

TRIODE HEXODE FREQUENCY CHANGER

ECH42

Triode hexode primarily intended for use as frequency changer in A.C. mains-operated receivers. The hexode section is designed for A.V.C. operation. The valve may also be employed as a phase inverter.

HEATER

V_h	6.3	V
I_h	0.23	A

MOUNTING POSITION Any

CAPACITANCES

C_{gt-g1}	< 0.35	$\mu\mu F$
C_{gt-ah}	< 0.2	$\mu\mu F$

Hexode Section

$C_{g1-h+k+g2+g4+skirt}$	4.0	$\mu\mu F$
$C_{a-h+k+g2+g4+skirt}$	9.2	$\mu\mu F$
C_{a-g1}	< 0.1	$\mu\mu F$
C_{g1-h}	< 0.15	$\mu\mu F$

Triode Section

$C_{gt-h+k+g2+g4+skirt}$	5.5	$\mu\mu F$
$C_{at-h+k+g2+g4+skirt}$	2.3	$\mu\mu F$
C_{at-gt}	1.2	$\mu\mu F$

OPERATING CONDITIONS AS FREQUENCY CHANGER

With Screen Grid fed from a potentiometer (see Fig. 1)

Hexode Section

$V_a = V_b$	250	V
R_1	27	k Ω
R_2	27	k Ω
R_k	180	Ω
R_{g3+gt}	47	k Ω
I_{g3+gt}	200	μA
V_{g1}	-2	V
V_{g2+g4}	85	V
I_a	3.0	mA
I_{g2+g4}	3.0	mA
g_c	750	$\mu A/V$
r_a	> 1.0	M Ω
R_{eq}	75	k Ω
V_{g1} for 100 : 1 reduction in g_c	-29	V

Triode Section

V_b	250	V
R_a	33	k Ω
R_{gt+g3}	47	k Ω
I_{gt+g3}	200	μA
I_a	4.8	mA

The effective mutual conductance under the above conditions is approximately 550 $\mu A/V$

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CHARACTERISTICS

Triode Section

V_a	100	V
V_g	0	V
I_a	10	mA
g_m	2.8	mA/V
μ	22	

TYPICAL OPERATING CONDITIONS AS PHASE INVERTER

(see Fig. 2)

V_b (V)	I_b (mA)	V_{g-g^*} ($V_{r.m.s.}$)	$\frac{V_{g-g}}{V_{in}}$	D_{tot}^* (%)
200	2.6	33.2	25.2	2.6
300	4.0	56.7	25.7	2.8
400	5.3	78.6	26.1	3.0

*Output voltage and distortion at the start of positive grid current. At lower output voltage the distortion is approximately proportional to the voltage.

LIMITING VALUES

Hexode Section

$V_{a(b)}$ max.	550	V
V_a max.	250	V
p_a max.	1.5	W
$V_{g2+g4(b)}$ max.	550	V
V_{g2+g4} ($I_a = 3$ mA)	125	V
V_{g2+g4} max. ($I_a < 1$ mA)	250	V
p_{g2+g4} max.	0.3	W
V_{g1} ($I_{g1} = +0.3$ μ A) max.	-1.3	V
I_k max.	7.0	mA
R_{g1-k} max.	3.0	M Ω
R_{g3-k} max.	3.0	M Ω
R_{h-k} max.	20	k Ω
V_{h-k} max.	50	V

