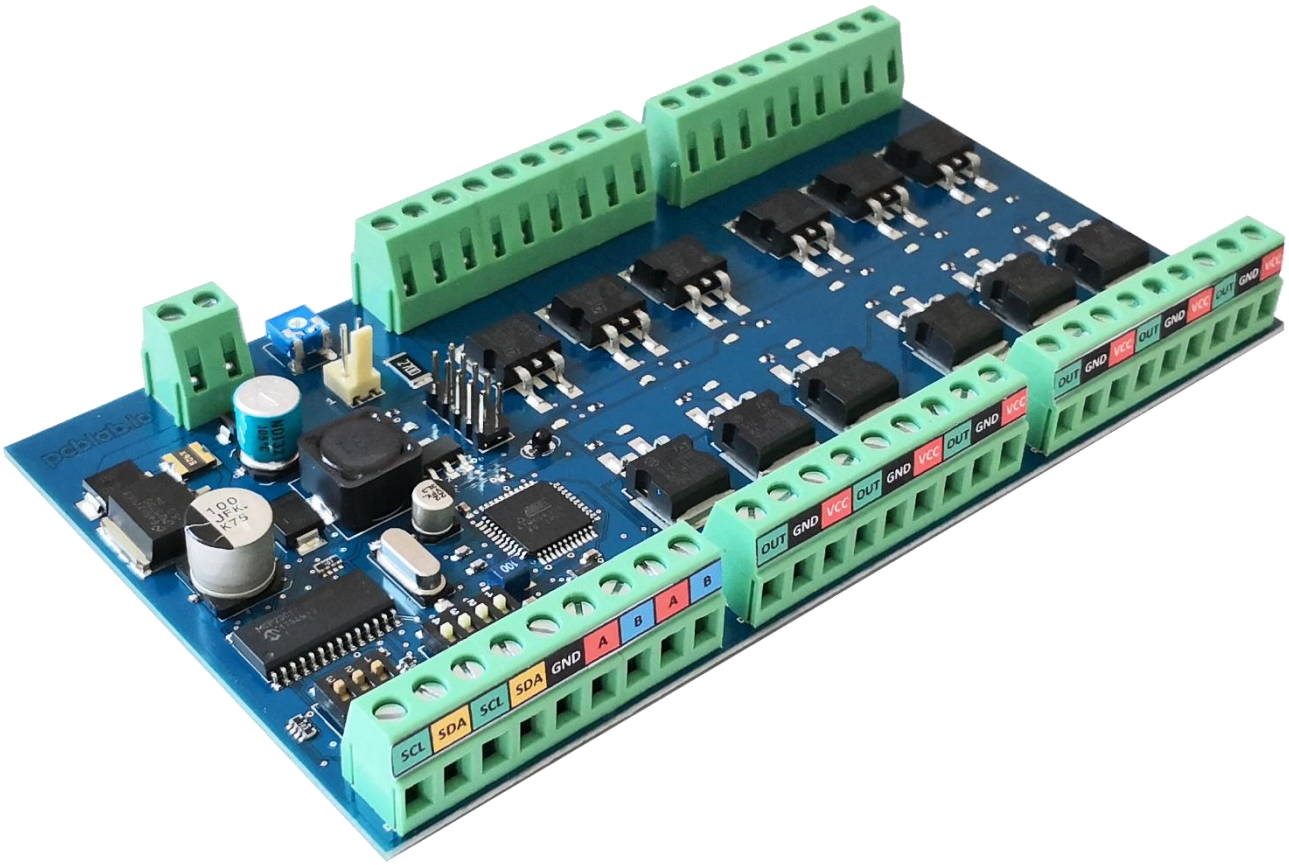
Open Drain PowerBoard®

for Arduino, Raspberry Pi and Domoticz

i2c and MODBUS controlled



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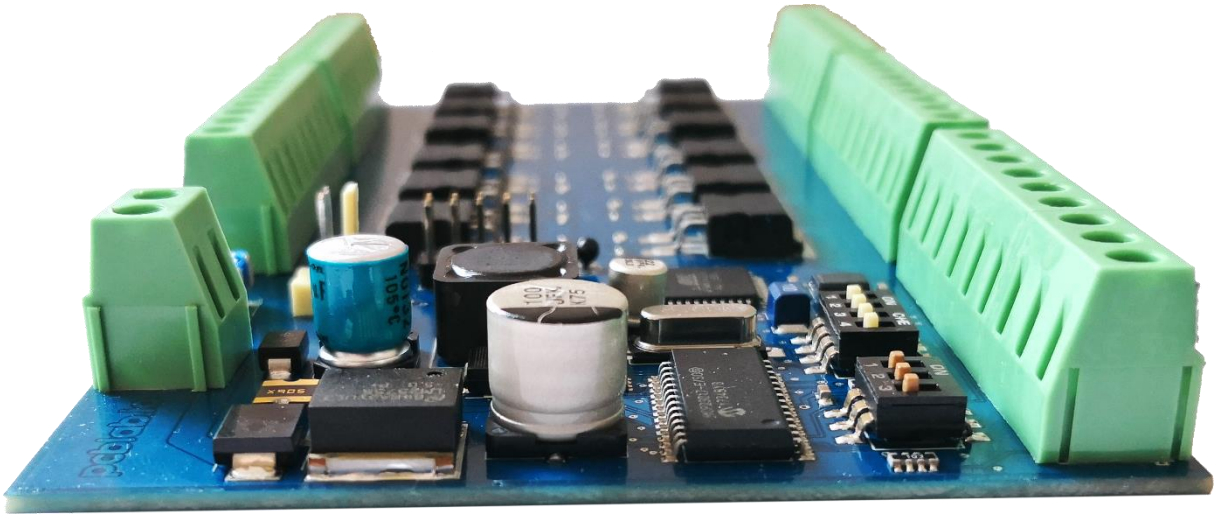
Product description

12 channel open drain Power Board® for Arduino- i2c - MODBUS with POWER MOSFET STB16NF06L transistors.

The controller can work with any device (PLC, HMI) that supports the MODBUS protocol (PLC-> MASTER / Power Board® -> SLAVE) or I2C bus. The system is equipped with 12 MOSFET channels in an open drain system, which allows individual power supply of each channel from an external power source or directly from the PCB board.

Board specification

- 12 high quality transistors Power MOSFET STB16NF06L VDSS - 60V, ID - 16A
- Operating voltage 5-24V
- Overload protection with polymer fuse
- Overvoltage protection with Transil diode - TVS
- Protection against reverse polarity
- i2c - You can connect up to 8 boards to one i2c bus - up to 96 open drain outputs.
- MODBUS - The board is equipped with SN75176A Differential Bus Transceiver - so the board can communicate with other devices with MODBUS communication protocol.
- I2c and MODBUS buses communication noise protected by SM712 ESD + diode - 30kV
- Fan connect option - to cooling the transistors. Fan is controlled by a thermistor - smooth increase of the fan's rotation as the temperature rises.
- The board is designed for the ITALTRONIC 05.0901530 DIN Rail Modulbox.



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MODBUS

Using the MODBUS protocol it is possible to connect up to 16 PowerBoard® devices on one bus (what makes 192 separate controlled circuits in total). The device supports the basic functions of MODBUS RTU:

- 0x03 - read registers,
- 0x06 - write one register,
- 0x10 - write multiple registers.

Each channel can be controlled individually according to the following table:

Registry Address	Value	Description
40010	>0	Turn on the output 1
40010	0	Turn off the output 1
40030	>0	Timer - setting the output ON time
40031	>0	Timer - setting the output OFF time
40032	>0	Pulse length
40034	1	Reset the output parameters

The output can work in modes:

- ON/OFF (register 10)
- Cyclic operation (register 30 - switching time / register 31 - break time between cycles)
- Delayed switch-off (register 32 defines how long the output should be switched on / in seconds /)
- Entering the value "1" in register 34 deletes all parameters entered previously.

