

NUMBER 147

'TRADER' SERVICE SHEETS

G.E.C. A.C. SUPER 4

COMPONENTS AND VALUES

THE G.E.C. A.C. Super 4 receiver is a 4-valve (plus rectifier) A.C. superhet employing a triode-hexode frequency changer and a separate double diode valve for second detection and A.V.C. purposes. Model No. BC3740 is for use with 190-250 V 40-100 c.p.s. mains, and No. BC3740L is for 110-130 and 210-230 V 40-100 c.p.s. mains. This Service Sheet applies specifically to the BC3740 receiver but the BC3740L, of course, is identical except for the mains transformer. Radio-gramophones BC3748 and BC3748L embody modified chassis, and the differences are noted in the General Notes section.

CIRCUIT DESCRIPTION

Aerial input via coupling coils L1, L2 and small coupling condenser C1 to inductively coupled band-pass filter. Primary L3, L4 tuned by C22; secondary L5, L6 tuned by C24.

First valve (V1, Osram metallised X41) is a triode-hexode operating as frequency changer with internal coupling. Triode section forms separate oscillator with grid coils L7, L8 and anode coils L9, L10 tuned by C28; trimming by C27 (M.W.) and C25 (L.W.); tracking by shaped plates and C7, C26 (L.W.).

Second valve, a variable-mu H.F. pentode (V2, Osram metallised VMP4G)

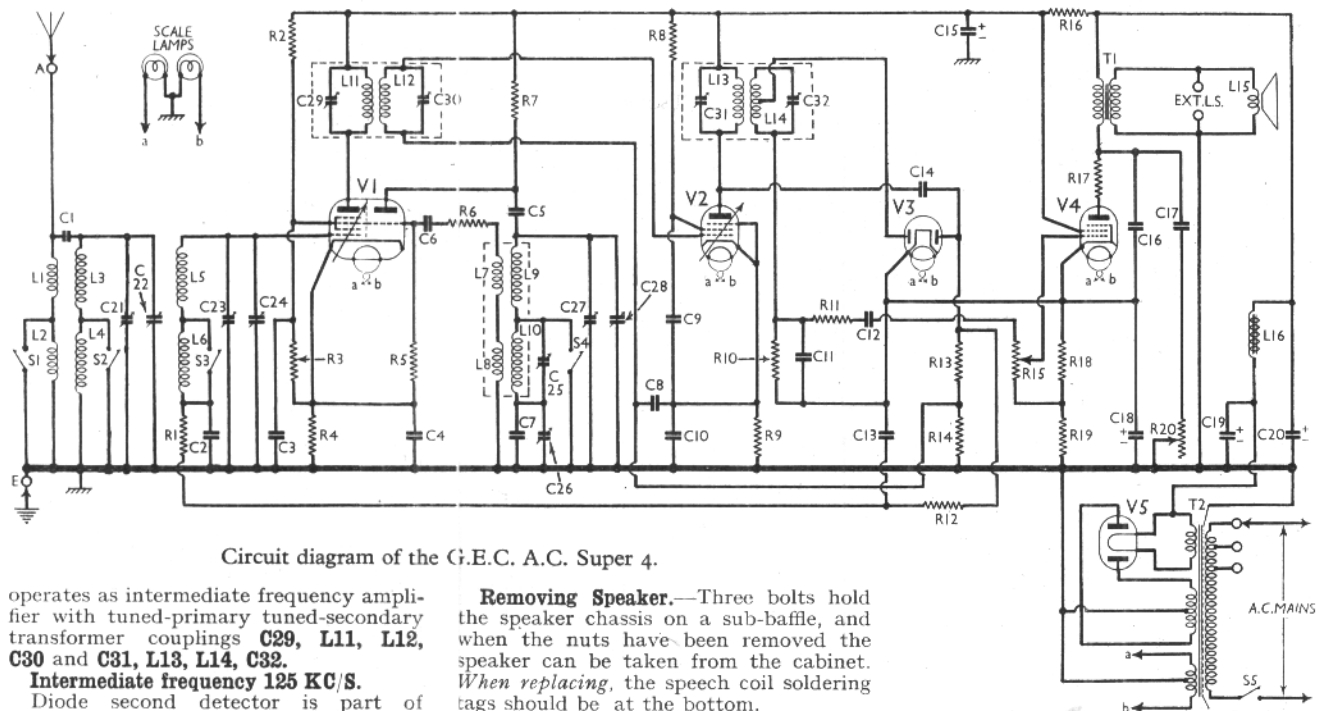
separate double diode valve (V3, Osram metallised D41). Audio-frequency component in rectified output is developed across load R10 and passed via I.F. filter C11, R11, coupling condenser C12 and manual volume control R15 to C.G. of pentode output valve (V4, Osram N41). Fixed tone compensation by condenser C16 in anode circuit; variable tone control by R.C. filter R20, C17. Provision for connection of low-impedance external speaker across secondary of output transformer T1.

