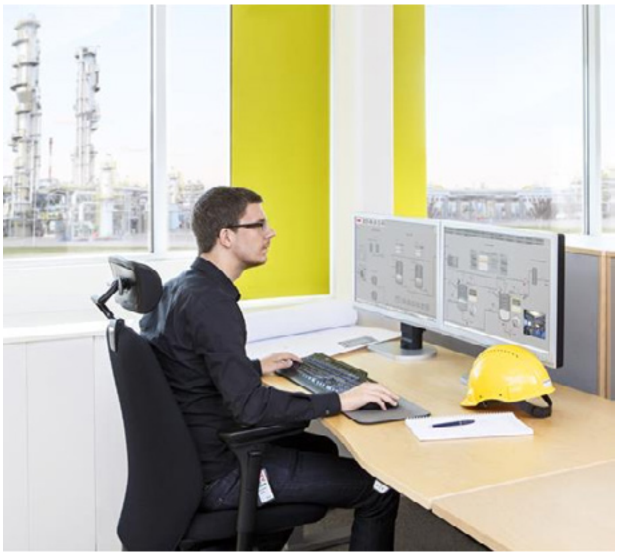
Application note: Profinet slave to 800xA
Connecting a Profinet slave to the 800xA

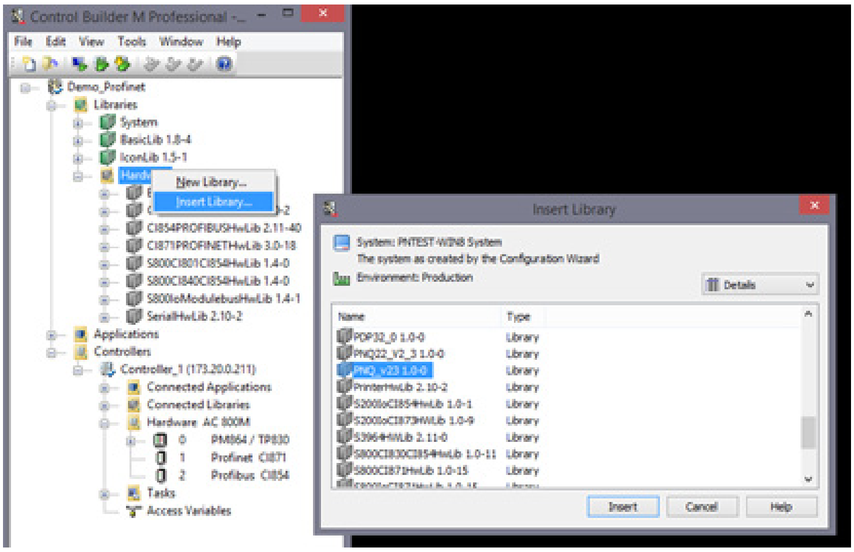
In this application note will be explained how to connect and configure a Profinet slave to the 800xA system. A PNQ22.0 with 4 connected UMC motor controller will be used as Profinet slave.



This document is the second out of three documents. The first document describes how to open the Control Builder M and how to create a new project and configuring the hardware. This document builds on the first document. The third document “Application Note Connecting a Profibus slave to the 800xA“ includes the configuration of a Profibus network and an example how to connect a UMC100.3 democase via PDP32.0 communication plug.

Adding the slave to the Profinet network

1. Open the Control Builder M and a new or existing project
2. Open “Libraries” in the project tree and click with right on “Hardware” to insert a library (“Insert library”)
3. Choose “PNQ_V23 1.0-0” and insert it.



System: PNTEST-WIN8 System
The system as created by the Configuration Wizard
Environment: Production

Name	Type
PDP32_0 1.0-0	Library
PNQ22_V2_3 1.0-0	Library
PNQ_v23 1.0-0	Library
PrinterHwLib 2.10-2	Library
S200IoCI854HwLib 1.0-1	Library
S200IoCI873HWLib 1.0-9	Library
S396HWLib 2.11-0	Library
S800CI830CI854HwLib 1.0-11	Library
S800CI871HwLib 1.0-15	Library

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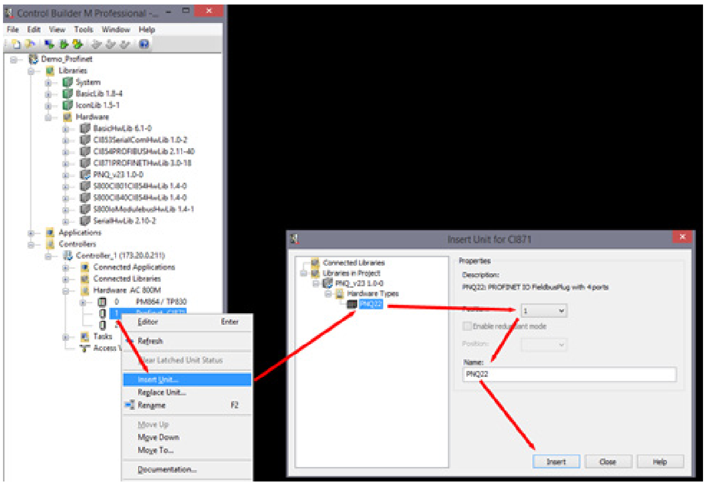
4. With a right click on the Profinet module and selection of “Insert Unit”, choose the PNQ and insert it to the module.

