, all Philco receivers are accurately aligned, but if misalignment is suspected through damage, no alteration should be made without instruction in the correct adjustment of the trimming and padding condensers. It should only be carried out with the aid of an accurately calibrated Signal Generator and for this purpose the PHILCO ALL-PURPOSE SET TESTER MODEL 077 is recommended.

Connect the Output Meter across the Primary of the Output Transformer, i.e. green and white leads. With gang condenser fully closed, check that pointer reads on scale margin line. Set wave-change switch to second position from left (M.W.), turn volume control fully clockwise and tone control as far counter clockwise as possible without switching off.

NOTE.—The link on TB.3 must be placed in socket "B."

INTERMEDIATE FREQUENCY.—The I.F. trimmers V.C.'s 4, 5, 6, and 7 must first be carefully adjusted by feeding in a 470 Kc. signal from the Signal Generator through a Standard Dummy to the grid cap of the 6A7 valve (with grid lead connected) and the Signal Generator earthed to the receiver earth socket or chassis. Adjust the Signal Generator Attenuator to give a half-scale reading on the Output Meter. The I.F. trimmers must then be adjusted for maximum output.

Transfer Signal Generator lead via the Standard Dummy to the Aerial Socket.

NOTE.—It is important that the following order of alignment be followed.

LONG WAVES.—Turn wave-change switch to L.W. position (fully counter clockwise) and set pointer at 290 Kc. (small mark on outer edge of S.W. scale above 14.6 Mc.) Feed in a 290 Kc. signal and trim V.C.'s 12, 9, and 16 underneath chassis in that order for maximum output.

Set pointer to 160 Kc. (small mark on outer edge of S.W. scale above 6.1 Mc.) and feed in a signal of 160 Kc. Rock gang and pad V.C.14 (nut) for maximum output. Readjust V.C.12 at 290 Kc. Repeat the above operation until no further improvement results.

MEDIUM WAVES.—Turn wave-change switch to second position clockwise (M.W.) and set pointer at 1,400 Kc. (corresponding to 16 Mc. on S.W. scale). Feed in a signal of 1,400 Kc. and trim V.C.'s 13, 10, and 15 underneath chassis in that order for maximum output.

Set pointer at 600 Kc. ("500" on scale) and feed in a signal of 600 Kc. Rock gang and pad V.C.14 (screw) for maximum output. Readjust V.C.13 at 1,400 Kc. Repeat the above operation until no further improvement is obtainable.

SHORT WAVES.—Turn wave-change switch to third position clockwise (S.W.). Substitute a 400 ohms resistor for the Standard Dummy and feed in an 18 Mc. signal. Set pointer at 18 Mc. and adjust V.C.11 underneath chassis for the second signal heard from tight (care is necessary as the two peaks are narrowly spaced).

NOTE.—Due to the very small difference between the pre-selector and oscillator frequencies, the adjustment of V.C.'s 8 and 17 will have a tendency to "pull" or change the frequency of the oscillator. By shunting a 21-plate variable condenser (approx. .00035 mfd.) across the oscillator section of the gang and tuning it, so that the second harmonic instead of the fundamental beats with the incoming signal, this "pull" can be minimised.

Connect the shunt condenser between V.C.11 tag and chassis and tune it (about half open) for signal at 18 Mc. Trim V.C.'s 8 and 17 underneath chassis in that order for maximum output. Disconnect shunt condenser and retrim V.C.11.

Check that 18 Mc. image is obtained at approximately 17.1 Mc.

Feed in and tune a signal of 6 Mc. and check for correct reading on scale. It should not be necessary to adjust the semi-fixed tracker (C.20) but if sensitivity is found to be low at 6 Mc., very slight adjustment only may be made while rocking the gang. (See note below.) Finally, retrim V.C.11 at 18 Mc.

NOTE.—It is permissible to make this adjustment only on oil-filled condensers. Any adjustment of a wax-sealed condenser will be unstable and on no account must be made.

Check calibration.

PARTS AND PRICE LIST—MODEL C-638.

