

ULTRA PANTHER A.C. SUPERHET

Circuit.—The first detector valve, AC/SG/VM, (V1) is used with a separate oscillator. The aerial circuit consists of a band-pass tuner, and coupling to the oscillator is by a coil in series with the cathode lead.

The oscillator, AC/HL, (V2) operates with the tuned coil in the anode circuit, and is biased by the orthodox cathode resistance.

The first I.F. valve, AC/SG/VM, (V3) is preceded by a band-pass I.F. transformer (frequency 456 K.C.) and is coupled to the second I.F. valve by a similar transformer. Volume is controlled by varying the bias on V1, V3 and V4, the cathodes of the latter two being connected together.

The second I.F. valve, AC/SG/VM, (V4) obtains its screen H.T. feed from the potentiometer supplying V3, and is decoupled from it by means of an H.F. choke H.F.C.1. The anode H.T. supply is also decoupled by a second H.F. choke.

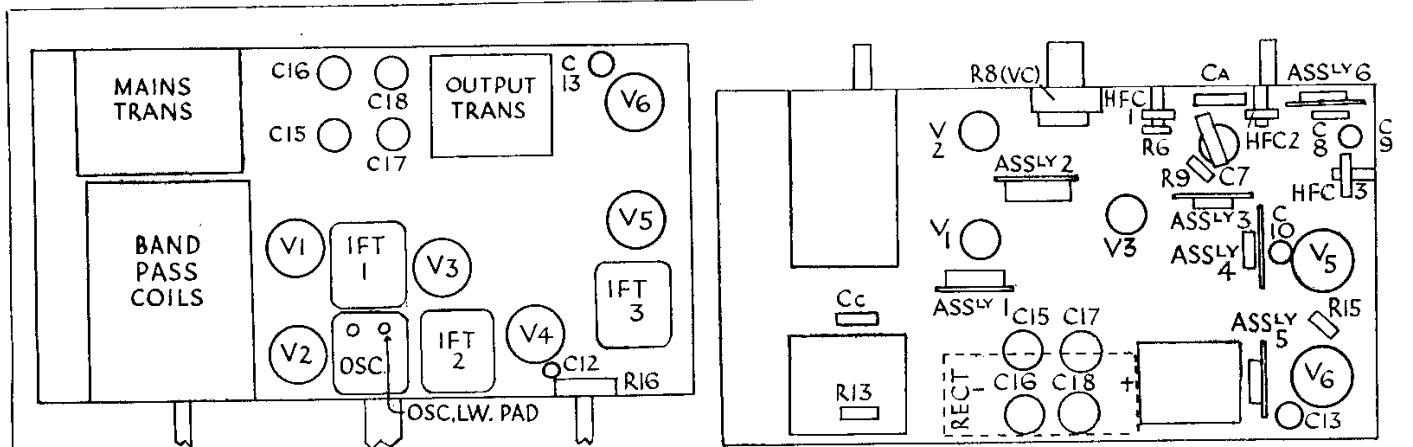
In the second detector valve, AC/HL/DD, (Continued on opposite page.)