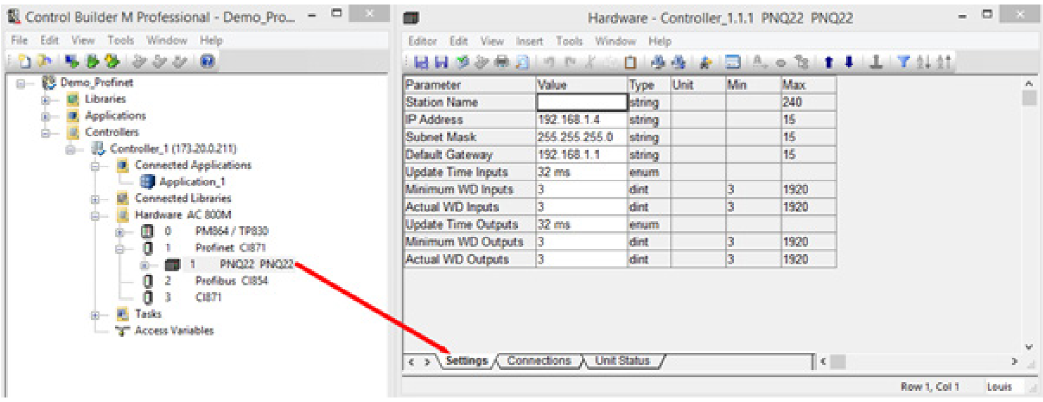


Description:
PNQ22: PROFINET IO FieldbusPlug with 4 ports

Position: 1

Name: PNQ22

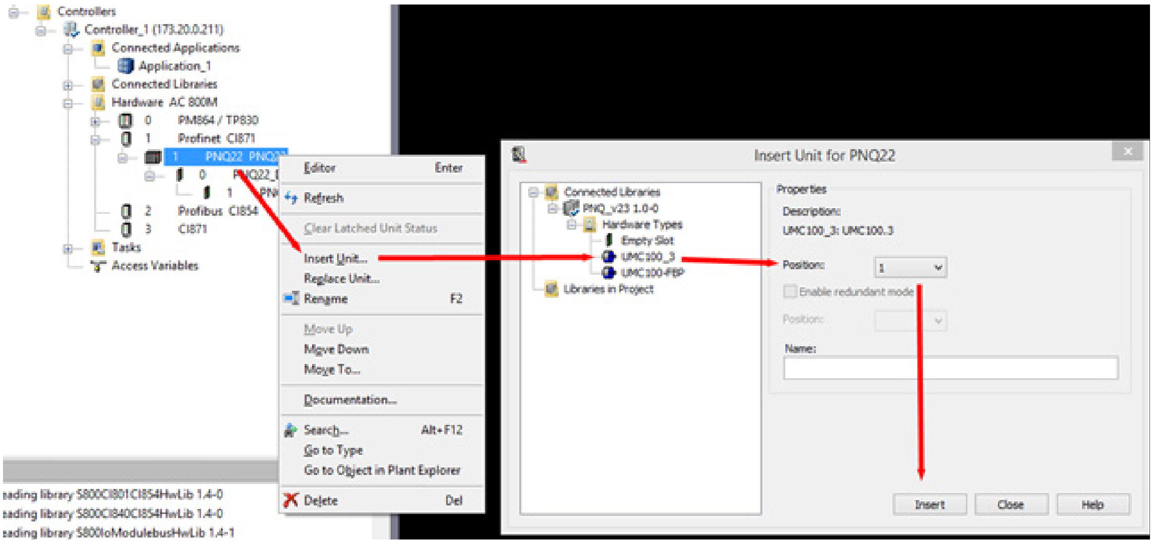
5. Double-click on the PNQ to open the hardware configuration of the PNQ. Open the “Settings” ribbon below in the window to configure a part of the PNQ.



Parameter	Value	Type	Unit	Min	Max
Station Name		string			240
IP Address	192.168.1.4	string			15
Subnet Mask	255.255.255.0	string			15
Default Gateway	192.168.1.1	string			15
Update Time Inputs	32 ms	enum			
Minimum WD Inputs	3	dint		3	1920
Actual WD Inputs	3	dint		3	1920
Update Time Outputs	32 ms	enum			
Minimum WD Outputs	3	dint		3	1920
Actual WD Outputs	3	dint		3	1920

6. Please enter the station name, the IP-address, the subnet mask and the default gateway and save it (NOTE: In case the station name is unknown you can use the integrated webserver of the 800M controller where you can analyze all connected slaves. This will be explained in another application note.).

7. The UMC can be added with a right click on the PNQ by choosing “Insert Unit”. After choosing the profile (UMC100 or UMC100.3) and the position it will be added with a click on “Insert”. In case one of the ports is not used, insert an “Empty Slot” at the equivalent postion.



