



ELECTRONIC TUBE REFERENCE

12BAP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Cathode-ray display tube documented by manufacturer data for type 12BAP4; available extracted source information is sparse, so no more specialized application or construction claim is made.

GENERAL CHARACTERISTICS

BASE DESIGNATION	B7-208	BASE PINS	7
NOMINAL HEATER	6.3 V / 300 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Cathode Ray	
MAXIMUM PLATE VOLTAGE	14000 V
MAXIMUM SCREEN VOLTAGE	550 V

12BAP4 — Electrostatic Focus Picture Tube

The **12BAP4** is a directly viewed, rectangular 12-inch glass picture tube designed for television applications. It features a squared-corner screen, an aluminized phosphor screen, and a 110-degree diagonal deflection angle. The tube incorporates a relatively flat, compound radius faceplate to minimize outer light reflections and improve picture clarity. It utilizes a very short electron gun that minimizes deflection distortion and operates without requiring an external ion trap magnet. The neck diameter is 1-1/8 inches, and the base is a "neoceightner" 7-pin integral glass button type with straight-through leads and an indexing plug.

Mechanical and Optical Specifications

The physical design of the 12BAP4 is optimized for compact television receiver designs.

Dimensions and Weight

- **Overall Length:** 9-5/16 $\pm$ 1/4 inches
- **Neck Length:** 4-1/8 $\pm$ 1/8 inches
- **Neck Diameter:** 1-1/8 inches
- **Weight:** Approximately 5.3 pounds
- **Bulb Contact:** JEDEC No. J1-21
- **Base:** JEDEC No. B7-208
- **Basing:** 8HR

Screen and Optical Characteristics

The 12BAP4 has a rectangular screen with squared corners.

- **Minimum Useful Screen Dimensions (Projected):**
 - **Diagonal:** 11-5/16 inches
 - **Horizontal Axis:** 9-13/16 inches
 - **Vertical Axis:** 7-11/16 inches
 - **Useful Area:** Approximately 71 square inches
- **Phosphor:** P4-Sulfide Type, Aluminized
- **Light Transmittance:** Approximately 78% at the center of the faceplate

Deflection and Alignment

- **Deflection Angles (Approximate):**
 - **Diagonal:** 110 degrees
 - **Horizontal:** 101 degrees
 - **Vertical:** 82 degrees
- **Bulb Contact Alignment:** The J1-21 bulb contact (ultor terminal) is aligned with pin position No. 7 at an angle of approximately 30 degrees. The plane through the tube axis and pin No. 4 may vary from the plane through the tube axis and the ultor terminal by an angular tolerance of ± 30 degrees. The ultor terminal is located on the same side of the tube as pin No. 4.

Electrical Characteristics and Interelectrode Capacitances

The 12BAP4 uses electrostatic focusing and magnetic deflection.

Heater Ratings

- **Heater Voltage:** 6.3 Volts
- **Heater Current:** 0.3 Amperes
- **Heater Warm-up Time:** 11 Seconds

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 (Ultor):** 400 pF minimum, 900 pF maximum

The external conductive coating must be grounded during operation.

Maximum Ratings (Design Maximum Values)

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

- **Anode Voltage:** 14,000 Volts maximum, 9,000 Volts minimum
- **Grid No. 4 (Focusing Electrode) Voltage:** -550 Volts to +1,100 Volts maximum
- **Grid No. 2 Voltage:** 200 Volts minimum, 550 Volts maximum
- **Grid No. 1 Voltage:**
 - **Maximum Negative Value:** 154 Volts
 - **Maximum Negative Peak Value:** 200 Volts
 - **Maximum Positive Value:** 0 Volts
 - **Maximum Positive Peak Value:** 2 Volts
- **Maximum Heater-Cathode Voltage:**
 - **Heater Negative with Respect to Cathode (during warm-up period $\leq$ 15 seconds):** 450 Volts
 - **Heater Negative with Respect to Cathode (after equipment warm-up):** 200 Volts
 - **Heater Positive with Respect to Cathode:** 200 Volts
- **Maximum Grid No. 1 Circuit Resistance:** 1.5 Megohms

Operating Conditions and Drive Services

The 12BAP4 can be operated in either Grid Drive or Cathode Drive configurations. Under typical operating conditions, the anode voltage is set to 10,000 Volts, and Grid No. 2 is operated at 400 Volts.

Grid Drive Service

In Grid Drive service, voltages are measured with respect to the cathode:

- **Anode Voltage:** 10,000 Volts
- **Grid No. 4 (Focusing Electrode) Voltage:** 0 to 400 Volts
- **Grid No. 2 Voltage:** 400 Volts
- **Grid No. 1 Voltage (for visual extinction of focused raster):** -36 to -94 Volts

Cathode Drive Service

In Cathode Drive service, voltages are measured with respect to Grid No. 1:

- **Anode Voltage:** 10,000 Volts

- **Grid No. 4 (Focusing Electrode) Voltage:** 0 to 400 Volts
- **Grid No. 2 Voltage:** 400 Volts
- **Cathode Voltage (for visual extinction of focused raster):** 36 to 78 Volts

Focusing Notes

Individual tubes will achieve satisfactory focus at some value of Grid No. 4 voltage between 0 and +400 Volts. This focus range is specified with the combined Grid No. 1 bias voltage and video-signal voltage adjusted to produce an anode current of 100 microamperes on a 7-11/16" x 9-13/16" pattern (using an RCA [2F21](#) Monoscope or equivalent).

Socket and Installation Requirements

The 12BAP4 uses the **8HR** basing arrangement, which is accessed via a 7-pin "neoceighter" integral glass button base (JEDEC No. B7-208).

Pin Connections (Bottom View)

- **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
- **Cap:** Ultor (Grid No. 3, Grid No. 5 Collector)
- **External Coating (C):** External Conductive Coating

Installation and Handling Precautions

- **Socket Mounting:** The socket for the B7-208 base must not be rigidly mounted. It should have flexible leads and be allowed to move freely to prevent the circuit wiring from exerting 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.
- **Reference Line:** When inserting the tube neck through the flared end of a JEDEC No. 126 reference-line gauge, the reference line is determined by the intersection of the gauge's CC' plane with the glass funnel.
- **Cleaning:** The area near the bulb contact and neck should be cleaned by wiping only with a soft, dry, lintless cloth.
- **X-ray Warning:** If the tube is operated at voltages higher than the manufacturer's maximum rated anode voltage or 16,000 Volts (whichever is less), X-ray radiation shielding may be necessary to protect against personal injury from prolonged exposure at close range.

Technical Summary

The **12BAP4** is a 12-inch, 110-degree electrostatic-focus, magnetic-deflection rectangular picture tube. It features an aluminized P4-sulfide phosphor screen, a short electron gun requiring no ion trap, and a "neoceighter" 7-pin base. Operating at a typical anode voltage of 10,000 Volts, it provides clear image reproduction with a useful screen area of 71 square inches. It supports both grid drive and cathode drive configurations, with focusing achieved via a dedicated Grid No. 4 electrode operating typically between 0 and 400 Volts.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1963 Hitachi

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

1963 HITACHI

Section 1 · Cathode Ray

CAPACITANCE

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Interelectrode capacitances published	1	See source table

CHARACTERISTIC

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Warm-up Time	11 s	—

OTHER

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Voltage	14000 V	—