

"TRADER" SERVICE SHEET

799

EKCO U29

A.C./D.C. TRANSPORTABLE SUPERHET



A SMALL internal frame aerial is fitted in the Ekco U29, a 4-valve (plus rectifier) 2-band superhet for A.C. or D.C. mains of 200-250V (50-100 c/s A.C.), but provision is made for connecting an external aerial.

Release date and original price: June, 1946, £13 18s plus £2 18s 8d purchase tax.

CIRCUIT DESCRIPTION

Tuned frame aerial input **L3**, **C35** or M.W. with loading coil **L4** (L.W.), precedes triode hexode valve (**V1**, Mullard metallized **CCH35**) which operates as frequency changer with internal coupling. I.F. rejection by **L5**, **C4** in C.G. circuit. Provision for connection of external aerial via compensating choke **L1** and mains isolator **G1**.

Triode oscillator grid coils **L6** (M.W.) and **L7** (L.W.) are tuned by **C36**. Parallel trimming by **C17** (M.W.) and **C15**, **C38** (L.W.); series tracking by **C14** (M.W.) and **C13** (L.W.); reaction coupling by anode coils **L8** and **L9**.

Second valve (**V2**, Mullard metallized **EF39**) is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned primary, tuned-secondary transformer couplings **G7**, **L10**, **L11**, **C8** and **G19**, **L12**, **L13**, **C20**.

Intermediate frequency 470 kc/s.

Diode second detector is part of double-diode beam tetrode output valve (**V3**, Mazda metallized **PEN453DD**). Audio frequency component in rectified output is developed across load resistor **R11** and passed via **C24** and manual volume control **R12** to C.G. of tetrode section. I.F. filtering by **C22**, **R10** and **C23**.

Second diode of **V3**, fed from **L13** via **C26**, provides D.C. potential which is developed across load resistor **R17** and fed back through de-

coupling circuits as G.B. to F.C. and I.F. valves, giving automatic volume control. Delay voltage, together with G.B. for tetrode section, is obtained from the drop along resistors **R13** and **R14** in **V3** cathode load to chassis. Fixed tone correction by **R15**, **C25** and **C27** in tetrode anode circuit.

When the receiver is operated from A.C. mains, H.T. current is supplied by half-wave (Continued overleaf)