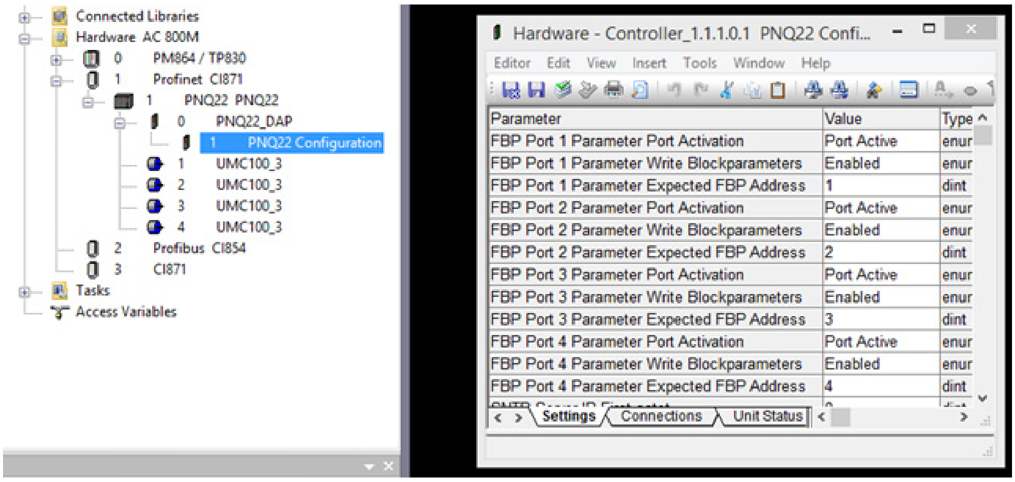
Description:
UMC100_3: UMC100.3

Position: 1

Name:

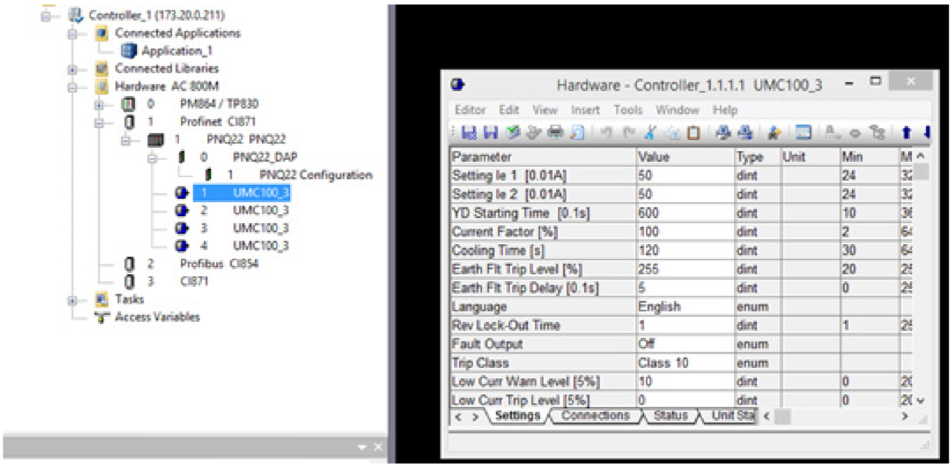
eading library S800CI801CI854HwLib 1.4-0
eading library S800CI840CI854HwLib 1.4-0
eading library S800IoModulebusHwLib 1.4-1

8. By opening “PNQ configuration” each port can be configured with an expected FBP-address.



Parameter	Value	Type
FBP Port 1 Parameter Port Activation	Port Active	enur
FBP Port 1 Parameter Write Blockparameters	Enabled	enur
FBP Port 1 Parameter Expected FBP Address	1	dint
FBP Port 2 Parameter Port Activation	Port Active	enur
FBP Port 2 Parameter Write Blockparameters	Enabled	enur
FBP Port 2 Parameter Expected FBP Address	2	dint
FBP Port 3 Parameter Port Activation	Port Active	enur
FBP Port 3 Parameter Write Blockparameters	Enabled	enur
FBP Port 3 Parameter Expected FBP Address	3	dint
FBP Port 4 Parameter Port Activation	Port Active	enur
FBP Port 4 Parameter Write Blockparameters	Enabled	enur
FBP Port 4 Parameter Expected FBP Address	4	dint

9. With a double click on each UMC, the block parameter can be defined



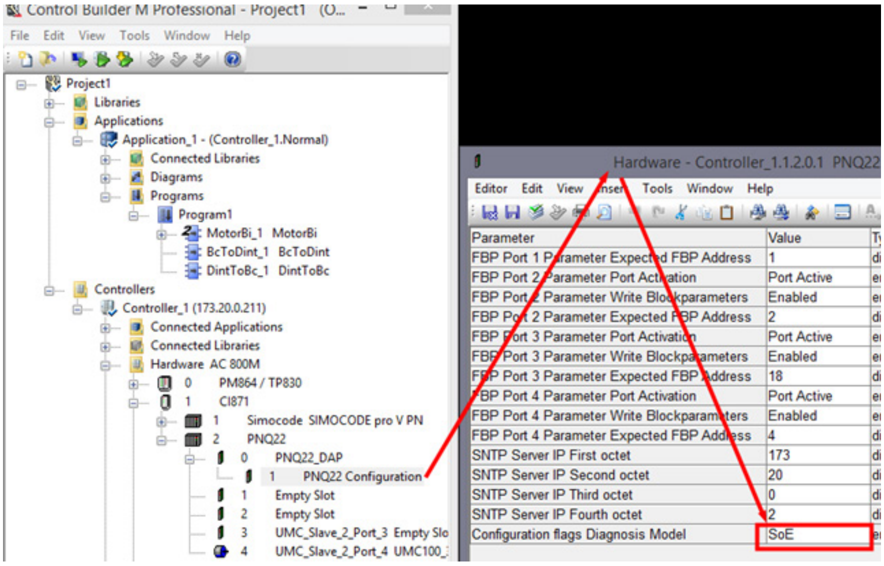
Parameter	Value	Type	Unit	Min	M
Setting Ie 1 [0.01A]	50	dint		24	32
Setting Ie 2 [0.01A]	50	dint		24	32
YD Starting Time [0.1s]	600	dint		10	36
Current Factor [%]	100	dint		2	64
Cooling Time [s]	120	dint		30	64
Earth Flt Trip Level [%]	255	dint		20	25
Earth Flt Trip Delay [0.1s]	5	dint		0	25
Language	English	enum			
Rev Lock-Out Time	1	dint		1	25
Fault Output	Off	enum			
Trip Class	Class 10	enum			
Low Curr Warn Level [5%]	10	dint		0	20
Low Curr Trip Level [5%]	0	dint		0	20

