

7BMP- CATHODE RAY TUBE

The E.T.C. 7BMP- is a 7-inch rectangular faced, single gun electrostatic deflection and focus cathode ray tube. The tube utilizes a post-accelerator and has been designed for high voltage operation with a resultant high brightness and small spot size. This tube has also been designed to minimum edge defocusing. The deflection plate leads and anode connections are brought out through the neck of the tube to minimize lead inductance and capacitance. The gun is designed to draw negligible focusing electrode current.

GENERAL CHARACTERISTICS

Electrical Data

|                                    |                       |       |        |        |                 |
|------------------------------------|-----------------------|-------|--------|--------|-----------------|
| Heater Voltage                     | 6.3 $\pm$ 10% Volts   |       |        |        |                 |
| Heater Current                     | 0.6 $\pm$ 10% Amperes |       |        |        |                 |
| Focusing Method                    | Electrostatic         |       |        |        |                 |
| Deflecting Method                  | Electrostatic         |       |        |        |                 |
| Phosphor                           | No. 1                 | No. 2 | No. 7  | No. 11 | No. 19 (Note 1) |
| Fluorescence                       | Green                 | Green | Blue   | Blue   | Yellow-Orange   |
| Phosphorescence                    | -----                 | Green | Yellow | -----  | -----           |
| Persistence                        | Medium                | Long  | Long   | Short  | Medium Long     |
| Direct Interelectrode Capacitances | Max.                  |       |        |        |                 |
| Cathode to all other electrodes    | 5.00 uuf              |       |        |        |                 |
| Grid #1 to all other electrodes    | 6.00 uuf              |       |        |        |                 |
| D1 to D2                           | 4.00 uuf              |       |        |        |                 |
| D3 to D4                           | 1.6 uuf               |       |        |        |                 |
| D1 to all                          | 9.00 uuf              |       |        |        |                 |
| D2 to all                          | 9.00 uuf              |       |        |        |                 |
| D3 to all                          | 4.00 uuf              |       |        |        |                 |
| D4 to all                          | 4.00 uuf              |       |        |        |                 |

Mechanical Data

|                        |                         |
|------------------------|-------------------------|
| Overall Length         | 17 $\pm$ 3/8 Inches     |
| Greatest Bulb Diameter | 6-5/8 $\pm$ 1/16 Inches |
| Minimum Useful Screen  | 3-1/4 x 5-1/4 Inches    |
| Bulb Contacts          |                         |
| Bulb Contact           | J1-25                   |
| Base                   | J1-22                   |
| Basing                 | B12-37                  |

Base Alignment

D3D4 trace aligns approx. with Pin #2  $\pm$  10 Degrees  
 Positive voltage on D1 deflects the beam approx. towards Pin No. 5  
 Positive voltage on D3 deflects the beam approx. towards Pin No. 2

Bulb Contact Alignment

J1-22 contact aligns with D2 trace  $\pm$  10 Degrees  
 J1-22 contact on same side as No. 5

Trace Alignment

Angle between D1D2 and D3D4 trace 90  $\pm$  1 Degrees  
 D1D2 trace aligns with bulb wall 1 Degrees

MAXIMUM RATINGS - Design Center Values

|                                                                   |                       |
|-------------------------------------------------------------------|-----------------------|
| Post-Accelerator Voltage                                          | 16,000 Max. Volts D-C |
| Accelerator Voltage                                               | 8,000 Max. Volts D-C  |
| Ratio Post-Accelerator Voltage to<br>Accelerator Voltage (Note 2) | 2 Max.                |
| Focusing Voltage                                                  | 1750 Max. Volts D-C   |
| Grid #1 Voltage                                                   |                       |
| Negative Bias Value                                               | 200 Max. Volts D-C    |
| Positive Bias Value                                               | 0 Max. Volts D-C      |
| Positive Peak Value                                               | 2 Max. Volts D-C      |
| Peak Heater to Cathode Voltage                                    |                       |
| Heater Negative with respect to Cathode                           | 180 Max. Volts D-C    |
| Heater Positive with respect to Cathode                           | 180 Max. Volts D-C    |
| Peak Voltage between Accelerator and any<br>Deflection Electrode  | 750 Max. Volts        |

TYPICAL OPERATING CONDITIONS

|                                               |                           |
|-----------------------------------------------|---------------------------|
| For Post-Accelerator Voltage                  | 10000 Volts D-C           |
| For Accelerator Voltage                       | 5000 Volts D-C            |
| Focusing Voltage                              | 1000 to 1400 Volts D-C    |
| Grid #1 Voltage (Note 3)                      | -53 to -87 Volts D-C      |
| Modulation Factor (Note 4)                    | 45 Volts Max.             |
| Line Width A (Note 5)                         | For P19<br>.30 .40 MM     |
| Deflection Factors                            |                           |
| D1 and D2                                     | 125 to 150 Volts D-C/Inch |
| D3 and D4                                     | 100 to 125 Volts D-C/Inch |
| Deflection Factor Uniformity (Note 6)         | 1-1/2% Max.               |
| Spot Position (Note 7) within 3/8 Inch Square |                           |
| Useful Scan                                   |                           |
| 1D2                                           | 5-1/4 Inches Min.         |
| 3D4                                           | 3-1/4 Inches Min.         |

