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'TRADER' SERVICE SHEETS

RECEIVER SERIES (NUMBER TWO)

G.E.C. "SUPERHET 5"

TABLE and CONSOLE—FOR A.C. MAINS

THE "Superhet Five" is one of the most popular of the 1933-4 G.E.C. A.C. super-heterodyne receivers. It is obtainable in table or console forms, employing a conventional 4-valve (plus rectifier) circuit.

CIRCUIT DESCRIPTION

One aerial connection by way of fixed condenser (**C1**) to coil which is coupled inductively, and by **C2** to primary of band-pass circuit (part of **L1**). **C2**, which also forms part of second channel suppression circuit, is built into coil **L1** and cannot be seen in chassis pictures. Secondary of band-pass circuit (**L2**) includes coupling coils. First valve (**V1**) is an **Osram MS4B,** functioning as frequency-changer (detector-oscillator). Oscillator coupling coil in cathode circuit with additional windings, coupled respectively to primary of band-pass input filter, and to grid of **V1** to minimise second channel interference. **V1** coupled to single variable-mu I.F. amplifier (**V2, Osram VMS4**) by tuned-primary, tuned-secondary transformer (**T1**). I.F. **107 KC.** Volume on radio controlled by potentiometer (**R21**) which varies G.B. applied to I.F. valve, and also acts as aerial-earth shunt resistance. **V2** coupled to S.G. anode bend second detector (**V3, Osram MS4B**), by second I.F. transformer (**T2**) with pick-up jack in secondary circuit. Special filter (**F**) after **V3,** also forming one of the suppression circuits. R.C. coupling to IHC output pentode (**V4, Osram MPT4**) with variable tone compensation by R.C. circuit (**R20** and **C14**). G.B. obtained from voltage drop across speaker field (in H.T. negative lead) by means of tapping on potential divider (**R15** and **R16**). Switch (**S6**) provided for cutting out internal speaker also switches in artificial load resistance (**R18**) to prevent high voltage surges in output circuit.

H.T. current supplied by full-wave rectifying valve (**V5, Osram U12**). Smoothing by speaker field and two dry electrolytic condensers (**C18** and **C19**). Mains transformer (**T5**) has shielded primary. Buffer condenser (**C23**) across mains input connections to prevent modulation hum and other interference.

DISMANTLING THE SET

Removing Chassis.—Pull off control knobs. No grub screws are fitted. Remove back of cabinet, and pull mains lead through hole in the back. In latest models back is held by 4 screws, the upper two not being interchangeable with lower two. If back is to be removed entirely, it will be necessary to take plug off mains lead. Four screws underneath base of cabinet hold chassis in position. Remove these, when chassis may be drawn out to the extent of the speaker leads. These permit chassis to be removed about 12 ins. from cabinet, which gives ample room for working on it. If it is to be entirely detached, the best plan is to remove speaker and external speaker switch, and not to disconnect leads to the speaker, since the field winding of the latter is part of the circuit, and must be connected to remainder when performing tests.

Remove speaker from cabinet by undoing four screws holding sub-baffle to inside front of cabinet. **Do not undo nuts holding speaker to baffle,** since on replacing, the screws may twist, preventing nuts from being screwed up tightly.

Remove speaker switch by undoing the knob and the 1-hole fixing nut holding switch to bracket. The whole assembly of chassis, speaker and switch can then be removed entirely from the cabinet.

If speaker has to be returned to the works for servicing, the wires connecting chassis and switch to the speaker input transformer must be unsoldered. The colour coding for replacement is shown in Fig. 5, which also indicates the wiring of tone control circuit (**R20, C14**) and the switch **S6** and resistance **R18.**

