

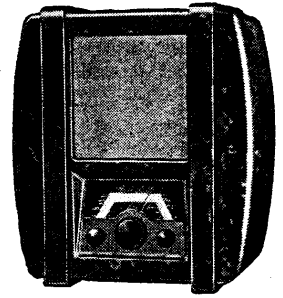
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EKCO SERVICE INFORMATION



MODEL AD37
CONSOLE RECEIVER

GENERAL DESCRIPTION.

The model AD37 is a straight universal receiver consisting of a variable-mu H.F. pentode valve (Mullard VP13C), H.F. pentode leaky-grid detector (Mullard SP13C) pentode output valve (Mullard Pen 36C or Mazda Pen 3520) and half-wave rectifier (Mullard URIC or Brimar ID5). All heaters are in series, the necessary voltage being dropped across a resistance (R10) mounted at the rear of the chassis. A special pilot lamp giving even illumination of the tuning scale is mounted above the gang condenser.

A high degree of selectivity is secured by the use of iron cored coils, while pre-set condensers for reaction and aerial matching purposes are incorporated. The set loudspeaker may be silenced in favour of an external speaker when desired by means of a small insulated screw at the rear of the receiver.

CIRCUIT DETAILS.

On the medium waveband (green spot uppermost) the aerial is coupled through C1 and via auto-transformer L2 to the H.F. pentode valve V1, while on the long waveband the coupling is through C1 and the inductively coupled transformer L1, L2, L3.

After amplification by V1, the signal passes through the inductively coupled iron cored H.F. transformer L4-7 via C10 to the grid of the detector valve V2 (C10, with associated resistance R3, is incorporated inside the H.F. transformer can).

The detector valve is resistance-capacity coupled by R5 and C13 to the output valve V3. (Decoupling in the anode circuit of V2 is provided by R6 and C14, which is a section of the dry electrolytic smoothing condenser block.) The output transformer T1 feeding the *permanent magnet* loudspeaker is mounted on the underside of the receiver chassis.

Volume is controlled by varying the bias applied to the H.F. pentode valve V1 by means of the variable resistance VR1 which, with R2, forms a potentiometer arrangement across main H.T.

SPECIAL FEATURES.

AERIAL EQUALISING CONDENSER.

A proportion of the aerial capacity will always be transferred to the tuned circuit L2, C3-4 on the M.W. band and L2, L3, C2-4 on the L.W. band. It will be apparent that unless a method is provided of varying this capacity within suitable limits, the circuits mentioned may be thrown out of adjustment with the corresponding circuits C8-9, L5, L7. The desired variation is obtained by means of the pre-set condenser C1 (see Fig. 1) which, once adjusted for a particular aerial, should not be touched. Readjustment will, however, be necessary if the receiver is used on a different aerial.

A refinement of this device is that the aerial coil is so designed that by operation of the switch contacts S1, S2 the same capacity is transferred from the aerial to the coils in the grid circuit of V1 when the wave-change switch is turned either to the M.W. or L.W. positions. This ensures accurate ganging on both wavebands, and also that once the aerial equalising condenser has been set for the medium waveband, it will not require further adjustment for the long wave band.

To Adjust Aerial Equalising Condenser.

Tune the receiver to a weak station at about 220 metres. With the volume control at a fairly low setting turn the aerial equaliser one way or the other until maximum volume is obtained. Re-tune the receiver accurately to the same station with the Station Selector and re-adjust the aerial equaliser.

PRE-SET REACTION CONDENSER.

Reaction is used to improve both sensitivity and selectivity, and is provided by the pre-set condenser C7 connected between the anodes of the H.F. and detector valves.

Due to the low H.F. resistance of the iron cored coils employed, it has been possible to ensure that reaction is constant practically throughout the tuning scale.

To Adjust Pre-Set Reaction Condenser.

Tune the receiver to a programme at the lower end of the medium wave band which necessitates advancing the volume control to maximum.

Screw the pre-set reaction condenser slowly in a clockwise direction until the receiver is just short of oscillating point, meanwhile rocking the tuning condenser slightly.

LOUDSPEAKER SILENCING SCREW.

This is at the back of the receiver (see Fig. 1) and, when unscrewed, breaks the speech coil circuit of the set speaker. The latter should not be silenced in this way, however, unless a moving coil loudspeaker with a speech coil impedance of 2-3 ohms is connected across the "Ext. L.S." sockets. This loudspeaker will not require an output transformer.

