

# Ekco AW70 AC All-Wave Superhet

Three valve, plus rectifier, three waveband table model superhet with manual tuning. Suitable for 200-250 volt, 40-60 cycle supplies, price 8 gns.

## CIRCUIT OUTLINE

ON the short-wave band the input to V1, a triode hexode, is by means of a tuned circuit with an aperiodic aerial winding. The return is taken to the AVC line.

On the other two bands there is band-pass coupling, the coils being arranged on a common former. In addition to the inductive coupling thus provided there is also capacitive coupling.

The screen circuit of V1 is fed from a potentiometer and the hexode anode circuit is not decoupled. The oscillator circuit is a little uncommon as the coils carry the D.C. component, the usual shunt feed system not being used. Series resistances are used in

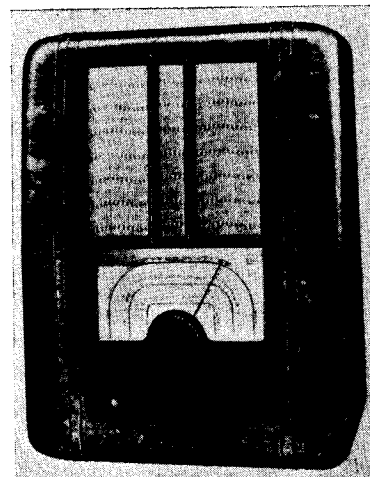
work is fed from a third winding on the speaker transformer.

The other diode is used for AVC and derives its input from the anode of the IF valve through the usual coupling condenser. Tone is controlled on the anode of the valve through a fixed condenser and variable resistance.

Power is derived from V4, a full-wave directly-heated rectifier, in conjunction with a smoothing choke and condensers. The power circuit has a filter condenser across the output of the rectifier and a shunt condenser on HT line.

## SPECIAL NOTES

THE general arrangement is orthodox with the exception of the feedback on the output valve. Although we are



not permitted to publish the actual circuit there should be little difficulty in following the design of the set, and all the components are easily located.

The set is unusual in that it employs a low intermediate frequency, which is now very uncommon. As a result, the set is fitted with an image rejector, which must be adjusted for minimum response in the manner described in the alignment notes.

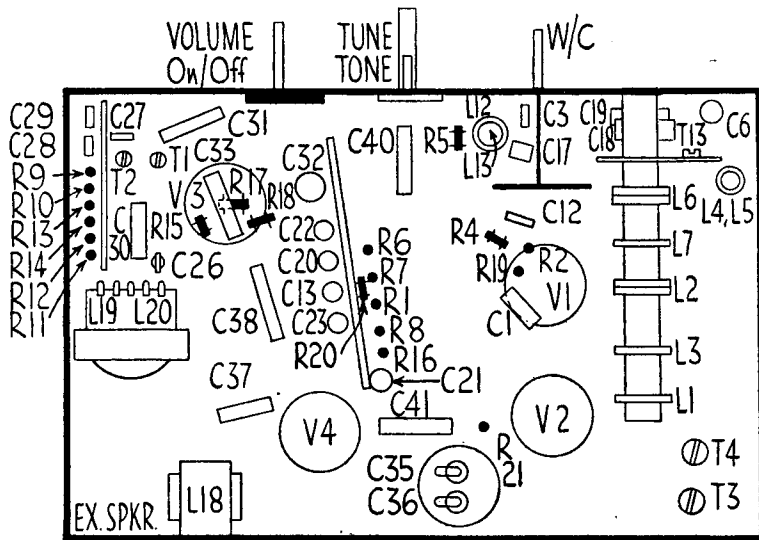
It should be particularly noticed that the tune frequency of the set and the frequency injected for adjustment of the rejector are different, and this rejector device must not be confused with the ordinary IF trap circuit frequently found in simple sets using a high IF.

Removal of the chassis is simple. There are only four chassis retaining bolts which are removed from the bottom of the cabinet.

