ARCADA

PLC Kit

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Energi and Environmental Technology
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Contents

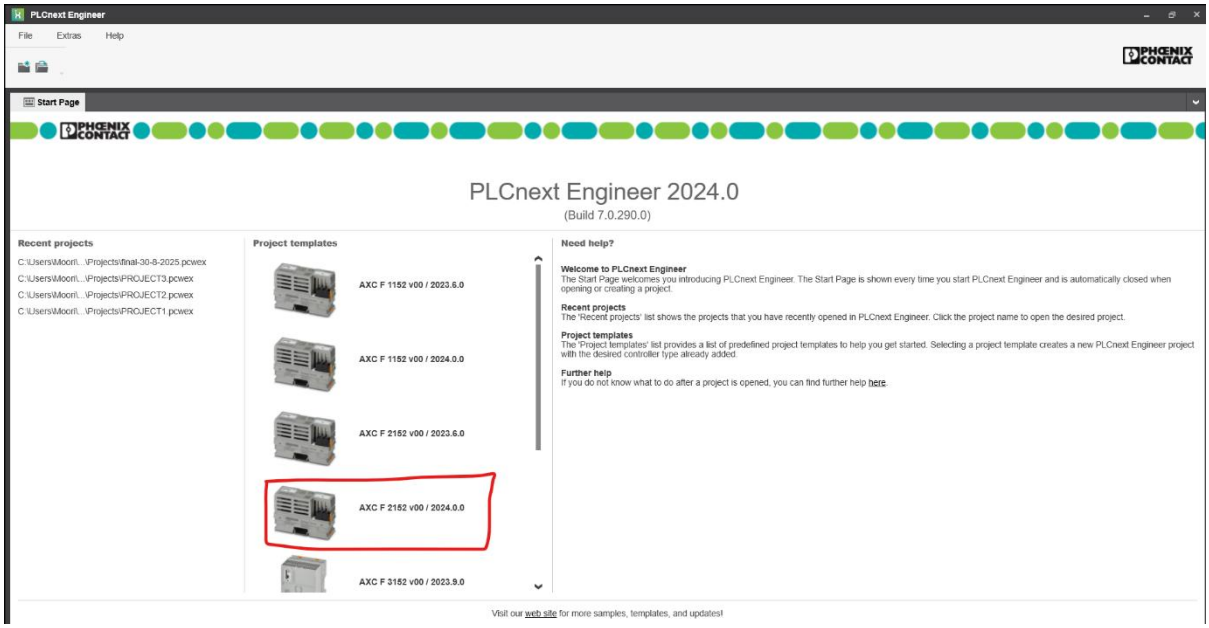
1 Introduction

This report documents the practical work completed with the PLC kit during the summer 2025. The purpose of this project was to gain hands-on experience with PLC kit, device configuration, and project management using PLCnext Engineer. Step-by-step screenshots and explanations are provided to demonstrate the workflow, beginning from the creation of an empty project through configuring and testing the PLC system.

The tasks were carried out using Phoenix Contact's PLCnext Engineer software. Each step is presented with supporting screenshots, explanations of procedures, and outcomes.
The goal is to configure the PLC and write and deploy a simple program that mirrors inputs to outputs that provides a visual confirmation whenever outputs change. These outputs should directly mirror the input states, which we control using switches and a potentiometer installed on the board.

2 Project setup

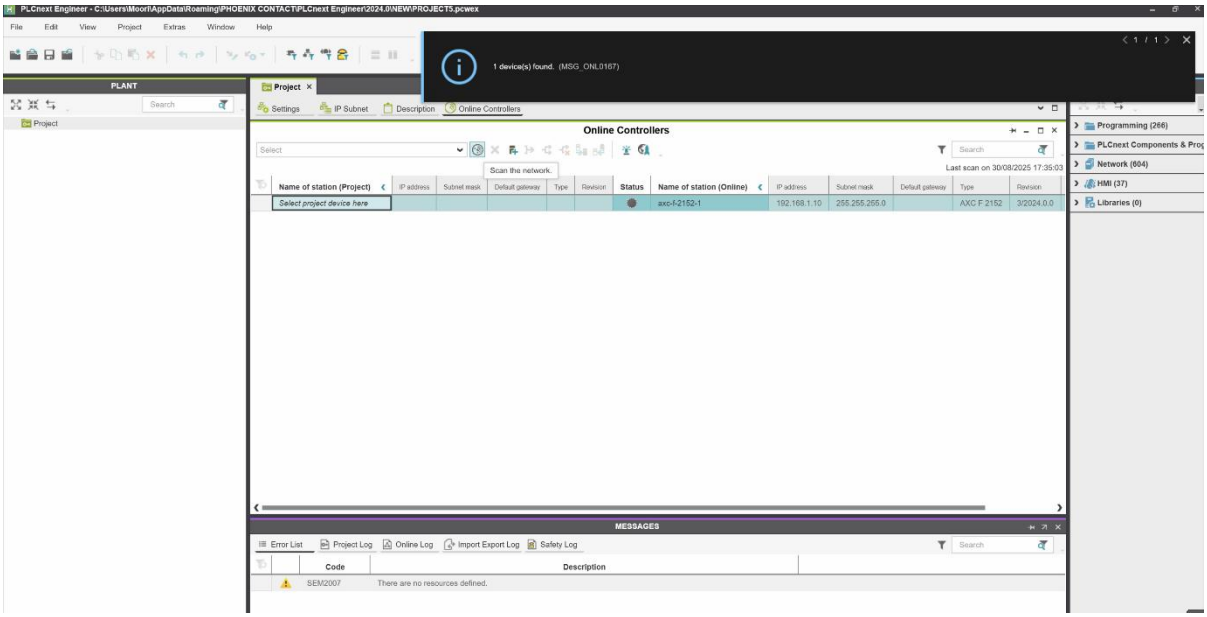
- Open PLCnext Engineer and choose the option in photo below. (According to the module on PLC Kit AXC-F 2152 v00/2024.0.0)



