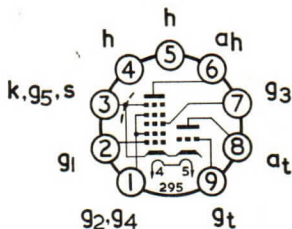


### TRIODE HEPTODE FREQUENCY CHANGER



B9A Base

### GENERAL

This triode heptode valve combination, with separate electrode structures, is for use in AM/FM broadcast radio AC/DC receivers. The valve is intended to be used as a frequency changer for AM signals with the triode as local oscillator and the heptode switched to operate as an I.F. amplifier for FM signals.

Heater Current	$I_h$	0.1	A
Heater Voltage	$V_h$	19.0	V

### RATINGS

		Triode	Heptode	
Maximum Anode Dissipation	$P_a(\max)$	0.8	1.7	W
Maximum Screen Grids Dissipation	$P_{g2+g4}(\max)$	—	1	W
Maximum Anode Voltage	$V_a(\max)$	250	250	V
Maximum Screen Grids Voltage ( $I_a = 7.6\text{mA}$ )	$V_{g2+g4}(\max)$	—	125	V
Maximum Screen Grids Voltage ( $I_a < 1\text{mA}$ )		—	250	V
Maximum Heater to Cathode Voltage (R.M.S.)	$V_{h-k}(\text{r.m.s.})\max$		100*	V
Maximum Mean Cathode Current	$I_{k(av)}\max$	6.5	12.5	mA

\* Measured with respect to the higher potential heater pin.

### INTER-ELECTRODE CAPACITANCES

		Triode	Heptode	
Output	$C_{out}$	2.1	7.9	pF
Input ( $g_1$ )	$C_{in}(g_1)$	2.6	4.8	pF
Input ( $g_3$ )	$C_{in}(g_3)$	—	6	pF
Grid 1 to Anode	$C_{g1-a}$	1	<0.006	pF
Grid 1 to Grid 3	$C_{g1-g3}$	—	<0.3	pF
Grid 1 to Grid 3, Grid Triode	$C_{g1-g3gt}$		<0.45	pF
Grid 1 to Grid Triode	$C_{g1-gt}$		<0.17	pF
Anode Heptode to Anode Triode	$C_{ah-at}$		0.2	pF

Inter-electrode capacitances measured with holder capacitances balanced out.

## CHARACTERISTICS

		Triode	Heptode	
Anode Voltage	$V_a$	100	170	V
Screen Grids Voltage	$V_{g2+g4}$	—	102	V
Grid 3 Voltage	$V_{g3}$	—	0	V
Control Grid Voltage	$V_{g1}$	-1	-2.2	V
Anode Current	$I_a$	10	6.2	mA
Mutual Conductance	$g_m$	3.2	2.3	mA/V
Amplification Factor	$\mu$	19	—	
Inner Amplification Factor	$\mu_{g1-(g2+g4)}$	—	20	

## TYPICAL OPERATION AS R.F. or I.F. AMPLIFIER

Heptode Section				
Supply Voltage	$V_b$		170	V
Anode Voltage	$V_a$		170	V
Screen Grids Resistance	$R_{g2+g4}$		18	k $\Omega$
Screen Grids Voltage (Initial)	$V_{g2+g4}$		102	V
Grid 3 Voltage	$V_{g3}$		0	V
Control Grid Voltage	$V_{g1}$		-2.2	V
Anode Current (approximately)	$I_a$		6.2	mA
Screen Grids Current (approximately)	$I_{g2+g4}$		3.8	mA
Mutual Conductance	$g_m$		2.3	mA/V
Valve Anode Resistance ( $\delta v_a/\delta i_a$ )	$r_a$		0.6	M $\Omega$
Equivalent Grid Noise Resistance	$R_{eq}$		8.8	k $\Omega$
Grid 1 Voltage for 100 : 1 reduction of Mutual Conductance			-28	