On the front there are four control knobs and after these have been released, the chassis can be withdrawn.

The speaker is connected to the chassis by two speech coil wires, and, if complete removal is necessary, these must be unsoldered.

Exact replacement condensers available from A. H. Hunt, Ltd., are for C35 and C36, unit No. 2923A at 9s. 6d., and for C34 unit no. 2839 at 2s. 6d.



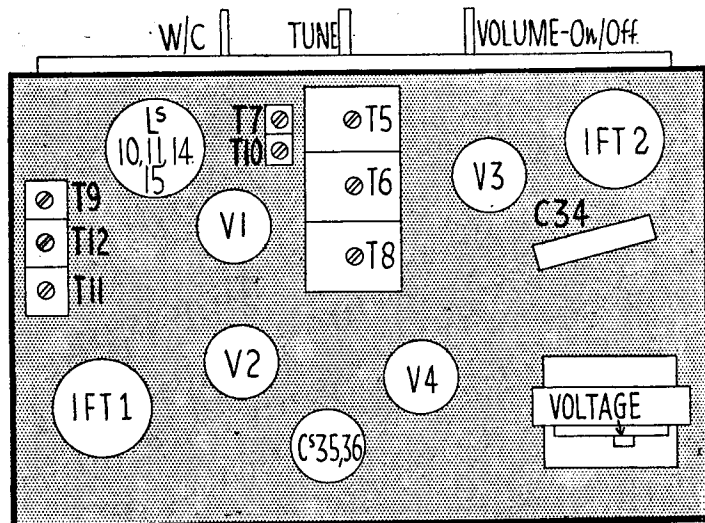
both grid and anode circuits, and the supply is decoupled.

Intermediate frequency coupling is by means of a trimmer-tuned transformer with a shunted secondary working into the grid circuit of V2. This valve, an EF9, is arranged with a variable screen voltage, the screen being fed through a high resistance. The grid control is taken from a tapping on the AVC diode load.

No decoupling is used on the anode circuit. A further trimmer-tuned transformer couples the valve to V3, an EBL1, which is a double-diode-pentode. The basic arrangement of this circuit is conventional, although there are some interesting details.

The diode load circuit contains the usual IF filter and the diode load is returned to the cathode in the normal manner. The volume control is connected through a coupling condenser to the diode load and is returned to a special resistance-capacity network which is joined to a point on the cathode resistor. This net-

The arrangement of components on the underside of the chassis of the Ekco AW70 is shown above. On the right is the top deck arrangement.



# 10-MINUTE FAULT-FINDER

# EKCO AW70

### Power Test.

Voltages : V4 cathode, 283 ; HT line, 250.  
Resistance : L18, 650 ohms.  
Feed current =  $283 - 250 \div 650 = 51$  ma.

Mains consumption, 42 watts.

### Output Stage, V3

Inject 2 volts AF at V3 grid. If defective, check :—

Voltages : Anode, 238 ; screen, 250 ; cathode, 17.5.

Resistances : Anode—HT, 330 ; grid—chassis, 865,300 ; cathode—chassis, 420 ohms.

### Demodulation, V3

Inject modulated 126.5-kc. signal at V2 anode. If defective, check :—

Resistances : L16, 70 ; L17, 70 ; signal diode—chassis, 660,300.

### IF Amplification, V2

Inject modulated 126.5-kc. signal at V2 grid. If defective, check :—

Voltages : Anode, 250 ; screen, 95 ; cathode, 2.1.

Resistances : Screen—HT, 91,000 ; grid—chassis, 470,000 ; cathode—chassis, 330 ohms.

### Mixer Hexode, V1

Inject modulated 126.5-kc. signal at V1 grid. If defective, check :—

Voltages : Anode, 250 ; screen, 80 ; cathode, 1.4.

Resistances : Screen—HT, 47,000 ; cathode—chassis, 200 ohms ; grid—chassis, 2.04 megohms.

