



### 1 Function and area of use

This Start Up document describes the necessary steps to be taken when configuring Profibus DP with Crevis I/O in a Nexto system.

### 2 About this Start Up document

This Start Up document should not be considered as a complete manual. It is an aid to be able to start up a normal application quickly and easily.

In this document the following software and hardware has been used.

#### Software

- BCS Tools 1.40

#### Hardware

- Beijer Electronics NX3010 (CPU)
- Beijer Electronics NX5001 (Profibus DP master)
- Decentralized I/O (Crevis I/O)

This document and other Start Up documents can be obtained from our homepage. Please use the address *manual@beijer.se* for feedback on our Start Up documents.

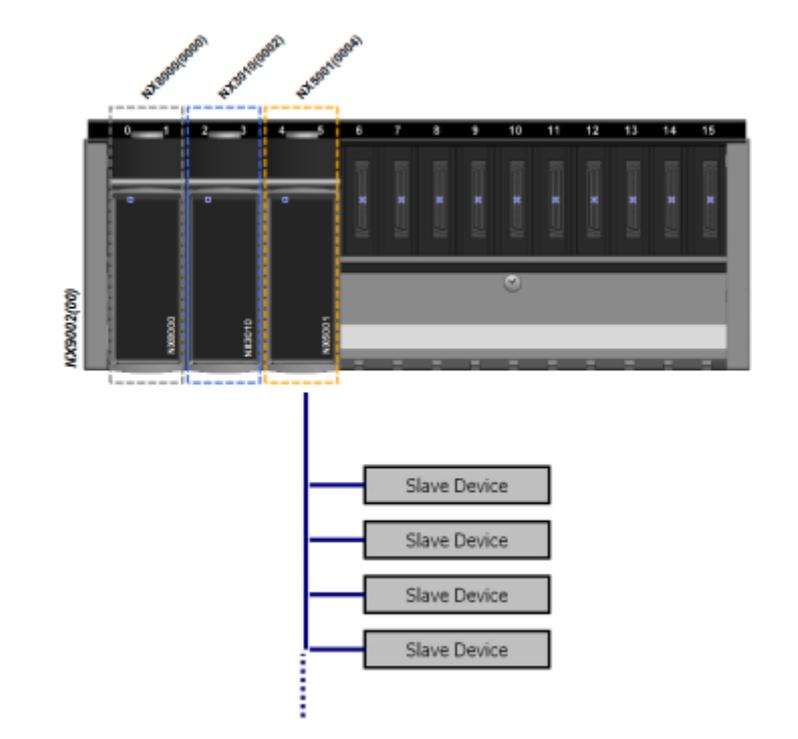


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## 4 Overview

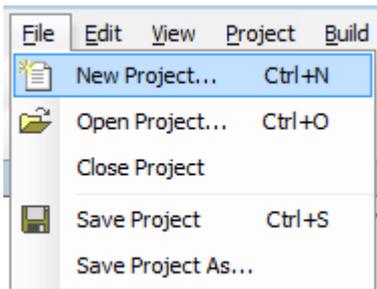
This is the basic configuration. As it can be seen in the figure below, the NX5001 interface is connected to a Nexto Series CPU on the same bus and to the Profibus DP slaves through a Profibus DP network.



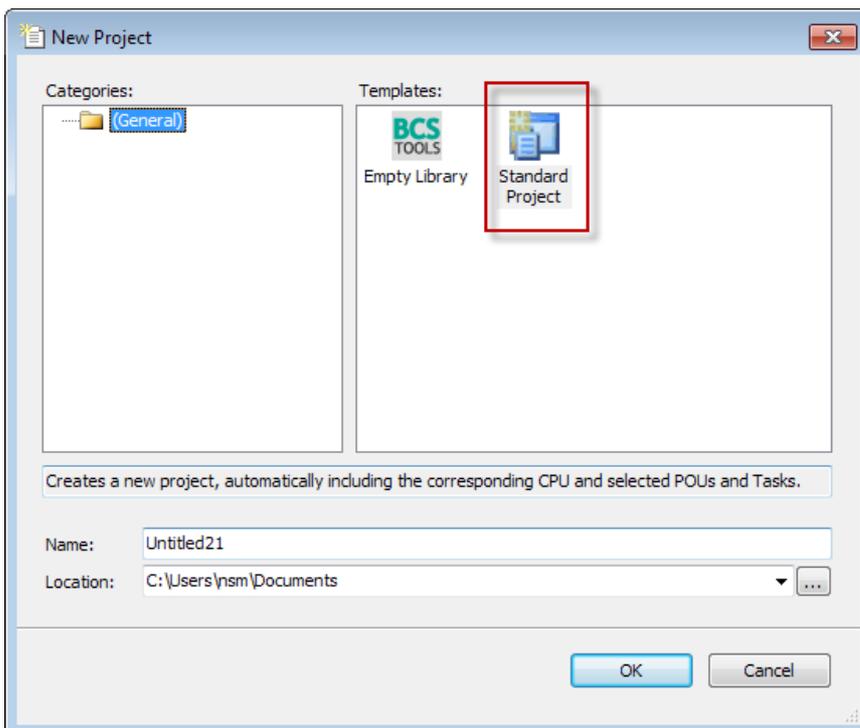
## 5 Configuration in BCS Tools

## 5.1 Create a new project

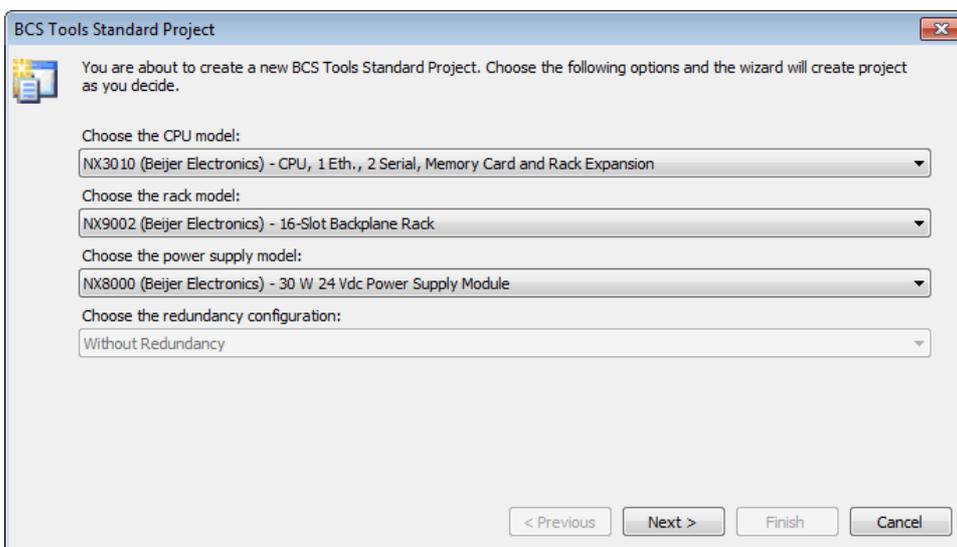
Create a new project from the File menu.



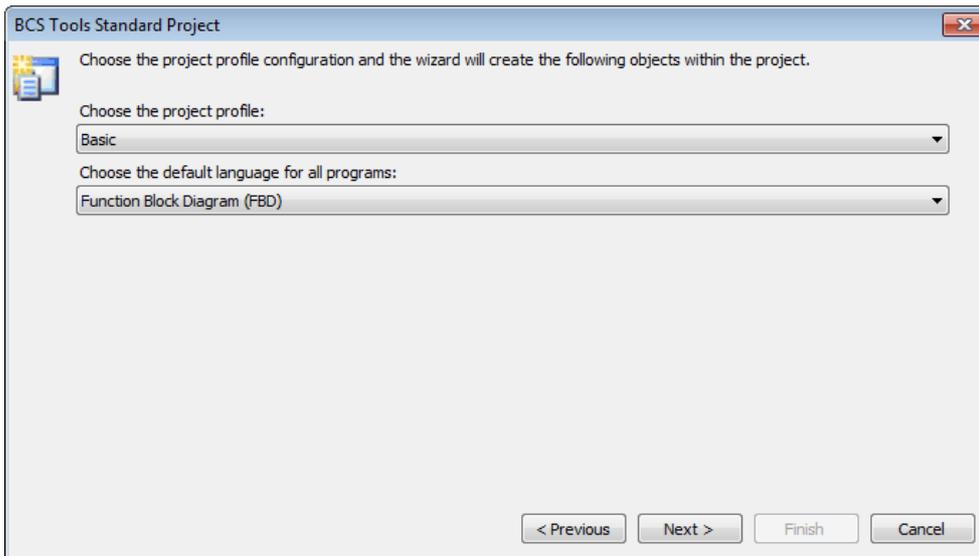
Choose the path of where the project should be created and the standard template.



Choose the cpu, rack and power supply model.



Choose the project profile, in this case the basic is being used.



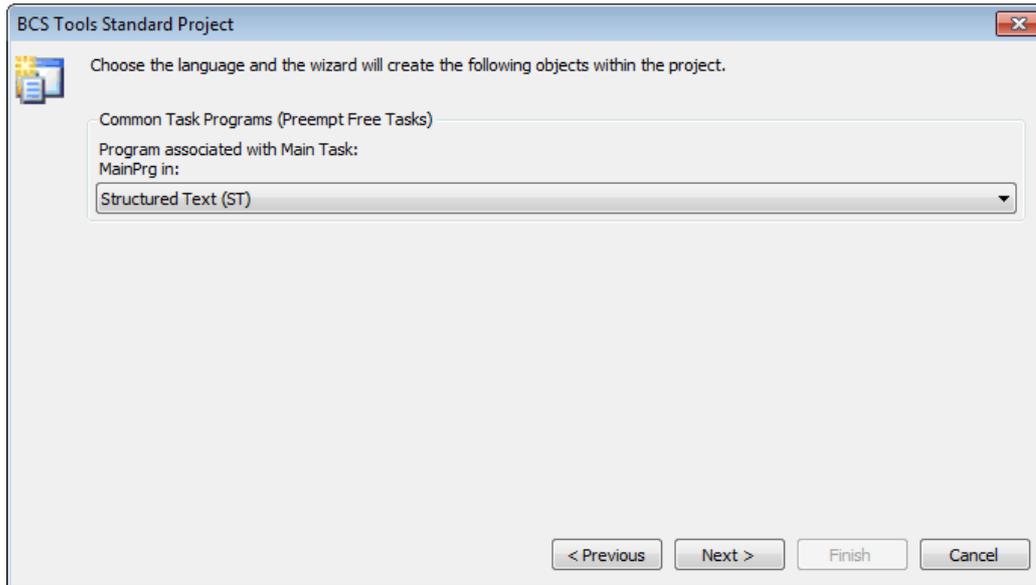
In the Basic project profile, the application has a user task from the Freewheeling type called MainTask which executes the program in a continuous loop (with no definition of cycle time) with priority fixed in 13. This task is responsible for the execution of a single programming unit POU called MainPrg. It is important to stress that the cycle time can vary according with communication task quantity used, as in this mode, the main task is interrupted by communication tasks.

This profile allows the inclusion of two interruption tasks with higher priority which can preempt the MainTask at any moment: the task called ExternInterruptTask00 is an interruption task from the Extern type with priority fixed in 02; the task called TimeInterruptTask00 is an interruption task from the cyclic type with priority fixed in 1.

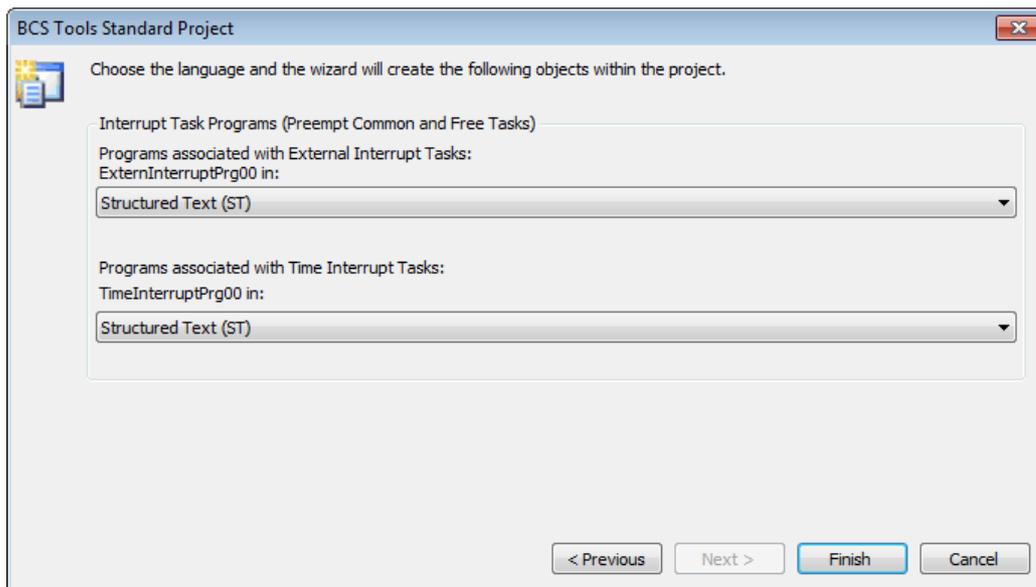
Task	POU	Priority	Type	Interval	Event
MainTask	MainPrg	13	Freewheeling		-
ExternInterruptTask00	ExternInterruptPrg00	02	Extern		IO_INT_0
TimeInterruptTask00	TimeInterruptPrg00	01	Cyclic	20 ms	-

For details about the other profiles refer to the CPU User's manual.

