

# Installing and starting up the AXC 1050 PN STARTERKIT

# Quick start guide



# Quick start guide Installing and starting up the AXC 1050 PN STARTERKIT

2015-03-31

Designation:	UM QS EN AXC 1050 PN STARTERKIT
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Revision: 00

Order No.: —

This user manual is valid for:

Designation AXC 1050 PN STARTERKIT Version 1.0 Order No. 2400361

# Please observe the following notes

#### User group of this manual

The use of products described in this manual is oriented exclusively to:

- Qualified electricians or persons instructed by them, who are familiar with applicable standards and other regulations regarding electrical engineering and, in particular, the relevant safety concepts.
- Qualified application programmers and software engineers, who are familiar with the safety concepts of automation technology and applicable standards.

#### Explanation of symbols used and signal words



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety measures that follow this symbol to avoid possible injury or death.

There are three different categories of personal injury that are indicated with a signal word.

DANGER	This indicates a hazardous situation which, if not avoided, will re-
	sult in death or serious injury.

**WARNING** This indicates a hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION** This indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



This symbol together with the signal word **NOTE** and the accompanying text alert the reader to a situation which may cause damage or malfunction to the device, hardware/software, or surrounding property.



This symbol and the accompanying text provide the reader with additional information or refer to detailed sources of information.

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# 1 General

# 1.1 Introduction

The AXC 1050 PN STARTERKIT is a combination of hardware and software. It contains all the components you need in order to create and start up a basic PROFINET system.

# **1.2** Information about this document

Using an example project, this document helps you to install and parameterize a bus configuration and to program the application program (according to IEC 61131).

It is assumed the user has knowledge and experience in the operation of PCs, Windows® operating systems, and knowledge of IEC 61131.

For more detailed information about the hardware components, please refer to the documentation for the components. The documentation is also included on the CD supplied with the AXC 1050 PN STARTERKIT. In addition, the documentation can be downloaded at phoenixcontact.net/products.

More detailed information about the individual functions of PC Worx can be found in the online help for the program. The entire help function can be called via "Help" in the menu bar. Help for specific functions can be called via F1.

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This quick start guide describes the quickest way to start up. Since the devices are read, a complete physical bus configuration is required.

No functions or commands that require communication with the control system can be executed without a physical bus configuration. However, complete parameterization is possible in the "offline" state. The application program can also be created and compiled. Should you wish to proceed in this way, please refer to the quick start guide for PC Worx.

# 1.3 Components of the AXC 1050 PN STARTERKIT

Table 1-1 Components of the AXC 1050 PN STARTERKIT

Description	Туре	Order No.	Pcs. / Pkt.
Software			
Demo DVD of the PC Worx automation software	PC WORX DEMO	2985725	1
License	PC WORX EDUCATION LIC	2700205	1
CD with example project/program, "Moving_Light" function block library, and "Installing and starting up the AXC 1050 PN STARTERKIT" quick start guide	CD AXC 1050 PN STARTERKIT	-	1
Hardware (module)			
Axiocontrol for the direct control of Axioline I/Os. With two Ethernet interfaces and programming options according to IEC 61131-3. Complete with connector plug and labeling field.	AXC 1050	2700988	1
Axioline F bus coupler for PROFINET (including bus base module and connector)	AXL F BK PN	2701815	1
Axioline F digital input module, 16 inputs, 24 V DC, 2, 3, 4-wire connection technology (including bus base module and connectors)	AXL F DI16/4 2F	2688022	1
Axioline F digital output module, 16 outputs, 24 V DC, 500 mA, 2, 3-wire connection technology (including bus base module and connectors)	AXL F DO16/3 2F	2688048	1
Hardware (accessories, included in the starter kit)			
24 V DC/1.75 A DIN rail power supply unit, primary- switched, single-phase	STEP-PS/ 1AC/24DC/1.75	2868648	1
Patch cable, CAT5, pre-assembled, 1.0 m	FL CAT5 PATCH 1,0	2832276	1
Connecting cable, for connecting the controller to a PC for PC Worx, USB A to micro USB B, 2 m in length	CAB-USB A/MICRO USB B/2,0M	2701626	1

# 1.4 System requirements

## 1.4.1 Operating systems supported

- Windows<sup>®</sup> XP SP3
- Windows<sup>®</sup> Vista Business SP2
- Windows<sup>®</sup> 7 (32/64 bits) SP1
- Windows<sup>®</sup> 8 Professional/Ultimate (32/64 bits)

### **1.4.2** Hardware requirements

Table 1-2 Hardware requirements

#### Hardware requirements for PC Worx Express CPU Pentium 4, 1 GHz (2 GHz recommended) RAM min. 1 Gbyte (minimum), (2 Gbytes recommended) Hard disk space 2 Gbytes free memory space DVD drive Yes Interfaces 1 x Ethernet (TCP/IP) Monitor min. XGA, resolution of 1024 x 768 pixels (minimum), SXGA, resolution of 1280 x 1024 (recommended) **Operator panels** Keyboard, mouse Java Standard Edition SE 6 (or later) with at least Web browser Java Runtime Environment JRE 6 (Version 1.6.x or later)

## 1.4.3 Required programming software

Table 1-3	Required	programming	software

Software	Software version
PC Worx	≥ 6.30

### 1.4.4 Required firmware versions

Table 1-4	Required firmware version
-----------	---------------------------

Device	Firmware version
AXC 1050	≥ 2.10
If the firmware version on your d	evice is earlier than that specified in Table 1-4, please up-



If the firmware version on your device is earlier than that specified in Table 1-4, please update your firmware. The latest firmware version can be downloaded at phoenixcontact.net/products.

# 2 Installing the hardware

One possible installation method is shown in Figure 2-1.

• Please mount all PROFINET components and the corresponding accessories on DIN rails. To do so, proceed as described in the corresponding package slips.



#### **AXC 1050 PN STARTERKIT**





Table 2-1	Outputs used in the	example program

Module	Input/output	Signal at	Variable
AXL F DO16/3 2F	Outputs 1 8	00 07	LED_0 LED_7

• Connect the Ethernet cables.





• Connect the supply voltages.

# 3 Installing the software

1

Prior to installation, close all open Windows® applications.

- This PC Worx version can be installed parallel to an existing earlier version.
- Carry out all the installation steps described in this section one after the other. Observe the installation order specified here.

# 3.1 Starting the installation program of the AUTOMATIONWORX Software Suite

Once you have inserted the PC WORX DEMO DVD into the drive, the start page of the installation program opens automatically.

1

If the start page of the installation program does not open automatically, open the installation program via the "Index.html" file ("Computer, DVD Drive, Index.html").

- Select the English language version by clicking the American flag. You are taken to the main page.
- Select "Programs".
- Click the "AutomationWorx Software Suite 1.82" link and download the displayed zip file.
- Extract the zip file to a folder.
- Start the unpacked "Setup.exe" file.
- Follow the instructions in the installation program.

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During installation, the installation program asks which components from the AUTOMATIONWORX Software Suite should be installed.

Install all components of the AUTOMATIONWORX Software Suite.

The installation program creates all directories that are necessary for operation and copies the files according to your selection in the installation program.

**USB** driver

The "Phoenix Contact USB to UART Interface" USB driver must be selected explicitly when installing the AUTOMATIONWORX Software Suite/PC Worx (see Figure 3-1). This is the only way to ensure that the AXC 1050 will be detected as a USB device under Windows®.



Figure 3-1 Selecting the USB driver

- You must restart your PC in order for the configuration file changes to come into effect. To do so, click on "Finish" at the end of the installation process.
- If, after installation, the AXC 1050 is not automatically detected as a USB device under Windows®, repeat the installation process and make sure that the "Phoenix Contact USB to UART Interface" USB driver is selected.

# 3.2 Starting PC Worx

For installation using the default settings, start PC Worx via "Start, Programs, Phoenix Contact, AUTOMATIONWORX Software Suite <Version>, PC Worx 6.xx".

# 3.3 Enabling the PC Worx license

After starting PC Worx, proceed as follows to enable your license:

• Select the "Register..." command in the "?" menu.

Register					<b>— X</b>
Enter registration code:					ОК
	· •	•	•	·	Cancel

Figure 3-2 Dialog box for entering the registration code

- Enter the registration code.
- Confirm your entry with "OK".



Alternatively, you can also license PC Worx via the License Manager in the AUTOMATIONWORX Software Suite.

Registration comes into effect the next time PC Worx is started.

# 4 Helpful information about PC Worx

# 4.1 Online help

More detailed information about the individual functions of PC Worx can be found in the online help for the program. The entire help function can be called via "Help" in the menu bar. Help for specific functions can be called via F1.

# 4.2 Selecting the language

When installing the software, the language in which PC Worx should be started can be selected. The program language can be changed at any time.

- Select the "Extras, Options..." menu.
- Select the "General" tab.
- Select the language.
- Confirm your selection with "Apply" and "OK".

The selected language is activated the next time PC Worx is started.

# 4.3 The PC Worx user interface

The user interface consists of the following main components: menu bar, toolbars, main window, and status bar. The contents of the main window depend on the selected work-space.



# 4.4 Toolbars

The program contains several toolbars with different icons, which enable frequently used operations to be executed quickly. Alternatively, these operating steps can be called via menu items or predefined shortcuts.

By default, all the toolbars are shown. To display or hide a specific toolbar, use the "Extras, Options" dialog box.

When the mouse pointer is placed over an icon (without clicking on it), a tool tip appears. The tool tip displays the name of the current icon. In addition, a short function description appears in the status bar. If tool tips are not displayed, this feature can be activated in the "Extras, Options, Toolbars" dialog box.

Icons for selecting the workspace

The workspace can be changed via the icons in the toolbar:

	<b>H</b>	=?	🗖 🗲
--	----------	----	-----

- Open the "IEC Programming" workspace
- Open the "Bus Configuration" workspace
- Open the "Process Data Assignment" workspace
- Open the "Project Comparison Result" workspace
- Copen the "FDT" (Field Device Tool) workspace

Frequently used icons

The following icons are frequently required for compiling and debugging:

- Online modifications
- Make (compile project; corresponds to "Build, Make" in the menu bar)
- Rebuild project (corresponds to "Build, Rebuild Project" in the menu bar)
- Switch debug mode on/off
- Display project control dialog box

# 4.5 Workspaces

PC Worx is divided into the following workspaces:

- IEC programming
- Bus configuration
- Process data assignment
- Project comparison
- FDT (Field Device Tool)

The "View" menu or the corresponding icon in the toolbar can be used to switch between the workspaces. Following initial installation, the "IEC Programming" workspace is the default setting.

Figure 4-2 to Figure 4-6 show the default workspaces. The windows that you wish to display can be defined at any time for each workspace.



Which windows will actually be displayed depends on which windows have been toggled on. Select the windows that are to be toggled on or off via the "View" menu item.

The last setting for each workspace is saved when the program is closed and restored when it is started again.

#### "IEC Programming" workspace

PC WORX - Quickstart_PN - [Global_Variabl	es:STI	D_CNF.STD_RES]				
Eile Edit View Project Build Layout	0 <u>n</u> lin	e E <u>x</u> tras <u>W</u> indow <u>?</u>				- 8 ×
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Project Tree Window 📮 🔻 🔟		Name	Туре	Usage	Description	Ac 🔺
E Project : C:\Users\Public\Documents\ 🔺		🖃 Default				<u> </u>
Libraries		□ System Variables				
🖻 🔄 Data Types 🔤		PLCMODE_ON	BOOL	VAR GLOB	PLC status ON	%MX1
sys_flag_types		PLCMODE_LOADING	BOOL	VAR_GLOB	PLC status LOADING	%MX1
E Logical POUs		PLCMODE_RUN	BOOL	VAR GLOB	PLC status RUN	%MX1
⊡ <u>Main</u> *		PLCMODE_STOP	BOOL	VAR_GLOB	PLC status STOP	%MX1
<u>i</u> MainT		PLCMODE_HALT	BOOL	VAR_GLOB	PLC status HALT	%MX1
MainV*		PLCDEBUG_BPSET	BOOL	VAR_GLOB	Breakpoint set	%MX1
⊡⊡ Main*		PLCDEBUG_FORCE	BOOL	VAR_GLOB	Variable(s) forced	%MX1
Physical Hardware*		DI ODERILO, DOMEDELOM	B001	VAD OLOB	Address status apphlad	0/11/4
	1		1			•
		Global_Vari				
IP/PROFINET: Configuration is	chec	ked.				
Resource is checked (STD_RES)	• • •					
MODBUS is checked (axc-10501 1	92.1	68.0.2 )				
2 age						
	PLC P	man ) Drint ) Multillian ) Due Configu				
The state of the s	FLU E	arons A Frank A wont-oser A Bus Configu				
For Help, press F1					40 / 82	C: >2GB

Figure 4-2 "IEC Programming" workspace

RC WORX - Quickstart_PN			
<u>File Edit View Project Build Online Extras ?</u>			
🗅 📁 💭 🍣 🐇 🖶 🐂 🖉 🔍 🔍	<b>(</b> )	- * 🛛 🛇 🗶 🗆 🛸 🖬	😐 🖬 🗉 🖬 🖕 🔛 🔛 🚟
Bus Structure 🕴 🔺 🗖	Devic	e Details	
□-49 Quickstart_PN	Quick	tart_PN \Project\	
🚔 🖞 axc-10501 192.168.0.2		D. 1. 1	
R Resource		Project name	value
R STD_RES AXC1050_20	면	Project name	Quickstart_PN
Axioline # Axioline	면	Creator	pyx129
PROFINET	면	Computer name at project creation	PYRAE0087
		MULTIPROG version at project creation	5.48.592.6
I ouch Display		PC WORX version at project creation	PC WORX 6.30.767
		Creation date	2014-02-10T10:48:08+01:00
		Last editor	pywc05
		Computer name at last project backup	PXCE-V0013
		MULTIPROG version at last project backup	5.48.592.6
		PC WORX version at last project backup	PC WORX 6.30.767
		Date of last project backup	2014-07-10T09:40:14+01:00
		Domain Postfix	quickstart.de
		Template for DNS name creation	
	B	First IP Address	192.168.0.2
	B	Last IP-Address	192.168.0.254
: Device Catalog 📮 🔺 🔟	B	Subnetmask	255.255.255.0
I → Contraction - Contraction	B	Default Gateway	
Phoenix Contact	B	Use DHCP	No
🗄 🛅 Universal	B	Certificate information	
	B	Organization	PHOENIX CONTACT GmbH _Co. KG
	B	Organizational Unit	
	B	Locality	Blomberg
	B	State or Province	Nordrhein-Westfalen
Enter search criteria 🔍 🗙	B	Country	DE
1 AI	<b>W</b>	roject	
For Help, press F1			40 / 82 C: >2GB