Ref. No.	Description.	Part No.	List Price	Ref. No.	Description.	Part No.	List Price
T.1	S.W. Aerial Transformer	320-1257	2 0	R.2B	½ watt Insulated Resistor, 63 ohms	330-2044	9
T.2	M. and L.W. Aerial Transformer	320-1214	6 0	or	½ watt Carbon Resistor, 63 ohms	330-1037	9
T.3	M. and L.W. H.F. Transformer	320-1216	6 0	R.3	½ watt Carbon Resistor, 70,000 ohms	5385	9
T.4	S.W. Oscillator Transformer	320-1259	3 6	R.4	½ watt Insulated Resistor, 35,000 ohms	330-2051	9
T.5	S.W. H.F. Transformer	320-1258	3 6	R.5	½ watt Carbon Resistor, 5,000 ohms	5310	9
T.6	M. and L.W. Oscillator Coil	320-1232	3 6	R.7	2 watt Carbon Resistor, 25,000 ohms	33-1072	10
T.7				R.8	1 watt Carbon Resistor, 25,000 ohms	3656	9
VC.4	2nd I.F. Transformer and Trimmers Assy.	320-1234	12 6	R.11	½ watt Insulated Resistor, 32,000 ohms	330-2031	9
VC.5				R.12	½ watt Insulated Resistor, 10,000 ohms	330-2014	9
C.22	Ceramic Condenser 70 mmfd.			R.14	½ watt Insulated Resistor, 100 ohms	330-2060	9
C.23	Ceramic Condenser 70 mmfd.			R.15	½ watt Insulated Resistor, 99,000 ohms	330-2003	9
T.8	1st I.F. Transformer and Trimmers Assy.	320-1233	12 6	R.16	½ watt Carbon Resistor, 400 ohms	330-1012	9
VC.6				R.17	½ watt Insulated Resistor, 160,000 ohms	330-2024	9
VC.7	Ceramic Condenser, 70 mmfd.			R.19	½ watt Carbon Resistor, 1.5 megohms	33-1188	9
C.24	Ceramic Condenser, 70 mmfd.			R.20	½ watt Insulated Resistor, 240,000 ohms	330-2002	9
C.25	Output Transformer, Part No. 320-8061	Complete		R.21	½ watt Insulated Resistor, 51,000 ohms	330-2004	9
T.9	Speech Coil and Cone, Part No. 360-4018	360-1122†	42 0	R.22	½ watt Insulated Resistor, 490,000 ohms	330-2001	9
CK.3	Field Coil			R.23	½ watt Insulated Resistor, 1 megohm	330-2018	9
CK.2	Mains Filter Choke and Screen Assembly	320-1260		R.24	½ watt Insulated Resistor, 240,000 ohms	330-2002	9
VC.1				R.25	½ watt Insulated Resistor, 490,000 ohms	330-2001	9
VC.2	3-Gang Condenser	31-1818	21 0	R.26	½ watt Insulated Resistor, 2,000 ohms	330-2023	9
VC.3				VR.1	Volume Control, 1 megohm	330-5021	3 6
VC.8	Single Padder, 4-30 mmfd.	31-6161	9	SW.1	On-off Switch	420-1036	
VC.9	Double Padder, 110+30 mmfd.	31-6179	1 6	SW.2	Tone Switch	420-1031	9 6
VC.10				SW.3	Wave-change Switch	420-1031	9 6
VC.11	Single Padder, 2.5-20 mmfd.	31-6212	9		6-Prong Valve Holder	27-6036	9
VC.12	Double Padder, 110+30 mmfd.	31-6179	1 6		4-Prong Valve Holder	27-6044 or	9
VC.13					310-6054	1 8	
VC.14	Double Padder, 875+120 mmfd.	31-6180 or	1 8		Power Transformer, 50-100 cycles	320-8005	22 6
VC.15					31-6115	2 0	P.T.
VC.16	Double Padder, 80+15 mmfd.	31-6115	2 0		Pilot Bulb	34-2141	
VC.17					31-6212	9	LP.1
