Product summary

NORA-B1 series

S

Stand-alone Bluetooth 5.2 Low Energy modules

Standard

Professional

Automotive

Dual-core Arm® Cortex® M33 with Bluetooth® 5.2 for performance oriented applications

- Arm® TrustZone® and CryptoCell® 312 for enhanced security
- Multi-protocol support for Bluetooth 5.2, Bluetooth mesh, Matter, Thread, Zigbee, and NFC
- Support for Bluetooth Low Energy audio and Bluetooth Direction Finding
- Option with front-end module PA/LNA for extended range
- Extended temperature range up to 105 °C
- Global certification

10.4 × 14.3 × 1.7 mm

Product description

NORA-B1 series are small, stand-alone Bluetooth Low Energy, wireless microcontroller unit (MCU) modules that comply with the Bluetooth 5.2 specification. The modules are built on the Nordic nRF5340 chip as an open CPU solution where customer applications run on two Arm® Cortex®-M33 processor cores with integrated flash and RAM memory.

The first core is for high-performance applications clocked at either 128 or 64 Mhz. The second core, clocked at 64 Mhz and optimized for low power and efficiency, is mainly dedicated to the wireless protocol stack and less demanding applications. Applications on the first core can run without being interrupted by network activity on the second, which is advantageous for time critical applications where a quick response is needed. In addition the modules support trusted execution with Arm TrustZone and root-of-trust with Arm CryptoCell-312.

NORA-B1 supports Bluetooth 5.2 features such as angle-of-arrival, angle-of-departure, Bluetooth long range and low energy audio. The modules support Bluetooth Low Energy services such as serial port communication, GATT, beacons, and mesh. Additionally, they support NFC and IEEE 802.15.4 with Thread, Zigbee, and Matter. NORA-B106/-B126 come with an internal PCB antenna that provides a robust low profile solution with high performance and an extensive range. NORA-B100/-B120 come with a U.FL connector and NORA-B101/-B121 come with an antenna pin, both providing the option to use an external antenna of choice. NORA-B1 has an option to include a front-end module PA/LNA, boosting the link budget by 15 dB, for even better range and coverage.

Key market segments are industrial automation, medical and healthcare, telematics, smart cities and buildings. Specific applications include connected tools, advanced and medical wearables, smart lighting, asset tracking, indoor location, low power sensors, as well as wireless-connected and configurable equipment. The NORA-B1 series is globally certified for use with the internal antenna or a range of external antennas. This greatly reduces time, cost and effort for customers integrating Bluetooth Low Energy in their designs.

	NORA-B100 NORA-B120	NORA-B101 NORA-B121	NORA-B106 NORA-B126
Grade			
Automotive			
Professional	•	•	•
Standard			
Radio			
Chip inside	nRF5340		
Bluetooth qualification version	5.2	5.2	5.2
Bluetooth Low Energy	•	•	•
Thread / Zigbee	•	•	•
Bluetooth output power EIRP [dBm]	8 / 18	8 / 18	5 / 15
Max range, estimated [meters]	700 / 1700	700 / 1700	400 / 1500
NFC	•	•	•
Antenna type (see footnotes)	U.FL	pin	pcb
Application software			
Open CPU for embedded applications	•	•	•
Interfaces			
UART	♦	♦	♦
QSPI and SPI	♦	♦	♦
I2C	♦	♦	♦
I2S and PDM	♦	♦	♦
USB	♦	♦	♦
PWM	♦	♦	♦
AD converters [channels]	8	8	8
GPIO pins	48 / 46	48 / 46	48 / 46
Features			
MCU	Dual-core Arm® Cortex®-M33		
RAM, application + network core [kB]	512 + 64		
Flash, application + network core [kB]	1024 + 256		
Secure boot	♦	♦	♦
Application core frequency [MHz]	128 or 64		
Arm TrustZone®	•	•	•
Arm CryptoCell-312 and KMU	•	•	•
Direction finding (AoA/AoD)	♦	♦	♦
Bluetooth mesh	♦	♦	♦
Front-end module, PA + LNA	- / •	- / •	- / •
FOTA	♦	♦	♦

pcb = Internal PCB antenna
pin = Antenna pin
U.FL = U.FL connector for external antenna

♦ = Feature enabled by HW. The actual support depends on the open CPU application SW.
KMU = Key management unit

NORA-B1 series

S

Features

Chip inside	Nordic Semiconductor nRF5340
Bluetooth	v5.2 (Bluetooth Low Energy)
NFC	NFC-A tag support
Estimated range	NORA-B100, NORA-B101: 700 m NORA-B106: 400 m NORA-B120, NORA-B121: 1700 m NORA-B126: 1500 m
Max. conducted output power	NORA-B10x: 3 dBm NORA-B12x: 13 dBm
Conducted sensitivity	NORA-B10x: –98 dBm (1 Mbit/s Bluetooth LE) –95 dBm (2 Mbit/s Bluetooth LE) –104 dBm (125 kbit/s Bluetooth LE) NORA-B12x: –103 dBm (1 Mbit/s Bluetooth LE) –99 dBm (2 Mbit/s Bluetooth LE) –109 dBm (125 kbit/s Bluetooth LE)

Open CPU for customer application

Customers develop and embed their own application on top of the Bluetooth stack in the NORA-B1 modules (open CPU concept). This section describes the possible features enabled by the NORA-B1 hardware. The Nordic Semiconductor's SDK environment for the nRF5340 chip (available for free) is required to develop the connectivity and application software.

