



ELECTRONIC TUBE REFERENCE

16MP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Direct-view cathode-ray picture tube documented by manufacturer data for type 16MP4; available extracted technical detail is limited, so the description remains conservative.

GENERAL CHARACTERISTICS

BASE DESIGNATION	12N	BASE PINS	5
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	14000 V
MAXIMUM SCREEN VOLTAGE	41 V
<i>CRT-specific anode/focus/deflection ratings retained as parameters rather than mapped to ordinary plate/screen fields.</i>	

16MP4 — Cathode Ray Picture Tube

A direct-view, round glass cathode ray tube designed for television applications, featuring magnetic focus and deflection, an external double field ion trap, and an external conductive coating.

Overview

The **16MP4** and **16MP4A** are direct-view cathode ray picture tubes designed specifically for television receiver applications. These two types are electrically and mechanically identical with a single physical distinction: the **16MP4A** incorporates a grey filter faceplate to improve picture contrast under ambient light, whereas the standard **16MP4** uses a clear faceplate.

Both tubes feature a round glass construction, a unipotential cathode, magnetic focusing, and magnetic deflection. They are designed to operate with an external double field ion trap magnet and utilize an external conductive bulb coating. The design is optimized to display a standard **10 1/2" by 14 3/4"** raster size.

Mechanical Design and Physical Dimensions

The 16MP4 is constructed with a round glass envelope. The physical dimensions and alignment tolerances are critical for proper mounting, deflection yoke placement, and focus coil positioning within a television chassis.

Envelope and Screen Dimensions

- **Overall Length:** $21 \frac{3}{4} \pm \frac{3}{8}$ inches
- **Greatest Diameter of Bulb:** $16 \frac{1}{8} \pm \frac{1}{8}$ inches
- **Minimum Useful Screen Diameter:** $14 \frac{3}{4}$ inches
- **Neck Diameter:** $1 \frac{7}{16} \pm \frac{1}{16}$ inches
- **Deflection Angle (Approximate):** 60 degrees

Component Positioning and Clearances

The neck of the tube requires specific clearances for external magnetic components:

- **Ion Trap Magnet Space:** A length of $4 \frac{5}{8} \pm \frac{3}{16}$ inches along the neck, measured from the base, must be kept clear for the installation and adjustment of the external double field ion trap magnet.
- **Anode Terminal Distance:** The anode terminal is located on the cone of the bulb, positioned at a distance of $5 \frac{5}{16} + \frac{3}{8} - \frac{1}{8}$ inches from the reference line.
- **Reference Line to Faceplate:** The distance from the reference line to the front edge of the bulb is $13 \frac{1}{4} + \frac{3}{16} - \frac{1}{16}$ inches.

Base and Bulb Contacts

- **Bulb Contact:** Recessed small cavity cap (J1-21 designation).
- **Base:** Small shell duodecal 5-pin base (B5-57 designation).
- **Basing Configuration:** 12N.
- **Bulb Contact Alignment:** The J1-21 anode contact aligns with pin position #3 within a tolerance of ± 10 degrees.

Electrical Connections and Basing

The 16MP4 uses a duodecal base with five active pins, plus an anode cap on the side of the glass cone. The pin connections, viewed from the bottom of the base, are assigned as follows:

Pin / Terminal	Connection
Pin 1	Heater
Pin 2	Grid No. 1
Pin 10	Grid No. 2
Pin 11	Cathode
Pin 12	Heater
Anode Cap	Anode

Heater Characteristics

The unipotential cathode is indirectly heated. The heater is designed for parallel AC or DC operation.

Heater Parameter	Value
Nominal Heater Voltage	6.3 V
Nominal Heater Current	0.6 A
Calculated Heater Power	3.78 W

The calculated heater power is derived directly from the nominal ratings ($6.3 \text{ V} * 0.6 \text{ A} = 3.78 \text{ W}$).

Electrical Characteristics and Typical Operating Points

The 16MP4 operates with high anode voltages and utilizes magnetic fields for both electron beam focusing and deflection.

Interelectrode Capacitances

The external conductive coating on the glass envelope forms a capacitor with the internal anode coating. This capacitance can be utilized as a filter capacitor for the high-voltage anode power supply.

- **Maximum External Coating to Anode Capacitance:** 3,500 pF (μpf)
- **Minimum External Coating to Anode Capacitance:** 1,500 pF (μpf)

Typical Operating Conditions

The typical operating parameters represent a standard configuration for television service:

- **DC Anode Voltage:** 12,000 Volts
- **DC Grid No. 2 Voltage:** 300 Volts
- **DC Grid No. 1 Voltage:** -33 to -77 Volts (configured for visual extinction of the undeflected focused spot)

- **DC Focusing Coil Current (Approximate):** 110 mA
- **DC Ion Trap Current (Approximate):** 120 mA

Focusing and Ion Trap Specifications

The typical focusing coil current of 110 mA is specified for a standard focus coil #109 (or equivalent) under the following conditions:

- The combined Grid No. 1 bias voltage and video signal voltage are adjusted to produce a highlight brightness of **20 foot-lamberts** on the standard 10 1/2" by 14 3/4" picture.
- The distance from the reference line to the center of the air gap on the focus coil must be maintained at **3.25 inches**.

