

ELECTRONIC TUBE REFERENCE

17LP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Seventeen-inch direct-view monochrome television picture tube with magnetic focusing, magnetic deflection, and an aluminized P4 white screen. Its approximately 90-degree deflection and high-voltage design support large-screen receiver display service.

GENERAL CHARACTERISTICS

BASE DESIGNATION	12L	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	16000 V
MAXIMUM SCREEN VOLTAGE	500 V
CRT-specific electrode/focus/deflection data retained as parameter rows.	

17LP4 — Direct-View Cathode Ray Picture Tube

The **17LP4** is a 17-inch, direct-view, rectangular glass cathode ray picture tube designed primarily for television receiver applications. It features magnetic deflection, low-voltage electrostatic focusing, a cylindrical grey filter faceplate, and an external conductive envelope coating.

A closely related variant, the **17LP4A**, is identical to the 17LP4 in all physical and electrical characteristics except that it incorporates an aluminized screen to enhance picture brightness, whereas the standard 17LP4 utilizes a non-aluminized screen.

Physical and Optical Characteristics

The 17LP4 is constructed with a rectangular glass bulb and a cylindrical grey filter faceplate. The faceplate is designed to improve picture contrast under ambient room lighting. Depending on the specification, the light transmission of this faceplate is rated at approximately 72%, or approximately 66% at the center.

Screen and Phosphor Specifications

The tube utilizes a sulfide-type **Phosphor No. 4 (P4)**, which produces a white fluorescence and a white phosphorescence with medium persistence. The minimum useful screen dimensions and physical boundaries are:

- **Minimum Useful Screen Diagonal:** 15 5/16 inches
- **Minimum Useful Screen Width:** 14 1/4 inches
- **Minimum Useful Screen Height:** 10 3/4 inches (with a typical raster size of 14 1/4 inches x 10 3/8 inches)

Physical Dimensions

The envelope dimensions of the tube are as follows:

Dimension	Value
Overall Length	19 3/16 ± 3/8 inches
Greatest Diagonal Dimension	16 5/8 ± 1/8 inches
Greatest Width	15 3/8 ± 1/8 inches
Greatest Height	12 1/4 ± 1/8 inches

Deflection and External Components

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

- **Horizontal Deflection Angle:** 65 degrees
- **Diagonal Deflection Angle:** 70 degrees

To prevent ion burn on the screen, the tube requires an external, single-field ion trap magnet (such as a RETMA #111 or equivalent) positioned on the neck. Additionally, the outer surface of the funnel is coated with an external conductive layer. This coating must be grounded and forms a high-voltage filter capacitor in conjunction with the internal conductive coating (collector).

Electrical Connections and Pinout

The 17LP4 uses a **Small Shell Duodecal 6-Pin base (B6-63)** with a **12L** basing configuration. High-voltage connection to the anode (comprising Grid No. 3, Grid No. 5, and the collector) is made via a

Recessed Small Cavity Cap (J1-21) located on the side of the bulb. The cavity cap is aligned with pin position No. 6 within a tolerance of ± 30 degrees.

Heater Ratings

The heater is designed for AC or DC operation:

- **Heater Voltage:** 6.3 Volts
- **Heater Current:** Approximately 0.6 Ampere

Pin Assignment (Bottom View)

The electrical connections for the 12L basing arrangement are detailed below:

Pin / Cap	Connection	Description
Pin 1	Heater	Filament supply
Pin 2	Grid No. 1	Control grid
Pin 6	Grid No. 4	Focusing electrode
Pin 10	Grid No. 2	Accelerating electrode
Pin 11	Cathode	Electron emitter
Pin 12	Heater	Filament supply
Anode Cap	Grid No. 3, Grid No. 5, Collector	High-voltage anode

Interelectrode Capacitances

The direct interelectrode capacitances of the tube are approximately:

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

Absolute and Design-Maximum Ratings

The following limits are established under the Design Center system and represent the maximum safe operating boundaries for the 17LP4:

Parameter	Rating
Maximum DC Grid No. 3, Grid No. 5, Collector (Anode) Voltage	16,000 Volts
DC Grid No. 4 (Focusing Electrode) Voltage	-500 to +1000 Volts

Parameter	Rating
Maximum DC Grid No. 2 Voltage	500 Volts
Maximum DC Grid No. 1 Negative-Bias Value	125 Volts
Maximum DC Grid No. 1 Positive-Bias Value	0 Volts
Maximum Peak Grid No. 1 Positive Value	2 Volts
Maximum Grid No. 1 Circuit Resistance	1.5 Megohms
Maximum Grid No. 4 Circuit Resistance	1.5 Megohms

Heater-Cathode Voltage Limits

To prevent insulation breakdown between the heater and cathode, the peak heater-cathode voltage must not exceed the following limits:

- **Heater negative with respect to cathode during warm-up (≤ 15 seconds):** 410 Volts DC
- **Heater negative with respect to cathode after warm-up:** 180 Volts DC
- **Heater positive with respect to cathode:** 180 Volts DC

Typical Operating Conditions and Characteristics

The 17LP4 can be operated under different anode voltage configurations. While typical characteristics are often specified at an anode potential of 12,000 V, a recommended operating point of 14,000 V is also documented. Operating the tube below 14,000 V may result in a decrease in picture brilliance and definition.

