

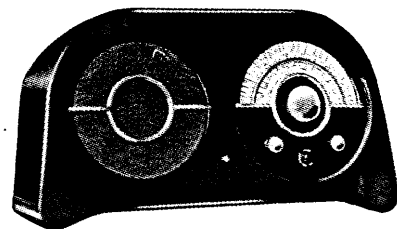
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EKCO
SERVICE INFORMATION



MODEL AD86
CONSOLE RECEIVER

DESCRIPTION OF CIRCUIT

The input from the aerial is applied through a .0008 mfd condenser (C1) to a tapping point on the medium wave section (L1 and L3) of the first coil of an inductively coupled band pass filter. On long waves the input reaches the first coil through C1 and the choke L16, incorporated for the purpose of preventing break through of medium wave signals on the long wave band.

Elimination of second channel interference is obtained by adjustment (see special note) of a small pre-set condenser (C27) connected, on medium waves only, between aerial and the grid of the octode frequency-changer valve, a metallised **Mullard FC13C**. This valve mixes the signal from the band pass filter with the oscillations produced in its triode section by coupling L7 and L8 with L9 and L10, the resultant beat of 130 Kc being passed on via tuned I.F. transformer L11, L12 to the I.F. valve, a metallised **Mullard VP13C**.

The coupling between this and the double diode valve, a metallised **Mullard 2D13C** (alternative Mazda DD620) is by means of an I.F. transformer consisting of three coils. Two, L13 and L14, are the usual primary and secondary from which the output is applied to the demodulator diode, while the third supplies the other diode for A.V.C. purposes. The third coil (L15) consists of more turns than the other two and is trimmed by a smaller capacity (C32).

The input to the demodulator diode is rectified and passed on via C12 and tone-compensated volume control VR2 to the L.F. amplifier valve, a metallised **Mazda HL1320**, which is resistance-capacity coupled to the pentode output valve, a **Mazda Pen 35/20**. The output transformer in the anode circuit of this valve is mounted on the receiver chassis.

High tension is by a half-wave indirectly-heated rectifying valve **Brimar ID5**, the output from which is smoothed by an L.F. choke (L19) in conjunction with electrolytic condensers (C21 and C22).

All valve heaters are connected in series, the mains voltage being dropped by the resistance R18/1-3.

STATION PRE-SELECTOR AND AUTOMATIC NOISE SUPPRESSOR.

This control serves two purposes:—

(1) To suppress the rush of background noises which would otherwise be heard when the receiver is tuned to a point between two transmissions, and caused by the Automatic Volume Control raising its sensitivity to maximum.

(2) To allow reception, at will, of:—

(a) All stations within the range of the receiver.

(b) Only those transmissions which are of sufficient strength to give reliable programme value.

(c) Only the very strongest transmissions.

It will be appreciated that if the knob is left at the "Medium" or "Strong" positions with the receiver tuned to a transmission which, while strong, is subject to fading, the noise suppression circuits will possibly completely suppress the station during periods of fade. Should complaints be made by customers of apparent intermittent operation on the medium wave band, it is advisable to emphasize that the knob should preferably be set at the "All Stations" position at all times except when actually tuning.

It should be pointed out that this inter-station noise suppressor cannot suppress heterodyne whistles or side band splash caused by inter-action of stations too close together in wavelength, neither can it eliminate the various noises caused by local electrical machinery which may interfere with reception of distant transmissions. It is, however, of material assistance in *selecting* those programmes which may be relied upon to be reasonably free from such noises.

AUTOMATIC VOLUME CONTROL.

Delayed A.V.C. is applied to V1 and V2 as the result of rectification by V3 of the voltages induced by L13 in L15.

IMAGE REJECTION ADJUSTMENT.

This device consists of a small pre-set condenser connected between the aerial socket, through switch contacts S6, to the modulator grid of the octode valve.

Points to note are:—

Adjustment of this pre-set condenser is best carried out with a non-metallic screwdriver. A piece of wood or ebonite can be appropriately shaped for this purpose.

