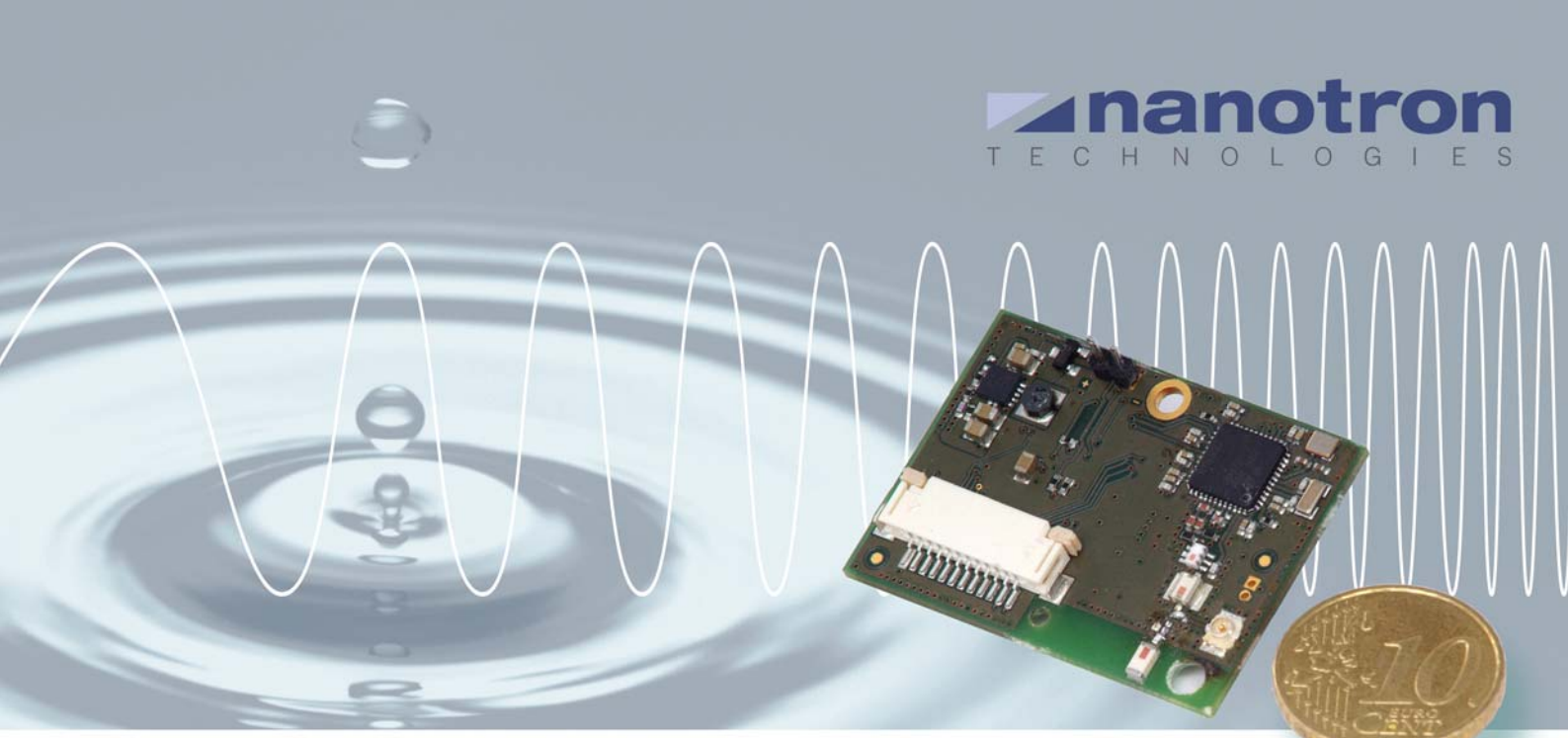


nanoLOC MSP Module

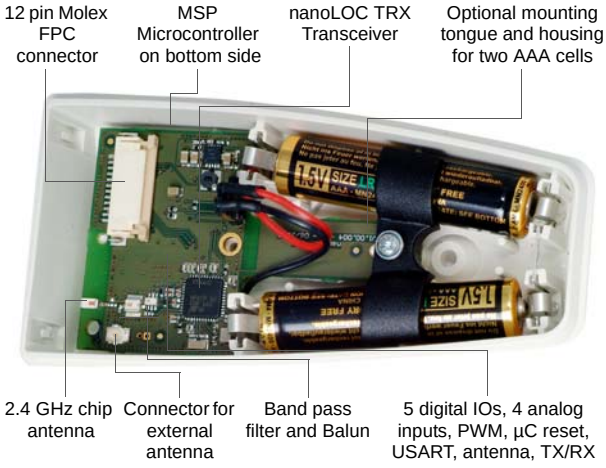
Energy-Efficient Smart RF Module Combining Location-Awareness and Robust Communication