Choose the preferred programming language for the freewheeling task.

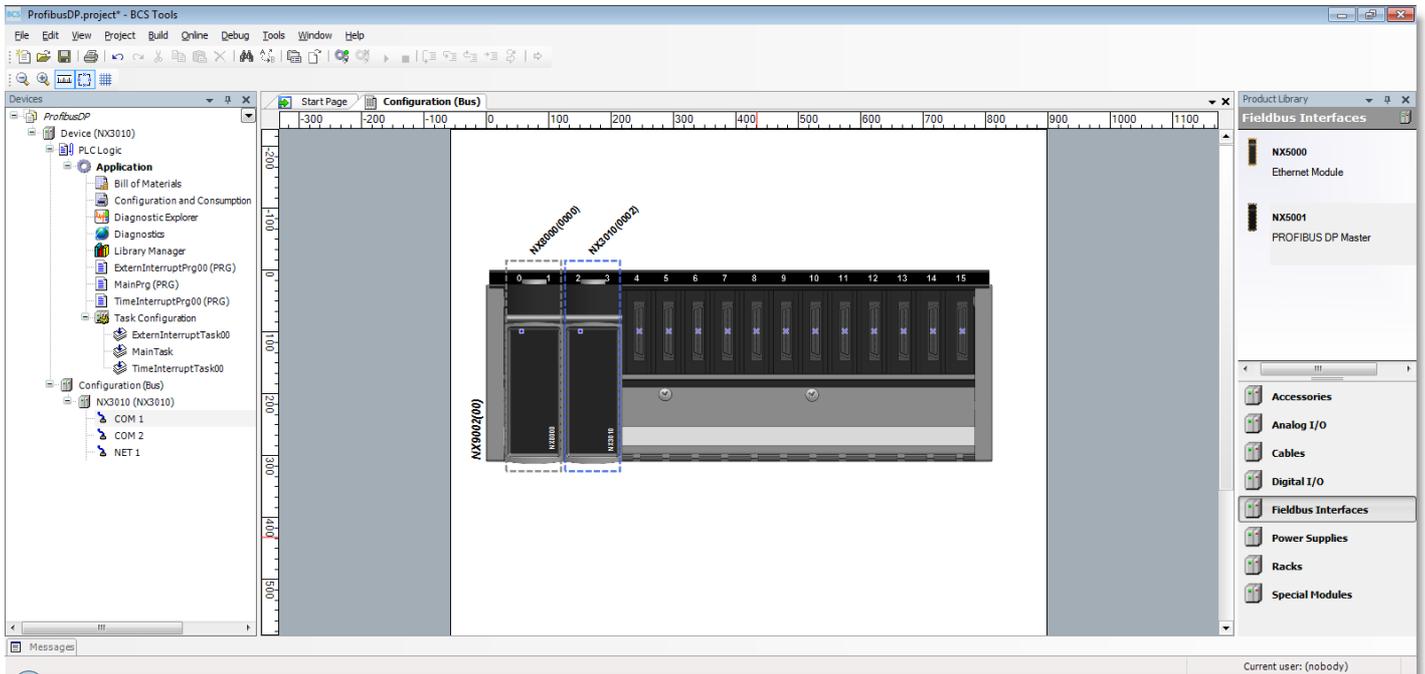


Choose the preferred programming language for the interrupt tasks.

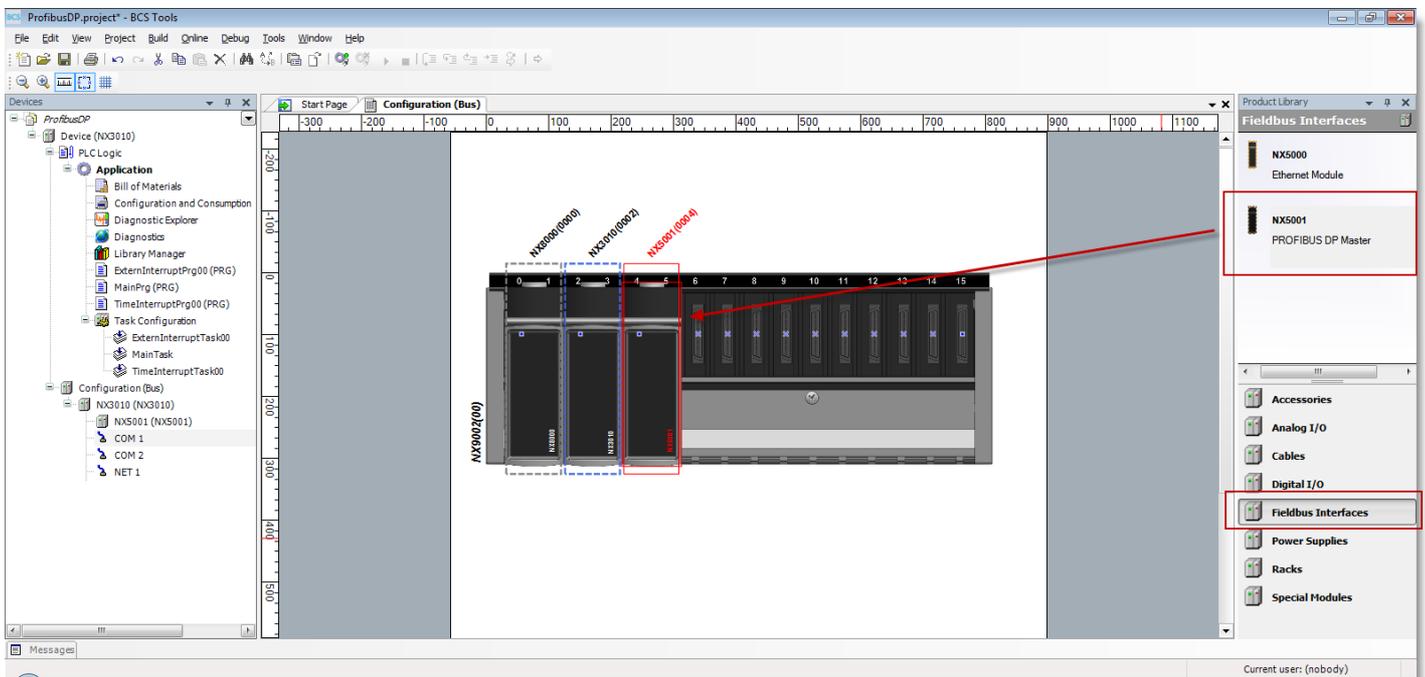


## 5.2 Configure the Profibus DP master, NX5001

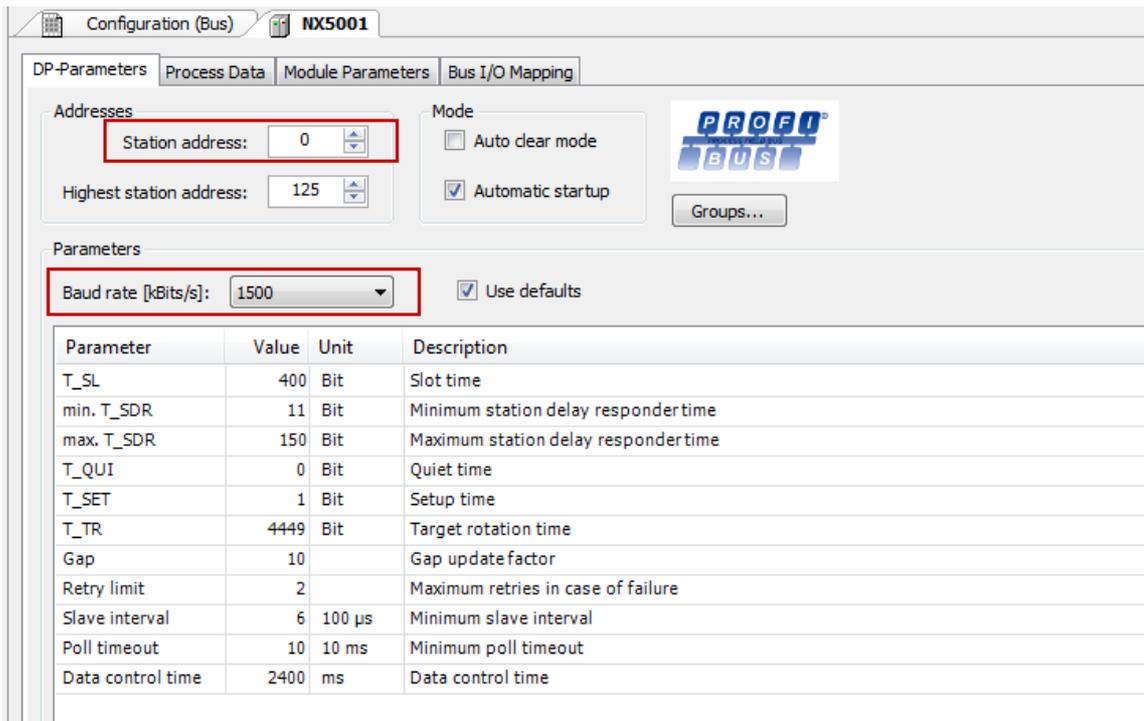
When the wizard is completed the following view appears, this is where the hardware configuration of the system is made.



The available modules are located in the Product library view, click and drag the NX5001 to the desired slot.



To select the Master address and baudrate click the NX5001 from the hardware configuration view or from the project tree view.



Depending of the total bus length the baudrate should be adjusted according to the following specification.

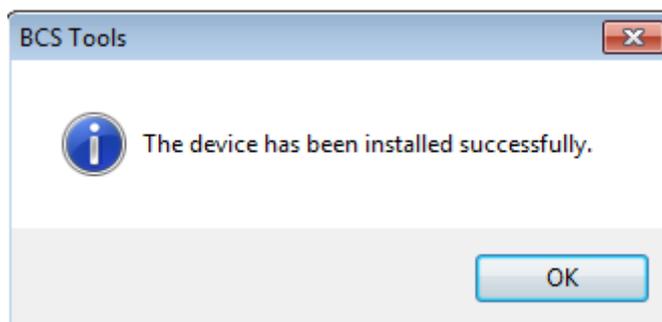
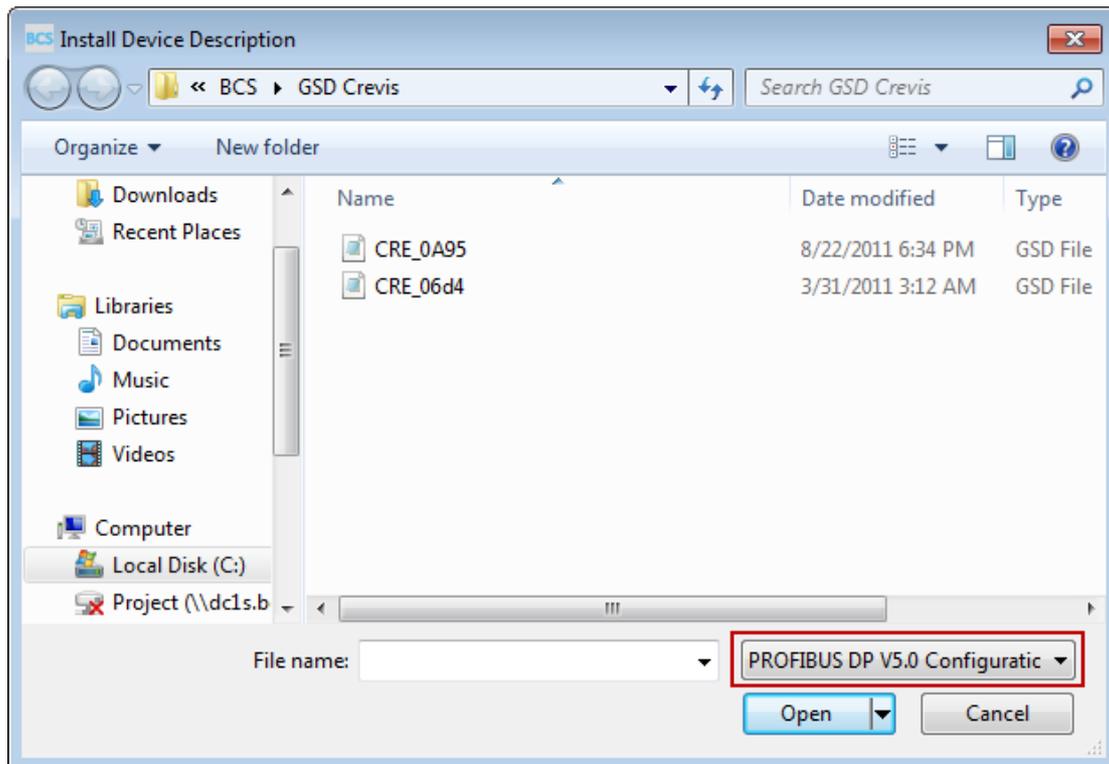
Transmission Rate (kbit/s)	Distance/segment (m)
9.6	1200
19.2	1200
93.75	1200
187.5	1000
500	400
1500	200
3000	100
6000	100
12000	100

### 5.3 Add the GSD file to BCS Tools

Before the Profibus DP slaves can be configured, the electronics datasheet, \*.gsd file, must be added to BCS Tools. To add the \*.gsd file click the Tools\Install device... option.

