NUMBER 115 **'TRADER' SERVICE SHEETS**

G.E.C. SUPERHET DC–AC4

DESIGNED for operation on A.C. or D.C. mains of 200-250 V (25-100 c.p.s. in the case of A.C.), the G.E.C. Superhet DC-AC 4 (BC3645) is a 4-valve (plus rectifier) superhet in which provision is made for using an extension speaker.

CIRCUIT DESCRIPTION

Aerial input by way of M.W. coupling coil **L1** and L.W. tap to primary of inductively coupled band-pass filter. Primary **L2, L3** tuned by **C24**; secondary **L5, L6** tuned by **C26.**

First valve (**V1, Osram metallised X32**) is a heptode operating as frequency charger with electron coupling. Oscillator grid coils **L7, L8** tuned by **C28** which has specially shaped vanes for tracking; additional L.W. tracking condensers **C7, C31**; oscillator anode reaction coils **L9, L10.** Image suppression by small coil **L4** in **V1** cathode circuit.

Second valve, a variable-mu H.F. pentode (**V2, Osram metallised W31**), operates as intermediate frequency amplifier with tuned primary tuned secondary transformer couplings **L11, L12** and **L13, L14.**

Intermediate frequency 125 KC/S.

Diode second detector forms part of double diode valve (**V3, Osram D41**). Second diode, fed via **C15,** provides D.C. potential which is developed across **R13** and **R14** and fed back through decoupling circuits as G.B. to F.C. and I.F. valves, giving automatic volume control. Delay voltage is obtained from drop along **V4** cathode resistances **R18, R19.**

Audio-frequency output from signal diode is developed across **R11** and passed via **C14,** manual volume control **R12, C17,** and I.F. stopper **R17** to C.G. of output pentode (**V4, Osram N31**). Fixed tone correction in anode circuit by **C19**; variable tone control by R. C. filter **R21, C20.** Provision for connection of low-impedance external speaker across secondary of internal speaker transformer **T1.**

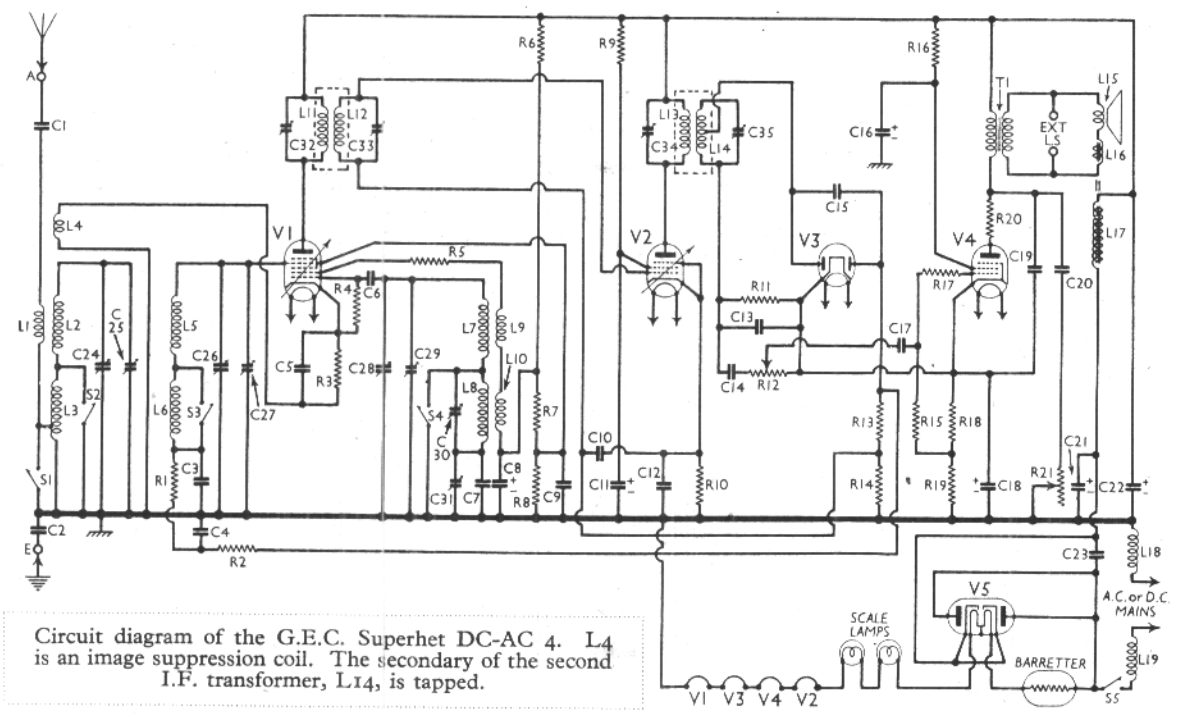
When receiver is used with A.C. mains, H.T. current is supplied by half-wave rectifying valve (**V5, Osram U30**) which behaves as a low resistance with D.C. supplies. Smoothing by speaker field coil **L17** and dry electrolytic condensers **C21, C22.**

Valve heaters are connected in series together with scale lamps and barretter lamp (**Osram 304**) across mains input circuit. Chokes **L18** and **L19** serve to suppress mains-borne interference.

