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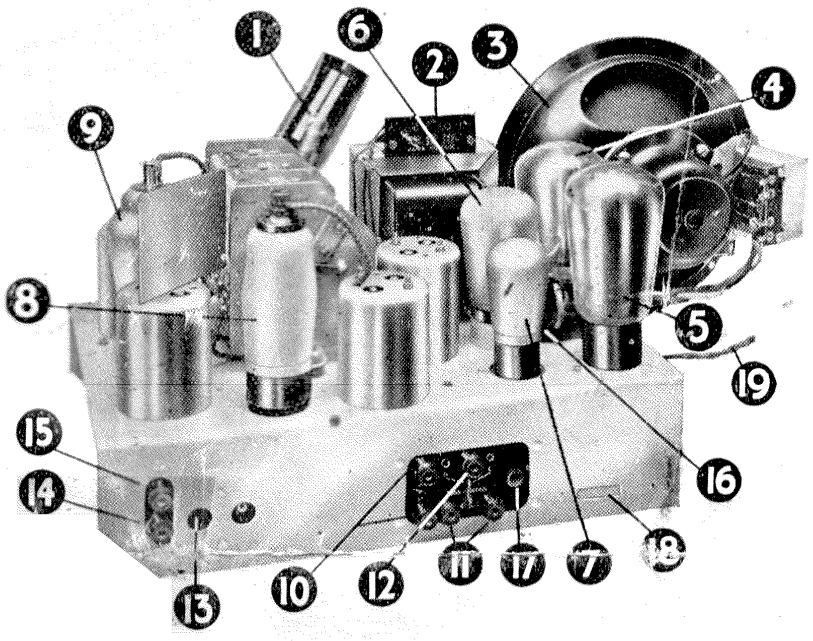
SERVICE INFORMATION

EKCO

MODEL AC85

CONSOLETTE RECEIVER



Chassis

1. Pilot light.
2. Mains voltage adjustment panel.
3. Speaker mounted in cabinet.
4. Rectifier valve.
5. Pentode output valve.
6. L.F. Amplifier valve.
7. 2nd detector valve.
8. I.F. amplifier valve.
9. Detector-oscillator valve.
10. Pick-up sockets.
11. External speaker sockets.
12. Tone control sockets.
13. Image rejection adjustment.
14. Earth socket.
15. Aerial socket.
16. Speaker plug.
17. Internal speaker switch.
18. Serial number.
19. Mains lead.

DESCRIPTION OF CIRCUIT

Mains Consumption. 280-305 m/a 220-230 volt tap, 230 v Input.

VALVES.

1. The Frequency Changer.

This valve is an octode, the approved types being Mullard FC4 or Cossor Pentagrid 41 M.PG, and combine the functions of 1st. detector and local oscillator.

The valve may be considered as a triode oscillator, the electron stream of which acts as the cathode for the H.F. Pentode.

A seven pin base is used and the control grid is brought out to a terminal on the top of the valve.

2. The I.F. Amplifier.

This valve is a variable-mu H.F. Pentode, the approved type being a Mazda AC/VP1. It is fitted with a seven pin base, the anode being connected to a terminal on top of valve.

3. Demodulator.

This valve is a double diode, the approved type being a Mazda V914, and is fitted with a five pin base. One diode acts as demodulator and the other supplies automatic volume control.

4. L.F. Valve.

This is a standard triode, the approved type being a Mullard metalised 354V, fitted with a five pin base.

5. Output Valve.

This is an L.F. Pentode, the approved type being a Mazda AC/Pen, and is fitted with a seven pin base

6. Rectifier.

This is a Mullard I.W.3. or Mazda UU3 giving full wave rectification.

SIGNAL FREQUENCY CIRCUIT.

This consists of an inductively coupled band pass filter, the aerial being connected through a .001 m f Condenser to a tapping point on the M/W Section of the first band pass coil or through the condenser and H.F. choke to a tapping point on the L/W section. The function of the choke is to prevent break through on the long wave band.

Adjustment for elimination of second channel interference is by a small pre-set condenser connected between the aerial and grid of V.1.

The band pass filter is wound on one former and looking from the long wave aerial end, the coils are as follows :—

1. Long wave aerial coil.
2. Long wave grid coil.
3. & 4. Medium wave grid coil.
5. & 6. Medium wave aerial coil.

All coils are Lessona wound. The medium wave coils are wound with Litz wire.

