**COMPLETE TUBE OUTLINE**

**SUBJECT**
SMP4 PROJECTION TELEVISION TUBE
Electromagnetic Focus & Deflection

**NOTE:** Refer to ISSUE 2 for all details and dimensions, except change of Side Contact Flare dimensions, as shown above.

from RMA release #642, March 20, 1948 and release #642A, Aug. 27, 1948

Unless noted, all dimensions are in inches
GENERAL DATA FOR CATHODE-RAY TUBES

NORTH AMERICAN PHILIPS CO., INC.
DOBBS FERRY, N. Y.
ELECTRONIC TUBE DIV.

SUBJECT

SMP4 PROJECTION TUBE
Electromagnetic Focus & Deflection

DESRIPTIVE PARAGRAPH

The SMP4 is a small projection television cathode ray tube with aluminized screen, capable of projecting a large picture. Space requirement for the tube is small.

GENERAL CHARACTERISTICS

Electrical

* Heater Voltage: 6.5 ± 10% Volts
* Heater Current: .6 ± 10% Ampères

* Focusing Method
* Deflecting Method
* Max. Deflecting Angle: 42°

* Phosphor: No. 4, aluminized
* Fluorescence: White
* Phosphorescence: Medium

Direct Interelectrode Capacitances, Nominal
Cathode to all other electrodes 7.75 uuf
Grid #1 to all other electrodes 14.5 uuf
D1 to D2 ____________________________ uuf
D3 to D4 ____________________________ uuf
D1 to all other electrodes except D2 ____________________________ uuf
D2 to all other electrodes except D1 ____________________________ uuf
D3 to all other electrodes except D4 ____________________________ uuf
D4 to all other electrodes except D3 ____________________________ uuf
External Conductive Coating to Anode #2: 875 max uuf
275 min uuf

Mechanical

* Overall Length: 10 3/8 Inches
* Greatest Diameter of Bulb (including face lugs): 2 25/32 ± 1/32 Inches
* Minimum Useful Screen Diameter: ____________________________ Inches
* Bulb Contact JETEC Designation: Recessed small ball cap
* Base: 5 Contact, radial
* Basing: JETEC Designation
* Base Alignment: trace Aligns, with Pin # ___ and tube axis ____________________________ Degrees
  Positive voltage on D1 deflects beam approx. toward Pin # ___.
  Positive voltage on D3 deflects beam approx. toward Pin # ___.
* Bulb contact alignment, (Electrostatic-Deflection Types), Contact aligns with trace of ___ ___ Degrees.
  Contact on same side as Pin # ___.
* Bulb contact alignment, (Magnetic-Deflection Types), Side Contact aligns with Base Contact # ___ 10° Degrees
MAXIMUM RATINGS Design Center Values

* Anode No. 3 Voltage (accelerator High-Volt, Electr.) ___ Max Volt DC
* Anode No. 2 Voltage ___ Max Volt DC
* Ratio Anode No. 3 Voltage to Anode No. 2 Voltage ___ Max
* Anode No. 1 Voltage ___ Max Volt DC
* Grid No. 2 Voltage ___ Max Volt DC
* Grid No. 1 Voltage
  Negative-Bias Value ___ Max Volt DC
  Positive-Bias Value ___ Max Volt DC
  Positive-Peak Value ___ Max Volt

* Peak Heater-Cathode Voltage
  Heater Negative with respect to cathode ___ Max Volt DC
  Heater Positive with respect to cathode ___ Max Volt DC

/ Peak Voltage between Anode No. 2 and any Deflection Electrode ___ Max Volt

TYPICAL OPERATING CONDITIONS (Magnetic-Deflection Types)

* Anode No. 2 Voltage ___ Volts DC
* Anode No. 1 Voltage ___ to ___ Volts DC
* Grid No. 2 Voltage ___ to ___ Volts DC
* Grid No. 1 Voltage ___ to ___ Volts DC
* Focusing Coil Current (DC) ___ Approx. Milliamperes
/ Spot Position (Undelected) ___ Approx. Millimeters
/ Ion Trap Current Standard Coil ___ Approx. Milliamperes

TYPICAL OPERATING CONDITIONS (Electrostatic-Deflection Types)

* For Anode No. 3 Voltage of ___ Volts
* For Anode No. 2 Voltage of ___ Volts

* Anode No. 1 Voltage ___ to ___ to ___ Volts
* Grid No. 1 Voltage ___ to ___ to ___ Volts
* Deflection Factors:
  D1 and D2 ___ to ___ to ___ Volts DC Per Inch
  D3 and D4 ___ to ___ to ___ Volts DC Per Inch

o Anode No. 1 Voltage ___% to ___% of Eb2 ___ Volts
o Grid No. 1 Voltage for Visual cut-off of Spot ___% to ___% of eb2 ___ Volts

/ Anode No. 1 Current for any operating condition ___ to ___ Microamperes
Deflection Factors:
No. 3rd Anode or Eb3 = Eb2
D1 and D2 ___ to ___ Volts DC per inch per Kilovolt of Eb2.
D3 and D4 ___ to ___ Volts DC per inch per Kilovolt of Eb2.
Eb3 = Twice Eb2
D1 and D2 ___ to ___ Volts DC per inch per Kilovolt of Eb2.
D3 and D4 ___ to ___ Volts DC per inch per Kilovolt of Eb2.

Spot Position (Undelected)5

Maximum Millimeters

Maximum Circuit Values:

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

Additional
Tube outline with essential dimensions and tolerances
Basing drawings and connections.
Average Characteristic Curves.

