Nordic Thingy:53

Multi-sensor prototyping platform for wireless IoT and embedded machine learning

Overview

The Nordic Thingy:53 is a multi-sensor prototyping platform for Matter, embedded machine learning (ML) and other wireless IoT products. It is based on the nRF5340 System-on-Chip (SoC), our current flagship dual-core wireless SoC. With integrated sensors for motion, sound, light and environmental factors, it is the perfect platform for building proof-of-concepts and developing new prototypes in a very short time.

For this third installment of the Nordic Thingies the case of the Thingy:53 features a completely new design, based on the well-known form-factor from the Thingy-lineup. While keeping the compact square shape and slim-profile, a door has been added to the casing to make the on/off-switch and the external connectors easily accessible, without having to remove the outer shell. Along with the Stemma/Qwiic/Groove-compatible external connector this allows for an improved user experience when using the Thingy:53 with or without external hardware accesories.

The Arm Cortex-M33 processor application core of the nRF5340 SoC ensures that the Thingy:53 can handle heavy computational tasks of embedded machine learning, without affecting the wireless connectivity. The application core is clocked at 128 MHz for the best possible performance, with ample room for your applications in its 1 MB of flash storage and 512 KB RAM. Wireless connectivity is handled separately by another Arm Cortex-M33 core clocked at a lower 64 MHz for more power efficient operation and without taking up any computational resources from the application core.

Every Thingy:53 comes with its own debug- and current-measurement board in the box. This small PCB provides easy access to pins that would otherwise not be accessible. A helpful accessory to troubleshoot your application, for instance, in combination with our Power Profiler Kit II or other standalone debugging- or power-analyzing hardware.

Key features

- Battery powered prototyping platform for Matter and machine learning on the nRF5340 SoC
- Support for multiple wireless standards, Bluetooth LE, Bluetooth mesh, Thread, Zigbee
- Environmental sensor for temperature, humidity, air quality and air pressure
- Color and light sensor
- Low-power accelerometer and 6-axis inertial measurement unit (IMU)
- Buzzer and PDM microphone
- Connector for additional external boards and accessories
- USB-C rechargeable Li-Po battery
- nRF Edge Impulse mobile app for embedded machine learning
- nRF Programmer mobile app for easily flashing firmware on the go

nRF5340 SoC

- High performance 128 MHz Arm Cortex-M33 application core
- Ultra-low power 64 MHz Arm Cortex-M33 network core
- Multi-protocol radio with support for Bluetooth LE, Bluetooth mesh, Thread and Zigbee
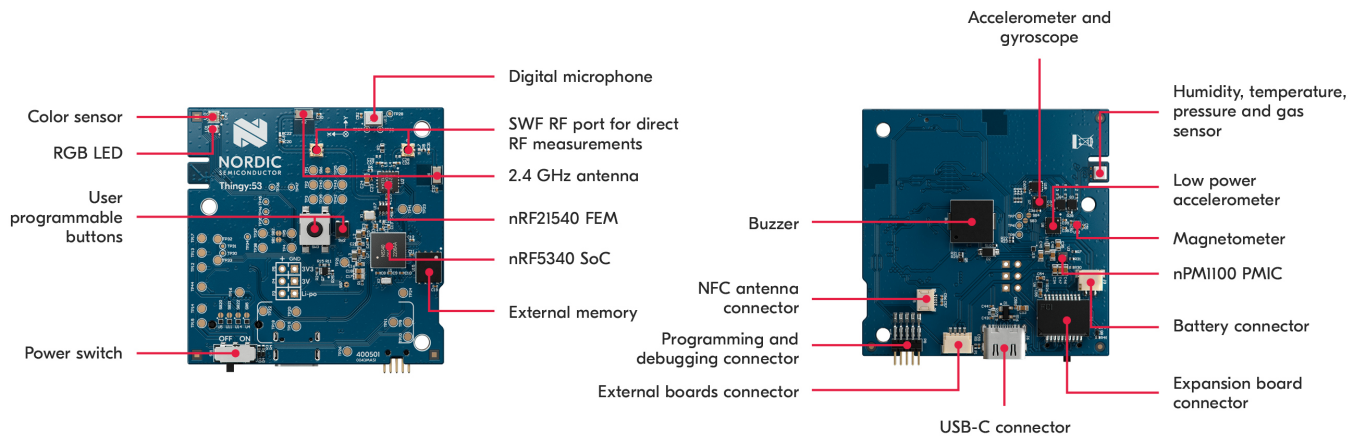
nPM1100 PMIC