## TYPICAL OPERATION AS A.M. FREQUENCY CHANGER

Heptode Section				
Supply Voltage	$V_b$		170	V
Anode Voltage	$V_a$		170	V
Screen Grids Resistance	$R_{g2+g4}$		10	k $\Omega$
Screen Grids Voltage (Initial)	$V_{g2+g4}$		102	V
Control Grid Voltage	$V_{g1}$		-2.2	V
Anode Current (approximately)	$I_a$		3.2	mA
Screen Grids Current (approximately)	$I_{g2+g4}$		6.8	mA
Heptode Grid 3 and Triode Grid Current	$I_{g3+gt}$		200	$\mu$ A
Heptode Grid 3 and Triode Grid Resistance	$R_{g3+gt}$		47	k $\Omega$
Peak Heterodyne Voltage	$v_{(pk)het}$		12	V
Conversion Conductance	$g_c$		750	$\mu$ A/V
Valve Anode Resistance ( $\delta v_a/\delta i_a$ )	$r_a$		0.9	M $\Omega$
Equivalent Grid Noise Resistance	$R_{eq}$		70	k $\Omega$
Grid Voltage for 100 : 1 reduction of Conversion Conductance			-24	V
Triode				
Anode Voltage	$V_a$		103	V
Anode Current (Average)	$I_{a(av)}$		4.5	mA

## MOUNTING POSITION—Unrestricted

## APPROXIMATE WEIGHT

Net		0.5	oz
Packed		0.75	oz

**AVERAGE CHARACTERISTIC CURVES :**

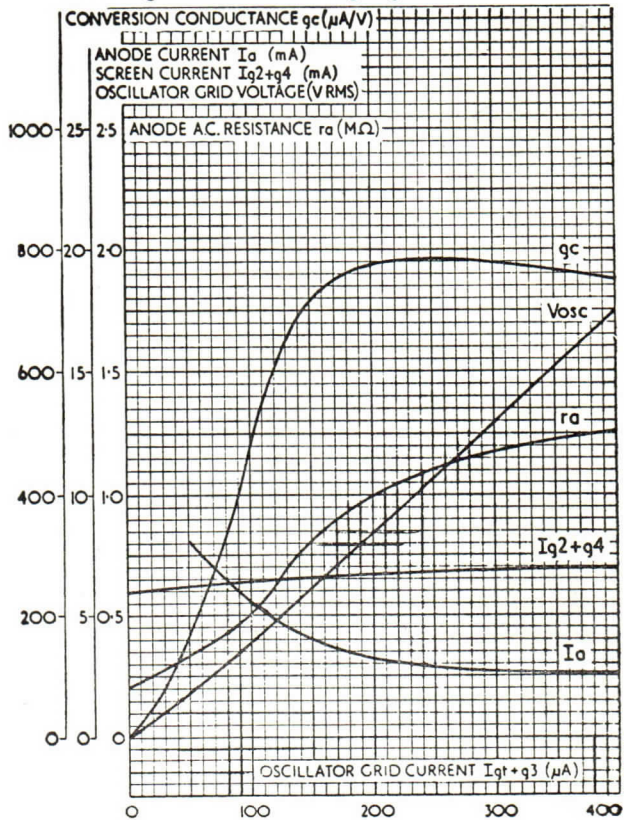
$I_a, I_{g2}, g_c, r_a, V_{osc}/I_{gt+g3}$

