PENTAGRID CONVERTER
MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:
Voltage .............................................. 6.3 ac or dc volts
Current .................................................. 0.3 amp

Direct Interelectrode Capacitances:

Without Shield With Shield

Grid No.3 to All Other Electrodes (RF Input) . 7 max. 7 max. \( \mu \)f
Plate to All Other Electrodes (Mixer Input) . 8 \( \mu \)f
Grid No.1 to All Other Electrodes (Osc. Input) . 5.5 max. 5.5 max. \( \mu \)f
Grid No.3 to Plate . 0.30 max. 0.25 max. \( \mu \)f
Grid No.3 to Grid No.1 . 0.15 max. 0.15 max. \( \mu \)f
Grid No.1 to Plate . 0.1 max. 0.05 max. \( \mu \)f
Grid No.1 to Cathode and Grid No.5 ....... 3 \( \mu \)f
Cathode and Grid No.5 to All Other Electrodes Except Grid No.1 . 15 20 \( \mu \)f

\* JETEC No.316 connected to pin No.2.

Mechanical:

Mounting Position ........................................... Any
Maximum Overall Length .................................... 2-1/8" 
Maximum Seated Length .................................... 1-7/8"
Length from Base Seat to Bulb Top (Excluding tip) . 1-1/2" \( \pm 3/32" 
Maximum Diameter ........................................... 3/4" 
Bulb ........................................... T-5-1/2
Base ........................................... Small-Button Miniature 7-Pin (JETEC No.E7-1)
Basing Designation for BOTTOM VIEW .................. 7CH

CONVERTER

Pin 1 - Grid No.1
Pin 2 - Cathode, Grid No.5
Pin 3 - Heater
Pin 4 - Heater
Pin 5 - Plate
Pin 6 - Grid No.2, Grid No.4
Pin 7 - Grid No.3

Maximum Ratings, Design-Center Values:

PLATE VOLTAGE .............................................. 300 max. volts
GRID-No.3 (CONTROL-GRID) VOLTAGE:
Negative Bias Value ...................................... 50 max. volts
Positive Bias Value ....................................... 0 max. volts
GRIDS-No.2 & No.4 (SCREEN) VOLTAGE .......... 100 max. volts
GRIDS-No.2 & No.4 SUPPLY VOLTAGE .......... 300 max. volts

MAY 3, 1954
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
TOTAL CATHODE CURRENT ........... 14 max. ma
PLATE DISSIPATION ............... 1 max. watt
GRIDS-No.2 & No.4 INPUT .......... 1 max. watt

PEAK HEATER-CATHODE VOLTAGE:
Heater negative with respect to cathode .. 90 max. volts
Heater positive with respect to cathode .. 90 max. volts

**Characteristics - Separate Excitation:**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value 1</th>
<th>Value 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate Voltage</td>
<td>100</td>
<td>250</td>
</tr>
<tr>
<td>Grid-No.2 &amp; No.4 Voltage</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Grid-No.3 Voltage</td>
<td>-1.5</td>
<td>-1.5</td>
</tr>
<tr>
<td>Grid-No.1 (Oscillator Grid) Voltage (rms)</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Grid-No.1 Resistor</td>
<td>20000</td>
<td>20000</td>
</tr>
<tr>
<td>Plate Resistance (Approx.)</td>
<td>0.4</td>
<td>1 megohm</td>
</tr>
<tr>
<td>Conversion Transconductance</td>
<td>455</td>
<td>475 µmhos</td>
</tr>
</tbody>
</table>

Grid-No.3 Voltage (Approx.) for conversion transconductance of:
- 10 µmhos ........... -30 -30 volts
- 100 µmhos ........... -6 -6 volts

Plate Current ........... 2.6 2.9 ma
Grids-No.2 & No.4 Current .......... 7 6.8 ma
Grid-No.1 Current .......... 0.5 0.5 ma
Total Cathode Current .......... 10.1 10.2 ma

**NOTE:** With grids-No.2 & No.4 and plate at 100 volts, grids-No.1 & No.3 at zero volts, and signal applied to grid No.1, the oscillator transconductance (not oscillating) is 7289 microhmhos; the cathode current is 25 milliamperes; and the amplification factor is 20. Grid-No.1 voltage (approx.) for plate current of 10 microamperes is -11 volts.

