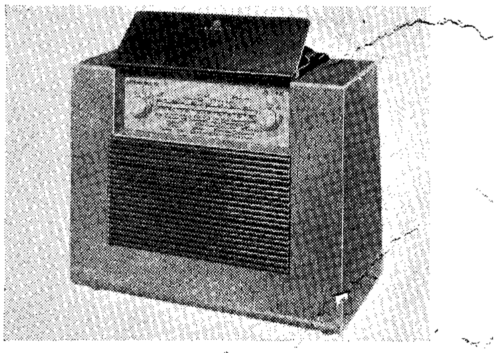
Supplement to Wireless & Electrical Trader, April 25, 1953

"TRADER" SERVICE SHEET

1090

EKCO MBP149



DESIGNATED the "Stroller" in succession to earlier receivers of the same type, the Ekco MBP149 is a 4-valve (plus metal rectifier) 2-band superhet portable designed to operate from A.C. or D.C. mains of 200-250 V or from self-contained dry batteries. The waveband ranges are 190-570 m and 1,000-2,100 m.

Alternative valve types are used in the position V1, and it is important that replacements are made with the correct type of valve. A note appears under "Modifications" overleaf.

Release date and original price: June, 1951; £16 7s 10d, without batteries. Purchase tax extra.

CIRCUIT DESCRIPTION

Tuned frame aerial input by **L1**, loading coil **L3**, and **C32** (M.W.) or **L1**, **L2**, **L3**, **C32** (L.W.) precedes heptode valve **(V1, Mullard DK92** or **DK91**, see "General Notes") which operates as frequency changer with electron coupling. Provision is made for the connection of an external aerial via **C1** to a tap on **L1** (M.W.) or a tap on **L2** (L.W.). An external earth socket is also provided, isolated from chassis by **C2**.

Oscillator anode coils **L5** (M.W.) and **L6** (L.W.) are tuned by **C35**. Parallel trimming by **C11**, **C33** (M.W.) and **C12**, **C34** (L.W.); series tracking by **C9** (M.W.) and **C10** (L.W.). Reaction coupling by **L4** (M.W.) and across the common impedance of tracker **C10** (L.W.). When **V1** is a DK91 the grid and anode circuits are transposed.

Second valve **(V2, Mullard DF91)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C5**, **L7**, **L8**, **C6** and **C17**, **L9**, **L10**, **C18**.

Intermediate frequency 470 kc/s.

Diode signal detector is part of diode pentode valve **(V3, Mullard DAF91)**. A.F. component in rectified output is developed across volume control **R12**, which acts as diode load, and is passed to control grid of pentode section.

D.C. potential developed across **R12** is used as bias for **V1** and **V2**, giving automatic gain control, but fixed bias is obtained from points on the potential divider **R9**, **R10**, **R11**, **R12** across the filament circuit.

Resistance-capacitance coupling by **R16**, **C23** and **R17** between **V3** pentode and pentode output valve **(V4, Mullard DL94)**. Fixed tone correction by **C25** in anode circuit and by negative feedback between **V4** anode and grid circuits via **C24**.

For battery operation, power supplies are carried by switches **S10(B)**, **S12(B)**, **S14(B)**, **S16(B)** and **S18(B)** which close in the battery position as indicated by the suffix **(B)**. The valve filaments are connected in series for mains or battery. **S19**, **S20** are the on/off switches.

For mains operation **S9(M)**, **S11(M)**, **S13(M)**, **S15(M)** and **S17(M)** close. H.T. current is

(Continued overleaf)

