

NUMBER SIXTY-NINE

'TRADER' SERVICE SHEETS

G.E.C. 'A.C. MAINS 4'

3-VALVE (PLUS RECTIFIER) A.C. RECEIVER

THREE receiving valves and a valve rectifier are employed in the G.E.C. "A.C. Mains Four" receiver, the receiving circuit consisting of a variable-mu tetrode H.F. amplifier, a tetrode detector and a pentode output valve.

In order to cater for different voltages and periodicities there are three models—BC3630 (190-250 V, 40-100 cycles), BC3630L (110-130 and 210-230 V, 40-100 cycles) and BC3631 (190-250 V, 25-100 cycles).

Our chassis was one of the first type.

CIRCUIT DESCRIPTION

Aerial input via coupling coil L1 to single-tuned circuit L2, L3, C17 which precedes variable-mu tetrode H.F. amplifier (V1, Osram metallised VMS4). Gain control by variable potentiometer R4 which varies G.B. applied and also acts as aerial-earth shunt.

Tuned-secondary transformer coupling by L4, L5, L6, L7 and C19 to tetrode detector (V2, Osram MS4B) operating on grid leak system with C7, R5. Reaction is applied from anode by coil L8, and controlled by differential condenser C21. Grid leak is returned to a point slightly negative with respect to chassis in order to give smooth control of reaction. Small fixed condenser C3 forms "top" coupling between primary and secondary windings of H.F. transformer, which are very loosely coupled inductively. Provision for connection of gramophone pick-up in V2 grid circuit.

Resistance-capacity coupling by R9, C10 and R13 to pentode output valve V3, (Osram N41). H.F. filtering in grid circuit by stopper R12 and by-pass C11. Tone compensation in anode circuit by fixed condenser C13. Coupling to high resistance external speaker by condenser C14.

H.T. current is supplied by full-wave rectifying valve (V4, Osram U12). Smooth-

ing by speaker field winding L11 and electrolytic condensers C15, C16.

