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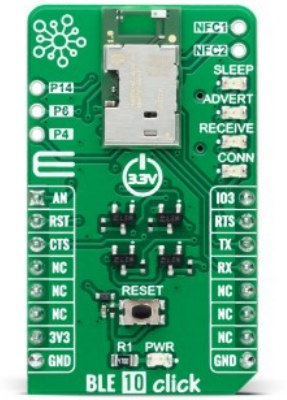
BLE 10 Click





PID: MIKROE-5135

BLE 10 Click is a compact add-on board that provides BT/BLE connectivity for any embedded application. This board features the PAN1780-AT, a Bluetooth® 5 Low Energy Module based on Nordic's nRF52840 single-chip controller from Panasonic. The Bluetooth® 5 features enable a higher symbol rate of 2Mbps using the high-speed LE 2M PHY, allowing for much larger broadcasted data in connectionless scenarios. Nordic nRF52840 comes with integrated BlueRadios nBlue™ Bluetooth® AT.s LE Command Set, ARM® Cortex®-M4F, 1MB Flash, and a 256kb RAM offering high design flexibility, supporting also Type 2 Near Field Communication (NFC). This Click board™ is suitable for low-energy Bluetooth® applications, high interference environments, connectionless scenarios, and long-range applications.

BLE 10 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.

How does it work?

BLE 10 Click as its foundation uses the PAN1780-AT, a low-power Bluetooth® module that provides BLE connectivity for any embedded application from Panasonic. The PAN1780-AT is based on the Nordic nRF52840 single-chip controller with integrated BlueRadios nBlue™ Bluetooth AT.s LE Command Set. With its ARM® Cortex®-M4F, a 1MB Flash, and a 256kb RAM, the PAN1780-AT offers high design flexibility, alongside its new channel selection algorithm, which improves its performance in high interference environments.

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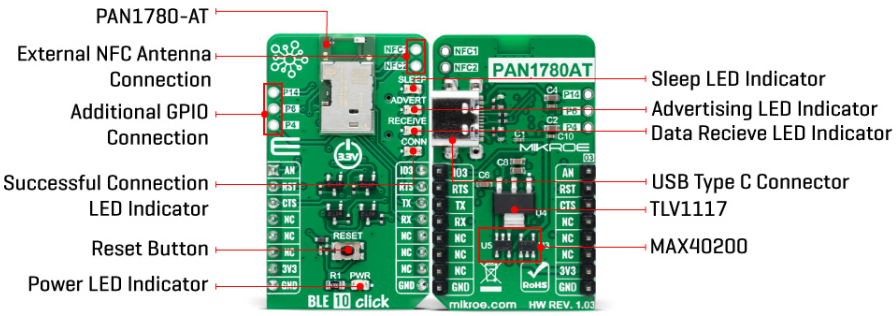

The Bluetooth® 5 features an additionally higher symbol rate of 2Mbps using the high-speed LE 2M PHY or a significantly longer range using the LE Coded PHY. The output power of up to 8dBm and the high sensitivity of the nRF52840 combined with the LE Coded PHY make this module very attractive in long-range applications.

The PAN1780-AT communicates with MCU using the UART interface with commonly used UART RX, TX, and hardware flow control pins UART CTS and RTS (Clear to Send and Ready to Send) as its default communication protocol for exchanging AT commands. It operates at 115200bps by default configuration to transmit and exchange data with the host MCU. The PAN1780-AT uses a proprietary GATT profile developed by BlueRadios to stream data; it is not an official Bluetooth® profile. BlueRadios serial port implementation simplifies the user experience, allowing users to stream data similar to how the official Bluetooth® Serial Port Profile (SPP) works on BR/EDR devices. This Click board™ is also equipped with a USB type C connector, which allows the module to be powered and configured by a personal computer (PC).

In addition to these features, it also uses several other mikroBUS™ pins. A Reset button routed to the RST pin on the mikroBUS™ socket puts the module into a Reset state, while AN and IO3 pins routed to the AN and PWM pins on the mikroBUS™ socket represent analog signal monitor and GPIO signal which can be used as Sleep Mode toggle function. In addition, it has four orange LED indicators to indicate various functions such as Sleep mode activation, advertising, received data/commands, and successful module connections.

Two unpopulated headers can also be found on this Click board™, one of which is provided for the optional connection of an external NFC antenna (Type 2 Near Field Communication (NFC-A) for use in simplified pairing and payment solutions), while the second header represents three additional GPIO pins that carry a handful of additional functions whose description can be found in the attached datasheet.

This Click board™ can be operated only with a 3.3V logic voltage level. Considering that the board can also be powered via USB, using the additional LDO, the TLV1117 achieves the required voltage of 3.3V required to power the module. An LDO and 3V3 mikroBUS™ power rail have protection in the form of diode MAX40200 to prevent any unwanted back voltage. The board must also perform appropriate logic voltage level conversion before using MCUs with different logic levels. 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

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Type	BT/BLE
Applications	Can be used for low-energy Bluetooth® applications, high interference environments, connectionless scenarios, and long-range applications
On-board modules	PAN1780-AT - Bluetooth® Low Energy Module from Panasonic
Key Features	Based on Nordic nRF52840 single-chip controller featuring ARM® Cortex®-M4F with 64 MHz, Bluetooth® 5 LE including LE 2M and LE Coded PHY, low power consumption, embedded 1 MB Flash memory and 256 kB internal RAM, AT command set, and more
Interface	UART,USB
ClickID	No
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 BLE 10 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Analog Signal	**AN**	1	AN	PWM	16	**IO3**	General Purpose I/0
Reset	**RST**	2	RST	INT	15	**RTS**	UART RTS
UART CTS	**CTS**	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	SLEEP	-	Sleep LED Indicator
LD3	ADVERT	-	Advertising LED Indicator
LD4	RECEIVE	-	Data Receive LED Indicator
LD5	CONN	-	Successful Connection LED Indicator
T1	RESET	-	Reset Button
J1	-	Unpopulated	Additional GPIO Connection Header

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J2	-	Unpopulated	External NFC Antenna Connection Header

BLE 10 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Operating Frequency Range	2.402	-	2.480	MHz
Data Rate	-	-	2	Mbps
Operating Temperature Range	-40	+25	+85	°C

Software Support

We provide a library for the BLE 10 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 BLE 10 Click driver.

Key functions

- ble10_set_device_name This function sets the local device name.
- ble10_factory_reset This function factory resets the device.
- ble10_get_temperature This function executes get temperature command which returns the current temperature of the module's internal temperature sensor.

Example Description

This example reads and processes data from BLE 10 clicks.

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.BLE10

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

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interface available on the board. UART terminal is available in all MikroElektronika compilers.

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

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

Downloads

BLE 10 click example on Libstock

BLE 10 click 2D and 3D files

BLE 10 click schematic

MAX40200 datasheet

PAN1780 AT commands

TLV1117 datasheet

PAN1780 datasheet

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