

### ULTRA MODEL 66 A.C. RECEIVER (Contd.)

steadily current through the volume control, as otherwise control would be almost neutralised by the decrease in valve current.

The auxiliary grid voltage for V2 is obtained from the cathode of V3, which is normally 12.5 volts positive with relation to chassis.

**Quick Tests.**—Between the two lower terminals (next to speaker field) on the output transformer and chassis:—

Nearest the back, V3 anode, 250 volts.

Nearest the front, H.T. smoothed, 265 volts.

**Removing the Chassis.**—Remove the knobs (grub screw). Remove the three hold-

*Left is seen the table model in the Ultra range of 66 type instruments. Console and radiogram versions are also produced.*

ing screws from underneath, and lift the chassis out

**General Notes.**—The condensers C12 and C13 are in one cylindrical container. The yellow lead is C13; the red, C12. Mains transformer connections (see layout diagram) are:—

- A and G, set heaters,
- C, C.T. to chassis,
- B and D, rectifier anodes,
- E and M, rectifier heater,
- F and N, pilot lamps,
- L, mains O to switch,
- K, 200 v. tapping,
- H, 230 v. tapping.

The L.F. coupling components between V2 and V3 are mounted on the assembly next V3.

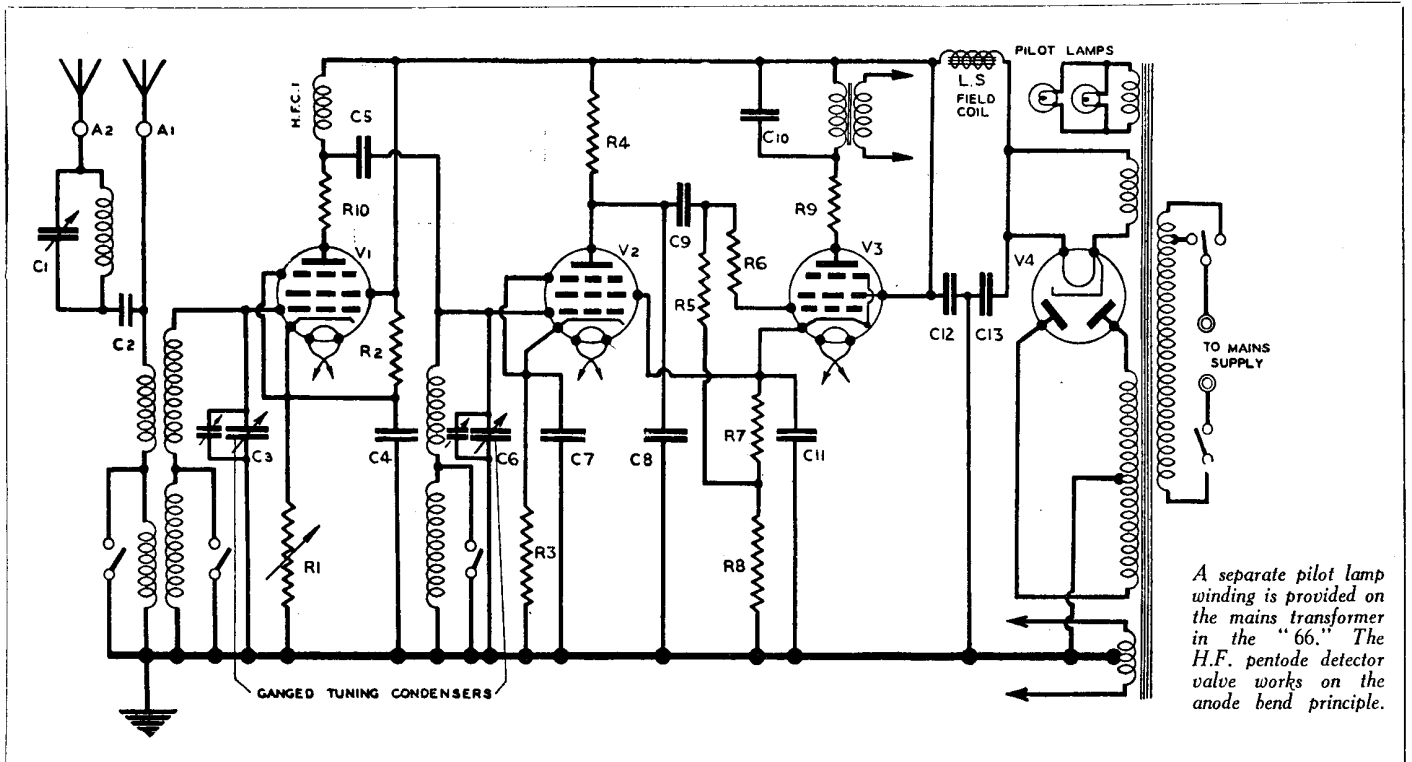
**Replacing Chassis.**—Lay chassis inside the cabinet. Replace holding screws and knobs.