Registry Address	Value	Description
40011	>0	Turn on the output 2
40011	0	Turn off the output 2
40035	>0	Timer - setting the output ON time
40036	>0	Timer - setting the output OFF time
40037	>0	Pulse length
40039	1	Reset the output parameters

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Registry Address	Value	Description
40012	>0	Turn on the output 3
40012	0	Turn off the output 3
40040	>0	Timer - setting the output ON time
40041	>0	Timer - setting the output OFF time
40042	>0	Pulse length
40044	1	Reset the output parameters

Registry Address	Value	Description
40013	>0	Turn on the output 4
40013	0	Turn off the output 4
40045	>0	Timer - setting the output ON time
40046	>0	Timer - setting the output OFF time
40047	>0	Pulse length
40049	1	Reset the output parameters

Registry Address	Value	Description
40014	>0	Turn on the output 5
40014	0	Turn off the output 5
40050	>0	Timer - setting the output ON time
40051	>0	Timer - setting the output OFF time
40052	>0	Pulse length
40054	1	Reset the output parameters

Registry Address	Value	Description
40015	>0	Turn on the output 6
40015	0	Turn off the output 6
40055	>0	Timer - setting the output ON time
40056	>0	Timer - setting the output OFF time
40057	>0	Pulse length
40059	1	Reset the output parameters

Registry Address	Value	Description
40016	>0	Turn on the output 7
40016	0	Turn off the output 7
40060	>0	Timer - setting the output ON time
40061	>0	Timer - setting the output OFF time
40062	>0	Pulse length
40064	1	Reset the output parameters

Registry Address	Value	Description
40017	>0	Turn on the output 8
40017	0	Turn off the output 8
40065	>0	Timer - setting the output ON time
40066	>0	Timer - setting the output OFF time
40067	>0	Pulse length
40068	1	Reset the output parameters

Registry Address	Value	Description
40018	>0	Turn on the output 9
40018	0	Turn off the output 9
40070	>0	Timer - setting the output ON time
40071	>0	Timer - setting the output OFF time
40072	>0	Pulse length
40074	1	Reset the output parameters

Registry Address	Value	Description
40019	>0	Turn on the output 10
40019	0	Turn off the output 10
40075	>0	Timer - setting the output ON time
40076	>0	Timer - setting the output OFF time
40077	>0	Pulse length
40079	1	Reset the output parameters

Registry Address	Value	Description
40020	>0	Turn on the output 11
40020	0	Turn off the output 11
40080	>0	Timer - setting the output ON time
40081	>0	Timer - setting the output OFF time
40082	>0	Pulse length
40084	1	Reset the output parameters

Registry Address	Value	Description
40021	>0	Turn on the output 12
40021	0	Turn off the output 12
40085	>0	Timer - setting the output ON time
40086	>0	Timer - setting the output OFF time
40087	>0	Pulse length
40089	1	Reset the output parameters

i2c bus

The default i2c board address is set to 0x27.

Controlling with ARDUINO:

1. Connect board SDA to Arduino pin PC4
2. Connect board SCL to Arduino pin PC5

Example Arduino Sketch Link

The board must be powered from the same power source as Arduino or have the common ground!

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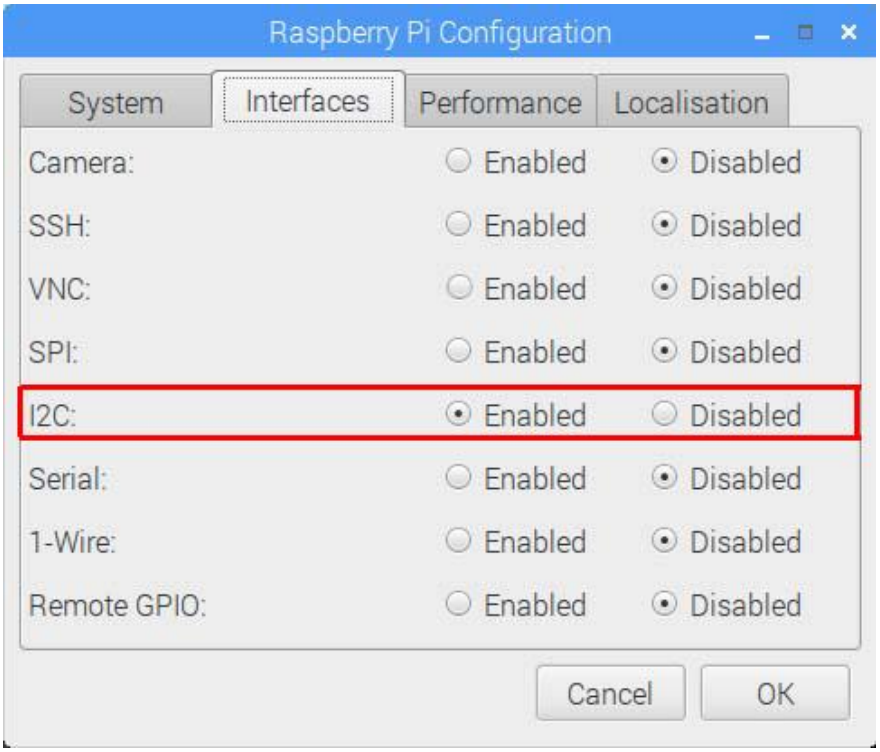
Controlling with Raspberry Pi:

