Teensy Shield
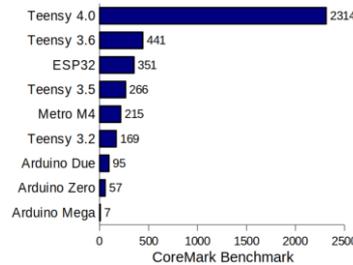
The **Teensy Shield** is an adapter that allows you to install Teensy 4.0, Teensy 3.2, Teensy LC and previously produced Teensy 3.1 modules in the mikroBUS slot or connect mikroBUS modules (such as MikroElekronika's Click®) to Teensy modules.

Teensy 4.0 uses the most powerful microcontroller - 600 MHz Cortex-M7. Here are the test results:

The correspondence between the Teensy contacts and the **Teensy Shield** contacts (connector with mikroBUS interface) is as follows:

Teensy 3.2		Teensy LC		Teensy 4.0		mikroBUS Left	Teensy 3.2, LC, 4.0	
№	Pin	№	Pin	№	Pin		№	Pin
14	A0	14	A0	14	A0	AN	23	PWM
5	D5	5	D5	5	On/Off	RST	22	PWM
10	D10	10	D10	10	D10	CS	0	RX1
13	D13 (LED)	13	D13 (LED)	13	D13 (LED)	SCK	1	TX1
12	D12	12	D12	12	D12	MISO	19	D19
11	D11	11	D11	11	D11	MOSI	18	D18
3V	3V3	3V	3V3	3V	3V3	3V3	5V	VIN
GND	GND	GND	GND	GND	GND	GND	GND	GND

Signals that are not used in mikroBUS come to the AUX1 and AUX2 connectors from the installed Teensy, which makes it possible to use almost all Teensy functions without changing the programs. The correspondence between Teensy pins and AUX1 and AUX2 pins is as follows:

Teensy 3.2		Teensy LC		Teensy 4.0		AUX1	Teensy 3.2, LC, 4.0		AUX2
№	Pin	№	Pin	№	Pin		№	Pin	
7	RX3	7	RX3	7	RX2	1	-	Program	1
8	TX3	8	TX3	8	TX2	2	21	A7	2
3	PWM	3	PWM	3	PWM	3	20	A6	3
4	PWM	4	PWM	4	PWM	4	17	A3	4
-	DAC	-	DAC	-	PWM	5	16	A2	5
-	Vbat	-	Vbat	-	Vbat	6	15	A1	6

The bottom-side shield has a Qwiic connector for I²C. The bottom-side also houses pull-up resistors for I²C. They are switchable (using JP jumpers on bottom-side), resistors are connected by default.

On the bottom-side there are also jumpers to select direct and cross-connect RX and TX to the corresponding mikroBUS signals.

List of jumpers on the bottom-side and their default states:

	Function	Default state
JP1	direct or cross connection for TX0 (default is direct)	CLOSE
JP2		OPEN
JP3	direct or cross connection for RX0 (default is direct)	CLOSE
JP4		OPEN
JP5	3V3 source for mikroBUS (JP5 - Teensy, JP6 - Shield), default Teensy	CLOSE
JP6		OPEN
JP7	pull-up for i2c	CLOSE
JP8		CLOSE
JP9	BME280 address on i2c	OPEN
JP10	mikroBUS RST (JP11 - Teensy 4.0, JP10- other)	OPEN
JP11		CLOSE
JP12	AUX1 pin5 (JP13 - Teensy 4.0, JP12- other)	OPEN
JP13		CLOSE

The **Teensy Shield** contains (on the bottom-side) the voltage regulator [AMS1117-3.3](#) and the necessary capacitors. On the bottom-side there is a jumper defining the 3V3 source on the mikroBUS (from the installed to Teensy slot module or from AMS1117-3.3). By default - from the installed module.

