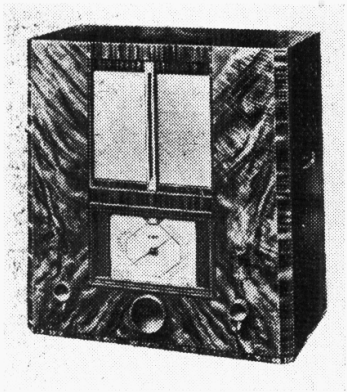
'TRADER' SERVICE SHEET 324

G.E.C. BC3754

AC TRANSPORTABLE 5



OF the transportable type, the G.E.C. AC Transportable 5 is a 5-valve (plus rectifier) AC 2-band superhet receiver with self-contained frame aerials.

The BC3754 is for mains of 190-250 V, 40-100 C/S, while the BC3754 L is for 110-130 and 210-230 V, 40-100 C/S. This *Service Sheet* was prepared on one of the former models but the differences in the mains transformer of the BC3754L are explained under "BC3754L Modifications."

CIRCUIT DESCRIPTION

Tuned frame aerial input **L2, L3, C27** to variable-mu pentode valve (**V1, Osram metallised VMP4G**) operating as RF amplifier.

Neon tuning indicator (**T.I., Osram "Button" Tuneon**) is operated by potential developed in anode circuit and adjusted by resistances **R5, R6, R7.**

Choke-fed tuned-grid coupling by RF chokes **L5** (MW), plus **L4** (LW), **C3** and **L6, L7, C30** between **V1** and triode hexode valve (**V2, Osram X41**) operating as frequency changer with internal coupling. Triode anode coils **L10** (MW), **L11** (LW) are tuned by **C35**; parallel trimming by **C34** (MW) and **C31** (LW); series tracking by **C12, C33** (MW) and **C11, C32** (**LW**). Reaction by grid coils **L8, L9.** Two-position muting by **R13, S5.**

Third valve (**V3, Osram metallised VMP4G**) is a variable-mu RF pentode operating as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **C36, L12, L13, C37** and **C38, L14, L15, C39.**

Intermediate frequency 125KC/S.

