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SERVICE MANUAL

Price **6d.**

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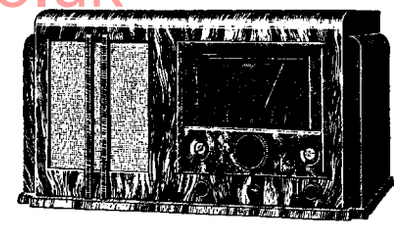
EKCO



MODEL AW 108

ALL-WAVE RECEIVER.

GENERAL DESCRIPTION.

Model AW108 is an all-wave high fidelity superheterodyne using five valves and a cathode ray tuning indicator :—

V1. Frequency changer : **Mullard TH4** (triode-hexode).

V2. I.F. amplifier : **Mullard VP4B** or **Ekco VP41** (variable-mu H.F. pentode).

V3. Combined demodulator, A.V.C. and 1st L.F. amplifier : **Mullard TDD4** (double-diode-triode).

V4. Output valve : **Mullard Pen 428** or **Ekco OP41** (L.F. pentode).

V5. Rectifier : **Mullard IW4/350** (indirectly-heated full-wave rectifier).

V6. Mystic Eye tuning indicator : **Mullard TV4** (cathode ray tube incorporating triode amplifier).

Wave ranges: 200/550, 1,000/2,000 and 19/50 metres. (15.8—5.7 megacycles).

Intermediate Frequency: 460 kc.

Mains: 200/250 volt, 40—80 cycle A.C.

Consumption: 85 watts.

Pilot lamps: Osram 6.2 volt 0.3 amp. type. Access to all four lamps (and tuning indicator) may be obtained by removing escutcheon plate. First remove tuning knob (grub screw) then loosen three screws (with knurled heads) along top edge of reflector plate. Escutcheon plate may now be removed, using a slight lifting action.

Features: Variable selectivity, iron-cored I.F. transformers, variable tone control, compensated feed-back on medium and long wavebands, tuned rejector at 9 kc. and an eight watt output stage. Gramophone pick-up and extension speaker sockets are provided.

RECEIVER SECTIONS.

Model AW108 is constructed in three sections : H.F. sub-chassis, main receiver chassis, and power unit. If necessary, therefore, the first or third may be returned to factory without consigning complete receiver.

Removal of power unit is straightforward, while the H.F. sub-chassis may be withdrawn after unsoldering the connections (including earthing braids), removing wavechange switch link mechanism and the four nuts and bolts (with rubber buffers) holding sub-chassis to main receiver chassis. Remove gang condenser drive by loosening two black grub-screws, and removing the two cheese-headed screws holding drive to gang frame. Screws, which should be retained, are accessible through holes in drive plate if pointer is turned to 300 metre position.

H.F. sub-chassis. If an ordinary aerial is connected to "A" (dipole switch closed), aerial circuit is completed through wavechange and dipole switches, and L4, L4 plus L1, L4 plus L6 for S.W., M.W. and L.W. respectively.

If a dipole aerial is connected to "A" and "DA" (dipole switch open) the two ends are connected across L4 on S.W. and together to L1 and L6 on M.W. and L.W.

In both cases break-through of 460 kc. signals is prevented by the filter L12/C23.

The wavechange switch is of wafer type, and short-circuits unused sections of coils by means of metal plates. Single studs in contact with wiper arms select appropriate coils left un-shorted by the metal plates.

Main receiver chassis. Variable selectivity is obtained by Fidelity Control switch S5. In "Normal" position (anti-clockwise) the switch connects 1st I.F. transformer in usual manner, but in "Brilliant" position (clockwise) tightens coupling by introducing a third coil (L14). The I.F. and diode circuits are straightforward, one diode being used for demodulation, and the other for A.V.C. and operation of the tuning indicator.

Tone control VR1 and bass-boost network L18, C42, C43 are connected between anode of V3 and chassis. The network maintains tone-balance at low volume levels by accentuating lower audio frequencies as volume control is turned towards minimum.