### Oscillator Test, V1

Tune to local station and inject that frequency plus 126.5 at osc. grid. If defective, check :—

Voltage : Osc. anode, 100.

Resistances : Osc. anode—HT, 56,220 ; osc. grid—chassis, 100,239 ohms.

If signals still absent, check input coils and switching.

### IF Circuits (126.5 kc.)

Connect a signal generator to the grid of V1 and chassis, an output meter to the set

and tune the receiver at the top of the LW band.

Adjust the generator to 126.5 kc. and tune T1, T2, T3 and T4 for maximum, using a small input below the AVC value.

Check the adjustment with the generator connected to the aerial and earth sockets.

### Short Waves (15 to 50 metres)

Tune set and generator to 20 mc. (15 metres) and adjust T5 for maximum.

Tune set and generator to 15 mc. (20 metres) and adjust T6 for maximum.

### Medium Waves (190 to 560 metres)

Tune set and generator to 200 metres (1,500 kc.) and adjust T7 for maximum.

Tune set and generator to 250 metres (1,200 kc.) and adjust T8 and T9 for maximum.

### Long Waves (900 to 2,000 metres)

Tune set and generator to 1,300 metres (230 kc.) and adjust T10 for maximum.

Then adjust T11 and T12 for maximum.

### Image Rejection

Inject 1,000 kc., tune the set to 747 kc. and adjust T13 for *minimum*.

## CONDENSERS

	Mfds.
1 .. MW top coupling .. .. .	.0005
3 .. LW bandpass couple .. ..	.002
6 .. V1 AVC decouple .. .. .	.1
12 .. Osc. grid .. .. .	.00004
13 .. V1 cathode bias shunt .. ..	.1
17 .. SW regen. by-pass .. .. .	.002
18 .. LW padder .. .. .	.0008
19 .. SW padder .. .. .	.002
20 .. Osc. anode decouple .. .. .	.1
21 .. V2 AVC decouple .. .. .	.01
22 .. V1 screen decouple .. .. .	.1
23 .. V2 cathode shunt .. .. .	.1
26 .. AVC couple .. .. .	.000015
27 .. IF filter .. .. .	.0002
28 .. IF filter .. .. .	.0002
29 .. V3 grid shunt .. .. .	.0002
30 .. Feedback injection shunt ..	.1
31 .. AF couple .. .. .	.01
32 .. Tone control .. .. .	.04
33 .. V3 anode shunt .. .. .	.0025
34 .. V3 cathode bias shunt .. ..	.50
35 .. HT smoothing .. .. .	.16
36 .. HT smoothing .. .. .	.8
37 .. V4 heater bypass .. .. .	.0025
38 .. V1 AVC decouple .. .. .	.01
39 .. LW osc. trimmer .. .. .	.000025
40 .. HT line shunt .. .. .	.1
41 .. V2 screen decouple .. .. .	.1

## VALVE READINGS

V.	Type.	Anode.	Screen.	Cathode.
1 .. ECH3 ..	250 (osc.)	80 ..	1.4	
2 .. EF9 ..	250	95 ..	2.1	
3 .. EBL1 ..	238	250 ..	17.5	
4 .. AZ1 ..	285 AC	— ..	283	

(All Mullard)  
Pilot Lamps. M.E.S., 6.5 volts, .35 amp.

### CIRCUIT

E. K. COLE, LTD., do not permit publication of the circuit diagram of this receiver. The chassis diagrams and component tables identify and give the purpose of every component, and the text gives a general outline, so that little difficulty should be experienced.

