Radio Manufacturers Association

Release No. 718
December 9, 1948
sponsor: Allen B. Dumont Laboratories

5XP1, 5XP2, 5XP11 CATHODE-RAY TUBES

The Type 5XP- is an electrostatic focus and deflection Cathode-ray Tube, with very high sensitivity D3D4 deflection plates, and with an intensifier subdivided into several steps for operation at high voltages and at high ratios of intensifier to second anode voltage.

The high D3D4 sensitivity is achieved by using long deflecting plates and limiting the D3D4 scan to a useful portion of the full screen diameter. Capacitances are low, being comparable to other types such as the 5JP-A and 5RP-A where deflection connections are made through the neck instead of the base.

The Type 5XP- is particularly useful for wide band oscillographs and for any application requiring high D3D4 deflection plate sensitivity, and the high writing rate capabilities of a multi-band cathode-ray tube.

GENERAL CHARACTERISTICS

**Electrical**

<table>
<thead>
<tr>
<th></th>
<th>6.3</th>
<th>0.6 ± 10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heater Voltage</td>
<td>Volts</td>
<td>Ampere</td>
</tr>
<tr>
<td>Heater Current</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Focusing Method**

Electrostatic

**Deflecting Method**

Electrostatic

**Phosphor**

<table>
<thead>
<tr>
<th></th>
<th>P1</th>
<th>P2</th>
<th>P11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluorescence</td>
<td>Green</td>
<td>Green</td>
<td>Blue</td>
</tr>
<tr>
<td>Phosphorescence</td>
<td>--</td>
<td>Green</td>
<td>--</td>
</tr>
<tr>
<td>Persistence</td>
<td>Medium</td>
<td>Long</td>
<td>Short</td>
</tr>
</tbody>
</table>

**Direct Interelectrode Capacitances, Approx.**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Cathode to all other electrodes</td>
<td>5.0 μf.</td>
</tr>
<tr>
<td>Grid No. 1 to all other electrodes</td>
<td>5.4 μf.</td>
</tr>
<tr>
<td>D1 to D2</td>
<td>1.7 μf.</td>
</tr>
<tr>
<td>D3 to D4</td>
<td>1.7 μf.</td>
</tr>
<tr>
<td>D1 to all other electrodes except D2</td>
<td>2.5 μf.</td>
</tr>
<tr>
<td>D2 to all other electrodes except D1</td>
<td>2.3 μf.</td>
</tr>
<tr>
<td>D3 to all other electrodes except D4</td>
<td>1.9 μf.</td>
</tr>
<tr>
<td>D4 to all other electrodes except D3</td>
<td>1.6 μf.</td>
</tr>
</tbody>
</table>

**Mechanical**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Overall Length</td>
<td>17 5/8&quot; ± 3/8&quot;</td>
</tr>
<tr>
<td>Greatest Diameter of Bulb</td>
<td>5 1/4&quot; ± 3/32&quot;</td>
</tr>
<tr>
<td>Bulb Contacts</td>
<td>J1-22 (Recessed small ball contact)</td>
</tr>
<tr>
<td>Neck Contacts</td>
<td>Special lateral contacts</td>
</tr>
<tr>
<td>Base</td>
<td>Medium 12-pin diheptal</td>
</tr>
<tr>
<td>Basing</td>
<td>14F</td>
</tr>
</tbody>
</table>

Base Alignment: LD2 trace aligns with

- Pin No. 5 and tube axis ± 10 Degrees
- Positive voltage on D1 deflects beam approximately toward Pin No. 5.
- Positive voltage on D3 deflects beam approximately toward Pin No. 2.

