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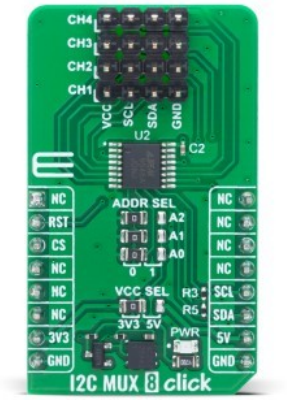
I2C MUX 8 Click



PID: MIKROE-6564

I2C MUX 8 Click is a compact add-on board designed to expand a single I2C bus into four independent channels for communication between multiple I2C devices without conflicts. It is based on the TPT29546A, a four-channel I2C switch with a reset function from 3PEAK. This Click board™ features a bidirectional translating switch with a programmable control register, supports Fast-Mode (400 kHz) I2C communication, and includes a built-in recovery mechanism to reset stuck buses. It operates with both 3.3V and 5V logic voltage levels and offers configurable I2C addresses via onboard jumpers. Ideal for applications in servers, storage solutions, telecom routers, industrial automation, and systems with multiple identical I2C devices, I2C MUX 8 Click ensures conflict-free operation in complex embedded environments.

For more information about **I2C MUX 8 Click** visit the official product page.

How does it work?

I2C MUX 8 Click is based on the TPT29546A, a four-channel I2C switch with a reset function from 3PEAK. This bidirectional translating switch allows a single upstream I2C bus (SCL/SDA pair) to be expanded into four independent downstream channels. The selection of active channels is controlled via a programmable register, making it highly flexible for applications that require multiple I2C devices to operate simultaneously without interference. I2C MUX 8 Click is a solution particularly valuable in systems where multiple I2C devices need to coexist without address conflicts. It is commonly used in servers and storage solutions, telecom switching equipment such as routers, and industrial automation. Additionally, it is an ideal choice for products that require multiple identical I2C devices, such as temperature sensors, ensuring efficient and conflict-free operation in complex embedded systems.

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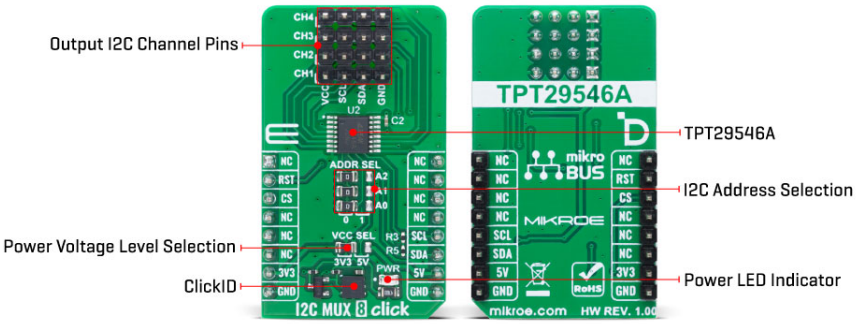

I2C MUX 8 Click communicates with MCU using the standard I2C 2-Wire interface that supports Standard-Mode (100 kHz) and Fast-Mode (400 kHz) operation. The TPT29546A has a 7-bit I2C address with the first five MSBs fixed to 1110. The address pins A0, A1, and A2, are programmed by the user and determine the value of the last three LSBs of the I2C address, which can be selected by onboard SMD jumpers labeled as ADDR SEL, allowing selection of the I2C address LSBs.

A notable feature of the TPT29546A is its built-in recovery mechanism. If any of the downstream I2C buses become stuck in a LOW state, the active-low reset function (RST pin) can be used to restore normal operation. By pulling the RST pin LOW, the internal I2C state machine is reset, and all channels are deselected. Additionally, the device includes an internal power-on reset feature, ensuring a stable startup by resetting all channels to their default state.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the VCC SEL jumper. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. Also, this 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	I2C,Multiplexer
Applications	Ideal for applications in servers, storage solutions, telecom routers, industrial automation, and systems with multiple identical I2C devices
On-board modules	TPT29546A - four-channel I2C switch with a reset function from 3PEAK
Key Features	Four-channel bidirectional I2C switch, reset function, Fast-Mode (400 kHz) I2C communication, programmable control register for channel selection, built-in recovery mechanism, I2C address with configurable LSBs, and more
Interface	I2C

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Feature	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 I2C MUX 8 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
	NC	1	AN	PWM	16	NC	
Reset	**RST**	2	RST	INT	15	NC	
ID COMM	**CS**	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 Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V
JP2-JP4	ADDR SEL	Left	I2C Address Selection 0/1: Left position 0, Right position 1

I2C MUX 8 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V

Software Support

I2C MUX 8 Click demo application is developed using the NECTO Studio, ensuring compatibility with mikroSDK's open-source libraries and tools. Designed for plug-and-play implementation and testing, the demo is fully compatible with all development, starter, and mikromedia boards featuring a mikroBUS™ socket.

Example Description

This example demonstrates the use of I2C MUX 8 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.

Key Functions

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- i2cmux8_cfg_setup This function initializes Click configuration structure to initial values.
- i2cmux8_init This function initializes all necessary pins and peripherals used for this Click board.
- i2cmux8_set_channel This function sets the active channel and updates the slave address for communication.
- i2cmux8_read_channel This function reads the currently selected channel.
- i2cmux8_i2c_read_reg This function reads data from a specific register of the currently active I2C slave.

Application Init

Initializes the driver and resets the device.

Application Task

Reads the device ID of the connected Click boards. Channel 1 : 6DOF IMU 11 Click [slave address: 0x0E; reg: 0x00; id: 0x2D], Channel 4 : Compass 3 Click [slave address: 0x30; reg: 0x2F; id: 0x0C]. All data is being logged on the USB UART where you can check the device ID.

Application Output

This Click board can be interfaced and monitored in two ways:

- Application Output - Use the "Application Output" window in Debug mode for real-time data monitoring. Set it up properly by following this tutorial.
- UART Terminal - Monitor data via the UART Terminal using a USB to UART converter. For detailed instructions, check out this tutorial.

Additional Notes and Information

The complete application code and a ready-to-use project are available through the NECTO Studio Package Manager for direct installation in the NECTO Studio. The application code can also be found on the MIKROE GitHub account.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

ClickID

Downloads

I2C MUX 8 click example package

I2C MUX 8 click 2D and 3D files v100

I2C MUX 8 click schematic v100

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TPT29546A datasheet

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MIKROE-6564