# "Bus Configuration" workspace

Figure 4-3 "Bus Configuration" workspace

"Process Data Assignment" workspace

RC WORX - Qui	ckstart_PN							
Eile Edit View	<u>P</u> roject <u>B</u> uild O <u>n</u> line E <u>x</u> tras	; ?						
E 🗳 🗐 🕄	😂 👍 🗗 🐚 🖍 🖎		) 🗖 🌮 🔜 🗔 📀 🗷 🗉	🍯 🖪 🛛 🖬				» 🖀 🖀 🛓
Process Data Assign	nment						· ·	🕂 🔻 🖾
Symbols/Variables	: eCLR ES : AXC1050_20 fault stem Variables D_TSK : DEFAULT Main : Main		Quickstart, PN Quickstart, PN Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Resource Reso	0.2 <c1050_20 T</c1050_20 				
Symbol/Variable	Data Type	Process Dat	Device	Process Data Item	I/Q	Data Type		Byte.Bit ^
			1 @FL SWITCH SMCS 8TX	~PNIO_DATA_STATE	I	BYTE		0.0
			1 @FL SWITCH SMCS 8TX	PNIO_IS_PRIMARY	I	BOOL		0.0
			1 @FL SWITCH SMCS 8TX	PNIO_DATA_VALID	I	BOOL		0.2
			1 @FL SWITCH SMCS 8TX	PNIO_APPL_RUN	I	BOOL		0.4
			1 @FL SWITCH SMCS 8TX	PNIO_NO_DIAG	I	BOOL		0.5 👻
•	III	Þ						•
IP/FROFINET: Configuration is checked.       Resource is checked (STD_RES)       MODBUS is checked (axc-10501 192.168.0.2 )       Image: State of the state of th								
For Help, press F1							40 / 82	C:>2GB



"Project Comparison Result" workspace

RC WORX -	Quickstart_PN	N						
Eile Edit V	iew <u>P</u> roject <u>I</u>	<u>B</u> uild O <u>n</u> line I	E <u>x</u> tras <u>?</u>					
i 🗅 🎾 🖵	9 🕹 🖌	• 🖻 🗞 🕼		. 🔽 🗖 🌮	🔜 🐻 🗞 💌	😐 🚳 🔳	💿 🕾 🖬 🗉	2 🖬 🗆 🖩
Project Compa	arison Result Wir	ndow					<u></u>	🕂 🔻 🛛
Project Part	Source Type	Change Type	Description	Source Value	Reference Value			
(C) (C) -		. /						
Prope	rties / Workshe	eets /						
IP/PRC	OFINET: Con:	figuration i	s checked.					
🖡 Resour	rce is chec	ked (STD_RES	)					
MODBUS	5 is checked	d (axc-10501	192.168.0	.2)				
Min .								
Gess								
Ž. € ► Bui	ild 🛛 Errors 👌 \	Warnings 👌 Infos	PLC Errors	A Print ↓ Multi-I	Jser 👌 Bus Configur	ator FDT /		
For Help, press	F1						40 / 82	C: >2GB

Figure 4-5 "Project Comparison Result" workspace

#### "FDT" workspace



Figure 4-6 "FDT" workspace

Toggling windows on/off	Each window can be toggled on/off via the "View" menu by selecting the corresponding menu item.
Docking/undocking win- dows	For each window, you can specify whether or not it is to be docked in the other windows. There are various options for docking/undocking windows:

- 1. Permanent docking/undocking: In the title bar or the gray frame of the relevant window, right-click with the mouse and activate/deactivate the "Allow Docking" menu item. Move an undocked window to the position where it is to be inserted in the desktop.
- 2. Temporary undocking: Double-click on the title bar or the gray frame of the window. The window is then displayed as a "normal" window. Its size can be modified and it can be moved to any position on the screen. In order to re-dock the window, i.e., to reinsert it in the desktop, double-click on the title bar.

#### "Bus Structure" window 4.6

The "Bus Structure" window is used to display and edit the bus topology of the project.

#### 4.6.1 Icons in the "Bus Structure" window

#### 4.6.1.1 Logical device functions

The individual device functions are identified in the "Bus Structure" window with logical The legical icone in the example hus configuration have the following : \_

cons. The logical	icons in the example bus configuration have the following meaning.
Table 4-1 lc	ons for logical device functions
lcon	Meaning
R Ressource	Controller resource
	When creating the project using a template, the controller resource is inserted below this icon.
	When creating the project using the wizard, you insert the controller resource below this icon.
PROFINET	PROFINET controller
	Insert all PROFINET devices below this icon in the lower level.
🟧 # Axioline	Axioline
· :	In the example project, the Axioline icon is displayed below the PROFINET icon after the bus coupler has been inserted.
	Below this icon, insert the Axioline F modules that are connected to the bus coupler.

#### 4.6.1.2 Validity of actions

When editing the bus configuration with the mouse, the mouse pointer indicates the validity of your actions.

Table 4-2Icons when editing the bus configuration

lcon	Meaning
	Insert at the same level
	The device can only be inserted in/moved to the same level as existing devices.
2	Insert in the lower level
- Vie	The device can only be inserted in/moved to a lower level than existing devices.
2 🛱	Replace
1. L	The device under the mouse pointer can be replaced by holding down the <ctrl> key and placing the mouse pointer on the existing device.</ctrl>
~	Not permitted
0	This icon indicates a mouse pointer position for which actions are not permitted.

#### 4.6.1.3 Display of status information

In the "Bus Structure" window, some icons, which superimpose other graphics, are used to display important status information.

l able 4-3	Icons for displaying status information

lcon	Meaning
0	The device is hidden or the bus is deactivated.
8	Errors have occurred for the device.
Δ	Warnings have occurred for the device.
Q	The pin indicates a module that is a fixed component of a device. This element cannot be deleted or replaced.

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# 4.6.2 Display in the "Bus Structure" window

The display in the "Bus Structure" window can be adapted to your requirements.

- Switch to the bus configuration workspace.
- In the context menu of a device, open the "Edit Device Representation..." menu item.

Replace Create DNS name Exchange Data	Ctrl+R ▶
Copy Device	Ctrl+C
Copy with Subdevices	Ctrl+T
Cut	Ctrl+X
Paste as Child	Ctrl+B
Paste as Sibling	Ctrl+V
Replace	
Blind out Device Deactivate Bus	Ctrl+Shift+D
Delete	Delete
Edit Device Representation	Ctrl+E
Print Bus	
Refresh View	F5

Figure 4-7 "Edit Device Representation..." menu item

• Select the criteria that you would like to see in the display.

Device Representation				
Device Representation Display Order of Characte Available Station name Module equipment id DNS Name 2 Separator 1 Separator 2 Separator 3 IP Address 2 Designation Order number	ristics	>	Used Device name Type DNS Name IP Address	÷
	OK		ancel	

Figure 4-8 Device representation

Examples of different device representations:

Bus Structure	<b>₹ ▲ ⊠</b>	Bus Structure	🕂 🔺 🖾
Quickstart_PN  Resource  R STD_RES AXC1050_21  R STD_RES AXC1050_2  R STD_		Image: Second	
<	F.	<	•
DNS name		Product designation and I	P addres



The selected representation only affects the representation of a specific device group.

These groups are for example:

- Controllers
- PROFINET devices
- Axioline modules
- Modbus/TCP devices

For example, the set device representation for the AXC 1050 controller does not have any influence on the representation of the PROFINET devices (see Figure 4-10).



Figure 4-10 Example of different device representations of the individual device groups

# 4.7 Compiling and sending a project and performing a cold restart

## 4.7.1 Compiling a project

- When compiling a project for the first time, select the "Rebuild Project" command from the "Build" menu. For further compiling processes you can also use the "Make" command (see also "Compiling (additional information)" on page 33).
- If errors occur when compiling, remove the errors and repeat the compiling process until it is completed successfully. Error messages must be removed. Warning messages do not have to be removed.

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If you are compiling the project but have not yet programmed anything, you will receive the "Empty worksheet" warning message. This warning message does not affect the next step. The warning message can be ignored.

The results of the compiling process are displayed in the "Message Window" together with details of the number of errors and warnings.

## 4.7.2 Downloading a project

When downloading the project to the controller, the desired PROFINET configuration is transmitted and activated.

Open	the "Proje	ect Control Dialog" dialog box.
STD_RES		
State: Runn	ning	
Stop	C <u>o</u> ld	
<u>R</u> eset	<u>₩</u> arm	
Error	Hot	
Download	Upload	
More	Info	
Close	Help	



Before downloading the project to the controller, the download options can be set.

Click on "More...".

#### **Download options**

#### The "Download Options" dialog box opens.

Download Options	×		
Options			
Permanent as Bootproject			
Include Sources			
Include User-Libraries			
Include Page-Layouts			
Include Backend-Code			
Always allow real-time violations during Download Changes			
Bootproject			
Download Activate Delete			
<u>C</u> lose <u>H</u> elp			

Figure 4-12 "Download Options" dialog box

In the dialog box in Figure 4-12, the following download options can be selected for the project, which is to be transmitted to the controller. In addition, the boot project of the current project can be sent separately or activated/deleted on the controller. The settings selected in this dialog box are used for all transmissions to this specific controller (AXC 1050 in the example).

"Options" area

- Permanent as Bootproject This option can be deactivated to exclude the boot project when downloading to the controller.
  - Include Sources This option enables additional options that can be used to select sources, which are included when downloading a project.
    - Include User-Li- All included user libraries are included in the packed probraries gram source.
    - Include Page-<br/>LayoutsAll page layouts that are used are included in the packed<br/>program source.
    - Include Backend-Code
       All project source data including the compilation is included in the packed program source.

Always allow real-time violations during Download Changes When it is selected, the following standard procedure applies: next time "Download Changes" is executed, the sys-

plies: next time "Download Changes" is executed, the system does not attempt to observe the realtime conditions (i.e., execution of the user task at the exact time) on the controller. Instead the system stops program execution on the controller, downloads the project, copies all instance-related data, and then resumes execution of the modified program. The system does not issue a warning message prior to the associated violation of realtime conditions.

Use of this option is recommended if "Download Changes" cannot be executed while observing the realtime conditions because there is too much POU instance data (modified project parts) to be copied.

Once you have selected the checkbox, this setting is applied to all future "Download Changes" actions.

i	]

The box is also selected if the checkbox of the same name is selected in the message dialog box ("Download changes could not be executed in realtime. Try again?").

**NOTE:** If realtime violations are permitted, first ensure that your project is running within safe limits. Please note that each realtime violation may result in unexpected consequences in the automation system, as under certain circumstances user tasks are not processed for a short time. Therefore, check the level of risk before enabling this option.

#### "Bootproject" area

- "Download" button The boot project is downloaded separately to the controller without the complete project.
- "Activate" button The boot project saved on the controller is activated. Following activation, the boot project can be executed.
- "Delete" button The boot project saved on the controller is deleted.
- Close the "Download Options" dialog box once you have made the necessary settings for your project.
- Click "Download" in the "Project Control Dialog" dialog box.

The project is now in the RAM of the controller.

### 4.7.3 **Performing a cold restart**

In order to activate the project, it is necessary to perform a cold restart.

To do this, click "Cold" in the "Project Control Dialog" dialog box.

STD_RES	. • 💌		
State: Stop			
<u>S</u> top	C <u>o</u> ld		
<u>R</u> eset	<u>W</u> arm		
Error	Hot		
<u>D</u> ownload	Upload		
<u>M</u> ore	Info		
[]ose	<u>H</u> elp		



The AXC 1050 has been started up successfully if the green RUN LED is on.

## 4.7.4 Compiling (additional information)

There are two options for compiling:

- 1 "Build, Make"
- 2 "Build, Rebuild Project"

**Rebuilding the project** Use this command to compile an **entire** project for the first time or after modifying a user library.

"Rebuild Project" compiles and links all worksheets. Errors and warnings that are discovered by the compiler are logged in the "Message Window". After the syntax has been checked successfully, the system automatically generates the IEC code and the special PLC code. Finally, the project can be downloaded to the controller.

1	•	
	1	

The "Rebuild project" command should only be used if errors occurred when compiling with "Make" or if your project was unpacked without frontend.

Make

The "Make" command is the standard mode for compiling. Use this command after editing and completing your project.

When the "Make" menu item is executed, all **modified** worksheets are compiled/linked and the modified PLC code is generated.

This command can be executed from the menu bar via "Build, Make", with the "Make" icon in the toolbar or via F9.

Modified worksheets in the project tree are identified by an asterisk that appears behind the worksheet name.

BothAfter the compiler has been started, the "Message Window" appears automatically if it was<br/>closed before. This window shows the steps the compiler is currently performing. In addi-<br/>tion, errors, warnings, and additional information about the process are logged here.

Once the compiling process has been completed successfully, (i.e., no errors have been reported), the modified project can be downloaded to the controller.

