



ELECTRONIC TUBE REFERENCE

16BVP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Sixteen-inch P4 cathode-ray picture tube documented by RMA/EIA for direct-view high-voltage display. Typical anode operation is about 15 kV, characteristic of monochrome television picture-tube service.

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

SECTION 1 Cathode Ray

No fixed ratings recorded.

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

16BVP4 — 114-Degree Television Picture Tube

The **16BVP4** is a 16-inch, 114-degree direct-view rectangular cathode ray tube (CRT) designed for television receiver applications. Developed by Philco Corporation (Lansdale Division), this tube features a space-saving short neck design, electrostatic focusing, and magnetic deflection. It incorporates an aluminized screen with a P4 phosphor, a non-ion-trap electron gun designed for high-resolution picture reproduction, and integrated banded implosion protection.

Mechanical Design and Physical Dimensions

The 16BVP4 is constructed with a rectangular glass bulb (designation **J125B1**) and utilizes a banded implosion protection system (tension band). The physical dimensions of the tube are highly compact,

particularly in its overall length, to facilitate shallow cabinet designs:

- **Overall Length:** 10.413 +0.242 / -0.180 inches
- **Neck Length:** 4.219 ± 0.0625 inches
- **Greatest Bulb Dimensions:**
 - Diagonal: 15.841 inches
 - Width: 13.960 inches
 - Height: 11.312 inches
- **Minimum Useful Screen Dimensions (Projected):**
 - Diagonal: 14.875 inches
 - Horizontal Axis: 12.938 inches
 - Vertical Axis: 10.250 inches
 - Total Useful Area: 125 square inches

The tube features a high-voltage bulb contact (anode button, designation **J1-21**) that aligns with Pin 4 within a tolerance of ±30 degrees. The area surrounding this button is covered with an insulating coating to prevent high-voltage arcing. The base of the tube is a short-neck type with a **B7-208** designation, utilizing straight-through leads oriented by an indexing lug.

To prevent mechanical stress on the tube, the socket must not be rigidly mounted. It should have flexible leads and be allowed to move freely so that the circuit wiring does not impress lateral strains on the base pins. The bottom circumference of the base wafer falls within a 1 3/4-inch diameter circle concentric with the bulb axis. The reference line of the tube is determined using a JEDEC #126 reference line gauge.

Heater and Electrical Characteristics

The 16BVP4 utilizes a unipotential, indirectly heated cathode. The heater is designed for series or parallel operation with the following specifications:

- **Heater Voltage:** 6.3 V (nominal)
- **Heater Current:** 450 ± 5% mA
- **Heater Warm-up Time:** 11 seconds

The heater warm-up time is defined under specific test conditions: the time required for the voltage across the heater to reach 80% of its rated value after applying 4 times the rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to 3 times the rated heater voltage divided by the rated heater current.

Direct Interelectrode Capacitances

- **Cathode to All other electrodes (approximate):** 4 pF
- **Grid No. 1 to All other electrodes (approximate):** 5 pF
- **External Coating Capacitance:** 1050 pF minimum, 1450 pF maximum (measured with the implosion protection hardware connected to the external coating).
- **Resistance between external conductive coating and implosion protection hardware:** 50 Megohms minimum.

Base Connections and Pinout (8HR Basing)

The 16BVP4 uses the **8HR** basing configuration. The pin connections, viewed from the bottom of the base, are as follows:

Pin Number	Connection
Pin 1	Heater
Pin 2	Grid No. 1
Pin 3	Grid No. 2
Pin 4	Grid No. 4 (Focusing Electrode)
Pin 6	Grid No. 1
Pin 7	Cathode
Pin 8	Heater
Recessed Button	Anode (Grid No. 3, Grid No. 5, and Anode)

Note that Grid No. 1 is connected to both Pin 2 and Pin 6. Pin 5 is omitted from the base.

Electro-Optical Characteristics

The tube features an aluminized screen utilizing **P4** phosphor, which provides a white display suitable for monochrome television.