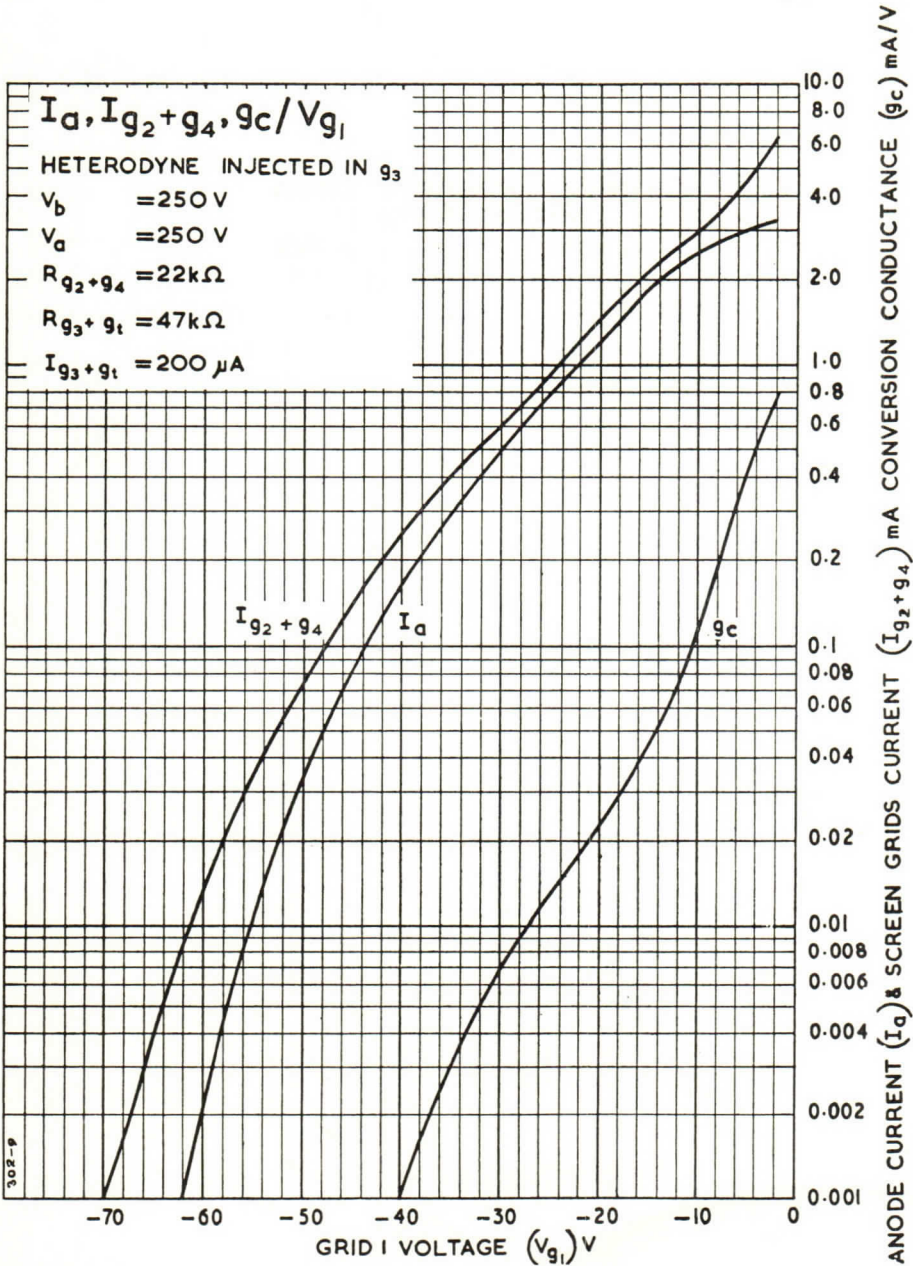
$V_a = 250V$

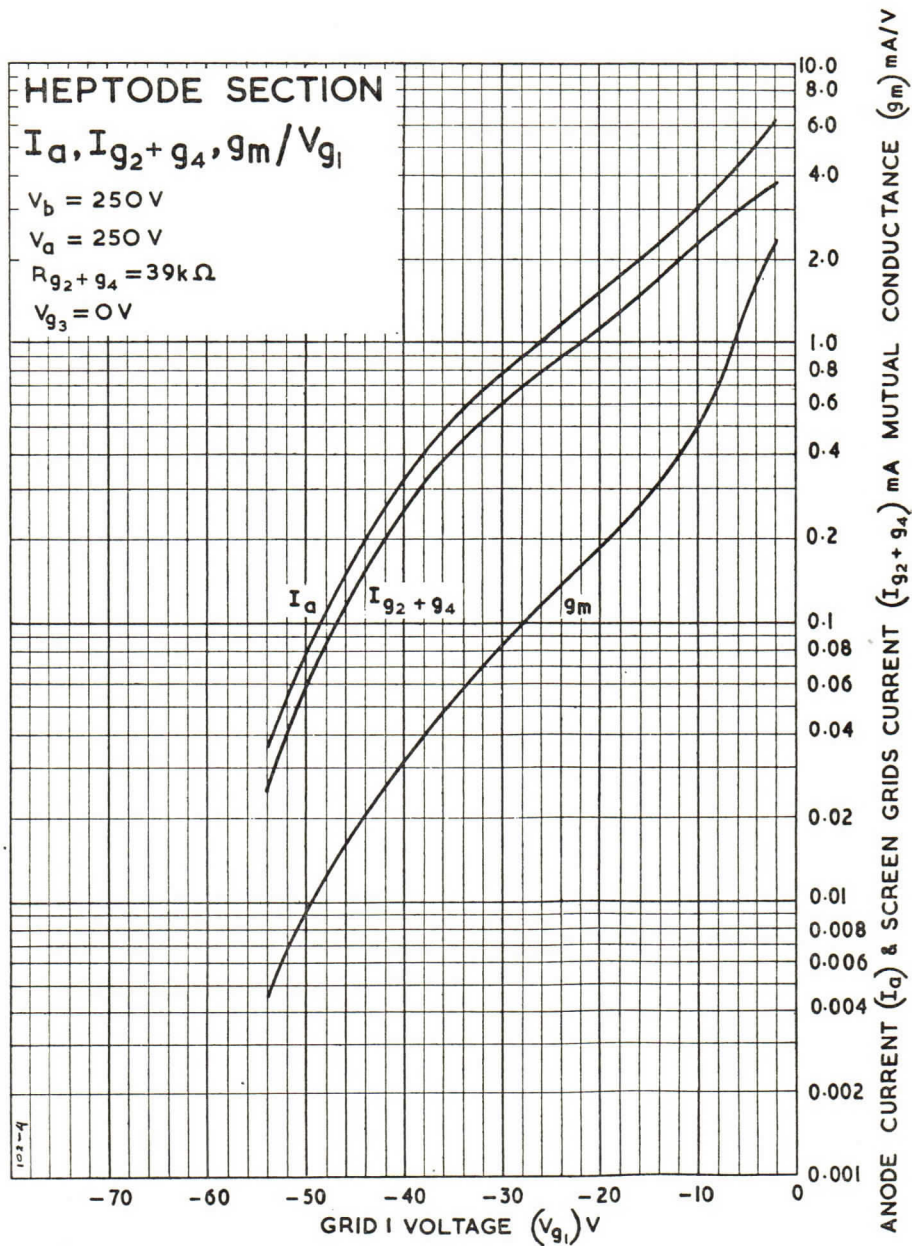
