

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

CATHODERAY

17VP4

Specialized - Cathode Ray electronic tube

High-voltage P4 cathode-ray picture-display tube using magnetic deflection, with manufacturer data supporting wide-angle scanning and typical anode operation in the 12-14 kV range.

GENERAL CHARACTERISTICS

BASE DESIGNATION	12L	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	350 V
MAXIMUM SCREEN VOLTAGE	5 V
CRT-specific electrode/focus/deflection data retained as parameter rows.	

17VP4 — Direct-View Cathode Ray Picture Tube

The **17VP4** is a rectangular, direct-view cathode ray picture tube designed primarily for use in television receivers. It features a low-voltage electrostatic focusing system combined with magnetic deflection. The tube incorporates a unipotential cathode, an external single-field ion trap, and an external conductive coating that serves as a filter capacitor when grounded.

A closely related variant, the **17VP4B**, is identical to the 17VP4 in all electrical and mechanical characteristics except that it features an aluminized screen, whereas the standard 17VP4 utilizes a non-aluminized screen.

Mechanical Specifications and Physical Dimensions

The 17VP4 is constructed with a rectangular glass envelope and a cylindrical, neutral density faceplate. The physical dimensions of the tube are as follows:

- **Overall Length:** $19 \frac{3}{16} \pm \frac{3}{8}$ inches (with some specifications indicating $19 \frac{3}{8} \pm \frac{3}{8}$ inches)
- **Neck Length:** $7 \frac{1}{2}$ inches
- **Greatest Bulb Dimensions:**
 - Diagonal: $16 \frac{5}{8} \pm \frac{1}{8}$ inches
 - Width: $15 \frac{3}{8} \pm \frac{1}{8}$ inches (with some variants specified at $15 \frac{25}{64} \pm \frac{1}{8}$ inches)
 - Height: $12 \frac{9}{32} \pm \frac{1}{8}$ inches (with some variants specified at $12 \frac{1}{4} \pm \frac{1}{8}$ inches)
- **Minimum Useful Screen Dimensions:**
 - Diagonal: $15 \frac{1}{2}$ to $15 \frac{3}{4}$ inches
 - Width: $14 \frac{1}{4}$ to $14 \frac{1}{2}$ inches
 - Height: $10 \frac{3}{4}$ to $10 \frac{7}{8}$ inches
- **Raster Size:** $10 \frac{7}{8}$ inches by $14 \frac{1}{2}$ inches (or $10 \frac{3}{4}$ inches by $14 \frac{1}{4}$ inches depending on the specific screen area configuration)
- **Net Weight:** Approximately 18 pounds
- **Bulb Number (ASA):** J133-C1

The tube uses a **Small-shell Duodecal 6-Pin** base (JETEC No. B6-63) and a **Recessed Small Cavity Cap** (JETEC No. J1-21) for the high-voltage anode connection. The bulb contact is aligned such that the anode cap aligns with pin position No. 6 within a tolerance of ± 30 degrees. The tube can be mounted and operated in any position.

Electron Gun, Heater, and Pinout

The electron gun of the 17VP4 utilizes a unipotential cathode and a low-voltage electrostatic focusing electrode. The heater is designed for standard television receiver supplies:

- **Heater Voltage:** 6.3 Volts
- **Heater Current:** 0.6 Ampere (with a tolerance of $\pm 10\%$)

Pin Connections (Basing 12L)

The tube uses the **12L** basing arrangement. Viewed from the bottom of the base, the pin connections are assigned as follows:

Pin Number	Connection
Pin 1	Heater
Pin 2	Grid No. 1 (Control Grid)
Pin 6	Grid No. 4 / Focusing Electrode (also designated as Anode No. 1 or Anode No. 4)

Pin Number	Connection
Pin 10	Grid No. 2 (Screen Grid)
Pin 11	Cathode
Pin 12	Heater
Anode Cap	Grid No. 3 / Anode (internally connected)

Interelectrode Capacitances

The approximate direct interelectrode capacitances of the 17VP4 are:

- **Cathode to all other electrodes:** 5 μF
- **Grid No. 1 to all other electrodes:** 6 μF
- **External conductive coating to anode:** 750 μF (minimum) to 1500 μF (maximum)

The external conductive coating, when properly grounded, forms a high-voltage filter capacitor with the internal anode coating, aiding in the ripple filtration of the high-voltage anode power supply.

Optical and Deflection Characteristics

The 17VP4 is equipped with a cylindrical gray faceplate designed to reduce specular reflection and enhance picture contrast under high ambient light conditions.

- **Phosphor:** Type P4 (Sulfide type)
- **Fluorescent Color:** White
- **Phosphorescent Color:** White
- **Persistence:** Short
- **Faceplate Light Transmission:** Approximately 58% to 72% at the center (with some specifications indicating a nominal 72%)

Deflection Angles

The tube is designed for magnetic deflection with the following approximate deflection angles:

- **Diagonal:** 70 Degrees
- **Horizontal:** 65 to 66 Degrees
- **Vertical:** 50 Degrees

Electrical Ratings and Operating Conditions

The electrical ratings of the 17VP4 are established under the Design-Center system. These maximum limits must not be exceeded under any operating conditions.

