

## NFC 2 Click

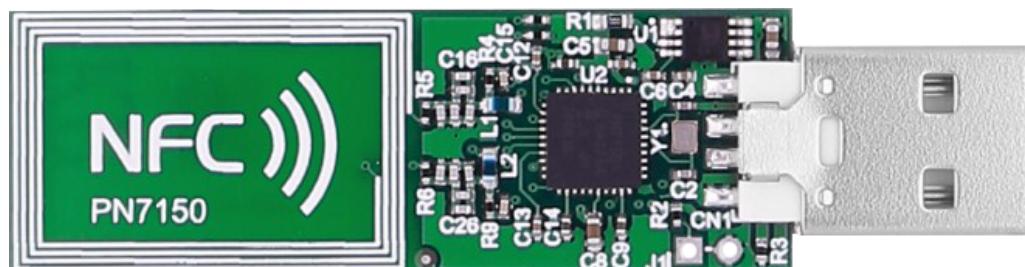


PID: MIKROE-4309

NFC 2 Click is a compact add-on board that contains a highly integrated NFC transceiver for contactless communication. This board features the PN7150, the best plug&play high-performance full NFC solution with integrated firmware and NCI interface designed for contactless communication at 13.56 MHz from NXP USA Inc. This I2C configurable transceiver utilizes an outstanding modulation and demodulation concept completely integrated for different kinds of contactless communication methods and protocols. It can operate both in Reader Mode and in Card Mode. This Click board™ is the ideal solution for rapidly integrating NFC technology in any application.

NFC 2 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.

**NOTE:** Besides the Click board form factor, Mikroe offers a Dongle version also based on NXP's PN7150 transceiver. If you are interested in finding out more about this product, please visit our NFC USB Dongle [product page](#).



Mikroe produces entire development toolchains for all major microcontroller architectures.

Committed to excellency, we are dedicated to helping engineers bring the project development up to speed and achieve outstanding results.



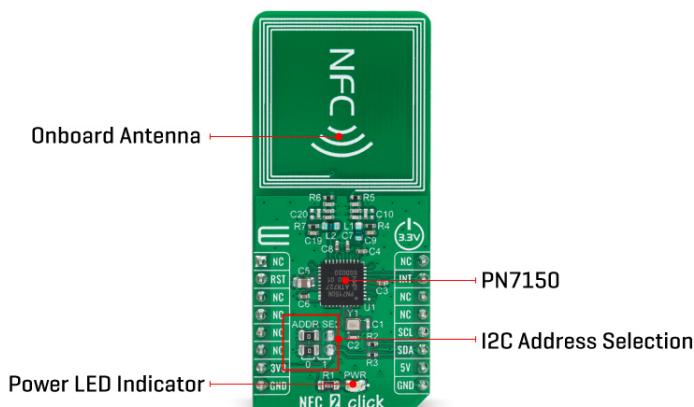
ISO 27001: 2013 certification of informational security management system.  
 ISO 14001: 2015 certification of environmental management system.  
 OHSAS 18001: 2008 certification of occupational health and safety management system.



ISO 9001: 2015 certification of quality management system (QMS).

## How does it work?

NFC 2 Click is based on the PN7150, high-performance full NFC solution with integrated firmware and I2C interface designed for contactless communication at 13.56 MHz from NXP USA Inc. This board has full compliance with NFC Forum specification that means that you will be able to use the full potential of NFC. It is the ideal solution for rapidly integrating NFC technology in any application, especially those running O/S environments like Linux and Android, reducing size and cost thanks to embedded NFC firmware providing all NFC protocols as a pre-integrated feature and ultra-low power consumption.



The PN7150 embeds a microcontroller core ARM Cortex-M0 loaded with the integrated firmware and provides an easy integration and validation cycle as all the NFC real-time constraints, protocols, and device discovery are being taken care of internally. The host can configure the PN7150 to notify for a card or peer detection and start communicating with them. The core microcontroller chip of the PN7150 can run without any external clock (based on an internal oscillator). However, the 13.56MHz RF field carrier accuracy requirements are not compatible with the use of an internal oscillator. That's why the PN7150 has an external crystal oscillator connected to its XTAL pins.

It also has four power states: Monitor, Hard Power Down (HPD), Standby, and Active. At the application level, the PN7150 will continuously switch between different power states to optimize the current consumption. The PN7150 is designed to allow the host controller to have full control over its operation, thus of the power consumption of the PN7150 based NFC solution and the possibility to restrict parts of the PN7150 functionality. More information about these modes user can find in the attached datasheet.

NFC 2 Click communicates with MCU using the standard I2C 2-Wire interface with a clock frequency up to 100kHz in the Standard, up to 400kHz in the Fast, and up to 3.4MHz in the High-Speed Mode. The PN7150 also allows the choice of the least significant bit (LSB) of its I2C slave address by positioning SMD jumpers labeled as ADDR SEL to an appropriate position marked as 0 and 1. To enable and ensure data flow control between PN7150 and host controller, additionally, a dedicated interrupt line labeled as INT is provided that Active state is programmable. It also contains Reset function, and the RF antenna which is used to communicate over RF with a Tag (Card) and a Reader/Writer or a Peer device.