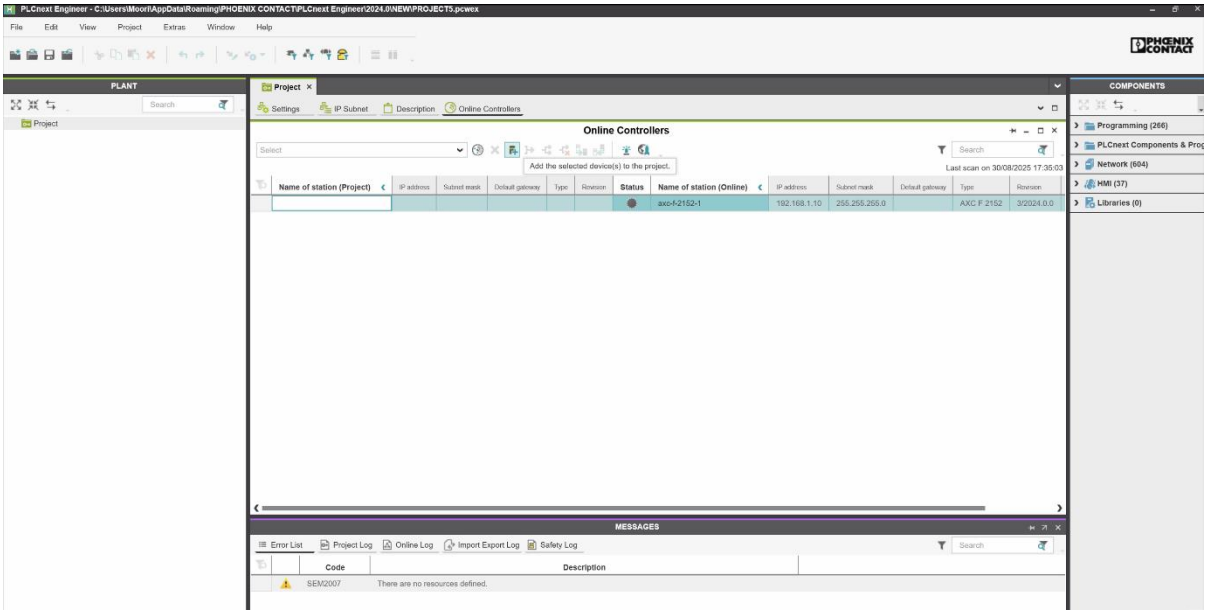
- Click on “Create a new project” top left on the image and then double click on “Project” direction and click on “Online Controllers” to select the same network as the PLC Kit.

3 Connecting to PLC

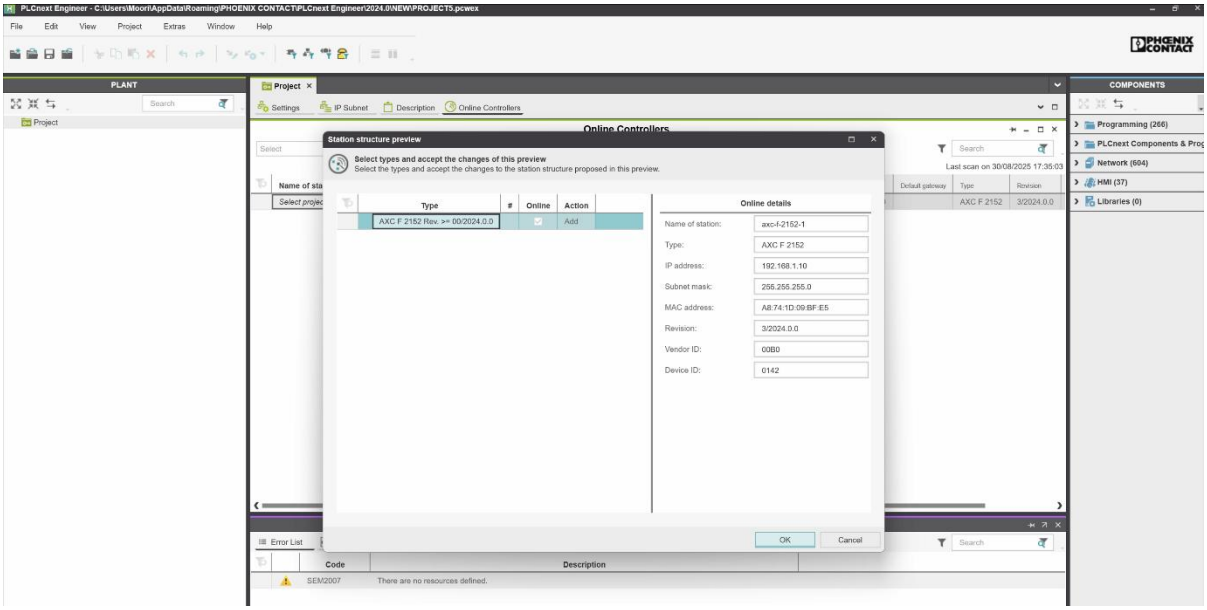
- Double click on Project directory on the left side
- Click Online Controllers
- Select Network card connected to same Network as PLC