Triode Section

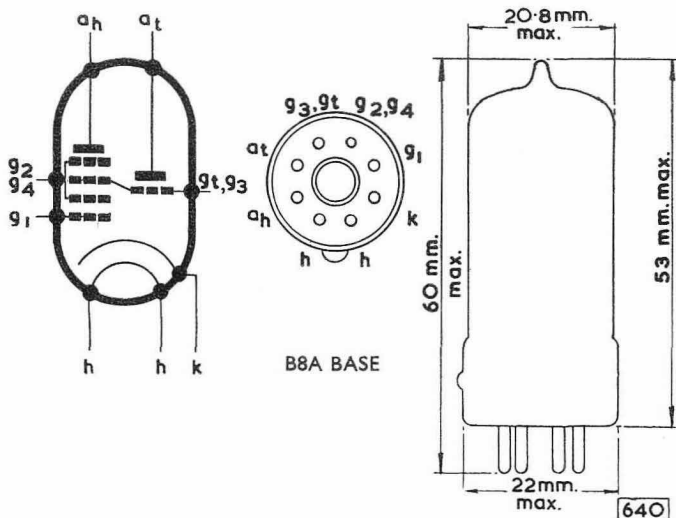
$V_{a(b)}$ max.	550	V
V_a max.	175	V
p_a max.	0.8	W
V_{gt} max. ($I_{gt} = +0.3$ μ A)	-1.3	V
I_k max.	6.0	mA
R_{gt-k} max.	3.0	M Ω
R_{h-k} max.	20	k Ω
V_{h-k} max.	50	V



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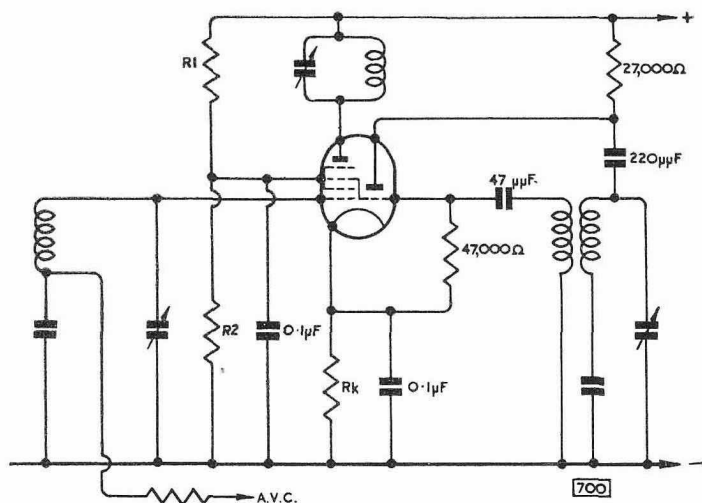


Fig. 1—ECH42 as Frequency Changer

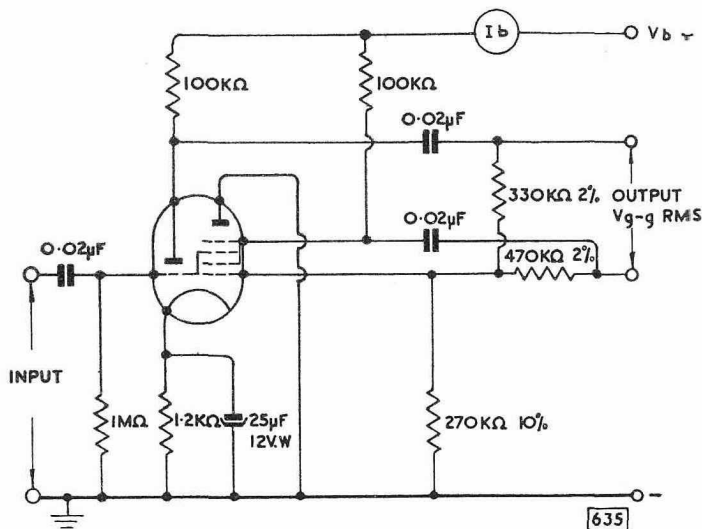
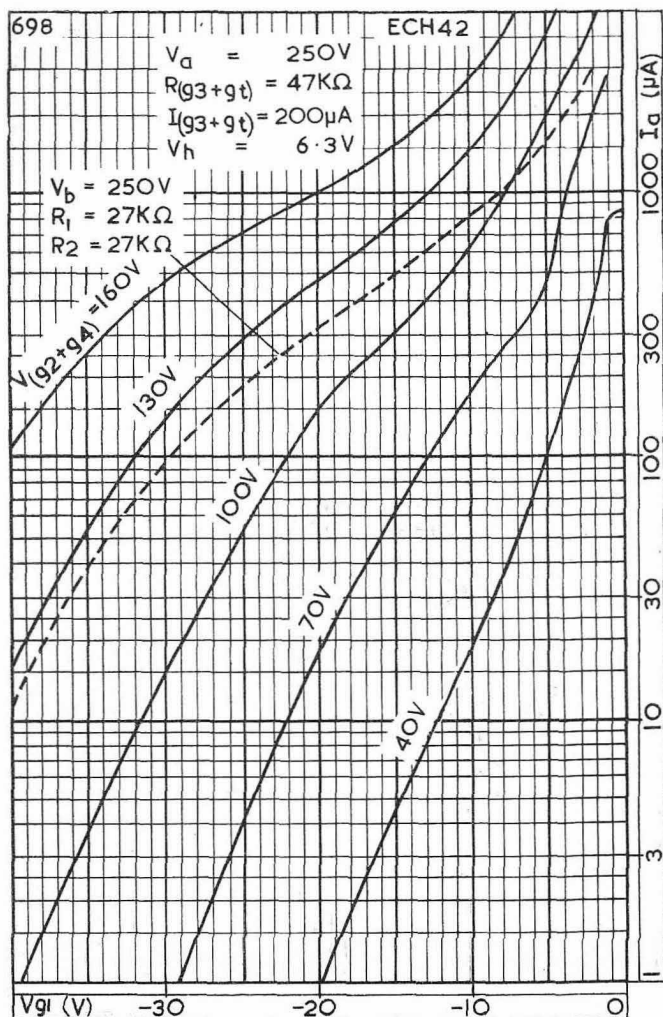


