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GEC BC4650

Four-valve, plus rectifier, three waveband superhet for operation from AC mains of 190-250V (110-130 and 210-230V on BC 4650L), 40-100 cycles. Provision for external speaker and gramophone pick-up. Marketed by General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2. First production, January, 1946. Retail price, BC4650, £14 14s., plus £3 3s. 3d. tax; BC4650L, £15 15s., plus £3 5s. 7d. tax.

SOCKET A1 brings C1 into circuit for optimum coupling on MW and SW; C1 is short circuited by S2 on LW. R1 is the usual static drain also damping the input circuit.

Coupling to the grid circuit of V1 is effected by L1 on SW, and by L9 on MW with some additional coupling by L1 as the SW coils are left in circuit. LW utilises L10 and extra coupling by L9 and L1.

Grid circuit uses L2 on SW, the LW and MW coils being short circuited by S6. SW trimmer is T1. MW employs L3 in parallel with trimmer T2, L2 being left in circuit. LW uses L4 with fixed padder C2 and trimmer T3 (L4 is short circuited by S1 on MW and SW). Main RF tuning capacitor is VC1.

C3 and R2 parallel feed AVC and standing bias to V1. R26 supplies the standing bias.

Potential divider R8, R9 and R10 across the main HT supply feeds the oscillator anode and screen of V1 the frequency-changer. The oscillator anode is tapped from the junction of R8 and R9 and decoupled by C11, C12 and R7.

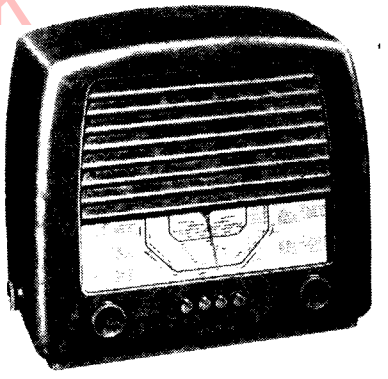
L6 is the SW anode coupling coil, R6 being an oscillation smoother. The tuned grid circuit on SW is composed of L5 and trimmer T4, S8 short circuiting the MW and LW networks, completing the circuit via C7 which is also common to the anode circuit thereby giving further coupling.

On switching to MW or LW, coupling by C8, and

Continued overleaf.

INDUCTORS

L	Ohms	L	Ohms
1	—	12	4.0
9	.36	13	430.0
10	—	14	.49
2	.06	15	2.3
3	2.8	16	650.0
4	19.5	17	170 plus 170
5	.06	18	.13
6	.32	19	.16
7	3.4	20	(max) 34
8	7.7	21	7.0
11	4.0	22	7.0



RESISTORS

R	Wattage	%	Ohms
1	½	10	10,000
2	½	20	1meg
3	½	10	100,000
4	½	10	68
5	½	10	10,000
6	½	10	470
7	½	10	22,000
8	1	10	10,000
9	1	10	15,000
10	½	10	22,000
11	½	10	56,000
12	½	20	1 meg
13	½	10	56,000
14	½	10	470,000
15	½	10	470,000
16	—	—	1 meg
17	½	10	15,000
18	½	10	100,000
19	½	10	2,200
20	½	10	330,000
21	½	10	680,000
22	½	10	100
23	½	10	150,000
24	½	10	91
25	—	—	55,000
26	½	10	39

CAPACITORS

C	Type	Working voltage	Mfd
1	Protected silver mica	—	22pfd
2	Silvered mica*	—	.003
3	Moulded mica foil	—	100pfd
4	Tubular	500	.05
5	Protected silver mica	—	39pfd
6	Moulded mica foil	—	100pfd
7	Silvered mica*	—	.00395
8	Tubular	1,000	.005
9	Protected silver mica	—	100pfd
10	Tubular	500	.05
11	Electrolytic pack	450	8
12	Electrolytic pack	450	4
13	Tubular	500	.05
14	Tubular	500	.05
15	Protected silver mica	—	22pfd
16	Moulded mica foil	—	300pfd
17	Tubular	750	.02
18	Electrolytic pack	450	4
19	Moulded mica foil	—	500pfd
20	Electrolytic	25	25
21	Tubular	750	.02
22	Moulded mica foil	—	200pfd
23	Moulded mica foil	—	.0015
24	Tubular	1,000	.005
25	Tubular	500	.05
26	Electrolytic pack	450	8
27	Electrolytic pack	450	16