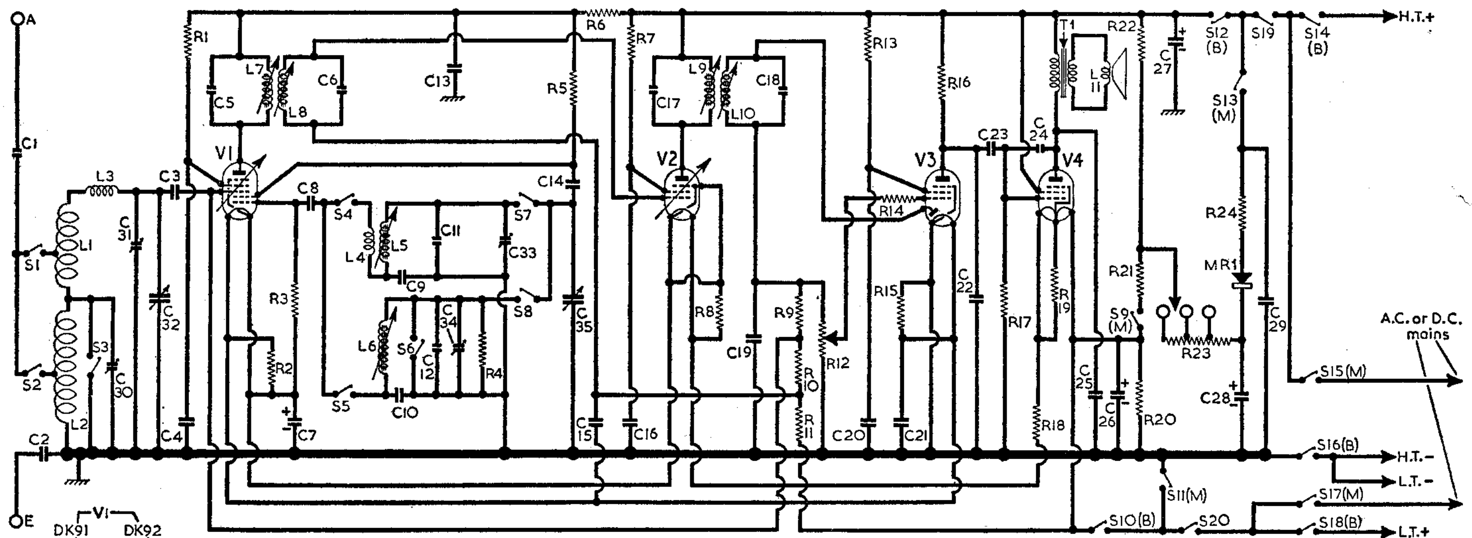
COMPONENTS AND VALUES

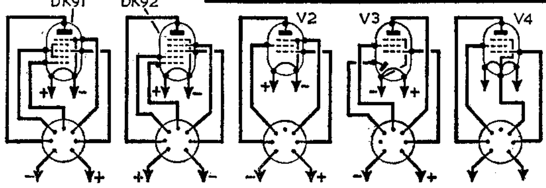
	RESISTORS	Values	Locations
R1	V1 S.G. feed ...	150kΩ	F3
R2	V1 filament shunt	140Ω	E2
R3	V1 osc. C.G.	68kΩ	F3
R4	L.W. osc. shunt ...	33kΩ	G2
R5	Osc. anode load ...	33kΩ	F3
R6	H.T. decoupling	1kΩ	F3
R7	V2 S.G. feed ...	68kΩ	F2
R8	V2 filament shunt	150Ω	E2
R9	} A.G.C. potential	3·3MΩ	F3
R10	} divider ...	3·3MΩ	F3
R11	}	10MΩ	F3
R12	Volume control ...	1MΩ	C1
R13	V3 S.G. feed ...	3·3MΩ	E3
R14	V3 C.G. stopper ...	47kΩ	E3
R15	V3 filament shunt	120Ω	E2
R16	V3 anode load ...	500kΩ	E3
R17	V4 C.G.	500kΩ	E3
R18	Part V4 G.B. ...	10Ω	E2
R19	Filament shunt	300Ω	D2
R20	} Filament potential	22kΩ	F3
R21	} divider ...	2·13kΩ	D3
R22	H.T. smoothing ...	1·5kΩ	D3
R23	Ballast resistor	*1,891Ω	D3
R24	MR1 surge limiter	250Ω	B1

