

Nordic Thingy:91

Cellular IoT prototyping platform



Product overview

The Nordic Thingy:91 is a battery-operated prototyping platform for cellular IoT, certified for global operation. It integrates the nRF9160 System-in-Package (SiP), supporting LTE-M, NB-IoT and GNSS, and a nRF52840 board controller, supporting Bluetooth Low Energy and NFC. Source code for firmware, hardware layout, schematics are all available for free.

It is the ideal platform for rapidly developing a prototype for any cellular IoT (cIoT) concept. It is especially suited for any flavor of asset tracking application. Find the position with the GNSS integrated in the nRF9160 SiP, and use the accelerometers to do motion analysis and sleep when nothing is happening.

An exhaustive set of sensors is included to gather data about the environment, and the movement of the Nordic Thingy:91. Temperature, humidity, air quality, air pressure, color and light data can easily be extracted for local or remote analysis. This also makes it a great tool to develop machine learning models.

For input, the Nordic Thingy:91 offers a user-programmable button. Visual output is achieved with user-programmable RGB LEDs, while a buzzer can provide audible output.

It has one LTE-M, NB-IoT and GNSS antenna connected to the nRF9160 SiP, supporting a global range of LTE bands. It has two antennas connected to the nRF52840, a 2.4 GHz chip antenna for Bluetooth LE and an NFC antenna.

The Nordic Thingy:91 has a Nano/4FF SIM card slot, supporting (e)SIM. It is bundled with an eSIM card from iBasis, preloaded with 10 MB, to get connected to our nRF Cloud out of the box.

A 1350 mAh rechargeable Li-Po battery is also part of the package, giving a smooth transition into prototype field-testing.

LTE bands B1-B5, B8, B12-B14, B17-B20, B25-B26, B28 and B66 are enabled out of the box.

Key features

Battery-operated prototyping platform for the nRF9160 SiP

- Certifications: FCC (USA), CE (EUR)
- nRF52840 board controller
- LTE-M/NB-IoT/GNSS, Bluetooth LE and NFC antennas
- User-programmable button and RGB LEDs
- Environmental sensor for temperature, humidity, air quality and air pressure, plus a color and light sensor
- Low-power accelerometer and high-g accelerometer
- 4 × N-MOS transistors for external DC motors or LEDs
- Rechargeable Li-Po battery with 1350 mAh capacity

nRF9160 SiP

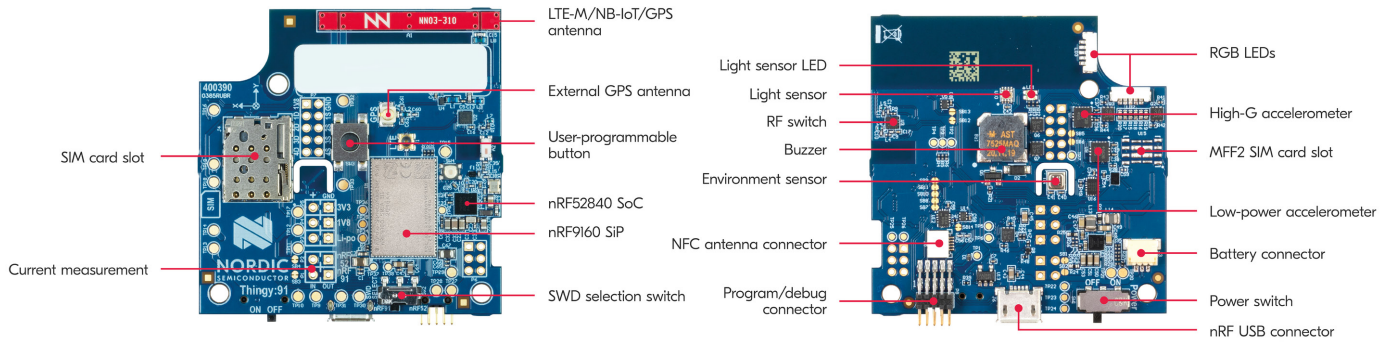
- Certified for global operation
 - AT&T, Bell, China Telecom, Deutsche Telekom, KDDI, Telstra, Verizon, Vodafone, etc
 - GCF, PTCRB
 - FCC (USA), CE (EUR), UKCA (UK), ISED (CAN), SRRC (CHN), ACMA RCM (AUS) and more
 - More info: nordicsemi.com/9160cert
- Multimode LTE-M/NB-IoT modem
 - 700-2200 MHz LTE band support
 - +23 dBm output power
 - GNSS (GPS, QZSS)
 - eDRX and PSM power saving features
 - Single pin 50 Ω antenna interface
 - UICC interface
- Application processor
 - 64 MHz Arm® Cortex®-M33 CPU
 - Arm TrustZone® for trusted execution
 - Arm CryptoCell 310 for application layer security
 - 1 MB Flash & 256 KB RAM
 - 4 × SPI/UART/TWI, PDM, I2S, PWM, ADC

