

GENERAL ELECTRIC

INDUSTRIAL AND MILITARY CATHODE RAY TUBES

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12ARP-
CATHODE RAY TUBE

12-1/2 - INCH	FACE PLATE: SPHERICAL, 40" R
FOCUS - ELECTROSTATIC	DUAL BEAM
DEFLECTION - ELECTROSTATIC	POST ACCELERATION
	ALUMINIZED

DESCRIPTION AND RATING

The General Electric Type 12ARP- is a 12-1/2 inch diameter, dual beam, electrostatic focus and deflection cathode ray tube, having minimum pattern distortion, deflection defocusing, and tracking error.

An aluminized screen is used for greater light output and for stabilization of screen potential.

GENERAL

ELECTRICAL

Focusing Method	Electrostatic
Deflecting Method	Electrostatic

Direct Interelectrode Capacitances, Approx.

Cathode to all other electrodes	6.0 μ f
Grid #1 to all other electrodes	7.0 μ f
D1 to D2	4.0 μ f
D3 to D4	3.5 μ f
D1 to all other electrodes	10.0 μ f
D2 to all other electrodes	10.0 μ f
D3 to all other electrodes	10.0 μ f
D4 to all other electrodes	10.0 μ f

OPTICAL

Phosphor Number	2	7	14	19	25
Fluorescent Color	Green	Blue	Purple	Orange	Orange
Phosphorescent Color	Green	Yellow	Orange	Orange	Orange
Persistence	Long	Long	Med.-Long	Very Long	Very Long

Faceplate - Clear

MECHANICAL

Over-all Length	24 7/8 ^{+3/8} Inches
Greatest Diameter of Bulb	12 7/12 ^{+1/16} Inches
Minimum Useful Screen Diameter	11 Inches

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Bulb Contact	J1-22
Neck Contacts.	J1-25
Base	E12-37
Basing	Special

Bulb Contact Alignment:

J1-22 contact aligns with trace of DLD2	± 10 Degrees
J1-22 contact on same side as Pin #4	

Base Alignments:

DLD2 trace aligns with Pin #4 and tube axis	± 10 Degrees
Positive voltage on D1 deflects beam approximately toward Pin #4	
Positive voltage on D3 deflects beam approximately toward Pin #1	

Angle between D3D4 and DLD2 traces $90 \pm$ Degrees

RATINGS
(Design Center Values)¹

Heater Voltage	6.3 Volts
Heater Current at 6.3 Volts	$0.6 \pm 10\%$ Ampere
Post Accelerator Voltage	16,000 Max. Volts DC
Accelerator Voltage	10,000 Max. Volts DC
Accelerator Input	6 Max. Watts
Focusing Electrode Voltage	4,000 Max. Volts DC
Ratio Post Accelerator Voltage to Accelerator Voltage	2.0 Max.

Grid #1 Voltage

Negative Bias Value	300 Max. Volts DC
Positive Bias Value	0 Max. Volts DC
Positive Peak Value	0 Max. Volts

Peak Heater-Cathode Voltage

Heater negative with respect to cathode	180 Max. Volts
Heater positive with respect to cathode	180 Max. Volts

Peak Voltage between Accelerator and any

Deflection Electrode	2,500 Max. Volts
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TYPICAL OPERATING CONDITIONS¹

Post Accelerator Voltage	7,700 Volts
Accelerator Voltage	7,500 Volts
Focusing Electrode Voltage	1,750 to 2,500 Volts
Grid #1 Voltage ³	-150 to -225 Volts

Deflection Factors:

D1 and D2	130 to 180 Volts DC per Inch
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D3 and D4	130 to 180 Volts DC per Inch
Line Width "A" ³015 Inch Max.
Tracking Accuracy ⁴	0.15 Inch
Interaction Factor	14 x 10 ⁻⁵ Max. Inches per Volt
Deflection Defocusing ⁶ Spot Position ⁶	Within a 5/8" Radius Circle

MAXIMUM CIRCUIT VALUES

Grid #1 Circuit Resistance	1.5 Max. Megohms
Resistance in any Deflecting-Electrode Circuit ⁸	5.0 Max. Megohms

NOTES:

1. The values shown are for each unit unless otherwise stated.
2. The visual extinction of the focused, undeflected spot.
3. For a beam current of 2 μ Adc, measured in accordance with MIL-E-1 specifications,
4. The measurement of tracking error shall be made as follows:

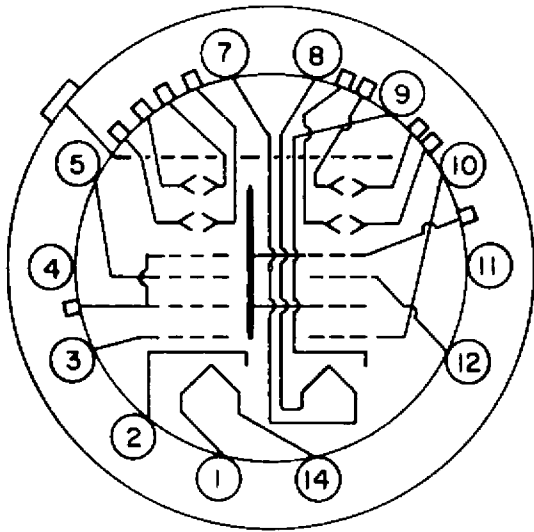
The focused spots of both guns shall be moved by means of a common d-c voltage along the 1D2 axis until the spot of gun A is at +3 inches from the center of the tube. Then by means of a small correction voltage the spot of gun B shall be moved to the same 1D2 position. The spots then shall be moved by means of the common d-c voltage in the opposite direction until the spot of the less sensitive gun reaches -3 inches by means of a voltage divider. The procedure is repeated until 1D2 deflection factor compensation is complete. The entire procedure is then duplicated along the 3D4 axis with a distance from the center of ± 3 inches. Then by means of the two common d-c voltages the spots shall be tracked over the area within a circle 10 inches in diameter. If desired, a small correction voltage may be applied to the plates of one gun to allow optimum spot positioning for minimum over-all tracking error.

The separation of spots over the tracking area shall not exceed .15 inches.

5. Deflection per unit volt of one beam at any position of the beam within its useful scan when a balanced voltage of at least plus or minus 300 volts is applied to the 1D2 deflection electrodes of the other electron gun shall be not greater than the value specified herein.

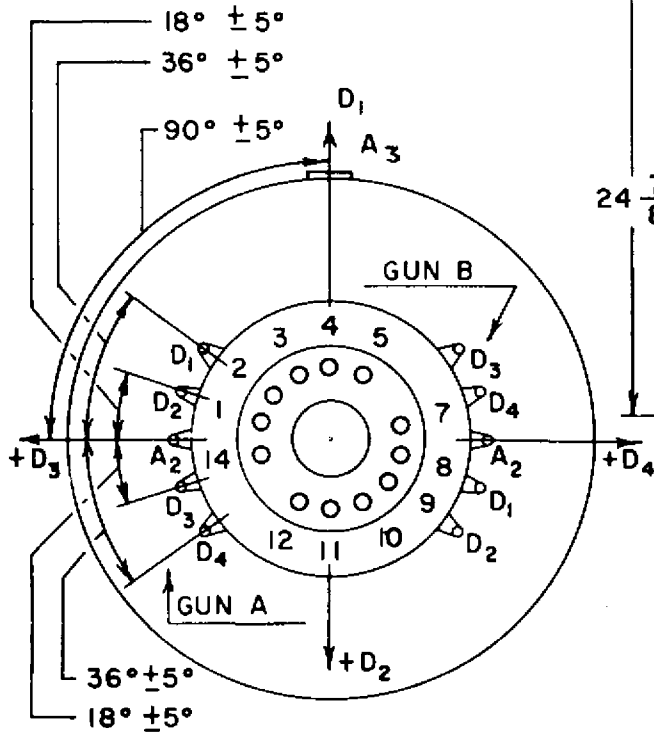
6. Defocusing of the spot resulting from all causes is a minimum within an area 10 inches in diameter. Specifically, the degradation in spot size anywhere within a circle 10 inches in diameter compared to the spot size of compromise focus will not exceed 1.5 to 1.
7. When the tube is operated at typical operating conditions, with E_{c1} adjusted to avoid damage to the screen, with each of the deflecting electrodes connected to the accelerator, and with the tube shielded against external influences, the spot will fall within a $5/8$ -inch radius circle, centered on the tube face.
8. It is recommended that the deflection electrode circuit resistances be approximately equal.