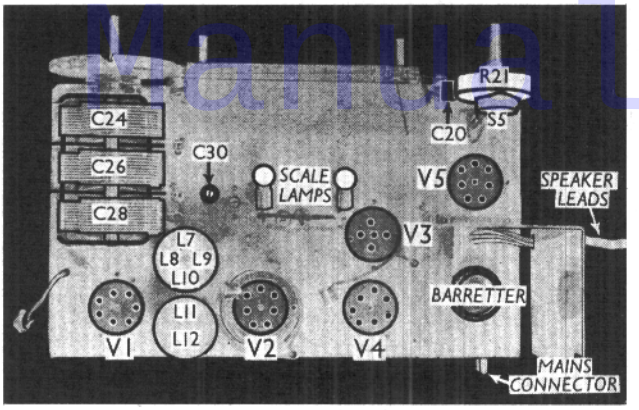
COMPONENTS AND VALUES

	Resistances	Values (ohms)
R1	V1 tetrode C.G. decoupling ..	220,000
R2	V1 A.V.C. line decoupling ..	440,000
R3	V1 fixed G.B. resistance ..	250
R4	V1 oscillator C.G. resistance	99,000
R5	V1 osc. anode circuit stabiliser	2,500
R6	V1 S.G.'s and oscillator anode H.T. potential divider	5,500
R7		7,000
R8		15,000
R9	V2 S.G. H.T. feed	33,000
R10	V2 fixed G.B. resistance ..	250
R11	V3 signal diode load	440,000
R12	Manual volume control ..	500,000
R13	V3 A.V.C. diode load ..	660,000
R14		220,000
R15	V4 C.G. resistance	440,000
R16	V4 aux. grid H.T. feed ..	3,300
R17	V4 C.G. I.F. stopper	77,000
R18	V4 G.B. and A.V.C. delay voltage resistances	90
R19		150
R20	V4 anode circuit stabiliser ..	100
R21	Variable tone control ..	50,000

	Condensers	Values (μF)
C1	Aerial series condenser ..	0·01
C2	Earth blocking condenser ..	0·1
C3	V1 tetrode C.G. decoupling ..	0·05
C4	V1 A.V.C. line decoupling ..	0·05
C5	V1 cathode by-pass	0·05
C6	V1 oscillator C.G. condenser	0·0001
C7	Oscillator L.W. tracker, fixed	0·0005
C8*	V1 osc. anode decoupling ..	3·0
C9	V1 S.G.'s by-pass	0·05
C10	V2 C.G. decoupling	0·05
C11*	V2 S.G. by-pass	3·0
C12	V2 cathode by-pass	0·1
C13	I.F. by-pass	0·0003
C14	L.F. coupling to vol. control..	0·02



Circuit diagram of the G.E.C. Superhet DC-AC 4. L4 is an image suppression coil. The secondary of the second I.F. transformer, L14, is tapped.



Plan view of the chassis. Note that C30 is adjusted through the chassis deck, the other trimmers being reached through the sides of the chassis. The two scale lamps are in series.

	Condensers (contd.)	Values (μF)
C15	Coupling to V3 A.V.C. diode	0·0001
C16*	V4 aux. grid by-pass	2·0
C17	L.F. coupling to V4	0·02
C18*	V4 cathode by-pass	50·0
C19	Fixed tone corrector	0·003
C20	Part of variable T.C. filter	0·02
C21*	H.T. smoothing	8·0
C22*	H.T. smoothing	24·0
C23	V5 anode-cathode by-pass	0·01
C24†	Band-pass primary tuning	—
C25‡	Band-pass primary trimmer	—
C26†	Band-pass secondary tuning	—
C27‡	Band-pass secondary trimmer	—
C28†	Oscillator tuning	—
C29‡	Oscillator main trimmer	—
C30‡	Oscillator L.W. trimmer	—
C31‡	Oscillator L.W. tracker	—
C32‡	1st I.F. trans. pri. tuning	—
C33‡	1st I.F. trans. sec. tuning	—
C34‡	2nd I.F. trans. pri. tuning	—
C35‡	2nd I.F. trans. sec. tuning	—

* Electrolytic † Variable ‡ Pre-set

	Other Components	Approx. Values (ohms)
L1	Aerial M.W. coupling coil	1·6
L2	Band-pass primary coils	4·0
L3	Band-pass primary coils	17·0
L4	Image suppression coil	0·15
L5	Band-pass secondary coils	3·9
L6	Band-pass secondary coils	17·0
L7	Oscillator tuning coils	3·8
L8	Oscillator tuning coils	11·5
L9	Oscillator reaction coils, total	2·5
L10	Oscillator reaction coils, total	2·5
L11	1st I.F. transformer Pri.	82·0
L12	1st I.F. transformer Sec.	82·0
L13	2nd I.F. transformer Pri.	82·0
L14	2nd I.F. transformer Sec.	82·0
L15	Speaker speech coil	1·9
L16	Hum neutralising coil	0·05
L17	Speaker field coil	500·0
L18	Mains circuit filter chokes	3·0
L19	Mains circuit filter chokes	3·0
T1	Speaker input trans. Pri.	400·0
	Speaker input trans. Sec.	0·8
S1-S4	Waveband switches	—
S5	Mains switch, ganged R21	—

DISMANTLING THE SET

Removing Chassis.—Remove the four control knobs (screws through the centres), the two battens on the bottom of the cabinet (two countersunk-head wood screws each) and the four chassis bolts (with washers) which are thus exposed. Remove the batten across the back of the cabinet, when the chassis can be withdrawn to the extent of the speaker leads, which is sufficient for normal purposes.