The output transformer incorporates a third winding, which is switched across R18 on M.W. and L.W. to introduce compensated feed-back. Resultant elimination of harmonic distortion greatly improves reproduction.

The special filter L19, R22, R28, C46, C47 is connected in V4 anode circuit to suppress frequencies above 9 kc.

Power unit. This carries mains transformer, electrolytic smoothing condensers and bias resistance for V4. Note that can of wet electrolytic (C52) is 100 volts negative to chassis.

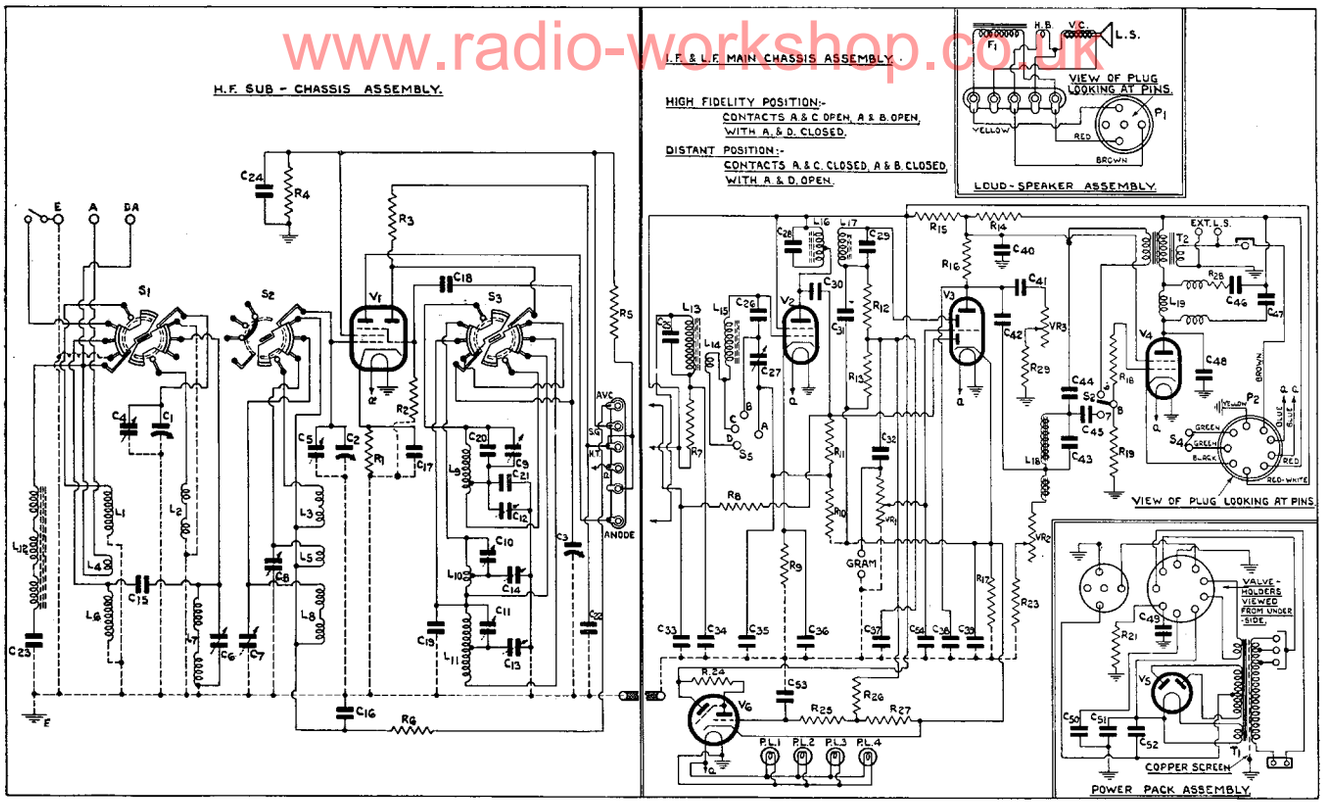


Fig. 1. Circuit diagram. Some receivers are fitted with a resistance (R22) across L19.

