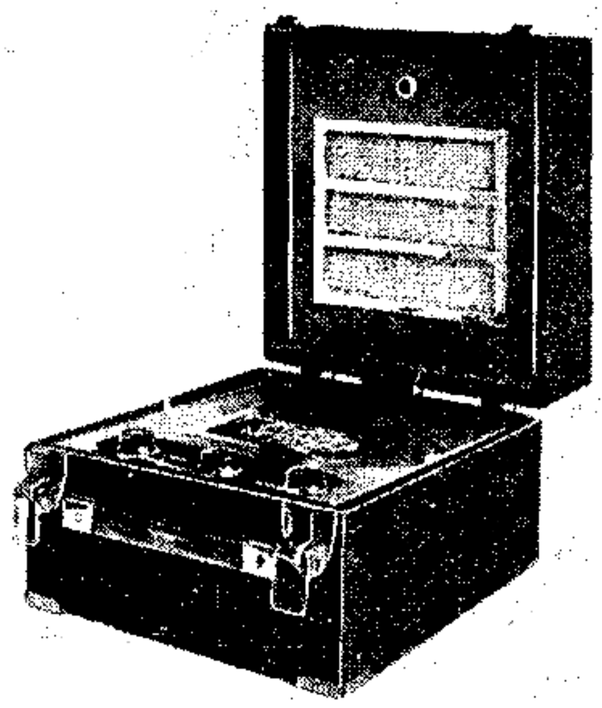
REVISED ISSUE OF

SERVICE SHEET No. 285

BEETHOVEN P107

SUPER MINOR PORTABLE



THE Beethoven P107 Super Minor portable receiver is a 4-valve battery-operated model with its own frame aerial. The cabinet is of the suitcase type, a turntable being fitted to the bottom. Provision is made for an external aerial and earth and for an extension speaker or headphones.

Release date and original price : August, 1937 ; £8 18s. 6d. complete with batteries.

CIRCUIT DESCRIPTION

Tuned frame aerial input **L1, L2, C12** to RF pentode valve **(V1, Mullard metallised VP2)** which operates as RF amplifier with fixed grid potential. Provision for connection of external aerial and earth if required.

Tuned anode coupling by **L4, L5, C15** between **V1** and triode detector valve **(V2, Mullard metallised PM2HL)** which operates on grid leak system with **C2, R3, R4.** Reaction is applied from anode by coil **L3,** and controlled by **C14.** RF filtering in anode circuit by **R7, C4.** Fixed tone correction in anode circuit by **C5.**

Auto-transformer coupling by **R6, C6,** manual volume control **R8** and **T1** between **V2** and triode AF amplifying valve **(V3, Mullard metallised PM2HL).** Fixed tone correction in anode circuit by **C8.** RF filtering in grid circuit by **R9, C7.**

Resistance-capacity coupling by **R11, C9** and **R12** between **V3** and beam tetrode output valve **(V4, Osram KT2).** Fixed tone correction in anode circuit by **C10.** Provision for connection of headphones across primary of speaker input transformer **T2.**

Fuse **F1** in HT negative lead affords protection from damage in case of accidental short-circuit.

C11 is HT circuit reservoir condenser.

COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	Frame aerial damping ...	65,000
R2	V1 HT feed resistance ...	3,000
R3	V2 grid leak resistances	4,000,000
R4	V2 grid leak resistances	4,000,000
R5	V2 anode decoupling ...	12,000
R6	V2 anode load	40,000
R7	V2 anode RF stopper ...	3,000
R8	Volume control, ganged C14	15,000
R9	V3 CG RF stopper ...	250,000
R10	LW stabilising resistance	250,000
R11	V3 anode load	30,000
R12	V4 CG resistance ...	100,000

	CONDENSERS	Values (μF)
C1*	V1 HT feed decoupling ...	4·0
C2	V2 CG condenser... ...	0·0001
C3*	V2 anode decoupling ...	4·0
C4	V2 anode RF by-pass ...	0·0001
C5	Fixed tone corrector ...	0·0025
C6	AF coupling to T1 ...	0·2
C7	V3 CG RF by-pass ...	0·0003
C8	Fixed tone corrector ...	0·005
C9	V3 to V4 AF coupling ...	0·1
C10	Fixed tone corrector ...	0·0025
C11*	HT reservoir condenser ...	4·0
C12†	Frame aerial circuit tuning	—
C13‡	Frame aerial MW trimmer	—
C14†	Reaction control	—
C15†	V1 anode circuit tuning...	—
C16‡	V1 anode MW trimmer ...	—

