

'TRADER' SERVICE SHEETS

RECEIVER SERIES (NUMBER THREE)

The ULTRA "TIGER"

A.C. MODEL

THE Ultra "Tiger" model is a four-stage A.C. super-heterodyne receiver employing a conventional circuit, and is probably the most popular model in the Ultra range. It is marketed in table, console and radio-gramophone forms. The notes below deal with the table and console models, but the radio-gram contains a similar chassis.

CIRCUIT DESCRIPTION

One aerial connection by way of variable tapping on aerial-earth potentiometer (R1) to coupling coil L1. R1 forms pre-detector volume control. Inductively coupled band-pass input circuit (Pri. L2, L3; Sec. L5, L6; Coupling L4) to S.G. combined first detector and oscillator valve (V1, Mazda AC/SG). Oscillator coupling coil (L7, L8) in cathode circuit. Oscillator tuned coils (L9, L10), coupled to anode circuit of V1 through pre-set condenser. V1 coupled to single variable-mu I.F. amplifier (V2, Mazda AC/S1VM) by tuned-primary tuned-secondary transformer (T1). I.F. 456KC. Volume controlled by variable resistance R2 (ganged with R1), which varies G.B. applied to V2. V2 coupled to S.G. anode-bend second detector (V3, Mazda AC/SG) by second I.F. transformer (T2), with provision for pick-up in secondary circuit. R.C. coupling to IHC output pentode (V4, Mazda AC/Pen) with variable tone compensator in grid circuit (C11, R14). Usual R.C. voltage-limiting filter (R15, C13) in plate circuit.

H.T. current supplied by Westinghouse metal rectifier working on voltage-doubler system with condensers C19 and C20. Smoothing by means of speaker field (L12) and electrolytic condensers C17 and C18.

DISMANTLING THE SET

Removing Chassis.—Remove control knobs, first loosening grub screws. Unscrew 3 screws holding chassis to bottom of cabinet. Unplug internal speaker, and unsolder red and black flex wires leading to speaker field. The chassis can now be slid out. Beneath it are a flat sheet

screen and two Sorbo rubber strips. When replacing, make certain that the chassis is not touching the front of the cabinet, and that it is correctly resting on the flat screen and rubber strips. The spindles of the controls should be clear of the holes in the front of the cabinet. Do not forget to re-solder the speaker field wires.

If the set is to be tested while the chassis is out of the cabinet, it will be necessary to take out the speaker as well, since its field winding forms part of the circuit. Four bolts and nuts hold the speaker to the cabinet.

When replacing the field wires, if they have been removed, note that they are connected to the two outer tags on the speaker terminal panel. These are colour-coded red and black, by the sleeving over the wires running from the field winding to them. The second tag from the bottom has no connection externally.

the various trimmers and pre-set condensers. These are adjusted and sealed.

Resistances		Value (ohms)
R1	Variable aerial-earth potentiometer ..	50,000
R2	V2 variable G.B. resistance ..	10,075
R3	V1 cathode resistance ..	2,000
R4	V1 S.G. pot. divider ..	80,000
R5		17,500
R6	Part of osc. coupling circuit ..	2,000
R7	Part of V2 G.B. circuit	100,000
R8		100,000
R9	V2 S.G. pot. divider ..	40,000
R10		25,000
R11	Pick-up shunt resistance ..	100,000
R12	V3 bias resistance ..	15,000
R13	V3 anode resistance ..	1,000,000
R14	V4 grid res. and var. tone contr. ..	500,000
R15	Part of voltage-limiting circuit ..	15,000
R16	V4 bias resistance ..	415