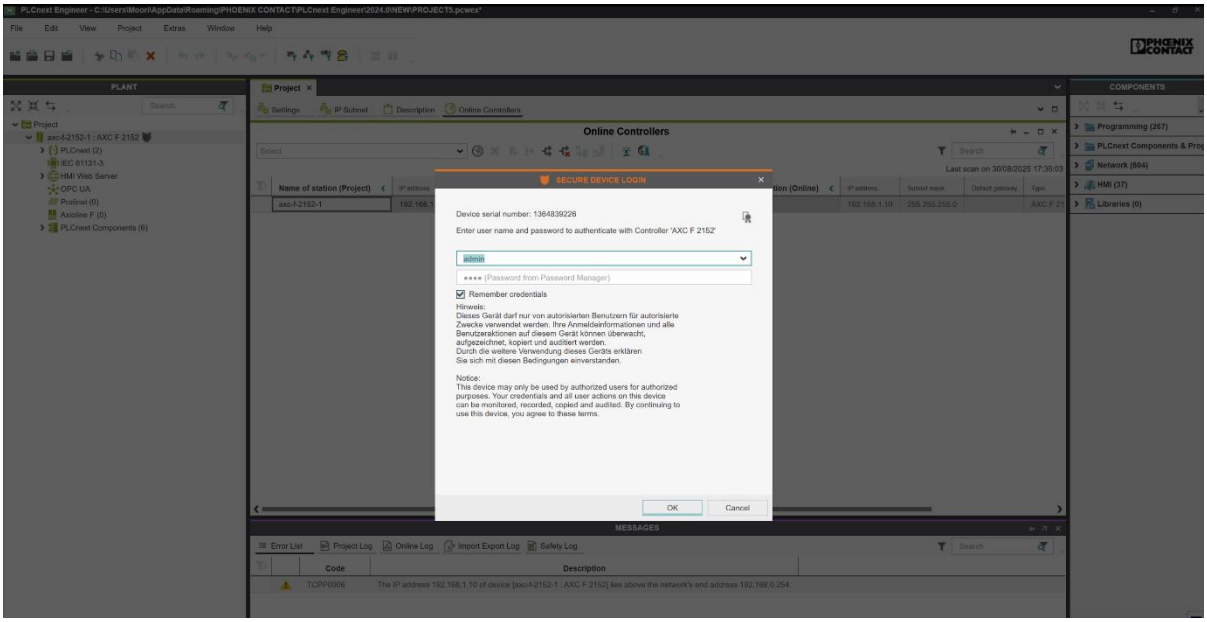


- Select the PLC from the list and click on "Add Selected device to the project"

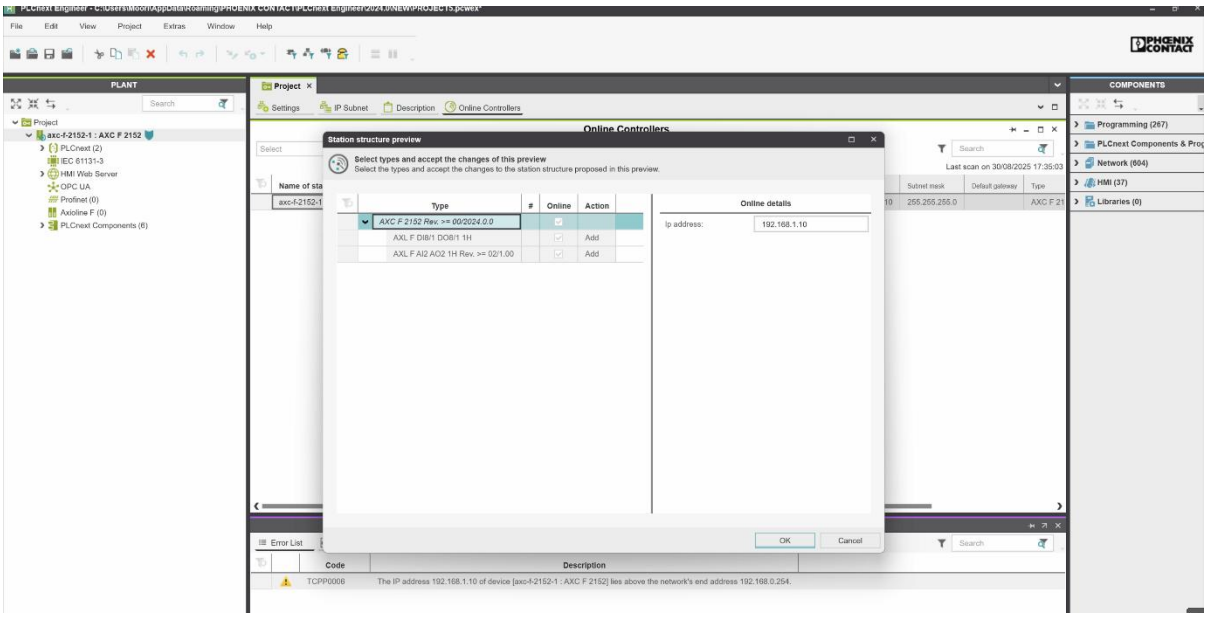


- Choose Type "AXC F 2152 Rev. >= 00/2024.0.0"
- The module introduced an additional pop-up window displaying the username and password, which are provided on the module itself in the PLC kit.





- Credentials can be found from print on the module.



