

I2C MUX 3 Click



PID: MIKROE-4262

I2C MUX 3 Click is a compact add-on board that contains eight bidirectional translating switches dedicated for applications with I2C slave address conflicts. This board features the [TCA9548APWR](#), a low voltage 8-channel I2C bus switch with an active-low reset input from [Texas Instruments](#). It possesses three programmable address pins that allow up to eight TCA9548APWR devices, supports hot insertion, has a low Stand-by current, and no glitch during Power-Up with all switch channels deselected. This Click board™ is suitable to work with I2C interfaces for applications such as fault isolation, address conflict, level translation, or broadcast communication (servers, routers...).

I2C MUX 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?

I2C MUX 3 Click is based on the TCA9548APWR, a low voltage eight bidirectional translating switches with an active-low reset input controlled through the I2C serial interface from Texas Instruments. The master SCL/SDA signal pair is directed to eight channels of slave devices, SC0/SD0-SC7/SD7, where any individual downstream channel can be selected as well as any combination of the eight channels. It features I2C control using a single 8-bit control register in which each bit controls the enabling and disabling of one of the corresponding 8 switch channels for I2C data flow.

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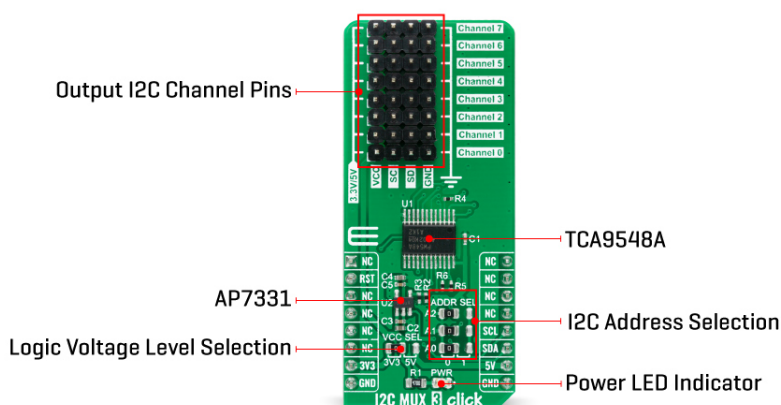
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This Click board™ includes a low dropout linear regulator [AP7331](#) from [Diodes Incorporated](#) to provide the 2.45V supply voltage for the TCA9548APWR. When the TCA9548APWR is turned on for the first time or anytime the device needs to be reset 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. Additionally, if communication on the I2C bus enters a fault state, the TCA9548APWR can be reset to resume normal operation using the RST pin feature or by a Power-On reset which results from cycling power to the device.

I2C MUX 3 Click communicates with MCU using the standard I2C 2-Wire interface that supports Standard-Mode (100 kHz) and Fast-Mode (400 kHz) operation. The TCA9548APWR has a 7-bit slave address with the first five MSBs fixed to 1110. The address pins A0, A1 and A2 are programmed by the user and determines the value of the last three LSBs of the slave address which can be selected by onboard SMD jumpers labeled as ADDR SEL allowing selection of the slave address LSBs. It also has an active-low reset signal routed on the RST pin of the mikroBUS™ socket used to recover from a bus-fault condition. When this signal is asserted low the TCA9548APWR resets its registers alongside with I2C state machine and deselects all channels.

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. More information about the [TCA9548APWR](#) can be found in the attached datasheet. However, the Click board™ comes equipped with a library that contains easy to use functions and a usage example that may be used as a reference for further development.

Specifications

Type	I2C
Applications	Can be used with I2C interfaces for applications such as fault isolation, address conflict, level translation, or broadcast communication (servers, routers...).
On-board modules	I2C MUX 3 Click is based on the TCA9548APWR, a low voltage eight bidirectional translating switches with an active-low reset input controlled through the

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	I2C serial interface from Texas Instruments.
Key Features	1-to-8 bidirectional translating switches, low Stand-By current, support hot insertion, deselected channels during Power-Up, and more.
Interface	I2C
Feature	No ClickID
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 I2C MUX 3 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
	NC	1	AN	PWM	16	NC	
Reset	RST	2	RST	INT	15	NC	
	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
JP1	VCC SEL	Left	Power Supply Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
JP2-JP4	ADDR SEL	Left	Communication interface selection: Left position 0, Right position 1
J1-J8	-	-	Output I2C Channel Pins

I2C MUX 3 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-0.5	-	7	V
Maximum Output Current	-25	-	-	mA
Maximum Frequency	-	-	400	kHz
Operating Temperature Range	-40	-	+125	°C

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Software Support

We provide a library for the I2C MUX 3 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 that enables the usage of the I2C MUX 3 click board. User can set one of 8 channels by writing to devices control register and check it by reading, or use the function to set it directly. User can also use sequential read and write function to communicate with the devices connected to the selected channel.

Key functions:

- `uint8_t n_bytes);` - Function is used to write a sequential data starting from the targeted 8-bit register address of the device connected to the desired channel of the I2C MUX 4 click board.
- `uint8_t n_bytes)` - Function is used to read a sequential data starting from the targeted 8-bit register address of the device connected to the desired channel of the I2C MUX 4 click board.
- `void i2cmux3_ch_sel (uint8_t sel_ch);` - Function is used to select communication channel.

Examples description

The application is composed of three sections :

- System Initialization - Initializes I2C module, LOG structure and sets RST pin as output.
- Application Initialization - Initializes I2C driver, performs hardware reset and makes an initial log.
- Application Task - This example shows the capabilities of the I2C MUX 3 click by reading device ID values from eight different click boards and displaying the readings via USART terminal. Some of the used click boards have the same I2C slave addresses, while others do not.
- Application Note - Click boards used in this example : 6DOF IMU 12 click - <https://www.mikroe.com/6dof-imu-12-click> RTC 10 click - <https://www.mikroe.com/rtc-10-click> Surface Temp click - <https://www.mikroe.com/surface-temp-click> Spectrometer click - <https://www.mikroe.com/spectrometer-click> Compass 3 click - <https://www.mikroe.com/compass-3-click> Color 3 click - <https://www.mikroe.com/color-3-click> 6DOF IMU 11 click - <https://www.mikroe.com/6dof-imu-11-click> Heart Rate 4 click - <https://www.mikroe.com/heart-rate-4-click>

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

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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

[I2C MUX 3 click 2D and 3D files](#)

[TCA9548APWR datasheet](#)

[I2C MUX 3 click example on Libstock](#)

[I2C MUX 3 click schematic](#)

[AP7331 datasheet](#)

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