OSCILLATOR CIRCUIT.

This consists of a tuned grid circuit coupled to a coil in the anode circuit of the triode section of the octode valve.

The oscillator coils are mounted in a screened can on the chassis in front of the frequency changer valve.

INTERMEDIATE FREQUENCY STAGES.

The coupling between V1 and V2, and between V2 and V3, is by means of I.F. Transformers. These transformers are mounted with their necessary trimmers in screened cans on the chassis.

The 1st. I.F. transformer is fitted at the back of the frequency changer valve.

The 2nd I.F. transformer is fitted at the side of the I.F. valve.

The 3rd. I.F. or link coil is fitted behind the mains transformer.

Trimmer condensers are adjusted by a box spanner through holes in top of screening cans.

L.F. STAGE.

Resistance capacity coupled to preceding valve.

OUTPUT STAGE.

Resistance capacity coupled to preceding valve.

AUTOMATIC VOLUME CONTROL AND NOISE SUPPRESSION.

A very careful study should be made of the details of this part of the circuit as once the idea is mastered, there should be no difficulty in tracing trouble should these circuits fail to operate. To make matters as clear as possible the description of the circuit is divided into :—

1. Automatic Volume Control.
2. Noise suppression circuit.

1. Automatic Volume Control.

The A.V.C. system provides simple A.V.C. to the grid of V2 and amplified A.V.C. to the grid of V1.

Advantage is taken of the fact that a small variation of potential applied to the grid of a valve will produce a much greater variation of potential across any load in its anode or cathode circuit.

By tracing the circuit through, it will be found that one diode of the duo diode valve is connected to the secondary of the 2nd. I.F. transformer and returned to chassis through the resistances R9-R7-R1 which form the load for the diode.

The diode thus acts in a normal way as 2nd detector, the rectified output being applied from the junction of resistance R9 and R7 through condenser C23 to the manual volume control, which is the grid leak of V4 valve.

The other diode in the duo diode valve takes its I.F. supply through condenser C22 from the secondary of the A.V.C. link coil, the primary of which is connected across the secondary of the 2nd. I.F. transformer.

The object of the link coil is to provide supply for the A.V.C. diode.

The link coil is similar to the 2nd I.F. transformer and is mounted in a screened can on chassis behind the mains transformer.

The load for the A.V.C. diode is formed by the resistances R10 and R4 and is returned to the cathode through the 300 ohm resistance R5, the drop in volts across this resistance being from 2 to 3, and this drop is a bias applied to the diode and provides the delay action of the A.V.C.

How the A.V.C. works.

If a signal is received that is strong enough to overcome the delay bias of 2 to 3 volts on A.V.C. diode, the diode will rectify and a negative potential is developed across R.10 and R4, the potential across R4 being applied to the grid of V2 as negative bias, the current through the valve will fall, causing a fall in potential across the resistance R5, R6 and VR1 in the cathode circuit of this valve.

The grid of V1 being connected through R8 into the cathode load of V2, its potential will also fall, but to a much greater extent and depending on the amplification of V2. The stronger the signal, the greater will be the negative potential developed across the A.V.C. diode and the greater the negative bias applied to the grid of valves V1 and V2, thus the signal strength is automatically controlled.

2. Noise Suppression Circuit.

The noise suppression control is a variable resistance VR1 connected in the cathode circuit of V2. The control is graded in three positions " All Stations," " Medium " and " Strong."

For our description, we will take the Noise Suppression control in the " Strong " position, i.e. when all stations except the most powerful are cut out.

In this position there will be a difference of potential of approximately 95 volts between V2 cathode and chassis, and 65 volts between V1 cathode and chassis, giving a positive bias to the grid of V1 causing the valve to operate very inefficiently.

As the rectifier anode of V3 is returned to the cathode of V1, and its cathode is common with the cathode of V2, there will be a bias of about 30 volts applied to the rectifying diode. The A.V.C. diode as before explained is biassed at about 2 or 3 volts. Hence we have :—

(a) V1 operating very inefficiently.
(b) V2 ,, at maximum efficiency.
(c) A large delay bias applied to the 2nd detector or rectifying diode.
(d) A.V.C. operating normally.

