SERVICE MANUAL

Price 6d.

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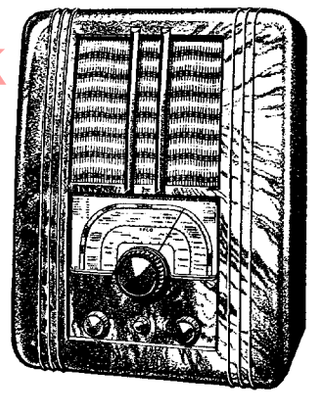
EKCO

SERVICE DEPT., E. K. COLE LTD., SOUTHEND-ON-SEA, ESSEX.

Telephone: Southend 49491.

MODELS AW 70 & TRG 502.



Scottish Service Depot: 27, Cadogan Street, Glasgow, C.2. Telephone: Central 5357/8/9.
Manchester Service Depot: Bombay House, 59, Whitworth Street. (Goods address: 7, Bombay Street.) Telephone: Central 6711/2.
Bristol Service Depot: 14, Redcross Street. Telephone: Bristol 22269.

GENERAL DESCRIPTION: Model AW70 is a four-valve (including rectifier) all-wave superheterodyne for use on 200/250 volt 40/60 cycle A.C. mains.

VALVES: V1—Mullard ECH3 (frequency changer); **V2—Mullard EF9** (I.F. amplifier); **V3—Mullard EBL1** (detector—AVC—LF amplifier); **V4—AZ1 Mullard** (rectifier). **NOTE:** The heater voltage for V1, V2 and V3 is 6.3 volts.

WAVE RANGES: Short wave 15/50 metres (20/6 Mcs), Medium waves 190/560 metres, Long waves 900/2,000 metres.

INTERMEDIATE FREQUENCY: 126.5 Kcs.

MAINS CONSUMPTION: 42 watts.

DIAL LAMP: 6.5v. .35 amp. type (A5767). It is important that lower rated lamps are not used as supply is 6.3 volts R.M.S.

CIRCUIT DETAILS: For S.W. reception the aerial is aperiodically coupled to the tuned grid circuit of V1, whilst capacitive coupling and inductive coupling are used respectively for M.W. and L.W. input to band-pass tuning circuit. The oscillator circuit is conventional, using the triode section of V1.

The I.F. output of VI is transformer coupled to V2, amplified and again transformer coupled to the rectifier diode of V3. The L.F. component of the rectified signal is taken off from the low potential end of the second I.F. transformer secondary circuit and applied via R9, C31, VR1 to the pentode section of V3 for final amplification. A permanent magnet speaker is used, and is transformer coupled.

A small percentage of the signal voltage is transferred from V2 anode circuit by C26 to the remaining diode of V3. The D.C. voltage output of this diode circuit is used for A.V.C., being applied to the grid circuits of V1 and V2.

The tertiary winding on the O.P. transformer is regeneratively connected and care should be taken when replacing this component to connect the leads correctly It will be noticed in the table of voltage readings that the cathode voltage of V3 is given as 17.5v., which may be misleading. The actual bias voltage is about 7.5v., for as can be seen on the circuit diagram, the grid return lead connects not to chassis but to a tapping on the cathode circuit. This tapped point is approximately 10v. above chassis.