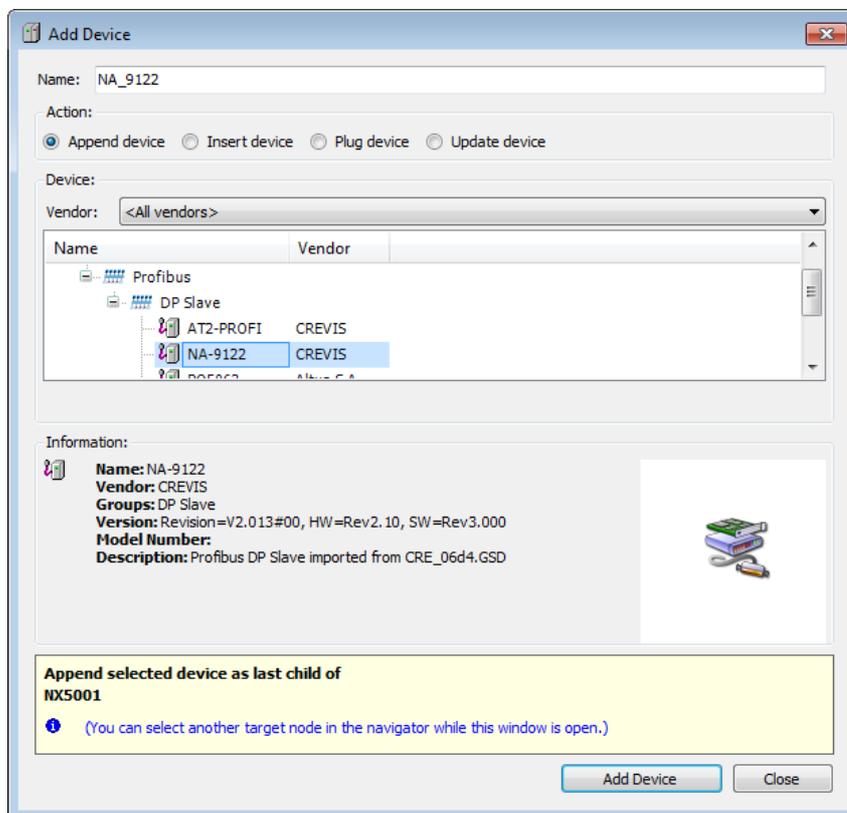
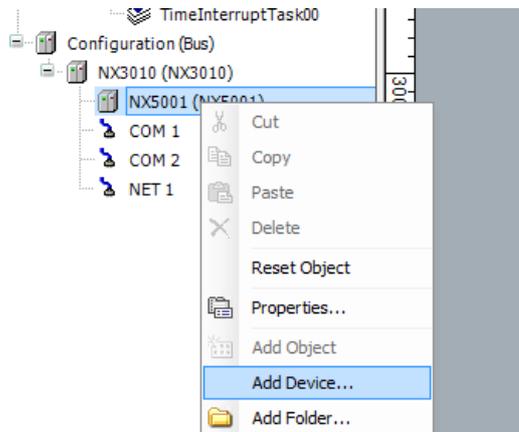


Set the search filter to Profibus DP, Locate the gsd file and click Open.



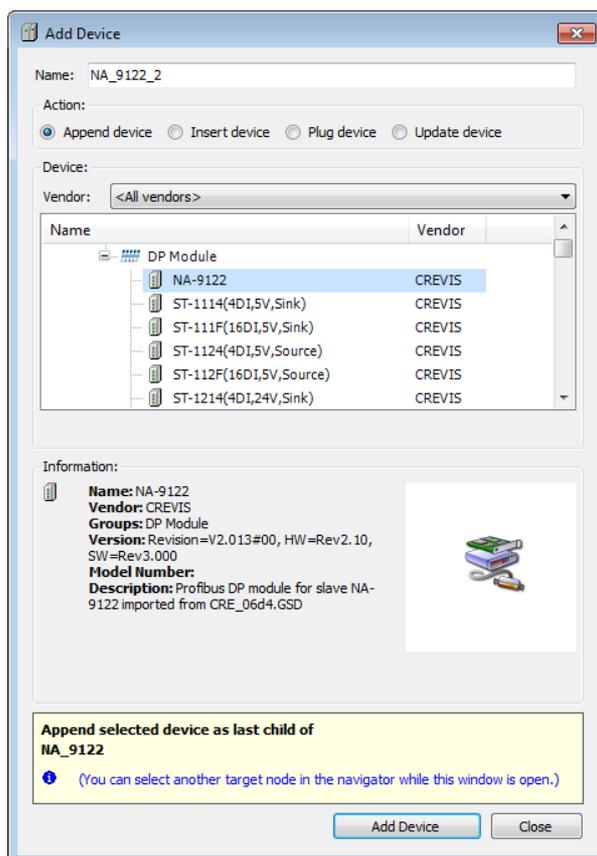
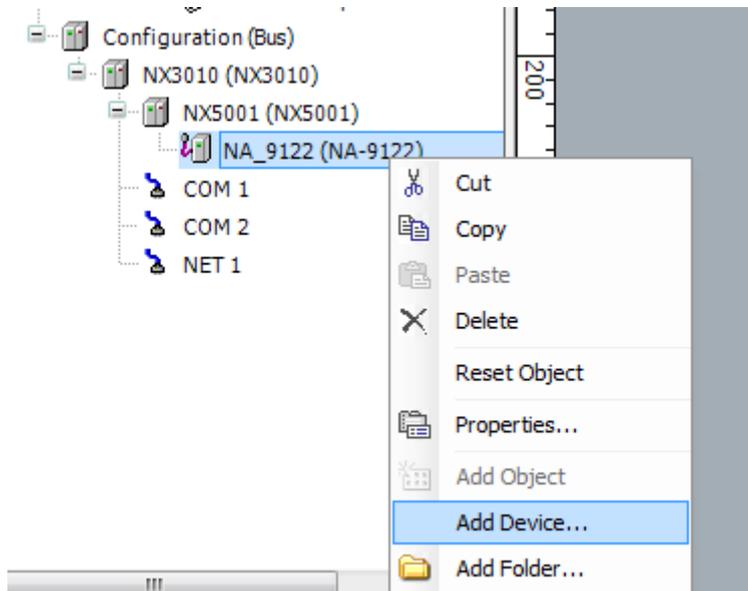
## 5.4 Add the Profibus DP slave

Right-click on the NX5001 in the project tree and choose the Add Device option and insert the Profibus DP slave Crevis NA-9122.

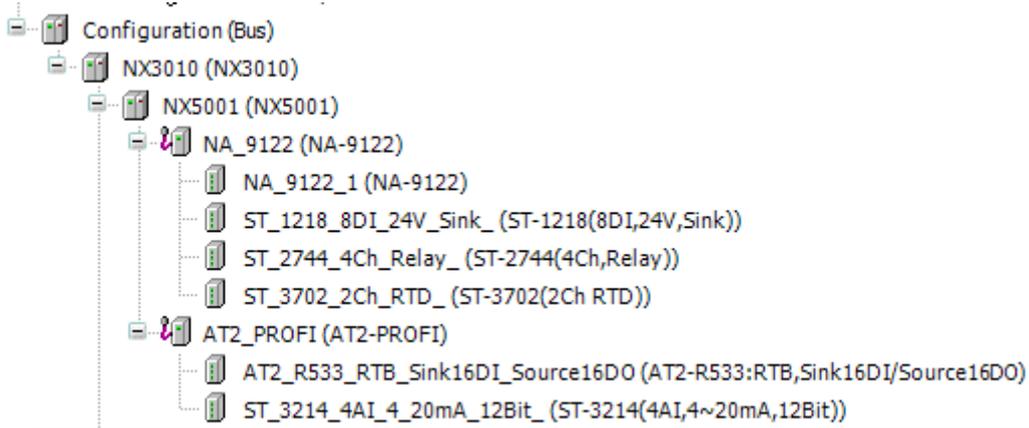


When the NA-9122 has been inserted, right-click the NA-9122 and choose Add device to access all available modules for the NA-9122.

The NA-9122 slot must be inserted first and after that the modules that are mounted to the NA-9122.

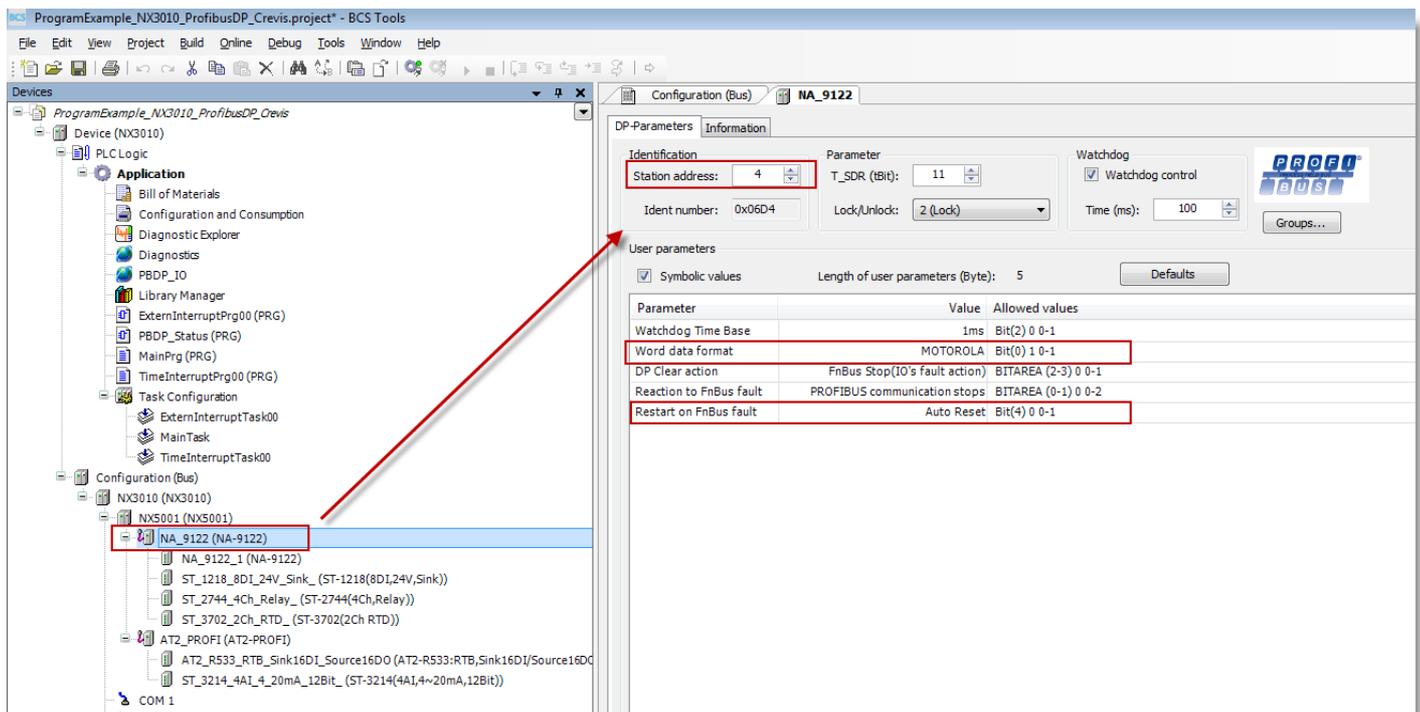


The result might look like this. In this example two different Crevis I/O slaves has been inserted.