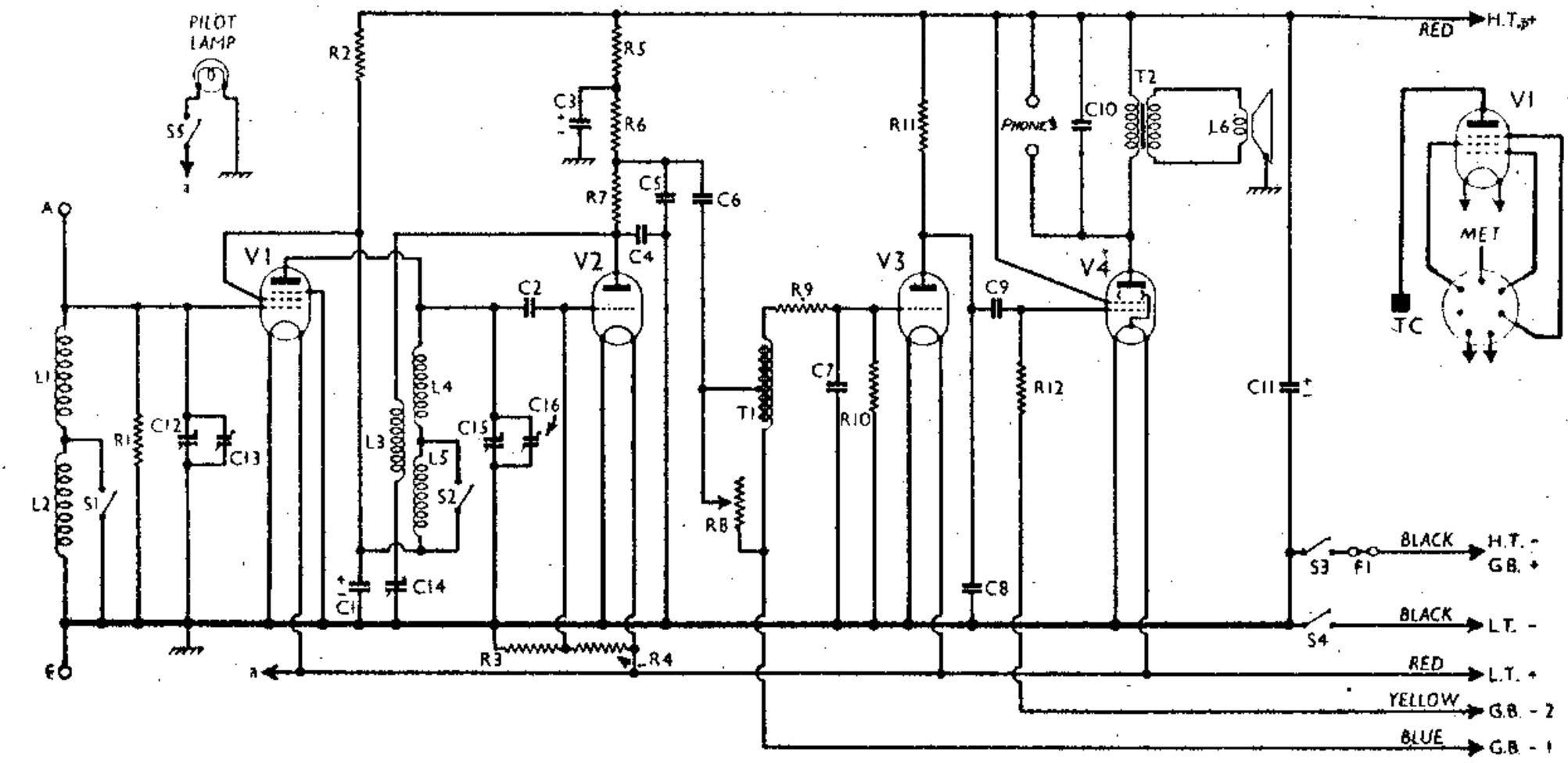
* Electrolytic. † Variable. ‡ Pre-set.