VALVE READINGS				
Valve.	Type.	Electrode.	Volts.	M.A.
1	ACVP1 met. (7)	anode ..	260	14
		aux. grid ..	265	
2	AC/s2/Pen. (7)	anode ..	92	*
		aux. grid ..	12.5	
3	AC/2 Pen. (7)	anode ..	250	34
		aux. grid ..	265	5

\* Insertion of current meter leads causes instability.

CONDENSERS		
C.	Purpose.	Mfd.
2	Series with aerial filter ..	10 mmfd.
4	V1 cathode by-pass ..	.1
5	H.F. coupling V1 to V2 ..	10 mmfd.
7	V2 cathode by-pass ..	10
8	V2 anode, H.F. by-pass ..	.0002
9	L.F. coupling V2 to V3 ..	.01
10	Tone compensating V3 ..	.01
11	V3 cathode by-pass ..	50
12	H.T. smoothing ..	16
13	H.T. smoothing ..	8

RESISTANCES		
R.	Purpose.	Ohms.
1	V1 cathode, V.C. ..	10,000
2	Current feed to V1 cathode resist. ..	50,000
3	V2 grid leak ..	15,000
4	V2 anode, L.F. coupling ..	.5 meg.
5	V3 grid leak ..	1 meg.
6	V3 grid stabiliser ..	50,000
7	V3 cathode bias ..	138
8	V3 bias ptr. (series) ..	138
9	V3 anode stabiliser ..	60
10	V1 anode stabiliser ..	50



*A separate pilot lamp winding is provided on the mains transformer in the "66." The H.F. pentode detector valve works on the anode bend principle.*

## BUSH D.A.C.1 UNIVERSAL SUPERHET

**Circuit.**—The combined first detector-oscillator, FC13 met. (VI) (P type base), is preceded by a band-pass aerial circuit. Bias is by A.V.C. with limiting cathode resistance. Oscillator tuning is in the grid circuit and coupling to the next valve is by band-pass I.F. transformer (frequency 123KC). (Note that the manufacturers do not recommend adjustments to be made to the trimmers).

The I.F. valve, VPI3A met. (V2) (P base), is also biased by A.V.C. and cathode resistance, and is followed by a second band-pass I.F. transformer.

VALVE READINGS				
No signal. Taken on 225v. A.C.				
Valve.	Type.	Electrode.	Volts.	M.A.
1	FC13 met. (8) ..	anode ..	190	4
		"P" base ..	82	4
		osc. anode ..	82	2
2	VPI3A met. (8) ..	anode ..	145	3.75
		"P" base ..	82	1
3	Pen.3520 (7) ..	anode ..	206	42
		aux. grid ..	230	10

Note that voltages are approximately 15 to 20 per cent. lower on the same D.C. mains voltage.

The second detector for L.F. and A.V.C. purposes is a type WMX12 Westector, which is coupled to the output valve, Pen 3520 (V3), by resistance capacity filter. The volume control forms the diode load.

The output valve is stabilised by grid resistance, and optional tones are provided by condensers connected between the anode and chassis, and controlled by a switch.

Mains equipment consists of an H.F. choke in each mains lead, a B27 Westinghouse metal

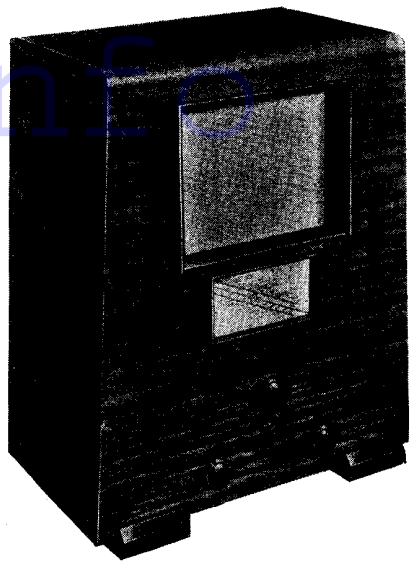
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### BUSH MODEL D.A.C.I. SUPERHET (Cont.)

rectifier, and a smoothing circuit consisting of a choke and electrolytic condensers. The heater supply is fed through a Philips C1 barretter lamp. The pilot lamp is 6.2 v. 3 amp. type. A permanent magnet speaker is used, and

provision is made for the use of an external low-impedance speaker, either with or without the internal speaker.