RESISTANCES

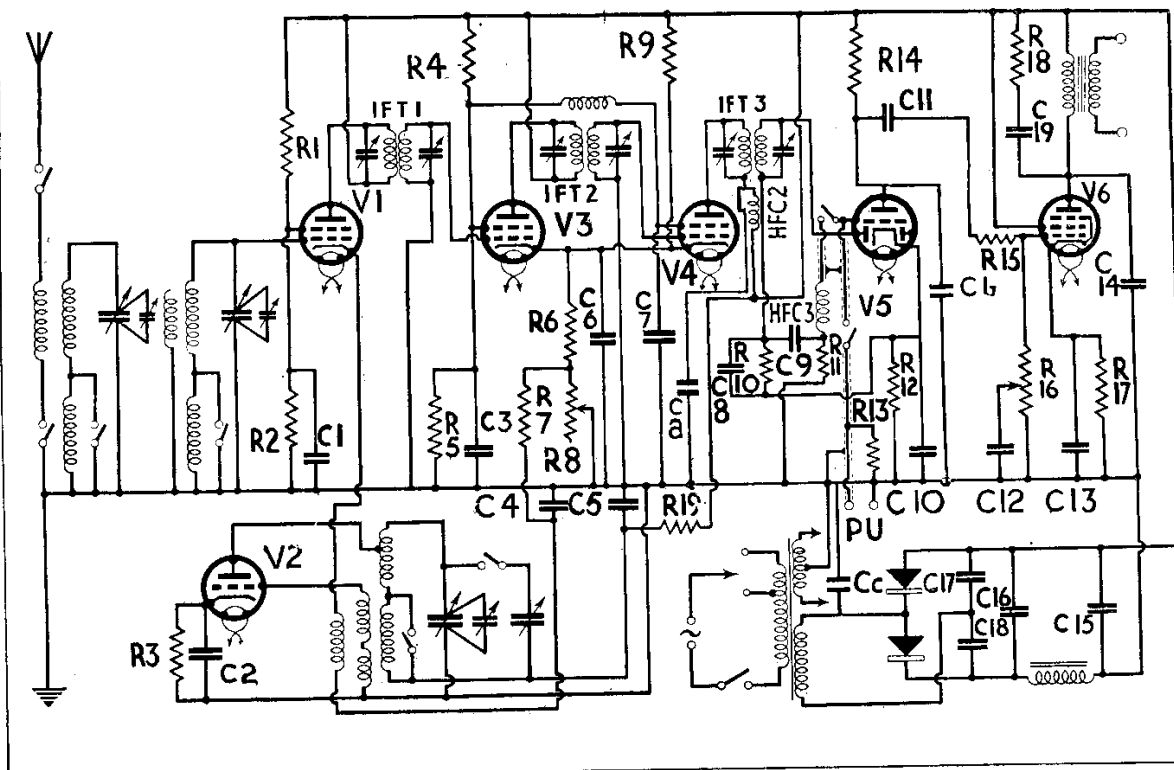
No.	Purpose.	Ohms.
1	Upper part of V1 screen ptr ...	40,000
2	Lower part of V1 screen ptr ...	25,000
3	V2 cathode bias ...	1,000
4	Upper part of V3 and V4 screen ptr ...	40,000
5	Lower part of V3 and V4 screen ptr ...	25,000
6	Fixed part of bias resistor V3, V4 ...	950
7	Fixed part of bias resistor V1 ...	750
8	Volume control series with R6 and R7 ...	10,000
9	Current stabiliser for bias ptr ...	75,000
10	Diode anode load ...	.5 meg.
11	V5 triode grid leak ...	1 meg. or 2 meg.
12	V5 cathode bias ...	1,000
13	Across P.V. leads ...	100,000
14	V5 triode anode resist ...	50,000
15	HF stopper grid V6 ...	100,000
16	V6 grid leak (tone control) ...	.5 meg.
17	V6 cathode bias ...	415
18	Tone compensating circuit ...	15,000
19	Decoupling anode V2 ...	15,000
	L.S. field ...	1,500
	P of output trans ...	210

CONDENSERS

C.	Purpose.	Mfd.
1	V1 screen ...	.1
2	V2 cathode ...	.01
3	V3 screen ...	.1
4	V1 cathode ...	.1
5	Decoupling V2 anode ...	.1
6	V3 and V4 cathodes ...	.1
7	V4 screen ...	.1
8	HF by-pass from diode ...	.0001
9	LF coupling from diode ...	.01
10	V5 cathode ...	.1
11	LF coupling V5 to V6 ...	.01
12	Tone control across R16 ...	.002
13	V6 cathode ...	25 el.
14	V6 anode fixed compensator ...	.001
15	HT smoothing ...	8 el.
16	HT smoothing ...	8 el.
17	Voltage doubles circuit ...	4 el.
18	Voltage doubles circuit ...	4 el.
19	Part of tone compensating circuit ...	.01
a	Decoupling V4 anode ...	.1
b	V5 anode by-pass ...	.001
c	HF by-pass from mains transformer sec. ...	.01

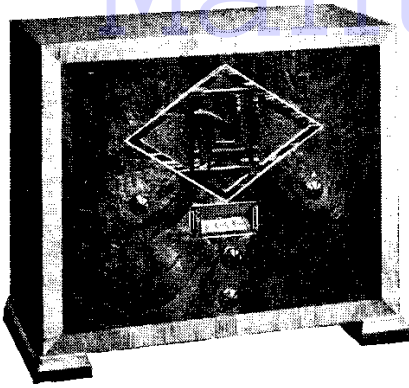


The arrangement of components above and below the chassis of the Ultra Panther is shown in the diagrams above. For details of the six component assemblies see "General Notes."



