

FERRANTI

DOUBLE TRIODE

An indirectly heated high μ double triode with centre tapped heater. Except for the common heater each triode unit is independent of the other. It is suitable for use as a Resistance coupled A.F. amplifier or phase inverter.

PHYSICAL DETAILS.

Base	...	...	...	B9A Noval.
Bulb	...	...	...	Clear.
Max. Overall Length	...	...	...	56 mm. (2 $\frac{1}{4}$ in.).
Max. Seated Height	...	...	...	49 mm. (1 $\frac{13}{16}$ in.).
Max. Diameter (Base)	...	...	...	22.2 mm. ($\frac{7}{8}$ in.).
Mounting Position	...	...	...	Any.

BASE CONNECTIONS.

Pin 1—Anode Triode 2.	Pin 5—Heater.
Pin 2—Grid Triode 2.	Pin 6—Anode Triode 1.
Pin 3—Cathode Triode 2.	Pin 7—Grid Triode 1.
Pin 4—Heater.	Pin 8—Cathode Triode 1.
Pin 9—Heater	Centre Tap.

HEATER.

The heater is centre tapped and the two halves may be operated either in series or in parallel with one other.

	Series†	Parallel‡
Heater Voltage	12.6	6.3 volts.
Heater Current	0.15	0.3 Amp.

RATINGS.*

Max. Anode Supply Voltage	...	550 volts.
Max. Anode Voltage	...	300 volts.
Max. Anode Dissipation	...	1.0 watts.
Max. Cathode Current	...	8 mA.
Max. Neg. Grid Voltage	...	50 volts.
Max. Pos. Grid Voltage	...	0 volts.
Max. V_h -k	...	180 volts.
§Max. R_g -k (Fixed Bias)	...	0.5 M Ω
Max. R_g -k (Cathode Bias)	...	1.0 M Ω
Max. R_g -k (Cathode Bias) ($I_a < 1$ mA)	...	2.2 M Ω
**Max. R_h -k	...	20 k Ω

CHARACTERISTICS.*

Anode Voltage	...	100	250	volts.
Grid Voltage	...	-1.0	-2.0	volts.
Anode Current	...	0.5	1.2	mA.
Amplification Factor	...	100	100	
Anode Impedance	...	80	62.5	k Ω
Mutual Conductance	...	1.25	1.6	mA/V.

CAPACITANCES.

* C_{in}	...	1.6 pF.
$C_{a'-k'}$	...	0.46 pF.
$C_{a''-k''}$	...	0.34 pF.
* C_{a-g}	...	1.7 pF.
* C_{g-h}	...	<0.15 pF.
$C_{g-a''}$	...	<1.2 pF.
$C_{g'-g''}$	...	<0.01 pF.
$C_{a'-g'} = C_{a''-g''}$	...	<0.1 pF.

*Each Section.

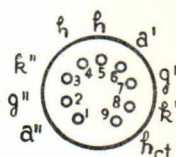
**Max. R_h -k may be 120 k Ω when the valve is used as a phase inverter immediately preceding the output stage.

† V_h applied between pins 4 and 5.

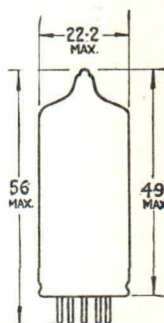
‡ V_h applied between pin 9 and pins 4 and 5 connected together.

§With grid current biasing Max. R_g -k = 22 M Ω

12AX7



Base
Connections
Underside View
of Base



All dimensions
shown are in
millimetres.





TYPICAL OPERATION as Resistance Coupled A.F. Amplifier

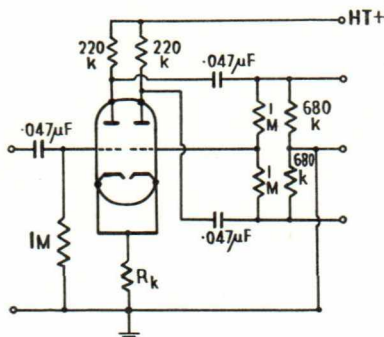
1. Cathode Bias.

