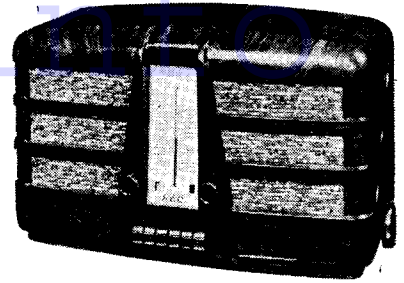


G.E.C. 4040 Push-button AC Five

Four-valve, plus rectifier, two waveband table model superhet receiver with mechanical-type push-button and also manual tuning. For 190-250 volt, 40-100 cycle AC supplies, price 8½ gns. [Model BC4040L, 110-130 and 210-230 volt, 40-100 cycles, price 9 gns.]



The circuit of the 4040 (shown divided below only for presentation reasons) is basically straightforward. An unusual detail is the series bias resistance R24. The receiver covers two wavebands.

CIRCUIT OUTLINE

THE aerial is taken direct to earth through an ohmic impedance, the voltages across this being introduced into the tuned input circuits through a capacity network. Coupled MW and LW tuned circuits form the input to V1, a heptode mixer, provided with a conventional oscillator circuit.

The IF voltages are taken from the anode circuit of V1 by means of a trimmer-tuned transformer, the secondary of which works into the grid circuit of V2, the IF amplifier. The grid return of this valve is provided with AVC as well, of course, as that of V1.

A further IFT is used between V2 and V3, the double-diode triode. This valve is connected in an orthodox manner, one diode being used for AVC and the other for signal demodulation. The load circuit has a tapping from which the IF coupling condenser is connected to the top of the volume control, which forms the grid return of V3.

Between the anode of V3 and the input of V4 there is ordinary resistance-capacity coupling. V4 is an output tetrode with a tone control circuit on the anode. A series bias circuit is fitted in the main HT return. This provides the steady bias for the first two valves and the delay volts for the AVC diode.

Power is supplied from a full-wave rectifier, V5, in conjunction with the speaker field and electrolytic smoothing condensers.

Chassis Removal

First pull off the two control knobs on the front of the cabinet and then the tone control knob at the left. The tuning knob is held by the press-button locking screw, which must be slackened, allowing the knob to be removed.

Before unscrewing the chassis retaining bolts release the tuning band indicator from the drive cord. This is held in a small clip, fixed by a screw. After withdrawing the pilot-lamp clip, the chassis bolts can be removed and the chassis carefully taken out of the cabinet.

This requires a little care, since the chassis must be pulled slightly forward and given a slight twist to enable the control rod to clear the hole in the side of the cabinet.

If the speaker is disconnected the order of leads is: top strip (speech coil), white to left-hand tag, black to right-hand, and hence to frame; lower strip (field), red/white to left and red to right-hand tag.

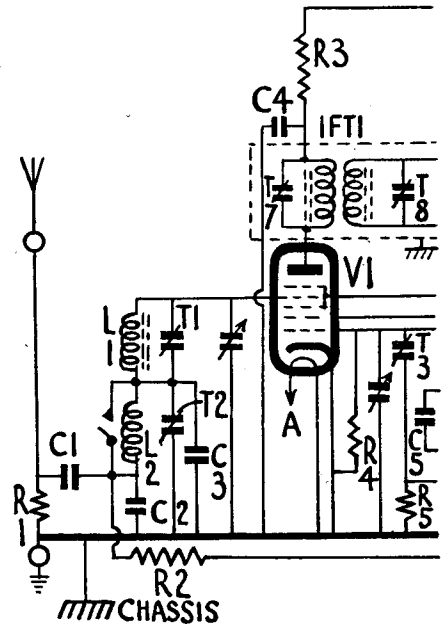
CONSTRUCTIONAL FEATURES

NO trouble should be experienced in servicing this set as the chassis con-

VALVE READINGS

V.	Type.	Anode.	Screen.	Cathode.
1	X63	210	79	—
2	KTW61	220 (osc.)	75	—
3	D263	85	—	15
4	KT61	200	220	3.9
5	U50	320 AC	—	325

Pilot lamp, G.E.C., MES, 6.5 volt, .3 amp.



forms very accurately to the makers' specifications.

