

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA
1 SECTION
CONSTRUCTION
CATHODERAY

17CP4

Specialized - Cathode Ray electronic tube

Seventeen-inch direct-view television picture tube with magnetic focusing and magnetic deflection. Its unipotential electron gun, high-voltage anode operation, optical screen characteristics, and external ion-trap system are documented for receiver service.

GENERAL CHARACTERISTICS

BASE DESIGNATION	12D	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 SCREEN VOLTAGE	410 V
CRT electron-gun/display section; published electrode ratings promoted where unambiguous.	

17CP4 — Rectangular Metal-Cone Cathode Ray Picture Tube

The **17CP4** is a 17-inch rectangular, metal-cone, direct-view cathode ray picture tube designed for television applications. It features magnetic focus and magnetic deflection, utilizing an external single-field ion-trap magnet to prevent screen damage. The tube incorporates a unipotential cathode and a high-efficiency sulfide-type phosphor screen that produces a white fluorescent and phosphorescent display.

Designations and Physical Construction

The 17CP4 family includes two closely related variants:

- **17CP4:** Features a spherical, gray, frosted faceplate that reduces specular reflection of ambient light (limited to a maximum of 1.5%) and enhances picture contrast.
- **17CP4A:** Identical to the 17CP4 but utilizes an unfrosted faceplate.

The physical envelope of the tube is constructed with a lightweight metal cone. Because the metal cone operates at high voltage, it must be properly insulated to withstand the maximum applied anode voltage. The faceplate is made of filter glass with a light transmission of approximately 65% to 66% at the center.

The mechanical dimensions of the tube are as follows:

- **Overall Length:** 19 inches
- **Greatest Bulb Dimensions:**
 - Diagonal: $16 \frac{13}{16} \pm \frac{3}{16}$ inches
 - Width: $15 \frac{15}{16} \pm \frac{1}{8}$ inches
 - Height: $12 \frac{1}{4} \pm \frac{1}{8}$ inches
- **Minimum Useful Screen Dimensions:**
 - Width: $14 \frac{5}{8}$ inches (or $14 \frac{3}{8}$ inches in some configurations)
 - Height: 11 inches (or $10 \frac{11}{16}$ inches in some configurations)
 - Raster/Picture Size: $14 \frac{5}{8}$ " x 11" or $14 \frac{3}{4}$ " x $10 \frac{11}{16}$ "
- **Net Weight:** Approximately 10 lbs.

The tube provides wide deflection angles to cover the rectangular screen area:

- **Horizontal Deflection Angle:** 66°
- **Vertical Deflection Angle:** 50°
- **Diagonal Deflection Angle:** 70°

Electrical Specifications and Base Connections

The 17CP4 uses a small-shell Duodecal 5-pin base (JETEC No. B5-57) with a 12D basing designation. The electrical connections are made through the base pins and a metal shell lip, which serves as the anode contact. The anode and Grid No. 3 are connected internally.

Depending on the specific manufacturing standard, the base alignment is specified as either Pin No. 6 aligning with the horizontal picture axis within ± 10 degrees, or Pin No. 3 aligning with the horizontal picture axis within ± 30 degrees.

Pin Connections (Bottom View)

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

Interelectrode Capacitances

- **Cathode to all other electrodes:** Approximately 5 μF
- **Grid No. 1 to all other electrodes:** Approximately 6 μF

Absolute and Design-Center Ratings

The operating limits of the 17CP4 must be strictly observed to ensure reliable operation and prevent damage to the tube:

- **Heater Voltage:** 6.3 V
- **Heater Current:** 0.6 A (with a tolerance of $\pm 10\%$)
- **Maximum DC Anode Voltage:** 16,000 V (The product of the anode voltage and the average anode current must be limited to 6 W)
- **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 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
- **Maximum Grid No. 1 Circuit Resistance:** 1.5 Megohms

Typical Operating Conditions and Adjustments

The 17CP4 can be operated under slightly different typical conditions depending on the desired brightness and focus characteristics. Brilliance, focus quality, and definition decrease with decreasing anode voltage, and the anode voltage should not be operated below 12,000 V.

