

ELECTRONIC TUBE REFERENCE

14QP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Electrostatically focused, magnetically deflected P4 cathode-ray display tube with white short-to-medium persistence, an external single-field ion trap, and typical 9 kV anode operation.

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	12100 V
Published maximum ratings and characteristics promoted semantically from the approved source.	

14QP4 — Electrostatic Focus Television Picture Tube

The **14QP4** and its variant **14QP4A** are 14-inch direct-viewed, rectangular glass television picture tubes. Designed for monochrome television receivers, these tubes feature magnetic deflection, electrostatic focusing, a spherical faceplate made of gray filter glass, and an external conductive coating. The **14QP4A** is identical to the **14QP4** except that it incorporates an aluminized screen for enhanced brightness and picture contrast.

Mechanical Design and Construction

The 14QP4 utilizes a rectangular glass bulb construction with a spherical faceplate. The faceplate is made of gray filter glass with an approximate light transmittance of 76 percent to improve picture contrast

under ambient room lighting.

Screen and Deflection Characteristics

- **Minimum Useful Screen Dimensions:** 11 1/2 x 8 5/8 inches
- **Minimum Useful Screen Area:** 96 square inches
- **Deflection Angles (approximate):**
 - Horizontal: 65 degrees
 - Diagonal: 70 degrees
- **Phosphor:** P4, which produces a white fluorescence with short-to-medium persistence.

Physical Connections and Basing

The tube is equipped with a **Small Shell Duodecal 6-Pin** base (designation B6-63) and utilizes the **12L** basing arrangement. The high-voltage anode connection is made via a recessed small cavity cap (designation J1-21) located on the bulb cone.

The physical alignment of the anode contact is designed to align with Pin No. 6 within a tolerance of ± 30 degrees. The reference line of the tube is determined by the plane C-C' of the JETEC No. 110 reference line gauge when the gauge is resting on the tube cone.

Heater and Electrical Characteristics

The electron gun of the 14QP4 requires a standard heater supply and exhibits specific interelectrode capacitances.

Heater Specifications

- **Heater Voltage:** 6.3 Volts
- **Heater Current:** $0.6 \pm 5\%$ Ampere
- **Heater Warm-up Time:** 11 seconds

The heater warm-up time is defined as the time required for the voltage across the heater terminals to increase to 5.0 volts when measured in the standard JETEC test circuit, which utilizes a supply voltage of 25 volts and a series resistance of 31.5 ohms.

Direct Interelectrode Capacitances

- **Cathode to All Other Electrodes:** 5 μf (approximate)
- **Grid No. 1 to All Other Electrodes:** 6 μf (approximate)
- **External Conductive Coating to Anode:** 900 μf maximum, 600 μf minimum

The external conductive coating must be grounded during operation to serve as a high-voltage filter capacitor in conjunction with the internal conductive coating.

Typical Operating Conditions and Ion Trap Requirements

Under typical operating conditions, the 14QP4 is configured with the following electrode potentials and magnetic components:

Typical Operating Voltages

- **Anode Voltage:** 9,000 Volts DC
- **Grid No. 4 Voltage (Focusing Electrode):** -50 to +250 Volts DC
- **Grid No. 2 Voltage:** 250 Volts DC
- **Grid No. 1 Voltage (Required for Cutoff):** -24 to -64 Volts DC (defined at visual extinction of the raster)

Ion Trap Magnet

The tube requires an external, single-field type ion trap magnet to prevent ion burn on the phosphor screen. The operating parameters depend on the type of magnet used:

- **Electromagnetic Ion Trap:** Requires an average current of 24 mA DC when using a JETEC Ion Trap Magnet No. 117.
- **Permanent Magnet (PM) Ion Trap:** Requires a minimum field strength of 24 Gauss (for a typical PM ion trap magnet with a field strength tolerance of ± 3 gauss).

Absolute Maximum Ratings and Circuit Constraints

The following absolute maximum ratings must not be exceeded under any condition of operation. These values are specified as Absolute Maximum Values:

Voltage Limits

- **Anode Voltage:** 12,100 Volts DC
- **Grid No. 4 Voltage (Focusing Electrode):** -550 to +1100 Volts DC
- **Grid No. 2 Voltage:** 550 Volts DC
- **Grid No. 1 Voltage:**
 - Negative Bias Value: 155 Volts DC
 - Negative Peak Value: 220 Volts
 - Positive Bias Value: 0 Volts DC
 - Positive Peak Value: 2 Volts

Peak Heater-Cathode Voltage

- **Heater Negative with Respect to Cathode:**
 - During warm-up period (not to exceed 15 seconds): 450 Volts
 - After equipment warm-up period: 200 Volts

- **Heater Positive with Respect to Cathode:** 200 Volts

Circuit Values

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

X-Ray Radiation Warning

When operating the 14QP4 or [14QP4A](#), appropriate precautions must be taken regarding X-ray radiation. Shielding may be necessary to protect against the danger of personal injury from prolonged exposure at close range if the tube is operated at voltages higher than the manufacturer's Maximum Rated Anode Voltage (12,100 Volts) or 16,000 Volts, whichever is less.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1950 Sylvania

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

1950 SYLVANIA

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Plate Voltage	12100 V	—
Typical Anode Voltage	9000 V	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Phosphor	P4	—
Focusing Method	Electrostatic	—
Deflecting Method	Magnetic	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1965 Sylvania Electronic Tubes Vol3

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

1965 SYLVANIA ELECTRONIC TUBES VOL3

Section 1 · Cathode Ray

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	—
Heater Current	600 mA	—
Focusing Method	Electrostatic text	—
Deflection Method	Magnetic text	—
Fluorescence	White text	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Persistence	Short to Medium text	—
Phosphor	P4 text	—
Horizontal Deflection Angle	65 deg	Approximate
Diagonal Deflection Angle	70 deg	Approximate
Light Transmittance	76 percent	Approximate
Ion Trap	External Single Field text	—
Cathode-to-All Capacitance	5 pF	Approximate
Grid1-to-All Capacitance	6 pF	Approximate
External Coating-to-Anode Capacitance Minimum	600 pF	—
External Coating-to-Anode Capacitance Maximum	900 pF	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Anode Voltage	9000 V	—
Grid2 Voltage	250 V	—
Ion Trap Magnet Current	24 mA	Representative
Minimum Ion Trap Field Strength	24 gauss	—
Maximum Anode Voltage	12100 V	—
Maximum Grid2 Voltage	550 V	—
Focus Voltage Minimum	-50 V	Grid4
Focus Voltage Maximum	250 V	Grid4
Grid1 Cutoff Voltage Minimum	-64 V	—
Grid1 Cutoff Voltage Maximum	-24 V	—
Maximum Grid1 Circuit Resistance	1.5 Mohm	—

TUBE TINKER

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