

Application manual PROFINET Controller/Device

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Application manual
PROFINET Controller/Device

RobotWare 6.05

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Table of contents

Overview of this manual	7
Product documentation, IRC5	9
Safety	11
Network security	12
Terminology	13
1 Introduction	15
1.1 What is PROFINET?	15
1.2 PROFINET for IRC5	16
2 Hardware overview	19
2.1 Main computer	19
2.2 Ethernet switches	26
2.3 I/O devices	27
3 Software overview	29
3.1 Information about the internal device	29
3.2 Information about the internal controller	31
3.3 Software for configuring a device	32
3.4 Software for configuring a controller	33
4 Configuring the internal device and external controller	35
4.1 Recommended working procedure	35
4.2 Configuring the PROFINET network settings	36
4.3 Configuring the internal device	38
4.4 Configuring the external controller	39
5 Configuring the internal controller and external device	41
5.1 Recommended working procedure	41
5.2 Creating the PROFINET configuration file	42
5.3 Configuring the IRC5 controller	43
5.4 Using Fast Device Startup	44
5.5 Using Shared Device	46
5.5.1 About Shared Device	46
6 System parameters	49
6.1 Introduction	49
6.2 Type Industrial Network	52
6.2.1 Connection	52
6.2.2 Configuration File	53
6.2.3 PROFINET Station Name	54
6.2.4 Nested Diagnosis	55
6.3 Type PROFINET Device	56
6.3.1 PROFINET Station Name	56
6.3.2 Fast Device Startup	57
6.3.3 Port 1	58
6.3.4 Port 2	59
6.3.5 Port 3	60
6.3.6 Port 4	61
6.3.7 Energy Saving	62
6.4 Type Signal	63
6.4.1 Transfer To Device	63
6.4.2 Output Offset on Destination Device	64
6.4.3 Transfer From Device	65
6.4.4 Input Offset on Source Device	66

Table of contents

6.5	Type PROFINET Internal Device	67
6.5.1	Input Size	67
6.5.2	Output Size	68
7	Troubleshooting	69
7.1	Scenarios	69
A	About the third party tool information	71
B	Using Siemens Step 7 PC tool	75
C	Using PROFINET Configurator Express	79
D	Using PC WORX	85
Index	91

Overview of this manual

About this manual

This manual describes the following options and contains instructions on how to configure them in an IRC5 system.

- PROFINET Controller/Device, option number 888-2
- PROFINET Device, option number 888-3

Usage

This manual should be used during installation and configuration of the PROFINET options.

Who should read this manual?

This manual is intended for:

- Personnel that are responsible for installations and configurations of industrial network hardware/software.
- Personnel that make the configurations of the I/O system.
- System integrators.

Prerequisites

The reader should have the required knowledge of:

- PROFINET network
- I/O system configuration
- IRC5 controller
- RobotStudio

References

ABB documents

Reference	Document ID
<i>Technical reference manual - System parameters</i>	3HAC050948-001
<i>Product manual - IRC5</i>	3HAC047136-001
<i>Operating manual - IRC5 with FlexPendant</i>	3HAC050941-001
<i>Operating manual - RobotStudio</i>	3HAC032104-001
<i>Application manual - PROFINET Anybus Device</i>	3HAC050968-001
<i>Application manual - PROFIenergy Device</i>	3HAC050967-001

Other references

Reference	Description
International standard IEC 61158 Type 3 International standard IEC 61784	The PROFINET industrial network standard is described in the international standards.
PROFINET Cabling and Interconnection Technology	Installation Guideline for PROFINET (Version 2.00, September 1998)

Continues on next page

Reference	Description
Commissioning PC Stations - Manual and Quick Start	Release 12/2006 C79000-G8976-C156-08
ET200S Distributed I/O System	Manual from Siemens
www.profinet.com	The web site of PROFINET International

Revisions

Revision	Description
-	First edition. Released with RobotWare 6.0.
A	Released with RobotWare 6.01. <ul style="list-style-type: none">• Added information about different ways to connect to networks in section Main computer on page 19.• System parameters <i>Address</i>, <i>Subnet Mask</i>, and <i>Gateway</i> removed from <i>Industrial Network</i>.• Added a note that it is advisable to avoid multiple master networks installation to ensure proper system performance in section Software overview on page 29.
B	Released with RobotWare 6.02. <ul style="list-style-type: none">• Updated the path to the template files, see Template I/O configuration file on page 29.• Added shared device functionality and configuration, see Using Shared Device on page 46.• Added new parameter <i>Nested Diagnosis</i>, see Nested Diagnosis on page 55.• Added new parameter <i>Energy Saving</i>, see Energy Saving on page 62.• Added <i>PROFINET Station Name</i> under Type <i>PROFINET Device</i>, see PROFINET Station Name on page 56.• The PROFINET internal device has been extended from 128 bytes (1024 signals) to 256 bytes (2048 signals). See Input Size on page 67 and Output Size on page 68.
C	Released with RobotWare 6.03. Added information about configuration of AC500 with an IRC5 device in Automation Builder (Control Builder Plus). See Troubleshooting on page 69 section.
D	Released with RobotWare 6.04. The information about third party tools is moved to an appendix. Added new parameters in Type Signal in System Parameters section. See Transfer To Device on page 63 , Output Offset on Destination Device on page 64 , Transfer From Device on page 65 , and Input Offset on Source Device on page 66 .
E	Released with RobotWare 6.05. Added new allowed value <i>Support</i> in parameter Fast Device Startup on page 57 .

Product documentation, IRC5

Categories for user documentation from ABB Robotics

The user documentation from ABB Robotics is divided into a number of categories. This listing is based on the type of information in the documents, regardless of whether the products are standard or optional.

All documents listed can be ordered from ABB on a DVD. The documents listed are valid for IRC5 robot systems.

Product manuals

Manipulators, controllers, DressPack/SpotPack, and most other hardware is delivered with a **Product manual** that generally contains:

- Safety information.
- Installation and commissioning (descriptions of mechanical installation or electrical connections).
- Maintenance (descriptions of all required preventive maintenance procedures including intervals and expected life time of parts).
- Repair (descriptions of all recommended repair procedures including spare parts).
- Calibration.
- Decommissioning.
- Reference information (safety standards, unit conversions, screw joints, lists of tools).
- Spare parts list with exploded views (or references to separate spare parts lists).
- Circuit diagrams (or references to circuit diagrams).

Technical reference manuals

The technical reference manuals describe reference information for robotics products.

- *Technical reference manual - Lubrication in gearboxes*: Description of types and volumes of lubrication for the manipulator gearboxes.
- *Technical reference manual - RAPID overview*: An overview of the RAPID programming language.
- *Technical reference manual - RAPID Instructions, Functions and Data types*: Description and syntax for all RAPID instructions, functions, and data types.
- *Technical reference manual - RAPID kernel*: A formal description of the RAPID programming language.
- *Technical reference manual - System parameters*: Description of system parameters and configuration workflows.

Continues on next page

Application manuals

Specific applications (for example software or hardware options) are described in **Application manuals**. An application manual can describe one or several applications.

An application manual generally contains information about:

- The purpose of the application (what it does and when it is useful).
- What is included (for example cables, I/O boards, RAPID instructions, system parameters, DVD with PC software).
- How to install included or required hardware.
- How to use the application.
- Examples of how to use the application.

Operating manuals

The operating manuals describe hands-on handling of the products. The manuals are aimed at those having first-hand operational contact with the product, that is production cell operators, programmers, and trouble shooters.

The group of manuals includes (among others):

- *Operating manual - Emergency safety information*
- *Operating manual - General safety information*
- *Operating manual - Getting started, IRC5 and RobotStudio*
- *Operating manual - IRC5 Integrator's guide*
- *Operating manual - IRC5 with FlexPendant*
- *Operating manual - RobotStudio*
- *Operating manual - Trouble shooting IRC5*

Safety

Safety of personnel

When working inside the robot controller it is necessary to be aware of voltage-related risks.

A danger of high voltage is associated with the following parts:

- Devices inside the controller, for example I/O devices, can be supplied with power from an external source.
- The mains supply/mains switch.
- The power unit.
- The power supply unit for the computer system (230 VAC).
- The rectifier unit (400-480 VAC and 700 VDC). Capacitors!
- The drive unit (700 VDC).
- The service outlets (115/230 VAC).
- The power supply unit for tools, or special power supply units for the machining process.
- The external voltage connected to the controller remains live even when the robot is disconnected from the mains.
- Additional connections.

Therefore, it is important that all safety regulations are followed when doing mechanical and electrical installation work.

Safety regulations

Before beginning mechanical and/or electrical installations, ensure you are familiar with the safety regulations described in *Operating manual - General safety information*¹.

¹ This manual contains all safety instructions from the product manuals for the manipulators and the controllers.

Network security

Network security

This product is designed to be connected to and to communicate information and data via a network interface, It is your sole responsibility to provide and continuously ensure a secure connection between the product and to your network or any other network (as the case may be). You shall establish and maintain any appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of anti-virus programs, etc) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information. ABB Ltd and its entities are not liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.

Terminology

Terms

Term	Explanation
Controller	The <i>PROFINET master</i> is referred to as <i>PROFINET controller</i> .
Device	In this manual the term <i>device</i> is used to describe a physical unit.
<i>External</i> slave or master	The term <i>external</i> is used to describe a controller or device on the PROFINET network connected to the IRC5 controller.
External PROFINET configuration tool	A third party PC software to configure the PROFINET controller. Recommended softwares are: <ul style="list-style-type: none"> • PROFINET-IO Configurator Express • PROFINET-IO Configurator Professional • PC WORX See Configuration programs on page 16 .
Fast Device Startup	Functionality for shortening the connection time with an I/O device. Other manufacturers refer to this functionality as Fast Start Up (FSU) or Prioritized Startup.
GSDML file	A GSDML file contains information about a PROFINET device. (Generic Station Description Markup Language)
Internal Device	A built-in device in the robot controller
<i>Internal</i> slave or master	The term <i>internal</i> is used to describe when the IRC5 controller acts as a controller or device on the PROFINET network.
LAN	Port/connector for Local Area Network.
Nested Diagnosis	The nested diagnosis functionality is used for diagnosis in hierarchial plants and enables the user to evaluate the status of the PROFINET network from a central PLC or external tool.
PROFINET configuration file	XML file created using an external PROFINET configuration tool
Reduction ratio	Poll rate
Shared Device	A device that is controlled by two controllers via a PROFINET interface.
Slave	See term <i>Device</i>
WAN	Port/connector for Wide Area Network.

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1 Introduction

1.1 What is PROFINET?

General

PROFINET is an open standard for Industrial Ethernet. PROFINET satisfies requirements for automation technology. PROFINET solutions can be implemented for factory and process automation, for safety applications, and for the entire range of drive technology right up to clock-synchronized motion control.

Standardization

The use of open standards, simple operation, and the integration of existing system segments have driven the definition of PROFINET from the beginning. PROFINET is standardized in IEC 61158 and IEC 61784. The continual further development of PROFINET offers users a long term perspective for the implementation of their automation tasks.

Communication profiles

PROFINET has a modular design and different PROFINET communication profiles are all combinations of modular elements from the groups transmission technology, communication protocol, and application profiles.

Here are some examples of PROFINET communication profiles:

- **PROFINET-IO** - Distributed I/O (Remote I/O). Here, the familiar I/O view of PROFIBUS is retained, in which the user data from the field devices are periodically transmitted into the process model of the control system.
- **PROFINET-CBA** - Based on the object-oriented modelling of technological modules. Based on the object model, machines and installations are structured in PROFINET in the form of technological modules.
- **PROFIsafe** - Defines how safety-oriented devices (emergency shutoff switches, light grids, overfill protection systems, etc.) can communicate safety control information over a network securely enough that they can be used in safety-oriented automation tasks up to EN954's KAT4, AK6, or SIL3 (Safety Integrity Level).
- **PROFIdrive** - The PROFIdrive profile covers application scenarios from simple frequency converters to highly dynamic servo drivers.
- **PROFIenergy** - A profile of the PROFINET communications protocol that allows the power consumption of automation equipment in manufacturing (such as robot assembly cells, laser cutters and sub-systems such as paint lines) to be managed over a PROFINET network. It offers an open and standardized means of controlling energy usage during planned and unplanned breaks in production. See also *Application manual - PROFIdenergy Device*.

1 Introduction

1.2 PROFINET for IRC5

1.2 PROFINET for IRC5

General

The PROFINET network is running on the IRC5 main computer and does not require any additional hardware. PROFINET as described in this manual requires the main computer DSQC1000.

Options

With option *PROFINET Controller/Device*, the IRC5 controller can act as a controller, device, or both on the PROFINET network.

With option *PROFINET Device*, the IRC5 controller can only act as a device.



Tip

If only PROFINET device functionality is required, then the option *PROFINET Anybus Device* can also be used.

For more information, see *Application manual - PROFINET Anybus Device*.



Note

Note that the network settings are set for the *Connection*, i.e. the physical connector on the main computer used for the PROFINET network.

This means that the network settings are shared between the internal device and the internal controller if the IRC5 controller acts as both on the PROFINET network.

Compatibility

PROFINET supports the communication profile PROFINET-IO RT ver.V2.2 conformance class A, see [Communication profiles on page 15](#)).

Configuration programs

To be able to configure the PROFINET controller, an external PROFINET configuration tool is needed. There are two different versions available: *PROFINET-IO Configurator Express* and *PROFINET-IO Configurator Professional*. Supplied on the RobotWare DVD is the Express version, see [About the third party tool information on page 71](#). The Professional version have some additional features and can be bought separately. It is also possible to use the tool PC WORX from Phoenix.

The PROFINET internal device does not require any external configuration tool for the IRC5 controller. A connecting PLC or other controller needs to use the provided GSDML file and its vendor specific configuration tool to be able to connect to the PROFINET internal device.