RE-CALIBRATING AND RE-GANGING MODEL AD37.

Note: It is unnecessary to remove the chassis from the cabinet when carrying out these procedures.

RE-CALIBRATING.

When the gang condenser is turned to its *electrical* maximum in a clockwise direction, the station pointer should cover the green line corresponding with about 570 metres.

If this is not the case the tuning knob should be removed in order to gain access to the inner end of the indicator arm. A small screw engaging with a slot in the flat end of the arm will be observed, and if this screw is loosened, the arm may be pivoted on the gang condenser spindle to the correct point.

RE-GANGING.

Note: It cannot be too strongly emphasised that *re-ganging should be attempted only if the circuits are distinctly out of balance*. Ensure that the modulated service oscillator used is as described below and follow the instructions very carefully.

1. Connect a modulated service oscillator having an output capacity of .0002 mfd. to aerial and earth sockets of the receiver.

2. Screw the aerial-equalising condenser hard in, then slack it off exactly *one and a quarter* turns. It is most important that this procedure be closely followed in order to ensure that the receiver is re-ganged under average working conditions.

3. Connect a suitable output meter (range 0-5 volts) to the "Ext. L.S." sockets. (Remember that these are connected across the speech coil winding of the output transformer.)

4. Set oscillator and receiver tuning indicators to 1,200 kc/s (250 metres) (green dot uppermost on receiver wave-change switch).

5. Adjust the trimmer C9 (see Fig. 1) on the H.F. transformer section of the gang condenser for maximum reading on the output meter.

6. Adjust the trimmer (C4) on the aerial section of the gang condenser for maximum output meter reading.

Note: Upon reconnecting the receiver to the customer's aerial and earth, do not forget to readjust the aerial equaliser (C1).

LONG WAVE GANGING.

1. Set the oscillator to give an output at 200 kc/s (1,500 metres).

2. Turn the receiver wave-change switch to the "Long Wave" position and tune the receiver to the oscillator signal.

3. Adjust the long wave trimmer condenser C2 for maximum output, meanwhile "rocking" the tuning condenser slightly. C2 is mounted inside the aerial coil can (see Fig. 1).

Note: A trimming tool not more than three inches in length and sufficiently thin to be inserted through the hole in the coil-can will be required for adjustment of C2. (It will be noted that the hole is obliquely set to the plane in which C2 is mounted, thus restricting its effective size.)

