

SERVICE ENGINEER

G.E.C. MODEL D.C.-A.C.4 UNIVERSAL SUPERHET

CIRCUIT.—This receiver is designed for working on either A.C. or D.C. mains and operates over the usual medium and long wavelengths.

The aerial circuit consists of an inductively-coupled band-pass filter, incorporating a small image rejector coil connected in the cathode circuit of V1, which is the frequency changer valve.

The coupling to V2, an H.F. pentode, is through an air-cored I.F. transformer, tuned to 125 kc., a second I.F. transformer being used between this valve and V3, a double diode. The rectified output of V3 passes *via* a resistance and capacity stage, incorporating the volume control, to the output pentode V4.

A.V.C. volts are applied to V1 and V2 from one diode of V3 in the orthodox manner.

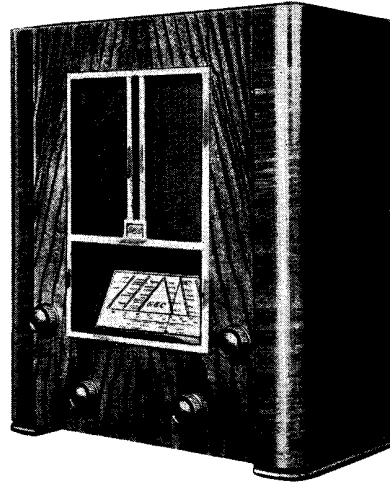
Two H.F. chokes are connected in series with the mains leads to suppress any interference which might reach the receiver from that source.

The mains equipment consists of a series-connected strapped rectifier, barreter, electrolytic condensers, and the speaker field.

Special Notes.—The dial lamps are rated at 6.5 v., .3 amps., and are very easily removed.

The external speaker is connected on the low resistance side of the output transformer, and should have a speech coil impedance of about 5 ohms.

Removing Chassis.—Remove four knobs from the front of the cabinet by unscrewing the hexagonal nuts on each, and pulling them off. Remove the two wooden battens from underneath the cabinet (two wood screws each), and the four chassis fixing bolts that are then exposed. Then re-



This universal four-valve superhet receiver was introduced by the General Electric Co. for the 1935-6 season. It is listed as Model BC3645.

move the bracing batten from across the back of the cabinet.

The chassis will then slide right out of the cabinet. An extra long speaker lead is fitted, so that there is no need to unsolder this.

ALIGNMENT NOTES

I.F. Circuits.—Connect a modulated oscillator tuned to 125 kc. to the grid cap

of V1, temporarily connecting together the ends of R21 and R5, the left-hand ends as seen in the under-chassis diagram.

Adjust C24, C25, C26 and C27 for maximum reading on output meter.

Remove the shorting lead across R21 and R5, and replace the grid lead.

Medium-wave Band.—Connect the modulated oscillator to the aerial and earth terminals through a dummy aerial.

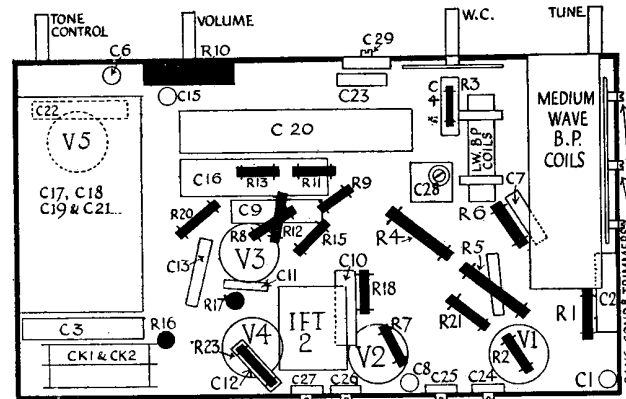
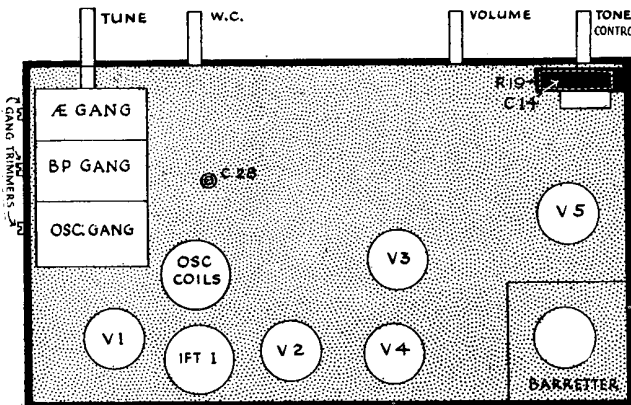
Tune the oscillator and the set to 214 metres and trim the three trimmers on the gang condenser for maximum reading on the output meter, starting with the oscillator trimmer which is on the back section of the gang.

