

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	—
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
MAXIMUM SCREEN VOLTAGE	70 V
Low-grid-2 cathode-drive P4 tube; differential ratings referenced to grid No.1.	

19BDP4 — Rectangular Glass Picture Tube

The **19BDP4** is a rectangular glass picture tube designed for television display applications. It features an aluminized screen, low-voltage electrostatic focus, and magnetic deflection. The tube is engineered with a cathode-drive electron gun that operates without the need for an external ion-trap magnet.

Overview and Optical Characteristics

The 19BDP4 utilizes a rectangular glass envelope with a filterglass faceplate. The faceplate has a light transmission rating of approximately 78%, which helps improve picture contrast under ambient lighting

conditions. The screen is coated with an aluminized P4-Sulfide Type phosphor, providing a bright and efficient display.

Key operational features of the 19BDP4 include:

- **Deflection Angle:** 92° magnetic deflection.
- **Focusing Method:** Low-voltage electrostatic focus.
- **Electron Gun:** Cathode-drive design requiring no ion-trap magnet.
- **Operating Position:** Unrestricted (any position).

Mechanical Specifications and Basing

The physical structure of the 19BDP4 is characterized by its rectangular screen and specific mechanical dimensions.

Physical Dimensions and Weight

- **Overall Length:** 15-1/4" ± 3/8"
- **Neck Length:** 5-1/2" ± 3/16"
- **Projected Screen Area:** 172 square inches
- **Weight:** Approximately 15 lbs

External Fittings and Connections

The tube features a regular band-type external conductive coating, which requires a grounding contact area located near the Reference Line. The high-voltage connection is made via a recessed small cavity cap (JEDEC No. J1-21).

The base of the tube can be one of two alternate configurations:

- A Short Small-Shell Duodecal 6-Pin base (JEDEC Group 4, No. B6-203).
- A Small-Shell Duodecal 6-Pin base, Arrangement 1 (JEDEC Group 4, No. B6-63).

The overall pin configuration is designated as the **12L** basing arrangement, viewed from the bottom of the tube.

Pinout Configuration (12L Bottom View)

Pin Number	Connection
Pin 1	Heater
Pin 2	Grid No. 1
Pin 6	Grid No. 4 (Focusing Electrode)
Pin 10	Grid No. 2

Pin Number	Connection
Pin 11	Cathode
Pin 12	Heater
Cap	Ultor (Grid No. 3, Grid No. 5, Collector)
C	External Conductive Coating

Heater and Electrical Characteristics

The 19BDP4 is designed with an indirectly heated cathode that features a controlled warm-up characteristic, making it suitable for series or parallel heater strings.

Heater Ratings

- **Nominal Heater Voltage:** 6.3 V
- **Heater Current:** 600 $\pm$ 10% mA
- **Average Heater Warm-Up Time:** 11 seconds

Interelectrode Capacitances

- **Grid No. 1 to all other electrodes:** 6 μ F
- **Cathode to all other electrodes:** 5 μ F
- **External conductive coating to ultor:** 1500 μ F (minimum) to 2000 μ F (maximum)

Design-Maximum Ratings

The design-maximum ratings represent the absolute limiting values for the safe and reliable operation of the 19BDP4. These ratings must not be exceeded under any operating conditions.

- **Ultor-to-Grid-No. 1 Voltage:** 12,000 V (minimum) to 19,800 V (maximum)
- **Grid-No. 4-to-Grid-No. 1 (Focusing) Voltage:**
 - Positive value: 1100 V (maximum)
 - Negative value: 500 V (maximum)
- **Grid-No. 2-to-Grid-No. 1 Voltage:** 40 V (minimum) to 70 V (maximum)
- **Cathode-to-Grid-No. 1 Voltage:** 100 V (maximum)
- **Heater Voltage:** 5.8 V (minimum) to 7.0 V (maximum)
- **Peak Heater-Cathode Voltage:**
 - Heater negative with respect to cathode:
 - During equipment warm-up period ($\leq$ 15 seconds): 410 V (maximum)
 - After equipment warm-up period: 180 V (maximum)
 - Heater positive with respect to cathode: 180 V (maximum)
- **Maximum Grid-No. 1-Circuit Resistance:** 1.5 M Ω

Typical Operating Conditions

Under typical operating conditions, the 19BDP4 is set up with the following electrode potentials to achieve a focused raster and proper visual extinction:

- **Ultor-to-Grid-No. 1 Voltage:** 14,500 V
- **Grid-No. 2-to-Grid-No. 1 Voltage:** 50 V
- **Grid-No. 4-to-Grid-No. 1 Voltage for Focus:** 0 to 500 V
- **Cathode-to-Grid-No. 1 Voltage for Visual Extinction of Focused Raster:** 31 to 49 V

The low-voltage electrostatic focus design allows the focusing electrode (Grid No. 4) to be operated at or near ground potential, with a range of 0 to 500 V relative to Grid No. 1, simplifying the focus supply circuitry in television receivers.

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

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	—
Heater current	600 mA	—
Heater warm-up time	11 s	—
Maximum anode/ultor voltage	19800 V	—
Minimum anode/ultor voltage	12000 V	—
Typical anode/ultor voltage	19500 V	PictureTubeService
Maximum grid No.2 voltage	70 V	—
Typical grid No.2 voltage	50 V	PictureTubeService
Focus-voltage range minimum	0 V	OptimumFocus
Focus-voltage range maximum	500 V	OptimumFocus
Visual-extinction voltage range minimum	31 V	FocusedRasterExtinction
Visual-extinction voltage range maximum	49 V	FocusedRasterExtinction
Maximum grid No.1 circuit resistance	1.5 megohm	—
X-ray shielding warning	Present	HighAnodeVoltage
Maximum cathode positive bias voltage	100 V	CathodeDrive
Maximum cathode positive peak voltage	150 V	CathodeDrive
Maximum cathode negative peak voltage	2 V	CathodeDrive
Peak heater-cathode voltage during warm-up	410 V	HeaterNegative;Warmup<=15s

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Peak heater-cathode voltage after warm-up	200 V	HeaterNegative
Peak heater-cathode voltage heater positive	180 V	HeaterPositive

CONSTRUCTION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Focusing method	LowVoltageElectrostatic	—
Deflection method	Magnetic	—
Phosphor	P4	—
Screen type	White	P4

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Deflection angle	114 deg	Approximate

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode to all other electrodes capacitance	5 pF	Approximate