

Short range radio product overview



Robust, secure, and versatile short range chips and modules

Short range radio technologies for all kinds of applications

u-blox short range radio modules target automotive, telematics, industrial automation, smart cities and buildings, fitness, healthcare, and consumer markets. Our offering includes Wi-Fi and Bluetooth® communications, individually and in combination. Our components are compliant with industry standards and have national certifications around the world. u-blox stand-alone modules and host-based modules are designed and developed to meet the more demanding requirements of industrial and automotive markets.

Key features and benefits

u-connect: We offer two variants of our u-connect software for stand-alone modules:

- u-connectXpress software makes the integration of Bluetooth, Wi-Fi, and multiradio connectivity into new and existing products easy and efficient.
- u-connectLocate software has an optimized direction finding algorithm for use with indoor positioning solutions. This is currently available for use with NINA-B410 and NINA-B411 modules.

Form factor compatibility: Our modules focus on optimizing performance and ease of use, with footprint roadmaps that allow a single PCB to support multiple technology options and future revisions of technologies. For example, Bluetooth 5 and 5.1 modules are pin compatible.

Security: To safeguard customer applications, protect data, and ensure secure data transmission, our products are designed to follow a set of security principles. Secure boot ensures that the module firmware is authentic and has not been modified. User authentication mechanisms and encryption protect both the system from unauthorized usage as well as the actual data shared over the wireless connection.

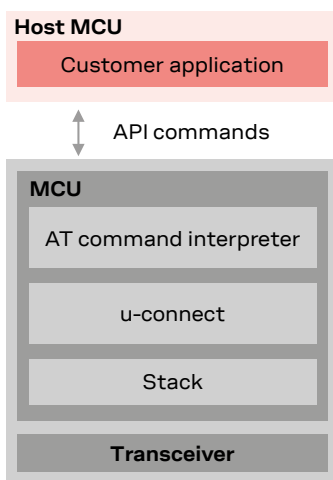
Short range radio architectures

u-blox short range radio products are available in two different architectures. Modules based on the stand-alone architecture include an embedded MCU, which runs the driver, stack, and application. This architecture is configurable for u-connect software or open CPU operation. Modules based on our host-based architecture run the stack and applications on a Linux, Android, or Windows host processor.

Stand-alone

u-connect

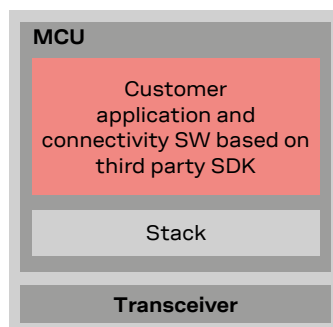
- Stack runs on u-blox short range module
- Application runs on the external MCU



Short range module

open CPU

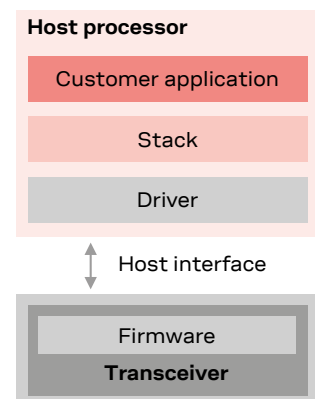
- Stack runs on u-blox short range module
- Application runs on the u-blox module, and is based on 3rd party SDK



Short range module

Host-based

- Third party stack runs on a host processor with open OS
- Application runs on the host processor



Short range module



Technology overview

Stand-alone modules	Bluetooth											Multiradio				Wi-Fi
	ANNA-B1	ANNA-B4	NORA-B1	NINA-B1	NINA-B2	NINA-B3	NINA-B4	BMD-34x BMD-380	BMD-360	BMD-30x BMD-350	BMD-330	NORA-W1	NORA-W25xAWS	NINA-W10 NINA-W15	ODIN-W2	NINA-W13
Application software	u/o	u/o	o	u/o	u	u/o	u/o	o	o	o	o	u/o	A	u/o	u/o	u
Bluetooth version	5.0	5.1	5.2	5.0	4.2	5.0	5.1	5	5.1	5.0	5.0	5.0	5.0	4.2	4.2	
Bluetooth mesh	◆	◆	◆	◆		◆	◆	◆		◆						
NFC	•	•	◆	•		•	•	◆		◆						
Thread / Zigbee		◆	◆			◆	◆	◆	◆							
Wi-Fi 2.4 / 5 GHz												2.4	2.4	2.4	2.4/5	2.4
Wi-Fi 802.11 standards												b/g/n	b/g/n	b/g/n	a/b/g/n	b/g/n
Antenna options	P,C	P,C	P,B,U	P,M	P,M	P,B,M	P,B,U	B,C,U	B	B,C,U	B	P,B	P,B	P,B,M	M,U	P,M
Secure boot		•	◆		•	•	•	◆				•	•	◆	•	•