10. With a download all settings and programs will be sent to the controller

Reading the ABB specific diagnostic (SoE) of an intelligent Slave

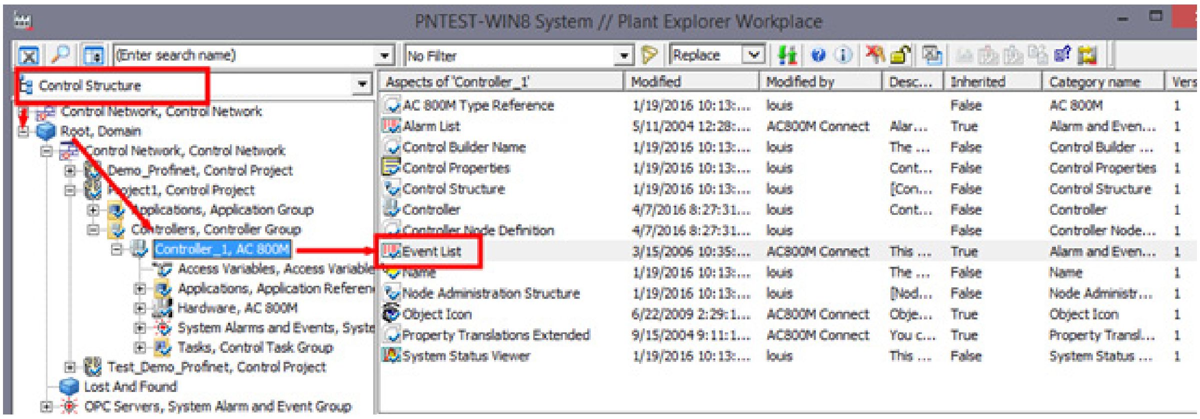
The UMC for example is an intelligent slave for the motor supervision which also can generate lots of diagnostic telegrams. With the ABB specific diagnostic model Sequence of Event it’s possible to detect and display occurring faults directly on the computer or in the control station.

1. Open the Control Builder M and open the PNQ22 configuration.
2. Choose “SoE” for “Configuration flags for Diagnosis Model"


Control Builder M Professional - Project1 (O...
File Edit View Tools Window Help
Project1
Libraries
Applications
Application_1 - (Controller_1.Normal)
Connected Libraries
Diagrams
Programs
Program1
MotorBi_1 MotorBi
BcToDint_1 BcToDint
DintToBc_1 DintToBc
Controllers
Controller_1 (173.20.0.211)
Connected Applications
Connected Libraries
Hardware AC 800M
0 PM864 / TP830
1 CI871
1 Simocode SIMOCODE pro V PN
2 PNQ22
0 PNQ22_DAP
1 PNQ22 Configuration
1 Empty Slot
2 Empty Slot
3 UMC_Slave_2_Port_3 Empty Slo
4 UMC_Slave_2_Port_4 UMC100_
Hardware - Controller_1.1.2.0.1 PNQ22
Editor Edit View Insert Tools Window Help

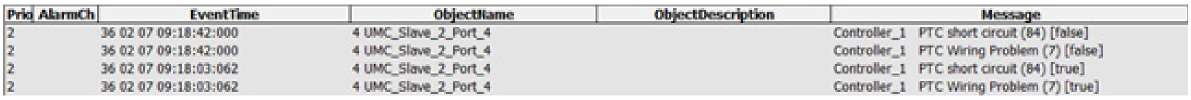
Parameter	Value	T
FBP Port 1 Parameter Expected FBP Address	1	di
FBP Port 2 Parameter Port Activation	Port Active	e
FBP Port 2 Parameter Write Blockparameters	Enabled	e
FBP Port 2 Parameter Expected FBP Address	2	di
FBP Port 3 Parameter Port Activation	Port Active	e
FBP Port 3 Parameter Write Blockparameters	Enabled	e
FBP Port 3 Parameter Expected FBP Address	18	di
FBP Port 4 Parameter Port Activation	Port Active	e
FBP Port 4 Parameter Write Blockparameters	Enabled	e
FBP Port 4 Parameter Expected FBP Address	4	di
SNTP Server IP First octet	173	di
SNTP Server IP Second octet	20	di
SNTP Server IP Third octet	0	di
SNTP Server IP Fourth octet	2	di
Configuration flags Diagnosis Model	SoE	e

3. Save and close the window.
4. Open the program “Plant Explorer Workspace – Production”
5. Select the “Control Structure” and open “Root, Domain”->”Control Network, Control Network”->”Project1” (or your personal project”->”Controllers, Controller Group”->”Controller_1, AC800M”