- **Light Transmission at Center:** Approximately 54%
- **Antireflection Treatment:** None
- **Deflection Angles (Approximate):**
 - Diagonal: 114 degrees
 - Horizontal: 102 degrees
 - Vertical: 85 degrees
- **Focusing Method:** Electrostatic (utilizing a unipotential focus lens)
- **Deflection Method:** Magnetic
- **Ion Trap:** None (incorporates a non-ion-trap gun)

The electron gun is designed to produce an exceptionally small spot size, ensuring sharp picture resolution across the screen.

Maximum Ratings (Design Maximum System)

All voltage values are positive and measured with respect to the cathode unless otherwise specified.

- **Anode Voltage:** 20,000 Max. Volts DC, 11,000 Min. Volts DC

- **Grid No. 4 (Focusing Electrode) Voltage:**
 - Positive Value: 1100 Max. Volts DC
 - Negative Value: 550 Min. Volts DC
- **Grid No. 2 Voltage:** 550 Max. Volts DC, 250 Min. Volts DC
- **Grid No. 1 Voltage:**
 - Maximum Negative Value: 154 Max. Volts DC
 - Maximum Negative Peak Value: 220 Max. Volts
 - Maximum Positive Value: 0 Max. Volts DC
 - Maximum Positive Peak Value: 2 Max. Volts
- **Heater Voltage:** 6.9 Max. Volts, 5.7 Min. Volts
- **Maximum Heater-Cathode Voltage:**
 - **Heater Negative with Respect to Cathode:**
 - During warm-up period (not to exceed 15 seconds): 450 Max. Volts
 - After equipment warm-up period: 300 Max. Volts
 - **Heater Positive with Respect to Cathode:** 300 Max. Volts

Operating Conditions and Service Modes

The 16BVP4 can be operated in either Grid Drive Service or Cathode Drive Service. Under typical operating conditions, the anode voltage is set to 15,000 Volts DC, and Grid No. 2 is operated at 300 Volts DC.

Grid Drive Service

In Grid Drive Service, all voltage values are positive and measured with respect to the cathode:

- **Anode Voltage:** 15,000 Volts DC
- **Grid No. 4 (Focusing Electrode) Voltage:** 0 Volts DC (satisfactory focus is obtained on individual tubes at some value between -200 and +200 Volts DC)
- **Grid No. 2 Voltage:** 300 Volts DC
- **Grid No. 1 Voltage (for visual extinction of the focused raster):** -43 to -70 Volts DC (for cutoff of an undeflected focus spot, the absolute value of the bias between cathode and grid increases by approximately 5 Volts)
- **Grid No. 1 Circuit Resistance:** 1.5 Max. Megohms

Cathode Drive Service

In Cathode Drive Service, all voltage values are positive and measured with respect to Grid No. 1:

- **Anode Voltage:** 15,000 Volts DC
- **Grid No. 4 (Focusing Electrode) Voltage:** 0 Volts DC (satisfactory focus is obtained on individual tubes at some value between -200 and +200 Volts DC)
- **Grid No. 2 Voltage:** 300 Volts DC

- **Cathode Voltage (for visual extinction of the focused raster):** +38 to +59 Volts DC (for cutoff of an undeflected focus spot, the absolute value of the bias between cathode and grid increases by approximately 5 Volts)
- **Grid No. 1 Circuit Resistance:** 1.5 Max. Megohms

The focus voltage of 0 Volts is specified under test conditions where the combined Grid No. 1 bias voltage and video-signal voltage are adjusted to give an anode current of 200 microamperes on a 10" by 12" pattern from an RCA [2F21](#) monoscope or equivalent.

Safety and X-Ray Warning

When operating the 16BVP4, appropriate safety precautions must be observed. If the tube is operated at anode voltages higher than 16,000 Volts, X-ray radiation shielding may be necessary to protect against the danger of personal injury from prolonged exposure at close range.



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
Typical anode voltage	15000 V	—
Typical grid No. 2 voltage	300 V	—

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater warm-up time	2 s	—

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