IIIE16
H.F. DOUBLE TETRODE
Indirectly heated

TENTATIVE

GENERAL
The IIIE16 is an internally neutralised h.f. double tetrode. It has a centre tapped heater and is intended for use as a push-pull amplifier or frequency trebler at frequencies up to 600 Mc/s.

RATING

Heater Voltage \( V_h \) 12.6 6.3 V
Heater Current \( I_h \) 0.65 1.3 A
Maximum Operating Frequency \( f_{\text{max}} \) 600 Mc/s
Maximum Permissible Temperature of hottest part of bulb 200 °C
Maximum Permissible Temperature of the base pins 180 °C

§ All limiting values are Absolute, not Design Centres.

RATING—Absolute values.
Class "C" r.f. push-pull power amplifier for c.w. telegraphy or f.m. telephony.

Maximum Anode Voltage \( V_a(\text{max}) \) 600* V
Maximum Screen Grid Voltage \( V_g2(\text{max}) \) 300 V
Maximum Negative Control Grid Voltage \( V_g1(\text{max}) \) -75 V
Maximum Heater/Cathode Voltage \( V_h-k(\text{max}) \) 100 V
Maximum Anode Dissipation \( P_a(\text{max}) \) 10† W
Maximum Screen Grid Dissipation \( P_g2(\text{max}) \) 1.5† W
Maximum Control Grid Dissipation \( P_g1(\text{max}) \) 0.5† W
Maximum Peak Cathode Current \( I_k(pk)_{\text{max}} \) 260† mA

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Maximum Mean Cathode Current  I_{k(av)}^{\text{max}}  55\uparrow  mA
Maximum Control Grid Cathode Resistance (fixed bias)  R_{g1-k(\text{max})}  50\uparrow  k\Omega
Maximum Control Grid/Cathode Resistance (automatic bias)  R_{g1-k(\text{max})}  100\uparrow  k\Omega
Maximum Mean Control Grid Current  I_{g1(\text{av})}^{\text{max}}  2.5\uparrow  mA

* For natural cooling \( V_a^{(\text{max})} = 600 \) V up to 150 Mc's but is limited to 250V at 600 Mc/s. For forced air cooling \( V_a^{(\text{max})} = 600 \) V up to 300 Mc's but is limited to 400V at 600 Mc/s.
\uparrow  Each section.

RATING—Absolute values.
Class "C" r.f. power amplifier with anode and screen modulation (carrier condition for use with modulation factor 1).

Maximum Anode Voltage  \( V_a^{(\text{max})} \)
Maximum Screen Grid Voltage  \( V_{g2(\text{max})} \)
Maximum Negative Control Grid Voltage  \( V_{g1(\text{max})} \)
Maximum Heater Cathode Voltage  \( V_{h-k(\text{max})} \)
Maximum Anode Dissipation  \( P_a^{(\text{max})} \)
Maximum Screen Grid Dissipation  \( P_{g2(\text{max})} \)
Maximum Control Grid Dissipation  \( P_{g1(\text{max})} \)
Maximum Peak Cathode Current  \( I_{k(pk)}^{\text{max}} \)
Maximum Mean Cathode Current  \( I_{k(\text{av})}^{\text{max}} \)
Maximum Mean Control Grid Current  \( I_{g1(\text{av})}^{\text{max}} \)

* For natural cooling \( V_a^{(\text{max})} = 600 \) V up to 150 Mc's but is limited to 250V at 600 Mc/s. For forced air cooling \( V_a^{(\text{max})} = 600 \) V up to 250 Mc's but is limited to 440V at 600 Mc/s.
\uparrow  Each section.
**IIE16**

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**TENTATIVE**

**RATING**—Absolute values.

Frequency Trebler,

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Anode Voltage</td>
<td>$V_a(\text{max})$ 600 V</td>
</tr>
<tr>
<td>Maximum Screen Grid Voltage</td>
<td>$V_{g2}(\text{max})$ 300 V</td>
</tr>
<tr>
<td>Maximum Negative Control Grid Voltage</td>
<td>$V_{g1}(\text{max})$ -200 V</td>
</tr>
<tr>
<td>Maximum Heater/Cathode Voltage</td>
<td>$V_{h-k}(\text{max})$ 100 V</td>
</tr>
<tr>
<td>Maximum Anode Dissipation</td>
<td>$P_a(\text{max})$ 10† W</td>
</tr>
<tr>
<td>Maximum Screen Grid Dissipation</td>
<td>$P_{g2}(\text{max})$ 1.5† W</td>
</tr>
<tr>
<td>Maximum Control Grid Dissipation</td>
<td>$P_{g1}(\text{max})$ 0.5† W</td>
</tr>
<tr>
<td>Maximum Peak Cathode Current</td>
<td>$i_{k(\text{pk})}(\text{max})$ 275† mA</td>
</tr>
<tr>
<td>Maximum Mean Cathode Current</td>
<td>$i_{k(\text{av})}(\text{max})$ 50† mA</td>
</tr>
<tr>
<td>Maximum Control Grid/Cathode Resistance (fixed bias)</td>
<td>$R_{g1-k}(\text{max})$ 50† kΩ</td>
</tr>
<tr>
<td>Maximum Control Grid/Cathode Resistance (automatic bias)</td>
<td>$R_{g1-k}(\text{max})$ 100† kΩ</td>
</tr>
<tr>
<td>Maximum Mean Control Grid Current</td>
<td>$i_{g1(\text{av})}(\text{max})$ 2.5† mA</td>
</tr>
</tbody>
</table>

† Each section.

