



PHILCO



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TYPE CIRCUIT: Five-valve Superheterodyne Receiver with Delayed A.V.C., and Pentode Output (3 watts) for operation on Short, Medium and Long wave-bands. 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. By reason of special design and temperature drift compensation, the Receiver has a very high degree of frequency stability.

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

WAVE-BANDS: COVERAGE: Three: (a) Short, 18.6 megacycles (16.6-50 metres); (b) Medium, 200-550 metres (1,500-545.4 kilocycles); (c) 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 drive—ratio 40-1.

TONE CONTROL: The extreme counter-clockwise position is the high fidelity position. Turning the knob in a clockwise direction operates a switch, providing a sharp cut to eliminate "heterodyne whistles." Further clockwise rotation serves to alter the tonal balance, discriminating against the higher frequencies.

LOUDSPEAKER: Bakelite Cabinet Models—6 ins. diameter fully energised moving coil speaker with curvi-linear cone, which in conjunction with the Philco System of Audio Degeneration, gives the highest efficiency audio output and greater bass response. Wood Cabinet Models—An 8 in. diameter electrodynamic speaker is used.

INTERMEDIATE FREQUENCY: 475 Kc.

POWER CONSUMPTION: 60 watts.

Model D.531

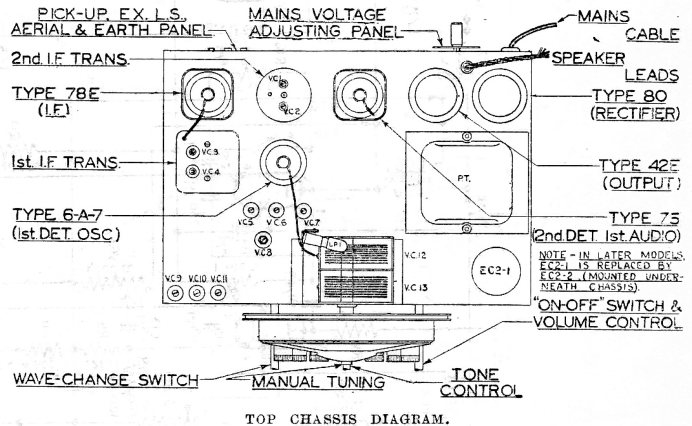


TABLE 1 —
VOLTAGES.

Valve socket readings to chassis taken with an 065, 077 or J3 Philco Set Tester, using the 500, 250 and 10 volts ranges. Volume control at minimum, tone control fully counter-clockwise, wave-change switch in M.W. position and no aerial connected. A.C. line, 230 volts, 50 cycles.

POSITION	VALVE	ANODE	SCREEN	BIAS
1st Detector and Oscillator, S.2 ...	6A7	Pin 3. 265 v. Pin 5. 200 v.*	Pin. 4. 90 v.	—
I.F. Amplifier, S.1 ...	78E	Pin 3. 265 v.	Pin 4. 90 v.	Pin 5.—3.5 v.
2nd Detector, A.V.C. and 1st L.F. Amplifier, S.3 ...	75	Pin 3. 150 v.	—	Pin 6. 5 v.
Pentode Output, S.4 ...	42E	Pin 3. 250 v.	Pin 4. 265 v.	—18 v.†
Full Wave Rectifier, S.5 ...	80	Pin 3. 350v.A.C. Pin 4. 350v.A.C.	—	—

* Oscillator Anode Volts. † Bias measured between T.B.5/2 and chassis. Total D.C. 365 volts, measured between V.5/1 and T.B.5/2. V.1, V.2, V.3, V.4 and L.P.1 filaments, each 6.3 volts A.C.; V.5 filament, 5 volts A.C., measured between pins 1 and 2 on each socket.

