GENERAL ELECTRIC T.R.F.3 BATTERY SET

CIRCUIT.—This model is a 3-valve battery receiver for medium and long waves.

The input from the aerial to V1, a variable-mu screen grid valve, is through a series aerial condenser and an inductively-coupled H.F. coil. Coupling between V1 and V2, an H.F. pentode used for detection, is inductive and capacitative.

Reaction control is by means of a differential condenser and a preset condenser C10, which is shunted across the moving and one set of fixed plates, so that a certain amount of reaction is applied to the grid of V2 with the manual control at minimum.

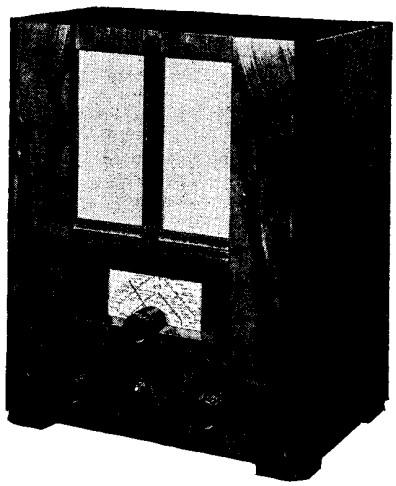
The L.F. output of V2 is then passed to V3, a pentode, through an auto-transformer and to the speaker through a matching transformer.

Volume control is effected by varying the aerial input to V1, by means of R2, and also the bias on V1.

Special Notes.—R1 and C2 are arranged to prevent the set going out of gang in the region of 500 metres.

Removing Chassis.—Remove the four

(*Continued on next page.*)



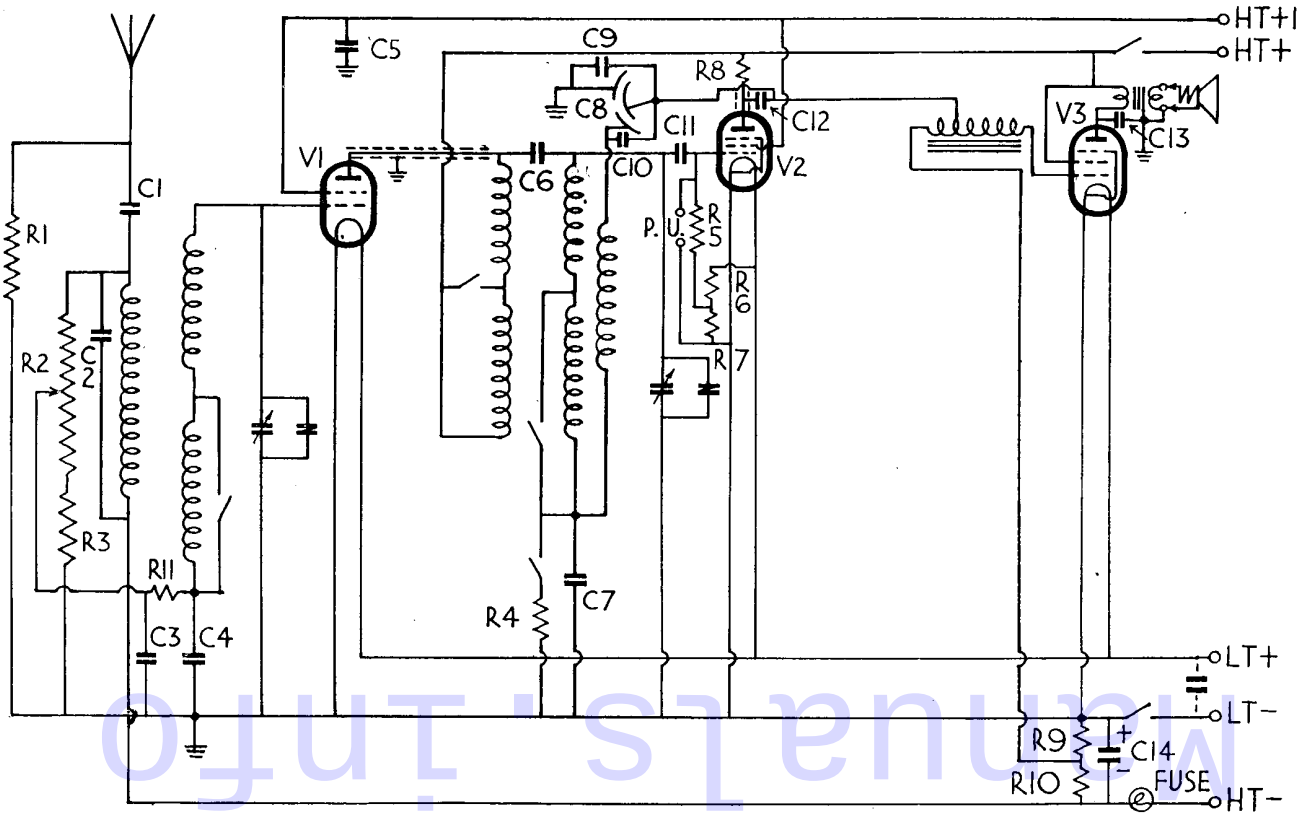
The T.R.F.3 battery set by G.E.C. is a "straight three" which includes a number of refinements which ensure a high performance over both wavebands and ease of control.

