

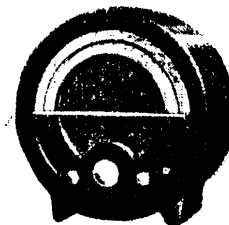
CONFIDENTIAL—

*For the Information of Ekco
Registered Factors and Registered
Dealers only.*

NOT TO BE COPIED

or disclosed to any third party

**EKCO
SERVICE INFORMATION**



**MODEL AC76
CONSOLE 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 an H.F. choke (L15) 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 FC4**, "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 Mazda AC/VP1**.

The latter is coupled to the demodulator diode of the double diode valve, a **metallised Mullard 2D4A** (alternative Mazda V914) through the 2nd I.F. transformer L13 L14, while the voltage across the primary of this transformer is also applied through C17 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 R9 which are applied via C18, volume control VR2, and L12 to the grid of V2. This valve acts as an I.F. amplifier and also as a three electrode L.F. stage, of which the cathode, grid and anode are respectively cathode, control grid and screening grid of V2. In the screening grid circuit, decoupling is provided by R12 and C23, while the L.F. voltage variations developed across R11 are applied through C24 to the grid of the output valve, a seven pin **Mazda AC2/Pen**.

An output transformer mounted on the chassis of the receiver energises the loudspeaker, 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 C20, which results in the bass notes being progressively emphasised as VR2 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 $2\frac{1}{3}$ ohms impedance is connected across "Ext. L.S." sockets.

High tension is by a full wave indirectly heated rectifier valve **Mullard IW3** (alternative Mazda UU3). A directly heated type should not be used, otherwise there is risk of breakdown of the electrolytic condenser block consisting of two 8 mfd, and one 2 mfd sections which, in conjunction with the loudspeaker field winding provides adequate smoothing.

AUTOMATIC VOLUME CONTROL.

The I.F. input applied through the small condenser C17 to the A.V.C. diode of V3 is rectified, thus developing a voltage across R5, R7 and R3 comprising the A.V.C. load. The voltage across R7 and R3 is applied as a negative bias to the grid of V1, and that across R3 as a negative bias 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 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, R8 and R9 to chassis, and the cathode to the junction of R4 and R14. When VR1 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 and 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 interaction 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 AC76 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

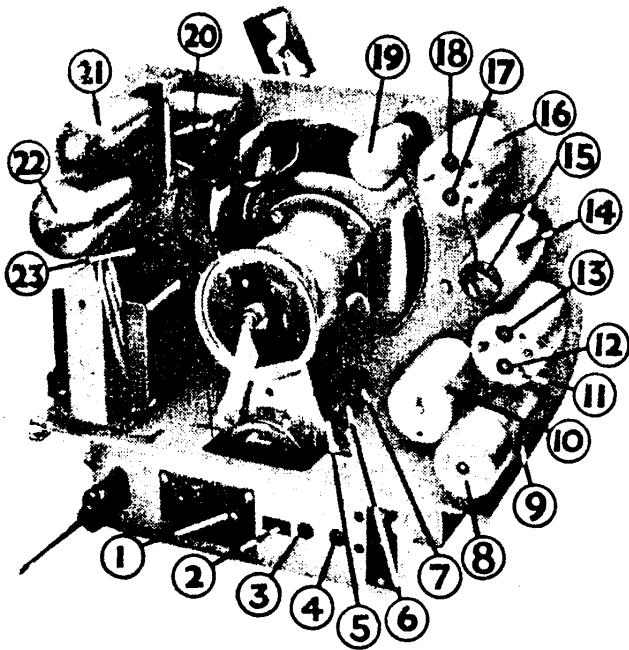
(1) Remove the control knobs by loosening the grub screws, including that of the "Noise Suppressor." The single grub screw fixing the latter to its spindle is accessible by means of a long screwdriver inserted along the inside of the cabinet. A portion of the chassis is cut away for this purpose.