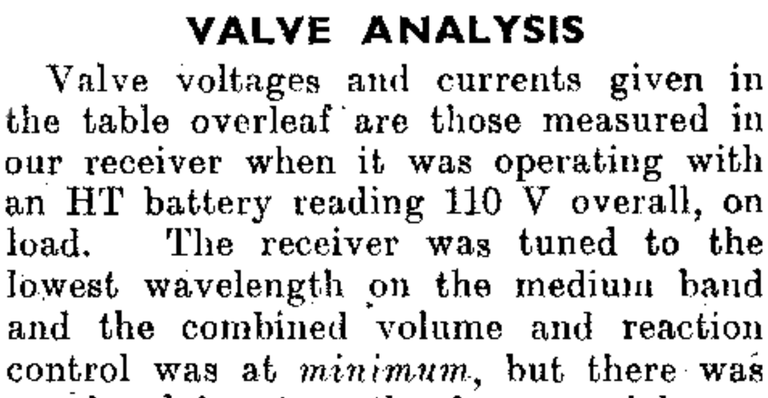
	OTHER COMPONENTS	Approx. Values (ohms)
L1	Frame aerial windings ...	1·8
L2	Frame aerial windings ...	10·0
L3	Reaction coil	3·1
L4	V1 anode tuning coils ...	2·2
L5	V1 anode tuning coils ...	13·0
L6	Speaker speech coil ...	3·0
T1	Intervalve auto-trans., total	5,000·0
T2	Speaker input trans. Pri.	480·0
	Speaker input trans. Sec.	0·2
S1, S2	Waveband switches ...	—
S3	HT circuit switch ...	—
S4	LT circuit switch ...	—
S5	Pilot lamp switch ...	—
F1	HT circuit fuse	—

VALVE ANALYSIS

Valve voltages and currents given in the table overleaf are those measured in our receiver when it was operating with an HT battery reading 110 V overall, on load. The receiver was tuned to the lowest wavelength on the medium band and the combined volume and reaction control was at *minimum*, but there was no signal input as the frame aerial connections were shorted.

Voltages were measured on the 400 V





Circuit diagram of the Beethoven P107 Super Minor Portable. The volume control **R8** and reaction condenser **C14** are ganged.

scale of a model 7 Universal Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 VP2	100	1·7	100	0·6
V2 PM2HL	68	0·6	—	—
V3 PM2HL	76	0·8	—	—
V4 KT2 ...	103	5·0	106	1·1

DISMANTLING THE SET

Removing Chassis.—Remove the top panel (two knurled nuts), and remove the batteries;
remove two countersunk-head wood screws holding front of chassis to carrying case;
remove the wooden strip (two countersunk-head wood screws with nuts and washers) separating the chassis and the battery compartment;
remove the paxolin panel at the bottom of the battery compartment (two countersunk-head wood screws);
remove three round-head wood screws holding the chassis to the bottom of the carrying case;
unsolder the earthing lead going to the tag at the front of the case.

The chassis may now be withdrawn to the extent of the speaker and frame aerial leads, which is sufficient for normal purposes.

Removing Frame Aerial.—Remove the countersunk-head wood screw (with washer) holding the connector to the carrying case, and remove the two wooden strips holding the assembly in the lid of the case (eight round-head wood screws).

The frame and speaker may now be withdrawn together.

Removing Speaker.—Remove the frame aerial assembly as previously described;
unsolder the leads to the speaker, and remove the nuts from the four screws holding it to the sub-baffle.

When replacing, the terminal panel should be at the bottom;
take the tinned copper lead in yellow sleeving from the top tag on the transformer to the left-hand tag on the speaker;
connect the tinned copper lead in red sleeving from the bottom tag on the transformer to the right-hand tag on the speaker.

GENERAL NOTES

Switches.—**S1** and **S2** are the waveband switches, and **S3** and **S4** the battery circuit switches, ganged in a single rotary unit beneath the chassis. The individual switches are identified in our under-chassis view, and no separate diagram is given. All the switches are closed on MW (control knob turned fully anti-clockwise), and open on OFF (centre position). On LW (control knob fully clockwise), **S1, S2** are open, and **S3, S4** are closed.