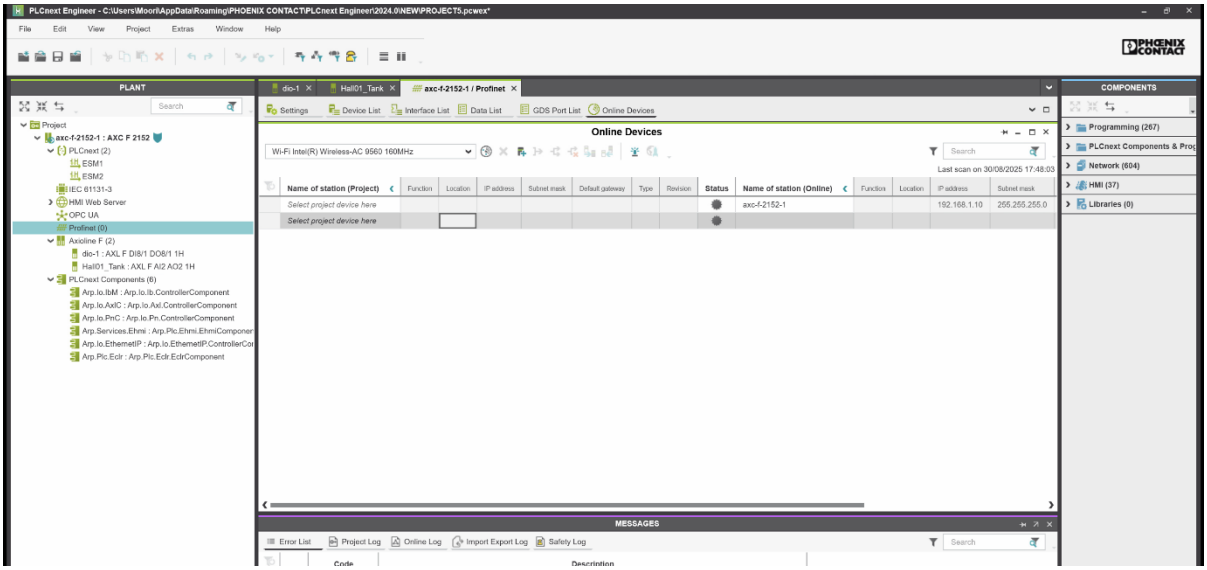
4 Adding Modules

4.1 Pre-added Modules

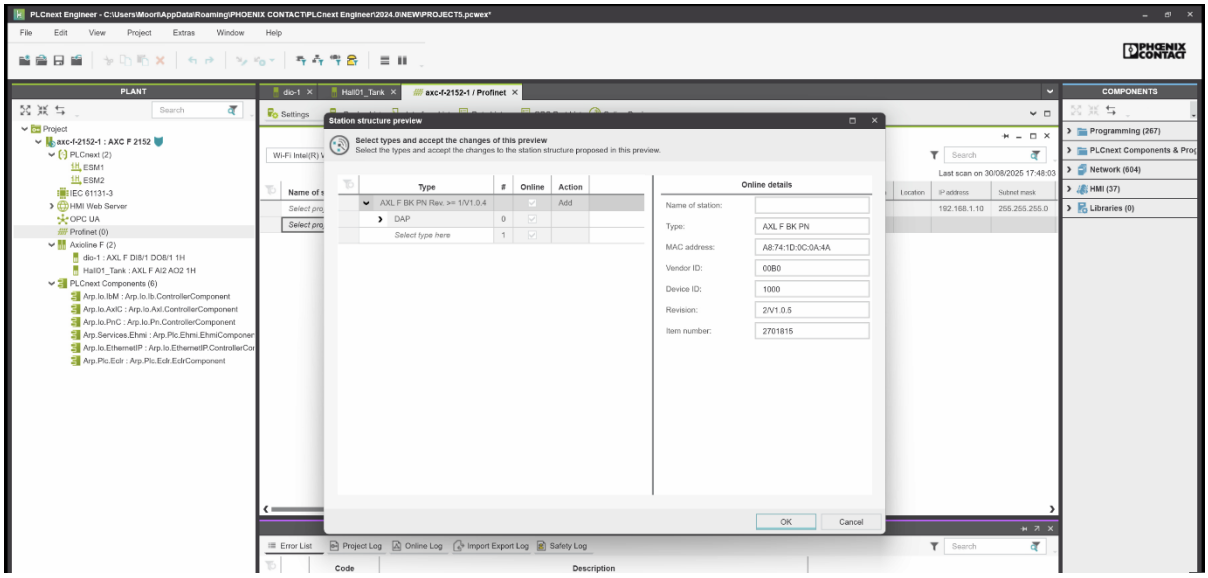
- **dio-1**: AXL F DI8/1 DO8/1 1H (already included)
- **Hall01_Tank**: AXL F AI2 AO2 1H (already included)

4.2 Adding AXL F BK PN Module

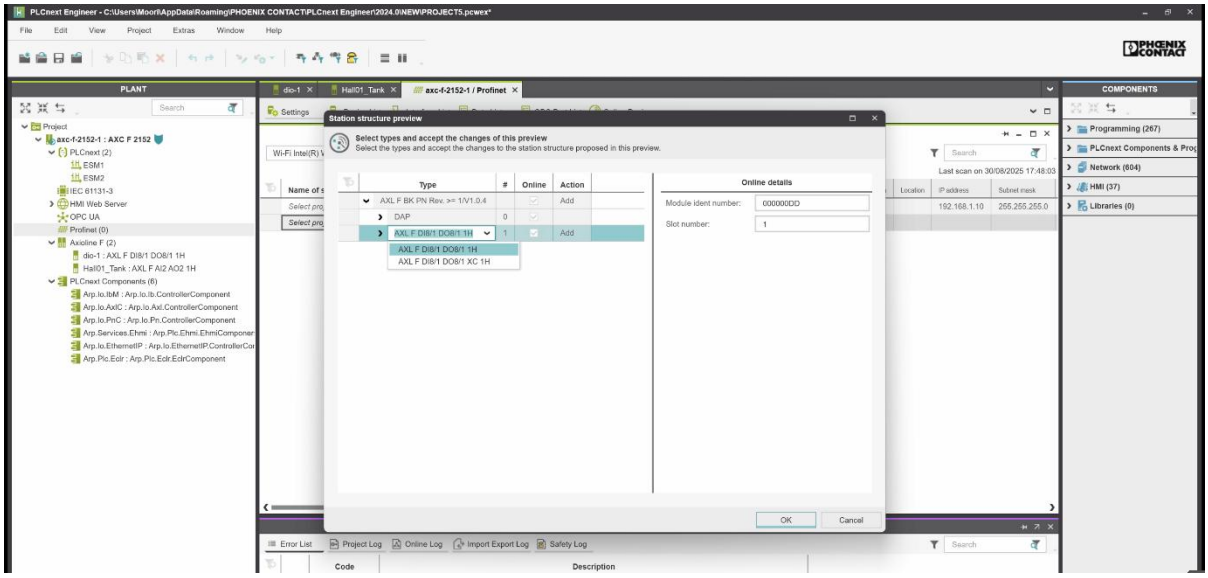
- From the left menu, select **Profinet → Online Devices**.
- Click **Scan the Network**. Two devices appear.



- To identify the correct module, use **Toggle flashing light on** and check the LED next to the LAN port.
- Select the correct device and click **Add Device**.