* Tapped at 1,184Ω + 345Ω + 362Ω from MR1

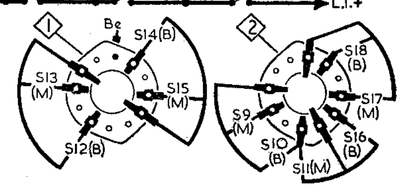
	CAPACITORS	Values	Locations
C1	Aerial coupling ...	50pF	A1
C2	Earth isolator ...	0·01μF	A1
C3	V1 C.G.	300pF	G3
C4	V1 S.G. decoupling	0·1μF	F2
C5	} 1st I.F. trans.	56pF	B1
C6	} tuning ...	56pF	B1
C7*	Filament by-pass	50μF	F2
C8	V1 osc. C.G. ...	100pF	F2
C9	M.W. osc. tracker	540pF	G2
C10	L.W. osc. tracker	166pF	G3
C11	M.W. osc. trim. ...	20pF	G2
C12	L.W. osc. trim. ...	82pF	G3
C13	H.T. decoupling	0·1μF	F2
C14	Osc. anode coup.	100pF	F3
C15	A.G.C. decoupling	0·01μF	F3
C16	V2 S.G. decoupling	0·1μF	E3
C17	} 2nd I.F. trans.	56pF	B1
C18	} tuning	56pF	B1
C19	I..F by-pass ...	200pF	F3
C20	V3 S.G. decoupling	0·1μF	E2
C21	Filament by-pass	0·1μF	E2
C22	I.F. by-pass ...	300pF	E3
C23	A.F. coupling ...	0·005μF	E3
C24	Neg. feed-back ...	8pF	E3
C25	Tone corrector ...	0·002μF	D3
C26*	Filament smoothing	100μF	B1
C27*	} H.T. smoothing ...	32μF	C1
C28*	}	32μF	C1
C29	Mains R.F. by-pass	0·05μF	B1
C30‡	L.W. aerial trim....	40pF	A1
C31‡	M.W. aerial trim.	40pF	A1
C32†	Aerial tuning ...	—	A1
C33‡	M.W. osc. trim. ...	40pF	G2
C34‡	L.W. osc. trim. ...	40pF	G2
C35†	Oscillator tuning	—	A1

* Electrolytic. † Variable. ‡ Pre-set.





Circuit diagram of the Ekco MBP149 "Stroller". Inset to the right of this caption are the diagrams of the mains/battery change-over switches. These are viewed from the rear of the chassis as indicated in the plan view by the numbers 1 and 2 in diamond surrounds.



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OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	M.W. frame aerial	1·3	A1
L2	L.W. frame aerial	6·7	A1
L3	Loading coil ...	0·2	B1
L4	M.W. osc. reaction	0·3	G2
L5	Oscillator tuning	2·4	G2
L6	coils	5·6	G3
L7	1st I.F. trans. Pri.	33·0	B1
L8	Sec.	33·0	B1
L9	2nd I.F. trans. Pri.	33·0	B1
L10	Sec.	33·0	B1
L11	Speech coil ...	2·3	—
T1	O.P. trans. Pri.	697·0	C1
	Sec.	0·32	
S1-S8	Waveband switches	—	B1
S9(M)-S18(B)	Mains/battery switches ...	—	B1
S19, S20	Power sw., g'd R12	—	C1

***Circuit Description**—continued*

supplied by half-wave metal rectifier **(MR1, Westinghouse 14B35).** Smoothing by **R22, R23** and electrolytic capacitors **C27, C28.** Filament current is also taken from the H.T. circuit, the series-connected filaments being shunted across **R20,** which together with **R21** forms an H.T. potential divider.

Filament smoothing by **C26. R2, R8, R15** and **R19** by-pass the H.T. current past the filaments. Bias is obtained from points of appropriate potential in the filament chain, extra bias for **V4** being obtained by inserting **R18** to raise its filament potential to the required level.

DISMANTLING

Removing Chassis.—Remove back covers and unplug leads from batteries (if fitted);
pull out cardboard shelf from below chassis;
slacken off two wood screws securing top edges of scale backing plate to chassis;
remove two 6BA bolts (with washers) from rear edges of chassis and two wood screws from front edges of chassis;
unsolder speaker leads and, raising the chassis sufficiently to clear the scale back securing screws, withdraw the chassis from the carrying case.