Continues on next page

Specification overview, internal controller

Item	Specification
Number of I/O devices connected to controller	Maximum 50 I/O devices
Number of I/O signals	2048 digital inputs per I/O device 2048 digital outputs per I/O device
Maximum number of I/O signals	Maximum 12000 I/O signals

Specification overview, internal device

Item	Specification
GSDML file	See GSDML file on page 29 .
PROFINET Version	V2.2
Slot configuration	Slot 1-2: Digital input or output modules of variable size
Number of I/O signals	2048 digital inputs 2048 digital outputs

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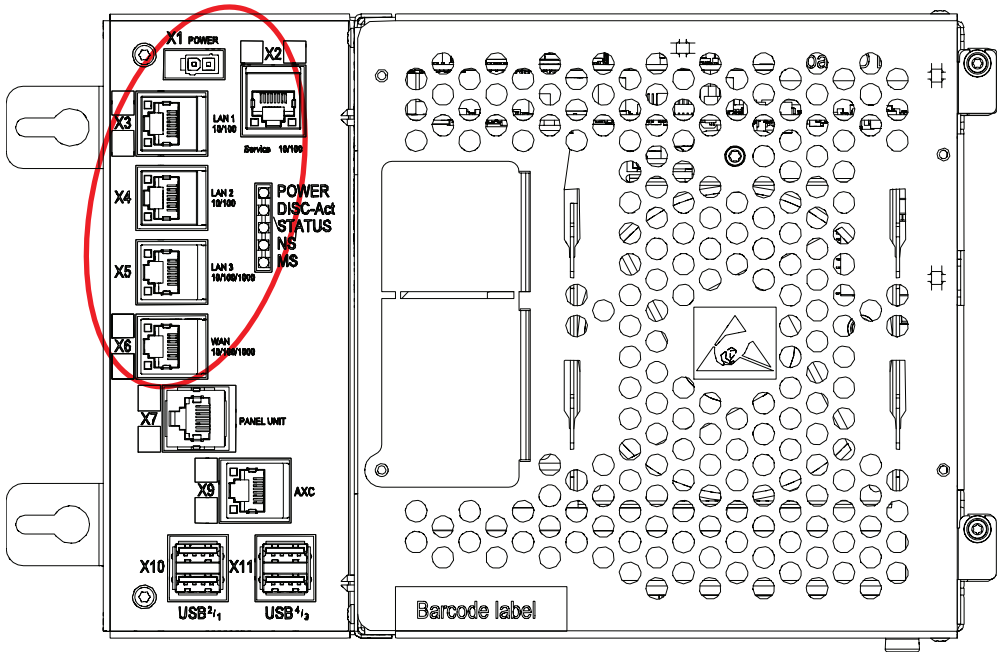
2 Hardware overview

2.1 Main computer

Connections

The I/O network can be connected to one of the the Ethernet ports WAN, LAN 2, or LAN 3 on the main computer.

The following figure illustrates where the Ethernet port connectors, are placed on the main computer.



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Connector	Label	Description
X2	Service	Port to the robot's private network. Intended to be left empty so that service personnel can use it to connect to the computer unit.
X3	LAN 1	Port to the robot's private network. Normally used to connect the FlexPendant.
X4	LAN 2	Port to the robot's private network.
X5	LAN 3	By default LAN 3 is configured for an isolated LAN3 network. Can be reconfigured to be a part of the private network.
X6	WAN	Wide Area Network that can host a public industrial network.



Note

It is not supported to connect multiple ports of the main computer (X2 - X6) to the same external switch, unless static VLAN isolation is applied on the external switch.

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2 Hardware overview

2.1 Main computer

Continued

Intended use of WAN and LAN ports

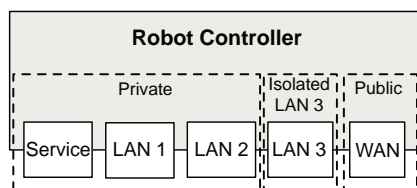
The WAN port is a public network interface to the controller, typically connected to the factory network with a public IP address provided by the network administrator.

The LAN ports are intended for connecting network based process equipment to the controller, for example industrial networks, cameras, and welding equipment.

LAN 2 can only be used as a private network to the IRC5 controller.

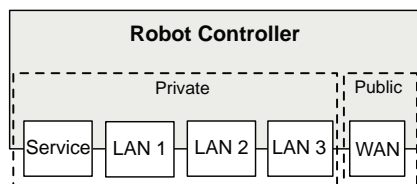
Isolated LAN 3 or LAN 3 as part of the private network

The default configuration is that LAN 3 is configured as an isolated network. This allows several robot controller to be connected to the same network, see [PROFINET on dedicated industrial network on page 23](#).



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An alternative configuration is that LAN 3 is part of the private network. The ports Service, LAN 1, LAN 2, and LAN 3 then belong to the same network and act just as different ports on the same switch. This is configured by changing the system parameter *Interface*, in topic *Communication* and type *Static VLAN*, from "LAN 3" to "LAN". See *Technical reference manual - System parameters*.



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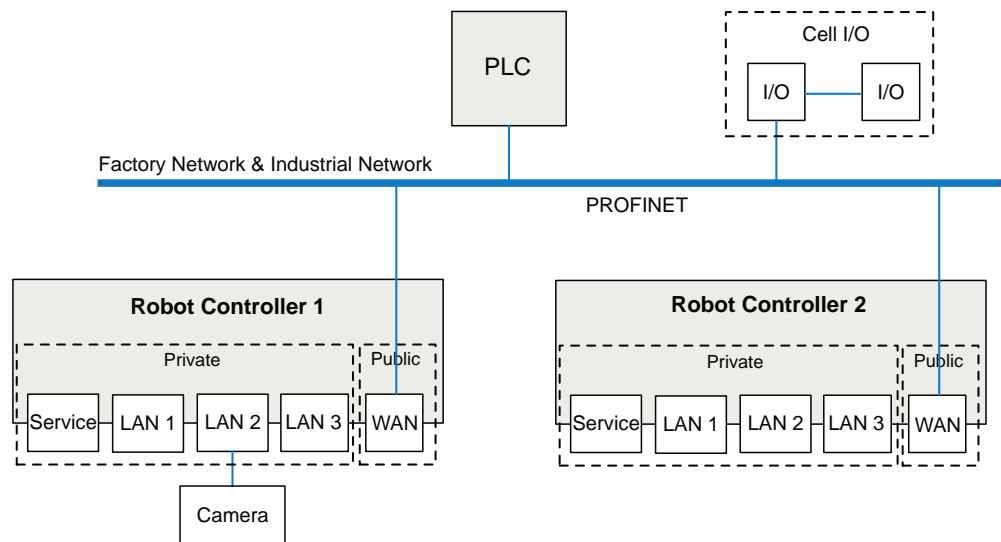
One PROFINET network connected to the robot controller

If PROFINET is used on the public network (WAN port) without an Anybus adapter, PROFINET cannot be used on the private network. Equipment not using PROFINET (for example a camera) can be connected to the private network. To use PROFINET on both the public and private network, an Anybus adapter must be used. See [Using Anybus adapter to connect two PROFINET networks on page 24](#).

PROFINET on factory network

When the WAN port is used for connecting to an industrial network, the traffic shares the same media as the factory network and will share bandwidth with other non industrial network traffic.

The following figure illustrates the network when connecting a controller and a device to the WAN port of the main computer:



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2 Hardware overview

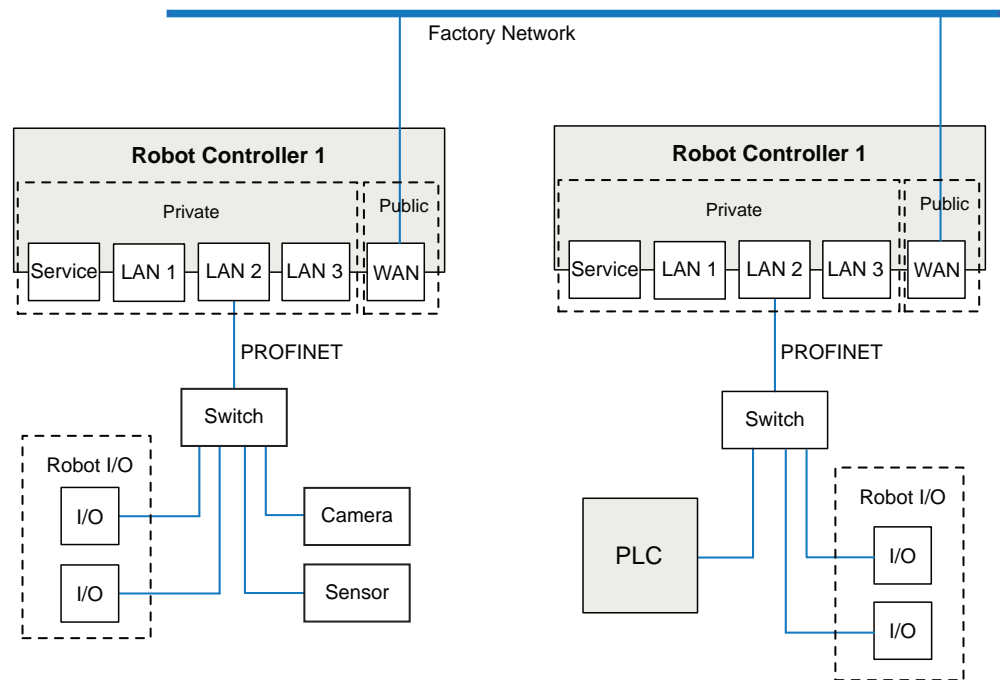
2.1 Main computer

Continued

PROFINET on private network

The private network can contain I/O, sensors, etc. for the robot controller. However, it is not possible to connect several robot controllers to the same private network.

The following illustration shows two robot controllers with PROFINET (and other IP traffic) on each private network. The factory network cannot communicate with the robot controller using PROFINET.

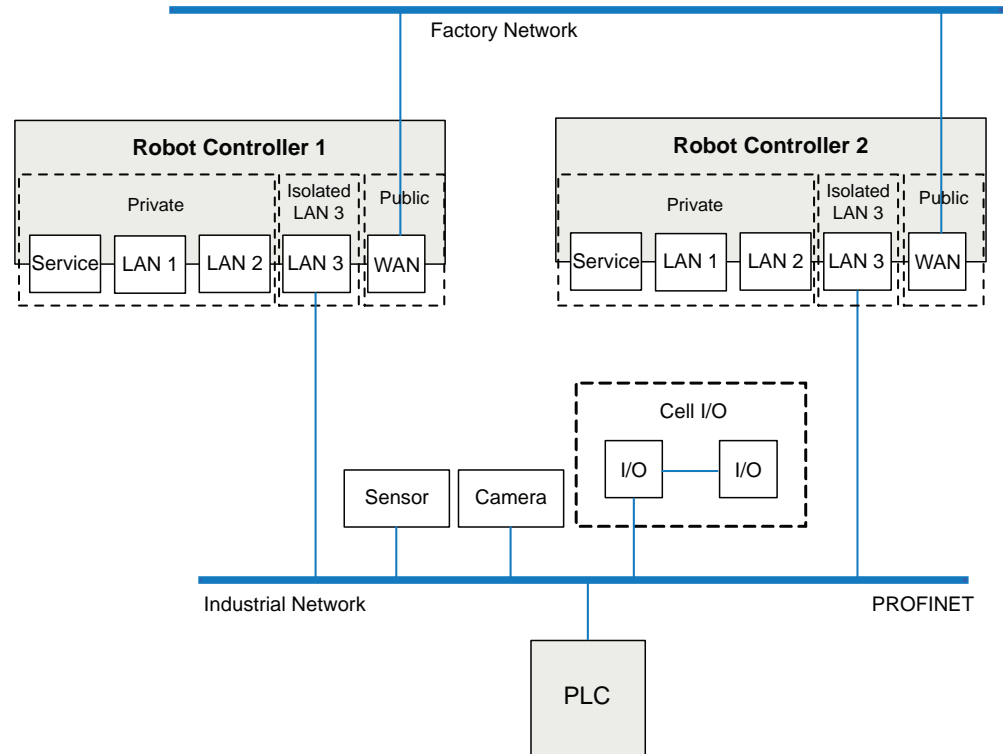


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PROFINET on dedicated industrial network

By connecting to the isolated LAN 3 port it is possible to connect several robot controllers to a dedicated industrial network.



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2 Hardware overview

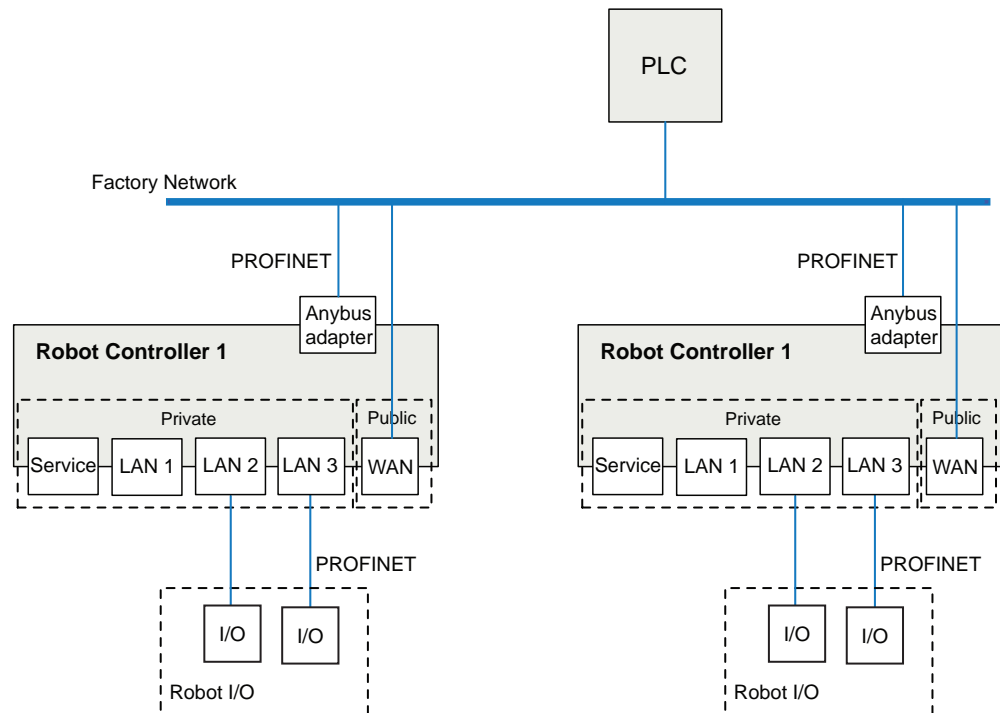
2.1 Main computer

Continued

Using Anybus adapter to connect two PROFINET networks

PROFINET on shared factory network and private network

To be able to use PROFINET on both the public and the private network, an Anybus adapter must be used. If the same factory network is used both for PROFINET communication and other communication, both the Anybus adapter and the WAN port must be connected to the factory network. For information about the PROFINET Anybus adapter, see *Application manual - PROFINET Anybus Device*.