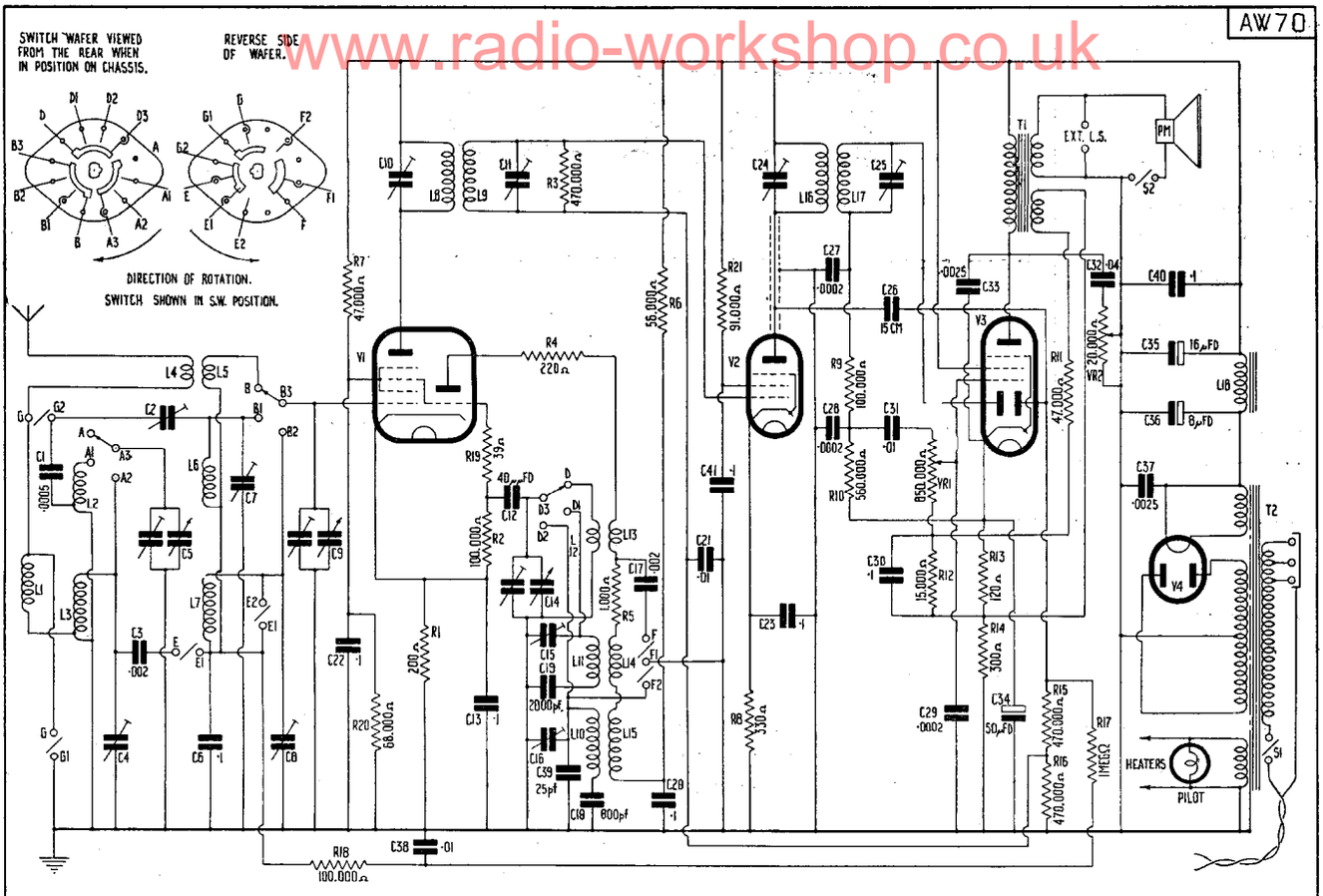
The external speaker sockets are connected across the O.P. transformer secondary, and an additional speaker should have a speech coil impedance of about 3 ohms. The same type of speaker as fitted in the receiver is advised for use externally when one only is to be used.

CIRCUIT ALIGNMENT: *This operation must only be carried out in conjunction with a service oscillator of known accuracy. To ensure reliable results the calibration and output levels of service oscillators should be checked frequently, and in any event not less often than once every six months. The "on load" voltage of batteries in battery-driven oscillators should be regularly measured, and new batteries fitted as soon as the voltage falls below rated pressure.*

I.F. ALIGNMENT: The trimmers of both I.F. transformers are located at the bottoms of the coil assemblies and are adjustable from beneath the chassis.

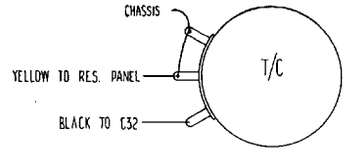
Switch to L.W., close the gang, turn the volume control and tone control to maximum and connect O.P. meter. Inject 126.5 Kcs. signal between grid of ECH3 and