**Quick Tests.**—Voltages between the following two terminals on speaker transformer and chassis (mains voltage 225 v. A.C.):—  
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The Bush D.A.C.I. is a universal superhet and for the second detector uses a Westector to which a positive bias is applied.

#### RESISTANCES

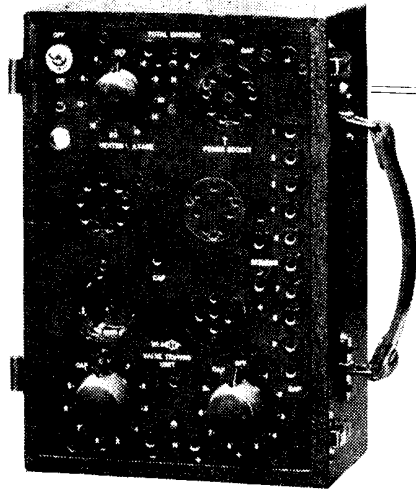
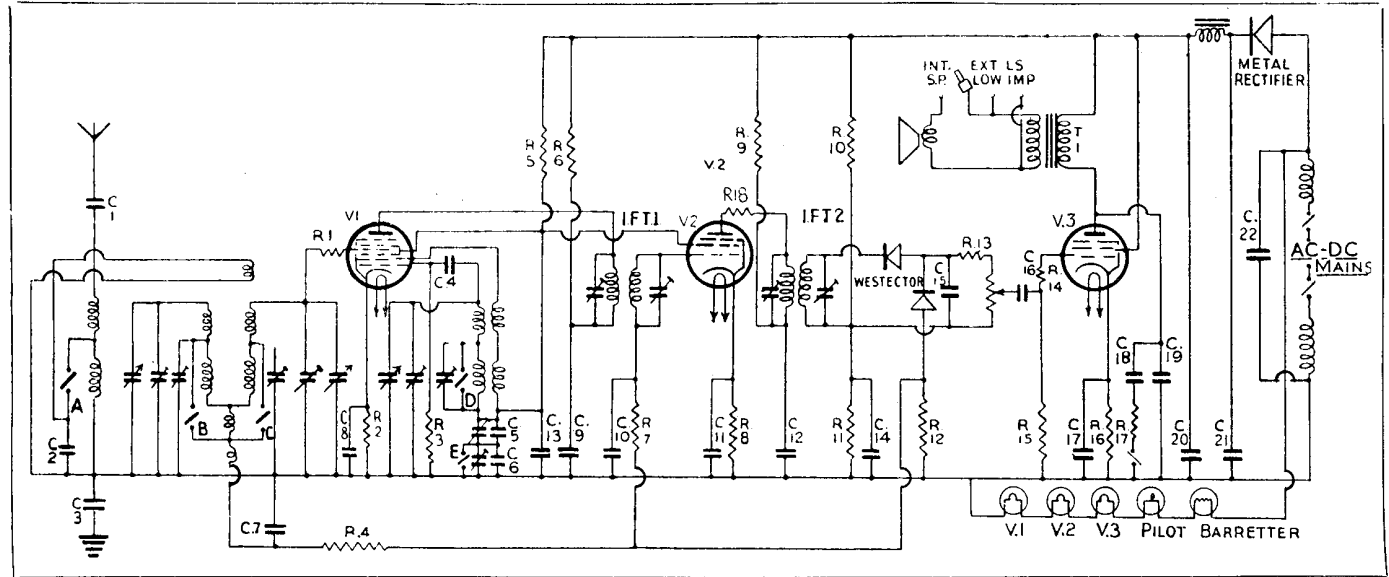
R.	Purpose.	Ohms.
1	V1 grid stabiliser ..	250
2	V1 cathode bias ..	250
3	V1 osc. grid leak ..	40,000
4	Decoupling A.V.C. to V1 ..	1 meg.
5	Decoupling V1 osc. anode ..	20,000
6	Decoupling V1 anode ..	10,000
7	Decoupling A.V.C. to V2 ..	1 meg.
8	V2 cathode bias ..	1,000
9	Decoupling V2 anode ..	10,000
10	Bias ptr. for Westector ..	100,000
11*	Bias ptr. for Westector ..	5,000
12	A.V.C. rectifier load ..	1 meg.
13	H.F. stopper ..	50,000
14	V3 grid stabiliser ..	100,000
15	V3 grid leak ..	500,000
16	V3 cathode bias ..	130
17	Tone control circuit V3 anode ..	10,000
18	V2 anode stabiliser ..	10,000

\* In Chassis Nos. 30,001 to 30,500, R11 is 10,000 ohms.

