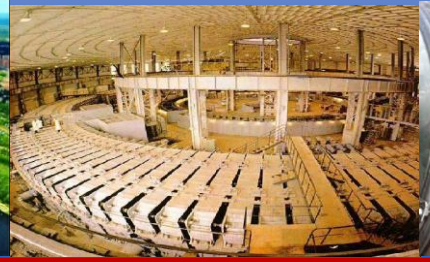


Slow Control System

Definition: the purpose, functionality;
Design: hardware, software, bookware;
Example implementation: BM@N; MPD-NICA

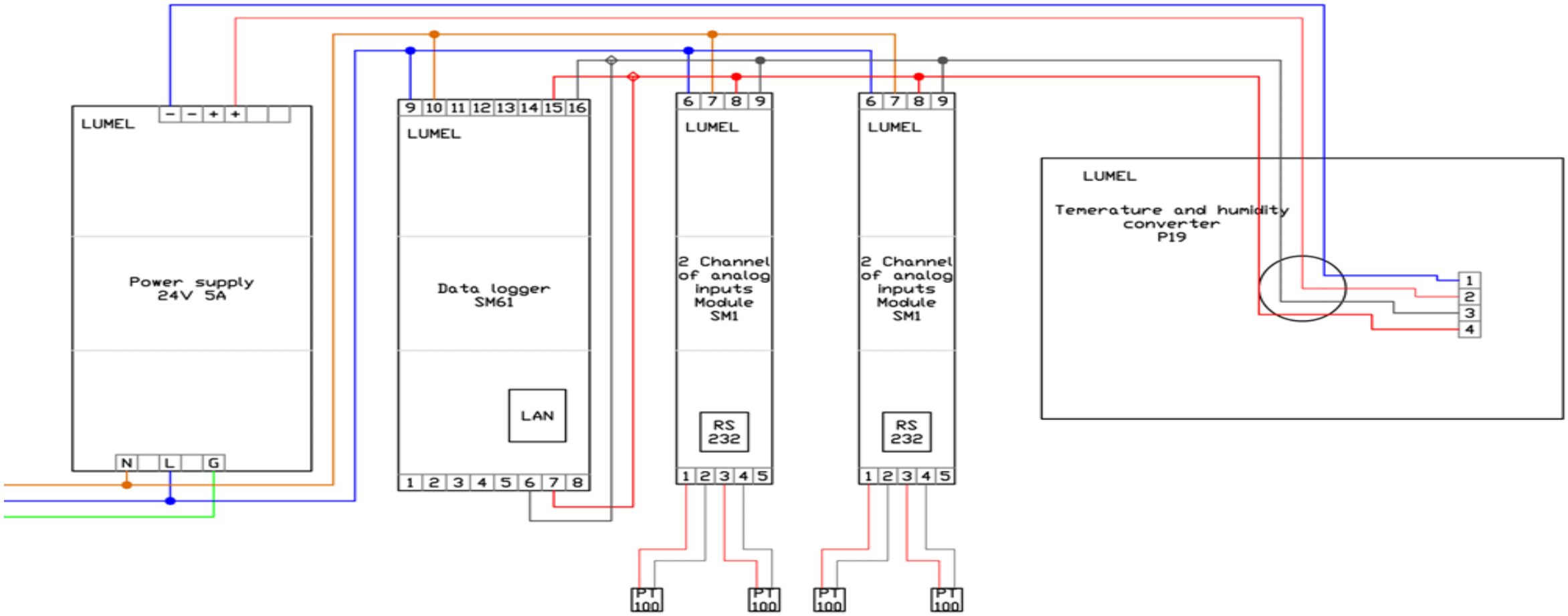
JOINT INSTITUTE
FOR NUCLEAR RESEARCH

Study of energy emitted from a detector by measuring its temperature

I.Dusza, P.Antkowiak, P.Rybak
Warsaw University of Technology

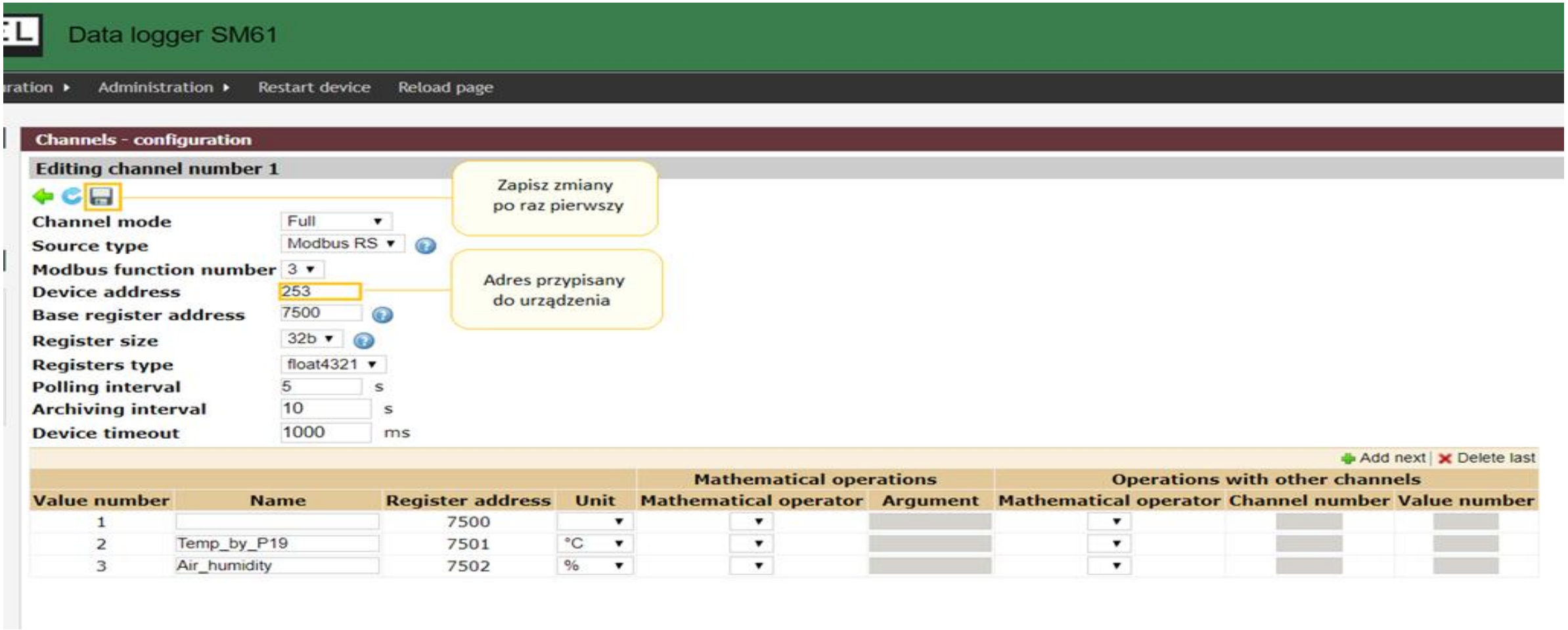
Goal of the project

Devices

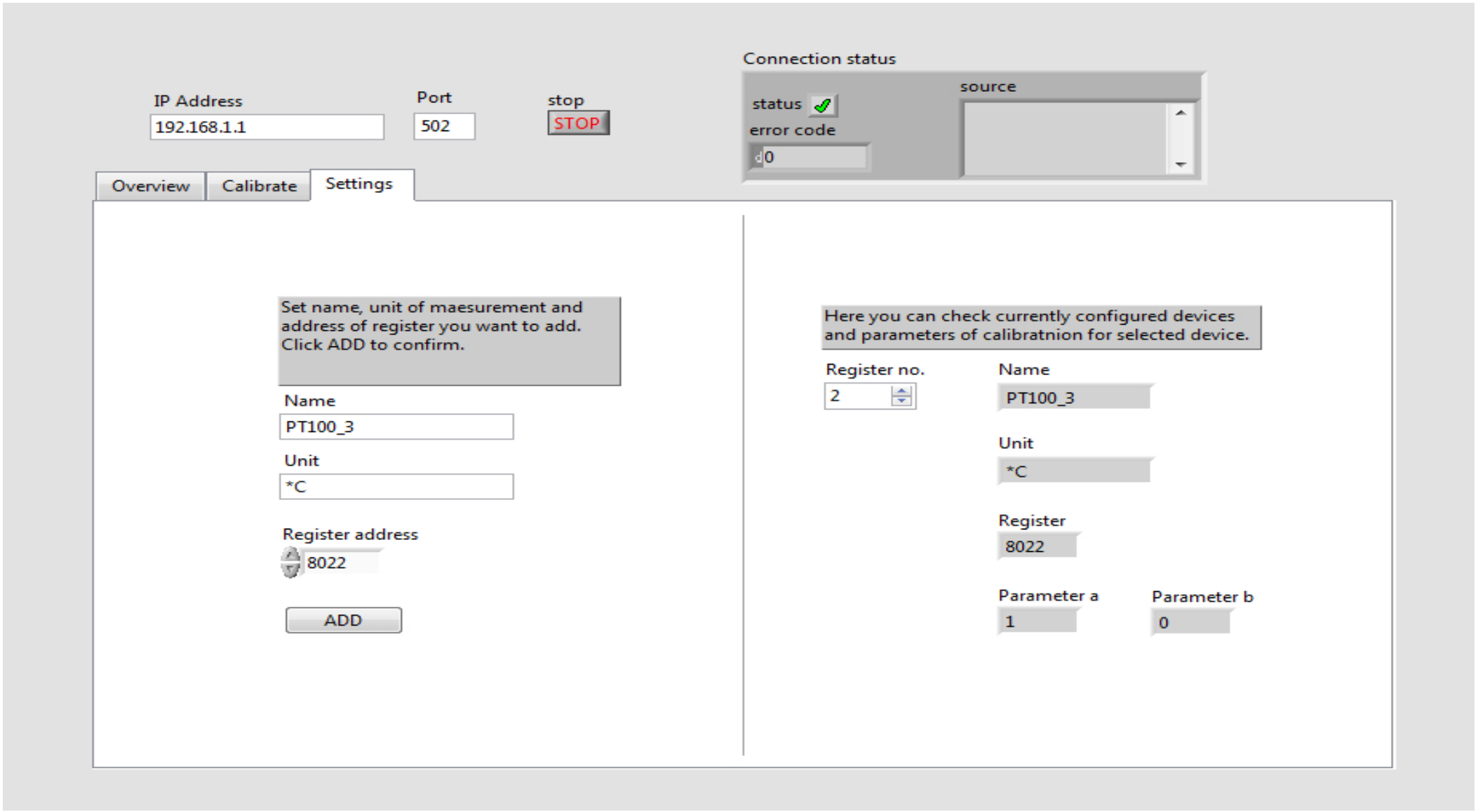

LUMEL
Power supply
24V 5A
N L G
LUMEL
Data logger
SM61
LAN
1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16
LUMEL
2 Channel
of analog
inputs
Module
SM1
RS
232
1 2 3 4 5
6 7 8 9
LUMEL
2 Channel
of analog
inputs
Module
SM1
RS
232
1 2 3 4 5
6 7 8 9
LUMEL
Temerature and humidity
converter
P19
1
2
3
4
PT
100
PT
100
PT
100
PT
100

Assembled layout

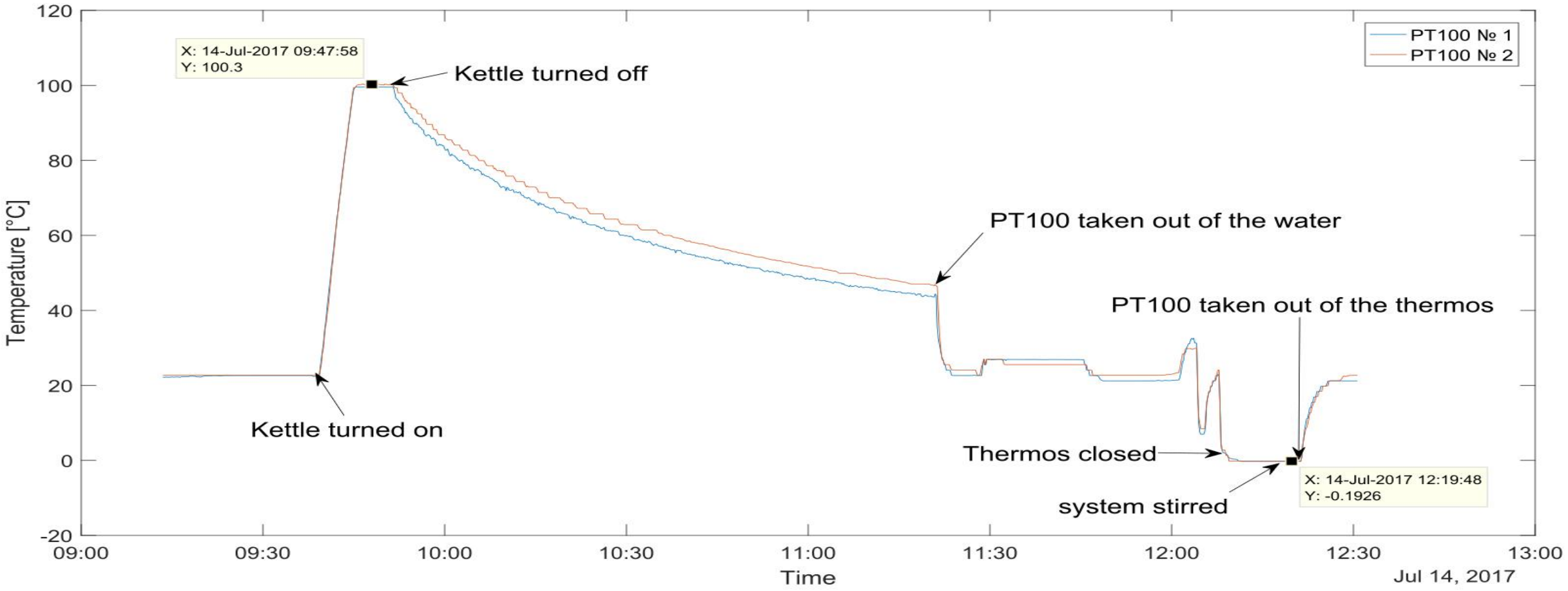
Data Recorder SM61 setup



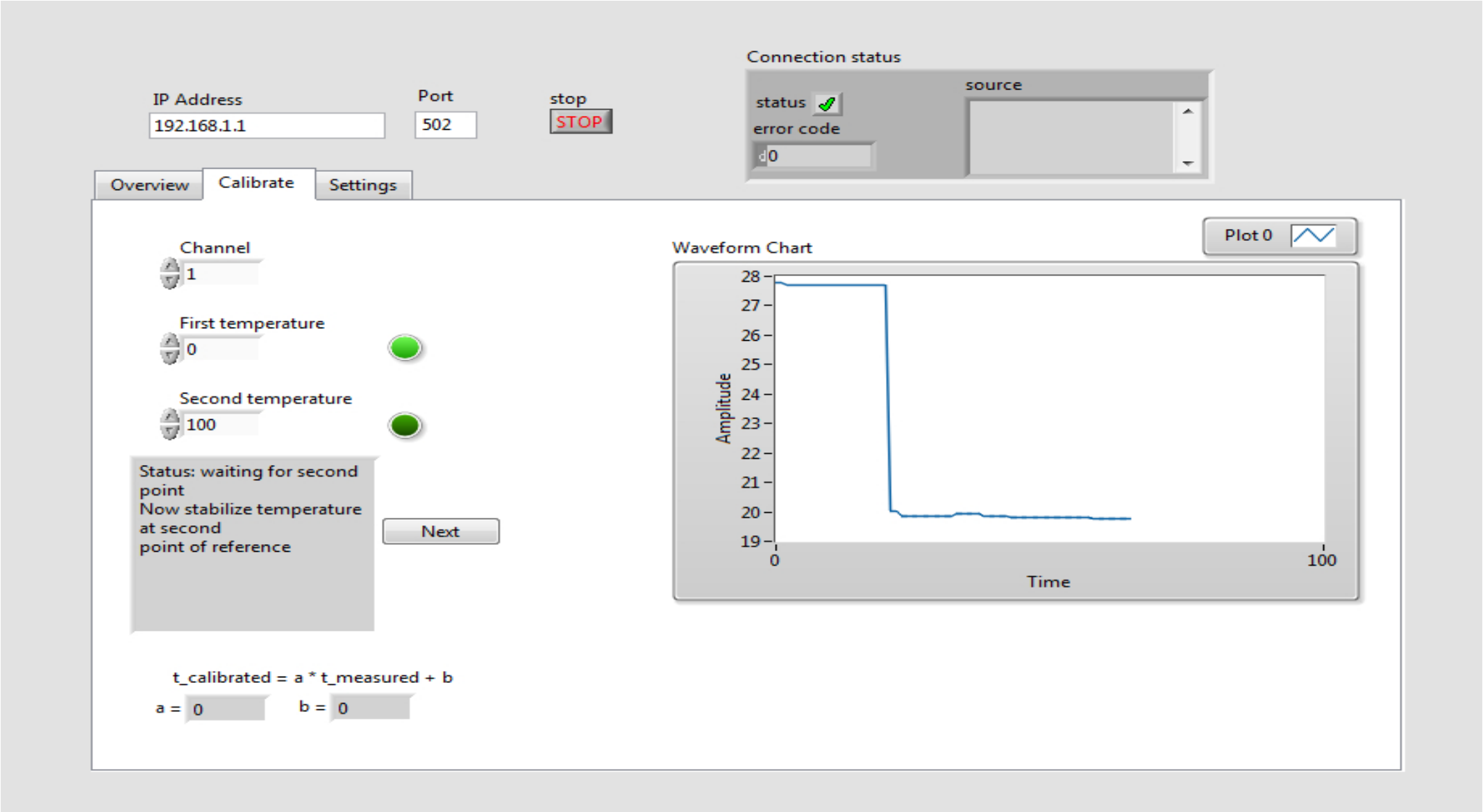
Labview settings



How does it work? – calibration



Calibration software created in Labview



Conclusion

Thank You

Slow Control System

DEFINITION:

The **S**low **C**ontrol **S**ystem (**SCS**) is an electronic system, which is intended to support and enable operation of complex equipment for any physical experiment, e.g. for detectors in high energy physics experiments.

Slow Control System

CHARACTERISTICS of the SCS:

- Modular
- Scalable
- Multiuser
- Open
- EqDb (Database)

Slow Control System

EXPECTED USE - support of the detectors in experiments at **JINR** (**J**oint **I**nstitute for **N**uclear **R**esearch) in Dubna:

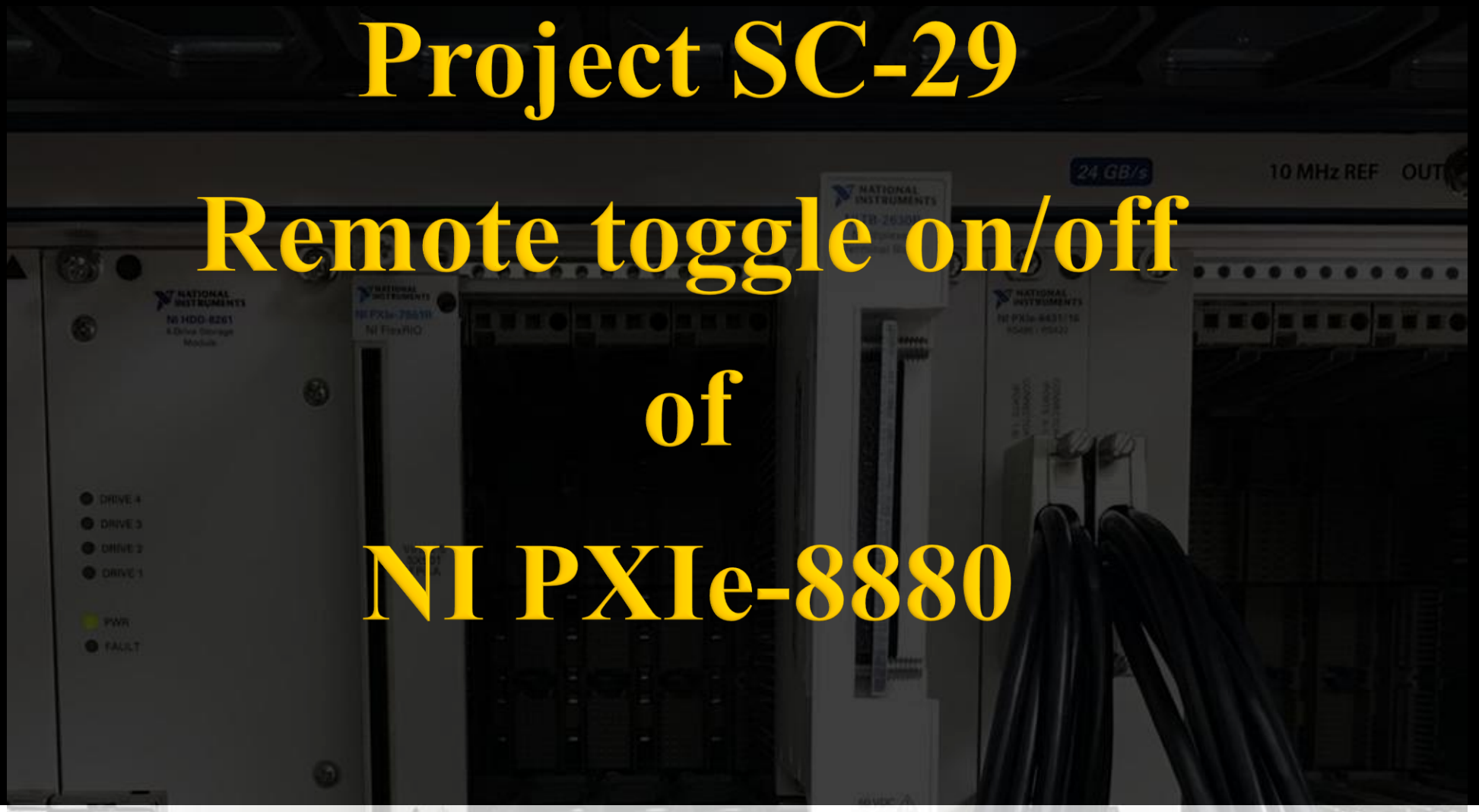
- **BM@N** (**B**aryonic **M**atter at **N**uclotron)
- **MPD – NICA** (**M**ulti-**P**urpose **D**etector)-(**N**uclotron-based **I**on **C**ollider f**A**cility)

Importance of remote toggle

- Expensive restart
  - Vacuum
  - Superconductive environment
- Electric field
- Strong radiation

Project SC-29

Remote toggle on/off of NI PXIe-8880



Filip Protoklitow, Warsaw University of Technology, Faculty of Mechatronics, Faculty of Physics

Ashima Vashistha, Warsaw University of Technology, Faculty of Mechatronics

Jan Wójcik, Warsaw University of Technology, Faculty of Electronics and Information Technology

Requirements

- RJ-45
- LabVIEW

Features

- User prompt
- Remotely turning on/off
- Checking status
- Saving configuration in a file

