

NUMBER FIFTY - FOUR

# 'TRADER' SERVICE SHEETS

## G.E.C. "FIDELITY FIVE" A.C. TABLE AND RADIOGRAM MODELS

**T**HE G.E.C. Fidelity Five series of A.C. receivers and radiograms is made in several models. The table models are BC3650 (190/250V, 40/100 c.p.s.); BC3650L (110/130 and 210/230V, 40/100 c.p.s.); BC3651 (100/250V, 25/100 c.p.s.). The ordinary radiograms are BC3658 (100/250V, 40/60 c.p.s.) and BC3658L (100/130 and 210/230 V, 40/60 c.p.s.). The two corresponding record changer models are BC3659 and BC3659L.

Our circuit diagram is based on the radiogram models, but, except that one or two components are omitted, the table models are similar. The chassis pictures are of the table model used in preparing this sheet.

### CIRCUIT DESCRIPTION

Aerial input to coils **L1, L2** which are coupled to primary of inductively-coupled band-pass filter. Primary **L4, L5** tuned by **C28**; secondary **L7, L8** tuned by **C30**; coupling coil **L6**. First valve (**V1, Osram MX40**) is a heptode operating as frequency-changer with electron coupling. Oscillator grid coils **L9, L10** tuned by **C32**; tracking by **C3, C35** (L.W.) and **C4, C36** (M.W.); oscillator anode coil **L11**. Image rejection by coil **L3** in **V1** cathode circuit.

Second valve, a variable-mu H.F.

### Intermediate frequency 125 KC/S.

Tuneon neon tuning indicator in anode feed circuit to **V2**.

Diode second detector forms part of double diode triode (**V3, Osram MHD4**) which also provides a form of amplified delayed automatic volume control and audio-frequency amplification. The audio-frequency component in the output from the rectifier diode is developed across load resistance **R18** and passed directly to the triode section control grid by way of I.F. stopper **R17**. G.B. for radio amplification is obtained from the D.C. potential present across **R18** by reason of the carrier wave of a transmitter; on gramophone the necessary voltage is provided by cathode resistance **R22**. Resistances **R35** and **R36**, also in cathode circuit, provide the high cathode to earth potential required for amplified delayed A.V.C. in conjunction with the second diode of **V3**, its load resistance **R24**, and potential divider **R30, R31, R32, R33** and **R34** across speaker field winding **L20** in H.T. negative line. In addition to maximum sensitivity and high fidelity positions, the muting-fidelity control has three muting positions, giving increasing degrees of inter-station noise suppression. These are obtained by means of increases in the A.V.C. delay and **V1**

and **V2** fixed G.B. voltages brought about by switches **S14, S15** and **S16**.

I.F. by-passing in **V3** grid circuit by filter **L16, C10**, and in anode circuit by condenser **C14**. Adjustable filter **L17, C42**, eliminates heterodyne whistles.

