

# ULTRA RADIO CO.

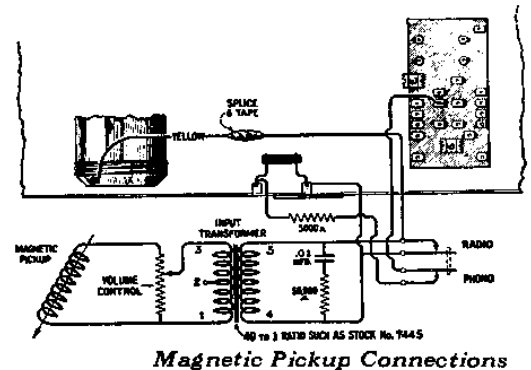
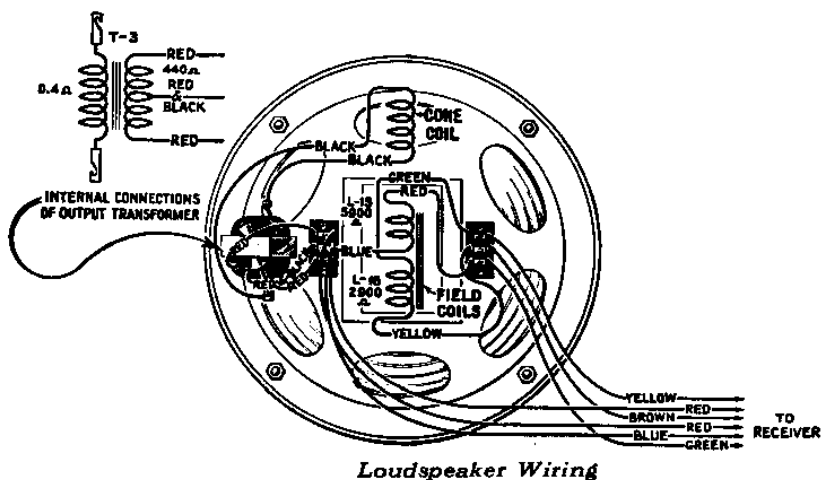
## RADIOTRON SOCKET VOLTAGES

120 Volt A. C. Line

(No Signal Being Received—Antenna Lead Grounded to Chassis)

Radiotron No.	Cathode to Heater Volts, D. C.	Cathode or Filament to Control Grid, Volts, D.C.	Cathode or Filament to Screen Grid, Volts, D.C.	Cathode or Filament to Plate, Volts, D. C.	Plate Current, M. A.	Heater or Filament, Volts, D. C.
<b>VOLUME CONTROL AT MINIMUM</b>						
1. R. F.	+4	1.0	90	280	0	2.4
2. 1st Det.	0	1.2	90	275	0	2.4
3. Osc.	+4	0	—	55	5.0	2.4
4. I. F.	+3	1.8	90	280	0	2.4
5. A. V. C.	0	0	—	5	0	2.4
6. 2nd Det.	+15	3.0	—	225	1.0	2.4
7. 1st A. F.	+14	10.0	—	260	5.0	2.4
8. Power	—	0	—	400	6.0	2.4
9. Power	—	0	—	400	6.0	2.4
<b>VOLUME CONTROL AT MAXIMUM</b>						
1. R. F.	+4	0	70	250	4.5	2.4
2. 1st Det.	+6	0.6	75	235	2.0	2.4
3. Osc.	+4	0	—	50	5.0	2.4
4. I. F.	+4	1.5	84	250	4.5	2.4
5. A. V. C.	0	0	—	15	0	2.4
6. 2nd Det.	+15	3.0	—	210	1.0	2.4
7. 1st A. F.	+14	10.0	—	240	5.0	2.4
8. Power	—	0	—	400	6.0	2.4
9. Power	—	0	—	400	6.0	2.4

## MODEL 102



# ULTRA - 102,95,97

## VALVE ANALYSIS

Value	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 TP2620	165 Oscillator	3.8 2.3	165	1.7
V2 VP1321	210	14.0	210	3.7
V3 Pen DD	4020 ...	—	210	8.3
V4 U4020	190 †	40.0 —	—	—

† Cathode to chassis, 245V, DC.