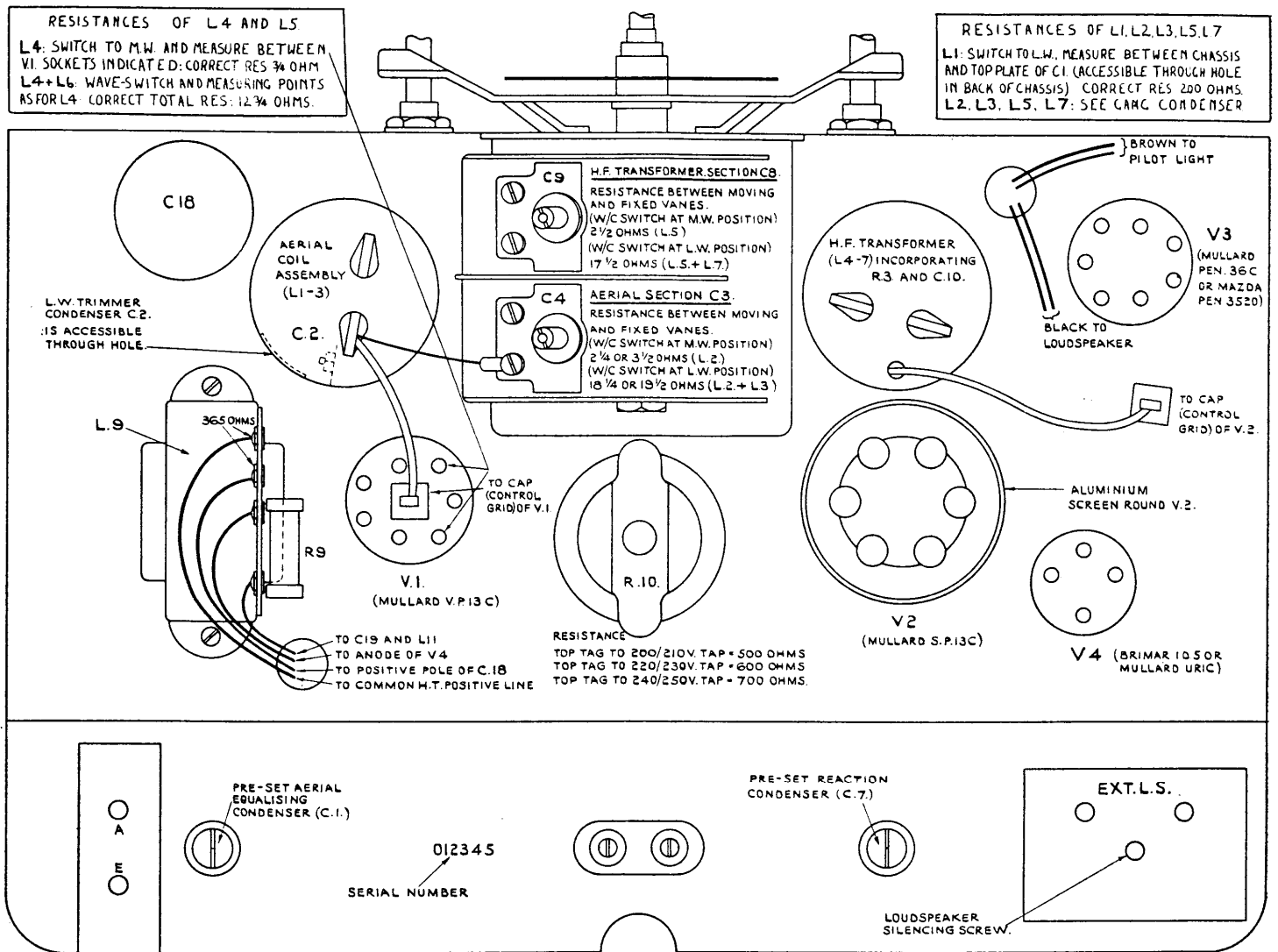


Fig. 1. Top view of chassis. All coil resistances are shown.

TO REMOVE CHASSIS FROM CABINET.

1. Remove back, after lifting slightly so that the metal cowl clears the top of the mains resistance.
2. Remove knobs by unscrewing grub screws.
3. Unsolder the leads to the pilot lamp and speaker.
4. Remove the four cheese-headed screws in the base of the cabinet, leaving the two countersunk screws in place.
5. The chassis may now be withdrawn from the cabinet.

Notes: It is advisable to leave the transverse chassis bars affixed to the chassis in order to avoid subsequent incorrect assembly of the insulating washers.

The speaker should, of course, be reconnected by means of extension leads when testing the chassis. It is also advisable to reconnect the pilot lamp in a similar manner, as otherwise the valve operating voltages will be affected. Carefully insulate the ends of the pilot lamp leads in order to prevent accidental contact with the chassis.