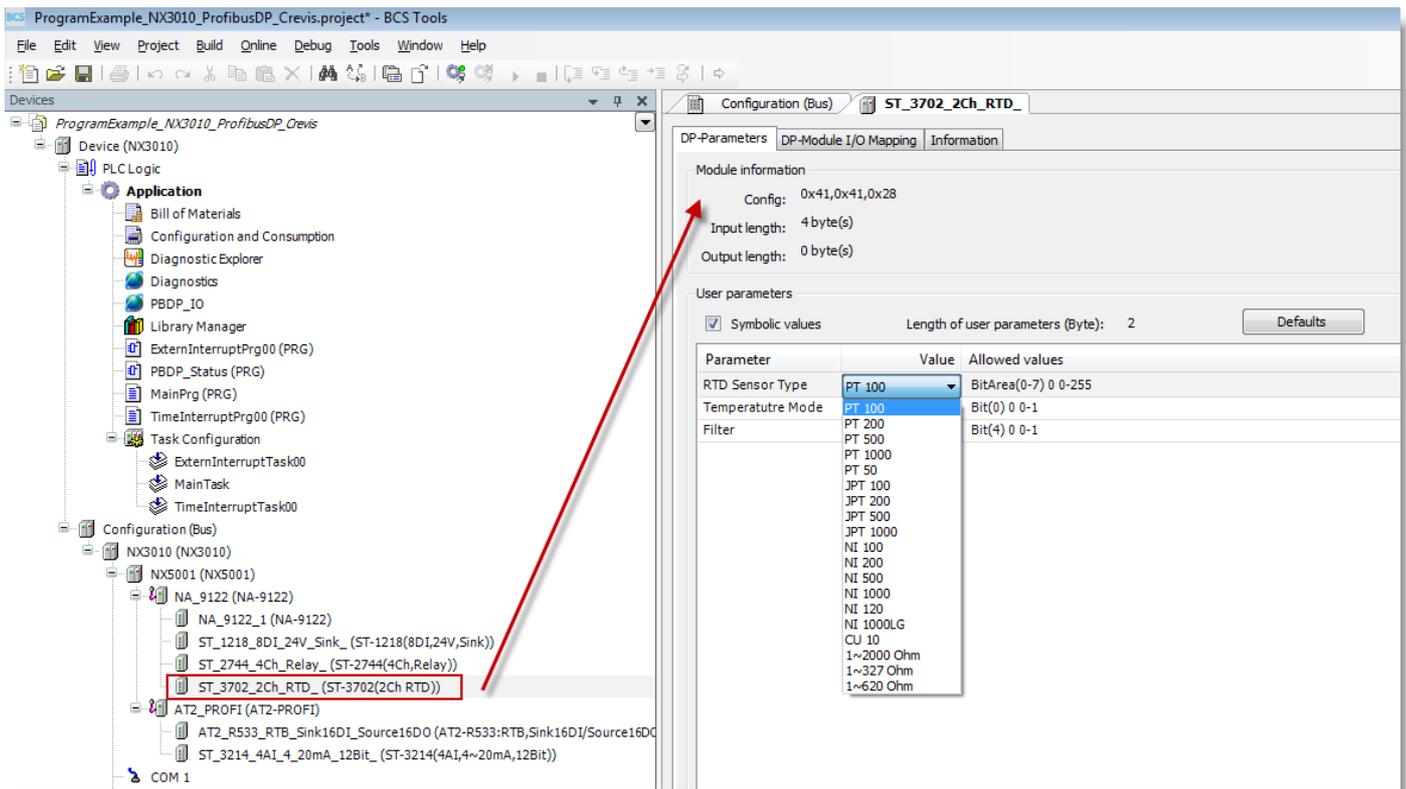


### 5.5 Configure the Crevis NA-9122 slave

Double-click the NA-9122 slave to set the general parameters like station number, watchdog time and other slave specific parameters.



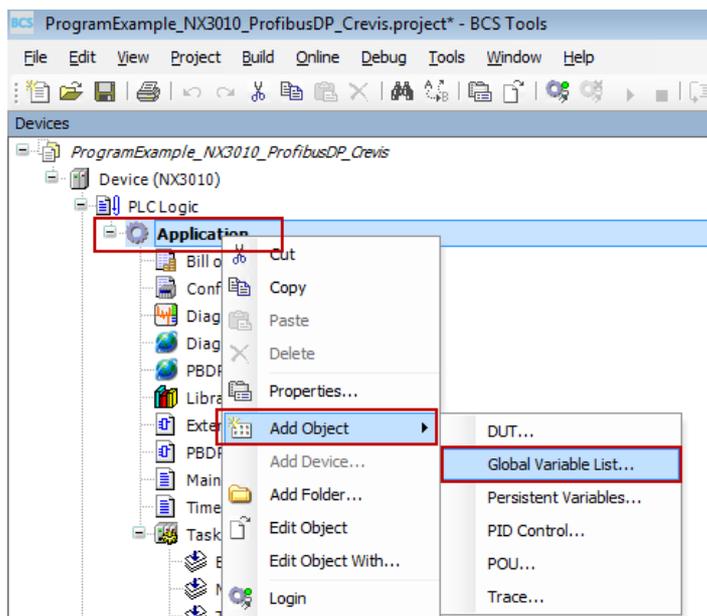
If the specific modules in the slave has parameters, these can be modified by double-clicking the module itself.

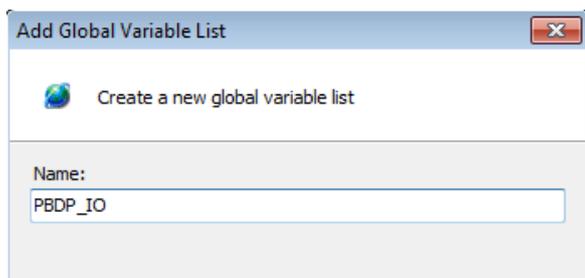


### 5.6 Create and map the I/O data to variables

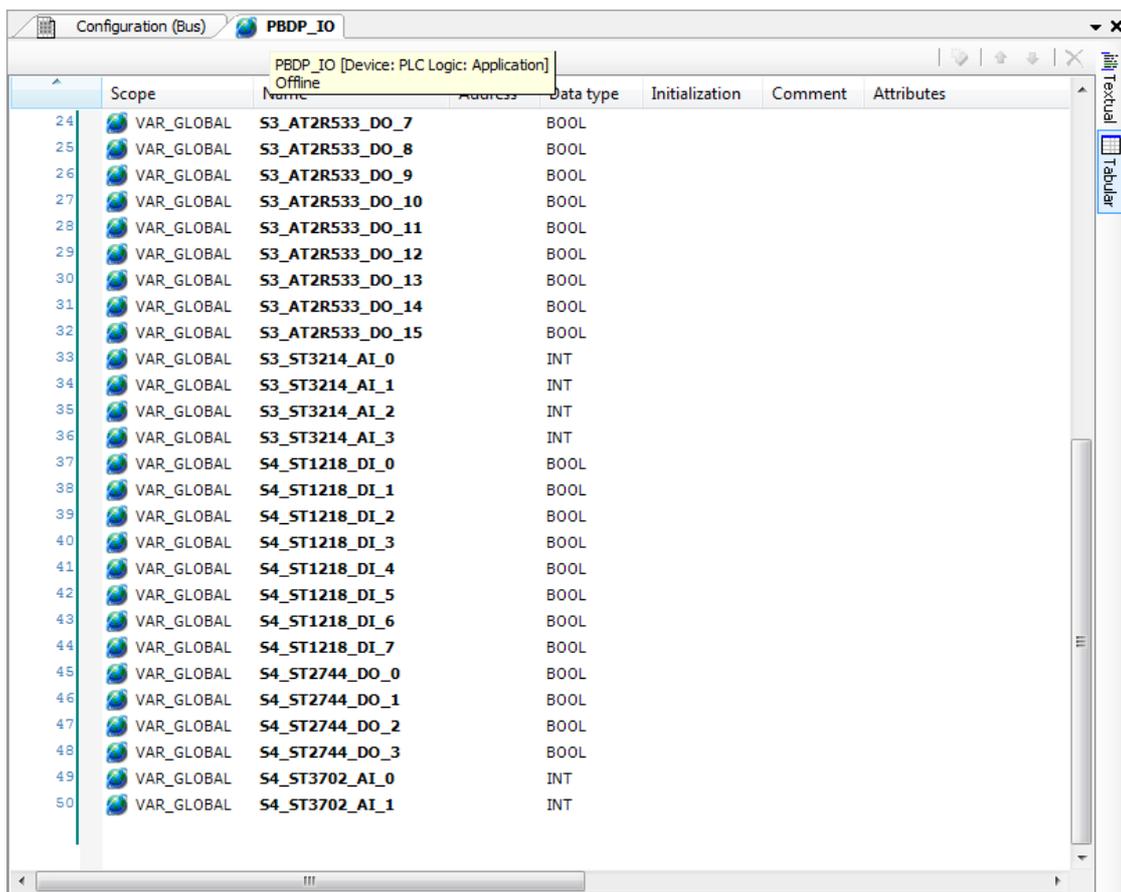
To map the signals that are read and written to the Profibus DP slave follow these steps.

The first step is to create a Global Variable List, GVL. To create a new GVL, right-click your application and choose Add Object\Global Variable List.



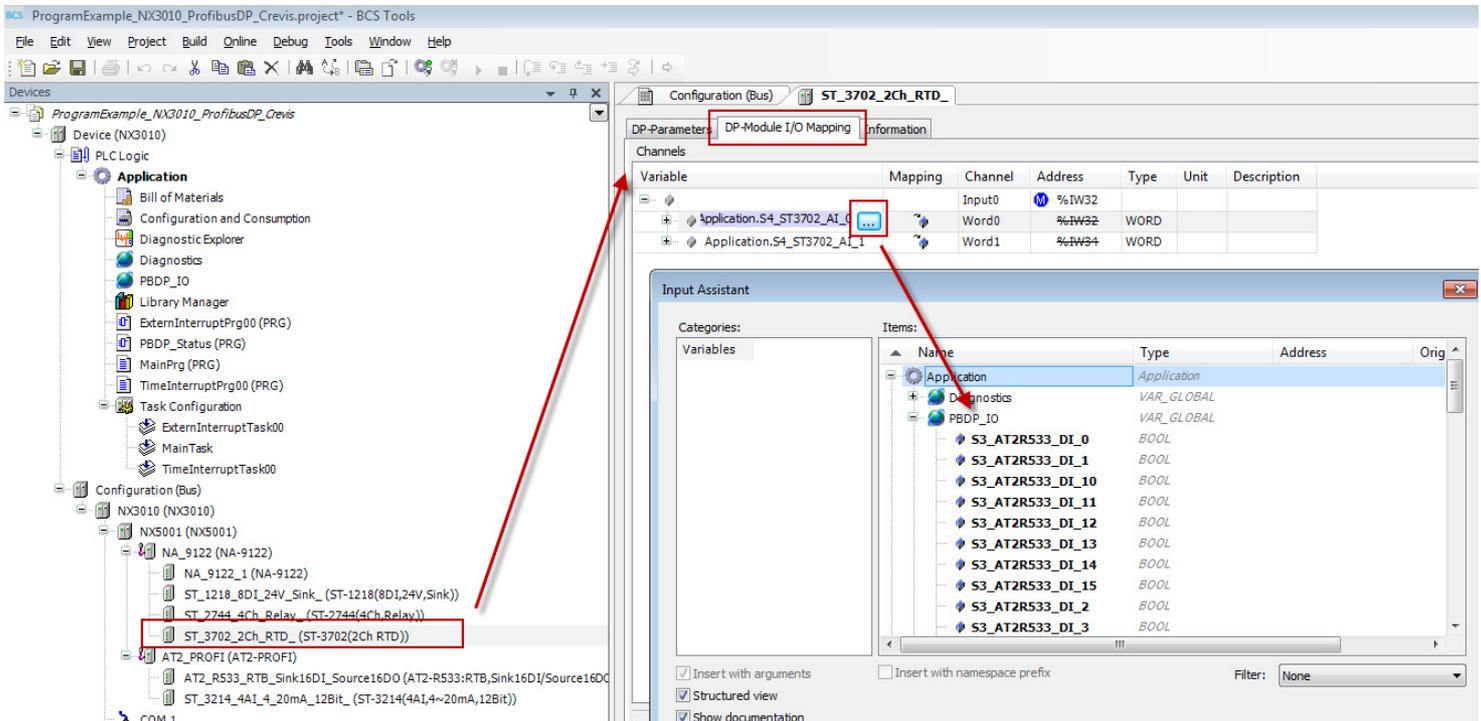


The second step is to create the user variables where the data from the slave will be available.



The third step is to link the user variables to the slave. Double-click the module in the Profibus DP slave where the variables will be connected

Click the DP-Module I/O mapping tab and then click the button to select from the variables created earlier.



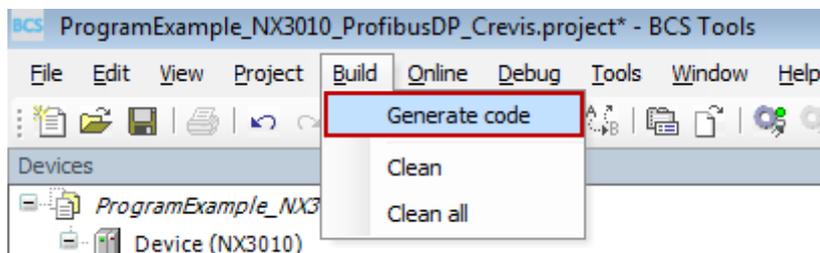
The configuration of the slave is now completed and the next step is to compile the project.

## 6 Compile and download of the project

This chapter describes how to compile and download the project.

### 6.1 Compile of the project

When the configuration has been completed the project has to be compiled. To compile the project click the menu Build\Generate code.



Once the code generation has been successful it's time to download the project.

