



ELECTRONIC TUBE REFERENCE

16TP4

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 16TP4.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	5
NOMINAL HEATER	6.3 V / 600 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	3 V
<i>CRT-specific anode, focus, deflection and optical data retained as parameters rather than forced into ordinary plate/screen fields.</i>	

16TP4 — Rectangular Glass Cathode-Ray Tube

The 16TP4 is a direct-view, all-glass rectangular picture tube designed for television applications, featuring magnetic focus and deflection, a spherical gray filter faceplate, and an external conductive coating.

Overview

The **16TP4** is a 16-inch rectangular cathode-ray tube designed primarily for television receiver service. It features an all-glass construction with a space-saving rectangular face shape that provides a nominal raster size of 13 1/2 inches by 10 1/8 inches. The tube utilizes magnetic deflection and magnetic focusing, requiring an external single-field ion-trap magnet to prevent ion burn on the phosphor screen.

To enhance picture quality, the 16TP4 incorporates a spherical gray filter faceplate that improves contrast and detail under high-ambient-light conditions. Additionally, an external conductive coating is applied to the bulb cone, which acts as a high-voltage filter capacitor when connected to ground.

Mechanical Specifications and Optical Characteristics

The 16TP4 is constructed with a rectangular glass envelope and has the following physical dimensions:

Dimension	Value
Overall Length	18 1/8 ± 3/8 inches
Greatest Bulb Diagonal	16 1/8 ± 1/8 inches
Greatest Bulb Width	14 3/4 ± 1/8 inches
Greatest Bulb Height	11 1/2 ± 1/8 inches
Neck Length	6 1/8 inches
Net Weight (Approximate)	16 pounds
Mounting Position	Any

The minimum useful screen dimensions are 14 7/8 inches diagonally, 13 1/2 inches in width, and 10 1/8 inches in height. The bulb number carries the ASA designation **J129-B1**.

Optical Data

The tube's screen uses a **P4** sulfide-type phosphor, which produces a white fluorescent and phosphorescent color with a short persistence. The spherical gray faceplate has an approximate light transmission of 72 percent at the center, which helps maintain picture contrast by reducing reflections and ambient light glare.

Electrical Connections and Basing

The 16TP4 is equipped with a unipotential cathode and a standard heater. The electrical connections are made through a base at the end of the neck and a high-voltage recessed small cavity cap on the side of the bulb.

- **Base:** Small-shell Duodecal (B5-57), available in 5-pin or 15-pin configurations.
- **Basing Designation:** 12N.
- **Anode Contact:** Recessed small cavity cap (J1-21).
- **Bulb Contact Alignment:** The J1-21 anode contact aligns with pin position No. 6 ± 30 degrees.

The pin connections, viewed from the bottom of the base, are assigned as follows:

Pin Number	Connection
Pin 1	Heater
Pin 2	Grid No. 1 (Control Grid)
Pin 10	Grid No. 2 (Screen Grid)
Pin 11	Cathode
Pin 12	Heater
Recessed Cap	Anode / Grid No. 3

Grid No. 3 and the anode are connected together internally and are brought out to the recessed small cavity cap on the bulb cone.

Interelectrode Capacitances

The direct interelectrode capacitances of the 16TP4 are approximately:

- **Cathode to all other electrodes:** 5 μf
- **Grid No. 1 to all other electrodes:** 6 μf
- **External conductive coating to anode (Maximum):** 2000 μf
- **External conductive coating to anode (Minimum):** 750 μf

The external conductive coating must be grounded to utilize its capacitance as a high-voltage filter.

Typical Operating Conditions and Characteristics

The 16TP4 operates with high anode voltages to ensure adequate brightness and focus quality. In general, the anode voltage should not be operated below 10,000 volts, as performance degrades at lower potentials.

The typical operating parameters under standard conditions are:

Parameter	Value
DC Anode & Grid No. 3 Voltage	12,000 Volts
DC Grid No. 2 Voltage	300 Volts
DC Grid No. 1 Voltage (for visual extinction)	-28 to -72 Volts (or -33 to -77 Volts)
DC Focusing Coil Current (Approximate)	99 mA ($\pm 20\%$)
Ion-Trap Field Intensity / Current	35 Gauss (or $75 \pm 50\%$ mA)

Focusing and Deflection Requirements

The deflection system is magnetic, providing approximate deflection angles of:

- **Diagonal:** 70 degrees
- **Horizontal:** 65 to 66 degrees
- **Vertical:** 50 degrees

Focusing is achieved magnetically using a standard focusing coil (such as JETEC No. 109 or equivalent). For proper focus, the distance from the yoke-reference-line to the center of the air gap on the focus coil must be maintained at 3 1/8 inches. The combined Grid No. 1 bias and video signal are typically adjusted to produce a highlight brightness of 35 foot-lamberts on a standard 10 1/8" by 13 1/2" picture.