1. Connect board SDA to RPi pin 3 – GPIO2
2. Connect board SCL to RPi pin 5 – GPIO3

Make sure you have turned the i2c on in Raspberry Pi settings



The board must be powered from the same power source as Raspberry Pi or have the common ground!

Now you cant use this example commands:

- i2cdetect -y -1 – to check if the board is detected
- i2cset -y 1 0x20 0x12 0x00 – where 0x20 is i2c board address, 0x12 is MCP port A address, 0x00 is port valute (0b00000000 – set all outputs to off).
- i2cset -y 1 0x27 0x13 0xFF – where 0x27 is i2c board address, 0x13 is MCP port B address, 0xFF if port value (0b11111111 – set all outputs to on).

Example Python Code

For more i2c bus settings check the MCP23016 datasheet.

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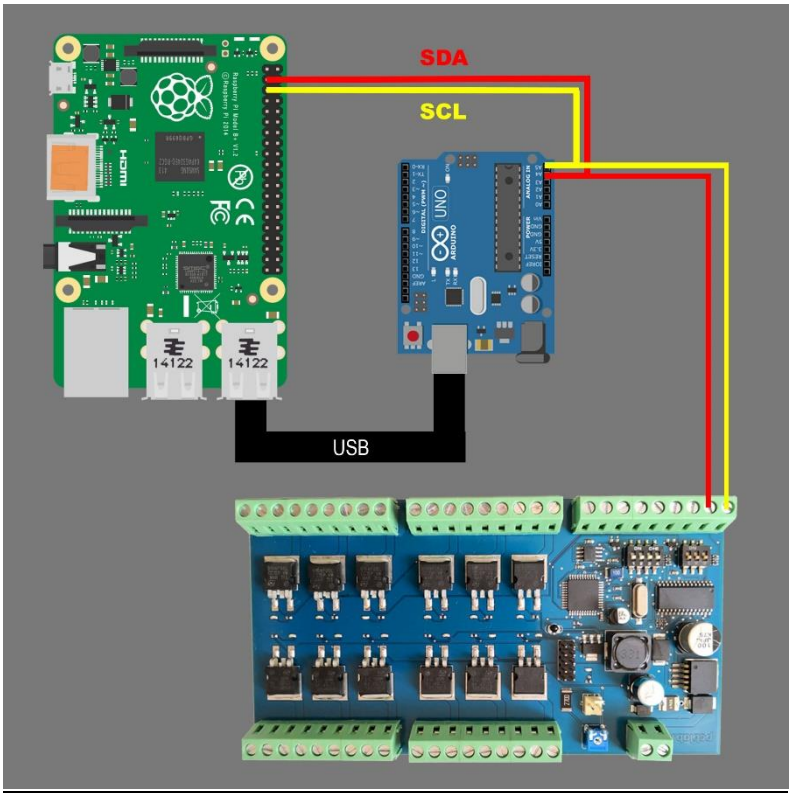
DOMOTICZ

To use PowerBoard® with Domoticz the best way is to use MySensors Library. Below is an example of configuration.

Connection:



Code:

[Arduino Example Code]

Domoticz:

1. Go to the **Hardware** tab and add hardware: **MySensors Gateway USB**
2. Then go to the Switches tab and press **LEARN Light/Switch button**. Then press the button connected to arduino. Do it with all the buttons you have connected to arduino and want to add them to Domoticz.

