



ELECTRONIC TUBE REFERENCE

14GP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Fourteen-inch cathode-ray television picture tube identified by RCA for direct-view television service; available source data is sparse beyond its screen size and intended application.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	6.3 V / 800 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Cathode Ray

No fixed ratings recorded.

Television kinescope with electrostatic focus and magnetic deflection.

14GP4 Kinescope

An electrostatic-focus, magnetic-deflection rectangular glass picture tube featuring an ion-trap gun, a Filterglass faceplate, and an external conductive bulb coating.

Overview

The **14GP4** is a short, directly viewed, rectangular glass picture tube designed for use in television receivers. It features a screen size of 11-3/8" by 8-1/2" with a nominal 12-1/2" diagonal. By utilizing electrostatic focusing, the tube eliminates the need for an external focusing coil or focusing magnet, simplifying installation and automatic focus maintenance during line voltage variations or brightness adjustments.

The rectangular geometry of the 14GP4 provides a significant space-saving advantage, requiring approximately 20 percent less cabinet height than a round-face tube of equivalent picture width. This design allows the receiver chassis to remain flat and uncut beneath the face of the tube, facilitating flexible control placement. To enhance picture contrast under ambient light, the tube incorporates a neutral light-absorbing Filterglass faceplate and a high-efficiency white fluorescent screen.

Physical and Optical Characteristics

The 14GP4 is constructed with a rectangular glass envelope, a specialized funnel-to-neck section to facilitate yoke centering, and an external conductive coating.

Screen and Phosphor Specifications

- **Fluorescence:** White
- **Phosphorescence:** White
- **Persistence:** Short
- **Phosphor Type:** No. 4-Sulfide Type
- **Faceplate:** Filterglass with approximately 66% light transmission
- **Deflection Angles (Approximate):**
 - Diagonal: 70°
 - Horizontal: 65°
 - Vertical: 50°

Dimensional Limits

Dimension	Value	Tolerance / Limit
Overall Length	16-13/16"	± 3/8"
Greatest Diagonal of Tube at Face	13-11/16"	± 1/8"
Greatest Width of Tube at Face	12-17/32"	± 1/8"
Greatest Height of Tube at Face	9-23/32"	± 1/8"
Minimum Screen Diagonal	12-1/4"	Minimum
Minimum Screen Width	11-1/8"	Minimum
Minimum Screen Height	8-5/16"	Minimum

Electrical Characteristics and Ratings

The 14GP4 utilizes an indirectly heated, coated unipotential cathode. The electrical connections are made via a small-shell duodecal 6-pin base (JETEC No. B6-63) and a recessed small cavity cap (JETEC No. J1-21)

for the high-voltage ultor connection.

Heater and Capacitances

- **Heater Voltage (AC or DC):** 6.3 V
- **Heater Current:** 0.8 A
- **Direct Interelectrode Capacitances:**
 - Grid No. 1 to all other electrodes: 6 μF
 - Cathode to all other electrodes: 5 μF
- **External Conductive Coating Capacitance to Ultor:** 2000 μF maximum, 750 μF minimum

Terminal Connections (Bottom View)

- **Pin 1:** Heater
- **Pin 2:** Grid No. 1
- **Pin 6:** Grid No. 4
- **Pin 10:** Grid No. 2
- **Pin 11:** Cathode
- **Pin 12:** Heater
- **Recessed Cap:** Ultor (Grid No. 3, Grid No. 5, and Collector connected internally)
- **External Coating (C):** Must be grounded

Maximum Ratings (Design-Center Values)

Parameter	Value	Unit
Ultor Voltage	14000 max	Volts
Grid-No. 4 Voltage	5000 max	Volts
Grid-No. 2 Voltage	500 max	Volts
Grid-No. 1 Voltage (Negative bias value)	125 max	Volts
Grid-No. 1 Voltage (Positive bias value)	0 max	Volts
Grid-No. 1 Voltage (Positive peak value)	2 max	Volts
Peak Heater-Cathode Voltage (Heater negative to cathode during warm-up $\leq 15\text{s}$)	410 max	Volts

Parameter	Value	Unit
Peak Heater-Cathode Voltage (Heater negative to cathode after warm-up)	180 max	Volts
Peak Heater-Cathode Voltage (Heater positive to cathode)	180 max	Volts
Grid-No. 1 Circuit Resistance	1.5 max	Megohms

Typical Operating Conditions

Under typical operating conditions, the 14GP4 is operated with an ultor voltage of 12,000 V. The ultor voltage should generally not be operated below 10,000 V, as brilliance and definition decrease at lower potentials.