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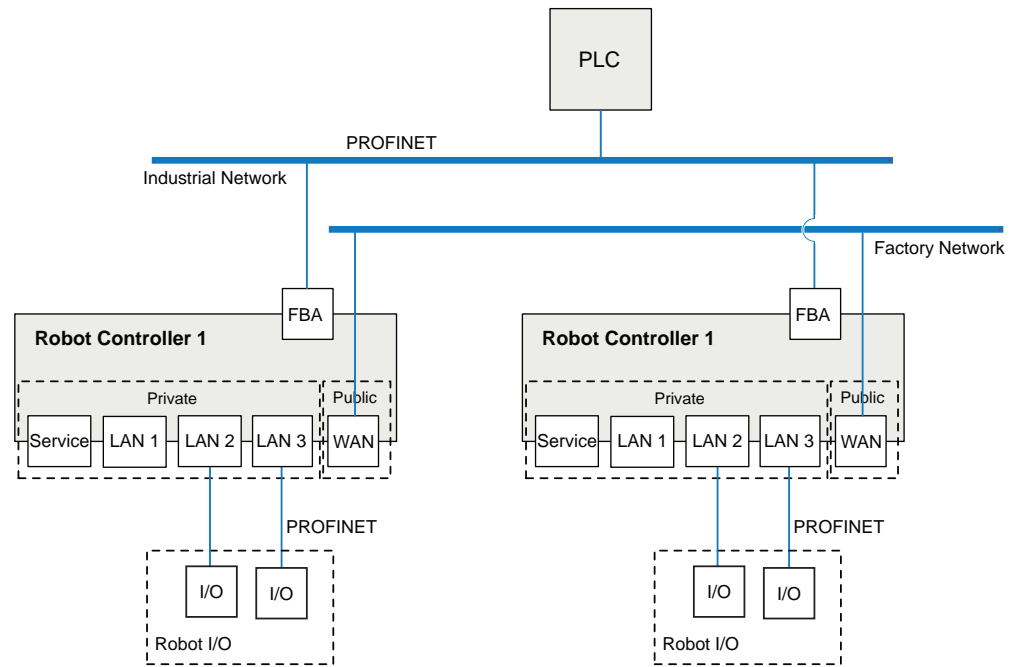
PROFINET on dedicated industrial network

If the PROFINET communication is separated from other communication, an Anybus adapter must be connected to the PROFINET industrial network and the WAN port must be connected to the factory network.

If the PROFINET communication shall be separated from other Ethernet communication, an Anybus adapter must be installed and connected to the public PROFINET industrial network and the WAN port connected to the factory network.

Continues on next page

For information about the PROFINET Anybus adapter, see *Application manual - PROFINET Anybus Device*.



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2 Hardware overview

2.2 Ethernet switches

2.2 Ethernet switches

Prerequisites

It is recommended that switches used in the I/O network support Quality of Service (QoS).

I/O devices mark their packets with a priority value. The priority value is used in order to get better I/O data throughput and shorter delays on the network.

Switches and routers are then able to differentiate the device's critical from the other non-critical traffic. To do this, the switches and routers must support Quality of Service.

2.3 I/O devices

Limitations

It is possible to connect any type of PROFINET-IO compliant I/O device on the PROFINET controller network. All I/O devices should comply with the PROFINET standard and be conformance tested by PROFINET international. I/O devices may be mounted inside the IRC5 controller.

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3 Software overview

3.1 Information about the internal device

General

To use the PROFINET internal device, the IRC5 controller must be installed with either the option *888-2 PROFINET Controller/Device* or *888-3 PROFINET Device*.

The PROFINET internal device can be used to:

- connect a PLC to the IRC5 controller.
- connect the IRC5 controller to another IRC5 controller which acts as a master.

Predefined network

When the robot system is installed with the *PROFINET* option, a predefined network with the name *PROFINET* is created at system startup.

Use RobotStudio or other recommended tool to configure the PROFINET network for initial use. For example, by setting the correct network name and IP settings.

Predefined internal device

When the robot system is installed with the *PROFINET* option, a predefined internal device with the name *PN_Internal_Device* is created at system startup.

It is used to define the internal device in the IRC5 controller, which will enable a PLC to connect to the IRC5 controller. There can only be one internal device defined in the IRC5 controller.

GSDML file

In order to configure a PROFINET network with an external PROFINET configuration tool, a GSDML file for each I/O device needs to be imported into the tool. These files contain vital information about the PROFINET I/O devices and they shall be supplied by the vendor/manufacturer of the specific PROFINET module.

For information on where to find the GSDML file for the IRC5 controller, see [Location of GSDML files on page 32](#).

Template I/O configuration file

A template I/O configuration file is available for the internal device. The file contains preconfigured names for all available inputs and outputs. The file can be loaded to the controller, using RobotStudio or the FlexPendant, to facilitate and speed up the configuration.

The I/O template configuration file, *PN_Internal_Device.cfg*, can be obtained from RobotStudio or the IRC5 controller.

- In the RobotWare installation folder in RobotStudio: ...\\RobotPackages\\RobotWare_RPK_<version>\\utility\\service\\ioconfig\\PROFINET\\
- On the IRC5 Controller: <SystemName>\\PRODUCTS\\<RobotWare_xx.xx.xxxx>\\utility\\service\\ioconfig\\PROFINET\\

Continues on next page

3 Software overview

3.1 Information about the internal device

Continued



Note

Navigate to the RobotWare installation folder from the RobotStudio **Add-Ins** tab, by right-clicking on the installed RobotWare version in the **Add-Ins** browser and selecting **Open Package Folder**.

Input and output size

PROFINET has an internal device with maximum 2048 digital input signals and maximum 2048 digital output signals.

The internal device *PN_Internal_Device* has two system parameters, *Input Size* and *Output Size*. *Input Size* is used to configure the input size of the internal device and *Output Size* configures the output size. A connecting PLC needs to have a slot configuration created in the external PROFINET configuration tool that matches the configuration of the internal device.

The following table shows a few examples of how the *Input Size* and *Output Size* parameters can be used to create different slot configurations of a connecting PLC:

<i>Input Size</i>	<i>Output Size</i>	Step 7 Configuration
8 bytes	8 bytes	Slot 1: DI 8 bytes Slot 2: DO 8 bytes
8 bytes	16 bytes	Slot 1: DI 16 bytes Slot 2: DO 8 bytes
64 byte	32 bytes	Slot 1: DI 32 bytes Slot 2: DO 64 bytes



Tip

If a configuration mismatch between the connecting PLC and the internal device occurs, an event message is generated on the FlexPendant. This event message informs the user of the present slot configuration of the internal device.



Note

The *Input Size* sets the size on digital outputs and *Output size* sets the size on digital inputs, seen from the PLC's point of view.

3.2 Information about the internal controller

General

To use the PROFINET internal controller, the IRC5 controller must be installed with the option *PROFINET Controller/Device*.

The PROFINET internal controller can be used to:

- connect PROFINET devices to the IRC5 controller.
- connect the IRC5 controller to another IRC5 controller which acts as a device.

GSDML files

In order to configure a PROFINET network with an external PROFINET configuration tool, GSDML files need to be imported into the tool. These files contains vital information about the PROFINET I/O devices and they shall be supplied by the vendor/manufacture of the specific PROFINET module.

Configuration programs

See [Configuration programs on page 16](#) and [About the third party tool information on page 71](#).

3 Software overview

3.3 Software for configuring a device

3.3 Software for configuring a device

General

The PROFINET internal device does not need any type of PC software to be activated, but the connecting PLC / PROFINET controller might need a PC software tool to configure all connection parameters used to connect to the IRC5 system.

Location of GSDML files

The provided GSDML file for the IRC5 PROFINET device is used to inform the connecting PLC / PROFINET controller of supported connection parameters.

The GSDML file, *GSDML-V2.xx-ABB-Robotics-PNSW-Device-YYYYMMDD.xml*, for the internal device can be obtained from the RobotStudio or the IRC5 controller.

- In the RobotWare installation folder in RobotStudio: ...\\RobotPackages\\RobotWare_RPK_<version>\\utility\\service\\PROFINET\\
- On the IRC5 Controller: <SystemName>\\PRODUCTS\\<RobotWare_xx.xx.xxxx>\\utility\\service\\GSDML\\



Note

Navigate to the RobotWare installation folder from the RobotStudio **Add-Ins** tab, by right-clicking on the installed RobotWare version in the **Add-Ins** browser and selecting **Open Package Folder**.

3.4 Software for configuring a controller

PC Software

To configure the PROFINET network in the IRC5 controller, a PROFINET configuration file needs to be created and downloaded to the IRC5 controller. This PROFINET configuration file has to be created using a third party configuration software. See [About the third party tool information on page 71](#).

NetNames+ is a PC software that is used for diagnostics mainly, like setting the name, IP address, Subnet Mask, etc of the internal device. For more information, see [Netnames+ on page 72](#).

The following third party software PC tools can be used to create PROFINET configuration files:

- PROFINET -IO Configurator Express
- PROFINET -IO Configurator Professional
- PCWORX (Phoenix Contact)



Note

The software *PROFINET-IO Configurator Express*, together with *NetNames+*, is free to use and is included with the the RobotWare DVD.



Note

PROFINET -IO Configurator Professional provides some added functionality compared to the PROFINET-IO Configurator Express. For example, functionality to scan a network and import devices.

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4 Configuring the internal device and external controller

4.1 Recommended working procedure

General

This section describes the recommended working procedure when installing and configuring a PROFINET internal device. The working procedure helps to understand the dependencies between the different steps.

When the IRC5 controller is connected to an external master, the IRC5 controller acts as an ordinary slave device on the PROFINET network.

Do not configure parameters while exchanging I/O data

It is important to make sure that the PROFINET network is not involved in any I/O data exchange before configuring the parameters.

If for example the PROFINET internal device is exchanging I/O data with a PLC, it is not possible to change the IP address or any other settings of the *PROFINET* network.

Basic steps

Use this procedure to install and configure a PROFINET device.

	Action	See
1	Use RobotStudio to configure the topic Communication.	<i>Technical reference manual - System parameters</i>
2	Use RobotStudio, or an external PROFINET network browser tool, to configure the PROFINET network settings.	Configuring the PROFINET network settings on page 36
3	Create and configure the internal device in the IRC5 controller using RobotStudio or the FlexPendant.	Configuring the internal device on page 38
4	Configure the external controller using the vendor specific configuration tool.	Configuring the external controller on page 39

4 Configuring the internal device and external controller

4.2 Configuring the PROFINET network settings

4.2 Configuring the PROFINET network settings

General

The following procedure describes how to change the PROFINET network settings using RobotStudio.

External tools

These settings, except *Connection*, can also be configured using an external PROFINET network browser tool.

Many external PROFINET tools have overlapping functionality when it comes to changing the network settings. This means that for example a network address set in RobotStudio can be overwritten by an external tool in a subsequent step.

The overwritten settings will not be applied immediately but after the next restart of the IRC5 controller. Therefore, it is important to have a good working procedure to avoid that parameters are overwritten.



Note

Note that the network settings are set for the *Connection*, i.e. the physical connector on the main computer used for the PROFINET network.

This means that the network settings are shared between the internal device and the internal controller if the IRC5 controller acts as both on the PROFINET network.

Network configuration

Use this procedure to configure the PROFINET network settings in the IRC5 controller, using RobotStudio.

	Action	Note
1	Start RobotStudio and connect to the IRC5 controller. Request write access.	
2	Open the Configuration Editor and select I/O System.	For more information about the parameters, see System parameters on page 49 .
3	<p>In the Type list click Industrial Network and edit the parameter PROFINET.</p> <p>Edit the parameter values, if applicable.</p> <ul style="list-style-type: none">• Connection, the physical connector on the main computer.• Configuration File, empty for internal device.• PROFINET Station Name, user defined.• Simulated, user defined. <p>Click OK.</p>	<p>xx1400002055</p>
4	Restart the controller, or continue with the next step of the configuration.	Configuring the internal device on page 38

Continues on next page



Note

Gateway is chosen from one of the configured instances of *IP Route* (see *Technical reference manual - System parameters*). The gateway is matched with the configured *IP Setting* pointed out by the *Connection* parameter for the *Industrial Network* (see [Connection on page 52](#)). If the gateway is found to be on the same network as defined by the *IP Setting* for the *Industrial Network*, it is chosen.

4 Configuring the internal device and external controller

4.3 Configuring the internal device

4.3 Configuring the internal device

General

The internal device is pre-installed at the system startup. However, the input and output size of the device can be changed. The size of the internal device determines how many signals that can be attached, see [Input and output size on page 30](#).

This section describes the recommended working procedure of configuring a internal device. The working procedure helps to understand the dependencies between the different steps.


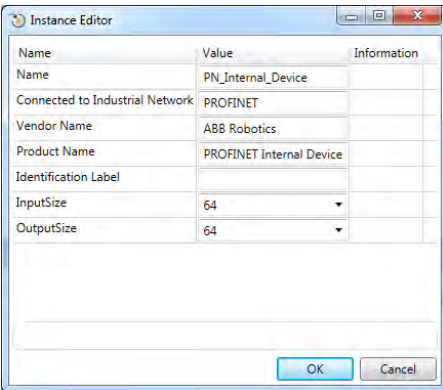


Note

It is only possible to have one internal device.

Internal device configuration

Use this procedure to create and configure the internal device in the IRC5 controller, using RobotStudio.

	Action	Note
1	Start RobotStudio and connect to the IRC5 controller. Request write access.	
2	Open the Configuration Editor and select I/O System.	For more information about the parameters, see System parameters on page 49 .
3	<p>In the Type list, click PROFINET Internal Device, right-click in the workspace and select PROFINET Internal Device.</p> <p>Edit the parameter values for the internal device, if applicable.</p> <ul style="list-style-type: none">Change the default values for Input Size and Output Size to the desired size. <div>Note<p>This step is optional, for more information see Input and output size on page 30.</p></div> <p>Click OK.</p>	 xx1400002056
4	In the Type list click Signal . Add I/O signals for the internal device.	
5	Restart the controller.	

4.4 Configuring the external controller

General

The external controller is configured using the vendor specific configuration tool that is delivered, or bought, together with the controller.

The tool is used to specify all the devices in the PROFINET network. One of the devices is the internal device of the IRC5 controller. To create such a device, the GSDML file describing the internal device has to be imported into the vendor specific configuration tool, see [Location of GSDML files on page 32](#).

All other I/O devices used in the network also has to have its GSDML file imported.

Example

As an example, a Siemens PLC is used to configure an external controller. The procedure to configure an external controller using Siemens Step 7 PC tool is described in the Appendices. See [Using Siemens Step 7 PC tool on page 75](#).

External controller configuration

This procedure describes the general steps that needs to be performed when configuring an external controller, independent of which tool is used.

	Action
1	<p>Use the external controller configuration tool to:</p> <ul style="list-style-type: none">• Specify the IP address range that the external PROFINET controller operates within.• Import the GSDML files for the internal device and all other types of I/O devices in the network.• Add the IRC5 controller I/O device and set the same IP address as the PROFINET industrial network.• Add any other I/O devices.• Set the properties of the I/O devices to reflect the device's properties on the PROFINET network.

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5 Configuring the internal controller and external device

5.1 Recommended working procedure

General

This section describes the recommended working procedure when installing and configuring a PROFINET controller. The working procedure helps to understand the dependencies between the different steps.

Basic steps

Use this procedure to install and configure a PROFINET controller.

