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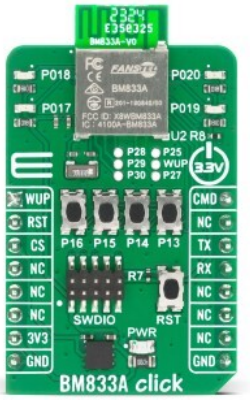
BM833A Click



PID: MIKROE-7002

BM833A Click is a multiprotocol wireless connectivity board for adding low-power Bluetooth® Low Energy and IEEE 802.15.4 communication to embedded systems. It features the BM833A module from Fanstel Corporation, built around Nordic Semiconductor's nRF52811 SoC with a 64MHz Arm® Cortex®-M4 processor, 192KB Flash, 24KB RAM, and an integrated PCB antenna. UART control enables command and data exchange, while Coded PHY, direction finding, AES encryption, OTA updates, user buttons, configurable LEDs, SWD debugging, GPIO access, and ClickID support flexible development. It is suitable for sensor networks, smart buildings, connected homes, lighting control, wearables, portable medical devices, industrial monitoring, and battery-powered IoT systems.

For more information about **BM833A Click** visit the official product page.

How does it work?

BM833A Click is a compact add-on board designed to add low-power, multiprotocol 2.4GHz wireless connectivity to embedded applications. This Click board™ is based on the BM833A from Fanstel Corporation, a Bluetooth Low Energy module built around the Nordic Semiconductor nRF52811 QFAA SoC. The module integrates a 64MHz, 32-bit Arm® Cortex®-M4 processor, 192KB of Flash memory, 24KB of RAM, a 2.4GHz multiprotocol transceiver, RF matching circuitry, and a PCB trace antenna. Integrated DC/DC converter inductors reduce the number of external components and help achieve efficient low-power operation. The BM833A supports Bluetooth® 5.1 Low Energy, IEEE 802.15.4-2006, and proprietary 2.4GHz communication, making the board suitable for sensor networks, building and home automation, lighting control, wearable electronics, portable medical equipment, and other battery-powered IoT devices.

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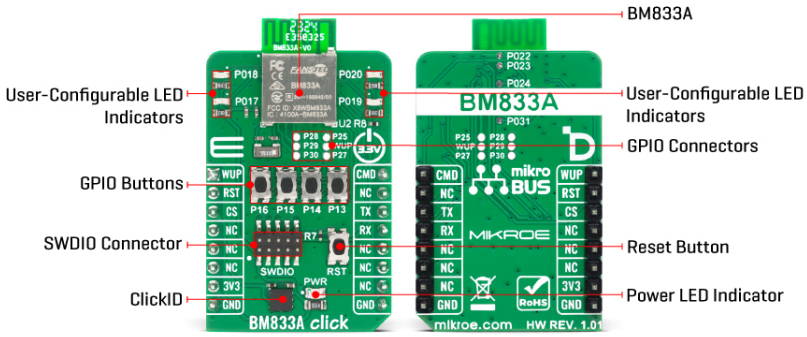

The Bluetooth radio supports 2Mbps and 1Mbps data rates, as well as 500kbps and 125kbps Coded PHY modes for increased communication range. Receiver sensitivity reaches -104dBm at 125kbps, while the transmit power is programmable from +4dBm to -20dBm in 4dB steps. According to the module specifications, an estimated BLE range of up to 680m can be achieved at 125kbps under appropriate operating conditions. The nRF52811 also supports Bluetooth direction finding using Angle-of-Arrival and Angle-of-Departure techniques, hardware AES encryption, RSSI measurement with 1dB resolution, Nordic SoftDevices, and over-the-air firmware updates. Its peripheral set includes 32 GPIOs, a 12-bit 200KSPS ADC with eight configurable channels, SPI, I2C-compatible two-wire communication, UART with DMA and hardware flow control, PDM, PWM, timers, real-time counters, a low-power comparator, a quadrature decoder, and a Programmable Peripheral Interconnect system for direct peripheral operation with reduced CPU intervention. The module operates across a temperature range from -40°C to +85°C and requires only about 4.6mA peak current in receive mode or when transmitting at 0dBm.

