

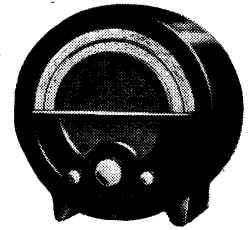
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EKCO
SERVICE INFORMATION



MODEL AD76
CONSOLETTA RECEIVER

DESCRIPTION OF CIRCUIT

The input from the aerial is applied through a .0008 mfd. condenser (C10) 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 C10 and an H.F. choke (L17) incorporated for the purpose of preventing break-through on the long wave band.

Elimination of second channel interference is obtained by adjustment (see special note) of a small pre-set condenser (C4) connected, on medium waves only, between aerial and the grid of the Octode Frequency Changer Valve. This valve, a metallised **Mullard FC13C** "mixes" the input 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 130Kc. being passed on via tuned I.F. transformer L11, L12 to the I.F. valve, a metallised **Mullard VP13C**.

The latter is coupled to the demodulator diode of the double diode valve, a **Mazda DD620** (alternative Mullard 2D13C) by means of the second I.F. transformer L13, L14, while the voltage across the primary of this transformer is also applied through C18 to the other diode for A.V.C. purposes.

Rectification of the I.F. signal at the demodulator diode develops L.F. voltage variations across R12 which are applied via C23, R18, volume control VR1 and L12 to the grid of V2. This valve acts both as I.F. amplifier and a three electrode L.F. stage, of which the cathode, control grid and anode are respectively cathode, control grid and screening grid of V2. In the screening grid circuit, decoupling is provided by R3 and C15, while the L.F. voltage variations developed across R4 are applied through C27 to the grid of the output valve, a **Mullard Pen36C** (alternative Mazda Pen3520).

An output transformer mounted on the chassis of the receiver supplies the loudspeaker, the field of which is connected *across* main H.T., and it will be noticed that a small volume of sound will still be audible even with the volume control at minimum. This is due to the presence of C24, which results in the bass notes being progressively emphasised as VR1 is turned anti-clockwise with the result that a pleasing balance of tone is maintained at the minimum volume position.

A further feature is the provision for silencing the loudspeaker by means of a screw at the back of the receiver, but it is important to note that this screw should only be unscrewed when another loudspeaker without transformer and of 2-3 ohms impedance is connected across "Ext. L.S." sockets. *Model AD76 is not provided with gramophone pick-up sockets.*

High tension is by a half-wave indirectly heated rectifying valve, **Brimar ID5**. When used on D.C. the rectifying valve is unnecessary, but as it passes current continuously so long as its anode is positive, it is left in circuit to avoid switching complications. It must not be short circuited on D.C. as the electrolytic condensers C26 and C29, which provide adequate smoothing in conjunction with choke L18, are not reversible.

All valve heaters are connected in series, the mains voltage being dropped by the resistance R17/1/2/3.

AUTOMATIC VOLUME CONTROL.

The I.F. input applied through the small condenser C18 to the A.V.C. diode of V3 is rectified, thus developing a voltage across R10, R7 and R8 comprising the A.V.C. load. The voltage across R7 and R8 is applied as a negative bias through R6 to the grid of V1, and that across R8 to the grid of V2, thus reducing the amplification of both valves. The stronger the signal the greater the bias applied to V1 and V2, thus automatically controlling amplification.

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.

The demodulator diode of V3 is connected through L14, R11 and R12 to chassis, and the cathode to the junction of R5 and R9. When VR2 is turned to maximum, *i.e.*, "Strong" position, five volts are developed across it and applied as a negative bias to the demodulator diode. Accordingly, any signal passed on by the I.F. valve which is not strong enough to overcome this bias, cannot be rectified by the demodulator diode and will, therefore, not be heard.

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 therefore 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.

IMAGE REJECTION ADJUSTMENT.

This device consists of a small pre-set condenser connected between the aerial socket, through switch contacts S4, to the modulator grid of the octode valve.

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

No whistle due to second channel interference will be heard on the long wave band, and the Image Rejector condenser is, in fact, cut out on this band by opening of the switch contacts S4.

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 table 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 AD76 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.

