

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA

12AMP2

1 SECTION
CONSTRUCTION
CATHODERAY

Specialized - Cathode Ray electronic tube

Twelve-inch cathode-ray display tube with electrostatic focusing and electrostatic deflection. Its aluminized P2 screen produces yellow-green/green fluorescence with long persistence, supporting direct-view oscillographic and instrumentation displays requiring retained traces.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	6.3 V / 600 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Cathode Ray
No fixed ratings recorded.
Cathode-ray display/electron-gun section.

12AMP2 — Electrostatic Focus and Deflection Cathode-Ray Tube

Overview

The **12AMP2** is a 12 7/16-inch diameter, single-beam, fast writing rate cathode-ray tube designed specifically for high-speed radar displays. It features electrostatic focus and electrostatic deflection. The tube incorporates an advanced, low-drive electron gun design that permits the use of transistorized video circuitry alongside electrostatic deflection.

To achieve high deflection sensitivity while maintaining high overall accelerating voltages, the 12AMP2 utilizes post-acceleration. It also features a specialized deflection structure designed to minimize spot defocusing during deflection. The deflection plate connections are routed directly through the neck of the tube to facilitate high-frequency operation.

Optical and Screen Characteristics

The 12AMP2 is equipped with an aluminized screen, which provides enhanced light output and minimizes screen charging effects. The "2" suffix in the designation indicates the use of Phosphor Number 2 ([P2](#)), which exhibits the following characteristics:

- **Fluorescent Color:** Blue-Green
- **Phosphorescent Color:** Green
- **Persistence:** Long

To prevent severe and permanent damage to the aluminized screen under static operating conditions, the screen current must not be allowed to exceed 5 μ ADC.

Mechanical Specifications and Basing

The physical dimensions and structural alignment of the 12AMP2 are precisely defined to support accurate display calibration:

- **Overall Length:** $23 \frac{5}{16} \pm \frac{3}{16}$ inches
- **Greatest Diameter of Bulb:** $12 \frac{7}{16} \pm \frac{1}{16}$ inches
- **Minimum Useful Screen Diameter:** 11.0 inches
- **Bulb Contact:** J1-22 cap (used for the post-accelerator connection)
- **Neck Contacts:** Seven J1-25 caps
- **Base:** B6-63 6-pin Duodecal base
- **Basing Configuration:** 12BH

Pin and Neck Connections

The B6-63 base provides the following electrical connections:

- **Pin 1:** Heater
- **Pin 2:** Grid No. 1
- **Pin 10:** Modulation Adjustment Electrode
- **Pin 11:** Cathode
- **Pin 12:** Heater

The seven J1-25 neck caps provide direct connections to the internal deflection plates and focusing elements:

- **+[D1](#), +[D2](#), +D3, +D4:** Deflection Plates
- **Accelerator**

- **Astigmatism Electrode**
- **Focusing Electrode**

Alignment Tolerances

- **Trace Alignment:** The angle between the D3D4 and D1D2 traces is 90 ± 1 degrees.
- **Base Alignment:** The D1D2 trace aligns with Pin No. 1 and the tube axis within ± 10 degrees. A positive voltage applied to D1 deflects the electron beam approximately toward Base Pin No. 1, while a positive voltage on D3 deflects the beam approximately toward Base Pin No. 10.
- **Bulb Contact Alignment:** The J1-22 cap aligns with Pin Position No. 1 within ± 10 degrees and with the D1D2 trace within ± 10 degrees. The cap is positioned on the same side of the tube as Pin No. 1.

Electrical Ratings and Operating Conditions

The 12AMP2 is rated under the Design Maximum system. Operating parameters must be maintained within these limits to ensure reliable performance.

Design Maximum Ratings

- **Heater Voltage:** 6.3 V
- **Heater Current (at 6.3 V):** 0.6 A $\pm$ 10%
- **Post-Accelerator Voltage:** 15,000 Max. Volts DC
- **Accelerator Voltage:** 8,500 Max. Volts DC
- **Accelerator Input:** 6 Max. Watts
- **Astigmatism Electrode Voltage:** 8,500 Max. Volts DC
- **Focusing Electrode Voltage:** 3,000 Max. Volts DC
- **Modulation Adjustment Electrode Voltage:** 200 Max. Volts DC
- **Cathode to Grid No. 1 Voltage:**
 - *Positive Bias Value:* 100 Max. Volts DC
 - *Positive Peak Value:* 100 Max. Volts
 - *Negative Bias Value:* 0 Max. Volts DC
 - *Negative Peak Value:* 0 Max. Volts
- **Peak Heater-Cathode Voltage:**
 - *Heater negative with respect to cathode (during warm-up, $\leq$ 15 seconds):* 410 Max. Volts
 - *Heater negative with respect to cathode (after warm-up):* 180 Max. Volts
 - *Heater positive with respect to cathode:* 180 Max. Volts
- **Peak Voltage between Accelerator and any Deflection Electrode:** 1,500 Max. Volts

