

ELECTRONIC TUBE REFERENCE

17BP4A

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Aluminized P4 monochrome television picture tube using magnetic focusing and deflection, with approximately 70-degree scanning and typical 14 kV anode operation.

GENERAL CHARACTERISTICS

BASE DESIGNATION	12D	BASE PINS	6
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	16000 V
MAXIMUM SCREEN VOLTAGE	410 V
Maximum anode/grid ratings and capacitance presence promoted from supplied Sylvania CRT data. X-ray warning is explicitly published.	

17BP4A — Rectangular Television Picture Tube

The **17BP4A** is a 17-inch direct-view rectangular glass cathode-ray tube designed for television receiver applications. It features a grey filter glass faceplate, magnetic focusing and deflection, and an external single-field ion trap. The tube utilizes a sulfide-type P4 phosphor screen that produces a white fluorescent and phosphorescent display with medium persistence.

A key distinguishing feature of the 17BP4A is its external conductive coating, which must be grounded. This coating, in combination with the internal anode, forms an integrated filter capacitor.

Family Comparison and Physical Construction

The 17BP4A belongs to a family of closely related 17-inch picture tubes, sharing physical dimensions and basic electrical characteristics with the [17BP4](#), [17BP4B](#), and [17BP4C](#), but differing in specific faceplate treatments, screen types, and coatings:

- **17BP4**: Lacks an external conductive coating and uses the **12D** basing configuration.
- **17BP4A**: Features an external conductive coating and uses the **12N** basing configuration.
- **17BP4B**: Features an aluminized screen and an external conductive coating, using the **12N** basing configuration.
- **17BP4C**: Features a frosted faceplate and an external conductive coating, using the **12N** basing configuration.

Mechanical Specifications

The physical envelope is a rectangular glass structure with the following dimensions:

- **Overall Length**: 19 1/4 ± 3/8 inches
- **Greatest Bulb Diagonal**: 16 5/8 ± 1/8 inches
- **Greatest Bulb Width**: 15 3/8 ± 1/8 inches
- **Greatest Bulb Height**: 12 1/4 ± 1/8 inches
- **Minimum Useful Screen Diagonal**: 15 3/8 inches
- **Minimum Useful Screen Dimensions**: 14 1/4 inches (width) by 10 3/4 inches (height)

The faceplate is constructed of grey filter glass with a light transmission of approximately 66% at the center, which improves picture contrast under ambient room lighting.

The tube uses a **Small Shell Duodecal 5-Pin (B5-57)** base and a **Recessed Small Cavity Cap (J1-21)** for the high-voltage anode connection. The anode contact is aligned with the vacant pin position No. 6 within a tolerance of ±30 degrees.

Electrical Connections and Basing

The 17BP4A utilizes the **12N** basing arrangement. The pin assignments, viewed from the bottom of the base, are as follows:

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

Pin / Cap	Connection
Anode Cap	Grid No. 3 / Anode

The cathode is an indirectly heated, unipotential type.

Heater and Interelectrode Capacitances

The heater is designed for operation from a nominal 6.3-volt supply:

Parameter	Value
Heater Voltage	6.3 V
Heater Current	0.6 A

The nominal heater power is calculated as: $\text{Heater Power} = 6.3 \text{ V} \times 0.6 \text{ A} = 3.78 \text{ W}$

Capacitance Values

The interelectrode capacitances of the tube are approximately:

- **Cathode to all other electrodes:** 5 μF
- **Grid No. 1 to all other electrodes:** 6 to 6.5 μF
- **External conductive coating to anode:** 750 μF (minimum) to 1500 μF (maximum)

The capacitance between the external conductive coating and the internal anode serves as a high-voltage filter capacitor for the receiver's anode power supply when the external coating is properly grounded.

Maximum Ratings (Design Center Values)

The following maximum ratings are established under the Design Center system:

Rating Parameter	Absolute Limit
Maximum DC Anode (Grid No. 3) Voltage	16,000 V
Maximum DC Grid No. 2 Voltage	410 V
Maximum DC Negative-Bias Grid No. 1 Voltage	125 V
Maximum DC Positive-Bias Grid No. 1 Voltage	0 V
Maximum Positive-Peak Grid No. 1 Voltage	2 V
Maximum Grid No. 1 Circuit Resistance	1.5 M

Heater-Cathode Voltage Limits

To prevent insulation breakdown, the peak voltage between the heater and cathode must not exceed the following limits:

- **Heater negative with respect to cathode:**
 - During equipment warm-up (≤ 15 seconds): **410 V**
 - After equipment warm-up: **150 V**
- **Heater positive with respect to cathode: 150 V**

Typical Operating Conditions and Focusing

The 17BP4A can be operated under slightly different typical anode voltages, though performance degrades at lower potentials. Two typical operating configurations are documented:

Parameter	Configuration A	Configuration B
DC Anode (Grid No. 3) Voltage	12,000 V	14,000 V
DC Grid No. 2 Voltage	300 V	300 V
DC Grid No. 1 Voltage (for Cutoff)	-33 to -77 V	-33 to -77 V
Focusing Coil Current (approx.)	92 mA	95 mA

Note: Brilliance and definition decrease with decreasing anode voltage. Operating guidelines recommend that the anode voltage should not be operated below 12,000 V to 14,000 V.