TO REMOVE CHASSIS FROM CABINET

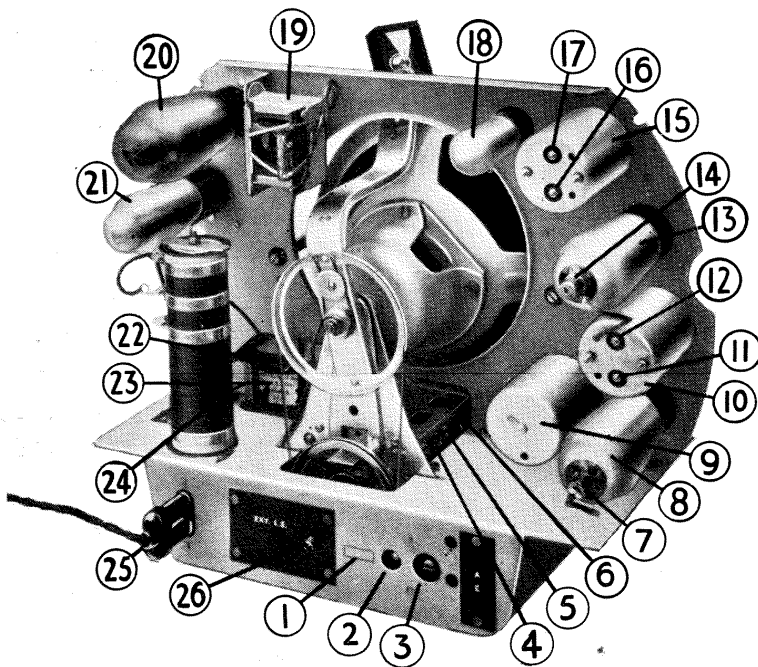
(1) Remove the control knobs by loosening the grub screws, including that of the "Noise Suppressor." The single grub screw fixing the latter to its spindle is accessible by means of a long screwdriver inserted along the inside of the cabinet. A portion of the chassis is cut away for this purpose.

(2) Remove the four chassis fixing screws. These are located near base of 2nd I.F. Transformer, base of output valve, top of frequency changer valve and base of mains resistance respectively.

(3) The chassis, complete with loudspeaker, may now be withdrawn, leaving the tuning scale in place.

Note: When replacing chassis in cabinet, care should be taken to see that the heater wiring is not "nipped," and that the resistances are so positioned that they will not foul the tuning indicator arm. When replacing the noise suppression control knob, the resistance must be turned as far as it will go in a clockwise direction, and the knob so fitted that the lettering "Strong" is in the uppermost position.

Chassis



1. Serial Number.
2. L.W. Padding Condenser (C5).
3. Image Rejection Adjustment (C4).
4. 1st B.P. Section (C1).
5. 2nd B.P. Section (C2).
6. Oscillator Section (C3).
7. Control Grid Cap.
8. Frequency-changer Valve (V1).
9. Oscillator Coil (L7-10).
10. 1st I.F. Transformer (L11-12).
11. Primary Trimmer (C6).
12. Secondary Trimmer (C7).
13. Combined I.F. and L.F. Amplifier (V2).
14. Control Grid Cap.
15. 2nd I.F. Transformer (L13-14).
16. Primary Trimmer (C8).
17. Secondary Trimmer (C9).
18. Double Diode Valve (V3).
19. Output Transformer (T1).
20. Output Valve (V4).
21. Rectifier Valve (V5).
22. Current Limiting Resistance (R15).
23. L.F. Choke (L18).
24. Tapped Mains Resistance (R17/1-3).
25. Mains Plug Incorporating Fuses (X1-2).
26. Loudspeaker Silencing Screw.

RE-ALIGNING

1. Remove chassis from cabinet as indicated on page 2.
2. Set wave-change switch to long wave position and tuning condenser to about 1,000 metres.
3. Connect a 0-10 milliammeter across VR2, which should be turned to maximum, *i.e.*, clockwise.
4. Apply output of 130 Kc. from service oscillator to aerial and earth sockets.
5. Adjust trimmers in following order for minimum reading on milliammeter:—
 (a) 1st I.F. transformer primary. (b) 2nd I.F. transformer primary. (c) 1st I.F. transformer secondary.
6. Adjust 2nd I.F. transformer secondary trimmer for maximum milliammeter reading.

N.B.—When re-aligning, never use a stronger service oscillator signal than necessary.

