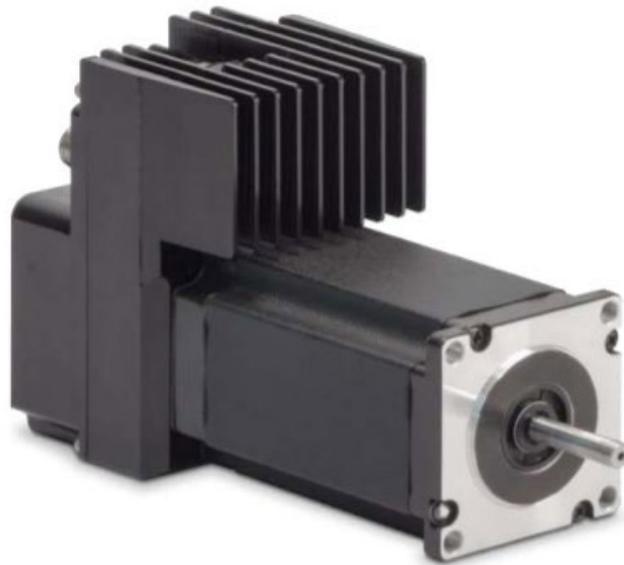


ACSI Motor/Drive/Controller with Siemens TIA Portal PROFINET Setup Guide

ACSI Motor/Drive/Controllers with ProfiNet drive are **DISCONTINUED** Replacements are not available. Use this manual as reference only.

EtherNet/IP, Modbus and Basic ASCI Motor/Drive/Controllers continue with full Tolomatic Support



3600-4197_03

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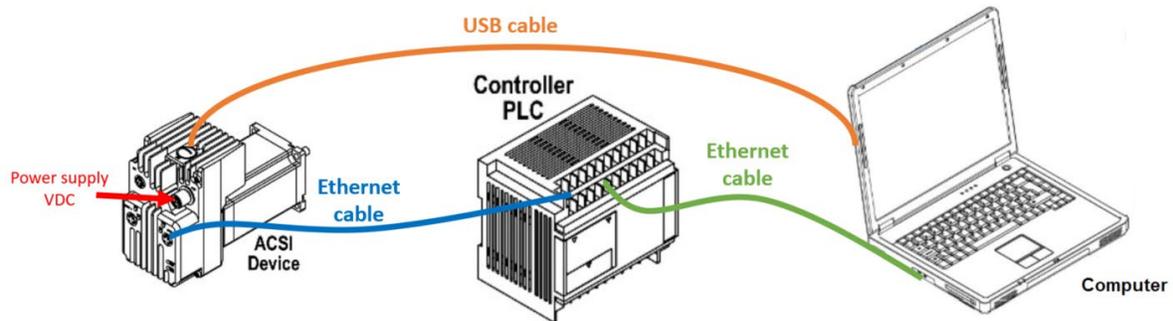
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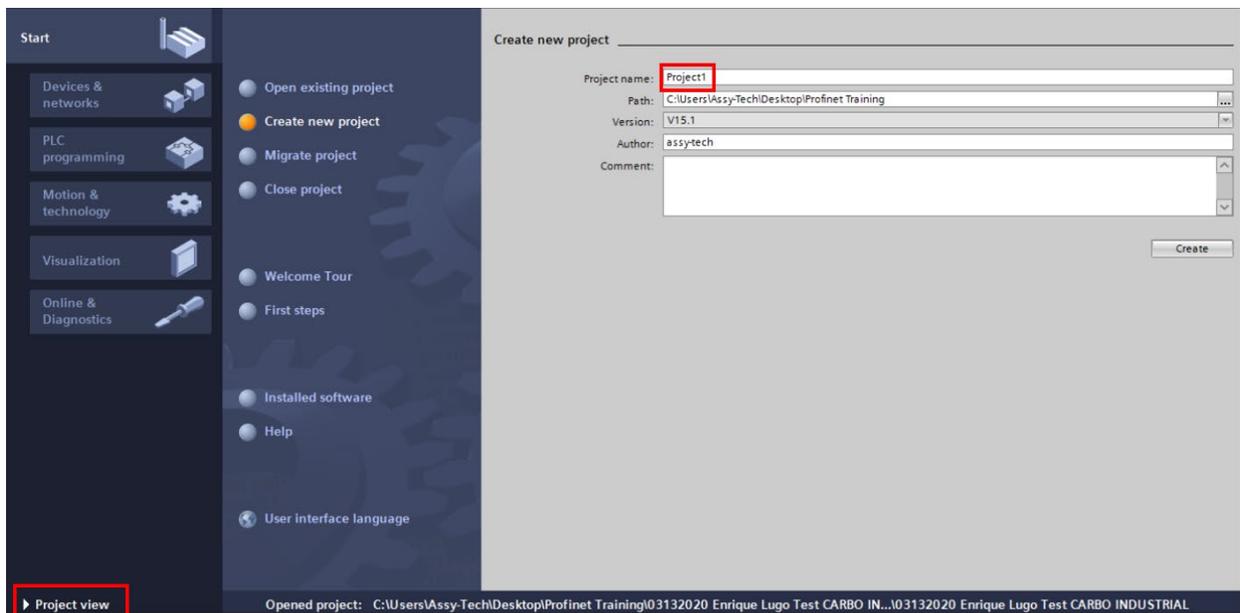
PROFINET SET-UP

Profinet set- up

1. Make sure you have the following connections (use tested/quality cables):



2. Configure ACSI in TMI via USB.
 - a. Mode Select -> **PROFINET**
 - b. **Download flash**
 - c. Click on **Disconnect** in the **Drive Tab**
3. Connect ACSI to PLC via Ethernet cable.
4. Open **TIA SIEMENS V15.1** Software
5. Disable firewall on your computer and turn off WiFi
6. Create new project in TIA and save.
7. Click on "PROJECT VIEW"



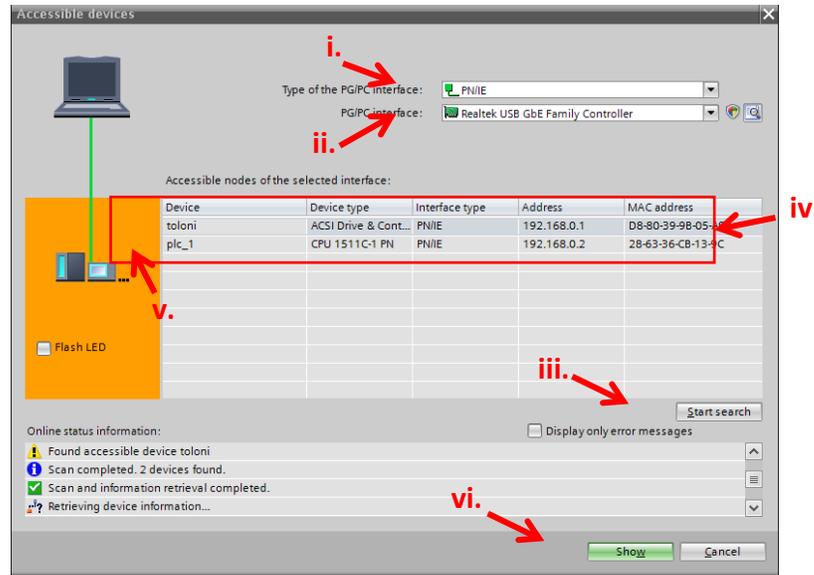
8. Go to the tool bar on the TIA Software, and click on **accessible devices**



PROFINET SET-UP

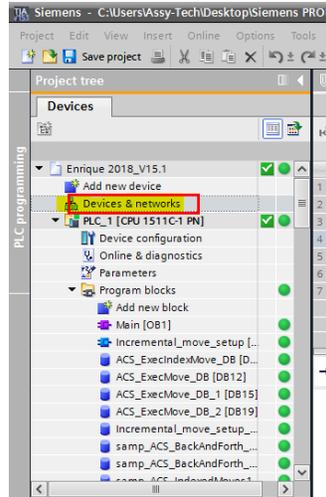


- a. Select the following parameters:
 - i. **Type of PG/PC interface:** PN/IE
 - ii. Deploy the **PG/PC interface** drop down list and select the right connection (based on what port is the Ethernet cable connected to the computer).
 - iii. Click on **Start search**
 - iv. Verify that you see the following in the list of **devices:** ACSI Drive and PLC.
 - v. Select **PLC**
 - vi. Click on **Show**



9. Download GSDML file from <https://www.tolomatic.com/info-center/resource-details.aspx?resourceId=897>
10. Save the file in a known location
11. Install the GSDML File.
 - a. Go to **OPTIONS** -> **Manage General Station Description files (GSD)**
 - b. Look for the location the GSDML file was installed and accept
12. In the main screen look for the project tree, and find "Devices and Networks" and double click on it.