PXIe - 8880

- **Intel Xeon 8-Core embedded controller**

  -Eight-core, 2,3 GHz each, Intel® Xeon® E5-2618L v3 processor

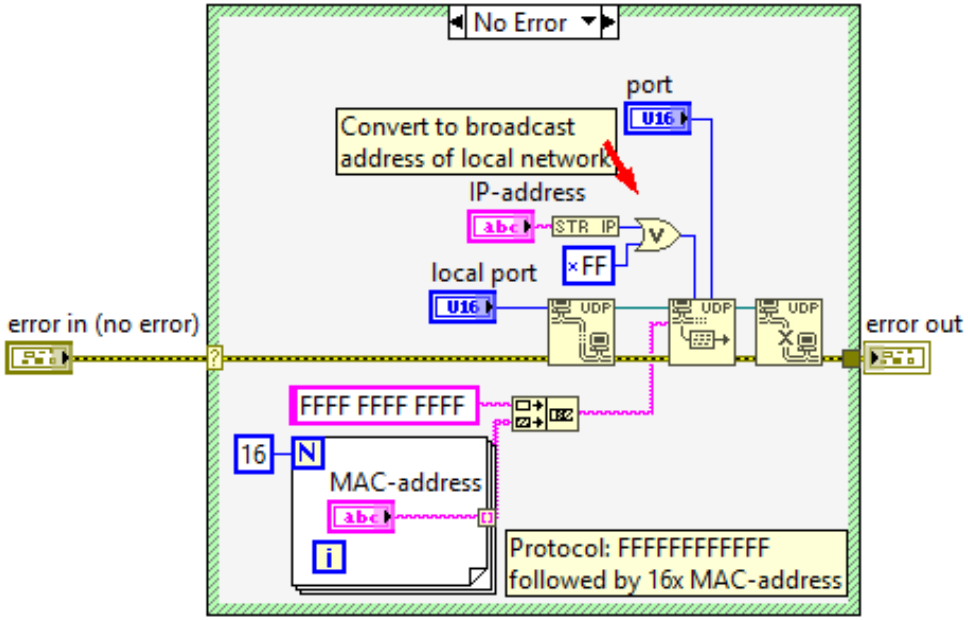
  -Up to 24 GB of DDR4 SDRAM

  -AMD Radeon E6460 Embedded GPU

  -Windows 7 installed

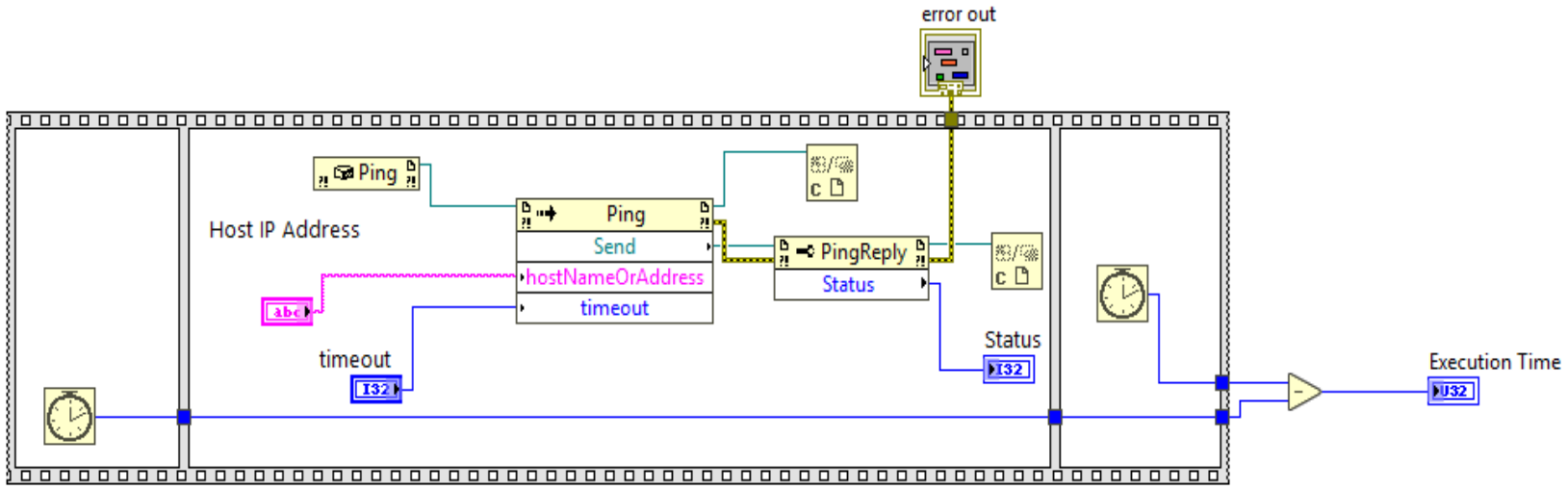
Turning on

- **W**ake **O**n **L**an **(WOL)**
  - **Magic packet** of 6 bytes of all 1's followed by 16 repetitions of the MAC address for the controller you want to wake.
  - IP address
  - MAC addres
  - Port
  - Local port



Checking the status

- Pinging NI PXIe-8880 using remote computer via LabVIEW
  - IP address
  - Timeout (600 ms set as default)



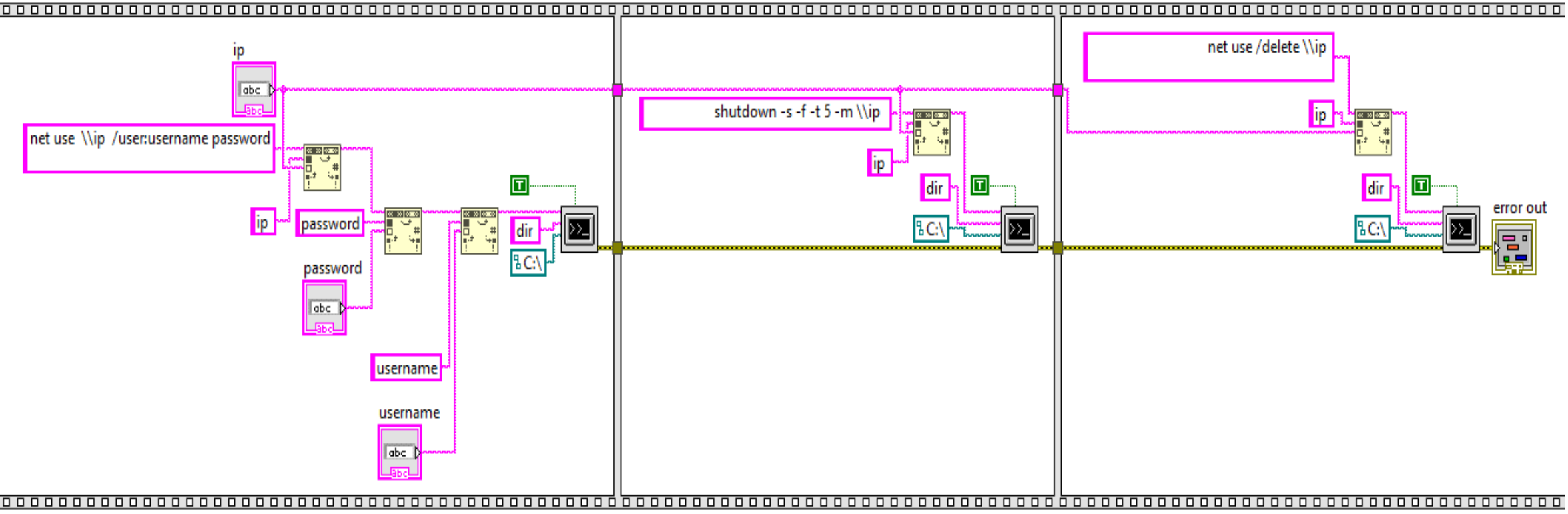
Saving the data

- The data is stored in an Xml file.
- Data Saved:
  - IP address
  - MAC address
  - Username
  - Password
  - Port
  - Local port

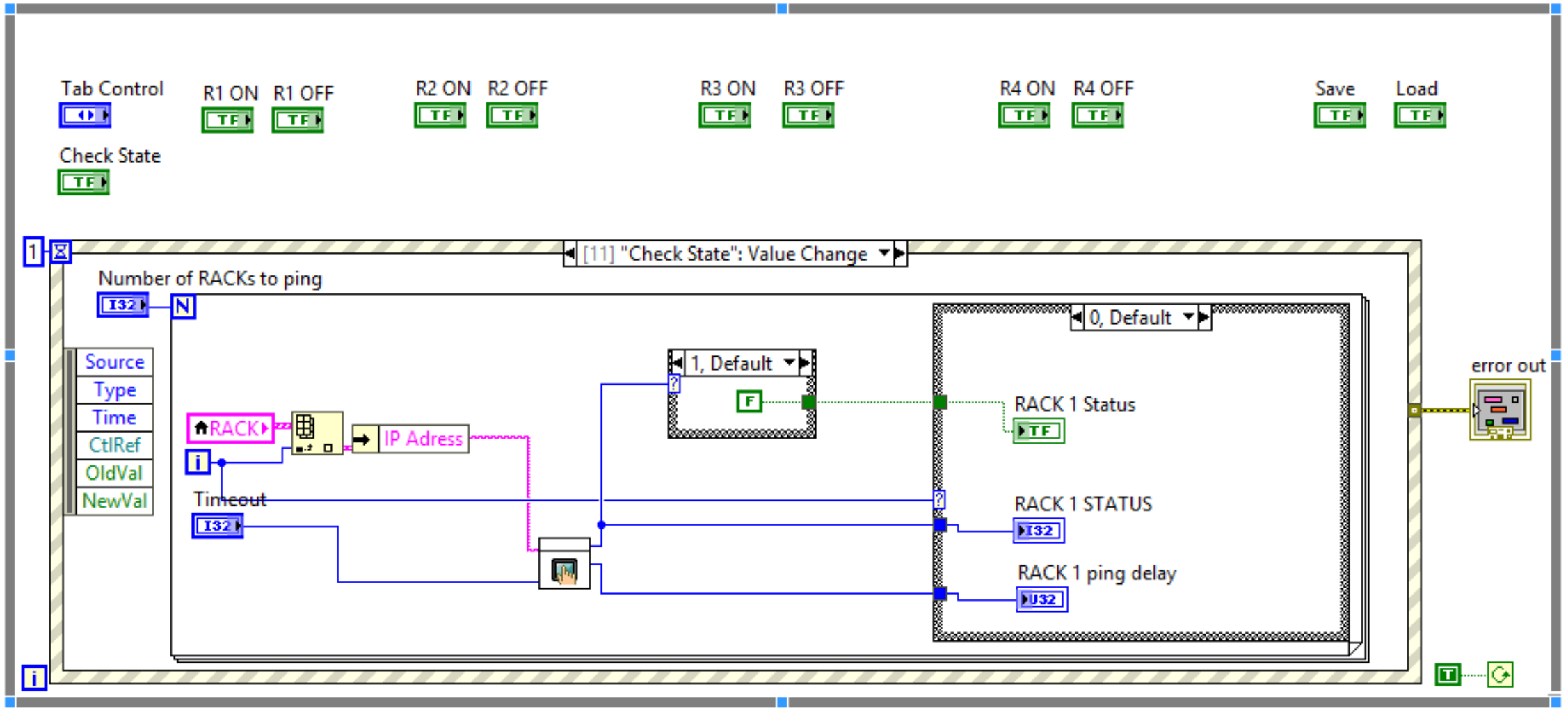
```
<?xml version='1.0' standalone='yes' ?>
<LVData xmlns="http://www.ni.com/LVData">
<Version>17.0</Version>
<Cluster>
<Name>Data to save</Name>
<NumElts>6</NumElts>
<Array>
<Name>RACK</Name>
<Dimsize>1</Dimsize>
<Cluster>
<Name>Cluster</Name>
<NumElts>6</NumElts>
<String>
<Name>IP Adress</Name>
<Val>192.168.0.20</Val>
</String>
<String>
<Name>MAC Adress</Name>
<Val> €/% ”</Val>
</String>
<I32>
<Name>Port</Name>
<Val>7</Val>
</I32>
<I32>
<Name>Local Port</Name>
<Val>0</Val>
</I32>
<String>
<Name>Login</Name>
```

Shutting down

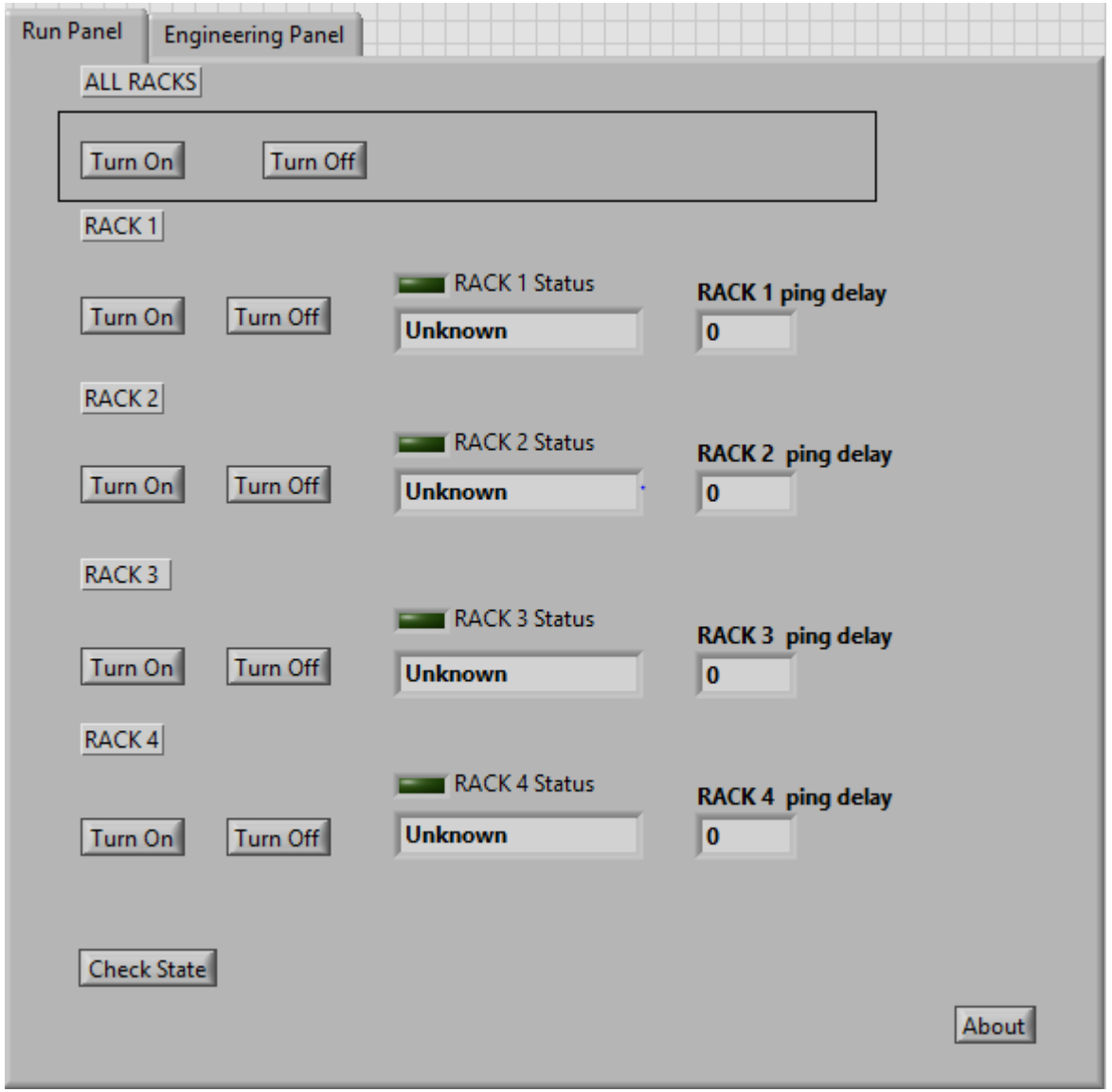
- Using LabVIEW to open cmd window on NI PXIe-8880 in order to automatically type shutdown command
- Required data: IP, username, password of the controller.



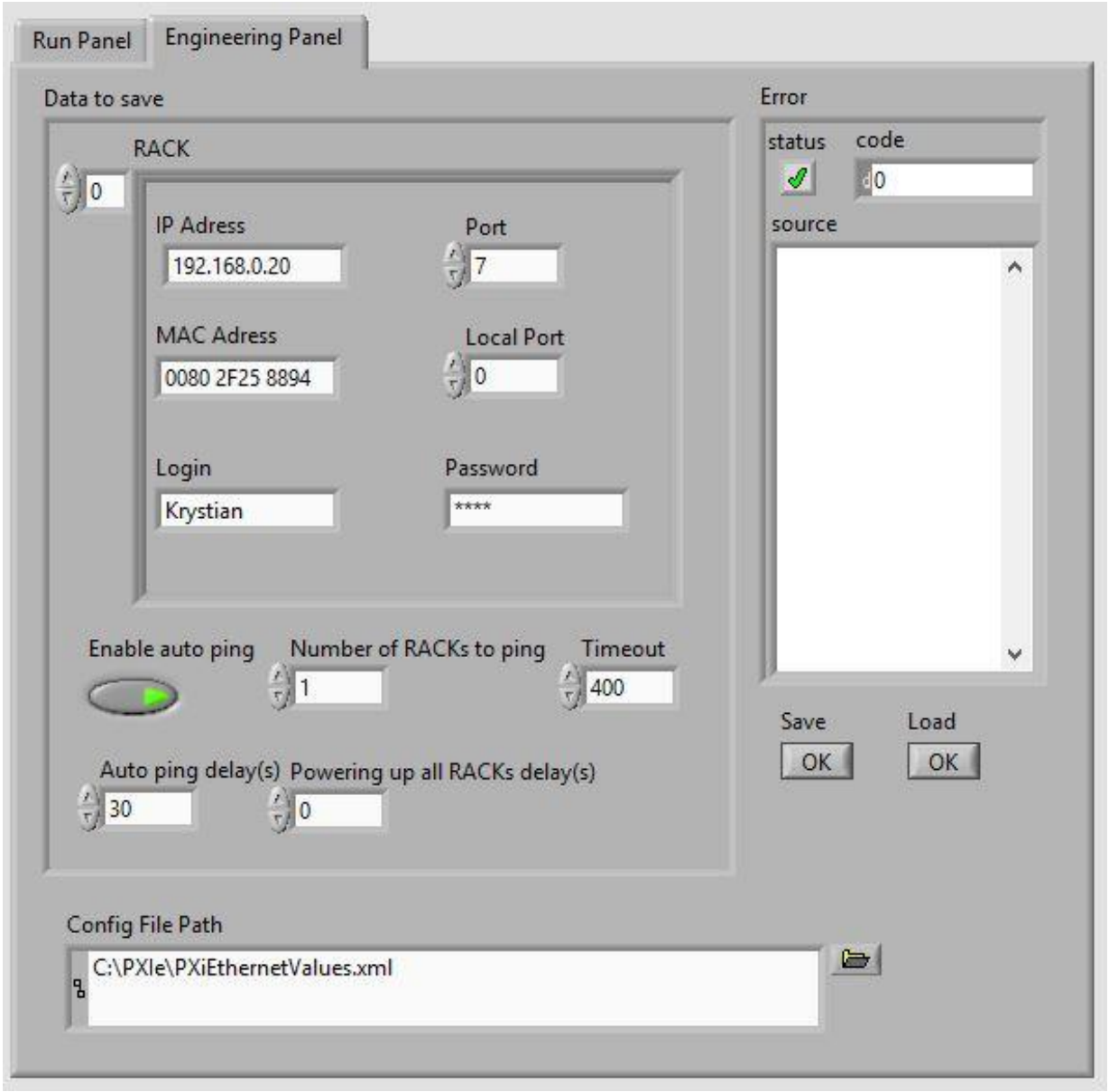
Final scheme



Run Panel


Run Panel
Engineering Panel
ALL RACKS
Turn On
Turn Off
RACK 1
Turn On
Turn Off
RACK 1 Status
Unknown
RACK 1 ping delay
0
RACK 2
Turn On
Turn Off
RACK 2 Status
Unknown
RACK 2 ping delay
0
RACK 3
Turn On
Turn Off
RACK 3 Status
Unknown
RACK 3 ping delay
0
RACK 4
Turn On
Turn Off
RACK 4 Status
Unknown
RACK 4 ping delay
0
Check State
About

Engineering Panel



Summary

- Made for 4 racks but can be **modified** to add more
- 2 pannels that can be adjusted according to the users’ demand
- Simultaneously checking status of each rack
- Turning on/off all racks at once

Thank You

In case of fire

- No human access
- Extinguish certain rack on fire

GDAŃSK UNIVERSITY OF TECHNOLOGY

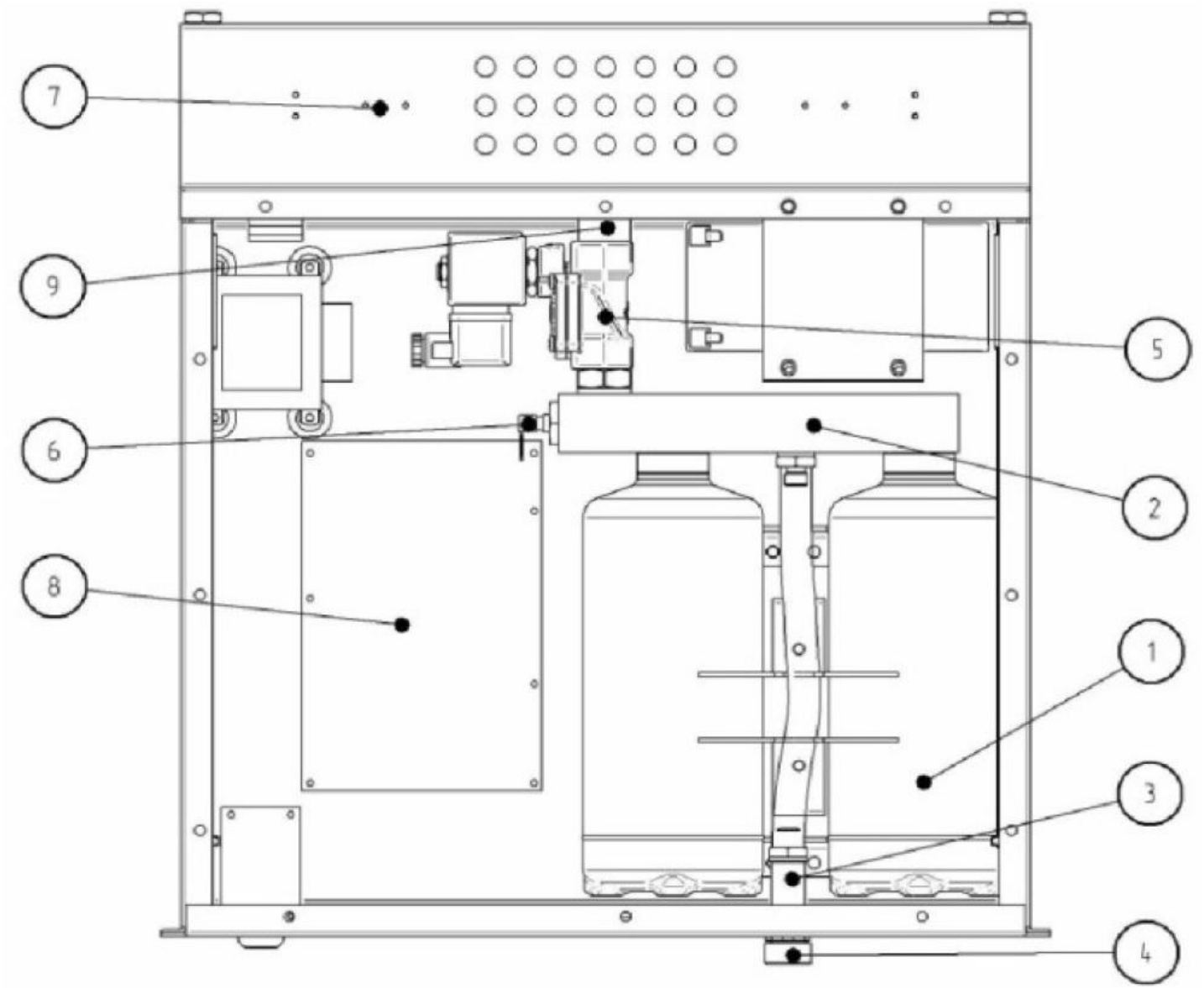
Fire extinguishing system

Authors:
Agnieszka Domalewska, Gdańsk University of Technology
Szymon Rowiński, Warsaw University of Technology
Radosław Krzosa, Warsaw University of Technology

