CATHODE-RAY TUBE

The TELEFUNKEN Type 5 DSP is a five inch flat face, single beam, electrostatic deflection and focus Cathode-Ray-Tube, with small spot size and metallized screen.

<table>
<thead>
<tr>
<th>5 DSP 2</th>
<th>5 DSP 11</th>
<th>5 DSP 31</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 13-18</td>
<td>DB 13-18</td>
<td>DG 13-18</td>
</tr>
</tbody>
</table>

Focusing Method: electrostatic
Deflecting Method: electrostatic

Direct Interelectrode Capacitances, Approximate
- Cathode to all other electrodes: 7.5 \(\mu F\)
- Grid 1 to all other electrodes: 6.7 \(\mu F\)
- D 1 to D 2: 3.0 \(\mu F\)
- D 3 to D 4: 1.6 \(\mu F\)
- D 1 to all other electrodes except D 2: 5.2 \(\mu F\)
- D 2 to all other electrodes except D 1: 5.0 \(\mu F\)
- D 3 to all other electrodes except D 4: 3.5 \(\mu F\)
- D 4 to all other electrodes except D 3: 3.0 \(\mu F\)
- D 1, D 2 to D 3, D 4: 0.4 \(\mu F\)

OPTICAL DATA

<table>
<thead>
<tr>
<th>Phosphor Number</th>
<th>2</th>
<th>11</th>
<th>31</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluorescent Color</td>
<td>Bluegreen</td>
<td>Blue</td>
<td>Green</td>
</tr>
<tr>
<td>Phosphorescent Color</td>
<td>Green</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Persistence</td>
<td>Long</td>
<td>Short</td>
<td>Short</td>
</tr>
</tbody>
</table>

MECHANICAL DATA

- Overall Length: 17\(\frac{1}{8}\) Max Inches
- Greatest Diameter of Bulb: 5\(\frac{33}{64}\) ± 0.1 Inches
- Minimum Useful Screen Diameter: 4\(\frac{23}{32}\) Inches
- Base Small Shall: B 12-37
- Base Alignment: D 3 D 4 trace aligns with pin No. 11 and tube axis ±10 Degrees
- Positive voltage on D 2 deflects beam: approximately toward the midpoint between pin 1 and 14
- Positive voltage on D 4 deflects beam: approximately toward pin 4

from JEDEC release #3645, March 19, 1962
**MECHANICAL DATA** (Continuation)

- Angle between D3 D4 and D1 D2 traces: $90 \pm 1$ Degrees
- Bulb contact alignment:
  - J1–21 contact aligns with trace of D1–D2 (between pin 7 and 8): $\pm 10$ Degrees

**RATINGS** Note 1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heater Voltage</td>
<td>6.3 Volts</td>
</tr>
<tr>
<td>Heater Current at 6.3 volts</td>
<td>0.3$\pm$10% Ampere</td>
</tr>
<tr>
<td>Post-Accelerator voltage</td>
<td>11,000 Max Volts DC</td>
</tr>
<tr>
<td>Isolation Shield voltage</td>
<td>3,000 Max Volts DC</td>
</tr>
<tr>
<td>Accelerator voltage</td>
<td>3,000 Max Volts DC</td>
</tr>
<tr>
<td>Grid 3 Voltage (Focusing Electrode)</td>
<td>1,500 Max Volts DC</td>
</tr>
<tr>
<td>Grid 1 Voltage</td>
<td></td>
</tr>
</tbody>
</table>
  - Negative-Bias Value                         | $-250$ Max Volts DC |
  - Positive-Bias Value                         | 0 Max Volts DC |
  - Positive-Peak Value                         | 0 Max Volts DC |
| Peak-Heater-Cathode Voltage                   |             |
  - Heater negative with respect to cathode     | 125 Max Volts |
    - During warm-up period not to exceed 15 seconds | 125 Max Volts |
    - After equipment warm-up period            | 125 Max Volts |
  - Heater positive with respect to cathode     | 125 Max Volts |
| Peak Voltage between Accelerator and any      |             |
  - Deflection Electrode                        | 750 Max Volts |
| Cathode current                               | 200 Max Microamperes eff. |