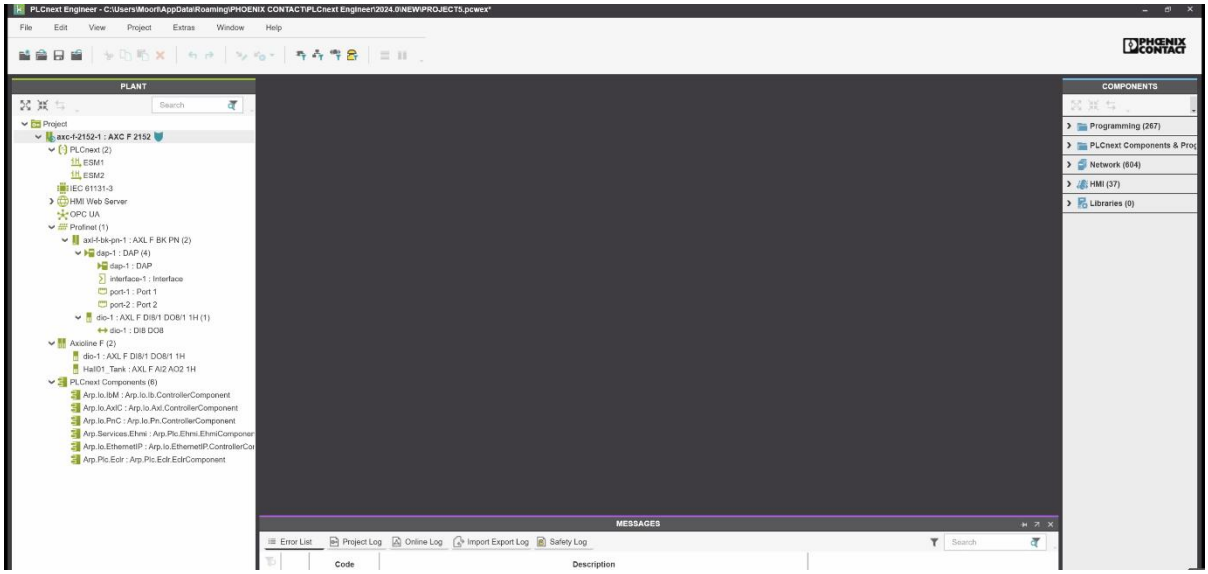
- In “Station Structure Preview”, select **AXL F DI8/1 DO8/1 1H** in the “Type” field.



- Confirm with OK.

Outcome:

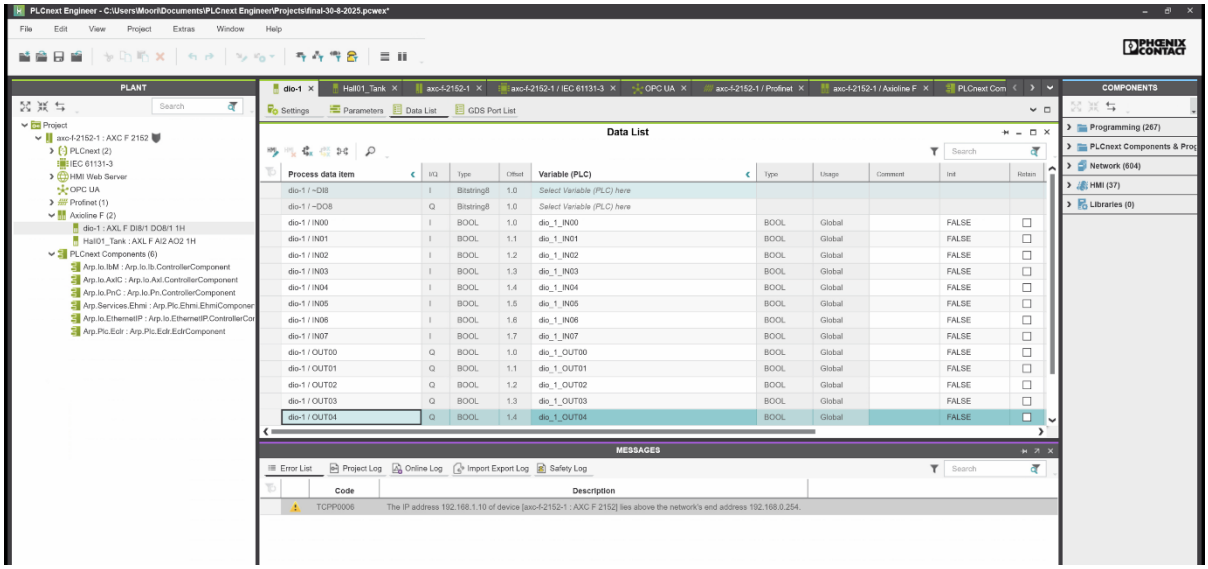
The AXL F BK PN module now appears under “Profinet” in the Project structure.



5 Defining Variables

5.1 Generate Variables for dio-1

1. Navigate to **Axioline F → dio-1 AXL F DI8... → Data List**.
2. Select all rows (deselect rows starting with ~).
3. Right-click → **Add Variable**.