VALVE VOLTAGE AND CURRENT READINGS

VALVE	ELECTRODE	CHASSIS TO:-	VOLTS	M.A.
V1 (OSC-LLATING)	HEX ANODE	SOCKET 7	215	2·5
	HEX SCREEN	" 3	75	3·5
	OSC ANODE	CURRENT THRU R3		5·5
	CATHODE	SOCKET 6	4	13·3
V2	ANODE	" 2	220	8·5
	SCREEN GRID	" 7	220	3
	CATHODE	" 6	5·7	11·5
V3	ANODE	" 7	100	2·6
	CATHODE	" 6	2	2·6
V4	ANODE	" 7	300	6·6
	AUX GRID	" 3	240	8
	CATHODE	" 6	12·5	6·4

VALVE	ELECTRODE	CHASSIS TO:-	VOLTS	M.A.
V1 (NOT OSC-LLATING)	HEX ANODE	SOCKET 7	200	8·5
	HEX SCREEN	" 3	85	4
	OSC ANODE	CURRENT THRU R3		3·7
	CATHODE	SOCKET 6	4·5	16

NOTE. AERIAL AND EARTH DISCONNECTED, GANG TURNED TO MINIMUM, WAVECHANGE SWITCH TO M.W., MAINS VOLTAGE 230 A.C. USING 220-230 MAINS TAPPING. VOLTAGES MEASURED WITH A HIGH RESISTANCE METER.