No whistle due to second channel interference will be heard on the long wave band; the image rejector condenser is, in fact, cut out on this band by opening of the switch contacts S6.

IMPORTANT:—

Do not screw in the image rejector condenser more than is necessary to reduce the whistle to minimum. If this advice is disregarded, not only will an image of the local programme take the place of the whistle on the affected station, but powerful foreign transmissions will break through with sufficient strength to cause further whistles over the medium wave band.

SECOND CHANNEL WHISTLES.

Heterodyne and other whistles should not be mistaken for second channel interference as probably only one of the whistles heard on the medium wave band originates in this way. Once the image rejector condenser has been adjusted to eliminate whistle on the appropriate station (see below) its setting should not be touched. Second channel interference may be expected within a radius of about 50 miles (this distance depending on aerial efficiency and local reception conditions) of the stations given below in heavy type. Stations to which AD86 should be tuned for adjustment of the image rejector are indicated in italics.

London National and Regional, *Florence or Brussels No. 1* : West National and Regional, *Budapest* : Midland National and Regional, *Katowice or Marseilles P.T.T.* : North National and Regional, *Graz* : Scottish National and Regional, *Leipzig*.

TONE-COMPENSATED VOLUME CONTROL.

The condenser C13 at the lower end of VR2 causes progressive emphasis of the bass notes as the volume control is turned towards minimum, and a pleasing balance of tone is thus maintained at low volume levels. The presence of C13 results in a small volume of sound being audible when V.R.2 is at the minimum position.

TONE CONTROL.

This consists of a 60,000 ohms variable resistance (VR3) in series with a .02 mfd condenser (C14) connected between the anode of V5 and chassis. It may be used to advantage in reducing heterodyne whistles, side-band splash and other background noises when listening to distant stations.

LOUDSPEAKER SILENCING DEVICE.

This is a small screw with insulated head mounted on the black panel carrying the extension loudspeaker sockets, which, when unscrewed, breaks the speech coil circuit of the set speaker. It is important to note that the latter should only be silenced in this manner if a suitable loudspeaker, *i.e.*, one having no output transformer and with a speech coil resistance of 2 to 3 ohms is connected across the "Ext. L.S." sockets.

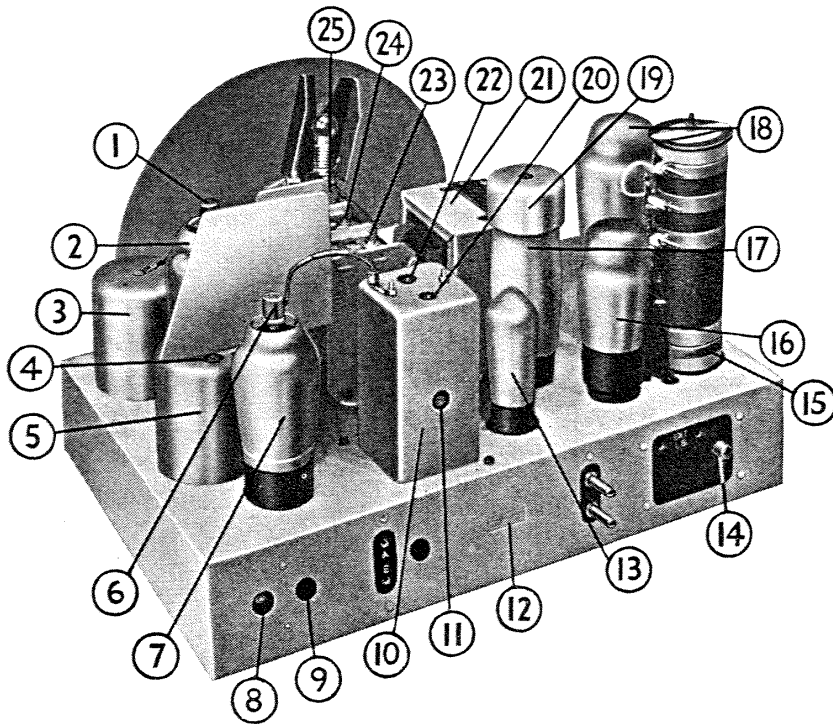
Model AD86 is not provided with gramophone pick-up sockets.

