

I2C 2RO (SPDT) + 2DI (ISO1211) Pro

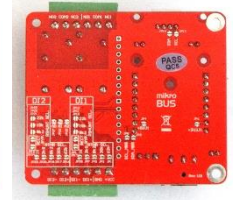
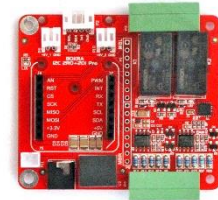


The **BOKRA I2C 2RO (SPDT) + 2DI (ISO1211) Pro** module is a relay output and digital input module containing two Omron [G5Q-14](#) relays and two Texas Instruments [ISO1211](#)-based digital input channels.

Relays and digital inputs are controlled via the I²C interface using the [MCP23008](#) chip.

The relays have a maximum switching current of 3A at a voltage of 250 VAC or 30 VDC. The type of switch is SPDT. Galvanic insulation - individual. An electrical insulation strength of 4 kV VAC (within 1 minute between the coil and the contacts) and 1 kV VAC (within 1 minute between the contacts of the same polarity) is ensured.

The modules allow you to enter the values of two digital signals from 9V to 300V both DC and AC. Compliant to IEC 61131-2; Type 1, 2, 3 characteristics for 24-V insulated digital inputs. Accurate Current Limit for Low-Power Dissipation – 2.2 mA to 2.47 mA for Type 3. The maximum insulation voltage (up to 60 s) is 3600V_{PK}.



mikroBUS modules can be installed on the **BOKRA I2C 2RO (SPDT) + 2DI (ISO1211) Pro** modules, for example, BOKRA SoM Lite or Click® modules from Mikroelektronika.

Input Power: 9-36VDC. The DC-DC converter produces uninsulated power 5VDC, 1,5A. Overvoltage and reverse polarity protection.

Main applications of the module:

- PLC
- Industry
- Electrical and lighting management
- Smart home
- Data Acquisition Systems (DAS)
- Transport
- Smart farms
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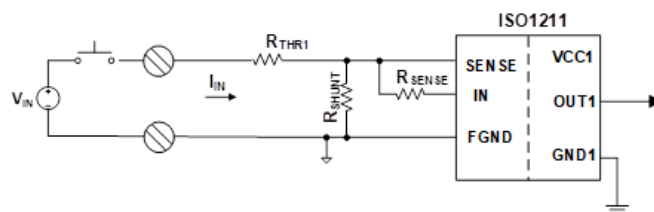
BOKRA I2C 2RO (SPDT) + 2DI (ISO1211) Pro features

- MCP23008 chip with I²C bus for relay control and digital signal input
- Support 100kHz and 400kHz on I²C bus
- Selection of one of eight addresses on the I²C bus for the MCP23008 using jumpers on the bottom-side of the module, default address is 0100 010x
- Grove connector for external module with I²C bus
- Compatible with major well-known microcontrollers
- 2 SPDT relays
- Current consumption of each relay is less than 80mA
- Characteristics for resistive load:
 - 3A 30VDC
 - 3A 250VAC
- Dielectric strength:
 - 4 kV VAC, for 1 minute between coil and contacts
 - 1 kV VAC, for 1 minute between contacts of the same polarity

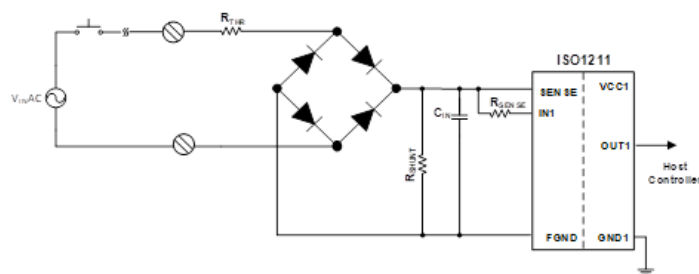
- Compliant to IEC 61131-2; Type 1, 2, 3 characteristics for 24-V insulated digital inputs
- Allow you to enter the values of two digital signals from 9V to 300V both DC and AC
- Accurate Current Limit for Low-Power Dissipation – 2.2 mA to 2.47 mA for Type 3
- The maximum insulation voltage (up to 60 s) is 3600V_{PK}
- Maximum working insulation voltage: AC – 400V_{RMS}, DC – 566V_{DC}
- Reverse polarity protection
- Possibility to install a module with mikroBUS bus:
 - BOKRA modules (SoM Lite series and other modules);
 - Click® modules from MikroElektronika
- Power supply: non-isolated, 9-36VDC
- The module size 65 x 56 mm. The format of the module corresponds to the popular format of the Raspberry Pi 3A+, which greatly simplifies its use with the Raspberry Pi.