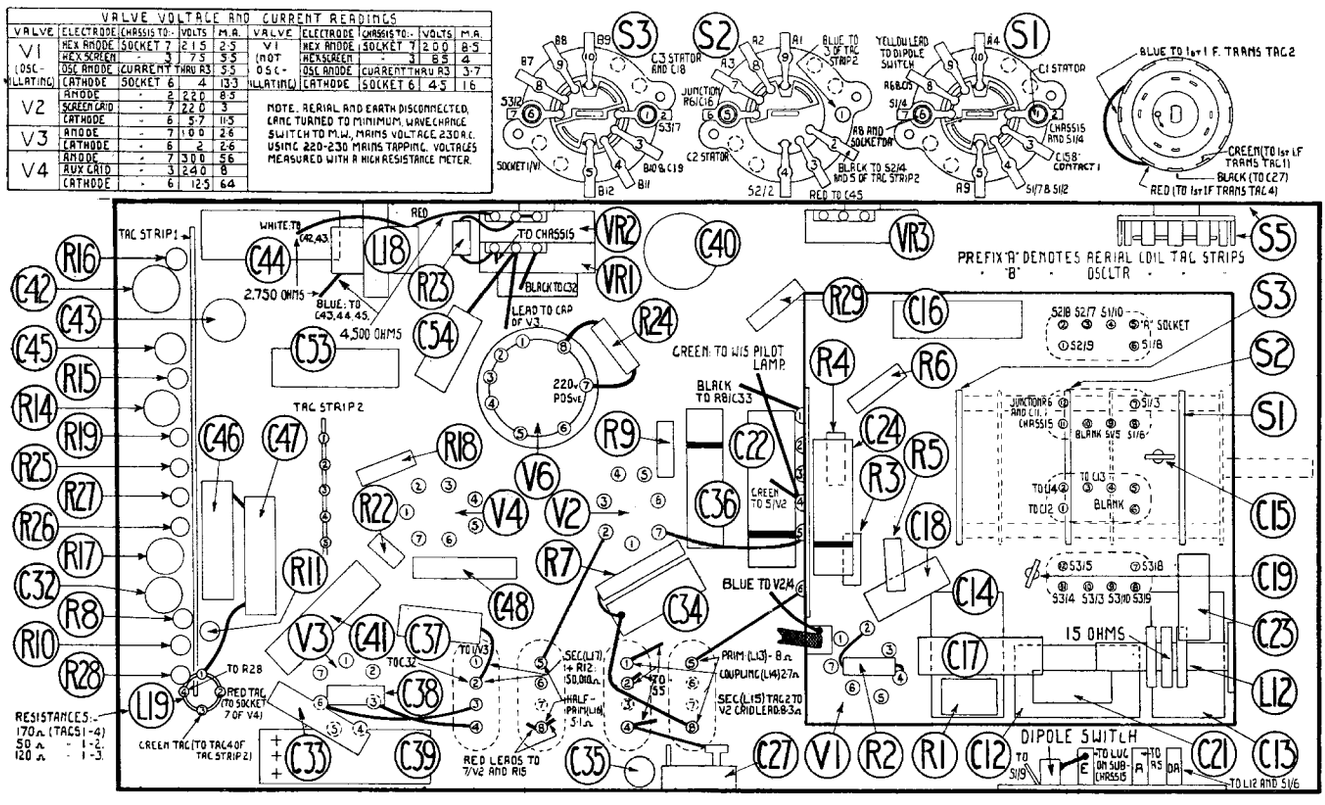


Fig. 2. Underside of chassis. Details include resistances of L12-19 and voltage and current readings.

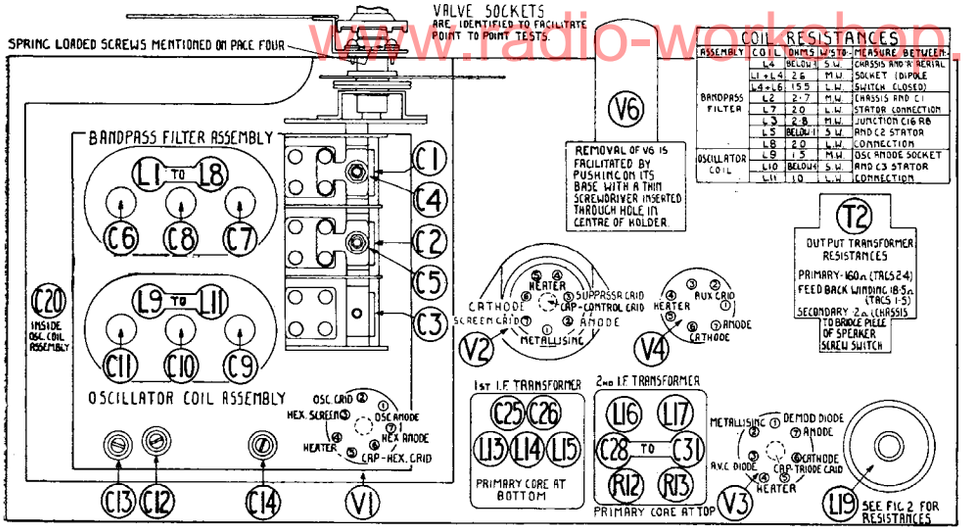


Fig. 3. Top of Ekco AW108 chassis. Details include resistances of L1-11 and T2.

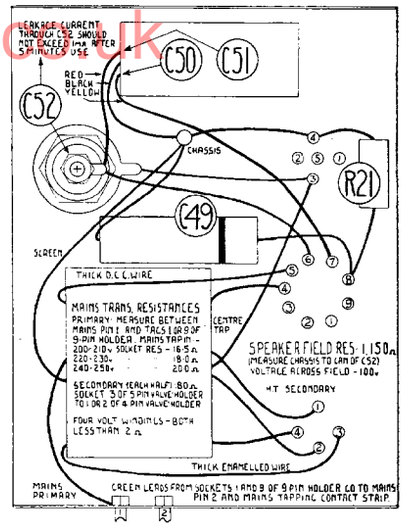


Fig. 4. Underside of power pack.

