nanoPAN 5375 RF Module
High Performance RF Module
Enabling Location Awareness and Robust Communication

Complete RF Subsystem
Nanotron provides robust wireless technology for building RTLS and Location-Aware WSN solutions. For easy product development and fast market entry, Nanotron provides the nanoPAN 5375 RF Module. It is only 29 mm by 15 mm and less than 4 mm thick and integrates all the required components for a complete RF module based on Nanotron’s innovative nanoLOC chip.

nanoLOC – Highly Integrated Solution with Ranging
nanoLOC is a highly integrated mixed signal chip utilizing Nanotron’s unique wireless Chirp Spread Spectrum (CSS) communication technology. Along with robust wireless communication, nanoLOC provides ranging capabilities which can be used to develop ranging and location aware wireless applications.

Supporting a freely adjustable center frequency with 3 non-overlapping frequency channels, nanoLOC enables multiple physically independent networks and improved coexistence with existing 2.4 GHz wireless technologies.

nanoLOC provides data rates from 2 Mbps to 125 kbps. It includes a sophisticated MAC controller with CSMA/CA, TDMA, and FDMA. Forward Error Correction (FEC) and 128 bit hardware encryption are selectable. Scrambling, automatic address matching, and packet retransmission can also be enabled.

Key Features
nanoLOC TRX Transceiver
- Provides built-in precise ranging capabilities
- Operates worldwide ............................. 2.4 GHz ISM band
- Programmable data rates .................. 2 Mbps to 125 kbps
- Modulation technique ...................... Chirp Spread Spectrum
- Programmable output power .............. -37 dBm to 0 dBm
- Receiver sensitivity ........................... up to -95 dBm
- Operating temperature ...................... -40°C to + 85°C

Key Components
- nanoLOC TRX Transceiver
- Matching circuits (Balu)
- ISM band pass filter for improved robustness against out-of-band inferences
- RF switch to switch chip between TX and RX
- 20 dBm power amplifier for high efficiency, high gain, and a high output power
- Voltage range: 2.5 V ± 0.2 V
- nanoPAN 5375 RF Test Module available

External Interfaces
- 33 peripheral module pins in total
- 4 programmable digital IOs
- 50 Ohm RX/TX connection to antenna
- Pins for power supply, supply voltage for µC, SPI, reset, reset of µC, Tx/Rx status, and IRQ
Applications

The nanoPAN 5375 RF Module can be used for a wide range of RTLS and Location-Aware WSN solutions:

- **Condition Monitoring** – including monitoring of processes, plant and machinery provides valuable data about the performance and condition of your equipment and machinery. It even works with low-power sources such as vibration-induced power supplies.

- **Manufacturing and Logistics** – including asset tracking, self-configuring location-aware wireless sensor networks, active RFID, and 2D/3D Real Time Location Systems.

- **Health Care** – including high-value asset tracking, personal locating, disaster management, and remote patient monitoring and tracking.

nanoLOC nTRX Driver

Nanotron provides an software driver for convenient access to the chip’s functions. This includes chip-specific settings and performance criteria such as address matching, error checking, modulation methods, and data transmission rates. Hardware adaption layer messages are sent to the nanoLOC chip over the SPI interface.

nanoLOC Development Kit

Quickly develop RTLS and Location-Aware WSN applications using this complete, easy-to-use development kit based on the nanoLOC TRX Transceiver. Then go into full production using the nanoPAN 5375 RF Module on your own custom hardware.

Pin Assignments

![Diagram of pin assignments](image)

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Pin Name</th>
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<th>Pin Name</th>
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<tbody>
<tr>
<td>1,3,4,14-20</td>
<td>GND</td>
<td>11</td>
<td>DIO1</td>
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<tr>
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<td>GND</td>
<td>12</td>
<td>DIO0</td>
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<tr>
<td>2</td>
<td>VCC</td>
<td>13</td>
<td>/PONRESET</td>
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<tr>
<td>5</td>
<td>SPICLK</td>
<td>21</td>
<td>VDD</td>
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<tr>
<td>6</td>
<td>UCVCC</td>
<td>24</td>
<td>ANT</td>
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<tr>
<td>7</td>
<td>SPIRXD</td>
<td>26</td>
<td>TX_RX</td>
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<tr>
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<td>UCIRO</td>
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<tr>
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<td>DIO03</td>
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<td>10</td>
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Ordering Information

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<td>nanoPAN 5375 RF Module</td>
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Nanotron Technologies GmbH
Alt-Moabit 60 | 10555 Berlin | Germany
Phone +49 30 399 954 - 0 | Fax +49 30 399 954 - 188
E-mail sales@nanotron.com | Web www.nanotron.com