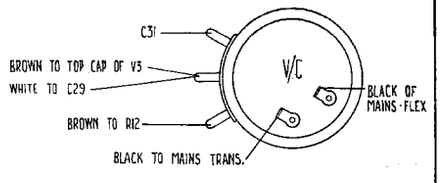
AW70

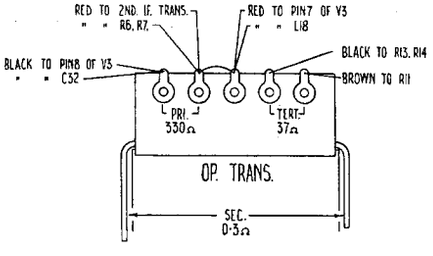


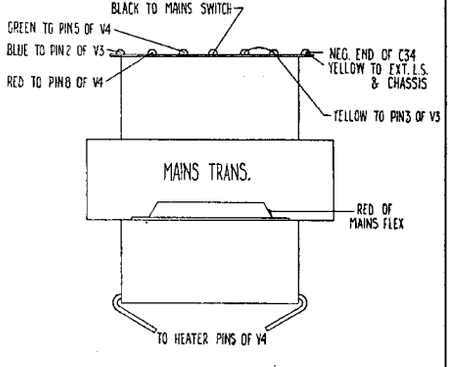
D.C. RESISTANCE OF WIREWOUND COMPONENTS.

L No	RES.Ω	SET W/S TO	MEASURE BETWEEN
L1	4	LW	L1 TAGS
L2	2·6	MW	C5 STATOR & CHASSIS
L3	27	LW	" " " "
L4	NEGLIGIBLE	SW	AERIAL & CHASSIS
L5	"	SW	C9 STATOR & C6
L6	2·6	MW	" " " "
L7	27	LW	" " " "
L8	70	-	PIN8 OF V1 & H.T.+
L9	70	-	TOP CAP OF V2 & JUNCTION OF R15.R16.C21
L10	17·5	LW	C14 STATOR & C18
L11	7	MW	" " & C19
L12	NEGLIGIBLE	SW	" " & CHASSIS
L13	"	-	R4 & R5
L14+L15	3·5	-	RED & RED/WHITE LEADS FROM OSC. COIL
L16	70	-	PIN8 OF V2 & H.T.+
L17	70	-	PIN5 OF V3 & R9
L18	650	-	L18 TAGS







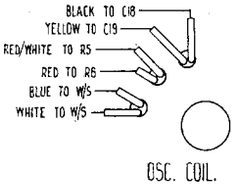


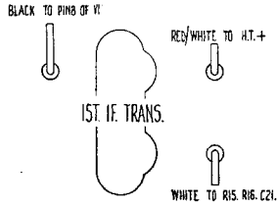
VOLTAGE & CURRENT READINGS.

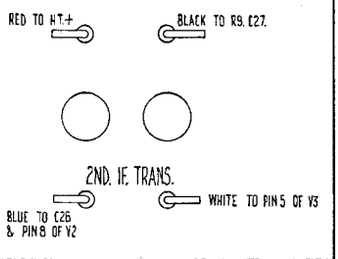
	PIN		VOLTS	M.A.
V1	4	CATHODE	1·4	6·98
	5	OSC. ANODE	100	2·9
	7	S.G.	80	2·68
	8	ANODE	250	1·4
V2	4	CATHODE	2·1	7·3
	7	S.G.	95	1·5
	8	ANODE	250	5·8
V3	4	CATHODE	17·5	41·5
	7	S.G.	250	6·5
	8	ANODE	238	35
V4	3	FIL. (H.T.+)	283	58
	5	ANODE	285 R.M.S.	
	8	ANODE	285 R.M.S.	