The only point to bear in mind is that when ganging the set the MW and LW oscillator circuits are in series, and adjustment of the MW padder affects the LW padding.

Wavechange Switches

The switching is extremely simple because the only operation is that of short-circuiting the LW input and oscillator coils. Accordingly, there are only two wiper, W1 and W2, provided, respectively, with contacts 1 and 2.

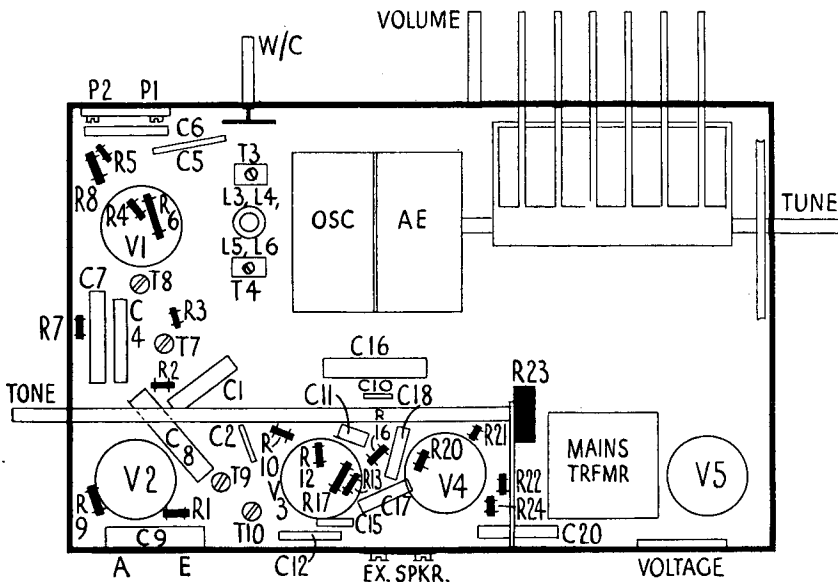
Press-buttons

TURN the tuning control fully anticlockwise and release the concentric locking screw by a single turn in the same direction.

Tune in a desired station and then depress the relevant push-button. Proceed in the same manner with the other buttons.

Then turn the tuning control fully

(Continued on opposite page.)



This diagram identifies components underneath the chassis. To help you locate the parts, resistors are shown in solid black, and condensers in outline.

10-MINUTE FAULT-FINDER

G.E.C. 4040

Power Test.

Voltages : V5 cathode, 325; HT line, 220.

Resistance : L12, 1,500 ohms.

Total feed = $325 - 220 \div 1,500 = 70$ ma.

Output Stage, V4.

Inject 3 volts AF at V4 grid. If defective check :—

Voltages : Anode, 200; screen, 220; cathode, 3.9.

Resistances : Anode-HT, 580; screen-HT, 100; cathode-chassis, 90; grid-chassis, 440,000 ohms.

AF Stage, V3.

Inject 1 volt AF at grid. If defective, check :—

Voltages : Anode 85; cathode, 15.

Resistances : Anode-HT, 103,400; cathode-chassis, 17,200 ohms; grid-chassis, 1 megohm.

Demodulation, V3.

Inject modulated 456 kc. signal at V2 anode. If defective, check :—

Resistances : L9, 4; L10, 4; diode-chassis, 449,000 ohms.

IF Stage, V2.

Inject modulated 456 kc. signal at V2 grid. If defective, check :—

Voltages : Anode, 200; screen, 220.
Resistances : Screen-HT, 48,400 ohms; grid-chassis, 1.44 megohms.

Mixer Stage, V1.