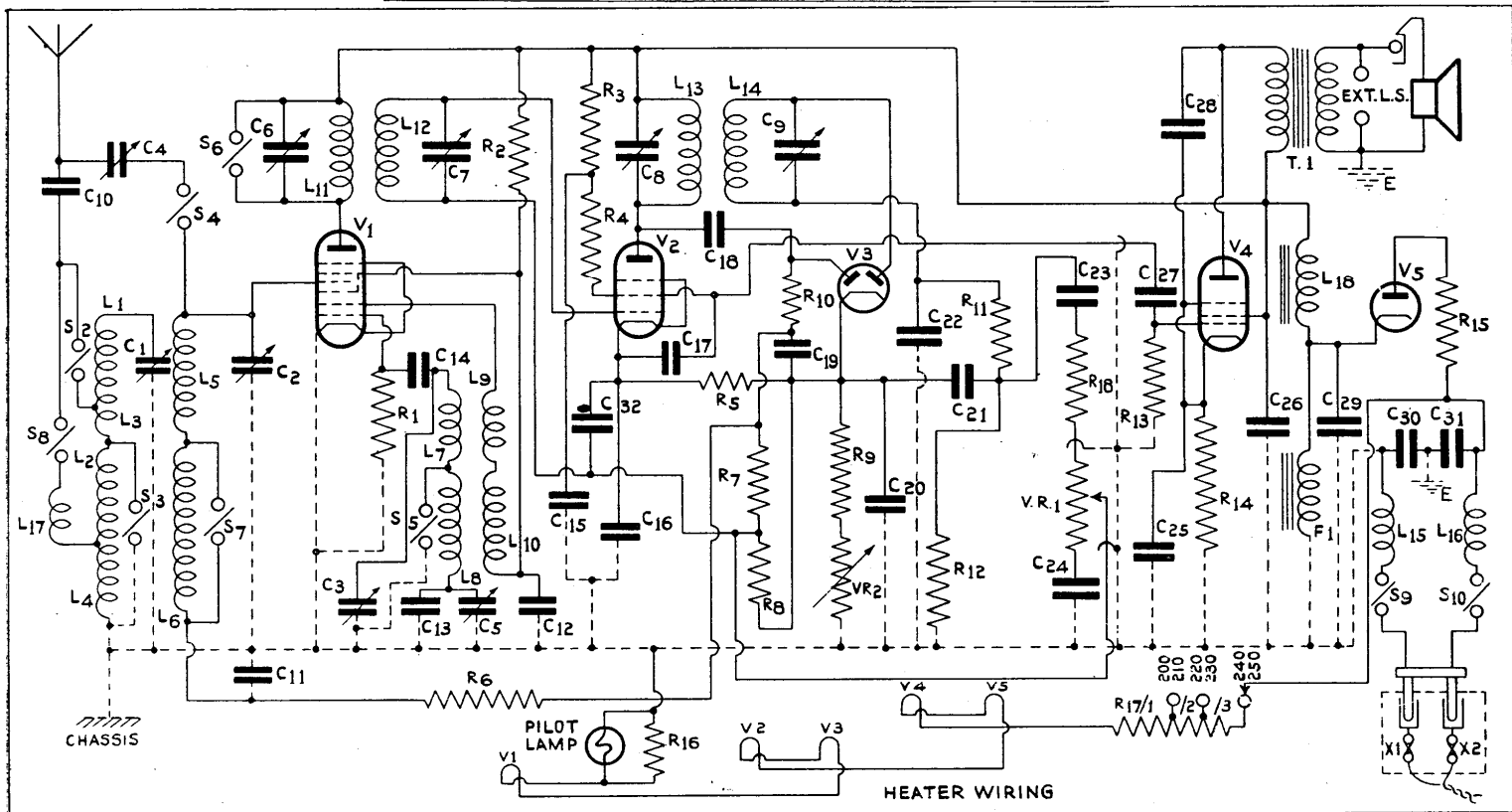
RE-GANGING

1. Set oscillator at 194.5 metres (1,540 Kc.).
2. Set wave-change switch to medium waves and turn tuning indicator to bring ganged condenser to minimum position.
3. Adjust oscillator trimmer on ganged condenser for minimum deflection of milliammeter needle.
4. Set oscillator at 250 metres (1,200 Kc.).
5. Turn tuning indicator to obtain minimum deflection of milliammeter needle.
6. Adjust band pass trimmers for minimum deflection of milliammeter needle.
7. Check calibration on other medium wave-lengths.
8. Set wave-change switch to long waves and check calibration on 1,600 metres. If out to any extent, adjust by padding condenser at rear of chassis to maximum output, meanwhile rocking tuning condenser slightly.

