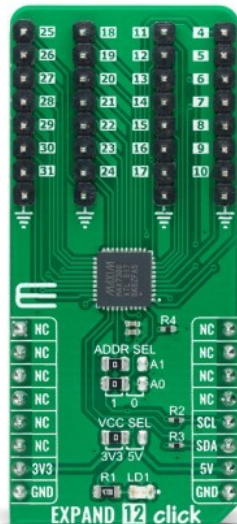


Expand 12 Click



PID: MIKROE-4889

Expand 12 Click is a compact add-on board that contains a multi-port I/O expander. This board features the [MAX7300](#), a general-purpose I/O expander providing remote I/O expansion for most MCU's families from [Analog Devices](#). The MAX7300 comes in a 28-port configuration and allows easy addition of I/O through a standard I2C serial interface. Each port is user-configurable to either a logic input or logic output, capable of sinking 10mA and sourcing 4.5mA. In addition, seven ports feature configurable transition detection logic, which generates an interrupt upon change of port logic level. This Click board™ provides a simple solution when additional I/Os are needed while keeping interconnections to a minimum in system monitoring applications, industrial controllers, portable equipment, and many more.

Expand 12 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?

Expand 12 Click as its foundation uses the MAX7300, a general-purpose input/output (GPIO) expander from Analog Devices, now part of Analog Devices. This port expander is a simple solution when additional I/Os are needed while keeping interconnections to a minimum, particularly great for system monitoring applications, industrial controllers, portable equipment, and others. The MAX7300 comes in a 28-port configuration, which can be configured to any combination of logic inputs and logic outputs, and default to logic inputs on Power-Up.

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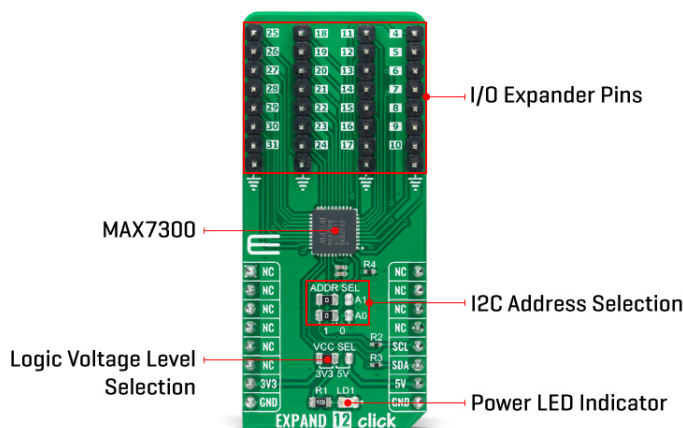
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ISO 9001: 2015 certification of quality management system (QMS).



Any I/O port can be configured as a push-pull output (sinking 10mA, sourcing 4.5mA) or a Schmitt-trigger logic input. Each input has an individually selectable internal pull-up resistor. Additionally, transition detection allows seven ports (from port 24 up to port 30) to be monitored in any maskable combination for changes in their logic status. A detected transition is flagged through a status register bit, as well as an interrupt pin (port 31) if desired.

Expand 12 Click communicates with MCU using the standard I2C 2-Wire interface to read data and configure settings with a maximum frequency of 400kHz. Besides, it also allows the choice of the least significant bit of its I2C slave address by positioning the SMD jumpers labeled as ADDR SEL to an appropriate position marked as 1 and 0. This way, the MAX7300 provides the opportunity of the 16 possible different I2C addresses by positioning the SMD jumper to an appropriate position.

This Click board™ can operate with both 3.3V and 5V logic voltage levels selected via the VCC SEL jumper. This way, it is allowed for both 3.3V and 5V capable MCUs to use the I2C 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	Port expander
Applications	Can be used in system monitoring applications, industrial controllers, portable equipment, and many more
On-board modules	MAX7300 - general-purpose input/output (GPIO) expander from Maxim Integrated, now part of Analog Devices
Key Features	Remote I/O pins that default to inputs at Power-Up, compliant with the I2C-bus Fast and Standard modes, 5V tolerant I/Os, sinking 10mA and sourcing 4.5mA, programmable slave addresses, and more
Interface	I2C
ClickID	No

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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 Expand 12 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	
	NC	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-JP3	ADDR SEL	Left	I2C Address Selection 1/0: Left position 1, Right position 0
J1-J4	4-31	Populated	I/O Expander Ports

Expand 12 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Port Sink Current	-	10	-	mA
Port Source Current	-	4.5	-	mA
Number of I/Os	-	-	28	pins
Operating Temperature Range	-40	+25	+125	°C

Software Support

We provide a library for the Expand 12 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](#).

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Library Description

This library contains API for Expand 12 Click driver.

Key functions

- `expand12_set_pin_direction` This function sets the direction of the selected pin.
- `expand12_set_pin_value` This function sets the logic level of the selected pin.
- `expand12_read_all_pins_value` This function reads all pins logic levels.

Example Description

This example demonstrates the use of Expand 12 Click board™.

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.Expand12

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 MikroElektronika [compilers](#).

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](#).

Resources

[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click Boards™](#)

Downloads

[Expand 12 click schematic](#)

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[Expand 12 click 2D and 3D files](#)

[MAX7300 datasheet](#)

[Expand 12 click example on Libstock](#)

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