It is obvious that only a very strong signal will cause V1 to rectify and only a very weak intermediate frequency signal will be passed via the I.F. circuit to the A.V.C. and rectifier diode, but providing the voltage is sufficient to overcome the delay bias on the A.V.C. diode, that diode will rectify and ordinary A.V.C. action will take place, resulting in the grid of V1 becoming increasingly less positive and working more efficiently. The delay bias in the rectifying diode is also falling until the signal is able to overcome the remaining bias, when it is rectified and passed on to the L.F. valve.

Any signal unable to overcome the A.V.C. delay bias will not be heard.

TONE CONTROL.

Arrangements are made for plugging in resistance R.15 and condenser C.29 across the anode circuit of the output pentode.

TO REMOVE CHASSIS FROM CABINET

(In this model the tuning scale and loud speaker are fixed to the cabinet).

1. Detach back by undoing 7 special screws.
2. Remove control knobs by slackening grub screws.
3. Unplug loudspeaker lead.
4. Remove the two screws that are let in underside of cabinet and also the two centre screws when chassis can be withdrawn.

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.

RE-ALIGNMENT AND GANGING

RE-ALIGNING

There are two methods of aligning the I.F circuit. In method A it will be necessary to remove the chassis from the cabinet. In method B, the operations can be carried out by removing the back of the cabinet only.

Method A is recommended as it is slightly more accurate than method B.

A. It will be necessary to break the joint between the R5 and cathode. Connect a millampere meter (0-10) from the end of R5 to cathode. Turn VR1 to minimum position.

Set W/C switch to long wave position and tuning condenser at maximum capacity.

Apply oscillator output to A & E sockets 110 Kc.

Adjust I.F. trimmers in the following order so as to give the minimum reading on the meter.

1. 1st. I.F. Transformer Primary.
2. 2nd. I.F. Transformer Primary.
3. 1st. I.F. Transformer Secondary.
4. 2nd I.F. Transformer Secondary
5. Primary of Link Coil.
6. Secondary of Link Coil.

If signals from oscillator are not loud enough when the oscillator is connected to A. & E. sockets, it can be connected from grid of octode valve to chassis.

When adjustments are finished, disconnect meter and reconnect R5 to cathode.

B. Connect suitable output meter to external loudspeaker socket, and connect oscillator as explained under A.

Adjust 1st I.F and 2nd I.F. trimmers for maximum reading. Screw in 2nd I.F. secondary trimmer slightly peak link coil primary. Special care must be taken with the link coil secondary, a slight double peak will be noticed and the correct point of adjustment is the lowest point between these peaks.

This dip will be more noticeable if the Noise Suppressor is turned to the " All Stations " position.

Return to the 2nd I.F. secondary and peak for maximum output.

GANGING.

1. Set input oscillator at 200 metres.
2. Set wave change switch to medium waves.
3. Swing tuning condenser to 200 metres mark on dial.
4. Adjust oscillator trimmer on gang condenser (front trimmer) for maximum signal.
5. Set input oscillator at 250 metres.
6. Swing tuning condensers to 250 metres mark on dial.
7. Adjust band pass trimmers for maximum signals.
8. Check calibration on other wavelengths.
9. Set wave change switch to Long Waves.
10. Check calibration on 1600 metres. If out to any extent, adjust by padding condenser at rear of chassis to maximum output, meanwhile rocking tuning condenser slightly.

POSSIBLE FAULTS

1. After switching on and waiting for valves to heat, no results are obtained, but by switching off quickly once or twice, set will operate satisfactorily.
2. Noise suppressor not operating.

Cause : FC4 valve not oscillating. This trouble occurs sometimes with a new valve but will disappear after the valve has had a little use.

Cause : One or more of the following valves faulty. Octode, I.F. or double diode.

3. Crackle.
   (a) Loose pilot light.
   (b) Noisy valve.
   (c) Loose connection or valve loose in socket.
   (d) Internal intermittent short in fixed condenser.
   (e) Bad joint.
   (f) Dirty wave-change switch.
   (g) Outside interference.
   (h) Loose loudspeaker plugs.