Long-wave Band.—Disconnect the oscillator section of the gang condenser and in its place connect an ordinary .0005 mfd. variable condenser. Inject a signal of 1,000 metres and tune in the signal by means of the gang condenser and the external variable; when the maximum read-

(Continued on page 15.)

VALVE READINGS

V.	Type.	Electrode.	Volts.	M.a.
1	All Osram. X32 Met. (7) ...	anode ...	180	3.5
		screen ...	80	2
		osc. anode ...	110	2
2	W31 Met. (7) ...	anode ...	180	4
		screen ...	80	2.5
3	D.41 Met. (5)	diode ...	—	—
4	N31 ...	anode ...	170	3
		screen ...	150	6.5
5	U30 (7)	cathode	210	

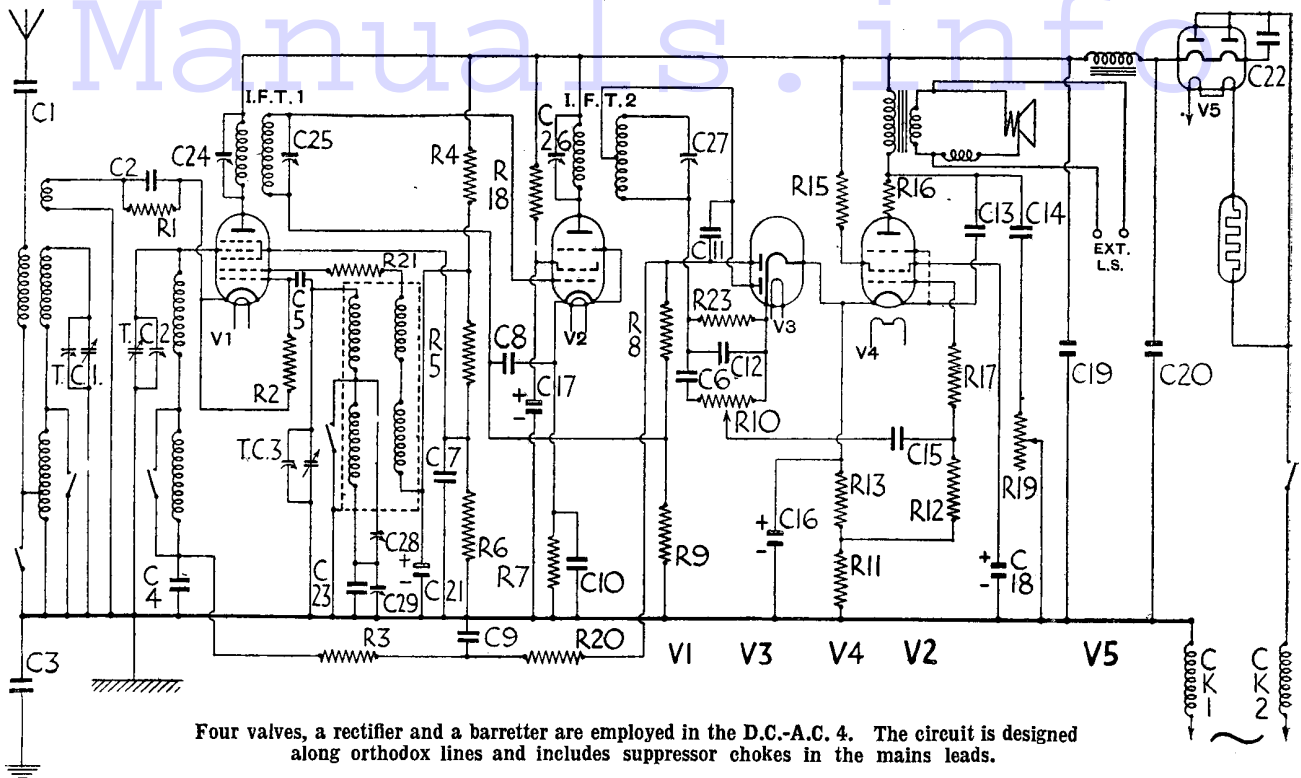


These chassis layout diagrams of the G.E.C. receiver show logical, clean construction. The "tinted" drawing shows the top of the chassis and the one on the right gives the underside layout.