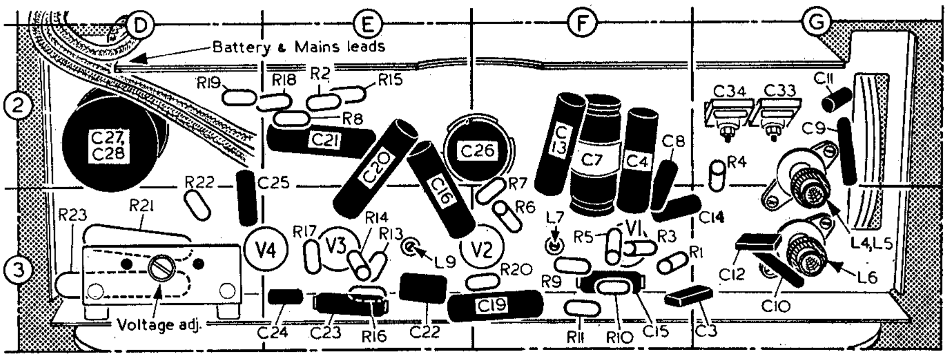
CIRCUIT ALIGNMENT

I.F. Stages.—Remove chassis from carrying case as described under "Dismantling" and stand it on end. Switch receiver to M.W. and turn gang to maximum. Connect signal generator output, via an 0.1 μF capacitor in each lead, to control grid (pin 6) of **V1** and chassis. Feed in a 470 kc/s (638.3 m) signal and adjust the cores of **L10** (location reference B1), **L9** (E3), **L8** (B1) and **L7** (F3) for maximum output. Repeat these adjustments.

R.F. and Oscillator Stages.—Disconnect signal generator leads and lay them near the frame aerials. Check that with gang at maximum capacitance the cursor coincides with the datum mark at the high wavelength end of the L.W. scale.

M.W.—Switch receiver to M.W. and tune to 200 m. Feed in a 200 m (1,500 kc/s) signal and adjust **C33** (G2) and **C31** (A1) for maximum output. Tune receiver to 549.4 m, feed in a 549.4 m (546 kc/s) signal and adjust the core of **L5** (A1) for maximum output. Repeat these adjustments.

L.W.—Switch receiver to L.W., tune to 1,000 m, feed in a 1,000 m (300 kc/s) signal and adjust **C34** (G2) and **C30** (A1) for maximum output. Tune receiver to 2,000 m, feed in a 2,000 m (150 kc/s) signal and adjust the core of **L6** (A1) for maximum output. Repeat these adjustments.



Underside view of the chassis. The waveband and power switches appear on the plan view.

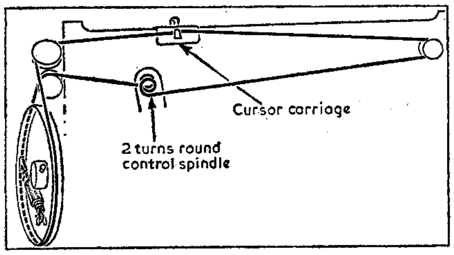
GENERAL NOTES

Switches.—**S1-S8** are the waveband switches, ganged in a single rotary unit on the chassis deck. Its position is indicated in our plan view of the chassis, but the unit is shown in detail in the diagram inset beside the plan view, where it is drawn as seen from the rear of the chassis.

S1, S3, S4, S6 and **S7** close for M.W. operation (control knob turned clockwise); **S2, S5** and **S8** close for L.W. The control knob is concentric with the tuning control knob, and the switch unit is operated by a lever on the outer spindle of the two.

S9(M)-S18(B) are the mains/battery change-over switches, ganged in two rotary units mounted on the chassis deck. Their position is indicated in our plan view of the chassis, but the units are shown in detail in the diagrams inset beneath the main circuit diagram overleaf.

The two units are identified by the numbers **1** and **2** in diamond surrounds. The action of the switches is indicated by their suffixes **(M),** which means that it closes for mains, and **(B),** which means that it closes for battery. The unit is lever operated from a control knob which is concentric with the volume control. It turns clockwise for mains.



Sketch of tuning drive system, as seen from rear, with gang at maximum.