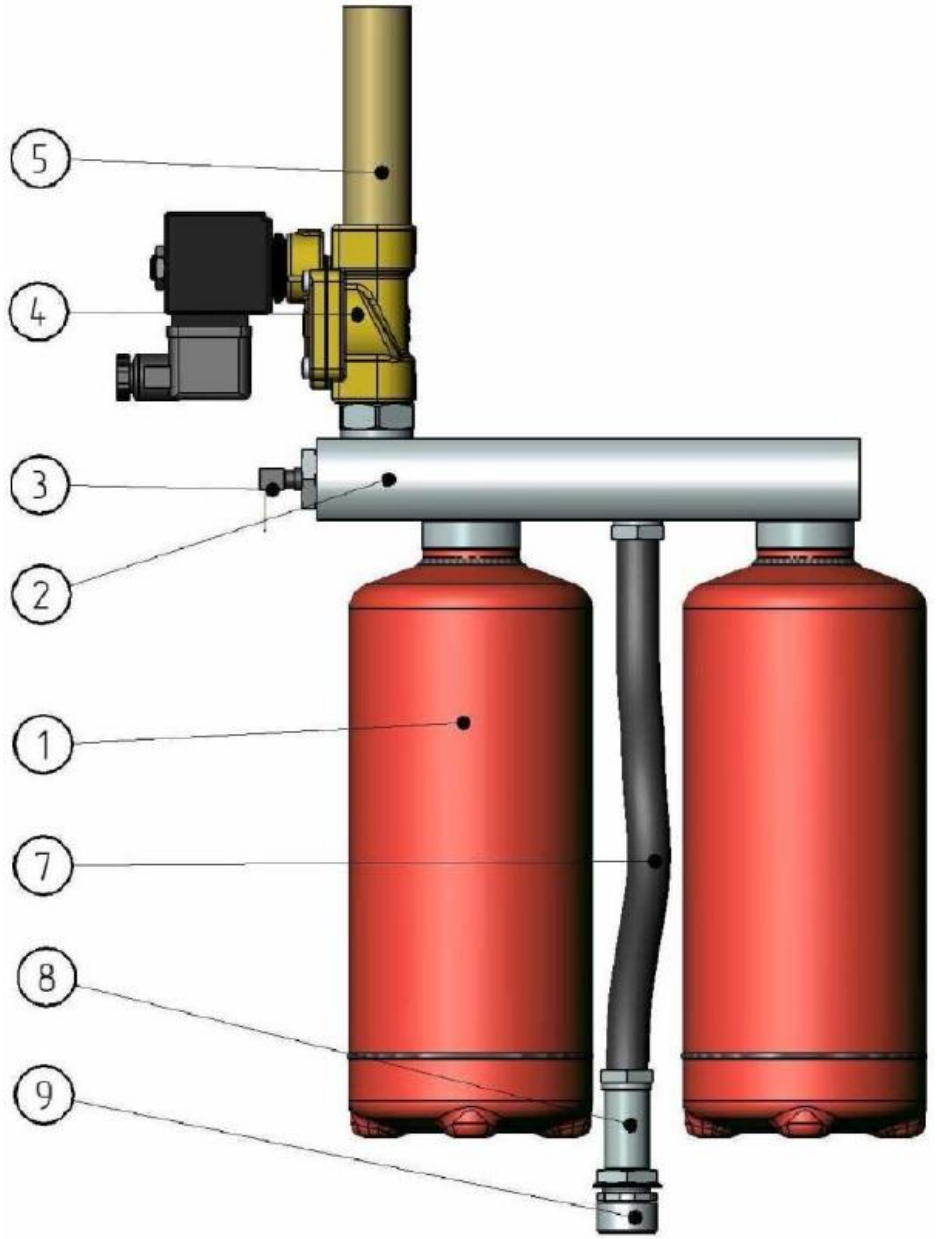
PROJECT PURPOSE

- Connecting to the FRS-RACK Master and Slave extinguishing modules
- Communication and checking the working parameters
- Creating the LabView software

