EKCO AD 65

Three-valve, plus rectifier, two-waveband superhet for operation from AC or DC mains, 200-250 volts. Made by E. K. Cole, Ltd., Service Department, Southend-on-Sea, Essex.

SIGNALS from the aerial are fed via a series condenser, C1, and switch contacts to tappings on the MW (L1) and LW (L2) primary coils of an inductively coupled bandpass filter. These coils are tuned by VC1 section of the triple-gang condenser, whilst VC2 section tunes the grid coils, L3 (MW) and L4 (LW). The "earthy" end of the long-wave coil is returned to the AVC circuit.

From L3 the signal is fed direct into the control grid of the HF pentode section of the first valve, V1, which is a frequency-changer. A trimmer, T9, is connected from grid to aerial input for image suppression.

The screening grid of V1 derives its potential from the junction of two resistances, R1 and R2, and is decoupled by C3. R1 connects to the HT positive line, while R2 is taken to the top end of the volume control, VR1, the slider of which is connected to chassis.

The control is also in series with the cathode resistance, R3 (decoupled by C2), which provides cathode bias for V1, and with R5 (decoupled by C8), which is V2 bias resistance. The extra current flowing through the volume control from R1 and R2 enables a larger voltage variation to be obtained on the cathode of V1 and V2 so as to give a greater range of bias control and hence sensitivity.

Reverting to V1, the oscillator triode section employs a tuned grid circuit, L5 being the MW coil and L6 the LW coil; these are tuned by the oscillator section, VC3 of the gang condenser. C4 is the grid condenser, and R4 the grid leak between the grid of the valve and its cathode.

The anode of the oscillator section of V1 is connected via a common reaction winding, L7, to the junction of R1 and R2.

The IF output of V1 is transferred by an IF transformer, L8 (trimmed by T1), and L9 (trimmed by T3), to the grid of the IF amplifying valve, V2. A second IF transformer, L10 (trimmed by T2), L11 (trimmed by T4), hands on the signal to the signal diode of the double diode pentode output valve, V3. The load for this diode is R6 and R7, the latter being connected to the cathode of V3.

An LF reflex action is obtained by connecting the junction of R6 and R7 via C5 to the "earthy" end of L9, which is the secondary of the first IF transformer. Thus the LF signal is fed to the grid of V2.

The screening grid of this valve acts as the anode for the LF signal, and this electrode is connected to HT positive line via R8 and R9. R8 is HF by-passed to chassis by C9, while the junction of R8 and R9 is decoupled to chassis by C10.

R8 is the LF load resistance, and the LF signal is passed from it via C11 to the grid of the pentode section of V3, R10 being the grid to chassis resistance. V3 has cathode bias provided by R11 decoupled by C15.

The AVC diode of V3 is fed from the anode of V2 by C12, and from the diode is connected a load resistance network, R12, R13, and R14, to chassis. The voltage dropped across R11—the V3 cathode bias resistance—provides the delay volts.

V1 grid circuit is fed from the junction of R12 and R13, while V2 grid circuit is fed from junction of R13 and R14, the latter being filtered by C13, while R12 is decoupled by C14.

The output of V3 is coupled to the low-impedance moving-coil loudspeaker by the output transformer, L12, L13. A permanent degree of tone correction is effected by C16, which is connected between anode and cathode.

The HT and LT circuits are conventional. The heater circuit is fed from the mains through voltage dropping resistances, R15, R16, R17.

A 100-ohm resistance, R19, connects the remote end (V1 heater) of the heater chain to the chassis, and the pilot lamp is connected across the resistance. A resistance, R18, is connected from the HT line to the filament end of R19 as a "bleeder" to provide additional current through R19.

The HT circuit from the cathode of the half-wave rectifier, V4, is fed via the field winding of the loudspeaker, L15, and smoothed by C17 and C18.

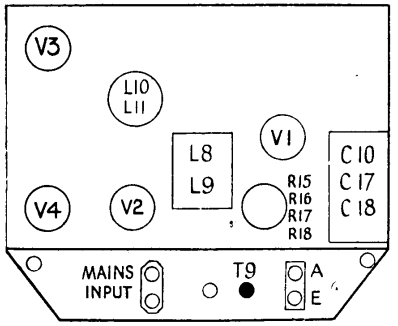
The mains input is filtered by HF chokes, L16, L17, and condensers, C19, C20.

Engineers must not forget that as this is an AC-DC receiver the chassis is connected to one of the mains and may be "live." If the supply is DC and the positive main is earthed the chassis will be a dangerous negative potential. Where the supply is AC it is possible by reversing the mains plug to connect the chassis to the earthed main. Test by connecting a .25 mfd condenser in series with the earth lead and touching onto chassis. If there is a charging flash, reverse mains plug.

CIRCUIT DIAGRAM

E. K. Cole, Ltd. do not permit us to publish the circuit diagram of this receiver. The review below, however, has been specially prepared so that few difficulties should arise on this account.

The circuit description and tables give the purpose and values of practically all components.



This diagram identifies the main features on the chassis of the Ekco AD65. The parts indicated are grouped round the loudspeaker. Most of the trimmers are associated with the gang condenser.