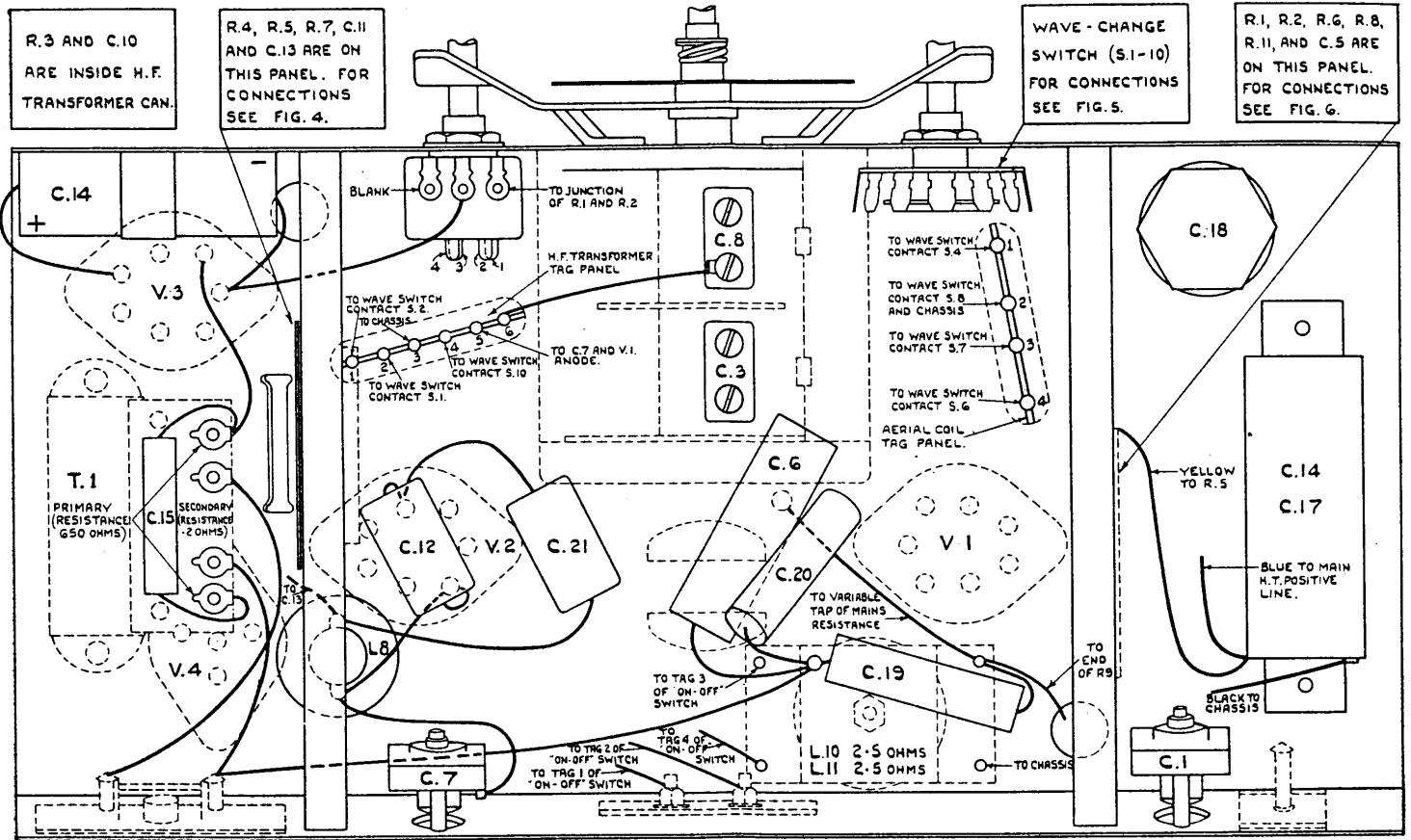


Fig. 3. Underside view of chassis showing coil connections.

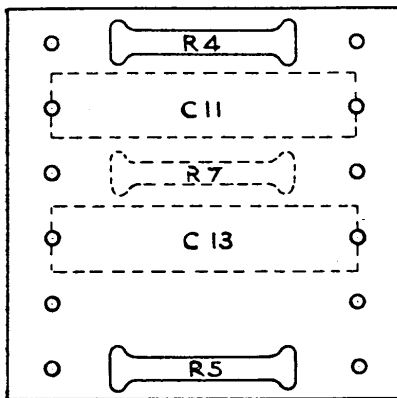


Fig. 4. Diagram of sub-panel carrying R4, R5, R7, C11 and C13.

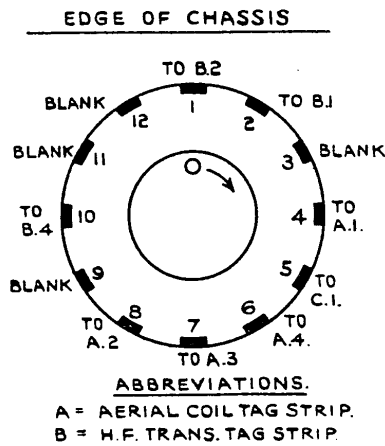


Fig. 5. Diagram of connections to wave-change switch.

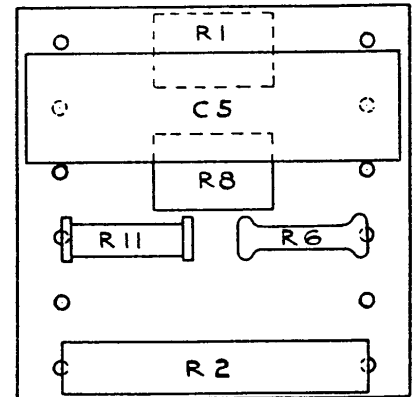


Fig. 6. Diagram of subpanel carrying R1, R2, R6, R8, R11 and C5.