Cathode Ray Tube Characteristics

Notes
1. Cathode should be returned to one side or to the mid-tap of the heater transformer winding.
2. Visual extinction of undelected focused spot.
3. For standard focus coil#(R.A.P)#, or equivalent, with the combined grid-No. 1 bias voltage and video-signal voltage adjusted to produce a high-light brightness of 1700 foot lamberts on a 36" X 48" picture area. Distance (D) shall be 2.78 inches. If other than the standard focus coil is used the rating is then given in ampereturns.
4. It is recommended that the deflecting-electrode-circuit resistances be approximately equal.
5. Connect free deflecting electrodes to second anode.

Notes in brackets are for the aid of those persons filling in the data and will not appear on the final sheets.

Reservation requires minimum of *
Registration requires minimum of * plus/
JETEC Data requires minimum of * plus / plus o.
BASE CONNECTIONS
As Viewed From Bottom

ANODE CONTACT: Access Small Ball Cap (Connection to Internal Conductive Coating)

<table>
<thead>
<tr>
<th>BASE CONTACT NO.</th>
<th>DESCRIPTION</th>
<th>MAXIMUM VOLTAGE RATINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Grid</td>
<td>-125 to 2 Volts D.C.</td>
</tr>
<tr>
<td>2</td>
<td>Heater</td>
<td>6.3 Volts ±10% A.C. or D.C. (Base contact grounded)</td>
</tr>
<tr>
<td>3</td>
<td>Shield</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Heater</td>
<td>6.3 Volts ±10% A.C. or D.C.</td>
</tr>
<tr>
<td>5</td>
<td>Cathode</td>
<td>All Element Voltages with Respect to Cathode</td>
</tr>
</tbody>
</table>
CATHODE RAY TUBE TYPE 3NP4

The 3NP4 is a magnetic focus and magnetic deflection projection tube for television application designed primarily for use with reflective optical systems. It has an external conductive coating.

**GENERAL CHARACTERISTICS**

<table>
<thead>
<tr>
<th>Electrical Data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Heater Voltage</td>
<td>6.5 volts</td>
</tr>
<tr>
<td>Heater Current</td>
<td>0.6 10% amperes</td>
</tr>
<tr>
<td>Focusing Method</td>
<td>Magnetic</td>
</tr>
<tr>
<td>Deflecting Method</td>
<td>Magnetic</td>
</tr>
<tr>
<td>Deflecting angle (approximate)</td>
<td>45 degrees</td>
</tr>
<tr>
<td>Phosphor</td>
<td>No. 4</td>
</tr>
<tr>
<td>Fluorescence</td>
<td>White</td>
</tr>
<tr>
<td>Persistence</td>
<td>Medium</td>
</tr>
<tr>
<td>Direct Inter-electrode Capacitance (approximate)</td>
<td>8 muf</td>
</tr>
<tr>
<td>Cathode to all other electrodes</td>
<td>14</td>
</tr>
<tr>
<td>Grid to all other electrodes</td>
<td>275 - 375 muf</td>
</tr>
<tr>
<td>External Conductive Coating to Anode</td>
<td></td>
</tr>
<tr>
<td>Direct Inter-electrode Capacitance (approximate)</td>
<td>8 muf</td>
</tr>
<tr>
<td>Cathode to all other electrodes</td>
<td>14</td>
</tr>
<tr>
<td>Grid to all other electrodes</td>
<td>275 to 375 muf</td>
</tr>
</tbody>
</table>

**Mechanical Data**

| Basing | See Drawing |
| Overall Length | 19 3/8 inches |
| Greatest Diameter of Bulb (including face lugs) | 2.25/32 1/32 inches |
| Minimum useful Screen Diameter | 2 3/16 inches |
| Bulb Contact | J1-22 |
| Base | (See Drawing) 5 Contact |
| Bulb Contact Alignment | J1-22 Contact aligns with Base Contact 90 19 degrees |

**MAXIMUM RATINGS**

| Anode Voltage | 26,000 Max. volts D-C |
| Grid Voltage | 155 Max. volts D-C |
| Negative - Bias Value | 10 Max. volts D-C |
| Positive - Bias Value | 1 Max. volts D-C |
| Positive - Peak Value | 2 Max. volts D-C |
| Peak Heater - Cathode Voltage | 175 Max. volts D-C |
| Heater Negative with respect to cathode | 10 Max. volts D-C |
| Heater Positive with respect to cathode | 10 Max. volts D-C |

**TYPICAL OPERATING CONDITIONS**

| Anode Voltage | 24,000 volts D-C |
| Grid Voltage | 36 to -84 volts D-C |
| Focusing Coil Current | Approx. 120 ma. D-C |
| Spot Position (Undelected) | 35 Max. millimeters |

**MAXIMUM CIRCUIT VALUES**

| Grid Circuit Resistance | 1.8 Max. megohms |

**NOTES**

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

2. Visual extinction of undeflected focused spot.

3. Focusing Coil (see attached data) with combined grid-bias voltage and video signal adjusted, produces a high-light brightness of 1700 foot lamberts on a 36 mm X 48 mm picture area. Distance (D) shall be 2.78 inches.
FOCUS COIL

CHARACTERISTICS

8,300 Turns of #28 (.015" Dia.) enamel wire
Resistance: 290 ohms ±10% at 20°C

BASE CONNECTIONS
As Viewed From Bottom
1. Grid
2. Heater
3. Shield (Grounded)
4. Heater
5. Cathode
J1-22 Anode

Grid Current in Foot Lamberts

Peak Grid Signal, Volts

ANODE = 25,000 Volts
RATED SIZE = 36mm x 48mm
GALID VOLTS D.C. measured above cut-off