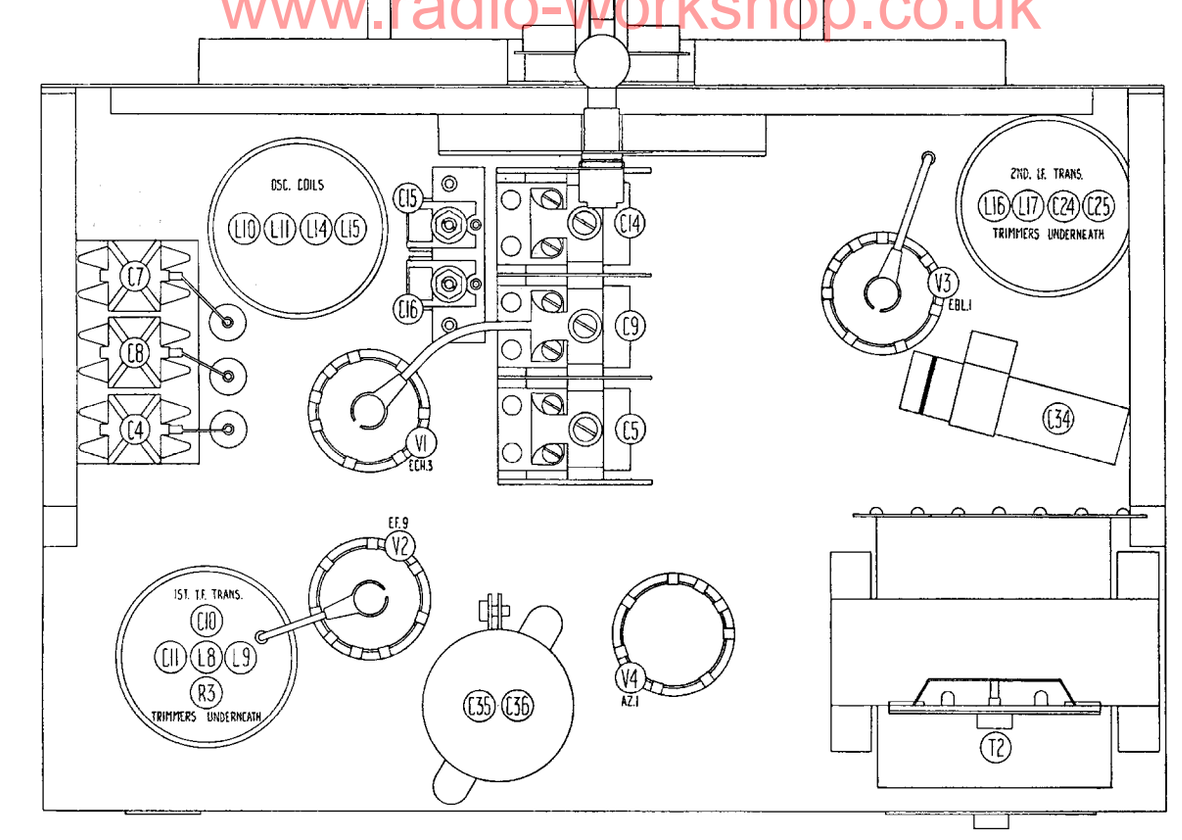
VOLTAGES TAKEN WITH 20.000Ω/V METER WITH RECEIVER TUNED TO 300 METRES.

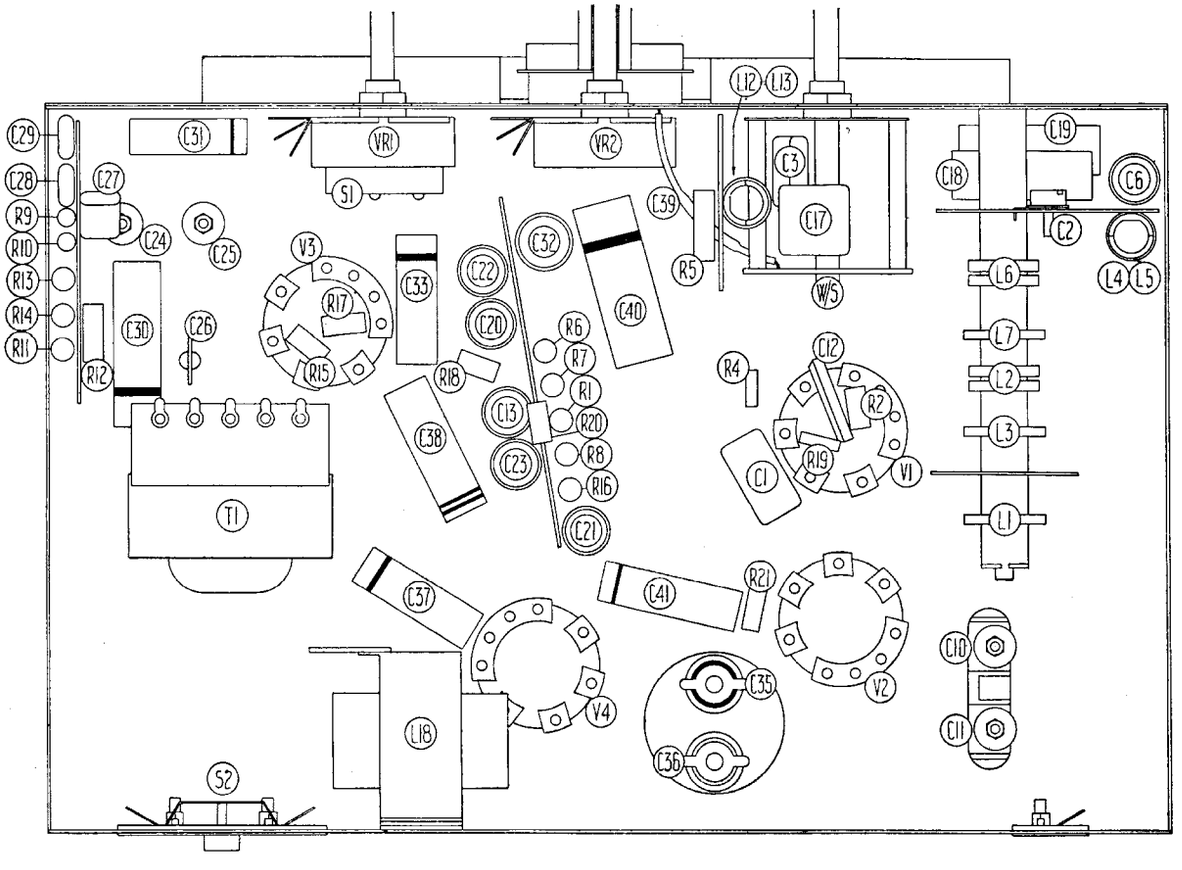
CHASSIS USED AS NEGATIVE FOR VOLTAGE READINGS.











