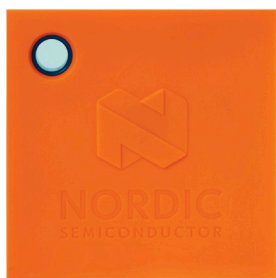# Nordic Thingy:91

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 SiP, supporting LTE-M, NB-IoT and GPS, 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 concept. It is especially suited for any flavor of asset tracking application. Find the position with the GPS 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.

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 GPS antenna connected to the nRF9160, supporting a global range of LTE bands. It has two antennas connected to the nRF52840, a 2.4 GHz 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 the cloud out of the box.

A 1440 mAh rechargable Li-Po battery is also part of the package, giving a smooth transition into prototype field-testing.

LTE bands B2, B3, B4, B8, B12, B13, B20 and B28 are enabled out of the box. Please visit the following for a complete overview of all current and planned certifications: *nordicsemi.com/9160cert*

KEY FEATURES

- Battery-operated prototyping platform for the nRF9160 SiP
- 700-960 MHz + 1710-2200 MHz LTE band support
- Certifications: FCC (USA), CE (EUR)
- nRF52840 board controller
- LTE-M/NB-IoT/GPS, Bluetooth LE and NFC antennas
- Nano/4FF SIM card slot
- 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
- Buzzer
- 4 × N-MOS transistors for external DC motors or LEDs
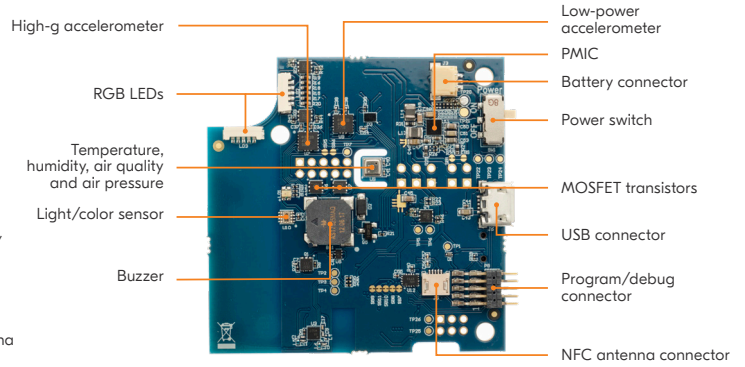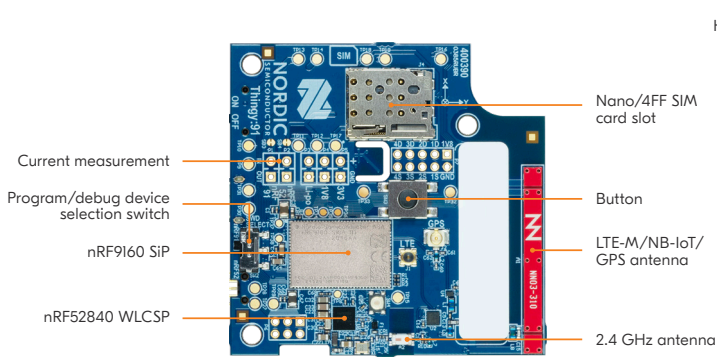- Rechargeable Li-Po battery with 1440 mAh capacity

nRF9160 SiP

- Certified for global operation
  - Verizon
  - GCF, PTCRB
  - FCC (USA), CE (EUR), ISED (CAN), ACMA RCM (AUS), NCC (TWN), IMDA (SGP), MIC (JPN), MSIP (KOR)
- Multimode LTE-M/NB-IoT modem
  - 700-2200 MHz LTE band support
  - 23 dBm output power
  - GPS
  - eDRX and PSM power saving modes
  - Coverage enhancement modes
  - 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 x SPI/UART/TWI, PDM, I2S, PWM, ADC

nRF52840 WLCSP

- Board controller
- Bluetooth LE and NFC support
- 64 MHz Arm Cortex-M4F CPU
- 1 MB Flash & 256 KB RAM
- USB

APPLICATIONS

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

Front board labels:
- Nano/4FF SIM card slot
- Current measurement
- Program/debug device selection switch
- nRF9160 SiP
- nRF52840 WLCSP
- Button
- LTE-M/NB-IoT/GPS antenna
- 2.4 GHz antenna

Back board labels:
- High-g accelerometer
- RGB LEDs
- Temperature, humidity, air quality and air pressure
- Light/color sensor
- Buzzer
- Low-power accelerometer
- PMIC
- Battery connector
- Power switch
- MOSFET transistors
- USB connector
- Program/debug connector
- NFC antenna connector

Software and tools

The standard application firmware on the Nordic Thingy:91 extracts the data from the different sensors and relays it securely up to the nRF Connect for Cloud, where it is displayed in a lucid 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 is a low power SiP integrating a dedicated application processor and a multimode LTE-M and NB-IoT modem. It is the most compact cellular IoT (cIoT) solution on the market, measuring just 10×16×1 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 modes and the coverage enhancement features of LTE-M and NB-IoT, and has GPS 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 cellular IoT. It integrates the Zephyr RTOS, and a wide range of examples, application protocols, libraries and hardware drivers. Everything needed to get started with cellular IoT development.

It is publicly hosted on GitHub and offers version control management with Git. It supports the SEGGER Embedded Studio IDE free of charge.

RELATED PRODUCTS

nRF9160 DK	Development kit for the nRF9160 SiP
nRF9160 SiP	LTE-M/NB-IoT/GPS SiP
nRF52840	Bluetooth 5/Bluetooth mesh/802.15.4/Thread/Zigbee/ANT/2.4 GHz SoC
nRF Connect SDK	Cellular IoT software development kit
nRF Connect for Cloud	Cloud solution for LTE-M and NB-IoT
LTE Link Monitor	Development tool providing an AT command user interface
Programmer	Programming user interface

ORDER INFORMATION

nRF6943	Nordic Thingy:91, cellular IoT prototyping platform

WORLD WIDE OFFICE LOCATIONS

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For more information
Visit 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.