RESISTANCE AND CONSUMPTION READINGS

Volume Control	...	...	...	250,000 ohms	Mains Resistance (R17/1-3)			
Noise Suppression Resistance, maximum	...	...	...	2,075 ohms	Section 1	...	...	460 ohms
" " " " minimum	...	...	...	75 ohms	" 2	...	...	100 ohms
Output Transformer Primary	...	...	...	620 ohms	" 3	...	...	100 ohms
" " Secondary	...	...	...	0.2 ohms	Consumption of Receiver (on AC)	...	...	75 watts
Smoother Choke (L18)	...	...	...	300 ohms	" " (on DC)	...	...	70 watts
Loudspeaker Field Resistance	...	...	...	5,500 ohms				

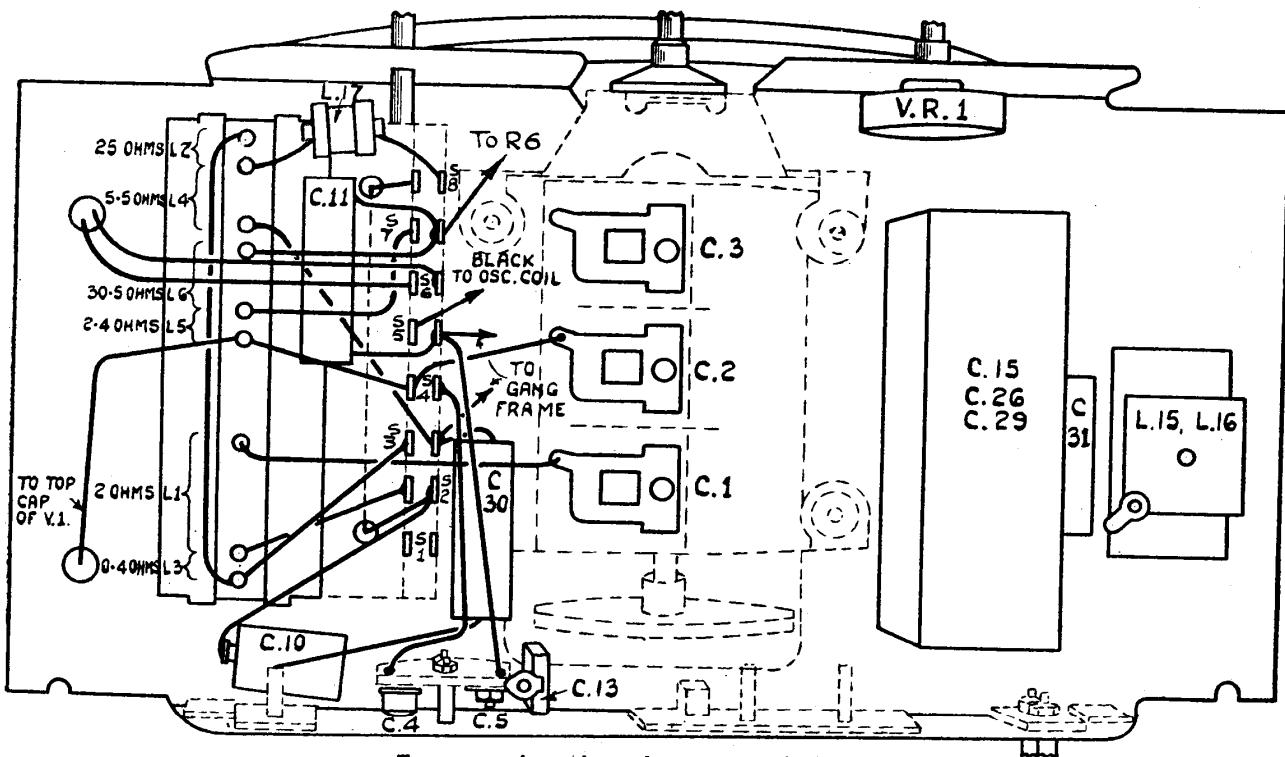
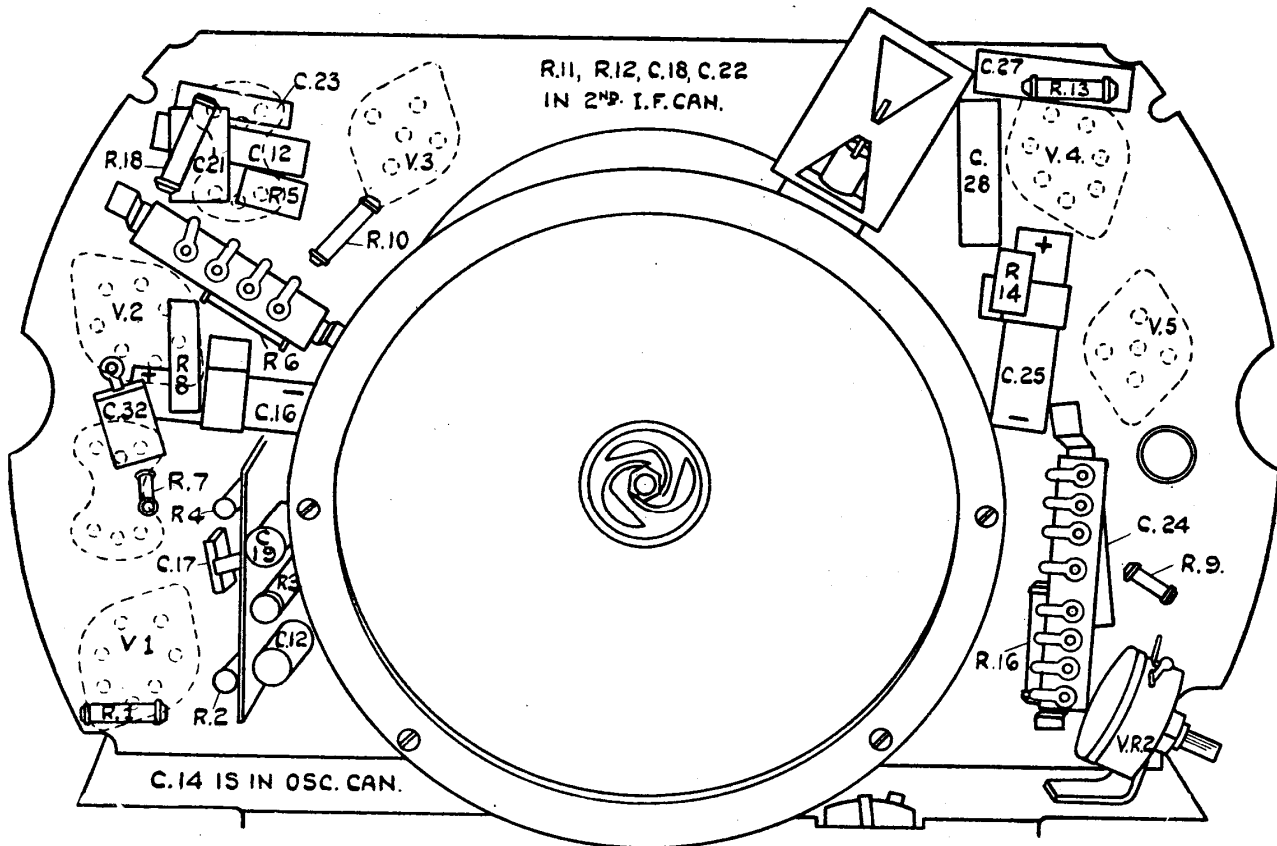
AD76 CIRCUIT DIAGRAM