(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 transformer 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. Loudspeaker silencing screw.
2. Serial number.
3. Long wave tracking condenser (C5).
4. Image rejection adjustment (C4).
5. First B.P. section (C1).
6. Second B.P. section (C2).
7. Oscillator section (C3).
8. Modulator grid cap screen.
9. Frequency changer valve (V1).
10. Oscillator coils (L7-10).
11. First I.F. transformer (L11, L12).
12. Primary trimmer (C6).
13. Secondary trimmer (C7).
14. I.F. Valve (V2).
15. Anode cap.
16. Second I.F. transformer (L13, L14).
17. Primary trimmer (C8).
18. Secondary trimmer (C9).
19. Double diode valve (V3).
20. Output transformer (T1).
21. Output valve (V4).
22. Rectifier valve (V5).
23. Mains voltage adjustment.

RE-ALIGNING

1. Remove chassis from cabinet as indicated on page 2.
 2. Set wave change switch to "Long Wave" and tuning condenser to about 1,000 metres.
 3. Connect a 0-10 milliammeter across VR1, 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.

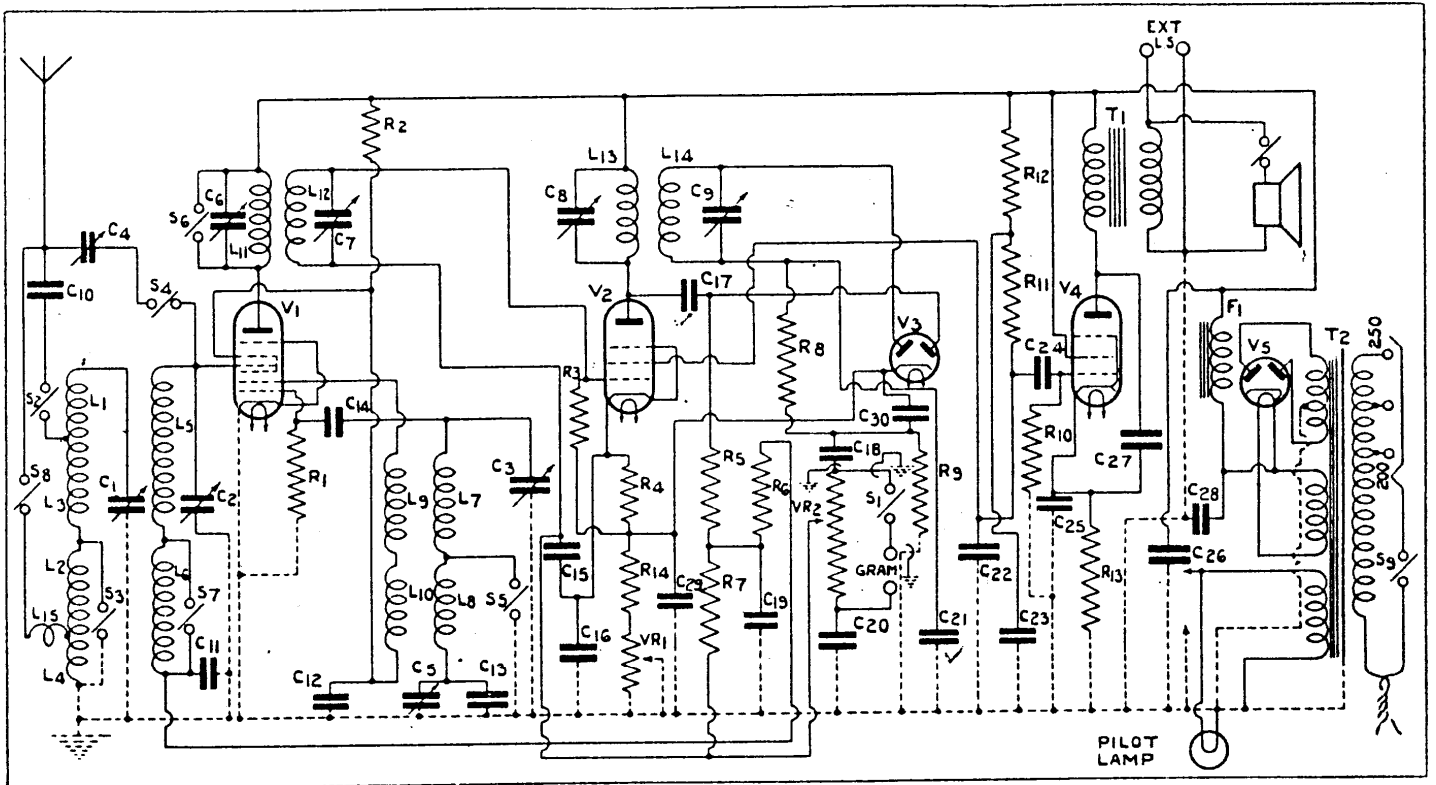
VOLTAGE AND RESISTANCE READINGS

Volume Control: 250,000 ohms.
Noise suppression resistance: max. 2,075 ohms.
Noise suppression resistance: min. 75 ohms.
Output transformer, primary: 650 ohms.
Output transformer, secondary: 0.2 ohms.
Loudspeaker field resistance: 2,000 ohms.