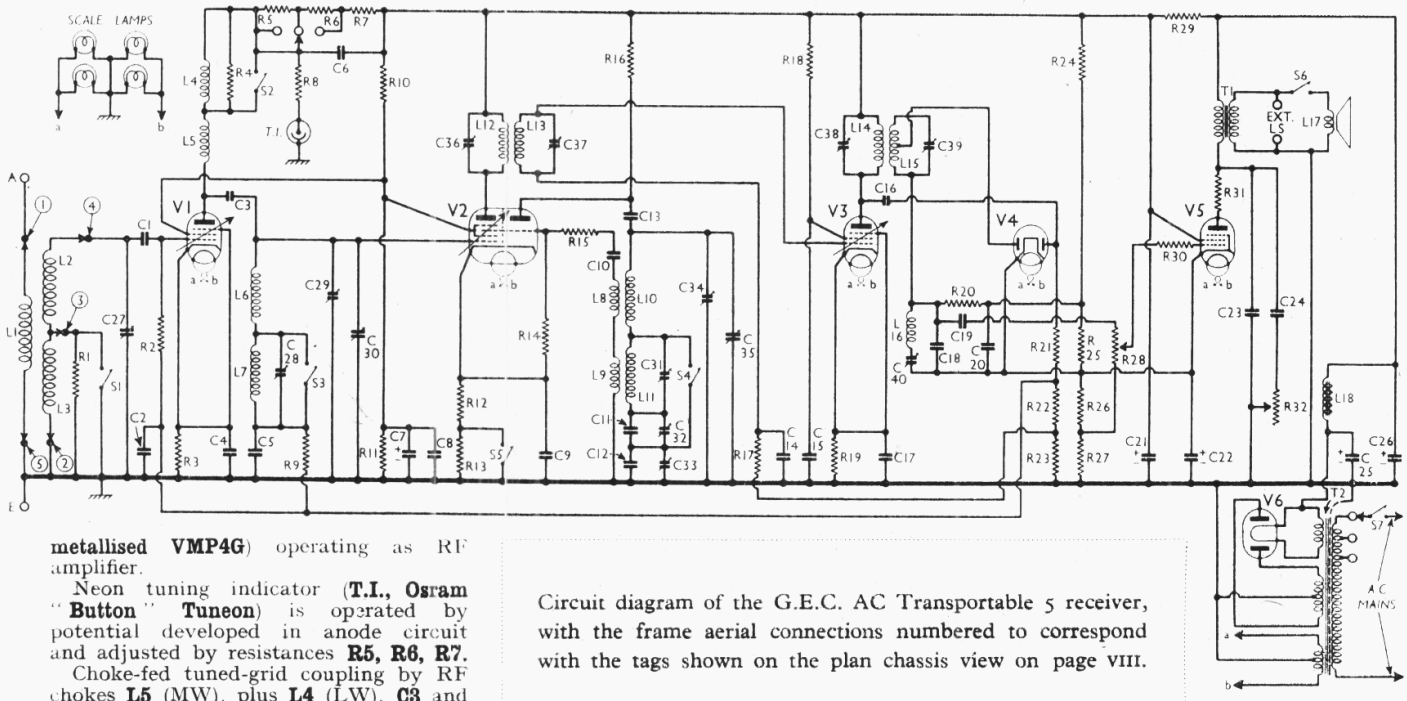
Diode second detector is part of separate double diode valve (**V4, Osram metallised D41**). Audio frequency component in rectified output is developed across load resistance **R20** and passed via AF coupling condenser **C19,** manual volume control **R28** and grid stopper **R30** to CG of pentode output valve (**V5, Osram N41**). IF filtering by tuned circuit **L16, C40** and **C18.** Fixed tone correction by **C23,** and variable tone control by **C24, R32,** in anode circuit. Provision for external speaker across secondary of **T1.**

Second diode of **V4,** fed from **V3** anode via **C16,** provides DC potentials which are developed across load resistances **R21, R22, R23** and fed back through decoupling circuits as GB to RF, FC and IF valves, giving automatic volume control. Delay voltage is obtained from potential divider **R24, R25, R26, R27,** which also provides bias for signal diode and GB potential for **V5.**

HT current is supplied by full-wave rectifying valve (**V6, Osram U12**). Smoothing by speaker field **L18** and dry electrolytic condensers **C25, C26** with the addition of **C21** except in the supply to **V5** anode.

