Supplement to Wireless & Electrical Trader, 27 November 1954

"TRADER" SERVICE SHEET 1174

G.E.C. BC4644

2-band Transportable A.C. Superhet

HOUSED in a novel 2-piece plastic carrying case which hinges open to give speedy access to the chassis, the G.E.C. BC4644 is a 4-valve (plus metal rectifier) 2-band A.C. transportable superhet employing ferrite rod internal aerials. It is designed to operate from A.C. mains of 190-250 V, 40-100 c/s. Waveband ranges are 186-570 m and 1,000-2,000 m.

Release date and original price: August, 1954, £11 18s 6d. Purchase tax extra.

COMPONENTS AND VALUES

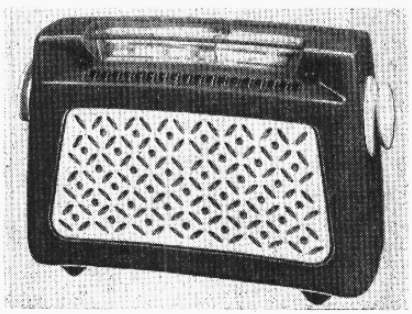
	CAPACITORS	Values	Locations
C1	Aerial coupling ...	5pF	D3
C2	L.W. aerial trim....	170pF	E3
C3	M.W. aerial trim.	10pF	D4
C4	V1 C.G.	300pF	D4
C5	V1 S.G. decoupling	0·05μF	D4
C6	1st I.F. trans. tuning	120pF	B2
C7		120pF	B2
C8	V1 osc. C.G. ...	47pF	E4
C9	Osc. tracker ...	590pF	C2
C10	M.W. osc. trim. ...	22pF	E4
C11	L.W. osc. trim. ...	520pF	D3
C12	Osc. anode coup.	0·005μF	C2
C13	A.G.C. decoupling	0·04μF	E4
C14	V2 cath. by-pass	0·04μF	E4
C15	2nd I.F. trans. tuning	120pF	B2
C16		120pF	B2
C17	I.F. by-pass ...	300pF	F4
C18	A.G.C. coupling ...	47pF	F4
C19	A.F. coupling ...	0·04μF	F4
C20	V3 anode decoup.	0·25μF	G4
C21	I.F. by-pass ...	470pF	F4
C22	A.F. coupling ...	0·01μF	F4
C23*	H.T. smoothing ...	32μF	A2
C24*		32μF	A2
C25	Tone corrector ...	0·01μF	B2
C26	Mains R.F. by-pass	0·01μF	G3
C27‡	M.W. aerial trim.	—	D4
C28†	Aerial tuning ...	—	C2
C29†	Osc. tuning ...	—	C2
C30‡	M.W. osc. trim. ...	—	D4

	RESISTORS	Values	Locations
R1	Aerial pot. divider	150kΩ	D3
R2		1·5MΩ	D3
R3	V1 C.G.	1MΩ	D4
R4	V1 S.G. feed ...	68kΩ	D4
R5	V1 osc. C.G. ...	100kΩ	D4
R6	Osc. anode feed ...	27kΩ	D4
R7	V2 G.B.	470Ω	E4
R8	Volume control ...	1MΩ	A1
R9	V3 C.G.	10MΩ	F4
R10	V3 anode decoup.	56kΩ	F3
R11	V3 anode load ...	150kΩ	F4
R12	A.G.C. decoup. ...	1MΩ	E4
R13	A.G.C. diode load	470kΩ	F4
R14	V4 C.G.	270kΩ	E4
R15	H.T. smoothing ...	2·7kΩ	B2
R16	V4 C.G. stopper ...	10kΩ	B1
R17	V4 G.B.	120Ω	B2

	OTHER COMPONENTS	Approx. Values (ohms)	Locations
L1	Internal aerials	0·8	F3
L2		6·8	E3
L3	Osc. tuning coil ...	2·5	C2
L4	Osc. reaction coup.	0·8	C2
L5	1st I.F. trans. Pri.	8·6	B2
L6	1st I.F. trans. Sec.	8·6	B2
L7	2nd I.F. trans. Pri.	9·0	B2
L8	2nd I.F. trans. Sec.	9·0	B2
L9	Speech coil ...	3·0	—
T1	O.P. trans. a ...	21·0	B1
	O.P. trans. b ...	680·0	
	O.P. trans. c ...	0·5	
T2	Mains trans. a	0·3	A2
	Mains trans. b	175·0	
S1, S2	Waveband switches	—	D3
S3, S4	Mains sw., g'd R8	—	A1
MR1	H.T. rect. G480 ...	—	A2

*Electrolytic. †Variable. ‡Pre-set.

