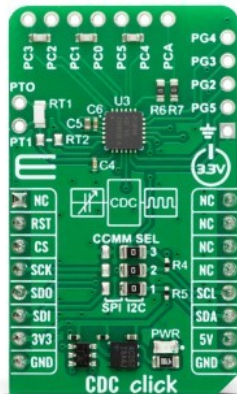


CDC Click



PID: MIKROE-5985

CDC Click is a compact add-on board that allows your application do a conversion of capacitance to a digital format. This board features the [PCAP04](#), a capacitance-to-digital converter (CDC) from [ScioSense](#). It also includes an integrated digital signal processor (DSP) for on-chip data post-processing. The converter has high flexibility and allows you to convert grounded capacitors and floating capacitors to a digital format. It has up to 50KHz sampling rate in up to 20-bit resolution. This Click board™ makes the perfect solution for the development of measuring devices, industrial applications, sensitive equipment, and more.

CDC Click is fully compatible with the mikroBUS™ socket and can be used on any host system supporting the [mikroBUS™](#) standard. It comes with the [mikroSDK](#) open-source libraries, offering unparalleled flexibility for evaluation and customization. What sets this [Click board™](#) apart is the groundbreaking [ClickID](#) feature, enabling your host system to seamlessly and automatically detect and identify this add-on board.

How does it work?

CDC Click is based on the PCAP04, a capacitance-to-digital converter from ScioSense. It covers a wide capacitance input range from a few femtofarads to several hundreds of nanofarads. Configuring the PCAP04 for different capacitance measurement tasks, such as single and differential sensors in grounded or floating connections, is easy. The CDC Click is pre-assembled with 10pF capacitors on the PC0 – PC5 header to emulate capacitive sensors. They are connected as single sensors in floating mode. There is a GND connector for connecting the capacitive sensors in grounded mode. The typical value of the capacitive sensors that can be connected is in the range of 30pF to 3.5nF.

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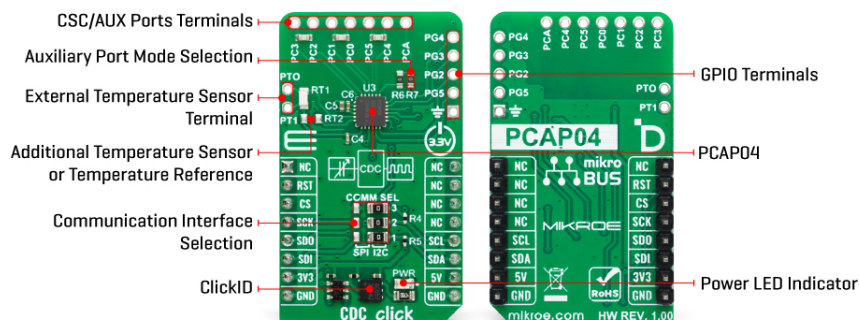
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ISO 9001: 2015 certification of quality management system (QMS).



The PCAP04 has four general-purpose input/output pins (PG prefix) and can be used as pulse-density/pulse-width modulation outputs. The PCAP04 features the RDC (resistance-to-digital converter) as well. The RDC unit is mainly intended for measuring temperature, using an internal sensor and reference, or using external resistors like the PT1000 onboard. You can, however, connect an external sensor over the PT1 and PTO connectors or any other resistance element. The DSP takes information from both the CDC and RDC, processes it, and makes it available to the host MCU. You can also add another temperature sensor or temperature reference on RT2. The auxiliary port (PCAUX – PCA on CDC Click) can be used for external compensation capacitance or external discharge resistor and guarding port. You can make a selection by soldering an R7 jumper.

CDC Click can communicate with the host MCU using a standard I2C interface or a 4-wire SPI serial interface. The selection can be made over the COMM SEL jumpers. The I2C is set by default and supports up to 100kHz of the bus frequency clock. The SPI clock frequency is up to 20MHz.

This Click board™ can be operated only with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before using MCUs with different logic levels. Also, it comes equipped with a library containing functions and an example code that can be used as a reference for further development.

Specifications

Type	Capacitive
Applications	Can be used for the development of measuring devices, industrial applications, sensitive equipment, and more
On-board modules	PCAP04 - capacitance-to-digital converter from ScioSense
Key Features	Capacitance-to-digital converter, resistance-to-digital converter, high flexibility, ultra-low power, high resolution, high speed, on-chip DSP for sensor algorithms, on-chip and external temperature measurement capabilities, and more
Interface	I2C, SPI

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Feature	ClickID
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 CDC 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	
ID SEL	RST	2	RST	INT	15	NC	
SPI Select / ID COMM	CS	3	CS	RX	14	NC	
SPI Clock	SCK	4	SCK	TX	13	NC	
SPI Data OUT	SDO	5	MISO	SCL	12	SCL	I2C Clock
SPI Data IN	SDI	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
JP1-JP3	COMM SEL	Right	Communication Interface Selection SPI/I2C: Left position SPI, Right position I2C
RT2	RT2	Unpopulated	External temperature sensor or temperature reference
R7	R7	Populated	Auxiliary port mode selection

CDC Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Capacitive Sensors Operating Range	0.03	-	3.5	nF
Sampling Range	-	-	50	kHz
Resolution	-	-	20	bit

Software Support

We provide a library for the CDC Click as well as a demo application (example), developed using MIKROE [compilers](#). The demo can run on all the main MIKROE [development boards](#).

Package can be downloaded/installed directly from NECTO Studio Package Manager (recommended), downloaded from our [LibStock™](#) or found on [Mikroe github account](#).

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Library Description

This library contains API for CDC Click driver.

Key functions

- `cdc_write_config` This function writes configuration data starting from the selected config address.
- `cdc_send_opcode` This function sends a desired opcode command byte.
- `cdc_read_results` This function reads all results and status registers.

Example Description

This example demonstrates the use of CDC Click board™ by reading capacitance measurements from C3/C2 and C5/C4 ports calculated from pure capacitance ratio between those ports and port C1/C0 which is used as external C reference.

The full application code, and ready to use projects can be installed directly from NECTO Studio Package Manager (recommended), downloaded from our [LibStock™](#) or found on [Mikroe github account](#).

Other Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.CDC

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 MIKROE [compilers](#).

mikroSDK

This Click board™ is supported with [mikroSDK](#) - MIKROE 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™](#)

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[ClickID](#)

Downloads

[CDC click example on Libstock](#)

[CDC click 2D and 3D files](#)

[CDC click schematic](#)

[PCAP04 datasheet](#)

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