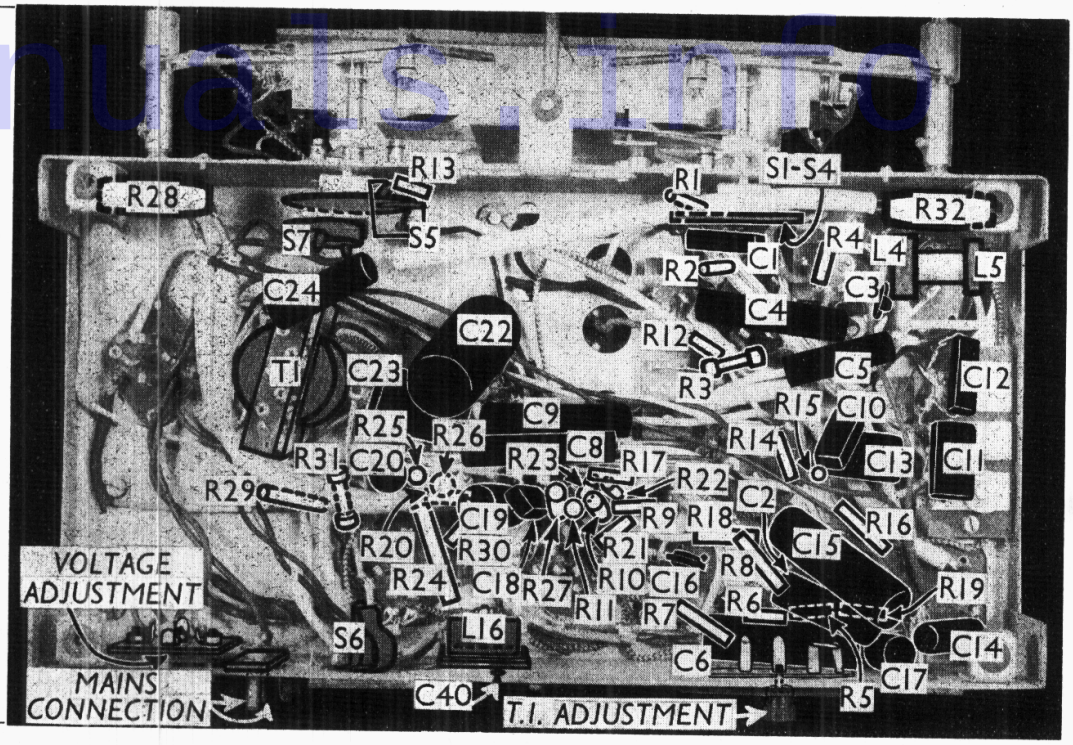
COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	Frame aerial LW shunt ..	55,000
R2	V1 CG resistance	330,000
R3	V1 fixed GB resistance ..	800
R4	V1 anode LW choke shunt ..	22,000
R5	T.I. adjustment resistances	5,500
R6		5,500
R7		15,000
R8	T.I. surge limiter	9,900
R9	V2 hexode CG decoupling ..	440,000
R10	V1, V2 SG's HT potential divider	33,000
R11		22,000
R12	V2 fixed GB resistances	500
R13		600
R14	V2 osc. CG resistance ..	55,000
R15	V2 osc. CG stabiliser ..	2,200
R16	V2 osc. anode HT feed ..	55,000
R17	V2 CG decoupling	440,000
R18	V3 SG HT feed	99,000
R19	V3 fixed GB resistance ..	600
R20	V4 signal diode load	220,000
R21	V4 AVC diode load resistances	440,000
R22		220,000
R23		99,000
R24	V4 signal diode bias, V5 GB and AVC delay voltage potential divider ..	99,000
R25		2,200
R26		99
R27		400
R28	Manual volume control ..	400,000
R29	V1, V2, V3, and V5 SG HT feed	990
R30	V5 grid stopper	99,000
R31	V5 anode stopper	99
R32	Variable tone control	55,000



Circuit diagram of the G.E.C. AC Transportable 5 receiver, with the frame aerial connections numbered to correspond with the tags shown on the plan chassis view on page VIII.

Under - chassis view. **S5** and **S7** are ganged, while **S1-S4** are shown in detail overleaf. **S6** is the internal speaker muting switch. Mains voltage and **T.I.** adjustments are provided at the rear of the chassis.



	CONDENSERS	Values (μF)
C1	V1 CG condenser	0·0005
C2	V1 CG decoupling	0·05
C3	V1 to V2 RF coupling	0·000007
C4	V1 cathode by-pass	0·1
C5	V2 hexode CG decoupling	0·05
C6	T.I. HT feed decoupling	0·25
C7*	V1, V2 SG's decoupling	3·0
C8	V1, V2 SG's RF by-pass	0·1
C9	V2 cathode by-pass	0·1
C10	V2 osc. CG condenser	0·0001
C11	Osc. circuit LW fixed tracker	0·0011
C12	Osc. circuit MW fixed tracker	0·0013
C13	V2 osc. anode coupling	0·001
C14	V3 CG decoupling	0·05
C15	V3 SG decoupling	0·1
C16	Coupling to V4 AVC diode	0·000007
C17	V3 cathode by-pass	0·1
C18	Part IF filter circuit	0·0003
C19	AF coupling to V5	0·02
C20	V4 signal diode load decoupling	0·05
C21*	V1, V2, V3, and V5 SG, HT smoothing	7·0
C22*	V4, V5 cathodes by-pass	30·0
C23	Fixed tone corrector	0·002
C24	Part of variable tone control	0·02
C25*	HT smoothing	7·0
C26*	HT smoothing	7·0
C27†	Frame aerial circuit tuning	—
C28‡	V2 grid circuit LW trimmer	—
C29‡	V2 hex. grid MW trimmer	—
C30†	V2 hex. grid tuning	—
C31‡	Osc. circuit LW trimmer	—
C32‡	Osc. circuit LW tracker	—
C33‡	Osc. circuit MW tracker	—
C34‡	Osc. circuit MW trimmer	—
C35†	Oscillator circuit tuning	—
C36‡	1st IF trans. pri. tuning	—
C37‡	1st IF trans. sec. tuning	—
C38‡	2nd IF trans. pri. tuning	—
C39‡	2nd IF trans. sec. tuning	—
C40‡	IF filter circuit tuning	—