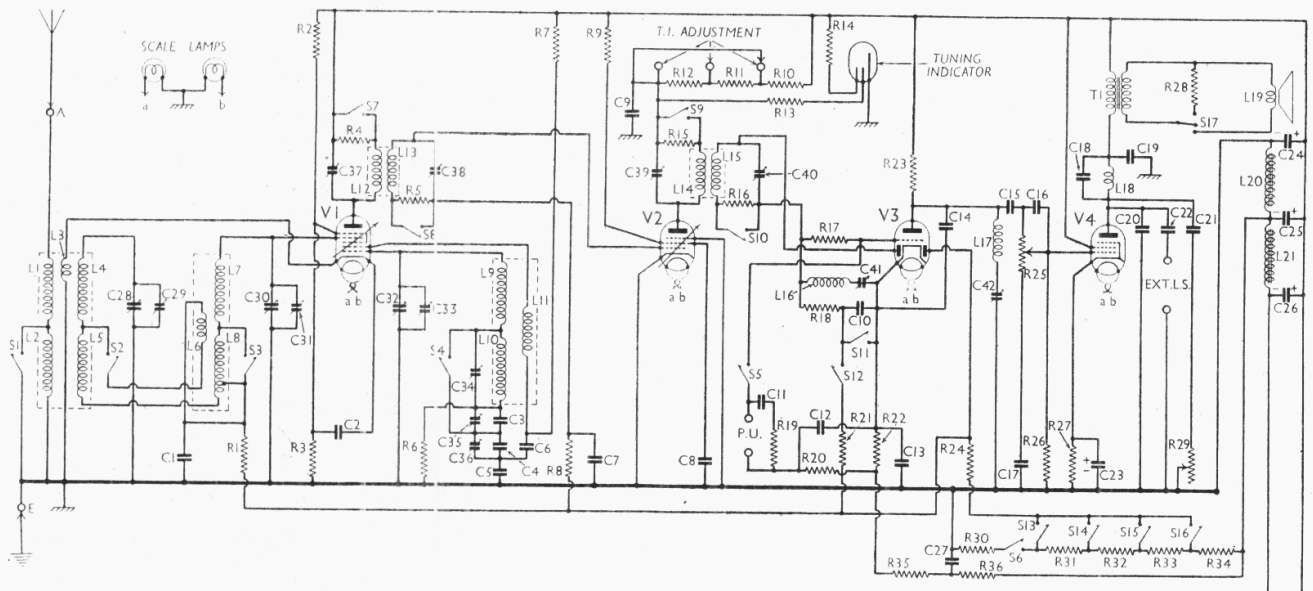
Resistance-capacity coupling by **R23, C15**, and volume control **R25** to output pentode (**V4 Osram Catkin MPT4**). Tone compensation by special filter **L18, C18**, condensers **C19, C20**, and variable R.C. circuit **R29, C21**. Coupling to external high-resistance speaker by condenser **C22**. Switch **S17** cuts out speech coil of internal speaker and connects artificial load **R28**.

H.T. current is supplied by full-wave rectifying valve (**V5, Osram U12**). Smoothing by speaker field winding **L20**, extra choke **L21**, and electrolytic condensers **C24, C25, C26**.

### DISMANTLING THE SET

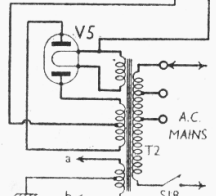
**Removing Chassis.**—Before removing back, withdraw small knob from tone control (pull off) and screw from Tuneon adjustment panel, both at back. Back can then be freed. Remove the four control knobs from front and withdraw Tuneon from clips above tuning dial escutcheon. Remove four bolts holding chassis, heads on underside of cabinet. Chassis can then be withdrawn sufficiently for normal repairs.

To remove chassis entirely, unsolder the three leads on the speaker input transformer and the long orange lead from filter circuit. While the chassis will



pentode (**V2, Osram metallised VMP4G**) operates as intermediate frequency amplifier with tuned-primary-tuned-secondary transformer couplings **L12, L13** and **L14, L15**. When the muting and fidelity control is set to "high fidelity," switches **S7-S10** open and connect in circuit damping resistances **R4, R5** and **R15, R16**.

The circuit of the G.E.C. Fidelity Five models. This is actually the radiogram circuit, but the table model is similar, except for slight omissions in the pick-up circuit, and the exclusion of **S6, R30** being permanently joined to **R31**.



now be free, the tone control, speaker switch and filter circuit will remain in the cabinet. When replacing, the colour code shown in our illustration of the rear of the speaker should be followed.

**Removing Speaker.**—The speaker is held to the cabinet front by three bolts with ornamental heads. When removing them take care not to scratch the cabinet. If it is desired to remove the speaker entirely, the leads to the tone control, switch and filter circuit will have to be unsoldered or the components unscrewed from their fixings. The latter is probably the easier.

