

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 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. Initially, this will be available with NINA-B410 and NINA-B411.

Form factor compatibility: Our modules focus on 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. Secure firmware only lets authenticated and validated updates to be made.

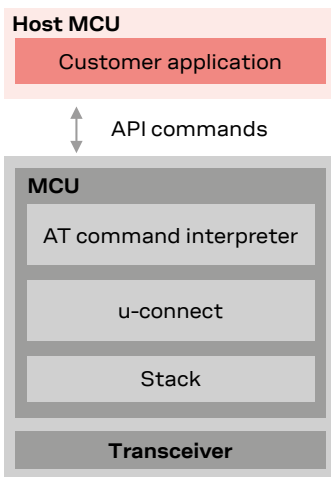
Short range radio architectures

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

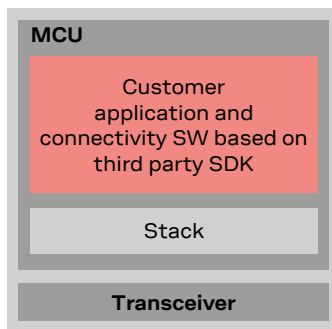
u-connect

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



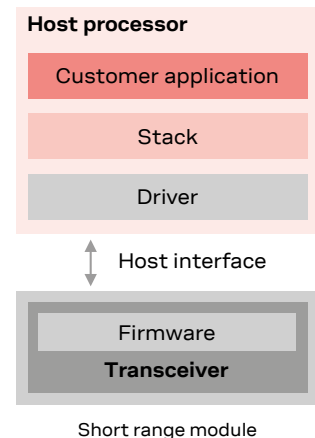
open CPU

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



Host-based

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





Technology overview

	Bluetooth										Multiradio							Wi-Fi	
	ANNA-B1	NORA-B1	NINA-B1	NINA-B2	NINA-B3	NINA-B4	BMD-34x BMD-380	BMD-360	BMD-30x BMD-350	BMD-330	NINA-W10 NINA-W15	ODIN-W2	MAYA-W1	JODY-W1	JODY-W2	JODY-W3	EMMY-W1	NINA-W13	LILY-W1
Host-based																			
Stand-alone	•	•	•	•	•	•	•	•	•	•	•	•						•	
u-connect	•		•	•	•	•					•	•						•	
Open CPU	•	•	•		•	•	•	•	•	•	•	•							
Bluetooth version	5	5.2	5	4.2	5	5.1	5	5.1	5	5	4.2	4.2	5.0	4.2	5	5.1	4.2		
Bluetooth LE	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
Bluetooth mesh	◆	◆	◆		◆	◆	◆		◆										
NFC	•	•	•		•	◆	◆		◆										
Thread / Zigbee		•			◆	◆	◆	◆											
Wi-Fi 2.4 / 5 GHz											2.4	2.4/5	2.4/5	2.4/5	2.4/5	2.4/5	2.4/5	2.4	2.4
Wi-Fi 802.11 standards											b/g/n	a/b/g/n	a/b/g/n	a/b/g/n/ac	a/b/g/n/ac	a/b/g/n/ac	a/b/g/n/ac	b/g/n	b/g/n
Antenna options	P,C	P,B,U	P,M	P,M	P,B,M	P,B,U	B,C,U	B	B,C,U	B	P,M	M,U	P,B,U	P	P	P	P	P,M	P,M
Secure boot				•	◆	◆	◆				◆							•	

◆ = Feature enabled by HW. The actual support depends on the open CPU application SW.

Antenna option notes: 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

Some of the industries that use u-blox short range modules along with a selection of applications are shown here, along with proposed u-blox modules well-suited to the applications.



Industrial automation

- Networked control systems
- Handheld operator terminals
- Networked tools and sensors
- 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 new direction finding feature, a key component of the Bluetooth v5.1 specification, brings the benefits of high precision positioning to indoor applications. NINA-B4 is the first u-blox module designed to act as both a transmitter and a receiver in angle of arrival (AoA) and angle of departure (AoD) direction finding and indoor positioning applications.

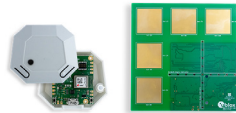
Mesh support: Bluetooth mesh is a specification for forming mesh networks, developed to support a number of use cases for large scale networks. Nodes can communicate using one-to-one, one-to-many, and many-to-many communication. Bluetooth Mesh can be used with u-connectXpress software.

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 to manage the charging process.

Explore and evaluate – kits and cards featuring u-blox modules for easy evaluation

XPLR-AOA-1

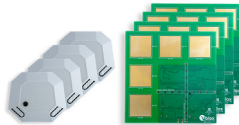
Direction finding explorer kit with NINA-B4 Bluetooth 5.1 module



- 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 4 antenna boards and 4 tags
- High resolution positioning engine
- u-connectLocate software with optimized direction finding

M2-JODY-W2/W3 card

M.2 cards with JODY Wi-Fi 5/6 and Bluetooth 5.0/5.1 module

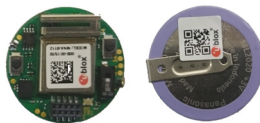


- M.2 Type 2230 Key E form factor
- Dual-band Wi-Fi 2.4 GHz and 5 GHz, 802.11a/b/g/n/ac/ax
- Parallel operation of Wi-Fi and Bluetooth, including long range
- Simultaneous access point (AP), station (STA), or Wi-Fi direct (P2P)

u-blox blueprints – 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
- Powered by USB
- Access to UART over USB
- One button and one RGB LED

IoT solution board

B208 with NINA-B306, SARA-412M, and ZOE-M8



- BLE 5.0, LTE Cat M1/NB-IoT, and GNSS
- Open CPU with Nordic SDK
- Includes accelerometer, RGB LED, and buttons
- Schematics, bill of material, layout, and Gerber data available



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 designed for Bluetooth and/or Wi-Fi.



U.FL connector



Antenna pin



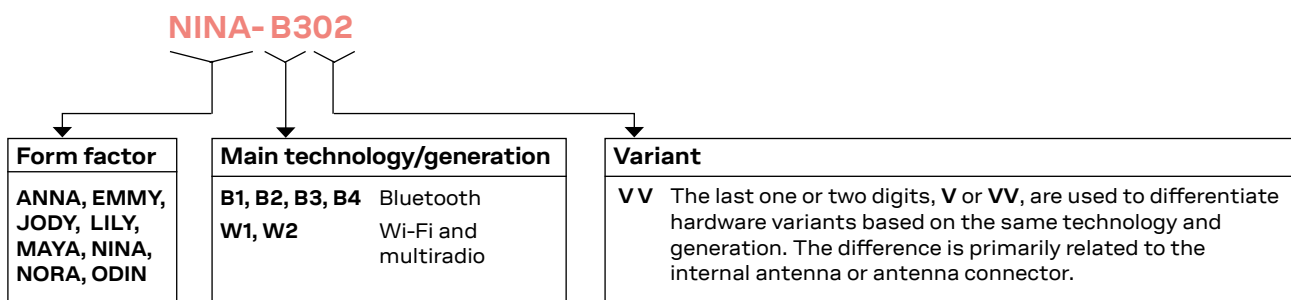
PIFA antenna



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 R41 Z 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
- Module form factor consistency



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-us.

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

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