Operating Points Comparison

Parameter	12,000 V Operating Point	14,000 V Operating Point
Anode (Collector) Voltage	12,000 V DC	14,000 V DC
Grid No. 2 Voltage	300 V DC	300 V DC
Grid No. 4 (Focus) Voltage	-48 to +260 V DC	-56 to +310 V DC
Grid No. 1 Voltage (for visual extinction)	-33 to -77 V DC	-33 to -77 V DC
Grid No. 4 Current	-15 to +25 μ A	-15 to +25 μ A
Grid No. 2 Current	-15 to +15 μ A	-15 to +15 μ A
Ion Trap Field Strength	35 Gauss	35 Gauss

Focusing Voltage Calculations

The electrostatic focusing electrode (Grid No. 4) operates at a low voltage relative to the high-voltage collector. The focus range is designed to cover **-0.4% to +2.2%** of the collector voltage.

- **Calculation at 12,000 V:**

- Minimum focus voltage: $12,000 \text{ V} * (-0.004) = -48 \text{ V}$
- Maximum focus voltage: $12,000 \text{ V} * 0.022 = +264 \text{ V}$ (specified as approximately +260 V)

- **Calculation at 14,000 V:**

- Minimum focus voltage: $14,000 \text{ V} * (-0.004) = -56 \text{ V}$
- Maximum focus voltage: $14,000 \text{ V} * 0.022 = +308 \text{ V}$ (specified as approximately +310 V)

These calculations demonstrate how the focusing voltage scales proportionally with the overall anode potential to maintain a sharp, undeflected spot.

Safety Considerations

When operating the 17LP4, appropriate safety precautions must be observed regarding high voltages and potential radiation. If the tube is operated at or near its maximum rated anode voltage of 16,000 V, X-ray radiation shielding may be necessary to protect equipment operators and users. Adequate shielding should always be implemented if the operating anode voltage exceeds 16,000 V or the maximum rated voltage, whichever is less.

Technical Summary

The **17LP4** is a **17-inch rectangular glass television picture tube** utilizing **magnetic deflection (65° horizontal, 70° diagonal)** and **low-voltage electrostatic focusing**. It is equipped with a **6.3 V, 0.6 A heater**, a **Small Shell Duodecal 6-Pin base (B6-63)**, and a **recessed small cavity cap (J1-21)** for the high-voltage anode.

The tube features a **P4 white-emitting phosphor screen** with medium persistence, which is non-aluminized in the standard **17LP4** and aluminized in the **17LP4A** variant. With a maximum anode rating of **16,000 V**, the tube is typically operated at **12,000 V to 14,000 V**, requiring an external single-field ion trap magnet of approximately **35 Gauss**es and a grounded external conductive coating to complete its high-voltage filtering system.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1950 Sylvania

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1950 SYLVANIA

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Plate Voltage	16000 V	—
Anode Voltage	14000 V	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Phosphor	P4	Aluminized



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

[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	500 V	Published maximum Grid No. 2 voltage
FACEPLATE LIGHT TRANSMISSION AT CENTER (APPROX.)	56 %	FACEPLATE LIGHT TRANSMISSION AT CENTER (APPROX.) 56 PERCENT
HEATER VOLTAGE	6.3 V	HEATER VOLTAGE 6.3 VOLTS
HEATER CURRENT	600 mA	HEATER CURRENT 0.6 AMP.
MAXIMUM DC GRID #3, GRID #5, COLLECTOR VOLTAGE	16000 V	MAXIMUM DC GRID #3, GRID #5, COLLECTOR VOLTAGE 16 000 VOLTS
MAXIMUM DC GRID #4 VOLTAGE -500 TO }	1000 V	MAXIMUM DC GRID #4 VOLTAGE -500 TO }1000 VOLTS
MAXIMUM DC GRID #2 VOLTAGE	500 V	MAXIMUM DC GRID #2 VOLTAGE 500 VOLTS
HEATER POSITIVE WITH RESPECT TO CATHODE 1\$	0 V	HEATER POSITIVE WITH RESPECT TO CATHODE 1\$0 VOLTS
MAXIMUM GRID #1 CIRCUIT RESISTANCE	1.5 Mohm	MAXIMUM GRID #1 CIRCUIT RESISTANCE 1.5 MEGOHMS
DC GRID #1, GRID #5, COLLECTOR VOLTAGE	12000 V	DC GRID #1, GRID #5, COLLECTOR VOLTAGE 12 000 VOLTS
DC GRID #2 VOLTAGE	300 V	DC GRID #2 VOLTAGE 300 VOLTS

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
DC GRID #1 VOLTAGE S —33 To —	77 V	DC GRID #1 VOLTAGE S —33 To —77 VOLTS
f DC GRID #4 VOLTAGE (APPROX.)C —4g To +	260 V	f DC GRID #4 VOLTAGE (APPROX.)C —4g To +260 VOLTS

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
CATHODE TO ALL OTHER ELECTRODES	5 MMF	CATHODE TO ALL OTHER ELECTRODES 5 μmf
GRID #1 TO ALL OTHER ELECTRODES	6 MMF	GRID #1 TO ALL OTHER ELECTRODES 6 μmf



SOURCE OPERATING CONDITIONS

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	—