



ELECTRONIC TUBE REFERENCE

16MP4A

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Direct-view cathode-ray picture tube documented by manufacturer data for type 16MP4A; 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

SECTION 1 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>	

16MP4A — Direct-View Television Picture Tube

The **16MP4A** is a round glass, direct-view cathode ray tube (CRT) designed primarily for television receiver applications. It is electrically and mechanically identical to the **16MP4**, with the sole distinction being the inclusion of a grey filter faceplate on the 16MP4A to enhance picture contrast under ambient lighting conditions.

Construction and Principles of Operation

The 16MP4A is constructed with a round glass envelope and incorporates several key design features:

- **Unipotential Cathode:** The tube features an indirectly heated, coated unipotential cathode.
- **Magnetic Focus and Deflection:** Both focusing and deflection are accomplished magnetically. The nominal deflection angle of the electron beam is approximately 60 degrees.
- **Ion Trap:** The tube requires an external double-field ion trap magnet to prevent negative ions from damaging the phosphor screen. A dedicated space of $4\text{-}5/8 \pm 1/16$ inches along the neck must be kept clear for the installation of this magnet.
- **External Conductive Coating:** An external conductive coating is applied to the glass cone. When grounded, this coating forms a high-voltage filter capacitor in conjunction with the internal conductive anode coating. The capacitance of this structure ranges from a minimum of 1,500 μF to a maximum of 3,500 μF .

Optical Characteristics

The screen utilizes Phosphor No. 4, which provides a white fluorescence and a white phosphorescence. The persistence of the phosphor is classified as medium, making it suitable for standard television scanning rates. The nominal raster size produced on the screen is 10-1/2 inches by 14-3/4 inches.

Mechanical Specifications and Basing

The physical dimensions of the 16MP4A require precise alignment of external components:

Mechanical Parameter	Value
Overall Length	$21\text{-}3/4 \pm 3/8$ inches
Greatest Diameter of Bulb	$16\text{-}1/8 \pm 1/8$ inches
Minimum Useful Screen Diameter	14-3/4 inches
Neck Diameter	$1\text{-}7/16 \pm 1/16$ inches
Bulb Contact	Recessed small cavity cap (J1-21)
Base	Small shell duodecal 5-pin (B5-57)
Basing Designation	12N

Bulb Contact Alignment

The J1-21 recessed small cavity cap serves as the anode terminal. This contact is aligned with pin position #3 on the base within a tolerance of ± 10 degrees. The distance from the reference line to the center of the anode terminal is approximately 5-5/16 inches.

Pin Connections

The 16MP4A utilizes a 5-pin duodecal base. The pin connections, viewed from the bottom of the base, are assigned as follows:

Pin Number	Connection
1	Heater
2	Grid No. 1 (Control Grid)
10	Grid No. 2 (Screen Grid)
11	Cathode
12	Heater
Cap	Anode Terminal

Electrical Ratings and Operating Conditions

Heater Ratings and Calculation

The heater is designed for AC or DC operation. The nominal ratings are:

- **Heater Voltage:** 6.3 V
- **Heater Current:** 0.6 A

Using these nominal values, the heater power consumption is calculated as: $\text{Heater Power} = 6.3 \text{ V} \times 0.6 \text{ A} = 3.78 \text{ W}$

Design Center Maximum Ratings

The following maximum ratings are established under the Design Center system and must not be exceeded under the worst-case operating conditions:

Parameter	Maximum Rating
Maximum DC Anode Voltage	14,000 V
Maximum DC Grid No. 2 Voltage	410 V
Maximum Grid No. 1 Voltage:	
- DC Negative-Bias Value	125 V
- DC Positive-Bias Value	0 V
- Positive-Peak Value	2 V
Maximum DC Peak Heater-Cathode Voltage:	
- Heater negative with respect to cathode (during warm-up $\leq 15 \text{ s}$)	410 V

Parameter	Maximum Rating
- Heater negative with respect to cathode (after warm-up)	125 V
- Heater positive with respect to cathode	125 V

Typical Operating Conditions

For standard television receiver service, the typical operating parameters are defined as follows:

- **DC Anode Voltage:** 12,000 V
- **DC Grid No. 2 Voltage:** 300 V
- **DC Grid No. 1 Voltage (for visual extinction of undeflected focused spot):** -33 V to -77 V
- **DC Focusing Coil Current (Approximate):** 110 mA
 - *Operating Condition:* This current is specified for standard focus coil #109 (or equivalent), with the combined Grid No. 1 bias voltage and video signal voltage adjusted to produce a highlight brightness of 20 foot-lamberts on a 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.
- **DC Ion Trap Current (Approximate):** 120 mA (using standard coil #108)
- **Maximum Grid No. 1 Circuit Resistance:** 1.5 Megohms

Technical Summary

The **16MP4A** is a 16-inch round glass, magnetically focused and deflected cathode ray tube designed for television display applications. It features a grey filter faceplate for improved contrast, a unipotential cathode, and a No. 4 white phosphor screen with medium persistence. The tube operates with a 6.3 V, 0.6 A heater (consuming 3.78 W) and is rated for a maximum DC anode voltage of 14,000 V. It utilizes a small shell duodecal 5-pin base (basing 12N) and an external conductive coating that provides 1,500 to 3,500 μF of filter capacitance. Proper operation requires an external double-field ion trap magnet and a magnetic focusing coil aligned according to specified physical tolerances.



SOURCE OPERATING CONDITIONS

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

[SOURCE PDF](#)

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.