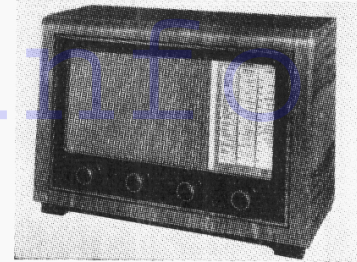


"TRADER" SERVICE SHEET
1026

G.E.C. BC5442
& BC5441 A.C. Table Superhets



ALTHOUGH it is designed primarily for operation from an external aerial, the G.E.C. BC5442 is provided with a frame aerial, which is wound on its back cover and permits local station reception in areas of good signal strength. The receiver is a 4-valve (plus rectifier) 3-band superhet designed to operate from A.C. mains of 190-250 V, 40-100 c/s. The waveband ranges are 13.5-50 m, 186-572 m and 1,000-2,000 m.

The BC5442L is identical in every respect but the mains voltage range, which is arranged to cover mains of 110-240 V in three tappings. The differences in the BC5441 and BC5441L, which preceded the BC5442, are described overleaf.

Release dates and original prices: BC5442 and L. August 1951, £17 17s 3d; BC5441 and L. July 1950, £15 11s 5d. Purchase tax extra.

CIRCUIT DESCRIPTION

Aerial input on M.W. and L.W. is bottom-coupled via C2 to single-tuned circuits L4, C27 (M.W.) and L5, C27 (L.W.). On S.W., coupling is inductive via C1 and L2 to the tuning circuit L3, C27. On L.W., S1 closes, but on M.W. it remains open and provides "top" coupling. R1 suppresses modulation hum. In areas of good signal strength the receiver can be operated from a self-contained frame aerial winding, wound on the back cover.

First valve (V1, Osram X79, or X78 in some models) is a triode hexode operating as frequency changer with internal coupling. Oscillator grid coils L6 (S.W.), L7 (M.W.) and L8 (L.W.) are tuned by C28. Parallel trimming by C29 (S.W.), C30 (M.W.) and C9 (L.W.); series tracking by C12 (S.W.), C11 (M.W.) and C10 (L.W.). Reaction coupling from anode by L9 (S.W.) and via the common impedance of the trackers on the other bands.

Second valve (V2, Osram W77) is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned-primary, tuned-

secondary transformer couplings C5, L10, L11, C6 and C15, L12, L13, C16.

Intermediate frequency 470 kc/s. Diode signal detector is part of double diode triode valve (V3, Osram DH77). Audio frequency component in rectified output is developed across manual volume control R9, which acts as load resistance, and passed via C18 to control grid of triode section, which operates as A.F. amplifier. I.F. filtering by C17, R8 and the screening of the leads. Provision for connection of gramophone pick-up across R9.

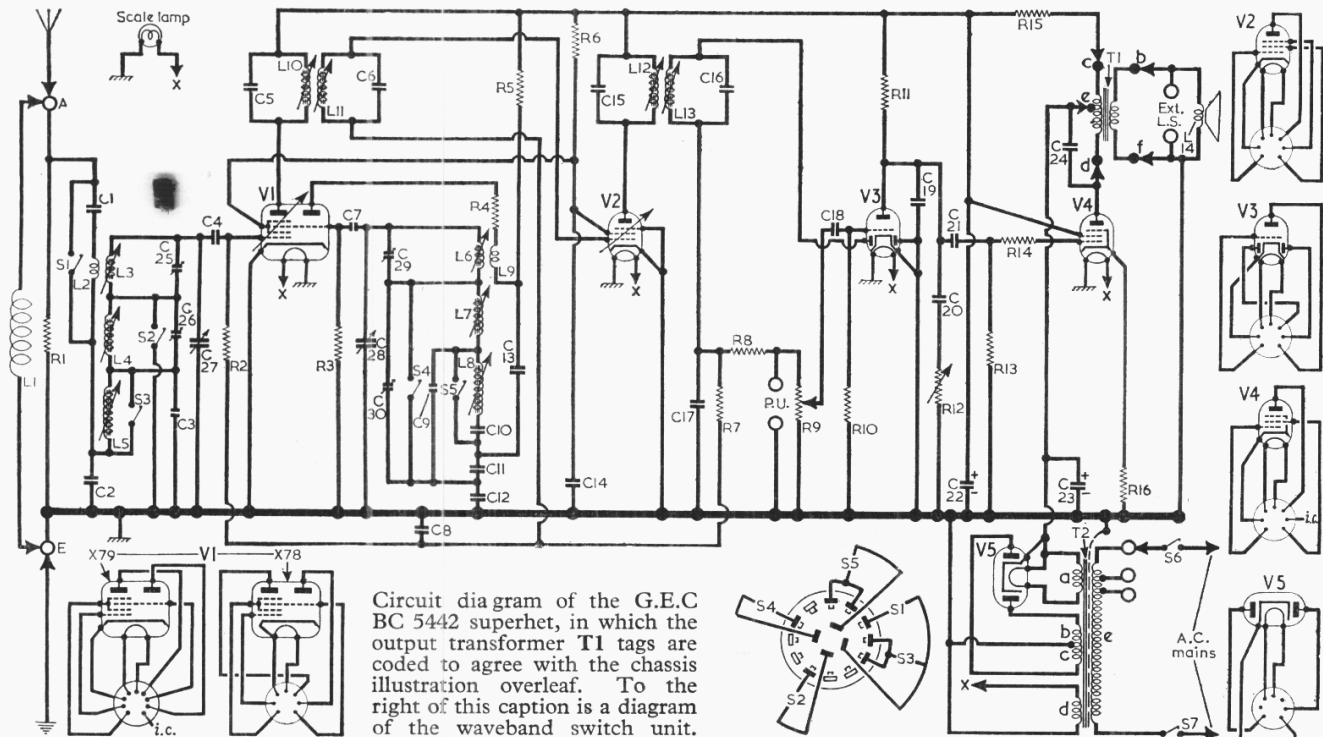
D.C. potential developed across R8, R9 is tapped off and fed back via decoupling circuit to F.C. and I.F. valves, giving automatic gain control. Second diode anode of V3 is strapped to cathode, and further I.F. filtering is effected by C19. Variable tone control by C20 and R12. Resistance-capacitance coupling by R11, C21 (Continued col. 1 overleaf)

