

ELECTRONIC TUBE REFERENCE

16BXP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Sixteen-inch P4 direct-view picture tube rated for approximately 12–17.6 kV anode operation, with about 15 kV typical. RMA/EIA documentation supports its use as a high-voltage monochrome television display.

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	17600 V
CRT anode/ultor voltage is represented in MaxPlateVoltage; additional electrode, drive, optical, and capacitance data retained as parameters.	

16BXP4 — Rectangular Cathode-Ray Tube

The **16BXP4** is a 16-inch direct-view rectangular glass-envelope cathode-ray tube (CRT) designed for television receiver applications. It features a wide 114-degree magnetic deflection angle, electrostatic focusing, and a specialized cathode-drive design. The tube incorporates a P4 aluminized phosphor screen, a gray filter glass faceplate, and a filled rim implosion protection system with integrated mounting holes. It is designed to operate with a low Grid No. 2 voltage of 35 V and does not require an ion trap.

Mechanical Design and Physical Dimensions

The 16BXP4 is constructed with a rectangular glass envelope (bulb designation J125B1A) and a protective metal rim that provides implosion protection and mounting holes. The physical dimensions of the tube are

highly compact, featuring a short neck length of $4 \frac{3}{8} \pm \frac{1}{8}$ inches and an overall length of $10 \frac{9}{16} \pm \frac{1}{4}$ inches.

The greatest dimensions of the tube, including the metal rim, are:

- **Diagonal:** $17 \frac{1}{2} \pm \frac{3}{32}$ inches
- **Width:** $14 \frac{3}{8} \pm \frac{1}{16}$ inches
- **Height:** $11 \frac{3}{4} \pm \frac{1}{16}$ inches

The minimum useful screen dimensions (projected) are:

- **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 has an approximate weight of 9 pounds 14 ounces. It uses a J1-21 high-voltage bulb contact for the anode connection, which is aligned with pin position No. 7 within a tolerance of ± 30 degrees. The base is a B6-214 type, utilizing the 7FA basing configuration.

Heater and Electrical Characteristics

The 16BXP4 is equipped with an indirectly heated cathode. The heater is designed to operate at a nominal voltage of 6.3 V with a current draw of $450 \text{ mA} \pm 5\%$. The heater has a controlled warm-up time of 11 seconds.

Heater Power Calculation

Using the nominal heater voltage (6.3 V) and the nominal heater current (0.45 A), the calculated heater power consumption is:

$$6.3 \text{ V} * 0.45 \text{ A} = 2.835 \text{ W}$$

Direct Interelectrode Capacitances

- **Cathode to all other electrodes:** approximately 5 pF
- **Grid No. 1 to all other electrodes:** approximately 6 pF
- **External conductive coating to anode (including implosion protection hardware):** 1,400 pF maximum, 900 pF minimum

Deflection and Focusing

- **Deflection Method:** Magnetic
- **Deflection Angles (approximate):**
 - Horizontal: 103 degrees
 - Vertical: 87 degrees
 - Diagonal: 114 degrees

- **Focusing Method:** Electrostatic (Grid No. 4)

Basing and Terminal Connections

The 16BXP4 uses the **7FA** basing arrangement. The pin connections, viewed from the bottom of the base, are as follows:

Pin	Connection
1	Heater
2	Cathode
3	No Connection
4	Heater
5	Grid No. 1
6	Grid No. 4 (Focusing Electrode)
7	Grid No. 2
Recessed Contact	Anode (J1-21 bulb contact)

The reference line of the tube is determined by Plane C-C' of J.E.D.E.C. using Reference Line Gauge No. 126.

Ratings and Operating Conditions

The ratings of the 16BXP4 are defined under the **Design Maximum System**. Unless otherwise specified, all voltage values are positive and measured with respect to Grid No. 1.

Design Maximum Ratings

- **Maximum Anode Voltage:** 17,600 Volts
- **Minimum Anode Voltage:** 12,000 Volts
- **Grid No. 4 (Focusing Electrode) Voltage:** -500 to +1100 Volts
- **Maximum Grid No. 2 Voltage:** 60 Volts
- **Minimum Grid No. 2 Voltage:** 25 Volts
- **Cathode Voltage:** 100 Volts
- **Maximum Heater Voltage:** 7 Volts
- **Minimum Heater Voltage:** 5.8 Volts
- **Maximum Heater-Cathode Voltage:**
 - *Heater negative with respect to cathode:*
 - During warm-up time (not to exceed 15 seconds): 410 Volts
 - After equipment warm-up period: 180 Volts

- *Heater positive with respect to cathode:* 180 Volts

Typical Operating Conditions (Cathode Drive Service)

In typical cathode drive service, all voltages are positive with respect to Grid No. 1:

- **Anode Voltage:** 15,000 Volts DC
- **Grid No. 4 (Focusing Electrode) Voltage:** 250 Volts DC (individual tubes will achieve satisfactory focus at some value between 0 and 500 Volts)
- **Grid No. 2 Voltage:** 35 Volts DC
- **Cathode Voltage (for visual extinction of focused raster):** 25 to 50 Volts DC

Maximum Circuit Values

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

Special Characteristics and Optical Properties

The 16BXP4 features a **P4 aluminized** phosphor screen, which provides a white display suitable for television applications. The faceplate is made of gray filter glass with an approximate light transmittance of 55% at the center, enhancing contrast under ambient light conditions.

A key performance parameter is the **Anode Penetration Current** (or maximum beam current), which is rated at a maximum of 150 μ A. This limit is defined under specific test conditions: 17,600 Volts (design maximum) applied to the anode, zero voltage applied to the cathode, Grid No. 1, and Grid No. 2, with all other elements operating at their nominal voltages.

During typical operation, focusing is evaluated with the combined Grid No. 1 bias voltage and video-signal voltage adjusted to produce an anode current of 125 microamperes on a 12 15/16 by 10 1/4 inches pattern (using an RCA [2F21](#) Monoscope or equivalent).

Technical Summary

The **16BXP4** is a 16-inch rectangular glass-envelope cathode-ray tube featuring a 114-degree magnetic deflection angle, electrostatic focusing, and a low Grid No. 2 operating voltage of 35 V. It is designed for cathode-drive television receiver applications, utilizing a P4 aluminized screen and gray filter glass with 55% light transmittance. The tube incorporates a filled rim implosion protection system with integrated mounting holes, reducing the overall depth of the receiver cabinet with its short 10 9/16-inch length. Operating under the Design Maximum System, it supports anode voltages up to 17,600 V and utilizes a standard 7FA basing configuration with a 6.3 V, 450 mA heater.

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	12000 V	—
Maximum anode voltage	17600 V	—
Minimum anode voltage	12000 V	—
Typical anode voltage	15000 V	—
Maximum grid No. 2 voltage	60 V	—
Minimum grid No. 2 voltage	25 V	—
Typical grid No. 2 voltage	35 V	—
Maximum heater voltage	7 V	—
Minimum heater voltage	5.8 V	—

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid No. 1 to other electrodes capacitance	6 pF	—
External conductive coating capacitance	1400 pF	—

TUBE TINKER

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