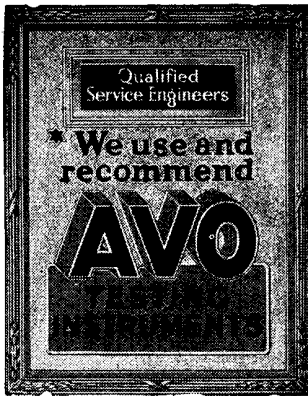
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G.E.C. MODEL D.C.-A.C.4 UNIVERSAL



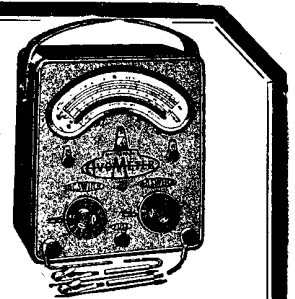
Four valves, a rectifier and a barretter are employed in the D.C.-A.C. 4. The circuit is designed along orthodox lines and includes suppressor chokes in the mains leads.



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SUPERHET

ing is obtained on the output meter, reconnect the oscillator gang temporarily and adjust C28 for maximum reading on output meter.

With the .0005 mfd. again connected in place of the oscillator section, inject and tune in a signal of 2,150 metres, and when maximum output is obtained, reconnect the oscillator section and trim C29 for maximum reading on output meter.

Repeat as before at 1,000 metres, and when satisfied that no further adjustment is possible resolder the lead to the oscillator section of the gang condenser.

CONDENSERS

C.	Purpose.	Mfd.
1	Aerial isolating ...	.01
2	V1 cathode bias shunt ...	.05
3	Chassis isolating ...	.1
4	V1 A.V.C. decoupling ...	.05
5	V1 osc. grid ...	.0001
6	L.F. coupling ...	.02
7	V1 screen decoupling ...	.05
8	V2 A.V.C. decoupling ...	.05
9	A.V.C. decoupling ...	.05
10	V2 cathode bias shunt ...	.1
11	A.V.C. diode coupling ...	.0001
12	H.F. by-pass ...	.0003
13	H.F. by-pass ...	.003
14	Tone control ...	.02
15	L.F. coupling ...	.02
16	V4 cathode bias shunt ...	35
17	V2 screen decoupling ...	3
18	V4 screen decoupling ...	2
19	H.T. smoothing ...	24
20	H.T. smoothing ...	3
21	V1 osc. anode decoupling ...	8
22	Mains H.F. by-pass ...	.01
23	Long-wave padding ...	.0005

RESISTANCES

R.	Purpose.	Ohms.
1	V1 cathode bias ...	250
2	V1 osc. grid leak ...	99,000
3	V1 A.V.C. decoupling ...	220,000
4	V1 osc. anode and screen decoupling pot. ...	5,500
5	Do. ...	7,000
6	Do. ...	15,000
7	V2 cathode bias ...	250
8	V3 A.V.C. diode load pot. ...	660,000
9	Do. ...	220,000
10	Volume control ...	500,000
11	V3 and V4 cathode bias pot. ...	150
12	V4 grid leak ...	440,000
13	V3 and V4 cathode bias pot. ...	90
15	V4 screen decoupling ...	3,300
16	V4 anode stabiliser ...	100
17	V4 grid stopper ...	77,000
18	V2 screen decoupling ...	33,000
19	Tone control ...	50,000
20	A.V.C. decoupling ...	440,000
21	V1 osc. anode control ...	2,500
23	V3 demodulator diode load ...	440,000

QUICK TESTS

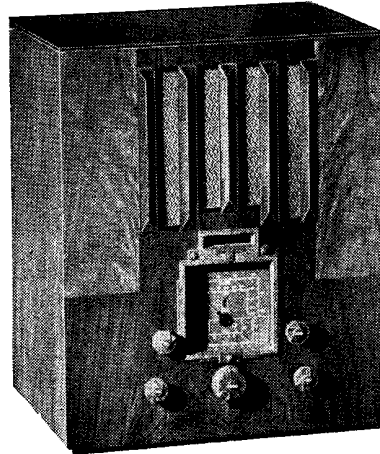
Quick tests are available on the terminal strip on the speaker transformer, volts measured between this and the chassis should be:—
 Red-white lead, unsmoothed H.T., 210 volts.
 Orange lead, smoothed H.T., 170 volts.
 Red lead, smoothed H.T., 185 volts.

