PROTON ELECTRONICS A5 Nano PLC Module User Manual

**A5 Nano PLC Module
User Manual**

Contents

A5 Nano PLC Module

ATTENTION!

Be sure to always remove the power supply before installing or removing the Arduino board inside A5 PLC board. Follow all applicable electrical safety standards, guidelines,specifications and regulations for installation, wiring and operations of Proton PLC modules.

Carefully and fully read this A5 PLC user guide before installation.

Usage

The A5 PLC board is a small microcontroller board with peripherals based on the open-source Arduino platform. With this A5 PLC board you can solve many automation and control tasks. To do this you have to program it with the ide and language you are familiar with (Arduino IDE, Visuino, OpenPLC ect…).

On our website (**www.proton-electronics.net**) you will find various demos programs and libraries that will get you started with programming.

Any use other than described in this manual is not permitted. Besides possible damages to the device can occurs, with dangers like short circuit or electric shock.

The A5 PLC board must not be altered or modified. The safety instructions as well as the maximum permissible operating and ambient conditions given in the chapter "technical data" must be observed.

Read the whole instruction manual carefully and attentive. It contains important information on mounting, operating and handling your A5 PLC board.
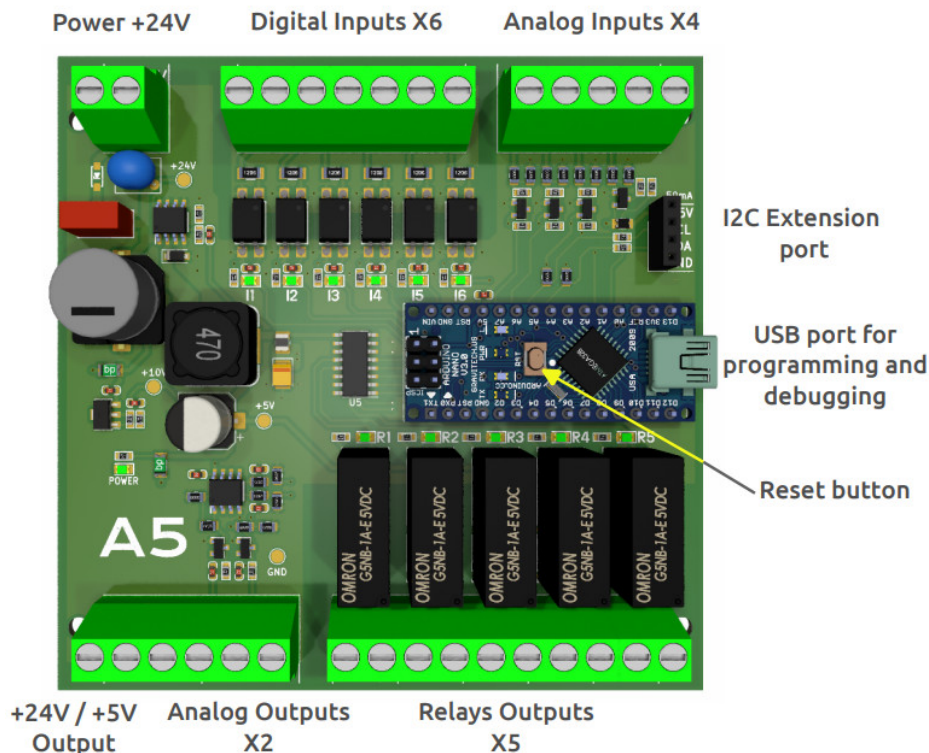

Figure-1

Hardware Description

Power Supply

The connection "12V / 24V" of the upper left terminal block is used for voltage / current supply of the A5 PLC board (Figure 2).

The A5 PLC can be operated with a 12V or 24V DC voltage.

The A5 PLC board is protected by a 1Amp. fuse located on the PCB (see Fig-3).

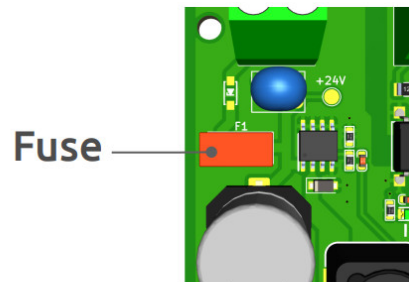An additional fuse is provided on the package.

Figure 2

Figure 3

⚠ Exceeding the maximum voltage (+32V), would lead to damage the controller permanently.

USB connector

The A5 PLC can be connected to a computer (USB connection cable A-C provided) via the USB port that is attached to the right side of the board.

The main function of the USB port is to program the A5 PLC. Inside the Arduino Nano there is a USB to UART converter which generates a virtual COM-Port on the PC. You can also use this port to send data to a terminal or another program or for debugging your program.