COMPONENTS AND VALUES

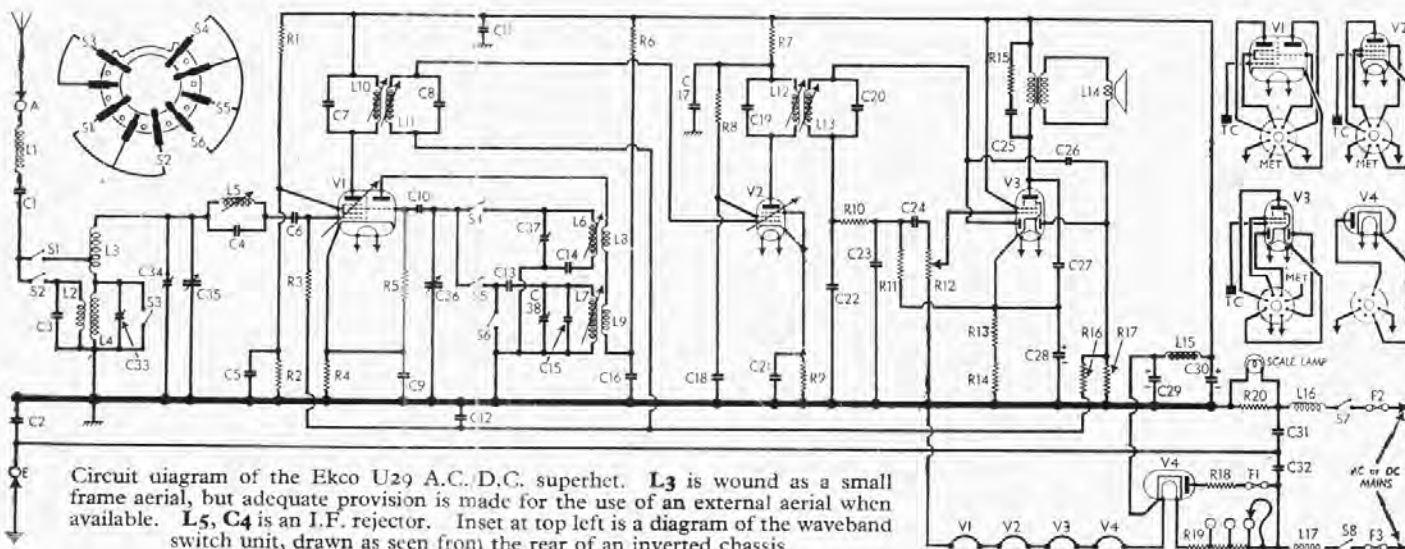
CAPACITORS		Values (pF)
C1	Aerial isolator	0-002
C2	Earth isolator	0-1
C3	Aerial circuit L.W. shunt	0-0002
C4	I.F. filter tuning	0-0001
C5	V1 S.G. decoupling	0-1
C6	V1 hex. C.G. capacitor	0-0001
C7	1st I.F. transformer tuning capacitors	0-0001
C8	2nd I.F. transformer tuning capacitors	0-0001
C9	V1 cathode by-pass	0-1
C10	V1 osc. C.G. capacitor	0-00005
C11	H.T. circuit R.F. by-pass	0-1
C12	A.V.C. line decoupling	0-1
C13	Osc. circ. L.W. tracker	0-000162
C14	Osc. circ. M.W. tracker	0-000163
C15	Osc. L.W. fixed trimmer	0-00005
C16	V1 osc. anode decoupling	0-1
C17	V2 H.T. decoupling	0-1
C18	V2 S.G. decoupling	0-1
C19	1st I.F. transformer tuning capacitors	0-0001
C20	2nd I.F. transformer tuning capacitors	0-00022
C21	V2 cathode by-pass	0-1
C22	I.F. by-pass capacitors	0-0001
C23	A.F. coupling to V3 pent.	0-0001
C24	Fixed tone corrector	0-01
C25	V3 A.V.C. diode coupling	0-000015
C26	Fixed tone corrector	0-0025
C27	V3 cathode by-pass	50-0
C28	H.T. smoothing capacitors	8-0
C29	Mains R.F. by-pass capacitors	24-0
C30	Aerial circ. L.W. trimmer	0-1
C31	Aerial circ. M.W. trimmer	0-1
C32	Aerial circuit tuning	—
C33	Oscillator circuit tuning	—
C34	Osc. circ. M.W. trimmer	—
C35	Osc. circ. L.W. trimmer	—
C36	Osc. circ. L.W. trimmer	—
C37	Osc. circ. L.W. trimmer	—
C38	Osc. circ. L.W. trimmer	—

RESISTORS		Values (ohms)
R1	V1 S.G. H.T. potential divider	17,000
R2	V1 hex. C.G. resistor	68,000
R3	V1 fixed G.B. resistor	750,000
R4	V1 osc. C.G. resistor	200
R5	V1 osc. anode decoupling	100,000
R6	V2 H.T. decoupling	47,000
R7	V2 S.G. H.T. feed	2,200
R8	V2 fixed G.B. resistor	91,000
R9	I.F. stopper	330
R10	Signal diode load	100,000
R11	Manual volume control	560,000
R12	V3 pent. G.B. and A.V.C. delay resistors	1,000,000
R13	Part fixed tone corrector	330
R14	A.V.C. line decoupling	150
R15	A.V.C. diode load	4,700
R16	V4 anode surge limiter	170,000
R17	Heater ballast resistor	1,500,000
R18	Scale lamp shunt	47
R19		832*
R20		37

* Tapped at 632Ω, 1002Ω, 1002Ω from V4 heater.

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial compensating choke	14-0
L2	Aerial L.W. coupling coil	28-0
L3	Frame aerial winding	0-8
L4	Aerial L.W. tuning coil	28-0
L5	I.F. filter coil	10-0
L6	Osc. M.W. tuning coil	2-3
L7	Osc. L.W. tuning coil	4-6
L8	Oscillator reaction coils, total	1-7
L9	1st I.F. trans. Pri.	10-0
L10	1st I.F. trans. Sec.	10-0
L11	2nd I.F. trans. Pri.	10-0
L12	2nd I.F. trans. Sec.	6-0
L13	Speaker speech coil	2-4
L14	H.T. smoothing choke	360-0
L15	Mains R.F. filter chokes	1-6
L16	Output trans. Pri.	350-0
L17	Output trans. Sec.	0-5
T1	Waveband switches	—
S1-S6	Mains switches, ganged R12	—
S7-S8	H.T. circuit fuse—0.5 A	—
F1	Mains fuses—1.0 A	—
F2-F3		—

* Electrolytic. † Variable. ‡ Preset.



