



USB Dongle

UDG-NRF52840

Datasheet

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Revision History

Table 1. Document Revision

Revision no.	Description	Data	Prepared by	Approved by
1.0	Initial version	Aug 31, 2023	Duy Thinh Tran	Nguyen Hoang Hoan

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Limited Warranty

The USB Dongle (UDG-NRF52840 and UDG-NRF52840C) is warranted against defects in materials and workmanship for a period of 30 days from the date of purchase from I-SYST or from an authorized dealer.

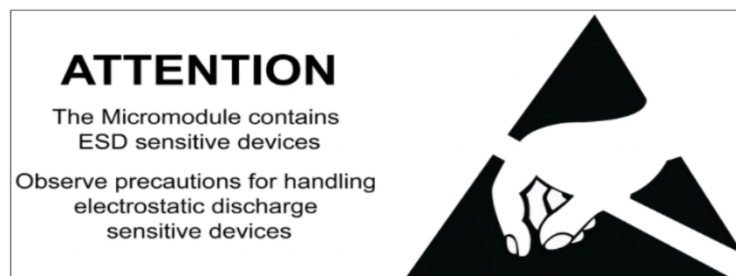
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Trademark

ARM® Cortex™ are registered trademark of ARM

Bluetooth® is a registered trademark of Bluetooth SIG



I. Product Overview

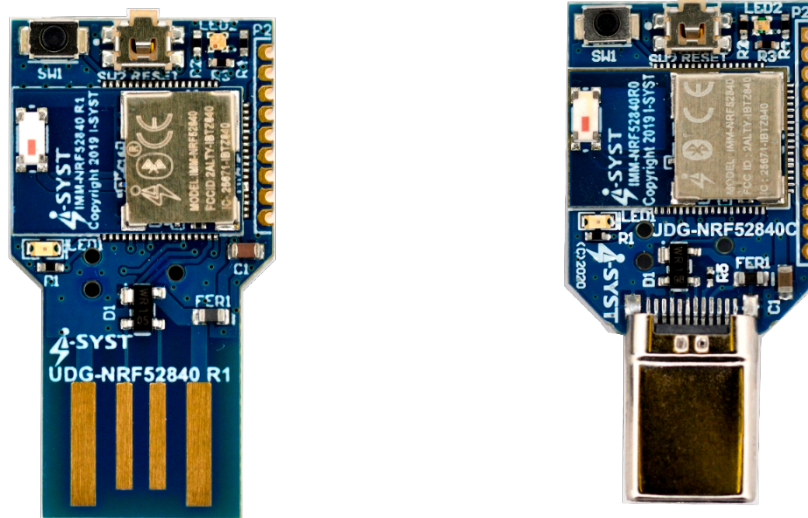
The I-SYST USB Dongle is built upon the I-SYST [BLYST840](#) module (IMM-NRF52840) using the Nordic nRF52840 SoC. This small and low-cost USB dongle enables short-range wireless standards including Bluetooth® Low Energy (BLE), Bluetooth® mesh, IEEE 802.15.4 (Thread and Zigbee), ANT, and 2.4 GHz proprietary applications.

The dongle, together with nRF Connect for Desktop apps, provides a wide range of wireless application such as Bluetooth scanner, received signal strength indicator (RSSI) measurer, and Over-the-Air Device Firmware Update (OTA-DFU) for other wireless devices. These applications will be automatically programmed if needed.

Moreover, custom applications can be made and programmed to the nRF52840 SoC on the dongle with the supported bootloader and free development tools, including the nRF Connect SDK. The custom applications can take advantage of the following key features:

- **Bluetooth® 5** – High wireless link budget for in-home wireless applications
 - o 2 Mbps high throughput demand application
 - o 500 Kbps for longer range demand application
- **ARM® CryptoCell 310** – Built-in low-power cryptographic hardware accelerator for solid security solutions
- **OTA-DFU** – In-the-field wireless updates of application and/or protocol stack support
- **nRF Connect SDK** – Opensource software development kit for nRF52 SoC series
 - o Support multiple 2.4GHz protocol application development (BLE, Thread, and Zigbee)

For improving user convenience, the dongle is available in two variants: USB Type-A and USB Type-C connectors (Figures 1 and 2).



II. Key Features

- Bluetooth® 5.2 ready multiprotocol
 - ✓ High throughput (2 Mbps)
 - ✓ Long Range
 - ✓ Advertising extensions
- Channel selection algorithm #2
- IEEE 802.15.4 radio support
 - ✓ Zigbee
 - ✓ Thread
- Arm® Cortex™-M4F with floating point support
- DSP instruction set
- ARM® CryptoCell CC310 cryptographic accelerator
- 10 GPIO available via edge castellation
- USB interface direct to nRF52840 SoC
- Integrated 2.4 GHz PCB antenna
- 1 user-programmable button
- 1 user programmable RGB LED
- 1 user programmable single-color LED
- 1.7-5.5-volt operation from USB or external power source
- Small footprint (31 x 16 x 4 mm)