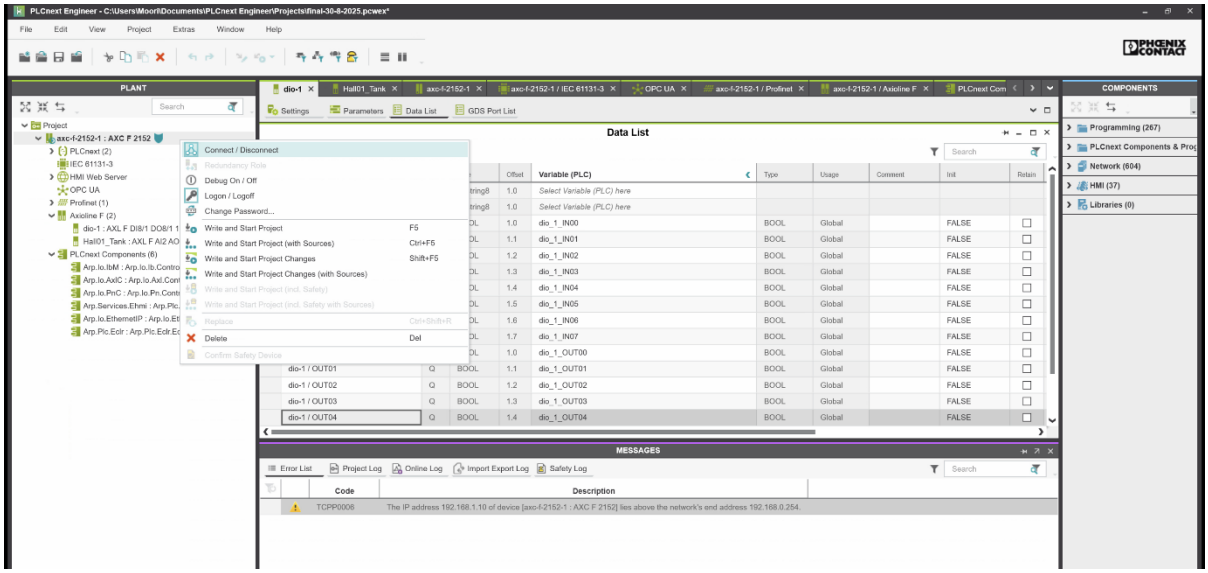


5.2 Repeat for Other Modules

Apply the same procedure for the remaining modules.

Outcome:

Each port now has an associated variable for use in the program.



6 Creating IO Mirror Program

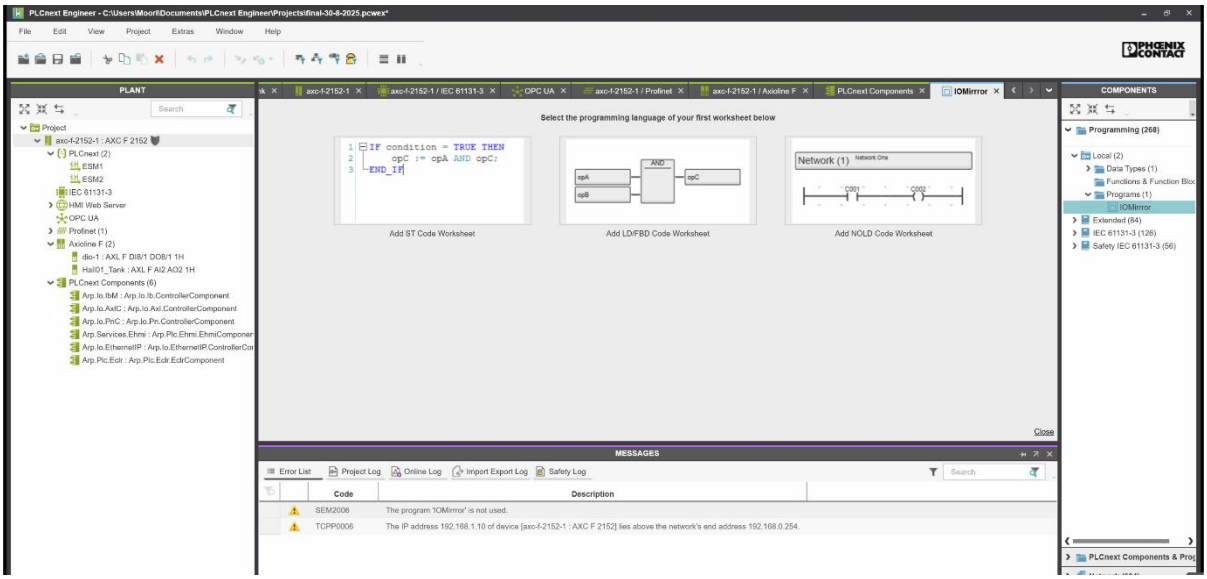
6.1 Create Program

1. From the “Components” window, right-click **Local/Program**.

2. Create a new program and name it **IOMirror**.

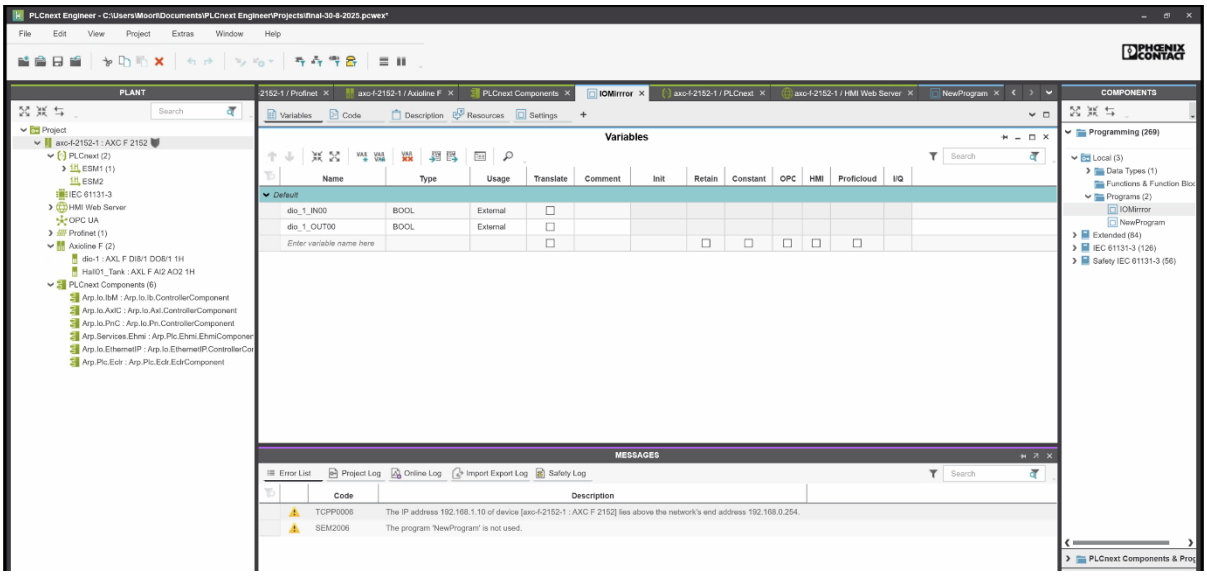
6.2 Add ST Code Worksheet

- Open “IOMirror” → Add **ST Code Worksheet**.



