

NUMBER 129

'TRADER' SERVICE SHEETS

G.E.C. 'BATTERY TRF THREE'

G.E.C. incorporate a 3-valve battery operated chassis in their "Battery TRF 3," model BC3736, the valve arrangement comprising a variable-mu tetrode H.F. amplifier, a variable-mu pentode detector, and a pentode output valve. An indicator on the tuning scale shows to which band the receiver is switched.

CIRCUIT DESCRIPTION

Aerial input via blocking condenser **C1** and coupling coil **L1** to single tuned circuit comprising **L2, L3** and **C12**. Aerial-earth shunt resistance **R1**, and **L1** shunt condenser **C2** serve to maintain constant sensitivity over the whole wave-range.

First valve (**V1, Osram metallised VS24**) is a variable-mu tetrode operating as H.F. amplifier. Gain control is effected by variable potentiometer **R2** which varies G.B. applied, while at the same time it works in conjunction with condenser **C3** to vary signal input to tuned circuit.

Tuned-secondary transformer coupling by **L4, L5, L7, L8** and **C14** to H.F. pentode detector (**V2, Osram metallised VP21**) which operates on grid leak system with **C8** and **R6**. Small condenser **C6** forms top coupling between primary and secondary windings of transformer which are very loosely coupled inductively. Reaction is applied from **V2** anode by coil **L6** and controlled by differential condenser **C16**. Pre-set condenser **C17** provides a fixed degree of reaction when **C16** is at minimum. Detector grid leak is returned to tapping on filament, potentiometer **R7, R8** in order to give smooth control of reaction, while resistance **R5** is switched into circuit on

L.W. for the same reason. Provision for connection of gramophone pick-up in **V2** grid circuit.

Parallel-fed auto-transformer coupling by **R9, C9** and **T1** to output pentode (**V3, Osram PT2**). Fixed tone correction by condenser **C10** in anode circuit. G.B. for **V3** and **V1** is obtained automatically by voltage drop along resistances **R10, R11** in common H.T. negative line.

COMPONENTS AND VALUES

Resistances		Values (ohms)
R1	Aerial-earth shunt	9,900
R2	V1 gain control	50,000
R3	Gain control fixed min.	2,000
R4	V1 C.G. decoupling	33,000
R5	C7 shunt (L.W.)	990
R6	V2 grid leak	4,000,000
R7	V2 grid leak potentiometer	77,000
R8		220,000
R9	V2 anode load	33,000
R10	Automatic G.B. resistances	500
R11		500

Condensers		Values (μF)
C1	Aerial circuit blocking	0.003
C2	L1 shunt	0.00005
C3	Part of input control	0.02
C4	V1 C.G. decoupling	0.005
C5	V1 and V2 S.G.'s by-pass	0.25
C6	H.F. trans. capacitative coupling	0.000011
C7	H.F. trans. sec. bottom coupling	0.005
C8	V2 grid condenser	0.00005
C9	L.F. coupling to T1	0.1
C10	Tone corrector	0.002
C11*	Auto. G.B. circuit by-pass	35.0
C12†	Aerial circuit tuning	—
C13‡	Aerial circuit trimmer	—
C14‡	H.F. transformer tuning	—
C15‡	H.F. transformer trimmer	—
C16†	Main reaction control	0.00037
C17‡	Pre-set reaction control	—

*Electrolytic. †Variable. ‡Pre-set.

Other Components		Approx. Values (ohms)
L1	Aerial coupling coil	5.5
L2	Aerial tuning coils	2.6
L3		18.0
L4		40.0
L5	H.F. transformer primary	135.0
L6	Reaction coil	0.5
L7	H.F. transformer secondary	2.6
L8		18.0
L9	Speaker speech coil	1.9
T1	Intervalve trans., total winding	2,500.0
T2	Output trans. Pri.	850.0
	Sec.	0.6
S1-S4	Waveband switches	—
S5	H.T. circuit switch	—
S6	L.T. switch	—

DISMANTLING THE SET

Removing Chassis.—If it is desired to remove the chassis from the cabinet, first remove the back and the batteries. Next remove the four control knobs (pull off) and the three bolts (with washers) holding the chassis to the bottom of the cabinet. Now free the speaker leads from the two cleats on the side of the cabinet, when the chassis can be withdrawn to the extent of the lead, which is adequate for carrying out normal repairs.

