

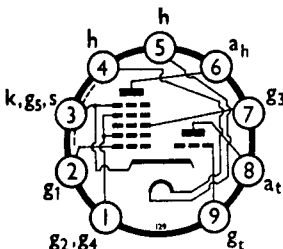


**TRIODE-HEPTODE**  
**6.3V INDIRECTLY HEATED**

**X719/  
ECH81**  
ISSUE 1  
JANUARY, 1958

Primarily designed for use as a frequency changer.

**BASE CONNECTIONS AND VALVE DIMENSIONS**



View from underside  
of base

Base : B9A  
Bulb : Tubular  
Max. overall length : 67 mm.  
Max. seated length : 60 mm.  
Max. diameter : 22.2 mm.

**HEATER**

$V_h$	6.3	V
$I_h$	0.3	A

**MAXIMUM RATINGS**

**Heptode Section**

$V_a$	300	V
$V_{g2, g4}$ ( $I_a < 1\text{mA}$ )	300	V
$V_{g2, g4}$	125	V
$V_{g3}$ ( $I_{g3} = +0.3\mu\text{A}$ )	-1.3	V
$V_{g1}$ ( $I_{g1} = +0.3\mu\text{A}$ )	-1.3	V
$p_a$	1.7	W
$p_{g2+g4}$	1	W
$I_k$	12.5	mA
$V_{h-k}$	100	V
$R_{g1-k}$	3	M $\Omega$
* $R_{g3-k}$	3	M $\Omega$
$R_{h-k}$	20	k $\Omega$

\*If the two sections of the valve are switched during operation so that there is no direct connection between  $g_3$  and  $g_t$ , as may occur in f.m./a.m. receivers, then  $R_{g3-k} = 20\text{k}\Omega$ .

**Triode Section**

$V_a$	250	V
$p_a$	0.8	W
$I_k$	6.5	mA
$V_g$ ( $I_g = +0.3\mu\text{A}$ )	-1.3	V
$V_{h-k}$	100	V
$R_{g-k}$	3	M $\Omega$
$R_{h-k}$	20	k $\Omega$

**CAPACITANCES**

$C_{ah-at}$ : 0.20 pF	$C_{ah-gt}$ : <0.09 pF	$C_{ah-(g3, gt)}$ : <0.35 pF
$C_{g1-at}$ : <0.06 pF	$C_{g1-gt}$ : <0.17 pF	$C_{g1-(g3, gt)}$ : <0.45 pF

**Heptode Section**

$C_{in(g1)}$ : 4.8 pF	$C_{in(g3)}$ : 5.8 pF	$C_{out}$ : 7.9 pF
$C_{a-g1}$ : <0.01 pF	$C_{g1-g3}$ : <0.3 pF	$C_{g1-h}$ : <0.02 pF
		$C_{g3-h}$ : <0.06 pF

**Triode Section**

$C_{in}$ : 2.6 pF	$C_{out}$ : 2.1 pF	$C_{a-g}$ : 1.0 pF
		$C_{g-h}$ : <0.02 pF

# X719/ECH81

## CHARACTERISTICS

### Triode Section

$V_a$	100	V
$I_a$	13.5	mA
$V_g$	0	V
$g_m$	3.7	mA/V
$\mu$	22	

## TYPICAL OPERATION

### Heptode Section as r.f. or i.f. Amplifier

$V_a = V_b$	250	250	V
$V_{g2, g4}$	100	103	V
$V_{g3}$	0	0	V
$V_{g1}$	-2.0	-2.1	V
$V_{g1}$ (for $g_m/100$ )	-42	-42	V
$I_a$	6.5	6.5	mA
$I_{g2+g4}$	3.8	4.1	mA
$R_{g2, g4}$	39	22*	k $\Omega$
$R_{eq}$	8.5	8.5	k $\Omega$
$r_{in}$ (at 100 Mc/s)	2.0	—	k $\Omega$
$g_m$	2.4	2.4	mA/V
$r_a$	700	700	k $\Omega$
$\mu_{g1-(g2, g4)}$	20	20	

\*Common screen resistor for X719/ECH81 and W719/EF85. The current through this resistor is 6.7 mA.

### Heptode Section as a.m. Frequency Changer

$V_a = V_b$	250	250	250	V
$V_{g2, g4}$	103	97	92	V
$V_{g1}$	-2	-1.9	-2	V
$V_{g1}$ (for $g_c/100$ )	-28.5	-28.5	-28.5	V
$I_a$	3.25	3	2.5	mA
$I_{g2+g4}$	6.7	6.1	5.5	mA
$I_{g3+gt}$	200	200	200	$\mu$ A
$R_{g2, g4}$	22	18*	22†	k $\Omega$
$R_{eq}$	70	70	66	k $\Omega$
$g_c$	775	750	700	$\mu$ A/V
$r_a$	1	1	1	M $\Omega$

\*Common screen resistor for X719/ECH81 and W719/EF85. The current through this resistor is 8.5 mA.

