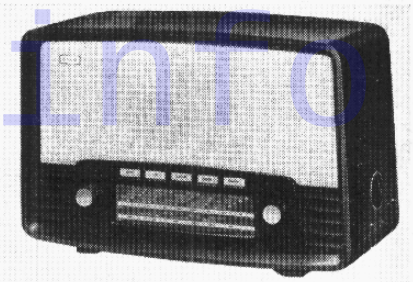
"TRADER" SERVICE SHEET

1129

EKCO U199

A.C./D.C. Transportable Superhet



CHOICE of three pre-tuned M.W. stations as well as manual tuning is provided in the Ekco U199, a 4-valve (plus rectifier) 2-band transportable superhet, designed to operate from A.C. or D.C. mains of 110-120 V and 200-250 V (50 c/s in the case of A.C.). The waveband coverage is 184-561 m and 1,000-2,000 m.

Release date and original price: September, 1953; £15 17s, plus purchase tax.

CIRCUIT DESCRIPTION

Frame aerial input **L1** and loading coil **L2** (M.W.), or **L3** (L.W.), is tuned manually by **C33**. On these two manually tuned ranges **S7** closes to connect **C33**.

Three further positions on the waveband switch control provide a choice of three pre-tuned M.W. stations. In these positions **S1** closes to connect the fixed tuning capacitor **C2** across the M.W. frame aerial circuit, and station-setting is performed by adjustable trimmers **C30, C31** and **C32**.

First valve **(V1, Mullard UCH42)** is a triode hexode operating as frequency changer with internal coupling. Oscillator grid coils **L4** (M.W.) and **L5** (L.W.) are tuned manually by **C34**, which is connected via **S8**. Parallel trimming by **C36** (M.W.) and **C11, C35** (L.W.); series tracking by **C12** (M.W.) and **C10** (L.W.). Reaction coupling by **L9** (M.W.) and **L10** (L.W.). Addition coupling on M.W. by the common impedance of tracker **C12**.

For pre-set station operation **S8** opens and **S14** closes. Station setting is performed by adjustment of the pre-set cores of **L6, L7** and **L8**, the coils being arranged in a Colpitts circuit with **C8, C9**.

Second valve **(V2, Mullard UF41)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C4, L11, L12, C5** and **C15, L13, L14, C16**.

Intermediate frequency 460 kc/s.

Diode signal detector is part of double diode triode valve **(V3, Mullard UBC41)**. A.F. component in rectified output is developed across volume control **R6**, which acts as diode load, and is passed via **C18** to grid of triode section. I.F. filtering by **C17** and **R5**.

Resistance-capacitance coupling by **R8, C23** and **R12** between **V3** and pentode output valve **(V4, Mullard UL41)**. Fixed tone correction by **C25** and by negative feed-back paths **C19,** between **V3** anode and grid, and **R15, R16,** between winding **c** on output transformer **T1** and **V3** cathode circuit. Two-position tone control by **C21, C22, R11** and switch **S18**. Negative voltage developed across **R13, R14** in the H.T. negative circuit is supplied as bias to **V4,** and a proportion of it, that developed across **R13,** provides a degree of standing bias for **V1** and **V2**. H.T. current is supplied by I.H.C. half-wave rectifying valve **(V5, Mullard UY41)**.