Voltage drop across speaker field: 130 volts.
Mains transformer. (Consumption 60 watts.).
Primary: 200-210 volt tap 33.3 ohms.
" 220-230 " " 36.7 "
" 240-250 " " 40 "
Secondary (each half): 350 ohms.

MODEL AC76

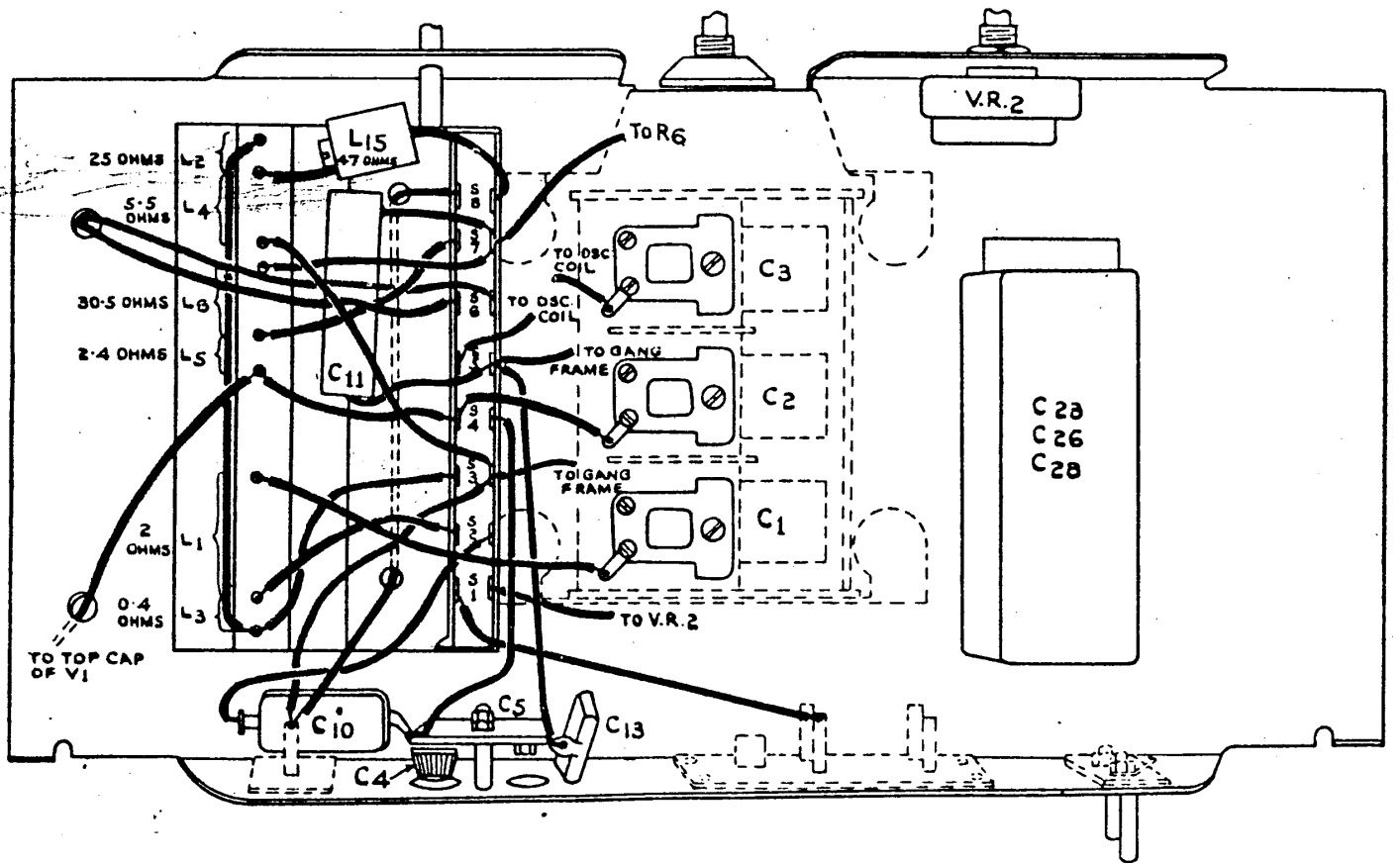
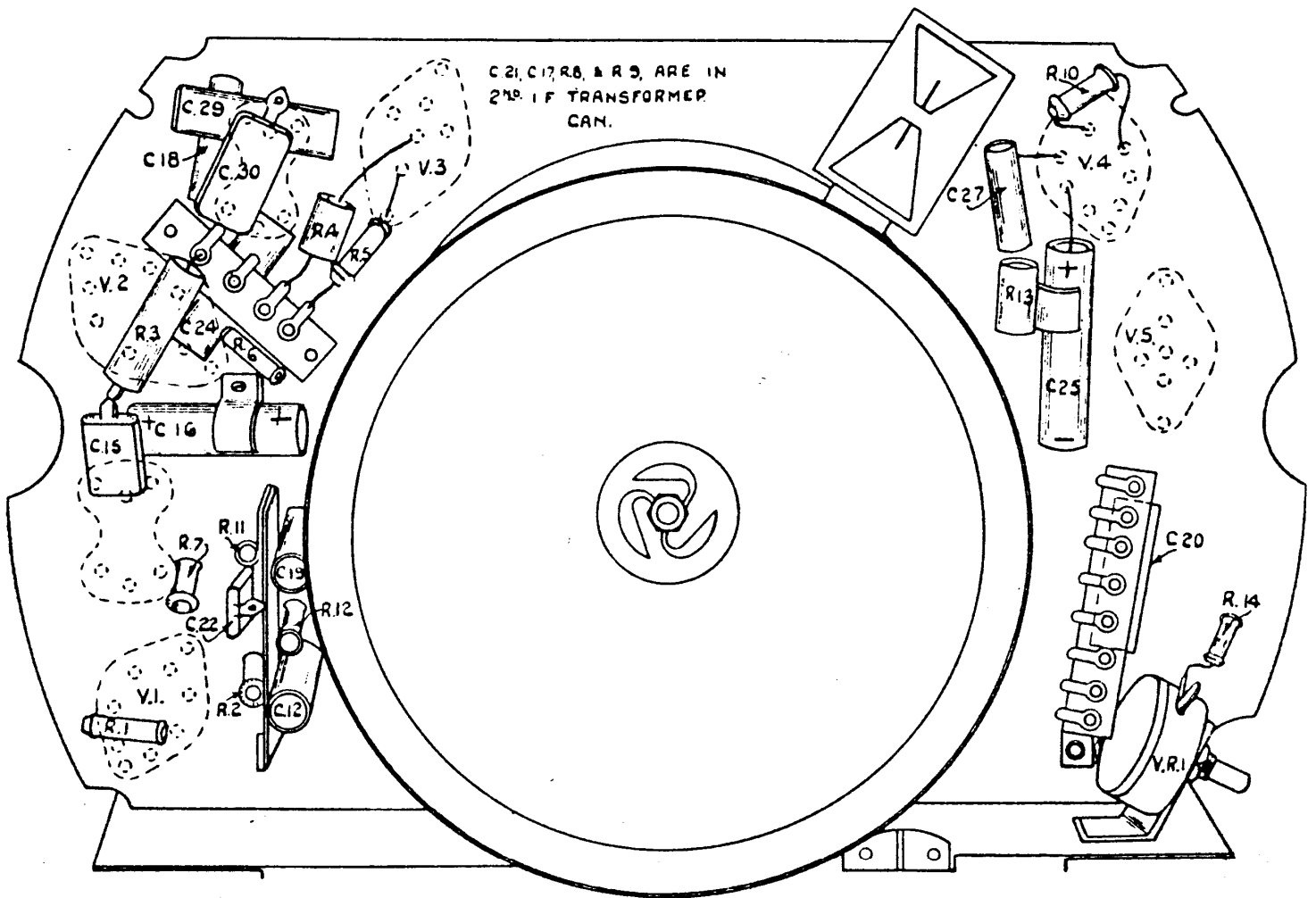
CIRCUIT DIAGRAM