6.3 Add Variables

- Go to the “Variables” tab.
- Add all required variables, including **dio_1_*** and analog variables.



6.4 Add ST Code

We go to Code section and paste following code:

dio_1_OUT00 := dio_1_IN00;

dio_1_OUT01 := dio_1_IN01;

dio_1_OUT02 := dio_1_IN02;

dio_1_OUT03 := dio_1_IN03;

dio_1_OUT04 := dio_1_IN04;

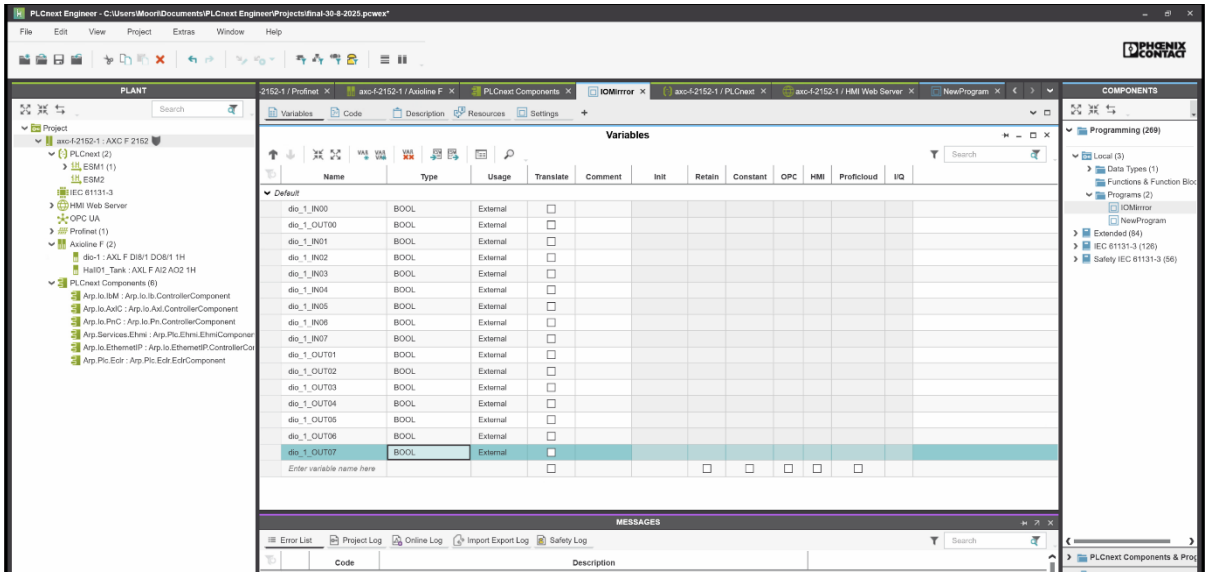
dio_1_OUT05 := dio_1_IN05;

dio_1_OUT06 := dio_1_IN06;

dio_1_OUT07 := dio_1_IN07;

Hall01_Tank_AQ32 := Hall01_Tank_AI32;

axl_f_bk_pn_1_dio_1_dio_1_DO8 := axl_f_bk_pn_1_dio_1_dio_1_DI1;

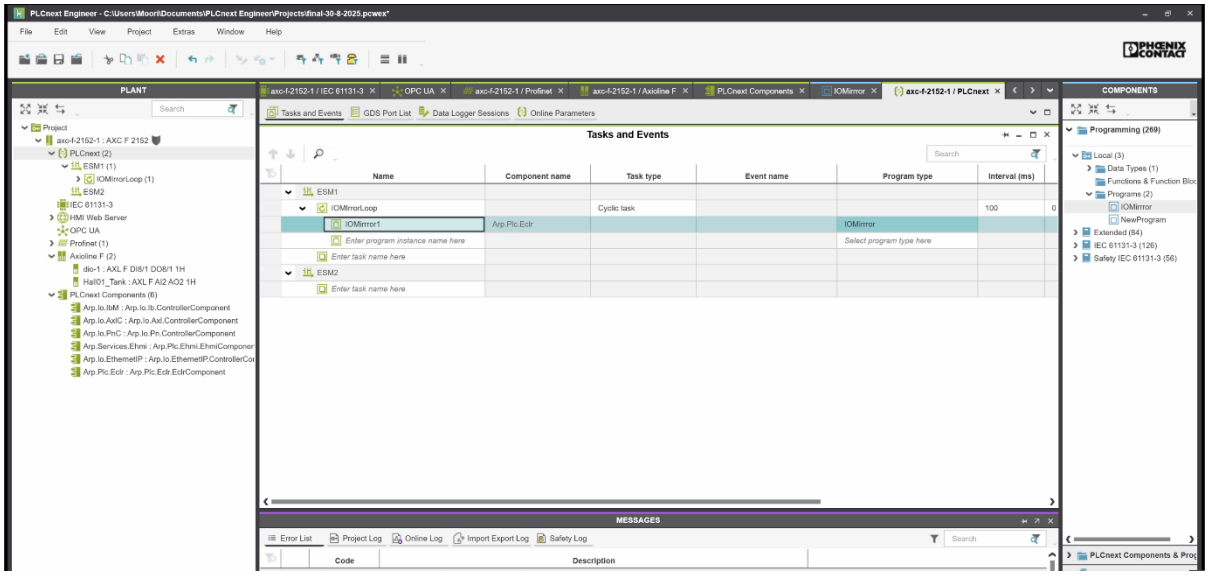


6.5 Configure Program Instance

1. Navigate to: **Project → axc-f-2152-1: AXC F 2152 / PLCnext**.
2. In *Program Instance Name*, enter **IOMirrorProgram**.
3. Drag the **IOMirror** program file from the right pane to this instance.