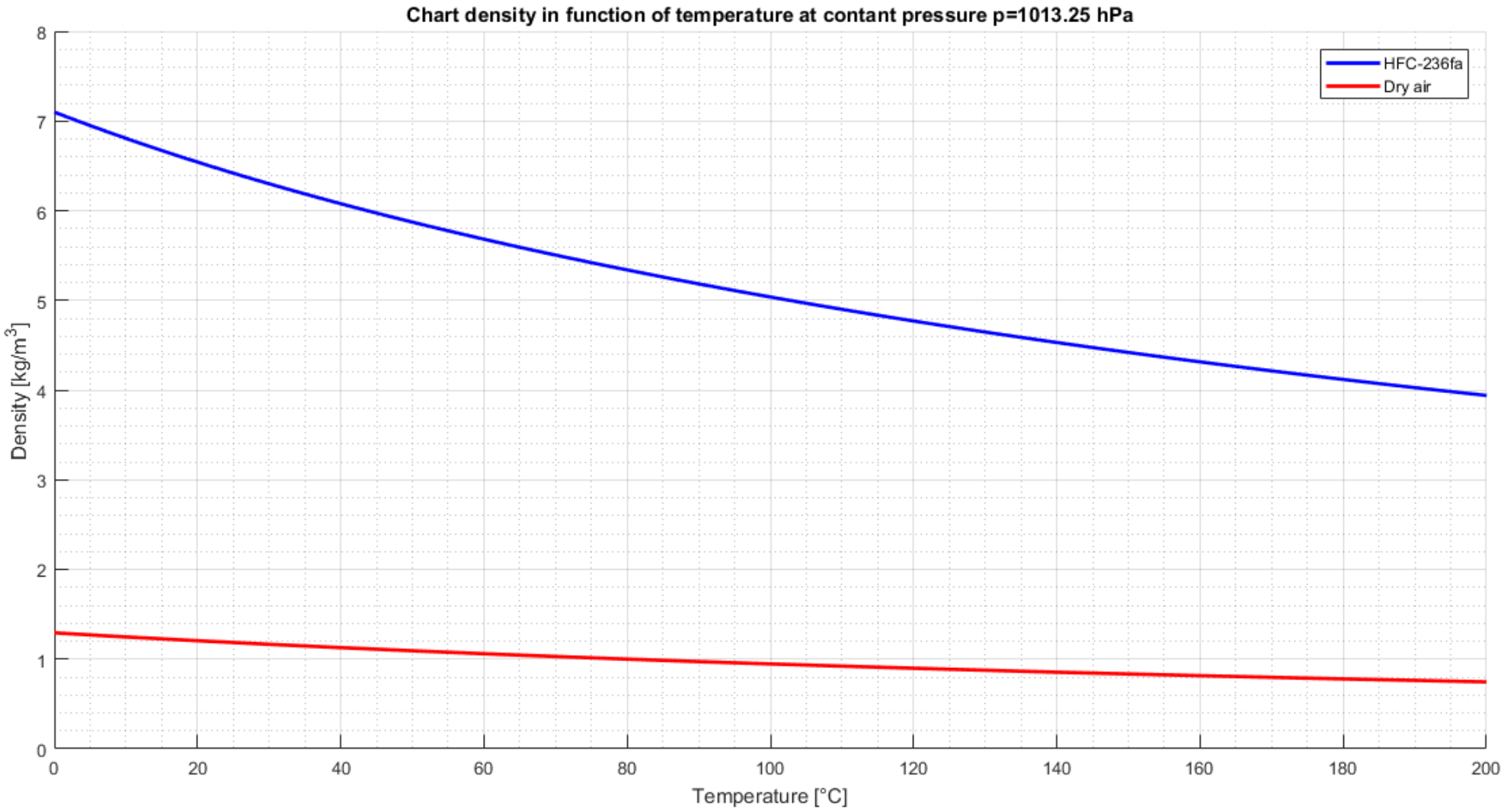
FRS-RACK



EXTINGUISHING UNIT



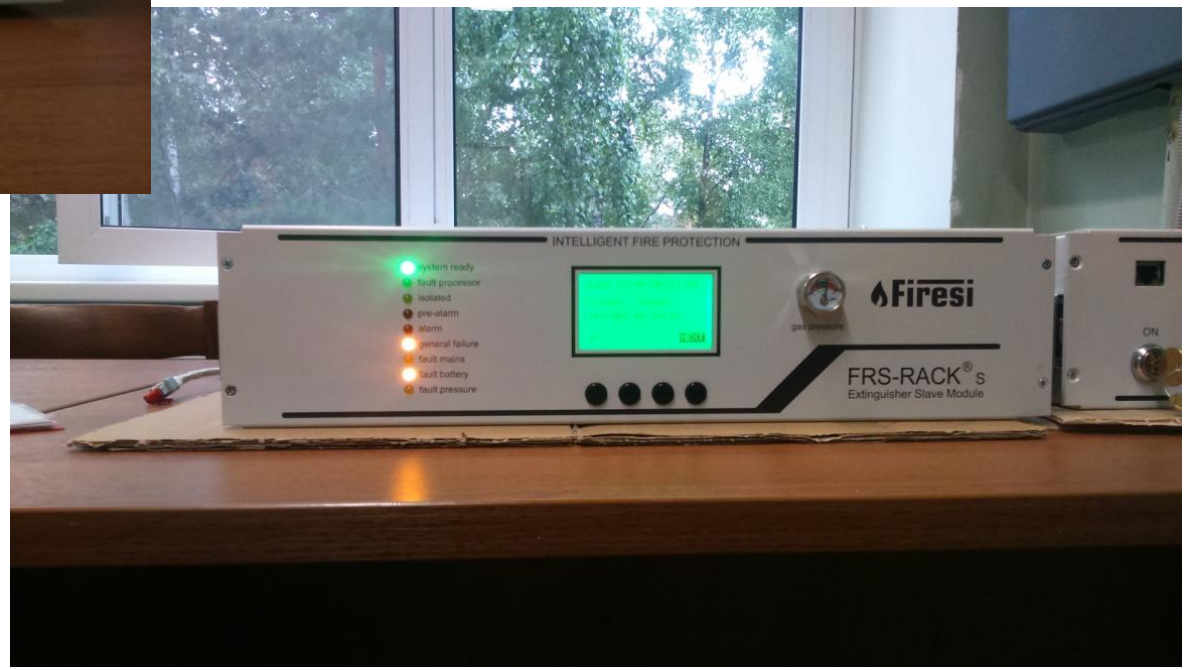
EXTINGUISHING AGENT



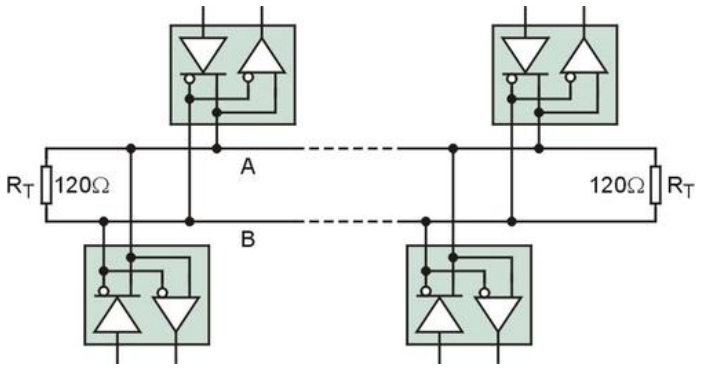
FRS-RACK DEVICE

Master module

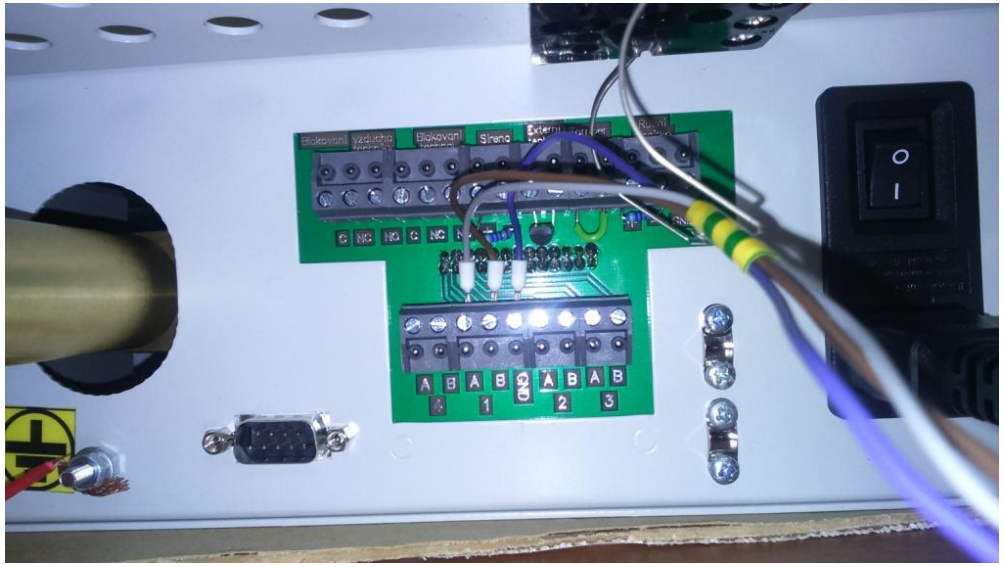
Slave module



MASTER – SLAVE COMMUNICATION



RS485 serial connection

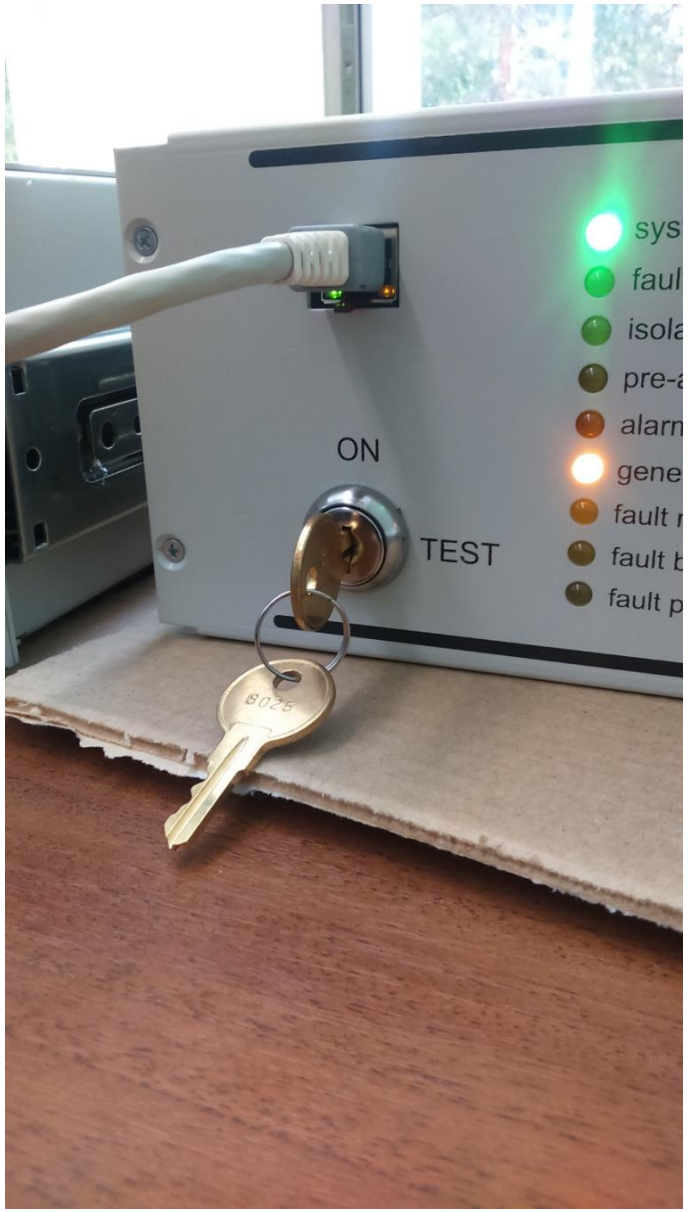


Master connection

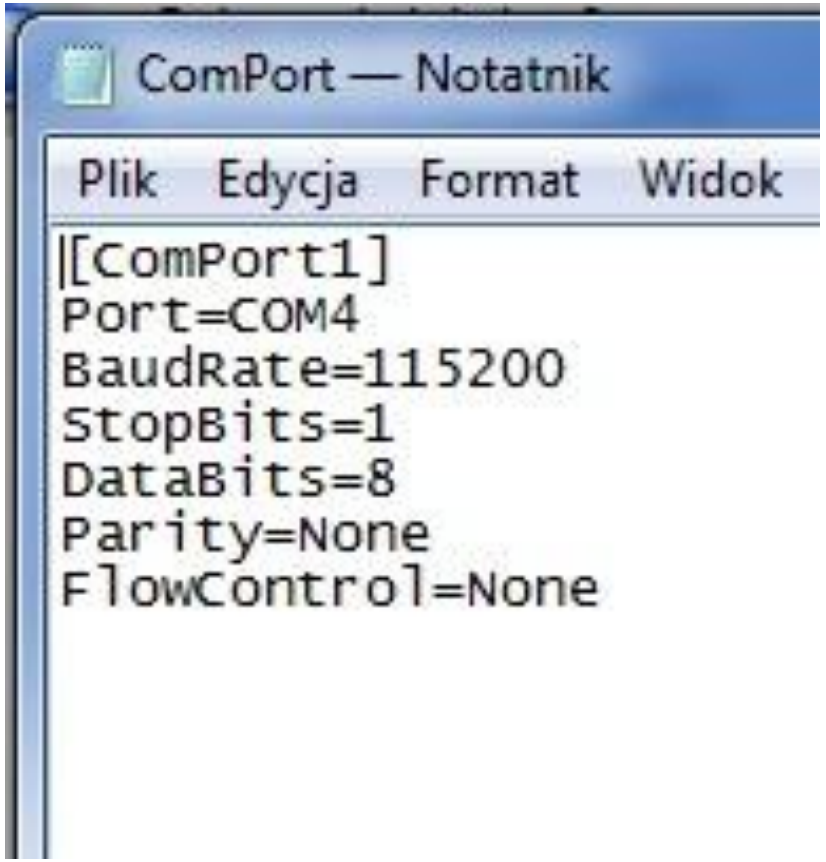
Slave connection

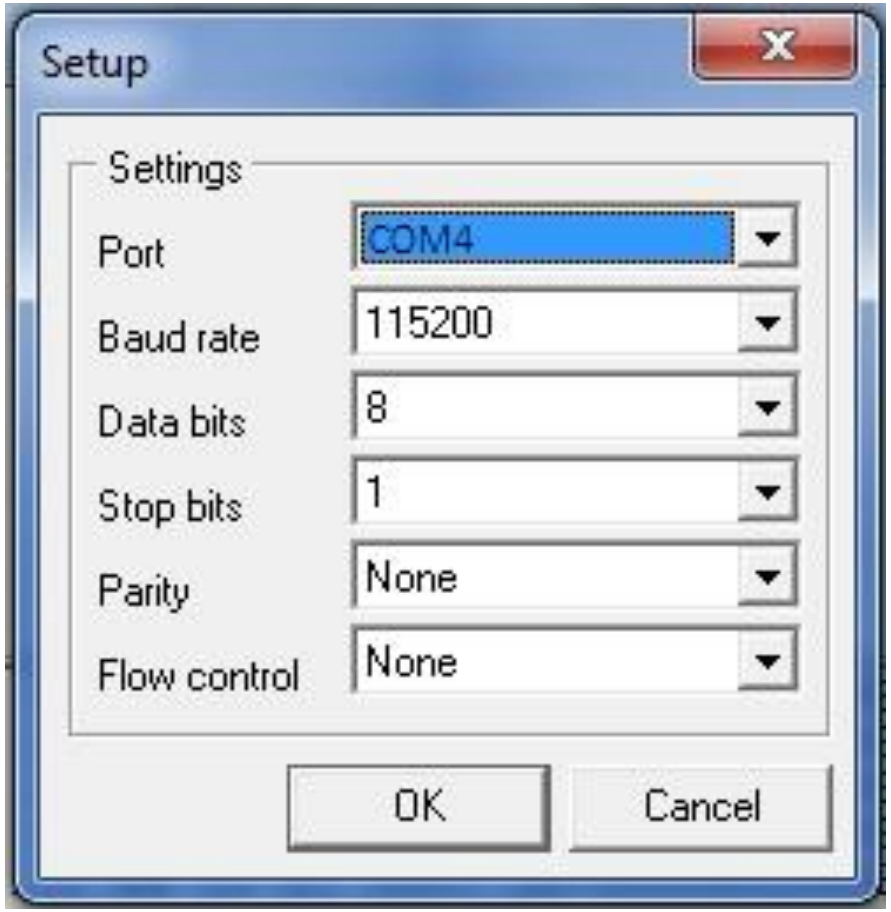
COMMUNICATION WITH A MODULE

RS232 and Ethernet ports

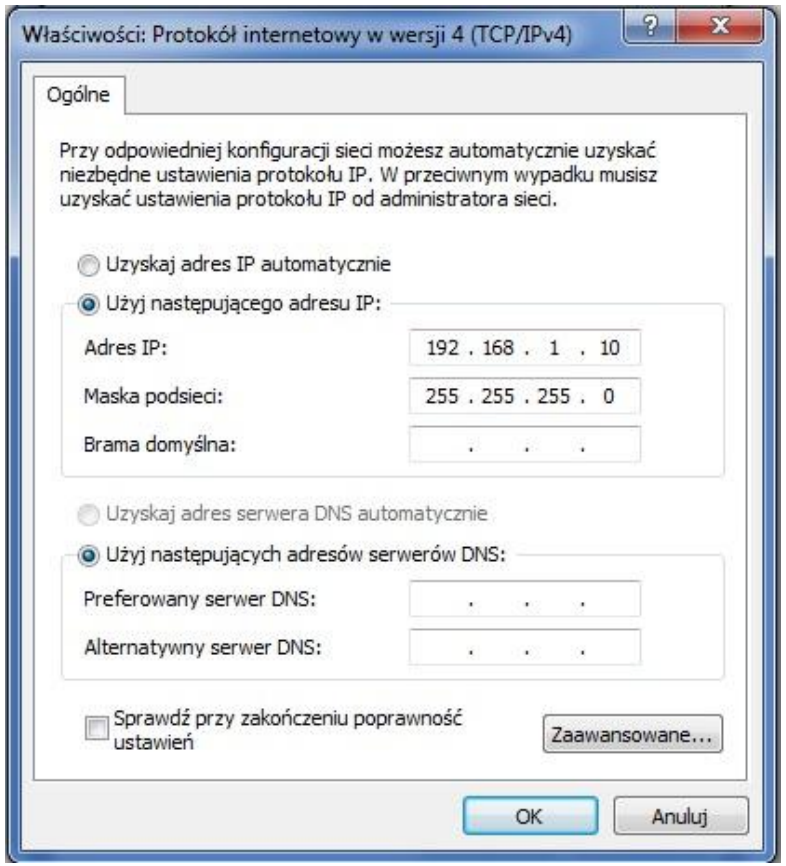


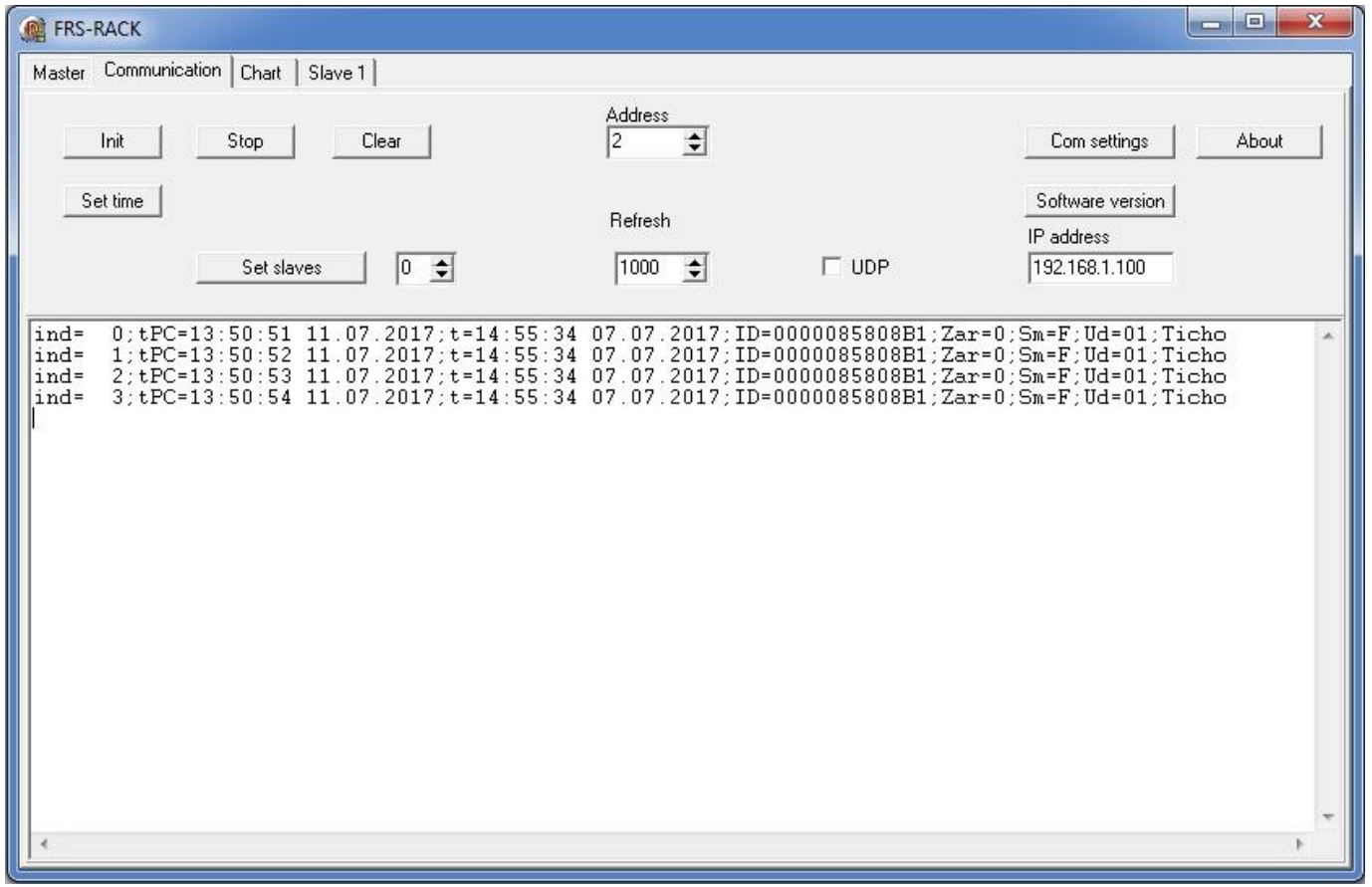
SET UP A CONNECTION THROUGH RS232 PORT



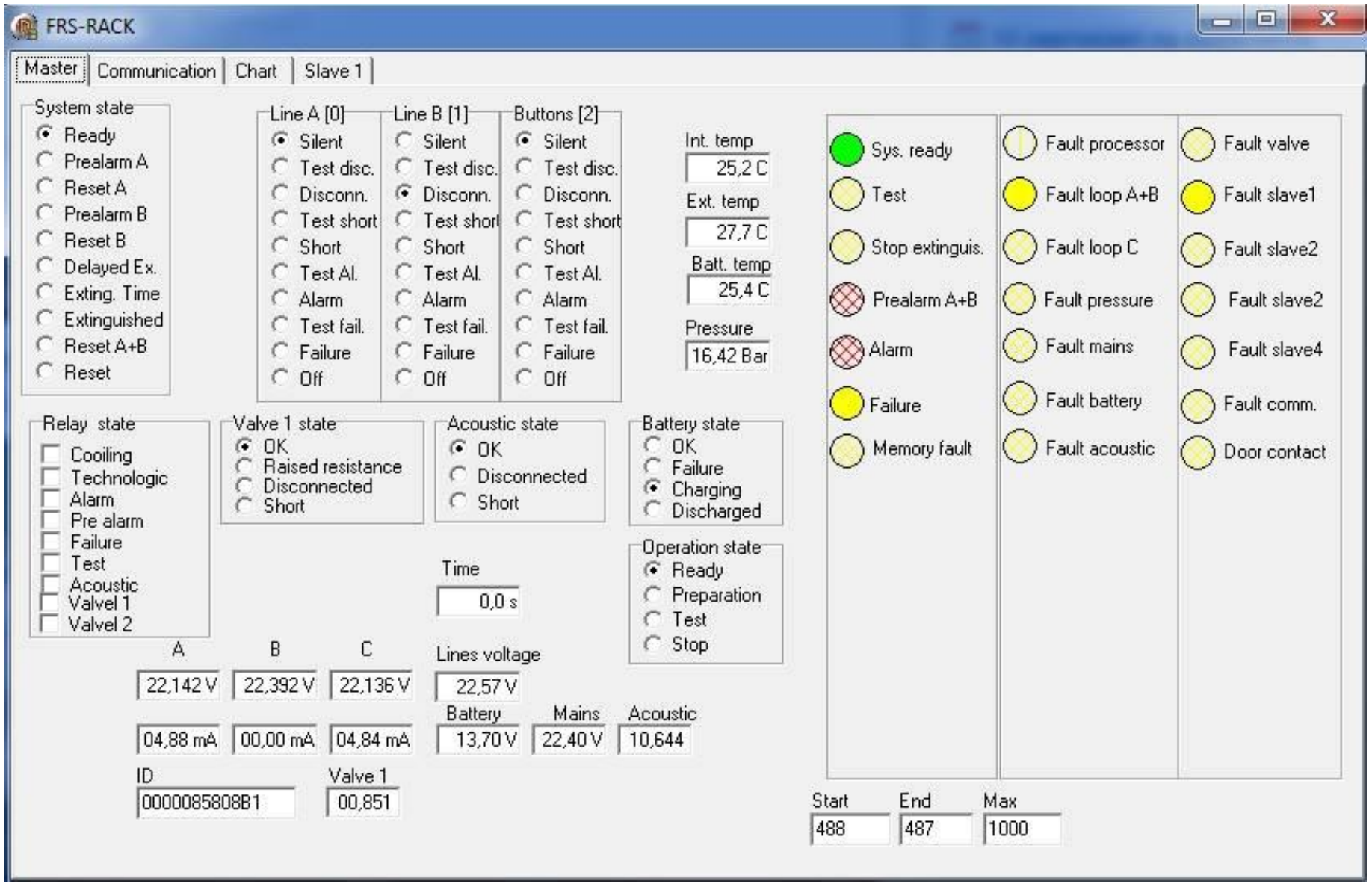


SET UP AN ETHERNET CONNECTION

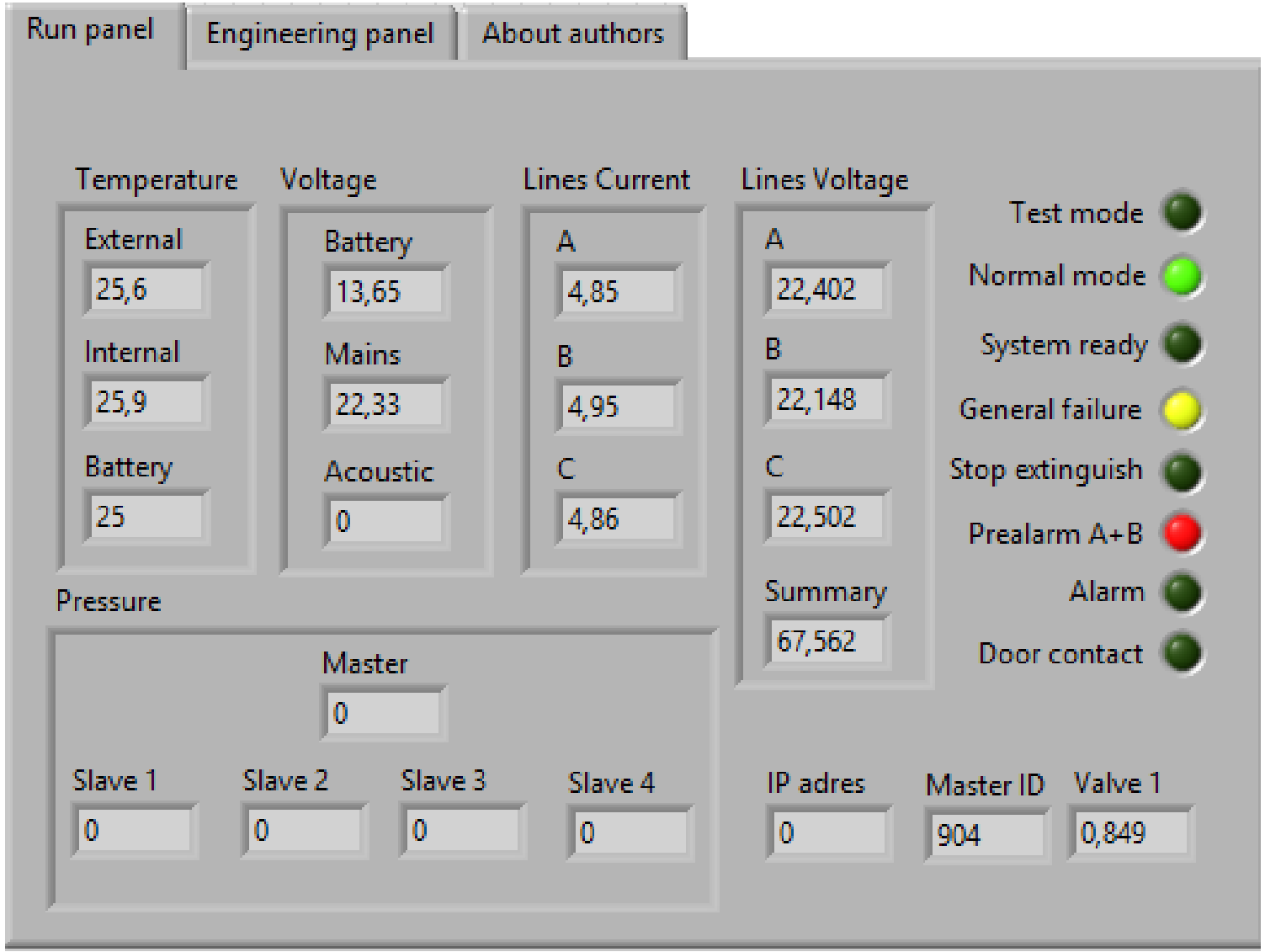




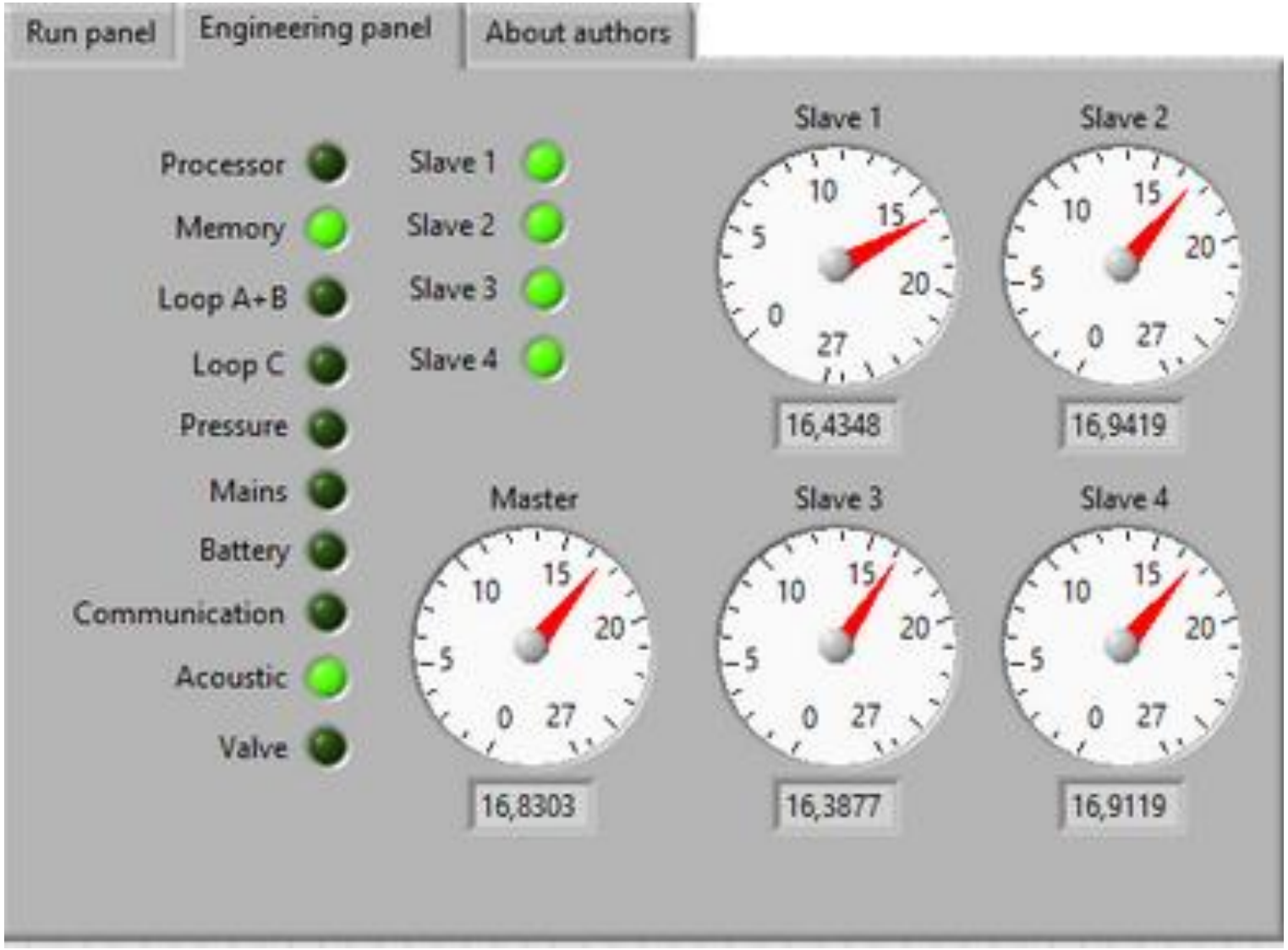
MAIN PARAMETERS



LABVIEW SOFTWARE



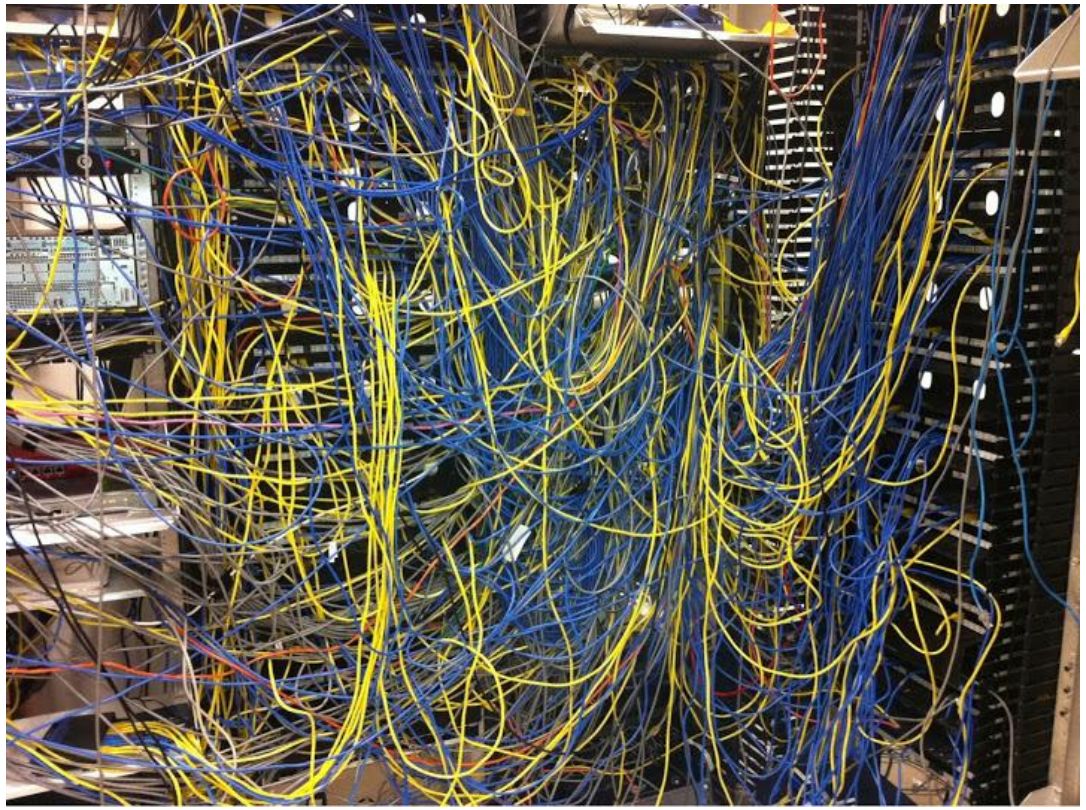
LABVIEW SOFTWARE



Thank you for attention!

Importance of intelligent power distribution

- Symmetrize power supply
- Swaping phases
- Symmetrize system
- No human access



Electrical network analyzer

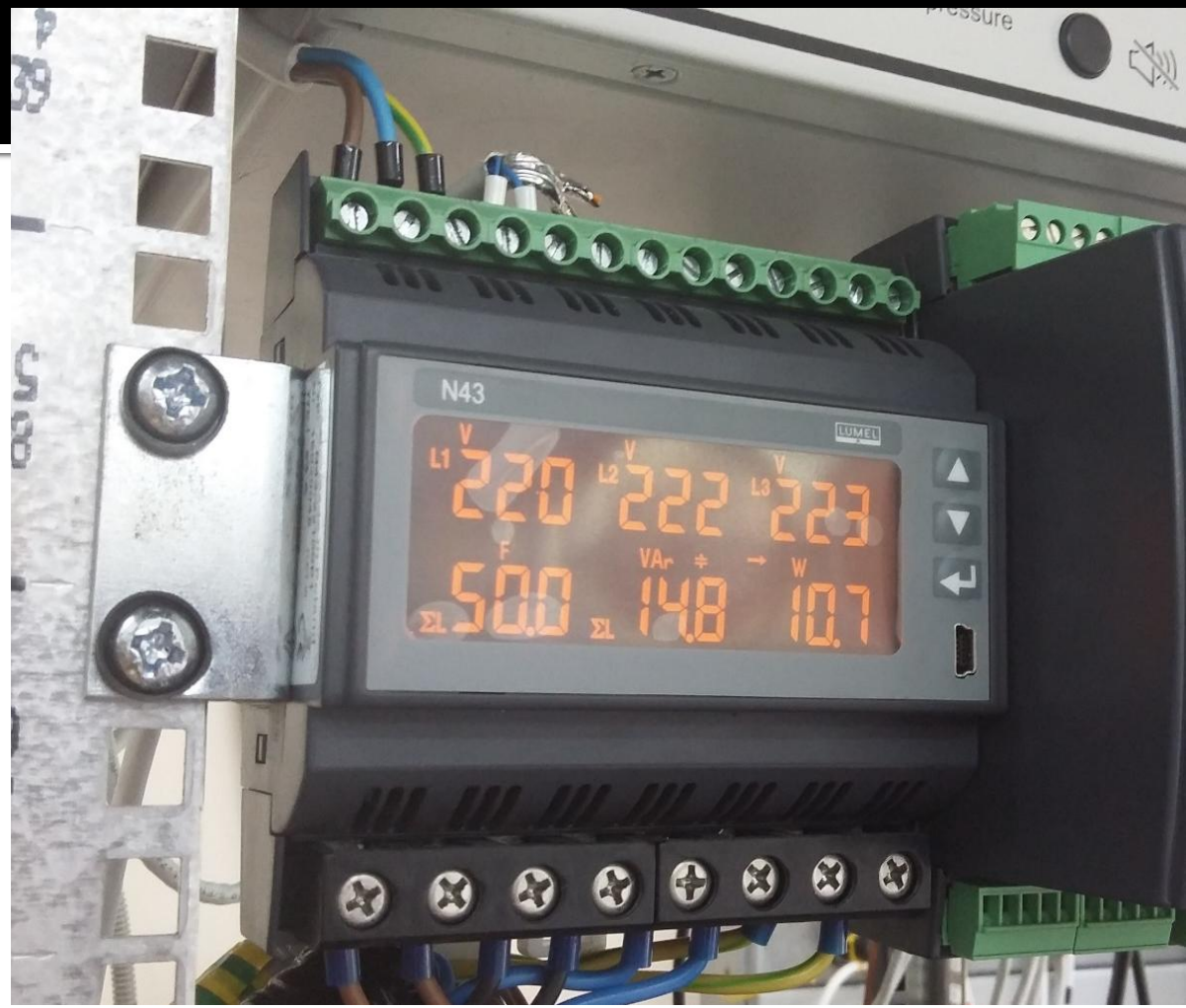
Barbara Kędzierska, Warsaw University of Technology, Faculty of Power and Aeronautical Engineering
Tomasz Kowalski, Warsaw University of Technology, Faculty of Electronics and Information Technologies
Supervisor: Marek Peryt

Goal of the project

- Smart energy distribution and power network analysis

Our tasks

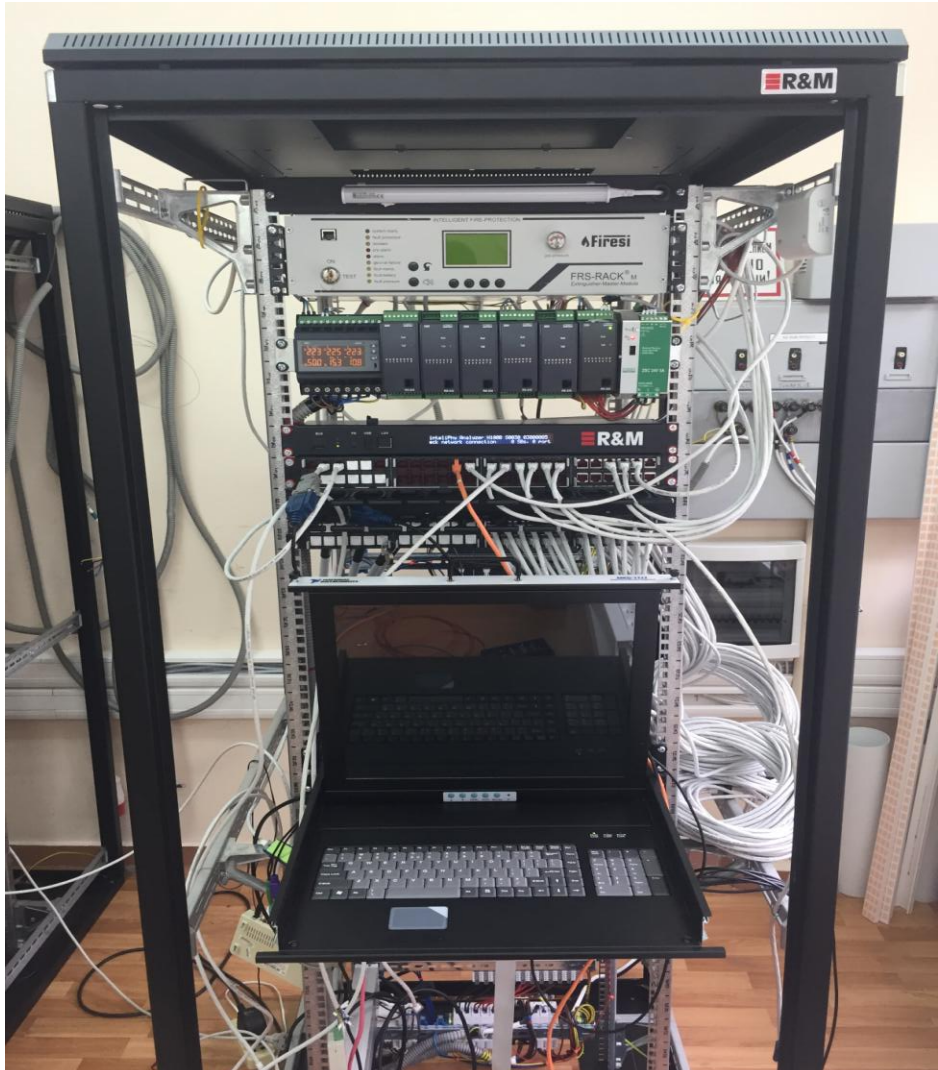
- Communication with the electrical network analyzer by PXIe serial modul
- Measuring and displaying network parameters on the self-made interface
- Sending data to another program which controls switching on devices to power network



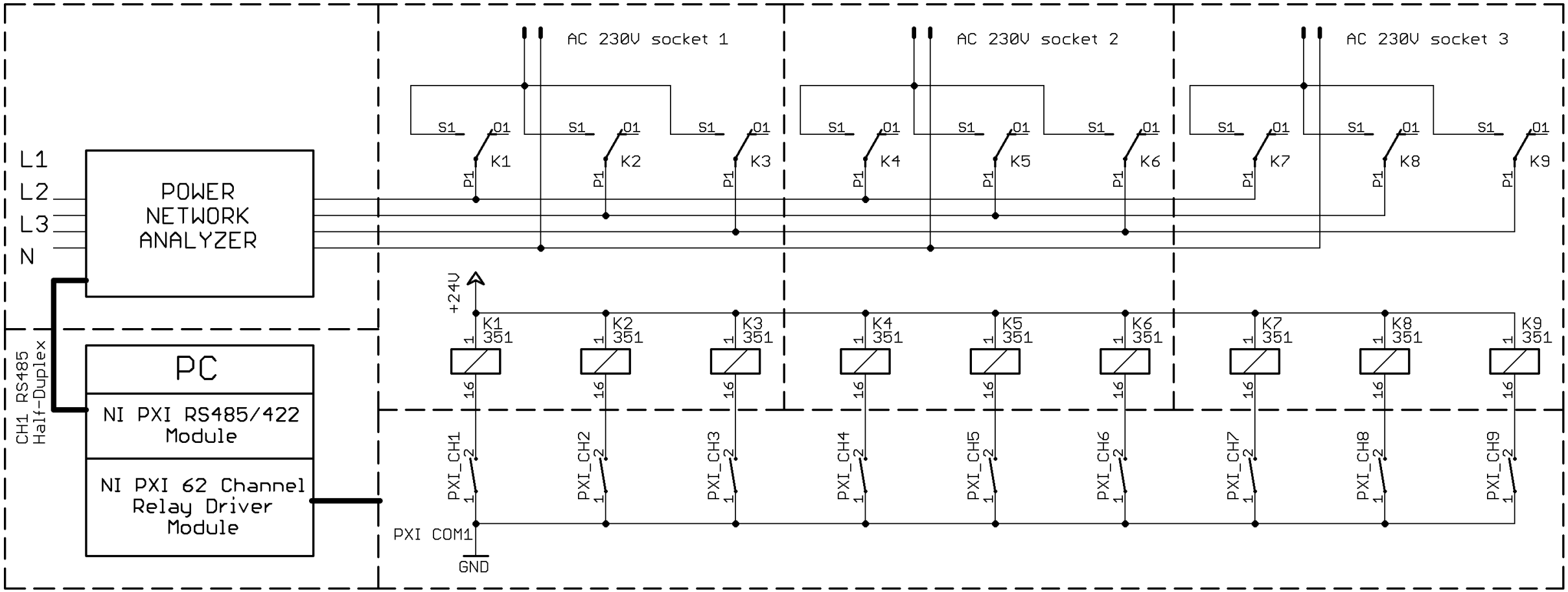
Why electrical network analysis is important?

