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-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.

<table>
<thead>
<tr>
<th>Form factor</th>
<th>Main technology/generation</th>
<th>Variant</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELLA, EMMY, JODY, LILY, NINA, ODIN, VERA,</td>
<td>B1, B2, B3, B4 Bluetooth</td>
<td>VV</td>
</tr>
<tr>
<td></td>
<td>W1, W2 Wi-Fi</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P1, P3 V2X (802.11p)</td>
<td></td>
</tr>
</tbody>
</table>

Further information

For contact information, see www.u-blox.com/contact-us.
For more product details and ordering information, see the product data sheet.
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, Bluetooth®, and V2X 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-connectXpress: Our u-connectXpress software for stand-alone modules makes the integration of Bluetooth, Wi-Fi, and multiradio connectivity into new and existing products easy and efficient.

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-connectXpress 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-connectXpress
- 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

Key features and benefits
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u-blox short range product overview

Technology overview

<table>
<thead>
<tr>
<th></th>
<th>Bluetooth</th>
<th>Multiradio</th>
<th>Wi-Fi</th>
<th>V2X</th>
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<tbody>
<tr>
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<td>ANNA-B1</td>
<td>ANNA-B1</td>
<td>BMD-30</td>
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<td>u-connectXpress</td>
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<td>Open CPU</td>
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<td>5 5 5 5 5 5 5</td>
<td>4.2 4.0 4.2 5 5.1</td>
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<td>NFC</td>
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<td>Antenna options</td>
<td>P M P M B U B C U B</td>
<td>M U P P P</td>
<td>P M P M P P</td>
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<td>Secure boot</td>
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</table>

* = 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

Blueprints

u-blox blueprints provide a reference 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
u-blox short range product overview

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

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

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

**Retail and point of sales**
- Payment terminals
- Vending machines
- Cash registers and receipt printers
- Gateways and hubs

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

**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.

**V2X:** Driven by demands for reducing traffic accidents and optimized traffic management, V2X technology leverages wireless communication for vehicle to vehicle (V2V) and vehicle to infrastructure (V2I) communication, giving all vehicles on the road a shared real time perception of their surroundings. The u-blox UBX P3 communicates via the IEEE 802.11p wireless standard, also referred to as Dedicated Short Range Communications (DSRC), a technology that is mature for the deployment of V2X systems.

**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 promise to further increase the convenience of EV charging. In addition to shortening setup time (drivers simply have to park over the wireless charger), they do away with the need for charging cables, increase safety, and simplify maintenance. In both wired (AC/DC) and wireless charging setups, Wi-Fi is establishing itself as the most efficient solution to manage the charging process.

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