Host-based modules	Multiradio							Wi-Fi
	MAYA-W1 M2-MAYA-W1 (on M.2 card)	MAYA-W2 M2-MAYA-W2 (on M.2 card)	JODY-W1	JODY-W2 M2-JODY-W2 (on M.2 card)	JODY-W3 M2-JODY-W3 (on M.2 card)	EMMY-W1	LILY-W1	
Bluetooth version	5.2	5.2	5.0/5.1	5.2	5.3	4.2		
Wi-Fi 2.4 / 5 GHz	2.4/5	2.4/5	2.4/5	2.4/5	2.4/5	2.4/5	2.4	
Wi-Fi 802.11 standards	a/b/g/n	a/b/g/n/ac/ax	a/b/g/n/ac	a/b/g/n/ac	a/b/g/n/ac/ax	a/b/g/n/ac	b/g/n	
Antenna options	P, B, U	P, B, U	P	P	P	P	P, M	

◆ = Feature enabled by HW (the actual support depends on the open CPU application SW)
 Application software: o = open CPU, u = u-connectXpress, A = AWS IoT ExpressLink
 Antenna options: P = antenna pin(s), B = internal PCB, C = internal chip, M = internal metal PIFA, U = U.FL connector


For a detailed view of our product offering, see our guided product selector: www.u-blox.com/guided-product-selector

Popular applications


Here are some of the industries that use u-blox short range modules along with a selection of their applications:

 **Industrial automation**


- Networked control systems and tools
- Handheld operator terminals
- Gateways and hubs
- Connected tools

 **Retail and point of sales**


- Payment terminals
- Vending machines
- Cash registers and receipt printers
- Gateways and hubs

 **Smart buildings**


- HVAC, alarm panels, and security cameras
- Access control, lighting, beacons
- Gateways and hubs
- Appliances and white goods

 **Automotive**

- In-vehicle infotainment (IVI)
- Advanced driver assistance systems (ADAS)
- Automotive control units (ACU)
- Telematics control units (TCU)

 **Medical and healthcare**

- Enterprise patient monitoring
- Connected home health devices
- Fitness and rehabilitation equipment
- Gateways and hubs

 **Telematics**

- Fleet management systems
- Vehicle trackers and e-loggers
- Driver recorders and insurance boxes



Emerging use cases

Indoor positioning: Bluetooth's direction finding feature, a key component of the Bluetooth 5.1 specification, brings the benefits of high precision positioning to indoor applications. NINA-B4 acts as both a transmitter and a receiver in angle of arrival (AoA) and angle of departure (AoD) direction finding and indoor positioning applications.

Mesh support: Bluetooth mesh is used to form mesh networks, ideal for large scale networks. Nodes can be configured to use one-to-one, one-to-many, or many-to-many communication. It is supported by u-connectXpress software.

Wi-Fi for electric vehicle charging: Wireless charging stations increase the convenience of EV charging. They shorten setup time (park over the wireless charger), omit need for charging cables, increase safety, and simplify maintenance. In both wired (AC/DC) and wireless charging setups, Wi-Fi is the most efficient solution for managing the charging process.

Explore and evaluate – some of our kits and cards featuring u-blox modules for easy evaluation and integration:

XPLR-IOT-1

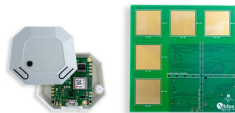
**IoT explorer kit:
Platform for end-to-end IoT
proof-of-concept**



- Multipurpose explorer kit for IoT applications
- LTE-M/NB-IoT, Wi-Fi, Bluetooth®, GNSS
- Designed for use with u-blox services
- Embedded SIM with MQTT Anywhere trial subscription

XPLR-AOA-1

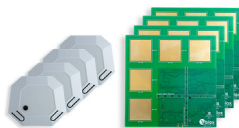
**Direction finding explorer kit
with NINA-B4 Bluetooth 5.1
module**



- Evaluate Bluetooth 5.1 direction finding using angle-of-arrival
- Includes one antenna board and one tag
- u-connectLocate software with optimized direction finding
- High-resolution angle calculation in two dimensions

XPLR-AOA-2

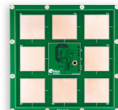
**Indoor positioning explorer kit
with NINA-B4 Bluetooth 5.1
module**



- Evaluation tool for Bluetooth 5.1 indoor positioning
- Includes four antenna boards and four tags
- High resolution positioning engine
- u-connectLocate software with optimized direction finding