Bulb contact alignment:

- J1-22 contacts align with LD2 trace ± 10 degrees
- J1-22 contacts on same side as Pin No. 5.
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MAXIMUM RATINGS  Design Center Values

Anode No. 3 Voltage (Accelerator High Voltage Electrode) 25,500 Max. Volts D-C
Anode No. 2 Voltage 3,500 Max. Volts D-C
Ratio Anode No. 3 Voltage to Anode No. 2 Voltage 10 Max.
Anode No. 1 Voltage 1,550 Max. Volts D-C
Grid No. 1 Voltage
  Negative Bias Value 125 Max. Volts D-C
  Positive Bias Value 0 Max. Volts D-C
  Positive Peak Value 2 Max. Volts
Peak Heater Cathode Voltage
  Heater Negative with respect to Cathode 125 Max. Volts D-C
  Heater Positive with respect to Cathode 125 Max. Volts D-C
Peak Voltage between Anode No. 2 and any Deflection Electrode 1,200 Max. Volts

TYPICAL OPERATING CONDITIONS

For Anode No. 3 Voltage of 4,000 10,000 20,000 Volts
For Anode No. 2 Voltage of 2,000 2,000 2,000 Volts
Anode No. 1 Voltage for focus 362 to 695 362 to 695 362 to 695 Volts
Grid No. 1 Voltage 3 -30 to -90 -30 to -90 -30 to -90 Volts
Deflection Factors:
  DI and D2 72 to 108 102 to 154 140 to 210 Volts D-C per Inch
  D3 and D4 24 to 36 34 to 52 46 to 68 Volts D-C per Inch
Useful Scan:
  DI and D2 4.25 4.25 3.5 Inches
  D3 and D4 2.50 1.75 1.25 Inches
Frequency for 10% reduction in D3D4 deflection factor due to transit time 5
  200 200 200 mc.
Anode No. 1 Voltage for focus 18.1% to 34.8% of Eb2 Volts
Grid No. 1 Voltage 3 1.5% to 4.5% of Eb2 Volts
Anode No. 1 Current for any operating condition -50 to +10 Microamperes
Deflection Factors:
  No 3rd Anode or Eb3 = Eb2
  DI and D2 30 to 45 Volts D-C per inch per Kilovolt of Eb2
  D3 and D4 9.5 to 14.5 Volts D-C per inch per Kilovolt of Eb2
  Eb3 = Twice Eb2
  DI and D2 36 to 54 Volts D-C per inch per Kilovolt of Eb2
  D3 and D4 12 to 18 Volts D-C per inch per Kilovolt of Eb2
Spot Position (Undeflected) 6 Within 20 Millimeters square

MAXIMUM CIRCUIT VALUES

Grid No. 1 Circuit Resistance 1.5 Max. Megohms
Resistance in any Deflecting Electrode Circuit 7 5 Max. Megohms

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1. Cathode should be returned to one side or to the mid-taps of the heater transformer winding.

2. Anode No. 2 to final intensifier electrode voltage equally divided over the three intensifier electrodes.

   Suggested method of connections:

   A3
   -
   25 Neg.
   |
   |
   |
   |
   |
   |
   A2
   -
   25 Neg.

   The two A2 terminals must be connected together.

3. Visual extinction of undeflected focused spot.

4. Reduction in useful scan when Vp3 is greater than Vp2 is determined by the ratio of Vp3 to Vp2 (note both voltages are with respect to cathode). Values shown are therefore applicable to any operating condition with Vp3 to Vp2 ratios of 2:1, 5:1, and 10:1.

5. Computed.

6. When the tube is operated at (1) normal heater voltage; (2) Vn2 = 2000 volts; (3) Vn2 = 10,000 volts; (4) Vh2 adjusted for focus; (5) Vh1 set at such a value as will avoid damage to the screen; (6) with each of the deflecting electrodes connected to Anode No. 2; and (7) with the tube shielded against external influences.

   The spot will fall within a 20 mm. square, the center of which coincides with the geometric center of the tube face and the sides of which are parallel to the traces produced by deflecting electrodes D1 and D2 and by deflecting electrodes D3 and D4 respectively.

7. It is recommended that the deflecting electrode circuit resistances be approximately equal.