Fig. 2—ECH42 as Phase Inverter

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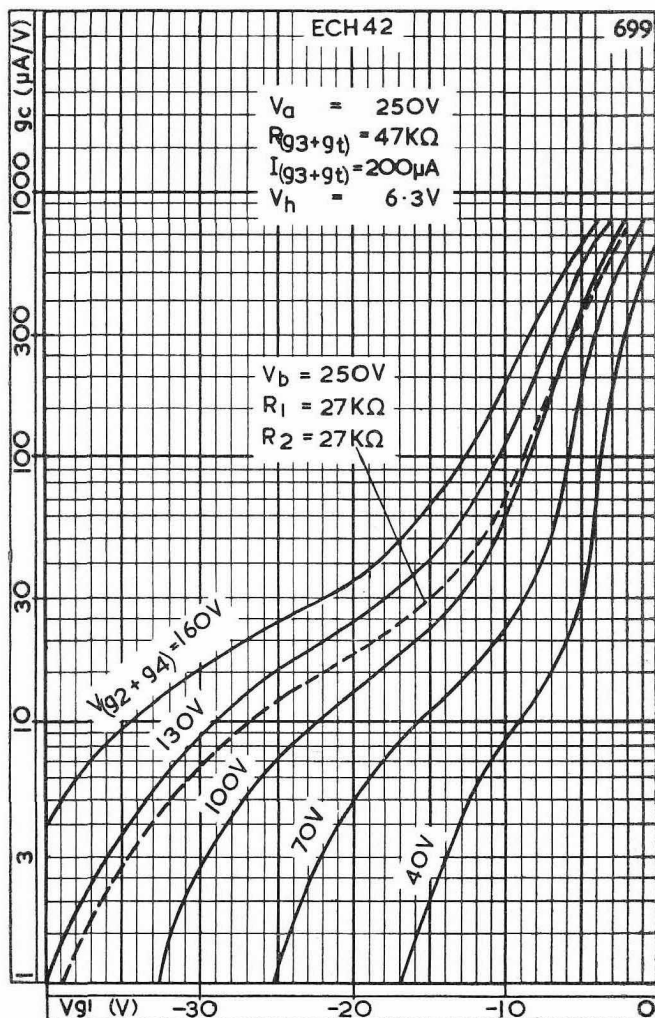