The electron gun requires an external single-field ion-trap magnet (such as JETEC No. 117 or equivalent) adjusted to its optimum position. This corresponds to an approximate field intensity of 35 Gauss, or a current of $75 \pm 50\%$ mA through a standard No. 111 coil. The space on the neck designated for the ion-trap magnet must be kept clear of other magnetic components.

Maximum Ratings and Circuit Limits

The following maximum ratings are established under the Design-Center system, which incorporates a ten-percent safety factor to accommodate variations in line voltage and component tolerances:

Rating Parameter	Maximum Value
DC Anode & Grid No. 3 Voltage	14,000 Volts
DC Grid No. 2 Voltage	410 Volts
DC Grid No. 1 Negative-Bias Value	125 Volts
DC Grid No. 1 Positive-Bias Value	0 Volts
Grid No. 1 Positive-Peak Value	2 Volts
Grid No. 1 Circuit Resistance	1.5 Megohms

Peak Heater-Cathode Voltage Limits

The cathode should be returned to one side or to the center tap of the heater transformer winding. The maximum peak heater-cathode voltages are:

- **Heater negative with respect to cathode:**
 - During warm-up period (not to exceed 15 seconds): 410 Volts
 - After equipment warm-up period: 150 Volts
- **Heater positive with respect to cathode:** 150 Volts

Technical Summary

The **16TP4** is a 16-inch rectangular, all-glass cathode-ray tube designed for direct-view television applications. It features a **6.3 V, 0.6 A** heater (with a $\pm 10\%$ current tolerance), a unipotential cathode, and a **12N** duodecal basing configuration. Utilizing magnetic focus and deflection with a 70-degree diagonal deflection angle, the tube is optimized for operation at an anode voltage of **12,000 V** (with a design-center maximum of **14,000 V**). Its spherical gray filter faceplate provides a high-contrast white image (P4 phosphor) with short persistence, while its external conductive coating provides integrated high-voltage filtering when grounded.



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

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OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Voltage	14000 V	—
Typical Anode Voltage	12000 V	—
Maximum Grid2 Voltage	410 V	—
Typical Grid2 Voltage	200 V	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
FocusingMethod	Magnetic	—
DeflectingMethod	Magnetic	—
DiagonalDeflectionAngleApproximate	70 degree	—
PhosphorNumber	4	—
FluorescentColor	White	—
Persistence	Short	—



SOURCE OPERATING CONDITIONS

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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

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MAXIMUM DC ANODE S GRID #3 VOLTAGE	3 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
MAXIMUM GRID #1 VOLTAGE	1 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
MAXIMUM GRID #i CIRCUIT RESISTANCE	1.5 mA	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
DC ANODE, GRID #3 VOLTAGE	3 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
DC GRID #2 VOLTAGE	2 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
DC FOCUSING COIL CURRENT (APPRO%.) B – value 1	99 mA	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
DC FOCUSING COIL CURRENT (APPRO%.) B – value 2	20 mA	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
DC ION TRAP CURRENT STANDARD COIL X111 (APPRO%.j – value 1	5 mA	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
DC ION TRAP CURRENT STANDARD COIL X111 (APPRO%.j – value 2	50 mA	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
S IGXAL VOLTAGE ADJUSTED TO PRODUCE A NIGNLIGHT 8RI GMTNESS OF j5 F00T LAw9ERT\$ ~M A 10 1/R" RT – value 1	8 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
S IGXAL VOLTAGE ADJUSTED TO PRODUCE A NIGNLIGHT 8RI GMTNESS OF j5 F00T LAw9ERT\$ ~M A 10 1/R" RT – value 2	10 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
S IGXAL VOLTAGE ADJUSTED TO PRODUCE A NIGNLIGHT 8RI GMTNESS OF j5 F00T LAw9ERT\$ ~M A 10 1/R" RT – value 3	1 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.



SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

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1968 General Electric Co

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1968 GENERAL ELECTRIC CO
Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HeaterOrFilamentVoltageNominal	6.3 V	—
HeaterOrFilamentCurrentNominal	600 mA	—