

# PHILCO CATHODE RAY TUBE DATA SHEET

TENTATIVE

## 21EVP4 TELEVISION PICTURE TUBE

### DESCRIPTION

The 21EVP4 is an extremely short electrostatic focus and magnetic deflection, direct view picture tube specifically intended for television applications. The tube incorporates internal magnetic shielding in the gun design so that, in spite of the very short neck length, deflecting yokes without special magnetic shields may be used. Another feature of the tube is its unusually low heater power. The heater is a 450 milliampere, 2.68 volt design with controlled warm-up time for series string applications. Other features of the tube are a metal backed screen, a straight gun requiring no ion trap magnet and a short integral glass-button base having straight through leads and an indexing lug. The distinctive yellow base identifies the 21EVP4 as having internal magnetic shielding.

### GENERAL DESCRIPTION

21" rectangular extremely short cathode ray tube intended for direct view television applications requiring low heater power.

### ELECTRICAL DATA

|                                                |                                                    |
|------------------------------------------------|----------------------------------------------------|
| Focusing Method                                | Electrostatic                                      |
| Deflecting Method                              | Magnetic                                           |
| Deflection Angle, approximate                  |                                                    |
| Horizontal                                     | 105 Degrees                                        |
| Vertical                                       | 87 Degrees                                         |
| Diagonal                                       | 110 Degrees                                        |
| Direct Interelectrode Capacitance, approximate |                                                    |
| Cathode to All                                 | 3.65 $\mu\text{f}$                                 |
| Grid #1 to All                                 | 4.15 $\mu\text{f}$                                 |
| External Coating Capacitance                   | 1500 min. $\mu\text{f}$<br>2000 max. $\mu\text{f}$ |
| Heater Voltage                                 | 2.68 $\pm$ 10% Volts                               |
| Heater Current at 2.68 Volts                   | 0.45 Amperes                                       |
| Heater Warm-up Time (Note 1)                   | 11 Seconds                                         |

### OPTICAL DATA

|                                       |              |
|---------------------------------------|--------------|
| Phosphor Number                       | P4           |
| Fluorescent Color                     | White        |
| Persistence                           | Medium       |
| Faceplate                             |              |
| Light Transmission at Center, approx. | 75.5 Percent |

### MECHANICAL DATA

|                                                                          |                                               |
|--------------------------------------------------------------------------|-----------------------------------------------|
| Overall Length                                                           | 12 $\frac{15}{16}$ $\pm$ $\frac{1}{4}$ Inches |
| Neck Length                                                              | 3 $\frac{1}{16}$ $\pm$ $\frac{1}{16}$ Inches  |
| Greatest Dimensions of Bulb                                              |                                               |
| Diagonal                                                                 | 21 $\frac{3}{8}$ $\pm$ $\frac{1}{8}$ Inches   |
| Width                                                                    | 20 $\frac{1}{4}$ $\pm$ $\frac{1}{8}$ Inches   |
| Height                                                                   | 16 $\frac{3}{8}$ $\pm$ $\frac{1}{8}$ Inches   |
| Minimum Useful Screen Dimensions<br>(maximum assured dimensions)         |                                               |
| Diagonal                                                                 | 20 $\frac{1}{4}$ Inches                       |
| Width                                                                    | 19 $\frac{1}{16}$ Inches                      |
| Height                                                                   | 15 $\frac{1}{16}$ Inches                      |
| Bulb                                                                     | J171G1                                        |
| Base                                                                     | B7-208                                        |
| Basing                                                                   | 8JK                                           |
| Anode Contact                                                            | J1-21                                         |
| Anode Contact Aligns with Center Line between<br>Pin #6 and #7 $\pm$ 30° |                                               |

### GRID DRIVE SERVICE

Voltages are positive with respect to cathode unless indicated otherwise.

### MAXIMUM RATINGS (Absolute Maximum Values)

|                                         |                            |
|-----------------------------------------|----------------------------|
| Anode Voltage (Note 2)                  | 20,000 Max. Volts DC       |
| Grid #4 Voltage                         | -700 to +950 Max. Volts DC |
| Grid #2 Voltage                         | 550 Max. Volts DC          |
| Grid #1 Voltage                         |                            |
| Negative-Bias Value                     | 155 Max. Volts DC          |
| Negative-Peak Value                     | 400 Max. Volts             |
| Positive-Bias Value                     | 0 Max. Volts DC            |
| Positive-Peak Value                     | 2 Max. Volts               |
| Peak-Heater-Cathode Voltage             |                            |
| Heater Negative with Respect to Cathode |                            |
| During Warm-up Period not to exceed     |                            |
| 15 seconds                              | 450 Max. Volts             |
| After Equipment Warm-up Period          | 200 Max. Volts             |
| Heater Positive with Respect to Cathode | 200 Max. Volts             |

### TYPICAL OPERATING CONDITIONS

|                           |                     |
|---------------------------|---------------------|
| Anode Voltage             | 16,000 Volts DC     |
| Grid #4 Voltage for Focus | 100 to 500 Volts DC |
| Grid #2 Voltage           | 300 Volts DC        |
| Grid #1 Voltage (Note 3)  | -35 to -72 Volts DC |

### MAXIMUM CIRCUIT VALUES

|                            |                |
|----------------------------|----------------|
| Grid #1 Circuit Resistance | 1.5 Max. Megs. |
|----------------------------|----------------|

### CATHODE DRIVE SERVICE

Voltages are positive with respect to Grid #1 unless indicated otherwise.

