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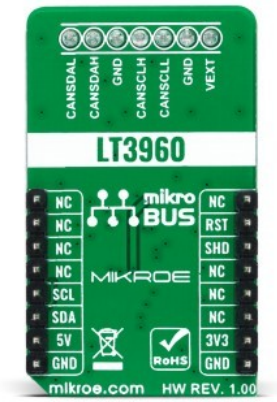
I2C to CAN Click



PID: MIKROE-4644

I2C to CAN Click is a compact add-on board that contains I2C to CAN-physical transceiver, which extends a single-master I2C bus through harsh or noisy environments. This board features the LT3960 (https://www.analog.com/en/products/lt3960.html#product-overview), a robust high-speed transceiver that extends a single-master I2C bus up to 400kbps using the CAN-physical layer from Analog Devices. One LT3960 from SCL and SDA I2C lines creates equivalent differential buses (CAN) on two twisted pairs, while the second LT3960 recreates the I2C bus locally for any slave I2C devices on the other end of the twisted pairs. A built-in 3.3V LDO powers both the I2C and CAN lines from a single input supply from 4V to 60V. This Click board™ is suitable for industrial and automotive networking, remote sensor applications, and more.

I2C to CAN 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 to CAN Click as its foundation uses the LT3960, I2C to CAN-Physical transceiver used to send and receive I2C data up to 400kbps using the CAN-Physical layer for differential signaling over twisted pair connections from Analog Devices. Using two integrated CAN transceivers, the LT3960 creates a differential proxy for each single-ended I2C clock and data signal capable of crossing harsh or noisy environments across two twisted pairs. Each transceiver consists of a transmitter and receiver, capable of quickly converting I2C dominant signal into a differential dominant signal and vice versa. Also, it extends functionality in environments with high common-mode voltages due to electrical noise or local ground potential differences.

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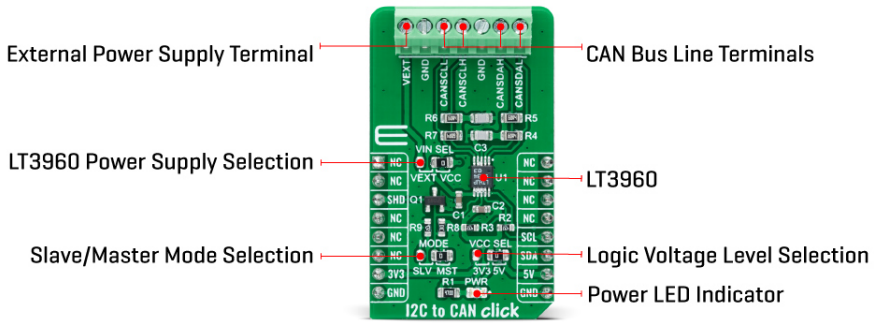

I2C to CAN Click communicates with MCU using the standard I2C 2-Wire interface to read data and configure settings, supporting Fast Mode operation with a clock frequency up to 400kHz. The LT3960 provides a mode selection feature selectable via jumper labeled as MODE, where the user can choose between Master or Slave mode of operation. The SHD pin routed to the CS pin of the mikroBUS™ socket is used to put the LT3960 in a low-power Shutdown mode, disabling both the LDO and transceivers and allows selection between Master and Slave modes when enabled.

The selection between Master and Slave mode is performed by positioning the SMD jumper labeled as MODE to an appropriate position marked as SLV and MST. When a jumper is on the MST position, Master mode is selected, and the EN/MODE pin of the LT3960 is tied to a high logic state, while floating this pin, more precisely positioning the SMD jumper to an SLV position, allows the user to select Slave mode of operation.

This Click board™ can operate with both 3.3V and 5V logic voltage levels selected via the VCC SEL jumper. It allows for both 3.3V and 5V capable MCUs to use the I2C communication lines properly. Additionally, there is a possibility for the LT3960 power supply selection via jumper labeled as VIN SEL to supply the LT3960 from an external power supply terminal in the range from 4 to 60V or with VCC voltage levels from mikroBUS™ power rails. 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	CAN
Applications	Can be used for industrial and automotive networking, remote sensor applications, and more.
On-board modules	LT3960 - I2C to CAN-Physical transceiver used to send and receive I2C data up to 400kbps using the CAN-Physical layer for differential signaling over twisted pair connections from Analog Devices
Key Features	High speed I2C to CAN-physical transceiver, up to 400kbps I2C communications, up to 60V power supply, low current Shutdown mode,

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	and more.
Interface	I2C
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 I2C to CAN 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	
	NC	2	RST	INT	15	NC	
Shutdown	**SHD**	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	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
JP2	VIN SEL	Right	LT3960 Power Supply Voltage Selection VEXT/VCC: Left position VEXT, Right position VCC
JP3	MODE	Right	Slave/Master Mode Selection SLV/MST: Left position SLV, Right position MST

I2C to CAN Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage VCC	3.3	-	5	V
Supply Voltage VIN	4	-	60	V
Data Rate	-	-	400	kbps
Operating Temperature Range	-40	+25	+125	°C

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Software Support

We provide a library for the I2C to CAN 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 to CAN Click driver.

Key functions:

- i2ctocan_cfg_setup - Config Object Initialization function.
- i2ctocan_init - Initialization function.
- i2ctocan_default_cfg - Click Default Configuration function.

Examples description

This library contains API for the I2C to CAN Click driver. This demo application shows an example of an I2C to CAN wired to the VAV Press Click for reading differential pressure and temperature measurement.

The demo application is composed of two sections :

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.I2cToCan

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.

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Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click Boards™

Downloads

I2C to CAN click 2D and 3D files

I2C to CAN click schematic

LT3960 datasheet

I2C to CAN click example on Libstock

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