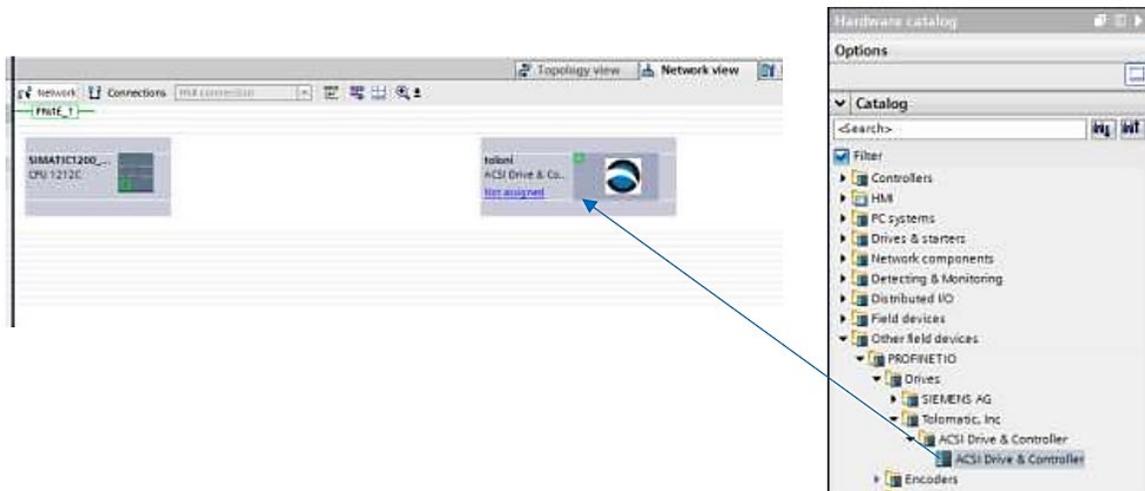
PROFINET SET-UP



13. Click on Network view

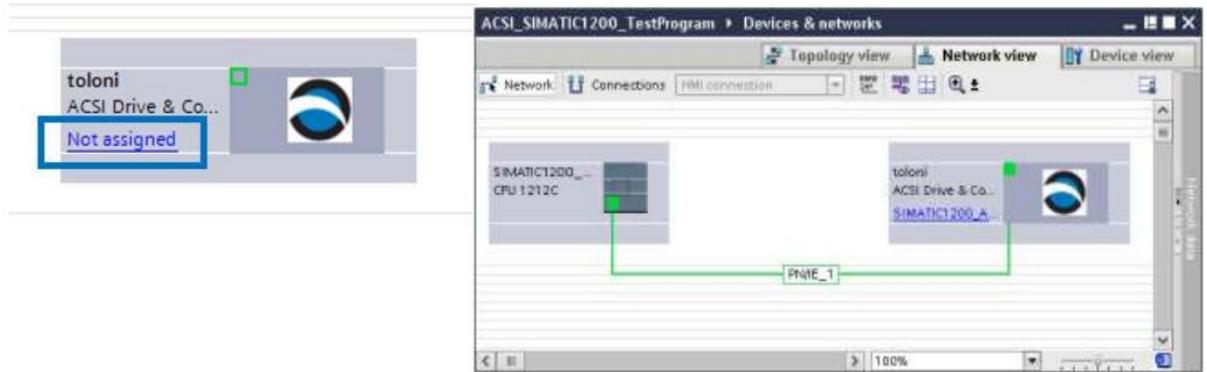


14. Drag and drop device from catalog under “Other Field Devices → PROFINET IO → Drives → Tolomatic, Inc. → ACSI Drive & Controller → ACSI Drive & Controller.”



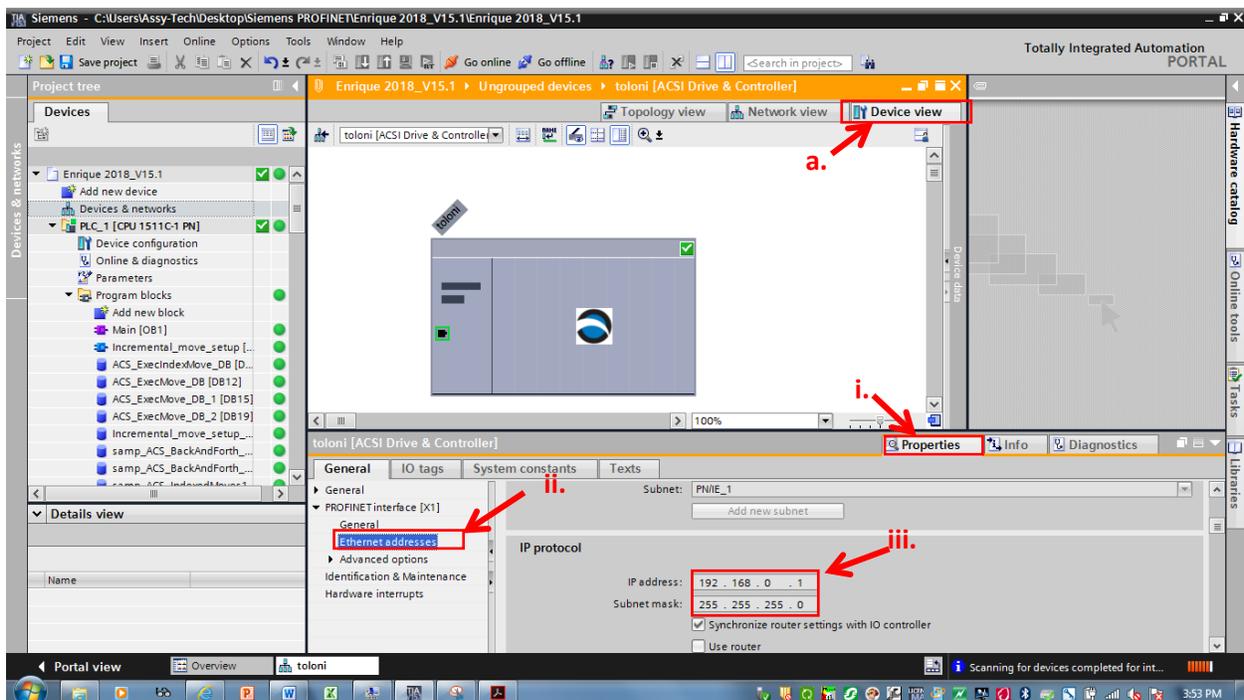
15. Click “not assigned” on the device picture and assign to the controller by selecting the controller name and network name, once connected there should be a dashed green line between controller and the device.

