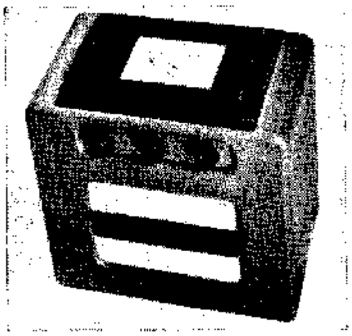
Supplement to The Wireless & Electrical Trader, Feb. 24, 1940.

"TRADER" SERVICE SHEET

452

EKCO P150

BATTERY PORTABLE



THE Ekco P150 is a portable battery superhet covering the MW and LW bands, and using four Mazda economy-type 2V valves. Frame aerials are fitted, and the set has a large moulded carrying handle.

As we are still not permitted to publish Ekco circuit diagrams, this part of the Service Sheet has had to be omitted, but the circuit details given, together with the tabular lists of components and the chassis photographs should enable service engineers to locate and repair faults.

Release date: August, 1939.

CIRCUIT DESCRIPTION

Tuned frame aerial input **L1**, **C28** (MW) and **L2**, **C28** (LW) to CG of pentode section of triode pentode frequency changer valve (**V1, Mazda metallised TP25**). Aerial circuit IF filter **C2**, **L3** is connected between pentode CG and chassis. Independent frames are used for the two bands, and are connected to **C28** via switches **S2** (MW) and **S3** (LW). **S1** short-circuits LW frame on MW band.

V1 oscillator grid coils **L4** (MW) and **L5** (LW) are tuned by **C29**; parallel trimming by **C8**, **C30** (MW) and **C9**, **C31** (LW), and **C6** is connected across **C29**; series tracking by **C10** (MW) and **C7** (LW). Again independent coils are employed, connected between **S4** (MW), **S5** (LW) and their respective trackers. All the trimmers are connected on one side to chassis, except **C9** which is connected directly across **L5**.

Reaction by coils **L6** (MW) and **L7** (LW) which are connected in series between **V1** oscillator anode and HT positive line.

Second valve (**V2, Mazda metallised VP23**) is a variable-mu RF pentode operating as IF amplifier with tuned-primary, tuned-secondary transformer couplings **C3**, **L8**, **L9**, **L10**, **C4** and **C14**, **L11**, **L12**, **L13**, **C15**. The coils have iron-dust cores in each case but the primaries and secondaries are mounted at right-angles to each other to reduce direct coupling, and coupling is then effected by the coils **L9** and **L12** respectively, which are wound on the primary formers but connected in series with the secondary windings.

Intermediate frequency 465 KC/S.

Diode second detector is part of double diode triode valve (**V3, Mazda metallised HL 23 DD**). Audio frequency component in rectified output is developed across load resistance **R5**, which is returned to LT positive line, and passed via **C19** and volume control **R6** to CG of triode section. IF filtering by **C17**, **R4** (connected between **L12** and **R5**) and **C18** in diode circuit, and **C20** between triode anode and chassis.

Second diode of **V3**, fed from **V2** anode via **C16**, provides DC potentials which are developed across load resistance **R9** and fed back through decoupling circuits **R1**, **C1** and **R8**, **C12** to FC and IF valves, giving AVC.

Parallel-fed transformer coupling by **R7**, **C21** and **T1** between **V3** triode and QPP double pentode output valve (**V4, Mazda QP25**). Fixed tone correction by **C22** and **C23** (one connected between each anode and chassis) and **C24** (between anodes). One end of **T1** primary is returned to chassis, and the secondary CT is returned to GB source via **R11**.

V4 screens and **T2** primary CT are fed directly from HT+lead, but the HT positive line to the rest of the receiver is fed via **R10**. **C11** is connected between the **V1**, **V2**, **V3** side of **R10** and chassis, and **C25** between the **V4** side and chassis.

All GB and AVC delay potentials are obtained automatically from the drop along **R12** and **R13** which are connected between chassis and HT negative in that order. **R6** and **R9** are returned to the junction of **R12** and **R13**, while **R11** is returned to the other end of **R13**, directly to HT negative.

DISMANTLING THE SET

Removing Chassis.—Remove the three control knobs (recessed grub screws);

remove the two 4BA (unslotted) hexagon screws (with washers) holding the moulded escutcheon to the top of the cabinet;

push the escutcheon bodily slightly forward, when it can be removed. The handle may be left in position.