* Electrolytic. † Variable. ‡ Pre-set.

	OTHER COMPONENTS	Approx. Values (ohms)
L1	External aerial coupling	0·29
L2, L3	Frame aerial windings	0·94
L4	V1 anode LW RF choke	47·0
L5	V1 anode MW choke	135·0
L6, L7	V2 hex. grid circuit tuning coils	40·0 / 2·7 / 38·5
L8, L9	Osc. circuit MW grid reaction / Osc. circuit LW grid reaction	total 3·9
L10	Osc. circuit MW tuning coil	3·5
L11	Osc. circuit LW tuning coil	8·5
L12, L13	1st IF trans. Pri. / Sec.	82·0 / 82·0
L14, L15	2nd IF trans. Pri. / Sec.	82·0 / 82·0
L16	IF filter tuning coil	41·0
L17	Speaker speech coil	1·9
L18	HT smoothing choke	380·0
T1	Output trans. Pri. / Sec.	400·0 / 0·8
T2	Mains trans. Pri., total / Heater sec. / Rect. heat. sec. / HT sec., total	21·0 / 0·06 / 0·14 / 410·0
S1-S4	Waveband switches	—
S5	"Muting" switch, ganged S7	—
S6	Internal speaker switch	—
S7	Mains switch, ganged S5	—

DISMANTLING THE SET

It should be noted that the chassis, speaker and frame aerial can be removed as a complete assembly, and although it is possible to remove the chassis alone, it is better to remove the complete assembly first.

Removing Assembly.—To remove the complete assembly, first remove the tuning knob (recessed screw) and the other knobs and thumb controls (pull off). Then remove the four bolts (with spring washers and brass washers) holding the assembly to the bottom of the cabinet, and the batten across the back of the cabinet (two countersunk-head wood screws).

Next remove the four smaller bolts (with spring washers and brass washers) holding the sub-baffle to the front of the cabinet, when by tilting the back upwards, the whole assembly can be removed from the cabinet. Care should be taken not to damage the frame aerial.

When replacing, fix the batten across the back of the cabinet so that the screws are below the clips holding the back.

Removing Chassis from Assembly.—If it is desired to remove the chassis from the assembly, remove the screen from **V1** and the valve itself, giving access to the frame connections, which unsolder. Then remove the four bolts (with washers) holding the chassis to the bottom of the assembly, when the chassis can be withdrawn to the extent of the speaker leads, which is sufficient for normal purposes.

Before access can be gained to the components beneath the chassis it will be necessary to remove the screen covering the bottom of the chassis (eleven round-head screws with lock washers).

If it is desired to operate the receiver while the frame aerial is disconnected, this can be done by connecting an external aerial to the brass soldering tag on the top of **C27.**

When replacing, note that the leads connecting the frame aerial to the chassis go straight across to the nearest tag on the chassis.

To free the chassis entirely, unsolder the speaker leads and *when replacing*, take the black lead to the lower tag.