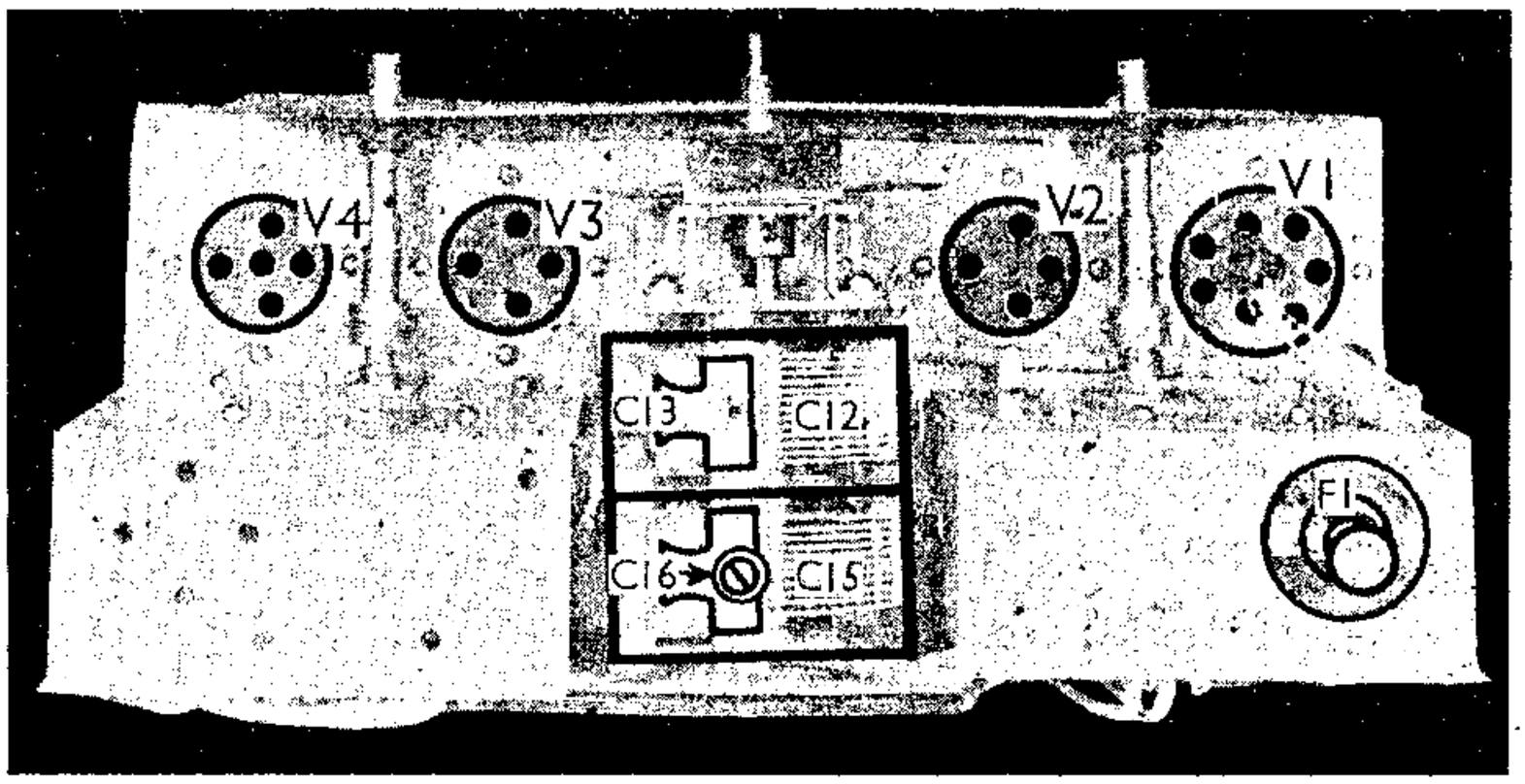
S5 is the pilot lamp switch, combined with the pilot lamp holder, behind the speaker panel. By rotating the knurled escutcheon of the lamp-holder, **S5** can be made to open or close.

Coils.—**L1** and **L2** are the frame aerial windings, which are not shown in our chassis illustrations. **L1** is the winding with the fewer turns.

L3, L4 and **L5** are in a tubular unscreened unit beneath the chassis. **L3** is actually on a smaller former inside that carrying **L4** and **L5.**

Pilot Lamp.—This is an Osram MES type, rated at 3.5 V, 0.3 A, and having a small bulb.

Fuse F1.—This is similar to an MES lamp. It is an Osram type, rated at 1.25 V, 0.2 A.



Plan view of the chassis. **C13** was not used in this sample.

Batteries.—LT, Sterling 2 V 15 AH celluloid cased jelly acid cell, type 5001. HT and GB, Sterling combined 105 V HT plus 3 V GB dry battery, type 2001.

Battery Leads and Voltages.—All the leads are of red coloured flex. Black spade tag, LT negative; red spade tag, LT positive 2 V; black plug, HT negative, GB positive; red plug, HT positive 105 V; blue plug, GB negative 1, —1.5 V; yellow plug, GB negative 2, —3 V.

External Headphones.—Two sockets are provided at the bottom right-hand corner of the speaker panel for headphones or a high impedance (about 10,000 O) external speaker.

External Aerial and Earth.—Two sockets are provided at the bottom left-hand corner of the speaker panel for an external aerial (red) and earth (black).