Connection for DC and AC

General wiring diagram for DC:

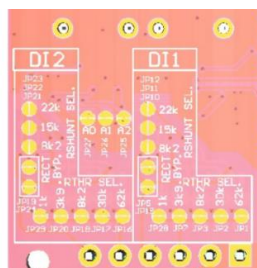


General wiring diagram for AC:



R_{SENSE} , R_{SHUNT} and R_{THR} are contained within the **BOKRA I2C 2RO (SPDT) + 2DI (ISO1211) Pro** module.

The bottom-side of the module contains jumpers with which you can select a circuit (AC or DC) for each DI channel, as well as R_{SHUNT} and R_{THR} .



The default is the circuit for DC.

R_{SENSE} is always 560 Ω .

R_{THR} can be selected from the following values: 1 k Ω , 3.9 k Ω , 8.2 k Ω , 30 k Ω , 62 k Ω .

R_{SHUNT} can be selected from the following values: 8.2 k Ω , 15 k Ω , 22 k Ω .

Using a [calculator](#), depending on R_{SENSE} , R_{SHUNT} and R_{THR} , you can calculate the current through ISO1211 (mA), V_{IH} (high threshold), V_{IL} (low threshold), I_{IN} current for the selected voltage (true only for $V_{IN} > V_{IH}$), the maximum allowable input voltage V_{IN_MAX} .

Using the mikroBUS slot

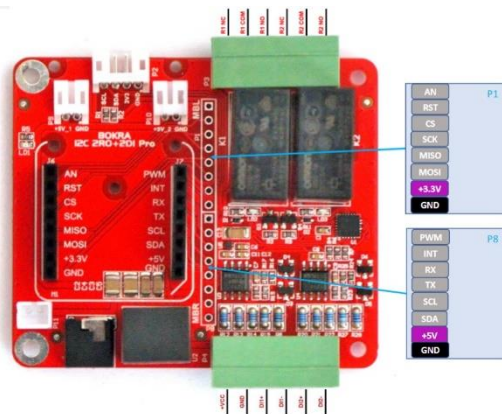
BOKRA I2C 2RO (SPDT) + 2DI (ISO1211) Pro modules contain a mikroBUS slot, which can be used to install various modules for the mikroBUS, including SoM (System on Module), i.e. modules with microcontroller.

Installing SoM in this Module is used in the following two cases:

- 1) To build simple devices. In this case, the installed SoM is the main one in the device and controls the analog input on this Module and other modules and/or devices on the I²C interface. It is necessary that the installed SoM had pull-up resistors on the I²C interface. If they are absent, you can turn on and use the pull-up resistors located on the Module.
- 2) For complex devices with smart analog input. In this case, the installed SoM controls the analog input on this Module and performs certain smart functions, but at the same time it is a slave for some other module on the I2C bus, which is the main one in the device / system. For I²C, both the installed SoM and the main module are master and the more complex multimaster mode must be used on the I²C interface. It is desirable that the installed SoM has the option of disabling pull-up resistors on the I²C.

The following figure shows the **location of elements on the BOKRA I2C 2RO (SPDT) + 2DI (ISO1211) Pro module.**

Power Supply - via J1 or P11 connector.



