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1-Wire Switch Click

PID: MIKROE-5589

1-Wire Switch Click is a compact add-on board that allows you to switch a device remotely using a 1-wire signal. This board features the DS2413, a dual-channel programmable I/O 1-Wire switch from Analog Devices. Communication and operation of this Click board™ are performed with the single 1-Wire serial interface, with the possibility of selecting signals for data processing. With the help of the button and the red LED, it is possible to give/detect I/O signals, and thanks to the additional I/O header, it is also possible to connect an additional external 1-Wire device. This Click board™ makes a perfect choice for industrial control, key-pick systems, accessory identification and control, and many more.

1-Wire Switch 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?

1-Wire Switch Click is based on the DS2413, a dual-channel addressable switch from Analog Devices. The DS2413 combines two programmable I/O pins and a fully featured 1-Wire interface in a single package, ensuring that PIO output changes occur error-free. The PIO outputs are configured as open-drain, operate at up to 28V (provide a high level of fault tolerance in the end application), and have an ON-resistance of 20Ω maximum. By monitoring the voltage at its programmable I/O pins, the DS2413 lets you read back the state of the load, in this case, the state of the button, which in this configuration is in the role of input, while the

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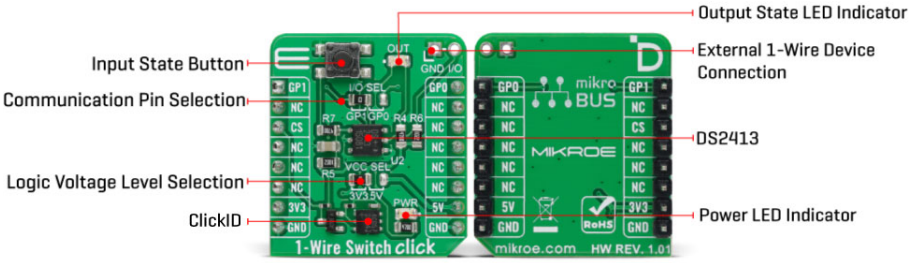
output state is visually detected through the red LED marked with OUT.



The DS2413's power is supplied parasitically from the 1-Wire bus, a system with a single bus controller and one or more peripherals. With that in mind, this Click board™ has one additional unpopulated header, which enables the connection of other external 1-Wire devices, thus forming a line with several peripherals on one controller. The DS2413 also has a 64-bit long registration number that guarantees unique identification. This number addresses the device in a multidrop 1-Wire network environment, where multiple devices reside on a common 1-Wire bus and operate independently.

As mentioned, the 1-Wire Switch Click communicates with MCU using the 1-Wire interface that, by definition, requires only one data line (and ground) for communication with MCU. The 1-Wire communication line is routed to the SMD jumper labeled as I/O SEL, which allows routing of the 1-Wire communication either to the GP0 pin or the GP1 pin of the mikroBUS™ socket. These pins are labeled, respectively, the same as the SMD jumper positions, making the selection of the desired pin simple and straightforward.

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. 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	1-Wire
Applications	Can be used for industrial control, key-pick systems, accessory identification and control, and more
On-board modules	DS2413 - dual-channel 1-Wire switch from Analog Devices
Key Features	Configured as open-drain, parasitic power supply through 1-Wire, high performance, unique 64-bit ROM factory-lasered serial number, low power consumption, selectable communication pin, and more
Interface	1-Wire

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Feature	ClickID
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on 1-Wire Switch Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
1-Wire Data IN/OUT	**GP1**	1	AN	PWM	16	**GP0**	1-Wire Data IN/OUT
	NC	2	RST	INT	15	NC	
ID COMM	**CS**	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	NC	
	NC	6	MOSI	SDA	11	NC	
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
LD2	OUT	-	Output State LED Indicator
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
JP2	I/O SEL	Left	Communication Pin Selection GP1/GP0: Left position GP1, Right position GP0
J1	-	Unpopulated	External 1-Wire Device Connection Header
T1	-	-	Input State Button

1-Wire Switch Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V

Software Support

We provide a library for the 1-Wire Switch Click as well as a demo application (example), developed using Mikroe compilers. The demo can run on all the main Mikroe development boards.

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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 1-Wire Switch Click driver.

Key functions

- c1wireswitch_set_pio_state 1-Wire Switch write specific programmable I/O state function.
- c1wireswitch_get_pio_state 1-Wire Switch read specific programmable I/O state function.
- c1wireswitch_get_pio_latch_state 1-Wire Switch read programmable I/O latch state function.

Example Description

This library contains API for 1-Wire Switch Click driver. The library initializes and defines the 1-Wire bus drivers to
write and read data for state programmable I/O,
as well as the default configuration.

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.c1WireSwitch

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. A UART terminal is available in all Mikroe compilers.

mikroSDK

This Click board™ is supported with mikroSDK - Mikroe Software Development Kit, which needs to be downloaded from the LibStock and installed for the compiler you are using to ensure proper operation of mikroSDK compliant Click board™ demo applications.

For more information about mikroSDK, visit the official page.

Resources

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DS2413 datasheet

1-Wire Switch click schematic v101