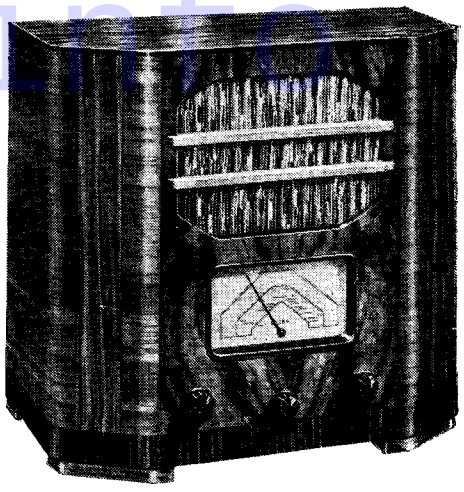
ULTRA 123 BATTERY SUPERHET



The Ultra 123 is a three-waveband four-valve battery superhet with Q.P.P. output.

CIRCUIT.—The aerial is coupled to V1, a triode pentode frequency changer through a set of band-pass coils on the medium- and long-wave bands. On short waves an H.F. transformer arrangement is switched into operation.

An iron-core choke with twin windings is incorporated in the heater circuit of V1, and there is an H.F. choke in the oscillator anode supply circuit.

The output of V1 passes through an I.F. transformer to the demodulating diode of V3, a double diode triode. The other diode provides a D.C. potential that is fed back to the preceding stages to give automatic volume control.

A manual volume control is connected in the coupling circuit between the demodulating diode load feed point and the grid of the triode section of V3.

V3 is coupled to V4, a double pentode output valve by a parallel-fed L.F. transformer arrangement. Across the secondary of the L.F. coupling transformer a variable resistance and fixed condenser are connected to form a tone control. V4 works in quiescent push-pull, the output of the twin anodes passing via a push-pull output transformer to the permanent-magnet moving-coil speaker.

A fixed tone compensator consisting of a condenser and resistance is connected across the primary of the output transformer.

Battery power is supplied by a Drydex 120-volt H.T. battery, type 1132, and a 2-volt accumulator, an Exide D.F.G.

Chassis Removal.—Remove the back of the cabinet and the three control knobs on the face of the cabinet. Turn the cabinet on its side so as to render the base accessible and remove the four fixing bolts and washers.

The chassis can then be withdrawn from the cabinet to a certain extent, and is available for most service requirements. If desired, the speaker (secured by three bolted sliding clips) can be removed from the cabinet and also the tone control with associated knob. The switch is removed by unscrewing the metal bracket holding it.

Special Notes.—A pair of sockets is provided for a pick-up.

When the wave-change switch is in the gramophone position, a bias is applied to the oscillator grid of V1, which effectively quenches the oscillations, thereby completely avoiding radio break through.

Sockets located at the rear of the chassis enable an extension speaker to be operated. The extra speaker can be operated either in conjunction with the set or by itself, the set speaker being silenced when the wander plug of the cut-out device is withdrawn from its socket.

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

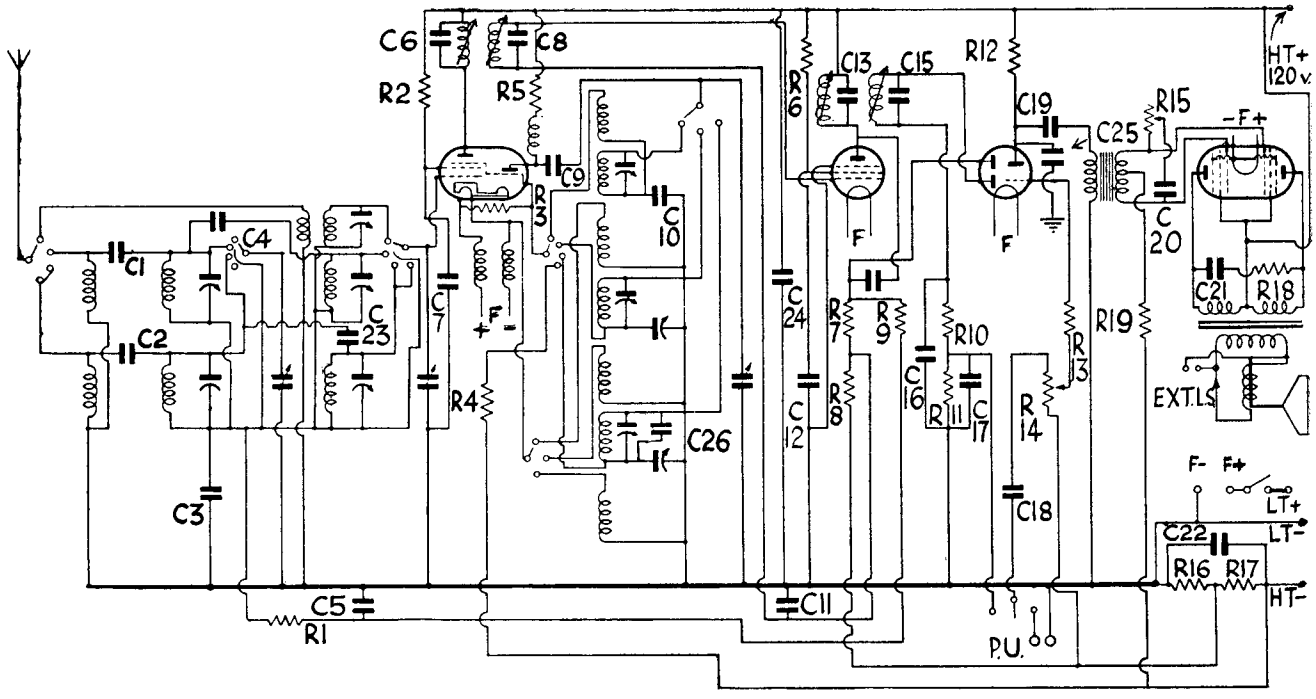
There are two dial lights located, one each side of the wavelength scale assembly. They are mounted in screw-in holders that clamp to the dial supports. They are Osram bulbs rated at 3.5 volts .15 amp.