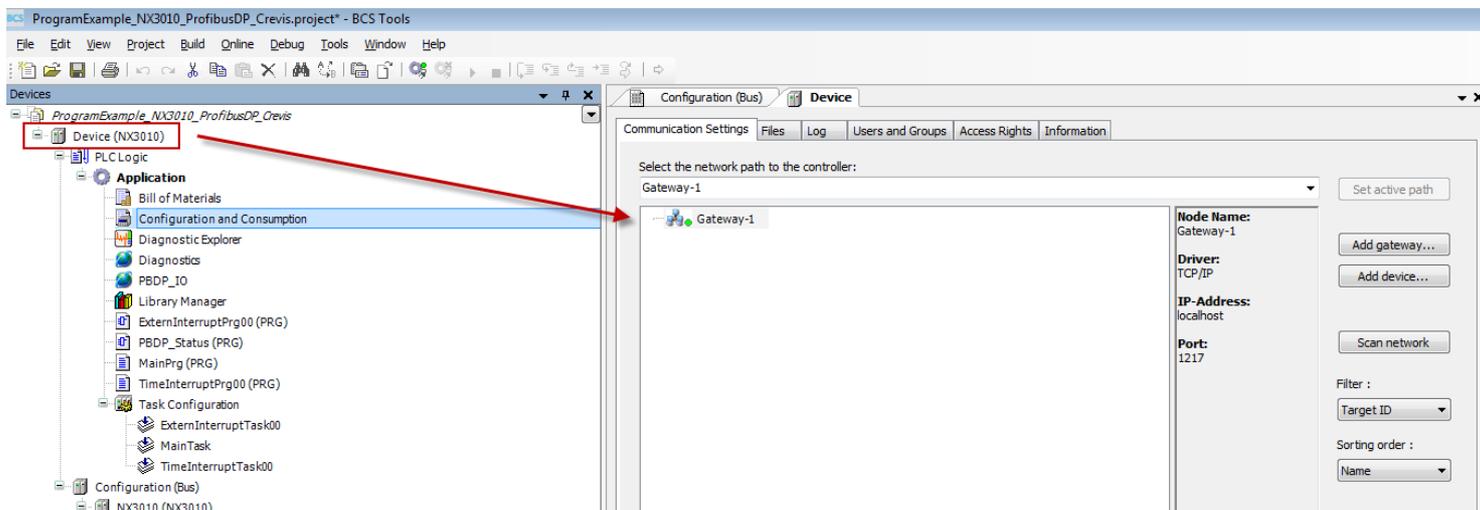
### 6.2 Download of the project

To download the project the accesspath to the cpu must be configured. The access must be made via the built-in ethernet port of the cpu. The default IP-address of NET1 is 192.168.15.1

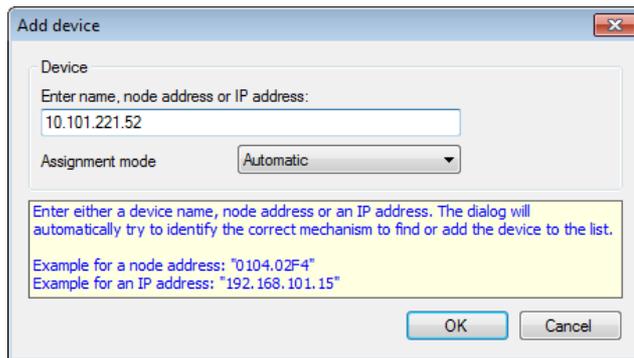
NET 1	
IP Address	192.168.15.1
Subnet Mask	255.255.255.0
Gateway Address	192.168.15.253

In case of using the NX3020 or NX3030 with two ethernet ports NET1 must be used for communication with BCS Tools.

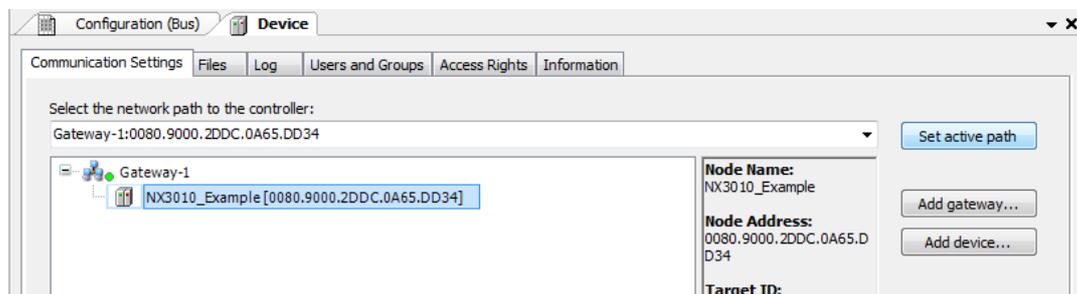
Double-click the device in the project tree to access the communication settings.



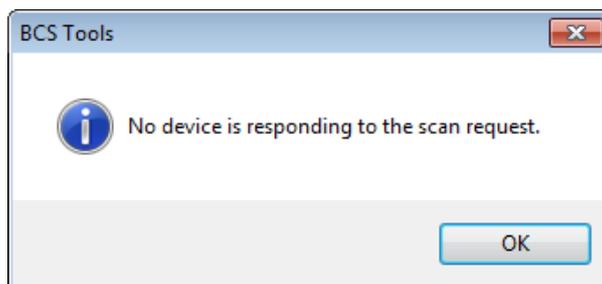
Choose the Scan Network option or add the device manually by clicking the Add device button.



If the cpu is found on the network it will be shown in the list.



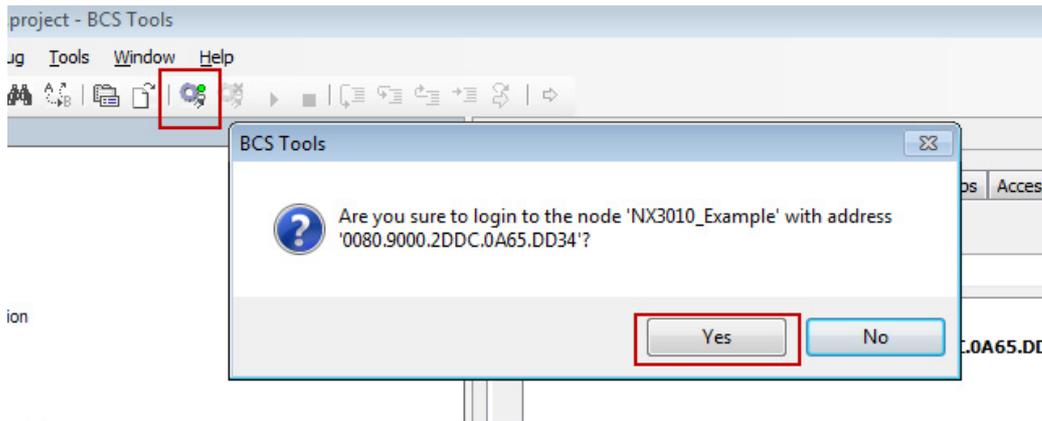
If cpu is unavailable an error message will be shown.



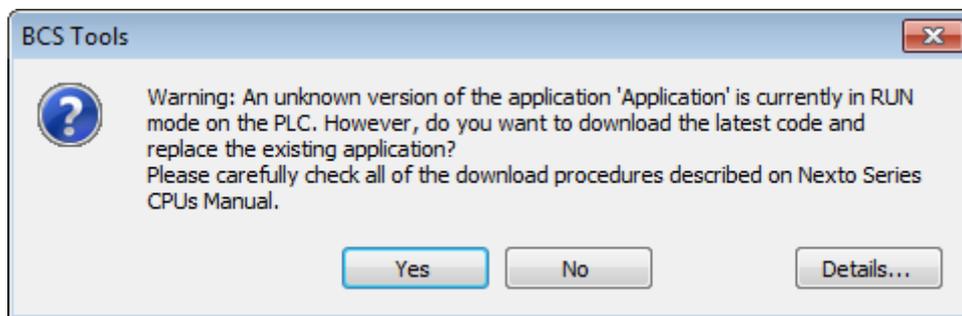
When the cpu has been found click the button Set active path. The cpu in the list will be bold to indicate that this is the path that will be used when an online action is made.



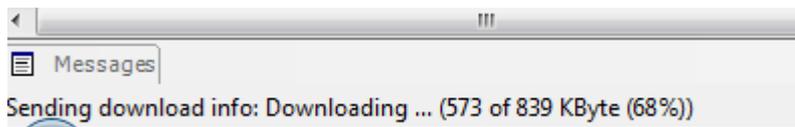
To download the project click the Login button and click the Yes button.



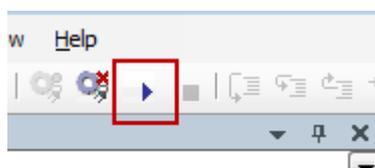
If the cpu is empty or if there is another project running BCS Tools will prompt the user to confirm the download. The cpu will be stopped and the older project will be overwritten.



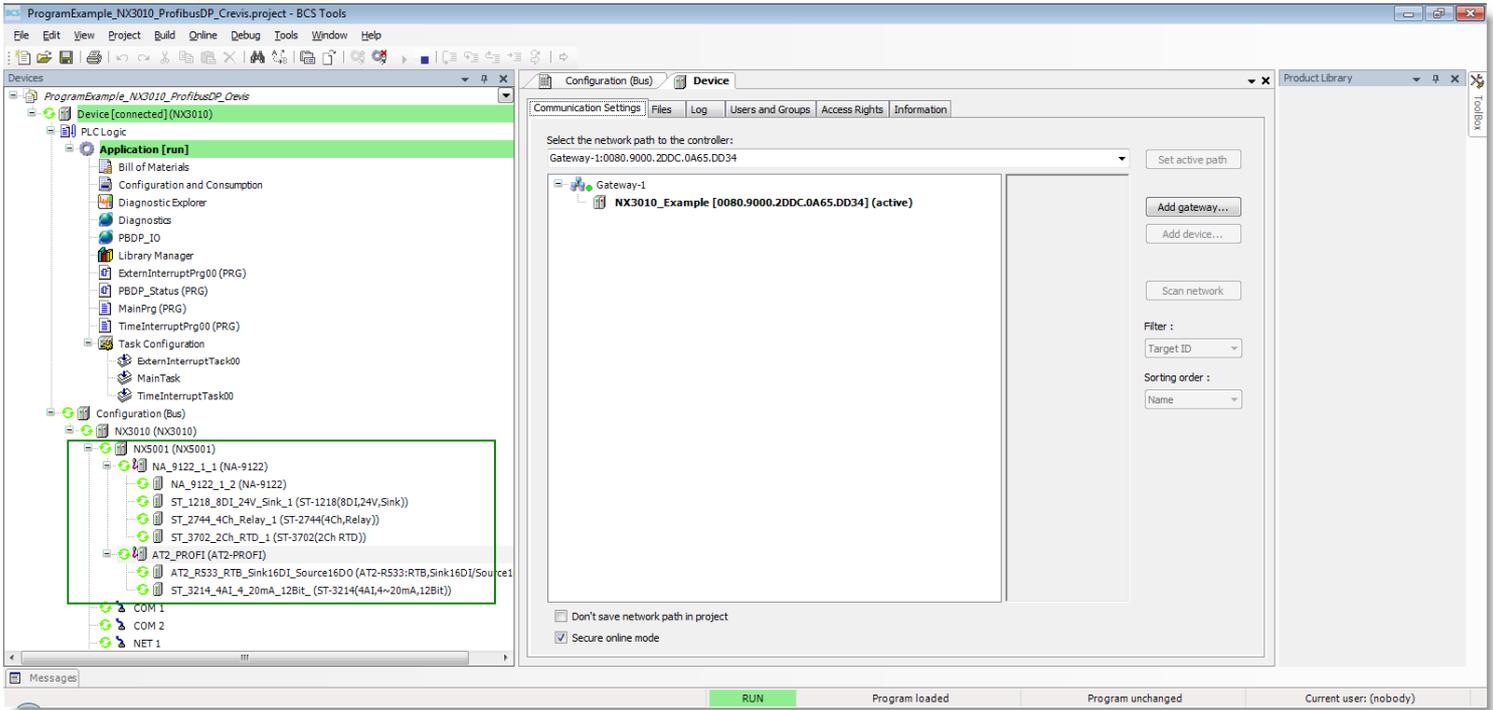
The progress of the download can be found down in the left corner of BCS Tools.



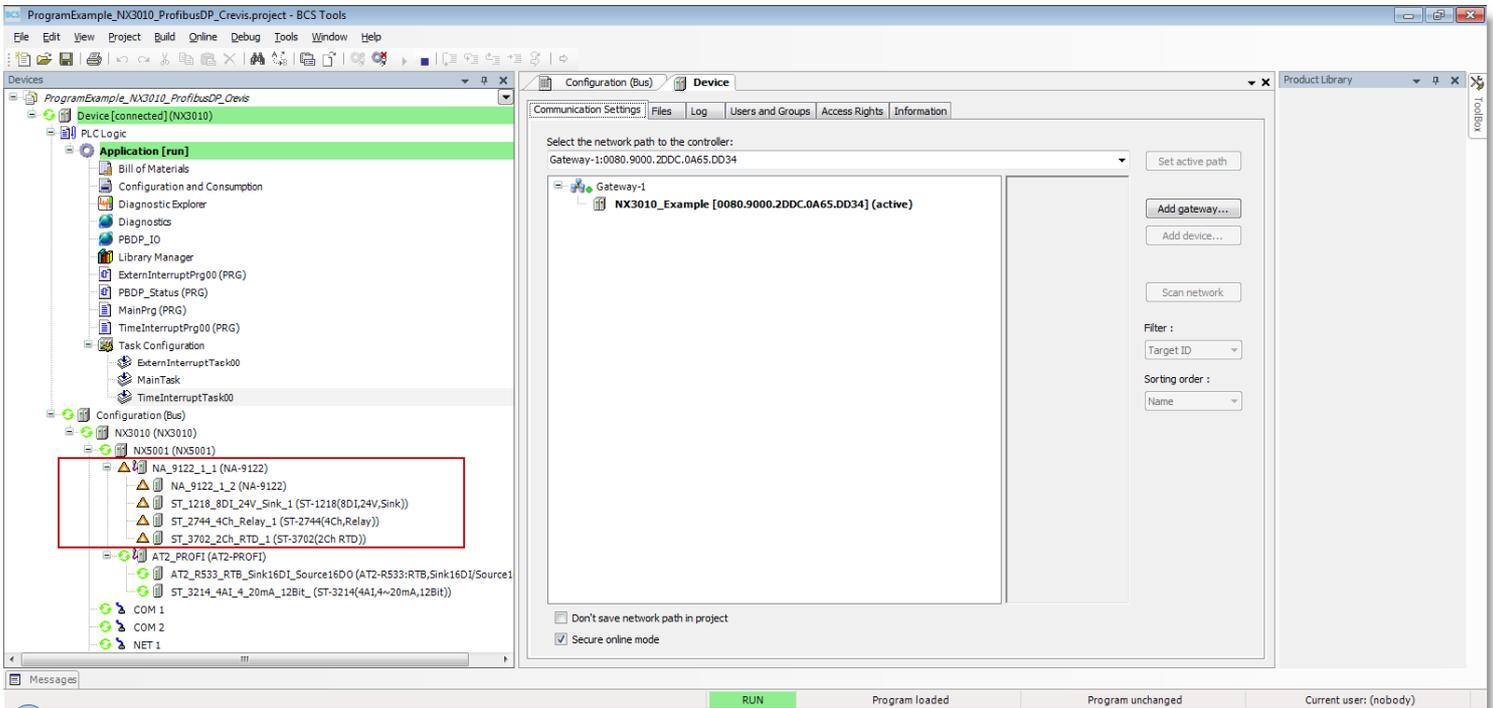
When the download is completed the cpu is in STOP state. To set the cpu into RUN state press the run button. No reset or power on/off is necessary after the download even if parameters has been changed.