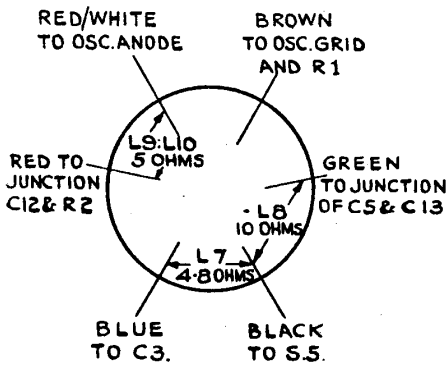
CIRCUIT KEY AND PRICE LIST.

Ref.	Description.	Part No.	Retail Price.	Ref.	Description.	Part No.	Retail Price.
L1	B.P. coil M.W. Sec. 1	...	...	C16, 25	25 mfd. Condenser	A3265	2/3
L2	" " L.W. Sec. 1	...	...	C17, 32	.0008 " " "	A3842	9d.
L3	" " M.W. Pri. ...	BP378	5/6	C18	15 C.M. " " "	A5422	9d.
L4	" " L.W. Pri. ...	...	...	C21	.0003 " " "	A3840	9d.
L5	" " M.W. Sec. 2	...	...	C22	.0003 " " "	A3842	9d.
L6	" " L.W. Sec. 2	...	...	C23	.01 " " "	A3846	9d.
L7	Osc. Coil M.W. Section	...	...	C28	.0025 " " "	A3684	9d.
L8	" " L.W. Section	SA84	6/6	C30, 31	1 " " "	A5044	9d.
L9	" " M.W. Cathode Sec.	...	...	R1, 4	50,000 ohms Resistance	A3263	9d.
L10	" " L.W. " "	...	...	R2, 3	15,000 " " "	A3263	9d.
L11	1st I.F. Transformer Pri. "	SA103	5/6	R5, 14	165 " " "	A4881	9d.
L12	" " " " Sec. ...	SA102	5/6	R6, 7	500,000 " " "	A3263	9d.
L13	2nd " " " " Pri. ...	...	...	R8, 10, 13	250,000 " " "	A3263	9d.
L14	" " " " Sec. ...	...	...	R9	75 " " "	A4705	9d.
L15	Filter Coil	SA73	3/-	R11	50,000 " " "	A4444	9d.
L16	" " " " " " " "	...	...	R12	250,000 " " "	A4444	9d.
L17	M.W. Suppression Choke	DP741	1/3	R15	50 " " "	A4882	9d.
L18	L.F. Choke	SA101	6/-	R16	100 " " "	A4880	9d.
C1-3	Ganged Condenser and Drive Assembly	D5186	18/6	R17/1	460 " ") Mains	DP753	5/6
C4-5	L.W. Padding and 2nd Channel Condenser	DP767	1/3	R17/2	100 " ") Resistance.	...	...
C10	.0008 mfd. Condenser	A3840	9d.	R17/3	100 " " )	...	...
C11, 12, 19, 20, 24, 27	.1 " " " "	A3844	9d.	R18	25,000 " Resistance	A3263	9d.
C13	.0007 " " " "	A3839	9d.	S9-10	On-off Switch	A4167	2/-
C14	.001 " " " "	A3841	9d.	X1, 2	1 amp. fuse	A5075/1	6d.
C15, 26, 29	2 x 24 x 8 mfd. Electrolytic Condenser	B5388	7/6	VR1	Volume Control (250,000 ohms)	B5394	4/6
				VR2	Noise Suppression Control (2,000 ohms)	B5182	4/6

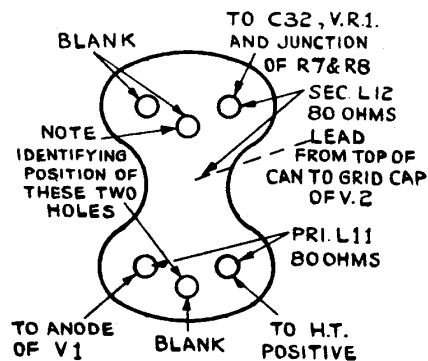
These prices are subject to alteration without notice.



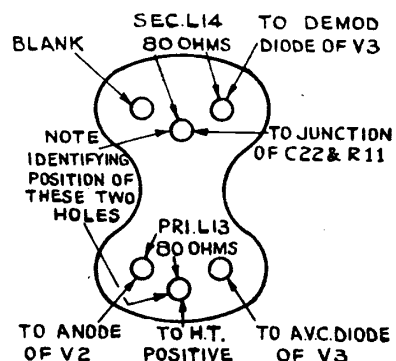
Front and underside views of Chassis.



OSCILLATOR COIL

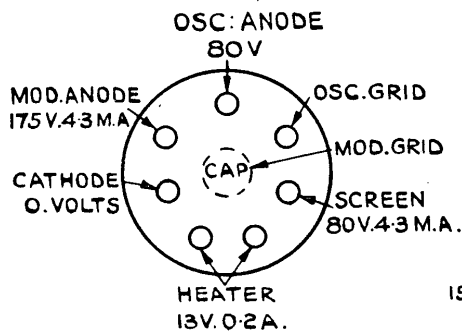


1ST I.F. TRANSFORMER

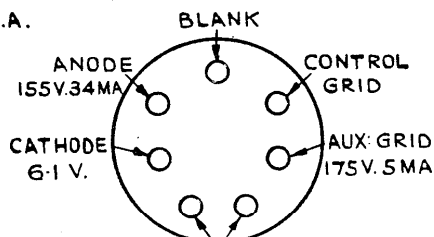


2ND I.F. TRANSFORMER

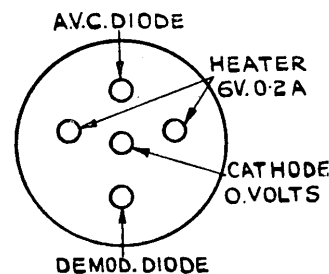
Connections and resistances of Oscillator Coil and I.F. transformers.



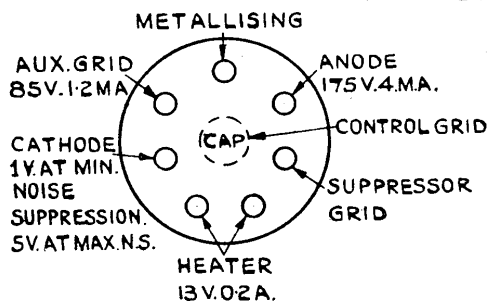
V.1.