- **Ultor Voltage:** 12000 V
- **Grid-No. 4 Voltage (for focus at 100 μ A ultor current):** 2170 to 2940 V (representing 18.1% to 24.5% of the applied ultor voltage)
- **Grid-No. 2 Voltage:** 300 V
- **Grid-No. 1 Voltage (for visual extinction of undeflected focused spot):** -33 to -77 V
- **Grid-No. 4 Current:** -15 to +25 μ A
- **Grid-No. 2 Current:** -15 to +15 μ A

System Integration and Operating Considerations

Focusing and Ultor Supply

The "ultor" is a collective term for Grid No. 3, Grid No. 5, and the collector, which are connected internally to accelerate the electron beam prior to deflection. Electrostatic focusing is achieved by adjusting the voltage applied to Grid No. 4. Because Grid No. 4 draws very little current, its voltage can be economically derived from a simple rectifier system connected to a tap on the horizontal-deflection-output and high-voltage transformer. This arrangement minimizes voltage drop in the main high-voltage supply.

Magnetic Deflection and Centering

The deflecting yoke must be held firmly against the funnel. It should have an effective length of no more than 1-11/16 inches, with its effective center of deflection located approximately 1.15 inches from the Reference Line. This positioning prevents the electron beam from striking the neck of the tube during wide-angle deflection.

To prevent electrical arcing between the recessed small cavity cap and the yoke mounting hood, a high-quality insulating material such as Neoprene must be placed between the hood and the funnel.

Pattern centering is accomplished using a small, adjustable centering magnet located on the tube neck within 3-1/4 inches of the Reference Line. This centering magnet must be constructed of a material capable of withstanding the alternating magnetic field of the deflecting yoke without demagnetizing. If placed too close to the yoke, it may cause deflection defocusing or neck shadow.

Ion-Trap Magnet

The 14GP4 requires an external, single-field ion-trap magnet. The magnet must be positioned with its north pole adjacent to vacant pin position No. 8 and its south pole adjacent to pin No. 2.

- **Field Strength (Approximate):** 35 gaussses
- **DC Current (Approximate):** 70 mA

The optimum position of the ion-trap magnet is in the region of Grid No. 2, adjusted by rotating and moving the magnet toward the base to achieve maximum picture brightness without corner shadowing. Operating the tube with an excessively strong ion-trap magnet will raise the required focusing voltage beyond the specified limits.

Safety and Handling

- **Implosion Protection:** The 14GP4 contains a high vacuum. It must be handled with extreme care, avoiding scratches or excessive pressure. Receivers must be designed with a clear, shatter-proof glass or plastic cover over the faceplate to protect against flying glass in the event of an implosion.
- **Grounding:** The external conductive bulb coating must be grounded. Connection can be made using a soft brush contact on the deflecting yoke or a grounding strap around the face end of the coating. A minimum contact area of 1/4 square inch is required. Proper grounding of this coating also minimizes radiation caused by horizontal-scanning pulses.
- **X-Ray Radiation:** When operated at or below its maximum design-center ratings, the 14GP4 does not produce harmful X-ray radiation. The tube can be operated up to 16 kilovolts (absolute value) without requiring special shielding for prolonged close-range exposure. Above 16 kilovolts, additional X-ray shielding precautions may be necessary.

Technical Summary

The **14GP4** is a specialized, space-saving rectangular kinescope utilizing electrostatic focusing and magnetic deflection. Operating at a typical ultor voltage of 12,000 V, it provides a bright, high-contrast 11-3/8" x 8-1/2" picture. Its design integrates an internal-external conductive coating capacitor system, an efficient white sulfide phosphor screen, and an economical low-current electrostatic focusing gun. These features, combined with its reduced height requirements, made it a highly practical choice for compact television receiver designs of its era.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1940 RCA

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

1940 RCA

Section 1 · Cathode Ray

APPLICATION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Application	TelevisionPictureTube text	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
ScreenDiagonal	14 in	—