4. **Low Output.**

Cause : (a) Faulty band pass coil ; (b) Faulty condenser C.13.
Faulty oscillator coil or series padding on L W Section.
Suspect Condenser C30.
Suspect Condenser C26.
Suspect Condenser C.31.
Suspect Condenser C.20.
Suspect Condenser C24.
Suspect Condenser C15.
Suspect Condenser C17 or resistance R4.

5. **Will not calibrate** correctly.

6. Distortion accompanied by growling noises.
7. Hum above normal with some loss of bass.
8. Severe loss of bass.
9. Instability on L/W about 1500 metres.
10. Signals generally weak on both wave bands.
11. Bubbling noise on loud speaker.
12. If when tuning through a fairly weak station nothing is heard, but on changing rapidly from a strong station back to the weaker one signals are heard. This will be more noticeable when control is set in " All Stations " position.

VALUES AND VOLTAGES

Volume Control total resistance	250,000 ohms.
Noise Suppressor resistance Maximum	10,000 ohms.
Noise Suppressor resistance Minimum	Not greater than 10 ohms.
Loud speaker field resistance	2000—2300 ohms.

COILS

Long Wave aerial coil	(section 1)	27.7 ohms.
Long wave grid	(section 2)	27.7 ohms.
Medium grid	(section 3 & 4)	2.7—3 ohms.
Medium aerial	(section 5 & 6)	2.7—3 ohms.

Oscillator Coil

Medium wave section	4.7 ohms.
Long wave section	13.7 ohms.
Cathode Section	1 ohm approx.

1st I.F. and 2nd I.F. Transformer and Link Coil

Primary	110 ohms.
Secondary	110 ohms.

Mains Transformer

Primary— 200-210Volt tap.	29.3 ohms.
220-230 Volt tap.	33.1 ohms.
240-250 Volt tap.	36.5 ohms.
Secondary H.T. Total resistance	609 ohms.
L.T.1.	.22 ohms.
L.T.2.	.099 ohms.

VALVES

Octode

Anode to Earth	260 volts.
Anode Current	3.4 m/a
Cathode to Earth	54—56 volts
Oscillator anode to Earth	154 volts
Oscillator anode current	2.8 m/a
Screen grid to Cathode	90—95 volts
Screen grid Current	4 m/a.

Output transformer primary	615—630 ohms.
,, ,, **secondary**	1.5—2 ohms.
,, ,, **drop across primary**	27 volts.
Average drop across L/S field	127 volts

I.F. Valve

Anode to Earth	260 volts.
Anode current	2.2 m/a.
Screen to Earth	260 volts.
Screen current	9 m/a.
Cathode to Earth at minimum Noise Suppression	54—56 volts.

Demodulator

AVC Anode to Earth	Must be 2 to 4 volts lower than the octode cathode to earth.
Rectifier anode to Earth at maximum noise suppression position	38 volts (with no signals).
Cathode to Earth at minimum noise suppression	54 volts.