Network analysis:

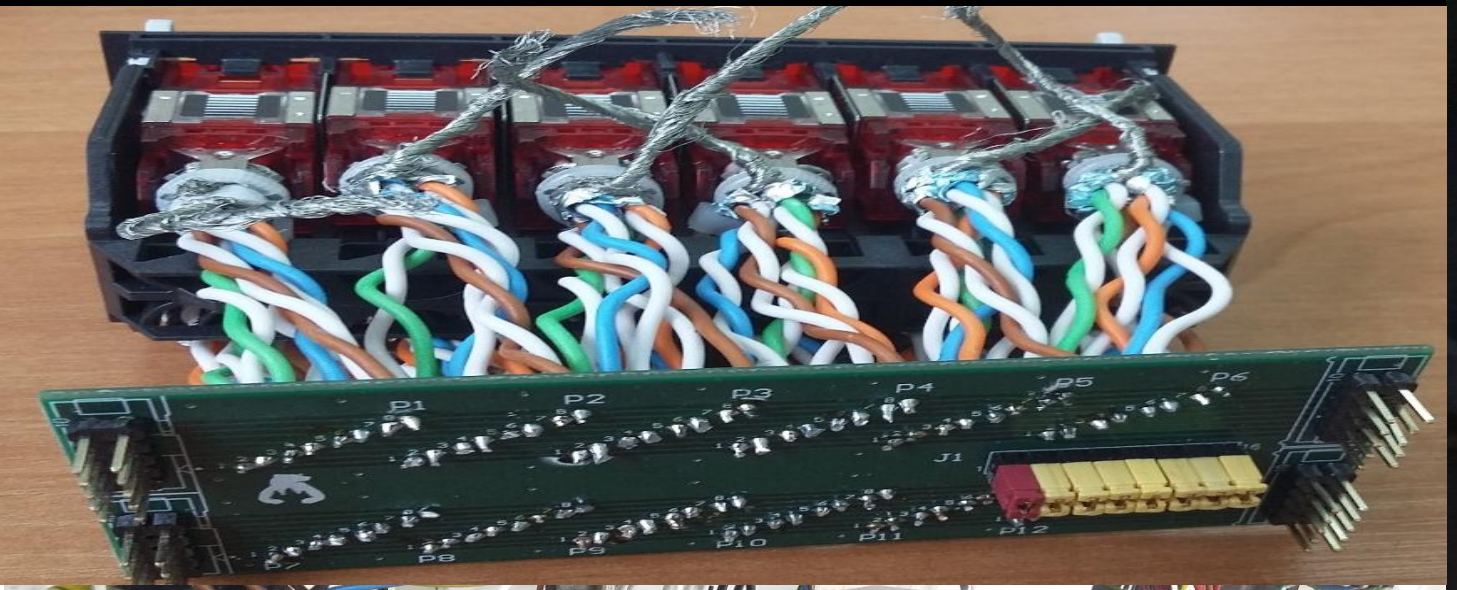
- General information about conditions of power network and total power consumption by our system
- Measurement of devices power consumptiuon gave us information about:
- Device is connected properly to a power network
- Connect different devices to different phases in order to achieve equal load of electrical network

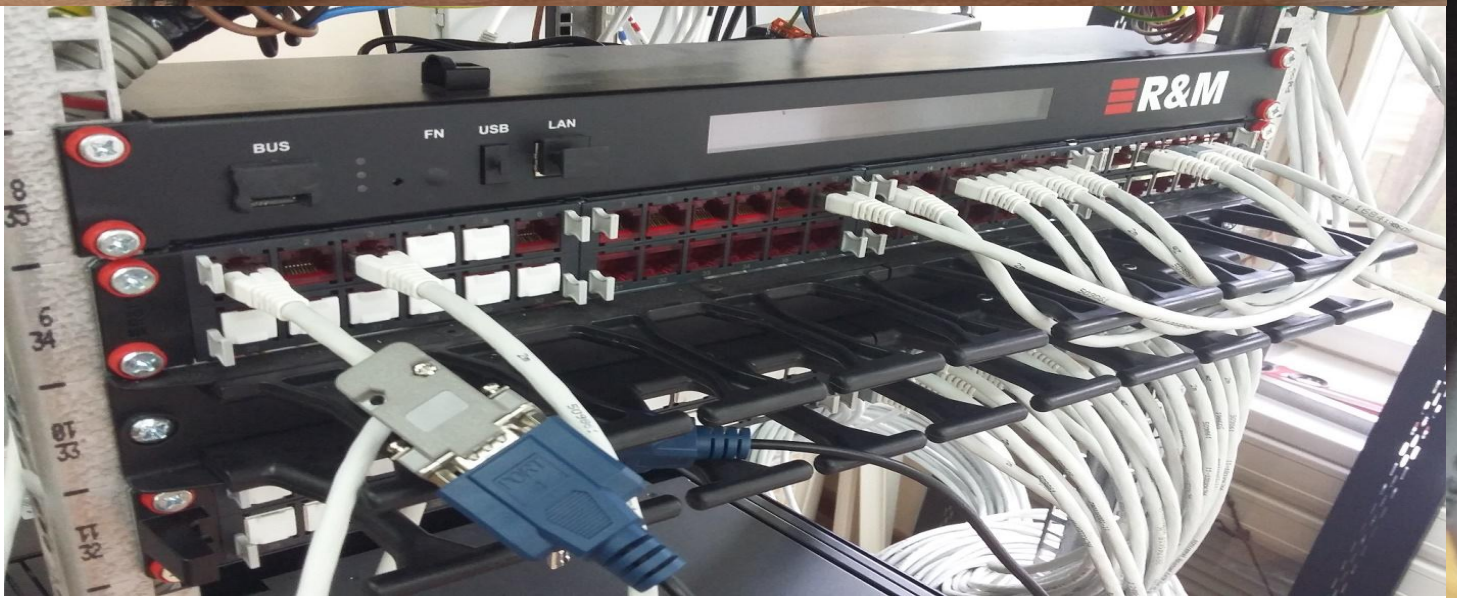


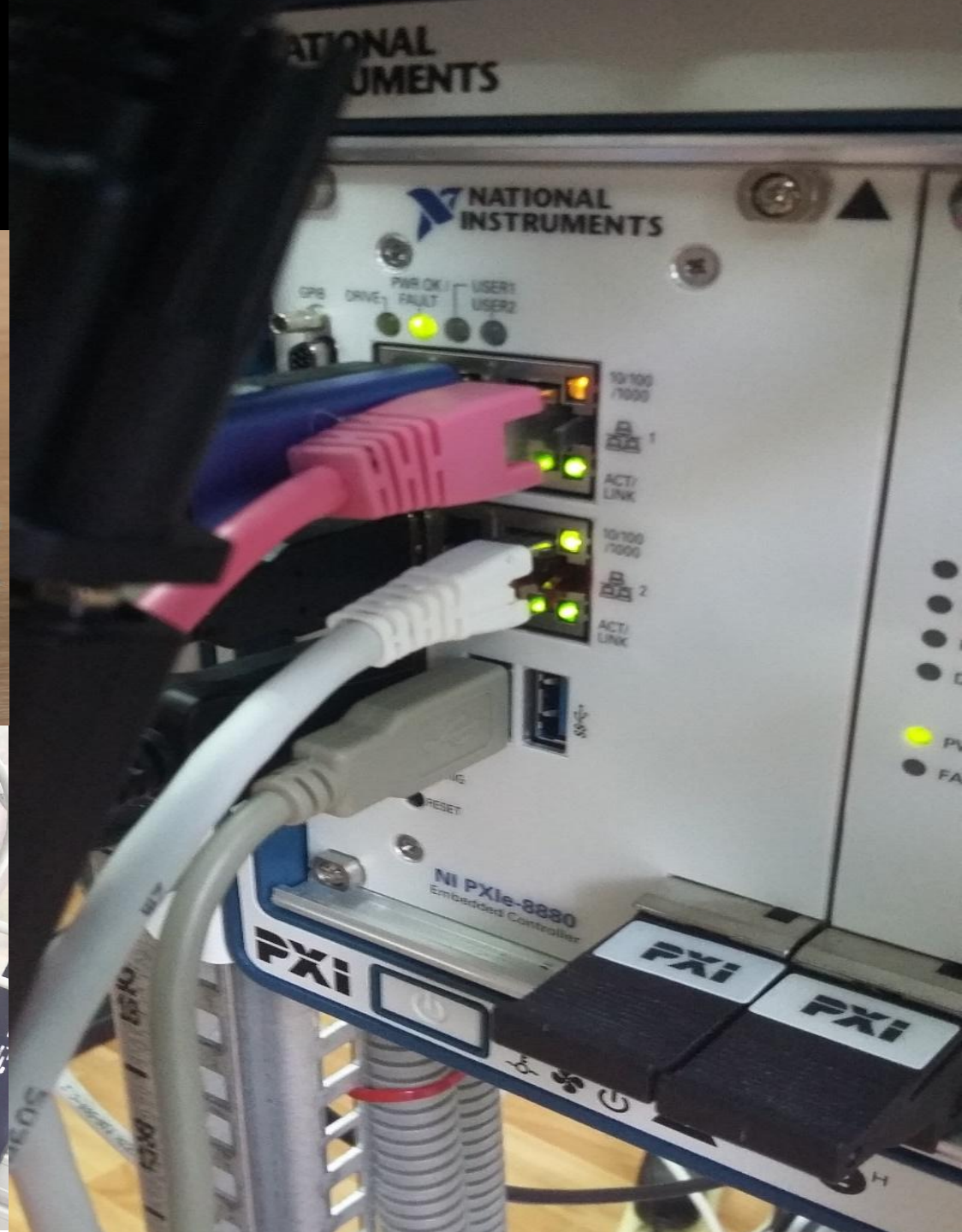
System architecture



Lab stand


P1
P2
P3
P4
P5
P6
J1
P7
P8
P9
P10
P11
P12

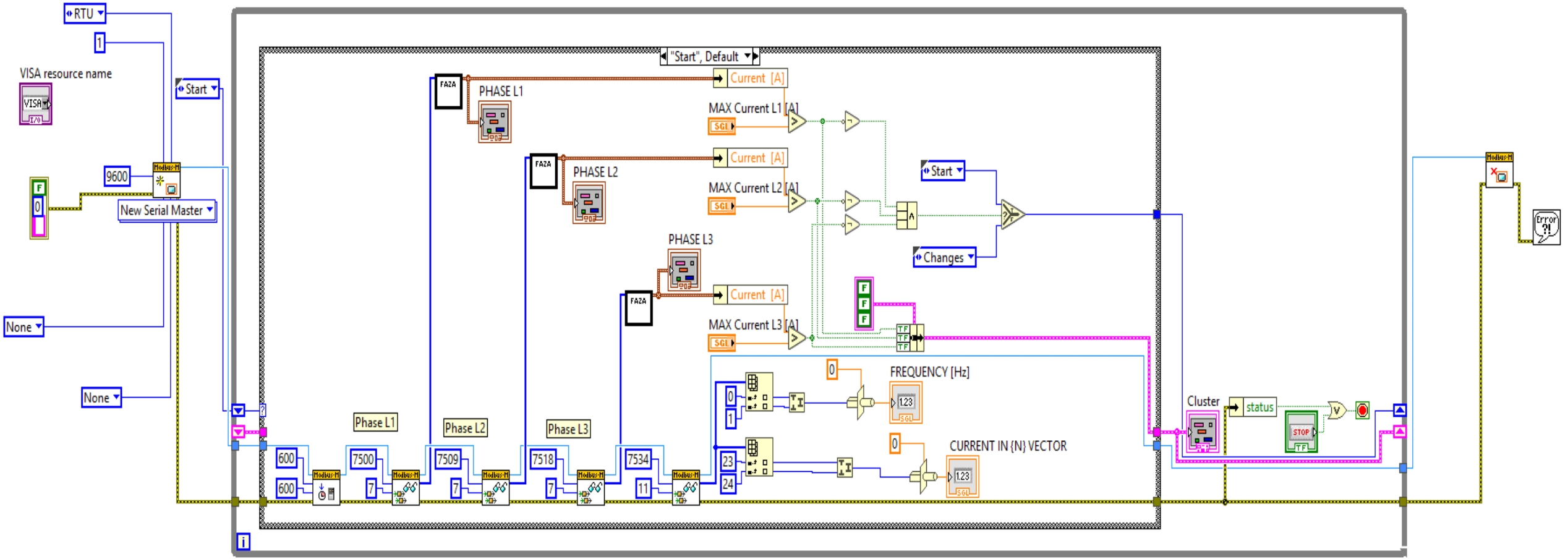

BUS
FN
USB
LAN
R&M


NATIONAL INSTRUMENTS
PWR OK / FAULT
USER1
USER2
10/100 /1000
ACT/ LINK
NI PXIe-8880
Embedded Controller
PXI
PXI
PXI

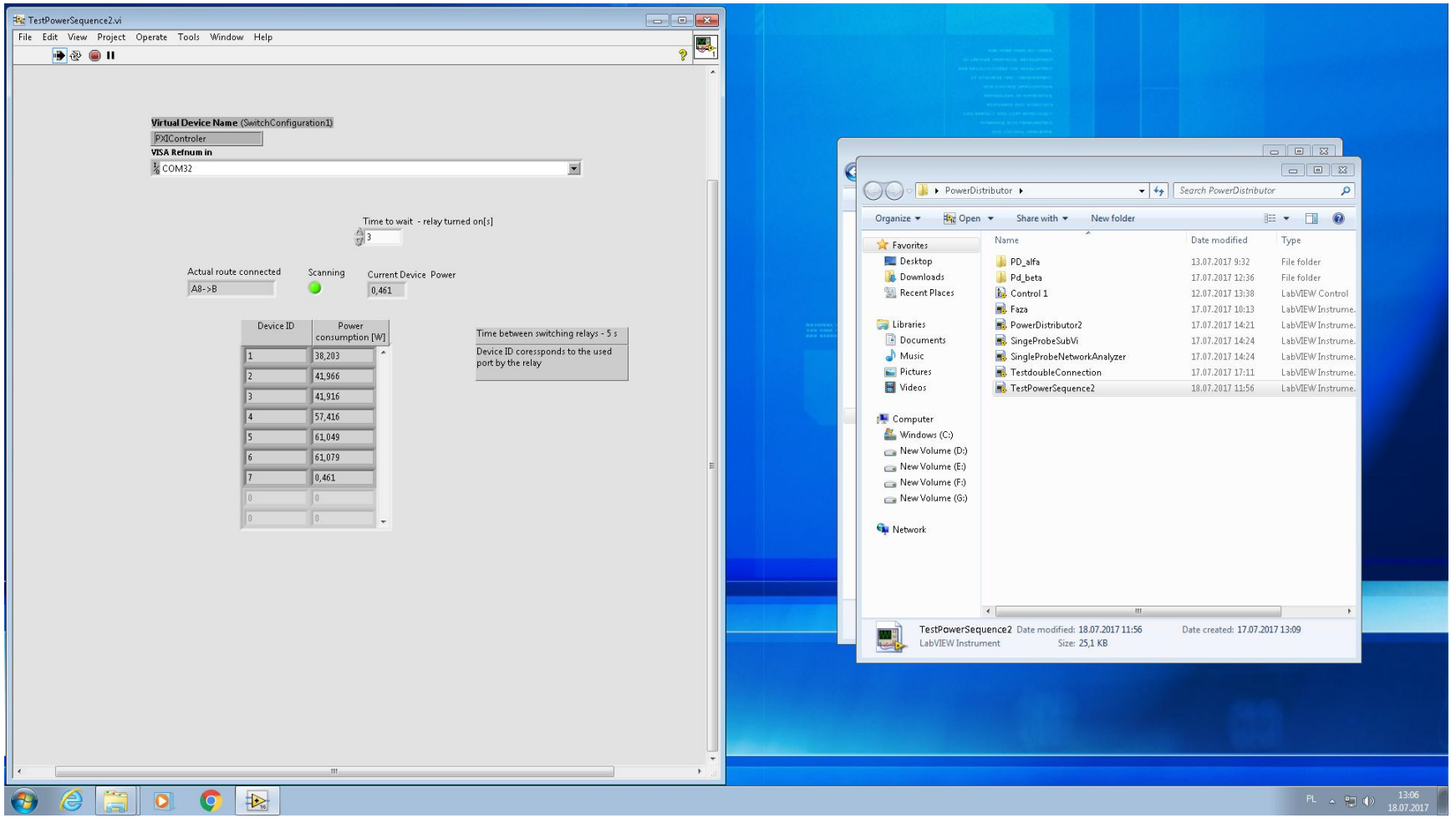
User interface

- Allows to display 7 parameters for each phase
- Red indicator appears if phase is loaded
- Display can be stopped by pressing the yellow button

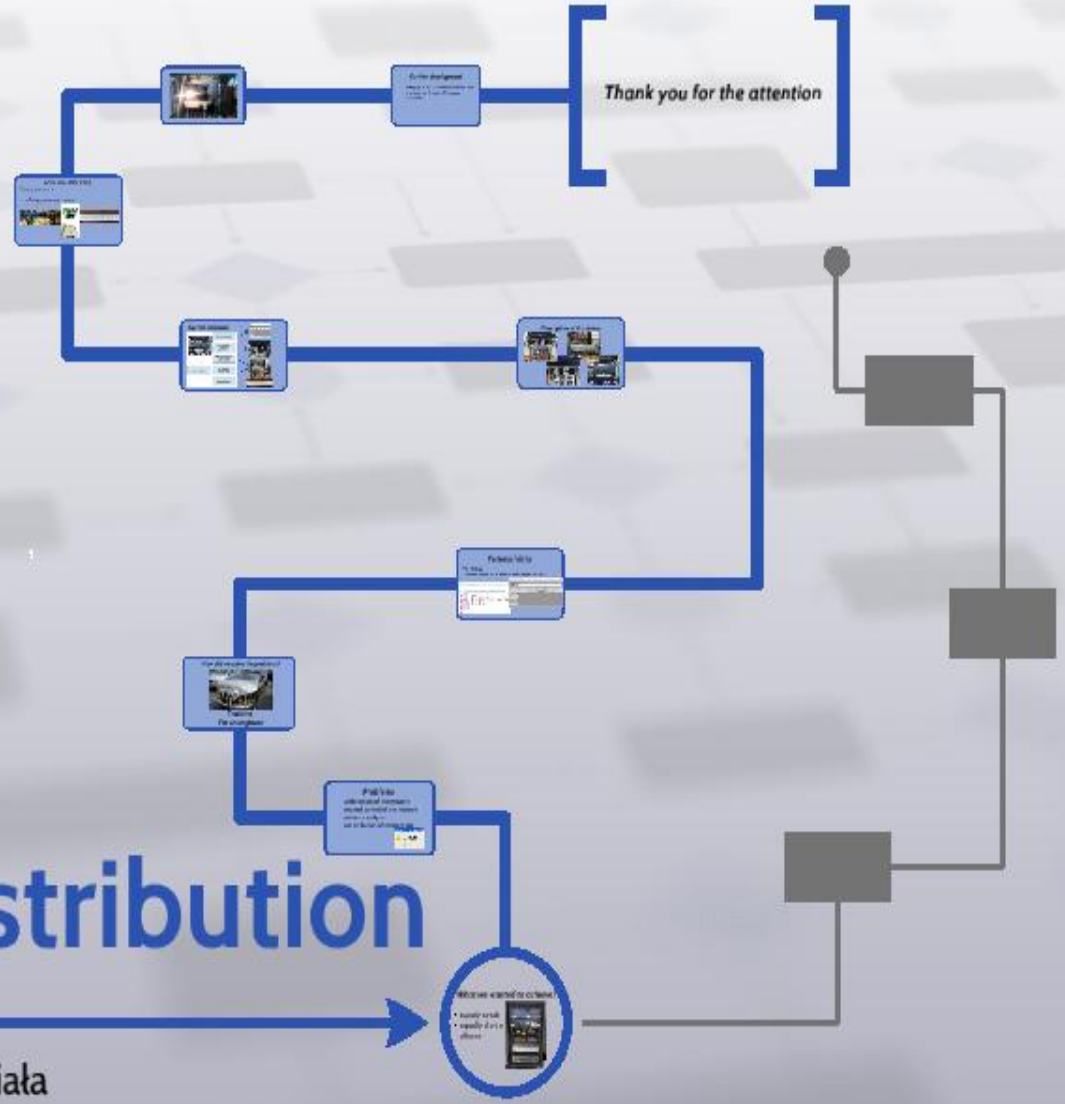
What is behind?



Part of common project



Thank you!



Intelligent Power Distribution

Aleksandra Fliszkiewicz, Tomasz Zalewski, Klaudia Zardzewiała

Dubna, 20.07.2017

What we wanted to achieve?

- supply a rack
- equally divide phases

Problems

- architecture of the network
- manual control of the network
- network analysis
- redistribution of connections

How did we solve the problems?