$R_{g2+g4} = 22k\Omega$

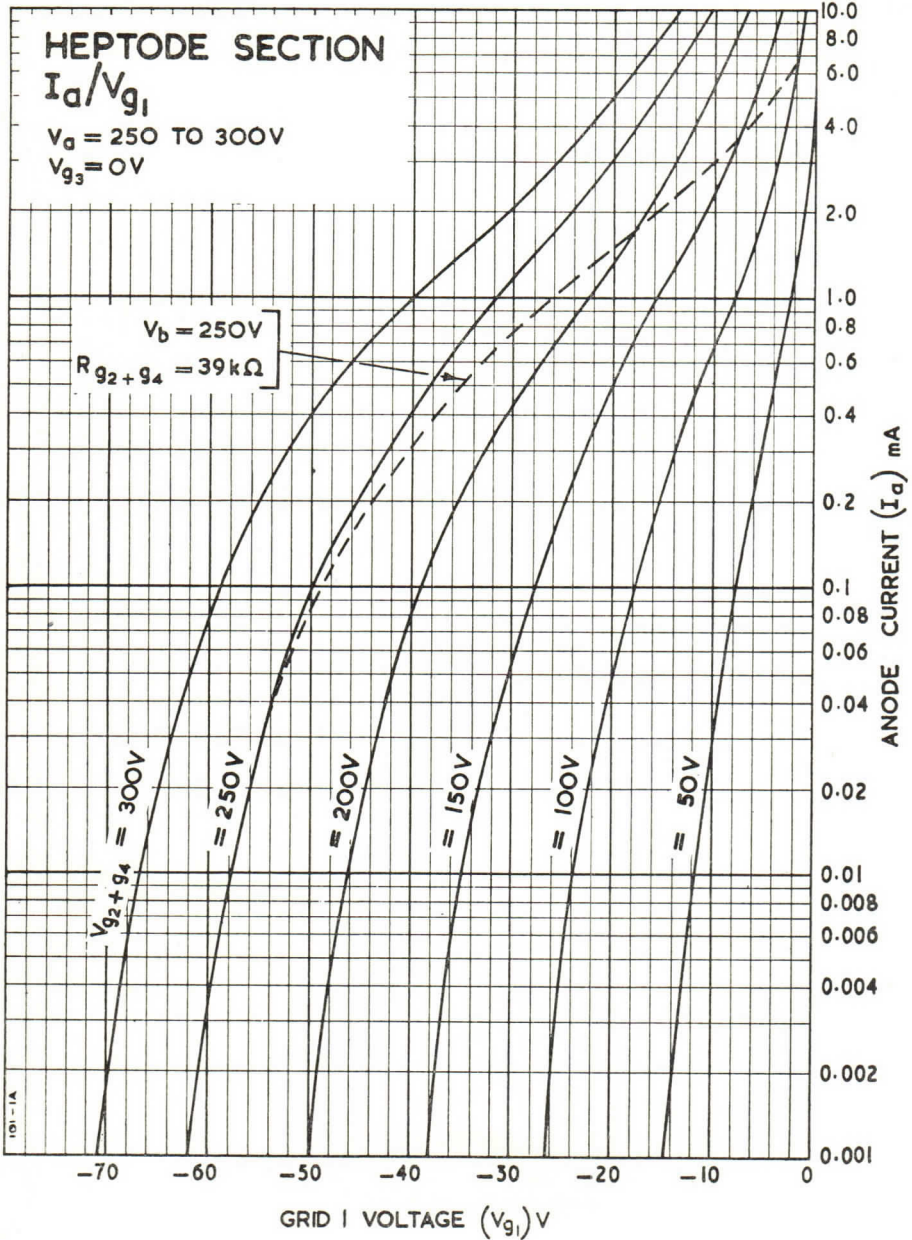