The tube is designed for optimum performance at a ratio of Post-Accelerator Voltage to Accelerator Voltage (Eb3/Eb2) of 1.7. Operating the tube at other ratios may result in pattern distortion and changes in deflection uniformity.

Typical Operating Conditions (Cathode Drive)

All typical operating voltage values are measured with respect to Grid No. 1:

- **Post-Accelerator Voltage:** 9,700 V DC
- **Accelerator Voltage:** 5,650 V DC
- **Astigmatism Electrode Voltage:** 5,650 V DC (adjusted for optimum spot shape)
- **Focusing Electrode Voltage:** 1,550 to 1,850 V DC (measured in accordance with MIL-E-1 specifications; dynamic defocusing may be applied to improve overall focus)
- **Modulation Adjustment Electrode Voltage:** 40 to 120 Max. V DC (adjusted for a cathode voltage of +11.5 V for visual extinction of the undeflected, focused spot)
- **Cathode Voltage:** 11.5 V DC
- **Focusing Electrode Current:** -5 to +5 μ A (for any operating condition)
- **Spot Position (Focused and Undeflected):** Falls within a 3/4-inch square centered on the tube face, with sides parallel to the deflection traces (measured with deflecting electrodes connected to the accelerator and the tube shielded against external influences).

Deflection and Modulation Performance

- **Deflection Factors:**
 - *D1D2*: 112 to 125 Volts DC/Inch
 - *D3D4*: 112 to 125 Volts DC/Inch
- **Modulation:** 11.5 Volts DC (Max.) for a post-accelerator current (I_{b3}) of 55 μ ADC.
- **Line Width "A":** 0.020 Max. Inch for a post-accelerator current (I_{b3}) of 5 μ ADC. The line width remains essentially constant over a wide range of current.

Interelectrode Capacitances and Circuit Limits

Direct Interelectrode Capacitances

The approximate direct interelectrode capacitances of the 12AMP2 are as follows:

- **Cathode to all other electrodes:** 3.7 pF
- **Grid No. 1 to all other electrodes:** 9.8 pF
- **Modulation Adjustment Electrode to all other electrodes:** 8.8 pF
- **D1 to D2:** 3.8 pF
- **D3 to D4:** 1.6 pF
- **D1 to all other electrodes:** 8.6 pF
- **D2 to all other electrodes:** 8.6 pF
- **D3 to all other electrodes:** 3.7 pF
- **D4 to all other electrodes:** 3.9 pF

Maximum Circuit Values

- **Grid No. 1 Circuit Resistance:** 1.5 Max. Megohms
- **Resistance in any Deflecting-Electrode Circuit:** 5.0 Max. Megohms

It is recommended that the circuit resistances for the deflecting electrodes be approximately equal to maintain balanced operation.

Technical Summary

The **12AMP2** is a specialized 12 7/16-inch electrostatic focus and deflection cathode-ray tube optimized for high-speed radar displays. By combining a low-drive electron gun with post-acceleration, it supports transistorized video drive circuitry while maintaining high deflection sensitivity and overall brightness. Its aluminized screen features a long-persistence P2 phosphor (blue-green fluorescence, green phosphorescence). Operating at a recommended Eb3/Eb2 voltage ratio of 1.7, the 12AMP2 provides precise trace alignment, minimal spot defocusing, and stable line-width performance across a wide range of operating currents.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1960 Du Mont

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1960 DU MONT

Section 1 · Cathode Ray

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	—
Heater Current	600 mA	—
Focusing Method	Electrostatic text	—
Deflection Method	Electrostatic text	—
Phosphor	P2 text	—
Fluorescence	Yellow-green/green text	—
Persistence	Long text	—
Screen Construction	Aluminized/metal-backed text	—

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