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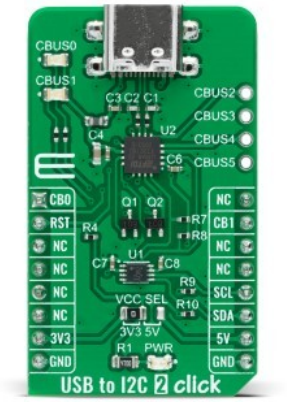
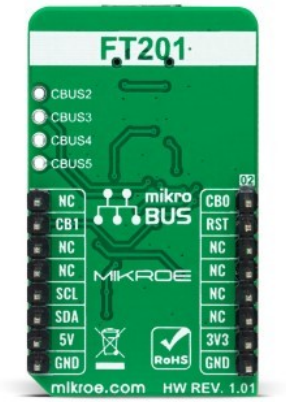
USB to I2C 2 Click





PID: MIKROE-5065

USB to I2C 2 Click is a compact add-on board that contains a general-purpose USB to I2C serial interface. This board features the FT201X, a full-speed USB to I2C protocol converter from FTDI. The FT201X converts USB2.0 full-speed to an I2C serial interface capable of operating up to 3.4MBit/s, with low power consumption (typical 8mA). The entire USB protocol is handled on the chip itself, where no USB-specific firmware programming is required. It also has a fully-integrated 2048 byte Multi-Time-Programmable (MTP) memory for storing device descriptors and CBUS I/O user-desirable configuration. This Click board™ includes the complete FT-X series feature set and enables USB to be added into a system design quickly and easily over an I2C interface.

USB to I2C 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.

How does it work?

USB to I2C 2 Click as its foundation uses the FT201X, a USB to I2C interface device which simplifies USB implementations from FTDI. The FT201X is USB 2.0 full-speed compatible and handles the entire USB protocol by itself; no USB-specific firmware programming is required. It fully integrates 2048 byte Multi-Time-Programmable (MTP) memory for storing device descriptors and CBUS I/O user-desirable configuration and clock generation with no external crystal required plus optional clock output selection enabling a glue-less interface to external MCU or FPGA.

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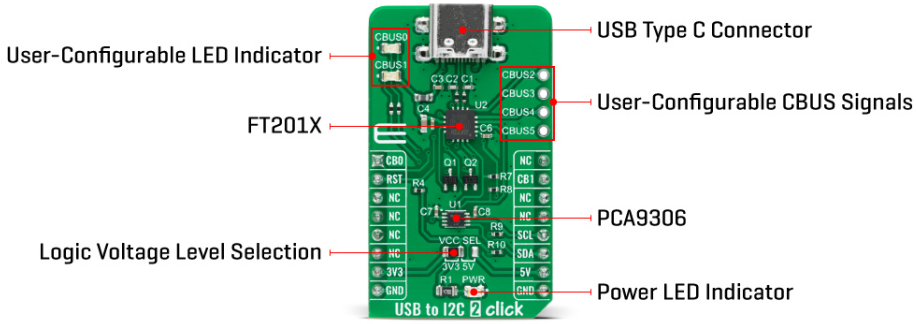

This Click board™ communicates with MCU using the standard I2C 2-Wire interface to read data and configure settings, supporting Standard Mode operation with a clock frequency of 100kHz and Fast Mode up to 400kHz. Since the FT201X for operation requires a 5V only, this Click board™ also features the PCA9306 voltage-level translator from Texas Instruments. The I2C interface bus lines are routed to the dual bidirectional voltage-level translator, allowing this Click board™ to work with both 3.3V and 5V MCUs properly.

The FT201X also contains an embedded fully integrated MTP memory used to specify the functionality of the Control Bus (CBUS) pins, the current drive on each signal pin, the current limit for the USB bus, and the descriptors of the device. There are six configurable CBUS I/O pins, two of which are routed on AN and INT pins of the mikroBUS™ socket, marked as CB0 and CB1, alongside the two blue LED indicators labeled as CBUS0 and CBUS1 used for optional user-configurable visual indication.

The other four CBUS pins can be found on the onboard CBUS header, and be used as user-configurable CBUS signals. A wide range and the way of using these pins can be found in the attached datasheet. This board also uses an active-low reset signal routed on the RST pin of the mikroBUS™ socket, which provides a reliable Power-On reset to the device's internal circuitry at Power-Up.

This Click board™ can operate with both 3.3V and 5V logic voltage levels selected via the VCC SEL jumper. This way, it is allowed for both 3.3V and 5V capable MCUs to use the communication lines properly. However, the Click board™ comes equipped with a library that contains easy-to-use functions and an example code that can be used, as a reference, for further development.

Specifications

Type	USB
Applications	This Click board™ includes the complete FT-X series feature set and enables USB to be added into a system design quickly and easily over an I2C interface
On-board modules	FT201X - full-speed USB to I2C protocol converter from FTDI
Key Features	USB 2.0 full-speed compatible, entire USB

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	protocol handled on the chip, integrated 2048 byte MTP memory, configurable CBUS I/O pins, and more
Interface	I2C,USB
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on USB to I2C 2 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Control Pin 0	**CB0**	1	AN	PWM	16	NC	
Reset	**RST**	2	RST	INT	15	**CB1**	Control Pin 1
	NC	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
LD2-LD3	CBUS0-CBUS1	-	User-Configurable LED Indicators
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
J1	-	Unpopulated	User-Configurable CBUS Pins Header

USB to I2C 2 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Data Rate	-	-	12	Mbit/s
CBUS Pins Output Current	4	-	16	mA
Operating Temperature Range	-40	+25	+85	°C

Software Support

We provide a library for the USB to I2C 2 Click as well as a demo application (example),

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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 USB to I2C 2 Click driver.

Key functions

- usbtoi2c2_write_data This function writes a desired number of data bytes by using I2C serial interface.
- usbtoi2c2_read_data This function reads a desired number of data bytes by using I2C serial interface.
- usbtoi2c2_reset_device This function resets the device by toggling the RST pin state.

Example Description

This example demonstrates the use of USB to I2C 2 click by echoing back all the received messages.

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.USBtoI2C2

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 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

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mikroBUS™

mikroSDK

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PCA9306 datasheet

FT201X datasheet

USB to I2C 2 click example on Libstock

USB to I2C 2 click schematic

USB to I2C 2 click 2D and 3D files

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