PNTEST-WIN8 System // Plant Explorer Workplace
(Enter search name)
No Filter
Replace
Control Structure
Control Network, Control Network
Root, Domain
Control Network, Control Network
Demo_Profinet, Control Project
Project1, Control Project
Applications, Application Group
Controllers, Controller Group
Controller_1, AC 800M
Access Variables, Access Variable
Applications, Application Referen
Hardware, AC 800M
System Alarms and Events, Syste
Tasks, Control Task Group
Test_Demo_Profinet, Control Project
Lost And Found
OPC Servers, System Alarm and Event Group

Aspects of 'Controller_1'	Modified	Modified by	Desc...	Inherited	Category name	Vers
AC 800M Type Reference	1/19/2016 10:13:...	louis		False	AC 800M	1
Alarm List	5/11/2004 12:28:...	AC800M Connect	Alar...	True	Alarm and Even...	1
Control Builder Name	1/19/2016 10:13:...	louis	The ...	False	Control Builder ...	1
Control Properties	1/19/2016 10:13:...	louis	Cont...	False	Control Properties	1
Control Structure	1/19/2016 10:13:...	louis	[Con...	False	Control Structure	1
Controller	4/7/2016 8:27:31...	louis	Cont...	False	Controller	1
Controller Node Definition	4/7/2016 8:27:31...	louis		False	Controller Node...	1
Event List	3/15/2006 10:35:...	AC800M Connect	This ...	True	Alarm and Even...	1
Name	1/19/2016 10:13:...	louis	The ...	False	Name	1
Node Administration Structure	1/19/2016 10:13:...	louis	[Nod...	False	Node Administr...	1
Object Icon	6/22/2009 2:29:1...	AC800M Connect	Obje...	True	Object Icon	1
Property Translations Extended	9/15/2004 9:11:1...	AC800M Connect	You c...	True	Property Transl...	1
System Status Viewer	1/19/2016 10:13:...	louis	This ...	False	System Status ...	1

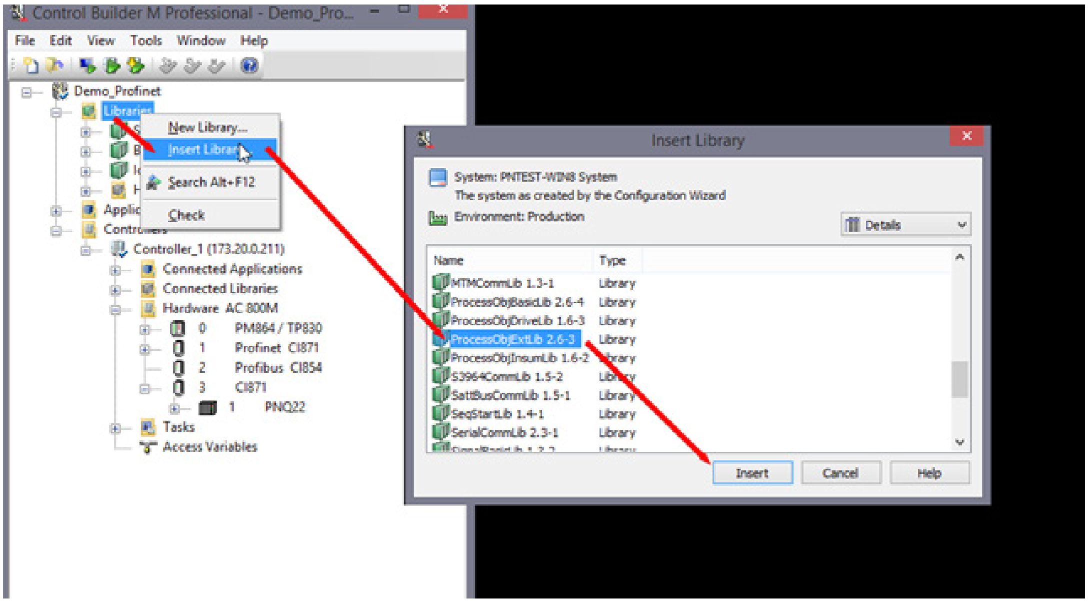
6. By clicking on ”Controller_1, AC800M” several points will open in the right part of the window. Open the “Event List” with a double click.
7. In the Event List all coming and going events will be displayed with further information:



Prio	AlarmCh	EventTime	ObjectName	ObjectDescription	Message
2		36 02 07 09:18:42:000	4 UMC_Slave_2_Port_4		Controller_1 PTC short circuit (84) [false]
2		36 02 07 09:18:42:000	4 UMC_Slave_2_Port_4		Controller_1 PTC Wiring Problem (7) [false]
2		36 02 07 09:18:03:062	4 UMC_Slave_2_Port_4		Controller_1 PTC short circuit (84) [true]
2		36 02 07 09:18:03:062	4 UMC_Slave_2_Port_4		Controller_1 PTC Wiring Problem (7) [true]