CIRCUIT KEY AND PRICE LIST.

Ref.	Description.	Retail Part No.	Price.
L1	M.W. aer.		
L2	M.W. B.P.		
L3	M.W. grid	Bandpass filter assembly	
L4	S.W. aer.	SA149	10/6
L5	S.W. grid		
L6	L.W. aer.		
L7	L.W. B.P.		
L8	L.W. grid		
L9	M.W.		
L10	S.W.	Osc. coil assembly SA150	10/6
L11	L.W.		
L12	460 kc. filter coil	DP1294	2/6
L13	Primary		
L14	Coupling	1st I.F.trans SA197	8/6
L15	Secondary		
L16	Primary	2nd I.F. trans.	
L17	Secondary	SA198	9/6
L18	Bass boost choke ...	DP1305	5/6
L19	Low pass filter	DP1302	6/6
C1	B.P. section		
C2	Grid section	Gang condsr. (less drive)	
C3	Osc. section	D7134	11/6
C4	C1 trimmer		
C5	C2 trimmer		
C6	L.W. B.P. trimmer ...	—	—
C7	L.W. grid trimmer ...	—	—
C8	S.W. grid trimmer ...	—	—
C9	M.W.	Oscillator	
C10	S.W.	shunt	
C11	L.W.	trimmers —	—
C12	M.W.	Oscillator	
C13	L.W.	series	
C14	S.W.	trimmers A6504	2/6
C15	20 cm.	A6573	1/-
C16	.02 mfd.	A4147	1/-
C17	.1 mfd.	A3844	1/-
C18	.0001 mfd.	A5747	9d.
C19	.00004 mfd.	—	—
C20	10 cm.	A6260	1/-
C21	.00033 mfd.	A6516	9d.
C22	.25 mfd.	A5220	1/-
C23	40 mmfd.	B7223	1/-
C24	.1 mfd.	A3844	1/-
C25	75 mmfd.	B7043	1/-
C26	75 mmfd.	B7043	1/-
C27	Trimmer	B7348	2/6
C28	80 mmfd.	B7043	1/-
C29	75 mmfd.	B7043	1/-
C30	5 cm.	A5540	1/-
C31	80 cm.	A6517	1/-
C32	.1 mfd.	A3844	1/-
C33	.01 mfd.	A3844	1/-
C34	.02 mfd.	A5381	1/-
C35	.01 mfd.	A3846	1/-
C36	.1 mfd.	A3844	1/-
C37	.0001 mfd.	A5747	9d.
C38	.0005 mfd.	A5747	9d.
C39*	25 mfd.	A3265	2/3
C40*	2 mfd.	B7149	2/3
C41	.05 mfd.	A6315	1/-
C42	.25 mfd.	A5220	1/-
C43	.2 mfd.	A6220	1/-
C44	.25 mfd.	A5220	1/-
C45	.05 mfd.	A6315	1/-
C46	.01 mfd.	A3846	1/-
C47	.01 mfd.	A3846	1/-
C48	.0025 mfd.	A3684	1/-
C49*	50 mfd.	A6304	2/9
C50*	4 mfd.	C7121	5/6
C51*	8 mfd.		
C52†	8 mfd.	B6825	5/6
C53	.1 mfd.	A3844	1/-
C54	.0001 mfd.	A5747	9d.
R1	325 ohms	A6128	9d.
R2	25,000 ohms	A6449	9d.
R3	25,000 ohms	A6449	9d.
R4	60 000 ohms	A6449	9d.
R5	25.000 ohms	A6449	9d.
R6	100,000 ohms	A6446	9d.
R7	1,000 ohms	A6445	9d.
R8	1 megohm	A6123	9d.
R9	600 ohms	A6122	9d.
R10	500,000 ohms	A6123	9d.
R11	500,000 ohms	A6123	9d.
R12	50,000 ohms	A6122	9d.
R13	250,000 ohms	A6123	9d.
R14	2,000 ohms	A6000	9d.
R15	1,000 ohms	A6449	9d.
R16	50,000 ohms	A6449	9d.
R17	1,000 ohms	A6445	9d.
R18	100,000 ohms	A6121	9d.
R19	100,000 ohms	A6121	9d.
R21	200 ohms	A6131	9d.
R22	3,000 ohms	A6122	9d.
R23	3,000 ohms	A6122	9d.
R24	2 megohms	A6121	9d.
R25	500,000 ohms	A6123	9d.
R26	1 megohm	A6123	9d.
R27	500,000 ohms	A6123	9d.
R28	400 ohms	A6444	9d.
R29	1.500 ohms	A6122	9d.
VR1	500,000 ohms		
VR2	50,000 ohms (Vol. control)	C7142	8/6
VR3	60,000 ohms (Tone control)	C7143	4/6
S1-3	Wavechange switch	D7123	7/6
S4	On/off switch	—	—
S5	Fidelity switch	B7144	2/6
T1	Mains trans.	DP1298	20/-
T2	Output trans.	SA199	12/6
Loudspeaker		D7329	35/-
Five-pin plug		—	9d.
Gang drive ...		—	4/6
Scale pointer ...		—	6d.
Reflector plate		D7325	2/-
Pilot lamp ...		P2445	9d.
Rubber shield for V6		A7315	6d.
Nine-pin plug		—	1/-
Walnut cabinet		DP1456	55/-
Bakelite escutcheon		DP1324	7/6
Glass scale ...		E7312	4/6
Tuning knob ...		DP1326	1/6
Vol. control knob		DP1327	9d.
Tone control knob		DP1329	9d
Fidelity control knob		DP1328	9d.
Wavechange switch knob ...		DP998	9d.

