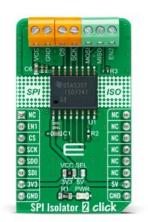MIKROELEKTRONIKA D.O.O, Batajnički drum 23, 11000 Belgrade, Serbia
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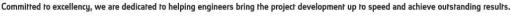# SPI Isolator 2 Click

PID: MIKROE-4415

SPI Isolator 2 Click is a compact add-on board that contains a digital isolator optimized for a serial peripheral interface. This board features the ISO7741, a high-performance quad-channel digital isolator with a double capacitive silicon dioxide insulation barrier capable of galvanic isolation up to 5000Vrms from Texas Instruments. The ISO7741 provides high electromagnetic immunity and low emissions at low power consumption while isolating digital I/Os. It has three forward and one reverse-direction channel with enable pins that can be used to put the respective outputs in Hi-Z state. This Click board™ provides a simple, compact solution for isolated SPI data communication.

SPI Isolator 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?

SPI Isolator 2 Click is based on the ISO7741, a high-performance quad-channel digital isolator capable of galvanic isolation up to 5000Vrms from Texas Instruments. It provides high electromagnetic immunity and low emissions at low power consumption while isolating digital I/Os. It has three forward and one reverse-direction channel and provides a simple, compact solution for isolated SPI data communication. Each isolation channel has a logic input and output buffer separated by a double capacitive silicon dioxide insulation barrier.

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The ISO7741 digital isolator use single-ended CMOS-logic switching technology and transmit the digital data across the isolation barrier. The transmitter sends a high-frequency carrier across the isolation barrier to represent one digital state and sends no signal to represent the other digital state. The receiver demodulates the signal after advanced signal conditioning and produces the output through a buffer stage. If the Enable pin is in a low logic state, then the output signal goes to a Hi-Z state.

SPI Isolator 2 Click communicates with MCU using the SPI serial interface with a maximum data rate of 100 Mbps. This Click board™ also comes with two enable pins on each side, which can be used to put the respective outputs in a Hi-Z state for multi-master driving applications and reduce power consumption. The enable pin on the digital side of ISO7741, labeled as EN1, is routed on the RST pin of the mikroBUS™ socket, while the other Enable pin is connected to the external connector on the isolated side labeled as EN2.

In addition to the connectors to which the isolated SPI data communication lines are routed, this Click board ™ has another additional that represents an external power supply terminal. The voltage range is from 2.25 V to 5.5 V for both supplies logic and external, which makes it suitable for both 3.3V and 5V MCUs. The ISO7741 can also block high voltages, isolate grounds and prevent noise currents on a data bus or other circuits from entering the local ground and damaging sensitive circuitry.

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

Specifications

Type	Isolators,SPI
Applications	Can be used for isolated SPI data communication.
On-board modules	SPI Isolator 2 Click is based on the ISO7741, a high-performance quad-channel digital isolator capable of galvanic isolation up to 5000Vrms from Texas Instruments

Key Features	Low power consumption, up to 5000Vrms isolation rating, high speed, high-performance, provides high electromagnetic immunity, each channel separated by a double capacitive silicon dioxide insulation barrier, and more
Interface	SPI
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 SPI Isolator 2 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	
Enable	EN1	2	RST	INT	15	NC	
SPI Chip Select	CS	3	CS	RX	14	NC	
SPI Clock	SCK	4	SCK	TX	13	NC	
SPI Data OUT	SDO	5	MISO	SCL	12	NC	
SPI Data IN	SDI	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
LD1	PWR	-	Power LED Indicator
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V

SPI Isolator 2 Click electrical specifications

Description	Min	Typ	Max	Unit
Logic Level Supply Voltage	3.3	-	5	V
External Supply Voltage	2.25	-	5.5	V
Isolation Voltage	-	-	5000	Vrms
Data Rate	0	-	100	Mbps
Operating Temperature Range	-55	+25	+125	°C

Software Support

We provide a library for the SPI Isolator 2 Click on our LibStock page, as well as a demo application (example), developed using MikroElektronika compilers. The demo can run on all

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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

The library covers all the necessary functions to control SPI Isolator 2 Click board™. Library performs a standard SPI interface communication.

Key functions:

- void spiisolator2_output_enable (uint8_t en_out) - Output enable function.
- int8_t addr_n_bytes, uint8_t *p_tx_data, uint8_t tx_data_n_bytes) - Multi write function.
- uint8_t addr_n_bytes, uint8_t *p_rx_data, uint8_t tx_data_n_bytes) - Multi read function.

Examples description

The application is composed of three sections :

- System Initialization - Initializes SPI, set RST and CS pin as outputs, begins to write log.
- Application Initialization - Initialization driver enables - SPI, set write/read memory address, enable output, also write log.
- Application Task - (code snippet) This is an example that demonstrates the use of the SPI Isolator 2 Click board™. In this example, we write and then read data from the connected EEPROM 5 click to the SPI Isolator 2 Click board™. Results are being sent to the Usart Terminal where you can track their changes. All data logs write on USB uart changes approximately for every 5 sec.

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

Other Mikroe Libraries used in the example:

- SPI
- 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

[SPI Isolator 2 click example on Libstock](#)

[SPI Isolator 2 click 2D and 3D files](#)

[ISO7741 datasheet](#)

[SPI Isolator 2 click schematic](#)

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