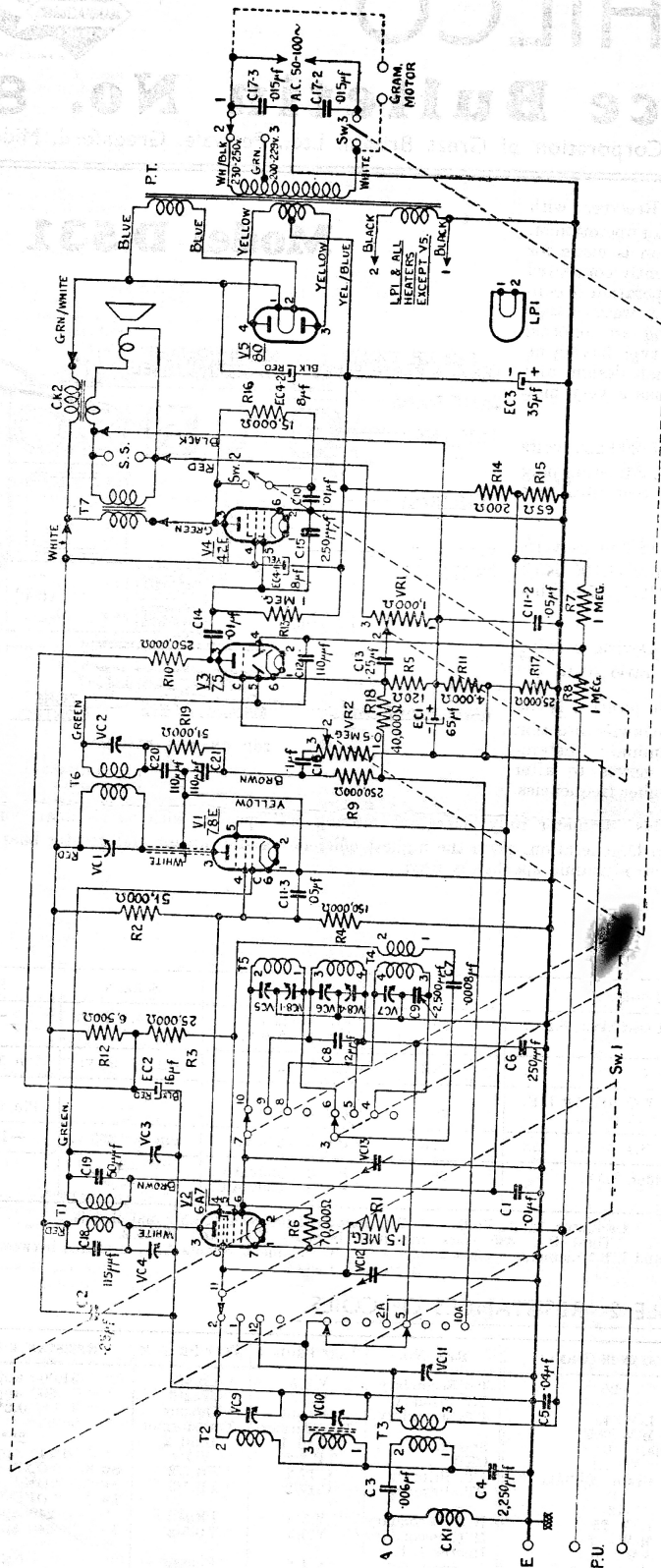
TABLE 2—RESISTANCES OF COILS.

REF. NO.	TEST PROD. 1	TEST PROD. 2	RESISTANCE (OHMS)	REF. NO.	TEST PROD. 1	TEST PROD. 2	RESISTANCE (OHMS)
CK.1 ...	TB.1	Chassis	25	T.6 Secondary	V.3/5	TB.4/3	51,000 approx.
T.2 ...	Socket "A"	T.2/1	Sw.1. L.W. 45	T.7 Primary	V.4/3	TB.2/2	500 approx.
T.3 Primary	T.3/2	T.2/1	Sw.1. M.W. 3.5	T.7 Secondary	Output	Output	0.2**
T.3 Secondary	V.2 Cap	T.3/3	Less than 0.1	Speech Coil ...	Lead 1	Lead 2	2**
T.1 Primary	V.2/3	TB.2/2	Sw.1. S.W. 0.1	CK.2 ...	TB.2/2	V.5/1	1,140 approx.
T.1 Secondary	V.1 Cap	V.1/5	Sw.1. Gram. Infinity	PT. Primary	C.17/2	TB.7/2	Sw.3. "ON," 20
T.5 ...	V.2/6	Sw.1/3	8	PT. Primary	C.17/2	TB.7/3	Sw.3. "ON," 18
T.4 Primary	V.2/6	Sw.1/3	12	H.T. Secondary	V.5/3	TB.5/2	Sw.3. "OFF," Infinity
T.1 Secondary	V.1 Cap	V.1/5	Sw.1. L.W. 25	H.T. Secondary	V.5/4	TB.5/2	240 approx.
T.5 ...	V.2/6	Sw.1/3	Sw.1. M.W. 5	Heater L.T.	Secondary	Chassis	240 approx.
T.4 Primary	V.2/6	Sw.1/3	Sw.1. S.W. 0.1	Rectifier L.T.	V.4/2		0.2††
T.4 Secondary	V.2/5	T.4/1	Sw.1. Gram. Infinity	Secondary	V.5/1	V.5/2	0.1††
T.6 Primary	V.1/3	TB.2/2	0.5				
			12				