Intermediate frequency 456 kc/s.

## RADIOGRAM MODIFICATIONS

In the radiogram model 97 and the auto-radiogram model 95 the 102 chassis, modified to permit V2 to operate as a pick-up amplifier, is employed. This involves the addition of six capacitors and 3 resistors and four switches.

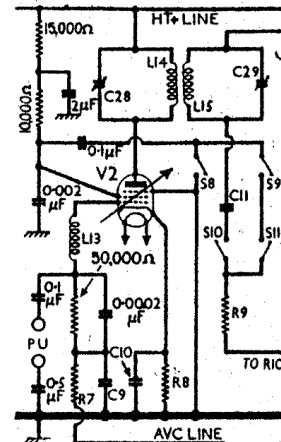
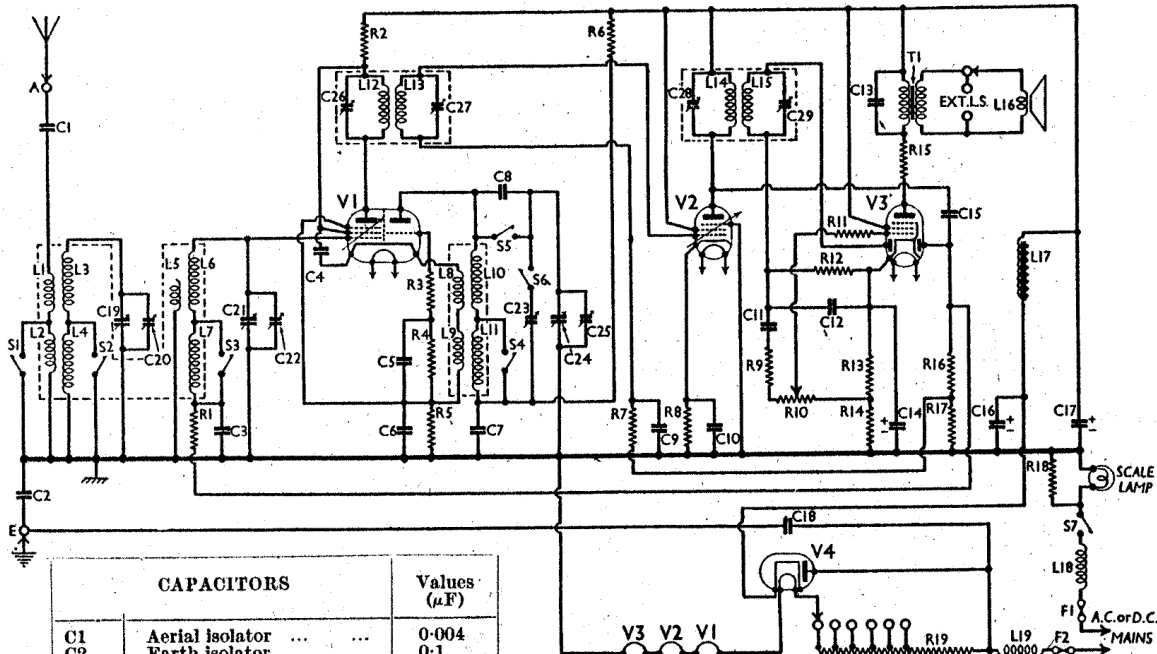
A section of the circuit diagram is redrawn and inset beside the main circuit diagram overleaf, showing the modified arrangement. The pick-up is fed in to V2 control grid circuit, and the AF output is taken from the screen, which acts as a triode anode. It then passes via S9 and S10 to R9 and R10. Component values are marked in the diagram.

The four switches S8-S11 are added at the rear end of the switch unit, just beyond S4, where they occupy only two spaces.