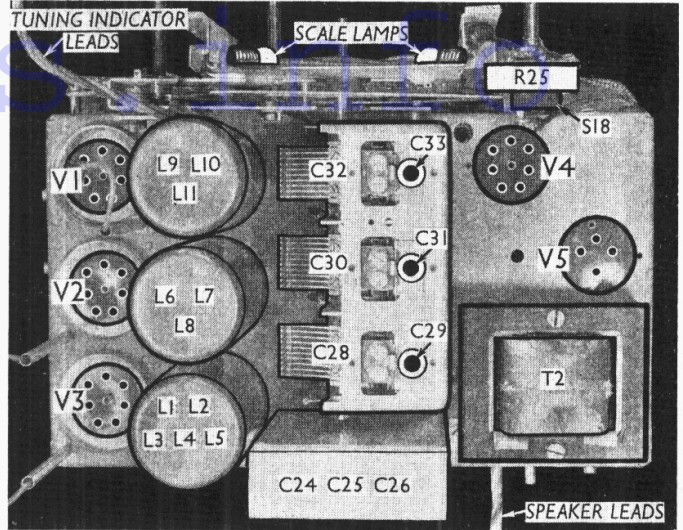
**COMPONENTS AND VALUES**

Resistances		Values (ohms)
R1	V1 cont. grid decoupling	99,000
R2	V1 S.G.'s pot. divider	50,000
R3		30,000
R4		990
R5	1st I.F. trans. damping	990
R6	V1 osc. grid resistance	99,000
R7	V1 osc. anode decoupling	44,000
R8	V2 cont. grid decoupling	99,000
R9	V2 S.G. H.T. feed	77,000
R10	Neon tuning indicator feed resistances	15,000
R11		5,500
R12		5,500
R13		20,000
R14		1,000,000
R15	2nd I.F. trans. damping	990
R16		990
R17	V3 triode grid I.F. stopper	99,000
R18	V3 rectifier diode load	440,000
R19*	Part of pick-up shunt circuit	22,000
R20*	Gram pick-up decoupling	220,000
R21	Part of muting circuit	220,000
R22	V3 G.B. resistance (gram. only)	990
R23	V3 anode resistance	77,000
R24	V3 A.V.C. diode load	440,000
R25	Manual volume control	500,000
R26	V4 grid resistance	330,000
R27	V4 G.B. resistance	300
R28	Artificial output load	8
R29	Variable tone control	50,000
R30	Potential divider across speaker field winding	5,000
R31		1,500
R32		3,000
R33		4,000
R34	Amplified A.V.C. circuit voltage-dropping resistances	99,000
R35		20,000
R36		33,000

\* Not in our chassis.

Condensers		Values (μF)
C1	V1 cont. grid decoupling	0.05
C2	V1 S.G.'s by-pass	0.05
C3	Osc. L.W. tracker, fixed	0.0005
C4	Osc. M.W. tracker, fixed	0.00175
C5	Osc. grid condenser	0.005
C6	V1 osc. anode decoupling	0.1
C7	V2 cont. grid decoupling	0.05
C8	V2 S.G. by-pass	0.05
C9	V2 anode decoupling	0.25
C10	Part of muting circuit	0.1
C11†	Part of pick-up shunt circuit	0.002
C12†	Pick-up circuit decoupling	0.05
C13	V3 cathode by-pass	0.5
C14	V3 anode I.F. by-pass	0.0005
C15	L.F. coupling to V4	0.02
C16	Manual volume control shunt	0.0002
C17	R25 blocking condenser	0.05
C18	Parts of V4 anode filter circuit	0.00065
C19		0.003
C20		0.003
C21*	Tone control condenser	0.05
C22	Coupling to ext. speaker	0.2
C23*	V4 cathode by-pass	50.0
C24*		6.0
C25*	H.T. smoothing	6.0
C26*		6.0
C27		0.5
C28	Part of amp. A.V.C. circuit	—
C29†	Band-pass primary tuning	—
C30	Band-pass primary trimmer	—
C31†	Band-pass secondary tuning	—
C32†	Band-pass secondary trimmer	—
C32	Oscillator tuning	—

Plan view of the chassis. The valve screens have been removed. C24, C25, C26 are dry electrolytics in a metal-cased block with the connecting leads passing through the chassis deck.