$V_{g1} = -2V$

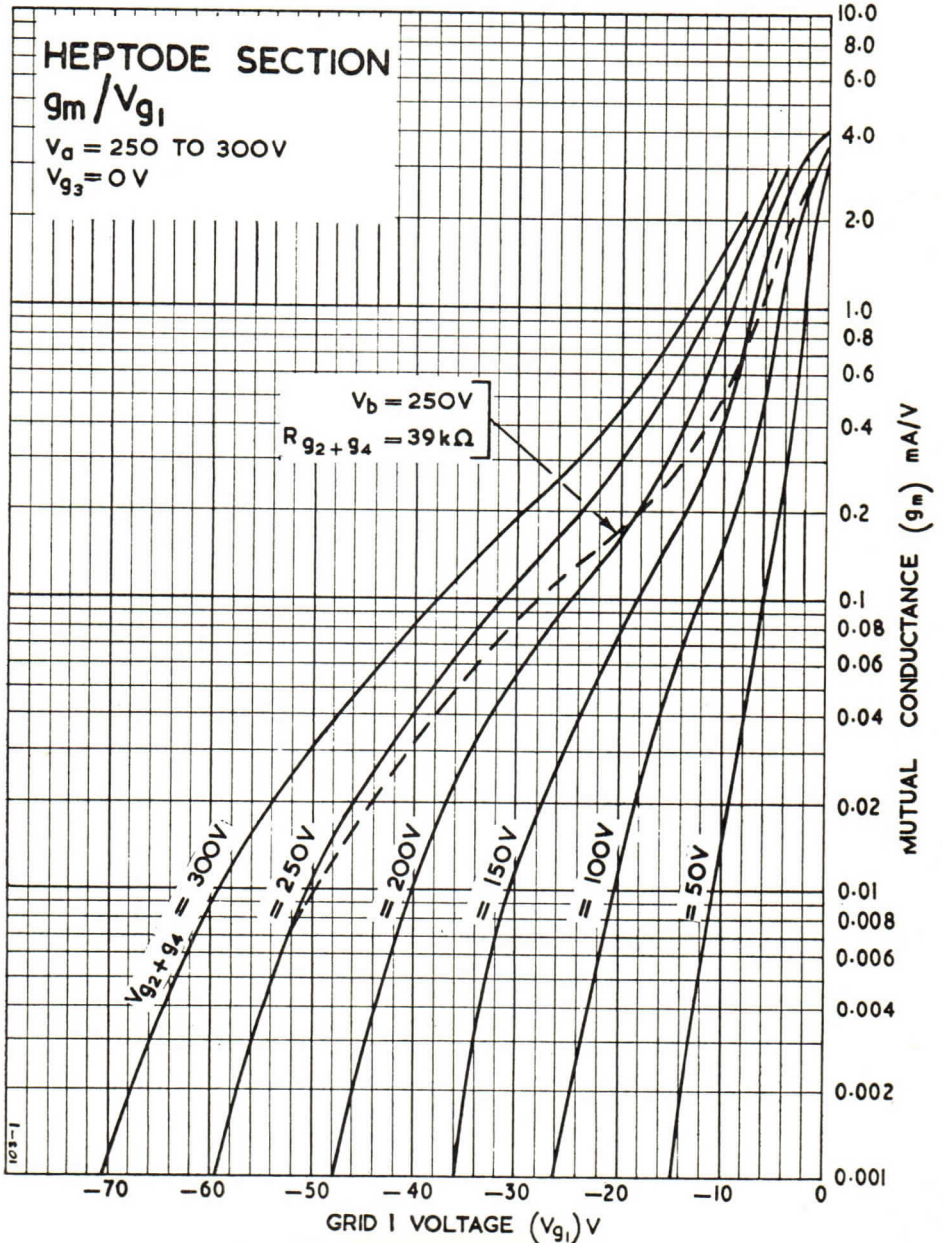
$R_{gt+g3} = 47k\Omega$

