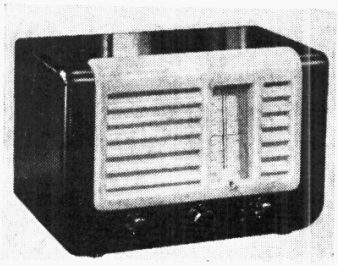
Supplement to The Wireless & Electrical Trader, January 11, 1947

"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 13s plus £2 18s 8d purchase tax.

CIRCUIT DESCRIPTION

Tuned frame aerial input **L3, C35** on 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 **C1.**

Triode oscillator grid coils **L6** (M.W.) and **L7** (L.W.) are tuned by **C36.** Parallel trimming by **C37** (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 **C7, L10, L11, C8** and **C19, 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 decoupling 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 lead 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

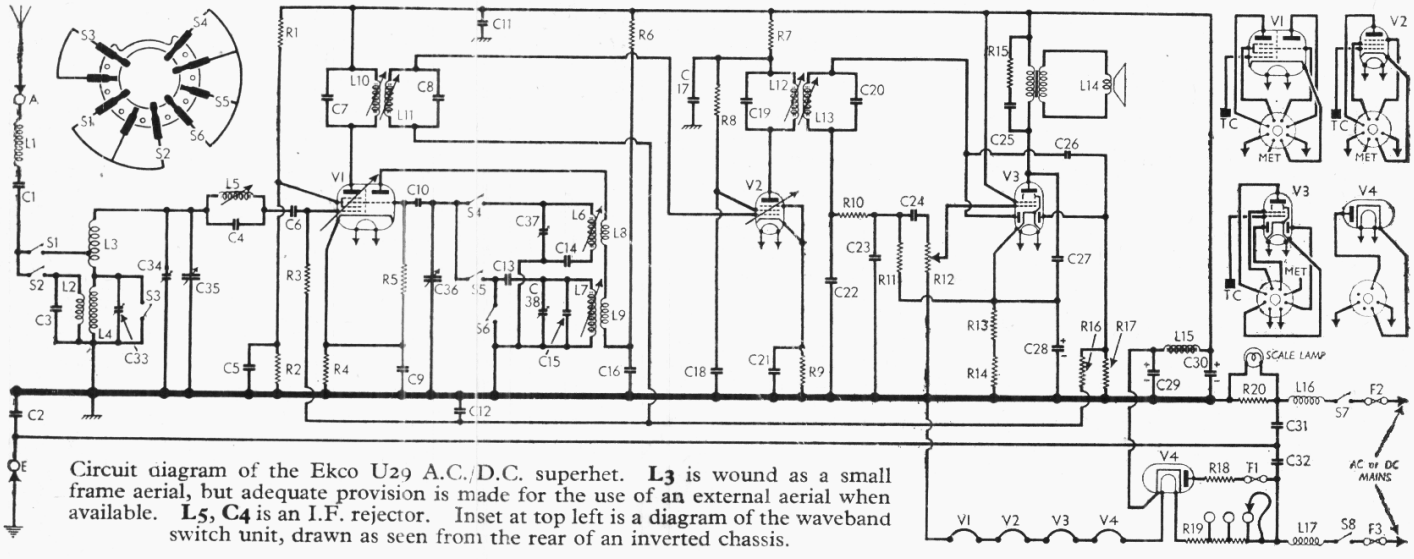
	CAPACITORS	Values (μF)
C1	Aerial isolator	0·002
C2	Earth isolator	0·1
C3	Aerial circuit L.W. shunt	0·0002
C4	I.F. filter tuning	0·0001
C5	V1 S.G. decoupling ...	0·1
C6	V1 hex. C.G. capacitor ...	0·0001
C7, C8	1st I.F. transformer tuning capacitors	0·0001
C9	V1 cathode by-pass ...	0·1
C10	V1 osc. C.G. 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 ...	0·000463
C15	Osc. L.W. fixed trimmer...	0·000065
C16	V1 osc. anode decoupling	0·1
C17	V2 H.T. decoupling ...	0·1
C18	V2 S.G. decoupling ...	0·1
C19	2nd I.F. transformer tuning capacitors	0·0001
C20	V2 cathode by-pass ...	0·00022
C21	I.F. by-pass capacitors ...	0·1
C22, C23		0·0001
C24	A.F. coupling to V3 pent.	0·01
C25	Fixed tone corrector ...	0·04
C26	V3 A.V.C. diode coupling	0·000015
C27	Fixed tone corrector ...	0·0025
C28*	V3 cathode by-pass ...	50·0
C29*, C30*	H.T. smoothing capacitors	8·0 + 24·0
C31, C32	Mains R.F. by-pass capacitors	0·1 + 0·1
C33‡	Aerial circ. L.W. trimmer	—
C34‡	Aerial circ. M.W. trimmer	—
C35†	Aerial circuit tuning ...	—
C36†	Oscillator circuit tuning ...	—
C37‡	Osc. circ. M.W. trimmer...	—
C38‡	Osc. circ. L.W. trimmer...	—

* Electrolytic. † Variable. ‡ Pre-set.

