

ELECTRONIC TUBE REFERENCE

10ADP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Direct-view rectangular P4 picture tube using electrostatic focusing and magnetic deflection, designed for approximately 90-degree scanning with a 12 kV maximum anode rating.

GENERAL CHARACTERISTICS

BASE DESIGNATION	B6-53	BASE PINS	—
NOMINAL HEATER	— / —	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 maximum anode voltage 12000 V; CRT-specific electrode ratings retained in parameter table.

10ADP4 — Electrostatic-Focus Magnetic-Deflection Cathode Ray Tube

The **10ADP4** is an all-glass, rectangular, direct-view cathode ray tube designed for television applications. It features a 90-degree diagonal deflection angle, electrostatic focusing, and magnetic deflection. The tube incorporates a spherical filter-glass faceplate with approximately 81% light transmission to improve picture contrast under ambient light.

The 10ADP4 is designed with a low-current heater to minimize heat dissipation, making it highly suitable for compact television receiver designs. It utilizes an electron gun that requires an external single-field ion-trap magnet, and features an external conductive bulb coating.

Mechanical Specifications and Physical Dimensions

The 10ADP4 is a compact rectangular picture tube with the following physical dimensions and mechanical characteristics:

- **Overall Length:** 11 7/8 inches (with a tolerance of $\pm 5/16$ inches)
- **Greatest Bulb Dimensions:**
 - **Diagonal:** 10 3/8 + 1/8 - 1/16 inches
 - **Width:** 9 3/4 + 1/8 - 1/16 inches
 - **Height:** 7 1/2 + 1/8 - 1/16 inches
- **Minimum Useful Screen Dimensions:**
 - **Screen Area:** 55 square inches
 - **Diagonal:** 9 9/16 inches
 - **Width:** 9 1/16 inches
 - **Height:** 6 5/8 inches
- **Weight:** Approximately 3 1/4 lbs.
- **Bulb Contact:** J1-21 recessed small cavity contact
- **Base:** B6-63
- **Basing Designation:** 12L
- **Neck Diameter:** 1 7/16 $\pm$ 1/32 inches
- **Neck Length:** 6 1/2 $\pm$ 3/16 inches

Alignment and Mounting Considerations

The J1-21 anode bulb contact is located on the cone of the tube. The plane passing through the tube axis and pin position 6 aligns with this anode contact within a tolerance of ± 30 degrees. The reference line of the tube is established by the plane where a standard JETEC reference line gauge #116 stops against the bulb.

To prevent mechanical stress on the tube neck and base, the socket for the B6-63 base must not be rigidly mounted; it should have flexible leads and be free to move. Additionally, a specific zone along the neck must be kept clear to accommodate the external ion-trap magnet.

Electrical Characteristics and Interelectrode Capacitances

The 10ADP4 utilizes a No. 4 phosphor screen, which exhibits white fluorescence and a short-to-medium persistence. The electrical capacitances between the internal electrodes and external coatings are as follows:

- **Cathode to all other electrodes:** 5 μ F (pF) approx.
- **Grid No. 1 to all other electrodes:** 6 μ F (pF) approx.
- **External conductive coating to anode:** 400 pF (Min.) to 850 pF (Max.)

The external conductive coating, when grounded, forms a high-voltage filter capacitor in conjunction with the internal anode coating.

Heater and Cathode Ratings

The 10ADP4 is equipped with an indirectly heated cathode. The heater is designed for series or parallel operation with a low current draw to reduce overall heat generation in compact cabinets.

- **Heater Voltage:** 8.4 Volts
- **Heater Current:** 0.45 Amperes (with a tolerance of $\pm 10\%$)
- **Peak Heater-Cathode Voltage:**
 - *Heater negative with respect to cathode during warm-up (not to exceed 15 seconds):* 410 Max. Volts D.C.
 - *Heater negative with respect to cathode after equipment warm-up:* 180 Max. Volts D.C.
 - *Heater positive with respect to cathode:* 180 Max. Volts D.C.

Maximum Ratings (Design Center Values)

The operating limits of the 10ADP4 are defined under the Design Center rating system. Operating the tube beyond these limits may impair its performance and lifetime.

- **Anode Voltage:** 12,000 Max. Volts D.C.
- **Grid No. 4 Voltage (Focusing Electrode):** -500 to +1,000 Max. Volts D.C.
- **Grid No. 2 Voltage:** 500 Max. Volts D.C.
- **Grid No. 1 Voltage:**
 - *Negative peak value:* 200 Max. Volts D.C.
 - *Negative bias value:* 140 Max. Volts D.C.
 - *Positive bias value:* 0 Max. Volts D.C.
 - *Positive peak value:* 2 Max. Volts
- **Grid No. 1 Circuit Resistance:** 1.5 Max. Megohms

Typical Operating Conditions

Under typical operating conditions in a television receiver, the 10ADP4 is operated with the following parameters:

- **Anode Voltage:** 7,500 Volts D.C.
- **Grid No. 4 (Focusing) Voltage:** 0 to 500 Volts D.C.
- **Grid No. 2 Voltage:** 300 Volts D.C.
- **Grid No. 1 Voltage (for visual extinction of focused raster):** -38 to -72 Volts D.C.
- **Field Strength of PM Ion-Trap Magnet:** 32 Minimum Gauss

Focusing and Ion-Trap Magnet Adjustment

Grid No. 4 serves as the electrostatic focus control electrode. The typical focus voltage range of 0 to 500 V D.C. is specified with the combined Grid No. 1 bias voltage and video signal adjusted to produce an anode current of 100 μ A on an 8 7/8 x 6 9/16 inch picture, adjusted for the best overall focus. For anode voltages other than the typical 7,500 V, the required focus voltage will scale from 0% to 5.5% of the actual anode voltage.