# 5 Example project

In this section, it is assumed that the following steps have already been completed:

	Step		Section	
	Ι	The hardware is installed.	See Section 2 "Installing the hardware"	
ſ	١	The software is installed.	See Section 3, "Installing the software"	

# 5.1 Overview



Figure 5-1 Sequence for creating a project

# 5.2 Creating a new project

In the following sections, an example project is developed.



Please note that the example project is available in compressed format as the "Quickstart\_PN.zwt" file on the CD AXC 1050 PN STARTERKIT.

- If you want to try out the following steps yourself, please use the same identifiers and names as in this user manual in order to achieve the best possible result.
- Read the detailed description in Section "Example project on CD" on page 68 if you want to use the example project directly from the CD in PC Worx.
- Select the "New Project..." command from the "File" menu to create a new project using a template.
- Select the "AXC 1xxx" tab because the AXC 1050 controller is used.

The tree structure and the selection of the controller are now prepared.

• Select the "AXC 1050 Rev. > 01/2.10" controller and confirm your selection with "OK".



Figure 5-2 "New Project" dialog box: project templates
- Select the "File, Save Project As / Zip Project As..." command.
- Enter a project name (here: Quickstart\_PN) and save the project.



Figure 5-3 "Save/Zip project as" window

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## 5.3 Adapting the project information

• Switch to the bus configuration workspace.

After creating a new project, the project information is displayed in the bus configuration workspace.

Adapt the project information to your project.



Figure 5-4 Project information after creating a new project

### **Domain postfix**

Assign the name suffix for the PROFINET device name (here: quickstart.de) in the "Device Details" window under "Domain Postfix".

The following characters are permitted for the "Domain Postfix":

Lowercase letters without umlauts a to z

As separator: dot



Upper case letters without umlauts are permitted, however, they will be converted to lower case letters internally. The entry is therefore not case-sensitive.

If the "Domain Postfix" is entered at the start of the project, it will be used automatically for all subsequent PROFINET devices that are inserted in the PROFINET device name (see also "DNS name" on page 52).



If the PROFINET devices are read in, the PROFINET device name for the devices will also be read in. In this case, the "Domain Postfix" may differ. Adapt it accordingly.

First and last IP address, subnet mask	During project creation, PC Worx automatically assigns an IP address area for a local net- work (area from 192.168.0.2 to 192.168.0.254). If you would like to use a different address area (e.g., a global network), adapt the start and end address on the project node (here: Quickstart_PN) to your application.
	If the IP parameters are modified in the project settings, the IP addresses of the PROFINET controller may also have to be modified manually (see Section "Checking/modifying IP settings for the PROFINET controller" on page 40).
	When inserting or reading PROFINET devices, PC Worx automatically assigns IP parameters that are within the specified area.
Ĺ	If you are using the addresses of a local network in your project, also assign the corre- sponding address (e.g., 192.168.0.225) to the PC on which PC Worx is installed. Other- wise the devices in the local network cannot be accessed.
	For information on the IP addresses to be used within your system, please contact your system administrator.
	If the start address of the new address area to be entered is higher than the previous end address, modify the end address first.
	If you manually assign IP parameters that are outside the defined area, they will not be accepted.
Default gateway	If you are using a default gateway:
	• Enter the address for the default gateway under "Default Gateway" in the "Device De- tails" window.
	This address must be within the specified IP address area. If the default gateway is entered at the start of the project, it will be used automatically for all subsequent Phoenix Contact devices that are inserted (see also Section 5.8).

## 5.4 Preparing the PC for communication

In the "Extras, PROFINET Configuration..." menu in PC Worx, select the network card for your computer that is to be used for communication.



Figure 5-5 Selecting the network card

# 5.5 Checking/modifying IP settings for the PROFINET controller

The IP settings for the controller are made when the project is created.



### Changes to project information are not applied automatically

If any modifications are made to the project information (see Figure 5-4) that affect the IP settings for the controller, a warning is displayed. However, the modification is not implemented automatically.

When a new project is created, the default settings are specified under "IP Settings".

Adapt the IP settings, if required.

- Switch to the bus configuration workspace.
  - Select the controller node.
  - In the "Device Details" window, switch to the "IP Settings" tab.
  - Check the IP settings and modify them, if necessary. Make sure that the controller IP address is within the project IP address area.

Bus Structure 🛛 📮 🔻 🔀	: Device Details	
🖃 🎒 Quickstart_PN	AXC 1050 192.168.0.2 \IP Settings\	
AXC 1050 192.168.0.2	Name	Value
<b>R</b> STD_RES AXC1050_21	🗅 Vendor	Phoenix Contact
# Axioline	Designation	AXC 1050
PROFINET	Functional description	Axioline Controller for Ethernet Networks
	Device type	PLC
🔤 Touch Display	Device family	AXC1xxx
	C Order number	2700988
	🗅 Revision	01/2.10
	🗅 Station Name	
	🗅 Device Name	
	🗅 Module Equipment ID	
	🗅 DNS Name	axc-10501
	MAC Address	
	IP Address	192.168.0.2
	🗅 Subnetmask	255.255.255.0
	Default Gateway	
	🗮 🗮 IP Settings 🛛 🕞 Extended Settings 🚮 Comm	unication [ [] IP Assignment 🔠 CPU Ser 🕢
Figure 5-6 IP set	ings	

i

The IP parameters that are assigned here for the controller are also implemented as the IP parameters for the communication path via TCP/IP.

## 5.5.1 Assigning the IP address for the PROFINET controller

By default for the AXC 1050 PN STARTERKIT, the AXC 1050 has no preset IP address. Initial setting of the controller's IP address can be carried out with the PC Worx software manually via the DCP protocol or manually via the USB interface. The IP address can be changed later using the PC Worx software via the USB connection, Ethernet, or the DCP protocol.



Phoenix Contact recommends that you assign the IP address via the DCP protocol.

### 5.5.1.1 Dynamic Configuration Protocol (DCP)



The AXC 1050 controller from firmware version 2.10 or later and from PC Worx version 6.30.767 or later (part of the AUTOMATIONWORX Software Suite 1.81 incl. AddON V1) supports the DCP protocol.

The DCP protocol is used to assign an IP address and a name to individual network devices. The PC Worx software sends a broadcast request with a DCP telegram to the devices within the network. The devices respond with their MAC address and device type. By default upon delivery, the AXC 1050 controller has no IP address and therefore responds with 0.0.0.0 and its specific MAC address. In the next step, the IP address is set in PC Worx; then the IP address is transmitted to the AXC 1050 by means of a DCP telegram.

To determine whether your network permits the IP settings used in the example project (see Figure 5-4 on page 38), proceed as follows:

- In the Windows® Control Panel, check the settings for your PC network adapter.
- If necessary, adjust these settings so that the AXC 1050 can be accessed in your network via the IP address used in the example project.

If your network does not permit the use of the IP address used in the example project, adjust the settings in the project information accordingly (see Figure 5-4 on page 38).



PC/network adapter

### Changes to project information are not applied automatically

If any modifications are made to the project information (see Figure 5-4) that affect the IP settings for the controller, a warning is displayed. However, the modification is not implemented automatically.

When a new project is created, the default settings are specified under "IP Settings".

The IP address is assigned via the DCP protocol in the PC Worx software via the "Device Details" window:

- Select the controller in the "Bus Structure" window.
- Select the "IP Settings" tab in the "Device Details" window.
- Enter the IP address of the controller (here: 192.168.0.2).

### **AXC 1050 PN STARTERKIT**

	Name	Value
ß	Vendor	Phoenix Contact
ß	Designation	AXC 1050
ß	Functional description	Axioline Controller for Ethernet Networks
ß	Device type	PLC
ß	Device family	AXC1xxx
ß	Order number	2700988
ß	Revision	01/2.10
ß	Station Name	
ß	Device Name	
ß	Module Equipment ID	
ß	DNS Name	axc-10501
ß	MAC Address	
ß	IP Address	192.168.0.2
Δ	Subnetmask	255.255.255.0
ß	Default Gateway	

Figure 5-7 DCP: setting the IP address

The "IP Assignment" tab is used for actual IP address assignment with DCP.

• Select the "IP Assignment" tab.

After selecting the "IP Assignment" tab, the PROFINET network is searched for DCP devices.

- Deactivate the checkbox in the "Filter" area.
- Select the "[Unknown Type]: AXC 1050" controller.
- Click on "Assign IP" to start IP address assignment with DCP.

siected Device						
Nar	me: axc-10501				IP Address:	192.168.0.2
Device Typ	pe: AXC 1050				Subnet Mask:	255.255.255.0
					Default Gateway:	
vailable on Netv	work					
Name	Туре	MAC Ad	ldress I	P Address	Subnet Mask	
axc-10501	[Unknown Type]: A	XC 1050 00:A0:4	5:8D:6C:BB 1	192.168.0.2	255.255.255.0	D
	(IOD): AXL F BK PN	00:A0:4	5:8F:24:3A	0.0.0.0	0.0.0.0	
ilter: 🔲 u	unnamed 🕅	not in Project	same	зТуре		
ilter: 🔳 u	unnamed	not in Project	same	: Туре		
ilter: 📄 u Refresh	unnamed 🗖	not in Project On	same	а Туре		Assign IP
ilter: 🔄 t Refresh Assign Na	umnamed Tlashing me Delete Na	not in Project On	same	э Туре		Assign IP
ilter: 🔲 u Refresh Assign Nai	urmamed International Internat	not in Project On ame 192.168.0.2 successfull	Same same	: Туре хс:10501 (00-А0)	45:80-6C;BB)	Assign IP Save IP permanently
ilter: 📄 t Refresh Assign Na	unnamed Flashing me Delete Na IP addres	not in Project On ame \$ 192.168,0.2 successfull	same same same same same same	≥ Type xc-10501 (00.A0:	45-8D-60;8Bji	Assign IP Save IP permanently Help
ilter: 📄 t Refresh Assign Nar	umnamed Flashing me Delete Na IP addres	not in Project On ame a 192, 168.0.2 successfull	same same	≥ Type xc:10501 (00:A0)	45:8D: 6C: BBJ!	Assign IP Save IP permanently Help

A green status indicator indicates successful IP address assignment.

Assign the PROFINET device name in the same way.

- Then check the communication between PC Worx and the AXC 1050:
- In the "Device Details" window select the "Communication" tab.
- Click on the "Test" button.

A green status indicator indicates successful communication.

If communication between PC Worx and the AXC 1050 could not be established:

- Check again whether your network permits the IP settings used in the example project (see Section 5.3 on page 38).
- Adjust the settings, if required, then check again communication between PC Worx and the AXC 1050.

### 5.5.1.2 USB interface



The CAB-USB A/MICRO USB B/2,0M USB connecting cable (Order No. 2701626) is available as an optional accessory for connecting the controller to a PC via the USB interface.



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In order to use the USB interface of the AXC 1050, the "Phoenix Contact USB to UART Interface" driver must be installed (see Section 3.1 on page 17).

 Establish a USB connection between the PC on which the PC Worx software is running and the AXC 1050.

If you selected to install the USB driver when installing the

AUTOMATIONWORX Software Suite/PC Worx (see Section 3.1) and if your PC supports automatic detection of USB devices, the PC will immediately detect the AXC 1050 as a USB device. No other settings are required.

### Manual assignment of IP address settings

- Switch to the bus configuration workspace.
  - Select the controller node (in the example: "AXC 1050").
  - Select the "Extended Settings" tab in the "Device Details" window.
  - Select the "Ethernet" setting below the "Extended Settings" folder.
  - In the "Network Settings" area, select the "Manual definition of the TCP/IP settings" item.
  - Enter the required IP address (in the example in Figure 5-9: IP address: 192.168.0.02; subnet mask: 255.255.255.0).

Device Details	4.7	
AXC 1050 192.168.0.2 \Extended Settings\		
Extended Settings Sthemet SNMP agent PROFINET activation PROFINET activation PROFINET Device input-output range	Image: Network Settings         Image: Network Settings         IP Address:         192       168       0       2         Subnet Mask:         255       255       0         Gateway Address:         .       .       .         Image: Network Settings         Image: Network Settings         Image: Network Settings         Image: Network Settings         .       .         .       .         .       .         .       .         .       .         .       .         .       .         .       .         .       .         .       .         .       .         .       .         .       .         .       .         .       .         .       .         .       .         .       .         .       .         .       .         .       .         .       .         .       .         .       .         . <td< td=""><td></td></td<>	
	Usage of a DHCP Server     Send       DNS name     axc-10501     Send       axc-10501     Send     Send       Real-time Clock Settings     Time:     8:39:18 AM       Date:     Date:     Thursday , October 23, 2014	
	Settings Read Activate Network Settings FTP Open FTP Folder on Device ?	
IP Settings 🛃 Extended Settings 🔏 Co	, mmunication   🗂 IP Assignment   🔄 CPU Service Editor   🍔 Terminal Point 🕡	•

Figure 5-9 Network settings: manual assignment of the IP address

- Click on "Send" in the "Network Settings" area.
- In the "Settings Communication Path" dialog box, select the USB interface and confirm with "OK".

Settings Communication Path	x
	_
COM3 (USB: AXC 1050)	•
OK Cancel	

Figure 5-10 "Settings Communication Path" dialog box

### **Example project**

Device Details AXC 1050 192.168.0.2 \Extended Settings\		‡ ▼ 🛛
Extended Settings Ethernet SNMP agent MRP client PROFINET activation PROFINET Device input-output range	Network Settings            ⓐ Manual definition of the TCP/IP settings         IP Address:             192         .         168         0         2         ✓         Subnet Mask:         255         .         255         .         255         .         255         .         0         Gateway Address:             Usage of a BootP Server         Usage of a DHCP Server	Send

Successful download of the IP settings to the controller is displayed in the status window:

 Service executed successfully!
 ?

