THE 12DT6 IS A SHARP CUTOFF PENTODE IN THE 7 PIN MINIATURE CONSTRUCTION. IT IS INTENDED FOR USE AS AN FM DETECTOR IN TELEVISION RECEIVERS. DESIGNED SO THAT GRID #1 AND GRID #3 CAN EACH BE USED AS INDEPENDENT SHARP CUTOFF CONTROL ELECTRODES, THE TUBE MAY ALSO BE USED IN DELAY CIRCUITS, GAIN-CONTROLLED AMPLIFIER CIRCUITS, AND MIXER CIRCUITS. WITH THE EXCEPTION OF HEATER WARM-UP TIME AND HEATER CHARACTERISTICS, IT IS IDENTICAL TO THE 6DT6.

DIRECT INTERELECTRODE CAPACITANCES — APPROX.
WITH EXTERNAL SHIELD, #316, CONNECTED TO CATHODE

- GRID #1 TO PLATE: 0.02 µuf
- GRID #1 TO GRID #3: 0.1 µuf
- GRID #3 TO ALL OTHER ELECTRODES: 6.1 µuf
- GRID #1 TO GRID #2, GRID #3, HEATER, AND INTERNAL SHIELD AND CATHODE: 5.8 µuf
- GRID #3 TO PLATE: 1.4 µuf

RATINGS
INTERPRETED ACCORDING TO DESIGN MAXIMUM SYSTEM
FM DETECTOR SERVICE

- HEATER VOLTAGE: 12.6 VOLTS
- MAXIMUM PLATE VOLTAGE: 330 VOLTS
- MAXIMUM GRID #3 (SUPPRESSOR) VOLTAGE: 28 VOLTS
- MAXIMUM GRID #2 SUPPLY VOLTAGE: 330 VOLTS
- MAXIMUM GRID #2 (SCREEN) VOLTAGE: SEE RATING CHART
- MAXIMUM GRID #1 (CONTROL-GRID) VOLTAGE:
  - POSITIVE BIAS VALUE: 0 VOLTS
  - MAXIMUM PLATE DISSIPATION: 1.7 WATTS
  - MAXIMUM GRID #2 INPUT:
    - FOR GRID #2 VOLTAGES UP TO 165 VOLTS: 1.1 WATTS
    - FOR GRID #2 VOLTAGES BETWEEN 165 AND 330 VOLTS: SEE RATING CHART
- MAXIMUM HEATER-CATHODE VOLTAGE:
  - HEATER NEGATIVE WITH RESPECT TO CATHODE: 100 VOLTS
  - HEATER POSITIVE WITH RESPECT TO CATHODE: 100A VOLTS
- HEATER WARM-UP TIME (APPROX.)*: 11 SECONDS

* THE DC COMPONENT MUST NOT EXCEED 100 VOLTS.
* HEATER WARM-UP TIME IS DEFINED AS THE TIME REQUIRED FOR THE VOLTAGE ACROSS THE HEATER TO REACH 80% OF ITS RATED VOLTAGE AFTER APPLYING 4 TIMES RATED HEATER VOLTAGE TO A CIRCUIT CONSISTING OF THE TUBE HEATER IN SERIES WITH A RESISTANCE OF VALUE 3 TIMES THE NOMINAL HEATER OPERATING RESISTANCE.

CONTINUED ON FOLLOWING PAGE
TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS
CLASS A\textsubscript{1} AMPLIFIER

- **Heater Voltage**: 12.6 Volts
- **Heater Current**: 0.15 Amp.
- **Plate Supply Voltage**: 150 Volts
- **Grid #3 Supply Voltage**: 0 Volts
- **Grid #2 Supply Voltage**: 100 Volts
- **Cathode-Bias Resistor**: 560 Ohms
- **Plate Resistance (Approx.)**: 0.15 Megohms
- **Transconductance**:
  - Grid #1 to Plate: 800 \(\mu\)Mhos
  - Grid #3 to Plate: 515 \(\mu\)Mhos
  - Grid #1 Voltage (Approx.) for Plate Current of 10 \(\mu\)Amp: -4.5 Volts
  - Grid #3 Voltage (Approx.) for Plate Current of 10 \(\mu\)Amp: -3.5 Volts
- **Plate Current**: 1.1 Ma.
- **Grid #2 Current**: 2.1 Ma.