Design-Center Maximum Ratings

- **Anode Voltage (Grid No. 3, Anode):** 16,000 Volts DC (with protective face viewing window)
- **Focusing Electrode (Grid No. 4 / Anode No. 1 / Anode No. 4) Voltage:** -500 to +1000 Volts DC
- **Focusing Electrode Current:** -15 to +25 Microamperes DC (measured at design-center maximum anode voltage plus 10%)
- **Grid No. 2 Voltage:** 500 Volts DC
- **Grid No. 1 Voltage:**
 - DC Negative-bias value: 125 Volts DC
 - DC Positive-bias value: 0 Volts DC
 - Positive-peak value: 2 Volts
- **Peak Heater-Cathode Voltage:**
 - Heater negative with respect to cathode during warm-up period (not to exceed 15 seconds): 410 Volts
 - Heater negative with respect to cathode after equipment warm-up: 180 Volts
 - Heater positive with respect to cathode: 180 Volts
- **Grid No. 1 Circuit Resistance:** 1.5 Megohms (maximum)

Typical Operating Conditions

The 17VP4 can be operated under different typical anode voltage conditions. Two representative operating points illustrate the performance of the tube:

Operating Point A (12,000 Volt Operation)

- **Anode Voltage:** 12,000 Volts DC
- **Focusing Electrode Voltage:** -48 to +260 Volts DC
- **Grid No. 2 Voltage:** 300 Volts DC
- **Grid No. 1 Voltage (for visual extinction of undeflected focused spot):** -33 to -77 Volts DC
- **Ion Trap Current (Standard Coil No. 111):** $75 \pm 50\%$ mA
- **Ion Trap Field Intensity:** 35 Gauss (using a single-field ion trap adjusted to the optimum position)

Operating Point B (14,000 Volt Operation)

- **Anode Voltage:** 14,000 Volts DC (Note: The anode voltage should not be operated below 12,000 Volts, as brightness and focus quality degrade significantly below this level)
- **Focusing Electrode Voltage:** -56 to +308 Volts DC
- **Grid No. 2 Voltage:** 300 Volts DC
- **Grid No. 1 Voltage (for visual extinction of focused raster):** -28 to -72 Volts DC
- **Ion Trap Field Intensity:** 37 Gauss (equivalent to 37 mA through JETEC ion-trap magnet No. 117)

The focusing electrode voltage can be modulated within its maximum range without causing damage to the tube. Under specific test conditions (such as using an Indian Head test pattern with blacks adjusted to be just black, yielding an average beam current of 100 μ A on a 10 3/4" by 14 1/4" picture area), the focusing voltage range is typically -64 to +350 Volts.



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	18000 V	—
Typical Anode Voltage	14000 V	—
Maximum Grid2 Voltage	500 V	—
Typical Grid2 Voltage	300 V	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
FocusingMethod	Magnetic	—
DeflectingMethod	Magnetic	—
DeflectionAngleApproximate	90 degree	—
PhosphorNumber	4	—
FluorescentColor	White	—



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

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
FACEPLATE LIGHT TRANSMISSION AT CENTER (gPPROX.) – value 1	58 percent	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
FACEPLATE LIGHT TRANSMISSION AT CENTER (gPPROX.) – value 2	72 percent	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
HEATER VOLTAGE	6.3 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
HEATER POSITIVE WITH RESPECT TO CATHODE	1 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM GRID M1 CIRCUIT RESISTANCE	1.5 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
PATTERN WITH THE BL ACNS JUST BL AC N, TO GIVE AN AVERAGE BEAM CURRENT OF 100 MICRO AMPERES ON A	100	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC ANODE N2,, GRID N} VOLTAGE	12 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC ANODE N1 VOLTAGE (FOCUSING ELECTRODE)	260 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC GRID M2 VOLTAGE	3 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC ION TRAP CURRENT STANDARD COIL 8111 – value 1	8111 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC ION TRAP CURRENT STANDARD COIL 8111 – value 2	75 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
ION TRAP FIELD INTENSITY (APPROX.)D	35	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MAXIMUM ANODE 81 VOLTAGE RANGE FOR FOCUS B – value 1	81 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM ANODE 81 VOLTAGE RANGE FOR FOCUS B – value 2	-64 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM ANODE 81 VOLTAGE RANGE FOR FOCUS B – value 3	350 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM DC GRID N2 VOLTAGE	5 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM DC ANODE #i VOLTAGE	-5 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM DC ANODE IM1 CURRENT RANGE – value 1	-15 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM DC ANODE IM1 CURRENT RANGE – value 2	25 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.



SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

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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
AnodeVoltageMaximum	16000 V	—
AnodeVoltageTypical	14000 V	—
Grid2VoltageMaximum	500 V	—



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