

ELECTRONIC TUBE REFERENCE

17FP4A

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Seventeen-inch direct-view television picture tube with electrostatic focus, magnetic deflection, high-voltage anode operation, and an external ion-trap arrangement. Documentation specifies receiver-display optical and electrode characteristics and warns about X-ray radiation above 16 kV.

GENERAL CHARACTERISTICS

BASE DESIGNATION	12L	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
No fixed ratings recorded.
CRT electron-gun/display section; published electrode ratings promoted where unambiguous.

17FP4A — Electrostatic-Focus Cathode Ray Tube

The **17FP4A** is an all-glass, direct-view rectangular cathode ray tube designed primarily for television receiver applications. It features electrostatic focusing and magnetic deflection, utilizing a space-saving rectangular face shape and a spherical gray filter glass faceplate. The tube is equipped with an external conductive coating that acts as a filter capacitor when grounded, and it requires an external single-field ion-trap magnet for proper operation.

The 17FP4A is identical to the [17FP4](#), with the sole distinction being the external conductive coating: the [17FP4](#) features a partial external conductive coating, whereas the 17FP4A is constructed with a complete external conductive coating.

Mechanical Specifications and Construction

The 17FP4A is built with a rectangular glass envelope and can be mounted in any position. It has a net weight of approximately 16 pounds. The physical dimensions of the tube are as follows:

- **Overall Length:** 19-3/16 +/- 3/8 inches to 19-1/4 +/- 3/8 inches
- **Neck Length:** 7-1/2 inches
- **Greatest Bulb Dimensions:**
 - **Diagonal:** 16-5/8 inches (with a tolerance of +/- 1/8 to +/- 3/16 inches)
 - **Width:** 15-3/8 +/- 1/8 inches
 - **Height:** 12-1/4 +/- 1/8 inches
- **Minimum Useful Screen Dimensions:**
 - **Diagonal:** 15-1/2 inches
 - **Width:** 14-1/4 inches
 - **Height:** 10-3/4 to 11-1/8 inches (with a useful height of 10-3/4 inches indicated on dimension diagrams)
- **Raster Size:** 14-1/4 x 10-11/16 inches

The bulb and base configuration corresponds to the ASA J133-A1 or -B1 bulb specifications. The electrical connection to the anode is made via a recessed small cavity cap (JETEC J1-21), which is aligned with pin position #6 (or the anode cap) within a tolerance of +/- 30 degrees.

Electrical Connections and Basing

The tube utilizes a small-shell duodecal 6-pin base (JETEC B6-63) with a 12L basing arrangement. The bottom-view pin connections are defined as follows:

Pin / Cap	Connection
Pin 1	Heater
Pin 2	Grid No. 1
Pin 6	Grid No. 4 (Focusing Electrode)
Pin 10	Grid No. 2
Pin 11	Cathode
Pin 12	Heater
Recessed Cap	Anode (Grid No. 3, Grid No. 5, and Collector connected internally)

The heater is designed for a nominal voltage of 6.3 Volts and a current of 0.6 Ampere (with a tolerance of +/- 10%). The cathode is a unipotential, indirectly heated type.

Optical and Deflection Characteristics

The faceplate of the 17FP4A is made of gray filter glass, which provides a light transmission at the center of approximately 66% to 72%. The screen is coated with P4 (Sulfide type) phosphor, which exhibits the following properties:

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

The tube's magnetic deflection system is designed for the following approximate deflection angles:

- **Diagonal:** 70 degrees
- **Horizontal:** 65 degrees
- **Vertical:** 50 degrees

Interelectrode Capacitances

The approximate interelectrode capacitances of the 17FP4A are:

- **Cathode to all other electrodes:** 5 pF (micromicrofarads)
- **Grid No. 1 to all other electrodes:** 6 pF (micromicrofarads)
- **External conductive coating to anode:** 750 pF minimum to 2000 pF maximum

Maximum Ratings

The design-center maximum ratings for the 17FP4A must be strictly observed to ensure reliable operation:

- **Anode (Grid No. 3, Grid No. 5, Collector) Voltage:** 18,000 Volts DC maximum
- **Focusing Electrode (Grid No. 4) Voltage:** 5,000 Volts DC maximum
- **Focusing Electrode Current:** -15 to +25 microamperes DC
- **Grid No. 2 Voltage:** 410 to 500 Volts DC maximum
- **Grid No. 1 Voltage:**
 - **DC Negative-Bias:** 125 Volts maximum
 - **DC Positive-Bias:** 0 Volts maximum
 - **Positive-Peak:** 2 Volts maximum
- **Peak Heater-Cathode Voltage:**
 - **Heater negative with respect to cathode during warm-up** (not to exceed 15 seconds): 410 Volts maximum
 - **Heater negative with respect to cathode after warm-up:** 150 to 180 Volts maximum
 - **Heater positive with respect to cathode:** 150 to 180 Volts maximum

