



ELECTRONIC TUBE REFERENCE

17CEP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Seventeen-inch direct-view television picture tube with electrostatic focusing, magnetic deflection, and an aluminized screen. Thomas documentation explicitly warns that X-ray shielding is required when operating above 16 kV.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	5
NOMINAL HEATER	6.3 V / 300 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 0 Cathode Ray

No fixed ratings recorded.

CRT electrode ratings, focusing/deflection data, capacitances, and operating voltages are preserved in parameter rows.

17CEP4 — Rectangular Television Picture Tube

A short-neck, rectangular glass picture tube featuring electrostatic focus, magnetic deflection, and an aluminized screen, designed for direct-view television receiver applications.

Overview

The **17CEP4** (also written as **17CE P4**) is a rectangular glass, direct-view picture tube manufactured by Thomas Electronics, Inc. and introduced in early 1957. It features a short neck, a spherical lightweight face, and a short straight electron gun that does not require an external ion trap magnet. The tube utilizes

electrostatic focusing and magnetic deflection, and incorporates a metal-backed (aluminized) screen to enhance brightness and contrast.

Physical and Optical Characteristics

The 17CEP4 is constructed with a gray filter glass faceplate having approximately 79% light transmission, which improves picture contrast under ambient light. The screen uses a P4 aluminized phosphor, which exhibits white fluorescence and medium persistence.

The physical dimensions and deflection angles of the tube are optimized for compact television cabinet designs:

- **Deflection Angles (Approximate):** Diagonal 90°, Horizontal 85°, Vertical 68°
- **Minimum Useful Screen Dimensions:** 14-3/4 inches by 11-11/16 inches
- **Minimum Useful Screen Area:** 155 square inches

The envelope features a Recessed Small Cavity Cap (J1-21) for the anode connection, which is aligned with Pin Position No. 6 within a tolerance of ± 30 degrees.

Electrical Connections and Pinout

The tube uses a Small Shell Duodecal 6-pin base (JETEC B6-63) with a 12L electrostatic basing designation. The pin connections, viewed from the bottom of the base, are as follows:

Pin / Cap	Connection
Pin 1	Heater
Pin 2	Grid No. 1 (Control Grid)
Pin 6	Focus Cylinder (Grid No. 4)
Pin 10	Grid No. 2 (Screen Grid)
Pin 11	Cathode
Pin 12	Heater
Cap	Anode (Grid No. 5, Grid No. 3, and collector connected internally)

Heater Ratings

The heater is designed for a nominal supply voltage of 6.3 Volts and draws a nominal current of 0.45 Ampere (450 mA) with a tolerance of $\pm 10\%$.

Interelectrode Capacitances

The approximate capacitances between the electrodes are:

- **Cathode to all other electrodes:** 5 pF
- **Grid No. 1 to all other electrodes:** 6 pF
- **External conductive coating to anode:** 1500 pF maximum, 1200 pF minimum

Operating Conditions and Electrical Characteristics

The 17CEP4 is designed to operate under specific recommended conditions to achieve optimal focus and raster quality.

Recommended Operating Points

- **Anode Voltage:** 14,000 Volts DC
- **Grid No. 4 (Focusing Electrode) Voltage:** -50 to +350 Volts DC (for focus with an anode current of 100 μ A and a 14-3/4" x 11-11/16" raster)
- **Grid No. 2 Voltage:** 300 Volts DC
- **Grid No. 1 Voltage (for visual extinction of focused raster):** -28 to -72 Volts DC (extinction of a stationary focused spot requires approximately 5 Volts more negative bias)

Circuit Values

- **Grid No. 1 Circuit Resistance:** 1.5 Megohms maximum

Absolute Maximum Ratings

The following design-center maximum ratings represent the absolute limits within which the tube must be operated to ensure reliability and safety:

- **Anode Voltage:** 16,000 Volts DC maximum
- **Grid No. 4 Voltage (Focusing Electrode):** -500 to +1000 Volts DC maximum
- **Grid No. 2 Voltage:** 500 Volts DC maximum
- **Grid No. 1 Voltage:**
 - **Negative Bias Value:** 140 Volts DC maximum
 - **Positive Bias Value:** 0 Volts DC maximum
 - **Positive Peak Value:** 2 Volts maximum
- **Peak Heater-Cathode Voltage:**
 - **Heater negative with respect to cathode (during warm-up $\leq$ 15 seconds):** 410 Volts DC maximum
 - **Heater negative with respect to cathode (after warm-up):** 180 Volts DC maximum
 - **Heater positive with respect to cathode:** 180 Volts DC maximum

Operational and Safety Considerations

When integrating the 17CEP4 into television receiver circuits, several operational guidelines must be followed:

Cathode Return

The cathode should be returned directly to one side of the heater transformer winding or to its center tap.

X-Ray Radiation Warning

If the tube is operated at voltages exceeding the design-center maximum of 16,000 Volts, X-ray shielding may be necessary to protect users from harmful radiation. Adequate protection is maintained if the radiation level in contact with the viewing window remains below 6.25 mR/hr.

Technical Summary

The **17CEP4** is a 90-degree magnetic deflection, electrostatic-focus rectangular picture tube featuring a lightweight spherical faceplate and an aluminized P4 screen. It operates with a 6.3 V, 450 mA heater and does not require an ion trap magnet due to its short straight electron gun design. With a recommended anode operating voltage of 14,000 V and a maximum rating of 16,000 V, it provides a minimum useful screen area of 155 square inches. The tube's design-center ratings and electrostatic focus range (-50 to +350 V) make it a highly standardized component for mid-1950s television receivers.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1951 Thomas Electronics

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

1951 THOMAS ELECTRONICS

Section 0 · Cathode Ray

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
FocusingMethod	Electrostatic	—
DeflectionMethod	Magnetic	—
Deflection Angle	70 degree	—
Heater Voltage	6.3 V	—
Heater Current	300 mA	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MaximumMainAnodeOrAcceleratorVoltage	16000 V	—
TypicalMainAnodeOrAcceleratorVoltage	11000 V	—
Maximum Grid2 Voltage	500 V	—
Typical Grid2 Voltage	300 V	—
Grid1CutoffVoltage	-72--28 V	—
Maximum Heater Cathode Voltage	180 V	AfterWarmup

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
ExternalConductiveCoatingToAnodeCapacitance	1500 pF	Maximum

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