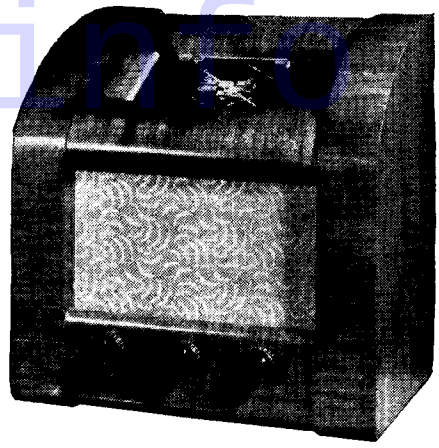
G.E.C. A.C. ALL-WAVE FIVE



The A.C. All-Wave Five by G.E.C. is a three band four-valve plus rectifier superhet at 10 gns.

CIRCUIT.—The aerial is coupled to V1, a heptode frequency changer, via a single tuned circuit. An alternative aerial socket inserts a small capacity in series with the aerial.

The signal, converted to the I.F., passes to V2, an H.F. pentode working as the I.F. amplifier on a frequency of 456 kc., via an I.F. transformer of iron-dust core construction.

The output of V2 passes by another I.F. transformer of identical type to the demodulating diode of V3, a double diode triode, where the signal is rectified. The other diode provides a D.C. potential, which is fed back to the previous stages by a resistance-capacity network to give automatic volume control.

The rectified signal passes to the grid of the triode section of V3 through an L.F. coupling condenser and a volume control.

V3 is resistance-capacity coupled to V4, a tetrode power output valve. A fixed condenser is connected across the primary of the speaker transformer to modify the tone.

Mains equipment consists of a mains transformer, full-wave rectifying valve, electrolytic smoothing condensers, and smoothing choke (speaker field).

Chassis Removal.—Remove the back of the cabinet, which is secured by five sliding clips, and the three control knobs on the front of the receiver. These are of the spring fixing type, and are removed by a slight pull. Take out the two wood screws securing the wood bar located midway of the back of the cabinet.

Turn the cabinet up on its side and remove the four fixing bolts and washers securing the chassis to the cabinet. Take out the two screws and washers holding the wavelength dial assembly to the top (inside) of the cabinet.

The chassis and associated wavelength dial assembly can now be removed to the extent of the loudspeaker cable and is completely accessible for all service requirements.

If the leads to the speaker are unsoldered, reconnection is as follows: Counting from left to right the red and white lead is connected to the first tag, black lead to second tag, the next tag is blank with reference to the speaker cable, and the white and red leads are connected respectively to the remaining two.

Special Notes.—The mains voltage adjustment is to be found at the rear of the chassis sub-panel, and is concealed by a