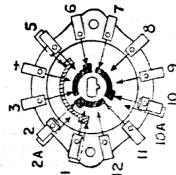
** Resistance of T.7 Secondary alone and Speech Coil alone (taken when disconnected).

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

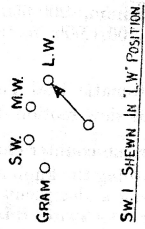
NOTE: Reference numbers for valves should be read in conjunction with the socket numbers, e.g., V.1—S.1.



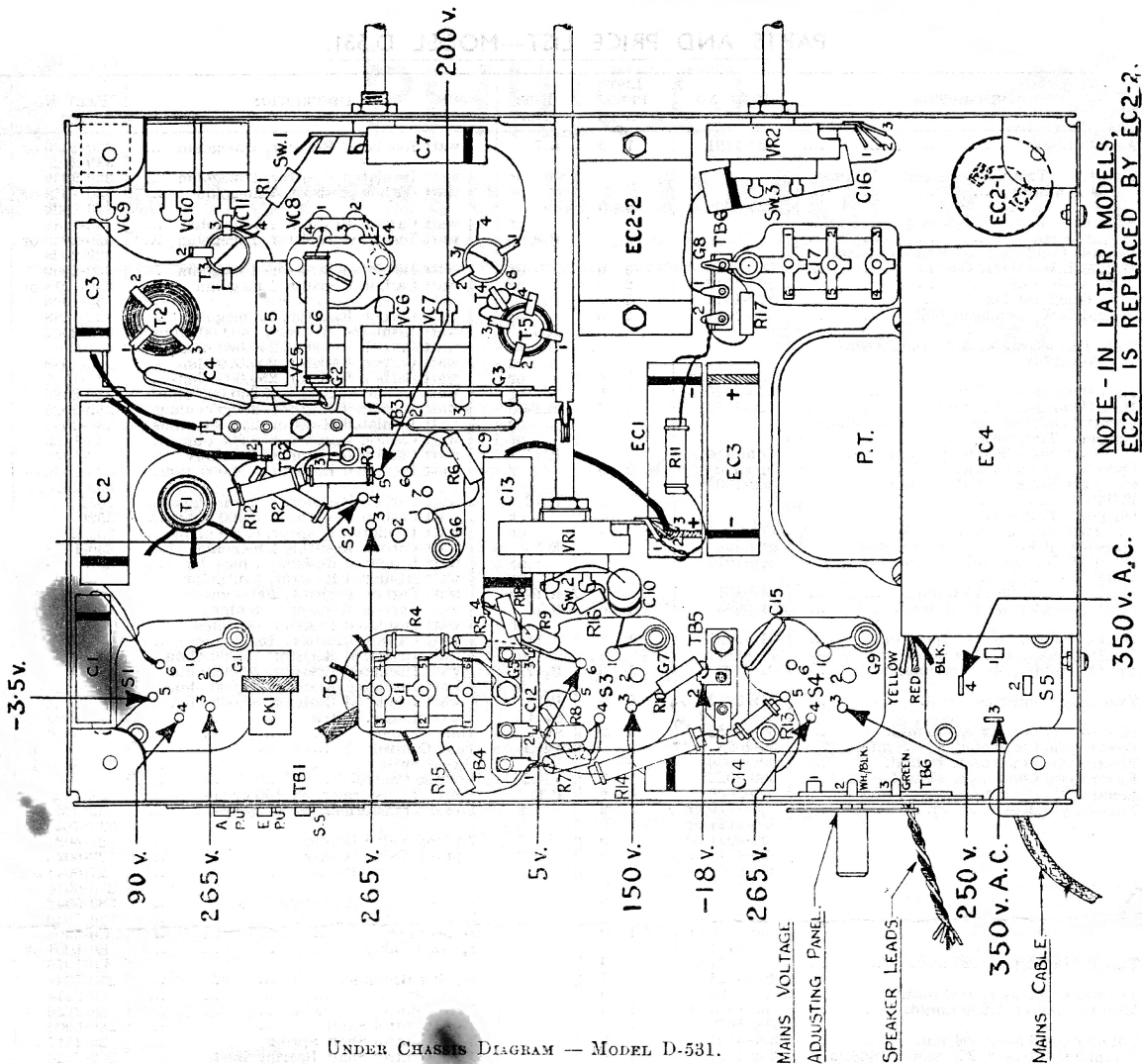
NOTE - ADDITION OF MOTOR CONNECTIONS FOR RADIOGRAM MODEL



VIEW OF SW.1 FROM REAR
CHASSIS BEING UPSIDE DOWN
SOLID AREA INDICATES FRONT OF SWITCH WAFER
SHADED AREA INDICATES REAR OF SWITCH WAFER



SCHEMATIC DIAGRAM — MODEL D-681.



UNDER CHASSIS DIAGRAM — MODEL D-531.

ALIGNMENT PROCEDURE — MODEL D.531.

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. Set wave-change switch to second position from left (M.W.), turn volume control fully clockwise and tone control fully counter-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:—

Check that the light slot and pilot light are in line with the letter "D" in word "DAVENTRY" on the S.W. scale, and the dot at 214 metres under letters "OR" in word "R. NORMANDIE."

Open tuning condenser to fullest extent, insert a .006 in. feeler gauge under the heel of the moving vanes and close the tuning condenser on to gauge. With tuning condenser in this position, check that indicator reads on letter "E" in word "R. NORMANDIE." 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 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.