*The characteristics shown with separate excitation correspond very closely with those obtained in a self-excited oscillator circuit operating with zero bias.*

**May 3, 1954**

**Tube Division**

**Radio Corporation of America, Harrison, New Jersey**
Pentagrid Converter

7-PIN MINIATURE TYPE

GENERAL DATA

Electrical:
Heater, for Unipotential Cathode:
Voltage (AC or DC).................. 6.3 ± 10% volts
Current at 6.3 volts................ 0.3 amp
Direct Inter-electrode Capacitances:

<table>
<thead>
<tr>
<th>Without External Shield</th>
<th>With External Shield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid No.3 to all other electrodes (RF input)</td>
<td>7</td>
</tr>
<tr>
<td>Plate to all other electrodes (Mixer input)</td>
<td>8</td>
</tr>
<tr>
<td>Grid No.1 to all other electrodes (Oscillator input)</td>
<td>5.5</td>
</tr>
<tr>
<td>Grid No.3 to plate</td>
<td>0.3 max.</td>
</tr>
<tr>
<td>Grid No.3 to grid No.1</td>
<td>0.15 max.</td>
</tr>
<tr>
<td>Grid No.1 to plate</td>
<td>0.1 max.</td>
</tr>
<tr>
<td>Grid No.1 to cathode &amp; grid No.5</td>
<td>3</td>
</tr>
<tr>
<td>Cathode &amp; grid No.5 to all other electrodes except grid No.1</td>
<td>15</td>
</tr>
</tbody>
</table>

Mechanical:
Operating Position.................. Any
Maximum Overall Length............. 2-1/8"
Maximum Seated Length.............. 1-7/8"
Length, Base Seat to Bulb Top (Excluding tip) | 0.650" to 0.750"
Diameter................................ See General Section
Dimensional Outline.................. See General Section
Bulb..................................... T5-1/2
Base................................. Small-Button Miniature 7-Pin (JEDEC No. E7-1)
Basing Designation for BOTTOM VIEW....... 7CH

Pin 1—Grid No.1
Pin 2—Cathode, Grid No.5
Pin 3—Heater
Pin 4—Heater
Pin 5—Plate
Pin 6—Grid No.2, Grid No.4
Pin 7—Grid No.3

CONVERTER

Maximum Ratings, Design-Maximum Values:

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLATE VOLTAGE</td>
<td>330 max. volts</td>
</tr>
<tr>
<td>GRID-No.3 (CONTROL-GRID) VOLTAGE:</td>
<td></td>
</tr>
<tr>
<td>Negative-bias value</td>
<td>55 max. volts</td>
</tr>
<tr>
<td>Positive-bias value</td>
<td>0 max. volts</td>
</tr>
<tr>
<td>GRIDS-No.2 &amp; No.4 (SCREEN-GRID)</td>
<td></td>
</tr>
<tr>
<td>SUPPLY VOLTAGE</td>
<td>330 max. volts</td>
</tr>
<tr>
<td>GRIDS-No.2 &amp; No.4 VOLTAGE</td>
<td>110 max. volts</td>
</tr>
</tbody>
</table>

Indicates a change.

RADIO CORPORATION OF AMERICA
Electron Tube Division
Harrison, N. J.

DATA 5-61
CATHODE CURRENT ......................... 15.5 max. ma
GRIDS-No.2 & No.4 INPUT ............... 1.1 max. watts
PLATE DISSIPATION ....................... 1.1 max. watts

PEAK HEATER–CATHODE VOLTAGE:
- Heater negative with respect to cathode: 200 max. volts
- Heater positive with respect to cathode: 200* max. volts

**Characteristics:**

*With separate excitation*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate Voltage</td>
<td>100 - 250 volts</td>
</tr>
<tr>
<td>Grid-No.3 Voltage</td>
<td>-1.5 - 1.5 volts</td>
</tr>
<tr>
<td>Grids-No.2 &amp; No.4 Voltage</td>
<td>100 - 100 volts</td>
</tr>
<tr>
<td>RMS Grid-No.1 (Oscillator Grid) Voltage</td>
<td>10 - 10 volts</td>
</tr>
<tr>
<td>Grid-No.1 Resistor</td>
<td>20000 - 20000 ohms</td>
</tr>
<tr>
<td>Plate Resistance (Approx.)</td>
<td>0.4 - 1 megohm</td>
</tr>
<tr>
<td>Conversion Transconductance</td>
<td>455 - 475 µmhos</td>
</tr>
</tbody>
</table>