COMPONENTS AND VALUES

	Condensers	Value (μF)
C1	Series aerial	·0001
C2	Coupling and 2nd channel suppr.	·000025
C3*	V1 S.G. by-pass	·1
C4	V1 cathode by-pass	·005
C5*	V1 anode decoupling	·11
C6*	V2 cathode by-pass	·25
C7*	V2 S.G. by-pass	·25
C8*	V3 S.G. by-pass	·25
C9	V3 anode by-pass	·0001
C10	L.F. coupling to V4	·01
C11*	V3 anode decoupling	·11
C12	V3 anode by-pass	·0001
C13*	Coupling to external speaker	·25
C14	Tone control capacity	·04
C15	External speaker by-pass	·001
C16*	V3 cathode by-pass	·25
C17*	V4 G.B. circuit by-pass	·3
C18	H.T. smoothing (electrolytic)	8·0
C19	H.T. smoothing (electrolytic)	8·0
C20†	Oscillator padding capacities	·00135
C21†		·00145 ·00125 ·00135
C22*	V3 grid decoupling	·25
C23	Mains buffer	·01 + ·01
C24	Primary band-pass tuning	—
C25	Secondary band-pass tuning	—
C26	Oscillator tuning	—

* In condenser block. † Between the values given.

NOTE.—The above list includes all

(*Continued overleaf*)