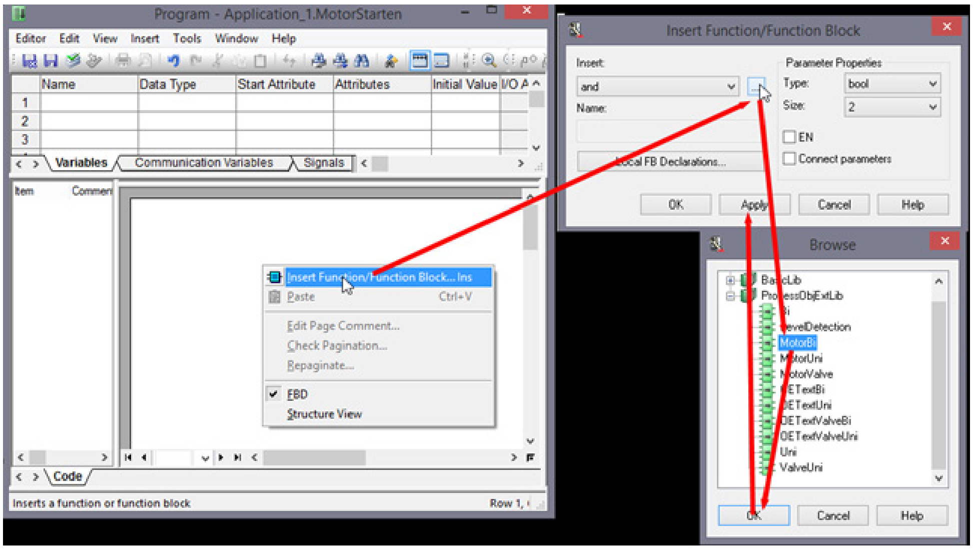
Example: Control the motor of a via Profinet connected TBU22 demo case

1. Import the library “ProcessObjExtLib 2.6-3“ with a right click on “Libraries“ -> “Insert Library”.


Control Builder M Professional - Demo_Pro...
File Edit View Tools Window Help
Demo_Profinet
Libraries
New Library...
Insert Library
Search Alt+F12
Check
Applic
Contro
Controller_1 (173.20.0.211)
Connected Applications
Connected Libraries
Hardware AC 800M
0 PM864 / TP830
1 Profinet CI871
2 Profibus CI854
3 CI871
1 PNQ22
Tasks
Access Variables
Insert Library
System: PNTEST-WIN8 System
The system as created by the Configuration Wizard
Environment: Production
Details
Name
Type
MTMCommLib 1.3-1 Library
ProcessObjBasicLib 2.6-4 Library
ProcessObjDriveLib 1.6-3 Library
ProcessObjExtLib 2.6-3 Library
ProcessObjInsumLib 1.6-2 Library
S3964CommLib 1.5-2 Library
SattBusCommLib 1.5-1 Library
SeqStartLib 1.4-1 Library
SerialCommLib 2.3-1 Library
Insert
Cancel
Help

2. Open “Applications” in the project tree and select “new” after a right click on “Application_1 – (Controller_1.Normal)“.
3. After inserting and renaming the program (“MotorStarten”) open “Application_1 – (Controller_1.Normal)“, click with right on “Connected libraries” and look for the above mentioned library to connect it to the application.
4. A double-click on the program “MotorStarten” opens the editor.
5. With a right click in the code area (below on the right) select “Insert Function/Functionblock”

6. Select the library “ProcessObjExtLib“ after clicking on „Browse“ and add the block „MotorBi“ (for a reverse starter). This block connects a graphical surface directly to the Profinet communication.

