

NB IoT 6 Click



PID: MIKROE-6419

NB IoT 6 Click is a compact add-on board that provides reliable Narrowband IoT connectivity for embedded applications. It is based on the [BC65](#), a high-performance multi-band NB-IoT module from [Quectel](#) with ultra-low power consumption, compliant with 3GPP Release 13 and Release 14 standards. The board operates across a wide frequency range from approximately 700MHz to 2.2GHz, supporting LTE bands B1, B3, B5, B8, B20, and B28 with a transmission power of 23dBm \pm 2dB and a receiving sensitivity of -114dBm. Alongside the main UART interface with hardware flow control, it integrates auxiliary and debug UARTs, a general-purpose 10-bit ADC channel, a SIM card holder, a network status LED, and an SMA LTE antenna connector. This Click board is ideal for smart metering, asset tracking, smart parking, wearables, agriculture, smart city infrastructure, and environmental monitoring.

For more information about **NB IoT 6 Click** visit the official [product page](#).

How does it work?

NB IoT 6 Click is based on the BC65, a high-performance multi-band NB-IoT module from Quectel with ultra-low power consumption, designed in compliance with 3GPP Release 13 and Release 14 standards. Operating in a wide frequency range from approximately 700MHz up to 2.2GHz, the BC65 supports multiple LTE bands including B1, B3, B5, B8, B20, and B28, protocol stacks like UDP, TCP, and MQTT, along with a transmission power of 23dBm \pm 2dB and excellent receiving sensitivity of -114dBm without retransmission. This board brings reliable Narrowband IoT connectivity to embedded applications, such as smart metering, asset tracking, smart parking, wearables, smart city solutions, agriculture, environmental monitoring, and home appliances that requires wide-area coverage and stable communication.

Mikroe produces entire development toolchains for all major microcontroller architectures.

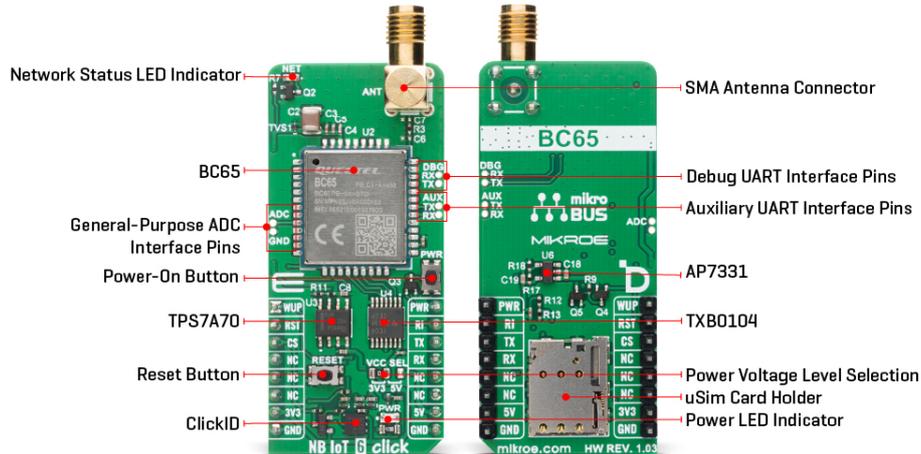
Committed to excellency, we are dedicated to helping engineers bring the project development up to speed and achieve outstanding results.



ISO 27001: 2013 certification of informational security management system.
ISO 14001: 2015 certification of environmental management system.
OHSAS 18001: 2008 certification of occupational health and safety management system.



ISO 9001: 2015 certification of quality management system (QMS).



Communication between the BC65 and the host MCU is made through a UART interface, using standard UART RX and TX pins and Ring Indicator for data transfer. The module defaults to a communication speed of 115200bps, allowing for data exchange over AT commands. The board also includes several additional functionalities that enhance its usability and control. The PWR button allows users to easily power the module ON or OFF, while the RESET button provides a quick way to reset the module. These functions can also be controlled digitally via the mikroBUS™ pins PWR and RST, offering greater flexibility.

NB IoT 6 Click also integrates a rich set of additional communication and peripheral interfaces alongside the main UART connection, making it highly adaptable for diverse development scenarios. In addition to the primary UART interface used for standard data communication, the board provides dedicated pins for a debug UART (DBG), which is intended for firmware debugging and upgrading. It further includes an auxiliary UART (AUX) that allows flexible use of AT command communication and data transmission, giving developers extended control and connectivity options within their applications. Moreover, the module features one general-purpose 10-bit ADC channel that supports input signal levels from 0 to 1.8V, enabling straightforward analog signal acquisition for monitoring external sensors or other analog sources.

The board features one SMA connector for the LTE antenna that MIKROE offers, like the [LTE Flat Rotation Antenna](#), and one blue NET LED that indicates the current network status of the module. The device has successfully registered on the network when the LED blinks slowly. A fast blinking pattern signals data transmission. When the LED is completely OFF, it indicates that the device is either powered OFF or in Power Saving Mode (PSM). The board also has a micro SIM card holder that supports both 1.8V and 3.0V uSIM cards, allowing users to select the most appropriate service provider for their particular use case.

