

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA

19DUP4

1 SECTION
CONSTRUCTION
CATHODERAY

Specialized - Cathode Ray electronic tube

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

19DUP4 — Direct-View Rectangular Picture Tube

Overview

The **19DUP4** is a 19-inch, direct-view rectangular glass picture tube designed for television display applications. It features a 114-degree diagonal deflection angle, electrostatic focusing, and magnetic deflection. The tube incorporates an aluminized phosphor screen (P4) that produces a white fluorescent color with medium-short persistence.

A key feature of the 19DUP4 is its "HiGm" non-ion trap electron gun, which is specifically designed for cathode-drive service under low Grid #2 voltage conditions. The tube also includes internal shielding, banded implosion protection, and a spherical faceplate with approximately 48.5% light transmission at the center.

Mechanical and Envelope Specifications

The 19DUP4 utilizes a J149F1 glass bulb and a short B7-208 tube base with straight-through leads oriented by an indexing lug. The anode contact is a J1-21 connector, which aligns with Pin #8 within a tolerance of ± 30 degrees.

Physical Dimensions

The physical envelope and screen dimensions of the tube are specified as follows:

- **Overall Length:** 11 3/4 + 7/32 - 3/16 inches
- **Neck Length:** 4 1/2 + 3/16 - 1/16 inches
- **Greatest Dimensions:**
 - Diagonal: 18.868 inches
 - Width: 16.644 inches
 - Height: 13.924 inches
- **Minimum Useful Screen Dimensions:**
 - Area: 172 square inches
 - Diagonal: 17 9/16 inches
 - Width: 15 1/8 inches
 - Height: 12 inches

Deflection Angles

The magnetic deflection system must accommodate the following approximate deflection angles:

- **Diagonal:** 114°
- **Horizontal:** 102°
- **Vertical:** 85°

Heater and Basing Configuration

The 19DUP4 is equipped with an indirectly heated cathode. The heater is designed for series or parallel operation with the following nominal ratings:

- **Heater Voltage:** 6.3 V
- **Heater Current:** 0.45 A $\pm$ 5%
- **Calculated Heater Power:** 2.84 W (calculated as 6.3 V $\times$ 0.45 A)
- **Heater Warm-up Time:** 11 seconds

The heater warm-up time is defined as the time required to reach 80% of the rated heater voltage when applied in series with an external resistance equal to three times the rated heater voltage divided by the rated heater current, under an applied voltage of four times the rated voltage.

Pinout (8HR Basing)

The tube uses the 8HR basing arrangement, viewed from the bottom of the base:

Pin Number	Connection
Pin 1	Heater
Pin 2	Grid #1
Pin 3	Grid #2
Pin 4	Grid #4 (Focusing Electrode)
Pin 6	Grid #1
Pin 7	Cathode
Pin 8	Heater

Anode connection (including Grid #3 and Grid #5) is made via the J1-21 recessed button connector on the bulb envelope.

Direct Interelectrode Capacitances

The approximate direct interelectrode capacitances of the 19DUP4 are:

- **Cathode to all other electrodes:** 4.0 pF
- **Grid #1 to all other electrodes:** 5.0 pF
- **External conductive coating capacitance:** 1150 pF minimum, 1550 pF maximum

The external conductive coating acts as a filter capacitor when combined with the internal shielding and anode connection.

Operating Conditions and Ratings

The 19DUP4 is rated under the Design Maximum System. All voltages are specified as positive with respect to Grid #1 unless otherwise noted.

Absolute Maximum Ratings

- **Anode Voltage (Anode, Grid #3, Grid #5 connected):** 22,000 V DC
- **Grid #4 Voltage:** -550 to +1100 V DC
- **Grid #2 Voltage:** 80 V DC

- **Cathode Voltage:**
 - Positive-Bias Value: 154 V DC
 - Positive-Peak Value: 220 V
 - Negative-Bias Value: 0 V DC
 - Negative-Peak Value: 2 V
- **Peak Heater-Cathode Voltage:**
 - Heater negative with respect to cathode during warm-up (≤ 15 seconds): 450 V maximum
 - Heater negative with respect to cathode after warm-up: 200 V maximum
 - Heater positive with respect to cathode: 200 V maximum
- **Grid #1 Circuit Resistance:** 1.5 M Ω maximum

Typical Operating Conditions (Cathode-Drive Service)

In typical cathode-drive operation, the input signal is applied to the cathode while Grid #1 is held at a reference potential (typically ground). The operating parameters are:

- **Anode Voltage:** 16,000 V DC
- **Grid #4 Voltage (Focusing Electrode):** -200 to +200 V DC
- **Grid #2 Voltage:** 50 V DC
- **Cathode Voltage (for visual extinction of focused raster):** +33 to +45 V DC

For the cutoff of an undeflected focused spot, the absolute bias value increases by approximately 4 V over the raster extinction value (resulting in a range of approximately +37 to +49 V DC).

Safety and Installation Notes

- **X-Ray Radiation Warning:** When operated at anode voltages higher than 18,000 V, the 19DUP4 may produce X-rays. Adequate radiation shielding must be provided in the equipment to protect users from exposure.
- **Socket Mounting:** The socket for the B7-208 base must not be rigidly mounted. It must be connected using flexible leads to prevent any lateral mechanical strain on the base pins, which could damage the glass-to-metal seals.

Technical Summary

The **19DUP4** is a 19-inch rectangular glass picture tube featuring a 114-degree deflection angle, electrostatic focusing, and magnetic deflection. It utilizes a "HiGm" non-ion trap gun designed for low Grid #2 voltage cathode-drive service. Operating at a typical anode voltage of 16,000 V (with a design maximum of 22,000 V), the tube provides a minimum useful screen area of 172 square inches on its aluminized P4 phosphor screen. The 6.3 V, 0.45 A heater has a controlled 11-second warm-up time. Safe operation requires flexible socket mounting to prevent pin strain and appropriate shielding if anode voltages exceed 18,000 V due to potential X-ray radiation.

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	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	1150 pF	—
External Coating-to-Anode Capacitance Maximum	1550 pF	—
Phosphor	P4 Aluminized text	—
Fluorescence	White text	—
Persistence	Medium short text	—

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