TO REMOVE CHASSIS FROM CABINET

1. Remove control knobs (by slackening grub screws).
2. Unplug loudspeaker lead.
3. Remove the six screws in the base of the cabinet so that the chassis may be withdrawn complete with the two lengthwise bars. The latter should preferably remain screwed to the two crosswise chassis bars, as this will avoid, when replacing chassis in cabinet, the possibility of incorrect assembly of the washers which insulate the two pairs of bars from one another.

Note: When refitting the noise suppression control knob, the resistance must be turned as far as it will go in a clockwise direction, and the knob fitted so that the lettering "Strong" is in the uppermost position.

Chassis.



1. Grid cap.
2. Frequency-changer valve (V1).
3. Oscillator coil (L7-10).
4. Secondary trimmer (C29).
5. 1st I.F. transformer (L11, L12).
6. Grid cap.
7. I.F. valve (V2).
8. L.W. tracking condenser (C26).
9. Image rejector condenser (C27).
10. 2nd I.F. transformer (L13-15).
11. Link coil trimmer (C32).
12. Serial number.
13. Demodulator and A.V.C. valve (V3).
14. Speaker silencing screw.
15. Mains resistance (R18/1-3).
16. Rectifier valve (V6).
17. L.F. valve (V4).
18. Output valve (V5).
19. Grid cap screen.
20. Secondary trimmer (C31).
21. Output transformer.
22. Primary trimmer (C30).
23. 1st B.P. section (C23).
24. 2nd B.P. section (C24).
25. Oscillator section (C25).

Note.—L.F. choke (L19) carrying R16 is located beside output transformer (Fig. 21).

RE-ALIGNING AND RE-GANGING

Note.—It is absolutely essential to obtain a reliable modulated service oscillator before attempting re-aligning or re-ganging.

RE-ALIGNING (Milliammeter method).

- (1) Connect a 0-10 milliammeter across VR1, which should be turned to maximum.
- (2) Apply a 130 Kc. output from service oscillator between aerial and earth sockets.
- (3) Set wave-change switch to "L.W." and turn tuning condenser to about 1,900 metres.
- (4) Adjust trimmers in following order for minimum deflection of milliammeter:—
 - (a) 1st I.F. primary (C28)
 - (b) 2nd I.F. primary (C30)
 - (c) 1st I.F. secondary (C29)
 - (d) 2nd I.F. secondary (C31)
 - (e) Link coil (C32).

Note.—Never use a stronger service oscillator signal than necessary.

RE-GANGING (Milliammeter method).

