



ELECTRONIC TUBE REFERENCE

17DBP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Seventeen-inch direct-view picture and monitor CRT with electrostatic focusing, magnetic deflection, and high-voltage anode operation. Sylvania publishes interelectrode capacitances and an explicit X-ray radiation warning for the tube.

GENERAL CHARACTERISTICS

BASE DESIGNATION	12L	BASE PINS	—
NOMINAL HEATER	6.3 V / 300 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Cathode Ray	
MAXIMUM PLATE VOLTAGE	17600 V
MAXIMUM SCREEN VOLTAGE	550 V
<i>Maximum anode/grid ratings and capacitance presence promoted from supplied Sylvania CRT data. X-ray warning is explicitly published.</i>	

17DBP4 — 17-Inch Television Picture Tube

The **17DBP4** is a 17-inch, direct-viewed, rectangular glass television picture tube designed for monochrome television receivers. It features a low-voltage electrostatic focusing system and magnetic deflection. The tube incorporates an aluminized P4 phosphor screen, which produces white fluorescence with short to medium persistence. To improve picture contrast under ambient light, the faceplate is constructed from a spherical gray filter glass with approximately 74% light transmittance. The 17DBP4 requires an external, single-field type ion trap magnet to prevent ion burn on the phosphor screen, and features an external conductive coating that must be grounded to serve as a high-voltage filter capacitor.

Mechanical Specifications and Physical Construction

The mechanical design of the 17DBP4 utilizes either a J133B or J133D glass bulb. The physical dimensions of the tube provide a minimum useful screen width of 14 5/16 inches and a minimum useful screen height of 11 1/8 inches, resulting in a minimum useful screen area of 149 square inches. The total weight of the tube is approximately 18 pounds.

The faceplate is spherical and made of gray filter glass to reduce reflections and enhance contrast. The electrical connection to the high-voltage anode is made via a recessed small cavity cap (J1-21) located on the bulb cone. The base of the tube is a Small Shell Duodecal 6-Pin base (B6-63), configured according to the 12L basing arrangement.

The external conductive coating on the bulb must be connected to a reliable chassis ground. This coating, in conjunction with the internal anode coating, forms a high-voltage filter capacitor that helps smooth the high-voltage anode supply.

Heater Characteristics and Warm-up Design

The 17DBP4 is equipped with an indirectly heated cathode. The heater is designed to operate under the following nominal electrical conditions:

- **Heater Voltage:** 6.3 V
- **Heater Current:** 0.3 ± 5% A
- **Heater Warm-up Time:** 11 seconds

The heater warm-up time is precisely defined as the time required for the heater to reach 80% of its rated voltage when four times the rated heater voltage (25.2 V) is applied in series with an external resistance. This external resistance is calculated from the nominal heater ratings as follows:

Resistance = (3 * Rated Voltage) / Rated Current = (3 * 6.3 V) / 0.3 A = 63 Ohms

This controlled warm-up characteristic is critical for television receivers utilizing series-connected heater strings, ensuring balanced voltage distribution during the initial power-on phase.

Basing and Pin Connections

The 17DBP4 uses the **12L** basing configuration with a Small Shell Duodecal 6-Pin base (B6-63). The pin assignments, viewed from the bottom of the base, are as follows:

Pin Number	Connection	Description
Pin 1	H	Heater
Pin 2	G1	Grid No. 1 (Control Grid)
Pin 6	G4	Grid No. 4 (Focusing Electrode)
Pin 10	<u>G2</u>	Grid No. 2 (Screen Grid)

Pin Number	Connection	Description
Pin 11	K	Cathode
Pin 12	H	Heater
Cap	Anode	Recessed Small Cavity Cap (J1-21) for Anode, Grid No. 3, and Grid No. 5

Grid No. 4 (the focusing electrode) is designed such that its connection pin aligns with the horizontal centerline of the tube within an angular tolerance of 30°, positioned on the same side of the neck as the anode contact cap. The high-voltage anode connection (which internally connects Grid No. 3, Grid No. 5, and the anode) is made through the recessed small cavity cap on the bulb.

