



PHILCO



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Model S.521

TYPE CIRCUIT: Five-valve Superheterodyne Receiver with Quiescent Pentode Output (0.6 watt undistorted) for operation on Medium and Long Wavebands. Full A.V.C. is incorporated in the circuit, and provision is made by means of sockets on the speaker panel for connecting an external speaker of the Permanent Magnet Moving Coil type, having an impedance of 2-3 ohms. By reason of special design and temperature drift compensation, the Receiver has a very high degree of frequency stability.

POWER SUPPLY: Low tension accumulator, 2 volts, approximate size 5 in. x 2½ in. x 8 in. in height; combined high tension, 120 volts and Grid Bias, 9 volts, approximate size 10 in. x 6½ in. x 3¼ in. in height. Suitable types are Exide, Type CZG3 or CZG2 or Pertrix, Type PXG3 or PXG2 accumulator and Exide, Type H1071 or H1104 or Pertrix, Type 2459 or Ever Ready, Type "Portable 34" or Siemens "Full-o'-Power," Type 1342, combined H.T. and G.B. Battery. Provision is made by means of a connecting link supplied with the Receiver for using separate H.T. and G.B. batteries, if desired. The black plug on the link connects to the socket in the black (H.T.—) plug and the red plug on the link is inserted in the positive (+) socket of the separate Grid Bias Battery. With this arrangement both batteries should be of similar capacity and must be renewed together.

WAVEBANDS: COVERAGE: Two: (a) Medium, 200-550 metres (1,500-545.4 kilocycles); (b) Long, 1,100-1,900 metres (272.7-157.9 kilocycles).

TUNING DIAL: Philco Automatic Dial Tuning device, glowing beam station indicator and slow motion manual drive-ratio 14-1.

LOUDSPEAKER: Bakelite Cabinet Models—a 6-inch diameter nickel-aluminium alloy permanent magnet moving coil speaker with curvi-linear cone is used. This speaker gives the highest efficiency audio output and greater bass response.

Wood Cabinet Models—an 8-inch diameter permanent magnet moving coil speaker is used.

INTERMEDIATE FREQUENCY: 475 Kc.

POWER CONSUMPTION: L.T. current, 0.7 amp.; H.T. current, 7 milliamps quiescent, 9.5 milliamps normal, rising to 15 milliamps on loud signals.

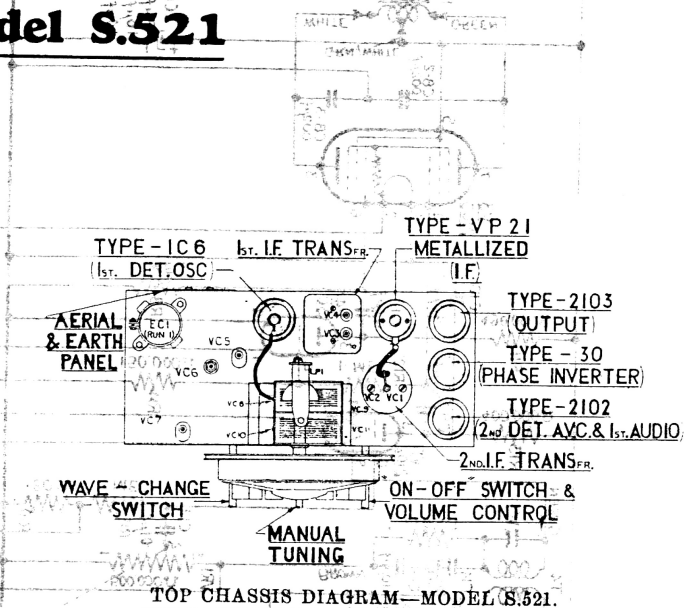


TABLE 1 — VOLTAGES

Valve socket readings to chassis taken with an 666, 077 or J3 Philco Set Tester, using the 250 and 100 volts ranges. Volume control at minimum, wavechange switch in M.W. position and no aerial connected.