	Action	See
1	Use RobotStudio to configure the topic Communication.	<i>Technical reference manual - System parameters</i>
2	Use a PROFINET network browser tool to configure the PROFINET network settings.	Configuring the PROFINET network settings on page 36
3	Use an external PROFINET configuration tool to create a project that contains the configuration of the PROFINET network.	Creating the PROFINET configuration file on page 42
4	Download the PROFINET configuration file to the controller.	Configuring the IRC5 controller on page 43
5	Configure the I/O devices connected to the PROFINET network using RobotStudio or FlexPendant.	

Additional configuration

Action	See
Configuring <i>Fast Device Startup</i> .	Using Fast Device Startup on page 44
Configuring <i>Shared Device</i> .	Using Shared Device on page 46

Examples

Action	See
Creating master network configuration file using PROFINET-IO Configurator Express.	Using PROFINET Configurator Express on page 79
Creating master network configuration file using PC WORX.	Using PC WORX on page 85

5 Configuring the internal controller and external device

5.2 Creating the PROFINET configuration file

5.2 Creating the PROFINET configuration file

General

The PROFINET configuration file can be created with the help of an external PROFINET configuration tool. This section describes the basic steps that needs to be performed independent of which tool is used.

Examples

As an example, PROFINET Configurator Express and PC WORX tools are used to create a configuration file. The procedure is described in the Appendices. See [Using PROFINET Configurator Express on page 79](#) and [Using PC WORX on page 85](#).

Basic steps

This procedure describes the general steps that needs to be performed when creating a controller network configuration file, independent of which tool is used.

	Action
1	Use the PROFINET configuration tool to: <ul style="list-style-type: none">• Specify the IP address range that the PROFINET internal controller operates within.• Set the same IP address for the PROFINET industrial network as specified in the system parameter <i>IP Address</i> in the IRC5 controller.• Import the GSDML files for all types of I/O devices in the network.• Add the I/O devices into the network structure.• Set the properties of the I/O devices to reflect the device's properties on the PROFINET network.
2	Build the project and create the PROFINET configuration file, <i>ippnio.xml</i> .

The next step is to download the *ippnio.xml* file to the *HOME* directory of the currently used RobotWare system, see [Configuring the IRC5 controller on page 43](#).

5.3 Configuring the IRC5 controller

Description

This configuration example uses the PROFINET configuration file, *ippnio.xml*, created in section [Creating the PROFINET configuration file on page 42](#). It shows how to use the PROFINET configuration file and how to add the configuration definitions to the system parameters.

Internal controller configuration

Use this procedure to configure the PROFINET controller in the IRC5 controller, using the **Configuration Editor** in RobotStudio.

	Action	Note
1	Start RobotStudio and connect to the IRC5 controller. Request write access.	
2	Download the <i>ippnio.xml</i> configuration file to the <i>HOME</i> directory of the currently used RobotWare system.	Use the File Transfer tool in RobotStudio, or an external FTP client.
3	Click Configuration Editor and select I/O System .	
4	In the type list, click Industrial Network and then right-click in the workspace on the PROFINET item and select Edit Industrial Network .	For more information about the parameters, see System parameters on page 49 .
5	<p>Enter the parameter values for the industrial network.</p> <ul style="list-style-type: none"> Connection, select the used Ethernet connector. <div data-bbox="571 1243 632 1301" data-label="Image"></div> <div data-bbox="655 1258 718 1285" data-label="Section-Header">Note</div> <p>The Connection value is configured in <i>Communication</i> topic. A default connection is created for PROFINET. For information about IP address configuration, see <i>Technical reference manual - System parameters</i>, section 2.2 Communication, Use case 2: isolated LAN 3.</p> <ul style="list-style-type: none"> Configuration File, the path to the <i>ippnio.xml</i> file. PROFINET Station name, the robot's PROFINET name id on the PROFINET network. <p>Click OK.</p>	<div data-bbox="963 1111 1436 1456" data-label="Image"></div> <p>xx1500000937</p>
6	Restart the IRC5 controller. In this example, the et200_test device (found in the example file ippnio.xml) is added.	
7	If needed, change the signal names on the added I/O device.	
8	Restart the IRC5 controller to connect to the configured I/O device.	

5 Configuring the internal controller and external device

5.4 Using Fast Device Startup

5.4 Using Fast Device Startup

About Fast Device Startup

The Fast Device Startup functionality is used in tool changing applications to shorten the connection time between the PROFINET controller and an I/O device. To be able to use this functionality, the I/O device needs to support this functionality. All devices must support fast startup in the communication chain. Devices such as switches or other intermediate hardware that could affect the PROFINET communication. For more information, see [Poor performance using fast startup on page 69](#).

Some manufacturers also call this functionality Fast Start Up (FSU) or Prioritized Startup.

To activate Fast Device Startup against an I/O device, activate the system parameter *Fast Device Startup* and select the corresponding port(s) to be configured. See [Fast Device Startup on page 57](#).

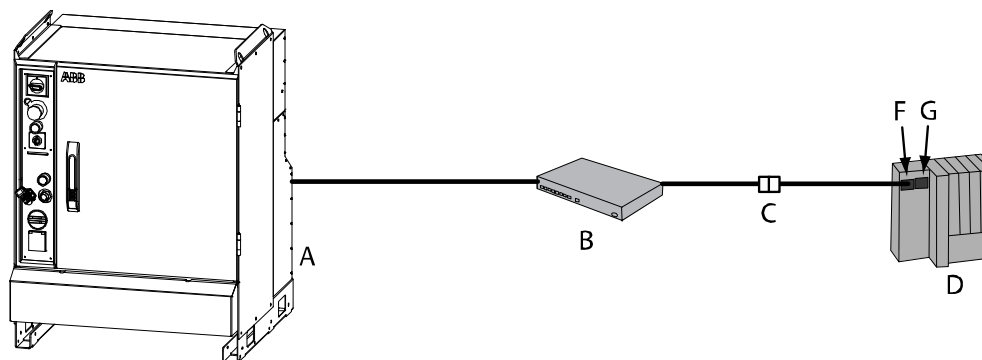


Note

The I/O device with FSU functionality is connected with the IRC5 controller. When the power of the I/O device is switched off and switched on again, the IRC5 controller establishes contact with the I/O device using the fast startup sequence.

Three alternative connections

I/O device connected via a switch



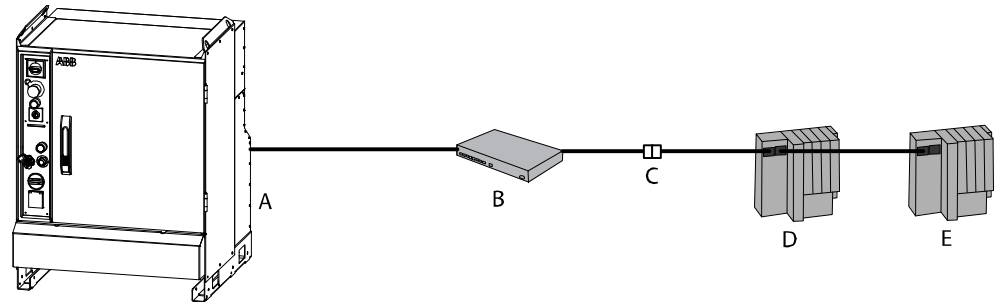
xx1100000093

A	IRC5 controller acting as PROFINET controller
B	Switch
C	Connection point
D	I/O device
F	Port 1 on the device
G	Port 2 on the device

In this alternative the PROFINET controller connects to the I/O device via a switch. Enable fast device startup and select 100 MBit (full duplex) on port 1. The port number is usually displayed upon the I/O device itself.

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Two I/O devices connected in serial via a switch

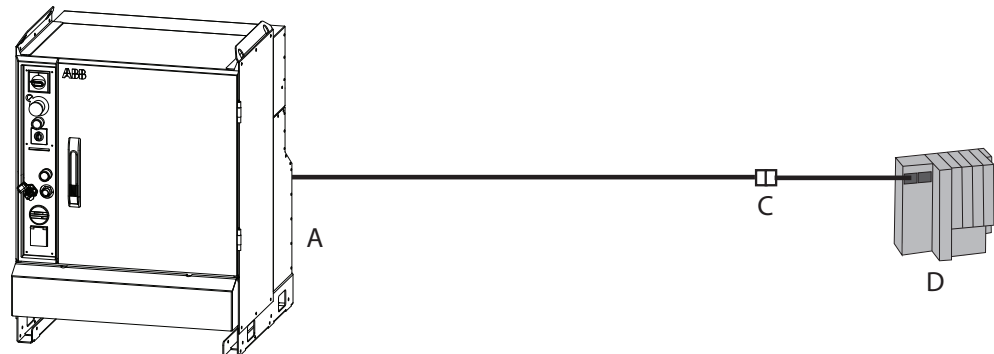


xx1100000094

A	IRC5 controller acting as PROFINET controller
B	Switch
C	Connection point
D	I/O device
E	I/O device

In this alternative, both I/O devices are disconnected at the connection point. Both port 1 and port 2 on the first device (D) and port 1 on the second device (E) needs to be configured to support Fast Device Startup.

I/O device connected without a switch



xx1100000095

A	IRC5 controller acting as PROFINET controller
C	Connection point
D	I/O device

In this alternative there is a direct cable between the PROFINET controller and the I/O device. Enable fast device startup and select 100 MBit (full duplex) on the port. A crossed Ethernet cable needs to be used.

5 Configuring the internal controller and external device

5.5.1 About Shared Device

5.5 Using Shared Device

5.5.1 About Shared Device

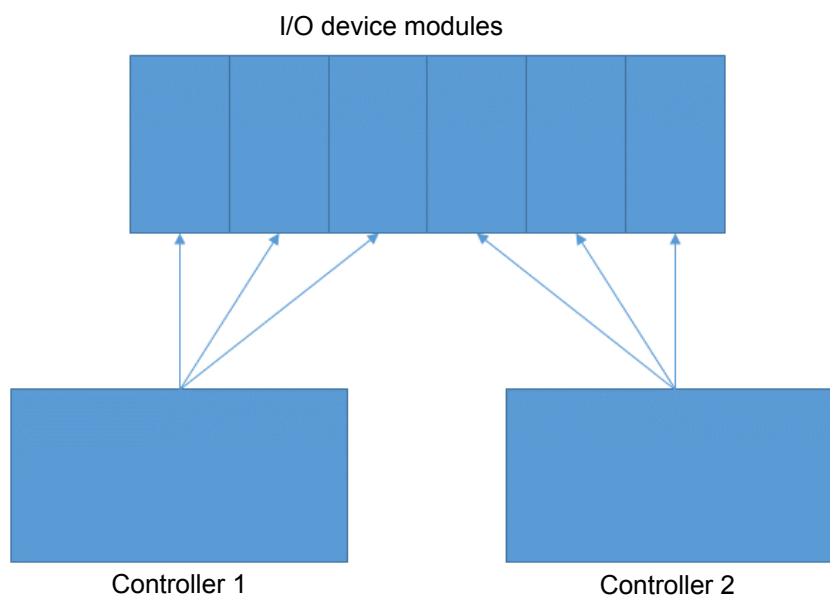
Introduction

Shared device functionality is when two controllers are sharing a device. Each controller has the ownership over different modules on the device.



Note

The internal device itself cannot be configured to be a shared device.



xx1400002064

Configuring PROFINET controller with shared device functionality

Basic steps

	Action	See
1	Use the external PROFINET configuration tool to create a project that contains the configuration of the PROFINET network.	Using PROFINET Configurator Express on page 79
2	Update the project in PROFINET configuration tool to create shared device functionality.	Updating configuration file to support shared device functionality on page 83.
3	Download the PROFINET configuration file to the IRC5 controller.	
4	Configure the I/O devices connected to the Profinet network using RobotStudio or the Flex-Pendant.	Configuring the IRC5 controller on page 43

Continues on next page

	Action	See
5	Configure the I/O signals.	<i>Technical reference manual - System parameters</i>
6	Restart the IRC5 controller.	

Updating PROFINET configuration file for shared device

This section describes how to update the configuration file with the shared device functionality, where the configuration file is created by using the *PROFINET Configurator Express* tool.

For details on installing the *PROFINET Configurator Express*, see [PROFINET-IO Configurator Express on page 71](#) and [Updating configuration file to support shared device functionality on page 83](#).

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6 System parameters

6.1 Introduction

About the system parameters

There are both PROFINET specific parameters and more general parameters. This chapter describes all PROFINET specific system parameters. The parameters are divided into the type they belong to. For information about other parameters, see *Technical reference manual - System parameters*.

PROFINET system parameters

Industrial Network

These parameters belong to the type *Industrial Network* in the topic *I/O System*.

Parameter	For more information, see ...
Name	<i>Technical reference manual - System parameters</i>
Identification Label	<i>Technical reference manual - System parameters</i>
Connection	Connection on page 52
Configuration File	Configuration File on page 53
PROFINET Station Name	PROFINET Station Name on page 54
Nested Diagnosis	Nested Diagnosis on page 55

PROFINET Device

These parameters belong to the type *PROFINET Device* in the topic *I/O System*.

Parameter	For more information, see ...
Name	<i>Technical reference manual - System parameters</i>
PROFINET Station Name	PROFINET Station Name on page 56
Connected to Industrial Network	<i>Technical reference manual - System parameters</i>
State at System Restart	<i>Technical reference manual - System parameters</i>
Identification Label	<i>Technical reference manual - System parameters</i>
Trust Level	<i>Technical reference manual - System parameters</i>
Simulated	<i>Technical reference manual - System parameters</i>
Vendor Name	<i>Technical reference manual - System parameters</i>
Recovery Time	<i>Technical reference manual - System parameters</i>
Fast Device Startup	Fast Device Startup on page 57
Port1, 2, 3, 4	Fast Device Startup on page 57
Energy Saving	Energy Saving on page 62

Continues on next page

6 System parameters

6.1 Introduction

Continued

Signal

These parameters belong to the type *Signal* in the topic *I/O System*.

Parameter	For more information, see ...
Name	<i>Technical reference manual - System parameters</i>
Type of Signal	PROFINET Station Name on page 56
Assigned to Device	<i>Technical reference manual - System parameters</i>
Signal Identification Label	<i>Technical reference manual - System parameters</i>
Device Mapping	<i>Technical reference manual - System parameters</i>
Category	<i>Technical reference manual - System parameters</i>
Access Level	<i>Technical reference manual - System parameters</i>
Default Value	<i>Technical reference manual - System parameters</i>
Filter Time Passive (ms)	<i>Technical reference manual - System parameters</i>
Filter Time Active (ms)	Fast Device Startup on page 57
Invert Physical Value	Fast Device Startup on page 57
Analog Encoding Type	Energy Saving on page 62
Maximum Logical Value	<i>Technical reference manual - System parameters</i>
Maximum Physical Value	<i>Technical reference manual - System parameters</i>
Maximum Physical Value Limit	<i>Technical reference manual - System parameters</i>
Maximum Bit Value	<i>Technical reference manual - System parameters</i>
Minimum Logical Value	<i>Technical reference manual - System parameters</i>
Minimum Physical Value	<i>Technical reference manual - System parameters</i>
Minimum Physical Value Limit	<i>Technical reference manual - System parameters</i>
Minimum Bit Value	<i>Technical reference manual - System parameters</i>
Transfer To Device	Transfer To Device on page 63
Output Offset On Destination Device	Output Offset on Destination Device on page 64
Transfer From Device	Transfer From Device on page 65
Input Offset On Source Device	Input Offset on Source Device on page 66

PROFINET Internal Device

These parameters belong to the type *PROFINET Internal Device* in the topic *I/O System*.