- Highly efficient PMIC for better battery life
- Full power path for seamless switching between charging and battery operation

nRF21540 FEM

- RF front end for extended range and increased link robustness

Applications

- Machine learning
- Smart home sensing
- Fast prototyping
- Proof-of-concept development

Internal layout of the Thingy:53.

nRF Edge Impulse machine learning app

Every Nordic Thingy:53 comes pre-installed with firmware to transfer training data wirelessly using Bluetooth LE to the cloud via the nRF Edge Impulse mobile app, to create an embedded machine learning model with Edge Impulse Studio. The model can then be wirelessly deployed to the Thingy:53. Inferencing is performed by the Thingy:53 and the results can be viewed in the app. This enables you to take full advantage of the advanced sensors of the Thingy:53 in applications like voice recognition or movement pattern detection. The low-power accelerometer and the PDM microphone can also wake the SoC from sleep on motion or sound events. This is especially useful for creating low-power embedded machine learning applications, allowing the device to remain sleeping and save power when there is nothing to register or react to.

nRF Programmer app

The accompanying nRF Programmer app for the Thingy:53 adds a new level of simplicity never seen before in a proto-typing platform of this type. With the app you'll be able to select from pre-made firmware for the Thingy:53 and flash it directly over-the-air from an iOS or Android device. This means uploading new firmware to take advantage of the nRF5340 SoC and the built-in sensors capabilities is possible anywhere, and without connecting to a PC.

nRF Connect SDK

For programming your own firmware applications, the Thingy:53 has full support in the nRF Connect SDK. It is a scalable and unified software development kit for building products based on all our nRF52, nRF53 and nRF91 Series wireless devices. It offers developers an extensible framework for building firmware for devices and applications in all product categories, from lightweight to computational heavy tasks. It integrates the Zephyr RTOS and a wide range of samples, application protocols, protocol stacks, libraries and hardware drivers. nRF Connect SDK offers a single code base for all our devices and software components. It simplifies porting modules, libraries and drivers from one application to another, thus reducing development time. By enabling developers to pick and choose the essential software components for their application, high memory efficiency is guaranteed.

Specification

nRF5340 SoC	
Application core	128 MHz Arm Cortex-M33 1 MB Flash + 512 KB RAM
Network core	64 MHz Arm Cortex-M33 256 KB Flash + 64 KB RAM
Power management IC	nPM1100 PMIC
RF front-end	nRF21540 FEM
Wireless protocol support	Bluetooth LE/Bluetooth mesh/NFC/ Thread/Zigbee/2.4 GHz proprietary
External connectors	Qwiik/Stemma/Groove compatible 4-pin JST
Battery	Li-Po, USB-C rechargeable
LED	RGB, programmable
Buttons	Available through casing, programmable
Inertial measurement unit	6-axis with accelerometer
Low power accelerometer	Wake-on-motion capable
Enviromental sensors	Temperature, humidity, air quality, air pressure
Color and light sensor	Senses lighting conditions
Microphone	PDM, wake-on-sound capable
Buzzer	Piezoelectric, 4 kHz

Related Products

nRF5340 SoC	SoC supporting Bluetooth LE, Bluetooth mesh, Thread and Zigbee
nPM1100 PMIC	Power management IC
nRF21540 RF FEM	RF front end module for Bluetooth LE, Bluetooth mesh, Thread and Zigbee
nRF Connect SDK	Software development kit for the nRF5340
Power Profiler Kit II	Power profiling and power optimization of embedded solutions

Order Information

Thingy53	IoT prototyping platform