# NINA-B1 series

**Stand-alone Bluetooth 5 low energy modules with NFC**

## Feature rich Bluetooth 5 low energy with most worldwide certifications
- Bluetooth 5 and Bluetooth mesh
- u-connect software for accelerated time to market
- Open CPU for customer applications
- Hardware optimized for performance and low power consumption
- Pin compatible with other NINA modules
- Multiple antenna options

## Product Description

The NINA-B1 series modules are small, stand-alone Bluetooth low energy modules featuring Bluetooth 5, a powerful Arm® Cortex®-M4 with FPU, and state-of-the-art power performance. The embedded low power crystal in NINA-B1 minimizes power consumption, thus extending the battery life.

The NINA-B1 is 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 – all configurable from a host by using AT commands.

NINA-B1 offers full flexibility for customers who prefer their application to run on the built-in Arm Cortex-M4 with FPU. With 512 kB flash and 64 kB RAM, it offers the best-in-class capacity for customer applications running on top of the Bluetooth low energy stack using SDK from Nordic Semiconductor or Arm Mbed. Additionally, NFC and interfaces such as SPI, I²C, and I²S are available, and features like Bluetooth mesh, AirFuel, and Apple HomeKit are also supported. In combination with Wirepas Connectivity stack, NINA-B1 can form large scale industrial mesh networks for several applications, such as lighting, asset tracking, and metering.

NINA-B112 comes with an internal antenna and NINA-B111 has a pin for use with an external antenna. The internal PIFA antenna is specifically designed for the small NINA-B1 form factor and provides an extensive range of more than 300 m, independent of ground plane and component placement.

The NINA-B1 series is globally certified for use with the internal antenna or a range of external antennas. This reduces time and effort for customers integrating NINA-B1 in their designs.

---

## Product Summary

### NINA-B111
- **Grade**: Automotive, Professional, Standard
- **Radio**
  - Bluetooth profiles: G
  - Bluetooth qualification: v5.0
  - Bluetooth low energy
  - Bluetooth output power EIRP [dBm]: 7, 6
  - Max range [meters]: 350, 300
  - NFC for “Touch to Pair”
  - Antenna type: p
- **Application software**
  - u-connectXpress software
  - Open CPU for embedded customer applications
- **Interfaces**
  - UART: 1
  - SPI: 1
  - I²C: 1
  - I²S: 1
  - GPIO pins: 19
  - AD converters (ADC): 7, 19, 19
- **Features**
  - AT command interface
  - GATT server and client
  - Extended Data Mode
  - Low Energy Serial Port Service
  - Throughput [Mbit/s]: 0.8, 1.4
  - Maximum Bluetooth connections: 7, 20, 7, 20
  - FOTA
  - Mesh networking

### NINA-B112
- **Grade**: Automotive, Professional
- **Radio**
  - Bluetooth profiles: G
  - Bluetooth qualification: v5.0
  - Bluetooth low energy
  - Bluetooth output power EIRP [dBm]: 7, 6
  - Max range [meters]: 350, 300
  - NFC for “Touch to Pair”
  - Antenna type: p
- **Application software**
  - u-connectXpress software
  - Open CPU for embedded customer applications
- **Interfaces**
  - UART: 1
  - SPI: 1
  - I²C: 1
  - I²S: 1
  - GPIO pins: 19
  - AD converters (ADC): 7, 19, 19
- **Features**
  - AT command interface
  - GATT server and client
  - Extended Data Mode
  - Low Energy Serial Port Service
  - Throughput [Mbit/s]: 0.8, 1.4
  - Maximum Bluetooth connections: 7, 20, 7, 20
  - FOTA
  - Mesh networking

---

UBX-15018SS2 - R19

10.0 × 10.6 × 2.2 mm

10.0 × 14.0 × 3.8 mm
NINA-B1 series

Features

- Bluetooth v5.0 (Bluetooh low energy)
- NFC
  - NFC-A tag support
- Range
  - NINA-B111: 350 m, antenna pin reference design with 1/2 wave antenna
  - NINA-B112: 300 m, internal antenna
- Max. conducted output power: 4 dBm
- Max. radiated output power (EIRP): 7 dBm with approved antennas
- Receiver sensitivity
  - NINA-B111: –95 dBm (Conducted: –98 dBm with approved antennas)
  - NINA-B112: –97 dBm

u-connectXpress software

This section describes the NINA-B1 features when used with the embedded u-connectXpress software. All NINA-B1 modules are delivered with this software and the module is configured using AT commands.