Batteries.—Those recommended by the makers are Ever Ready "Alldry 31," 7.5 V, for L.T., and Drydex H1146, 90 V, for H.T. The L.T. connector is a standard 2-pin plug with one pin thicker than the other. For H.T. connections, two wander-plugs are provided.

Drive Cord Replacement.—About 40 inches of flax fishing line, plaited and waxed, is required for a new tuning drive cord, which should be run as shown in the accompanying sketch. This is drawn as seen from the rear of the chassis when the gang is at maximum capacitance. The cord should be stretched before fitting, and the makers suggest suspending by it a 14lb weight for 24 hours.

Modifications.—Originally **V1** was a Mullard DK91, but owing to the condition of availability, it has been necessary to change over temporarily to DK92, which involves certain changes in the circuit. Our sample receiver was fitted with a DK92, and our circuit diagram is based on that version.

In DK91 versions, the anode and grid circuits of the oscillator are transposed, the tuning circuits being connected to the control grid, and the reaction circuits to the anode. The component values are unchanged, but other component changes occur.

R1 and **C4** are omitted, and the screen grid is connected in place of the oscillator anode to **R5,** and thus via **C8** to the reaction circuits. **C14** goes to the control grid, thus effecting the transposition. **R3** becomes 150 kΩ.

It is important to know when supplying a replacement valve whether it should be DK91 or DK92, and unless the old valve is present this will necessitate removing the chassis from the cabinet. Then if **C35** goes via **C14** to the grid (pin 4) it is a DK91; if they go to the anode, or grid 2 (pin 3) it is a DK92.

Another change that may be found in some cases is that the mains rectifier MR1, which is normally a Westinghouse 14B35, may instead be a SenTerCel DRH2B.

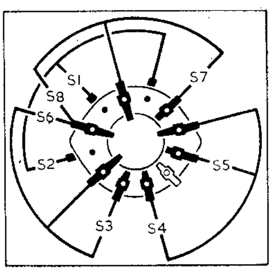
VALVE ANALYSIS

Valve voltages and currents given in the table below are derived from the manufacturers' information and were measured with the receiver tuned to the highest wavelength end of M.W. The receiver was operated from 230 V A.C. mains, the voltage adjustment being set to the 220/230 V tapping. Readings taken with the receiver operating from a new set of batteries were approximately the same. There was no signal input.

Voltage readings were measured with a Model 40 Avometer, chassis being the negative connection in each case. Total input current on A.C. mains of 230 V was 121 mA, and on D.C. mains of 230 V was 61.5 mA.

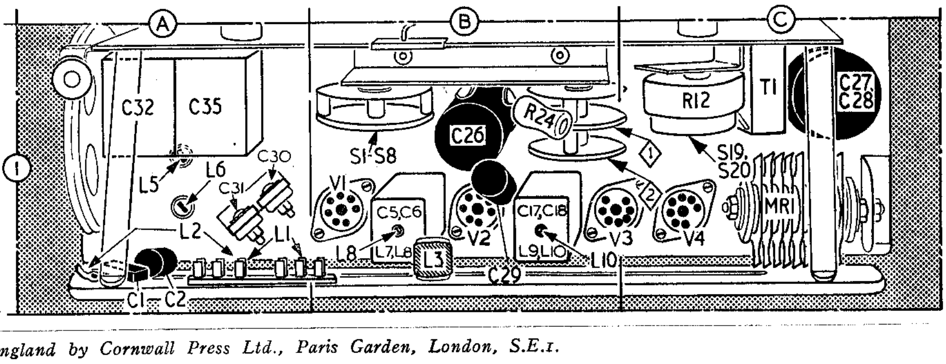
Valve	Anode		Screen	
	V	mA	V	mA
V1 DK92	89	0·5	20	0·14
	Oscillator			
	30	1·6		
V1 DK91	90	0·4	39	1·0
V2 DF91	90	0·75	44	0·5
V3 DAF91	*	0·1	*	0·03
V4 DL94	85	6·0	90	1·2

* Negligible owing to high circuit resistance.



Left: Waveband switch diagram as seen from rear of chassis.

Right: Plan view of the chassis.



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