 IP Settings
 Extended Settings

 Communication
 IP Assignment

 CPU Service Editor
 Image: Terminal Points

Figure 5-11 Successful download of the IP settings

To accept the IP settings, the AXC 1050 must be restarted.

- Select the "Ethernet" setting below the "Extended Settings" folder.
- In the "Activate Network Settings" area, click on the "Restart Controller" button.

	Settings Read Activate Network Settings Restart Controller
	FTP Open FTP Folder on Device
	Offline
IP Settings 🕞 Extended Settings 🦽 Co	 mmunication   🗂 IP Assignment   📑 CPU Service Editor   🍔 Terminal Points   🕢 🕨

Figure 5-12 Activating the network settings: restarting the controller

- If a prompt appears asking whether you really want to restart the controller, confirm the dialog box with "Yes".
- In the "Settings Communication Path" dialog box, select the USB interface and confirm with "OK" (see Figure 5-10).

	Activate Network Settings
	Restart Controller
	FTP
	Open FTP Folder on Device
	Service executed successfully!
Restrings Extended Settings	🖌 Communication   🗂 IP Assignment   🗄 CPU Service Editor   🍔 Termina ( )

Successful execution of the service will be displayed in the status window.

Figure 5-13 Activating the network settings: service executed successfully

The network settings assigned to the AXC 1050 are active.

You can test whether the settings are working correctly on the "Communication" tab in the "Device Details" window.

Device Details AXC 1050 192.168.0.2 \Communication\	÷ 🕶 🖸
Interface Type	Connection Name         Manual Input       ▼         IP Address         192       168       0       2       ▼         Subnet Mask:         255       255       0       Gateway Address:       ↓       ↓         .       .       .       ↓       ↓         Image: state of the state
Host Type: Test Ap Test Ap	AXC 1050 Pply Help ion T IP Assignment B CPU Service Editor 8 1 + >
Figure 5-14 Successful communicat	ion path test

## 5.6 Activating the PROFINET controller function

Once you have assigned an IP address for the AXC 1050, the PROFINET controller function must be activated.

- Select the "Extended Settings" tab in the "Device Details" window.
- Select the "PROFINET activation" setting below the "Extended Settings" folder.
- In the "Settings" area, select "PROFINET controller activated" from the drop-down list.

: Device Details AXC 1050 192.168.0.2 \Extended Settings\	÷ ▼ 🖸
Extended Settings   Ethernet  SNMP agent  SNMP client  PROFINET activation  PROFINET Device input-output range  PROFINET Device input-output range	Settings       PROFINET controller activated       PROFINET device activated       PROFINET controller activated       PROFINET controller activated
IP Settings Extended Settings Co	mmunication   [그] IP Assignment   🟥 CPU Service Editor   👹 Terminal Points   🧃 🛌

Figure 5-15 Activating the PROFINET controller function

- Click on "Send".
- In the "Settings Communication Path" dialog box, confirm the suggested communication path or a communication path suitable for your application with "OK".

Successful execution of the service will be displayed in the status window.

To activate the enabled PROFINET controller function on the AXC 1050, the AXC 1050 must be restarted.

- In the "Activate Network Settings" area, click on the "Restart Controller" button (see Figure 5-12 on page 45).
- If a prompt appears asking whether you really want to restart the controller, confirm the dialog box with "Yes".
- In the "Settings Communication Path" dialog box, confirm the suggested communication path or a communication path suitable for your application with "OK".

The BF LED flashes following successful execution of the service. The AXC 1050 can now be read in as a PROFINET device.

## 5.7 Reading in PROFINET devices

- Make sure you are in the bus configuration workspace.
  - In the "Bus Structure" window, select the PROFINET node of the controller.
  - Right-click to open the context menu and select "Read PROFINET".



Figure 5-16

All the connected PROFINET devices are displayed. When reading in, the device name and the IP parameters are imported for each device - if present.

Device Type: AXC 1050			IP Subn Default (	Address: 192.168.0.2 net Mask: 255.255.255.0 Gateway:
ailable on Network				
Name	Туре	MAC Address	IP Address	Subnet Mask
axc-10501	[IOC]: AXC 1050	. 00:A0:45:8D:6C:BB	192.168.0.2	255.255.255.0
	[IOD]: AXL F BK PN	00:A0:45:8D:37:A0	0.0.0.0	0.0.0.0
lter: 🗌 unnamed	not in Project			
lter: 🔲 unnamed Refresh Flash	not in Project			
ter: unnamed Refresh Flash	not in Project			

#### Figure 5-17 Connected PROFINET devices

• Select the devices that are to be included in your project.

The AXC 1050 controller is already included in the project. It is therefore only necessary to insert the AXL F BK PN in the project.

- Importing PROFINET devices into the project
- Selecting the PROFINET device description

٠

Click on the "Insert" button to import the selected devices into the project.

If the "Select PROFINET device description" dialog box opens, select the device description (here: "AXL F BK PN", version "01/1.01").

Infor An sea	mation to the searched device unique entry for the following comp rched one. Name:	oonent could not be found. F	Please select a d	evice which matches the
No	Designation	Version	Order Num	Vendor
1	AXL BK PN-ME	01/1.00	2688132	Phoenix Contact
2	AXL BK PN-ME	01/1.20	2688132	Phoenix Contact
3	AXL F BK PN	01/1.0	2701815	Phoenix Contact
4	AXL F BK PN	01/1.01	2701815	Phoenix Contact
				OK Cancel

Figure 5-18 Selecting the PROFINET device description

Confirm your selection with "OK".

Naming the PROFINET device

If a PROFINET device name does not yet exist for a device ("DNS Name"), a name should be assigned at this point in the "Insert PROFINET Device" dialog box that opens.

The PROFINET device name ("DNS Name") is the unique identification for the PROFINET device in the network. The PROFINET device name must be known to the PROFINET device before the PROFINET device can be used in the network.

PC Worx automatically ensures that each device is assigned a PROFINET device name ("DNS Name") that is unique throughout the entire project. The "Domain Postfix" that was set on the project node is attached to this name (here: quickstart.de).

The PROFINET device name can be freely modified.

The following characters are permitted for the PROFINET device name:

Lowercase letters without umlauts a to z As separator: dot . Hyphen - If the naming conventions have not been observed, an error message is output in the "Message Window" and the name is rejected.

i

.

Upper case letters without umlauts are permitted, however, they will be converted to lower case letters internally. The entry is therefore not case-sensitive.

- Check the displayed PROFINET device name and modify it, if necessary.
- Activate the "Name Device" checkbox.
- Then click "OK".

Insert PROFINET Device	? ×
Selected Device	
DNS Name:	axl-f-bk-pn.quickstart.de
Device Type:	AXL F BK PN
MAC-Adresse:	00:A0:45:8D:37:A0
🔽 Name Device	
PROFINET device	will be added to the project with the name and IP parameters specified!
Flashing On	OK Cancel

Figure 5-19 Naming the PROFINET device

• Close the "Read PROFINET" window.

The PROFINET topology is displayed in the "Bus Structure" window. The current PROFINET device name was assigned and the IP address was specified for each device.



Figure 5-20 Bus configuration with read in PROFINET devices

The current settings can also be checked in the "Read PROFINET" window. All PROFINET devices should now have a PROFINET device name. The IP parameters are only assigned after project download and controller startup.

The updated list contains the PROFINET devices together with their PROFINET device names.

### **Example project**

Name: axc-10501			IP.	Address: 192.168.0.	.2
Device Type: AXC 1050		Subnet Mask: 255.255.255.0 Default Gateway:			
vailable on Network					
Name	Туре	MAC Address	IP Address	Subnet Mask	
axc-10501	[IOC]: AXC 1050	00:A0:45:8D:6C:BB	192.168.0.2	255.255.255.0	
axl-f-bk-pn.quickstart.de	(IOD): AXL F BK PN	00:A0:45:8D:37:A0	0.0.0.0	0.0.0.0	
Filter: 🔲 unnamed	🗖 not in Project				
Filter: unnamed	not in Project				

Figure 5-21 All devices with PROFINET device names

## 5.8 Checking/modifying the PROFINET settings for PROFINET devices

When reading in, the PROFINET settings of the relevant PROFINET devices are imported with default values. Check these settings and modify them, if necessary.

- Make sure you are in the bus configuration workspace.
  - In the "Bus Structure" window, select the PROFINET device (here: AXL F BK PN bus coupler).
  - Select the "PROFINET Settings" tab in the "Device Details" window.
  - Check the PROFINET settings and modify them, if necessary.

## AXC 1050 PN STARTERKIT

: Bus Structure 📮 🔺 🔟	Devio	e Details	‡ ▼ 🖪
🖃 🎝 Quickstart_PN 🔹	AXL F	BK PN axl-f-bk-pn.quickstart.de 192.168.0.3 \PR	OFINET Settings\
AXC 1050 192.168.0.2		Name	Value
Resource		INAME	value
R STD_RES AXC1050_21		Vendor	Phoenix Contact
		VendorID	0x00B0
PROFINET		Designation	AXL F BK PN
AXL F BK PN axl-f-bk-pn.quickstart.de 192.168.0.3		DeviceID	0x1000
= #0 Axioline		Functional description	PROFINET IO - Axioline Bus Coupler
I @AXL F BK PN		Device type	Bus Coupler
		Device family	AXL F
		Order number	2701815
		Revision	01/1.01
# MODBUS_CLT	D	DNS Name	axl-f-bk-pn.quickstart.de
	B	Station Name	
onconnected	B	Device Name	
	B	Module Equipment ID	
-	B	IP Address	192.168.0.3
Device Catalan	B	Subnetmask	255.255.255.0
	B	Default Gateway	
Esto	B	Realtime class	RT
Phoenix Contact	B	Reduction ratio input	8 ms
	B	Reduction ratio output	8 ms
	B	Faulty telegrams until connection is aborted	24
	B	Monitoring Time Inputs (ms)	192
	B	Monitoring Time Outputs (ms)	192
	B	Operation in case of configuration differen	No
	B	Log connection state	Yes
	B	Drive BF	Yes
		Substitute value behavior of inputs	Set to zero
Enter en verb atterin		Connection establishment at startup	Yes
		Node ID	43
All	🧠 I	PROFINET Settings 🥬 Device parameters	PROFINET Stationnames 🛛 🏶 Bus interfaces 📄 🕢 🕞

Figure 5-22

PROFINET settings of the "AXL F BK PN" bus coupler

The PROFINET settings comprise:

DNS name		This name is the unique identification for the PROFINET device in the network. It must be known to the PROFINET device before it can be used in the network (see also page 49).
	1	If you modify the "DNS Name" PROFINET device name later, you will also have to adapt the DNS name of the PROFINET device accordingly.
IP address		During operation, the device can be accessed via the IP address. PC Worx selects the ad- dress from the area that is set on the project node.
	1	If the area for the IP addresses is later modified in the project node, you will also have to adapt the addresses of the PROFINET devices accordingly.
Subnet mask		The subnet mask that was specified on the project node is assigned to each PROFINET de- vice as the default subnet mask. It can be modified specifically for each individual device.
Default gateway		If a default gateway is used, enter its IP address here. The default gateway specified on the project node is automatically assigned to each PROFINET device.
	i	"IP Address", "Subnetmask", and "Default Gateway" represent the <b>IP parameters</b> for a device.

Reduction ratio input/ Reduction ratio output	The time in v dividually for	which the inputs/outputs of the PROFINET device are updated. It can be set in- r each PROFINET device for both data directions.		
	The reductic be operated value that wa ting exceeds sage appear tain devices	on ratio (update time) directly affects the number of PROFINET devices that can via a PROFINET controller. The default setting displayed in PC Worx is the as stored in the FDCML file for the corresponding PROFINET device. If this set- s the performance level of the PROFINET controller, a corresponding error mes- rs when translating the project. In this case, select a longer update time for cer-		
Monitoring time inputs (ms)	Period during which the PROFINET controller waits for data from the PROFINET device. If the PROFINET device does not send data to the PROFINET controller within this period, the connection between the PROFINET controller and the PROFINET device is terminated.			
Monitoring time outputs (ms)	Setting this t telegrams be fluence the e	ime decides how long the PROFINET devices cannot receive valid PROFINET efore substitute values are written to the outputs. This setting can be used to in- error insensitivity of the network.		
(])	NOTE: Err Please note PROFINET	ors within the process e that excessively high settings can result in errors in the process as the device "freezes" the last output value until the error is detected.		
Operation in case of con- figuration differences	This setting DiffBlock" in The followin	affects the startup behavior of the controller for devices that return a "Module- formation to the controller in the PROFINET parameterization sequence. g settings can be made:		
	No	<ul> <li>Default setting; the connection to the device is disconnected again in the event of configuration differences.</li> <li>Start parameterization again via a download to set the device to the operational state.</li> </ul>		
	Yes	The connection is maintained even in the event of configuration differences.		
Log connection state	This setting The followin	affects connection logging in the controller for each device. g settings can be made:		
	Yes	Default setting; a message is written to the diagnostic archive of the controller upon every connection abortion and connection reestablishment.		
	No	Logging is prohibited because, for example, switching off a device is an application-relevant situation.		
Drive BF	This setting the controlle vice. The fol	defines whether the BF LED and the PNIO_SYSTEM_BF system variable on er are to be controlled in the event of a missing connection to the selected de- lowing settings can be made:		
	Yes	Default setting; each aborted connection is indicated by the BF LED and by setting the system variable to TRUE.		
	No	Indication is prohibited because, for example, switching off a device is an application-relevant situation.		

## 5.9 Transferring PROFINET device names and IP settings to PROFINET devices

Before a PROFINET device can be operated in a PROFINET network, the PROFINET device name ("DNS Name") and IP address configured in PC Worx must also be made known to the device itself.

- Make sure that the PROFINET controller can establish communication to the PROFINET devices.
- Compile the project, send it to the controller, and perform a cold restart. Proceed as described in "Compiling and sending a project and performing a cold restart" on page 30.

