TUNG-SOL

TWIN TRIODE

MINIATURE TYPE

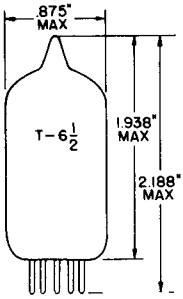
COATED UNIPOTENTIAL CATHODE

HEATER

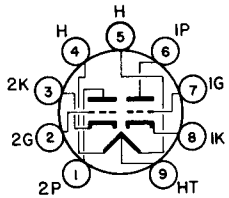
SERIES	PARALLEL
12.6 VOLTS	6.3 VOLTS
0.15 AMP.	0.3 AMP.

AC OR DC

FOR 12.6 VOLT OPERATION APPLY HEATER VOLTAGE BETWEEN PINS #4 AND #5. FOR 6.3 VOLT OPERATION APPLY HEATER VOLTAGE BETWEEN PIN #9 AND PINS #4 AND #5 CONNECTED TOGETHER.



GLASS BULB
SMALL BUTTON
9 PIN BASE E9-1
OUTLINE DRAWING
JEDEC 6-2



BOTTOM VIEW
BASING DIAGRAM
JEDEC 9A

THE 12AU7 COMBINES TWO INDEPENDENT MEDIUM-MU INDIRECTLY HEATED CATHODE TYPE TRIODES IN THE SMALL 9 PIN BUTTON CONSTRUCTION. IT IS ADAPTABLE TO APPLICATION EITHER AS AN AUDIO FREQUENCY AMPLIFIER OR AS COMBINED OSCILLATOR AND MIXER.

DIRECT INTERELECTRODE CAPACITANCES

	WITH SHIELD[A]	WITHOUT SHIELD	
TRIODE UNIT 1			
GRID TO PLATE: (G TO P)	1.5	1.5	pf
INPUT: G TO (H+K)	1.8	1.6	pf
OUTPUT: P TO (H+K)	2.0	0.40	pf
TRIODE UNIT 2			
GRID TO PLATE: (G TO P)	1.5	1.5	pf
INPUT: G TO (H+K)	1.8	1.6	pf
OUTPUT: P TO (H+K)	2.0	0.32	pf

[A] EXTERNAL SHIELD #315 CONNECTED TO CATHODE OF UNIT UNDER TEST.

RATINGS

INTERPRETED ACCORDING TO DESIGN CENTER SYSTEM

EACH TRIODE UNIT

	CLASS A_1[B] AMPLIFIER	VERTICAL[B] DEFLECTION AMPLIFIER	
MAXIMUM HEATER-CATHODE VOLTAGE:			
HEATER NEGATIVE WITH RESPECT TO CATHODE: TOTAL DC AND PEAK	200	200	VOLTS
HEATER POSITIVE WITH RESPECT TO CATHODE: DC	100	100	VOLTS
TOTAL DC AND PEAK	200	200	VOLTS
MAXIMUM PLATE VOLTAGE	300	300	VOLTS
MAXIMUM PEAK POSITIVE PLATE VOLTAGE (ABSOLUTE MAXIMUM)	---	1200	VOLTS
MAXIMUM PLATE DISSIPATION:[C]			
EACH PLATE	2.75	2.75	WATTS
BOTH PLATES	5.5	5.5	WATTS
MAXIMUM PEAK NEGATIVE GRID VOLTAGE	---	250	VOLTS
MAXIMUM CATHODE CURRENT	20	20	MA.
MAXIMUM PEAK CATHODE CURRENT	---	60	MA.
MAXIMUM GRID CIRCUIT RESISTANCE			
FIXED BIAS OPERATION	0.25	---	MEGOHM
CATHODE BIAS OPERATION	1.0	2.2	MEGOHMS

[B] FOR OPERATION IN A 525-LINE, 30-FRAME SYSTEM AS DESCRIBED IN "STANDARDS OF GOOD ENGINEERING PRACTICE FOR TELEVISION BROADCASTING STATIONS; FEDERAL COMMUNICATIONS COMMISSION". THE DUTY CYCLE OF THE VOLTAGE PULSE NOT TO EXCEED 15 PERCENT OF A SCANNING CYCLE.