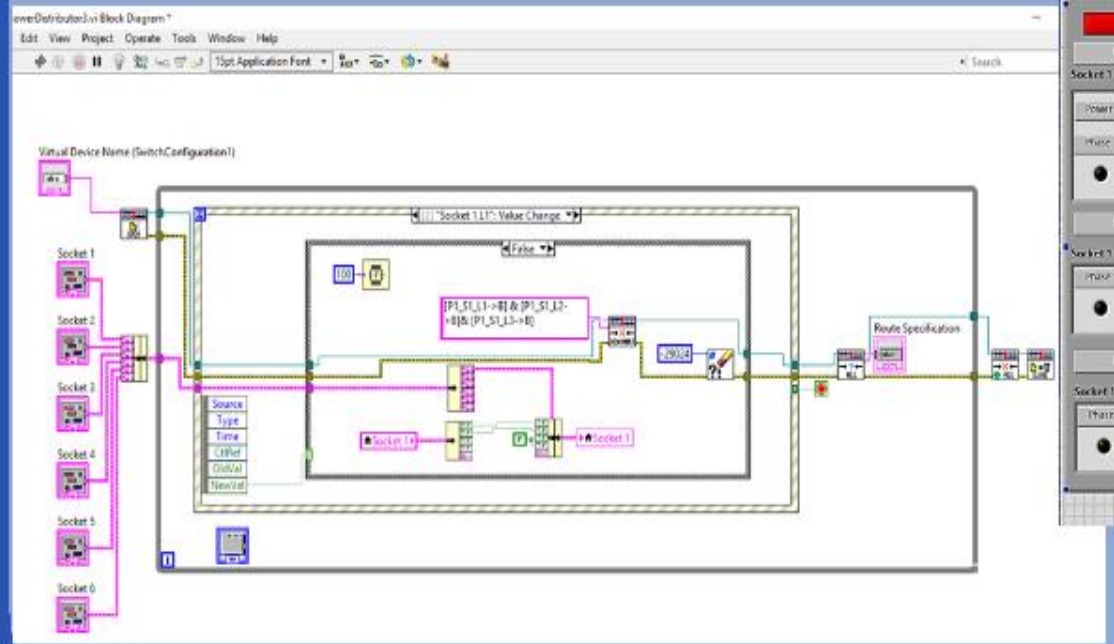
Trust me,

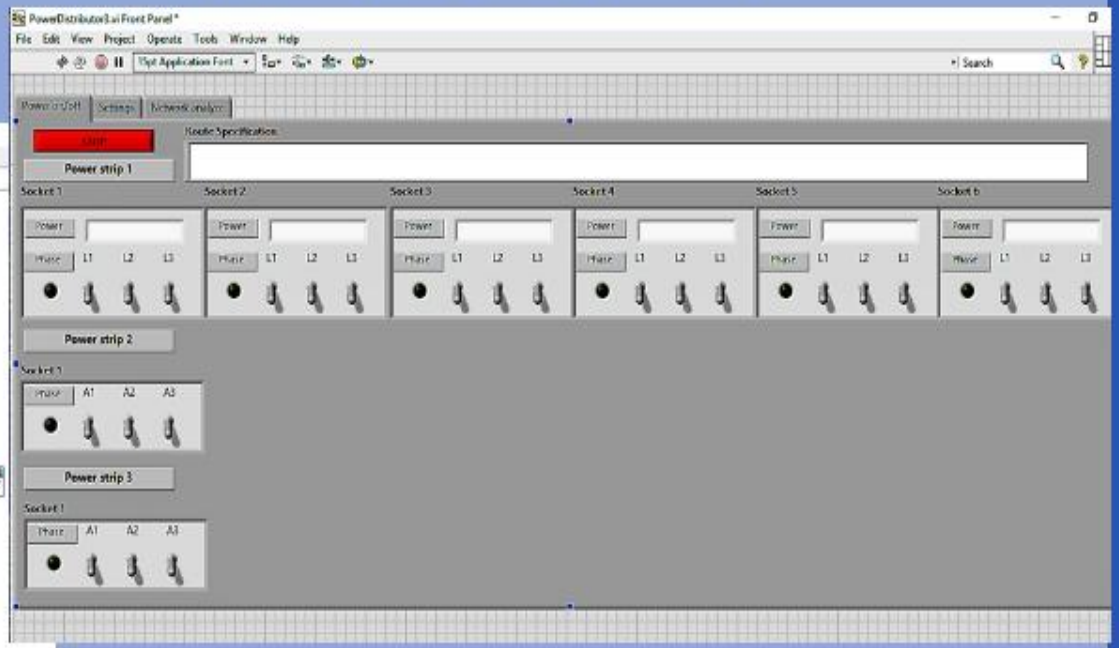
I'm an engineer

Technical data

Used programs:

- LabVIEW 2016
- NI Switch Executive (and NI-Switch 15.0 driver) configured with NI MAX





System structure

LabView controller

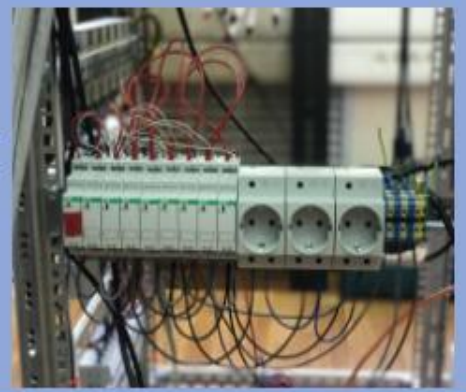
PXI multiplexer
Ni 2530B
60 V, 0.4 A

PXI Front mounting
terminal block
Ni Tb2630B

Power supply

54 relay set
(PK-2P 24V)

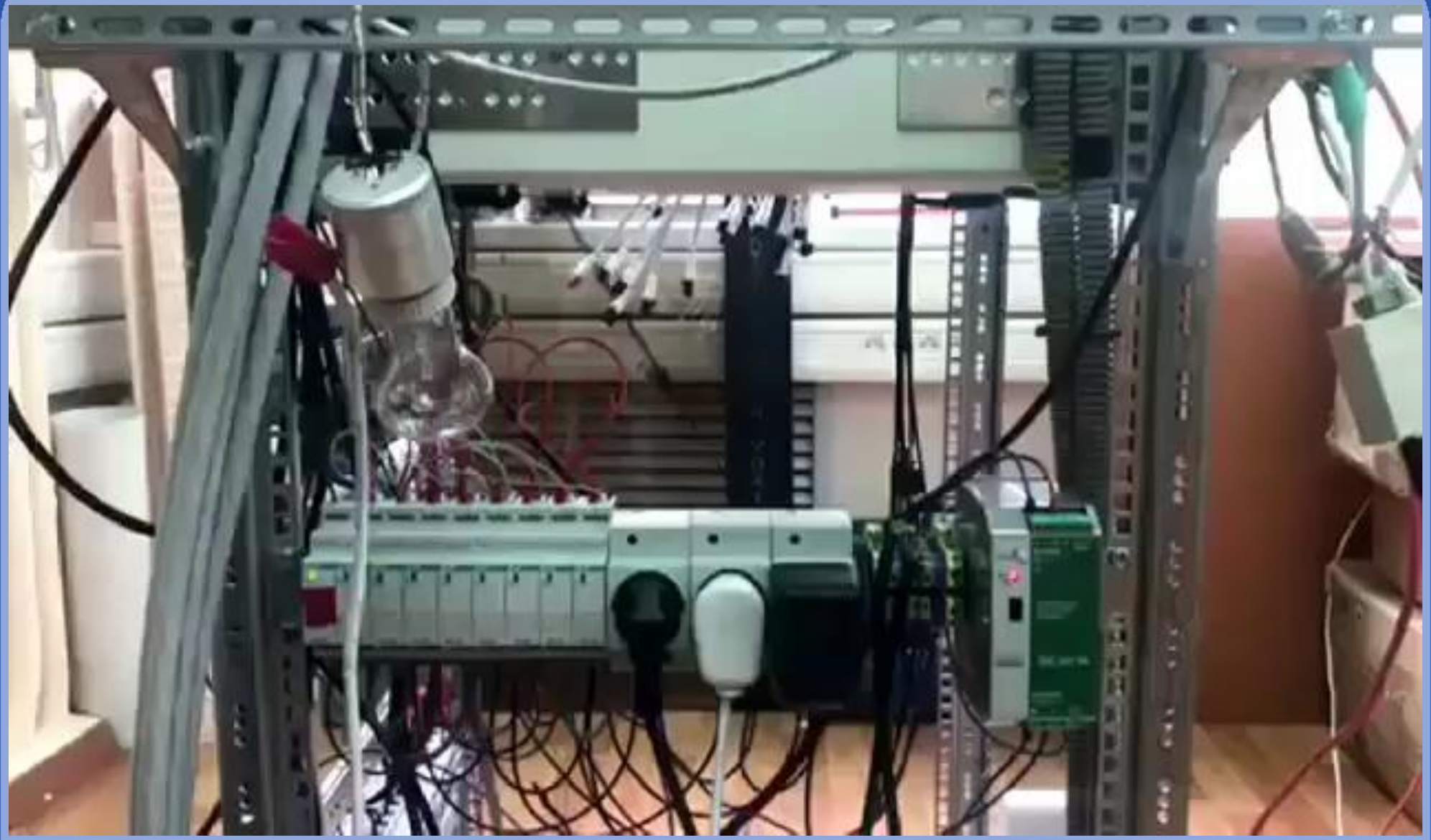
Sockets system



Current status of the project

The device is connected to:

- din rail
- relays
- power strips (there will be 3 in each rack).



Further development

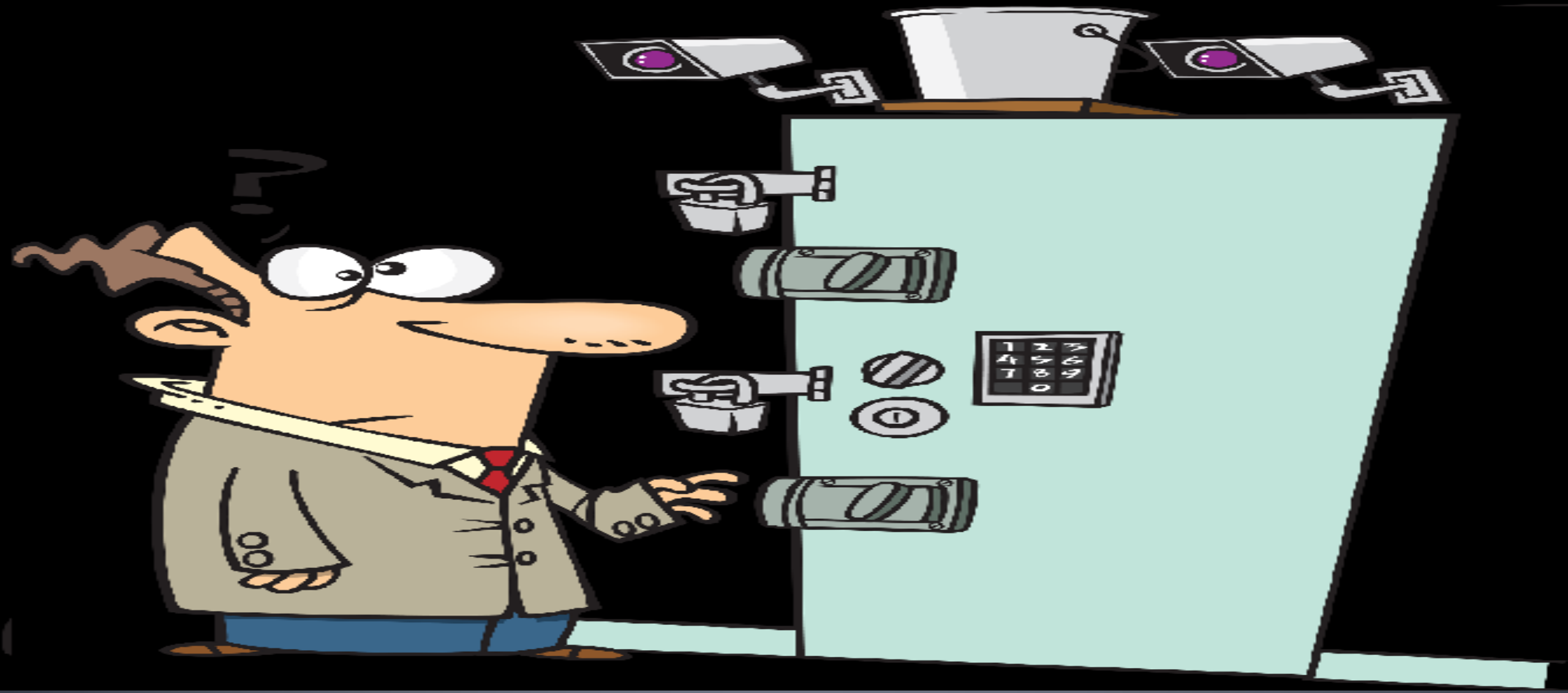
- finding optimized solution for the network load
- automated redistribution of the relays connections

Thank you for the attention

Restricted access

Preventing unathorized access

Electronic Lock



Authors: Aleksandra Bedełek, Aleksander Kubań

Dubna, July 2017

Plan of presentation

- The goal of our project
- Elements used
- The course of action
- Final result
- What's next?

Our objective

- To lock a door

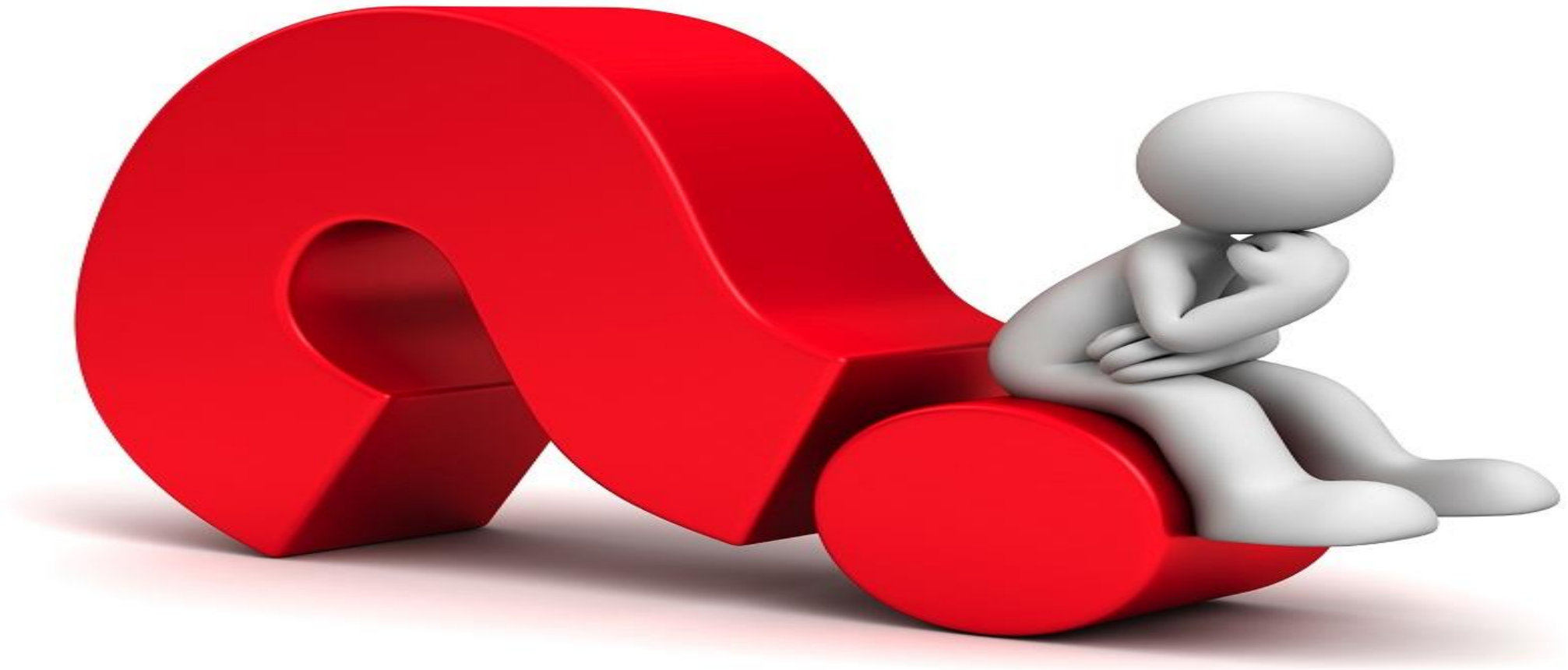
Elements used

- Network Controller
- Communication Interface

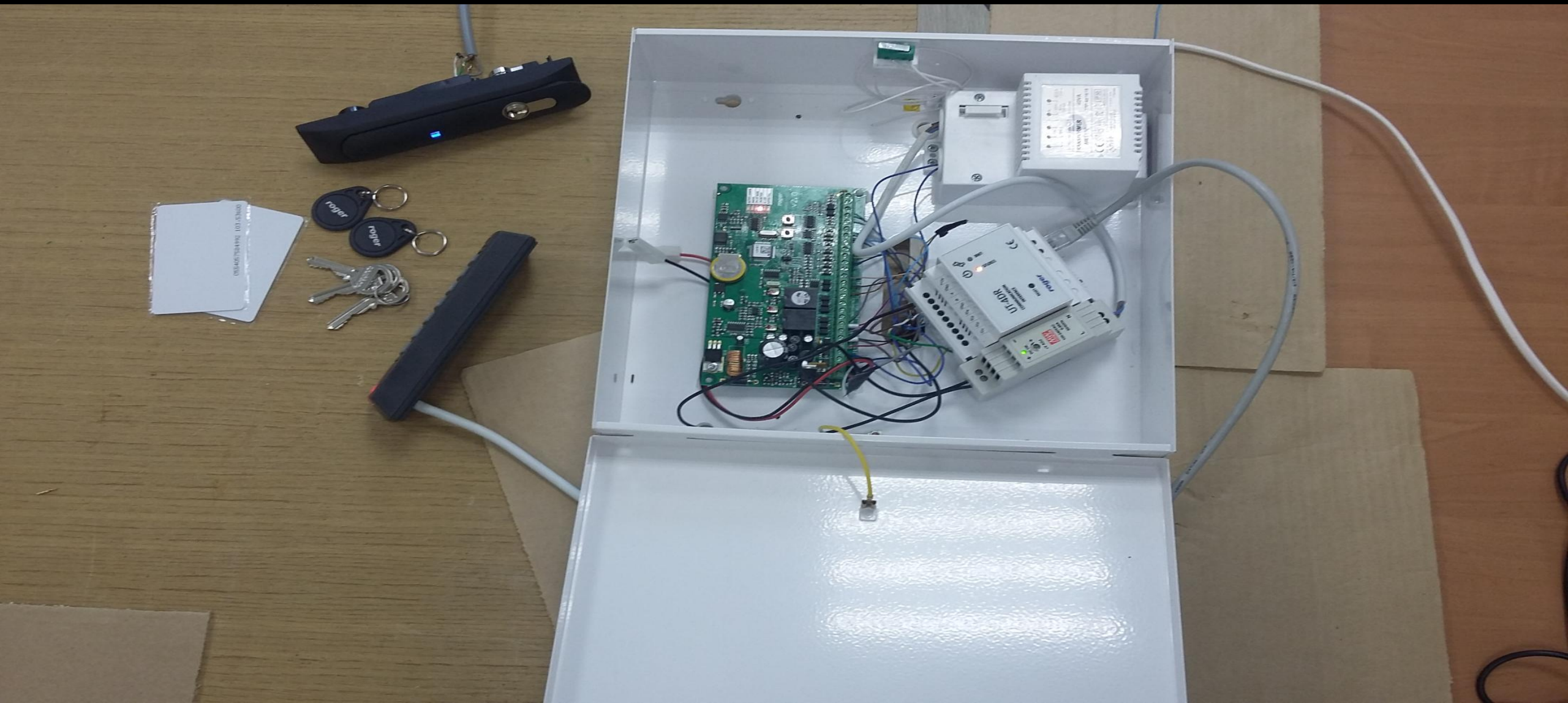
Elements used

- Access Controller
- Metal Enclosure with Transformer
- Electronic Lock

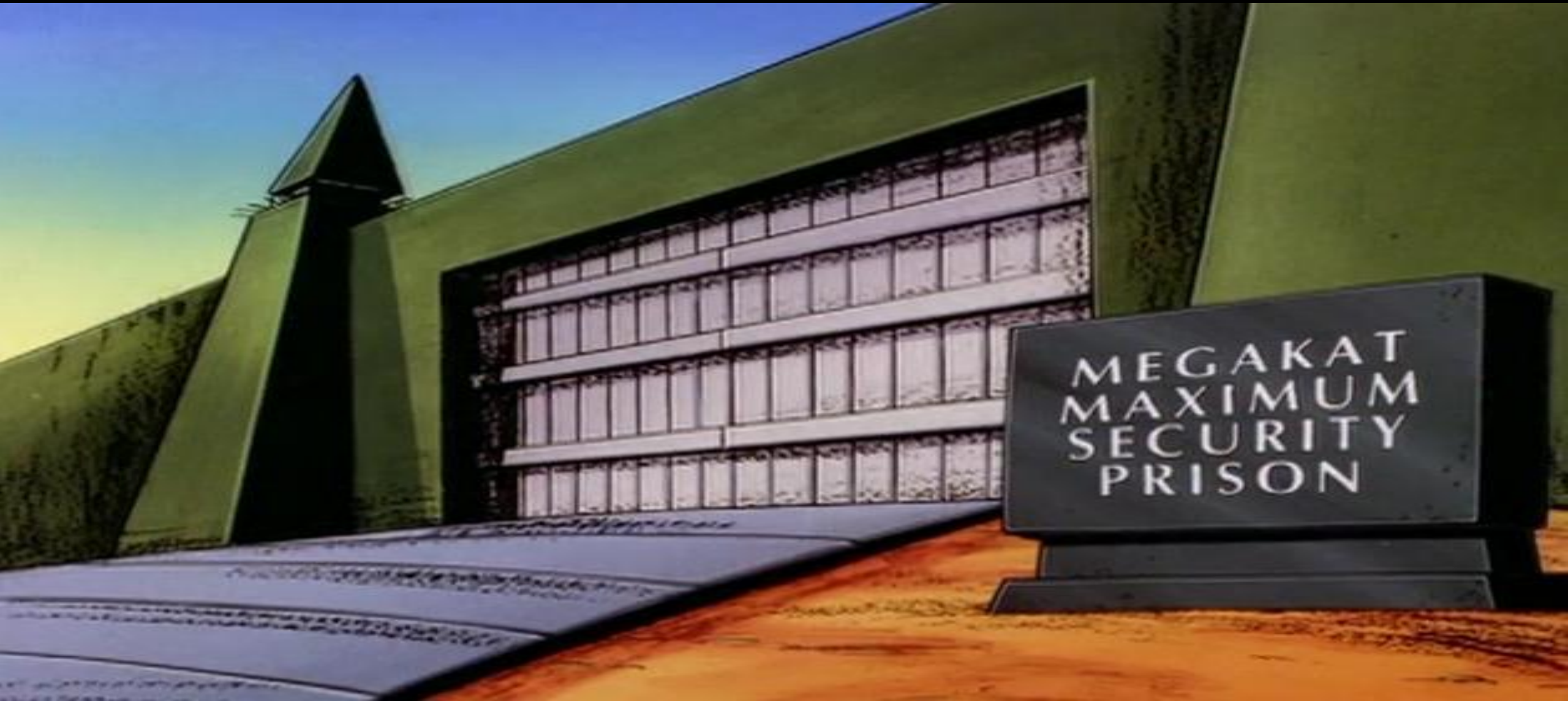
Approach



Final Results



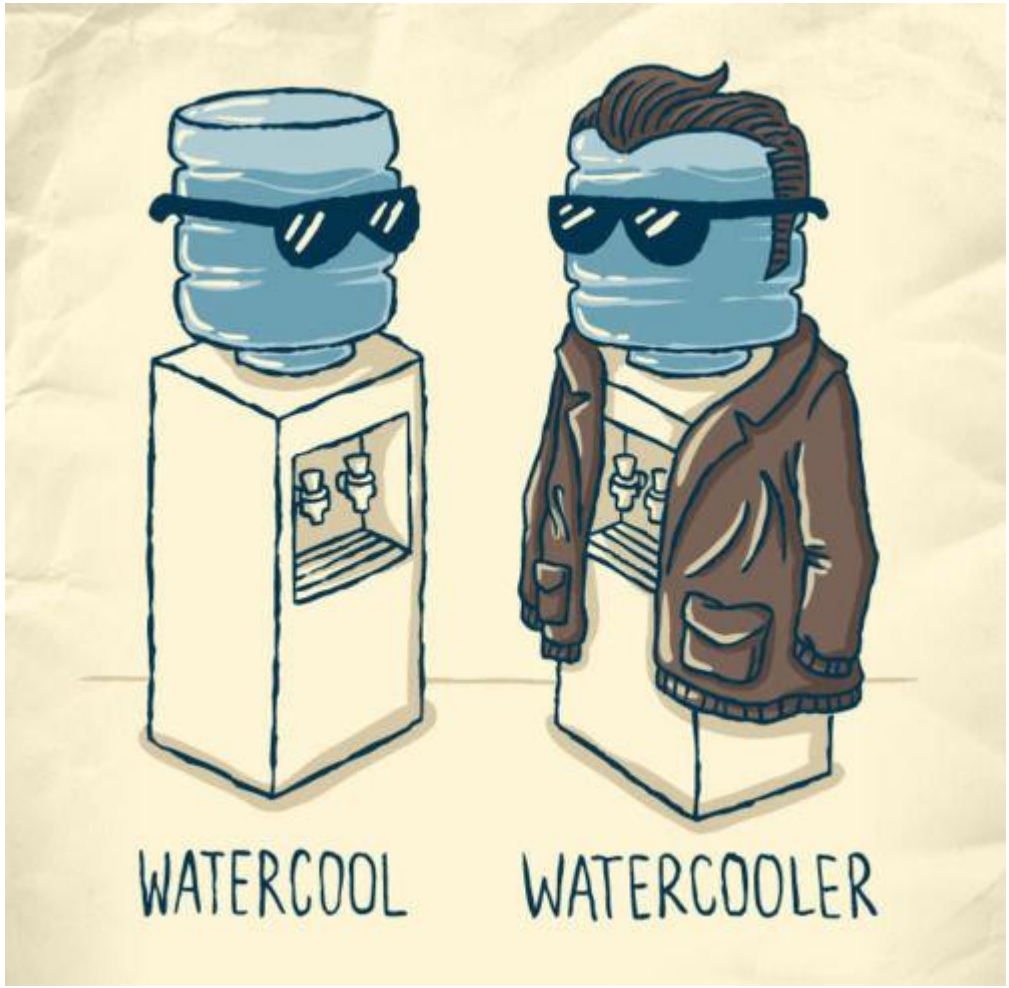
What's next?