GANGING

IF Circuits.—Switch to long waves and turn gang condenser to maximum position. Inject a signal of 110 kc into the aerial and earth sockets. Adjust T1 for maximum output. Then adjust T2 for minimum output, and finally adjust T3 and T4 for maximum output.

MW Band.—Switch to MW. Inject and tune in a signal of about 210 metres, and adjust T5 (VC3), T6 (VC2), and T7 (VC1) for maximum output.

LW Band.—Switch to LW. Inject and tune in a signal of 1,300 metres, and adjust the long-wave padding condenser, T8, for maximum output.

Image Rejection.—Tune in image of local station. Adjust T9 for minimum output.

VALVE READINGS

Taken on 230 v AC mains with a 1,000 o-per-volt meter.

V	Type	Electrode	Volts	Ma
1	FC13	Anode	195	1.6
		Osc anode	80-90	2.1
		Screen	80–90	6
2	VP/1321	Anode	195	4.5
		Screen	115–155	.8
3	PEN/DD/4020	Anode	180	29
		Screen	200	10
		Cathode	6	—
4	UR2	Cathode	240	—

RESISTANCES

R	Purpose	Ohms
1	V1 SG pot. feed	15,000
2	V1 SG pot. feed	60,000
3	V1 cathode bias	200
4	V1 osc grid leak	60,000
5	V2 cathode bias	300
6	Signal diode filter	30,000
7	Signal diode load	250,000
8	V2 SG LF load	15,000
9	V2 SG voltage dropper	15,000—30,000
10	V3 grid-chassis resistance	500,000
11	V3 cathode bias	165
12	Part of AVC load	1 meg
13	" " "	250,000
14	" " "	250,000
15	1st tap on mains dropper	100
16	2nd tap on mains dropper	100
17	Major part mains dropper	560
18	HT bleeder	5,000
19	Pilot lamp shunt	100
VR1	Volume control	2,000

CONDENSERS

C	Purpose	Mfds
1	Aerial coupling	.001
2	V1 cathode decoupler	.1
3	V1 SG decoupler	.1
4	V1 osc grid condenser	.001
5	LF coupling V3 to V2 (reflex)	.0005
6	Padder across T8	.0008
7	Signal diode HF by-pass	.0003
8	V2 cathode decoupler	25
9	V2 SG HF by-pass	.0005
10	V2 SG feed decoupler	2
11	LF coupling V2 to V3	.005
12	AVC diode feed	.0001
13	V2 grid decoupler	.004
14	V1 grid decoupler	.1
15	V3 cathode decoupler	25
16	V3 anode tone corrector	.005
17	Smoothing	24
18	Reservoir	8
19	Mains HF filter	.1
20	" "	.1

WINDINGS

L	Purpose	Ohms
1	MW aerial coil	3.75
2	LW aerial coil	14
3	MW grid coil	3.75
4	LW grid coil	14
5	MW osc coil	5
6	LW osc coil	10
7	Reaction winding	5.5
8	1st IF primary	100
9	1st IF secondary	100
10	2nd IF primary	100
11	2nd IF secondary	100
12	Output trsfr, primary	625
13	Output trsfr, secondary	Very low
14	Speech coil	4
15	LS field	410
16	Mains HF filter	—
17	" "	—

Three Intermittent Faults

A FIVE valve all-wave receiver functioned for a short while, but on becoming well warmed up, cut off completely. The fault was also made to occur by turning the wavechange switch from one band to another. In checking voltages it was found that the oscillator anode voltage dropped from 90 to 30 simultaneously with the set cutting off. This valve, a TH22C, was replaced, and the set then functioned correctly.

An intermittent hum was heard on a universal set; the cause was a rusty earth plug.

Intermittent results on the long-wave band of a set which varied on tapping the wavechange switch, sounded as if the contacts of the switch were giving trouble, but the fault was found to be due to a dry joint on the long wave padder. —ALFRED ROSE.

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AN Ultra battery receiver was brought in for repair, and among other things a Mazda DD207 was wanted. This valve seems almost unobtainable, and there was no equivalent in stock.

I took a Cossor 210 DDT, drilled a hole through the centre of the valveholder, unsoldered the connections from pin 1, extended them, and soldered them to a socket from an old HT battery, so as to make a connection on the centre pin. The set worked perfectly.—VANNI SCARFI.

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A COMMON fault in the latest type of HMV receiver (the 418 model and later version) is whistling on the edge of a station, and whistling where weak stations are normally received. This appears to be oscillation on the IF stages and can be cured by fitting a fixed resister in the plate circuit.

The value may vary from 50,000 to 250,000 ohms.—F. DAY-LEWIS.

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A SET was being tested for weak reception generally, and it was found that when one IF valve was removed the anode voltage to it was increased enormously. It was thought that the valve was passing excessive current and faulty, but replacement effected no cure.

Testing for anode current showed this to be low. The IF coil was tested and showed a resistance of very high value, instead of 80 ohms. Rewinding repaired the set.—F. DAY-LEWIS.