[C] IN STAGES OPERATING WITH GRID-LEAK BIAS, AN ADEQUATE CATHODE BIAS RESISTOR OR OTHER SUITABLE MEANS IS REQUIRED TO PROTECT THE TUBE IN THE ABSENCE OF EXCITATION.

CONTINUED ON FOLLOWING PAGE

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RATINGS (CONT'D)

EACH TRIODE UNIT

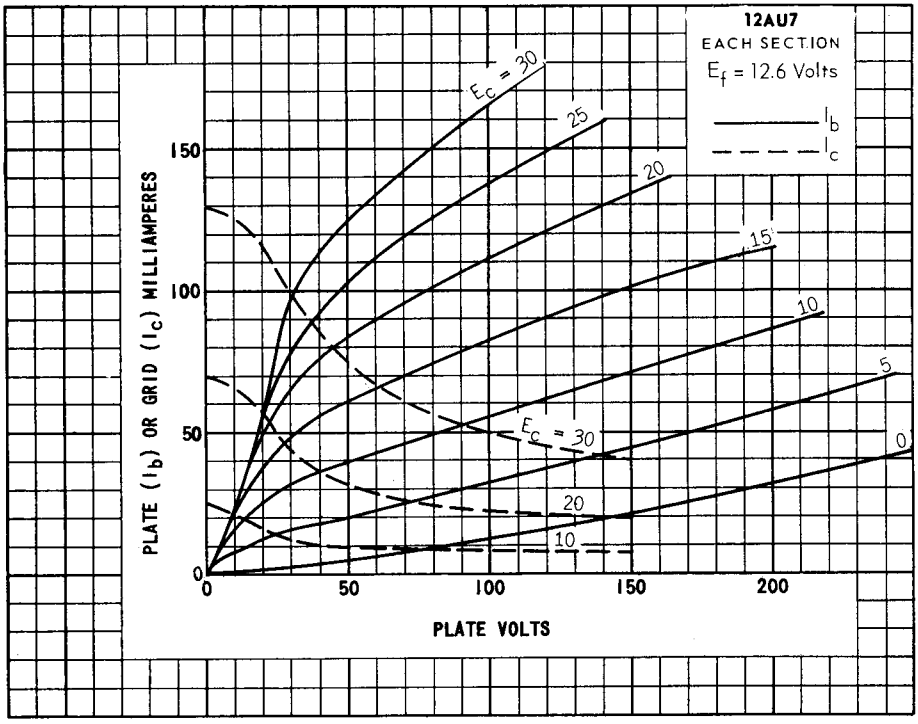
	VERTICAL[D] DEFLECTION OSCILLATOR	HORIZONTAL[D] DEFLECTION OSCILLATOR	
MAXIMUM HEATER–CATHODE VOLTAGE:			
HEATER NEGATIVE WITH RESPECT TO CATHODE:			
TOTAL DC AND PEAK	200	200	VOLTS
HEATER POSITIVE WITH RESPECT TO CATHODE:			
DC	100	100	VOLTS
TOTAL DC AND PEAK	200	200	VOLTS
MAXIMUM DC PLATE VOLTAGE	300	300	VOLTS
MAXIMUM PLATE DISSIPATION:			
EACH PLATE	2.75	2.75	WATTS
BOTH PLATES	5.5	5.5	WATTS
MAXIMUM PEAK NEGATIVE GRID VOLTAGE	400	600	VOLTS
MAXIMUM AVERAGE CATHODE CURRENT	20	20	MA.
MAXIMUM PEAK CATHODE CURRENT	60	300	MA.
MAXIMUM GRID CIRCUIT RESISTANCE	2.2	2.2	MEGOHMS