EC.1	Electrolytic Condenser, 10 mfd.	300-4081	1 6		Grid Clip	28-2214	
EC.2	Electrolytic Condenser, 16 mfd.	300-2013	6 0		Rubber Grommet	270-7264	
EC.3	Electrolytic Condenser, 16 mfd.	300-2013	6 0		Rubber Buffers	270-7189	
EC.4	Electrolytic Condenser, 16 mfd.	30-2118	5 6		Mains Cable	LO-1009	1 9
EC.5	Electrolytic Condenser, 4 mfd.	300-2008	2 6		Speaker Cable	LO-1085	1 9
C.1A	Tubular Condenser, .002 mfd.	30-4177	9		Mains Voltage Adjusting Panel	380-5342	9
C.1	Moulded Condenser, .09+.09 mfd.	4989-DG	2 0		Mains Voltage Adjusting Plug	380-5340	6
C.2	Tubular Condenser, .05 mfd.	30-4518 or			Scale Holder Assembly	380-5351	2 6
C.3	Moulded Condenser, .02+.05 mfd.	30-4123	1 6		Pointer Hub and Felt Pad Assembly	380-5526	
C.4	Tubular Condenser, .006 mfd.	30-4024	10		Wave-band Indicator Assembly	380-5587	
C.4A	Tubular Condenser, .01 mfd.	30-4146	9		Dial Scale	270-5097C	4 9
C.5	Tubular Condenser, .01 mfd.	30-4145	9		Rubber Cushion Plate	27-7497	
C.6	Tubular Condenser, .05 mfd.	30-4020	9		Chassis Corner Feet (Rubber)	27-4116	
C.7	Tubular Condenser, .001 mfd.	30-4201	10		Chassis Mounting Washers	29-2089	
C.8	Tubular Condenser, .05 mfd.	30-4020	9		Chassis Mounting Bolts	W-1345	
C.8A	Mica Condenser, 70 mmfd.	300-1049	1 0		Cable Clamp	28-2345	
C.9	Mica Condenser, 50 mmfd.	200-1046	9		Large Tuning Knob and Spring	270-4120	
C.9A	Ceramic Condenser, 5 mmfd.	300-1074	9		Small Tuning Knob and Spring	270-4118	
C.10	Tubular Condenser, .1 mfd.	30-4122	1 0		Knob (Wave-change) and Spring	270-4118	
C.11	Ceramic Condenser, 14 mmfd.	800-1070	9		Knob (Tone) and Spring	270-4114	
C.12	Tubular Condenser, .01 mfd.	80-4124	9		Knob (Volume) and Spring	270-4140	
C.14	Mica Condenser, 110 mmfd.	30-1031 or	10		Knob Spring for Large knob	28-1738	
C.15		300-1056	10		Knob Spring for Small knob	280-5262	
C.16	Mica Condenser, 110 mmfd.	30-1031 or	10		Red Wander Plug	380-5087	
C.17		300-1056	10		Black Wander Plug	380-5015	
C.18	Mica Condenser, 110 mmfd.	30-1031 or	10	V.1	Type 42E Pentode Output Valve	8315E	
C.19		300-1056	10	V.2	Type 80 Full Wave Rectifier Valve	3149	
C.20	Tubular Condenser, .1 mfd.	30-4170	1 0	V.3	Type 78E Variable-mu H.F. Pentode Valve	8315E	
R.1	½ watt Insulated Resistor 240,000 ohms	31-6219 or		V.4	Type 6A7 Variable-mu Heptode Valve	34-2002	
R.2		310-6055		V.5	Type 75 Double-diode Triode Valve	8002	
R.2A	½ watt Insulated Resistor, 63 ohms	330-2002	9	V.6	Type 78E Variable-mu H.F. Pentode Valve	8315E	
or		½ watt Carbon Resistor, 63 ohms	330-1037	9			

† When ordering speaker parts, the letter which will be found in the part number of the Speaker must also be given.