

ELECTRONIC TUBE REFERENCE

16AGP7

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Sixteen-inch cathode-ray display tube with electrostatic focusing, magnetic deflection, and a P7 screen. Blue-white fluorescence and long persistence provide a lingering trace useful for specialized monitoring or information-display applications.

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.

16AGP7 — Electrostatic Focus Magnetic Deflection Cathode-Ray Tube

The **16AGP7** is a 16-inch diameter, metal-envelope cathode-ray tube designed primarily for radar indicator applications. It features a curved face, a single electron beam, low-voltage electrostatic focusing, and magnetic deflection. The electrostatic focus lens is designed to operate at or near cathode potential, which provides substantially automatic focusing that remains independent of variations in the accelerator voltage.

The 16AGP7 variant utilizes **Phosphor No. 7**, which provides a white fluorescence, a yellow-green phosphorescence, and long persistence. This combination is highly suited for radar applications where a persistent image is required to retain sweep information between scans.

Mechanical Construction and Physical Dimensions

The 16AGP7 is constructed with a metal envelope, utilizing a metal cone that serves as the electrical connection for the accelerator.

The physical dimensions and mechanical characteristics of the tube include:

- **Overall Length:** 21 1/2 ± 3/8 inches
- **Greatest Diameter of Bulb:** 15 7/8 ± 1/8 inches
- **Minimum Useful Screen Diameter:** 14 3/8 inches (or 13 5/8 inches for metallized versions)
- **Bulb Contact:** Metal Cone Lip
- **Deflection Angle (Approximate):** 53 degrees

The tube is designed to be used with a small shell duodecal 7-pin base (JEDEC designation B7-51) and follows the **12M** basing configuration.

Pinout and Base Connections

The 12M basing arrangement provides the following pin connections, viewed from the bottom of the base:

Pin Number	Element
1	Heater
2	Grid No. 1 (Control Grid)
6	Focusing Electrode
7	No Connection
10	Grid No. 2 (Screen Grid)
11	Cathode
12	Heater
Metal Cone	Accelerator

The metal cone lip serves as the high-voltage contact for the accelerator electrode.

Electrical and Interelectrode Characteristics

The 16AGP7 operates with a standard heater supply and exhibits low direct interelectrode capacitances, which helps maintain signal integrity in the drive circuitry.

Heater Ratings

- **Heater Voltage:** 6.3 V
- **Heater Current (at 6.3 V):** 0.6 A ± 10%

- **Heater Power Calculation:** The nominal heater power is calculated as 6.3 V multiplied by 0.6 A, which equals 3.78 W.

Direct Interelectrode Capacitances

- **Cathode to all other electrodes:** 3 pF (minimum) to 6 pF (maximum)
- **Grid No. 1 to all other electrodes:** 5.5 pF (minimum) to 9.5 pF (maximum)

Absolute Maximum Ratings

The absolute maximum ratings represent the limiting values of operating and environmental conditions beyond which the serviceability or life of the tube may be impaired.

Parameter	Absolute Maximum Value
Accelerator Voltage	16,500 V DC
Focusing Electrode Voltage	-550 to +1100 V DC
Grid No. 2 Voltage	770 V DC
Grid No. 1 Negative Bias Value	180 V DC
Grid No. 1 Positive Bias Value	0 V DC
Grid No. 1 Positive Peak Value	0 V
Peak Heater-Cathode Voltage (Heater negative with respect to cathode)	180 V
Peak Heater-Cathode Voltage (Heater positive with respect to cathode)	180 V
Average Accelerator Power Input	6 W

To prevent permanent damage or burning of the phosphor screen, the average accelerator power input must be limited to 6 watts. Minimum beam current densities should be employed to protect the screen from degradation.

Typical Operating Conditions

Under typical operating conditions, the 16AGP7 is configured to balance image brightness, focus quality, and spot size. The nominal operating parameters are as follows:

- **Accelerator Voltage:** 12,000 V DC
- **Focusing Electrode Voltage:** -135 to +400 V DC
- **Focusing Electrode Current:** -15 to +15 μ A DC
- **Grid No. 2 Voltage:** 300 V DC
- **Grid No. 1 Voltage (for visual extinction of focused, undeflected spot):** -35 to -75 V DC

- **Line Width "A":** 0.018 inch maximum
- **Spot Position:** Within a 5/8-inch radius circle concentric with the center of the tube face (when the tube is properly shielded).

Operating Notes and Performance Considerations

1. **Accelerator Voltage Limits:** While the typical accelerator voltage is 12,000 V DC, the brilliance and definition of the display decrease as this voltage is reduced. In general, the accelerator voltage should not be operated below 9,000 V DC.
2. **Focusing Electrode Voltage Adjustment:** The focusing electrode voltage range of -135 to +400 V DC is specified with the Grid No. 1 voltage adjusted to produce an accelerator current of 20 μ A, and the pattern adjusted for the best overall focus. This is typically measured using a 525-line, 9 x 9-inch pattern.
3. **Line Width Measurement:** The maximum line width of 0.018 inch is measured using a 525-line pattern adjusted to 90% of the minimum useful screen diameter at a beam current of 100 μ A. The line width is calculated as the merged raster height divided by the number of lines (525), measured at the center of the tube face. When measuring line width, screen current should be carefully managed to prevent damage; limiting the screen current to 50 μ A during measurement results in a maximum line width of 0.017 inch.
4. **Spot Position and Shielding:** The undeflected, focused spot center is guaranteed to fall within a 5/8-inch radius circle concentric with the center of the tube face, provided that the tube is adequately shielded from external magnetic fields.

Technical Summary

The **16AGP7** is a specialized 16-inch metal-envelope cathode-ray tube designed for radar indicator service. It combines low-voltage electrostatic focusing with a 53-degree magnetic deflection system. Operating typically at an accelerator voltage of 12,000 V DC and a Grid No. 2 voltage of 300 V DC, it provides a highly focused beam with a maximum line width of 0.018 inch. The electrostatic focus lens is designed to operate near cathode potential, ensuring stable focus performance despite variations in the accelerator supply. Utilizing Phosphor No. 7, the tube delivers a long-persistence yellow-green phosphorescent image, making it an essential component for displaying persistent radar sweep information.



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	Magnetic text	—
Phosphor	P7 text	—
Fluorescence	Blue/white text	—
Persistence	Long text	—
Deflection Angle	53 deg	Approximate

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