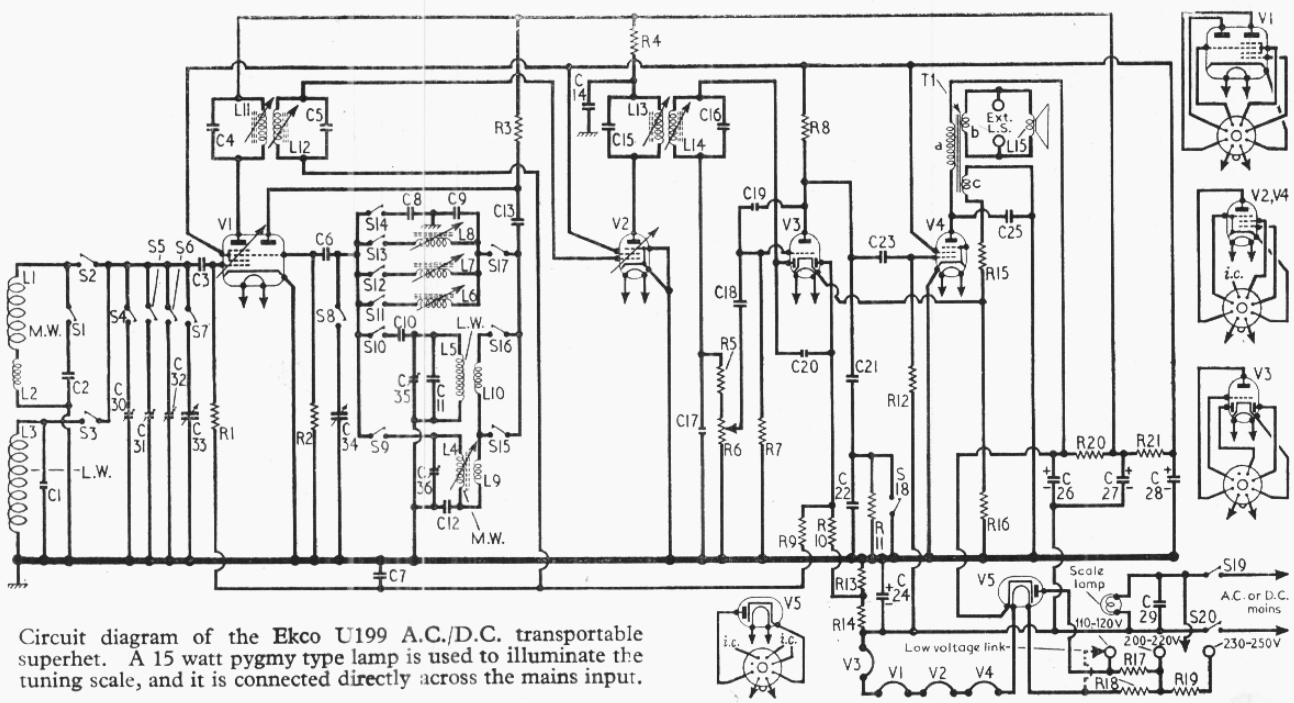
COMPONENTS AND VALUES

	RESISTORS	Values	Locations
R1	V1 C.G.	680kΩ	F4
R2	V1 osc. C.G. ...	47kΩ	G3
R3	Osc. anode feed ...	33kΩ	F4
R4	V2 anode decoup.	1kΩ	F4
R5	I.F. stopper ...	47kΩ	E4
R6	Volume control ...	1MΩ	D3
R7	V3 C.G.	10MΩ	D3
R8	V3 anode load ...	220kΩ	E4
R9	A.G.C. decoupling	1MΩ	F4
R10	A.G.C. diode load	1MΩ	E4
R11	Part tone control	68kΩ	D4
R12	V4 C.G.	680kΩ	D4
R13	V4 G.B. and A.G.C. delay ...	33Ω	E3
R14		68Ω	E4
R15	Neg. feed-back ...	150Ω	E4
R16	pot. divider ...	10Ω	E4
R17	V5 surge limiter	160Ω	C1
R18	Heater ballast ...	930Ω	C1
R19		200Ω	C1
R20	H.T. smoothing ...	1,650Ω*	D3
R21		4·7kΩ	F3

*Two 3·3kΩ resistors in parallel.

	CAPACITORS	Values	Locations
C1	L.W. aerial trim.	60pF	A2
C2	M.W. muting ...	0·001μF	G4
C3	V1 C.G.	100pF	F4
C4	1st I.F. trans. tuning	100pF	B1
C5		100pF	B1
C6	V1 osc. C.G. ...	100pF	A2
C7	A.G.C. decoupling	0·1μF	F3
C8	Osc. pre-set ... tuning ...	560pF	G4
C9		0·001μF	G4
C10	L.W. osc. tracker	403pF	G3
C11	L.W. osc. trimmer	280pF	G3
C12	M.W. osc. tracker	545pF	G4
C13	Osc. anode coup.	0·001μF	F4
C14	V2 anode decoup.	0·1μF	F4
C15	2nd I.F. trans. tuning	100pF	B2
C16		100pF	B2
C17	I.F. by-pass ...	50pF	E4
C18	A.F. coupling ...	0·01μF	E3
C19	Neg. feed-back ...	68pF	E4
C20	A.G.C. coupling ...	15pF	E4
C21	Part tone control	0·01μF	E4
C22		0·002μF	D4
C23	A.F. coupling ...	0·002μF	E4
C24*	G.B. by-pass ...	50μF	D3
C25	Tone corrector ...	0·02μF	D4
C26*	H.T. smoothing ...	50μF	C1
C27*		50μF	C1
C28*		4μF	F3
C29	Mains R.F. by-pass	0·05μF	D3
C30‡	Aerial pre-sets ...	200pF	G4
C31‡		380pF	G4
C32‡		750pF	G4
C33†	Aerial tuning ...	—	B1
C34†	Oscillator tuning	—	B1
C35‡	L.W. osc. trim. ...	40pF	G4
C36‡	M.W. osc. trim. ...	40pF	G3

* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Ekco U199 A.C./D.C. transportable superhet. A 15 watt pygmy type lamp is used to illuminate the tuning scale, and it is connected directly across the mains input.