PROFINET SET-UP



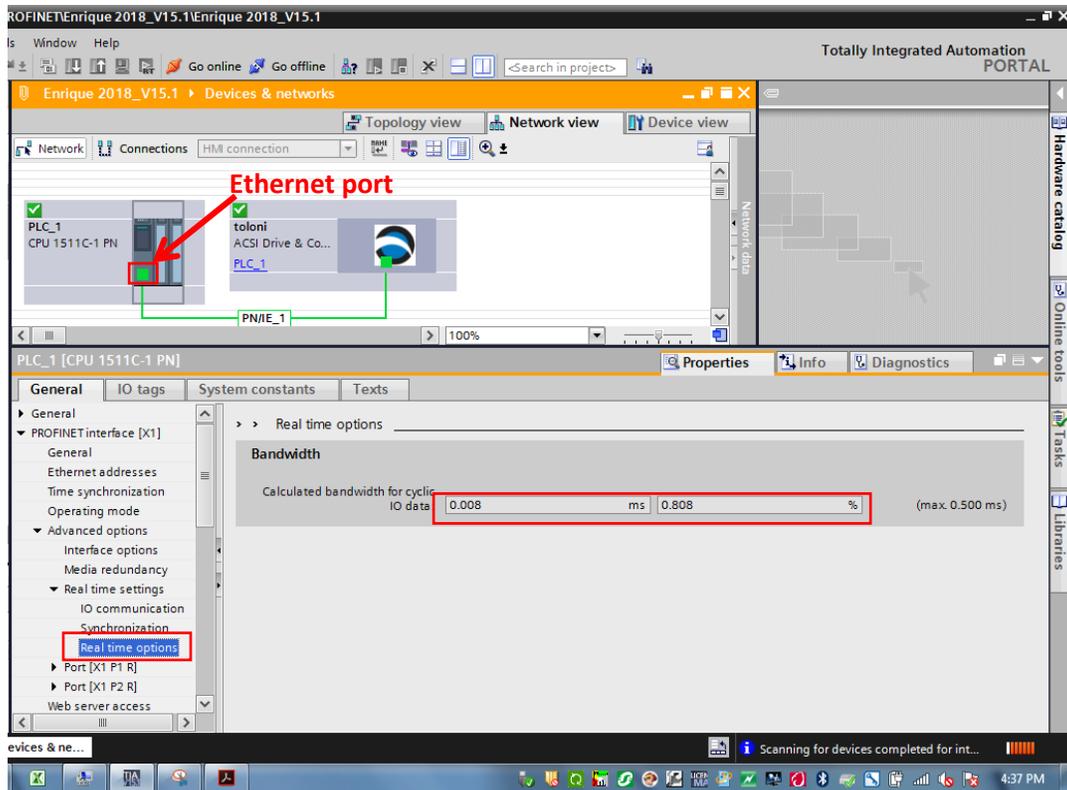
16. Configure IP Address:

- a. Double click the “toloni” device to enter **Device view** (or click device view tab and select device with dropdown)
- b. Configure the IP address (if needed) and device name under:
 - i. **Properties.**
 - ii. **Ethernet addresses** and modules (the modules will automatically be configured in the ACSI device overview).
 - iii. Input desired IP Address.



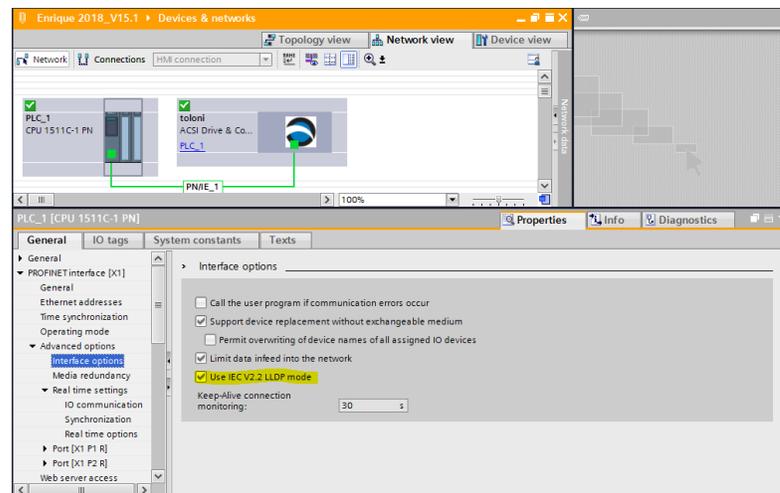
15. Set PN IO update times to meet application requirements (ACSI defaults to 8ms which is set by GSDML file and 0.808%) under the **NETWORK VIEW**, highlight the PLC's **ETHERNET PORT** again, under properties tab **PROFINET INTERFACE** → **ADVANCED OPTIONS** → **REAL TIME OPTIONS**.

PROFINET SET-UP



16. Always set IP Address on PLC if necessary manually. (This can be done automatically, vendor specific tools, or PN browser in PROFINET Commander, TIA to set IP on controller in advance).

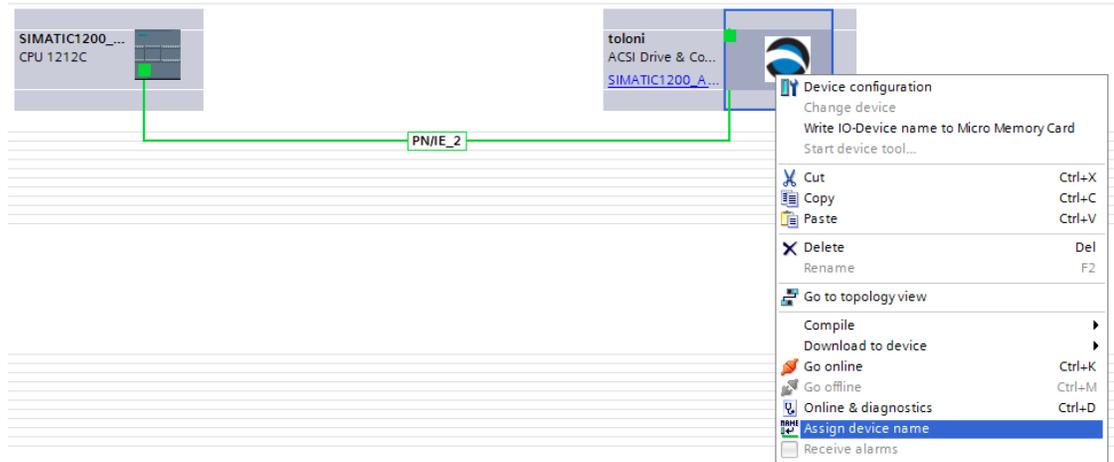
17. While on the **ETHERNET PORT** again, under properties tab, go to **PROFINET INTERFACE** → **ADVANCED OPTIONS** → **INTERFACE OPTIONS** and ensure that 'Use IEC V2.2 LLDP Mode' is checked for proper drive/PLC communication.



18. Set or Download the device names on the PROFINET IO devices with your Engineering Configuration Tool. In TIA highlight PN Network in network view, right click → **Assign Device**

PROFINET SET-UP

Name. Assign each name to the correct device from the list. Once the device names are set, compile the configuration and download to the controller.



NOTE: If the device names are not set correctly, the controller will not find the device at startup.