The status of the cpu and the Profibus DP slaves can be found in BCS Tools.



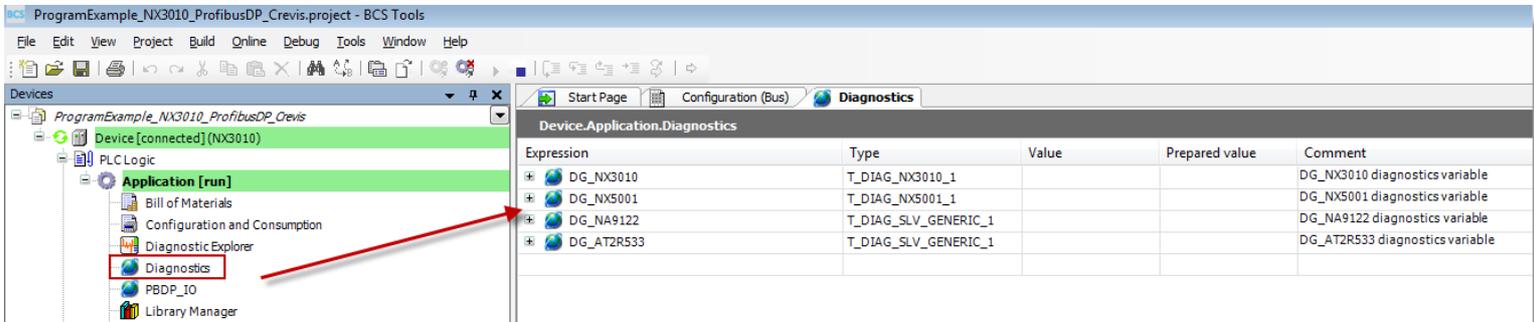
If a Profibus DP slave is missing in the network this will be visualized with a orange triangle.



## 7 Communication interlock signal

For every module mounted in the Nexto system, BCS Tools creates diagnostic structures. These structures contains detailed information of the cpu, communication module, Profibus DP slave etc.

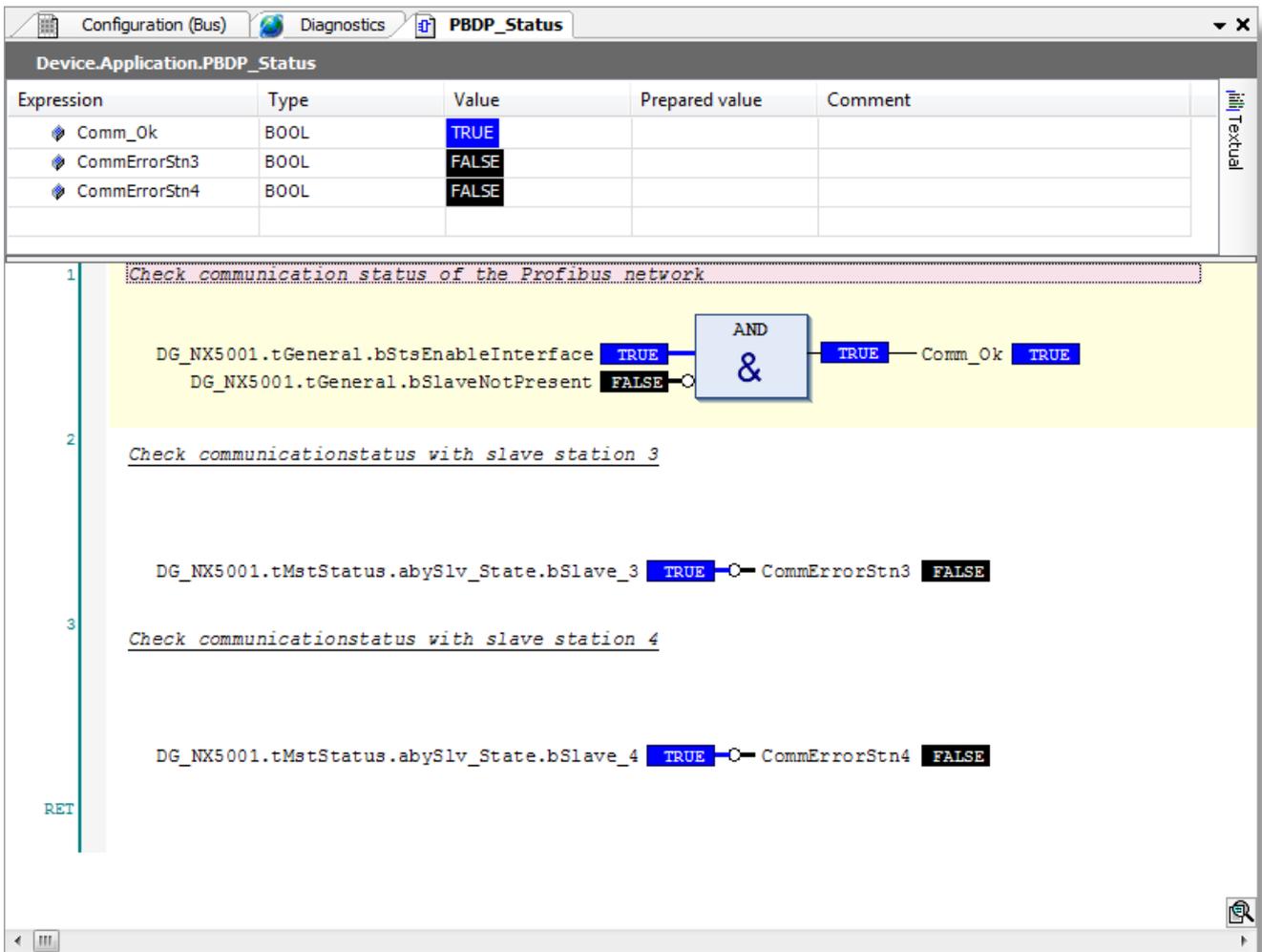
For more details about these structures refer to the User’s manual of the specific module or the CPU User’s manual.



### 7.1 Example of how to create a communication interlock signal

This is an example of how we can create a Comm\_OK signal. When any of the configured slaves stops responding to the master this flag will be set to FALSE.

There is also flags available for independent communication control of each slave.



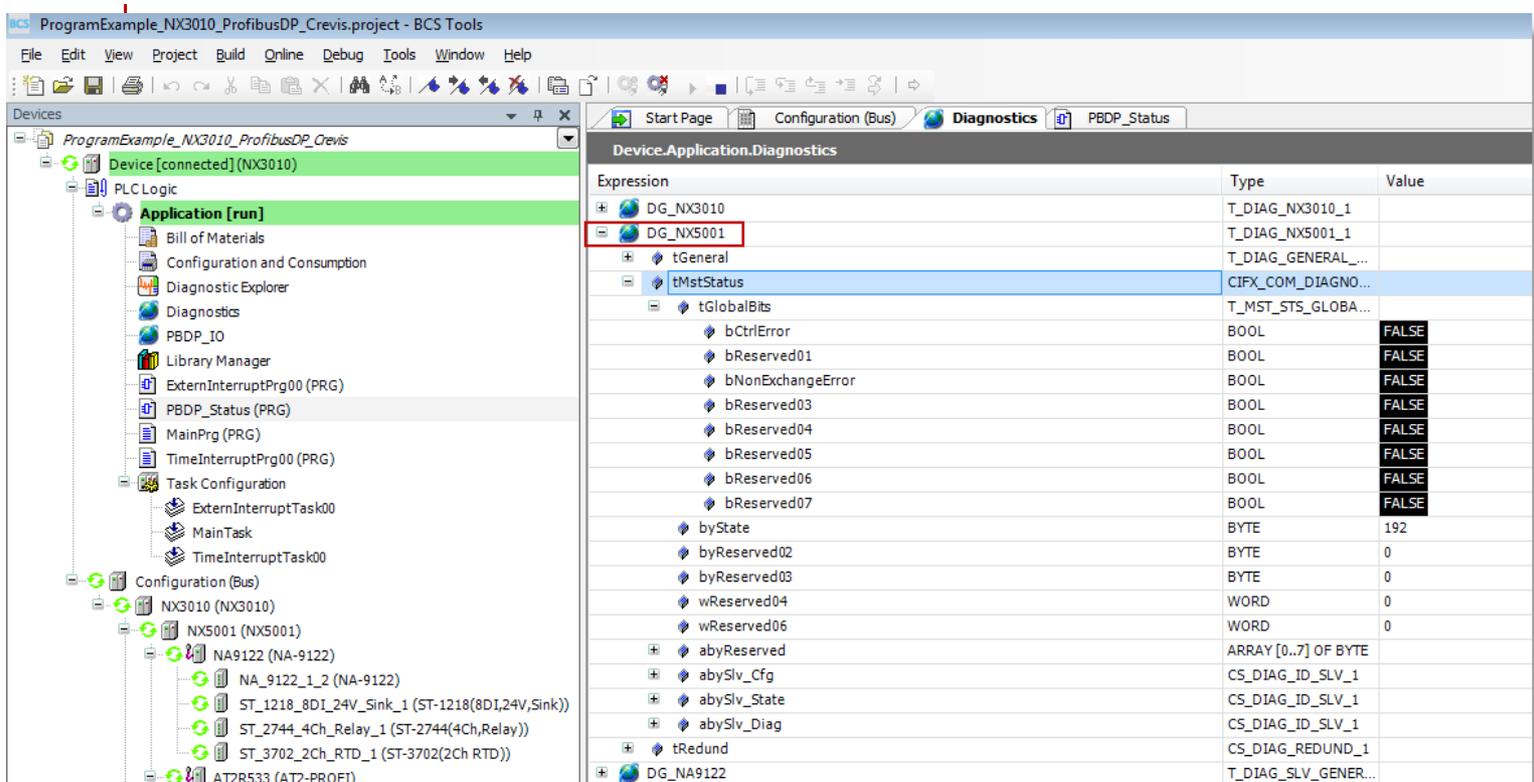
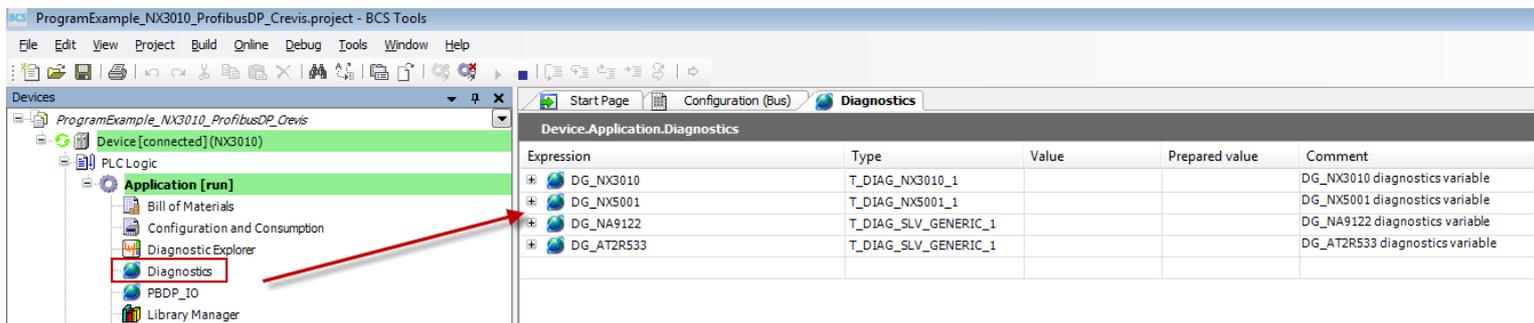
## 8 Troubleshooting

To troubleshoot and get diagnostics from the Nexto system there are several possibilities available.

- Diagnostics structures, created automatically in BCS Tools.
- The OTD, One Touch Diagnostics function and LED:s on the NX5001 module.
- Diagnostics via the WWW page in the cpu.

### 8.1 Diagnostic structures

When the NX5001 is inserted a data structure is created automatically located in a list named Diagnostics. This list will be populated with diagnostics structures for all hardware inserted in BCS Tools.



