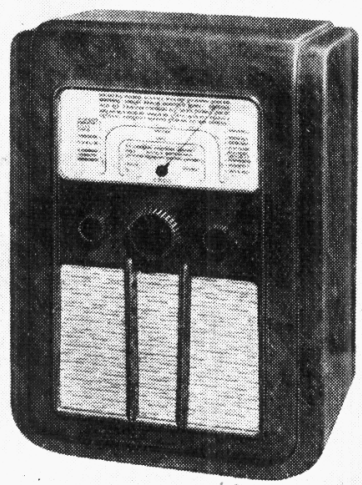
Supplement to The Wireless & Electrical Trader, May 20, 1939

"TRADER" SERVICE SHEET

404

EKCO B39

3-VALVE BATTERY RECEIVER



THE Ekco B39 receiver is a 3-valve battery 2-band receiver using a straight circuit with a tuned RF stage, a pentode detector and a pentode output stage. There is a gain control and a reaction condenser, while a sensitivity switch, operated by the latter, prevents overload on powerful stations.

Provision is made for the connection of an external speaker, and for muting the internal speaker.

Release date : August, 1938.

CIRCUIT DESCRIPTION

Aerial input on MW is via series aerial condenser **C1,** coupling coil **L1** and coupling condensers **C2, C11,** to single-tuned circuit **L2, C13. C2** and **C11** are included to maintain a constant coupling efficiency throughout the MW band. On LW, input is via **C1** and coupling coil **L1** to tuned circuit **L2, L3** and **C13.** Switch **S2** is closed on LW so that aerial coupling will be entirely inductive; **C11** then becomes the aerial circuit LW trimmer. When strong local transmissions are being received, **S1** is automatically closed as the reaction control is slacked off, to damp the aerial circuit and prevent overloading.

First valve (**V1, Mullard metallised VP2B**) is a variable-mu RF hexode operating as signal frequency amplifier with gain control by variable potentiometer **R8.**

Tuned-secondary RF transformer coupling by **L4, L6** (MW), plus **L5, L7** (LW), tuned by **C15,** between **V1** and an RF pentode valve (**V2, Mullard metallised SP2**) which operates as detector on the grid leak system with **C5** and **R3.** Reaction is applied from anode by variable condenser **C14** connected between **V1, V2** anodes. When **C14** is reduced in capacity to a point approaching minimum, switch **S1** in the aerial circuit closes. RF filtering in anode circuit by **L8, C7.**

Resistance-capacity coupling by **R5, C8** and **T1** between **V2** and pentode output valve (**V3, Mullard PM22A**). Fixed tone correction in anode circuit by **C9.** Provision for connection of low impedance external speaker across secondary of output transformer **T2. S7** permits the internal speaker to be muted by breaking its speech coil circuit, if desired.

Grid-bias potential for **V3** is automatically obtained from drop along **R7** in the HT negative lead to chassis. A separate GB battery is employed to provide a potential difference across **R8** for **V1** GB control, and it should be noted that this battery is connected across **R7** and **R8.**

