



TRIODE PENTODE

Designed primarily for use as a frequency changer in Television Receivers operating at frequencies up to 220 Mc/s. It is suitable for series connected heater operation, a.c. or d.c. The Triode and Pentode sections have separate cathodes.

PHYSICAL DETAILS.

Base	...	...	B9A—Noval.
Max. Overall Length	...	...	56 mm. ($2\frac{1}{2}$ ins.).
Max. Seated Height	...	...	49 mm. ($1\frac{3}{4}$ ins.).
Max. Diameter	...	...	22.2 mm. ($\frac{7}{8}$ in.).
Mounting Position	...	...	Any.

BASE CONNECTIONS.

Pin 1—Triode Anode	Pin 5—Heater.
Pin 2—Pentode g_1	Pin 6—Pentode Anode.
Pin 3—Pentode g_2	Pin 7—Pentode cathode $g_{3,s}$.
Pin 4—Heater	Pin 8—Triode Cathode.
Pin 9—Triode Grid.	

HEATER.

Heater Current.	...	...	0.3 amp.
Heater Voltage	...	...	9.0 volts (approx.)

RATINGS.

PENTODE SECTION.

Max. H.T. Supply Voltage	...	...	550 volts.
Max. Anode Voltage	...	...	300 volts.
Max. Screen Voltage	...	...	300 volts.
Max. Anode Dissipation	...	...	2.0 watts.
Max. Screen Dissipation	...	...	0.5 watts.
Max. Neg. Grid Voltage (for $I_g < +0.3 \mu A$.)	...	...	-1.3 volts.
Max. V_{h-kp} (heater positive)	...	...	90 volts.
Max. V_{h-kt} (heater negative)	...	...	220 volts.
Max. R_{g_1-kp} (auto bias)	...	...	1.0 MΩ
Max. R_{g_1-kp} (fixed bias)	...	...	0.5 MΩ
Max. R_{h-kp}	...	...	20 kΩ

TRIODE SECTION.

Max. H.T. Supply Voltage	...	...	550 volts.
Max. Anode Voltage	...	...	300 volts.
Max. Anode Dissipation	...	...	1.5 watts.
Max. Neg. Grid Voltage (for $I_g < +0.3 \mu A$.)	...	...	-1.3 volts.
Max. Cathode Current	...	...	20 mA.
Max. V_{h-kt} (heater positive)	...	...	90 volts.
Max. V_{h-kt} (heater negative)	...	...	220 volts.
Max. R_{gt-kt}	...	...	1.0 MΩ
Max. R_{h-kt}	...	...	20 kΩ

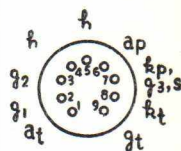
CHARACTERISTICS.

PENTODE SECTION.

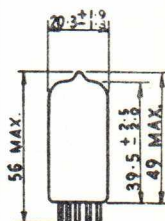
Anode Voltage	...	...	170–200 volts.
Screen Voltage	...	...	110 volts.
Grid Bias Voltage	...	...	-0.9 volt.
Anode Current	...	...	10 mA.
Screen Current	...	...	3.3 mA.
Mutual Conductance	...	...	5.5 mA/V.
Anode Impedance	...	...	400 kΩ
Inner μ	...	...	32
V_{g_1} for cut-off	...	...	-10 volts.

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Base
Connections
Underside View
of Base



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CHARACTERISTICS (Continued).

TRIODE SECTION.

Anode Voltage	...	...	...	...	150 volts.
Grid Bias Voltage	...	...	...	...	-2 volts.
Anode Current	...	...	...	...	11 mA.
Mutual Conductance	...	...	...	...	5.8 mA/V.
Anode Impedance	...	...	...	...	5 k Ω
μ	...	...	...	...	35

TYPICAL OPERATING CONDITIONS (As Frequency Changer).

TRIODE as Oscillator.

Anode Supply Voltage	$V_a(b)$	170	200	250	volts.
Anode Resistor	R_a	20	20	20	k Ω
Grid Resistor	R_g	20	20	20	k Ω
Oscillator Voltage	$V_{osc.}$	3	3	3	Volts. (r.m.s.).
Anode Current	I_a	3.3	4.1	5.7	mA.
Grid Current	I_g	160	160	160	μ A.
Mutual Conductance	$g_{m(eff)}$	2.8	3.2	3.9	mA/V.

PENTODE (As Mixer).

