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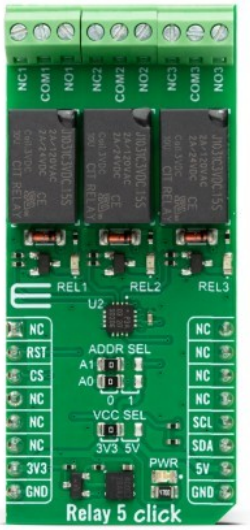
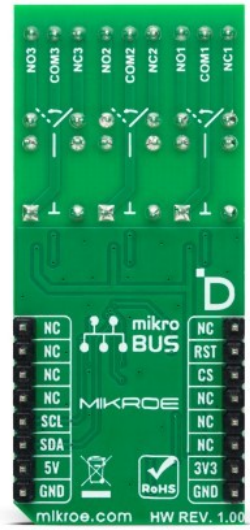
Relay 5 Click





PID: MIKROE-5675

Relay 5 Click is a compact add-on board with general-purpose relays that any host MCU can control. This board features three J1031C3VDC.15S, a high-current single-pole double-throw (SPDT) signal relays controlled by the PCA9538A, a low-voltage 8-bit I/O port expander from NXP Semiconductors. Highly sensitive, the J1031C3VDC.15S offers a low coil power consumption in a small, lightweight package with PC pin mounting. It comes with a dimension of 12.5x7.5x10 millimeters (LxWxH) and a 1C contact arrangement with a coil voltage of 3VDC, providing a maximum switching voltage of 125VAC/60VDC. This Click board™ makes the perfect solution for controlling high-power applications.

How does it work?

Relay 5 Click is based on three J1031C3VDC.15S, a high-current single-pole double-throw (SPDT) signal relays from CIT Relay and Switch, controlled in a very simple way through a port expander from NXP Semiconductors, the PCA9538A. The J1031C3VDC.15S relay is well known for its reliability and durability, high sensitivity, and low coil power consumption housed in a small package with PC pin mounting. Despite its size (12.5x7.5x10 millimeters (LxWxH)), the J1031C3VDC relay can withstand up to 2A and 125VAC/60VDC maximum. These relays are designed to easily activate their coils by relatively low currents and voltages, making them a perfect choice that any MCU can control. Besides, their durability is impressive, with over 5M of mechanical life cycles.

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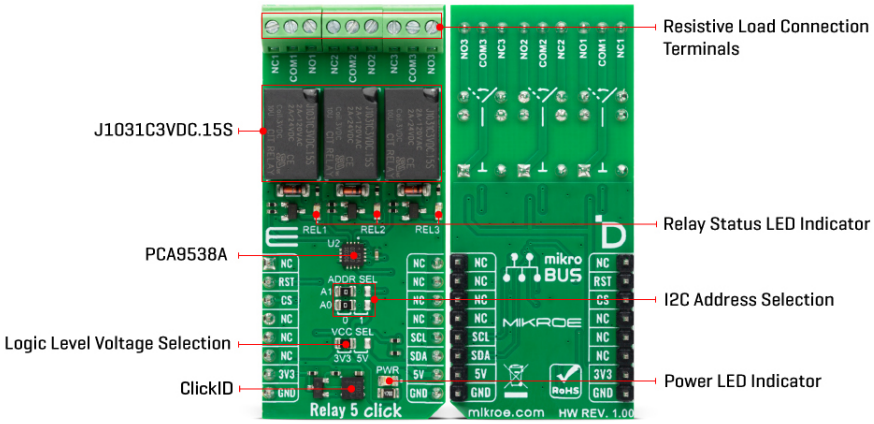

The contact configuration of the J1031C3VDC.15S is a single-pole double-throw (SPDT), meaning it has one pole and two throws. Based on the default position of the pole, one throw is considered normally open (NO) while the other is normally closed (NC), which is, in this case, its default position. When the coil is energized, it will attract the internal switching elements similar to a switch. For this purpose, the Relay 5 Click has three terminals for each relay that are adequately labeled. In addition, every relay has its status LED (REL1-3) for visual status presentation.

As mentioned, the relays are not directly driven by the host MCU but by the PCA9538A, a low-voltage 8-bit I/O port with interrupt and reset from NXP Semiconductors. This I/O expander provides a simple solution when additional I/Os are needed while keeping interconnections to a minimum. The Relay 5 Click uses the PCA9538A and 2-Wire I2C interface to communicate with the host MCU. The PCA9538A supports a fast mode of up to 400KHz of clock frequency. The I2C Address can be selected via the ADDR SEL jumpers, with 0 selected by default. The expander can be reset over the RST pin with active LOW, thus setting the registers to their default values without the need to power it off.

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	Relay
Applications	Can be used for controlling high-power applications
On-board modules	J1031C3VDC.15S - high-current single-pole double-throw (SPDT) signal relays from CIT Relay and Switch PCA9538A - low-voltage 8-bit I/O port expander from NXP Semiconductors
Key Features	Three electro-mechanical relays, low power consumption, reliable switching, high current, high sensitivity, SPDT configuration, relay activity indicators, long mechanical life, control over the I/O port expander, and more

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Interface	I2C
Feature	ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on Relay 5 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 Dlock
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-LD3	REL1-REL3	-	Relay Status LED Indicators
JP1	VCC SEL	Left	Logic Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V
JP2	ADDR SEL	Right	I2C Address Selection 0/1: Left position 0, Right position 1

Relay 5 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Maximum Switching AC Voltage	-	-	125	V
Maximum Switching DC Voltage	-	-	60	V
Maximum Current Switching	-	-	2	A

Software Support

We provide a library for the Relay 5 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), downloaded from our LibStock™ or found on Mikroe github account.

Library Description

This library contains API for Relay 5 Click driver.

Key functions

- relay5_set_relay1_open This function sets the relay 1 to normally open state by setting the RL1 pin to low logic level.
- relay5_set_relay1_close This function sets the relay 1 to normally close state by setting the RL1 pin to high logic level.
- relay5_switch_relay1 This function switches the relay 1 state by toggling the RL1 pin logic level.

Example Description

This example demonstrates the use of Relay 5 Click board™ by toggling the relays state.

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.Relay5

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, that 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

mikroBUS™

mikroSDK

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Click board™ Catalog

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ClickID

Downloads

Relay 5 click example on Libstock

Relay 5 click 2D and 3D files

J1031C3VDC.15S datasheet

PCA9538A datasheet

Relay 5 click schematic

Mouser Electronics

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