

ELECTRONIC TUBE REFERENCE

19AP4B

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

P4 high-voltage cathode-ray picture-display tube with magnetic focusing and deflection; this 19AP4B variant differs principally in faceplate treatment, with manufacturer documentation warning about X-ray shielding above 16 kV.

GENERAL CHARACTERISTICS

BASE DESIGNATION	12D	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	19000 V
MAXIMUM SCREEN VOLTAGE	410 V
CRT specialized anode, grid, optical, and deflection data retained in TUBE_SECTION_PARAMETER.	

19AP4B — Television Cathode Ray Tube

The **19AP4B** is a direct-view picture tube designed for television applications. It features a round metal construction, a unipotential cathode, and utilizes magnetic focus and deflection. The tube requires an external single-field ion trap magnet and provides a nominal raster size of 11 3/4" x 15 3/4".

Physical and Mechanical Construction

The 19AP4B is built with a round metal envelope. The metal shell lip of the bulb serves as the electrical contact for Grid No. 3 and the anode.

The physical dimensions of the tube are:

- **Overall Length:** 21 1/2 ± 1/2 inches
- **Greatest Bulb Diameter:** 18 5/8 ± 1/8 inches
- **Minimum Useful Screen Diameter:** 17 3/8 inches

The faceplate is a frosted filter type designed to reduce glare and improve contrast, offering approximately 66% light transmission at the center. The screen uses Phosphor No. 4, which produces a white fluorescent and white phosphorescent output with medium persistence, suitable for television picture reproduction. The deflection angle of the tube is approximately 66 degrees.

Electrical Connections and Basing

The tube uses a **small shell duodecal 5-pin base (B5-57)** with a **12D** basing arrangement. The pin connections, viewed from the bottom, are as follows:

Pin	Connection
Pin 1	Heater
Pin 2	Grid No. 1
Pin 10	Grid No. 2
Pin 11	Cathode
Pin 12	Heater
Metal Shell Lip	Grid No. 3, Anode

Interelectrode Capacitances

The approximate interelectrode capacitances of the tube are:

- **Cathode to all other electrodes:** 5 µµF
- **Grid No. 1 to all other electrodes:** 7 µµF

Heater and Design Center Ratings

The 19AP4B operates with a standard heater supply and has strict limits on electrode voltages to ensure safe and reliable operation.

Heater Characteristics

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

Design Center Maximum Ratings

- **Maximum DC Anode Voltage:** 19,000 V (Note: X-ray shielding may be required if operating above 16,000 V)
- **Maximum DC Grid No. 2 Voltage:** 410 V
- **Maximum Grid No. 1 Voltage:**
 - DC negative-bias: 125 V
 - DC positive-bias: 0 V
 - Positive-peak: 2 V
- **Maximum DC Peak Heater-Cathode Voltage:**
 - Heater negative to cathode (during warm-up, ≤ 15 seconds): 410 V
 - Heater negative to cathode (after warm-up): 150 V
 - Heater positive to cathode: 150 V

Circuit Constraints

- **Maximum Grid No. 1 Circuit Resistance:** 1.5 M Ω

Typical Operating Conditions

Under typical operating conditions, the 19AP4B is configured with the following parameters to achieve a focused, high-brightness display:

- **DC Anode Voltage:** 12,000 V
- **DC Grid No. 2 Voltage:** 300 V
- **DC Grid No. 1 Voltage:** -33 V to -77 V (for visual extinction of an undeflected focused spot)
- **DC Focusing Coil Current:** 140 $\pm$ 20% mA
 - *Focusing Configuration:* This current is specified using a standard focus coil #106 or equivalent, with the focus coil air gap center positioned 3.0 inches from the reference line. The combined Grid No. 1 bias and video signal are adjusted to achieve a brightness of 18 foot-lamberts on the 11 3/4" x 15 3/4" picture area.
- **DC Ion Trap Current:** 75 $\pm$ 50% mA (using a standard single-field ion trap coil #111)

Technical Summary

The **19AP4B** is a 19-inch class round metal-cone cathode ray tube designed for direct-view television receivers. It features a 66-degree deflection angle, magnetic focus, and magnetic deflection, requiring an external single-field ion trap. Operating at a typical anode voltage of 12,000 V (with a design maximum of 19,000 V), it utilizes a frosted filter faceplate with Phosphor No. 4 to deliver a high-contrast white display. The tube is based on a small shell duodecal 5-pin configuration and requires a 6.3 V, 0.6 A heater supply.

