

## Thyone-I Click



PID: MIKROE-6085

Thyone-I Click is a compact add-on board for wireless communication in various devices like control systems, remote controls, and sensor nodes. This board features the WURL-PRO2 Thyone-I (2611011021000) module from Würth Elektronik. It operates in the 2.4GHz license-free band, ensuring secure and reliable data transmission in both point-to-point and mesh configurations. It features versatile connectivity options with onboard and external antenna support, a data transmission rate of up to 2Mbit/s, and embedded security with hardware-accelerated encryption. The module supports the UART interface for easy configuration and control, offering both Command and Transparent modes for flexible operation. Suitable for global deployment, it meets various regulatory requirements and is ideal for applications requiring robust wireless communication, such as industrial automation and IoT networks.

### How does it work?

Thyone-I Click is based on the WURL-PRO2 Thyone-I (2611011021000) module from Würth Elektronik. This radio sub-module provides wireless communication for various devices, including control systems, remote controls, and sensor nodes. Operating within the globally available 2.4GHz license-free band, the Thyone-I ensures secure and reliable data transmission in both point-to-point and mesh configurations. Pre-loaded with Würth Elektronik's WE-ProWare radio stack, it offers high flexibility and reliability. The module interfaces with the host system via a serial UART interface, simplifying the configuration and control of the radio through an easy command interface. Additionally, it features a transparent mode for cable replacement applications, functioning as a serial-to-radio adapter.

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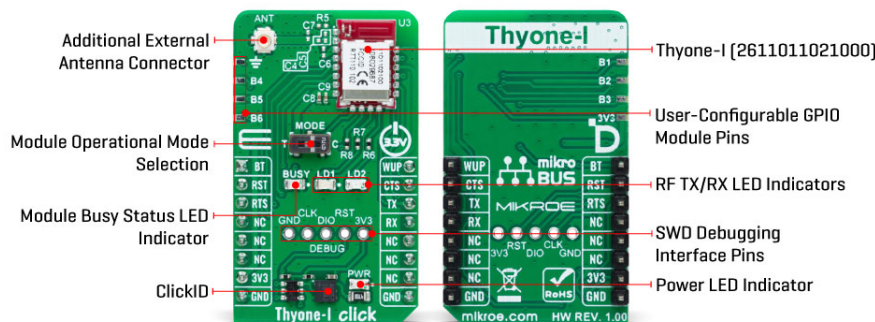
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The Thyone-I module carries versatile features, from low-power, long-range capabilities to line-powered, high-throughput performance, making it energy-efficient. Users can choose between the onboard PCB antenna for compact designs or an external antenna for long-range applications, thanks to the onboard ANT u.FI connector. The module supports a radio profile with a 2Mbit/s data transmission rate, leading to an effective end-to-end throughput of approximately 400kbit/s. It also offers embedded security with a secure bootloader and hardware-accelerated end-to-end encryption. Other features include repeater functionality for simple flooding mesh network creation.

Pre-flashed, tested, and ready to use out-of-the-box, the Thyone-I module complies with various regulatory requirements, making it suitable for global use. Operating in the 2.4GHz band, it can be configured to use one of the 39 channels from 2403MHz to 2479MHz. The module's transmit power ranges from -40dBm to +8dBm, affecting both radio range and current consumption. When powered on, the Thyone-I can be put in Command or Transparent modes of operations via the MODE switch (clearly marked on the board T for Transparent and C for Command). Command mode is the standard mode of operation for Thyone-I. The module can be configured and controlled in this mode using the command interface. In the transparent mode, the module acts as a transparent UART-radio bridge, and any data received on the UART interface will be sent via radio.

As mentioned, communication between the Thyone-I module and the host MCU is established through a UART interface, standard UART RX and TX pins, and hardware flow control pins (CTS/RTS). The default communication speed is 115200bps, ensuring efficient data exchange. The board also includes a reset (RST) pin for hard resetting the module, a wake-up pin for waking the module from Sleep mode, and a Boot (BT) pin to trigger the bootloader mode for firmware updates when set to a low logic level during reset.

