



ELECTRONIC TUBE REFERENCE

10BP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

P4 cathode-ray picture tube documented with a 6.3 V, 0.6 A heater; the available manufacturer material identifies the type but provides little additional functional detail.

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

SECTION 1 Cathode Ray*No fixed ratings recorded.*

10BP4 — Electromagnetic Cathode Ray Tube

An electromagnetic, direct-view cathode ray tube designed for black-and-white television applications, featuring magnetic focus and deflection, a 50-degree deflection angle, and a medium-persistence white screen.

Overview

The **10BP4** is a specialized cathode ray tube (CRT) designed for direct-view television receivers. It is engineered to produce a high-definition black-and-white picture with a nominal image size of 6 inches by 8 inches. The tube utilizes magnetic deflection and magnetic focusing, and it requires an external, magnetic ion-trap magnet to prevent screen blemishes.

Constructed with a glass bulb and a conductive external coating, the 10BP4 features a coated unipotential cathode and is designed to operate in any mounting position.

Physical and Constructional Specifications

The 10BP4 is built around a glass envelope with specific physical dimensions and screen characteristics optimized for early television displays.

Screen and Phosphor Characteristics

- **Fluorescence:** White
- **Phosphorescence:** White
- **Persistence:** Medium
- **Deflection Method:** Magnetic
- **Focusing Method:** Magnetic
- **Deflection Angle (Approximate):** 50 degrees
- **Ion Trap:** Magnetic (requires an external ion-trap magnet)
- **External Coating:** Conductive

Physical Dimensions

The physical envelope of the 10BP4 is defined by the following dimensions:

Dimension Parameter	Value	Tolerance
Overall Length	17-5/8 inches	$\pm 3/8$ inch
Bulb Face Diameter	10-1/2 inches	$\pm 1/8$ inch
Neck Diameter	1-7/16 inches	$\pm 1/16$ inch
Neck Length (to base)	7-1/8 inches	+1/2 inch, -1/4 inch
Cone Depth	9-7/16 inches	$\pm 3/16$ inch

Heater and Basing Configuration

The 10BP4 is equipped with a **small shell duodecal 7-pin base** and an external anode cap. The heater is designed for either AC or DC operation.

Heater Characteristics

- **Heater Voltage:** 6.3 Volts
- **Heater Current:** 0.6 Ampere
- **Cathode Type:** Coated unipotential

Pin Connections

The base connections, viewed from the bottom of the tube, are assigned as follows:

- **Pin 1:** Heater
- **Pin 2:** Grid No. 1
- **Pin 6:** No Connection
- **Pin 7:** No Connection
- **Pin 10:** Grid No. 2
- **Pin 11:** Cathode
- **Pin 12:** Heater
- **Cap:** Anode, Grid No. 3

Direct Interelectrode Capacitances

The direct interelectrode capacitances of the tube are specified as follows:

- **Grid #1 to all other electrodes** (G1 to H + K + G2 + A & G3): 6.5 μF
- **Cathode to all other electrodes** (K to H + G1 + G2 + A & G3): 5.0 μF
- **External conductive coating to Anode #2:** 2500 μF maximum, 500 μF minimum

Maximum Ratings

The maximum ratings for the 10BP4 are interpreted according to the **RMA Standard M8-210**. Operating the tube beyond these limits may impair performance or cause permanent damage.

Rating Parameter	Maximum Value	Unit
Anode Voltage (A & G3)	10,000	Volts
Grid #2 Voltage	410	Volts
Grid #1 Negative Bias Voltage	125	Volts
Grid #1 Positive Bias Voltage	0	Volts
Grid #1 Positive Peak Voltage	2	Volts
Peak Heater-Cathode Voltage (Heater negative, warm-up period ≤ 15 s)	410	Volts
Peak Heater-Cathode Voltage (Heater negative, after warm-up)	125	Volts
Peak Heater-Cathode Voltage (Heater positive with respect to cathode)	125	Volts

Typical Operating Conditions

Under typical operating conditions, the 10BP4 is configured with the following parameters:

- **Anode Voltage:** 9,000 Volts
- **Grid #2 Voltage:** 250 Volts
- **Grid #1 Voltage (for visual extinction of undeflected focused spot):** -27 to -63 Volts

Performance Curves and Characteristics

The operational performance of the 10BP4 is characterized by the relationship between the peak Grid #1 signal voltage, the resulting anode current, and the highlight brightness of the screen. These characteristics are measured under typical operating conditions of a 6.3 V heater, a 9,000 V anode supply, and a Grid #2 voltage of 250 V.

- **Highlight Brightness:** The highlight brightness (measured in foot-lamberts) rises non-linearly with the peak Grid #1 signal voltage. It begins to register above 0 foot-lamberts past a 10-volt peak signal, reaching approximately 50 foot-lamberts at a 30-volt peak signal, and climbing to 100 foot-lamberts at approximately 37 volts.
- **Anode Current:** The anode current (measured in microamperes) follows a similar upward curve. It remains near zero for low signal voltages, rising to approximately 200 microamperes at a 30-volt peak Grid #1 signal, and reaching approximately 500 microamperes at a 40-volt peak signal.

Technical Summary

The **10BP4** is a 10-1/2 inch electromagnetic cathode ray tube designed for direct-view black-and-white television receivers, producing a 6" by 8" picture. It features a small shell duodecal 7-pin base, a 6.3 V / 0.6 A heater, and requires external magnetic deflection, magnetic focusing, and an external ion-trap magnet. Operating typically with an anode voltage of 9,000 V and a Grid #2 voltage of 250 V, it provides high-definition images with a medium-persistence white phosphor screen.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1961 Tung Sol

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

1961 TUNG SOL

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	—
Heater Current	600 mA	—

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