Focusing and Deflection

- **Deflection Angles (Approximate):** Horizontal: 65° to 66°, Vertical: 50°, Diagonal: 70°.
- **Focusing Method:** Magnetic. The focusing coil (such as a standard JETEC No. 109 or equivalent) is positioned 3.0 inches from the reference line to the center of the air gap.
 - At 12,000 V anode voltage, a focusing current of approximately **92 mA** ± 10% is used to achieve a highlight brightness of 30 foot-lamberts on a 14 1/4" x 10 3/4" picture size.
 - At 14,000 V anode voltage, a focusing current of approximately **95 mA** is used to achieve a highlight brightness of 20 foot-lamberts.
- **Ion Trap:** Requires an external, single-field ion trap magnet. The required field strength is approximately **40 Gauss**, which corresponds to a current of approximately **70 mA** when using a standard No. 111 ion trap coil.

Safety Considerations

When operating the 17BP4A, appropriate precautions must be taken regarding high voltages and potential X-ray radiation. If the tube is operated at voltages higher than 16,000 V (or the maximum rated

anode voltage, whichever is less), shielding may be necessary to protect personnel against prolonged exposure to X-rays at close range.

Technical Summary

The **17BP4A** is a **17-inch rectangular glass television picture tube** featuring **magnetic focusing and deflection**, a **P4 white-emitting sulfide phosphor screen**, and a **grey filter glass faceplate** with 66% light transmission. It operates with a **6.3 V, 0.6 A heater** and requires an **external single-field ion trap**. The tube is distinguished from the base [17BP4](#) by its **external conductive coating** (which provides 750 to 1500 μF of filter capacitance to the anode) and its **12N basing** configuration on a **small shell duodecal 5-pin base**. Under typical operating conditions, it utilizes an anode voltage of **12,000 to 14,000 V**, a Grid No. 2 voltage of **300 V**, and a Grid No. 1 cutoff bias of **-33 to -77 V**, requiring a focusing coil current of approximately **92 to 95 mA**.



SOURCE OPERATING CONDITIONS

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

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	—
Heater Current	600 mA	—
Cathode To All Other Electrodes Capacitance	5 pF	Approximate

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Anode Voltage	16000 V	—
Maximum Grid2 Voltage	410 V	—
Typical Anode Voltage	14000 V	—



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
Focusing method	Magnetic	—
Deflection method	Magnetic	—
Horizontal deflection angle	66 deg	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Diagonal deflection angle	70 deg	—
Fluorescence	White	—
Persistence	Short to medium	—
Heater voltage	6.3 V	—
Heater current	600 mA	—

CONSTRUCTION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Phosphor	Aluminized P4	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum anode voltage	16000 V	—
Typical anode voltage	14000 V	—
Cutoff voltage range	-33 to -77 V	—
Grid1 circuit resistance maximum	1.5 Mohm	—

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Grid1-to-all capacitance	6 pF	—

APPLICATION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Application	Monochrome television picture display	—



SOURCE DATA APPENDIX

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.

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum DC grid 2 voltage	410 V	—
Maximum grid 1 negative-bias voltage	125 V	NegativeBias
Maximum grid 1 positive-bias voltage	0 V	PositiveBias
Maximum grid 1 positive-peak voltage	2 V	PositivePeak
Peak heater-cathode voltage	410 V	HeaterNegativeWarmup
Peak heater-cathode voltage	150 V	HeaterNegativeAfterWarmup
Peak heater-cathode voltage	150 V	HeaterPositive
DC anode voltage	12000 V	TypicalOperation
DC grid 2 voltage	300 V	TypicalOperation
DC grid 1 voltage	-33--77 V	TypicalOperation
Focusing coil current	92 mA	Approximate
Ion trap current	70 mA	Approximate

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Horizontal deflection angle	65 degrees	Approximate
Vertical deflection angle	50 degrees	Approximate
Diagonal deflection angle	70 degrees	Approximate

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode to all other electrodes capacitance	5 pF	Approximate
Grid 1 to all other electrodes capacitance	6.5 pF	Approximate
External conductive coating to anode capacitance	1500 pF	Maximum
External conductive coating to anode capacitance	750 pF	Minimum

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

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