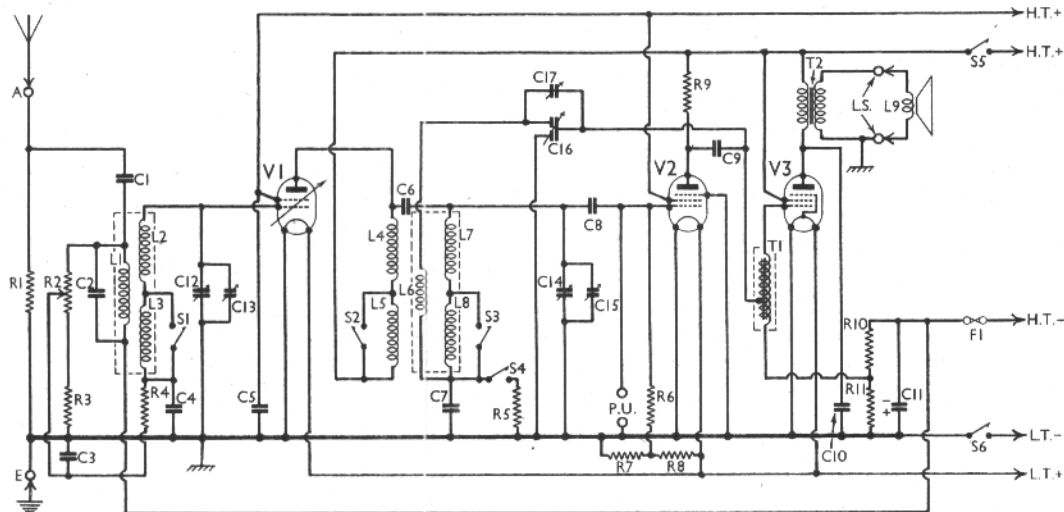
To free the chassis entirely, disconnect the speaker leads from the sockets at the back of the chassis.

Removing Speaker.—To remove the speaker from the cabinet, remove the nuts, spring washers, washers and brass washers from the three bolts holding it to the sub-baffle. When replacing, see that the terminal panel is pointing to the bottom left-hand corner of the cabinet, looking from the back.