Software features
- u-blox Low Energy Serial Port Service (SPS);
- GATT server and client via AT commands;
- Configuration over air;
- Extended Data Mode (EDM) protocol for simultaneous AT commands and data, and multiple simultaneous data streams; beacons; NFC tag for pairing and data

HW interfaces
- UART, 7 x GPIO pins

Configuration
- AT Commands

Support tools
- s-center

Operating modes
- Central role (7 simultaneous links)
- Peripheral role
- Simultaneous central and peripheral roles (7 simultaneous links)
- LE 1M PHY
- LE 2M PHY
- Advertising Extensions
- LE Data Length Extension

Security
- Secure Simple Pairing
- 128-bit AES encryption
- LE secure connections

Throughput
- 780 kbps

Open CPU for customer application

Customers can develop and embed their own application on top of the Bluetooth stack and software inside the NINA-B1 module (open CPU concept). This section describes features specific to using NINA-B1 with an open CPU. Many software features are already available via Arm Mbed or Nordic SDK environment, and more are added continuously.

Development environment
- Nordic SDK (including Bluetooth Mesh Homekit, AirFuel, IoT); Arm Mbed S; Wirepas connectivity software (for large scale mesh networking)

HW interfaces
- NFC tag for pairing
- 3 x SPI
- 2 x I²C
- 19 x GPIO pins
- 8 x ADC channels
- 12 x PWM
- 98 x ADC channels
- PDM
- QDEC

Security
- Secure Simple Pairing
- 128-bit AES encryption
- LE secure connections

Package

- Dimensions
  - NINA-B111: 10.0 x 10.6 x 2.2 mm
  - NINA-B112: 10.0 x 14.0 x 3.8 mm
- Weight: < 1.0 g
- Mounting: Machine mountable
- Solder pins

Environmental data, quality & reliability

- Operating temperature: –40 °C to +85 °C
- Storage temperature: –40 °C to +85 °C
- Humidity: RH 5-90% non-condensing

Electrical data

- Power supply: 1.7 V to 3.6 VDC
- Power consumption
  - Active TX @ 0 dBm: 5.3 mA
  - Standby: 2.2 µA
  - Sleep: 300 nA (with wake-up on external event)

Certifications and approvals

- Type approvals
  - Europe (ETSI RED); US (FCC/CFR 47 part 15 unlicensed modular transmitter approval);
  - Australia (ACMA);
  - New Zealand;
  - Brazil (Anatel);
  - Canada (IC RSS);
  - Japan (MIC - formerly TELEC);
  - South Africa (ICASA);
  - South Korea (KCC);
  - Taiwan (NCC)

Health and safety
- EN 62479, EN 60950-1, IEC 60950-1
- Medical Electrical Equipment
- EN 60601-1-2
- Bluetooth qualification: v5.0 (Bluetooth low energy)

Support products

The evaluation kits include a NINA-B1 module on an evaluation board with built-in debugging capabilities. To be used with Nordic SDK or Arm Mbed as a development kit or with s-center to evaluate the u-connectXpress software. A blueprint is available on request, which includes a NINA-B1 module, a sensor, LEDs, buttons, and the source code for NINA-B1 and smart phones.

- EVK-NINA-B111 Evaluation kit for NINA-B111 module with antenna pin and external antenna
- EVK-NINA-B112 Evaluation kit for NINA-B112 module with internal antenna

Product variants

- NINA-B111 With antenna pin
- NINA-B112 With internal antenna

Modules are shipped with the u-connectXpress software and can be re-flashed with customer application (open CPU).

Further information

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

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

UBX-15018552 - R19

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 © 2019, u-blox AG