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			C15, 22	.0008 mfd. Condenser	A3842	9d.
L2	" " L.W. Sec. 2			C16, 25	25 " Electrolytic	A3265	2/3
L3	" " M.W. Pri.	SA88	5/6	C17	.0001 " Condenser	A3840	9d.
L4	" " L.W. Pri.			C18	.01 " " "	A3846	9d.
L5	" " M.W. Sec. 2			C21	.0003 " " "	A3842	9d.
L6	" " L.W. Sec. 2			C23, 26, 28	2+8 " Electrolytic	B5207	14/6
L7	Osc. Coil M.W.				+8 " Condenser	A4272	9d.
L8	" " L.W.	SA84	6/6	C27	.004 " Condenser	A3840	9d.
L9	" Cathode Coil M.W.			C30	.0003 " " "	A3263	9d.
L10	" " L.W.			R1, 11	50,000 ohms Resistance	A3263	9d.
L11	1st I.F. Transformer Pri.	SA85	5/6	R2	30,000 " " "	A4881	9d.
L12	" " " Sec.			R3, 5, 10	250,000 " " "	A3263	9d.
L13	2nd " " Pri.	SA89	5/6	R4	300 " " "	A4444	9d.
L14	" " " Sec.			R6, 7	500,000 " " "	A3263	9d.
L15	M.W. Suppression Choke	DP741	1/3	VR1	2,000 " Variable Noise Suppressor	B5182	4/6
C1-3	Gang Condenser and Drive Assembly	E5186	18/6	VR2	250,000 " Volume Control	B5168	7/6
C4-5	L.W. Padding and Image Re-jector Condenser	DP313	1/3				
C10	.0008 mfd. Condenser	A3840	9d.				
C11, 12, 19, 20, 24, 29	01 " " "	A3844	9d.				
C13	.0007 " " "	A3839	9d.				
C14	.001 " " "	A3841	9d.				

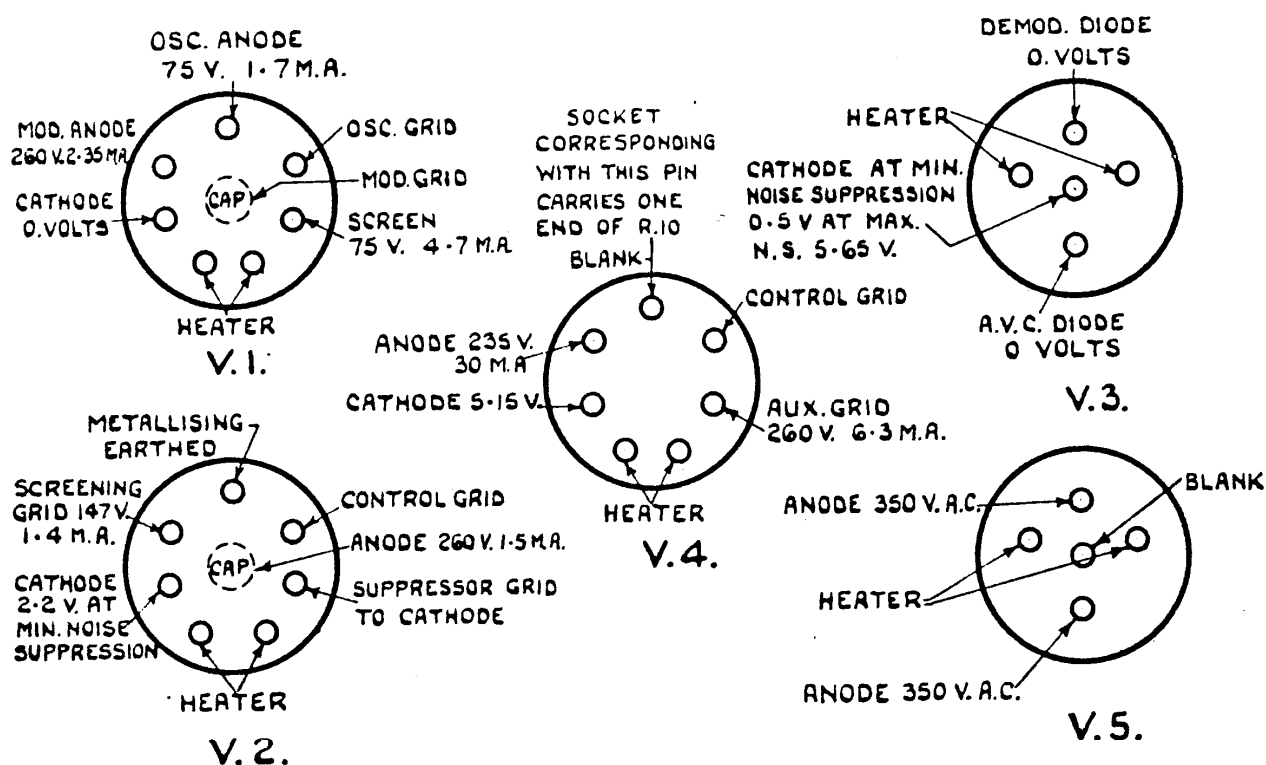
These prices are subject to alteration without notice.