Optionally, a [BME280](#) is installed on the bottom-side of the module (7-bit address on I^2C = 111011x). The address for BME280 is selected with jumpers on the bottom-side. The default address should be 1110111.
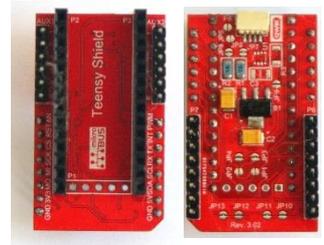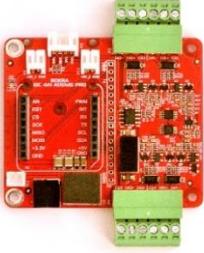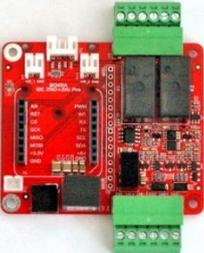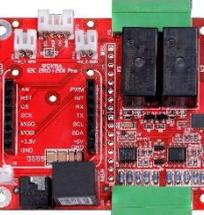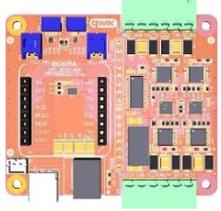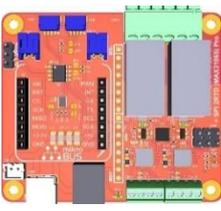
Teenay Shield size   -   42.93 x 25.4 mm.

The main areas of application of the shield:

- Data acquisition systems (DAS) and PLC
- Communication devices
- Devices and tools
- Lighting systems
- Environmental monitoring
- Smart home control
- Consumer electronics
- Security systems

With **Teensy Shield**, it is easy to use Teensy modules to control the following Pro Series I / O modules:

Image	Name	Characteristics
	I2C 4AI ADS1x15 Pro	4 channels differential analog input based on 16-bit ADS1115 and 12-bit ADS1015 ADC. The two Texas Instruments ΔΣ (delta-sigma) ADCs installed on the module. Voltage measurement ranges: 0-0.5V, 0-5V, 0-10V, ± 0.5V, ± 5V, ± 10V. Current measurement ranges: 0-20mA, 4-20mA, ± 20mA, 0-40mA. Measurement speed: up to 860 measurements per second for ADS1115 and up to 3300 measurements per second for ADS1015.
	I2C 2RO+2AI Pro	2 Omron G5Q-14 relays and 2 analog input channels based on an ADC from Texas Instruments (either ADS1115-Q1 or ADS1015). Voltage measurement ranges: 0-0.5V, 0-5V, 0-10V, ± 0.5V, ± 5V, ± 10V. Current measurement ranges: 0-20mA, 4-20mA, ± 20mA, 0-40mA. Measurement speed: up to 860 measurements per second for ADS1115 and up to 3300 measurements per second for ADS1015.
	I2C 2RO+2DI Pro	2 Omron G5Q-14 relays and 2 digital input channels (based on Texas Instruments ISO1211). The modules allow you to enter the values of 2 digital signals, both DC and AC. Supports 9-V to 300-V DC and AC digital input. Compliant to IEC 61131-2; Type 1, 2, 3 characteristics for 24-V isolated digital inputs. Accurate Current Limit for Low-Power Dissipation: – 2.2 mA to 2.47 mA for Type 3. Maximum transient isolation voltage (up to 60s) – 3600V.
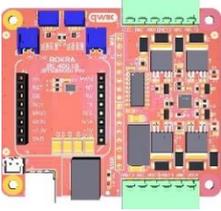
	I2C 4DO LS (BTS3160D) Pro	4 channels low-side digital output, based on BTS3160D.
	I2C 4DO HS (TPS1H100) Pro	4 channels high-side digital output, based on TPS1H100.
	I2C 2RO + SPI 2RTD Pro	2 Omron G5Q-14 relays and 2 digital input channels (based on Texas Instruments ISO1211).