Removing Speaker.—To remove the speaker from the cabinet, unsolder the leads and remove the nuts, washers and cardboard washers from the three screws holding the speaker to the sub-baffle. It may first be necessary to soften the sealing compound on the screws by heating the screws with a soldering iron.

When replacing, see that the terminal panel is pointing to the bottom left-hand corner of the cabinet and take the black lead to the lower tag.

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G.E.C. BC3754—*Continued*

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 230 V, using the 220 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the medium band, the volume control was at maximum and the muting switch was in position "1." There was no signal input as the frame connections were shorted.

Voltages were measured on the 400 V scale of a model 7 Universal Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 VMP4G	183	2·1	65	1·2
	(260	1·1)		
V2 X41	Oscillator		65	1·7
	(90	2·8)		
V3 VMP4G	260	3·3	69	2·0
V4 D41	—	—	—	—
V5 N41	287	34·0	260	7·2
V6 U12	315†	—	—	—

† Each anode, AC.

GENERAL NOTES

Switches.—**S1-S4** are the waveband switches, in a single rotary unit beneath the chassis, indicated in our under-chassis view, and shown in detail in the diagram in col. 3. All the switches are *closed* on the MW band and *open* on the LW band.

S5 is the muting switch, which closes in the muting 1 position and opens on muting 2. It is ganged with **S7,** the QMB mains switch.

S6 is the internal speaker jack switch, at the rear of the chassis, which opens when the plug of an external speaker is fully inserted.

Coils.—**L1-L3** are the frame aerial windings, **L1** consisting of 3 turns of 22 SWG enamelled wire, **L2** of 12 turns of the same wire, and **L3** of 30 turns of 38 SWG enamelled and single silk-covered wire. **L1** is between **L2** and **L3.** The ends of the windings are brought to five tags on the wooden framework, which are connected across to five tags on the chassis deck. These are numbered in our plan chassis view, and the connections are indicated by similar numbers in the circuit diagram.

L4, L5 are two chokes in a single unscreened unit beneath the chassis. **L6, L7; L8-L11** and the IF transformers **L12, L13** and **L14, L15** are in four screened units on the chassis deck.

L16 is in a small brass screened unit beneath the chassis attached to the rear member.

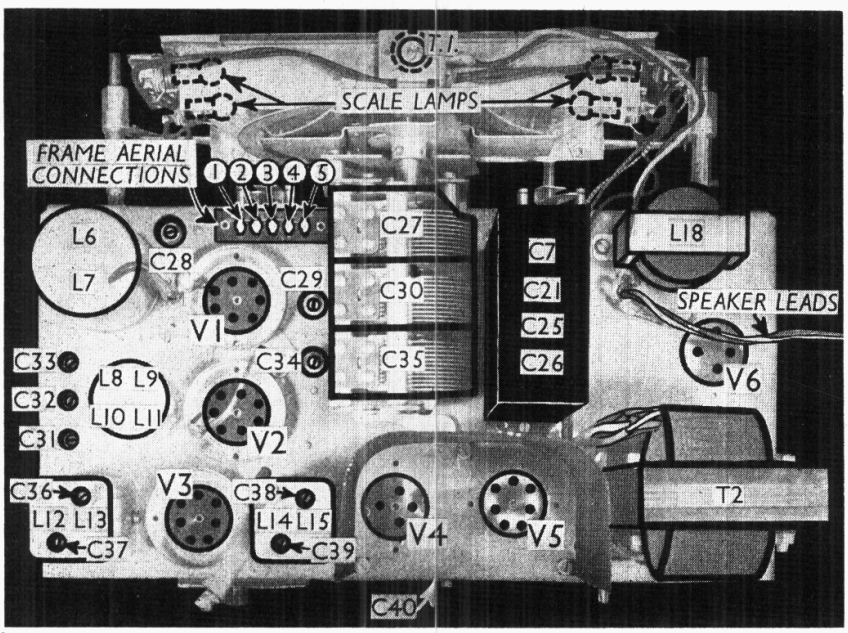
Scale Lamps.—These are four Osram MES types, rated at 3·5 V 0·3 A. They are wired in pairs in parallel across each half of the heater secondary of **T2.**

External Speaker.—Two sockets are provided at the rear of the chassis for a low impedance (2-4 O) external speaker. On fully inserting the plug, **S6** opens and mutes the internal speaker.

