

# I2C MUX 4 Click



PID: MIKROE-4240

I2C MUX 4 Click is a compact add-on board that contains a dual bidirectional translating switch dedicated for applications with I2C slave address conflicts. This board features the TCA9543APWR, a low voltage 2-channel I2C bus switch with interrupt logic from Texas Instruments. The master SCL/SDA signals are directed to two downstream pairs, or channels, where either individual SCL/SDA channel or both channels can be selected by setting the programmable control register. It has two interrupts and a Reset input which allows the TCA9543A to recover from a situation where one of the downstream I2C buses is stuck in a low state. This Click board™ is suitable to work with I2C interfaces for applications such as fault isolation, address conflict, level translation, or broadcast communication.

I2C MUX 4 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?

I2C MUX 4 Click is based on the TCA9543APWR, a 2-channel, bidirectional translating I2C switch from Texas Instruments. The master SCL/SDA signal pair is directed to two channels of slave devices SC0/SD0 - SC1/SD1 where either individual channel or both channels can be selected determined by the programmable control register. The TCA9543APWR supports interrupt signals for the Master to detect an interrupt that can result from any of the slave devices connected to the interrupt pins on the output I2C channel header. It features I2C control using a single 8-bit control register in which bits 1 and 0 control the enabling and disabling of the two switch channels of I2C data flow, it supports a reset function, hot insertion, and has all switch channels deselected during Power-Up.

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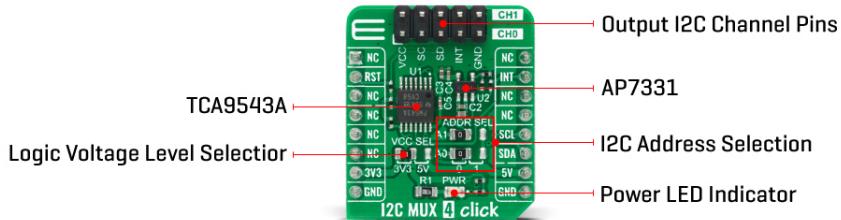
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This Click board™ includes a low dropout linear regulator [AP7331](#) from [Diodes Incorporated](#) to provide the 2.45V supply voltage for the TCA9543APWR. When the TCA9543APWR is turned on for the first time or anytime the device needs to be reset by cycling the power supply, which means that the Power-On reset requirements must be followed to ensure the I2C bus logic is initialized properly. The TCA9543APWR can also be reset to its default conditions by using the Power-On reset feature in the event of a glitch or data corruption.

I2C MUX 4 Click communicates with MCU using the standard I2C 2-Wire interface that supports Standard-Mode (100 kHz) and Fast-Mode (400 kHz) operation. The TCA9543APWR generates a programmable interrupt signal routed on the INT pin of the mikroBUS™ used for the Master to detect an interrupt which can result from any of the slave devices connected to the output I2C channel pins. It also has two address pins that allow the choice of the least significant bit (LSB) of its I2C slave address which can be done by using the SMD jumper labeled as ADDR SEL, and a Reset function routed on the RST pin of the mikroBUS™ socket used to recover the TCA9543APWR from a bus-fault condition.

This Click board™ is designed to be operated with both 3.3V and 5V logic voltage levels that can be selected via VCC SEL jumper. This allows for both 3.3V and 5V capable MCUs to use the I2C communication lines properly.

## Specifications

Type	I2C
Applications	Can be used with I2C interfaces for applications such as fault isolation, address conflict, level translation, or broadcast communication.
On-board modules	I2C MUX 4 Click is based on the TCA9543APWR, a 2-channel, bidirectional translating I2C switch from Texas Instruments.
Key Features	1-of-2 bidirectional translating switches, low Stand-By current, support hot insertion, deselected channels during Power-Up, and more.
Interface	I2C

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ClickID	No					
Compatibility	mikroBUS™					
Click board size	S (28.6 x 25.4 mm)					
Input Voltage	3.3V or 5V					

## Pinout diagram

This table shows how the pinout on I2C MUX 4 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	
Reset	<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	VCC SEL	Left	Power Supply Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
JP2-JP3	ADDR SEL	Left	Communication Interface Selection: Left position 0, Right position 1
J1	-	-	Output I2C Channel Pins

## I2C MUX 4 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-0.5	-	7	V
Maximum Output Current	-	-	±20	mA
Maximum Frequency	-	-	400	kHz
Maximum Power Dissipation	-	-	400	mW
Operating Temperature Range	-40	-	+85	°C

## Software Support

We provide a library for the I2C MUX 4 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](#).

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## Library Description

The library covers all the necessary functions to control I2C MUX 4 Click board. A library performs the communication with the TCA9543A Low Voltage 2-Channel I2C Bus Switch via I2C interface.

Key functions:

- void i2cmux4\_power\_on ( uint8\_t enable ) - Power On function.
- void i2cmux4\_set\_channel ( uint8\_t sel\_ch, uint8\_t ch\_slave\_addr ) - Set channel function.
- uint8\_t i2cmux4\_check\_int ( void ) - Check interrupt function.

## Examples description

The application is composed of three sections :

- System Initialization - Initializes I2C, set RST pin as output, INT pin as input and start to write log.
- Application Initialization - Initialization driver enables - I2C, executes call power On and hardware reset, also write log.
- Application Task - (code snippet) This is an example that demonstrates the use of the I2C MUX 4 Click board. In this example, we read "Who am I" ( or "State" ) register of the connected click boards to the I2C MUX 4 click. Channel 0 : 6DOF IMU 12 click [slave address: 0x0E; reg: 0x00; id val.: 0x24], Channel 1 : RTC 10 click [slave address: 0x68; reg: 0x0F; st val.: 0x88]. All data logs write on USB UART changes approximately every 2 sec.

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

Other mikroE Libraries used in the example:

- I2C
- 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

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[mikroBUS™](#)[mikroSDK](#)[Click board™ Catalog](#)[Click boards™](#)

## Downloads

[I2C MUX 4 click 2D and 3D files](#)[TCA9543A datasheet](#)[AP7331 datasheet](#)[I2C MUX 4 click example on Libstock](#)[I2C MUX 4 click schematic](#)

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