QUICK TESTS

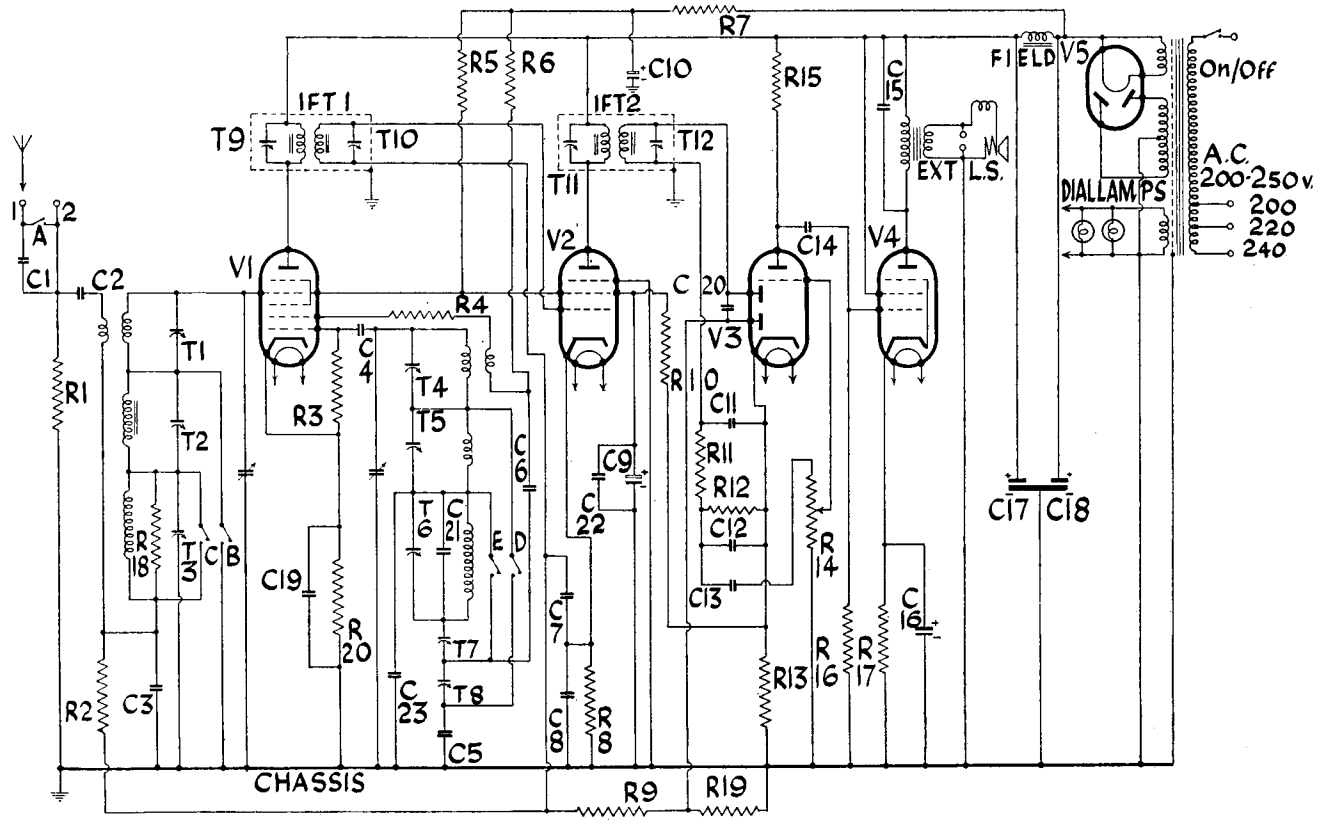
These are available on this receiver on the speaker transformer leads. Volts measured between these and the chassis should be:—
Brown lead, yellow spot, 185 volts.
Green lead, red spot, 190 volts.

VALVE READINGS

No Signal. Volume maximum. 200 volts A.C. mains.

V.	Type.	Electrode.	Volts.	Ma.
	Osram Valves.			
1	X42 (7) ..	Anode ..	265	
		Screen ..	80	*
		Osc. anode	125	
2	W42 (7) ..	Anode ..	265	6
		Screen ..	80	*
3	DH42 (7) ..	Anode ..	98	.7
4	N42 (7) ..	Anode ..	232	35
		Screen ..	265	5.8
5	U12 (5) ..	Fil. ..	333	—

* Inaccessible.



A normal two-gang tuning condenser is used, the oscillator circuit being padded by C5 on short waves, T8 on medium, and T7 on long. Frequency changer and I.F. valves are A.V.C. controlled on M. and L. waves; only the I.F. is controlled on short.

metal plate. The device takes the form of a movable link connecting terminals marked with the various voltage taps.

There are two dial lamps in the receiver, and these are located on each side of the wavelength dial assembly towards the top of the cabinet. They are rated at 6.2 volts .3 amp., 10 mm. diameter, and are mounted in screw in holders.

A pair of terminals at the rear of the chassis sub-panel enable an external speaker to be operated. This need not have its own matching transformer provided its speech coil has an impedance of between 2 to 4 ohms.

Circuit Alignment Notes

I.F. Circuits.—Turn waverange switch to medium waves. Set gang to maximum capacity and volume control to maximum. Short circuit the oscillator section of the gang condenser to chassis. Connect a service oscillator between the top grid cap of V1 and chassis through a .1 mfd. fixed condenser and an output meter across the primary of the speaker transformer.

Tune the service oscillator to 456 kc. and adjust the trimmers of the first and second **I.F.T.s until maximum output is** obtained, reducing the input from the oscillator as the circuits come into line to keep the A.V.C. inoperative.

Signal Circuits.—Leave the output meter connected as before, but connect the service oscillator by a dummy aerial or fixed condenser to the aerial and earth terminals of the receiver. Remove the short circuit from the oscillator section of the gang. Check the pointer for straightness and confirm that the pointer coincides with the zero line on the wavelength dial when the gang is at the maximum capacity. Only feed sufficient input to get definite peaks so as to render the A.V.C. inoperative.

Short Waves.—Tune set and oscillator to 17.6 metres (17 mc.) and adjust T4 and T1 respectively for maximum, the lowest capacity peak of T4 being the correct calibration. On some receivers slight pulling is experienced when T1 is adjusted. The gang should therefore be rocked slightly to compensate for this.

Short wave padding is fixed.