During startup, the AXC 1050 automatically assigns the IP settings and device parameterizations specified in the project to the PROFINET devices.

• To check the currently assigned device names and IP settings, select the "PROFINET Stationnames" tab in the "Device Details" window.

The updated list contains the PROFINET devices together with their PROFINET device names and the IP parameters.

elected Device					
Name: axl-f-bk-pn.quickstart.de		IP.	Address: 192,168,0,3	l	
Device Type: AXL F BK PN		Subnet Mask: 255.255.255.0			
			Default 0	iateway:	
vailable on Network					
Nama	Tune	MAC Address	ID Address	Subast Mask	
Name	Type	MAL Address	IP Address	Subhet Mask	
axe-10501 avlitibleon quickstart de	[IUL]: AXU 1050	00:A0:45:8D:6C:8B	192.168.0.2	255,255,255,0 255,255,255,0	
ilter: 🔲 unnamed 📄 r	not in Project	same Type			
ilter:	not in Project	same Type		As	sign IP
ilter: unnamed r Refresh Flashing C Assign Name Delete Nar	not in Project Dn	same Type		As:	sign IP
ilter: unnamed r r Refresh Flashing C Assign Name Delete Nar	not in Project In me 2 DCP devices rear	same Type		As: Save IF	sign IP ? permanent
ilter: unnamed r r Refresh Flashing C Assign Name Delete Nar	not in Project In me 2 DCP devices rear	same Type		As: Save IF	sign IP ? permanent lelp

Figure 5-23 All PROFINET devices with PROFINET device name and IP address

When the "PROFINET Stationnames" tab is selected, the list is updated. If you wish to update at a later point in time, click on the "Refresh" button.

The BF LED is now off on all PROFINET devices.

The PROFINET network is running.

## 5.10 Reading in Axioline devices

The process for reading in Axioline F modules that are connected to a PROFINET controller or a PROFINET device is the same.

The Axioline F modules connected to a **PROFINET controller** can be read once the communication path to the **PROFINET** controller has been established.



In the example configuration (see Figure 2-3) no further modules are connected to the AXC 1050.

Axioline F modules that are connected to PROFINET devices can be read once the device names and IP addresses have been specified for the PROFINET devices. In the example project, Axioline F modules are connected to the AXL F BK PN bus coupler.

#### How to proceed

- In the "Bus Structure" window, select the "Axioline" node **below** the bus coupler.
- Right-click to open the context menu and select the "Read Axioline" menu item.



Figure 5-24 "Read Axioline" context menu

All Axioline F modules connected to the PROFINET device (here: to the bus coupler) are displayed in the "Read Axioline" dialog box that opens. Modules marked in black have not yet been read into the PC Worx project; modules marked in green have already been configured. When the "Re-insert all modules" option is selected, modules that have already been configured are also read in again. The previously configured bus configuration is overwritten.

Read bus configuration:	
Name	Version
AXL F DO 16/3 2F	04
AXL F DI 16/4 2F	04
Modules which remain unchanged in the project.	
Modules which are inserted into the bus structure.	
Modules which are inserted into the bus structure. Re-insert all modules.	

Figure 5-25 Reading in connected Axioline F modules: Axioline F modules that have not yet been read in

Click on "OK" to read in the Axioline F modules.

The read in Axioline F modules are read in with their default configuration and are displayed in the "Bus Structure" window. If you select a device, the device details will be displayed.



Figure 5-26 Read in Axioline F modules

# 5.11 Compiling and sending a project, and performing a cold restart after reading the bus topology

The bus configuration is now completely included in the project. At this point you can compile your project in order to detect any errors that may have occurred.

 In order to start up the project, compile it, send it to the controller, and perform a cold restart. Proceed as described in Section 4.7, "Compiling and sending a project and performing a cold restart". The AXC 1050 controller and the connected Axioline F modules are now started up. The D LED on the Axioline F modules is permanently on. The Axioline F local bus is running.

## 5.12 Creating the program

After the bus configuration has been read in completely, the program can be created.

You can

- Create a project yourself according to your requirements (see quick start guide for PC Worx (UM QS EN PC WORX))
  - Or
- Insert the "Moving\_Light" example program (included in the starter kit) in the project and test the example program.

How to insert and test the "Moving\_Light" example program is described in the following.

## 5.12.1 "Moving\_Light" program description

The "Moving\_Light" example program is created using the function block diagram (FBD) programming language.



Figure 5-27 "Moving\_Light" program code

Figure 5-27 shows the program code of the example project.

In the example program, a running light for the LEDs of digital outputs 1 to 8 of the AXL F DO16/3 2F Axioline F output module is programmed. The "Moving\_Light" function block is used for this purpose. The running light is active if a 1 signal is present at input 1 of the AXL F DI16/4 2F Axioline F digital input module.

Variables in the programThe switch variable maps the status of input 1 of the AXL F DI16/4 2F Axioline F digital<br/>input module. Variables LED\_1 to LED\_8 map the states of outputs 1 to 8 of the<br/>AXL F DO16/3 2F Axioline F digital output module.

If the **switch** variable is TRUE, outputs 1 to 8 are connected one after the other for 200 ms each (initial value of variable **Time\_Parameter**), and the corresponding LEDs light up. The running light is active as long as the **switch** variable is TRUE.

Visualization

The "FirstSteps\_AXC1050\_PN\_Starterkit.prj" example visualization can be used to display the states of the inputs and outputs and of the LEDs in your web browser. The value of the **Time\_Parameter** variable (initial value: 200 ms) can be modified in the input field. The "Start/Stop" button is used to set the value for the **switch** variable and to start or stop the running light.



**F** 

For more information about installing and starting up the example visualization on the controller, and the requirements for your web browser, refer to Section 7.

## 5.12.2 Extracting the "Moving\_Light" function block library

The "Moving\_Light" function block used in the example program is part of the function block library of the same name. It is available in compressed format as the "Bibliothek\_Moving\_Light.zip" file on the CD AXC 1050 PN STARTERKIT.

- Save the compressed "Bibliothek\_Moving\_Light.zip" file from the CD AXC 1050 PN STARTERKIT to the hard disk on your PC.
- Extract the file to the default directory for PC Worx libraries ("\Libraries\Documents\PC WORX\Libraries") on the hard disk of your PC.

## 5.12.3 Importing and compiling the "Moving\_Light" function block library in PC Worx

Before the "Moving\_Light" function block can be used, the function block library must be imported into PC Worx.

- Switch to the "IEC Programming" workspace.
  - In the "Project Tree Window", right-click to open the context menu for the "Libraries".

## Importing the function block library

Select the "Insert... User Library..." commands.



Figure 5-28 "Insert... User Library..." context menu

- Select the "Moving\_Light.mwt" file from the folder of the previously extracted "Moving\_Light" function block library.
- Then click on "Include".

The function block library is now included in the "Project Tree Window" below the "Libraries" item.

Before the function block library can be used, it must be compiled.

- Right-click to open the context menu for the "Moving\_Light" function block library.
- Select the "Open library as project" command.

Project Tree Window		4 🔻 🖬	
Project : C:\Users\Pul		\Documents\PC WORX\Pr	
⊡ ⊡ Data Types		<u>I</u> nsert <u>D</u> elete	ENTF
	<b>}</b> ₀	Cut S	STRG+X
⊡ MainV*	1	Paste	STRG+C
È∰ Physical Hardwa È∰ STD_CNF :		<u>E</u> xpand All Co <u>l</u> lapse All	
⊡		Show version information	n
		Open library as project	
		Save As <u>N</u> etwork Templa Define Place <u>h</u> olders	te
	5	P <u>r</u> operties	
	_	Þ	



The function block library is opened as the PC Worx project "Moving\_Light".

• Select the "Build, Rebuild Project" command.

iiiii

- Close the "Moving\_Light" PC Worx project after compiling is complete.
- Open the "Quickstart\_PN" PC Worx project again.

The "Moving\_Light" function block library can now be used.

Project Tree Window 📮 🔻 🔀
Project : C:\Users\Public\Documents\PC WORX\Projects\Quick
Moving_Light
🖻 🔄 Data Types
sys_flag_types*
🗄 💼 Logical POUs
🖻 🖓 Physical Hardware*
ia@ STD_CNF∶eCLR*
⊟ STD_RES : AXC1050_21*
🔁 🖓 Tasks
STD_TSK : DEFAULT
⊡… 🛄 Main : Main*
MainV*
Global_Variables*
IO_Configuration*
4 111

Figure 5-30 Inserted "Moving\_Light" function block library

### 5.12.4 Programming

•

Double-click on the "Main" in the "Project Tree Window" to activate the IEC programming interface.

#### Inserting the function block into the worksheet

In the "Main" worksheet, click on an empty position where you would like to insert the function block.



lected

- In the "Edit Wizard" window, double-click on the "Moving\_Light" function block.
- Enter the name "Moving\_Light" in the "Variable Properties" window and confirm your entry with "OK".

Variable Properties	Definition scope © Local Local Variable Groups: Default Global Variable Groups: Physical Hardware STD_RES Default System Variables @ Default System Variables @ Default	Cancel Help
PDD OPC Hidden	v worksheets v worksheets v worksheets	



The "Moving\_Light" function block is inserted in the "Main" worksheet.



Creating variables

After the function block has been inserted in the worksheet, variables must be assigned to the inputs and outputs of the function block.

• Double-click on the "CycleTime" input.

The "Variable Properties" window opens.

- Enter the variable name "Time\_Parameter" in the "Name" field.
- Enter the text "Time#200ms" in the "Initial value" field.
- Select the "PDD" checkbox.



When the "PDD" checkbox is activated, process data is transferred to visualization programs (WebVisit in the example). The process data is transferred using a .csv file.

Variable Properties		×
Name: Time_Parameter Data Type: TIME Usage: VAR_GLOBAL RETAIN Initial value: Time#200ms I/0 address: Description:	Definition scope © Local Global Local Variable Groups: © Default Global Variable Groups: © Physical Hardware © STD_CNF © STD_CNF © STD_RES © Default © Default © Main	OK Cancel Help
PDD     OPC     Hidden     Initvalue as default     Redundant	V Show all variables of worksheets	

Figure 5-34 Properties of the Time\_Parameter variable

• Confirm your entries with "OK".

The **Time\_Parameter** variable has been created and connected to the "CyclicTime" input (see Figure 5-35).



Figure 5-35 **Time\_Parameter** variable at the "CyclicTime" input

Create variables for all other inputs and outputs of the function block:

Input/output	Variable		
INPUT_1	switch		
Output_0 output 7	LED_0 LED 7		

• Make sure that the "PDD" checkbox is activated for each variable when creating.

Figure 5-36 shows the function block after all the required variables have been created and connected to the corresponding inputs and outputs.





### 5.12.5 Compiling after creating the program

At this point you can compile your project in order to detect any errors that may have occurred.

<del>\*\*\*</del>

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Select the "Build, Rebuild Project" command.

## 5.13 Assigning process data

After all the required variables have been created, they must be assigned process data. It is assigned in the "Process Data Assignment" workspace.

- Switch to the "Process Data Assignment" workspace.
  - Select the controller in the top right window. The standard configuration is then displayed in the top left window ("Symbols/Variables").
    - In the top left window ("Symbols/Variables"), select the "STD\_RES : AXC 1050\_21" resource.

- In the top right window, select the device/module for which you would like to link the process data to variables (here: AXL F DO16/3 2F).
- Select the process data item to be linked (here: process data item "OUT00")
- Using drag and drop, link the selected variable to a shown variable (here: **LED\_0**) on the left-hand side.



Figure 5-37 Process data item "OUT00" assigned to variable LED\_0

• Repeat this procedure for all inputs to be evaluated and for all outputs to be controlled.

For the example project, this means the following:

 Using drag and drop, link the process data "IN01" ... "IN07" to variables LED\_1 ... LED 7.

The result of process data assignment is shown in Figure 5-38.

Process Data Assig	nment				7 💌 🖾			
Symbols/Variables			🖃 📲 Quickstart_PN					
STD CNF: eCLR			🚊 🛔 AXC 1050 192.168.0.2					
STD RES: AXC1050 21			R Resource					
De De	- fault		R STD_RES AXC1050_21					
Sv	stem Variables		# Axioline					
📄 🖬 sī				PROFINET				
 □	_ Main : Main		🚊 📲 🗛 AXL F BK PN axl-f-bk-pn.quickstart.d					
			#0 Axioline					
			[] 1 @AXL F BK PN					
				'68 Interface				
				69 Port 1				
				70 Port 2				
			# 1 AX	L F DO 16/3 2F				
			# # MODDUG C	L F DI 16/4 ZF				
			# MODBUS_C	L I				
			Touch Display		-			
			< III		•			
Symbol/Variable	Data Type	Process Data Item	Device	Process Data Item	I/ ^			
Time_Parameter	TIME		#1 AXL F DO 16/3 2F	OUT00	C			
switch	BOOL		#1 AXL F DO 16/3 2F	OUT01	C			
LED_0	BOOL	#1 AXL F DO 16/3 2F \ OUT00	#1 AXL F DO 16/3 2F	OUT02	ÇΞ			
LED_1	BOOL	#1 AXL F DO 16/3 2F \ OUT01	#1 AXL F DO 16/3 2F	OUT03	Ç			
LED_2	BOOL	#1 AXL F DO 16/3 2F \ OUT02	#1 AXL F DO 16/3 2F	OUT04	C			
LED_3	BOOL	#1 AXL F DO 16/3 2F \ OUT03	#1 AXL F DO 16/3 2F	OUT05	Ç			
LED_4	BOOL	#1 AXL F DO 16/3 2F \ OUT04	#1 AXL F DO 16/3 2F	OUT06	Ç			
LED_5	BOOL	#1 AXL F DO 16/3 2F \ OUT05	#1 AXL F DO 16/3 2F	OUT07	Ç			
LED_6	BOOL	#1 AXL F DO 16/3 2F \ OUT06	#1 AXL F DO 16/3 2F	OUT08	Ç			
LED_7	BOOL	#1 AXL F DO 16/3 2F \ OUT07	#1 AXL F DO 16/3 2F	OUT09	¢			
	1							

Figure 5-38 All process data used is assigned to variables

## 5.14 Compiling and sending a project (including program), and performing a cold restart

The project is now complete. In order to start up the project, compile it, send it to the controller, and perform a cold restart.