Second diode of V3, fed from V2 anode via C14, provides D.C. potentials which are developed across resistances R13, 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.

H.T. current is supplied by a full-wave rectifying valve (V5, Osram U12). Smoothing by iron-cored choke L16 and dry electrolytic condensers C19, C20.

DISMANTLING THE SET

Removing Chassis.—Remove the four control knobs from their spindles (pull off). Remove the four screws (with washers) from the underside of the cabinet and the chassis can be withdrawn to the extent of the speaker leads for all normal repairs.



Circuit diagram of the G.E.C. A.C. Super 4.

operates as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings C29, L11, L12, C30 and C31, L13, L14, C32.

Intermediate frequency 125 KC/S.

Diode second detector is part of

Removing Speaker.—Three bolts hold the speaker chassis on a sub-baffle, and when the nuts have been removed the speaker can be taken from the cabinet. When replacing, the speech coil soldering tags should be at the bottom.

| RESISTANCES | | Values (ohms) |
|-------------|-----------------------------------|---------------|
| R1 | V1 hexode C.G. decoupling .. | 220,000 |
| R2 | V1 S.G. H.T. potential divider .. | 33,000 |
| R3 | V1 fixed G.B. resistance .. | 22,000 |
| R4 | V1 osc. C.G. resistance .. | 300 |
| R5 | V1 osc. harmonic suppressor .. | 55,000 |
| R6 | V1 osc. anode resistance .. | 4,200 |
| R7 | V2 S.G. H.T. feed .. | 55,000 |
| R8 | V2 fixed G.B. resistance .. | 66,000 |
| R9 | V3 signal diode load .. | 500 |
| R10 | V3 A.V.C. diode load .. | 440,000 |
| R11 | I.F. stopper .. | 77,000 |
| R12 | V1 A.V.C. line decoupling .. | 440,000 |
| R13 | V3 A.V.C. diode load .. | 660,000 |
| R14 | Manual volume control .. | 220,000 |
| R15 | V1, V2 H.T. line decoupling .. | 400,000 |
| R16 | V1, V2 H.T. line decoupling .. | 1,500 |
| R17 | V4 anode circuit stabiliser .. | 99 |
| R18 | V4 G.B. and A.V.C. delay .. | 99 |
| R19 | voltage resistances .. | 400 |
| R20 | Variable tone control .. | 50,000 |

| CONDENSERS | | Values (µF) |
|------------|-----------------------------------|-------------|
| C1 | Aerial coupling .. | 0.000011 |
| C2 | V1 hexode C.G. decoupling .. | 0.05 |
| C3 | V1 S.G.'s by-pass .. | 0.1 |
| C4 | V1 smoothing by-pass .. | 0.05 |
| C5 | V1 osc. anode condenser .. | 0.001 |
| C6 | V1 osc. C.G. condenser .. | 0.0001 |
| C7 | Oscillator L.W. tracker, fixed .. | 0.0005 |
| C8 | V2 C.G. decoupling .. | 0.05 |
| C9 | V2 S.G. by-pass .. | 0.1 |
| C10 | V2 cathode by-pass .. | 0.1 |
| C11 | I.F. by-pass .. | 0.0003 |
| C12 | L.F. coupling to V4 .. | 0.02 |
| C13 | V1 A.V.C. line decoupling .. | 0.05 |
| C14 | Coupling to V3 A.V.C. diode .. | 0.000011 |
| C15* | V1, V2, H.T. line decoupling .. | 3.0 |
| C16 | Fixed tone corrector .. | 0.002 |
| C17 | Part variable T.C. filter .. | 0.02 |
| C18* | V4 cathode by-pass .. | 30.0 |