A separate oscillator and a double diode triode are features of the six-valve circuit of the Ultra Panther.

ULTRA PANTHER SUPERHET (Cont.)



The Panther 6-valve plus rectifier superhet by Ultra Electric, Ltd.

(V5) a double diode triode, only one of the diode anodes is utilised. The L.F. feed is taken from the low H.F. potential end of the I.F.T.3 secondary through the L.F. coupling condenser C.9 to the grid of the triode section. The circuit includes another H.F. choke (H.F.C.3) to prevent I.F. impulses from reaching the L.F. section. In addition an extra H.F. by-pass condenser may be found connected as shown at C.b.

Coupling to the output valve is by resistance capacity filter. The valve, an AC/Pen. (7-pin), (V6) has another H.F. stopper in its grid circuit (R15), and tone control is provided by connecting a condenser C.12 across a variable part of the grid leak potentiometer.

Tone compensation is provided by a resistance and condenser in series across the primary of the output transformer, as well as by a fixed condenser between the anode and chassis.

Mains equipment consists of transformer, and a metal rectifier used on the voltage doubler principle with electrolytic condensers. The speaker field is in the negative H.T. lead with two 8 mfd. condensers for smoothing.

Quick Tests.—The terminals on the output transformer are inaccessible, as they are inside the chassis.

Voltages between the following points and chassis with V.C. max. (note the polarity relative to the chassis) :—

End (red) terminal on speaker (negative), 100 v. (the on outer terminals are L.S. field.)

Case of C.16 (negative), 100 v. (i.e., voltage drop across L.S. field)

Removing Chassis.—Pull off the tuning knob and remove the others by undoing grub screws. Remove six screws underneath and pull out L.S. speech coil leads.

General Notes.—The majority of the small components are mounted on six assem-

blies placed close to their corresponding valves. These are numbered in the lay-out diagram, and the components mounted on them are, counting from inside of chassis :—

- (1) R7, C1, R2, R1 with C4 on the front side.
- (2) R3, C2, R18, C5.
- (3) C6, C3, R5, R4.
- (4) Cb, C11, R12.
- (5) R17, C14, C15, R18.
- (6) R14, R10, R11, with C8 on rear side.

The seven-pin valve connections, counting from the two heater pins together at one end, are :—

- AC/HL/DD, H, H, cathode, anode, diode anode 1, blank, blank.
- AC/Pen., H, H, cathode, anode, blank, grid, aux. grid.

The output transformer is mounted on the chassis, and the three terminals in front, counting from the rectifier side, are :—

- (1) H.T. +; (2) blank; (3) V6 anode.
- The two on the other side are the ends of the secondary.

As the L.S. field is in the negative lead, the cases of C16, C17 and C18 are insulated from the chassis. If one of these requires replacement the insulating washers must be replaced.

Mains transformer connections (counting from outside) :—

- Two projecting wires at outside, valve filaments.
- Front, (1) to tap on rectifier.
- " (2) C.T. of filament to chassis.
- " (3) to C17 and C18
- Rear, (1) 230-250 volt tapping.
- " (2) 200-230 volt tapping
- " (3) Mains 0 to switch.

Replacing Chassis.—See that screening plate is in correct position on base of cabinet. Lay chassis inside, insert speaker plugs and replace holding screws and knobs.

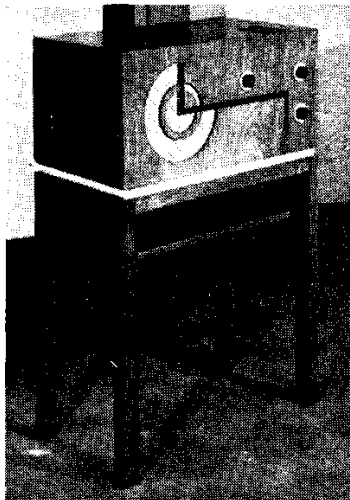
VALVE READINGS

V.C. max.