Parameter	For more information, see ...
Name	<i>Technical reference manual - System parameters</i>
Connected to Industrial Network	<i>Technical reference manual - System parameters</i>
Simulated	<i>Technical reference manual - System parameters</i>
Vendor Name	<i>Technical reference manual - System parameters</i>

Continues on next page

Parameter	For more information, see ...
Product Name	<i>Technical reference manual - System parameters</i>
Identification Label	<i>Technical reference manual - System parameters</i>
Input Size	<i>Input Size on page 67</i>
Output Size	<i>Output Size on page 68</i>

6 System parameters

6.2.1 Connection

6.2 Type Industrial Network

6.2.1 Connection

Parent

Connection belongs to the type *Industrial Network*, in the topic *I/O System*.

Cfg name

Connection

Description

The parameter *Connection* specifies the *IP Setting* that the PROFINET industrial network shall use.

Default value

PROFINET Network

Allowed values

Valid instances of *IP Setting*

Additional information

The Public Network or the Private Network cannot be edited by external controllers or tool, such as NetNames+.

6.2.2 Configuration File

Parent

Configuration File belongs to the type *Industrial Network*, in the topic *I/O System*.

Cfg name

CfgPath

Description

Configuration File specifies the path to an XML file that is located on the IRC5 controller. This file is created and edited with the program *PROFINET-IO Configurator Express*, *PROFINET-IO Configurator Professional* or *PC WORX*, see [Creating the PROFINET configuration file on page 42](#).

Usage

The *Configuration File* system parameter is used to point out where to find the PROFINET controller configuration file. This file is only used by the controller part. If the file is placed in the HOME directory of the installed system on the IRC5 controller, it is enough to write the file name.

If the PROFINET configuration file is placed in the HOME directory, it will also be included in backups.

Prerequisites

The option *PROFINET Controller/Device* must be installed.

Default value

The default value is an empty string.

Allowed values

A string with maximum 80 characters.

6 System parameters

6.2.3 PROFINET Station Name

6.2.3 PROFINET Station Name

Parent

PROFINET Station Name belongs to the type *Industrial Network*, in the topic *I/O System*.

Cfg name

StationName

Description

PROFINET Station Name specifies the PROFINET station name on the network of the IRC5 controller.

Usage

The parameter *PROFINET Station Name* is used to identify a PROFINET device on the network. The name must be unique on the network.

The parameter *PROFINET Station Name* can also be changed with an external PROFINET configuration tool or a connecting PROFINET controller.

Prerequisites

The option *PROFINET Controller/Device* or *PROFINET Device* must be installed.

Default value

The default value is an empty string.

Allowed values

A string with maximum 80 characters.

Allowed characters:

- 0-9 (numerical)
- A-Z (uppercase letters)
- a-z (lowercase letters)
- - (hyphen)
- . (full stop)

6.2.4 Nested Diagnosis

Parent

Nested Diagnosis belongs to the type *Industrial Network*, in the topic *I/O System*.

Cfg name

Nesteddiagnosis

Description

The parameter *Nested Diagnosis* specifies diagnosis in hierarchical plants and enables the end-users to evaluate the status of the PROFINET network from a central PLC or external tool.

Usage

If the parameter *Nested Diagnosis* is activated, alarms will be forwarded from a controller if its internal device has a connected controller.

Prerequisites

The option *PROFINET Controller/Device* or *PROFINET Device* must be installed.

Default value

The default value is *Deactivated*.

Allowed values

Activated
Deactivated

6 System parameters

6.3.1 PROFINET Station Name

6.3 Type PROFINET Device

6.3.1 PROFINET Station Name

Parent

PROFINET Station Name belongs to the type *PROFINET Device*, in the topic *I/O System*.

Cfg name

StationName

Description

PROFINET Station Name specifies the PROFINET station name on the network of the external I/O device.

Usage

The parameter *PROFINET Station Name* is used to identify a PROFINET device on the network. The name must be unique on the network.

Prerequisites

The option *PROFINET Controller/Device* or *PROFINET Device* must be installed.

Default value

The default value is an empty string.

Allowed values

The station name follows the PROFINET naming convention for IO devices.

**Note**

It is possible to set the PROFINET station name of a device and it does not follow the naming restriction as the CFG name, which still has restrictions of a RAPID Identifier.

6.3.2 Fast Device Startup

Parent

Fast Device Startup belongs to the type *PROFINET Device*, in the topic *I/O System*.

Cfg name

FastDeviceStartup

Description

The parameter *Fast Device Startup* specifies if the I/O device should use a faster connection attempt algorithm or not.

Usage

The parameter *Fast Device Startup* is used mainly to speed up tool change applications. The usual PROFINET connection attempt takes a few seconds to complete, but with Fast Device Startup enabled devices, this time is shortened to less than a second. For more information, see [Using Fast Device Startup on page 44](#).

Prerequisites

The option *PROFINET Controller/Device* must be installed.

Limitations

The Ethernet switches between the IRC5 controller and the I/O device that uses the *Fast Device Startup* functionality. It must be configured to disable the auto crossover and automatic speed detection functions on used connectors. The speed rate is set to 100Mbps (full duplex).

Default value

The default value is *Deactivated*.

Allowed values

- *Deactivated*
- *Activated*
- *Support*

**Note**

Select *Support* to set the desired port speed. For port speed, select *100 Mbps* and the port speed is adjusted to 100Mbps, and auto negotiation is turned off for the port.

Hence, it is possible to change the settings on a built-in switch for a PROFINET I/O device.

6 System parameters

6.3.3 Port 1

6.3.3 Port 1

Parent

Port 1 belongs to the type *PROFINET Device*, in the topic *I/O System*.

Cfg name

FastDeviceStartup_Port1

Description

The parameter *Port 1* specifies fast device startup port 1 in the I/O device.

Usage

The parameter *Fast Device Startup* is configured at port 1 of the I/O device.

Prerequisites

The parameter *Fast Device Startup* must be activated.

Default value

The default value is *Deactivated*.

Allowed values

- *Deactivated*
- *100 Mbps*

6.3.4 Port 2

Parent

Port 2 belongs to the type *PROFINET Device*, in the topic *I/O System*.

Cfg name

FastDeviceStartup_Port2

Description

The parameter *Port 2* specifies fast device startup port 2 in the I/O device.

Usage

The parameter *Fast Device Startup* is configured at port 2 of the I/O device.

Prerequisites

The parameter *Fast Device Startup* must be activated.

Default value

The default value is *Deactivated*.

Allowed values

- *Deactivated*
- *100 Mbps*

6 System parameters

6.3.5 Port 3

6.3.5 Port 3

Parent

Port 3 belongs to the type *PROFINET Device*, in the topic *I/O System*.

Cfg name

FastDeviceStartup_Port3

Description

The parameter *Port 3* specifies fast device startup port 3 in the I/O device.

Usage

The parameter *Fast Device Startup* is configured at port 3 of the I/O device.

Prerequisites

The parameter *Fast Device Startup* must be activated.

Default value

The default value is *Deactivated*.

Allowed values

- *Deactivated*
- *100 Mbps*

6.3.6 Port 4

Parent

Port 4 belongs to the type *PROFINET Device*, in the topic *I/O System*.

Cfg name

FastDeviceStartup_Port4

Description

The parameter *Port 4* specifies fast device startup port 4 in the I/O device.

Usage

The parameter *Fast Device Startup* is configured at port 4 of the I/O device.

Prerequisites

The parameter *Fast Device Startup* must be activated.

Default value

The default value is *Deactivated*.

Allowed values

- *Deactivated*
- *100 Mbps*

6 System parameters

6.3.7 Energy Saving

6.3.7 Energy Saving

Parent

Energy Saving belongs to the type *PROFINET Device*, in the topic *I/O System*.

Cfg name

Energy Saving

Description

The parameter *Energy Saving* specifies if the I/O device should respond to energy saving command or not.

Usage

The parameter *Energy Saving* is used mainly to activate energy saving mode.

Prerequisites

The option *PROFINET Controller/Device* and *PROFenergy* must be installed.

Default value

The default value is *Activated*.

Allowed values

- *Activated*
- *Deactivated*

6.4 Type Signal

6.4.1 Transfer To Device

Parent

Transfer To Device belongs to the type *Signal*, in the topic *I/O System*.

Cfg name

TransferToDevice

Description

The parameter *Transfer To Device* specifies that the signal shall be transferred to the internal device starting at the offset specified in the parameter *Output Offset On Destination Device*.

Prerequisites

The option *PROFINET Controller/Device* must be installed.

Limitations

Only signals of type Digital Output/ Digital Input/ Group Output/ Group Input can be transferred. The destination I/O device can only be the PROFINET internal device.

Allowed values

The allowed value is the PROFINET internal device.

6 System parameters

6.4.2 Output Offset on Destination Device *PROFINET Controller/Device*

6.4.2 Output Offset on Destination Device

Parent

Output Offset On Destination Device belongs to the type *Signal*, in the topic *I/O System*.

Cfg name

TransferOutputOffset

Description

The parameter *Output Offset On Destination Device* specifies the output start bit on the PROFINET internal device set by the transfer signal.

Prerequisites

The option *PROFINET Controller/Device* must be installed.

Limitations

The destination I/O device can only be the PROFINET internal device.

Default value

The default value is -1. This means that no *Output Offset On Destination Device* is defined.

Allowed values

The values are in the range of -1 to 65535.

Additional information

The parameter *Output Offset On Destination Device* specifies the start bit on the internal device. And, for bits specified in a group are transferred starting with the first bit.

6.4.3 Transfer From Device

Parent

Transfer From Device belongs to the type *Signal*, in the topic *I/O System*.

Cfg name

TransferFromDevice

Description

The parameter *Transfer From Device* specifies that the bit value for the internal device (starting at the offset specified in the parameter *Input Offset On Destination Device*) shall be transferred to the signal.

Prerequisites

The option *PROFINET Controller/Device* must be installed.

Limitations

Only the input bits from the PROFINET internal device can be transferred to the signals of type digital output and group output.

Allowed values

The allowed value is the PROFINET internal device.

6 System parameters

6.4.4 Input Offset on Source Device *PROFINET Controller/Device*

6.4.4 Input Offset on Source Device

Parent

Input Offset on Source Device belongs to the type *Signal*, in the topic *I/O System*.

Cfg name

TransferInputOffset

Description

The parameter *Input Offset on Source Device* specifies the input start bit PROFINET internal device that will be transferred to the defined signal.

Prerequisites

The option *PROFINET Controller/Device* must be installed.

Limitations

The transfer is possible only to the signals of type digital output and group output. For all cases, it is possible to transfer information from the internal device to signals defined on other PROFINET I/O devices only.

Default value

The default value is -1. This means that *Input Offset on Source Device* is not defined.

Allowed values

The values are in the range of -1 to 65535.

Additional information

The parameter *Input Offset On Destination Device* specifies the start bit on the internal device. The bits specified in a group are transferred starting with the first bit.

6.5 Type PROFINET Internal Device

6.5.1 Input Size

Parent

Input Size belongs to the type *PROFINET Internal Device*, in the topic *I/O System*.

Cfg name

InputSize

Description

The parameter *Input Size* is used to configure the input slot configuration of the PROFINET internal device.

Usage

It will configure the input slot size for the PROFINET internal device. This size must match the connecting PLC's or other PROFINET controller's defined output slot size. For more information, see [Input and output size on page 30](#).

Prerequisites

The option *PROFINET Controller/Device* or *PROFINET Device* must be installed.

Default value

The default value is 64 bytes (512 signal bits).

Allowed values

8, 16, 32, 64, 128 or 256 bytes (64, 128, 512, 1024 or 2048 signal bits).

6 System parameters

6.5.2 Output Size

6.5.2 Output Size

Parent

Output Size belongs to the type *PROFINET Internal Device*, in the topic *I/O System*.

Cfg name

OutputSize

Description

The parameter *Output Size* is used to configure the output slot configuration of the PROFINET internal device.

Usage

The parameter *Output Size* is only valid for the PN_Internal_Device. It will configure the output slot size for the PROFINET internal device. This size must match the connecting PLC's or other PROFINET controller's defined input slot size. For more information, see [Input and output size on page 30](#).

Prerequisites

The option *PROFINET Controller/Device* or *PROFINET Device* must be installed.

Default value

The default value is 64 bytes (512 signal bits).

Allowed values

8, 16, 32, 64, 128 or 256 bytes (64, 128, 512, 1024 or 2048 signal bits).

7 Troubleshooting

7.1 Scenarios

Problem assigning IP address or station name

If an external PROFINET configuration tool is used to set IP address or station name for a controller or device, it may not be possible to perform that operation. In such a case, make sure that the device or PLC is not involved in any I/O data exchange. If, for example, a device or PLC is exchanging data with another device or PLC, it is not possible to change the IP address or station name of those devices.

Unable to connect to a device

If all parameters are correct, but it is still not possible to connect to an device using the PROFINET controller, make sure that the device does not already have an active connection with another controller. Most I/O devices do not accept that two controllers are connected against the same I/O device at the same time. That is, if the device does not allow shared device functionality.

Connections are lost randomly

Lost connections can occur for a number of reasons.

- Bad network
- Overloaded Ethernet switches
- Ethernet cable problems

Another possible reason is that the IRC5 PROFINET is not able to process all the PROFINET requests within the specified time frame. If, for example, 20 I/O devices are used with 1 ms reduction ratio (poll rate), the slightest variation of CPU load on the main computer might cause a protocol disturbance which can lead to a connection timeout. The maximum possible devices that can be used depends on the reduction ratios used, CPU load and data lengths transferred at every data cycle.

There can be connection loss while configuring PROFINET Master on the same logical subnet as other applications, on the WAN port. It might cause sporadic loss of communication for the applications as well as for the PROFINET communication.

Poor performance using fast startup

In general the startup time for one I/O device using fast startup is less than a second, together with the robot controller. This is highly dependent upon the device itself. Check with the device vendor for detailed description about I/O devices that support fast startup with corresponding performance figures.

- If there are other intermediate hardware on the connection link that might interfere with the PROFINET connection.
- If there is a chained setup containing multiple devices, there is an increased latency before all devices are running. Depending upon the number of chained devices the total connection time can be more than a second.

