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BT840 Click

PID: MIKROE-6454

BT840 Click is a compact add-on board that provides advanced Bluetooth Low Energy (BLE) connectivity for modern IoT applications. This board features the BT840 module from Fanstel, based on the nRF52840 SoC from Nordic Semiconductor, equipped with a Cortex M4F MCU, 1MB Flash, 256KB RAM, and an ARM® TrustZone® Cryptocell-310 co-processor for enhanced security. This Click board™ offers long-range communication with a maximum TX power of +4.9dBm, achieving ranges of up to 210 meters at 125kbps, and supports NFC functionality for easy Bluetooth pairing. Additional features include UART communication, user-configurable LEDs and buttons, GPIO access, and low-power operation through LP CUT traces. BT840 Click is ideal for IoT applications requiring efficient and secure wireless communication, such as industrial monitoring, consumer electronics, and smart home devices.

For more information about **BT840 Click** visit the official product page.

How does it work?

BT840 Click is based on the BT840, an ultra-low power Bluetooth Low Energy (BLE) module from Fanstel, designed to meet the demanding requirements of modern IoT applications. It integrates the nRF52840 QIAA SoC from Nordic Semiconductor, built around a powerful Cortex M4F MCU with 1MB of Flash memory and 256KB of RAM. This module also includes the ARM® TrustZone® Cryptocell-310 co-processor, ensuring robust, industry-grade security for sensitive data. It communicates with the host MCU via a standard UART interface, simplifying integration into existing systems for developing high-performance IoT systems with minimal power requirements.

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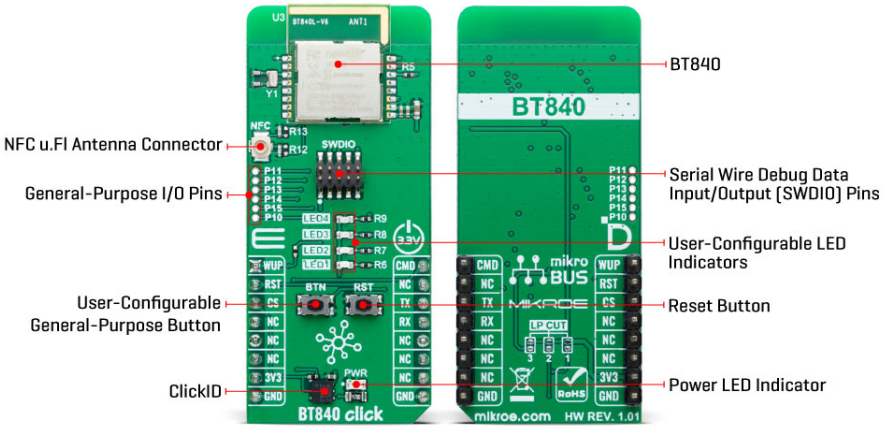

The BT840 module is a complete RF solution featuring an embedded 2.4GHz multi-protocol transceiver and support for NFC functionality, making it suitable for a broad range of IoT use cases. Its integrated PCB trace antenna ensures reliable communication with a maximum TX power of +4.9dBm, enabling long-range performance. Depending on the data rate, it can achieve communication ranges of up to 150 meters at 1Mbps and 210 meters at 125kbps, offering exceptional flexibility for diverse applications. The BT840 Click is ideal for IoT devices requiring efficient and secure wireless communication and is designed to support ultra-low power consumption, long-range connectivity, and high throughput. Its advanced features, including the Cryptographic Accelerator, ensure secure and reliable data transmission, meeting the critical needs of industrial, commercial, and consumer IoT applications.

As mentioned, this Click board™ establishes communication with the host MCU via a UART interface, using the TX and RX pins for data exchange at a default baud rate of 115200bps. In addition to the UART interface, the board features dedicated control pins for enhanced functionality: the WUP pin is used to wake up the module by toggling its logic state, while the CMD pin enables command mode by setting it to a HIGH logic level.

The BT840 Click also includes an external NFC antenna u.Fl connector, enabling advanced Near Field Communication (NFC) capabilities. The module's NFC block supports NFC-A tags, allowing proximity detection and Wake-on-field functionality from a low-power mode. This feature simplifies device pairing by enabling Out-Of-Band (OOB) Bluetooth pairing, streamlining deployment in IoT systems. Additionally, the board features an unpopulated 6-pin header for direct access to the module's GPIO signals, offering flexibility for custom configurations and expanded functionality.

The board has four red LED indicators (LED1-LED4), which can be configured for user-specific applications, along with two buttons: a RST button for resetting the module and a general-purpose BTN button for additional functionality. SWDIO connection pins are available for debugging and development to achieve serial wire debugging. LP CUT traces are located on the back of the board to support low-power operation. By breaking these traces, power is disconnected from the LEDs and the ClickID section, significantly reducing power consumption and enabling efficient operation in energy-sensitive applications.

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.

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Specifications

Type	BT/BLE
Applications	Ideal for IoT applications such as industrial monitoring, consumer electronics, and smart home devices
On-board modules	BT840 - ultra-low power Bluetooth Low Energy (BLE) module from Fanstel
Key Features	Bluetooth Low Energy (BLE) connectivity, module based on Nordic nRF52840 SoC, ARM® TrustZone® Cryptocell-310 co-processor, Embedded 2.4GHz multi-protocol transceiver, NFC support, UART interface, SWDIO debug pins, user-configurable LEDs, GPIO pins, 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 BT840 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Module Wake-Up	**WUP**	1	AN	PWM	16	**CMD**	Command Mode Control
Reset	**RST**	2	RST	INT	15	NC	
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	NC	
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
LD2-LD5	LED1-LED4	-	User-Configurable LED Indicator
T1	RST	-	Reset Button
T2	BTN	-	User-Configurable General-Purpose Button

BT840 Click electrical specifications

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Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Frequency	-	2.4	-	GHz
Receiver Sensitivity	-	-96	-	dBm
Output Power	-	-	+4.9	dBm
BLE Data Rate	125	-	2000	kbps

Software Support

BT840 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 BT840 Click board by processing data from a connected BT device.

Key Functions

- bt840_cfg_setup Config Object Initialization function.
- bt840_init Initialization function.
- bt840_cmd_run This function sends a specified command to the Click module.
- bt840_cmd_set This function sets a value to a specified command of the Click module.
- bt840_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:

- BT840_POWER_UP:

  Powers up the device and reads the system information.

- BT840_CONFIG_EXAMPLE:

  Sets the BT device name.

- BT840_EXAMPLE:

  Performs a BT terminal example by processing all data from a connected BT device and sending back an adequate response messages.

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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

BT840 click 2D and 3D files v101a

BT840 datasheet

BT840 Click example package

BT840 click schematic v101a

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