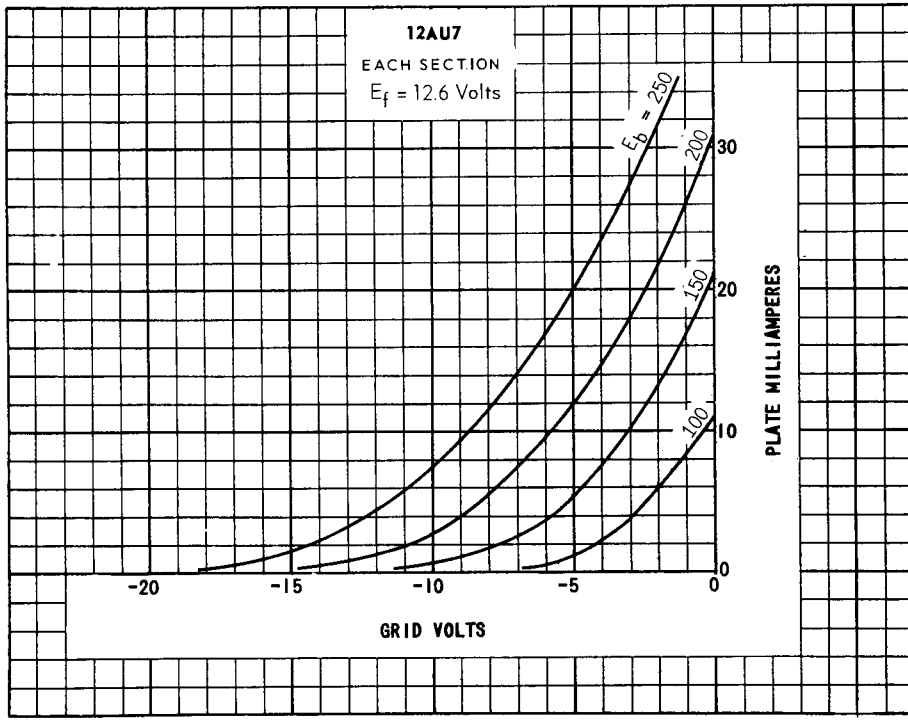
[D] FOR OPERATION IN A 525-LINE, 30-FRAME SYSTEM AS DESCRIBED IN "STANDARDS OF GOOD ENGINEERING PRACTICE FOR TELEVISION BROADCASTING STATIONS; FEDERAL COMMUNICATIONS COMMISSION". THE DUTY CYCLE OF THE VOLTAGE PULSE NOT TO EXCEED 15 PERCENT OF A SCANNING CYCLE.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

