



ELECTRONIC TUBE REFERENCE

19CAP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Nineteen-inch direct-view monochrome television picture tube with electrostatic focusing, magnetic deflection, a rectangular face, and an aluminized screen. It belongs to the high-voltage picture-tube family designed for bright receiver display.

GENERAL CHARACTERISTICS

BASE DESIGNATION	B7-208	BASE PINS	7
NOMINAL HEATER	6.3 V / 600 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.

19CAP4 — Rectangular Glass Picture Tube

The **19CAP4** is a direct-view rectangular glass picture tube designed for television receivers. It features a short straight electron gun that eliminates the need for an ion trap, a short neck, and a wide 110-degree diagonal deflection angle. The tube is constructed with a grey-tinted, flat compound faceplate, a tri-potential focus system, and a metal-backed (aluminized) screen.

Mechanical Design and Physical Characteristics

The 19CAP4 is built with a rectangular glass envelope and has the following approximate deflection angles:

- **Diagonal:** 110°
- **Horizontal:** 99°
- **Vertical:** 82°

The screen utilizes a P4 aluminized phosphor, which provides white fluorescence with medium persistence. The faceplate is made of grey filter glass with approximately 78% light transmission. The minimum useful screen dimensions are 15 1/8 by 12 inches, yielding a minimum useful screen area of 172 square inches.

The physical structure of the tube weighs approximately 13 1/2 lbs. It features a recessed small cavity cap (J1-21) bulb contact and a small wafer Eightar 7-pin base (B7-208) with an 8JR basing configuration. The anode contact is aligned such that the J1-21 contact aligns with Pin Position No. 4 within a tolerance of $\pm 30^\circ$. During manufacturing, a bulge at the splice-line seal may increase the maximum envelope width, diagonal, and height by up to 1/4 inch, but this bulge will not protrude more than 1/8 inch beyond these dimensions at any point.

Electrical Connections and Pinout

The 19CAP4 is equipped with an indirectly heated cathode. The heater requires a nominal voltage of 6.3 Volts and a current of 0.6 Ampere $\pm 5\%$.

Pin Configuration (Basing 8JR)

The bottom view of the 8JR base provides the following pin connections:

Pin	Connection
Pin 1	Heater
Pin 2	Grid No. 1
Pin 3	Grid No. 2
Pin 4	Grid No. 4 (Focusing Electrode)
Pin 6	Grid No. 1
Pin 7	Cathode
Pin 8	Heater
Cap	Anode (Grid No. 3, Grid No. 5, Collector)
C	External Conductive Coating

Within the tube, Grid No. 5 and the collector are connected together and referred to as the anode, which terminates at the recessed small cavity cap.

Interelectrode Capacitances

The approximate capacitances of the tube's electrodes are:

- **Cathode to all other electrodes:** 5 uuf
- **Grid No. 1 to all other electrodes:** 6 uuf
- **External conductive coating to anode capacitance:** 1000 uuf (minimum) to 1500 uuf (maximum)

Operating Conditions and Circuit Design

The electrical ratings of the 19CAP4 are established under the Design-Maximum Rating System. Designers must adhere to these limits to ensure reliable operation.

Absolute Maximum Ratings

- **Anode Voltage:** 20,000 Volts dc
- **Grid No. 4 Voltage (Focusing Electrode):** -350 to +700 Volts dc
- **Grid No. 2 Voltage:** 600 Volts dc
- **Grid No. 1 Voltage:**
 - Negative bias value: 154 Volts 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 (not to exceed 15 seconds): 450 Volts dc
 - Heater negative with respect to cathode after warm-up: 200 Volts dc
 - Heater positive with respect to cathode: 200 Volts dc

Recommended Operating Conditions

For typical operation, the following parameters are recommended:

- **Anode Voltage:** 16,000 Volts dc
- **Grid No. 4 Voltage:** 0 to +400 Volts dc (for focus with an anode current of 100 uA and a 15 1/8 x 12 inch raster; this electrode is listed as Grid No. 3 in some text)
- **Grid No. 2 Voltage:** 500 Volts dc
- **Grid No. 1 Voltage:** -43 to -78 Volts dc (for visual extinction of the focused raster; achieving extinction of a stationary focused spot requires approximately 5 Volts more negative values)

Circuit and Installation Requirements

- **Grid No. 1 Circuit Resistance:** Must not exceed a maximum value of 1.5 Megohms.
- **Cathode Return:** The cathode should be returned to one side or to the mid-tap of the heater transformer winding.
- **Grounding:** The external conductive coating (C) must be grounded.

- **Anti-Corona Protection:** An anti-corona coating is applied around the anode connector to prevent electrical discharge.

Technical Summary

The **19CAP4** is a 110° rectangular glass television picture tube featuring a short neck, a short straight electron gun, and a tri-potential focus system. Operating with a 6.3 V, 0.6 A heater, it delivers a 172 sq. in. viewing area on an aluminized P4 white phosphor screen. With a maximum anode voltage rating of 20,000 V dc and recommended operation at 16,000 V dc, the tube provides a reliable display solution when installed with proper grounding of its external conductive coating and appropriate cathode return configurations.

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	600 mA	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MaximumMainAnodeOrAcceleratorVoltage	20000 V	—
TypicalMainAnodeOrAcceleratorVoltage	16000 V	—
MaximumFocusingElectrodeVoltage	-350–700 V	—
Maximum Grid2 Voltage	600 V	—
Maximum Heater Cathode Voltage	200 V	AfterWarmup