

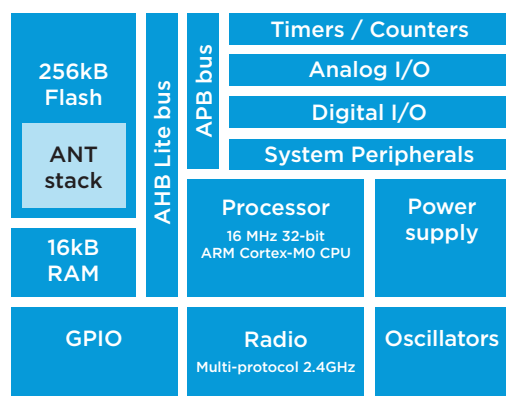


# nRF51422

*Multi-protocol ANT System-on-Chip*

## ANT System-on-Chip

The nRF51422 is a powerful multi-protocol single chip solution for ULP wireless applications. It incorporates Nordic's latest best-in-class performance radio transceiver architecture, the ARM Cortex M0 MCU and 256kB flash memory. The nRF51422 supports an ANT+ and Gazell protocol stacks.



## Lower power and higher performance

The nRF51422 uses the 32-bit ARM Cortex M0 MCU, together with extensive flash availability, 256kB in total, +12kB RAM available for application development. Code density and execution speed are considerably greater than for 8/16-bit platforms.

The Programmable Peripheral Interconnect (PPI) provides a 16-channel bus for direct and autonomous system peripheral communication without CPU intervention. This brings predictable latency times for peripheral to peripheral task and events and associated power saving benefits. The device has 2 global power modes ON/OFF, but all system blocks and peripherals have individual power management control which allows for automatic switching RUN/IDLE for system based only on those required/not required to achieve particular tasks.

The new radio forms the basis of the nRF51422's performance. The radio supports ANT and is on-air-compatible with the nRF24L/nRF24AP-series products from Nordic Semiconductor. Output power is now scalable from a maximum of +4dBm down to -20dBm in 4dB steps. Sensitivity is increased at every level and offers sensitivity ranges (dependent on data rate) from -96 to -85dBm, with -90dBm for 1Mbps ANT.

## KEY FEATURES

- Multi-protocol 2.4GHz radio
- 32-bit ARM Cortex M0 processor
- 256kB flash/16kB RAM
- Embedded ANT stack
- Pin compatible with other nRF51xx series devices
- Application development independent from protocol stack
- Fully on-air compatible with nRF24L/nRFAP-series
- Programmable output power from +4dBm to -20dBm
- RSSI
- RAM mapped FIFOs using EasyDMA
- Flexible and configurable 31 pin GPIO
- Programmable Peripheral Interconnect – PPI
- Full set of digital interfaces including: SPI/2-wire/UART
- Dynamic on-air payload length up to 256 bytes
- 10-bit ADC
- 128-bit AES ECB/CCM/AAR co-processor
- Quadrature demodulator
- Low cost external 16MHz ± 60ppm
- Low power 16MHz crystal and RC oscillators
- Ultra low-power 32kHz crystal and RC oscillators
- Wide supply voltage range (1.8 V to 3.6 V)
- Simple ON/OFF global power modes
- Flexible power management for all peripherals
- On-chip DC/DC buck converter
- Package options: 48-pin 6x6 QFN

## APPLICATIONS

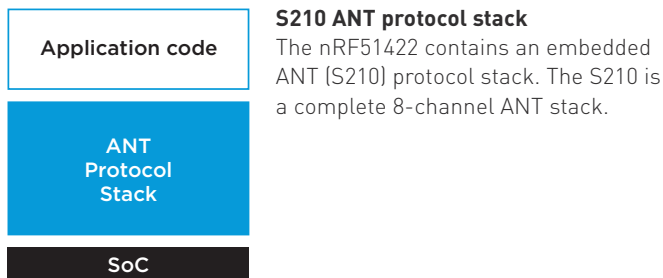
- Sports and Fitness sensors
- Healthcare and lifestyle sensors
- Domestic/Industrial control and data-acquisition
- Smart RF tags
- Audience response system
- Intelligent domestic appliances

### Easy, fast and safe code development

The nRF51422 offers developers a clean separation between application development and embedded protocol stacks. This means compile, link and run-time dependencies and associated de-bugging challenges are removed. The embedded stack interface uses an asynchronous, event-driven model removing the need for RTOS frameworks. Developers can concentrate with confidence on what they do best – developing applications.

### Maximum re-use and easy migration

The devices in the nRF51 series are pin compatible enabling migration between technologies such as Bluetooth low energy and ANT with no layout changes. The common HW architecture and the Cortex M0 ensure code can be re-used effortlessly between nRF51 series devices. Variants in the nRF51 series enable simple choices tailoring device selection to desired wireless protocol and feature requirements with little or no changes.



### Development tools

Nordic Semiconductor provides a complete range of hardware and software development tools for the nRF51 series devices. For more information contact us.

### RELATED PRODUCTS

nRF6700	nRFgo Starter Kit
nRF51422-DK	nRF51422 Development Kit
nRF51822	Bluetooth® low energy multi-protocol SoC

### SPECIFICATIONS

Frequency band	2.4GHz ISM ( 2.40000 – 2.4835GHz)
On-air data rate	250 kbps, 1 Mbps or 2 Mbps
Modulation	GFSK
Output power	Programmable: +4 to -20dBm in 4dB steps
Sensitivity	-96dBm at 250kb -90dBm at 1Mbps (ANT mode) -85dBm at 2Mbps
Radio current consumption LDO at 1.8V	16mA – TX at +4dBm output power 10.5mA – TX at 0dBm output power 13mA – RX at 1Mbps
Radio current consumption DC-DC at 3V	10.5mA – TX at +4dBm output power 8.1mA – TX at 0dBm output power 9.5mA – RX at 1Mbps
Microcontroller	32-bit ARM Cortex M0
Radio current consumption	16mA – TX +4dBm output power 10.5mA – TX 0dBm output power 13mA – RX at 1Mbps
Program Memory	256kB Flash
RAM	16kB
Oscillators	16MHz crystal oscillator 16MHz RC oscillator 32kHz crystal oscillator (opt) 32kHz RC oscillator
System current consumption	420nA – No RAM retention 530nA – 8k RAM retention 2µA – All peripherals in IDLE mode
Hardware Security	128-bit AES ECB/CCM/AAR co-processor
GPIO	31 configurable
Digital I/O	X2 Hardware SPI master 2-wire master UART Quadrature demodulator
Peripherals	10-bit ADC RNG Temperature sensor RTC
PPI	16-channel
Voltage regulator	LDO (1.8 to 3.6V), LDO bypass (1.75 to 1.95V) Buck DC/DC (2.1 to 3.6V)
Timers/counters	2 x 16 bit, 1 x 24bit, 2 x 24bit, RTC
Package options	RoHS compliant 48-pin 6x6 QFN

### WORLD WIDE OFFICE LOCATIONS

Headquarters:  
Trondheim, Norway  
Tel: +47 72 89 89 00



### For more information

Visit [www.nordicsemi.com](http://www.nordicsemi.com) for the complete product specification about this and any other wireless ULP products.

### About Nordic Semiconductor

Nordic Semiconductor is a fabless semiconductor company specializing in ULP short-range wireless communication. Nordic is a public company listed on the Norwegian stock exchange.