* Close tolerance

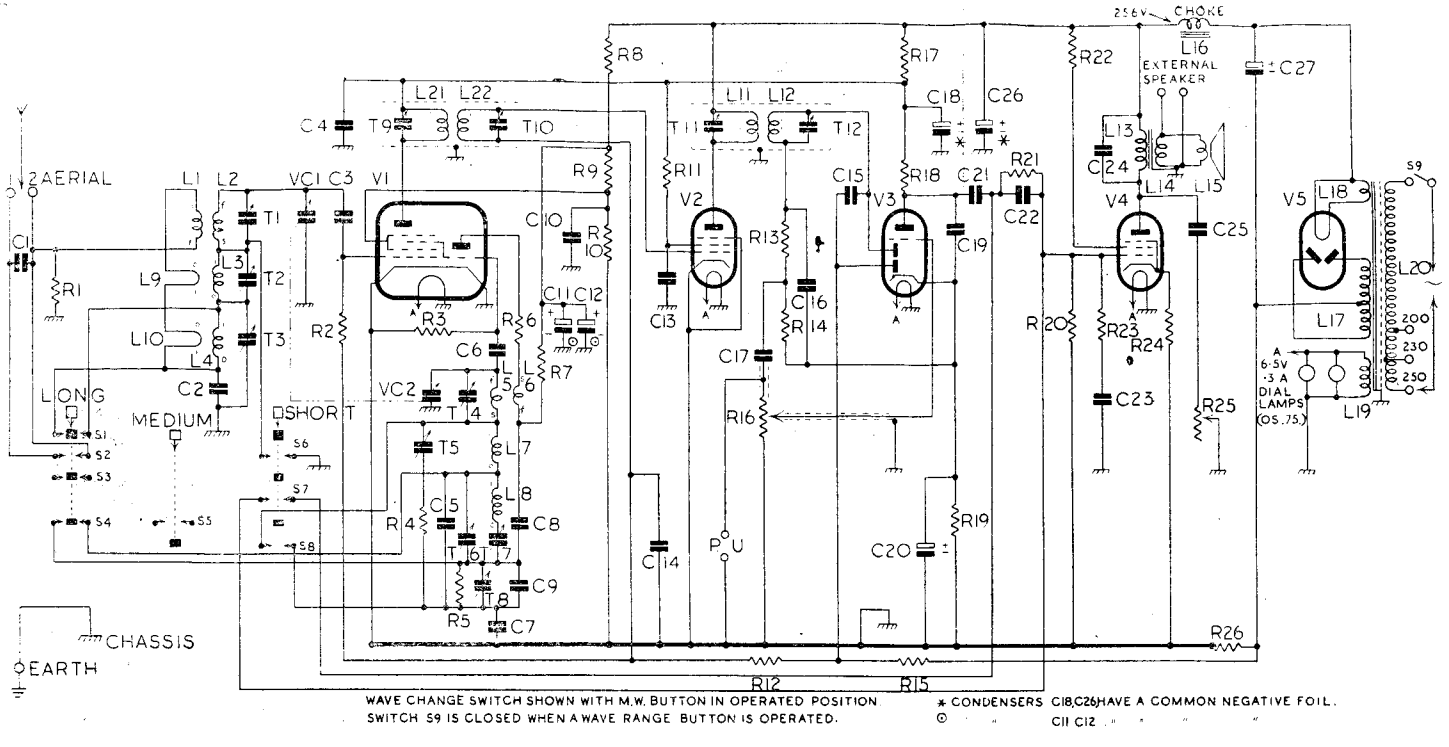
V1 — 70V. S OSC.G 2·6 m.a. 180V. A 1·7 m.a. OSC.A 90V. 3·3 m.a. H H M C — X61M

V2 — 60V. S SUP.G 2·3 m.a. 256V. A 8·2 m.a. H H C — KTW61

V3 — SIG.D AVC.D 105V. A 0·7 m.a. H H C — DH63

V4 — 245V. S G 6·9 m.a. 225V. A 4·2 m.a. H H C — KT61

V5 — 280V. A.C. A A 280V. A.C. C&H 305V. 75 m.a. H — U50



WAVE CHANGE SWITCH SHOWN WITH M.W. BUTTON IN OPERATED POSITION
SWITCH S9 IS CLOSED WHEN A WAVE RANGE BUTTON IS OPERATED.