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7 Troubleshooting

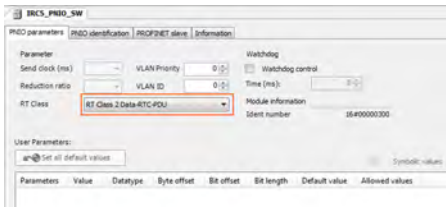
7.1 Scenarios

Continued

- Make sure that the port/ports used for fast startup is selected in the IO configuration.
- Check with the device vendor for optimal settings when using the I/O device with fast startup. Sometimes device behavior is configurable with a vendor specific tool or through the network configuration tool. According to the GSDML file.
- Check that the switch settings are correct according to below:
 - 100 Mbit speed rate with full duplex.
 - Auto negotiation shall be switched off.
 - Disable "switch intelligent features" such as flow control and MDIX (medium dependent interface crossover) that might cause delays during startup.

Configuration of AC500 with an IRC5 device in Automation Builder (Control Builder Plus)

Use this procedure to configure the AC500 with an IRC5 device in the Automation Builder:

	Action	Note
1	In the AC500 project, select the appropriate PROFINET controller.	
2	Double-click on the IRC5 device icon to select the IRC5 device.	 xx1500003223
3	In the PNIO parameters tab, edit the field RT Class to RT Class 2 Data-RTC-PDU.	

A About the third party tool information

Overview

There are external software tools available to configure the PROFINET controller. This section describes some of the external tools and procedure of configuring the controller.

Validity of the information for third party tools

The information is available "as is", and should only be used for reference. The third party tools can include functionality that is not supported in IRC5.

The information about the third party tools is applicable for specific versions of the third party tools and RobotWare. Other versions of the tools can also be used but are not tested by ABB.

PROFINET-IO Configurator Express


PROFINET-IO Configurator Express is a PC software used to create PROFINET configuration files.

The PROFINET-IO Configurator Express package is available on the RobotWare DVD.

Installation

The installation can be downloaded from the [RobotStudio Online Community](#), where it is included in the *RobotWare Tools and Utilities* package.

Use this procedure to install the PROFINET-IO Configurator Express package, including NetNames+.

	Action
1	Go to the RobotStudio Online Community and click Downloads to open the Software Downloads webpage.
2	In Software Downloads webpage, under Miscellaneous group, click Download RobotWare Tools and Utilities .
3	After the package is downloaded, unzip the package.
4	Locate the file and run the PROFINET configurator.exe file.  Note After the download, the folder path is: C:\Users\...\Downloads\RobotWare Tools and Utilities 6.01\Utilities\Fieldbus\Profinet
5	Follow the instructions on the installation window.



Note

Please refer to www.kw-software.com for information about system requirements and limitations when running the PROFINET-IO Configurator Express tool.

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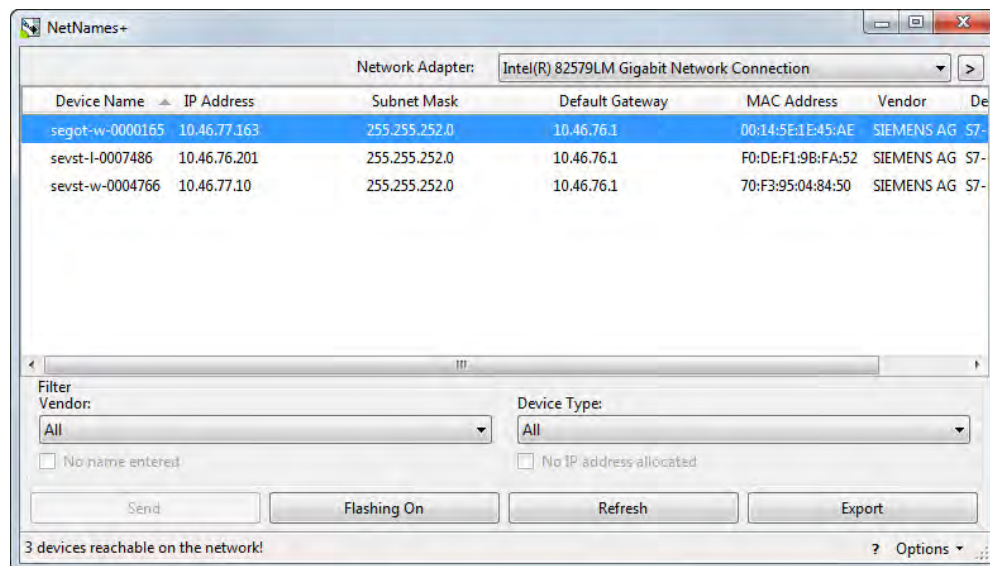
A About the third party tool information

Continued

NetNames+

NetNames+ is a PC software used to manage the PROFINET network, organize the PROFINET devices, and avoid duplicated IP addresses and station names.

NetNames+ is included in the PROFINET-IO Configurator Express package available on the RobotWare DVD.




xx1300002216

Installation

NetNames+ is included in the PROFINET-IO Configurator Express installation, see [PROFINET-IO Configurator Express on page 71](#).

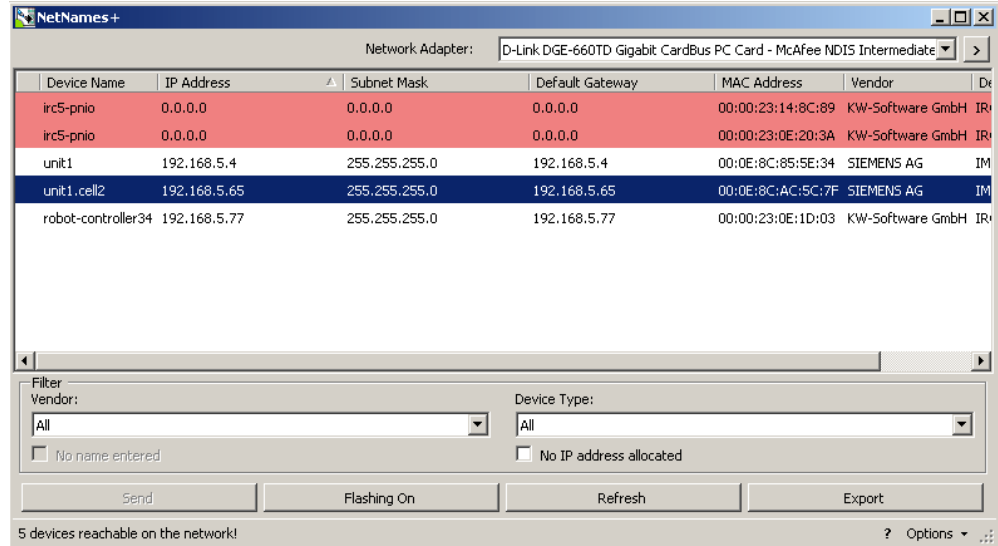
Use this procedure to install the NetNames+.

	Action	Note
1	Start NetNames+.	
2	Select Network Adapter to the Ethernet adapter used on the PC that connects to the PROFINET network.	
3	Click Options and make sure that Save IP Addresses permanently is selected. This makes sure that a name or IP address change sent down from NetNames+ is saved by the PROFINET device.	
4	Click the Refresh button.	Now NetNames+ will list all PROFINET devices that are reachable on the network. Using this view, it is possible to change a device configuration parameters.
5	To change a device's parameters, double-click on that device and fill in the values that need to be changed. When done, click the Send button.	 Note Gateway cannot be set, see Limitations.

Continues on next page

Fault indication

If there is a problem with a device, like duplicated IP address, the device will be marked red.



en1100000261

Device identification

Sometimes it is difficult to distinguish devices in the network from each other. A useful function in such a case is the Flashing On functionality. This will send a request to the selected device to flash its status LEDs.

	Action
1	Select a device from the list and click the Flashing On button.
2	The status LED on the selected device will start to flash.
3	Click the Flashing On button again to stop the status LED from flashing.

Limitations

Since the gateway is chosen from *IP Route* and must be valid to our system it is not possible to set the gateway externally from DCP request, ie. AddressAssignMode is LOCAL when it comes to the gateway parameter.

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B Using Siemens Step 7 PC tool

Configuring an external controller using Siemens Step7 PC tool

Description

This is a configuration example for an internal device with 32 byte input and 32 byte output size. The example also shows how to configure a PLC that connects against the internal device.

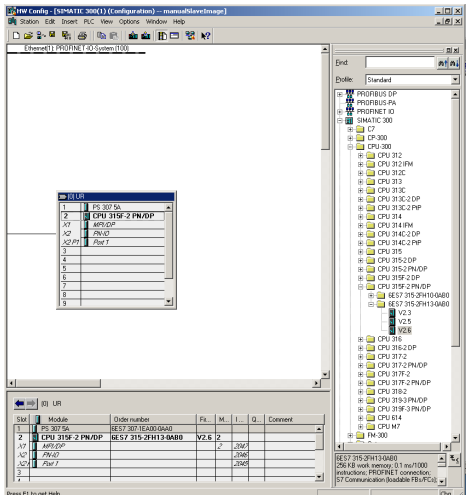
This example uses the Siemens Step7 PC tool. The procedure can be used with other tools as well. See the documentation for your PLC configuration tool.

Configuring the internal device

Use the procedure described in sections [Configuring the PROFINET network settings on page 36](#) and [Configuring the internal device on page 38](#). Set the *Input Size* and *Output Size* to 32 bytes.

Configuring the external controller

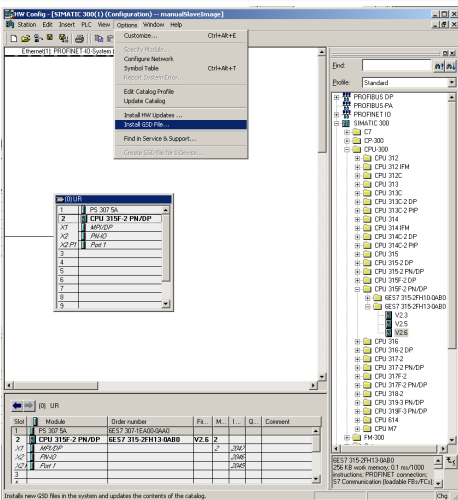
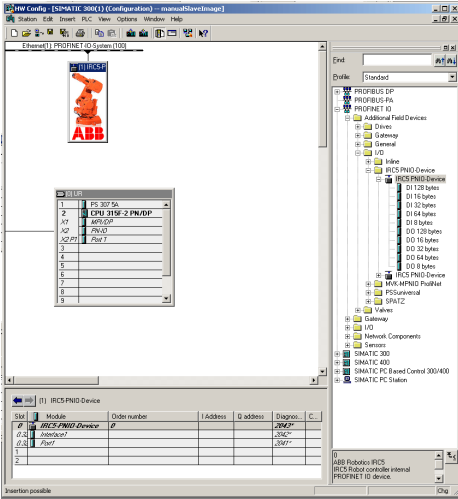
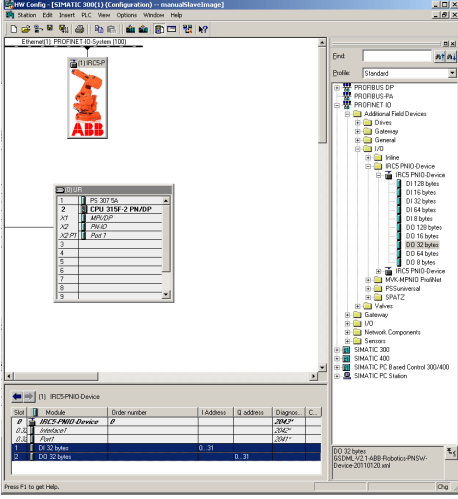
Use this procedure to configure a Siemens PLC to connect to the internal device, using Siemens Step 7.

Action	Note
1 Start Simatic Manager and create a new PLC project. Open the HW Config window for the PLC hardware configuration.	 <p>en1000001189</p>
2 Make sure the PROFINET network connected to the PLC is the same as the network connected to the IRC5 controller's PROFINET network port. Also make sure that they are on the same logical subnet IP address range. See Configuring the PROFINET network settings on page 36 .	

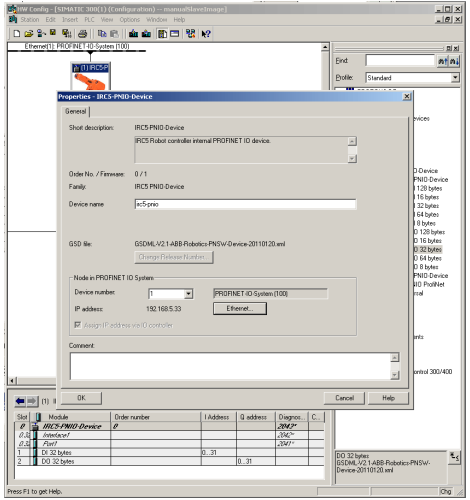
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B Using Siemens Step 7 PC tool

Continued

Action	Note	Note
3	Install the GSDML file for the PROFINET internal device. The GSDML file is included in the controller software, see GSDML file on page 29 .	 <p>en1000001190</p>
4	Expand PROFINET IO \ Additional Field Devices \ I/O \ IRC5 PNIO-Device in the catalog view to the right, to find the PROFINET internal device. Add the IRC5 PNIO-Device to the PLC project.	 <p>en1000001191</p>
5	Add a DI 32 bytes module on Slot 1 and a DO 32 bytes module on Slot 2.	 <p>en1000001192</p>

Continues on next page

Action	Note
6	<p>Double-click on the ABB icon to bring up the Properties window. Make sure that Device name is set to the same name as the IRC5's PROFINET industrial network parameter <i>PROFINET Station Name</i>, see PROFINET Station Name on page 54. Also make sure that Address is the same as the system parameter <i>IP</i> used by the PROFINET network.</p>  <p>en1000001193</p>
7	Download the configuration to the PLC.