Medium Waves.—Tune set and oscillator to 200 metres (1,500 kc.) and adjust T5 for maximum, using lower capacity peak as before.

Tune set and oscillator to 214 metres and adjust T2 for maximum response, but do not alter T5.

Tune oscillator to 500 metres (600 kc.).

Disconnect the oscillator tuning section of the gang by unsoldering its lead from the soldering tag at the "Point X" in the chassis diagram and connect an external

(*Continued on page 29.*)

Replacement Condensers

Two exact replacement condensers for the G.E.C. A.C All-wave Five are produced by A. H. Hunt, Ltd., of Garratt Lane, Wandsworth, London, S.W.18.

These are: for block containing Cs 9, 10, 17 and 18, unit list number 3,752, price 10s.; for C 16, unit 2.970, price 1s. 10d.

All-wave Five on Test

MODEL A.W.5. — Standard model, BC3850, for A.C. mains operation, 190-250 volts, 40-100 cycles. Price 10 gns. (Model BC3850L is available for 110-130 and 210-230 volt, 40-100 cycle supplies at 10½ gns.)

DESCRIPTION. — Three-waveband, four-valve and rectifier table model superhet.

FEATURES.—Full-vision scale on sloping front with volume and wave indicators worked by controls. Controls for volume, tuning and wave selection. Extension speaker sockets. Optional aerial sockets.

LOADING.—68 watts.

Selectivity and Sensitivity

SHORT WAVES (15.5-50 metres).—Average gain and excellent selectivity. Tuning sharp and no drift. Sensitivity greatest at the beginning of the waveband.

MEDIUM WAVES (200-550 metres). —Excellent gain well maintained. Local stations spread on adjacent channels. Selectivity well up to standard.

LONG WAVES (1,000-2,000 metres). —Performance well up to standard.

Acoustic Output

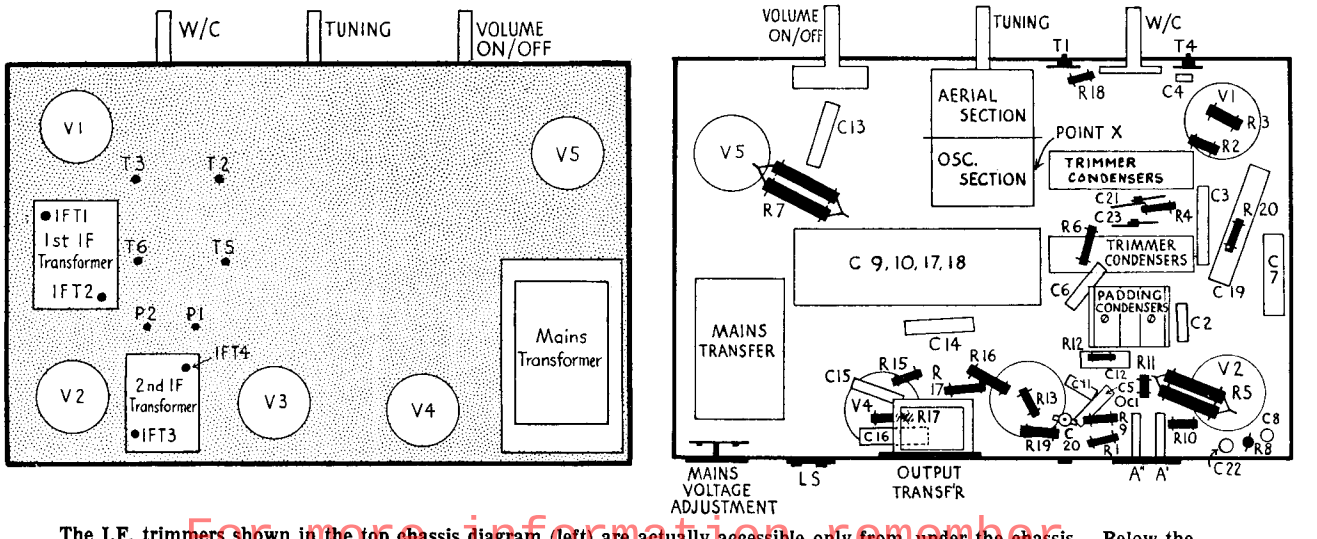
Representative, balanced tone with crisp and clean top and good attack. Only slight colouration on speech and all musical reproduction pleasing.