COMPONENTS AND VALUES

RESISTORS		Values	Locations
R1	Aerial shunt ...	10kΩ	D4
R2	V1 C.G. ...	1MΩ	D4
R3	V1 osc. C.G. ...	100kΩ	D4
R4	S.W. stabilizer ...	390Ω	D4
R5	Osc. H.T. feed ...	33kΩ	D4
R6	V1, V2 S.G. feed ...	100kΩ	D4
R7	A.G.C. decoupling ...	1MΩ	E4
R8	I.F. stopper ...	56kΩ	E4
R9	Volume control ...	1MΩ	E3
R10	V3 C.G. ...	10MΩ	F4
R11	V3 anode load ...	150kΩ	E4
R12	Tone control ...	500kΩ	F3
R13	V4 C.G. ...	220kΩ	F4
R14	V4 C.G. stopper ...	10kΩ	F3
R15	H.T. smoothing ...	6.8kΩ	B1
R16	V4 G.B. ...	150Ω	F3

CAPACITORS		Values	Locations
C1	Aerial coupling ...	0.001μF	D4
C2		3,950pF	E3
C3	L.W. aerial trim. ...	47pF	E3
C4	V1 C.G. ...	100pF	D4
C5	1st I.F. trans. tuning ...	120pF	C2
C6		47pF	C2
C7	V1 osc. C.G. ...	47pF	D4
C8	A.G.C. decoupling ...	0.05μF	E4
C9	L.W. osc. trim. ...	82pF	D3
C10	Oscillator trackers	270pF	D3
C11		390pF	D3
C12	Osc. coup. ...	0.006μF	D3
C13		0.005μF	D3
C14	V1, V2 S.G. decoup. ...	0.05μF	E4
C15	2nd I.F. trans. tuning ...	120pF	B2
C16		120pF	B2
C17	I.F. by-pass ...	300pF	F4
C18	A.F. coupling ...	0.02μF	F4
C19	I.F. by-pass ...	500pF	F4
C20	Part tone control ...	0.005μF	F3
C21	A.F. coupling ...	0.02μF	F4
C22*	H.T. smoothing ...	32μF	B2
C23*		16μF	B2
C24	Tone corrector ...	0.01μF	E3
C25†	S.W. aerial trim. ...	—	D3
C26‡	M.W. aerial trim. ...	—	D3
C27†	Aerial tuning ...	—	C1
C28†	Oscillator tuning ...	—	C2
C29†	S.W. osc. trimmer ...	—	D3
C30†	M.W. osc. trimmer ...	—	D3

* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the G.E.C BC 5442 superhet, in which the output transformer T1 tags are coded to agree with the chassis illustration overleaf. To the right of this caption is a diagram of the waveband switch unit.