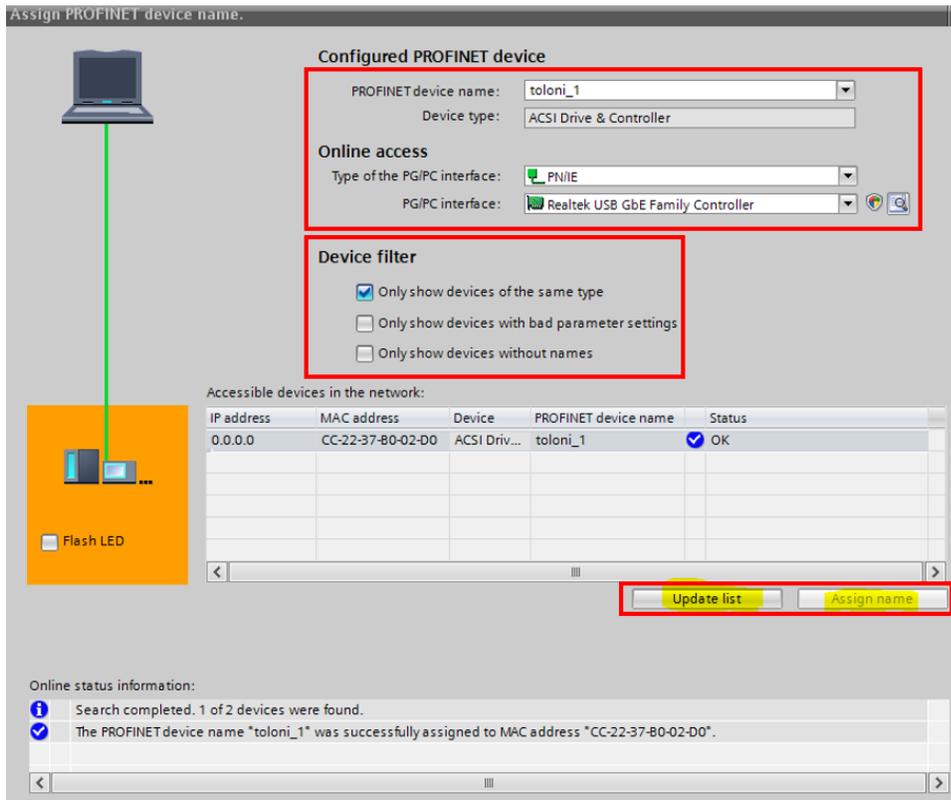
NOTE: The following rules apply for PROFINET V2.3 for device names.

1. The device name must not be longer than 240 characters. The following characters are permitted:
 - a. Letters "a" to "z"
 - b. Numbers "0" to "9"
 - c. Hyphen or period
2. One name component in the device name . a character string between two periods . may not be longer than 63 characters.
3. The device name may not begin with a hyphen.
4. The device name may not begin with the character string "port-xyz" (x,y,z = 0 to 9).
5. The device name may not have the form n.n.n.n (n = 0 to 9)

19. In the **DEVICE NAME** window select the device you wish to assign the name to with the top dropdown button, then set the online access up to **PN/IE** and correct network card (**PG/PC interface**).

PROFINET SET-UP

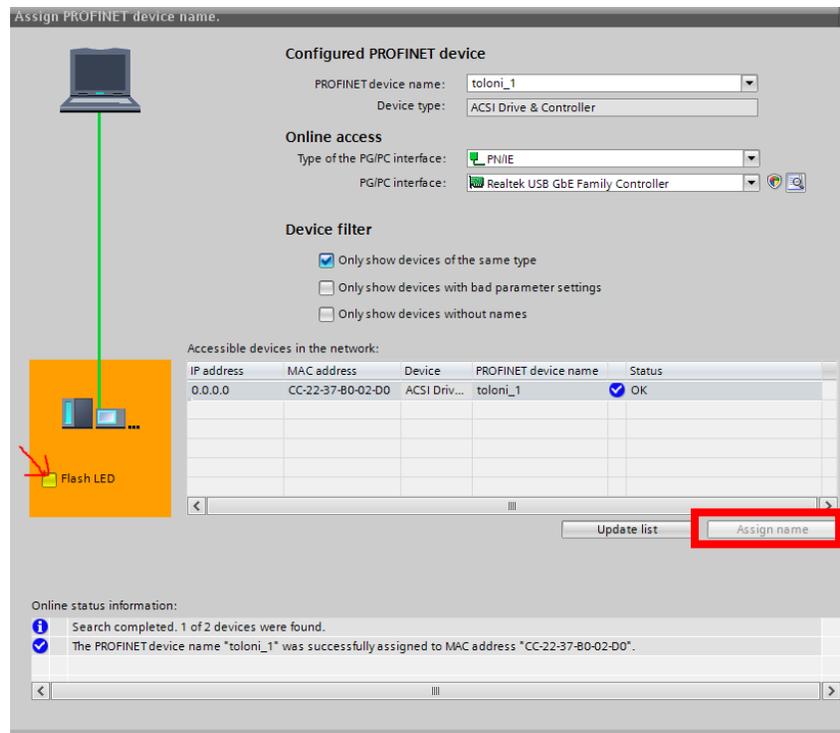
Next click **UPDATE LIST** and uncheck all of the device filters. Once you are used to the filters can re-enable them.



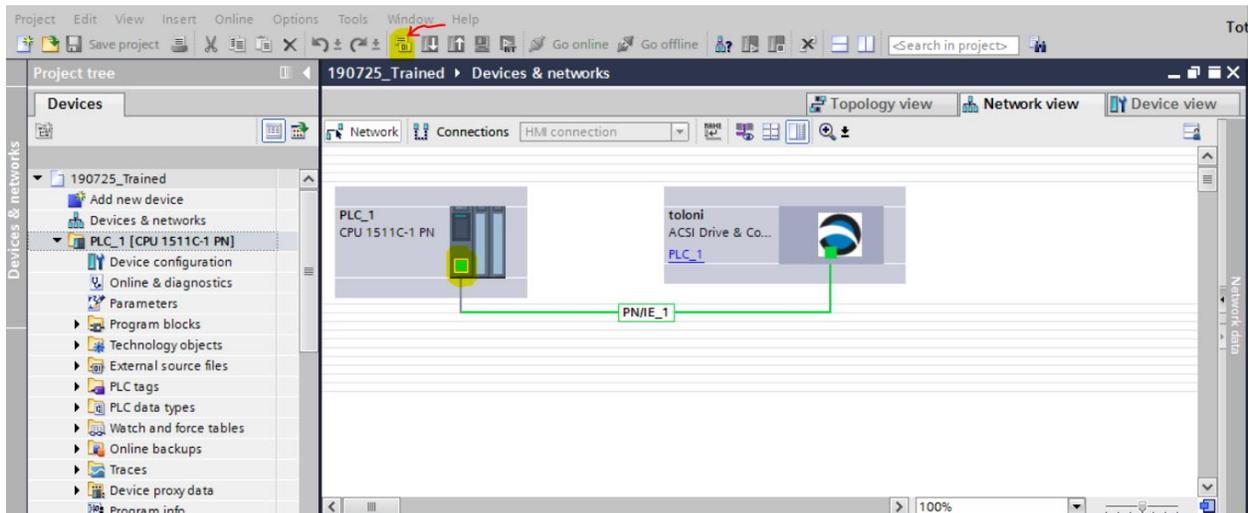
Find the device list you wish to set the name and highlight, then look at device type, click **FLASH LED** (ACSI should Flash two LEDs alternating between GREEN and RED) or check the MAC ID compared to the device housing.

Once you have confirmed the right device, click the **ASSIGN NAME** button to write the name to the device. Now the device will retain the name even after a power cycle.

