

ELECTRONIC TUBE REFERENCE

19EBP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Nineteen-inch rectangular television picture tube with low-voltage electrostatic focus, 114-degree magnetic deflection, aluminized P4 white screen, and no ion trap. Its high-voltage direct-view design carries published X-ray precautions.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	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	
MAXIMUM PLATE VOLTAGE	23000 V
MAXIMUM SCREEN VOLTAGE	550 V
Filled-rim aluminized P4 cathode-drive picture tube.	

19EBP4 — 19-Inch Cathode Ray Tube

The **19EBP4** is a 19-inch cathode ray tube designed for television display applications. It features a 114-degree magnetic deflection angle, electrostatic focusing, and a straight electron gun that does not require an external ion-trap magnet. The tube incorporates a filled-rim implosion protection system and an aluminized P4 sulfide-type phosphor screen.

Mechanical Design and Physical Dimensions

The 19EBP4 is built using the JEDEC J149 F (also designated J-149-F1) glass bulb. It has a short neck design, measuring 4.375 ± 0.125 inches (4 3/8 ± 1/8 inches) in length, which contributes to a compact

overall tube length of 11.625 $\pm$ 0.250 inches (11 5/8 $\pm$ 1/4 inches). The approximate weight of the tube, including its integrated implosion protection hardware, is 16 pounds.

The screen has a projected minimum useful area of 172 square inches, with the following minimum dimensions:

- **Diagonal:** 17.562 inches (17 9/16 inches)
- **Greatest Width:** 15.188 inches (15 1/8 inches)
- **Greatest Height:** 12.000 inches (12 inches)

The greatest external shell dimensions are:

- **Diagonal:** 20 7/8 $\pm$ 3/32 inches
- **Width:** 17 1/8 $\pm$ 1/16 inches
- **Height:** 14 5/64 $\pm$ 1/16 inches

The faceplate is constructed of filterglass with a light transmission rating of approximately 48% to 49% at the center. The screen uses an aluminized P4 sulfide-type phosphor to optimize brightness and contrast.

Electrical Connections and Pinout

The tube utilizes a JEDEC B7-208 Small-Button Neoeightar 7-pin base (Arrangement 1) and is configured according to the JEDEC 8HR basing diagram. The high-voltage anode connection is made via a recessed small cavity cap (JEDEC No. J1-21) located on the bulb cone. This cap aligns with Pin Position No. 4 within a tolerance of $\pm$ 30 degrees.

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

- **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, Screen, Collector / Ultor)
- **External Conductive Coating:** Grounding contact area near Reference Line

Installation and Mounting Notes

The socket for the 19EBP4 must not be rigidly mounted. It should be connected using flexible leads to prevent lateral mechanical strain on the base pins. The bottom circumference of the base wafer is designed to fall within a 1.75-inch diameter circle concentric with the bulb axis. Additionally, the external conductive coating must be reliably grounded to the chassis.

Heater and Cathode Ratings

The 19EBP4 is equipped with an indirectly heated cathode. The heater is designed for a nominal operating voltage of 6.3 V, but can tolerate a range from a minimum of 5.7 V to a maximum of 6.9 V.

- **Nominal Heater Voltage:** 6.3 V
- **Heater Current:** 600 ± 30 mA
- **Average Heater Warm-Up Time:** 11 seconds

Heater-Cathode Voltage Limits

To prevent insulation breakdown, specific voltage limits between the heater and cathode must be observed:

- **Heater negative with respect to cathode:**
 - During the initial equipment warm-up period (≤ 15 seconds): 450 V maximum.
 - After the warm-up period: 200 V to 300 V maximum.
- **Heater positive with respect to cathode:**
 - Combined AC and DC voltage: 200 V maximum.
 - DC component: 100 V maximum.

Interelectrode Capacitances

The direct interelectrode capacitances of the tube are:

- **Cathode to all other electrodes:** approximately 5 pF.
- **Grid No. 1 to all other electrodes:** approximately 6 pF.
- **External conductive coating to anode:** 1,000 to 1,250 pF minimum, and 1,500 to 1,750 pF maximum (measured with the implosion protection hardware connected to the external coating).
- **Resistance between external conductive coating and implosion protection hardware:** 50 M Ω minimum.

Design-Maximum Ratings

The following design-maximum ratings represent the absolute limits within which the 19EBP4 must be operated. All voltages are positive with respect to the cathode unless otherwise specified.