Typical Operating Conditions

The tube can be operated under different typical anode voltage conditions. The following table outlines the typical operating parameters:

Parameter	Condition A	Condition B
Anode Voltage	12,000 V DC	14,000 V DC
Focusing Electrode (Grid No. 4) Voltage	2,300 to 3,550 V DC	2,650 to 3,650 V DC
Grid No. 2 Voltage	300 V DC	300 V DC
Grid No. 1 Voltage (for visual extinction)	-33 to -77 V DC	-28 to -72 V DC
Ion-Trap Field Intensity	~35 Gauss	~35 Gauss

Under typical operating conditions, the focusing range of Grid No. 4 is approximately 19.1% to 25.9% of the anode voltage. For Condition A, the focusing electrode voltage range is specified for visual extinction of an undeflected focusing spot, with combined Grid No. 1 bias and video-signal adjusted for 100 microamperes anode current on a 10-3/4 x 14-1/4 inch picture. For Condition B, the Grid No. 1 voltage range is specified for visual extinction of a focused raster.

The external single-field ion-trap magnet requires a field intensity of approximately 35 Gauss. This corresponds to an ion-trap current of approximately 75 +/- 50% mA when using Standard Coil #111, or approximately 35 mA when using JETEC ion-trap magnet No. 117.

Circuit and Safety Considerations

Circuit Values

The maximum Grid No. 1 circuit resistance must not exceed **1.5 Megohms**. The external conductive coating, when properly grounded, acts as a filter capacitor in conjunction with the anode, providing a capacitance of 750 to 2000 pF to assist in high-voltage filtering.

Safety and X-Ray Radiation

When operating the 17FP4A, safety precautions regarding X-ray radiation must be observed. While the tube is rated for a maximum anode voltage of 18,000 Volts, operating the tube in excess of 16,000 Volts may require X-ray radiation shielding. It is recommended to use a face-viewing window that limits radiation exposure to 6.25 mR/hr or less. Additionally, the cathode must be returned to one side or to the midtap of the heater transformer winding to manage heater-cathode potential limits.

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

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
CATHODE TO ALL OTHER ELECTRODES	5 MMF	CATHODE TO ALL OTHER ELECTRODES 5 μ f
GRID #1 TO ALL OTHER ELECTRODES	6 MMF	GRID #1 TO ALL OTHER ELECTRODES 6 μ f

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
FACEPLATE LIGHT TRANSMISSION AT CENTER (APPROX.)	66 %	FACEPLATE LIGHT TRANSMISSION AT CENTER (APPROX.) 66 PERCENT
MAXIMUM DC GRID #3, GRID #5, COLLECTOR VOLTAGEA 1B	0 V	MAXIMUM DC GRID #3, GRID #5, COLLECTOR VOLTAGEA 1B 000 VOLTS
MAXIMUM DC ANODE #1 VOLTAGE	5000 V	MAXIMUM DC ANODE #1 VOLTAGE 5 000 VOLTS
MAXIMUM OC GRID #2 VOLTAGE	410 V	MAXIMUM OC GRID #2 VOLTAGE 410 VOLTS
HEATER POSITIVE WITH RESPECT TO CATHODE	150 V	HEATER POSITIVE WITH RESPECT TO CATHODE 150 VOLTS
F TNIS TUBE IS OPERATED AT VOLTAGE IN E%LESS OF	16000 V	F TNIS TUBE IS OPERATED AT VOLTAGE IN E%LESS OF 16,000 VOLTS. %-RAY RADIATION SHIELDING MAY
DC GRID #3, GRID #5, COLLECTOR VOLTAGE	12000 V	DC GRID #3, GRID #5, COLLECTOR VOLTAGE 12 000 VOLTS
DC ANODE #1 VOLTAGE (FOCUSING ELECTR ODE)C 2300 TO j	550 V	DC ANODE #1 VOLTAGE (FOCUSING ELECTR ODE)C 2300 TO j550 VOLTS
DC GRID #2 VOLTAGE j	0 V	DC GRID #2 VOLTAGE j00 VOLTS

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
AnodeVoltageMaximum	18000 V	—
AnodeVoltageTypical	14000 V	—
Grid2VoltageMaximum	500 V	—

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