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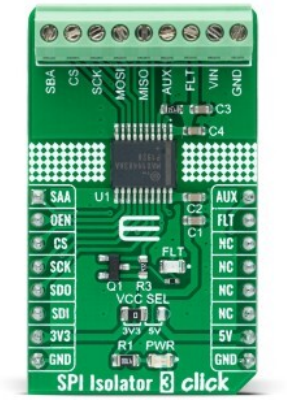
SPI Isolator 3 Click



PID: MIKROE-4651

SPI Isolator 3 Click is a compact add-on board that contains a digital isolator optimized for a serial peripheral interface. This board features the MAX14483, a 6-channel 3.75kVRMS digital galvanic isolator with a very low propagation delay on the SDI, SDO, and SCLK channels from Analog Devices. Besides a second enable control input, which allows MAX14483 to isolate multiple SPI devices, and an auxiliary channel available for passing timing or control signals from the master side to the slave side, the MAX14483 also possesses power monitors provided for both power domains to signal if the opposite side of the isolator is ready for operation. Thus, this Click board™ is suitable for general SPI-bus isolation and the industrial, process, and building automation, in programmable logic controllers, and many more.

SPI Isolator 3 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 3 Click as its foundation uses the MAX14483, a 6-channel 3.75kVRMS digital isolator with a very low propagation delay on the SDI, SDO, and SCLK channels from Analog Devices. It provides galvanic isolation for digital signals transmitted between two ground domains. The device withstands up to 560Vpeak of continuous isolation and up to 3.75kVRMS for up to 60 seconds. The wide supply voltage range of both power pins allows the MAX14483 to be used for level translation and isolation.

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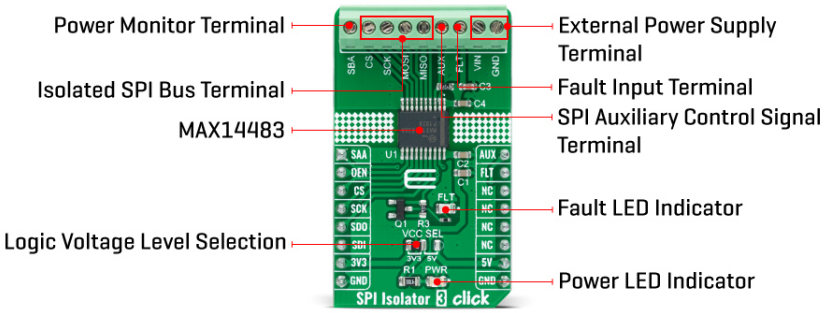

The MAX14483 offers low-power operation, high electromagnetic interference immunity, and stable temperature performance through Maxim's proprietary process technology. The device isolates different ground domains and blocks high-voltage/high-current transients from sensitive or human interface circuitry. It also features an internal refresh circuit to ensure output accuracy when an input remains in the same state indefinitely.

SPI Isolator 3 Click communicates with MCU using the SPI serial interface with a maximum data rate of 200 Mbps. This Click board™ also comes with a SDO line enable control pin, labeled as OEN and routed on the RST pin of the mikroBUS™ socket, allowing MAX14483 to isolate multiple SPI devices. It also has a red LED indicator labeled as FLT to detect error outputs from other devices.

Besides an auxiliary channel, labeled as AUX, available for passing timing or control signals from the master side to the slave side, the MAX14483 also possesses power monitors for both power domains to signal if the opposite side of the isolator is ready for operation. The FLT and AUX channels are designed to support SPI devices that require control signals beyond the standard 4-wire SPI bus. Each channel is unidirectional; it only passes data in one direction with a maximum data rate of 25Mbps.

The monitor channels (SAA, SBA) are designed to pass DC signals and have significantly longer propagation delays than other channels, meaning they should not be used for data signals. SAA and SBA are set high when their respective opposite side of the isolator has power and is operating normally. When Side A or Side B is not powered, SAA or SBA is set low, and all outputs are set to their default state.

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 SPI communication lines properly. However, the 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	Isolators,SPI
Applications	Can be used for general SPI-bus isolation and the industrial, process, and building automation, in programmable logic controllers,

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	and many more.
On-board modules	MAX14483 - 6-channel 3.75kVRMS digital isolator with a very low propagation delay on the SDI, SDO, and SCLK channels from Maxim Integrated
Key Features	Low power consumption, 6 isolated channels, low propagation delay on SCLK, SDI, and SDO lines, robust galvanic isolation of digital signals, shared interrupt feature, auxiliary channel for timing or control, 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,External

Pinout diagram

This table shows how the pinout on SPI Isolator 3 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS™				Pin	Notes
Power Monitoring	**SAA**	1	AN	PWM	16	**AUX**	Auxiliary Signal for Timing or Control
SPI SDO Signal Enable	**OEN**	2	RST	INT	15	**FLT**	Interrupt
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
LD2	FLT	-	Fault LED Indicator
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V

SPI Isolator 3 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage VCC	3.3	-	5	V
External Supply Voltage VIN	1.71	-	5.5	V

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Isolation Voltage	-	-	3750	Vrms
Data Rate	-	-	200	Mbps
Operating Temperature Range	-40	+25	+125	°C

Software Support

We provide a library for the SPI Isolator 3 Click as well as a demo application (example), 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 SPI Isolator 3 Click driver.

Key functions:

- spiisolator3_cfg_setup - Config Object Initialization function.
- spiisolator3_init - Initialization function.
- spiisolator3_default_cfg - Click Default Configuration function.

Examples description

This library contains API for the SPI Isolator 3 click driver. This demo application shows an example of an SPI Isolator 3 click wired to the nvSRAM 4 click for reading Device ID.

The demo application is composed of two sections :

Additional Function

- get_device_id - Get Device ID function.

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.SpiIsolator3

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.

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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 3 click 2D and 3D files

MAX14483 datasheet

SPI Isolator 3 click schematic

SPI Isolator 3 click example on Libstock