This Click board™ can operate with both 3.3V and 5V logic voltage levels selected via the VCC SEL jumper. Since the BC65 module operates at 4.07V and communicates at 1.8V, a logic-level translator, the [TXB0104](#) is also used for proper operation and an accurate signal-level translation. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. Also, this Click board™ comes equipped with a library containing easy-to-use functions and an example code that can be used as a reference for further development.

Specifications

Type	LTE IoT
------	---------

Mikroe produces entire development toolchains for all major microcontroller architectures.

Committed to excellency, we are dedicated to helping engineers bring the project development up to speed and achieve outstanding results.



ISO 27001: 2013 certification of informational security management system.
 ISO 14001: 2015 certification of environmental management system.
 OHSAS 18001: 2008 certification of occupational health and safety management system.



ISO 9001: 2015 certification of quality management system (QMS).

Applications	Ideal for smart metering, asset tracking, smart parking, wearables, agriculture, smart city infrastructure, and environmental monitoring
On-board modules	BC65 - NB-IoT module with ultra-low power consumption from Quectel
Key Features	Multi-band NB-IoT connectivity compliant with 3GPP Release 13 and 14, supporting LTE bands B1, B3, B5, B8, B20, and B28, ultra-low power consumption, main UART interface with auxiliary and debug UART pins, one general-purpose 10-bit ADC channel, network status indication, micro SIM card holder supporting 1.8V and 3.0V uSIM cards, and more
Interface	UART
Feature	ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on NB IoT 6 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
Module Wake-Up	WUP	1	AN	PWM	16	PWR	Module Power-On
Reset	RST	2	RST	INT	15	RI	Ring Indicator
ID COMM	CS	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	5V	Power Supply
Ground	GND	8	GND	GND	9	GND	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
LD2	NET	-	Network Status LED Indicator
JP1	VCC SEL	Left	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V
T1	PWR	-	Power-On Button
T2	RST	-	Reset Button

NB IoT 6 Click electrical specifications

Mikroe produces entire development toolchains for all major microcontroller architectures.

Committed to excellency, we are dedicated to helping engineers bring the project development up to speed and achieve outstanding results.



ISO 27001: 2013 certification of informational security management system.
 ISO 14001: 2015 certification of environmental management system.
 OHSAS 18001: 2008 certification of occupational health and safety management system.



ISO 9001: 2015 certification of quality management system (QMS).

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Frequency Range	700	-	2200	MHz
Transmitting Power (± 2 dB)	-	23	-	dBm
Receiving Sensitivity (without retransmission)	-	-114	-	dBm

Software Support

[NB IoT 6 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

Application example shows device capability of connecting to the network and sending SMS or TCP/UDP messages using standard "AT" commands.

Key Functions

- `nbiot6_cfg_setup` This function initializes Click configuration structure to initial values.
- `nbiot6_init` This function initializes all necessary pins and peripherals used for this Click board.
- `nbiot6_set_power_state` This function sets a desired power state by toggling PWR, RST, and WUP pins with a specific time frame.
- `nbiot6_cmd_run` This function sends a specified command to the Click module.
- `nbiot6_cmd_set` This function sets a value to a specified command of the Click module.
- `nbiot6_send_sms_text` This function sends text message to a phone number.

Application Init

Initializes the driver and logger.

Application Task

Application task is split in few stages:

- **NBIOT6_POWER_UP:**
Powers up the device and reads system information.
- **NBIOT6_CONFIG_CONNECTION:**
Sets configuration to device to be able to connect to the network.
- **NBIOT6_CHECK_CONNECTION:**
Waits for the network registration indicated via CEREQ command and then checks the signal quality report.

Mikroe produces entire development toolchains for all major microcontroller architectures.

Committed to excellency, we are dedicated to helping engineers bring the project development up to speed and achieve outstanding results.



ISO 27001: 2013 certification of informational security management system.
 ISO 14001: 2015 certification of environmental management system.
 OHSAS 18001: 2008 certification of occupational health and safety management system.



ISO 9001: 2015 certification of quality management system (QMS).

- NBIOT6_CONFIG_EXAMPLE:

Configures device for the selected example.

- NBIOT6_EXAMPLE:

Depending on the selected demo example, it sends an SMS message (in PDU or TXT mode) or TCP/UDP message. By default, the TCP/UDP example is selected.

Application Output

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

[NB IoT 6 click example package](#)

[BC65 datasheet](#)

[NB IoT 6 click 2D and 3D files v103](#)

[NB IoT 6 click schematic v103](#)

Mikroe produces entire development toolchains for all major microcontroller architectures.

Committed to excellency, we are dedicated to helping engineers bring the project development up to speed and achieve outstanding results.



ISO 27001: 2013 certification of informational security management system.
ISO 14001: 2015 certification of environmental management system.
OHSAS 18001: 2008 certification of occupational health and safety management system.



ISO 9001: 2015 certification of quality management system (QMS).