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	Frame aerial	—	E4
L2	S.W. aerial coup. ...	—	E4
L3	Aerial tuning coils	2.6	E3
L4		17.0	E3
L5		—	D4
L6	Oscillator tuning coils ...	3.4	D3
L7		7.5	D3
L8	Osc. reaction coil ...	—	D4
L9		—	C2
L10	1st I.F. {Pri. ...	10.0	C2
L11		10.0	C2
L12	2nd I.F. {Pri. ...	10.0	B2
L13		10.0	B2
L14	Speech coil	3.0	—
T1	O.P. trans. {	c-e ...	B2
		b-f ...	—
		a ...	—
T2	Mains trans. {	b ...	300.0
		c ...	300.0
		d ...	—
		e ...	34.0
S1-S5	Waveband switches	—	D3
S6, S7	Mains sw., g'd R9...	—	E3

Circuit Description—Continued

and R13, via grid stopper R14, between V3 triode and pentode output valve (V4, Osram N78). Fixed tone correction by C24 in anode circuit, and a measure of negative feedback is introduced by the omission of the usual by-pass capacitor in the cathode circuit. Provision for the connection of a low impedance external speaker across T1 secondary. H.T. current is supplied by full-wave rectifying valve (V5, Osram U78).

In the standard model, the mains transformer primary windings are rated for 200 V, 230 V and 250 V, but in the "L" model, which is designed to operate from low-voltage mains, the windings are centred on 115 V, 125 V and 220 V respectively.

GENERAL NOTES

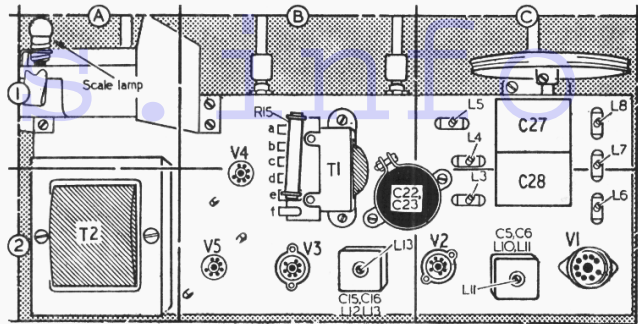
Switches.—S1-S5 are the waveband switches, ganged in a single 3-position rotary unit beneath the chassis. This is indicated in our under-chassis view, and shown in detail in the diagram inset beneath our circuit diagram overleaf. The table below gives the switch positions for the three control settings, starting from the fully anti-clockwise (S.W.) position of the control knob. A dash indicates open, and C, closed.

Scale Lamp.—This is an Osram lamp, with an M.E.S. base and a small clear spherical bulb, rated at 6.5 V, 0.3 A.

External Speaker.—Two sockets are provided at the rear of the chassis for the connection of a low impedance (about 2.4 Ω) external speaker.

Switches	S.W.	M.W.	L.W.
S1	—	—	C
S2	—	—	—
S3	—	—	—
S4	—	—	—
S5	—	—	—

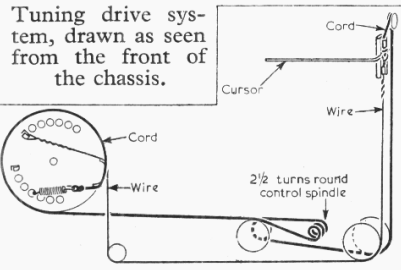
Plan view of the chassis, in which numerous core adjustments are identified. The tags of the output transformer T1 are coded to agree with the circuit diagram.



Transformer T1.—The connecting tags of the output transformer are letter-coded a-f in our plan view and the five tags used by the transformer are correspondingly coded in our circuit diagram. It is important to get the primary windings properly connected.

Valve V1.—This is usually an Osram X79, with a 9-pin Noval base, but in a small number of early models an X78 was used. This has a 7-pin base. Both base diagrams are inset in our circuit diagram overleaf.

Drive Cord Replacement.—Approximately four feet of high-grade plaited and waxed fishing line, and a little over two feet of stranded steel flexible wire are required for the complete



tuning drive, which consists of two parts. Suitable lengths can be obtained from the makers' Service Department, Greycoat Street, Westminster, London, S.W.1.

Our sketch shows the complete system as seen when viewed from the front with the gang at maximum capacitance. The wire is made up into a length measuring 2 1/4 in overall, with a soldered loop about 3/8 in diameter each end.

Model BC5441.—The circuit of this model, with its low-voltage version BC5441L, is basically the same as that of the BC5442, but there are the following differences: C1 is omitted, together with S1; C7 is 100 pF; C11 is 470 pF; R11 is 100 kΩ; R13 is 330 kΩ; R16 is 100 Ω.