## Compiling a project

• Select the "Build, Rebuild Project" command.

### **Downloading a project**

- Open the "Project Control Dialog" dialog box.
  - Click on "More...".
  - Activate the "Permanent as Bootproject" checkbox in the "Download options" dialog box.
  - Activate the "Always allow real-time violations during Download Changes" checkbox in the "Download Options" dialog box.
  - Close the "Download Options" dialog box.
  - Click "Download" in the "Project Control Dialog" dialog box.
- Performing a cold restart Click "Cold" in the "Project Control Dialog" dialog box.

## 5.15 Operation and debug mode – Viewing values online

While the program is running on the controller, it is possible to activate debug mode in PC Worx. In debug mode, the operation of the program can be monitored online.

Activate debug mode.



•

To view values online in debug mode, the example program must be started first. To do this, proceed as follows:

- Switch to the "IEC Programming" workspace.
- Double-click on "Main" in the "Project Tree Window".
- Right-click to open the context menu for the **switch** variable.
- Select the "Debug dialog" item.
- In the window that opens ("Debug: STD\_RES"), activate the "TRUE" value.
  - Click on the "Overwrite" button.

The example program is started.

The status of all global variables in the program is displayed under "MainV" in the "Project Tree Window".

Project Tree Window 🕴 🔻 🛛		Name	Online value	Туре	Usage
Project : C:\Users\Public\Documents\PC WORX\Projects\Quick		🖃 Default			
		Moving_Light		Moving_Light	VAR
Moving_Light		Time_Parameter	0.200	TIME	VAR_EXTE
		switch	TRUE	BOOL	VAR_EXTE
sys_flag_types		LED_0	FALSE	BOOL	VAR_EXTE
		LED_1	FALSE	BOOL	VAR_EXTE
		LED_2	FALSE	BOOL	VAR_EXTE
Main I		LED_3	FALSE	BOOL	VAR_EXTE
Mainv		LED_4	FALSE	BOOL	VAR_EXTE
		LED_5	FALSE	BOOL	VAR_EXTE
		LED_6	TRUE	BOOL	VAR_EXTE
		LED_7	FALSE	BOOL	VAR_EXTE
		III			•
	1	🕨 Main:Main 🔢 MainV:Mair	n		
		<i></i>			

Figure 5-39 Debug mode: "MainV"



The program status of a POU is displayed by opening the worksheet (in Figure 5-40 under "Main" in the "Project Tree Window" or under "Main:Main" on the tab in the workspace).

Figure 5-40 Debug mode: "Main"

The status of all global variables is displayed under "Global Variables" in the "Project Tree Window".

Project Tree Window		Name	Online value	Туре	Usage	Description	Addre 🔺	
Project : C:\Users\Public\Documents\PC WORX\Projects\Quick		Default						1
		Time_Parameter	0.200	TIME	VAR_GLOBAL		=	
Moving_Light		switch	TRUE	BOOL	VAR_GLOBAL			1
E Data Types		LED_0	FALSE	BOOL	VAR_GLOBAL		%QX6	2
sys_flag_types		LED_1	FALSE	BOOL	VAR_GLOBAL		%QX6	
E Cogical POUs		LED_2	FALSE	BOOL	VAR_GLOBAL		%QX6	
		LED_3	FALSE	BOOL	VAR_GLOBAL		%QX6	
MainT		LED_4	FALSE	BOOL	VAR_GLOBAL		%QX6	
MainV		LED_5	FALSE	BOOL	VAR_GLOBAL		%QX6	
1 Main		LED_6	TRUE	BOOL	VAR_GLOBAL		%QX6	
Physical Hardware		LED_7	FALSE	BOOL	VAR_GLOBAL		%QX6	
		🖃 System Varia	ables					
STD_RES: AXC1050_21		PLCMODE_ON	FALSE	BOOL	VAR_GLOBAL	PLC status ON	%MX1	
		PLCMODE_LO	FALSE	BOOL	VAR_GLOBAL	PLC status LOA	%MX1	
		PLCMODE_RUN	TRUE	BOOL	VAR_GLOBAL	PLC status RUN	%MX1	
		PLCMODE_STOP	FALSE	BOOL	VAR_GLOBAL	PLC status STOP	%MX1	
iii Main V		PLCMODE_HALT	FALSE	BOOL	VAR_GLOBAL	PLC status HALT	%MX1	
		PLCDEBUG_BP	FALSE	BOOL	VAR_GLOBAL	Breakpoint set	%MX1	
		PLCDEBUG_FO	FALSE	BOOL	VAR_GLOBAL	Variable(s) forced	%MX1 -	۳.
▲ III ▶	1						P	
		Main:Main	MainV:Main	obal_Vari				

Figure 5-41 Debug mode: "Global Variables"

Switch to the window that provides the best display of the required information.



You can now view the relevant visualization ("First\_Steps\_AXC1050\_PN\_Starterkit.prj") for the "Moving\_Light" example program. For more information about installing and starting up the example visualization on the con-

troller, and the requirements for your web browser, refer to Section 7.

## 5.16 Example project on CD

The example project that has been developed in the previous sections is available in compressed format as the "Quickstart\_PN.zwt" file on the CD AXC 1050 PN STARTERKIT.

If you would like to test the project without developing it yourself, you can use the "Quickstart\_PN.zwt" file.

- Save the "Quickstart\_PN.zwt" file on your PC, e.g., under the default path for PC Worx projects ("\Libraries\Documents\PC Worx\Projects").
- Open PC Worx.
- Select "Open Project / Unzip Project..." under the "File" menu item.
- Confirm the prompt asking whether the project should be extracted to the directory containing the zwt file with "Yes" if the file is to be extracted to this directory. Or select a different directory. PC Worx extracts the file automatically.
- If PC Worx prompts you to overwrite layouts (e.g., page layouts) or bitmaps, confirm this prompt with "No to all".

The "Moving\_Light" function block used in the example program is part of the function block library of the same name. It is available in compressed format as the "Bibliothek Moving Light.zip" file on the CD AXC 1050 PN STARTERKIT.

- Save the compressed "Bibliothek\_Moving\_Light.zip" file from the CD AXC 1050 PN STARTERKIT to the hard disk on your PC.
- Extract the file to the default directory for PC Worx libraries ("\Libraries\Documents\PC WORX\Libraries") on the hard disk of your PC.

Before the function block library can be used, it must be compiled. This can be done from the "Quickstart\_PN" PC Worx project that is already open.

- Switch to the "IEC Programming" workspace.
- Right-click to open the context menu for the "Moving\_Light" function block library.
- Select the "Open library as project" command (see Figure 5-29).
- Select the "Build, Rebuild Project" command.
- Close the "Moving\_Light" PC Worx project after compiling is complete.
- Open the "Quickstart\_PN" PC Worx project again.

Once PC Worx has unzipped the project, and the function block library has been extracted, saved, and compiled, the example project is available for you to view and edit.

1

To start up the project completely, the example bus configuration must be configured according to Section 2, "Installing the hardware".

- Prepare your PC for communication (see Section "Preparing the PC for communication" on page 39).
- Set the IP address and the name specified in the project on the PROFINET controller (see "Assigning the IP address for the PROFINET controller" on page 41).
- Set the IP address and the name specified in the project on the AXL F BK PN controller: Select the AXL F BK PN bus coupler in the "Bus Structure" window.
   Select the "PROFINET Stationnames" tab.
- Select the "[IOD]: AXL F BK PN" bus coupler. Click on the "Assign IP" button. Click on the "Assign Name" button.
- Activate the PROFINET controller function (see Section "Activating the PROFINET controller function" on page 46).

• Compile the example project, send it to the controller, and perform a cold restart (see Section "Compiling and sending a project and performing a cold restart" on page 30).

The AXC 1050 controller and the connected Axioline F modules are now started up together with the program of the example project.

You can now switch to debug mode, for example, to view the variable states (Section "Operation and debug mode – Viewing values online" on page 66). Alternatively, you can view the relevant visualization

("First\_Steps\_AXC1050\_PN\_Starterkit.prj") for the "Moving\_Light" example program. For more information about installing and starting up the example visualization on the controller, and the requirements for your web browser, refer to Section 7.

## 6 Additional functions of PC Worx

# 6.1 Changing the PROFINET device name ("DNS Name")

When a PROFINET connection is established, a PROFINET device name cannot be assigned. Abort these connections first. To do this, proceed as follows:

- Open the "Project Control Dialog" dialog box.
  - Click on "Stop".
  - Click the "Reset" button.

The BF LEDs on the devices now are off.

All Ethernet connections are aborted and the PROFINET device names can now be assigned.

- Make sure you are in the bus configuration workspace.
  - In the bus configuration, select the PROFINET device which is to be assigned the name.
  - Select the "PROFINET Settings" tab in the "Device Details" window.
  - Change the device name under "DNS Name".
  - In the "Device Details" window, select the "PROFINET Stationnames" tab.

When the tab is selected, the list is updated. If you wish to update at a later point in time, click on the "Refresh" button.

In order to limit the search results, different options are available:

No filter set	All PROFINET devices that are available in the network are listed.
unnamed	All the PROFINET devices that do not yet have a device name ("DNS Name") are listed.
not in Project	All the PROFINET devices that are not included in the project are listed.
same Type	Only the PROFINET devices that are the same type as the PROFINET device selected in the bus configuration are listed.

### **AXC 1050 PN STARTERKIT**

Quickstart PN	AXL F BK PN axl-f-bk-pn.quickstart.de 192.1	68.0.3 \PROFINET Stationna	ames\			
AXC 1050 192.168.0.2     AXC 1050 192.168.0.2     Ressource     R STD_RES AXC1050_21     # Axioline     ## PROFINET	Selected Device Name: axH-bk-pn.quickstart. Device Type: AXL F BK PN Available on Network	Selected Device Name: axHFbk-pn.quickstart.de Device Type: AXL F BK PN Subnet Mask: 255.255.255.1 Default Gateway: Available on Network				
- 1 @AXL F BK PN	Name	Tune	MAC Address	IP Address	Subnet Mask	
→ 32769 Port 1 → 32769 Port 2 → 1 AXL DO 16/3-ME ≠ 1 AXL DO 16/3-ME ≠ # MOBUS_CLT → ■ # Touch Display ↓ Unconnected	ax-10501 axi4-bk-pn.quickstart.de	(IOC): AXC 1050 (IOD): AXL F BK PN	00:A0:45:8D:6C:BB 00:A0:45:8D:37:A0	192168.0.2 192168.0.3	255 255 255 0 255 255 255 0	
	Filter: 🕅 unnamed	] not in Project	🔲 same Type			
	Refresh Flashin Assign Name Delete M	) On lame 2 DCP devices rea	chable on the network!		Assign IP	
			0.5		Help	

Figure 6-1 List of all PROFINET devices that can be accessed in the network

In the "Selected Device" area, the PROFINET device name specified under "IP Settings" is displayed.

From the list, select the corresponding PROFINET device (e.g., using the indicated MAC address).

Bus Structure	V 🖸 📔 Device Details
🖃 🎒 Quickstart_PN	AXL F BK PN axl-f-bk-pn.quickstart.de 192.168.0.3 \PROFINET Stationnames\
AXC 1050 192.168.0.2 - R Ressource - R STD_RES AXC1050_21 + Axioline 	Selected Device Name: awl-bik-pn.quickstart.de Device Type: AXL F BK PN Default Gateway:
# 0 Axioline	Available on Network
□ 1 @AXLFBKPN	Name Type MAC Address IP Address Subnet Mask
	axc-10501 UDC: AXC 1050 00:A0:45:8D:6C:BB 192.168.0.2 255.255.255.0
	axl-f-bk-pn.quickstart.de [[0D]; AXL F BK PN 00:A0:45:8D:37:A0 192.168.0.3 255.255.0
Unconnected	Filter:     unnamed     not in Project     same Type
	nellesri ridsting un Assignir
	Assign Name Delete Name Save IP permanently
	2 DCP devices reachable on the network!
	Help
	🛛 🔍 PROFINET Settings 🤌 Device parameters 🗰 PROFINET Stationnames ≆ Bus interfaces 🖹 Data sheet
Fig	a 6.2 Selecting the PROFINET device

Figure 6-2 Selecting the PROFINET device
A flashing display can be triggered on the PROFINET device via the "Flashing On" button. This display can be used to find the selected PROFINET device in the field.

When the button is activated, the devices in the example system flash as follows:

AXL F BK PN

Flashing LNK LED

The flashing process is also displayed in the list.

• Click on the "Assign Name" button to send the name to the PROFINET device.



In case an error message appears, first click on the "Delete Name" button. After that assign the name again.

The PROFINET device name ("DNS Name") is transferred from the PC to the PROFINET device. The previous parameters are still displayed as the IP parameters. The IP parameters are not assigned until the next step (see Section 6.2).

- Assign the appropriate PROFINET device name to each PROFINET device.
- Compile the project, send it to the controller, and perform a cold restart (see Section 4.7, "Compiling and sending a project and performing a cold restart").

#### 6.2 Renumbering devices

There is also the option of automatically regenerating the IP parameters (e.g., IP addresses, Domain Postfix) for all devices. The settings from the project information are used for this.