**MAXIMUM CIRCUIT VALUES**

<table>
<thead>
<tr>
<th>Circuit</th>
<th>Maximum Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid 1 Circuit Resistance</td>
<td>10 Max Megohms</td>
</tr>
<tr>
<td>Resistance for Deflecting-Electrode Circuit</td>
<td>5 Max Megohms</td>
</tr>
</tbody>
</table>
TYPICAL OPERATING CONDITIONS (Note 1)

Post-Accelerator voltage 10,000 Volts
Isolation Shield voltage (Note 9) 1925 to 2075 Volts
Accelerator voltage (Note 2) 1925 to 2075 Volts
Modulation (Note 3) 50 Max Volts
Grid 3 Voltage (Focusing Electrode) 400 to 590 Volts
Grid 1 Voltage (Note 4) -75 to -45 Volts

Deflection Factors:
- D 1 and D 2 75 to 92.5 Volts DC per inch
- D 3 and D 4 85 to 103 Volts DC per inch

Focusing Electrode Current for any operating condition -10 to +10 Microamperes
Spot Position (undeflected) (Note 5) 6 Max Millimeters
Line Width (Note 6) 0.018 Max Inches
Deflection factor uniformity (Note 7) 2 \% max.
Pattern distortion (Note 8) 1.35 \% max.

For Anode Voltage not shown in the preceding table, the following can be used as a guide:

| Focusing Electrode Voltage | 20 to 29.5 \% of Anode Volts |
| Grid 1 Voltage (Note 4) | 3.75 to 2.25 \% of Anode Volts |

Deflection Factors:
- D 1 and D 2 37.5 to 46.3 Volts DC per inch per Kilovolt of Anode
- D 3 and D 4 42.5 to 51.5 Volts DC per inch per Kilovolt of Anode
Useful scan D 1–D 2 100 Min Millimeters
Useful scan D 3–D 4 100 Min Millimeters
Post Accelerator helix resistance 133 to 400 Megohms

Pin Connection
- Pin No. 1 Heater
- Pin No. 2 Cathode
- Pin No. 3 Grid No. 1
- Pin No. 4 Internal Connection
- Pin No. 5 Focusing Electrode Grid No. 3
- Pin No. 7 Deflecting Electrode D 4
- Pin No. 8 Deflecting Electrode D 3
- Pin No. 9 Accelerator
- Pin No. 10 Deflecting Electrode D 1
- Pin No. 11 Deflecting Electrode D 2
- Pin No. 12 Isolation Shield
- Pin No. 14 Heater
1. All voltages taken with respect to cathode.

2. The accelerator voltage is made variable from 1925 Volts to 2075 Volts to provide for astigmatism control. In order to maintain proper astigmatism adjustment as total cathode current is varied, it is recommended that the resistance in the accelerator circuit is small. (The mid potential of the deflection electrodes is 2,000 V.)

3. The increase in Grid No. 1 voltage from cutoff to produce an screen current of 100 μA DC.

4. Visual extinction of undeflected focused spot.

5. Connect free deflecting electrodes to anode.

6. For a beam current of 25 microamperes DC in accordance with Mil-E-1 C specification.

7. The deflection factor (for both D1 D2 and D3 D4 plate pairs, separately) for deflections of less than 75% of the useful scan will not differ from the deflection factor for a deflection of 25% of the useful scan by more than specified amount.

8. The edges of a raster pattern with the mean dimension 75×75 mm will not deviate from the mean dimension by more than the specified amount.

9. The Isolations Shield electrode should be adjusted for optimum performance. For any necessary adjustment, its potential will be within a range of 1925 to 2075 Volts with respect to cathode.

10. It is recommended that the deflecting-electrode-circuit resistance be approximately equal.

Accessories:

- Shielding stock no. 30427
- Socket stock no. 30223
- Post-acceleration cap stock no. 30319