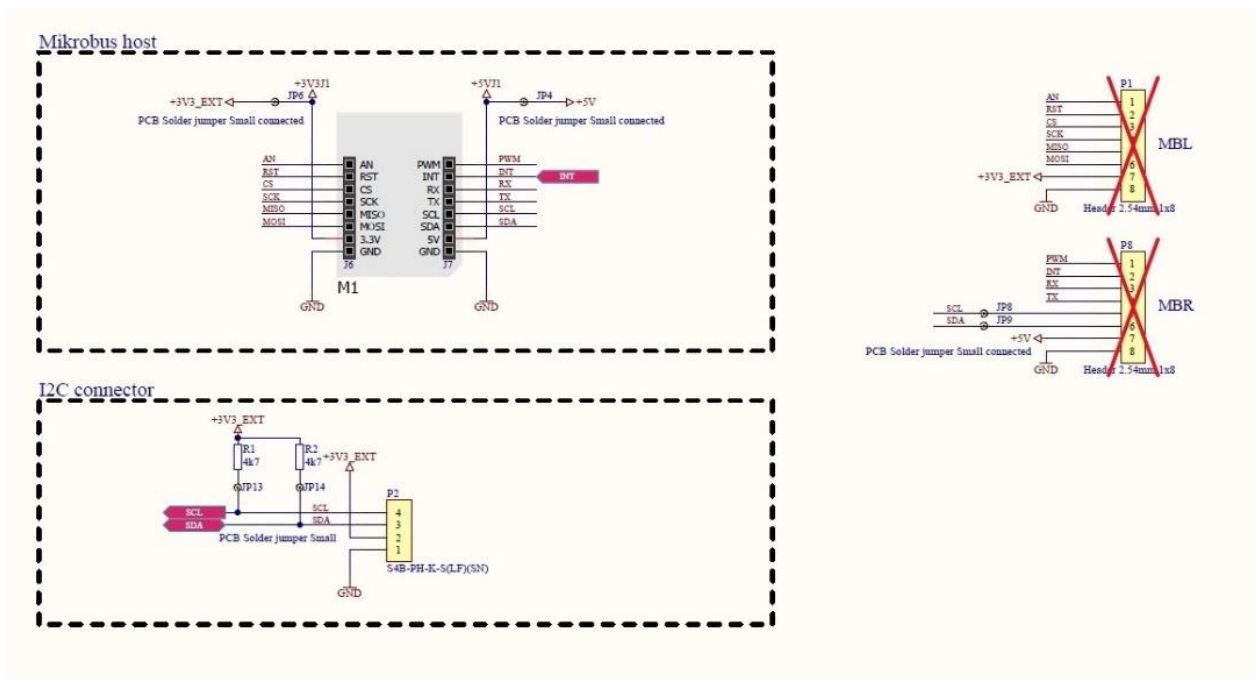
P11 can also be used to transfer input power to another module.

P9 and P10 connectors are intended for transferring on other modules of power supply 5VDC from this Module.

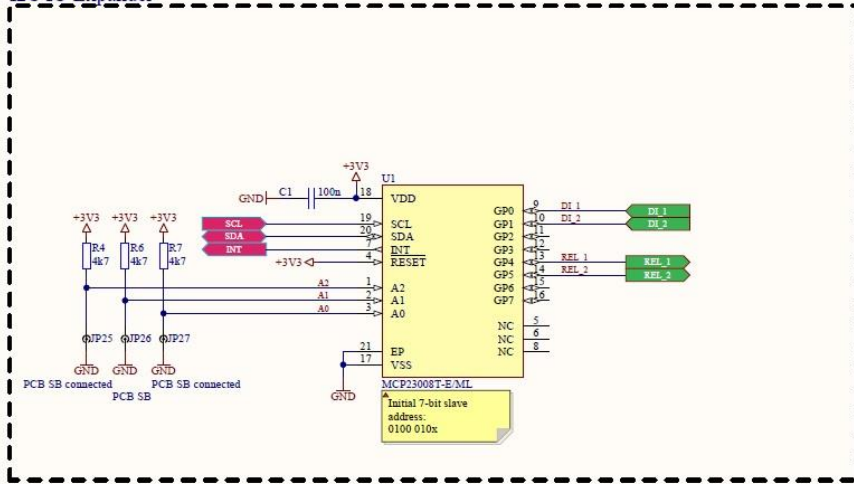
MBL and MBR (P1 and P8) connectors are used to transfer signals to other modules (if a module with SoM is installed on this module in the mikroBUS slot), or to receive I²C interface signals from the main module / device of the system (master).

It is possible to communicate with the Module via the I²C interface through an external connector physically located under the mikroBUS slot.