- Select the project node.
- Select "Renumber devices, Whole project" from the context menu and then the menu item for renumbering the devices (e.g., "Append Domain Postfix to all DNS names").

cture	<b>.</b>			
Quickstart AXC 10	Parameterize			
R Res	Renumber devices	۱.	Whole project	All IP Addresses
- <b>R</b>	Create DNS name	L		All Subnet Masks and Standard Gateways
A # 🕰	Exchange Data	+		Append Domain Postfix to all DNS names
≟## PR(	Document Network	•		
Ē	Copy Device	Ctrl+C		
	Copy with Subdevices	Ctrl+T		
	Cut	Ctrl+X		
	Paste as Child	Ctrl+B		
	Paste as Sibling	Ctrl+V		
	Replace			
	Blind out Device	Ctrl+Shift+D		
<del>%</del> # N	Deactivate Bus			
Tol	Delete	Delete		
Uncon	Edit Device Representation	Ctrl+E		
	Print Bus			
	Refresh View	F5		

If, for example, the PROFINET device names were saved without Domain Postfix, the Domain Postfix specified in the project node (here: quickstart.de) will be added to the device names when renumbering. This is the complete PROFINET device name ("DNS Name").

 To view the IP addresses in the bus configuration in ascending order, renumber the IP addresses as well.

All the PROFINET devices in the project now have the correct IP parameters. These parameters must now actually be assigned to the PROFINET devices.

 Compile the project, send it to the controller, and perform a cold restart (see Section 4.7, "Compiling and sending a project and performing a cold restart").

#### 6.3 Diagnostics with Diag+

The Diag+ diagnostic tool is used for consistent diagnostics of the Axioline F local bus and PROFINET.

When installing PC Worx, Diag+ is also installed automatically. Diag+ is integrated in PC Worx and can be called from PC Worx.

• Call Diag+ via the "View, Diag+" menu.

The "Diag+" dialog box opens.

Diag+				
Communication Path AXC 1050 (192.168.0.2)	Connect			
User				
Name:	Login			
Password:	Logout			
Communication Path Serial / USB Registry Assignment File Custom DCP PC WORX View				
Device Representation Device Type: PROFINET Modules				
Display: Slot Number Order Designation F Dest Add				
Refresh: 105 -				
Version: 2.60.767SP1 Project Name:				
Offline	?			

Figure 6-4 Diag+ start screen

The diagnostics represented depend on the communication path:

Table 6-1 Possible diagnostics
--------------------------------

PROFINET controller	PROFINET devices
Diagnostic archive	Axioline diagnostics
PROFINET diagnostics	
Ethernet diagnostics	
Optical PROFINET diagnostics	
Axioline diagnostics	

• Under "Communication Path", select the device to which you wish to establish a connection. Select the AXL F BK PN bus coupler, for example.

**Device representations** 

•

Diag+		
Communication Path	AXC 1050 (192.168.0.2)	Connect
View	AXC 1050 (192.168.0.2)	
Figure 6-5	Diag+: selecting the commu	nication nath

To activate the communication path, click on "Connect".

• In the "View, Device Representations" area, select which information is to be represent-

ed for the devices. All information marked blue is displayed in the various views.

# View Device Representation Device Type: PROFINET IO Devices Display: DNS Name Station Name Module Equipment ID Refresh: 10s

Figure 6-6 Diag+: example for device representation

• At the top under "View", select which general information is to be represented (here: "Axioline Diagnostics").

Diag+		
Communication Path	AXL F BK PN (192.168.0.3)	Disconnect
View	Settings 🗸 🗸	
User	Settings	
Name:	Axioline Diagnostic	Login
igure 6-7	Diag+: selecting the informat	ion to be rep

View: Axioline diagnostics Diag+ switches to the diagnostic view of the connected Axioline F system configured in PC Worx.



Figure 6-8 Axioline diagnostics: no error

Figure 6-8 shows diagnostics of an error-free Axioline F bus.

Any errors that occur are diagnosed by Diag+ and displayed. In the following example, the supply voltage for the AXL F DI16/4 2F Axioline F module is not present.

When the bus coupler is selected, Diag+ shows the following:

Diag+		🕂 🔻 🖾
Communication Path	AXL F BK PN (192.168.0.3)	Disconnect
View	Axioline Diagnostic 🔹	
🖃 🖬 🗛 AXL F BK PN (19	92.168.0.3)	
1/AXLFDC	D 16/3 2F	
	16/4 2F	
Diagnosos	Pue state	
Diagnoses.	Peripheral error	
Device Data:	Axio control	
	-	
	Bus state	
Bus state	RUN	
Description:	The bus runs and the process data are cyc updated.	lically
Update time:	3,5 µs	
	Derinheral error	
Error Magazara;	Peripheral error	
Description:	There are module diagnostics available. O	nen the
Description.	module level and select a module in order	to display the
$\square$	diagnostic information!	
	Axio control	
Station name:		
Device name:		
Module equipment I	D:	
DNS name:		
IP address:	192.168.0.3	
Subnet mask:	255.255.255.0	
Gateway:	192.168.0.3	
Order designation:	AXL F BK PN	-
Proj	ect Name:	
Online		?
<b>F</b> :	AVI E DIZ DNI have a source and	

Figure 6-9 AXL F BK PN bus coupler: peripheral error

Diag+			<b>∔ ▼ </b> [
Communication Path	AXL F BK PN (192.16	i8.0.3) 👻	Disconnect
View	Axioline Diagnostic	•	
AXL F BK PN (9	2.168.0.3) 116/3.2E 16/4.2F		
Diagnoses: Device Data:	<u>Diagnoses</u> <u>Axioline modu</u>	le	
	Diag	noses	
Axioline module:	2 / AXL F DI 16	5/4 2F	
Error Message:	Sensor supply	y not present	
Error Code: 0x3412			
Description.			
	Axioline	e module	
Slot number:		2	
Location:			
Module equipment ID	):		
Application-specific d	levice address:	0	
Hardware version:		04 (22.01.2014)	
Firmware version:		-	
Order designation:		AXL F DI 16/4 2F	
Vendor:		Phoenix Contact	
Device type:		I/O digital IN	
Order number:		2688022	
Axioline Module ID:		0x00000d0 (208)	
Axioline module type:		0x00800002 (8388610)	
Process data length:		16	
Proje	ect Name:		

If you select the module on which the error has occurred, Diag+ displays error details:

Figure 6-10 AXL F DI16/4 2F Axioline F module: supply voltage not present

Diagnostics can be used to identify errors in your application.

• Remove the error (here: connect the supply connector again).

#### **AXC 1050 PN STARTERKIT**

Context menu of the PROFINET device in Diag+ The context menu of the PROFINET device can be used to influence the state of the Axioline F local bus.

Diag+					
Communication Path					
Communication Path	AXL F BK PN (192.168.0.3)				
View	Axioline Diagnostic 🔹				
	2.168 Refresh (E5)				
	16/1 Reset bus				
	16/4 Stop bus				
	Stop bus				
Diagnosos	Start bus				
Dagnoses. Device Data:					
Device Data.	<u>Allo control</u>				
	Bus state				
Bus state	RUN				
Description:	The bus runs and the process data are				
	cyclically updated.				
Update time:	3.5 µs				
	Auto annéal				
<u>Axio control</u>					
Station name:					
Device name:					
Module equipment IL	):				
Divo name.					
Project N	ame:				
Unline	?				

Figure 6-11 Context menu of the PROFINET device

The following menu items can be selected:

Refresh	Refreshes the view in Diag+.		
Reset bus	Resets the local bus.		
	The process data is no longer updated.		
Stop bus	Stops cyclic updating of the process data.		
	The process data is no longer updated.		
Start bus	If a valid configuration frame has been generated, the local bus can be started using this menu item. The process data is updated cyclically after the local bus is started.		
	The process data is updated again.		
Create configuration	Generates a valid bus configuration using the Axioline modules connected to the PROFINET device.		

#### View: PROFINET diagnostics

- Select the AXC 1050 PROFINET controller as the "Communication Path".
- To activate the communication path, click on "Connect".
- At the top under "View", select "PROFINET Diagnostic".

The diagnostic information for the PROFINET devices is displayed.



Figure 6-12 PROFINET diagnostics

#### 6.4 Importing Ethernet devices into the project

Ethernet devices, such as the programming PC, can also be imported into your project. This provides you an overview of the complete network.

To import an Ethernet device into the project, proceed as follows:

- Make sure you are in the bus configuration workspace.
- Open the "Universal, Universal, IP" entry in the "Device Catalog".
- If the "Generic IP Device" entry is not present, import this entry. To do this, proceed as follows:
  - Open the context menu in the device catalog.
  - Select the "Import Device..." command.

무

 In the "...fdcml10\ETHERNET\Universal" folder, open the "Generic\_IP Device-xx.xml" file.

The file will be imported into the device catalog.

• Insert the "Generic IP Device" in the project.



Figure 6-13 Inserting the "Generic IP Device"

The generic IP device is inserted together with a free IP address and a PROFINET device name.

• Adapt the IP address and the DNS name on the "IP Settings" tab.

The programming PC is to be inserted in the example. Its IP address is 192.168.0.100.



Figure 6-14 Adapting the IP address and PROFINET device name ("DNS Name")

• Compile the project, send it to the controller, and perform a cold restart (see "Compiling and sending a project and performing a cold restart" on page 30).

#### 6.5 Device description files

Device description files are FDCML or GSD files, which provide a complete description of a device. If the device catalog does not contain a corresponding device description file, it must be imported as described in the following sections.

#### 6.5.1 Phoenix Contact device description files (FDCML files)

When PC Worx is installed for the first time, the device description files for the devices available at the time are also installed. These descriptions are also found in the device catalog. When installing add-ons for PC Worx, new device description files are installed in the "..\FDCML10\...\Phoenix Contact" folder. These new descriptions are not included in the device catalog yet. They must be imported as necessary.

- In PC Worx, select "Phoenix Contact" in the "Device Catalog" window.
- Right-click to open the context menu and select "Import Device...".



Figure 6-15

Device catalog: import device

 Select the device description file. If you have used the suggested standard installation, the file is located in directory: C:\Users\Public\Documents\FDCML10\xxx\Phoenix Contact.

xxx = system (e.g., Axioline, INTERBUS, PROFINET)

4 퉬 FDCML10	
🛛 📗 Axioline	
퉬 CatalogFiles180	
퉬 CatalogFilesExpress180	
D 🌗 CPX	
ETHERNET	
🛛 🐌 INTERBUS	
MODBUS	
🖻 퉬 Profibus	
🛛 鷆 PROFInet	
Image: Series	
Figure 6-16 Di	rectory for device description files

• Confirm your selection by clicking "Open".

The "Message Window" indicates whether the device has been imported successfully.

# 6.5.2 Device description files from other manufacturers (GSD files)

GSD files can be used to integrate devices from manufacturers other than Phoenix Contact in PC Worx.

- Copy the GSD file for your device, e.g., from the Internet to your PC hard disk.
- In PC Worx, select "Phoenix Contact" in the "Device Catalog" window.
- Right-click to open the context menu and select "Import GSD File...".



Figure 6-17 E

7 Device catalog: import GSD file

• Confirm your selection by clicking "Open".

PC Worx creates an entry for the device in the device catalog. The entry can be found in directory C:\Users\Public\Documents\FDCML10\... (for standard installation).

The "Message Window" indicates whether the device has been imported successfully.

When reading a modular device, only the device, and not its modules, is displayed in the bus configuration.

Manually insert the modules for these devices. To do this, proceed as follows:

- Open the module catalog via "View, Module Catalog".
- Select the device modules one at a time from the module catalog and drag and drop them in the lower level below the device entry.

# 7 Visualization with WebVisit

#### 7.1 General

The WebVisit software is used to visualize variables of the controller used under PC Worx. WebVisit is a software tool used to generate web pages. The software runtime component is a web server, which is stored on the controller. The variable values are actually visualized via a Java-compatible standard browser.



For visualization, you need a web browser with Java Standard Edition SE 6 (or later) with at least Java Runtime Environment JRE 6 (Version 1.6.x or later).

Variables in PC Worx

To visualize variables from your PC Worx project in WebVisit, activate the "PDD" checkbox in PC Worx:

- In the "Variable Properties" window (Figure 7-1)
- On the worksheet (Figure 7-2)

Variable Properties		<b>X</b>
Name: switch Data Type: BOOL Usage: VAR_GLOBAL Initial value: I/O address: Description:	Cefinition scope Cocal C	OK Cancel Help
PDD     OPC     Hidden     Initvalue as default     Redundant	Show all variables of worksheets	



#### **AXC 1050 PN STARTERKIT**

	Name	Туре	Usage	Description	Address	Init	Retain	PDD	OPC	~
	🖃 Default									=
	Time_Parameter	TIME	VAR_GLOBAL			Time#200ms		1		
	switch	BOOL	VAR_GLOBAL					1		
	LED_0	BOOL	VAR_GLOBAL		%QX6.0			1		
	LED_1	BOOL	VAR_GLOBAL		%QX6.1			1		
	LED_2	BOOL	VAR_GLOBAL		%QX6.2			1		
	LED_3	BOOL	VAR_GLOBAL		%QX6.3			1		
	LED_4	BOOL	VAR_GLOBAL		%QX6.4			1		
	LED_5	BOOL	VAR_GLOBAL		%QX6.5			1		
	LED_6	BOOL	VAR_GLOBAL		%QX6.6			1		
	LED_7	BOOL	VAR_GLOBAL		%QX6.7			1		Ŧ
•	· · · · · · · · · · · · · · · · · · ·									
	E Global_Vari									



When compiling the project in PC Worx, a file called "pdd.csv" is generated, which is used by WebVisit for visualization.

In WebVisit, enter the PC Worx project used (recommended) or the corresponding pdd.csv file. When carrying out standard installation (see Section 3) and naming the PC Worx project according to Section 5, you will find

- The project in directory
  - \Libraries\Documents\PC Worx\Projects

And

 The associated pdd.csv file in directory \Libraries\Documents\PC Worx\xxx\C\STD\_CNF\R\STD\_RES
 (www = project pame; in the example; FirstStape, AYC1050, RN, Starte

(xxx = project name; in the example: FirstSteps\_AXC1050\_PN\_Starterkit).