Inject modulated 456 kc. signal at grid. If defective, check :—

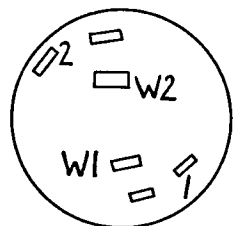
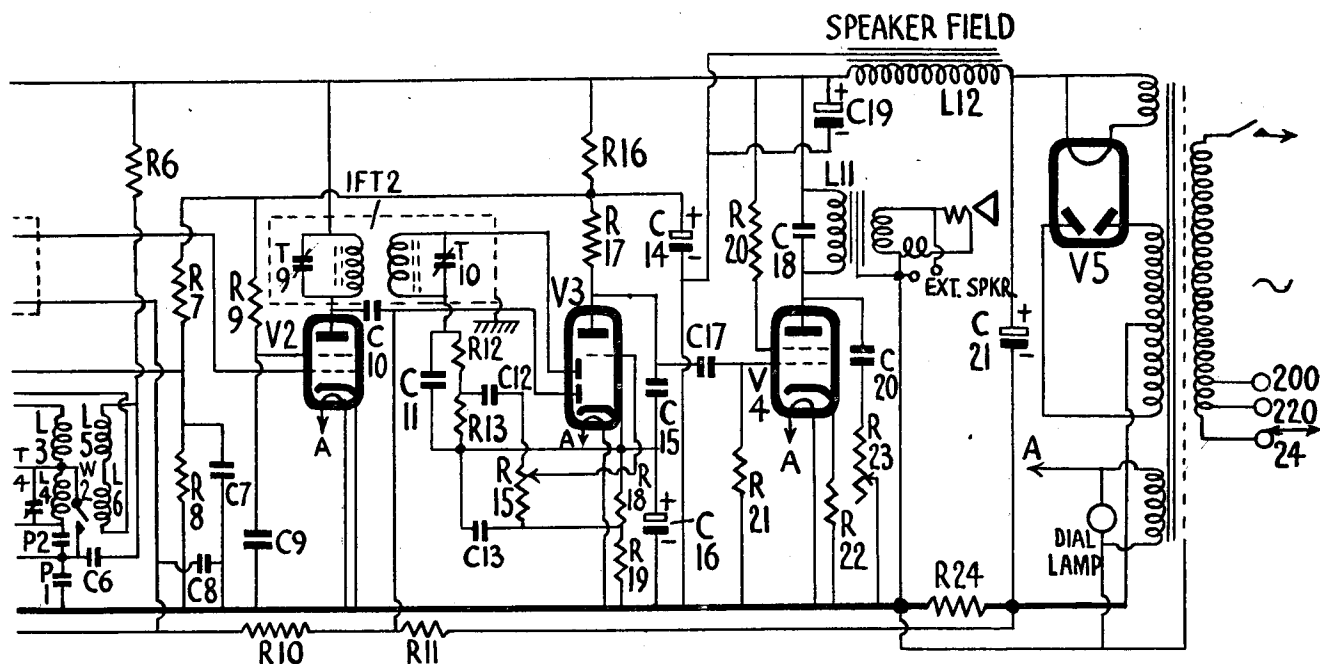
Voltages : Anode, 210; screen, 79.
Resistances : L8, 7; L7, 7; anode-HT, 5,500 ohms; grid-chassis, 2.44 megohms, screen-HT, 26,400 ohms.

Oscillator Test, V1.

Tune to local station and inject that frequency plus 456 kc. at osc. grid. If defective, check :—

Voltage : Osc. anode, 130.
Resistances : Osc. anode-HT, 22,000; osc. grid-chassis, 99,000 ohms.

If signals are still absent, check switching and coils.



Wave switching is by one simple bank. W1 and W2 are the aerial and oscillator wipers with respective contacts 1 and 2.

clockwise and re-lock the central screw. Check the setting of the buttons, and if necessary repeat operation.

Alignment

IF Circuits (456 kc.).

Connect an output meter to set and signal generator to the grid of V1 through a 0.1 mfd. condenser. Adjust generator to 456 kc.

Tune T10, T9, T8 and T7 in that order for maximum, using a small input below the AVC level.

Medium Waves (192 to 550 metres).