Tuning Indicator.—This is an Osram Button Tuneon type, fitted with a special screw cap. An adjustment is provided at the rear of the chassis, consisting of a screw and three sockets for tapping the **T.I.** anode, via **R8** on to the junction of **R4, R5; R5, R6** or **R6, R7.**

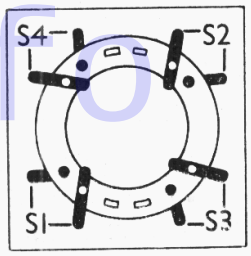
Condensers C7, C21, C25, C26.—These are four dry electrolytics in a single rectangular metal case on the chassis deck, having a common negative (black) lead. The yellow lead is the positive of **C7** (3μF). Of the other three positive (red) leads, that to **V5** valve-holder belongs to **C21** (7μF); that to **V6** holder, **C25** (7μF); and that to **T1** primary, **C26** (7 μF).

Condenser C16.—This is a small unit of the disc type comprising two tagged washers clamped up with a disc of mica between them.



Plan view of the chassis. Note the numbered frame aerial connections. Many of the trimmers are adjusted through holes in the chassis deck.

S1-S4 diagram, looking from the rear of the underside of the chassis.



Condenser C12.—In some chassis an extra 0·0003 μF fixed condenser may be connected in parallel with this.

BC3754L Modification.—The only difference in the low voltage model is in the primary winding of **T2.** Its total resistance is 17·6 O instead of 21·0 O.

CIRCUIT ALIGNMENT

IF Stages.—Switch set to MW, and turn gang to maximum. Turn volume control to maximum and muting switch to position 1 (maximum sensitivity). Short circuit **C35.** Connect signal generator via a 0·1 μF condenser to control grid (top cap) of **V2** and chassis. Leave existing connection in place. Connect the output meter. A high impedance type connected to the secondary of **T1** is preferable.

Feed in a 125 KC/S signal, and adjust **C36, C37, C38** and **C39** for maximum output, progressively reducing the input.

RF and Oscillator Stages.—With gang at maximum, pointer should be vertical. Connect signal generator, via a standard dummy aerial, to external **A** and **E** sockets. If the frame picks up a station, rotate for minimum interference.

MW.—Switch set to MW, tune to 214 m on scale, feed in a 214 m (1,400 KC/S) signal, and adjust **C34,** then **C29,** for maximum output.

Disconnect **C35** by unsoldering the green lead emerging from it beneath the chassis, at the point where it is joined to a tag on a connector panel. Connect an external variable condenser between the disconnected tag and chassis.

Feed in a 500 m (600 KC/S) signal, and adjust the ext. variable condenser and the tuning control, at the same time, for maximum output. Disconnect ext. variable condenser and re-connect **C35.**

Without altering tuning control, adjust **C33** for maximum output.

Repeat the adjustment of **C34** and **C29** at 214 m.

LW.—Switch set to LW, tune to 1,000 m on scale, feed in a 1,000 m (300 KC/S) signal, and adjust **C31,** then **C28,** for maximum output.

Disconnect **C35** as before, connect ext. variable condenser, feed in an 1,818 m (165 KC/S) signal, and tune it in with the ext. variable condenser and the receiver tuning control at the same time. Disconnect ext. variable condenser, re-connect **C35,** and without altering receiver tuning control, adjust **C32** for maximum output.

Repeat the adjustment of **C31** and **C28** at 1,000 m.

IF Filter.—Switch set to LW, with volume control at maximum and feed in a 1,200 m (250 KC/S) signal. Tune this in, and adjust **C40** for *minimum* output.

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