The electron gun is designed for use with an external permanent magnet (PM) ion-trap, such as the Heppner Model No. E437 or an equivalent. The magnet must be positioned on the neck to yield maximum brightness for the specific equipment application. The tolerance range for the strength of the PM ion magnet should be added to the minimum value of 32 Gauss, and the maximum strength of the magnet should not exceed this specified minimum value.

Pinout and Basing Diagram

The 10ADP4 uses the **12L** basing configuration with a **B6-63** base. The pin connections, viewed from the bottom of the tube base, are as follows:

- **Pin 1:** Heater (H)
- **Pin 2:** Grid No. 1 (g1)
- **Pin 6:** Grid No. 4 (g4)
- **Pin 10:** Grid No. 2 (g2)
- **Pin 11:** Cathode (k)
- **Pin 12:** Heater (H)
- **Recessed Cap:** Anode (J1-21 Contact)

Technical Summary

The **10ADP4** is a specialized 10-inch class rectangular cathode ray tube featuring electrostatic focusing and 90-degree magnetic deflection. With its low-current 8.4 V heater, spherical neutral-density filter faceplate, and integrated external conductive coating, it was engineered to support compact, high-contrast monochrome television designs of the mid-1950s. Operating at a typical anode voltage of 7,500 V, the tube provides a 55-square-inch viewing area, utilizing an external PM ion-trap magnet and a flexible, non-rigidly mounted socket to ensure reliable operation.

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
The type	10	The type 10ADPY is an electrostatic focus and magnetic deflection direct view
picture tube. It has an all glass, rectangular bulb designed for	90	picture tube. It has an all glass, rectangular bulb designed for 90° deflection.
Deflection Angle (Approx.) Horizontal	85	Deflection Angle (Approx.) Horizontal 85 Degrees
Phosphor No	4	Phosphor No. 4
Grid No	1 pF	Grid No. 1 to all other electrodes uuf
External conductive coating to anode	850 pF	External conductive coating to anode 850 Max, uuf
Heater Voltage	8 V	Heater Voltage 8.L Volts
Heater Current o5 ad	108 A	Heater Current o5 ad 108 Amperes
Anode Voltage	12000 V	Anode Voltage 12,000 Maxe. Volts D.C.
Orid No. L Voltage	1 V	Orid No. L Voltage 1 Max., Volts D.C.
Grid No [1]	2 V	Grid No. 2 Voltage 500 Max. Volts D.C.
Grid No [2]	500 V	Grid No. 2 Voltage 500 Max. Volts D.C.
Orid No	1 V	Orid No. 1 Voltage
warm-up period not to exceed [1]	15 V	warm-up period not to exceed 15 seconds k10 Max. Volts D.C,
warm-up period not to exceed [2]	0 V	warm-up period not to exceed 15 seconds k10 Max. Volts D.C,
After equipment warm=up	180 V	After equipment warm=up 180 Max. Volts D.C.
Heater positive with respect to cathode	180 V	Heater positive with respect to cathode 180 Max. Volts
Anode Voltage	75500 V	Anode Voltage 75500 Volts D.C.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid No. L Voltage ²	0 V	Grid No. L Voltage ² 0 to 500 Volts D.C.
Grid No [1]	2 V	Grid No. 2 Voltage 300 Volts D.C,
Grid No [2]	300 V	Grid No. 2 Voltage 300 Volts D.C,
Grid No [1]	1 V	Grid No. 1 Voltage ³ =38 to ~72 Volts D.C.
Grid No [2]	38 V	Grid No. 1 Voltage ³ =38 to ~72 Volts D.C.
Grid No [3]	72 V	Grid No. 1 Voltage ³ =38 to ~72 Volts D.C.
Grid No [1]	1	Grid No. 1 Circuit Resistance 1.5 Max. Meghoms
Grid No [2]	1.5	Grid No. 1 Circuit Resistance 1.5 Max. Meghoms
Published value	1	1Grid number four in this tube is the focus control electrode.
Published value [1]	2 V	2With the combined grid No. 1 bias voltage and video signal adjusted to produce
Published value [2]	1 V	2With the combined grid No. 1 bias voltage and video signal adjusted to produce
an anode current of [1]	100	an anode current of 100 ua on a 8 7/8 x 6 9/16 inch picture adjusted for best
an anode current of [2]	8	an anode current of 100 ua on a 8 7/8 x 6 9/16 inch picture adjusted for best
an anode current of [3]	7	an anode current of 100 ua on a 8 7/8 x 6 9/16 inch picture adjusted for best
an anode current of [4]	8	an anode current of 100 ua on a 8 7/8 x 6 9/16 inch picture adjusted for best
an anode current of [5]	6	an anode current of 100 ua on a 8 7/8 x 6 9/16 inch picture adjusted for best
an anode current of [6]	9	an anode current of 100 ua on a 8 7/8 x 6 9/16 inch picture adjusted for best
an anode current of [7]	16	an anode current of 100 ua on a 8 7/8 x 6 9/16 inch picture adjusted for best
overall focus. For other anode voltages, the focus voltage will be from	0 V	overall focus. For other anode voltages, the focus voltage will be from 0%
Published value	3	3Visual extinction of focused raster.
the anode contact +	300	the anode contact + 300,