

ELECTRONIC TUBE REFERENCE

17BKP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

P4 cathode-ray display tube documented for high-voltage direct-view operation, using magnetic deflection and manufacturer-specified beam focusing and control arrangements appropriate to type 17BKP4.

GENERAL CHARACTERISTICS

BASE DESIGNATION	B6-63	BASE PINS	6
NOMINAL HEATER	6.3 V / 450 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Cathode Ray	
MAXIMUM PLATE VOLTAGE	17600 V
CRT-specific anode, focus, deflection and optical data retained as parameters rather than forced into ordinary plate/screen fields.	

17BKP4 — Electrostatic-Focus Cathode Ray Tube

The **17BKP4** is a direct-view, rectangular glass cathode ray tube designed primarily for television receiver applications. It features electrostatic focusing, magnetic deflection, and a unipotential cathode. A closely related variant, the **17BKP4A**, is identical to the 17BKP4 in all electrical and mechanical specifications except that it incorporates an aluminized screen, whereas the standard 17BKP4 utilizes a non-aluminized screen.

Mechanical Design and Physical Dimensions

The 17BKP4 is constructed with a rectangular glass envelope. The physical dimensions of the bulb are as follows:

- **Overall Length:** $15\text{-}5/8 \pm 3/8$ inches
- **Greatest Diagonal Dimension:** $16\text{-}5/8 \pm 1/8$ inches
- **Greatest Width:** $15\text{-}3/8 \pm 1/8$ inches
- **Greatest Height:** $12\text{-}9/32 \pm 1/8$ inches
- **Minimum Useful Screen Width:** $14\text{-}5/16$ inches
- **Minimum Useful Screen Height:** $11\text{-}1/8$ inches
- **Standard Raster Size:** $14\text{-}5/16$ inches by $11\text{-}1/8$ inches

The tube features a gray filter faceplate designed to improve picture contrast, providing an approximate light transmission of 74% at the center of the screen.

Electrical connection to the high-voltage anode is made via a recessed small cavity cap (J1-21) located on the bulb cone. This anode contact is aligned with pin position #6 on the base within a tolerance of ± 30 degrees. The tube base is a small shell duodecal 6-pin base (B6-63), which conforms to the 12L basing arrangement.

Electrical Connections and Basing

The 12L basing configuration provides the following pin connections, viewed from the bottom of the tube:

Pin Number	Connection
Pin 1	Heater
Pin 2	Grid No. 1 (Control Grid)
Pin 6	Grid No. 4 (Focusing Electrode)
Pin 10	Grid No. 2 (Screen Grid)
Pin 11	Cathode
Pin 12	Heater
Anode Cap	Grid No. 3, Grid No. 5 (Anode)

The external conductive coating on the bulb envelope must be grounded, as it forms a capacitor with the internal anode coating. The capacitance between the external conductive coating and the anode is rated at a minimum of 1200 μf and a maximum of 1500 μf .

Heater and Cathode Characteristics

The 17BKP4 utilizes an indirectly heated, unipotential cathode. The heater is designed for operation under the following nominal conditions:

- **Heater Voltage:** 6.3 Volts
- **Heater Current:** 0.450 Ampere (with an allowable tolerance of $\pm 5\%$)
- **Approximate Heater Warm-up Time:** 11.0 seconds

The heater warm-up time is defined as the time required for the voltage across the heater terminals to increase to 5.0 Volts when tested in a standard JETEC test circuit. This circuit utilizes a supply voltage of 25 Volts and a series resistance of 42 Ohms.

The direct interelectrode capacitances of the tube, measured without an external shield, are approximately:

- **Cathode to all other electrodes:** 5 μpf
- **Grid No. 1 to all other electrodes:** 6 μpf

Electrostatic Focus and Deflection Systems

The 17BKP4 employs electrostatic focusing, where Grid No. 4 serves as the focusing electrode. The focusing voltage is adjustable over a range that spans both negative and positive values relative to the cathode, allowing for precise beam alignment and sharpness.

