

ELECTRONIC TUBE REFERENCE

19DP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Nineteen-inch direct-view television picture tube with magnetic focusing, approximately 56-degree deflection, and a white P4 medium-persistence screen. Its large rectangular picture area is intended for conventional monochrome receiver display service.

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	1 V
MAXIMUM SCREEN VOLTAGE	41 V
CRT-specific electrode, focusing and deflection data retained as parameters.	

19DP4 — Direct-View Picture Tube

The **19DP4** is a direct-view, round glass picture tube designed primarily for television receiver applications. It features a unipotential cathode, magnetic focusing, and magnetic deflection. The tube is equipped with an external conductive coating and requires an external single-field ion trap for proper operation.

A closely related variant, the **19DP4A**, shares the same electrical and mechanical characteristics but incorporates a grey filter faceplate providing approximately 70% light transmission at the center, whereas the standard 19DP4 features a clear glass faceplate.

Mechanical Specifications and Basing

The 19DP4 is constructed with a round glass bulb and a small shell duodecal 5-pin base (designation B5-57), utilizing the 12N basing arrangement. The high-voltage anode connection is made via a recessed small cavity cap (J1-21) located on the side of the bulb.

Physical Dimensions

- **Overall Length:** 21-1/2" $\pm$ 3/8"
- **Greatest Bulb Diameter:** 18-7/8" $\pm$ 1/8"
- **Minimum Useful Screen Diameter:** 17-3/8"
- **Typical Raster Size:** 11-3/4" x 15-3/4"
- **Bulb Contact Alignment:** The J1-21 anode contact aligns with pin position #3 within a tolerance of $\pm$ 10 degrees.

Pin Connections

Viewed from the bottom of the base, the 12N pinout provides the following connections:

Pin Number	Connection
Pin 1	Heater
Pin 2	Grid No. 1
Pin 10	Grid No. 2
Pin 11	Cathode
Pin 12	Heater
Anode Cap	Recessed small cavity cap (J1-21)

Optical and Electrical Characteristics

The tube utilizes Phosphor No. 4, which produces a white fluorescent color and a white phosphorescent color with medium persistence.

Deflection and Capacitance

- **Focusing Method:** Magnetic
- **Deflecting Method:** Magnetic
- **Deflection Angle (Approximate):** 56°
- **Direct Interelectrode Capacitances:** The capacitance from the external conductive coating to the anode ranges from a minimum of 750 μ F to a maximum of 2500 μ F.

Heater Ratings

The heater is designed for a nominal voltage of 6.3 V and draws a nominal current of 0.6 A. The calculated nominal power consumption of the heater is:

$$\text{Power} = 6.3 \text{ V} \times 0.6 \text{ A} = 3.78 \text{ W}$$

Maximum Ratings (Design Center Values)

The operating limits of the 19DP4 must be maintained within the specified Design Center Values to ensure reliable performance and longevity:

- **Maximum DC Anode Voltage:** 17,000 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 (≤ 15 seconds): 410 V
 - Heater negative with respect to cathode after warm-up: 125 V
 - Heater positive with respect to cathode: 125 V

Typical Operating Conditions and Circuit Values

Under typical operating conditions, the tube is configured with the following parameters to achieve a highlight brightness of 25 foot-lamberts on the standard 11-3/4" x 15-3/4" raster:

- **DC Anode Voltage:** 13,000 V
- **DC Grid No. 2 Voltage:** 250 V
- **DC Grid No. 1 Voltage (for visual extinction of undeflected focused spot):** -26 V to -63 V
- **DC Focusing Coil Current:** Approximately 146 mA, using a standard focus coil (such as focus coil #109 or equivalent) positioned with the air gap center 3.25" from the reference line.
- **DC Ion Trap Current:** Approximately 75 mA when using a standard single-field ion trap coil. Based on the specified $\pm 50\%$ tolerance, the calculated operating range for the ion trap current is 37.5 mA to 112.5 mA.
- **Maximum Grid No. 1 Circuit Resistance:** 1.5 M Ω

Technical Summary

The **19DP4** is a 56-degree magnetic-deflection, magnetic-focus round glass television picture tube. It operates with a 6.3 V, 0.6 A heater and features a white-emitting Phosphor No. 4 screen. The tube is characterized by its 12N duodecal basing, requiring an external single-field ion trap and an external conductive coating that provides up to 2500 μF of capacitance to the anode. With a maximum anode

rating of 17,000 V and typical operation at 13,000 V, the 19DP4 and its grey-filtered counterpart, the 19DP4A, served as standard direct-view displays in early television receiver designs.



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	17000 V	—
Typical Anode Voltage	13000 V	—
Maximum Grid2 Voltage	410 V	—
Typical Grid2 Voltage	250 V	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
DeflectionAngleApproximate	56 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

Section 1 · Cathode Ray

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
11 3~'a" % 15 3~N" RASTER SIZE – value 1	3	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
11 3~'a" % 15 3~N" RASTER SIZE – value 2	15	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
11 3~'a" % 15 3~N" RASTER SIZE – value 3	3	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
DEFLECTION ANGLE (APPROX.)	56 degrees	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
HEATER POSITIVE WITH RESPECT TO CATHODE	125 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
OC ION TRAP CURRENT STANDARD COIL (APPROX.)	75 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
FO R, STANDARD FOCUS COIL 1109, OR – value 1	1109 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
FO R, STANDARD FOCUS COIL 1109, OR – value 2	111 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
VIDEO SIGNAL	25 V	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
11 3/μ" BY 15 3/μ+ PICTURE SIZE. – value 1	3	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
11 3/μ" BY 15 3/μ+ PICTURE SIZE. – value 2	15	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
11 3/μ" BY 15 3/μ+ PICTURE SIZE. – value 3	3	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MAXIMUM OC ANODE VOLTAGE	1 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	41 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 GR 10 #i CIRCUIT RESISTANCE – value 1	10 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.
MAXIMUM GR 10 #i CIRCUIT RESISTANCE – value 2	1.5 mA	Published CRT datasheet value; multiple values on a row correspond to separate source-table conditions or limits.