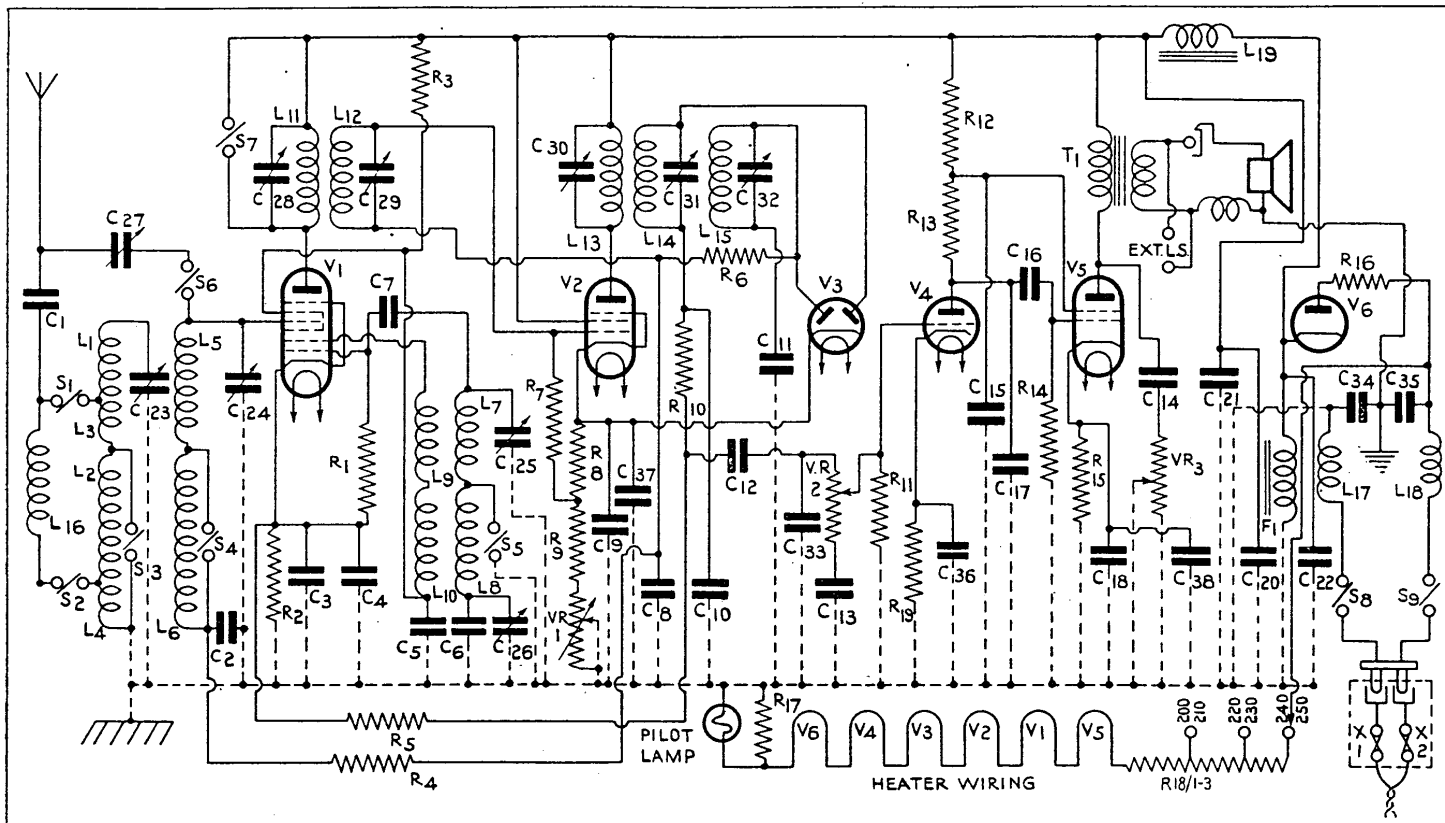
- (1) With milliammeter connected as above apply output of 1,500 Kc. (200 metres) from service oscillator to aerial and earth sockets of receiver.
- (2) Set wave-change switch to "M.W." position, and turn tuning condenser to the 200 metre mark.
- (3) Adjust oscillator trimmer (C25) to obtain minimum deflection on milliammeter.
- (4) Swing tuning condenser to 250 metres and set service oscillator at 1,200 Kc. (250 metres).
- (5) Adjust trimmers of C24 and C23 sections of ganged condenser to obtain minimum deflection of milliammeter.
- (6) Switch to "L.W." and check accuracy of calibration on a 176.5 Kc. input (1,700 metres) from oscillator. If out, correct by adjusting long wave tracking condenser (C26), meanwhile "rocking" the tuning condenser slightly.

OUTPUT METER METHOD.

Re-aligning and re-ganging may also be carried out with a suitable output meter connected across the external L.S. sockets. (Remember that these are connected to the *secondary* of the output transformer.)

The procedure to be adopted is exactly the same as for the milliammeter method except that all I.F. and ganged condenser trimmers are adjusted for *maximum* reading on the output meter. The link coil trimmer should be adjusted for *minimum* reading.