Outcome:

The IOMirror program mirrors input signals to outputs, allowing real-time testing of the hardware modules.

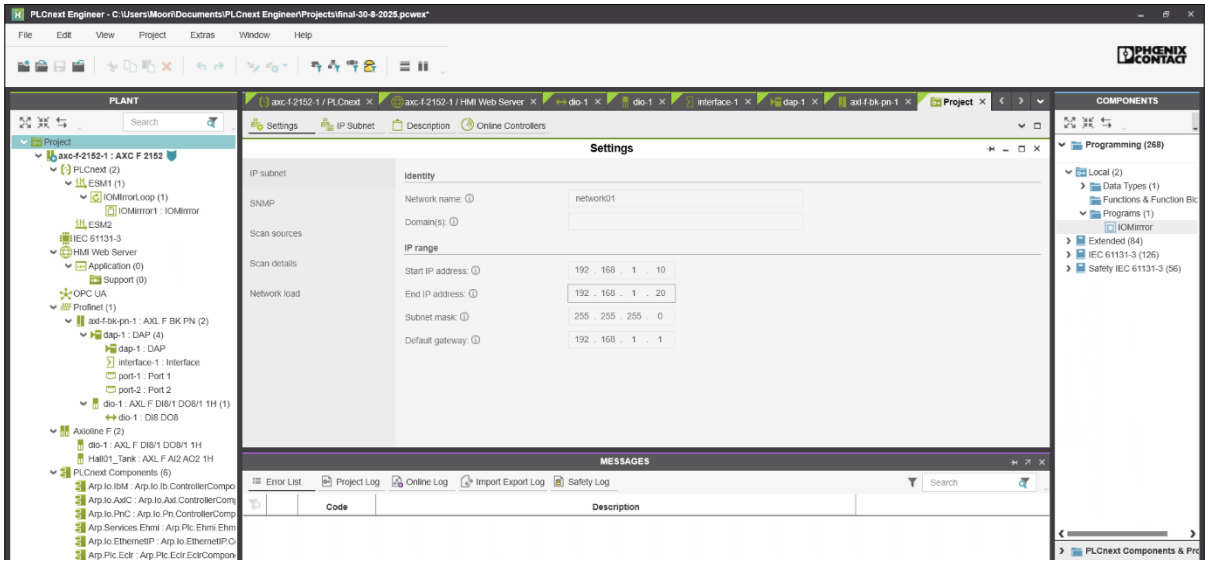


7 Network Configuration

1. Open **Project → Settings**.
2. Ensure the “Start IP Address” and “End IP Address” are configured to the connected network.

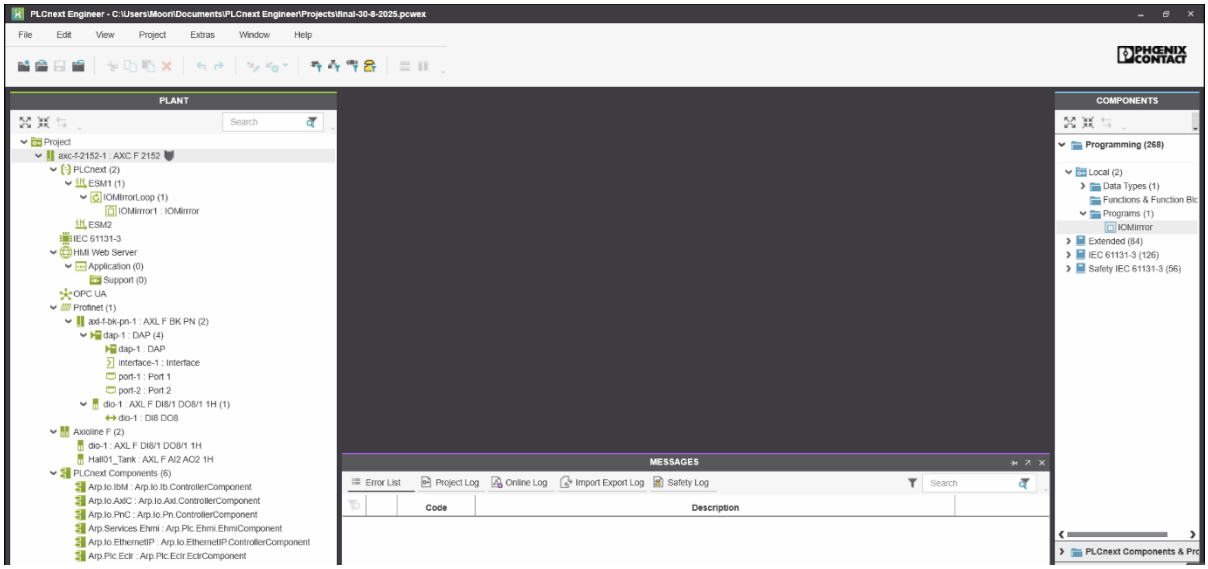
Outcome:

The PLC system is now fully configured with proper networking, modules, and the IOMirror program.



8 Run the project

Double click on Project and then right click on "**axc-f-2152-1: AXC F 2152**" and click on "write and start project"



9 Conclusion

The program ensures that inputs are correctly mapped and that code execution copies the input variable values directly into the outputs. With visual confirmation from the switches and potentiometer, it is easy to verify that the board is functioning as intended.

10 References

Phoenix Contact. (n.d.). *Nisses skola – PLCnext video*. från https://www.phoenixcontact.com/sv-se/nisses-skola/nisses-skola-plcnext-video

PLCnext Engineer. (n.d.). *Interbus Parameterization*. från https://engineer.plcnext.help/2025.0_en/InterbusParameterization.htm

Phoenix Contact. (n.d.). *Software PLCnext Engineer*. från https://www.phoenixcontact.com/en-pc/products/software-plcnext-engineer-1046008