MEDIUM WAVES: Set dial at 1,400 kc. (corresponding to dot at 214 metres, under letters "OR" in word "R. NORMANDIE"); feed in a signal of 1,400 kc., and trim VC.'s 6 and 10 in that order for maximum output.

Feed in and tune a signal of 600 kc. (500 metres). Rock tuning condenser and pad VC.8 (screw) for maximum output. Readjust VC.6 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 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 fully 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 9 in that order for maximum output.

(c) Feed in and tune a signal of 160 kc. (corresponding to dot at 1,875 metres). Rock tuning condenser and pad VC.8 (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 (maximum counter-clockwise rotation) and set dial so that indicator reads on 1,250 metres (240 kc.). Feed in a signal of 240 kc. and trim VC.'s 5 and 9 in that order for maximum output.

Set dial so that indicator reads on dot at 1,875 metres and feed in a signal of 160 kc.

Rock tuning condenser and pad VC.8 (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 L.W. alignment should be carried out.

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 dial so that indicator reads on 18 mc., and adjust VC.7 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 VC.11 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 VC.7 tag and chassis and tune it (about half open) for signal at 18 mc. Trim VC.11 for maximum output. Disconnect shunt condenser and retrim VC.7.

Check that the 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. (There is no tracker adjustment for 6 mc.).

Check calibration.

PARTS AND PRICE LIST—MODEL D.531.