Remove the scale pointer (pull off);

remove (with tubular box spanner) the 4BA nuts (with washers) holding the top of the chassis to the front of the cabinet. This can be more easily accomplished if **V3** and **V4** are first withdrawn;

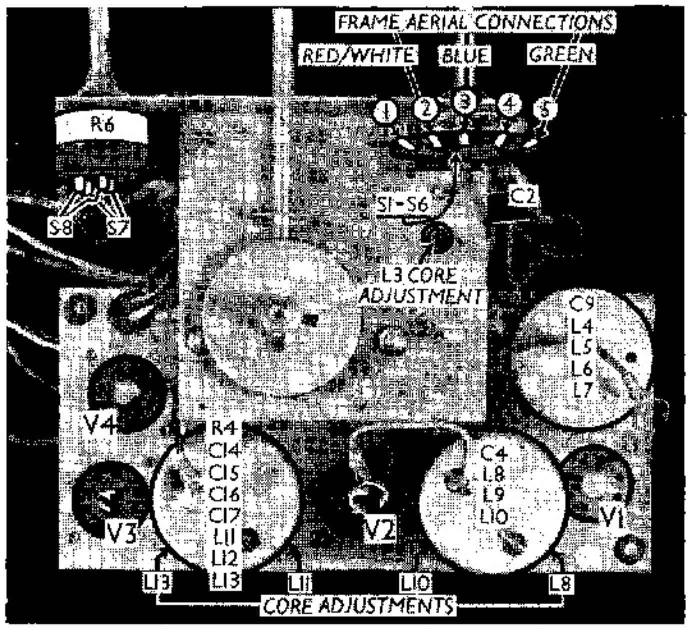
remove the round-head wood screw (with washer) holding the front left-hand corner of the chassis (viewed from rear of case);

remove the 4BA round-head screw (with washer) holding the rear right-hand corner of the chassis to the bracket on the side of the case.

If the chassis is now swung round a little to clear this bracket, it can be dropped slightly until the tuning spindle clears the tuning scale, and then withdrawn to the extent of the speaker and frame aerial leads, which is sufficient to give access to any part of the chassis.

To free chassis entirely, unsolder the frame leads from the tags on the wavechange switch, and the speaker leads from the output transformer.

When replacing, before fitting the chassis into position, connect the frame leads to the wavechange switch as follows, numbering the tags from left to right, as indicated in our chassis plan view:



Plan view of the chassis, showing the frame aerial connections.

1, blank;
2, red/white lead from trimmer inside top of case;
3, blue lead from same trimmer;
4, no frame connection:
5, green lead from top right-hand front corner of case.

Connect speaker leads as follows, numbering the tags from top to bottom:

1, yellow lead from chassis (and green lead from speaker);
2, blank;
3, blue lead from chassis;
4, red lead from chassis;
5, blue lead from chassis.

Before replacing moulded escutcheon, replace scale pointer, one end of which should coincide with the 1,000m mark with condenser vanes fully enmeshed.

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Removing Speaker.—Unsolder the two leads from the speech coil tags; remove the four nuts (with washers) holding the speaker to the sub-baffle.
When replacing, connecting tags should be on the left;
connect the green lead from transformer to the upper tag, and the other lead, in yellow sleeving, coming directly from the transformer winding, to the lower tag.

Removing Output Transformer.—Unsolder the two leads from the tags on the speaker, remove the two fixing screws holding the transformer to the sub-baffle.
When replacing, the connecting tags should be on the right;
the countersunk-head wood screw goes at the bottom;
the 4BA cheese-head screw goes at the top (its nut remains behind the sub-baffle).

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating with a new 90V HT battery reading 90V on load. The receiver was tuned to the bottom of the MW band and the volume control was at maximum, but the frame aerial connections were shorted.

Voltages were measured on the 300V scale of a model 7 Universal Avometer, chassis being negative.

Valve		Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1	TP25	75	0·3	38	0·8
		75	2·0		
V2	VP23	75	0·75	38	0·2
V3	HL23DD	51	0·4		
V4	QP25	82†	1·9	80	0·9

† Each anode.