CIRCUIT DESIGN VALUES

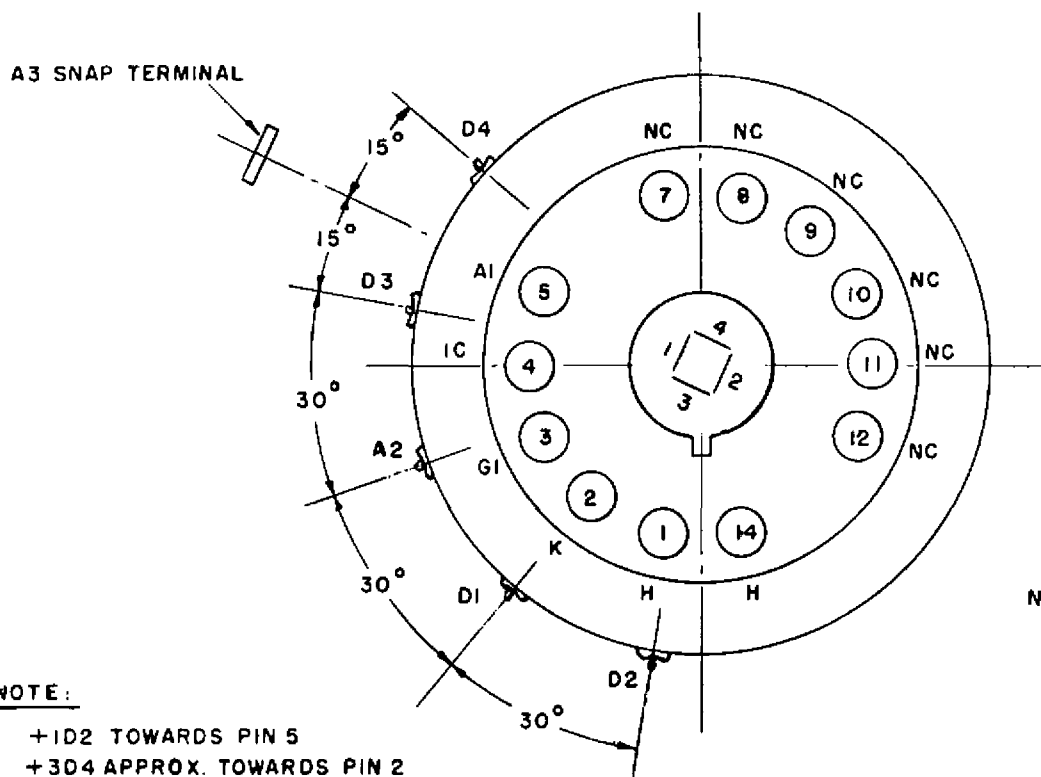
|                                                         |                         |
|---------------------------------------------------------|-------------------------|
| Focusing Current for any operating condition            | -15 to +10 Microamperes |
| Grid #1 Circuit Resistance                              | 1.5 Max. Megohms        |
| Resistance in any deflecting Electrode Circuit (Note 8) | 1 Megohms               |

NOTES:

- 1 - The tube can be severely and permanently damaged if the current density on the P19 screen is allowed to raise too high in static tests. For this reason, the length of time during which the screen is bombarded should be kept as short as possible and within the specified current limits.
- 2 - The tube is designed for optimum performances when operating at an  $E_{03}/E_{02}$  ratio of 2.0. Operation at other ratios may result in changes in deflection uniformity, pattern distortion and useful scan.

NOTES (CONT'D)

- 3 - Visual extinction of undeflected focus spot.
- 4 - The increase in grid voltage from cutoff to produce an  $I_{b3}$  of 25 uAdc for a Pl9 screen the  $I_{b3}$  should be limited to 5 uA Max.
- 5 - Measured in accordance with MIL-E-1 specifications using an  $I_{b3}$  of 25 uAdc. Pl9 screen an  $I_{b3}$  of 2 uAdc.
- 6 - The deflection (for both D1D2 and D3D4 plate pairs separately) for a deflection of less than 75% of the useful scan will not differ from the deflection factor for a deflection at 25% of the useful scan by more than the indicated value.
- 7 - Centered with respect to the tube face with the tube shielded.
- 8 - It is recommended that the deflection electrode circuit resistance be approximately equal. Higher resistance values up to five megohms may be used for low current operation.



**NOTE:**

+1D2 TOWARDS PIN 5  
+304 APPROX. TOWARDS PIN 2



PHILADELPHIA, PA.

**TITLE**

### TOLERANCES

DEC.

**FRAC.**

**ANG.**

**ENG.**

DATE 3-13-61

APP.

DR. J. E. G. JR.

SCALE 1/4"=FULL

**DRAWING NO.**

CKD. *Id. Warren*

REV. WAS - 7ITCP

A 3651