Circuit diagram of the Ekco U29 A.C./D.C. superhet. **L3** is wound as a small frame aerial, but adequate provision is made for the use of an external aerial when available. **L5**, **C4** is an I.F. rejector. Inset at top left is a diagram of the waveband switch unit, drawn as seen from the rear of an inverted chassis.

Circuit Description—Continued

rectifying valve (V4, Mullard CY31) which, with D.C. mains, behaves as a low resistance. Smoothing is effected by iron-cored choke L15 and electrolytic capacitors C29, C30.

Valve heaters, together with scale lamp and adjustable ballast resistor R19, are connected in series across mains input. Filter circuit comprising chokes L16, L17 and capacitors C31, C32 suppresses mains-borne interference.

DISMANTLING THE SET

Removing Chassis.—Remove the three control knobs (recessed grub screws); facing the back of the cabinet, remove two self threading screws (with washers), one is located to the left of the scale lamp holder, while the other is above the upper left-hand speaker fixing nut; remove four cheese-head bolts (with metal washers) securing the chassis to the base of the cabinet; the chassis and speaker may now be withdrawn as a single unit.

When replacing, do not omit to cover the control knob grub screws with a suitable insulating compound.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on A.C. mains of 230 V, using the 220-230 V tapping on the heater ballast resistor. The receiver was tuned to the lowest wavelength on the M.W. band, and the volume control was at maximum, but there was no signal input.

Voltages were measured on the 400 V scale of a model 7 Avometer, chassis being the negative connection.

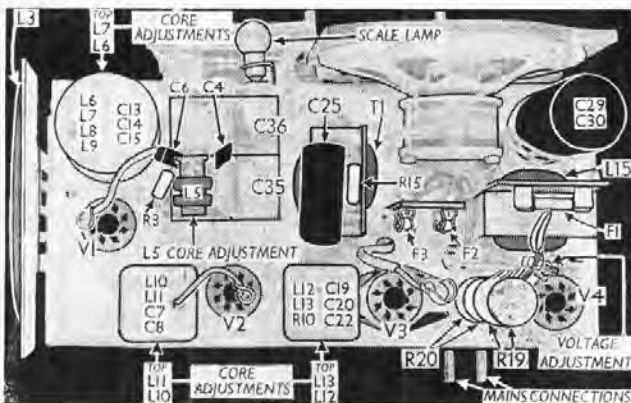
Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 (CY15)	220 104	1.6 2.3	67	2.4
V2 (EP39)	200	4.9		
V3 (PEN154DE)	207	32.0	220	5.5
V4 (CY31)				

† Cathode to chassis, 242 V, D.C.

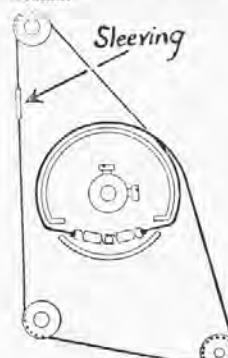
REPLACING CORD DRIVE

First remove the complete scale and drive assembly from the front of the set. This is done by slackening the two setscrews holding drive drum to gang shaft, removing two 2BA nuts holding the assembly to the front of the gang, and removing two 4BA screws holding the bottom of the assembly to front chassis member. Lift off the assembly, and lay it face down on the bench, when its salient points will

Plan view of the chassis. L3 is the frame aerial winding, which should face outwards from the chassis when correctly mounted, as shown here. R20 is a small section at the bottom of the ballast resistor unit carrying R19.



be seen to agree with the diagram in this column.



Take about 24in of cord, slip on to it one 3/16in length of 1mm sleeving, and tie the two tension springs to the two ends so that the overall length of cord and springs is 22in. A complete assembly of this kind can be obtained from the makers, part number D.P. 10565.

Fit the cord as shown in the diagram, making a little over one complete turn round the lower right pulley, and keeping the sleeving between the other two. Replace assembly on chassis, turn gang to maximum, turn drum so that springs are vertical and to left of spindle (viewed from front), tighten boss screws and reft pointer over sleeving.

GENERAL NOTES

Switches.—S1-S6 are the waveband switches, ganged in a single rotary unit beneath the chassis. The unit is shown in detail in the diagram inset in the top left-hand corner of the circuit diagram, where it is drawn as seen from the rear of an inverted chassis. S1, S3, S4 and S6 close on M.W.; S2, S5 close on L.W.

Coils.—The aerial coils L1, L2, L4 are in an unscreened tubular unit beneath the chassis. The frame aerial winding L1 is held to its bracket at one end of the chassis deck by its connecting tags, and since it is possible to mount the frame in four different positions, it should be noted that in the correct one the winding is on the outside, and the three screws are below the horizontal centre-line of the frame.