**RATING**—Absolute values

Class "B" a.f. power amplifier or modulator.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Anode Voltage</td>
<td>$V_a(\text{max})$ 600 V</td>
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<td>$V_{g2}(\text{max})$ 300 V</td>
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<td>Maximum Negative Control Grid Voltage</td>
<td>$V_{g1}(\text{max})$ -75 V</td>
</tr>
<tr>
<td>Maximum Heater/Cathode Voltage</td>
<td>$V_{h-k}(\text{max})$ 100 V</td>
</tr>
<tr>
<td>Maximum Anode Dissipation</td>
<td>$P_a(\text{max})$ 10† W</td>
</tr>
<tr>
<td>Maximum Screen Grid Dissipation</td>
<td>$P_{g2}(\text{max})$ 1.5† W</td>
</tr>
</tbody>
</table>

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**IIE16**

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Indirectly heated

**TENTATIVE**

Maximum Control Grid Dissipation

\[ P_{g1}(\text{max}) = 0.5 \text{ W} \]

Maximum Peak Cathode Current

\[ I_{k(pk)\text{max}} = 120 \text{ mA} \]

Maximum Mean Cathode Current

\[ I_{k(\text{av})\text{max}} = 55 \text{ mA} \]

Maximum Control Grid/Cathode Resistance (fixed bias)

\[ R_{g1-k(\text{max})} = 50 \text{ k}\Omega \]

Maximum Control Grid/Cathode Resistance (automatic bias)

\[ R_{g1-k(\text{max})} = 100 \text{ k}\Omega \]

† Each section

**INTER-ELECTRODE CAPACITANCES**

- Anode/Grid 1 ↔
  \[ C_{a-g1} = 0.04 \text{ pF} \]

- Grid 1 All other electrodes†
  \[ C_{g1-all} = 7.5 \text{ pF} \]

- Anode All other electrodes†
  \[ C_{a-all} = 2.6 \text{ pF} \]

- Input Capacitance‡
  \[ C_{\text{in}} = 4.4 \text{ pF} \]

- Output Capacitance‡
  \[ C_{\text{out}} = 1.6 \text{ pF} \]

* Internally neutralised for push-pull operation.
† Each section.
‡ 2 sections in push-pull.

**CHARACTERISTICS†‡**

- Mutual Conductance
  \[ g_m = 3.0 \text{ mA/V} \]

- Inner Amplification Factor
  \[ \mu_{g1-g2} = 8.0 \]

† Each section.
‡ At \( V_a = 300\text{V} \), \( V_{g2} = 250\text{V} \), \( I_a = 20\text{mA} \).

**DIMENSIONS**

- Maximum Overall Length
  85 mm

- Maximum Diameter
  47 mm

- Maximum Seated Height
  73 mm

- Approximate Net Weight
  2 oz

February, 1962

Associated Electrical Industries Limited

Electronic Components Department

Tel: GER.rard 9797
**IIEI6**

**H.F. DOUBLE TETRODE**

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**TENTATIVE**

**MOUNTING POSITION**—Mobile operation; vertical, base up or down. Fixed station operation; vertical, base up or down. Horizontal; anode pins in horizontal plane.

**CAPS**—Wire 2mm dia.

**BASE**—B7A

Viewed from free end of pins

**CONNECTIONS**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Heater</td>
<td>h</td>
</tr>
<tr>
<td>2</td>
<td>Control Grid, Section 1</td>
<td>g1'</td>
</tr>
<tr>
<td>3</td>
<td>Screen Grid</td>
<td>g2', g2''</td>
</tr>
<tr>
<td>4</td>
<td>Cathode, Beam Plates, Shield</td>
<td>k, bp, s</td>
</tr>
<tr>
<td>5</td>
<td>Heater Centre Tap</td>
<td>hct</td>
</tr>
<tr>
<td>6</td>
<td>Control Grid, Section 2</td>
<td>g1''</td>
</tr>
<tr>
<td>7</td>
<td>Heater</td>
<td>h</td>
</tr>
<tr>
<td>Cap No. 1</td>
<td>Anode, Section 1</td>
<td>a'</td>
</tr>
<tr>
<td>Cap No. 2</td>
<td>Anode, Section 2</td>
<td>a''</td>
</tr>
</tbody>
</table>