If the component numbers given in the accompanying tables are used when ordering replacement parts, dealers are advised to mention the fact on the order, as these numbers may differ from those used in the manufacturers' diagram.



Appearance of the G.E.C. BC4644

CIRCUIT DESCRIPTION

Ferrite rod internal aerial coils **L1** (M.W.) and **L2** (L.W.) are tuned by **C28** and precede triode hexode valve **(V1, Osram X79)** which operates as frequency changer with internal coupling. Provision is made for the connection of an external aerial via **R1** and chassis isolator **C1**. **R2** prevents the build-up of static charges on the aerial.

Oscillator grid coil **L3** is tuned by **C29** for both M.W. and L.W. operation. Parallel trimming by **C10, C30** (M.W.) and **C10, C11, C30** (L.W.); series tracking on both bands by **C9**. Reaction coupling from anode circuit by **C12** and **L4**.

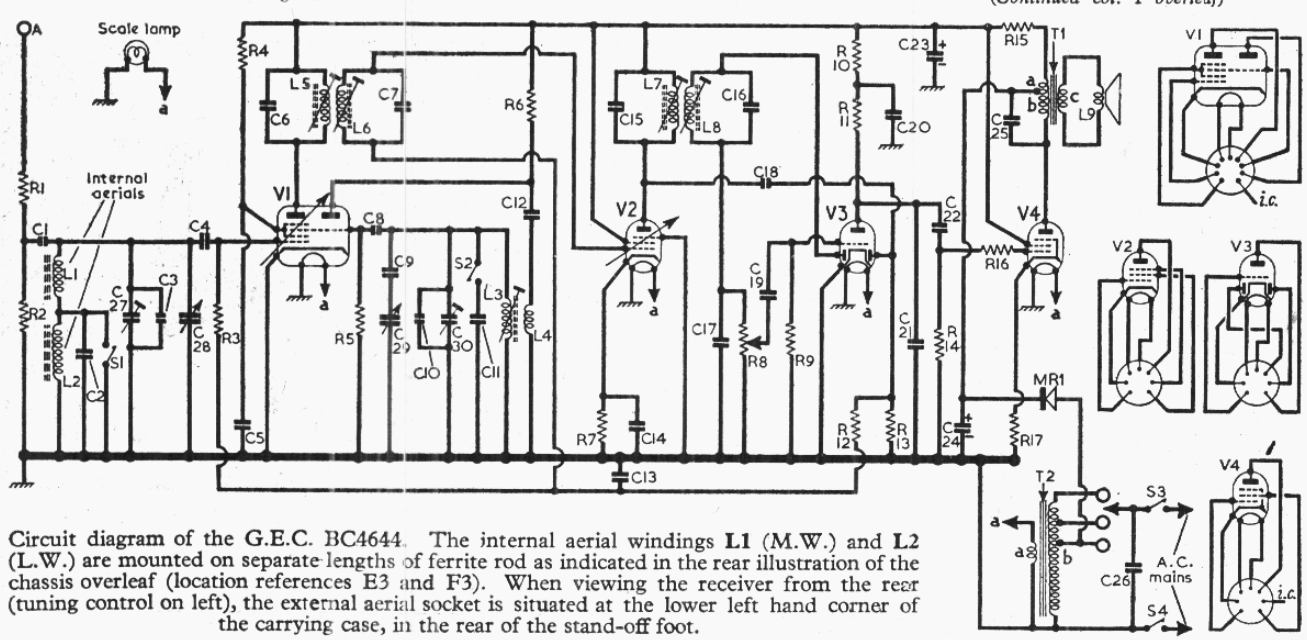
Second valve **(V2, Osram W77)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C6, L5, L6, C7** and **C15, L7, L8, C16**.

Intermediate frequency 470 kc/s.