The oscillator and I.F. transformer coils are in three screened units on the chassis deck.

Scale Lamp.—This is an Osram M.E.S. type lamp, with a large spherical bulb, rated at 6.2 V 0.3 A. It is shunted by R20.

Fuses.—F1 is the I.F. circuit fuse, rated at 500 mA. F2 and F3 are in the mains input circuit, and are rated at 1 A each. F1 is 1 1/2 in length, and F2, F3 are 1 in types.

Capacitors C29, C30.—These are two dry electrolytics in a single tubular metal container. Our sample was a Hunts type K44, rated at 350 V DC working. The red tag is the positive of C30 (24 μF), and the yellow tag that of C29 (8 μF), while a black tag is provided for the negative connection.

Ballast Resistor.—This is a wire-wound unit comprising R19 and R20, with three tappings for mains voltage adjustment. The two tappings at the bottom of the unit are the connections for R20.

Alternative Output Valve.—V3 in our chassis was a Mazda Pen 453DD, but in some chassis it may be a Mullard CBL31. In such cases the bias is lowered accordingly by returning the bottom of the volume control to the junction of R13 and R14 instead of to chassis. The valve-holder and its wiring are, of course, different also.

CIRCUIT ALIGNMENT

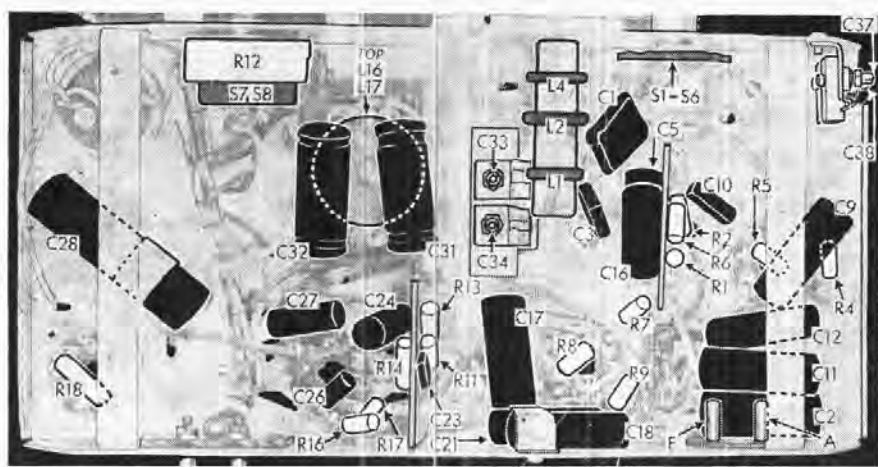
I.F. Stages.—Switch set to M.W. and turn the gang and volume control to maximum. Connect signal generator leads via a 0.1 μF capacitor to control grid (top cap) of V1 and chassis, and check that chassis is connected to earthed side of mains if A.C. is used. Feed in a 470 kc/s (638.3 m) signal, and adjust the cores of L13, L12, L11 and L10 in that order for maximum output, reducing the generator output as they come into line.

R.F. and Oscillator Stages.—Transfer signal generator leads to A and E sockets, via a dummy aerial. With the gang at maximum, the cursor should cover the lines beneath "Long, Medium" at bottom of scale.

I.F. Rejector.—Feed in a 470 kc/s signal, and adjust the core of L5 for minimum output.

M.W.—Switch set to M.W., tune to 200 m on scale, feed in a 200 m (1,500 kc/s) signal, and adjust C37 for maximum output. Feed in a 500 m (600 kc/s) signal, tune in, and adjust the core of L6 for correct calibration and optimum results. Tune to 250 m on scale, feed in a 250 m (1,200 kc/s) signal, and adjust C34 for maximum output. Repeat these adjustments until no improvement can be obtained.

L.W.—Switch set to L.W., tune to 1,000 m on scale, feed in a 1,000 m (300 kc/s) signal, and adjust C38 for maximum output. Feed in a 2,000 m (150 kc/s) signal, tune it in, and adjust the core of L7 for correct calibration and optimum results. Tune to 1,300 m on scale, feed in a 1,300 m (231 kc/s) signal, and adjust C33 for maximum output. Repeat these adjustments until no improvement can be obtained.



Under-chassis view. A diagram of the S1-S6 switch unit, viewed in the direction indicated here by an arrow, is inset in the circuit diagram overleaf.