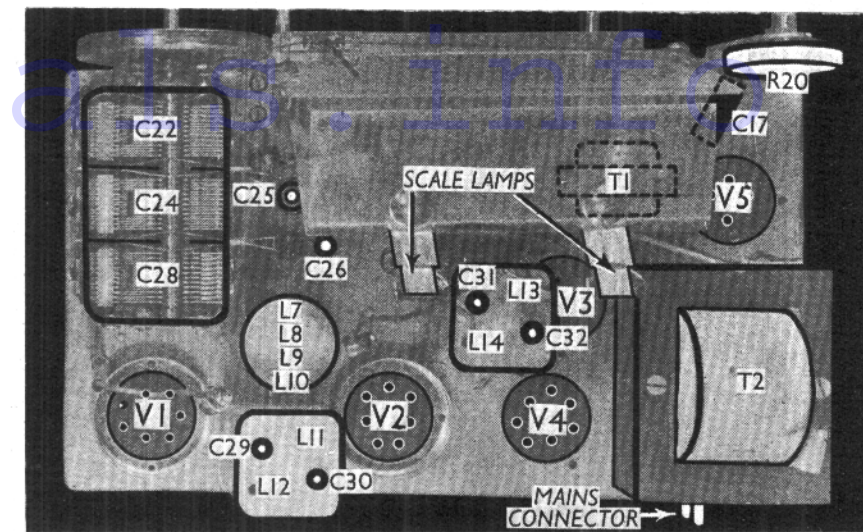
| CONDENSERS (Continued) | | Values (μF) |
|------------------------|---------------------------------|-------------|
| C19* | H.T. smoothing | 7.0 |
| C20* | H.T. smoothing | 7.0 |
| C21† | Band-pass primary trimmer | — |
| C22† | Band-pass primary tuning | — |
| C23† | Band-pass secondary trimmer | — |
| C24† | Band-pass secondary tuning | — |
| C25† | Oscillator circuit L.W. trimmer | — |
| C26† | Oscillator L.W. tracker | — |
| C27† | Oscillator circuit M.W. trimmer | — |
| C28† | Oscillator circuit tuning | — |
| C29† | 1st I.F. trans. pri. tuning | — |
| C30† | 1st I.F. trans. sec. tuning | — |
| C31† | 2nd I.F. trans. pri. tuning | — |
| C32† | 2nd I.F. trans. sec. tuning | — |

* Electrolytic. † Variable. ‡ Pre-set.

| OTHER COMPONENTS | | Approx. Values (ohms) |
|------------------|----------------------------------|-----------------------|
| L1 | Aerial coupling coils | 5.0 |
| L2 | — | 90.0 |
| L3 | Band-pass primary coils | 2.7 |
| L4 | — | 17.0 |
| L5 | Band-pass secondary coils | 2.5 |
| L6 | — | 17.0 |
| L7 | Oscillator grid coils, total | 3.8 |
| L8 | — | — |
| L9 | — | — |
| L10 | Oscillator anode coils | 4.2 |
| L11 | — | 10.5 |
| L12 | 1st I.F. trans. { Pri. | 82.0 |
| L13 | { Sec. | 82.0 |
| L14 | 2nd I.F. trans. { Pri. | 82.0 |
| L15 | { Sec. | 82.0 |
| L16 | Speaker speech coil | 1.8 |
| L17 | H.T. smoothing choke | 650.0 |
| T1 | Output trans. { Pri. | 400.0 |
| | { Sec. | 0.6 |
| | { Pri. total | 40.0 |
| T2 | Mains trans. { Heater sec. . . . | 0.1 |
| | { Rect. fil. sec. . . | 0.15 |
| | { H.T. sec. total . . | 540.0 |
| S1-S4 | Waveband switches | — |
| S5 | Mains switch, ganged R15 | — |

VALVE ANALYSIS

Valve voltages and currents listed in the table below were obtained from a representative chassis operating with 230 V 50 c.p.s. A.C. mains (240 V mains transformer tap). There was no signal input (aerial and earth sockets s/c), and the receiver controls were set as follows:—wave-change switch at M.W.; tuning condenser at minimum capacity; volume control at maximum. All voltage readings were taken on the 1,200 V Avometer scale, chassis being negative.



Plan view of the chassis. The signal frequency coils are underneath.

| Valve | Anode Voltage (V) | Anode Current (mA) | Screen Voltage (V) | Screen Current (mA) |
|----------|-------------------|--------------------|--------------------|---------------------|
| V1 X41* | 245 | 1.1 | 75 | 2.1 |
| V2 VMP4G | 245 | 3.1 | 75 | 2.8 |
| V3 D4I | — | — | — | — |
| V4 N4I | 255 | 32.0 | 245 | 7.0 |
| V5 U12 | 300† | — | — | — |

* Triode osc. anode 90 V, 2.3 mA. † Each anode, A.C.