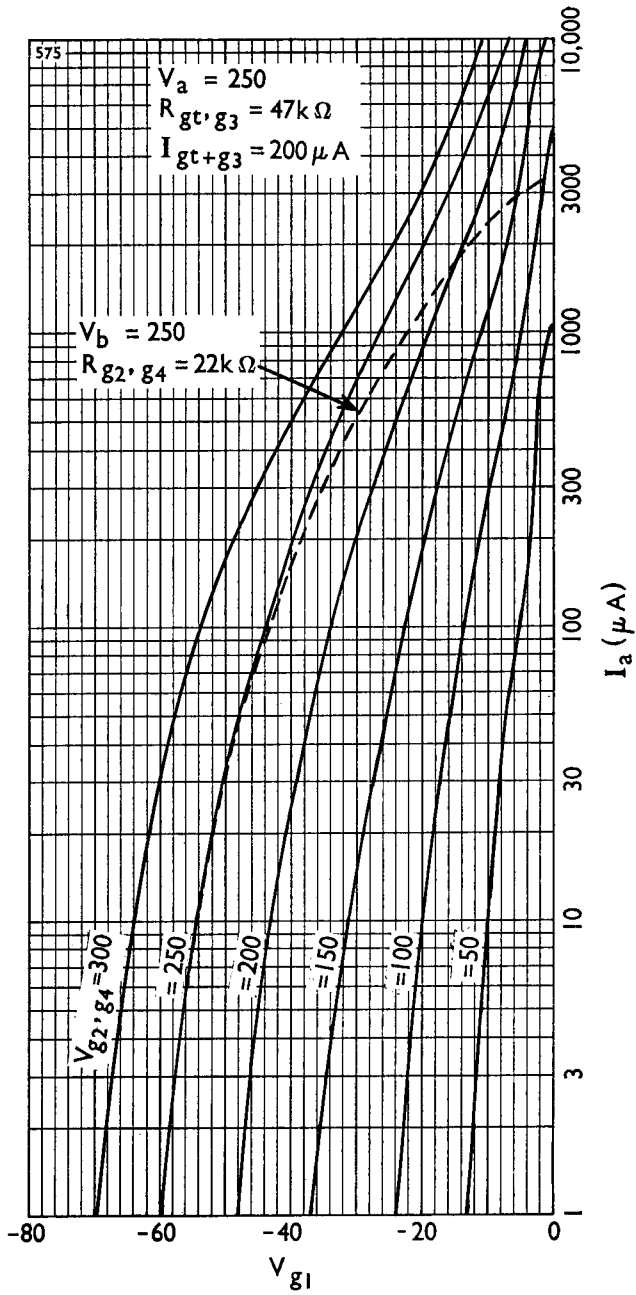
†Common screen resistor for X719/ECH81 and WD709/EBF80. The current through this resistor is 7.2 mA.