Deflection is accomplished magnetically, requiring external horizontal and vertical deflection coils. The nominal deflection angles are:

- **Horizontal Deflection Angle:** 85°
- **Diagonal Deflection Angle:** 90°

To prevent ion burn on the phosphor screen, the tube requires an external single-field ion trap magnet. Under typical operating conditions, a standard coil #117 ion trap magnet requires an approximate current of 28 mA, corresponding to a rated magnet strength of 31 Gauss.

Optical and Screen Characteristics

The screen of the 17BKP4 utilizes a sulfide-type P4 phosphor. This phosphor is characterized by:

- **Fluorescent Color:** White
- **Phosphorescent Color:** White
- **Persistence:** Medium

The standard 17BKP4 screen is non-aluminized, whereas the [17BKP4A](#) features an aluminized backing to increase light output and reduce raster burn.

Electrical Ratings and Operating Conditions

The maximum ratings for the 17BKP4 are defined under the Design Center System. These limits represent the absolute boundaries within which the tube must be operated to ensure reliability and longevity.

Design Center Maximum Ratings

- **Maximum DC Anode Voltage (Grid No. 3, Grid No. 5):** 17,600 Volts
- **DC Grid No. 4 Voltage Range:** -550 to +1100 Volts
- **Maximum DC Grid No. 2 Voltage:** 550 Volts
- **Maximum Grid No. 1 Voltage:**
 - **DC Negative-bias value:** 155 Volts
 - **DC Positive-bias value:** 0 Volts
 - **Positive-peak value:** 2 Volts
- **Maximum DC Peak Heater-Cathode Voltage:**
 - **Heater negative with respect to cathode (during warm-up, ≤ 15 seconds):** 450 Volts
 - **Heater negative with respect to cathode (after warm-up):** 200 Volts
 - **Heater positive with respect to cathode:** 200 Volts
- **Maximum Grid No. 1 Circuit Resistance:** 1.5 Megohms

Typical Operating Conditions

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

- **DC Anode Voltage:** 14,000 Volts
- **DC Grid No. 4 Voltage (Focusing Electrode):** -56 to +310 Volts
- **DC Grid No. 2 Voltage:** 300 Volts
- **DC Grid No. 1 Voltage (for visual extinction of focused raster):** -28 to -72 Volts
- **Ion Trap Magnet Strength:** 31 Gauss (approx. 28 mA with standard coil #117)

Technical Summary

The **17BKP4** is a rectangular, electrostatic-focus, magnetic-deflection cathode ray tube designed for television display applications. Operating with a nominal 6.3 V, 0.450 A heater, it features a 90° diagonal deflection angle and a P4 white-emitting phosphor screen. The tube requires an external single-field ion trap magnet and an external conductive coating ground connection. The **17BKP4A** variant provides identical electrical and mechanical characteristics but incorporates an aluminized screen for enhanced brightness.



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	17600 V	—
Typical Anode Voltage	14000 V	—
Maximum Grid2 Voltage	550 V	—
Typical Grid2 Voltage	200 V	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
FocusingMethod	Electrostatic	—
DeflectingMethod	Magnetic	—
DiagonalDeflectionAngleApproximate	90 degree	—
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

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum DC grid 2 voltage	550 V	—
Maximum DC grid 4 voltage	-550–1100 V	—
Maximum grid 1 negative-bias voltage	155 V	NegativeBias
Maximum grid 1 positive-bias voltage	0 V	PositiveBias
Maximum grid 1 positive-peak voltage	2 V	PositivePeak
Peak heater-cathode voltage	450 V	HeaterNegativeWarmup
Peak heater-cathode voltage	200 V	HeaterNegativeAfterWarmup
Peak heater-cathode voltage	200 V	HeaterPositive
DC anode voltage	14000 V	TypicalOperation
DC grid 4 voltage	-50–310 V	TypicalOperation
DC grid 2 voltage	300 V	TypicalOperation
DC grid 1 voltage	-28--72 V	TypicalOperation
Ion trap current	28 mA	Approximate
Ion trap magnet rated strength	31 gauss	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Horizontal deflection angle	85 degrees	Approximate
Vertical deflection angle	68 degrees	Approximate
Diagonal deflection angle	90 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 pF	Approximate
External conductive coating to anode capacitance	1500 pF	Maximum

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
External conductive coating to anode capacitance	1200 pF	Minimum