#### CONDENSERS

C.	Purpose.	Mfd.
1	Series aerial ..	.002
2	Short circuiting L.W. aerial coil ..	.01
3	Series earth ..	.01
4	V1 osc. grid ..	.0005
5	M.W. osc. track ..	.0022
6	L.W. osc. track ..	.0011
7*	Decoupling V1 grid ..	.1
8*	V1 cathode by-pass ..	.1
9*	Decoupling V1 anode ..	.1
10*	Decoupling V2 grid ..	.1
11*	V2 cathode by-pass ..	.1
12*	Decoupling V2 anode ..	.1
13	Decoupling V1 osc. anode ..	.5
14	Decoupling Westector bias ..	.25
15	H.F. by-pass ..	.0001
16	L.F. coupling ..	.01
17	V3 cathode by-pass ..	.25
18	Tone compensating V3 anode ..	.03
19	Tone compensating V3 anode ..	.005
20	H.T. smoothing ..	.24
21	H.T. Smoothing ..	.16
22	H.F. by-pass across mains ..	.01

\* In block.



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### BUSH MODEL D.A.C.1 SUPERHET (Cont.)

Top (red) H.T. smoothed, 230 volts; bottom (green) V3 anode, 206 volts.

**Removing Chassis.**—Remove the knobs (grub screw). Remove the wood-blocks over the holding screws underneath the cabinet,

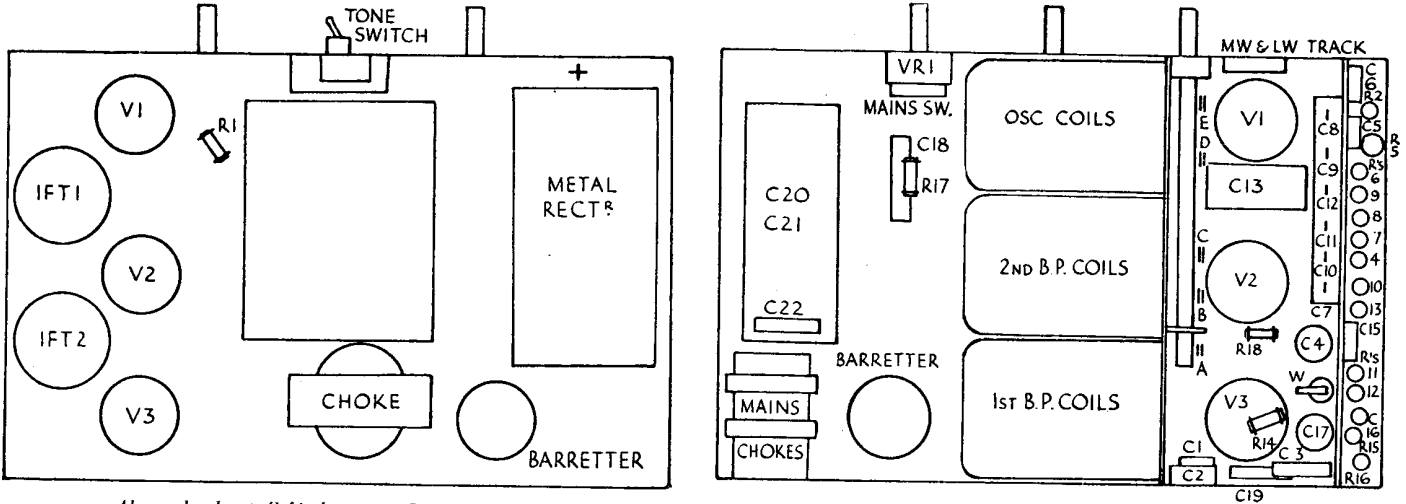
and, after removing the screws, free the speaker cable from the clip.

**General Notes.**—The pins on the Mullard bases are numbered and the connections are:

V1: 1, metallising; 2 and 3, heater; 4, cathode; 5, osc. anode; 6, osc. grid; 7, screen; 8, anode. The control grid is at the top.

V2: 1, metallising; 2 and 3, heater; 4, cathode; 5, earthed grid; 7, screen; 8, anode.

**Replacing Chassis.**—Lay the chassis inside the cabinet, replace holding screws and covers, cleat the speaker lead and replace the knobs.



Above, the chassis (left) the resistor R1 is contained in the sleeving. Below, the coil cans are in the centre with a compact assembly at the end.

## KOLSTER-BRANDES "CAVALCADE"

**Circuit.**—The first detector oscillator valve, 15 D1 or 13 PGA (V1), is preceded by a band-pass aerial coupling. Bias is by A.V.C. with cathode limiting resistance and the coupling to the next valve is a band-pass I.F. transformer (frequency 130 KC).