REF. No.	DESCRIPTION	PART No.	LIST PRICE £ s. d.	REF. No.	DESCRIPTION	PART No.	LIST PRICE £ s. d.
CK.1	Aerial Chokey	320-1191	1 3	R.7	1/2 watt Insulated Resistor, 1 megohm ...	330-2030 or	9
T.1	1st I.F. Transformer and Trimmers Assembly	329-1002	9 0	or	1/2 watt Insulated Resistor, 1 megohm ...	330-2028	9
VC.3				or	1/2 watt Carbon Resistor, 1 megohm ...	330-2039	9
VC.4	Silvered Mica Condenser, 115 mfd. (Special)	329-1000	3 6	or	1/2 watt Carbon Resistor, 1.5 megohm ...	330-1018 or	9
C.18				or	1/2 watt Insulated Resistor, 1 megohm ...	33-1096	9
C.19	Ceramic Condenser, 50 mmfd. (Special) ...	329-1012	2 0	R.8	1/2 watt Carbon Resistor, 1.5 megohm ...	330-2030 or	9
T.2	M. and L.W. Aerial Coil	329-1011	2 0	or	1/2 watt Insulated Resistor, 1 megohm ...	330-2028	9
T.3	S.W. Aerial Coil	329-1001	2 6	or	1/2 watt Carbon Resistor, 1 megohm ...	330-2039	9
T.4	S.W. Oscillator Coil	329-1001	2 6	or	1/2 watt Carbon Resistor, 1.5 megohm ...	330-1018 or	9
T.5	M. and L.W. Oscillator Coil			or	1/2 watt Carbon Resistor, 1.5 megohm ...	33-1096	9
T.6	2nd I.F. Transformer and Trimmers Assembly	32-2503 or	7 6	R.9	1 watt Carbon Resistor, 240,000 ohms ...	330-2002	9
VC.1				or	1 watt Carbon Resistor, 240,000 ohms ...	4410	9
VC.2	Mica Condenser, 110 mmfd.	320-1126 or	7 6	or	1 watt Carbon Resistor, 200,000 ohms ...	33-1048	9
C.20	Mica Condenser, 110 mmfd.	320-1155	7 6	or	1 watt Carbon Resistor, 250,000 ohms ...	33-1185	9
C.21	1/2 watt Insulated Resistor, 51,000 ohms.	Complete	1 2 0	R.10	watt Insulated Resistor, 250,000 ohms ...	339-2025	9
R.19	Output Transformer, Part No. 329-7001			Speaker	369-1001†	or	watt Insulated Resistor, 250,000 ohms ...
T.7	Speech Coil and Cone, Part No. 369-3001	Wood	Complete	R.11	watt Carbon Resistor, 4,000 ohms ...	33-1185	9
CK.2	Field Coil			Cabinet	369-1010†	or	watt Carbon Resistor, 4,000 ohms ...
or T.7	Output Transformer, Part No. 329-7007	Models	Complete	or	watt Insulated Resistor, 4,000 ohms ...	330-2056 or	9
CK.2	Speech Coil and Cone, Part No. 369-3010			Models	369-1010†	or	1 watt Carbon Resistor, 6,000 ohms ...
VC.5	Field Coil	31-6181	9	R.12	1 watt Carbon Resistor, 5,000 ohms ...	7852	9
VC.6	Single Padder, 30-110 mmfd.	31-6093	1 6	or	watt Insulated Resistor, 6,500 ohms ...	3526	9
VC.7	Double Padder, 30 + 30 mmfd.	310-6027	1 6	R.13	watt Insulated Resistor, 1 megohm ...	339-2017	9
VC.8	Single Padder, 30-110 mmfd.	31-6181	9	or	watt Carbon Resistor, 1 megohm ...	330-1018	9
VC.9	Double Padder, 30 + 30 mmfd.	31-6093	1 6	or	watt Insulated Resistor, 1 megohm ...	339-2028	9
VC.10	Two-gang Condenser	312-2012	9 0	R.14	watt Insulated Resistor, 1 megohm ...	330-2018	9
VC.11				or	1 watt Carbon Resistor, 200 ohms ...	330-1033	9
VC.13	Electrolytic Condenser, 65 mfd.	309-2002	1 2	R.15	watt Carbon Resistor, 65 ohms ...	339-1107	9