Connect generator to set through

Continued on page 22

RESISTANCES

	Ohms.
1 .. Aerial impedance	9,900
2 .. V1 AVC decouple	1 meg.
3 .. V1 anode decouple	5,500
4 .. Osc. grid leak	99,000
5 .. Het. compensation circuit (part)	77,000
6 .. Osc. anode feed	22,000
7 .. V1 screen pot. (part)	22,000
8 .. V1 screen pot. (part)	66,000
9 .. V2 screen decouple	44,000
10 .. V2 AVC decouple	1 meg.
11 .. AVC diode load	440,000
12 .. Signal diode load (part)	330,000
13 .. Signal diode load (part)	99,000
15 .. Volume control	1 meg.
16 .. V3 anode decouple	4,400
17 .. V3 anode load	99,000
18 .. V3 cathode bias (part)	2,200
19 .. V3 cathode bias (part)	15,000
20 .. V4 screen stabiliser	100
21 .. V4 grid leak	440,000
22 .. V4 cathode bias	90
23 .. Tone control	55,000
24 .. Series bias	50

CONDENSERS

	Mfds.
1 .. Aerial coupling .. .. .	.005
2 .. V1 AVC decouple .. .. .	.003
3 .. LW input fixed trimmer .. .. .	.00002
4 .. V1 anode decouple .. .. .	.05
5 .. LW osc. trimmer .. .. .	.00005
6 .. Het. compensation circuit (part)	.005

Condensers (continued)

7 .. V1 screen decouple .. .. .	.05
8 .. V2 AVC decouple .. .. .	.05
9 .. V2 screen decouple .. .. .	.05
10 .. AVC couple .. .. .	.00002
11 .. IF filter .. .. .	.0003
12 .. AF couple .. .. .	.02
13 .. V2 cathode bias shunt .. .. .	.25
14 .. V3 anode decouple .. .. .	.05
15 .. V3 anode shunt .. .. .	.0005
16 .. V3 bias decouple .. .. .	.30
17 .. AF couple .. .. .	.02
18 .. V4 anode shunt .. .. .	.005
19 .. HT smoothing .. .. .	.05
20 .. Tone control .. .. .	.05
21 .. HT smoothing .. .. .	.8

WINDINGS (D.C. Resistances)

L.	Ohms.	Range.	Where measured.
1 .. 2.2 .. MW	Across T1.
2 .. 22 .. LW	L1 and C1.
3 .. 3 .. MW	T3 and T4.
4 .. 6 .. LW	Across T4.
5 .. 1.3 .. MW	On tags.
6 .. 1.9 .. LW	On tags.
7 .. 7 .. —	V1 anode and R3.
8 .. 7 .. —	V2 grid and R10.
9 .. 4 .. —	V2 anode and HT line.
10 .. 4 .. —	Signal diode and R12.
11 .. 580 .. —	On leads.
12 .. 1,500 .. —	On leads.
13 .. 34 .. —	Mains plug.

Bush PB63 AC Six

Continued from page 16

be observed, however, that some are inside the IF cans, and these are clearly shown on the drawings.

Attention is drawn to the fact that there is no DC connection between the secondary of the second IFT and the diode circuit.

It should also be observed that part of the smoothing is by means of the speaker field in the negative lead and part by a resistance-capacity network which lowers the main HT rail. The HT for the output valve, however, is on the full voltage point.

When trimming the set it should be observed that the adjustments for the two intermediate transformers are at opposite ends of the cans. The trimmers for the pre-selector and oscillator circuits are immediately below and above the respective press-button switches, and in order to trim the set the escutcheon must be removed.

Chassis Removal

Removal of the chassis in this receiver is very simple. First, take off all the control knobs on the front and withdraw the speaker plug.

Then release the four chassis retaining bolts from the bottom and the chassis can be completely removed.

The press-buttons clear the escutcheon, and there is no need to remove this plate.

Alignment

IF Circuits (465 kc.).

Connect output meter to the set and generator to grid of V1 and chassis.

Adjust the generator to 465 kc. and tune for maximum output on the set by varying the permeability cores of the two transformers.

This adjustment must be made with the selectivity position at normal. It is also recommended that a damping network be used across the winding of the transformer not being adjusted. This may consist of a 30,000 ohm resistance in series with .05 mfd. Inject as low a signal as possible.

Medium Waves (195-550 metres).

Connect the generator to the set through a dummy aerial and tune set and generator to 300 metres (1,000 kc.) and adjust T10 and T1 for maximum.

