



ELECTRONIC TUBE REFERENCE

16GP4B

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Direct-view P4 television picture tube using magnetic focusing and deflection, with white medium-persistence fluorescence, approximately 70-degree deflection, and typical 12 kV anode operation.

GENERAL CHARACTERISTICS

BASE DESIGNATION	120	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	14000 V
MAXIMUM SCREEN VOLTAGE	410 V
<i>CRT-specific anode/focus/deflection ratings retained as parameters rather than mapped to ordinary plate/screen fields.</i>	

16GP4B — Direct-View Television Picture Tube

The **16GP4B** is a round, metal-shell direct-view cathode ray picture tube designed primarily for television receiver applications. It features magnetic focus and deflection, a unipotential cathode, and requires an external single-field ion trap magnet. The tube is part of a family of closely related designations, including the [16GP4](#), [16GP4A](#), and [16GP4C](#), sharing identical electrical and mechanical structures but differing in faceplate treatment.

Optical and Faceplate Characteristics

The 16GP4B is specifically distinguished from other members of its family by its faceplate construction, which consists of a frosted grey filter glass. This configuration is designed to control reflections and enhance contrast under ambient lighting conditions. In comparison:

- **16GP4**: Grey filter faceplate (non-frosted)
- **16GP4A**: Clear glass faceplate (non-frosted)
- **16GP4B**: Grey filter, frosted faceplate
- **16GP4C**: Clear glass, frosted faceplate

The faceplate of the 16GP4B provides a light transmission of approximately 65 percent at the center. Due to its frosted grey filter treatment, the specular reflection of ambient light is limited to 2.5 percent.

The tube utilizes Phosphor No. 4, which produces a white fluorescence and a white phosphorescence with medium persistence. The standard raster size produced on the screen is 10 inches by 13 1/4 inches.

Mechanical Construction and Basing

The 16GP4B features a round metal cone construction with a metal shell lip serving as the anode terminal. The physical dimensions and mechanical characteristics of the tube include:

Mechanical Parameter	Value
Overall Length	17 11/16 inches maximum
Greatest Diameter of Bulb	15 7/8 ± 1/8 inches
Minimum Useful Screen Diameter	14 3/8 inches
Bulb Contact	Metal shell lip
Base	Small shell duodecal 5-pin (B5-57)
Basing Designation	<u>12D</u>

The neck of the tube requires a clear space of 4 inches to accommodate the external ion trap magnet.

The 12D basing configuration provides the following pin connections, viewed from the bottom of the base:

- **Pin 1**: Heater
- **Pin 2**: Grid No. 1
- **Pin 10**: Grid No. 2
- **Pin 11**: Cathode
- **Pin 12**: Heater
- **Metal Shell Lip**: Anode / Grid No. 3

Electrical Ratings and Operating Conditions

The electrical design of the 16GP4B operates under specified design center maximum ratings and typical operating conditions.

Heater and Interelectrode Capacitances

The tube is equipped with an indirectly heated unipotential cathode. The nominal heater requirements and approximate direct interelectrode capacitances are:

- **Heater Voltage:** 6.3 Volts
- **Heater Current:** 0.6 Ampere
- **Cathode to all other electrodes:** 5 μF
- **Grid No. 1 to all other electrodes:** 6 μF

Design Center Maximum Ratings

To ensure reliable operation, the following maximum limits must not be exceeded:

- **Maximum DC Anode and Grid No. 3 Voltage:** 14,000 Volts
- **Maximum DC Grid No. 2 Voltage:** 410 Volts
- **Maximum Grid No. 1 Voltage:**
 - DC Negative-bias value: 125 Volts
 - DC Positive-bias value: 0 Volts
 - Positive-peak value: 2 Volts
- **Maximum DC Peak Heater-Cathode Voltage:**
 - Heater negative with respect to cathode (during warm-up period not exceeding 15 seconds): 410 Volts
 - Heater negative with respect to cathode (after equipment warm-up): 150 Volts
 - Heater positive with respect to cathode: 150 Volts
- **Anode Power Limit:** The product of the anode voltage and the average anode current must be limited to a maximum of 6 Watts.

Typical Operating Conditions

Under typical operating conditions, the tube is configured with the following parameters:

- **DC Anode and Grid No. 3 Voltage:** 12,000 Volts (Brilliance and definition decrease with decreasing anode voltage; the anode voltage should generally not be operated below 10,000 Volts).
- **DC Grid No. 2 Voltage:** 300 Volts
- **DC Grid No. 1 Voltage:** -33 to -77 Volts (for visual extinction of the undeflected focused spot).
- **DC Focusing Coil Current:** Approximately 100 mA when using a standard focus coil (such as focus coil #109 or equivalent). This is specified with the combined Grid No. 1 bias voltage and video signal voltage adjusted to produce a highlight brightness of 30 foot-lamberts on a 10-inch by 13-1/4-inch picture size, with the distance from the reference line to the center of the air gap on the focus coil set to 3 inches.

- **Ion Trap Magnet:** The 16GP4B (along with the [16GP4A](#)) requires a rated strength of 35 Gauss for its external single-field ion trap magnet, whereas the [16GP4](#) and [16GP4C](#) require 23 Gauss.
- **Maximum Grid No. 1 Circuit Resistance:** 1.5 Megohms.

Technical Summary

The **16GP4B** is a 70-degree magnetic deflection, magnetically focused television picture tube featuring a round metal construction and a frosted grey filter faceplate. Operating with a 6.3 V, 0.6 A heater, it provides a 10-inch by 13-1/4-inch raster with a medium-persistence white Phosphor No. 4. It is characterized by its 12,000 V typical anode operating potential, a 35 Gauss ion trap magnet requirement, and a duodecal 5-pin base. The frosted grey faceplate reduces specular reflection of ambient light to 2.5% while maintaining a center light transmission of 65%, making it optimized for high-contrast television displays.



SOURCE OPERATING CONDITIONS

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	14000 V	—
Typical Anode Voltage	12000 V	—
Maximum Grid2 Voltage	410 V	—
Typical Grid2 Voltage	300 V	—

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



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

CONSTRUCTION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Focusing method	Magnetic	—
Deflecting method	Magnetic	—
Phosphor	P4	White;MediumPersistence

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Deflection angle	70 deg	Approximate
Faceplate light transmission at center	65 %	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

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	—
Heater current	600 mA	—
Maximum DC anode voltage	14000 V	—
Maximum DC grid #2 voltage	410 V	—
Maximum grid #1 negative-bias magnitude	125 V	—
Maximum grid #1 positive DC bias	0 V	—
Maximum grid #1 positive peak	2 V	—
Typical DC anode voltage	12000 V	TelevisionPictureTube
Typical DC grid #2 voltage	300 V	TelevisionPictureTube
Typical grid #1 voltage minimum	-77 V	VisualExtinctionRange
Typical grid #1 voltage maximum	-33 V	VisualExtinctionRange

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Focusing coil current	200 mA	Approximate
Ion trap magnet strength	35 gauss	Approximate
Maximum heater-cathode voltage during warm-up	410 V	HeaterNegative;Warmup<=15s

APPLICATION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Application	Direct-view television picture tube	—



SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

1968 General Electric Co

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

1968 GENERAL ELECTRIC CO

Section 1 · Cathode Ray

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

TUBE TINKER

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