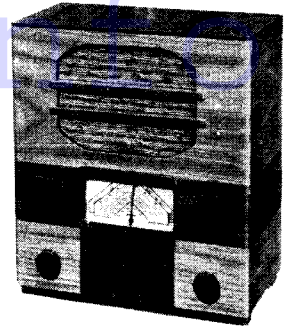


# ULTRA 105 BATTERY SUPERHET



The Ultra 105 is a three band four-valve battery superhet with pentode output. The cabinet is of contrasting ing walnut.

**CIRCUIT.**—The aerial circuit incorporates an I.F. filter, consisting of a fixed condenser and an iron-cored coil. The filter is tuned by adjusting the variable core of the coil.

The signal passes through a set of H.F. transformer coils (which have iron cores on M.W. and L.W.) to the grid of V1, a triode-pentode frequency changer.

Converted to the I.F. the signal passes to V2, an H.F. pentode, by an I.F. transformer of iron core construction. Another similar I.F. transformer leads to the demodulating diode of V3, a double diode valve.

The second diode provides a D.C. potential that is fed back to the preceding stages for A.V.C.

Coupling between V3 and V4, an output pentode, is effected by a fixed condenser connected to the mid-point of the demodulating diode load and thence to a manual volume control.

A fixed condenser is connected between the anode of the pentode and earth, to modify the tone of the receiver.

Battery power is supplied by a 120-volt H.T. battery of standard type and a 2-volt accumulator.

**Chassis Removal.**—The back of the cabinet is secured by two sliding clips. The three control knobs on the front are of the grub-screw fixing type. Remove these and then turn the cabinet on its side and take out the three fixing bolts and metal washers on the base of the cabinet.

The chassis can then be removed from the cabinet and is free to the extent of the speaker cable. If the speaker cable is unsoldered from the speaker panel, it should be noted that the yellow lead is

connected to the upper tag and the green to the other tag.

**Special Notes.**—A pair of sockets at the rear of the chassis enable an external speaker to be operated. The two speakers can be used together or the set speaker can be silenced by removing the wander plug from its socket on the bakelite external speaker panel on the rear of the chassis.

The external speaker should be of the low-impedance permanent-magnet moving-coil type.

In our particular chassis R8 was found to be two resistances in series with a total value of 1 meg.

## Circuit Alignment Notes

**I.F. Circuits.**—Set the wave-change switch to medium waves and turn the gang to maximum capacity. Turn the volume control to maximum.

Connect a service oscillator between the top grid cap of V1 and chassis via a small fixed condenser. Connect an output

meter across the primary of the output transformer.

Tune the service oscillator to 470 kc. and adjust the variable cores of the I.F. transformers, commencing with the second I.F. transformer, until maximum deflection is obtained in the output meter. Reduce the input as the circuits come into line to keep the A.V.C. inoperative.

**Signal Circuits.**—Leave the output meter as before, but connect the service oscillator between the aerial and earth terminals of the receiver through either a dummy aerial or a fixed condenser. Only feed sufficient input from the oscillator to obtain definite peaks on the output meter.

**Medium Waves.**—Tune the set and oscillator to 200 metres (1,500 kc.) and adjust T1 and T2 respectively for maximum.

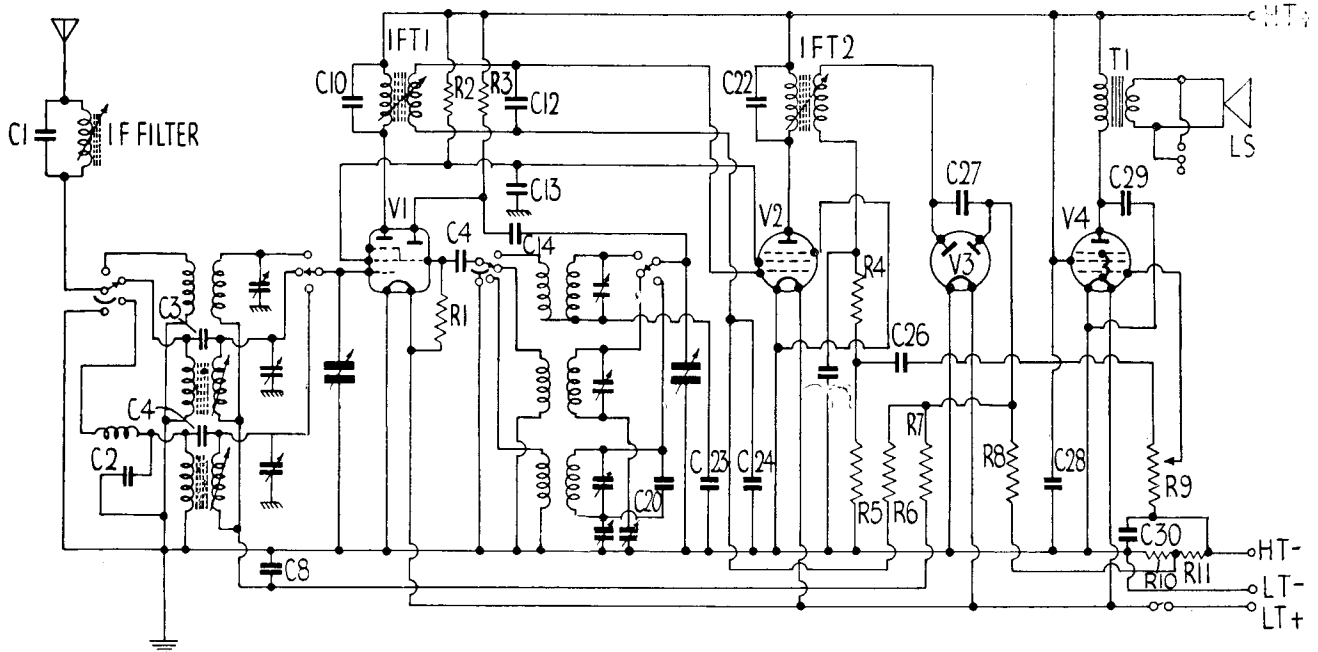
Tune the set and oscillator to 500 metres (600 kc.) and adjust the medium-wave paddler for maximum, simultaneously rocking the gang to ensure optimum results.