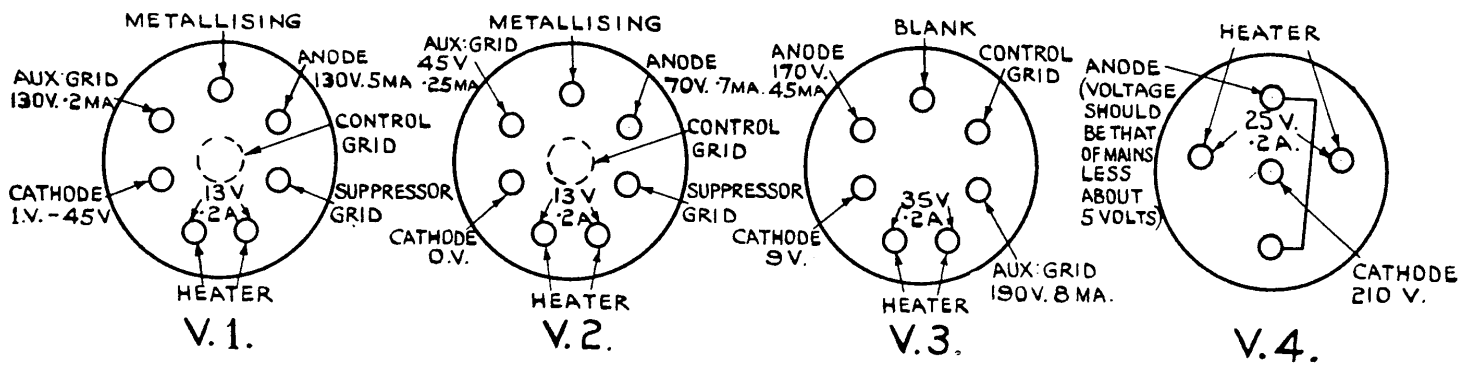


Fig. 7. Underside view of valve bases. Voltages shown are to chassis, and measured with a meter having a resistance of 1,000 ohms per volt.

FAULT FINDING.

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

If the receiver does not operate, a systematic stage by stage test starting from the L.F. end and making full use of voltage and current readings, will generally indicate the fault.

Removal of the earth lead will affect the ganging of the receiver by reducing the capacity across the aerial coil. In carrying out any tests involving a check of the sensitivity of the receiver, therefore, always ensure that the earth lead is connected and that the aerial equaliser (C1) is correctly adjusted.

Testing H.T. and heater circuits.

Ascertain whether the valves light up. If they do not, examine mains fuses (these are incorporated in the mains plug at the receiver end of the mains flex). Check continuity of valve heaters or try new valves.

If valves light up, check for H.T. between tag 2 of smoothing choke L9 (see Fig. 1) and chassis. No H.T. indicates a defective rectifier valve, defective mains resistance or R9 O.C.

No trouble should be experienced with the wet electrolytic condenser C18, which is self healing. The receiver chassis should not be operated in such a way, however, that this condenser is required to function for appreciable periods in any other than a vertical position.

Assuming that H.T. is measurable between tag 2 of L9 and chassis, test for H.T. between tag 1 and chassis. No H.T. indicates an O.C. choke or S.C. C17 (dry electrolytic condenser).

Testing L.F. section of receiver.

If H.T. between tag 2 and chassis is approximately correct, place a finger on the grid (top cap) of V2 (after seeing that L.S. silencing screw is screwed up). Normally a loud "screech" will be heard, and the absence of this will indicate a defect in the L.F. section of the receiver.

This defect will probably be traced by checking up the voltage and current readings of V2 and V3. For instance, no voltage on V3 anode indicates that primary of T1 is O.C. If the voltage on V3 anode is high (about 190 volts), and there is no voltage drop across T1 primary (normal drop about 30 volts) C15 is probably S.C. although V3 may itself be defective, or R8 O.C.

Excessive voltage drop (about 45 volts) across T1 primary accompanied by abnormal hum indicates C13, C16 S.C. or R7 O.C.

Note: In later receivers C15 is connected between anode and cathode of V3, as distinct from connection across T1 primary in earlier instruments.

Similarly check up voltage and current readings of V2. No anode voltage indicates L8, R5, R6 O.C. High anode voltage, but low anode current, indicates a defective V2, or O.C. R4. If both anode voltage and anode current are abnormally high, the reaction pre-set condenser C7 may be S.C.

Testing H.F. circuits.