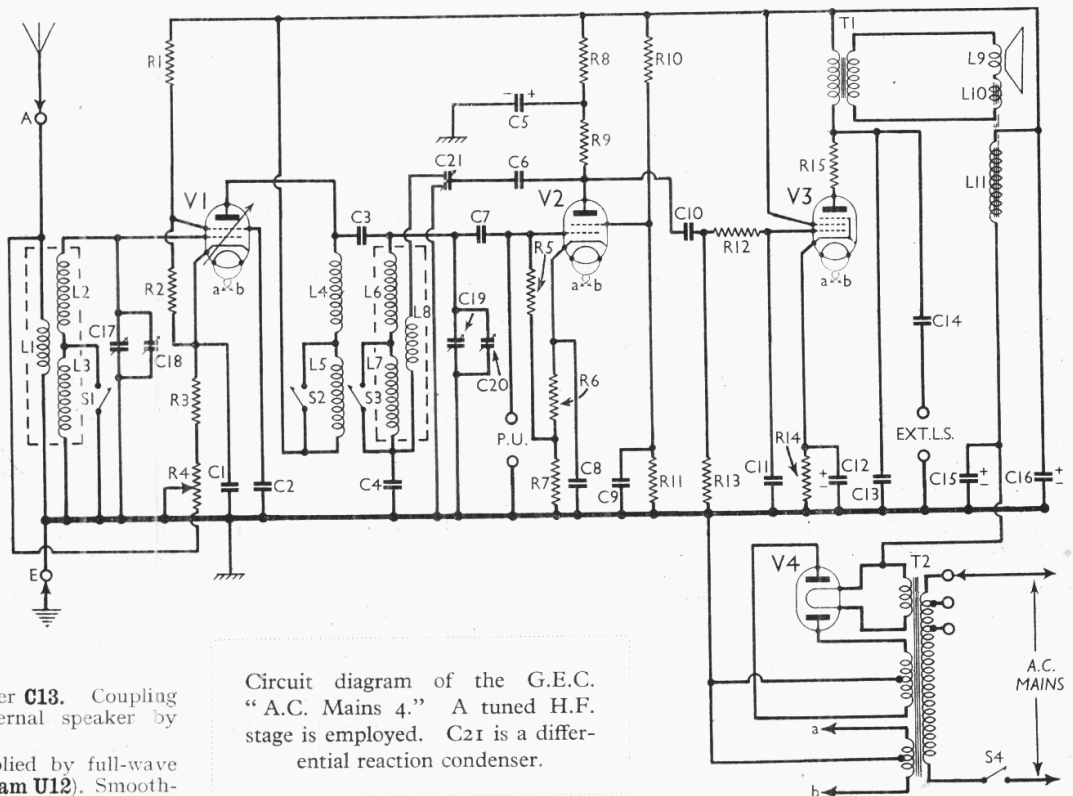
COMPONENTS AND VALUES

Condensers		Values (μF)
C1	V1 cathode by-pass	0.25
C2	V1 S.G. by-pass	0.1
C3	H.F. trans. top coupling	0.000011
C4	H.F. trans. sec. blocking	0.05
C5*	V2 anode decoupling	3.0
C6	Reaction blocking condenser	0.005
C7	V2 grid condenser	0.0005
C8	V2 cathode by-pass	0.5
C9	V2 S.G. by-pass	0.5
C10	L.F. coupling to V3	0.02
C11	V3 grid H.F. by-pass	0.0003
C12*	V3 cathode by-pass	50.0
C13	Tone compensator	0.005
C14	Coupling to ext. speaker	0.25
C15*	H.T. smoothing	7.0
C16*		7.0
C17	Aerial circuit tuning	—
C18†	Aerial circuit trimmer	—
C19	H.F. trans. tuning	—
C20†	H.F. trans. trimmer	—
C21	Differential reaction condenser	—

* Electrolytic. † Pre-set.

Resistances		Values (ohms)
R1	V1 S.G. pot. divider	50,000
R2		22,000
R3		200
R4	V1 fixed G.B. resistance	7,000
R5	V1 gain control	1,000,000
R6	V2 grid leak	200
R7	V2 G.B. resistances	200
R8		15,000
R9	V2 anode decoupling	30,000
R10	V2 anode load	70,000
R11	V2 S.G. pot. divider	30,000
R12		55,000
R13	V3 grid H.F. stopper	220,000
R14	V3 G.B. resistance	100
R15	V3 anode circuit stabiliser	100

Other Components		Values (ohms)
L1	Aerial coupling coil	5.5
L2	Aerial tuning coils	2.8
L3		15.4
L4	H.F. transformer primary	40.0
L5		135.0
L6	H.F. transformer secondary	2.7
L7		18.2
L8	Reaction coil	0.03
L9	Speaker speech coil	1.9
L10	Hum neutralising coil	0.05
L11	Speaker field winding	1,400.0
T1	Speaker input trans. { Pri. total	400.0
	{ Sec.	0.8
T2	Mains trans. { Pri. total	41.0
	{ Heater sec.	0.08
	{ Rect. fil. sec.	0.12
	{ H.T. sec.	540.0
S1-S3	Waveband switches	—
S4	Mains switch, ganged R4	—



Circuit diagram of the G.E.C. "A.C. Mains 4." A tuned H.F. stage is employed. C21 is a differential reaction condenser.

DISMANTLING THE SET

Removing Chassis.—To remove the chassis from the cabinet, remove the mains plug, back and control knobs (pull off). Release speaker leads from the cleats holding them to the sub-baffle and remove the four chassis fixing bolts (with large washers), heads underneath cabinet. The chassis can now be withdrawn to extent of speaker leads.

If it is necessary to remove the chassis entirely, unsolder the speaker leads from the transformer terminal panel. When replacing, the leads should be taken to the tags along the top edge of the panel and connected as follow, numbering the tags from left to right:— 1, red-white; 2, orange; 3 and 5, joined together; 4, black; 6 and 7, joined together, red.

Removing Speaker.—If it is desired to remove the speaker, remove the three bolts (each with a spring, metal and presspahn washer) which hold it to the sub-baffle. Between the speaker and sub-baffle are brass distance pieces; take care not to lose them. When replacing the speaker, place transformer at the top.

VALVE ANALYSIS

Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 6X4	250	14.5	90*	1.0
V2 6X4B	120	2.4	55	0.4
V3 6X4	230	32.0	250	7.1
V4 U12	275*	—	—	—

* Each anode, A.C.

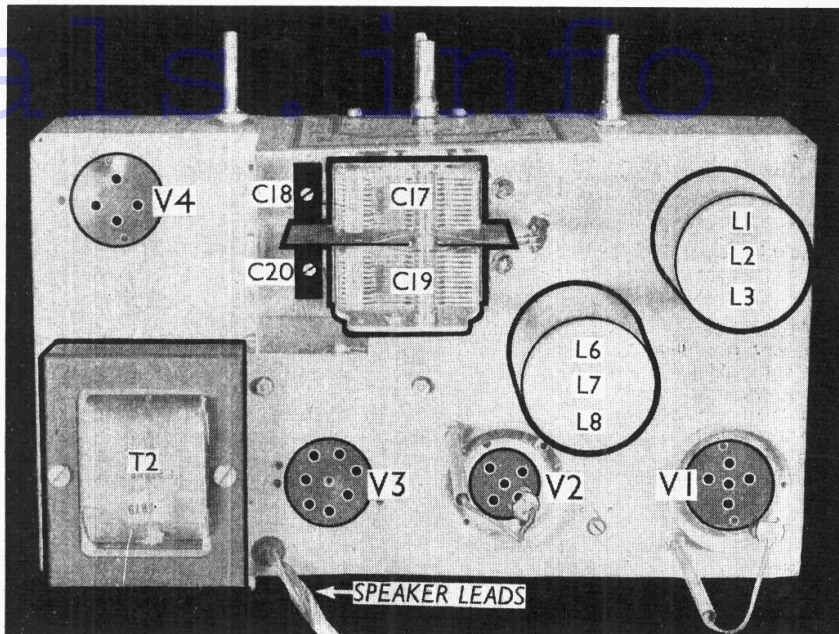
Readings of valve voltages and currents given in the table above were measured with no signal input, the volume control at maximum, the reaction control at minimum and the receiver operating from A.C. mains of 225 V. Voltages were measured on the 1,200 V scale of an Avometer, with chassis as negative.