When entering this path, the path for the pdd.csv file is updated automatically. Please also refer to Figure 7-3 on page 89.



For additional information on using WebVisit, please refer to the corresponding documentation.

#### 7.2 Saving/extracting the visualization

On the CD AXC 1050 PN STARTERKIT, you will find the visualization of the example project from Section 5 as a WebVisit project in compressed format ("FirstSteps\_AXC1050.zip" file).

- Save the compressed WebVisit project ("FirstSteps\_AXC1050.zip") from the CD AXC 1050 PN STARTERKIT to the hard disk of your PC.
- Extract the file to the default directory for WebVisit projects
   C:\Program Files (x86)\Phoenix Contact\Software Suite 182\WebVisit ...\Projects on the hard disk of your PC.

#### 7.3 WebVisit: path to the PC Worx project

For the variables from the PC Worx project to be visualized in WebVisit, the path to the PC Worx project and the path to the "pdd.csv" file must be specified in WebVisit.

- Open WebVisit.
- Select the "Open Project" command from the "File" menu.
- In the window that opens, navigate to the "FirstSteps\_AXC1050\_PN\_Starterkit" WebVisit project:
   C:\Program Files (s86)\Phoenix Contact\Software Suite 182\WebVisit ...\Proj
  - ects\FirstSteps\_AXC\_1050.
- Select the "FirstSteps\_AXC1050\_PN\_Starterkit.prj" file.
- Then click "Open".

The WebVisit project is opened.

- Select the "Project Configurations" command from the "Project" menu.
- Switch to the "Project Advanced" tab.
- Enter the path to the PC Worx under "PPO Variable List, \*.mwt, \*.mwe Path".

The path to the "pdd.csv" file in the "PPO List pdd.csv Path" field is added automatically.

View Configurations       Runtime Configurations       Build Advanced       Project Advanced         Project Advanced Configurations       Project Type       Standard         Project Type       Standard         * PPO Variable List       *.mwt;*.mwe Path       C:\Users\Public\Documents\PC WORX\P         PPO List pdd.csv Path       C:\Users\Public\Documents\PC WORX\P         Manae List       Work List	
Project Advanced Configurations     Project Type     Standard     PPO Variable List     *.mwt,*.mwe Path     C:\Users\Public\Documents\PC WORX\P     PPO List pdd.csv Path     C:\Users\Public\Documents\PC WORX\P     More Lik Pdt	
Project Type Standard  Project Type Standard  Pro Variable List  *.mwt,*.mwe Path C:\Users\Public\Documents\PC WORX\P PPO List pdd.csv Path C:\Users\Public\Documents\PC WORX\P Marrol ib Path	
PPO Variable List     *.mwt;*.mwe Path     C:\Users\Public\Documents\PC WORX\P     PPO List pdd.csv Path     C:\Users\Public\Documents\PC WORX\P     Mannel ib     Mannel ib	
*.mwt;*.mwe Path C:\Users\Public\Documents\PC WORX\P PPO List pdd.csv Path C:\Users\Public\Documents\PC WORX\P Manual ib Path Manual ib	
PPO List pdd.csv Path C:\Users\Public\Documents\PC WORX\P	rojects\Qui
Manage Like Data	roj
IVIACIO LID Path IVIACIOLID	
Hardware Profile Webserver Integrated in PLC	
2 Bits Colors Paint	
Deploy	
Add design time project files in deploy	
Add Files From Extra Folder During Deploy	
Deploy Extra Folder	
Zip design time project's files before deploy	
FTP Download	
HMI Remote Directory	
SCADA Config Remote Dir. /SpiderAlrTrd/Config	
Passive FTP	
Deploy to HW	
Base Path	
HMI Relative Path	
SCADA Config Relative Path /SpiderAlrTrd/Config/	
Clear before	
ОК	Cancel

Figure 7-3 PC Worx example project: setting the path

Confirm your entries with "OK".

# 7.4 WebVisit: downloading the visualization to the controller

- Select the "Download Project" command from the "Project" menu.
- In the dialog box that opens, confirm the question "Would you like to make a BuildAll before deploying the HMI Project" with "Yes".
- In the "Connect" area, set the IP address of the controller under "Server" ("192.168.0.2" in the example, see Figure 7-4).

FTP Download -	HMI		×
Connect	192 109 0 2		-
Anonym	j 192. 166. U.2 ous Login	Passive FTP	
Connect	NO CONNECTION		
		E wit	

Figure 7-4 WebVisit: FTP download to the controller

• Click on the "Connect" button.

FTP Download - HMI	
Connect Server 192.168.0.2 I Anonymous Login	Passive FTP
Connect	
Download Remote Directory	
Select Project's Files To Download (default all selected)	Make/Change Dir Up Dir Deselect All
a_0036040.gif AXC_1050_ktein.png AXL_F_B_PN_ktein.png AXL_F_D116_ktein.png btn_glnav_d_svg btn_glnav_d_4.svg btn_glnav_d_4.svg btn_glnav_d_3.svg btn_simple_3.svg	
	Download Project
	Exit

Figure 7-5

WebVisit connected to the controller

• Click on the "Download Project" button.

FTP Download	HMI			x		
Connect Server	192.168.0.2 Jous Login	Passive FTP	Þ			
Connect	CONNECTED					
Download Remote Dir	ectory					
			Make/Change Dir Up Dir			
Select Proje	ect's Files To Download (default all selecte	d)	Deselect All			
a_003604 AXC_1050 AXL_F_D AXL_F_D AXL_F_D btn_ginav, btn_ginav, btn_ginav, btn_simple	0 gif Lein, png PN, klein, png 16, klein, png 16, klein, png 16, klein, png 4, svg 12, svg 13, svg 13, svg 14, gauge		* #			
		Download Project				
Downloadii Zubehör\Fi	Downloading [C:\Users\pywc05\Desktop\Statterkit Zubehör\FirstSteps_AXC_1050\FirstSteps_AXC_1050\AXL_F_B_PN_klein.png]					
		Exit				

Figure 7-6 Downloading the WebVisit project to the controller

The progress bar shows the transmission status.

• After successful download, close the window by clicking on "Exit".

The visualization project has been transmitted to the controller. The visualization can now be displayed via your web browser (see Section 7.5).

#### 7.5 Starting the visualization



#### Please note:

The visualization is only started once the following setting has been made in the Windows® Control Panel.

- In the Windows® Control Panel, open the Java settings window.
- In the settings for temporary files, deactivate the "Keep temporary files on my computer" checkbox.
- In the address window of your java-compatible web browser, enter the IP address of the controller (in the example: "http://192.168.0.2").

Once all settings have been properly made, your web browser will display the visualization's start page after a short loading time. Here you can see the running light of the PC Worx project as an animated representation of LEDs, which can be activated/deactivated using the "Start/Stop" button.



AXC 1050 PN Starterkit



Figure 7-7 Visualization of the example program

- In the input field, enter a cycle time > 100 ms.
   If no cycle time is entered, the default cycle time of 200 ms (initial value of the Time\_Parameter variable, see Section 5.12) will be used.
   LEDs 00 to 07 of the Axioline F digital output module light up one after the other for the cycle time specified.
- Activate the "Start/Stop" button to activate or deactivate animation of the running light in the web browser.

## A Status information and system variables

#### A 1 Status of the PROFINET controller

The PROFINET controller has status information that indicates its configuration status.

This can be requested via the PNIO\_CONFIG\_STATUS system variable. The system variable is available as a word and as individual bits under "Global\_Variables".

Project Tree Window		Name	Туре	Usage	Description	*
Project : C:\Users\Public\Documents\PC		AXIO_DIAG_STATUS_REG_ACT	BOOL	VAR_GLOB	Selected configuration is ready to	
Libraries		AXIO_DIAG_STATUS_REG_RDY	BOOL	VAR_GLOB	Controller board ready to operate	
Data Types		AXIO_DIAG_STATUS_REG_SYSFAIL	BOOL	VAR_GLOB	The controller is in the STOP state	
sys_flag_types*		PNIO_FORCE_FAILSAFE	BOOL	VAR_GLOB	All PROFINET devices are prompte	
		PNIO_CONFIG_STATUS	WORD	VAR_GLOB	Current configuration status of the	
		PNIO_CONFIG_STATUS_READY	BOOL	VAR_GLOB	Context manager active	
Main I		PNIO_CONFIG_STATUS_ACTIVE	BOOL	VAR_GLOB	Communication started	
MainV		PNIO_CONFIG_STATUS_CFG_FAULT	BOOL	VAR_GLOB	Configuration error	
Main Main		PNIO_SYSTEM_BF	BOOL	VAR_GLOB	Missing connection to a configure	-
Physical Hardware		PNIO_SYSTEM_SF	BOOL	VAR_GLOB	Diagnostic alarm for a configured	=
		PNIO_DIAG_AVAILABLE	BOOL	VAR_GLOB	Diagnostic available	
		PNIO_MAINTENANCE_REQUIRED	BOOL	VAR_GLOB	Maintenance required	
		PNIO_MAINTENANCE_DEMANDED	BOOL	VAR_GLOB	Maintenance demanded	
		PND_S1_PLC_RUN	BOOL	VAR_GLOB	Status of the higher-level control :	
		PND_S1_VALID_DATA_CYCLE	BOOL	VAR_GLOB	IO Controller has established the c	
Main V		PND_S1_OUTPUT_STATUS_GOOD	BOOL	VAR_GLOB	IOP status of the higher-level cont	
		PND_S1_INPUT_STATUS_GOOD	BOOL	VAR_GLOB	IOC status of the higher-level cont	
IO_Configuration		PND_S1_DATA_LENGTH	WORD	VAR_GLOB	Process data length	Ŧ
	1				•	
4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		Global_Vari				

Figure A-1 PNIO\_CONFIG\_STATUS system variable

PNIO_CONFIG_ STATUS_READY	The variable is set if the PROFINET controller has been initialized correctly. No desired con- figuration has been loaded by PC Worx yet. Connection establishment to the devices has been completed.
PNIO_CONFIG_ STATUS_ACTIVE	The variable is set if the desired configuration for the PROFINET controller has been loaded. In this state, the PROFINET controller attempts to establish a connection cyclically to all devices in the desired configuration (in the bus configuration below the PROFINET icon). In this way, it attempts to find each device with the corresponding PROFINET device name ("DNS Name") in the current subnetwork.
	If the connection to a PROFINET device has been established successfully, the corre- sponding PNIO_DATA_VALID process data item is set.
	For inaccessible devices, the PROFINET controller cyclically attempts to establish a con- nection approximately every 5 seconds.
	A connection cannot be established, e.g., if the corresponding device is ready, but a correct PROFINET device name ("DNS Name") has not yet been assigned to it (see also Section 5.7).
PNIO_CONFIG_ STATUS_FAULT	This system variable is set if an error occurred when configuring the PROFINET controller.

#### A 2 Status of a PROFINET device

The status of a PROFINET device can be queried using predefined process data.

	Quickstart_PN  AXC 1050 192.168.0.2  R Resource  Axioline  AXL F BK PN axl-f-bk-pn.quickstart.de 192.168.0.3  AXL F BK PN axl-f-bk-pn.quickstart.de 192.168.0.3  AXL F BK PN axl-f-bk-pn.quickstart.de 192.168.0.3  AXL F D Axioline  AXL F D 16/3 2F  AXL F D 16/3			
	Device Process Data Item I/Q Data Type			
	1 @AXL F BK PN ~PNIO_DATA_STATE I BYTE			
	1 @AXLFBKPN PNIO_DATA_VALID I BOOL			
	1 @AXLFBKPN PNIO_APPL_RUN I BOOL			
	1 @AXL F BK PN PNIO_NO_DIAG I BOOL			
	< >			
	The ~PNIO_DATA_STATE byte that contains the corresponding status bits is available. A PROFINET device only provides valid data if these bits are set.			
PNIO_IS_PRIMARY	This process data item is reserved for future redundancy functions.			
PNIO_DATA_VALID	For PROFINET, it may be normal during operation that a PROFINET device within the net- work cannot be accessed (e.g., undocking devices).			
	Use this process data item to specify for your application whether or not the operation of all other PROFINET devices is to be continued despite a device failure.			
	In either case, the application program must receive information as to whether or not a PROFINET device is supplying valid data. This is why each PROFINET device has a PNIO_DATA_VALID process data item.			
	This bit must be set for the PROFINET device to supply valid data and all other process data to be valid.			
PNIO_APPL_RUN	This bit indicates that the application is running on the PROFINET device.			
PNIO_NO_DIAG	If this bit is set, there are no device diagnostics present.			
Not all bits from byte ~PNIO_DATA_STATE are used. To prevent unused bits bein by mistake, hide them in the control program by linking to a corresponding bit matching the second				

To query the status, assign the process data to the corresponding variables.

i

If variables have been created previously and are to be assigned to the predefined process data, proceed as described in Section 5.13.

#### A 3 PNIO\_FORCE\_FAILSAFE system variable

In many cases, a machine or system can no longer be operated in the event of a PROFINET device failure. This is normal in INTERBUS systems where neither bus couplers nor isolated disconnection are used.

In the example system, a PROFINET device failure does not affect the operation of all the other PROFINET devices. If you would like to set all the outputs to a safe state in the event of an error, the PNIO\_FORCE\_FAILSAFE system variable can be used for this. It can be found under "Global\_Variables" in the "IEC Programming" workspace.



Figure A-3 PNIO\_FORCE\_FAILSAFE system variable

If the variable is set, all the PROFINET devices output zero values or defined substitute values. The corresponding inputs are set to zero.

# **B** Appendixes

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