The diagnostics variables DG\_NX5001.tMstStatus.abvSlv\_Cfg.bSlave\_xx are variables representing the configured slaves in the project.

For example DG\_NX5001.tMstStatus.abvSlv\_Cfg.bSlave\_3 is a Profibus DP slave with station number 3. The value TRUE = configured and FALSE = not configured.

Expression	Type	Value
DG_NX3010	T_DIAG_NX3010_1	
DG_NX5001	T_DIAG_NX5001_1	
tGeneral	T_DIAG_GENERAL_...	
tMstStatus	CIFX_COM_DIAGNO...	
tGlobalBits	T_MST_STS_GLOBA...	
byState	BYTE	192
byReserved02	BYTE	0
byReserved03	BYTE	0
wReserved04	WORD	0
wReserved06	WORD	0
abyReserved	ARRAY [0..7] OF BYTE	
abySlv_Cfg	CS_DIAG_ID_SLV_1	
bSlave_0	BOOL	FALSE
bSlave_1	BOOL	FALSE
bSlave_2	BOOL	FALSE
bSlave_3	BOOL	TRUE
bSlave_4	BOOL	TRUE
bSlave_5	BOOL	FALSE
bSlave_6	BOOL	FALSE

The diagnostics variables DG\_NX5001.tMstStatus.abvSlv\_State.bSlave\_xx are variables representing the online status of the configured slaves in the project.

For example DG\_NX5001.tMstStatus.abvSlv\_State.bSlave\_3 is a Profibus DP slave with station number 3. The value TRUE = online and FALSE = offline.

Expression	Type	Value
DG_NX3010	T_DIAG_NX3010_1	
DG_NX5001	T_DIAG_NX5001_1	
tGeneral	T_DIAG_GENERAL_...	
tMstStatus	CIFX_COM_DIAGNO...	
tGlobalBits	T_MST_STS_GLOBA...	
byState	BYTE	192
byReserved02	BYTE	0
byReserved03	BYTE	0
wReserved04	WORD	0
wReserved06	WORD	0
abyReserved	ARRAY [0..7] OF BYTE	
abySlv_Cfg	CS_DIAG_ID_SLV_1	
abySlv_State	CS_DIAG_ID_SLV_1	
bSlave_0	BOOL	FALSE
bSlave_1	BOOL	FALSE
bSlave_2	BOOL	FALSE
bSlave_3	BOOL	FALSE
bSlave_4	BOOL	FALSE
bSlave_5	BOOL	FALSE
bSlave_6	BOOL	FALSE

For more information about the structures refer to the User's manual of the NX5001.

## 8.2 OTD and LED information

PROFIBUS DP Master NX5001 has two LEDs in its front panel to indicate diagnostics related to the PROFIBUS interface:

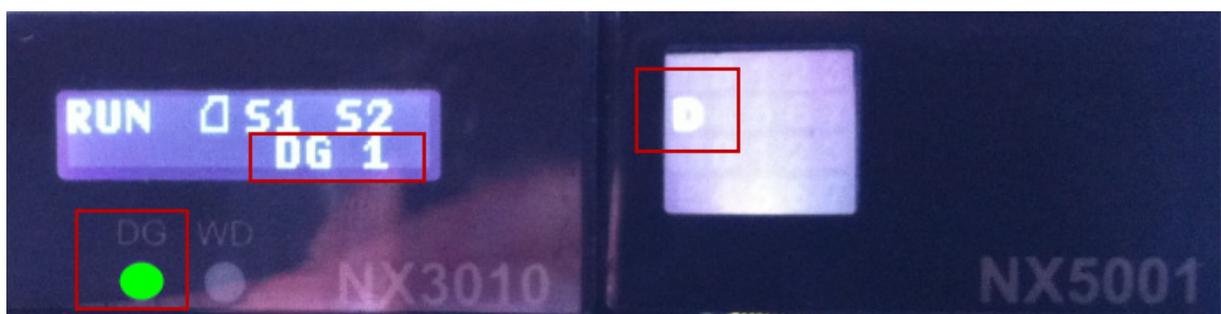
LED ST: green

LED ER: red

LED ST	LED ER	Meaning	Causes
Off	Off	Module Off Hardware Failure	<ul style="list-style-type: none"> <li>No power supply.</li> <li>Hardware failure.</li> </ul>
On	Off	Slave communication established.	<ul style="list-style-type: none"> <li>All slave communications were reestablished.</li> </ul>
On	Flashing	There are present and absent slaves in the PROFIBUS network.	<ul style="list-style-type: none"> <li>Some PROFIBUS slaves are exchanging I/O data with NX5001, others aren't.</li> <li>PROFIBUS termination problem.</li> </ul>
Off	On	No activity in the PROFIBUS network.	<ul style="list-style-type: none"> <li>Loss of communication with all slaves.</li> <li>PROFIBUS network cable not connected.</li> <li>PROFIBUS network damaged.</li> <li>PROFIBUS termination problem.</li> </ul>
Flashing	Off	NX5001 received configuration.	<ul style="list-style-type: none"> <li>NX5001 has received the CPU configuration, but the communication wasn't enabled by the application.</li> </ul>
Flashing 4x	Off	NX5001 isn't unconfigured.	<ul style="list-style-type: none"> <li>NX5001 hasn't received the slave and the PROFIBUS bus configuration from the CPU.</li> </ul>
On	On	NX5001 initialization.	<ul style="list-style-type: none"> <li>NX5001 was connected to the Nexto bus, or restarted.</li> </ul>

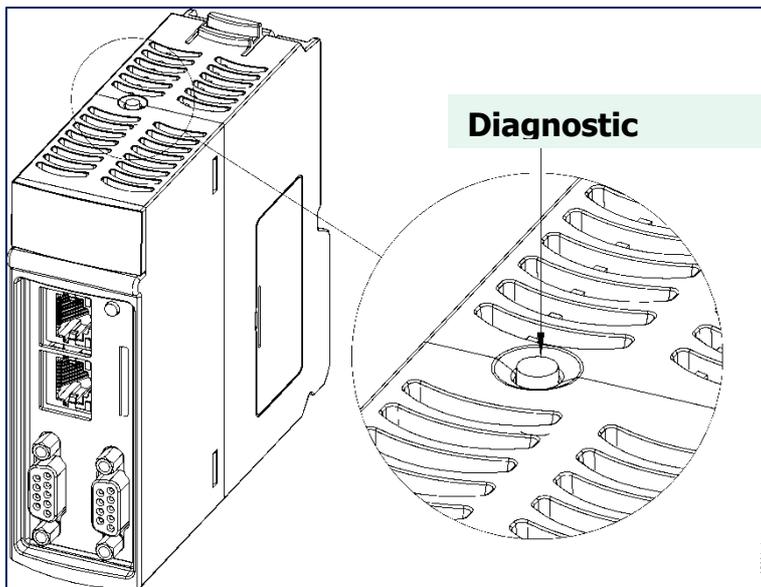
When there is diagnostics available from the NX5001 module the letter **D** will blink on the NX5001 display and the cpu will display the number of diagnostic messages available and the DG led will blink 2x fast

*CPU and NX5001 display.*

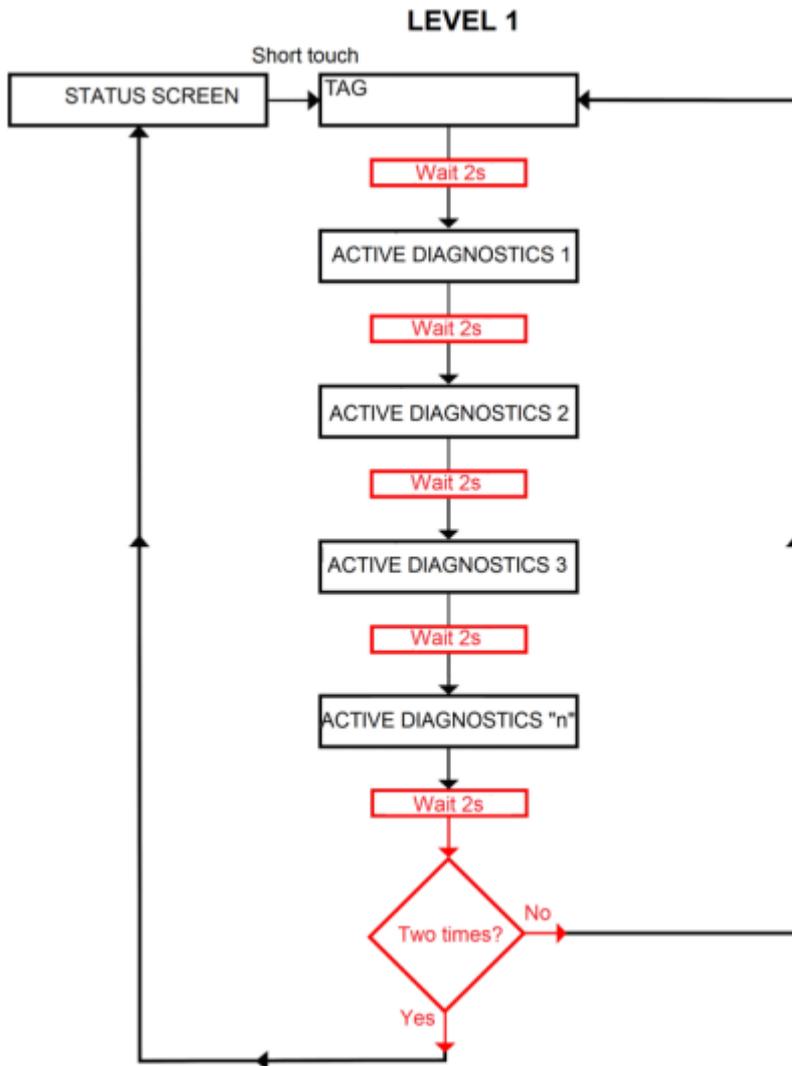


DG 1 indicates that there is one diagnostic message available.

To check the diagnostic message in the display just press the OTD button on the NX5001, located on the top of the module.

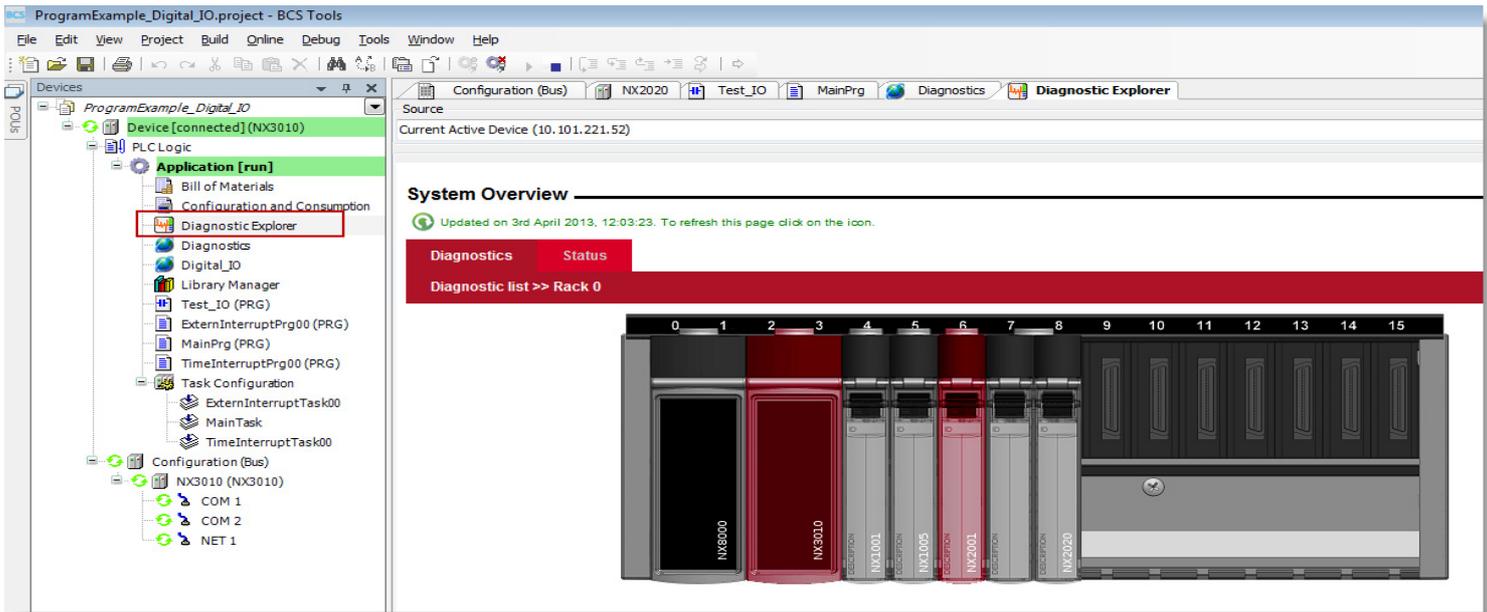


The diagnostics available will be displayed according to the following flowchart.