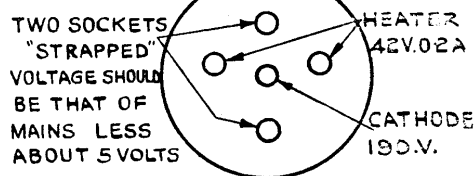
V.4.



V.3



V.2.



V.5

View of underside of valve-holders. Voltages shown are to chassis and measured with a meter having a resistance of 1,000 ohms per volt.

ADDITIONAL PRICES OF SPARE PARTS FOR AD76

Description.	Part No.	Price	Description.	Part No.	Price.
Cabinet (Dark Walnut)	DP772	25/-	Pilot Lamp	P2445	9d.
Cabinet (Black)	DP773	32/6	Plug (Red and Black)	A3654	2d.
Knob (Dark Walnut) Noise Suppressor	DP721	9d.	6BA Insulated Screw	P1532	3d.
Knob (Black) Noise Suppressor	DP721	1/-	Valve Top Clip	A4558	1d.
Knob (Dark Walnut) Tuning	C5152	2/-	Shadow Indicator Assembly	D5241	2/6
Knob (Black) Tuning	DP701	2/6	Wavechange Switch Assembly (Switch only)	SA88	4/6
Knob (Dark Walnut) Volume Control	C3838	9d.	Wavechange Switch Spindle	DP692	1/6
Knob (Black) Volume Control	DP142	1/-	Wavechange Switch Contact Spring Assembly (Inner)	DP374	1/6
Knob (Dark Walnut) Wavechange	B4056	9d.	Wavechange Switch Contact Spring Assembly (Outer)	DP373	1/6
Knob (Black) Wavechange	B4056	1/-	Wavechange Switch Locating spring	A4277	1d.
Back Cover and Cowl Assembly	DP765	4/-	Mains Resistance Clamp	A4812	2d.
Mains Lead Assembly	DP759	5/-	Mains Resistance	DP753	5/6
Clamp L/H	C5158	3d.	Chcke' Assembly	SA101	6/-
" R/H	C5158	3d.	Output Transformer	SA104	12/6
Mains Lead Fuse	A5075/1	6d.	Loudspeaker	M55/1	25/-
Scale Centre Bar (Dark Walnut)	C5151	1/3			
Scale Centre Bar (Chrom. Plated)	C5151	1/6			
Scale	D5167	4/6			

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; R16 and dial lamp O.C.; R17/1-3, L15 or L16 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 L18 (Fig. 23, page 3) to which red rubber covered lead is attached. If no H.T. V5 may be defective, or R15 O.C. If above normal, field of L.S. or L18 may be O.C. Test for smoothed H.T. between chassis and tag on L18 to which blue rubber covered lead is attached. If no H.T. L18 is probably O.C.

Satisfactory H.T. No radio.

Test V1, V2, V3 and V4 by substitution. If no signals ascertain whether V1 is oscillating by noting whether there is any change in voltage drop across R2 upon short circuiting fixed plates of C3 to chassis. If no change, V1 is not oscillating, in which case R1, R2 or C14 may be O.C. oscillator coils defective (check continuity and resistance) or C12 defective.

V1 Oscillating. No radio.

Test Band Pass and I.F. Transformer coils. If one is of negligible resistance the relative trimmer is probably S.C. C10 may be O.C.

V1 and associated circuits in order. No radio.

Check voltage and current readings of V2 and V4. No anode voltage to V2 indicates L13 to be O.C. If no anode current R5, R9 or VR2 may be O.C. If anode current is low, R3 or R4 may be O.C. or C15, C17 S.C. If high, L12, R8 may be O.C. and C32 or C16 S.C.

No anode voltage to V4 indicates primary of T1 is O.C. No anode current suggests an O.C. R14. High anode current suggests that R13 is O.C. or C25, C27 S.C.

NOTE: Normally A.V.C. diode of V3 should show no voltage to cathode. If appreciable voltage is measurable, C18 in 2nd I.F. transformer can is probably S.C.

Test I.F. 2nd detector, L.F. and output sections of receiver by applying a 130 Kc. input from a modulated oscillator to V2. One lead from the oscillator should be connected to chassis, and the other through a condenser of about .0003 mfd. to the control grid (top cap) of V2. The .0003 mfd. condenser is included as a precautionary measure.

If no audible note from loudspeaker, C23, C27, R3, R4, R11, R18, L12 or L13 may be O.C. or C15, C17, C32 may be S.C. See that the metal screening of leads to volume control and C27 are not short circuiting any connection to chassis.

