IDE SET UP

1. Download and install the Arduino IDE from Arduino.cc (minimum version 1.6.12)

2. In the boards manager (Tools->Boards Manager) search for "Industruino" and install the "Industruino SAMD Boards" package.

3. In the library manager (Sketch->Include library->Manage libraries) search and install the following libraries
   - Indio (essential for IND.I/O functions)
   - UC1701 (LCD functions)

4. For Windows users: before connecting the Industruino download and install the USB driver from: *https://static.industrui-no.com/downloads/drivers/drivers-industruino-windows-0.0.1.zip*

5. Connect the Industruino to your computer via the USB-micro port.

6. Select "Industruino D21G" from Tools->Board

Arduino File Edit Sketch	Tools	Help
	Board ▶	
		✓ Industruino D21G

7. Select your serial port from Tools->Port

Arduino File Edit Sketch	Tools	Help
	Serial Port ▶	
		✓ /dev/tty.usbmodem3d11

8. Upload your first sketch. Each library installed in step #3 has example sketches which can function as the starting point of your application (ex. File->Examples->Indio).

✓ → ☐ ↓ ↑ Upload
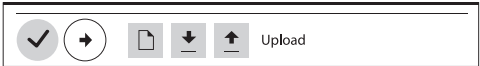
For more detailed documentation please visit our tech support page: **industruino.com/support**

I/O OPERATIONS

D21G Topboard GPIO

Arduino pin	Peripheral function	Internal dependencies	External dependencies
D0	RX - Serial	RS485	GSM RX
D1	TX - Serial	RS485	GSM TX
D2	SDA - i2c	RTC, EEPROM, INDIO	
D3	SCL - i2c	RTC, EEPROM, INDIO	
D4	GPIO		MicroSD CS
D5	TX - Serial1		GSM RX1, ETH RST
D6	GPIO		FRAM CS
D7	GPIO		ETH IRQ
D8	GPIO	INDIO digital interrupt	
D9	GPIO	RS485 direction pin	
D10	RX - Serial1		GSM TX1, ETH CS
D14	MISO - SPI		SD, ETH, FRAM
D15	SCLK - SPI		SD, ETH, FRAM
D16	MOSI - SPI		SD, ETH, FRAM
D19	GPIO	LCD CS	
D20	MOSI - SPI1	LCD MOSI	
D21	SCLK - SPI1	LCD SCLK	
D22	GPIO	LCD D/C	
D23	GPIO	Button UP	
D24	GPIO	Button ENTER	
D25	GPIO	Button DOWN	
D26	GPIO	LCD Backlight	
D27	GPIO	RTC interrupt	

Digital Setup() routines

Syntax
Indio.digitalMode(channel, mode);

Parameters
channel: Channel that you want to configure
mode: INPUT, OUTPUT

Example
Indio.digitalMode(1,INPUT); // Set CH1 as an input

1 Read digital input

Syntax
Indio.digitalRead(channel); // Read CH1

Parameters
channel: Input channel to read

Example
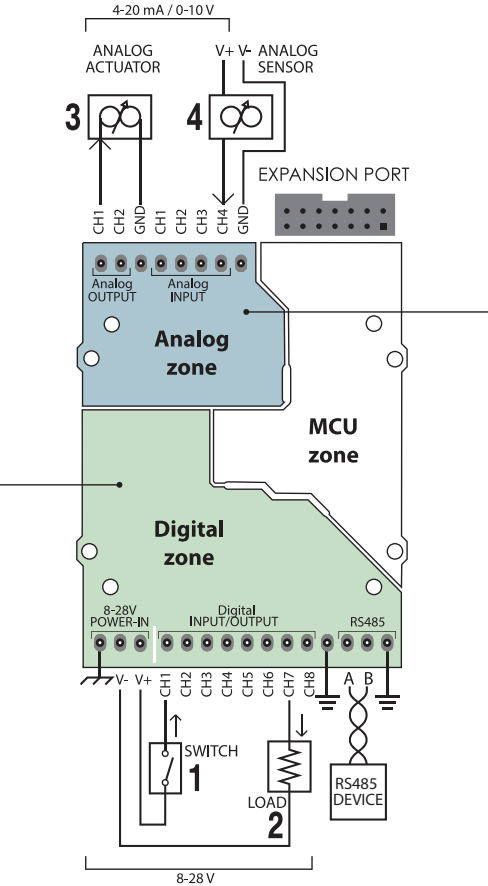int x = Indio.digitalRead(1); // Read CH1 to integer x.

2 Write digital output

Syntax
Indio.digitalWrite(channel, value); // Read CH1

Parameters
channel: Output channel to write to
value: HIGH, LOW

Example
Indio.digitalWrite(7,HIGH); // Set CH7 high

INDUSTRUINO CODE REFERENCE

CAUTION: Always connect an external power supply when using the I/O functions (ex. 20W 12 VDC / 24 VDC PSU).