* *Dry electrolytic.* † *Wet electrolytic.*

PRICES OF H.F. SUB-CHASSIS AND POWER UNIT.

H.F. sub-chassis (less valve). Part No. C81 ... ... £3 3 0 nett.
Power unit (less valve). Part No. C79 ... ... £2 5 0 nett.

All prices quoted in this manual are subject to alteration without notice.

CIRCUIT ALIGNMENT.

It cannot be too strongly emphasised that re-aligning should not be attempted unless a service oscillator of proved accuracy on all wave ranges is available. Oscillator accuracy should be checked by heterodyning, on a "straight" receiver, transmissions from stations known to adhere to published frequency.

The necessary frequency adjustment in I.F. transformers and 460 kc. filter is obtained by screwing the iron cores along the coil axes. The cores are sealed at the factory after adjustment, and it is extremely unlikely that they will require resetting.

A special wax is used for sealing the cores, and this should be melted by a hot soldering iron with ¼in. diameter bit. A screwdriver should not be used for dislodging the wax, as the coil formers may break from their mountings. These remarks do not apply to later models, in which cores are fixed by a plastic substance.

The slots in the heads of the adjustable cores require a ¼in. screwdriver, which must be non-metallic otherwise it will be difficult to set the cores accurately.

Use the minimum oscillator input (except in the case of 460 kc. filter adjustment) consistent with reliable output meter reading. The receiver volume control should be set at maximum throughout.

I.F. circuits.

Note.—In no circumstances adjust C27.

1. Leave chassis in cabinet. Connect one lead of service oscillator to "E" socket, and the other through a .02 mfd. condenser to V1 grid cap.
2. Set gang condenser to minimum and wavechange switch to M.W.
3. Turn Fidelity Control switch to "Normal" (anti-clockwise).
4. Connect a 0—5 volt output meter to EXT. L.S. sockets.
5. Inject a 460 kc. signal from service oscillator.
6. Adjust primary and secondary cores of 1st, then 2nd, I.F. transformers for maximum meter reading. (First I.F. primary core should first be screwed right out, then slowly in to the first peak.)
7. Repeat adjustment of all four.
8. Re-seal cores.

H.F. and oscillator circuits.