chassis, using minimum signal input consistent with reliable meter reading. Adjust all I.F. trimmers for maximum output. The receiver controls should not be altered, any signal variation being made by adjusting the service oscillator. Now connect the service oscillator to A.E. sockets and readjust trimmers.

CALIBRATION: Fully mesh the gang and adjust the pointer level with the lines terminating the L.F. ends of the scale. Switch to S.W. and tune set to 20 Mcs. Inject a 20 Mcs. signal from service oscillator and adjust C14 (gang trimmer) for maximum output co-incident with correct calibration. Now tune the set to 15 Mcs., inject a signal of this frequency and adjust C9 (gang trimmer) for maximum output.

Switch to M.W. and tune set to 200 metres. Inject 1,500 Kcs. signal and trim oscillator circuit by means of C15 (alongside gang). Tune set to 250 metres, inject 1,200 Kcs. signal and adjust C5 (gang trimmer) and C7 for maximum output.

Switch to L.W. and tune set to 1,300 metres. Inject 230 Kcs. signal and adjust C16 for maximum output with correct calibration, then adjust both L.W. band-pass trimmers C4 and C8 for maximum output. Calibration should be checked at the L.F. ends of each wave-band, which should be correct if the calibration adjustments are accurately carried out. If an error is present, realignment should be carried out again to check possible errors before suspecting components.

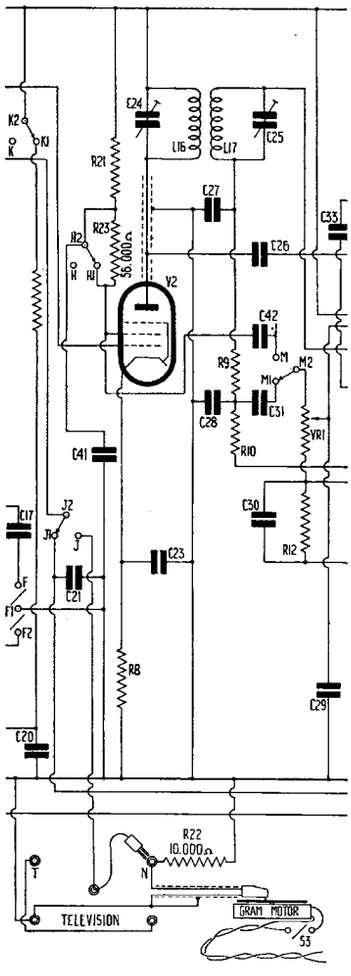
IMAGE REJECTION: C2 is provided for this purpose and can be adjusted from the front of the chassis. The trimmer should be adjusted for maximum rejection with 1,000 Kcs. input and receiver tuned to 747 Kcs. Repeat M.W. adjustments.