It also features three LED indicators: a yellow BUSY LED indicating data transmission activity in Transparent mode and blue and green LEDs (LD1 for TX and LD2 for RX) for RF transmission status. Additionally, it has GPIO and Debug pins. The GPIO pins (B1 to B6) can be configured and controlled for various digital I/O functions, while the Debug pins utilize the Serial Wire Debug (SWD) interface for debugging purposes.

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. Also, it comes equipped with a library containing functions and an example code that can be used as a reference for further development.

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## Specifications

Type	2.4 GHz Transceivers, Mesh Network
Applications	Ideal for applications requiring robust wireless communication, such as industrial automation and IoT networks
On-board modules	WIRL-PRO2 Thyone-I (2611011021000) - 2.4GHz wireless module from Würth Elektronik
Key Features	Operation in the 2.4GHz license-free band, data transmission in both point-to-point and mesh configurations, data transmission rate of up to 2Mbit/s, embedded security with a secure bootloader and hardware-accelerated end-to-end encryption, onboard PCB antenna and a connector for external ones, UART interface, reset/wake-up/boot pins, operational modes control switch, LED indicators for data transmission activity and status, and more
Interface	UART
Feature	ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V

## Pinout diagram

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

Notes	Pin					Pin	Notes
Bootloader	<b>BT</b>	1	AN	PWM	16	<b>WUP</b>	Module Wake-Up
Module Reset / ID SEL	<b>RST</b>	2	RST	INT	15	<b>CTS</b>	UART CTS
UART RTS / ID COMM	<b>RTS</b>	3	CS	RX	14	<b>TX</b>	UART TX
	NC	4	SCK	TX	13	<b>RX</b>	UART RX
	NC	5	MISO	SCL	12	NC	
	NC	6	MOSI	SDA	11	NC	
Power Supply	<b>3.3V</b>	7	3.3V	5V	10	NC	
Ground	<b>GND</b>	8	GND	GND	9	<b>GND</b>	Ground

## Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
LD2-LD3	LD1-LD2	-	RF TX/RX LED Indicators
LD4	BUSY	-	Module Busy Status LED Indicator
SW1	Mode	Right	Module Operational

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			Mode Selection T/C: Left position T, Right position C
J1	DEBUG	Unpopulated	SWD Debugging Interface Header
J2-J3	-	Unpopulated	User-Configurable GPIO Pins

## Thyone-I Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Frequency Range	2403	-	2479	MHz
Output Power	-	-	6	dBm
Line of Sight Range	-	750	-	m

## Software Support

We provide a library for the Thyone-I Click as well as a demo application (example), developed using MIKROE [compilers](#). The demo can run on all the main MIKROE [development boards](#).

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

## Library Description

This library contains API for Thyone-I Click driver.

### Key functions

- `thyonei_get_req` This command can be used to set individual setting parameters in flash of Thyone-I Click board™.
- `thyonei_multicast_data_req` This command provides the multicast data transmission to a group of modules configured with the same MAC GROUP ADDRESS of Thyone-I Click board™.
- `thyonei_unicast_data_req` This command provides the unicast data transmission to the configured MAC DESTINATION ADDRESS of Thyone-I Click board™.

## Example Description

This example demonstrates the use of the Thyone-I Click board™ by sending and receiving data and displaying them on the USB UART.

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

Other MIKROE Libraries used in the example:

- MikroSDK.Board

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- MikroSDK.Log
- Click.Thyone1

## 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. UART terminal is available in all MIKROE [compilers](#).

## mikroSDK

This Click board™ is supported with [mikroSDK](#) - MIKROE 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](#)

[Click board™ Catalog](#)

[Click boards™](#)

[ClickID](#)

## Downloads

[Thyone-I click example on Libstock](#)

[Thyone-I click 2D and 3D files v100](#)

[WIRL-PRO2 Thyone-I \(2611011021000\) datasheet](#)

[Thyone-I click schematic v100](#)

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