## RESISTANCES

	Ohms.
1 .. V1 cathode resistor .. .. .	200
2 .. Osc. grid leak .. .. .	100,000
3 .. IF T1 secondary shunt .. ..	470,000
4 .. Osc. anode stabiliser .. ..	220
5 .. Het. volt control .. .. .	1,000
6 .. Osc. anode decouple .. .. .	56,000
7 .. V1 screen pot. (part) .. ..	47,000
8 .. V2 cathode bias .. .. .	330
9 .. IF filter .. .. .	100,000
10 .. Signal diode load .. .. .	560,000
11 .. V3 back coupling .. .. .	47,000
12 .. V3 back coupling injection ..	15,000
13 .. V3 cathode bias (part) .. ..	120
14 .. V3 cathode bias (part) .. ..	300
15 .. AVC diode load (part) .. ..	470,000
16 .. AVC diode load (part) .. ..	470,000
17 .. AVC decouple .. .. .	1 megohm
18 .. V1 AVC decouple .. .. .	100,000
19 .. Osc. grid stabiliser .. .. .	39
20 .. V1 screen pot. (part) .. ..	68,000
21 .. V2 screen feed .. .. .	91,000

## WINDINGS

L.	Ohms.	Range.	Where measured.
1 .. 4 ..	LW ..	On tags.	
2 .. 2.6 ..	MW ..	Aerial gang and chassis.	
3 .. 27 ..	LW ..	Aerial gang and chassis.	
4 .. low ..	SW ..	Aerial and chassis.	
5 .. low ..	SW ..	Grid gang and chassis.	
6 .. 2.6 ..	MW ..	Grid gang and chassis.	
7 .. 27 ..	LW ..	Grid gang and chassis.	
8 .. 70 ..	— ..	V1 anode and HT line.	
9 .. 70 ..	— ..	V2 grid and C21.	
10 .. 17.5 ..	LW ..	Osc. gang and C18.	
11 .. 7 ..	MW ..	Osc. gang and C19.	
12 .. low ..	SW ..	Osc. gang and chassis.	
13 .. low ..	— ..	R4 and R5.	
14 .. 3.5 ..	— ..	R5 and C20.	
15 .. 70 ..	— ..	V2 anode and HT line.	
17 .. 70 ..	— ..	Signal diode and R9.	
18 .. 650 ..	— ..	On tags.	
19 .. 330 ..	— ..	On tags.	
20 .. 37 ..	— ..	On tags.	
21 .. 40 ..	— ..	Mains plug.	

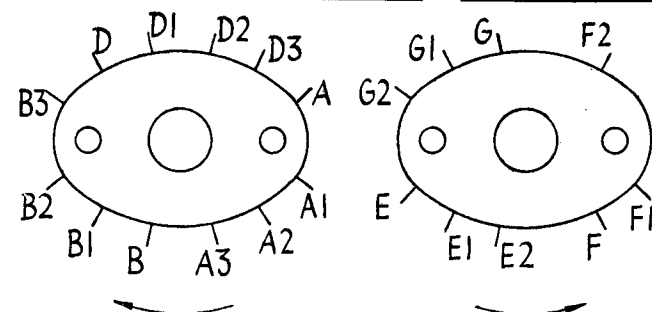
## SWITCHING

The absence of a circuit makes it necessary to depart from our normal method of indicating the switching. In spite of the somewhat complicated switching which is necessary, everything is carried out on a single wafer.

In the switch drawing the various contacts are lettered and the connections are described below. The elements are drawn as seen when observing the wafer from the back of the chassis. The second drawing indicates the reverse of the wafer.

The leads which go to the various contacts are as follows :—

CONTACT.	LEAD.	CONTACT.	LEAD.
A	Blank.	E2	L.W. band-pass.
A1	M.W. tuned in-pot.	G1	Junction L1 and L4.
A2	L.W. tuned in-pot.	G2	Earth.
A3	Aerial gang.	G2	Junction C1 and T13.
B	S.W. tuned in-pot.	D	S.W. osc. tune.
B1	M.W. band-pass.	D1	M.W. osc. tune.
B2	L.W. band-pass.	D2	L.W. osc. tune.
E	C5.	D3	Osc. gang.
E1	C6.	F	C17.
		F1	Earth.
		F2	D2.



Left, is the switch arrangement employed in the Ekco AW70. The wiring table is given in col. 3 on the right.