nanoLOC TRX

High Performance RF Transceiver Enabling Location Awareness

Highly Integrated Solution with Ranging

The nanoLOC TRX Transceiver is a highly integrated mixed signal chip utilizing Nanotron's unique wireless communication technology CSS (Chirp Spread Spectrum).

With its unique ranging capability, nanoLOC can measure the link distance between two nodes. Thus, nanoLOC supports location-aware applications including Location Based Services (LBS), enhanced RFID, as well as asset tracking (2D/3D RTLS). As ranging is performed during regular data communication, additional infrastructure, power, and/or bandwidth is not required.

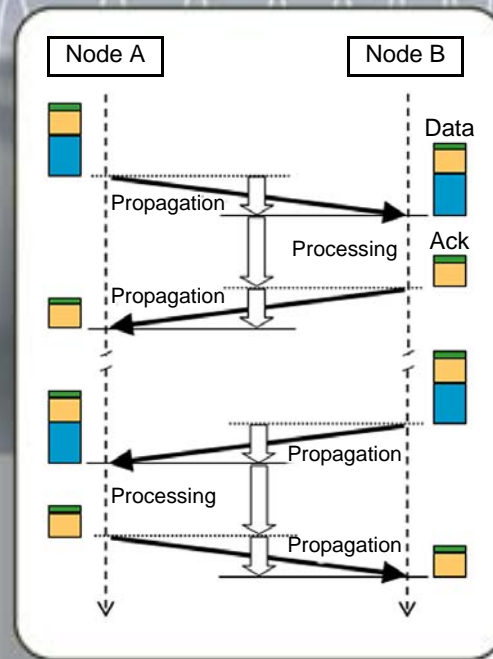### Improved Coexistence Performance

nanoLOC supports a freely adjustable center frequency with 3 non-overlapping frequency channels. This provides support for multiple physically independent networks and improved coexistence performance with existing 2.4 GHz wireless technologies.

Data rates are selectable from 2 Mbps to 125 kbps. Due to the chip's unique chirp pulse, adjustment of the antenna is not critical. This significantly simplifies the system's installation and maintenance ("pick and place").

A sophisticated MAC controller with CSMA/CA and TDMA support is included, as is Forward Error Correction (FEC) and 128 bit hardware encryption. To minimize software and microcontroller requirements, nanoLOC also provides scrambling, automatic address matching, and packet retransmission.

Key Features

- Single chip 2.4 GHz RF Transceiver operating in the worldwide ISM Band
- Integrated MAC controller with FEC and CRC checking
- Automatic retransmission and acknowledgement, as well as automatic address matching
- Few external components required
- Link distance estimation with built-in ranging capability
  - High precision ranging.. 2 m indoors / 1 m outdoors
- Low current consumption:
  - Current consumption RX starts at ....33 mA
  - Current consumption TX.................30 mA @ 0dBm
  - Standby current with active RTC ....1.2 µA
  - Low supply voltage ....2.3 – 2.7 V
- Modulation .... Chirp Spread Spectrum (CSS)
- Media Access Techniques
  - FDMA .... 3 non-overlapping channels
  - CSMA/CA
  - TDMA
- Programmable data rates..............2 Mbps to 125 kbps
- Clock available for external µC ....32.768 kHz
- Integrated fast SPI interface .... 32 Mbps
- Programmable output power............ -33 dBm – 0 dBm
- External power amplifier supported
- Receiver sensitivity ....up to -97 dBm
- RSSI sensitivity ....-95 dBm
- In-band C/I ....3 dB @ 250 kbps & C = -80 dBm
- Industrial temperature range..............-40 °C to +85 °C

Chirp it.

Node A   Node B

Data

Propagation

Processing

Ack

Propagation

Propagation

Processing

Propagation

SDS-TWR

Applications

- Logistics: Asset tracking / Active RFID
- 2D / 3D Real Time Location Systems (RTLS)
- Industrial Monitoring and Control
- Security / Government
- Medical Applications

Minimal External Components Required

The nanoLOC TRX Transceiver can work with almost every microcontroller. It is designed so that only a minimal number of external components are required to build a fully operational bi-directional wireless communication node, thus reducing the BOM to a minimum.
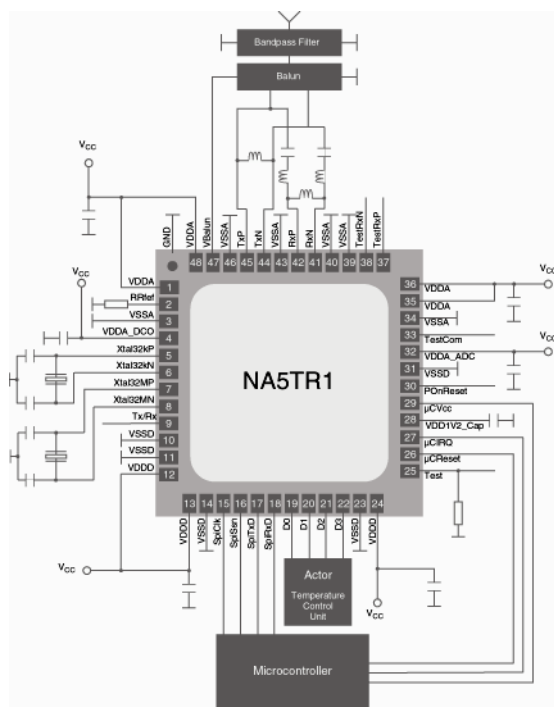
Superior Ranging with SDS-TWR

Nanotron's SDS-TWR algorithm (Symmetrical Double-Sided Two-Way Ranging) allows superior accuracy even with the use of low cost crystals for the oscillators. High frequency clocks are not required to achieve a resolution of less than a meter.

SDS-TWR enables low-cost and easy to install infrastructure RTLS – freeing you from the burden of expensive readers and time-synchronization cabling.

Flexible Development Tools

nanoLOC is fully supported with development and evaluation tools as well as drivers and demonstration software. Designers can quickly evaluate and develop custom location-enabled and ranging wireless applications.

Contact Nanotron Sales to order the nanoLOC RF Performance or Ranging Evaluation Kits, the nanoLOC Development Kit, and the nanoLOC nTRX Driver.

Ordering Information

Number	Description
NLSG0501A	nanoLOC TRX Transceiver

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

Chirp it.