This Click board™ is designed to be operated only with a 3.3V logic voltage level, while 5V is used as transmitter input supply voltage of PN7150. A proper logic voltage level conversion

Mikroe produces entire development toolchains for all major microcontroller architectures.

Committed to excellency, we are dedicated to helping engineers bring the project development up to speed and achieve outstanding results.



ISO 27001: 2013 certification of informational security management system.  
 ISO 14001: 2015 certification of environmental management system.  
 OHSAS 18001: 2008 certification of occupational health and safety management system.



ISO 9001: 2015 certification of quality management system (QMS).

should be performed before the Click board™ is used with MCUs with different logic levels. However, the Click board™ comes equipped with a library that contains easy to use functions and an example code which can be used, as a reference, for further development.

## Specifications

Type	RFID/NFC
Applications	Can be used for rapidly integrating NFC technology in any application.
On-board modules	NFC 2 Click is based on the PN7150, high-performance full NFC solution with integrated firmware and I2C interface designed for contactless communication at 13.56 MHz from NXP USA Inc.
Key Features	Ultralow power consumption, automatic wake-up via RF field, integrated non-volatile memory to store data and executable code for customization, various RF protocols supported, includes ARM Cortex-M0 microcontroller core, and more.
Interface	I2C
ClickID	No
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 2 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Reset	NC	1	AN	PWM	16	NC	
	<b>RST</b>	2	RST	INT	15	<b>INT</b>	Interrupt
	NC	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	<b>SCL</b>	I2C Clock
	NC	6	MOSI	SDA	11	<b>SDA</b>	I2C Data
Power Supply	<b>3.3V</b>	7	3.3V	5V	10	<b>5V</b>	Power Supply
Ground	<b>GND</b>	8	GND	GND	9	<b>GND</b>	Ground

## Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1-JP2	ADDR SEL	Left	I2C Address Selection: Left position 0, Right position 1

Mikroe produces entire development toolchains for all major microcontroller architectures.

Committed to excellency, we are dedicated to helping engineers bring the project development up to speed and achieve outstanding results.



ISO 27001: 2013 certification of informational security management system.  
 ISO 14001: 2015 certification of environmental management system.  
 OHSAS 18001: 2008 certification of occupational health and safety management system.



ISO 9001: 2015 certification of quality management system (QMS).

## NFC 2 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-0.3	3.3	4.35	V
Operating Frequency	-	13.56	52	MHz
Maximum RF Driver Current	-	-	180	mA
Maximum Output Power	-	-	0.85	W
Operating Temperature Range	-30	+25	+85	°C

## Software Support

We provide a library for the NFC 2 Click on our [LibStock](#) page, as well as a demo application (example), developed using MikroElektronika [compilers](#). The demo can run on all the main MikroElektronika [development boards](#).

## Library Description

The library covers all the necessary functions to control NFC 2 Click board™. A library performs the communication with the device via I2C interface.

Key functions:

- void nfc2\_generic\_write ( uint8\_t \*p\_tx\_data, uint8\_t n\_bytes ) - Generic write function.
- void nfc2\_generic\_read ( uint8\_t \*p\_rx\_h\_data, uint8\_t \*p\_rx\_p\_data ) - Generic read function.
- void nfc2\_cmd\_core\_reset ( void ) - Core reset command function.

## Examples description

The application is composed of three sections :

- System Initialization - Initializes I2C and start to write log.
- Application Initialization - Initialization driver enables - I2C, hw reset, reseteting and initialize core, disabling standby mode, starting test procedure, set configuration and start discovery, also write log.
- Application Task - (code snippet) This is an example which demonstrates the usage of NFC 2 Click board™. NFC 2 Click board™ can be used for detection of RFID tag and displays it's value via USART terminal. All data logs write on USB uart changes for every 1 sec.

Additional Functions :

- void display\_packet ( ) - Display packet log data.
- void display\_nfc\_data ( ) - Display packet log data.
- void nfc2\_test\_antenna ( ) - Testing Antenna function.
- void nfc2\_reset\_and\_init\_core ( ) - Reset and init core function.

The full application code, and ready to use projects can be found on our [LibStock](#) page.

Other mikroE Libraries used in the example:

- I2C

MikroE produces entire development toolchains for all major microcontroller architectures.

Committed to excellency, we are dedicated to helping engineers bring the project development up to speed and achieve outstanding results.



ISO 27001: 2013 certification of informational security management system.  
 ISO 14001: 2015 certification of environmental management system.  
 OHSAS 18001: 2008 certification of occupational health and safety management system.



ISO 9001: 2015 certification of quality management system (QMS).

- UART
- Conversions

## 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. The terminal available in all MikroElektronika [compilers](#), or any other terminal application of your choice, can be used to read the message.

## 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

[NFC 2 click 2D and 3D files](#)

[PN7150 datasheet](#)

[NFC 2 click example on Libstock](#)

[NFC 2 click schematic](#)

Mikroe produces entire development toolchains for all major microcontroller architectures.

Committed to excellency, we are dedicated to helping engineers bring the project development up to speed and achieve outstanding results.



ISO 27001: 2013 certification of informational security management system.  
ISO 14001: 2015 certification of environmental management system.  
OHSAS 18001: 2008 certification of occupational health and safety management system.



ISO 9001: 2015 certification of quality management system (QMS).