CONDENSERS

C.	Purpose.	Mfd.
1	Bias isolator	.003
2	See special notes	.00005
3	Signal filter	.01
4	Coupling	.005
5	V1 screen decoupling ...	.25
6	H.F. coupling	.000011
7	Long and medium wave padding	.005
8	Reaction	.00037
9	Reaction by-pass	.0001
10	Pre-set reaction	—
11	V2 Grid	.00005
12	L.F. coupling	.1
13	Pentode compensating ...	.002
14	Bias decoupling	35

RESISTANCES

R.	Purpose.	Ohms.
1	See special notes	9,900
2	Volume control	50,000
3	V1 grid bias	2,000
4	Long wave reaction modifier	990
5	V2 grid leak	4 meg.
6	Part V2 grid leak pot.... ..	220,000
7	Part V2 grid leak pot.... ..	77,000
8	V2 anode decoupling... ...	33,000
9	Part V2 bias pot.	350
10	Part V2 bias pot.	500
11	Signal filter	33,000



A pre-set reaction condenser C10 "hots up" the performance of the T.R.F.3. R4 assists smooth reaction during reception on the long-waves.

(*Continued from previous page.*)

knobs from the front of the cabinet and four bolts from underneath. Disconnect the speaker plugs from the sockets on the back of the chassis and the chassis can then be completely removed.

ALIGNMENT NOTES

(1) Connect modulated oscillator to aerial and earth terminals and output meter across speaker terminals. Tune oscillator and receiver to 250 metres. Adjust T1 and T2 for maximum on output meter.

(2) Tune oscillator and receiver to 500 metres and readjust T1 and T2 for maximum reading on output meter.

(3) Tune oscillator and receiver to 550 metres and with volume control at maximum and reaction at minimum, adjust C10 for near maximum reading on meter.

(4) Check adjustments (1) and (2) so that smooth reaction is obtained over the whole of both wave bands. If necessary, slacken off C10 slightly.

VALVE READINGS

No signal, and no reaction, volume maximum. New batteries.

V.	Type.	Electrode.	Volts.	Ma.
1	VS 24(5)Met.	anode ...	108	1.8
		screen ...	50	.7
2	VP 21(7)Met.	anode ...	58	1.8
		screen ...	50	.5
3	PT 2 (5) ...	anode ...	100	3.4
		screen ...	106	.75
	(All Osram)			

Tracing Source of Crackles

Notes on how to discover if interference is caused by an intermittent contact in house wiring and a simple way of locating the approximate position of such a fault.

INTERFERENCE taking the form of crackles, clicks and spluttering noises is due to intermittent contacts which may be in the receiver or the wiring of the house.

When a receiver appears to be satisfactory and it seems that the fault is in the house wiring, many retailers are rather at a loss as to how to proceed.

The best thing is to remove the fuses of the various circuits in the house from the main fuse box one by one—except, of course, the one in the circuit energising the set. If the noise stops when one fuse is out, the circuit indicated should be carefully examined—that is, all the fittings and any earth points should be painstakingly investigated.

Final Check

If the noises persist when all the other fuses are out, the circuit feeding the receiver should be checked. As a final test it may be necessary to try the set on another circuit—that is, in another room.

When the noise persists following these tests, it is safe to say that the source of the trouble is outside the house.

Where there is doubt as to whether the annoyance is due to the set itself it is sometimes easiest to check by trying another receiver in the same situation. A good deal can be learned by switching a receiver over to gramophone. If the trouble ceases it is either radiated or is introduced in the H.F. stages. If it continues it is in the L.F. side or is entering *via* the mains.

