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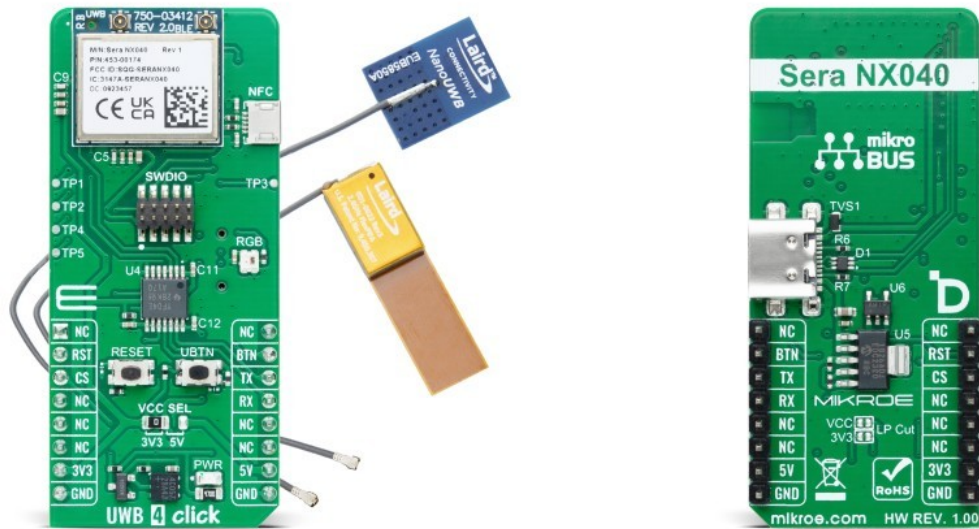www.mikroe.com

UWB 4 Click

PID: MIKROE-6305

UWB 4 Click is a compact add-on board for precise indoor positioning and location-based applications. This board features the Sera NX040 (453-00174C) from Ezurio, featuring NXP's SR040 chipset for ultra-wideband (UWB) and Nordic Semiconductor's nRF52833 for Bluetooth LE. The module supports IEEE 802.15.4/4z HPR UWB operations, providing exceptional ranging accuracy of less than ±10 cm with a typical receiver sensitivity of -92 dBm. It includes a USB interface and SWD/JTAG header for development and debugging, reset and user buttons, RGB LED indicator, and test points for easy testing. This Click board™ is ideal for asset tracking, navigation, and industrial automation applications, where precise positioning and wireless communication are crucial.

How does it work?

UWB 4 Click is based on the Sera NX040 (453-00174C), an advanced UWB/BLE module equipped with external antenna connectors from Ezurio. The module features top-tier silicon: NXP's SR040 chipset for ultra-wideband (UWB) and Nordic Semiconductor's nRF52833 for Bluetooth LE, providing outstanding performance in precise positioning and wireless communication. Moreover, the module is pre-calibrated for regulatory compliance and optimized for superior ranging performance across various temperatures and UWB antenna implementations, making this Click board™ ideal for precise indoor positioning and location-based applications, such as asset tracking, navigation, and industrial automation.

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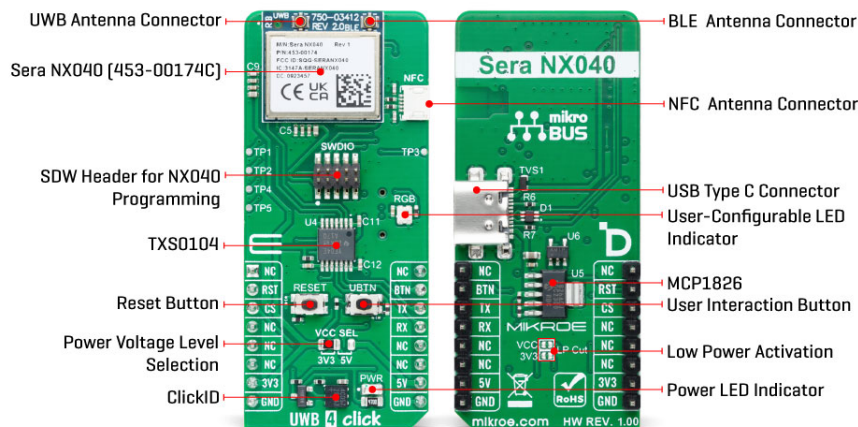
As mentioned, at the heart of the Sera NX040 is the NXP SR040 Ultra-Wideband Transceiver, which supports IEEE 802.15.4/4z High Precision Ranging (HPR) UWB operations. It includes a fully embedded FiRa-compliant MAC and PHY, allowing for seamless Two-Way Ranging (TWR) sessions in both initiator and responder modes, as well as Blink mode operation within Time Difference of Arrival (TDoA) systems. The SR040 achieves exceptional ranging accuracy of less than ±10cm, with a typical receiver sensitivity of -92dBm. Additionally, the module incorporates the Nordic Semiconductor nRF52833 chipset, a fully certified Bluetooth SoC that supports Bluetooth (LE) 5.4 for the efficient provisioning, setup, and control of UWB ranging sessions. The nRF52833 offers a maximum transmit output power of +8dBm and a typical receive sensitivity of -96dBm.