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	19000 V	—
Typical Anode Voltage	12000 V	—
Maximum Grid2 Voltage	410 V	—
Typical Grid2 Voltage	300 V	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
DeflectionAngleApproximate	66 degree	—
FocusingMethod	Magnetic	—
DeflectingMethod	Magnetic	—
PhosphorNumber	4	—
FluorescentColor	White	—
Persistence	Medium	—
FaceplateVariant	Frosted filter faceplate	—

SOURCE OPERATING CONDITIONS

1966 Tung Sol Electronic Tubes 4 of 4

[SOURCE PDF](#)

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

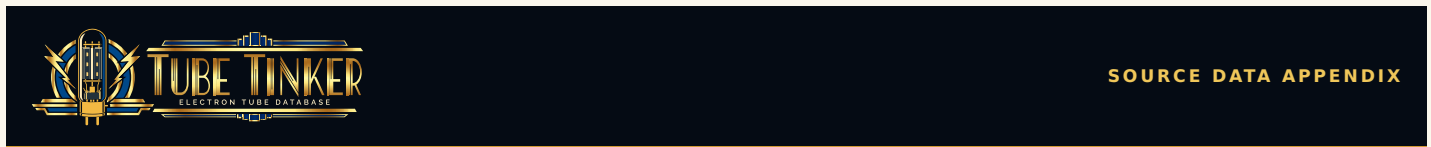
1966 TUNG SOL ELECTRONIC TUBES 4 OF 4

Section 1 · Cathode Ray

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
DEFLECTION ANGLE (APPROX.)	66 degrees	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
FACEPLATE LIGHT TRANSMISSION	66 percent	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
HEATER	6.3 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
A IF THIS TUBE IS OPERATED AT VOLTAGES IX E%LESS OF 16,000 VOLTS %RAY RADIATION SHIELD LNG MAY – value 1	16 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
A IF THIS TUBE IS OPERATED AT VOLTAGES IX E%LESS OF 16,000 VOLTS %RAY RADIATION SHIELD LNG MAY – value 2	0 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC ANODE	12 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC GRID #2 VOLTAGE – value 1	2 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC GRID #2 VOLTAGE – value 2	300 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC FOCUSING COIL CURRENTC (APPROX.) – value 1	140 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DC FOCUSING COIL CURRENTC (APPROX.) – value 2	20 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
G FOR STANDARD FOCUS COIL 4106, OR EQUIVALENT S WITH THE COMBINED GRID N1 BIAS VOLTAGE AMD	4106 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
VIDEO SIGNAL VOLTAGE ADJUSTED TO PRODUCE A XiGnL IGnT BRIGHTNESS OF 18 F00T LANBERTS ON A	18 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
11 j/4" % 15 j/R" PICTURE SIZE. DISTANCE FROM REFERENCE LINE TO CENTER OF 41R GAP ON FOCUS – value 1	4	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
11 j/4" % 15 j/R" PICTURE SIZE. DISTANCE FROM REFERENCE LINE TO CENTER OF 41R GAP ON FOCUS – value 2	15	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
11 j/4" % 15 j/R" PICTURE SIZE. DISTANCE FROM REFERENCE LINE TO CENTER OF 41R GAP ON FOCUS – value 3	41	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MAXIMUM DC ANODE	19000 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM DC GRID #2 VOLTAGE – value 1	2 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM DC GRID #2 VOLTAGE – value 2	410 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM GRID #1 VOLTAGE	1 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM GRID #1 CIRCUIT RESISTANCE – value 1	1 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM GRID #1 CIRCUIT RESISTANCE – value 2	1.5 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.



SOURCE OPERATING CONDITIONS

1968 General Electric Co

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

1968 GENERAL ELECTRIC CO

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Voltage	16000 V	—
Maximum Grid2 Voltage	410 V	—
Maximum Grid1 Negative Bias	125 V	—
Typical Anode Voltage	14000 V	—
Typical Grid2 Voltage	300 V	—
Typical Grid1 Voltage	-72--28 V	—
Maximum Specular Reflection	1.5 %	—

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode To All Other Electrodes Capacitance	5 pF	—
Grid1 To All Other Electrodes Capacitance	6 pF	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Deflection Angle	66 degree	—

TUBE TINKER

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

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