In our particular chassis C12 was found

VALVE READINGS

No signal. Volume maximum. New batteries.

V.	Type.	Electrode.	Volts.	Ma.
1	(All Mazda) TP23 met. (7)	Anode ..	116	.5
		Screen ..	21	.2
		Osc.anode	67	3.3
2	VP210 met. (7)	Anode ..	112	1.3
		Screen ..	28	.2
3	L21DD met.(5)	Anode ..	50	.9
4	QP230 (7) ..	Anode ..	116	2.3
		Anode ..	116	2.4
		Screen ..	116	1



Careful design is evident in the circuit of the Ultra 123 battery superhet. The I.F. coils have adjustable iron cores in place of the usual trimmer condensers.

to have a value of .025 mfd. A 25,000 ohms resistance, R20, was found in series with the oscillator grid of V1 and a fixed condenser C26 in parallel with the L.W. oscillator trimmer. We understand that these components are now standard.

Circuit Alignment Notes

I.F. Circuits.—Connect a service oscillator between the top grid cap of V1 and chassis via a fixed condenser. Connect an output meter across the primary of the output transformer. Switch the set to the medium waveband and turn the gang to the maximum capacity position.

Tune the external oscillator to a frequency of 465 kc., and adjust the cores of the second and first I.F. transformers respectively until maximum deflection is observed in the output meter. Reduce the input from the oscillator as the circuits come into line to render the A.V.C. inoperative.

Signal Circuits.—Leave the output meter connected as before, but feed the service oscillator to 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 so as to keep the A.V.C. inoperative.

Medium Waves.—Tune the set and oscillator to 200 metres (1,500 kc.), and adjust T1, T2 and T3 respectively for maximum response.

Tune the set and oscillator to 500 metres (600 kc.) and adjust P1 for maximum, simultanenously rocking the gang to ensure optimum results.

Repeat the above operations to ensure correct calibration and maximum sensitivity.

Long Waves.—Tune the set and oscillator to 1,000 metres (300 kc.) and adjust T4, T5 and T6 respectively for maximum.

Tune the set and oscillator to 1,700 metres (176 kc.) and adjust P2 for maximum, simultaneously rocking the gang.

Repeat the above operations to ensure correct calibration and maximum sensitivity.

Short Waves.—Tune the set and oscillator to 17 metres (17,647 kc.) and adjust T8 and T9 respectively for maximum, taking care that the image is received at about 18 metres.

Check for calibration by injecting signals of various wavelengths within the range covered.

CONDENSERS

C.	Purpose.	Mfd.
1	M.W. aerial coupling.. ..	.000005
2	L.W. aerial coupling.. ..	.00001
3	V1 A.V.C. decoupling ..	.025
4	M.W. top band pass coupling	.00001
5	V1 A.V.C. decoupling ..	.025
6	I.F.T.1 primary fixer trimmer	.00015
7	V1 screen decoupling.. ..	.1
8	I.F.T.1 sec. fixed trimmer ..	.00015
9	Osc. anode coupling	.0001
10	S.W. fixed padder	.004
11	V2 A.V.C. decoupling ..	.025
12	V2 screen decoupling.. ..	.1
13	I.F.T.2 primary fixed trimmer	.00015
14	A.V.C. diode coupling ..	.00006
15	I.F.T.2 sec. fixed trimmer ..	.00015
16	H.F. by-pass	.00006
17	H.F. by-pass	.0001
18	L.F. coupling	.01
19	L.F. coupling	.15
20	Tone control	.004
21	Tone control	.004
22	Bias shunt	50
23	L.W. top band pass coupling	.000001
24	H.T. reservoir	8
25	H.F. by-pass	.001
26	L.W. osc. fixed trimmer ..	.00006

