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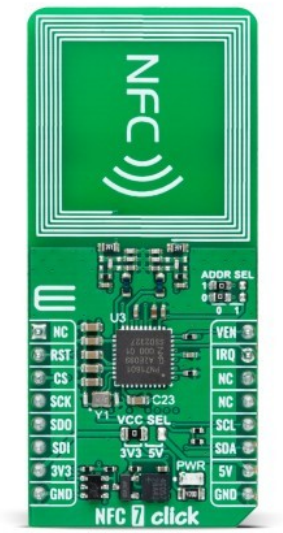
NFC 7 Click - I2C



PID: MIKROE-6453

NFC 7 Click - I2C is an add-on board that integrates NFC functionality in various applications. This board features the PN7160 (PN7160A1HN/C100), a Near Field Communication (NFC) controller from NXP that is compliant with NFC Forum and NCI 2.0 standards. The board features an I2C communication interface, low-power consumption modes, and a new-generation RF contactless front-end design with high sensitivity and dynamic load modulation for reliable communication. It supports multiple NFC standards, including ISO/IEC 14443, ISO/IEC 15693, MIFARE, and FeliCa, and offers standalone card emulation functionality. Ideal for mobile devices, wearables, personal digital assistants, consumer electronics, and smart home gateways, NFC 7 Click ensures efficient and versatile NFC performance for modern applications.

For more information about **NFC 7 Click - I2C** visit the official product page.

How does it work?

NFC 7 Click is based on the PN7160, a Near Field Communication (NFC) controller from NXP. This versatile NFC solution is designed to comply with NFC Forum and NCI 2.0 standards, offering robust integration for a wide range of NFC-enabled applications. This version of NFC 7 Click communicates with the host MCU exclusively through an I2C interface (PN7160A1HN/C100) and provides an optimized architecture for low-power consumption. The PN7160 features multiple power-saving modes, including a Hard Power-Down state, a firmware-activated Standby state, and a low-power polling loop for automatic device discovery to ensure efficient energy use across various operating scenarios. NFC 7 Click is particularly well-suited for portable and low-power applications where reliable NFC functionality is essential, including mobile devices, wearable technology, personal digital assistants, consumer electronics, and

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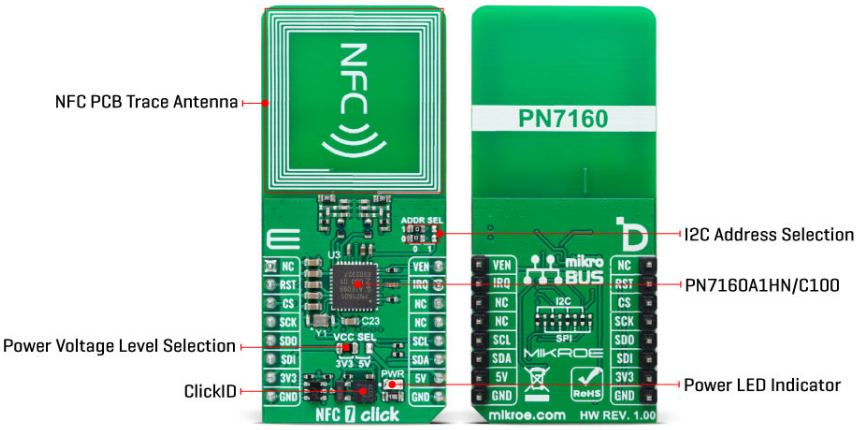
smart home gateways.



At its core, the PN7160 incorporates a new generation RF contactless front-end, supporting transmission modes compliant with NFCIP-1 and NFCIP-2, as well as ISO/IEC 14443, ISO/IEC 15693, MIFARE, and FeliCa standards. This advanced design significantly enhances performance by delivering higher sensitivity and active load modulation capabilities. These improvements allow NFC 7 Click to maintain reliable communication even with small antenna designs, such as the one integrated into this board.

The PN7160 introduces Enhanced Dynamic Load Modulation Amplitude (DLMA), which adapts the modulation amplitude dynamically based on external field strength. This feature extends communication distances in card emulation mode, ensuring independent phase adjustments for Type A, B, and F communication with 5° precision. Additionally, dynamic power control enables the board to operate at maximum power in reader mode without surpassing standard-defined limits, even at zero distance. In standalone card functionality, the PN7160 can operate autonomously once configured by the host MCU, allowing Passive Integrated Circuit Card (PICC) features to function without requiring the host to remain powered on. This makes NFC 7 Click an ideal solution for energy-efficient and always-on NFC applications.

As mentioned, NFC 7 Click uses a standard 2-wire I2C communication protocol, allowing the host MCU to control the PN7160 with clock frequencies up to 3.4MHz in High-Speed mode. In this I2C version of the board, the ADDR SEL jumpers must be populated to select the desired I2C address, ensuring proper communication with the host device. Additionally, the back of the board features a set of resistors that need to be populated depending on the board version; in this case, only the resistors in the I2C positions are populated, as required for I2C functionality.

Besides the interface pins, NFC 7 Click incorporates the VEN pin, which places the device into Hard Power-Down mode to conserve energy when not in use. It also uses the IRQ pin to handle interrupt requests, providing a mechanism for the host MCU to respond promptly to events such as tag detection, completed operations, or errors, enhancing the overall responsiveness and efficiency of NFC-based applications.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the VCC SEL jumper. 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.

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Specifications

Type	RFID/NFC
Applications	Ideal for mobile devices, wearables, personal digital assistants, consumer electronics, and smart home gateways
On-board modules	PN7160A1HN/C100 - Near Field Communication (NFC) controller from NXP
Key Features	Compliant with NFC Forum and NCI 2.0 standards, 2-wire I2C protocol with clock frequencies up to 3.4MHz, Hard Power-Down, firmware-activated Standby, and low-power polling loop for device discovery, high sensitivity and active load modulation, NFCIP-1, NFCIP-2, ISO/IEC 14443, ISO/IEC 15693, MIFARE, and FeliCa standards, and more
Interface	I2C
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 NFC 7 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
	NC	1	AN	PWM	16	**VEN**	Hard Power-Down Mode
ID SEL	**RST**	2	RST	INT	15	**IRQ**	Interrupt
ID COMM	**CS**	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	**SCL**	I2C Clock
	NC	6	MOSI	SDA	11	**SDA**	I2C Data
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
LD1	PWR	-	Power LED Indicator
JP1	VCC SEL	Left	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V
JP2-JP3	ADDR SEL	Left	I2C Address Selection 0/1: Left position 0,

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			Right position 1

NFC 7 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Subcarrier Frequency	-	13.56	-	MHz

Software Support

We provide a library for the NFC 7 Click - I2C 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 NFC 7 Click - I2C driver.

Key functions

- nfc7i2c_wait_discovery This function waits until remote NFC device is discovered.
- nfc7i2c_presence_check This function waits until the discovered target device is removed.
- nfc7i2c_stop_discovery This function stops the RF discovery process.

Example Description

This example demonstrates the use of NFC 7 Click - I2C by handling the detection and processing of various NFC technologies and protocols, and ensuring the application can respond to different NFC card types (A,B,F,V).

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.NFC7I2C

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.

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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

NFC 7 click - I2C example on Libstock

NFC 7 click - I2C 2D and 3D files v100

PN7160 datasheet

NFC 7 click - I2C schematic v100