

ELECTRONIC TUBE REFERENCE

17BNP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

P4 cathode-ray display tube documented for high-voltage direct-view operation, using magnetic deflection and manufacturer-specified beam focusing and control arrangements appropriate to type 17BNP4.

GENERAL CHARACTERISTICS

BASE DESIGNATION	B6-63	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	18000 V
CRT-specific anode, focus, deflection and optical data retained as parameters rather than forced into ordinary plate/screen fields.	

17BNP4 Cathode Ray Tube

A direct-view, rectangular glass picture tube designed for television applications, featuring electrostatic focus, magnetic deflection, and an aluminized screen.

Overview

The **17BNP4** is a cathode ray tube designed for television display systems. It utilizes electrostatic focusing and magnetic deflection, incorporating a unipotential cathode and an aluminized screen. The tube features a gray filter faceplate and does not require an external ion trap. Depending on the specific design configuration, the nominal raster size is specified as either 10 5/16" x 11 1/8" or 14 5/16" x 11 1/8".

Mechanical and Physical Specifications

The 17BNP4 is constructed with a rectangular glass envelope. Its physical dimensions and tolerances are as follows:

Dimension	Value
Overall Length	14 9/16 ± 3/8 inches
Greatest Diagonal	16 5/8 ± 1/8 inches
Greatest Width	15 3/8 ± 1/8 inches
Greatest Height	12 1/4 ± 1/8 inches
Minimum Useful Screen Diagonal	15 9/16 inches
Minimum Useful Screen Width	14 5/16 inches
Minimum Useful Screen Height	11 1/8 inches
Neck Diameter	1 7/16 inches

The electrical connection to the high-voltage anode is made via a recessed small cavity cap (J1-21) located on the bulb. This contact aligns with pin position #6 within a tolerance of ± 30 degrees. The base is a small shell duodecal 6-pin configuration (B6-63) with a 12L basing arrangement.

Electrical Connections and Basing

The 12L basing arrangement provides the following pin connections, viewed from the bottom of the tube:

- **Pin 1:** Heater
- **Pin 2:** Grid No. 1
- **Pin 6:** Grid No. 4
- **Pin 10:** Grid No. 2
- **Pin 11:** Cathode
- **Pin 12:** Heater
- **Anode Cap:** Grid No. 3, Grid No. 5

The heater is designed for a nominal supply voltage of **6.3 Volts** and draws a nominal current of **0.6 Ampere**.

Deflection, Optical, and Capacitance Characteristics

The tube is designed for magnetic deflection with wide-angle coverage:

- **Horizontal Deflection Angle:** 85 degrees
- **Vertical Deflection Angle:** 68 degrees

- **Diagonal Deflection Angle:** 90 degrees

Optical Performance

The screen utilizes a P-4 phosphor, which provides a white fluorescent and white phosphorescent display with short persistence. The center of the gray filter faceplate has an approximate light transmission of 74%.

Interelectrode Capacitances

The approximate capacitances of the tube electrodes are:

- **Cathode to all other electrodes:** 5 μf
- **Grid #1 to all other electrodes:** 6 μf
- **External conductive coating to anode:** 750 μf (minimum) to 1500 μf (maximum)

Maximum Ratings (Design Center System)

The maximum ratings for the 17BNP4 under Cathode Drive Service are defined as follows:

- **Maximum DC Anode Voltage:** 18,000 Volts (Anode voltage should not be operated below 12,000 Volts to maintain acceptable brilliance and definition)
- **Maximum DC Grid #4 Voltage:** -500 to +1000 Volts
- **Maximum DC Grid #2 Voltage:** 200 Volts
- **Maximum Grid #1 Voltage:**
 - DC negative-bias value: 125 Volts
 - DC positive-bias value: 0 Volts
 - Positive-peak value: 0 Volts
- **Maximum DC Peak Heater-Cathode Voltage:**
 - Heater negative with respect to cathode (during warm-up period $\leq$ 15 seconds): 410 Volts
 - Heater negative with respect to cathode (after warm-up): 180 Volts
 - Heater positive with respect to cathode: 180 Volts
- **Maximum Grid #1 Circuit Resistance:** 1.5 Megohms

Typical Operating Conditions and Drive Configurations

Under typical operating conditions in Cathode Drive Service, the tube is operated with the following parameters:

- **DC Anode Voltage:** 14,000 Volts
- **DC Grid #4 Voltage:** -50 to +350 Volts
- **DC Grid #2 Voltage:** 110 Volts
- **DC Grid #1 Voltage (for visual extinction of focused raster):** -37 to -50 Volts

Grid Drive Operation

The 17BNP4 can also be operated in Grid Drive configurations, though this mode is associated with some loss in efficiency. The average raster cutoff voltage (E_{g1co}) under grid drive can be calculated using the following formulas:

- $E_{g1co} = -(0.502 \times E_{[g2]}(/tubes/G2) + 5.8)$
- $E_{g1co} = -0.502 \times E_{[g2]}(/tubes/G2) + 5.8$

In these calculations, $E_{[g2]}(/tubes/G2)$ represents the DC Grid No. 2 voltage.

Technical Summary

The **17BNP4** is a rectangular, direct-view cathode ray tube designed for television receivers. It features electrostatic focus, magnetic deflection (90-degree diagonal), and a P-4 phosphor screen. Operating with a 6.3 V, 0.6 A heater, the tube is primarily rated for Cathode Drive Service with a typical anode voltage of 14,000 Volts, but it can also be operated in Grid Drive configurations. Its physical design includes a small shell duodecal 6-pin base and a recessed small cavity cap for anode connections, providing a robust and standardized interface for television receivers.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1961 Tung Sol

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

1961 TUNG SOL

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Voltage	18000 V	—
Typical Anode Voltage	14000 V	—
Maximum Grid2 Voltage	200 V	—
Typical Grid2 Voltage	110 V	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
FocusingMethod	Electrostatic	—
DeflectingMethod	Magnetic	—
DiagonalDeflectionAngleApproximate	90 degree	—
PhosphorNumber	4	—
FluorescentColor	White	—
Persistence	Short	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1966 Tung Sol Electronic Tubes 4 of 4

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

1966 TUNG SOL ELECTRONIC TUBES 4 OF 4

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum DC grid 2 voltage	200 V	—
Maximum DC grid 4 voltage	-500–1000 V	—
Maximum grid 1 negative-bias voltage	125 V	NegativeBias
Maximum grid 1 positive-bias voltage	0 V	PositiveBias
Maximum grid 1 positive-peak voltage	0 V	PositivePeak
Peak heater-cathode voltage	410 V	HeaterNegativeWarmup
Peak heater-cathode voltage	180 V	HeaterNegativeAfterWarmup
Peak heater-cathode voltage	180 V	HeaterPositive
DC anode voltage	14000 V	TypicalOperation
DC grid 4 voltage	-50–350 V	TypicalOperation
DC grid 2 voltage	110 V	TypicalOperation
DC grid 1 voltage	-37--50 V	TypicalOperation
Faceplate transmission at center	74 %	Approximate

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Horizontal deflection angle	85 degrees	Approximate
Vertical deflection angle	68 degrees	Approximate
Diagonal deflection angle	90 degrees	Approximate

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode to all other electrodes capacitance	5 pF	Approximate
Grid 1 to all other electrodes capacitance	6 pF	Approximate
External conductive coating to anode capacitance	1500 pF	Maximum
External conductive coating to anode capacitance	750 pF	Minimum

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and their source documents.

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