POSITION	VALVE	ANODE	SCREEN
1st Detector and Oscillator, S.1 ...	IC 6	Pin 3. 120 v. Pin 4. 85 v.*	Pin 6. 35 v.
I.F. Amplifier, S.2	VP21 (Metallised)	Cap. 120 v.	Pin 7. 30 v.
2nd Detector A.V.C. and 1st I.F. Amplifier, S.5	2102	Pin 3. 45 v.	
Phase Inverter, S.4	30	Pin 3. 40 v.	
Quiescent Pentode-Output, S.3	2103	Pin 3. 120 v. Pin 7. 120 v.	Pin 5. 120 v.

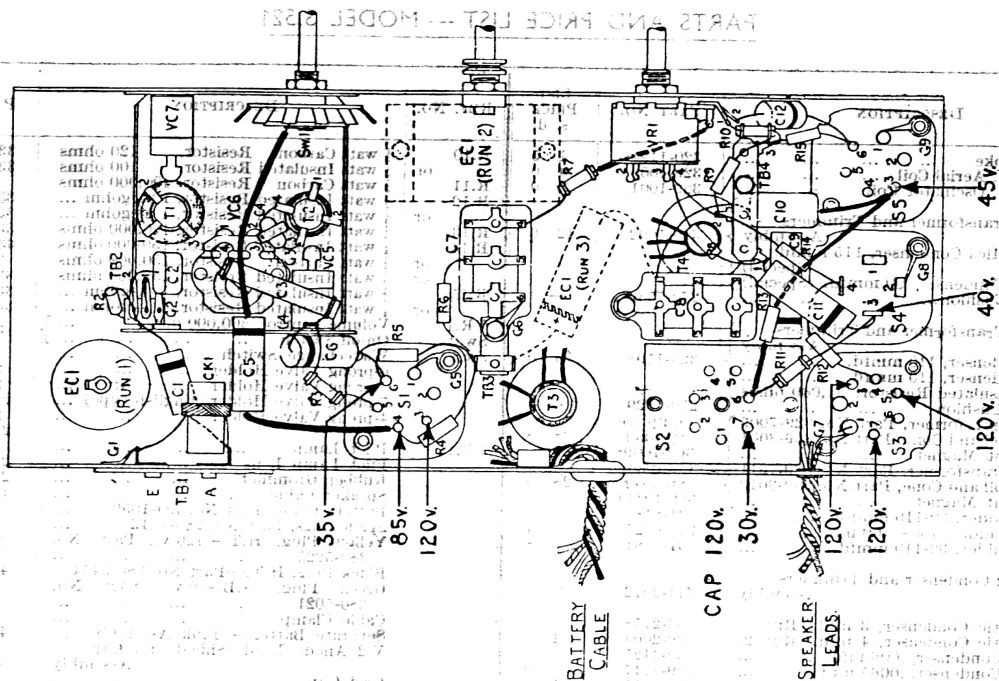
* Oscillator Anode Volts. Filament voltage on each valve, 2 volts.

TABLE 2 — RESISTANCES OF COILS

REF. NO.	TEST PROD. 1	TEST PROD. 2	RESISTANCE (Ohms)	REF. NO.	TEST PROD. 1	TEST PROD. 2	RESISTANCE (Ohms)
CK.1	TB.1 Socket "A"	Chassis	25	T.4 Primary	V.2 Cap	TB.3	12
T.1	V.1 Cap	TB.2/2	Sw.1. M.W. 3.5 L.W. 45	T.4 Secondary	V.6/5	VR.1/3	51,000 approx.
T.3 Primary	V.1/3	TB.3	8	T.5 Primary	V.3/3 V.3/7	V.3/5	250 approx. 250 approx.
T.3 Secondary	V.2/2	TB.2/1	12	T.5 Secondary	Output Transformer	Output Transformer	0.2†
T.2	V.1/5	Sw.1/1	Sw.1. M.W. 5 L.W. 25	Speech Coil	Lead 1	Lead 2	2†

† Resistance of T.5 Secondary alone and Speech Coil alone (taken when disconnected).