Complete nanoLOC RF Module

Nanotron provides robust wireless technology for building RTLS and Location-Aware WSN solutions. The nanoLOC MSP Module can be used as a mobile stand-alone system or as part of a sophisticated Real Time Location System.

Small form factor – At only 38 mm X 28 mm, this module allows for the development of devices requiring minimal size and weight, such as required for tags and sensors.

Complete system – This device integrates all the required components for a complete RF module. It includes the 16-bit MSP430F2418 microcontroller, a band pass filter, a balun, a 2.4 GHz chip antenna, and Nanotron's innovative nanoLOC TRX Transceiver.



Low power requirements – Two AAA cells power this energy-efficient RF Module. It supports a power supply range of between 2.5 V to 5.5 V. An optional housing including holders for two cells is available.

Location-awareness and robust communication – nanoLOC is a sophisticated mixed signal chip utilizing Nanotron's unique Chirp Spread Spectrum (CSS) wireless communication technology. Using CSS, this chip provides distance values while allowing data from applications or sensors to be simultaneously transmitted: location-awareness and robust wireless communication in one chip.

Key Features

- Modulation Technique . . . . . Chirp Spread Spectrum
- Ranging accuracy . . . . . 2 m indoors / 1 m outdoors
- Supply voltage . . . . . 2.5 V to 5.5 V
- Output power . . . . . -33 dBm to 0 dBm
- Data rates . . . . . 125 kbps to 2 Mbps
- Receiver sensitivity (FEC on) . . . . . up to -97 dBm
- Current consumption TX . . . . . 30 mA @ 0 dBm
- Current consumption RX . . . . . starts at 33 mA
- Standby current with active RTC . . . . . 1.2 µA
- RSSI sensitivity . . . . . -95 dBm
- Flashing and debugging . . . bootloader and JTAG pads
- External Interface . . . . . 12 Pin Molex FPC connector
- Module pins . . . . . 5 digital IOs, 4 analog inputs
- Total memory . . . . . 116 KB flash, 8 KB RAM
- Memory for applications . . . . . 85 KB flash, 6 KB RAM