Valve	Type.	Electrode.	Volts	M.A.
1	AC/SG/V.M	anode ...	265	1.1
		screen ...	92	
2	AC/HL ...	anode ...	180	*
		anode ...	265	*
3	AC/SG/V.M	screen ...	92	
		anode ...	265	*
4	AC/SG/V.M	screen ...	92	
		anode ...	265	*
5	AC/HL/DD	triode anode	143	2.3
		anode ...	270	29
6	AC/Pen ...	anode ...	270	29
		aux grid ...	260	5

* Inclusion of meter leads to take current readings causes instability.

MURPHY MODEL A.8 FOR A.C. MAINS



Eight valves plus a rectifier valve are utilised in the superhet circuit of Murphy Radio's A.8 receiver.

Circuit.—The H.F. valve, VMS4 plain (V1), is preceded by a single tuned aerial circuit. For use with pick-up the aerial is short-circuited to earth. Bias is partly fixed by a potentiometer common to the H.F. and I.F. valves, and partly variable from the A.V.C. line.

Coupling to the first detector is by a band-pass tuner, of which the first unit is a tuned secondary H.F. transformer.

The separate oscillator valve, A.C./H.L. met. (V2), operates with a tuned coil in the anode circuit coupled to a coil in series with the cathode return lead of the first detector.

This valve, an A.C./S.I./V.M. met. (V3), is coupled to the first I.F. valve by a band-pass I.F. transformer (frequency 120 K.C.). Bias is fixed.

The first I.F. valve, A.C./S.I./V.M. met (V4), is biased as V1 and is coupled to the second I.F. valve by a second band-pass I.F. transformer. The second I.F. valve, A.C./S.I./V.M. met. (V5), is biased from a different A.V.C. point, and is coupled to the second detector by the third I.F. band-pass transformer.

A simple double diode, A.C./D.D. met. (V6), forms the second detector, and is operated as a full-wave rectifier, with the L.F. (and A.V.C.) coupling taken from the centre tap of the H.F. transformer secondary. The D.C. voltage for A.V.C. is developed across the potentiometer formed by R. 15 and R. 16, and the L.F. component is fed through C. 30 to the grid potentiometer of V7.

The L.F. valve, V.M.S. 4 met. (V7), has its grid leak in the form of a volume-control

potentiometer. Bias is obtained from a potentiometer across the L.S. field.

R.C. coupling is employed to the output valve, A.C./Pen. (V8), which is tone compensated by a condenser (C. 34) and resistance (R. 24) between the anode and chassis. Optional degrees of compensation are provided by a switch across R. 24 (at back of chassis).

Mains equipment consists of transformer and full-wave 1807 rectifier. H.T. smoothing consists of a choke in the positive lead with electrolytic condenser and the field coil in the negative lead with an extra electrolytic condenser.

Special Notes.—There are two set filament windings, and it should be noted that the oscillator (V2) and the I.F. valves (V4 and V5) are on a different circuit from that of the remaining valves.

There are two definite voltage lines in the set; a 200-volt supply to the anodes of all the valves and the aux. grid of the pentode and a 50-volt supply to the screening grids of all but that of the L.F. valve, which takes its supply from a different tapping on the same potential divider.

Quick Tests.—Between the following terminals on speaker transformer, looking from rear and counting from the left, and chassis (note the polarity) :—

- (1) 0 to chassis.
- (2) 200 v. positive (H.T. smoothed).
- (3) 182 v. positive (V8 anode).
- (4) 70 v. negative (voltage drop across L.S. field).

These readings were taken with no signal and 235 v. mains in 233-250 volt tapping.

Note that the cases of C. 35 and C. 36 are at tag 4 potential, and are insulated from the chassis.

(Continued on next page.)

VALVE READINGS

No signal. 235 v. mains on 233-250 volt tapping.

Valve	Type.	Electrode.	Volts.	M.A.
1	VMS4 plain ...	anode ...	200	4
		screen ...	50	
2	AC/HL met ...	anode ...	60	2.5
		anode ...	200	4
3	ACSIVM met ...	screen ...	50	
		anode ...	200	4
4	ACSIVM met ...	screen ...	50	
		anode ...	200	4
5	ACSIVM met ...	anode ...	200	4
		screen ...	50	
6	AC/DD met ...	anode ...	*	*
		screen ...	50	
7	VMS4 met ...	anode ...	110	2
		screen ...	40	
8	AC/Pen ...	anode ...	180	25
		aux grid ...	200	4

* No H.T. voltage in this valve.