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NB IoT 2 Click





PID: MIKROE-4562

NB IoT 2 Click is a compact add-on board that contains a compact LTE Cat NB2 module with ultra-low power consumption. This board features the BC66-NA, a high-performance, multi-band LTE Cat NB2 module with extremely low power consumption from Quectel Wireless Solutions. It provides a flexible and scalable platform for migrating from GSM/GPRS to NB-IoT network and supports band 71 and band 85 to accommodate more operators. It also offers external interfaces, protocol stacks (providing great convenience for your applications), and a complete range of SMS and data transmission services to meet client-side demands. This Click board™ is suitable for a wide range of IoT applications, such as smart metering, intelligent wearables, security and asset tracking, home appliances, environmental monitoring, and many more.

NB IoT 2 Click is supported by a mikroSDK compliant library, which includes functions that simplify software development. This Click board™ comes as a fully tested product, ready to be used on a system equipped with the mikroBUS™ socket.

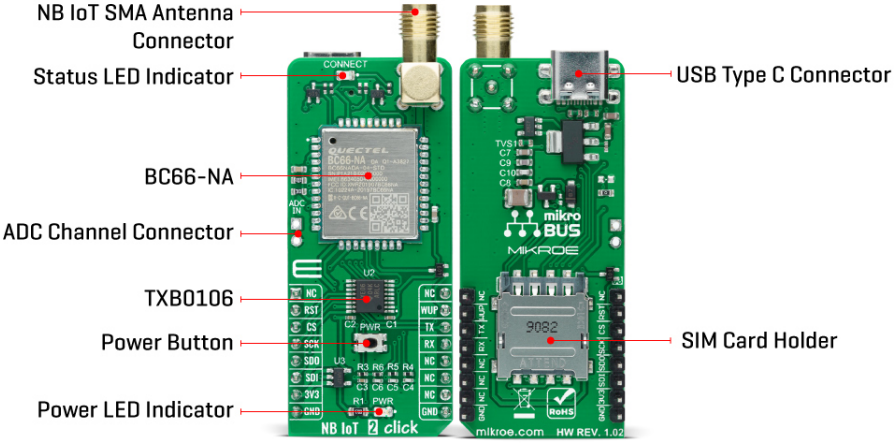
How does it work?

NB IoT 2 Click as its foundation uses the BC66-NA, a high-performance NB-IoT module with extremely low power consumption from Quectel Wireless Solutions. It is designed to communicate with the infrastructures of mobile network operators through NB-IoT radio protocols (3GPP Rel.13 and 3GPP Rel.14). It supports a broad range of frequency bands such as B1/B2/B3/B4/B5/B8/B12/B13/B17/B18/B19/B20/B25/B28/B66/B71/B85. It also provides several interfaces, UART and SPI, and protocol stacks such as UDP/TCP, MQTT, LwM2M, and others. These protocols that allow data and SMS transmission using NB technology, make this module the perfect choice for building IoT applications such as smart gas and water meters, even

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without the need for an external MCU unit.



In order to turn ON this Click board™, the user has to press the onboard push-button labeled as PWRKEY down for a period longer at least 500ms, which represents the Ignition (Power-On) button. PWRKEY button cannot be pulled down all the time; otherwise, the module will not be able to enter into power-save mode. This feature is shown by the yellow diode labeled as CONNECT to indicate the device's Operational Status.

NB IoT 2 Click communicates with MCU using the UART interface as its default communication protocol with the option for the users to use another interface such as SPI if they want to configure the module and write the library by themselves. It supports automatic baud rate detection, operates at 115200 bps by default configuration, and is used for data transmission and exchanging AT commands with the host MCU.

In addition to these features, the BC66-NA also uses two GPIO pins connected to the mikroBUS™ socket. The WUP pin routed on the INT pin of the mikroBUS™ represents the external interrupt pin used for waking up the device from a power-saving mode, while the RST pin on the mikroBUS™ socket can perform Hardware Reset function by putting this pin in a logic low state. This Click board™ also has the micro USB connector allowing the module to be powered and configured by a personal computer. Also, it has an additional header labeled as ADC IN because the BC66-NA provides a 10-bit ADC input channel to read the voltage value. The interface is available in Active mode and has to be woken up first to ensure availability in Sleep modes.

NB IoT 2 Click possesses the SMA antenna connector with an impedance of 50Ω. This Click board™ can use it to connect the appropriate antenna that Mikroe has in its offer. Besides the SMA connector, it also has a SIM card slot that provides multiple connections and interface options.

This Click board™ can be operated only with a 3.3V logic voltage level and comes with a proper logic voltage level conversion performed by the appropriate voltage level translator TXB0106. The board must complete the proper logic voltage level conversion before use with MCUs with different logic levels. However, the Click board™ comes equipped with a library containing functions and an example code that can be used, as a reference, for further development.

Specifications

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Type	LTE IoT
Applications	Can be used for a wide range of IoT applications, such as smart metering, intelligent wearables, security and asset tracking, home appliances, environmental monitoring, and many more.
On-board modules	BC66-NA - high-performance NB-IoT module with extremely low power consumption from Quectel Wireless Solutions
Key Features	Ultra-low power consumption, multi-band NB-IoT module, high performance, built-in eSIM, wake-up interrupt, and more.
Interface	SPI,UART,USB
ClickID	No
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 NB IoT 2 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
	NC	1	AN	PWM	16	NC	
Reset	**RST**	2	RST	INT	15	**WUP**	Wake-Up Interrupt
SPI Chip Select	**CS**	3	CS	RX	14	**TX**	UART TX
SPI Clock	**SCK**	4	SCK	TX	13	**RX**	UART RX
SPI Data OUT	**SDO**	5	MISO	SCL	12	NC	
SPI Data IN	**SDI**	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	CONNECT	-	Status LED Indicator
J2	Analog Input	Unpopulated	ADC Channel Connector
T1	PWR	-	Power Button

NB IoT 2 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Operating Frequency Range	698	-	2170	MHz
Operating Temperature Range	-35	+25	+75	°C

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Software Support

We provide a library for the NB IoT 2 Click on our LibStock page, as well as a demo application (example), developed using MikroElektronika compilers. The demo can run on all the main MikroElektronika development boards.

Library Description

Library provides functions for sending commands to device, and for controlling included GPIO.

Key functions:

- void nbiot2_send_cmd(char *cmd) - Function for sending data to device
- void nbiot2_hw_reset (void) - Function for restarting device

Examples description

The application is composed of three sections :

- System Initialization - Initialization of UART module and additional pins
- Application Initialization - Enables UART Interrupt, resets device, and configures device
- Application Task - Checks few parameters for device connection

Additional Functions :

- void write_buff ( ) - Function for writing response buffer

The full application code, and ready to use projects can be found on our LibStock page.

Other mikroE Libraries used in the example:

- UART

Additional notes and informations

Depending on the development board you are using, you may need USB UART click, USB UART 2 click or RS232 click to connect to your PC, for development systems with no UART to USB interface available on the board. The terminal available in all MikroElektronika compilers, or any other terminal application of your choice, can be used to read the message.

mikroSDK

This Click board™ is supported with mikroSDK - MikroElektronika Software Development Kit. To ensure proper operation of mikroSDK compliant Click board™ demo applications, mikroSDK should be downloaded from the LibStock and installed for the compiler you are using.

For more information about mikroSDK, visit the official page.

Resources

mikroBUS™

mikroSDK

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Click board™ Catalog

Click boards™

Downloads

NB IoT 2 click 2D and 3D files

BC66-NA datasheet

NB IoT 2 click schematic

NB IoT 2 click example on Libstock

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