When replacing, see that the knob with the red and green dots is placed on the spindle of the wave-change switch.

To free the chassis entirely, unsolder the speaker leads from the transformer terminal panel. *When replacing*, note that the leads go to the outer row of tags and connect as follow, numbering them from bottom to top :— 1, red ; 2, black ; 3 and 5 joined together, orange/white ; 4, orange/white ; 6, orange ; 7, red/white.

Removing Speaker.—Unsolder the leads and remove the four bolts (with spring washers and washers) holding the sub-baffle to the cabinet and remove the nuts, spring washers, washers and press-pahn washers from the three bolts holding the speaker to the sub-baffle.

When replacing, do not forget the distance pieces between the speaker and the sub-baffle, and see that the transformer is pointing to the top right-hand corner of the cabinet, looking from the back.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on A.C. mains of 225 V. The volume control was at maximum and the set was tuned to the lowest wavelength on the medium band, but there was no signal input.

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

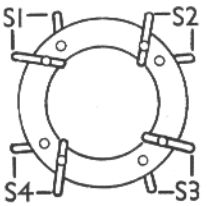
Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 X32*	205	1·4	80	3·1
V2 W31	205	6·4	86	3·6
V3 D41	—	—	—	—
V4 N31	188	35·0	178	8·2
V5 U30†	—	—	—	—

* Osc. anode (G2) 107 V, 4·6 mA.
† Cathode to chassis, 240 V D.C.

GENERAL NOTES

Switches.—**S1-S4** are the wavechange switches in a single rotary unit behind the front of the chassis. The unit is indicated in our under-chassis view, and the individual switches are shown in a separate diagram. All the switches are *closed* on the M.W. band and *open* on the L.W. band.

S5 is the Q.M.B. mains switch, ganged with the tone control **R21.**



The wavechange switch unit, as seen from the back of the underside of the chassis.

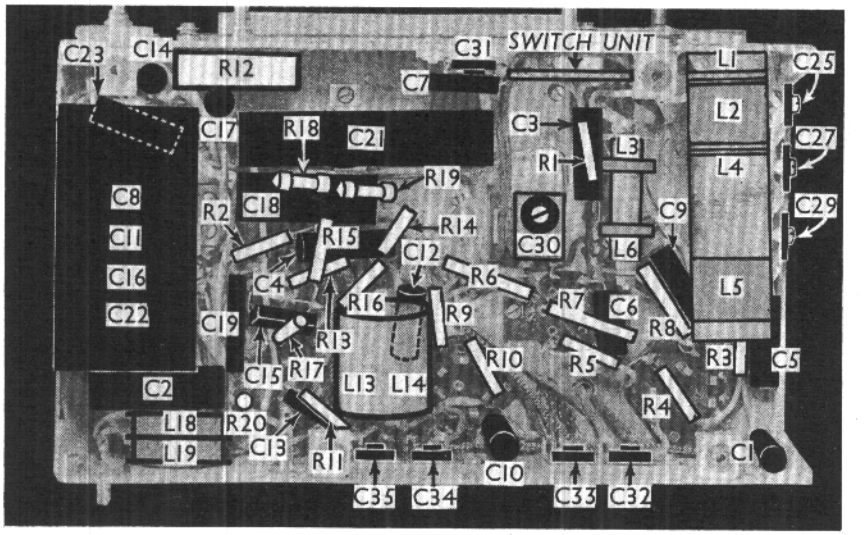
Coils.—**L1-L6** are in two unscreened units with cylindrical formers beneath the chassis. **L7-L10** and the first I.F. transformer, **L11, L12,** are in two screened units on the chassis deck. The second I.F. unit, **L13, L14,** is beneath the chassis. The two mains chokes, **L18, L19,** are also beneath the chassis.

Scale Lamps.—There are two of these, in series, and both are of the Osram M.E.S. type, rated at 6.5 V, 0.3 A.

External Speaker.—Sockets are provided at the rear of the chassis for a low resistance (4 to 6 O) external speaker.

Condensers C8, C11, C16, C22.—These are four dry electrolytic condensers in a single unit beneath the chassis. The black lead is the common negative. The positives are : Yellow lead (to junction of **R6** and **R7**), **C8** ; Yellow lead (to **V2** valve-holder), **C11** ; Green lead, **C16** ; Red lead, **C22.**

Trimmers.—Most of these are disposed round the side, front and back of the chassis, and are adjusted through holes in the chassis. **C30,** however, is reached through the chassis deck.



Under-chassis view. A diagram of the switch unit is given in Col. 3.