nRF52840 SoC

- Bluetooth LE and NFC support
- 64 MHz Arm Cortex-M4 CPU with FPU
- 1 MB Flash & 256 KB RAM

Applications

- Logistics and asset tracking
- Smart city & smart agriculture
- Predictive maintenance & industrial
- Wearables & medical



Software and tools

nRF Cloud is our IoT optimized cloud that works seamlessly with the Thingy:91. It enables the use of nRF Cloud Location Services, services which provide different ways of computing location data with a lower power consumption compared with regular GNSS.

The standard application firmware on the Nordic Thingy:91 extracts the data from the different sensors and relays it securely up to nRF Cloud, where it is displayed in a clear interface. The LEDs can be controlled remotely through this same interface. The firmware supports concurrent operation with LTE Link Monitor, a tool providing an AT command interface enabling link and network testing.

The firmware has been developed using the nRF Connect SDK. It is open source, and can be leveraged and modified to suit your specific needs. The firmware can be updated and debugged by using an external programmer/debugger, for example the one on the nRF9160 DK.

nRF9160 SiP

The nRF9160 SiP is a low power SiP integrating a dedicated application processor and a multimode LTE-M and NB-IoT modem with integrated GNSS. It is the most compact IoT solution on the market, measuring just 10×16×1.04 mm. The application processor includes a 64 MHz Arm Cortex-M33 CPU with 1 MB of flash and 256 KB of RAM dedicated for the application. It has Arm TrustZone for trusted execution and Arm CryptoCell for application layer security. It has a wide range of interfaces to communicate with sensors and actuators.

The multimode modem supports the eDRX and PSM power saving features and the coverage enhancement features of LTE-M and NB-IoT, and has GNSS integrated. The global RF front end supports bands from 700 MHz to 2.2 GHz, has +23 dBm output power and offers a single pin 50 Ω antenna interface.

nRF Connect SDK

nRF Connect SDK is our software development kit for Nordic Semiconductor devices. It integrates the Zephyr RTOS, and a wide range of examples, application protocols, libraries and hardware drivers. Everything needed to get started with IoT development.

It is publicly hosted on GitHub and offers version control management with Git. It supports the nRF Connect for VS Code and SEGGER Embedded Studio IDEs free of charge.

Related products

nRF9160 DK	Development kit for the nRF9160 SiP
nRF9160 SiP	LTE-M/NB-IoT/GNSS SiP
nRF52840 SoC	Bluetooth 5.3/Bluetooth mesh/802.15.4/Thread/Zigbee/ANT/2.4 GHz SoC
nRF Connect SDK	Short-range and IoT software development kit
nRF Cloud	IoT cloud optimized for ultra-low power Nordic devices
LTE Link Monitor	AT command user interface to test cellular link and get network info application
Trace Collector v2	Decrypt modem traces live and view them in Wireshark
Programmer	Programming user interface application

Order information

nRF6943	Nordic Thingy:91, IoT prototyping platform
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