PROFINET SET-UP

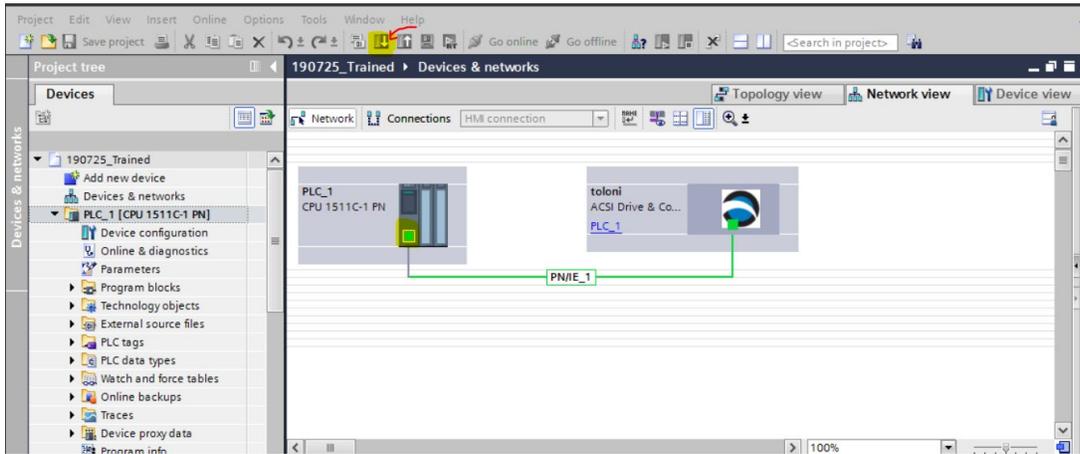


20. Back in network view, highlight the PLC station, then click **COMPILE** from the toolbar.

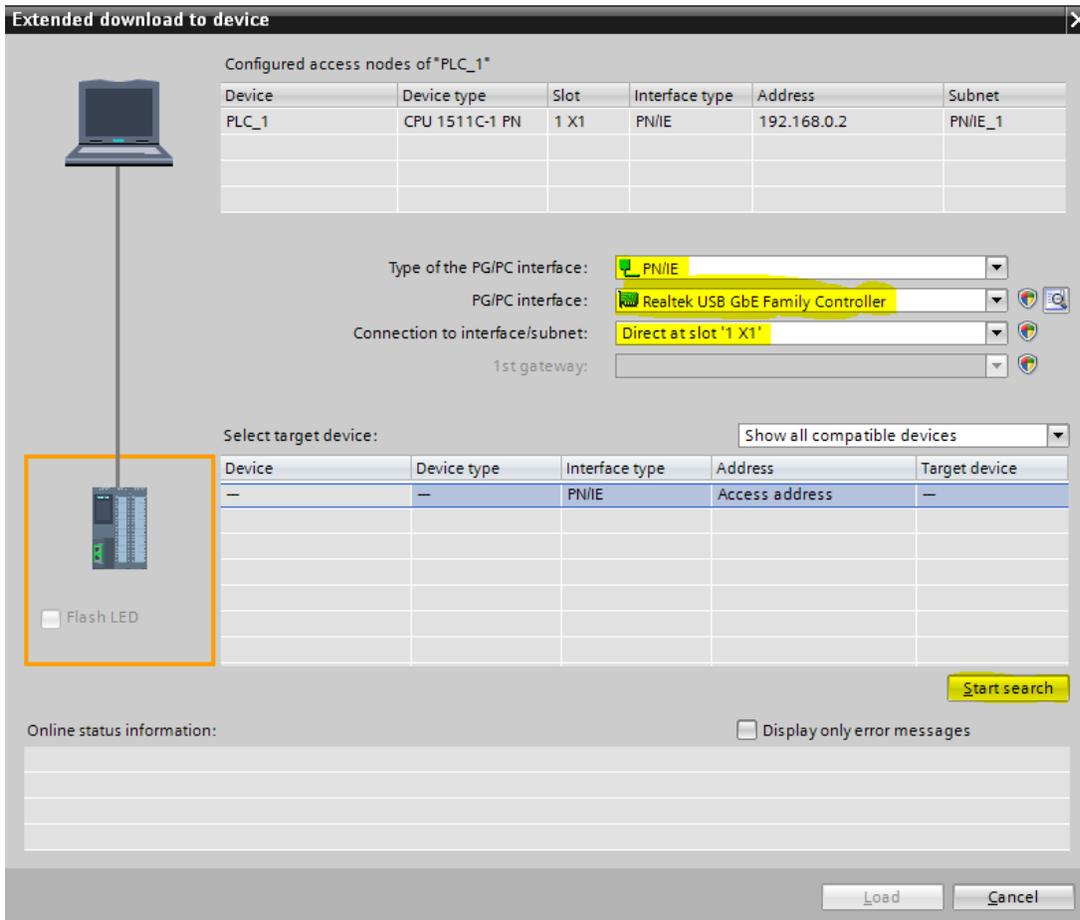


PROFINET SET-UP

21. If everything compiled correctly, next download the configuration to the PLC. Highlight the PLC station, click **DOWNLOAD TO DEVICE**



Then select the **PN/IE** interface, **Network card** and **PN I/E** network. Now click **“Start Search”**.



22. Once verified the ACSI device name and IP address will be set and can be found on the PROFINET network. Click **LOAD**.

PROFINET SET-UP

Extended download to device
✕





Flash LED

Configured access nodes of *PLC_1*

Device	Device type	Slot	Interface type	Address	Subnet
PLC_1	CPU 1511C-1 PN	1 X1	PN/IE	192.168.0.2	PN/IE_1

Type of the PG/PC interface:

PG/PC interface:

Connection to interface/subnet:

1st gateway:

Select target device:

Device	Device type	Interface type	Address	Target device
PLC_1	CPU 1511C-1 PN	PN/IE	192.168.0.2	PLC_1
---	---	PN/IE	Access address	---

Online status information: Display only error messages

-  Attempting to connect to the device with address 192.168.0.2. ^
-  Connection established to the device with address 192.168.0.2. ☰
-  Found accessible device toloni ☰
-  Scan completed. 1 compatible devices of 3 accessible devices found. v

4. USING DATABLOCKS & FUNCTIONBLOCKS

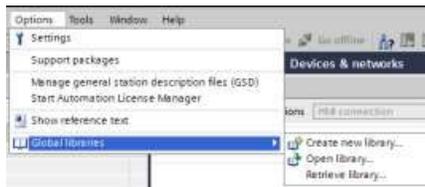
4. Using DataBlocks & FunctionBlocks

4.1 Overview

These instructions assume that the user is familiar with TIA V13 or greater programming and PROFINET communications. This document references PROFINET user guide 3600-4196 which defines PROFINET interface to the ACSI Drive/Controller/Motor

4.2 Import ACS Interface Library

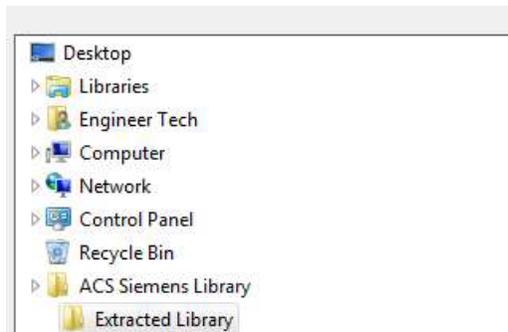
1. Download **ACSI Siemens Interface Library for TIA Portal** available in Tolomatic's website, save it in a known location. Select Options->Global libraries->Retrieve library...