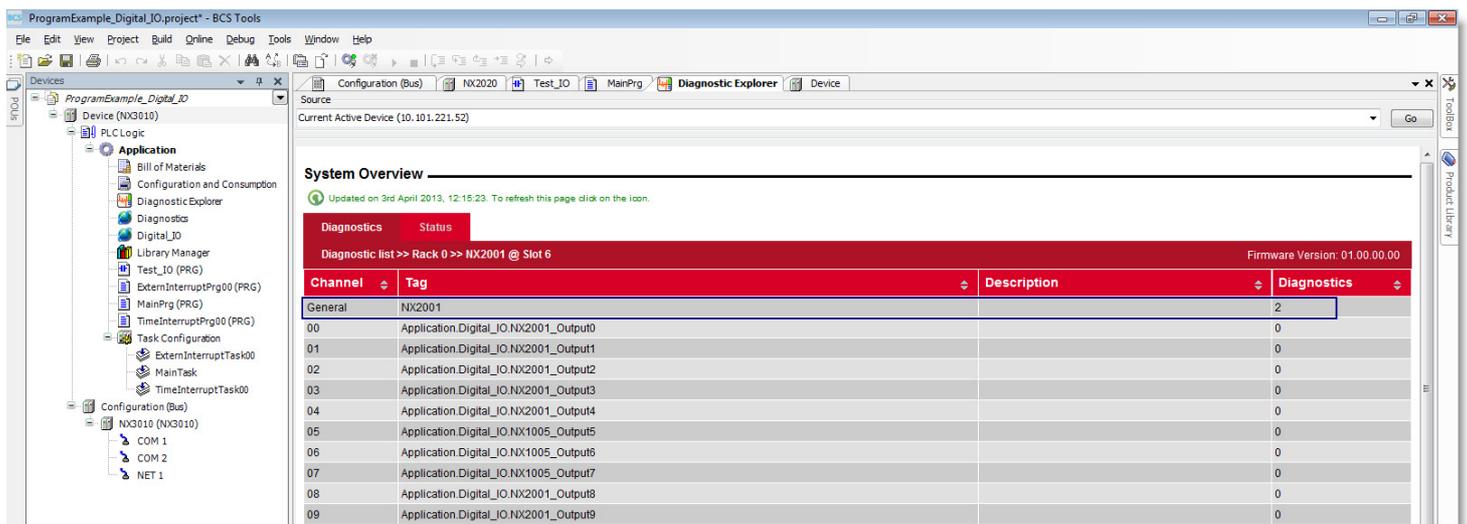


### 8.3 Diagnostics using the Diagnostic Explorer in BCS Tools

Double click the Diagnostic Explorer in the project tree.

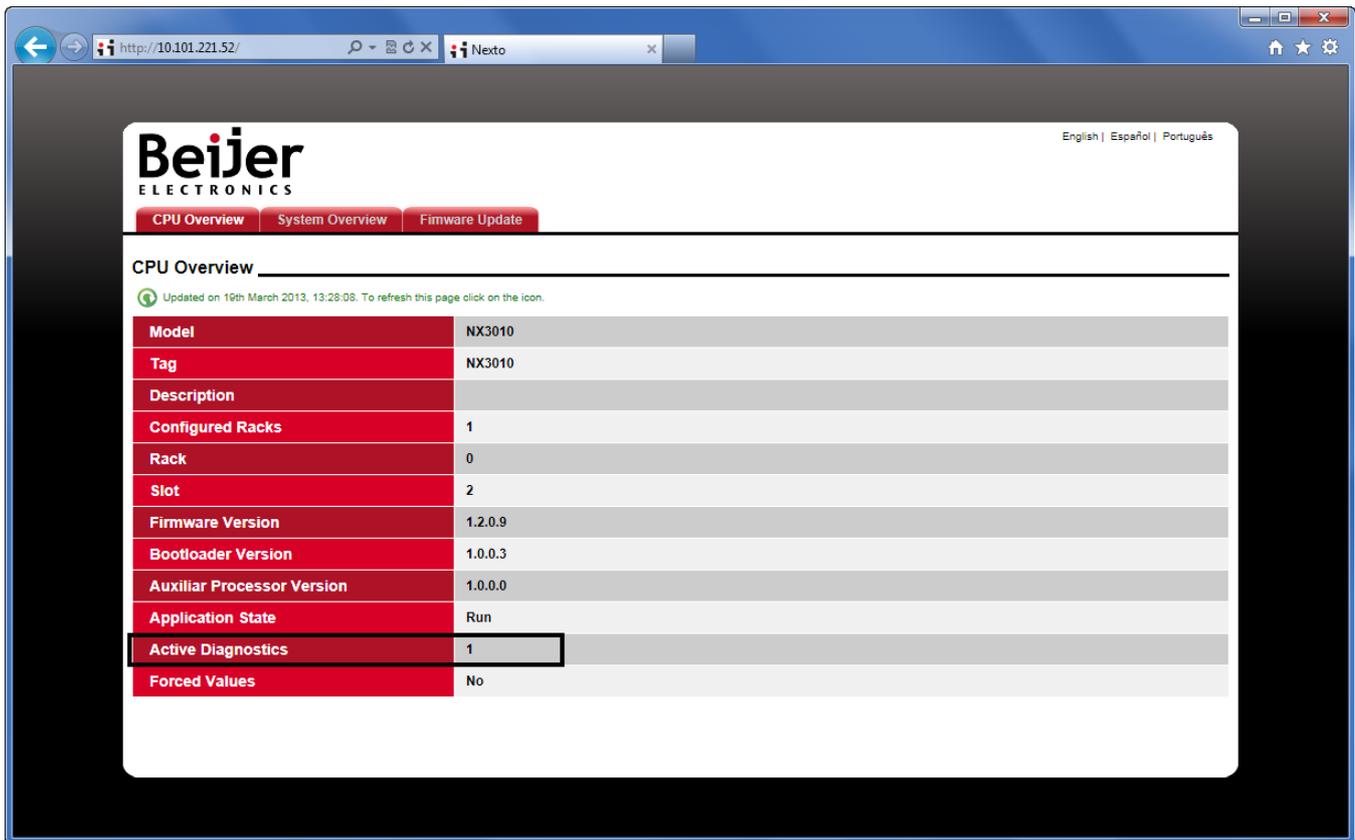


Modules with diagnostics will blink with a red colour. Click on the module with diagnostics to get details.

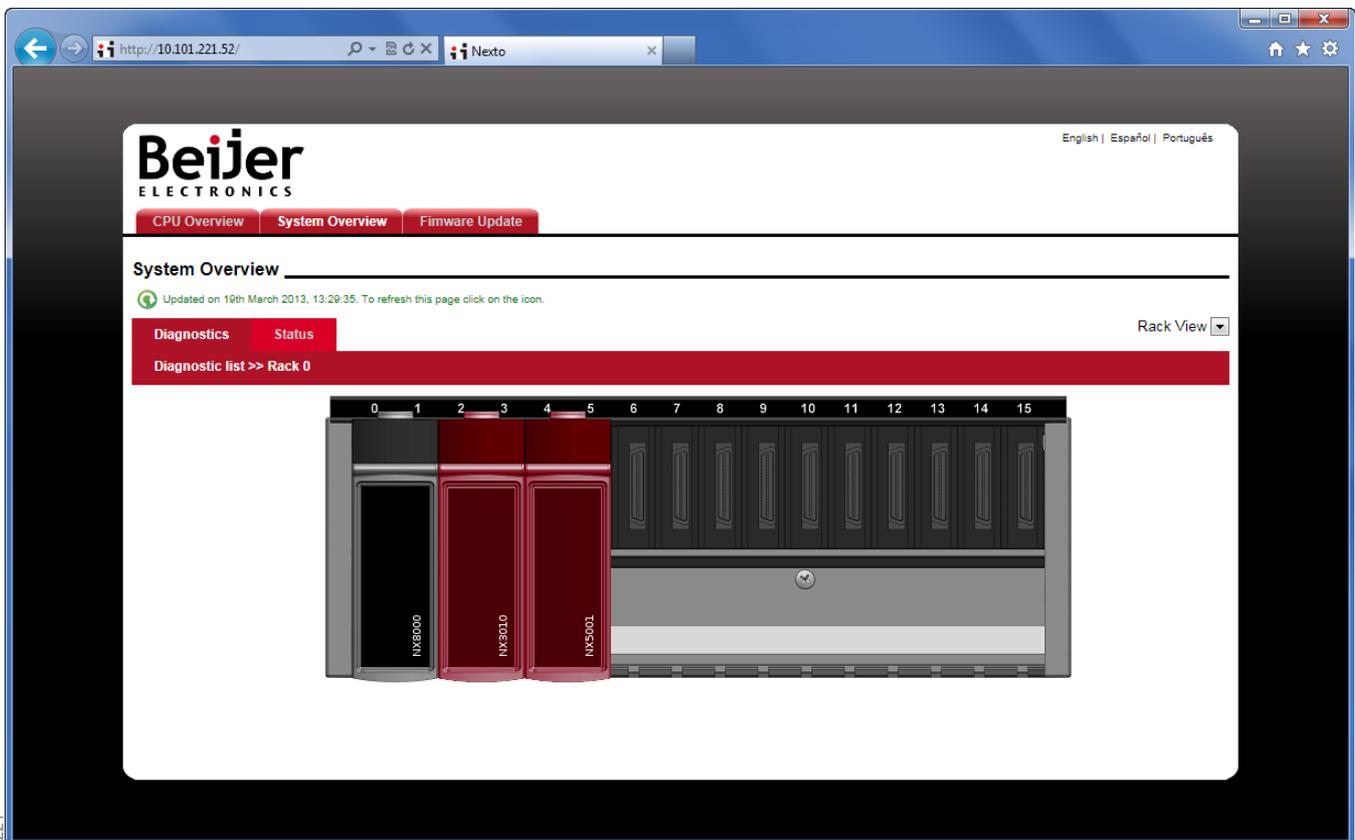


### 8.4 Diagnostics using the web browser

Start a web browser and type in the IP-address of the Nexto system.

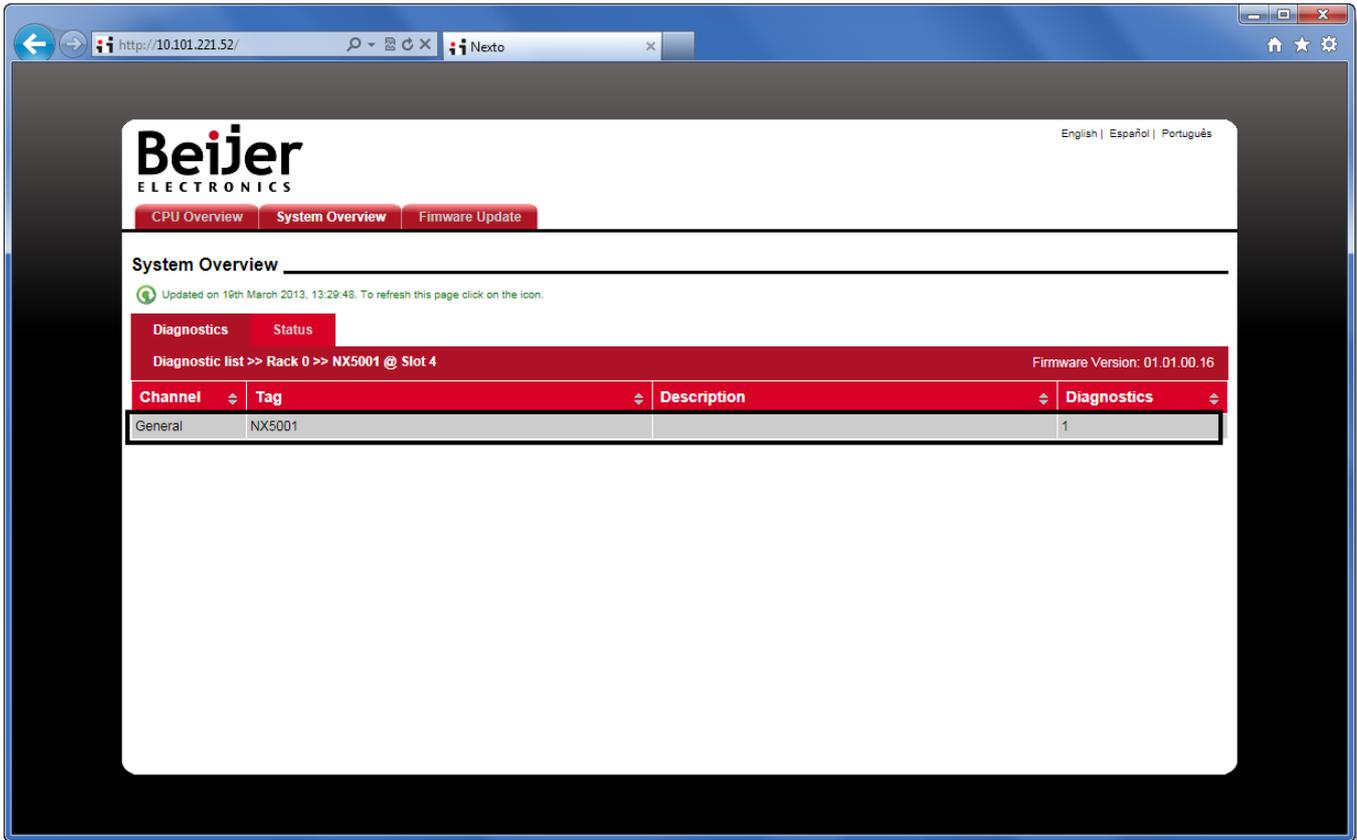


Modules with diagnostics will blink with a red colour. Click on the NX5001 module.



Kl\_eng.dot, 070921

A diagnostic list from the NX5001 will be shown, click the row to get details.



In this case a Profibus DP slave is offline.

