

ELECTRONIC TUBE REFERENCE

11HP4A

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Eleven-inch P4 cathode-ray picture tube with magnetic deflection for direct-view display. RCA documentation gives high-voltage anode operation around 9 kV and includes the control, focusing, screen-area, and capacitance data needed for receiver design.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	7
NOMINAL HEATER	6.9 V / 20 A	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Cathode Ray	
MAXIMUM SCREEN VOLTAGE	250 V
CRT-specific ratings, operating conditions, capacitances, focus/deflection, cutoff, optical, and screen data are retained in section parameters.	

11HP4A Picture Tube

The **11HP4A** is a PAN-O-PLY type cathode-ray tube designed for television display applications. It features a 110-degree magnetic deflection angle and utilizes low-voltage electrostatic focusing. The tube incorporates an aluminized P4-sulfide type phosphor screen and a filterglass faceplate, and its electron gun is designed to operate without requiring an external ion-trap magnet.

Mechanical Specifications and Optical Characteristics

The 11HP4A is constructed with a J87B glass bulb and includes integrated implosion protection hardware. It has the following physical and optical properties:

- **Weight:** Approximately 4 lbs.
- **Overall Length:** 8.785 ± 0.250 inches.
- **Neck Length:** 4.125 ± 0.125 inches.
- **Screen Dimensions:**
 - Projected Area: 60 square inches.
 - Minimum Diagonal: 10.250 inches.
 - Minimum Width: 9.000 inches.
 - Minimum Height: 7.062 inches.
- **Faceplate:** Filterglass with an approximate light transmission of 52% at the center.
- **Phosphor:** Aluminized P4-Sulfide type.
- **Deflection Angles:**
 - Diagonal: 110°
 - Horizontal: 99°
 - Vertical: 82°
- **External Conductive Coating:** Regular-band type. The contact area for grounding is located near the reference line, which is determined by a JEDEC No. G-126 gauge. The external conductive coating to anode capacitance is between 500 pF (minimum) and 750 pF (maximum).

Electrical Connections and Pinout

The tube utilizes a JEDEC No. B7-208 Small-Button Noveightar 7-pin base (Arrangement 1) and a JEDEC No. J1-21 recessed small cavity cap. The terminal connections, viewed from the bottom of the base, are assigned as follows:

Pin / Terminal	Connection
Pin 1	Heater
Pin 2	Grid No. 1
Pin 3	Grid No. 2
Pin 4	Grid No. 4
Pin 6	Grid No. 1
Pin 7	Cathode
Pin 8	Heater
Cap	Anode (Grid No. 3, Grid No. 5, Screen, Collector)
C	External Conductive Coating

The internal structure connects Grid No. 1 to both Pin 2 and Pin 6. The high-voltage anode connection, which includes Grid No. 3, Grid No. 5, the screen, and the collector, is made via the recessed cavity cap.

Heater and Interelectrode Capacitances

The 11HP4A is equipped with an indirectly heated cathode. The heater and direct interelectrode capacitances are characterized by the following values:

- **Heater Voltage (Nominal):** 6.3 V
- **Heater Current (at 6.3 V):** 450 ± 20 mA
- **Average Heater Warm-Up Time:** 11 seconds
- **Cathode to all other electrodes capacitance:** 5 pF
- **Grid No. 1 to all other electrodes capacitance:** 6 pF

Maximum and Minimum Ratings

The following design-maximum values are established for the 11HP4A, with voltages specified as positive with respect to the cathode unless otherwise noted:

- **Anode Voltage:** 9,000 V minimum to 15,000 V maximum
- **Grid-No. 4 (Focusing Electrode) Voltage:**
 - Positive value: 1,100 V maximum
 - Negative value: 550 V maximum
- **Grid-No. 2 Voltage:** 100 V minimum to 250 V maximum
- **Grid-No. 1 Voltage:**
 - Negative peak value: 220 V maximum
 - Negative bias value: 155 V maximum
 - Positive bias value: 0 V maximum
 - Positive peak value: 2 V maximum
- **Heater Voltage:** 5.7 V minimum to 6.9 V maximum
- **Peak Heater-Cathode Voltage:**
 - *Heater negative with respect to cathode:*
 - During equipment warm-up period (≤ 15 seconds): 450 V maximum
 - After equipment warm-up period: 300 V maximum
 - *Heater positive with respect to cathode:*
 - Combined AC & DC voltage: 200 V maximum
 - DC component: 100 V maximum

Typical Operating Conditions

For cathode-drive service, where voltages are specified as positive with respect to Grid No. 1, the typical operating parameters are:

- **Anode Voltage:** 11,000 V
- **Grid-No. 4 Voltage:** 0 V
- **Grid-No. 2 Voltage:** 150 V

- **Cathode Voltage (for visual extinction of focused raster):** 31 V to 49 V
- **Maximum Grid-No. 1 Circuit Resistance:** 1.5 MΩ

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

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

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Section 1 · Cathode Ray

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
I 10° MAGNETIC DEFLECTION	10 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Grid No.1to all other electrodes	6 pF	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
External conductive coating to anode – published value 1	500 mA	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
External conductive coating to anode – published value 2	750 mA	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Heater Current at G.3 V – published value 1	450 mA	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Heater Current at G.3 V – published value 2	20 mA	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Light transmission at center (approx)	52	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Projected Area of Screen	60	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Anode Voltage	9000 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Grid-No.2 Voltage – published value 1	100 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid-No.2 Voltage – published value 2	250 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Heater Voltage – published value 1	5.7 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Heater Voltage – published value 2	6.9 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Combined AC & DC voltage	200 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Anode Voltage – published value 1	1 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Anode Voltage – published value 2	1000 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Grid-No.4 Voltage	0 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Grid-No.2 Voltage	150 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Cathode Voltage – published value 1	31 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Cathode Voltage – published value 2	49 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Grid-No. 1 Circuit Resistance – published value 1	1 mA	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Grid-No. 1 Circuit Resistance – published value 2	5 mA	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Grid-No. 1 Circuit Resistance – published value 3	1 mA	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.