MISCELLANEOUS.

M.W. Signals. No L.W. C12, L2, L4, L6, L8, L17 O.C. If weak M.W. signals only, S2 and S8 may not be closing.

Satisfactory L.W. Signals. Weak or No M.W. S.C. turns in L7, L9, L11 or L12. Wave change switch not "making" properly. (Contacts may be cleaned by drawing between them a piece of paper previously "faced" on both sides by a soft blacklead pencil.)

Satisfactory L.W. Excessive Whistles and Tuning Repeat Points on M.W. C4 S.C. or screwed in too far.

Intermittent Operation. Dry joint, defective connection inside fixed condenser, defective resistance. If on M.W. only suspect wave change switch contacts. Apparent intermittent operation may result if the receiver has been tuned to distant station normally subject to fading, and the pre-selector control set at any other than the "All Station" position.

No Stations Received unless VR2 is turned to "All Stations" position. Poor aerial. Defective V1 or V2. Band pass or I.F. coils may be defective. C1-3 or C6-9 may require re-trimming (see page 3 for procedure).

Will not calibrate correctly. S.C. turns in oscillator coil. On L.W. band C13 or C5 may be O.C.

Instability. C11, C17, C32, C16 O.C. Try connecting a mica dielectric .01 mfd. condenser across C26, which may have high H.F. impedance.

Motor-boating. Screening of leads to volume control and C27 not "earthed," C15, C16, C20, C32 O.C.

Sensitivity of Receiver Satisfactory. Noise Suppression Control fails to function. VR2 defective. C16, C20 S.C.

Excessive suppression. Fault in B.P. coil assembly. C32 O.C. V1 or V2 defective.

Microphonicity. Defective valve (probably V2) 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, R13, C15, C25, C26, C29 O.C. C27 S.C. Defective C30 or C31. S.C. turns in L18. Screening of leads to volume control or C27 not "earthed." Metal coating of one of the valves disconnected from relative pin on its base.

Distortion. Defective loudspeaker or valve. R13 O.C. C27 may be leaking, in which case, anode current of V4 will be excessive.

Recurrent Fuse Failure. C26, C29, C30 or C31 S.C. Loudspeaker frame or speech coil circuit, which are normally connected to earth socket and *insulated* from chassis, may be in contact with the latter at some point.

REPLACING DRIVE CABLE.

The new cord must be 33 inches in length with a knot about a quarter of an inch from each end to prevent cord slipping from the small metal Y-shaped piece supplied with every length.

After clamping ends of the cord into arms of the small "Y" clip with the aid of a pair of pliers, the loop thus formed should be passed from the inside of lower drum through slot in its outer rim.

Now rotate the ganged condenser to bring slot uppermost when it will be found that each side of the loop may be passed round the lower drum for three-quarters of a complete turn before leaving the edge at a tangent for the upper drum. If the latter is turned to bring slot to top, the cord can be passed round groove in edge of drum for a quarter of a complete turn on either side before the loop itself is passed through the slot.

The cord is then looped over the brass centre bush, after which one end of the tensioning spring should be hooked through hole in the leg of the Y-shaped piece, and the other end over the projection provided for anchoring purposes on the flat inside surface of the lower drum.

Before finally clamping the cord in position by means of the $\frac{3}{4}$ in. diameter brass washer held by a single screw to the indicator arms, rotate the latter by turning indicator to its limit in a clockwise direction (viewed from back of chassis) to bring ganged condenser to its maximum capacity.

TO RE-CENTRE LOUDSPEAKER.

(a) Loosen spider fixing screw. (b) Space speech coil accurately from pole piece by using three strips of suitable material, such as visiting card, inserted through holes in spider. (c) Tighten centre screw. (d) Remove spacing strips.

TO REPLACE SCALE.

- (1) Remove chassis from cabinet as explained on page 2.
- (2) Remove the two semi-circular metal clamping brackets by unscrewing the two nuts at the ends and the five countersunk head screws.
- (3) Before fitting the new scale, affix the centre bar to it by means of the two bolts and three round-headed screws. This will assist in spacing wave-length and station markings accurately in the scale aperture. The lower edge of the scale which overlaps the top of the cardboard frame carrying the loudspeaker silk, is held firmly in place by the speaker rim after replacing chassis in cabinet.

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.

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

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

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, C1. Telephone: Central 5357/8.

Manchester Service Depot: Bombay House, 59, Whitworth Street, Manchester. Telephone: Central

6711. (Goods address: 7, Bombay Street, Manchester.)

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