	RESISTORS	Values (ohms)
R1, R2	V1 S.G. H.T. potential divider	47,000 + 68,000
R3	V1 hex. C.G. resistor ...	750,000
R4	V1 fixed G.B. resistor ...	200
R5	V1 osc. C.G. resistor ...	100,000
R6	V1 osc. anode decoupling	47,000
R7	V2 H.T. decoupling ...	2,200
R8	V2 S.G. H.T. feed ...	91,000
R9	V2 fixed G.B. resistor ...	330
R10	I.F. stopper	100,000
R11	Signal diode load... ...	560,000
R12	Manual volume control ...	1,000,000
R13, R14	V3 pent. G.B. and A.V.C. delay resistors	330 + 150
R15	Part fixed tone corrector...	4,700
R16	A.V.C. line decoupling ...	470,000
R17	A.V.C. diode load ...	1,500,000
R18	V4 anode surge limiter ...	47
R19	Heater ballast resistor ...	832*
R20	Scale lamp shunt... ...	37

* Tapped at 632Ω + 100Ω + 100Ω 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, L9	Oscillator reaction coils, total	1·7
L10, L11	1st I.F. trans. Pri. ... Sec. ...	10·0 + 10·0
L12, L13	2nd I.F. trans. Pri. ... Sec. ...	10·0 + 6·0
L14	Speaker speech coil ...	2·4
L15	H.T. smoothing choke ...	360·0
L16, L17	Mains R.F. filter chokes ...	1·6 + 1·6
T1	Output trans. Pri. ... Sec. ...	350·0 + 0·5
S1-S6	Waveband switches ...	—
S7, S8	Mains switches, ganged R12	—
F1	H.T. circuit fuse—0·5 A ...	—
F2, F3	Mains fuses—1·0 A ...	—



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 220 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.

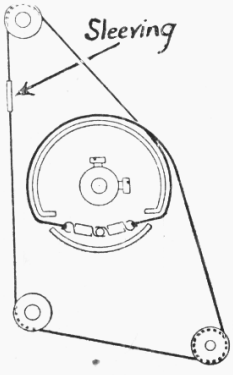
Voltages were measured on the 400 V scale of a model 7 Avometer, chassis being the negative connection.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen† Current (mA)
V1 CCH35	220	1·6	67	2·4
	Oscillator			
	104	2·3		
V2 EF39	200	4·9	75	1·4
V3 PEN453DD	207	32·0	220	5·5
V4 CY31†	—	—	—	—

† Cathode to chassis, 242 V, D.C.

REPLACING CORD DRIVE

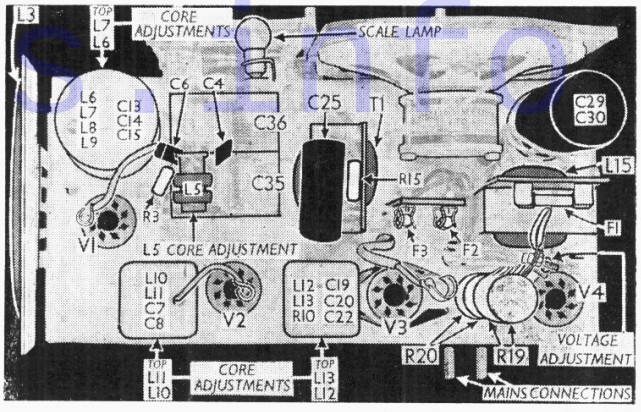
First remove the complete scale and drive assembly from the front of the set. This is done by slackening the two setscrews holding drive drum to gang shaft, removing two 2BA nuts holding the assembly to the front of the gang, and removing two 4BA screws holding the bottom of the assembly to front chassis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



Drive cord diagram.

Take about 24in of cord, slip on to it one ½in 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 DP. 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 refit pointer over sleeving.



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.**

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 H.T. circuit fuse, rated at 500 mA. **F2** and **F3** are in the mains input circuit, and are rated at 1 A each. **F1** is 1½ in 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 valveholder and its wiring are, of course, different also.

CIRCUIT ALIGNMENT

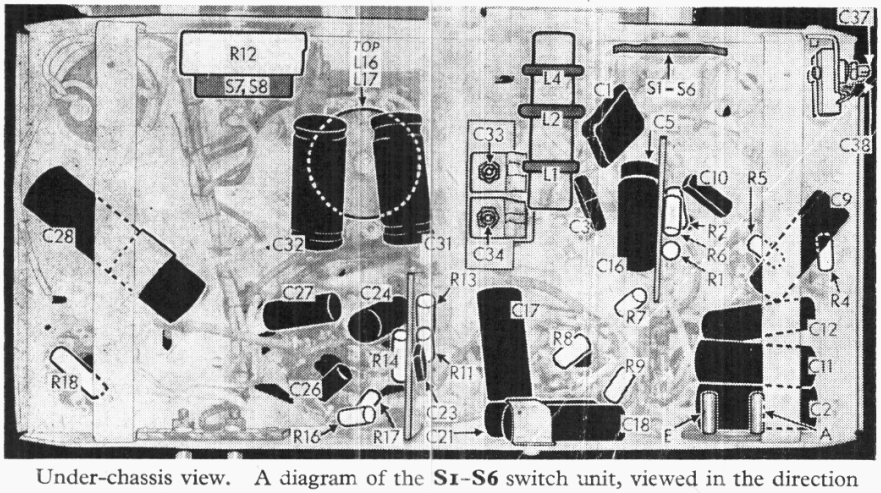
I.F. Stages.—Switch set to M.W. and turn the gang and volume control to maximum. Connect signal generator leads via a 0.1 μF capacitor to control grid (top cap) of **V1** and chassis, and check that chassis is connected to earthed side of mains if A.C. is used. Feed in a 470 kc/s (638.3 m) signal, and 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.

Printed in England by The Cornwall Press Ltd., Paris Garden, London, S.E.1.