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



UNDER CHASSIS DIAGRAM—MODEL S.521.

ALIGNMENT PROCEDURE — MODEL S.521

Before leaving the Factory, all Philco Receivers are accurately aligned, but if misalignment is suspected through damage, no alteration must be made without instruction in the correct adjustment of the trimming and padding condensers. It should be carried out only with the aid of an accurately calibrated Signal Generator, and for this purpose the PHILCO ALL-PURPOSE SET TESTER, MODEL 077 or 077E, is recommended. Connect the Output Meter across the Primary of the Output Transformer, i.e., green and white leads. Turn wave-change switch clockwise (M.W. position) and volume control fully clockwise.

DIAL CALIBRATION: In order to adjust this Receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Open tuning condenser to fullest extent, insert a .006 in. feeler gauge under the heel of the moving vanes and close tuning condenser on to gauge.

With tuning condenser in this position, check that indicator reads on index point (under letter "A" in word "LENINGRAD").

Remove feeler gauge.

INTERMEDIATE FREQUENCY: The I.F. trimmers (VC's 1, 2, 3 and 4) must first be carefully adjusted by feeding in a 475 Kc. signal from the Signal Generator via a Standard Dummy to the grid cap of the 106 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.

MEDIUM WAVES: Set dial at 1,400 Kc. (dot at 214 metres); feed in a signal of 1,400 Kc. and trim VC's 10 and 8 in that order for maximum output.

Feed in and tune a signal of 600 Kc. (500 metres). Rock tuning condenser and pad VC.6 (screw) for maximum output. Readjust VC.10 at 1,400 Kc. Repeat the above operation until no further improvement results.

LONG WAVES: (a) With wave-change switch in M.W. position, feed in and tune a 1,050 Kc. (285.7 metres) signal—this corresponds to West of England Regional. Keep dial in this position and turn wave-change switch counter-clockwise (L.W. position).

(b) Feed in a signal of 232 Kc. (1,293 metres), this corresponds to Luxembourg—and adjust VC's 5 and 7 in that order for maximum output.

(c) Feed in and tune a signal of 160 Kc. (corresponding to dot under letter "T" in word "BUDAPEST"). Rock tuning condenser and pad VC.6 (nut) for maximum output.

Repeat operations (a) and (b).

Repeat operations (c), (a) and (b) in that order until no further improvement is obtainable.

ALTERNATIVELY, the L.W. alignment may be carried out as follows:—

Turn wave-change switch to L.W. position (counter-clockwise rotation) and set dial so that indicator reads on dot above letter "R" in word "LUXEMBOURG." Feed in a signal of 240 Kc. and trim VC's 5 and 7 in that order for maximum output.

Set dial so that indicator reads on dot under letter "T" in word "BUDAPEST" and feed in a signal of 160 Kc. Rock tuning condenser and pad VC.6 (nut) for maximum output. Readjust VC.5 at 240 Kc. Repeat the above operation until no further improvement is obtainable.

NOTE.—For accurate coincidence of medium and long wave stations on Automatic Dial Push Buttons, the first method of alignment should be carried out.

Check calibration.