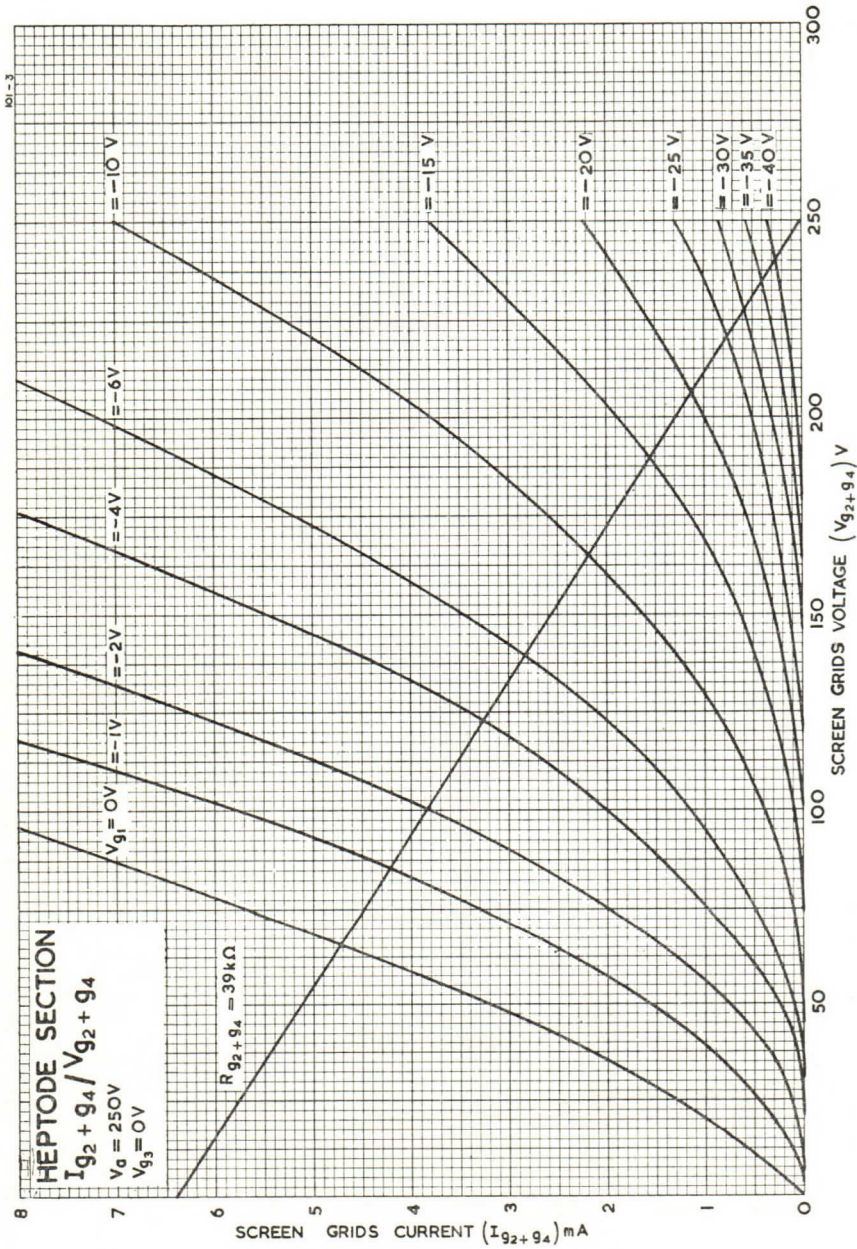




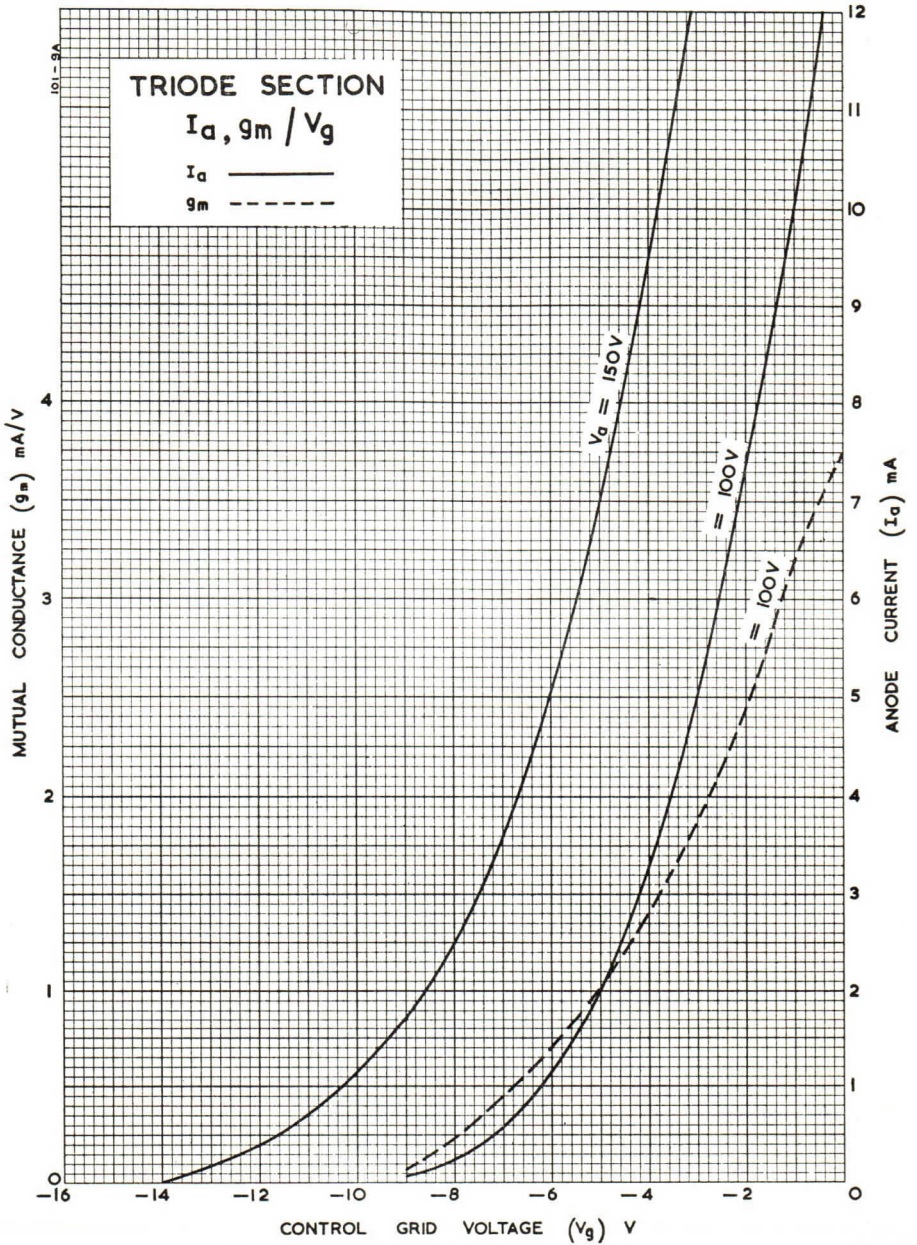












CHARACTERISTIC CURVES:  $I_a/V_a$   
Triode Section