RESISTORS		Values (ohms)
R1	V1 pent. CG decoupling	1,000,000
R2	V1 pent. HT decoupling	7,000
R3	V1 osc. grid stopper	1,000
R4	V1 osc. CG resistor	50,000
R5	V1 fixed GB	660
R6	V1 osc. anode HT feed	50,000
R7	V2 CG decoupling	1,000,000
R8	V2 fixed GB resistor	30
R9	IF stopper	10,000
R10	Manual volume control	1,000,000
R11	V3 grid stopper	1,000
R12	V3 signal diode load	500,000
R13	V3 GB and AVC delay	110
R14	resistors	110
R15	V3 pent. anode stopper	60
R16	V3 AVC diode load	250,000
R17	resistors	750,000
R18	Scale lamp shunt	80*
R19	Heater circuit ballast	625†

\* May be 55Ω.

† Tapped at 50Ω + 50Ω + 50Ω + 50Ω + 50Ω + 375Ω from V4 heater end.



radiogram chassis.  
(95 and 97)

CAPACITORS		Values (μF)
C1	Aerial isolator	0.004
C2	Earth isolator	0.1
C3	V1 pent. CG decoupling	0.05
C4	V1 pent. HT decoupling	0.1
C5	V1 osc. CG capacitor	0.0002
C6	V1 cathode by-pass	0.5
C7	V1 osc. anode decoupling	0.5
C8	Osc. circ. LW tracker	0.0003
C9	V2 CG decoupling	0.05
C10	V2 cathode by-pass	0.1
C11	AF coupling capacitor	0.01
C12	IF by-pass	0.0002
C13	Fixed tone corrector	0.01
C14*	V3 cathode by-pass	50.0
C15	AVC diode coupling	0.0002
C16*	HT smoothing capacitors	8.0
C17*		16.0
C18	Mains RF by-pass	0.1
C19†	Band-pass pri. tuning	—
C20†	B-P pri. MW trimmer	—
C21†	Band-pass sec. tuning	—
C22†	B-P sec. MW trimmer	—
C23†	Osc. circ. LW trimmer	—
C24†	Oscillator circuit tuning	—
C25†	Osc. circ. MW trimmer	—
C26†	1st IF trans. pri. tuning	—
C27†	1st IF trans. sec. tuning	—
C28†	2nd IF trans. pri. tuning	—
C29†	2nd IF trans. sec. tuning	—

\* Electrolytic. † Variable. ‡ Pre-set.

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial coupling coils	1.5
L2		65.0
L3	Band-pass primary coils	4.7
L4		11.3
L5	L6 loading coil	1.3
L6		4.7
L7	Band-pass secondary coils	11.3
L8	Oscillator reaction coils, total	0.8
L9		9.2
L10	Osc. MW tuning coil	9.8
L11	Osc. LW tuning coil	6.0
L12	1st IF trans. { Pri. ...	6.0
L13		6.0
L14	2nd IF trans. { Pri. ...	6.0
L15		6.0
L16	Speaker speech coil	2.0
L17	HT smoothing choke	500.0
L18	Mains RF filter chokes	1.0
L19		1.0
T1	Output trans. { Pri. ...	380.0
		0.2
S1-S6	Waveband switches	—
S7	Mains switch, ganged R10	—
F1, F2	Mains fuses, 0.5A	—

## CIRCUIT ALIGNMENT

**IF Stages.**—Connect signal generator to control grid (top cap) of V1 and E socket, feed in a 456 kc/s (657.9 m) signal, and adjust C29, C28, C27 and C26 for maximum output.

**MW.**—Switch set to MW, tune to 200 m on scale, feed in a 200 m (1,500 kc/s) signal, and adjust C25, then C22 and C20, for maximum output. If a whistle appears just above 340 m, readjust C20 and C25 until it disappears.

**LW.**—Switch set to LW, tune to 1,500 m on scale, feed in a 1,500 m (200 kc/s) signal, and adjust C23 for maximum output.