2. Browse to ACS Interface Library.zal13 archive file

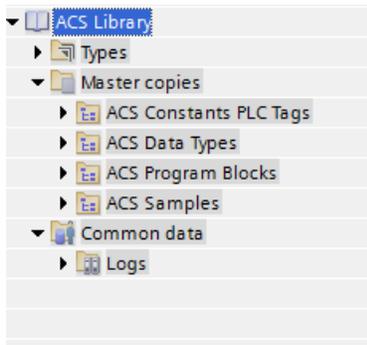


3. Select folder to extract library to

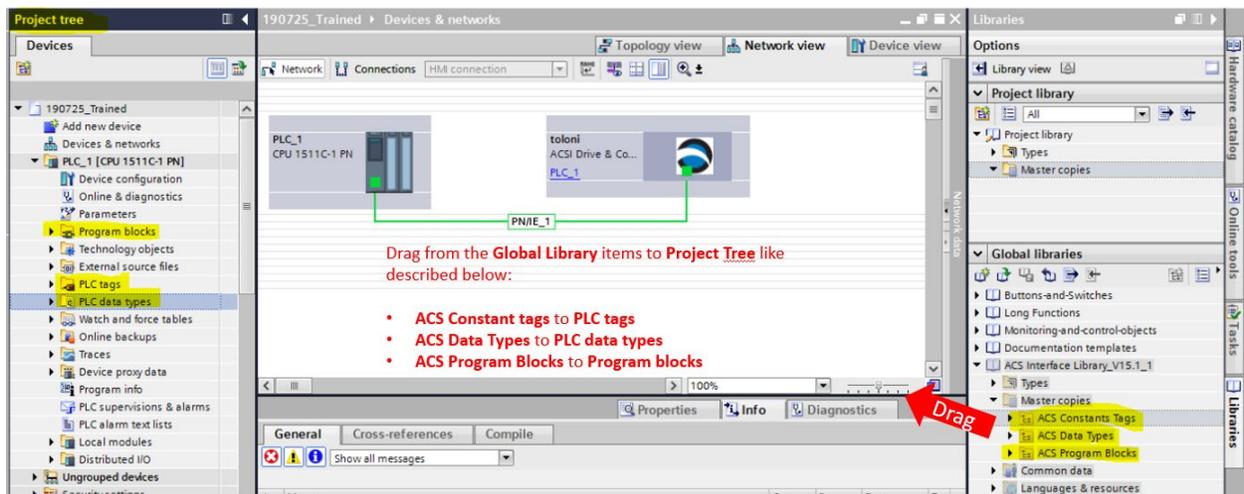


4. USING DATABLOCKS & FUNCTIONBLOCKS

4. ACS Library will be loaded into Global Libraries sidebar

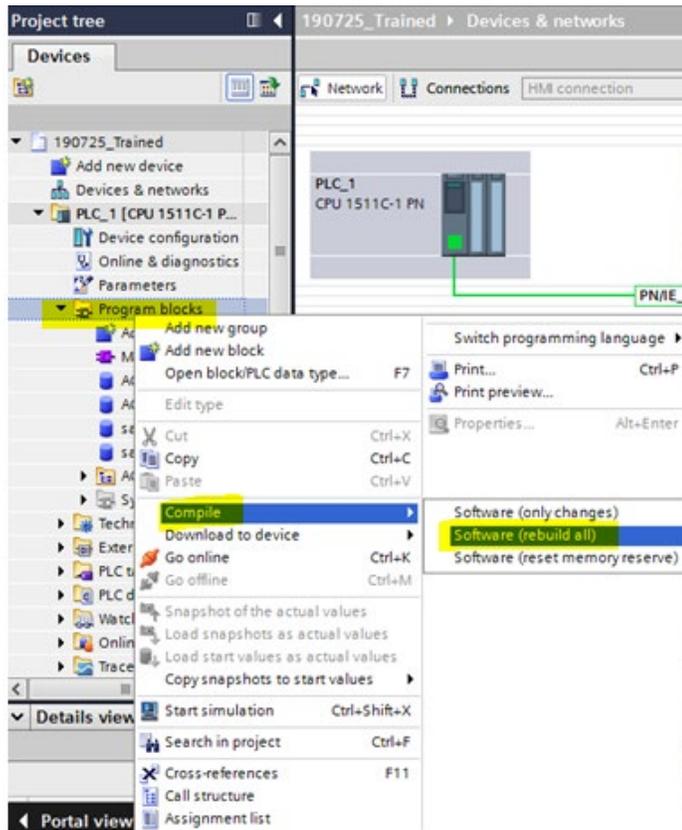


5. Drag libraries into PLC under as described below:



4. USING DATABLOCKS & FUNCTIONBLOCKS

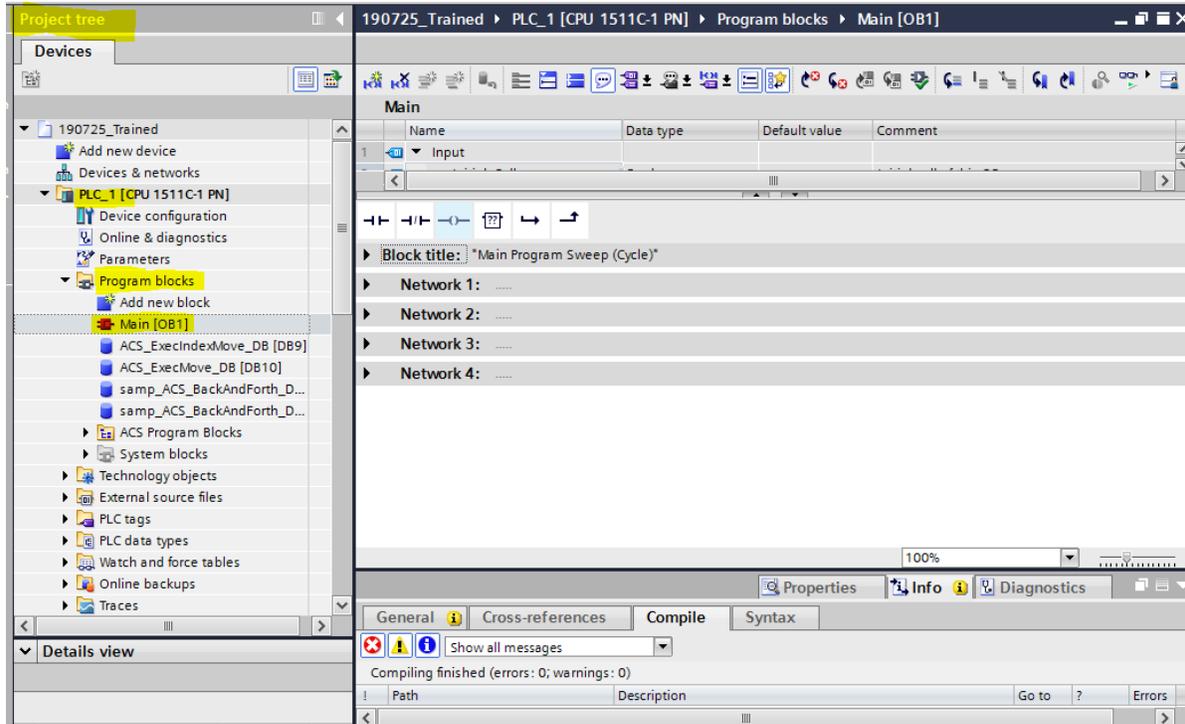
6. Once imported, compile the individual libraries by right clicking, selecting Compile -> Software (rebuild All).