* CONDENSERS C18,C26 HAVE A COMMON NEGATIVE FOIL.
⊙ " C11 C12 " " " "

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GEC BC4650

Continued

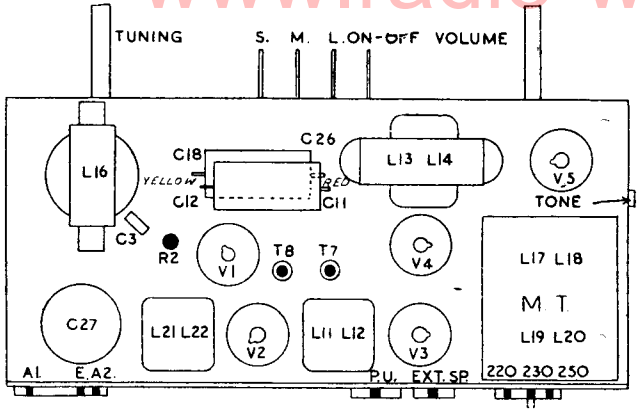
the common impedance R5, T8, C9 re-enforces the small amount of coupling due to the SW coils.

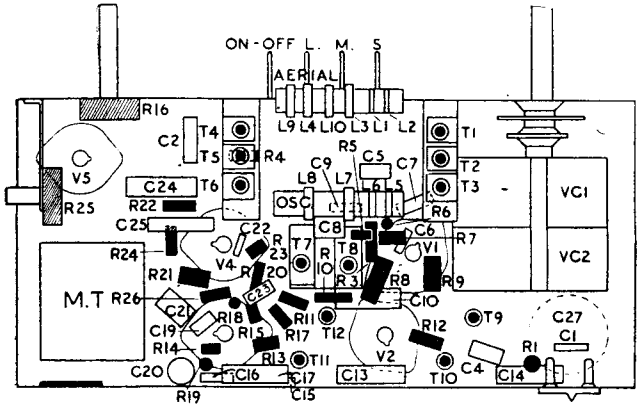
On MW, the LW circuit is shorted by S4 and hence L7 constitutes the main inductance with T5 acting as trimmer. R4 is a stabilising device. R5, T8, C9 provide additional padding and stabilising on both MW and LW, the circuits being completed to earth by C7.

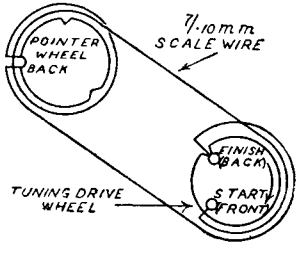
LW circuit uses L8 and padder T7 with trimmer T6 and fixed trimmer C5. L7 and L5 are also in circuit. Main oscillator tuning capacitor is VC2. R3 and C6 provide leak and condenser bias. Hexode portion screen obtains its potential from the junction of R9 and R10; decoupling is by C10. Anode circuit is made up of the [IFT1] primary using an iron-dust cored coil L21 and trimmer T9. HT is fed via R17 decoupled by C18 and an RF by-pass, C4.

Grid circuit of V2, IF amplifier, is composed of transformer secondary L22 and trimmer T10. AVC and bias are series fed by R12 and C14.

Continued on page viii.







These diagrams identify all components and trimmer positions. The dual drive diagram should be referred to in connection with the text on page viii.

TRIMMING INSTRUCTIONS

Use of an output meter is strongly recommended. An AC 0—100 FSD voltmeter of the universal type, not less than 20,000 ohms resistance, is suitable. A reading of 13.5 volts corresponds to 50mW output at which the AVC is inoperative. Set volume control to max. and tone control fully clockwise before commencing alignment.

Apply Signal as Below.	Tune Receiver to (metres).	Adjust in Order stated for Max. Output.
(1) 465 KC to top cap of V1 *via* .01 mfd leaving existing lead connected.	LW 2,000	T12, T11, T10, T9
(2) 1.4 MC between A2 and chassis *via* MW Dummy Aerial.	MW 214	T5, T2
(3) 600 KC as in (2)	MW 500	T8 whilst rocking gang.
(4) Repeat (2)	Repeat (2)	Repeat (2)
(5) 300 KC	LW 1,000	T6, T3
(6) 165 KC	LW 1,818	T7 whilst rocking gang.
(7) Repeat (5)	Repeat (5)	Repeat (5)
(8) 18 MC *via* SW Dummy Aerial.	SW 16.7	Screw T4 fully home and unscrew until second max. signal is heard. Trim about this point, adjust T1 and check T4.