BM833A Click communicates with the host MCU through a UART interface. The module TX signal is routed to the RX pin of the mikroBUS™ socket, while the module RX signal is routed to the mikroBUS™ TX pin. In addition to the UART lines, the WUP input is connected to the mikroBUS™ AN pin and allows the host to wake the module when required. The CMD line is routed to the PWM pin and provides command/data mode selection, while the active-low module reset signal is available through the mikroBUS™ RST pin. The mikroBUS™ CS pin is reserved for communication with the onboard ClickID identification circuitry rather than the BM833A module. The remaining SPI, I2C, and INT pins of the mikroBUS™ socket are not used. This arrangement allows the host MCU to exchange commands and application data with the wireless module while retaining direct control over its operating mode, wake-up state, and reset condition.

The board includes a 32.768kHz crystal that provides the BM833A with an accurate low-frequency clock source for sleep timing and low-power operation. A 10-pin SWD header gives access to SWDIO, SWCLK, SWO, reset, 3.3V, and ground signals for programming, debugging, and firmware development. Four active-low user pushbuttons are connected to GPIOs P0.16 through P0.13, while a separate active-low RST button provides manual module reset. Four red user-configurable LED indicators are connected to GPIOs P0.20 through P0.17, and a green PWR LED indicates the presence of the board supply. Two unpopulated three-pin I/O header footprints provide additional access to P0.25, WUP, P0.27, P0.28, P0.29, and P0.30, while dedicated test points expose P0.22, P0.23, P0.24, and P0.31. The board also incorporates a DS28E36BQ-based ClickID circuit, enabling automatic identification of the add-on board by

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compatible host systems.

BM833A Click operates exclusively from the 3.3V power rail of the mikroBUS™ socket, which also defines its logic voltage level, while the 5V rail is not connected. Appropriate external level conversion is therefore required when using the board with host controllers operating at a different logic voltage. This Click board™ comes with a library containing easy-to-use functions and a ready-to-use example code that can be downloaded and used as a reference for further development.

Specifications

Type	BT/BLE
Applications	Ideal for applications such as sensor networks, smart home and building automation, lighting control, wearable devices, portable medical equipment, industrial monitoring, asset tracking, and battery-powered IoT systems
On-board modules	BM833A - Bluetooth® 5.1 Low Energy and IEEE 802.15.4 module based on the nRF52811 SoC with an integrated PCB trace antenna from Fanstel Corporation
Key Features	Based on the BM833A wireless module, Bluetooth 5.1 Low Energy, IEEE 802.15.4 and proprietary 2.4GHz communication, 2Mbps and Coded PHY operation, Bluetooth direction finding, hardware AES encryption, OTA firmware updates, UART communication, integrated PCB antenna, four GPIO buttons, four user-configurable LEDs, SWD debugging, additional GPIO access, ClickID, 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 BM833A Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Wakeup	**WUP**	1	AN	PWM	16	**CMD**	CMD MODE
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	

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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	P020	-	User-Configurable LED Indicator
LD3	P019	-	User-Configurable LED Indicator
LD4	P018	-	User-Configurable LED Indicator
LD5	P017	-	User-Configurable LED Indicator
T1	P016	-	Active Low GPIO Button
T2	P015	-	Active Low GPIO Button
T3	P014	-	Active Low GPIO Button
T4	P013	-	Active Low GPIO Button
T5	RST	-	Active Low RESET Button
J1	-	-	IO Header
J3	-	-	IO Header

BM833A Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Operating Range	-	-	680	M
Frequency Range	-	-	2.4	GHz
Data Rate	-	-	2	Mb/s
Sensitivity	-	-104	-	dBm
Memory Size (Flash/RAM)	-	-	192/24	kB
Operating Temperature Range	-40	-	85	°C

Software Support

BM833A 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 BM833A Click board by processing data from a connected BT device.

Key Functions

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- bm833a_cfg_setup This function initializes Click configuration structure to initial values.
- bm833a_init This function initializes all necessary pins and peripherals used for this Click board.
- bm833a_cmd_run This function sends a specified command to the Click module.
- bm833a_cmd_set This function sets a value to a specified command of the Click module.
- bm833a_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:

- BM833A_POWER_UP:

  Powers up the device and reads the system information.

- BM833A_CONFIG_EXAMPLE:

  Sets the BT device name.

- BM833A_EXAMPLE:

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

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

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Click board™ Catalog

Click boards™

ClickID

Downloads

BM833A Click example package

BM833A Click 2D and 3D files v101

BM833A Click schematic v101

BM833A datasheet

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