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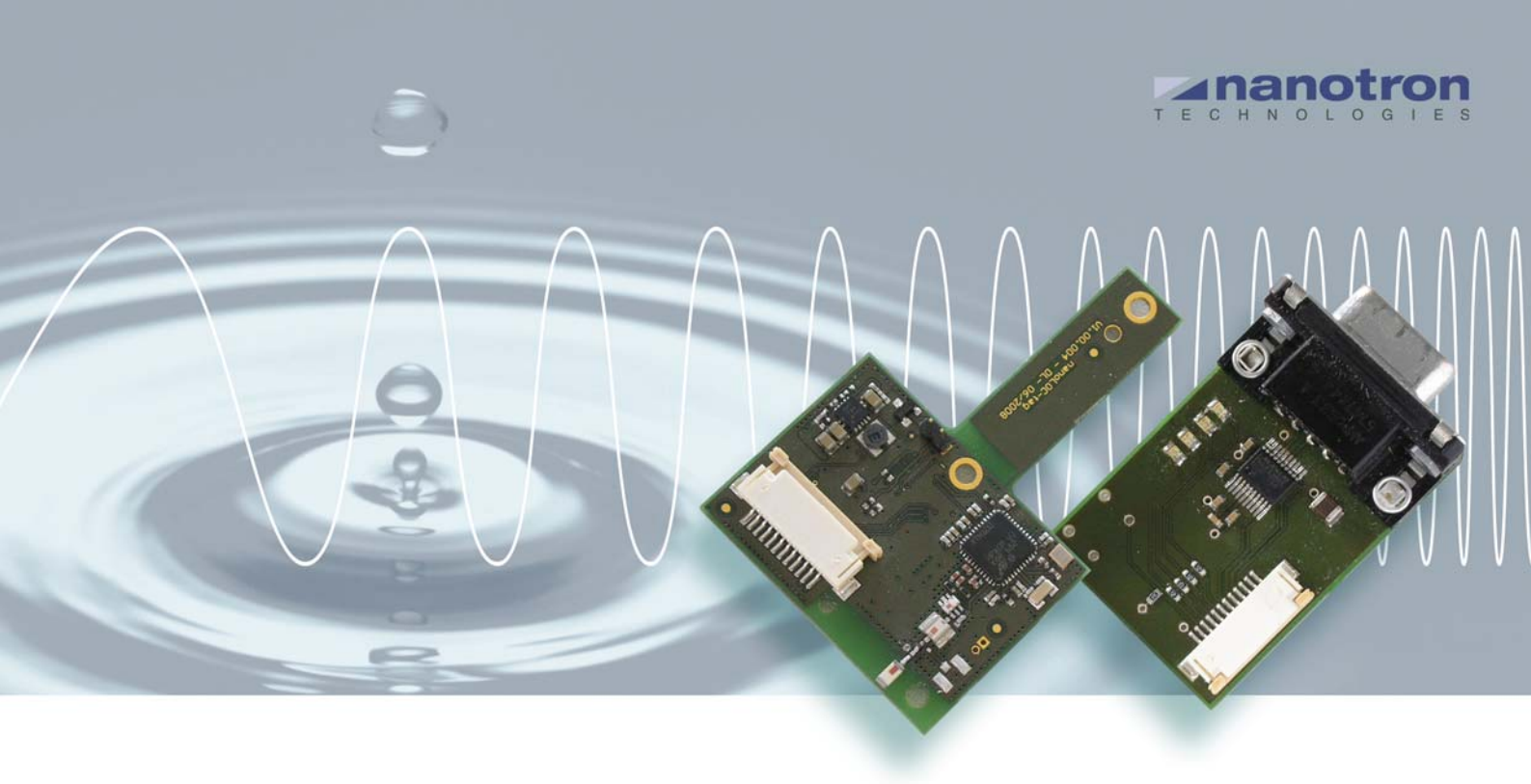
Chirp it.



RF Application Development

The V16 MHz MSP430F2418 microcontroller on the nanoLOC MSP Module provides:

- 85 KB RAM for Flash, 6 KB RAM for RF application
- Hardware multiplier, SVS, Watchdog timer
- Battery monitor (ADC: 12 bit SAR)
- 4x12 bit ADC / GPIO at interface connector
- Timer counter input, PWM / GPIO at interface connector

A radio communication stack is provided as a library that accesses the MSP microcontroller. This library can be used to develop custom RF applications. Some typical applications for the nanoLOC MSP Module include:

- **nanoLOC Location Application** – nanoLOC's ranging capabilities and a software algorithm determine the X/Y coordinates of a tag in 2D space.
- **nanoLOC Ranging Application** – nanoLOC's ranging capabilities determines the distance between a roaming tag and a reader connected to a PC.
- **nanoLOC Talk Application** – Chat program demonstrates nanoLOC's robust wireless communication.
- **RS-232 Cable Replacement** – Optional interface board provides a convenient RS-232 connectivity over the air.
- **Remote Control Application** – Optional interface board provides configurable IOs (4 for LEDs, 1 for push button) to run applications such as a simple remote control.
- **Simple Serial Command Set** – Enables the module to operate as a wireless modem from a remote PC or second microcontroller.

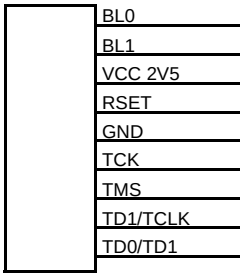
Modules that including up to 2 DAC and DMA channels are available on request.

Interface Board and Housing Available

The nanoLOC MSP module is available with a mounting tongue to attach the module to housing (also available). To flash and debug via RS-232, an optional Interface Board accesses the microcontroller's USART and the GPIOs, and provides a set of programmable LEDs.

As a standard 12 pin Molex connector is used, a control panel can be connected for application-specific uses after the module has been debugged. Different clips and front panels are also available.

Programming Interface



The necessary pins for JTAG or bootstrap loader programming are routed to a common header.

When a JTAG connector is used, the user application can be debugged

Ordering Information

Number	Description
TBD	nanoLOC MSP Module
TBD	nanoLOC MSP Module with Mounting Tongue
TBD	Communication Stack Software
TBD	Housing
TBD	Interface Board

For our complete product line and to locate an authorized distributor in your area, visit www.nanotron.com.

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Chirp it.