CHASSIS REMOVAL: Remove the back cover and the control knobs, then remove the four 2BA screws from the base of the cabinet and draw chassis clear.

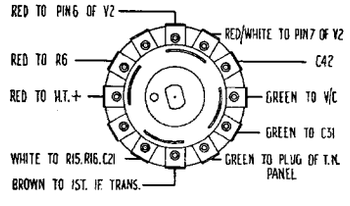
The TRG502 embodies the same chassis as the AW70, there being little difference beyond the inclusion of the switching necessary to change from radio to gram. operation.

The R.G. switch when turned to GRAM. operates as follows: (1) Breaks the H.T. feed to the oscillator circuits. (2) Disconnects the grid return lead of V2 from the AVC circuit and reconnects it to one side of the pick-up. (3) Removes s/c across an additional resistor R23 in V2 screen grid circuit. (4) Disconnects VR1 from C31 and reconnects to C42.

TRG502



SWITCH SHOWN IN "RADIO" POSITION.



R-G SWITCH

Briefly, the gram. circuit is as follows: Input to V2 grid is amplified by a triode arrangement of V2, the S.G. electrode being used as an anode and its output coupled by C42 to the pentode section of V3 for final amplification.

To convert the AW70 circuit (as printed) to the TRG502 circuit diagram, the diagram marked TRG502 should be detached from the manual and carefully trimmed (with a razor blade and steel straight edge) so that the line work terminates at the edge of the paper. The switch diagram may be left on the strip. The diagram is now ready to place over the AW70 circuit diagram so that V2 of one coincides with V2 of the other. When correctly positioned the line work of the top diagram will coincide exactly with the under diagram. The top strip should be gummed along its **top edge only** and set in position so that the two circuits may be easily changed over.

CHASSIS REMOVAL: Remove back cover and front control knobs. Unscrew the motor switch and tone control and lower both to rest on the chassis. Next unsolder the motor leads (which should be taped up for safety), then the yellow and green leads from the T and N panel at rear. Remove the four 2BA screws in the base of the cabinet, and chassis may now be withdrawn to the extent of the speaker leads, which should be sufficient to enable tests to be carried out.

SERVICE PROCEDURE.

Before consigning a receiver to any Ekco service depot, make quite certain that the trouble is not due to a faulty valve or other very minor defect, otherwise a minimum charge of 7/6 will be made for expenses in testing, handling, packing and carriage.

If it proves necessary to return a receiver or component part, *the customer's guarantee registration card must be enclosed.* Free repairs to a receiver, or replacement of a component part, cannot be effected if the guarantee has expired or the instrument has not been registered by the customer. In the latter connection please note that cards forwarded to us must be those originally issued with the receiver concerned. If they are not available for any reason, application should be made to us for duplicates. *Altered cards taken from other receivers will not be accepted by us for registration purposes.*

Stock receivers, or parts thereof, returned for repair must include the instruction booklet and blank guarantee card.

MISCELLANEOUS.

Description.	*Part No.*	*Retail*	*Description.*	*Part No.*	*Retail*
Back Cover (AW70 only) ...	E10206	2/6	Knob—V/C	DP2091	9d.
Baffle (AW70 only)	E10205	1/6	Knob—T/C	DP2399	6d.
Cabinet (AW70 only)	DP2397	30/–	Loudspeaker	D8761/1	30/–
Coil Assembly—Bandpass L1, 2, 3, 4, 5, 6, 7, C2	SA355/1	14/6	Mains Lead	DP1718	2/6
Coil Assembly — Oscillator (M.W. & L.W.) L10, 11, 14, 15	SA353	6/–	Pilot Lamp	A5767	9d.
Coil Assembly — Oscillator (S.W.) L12, 13	DP2429	1/6	Pilot Lamp Holder	A6227	9d.
Coil Assembly—1st I.F. L8, 9, C10, 11, R3	DP2437	5/6	Pointer	A10186	6d.
Coil Assembly—2nd I.F. L16, 17, C24, 25	DP2417	5/6	Scale	D10256	2/–
Choke, L.F. L18	SA278	4/6	Tone Control (AW70 only) ...	C10219	2/6
Knob—Tuning	DP2409	1/6	Transformer — Mains (AW70 only)	SA35/4	17/6
Knob—W/C	DP2400	9d.	Transformer — Output	SA242	7/6
			Valve Holder "E" Type 8 ...	A4126	1/–
			Volume Control & Switch ...	C10218	5/–
			Wavechange Switch	C10208	5/–
			Window	C10152	9d.

