



Circuit diagram of the Ultra 101 table A.C. superhet. The radio-gramophone, Model 96, is similar in general design but has several additional components. Note that the scale lamp is not connected across the whole of the mains transformer heater secondary, but to a special tapping *c*.

COMPONENTS AND VALUES

RESISTANCES		Values (ohms)
R1	V1 pentode C.G. decoupling ..	1,000,000
R2	V1 pentode anode decoupling ..	7,000
R3	V1 osc. harmonic suppressor ..	1,000
R4	V1 osc. C.G. resistance ..	50,000
R5	V1 cathode resistance ..	480
R6	V1 osc. anode decoupling ..	80,000
R7	V2 C.G. decoupling ..	1,000,000
R8	V2 fixed G.B. resistance ..	30
R9	V3 signal diode load ..	500,000
R10	V3 C.G. I.F. stopper ..	1,000
R11	I.F. stopper ..	10,000
R12	Manual volume control ..	1,000,000
R13	V3 G.B. and A.V.C. line delay ..	138
R14	voltage resistances ..	138
R15	V3 pentode anode stabiliser ..	60
R16	V3 A.V.C. diode load ..	250,000
R17		750,000

OTHER COMPONENTS (Continued)			Approx. Values (ohms)
Li2	1st I.F. trans.	Pri.	4·2
Li3		Sec.	4·2
Li4	2nd I.F. trans.	Pri.	4·2
Li5		Sec.	4·2
Li6	Speaker speech coil	2·2	
Li7	Hum neutralising coil.	0·1	
Li8	Speaker field coil	1500·0	
T1	Output trans.	Pri.	375·0
		Sec.	0·18
T2	Mains trans.	Pri. total	28·0
		Heater sec.	0·1
		Rect. heat. sec.	0·15
		H.T. sec. total	580·0
Sl-S6	Waveband switches	—	
S7	Mains switch, gauged Rr2	—	

VALVE ANALYSIS

Valve voltages and currents listed in the table below were obtained from an average chassis operating with a 230 V 50 c.p.s. mains supply (230-250 mains transformer tap). There was no signal input (aerial and earth sockets S/C), and the receiver controls were set as follows :— wavechange switch at M.W.; gang condenser at minimum capacity; volume control at maximum.

All voltages were measured on the 1,200 V scale of an Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 AC/TP*	170	6.7	170	2.3
V2 AC/VP*	240	14.5	240	4.1
V3 AC/z- TmDD	225	30.0	240	6.5
V4 UU3 ..	310†	—	—	—

* Triode osc. anode 65V 2.0 mA. † Each anode A.C.

GENERAL NOTES

Switches.—**S1-S6** are the waveband switches in a single ganged unit beneath the chassis. The screening cover over this and the signal-frequency coils has been removed in our under-chassis view. All switches, except **S6**, are *closed* on the M.W. and *open* on the L.W. band. **S6** is *closed* on L.W. and *open* on M.W.

S7 is the Q.M.B. mains switch, ganged with the volume control **R12**.

Coils.—L1-L7, the signal-frequency coils, are mounted beneath the chassis between the switch unit and the chassis deck. A

CONDENSERS		Values (μ F)
C1	V1 pentode C.G. decoupling ..	0.05
C2	V1 pentode S.G. and anode decoupling ..	0.1
C3	V1 osc. C.G. condenser ..	0.0002
C4	V1 cathode by-pass ..	0.5
C5	V1 osc. anode decoupling ..	0.1
C6	Oscillator L.W. tracker ..	0.0003
C7	V2 C.G. decoupling ..	0.05
C8	V2 cathode by-pass ..	0.1
C9	L.F. coupling to V3 pentode ..	0.01
C10	I.F. by-pass ..	0.0002
C11*	V3 cathode by-pass ..	50.0
C12	Coupling to V3 A.V.C. diode ..	0.0002
C13	Fixed tone corrector ..	0.01
C14*	H.T. smoothing	8.0
C15*		16.0
C16†	Band-pass primary tuning ..	—
C17†	Band-pass primary trimmer ..	—
C18†	Band-pass secondary tuning ..	—
C19†	Band-pass secondary trimmer ..	—
C20†	Oscillator L.W. trimmer ..	—
C21†	Oscillator circuit tuning ..	—
C22†	Oscillator M.W. trimmer ..	—
C23†	1st I.F. trans. pri. tuning ..	—
C24†	1st I.F. trans. sec. tuning ..	—
C25†	2nd I.F. trans. pri. tuning ..	—
C26†	2nd I.F. trans. sec. tuning ..	—

* Electrolytic. † Variable. ‡ Pre-set.

OTHER COMPONENTS			Approx. Values (ohms)
L ₁	{ Aerial coupling coils .. {		1·5
L ₂			48·5
L ₃	{ Band-pass primary coils {		4·7
L ₄			11·3
L ₅	L ₆ loading coil.. .. .		1·3
L ₆	{ Band-pass secondary coils {		4·7
L ₇			11·3
L ₈	{ Oscillator coupling coils, total		1·2
L ₉			
L ₁₀	{ Oscillator tuning coils.. {		8·5
L ₁₁			8·5

screening cover fits over the whole assembly. Note that **L1** and **L5** are wound over **L3** and **L6** respectively.

L8-L11, the oscillator coils, are in a screened unit on the chassis deck together with the trimming condenser **C20**.

The I.F. transformers **C23, L12, L13, C24 and C25, L14, L15, C26** are in two further screened units on the chassis deck. The second unit also contains **R1, R7, R16, R17 and C12.**

Condensers.—**C14**, **C15** are two aqueous electrolytics in cylindrical metal cases mounted on the chassis deck. **C14** has a rated capacity of $8\mu\text{F}$ and **C15** $16\mu\text{F}$. The container of each is the negative connection.

C11 is a tubular 50 μ F 12 V dry electrolytic condenser mounted underneath the chassis.

Components C11, C9, R9, R10.—These are mounted on a vertical paxolin panel underneath the chassis. As their positions may not be quite clear in the under-chassis illustration, it should be noted that the large tubular electrolytic condenser **C11** is at the top, then come **C9, R9** and **R10**, in that order.

Components R1, R7, R16, R17, C12.—These are all inside the second I.F. transformer unit, and the resistances can be identified by their colour coding. Both **R1** and **R7** are 1 MO resistances, and of the two, **R1** is mounted vertically and **R7** horizontally.

Scale Lamp.—This is an Osram M.E.S. type rated at 4.5 V 0.3 A. Note that it is connected across a part of the mains output. Keep input low in order to avoid A.V.C. action.