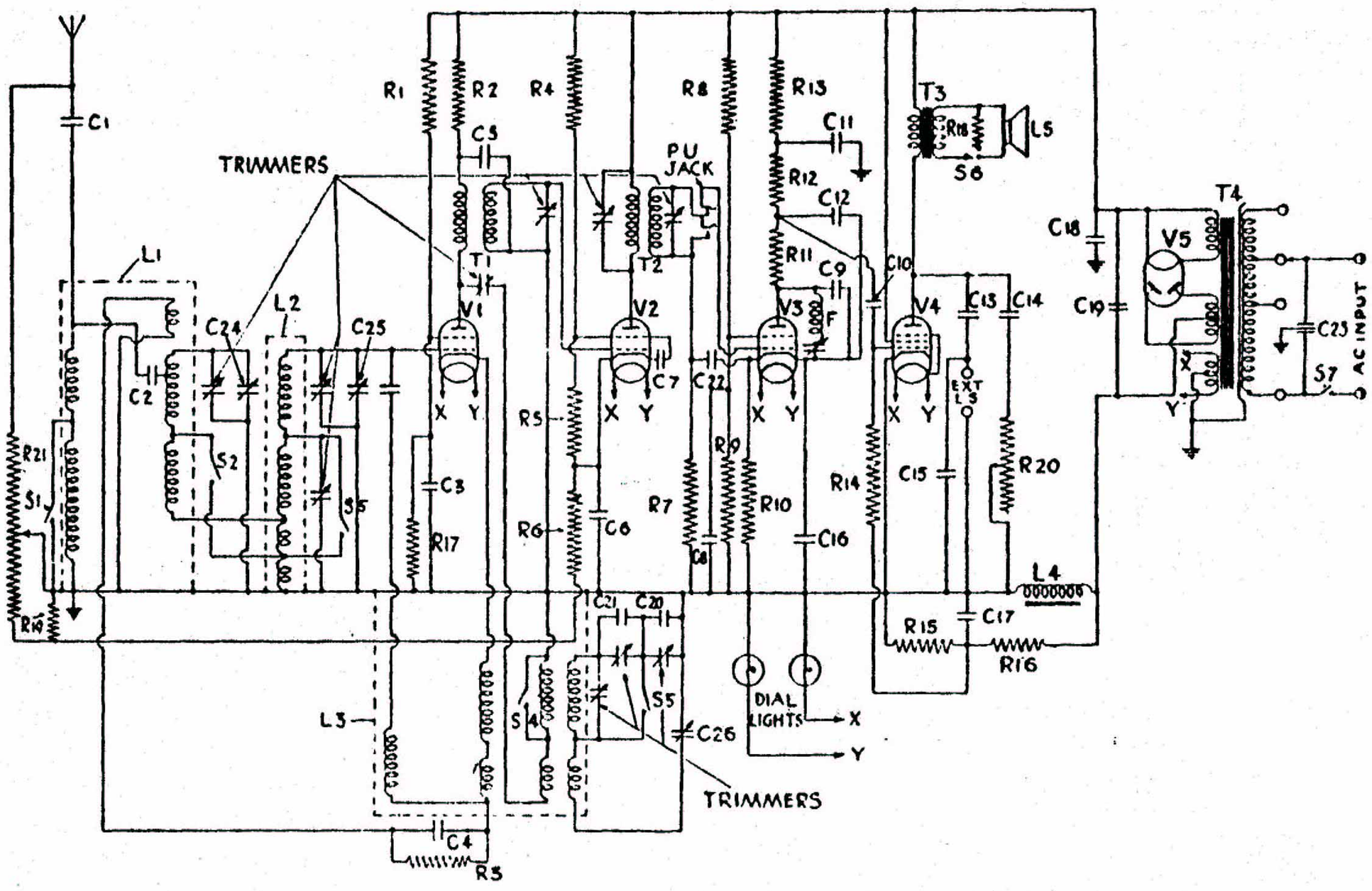

Fig. 1.—The circuit of the G.E.C. Superhet 5 (A.C.). Trimmers are indicated, but not lettered or numbered. The dotted lines round the coils indicate the coil screens.

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The G.E.C. Superhet 5 (contd.)

the chief condensers, but does not include the various trimmers and other pre-set condensers, which, however, are all shown in Fig. 1. These are adjusted at the works, and sealed with red wax. They should not need re-adjustment, but if they do, special instructions should be obtained from the works.

	Resistances	Value (ohms)
R1*	Part of V1 S.G. pot. divider	88,000
R2*	V1 anode decoupling	20,000
R3	V1 cathode resistance	2,500
R4*	V2 S.G. pot. divider	24,000
R5*		13,000
R6	Fixed part of V2 G.B. resistance	150
R7	V3 grid decoupling	33,000
R8*	V3 S.G. pot. divider	88,000
R9*		55,000
R10*	V3 G.B. resistance	8,800
R11	V3 anode H.F. stopper	33,000
R12*	V3 anode resistance	200,000
R13*	V3 anode decoupling	33,000
R14*	V4 grid resistance	420,000
R15*	V4 G.B. pot. divider	125,000
R16*		420,000
R17*	Part of V1 S.G. pot. divider	44,000
R18	Artificial output load	8
R19	Part of V2 bias circuit	9,900
R20	Tone control (variable)	50,000
R21	Volume control (variable)	10,000

* On resistance panel.

	Component	Value* (ohms) (approx.)
L1	Pri. bandpass and aerial coils	—
L2	Sec. bandpass and B.P. coupling coils	—
L3	Oscillator and osc. coupling coils	—
L4	Speaker field coil	1,300
L5	Speaker speech coil	28
T1	1st I.F. trans. Pri.	82·5
	1st I.F. trans. Sec.	82·5
T2	2nd I.F. trans. Pri.	81
	2nd I.F. trans. Sec.	81
T3	Speaker input trans. Pri.	440
	Speaker input trans. Sec.	5
T4	Mains Trans. Pri. (total)	40
	Mains Trans. Sec. 1 Rect. Fil.	·15†
	Mains Trans. Sec. 2 Rect. H.T. (total)	415†
	Mains Trans. Sec. 3 Heaters (total)	·15†
F	Filter in 2nd det. plate-cath. circuit	—
S1, S2 S3, S4 S5	Waveband ganged switches	—
S6	External speaker switch	—
S7	Mains switch (ganged with R21)	—

* Approx. values obtained from our sample receiver.
† Measured by plugging ohmmeter into appropriate valve-holders.

VALVE ANALYSIS

All values given below are approximate only, and indicate roughly the figures to be expected with new valves. The voltages were measured with a 0-300 V voltmeter having a resistance of 1,000 Ω per V, and were taken with chassis as negative connection so that bias voltages are included.

Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 MS4B	240-260	1·1·5	80-90	—
V2 VMS4	275-285†	6-8†	80-90†	—
	285-295‡	Verysmall‡	115-125‡	—
V3 MS4B	90-100	0·2-0·4	90	—
V4 MPT4	245-255	30-32	270-280	6-7
V5 U12	300*(AC)	—	—	—

† Volume control at max. ‡Volume control at min.
* Each anode.