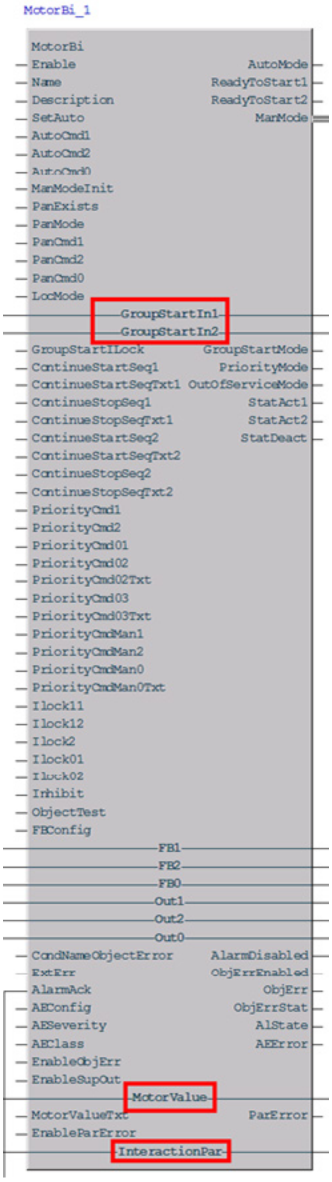


7. At first the red marked inputs will be connected:

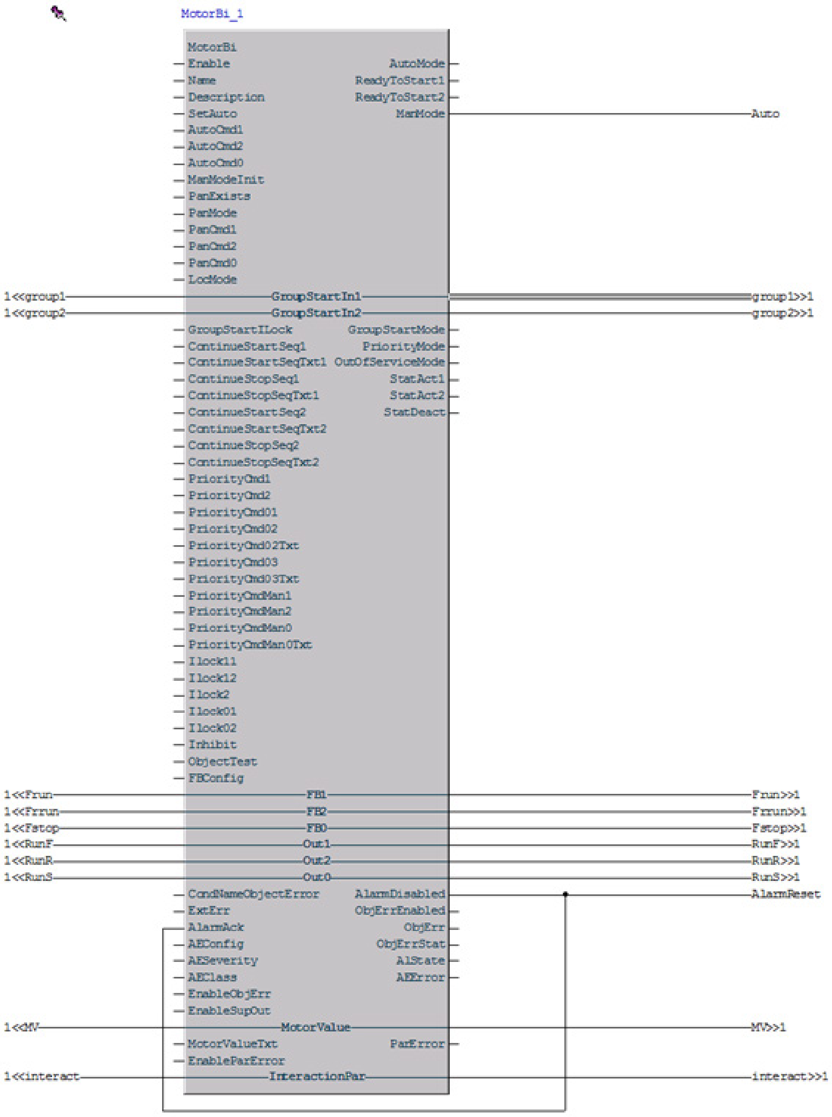
a. Right click on the input and select “Connect”

b. Type in the name of the variable,

c. Apply with “OK”



8. Like described in step 7, all other necessary variables will be defined:

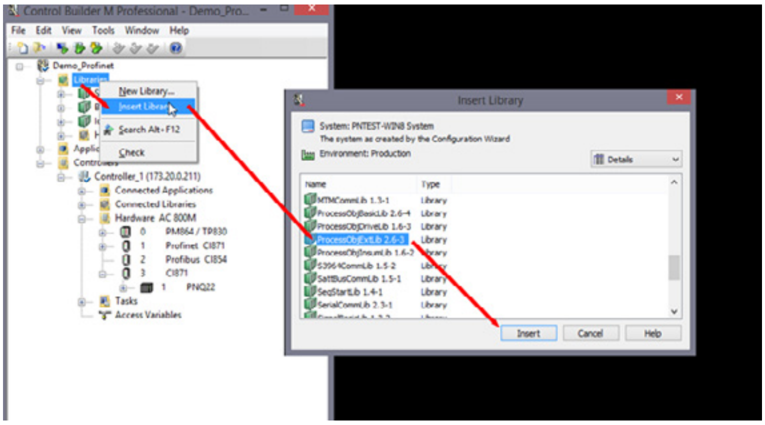


NOTE: In front of the variable name e.g. “Frun” of the input “FB1” appears “1<<”. This will be inserted automatically and haven’t to be typed in manually!

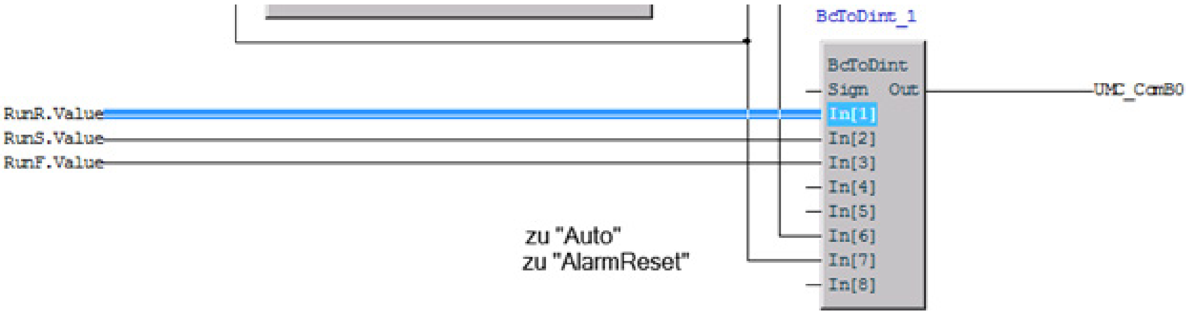
9. To send binary data over the Profinet bus the data has to be assembled to one data byte:

   a. In the left part of the editor window click with right on the existing function block and choose “Insert Function/ Functionblock”.

   b. In the “Basic” library search for the block “BcToDint” and set the “Size” to 8 (8 bit),