OTHER COMPONENTS			Approx. Values (ohms)	Locations
L1	M.W. frame aerial		3·0	C2
L2	M.W. loading coil...		0·5	A2
L3	L.W. frame aerial...		7·0	C2
L4	Osc. tuning coils ...		2·5	G1
L5			4·5	G1
L6	Osc. pre-set coils ...		1·0	G4
L7			1·5	G4
L8			2·0	G4
L9	Osc. reaction coils...		0·5	G1
L10			3·0	G1
L11	1st I.F. trans.	Pri.	10·0	B1
L12		Sec.	10·0	B1
L13	2nd I.F. trans.	Pri.	10·0	B2
L14		Sec.	10·0	B2
L15	Speech coil ...		2·5	—
T1	O.P. trans.	a ...	400·0	
		b ...	0·5	E3
		c ...	8·0	
S1-S17	Waveband switches		—	A2
S18	Tone control switch		—	D4
S19, S20	Mains sw., g'd R6...		—	D3

GENERAL NOTES

Switches.—**S1-S17** are the waveband and pre-set station switches, ganged in two rotary units beneath the chassis. These units are indicated in our plan view of the chassis and shown in detail in column 2, where they are drawn as seen from the waveband control knob end of an upright chassis.

S18.—This is a screw-type tone control switch situated on a panel at the rear of the chassis together with the extension speaker sockets.

S19, S20.—These are the Q.M.B. type mains switches ganged with the volume control **R6**.

Voltage Adjustment.—Two voltage adjustment leads are indicated in our plan view of the chassis. The ends of the lower lead are connected together to the bottom terminal on the ballast resistor for 200-220 V and 220-250 V mains, and between the bottom terminal and the top terminal for 110-120 V mains. The other flexible lead is connected to the second terminal from the bottom for 200-220 V mains, to the third terminal from the bottom for 220-250 V mains, and to the top terminal for 110-120 V mains. The scale lamp must be correctly rated for the mains in use.

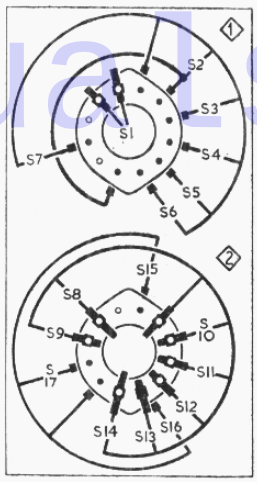
Drive Cord Replacement.—About 28in of fine-gauge Bowden cable and 2ft of high-grade flax fishing line, plaited and waxed, are required for a new drive cord. Soldered end loops should be made on the Bowden cable so that it measures 26¼in overall. One end of the length of drive cord should be tied to one of these soldered loops, and the complete drive then run as shown in the sketch in column 3.

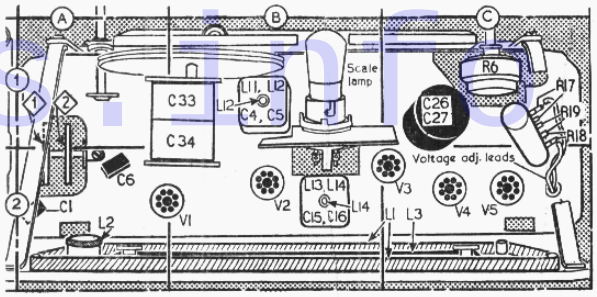
Waveband Indicator Drive.—About 20in of fine-gauge Bowden cable, with soldered end loops, is required for a new drive, which should have an overall length of 19¼in when made up. The drive should be run as shown in the sketch in column 3.

Scale Lamp.—This is a pygmy-type lamp rated at 250 V, 15 W for operation from 200-250 V mains, or 115 V, 15 W for operation from 110-120 V mains.

Switch Table

Switch	M.W.	L.W.	1	2	3
S1	—	C	—	—	—
S2	C	—	C	C	C
S3	—	C	—	—	—
S4	—	—	C	—	—
S5	—	—	—	C	—
S6	—	—	—	—	C
S7	C	C	—	—	—
S8	C	C	—	—	—
S9	C	—	—	—	—
S10	—	C	—	—	—
S11	—	—	C	—	—
S12	—	—	—	C	—
S13	—	—	—	—	C
S14	—	—	C	C	C
S15	C	—	—	—	—
S16	—	C	—	—	—
S17	—	—	C	C	C





Above : Plan view of the chassis showing the voltage adjustment leads on the ballast resistor. The lower lead actually consists of a loop of wire connected as indicated under "Voltage Alignment" in "General Notes."

Left : Diagrams of the waveband switch units as viewed in location A1 in plan view above.