If placing a finger on the top cap of V2 causes a loud "screech," however, showing that the L.F. section of the receiver is in order, it should be possible to make the receiver oscillate by gently screwing in the reaction condenser C7. As the receiver goes into oscillation a "plop" should be heard, while the voltage reading across the .0008 mfd. condenser C21 should increase from 80 to 90 volts (approximately). If the receiver will not oscillate on both wavebands check up the resistance of L5 and L7, measuring from the fixed vanes of C8 (see Fig. 1) and chassis. With wave-change switch in M.W. position the resistance reading should be $2\frac{1}{2}$ ohms and $17\frac{1}{2}$ ohms with switch in L.W. position. If in either position the resistance is negligible, the trimmer C9 is probably S.C. Ascertain whether signals can be received when the aerial is connected through a small condenser (.0001 mfd. or less) to the grid (top cap) of V1. If not, take voltage and current readings of V1. No anode voltage indicates L4, L6, R11 O.C., or C6 S.C. High anode voltage and low anode current point to a defective H.F. valve or no voltage on auxiliary grid, while absence of anode current indicates, unless V1 is faulty, an O.C. VR1 or R1. If the anode voltage is below normal, L2, L3 is O.C. or C5 S.C. In the latter case there will be no voltage on V1 cathode.

To check resistance of L2 and L3 measure between fixed vanes of C3 (see Fig. 1) and chassis. With the wave-change switch at the M.W. position the resistance should be $2\frac{1}{4}$ or $3\frac{1}{2}$ ohms while the resistance with the switch in the L.W. position should be $18\frac{1}{4}$ or $19\frac{1}{2}$ ohms.

Should signals be received when the aerial is connected as indicated the fault is in the aerial circuit, and may be due to an O.C. equalising condenser C1, or defective wave-change switch (contacts 4 and 6 Fig. 5).

MISCELLANEOUS FAULTS.

Microphony. This will generally be caused by loose electrodes in V2.

Motor boating. Try connection of equivalent capacities across the smoothing condensers C17, C18 and decoupling condensers C5, C14, C16.

Distortion. It is very unlikely that the loudspeaker will cause distortion with normal use. If it is proved to be responsible the loudspeaker should be returned for replacement.

Reproduction unduly high-pitched. C16, C21 O.C., C17 low capacity (C21 was not fitted in the earlier models).

Excessive reaction effect. C12 probably O.C. Also suspect tendency to instability in H.F. circuits due to O.C. C5 or C6.

Repeated fuse failure. C17, C19, C20 S.C. Make sure that the earth lead is not in contact with the metal chassis at any point. An S.C. C1 can also cause the trouble but only if the aerial is shorting to earth.

PRICES OF PARTS NOT GIVEN IN CIRCUIT KEY

Description.	Part No.	Retail Price.	Description.	Part No.	Retail Price.
Cabinet (black)	DP925	35/-	Reflector plate	B5955	6d.
" (walnut)	DP924	27/6	Loudspeaker	D5913	25/-
Tuning knob (walnut)	C5916	1/6	" baffle	D5914	1/-
" " (ivory)	C5916	2/-	Scale	D5948	2/6
Volume control knob (walnut)	B5946	9d.	" clamp	B5951	3d.
" " (ivory)	C5917	9d.	Mains lead assembly (complete)	DP759	5/-
Wave-change switch knob (walnut)	C5917	1/-	Double socket mains plug (with fuses)	B5333	3/-
" " (ivory)	B5946	1/-	1 amp. fuse	A5075/1	6d.
Back cover (with cowl)	DP864	3/-	Valve screen (tubular section)	B5919	6d.
Pilot lamp	B5934	2/6	" " (cap section)	B5920	3d.
" " holder	DP936	1/-	Insulated head screw	P1532	3d.

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

RETURN OF PRODUCTS.

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 repair cannot be effected if the guarantee has expired or the instrument has not been registered by the customer.

Stock receivers returned for repair *must* include the instruction booklet and blank guarantee card.

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

Do not return separately parts of complete components such as wave-change switches, coils, gang condensers, speakers and volume controls.

If a new iron-cored coil is required, indicate clearly whether it is an aerial (Part No. SA134) or detector type (Part No. SA133). Orders for replacement knobs should indicate the colour and state whether a tuning, volume control or wave-change switch type is required.

Always forward service correspondence, orders or receivers to your nearest Ekco service depot (see addresses below).

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

FAILURE TO OBSERVE THE ABOVE WILL RESULT IN DELAY.



"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.