EC.1	Electrolytic Condenser, 8 + 8 mfd.	30-2925	—	or	watt Insulated Resistor, 63 ohms ...	330-2044	9
EC.2/1 or	Electrolytic Condenser, 16 mfd.	309-2006	1 9	R.16	watt Carbon Resistor, 15,000 ohms ...	33-1177	9
EC.3	Electrolytic Condenser, 35 mfd.	309-4022	4 6	or	watt Insulated Resistor, 15,000 ohms ...	330-2019	9
EC.4	Electrolytic Condenser, 8 + 8 mfd.	309-2000	4 6	R.17	watt Insulated Resistor, 20,000 ohms ...	330-2049	9
C.1	Tubular Condenser, .01 mfd.	30-4479 or	9	or	watt Insulated Resistor, 25,000 ohms ...	339-2020	9
or	Tubular Condenser, .015 mfd.	30-4124 or	9	R.18	watt Insulated Resistor, 40,000 ohms ...	339-2021	9
or	Tubular Condenser, .03 mfd.	30-4051 or	9	Sw.1	Wave-change Switch	429-1000	3 6
or	Tubular Condenser, .05 mfd.	30-4145 or	9	Sw.2	Tone Switch	339-5000	5 6
C.2	Tubular Condenser, .25 mfd.	309-4018	—	VR.1	Tone Control	331-5208/1	2 9
C.3	Tubular Condenser, .006 mfd.	30-4226	1 0	Sw.3	On-off Switch		
C.4	Mica Condenser, 2,250 mmfd.	30-4025	9	VR.2	Volume Control	32-7823	18 0
C.5	Tubular Condenser, .04 mfd.	30-4020 or	9	P.T.	Power Transformer, 50-100 cycles ...		
C.6	Ceramic Condenser, 220 mmfd. (Special)	30-4123 or	1 0	or	Power Transformer, 25-40 cycles ...	320-7040	7
and	Ceramic Condenser, 25 mmfd. (Special)	30-4444	9	7-prong Valve Holder	27-6037	6	
or	Ceramic Condenser, 250 mmfd. (Special)	30-4134 or	9	6-prong Valve Holder	27-6036	6	
C.7	Tubular Condenser, .0008 mfd.	309-4025	9	4-prong Valve Holder	27-6044 or	6	
C.8	Ceramic Condenser, 12 mmfd.	30-4125	9	Mains Voltage Adjusting Panel ...	270-6010	4	
C.9	Silvered Mica Condenser, 2,500 mmfd. ...	30-1055 or	1 3	Mains Voltage Adjusting Plug ...	380-5342	6	
C.10	Tubular Condenser, .01 mfd.	300-1072	1 3	Mains Cable	380-5340	6	
C.11	Moulded Condenser, .05 + .05 mfd. ...	309-4021	9	Speaker Cable	L0-1009	1 9	
C.12	Mica Condenser, 110 mmfd.	309-1121	1 6	or	L0-1001 or	1 9	
or	Mica Condenser, 120 mmfd.	309-1105*	8	Rubber Grommet	L0-1075	1 9	
or	Mica Condenser, 140 mmfd.	309-1124 or	1 6	Grid Clip	270-7341	1	
or	Mica Condenser, 100 mmfd.	309-1125	9	Valve Shield	28-2214	5d. doz.	
C.13	Tubular Condenser, .25 mfd.	30-4335	9	Tone Control Shaft	28-2726	3	
C.14	Tubular Condenser, .01 mfd.	309-1123	9	Tone Control Shaft Spring	289-6003	6	
or	Tubular Condenser, .008 mfd.	309-1021	2 6	Tone Control Shaft Bearing Bush ...	28-4117	6d. doz.	
C.15	Mica Condenser, 250 mmfd.	309-4218	9	Shaft Retaining Spring	289-7026	—	
or	Mica Condenser, 240 mmfd.	3615-DG.	1 9	"C" Washer	280-1421	7d. doz.	
C.16	Tubular Condenser, .1 mfd.	30-1031 or	9	Manual Tuning Pulley	28-2043	1	
or	Mica Condenser, 120 mmfd.	300-1040 or	10	Rubber Ring	289-6002	9	
or	Mica Condenser, 140 mmfd.	300-1056	10	Spring Clip	279-7017	1	
or	Mica Condenser, 100 mmfd.	300-1095	9	Manual Tuning Spindle	28-8610	5d. doz.	
C.17	Moulded Condenser, .015 + .015 mfd. ...	300-1212	—	Manual Tuning Spindle Spring ...	289-6001	5	