The Sera NX040 achieves communication with the host MCU via a UART interface via standard RX and TX pins. With a default baud rate of 115200bps, this setup ensures efficient and reliable data transfer. In addition to UART, this board is equipped with a USB type-C connector for USB 2.0 FS (Full Speed, 12Mbps), enabling direct connection to the Sera NX040 module's USB port for flexible integration. When using the USB interface, the entire system is powered by a 3.3V supply provided by the [MCP1826](#) LDO regulator, which converts the 5V from the USB to 3.3V.

For development and debugging, the module provides a SWDIO header that grants access to the nRF52833's SWD (JTAG) interface, making it compatible with the Nordic SDK. This interface is crucial for developers leveraging advanced features and performing in-depth testing. Comprehensive support for USB drivers is available through the Nordic SDK, enhancing the module's versatility in various development environments.

NOTE: For detailed information on software, documentation, and the latest updates, please visit the official Sera NX040 [product page](#) and its [GitHub repository](#).

In addition to the interface pins, this Click board™ features a reset pin (RST) and a RESET button for module resetting. It also includes a user pin (BTN) and button (UBTN) for interactive control over the program flow. An RGB LED acts as a user-configurable red LED indicator, providing visual feedback for various statuses, such as UART messaging, boot processes, or debugger commands. The board also includes an NFC antenna connector for NFC applications and test points for debugging and monitoring. TP1 and TP2 serve as the second UART pins of the Sera NX040, while TP3, TP4, and TP5 provide access to the SR040 RST, SWCLK, and SWDIO pins, respectively. These features enable easy access to testing and development, making the board highly versatile for a wide range of applications.

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At the bottom of the UWB 4 Click, there are LP Cut traces. By cutting these traces, you can achieve low power consumption by disconnecting the PWR LED and ClickID from the circuit, resulting in additional power savings.

This Click board™ can operate with both 3.3V and 5V logic voltage levels selected via the VCC SEL jumper. Given that the Sera NX040 module operates at 3.3V, a logic-level translator, the TXS0104, is also used for proper operation and an accurate signal-level translation. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. Also, this Click board™ comes equipped with a library containing easy-to-use functions and an example code that can be used as a reference for further development.

Specifications

Type	UWB
Applications	Ideal for asset tracking, navigation, and industrial automation applications
On-board modules	Sera NX040 (453-00174C) - UWB/BLE module from Ezurio
Key Features	Ultra-Wideband (UWB) technology, Bluetooth LE connectivity, UART and USB interfaces, SWDIO, equipment for user interactions (buttons, LED, and test points), low-power mode, two Ezurio antennas included in the package, and more
Interface	UART,USB
Feature	ClickID
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 UWB 4 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikro™ BUS			Pin	Notes
	NC	1	AN	PWM	16	NC	
Reset	**RST**	2	RST	INT	15	**BTN**	User Interaction Signal
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	**5V**	Power Supply
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description

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LD1	PWR	-	Power LED Indicator
LD2	RGB	-	User-Configurable LED Indicator
JP1	VCC SEL	Left	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V
NT1-NT2	LP Cut	Connected	Low Power Mode Traces
T1	RESET	-	Reset Button
T2	UBTN	-	User Interaction Button
TP1-TP2	TP1-TP2	-	UART1 Interface Test Points
TP3-TP5	TP1-TP2	-	SR040 RST/SWCLK/SWDIO Test Points

UWB 4 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
UWB Frequency Range	6.24	-	8.24	GHz
UWB Channel Bandwidth	-	500	-	MHz
UWB RX Sensitivity	-	-92	-	dBm
UWB Ranging ToF Accuracy	-10	-	+10	cm
BLE Frequency Range	2402	-	2480	MHz
BLE RX Sensitivity	-	-96	-	dBm

Software Support

We provide a library for the UWB 4 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 UWB 4 Click driver.

Key functions

- uwb4_cmd_run This function sends a specified command to the click module.

- uwb4_cmd_set This function sets a value to a specified command of the click module.

- uwb4_reset_device This function resets the device by toggling the reset pin logic state.

Example Description

This example demonstrates the use of UWB 4 Click board™ by showing the UWB ranging

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between two click boards configured as initiator and responder.

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
- MikroSDK.Log
- Click.UWB4

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

UWB 4 click example on Libstock

UWB 4 click 2D and 3D files v100

Sera NX040 datasheet

EUB5850A3S-10MH4L datasheet

001-0022 datasheet

UWB 4 click schematic v100