



ELECTRONIC TUBE REFERENCE

19AEP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

P4 cathode-ray picture-display tube documented by National Video, typically operated at 14 kV with manufacturer-specified heater characteristics.

GENERAL CHARACTERISTICS

BASE DESIGNATION	8HR	BASE PINS	8
NOMINAL HEATER	12.6 V / 150 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Cathode Ray	
MAXIMUM PLATE VOLTAGE	17600 V
MAXIMUM SCREEN VOLTAGE	250 V
MAXIMUM HEATER-CATHODE VOLTAGE	180 V
<i>CRT anode and grid-2 maximum ratings are promoted from the printed ratings block; other CRT-specific focus/drive/deflection values are preserved in parameters.</i>	

19AEP4 — Electrostatic-Focus Magnetic-Deflection Picture Tube

The **19AEP4** is a low-voltage, electrostatic-focus, magnetic-deflection cathode-ray picture tube designed for television display applications. It features a rectangular, metal-backed (aluminized) screen with a P4 phosphor, providing high light output and contrast. The tube incorporates a straight electron gun design that does not require an external ion trap magnet. It has a wide-angle deflection system with a nominal diagonal deflection angle of 114°.

Mechanical and Physical Specifications

The 19AEP4 utilizes a J-149 glass bulb envelope. The physical dimensions and screen characteristics are highly specified to ensure proper mounting and optical performance:

- **Overall Length:** 11 5/8 ± 1/4 inches
- **Neck Length:** 4 3/8 ± 1/8 inches
- **Greatest Dimensions:**
 - **Diagonal:** 18 5/8 ± 1/8 inches
 - **Width:** 16 13/32 ± 1/8 inches
 - **Height:** 13 11/32 ± 1/8 inches
- **Minimum Useful Screen Dimensions (Projected):**
 - **Diagonal:** 17 9/16 inches
 - **Horizontal Axis:** 15 1/8 inches
 - **Vertical Axis:** 12 inches
 - **Total Area:** 172 square inches

The bulb splice line seal may exhibit a slight bulge, which can increase the maximum envelope width, diagonal, and height by up to 1/8 inch, though it does not protrude more than 1/16 inch beyond the mold match line.

Optical Characteristics

The screen is coated with a P4 phosphor and is aluminized (metal-backed) to maximize light output and prevent phosphor degradation. The light transmittance at the center of the faceplate is approximately 78%.

Deflection Angles

The tube is designed for wide-angle magnetic deflection, with the following approximate deflection angles:

- **Diagonal:** 114°
- **Horizontal:** 103°
- **Vertical:** 86°

Electrical Connections and Basing

The 19AEP4 is equipped with a **B7-208** base, which is a small button neodeightar 7-pin base (arrangement 1). The electrical connections are designated by the **8HR** basing diagram.

The pin configuration, viewed from the bottom of the base, is as follows:

Pin	Connection
Pin 1	Heater

Pin	Connection
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	Ultor (Grid No. 3, Grid No. 5, Collector)

The high-voltage anode connection is made via a recessed small cavity cap (**J1-21**) located on the bulb envelope. This contact connects to the Ultor, which comprises Grid No. 3, Grid No. 5, and the collector.

Mounting and Socketing

The socket for the B7-208 base must not be rigidly mounted. It should be wired with flexible leads and allowed to move freely to prevent mechanical stress on the tube neck and pins.

Heater and Filament Ratings

The heater is designed for operation with the following specifications:

- **Nominal Heater Voltage:** 12.6 V
- **Nominal Heater Current:** 150 $\pm$ 5% mA
- **Maximum Heater Voltage:** 13.8 V
- **Minimum Heater Voltage:** 11.4 V

Interelectrode Capacitances

The tube features an external conductive coating that, when grounded, forms a capacitor with the internal anode. The capacitance values are:

- **External Conductive Coating to Anode (Maximum):** 1500 μ F
- **External Conductive Coating to Anode (Minimum):** 1000 μ F

Absolute Maximum Ratings (Design-Maximum System)

All voltages are positive and measured with respect to the cathode unless otherwise specified. Under the Design-Maximum System, the following limits must not be exceeded:

- **Anode Voltage:** 17,600 V

- **Grid No. 4 (Focusing Electrode) Voltage:** -200 to +500 V
- **Grid No. 2 Voltage:** 250 V
- **Grid No. 1 Voltage:**
 - **Maximum Negative DC Value:** 155 V
 - **Maximum Negative Peak Value:** 220 V
 - **Maximum Positive DC Value:** 0 V
 - **Maximum Positive Peak Value:** 2 V
- **Heater-Cathode Voltage:**
 - **Heater negative with respect to cathode during warm-up (≤ 15 seconds):** 450 V
 - **Heater negative with respect to cathode after warm-up:** 200 V
 - **Heater positive with respect to cathode:** 200 V

Typical Operating Conditions (Cathode Drive Service)

In typical cathode drive service, voltages are specified as positive with respect to Grid No. 1:

- **Anode Voltage:** 14,000 V DC
- **Grid No. 4 (Focusing Electrode) Voltage:** -100 to +100 V DC
- **Grid No. 2 Voltage:** 100 V DC
- **Cathode Voltage (for visual extinction of focused raster):** +32 to +47 V DC

Focusing Conditions

The focus voltage range is determined with the combined Grid No. 1 bias and video-signal voltage adjusted to produce an anode current of 100 μ A on a 12-inch by 15 1/8-inch raster pattern. Individual tubes will achieve focus within the specified -100 to +100 V DC range under these conditions.

Safety and Operating Precautions

- **X-ray Radiation:** The 19AEP4 emits X-rays when operated. If the anode voltage exceeds 16,000 V, appropriate X-ray radiation shielding may be necessary to protect users from prolonged exposure at close range.
- **High Voltage:** The anode operates at potentials up to 17,600 V. Proper safety precautions must be observed when handling and servicing the tube.

Technical Summary

The **19AEP4** is a rectangular, 114° magnetic-deflection picture tube featuring electrostatic focusing and a straight electron gun that eliminates the need for an ion trap. Operating with a 12.6 V, 150 mA heater, it is designed for cathode drive service with a typical anode voltage of 14,000 V (up to a design-maximum of 17,600 V). Its aluminized P4 screen provides a useful area of 172 square inches. Safe operation requires flexible socket mounting to prevent mechanical strain, and appropriate shielding if operated above 16,000 V due to potential X-ray emission.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1956 National Video

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

1956 NATIONAL VIDEO

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Typical Anode Voltage	14000 V	—
Phosphor	P4	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage Nominal	12.6 V	—
Heater Current Nominal	150 mA	—

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