Front and underside views of Chassis.

MODEL AC76

VIEW OF UNDERSIDE OF VALVE HOLDERS.

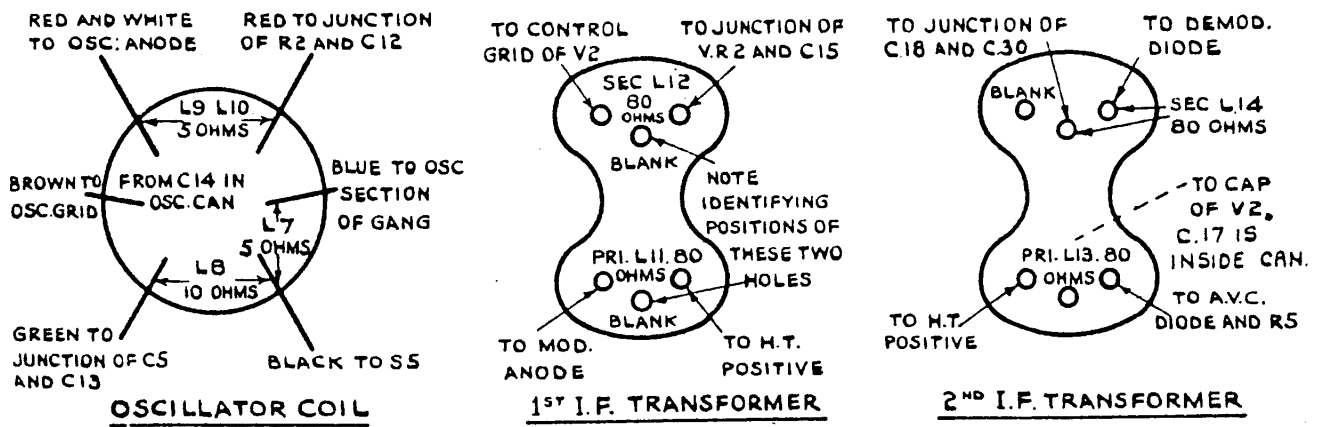


Voltages shown are to chassis and measured with a meter having a resistance of 1,000 ohms per volt.

ADDITIONAL PRICES OF SPARE PARTS FOR AC76

Part No.	Description.	Price.		Part No.	Description.	Price.	
		£	s. d.			£	s. d.
DP702	Cabinet (Dark Walnut)	1	5 0	D5167	Scale	4	6
DP703	" (Black)	1	12 6	P2445	Pilot Lamp		9
DP721	Knob (Dark Walnut), Noise Sup-		9	A3654	Plug (Red or Black)		2
	pressor		9	A4463	Rubber Buffer		2
	Knob (Black), Noise Suppressor ...	1	0	P1531	4BA Insulated Screw		3
C5152	" (Dark Walnut), Tuning	2	0	P1532	6BA " "		3
DP701	" (Black), Tuning	2	6	A4658	Valve Top Clip		1
C3838	" (Dark Walnut), Volume Con-		9	D5241	Shadow Indicator Assembly	2	6
	trol		9	DP692	Wave Change Switch Spindle... ..	1	6
DP142	" (Black), Volume Control	1	0	SA88	Wave Change Switch Assembly		
B4056	" (Dark Walnut), Wave Change		9		(Switch only)	4	6
	" (Black), Wave Change	1	0	DP374	Wave Change Contact Spring		
	Assembly (Inner)				Assembly (Outer)	1	6
E5147	Back Cover	2	6	DP373	Wave Change Contact Spring		
DP196	Mains Lead	3	6		Assembly (Outer)	1	6
C5158	Clamp, L/H		3	A4277	Wave Change Locating Spring ...		1
C5159	" R/H		3	SA86	Mains Transformer	1	0 0
C5151	Scale Centre Bar (Dark Walnut) ...	1	3	SA90	Output Transformer		12 6
	" " (Chrom. Plated)	1	6	M55	Loudspeaker	1	5 0

