

ELECTRONIC TUBE REFERENCE

12ABP7A

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Twelve-inch cathode-ray display tube with electrostatic focusing and magnetic deflection. It uses an aluminized P7 screen producing blue-white, long-persistence fluorescence, supporting high-voltage direct-view radar and 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	
MAXIMUM PLATE VOLTAGE	13200 V
Cathode-ray display/electron-gun section.	

12ABP7A — Electrostatic-Focus Magnetic-Deflection Cathode Ray Tube

The **12ABP7A** is a 12-inch, direct-viewed, round glass cathode ray tube (CRT) designed for special-purpose applications. It features a spherical faceplate, electrostatic focusing, and magnetic deflection with a nominal deflection angle of approximately 55 degrees. The tube is equipped with a gray filter glass faceplate to improve contrast and utilizes a high-efficiency aluminized screen with a long-persistence P7 phosphor.

Mechanical and Physical Construction

The 12ABP7A is constructed with a round glass envelope and a spherical faceplate made of gray filter glass, which provides a light transmittance of 74 percent. The mechanical dimensions and features of the tube include:

- **Overall Length:** 18 $\pm$ 3/8 inches
- **Nominal Bulb Diameter:** 12 $\pm$ 1/8 inches
- **Minimum Useful Screen Diameter:** 11 inches
- **Neck Diameter:** 1-7/16 $\pm$ 1/16 inches
- **Bulb Contact:** Recessed small cavity cap (J1-21)
- **Base:** Small shell duodecal 6-pin base (B6-63)
- **Basing Configuration:** 12M

The bulb contact (anode terminal) is aligned with the vacant pin position No. 3 within an angular tolerance of $\pm$ 10 degrees. The anode contact is located 10 $\pm$ 3/16 inches from the face of the tube, and 3 $\pm$ 1/8 inches from the reference line.

Reference Line and Handling Precautions

The reference line of the tube is defined as the point where a ring gauge with an internal diameter of 1.500 (+0.003, -0.000) inches and a length of 2 inches will stop.

An anti-corona coating is applied to the bulb, extending to a minimum radius of 1-1/2 inches concentric with the anode contact. To prevent damage or degradation of this protective layer, the tube must not be handled by the portion of the bulb carrying the anti-corona coating.

Electrical Characteristics and Ratings

The electrical system of the 12ABP7A consists of an indirectly heated cathode and electrostatic focusing and control electrodes.

Heater and Capacitances

The heater is designed for AC or DC operation with the following nominal characteristics:

- **Heater Voltage:** 6.3 Volts
- **Heater Current:** 0.6 $\pm$ 10% Ampere

The direct interelectrode capacitances of the tube are approximately:

- **Cathode to All Other Electrodes:** 5 $\pm$ 1 pF
- **Grid No. 1 to All Other Electrodes:** 6 $\pm$ 1 pF

Absolute Maximum Ratings

The following absolute maximum values must not be exceeded under any operating conditions:

Parameter	Absolute Maximum Value
Anode Voltage	13,200 Volts DC
Grid No. 4 Voltage (Focusing Electrode)	-550 to +1100 Volts DC
Grid No. 2 Voltage	770 Volts DC
Grid No. 1 Voltage (Negative Bias Value)	200 Volts DC
Grid No. 1 Voltage (Positive Bias Value)	0 Volts DC
Grid No. 1 Voltage (Positive Peak Value)	0 Volts
Peak Heater-Cathode Voltage (Heater Negative with respect to Cathode)	200 Volts DC
Peak Heater-Cathode Voltage (Heater Positive with respect to Cathode)	200 Volts DC

Maximum Circuit Values

- **Grid No. 1 Circuit Resistance:** 1.5 Megohms maximum

Typical Operating Conditions

Under typical operating conditions, the 12ABP7A is operated with an anode potential of 10,000 Volts DC. The typical operating parameters are outlined below:

- **Anode Voltage:** 10,000 Volts DC
- **Grid No. 4 Voltage for Focus:** 0 to 300 Volts DC
- **Grid No. 2 Voltage:** 300 Volts DC
- **Grid No. 1 Voltage for Cutoff:** -28 to -72 Volts DC
- **Alignment Magnet Field Strength:** 0 to 4 Gauss

Focus and Cutoff Adjustments

The focusing electrode (Grid No. 4) voltage is adjusted to achieve the best overall focus of a 7-1/2" x 10" raster pattern when Grid No. 1 is adjusted for a beam current of 100 microamperes.

The Grid No. 1 voltage required for visual extinction of a focused raster ranges from -28 to -72 Volts DC. If a stationary focused spot is used instead of a raster, visual extinction of the spot will require the Grid No. 1 bias to be approximately 5 Volts more negative than the raster cutoff value.

Screen and Phosphor Characteristics

The "A" suffix in the **12ABP7A** designation signifies the use of an **aluminized screen**, which distinguishes it from the standard **12ABP7** (which uses a non-aluminized screen). The aluminized screen

enhances light output and prevents ion burn.

The tube utilizes the **P7** phosphor, which is characterized by:

- **Fluorescence:** Blue
- **Phosphorescence:** Yellow
- **Persistence:** Long

Related Tube Designations

The 12ABP7A belongs to a family of magnetically deflected, electrostatically focused 12-inch CRTs. Other members of this family differ primarily in their phosphor type and screen construction:

- **12ABP7**: Identical to the 12ABP7A, but employs a non-aluminized P7 screen.
- **12ABP14 / 12ABP14A**: Employs a P14 phosphor (purple fluorescence, yellow phosphorescence, medium-long persistence). The "A" version features an aluminized screen.
- **12ABP19 / 12ABP19A**: Employs a P19 phosphor (orange fluorescence, orange phosphorescence, long persistence). The "A" version features an aluminized screen.

Operational and Safety Guidelines

Anode Supply and Screen Protection

At or near the maximum ratings, the effective resistance of the anode supply should be adequate to limit the anode input power to a maximum of 6 Watts. For long-persistence phosphors, particularly the P19 variant (and to a lesser extent P7 and P14), the screen can be permanently damaged if the electron beam current density is allowed to rise too high. To prevent screen burning, minimum beam current densities should always be maintained.

Additionally, the brilliance and definition of the displayed image decrease as the anode voltage is reduced. To maintain acceptable performance, the anode voltage should generally not be operated below 8,000 Volts.

Beam Alignment

For optimum quality of the focused spot, the use of an adjustable beam alignment magnet is recommended. This magnet should have a field strength of 0 to 4 Gauss and should be positioned approximately 5-5/16 inches from the reference line.

X-Ray Radiation Warning

When operating the 12ABP7A, precautions must be taken against X-ray radiation. Shielding may be necessary to protect personnel from prolonged exposure at close range if the tube is operated at voltages higher than the manufacturer's maximum rated anode voltage (13,200 Volts DC) or 16,000 Volts, whichever is less.



SOURCE OPERATING CONDITIONS

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	55 deg	Approximate
Screen Construction	Aluminized/metal-backed text	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1965 Sylvania Electronic Tubes Vol3

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

1965 SYLVANIA ELECTRONIC TUBES VOL3

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	—
Heater current	600 mA	—
Anode voltage maximum	13200 V	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid No. 2 voltage maximum	770 V	—
Grid No. 1 negative bias maximum	200 V	—
Heater-cathode peak voltage	200 V	—

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