Operating Point Examples

Two typical operating configurations are documented:

Parameter	Configuration A	Configuration B
DC Anode Voltage	12,000 V	14,000 V
DC Grid No. 2 Voltage	300 V	300 V
DC Grid No. 1 Voltage	-33 V to -77 V (for visual extinction of undeflected focused spot)	-28 V to -72 V (for visual extinction of focused raster)
Focusing Coil Current	$96 \pm 6\%$ mA	112 mA

Parameter	Configuration A	Configuration B
Ion-Trap Field Intensity	45 Gauss	37 Gauss

Focusing and Ion-Trap Adjustments

For Configuration A, the focusing coil current of $96 \pm 6\%$ mA is specified for a standard focus coil No. 109 or equivalent. This is measured with the combined Grid No. 1 bias and video signal adjusted to produce a highlight brightness of 30 foot-lamberts on a 10 11/16" x 14 3/8" picture size, with the focus coil air gap center positioned 3.0 inches from the reference line. The ion-trap current is approximately 70 mA using a standard coil No. 111, establishing a field strength of 45 Gauss.

For Configuration B, the focusing coil current of 112 mA DC is specified for a RETMA focusing coil No. 109, with a 3 1/2" distance from the yoke reference line to the center of the air gap. The ion-trap field intensity of 37 Gauss is achieved by adjusting a single-field ion-trap magnet to its optimum position, which is equivalent to 37 mA through a RETMA magnet No. 117.

Technical Summary

The **17CP4** is a high-voltage, rectangular, metal-cone television picture tube featuring a 17-inch screen, magnetic focus, and magnetic deflection. It operates with a nominal 6.3 V, 0.6 A heater and is rated for a maximum DC anode voltage of 16,000 V. The tube utilizes a Sulfide Type No. 4 (P4) white phosphor screen with medium/short persistence. The 17CP4 variant features a frosted faceplate to minimize ambient reflections, while the [17CP4A](#) variant uses an unfrosted faceplate. With its standard Duodecal 5-pin base and robust design-center ratings, the 17CP4 provides reliable direct-view imaging for vintage television applications.



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
Heater voltage	6.3 V	Nominal
Anode voltage	16 V	Published CRT operating condition
Grid 2 voltage	410 V	Published CRT operating condition



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 Grid No. 2 voltage	410 V	Published maximum Grid No. 2 voltage
FACEPLATE LIGHT TRANSMISSION AT CENTER (APPROX.)	65 %	FACEPLATE LIGHT TRANSMISSION AT CENTER (APPROX.) 65 PERCENT
HEATER VOLTAGE	6.3 V	HEATER VOLTAGE 6.3 VOLTS
HEATER CURRENT	600 mA	HEATER CURRENT 0.6 AMP.
MAXIMUM OC ANODE VOLTAGE A 16 OQ	0 V	MAXIMUM OC ANODE VOLTAGE A 16 OQO VOLTS
MAXIMUM DC GRID #2 VOLTAGE	410 V	MAXIMUM DC GRID #2 VOLTAGE 410 VOLTS
HEATER POSITIVE WITH RESPECT TO CATHODE	180 V	HEATER POSITIVE WITH RESPECT TO CATHODE 180 VOLTS

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
DC ANODE VOLTA 6E B	12000 V	DC ANODE VOLTA 6E B 12 000 VOLTS
DC GRID #2 VOLTAGE	300 V	DC GRID #2 VOLTAGE 300 voLTs
DC ION TRAP CURRENT STANDARD COIL #111 (APPROX.)	70 mA	DC ION TRAP CURRENT STANDARD COIL #111 (APPROX.) 70 MA.
MAXIMUM GRID #1 CIRCUIT RESISTANCE	1.5 Mohm	MAXIMUM GRID #1 CIRCUIT RESISTANCE 1.5 MEGOHMS

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
CATHODE TO ALL OTHER ELECTRODES	5 MMF	CATHODE TO ALL OTHER ELECTRODES 5 µmf



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
AnodeVoltageTypical	14000 V	—
Grid2VoltageMaximum	410 V	—