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I2C MUX 6 Click



PID: MIKROE-5168

I2C MUX 6 Click is a compact add-on board representing a bidirectional selector dedicated to I2C slave address conflicts applications. This board features the PCA9518, an expandable five-channel bidirectional buffer controlled by the I2C-bus from Texas Instruments. The PCA9518 overcomes the restriction of maximum bus capacitance by separating and buffering the I2C data (SDA) and clock (SCL) lines into multiple groups of 400pF I2C channels. It provides activation of the desired channel via a given Enable pin and permits extension of the I2C-bus, through an onboard expansion header, by buffering both the data (SDA) and the clock (SCL) lines enabling virtually an unlimited number of buses of 400pF. This Click board™ is suitable for various applications from industrial to medical, communications, and automotive systems.

I2C MUX 6 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?

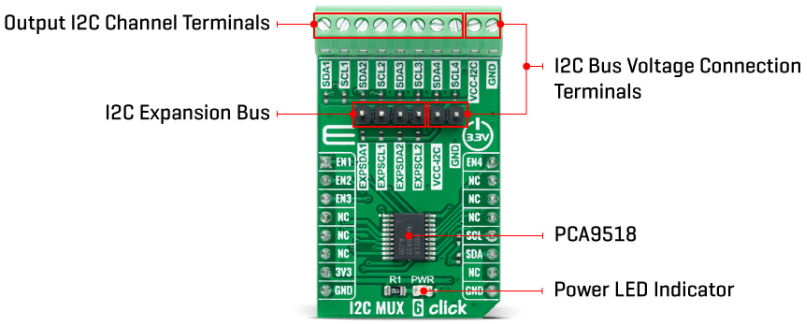
I2C MUX 6 Click as its foundation uses the PCA9518, an expandable four-channel bidirectional buffer controllable through the I2C serial interface from Texas Instruments. The primary SCL/SDA signal pair is directed to four channels where only one SCL/SDA channel can be selected at a time, determined on the state of the four Enable pins, routed to the AN, RST, CS, and PWM pins of the mikroBUS™ socket. The PCA9518 overcomes the restriction of maximum bus capacitance by separating and buffering the I2C data (SDA) and clock (SCL) lines into multiple groups of 400pF I2C channels.

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The PCA9518 has several multi-directional open-drain buffers designed to support the standard low-level-contention arbitration of the I2C bus. Except during arbitration, the PCA9518 acts like a pair of non-inverting open-drain buffers, one for SDA and one for SCL. It can communicate with other PCA9518 hubs through a 4-wire inter-hub expansion bus, located on the onboard header with EXP labeled pins, i.e., permits extension of the I2C-bus by buffering both the data (SDA) and the clock (SCL) lines enabling virtually an unlimited number of buses of 400pF.

The PCA9518 communicates with MCU using the standard I2C interface that supports Standard-Mode (100 kHz) and Fast-Mode (400 kHz) operation. As mentioned before, each Enable pin, ENx, controls its associated SDAx and SCLx channels. When the ENx pin is in a low logic state, it isolates its corresponding SDAx and SCLx lines from the system by blocking the inputs from SDAx and SCLx and disabling the output drivers on these lines. It is essential that the ENx change state only when both the global bus and the local port are in an IDLE state to prevent system failures.

This Click board™ is designed for 3.3V operation. It also has onboard terminals labeled as VCC-I2C to supply a voltage, 3.3V or 5V, for PCA9518's I2C lines, which are 5V-tolerant. However, the board must perform appropriate logic voltage level conversion before using MCUs with different logic levels. The Click board™ comes equipped with a library containing functions and an example code that can be used, as a reference, for further development.

Specifications

Type	I2C
Applications	Can be used for various applications from industrial to medical, communications, and automotive systems
On-board modules	PCA9518 - four-channel bidirectional buffer controllable through the I2C serial interface from Texas Instruments
Key Features	Low power consumption, fast I2C interface, 5V tolerant I2C and enable pins to support mixed-mode signal operation, powered-off high-impedance I2C pins, expansion bus, and more
Interface	I2C

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ClickID	No
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on I2C MUX 6 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Channel 1 Enable	**EN1**	1	AN	PWM	16	**EN4**	Channel 4 Enable
Channel 2 Enable	**EN2**	2	RST	INT	15	NC	
Channel 3 Enable	**EN3**	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	NC	
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
J1	-	Populated	I2C Expansion Header

I2C MUX 6 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
I2C Bus Voltage Range VCC-I2C	3.3	-	5	V
Operating Temperature Range	-40	+25	+85	°C

Software Support

We provide a library for the I2C MUX 6 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 I2C MUX 6 Click driver.

Key functions

- i2cmux6_set_channel This function sets the desired channel active and configures its

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slave address.

- i2cmux6_generic_write This function writes a desired number of data bytes starting from the selected register by using I2C serial interface.

- i2cmux6_generic_read This function reads a desired number of data bytes starting from the selected register by using I2C serial interface.

Example Description

This example demonstrates the use of I2C MUX 6 Click board™ by reading the device ID of a 6DOF IMU 11 and Compass 3 Click boards™ connected to the channels 1 and 4 respectfully.

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.I2CMUX6

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

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

Downloads

I2C MUX 6 click example on Libstock

PCA9518 datasheet

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I2C MUX 6 click 2D and 3D files

I2C MUX 6 click schematic

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