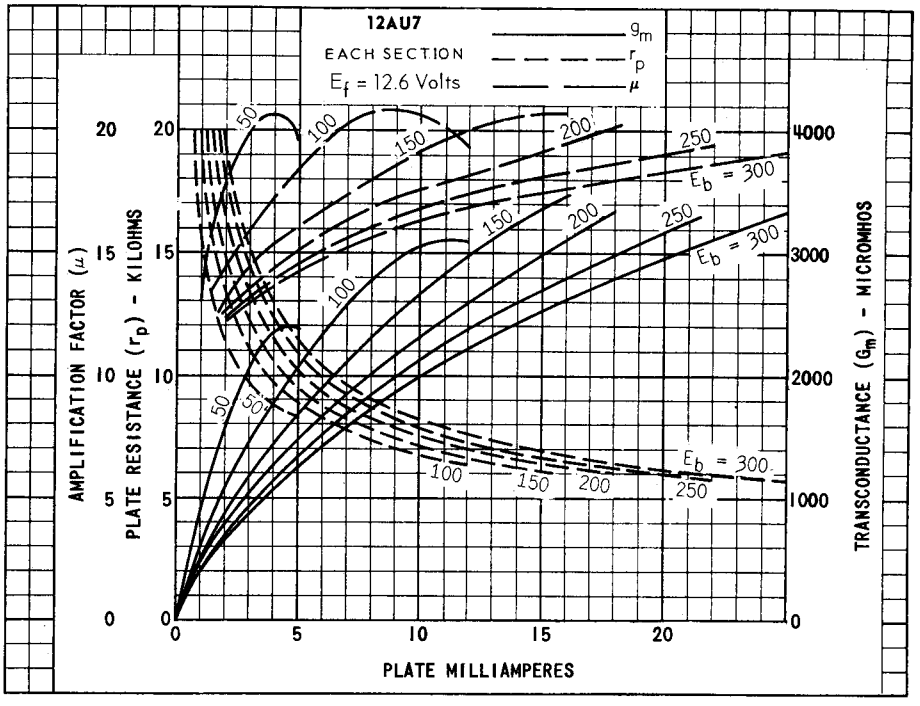
CLASS A_1 AMPLIFIER – EACH TRIODE UNIT

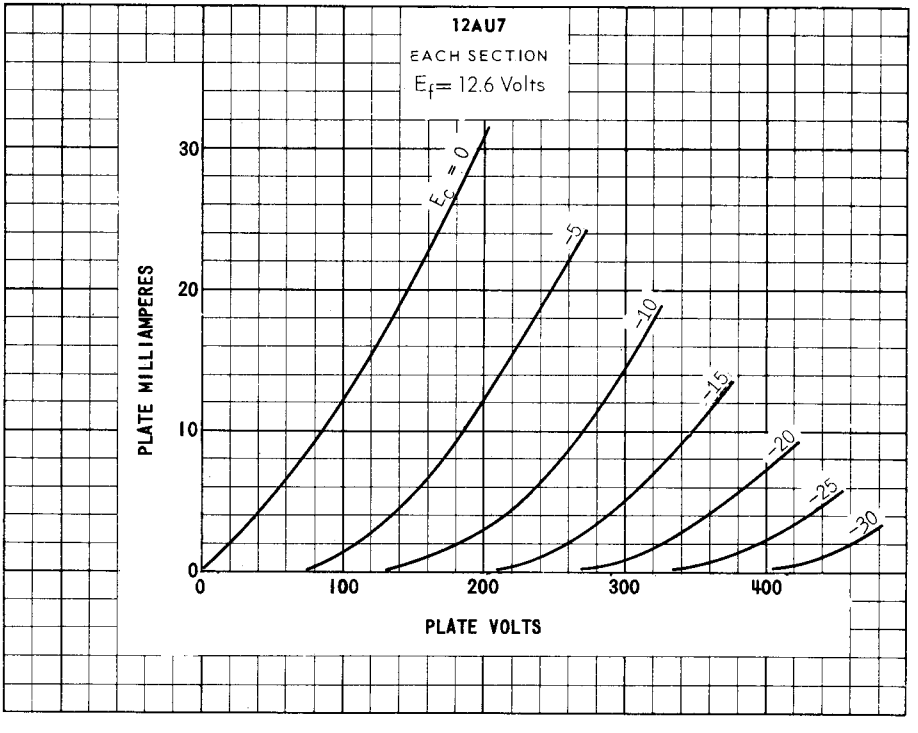
PLATE VOLTAGE	100	250	VOLTS
GRID VOLTAGE	0	−8.5	VOLTS
PLATE CURRENT	11.8	10.5	MA.
PLATE RESISTANCE (APPROX.)	6 500	7 700	OHMS
TRANSCONDUCTANCE	3 100	2 200	μMHOS
AMPLIFICATION FACTOR	20	17	
GRID VOLTAGE FOR I_b = 10 μA. (APPROX.)	---	− 24	VOLTS


12AU7
EACH SECTION
E_f = 12.6 Volts
I_b
I_c
E_c = 30
25
20
15
10
5
0
E_c = 30
20
10
PLATE (I_b) OR GRID (I_c) MILLIAMPERES
150
100
50
0
0
50
100
150
200
PLATE VOLTS


