

ELECTRONIC TUBE REFERENCE

16ABP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Direct-view P4 television picture tube using electrostatic focusing and magnetic deflection, with white medium-persistence fluorescence, approximately 70-degree deflection, and typical 14 kV anode operation.

GENERAL CHARACTERISTICS

BASE DESIGNATION	12N	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

SECTION1 Cathode Ray	
MAXIMUM PLATE VOLTAGE	16000 V
MAXIMUM SCREEN VOLTAGE	500 V
CRT-specific anode/focus/deflection ratings retained as parameters rather than mapped to ordinary plate/screen fields.	

16ABP4 — Electrostatic-Focus Television Picture Tube

The **16ABP4** is a direct-view cathode-ray picture tube designed specifically for television receiver applications. It features a rectangular glass construction, electrostatic focusing, and magnetic deflection. The design incorporates a grey filter faceplate to enhance picture contrast under ambient illumination, an external conductive bulb coating, and requires an external single-field ion trap magnet for proper operation.

Mechanical Design and Physical Dimensions

The 16ABP4 is constructed with a rectangular glass bulb envelope. Its physical dimensions and screen characteristics are highly specified to ensure proper mounting and alignment within television cabinets:

- **Overall Length:** $18 \frac{3}{4} \pm \frac{3}{8}$ inches
- **Greatest Bulb Dimensions:**
 - **Diagonal:** $16 \frac{1}{8} \pm \frac{1}{8}$ inches
 - **Width:** $14 \frac{3}{4} \pm \frac{1}{8}$ inches
 - **Height:** $11 \frac{1}{8} \pm \frac{1}{8}$ inches
- **Minimum Useful Screen Dimensions:**
 - **Diagonal:** $14 \frac{7}{8}$ inches
 - **Width:** $13 \frac{1}{2}$ inches
 - **Height:** $10 \frac{1}{2}$ inches
- **Raster Size:** $13 \frac{1}{2} \times 10 \frac{1}{2}$ inches

Bulb Connections and Alignment

The electrical connection to the high-voltage anode is made via a recessed small cavity cap (designated J1-21). The tube base is a small shell duodecal 5-pin base (designated B5-57), which conforms to the 12N basing arrangement.

To ensure proper orientation of the internal electron gun relative to the external deflection yoke and ion trap magnet, the J1-21 anode contact is aligned with pin position #6 on the base within a tolerance of ± 10 degrees. A specific region on the neck must be kept clear for the installation of the external ion trap magnet.

Electrical and Optical Characteristics

The 16ABP4 utilizes a unipotential cathode with an indirectly heated filament.

Heater and Cathode Requirements

The heater is designed to operate under standard television receiver power supply conditions:

Parameter	Value
Heater Voltage	6.3 V
Heater Current	0.6 A

The cathode must be electrically returned to one side or to the center-tap of the heater transformer winding to minimize hum and potential differences.

Interelectrode Capacitances

The tube exhibits the following approximate direct interelectrode capacitances:

- **Cathode to all other electrodes:** 5.0 μF
- **Grid No. 1 to all other electrodes:** 6.5 μF
- **External conductive coating to anode:** 750 μF (minimum) to 1,500 μF (maximum)

The external conductive coating acts as a capacitor in conjunction with the internal anode coating, which can be utilized as a high-voltage filter capacitor when the external coating is grounded.

Optical Specifications

The faceplate of the 16ABP4 is designed to optimize image quality:

- **Phosphor Type:** No. 4
- **Fluorescent Color:** White
- **Phosphorescent Color:** White
- **Persistence:** Medium
- **Faceplate Light Transmission:** Approximately 66% at the center, achieved via a grey filter glass to reduce reflections and enhance contrast.

Ratings and Operating Conditions

The ratings for the 16ABP4 are established under the Design Center system. Operating the tube beyond these limits may impair performance or cause permanent damage.

Maximum Ratings

- **DC Anode, Grid No. 3, and Grid No. 5 Voltage:** 16,000 V
- **DC Grid No. 2 Voltage:** 500 V
- **Grid No. 1 Voltage:**
 - **DC Negative-Bias Value:** 125 V
 - **DC Positive-Bias Value:** 0 V
 - **Positive-Peak Value:** 2 V
- **Peak Heater-Cathode Voltage:**
 - **Heater negative with respect to cathode (during warm-up, ≤ 15 seconds):** 410 V
 - **Heater negative with respect to cathode (after warm-up):** 180 V
 - **Heater positive with respect to cathode:** 180 V

Typical Operating Conditions

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

- **DC Anode, Grid No. 3, and Grid No. 5 Voltage:** 14,000 V
- **DC Grid No. 2 Voltage:** 300 V
- **DC Grid No. 1 Voltage (for visual extinction of an undeflected focused spot):** -33 V to -77 V
- **DC Ion Trap Current (using standard coil #111):** Approximately 75 mA (with a tolerance of $\pm 50\%$)

Circuit Constraints

To prevent grid emission and bias instability, the maximum resistance in the Grid No. 1 circuit must not exceed **1.5 Megohms**.

Pinout and Electrode Connections

The 12N basing diagram, viewed from the bottom of the tube base, provides the following pin connections:

Pin Number	Connection
Pin 1	Heater
Pin 2	Grid No. 1 (Control Grid)
Pin 10	Grid No. 2 (Screen Grid / Accelerating Electrode)
Pin 11	Cathode
Pin 12	Heater
Anode Cap	Grid No. 3 and Grid No. 5 (Focusing and High-Voltage Anode)

The electrostatic focusing is achieved internally, with Grid No. 3 and Grid No. 5 connected to the high-voltage anode terminal (recessed small cavity cap). Magnetic deflection is applied externally via a yoke around the neck of the tube, providing an approximate diagonal deflection angle of 70 degrees.



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	16000 V	—
Typical Anode Voltage	14000 V	—
Maximum Grid2 Voltage	500 V	—
Typical Grid2 Voltage	200 V	—

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



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

Section 1 · Cathode Ray

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

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Deflection angle	70 deg	Approximate
Faceplate light transmission at center	66 %	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	16000 V	—
Maximum DC grid #2 voltage	500 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	14000 V	TelevisionPictureTube
Typical DC grid #2 voltage	300 V	TelevisionPictureTube
Typical grid #1 voltage minimum	-68 V	VisualExtinctionRange
Typical grid #1 voltage maximum	-33 V	VisualExtinctionRange

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Ion trap current	75 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	—