Retune the set and oscillator to 200

## VALVE READINGS

No signal. Volume maximum. New batteries.

| V. | Type.                              | Electrode.    | Volts. | Ma.  |
|----|------------------------------------|---------------|--------|------|
| 1  | All Mazda.<br>TP23met. (7)         | Anode ..      | 120    | 1.15 |
|    |                                    | Screen ..     | 43     | .65  |
|    |                                    | Osc. anode .. | 43     | 1.5  |
| 2  | VP210met.(7)                       | Anode ..      | 120    | 1.35 |
|    |                                    | Screen ..     | 43     | .35  |
|    |                                    | Diode ..      | —      | —    |
| 3  | DD207met.(4)<br>Pen.231met.<br>(5) | Anode ..      | 118    | 3.1  |
|    |                                    | Screen ..     | 120    | .4   |



An I.F. filter in the aerial circuit and the use of iron-core coils are two features of the Ultra model 105 battery superhet.

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.

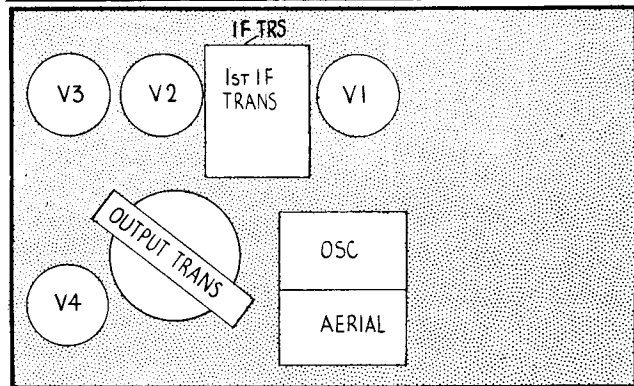
These are: for C28, unit list number 2,964, price 1s. 10d.; for C30, unit list number 3,751, price 2s.

### 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    |

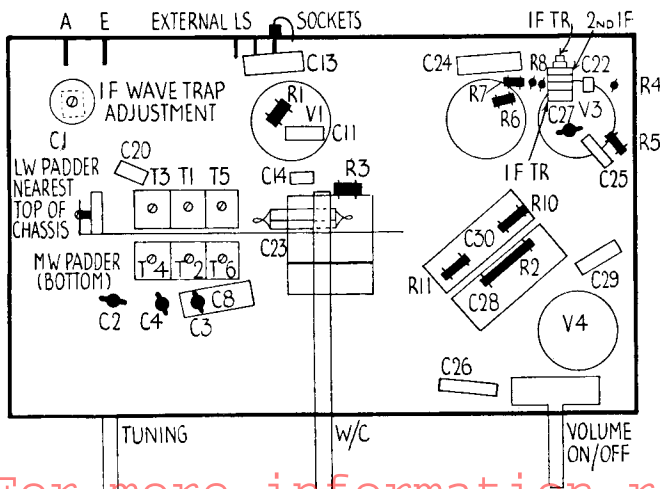
### RESISTANCES

| 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 pot. (part) .. .. .          | 130    |
| 11 | Auto bias pot. (part) .. .. .          | 200    |



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 under-chassis layout diagram showing the orderly placing of the trimmers. It will be noted one I.F. transformer is unshielded.



## 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** (16.3-51 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.

### Tungram Valve Charts

Reprints of the two Tungram 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.