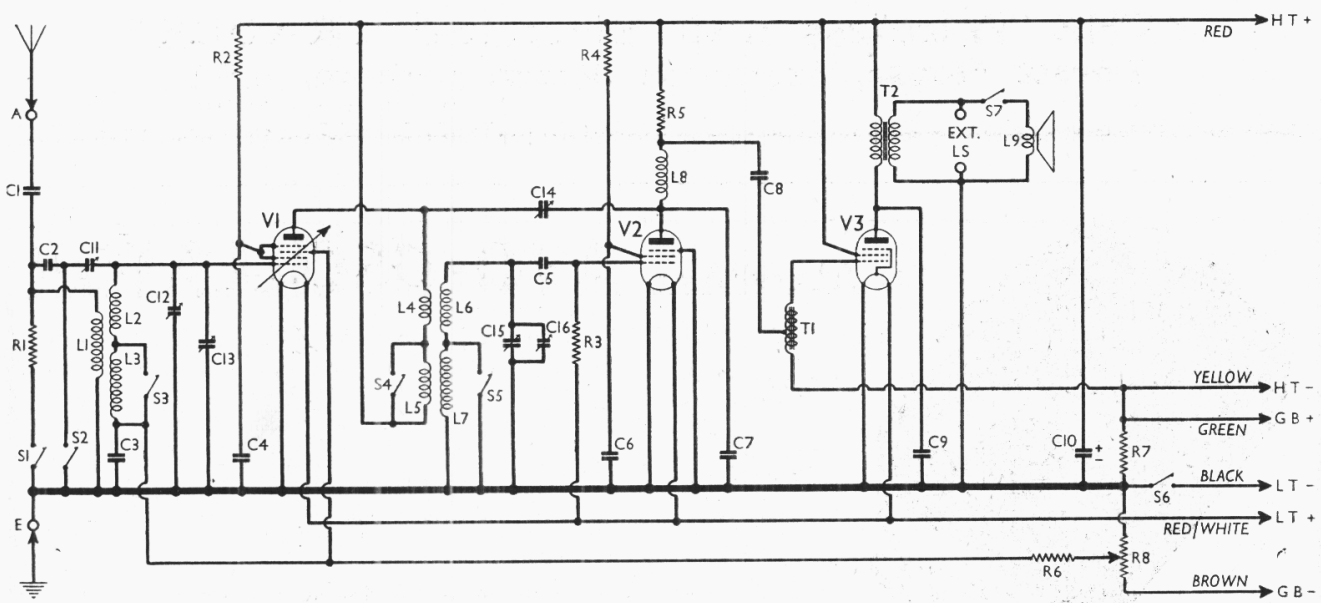
DISMANTLING THE SET

Removing Chassis.—If it is necessary to remove the chassis from the cabinet, remove the four control knobs (recessed grub screws), the three bolts (with washers) holding the chassis to the shelf and the two further bolts holding the chassis to the front of the cabinet, when the chassis may be withdrawn to the extent of the speaker leads, which is sufficient for normal purposes. To free the chassis entirely, unsolder the speaker leads.

When replacing, the knob marked with three coloured lines should be fitted to the right-hand (switch) spindle.

Removing Speaker.—To remove the speaker from the cabinet, unsolder the two leads from the connecting strip on the speaker frame and slacken the four nuts on the clamps holding it to the sub-baffle. If the four clamps are now swivelled about their bolts, the speaker may be lifted out.

When replacing, the connecting strip should be on the right-hand side of the speaker.



Circuit diagram of the Ekco B39 2-band battery receiver. Note the sensitivity switch **S1.**

COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	Aerial circuit shunt	300
R2	V1 SG HT feed	80,000
R3	V2 grid leak	2,000,000
R4	V2 SG HT feed	500,000
R5	V2 anode load resistance	75,000
R6	V1 CG decoupling	1,000,000
R7	V3 automatic GB resistance	490
R8	V1 gain control	1,500,000

	CONDENSERS	Values (μF)
C1	Aerial series condenser	0·00045
C2	Part of MW aerial coupling	Very low
C3	V1 CG decoupling	0·1
C4	V1 SG decoupling	0·1
C5	V2 CG condenser	0·000015
C6	V2 SG decoupling	0·1
C7	V2 anode RF by-pass	0·0002
C8	V2 anode AF coupling to T1	0·02
C9	Fixed tone corrector	0·004
C10*	HT reservoir condenser	10·0
C11‡	Part MW aerial coupling; aerial circuit LW trimmer	—
C12‡	Aerial circuit MW trimmer	—
C13†	Aerial circuit tuning	—
C14†	Reaction control	—
C15†	RF transformer secondary tuning	—
C16‡	RF transformer secondary MW trimmer	—

* Electrolytic. † Variable. ‡ Pre-set.