PARTS AND PRICE LIST — MODEL S.521

REF. NO.	DESCRIPTION	PART NO.	LIST PRICE s. d.	REF. NO.	DESCRIPTION	PART NO.	LIST PRICE s. d.
CK.1	Aerial Choke	320-1191	1 5	R.10	1/2 watt Carbon Resistor, 120 ohms	330-1032	8
T.1	M. & L.W. Aerial Coil	320-1000	4 0	R.11	1/2 watt Insulated Resistor, 100 ohms	339-2008	8
T.2	M. & L.W. Oscillator Coil	329-1001	3 0	R.12	1/2 watt Carbon Resistor, 490,000 ohms	6097	8
T.3				R.13	1/2 watt Insulated Resistor, 1 megohm	330-2018	8
VC.3	1st I.F. Transformer and Trimmers Assembly	320-1002	12 0	R.14	1/2 watt Insulated Resistor, 400,000 ohms	339-2028	8
VC.4						R.14	1/2 watt Insulated Resistor, 150,000 ohms
C.15	Silvered Mica Condenser, 115 mmfd. (Special)			or	1/2 watt Carbon Resistor, 150,000 ohms	339-2024	8
C.16	Ceramic Condenser, 50 mmfd. (Special)			or	1/2 watt Insulated Resistor, 150,000 ohms	33-1188	8
T.4	Coil Can Cushion	270-7539	—	R.15	1/2 watt Insulated Resistor, 1 megohm	330-2058	8
VC.1	2nd I.F. Transformer and Trimmers Assembly	320-1198	13 0	or	1/2 watt Insulated Resistor, 1 megohm	330-2018	8
VC.2						VR.1	Volume Control, 500,000 ohms
C.13	Mica Condenser, 110 mmfd.			Sw.2	On-off Switch	33-5213/1	4 6
C.14	1/2 watt Insulated Resistor, 51,000 ohms			Sw.1	Wavechange Switch	42-1321	2 9
R.1	Permanent Magnet				6-prong Valve Holder	27-6036	1 0
T.5	Output Transformer, Part No. 329-7009	270-7529	—		7-prong Valve Holder	27-6037	1 0
or T.5	Speech Coil and Cone, Part No. 369-3001	Complete Speaker	28 8		7-prong Valve Holder (English type)	270-6007	1 0
	Permanent Magnet	369-1279	—	LP.1	4-prong Valve Holder	27-6044 or	1 0
	Output Transformer, Part No. 329-7011	Complete Speaker	28 0		Pilot Lamp	270-6010	1 0
	Speech Coil and Cone, Part No. 369-3010	Complete Speaker	28 0		Pilot Lamp Lens	34-2150	1 9
	Permanent Magnet	369-1011†	—		Rubber Grommet	270-7341	1
VC.5	Single Padder, 30-110 mmfd.	31-6181	8		Speaker Cable	I.O-1004	1 0
VC.6	Double Padder, 100+100 mmfd.	310-6027	1 4		Battery Cable, Part No. I.O-1059		
VC.7	Single Padder, 30-110 mmfd.	31-6181	8		Spade Tags, Part No. 280-1012		
VC.8					Yellow Plug, H.T.+120 v., Part No. 380-5225	Complete Assembly	4 0
VC.9	Two-gang Condenser and Trimmers Assembly	311-2012	21 0		Black Plug, H.T.—Part No. 380-5454	410-3020	
VC.10							Green Plug, G.B.—9 v., Part No. 380-5021
VC.11					Cable Clamp	28-2345	doz. 5
EC.1	Electrolytic Condenser, 3 mfd. (Run 1)	30-2158	3 0		Separate Batteries Link Assembly	410-3023	8
or	Electrolytic Condenser, 4 mfd. (Run 2)	309-2004	1 9		V.2 Anode Lead, Shield and Cap		
C.1	Tubular Condenser, .0065 mfd.	30-4125	9		380-5283 Assembly		1 6
or	Tubular Condenser, .0065 mfd.	309-4117	9		Grid Clip	28-2214	doz. 6
C.2	Mica Condenser, 2,250 mmfd.	30-1055 or	1 5		Gang Condenser Mounting Bracket and Dial Stops Assembly		
		300-1072	1 2		Black Auto Dial Assembly	389-5048	3 11
C.3	Ceramic Condenser, 220 mmfd. (Special)	309-1121	1 0		Brown Auto Dial Assembly	389-5049	30 0
and	Ceramic Condenser, 25 mmfd. (Special)	309-1105*	1 0	or	Dial Scale	279-5001	2 4