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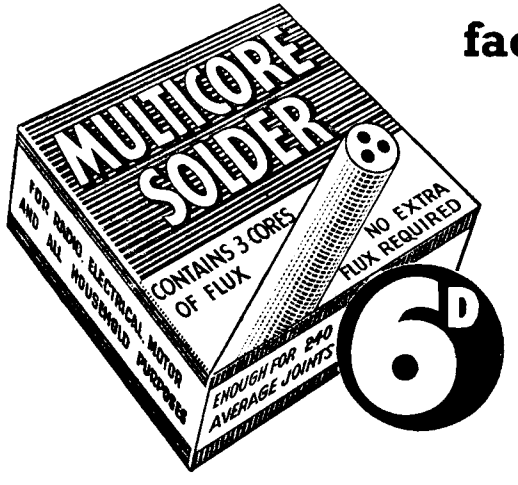

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EKCO A21—Continued

both small tags while the other end is fitted over the hook in the drive wheel.

With the gang fully open the pointer should coincide with the datum line. Any slight error not exceeding a half an inch either way can be corrected by loosening the drive wheel on the gang shaft and moving until the pointer is correct. Tighten grub screws on the drive wheel.

ALIGNMENT INSTRUCTIONS

Apply Signal as Below.	Tune Receiver to (metres)	Adjust in Order stated for Max. Output.
(1) 477 KC between V1 grid and chassis *via* .02 mfd condenser, leaving existing lead connected	MW 560	T25, T27, T26, T25
(2) 477 KC between aerial and earth	MW 560	T1 for min.
(3) 15 MC between aerial and earth *via* dummy aerial	SW 20	T24
(4) As in (3)	SW 21.4	This is the "image" signal and is useful for checking calibration with (3)
(5) 1,200 KC between aerial and earth *via* dummy aerial	MW 250	T22, T19
(6) 1,304 KC as in (5)	MW 230	T12
(7) 15 MC as in (3)	SW 20	T2
(8) 230.8 KC *via* an LW dummy aerial	LW 1,300	T23, T3
(9) 176.5 KC as in (8)	LW 1,700	T20, T6

Use of an output meter in parallel with speech coil is strongly recommended. An AC 0-100v meter of the universal type, not less than 20,000 ohms resistance, is suitable.

Pointer should coincide with 560 metres when the gang is fully meshed.

Turn volume and tone controls fully clockwise before trimming.

PUSH-BUTTON ADJUSTMENT

Remove escutcheon and detach trimming tool which is clipped to the back. Each button has its associated trimmer and coil immediately above and below it. Coverages are : button (1), 1430-1986 metres ; (2) 1160-1640 metres ; (3) 342-560 metres ; (4) 267-450 metres ; (5) 200-308 metres. Buttons are numbered left to right when facing front of receiver.

Fully unscrew the lower screw of button to be set. Turn volume to max. and wavechange to push-buttons (white). Press required button. Slowly rotate lower screw clockwise until desired station is received. Adjust upper screw to max. Adjust both for max. shadow on tuning indicator.

GEC 4650—Continued

Screen voltage for V2 is fed from R11 and R17 decoupled at the electrode by C13.

IFT2 primary consists of iron-dust coil L11 and trimmer T11. Secondary, L12, and trimmer T12, feed the signal to the detector and, via C15, to the AVC diode.

Signal diode load is R14 ; R13 and C16 provide IF filtering. C17 passes the AF voltages to the volume control R16 and hence to the triode grid. PU terminals are connected across R16.

AVC diode load is R15, a delay being obtained from R26. Cathode bias for V3 is provided by R19 decoupled by C20. Amplified AF voltages appear across the triode anode load R18. C19 provides fixed tone control and further IF filtering. Coupling to the output valve V4 is by C21 and C22 in parallel with R21. The latter two components are short circuited on SW by S7 to increase the overall sensitivity.

R20 is the usual grid resistor, R23 and C23 being fixed tone control. R24 provides cathode bias and negative current feedback is obtained by omitting the by-pass condenser. Screen supply is via a series resistance R22 which is not decoupled.