L.F. Valve

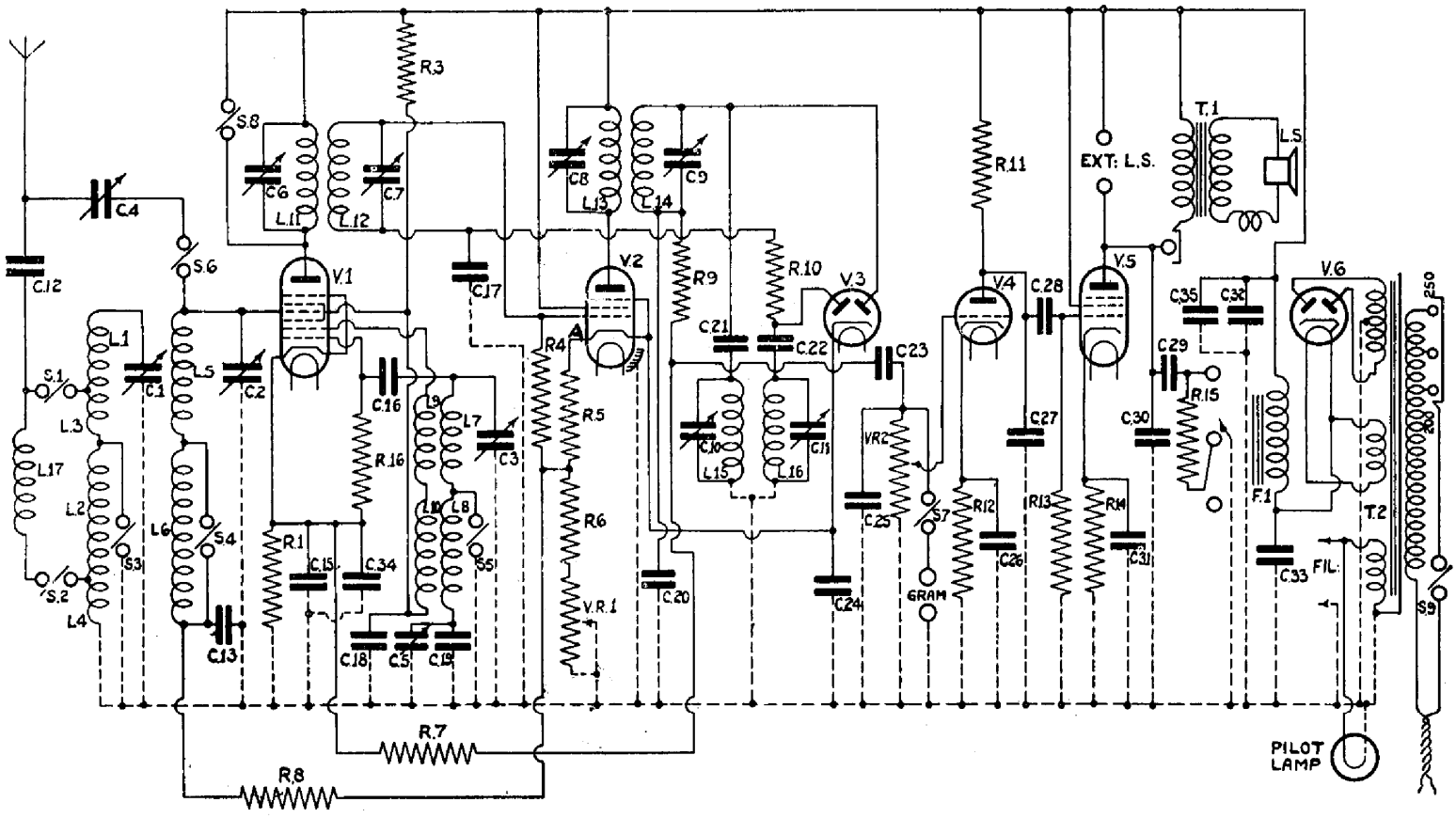
Anode to Earth	133 volts.
Anode Current	1.2 m/a
Cathode to earth	2.5 volts

Output Valve

Anode to Earth	238 volts.
Anode Current	28 m/a
Screen to Earth	260 volts
Screen Current	5.4 m/a
Bias	15 volts.

MODEL AC85

CIRCUIT DIAGRAM & VALUES



Circuit Diagram AC85

Ref.	Description	Part No.
C1	Gang Condenser	B.4065
C2	Gang Condenser	
C3	Gang Condenser	
C4	Pre-set Condenser	D.P.313
C5	Pre-set Condenser	
C6	Pre-set Condenser	
C7	Pre-set Condenser	S.A.30
C8	Pre-set Condenser	
C9	Pre-set Condenser	S.A.31
C10	Pre-set Condenser	
C11	Pre-set Condenser	S.A.32
C12	Fixed Condenser .001 ...	A.3842
C13	Fixed Condenser .1	A.3844
C15	Fixed Condenser 10 mfd. ...	R.4070
C16	Fixed Condenser .001 ...	A.3840
C17	Fixed Condenser .01 ...	A.3846
C18	Fixed Condenser .1	A.3844
C19	Fixed Condenser .0008 ...	A.3839
C20	Fixed Condenxer .0003 ...	A.3842
C21	Fixed Condenser .0001 ...	A.3840
C22	Fixed Condenser. 0001 ...	A.3840
C23	Fixed Condenser .01 ...	A.3846
C24	Fixed Condenser .1	A.3844
C25	Fixed Condenser .0005 ...	A.3842
C26	Fixed Condenser 25 mfd. ...	A.3265
C27	Fixed Condenser .002 ...	A.4109
C28	Fixed Condenser .1	A.3844
C29	Fixed Condenser .01 ...	A.3847
C30	Fixed Condenser .0025 ...	A.3684
C31	Fixed Condenser 25 mfd. ...	A.3265
C32	Fixed Condenser 12 mfd. ...	B.4069
C33	Fixed Condenser 8 mfd. ...	
C34	Fixed Condenser .1	A.3844
C35	Fixed Condenser .1	A.3844
L1	B.P. Coil M.W. Sec : 1 ...	D.P.378
L2	B.P. Coil L.W. Sec : 2 ...	
L3	B.P. Coil M.W. Pri : ...	
L4	B.P. Coil L.W. Pri : ...	
L5	B.P. Coil M.W. Sec : 2 ...	
L6	B.P. Coil L.W. Sec : 2 ...	