or	Ceramic Condenser, 250 mmfd. (Special)	309-1124	1 0		Drive Spindle Assembly	389-5003	4
	Ceramic Condenser, 220 mmfd. (Special)	309-1127	1 0		Shaft Retaining Clip	28-2043	1
C.4	Ceramic Condenser, 15 mmfd. (Special)	309-1120	1 0		Tuning Belt Assembly	389-5010	—
C.5	Tubular Condenser, .0008 mfd.	30-4355	9		Dog and Screw Assembly	389-5008	9
C.6	Tubular Condenser, .065 mfd.	309-4022	9		Black Push Button	279-4001	9
C.7	Moulded Condenser, .05+.05 mfd.	8615-DG	1 10		Brown Push Button	279-4005	9
C.8	Moulded Condenser, .002+.002 mfd.	7296-DG or	2 0	or	Station Names Kit (7 names)	409-5000	1 8
		300-4034	1 6		Station Names Kit (21 names)	409-5001	6
C.9	Tubular Condenser, .01 mfd.	30-4124 or	9		Chassis Mounting Screws	W-1345	1
		309-4018	9		Chassis Mounting Washers	29-2089	doz. 2
C.10	Mica Condenser, 140 mmfd.	300-1212	6		Chassis Mounting Rubbers (Thick)	270-7451	2
C.11	Tubular Condenser, .01 mfd.	30-4124 or	9		Chassis Mounting Rubbers (Thin)	270-7579	2
		309-4018	9		Chassis Mounting Cups	270-7374	2
C.12	Tubular Condenser, .01 mfd.	30-4124 or	9		Rubber Feet	279-7036	1
		309-4018	9		Wave-change Knob and Spring (Black)	270-4179	8
R.2	1/2 watt Insulated Resistor, 99,000 ohms	330-2012	8		Plain Knob and Spring (Black)	270-4177	8
or	1/2 watt Insulated Resistor, 100,000 ohms	339-2023	8		Wave-change Knob and Spring (Brown)	270-4197	8
R.3	1/2 watt Carbon Resistor, 190,000 ohms	33-1116	8	or	Plain Knob and Spring (Brown)	270-4183	8
or	1/2 watt Carbon Resistor, 200,000 ohms	33-1184	8		Knob Spring	280-5262	doz. 4
or	1/2 watt Carbon Resistor, 200,000 ohms	33-1048	8		Red Wander Plug	380-5087	3
R.4	1/2 watt Insulated Resistor, 20,000 ohms	339-2033	8	V.1	Black Wander Plug	380-5015	3
or	1/2 watt Insulated Resistor, 15,000 ohms	339-2019	8	V.2	Type 106 Variable-mu Heptode Valve	84-2033	10 6
R.5	1/2 watt Insulated Resistor, 150,000 ohms	33-1183	8		Type VP21 (Met.) Variable-mu H.F. Pentode Valve		
or	1/2 watt Carbon Resistor, 150,000 ohms	330-2058	8	V.8	Type 2108 Quiescent Pentode Output Valve	340-2002	9 0
or	1/2 watt Insulated Resistor, 150,000 ohms	339-2024	8		Type 30 Triode Valve	34-2067	14 0
or	1/2 watt Carbon Resistor, 150,000 ohms	33-1183	8	V.4	Type 2102 Double Diode Triode Valve	34-4191	5 6
R.6	1/2 watt Insulated Resistor, 150,000 ohms	330-2058	8	V.5	Instruction Manual	399-3060	10 0
or	1/2 watt Carbon Resistor, 150,000 ohms	33-1188	8		Automatic Dial Buttons Adjusting Tool	289-1028	9
R.7	1/2 watt Insulated Resistor, 1.5 megohms	339-2029	8				
or	1/2 watt Insulated Resistor, 1.5 megohms	330-2018	8				
R.8	1/2 watt Insulated Resistor, 1 megohm	339-2028	8				
or	1/2 watt Insulated Resistor, 1 megohm	339-2013	8				

† When ordering Speaker parts, the letter which will be found in the part number of the Speaker must also be given.
 * Only fitted to some models when necessary.

† Bakelite Cabinet Models. † Wood Cabinet Models.

Above prices do not apply in Eire.

JULY, 1938.

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