Thank you for your attention

Keeping it cool

- Temperature managment
- Liquid cooler
- Closed air circulation
- Isolation from enviroment



Cooling System
Slow Control

Supervisors :

mgr inż. Marek Peryt

mgr inż. Krystian Rosłon

Authors:

Maciej Czarnynoga
Gabriela Moryc
Agnieszka Borucka

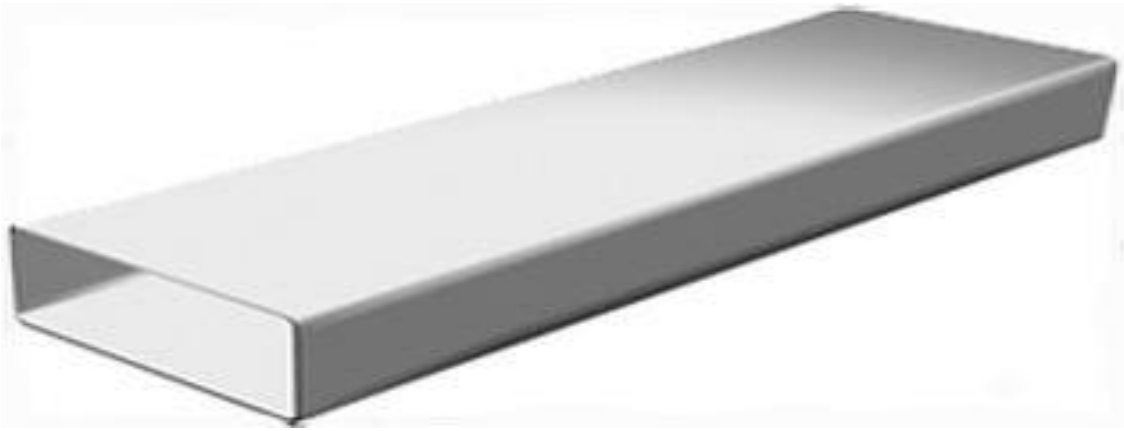
Wydział Fizyki

POLITECHNIKA WARSZAWSKA

Table of contects

Purpose of project

Creating a system which allows an easy opening and closing of the air circulation inside a ventilation duct.