AD86 CIRCUIT DIAGRAM

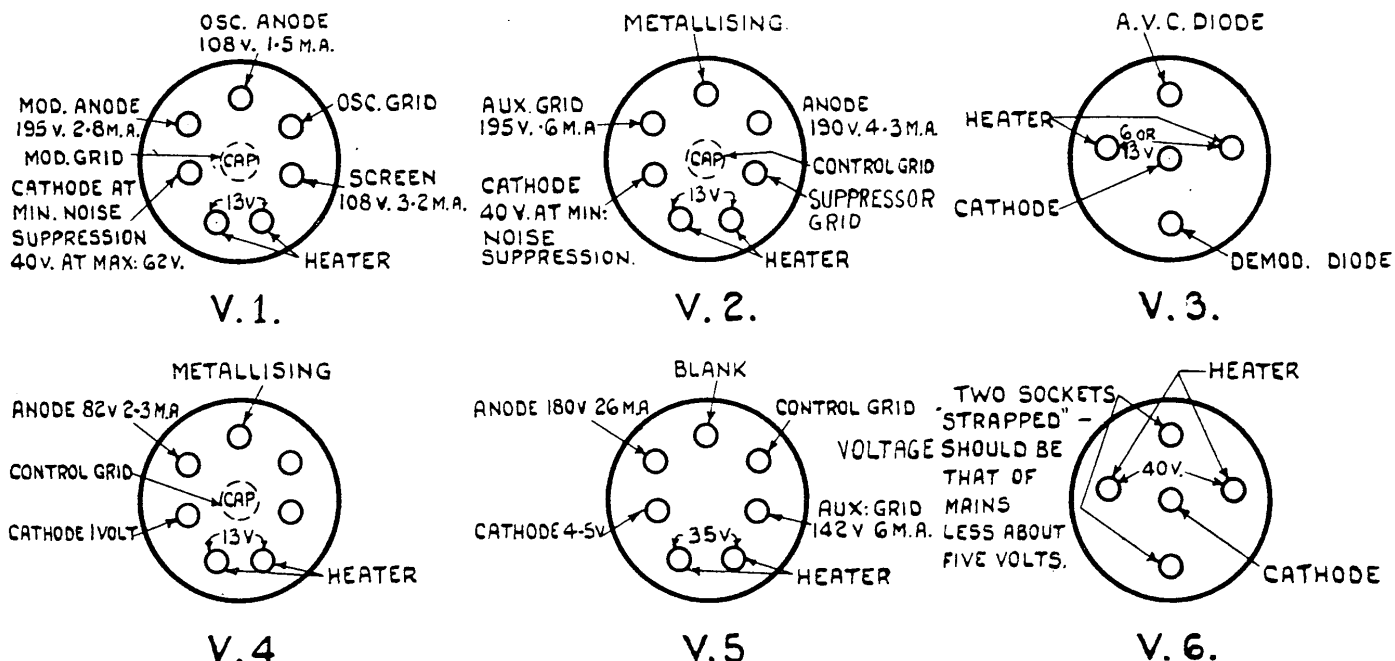


CIRCUIT KEY AND PRICE LIST.