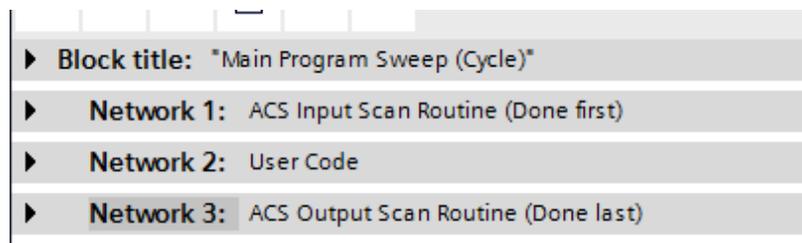
4. USING DATABLOCKS & FUNCTIONBLOCKS

4.3 Library Overview

1. Go to the **PROJECT TREE** and find under **PLC_Name -> Program Blocks -> Main [OB1]** and double click.

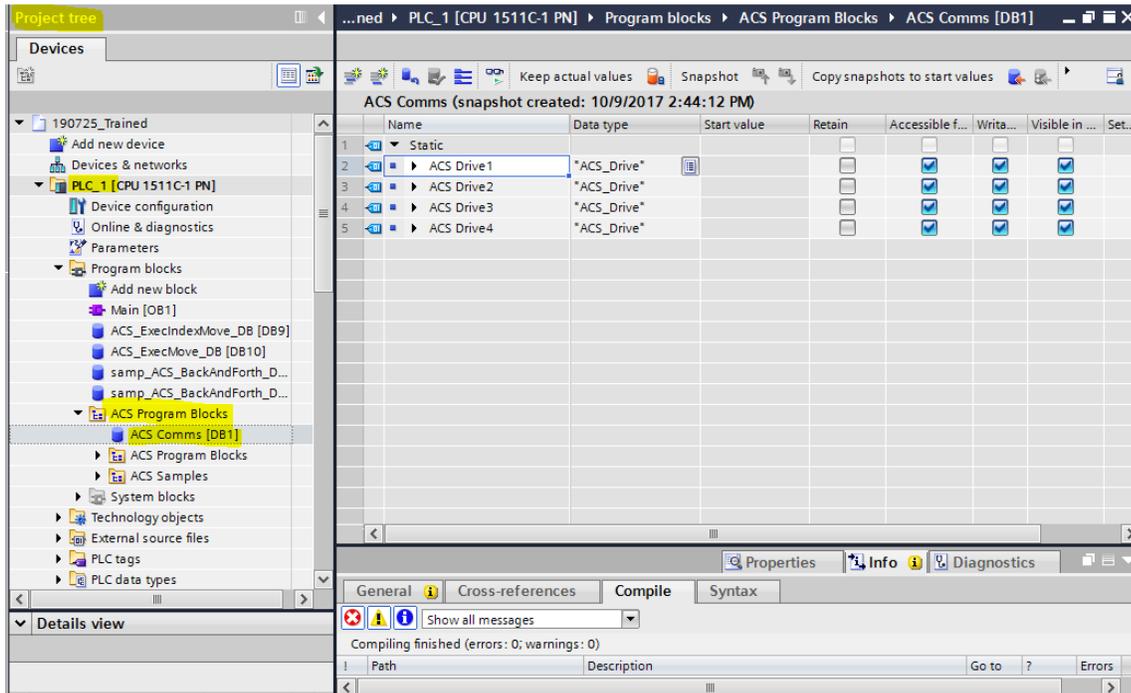


1.1 At the highest level, the program should be structured in the following way. It is important to the data flow of the program to have the Input Scan routine at the top of the program, and the Output Scan routine at the bottom.



4. USING DATABLOCKS & FUNCTIONBLOCKS

- Go to the **PROJECT TREE** and find under **PLC_Name -> Program Blocks -> ACS Program Blocks -> ACS Comms [DB1]** and double click.



Drives are stored and referenced in the ACS_Comms data block.

This is a close-up view of the table shown in the previous screenshot, detailing the configuration of the ACS Comms data block.

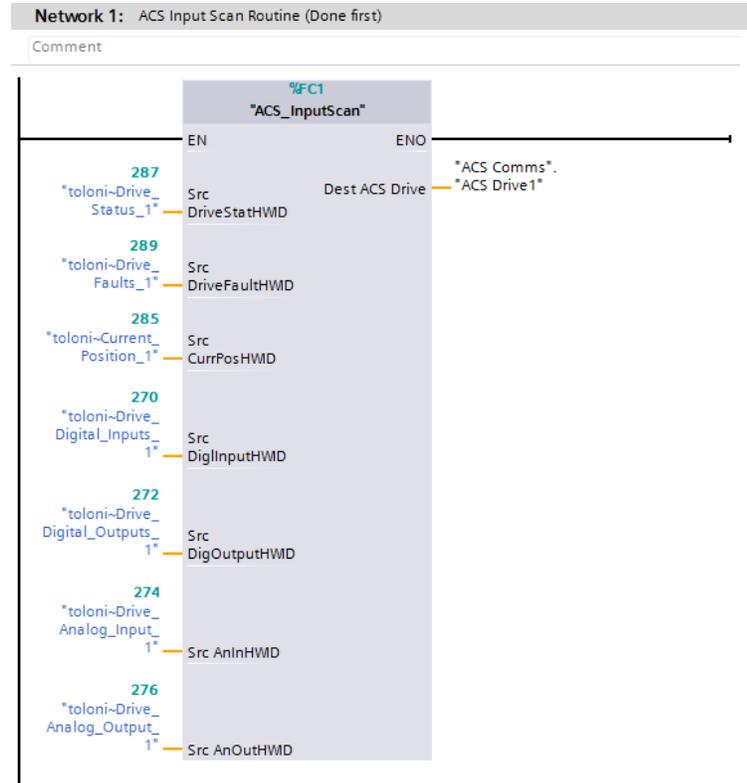
Name	Data type	Start va...	Retain	Accessible f...
1	Static		<input type="checkbox"/>	<input type="checkbox"/>
2	ACS Drive1	*ACS_Drive*	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	ACS Drive2	*ACS_Drive*	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	ACS Drive3	*ACS_Drive*	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	ACS Drive4	*ACS_Drive*	<input type="checkbox"/>	<input checked="" type="checkbox"/>

The ACS Synchronization Blocks contains the **Input Scan** and **Output Scan** function calls.

