



TRIODE HEPTODE

An indirectly heated triode heptode for use with series or parallel heater connection on AC. or DC. mains. Primarily designed for use as a frequency changer, the heptode section can be used as R.F. or I.F. amplifier.

PHYSICAL DETAILS.

Base	...	...	B9A—Noval.
Max. Overall Length	...	...	67.5 mm. (2 $\frac{1}{2}$ ins.).
Max. Seated Height	...	...	60.5 mm. (2 $\frac{1}{4}$ ins.).
Max. Diameter (Bulb)	...	...	22.2 mm. ($\frac{7}{8}$ in.).
Mounting Position	...	...	Any.

BASE CONNECTION.

Pin 1—Heptode Grids, g_2, g_4 .	Pin 5—Heater.
Pin 2—Heptode Grid g_1 .	Pin 6—Heptode Anode.
Pin 3—Cathode, g_3 , shield.	Pin 7—Heptode Grid g_3 .
Pin 4—Heater.	Pin 8—Triode Anode.
Pin 9—Triode Grid.	

HEATER.

Heater Current	...	...	0.1 amps
Heater Voltage	...	...	19.0 volts.

RATINGS.

HEPTODE SECTION.

Max. Supply Voltage	...	...	550 volts.
Max. Anode Voltage	...	...	250 volts.
Max. Screen Grid Voltage	...	...	125 volts.
Max. Screen Grid Voltage ($I_a < 1$ mA.)	...	...	200 volts.
Max. Anode Dissipation	...	...	1.7 watts.
Max. Screen Grid Dissipation	...	...	1.0 watts.
Max. Cathode Current	...	...	12.5 mA.
Max. Grid No. 1 Voltage ($I_{g1} = +0.3 \mu A.$)	...	...	-1.3 volts.
*Max. Grid No. 3 Voltage ($I_{g3} = +0.3 \mu A.$)	...	...	-1.3 volts.
Max. R_{g1-k}	...	...	3.0 Megohms.
Max. R_{g3-k}	...	...	3.0 Megohms.

TRIODE SECTION.

Max. Anode Voltage	...	...	250 volts.
Max. Anode Dissipation	...	...	0.8 watt.
Max. Mean Cathode Current	...	...	6.5 mA.
Max. Grid Voltage ($I_g = -0.3 \mu A.$)	...	...	-1.3 volts.
Max. Grid-Cathode Resistor	...	...	3.0 Megohms.

Max. Heater-Cathode Voltage	...	...	100 volts.
Max. Heater-Cathode Resistance	...	...	20,000 ohms.

CHARACTERISTICS.

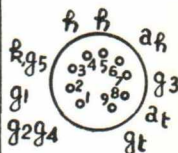
TRIODE SECTION.

Anode Voltage	...	...	100 volts.
Grid Voltage	...	...	0 volts.
Anode Current	...	...	13.5 mA.
Amplification Factor	...	...	22
Mutual Conductance	...	...	3.7 mA/V.

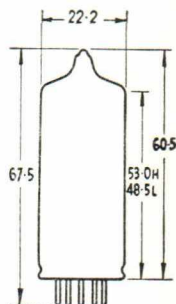
*The maximum value of R_{g3-k} must not exceed $20k\Omega$ if the two sections of the valve are switched in operation so that there is no direct connection between g_3 and g_t (e.g. in FM/AM applications.)

UCH81

19D8



Base
Connections
Underside View
of Base



Dimensions in
millimetres.

Ferranti

TYPICAL OPERATING CONDITIONS.

HEPTODE SECTION.

(As A.M. Frequency Changer).

Anode Supply Voltage	$V_a = V_b$	100	170	200	volts.
Screen Grid Feed Resistor	R_{g2g4}	10	10	10	k Ω
Oscillator Grid Resistor	R_{g3gt}	47	47	47	k Ω
Oscillator Grid Current	I_{g3gt}	115	200	230	μ A.
Grid Voltage ...	V_{g1}	-1.2	-2.2	-2.6	volts.
Cathode Bias Resistor	R_k	150	150	150	Ω
Anode Current ...	I_a	1.7	3.2	3.7	mA.
Screen Grid Current	I_{g2g4}	3.7	6.8	8.1	mA.
Conversion Conductance	g_c	620	750	775	μ A/V.
Anode Impedance ...	r_a	0.8	0.9	1.0	M Ω
Equivalent Noise Resistance ...	R_{eq}	62	70	75	k Ω
Grid Voltage (for 100:1 reduction in g_c)	V_{g1}	-14.5	-24	-28	volts.