Output transformer primary L13 has C24 in parallel for treble cut and to even out the response. Provision is made for external speaker of the low impedance type by connections at the rear. The set speaker is of the permanent magnet type. Variable tone control is effected by C25 and R25.

Models BC4650 and BC4650L are identical with the exception of the mains transformer voltage range. The 320-0-320V winding L17 has its centre tap returned to earth via R26 to provide standing bias for V1 and V2. The 6.5V heater and dial light winding L19 is earthed on one side. A 5V rectifier heater winding L18 is used. Smoothing is accomplished by condenser input filter C27, choke L16 and C26.

DRIVE WIRE REPLACEMENT

Before the wire drive can be replaced it is necessary to remove the pointer, speaker and baffle. Place chassis with controls facing the operator, fully disengage gang condenser, move pointer drive wheel so that fixing screw at rear is at 9 o'clock as in diagram (see page iv).

Fasten one end of the wire under front securing screw (now at 8 o'clock) on tuning drive wheel, pass around groove in an anti-clockwise direction for a half-turn and then direct to and over the pointer drive wheel.

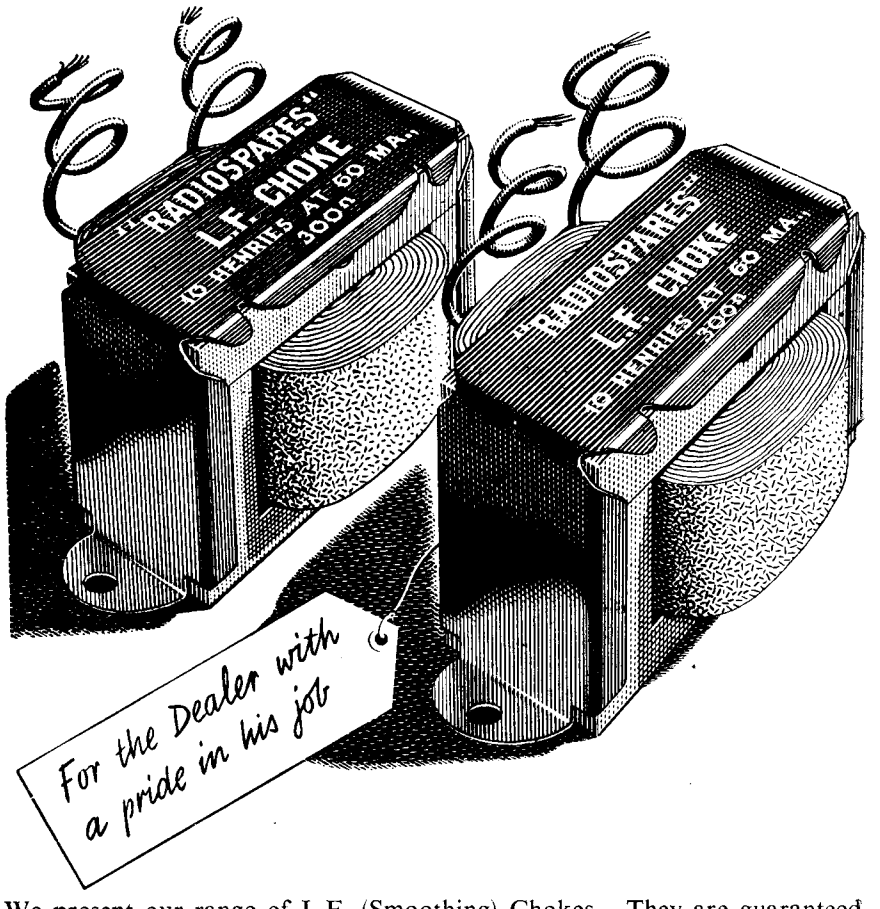
After making slightly more than a complete turn anti-clockwise, the wire is looped around the locating screw on the back of the pointer wheel and secured. Continuing in the groove in the same direction the wire is passed under the tuning drive wheel and along the groove in an anti-clockwise direction terminating under the head of the screw fitted at 10 o'clock on the rear of the wheel.

VIDOR CN222—Continued

the field winding which also acts as a smoothing choke.

On AC supplies high tension is derived from the mains via the half-wave rectifier V4 whose heater is in series with the other valve heaters in the usual way across the mains input.

Chokes L14 and L15 are provided for HF filtering.



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