Ref.	Description.	Part No.	Retail Price.	Ref.	Description.	Part No.	Retail Price.
L1-4	1st B.P. coil	DP378	5/6	C13	.25 mfd. condenser	A5220	9d.
L5-6	2nd " "			C14	.02 " "	A5381	9d.
L7	Osc. coil M.W. section			C15*	2 " electrolytic	B5388	—
L8	" " L.W. " "			C16	.1 " condenser	A3844	9d.
L9-10	" " anode " "	SA84	6/6	C17	.001 " "	A3842	9d.
L11	1st I.F. transformer primary	SA103	5/6	C18	25 " electrolytic	A3265	2/3
L12	" " " secondary	SA129	8/6	C20	.1 " condenser	A3844	9d.
L13	2nd " " primary	DP475	1/3	C21*	24 " electrolytic	B5388	—
L14	" " " secondary	SA73	3/-	C22*	8 " "	B5388	—
L15	Link coil	SA127	8/6	C23-25	Ganged " condenser	C5082	18/6
L16	M.W. suppression choke	A3840	9d.	C26	L.W. tracking condenser	DP313	1/3
L17	Mains filter coil	A3844	9d.	C27	Image rejector		
L18	" " " "	A3844	9d.	C28	1st I.F. trans. prim. trimmer	SA85	—
L19	L.F. choke	A3839	9d.	C29	2nd " " sec. " "	SA87	—
C1	.0008 mfd. condenser	A3841	9d.	C30	" " prim. " "		
C2	.1 " "	A3844	9d.	C31	" " sec. " "		
C3	10 " electrolytic	A3846	9d.	C32	Link coil trimmer		
C4	.1 " condenser	A3844	9d.	C33	.0003 mfd. condenser	A3842	9d.
C5	.1 " "	A3844	9d.	C34	.1 " "	A3844	9d.
C6	.0007 " "	A3842	9d.	C35	.1 " "	A3844	9d.
C7	.001 " "	A3844	9d.	C36	25 " electrolytic	A3265	2/3
C8	.01 " "	A3846	9d.	C37	10 " "	A4070	1/6
C9	.1 " "	A3844	9d.	C38	.1 " condenser	A3844	9d.
C10	.0002 " "	A3846	9d.				
C11	.01 " "						
C12	.01 " "						

* C15, C21 and C22 constitute the electrolytic smoothing block.

Above prices are subject to alteration without notice.



Underside view of valve holders giving voltage and current readings. Voltages, except those across heaters, are to chassis and measured with a voltmeter having a resistance of 1,000 ohms per volt.

RESISTANCE AND CONSUMPTION READINGS

Volume control 250,000 ohms Noise suppression resistance, maximum 10,000 ohms (Minimum not to exceed 10 ohms). Output transformer primary ... 750-850 ohms Smoothing choke (L19) 270 ohms Loudspeaker field resistance ... 4,500 ohms	Mains resistance (R18/1-3): Section 1 395 ohms " 2 100 ohms " 3 100 ohms Consumption of receiver (on A.C.) ... 75 watts " " " (on D.C.) ... 70 watts
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Note: Of the four pins on the loudspeaker plug, the two outermost are connected to the field winding, and the two innermost to the speech and hum-bucker coils.

ADDITIONAL PRICES OF SPARE PARTS AD86

Description.	Part No.	Retail Price.	Description.	Part No.	Retail Price.
Cabinet (dark walnut)	DP695	30/-	Wave-change switch	SA83	4/6
" (black)	DP696	37/6	Wave-change switch spindle	DP692	1/6
Knob (dark walnut), tuning	C3660	2/-	" " " contact spring		
" (black), tuning	DP143	2/6	" " " assembly (outer)	DP373	1/6
" (dark walnut), volume control	C3838	9d.	" " " assembly (inner)	DP374	1/6
" (black), volume control	DP142	1/-	" " " locating spring	A4277	1d.
" (dark walnut), W/C switch	B5863	9d.	Scale (buff or black)	C5208	2/6
" (black), W/C switch	B5863	1/-	" centre bar (brown)	B5113	1/3
" (dark walnut), tone control	DP719	9d.	" " (black)	B5113	1/6
" (black), tone control	DP719	1/-	Clamping rim	C5122	6d.
" (dark walnut) noise suppressor	B4376	9d.	" plate	A5121	3d.
" (black), noise suppressor	B4376	1/-	Scale mounting	B5102	3d.
Back cover (brown or black)	DP898	2/6	" clamp	B5101	2d.
Loudspeaker	D5047/1	30/-	Valve top clip	A4658	1d.
" baffle	B3100	2/-	Rubber grommet	A4463	2d.
Output transformer	DP896	12/6	Insulated screw	P1532	3d.
Electrolytic condenser block	B5388	7/6	Double socket mains plug (with fuses)	B5333	3/-
Pilot lamp	P2445	9d.	1-amp. fuse	A5075/1	6d.
Plug (red or black)	A3654	2d.	Mains lead assembly	DP759	5/-

Above prices are subject to alteration without notice.