This is what the Teensy looks like, installed with the **Teensy Shield** in the module **I2C 2RO + 2DI Pro**:
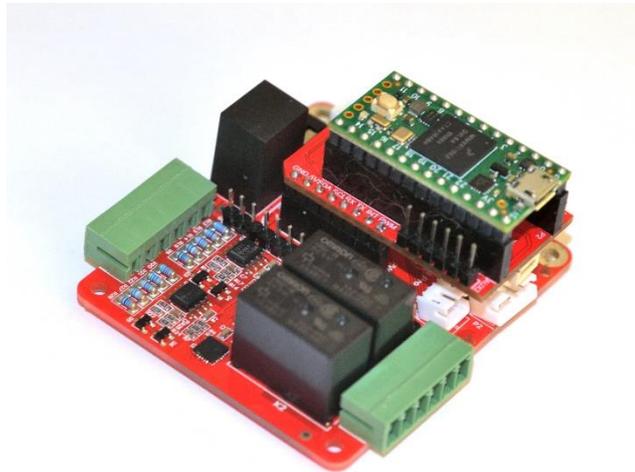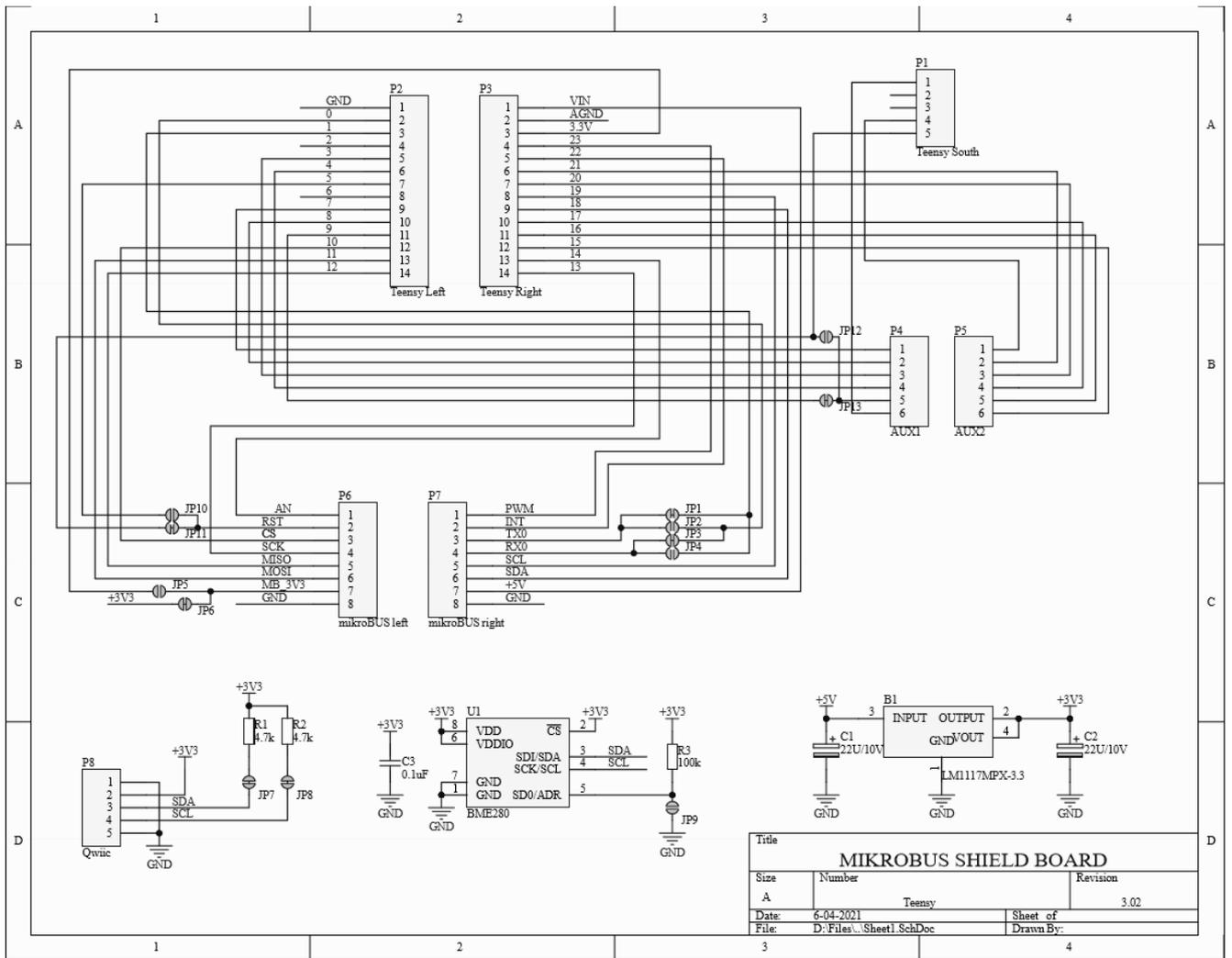

You can also learn more about the **I2C 2RO + 2DI Pro** module on the IoThings Digital page at Crowd Supply.

MikroElekronika manufactures numerous modules with mikroBUS interface - Click® modules.

All these modules can be easily connected directly to the Teensy using the **Teensy Shield**.

Teensy Shield schematic:

MIKROBUS SHIELD BOARD

Size	Number		Revision
A		Teensy	3.02

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