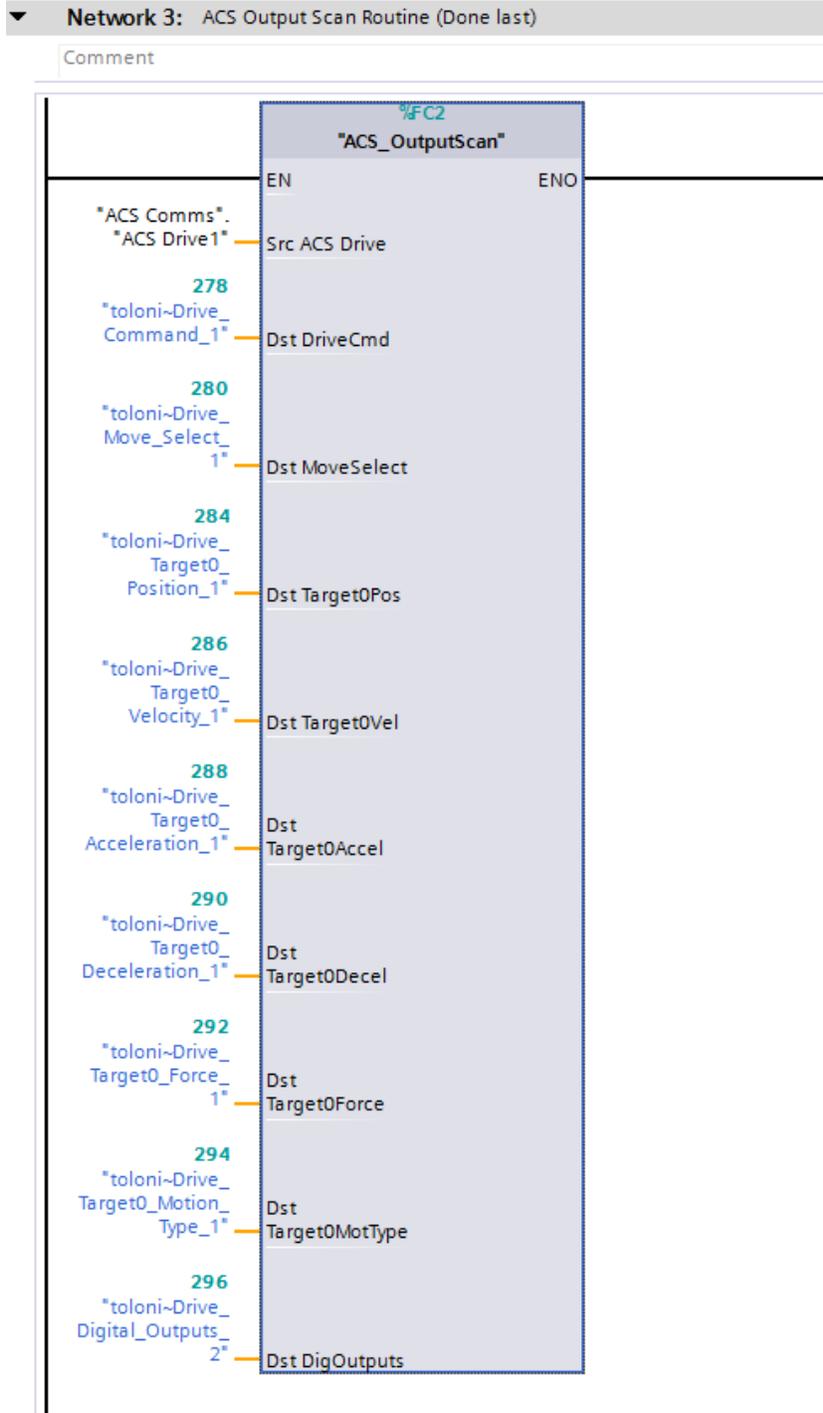
4. USING DATABLOCKS & FUNCTIONBLOCKS

4.4 Step 1: Set up Input and Output Scans

The Input and Output Scan functions link the ACS_Comms Drive object to Hardware IO Modules defined by the GSD file. This mapping only takes place in the scan objects, and all of the function blocks can now reference the object instead of the modules directly. This allows for greater expandability.



4. USING DATABLOCKS & FUNCTIONBLOCKS



4.5 Step 2: User Code

The library contains several example programs (designated with the **samp_** prefix) that show a variety of tasks, from one method of drive initialization to executing a series of pre-defined velocity moves.

The library is essentially an encapsulation of the PROFINET Users Guide. The Drive Status and Fault bits are defined in the ACS Drive object, the Drive Commands and Motion Types are defined in Tag Tables as Constants for quick reference.

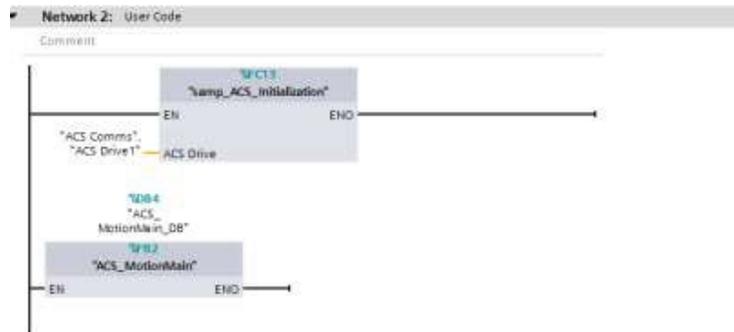
4. USING DATABLOCKS & FUNCTIONBLOCKS

4.6 Example Program: Back and Forth

A common mode of operation for a motor is a repetitive back and forth motion. In the sample code, we have an example called **ACS_BackAndForth**. We will walk through this example here.

The first thing we do is connect up the ACS Modules to an ACS Drive Object in the **ACS_Comms** data block. (See section Set up Input and Output Scans).

Next we add an initialization routine. A basic example is supplied in the sample code.



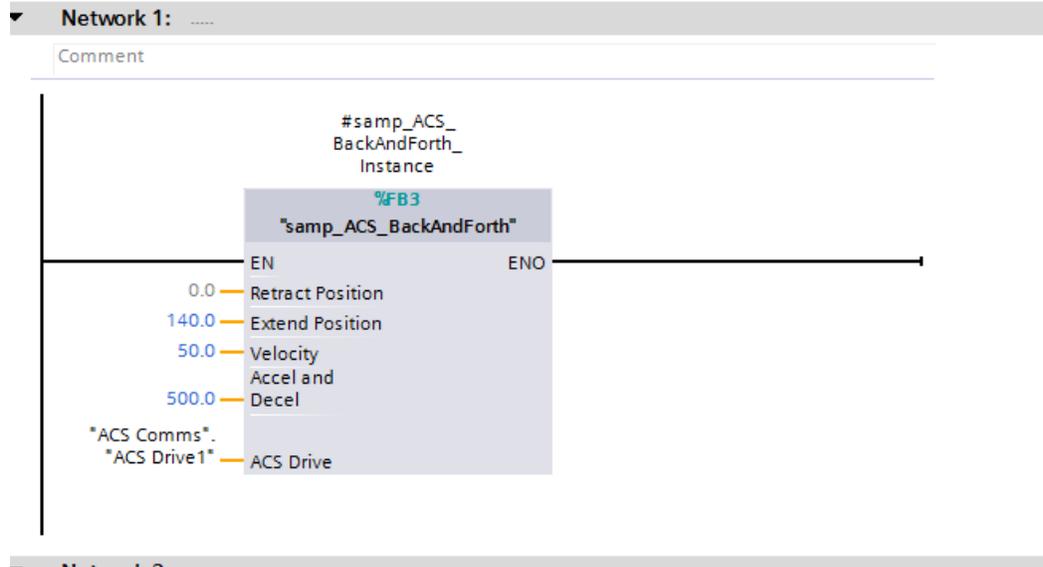
The sample initialization code is very basic. It looks at faults, if no faults it enables the drive if it is not enabled, and homes the drive if it is not homed. If a brake is controlled by the drive, you would also check the brake status here.

The **ACS_MotionMain** is a function block that provides a space to run multiple moves in a single area. When adding the sample **BackAndForth** function block to the **MotionMain** block, it is encouraged to select Multi-instance when prompted. This allows the ability to drill down into the sample with the Block Interface when multiple samples are being executed in the same function block.



The sample **BackAndForth** program takes in two absolute positions, a common velocity, and a common Accel/Decel value.

4. USING DATABLOCKS & FUNCTIONBLOCKS



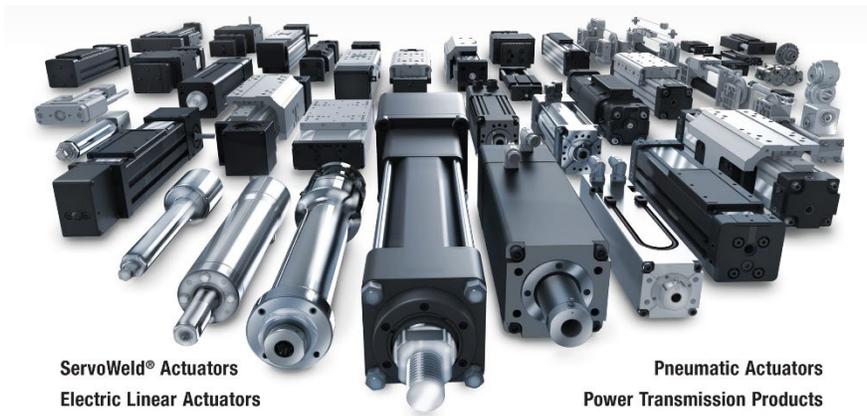
Diving deeper into the **BackAndForth** example, we see the following.

1. We verify we are in a state to move back and forth (Ready To Rumble).
2. We calculate a midpoint value between extend and retract to maintain positional state.
3. Update Positional State with relation to Midpoint calculation
4. Clear Start Motion Command if we are in motion. Commands are edge triggered, so one must clear the previous command in order to issue the same command again. (if motion is too fast to detect in motion, position can be monitored and Start Motion command can be toggled with timers. Take care to hold Clear Start Motion for long enough so the drive detects this state)
5. If we are ready to move and we are not in motion, we update the profile and move to position

Conclusion

This guide and the ACS Interface Library are companions to the PROFINET Users Guide. The library encapsulates the mechanics of interfacing with the ACS Drive and Controller.

4. USING DATABLOCKS & FUNCTIONBLOCKS



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