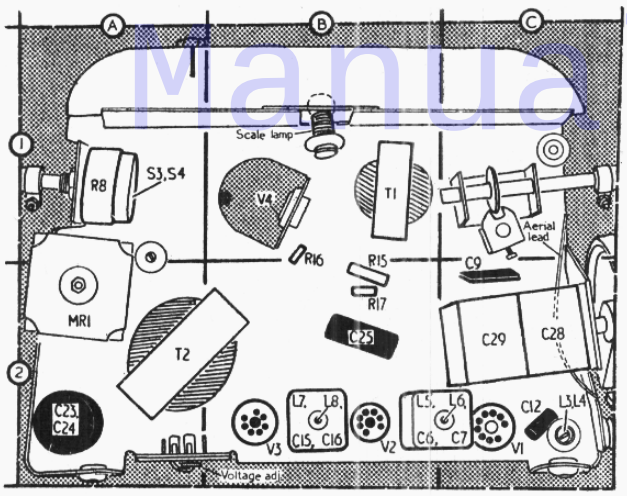
Diode signal detector is part of double diode triode valve **(V3, Osram DH77)**. Audio frequency component in its rectified output is developed across volume control **R8**, which acts as diode load, and is passed via **C19** to grid of triode section. I.F. filtering by **C17** and **C21**.

Second diode of **V3** is fed from **V2** anode via

(Continued col. 1 overleaf)



Circuit diagram of the G.E.C. BC4644. The internal aerial windings **L1** (M.W.) and **L2** (L.W.) are mounted on separate lengths of ferrite rod as indicated in the rear illustration of the chassis overleaf (location references E3 and F3). When viewing the receiver from the rear (tuning control on left), the external aerial socket is situated at the lower left hand corner of the carrying case, in the rear of the stand-off foot.



Front view of chassis. In order to gain access to the voltage adjustment (location reference A2) the carrying case should be hinged open as described under "Dismantling." The two grommets, which engage in pegs on the speaker assembly, can be seen at the base of the chassis in locations A2 and C2.

Circuit Description—*continued*

C18, and the resulting D.C. potential, developed across **R13,** is fed back as bias to **V1** and **V2.**

Resistance-capacitance coupling via **R11, C22** and **R14** between **V3** and pentode output valve **(V4, Osram N78).** Tone correction by **C25** in **V4** anode circuit and by the negative feed-back voltage developed across **R17.**

H.T. current is supplied by half-wave metal rectifier **MR1 (Westinghouse U480).** Smoothing by **R15** and electrolytic capacitors **C23, C24.** Residual hum is neutralized by passing H.T. current through section **a** of **T1** primary winding. Although the valve heaters are parallel-fed from winding **a** on the mains transformer **T2.** the A.C./D.C. technique is employed in the H.T. supply circuit, and the chassis, therefore, is "live" to the mains. Mains R.F. filtering by **C26.**

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating from 230 V A.C. mains. The receiver was tuned to a point at the high wavelength end of M.W. where there was no signal pick-up.

Valve voltages and currents were measured with an Avo Electronic **TestMeter, and as this** instrument has a high internal resistance, allowance should be made for the current drawn by other types of meter. Chassis was the negative connection in each case. The voltage measured across **C24** was 232 V and the total current drawn from the rectifier was 45 mA.

Valve		Anode		Screen		Cath.
		V	mA	V	mA	V
V1	X79	187 (Oscillator) 97	1·5 4·0	57	2·1	—
V2	W77	187	5·3	187	1·4	3·0
V3	DH77	72	0·62	—	—	—
V4	N78	213	27·0	187	4·2	3·6

CIRCUIT ALIGNMENT

Remove chassis from cabinet (see "Dismantling") and stand it upright on the bench.

I.F. Stages.—Switch receiver to L.W. and turn gang to maximum capacitance. Connect output of signal generator, via an 0.1 μF capacitor in each lead, to control grid (pin 2) of **V1** and chassis. Feed in a 470 kc/s (638.3 m) signal and adjust the cores of **L8** (location reference B2), **L7** (F4), **L6** (C2) and **L5** (E4). Repeat these adjustments until no further improvement results.

R.F. and Oscillator Stages.—Check that with the gang at maximum capacitance, the cursor lies between the two dots at the high wavelength end of the M.W. scale. Transfer signal generator "live" lead to aerial socket.

M.W.—Switch receiver to M.W. and tune to 500 m. Feed in a 500 m (600 kc/s) signal and adjust the core of **L3** (C2) for maximum output. The internal aerial coil **L1** (F3) should also be adjusted for maximum output at this frequency by sliding it along the ferrite rod. Tune receiver to 200 m, feed in a 200 m (1,500 kc/s) signal and adjust **C30** (D4) and **C27** (D4) for maximum output. Repeat these adjustments until no further improvement results.