R.1	1/2 watt Carbon Resistor, 1.5 megohms ...	309-1008	—	Gang Condenser Mounting Bracket and Dial Stops Assembly	289-8000	1	
R.2	1 watt Carbon Resistor, 15,000 ohms ...	30-4134 or	9	Auto Dial Assembly (Brown)	389-5048	3 0	
R.3	1 watt Carbon Resistor, 25,000 ohms ...	309-4025	9	Tuning Belt Assembly	389-5045	—	
R.4	1/2 watt Insulated Resistor, 150,000 ohms	309-1018	—	Dog and Screw Assembly	389-5010	7	
or	1/2 watt Insulated Resistor, 150,000 ohms	309-1010	—	Dial Stop	389-5008	—	
or	1/2 watt Carbon Resistor, 150,000 ohms ...	300-4024 or	1 8	Push Button (Brown)	289-1025 or	1	
or	1/2 watt Carbon Resistor, 160,000 ohms ...	30-4170 or	3	Dial Scale	280-1047	1	
or	1/2 watt Insulated Resistor, 160,000 ohms	30-4455	1 3	Dial Scale Mask	279-5003	2 6	
R.5	1/2 watt Carbon Resistor, 120 ohms	3793-DG	1 6	Station Names Kit (7 names)	279-5000	8	
R.6	1/2 watt Insulated Resistor, 70,000 ohms	3615-DG	1 9	Station Names Kit (21 names)	409-5004	6	
or	1/2 watt Carbon Resistor, 70,000 ohms ...	33-1188	9	Chassis Mounting Spacer	409-5005	1 0	
or	1/2 watt Carbon Resistor, 75,000 ohms ...	4237	9	Chassis Mounting Rubber	280-6064	4	
or	1/2 watt Carbon Resistor, 75,000 ohms ...	3656	9	Chassis Mounting Rubber	270-7579	1	
or	1/2 watt Insulated Resistor, 65,000 ohms	330-2037 or	9	Chassis Mounting Rubber	270-7451	1	
or	1/2 watt Insulated Resistor, 65,000 ohms	339-2024	9	Gang Condenser Mounting Rubber ...	3915	1	
or	1/2 watt Insulated Resistor, 65,000 ohms	330-2058	9	Chassis Mounting Screw	W-1345	1	
or	1/2 watt Carbon Resistor, 150,000 ohms ...	33-1183	9	Plain Knob and Spring (Brown) ...	270-4183	—	
or	1/2 watt Carbon Resistor, 160,000 ohms ...	33-1191	9	Wave-change Knob and Spring (Brown)	270-4185	—	
or	1/2 watt Insulated Resistor, 160,000 ohms	330-2024	9	Manual Tuning Knob and Spring (Brown)	270-4219	—	
R.5	1/2 watt Carbon Resistor, 120 ohms	330-1032	9	Manual Tuning Knob Spring	28-1738	4d. doz.	
R.6	1/2 watt Insulated Resistor, 70,000 ohms	330-2034	9	Spring for Small Knobs	280-5262	3d. doz.	
or	1/2 watt Carbon Resistor, 70,000 ohms ...	33-1115	9	Red Wander Plug	380-5087	9	
or	1/2 watt Carbon Resistor, 75,000 ohms ...	33-1080	9	Black Wander Plug	380-5015	9	
or	1/2 watt Insulated Resistor, 65,000 ohms	339-2022	9	Pilot Lamp	34-2141	1 2	
				LP.1	Type 75E Variable-mu H.F. Pentode		
				V.1	Valve	8315-E	12 6
				V.2	Type 6A7 Variable-mu Heptode Valve...	34-2002	15 0
				V.3	Type 75 Double-Diode Triode Valve ...	8002	12 6
				V.4	Type 42E Pentode Output Valve	6447-E	13 6
				V.5	Type 80 Full Wave Rectifier Valve ...	3149	8 0
					Instruction Manual	399-3037	1
					Automatic Dial Buttons Adjusting Tool	289-1028	7

† 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.

ABOVE PRICES DO NOT APPLY IN IRE.

A RADIO MANUFACTURERS' SERVICE PUBLICATION