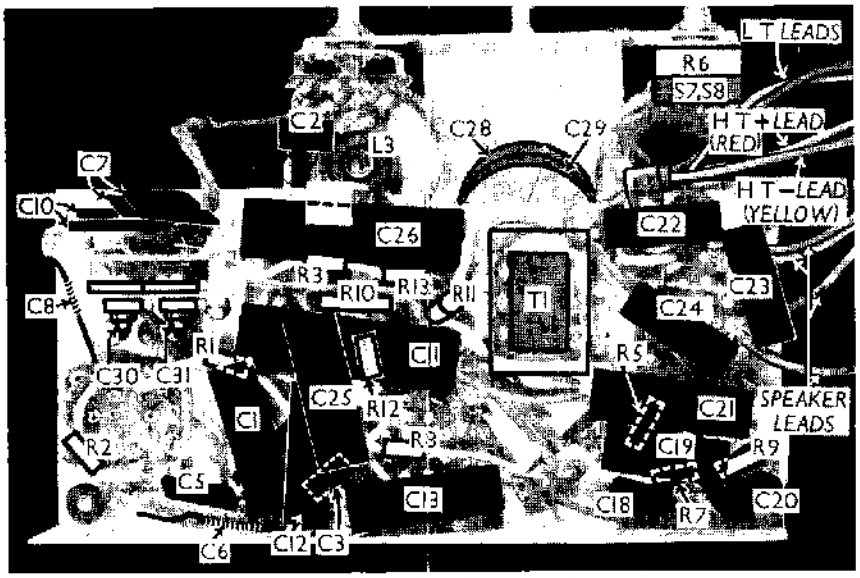
COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	V1 pentode CG decoupling	270,000
R2	V1 osc. CG resistance	100,000
R3	V1, V2 SG's HT feed	33,000
R4	IF stopper	16,000
R5	V3 signal diode load	0·5 0,000
R6	Manual volume control	500,000
R7	V3 triode anode load	47,000
R8	AVC line decoupling	0·5 0,000
R9	V3 AVC diode load	0·5 0,000
R10	V1, V2, V3 HT feed	1,500
R11	V4 CG's decoupling	100,000
R12	V1, V2 fixed GB; V3 triode and V4 GB; and AVC delay resistances	75 620

	CONDENSERS	Values (μF)
C1	V1 pentode CG decoupling	0·05
C2	Aerial IF filter tuning	0·00014
C3	1st IF transformer fixed tuning condensers	0·00014
C4	V1 osc. CG condenser	0·00005
C5	Osc. circuit fixed trimmer	Very low
C6	Osc. circuit LW tracker	0·0003455§
C7	Osc. circuit MW fixed trimmer	Very low
C8	Osc. circuit LW fixed trimmer	0·00014
C9	Osc. circuit MW tracker	0·0003839§
C10	HT circuit reservoir	4·0
C11*	V2 CG decoupling	0·01
C12	V1, V2 SG's decoupling	0·1
C13	2nd IF transformer fixed tuning condensers	0·00014
C14	Coupling to V3 AVC diode	0·000015
C15	IF by-pass condensers	0·00014
C16	AF coupling to V3 triode	0·01
C17	IF by-pass	0·0003
C18	AF coupling to T1	0·1
C19	Fixed tone correctors	0·003 0·001 0·005
C20	HT circuit RF by-pass	0·1
C21*	Auto GB circuit by-pass	50·0
C27‡	Frame aerial LW trimmer	—
C28‡	Frame aerial tuning	—
C29†	Oscillator circuit tuning	—
C30‡	Osc. circuit MW trimmer	—
C31‡	Osc. circuit LW trimmer	—

* Electrolytic. ‡ Variable. † Pre-set.
§ 0·000805 μF | 0·000094 μF in parallel.
* 0·00059 μF | 0·00001 μF in parallel.

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Frame aerial windings	4·0
L2		25·0
L3	Aerial circuit IF filter	13·0
L4	Osc. circuit MW tuning coil	4·0
L5	Osc. circuit LW tuning coil	7·5
L6	Oscillator MW reaction	8·5
L7	Oscillator LW reaction	1·8
L8	1st IF trans. Pri.	5·0
L9	Coupling	0·1
L10	Sec.	5·0
L11	2nd IF trans. Pri.	5·0
L12	Coupling	0·1
L13	Sec.	5·0
L14	Speaker speech coil	1·8
T1	Intervalve trans. Pri.	400·0
	Sec., total	3,000·0
T2	Output trans. Pri., total	1,250·0
	Sec.	0·2
S1 S6	Wave-band switches	—
S7	LT circuit switch, ganged	—
S8	HT circuit switch, R6	

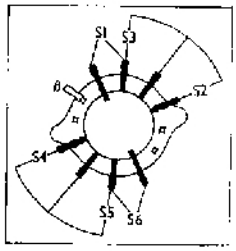


Under-chassis view, with various leads indicated.

