

ELECTRONIC TUBE REFERENCE

17AP4

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 17AP4.

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	15000 V
CRT-specific anode, focus, deflection and optical data retained as parameters rather than forced into ordinary plate/screen fields.	

17AP4 — Cathode Ray Picture Tube

The **17AP4** is a direct-view, rectangular glass cathode ray picture tube designed primarily for television receiver applications. It features a unipotential cathode, a grey filter faceplate to enhance picture contrast under ambient light, and an external conductive bulb coating. The tube utilizes magnetic focusing and magnetic deflection to control the electron beam.

Mechanical and Physical Characteristics

The 17AP4 is constructed with a rectangular glass envelope. Its physical dimensions and screen characteristics are highly standardized to facilitate mounting in television cabinets:

- Overall Length:** 18-5/8 ± 3/8 inches

- **Greatest Bulb Dimensions:**
 - **Diagonal:** 16-5/8 ± 1/8 inches
 - **Width:** 15-3/8 ± 1/8 inches
 - **Height:** 12-1/4 ± 1/8 inches
- **Minimum Useful Screen Dimensions:**
 - **Diagonal:** 15-1/8 inches
 - **Width:** 14-1/4 inches
 - **Height:** 10-3/4 inches
- **Raster Size:** 10-3/8" x 14-1/4" (also documented as 10-3/4" x 14-1/4")

The tube's electrical connection to the high-voltage anode is made via a recessed small cavity cap (J1-21) located on the bulb cone. This contact is aligned with the vacant pin position #6 on the base within a tolerance of ±30 degrees. The base itself is a small shell duodecal 5-pin configuration (B5-57) with a 12N basing arrangement.

Electrical and Basing Configuration

The 17AP4 uses a five-pin base arrangement that provides connections to the heater, cathode, control grid, and screen grid. The high-voltage focusing and accelerating anode connection is made separately through the bulb cap.

Pin Connections (Bottom View)

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
Anode Cap	Grid No. 3 / Anode

Heater and Interelectrode Capacitances

The unipotential cathode is indirectly heated. The heater is designed for parallel operation in television receivers:

- **Heater Voltage:** 6.3 Volts (AC or DC)
- **Heater Current:** 0.6 Ampere
- **Calculated Heater Power:** 3.78 Watts

The direct interelectrode capacitances of the tube are approximately:

- **Cathode to all other electrodes:** 5 μF
- **Grid No. 1 to all other electrodes:** 7 μF
- **External conductive coating to anode:** 750 μF (minimum) to 2000 μF (maximum)

The external conductive coating forms a capacitor with the internal anode coating when the tube is installed, which can be utilized as a high-voltage filter capacitor for the receiver's power supply.

Optical and Screen Properties

The screen of the 17AP4 is coated with Phosphor No. 4, which is optimized for television display service:

- **Fluorescent Color:** White
- **Phosphorescent Color:** White
- **Persistence:** Medium
- **Faceplate Light Transmission:** Approximately 66% at the center of the faceplate

The grey-tinted faceplate reduces reflections and improves the contrast ratio of the displayed image by absorbing ambient light twice (once as it enters the faceplate and again as it reflects off the phosphor screen) while absorbing the emitted light from the phosphor only once.

Operating Conditions and Maximum Ratings

The 17AP4 is rated under the Design Center system. Operating the tube beyond these limits may impair performance or cause permanent damage.

Maximum Ratings

Parameter	Design Center Value
Maximum DC Anode Voltage	16,000 Volts
Maximum DC Grid No. 2 Voltage	410 Volts
Maximum Grid No. 1 DC Negative-Bias Value	125 Volts
Maximum Grid No. 1 DC Positive-Bias Value	0 Volts
Maximum Grid No. 1 Positive-Peak Value	2 Volts
Maximum DC Peak Heater-Cathode Voltage:	
<i>Heater negative with respect to cathode (during warm-up ≤ 15 s)</i>	410 Volts
<i>Heater negative with respect to cathode (after warm-up)</i>	150 Volts
<i>Heater positive with respect to cathode</i>	150 Volts

Typical Operating Conditions

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

- **DC Anode Voltage:** 12,000 Volts
- **DC Grid No. 2 Voltage:** 300 Volts
- **DC Grid No. 1 Voltage:** -33 to -77 Volts (for visual extinction of an undeflected focused spot)
- **Maximum Grid No. 1 Circuit Resistance:** 1.5 Megohms

Focus and Deflection Requirements

The 17AP4 requires external magnetic fields for both focusing and deflection:

- **Deflection Method:** Magnetic
- **Deflection Angles (Approximate):** Horizontal: 65°, Diagonal: 70°
- **Focusing Method:** Magnetic
- **DC Focusing Coil Current:** $100 \pm 20\%$ mA. This value is specified using a standard focus coil #109 or equivalent, positioned such that the distance from the reference line to the center of the focus coil air gap is 3.0 inches. This current is measured with the combined Grid No. 1 bias and video signal adjusted to produce a highlight brightness of 25 foot-lamberts on a 14-1/4" x 10-3/4" raster.
- **Ion Trap:** The tube requires an external single-field ion trap.
- **DC Ion Trap Current:** $75 \pm 50\%$ mA when using standard ion trap coil #111.

The ion trap magnet must be adjusted properly to prevent ion burn on the phosphor screen and to ensure maximum brightness and spot focus.

Technical Summary

The **17AP4** is a 16-inch class rectangular glass cathode ray tube designed for direct-view television receivers. It features a 6.3 V, 0.6 A heater, a unipotential cathode, and a grey filter faceplate with approximately 66% light transmission. Utilizing magnetic deflection (65° horizontal, 70° diagonal) and magnetic focusing, it operates typically at an anode voltage of 12,000 V (with a design center maximum of 16,000 V) and a screen grid voltage of 300 V. Beam alignment and ion protection are managed via an external single-field ion trap. The tube's external conductive coating provides a capacitance of 750 to 2000 μF against the anode, serving as an integral part of the receiver's high-voltage filtering system.



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

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
FocusingMethod	Magnetic	—
DeflectingMethod	Magnetic	—
DiagonalDeflectionAngleApproximate	70 degree	—
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

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum DC grid 2 voltage	410 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	2 V	PositivePeak
Peak heater-cathode voltage	410 V	HeaterNegativeWarmup
Peak heater-cathode voltage	150 V	HeaterNegativeAfterWarmup
Peak heater-cathode voltage	150 V	HeaterPositive
DC anode voltage	12000 V	TypicalOperation
DC grid 2 voltage	300 V	TypicalOperation
DC grid 1 voltage	-33--77 V	TypicalOperation

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Horizontal deflection angle	65 degrees	Approximate
Diagonal deflection angle	70 degrees	Approximate

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode to all other electrodes capacitance	5 pF	Approximate
Grid 1 to all other electrodes capacitance	7 pF	Approximate
External conductive coating to anode capacitance	2000 pF	Maximum
External conductive coating to anode capacitance	750 pF	Minimum

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