Short range radio product overview

S

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

Software: We offer specialized software for our 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-locateEmbed* software has an optimized direction finding algorithm for use with indoor positioning solutions. This is currently available for use with NINA-B41x modules and ANT-B1x antenna boards.

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.
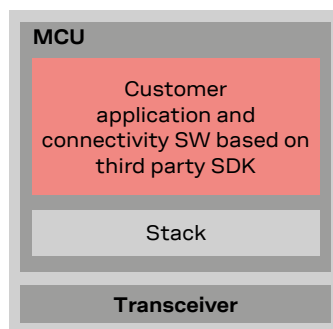
Stand-alone

u-connect

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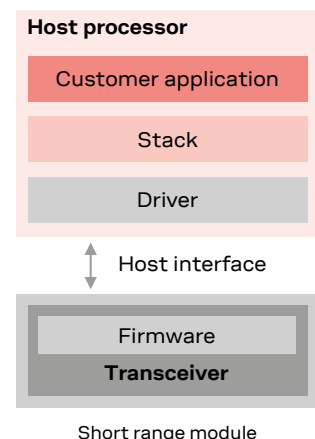- Application runs on the external MCU
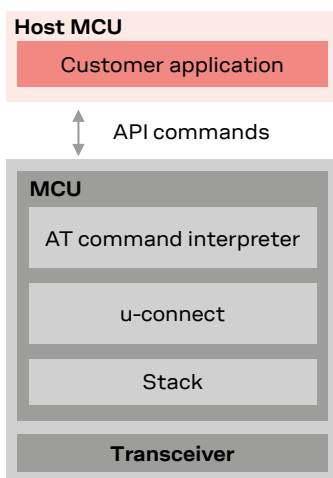
open CPU

- 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

Host MCU

Customer application

↕ API commands

MCU

AT command interpreter

u-connect

Stack

Transceiver

Short range module

MCU

Customer application and connectivity SW based on third party SDK

Stack

Transceiver

Short range module

Host processor

Customer application

Stack

Driver

↕ Host interface

Firmware

Transceiver

Short range module

* Note: u-locateEmbed was previously named u-connectLocate.

u-blox

u-blox short range product overview

S

Technology overview

Stand-alone	Bluetooth												Multiradio					Wi-Fi
	ANNA-B1	ANNA-B4	NORA-B1	NINA-B1	NINA-B2	NINA-B3	NINA-B4	NINA-B5	BMD-34x BMD-380	BMD-360	BMD-30x BMD-350	BMD-330	NORA-W1	NORA-W25xAWS	NORA-W3	NINA-W10 NINA-W15	IRIS-W1	NINA-W13
App software	u/o	u/o	o	u/o	u	u/o	u/o	o	o	o	o	o	u/o	A	u/o	u/o	u/o	u
Bluetooth version	5.0	5.1	5.2	5.0	4.2	5.0	5.1	5.3	5	5.1	5.0	5.0	5.0	5.0	5.3	4.2	5.3	
Bluetooth LE audio			♦														♦	
Bluetooth mesh	♦	♦	♦	♦		♦	♦		♦		♦							
NFC	•	•	♦	•		•	•		♦		•							
Thread / Zigbee		♦	♦			♦	♦	♦	♦	♦							♦	
Wi-Fi band [GHz]													2.4	2.4	2.4/5	2.4	2.4/5	2.4
Wi-Fi version													4	4	4	4	6	4
Antenna options	P,C	P,C	P,B,U	P,M	P,M	P,B,M	P,B,U	P,B	B,C,U	B	B,C,U	B	P,B	P,B		P,B,M	P,B	P,M
Secure boot		•	♦			•	•	•	•				•	•		♦ •	♦	•

Host-based	Multiradio																Wi-Fi
	MAYA-W1	M2-MAYA-W1 (on M.2 card)	MAYA-W2	M2-MAYA-W2 (on M.2 card)	MAYA-W3	M2-MAYA-W3 (on M.2 card)	JODY-W1	JODY-W2	M2-JODY-W2 (on M.2 card)	JODY-W3	M2-JODY-W3 (on M.2 card)	JODY-W4	JODY-W5	M2-JODY-W5 (on M.2 card)	JODY-W6	M2-JODY-W6 (on M.2 card)	LILY-W1
Bluetooth version	5.2		5.2		5.4		5.0/5.1	5.2		5.3		5.3	5.3		5.3		
Bluetooth LE audio				•		•						•		•		•	
Thread / Zigbee				•													
Wi-Fi band [GHz]	2.4/5		2.4/5		2.4/5/6		2.4/5	2.4/5		2.4/5		2.4/5/6	2.4/5		2.4/5/6		2.4
Wi-Fi version	4		6		6/6E		5	5		6		6E	6		6E		4
Antenna options	P, B, U		P, B, U		P, B, U		P	P		P		P	P		P		P, M
Secure boot				•		•						•		•		•	

♦ = 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**

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 overview

Explore and evaluate

Our explorer kits offer multiple technologies in one easy-to-use package. They feature u-blox modules for easy evaluation and prototyping of IoT applications or high precision positioning solutions.