The typical ion trap current of 120 mA is specified when using a standard ion trap coil #108.

Maximum Ratings and Circuit Limits

The ratings below are established under the **Design Center** system. Operating the tube beyond these limits may impair its performance and shorten its service life.

Electrode Voltage Limits

- **Maximum DC Anode Voltage:** 14,000 Volts
- **Maximum DC Grid No. 2 Voltage:** 410 Volts
- **Maximum Grid No. 1 Voltage:**
 - **DC Negative-Bias Value:** 125 Volts
 - **DC Positive-Bias Value:** 0 Volts
 - **Positive-Peak Value:** 2 Volts

Heater-Cathode Voltage Limits

To prevent insulation breakdown between the heater and the cathode, the potential difference between these elements must be kept within the following limits:

- **Heater Negative with Respect to Cathode:**
 - *During Warm-up Period (not to exceed 15 seconds):* 410 Volts maximum
 - *After Equipment Warm-up Period:* 125 Volts maximum
- **Heater Positive with Respect to Cathode:** 125 Volts maximum

Circuit Resistance Limits

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

Optical and Screen Characteristics

The screen of the 16MP4 utilizes a specialized phosphor blend to provide a clear monochrome image.

- **Phosphor Number:** No. 4
- **Fluorescent Color:** White
- **Phosphorescent Color:** White
- **Persistence:** Medium

The screen is capable of displaying a standard **10 1/2" by 14 3/4"** raster. The **16MP4A** variant incorporates a grey-tinted faceplate, which reduces reflections and enhances the contrast ratio when the television receiver is operated in brightly lit environments.

Technical Summary

The **16MP4** and **16MP4A** are **60-degree, magnetic-focus, magnetic-deflection cathode ray picture tubes** designed for monochrome television receivers. Operating with a nominal **6.3 V, 0.6 A** heater, these tubes feature a **16 1/8-inch** round glass envelope, a **small shell duodecal 5-pin base (B5-57)**, and a **recessed small cavity anode cap (J1-21)**.

The electrical design supports a maximum design-center anode voltage of **14,000 V** and typical operation at **12,000 V**, producing a **10 1/2" by 14 3/4"** raster. Beam focusing is achieved magnetically, typically requiring **110 mA** through a standard focus coil, while ion separation is managed via an external double field ion trap magnet requiring approximately **120 mA**. The **16MP4A** is distinguished solely by its grey filter faceplate, which provides superior contrast compared to the clear faceplate of the standard **16MP4**.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1961 Tung Sol

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

1961 TUNG SOL

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Voltage	14000 V	—
Typical Anode Voltage	12000 V	—
Maximum Grid2 Voltage	410 V	—
Typical Grid2 Voltage	300 V	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
DeflectionAngleApproximate	70 degree	—
FocusingMethod	Magnetic	—
DeflectingMethod	Magnetic	—
PhosphorNumber	4	—
FluorescentColor	White	—
Persistence	Medium	—



SOURCE OPERATING CONDITIONS

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1966 Tung Sol Electronic Tubes 4 of 4

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

1966 TUNG SOL ELECTRONIC TUBES 4 OF 4

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CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MAGNETIC FOCUS 8 DEFLECT90N	8 mA	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
EXTERNAL DOUBLE FIELD ION TRAP – value 1	1	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
EXTERNAL DOUBLE FIELD ION TRAP – value 2	2	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
EXTERNAL DOUBLE FIELD ION TRAP – value 3	3	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
DEFLECTION ANGLE (APPROX.)	6 degrees	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
HEATER VOLTAGE	6.3 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
SFOP STANO ARD FOCUS COIL W109, OR EQUIVALENT, WITX THE COMBINED GRID 41 BIAS VOLTAGE AMD VIDEO	41 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
SIGNAL VOLTAGE ADJUSTED TO PRODUCE A XIGMLI GHT BRIGX ? NESS OF 20 F00T LAMBERTS OX A 10 1/2" BY – value 1	10 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
SIGNAL VOLTAGE ADJUSTED TO PRODUCE A XIGMLI GHT BRIGX ? NESS OF 20 F00T LAMBERTS OX A 10 1/2" BY – value 2	1 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
SIGNAL VOLTAGE ADJUSTED TO PRODUCE A XIGMLI GHT BRIGX ? NESS OF 20 F00T LAMBERTS OX A 10 1/2" BY – value 3	2 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
14 j/N" PICTURE SIZE. DISTANCE FROM REFERENCE LIME TO CENTER OF AIR GAP ON FOCUS COIL SMALL BE	14 mA	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MAXIMUM DC ANODE VOLTAGE	14000 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
MAXIMUM DC GRID #2 VOLTAGE – value 1	2 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
MAXIMUM DC GRID #2 VOLTAGE – value 2	41 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
MAXIMUM GRID #1 VOLTAGE	1 V	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
MAXIMUM GRID #1 CIRCUIT RESISTANCE – value 1	1 mA	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.
MAXIMUM GRID #1 CIRCUIT RESISTANCE – value 2	1.5 mA	Published CRT datasheet value; multiple values on a row represent the source table's separate conditions/limits.