COMPONENTS AND VALUES

Condensers		Value (μF)
C1	Band-pass primary tuning ..	—
C2	Oscillator tuning ..	—
C3	Band-pass secondary tuning ..	—
C4	V1 cathode by-pass ..	0.01
C5	V1 S.G. by-pass ..	0.1
C6	V2 cathode by-pass ..	0.1
C7	V2 S.G. by-pass ..	0.1
C8	V3 cathode by-pass (electrolytic) ..	6.0
C9	V3 anode by-pass ..	0.0001
C10	L.F. coupling to V4 ..	0.01
C11	Tone control capacity ..	0.002
C12	V4 cathode by-pass (electrolytic) ..	25.0
C13	Part of voltage-limiting circuit ..	0.01
C14	V4 anode by-pass ..	0.001
C15	Part of H.T. smoothing ..	0.01
C16	Mains aerial capacity ..	0.0001
C17	H.T. smoothing (electrolytic) ..	8.0
C18	H.T. smoothing (electrolytic) ..	8.0
C19	Voltage-doubler (electrolytic) ..	4.0
C20	Voltage-doubler (electrolytic) ..	4.0

Components		Value (ohms) (approx.)
L1	Aerial coupling coil ..	1.35-1.65
L2	Pri. band-pass coils ..	4.6-5
L3		10.5-12.6
L4	Band-pass coupling coil ..	1.35-1.65
L5	Sec. band-pass coils ..	4.6-5
L6		10.5-12.6
L7	Oscillator coupling coils ..	0.8
L8		1.2
L9	Oscillator tuning coils ..	7.9
L10		4
L11	H.F. Choke ..	54-66
L12	Speaker field coil ..	1500
T1	1st I.F. transformer. Pri. and sec. each ..	5.25-6
T2	2nd I.F. transformer. Pri. and sec. each ..	5.25-6
T3	Output transformer { Pri. .. 210.0 Sec. .. 0.5	
T4	Mains transformer { Pri. (total) .. 30.0 Heater sec. .. 0.2 H.T. sec. .. 550.0	
S1-S6	Waveband ganged switches ..	—
S7	Pick-up shorting switch ..	—
S8	Mains switch (ganged with R14) ..	—

(Continued overleaf)