Sets for Review

Suggestions as to receivers which should be dealt with in the "Service Engineer" section are welcomed.

Efforts are made to meet all requests providing the receivers are of wide enough interest, and, in the case of old models, examples are still available from the makers.

PYE T10A ALL-WAVE SUPERHET



Four wavebands—ultra-short, short, medium and long—are covered by the 4-valve plus receiver Pye T10 A. The receiver is different from the T10 chiefly in that it does not use a radio-frequency amplifier before the frequency changer.

CIRCUIT.—Use is made of a four-valve, plus rectifier arrangement, for A.C. mains operation only. Four wavebands—long, medium, short and ultra short—are selected by the range switch. On long and medium waves, the aerial is coupled to V1, a frequency changer, via a band-pass filter. On short waves, it is connected through a single tuned circuit inductively coupled to the aerial coils.

Coupling between V1 and V2, an H.F. pentode, is through an air-cored I.F. transformer tuned to 465 kc. A second I.F. transformer is used between V2 and V3, a double diode triode. The coupling between the windings of both I.F. transformers is manually variable, the arrangement acting as a variable selectivity control.

With selectivity at maximum a switch is closed which connects a condenser, C39, between the anode of V4 and earth and reduces the high note response, thus eliminating heterodyne whistles.

One diode of V3 works as a signal demodulator, and, by means of small bias applied to it, supplies the inter-carrier suppression. This bias is removed when the sensitivity control is tuned fully clockwise. The other diode supplies A.V.C. in the orthodox manner.

The L.F. output of V3 is then passed via a resistance and capacity stage to the output pentode V4.

Mains equipment consists of transformer, full-wave rectifier, electrolytic condensers, and the speaker field.

Special Notes.—An external speaker should have a speech coil resistance of about 2 ohms.

The dial lamps are rated at 4 volts 3 amps. To remove, slacken the slotted nuts securing the holder to the

back of the dial assembly, and the holder will then slide out.

Exposing Chassis.—Practically all the work necessary on this receiver can be done without taking out the chassis, by removing the board from underneath the cabinet. This is secured by four wood screws.

To remove the chassis, remove five knobs from the front of the cabinet and four bolts from underneath. Free the speaker field leads from its cleats and the speech coil leads from the cleat on the rear of the mains transformer. The chassis will then slide out.

ALIGNMENT NOTES

On medium and long wavebands, the variable selectivity control is turned fully anti-clockwise.

In all cases where more than one peak is found, the nearest the minimum capacity of the trimmer is the correct setting.

I.F. Circuits.—Connect a modulated oscillator, tuned to 465 kc. via a .002 mfd. condenser to the grid cap of V1, the grid lead being connected to the chassis through a ½ meg. resistance, and an output meter across the speaker terminals.

Connect a .25 mfd. condenser between the osc. anode of V1 and earth to stop the valve from oscillating.

Adjust T1, T2, T3 and T4 for maximum reading on output meter.

Long-wave Band.—Remove the .25 mfd. condenser and replace the grid lead. Connect the oscillator to the aerial and earth terminals.

Tune oscillator and set to 876 metres. Adjust T5, and T6, and T7 for maximum reading on output meter.

Tune oscillator and receiver to 1950 metres and adjust T8 for maximum.

(Continued on next page.)

QUICK TESTS

Quick tests are available on the terminal board on the back of the speaker. Volts measured between this and the chassis should be:—
 Red lead, smoothed H.T., 252 volts.
 Black lead, unsmoothed H.T., 420 volts.

VALVE READINGS

No signal. Volume at maximum. 200 v. A.C. mains.

V.	Type.	Electrode.	Volts.	M.a.
1	All Ever-Ready. A80A Met. (7)	anode ...	245	1
		screen ...	40	1.5
		osc. anode	130	2.6
2	A50N Met. (7)	anode ...	120	4
		screen ...	80	2
3	A23A Met. (7)	anode ...	70	2
4	A70C (7)	anode ...	210	35
		screen ...	250	3.5
5	A11B	filament...	420	—