USB Frequency Synthesizer PLL (Phase Locked Loop), Operating From 5 GHz to 10 GHz With SMA Output

FMSN3902 is a Frequency Synthesizer Module that covers a wide frequency band from 5 GHz to 10 GHz with exceptional spurious rejection and phase noise performance. Attenuation range up to 30 dB is adjustable in 1 dB steps and maximum output power is greater than +17 dBm across the entire frequency band. This high quality signal source has several outstanding features including a USB 2.0 interface that is powered and command controlled directly by a host PC and a Female SMA output connector, and is VISA compliant which enables seamless cross platform use. The synthesizer can be GUI controlled via Windows®, Macintosh®, or Linux® platforms, or with SCPI compliant VISA commands (downloadable user manual), or with other system design software such as LabVIEW®. The compact size makes it ideal for bench top test and measurement use or for radar and communication systems. Frequency resolution of the FMSN3902 is available in integer and fractional operating modes and the User can select between an internal reference or externally applied reference. The module supports integrated phase locked loop (PLL) circuitry that the User can select between an internal reference (capable of phase locking) or externally applied reference. The RF Synthesizer Module comes complete with a USB 2.0 A extension and an SMA male to MMCX plug cable.

### Electrical Specifications

<table>
<thead>
<tr>
<th>Mode</th>
<th>Integer/Fractional Operating Modes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference Option(s)</td>
<td>Internal (External Optional)</td>
</tr>
<tr>
<td>Control Interface</td>
<td>Phase Lock Indicator USB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td>5</td>
<td>10</td>
<td>GHz</td>
<td></td>
</tr>
<tr>
<td>Output Power</td>
<td>-15</td>
<td>+18</td>
<td>dBm</td>
<td></td>
</tr>
<tr>
<td>Step Size (Integer Mode)</td>
<td>200</td>
<td>MHz</td>
<td></td>
<td></td>
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<tr>
<td>Step Size (Fractional Mode)</td>
<td>1</td>
<td>MHz</td>
<td></td>
<td></td>
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<tr>
<td>Phase Locked Speed</td>
<td>1</td>
<td>ms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase Noise @100kHz Offset</td>
<td>-72</td>
<td>dBC/Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd Harmonic</td>
<td>-24.5</td>
<td>dBC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd Harmonic</td>
<td>-18.5</td>
<td>dBC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th Harmonic</td>
<td>-30.5</td>
<td>dBC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference Frequency</td>
<td>10</td>
<td>50</td>
<td>100</td>
<td>MHz</td>
</tr>
<tr>
<td>Reference Power (CW)</td>
<td>+0</td>
<td>+15</td>
<td>dBm</td>
<td></td>
</tr>
<tr>
<td>Internal Reference Frequency</td>
<td>50</td>
<td>MHz</td>
<td></td>
<td></td>
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<tr>
<td>Internal Reference Accuracy</td>
<td>0.5</td>
<td>ppm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating DC Current 1</td>
<td>480</td>
<td>mA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Features:
- Wideband Output Frequency
- 5 GHz to 10 GHz
- Integer and Fractional operating modes
- +18 dBm max output power
- 30 dB Attenuation adjustable in 1 dB steps
- USB 2.0 Interface
- Female SMA output
- USBTMC VISA Compliant
- User Selectable internal reference or externally applied reference
- Small Compact package size
- LED indicators
- Downloadable User Manual
- Accessory cables included

Applications:
- Signal Generators
- Test Equipment
- RF System Integration
- Communication Systems
- EW Systems
- C-Band and X-Band Systems
- Radar Systems
- Frequency Conversion
- SIGINT
### Performance by Frequency

<table>
<thead>
<tr>
<th>Description</th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>5</td>
<td>7.5</td>
<td>10</td>
<td>GHz</td>
</tr>
<tr>
<td>Phase Noise @ 100 kHz Offset (With Internal Reference)</td>
<td>-77</td>
<td>-75</td>
<td>-72</td>
<td>dBc/Hz</td>
</tr>
<tr>
<td>2nd Harmonics</td>
<td>-24.5</td>
<td>-22.3</td>
<td>-31.5</td>
<td>dBc</td>
</tr>
<tr>
<td>3rd Harmonics</td>
<td>-18.5</td>
<td>-27.3</td>
<td>-42.5</td>
<td>dBc</td>
</tr>
<tr>
<td>4th Harmonics</td>
<td>-30.5</td>
<td>-48.3</td>
<td>&gt; -70</td>
<td>dBc</td>
</tr>
<tr>
<td>Output Power Range</td>
<td>-13 to +18</td>
<td>-14 to +18</td>
<td>-15 to +17</td>
<td>dBm</td>
</tr>
</tbody>
</table>

Electrical Specification Notes:  
Step size specified under default conditions (a 50 MHz reference input with a reference divider of 1).

### Mechanical Specifications

**Size**
- Length: 4.1 in [104.14 mm]
- Width: 0.9 in [22.86 mm]
- Height: 0.645 in [16.38 mm]
- Weight: 0.27 lbs [122.47 g]

**Configuration**
- Package Type: Connectorized
- Reference Connector: MMCX Female
- Output Connector: SMA Female
- Control Connector: USB Type A - Male
- Reference Divider Out Connector: MMCX Female

Mechanical Specification Notes:
The USB Type A - Male connector is used for both Power and Control.

### Environmental Specifications

**Temperature**
- Operating Range: 0 to +55 deg C
- Storage Range: -50 to +100 deg C

### Compliance Certifications
(visit www.FairviewMicrowave.com for current document)
- RoHS Compliant: Yes

### Plotted and Other Data

Notes:
Typical Performance Data

8.0 GHz Phase Noise Comparison

8.0 GHz Integer vs. Fractional Mode Comparison

Phase Noise at 8 GHz Carrier, Reference Comparison

Phase Noise - Carrier Frequency Comparison

5 GHz Carrier
7.5 GHz Carrier
10 GHz Carrier
USB Frequency Synthesizer PLL (Phase Locked Loop), Operating From 5 GHz to 10 GHz With SMA Output from Fairview Microwave is in-stock and available to ship same-day. All of our RF/microwave products are available off-the-shelf from our ISO 9001:2008 certified facilities in Allen, Texas. Fairview Microwave is RF on-demand.

For additional information on this product, please click the following link: USB Frequency Synthesizer PLL (Phase Locked Loop), Operating From 5 GHz to 10 GHz With SMA Output FMSN3902


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