

Eleven-inch P4 cathode-ray picture tube using magnetic deflection for direct-view display. Published operating data place the anode around 12 kV, with a substantial projected screen area suited to television-picture presentation.

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	550 V
CRT-specific ratings, operating conditions, capacitances, focus/deflection, cutoff, optical, and screen data are retained in section parameters.	

11CP4

The **11CP4** is a PAN-O-PLY type cathode-ray picture tube designed for television display applications. It features a 110-degree magnetic deflection system and a low-voltage electrostatic focus system. The tube incorporates an aluminized, sulfide-type P4 phosphor screen, a filterglass faceplate, and integrated implosion protection hardware.

Mechanical Design and Physical Dimensions

The 11CP4 utilizes the J87A bulb outline. Its physical dimensions and mechanical characteristics are highly specified to ensure precise mounting and alignment:

- **Screen Dimensions:** The screen has a minimum diagonal of 10.125 inches, a minimum height of 7.125 inches, and a minimum width of 8.938 inches. The projected area of the screen is 60 square inches.
- **Overall Bulb Dimensions:** The overall width is 9.750 ± 0.125 inches, the overall height is 8.000 ± 0.125 inches, and the diagonal dimension is 10.875 ± 0.125 inches.
- **Length and Neck:** The overall length of the tube is 8.785 ± 0.250 inches. The neck length is 4.125 ± 0.125 inches, with a neck diameter of 1.125 (+0.043 / -0.025) inches.
- **Deflection Angles:** The tube is designed for a diagonal deflection angle of 110° , a horizontal deflection angle of 99° , and a vertical deflection angle of 82° .
- **Weight:** The approximate weight of the tube is 4 pounds, which includes the integrated implosion protection hardware.
- **Reference Line:** The reference line of the bulb is determined by the JEDEC No. G-126 gauge.

Electrical Connections and Basing

The 11CP4 is equipped with a JEDEC No. B7-208 base, which is a small-button Neoeightar 7-pin base (Arrangement 1). The basing configuration is designated as 8HR. High-voltage anode connection is made via a recessed small cavity cap (JEDEC No. J1-21) located on the bulb funnel.

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

Pin	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 external conductive coating is a Regular-Band type. The contact area for grounding this coating is located near the reference line.

Heater and Electrostatic Characteristics

The tube's electron gun is designed to operate without requiring an external ion-trap magnet. The electrical characteristics of the heater and the interelectrode capacitances are detailed below:

- **Heater Voltage:** 6.3 V nominal (with a design-maximum range of 5.7 V minimum to 6.9 V maximum).
- **Heater Current:** 450 ± 20 mA at 6.3 V.
- **Heater Warm-Up Time:** An average of 11 seconds.
- **Cathode to All Other Electrodes Capacitance:** 5 pF.
- **Grid No. 1 to All Other Electrodes Capacitance:** 6 pF.
- **External Conductive Coating to Anode Capacitance:** 500 pF minimum to 750 pF maximum.

Maximum Ratings and Typical Operating Conditions

The maximum and minimum ratings are defined under the Design-Maximum rating system. All voltages are positive with respect to the cathode unless otherwise specified.

Design-Maximum Ratings

Parameter	Minimum Value	Maximum Value
Anode Voltage	8,000 V	15,000 V
Grid-No. 4 (Focusing Electrode) Voltage	-550 V	+1,100 V
Grid-No. 2 Voltage	200 V	550 V
Grid-No. 1 Negative Peak Voltage	—	220 V
Grid-No. 1 Negative Bias Voltage	—	155 V
Grid-No. 1 Positive Bias Voltage	—	0 V
Grid-No. 1 Positive Peak Voltage	—	2 V
Heater Voltage	5.7 V	6.9 V

Peak Heater-Cathode Voltage Limits

- **Heater Negative with Respect to Cathode:**
 - During equipment warm-up period (less than or equal to 15 seconds): 450 V maximum.
 - After equipment warm-up period: 300 V maximum.
- **Heater Positive with Respect to Cathode:**
 - Combined AC and DC voltage: 200 V maximum.
 - DC component: 100 V maximum.

Typical Operating Conditions (Grid-Drive Service)

Under typical grid-drive operating conditions, the electrode voltages are configured as follows:

- **Anode Voltage:** 12,000 V
- **Grid-No. 4 Voltage:** 0 to 400 V
- **Grid-No. 2 Voltage:** 400 V
- **Grid-No. 1 Voltage (for visual extinction of focused raster):** -39 to -94 V

The maximum circuit resistance for the Grid-No. 1 circuit must not exceed 1.5 MΩ.

Optical Characteristics

The 11CP4 features a specialized optical design optimized for television display clarity:

- **Phosphor:** Sulfide-type, aluminized P4 phosphor.
- **Faceplate:** Constructed of filterglass to enhance contrast.
- **Light Transmission:** Approximately 79% light transmission at the center of the faceplate.

Technical Summary

The 11CP4 is a compact, 110-degree magnetic deflection picture tube utilizing low-voltage electrostatic focusing. Its mechanical design features a J87A bulb with integrated implosion protection, weighing approximately 4 pounds. Electrically, it operates with a 6.3 V heater drawing 450 mA, and is rated for anode voltages up to 15,000 V. The tube uses a small-button Neoeightar 7-pin base and a recessed small cavity cap for the high-voltage anode connection. With its aluminized P4 sulfide phosphor and 79% transmission filterglass faceplate, the 11CP4 provides a reliable, high-contrast display solution for grid-drive television receiver service.

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.1 to 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 6.3 V – published value 1	6.3 mA	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Heater Current at 6.3 V – published value 2	450 mA	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Heater Current at 6.3 V – published value 3	20 mA	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Light transmission at center (approx.)	79	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 – published value 1	8000 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Anode Voltage – published value 2	15000 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	200 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Grid-No.2 Voltage – published value 2	550 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	12000 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Grid-No.4 Voltage – published value 1	0 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Grid-No.4 Voltage – published value 2	400 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Grid-No.2 Voltage	400 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Grid-No. 1 Voltage – published value 1	-39 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Grid-No. 1 Voltage – published value 2	-94 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.