

Nineteen-inch direct-view monochrome television picture tube with electrostatic focusing, magnetic deflection, an aluminized screen, external conductive coating, and a non-ion-trap gun. It belongs to the high-voltage picture-tube family designed for bright receiver display.

GENERAL CHARACTERISTICS

BASE DESIGNATION	8HR	BASE PINS	—
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
No fixed ratings recorded.
CRT specialized anode, grid, optical, and deflection data retained in TUBE_SECTION_PARAMETER.

19BHP4 Cathode Ray Tube

The **19BHP4** is a 19-inch rectangular glass picture tube designed for television display applications. It features electrostatic focusing and magnetic deflection, utilizing an aluminized fluorescent screen with a P4 phosphor and a spherical gray faceplate. The tube incorporates a non-ion trap gun and an external conductive coating that serves as a filter capacitor when properly grounded.

Mechanical Specifications and Construction

The 19BHP4 is constructed with a J149-A1 glass bulb and has a rectangular screen profile. The faceplate is a spherical gray glass with approximately 76% light transmittance at the center. The screen is aluminized to enhance brightness and efficiency.

Physical Dimensions

The physical envelope of the tube has the following dimensional specifications:

- **Overall Length:** $11 \frac{3}{4} \pm \frac{5}{16}$ inches
- **Neck Length:** $4 \frac{1}{2} \pm \frac{3}{16}$ inches
- **Greatest Diagonal Dimension:** $18 \frac{5}{8} \pm \frac{1}{8}$ inches
- **Greatest Width:** $16 \frac{13}{32} \pm \frac{1}{8}$ inches
- **Greatest Height:** $13 \frac{11}{32} \pm \frac{1}{8}$ inches

Screen Dimensions (Projected Minimum Useful)

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

Deflection Angles (Approximate)

- **Diagonal:** 114 degrees
- **Horizontal:** 102 degrees
- **Vertical:** 87 degrees

Bulb and Base Connections

The tube uses a JETEC No. J1-21 (or J1-J2) bulb contact for the high-voltage anode connection, which is aligned with Pin No. 4 within a tolerance of ± 30 degrees. The base is a JETEC No. B7-237 or B7-208, utilizing the 8HR basing configuration.

Heater and Basing Configuration

The 19BHP4 is equipped with an indirectly heated cathode. The heater is designed for a nominal voltage of 6.3 V and a current of 600 mA.

Heater Characteristics

- **Nominal Heater Voltage:** 6.3 V
- **Nominal Heater Current:** $600 \pm 10\%$ mA
- **Heater Warm-Up Time:** 11 seconds
- **Calculated Heater Power:** $6.3 \text{ V} \times 0.6 \text{ A} = 3.78 \text{ W}$

Basing Diagram (8HR)

The 8HR base configuration provides the following pin connections, viewed from the bottom of the tube:

Pin Number	Connection
Pin 1	Heater (H)
Pin 2	Grid No. 1 (G1)
Pin 3	Grid No. 2 (<u>G2</u>)
Pin 4	Grid No. 4 / Focusing Electrode (F)
Pin 5	No Connection
Pin 6	Grid No. 1 (G1)
Pin 7	Cathode (K)
Pin 8	Heater (H)
Recessed Cap	Anode (A)

Electrical Characteristics and Capacitances

The direct interelectrode capacitances of the 19BHP4 are approximately:

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

The external conductive coating, when connected to a system ground, forms a filter capacitor with the internal anode coating to assist in high-voltage ripple filtering.

Operating Conditions and Ratings

The ratings of the 19BHP4 are established under the Design Maximum System. All voltages are positive and measured with respect to the cathode unless otherwise specified.

Design Maximum Ratings

- **Anode Voltage:** 15,000 minimum to 22,000 maximum volts
- **Grid No. 4 (Focusing Electrode) Voltage:** -500 to +1000 volts
- **Grid No. 2 Voltage:** 400 minimum to 700 maximum volts
- **Grid No. 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
- **Heater Voltage:** 5.7 minimum to 6.9 maximum 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

Under typical operating conditions, the tube is set to the following parameters:

- **Anode Voltage:** 18,500 volts DC
- **Grid No. 4 Voltage:** 250 volts DC (individual tubes focus within a range of 0 to 500 volts)
- **Grid No. 2 Voltage:** 450 volts DC
- **Grid No. 1 Voltage (for visual extinction of focused raster):** -28 to -61 volts DC

Circuit Design and Maximum Values

To ensure reliable operation and protect the tube from internal arc damage, 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 (Grid No. 4) Circuit Resistance:** 0.1 megohms

The inclusion of protective resistance in the Grid No. 2 and focusing electrode circuits is highly advisable to prevent damage from transient discharges.

Technical Summary

The **19BHP4** is a 19-inch rectangular glass cathode ray tube utilizing electrostatic focus and magnetic deflection (114-degree diagonal deflection angle). It features a P4 aluminized screen, a spherical gray faceplate with 76% light transmittance, and a non-ion trap gun. Operating at a typical anode voltage of 18,500 V, it requires a 6.3 V heater and uses the 8HR basing configuration. Proper circuit design requires adhering to the minimum protective resistances on Grid No. 2 and Grid No. 4, as well as staying within the Design Maximum System limits.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

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
Maximum Anode Voltage	22000 V	—
Heater Warmup Time	11 s	—
Minimum Anode Voltage	15000 V	—
Maximum Grid2 Voltage	700 V	—
Minimum Grid2 Voltage	400 V	—
Typical Anode Voltage	18500 V	—
Typical Focus Grid Voltage	250 V	—
Typical Grid2 Voltage	850 V	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Horizontal Deflection Angle	102 degree	—
Vertical Deflection Angle	87 degree	—
Diagonal Deflection Angle	114 degree	—

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode To All Other Electrodes Capacitance	5 pF	—
Grid1 To All Other Electrodes Capacitance	6 pF	—
External Coating To Anode Capacitance	1000–1500 pF	—

An independent reference for electronic tubes, vacuum tubes,
and their source documents.

[Catalog](#) [Tube types](#) [Full books](#) [Blog](#) [Feedback & corrections](#)

© 2026 Tube Tinker