MCU: Dual core Arm Cortex-M33 with FPU	Application core:	128/64 MHz Arm Cortex-M33 with FPU and DSP 1 MB flash + 512 kB RAM 514 CoreMark or 73 CoreMark/mA
	Network core:	64 MHz Arm Cortex-M33 256 kB flash + 64 kB RAM 101 CoreMark/mA
Development environment	nRF Connect SDK (based on Zephyr RTOS)	
HW interfaces *	Application core:	1 x QSPI 5 x SPI (1 high speed) 4 x I2C (1 high speed) 4 x UART 1 x USB 1 x I2S 1 x PDM 4 x PWM (4 channels each) 8 x ADC (12-bit) 3 x Timer/Counter (32-bit) 2 x RTC (24-bit) 1 x QDEC
	Network core:	1 x SPI 1 x I2C 1 x UART 3 x Timer/Counter (32-bit) 2 x RTC (24-bit)
	Common:	NORA-B10x: 48 x GPIO NORA-B12x: 46 x GPIO
Security	Trusted execution with Arm TrustZone Hardware accelerated cryptography with Arm CryptoCell-312 Secure Key Storage Secure bootloader with root-of-trust and DFU Secure Simple Pairing 128-bit AES encryption Bluetooth Low Energy secure connections	

* Not all simultaneously

Package

Dimensions	10.4 x 14.3 x 1.7 mm
Weight	< 0.55 g
Mounting	Machine mountable, solder pins

Environmental data, quality & reliability

Operating temp.	–40 °C to +105 °C
Storage temp.	–40 °C to +125 °C
Humidity	RH 5 – 90% non-condensing

Electrical data

Power supply	NORA-B10x: 1.7 V to 5.5 V NORA-B12x: 1.7 V to 3.6 V
Power consumption (@3V DCDC)	NORA-B10x: Active TX @ 3 dBm: 5.3 mA RX only: 3.7 mA (1 Mbit/s) Standby: 1.3 µA, Sleep: 1.0 µA NORA-B12x: Active TX @ 13 dBm: 22.3 mA RX only: 9.2 mA (1 Mbit/s) Standby: 2.3 µA, Sleep: 2.0 µA

Certifications and approvals

Type approvals [2]	Europe (ETSI RED), Canada (ISED RSS), US (FCC/ CFR 47 part 15 unlicensed modular transmitter approval), Japan (MIC), South Korea (KCC), Taiwan (NCC), Australia/New Zealand (RCM), Brazil (Anatel), South Africa (ICASA)[1]
Health and safety [2]	EN 62479, EN 62368-1, IEC 62368-1
Bluetooth qualification [2]	version 5.2 (Bluetooth Low Energy)

1 = Pending for NORA-B10x 2 = Pending for NORA-B12x

Support products

EVK-NORA-B100	Evaluation kit for NORA-B100/B101 with U.FL connector for external antenna, Arduino UNO form factor, and SEGGER J-LINK-OB debug interface
EVK-NORA-B120	Evaluation kit for NORA-B120/B121 with U.FL connector for external antenna, Arduino UNO form factor, and SEGGER J-LINK-OB debug interface
EVK-NORA-B106	Evaluation kit for NORA-B106 with internal PCB antenna, Arduino UNO form factor, and SEGGER J-LINK-OB debug interface
EVK-NORA-B126	Evaluation kit for NORA-B126 with internal PCB antenna, Arduino UNO form factor, includes SEGGER J-LINK-OB debug interface
MINI-NORA-B106	Evaluation kit for NORA-B106 with internal PCB antenna and two mikroBUS compatible sockets
MINI-NORA-B126	Evaluation kit for NORA-B126 with internal PCB antenna and two mikroBUS compatible sockets

Product variants

NORA-B100	with U.FL antenna connector
NORA-B120	with FEM (PA+LNA) and U.FL antenna connector
NORA-B101	with antenna pin
NORA-B121	with FEM (PA+LNA) and antenna pin
NORA-B106	with internal PCB antenna
NORA-B126	with FEM (PA+LNA) and internal PCB antenna

Further information

For contact information, see www.u-blox.com/contact-us.

For more product details and ordering information, see the product data sheet.

Legal Notice:

u-blox reserves all rights to this document and the information contained herein. Products, names, logos and designs described herein may in whole or in part be subject to intellectual property rights. Reproduction, use, modification or disclosure to third parties of this document or any part thereof without the express permission of u-blox is strictly prohibited.

The information contained herein is provided "as is". No warranty of any kind, either express or implied, is made in relation to the accuracy, reliability, fitness for a particular purpose or content of this document. This document may be revised by u-blox at any time. For most recent documents, please visit www.u-blox.com.

Copyright © 2022, u-blox AG