These prices are subject to alteration without notice.



Connections and Resistances of Oscillator Coil and I.F. Transformers.

POSSIBLE FAULTS

(Abbreviations: O.C. Open circuited; S.C. Short circuited.)

Valves do not light up.

Break in mains flex. Disconnection inside either mains plug. Mains tapping screw on transformer unscrewed. On-off switch defective or disconnected.

Valves light up. No gramophone results.

Check switch in correct position. Defective V2, V4 or V5. (Test for correct H.T. across C26 and C28.) Open contact at S1. Defective VR2. Break in L12: S.C. C5, C22, C23 or C27: O.C. R4, R11, R12, R13, R14, VR1 or T1. (Test for voltage on appropriate points.) L.S. silencing screw loose: Poor contact on 4-pin loudspeaker plug.

Gramophone results. No radio.

Defective V1, V2 or V3. Test I.F. circuit by applying 130 Kc input from modulated oscillator between modulator grid (top terminal) of V1 and chassis. If no I.F. signal L11, L12, L13, L14, R8 or C18 may be O.C. and C6, C7, C8, C9 or C21 S.C. If weak I.F. signal, C13 or C16 may be S.C. or R.9 O.C.: L11, L12, L13 or L14 may have shorted turns, thus preventing "peaking." (Test for correct resistance.)

Satisfactory I.F. Signals. No radio.

V1 not oscillating. If this is the case, placing a wet finger on the fixed plates of the oscillator section of the ganged condenser will cause no change in voltage across C5. If not oscillating, gang trimmer may be shorting, C7 (inside oscillator coil can) may be shorting to can or O.C., while L7, L8, L9, L10, R1 or C5 may be O.C.

V1 Oscillating. No radio.

Trimmers of gang sections C1 and C2 may be S.C. L1, L3 or L5 O.C. If satisfactory signals on Long Wave Band only, C10 may be O.C. or wave change switch not "making" properly. The contacts of this may be cleaned by drawing between them a piece of smooth paper previously "faced" on both sides with a soft blacklead pencil. If Medium Wave results are satisfactory, but no Long Wave signals are received, S8 may be remaining "open," while L2, L4, L6 or L15 may be O.C.

MISCELLANEOUS.

Crackle. Outside interference; Loose pilot light; Noisy valve; Dry joint; Valve loose in socket; Internal S.C. in fixed condenser; Dirty W/C switch contacts; Loose L.S. silencing screw; Defective resistance.

Instability. C11, C15, C16 or C22 O.C.; C26 may have developed a high H.F. impedance. (Try connecting across it a mica dielectric condenser of about 0.1 mfd.)

Motorboating. C15, C16 or C22 may be O.C.

Distortion. Defective loudspeaker or valve; C16, C25 O.C.; C24 leaking.

Will not calibrate correctly. S.C. turns in oscillator coil. On Long Waves; C5 or C13 O.C. C13 O.C.

Noise suppressor fails to function. Defective VR1; C20 or C29 S.C.

Excessive suppression. Defective V1 or V3; C21 O.C.

Microphonicity. Probably V2 has loose electrodes or ganged condenser is defective. (See that the latter is "floating" properly on its rubber buffers.)

Hum. S.C. turns in L.S. field; R10, C16, C22, C26 or C28 O.C.; C25 S.C.; C24 leaking; V5 defective.

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 arm, 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.

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 combined volume controls and On-off switches, 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.

E. K. COLE LTD., SERVICE DEPT., 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.