- **Anode Voltage:** 11,000 to 12,000 V minimum, 23,000 V maximum.
- **Grid No. 4 (Focusing Electrode) Voltage:** -500 to -550 V maximum negative, +1,000 to +1,100 V maximum positive.
- **Grid No. 2 Voltage:** 200 to 220 V minimum, 550 V maximum.
- **Grid No. 1 Negative Peak Voltage:** 220 V maximum.
- **Grid No. 1 Negative Bias Voltage:** 154 to 155 V maximum.
- **Grid No. 1 Positive Bias Voltage:** 0 V maximum.
- **Grid No. 1 Positive Peak Voltage:** 2 V maximum.

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

Operating Conditions and Drive Services

The 19EBP4 can be operated in either Cathode-Drive or Grid-Drive configurations. The typical operating points for each service illustrate the electrode potentials required to achieve focus and raster extinction.

Cathode-Drive Service

In this configuration, voltages are referenced positive with respect to Grid No. 1:

- **Anode Voltage:** 16,000 V
- **Grid No. 4 Voltage:** 0 to 400 V (satisfactory focus is achieved within this range)
- **Grid No. 2 Voltage:** 300 V
- **Cathode Voltage (for visual extinction of focused raster):** 28 to 62 V
- **Required Centering Magnet Field Strength:** 0 to 8 Gauss (adjustable)

Grid-Drive Service

In this configuration, voltages are referenced with respect to the cathode:

- **Anode Voltage:** 16,000 Vdc
- **Grid No. 4 Voltage:** 0 to +400 Vdc
- **Grid No. 2 Voltage:** 400 Vdc
- **Grid No. 1 Voltage (for visual extinction of focused raster):** -39 to -94 Vdc

Technical Summary

The **19EBP4** is a 19-inch, 114-degree cathode ray tube utilizing electrostatic focusing and magnetic deflection. Its straight-gun design eliminates the need for an ion-trap magnet, simplifying receiver design. With its robust design-maximum ratings, including an anode voltage capability up to 23,000 V, and its dual compatibility with cathode-drive and grid-drive circuitry, the 19EBP4 provides a reliable and versatile display solution for television receivers.

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	600 mA	—
Heater Warm-up Time	11 s	—
Focusing Method	Electrostatic text	—
Deflection Method	Magnetic text	—
Horizontal Deflection Angle	102 deg	—
Vertical Deflection Angle	85 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	49 percent	ScreenCenter

1971 RCA HB3 Binder 1 of 7

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

1971 RCA HB3 BINDER 1 OF 7
Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	6.3 V	—
Heater current	600 mA	—
Heater warm-up time	11 s	—
Maximum anode/ultor voltage	23000 V	—
Minimum anode/ultor voltage	11000 V	—
Typical anode/ultor voltage	16000 V	PictureTubeService
Maximum grid No.2 voltage	550 V	—
Typical grid No.2 voltage	300 V	PictureTubeService
Focus-voltage range minimum	0 V	OptimumFocus
Focus-voltage range maximum	400 V	OptimumFocus
Visual-extinction voltage range minimum	28 V	FocusedRasterExtinction
Visual-extinction voltage range maximum	62 V	FocusedRasterExtinction
Maximum grid No.1 circuit resistance	1.5 megohm	—
X-ray shielding warning	Present	HighAnodeVoltage
Maximum negative grid No.1 peak voltage	220 V	—
Maximum negative grid No.1 bias magnitude	155 V	—
Maximum positive grid No.1 peak voltage	2 V	—
Peak heater-cathode voltage during warm-up	450 V	HeaterNegative;Warmup<=15s
Peak heater-cathode voltage after warm-up	300 V	HeaterNegative
Peak heater-cathode voltage heater positive	200 V	HeaterPositive

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Adjustable centering magnet field strength maximum	8 gauss	Approximate

CONSTRUCTION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Focusing method	LowVoltageElectrostatic	—
Deflection method	Magnetic	—
Phosphor	P4	—
Screen type	Aluminized white	P4

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Deflection angle	114 deg	Approximate

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode to all other electrodes capacitance	5 pF	Approximate
External conductive coating to anode capacitance minimum	1250 pF	Approximate
External conductive coating to anode capacitance maximum	1750 pF	Approximate

TUBE TINKER

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