

ELECTRONIC TUBE REFERENCE

19ECP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Nineteen-inch rectangular direct-view television picture tube with electrostatic focus, 114-degree magnetic deflection, aluminized P4 white screen, and no ion trap. Wide-angle scanning provides a large monochrome picture in a shallow cabinet.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	6.3 V / 450 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Cathode Ray
No fixed ratings recorded.
Television CRT electron-gun/display section.

19ECP4 — 19-Inch Rectangular Glass Picture Tube

The **19ECP4** is a 19-inch rectangular glass picture tube designed for television receiver applications. It features a space-saving design with a short overall length and a small neck diameter. The tube utilizes magnetic deflection and electrostatic focusing, incorporating a non-ion-trap gun and a banded-type implosion protection system. Its screen is coated with an aluminized P4 fluorescent phosphor to enhance light output and prevent screen charging. Additionally, an external conductive coating is applied to the envelope, which acts as a filter capacitor when grounded and helps suppress sweep-induced radiation.

Mechanical Specifications and Optical Characteristics

The 19ECP4 is constructed with a spherical gray faceplate that provides approximately 47% light transmittance at its center, improving picture contrast under ambient light.

Physical Dimensions

The physical envelope of the tube uses the J149 F1 bulb configuration. The mechanical dimensions are as follows:

- **Overall Length:** $11 \frac{3}{4} \pm \frac{1}{4}$ inches
- **Neck Length:** $4 \frac{1}{2} \pm \frac{1}{8}$ inches
- **Greatest Diagonal:** $18 \frac{3}{4} \pm \frac{1}{8}$ inches
- **Greatest Width:** $16 \frac{17}{32} \pm \frac{1}{8}$ inches
- **Greatest Height:** $13 \frac{19}{32} \pm \frac{1}{8}$ inches

Screen Characteristics

The minimum useful projected screen dimensions and area are:

- **Diagonal:** $17 \frac{9}{16}$ inches
- **Horizontal Axis:** $15 \frac{1}{8}$ inches
- **Vertical Axis:** 12 inches
- **Total Area:** 172 square inches

The screen utilizes an aluminized P4 phosphor, which produces a white light output.

Electrical Connections and Basing

The tube is equipped with a JETEC No. B7-237 or B7-208 base and uses the **8HR** basing arrangement. The high-voltage anode connection is made via a recessed small cavity cap bulb contact (JETEC No. J1-21) located on the side of the envelope. The anode contact is aligned with Pin No. 4 within a tolerance of ± 30 degrees.

Pinout Configuration

The pin connections, viewed from the base of the tube, are defined as follows:

- **Pin 1:** Heater (H)
- **Pin 2:** Grid 1 (G1)
- **Pin 3:** Grid 2 (G2)
- **Pin 4:** Focus Electrode / Grid 4 (F)
- **Pin 6:** Grid 1 (G1)
- **Pin 7:** Cathode (K)
- **Pin 8:** Heater (H)
- **Anode (A):** Recessed small cavity cap (JETEC No. J1-21)

Interelectrode Capacitances

The direct interelectrode capacitances of the 19ECP4 are:

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

Heater Ratings and Warm-up

The heater is designed for series or parallel operation with a nominal voltage of 6.3 volts and a controlled current rating:

- **Heater Current:** 450 $\pm$ 23 mA
- **Heater Voltage Range:** 5.7 to 6.9 volts
- **Heater Warm-up Time:** 11 seconds

The controlled warm-up time is particularly important in series-string receiver designs to prevent voltage surges across other heaters during start-up.

Deflection and Focusing

The 19ECP4 employs magnetic deflection to sweep the electron beam across the wide-angle screen, and electrostatic focusing to maintain beam sharpness.

- **Focusing Method:** Electrostatic (via Grid 4 / Focus Electrode)
- **Deflection Method:** Magnetic
- **Approximate Deflection Angles:**
 - Diagonal: 114 degrees
 - Horizontal: 102 degrees
 - Vertical: 87 degrees

Design-Maximum Ratings

The following ratings are established under the Design-Maximum System. All voltages are positive and measured with respect to the cathode unless otherwise specified:

- **Anode Voltage:** 13,000 minimum volts to 20,000 maximum volts
- **Grid 4 (Focusing Electrode) Voltage:** -500 to +1000 volts
- **Grid 2 Voltage:** 100 minimum volts to 250 maximum volts
- **Grid 1 Voltage:**
 - Maximum Negative DC Value: 140 volts
 - Maximum Negative Peak Value: 200 volts
 - Maximum Positive DC Value: 0 volts
 - Maximum Positive Peak Value: 2 volts

- **Maximum Heater-Cathode Voltage:**
 - Heater negative with respect to cathode (during warm-up ≤ 15 seconds): 410 volts
 - Heater negative with respect to cathode (after warm-up): 180 volts
 - Heater positive with respect to cathode: 180 volts

Typical Operating Conditions (Cathode Drive Service)

Under typical operating conditions in cathode drive service, the tube is operated with the following parameters:

- **Anode Voltage:** 16,000 volts DC
- **Grid 4 (Focusing Electrode) Voltage:** -250 to +150 volts DC
 - *Note: This voltage is measured with the combined Grid No. 1 bias and video-signal voltage adjusted to produce an anode current of 150 μ A on a 15 1/8 x 11 15/16 inch pattern.*
- **Grid 2 Voltage:** 150 volts DC
- **Cathode-to-Grid No. 1 Voltage:** 36 to 54 volts DC (required for visual extinction of the focused raster)

Circuit Design and Protective Values

To ensure reliable operation and protect the tube's internal electrodes from damage due to momentary internal arcs, specific circuit resistance limits must be observed:

- **Maximum Grid No. 1 Circuit Resistance:** 1.5 megohms
- **Minimum Grid No. 2 Circuit Resistance:** 0.1 megohms
- **Minimum Focusing Electrode Circuit Resistance:** 0.1 megohms

It is advisable to include protective resistance in both the Grid No. 2 and focusing electrode circuits. A single common resistor may be utilized to fulfill this protective function.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1964 RMA EIA

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

1964 RMA EIA

Section 1 · Cathode Ray

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	—
Heater Current	450 mA	—
Heater Warm-up Time	11 s	—
Focusing Method	Electrostatic text	—
Deflection Method	Magnetic text	—
Horizontal Deflection Angle	102 deg	—
Vertical Deflection Angle	87 deg	—
Diagonal Deflection Angle	114 deg	—
Cathode-to-All Capacitance	5 pF	Approximate
Grid1-to-All Capacitance	6 pF	Approximate
External Coating-to-Anode Capacitance Minimum	1000 pF	—
External Coating-to-Anode Capacitance Maximum	1500 pF	—
Phosphor	P4 Aluminized text	—
Fluorescence	White text	—
Light Transmittance	47 percent	ScreenCenter