

ANNA-B112 module

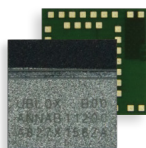
Stand-alone Bluetooth 5 low energy module

The smallest industrial Bluetooth 5 module

- Ultra compact SiP (6.5 x 6.5 x 1.2 mm)
- Bluetooth 5 and Bluetooth mesh
- u-connectXpress software for accelerated time to market
- Open CPU for customer applications
- Internal antenna / antenna pin
- Global certification



6.5 × 6.5 × 1.2 mm



ANNA-B112

Product description

The ANNA-B112 is an ultra-small, high-performing, standalone Bluetooth low energy module. The System in Package (SiP) module features Bluetooth 5, a powerful Arm® Cortex®-M4 microprocessor with FPU, and state-of-the-art power performance. The ANNA-B112 is delivered with u-connectXpress software, and may also be used as an open CPU solution to run customer application firmware.

The u-connectXpress software provides support for u-blox Bluetooth low energy Serial Port Service, GATT client and server, beacons, NFC, Bluetooth mesh, and simultaneous peripheral and central roles – all configurable from a host by means of AT commands.

ANNA-B112 offers full flexibility for customers who prefer their application to run on the built-in Arm Cortex-M4 with FPU. With 512 kB flash and 64 kB RAM, it offers the best-in-class capacity for customer applications running on top of the Bluetooth low energy stack using the SDK from Nordic Semiconductor or Arm Mbed. Additionally, SPI, I2C, and I2S interfaces are available, and features such as NFC, Bluetooth mesh, AirFuel, and Apple HomeKit are also supported. In combination with Wirepas Mesh stack, ANNA-B112 can form large-scale industrial mesh networks for several applications, such as lighting, asset tracking, and metering.

The ANNA-B112 module includes an integrated antenna providing a range of 160 m, and an antenna pin for design-in of an external antenna.

ANNA-B112 is globally certified for use with the internal or external antenna. This reduces time, cost and effort for customers integrating ANNA-B112 in their designs.

Grade	ANNA-B112	
Automotive		
Professional	•	
Standard		
Radio	ANNA-B112	
Chip inside	nRF52832	
Bluetooth qualification	v5.0	
Bluetooth low energy	•	
Bluetooth output power EIRP [dBm] *	5 / 8	
Max range [meters] *	160 / 190	
NFC	•	
Antenna type (see footnotes)	chip / pin	
Application software	ANNA-B112	
u-connectXpress	•	
Open CPU for embedded applications		•
Interfaces	ANNA-B112	
UART	1	◆
SPI		◆
I2C		◆
I2S		◆
PDM and PWM		◆
GPIO pins	11	25
AD converters [number of bits]		12
Features	ANNA-B112	
AT command interface	•	
MCU (see footnotes)		M4F
RAM [kB]		64
Flash [kB]		512
Simultaneous GATT server and client	•	◆
Low Energy Serial Port Service	•	
Throughput [Mbit/s]	0.8	1.4
Maximum Bluetooth connections	7	20
Bluetooth mesh	•	◆
FOTA		◆

* = The different values are for use with internal/external antenna

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

pin = Antenna pin
chip = Internal chip antenna
M4F = 64 MHz Arm® Cortex-M4 with FPU

Features

Bluetooth	v5.0 (Bluetooth low energy)
NFC	NFC-A tag support
Range	160 m with internal antenna 190 m with external antenna
Max. output power	4 dBm conducted 5 dBm with internal antenna 8 dBm with external antenna
Receiver sensitivity	-91 dBm conducted -92 dBm with internal antenna -95 dBm with external antenna

u-connectXpress software

This section describes features of ANNA-B112 when used with the embedded u-connectXpress software. ANNA-B112 is delivered with this software and the module is configured using AT commands.

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; Bluetooth mesh
HW interfaces	UART, 11 x GPIO pins, NFC tag for pairing
Configuration	AT Commands
Support tools	s-center
Operating modes	Central role (7 simultaneous links) Peripheral role (6 simultaneous links) Simultaneous central and peripheral roles (7 in total, whereof max 4 as peripheral and max 6 as central) LE 1M PHY LE 2M PHY Advertising Extensions LE Data Length Extension
Security	Secure Simple Pairing 128-bit AES encryption LE secure connections
Throughput	780 kbps

Open CPU for customer application

Customers can develop and embed their own application on top of the Bluetooth stack and software inside the ANNA-B112 module (open CPU concept). This section describes features specific to using ANNA-B112 with open CPU. Many software features are already available via the Arm Mbed or Nordic SDK environment, and more are added continuously.

Development environment	Nordic SDK (including Bluetooth Mesh, HomeKit, AirFuel, IoT); Arm Mbed 5; Wirepas Mesh (for large scale mesh networking)	
Memory	512 kB flash, 64 kB RAM	
HW interfaces*	NFC tag for pairing 3 x SPI 25 x GPIO pins 8 x ADC channels 12 x PWM	UART 2 x I2C I2S PDM QDEC
Security	Secure Simple Pairing 128-bit AES encryption LE secure connections	

* Not all simultaneously

Further information

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

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

Package

Dimensions	6.5 x 6.5 x 1.2 mm
Weight	0.1 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 V to 3.6 VDC
Power consumption	Active TX @ 0 dBm: 5.3 mA Standby: 2.2 µA with external LPO Sleep: 300 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 (ISED RSS); Japan (MIC); Taiwan (NCC); South Korea (KCC); Australia / New Zealand (ACMA); Brazil (Anatel); South Africa (ICASA); China (SRRC)
Health and safety	EN 62479, EN 62368-1
Bluetooth qualification	v5.0 (Bluetooth low energy)

Support products

The evaluation kits include an ANNA-B112 module on an evaluation board, with access to all module pins at connectors, and built-in debugging capabilities. It can be used either with the ready-to-use u-connectXpress software or with open CPU, where the customer application is developed using a software development kit such as Nordic nRF52 SDK, Arm Mbed, or Wirepas Mesh software.

EVK-ANNA-B112C Evaluation kit for ANNA-B112 module using the internal antenna, with module placed in the corner of the PCB

EVK-ANNA-B112U* Evaluation kit for ANNA-B112 module using the antenna pin, with an external antenna connected via a U.FL connector

*End of life - EVK-ANNA-B112C recommended for use

Product variants

ANNA-B112	With internal antenna and antenna pin
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ANNA-B112-0xB module versions come with the u-connectXpress software installed. (These can be re-flashed with a customer application for the open CPU solution.)

ANNA-B112-70B module versions are shipped specifically with no software loaded, which can simplify the process for customers who plan to install their own application software.

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