NOTE.—The above table contains all the main condensers, but does not include

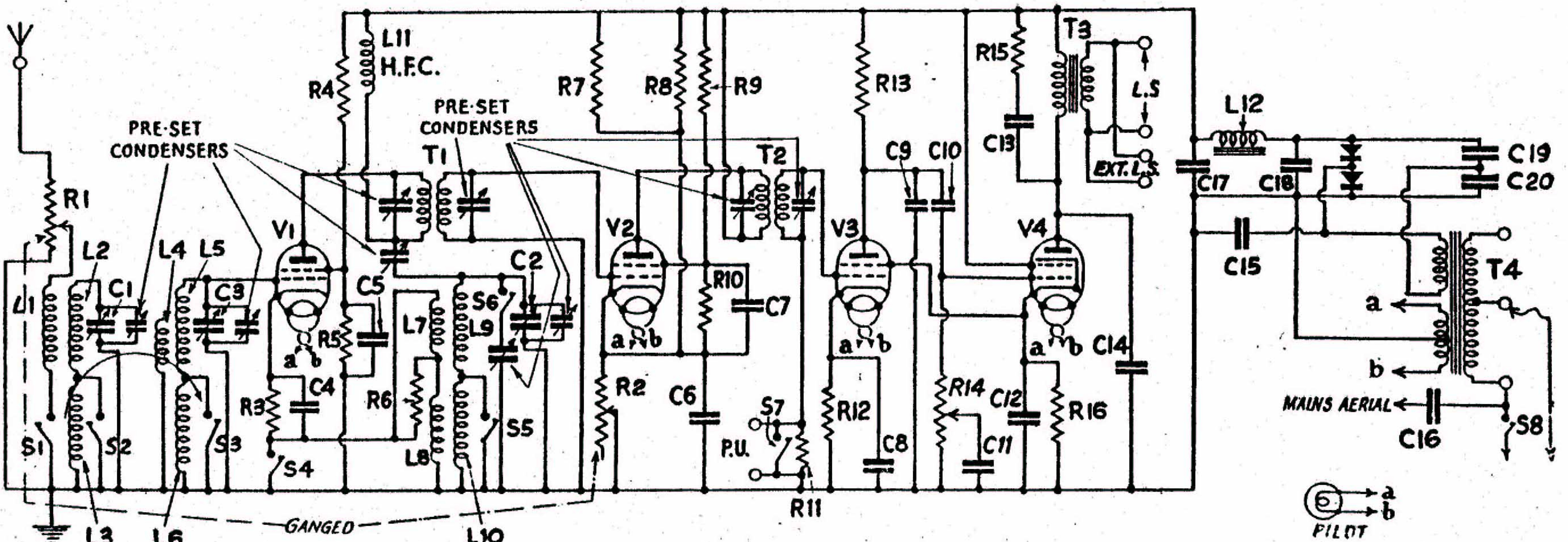


Fig. 1.—The circuit of the Ultra "Tiger" (A.C.). Pre-set condensers are indicated, but lettered or numbered.

The ULTRA "TIGER" (contd.)

VALVE ANALYSIS

Most of the voltage readings given below are taken with a 250 V meter, having a resistance of 1,000 Ω per V. Readings are given between anode and cathode, screen and chassis, and cathode and chassis. To obtain anode to chassis readings, add cathode to chassis and anode to cathode readings. Two sets of readings are given, with the volume control potentiometer at the minimum and maximum positions.

Voltages with Volume Control at Minimum			
Valve	Anode/Cathode	Screen/Chassis	Cathode/Chassis
V1 AC/SG ..	268	36	243
V2 AC/S1/VM	195	138	68
V3 AC/SG ..	50	16	1
V4 AC/Pen ..	250	270	16

Voltages with Volume Control at Maximum			
Valve	Anode/Cathode	Screen/Chassis	Cathode/Chassis
V1 AC/SG ..	250	33	5
V2 AC/S1/VM	250	62	1
V3 AC/SG ..	50	15	1
V4 AC/Pen ..	235	252	15

GENERAL NOTES

Switches.—There are seven switches in all (S1-S7) ganged upon the waveband and gramophone control. The remaining one, S8, is the mains switch, ganged with the variable tone control resistance. The table below shows which contacts are open and closed for each switch position. The various contacts are identified in Fig. 3, and are also shown in Fig. 1.

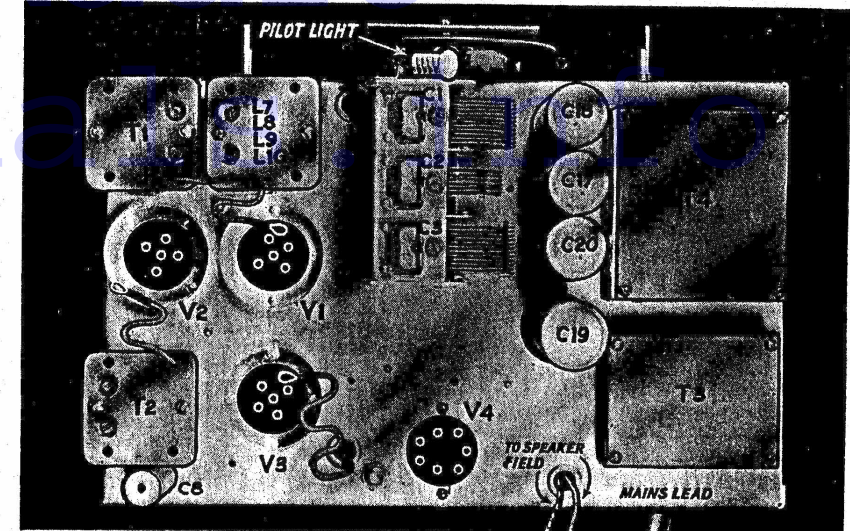


Fig. 2.—Plan view of the chassis. The valves and valve-screens have been removed.

Switch Position	Closed	Open
M.W.	1, 2, 3, 5, 7	4, 6
L.W.	6, 7	1, 2, 3, 4, 5
Gram.	3, 4, 6	1, 2, 5, 7

Main H.T. voltage (across C17) is 390V with vol. control at minimum, and 350 V with control at maximum.

Voltage across speaker field varies from 120 V to 114 V according to position of volume control.