Inputs

The A5 PLC board have a variety of digital and analog inputs which are suitable for collecting various data or states. The inputs for analog and digital signals are on different screw terminals and can be configured and queried differently depending on the application.

Digital Inputs

Each of the digital inputs labelled "D1" to "D6" can be used as a digital input to measure a switching status.

If a logic "1" (12 or 24V) is applied to the terminal block "Dx"the corresponding LED "Ix" will be lit and a "0" logic level will be measured. At a logic "0" (0V) on the terminal block "Dx" the corresponding LED "Ix" will be off and "1" logic level will be measured. This visual information can be used to get a quick overview about the status of the inputs.
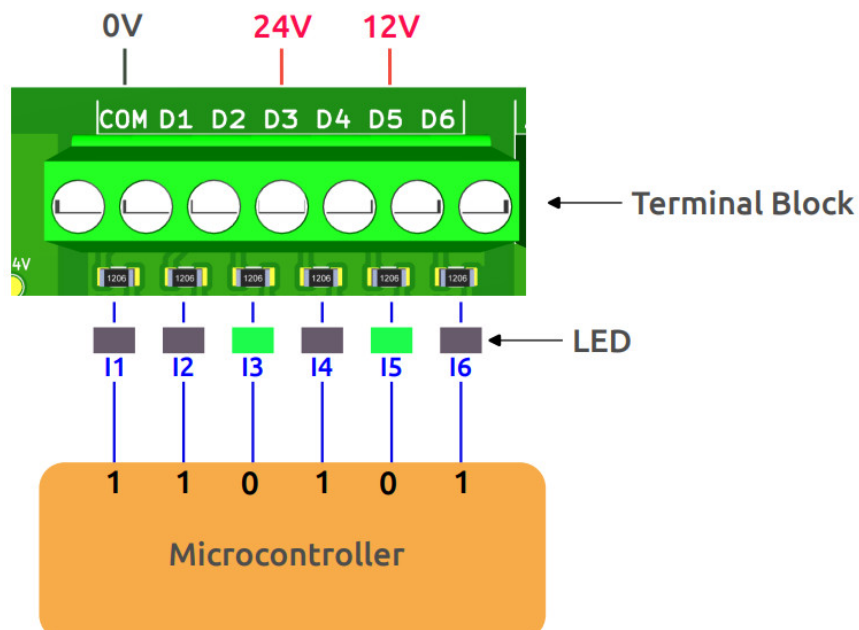

Figure 4

Analog Inputs

The analog inputs with the labels "A1" to "A4" are used to measure analog voltage, for example the output signal of a sensor that depends on certain physical sizes.

The data sampling works with the internal A/D converter of the microcontroller and has a resolution of 10 bit and delivers values from 0 to 1023.

The A5 PLC board ADC, can measure analog signals between 0V and 10V.

10V / 1023 = 0.0097

1 digit = 9.7mV.

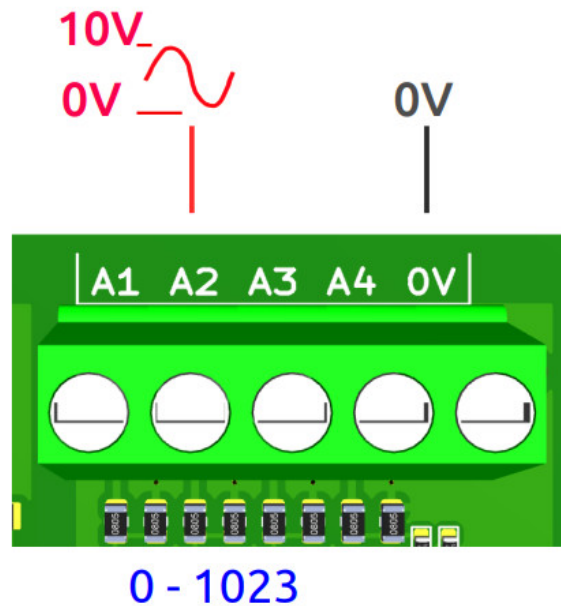

Figure 5

Analog Outputs

The is 2 analog outputs on board.

These outputs are capable of generating PWM (Pulse Width Modulation) signals. Therefore it is possible to dim a lamp or to control the speed of a DC motor.