### Triode Section as r.f. Oscillator

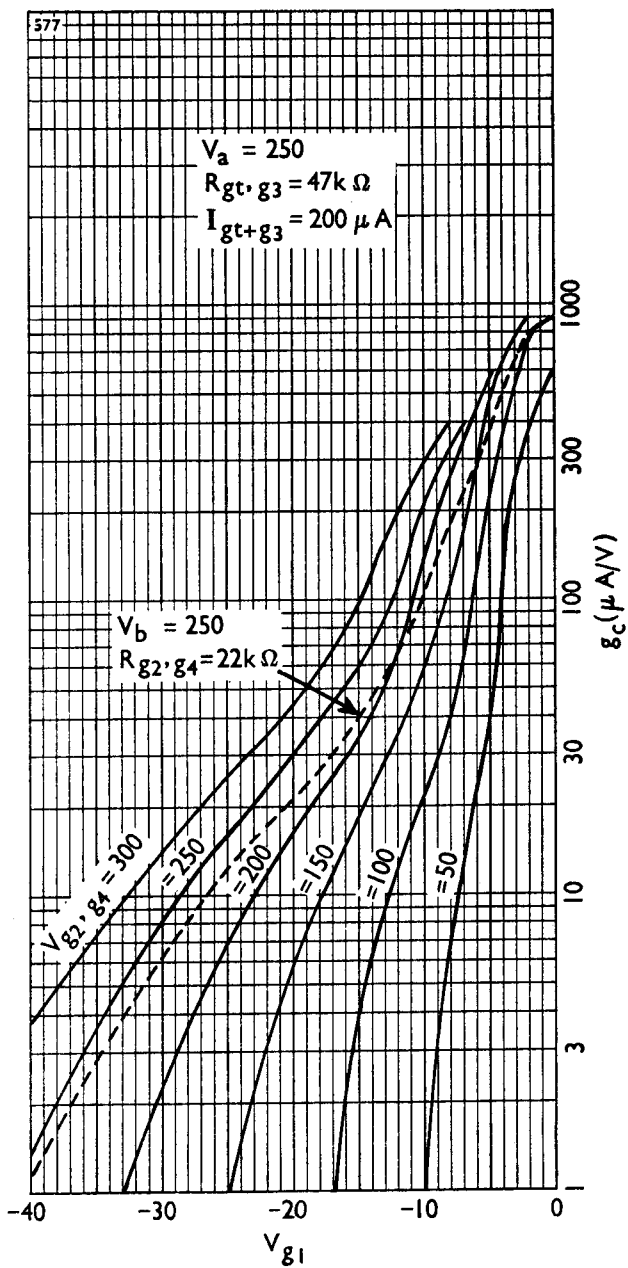
$V_b$	250	V
$R_{at}$	33	k $\Omega$
$I_{at}$	4.5	mA
$R_{g3, gt}$	47	k $\Omega$
$I_{g3+gt}$	200	$\mu$ A
$g_m$ (effective)	650	$\mu$ A/V

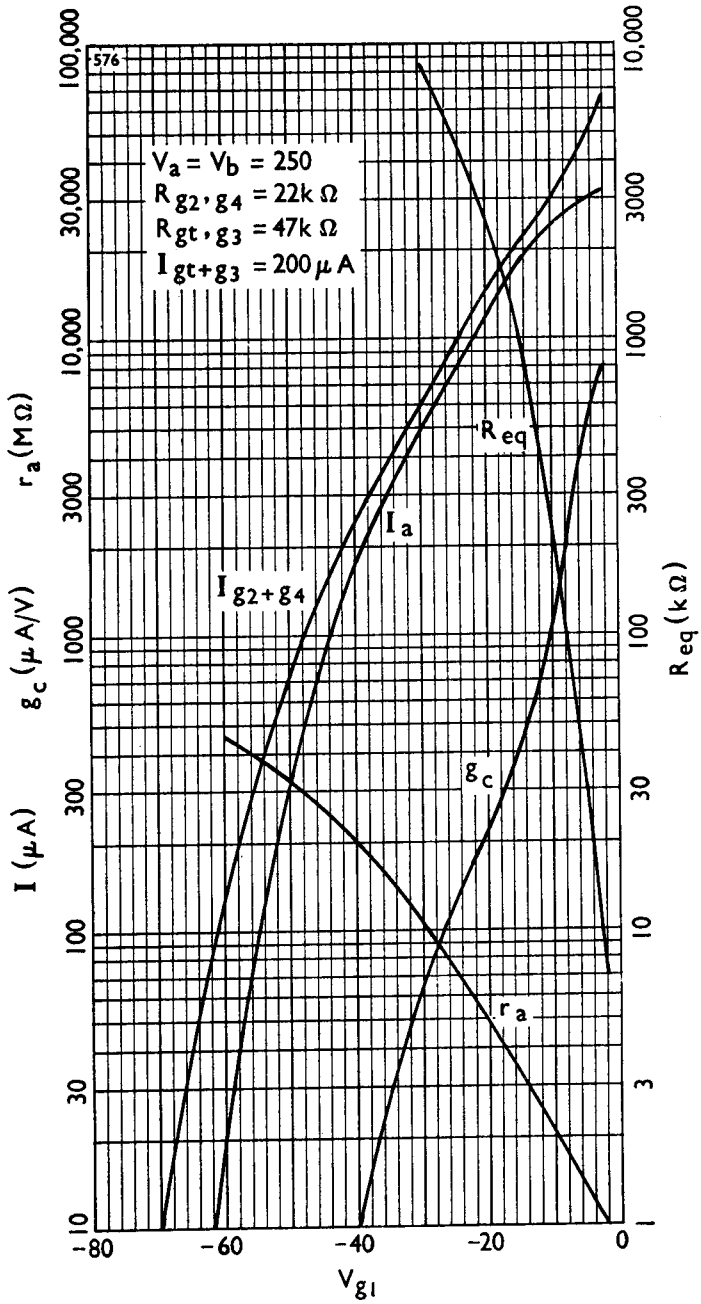
## MOUNTING

Any position.