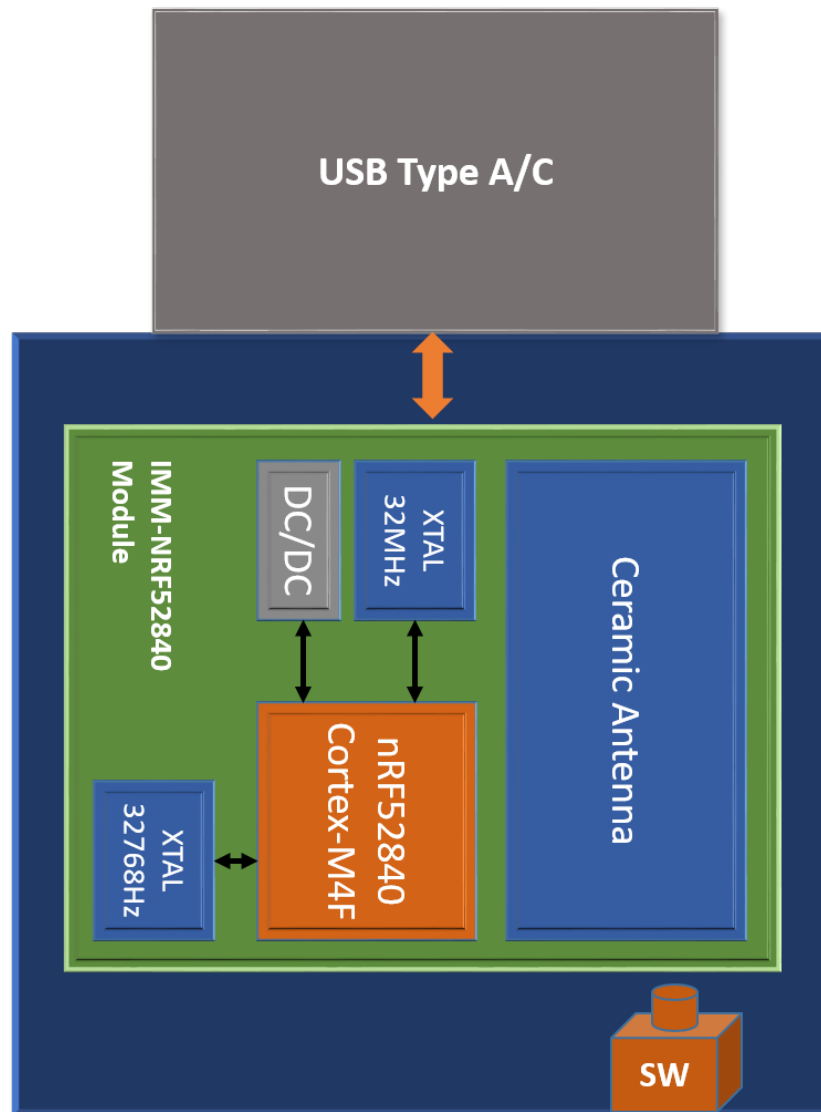
III. Applications

- **IoT**
 - ✓ Connected home sensors and controllers
 - ✓ Industrial IoT sensors and controllers
- **Advanced wearables**
 - ✓ Advanced personal fitness devices
 - ✓ Connected health
- **Interactive entertainment devices**
 - ✓ Gaming controllers

IV. Specification

Frequency band	2.4 GHz ISM
On-air data rate	2Mbps/1Mbps/500kbs/125kbs - Bluetooth low energy 250kbs – 802.15.4 2Mbps/1Mbps – 2.4GHz proprietary
Output power	Programmable -20dBm to +8dBm
Sensitivity	Bluetooth 5: -103dBm @ 125kbs, -99dBm @ 500kbs, -96dBm @ 1Mbps, - 92dBm @ 2Mbps 802.15.4: -100dBm @ 250kbs ANT: -92.5dBm @ 1Mbps 2.4GHz: -92.5dBm @ 1Mbps, -89dBm @ 2Mbps
Microcontroller	64MHz ARM® Cortex™-M4F
Program memory	1MB flash with cache
RAM	256 KB
Hardware security	128-bit AES ECB/CCM/AAR co-processor
Cryptography	ARM CryptoCell 310
GPIO	10 configurable
Digital I/O	QSPI x 1, SPI master x 1, SPI slave x1, 2-wire master x 2, 2-wire slave x2, UARTE x 2, Quadrature decoder, PDM, I²S
USB	USB 2.0 (12 Mbps)
Timers/counters	32-bit timers x 5 RTC x 3

V. Module Diagram



VI. Pin Description

Port	Pin Number	Nordic Pin Name	Description
P1	1	VDD_nRF	J-TAG interface
	2	SWDIO	
	3	RESET	
	4	SWCLK	
	5	GND	
	6	NC (not connect)	
P2	1	VDD_nRF	1.75-3.6 volts
	2	P0.05	GPIO
	3	P0.07	GPIO
	4	P1.08	GPIO
	5	P0.11	GPIO
	6	P0.13	GPIO
	7	P0.14	GPIO
	8	P0.15	GPIO
	9	GND	

VII. LEDs and Switches Description

Notation	Nordic Pin Name	Description
LED1	P0.06	Single-color LED
LED2 R	P0.08	Red RGB LED
LED2 G	P1.09	Green RGB LED
LED2 B	P0.12	Blue RGB LED
SW1	P1.06	User-programmable button Pull-down
SW2	RESET	SoC reset switch Active low