L.W.—Switch receiver to L.W. and tune to 1,304 m. Feed in a 1,304 m (230 kc/s) signal and adjust the internal aerial coil **L2** (E3) for maximum output by sliding it along the ferrite rod.

GENERAL NOTES

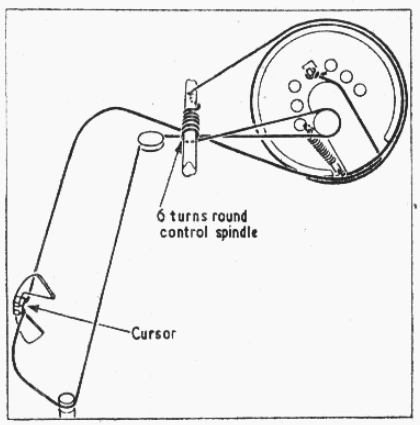
Switches.—**S1, S2** are the waveband switches ganged in a single rotary unit on the rear-side of the chassis. The switches are lever-operated via the tuning control knob, the knob being pushed in for M.W. operation **(S1** closed, **S2** open) and pulled out for L.W. operations **(S1** open, **S2** closed). The switch contacts are identified in the rear-side illustration of the chassis (location reference D3).

S3, S4 are the Q.M.B. mains switches, ganged with the volume control **R8.**

Scale lamp.—This is a 6.5 V, 0.3 A lamp, with a small clear spherical bulb and an M.E.S. base. It is made accessible for replacement by sliding the lamp holder and mounting grommet upwards out of the mounting bracket and withdrawing the lamp rearwards out of its felt mask.

Drive Cord Replacement.—About 60 inches of nylon braided glass yarn is required for a new drive. With the gang turned to minimum capacitance, one end of the drive cord should be tied to the lug on the drive drum and the cord then run as indicated in the sketch of the tuning drive system below, starting in a clockwise direction on the drum. Finally, before returning to the drum, the cord passes through a hole in the drive spindle.

Internal Aerials.—The M.W. and L.W. aerial coils **L1** and **L2** are mounted on individual lengths of ferrite rod to form two separate internal aerials. These are identified in the rear chassis illustration.

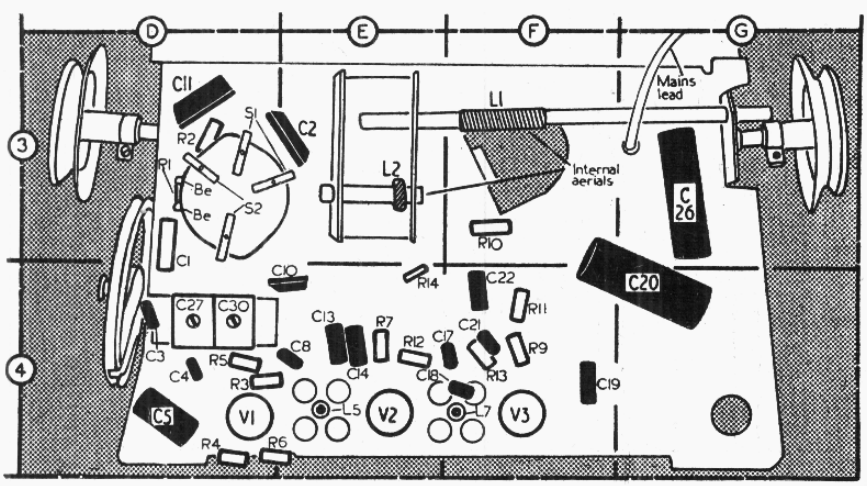


Sketch of the tuning control system as seen from the mains rectifier end of the chassis with the gang set at minimum capacitance.

DISMANTLING

Removing Chassis.—This is effected simply by removing the two plated bolts from the lower corners of the clear tuning scale section of the carrying case, and hinging open the carrying case. The chassis, complete with speaker, may now be lifted out of the carrying case.

The chassis is only held to the speaker assembly by means of two pegs and grommets along its lower edge, and, after the speaker leads and the lead from the external aerial socket have been disconnected, it can be disengaged from and lifted clear of the speaker **assembly.**



Rear view of the chassis showing the internal aerials in locations E3 and F3. The waveband switches **S1, S2** are identified in location D3. They are operated by a cam/lever device (shown in the front chassis illustration, location C1) associated with the tuning control. The control is pushed in for M.W. operation and pulled out for L.W. operation.

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