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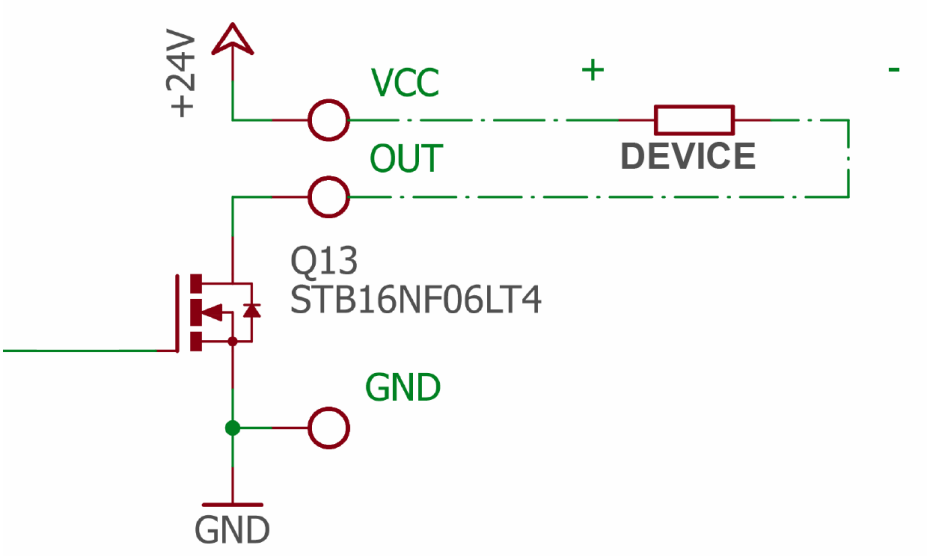
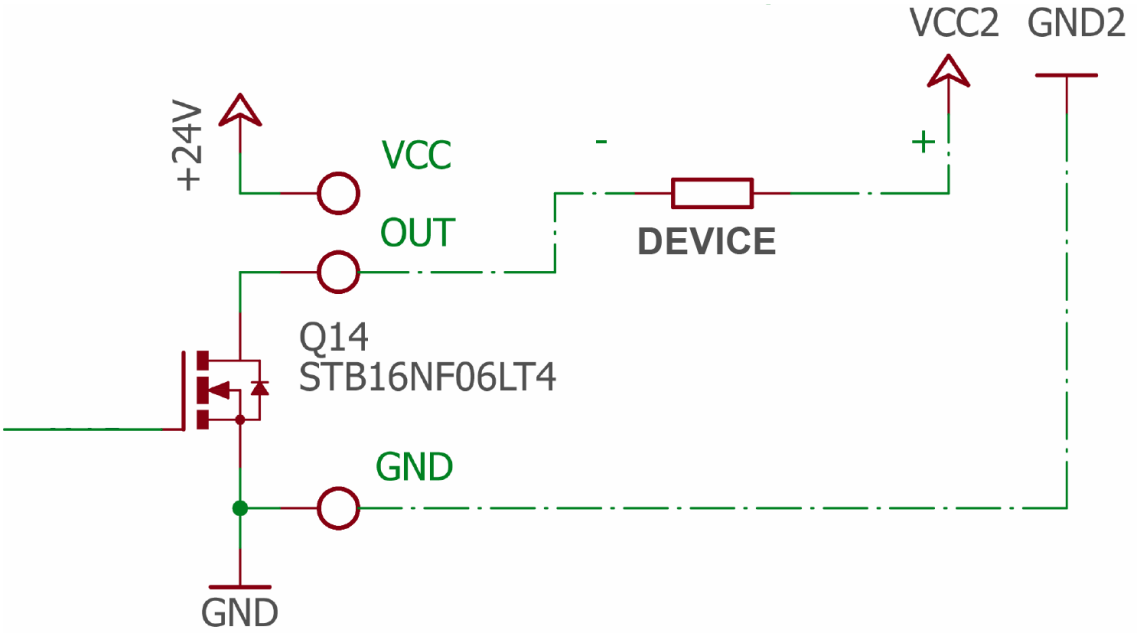
Circuits examples:

- Connecting the device to the internal power supply:



- Connecting the device to power from another source:



If you have any further questions feel free to contact us.

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