Hardware

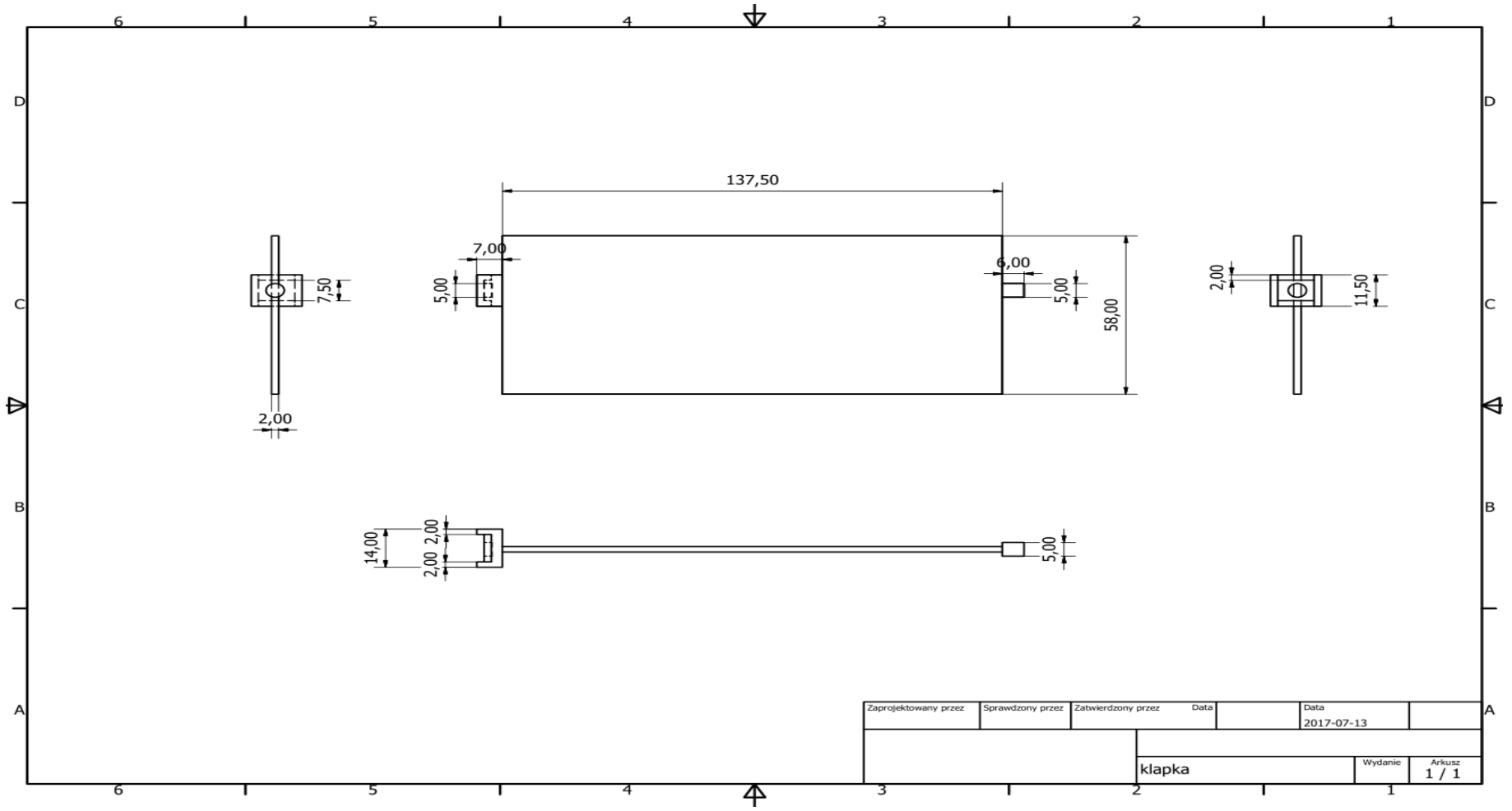
Servo machine HS-311 Hitec

Hardware

National Instruments myRIO

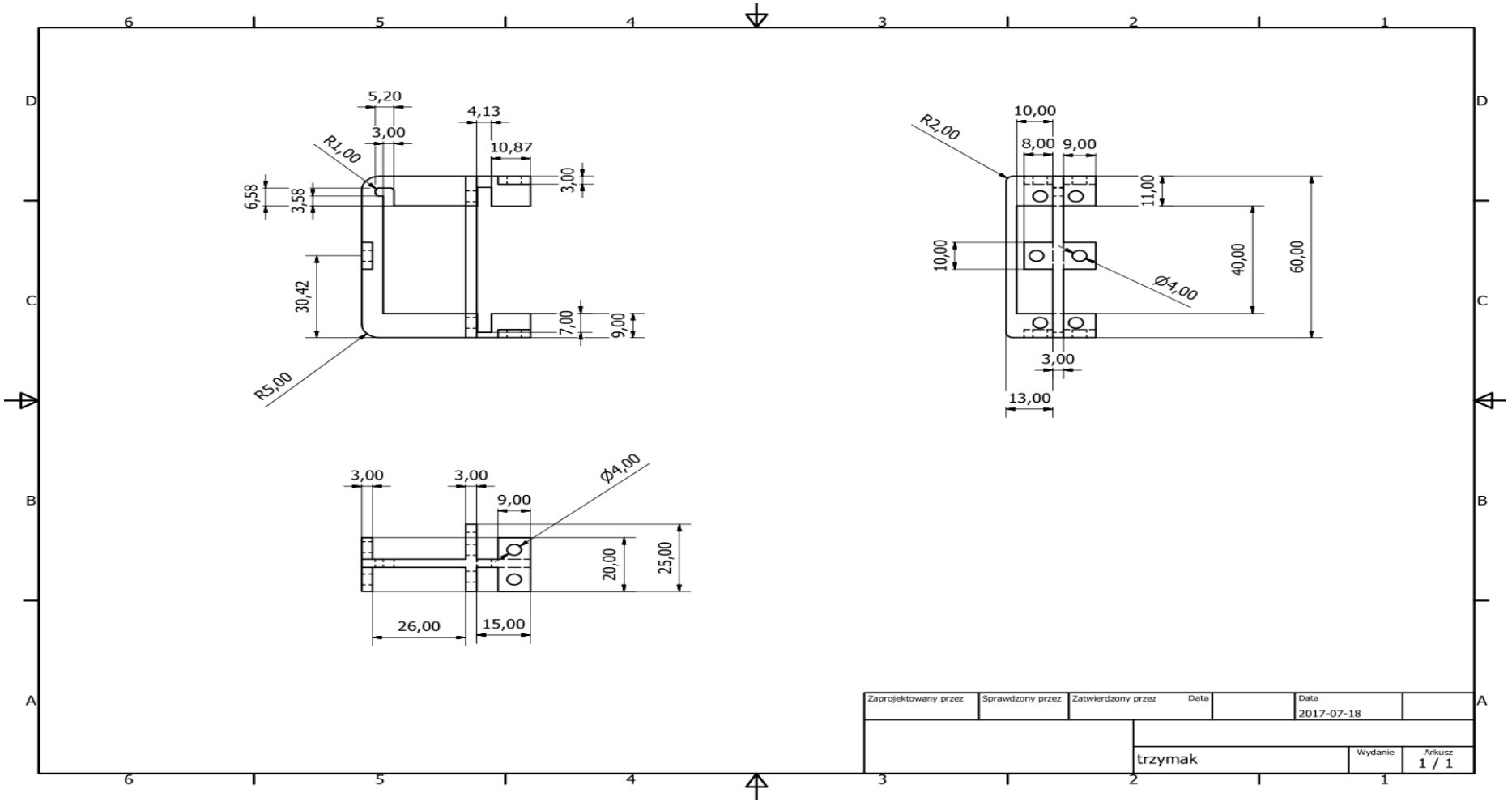
Assembly project

Version 1



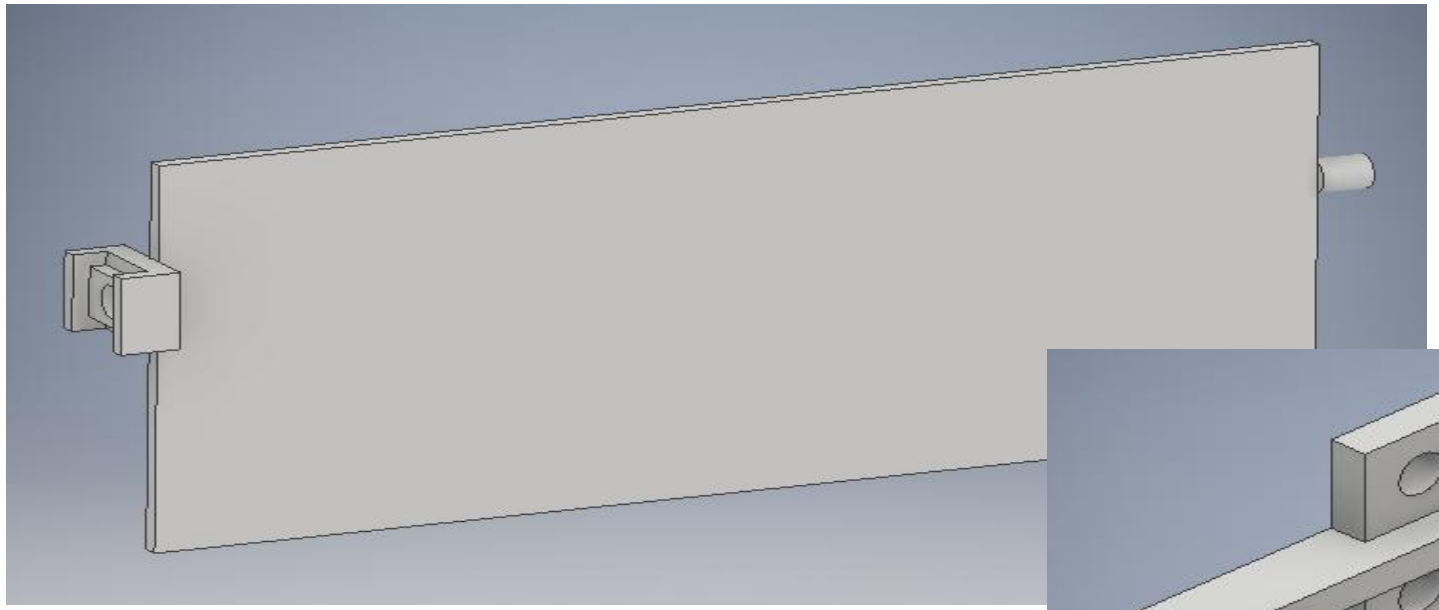
Assembly project

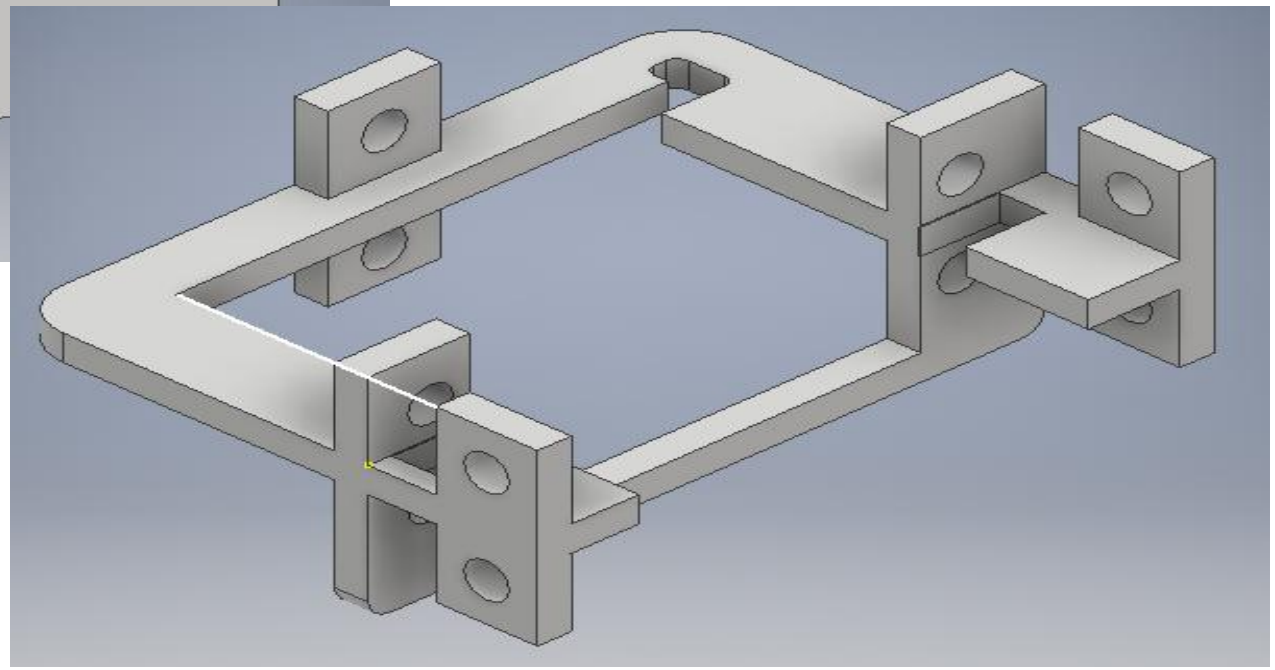
Version 1



Assembly project

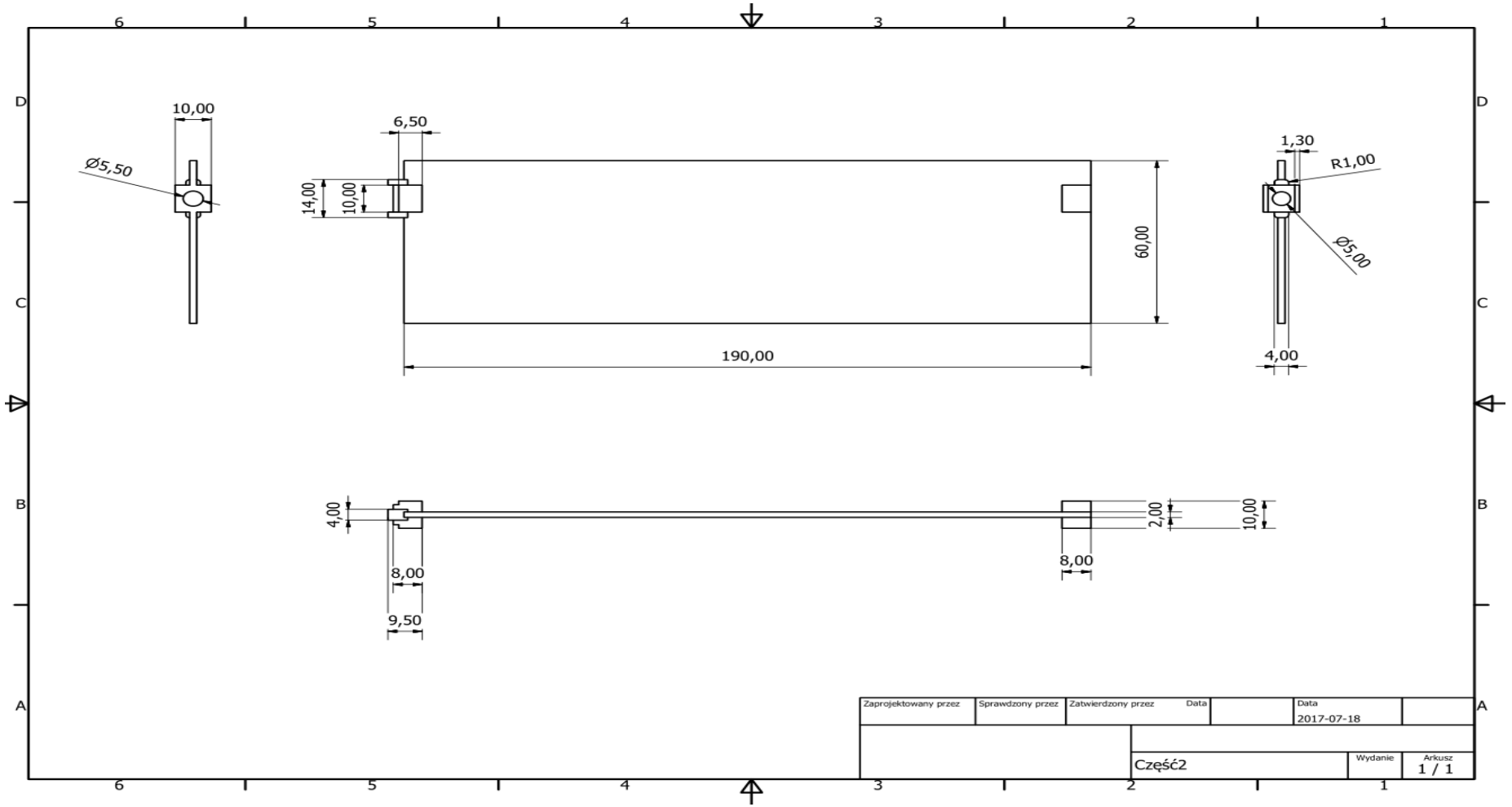
Version 1





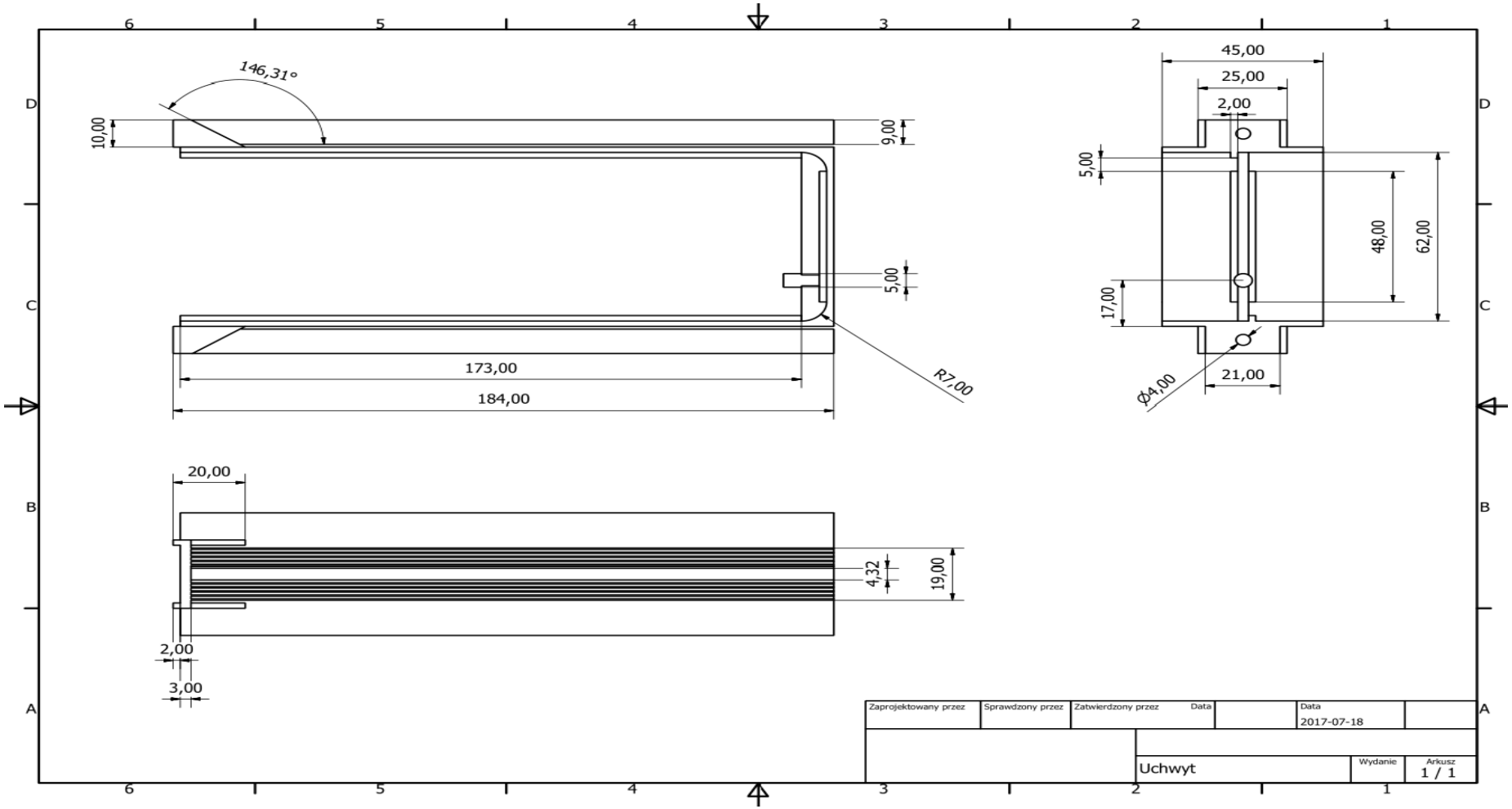
Assembly project

Version 2



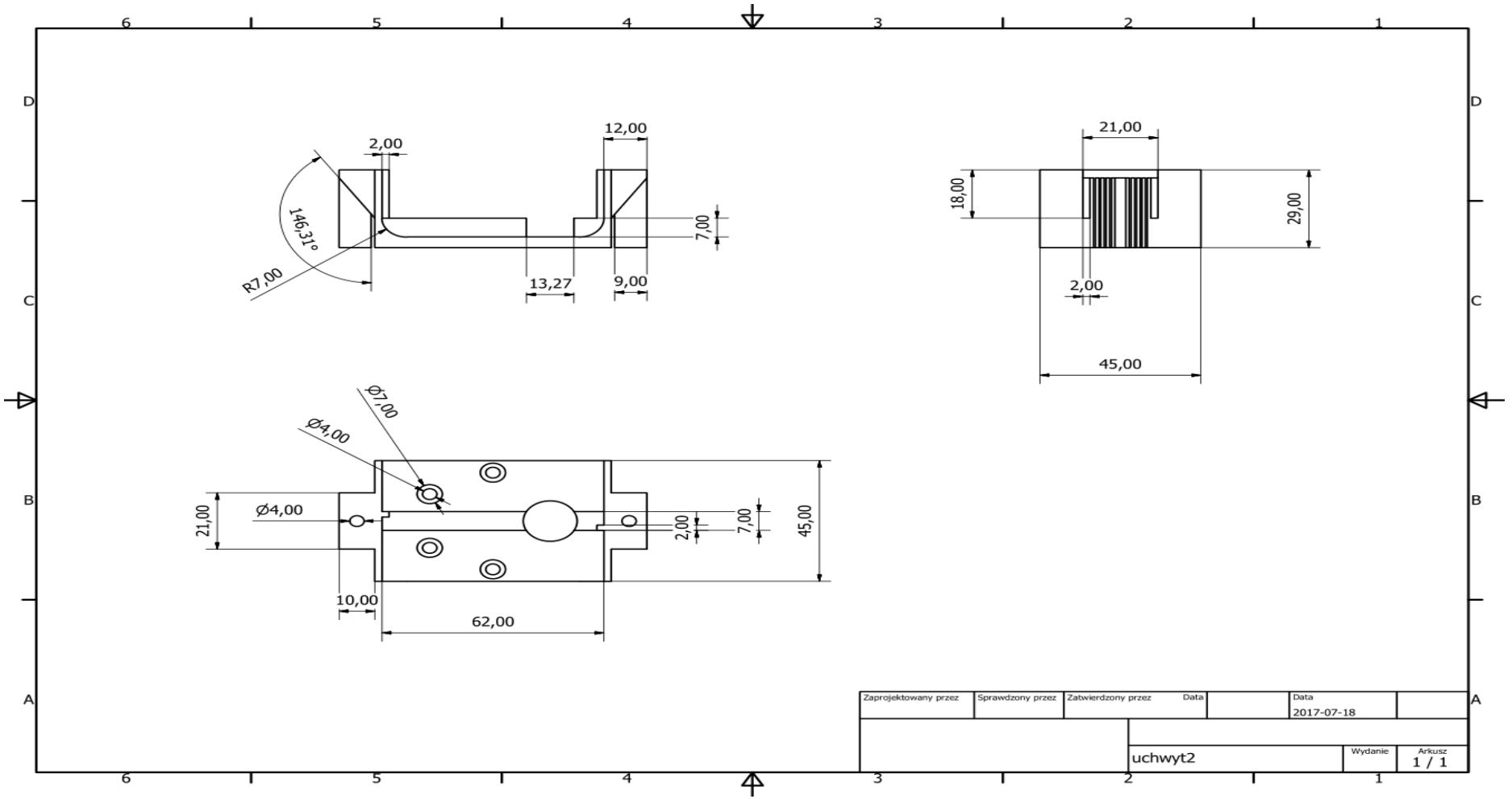
Assembly project

Version 2



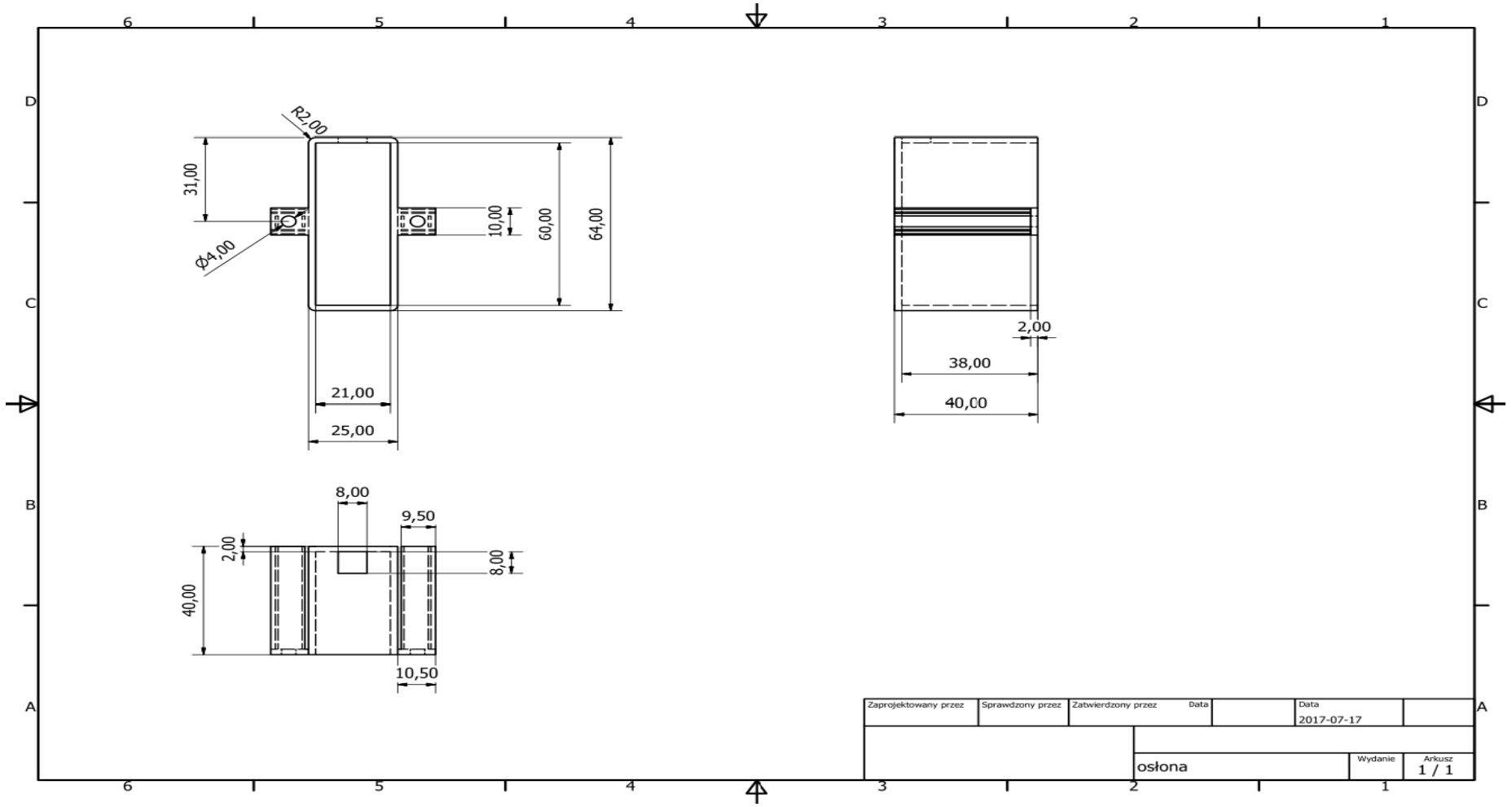
Assembly project

Version 2



Assembly project

Version 2



Assembly project

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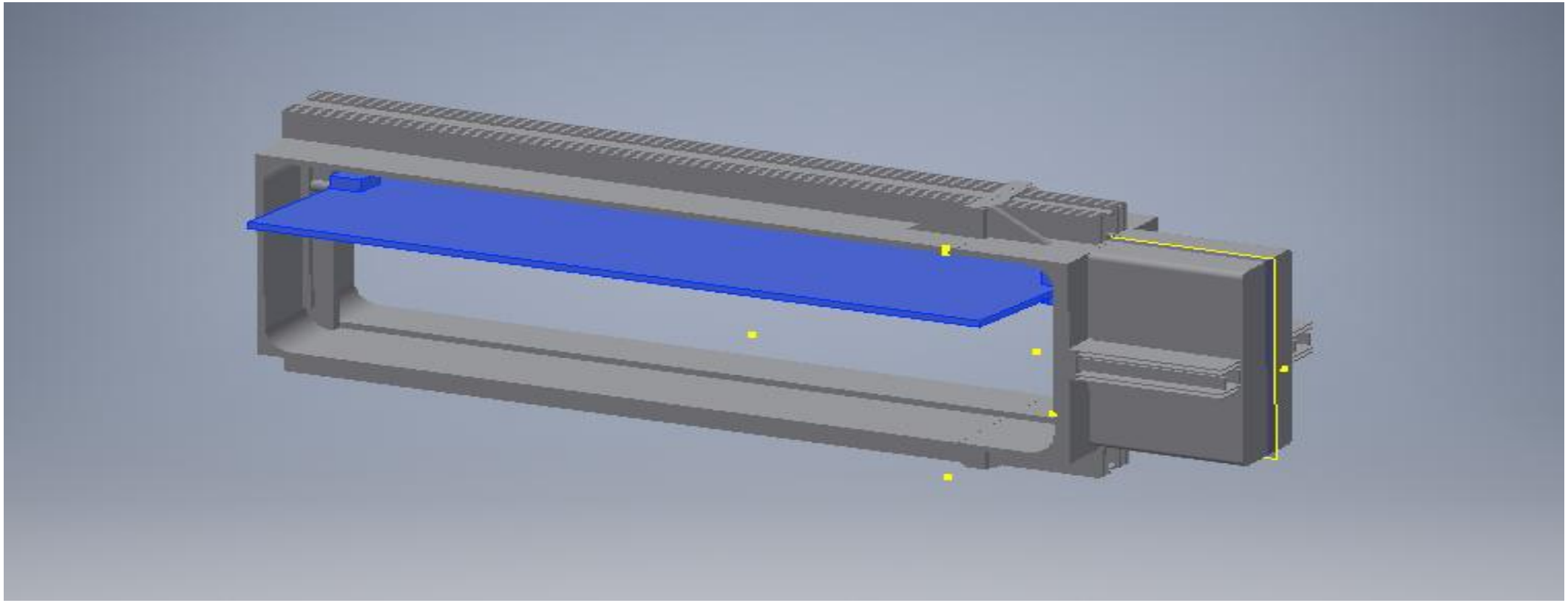
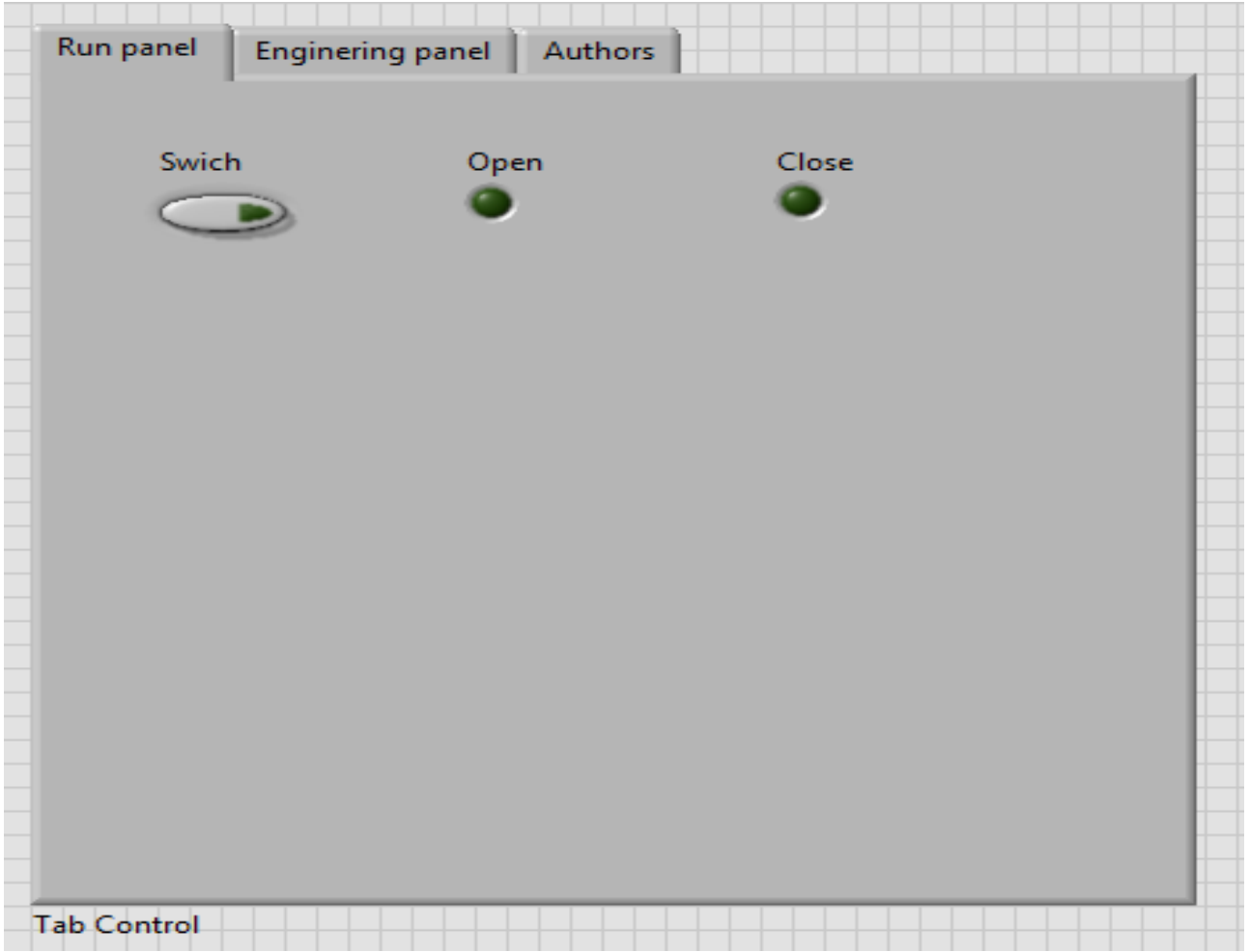


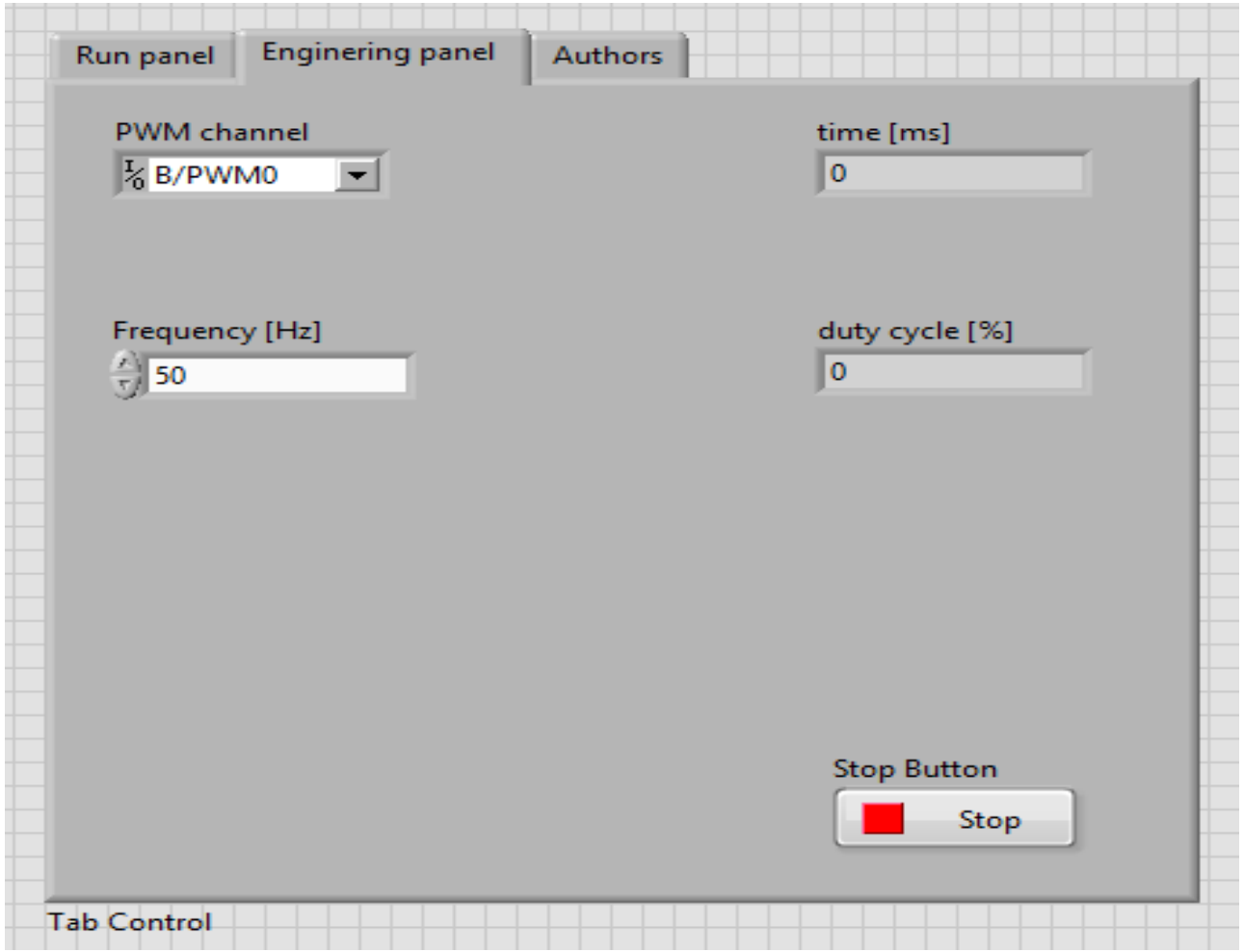
Interface of program

Run Panel



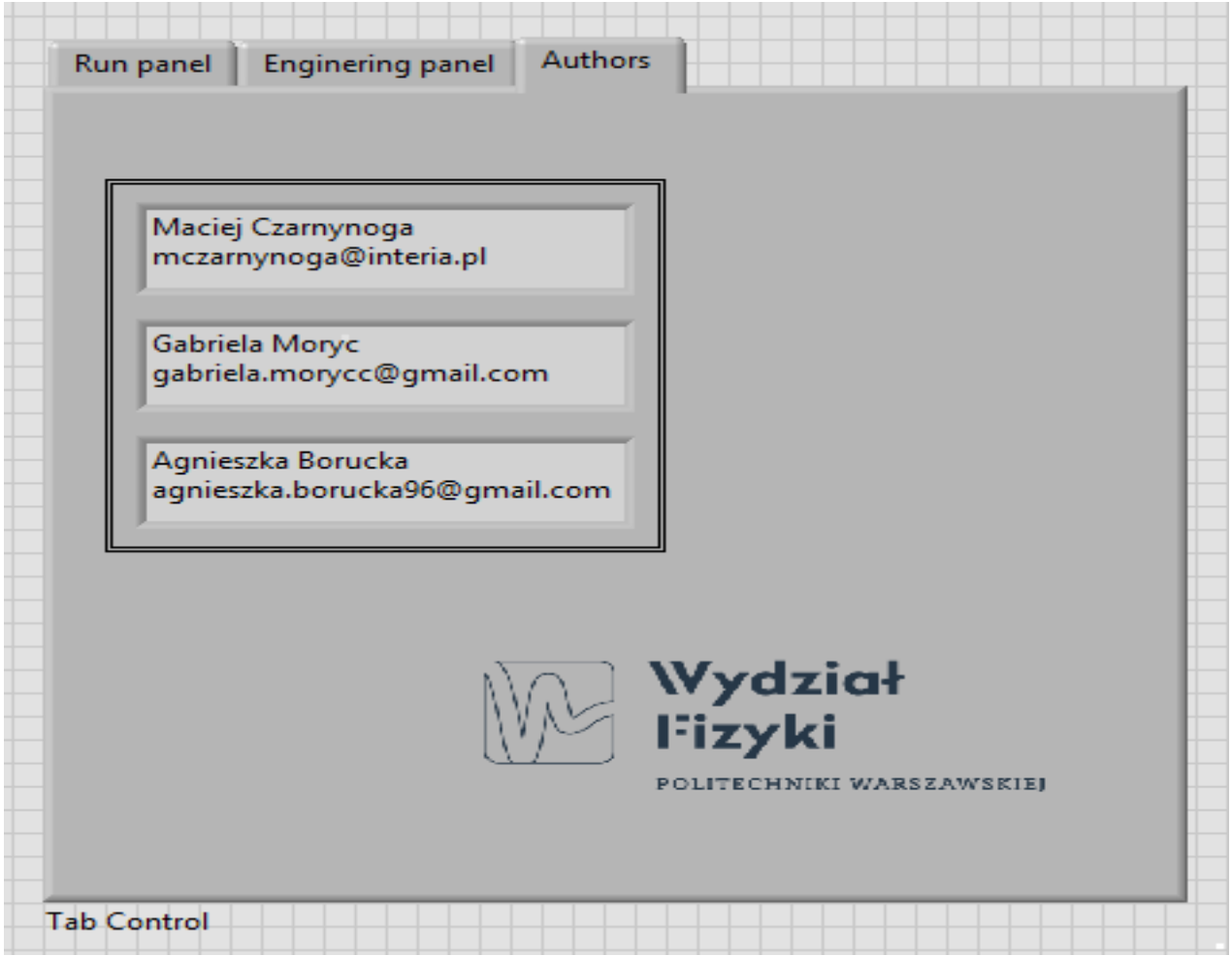
Interface of program

Enginering Panel

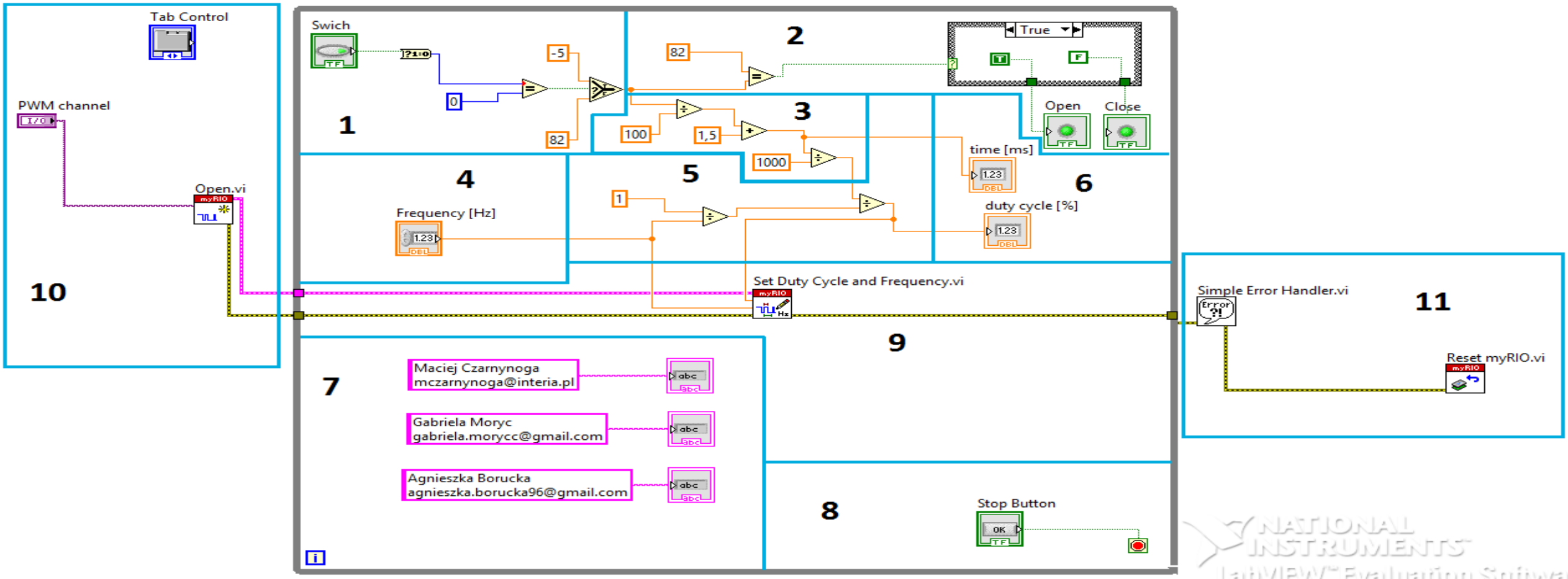


Interface of program

Authors Panel



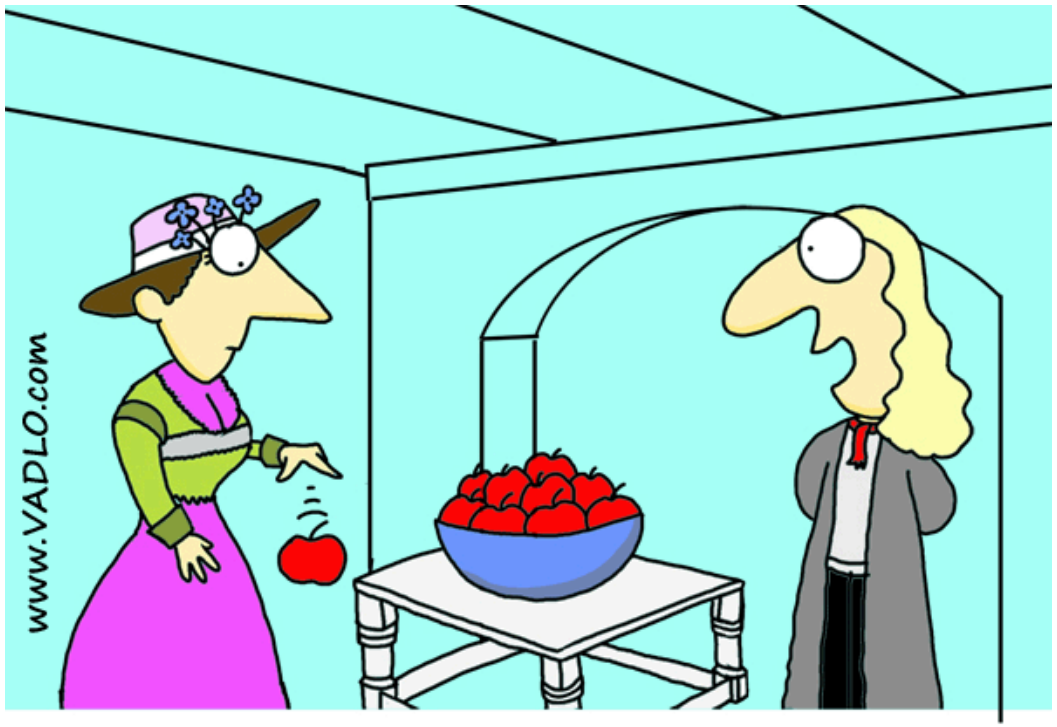
Block diagram



Summary

Our system is a part of cooling system for MASTER RACK and its future work will depends on data from ventilation panel – the project from previous Slow Control program.

Thank You



"Told you!"