PENTAGRID CONVERTER
SINGLE-ENDED METAL TYPE

GENERAL DATA

Electrical:
Heater, for Unipotential Cathode:
Voltage: 6.3 ac or dc volts
Current: 0.3 amp.
Direct Interelectrode Capacitances:
Grid No.3 to All Other Electrodes
  (RF Input)\(\uparrow\), 9.6 \(\mu\)f
Plate to All Other Electrodes
  (Mixer Output)\(\uparrow\), 9.2 \(\mu\)f
Grid No.1 to All Other Electrodes
  (Osc. Input)\(\uparrow\), 7.3 \(\mu\)f
Grid No.3 to Plate\(\uparrow\), 0.13 max. \(\mu\)f
Grid No.3 to Grid No.1\(\uparrow\), 0.16 max. \(\mu\)f
Grid No.1 to Plate\(\uparrow\), 0.06 max. \(\mu\)f
Grid No.1 to All Other Electrodes and
  Shell, Except Cathode 3.8 \(\mu\)f
Grid No.1 to Cathode 3.4 \(\mu\)f
Cathode to All Other Electrodes and
  Shell Except Grid No.1 4.5 \(\mu\)f

Mechanical:
Mounting Position: Any
Maximum Overall Length: 2-5/8"
Maximum Seated Length: 2-1/16"
Maximum Diameter: 1-5/16"
Bulb: MT-8G
Base: Small Wafer Octal 8-Pin, Micanol

Basing Designation for BOTTOM VIEW: 8R
Pin 1—Shell,
  Grid No.5
Pin 2—Heater
Pin 3—Plate
Pin 4—Grids
  No.2 & No.4
Pin 5—Grid No.1
Pin 6—Cathode
Pin 7—Heater
Pin 8—Grid No.3

CONVERTER SERVICE

Maximum Ratings, Design-Center Values:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLATE VOLTAGE</td>
<td>300 max. volts</td>
</tr>
<tr>
<td>GRIDS—No.2 &amp; No.4 VOLTAGE</td>
<td>100 max. volts</td>
</tr>
<tr>
<td>GRIDS—No.2 &amp; No.4 SUPPLY VOLTAGE</td>
<td>300 max. volts</td>
</tr>
<tr>
<td>PLATE DISSIPATION</td>
<td>2.0 max. watts</td>
</tr>
<tr>
<td>GRIDS—No.2 &amp; No.4 DISSIPATION</td>
<td>1.5 max. watts</td>
</tr>
<tr>
<td>TOTAL CATHODE CURRENT</td>
<td>22 max. ma.</td>
</tr>
<tr>
<td>GRID—No.3 VOLTAGE:</td>
<td></td>
</tr>
<tr>
<td>Negative Bias Voltage.</td>
<td>100 max. volts</td>
</tr>
<tr>
<td>Positive Bias Voltage.</td>
<td>0 max. volts</td>
</tr>
<tr>
<td>PEAK HEATER-CATHODE VOLTAGE:</td>
<td></td>
</tr>
<tr>
<td>Heater negative with respect to cathode</td>
<td>90 max. volts</td>
</tr>
<tr>
<td>Heater positive with respect to cathode</td>
<td>90 max. volts</td>
</tr>
</tbody>
</table>

\(\uparrow\) with shell connected to cathode.

APRIL 1, 1946
RCA VICTOR DIVISION
TENTATIVE DATA 1
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
PENTAGRID CONVERTER

Characteristics --- Separate Excitation:

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate Voltage</td>
<td>100</td>
<td>volts</td>
</tr>
<tr>
<td>Grids-No.2 &amp; No.4 (Screen) Voltage</td>
<td>100</td>
<td>volts</td>
</tr>
<tr>
<td>Grid-No.3 (Control) Grid Voltage</td>
<td>-1.0</td>
<td>volt</td>
</tr>
<tr>
<td>Grid-No.1 (Oscillator) Grid Resistor</td>
<td>20000</td>
<td>ohms</td>
</tr>
<tr>
<td>Plate Resistance (Approx.)</td>
<td>0.5</td>
<td>Megohm</td>
</tr>
<tr>
<td>Conversion Transconductance</td>
<td>900</td>
<td>μmhos</td>
</tr>
<tr>
<td>Conversion Transconductance**</td>
<td>3.5</td>
<td>μmhos</td>
</tr>
<tr>
<td>Plate Current</td>
<td>3.6</td>
<td>ma</td>
</tr>
<tr>
<td>Grids-No.2 &amp; No.4 Current</td>
<td>10.2</td>
<td>ma</td>
</tr>
<tr>
<td>Grid-No.1 Current</td>
<td>0.35</td>
<td>ma</td>
</tr>
<tr>
<td>Total Cathode Current</td>
<td>14.2</td>
<td>ma</td>
</tr>
</tbody>
</table>

Typical Operation in FM Band (88-108 Mc):