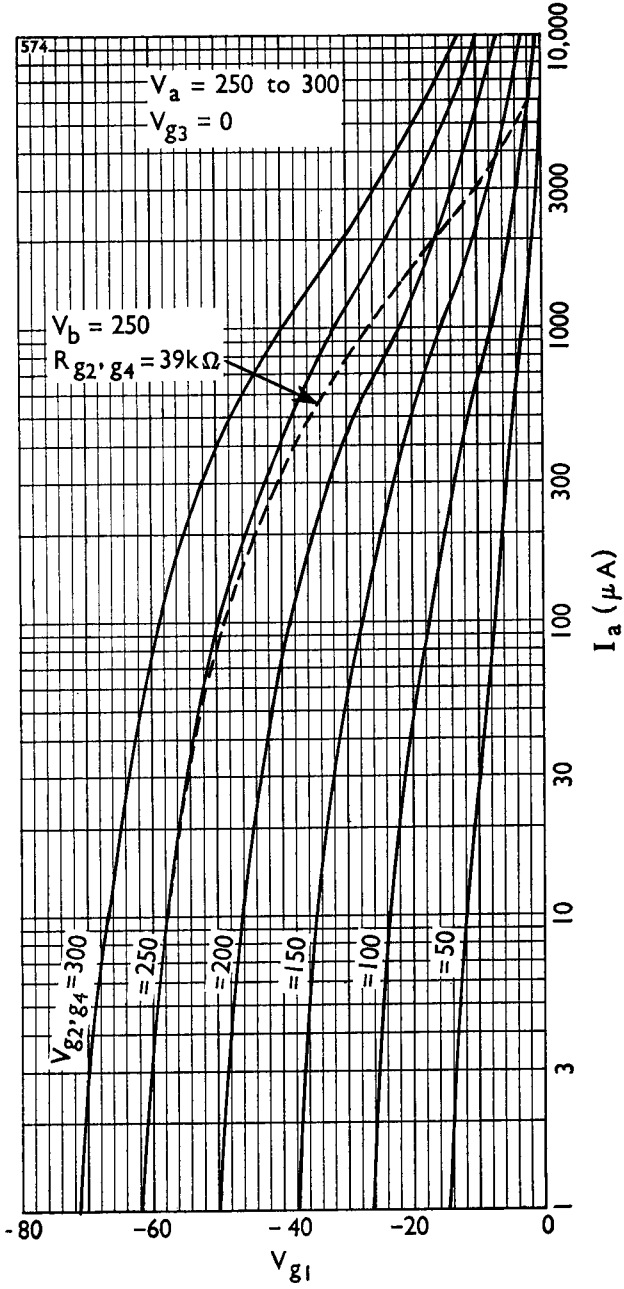


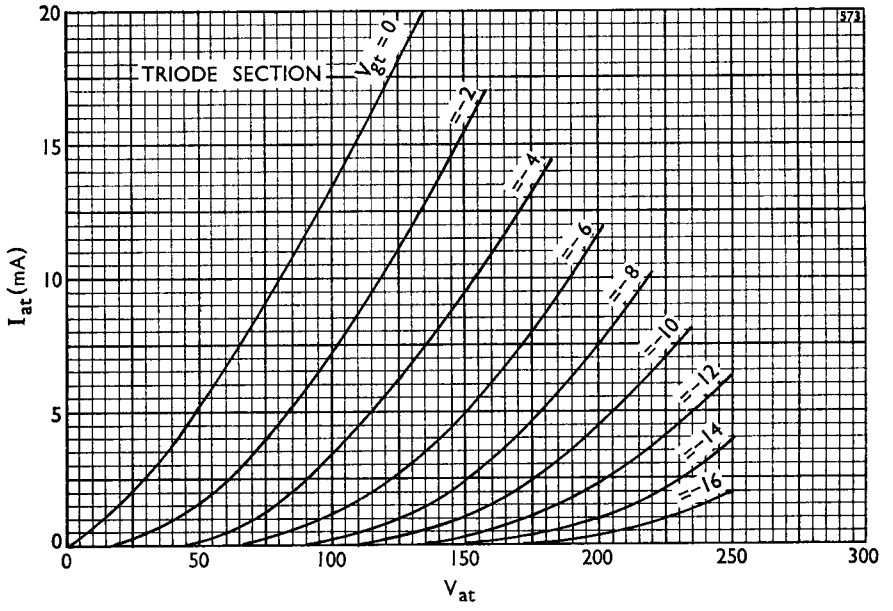
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**X719/ECH81**