Ref.	Description	Part No.
L7	Osc. Coil M.W. Section ...	S.A.33
L8	Osc. Coil LW Section ...	
L9	Osc. Coil Cath. Sec. M.W. ...	
L10	Osc. Coil Cath. Sec L.W. ...	
L11	1st. I.F. Coil Prim. ...	S.A.30
L12	1st. I.F. Coil Sec.	
L13	2nd. I.F. Coil Prim.	S.A.31
L14	2nd. I.F. Coil Sec. ...	
L15	A.V.C. Link Coil Pri : ...	S.A.32
L16	A.V.C. Link Coil Sec : ...	
L17	H.F. Choke	D.P.475
R1	Fixed Resis. 6,000 ohms. ...	A.4108
R3	Fixed Resis. 15,000 ohms. ...	A.3263
R4	Fixed Resis. 250,000 ohms. ...	A.3263
R5	Fixed Resis 300 ohms. ...	D.P.441
R6	Fixed Resis. 5,000 ohms. ...	A.4108
R7	Fixed Resis. 100,000 ohms. ...	A.3263
R8	Fixed Resis. 500,000 ohms. ...	A.3263
R9	Fixed Resis. 100,000 ohms. ...	A.3263
R10	Fixed Resis. 250,000 ohms. ...	A.3263
R11	Fixed Resis. 50,000 ohms. ...	A.3263
R12	Fixed Resis. 1,000 ohms. ...	A.3263
R13	Fixed Resis. 250,000 ohms. ...	A.3263
R14	Fixed Resis. 375 ohms. ...	D.P.147
R15	Fixed Resis. 9,000 ohms. ...	A.3263
R16	Fixed Resis. 50,000 ohms. ...	A.3263
VR1	Variable Resis. 0-10,000 ohms.	B.4067
VR2	Volume Control .25 meg. ...	B.3800
T1	Output Transformer	D.P.61
T2	Mains Transformer	S.A.35
V1	Octode	
V2	Variable Mu H.F. Pentode ...	
V3	Double Diode	
V4	Triode	
V5	Output Pentode	
V6	Full Wave Rectifier	
F1	Speaker Field Coil	
S1-8	Wave Change Switch ...	S.A.34
S9	Mains switch changed to V.R.2.	B.3800

PRICE LIST OF SPARE PARTS FOR AC85

Ref. No.	Part No.	Description	List Price.
CABINETS			
	DP434	Cabinet (Walnut)	30/-
	DP435	Cabinet (Black & Chromium) ...	37/6
KNOBS			
	C3660	Knob (Tuning) Walnut	2/-
	DP143	,, (Tuning) Black	2/6
	C3838	,, (Volume Control) Walnut ...	9d.
	DP142	,, (Volume Control) Black ...	1/-
	B4376	,, (Noise Suppressor) Walnut ...	9d.
	B4376	,, (Noise Suppressor) Black ...	1/-
	B4056	,, (Wave change) Walnut ...	9d.
	B4056	,, (Wave change) Black ...	1/-
SCALES, etc.			
	B4053	Scale Clamp (Large Quarter Section)	6d.
	A4090	Scale Clamp (Small Half Section) ...	2d.
	B4073	Scale mounting	2 -
	C4060	Scale (Station)	2 -
	A4245	Special Screw for scale mounting	1d.
	B4244	Scale centre bar (brown)	1/3
	B4244	Scale centre bar (chromium) ...	1/6
LOUD SPEAKER			
	DP379	Loud Speaker Assembly (Less trans.)	30/-
	D4072	Loud Speaker Baffle	2/-
	DP278	Loud Speaker Lead	1/-
	B3336	Loud Speaker Plug mounting (moulding only)	3d.
	A3337	Loud Speaker Plugs for above ...	1d.
COILS			
L15/16	SA22	A.V.C. Link coil Assembly	6 6
L13/14	SA31	2nd I.F. Coil Assembly	5 6
L11/12	SA30	1st I.F. Coil Assembly	5 6
L7/8/9/10	SA33	Oscillator Coil Assembly	6 6
L1-6 & S1-8	SA34	Band pass coil and wave change switch assembly	10 -
L1-6	DP378	Band pass coil assebly only ...	5 6
	DP373	Contact spring assembly (Outer) ...	1 6
	DP374	Contact spring assembly (Inner) ...	1,6