Condensers (contd.)		Values (μF)
C33†	Oscillator main trimmer	—
C34†	Oscillator L.W. trimmer	—
C35†	Oscillator L.W. tracker	—
C36†	Oscillator M.W. tracker	—
C37†	1st I.F. trans. pri. tuning	—
C38†	1st I.F. trans. sec. tuning	—
C39†	2nd I.F. trans. pri. tuning	—
C40†	2nd I.F. trans. sec. tuning	—
C41†	Part of I.F. filter	—
C42†	Part of V3 anode whistle filter	—

† Not in our chassis \* Electrolytics  
‡ Pre-set condensers × May be 0.02 μF

Other Components		Values (ohms)
L1	Aerial coupling coils	6.0
L2		100.5
L3	Image rejection coil	0.27
L4	Band-pass primary coils	5.3
L5		49.3
L6	Band-pass coupling coil	0.08
L7	Band-pass secondary coils	5.2
L8		49.5
L9	Oscillator grid coils	4.3
L10		27.0
L11	Oscillator anode coil	2.2
L12	1st I.F. transformer	Pri. ... 82.5
L13		Sec. ... 82.5
L14	2nd I.F. transformer	Pri. ... 82.5
L15		Sec. ... 82.5
L16	I.F. filter coil	38.0*
L17	Whistle filter coil	36.0
L18	V4 anode filter coil	400.0
L19	Speaker speech coil	1.9
L20	Speaker field winding	1,100
L21	Extra H.T. smoothing choke	400.0
T1	Speaker input trans.	Pri. ... 300.0
		Sec. ... 0.35
		Pri. total ... 41.0
T2	Mains trans.	Heater sec. ... 0.08
		Rect. fil. sec. ... 0.12
		H.T. sec. ... 540.0
S1-S4	Waveband switches, ganged	—
S5	Gram. pick-up switch	—
S6*	Radio muting switch on gram.	—
S7-S16	Muting and fidelity switches	—
S17	Internal speaker switch	—
S18	Mains switch, ganged R25	—

\* Not in our chassis.

**VALVE ANALYSIS**

Valve voltage and current readings given in the table below were taken with the aerial disconnected and with the muting-fidelity switch set at "normal." Voltage readings were taken with the chassis as negative, and since the voltmeter used was an electrostatic type, slightly lower readings may be obtained on other types of instruments. The figures are those given by the manufacturers.

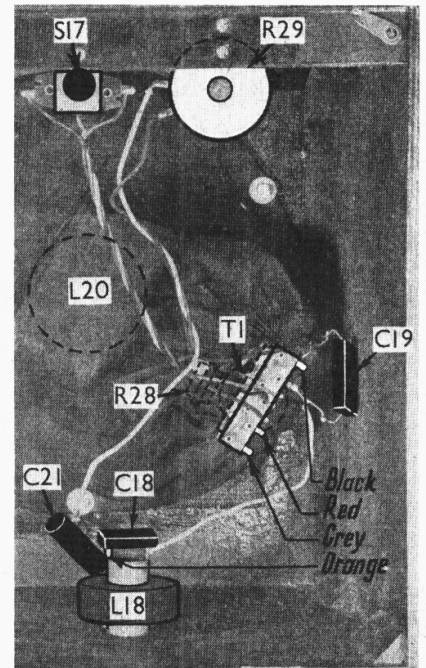
Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 MX40*	235	3.0	70	1.3
V2 VMP4G	175	3.5	65	2.0
V3 MHD4	100	2.0	—	—
V4 MPT4	210	32.0	235	6.0
V5 Ur2†	320†	—	—	—

\* Osc. anode (G2) 150V, 2mA.  
† Each anode, A.C.

**GENERAL NOTES**

**Switches.**—There are no fewer than 18 switches in this set, of which S17 is the internal speaker switch, at the top back of the cabinet, and S18 is the mains switch ganged with the volume control. S1-S5 are in one unit operated by a

(Continued overleaf)



View showing speaker and associated components in situ. The colour coding of the leads from the chassis is indicated.

