

NINA-B416 Click



PID: MIKROE-6618

NINA-B416 Click is a compact add-on board that provides secure, long-range Bluetooth 5.1 Low Energy and NFC tag functionality for embedded applications. It is based on the [NINA-B416](#) module from [u-blox](#). The onboard module supports u-connectXpress software, allowing easy configuration via AT commands over UART, with full support for Bluetooth LE Serial Port Service, GATT client/server, beacons, NFC tag operation, and simultaneous peripheral and central roles. It features secure boot, internal PCB antenna, u.FI NFC antenna connector, output power up to +11dBm, sensitivity of -95dBm, and maximum Bluetooth range up to 1400 meters. This Click board™ is ideal for smart buildings, smart cities, industrial automation, sensor networks, and asset tracking applications where secure and extended Bluetooth communication with NFC tag capability is required.

For more information about **NINA-B416 Click** visit the official [product page](#).

How does it work?

NINA-B416 Click is based on the NINA-B416, a professional-grade, stand-alone Bluetooth 5.1 Low Energy module from u-blox that integrates advanced features to ensure reliable wireless communication. The module operates with u-blox's u-connectXpress software, which greatly simplifies development by allowing easy configuration of connectivity parameters through AT commands via a standard UART interface. This software stack includes support for Bluetooth Low Energy Serial Port Service, full GATT client and server functionality, beacon operation, NFC integration, as well as the capability to operate in both peripheral and central roles simultaneously, offering maximum versatility for complex wireless topologies. With these capabilities, NINA-B416 Click is an ideal solution for applications in smart buildings, smart cities, industrial automation, sensor networks, and asset tracking, where reliable, secure, and

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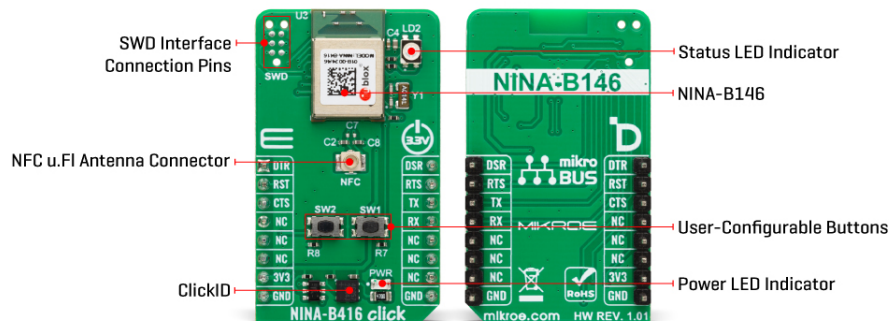


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long-range Bluetooth communication is essential.



The NINA-B416 module incorporates advanced security features such as secure boot, ensuring that only authenticated u-connectXpress firmware is allowed to run, thus protecting the integrity of the system from unauthorized code execution. The module's hardware design includes an integrated PCB antenna, delivering stable wireless performance without the need for external antenna components. Supporting Bluetooth output power of up to +11dBm and sensitivity levels reaching -95dBm at 1Mbit/s, the NINA-B416 module enables communication ranges of up to 1400 meters under optimal conditions, making it highly suitable for demanding environments where long-range connectivity is required. In addition, the module supports up to eight simultaneous Bluetooth connections, allowing efficient management of multiple devices within a network.

This Click board™ establishes communication between the NINA-B416 module and the host MCU through a UART interface, using standard UART RX and TX pins and hardware flow control via CTS and RTS pins. The default communication speed is set at 115200bps, ensuring efficient data exchange. The NINA-B416 software extends the UART interface beyond the usual RX, TX, CTS, and RTS signals by including the DSR (Data Set Ready) and DTR (Data Terminal Ready) pins. Additionally, the Click board™ includes a user-configurable RGB LED indicator labeled LD2, which indicates various module statuses, and two user-configurable buttons.

In addition to the interface pins, the board features a reset (RST) pin for hard-resetting the module when necessary and SWD pads designed for use with MIKROE's [6-pin Needle Cable](#), providing an optional flash and debug SWD (Serial Wire Debug) interface functionality. NINA-B416 Click also includes u.FI antenna for NFC support, that operates at 13.56MHz with a data rate of 106kbps. As an NFC tag, data can be read from NINA-B416 module using an NFC reader. The NINA-B416 module is not capable of reading other tags or initiating NFC communications.