RESISTANCES

R.	Purpose.	Ohms.
1	V1 A.V.C. decoupling ..	500,000
2	V1 screen decoupling.. ..	250,000
3	Osc. grid leak	25,000
4	Osc. quenching bias	25,000
5	Osc. anode load	10,000
6	V2 screen decoupling.. ..	150,000
7	A.V.C. diode load (part) ..	1 meg.
8	A.V.C. diode load (part) ..	250,000
9	V1 A.V.C. feed	1 meg.
10	Demodulating diode load (part)	25,000
11	Demodulating diode load (part)	500,000
12	V3 anode load	50,000
13	V3 grid stopper	1,000
14	Volume control	1 meg.
15	Tone control	2 meg.
16	Bias potr. (part)	130
17	Bias potr. (part)	640
18	Tone control	30,000
19	V4 QPP grid stabiliser ..	15,000
20	Regeneration modifier ..	25,000

Ultra 123 on Test

MODEL 123.—Standard model for battery operation requiring Drydex Type 1132, 120-volt double capacity H.T. and Exide D.F.G. 2-volt L.T. Price 12 gns., including batteries.

DESCRIPTION. — Three-waveband table model battery superhet using four valves. Walnut cabinet.

FEATURES.—Illuminated, colour coded full-vision scale. Q.P.P. output. Controls for tuning, volume, tone and wave selection. Pick-up and external speaker sockets. Iron-core coils.

LOADING.—H.T., 12.6 ma.; L.T., 0.96 amp.

Selectivity and Sensitivity

SHORT WAVES (16.8-50 metres).—Average gain and selectivity. No drift and easy handling. Sensitivity greatest near beginning and middle of waveband.

MEDIUM WAVES (200-550 metres).—Very good gain and excellent selectivity. Local station spread small and gain well maintained. Many weak stations easily received in daylight.

LONG WAVES (900-2,000 metres).—Similar performance to medium waves. Very slight overlap on Deutschlandsender. All main stations well received.

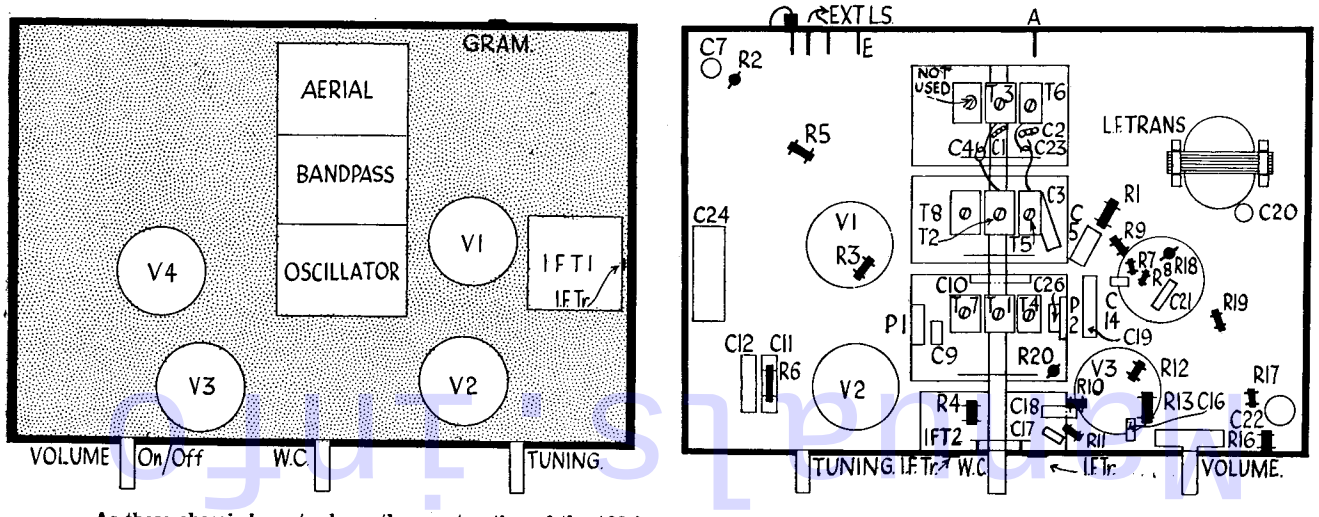
Acoustic Output

Excellent output for Q.P.P. with tone resembling that of a mains receiver. Tone control very well graded, normal response being clean with little colouration on speech.

Replacement Condensers

TWO exact replacement condensers for the Ultra 123 are available from A. H. Hunt, Ltd., of Garratt Lane, Wandsworth, London, S.W.18.

These are: for C24, unit list number 3477, 1s. 9d.; for C22, unit 2915, 1s. 9d.



As these chassis layouts show, the construction of the 123 is on very orderly lines, with neatly grouped trimmers and components.