



ELECTRONIC TUBE REFERENCE

12AYP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Cathode-ray display tube documented by manufacturer data for type 12AYP4; 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 / 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	14000 V
MAXIMUM SCREEN VOLTAGE	550 V

12AYP4 — 110-Degree Deflection Squared-Corner Picture Tube

A directly viewed, rectangular glass cathode-ray tube featuring electrostatic focus, magnetic deflection, an aluminized screen, and a short electron gun structure designed for television receiver applications.

Overview

The **12AYP4** is a specialized 12-inch rectangular glass picture tube designed for direct-view television applications. It features a 110-degree diagonal deflection angle and a "squared corner" screen geometry. The tube incorporates an aluminized screen with a P4-sulfide phosphor, which provides a bright, white display.

To enhance picture clarity and minimize the obstruction of outer light reflections, the 12AYP4 is constructed with a relatively flat, compound radius faceplate. The tube is engineered with a very short electron gun structure that minimizes deflection distortion and eliminates the need for an external ion trap magnet. It features a narrow 1-1/8 inch neck diameter and utilizes a "neoeighther" 7-pin integral glass button base with straight-through leads and an indexing plug.

Mechanical Specifications and Physical Dimensions

The mechanical design of the 12AYP4 is optimized for space-saving television chassis. The physical dimensions and mechanical parameters are specified as follows:

- **Overall Length:** 9-5/16 ± 1/4 inches
- **Neck Length:** 4-1/8 ± 1/8 inches
- **Neck Diameter:** 1-1/8 inches
- **Weight:** Approximately 5.3 pounds
- **Bulb Contact:** JEDEC No. J1-21 (recessed small cavity cap)
- **Base:** JEDEC No. B7-208 ("neoeighther" 7-pin base)
- **Basing Designation:** 8HR
- **Bulb Contact Alignment:** The bulb contact is aligned with pin position No. 7 with an angular tolerance of 30 degrees. The plane passing through the tube axis and pin No. 4 may vary from the plane passing 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 envelope as pin No. 4.
- **Reference Line:** The reference line is determined using a JEDEC No. 126 reference-line gauge. When the tube neck is inserted through the flared end of the gauge and properly seated, the reference line is defined by the intersection of the gauge's CC' plane with the glass funnel.

Screen and Optical Characteristics

The screen utilizes a **P4-sulfide type** aluminized phosphor. The light transmittance at the center of the faceplate is approximately 78 percent. The minimum useful projected screen dimensions are:

Dimension	Value
Diagonal	11-5/16 inches
Horizontal Axis	9-13/16 inches
Vertical Axis	7-11/16 inches
Useful Area	71 square inches

Electrical Characteristics and Interelectrode Capacitances

The 12AYP4 operates with an indirectly heated cathode and electrostatic focusing. Its primary electrical and capacitance characteristics include:

Heater Characteristics

The heater is designed for standard series or parallel operation:

- **Heater Voltage:** 6.3 Volts
- **Heater Current:** 0.45 Amperes
- **Heater Warm-up Time:** 11 Seconds

Direct Interelectrode Capacitances

- **Cathode to All Other Electrodes:** Approximately 5 μf
- **Grid No. 1 to All Other Electrodes:** Approximately 6 μf
- **External Conductive Coating to Anode (Ultor):** 900 μf maximum, 400 μf minimum

Deflection Angles

The tube is designed for wide-angle magnetic deflection:

- **Diagonal Deflection:** 110 Degrees
- **Horizontal Deflection:** 101 Degrees
- **Vertical Deflection:** 82 Degrees

Maximum Ratings (Design Maximum Values)

The maximum ratings for the 12AYP4 are established under the Design Maximum System. Unless otherwise specified, all voltage values are positive and measured with respect to the cathode.

Parameter	Minimum Value	Maximum Value
Anode Voltage	9,000 V	14,000 V
Grid No. 4 (Focusing Electrode) Voltage	-550 V	+1,100 V
Grid No. 2 Voltage	200 V	550 V
Grid No. 1 Negative Value	—	154 V
Grid No. 1 Negative Peak Value	—	200 V
Grid No. 1 Positive Value	—	0 V
Grid No. 1 Positive Peak Value	—	2 V
Heater-Cathode Voltage (Heater negative to cathode during warm-up, ≤ 15 s)	—	450 V

Parameter	Minimum Value	Maximum Value
Heater-Cathode Voltage (Heater negative to cathode after warm-up)	—	200 V
Heater-Cathode Voltage (Heater positive to cathode)	—	200 V

Typical Operating Conditions and Drive Services

The 12AYP4 can be configured for either Grid Drive Service or Cathode Drive Service. The typical operating points for both configurations are specified at an anode voltage of 10,000 Volts.

Grid Drive Service

In Grid Drive Service, all voltage values are positive and measured with respect to the cathode (except Grid No. 1, which is negative).

- **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, all voltage values are positive and 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

Focus and Bias Notes

- **Focusing Range:** Individual tubes will achieve satisfactory electrostatic focus at some value between 0 and +400 Volts on Grid No. 4.
- **Focus Measurement Conditions:** The focusing voltage 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).
- **Maximum Circuit Resistance:** The maximum Grid No. 1 circuit resistance must not exceed 1.5 Megohms.

Installation, Socketing, and Safety Guidelines

Socket Design and Mounting

The "neoeighter" 7-pin base (JEDEC No. B7-208) requires specific socketing considerations to prevent mechanical stress on the glass button base:

- The socket must **not** be rigidly mounted. It must have flexible leads and be allowed to move freely.
- The socket design must ensure that circuit wiring does not impress lateral strains through the socket contacts onto the base pins.
- The bottom circumference of the base wafer is designed to fall within a circle concentric with the bulb axis having a diameter of 1-3/4 inches.

Pinout and Connections (8HR Basing)

The 8HR basing configuration provides the following connections, viewed from the bottom of the base:

- **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 (Anode)
- **External Coating (C):** External Conductive Coating (must be grounded)

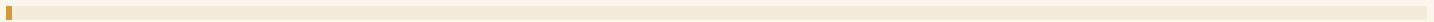
Note: Pin 5 is omitted from the active connections.

Maintenance and Handling

- **Grounding:** The external conductive coating must be grounded to ensure proper operation and safety.
- **Cleaning:** To clean the insulating coating area near the ultor recessed small cavity cap, wipe only with a soft, dry, lintless cloth.
- **X-ray Radiation Warning:** X-ray radiation shielding may be necessary to protect against potential personal injury from prolonged exposure at close range if the tube is operated at voltages higher than the manufacturer's Maximum Rated Anode Voltage (14,000 Volts) or 16,000 Volts, whichever is less.

Technical Summary

The **12AYP4** is a 12-inch, 110-degree deflection, electrostatic-focus picture tube featuring a squared-corner rectangular glass envelope, an aluminized P4-sulfide screen, and a short electron gun requiring no ion trap. Utilizing a 6.3 V, 0.45 A heater and an 8HR "neoeighter" 7-pin base, it supports both Grid Drive and Cathode Drive services at a typical anode operating voltage of 10,000 V. With design maximum ratings up to 14,000 V on the anode, the 12AYP4 provides a compact, low-distortion display solution when installed with a flexible, non-rigid socket and appropriate grounding of its external conductive coating.





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	—

TUBE TINKER

An independent reference for electronic tubes, vacuum tubes, and their source documents.

[Catalog](#) [Tube types](#) [Full books](#) [Blog](#) [Feedback & corrections](#)

© 2026 Tube Tinker