CONDENSERS

C.	Purpose.	Mfd.
1	Series aerial	.00002
2	Aerial coupling	.005
3	V1 A.V.C. decoupling	003
4	Osc. grid	0001
5	Osc. fixed padder	.004
6	Osc. anode decoupling and L.W. regeneration modifier.	.005
7	V2 A.V.C. decoupling	.05
8	V2 cathode shunt	.1
9	V1, V2 screen decoupling	3
10	V1, V2 screens and osc. anode decoupling.	7
11	H.F. bypass	.0003
12	H.F. bypass	.0001
13	L.F. coupling	.005
14	L.F. coupling	.02
15	Tone compensator	.005
16	V4 cathode shunt	35
17	H.T. smoothing	7
18	H.T. smoothing	7
19	V1 cathode shunt	.1
20	A.V.C. diode coupling	.00002
21	L.W. osc. fixed trimmer	.00002
22	V1, V2 screen H.F. bypass	.05
23	L.W. osc. shunt	.00002

RESISTANCES

R.	Purpose.	Ohms.
1	Aerial shunt	9 900
2	V1 A.V.C. decoupling	440,000
3	Osc. grid leak.	99,000
4	Regeneration modifier	150
5	V1, V2 screen potentiometer (part).	22,000
6	Osc. anode decoupling	9,900
7	V1, V2 screens and osc. anode decoupling.	22,000
8	V2 cathode bias	400
9	V2 A.V.C. decoupling	440,000
10	V1, V2 screen potentiometer (part).	15,000
11	H.F. filter	55,000
12	Demodulating diode load	440,000
13	V3 cathode bias	400
14	Volume control	1 meg.
15	V3 anode load	220,000
16	V4 grid leak	440,000
17	V4 cathode bias	400
18	L.W. aerial coil shunt	440,000
19	A.V.C. diode load	440,000
20	V1 cathode bias	300



The I.F. trimmers shown in the top chassis diagram (left) are actually accessible only from under the chassis. Below the chassis, R5 and R7 each constitute two paralleled resistors.

metres (1,500 kc.) and again adjust T1 and T2 respectively for maximum.

Long Waves.—Tune the set and oscillator to 1,000 metres (300 kc.) and adjust T3 and T4 respectively for maximum.

Tune the set and oscillator to 1,700 metres (176 kc.) and adjust the long-wave padder for maximum, simultaneously rocking the gang for optimum results.

Retune the set and oscillator to 1,000 metres (300 kc.) and again adjust T3 and T4 respectively for maximum response.

Short Waves.—Tune the set and oscillator to 17 metres (17,647 kc.) and adjust T5 and T6 respectively for maximum response, taking care that the image is received at about 18 metres.

Check for correct calibration by injecting signals of various wavelengths.

I.F. Wavetrap.—Tune the oscillator to 470 kc. and with wave-change switch in the medium position turn the gang to the maximum capacity position.

Adjust the core of the I.F. wavetrap coil until minimum or no deflection is indicated in the output meter.

Replacement Condensers

Two exact replacement condensers for these receivers are available from A. H. Hunt, Ltd., of Garratt Lane, Wandsworth, London, S.W.18.

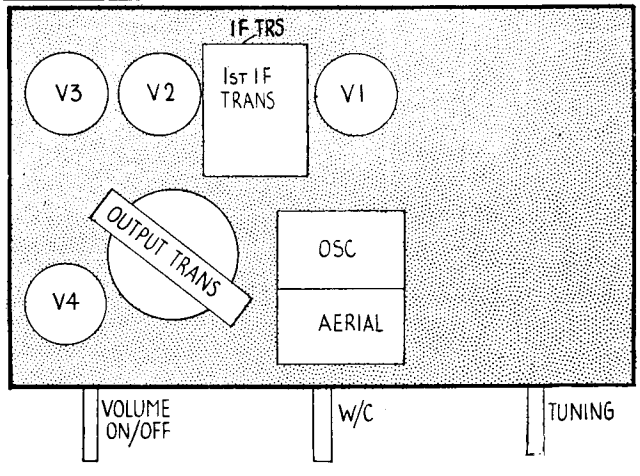
These are: for C28, unit list number 2.964, price 1s. 10d.; for C30, unit list number 3,751, price 2s.