TYPICAL OPERATION IN THE ACCOMPANYING LOCKED-OSCILLATOR, QUADRATURE-GRID FM DETECTOR CIRCUIT AT A CARRIER FREQUENCY OF 4.5 MC:

<table>
<thead>
<tr>
<th>Input Signal to Grid of Driver Tube</th>
<th>15</th>
<th>200</th>
<th>500</th>
<th>MV RMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate Supply Voltage</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>Volts</td>
</tr>
<tr>
<td>Grid #3 Voltage (Obtained from</td>
<td>-5</td>
<td>6</td>
<td>-6.4</td>
<td>Volts</td>
</tr>
<tr>
<td>A 560000-Ohm Resistor)</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>Volts</td>
</tr>
<tr>
<td>Cathode-Bias Resistor</td>
<td>560</td>
<td>560</td>
<td>560</td>
<td>Ohms</td>
</tr>
<tr>
<td>Plate Load Resistor</td>
<td>0.27</td>
<td>0.27</td>
<td>0.27</td>
<td>Megohms</td>
</tr>
<tr>
<td>Plate Current</td>
<td>0.23</td>
<td>0.22</td>
<td>0.21</td>
<td>Ma.</td>
</tr>
<tr>
<td>Grid #2 Current</td>
<td>3.4</td>
<td>5.5</td>
<td>6</td>
<td>Ma.</td>
</tr>
<tr>
<td>Grid #1 Current</td>
<td>0.013</td>
<td>0.6</td>
<td>0.8</td>
<td>Ma.</td>
</tr>
</tbody>
</table>

- **Bandwidth**: For a Total Harmonic Distortion of 10 Percent: 65 120 118 Kc
- **AM Rejection (Approx.)**: 53 29 28 DB

**Audio Output Voltage (RMS, Approx.)**:

- With \(\pm\) 7.5-KC Deviation From Mean Value of 4.5 MC: 5.5 6.5 7.5 Volts
- With \(\pm\) 25-KC Deviation From Mean Value of 4.5 MC: 17 21 23 Volts

**Total Harmonic Distortion**:

- With \(\pm\) 25-KC Deviation From Mean Value of 4.5 MC: 2 3 4 Percent

**Sensitivity**:

- With \(\pm\) 7.5-KC Deviation From Mean Value of 4.5 MC: 5\textsuperscript{o} Millivolts
- With \(\pm\) 25-KC Deviation From Mean Value of 4.5 MC: 15\textsuperscript{o} Millivolts

**Maximum Circuit Values**:

- **Grid #1 Circuit Resistance**: For Fixed-Bias Operation: 0.25 Megohms
- **For Cathode-Bias Operation**: 0.5 Megohms

\textsuperscript{B} Ratio of the Audio Output Voltage Produced by 30-Percent Amplitude Modulation of the 4.5-MC Carrier Frequency to the Audio Output Produced by \(\pm\) 25-KC Deviation from the 4.5-MC Carrier Frequency, with a Modulating Frequency of 400 CPS in Both Cases.

\textsuperscript{C} Signal Level at Which Detector Circuit Will Handle the Indicated Deviation in Frequency from the Mean Value of 4.5 MC, Before Distortion Occurs.
TUNG-SOL

LOCKED-OSCILLATOR, QUADRATURE-GRID DETECTOR CIRCUIT
UTILIZING TYPE 12DT6

TYPE 6AU6

4.5Mc INPUT

C1: 47μf, 400 VOLTS
C2: C3: 0.05μf, 400 VOLTS
C4: 0.05μf, 200 VOLTS
C5: 18μf, 200 VOLTS
C6: 0.05μf, 200 VOLTS
C7: 100 TO 1000μf, 400 VOLTS
C8: 0.05μf, 400 VOLTS

TYPE 12DT6

R1
4.2 VOLTS

T1

R2
R3
R4
R5
R6
R7

L1: SLUG-TUNED INDUCTOR WITH Q OF 50 AND TUNEABLE TO 4.5-MC.

R8: 270000 OHMS, 0.5 WATT

R9: 0.5 MEGOHM POTENTIOMETER

T1: SLUG-TUNED, BIFILAR MOUNT IF TRANSFORMER WITH RATIO OF 111.5, Q > 50, AND TUNEABLE TO 4.5-MC WITH TUBE AND WIRING CAPACITANCE.
12DT6
PENTODE
Performance in
Locked-Oscillator, Quadrature-Grid
Detector Circuit

AM Rejection - Decibels
Audio Output - Volts (RMS)

SIGNAL INPUT TP DRIVER TUBE - MILLIVOLTS (RMS)

12DT6
PENTODE
This Curve Also Applies
To Types In Which Grids
#2 & #4 Are Connected
Within The Tube

Grid #2 Input Expressed as % of
Maximum Grid #2 Input Rating

Grid #2 Voltage Expressed as % of
Maximum Grid #2 Supply Voltage Rating

Area Of
Permissible operation