ANODE CURRENT PLOTTED AGAINST CONTROL-GRID VOLTAGE FOR ANODE VOLTAGE OF 250 V

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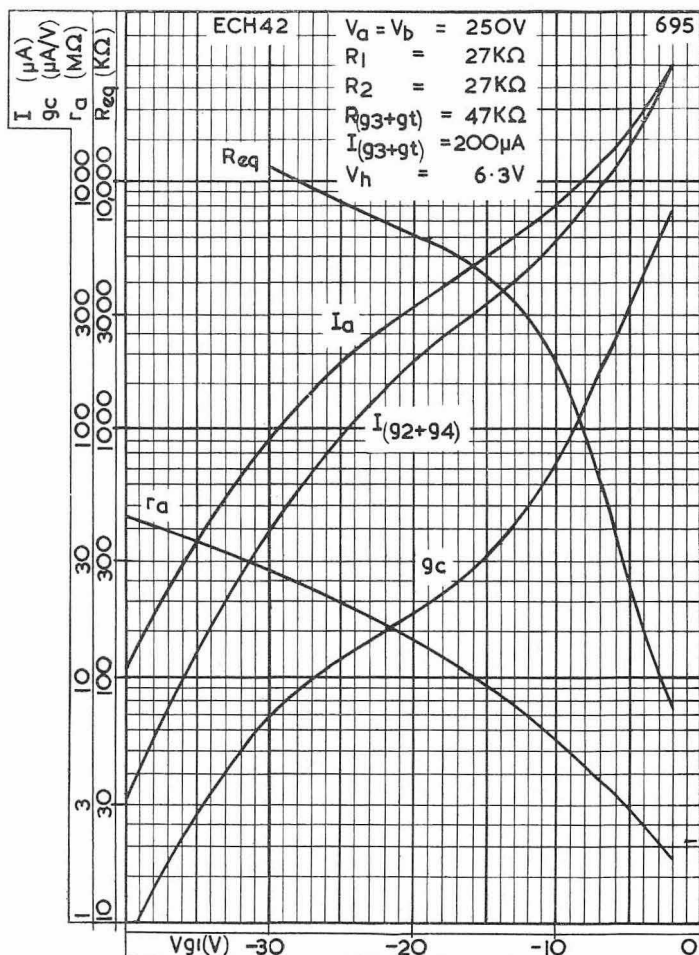


CONVERSION CONDUCTANCE PLOTTED AGAINST CONTROL-GRID VOLTAGE FOR ANODE VOLTAGE OF 250 V

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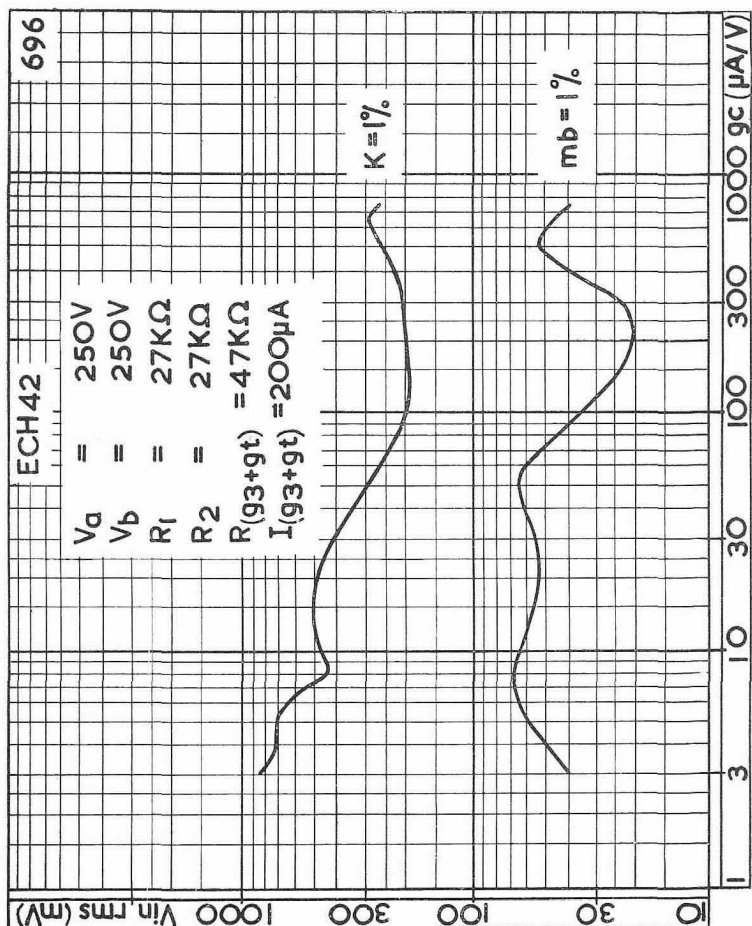