This Click board™ can be operated only with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before using MCUs with different logic levels. It also comes equipped with a library containing functions and example code that can be used as a reference for further development.

Specifications

Type	BT/BLE
Applications	Ideal for smart buildings, smart cities,

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	industrial automation, sensor networks, and asset tracking applications where secure and extended Bluetooth communication with NFC tag capability is required
On-board modules	NINA-B416 - professional-grade, stand-alone Bluetooth 5.1 Low Energy module from u-blox
Key Features	Bluetooth 5.1 Low Energy support, NFC tag functionality, u-connectXpress software with AT command configuration, full GATT client/server, Bluetooth LE Serial Port Service, beacon operation, simultaneous peripheral and central roles, secure boot, integrated PCB antenna, Bluetooth output power up to +11dBm, receiver sensitivity of -95dBm at 1Mbit/s, maximum range up to 1400 meters, support for up to eight simultaneous Bluetooth connections, UART interface, and more
Interface	UART
Feature	ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on NINA-B416 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Data Terminal Ready	DTR	1	AN	PWM	16	DSR	Data Set Ready
Reset / ID SEL	RST	2	RST	INT	15	RTS	UART RTS
UART CTS / ID COMM	CTS	3	CS	RX	14	TX	UART TX
	NC	4	SCK	TX	13	RX	UART RX
	NC	5	MISO	SCL	12	NC	
	NC	6	MOSI	SDA	11	NC	
Power Supply	3.3V	7	3.3V	5V	10	NC	
Ground	GND	8	GND	GND	9	GND	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
LD2	LD2	-	Status LED Indicator
T1-T2	SW1-SW2	-	User-Configurable Buttons

NINA-B416 Click electrical specifications

Description	Min	Typ	Max	Unit
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Supply Voltage	-	3.3	-	V
BLE Operational Frequency	-	2.4	-	GHz
BLE Output Power	-	+11	-	dBm
BLE Receiver Sensitivity (1Mbps)	-	-95	-	dBm
BLE Range	-	-	1400	m
NFC Operating Frequency	-	13.56	-	MHz
NFC Data Rate	-	106	-	kbps

Software Support

[NINA-B416 Click](#) demo application is developed using the [NECTO Studio](#), ensuring compatibility with [mikroSDK](#)'s open-source libraries and tools. Designed for plug-and-play implementation and testing, the demo is fully compatible with all development, starter, and mikromedia boards featuring a [mikroBUS™](#) socket.

Example Description

This example demonstrates the use of NINA-B416 Click board by processing data from a connected BT device.

Key Functions

- `ninab416_cfg_setup` This function initializes Click configuration structure to initial values.
- `ninab416_init` This function initializes all necessary pins and peripherals used for this Click board.
- `ninab416_cmd_run` This function sends a specified command to the Click module.
- `ninab416_cmd_set` This function sets a value to a specified command of the Click module.
- `ninab416_cmd_get` This function is used to get the value of a given command from the Click module.

Application Init

Initializes the driver and logger.

Application Task

Application task is split in few stages:

- **NINAB416_POWER_UP:**
Powers up the device, performs a factory reset and reads system information.
- **NINAB416_EXAMPLE:**
Performs a BT terminal example by processing all data from a connected BT device and sending back an adequate response messages.

Application Output

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This Click board can be interfaced and monitored in two ways:

- Application Output - Use the "Application Output" window in Debug mode for real-time data monitoring. Set it up properly by following [this tutorial](#).
- UART Terminal - Monitor data via the UART Terminal using a [USB to UART converter](#). For detailed instructions, check out [this tutorial](#).

Additional Notes and Information

The complete application code and a ready-to-use project are available through the NECTO Studio Package Manager for direct installation in the [NECTO Studio](#). The application code can also be found on the MIKROE [GitHub](#) account.

Resources

[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click boards™](#)

[ClickID](#)

Downloads

[NINA-B416 click example package](#)

[NINA-B416 click 2D and 3D files v100](#)

[NINA-B416 click schematic v100](#)

[NINA-B41 datasheet](#)

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