Anode Voltage	V_a	170	200	250	volts.
Screen Feed Resistor	R_{g2}	30	45	70	k Ω
Grid Resistor	R_{g1}	1	1	1	M Ω
Grid Voltage	V_{g1}	0	0	0	volts.
Oscillator Voltage	$V_{osc.}$	3	3	3	volts. (r.m.s.).
Anode Current	I_a	5.1	5.1	5.6	mA.
Screen Current	I_{g2}	2.1	2.0	1.9	mA.
Grid Current	I_{g1}	3.7	3.7	3.7	μ A.
Conversion Conductance	g_c	1.8	1.85	1.9	mA/V.

CAPACITANCES (Measured without external shield).

C_{p-at}	...	...	...	...	<0.07 pF.
C_{h-k}	...	...	...	...	3 pF. (approx.).

Pentode Section.

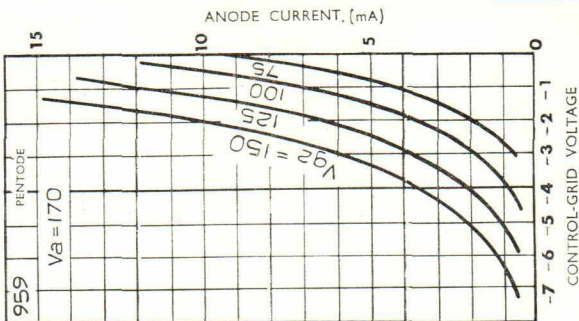
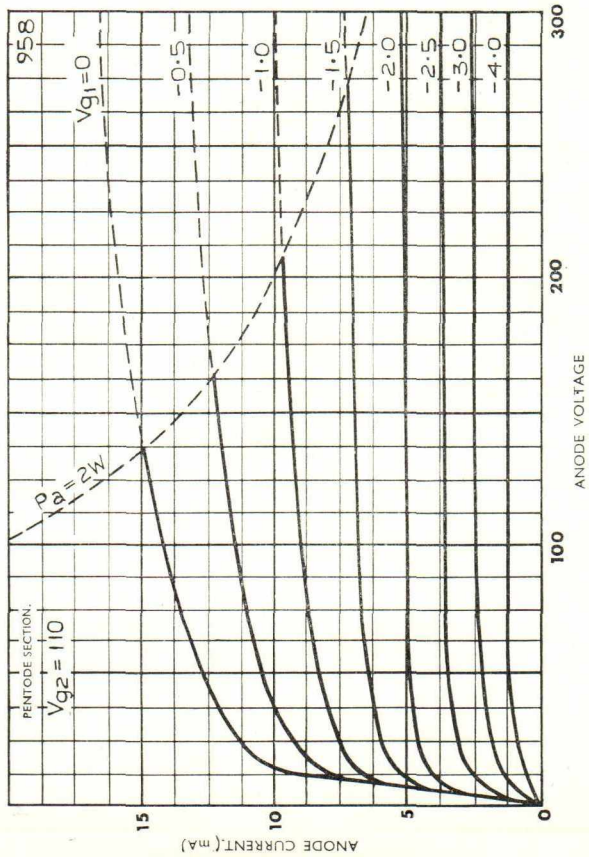
C_{in}	...	...	...	...	5.0 pF.
C_{out}	...	...	...	...	2.6 pF.
C_{a-g1}	...	...	...	...	<0.01 pF.

Triode Section.

C_{in}	...	...	...	...	2.5 pF.
* C_{in}	...	...	...	...	3.5 pF.
C_{out}	...	...	...	...	0.4 pF.
* C_{out}	...	...	...	...	1.6 pF.
C_{a-g}	...	...	...	...	1.8 pF.

*Capacitance with common cathode connection (i.e. pin 7 connected to pin 8.).

