Product summary

NINA-B41 series

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Stand-alone Bluetooth 5.1 Low Energy modules

Standard

Professional

Automotive

Bluetooth 5.1 module for harsh professional environments

- Bluetooth 5.1 module with long range and direction finding support
- u-connect software for accelerated time to market
- Extended temperature range to 105 °C
- Superior security functionality
- Pin compatible with other NINA modules
- Global certification

10.0 × 15.0 × 2.2 mm

10.0 × 11.6 × 2.2 mm

10.0 × 15.0 × 2.2 mm

Product description

The NINA-B41 series is comprised of small, stand-alone Bluetooth Low Energy modules featuring full Bluetooth 5.1. The modules are delivered with u-connectXpress software that provides support for u-blox Bluetooth Low Energy Serial Port Service, GATT client and server, beacons, NFC™, and simultaneous peripheral and central roles. u-blox u-connectXpress software allows hosts to easily configure connectivity using AT commands over a UART inteface.

NINA-B41 modules provide top grade security, thanks to secure boot, which ensures that the modules only boot up with authenticated u-connectXpress software. Leveraging Bluetooth 5 long range feature support, NINA-B41 modules also offer an extended communication range with reliable connections. NINA-B41 caters towards applications in smart buildings, smart cities, industrial automation systems, sensor networks, and asset tracking solutions.

For location applications, NINA-B41 supports Bluetooth 5.1 direction finding via angle-of-arrival. Connected to an array of antennas, the module can detremine the direction from which a signal is transmitted, which allows for more accurate location methods. The algorithms required to calculate the angle-of-arrival are embedded in the u-connectLocate software that runs in the module MCU.

The NINA-B41 series is globally certified for use with the internal antenna or a range of external antennas. NINA-B416 comes with an internal PCB antenna while NINA-B410 and NINA-B411 are used with an external antenna, connected through a U.FL connector or module pin. The global pre-certification of u-blox modules means less compliance and verification testing, lower development costs, and an accelerated time to market for your application designs.

	NINA-B410	NINA-B411	NINA-B416
Grade			
Automotive			
Professional	•	•	•
Standard			
Radio			
Chip inside	nRF52833		
Bluetooth qualification	v5.1	v5.1	v5.1
Bluetooth Low Energy	•	•	•
Bluetooth output power EIRP [dBm]	11	11	11
Max range [meters]	1400	1400	1400
NFC	•	•	•
Antenna type (see footnotes)	U.FL	pin	pcb
Application software			
u-connectLocate	•	•	
u-connectXpress	•	•	•
Interfaces			
UART	2	2	2
GPIO pins	26	26	26
Features			
AT command interface	•	•	•
Simultaneous GATT server and client	•	•	•
Throughput [Mbit/s]	0.8	0.8	0.8
Maximum Bluetooth connections	8	8	8
Secure boot	•	•	•
Low Energy Serial Port Service	•	•	•
Bluetooth long range	•	•	•
Direction finding (AoA/AoD)	•	•	•

pcb = Internal PCB antenna
pin = Antenna pin

U.FL = U.FL connector for an external antenna

NINA-B41 series

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Features

Bluetooth	v5.1 (Bluetooth Low Energy)
NFC	NFC-A tag for pairing and data
Range	1400 m
Max. conducted output power	8 dBm
Conducted sensitivity	–95 dBm (1 Mbit/s) –102 dBm (125 Kbit/s)

u-connectXpress software

NINA-B41 modules are pre-flashed with u-connectXpress and bootloader software that interfaces through an AT command interpreter to control customer application software running on host MCUs.

Bluetooth	u-blox Low Energy Serial Port Service (SPS) GATT server and client using AT commands Beacons 2 Mbit/s modulation 125 Kbit/s modulation long range functionality Advertising extensions
Confguration over air	Wireless transmission of AT commands to control the module
Extended Data Mode™	For simultaneous AT commands and data, and multiple simultaneous data streams
HW interfaces	2 x UART, GPIO
Configuration	AT commands
Support tools	s-center
Operating modes	Central role (7 simultaneous links) Peripheral role (6 simultaneous links) Simultaneous central and peripheral roles (8 in total, where max 4 as peripheral and max 7 as central) LE 1M PHY LE 2M PHY LE CODED PHY Advertising extensions LE data length extension
Security	Secure boot Secure Simple Pairing 128-bit AES encryption Bluetooth Low Energy secure connections
Throughput over UART	780 Kbit/s

Electrical data

Power supply	1.7 to 3.6 V
Power consumption	Active TX @ 0 dBm: 6.0 mA RX only: 6.0 mA Standby: 1.3 µA Sleep: 600 nA (with wake-up on external event)

Package

Dimensions	10.0 x 11.6 x 2.2 mm (NINA-B411) 10.0 x 15.0 x 2.2 mm (NINA-B410, NINA-B416)
Weight	< 1.0 g
Mounting	Machine mountable Solder pins

Environmental data, quality, and reliability

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

Certifications and approvals

Type approvals	Europe (ETSI RED), Great Britain (UKCA), US (FCC/CFR 47 part 15 unlicensed modular transmitter approval), Canada (IC RSS), Brazil (Anatel), Japan (MIC), South Korea (KCC), Taiwan (NCC) [1], Australia (ACMA), New Zealand, South Africa (ICASA) [1]
Health and safety	EN 62479, EN 62368-1, IEC 62368-1
Medical Electrical Equipment	EN 60601-1-2:2015
Bluetooth qualification	v5.1 (Bluetooth Low Energy)

1 = Pending approvals

Support products

EVK-NINA-B410	Evaluation kit for NINA-B410 and NINA-B411 with u-connectXpress software and U.FL connector for external antenna
EVK-NINA-B416	Evaluation kit for NINA-B416 with u-connectXpress software and internal PCB antenna

Product variants

NINA-B410	Bluetooth Low Energy module with u-connectXpress or u-connectLocate software and U.FL antenna connector
NINA-B411	Bluetooth Low Energy module with u-connectXpress software and pin for external antenna
NINA-B416	Bluetooth Low Energy module with u-connectXpress or u-connectLocate software and internal PCB antenna

Further information

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

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