

ELECTRONIC TUBE REFERENCE

# 19CRP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION  
CONSTRUCTION  
CATHODERAY

Nineteen-inch rectangular direct-view television picture tube with electrostatic focus and magnetic deflection. Approximately 80-degree deflection and high-voltage anode operation provide a large monochrome receiver display.

## GENERAL CHARACTERISTICS

|                     |                   |                      |               |
|---------------------|-------------------|----------------------|---------------|
| BASE DESIGNATION    | —                 | BASE PINS            | 6             |
| 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. |         |

## 19CRP4 — Direct-View Monochrome Cathode Ray Tube

The 19CRP4 is a 19-inch rectangular glass-envelope cathode ray tube designed for monochrome television receivers. It features electrostatic focus, 92-degree magnetic deflection, an aluminized screen, and a low Grid #2 operating voltage optimized for cathode-drive applications.

### Overview

The **19CRP4** is a direct-view cathode ray tube (CRT) with a rectangular glass envelope and a spherical faceplate. It incorporates an aluminized screen with P4 phosphor and gray filter glass to enhance picture

contrast. The tube is designed with an external conductive coating, which, when grounded, forms a high-voltage filter capacitor with the internal anode.

The 19CRP4 is engineered for cathode-drive service, allowing video signal input directly to the cathode. This design operates with a low Grid #2 voltage of 35 V and does not require an ion trap magnet, simplifying receiver circuitry and adjustment.

## Mechanical and Optical Specifications

The physical structure of the 19CRP4 utilizes a J149B1 bulb (or equivalent) paired with a B6-203 base and a 12L basing configuration. The mechanical dimensions and tolerances are precisely defined:

- **Overall Length:** 15 1/4 ± 3/8 inches
- **Neck Length:** 5 1/2 ± 3/16 inches
- **Greatest Diagonal Dimension:** 18 5/8 ± 1/8 inches
- **Greatest Width:** 16 13/32 ± 1/8 inches
- **Greatest Height:** 13 11/32 ± 1/8 inches

The screen provides a minimum useful projected area of 172 square inches. The minimum useful screen dimensions along its axes are:

- **Diagonal:** 17 9/16 inches
- **Horizontal Axis:** 15 1/8 inches
- **Vertical Axis:** 12 inches

The faceplate is constructed of gray filter glass with an approximate light transmittance of 78% at the center. The screen uses an aluminized P4 phosphor. Electrical connection to the high-voltage anode is made via a recessed J1-21 bulb contact, which is aligned with pin position #6 within a tolerance of ±30 degrees.

## Heater and Electrical Ratings

The 19CRP4 contains an indirectly heated cathode. The heater is designed with a controlled warm-up time, making it suitable for series or parallel heater strings.

| Heater Parameter       | Value        |
|------------------------|--------------|
| Nominal Heater Voltage | 6.3 V        |
| Heater Current         | 600 ± 10% mA |
| Heater Warm-up Time    | 11 seconds   |
| Maximum Heater Voltage | 7 V          |
| Minimum Heater Voltage | 5.8 V        |

## Heater-Cathode Voltage Limits

To prevent insulation breakdown, the design-maximum ratings specify strict limits for the potential difference between the heater and the cathode:

- **Heater negative with respect to cathode during warm-up ( $\leq 15$  seconds):**  $-410$  V maximum
- **Heater negative with respect to cathode after warm-up:**  $-180$  V maximum
- **Heater positive with respect to cathode:**  $180$  V maximum

## Electrostatic and Deflection Characteristics

The 19CRP4 utilizes magnetic deflection and electrostatic focusing. The approximate deflection angles of the scanning beam are:

- **Diagonal:**  $92^\circ$
- **Horizontal:**  $80^\circ$
- **Vertical:**  $65^\circ$

## Interelectrode Capacitances

The capacitances between the internal electrodes and external structures are:

- **Cathode to all other electrodes:** approximately  $5\ \mu\text{F}$
- **Grid #1 to all other electrodes:** approximately  $6\ \mu\text{F}$
- **External conductive coating to anode:**  $1,500\ \mu\text{F}$  minimum to  $2,000\ \mu\text{F}$  maximum

The external conductive coating must be connected to a reliable system ground to utilize the capacitance for high-voltage ripple filtering.

## Pinout and Basing Connection

The tube uses the **12L** basing arrangement. The pin connections, viewed from the bottom of the base, are as follows:

| Pin Number      | Connection                        |
|-----------------|-----------------------------------|
| Pin 1           | Heater (H)                        |
| Pin 2           | Grid #1 (G1)                      |
| Pin 6           | Grid #4 / Focusing Electrode (G4) |
| Pin 10          | Grid #2 (G2)                      |
| Pin 11          | Cathode (K)                       |
| Pin 12          | Heater (H)                        |
| Recessed Button | Anode (J1-21)                     |

# Operating Conditions and Design-Maximum Ratings

All voltage values are positive and referenced to Grid #1, unless otherwise specified.

## Design-Maximum Ratings

These ratings represent the absolute limits within which the tube must be operated to ensure reliability and prevent damage:

- **Anode Voltage:** 12,000 V minimum to 22,000 V maximum
- **Grid #4 (Focusing Electrode) Voltage:** -500 V to +1100 V
- **Grid #2 Voltage:** 25 V minimum to 60 V maximum
- **Cathode Voltage:** 100 V maximum
- **Maximum Grid #1 Circuit Resistance:** 1.5 Megohms

## Typical Operating Conditions (Cathode Drive Service)

In typical cathode-drive service, the video signal is applied to the cathode, and Grid #1 is typically held at a reference potential. Under these conditions, the operating parameters are:

- **Anode Voltage:** 16,000 V
- **Grid #4 (Focusing Electrode) Voltage:** 250 V (Individual tubes focus satisfactorily within a range of 0 V to 500 V under test conditions of 150  $\mu$ A anode current on a 15 1/8 x 12 inch pattern)
- **Grid #2 Voltage:** 35 V
- **Cathode Voltage (for visual extinction of focused raster):** 25 V to 50 V

## Technical Summary

The **19CRP4** is a 19-inch rectangular monochrome cathode ray tube featuring electrostatic focus, 92-degree magnetic deflection, and a low Grid #2 voltage design optimized for cathode-drive applications. It utilizes a P4 aluminized phosphor screen on a gray filter glass faceplate with 78% light transmittance. Operating at a typical anode voltage of 16,000 V and a low Grid #2 potential of 35 V, it provides a bright, focused raster without requiring an ion trap. The tube's heater is rated at 6.3 V, 600 mA with an 11-second warm-up time, making it suitable for standard television receiver designs.

## 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 | 12000 V         | —                          |
| Typical grid 2 voltage            | 25 V            | —                          |
| Maximum heater-cathode voltage    | 180 V           | Heater positive to cathode |

| CHARACTERISTIC    |                 |                  |
|-------------------|-----------------|------------------|
| PARAMETER         | PUBLISHED VALUE | CONDITION / NOTE |
| Focusing method   | Electrostatic   | —                |
| Deflection method | Magnetic        | —                |
| Deflection angle  | 80 deg          | —                |

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