RESISTANCES

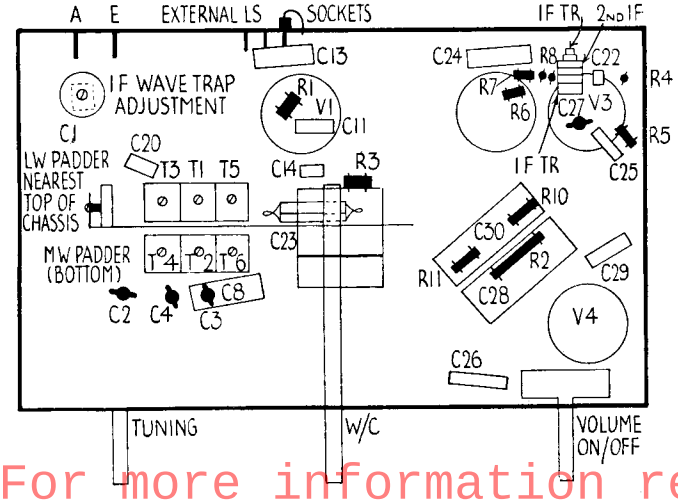
R.	Purpose.	Ohms
1	Osc. grid leak	25,000
2	V1, V2 screen decoupling	70,000
3	Osc. anode load	25,000
4	Demodulating load (part)	25,000
5	Demodulating diode load (part)	1 meg.
6	V2 A.V.C. decoupling	1 meg.
7	A.V.C. decoupling	1 meg.
8	A.V.C. diode load	1 meg.
9	Volume control	1 meg.
10	Auto bias potr. (part)	130
11	Auto bias potr. (part)	200

CONDENSERS

C.	Purpose.	Mfd.
1	I.F. wavetrap	.001
2	L.W. aerial shunt	.000005
3	M.W. aerial coupling	.000005
4	L.W. aerial coupling	.00001
8	V1 A.V.C. decoupling	.05
10	1st I.F.T. primary fixed trimmer	.0002
11	Osc. grid	.0003
12	1st I.F.T. sec. fixed trimmer	.0002
13	V1, V2 screen decoupling	.1
14	Osc. anode coupling	.0002
20	L.W. osc. fixed trimmer	.00007
22	2nd I.F.T. fixed trimmer	.0002
23	S.W. osc. fixed padder	.004
24	V2 A.V.C. decoupling	.05
25	H.F. bypass	.0002
26	L.F. coupling	.01
27	A.V.C. diode coupling	.00001
28	V4 screen decoupling	2
29	Pentode compensator	.002
30	Bias shunt	100



The drawing on the left shows the simple "top-deck" arrangement of parts in the Ultra 105. In "Service Engineer" reviews the top chassis views are always shown "tinted."



Right, is the underchassis layout diagram showing the orderly placing of the trimmers. It will be noted one I.F. transformer is unscreened.

Ultra 105 on Test

MODEL 105.—Standard model for battery operation requiring a standard 120-volt H.T. and a 2-volt accumulator. Price 8 gns., excluding batteries.

DESCRIPTION. — Three-waveband, four-valve battery table model superhet.

FEATURES.—Full-vision scale with wave- and name-calibration. Controls for tuning, volume and wave change. Extension speaker sockets.

LOADING.—H.T., 9.6 ma.; L.T., 0.7 amp.

Selectivity and Sensitivity

SHORT WAVES (16.8-51 metres).—Average gain and selectivity. Tuning gearing necessitates careful handling. No drift.

MEDIUM WAVES (200-550 metres).—Representative selectivity and sensitivity. Local stations spread on adjacent channels. Gain well maintained. All main stations easily received.

LONG WAVES (800-2,000 metres).—Similar performance to medium waves. Slight overlap on Deutschlandsender.

Acoustic Output

Well-balanced representative tone with crisp, very pleasing reproduction on music and little speech colouration.

G.E.C. ALL-WAVE 5

(*Continued from page 27.*)

variable condenser between the disconnected lead and chassis.

Adjust the external variable condenser and the receiver tuning control simultaneously to give a maximum reading. Then disconnect the external condenser and reconnect the oscillator tuning condenser, and without altering the gang tuning control adjust P1 for maximum.

Repeat operations for 214 metres adjustment to check calibration.

Long Waves.—Tune set and oscillator to 1,000 metres (300 kc.) and adjust T6 and T3 respectively for maximum response.

Disconnect the oscillator tuning condenser and reconnect the external variable condenser as before. Tune oscillator to 1,818 metres (165 kc.) and simultaneously tune the external variable and set tuning condensers as before for maximum response.

Disconnect the external condenser and reconnect the oscillator tuning condenser, and without altering the gang setting adjust P2 for maximum.

Repeat operations for 1,000 metres adjustment to check calibration.

Tungsram Valve Charts

Reprints of the two Tungsram wall charts, one showing comparative types of valves and the other illustrating valve base connections, have been put in hand, and full supplies of these are again available from the company at 82-4, Theobalds Road, London, W.C.1. These wall charts, which are mounted on stiff card and measure 2 ft. by 1½ ft., proved so popular when they were first issued that supplies were quickly exhausted.