POSSIBLE FAULTS

Abbreviations: O.C., open circuited; S.C., short circuited.

Note.—It is advisable to disconnect the earth lead as a precautionary measure while testing.

Valves do not light up.

Break in mains flex; disconnection inside either mains plug; "blown" fuse inside receiver mains plug; "on-off" switch defective or disconnected; R17 and dial lamp O.C.; R18, L17 or L18 O.C. A break in the heater of any valve will prevent all valves from lighting up.

Valves light up. No radio.

Ensure that L.S. silencing screw is screwed in. Test for unsmoothed H.T. between chassis and tag on L19 to which red rubber covered lead is attached. If no H.T., V6 may be defective or R16 O.C. If satisfactory unsmoothed H.T. but no smoothed H.T. (test between chassis and tag on L19 to which blue rubber covered lead is attached) L19 is probably O.C. Check continuity of L.S. field.

Satisfactory H.T. No radio.

Test V1 - 5 by substitution. If no signals ascertain whether V1 is oscillating by noting whether there is any change in voltage drop across R3 upon short circuiting fixed plates of C25 to chassis. If no change, V1 is not oscillating, in which case R2, R3 or C7 may be O.C. or oscillator coils defective. "Squegging" may result if R1 or C5 is O.C.

V1 oscillating. No radio.

Test B.P. and I.F. coils for continuity and correct resistance. (See page 5 for correct values.) If a coil is of negligible resistance, the relative trimmer is probably S.C.

V1 and associated circuits in order. No radio.

Check voltage and current readings of V2, V4 and V5. No voltage between anode of V2 and chassis indicates L13 O.C. If correct voltage at this point but no current reading, R8, R9 or VR1 is probably O.C. No voltage on anode of V4 indicates R12 or R13 O.C. If correct voltage but no current reading, R19 is O.C. No voltage on V5 indicates primary of T.1 O.C. If correct voltage but no current reading, R15 is O.C. If excessive anode current R14 is O.C. or C16, C18, C38 S.C.

Valves, coil resistances, voltage and current readings in order. No radio.

Apply 130 K.C. input from a modulated oscillator to V1. One lead from oscillator should be connected to chassis, and the other to the top cap of V1. (It is strongly recommended that a condenser of about .0005 mfd. be included in each lead as a precautionary measure.) If no audible note from loud-speaker, R10 or C12 may be O.C. C10 or C33 S.C.

MISCELLANEOUS.

M.W. signals. No L.W. L2, L4, L6, L8 or L16 O.C. Switch contacts S2 not "making." If M.W. signals only with excessive second channel interference, C1 may be O.C.

Satisfactory L.W. signals. Weak or no M.W. Switch contacts S1, S3, S4 or S5 not "making" properly. (Contacts may be cleaned by drawing between them a piece of cartridge paper previously "faced" on both sides by a soft blacklead pencil.)

Satisfactory L.W. Excessive whistle and tuning repeat points on M.W. C27 S.C. or screwed too far in.

Intermittent operation. Dry joint, defective connection inside fixed condenser, defective resistance, piece of loose solder under chassis or in a coil can, tarnished wave-change switch contacts. Apparent intermittent operation may result if the receiver has been tuned to a distant station normally subject to fading, and the pre-selector knob set at any other than the "All Stations" positions.

Excessive background noises. Defective valve, resistance or condenser. Dirty wave-change switch contacts. Corrosion on B.P. coil. Bad connection between tag and valve clip in one of the valve screens.