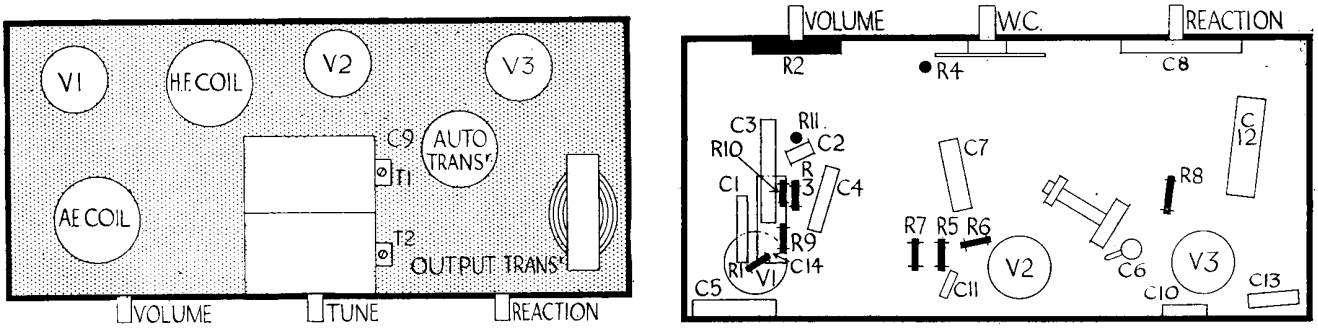
Noise that comes in at only certain positions of the tuning scale is usually due to some defect in the tuning condenser.

Other Listeners

In the event of the interference coming from outside the house, an indication as to its source may be obtainable, by inquiring in neighbouring houses, and, if possible, judging the relative increase or decrease in the strength of the noise. In such a case, of course, due allowance must be made for the different amplification of the various receivers.

For this reason it is very helpful to have a battery portable set. Moreover, the directional properties of the frame aerial provide unmistakeable clues as to the direction from which the radiation comes.

An idea used by G.P.O. engineers, which retailers may find worth copying, is to have the frame aerial separate from the receiver and mounted on a long handle. This enables an interference field to be explored very thoroughly.



The "tinted" diagram on the left shows how the parts are disposed on the top of the G.E.C. chassis, and the one on the right gives the layout of the underside.

ULTRA MODEL 96 A.C. RADIOGRAM (Continued)

former and should be of low-speech coil impedance.

The pick-up is permanently connected in the grid return lead of the first I.F. transformer and is shunted by C7.

Removing Chassis.—Remove the three knobs from the front of the cabinet (grub screws) and three chassis fixing bolts from underneath the shelf; unsolder the leads from the terminal strip on the speaker. Reconnection is as follows, starting on the right: (1) Black lead; (2) blank; (3) green lead; (4) yellow lead; (5) red lead.

Then remove the mains lead to the gramophone motor, the pick-up leads and the earth link, all secured by means of nuts. The chassis can then be completely removed from the cabinet; the leads to the speaker must, however, be reconnected, as the field forms part of the smoothing equipment.

To remove the gramophone assembly, unscrew the eight screws from around the edge of the motor plate and it will then be free.

ALIGNMENT NOTES

I.F. Circuits.—Connect a modulated oscillator tuned to 465 kc. to the grid of V1 and earth through a small fixed condenser, and an output meter across the external speaker terminals. Adjust T1, T2, T3 and T4, for maximum reading on output meter.

Medium Waves.—Inject a signal of 200 metres through a dummy aerial to the aerial and earth terminals, and tune in the signal and trim T5, T6 and T7 for maximum reading on output meter. Repeat at 500 metres and again at 350 for check.

Long Waves.—Tune oscillator and receiver to 1,000 metres and adjust T8 for maximum reading on the output meter.

QUICK TESTS

Quick tests are available on this receiver on the terminal strip at the back of the speaker. Volts measured between this and the chassis should be:—

Black lead, 260v., smoothed H.T.
Red lead, 365 v., unsmoothed H.T.