The I.F. valve, 9D2 or 13VPA (V2), is

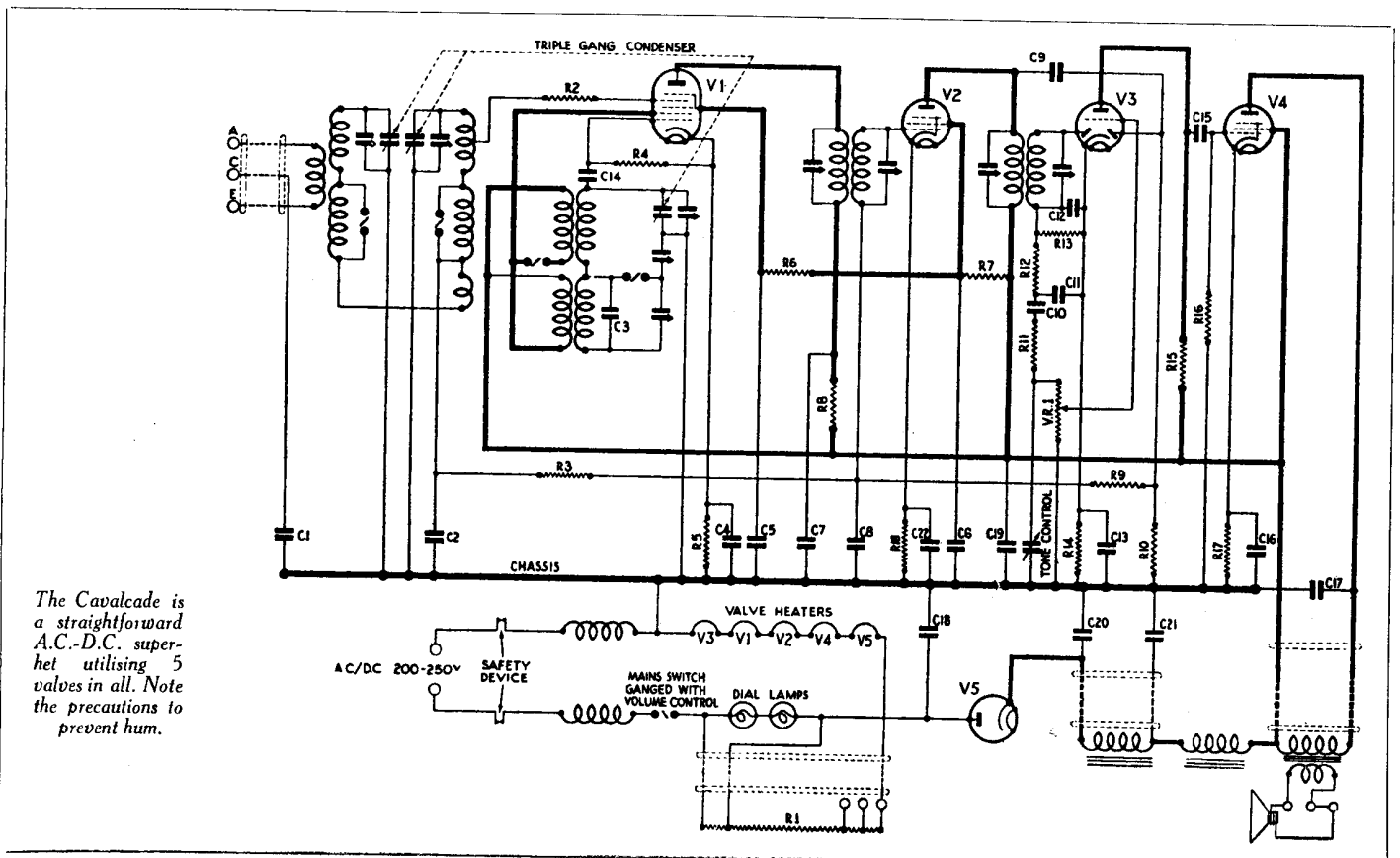
followed by a second band-pass I.F. transformer.

The second detector and L.F. amplifying valve, 11D3 or 13DHA (V3), uses one diode anode for L.F. purposes and the other for A.V.C. The L.F. coupling to the triode section is by resistance-capacity filter (R13, C10),

and the grid leak is controlled by a potentiometer. Tone is controlled by a variable condenser across the grid leak.

The output valve is a pentode, 7D3 or 40PPA (V4).

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The Cavalcade is a straightforward A.C.-D.C. superhet utilising 5 valves in all. Note the precautions to prevent hum.