Parts Applicable to TRG502 Only.

Back Cover	E10399	3/–	R.G. Switch Knob	DP2465	9d.
Cabinet	DP2462	£3/10/–	Switch Indicator	A10401	2d.
Needle Cup	D5208	6d.	Transformer—Mains	SA35/5	17/6
R.G. Switch	B10309	2/6	Tone Control	C10310	2/6

CONDENSERS.

	Description.	*Part No.*	*Retail*		*Description.*	*Part No.*	*Retail*
C1 ...	.0005 mfd.	A6516	10d.	C26 ...	15 cms.	A5925	1/–
C2 ...	(See B.P. Assembly)	—	—	C27 ...	.0002 mfd.	B8905	9d.
C3 ...	.002 mfd.	A5274	1/–	C28 ...	.0002 mfd.	B8905	9d.
C5, 9, 14,	Gang Condenser (and Drive)	C10171	15/–	C29 ...	.0002 mfd.	B8905	9d.
				C30 ...	.1 mfd.	A3844	1/4
C6 ...	.1 mfd.	A3844	1/4	C31 ...	.01 mfd.	A3846	1/–
C12 ...	.00004	A5747	8d.	C32 ...	.04 mfd.	B8487	1/3
C13 ...	.1	A3844	1/4	C33 ...	.0025 mfd.	B3684	1/6
C15, C16,	Dual Ceramic Presets	B10204	3/–	C34 ...	50 mfd.	B6304	2/9
C17 ...	.002 mfd.	A5274	1/–	C35, C36	16 x 8 mfd.	C9077	7/6
C18 ...	800 pf.	B8411	1/6	C37 ...	.0025 mfd.	B3684	1/6
C19 ...	2,000 pf.	B8412	1/6	C38 ...	.01 mfd.	A3846	1/–
C20 ...	.1 mfd.	A3844	1/4	C39 ...	25 pf.	DP2435	6d.
C21 ...	.01 mfd.	A3846	1/–	C40 ...	.1 mfd.	A5044	1/6
C22 ...	.1	A3844	1/4	C41 ...	.1 mfd.	A3844	1/4
C23 ...	.1	A3844	1/4	C42 ...	.1 mfd. TRG502 only	A3844	1/4

RESISTORS.

	Description.	*Part No.*	*Retail*		*Description.*	*Part No.*	*Retail*
R1 ...	200 ohms.	142/8	3d.	R13 ...	120 ohms	137/8	3d.
R2 ...	100,000 ohms. ...	86/9	3d.	R14 ...	300 ohms	146/8	3d.
R3 ...	470,000 ohms ...	94/9	3d.	R15 ...	470,000 ohms ...	94/9	3d.
R4 ...	220 ohms	54/8	3d.	R16 ...	470,000 ohms ...	94/9	3d.
R5 ...	1,000 ohms	62/8	3d.	R17 ...	1 megohm	98/9	3d.
R6 ...	56,000 ohms ...	83/9	3d.	R18 ...	100,000 ohms ...	86/9	3d.
R7 ...	47,000 ohms ...	82/8	3d.	R19 ...	39 ohms	45/7A	3d.
R8 ...	330 ohms	56/8	3d.	R20 ...	68,000 ohms ...	84/9	3d.
R9 ...	100,000 ohms ...	86/9	3d.	R21 ...	91,000 ohms ...	230/9	3d.
R10 ...	560,000 ohms ...	95/9	3d.	R22 ...	10,000 ohms) TRG502	74/9	3d.
R11 ...	47,000 ohms ...	82/9	3d.	R23 ...	56,000 ohms) only	83/9	3d.
R12 ...	15,000 ohms ...	76/9	3d.				

NOTE.—All prices are retail and are subject to 33⅓% only to EKCO Registered Dealers. Prices are liable to alteration without notice.