ANODE CURRENT, SCREEN-GRID CURRENT, CONVERSION CONDUCTANCE, ANODE IMPEDANCE AND EQUIVALENT NOISE RESISTANCE PLOTTED AGAINST CONTROL-GRID VOLTAGE FOR LINE VOLTAGE OF 250 V

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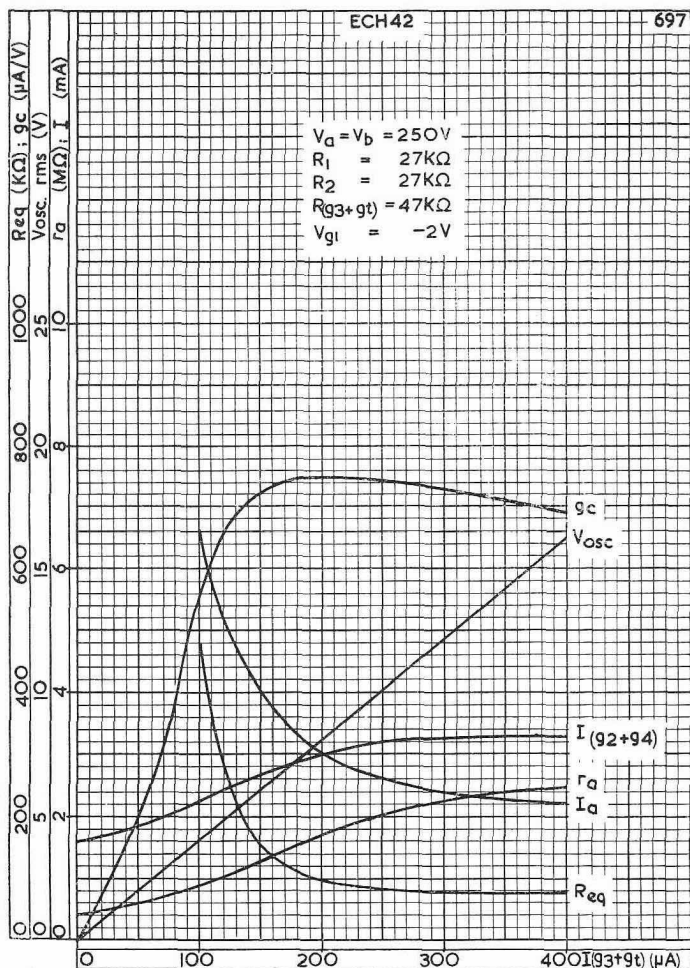


CROSS MODULATION AND MODULATION HUM PLOTTED AGAINST CONVERSION CONDUCTANCE FOR LINE VOLTAGE OF 250 V

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ANODE CURRENT, SCREEN-GRID CURRENT, CONVERSION CONDUCTANCE, OSCILLATOR-GRID VOLTAGE, ANODE IMPEDANCE AND EQUIVALENT NOISE RESISTANCE PLOTTED AGAINST OSCILLATOR-GRID CURRENT FOR LINE VOLTAGE OF 250V