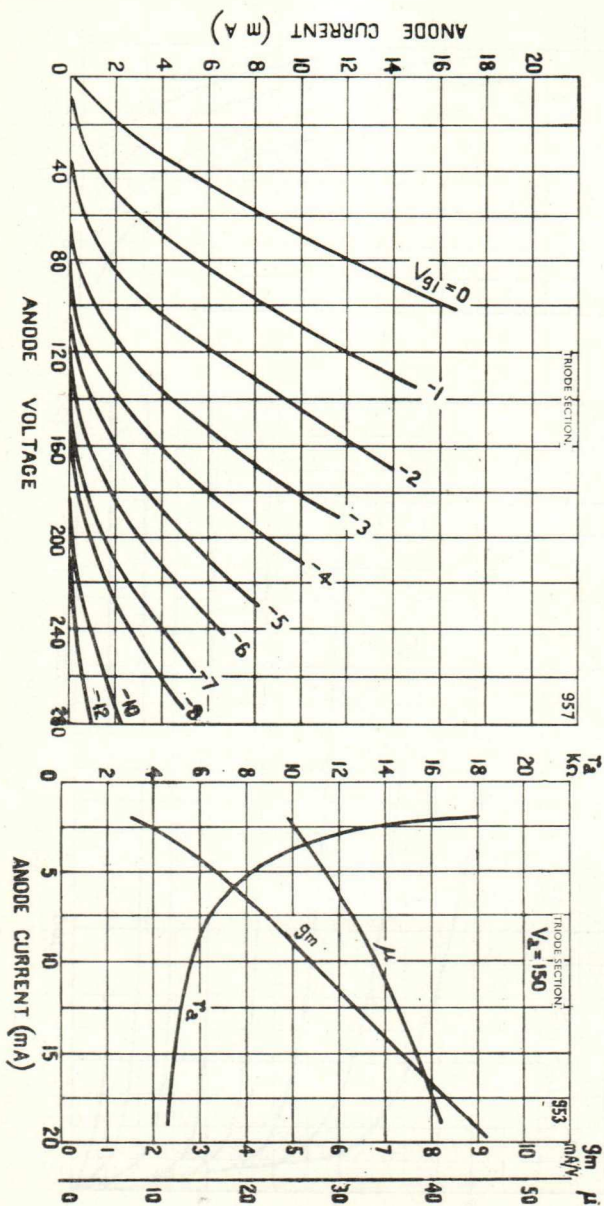
TYPICAL CHARACTERISTICS OF PENTODE SECTION.



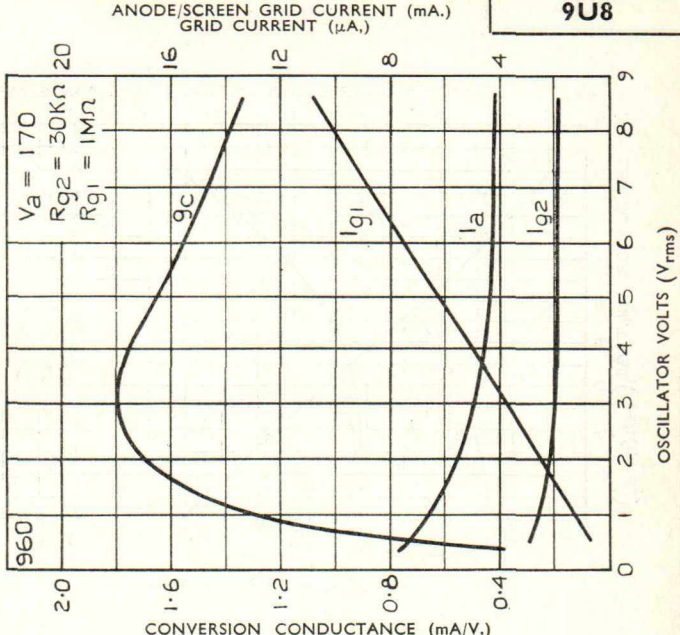
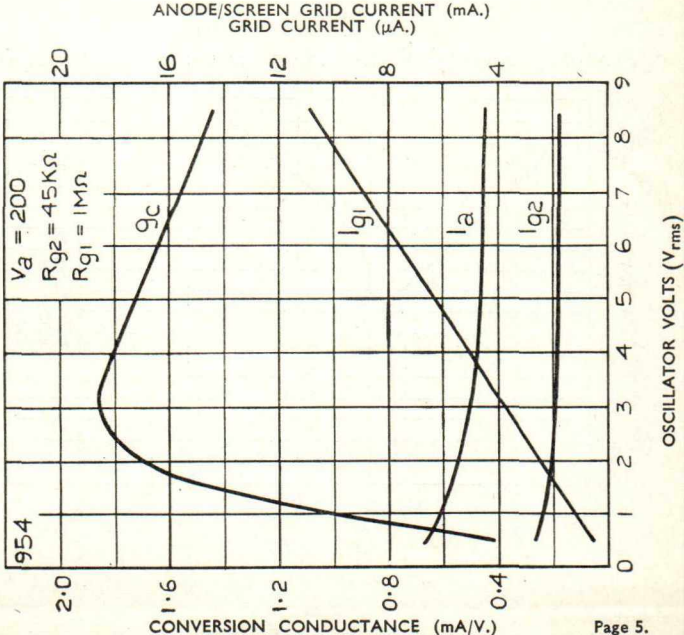
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TYPICAL CHARACTERISTICS OF TRIODE SECTION.



TYPICAL CHARACTERISTICS OF PENTODE SECTION AS MIXER.



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TYPICAL CHARACTERISTICS OF TRIODE SECTION AS OSCILLATOR.

