

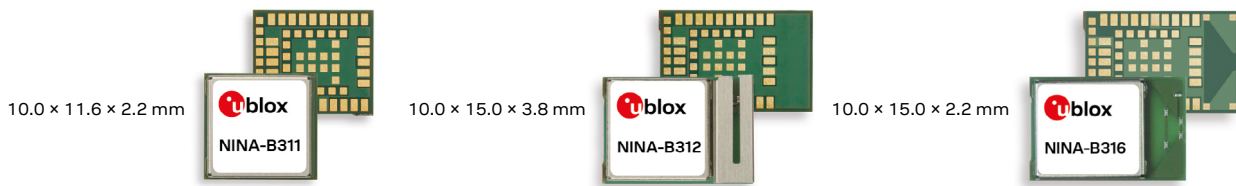
# NINA-B31 series



## Stand-alone Bluetooth 5 low energy modules

### Full Bluetooth 5 made easy and with worldwide certifications

- Full Bluetooth 5 with long range
- u-connect software for accelerated time to market
- Hardware optimized for performance and low power consumption
- Pin compatible with other NINA modules
- Superior security functionality with built-in secure boot
- Multiple antenna options



### Product description

The NINA-B31 series are small, stand-alone Bluetooth low energy wireless microcontroller unit (MCU) modules. NINA-B31 features full Bluetooth 5, a powerful Arm® Cortex®-M4 with FPU, and state-of-the-art power performance. The embedded low power crystal in NINA-B31 improves the power consumption by enabling optimal power save modes. The NINA-B31 modules are delivered with u-connect software, providing support for u-blox Bluetooth low energy Serial Port Service, GATT client and server, beacons, NFC™, and simultaneous peripheral and central roles. Two variants of the u-connect software are available: u-connectXpress that provides support for a host to easily configure connectivity using AT commands, and u-connectScript that allows an application to be embedded on the module using JavaScript.

The NINA-B31 modules provide top grade security, thanks to secure boot, which ensures the module only boots up with original u-blox u-connect software. NINA-B31 caters to applications in smart buildings, smart cities, and the Industry 4.0, including smart lighting systems, industrial sensor networks, asset tracking solutions, and building automation systems.

NINA-B312 comes with an internal PIFA antenna, NINA-B316 comes with an internal PCB antenna, while NINA-B311 has a pin for use with an external antenna. The internal PIFA antenna is specifically designed for the small NINA form factor and provides an extensive range, independent of ground plane and component placement. The internal PCB antenna provides a robust low profile solution with high performance.

The NINA-B31 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 NINA-B31 in their designs.

	NINA-B311	NINA-B312	NINA-B316
<b>Grade</b>			
Automotive			
Professional	•	•	•
Standard			
<b>Radio</b>			
Bluetooth qualification	v5.0	v5.0	v5.0
Bluetooth profiles	G	G	G
Bluetooth output power EIRP [dBm] *	10	10	10
Max range [meters] *	1400	1400	1400
NFC for "Touch to Pair"	•	•	•
Antenna type *	p	i	b
<b>Application software</b>			
u-connectXpress	•	•	•
u-connectScript	•	•	•
<b>Interfaces</b>			
UART	1	1	1
GPIO pins	28	28	28
<b>Features</b>			
AT command interface	•	•	•
Script engine – JavaScript	•	•	•
GATT server and client	•	•	•
Extended Data Mode	•	•	•
Low Energy Serial Port Service	•	•	•
Throughput [Mbit/s]	0.8	0.8	0.8
Maximum Bluetooth connections	8	8	8
Secure boot	•	•	•

G = GATT    p = Antenna pin    i = Internal PIFA antenna    b = PCB antenna

# NINA-B31 series



## Features

Bluetooth	v5.0 (Bluetooth Low Energy)
NFC	NFC-A tag support
Range	1400 m
Max. conducted output power	8 dBm
Conducted sensitivity	-94 dBm (1 Mbit/s) -100 dBm (125 Kbit/s)

## u-connectXpress software

This section describes the NINA-B31 u-connectXpress software features. More features will be available via software updates.

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; 2 Mbit/s modulation; 125 and 500 Kbit/s modulation for long range functionality; Advertisement extensions
HW interfaces	UART, GPIO
Configuration	AT Commands
Support tools	s-center
Simultaneous connections	8
Security	Secure boot Secure Simple Pairing 128-bit AES encryption
Throughput over UART	780 Kbit/s

## u-connectScript software

This section describes the NINA-B31 u-connectScript software features. More features will be available via software updates.

Software features	Embedded script engine; u-connect streams supporting u-blox Low Energy Serial Port Service (SPS) and I <sup>2</sup> C interface for connecting sensors; GATT server; Scanning and custom advertisement (beacons); 2 Mbit/s modulation; 125 and 500 Kbit/s modulation for long range functionality; Advertisement extensions; Power save mode
Programming language	JavaScript
Development environment	Microsoft Visual Studio Code u-blox Script IDE
Memory	Available Flash file system 85 kB Available RAM application 40 kB
Hardware interfaces	UART, GPIO, I <sup>2</sup> C
Simultaneous connections	1
Security	Secure boot Just Works™

## Further information

For contact information, see [www.u-blox.com/contact-us](http://www.u-blox.com/contact-us).

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

## Package

Dimensions	NINA-B311: 10.0 x 11.6 x 2.2 mm NINA-B312: 10.0 x 15.0 x 3.8 mm NINA-B316: 10.0 x 15.0 x 2.2 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 VDC to 3.6 VDC
Power consumption in Bluetooth LE mode	Active TX @ 0 dBm: 4.9 mA Standby: 1.3 µA Sleep: 400 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); Canada (IC RSS); Japan (MIC); Taiwan (NCC); Australia (ACMA) <sup>1</sup> ; New Zealand <sup>1</sup> ; Brazil (Anatel) <sup>1</sup> ; South Africa (ICASA) <sup>1</sup> ; South Korea (KCC) <sup>1</sup>
Health and safety	EN 62479, EN 60950-1, IEC 60950-1
Bluetooth qualification	v5.0 (Bluetooth low energy)

1 = Pending approvals

## Support products

EVK-NINA-B311	Evaluation kit for NINA-B311 module with u-connect software and antenna pin
EVK-NINA-B312	Evaluation kit for NINA-B312 module with u-connect software and internal PIFA antenna
EVK-NINA-B316	Evaluation kit for NINA-B316 module with u-connect software and internal PCB antenna

## Product variants

NINA-B311	With u-connect* software and antenna pin
NINA-B312	With u-connect* software and internal PIFA antenna
NINA-B316	With u-connect* software and internal PCB antenna

\* = Available in two variants – u-connectXpress and u-connectScript

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