Electronic Components Division
Cathode Ray Tube Department
Electronics Park - Syracuse, New York

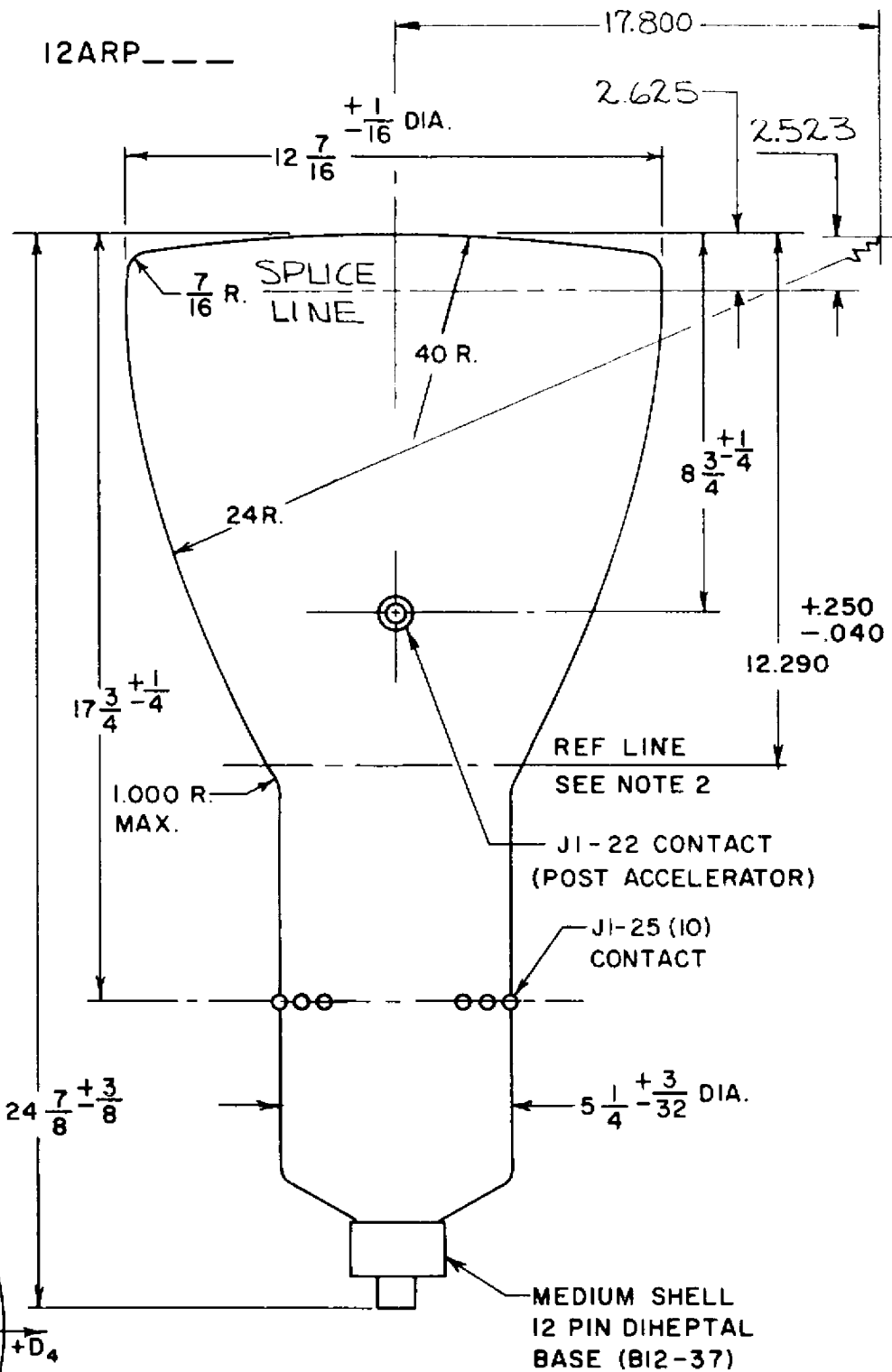


BASING DIAGRAM

- | GUN A | GUN B |
|-----------------------|------------------------|
| 1. HEATER | 7. HEATER |
| 2. CATHODE | 8. HEATER |
| 3. GRID NO. 1 | 9. CATHODE |
| 4. FOCUSING ELECTRODE | 10. GRID NO. 1 |
| 5. HEATER | 11. FOCUSING ELECTRODE |
| | 12. FOCUSING ELECTRODE |
| | 14. HEATER |



BOTTOM VIEW



NOTES : (1) BASE PIN #4 ALIGNS WITH JI-22 CONTACT

(2) REFERENCE LINE IS THAT POINT WHERE A 5.750 ± .003 INCH DIAMETER RING GAUGE WILL STOP