NILE

BT 5.4 + ZB/Thread + NFC-A Standalone Module

Description

NILE is a highly integrated **ultra-low-power** standalone certified full featured Bluetooth 5.4 (Bluetooth Low Energy) module. This small form-factor module reduces the system cost and gives design flexibility to the user by combining a **high performance** ARM Cortex-M4, 1MB flash, Bluetooth 5.4, 802.15.4 Thread and Zigbee, NFC-A wireless hardware with integrated antenna and needed crystals. This fine-tuned RF module is designed to deliver high performance, long range, and reliable wireless operation at ultra-low power which is criticalfor many Internet of Things (IoT) applications.

NILE module is based on Nordic nRF52840 SoC. This globally certified module reduces user's development cost and time to market with integrated wireless stacks, network stack, and application APIs and all the **advanced security features** (ARM Trust Zone Crypto cell-310). This module comes with a highly efficient development environment for ease of application development in various IoT verticals like Wearables, Home automation, Industrial IoT and smart medical.

Features

- ❖ Full featured Bluetooth Low Energy 5.4 (BLE)
- ❖ Supports advanced mesh networking protocols – Certified software stacks for Bluetooth Mesh, Thread and Zigbee
- ❖ Powerful Open CPU: 32bit, 64MHz ARM Cortex-M4 CPU with floating Point unit (FPU) and has 1MB flash with cache and 256kB RAM that stands enough for customer's high end applications
- ❖ Highly optimized hardware for ultra-low power consumption with excellent performance
- ❖ Support for secure boot, BLE secure connections and privacy
- ❖ ARM® Crypto Cell 310 cryptographic accelerator and AES128 bit encryption
- ❖ Over the air device firmware upgrade (OTA DFU)
- ❖ Generic GATT client and server APIs
- ❖ Nordic SDK with examples and comprehensive documentation covers all the features supported by the module. SDKs are available for BLE, Bluetooth Mesh, Thread, Zigbee and Home kit
- ❖ NFC Tag A support
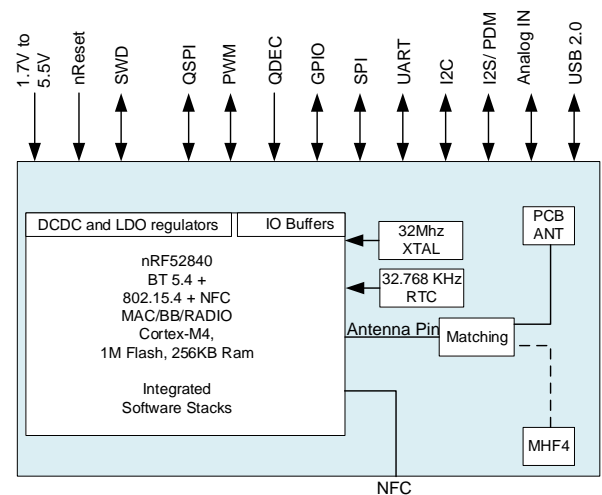- ❖ 3.3V or 5V power supply with integrated switching regulator

Footprint: 10 mm x 15 mm x 1.6 mm

Applications

- ❖ Personal fitness devices
- ❖ Wearables for wireless payment
- ❖ Connected health
- ❖ Virtual/Augmented reality applications
- ❖ Smart home sensors and controllers
- ❖ Industrial IoT sensors and controllers
- ❖ Gaming controllers
- ❖ Asset trackers and Locationing devices

Block Diagram

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Specifications

Wireless Protocols	Bluetooth 5, Thread, Zigbee, NFC
Frequency	2.402 – 2.480 GHz
On-air Data rates	Bluetooth 5 – 2 Mbps, 1 Mbps, 500 kbps,125 kbps 802.15.4 – 250 kbps NFC – 106 kbps
Security Features	ARM Crypto cell 310, 128-bit AES HW accelerator, Secure boot and all security features of BLE spec
Antenna options	PCB Trace Antenna or MHF4 connector
Operating modes	BLE, BLE Mesh, Zigbee, Thread, BLE + Zigbee, BLE + Thread
Programmable output power	-20 dBm to +8 dBm

Receive Sensitivity	Bluetooth 5:
	    -103 dBm at 125 kbps
	    -99 dBm at 500 kbps
	    -96 dBm at 1 Mbps
	    -92 dBm at 2 Mbps
	802.15.4: -100 dBm at 250 kbps

Current consumption	450nA – Deep sleep mode 1.5µA – System standby mode 4.8mA – TX at 0dBm output power
NFC	NFC-A (Type 2) Tag with wake-on field - "Touch to pair" support
GPIO	48 configurable
Range	> 1400 meters
Power supply and operating voltage range	Integrated DC-DC, 1.7v to 5.5v
Temperature	-40ºC to 85ºC
Humidity	5-90% non-condensing
Package	10 mm x 15 mm x 1.6 mm (including shield), 0.5mm pitch

Interfaces and peripherals

- ❖ 2 x UART
- ❖ Up-to 4 x SPI master/ 3x SPI slave
- ❖ 2 x I2C master, 1 x I2C slave
- ❖ 1 x I2S
- ❖ 1 x PWM
- ❖ 1 x Quadrature decoder
- ❖ 1 x PDM
- ❖ 12bit, 8 x ADC channels
- ❖ 32-bit timers x 5, RTC x 3
- ❖ 20 channel programmable peripheral interface
- ❖ 1x USB

Certifications and approvals

- ❖ Module certifications - FCC, IC, CE
- ❖ Bluetooth qualification - v5.4 (Low Energy)
- ❖ Zigbee and Thread certified

Part Ordering

NILE module	I540M0L8-I2LT (PCB Antenna, Tray packing) I540M0L8-I2LR (PCB Antenna, Tape/Reel packing) I541M0L8-I3LT (MHF4 connector, Tray packing) I541M0L8-I3LR (MHF4 connector, Tape/Reel packing)
NILE DVK	I540M0L8-2 DVK (PCB Antenna) I541M0L8-3 DVK (MHF4 connector)

Development Kit

DVK comes with the following major features:

- ❖ On board Segger JLink interface
- ❖ Arduino Uno Revision 3 shield compatible connector
- ❖ Access to all I/O and interfaces via edge connectors and user programmable Buttons and LEDs
- ❖ NFC tag-A interface

Additional Information

For the latest collaterals, please visit
http://www.ivativ.com

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