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Aerial coupling coil	18·0
L2	Aerial MW tuning coil	2·6
L3	Aerial LW tuning coil	27·5
L4	RF trans. MW primary coil.	6·2
L5	RF trans. LW primary coil.	30·0
L6	RF trans. MW secondary coil	2·7
L7	RF trans. LW secondary coil	20·0
L8	V2 anode RF filter choke	250·0
L9	Speaker speech coil	2·7
T1	Intervalve auto-transformer, total	3,500·0
T2	Output trans. Pri.	1,250·0
	Output trans. Sec.	0·2
S1	Aerial sensitivity switch, ganged C14	—
S2-S5	Waveband switches	—
S6	LT circuit switch	—
S7	Internal speaker switch	—

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating with a new HT battery reading 117 V on load. The receiver was tuned to the lowest wavelength on the MW band, the gain control was at maximum and the reaction control was advanced to a point just short of oscillation, but there was no signal input.

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

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 VP2B	112	1·9	40	0·6
V2 SP2	63	0·4	28	0·15
V3 PM22A	108	3·6	112	0·5

GENERAL NOTES

Switches.—**S1** is the aerial circuit sensitivity switch, which is ganged with the reaction control **C14.** The latter is of the compression type, operated by a spindle concentric with the tuning control spindle; the end of this spindle presses against the flat spring which carries one contact of **S1,** and causes the switch to open. **S1** closes when **C14** approaches its minimum position. The switch is indicated in our under-chassis view.

S2-S5 are the waveband switches, and **S6** the LT circuit switch, ganged together in a rotary unit beneath the chassis. This is indicated in our under-chassis view, and shown in detail in the diagram in col. 6, where it is drawn as seen looking from the rear of the underside of the chassis. Note the inter-connections between three of the contacts.

The table below gives the switch positions for the three control settings, starting from fully anti-clockwise. A dash indicates open, and **C** closed.

Switch	Off	MW	LW
S2	—	—	C
S3	—	C	—
S4	—	C	—
S5	C	C	—
S6	—	C	C

S7 is the internal speaker muting switch, operated by a small black knob at the rear of the chassis, on the Ext. LS panel. When this knob is unscrewed, **S7** opens, and breaks the internal speaker speech coil circuit, thus muting the speaker.

Coils.—**L1-L3** and **L4-L7** are in two screened units on the chassis deck. The choke **L8** is unscreened, and mounted beneath the chassis.

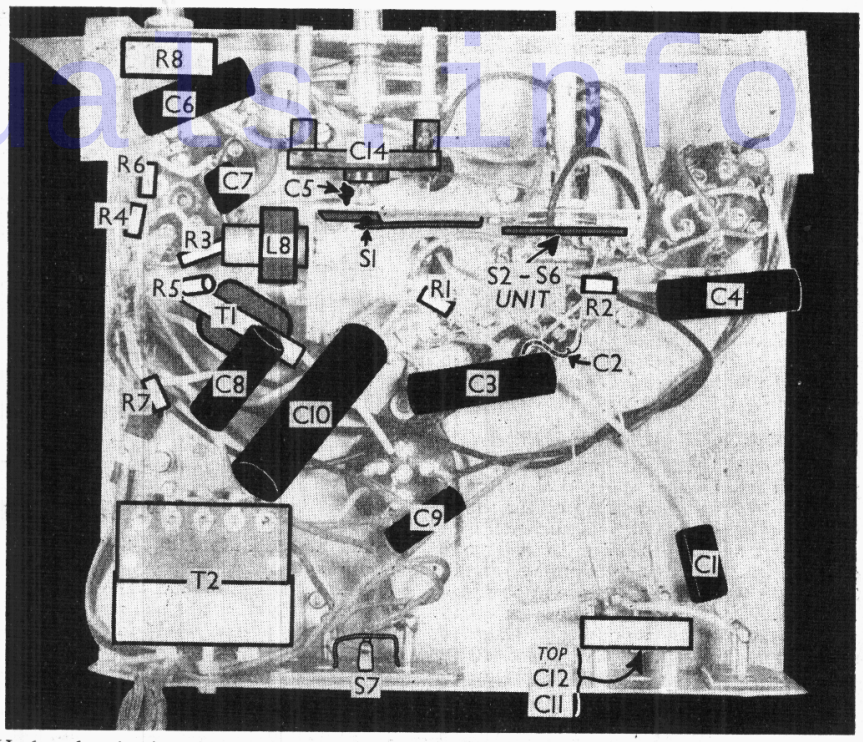
External Speaker.—Two sockets are provided at the rear of the chassis for a low impedance (3-4 Ω) external speaker. The internal speaker can be muted by means of **S7.**

Condenser C2.—This is a small fixed coupling consisting of a fine enamelled wire spiralled over a thicker one. It is indicated in the under-chassis view.