GENERAL NOTES

Switches.—**S1-S6** are the waveband switches in a rotary unit on the control strip of the chassis. It is indicated in our plan chassis view, and shown in detail in the diagram below, as seen from the rear of the top of the chassis. **S1, S2, S4** and **S6** are closed on MW and open on LW, while **S3** and **S5** are closed on LW, and open on MW.

Switch diagram, looking from the rear of the top of the chassis.



S7, S8 are the QMB LT and HT circuit switches, ganged with the volume control **R6**. They are indicated in both chassis views.

Coils.—The frame aerials **L1** and **L2** are incorporated in the woodwork of the cabinet, the MW being towards the front. Each has two connection tags on small panels. One connection is common to both frames, and is taken to the chassis by a red/white lead. The green lead is the other connection of the MW frame and the blue lead is the other connection of the LW frame.

L3 is beneath the section of the chassis on which the gang condenser is mounted, and has an adjustable core.

L4-L7, and the IF transformers **L8-L10** and **L11-L13** are in three screened units on the chassis deck. The first contains also **C9**; the second contains also **C4**; and the third contains also **R4** and **C14-C17**. The core adjustments are shown in the plan chassis view.

Condenser C27.—This is mounted inside the cabinet, connected across the LW frame aerial.

Condensers C6, C8.—These are two semi-fixed condensers of the wire-wound type, situated beneath the chassis.

Trimmers C30, C31.—These are mounted beneath the chassis, and can be reached by a long box spanner inserted through holes in the back plate of the chassis.

Batteries.—LT, 2V 10AH celluloid-cased accumulator cell, Exide CYU3K; HT, 90V dry battery, Drydex H1146, or Vidor L5089.

Battery Leads and Voltages.—Black lead, spade tag, LT negative; red/white lead, spade tag, LT positive 2V; yellow lead, white plug, HT negative; maroon lead, red plug, HT positive 90V.

Chassis Divergencies.—Early models may have a trimmer across **L1**, the MW frame, in which case it will be mounted at the side of **C27**, inside the cabinet. The following differences were noted in the maker's diagram: The lower side of **C3** (first IF primary fixed trimmer) is shown connected to chassis, not to the bottom of the IF primary coil, as in our chassis; the trackers **C7, C10** are shown as single condensers, but in our chassis they each consist of two fixed condensers in parallel; the small wire-wound condensers **C6, C8** are not shown in the maker's diagram; **S6** is directly across **L5** in the maker's diagram, but in our chassis is returned to chassis.

CIRCUIT ALIGNMENT

Alignment must be performed with the chassis and batteries in situ in the cabinet.

IF Stages.—Switch set to MW, and turn gang to maximum. Connect signal generator, via a 0·02μF condenser, to control grid (top cap) of **V1**, and to chassis. Feed in a 465 KC/S signal, and adjust cores of **L8, L10, L11** and **L13** in turn for maximum output.

IF Filter.—Couple signal generator via a loop of wire round the outside of the cabinet. Switch set to MW, tune to 500m on scale, feed in a strong 465 KC/S signal, and adjust core of **L3** for *minimum* output.

RF and Oscillator Stages.—With gang at maximum, pointer should cover 1,000m mark on scale. Couple signal generator as for IF filter adjustment.

MW. Switch set to MW, tune to 250m on scale, feed in a 250m (1,200 KC/S) signal, and adjust **C30** for maximum output, rocking gang slightly for optimum results. In early models, adjust the MW frame trimmer as well.

LW.—Switch set to LW, tune to 1,200m on scale, feed in a 1,200m (250 KC/S) signal, and adjust **C31**, then **C27** (inside cabinet) for maximum output.

Printed in Great Britain by St. Clements Press Ltd., Portugal Street, Kingsway, London, W.C.2.