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-HPG-1

Flexible high precision GNSS explorer kit with Wi-Fi, Bluetooth, cellular, and GNSS technologies

- Flexible platform for cm-level accuracy positioning apps
- High precision GNSS, LTE, Wi-Fi, Bluetooth, and antennas
- PointPerfect GNSS augmentation service
- ubxlib software components and application in source code

XPLR-HPG-2

Compact high precision GNSS explorer kit with Wi-Fi, Bluetooth, cellular, and GNSS technologies

- Compact prototyping kit for cm-level accuracy positioning
- High precision GNSS, LTE, Wi-Fi, Bluetooth, and antennas
- PointPerfect GNSS augmentation service
- ubxlib software components and application in source code

Indoor positioning

Our XPLR-AOA kits and antenna array boards are specifically designed for indoor positioning applications. 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.

XPLR-AOA-1

Direction finding explorer kit with NINA-B4 Bluetooth 5.1 module
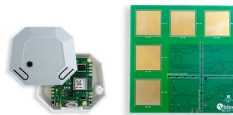
- Evaluate Bluetooth 5.1 direction finding using angle-of-arrival
- Includes one antenna board and one tag
- u-locateEmbed software with optimized direction finding
- High-resolution angle calculation in two dimensions
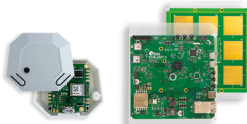
XPLR-AOA-2

Indoor positioning explorer kit with NINA-B4 Bluetooth 5.1 module
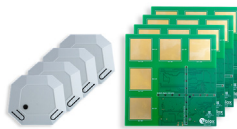
- Evaluation tool for Bluetooth 5.1 indoor positioning
- Includes four antenna boards and four tags
- High resolution positioning engine
- u-locateEmbed software with optimized direction finding

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
- u-locateEmbed software with optimized direction finding
- Includes plastic frame for mounting on walls and surfaces

ANT-B10

Bluetooth Low Energy 5.1 antenna board for direction finding and indoor positioning
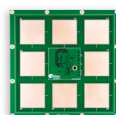
- Compact, eight-element antenna array
- Embedded AoA calculation with u-locateEmbed
- Outputs final angles, ready to be used on application level
- High immunity to multipath effects

ANT-B11

Bluetooth Low Energy 5.1 antenna board for direction finding and indoor positioning
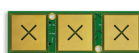
- Compact, three-element antenna array
- Embedded AoA calculation with u-locateEmbed
- Outputs final angles, ready to be used on application level
- High immunity to multipath effects

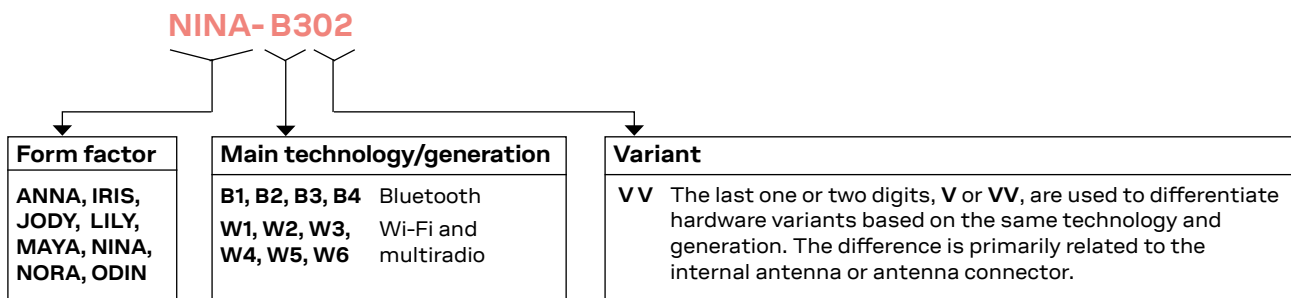# u-blox short range product overview

Popular applications

Many industries use u-blox short range modules an ever-growing selection of applications, such as:

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

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

Asset tracking
- Battery-powered tracking devices
- Trailers, containers, pallets
- Parcels, luggage, power tools
- Livestock, pets

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

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.

NINA- B302

Form factor	Main technology/generation	Variant
ANNA, IRIS, JODY, LILY, MAYA, NINA, NORA, ODIN	**B1, B2, B3, B4** Bluetooth **W1, W2, W3, W4, W5, W6** Wi-Fi and multiradio	**V V** The last one or two digits, **V** or **VV**, are used to differentiate hardware variants based on the same technology and generation. The difference is primarily related to the internal antenna or antenna connector.

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
- Indvidually 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.