No stations received unless VR2 is turned to "All Stations" position. Poor aerial. Defective V1 or V2. B.P. or I.F. coils defective. C23-25, C28-32 may require re-trimming (see page 3 for procedure). C3, C4 S.C.

Will not calibrate correctly. S.C. turns in oscillator coil. On L.W. band C6 or C26 may be defective.

Instability. C2, C4, C8, C9 or C20 O.C.

Volume control fails to function. C13 O.C.

Motor Boating. C15, C18, C21, C36 O.C.

Microphonicity. Defective valve (probably V1 or V4) or ganged condenser. If the ganged condenser appears microphonic, return of the receiver chassis is advised. Before adopting this course, however, ensure that the ganged condenser is "floating" freely on its rubber buffers.

Hum. Defective valve. R11, R14, C15, C18, C21, C22, C36 O.C. S.C. turns in L19 or in speaker field. C16 leaking.

Distortion. Defective loudspeaker or valve. C18, C36, C38 S.C. R14 O.C. or C16 leaking.

Recurrent fuse failure. C21, C22, C34, C35 S.C.

REPLACING SCALE.

(1) Remove chassis from cabinet as indicated on page 2.

(2) Remove large semi-circular clamping washer by unscrewing the five small round headed screws.

(3) Detach scale from adhesive tape round its edge.

(4) The adhesive tape should be used for fixing the new scale, which must be so mounted that the two black marks corresponding to 195 and 570 metres (approx.) are $1\frac{3}{4}$ " above the top surface of the chassis.

It should be noted that the shadow indicating line must coincide with the two black marks mentioned in (4) when the ganged condenser is turned to its limit in the minimum and maximum capacity positions. If the indicator is "out" to any extent, it should be adjusted by loosening the large set screw which holds the indicator assembly to the ganged condenser shaft.

TO RE-CENTRE LOUDSPEAKER.

(1) Free the two ends of the spider by holding the fixing nuts with pliers and loosening the two cheese headed screws. The latter are readily accessible from the rear of the loudspeaker.

(2) Space speech coil accurately from pole piece by using three strips of suitable material such as a visiting card.

(3) Tighten the spider screws while holding the fixing nuts with pliers.

(4) Remove spacing strips.

RETURN OF PRODUCTS

A charge will be made in respect of components or receivers returned for replacement or repair if the three-months guarantee has expired or the customer has not posted the relative application card. It is therefore advisable to ask the customer to produce the guarantee registration card before giving any undertaking that repair will involve no charge.

Delivery of products returned "Carriage Forward" will not be accepted.

When returning components always indicate the serial number of the receiver and whether it is a stock model.

In the case of all receivers returned for repair, include a carefully completed "Request for Service" form. All stock models returned must also include the instruction booklet and blank guarantee card.

Do not return component parts of complete units such as ganged condensers and loudspeakers.

The base connections and spacing of coils of the two I.F. transformers are different. When ordering replacements, therefore, it is essential to indicate which transformer is required.

Any order for replacement cabinet or knobs should indicate the colour required.

When ordering instruction booklets (for which a charge of 6d. will be made), do not fail to quote the serial number of the receiver.

FAILURE TO OBSERVE THE ABOVE WILL RESULT IN DELAY IN GIVING SERVICE.

Finally, before consigning a receiver to your nearest Ekco Service Depot (see addresses below), be quite certain that a valve or other very minor defect is not the cause of the trouble, otherwise a minimum charge of 7s. 6d. will be made for expenses in testing, handling, packing and carriage.

"SERVICE," E. K. COLE LTD., EKCO WORKS, SOUTHEND-ON-SEA.

Telephone: Southend 49491.

Scottish Service Depot: 27, Cadogan Street, Glasgow, C.1. Telephone: Central 5357/8.

Manchester Service Depot: Bombay House, 59, Whitworth Street, Manchester. Telephone: Central 6711/2. (Goods address: 7, Bombay Street, Manchester.)

Bristol Service Depot: 14, Redcross Street, Bristol. Telephone: Bristol 22269.