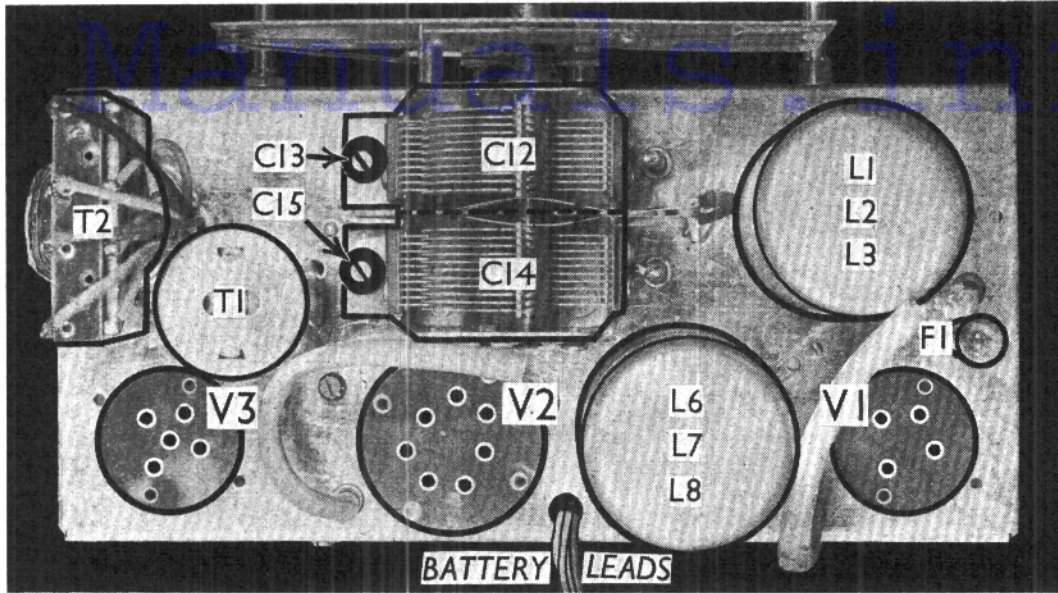
VALVE ANALYSIS

Valve voltages and currents given in the table (page III), are those measured in our receiver when it was operating from a new H.T. battery reading 128 V. The volume control was at maximum but the reaction control was at minimum. There was no signal input.

Voltages were measured on the 1,200 V scale of an Avometer, with chassis as negative.



Circuit diagram of the G.E.C. "Battery TRF Three." Note the gain control, R2, and the pre-set reaction condenser, C17, in parallel with the variable reaction condenser, C16. Automatic grid bias is used.



Plan view of the chassis. The layout is normal. Note that the output transformer T2 is on the receiver chassis, and not on the speaker. FI is an M.E.S. type lamp bulb, acting as an H.T. fuse.

Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 VS24	114	1.9	50	0.3
V2 VP21	40	2.2	50	0.8
V3 PT2	110	4.2	114	0.9

GENERAL NOTES

Switches.—S1-S4 are the waveband switches, and S5, S6 the battery switches. They are ganged together in a single rotary unit beneath the chassis. This is

Switch	Off	M.W.	L.W.
S1	C	C	O
S2	O	C	O
S3	O	C	O
S4	O	O	C
S5	O	C	C
S6	O	C	C

indicated in our under-chassis view, and shown in the form of a diagram on this page. The table above gives the switch positions for the various control settings, O indicating open, and C closed.

Coils.—L1-L3 and L6-L8 are in two screened units on the chassis deck. L4 and L5 are in an unscreened unit beneath the chassis.

Under - chassis view. The switch unit is shown in detail in Col. 3. L4 and L5 are the H.F. transformer primary coils. C17 is the pre-set reaction condenser.

External Speaker.—Two sockets are provided at the rear of the chassis for a low impedance (3-6 O) external speaker. The G.E.C. M.C. speaker, Cat. No. B.C. 1895 is recommended.

Fuse FI.—This is an Osram M.E.S. type lamp screwing into a holder on the chassis deck. It is rated at 3.5 V, 0.15 A.

Batteries.—L.T., G.E.C. 2V 14 AH celluloid cased cell, Cat. No. B.C.114. H.T., G.E.C. black label 120 V, Cat. No. B.B.720. Grid bias is automatic.

Battery Leads and Voltages.—Black lead, spade tag, L.T. negative; red lead, spade tag, L.T. positive 2 V; white lead, black plug, H.T. negative; blue lead, red plug, H.T. positive 60 V; red lead, red plug, H.T. positive 120 V.

Reaction Condensers.—C16, the variable reaction condenser, is of the differential type. One section of the fixed

vanes is connected to chassis, while across the other fixed section and the rotor is shunted through C17, a pre-set condenser adjustable through a hole in the rear of the chassis. This is adjusted so that even

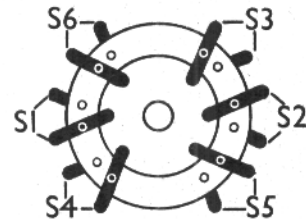


Diagram of the switch unit, as seen from the rear of the underside of the chassis.

with the main reaction control at minimum, a certain amount of reaction is in use, though not enough to cause the set to be near oscillation at any point on the two wavebands.

