

ELECTRONIC TUBE REFERENCE

16BYP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Sixteen-inch P4 direct-view picture tube with approximately 10-16 kV allowable anode voltage and typical operation near 13 kV. Its adjustable focusing electrode supports conventional monochrome television picture presentation.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	6.3 V / 450 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Cathode Ray	
MAXIMUM PLATE VOLTAGE	16000 V
CRT anode/ultor voltage is represented in MaxPlateVoltage; additional electrode, drive, optical, and capacitance data retained as parameters.	

16BYP4 — 16-Inch Rectangular Cathode Ray Tube

The **16BYP4** is a 16-inch rectangular glass picture tube designed for television display applications. It features electrostatic focusing, magnetic deflection, and a spherical gray faceplate. The tube is characterized by its wide-angle deflection capabilities, a non-ion-trap electron gun, an aluminized screen, and a compact neck design.

Design and Construction

The 16BYP4 is constructed with a rectangular glass envelope (bulb designation J125-B1) and incorporates a banded-type implosion protection system. The fluorescent screen uses a P4 aluminized phosphor, which is designed to enhance light output and minimize undesirable screen charging. The faceplate is made of spherical gray glass with a light transmittance of approximately 54 percent at the center.

To reduce sweep-induced radiation and provide filtering, the tube is equipped with an external conductive coating. When grounded, this coating acts as a filter capacitor in conjunction with the anode. The electron gun is a non-ion-trap design, and the tube features a small neck diameter to facilitate compact deflection yoke designs.

Mechanical Specifications

The physical dimensions and mounting requirements of the 16BYP4 are highly specified to ensure proper alignment and safety:

- **Overall Length:** $10 \frac{7}{16} \pm \frac{1}{4}$ inches
- **Neck Length:** $4 \frac{1}{4} \pm \frac{1}{8}$ inches
- **Greatest Dimensions:**
 - **Diagonal:** 15.688 ± 0.100 inches
 - **Width:** 13.780 ± 0.100 inches
 - **Height:** 11.187 ± 0.100 inches
- **Minimum Useful Screen Dimensions (Projected):**
 - **Diagonal:** $14 \frac{7}{8}$ inches
 - **Horizontal Axis:** $12 \frac{15}{16}$ inches
 - **Vertical Axis:** $10 \frac{1}{4}$ inches
 - **Total Area:** 125 square inches

The tube utilizes a JEDEC No. B7-208 base and an 8 HR basing configuration. The anode terminal is a JEDEC No. J1-21 bulb contact, which aligns with Pin No. 4 of the base within a tolerance of ± 30 degrees. The reference line of the tube is established by the intersection of the plane C-C of an EIA No. 126 gage with the glass funnel. For installation, a non-rigidly mounted socket with flexible leads must be used, and the bottom circumference of the base wafer must fall within a $1\frac{3}{4}$ inch diameter circle concentric with the bulb axis.

Electrical and Deflection Characteristics

The 16BYP4 operates with a combination of electrostatic focusing and magnetic deflection. The deflection angles are:

- **Diagonal (Approximate):** 114 degrees
- **Horizontal (Approximate):** 102 degrees
- **Vertical (Approximate):** 84 degrees

Heater Ratings

The heater is designed for a nominal operating voltage of 6.3 volts and draws a current of 450 ± 23 mA. The heater warm-up time is approximately 11 seconds.

Interelectrode Capacitances

- **Cathode to all other electrodes:** 0.5 μ F (approximate)
- **Grid No. 1 to all other electrodes:** 0.6 μ F (approximate)
- **External conductive coating to anode:** 1000 μ F minimum / 1500 μ F maximum

Basing Diagram and Pin Connections

The 16BYP4 uses the **8 HR** basing arrangement. The pin connections, viewed from the bottom of the base, are as follows:

- **Pin 1:** Heater
- **Pin 2:** Grid No. 1
- **Pin 3:** Grid No. 2
- **Pin 4:** Focusing Electrode (Grid No. 4)
- **Pin 6:** Grid No. 1
- **Pin 7:** Cathode
- **Pin 8:** Heater
- **Bulb Contact:** Anode (JEDEC No. J1-21)

Design Maximum Ratings

The following ratings are established under the Design Maximum System. All voltage values are positive and measured with respect to the cathode unless otherwise specified:

- **Anode Voltage:** 10,000 V minimum to 16,000 V maximum
- **Grid No. 4 (Focusing Electrode) Voltage:** -500 V to +1000 V
- **Grid No. 2 Voltage:** 75 V minimum to 200 V maximum
- **Grid No. 1 Voltage:**
 - **Maximum Negative DC Value:** 140 V
 - **Maximum Negative Peak Value:** 200 V
 - **Maximum Positive DC Value:** 0 V
 - **Maximum Positive Peak Value:** 2 V
- **Heater Voltage:** 5.7 V minimum to 6.9 V maximum
- **Maximum Heater-Cathode Voltage:**
 - **Heater negative with respect to cathode:**
 - During warm-up period (not to exceed 15 seconds): 410 V
 - After equipment warm-up period: 180 V
 - **Heater positive with respect to cathode:** 180 V

Typical Operating Conditions

For typical cathode drive service, the operating parameters are defined as follows:

- **Anode Voltage:** 13,000 V DC
- **Grid No. 4 (Focusing Electrode) Voltage:** 0 V DC
- **Grid No. 2 Voltage:** 100 V DC
- **Cathode-to-Grid No. 1 Voltage:** 31 V to 49 V DC (for visual extinction of a focused raster)

The 0-volt focus condition is specified with the combined Grid No. 1 bias voltage and video-signal voltage adjusted to produce an anode current of 150 microamperes on a 12 15/16 x 10 1/4 inch pattern (such as that from an RCA [2F21](#) monoscope or equivalent).

Maximum Circuit Values and Protection

To prevent damage to the tube's electrodes, the following circuit resistance limits must be maintained:

- **Maximum Grid No. 1 Circuit Resistance:** 1.5 megohms
- **Minimum Grid No. 2 Circuit Resistance:** 0.1 megohm
- **Minimum Focusing Electrode Circuit Resistance:** 0.1 megohm

The installation of protective resistance in the Grid No. 2 and focusing electrical circuits is highly advisable to prevent damage to the tube. If applicable, a single resistor common to both circuits may be utilized.

Technical Summary

The **16BYP4** is a specialized 16-inch rectangular glass cathode ray tube designed for television display systems. It combines a wide 114-degree diagonal magnetic deflection angle with electrostatic focusing, allowing for a compact overall length of 10 7/16 inches. Its design features a P4 aluminized screen, a spherical gray faceplate with 54% light transmittance, and a 450 mA heater with an 11-second warm-up time. Operating under the Design Maximum System, it supports anode voltages up to 16,000 V and utilizes an 8 HR basing configuration. Proper circuit design requires adhering to specified minimum and maximum resistance values on Grid No. 2 and the focusing electrode to ensure long-term reliability.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1964 RMA EIA

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

1964 RMA EIA

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Minimum anode voltage	10000 V	—
Maximum anode voltage	16000 V	—
Minimum anode voltage	10000 V	—
Typical anode voltage	13000 V	—
Maximum grid No. 2 voltage	200 V	—
Minimum grid No. 2 voltage	15 V	—
Typical grid No. 2 voltage	100 V	—
Maximum heater voltage	6.9 V	—
Minimum heater voltage	2.7 V	—
Grid No. 4 focusing voltage range	500–1000 V	—

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater warm-up time	11 s	—

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid No. 1 to other electrodes capacitance	6 pF	—
Cathode to other electrodes capacitance	5 pF	—