



ELECTRONIC TUBE REFERENCE

16DP4A

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 60-degree deflection, ion-trap operation, and typical 12 kV anode supply.

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	15000 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>	

16DP4A — Cathode-Ray Picture Tube

The **16DP4A** is a 16-inch round, glass, direct-view cathode-ray picture tube designed primarily for television receiver applications. It features magnetic focusing and magnetic deflection with an approximate deflection angle of 60 degrees. The tube incorporates an electron gun designed for use with an external double-field ion-trap magnet and utilizes a unipotential cathode.

The 16DP4A is closely related to the standard **16DP4**. The two types share identical electrical and mechanical dimensions, with the sole distinction residing in their faceplate construction:

- **16DP4**: Features a clear glass faceplate.

- **16DP4A:** Equipped with a gray filter faceplate designed to enhance picture contrast and detail under high ambient light conditions.

Mechanical Design and Physical Dimensions

The 16DP4A is constructed with a round glass bulb and a spherical faceplate. Its physical dimensions and mechanical characteristics are as follows:

- **Overall Length:** 20 3/4 ± 1/4 inches
- **Greatest Diameter of Bulb:** 15 7/8 ± 1/8 inches
- **Minimum Useful Screen Diameter:** 14 1/2 inches
- **Neck Length:** 7 5/8 inches
- **Bulb Number (ASA Designation):** J127B
- **Bulb Contact:** Recessed small cavity cap (JETEC No. J1-21)
- **Base:** Small-shell duodecal 5-pin (JETEC No. B5-57)
- **Basing Designation:** 12D
- **Mounting Position:** Any
- **Net Weight (Approximate):** 16 1/2 pounds
- **Raster / Picture Size:** Provides a picture size of approximately 10 1/4 by 14 1/2 inches (or 14 1/2 by 10 7/8 inches with rounded sides).

The alignment of the recessed bulb contact (anode terminal) is oriented such that it aligns with the position of pin number 3. The alignment tolerance is specified as ±10 degrees by some sources and ±30 degrees by others. The yoke reference line is determined by the plane of the upper edge of a standard reference-line gage (such as RETMA No. 112) when resting on the cone.

Electron Gun, Heater, and Basing Connections

The 16DP4A utilizes an indirectly heated, coated unipotential cathode. The electrical requirements for the heater and the interelectrode capacitances of the gun structure are:

Parameter	Value
Nominal Heater Voltage	6.3 V
Nominal Heater Current	0.6 A (with a ±10% tolerance)
Cathode to All Other Electrodes Capacitance	5.0 µF (pF)
Grid No. 1 to All Other Electrodes Capacitance	6.0 to 6.5 µF (pF)

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

- **Pin 1:** Heater
- **Pin 2:** Grid No. 1

- **Pin 10:** Grid No. 2
- **Pin 11:** Cathode
- **Pin 12:** Heater
- **Anode Cap:** Recessed small cavity cap (J1-21), which connects internally to the anode and Grid No. 3.

Optical Characteristics

The tube utilizes a phosphor screen with the following properties:

- **Phosphor Number:** P4 (Sulfide Type)
- **Fluorescent Color:** White
- **Phosphorescent Color:** White
- **Persistence:** Short to Medium
- **Faceplate Light Transmission:** The gray filter faceplate of the 16DP4A has an approximate light transmission of 70% to 73% at the center.

Electrical Ratings and Operating Conditions

The operating limits and typical characteristics of the 16DP4A must be carefully observed to ensure proper performance and longevity.

Design-Center Maximum Ratings

These ratings represent the maximum permissible values under the standard design-center system for cathode-ray tubes:

- **Maximum DC Anode Voltage:** 15,000 V
- **Maximum DC Grid No. 2 Voltage:** 410 V
- **Maximum Grid No. 1 Voltage:**
 - *DC Negative-Bias Value:* 125 V
 - *DC Positive-Bias Value:* 0 V
 - *Positive-Peak Value:* 2 V
- **Maximum DC Peak Heater-Cathode Voltage:**
 - *Heater Negative with Respect to Cathode:* 125 V (During a warm-up period not exceeding 15 seconds, a transient peak of up to 410 V is permissible).
 - *Heater Positive with Respect to Cathode:* 125 V
- **Maximum Grid No. 1 Circuit Resistance:** 1.5 Megohms

Typical Operating Conditions

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

- **DC Anode Voltage:** 12,000 V (Note: Brilliance and focus quality decrease with decreasing anode voltage. In general, the anode voltage should not be operated below 9,000 V).
- **DC Grid No. 2 Voltage:** 250 V to 300 V

- **DC Grid No. 1 Voltage (for visual extinction of the focused spot or raster):** -27 V to -72 V (specifically -27 V to -63 V when Grid No. 2 is at 250 V, and -28 V to -72 V when Grid No. 2 is at 300 V).
- **Focusing Coil Current (Approximate):**
 - *101 mA DC* when using a RETMA No. 109 focusing coil positioned with the center of its air gap at 4 1/8 inches from the yoke reference line.
 - *115 mA $\pm$ 15% DC* when using a standard No. 109 focusing coil positioned with the center of its air gap at 3.25 inches from the reference line.
- **Ion-Trap Magnet Adjustment:**
 - Requires an external double-field ion-trap magnet.
 - The approximate field intensity is 35 Gauss, which is equivalent to an operating current of approximately 109 mA to 120 mA through a standard No. 108 ion-trap coil adjusted to the optimum position.

Technical Summary

The **16DP4A** is an all-glass, 16-inch round cathode-ray picture tube designed for television display applications. It features a gray-tinted faceplate with 70% to 73% light transmission to improve contrast under ambient light, distinguishing it from the clear-faced **16DP4**. Operating with a 6.3 V, 0.6 A heater, the tube utilizes magnetic focus and magnetic deflection (60-degree angle) and requires an external double-field ion-trap magnet. Under typical operating conditions, it runs at an anode voltage of 12,000 V (with a design-center maximum of 15,000 V) and a Grid No. 2 voltage of 250 V to 300 V, producing a high-quality white display on its P4 phosphor screen.



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	15000 V	—
Typical Anode Voltage	12000 V	—
Maximum Grid2 Voltage	410 V	—
Typical Grid2 Voltage	300 V	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
DeflectionAngleApproximate	60 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	60 deg	Approximate
Faceplate light transmission at center	70 %	Approximate

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode to all other electrodes capacitance	5 pF	Approximate
Grid #1 to all other electrodes capacitance	6.5 pF	Approximate

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	—
Heater current	600 mA	—
Maximum DC anode voltage	15000 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	250 V	TelevisionPictureTube
Typical grid #1 voltage minimum	-63 V	VisualExtinctionRange
Typical grid #1 voltage maximum	-27 V	VisualExtinctionRange

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Focusing coil current	115 mA	Approximate
Ion trap current	109 mA	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

[SOURCE PDF](#)

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	—