GENERAL NOTES

Switches.—The wavechange switches, S1-S3, are in a single rotary unit indicated in our under-chassis view. Between S1 and S2 is a set of contacts which is not used. The switches are closed on the M.W. band and open on the L.W.

S4 is the mains switch, ganged with the volume control, R4.

Coils.—These are in two screened units on top of the chassis (L1, L2, L3, and L6, L7, L8), and an un-screened unit beneath the chassis (L4, L5). The two screens are not removable, but the coil units can be withdrawn from beneath the chassis, being supported on brackets screwed to the chassis.



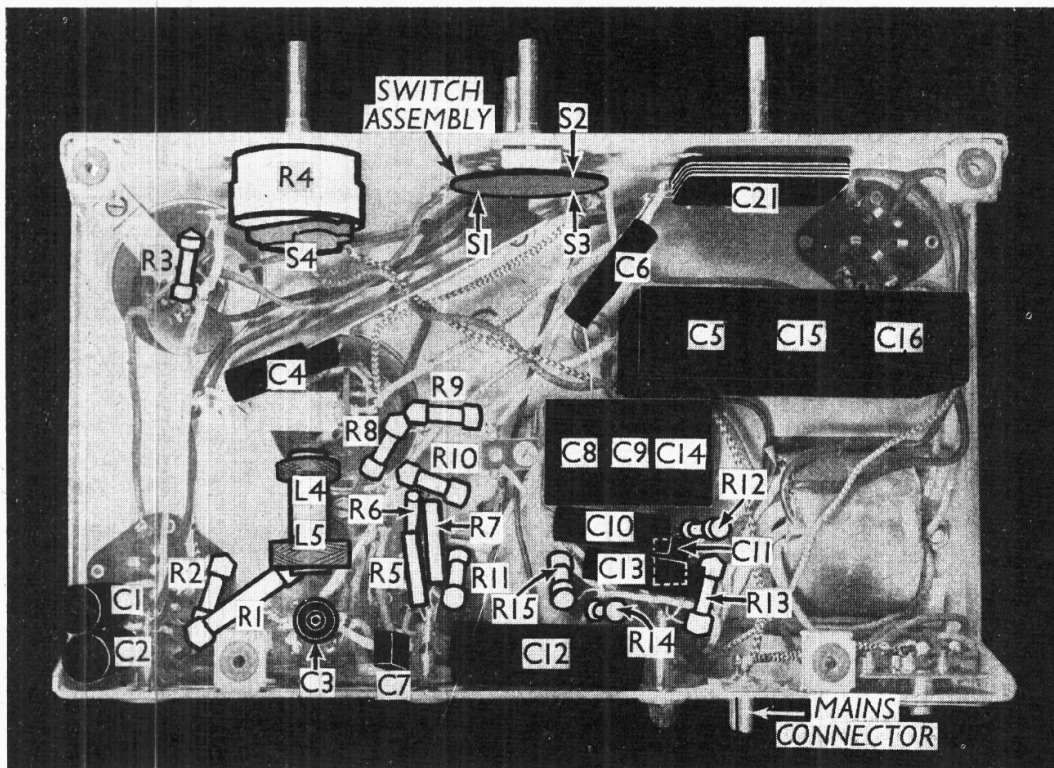
Plan view of the chassis. The layout is quite conventional. Note that L4 and L5 are not included in the coil units, but are beneath the chassis.

External Speaker.—This should be of the high resistance type (8,000-10,000 Ω), and should be plugged into the sockets at the rear of the chassis.

Condensers C5, C15, C16.—These are three dry electrolytic types in a single unit. They have a common negative (black) lead. Two red leads form the positives of C15 and C16, while the yellow lead is the positive of C5.

Condensers C8, C9, C14.—These are three paper types in a single screening case. The orange and orange-white leads belong to C14. C8 and C9 have one lead common (black), and the other lead in each case has a pink-white coding.

Condenser C3.—This is a small fixed mica unit, forming the top coupling of the H.F. transformer.



Under-chassis view. The positions of the switches S1—S3 are indicated by arrows. C3 is a small fixed condenser.

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