Ref. No.	Part No.	Description	List Price
CONDENSERS			
C1/2/3	B4065	Variable Condenser	18/6
C4/5	DP313	L/W Padding and 2nd Channel Trimmer Assembly	1/3
C12	A3842	Fixed Condenser .001 ...	9d.
C13, 18, 24, 28, 35, 34	A3844	,, ,, .1	9d.
C15	A4070	,, ,, 10 mfd.	1 6
C16	A3840	,, ,, .001	9d
C17, 23	A3846	,, ,, .01	9d.
C19	A3839	,, ,, .0008	9d.
C20	A3842	,, ,, .0003	9d.
C21, 22	A3840	,, ,, .0001	9d.
C25	A3842	,, ,, .0005	9d.
C26, 31	A3265	,, ,, 25 mfd.	1/6
C27	A4109	,, ,, .002	9d.
C29	A3847	,, ,, .01	9d.
C30	A3684	,, ,, .0025	9d.
C32 / C33	B4069	,, ,, 12 mfd / ,, ,, 8 mfd.	7/6
RESISTANCES			
R1	A4108	,, Resistance 6000 ohms ...	9d.
R3	A3263	,, ,, 15,000 ohms ...	9d.
R4, 10, 13	A3263	,, ,, 250,000 ohms ...	9d.
R5	DP441	,, ,, 300 ohms ...	9d.
R6	A4108	,, ,, 5,000 ohms ...	9d.
R7, 9	A3263	,, ,, 100,000 ohms ...	9d.
R8	A3263	,, ,, 500,000 ohms ...	9d.
R11, 16	A3263	,, ,, 50,000 ohms ...	9d.
R12	A3263	,, ,, 1,000 ohms ...	9d.
R14	DP147	,, ,, 375 ohms ...	9d.
R15	A3263	,, ,, 9,000 ohms ...	9d.
VR1	B4067	Variable Resistance 0-10,000 (Noise Suppressor)	6/-
VR2 & S9	B38..	Volume Control and Mains Switch ...	7/6
VALVES			
	A4071	Valve top Clip	2d.
V1		Octode Valve Detector Oscillator Mullard FC4	20/-
V2		Variable Mu HF Pentode Valve IF Amplifier Mazda AC/VP1	17 6
V3		Double Diode Valve 2nd Detector & AVC Mullard 2D4A or Mazda V914	5/6
V4		Triode Valve L.F. Amplifier Mullard 354v (Met.)	13/6
V5		Output Pentode Valve Mazda AC Pen	18/6
V6		Rectifier Valve Mullard IW3 or Mazda UU3	15/-

MISCELLANEOUS

	DP196	Mains lead Assembly	2/6
	P2445	Pilot Lamp	9d.
		Instruction Book	6d.
	E4058	Back Cover (200-250v Models) ...	2/6
	E4089	Back Cover (100-134v Models) ...	2/6
T2	SA35	Mains Trans. (200-250v 40-100 cy)	20/-
T2	SA35/1	Mains Trans. (100-135v 40-100 cy)	20/-
	A1531	Insulated Screw (for Mains Tapping)	3d.
	A4277	Spring (Locating)	1d.
L-17	DP475	H.F. Choke	1/-
	A3654	Plug Red	2d.
	A3654	Plug Black	2d.

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