Extension Speaker.—This must be plugged into the spare set of sockets at the back of the chassis. These are connected to the secondary of the output transformer T3, and the extra speaker must therefore be of the low impedance

type. The Ultra Imp Type S P.M. M.C. model is recommended. No harm will result if the internal speaker is unplugged when the external one is in use, but the field wires should, naturally, not be disconnected.

Pick-Up.—An external volume control is essential.

R. C. Filter, R15, C13.—In our sample set these two components were transposed. This makes no difference to the results.

Electrolytic Condensers.—Note that the case of C19 is insulated from the chassis. Two small electrolytics, C8 and C12 are fitted across the bias resistances of V3 and V4. Make certain that the insulated wire leading from the 1-hole fixing bush of C8 is not damaged by rubbing against the metallic part of the bush.

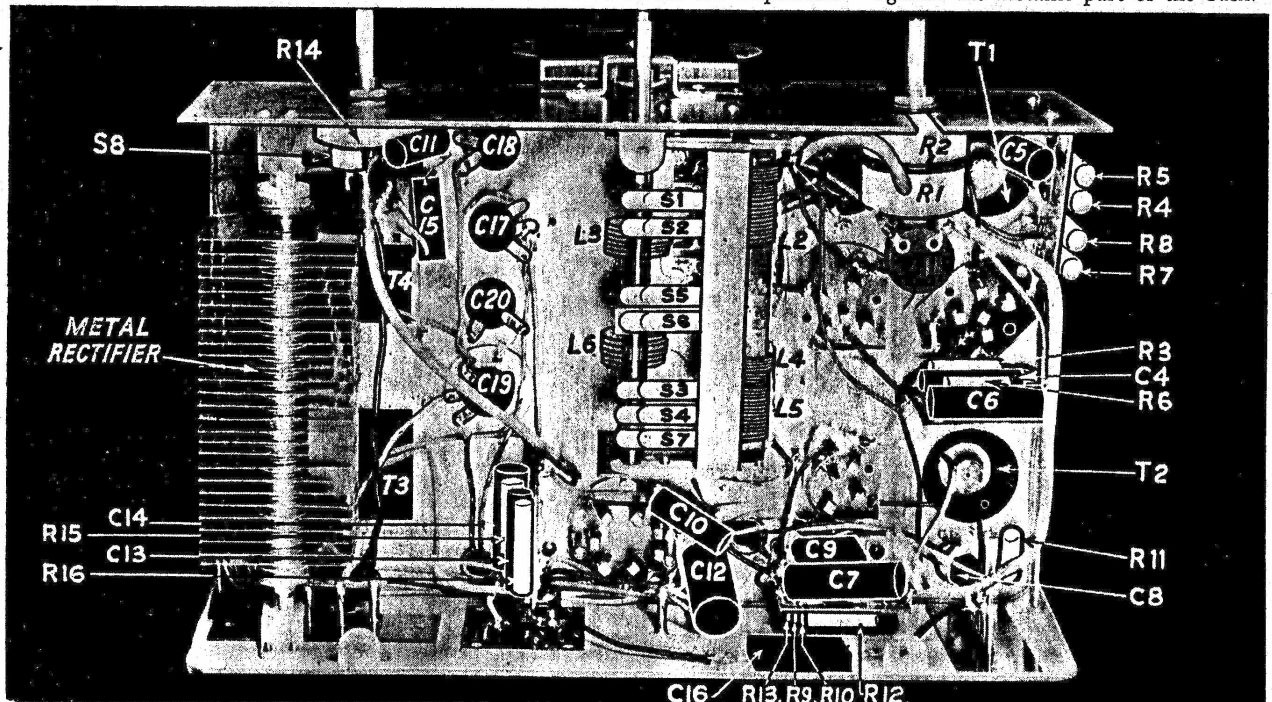


Fig. 3.—The under-chassis view. The screen over the coils and switches has been removed. In certain cases the condensers and resistances on the small vertical panels have been staggered to render them visible.

For more information remember
www.savoy-hill.co.uk