



ELECTRONIC TUBE REFERENCE

16AUP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Sixteen-inch P4 cathode-ray picture tube documented by Hitachi for high-voltage direct-view display. Its anode rating reaches approximately 15.4 kV, placing it firmly in the television picture-tube class.

GENERAL CHARACTERISTICS

BASE DESIGNATION	B7-208	BASE PINS	7
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	
MAXIMUM PLATE VOLTAGE	15400 V
MAXIMUM SCREEN VOLTAGE	550 V

16AUP4 — Rectangular Glass Picture Tube

The **16AUP4** is a directly viewed, rectangular glass picture tube designed for television receivers, particularly portable televisions. It features a 16-inch diagonal screen with a "squared corner" design, utilizing nearly straight sides and slightly rounded corners. The tube incorporates a 114-degree diagonal deflection angle, achieved using 110-degree deflecting components through specialized internal contouring of the envelope's deflecting yoke region. This design minimizes outer light reflection and enhances picture clarity.

Key features of the 16AUP4 include a very short electron gun that eliminates the need for an external ion-trap magnet while minimizing deflection distortion, a relatively flat compound-radius faceplate, and an integral glass-button "neoeighter" 7-pin base with straight-through leads and an indexing plug.

Mechanical Design and Physical Dimensions

The 16AUP4 is constructed with a rectangular glass envelope and a nominal neck diameter of 1-1/8 inches. The physical dimensions and tolerances of the tube are specified as follows:

- **Maximum Overall Length:** 10-1/8 inches (+3/8 inch, -1/4 inch)
- **Greatest Diagonal:** 15-3/8 inches ($\pm 1/8$ inch)
- **Greatest Width:** 13-45/64 inches ($\pm 1/8$ inch)
- **Greatest Height:** 11-3/32 inches ($\pm 1/8$ inch)
- **Neck Length:** 4 inches (+1/4 inch, -1/8 inch)
- **Minimum Useful Screen Diagonal:** 14-1/16 inches
- **Minimum Useful Screen Horizontal Axis:** 12-3/4 inches
- **Minimum Useful Screen Vertical Axis:** 10-1/16 inches
- **Minimum Projected Screen Area:** 119 square inches

The bulb contact is designated as JEDEC No. JI-21, and the base is a JEDEC No. B7-208 "neoeight" 7-pin base. The basing configuration is designated as 8 HR.

Electrical and Optical Characteristics

The 16AUP4 utilizes electrostatic focusing and magnetic deflection. The optical system features an aluminized P4-sulfide type phosphor screen, which provides a light transmittance of approximately 78 percent at the center.

Deflection Angles

The deflection system is designed for wide-angle operation:

- **Diagonal:** 114 degrees
- **Horizontal:** 102 degrees
- **Vertical:** 85 degrees

Direct Interelectrode Capacitances

- **Cathode to all other electrodes (approx.):** 5 pF
- **Grid No. 1 to all other electrodes (approx.):** 6 pF
- **External conductive coating to anode:** 1,500 pF maximum, 800 pF minimum

Heater Characteristics

The tube's heater is designed for standard television receiver supplies:

- **Heater Voltage:** 6.3 V
- **Heater Current:** 0.6 A
- **Heater Warm-up Time:** 11 seconds

Pinout and Socket Connections

The 16AUP4 uses an 8 HR basing arrangement on its 7-pin "neoeighter" base. The pin connections, viewed from the bottom of the base, are:

- **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 Cap:** Ultor (Grid No. 3, Grid No. 5, Collector)

Note that Grid No. 1 is connected to both Pin 2 and Pin 6. The ultor terminal (recessed small cavity cap, JEDEC No. JI-21) is located on the same side as Pin 4, with an angular tolerance of ± 80 degrees between the plane through the tube axis and Pin 4 and the plane through the tube axis and the ultor terminal.

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.
- **Grounding:** The external conductive coating must be grounded.
- **Cleaning:** To clean the conductive coating area, only a soft, dry, lintless cloth should be used.

Maximum Ratings (Design Maximum System)

The maximum ratings for the 16AUP4 are established under the Design Maximum System. Unless otherwise specified, all voltage values are positive and measured with respect to the cathode:

- **Maximum Anode Voltage:** 15,400 V
- **Minimum Anode Voltage:** 9,000 V
- **Maximum Grid No. 4 (Focusing Electrode) Voltage:** +1,100 V
- **Minimum Grid No. 4 (Focusing Electrode) Voltage:** -550 V
- **Maximum Grid No. 2 Voltage:** 550 V
- **Minimum Grid No. 2 Voltage:** 200 V
- **Grid No. 1 DC Voltage (Maximum Negative Value):** 154 V
- **Grid No. 1 Peak Voltage (Maximum Negative Peak Value):** 220 V
- **Grid No. 1 DC Voltage (Maximum Positive Value):** 0 V
- **Grid No. 1 Peak Voltage (Maximum Positive Peak Value):** 2 V
- **Maximum Heater Voltage:** 6.9 V
- **Minimum Heater Voltage:** 5.7 V

Heater-Cathode Voltage Limits

- **Heater negative with respect to cathode:**
 - During warm-up period (not to exceed 15 seconds): 450 V maximum
 - After equipment warm-up period: 200 V maximum
- **Heater positive with respect to cathode:** 200 V maximum

Typical Operating Conditions

The 16AUP4 can be operated in either Grid Drive or Cathode Drive service. The typical operating parameters for each mode are detailed below.

Grid Drive Service

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

- **Anode Voltage:** 12,000 V DC
- **Grid No. 4 (Focusing Electrode) Voltage:** 0 to +400 V DC
- **Grid No. 2 Voltage:** 400 V DC
- **Grid No. 1 Voltage:** -36 to -94 V DC (for visual extinction of focused raster)

Cathode Drive Service

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

- **Anode Voltage:** 12,000 V DC
- **Grid No. 4 (Focusing Electrode) Voltage:** 0 to +400 V DC
- **Grid No. 2 Voltage:** 400 V DC
- **Cathode Voltage:** 36 to 78 V DC (for visual extinction of focused raster)

For both operating services, individual tubes will achieve satisfactory focus at some value between 0 and 400 V on Grid No. 4. The raster extinction voltage is defined with the combined Grid No. 1 bias voltage and video-signal voltage adjusted to give an anode current of 100 microamperes on a 10-1/16 inch by 12-3/4 inch pattern (such as from an RCA [2F21](#) Monoscope or equivalent).

Technical Summary

The **16AUP4** is a 16-inch, rectangular, electrostatic-focus, magnetic-deflection picture tube featuring a 114-degree diagonal deflection angle. It is designed with a short electron gun requiring no ion-trap magnet, a squared-corner aluminized P4-sulfide screen, and a 7-pin "neoeighter" base. Operating at a typical anode voltage of 12,000 V, the tube is highly suited for portable television applications, offering flexible operation in both grid-drive and cathode-drive configurations.

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	15400 V	—

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