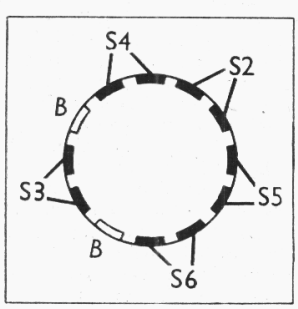
Condenser C14.—The reaction condenser is of the compression type, operated by a spindle concentric with the tuning drive spindle. It is situated beneath the chassis, and is ganged with **S1.** Rotating the knob clockwise increases the capacity of **C14.**

Droitwich Rejector.—In the area within 50 miles of Droitwich, a special rejector unit has been designed for use with this set. It consists of a coil, with a pre-set condenser and a 0·00028 μF fixed condenser in parallel across it, placed in series with the aerial input. The price of the complete unit is 3s. 6d. retail.

GB Circuit.—Note that **R7** and **R8** are permanently across the GB battery. This results in a leakage of about



Under-chassis view. **S1** is operated by the spindle of **C14.** The **S2-S6** unit is shown in detail in col. 6 (below). **C2** is a spiralled wire condenser.



The **S2-S6** switch unit, as seen from the rear of the underside of the chassis.

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0·006 mA, and its effect on the life of the GB battery will not be serious. It will be advisable, however, when replacing the HT battery to replace the GB as well.

Batteries.—Recommended types are: LT, 2 V accumulator cell, Exide DFG, GFG4 or LCA3, Pertrix PLB1 or SU24, Dagenite PMF7; HT, 120 V dry battery, Drydex H1006 or TT120, Pertrix 77 or 577, Hellesens HL120 or SR120. Any good 9 V GB battery will suit.

Battery Leads and Voltages.—Black lead, spade tag, LT negative; red/white lead, spade tag, LT positive 2 V; yellow lead and plug, HT negative; red lead and plug, HT positive 120 V; green lead and plug, GB positive; brown lead, white plug, GB negative 9 V.

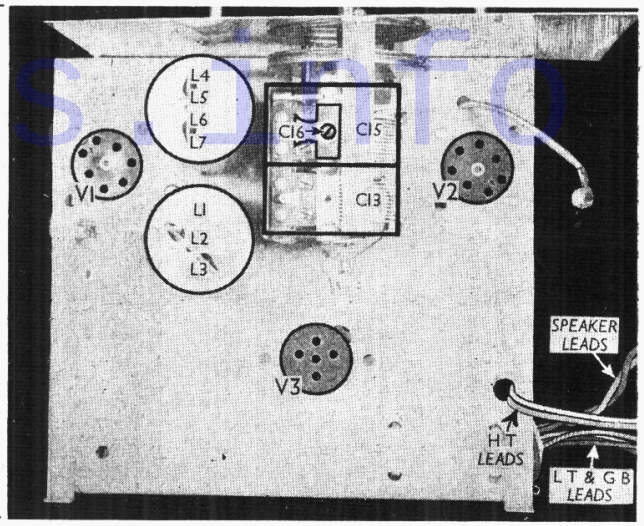
CIRCUIT ALIGNMENT

With the gang at maximum, the pointer should cover the 560 m mark on the scale. If not, slide the pointer round the gang spindle until it is correct.

Connect signal generator to **A** and **E** sockets via a suitable dummy aerial. Switch set to MW, tune to 250 m on scale, turn gain control to maximum, and reaction control to a point just short of oscillation. Feed in a 250 m (1,200 KC/S) signal, and adjust **C16**, then **C12**, for maximum output.

Switch set to LW, and tune to 1,300 m on scale. Feed in a 1,300 m (270 KC/S) signal and adjust **C11** for maximum output.