Grid-No.3 Voltage (Approx.) for conversion transconductance (µmhos) =
- 10: -30 - 30 volts
- 100: -6 - 6 volts

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate Current</td>
<td>2.6 - 2.9 ma</td>
</tr>
<tr>
<td>Grids No.2 &amp; No.4 Current</td>
<td>7 - 6.8 ma</td>
</tr>
<tr>
<td>Grid-No.1 Current</td>
<td>0.5 - 0.5 ma</td>
</tr>
<tr>
<td>Cathode Current</td>
<td>10.1 - 10.2 ma</td>
</tr>
</tbody>
</table>

**Oscillator Characteristics (Not Oscillating):**

*With grids No.2 & No.4 connected to plate*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate and Grids-No.2 &amp; No.4 Voltage</td>
<td>100 volts</td>
</tr>
<tr>
<td>Grid-No.3 Voltage</td>
<td>0 volts</td>
</tr>
<tr>
<td>Grid-No.1 Voltage</td>
<td>0 volts</td>
</tr>
</tbody>
</table>

Amplification Factor between grid No.1 and grids No.2 & No.4 connected to plate: 20

Transconductance between grid No.1 and grids No.2 & No.4 connected to plate: 7250 µmhos

Cathode Current ......................... 25 ma

Grid-No.1 Voltage (Approx.) for plate = 10. ... -11 volts

* With external shield JEDEC No.316 connected to cathode.

* The dc component must not exceed 100 volts.

* The characteristics shown with separate excitation correspond very closely with those obtained in a self-excited oscillator circuit operating with zero bias.
$E_f = 6.3$ VOLTS
PLATE VOLTS = 250
GRIDS-N°2 & N°4 VOLTS = 100
GRID-N°1 RESISTOR - OHMS = 20000
OSCILLATOR VOLTAGE ADJUSTED TO GIVE
GRID-N°1 CURRENT OF 0.5 MA.

SEPT. 26, 1945
RCA VICTOR DIVISION
92CM-6601
RADIO CORPORATION OF AMERICA, MARRIOTON, NEW JERSEY
OPERATION CHARACTERISTICS
WITH SEPARATE OSCILLATOR EXCITATION

\[ E_r = 6.3 \text{ VOLTS} \]
\[ \text{PLATE VOLTS} = 250 \]
\[ \text{GRIDS-NR 2 \\& NR 4 VOLTS} = 100 \]
\[ \text{GRID-NR 3 (CONTROL GRID) VOLTS} = -1.5 \]
\[ \text{GRID-NR 1 RESISTOR- OHMS} = 20000 \]
\[ \text{GRID-NR 1 CURRENT VARIED BY ADJUSTMENT OF OSCILLATOR VOLTAGE} \]

**Recommended Minimum Value of Ic**

CONVERSION TRANSCONDUCTANCE (k) - MICROMOHMS

CATHODE CURRENT

CATHODE MILLIAMPERES

200  400  800  1200  1600

0  0.2  0.4  0.6  0.8  1.0

GRID-NR 1 MILLIAMPERES (Ic)
**OPERATION CHARACTERISTICS WITH SELF-EXCITATION**

- $E_p = 6.3$ VOLTS
- GRID - N° 2 & N° 4 VOLTS = 100
- GRID - N° 3 CONTROL-GRID VOLTS = -1
- GRID - N° 1 RESISTOR-OHMS = 20000
- **P** - PERCENTAGE RATIO OF $E_K$ TO $E_K + E_g$, WHERE
  - $E_K$ = VOLTAGE ACROSS OSCILLATOR-COIL SECTION BETWEEN GROUND & CATHODE
  - $E_g$ = OSCILLATOR VOLTAGE BETWEEN CATHODE & GRID

**PARAMETERS:**
- **CONVERSION TRANSCONDUCTANCE - MICROMOS**
- **GRID - N° 1 MILLIAMPERES**

**Dates:**
- NOV. 12, 1945
- 92CM-6625