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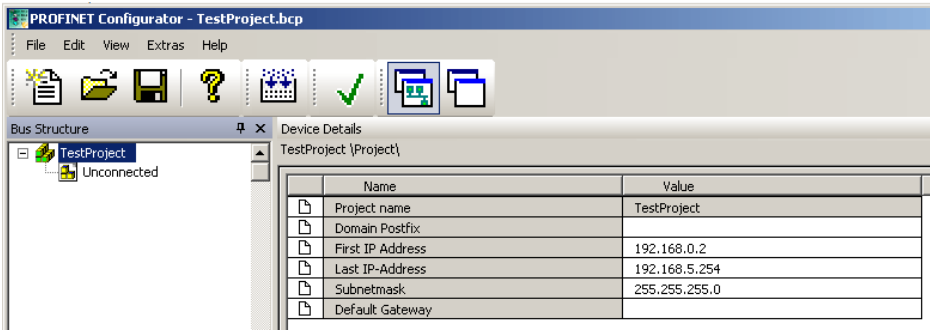
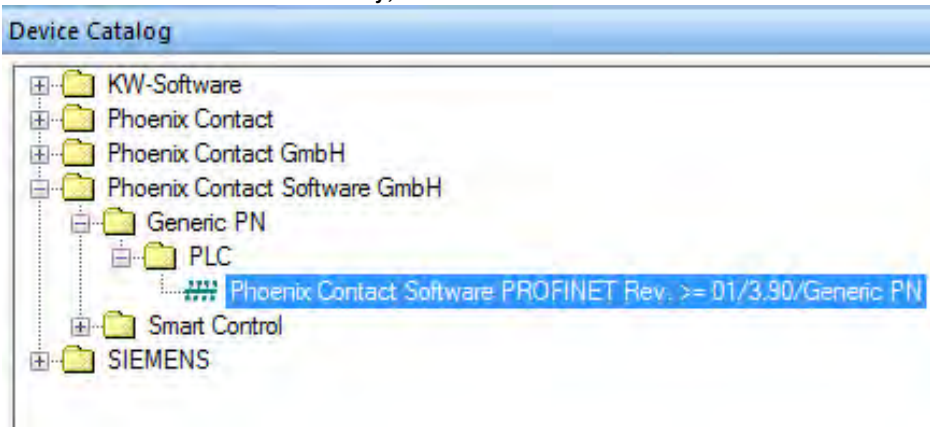
C Using PROFINET Configurator Express

Creating controller network configuration file using PROFINET Configurator Express

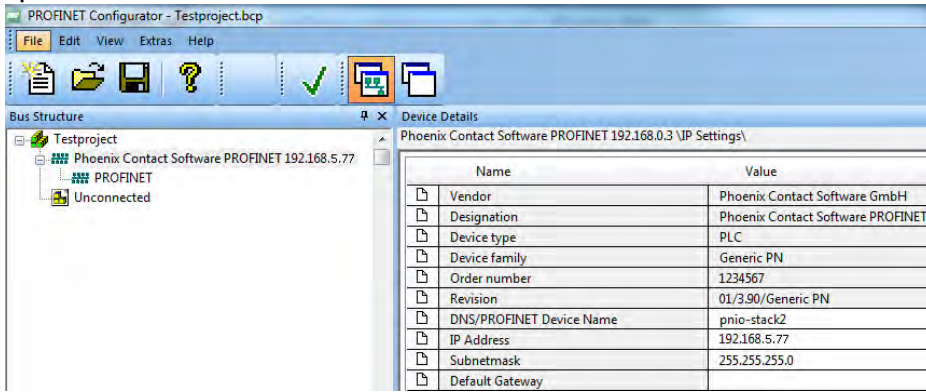
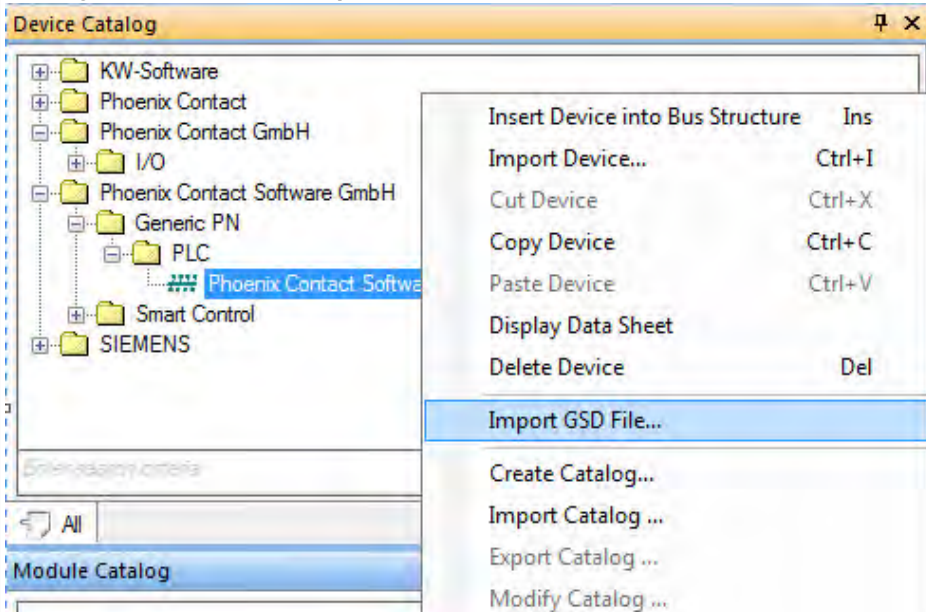
Description

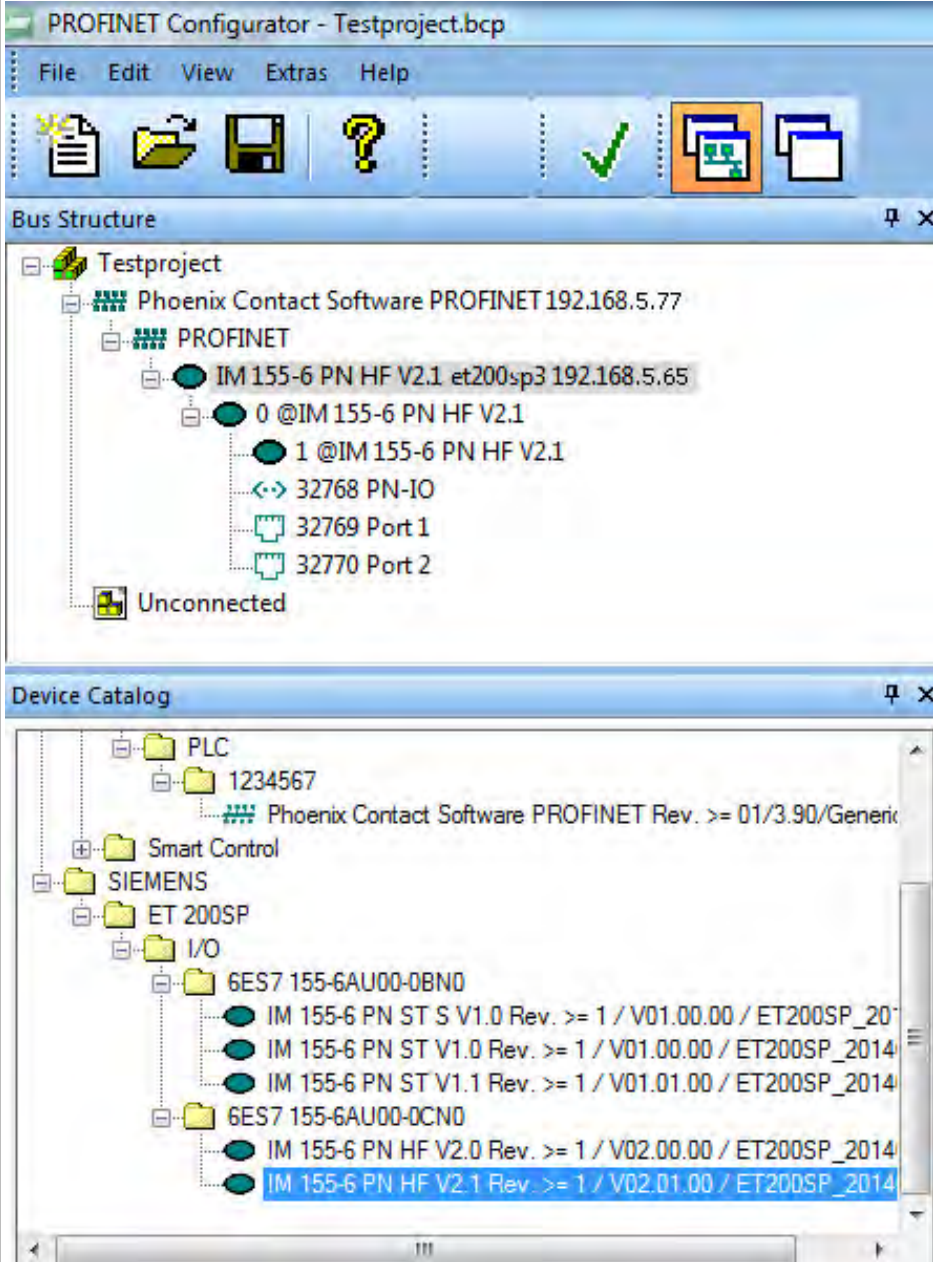
The following example is performed using *PROFINET Configurator Express*.

This example demonstrates how to create a PROFINET configuration file for one device, a Siemens ET200s with 5 DO 2-bit modules and 1 DI 2-bit module.

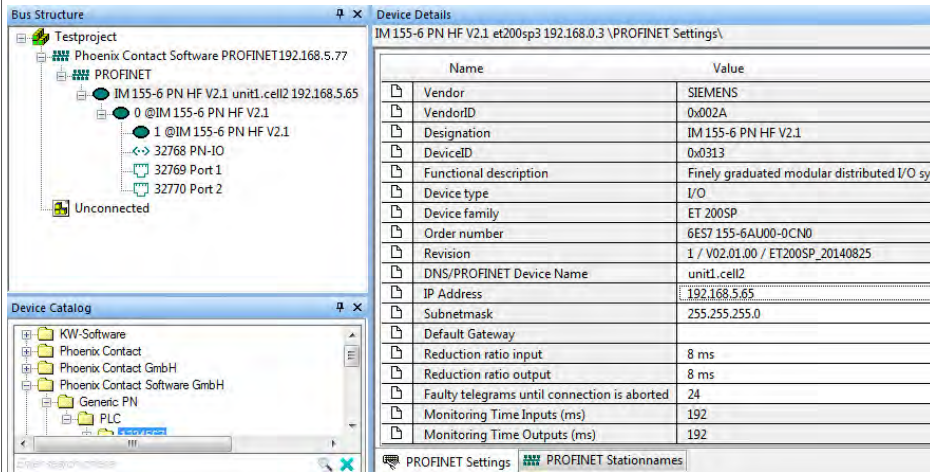


Action	
1	Start PROFINET-IO Configurator Express.
2	In PROFINET-IO Configurator Express, click File and select New to create a new empty project.
3	Click File and select Save to save the new project. Use the name "TestProject".
4	In the Bus Structure window, make sure that the "TestProject" node is selected.
5	<p>In the Device Details window, set the PROFINET IP range for this project by setting the following parameters:</p> <ul style="list-style-type: none"> Last IP Address: 192.168.5.254 First IP Address: 192.168.5.2 Subnetmask: 255.255.255.0 
6	<p>In the Device Catalog window, expand the nodes Phoenix Contact Software GmbH, Generic PN and PLC.</p> <ul style="list-style-type: none"> Select the PLC version that corresponds to the current version of the Phoenix Contact Software. Currently, it is 3.9 version. 

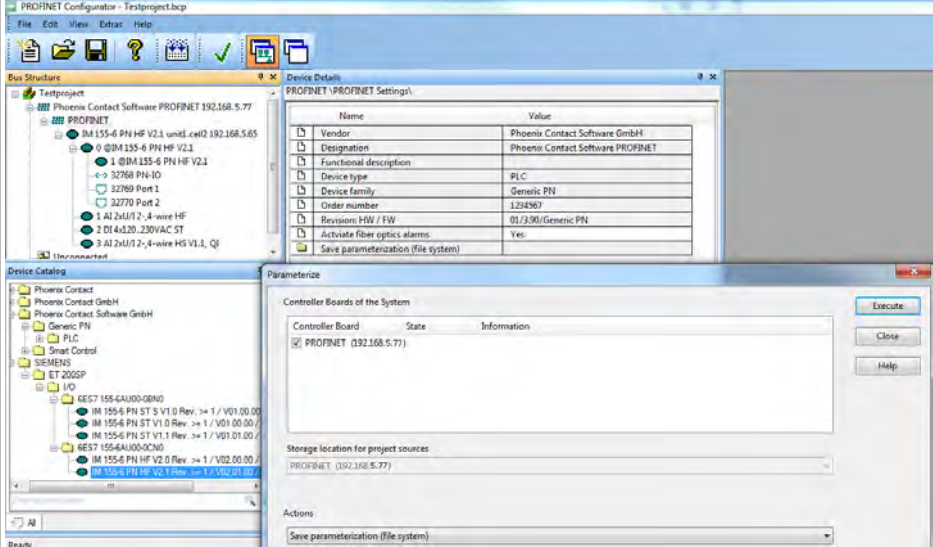
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	Action
7	<p>Right-click on Phoenix Contact Software PROFINET and select Insert Device into Bus structure. This node now represents the IRC5 controller master.</p>
8	<p>In the Bus Structure window, select Phoenix Contact Software PROFINET to bring up the Device Details window.</p>  <p>xx1600000030</p> <p>These values does not have any effect on the IRC5 controller settings, but could be filled with data to reflect the settings of the IRC5 controller that is using this configuration.</p>
9	<p>Install the GSDML file for the ET200s Standard device by right-clicking in the Device Catalog window and select Import GSD file.</p>  <p>xx1600000031</p> <p>In this example, install the GSDML-V2.2-Siemens-ET200S-20090309.xml file. This version of the PROFINET-IO Configurator Express support V2.2 syntax and earlier versions for the GSDML files. The installation of the GSDML file may take several minutes and the program might appear to be unresponsive during that time.</p>

	Action
10	<p>Make sure that the PROFINET node is selected in the Bus Structure window.</p> <p>Add an ET200s ST (standard) head module by expanding the SIEMENS / I/O / ET 200S node in the Device Catalog window.</p> <p>Right-click in the window and select Edit Catalog Representation. Move the Order Number item from Available to Used and click OK. The window will no be sorted with order numbers as well.</p> <p>Select and right-click the node (for example IM151-3 PN ST V6.0 Rev.) and choose Insert Device into Bus structure.</p> <p>In this example we use a version 6.0 module with order number 6ES7-151 3AA23-0AB0.</p>  <p>xx1600000032</p>

