

ELECTRONIC TUBE REFERENCE

14WP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Low-voltage electrostatically focused cathode-ray display tube with magnetic deflection, operated around a 12 kV anode supply and designed for a large direct-view screen area.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	6
NOMINAL HEATER	6.3 V / 30 A	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Cathode Ray	
MAXIMUM SCREEN VOLTAGE	300 V
CRT-specific ratings, operating conditions, capacitances, focus/deflection, cutoff, optical, and screen data are retained in section parameters.	

14WP4 Picture Tube

The **14WP4** is a rectangular glass-envelope cathode-ray picture tube designed for television display applications. It features an aluminized screen, low-voltage electrostatic focusing, and a 90-degree magnetic deflection system. Notably, the tube is engineered with a heater having a controlled warm-up time, making it suitable for series-string heater designs or other applications requiring coordinated thermal characteristics.

Optical and Mechanical Design

The 14WP4 utilizes a spherical filterglass faceplate with an approximate light transmission of 78%. The screen is coated with an aluminized P4-sulfide type phosphor, which provides a bright, high-contrast

display.

Mechanically, the tube has a compact and lightweight design for its class:

Physical Parameter	Value
Approximate Weight	8.5 lbs
Overall Length	13-3/16" ± 5/16"
Neck Length	5-1/2" ± 3/16"
Projected Area of Screen	104 sq. in.

The tube's envelope includes an external conductive coating of the regular-band type, which serves as a filter capacitor when combined with the internal conductive coating. The contact area for grounding this external coating is located near the reference line of the bulb. The high-voltage anode connection is made via a recessed small cavity cap (JEDEC No. J1-21).

Heater and Electrical Characteristics

The 14WP4 incorporates an electron gun design that does not require an external ion-trap magnet. The heater is designed for reliable operation with a controlled warm-up characteristic.

Heater Specifications

- **Nominal Heater Voltage:** 6.3 V
- **Heater Current (at 6.3 V):** 600 ± 30 mA
- **Calculated Heater Power:** 3.78 W (calculated as 6.3 V multiplied by 0.6 A)
- **Average Heater Warm-Up Time:** 11 seconds

The controlled 11-second warm-up time ensures that the heater resistance rises at a rate compatible with other tubes in a series-connected heater string, minimizing voltage surges during equipment turn-on.

Direct Interelectrode Capacitances

- **Cathode to all other electrodes:** 5 pF
- **Grid No. 1 to all other electrodes:** 6 pF
- **External conductive coating to anode:** 800 pF minimum / 1200 pF maximum

Basing and Pin Connections

The 14WP4 can be fitted with either of two alternate bases: a Small-Shell Duodecal 6-Pin base (JEDEC Group 4, No. B6-63) or a Short Small-Shell Duodecal 6-Pin base (JEDEC No. B6-203). The tube utilizes the **12L** basing designation, viewed from the bottom of the tube.

The pin assignments are as follows:

Pin Number	Connection
Pin 1	Heater
Pin 2	Grid No. 1 (Control Grid)
Pin 6	Grid No. 4 (Focusing Electrode)
Pin 10	Grid No. 2 (Screen Grid)
Pin 11	Cathode
Pin 12	Heater
Cap	Anode (Grid No. 3, Grid No. 5, Screen, Collector)
C	External Conductive Coating (Ground Connection)

The anode cap connects to the internal grids (Grid No. 3 and Grid No. 5), the screen, and the collector, which operate at high potential to accelerate the electron beam.

Maximum and Minimum Ratings

The following limits are established under the Design-Maximum rating system. Unless otherwise specified, all voltage values are positive with respect to the cathode.

Electrode Voltages

- **Anode Voltage:** 15,500 max volts / 9,000 min volts
- **Grid-No. 4 (Focusing) Voltage:**
 - Positive value: 1,100 max volts
 - Negative value: 550 max volts
- **Grid-No. 2 Voltage:** 550 max volts
- **Grid-No. 1 Voltage:**
 - Negative peak value: 220 max volts
 - Negative bias value: 200 max volts
 - Positive bias value: 0 max volts
 - Positive peak value: 2 max volts

Heater and Heater-Cathode Limits

- **Heater Voltage:** 5.7 min volts to 6.9 max volts
- **Peak Heater-Cathode Voltage (Heater negative with respect to cathode):**
 - During equipment warm-up period (not exceeding 15 seconds): 450 max volts
 - After equipment warm-up period: 200 max volts
- **Peak Heater-Cathode Voltage (Heater positive with respect to cathode):**

- Combined AC and DC voltage: 200 max volts
- DC component: 100 max volts

Typical Operating Conditions

For standard grid-drive service, where voltages are positive with respect to the cathode, the typical operating parameters are defined as follows:

Parameter	Typical Value
Anode Voltage	12,000 V
Grid-No. 4 Voltage	-50 to +350 V
Grid-No. 2 Voltage	300 V
Grid-No. 1 Voltage (for visual extinction of focused raster)	-28 to -72 V

Circuit Constraints

To ensure stable operation and prevent damage due to gas current or grid emission, the maximum resistance in the Grid-No. 1 circuit must be restricted:

- **Maximum Grid-No. 1-Circuit Resistance:** 1.5 megohms

Proper X-radiation shielding precautions must be observed when operating cathode-ray tubes at these high anode voltages to ensure operator and user safety.

Technical Summary

The **14WP4** is a specialized **90-degree magnetic deflection, low-voltage electrostatic focus picture tube** featuring a rectangular glass envelope and an aluminized P4-sulfide screen. Its design is optimized for television receiver service, incorporating a **6.3 V, 600 mA heater with a controlled 11-second warm-up time** to facilitate series-string heater configurations. Operating typically at an anode voltage of **12,000 V**, the tube provides a projected screen area of **104 square inches** and utilizes a **12L** duodecal basing arrangement. With its integrated electron gun requiring no ion-trap magnet and its robust design-maximum ratings, the 14WP4 represents a highly integrated display component of its era.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

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

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
LOW-VOLTAGE ELECTROSTATIC FOCUS	90 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Grid No.1 to all other electrodes	6 pF	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Heater Current at 6.3 volts – published value 1	6.3 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Heater Current at 6.3 volts – published value 2	600 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Heater Current at 6.3 volts – published value 3	30 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Heater Warm-Up Time (Average)	11	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Light transmission (Approx)	78	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Projected Area of Screen	104	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
GRID-No. 4 (FOCUSING) VOLTAGE	4 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
GRID-No. 1 VOLTAGE	1 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Anode Voltage	12000 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Grid-No.4 Voltage – published value 1	-50 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Grid-No.4 Voltage – published value 2	350 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Grid-No.2 Voltage	300 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
focused raster – published value 1	-28 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
focused raster – published value 2	-72 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
External conductive coating to anode. !1200 max	1200 mA	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
GRID-No. 2 VOLTAGE – published value 1	2 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
GRID-No. 2 VOLTAGE – published value 2	550 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Combined AC and DC voltage	200 V	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.
Grid-No.1~ircuit Resistance	1.5 mA	Published CRT datasheet value; multiple numbers on one source row represent its separate limits or operating conditions.

TUBE TINKER

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

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

© 2026 Tube Tinker