ANT-B10

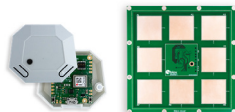
**Bluetooth Low Energy 5.1
antenna board for direction
finding and indoor positioning**



- Compact, eight-element antenna array
- Embedded AoA calculation with u-connectLocate
- Outputs final angles, ready to be used on application level
- High immunity to multipath effects

XPLR-AOA-3

**Direction finding explorer kit
and anchor point reference
design**

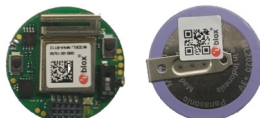


- Evaluation of ANT-B10 Bluetooth Low Energy antenna board
- Reference board with powerful MCU and various connections
- Includes Bluetooth 5.1 angle-of-arrival tag
- Includes plastic frame for mounting on walls and surfaces

u-blox blueprints – some reference designs for integration of the products in real-world applications:

Sensor board

B200 with NINA-B112



- On-board sensor (accelerometer, gyro, thermometer)
- Rechargeable coin cell battery with on/off switch
- Two push buttons and an RGB LED
- Debug pin header with UART, SWD, and power for charging

Tracking device

**B201 with NINA-B112
and EVA-M8**



- A Bluetooth Low Energy and GNSS technology solution
- Coin cell battery chargeable with USB and/or solar panel
- On-board sensor (accelerometer, gyroscope)
- Three push buttons and two LEDs

USB dongle

B204 with NINA-B112



- USB connector integrated in PCB
- Access to UART over USB and powered by USB
- One button and one RGB LED



Integrated antenna or antenna connector

To meet the divergent needs of the markets we serve, our products come with a broad range of antenna variants and connectors. Customers can choose the antenna solution they need, optimized for performance, robustness, versatility, size, and cost.

Module variants with integrated antennas may have the antenna included in the chip, internally within the module PCB or as part of the metal shield.

Available connectors for external antennas include U.FL connectors and antenna pins. Some modules include two or three antenna pins for single or simultaneous Wi-Fi and Bluetooth operation.



U.FL connector



Antenna pin



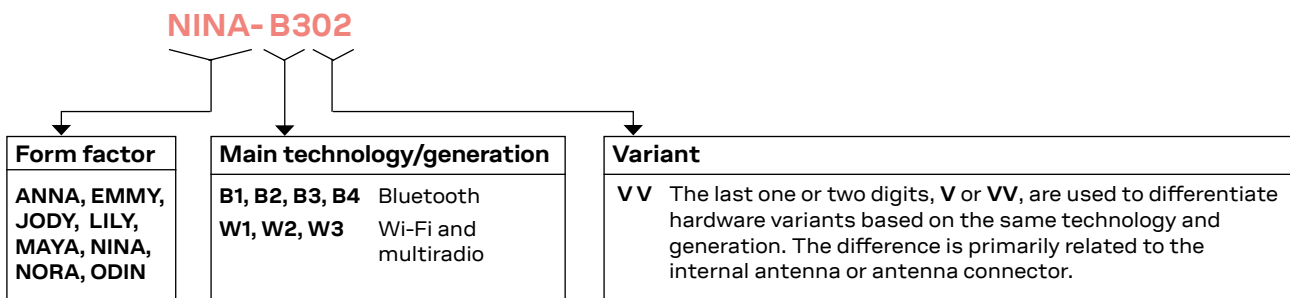
PIFA antenna



PCB trace antenna

u-blox short range product naming

u-blox short range modules are available in different form factors and variants to provide flexibility for scaling different short range technologies to various application requirements. The BMD and R41Z products have a simpler legacy naming.



u-blox values and promise



Competent technical support worldwide

- Over 20 years of R&D in GNSS and wireless technology
- Lifetime support and maximum competence
- Global leader in positioning and wireless communication



Quick time to market

- Short and reliable delivery times
- Standard module form factors for easy integration



High quality

- Qualified for a long lifetime in the field (ISO 16750)
- Individually tested, tuned and X-rayed modules
- Zero defect policy



Broad spectrum of solutions

- Strong synergies between technologies: Wi-Fi, Bluetooth, cellular, and positioning
- Hardware, software, services, and solutions



Security

- Advanced spoofing and jamming detection
- End-to-end trust of domain

Further information

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

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

Legal Notice:

u-blox or third parties may hold intellectual property rights in the products, names, logos and designs included in this document. Copying, reproduction, or modification of this document or any part thereof is only permitted with the express written permission of u-blox. Disclosure to third parties is permitted for clearly public documents only.

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.