12AU7
EACH SECTION
E_f = 12.6 Volts
E_b = 250
200
150
100
30
20
10
0
PLATE MILLIAMPERES
-20
-15
-10
-5
0
GRID VOLTS

12AU7


12AU7
EACH SECTION
E_f = 12.6 Volts
g_m
r_p
μ
AMPLIFICATION FACTOR (μ)
PLATE RESISTANCE (r_p) - KILOHMS
TRANSCONDUCTANCE (G_m) - MICROMHOS
PLATE MILLIAMPERES
50
100
150
200
250
E_b = 300
0
5
10
15
20
1000
2000
3000
4000


12AU7
EACH SECTION
E_f = 12.6 Volts
PLATE MILLIAMPERES
PLATE VOLTS
E_c = 0
-5
-10
-15
-20
-25
-30
0
100
200
300
400
10
20
30

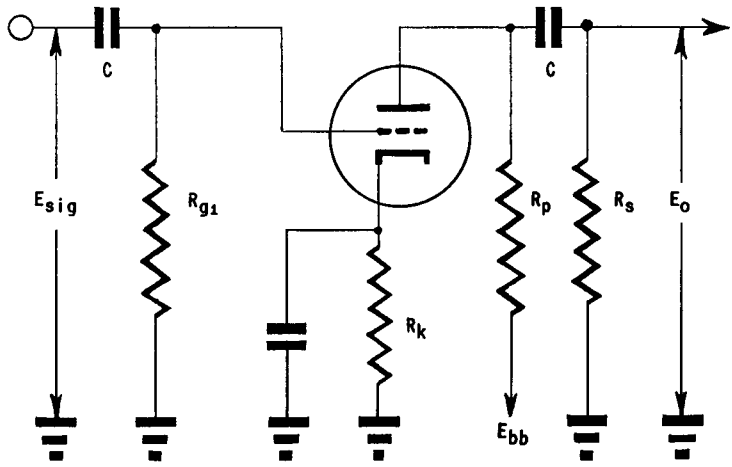
TUNG-SOL

RESISTANCE COUPLED AMPLIFIER

EACH SECTION

R_p MEG.	R_s MEG.	R_{g1} MEG.	E_{bb} = 90 VOLTS			E_{bb} = 180 VOLTS			E_{bb} = 300 VOLTS		
			R_k	GAIN	E_o	R_k	GAIN	E_o	R_k	GAIN	E_o
0.10	0.10	0.10	3300	14	13	2200	14	26	1800	14	40
0.10	0.24	0.10	3600	14	16	2700	15	33	2200	15	51
0.24	0.24	0.10	7500	14	16	5100	15	30	4300	15	44
0.24	0.51	0.10	9100	14	19	6800	15	39	5100	15	54
0.51	0.51	0.10	13000	14	16	9100	15	30	6800	16	40
0.51	1.0	0.10	15000	14	19	10000	16	32	7500	16	45
0.24	0.24	10	0	15	13	0	16	33	0	17	46
0.24	0.51	10	0	16	17	0	17	38	0	18	62
0.51	0.51	10	0	16	14	0	18	32	0	18	53
0.51	1.0	10	0	17	18	0	18	41	0	19	68

NOTES: 1. E_o IS MAXIMUM RMS VOLTAGE OUTPUT FOR FIVE PERCENT (5%) TOTAL HARMONIC DISTORTION.
2. GAIN MEASURED AT 2.0 VOLTS RMS OUTPUT.
3. FOR ZERO-BIAS DATA, GENERATOR IMPEDANCE IS NEGLIGIBLE.



NOTES: COUPLING CAPACITORS (C) SHOULD BE SELECTED TO GIVE DESIRED FREQUENCY RESPONSE.
R_k SHOULD BE ADEQUATELY BY-PASSED