14P IDC Expansion Port

+5V	MOSI/D16	GND	D5/PWM	D6/A7	D1/TX	D3/SCL
MISO/D14	SCLK/D15	D10/A10	D4/A6	D7	D0/RX	D2/SDA

Syntax
Indio.analogWriteMode(channel, mode);
Indio.analogReadMode(channel, mode);
Indio.setADCResolution(bit);

Parameters
channel: The channel you want to configure
mode: V10 (0-10V), V10_p (0-10V in %), V10_raw (0-10V in raw 12bit DAC integer value), mA (0-20mA), mA_p (4-20mA in %), mA_raw (0-20mA in raw 12bit DAC integer value)
bit: 12 (12bit@240SPS), 14 (14bit@60SPS), 16 (16bit@15SPS), 18 (18bit@3.75SPS)

Example
Indio.analogWriteMode(1, mA); //Set CH1 to 0-20 mA mode
Indio.analogReadMode(1, V10_p); //Set CH1 to 0-10V % mode
Indio.setADCResolution(16); //Set ADC to 16 bit

3 Read analog input

Syntax
Indio.analogRead(channel);

Parameters
channel: The channel you want to read from

Example
int x = Indio.analogRead(3); // Read the value of input CH 3 to variable x

4 Write analog output

Syntax
Indio.analogWrite(channel, value, EEPROMflag);

Parameters
channel: The channel you want to write to
value: Value to be written to analog output
EEPROMflag: false (recommend for normal repeated write to DAC), true (write value to EEPROM of DAC for fail-safe default at power up. Make sure this command is not repeated more than 1000.000 times as it would destroy the EEPROM)

Example
Indio.analogWrite(1, 15.3, false); // Set output CH1 to 15.3 (value depends on mode).

GUIDE BOOK:
IND.I/O D21G
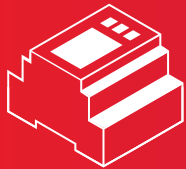
INDUSTRUINO

INDUSTRUINO®

Operation instructions

Before using Industruino IND.I/O please read the manual carefully, and pay full attention to safety to handle the product correctly.
For the full manual and instructions regarding installation, usage and operation of the Industruino kit please visit:
www.industruino.com/support

Before using Industruino IND.I/O please refer to our conditions of use:
www.industruino.com/conditions-of-use

Safety instructions

⚠️
WARNING:

• Do not connect any part of the device to voltages higher than 28V.
• Always switch off power before you connect or disconnect   an external device or accessory.
• Avoid circuit or wire exposure. Do not touch exposed connections or components when the device is powered on or when devices connected to it are powered on.
• Use only with cables and accessories that are approved or recommended by Industruino.
• Do not operate with suspected failures. If suspected damage occurs with the device, have it inspected by qualified service personnel before further operations.
• Do not operate in an explosive atmosphere.
• Do not use in wet/damp conditions.
• Keep device surfaces clean and dry.
• Use only for applications described in the catalog and the manual, and only with third party devices or components if they have been approved or recommended by Industruino.
• The device can only function correctly and safely if it is transported, stored, set up, and installed correctly, and operated and maintained as recommended.
• The device must be installed and wired by a trained technician following the applicable local safety standards and regulations.

Conditions of use

(1) Industruino IND.I/O programmable controller ("the PRODUCT") shall be used in conditions;
i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and
ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.
ES GEAR LTD. OR ITS DISTRIBUTORS SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY THE PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN ES GEAR LTD. OR ITS DISTRIBUTORS' USER, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.

("Prohibited Application")
Prohibited Applications include, but not limited to, the use of the PRODUCT in;

Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.

Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.

Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

Notwithstanding the above, restrictions ES Gear Ltd. may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by ES Gear Ltd. and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTs are required. For details, please contact an ES Gear Ltd. representative.

REGULATORY

CE COMPLIANCE

This product meets the essential requirements of applicable European Directives as follows:

2004/108/EC; Electromagnetic Compatibility Directive (EMC).
2011/65/EU; Restriction of Hazardous Substances Directive (RoHS).

CE

FCC COMPLIANCE

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

This device may not cause harmful interference.

This device must accept any interference received, including interference that may cause undesired operation.

All Industruino products that are subject to the WEEE directive shipped from September 1, 2014 are compliant with the WEEE marking requirement. Such products are marked with the "crossed-out wheelie bin" WEEE symbol (shown, above) in accordance with European Standard EN50419.

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Importer in EU: BTL cvba
Jan Mioenstraat 13, 8610 Kortemark, Belgium

Product: Industruino IND.I/O D21G