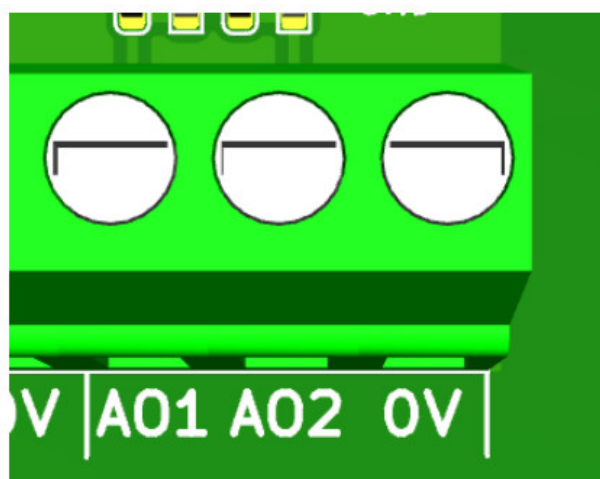The output voltage can be set between 0V and 10V

Figure 6

⚠ These outputs can deliver 10V only with 24V power supply. When powering the A5 PLC with 12V these outputs can deliver less than 10V.

Relays Outputs

The A5 PLC board contain 5 relays outputs. All these relays are NO (Normaly Open) contacts.
Each relay can switch 5A @ 250VAC. Each relay state is indicated by an LED associated with, "R1" to "R5".
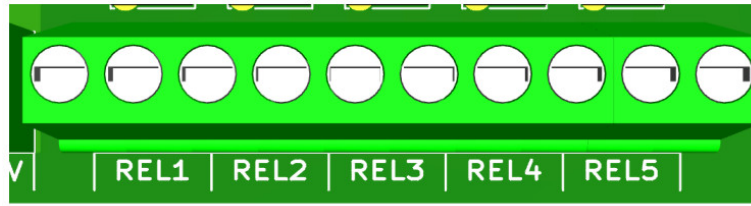
Figure 7

I²C Port

The I2C port is used to connect an I2C display or others I2C peripherals. Keep in mind that the power supply (+5V) output at this port is limited to 50mA only, and this output is protected by an PTC.
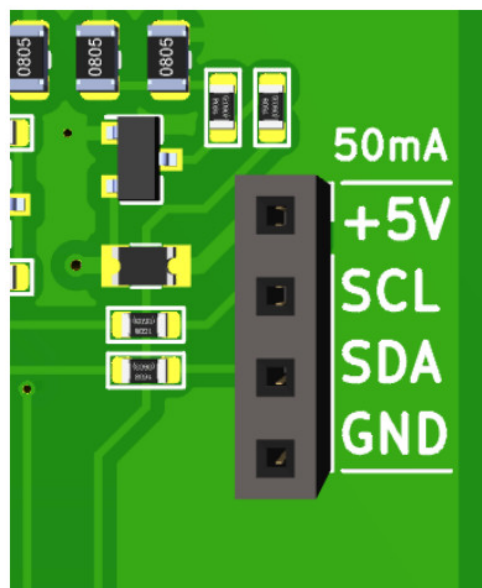A 6.8Kohms pullups resistors are also fited onboard.

Figure 8

+24 and +5V Outputs

These 2 power outputs can be used for powering some external sensors, and are derivated from the main (+24V) power terminal on the top left of the board.
The current on these 2 outputs should not exceed 100mA on each output.
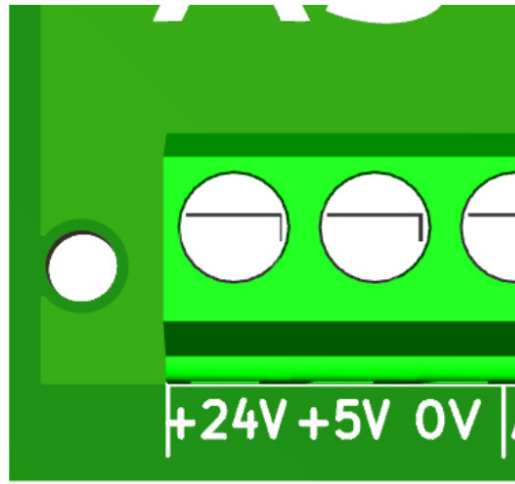Both of the outputs are current limited by 100mA PTC. The polarity should be respected.

Figure 9

Software Programming

Before start programming your A5 PLC, you must do some simple configuration to you Arduino environment. Follow the steps below to setup your Arduino IDE correctly.