Anode Supply Voltage	200	250	250	300	300	350	350	400	volts.
Anode Load Resistance	100	100	220	100	220	100	220	220	k Ω
Cathode Current	...	0.65	0.86	0.48	1.11	0.63	1.4	0.85	1.02
Cathode Bias Resistor	...	1.8	1.5	2.7	1.2	2.2	1.0	1.5	1.2
Grid Resistor of following valve	...	330	330	680	330	680	330	680	680
Stage Gain	...	50	54.5	66.5	57	72	61	75.5	76.5
*Output Voltage	...	20	26	28	30	36	36	37	38
									volts (r.m.s.)
*Total Distortion	...	4.8	3.9	3.4	2.7	2.6	2.2	1.6	1.1
									%

2. Grid Current Bias**

Anode Supply Voltage	200	250	250	300	300	350	350	400	volts.
Grid Resistance	...	10	10	10	10	10	10	10	M Ω
Anode Load Resistance	...	100	100	220	100	220	100	220	k Ω
Cathode Current	...	0.7	1.0	0.56	1.3	0.74	1.6	0.88	1.09
Cathode Bias Resistor	...	330	330	680	330	680	330	680	680
Grid Resistor of following valve	...	330	330	680	330	680	330	680	680
Stage Gain	...	50	51	62	54	66	56	67	68
Output Voltage	...	20	26	28	30	36	36	37	38
									volts (r.m.s.)
Total Distortion	...	3.9	2.6	2.7	2.2	2.2	1.8	1.7	1.4
									%

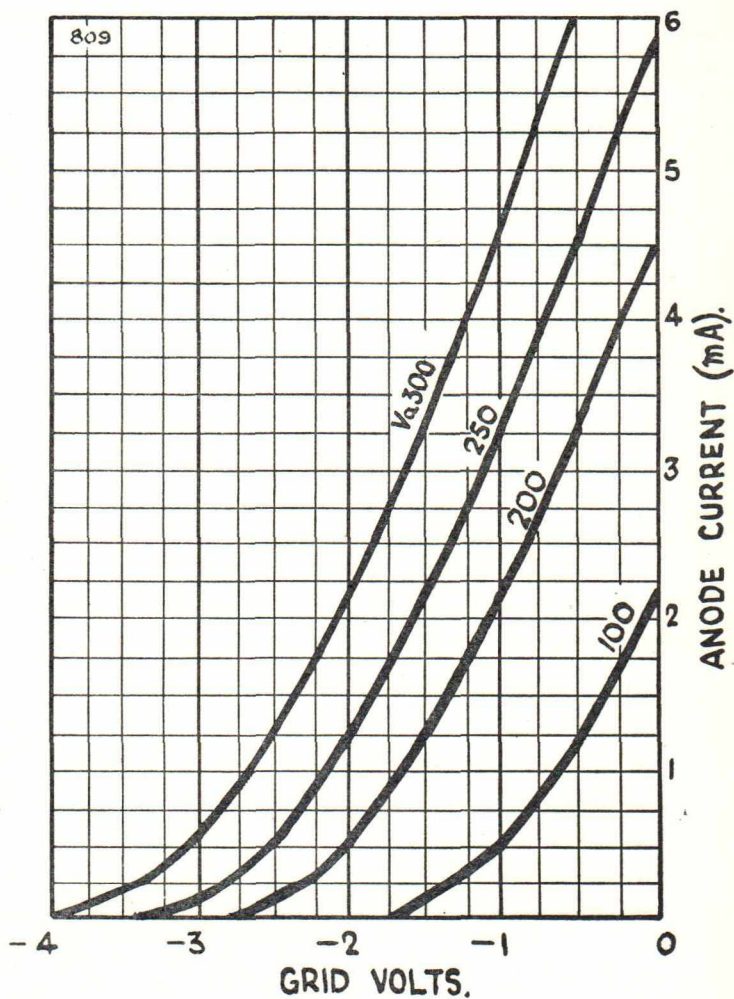
TYPICAL OPERATION AS PHASE INVERTER.



Anode Supply Voltage	...	250	350	volts.		
Cathode Resistor	...	1.2	0.82	k Ω		
Cathode Current	...	1.08	1.7	mA.		
Stage Gain	...	58	62			
*Output Voltage	...	35	7	45	9	V.r.m.s.
Total Distortion	...	5.5	1.1	3.5	0.7	%

*At start of positive grid current. At lower output voltages distortion is approximately proportionate to output voltage.

**Measured with a signal source impedance of 100 Ω



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