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate Voltage</td>
<td>250</td>
<td>volts</td>
</tr>
<tr>
<td>Grids-No.2 &amp; No.4 (Screen) Supply Voltage</td>
<td>250</td>
<td>volts</td>
</tr>
<tr>
<td>Grids-No.2 &amp; No.4 Resistor</td>
<td>12000</td>
<td>ohms</td>
</tr>
<tr>
<td>Grid-No.1 Resistor</td>
<td>22000</td>
<td>ohms</td>
</tr>
<tr>
<td>Signal Frequency</td>
<td>88</td>
<td>108 Mc</td>
</tr>
<tr>
<td>Oscillation Frequency</td>
<td>98.7</td>
<td>118.7 Mc</td>
</tr>
<tr>
<td>Plate Current</td>
<td>6.8</td>
<td>ma</td>
</tr>
<tr>
<td>Grids-No.2 &amp; No.4 Current</td>
<td>12.6</td>
<td>ma</td>
</tr>
<tr>
<td>Grid-No.1 Current</td>
<td>0.130</td>
<td>ma</td>
</tr>
</tbody>
</table>

NOTE: The transconductance between grid No.1 and grids No.2 and No.4 connected to plate (not oscillating) is approximately 8000 micromhos under the following conditions: signal applied to grid No.1 at zero-bias; grids No.2 and No.4 and plate at 100 volts; grid No.3 grounded. Under the same conditions, the plate current is 32 milliamperes and the amplification factor is 16.5.

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

** With grid-No.3 bias of -20 volts.
TYPICAL SELF-EXCITED CONVERTER CIRCUIT FOR TYPE 6SB7-Y WITH RF STAGE

88-108 Mc
(SEE TYPICAL OPERATION)

C1 C2 C3 = GANGED TUNING CONDENSERS: 7 - 23 \( \mu \)F
C4 C5 C6 = 22 \( \mu \)F
C7 C8 C9 C10 C11 = BY-PASS CONDENSERS
Cp = PADDING CONDENSERS
Ct = TRIMMER CONDENSERS

COIL I = ANTENNA COIL*: 2 TURNS NO. 14 WIRE + 1-1/4" LEAD NO. 20 WIRE. COIL TAPPED AT 1 TURN.
COIL II = INTERSTAGE COIL*: 2 TURNS NO. 14 WIRE + 1-1/4" LEAD NO. 20 WIRE. COIL TAPPED AT 1-1/4 TURN.
COIL III = OSCILLATOR COIL*: 1-7/8 TURNS NO. 14 WIRE, NO ADDED LEAD. COIL TAPPED AT 5/8 TURN.

* All coils 5/8" long, approx.

NOTE 1: All tap positions are approximate and should be adjusted to give stable operation.

NOTE 2: Insertion of a small non-inductive resistor of about 3 ohms in the circuit at grid-No. 3 terminal of the 6SB7-Y is helpful in preventing oscillation at the signal frequency.

92CM-6650

APRIL 1, 1946
RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
TENTATIVE DATA 2
OPERATION CHARACTERISTICS

$E_f = 6.3 \text{ VOLTS}$
PLATE VOLTS = 250
GRIDS-Nr. 2 & Nr. 4 VOLTS = 100
GRID-Nr. 1 RESISTOR-OHMS = 20000
OSCILLATOR VOLTAGE ADJUSTED TO GIVE
GRID-Nr. 1 CURRENT OF 0.35 MA.

GRID-Nr. 3 (CONTROL GRID) VOLTS

CONVERSION TRANSCONDUCTANCE - MICROHMS

NOV. 8, 1945
RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, MARRISON, NEW JERSEY

92CM-6619
OPERATION CHARACTERISTICS
WITH SELF-EXCITATION

$E_f = 6.3$ VOLTS
PLATE VOLTS = 250
GRIDS-N° 2 & N° 4 VOLTS = 100
GRID-N° 3 (CONTROL GRID) VOLTS = -1
GRID-N° 1 RESISTOR = 20000 OHMS

P - PERCENTAGE RATIO OF $E_K$ TO $E_K + E_q$, WHERE

$E_K = \text{VOLTAGE ACROSS OSCILLATOR-COIL SECTION}$
$\text{BETWEEN GROUND AND CATHODE, AND}$

$E_q = \text{OSCILLATOR VOLTAGE BETWEEN CATHODE}$
$\text{AND GRID}$
OPERATION CHARACTERISTICS
WITH SEPARATE OSCILLATOR EXCITATION

$E_F = 6.3$ VOLTS
PLATE VOLTS = 250
GRIDS-N$\# 2$ & N$\# 4$ VOLTS = 100
GRID-N$\# 3$ (CONTROL GRID) VOLTS = -1
GRID-N$\# 1$ RESISTOR - OHMS = 20000
GRID-N$\# 1$ CURRENT VARIED BY ADJUSTMENT
OF OSCILLATOR VOLTAGE.

RECOMMENDED MINIMUM
VALUE OF $I_C$

CONVERSION TRANSCONDUCTANCE ($g_{m}$) - MICROMHOS

800

600

400

200

$g_{m}$

$T_a$

$T_b$

PLATE ($I_b$), SCREEN ($I_c$), AND CATHODE ($I_e$) - MILLIAMPERES

0

0.2

0.4

0.6

0.8

1.0

1.2

GRID-N$\# 1$ MILLIAMPERES ($I_{ci}$)

NOV. 20, 1945
RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY
92CM - 6634