Plan view of the chassis. All the tuning coils are in the two units shown. Note that there is only one trimmer (**C16**) on the gang.



Droitwich Rejector.—If this has been installed, adjust it by tuning the set to 1,500 m, injecting a 1,500 m (200 KC/S) signal, and adjusting the rejector trimmer for *minimum* output.

MAINTENANCE PROBLEMS

Unusual Short Circuit

A MARCONIPHONE four waveband receiver was brought in for service with the complaint of no results on either of the two short wavebands.

On checking the set, the coils and condensers seemed O.K. and, on further testing, the set was found not to be oscillating on these bands.

As the oscillator grid coils contain only a few turns of wire it is difficult to test for a short circuit, so the coil unit was removed, and *inside* the former a long sliver of solder was completely shorting out the two oscillator grid coils. When this was removed, and the coil replaced, both bands were O.K.—**D. H. M.**

Trouble Due to Valve Connection

A MULLARD MU35 universal super-het which recently came in for attention had the complaint that when first switched on the set performed in a normal manner for about ten minutes, then with a faint "plop" reproduction would suddenly fall to about half volume. It could be restored by turning the volume control full on, and the set would then function satisfactorily for periods varying from twenty to forty-five minutes, when it would suddenly burst out at full volume without warning.

By the time someone had made a dash to reach the volume control it would usually have dropped again, just as suddenly, to half volume. This would continue the whole time the set was in use with rushes at the volume control at irregular intervals.

All valves were tested and passed as O.K. Voltages and currents taken whilst the set was switched on were within working tolerances, and the usual tests failed to locate the fault.

After considerable trouble the cause was found to be the HL13 AF valve. The internal connection from the grid was touching the top cap, but not soldered thereto, consequently the valve would function normally until it reached a certain critical temperature when the heat caused just sufficient expansion to separate the internal grid connection from the top cap, although not enough to prevent it touching at intervals.

The valve, of course, had not been left long enough in the valve-tester for the fault to show up. A new valve restored the performance of the set to normal.—**S. C. Duffett, Kettering.**

Gang Condenser Fault

IN a Lissen 8165 receiver, results were O.K. on medium and long waves, the trouble being that no reaction could be obtained on and above 40 m on the SW band. Everything was checked and the solution seemed as obscure as ever, and such dodges as increasing the detector anode voltage, different RF chokes, etc., proved fruitless.

Eventually it was found that slight pressure on the stator of the aerial section of the gang condenser cured the trouble. Close scrutiny showed that the riveting of the fixed vanes was making imperfect contact with the bonding plate that holds the vanes in alignment.

Luckily another soldering tag was available on the remaining bonding plate underneath the condenser, and the connection was transferred to this tag with the result that reaction was made workable on 40 m and upwards.—**R. A. Coates, Whitby.**

Effect of Trimmer Leakage

A RATHER unusual fault was found on a Philips 580 A. The customer could only get signals for a second or so when he turned the set on and then turned off again. Strangled results could be obtained by shorting the VP4A (IF valve) cathode to chassis.

On testing, a positive voltage was found on the grid of this valve, and the trouble was traced to dust on the IF trimmer unit that had got damp. As the trimmers (primary and secondary) are on one holder, the HT voltage was leaking to the grid and choking the valve. When the trimmer unit was cleaned, signals returned to normal.—**D. H. Moore, Scarborough.**

Intermittent Bias Condenser

RECENTLY we had in for service an Ever Ready 5003 AC receiver, the complaint being that tuning was impossible above 400 m and below 300 m. This is a common fault with this make of receiver, and can usually be cured by fitting a new oscillator coil assembly. This we did and, much to our surprise, no better results were obtained.

After a careful test of all components without finding anything faulty, we returned the set to the makers, and it was returned to us as perfect. Upon testing out, however, the old fault was there as before.

The chassis was again returned to the factory, and was eventually returned to us O.K. this time.

The fault was an intermittent bias condenser on the A23A double-diode triode valve.—**D. Fisk, Norwich.**

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