

NB IoT 5 Click



PID: MIKROE-4472

NB IoT 5 Click is a compact add-on board suitable as narrow-band Internet of Things universal wireless communication solution. This board features the OT01-5, a high-performance NB-IoT module with ultra-low power consumption allowing battery life of about ten years from Notion. It supports a broad range of frequency bands almost worldwide. It provides serial interfaces, UART and SPI, with protocol stacks such as UDP/TCP, CoAP, LWM2M, and others. It is offering an alternative to similar Low Power Wide Area Network (LPWAN) solutions. This Click board™ is suitable for a wide range of IoT applications such as smart gas/water meters, information collection, security monitoring, smart city/home, and other applications.

NB IoT 5 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.

NOTE: Please use an antenna that supports frequency bands used by the Notion OT01-5 module to ensure the best performance.

How does it work?

NB IoT 5 Click as its foundation uses the OT01-5, a high-performance narrow-band Internet of Things universal wireless communication module with extremely low power consumption allowing battery life of about ten years from Notion. It supports a broad range of frequency bands worldwide, such as 1 / 2 / 3 / 5 / 8 / 19 / 20 of 3GPP R13 (NB1) and R14 (NB2). It also provides several interfaces, UART and SPI, and protocol stacks such as UDP/TCP, CoAP, LWM2M, and others. In addition to motor driver inside-design, these protocols allow data and SMS transfer using the NB technology and make this module a perfect choice for building 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.

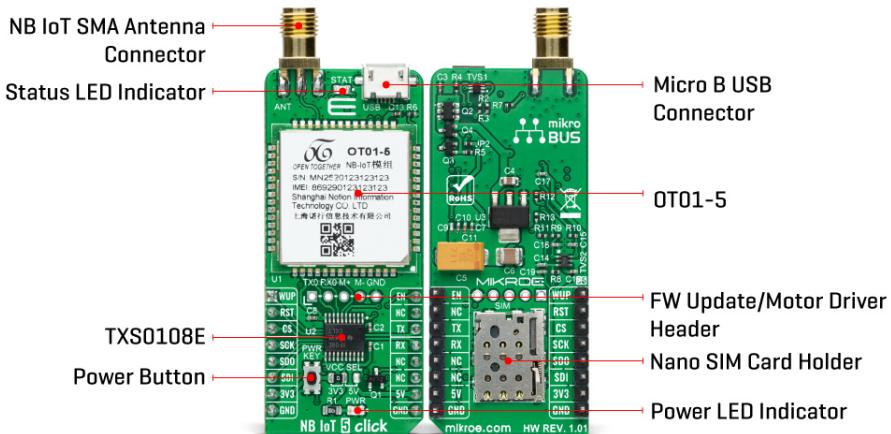


ISO 27001: 2013 certification of informational security management system.
 ISO 14001: 2015 certification of environmental management system.
 OHSAS 18001: 2008 certification of occupational health and safety management system.



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

applications and smart gas and water meters without an external microcontroller unit.



There are two ways to turn on this Click board™, through EN pin on the mikroBUS™ socket or by pressing the PWRKEY button down for a period longer than 3 seconds. The onboard push-button labeled as PWRKEY routed to the PWM pin on the mikroBUS™ socket represents the Ignition (Power-On) button. This feature is shown by the yellow diode labeled as STAT used to indicate the device's Operational Status.

NB IoT 5 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. Also, it has an additional header used for firmware upgrades, software debugging, log capturing, or even as a motor drive.

In addition to these features, the OT01-5 also uses several GPIO pins connected to the mikroBUS™ socket. The WUP pin routed on the AN pin of the mikroBUS™ represents the Wake-up function used for waking up the device, 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.

NB IoT 5 Click possesses the SMA antenna connector with an impedance of 50Ω. This Click board™ can use it to connect the appropriate antenna, such as [LTE Flat Rotation Antenna](#), that [Mikroe](#) has in its [offer](#). Besides the SMA connector, it also has a Nano-SIM card slot that provides multiple connections and interface options.

This Click board™ can operate with both 3.3V and 5V MCUs set via jumper labeled as VCC SEL with a proper logic voltage level conversion performed by the appropriate voltage level translator [TXS0108E](#). This way, it is allowed for both 3.3V and 5V capable MCUs to use communication lines properly. 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

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	Can be used for a wide range of IoT applications such as smart gas/water meters, information collection, security monitoring, smart city/home, and other applications
On-board modules	OT01-5 - high-performance narrow-band Internet of Things universal wireless communication module with extremely low power consumption allowing battery life of about ten years from Notion
Key Features	Ultra-low power consumption, high performance, broad range of frequency bands, motor driver inside-design, certified for global operation, and more.
Interface	SPI, UART, USB
ClickID	No
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 5 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Wake-Up	WUP	1	AN	PWM	16	EN	Power-On Control
Reset	RST	2	RST	INT	15	NC	
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	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	STAT	-	Status LED Indicator
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
CN1	-	Unpopulated	FW Update / Motor Driver Header
T1	PWRKEY	-	Power Button

NB IoT 5 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
Operating Frequency Range	800	-	1800	MHz
Operating Temperature Range	-20	+25	+60	°C

Software Support

We provide a library for the NB IoT 5 Click as well as a demo application (example), developed using MikroElektronika [compilers](#). The demo can run on all the main MikroElektronika [development boards](#).

Package can be downloaded/installed directly from NECTO Studio Package Manager(recommended way), downloaded from our [LibStock™](#) or found on [mikroE github account](#).

Library Description

This library contains API for NB IoT 5 Click driver.

Key functions:

- void nbiot5_cfg_setup (nbiot5_cfg_t *cfg); - Config Object Initialization function.
- NBIOT5_RETVAL nbiot5_init (nbiot5_t *ctx, nbiot5_cfg_t *cfg); - Initialization function.
- void nbiot5_default_cfg (nbiot5_t *ctx); - Click Default Configuration function.

Examples description

The full application code, and ready to use projects can be installed directly from NECTO Studio Package Manager(recommended way), downloaded from our [LibStock™](#) or found on [mikroE github account](#).

Other mikroE Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.NBIoT5

Additional notes and information

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

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).

[mikroBUS™](#)[mikroSDK](#)[Click board™ Catalog](#)[Click boards™](#)

Downloads

[NB IoT 5 click 2D and 3D files](#)[OT01-5 datasheet](#)[TXS0108E datasheet](#)[NB IoT 5 click schematic](#)[NB IoT 5 click example on Libstock](#)

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).