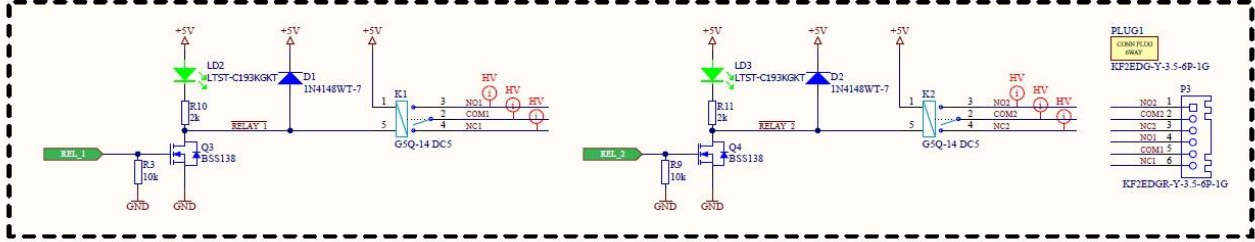
BOKRA I2C 2RO (SPDT) + 2DI (ISO1211) Pro:



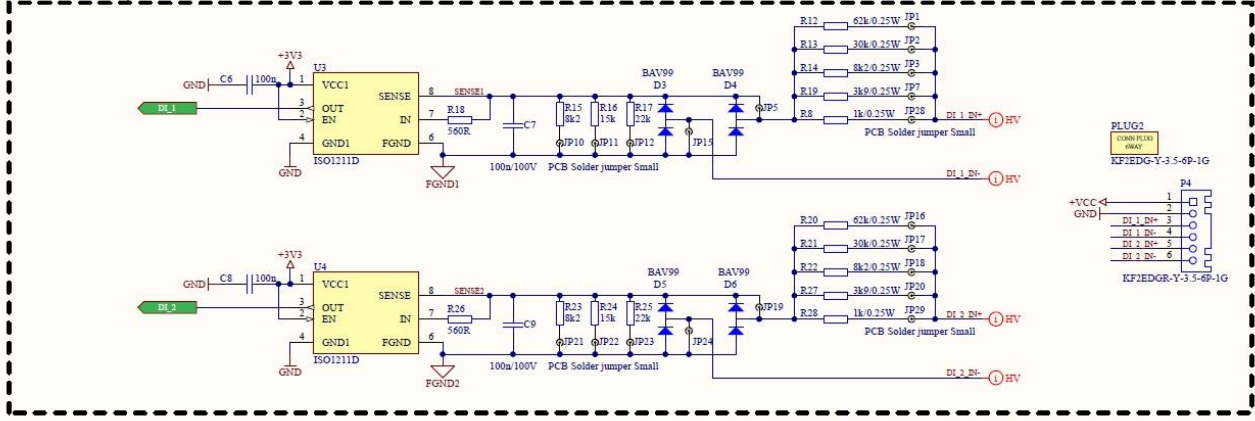
I2C IO Expander



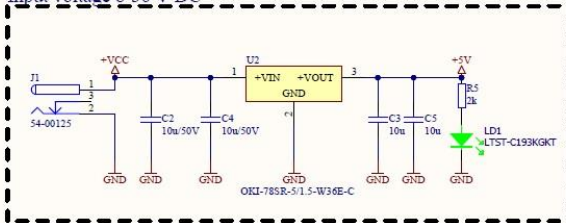
Relay outputs



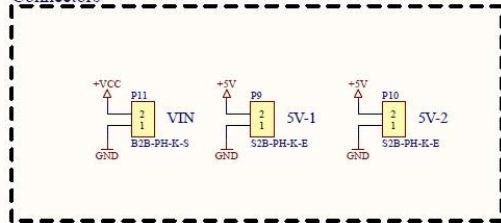
Differential amplifiers



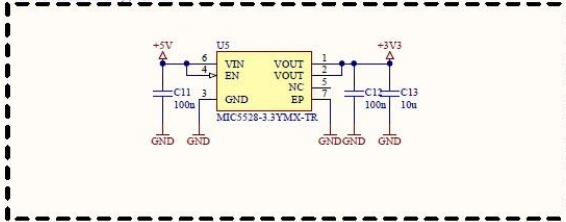
Input voltage 8-36 V DC



Connectors



+3V3 linear regulator



Board Support