The tone control circuit R12, C20 is omitted altogether, and a different range of valves is employed. They are: X61M, W61, DH63, KT61 and U50. These have octal bases with standard connections, and their base diagrams are not

shown here. Electrode voltages and currents that differ considerably from those for the BC5442 are: V1 anode, 210 V, 0.4 mA; screen, 26 V, 1 mA. V2 anode, 210 V, 3.1 mA; screen, 26 V, 0.9 mA. V4 screen 210 V, 5.4 mA.

CIRCUIT ALIGNMENT

The following operations can be performed with the chassis in the cabinet, core and trimmer adjustments being made accessible by removing the cabinet base cover (six wood screws with washers). Instructions for aligning the chassis when out of its cabinet are given under "R.F. and Oscillator Stages." Connect signal generator output, via an 0.1 μF capacitor in the "live" lead, to control grid (pin 1) of V2 and chassis.

I.F. Stages.—Switch set to L.W., turn gang to maximum capacitance, feed in a 470 kc/s (638.3 m) signal and adjust the cores of L13 (location reference B2) and L12 (E4) for maximum output. Transfer "live" signal generator lead to control grid (pin 2) of V1 and adjust the cores of L11 (C2) and L10 (D4) for maximum output. Repeat these adjustments.

R.F. and Oscillator Stages.—If the chassis is withdrawn from the cabinet, the tuning scale, which remains in the cabinet, can no longer be used for alignment purposes and reference must be made to a substitute tuning scale printed on the cursor carriage bracket. Readings on the substitute scale are taken against the lower edge of the cursor carriage and in the following instructions are given after each alignment point. The reading for the maximum capacitance setting of the gang is 90. Remove the frame aerial plugs and transfer signal generator via a dummy aerial to A and E sockets.

S.W.—Switch set to S.W., tune to 50 m (86.5 on substitute scale), feed in a 50 m (6 Mc/s) signal and adjust the cores of L6, L3 (C2) for maximum output. Tune set to 16.67 m (11), feed in a 16.67 m (18 Mc/s) signal and adjust C29, C25 (D3). Repeat these adjustments until calibration is accurate.

M.W.—Switch set to M.W., tune to 500 m (71), feed in a 500 m (600 kc/s) signal and adjust the cores of L7, L4 (C1) for maximum output. Tune set to 214.3 m (9.5), feed in a 214.3 m (1,400 kc/s) signal and adjust C30, C26 (D3) for maximum output. Repeat until calibration is correct.

L.W.—Switch set to L.W., tune to 1,304 m (87.5), feed in a 1,304 m (230 kc/s) signal and adjust the cores of L8, L5 (C1) for maximum output.

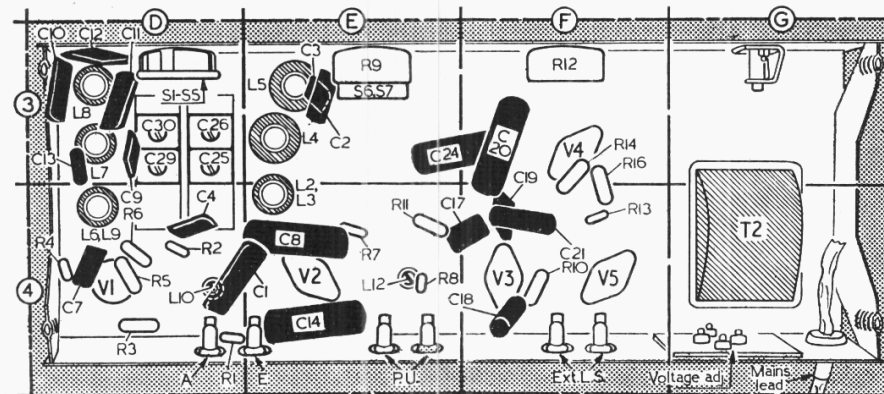
VALVE ANALYSIS

Valve voltages and currents given in the table below are those derived from the manufacturers' information whose receiver was operated from 230 V A.C. mains. The set was tuned to 214.3 m on M.W. with the volume control at maximum, but there was no signal input.

Voltages were measured on the 15 V and 750 V ranges of a 1,000 ohms-per-volt meter, chassis being the negative connection.

Valves	Anode		Screen		Cath.
	V	mA	V	mA	
V1 X79 ...	216	0.8	43	1.4	—
	Oscillator				
V2 W77 ...	110	3.2	43	0.3	—
	216	1.1			
V3 DH77 ...	80	0.9	—	—	—
V4 N78 ...	283	25.5	216	3.9	4.4
V5 U78 ...	250†	—	—	—	295.0

† A.C. voltage.



Underside view of the chassis, in which the sockets at the rear are identified.