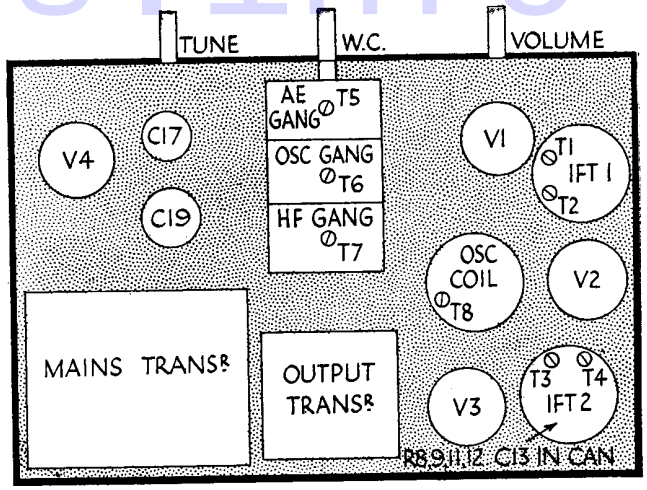
VALVE READINGS

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

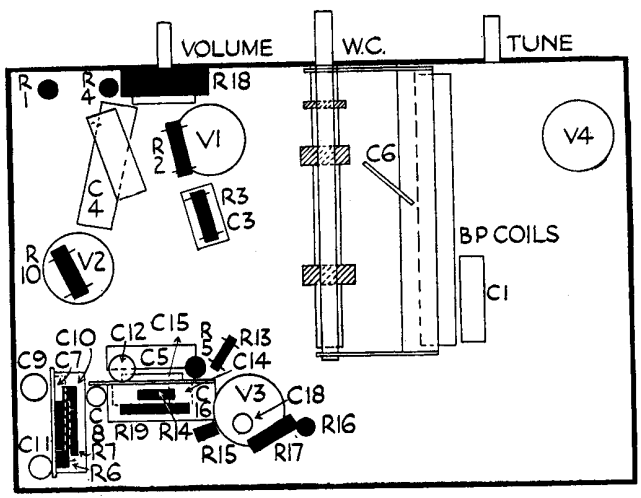
V.	Type.	Electrode.	Volts.	Ma.
1	AC/TP Met. (9)	anode ...	185	6
		screen ...	185	1.7
		osc. anode	80	2.2
2	AC/VP1Met. (7)	anode ...	230	17
		screen ...	225	5
3	AC2/Pen.DD(7)	anode ...	235	33
		screen ...	245	7
4	UU3 (4) ... All Mazda	filament	365	—

THE high-frequency type of neon sign, generally used in windows and where high voltages would be dangerous, sometimes introduce an interference component into the mains. A remedy can often be effected by putting a small earthed metal band round the tube. The band is moved along the tube until the interference is minimised.

On the right is the top-of-chassis layout diagram of the Ultra radiogram. The diagram is "tinted" to distinguish it from the layout showing the design of the underside of the chassis.



This drawing identifies the components mounted inside the chassis. To facilitate tracing parts, resistors are in solid black and condensers in outline.



ALIGNMENT NOTES FOR G.E.C. SET

DETAILS are available of the recommended alignment procedures for the G.E.C. models T.R.F.3, reviewed on page 57 of volume 1.

(i) Check that tuning pointer indicates zero mark on the scale with the gang condenser at minimum capacity. If necessary, the pointer may be adjusted after removing the chassis by turning the pointer clip round bodily on the spindle.

(ii) Select a station of known wavelength between 200 and 250 metres that for a reasonable signal to be obtained requires the setting of the volume control well towards the max. position, and the reaction condenser well towards the point of oscillation. Set the tuning pointer to this wavelength and adjust the trimmers for maximum response. If the set should oscillate as the circuits come into alignment, reduce reaction slightly and retrim.

(iii) Set tuning pointer to approximately the middle of the medium wave-band, and set the reaction control to minimum. Adjust C10, the reaction trimmer, until the receiver is just oscillating, and then turn back one complete turn. Check for freedom from oscillation over both wavebands, and seal trimmer.

Operation (ii) should be preferably carried out with a calibrated modulated oscillator at 1,400 kc. (214 metres).

A modification has been made in the T.R.F.3 and the condenser C9 shown in the circuit on page 57 of volume 1 of the MANUAL is not used.

The circuit description described the coupling between the H.F. and detector valves as inductive and capacitative. This, in conjunction with the drawing of the circuit, might be taken to indicate an H.F. transformer coupling. Actually, a switched H.F. choke is used in the anode circuit of the H.F. valve, and this feeds a simple tuned-grid circuit through a condenser.

Two errors occurred in the resistance table. R8 is "V2 anode coupling" and R9 and R10 are part of the bias potentiometer for V1 and V3.

The chassis, it will be found, is held by only three fixing bolts, whereas our review stated there were four.