CIRCUIT ALIGNMENT

I.F. Stages.—Remove chassis from cabinet and tune receiver to the high wavelength end of the M.W. band. Connect signal generator via an 0.1 μF capacitor in each lead, to control grid (pin 6) of **V1** and chassis. When adjusting the I.F. transformer primaries, the secondaries should be shunted by a 47 kΩ carbon resistor, and vice versa. Feed in a 460 kc/s (652.1 m) signal and adjust the cores of **L14** (location reference B2), **L13** (E4), **L12** (B1) and **L11** (F3) for maximum output. Repeat these adjustments.

R.F. and Oscillator Stages.—Replace chassis in cabinet. Trimmer **C35** can be adjusted from the rear of the chassis, and **C36** from a hole in the base of the cabinet. Check that with the gang at maximum capacitance the cursor coincides with the short vertical lines at the high wavelength ends of the tuning scales. Transfer signal generator leads to a loop consisting of six turns of wire of about 8in diameter, placed near to and parallel with the frame aerials.

M.W.—Switch receiver to M.W., tune to 250 m, feed in a 250 m (1,200 kc/s) signal and adjust **C36** (G3) for maximum output. Tune receiver to 500 m, feed in a 500 m (600 kc/s) signal and adjust the core of **L4** (G3) for maximum output. Repeat these adjustments.

L.W.—Switch receiver to **L.W.**, tune to 1,200 m, feed in a 1,200 m (250 kc/s) signal and adjust **C35** (G4) for maximum output.

Pre-set Stations.—The chassis should be in its cabinet for these adjustments.

The associated trimmers and core adjustments are shown in the under-chassis illustration, location reference G4. Starting with the waveband control fully clockwise the adjustments are: 3, **L8, C32** (310-550 m); 2, **L7, C31** (245-435 m); 1, **L6, C30** (188-343). A double-ended trimming tool is supplied with the receiver for use in setting up the pre-set stations.

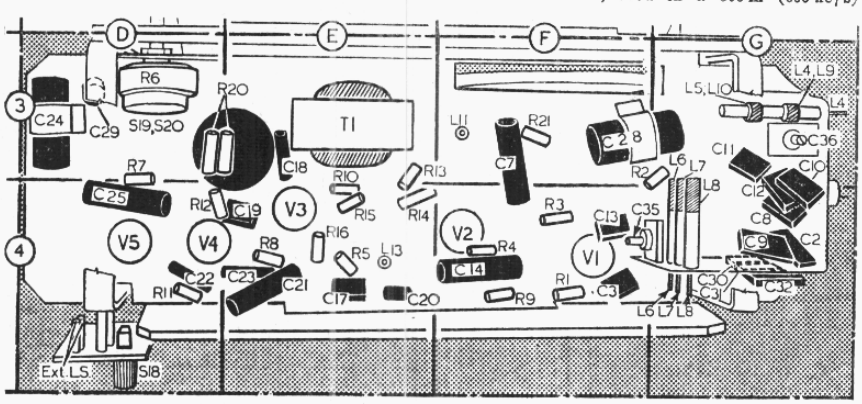
VALVE ANALYSIS

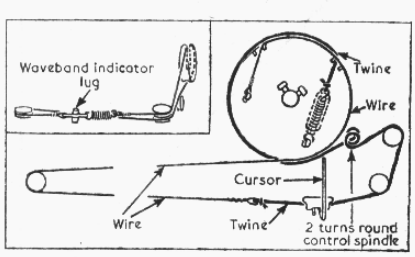
Valve voltages and currents given in the table below are those measured on our receiver when it was operating from 230 V A.C. mains, the voltage adjustment being set to the 220-250 V tapping. The receiver was tuned to the highest wavelength end of the M.W. band with the volume control turned to maximum, but there was no signal input.

Voltages were measured on an Avo Electronic Testmeter and as this instrument has a high internal resistance, allowance should be made for the current drawn by other types of meter. Chassis was the negative connection in each case. The voltage measured across **R13, R14** was 4.4 V, chassis being the positive connection.

Valve	Anode		Screen	
	V	mA	V	mA
V1 UCH42 ...	136 / 75	2·2 / Oscillator / 2·1	90	3·6
V2 UF41 ...	132	5·7	90	1·7
V3 UBC41 ...	56	0·17	—	—
V4 UL41 ...	160	25·0	90	18·0
V5 UY41 ...	160†	—	—	—

† A.C. reading. Cathode voltage 170 V; current 59 mA.





Above : Sketch of the tuning drive cord assembly and (inset) the waveband indicator drive. The lug on the indicator drive engages in a press-stud on the wave-band indicator slide.

Left : Underside view of the chassis.

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