### MAXIMUM RATINGS (Absolute Maximum Values)

|                                         |                             |
|-----------------------------------------|-----------------------------|
| Anode Voltage (Note 2)                  | 20,000 Max. Volts DC        |
| Grid #4 Voltage                         | -550 to +1100 Max. Volts DC |
| Grid #2 Voltage                         | 700 Max. Volts DC           |
| Cathode Voltage                         |                             |
| Positive-Bias Value                     | 155 Max. Volts DC           |
| Positive-Peak Value                     | 250 Max. Volts              |
| Negative-Bias Value                     | 0 Max. Volts DC             |
| Negative-Peak Value                     | 2 Max. Volts                |
| Peak-Heater-Cathode Voltage             |                             |
| Heater Negative with Respect to Cathode |                             |
| During Warm-up Period not to exceed     |                             |
| 15 Seconds                              | 450 Max. Volts              |
| After Equipment Warm-up Period          | 200 Max. Volts              |
| Heater Positive with Respect to Cathode | 200 Max. Volts              |

# 21EVP4

## TYPICAL OPERATING CONDITIONS

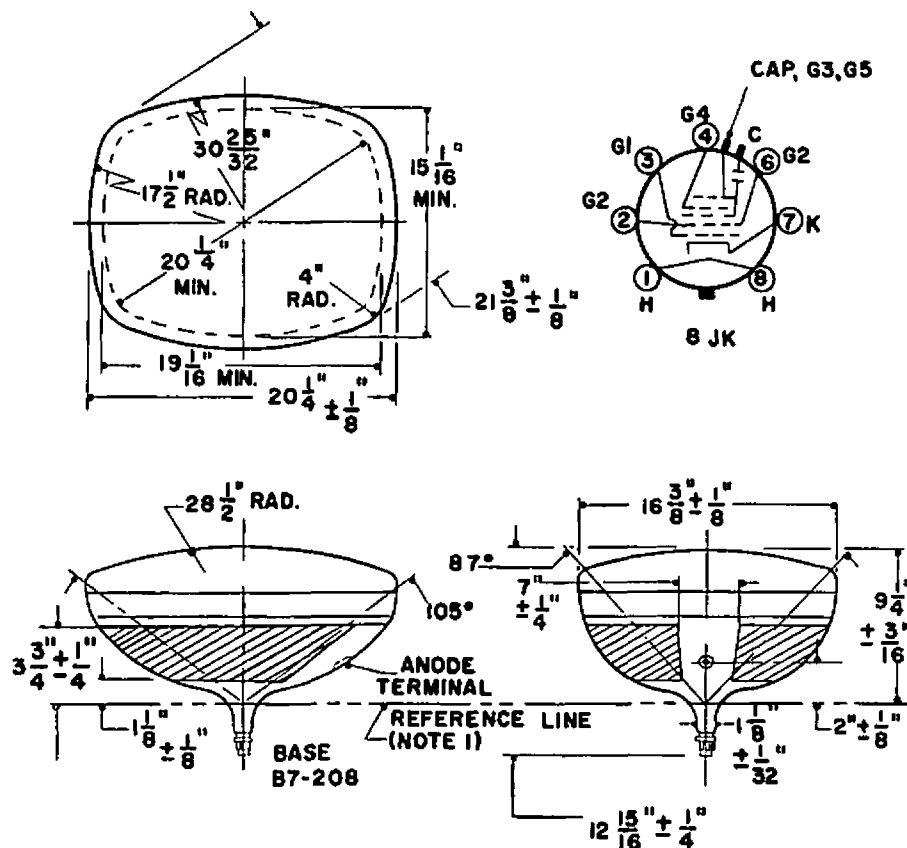
|                           |                  |
|---------------------------|------------------|
| Anode Voltage             | 16,000 Volts     |
| Grid #4 Voltage for Focus | 150 to 550 Volts |
| Grid #2 Voltage           | 300 Volts        |
| Grid #1 Voltage           | 0 Volts          |
| Cathode Voltage (Note 3)  | +34 to +60 Volts |

## MAXIMUM CIRCUIT VALUES

Grid #1 Circuit Resistance 1.5 Max. Megs.

## NOTES

1. Heater warm-up time is defined as the time required for the voltage across the heater to reach 80% of its rated value after applying 4 times rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to 3 times the rated heater voltage divided by the rated heater current.
2. Anode, Grid #3 and Grid #5 are connected together within the tube and are referred to herein as anode.
3. For visual extinction of the focused raster. For cutoff of the undeflected focus spot, the absolute value of the bias between cathode and grid will increase by about 5 volts.



## MECHANICAL NOTES

1. The reference line is determined by reference line gauge JETEC #126.
2. The area around the button is covered with an insulating coating.
3. Socket for this base should not be rigidly mounted; it should have flexible leads and be allowed to move freely. The design of the socket should be such that the circuit wiring cannot impress lateral strains through the socket contacts on the base pins. Bottom circumference of the base wafer will fall within a circle concentric with bulb axis and having a diameter of 1 3/4 inches.

## WARNING

X-ray radiation shielding may be necessary to protect against possible danger of personal injury from prolonged exposure at close range if this tube is operated at anode voltages higher than 16,000 volts.