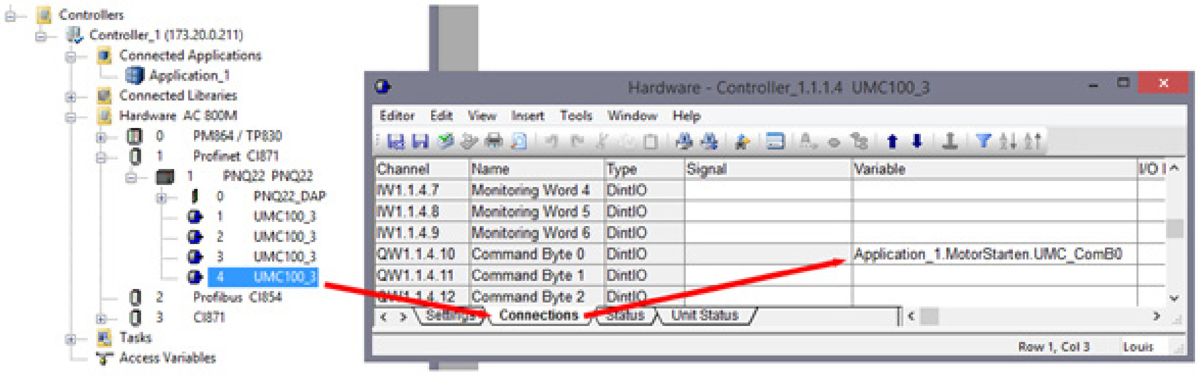
10. The inputs will be assembled to the Commandbyte 0 according to the UMC command data (UMC manual) (NOTE: “.value” has to be filled in manually during the declaration of the variables).



11. The output “UMC_ComB0” of the “BcToDint” block has to be connected to the Command data of the slave:
    a. Open Control Builder M.

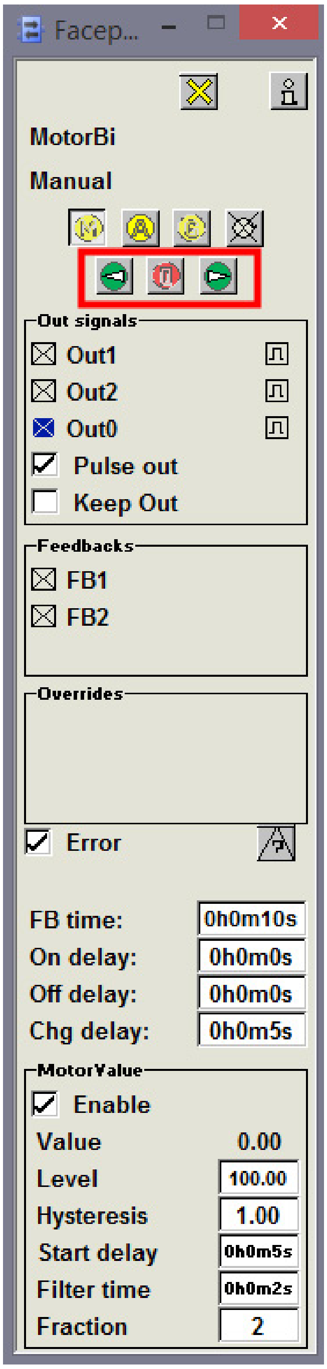
    b. Navigate in the project tree to the UMC which shall be controlled and open the configuration with a double click.

    c. Look for the equivalent command byte in the ribbon “Connections” and enter the path according the structure “A pplication”.”Program”.”Variable” in the field “Variable” (In this case the path would be: „Application_1.MotorStarten. UMC_ComB0“)



Channel	Name	Type	Signal	Variable	I/O I
IW1.1.4.7	Monitoring Word 4	DintIO			
IW1.1.4.8	Monitoring Word 5	DintIO			
IW1.1.4.9	Monitoring Word 6	DintIO			
QW1.1.4.10	Command Byte 0	DintIO		Application_1.MotorStarten.UMC_ComB0	
QW1.1.4.11	Command Byte 1	DintIO			
QW1.1.4.12	Command Byte 2	DintIO			

12. For the monitoring data the “DintToBc” block will be used instead of the “BcToDint” block and step 11 will be repeated with the monitoring byte 0. At the ouput of the block the single bits are available and can be used.
13. After saving and closing the application click with right on “Connected Applications” in the project tree and click on “Connect Application”.
14. Select the application in the new window and apply with “OK”.
15. After downloading everything to the 800M controller and changing to the online mode, the motor control panel can be opened and is able to control the motor of the demo case. The panel can be found in the project tree under: “Applications”-> “Application_1 – (Controller_1.Normal)” -> “Programs” -> “Program1” and will be opened with a right click on “MotorBi_1” -> “Interaction Window”.



MotorBi

Manual

Out signals

☒ Out1

☒ Out2

☒ Out0

☑ Pulse out

□ Keep Out

Feedbacks

☒ FB1

☒ FB2

Overrides

☑ Error

FB time: 0h0m10s

On delay: 0h0m0s

Off delay: 0h0m0s

Chg delay: 0h0m5s

MotorValue

☑ Enable

Value 0.00

Level 100.00

Hysteresis 1.00

Start delay 0h0m5s

Filter time 0h0m2s

Fraction 2

With the three buttons in the red box it is possible to start and stop the motor in both directions (in case a reverse starter is set as motor control function).

Version History

Version	What	Who	When
V1	Initial Document	Sebastian Koll	11.04.2016

Contact us

ABB STOTZ-KONTAKT GmbH
P. O. Box 10 16 80
69006 Heidelberg, Germany
Phone: +49 (0) 6221 7 01-0
Fax: +49 (0) 6221 7 01-13 25
E-mail: info.desto@de.abb.com

You can find the address of your
local sales organisation on the
ABB home page
http://www.abb.com/contacts
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