GENERAL NOTES

Switches.—S1-S4 are the waveband switches in a single rotary unit. They are all *closed* on the M.W. band and *open* on the L.W. band. A separate diagram shows their positions as seen from the rear of the upturned chassis. S5 is the Q.M.B. mains switch ganged with the volume control R15.

Coils.—The signal frequency coils L1-L6 are unshielded and are weave-wound on two cylindrical formers mounted underneath the chassis. The oscillator coils L7-L10 are in a small screening can on the

chassis deck together with the screened I.F. transformers C29, L11, L12, C30 and C31, L13, L14, C32.

Pre-Set Condensers.—C23 and C27 are adjusted from the side of the chassis beneath the gang condenser, and C21 is accessible through a hole in the rear of the chassis near the aerial socket. The oscillator L.W. trimmer C25 and L.W. tracker C26 are adjusted through holes in the chassis deck.

Condensers C15, C19, C20.

—These are three 500 V dry electrolytics in a single cardboard container. The black lead is the common negative, the yellow lead the positive of C15 (3 μF), and the two red leads the positives of C19 and C20 (7 μF each).

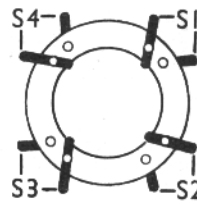


Diagram of the rotary switch unit viewed from the rear of the chassis.

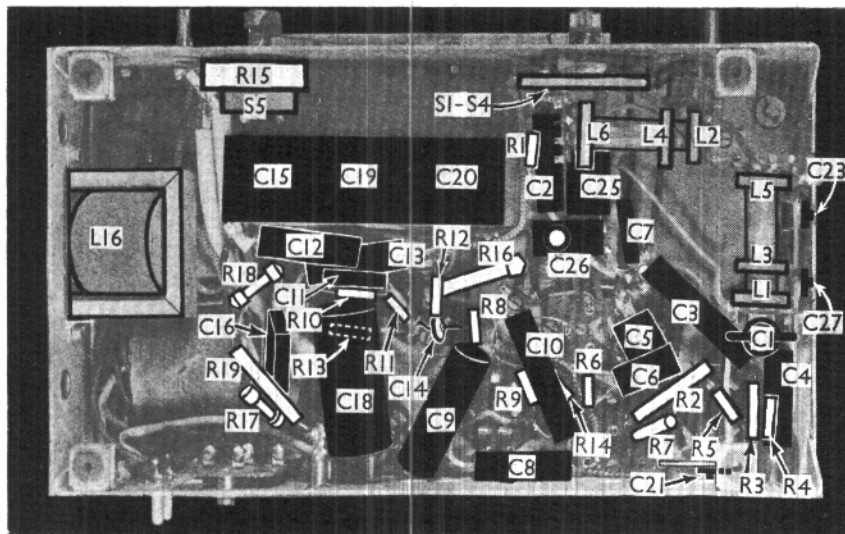
Condenser C18.—This is a 30 μF 50 V dry electrolytic in a tubular cardboard container.

Scale Lamps.—Osram M.E.S. types rated at 3.5 V, 0.3 A.

External Speaker.—This should be of the low-impedance (2-4 Ω) type.

Radio-gramophone Modifications.—In the A.C. Super 4 radio-grams the chassis, although similar to that of the receivers, is somewhat modified for pick-up working. When a G.E.C. pick-up is used there is one extra fixed condenser (0.003 μF) and two extra resistances (440,000 Ω and 22,000 Ω), but when a Garrard pick-up is used there are three additional resistances (440,000 Ω, 99,000 Ω and 55,000 Ω) and no condensers. There are also several extra switches in the chassis for changeover and radio muting purposes.

On gram., the pick-up output is fed into the C.G. circuit of the I.F. amplifier V2, which then operates as a triode L.F. amplifier with its S.G. as anode and resistance R8 as anode load. Condenser C9 is used as coupling condenser, passing the amplified signal via C12 and volume control R15 to the C.G. of V4.



Under-chassis view. Pre-set condensers C25, C26 are adjusted through holes in the chassis deck.