If station tuning positions do not correspond with scale markings, check that pointer covers the line representing 1,950 metres when gang condenser is turned to its electrical maximum. The pointer is held to gang by spring-loaded screws and, if incorrectly set, may be pushed through a small angle. The mounting plate is accessible from back of receiver.

If pointer is correctly set, re-align H.F. and oscillator circuits :—

1. Leave chassis in cabinet. Set wavechange switch to M.W. and turn tuning indicator to 200 metres.
2. Connect a 0—5 volt output meter to EXT. L.S. sockets.
3. Connect one lead of service oscillator to "E" socket. Connect other through dummy aerial to "A." Close dipole switch.
4. Inject a 1,500 kc. (200 metre) signal from service oscillator.
5. Fully unscrew oscillator shunt trimmer C9, then screw it in slowly for maximum meter reading.
6. Turn tuning indicator to 550 metres and inject a 545 kc. signal from service oscillator.
7. Adjust C4 and C5 for maximum meter reading, meanwhile "rocking" gang condenser about 550 metres.
8. Adjust oscillator series trimmer C12 for maximum meter reading, meanwhile "rocking" gang condenser.
9. Again set service oscillator to 1,500 kc. and tune receiver to 200 metres. Check adjustment of C4 and C5 for maximum meter reading.
10. Set wavechange switch to L.W., tune receiver to 1,000 metres and oscillator to 300 kc. (1,000 metres).
11. Adjust oscillator shunt trimmer C11 for maximum meter reading.
12. Tune receiver to 1,700 metres and inject a 176.3 kc. (1,700 metre) signal from service oscillator.
13. Adjust aerial trimmer C6 and bandpass trimmer C7 for maximum output. Retune receiver and check adjustment of these trimmers.
14. Adjust oscillator series trimmer C13 for maximum meter reading, meanwhile "rocking" gang condenser.
15. Set oscillator and receiver again to 1,000 metres and check adjustment of trimmers C6 and C7.
16. Turn wavechange switch to S.W., scale pointer to 15 mc. and inject a 15 mc. signal from service oscillator.
17. Adjust oscillator shunt trimmer C10 for maximum meter reading. This should be possible for two settings of C10, which should be "peaked" at that requiring less oscillator trimmer capacity.
18. Check C10 adjustment to ensure that oscillator is not tuned to image signal. With high service oscillator input the image should be heard at approximately 14.1 mc. on receiver scale. If the signal is not at this point but at 15.9 mc., trimmer C10 should be re-adjusted until signal can be tuned in at 15 mc. and image at 14.1 mc.
19. Reduce oscillator input to previous level and adjust C8 for maximum meter reading, meanwhile "rocking" gang.
20. Leave service oscillator set to 15 mc. and tune in image signal at 14.1 mc. If the latter is as strong as the 15 mc. signal, re-adjust C8.
21. Set receiver and service oscillator to 6 mc.
22. Adjust oscillator series trimmer C14 for maximum meter reading, meanwhile "rocking" gang condenser.
23. Check adjustment of C8 with receiver and oscillator set to 15 mc.

Re-setting 460 kc. filter.

Incorrect adjustment of L12 may be evidenced by C.W. or I.C.W. morse interference on stations at the top end of the M.W. band. In these circumstances :—

1. Remove wax from end of core as described above.
2. Connect one lead of service oscillator to "E" and the other through a dummy aerial to "A."
3. Adjust service oscillator for maximum output at 460 kc.
4. Connect a 0—5 volt output meter to the EXT. L.S. sockets.
5. Screw in dipole switch and tune receiver to 560 metres.
6. Adjust L12 core for minimum meter reading.
7. Re-seal core.

Note.—Do not regard break-through of spark transmissions as indication of an incorrectly adjusted L12.

"SERVICE," E. K. COLE LTD., EKCO WORKS, SOUTHEND-ON-SEA. Telephone : Southend 49491.
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.