- Open you Arduino IDE and go to Files -> Preferences a Preferences window show up.
- On the "Additional Board Manager URLs:" fiels paste the link below:
  https://raw.githubusercontent.com/Proton-Electronics/proton-plc/main/package_proton_ArdPlc_index.json
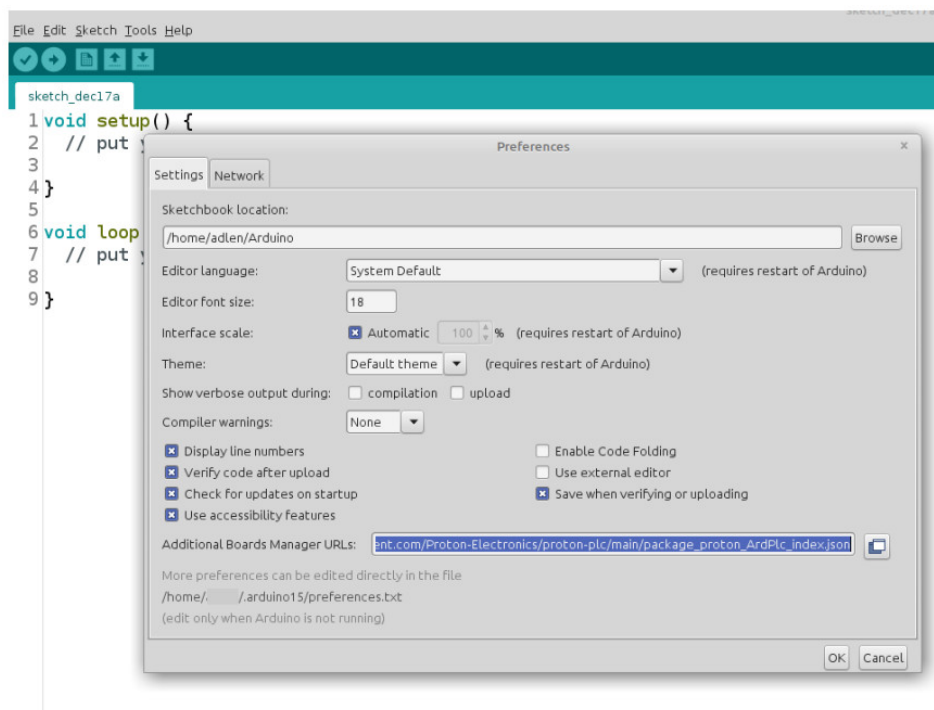
- Close this window and go to: "Tools -> Board -> Board Manager" On the search field at the top of the window, tape "Proton A5" The screen below should appear

edly:
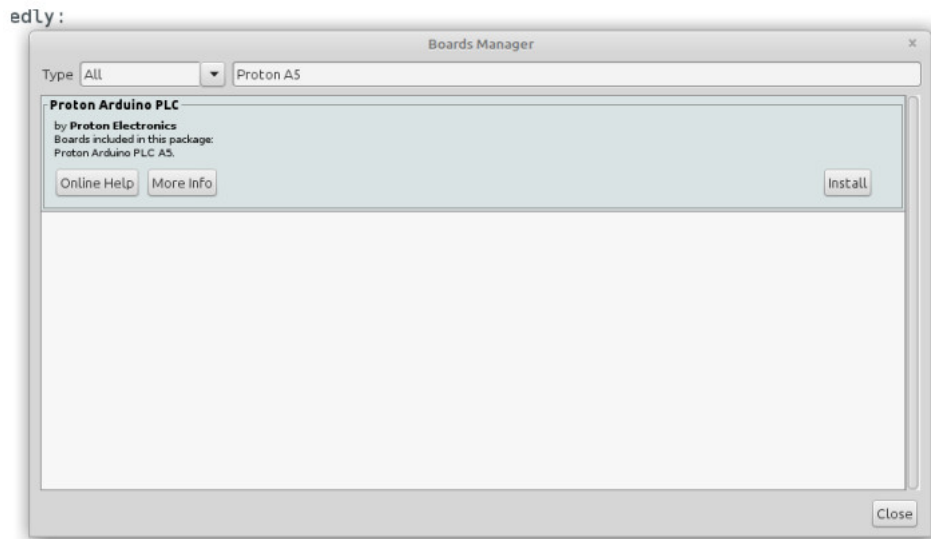
Click on Install. After few seconds "Installed" should appear on that field.

You can check if your installation is correct, go to: "Tools -> Board" you can find "Arduino AVR Board -> Proton Arduino PLC A5" there.

Congratulation your installation is finished and you can start programming your A5 PLC Board.

At the beginning of every program you must add this include.

#include <A5.h>

You can also find this setup steps at: **https://github.com/Proton-Electronics/proton-plc/wiki/rduino-IDE**

You can find many examples and how to use Classes for the A5 PLC board at the Github repository: **https://github.com/Proton-Electronics/proton-plc/wiki/A5.h**

Documents / Resources

PROTON ELECTRONICS A5 Nano PLC Module [pdf] User Manual
A5 Nano PLC Module, A5 Nano PLC, Module

References

- **A5.h · Proton-Electronics/proton-plc Wiki · GitHub**
- **Arduino IDE · Proton-Electronics/proton-plc Wiki · GitHub**

Manuals+,