Electrical Characteristics and Interelectrode Capacitances

The interelectrode capacitances of the 17DBP4 are relatively low, which minimizes loading on the video amplifier and deflection circuits. The approximate capacitance values are:

- **Cathode to all other electrodes:** 5 uuf
- **Grid No. 1 to all other electrodes:** 6 uuf
- **External conductive coating to anode:** 750 uuf (Minimum) to 1500 uuf (Maximum)

The capacitance between the external conductive coating and the internal anode serves as a filter capacitor for the high-voltage power supply. The minimum capacitance of 750 uuf is sufficient to suppress ripple when paired with typical high-voltage rectifier circuits.

Operating Conditions and Focus Adjustment

For typical operation in a television receiver, the 17DBP4 is operated under the following conditions:

- **Anode Voltage:** 14,000 V DC
- **Grid No. 2 Voltage:** 300 V DC
- **Grid No. 4 Voltage for Focus:** -50 to +300 V DC
- **Grid No. 1 Voltage for Cutoff:** -35 to -72 V DC
- **Ion Trap Magnet Field Strength:** approx. 30 Gauss

The Grid No. 4 focusing voltage is adjusted within the range of -50 to +300 V DC to achieve the best center focus. This adjustment is typically performed at an anode current of 100 uA over the useful screen area of 14 5/16 x 11 1/8 inches. The Grid No. 1 voltage required to achieve visual extinction of the focused raster (cutoff) ranges from -35 to -72 V DC. An external single-field ion trap magnet with a field strength of approximately 30 Gauss must be adjusted on the neck of the tube to obtain maximum raster brightness and prevent ion spot damage.

Absolute Maximum Ratings and Circuit Limits

To ensure reliable operation and prevent premature failure, the operating voltages of the 17DBP4 must be kept within the following absolute maximum limits:

- **Anode Voltage:** 17,600 V DC
- **Grid No. 4 (Focusing Electrode) Voltage:** -550 to +1100 V DC
- **Grid No. 2 Voltage:** 550 V DC
- **Grid No. 1 Negative Bias Value:** 155 V DC
- **Grid No. 1 Negative Peak Value:** 220 V
- **Grid No. 1 Positive Bias Value:** 0 V DC
- **Grid No. 1 Positive Peak Value:** 2 V
- **Grid No. 1 Circuit Resistance:** 1.5 Megohms Maximum

Heater-Cathode Voltage Limits

The potential difference between the heater and the cathode must be carefully controlled to prevent insulation breakdown. The maximum ratings are:

- **Heater negative with respect to cathode:**
 - During warm-up (first 15 seconds or less): 450 V
 - After warm-up (steady-state operation): 200 V
- **Heater positive with respect to cathode:** 200 V

X-ray Radiation Safety Warning

When operated at high voltages, television picture tubes can produce X-rays. If the 17DBP4 is operated above its maximum rated anode voltage or above 16,000 V (whichever is less), appropriate shielding must be provided in the receiver design to protect users from exposure to X-ray radiation. Under typical operating conditions (14,000 V), the glass envelope itself provides sufficient shielding, but operation near the absolute maximum anode voltage of 17,600 V requires careful safety evaluation and potential external shielding.

Technical Summary

The **17DBP4** is a 17-inch rectangular glass television picture tube utilizing low-voltage electrostatic focusing and magnetic deflection (70° diagonal angle). It features an aluminized P4 white-fluorescing screen with short to medium persistence, housed in a spherical gray filter glass bulb (J133B or J133D) with an external conductive coating. Operating with a 6.3 V, 0.3 A heater that has a controlled 11-second warm-up time, the tube is designed for monochrome television display service. It operates typically at an anode voltage of 14,000 V DC, requiring a Grid No. 4 focusing voltage of -50 to +300 V DC and an external single-field ion trap magnet of approximately 30 Gauss. Its absolute maximum anode voltage is 17,600 V DC, and appropriate X-ray shielding is required if operated above 16,000 V.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1950 Sylvania

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

1950 SYLVANIA

Section 1 · Cathode Ray

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	—
Heater Current	300 mA	—
Cathode To All Other Electrodes Capacitance	5 pF	Approximate

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Voltage	17600 V	—
Maximum Grid2 Voltage	550 V	—
Typical Anode Voltage	14000 V	—

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