

Nineteen-inch direct-view monochrome television picture tube with electrostatic focusing, magnetic deflection, and an aluminized P4 screen. Manufacturer documentation places it in the high-voltage picture-tube family used for bright, high-contrast receiver display.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	0
NOMINAL HEATER	6.3 V / 600 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Cathode Ray	
MAXIMUM PLATE VOLTAGE	19800 V
CRT accelerator/final-anode maximum mapped to MaxPlateVoltage.	

19CDP4 Television Picture Tube

The **19CDP4** is a 19-inch direct-view rectangular glass cathode-ray tube (CRT) designed for television receiver applications. It features a cathode-drive design, electrostatic focusing, and a wide-angle magnetic deflection system. The tube incorporates an aluminized screen with a P4 phosphor, a spherical faceplate made of gray filter glass with approximately 78% light transmittance at the center, and an external conductive coating. Notably, the design operates with a low Grid No. 2 voltage and does not require an ion trap magnet.

Mechanical Specifications and Screen Characteristics

The 19CDP4 is constructed with a rectangular glass envelope using a J 149 A1 bulb (or equivalent) and a B6-214 base. The physical dimensions of the tube are as follows:

- **Overall Length:** $11\text{-}5/8 \pm 1/4$ inches
- **Neck Length:** $4\text{-}3/8 \pm 1/8$ inches
- **Greatest Diagonal Dimension:** $18\text{-}5/8 \pm 1/8$ inches
- **Greatest Width:** $16\text{-}13/32 \pm 1/8$ inches
- **Greatest Height:** $13\text{-}11/32 \pm 1/8$ inches

The screen is designed to maximize the useful viewing area within its compact physical footprint. The minimum useful screen dimensions (projected) are:

- **Diagonal:** $17\text{-}9/16$ inches
- **Horizontal:** $15\text{-}1/8$ inches
- **Vertical:** 12 inches
- **Total Area:** 172 square inches

The faceplate is spherical and composed of gray filter glass, which provides an approximate light transmittance of 78% at the center to improve contrast under ambient light. The screen uses P4 phosphor and is aluminized to enhance brightness and efficiency.

The tube features an external conductive coating that acts as a capacitor in conjunction with the internal anode coating. The capacitance between the external conductive coating and the anode ranges from a minimum of 1400 μf to a maximum of 1900 μf .

Deflection and Focusing Systems

The 19CDP4 utilizes magnetic deflection with a diagonal deflection angle of 114° . The horizontal and vertical deflection angles are:

- **Horizontal Deflection:** 103°
- **Vertical Deflection:** 86°
- **Diagonal Deflection:** 114°

Focusing is accomplished electrostatically via Grid No. 4 (the focusing electrode). This design allows for a wide range of focus adjustment, with satisfactory focus obtainable between 0 V and 500 V under typical operating conditions.

Heater and Electrical Connections

The 19CDP4 is equipped with a heater designed for reliable operation and controlled warm-up.

- **Heater Voltage:** 6.3 V (nominal), with absolute limits of 5.8 V minimum and 7 V maximum.
- **Heater Current:** $600 \pm 10\%$ mA.
- **Heater Warm-up Time:** 11 seconds.

Pinout and Basing (7FA)

The tube uses a B6-214 base with a 7FA pinout configuration. The electrical connections are as follows:

- **Pin 1:** Heater
- **Pin 2:** Cathode
- **Pin 5:** Grid No. 1
- **Pin 6:** Grid No. 4 (Focusing Electrode)
- **Pin 7:** Grid No. 2
- **Pin 8:** Heater
- **Anode:** Recessed Small Cavity Cap (J1-21)

The anode contact (recessed small cavity cap J1-21) is aligned with pin position #7 within a tolerance of $\pm 30^\circ$.

Direct Interelectrode Capacitances

The direct interelectrode capacitances of the tube (approximate values) are:

- **Cathode to all other electrodes:** 5 μpf
- **Grid No. 1 to all other electrodes:** 6 μpf
- **External Conductive Coating to Anode:** 1400 μpf (minimum) to 1900 μpf (maximum)

Absolute Maximum Ratings

The ratings of the 19CDP4 are established under the Design-Maximum System. Unless otherwise specified, all voltages are positive and measured with respect to Grid No. 1.

Parameter	Minimum Value	Maximum Value
Anode Voltage	12,000 V	19,800 V
Grid No. 4 (Focusing Electrode) Voltage	-500 V	+1100 V
Grid No. 2 Voltage	40 V	70 V
Cathode Voltage	—	100 V
Heater Voltage	5.8 V	7.0 V
Grid No. 1 Circuit Resistance	—	1.5 M Ω

Heater-Cathode Voltage Limits

The maximum allowable voltage difference between the heater and the cathode depends on the polarity and the operating state of the equipment:

- **Heater negative with respect to cathode:**

- During the warm-up period (first 15 seconds or less): -410 V maximum
- After the equipment warm-up period: -180 V maximum
- **Heater positive with respect to cathode:** 180 V maximum

Typical Operating Conditions (Cathode Drive Service)

In typical cathode-drive service, the control voltages are referenced to Grid No. 1. Under these conditions, the operating parameters are:

- **Anode Voltage:** 16,000 V
- **Grid No. 4 (Focusing Electrode) Voltage:** 250 V (satisfactory focus is obtainable over a range of 0 to 500 V)
- **Grid No. 2 Voltage:** 50 V
- **Cathode Voltage (for visual extinction of focused raster):** 35 to 50 V

The cathode-drive configuration allows the video signal to be applied directly to the cathode, which can offer advantages in drive circuitry design. The low Grid No. 2 voltage rating of 50 V simplifies the power supply requirements for the screen grid.

Technical Summary

The **19CDP4** is a 114° magnetic deflection, electrostatically focused rectangular television picture tube featuring a 19-inch diagonal screen. It is designed for cathode-drive operation with a low Grid No. 2 voltage of 50 V and does not require an ion trap. The tube incorporates an aluminized P4 phosphor screen, a gray filter glass faceplate with 78% center light transmittance, and an external conductive coating. Operating with a nominal 6.3 V, 600 mA heater, the 19CDP4 provides a minimum useful screen area of 172 square inches. It is rated for anode voltages up to 19,800 V and features a 7FA basing configuration with a recessed small cavity cap for the anode connection.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1963 Rauland

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

1963 RAULAND

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	—
Heater current	600 mA	—
Typical anode/accelerator voltage	19800 V	—
Typical grid 2 voltage	70 V	—
Maximum heater-cathode voltage	180 V	Heater positive to cathode
Maximum grid 1 circuit resistance	1.5 Mohm	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Focusing method	Electrostatic	—
Deflection method	Magnetic	—
Deflection angle	103 deg	—