(As I.F. or R.F. Amplifier).

Anode Supply Voltage	$V_a = V_b$	100	170	200	volts.
Screen Grid Feed Resistor	R_{g2g4}	18	18	18	k Ω
Screen Grid Voltage ...	V_{g2g4}	60	100	125	volts.
Suppressor Grid Voltage	V_{g3}	0	0	0	volts.
Control Grid Voltage	V_{g1}	-1.2	-2.2	-2.6	volts.
Anode Current ...	I_a	3.4	6.2	7.6	mA.
Screen Grid Current	I_{g2g4}	2.2	3.8	4.3	mA.
Mutual Conductance	g_m	2.0	2.3	2.4	mA/V.
Anode Impedance ...	r_a	0.5	0.6	0.6	M Ω
Inner mu. ...	$\mu_{g1-g2g4}$	20	20	20	
Equivalent Noise Resistance	R_{eq}	5.8	8.8	9.7	k Ω
Grid Voltage (for 100:1 reduction in g_m)	V_{g1}	-16.5	-28	-33	volts.

TRIODE SECTION.

(As R.F. Oscillator).

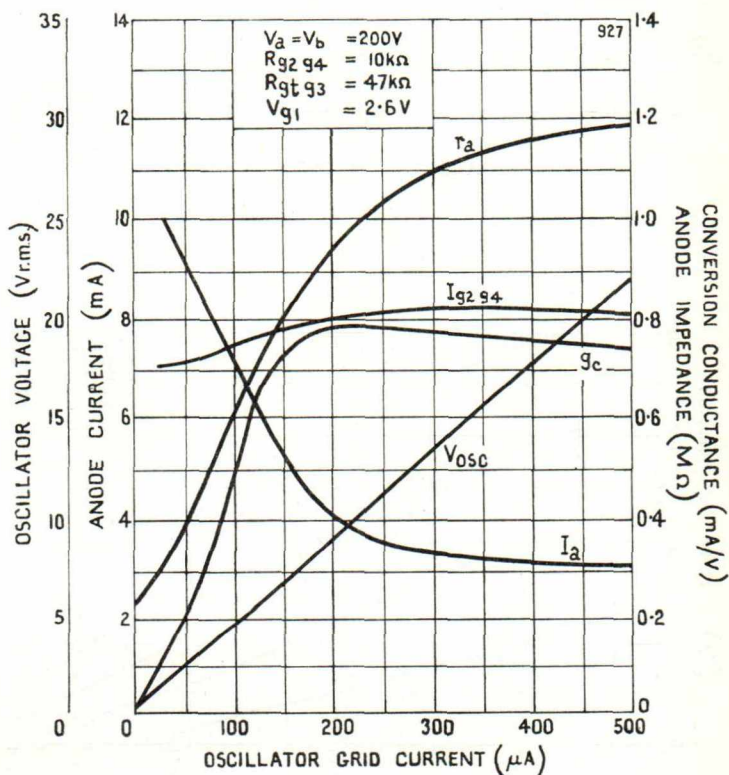
Supply Voltage ...	V_b	100	170	200	volts.
Anode Load Resistor	R_{at}	15	15	15	k Ω
Grid Resistor ...	R_{gt}	47	47	47	k Ω
Grid Current ...	I_{gt}	120	200	240	μ A.
Anode Current ...	I_{at}	2.5	4.5	5.4	mA.
Mutual Conductance	g_m (eff)	530	580	580	μ A/V.

Microphony.

This valve can be used without special precautions against microphony provided that for an output of 50 mW, the required input voltage for the heptode section is not less than 50 mV. For the triode section the corresponding figure is 25 mV.

CAPACITANCES.

Triode.		Heptode.	
C_{out}	2.2		7.9 pF.
C_{in}	2.6	(g_1)	4.8 pF.
C_{a-g}	1.0	(g_3)	6.0 pF.
C_{g-h}	<0.02		<0.01 pF.
$C_{g_1-g_3}$			<0.02 pF.
C_{g_3-h}			<0.3 pF.
C_{ah-at}			<0.06 pF.
C_{ah-gt}	0.20 pF.		
C_{ah-g_3gt}	<0.09 pF.		
C_{g_1-gt}	<0.35 pF.		
C_{g_1-gt}	<0.06 pF.		
C_{g_1-gt}	<0.17 pF.		
$C_{g_1-g_3gt}$	<0.45 pF.		



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Typical Conversion Conductance/Grid Voltage/Screen Voltage
when used as Frequency Changer.