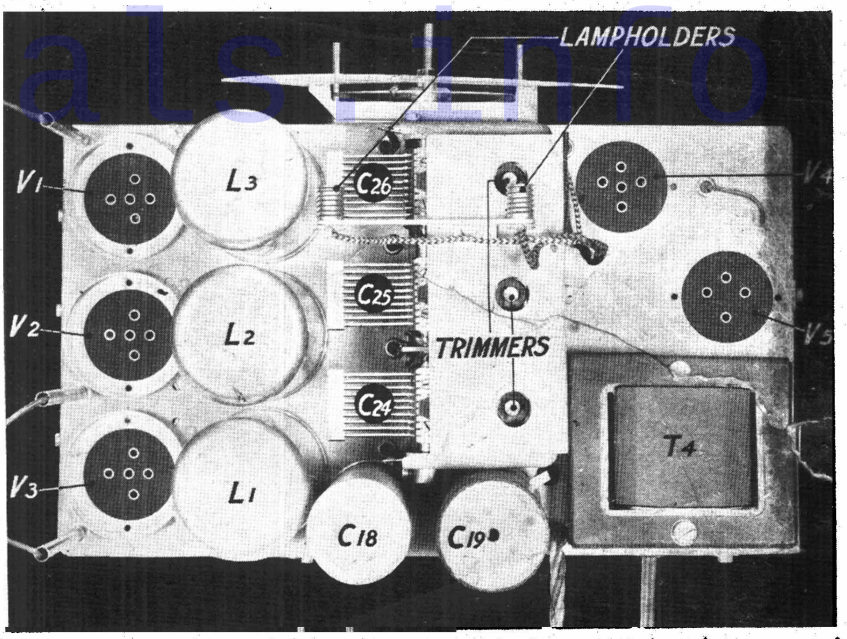

Fig. 2.—Plan view of the chassis. The valves and valve screens have been removed

GENERAL NOTES

If the valve voltages and currents differ from the figures given in the valve analysis table by more than about 30 per cent., and if new valves do not effect an improvement, it will be necessary to check up the anode, screen and grid circuits, testing the associated components. These can be traced from Fig. 1, and identified in Figs. 2 and 3, the values of most of them being given in the component tables.

Condenser Block.—This is seen in Fig. 3, bolted to the back of the chassis. It contains ten condensers, enumerated in Fig. 3. A diagrammatic representation of the block is shown in Fig. 4, which gives the colour-coded wiring and the points to which connections are made to the rest of the circuit. It also shows the internal connections. If a condenser is found to be broken down, it will normally be necessary to fit a new block, but since each unit has quite a small value, it may be possible to find room for a separate replacement condenser of the same value as a temporary expedient. The wires leading to the faulty condenser in the block should be disconnected, and the new condenser wired in place of it.

Removing Condenser Block.—If this becomes necessary, first unsolder the 2 screened leads attached to tags on condenser block case. Also unsolder the 3 black earthing leads on end of case. Unsolder all coloured wires leading to rest of circuit. Undo two screws holding block to chassis. The block can then be removed. *When replacing* re-solder all wires, as coded in Fig. 4. Do not forget the 3 black leads on the end of the case, and the 2 earthing tags held under fixing screws of block.

Removing Electrolytic Condensers.—It is necessary first to remove screws holding fixed condenser block, and twist block upwards. Access is thus gained to the anode terminals of electrolytics and the large 1-hole fixing nuts. NOTE.—C19 has a tubular insulating cover over its "can," and is also insulated from the chassis by its bush and a paxolin washer. Do not forget this when replacing condenser. The connection to the "can" is taken through an insulating bush

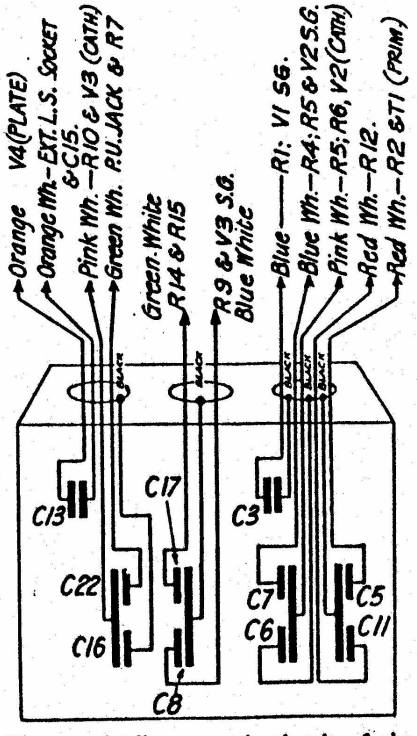

Fig. 4.—A diagrammatic sketch of the condenser block showing the colour-coded connections and internal wiring.

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