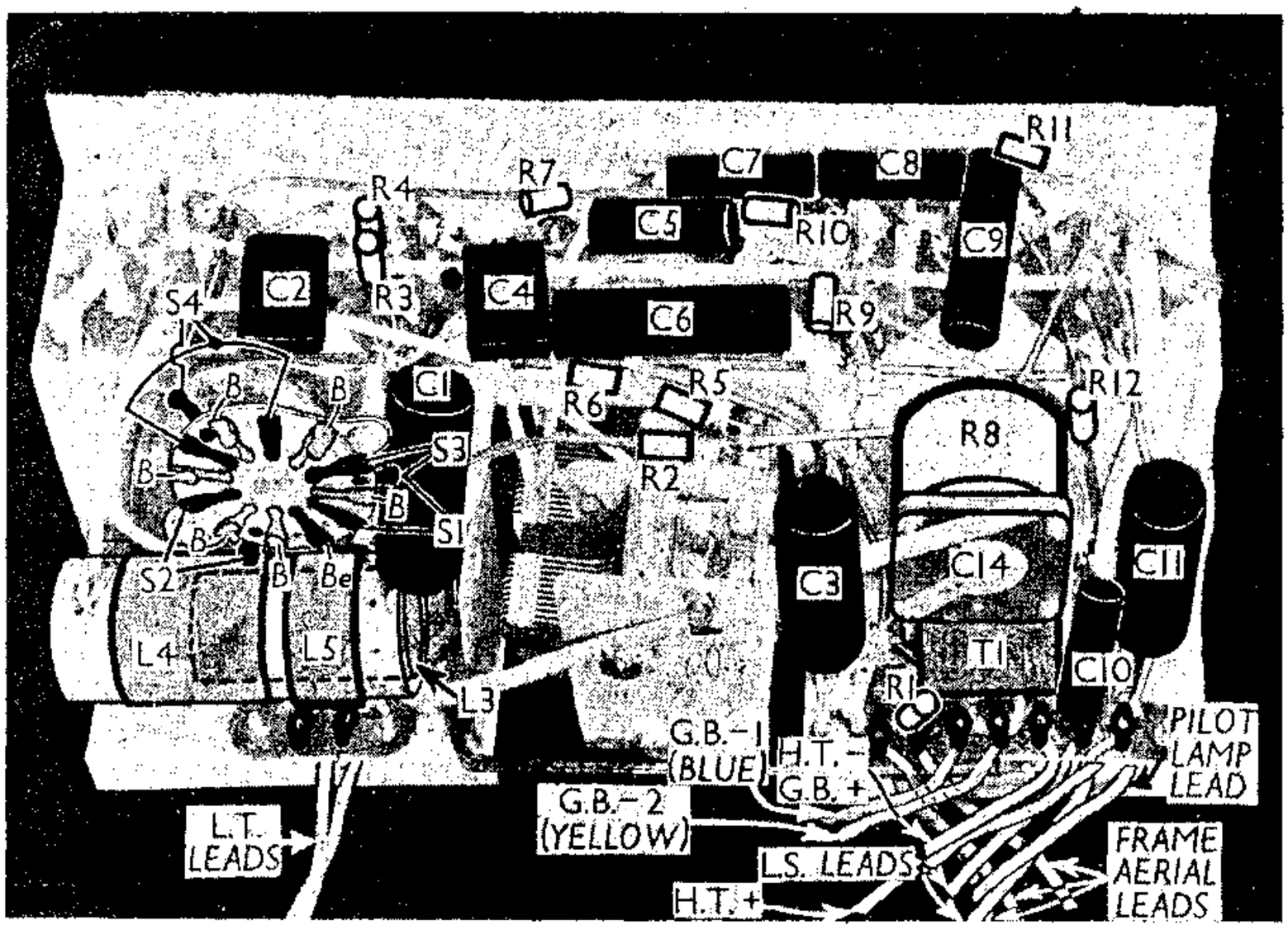
Trimmer C13.—In our chassis the adjusting screw and mica dielectric of this was taken out at the works, the trimmer not being used.

Chassis Divergencies.—R10 was not shown on the makers' diagram. **R12** was shown as 1 MO by the makers; it is actually 0.1 MO. **F1** was shown by the makers on the other side of **S3.**

CIRCUIT ALIGNMENT

Remove the battery cover, and take out the batteries, re-connecting them outside the cabinet, using extension leads.

Switch set to MW, feed in a 198.5 m (1,510 KC/S) signal, tune it in, and adjust **C16** for maximum output. **C13** should also be adjusted if its trimmer screw is present.



Under-chassis view. The individual switches in the rotary unit are indicated, as are also the various leads emerging from the chassis.

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