There is no padding, but check the adjustment at 500 metres.

Long Waves (850-2,000 metres).

Tune set and generator to 1,500 metres (200 kc.) and adjust T12 and T3 for maximum.

Although there is no padding adjustment, check at 1,900 metres.

Short waves (16.5-51 metres).

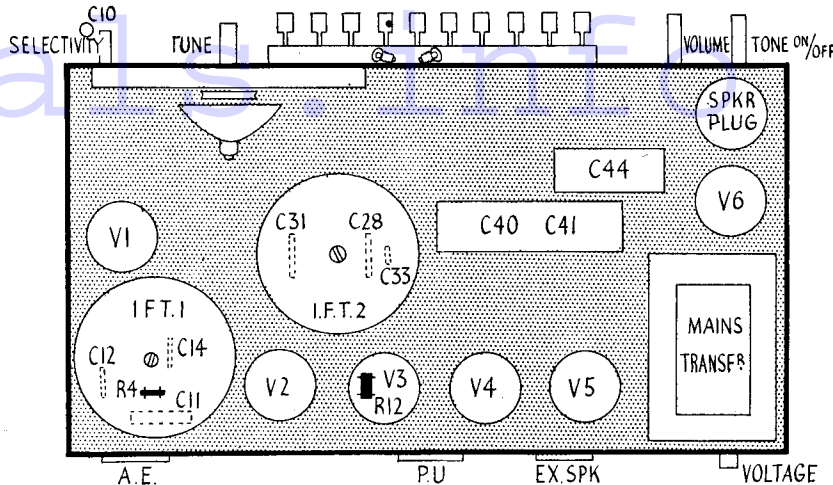
Tune set and generator to 18 metres (16.65 mcs.) and adjust T11 and T2 for maximum.

Check the calibration at 50 metres.

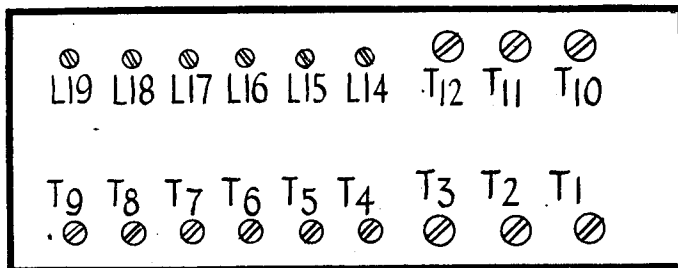
Replacement Condensers.

EXACT replacement electrolytic condensers are available from A. H. Hunt, Ltd., Garratt Lane, Wandsworth, London, S.W.18.

For the C40 + 41 block there is unit list number 1931A, price 8s. 6d.; for C44, unit 2867A, 3s. 6d.; and for the C35 + 36 tubular, 3824, 4s.



Above, the top-of-chassis layout diagram, and, right, the arrangement of push-button trimmers on a special assembly.



PUSH-BUTTONS

THE adjustable cores of the pre-set oscillator coils are fitted with approximate wavelength indicator plates. Press in the button immediately below the coil on which the desired wavelength can be obtained, and make an approximate adjustment of the core.

Turn the volume to maximum and adjust the corresponding aerial trimmer condenser below the coil until maximum sensitivity is obtained as the circuit comes into resonance, which will be noticed by the increase of background noise.

Then make a final adjustment to the core and trimmer for exact resonance.

Continued from page 15

dummy aerial, and tune set and generator to 1,400 kc. (214 metres). Adjust T3 and T1 for maximum.

Disconnect oscillator gang by unsoldering its lead, and substitute an external variable condenser.

From the external oscillator inject a frequency of 600 kc. (500 metres), and adjust tuning control of set and external condenser for maximum.

Re-connect the oscillator gang, and

without altering the set tuning control adjust P1 for maximum.

Check the trimming at 1,400 kc.

Long Waves (1,000 to 2,000 metres).

Tune set and generator to 300 kc. (1,000 metres), and adjust T4 and T2 for maximum.

Pad the receiver by the same method as that used on the MW band, injecting a frequency of 165 kc. (1,818 metres).

Check the trimming at 300 kc.