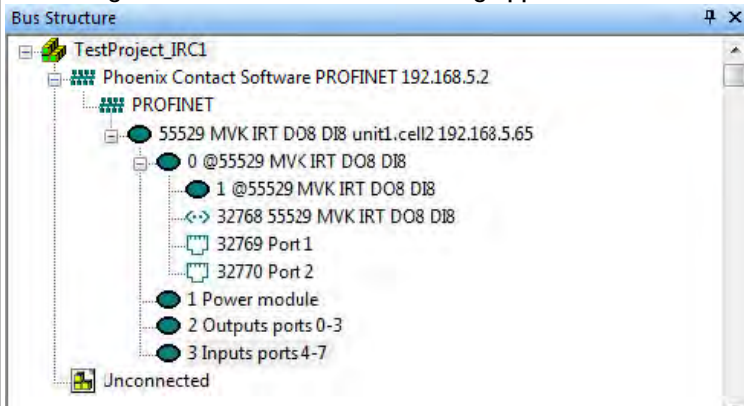
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	Action
11	<p>Select the added node in the Bus Structure window.</p> <p>In the Device Details window, set the device properties to reflect the device's properties on the PROFINET network, see Configuring the PROFINET network settings on page 36.</p> <p>In this example we set:</p> <ul style="list-style-type: none"> • DNS/PROFINET Device Name: unit1.cell2 • IP Address: 192.168.5.65 • Reduction ratio: 8 ms  <p>xx1600000033</p> <p> Note</p> <p>The DNS/PROFINET Device Name is using a much longer string length and a syntax that is not allowed in the IRC5 controller for a device name. The DNS/PROFINET Device Name is matched against the system parameter <i>Name</i> for a device definition in the IRC5 controller. Therefore the DNS/PROFINET Device Name must be unique for the first 32 letters or up to the first "." (full stop character).</p> <p>In this example the device's name in the Robot controller will be "unit1", but on the PROFINET network it will be displayed with the name "unit1.cell2".</p>
12	<p>Select the node 0 @IM151-3 PN ST V6.0 in the Bus Structure window.</p> <p>Now the Module Catalog window displays all possible modules to insert at Slot 1 for this device. Add the power module. Sort this window as well based on order number. Add a power module with order number 6ES7 138-4CA01-0AA0 by selecting it and drop it in the Bus Structure window on the text 0 @IM151-3 PN ST V6.0.</p> <p> Note</p> <p>It is very important for some devices that the firmware/hardware version on the device exactly matches the version used in the configuration (for example V 6.0).</p>
13	<p>Add the rest of the digital input and output modules by repeating the previous step. Select the node 1 PM-E DC24V. Sort the Module Catalog window on order number. Add a 2-bit DO module with order number 6ES7 132-4BB01-0AA0 by dragging and dropping it on the 1 PM-E DC24V node.</p>

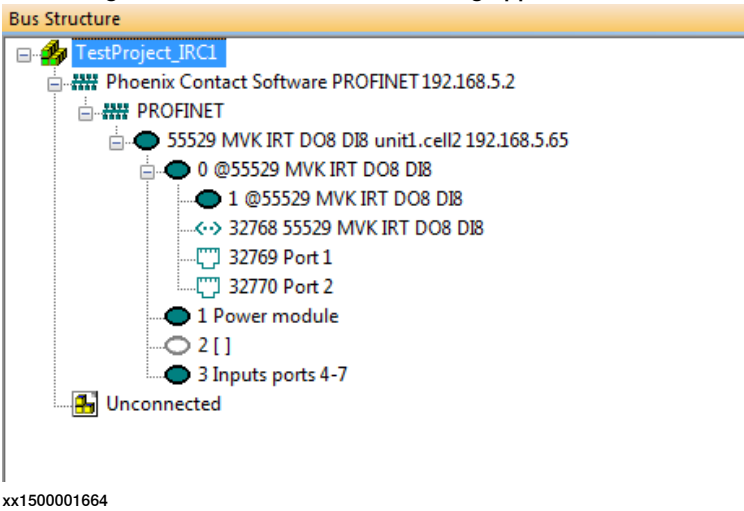
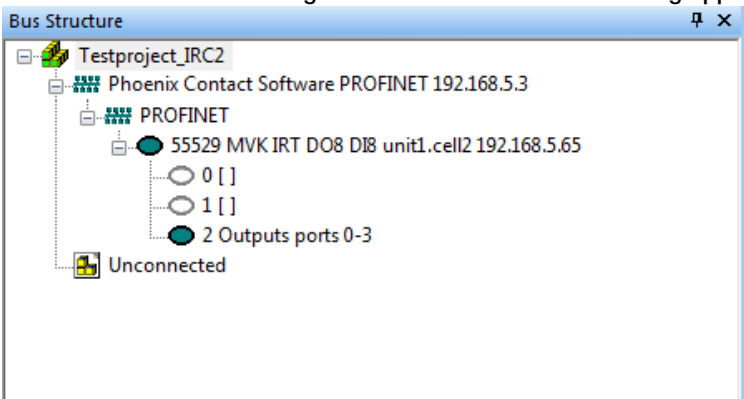
	Action
14	<p>When all modules are added, right-click the node PROFINET in the Bus Structure window and select Parameterize to compile the configuration project and create the ipnnio.xml file.</p>  <p>The screenshot shows the PROFINET Configurator Express interface. The 'Bus Structure' window on the left displays a project tree with a 'PROFINET' node. The 'Device Details' window on the right shows the configuration for the PROFINET device, including Vendor (Phoenix Contact Software GmbH), Designation (Phoenix Contact Software PROFINET), Device type (PLC), Device family (Generic PN), Order number (1234567), Revision: HW / FW (01/3/00/Generic PN), and Activate fiber optics alarms (Yes). The 'Parameterize' dialog box is open, showing the 'Controller Boards of the System' section with a table containing one entry: PROFINET (192.168.5.77). The 'Storage location for project sources' is set to PROFINET (192.168.5.77). The 'Actions' section shows 'Save parameterization (file system)' as the selected action.</p>
15	<p>Download the ipnnio.xml file to the HOME directory of the currently used RobotWare system using an FTP client.</p>

Updating configuration file to support shared device functionality

The following example is performed using *PROFINET Configurator Express*. This example demonstrates how two IRC5 controllers are configured when sharing an I/O device, a MURR 5529 with 8 DI and 8 DO modules.

	Action
1	<p>Follow the procedure from steps 1-13 that is explained in section Using PROFINET Configurator Express on page 79. Name the new project as "TestProject_IRC1". This configuration uses a MURR 5529 as shared device.</p> <p>The configuration should have the following appearance:</p>  <p>The screenshot shows the 'Bus Structure' window for a project named 'TestProject_IRC1'. The project tree shows a 'Phoenix Contact Software PROFINET 192.168.5.2' node. Under this node, there is a 'PROFINET' node, which is expanded to show a '55529 MVK IRT DO8 DI8 unit1.cell2 192.168.5.65' device. This device is further expanded to show its modules: '0 @55529 MVK IRT DO8 DI8', '1 @55529 MVK IRT DO8 DI8', '32768 55529 MVK IRT DO8 DI8', '32769 Port 1', '32770 Port 2', '1 Power module', '2 Outputs ports 0-3', and '3 Inputs ports 4-7'. The 'Unconnected' node is also visible at the bottom of the tree.</p>

Continues on next page

	Action
2	<p>After the device has been configured, delete the modules that should be owned by another controller.</p> <ul style="list-style-type: none"> Right-click on the module > click Delete on the shortcut menu. <p>The configuration should have the following appearance:</p>  <p>xx1500001664</p>
3	<p>Download the <i>ippnio.xml</i> file to the <i>HOME</i> directory of the currently used RobotWare system in the IRC5 controller using an FTP client.</p>
4	<p>Configure the second controller the same way as mentioned in the above steps 1-2, except that the other nodes should be deleted. That is, the modules owned by first controller are deleted.</p> <p>The second controller configuration should have the following appearance:</p>  <p>xx1500001665</p>
5	<p>Download the <i>ippnio.xml</i> file to the <i>HOME</i> directory of the currently used RobotWare system in the second IRC5 controller using an FTP client</p>
6	<p>Restart both IRC5 controllers.</p>

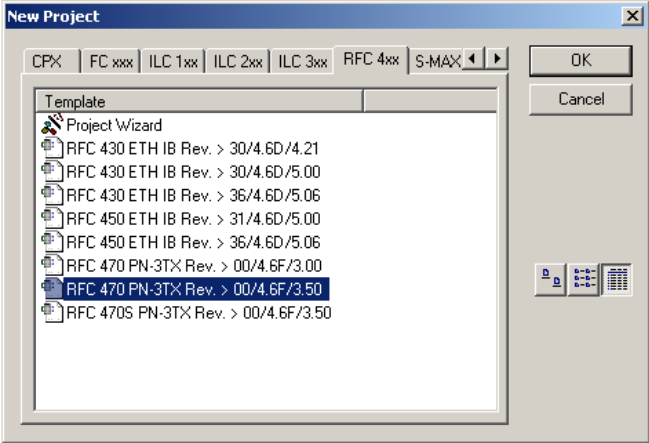
D Using PC WORX

Creating controller network configuration file using PC WORX

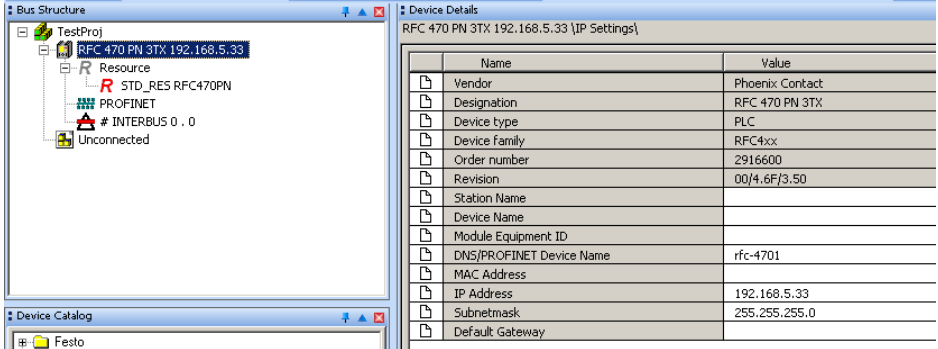
Description

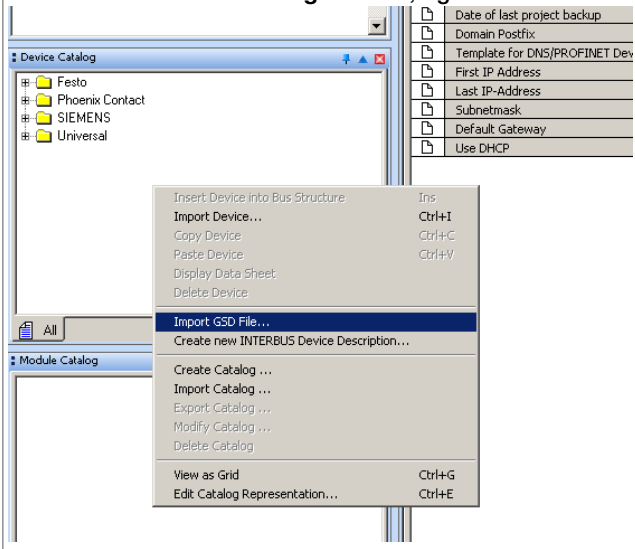
The following example is performed using PC WORX version 6.0 with Service pack 3 and hotfix 1.

This example demonstrates how to create a PROFINET master configuration file for a Siemens ET200s device that later can be downloaded to the IRC5 controller.

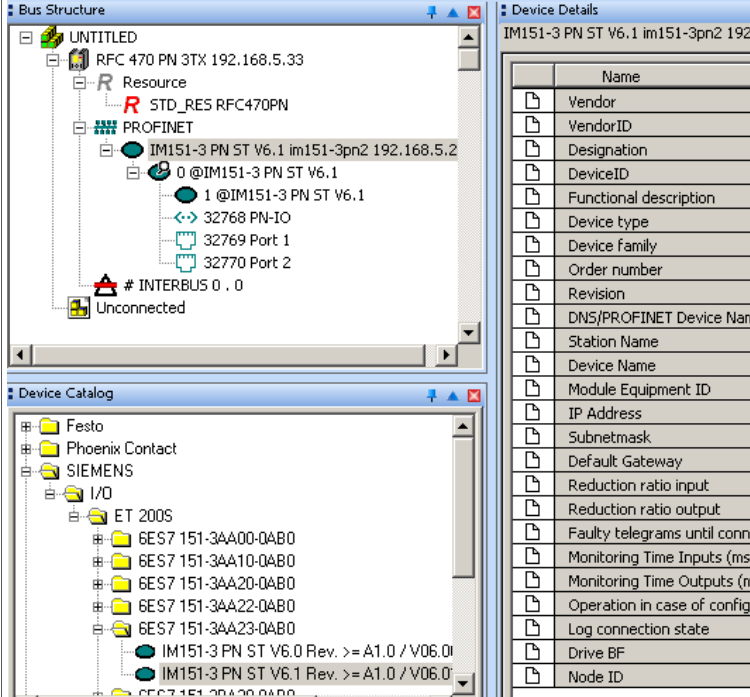
	Action
1	Start the program PC WORX 6.00.25 SP 3.73. The program can be found in the Windows Start menu, under Phoenix Contact and then AUTOMATIONWORX Software Suite 2009 1.50
2	Click on the menu View and select Bus Configuration . This changes the program view to Bus Configuration .
3	Click File and select New Project .
4	Select the project type RFC 470 PN-3TX ... and click OK .  en1100000067


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Action																																							
5	<p>In the Device details window, specify the IP address range that the PROFINET master operates within.</p> <p>For example, if the system parameter <i>IP</i> used by the PROFINET network is specified to 192.168.5.33:</p> <p>First IP Address can be 192.168.5.2</p> <p>Last IP Address can be 192.168.5.254.</p> <p>System parameter <i>IP</i> is described in <i>Technical reference manual - System parameters</i>.</p> <table border="1"> <thead> <tr> <th>Name</th> <th>Value</th> </tr> </thead> <tbody> <tr><td>Project name</td><td>UNTITLED</td></tr> <tr><td>Creator</td><td>pyx124</td></tr> <tr><td>Computer name at project creation</td><td>PYRYT0028</td></tr> <tr><td>MULTIPROG version at project creation</td><td>5.0.0.380</td></tr> <tr><td>PC WORX version at project creation</td><td>PC WORX 6.00.25 SP 2.1.62</td></tr> <tr><td>Creation date</td><td>2009-12-14T16:41:49+01:00</td></tr> <tr><td>Last editor</td><td>pyx124</td></tr> <tr><td>Computer name at last project backup</td><td>PYRYT0028</td></tr> <tr><td>MULTIPROG version at last project backup</td><td>5.0.0.380</td></tr> <tr><td>PC WORX version at last project backup</td><td>PC WORX 6.00.25 SP 2.1.62</td></tr> <tr><td>Date of last project backup</td><td>2009-12-14T16:43:45+01:00</td></tr> <tr><td>Domain Postfix</td><td></td></tr> <tr><td>Template for DNS/PROFINET Device Name gen...</td><td></td></tr> <tr><td>First IP Address</td><td>192 . 168 . 0 . 2</td></tr> <tr><td>Last IP-Address</td><td>192.168.0.254</td></tr> <tr><td>Subnetmask</td><td>255.255.255.0</td></tr> <tr><td>Default Gateway</td><td></td></tr> <tr><td>Use DHCP</td><td>no</td></tr> </tbody> </table> <p>en1100000071</p>	Name	Value	Project name	UNTITLED	Creator	pyx124	Computer name at project creation	PYRYT0028	MULTIPROG version at project creation	5.0.0.380	PC WORX version at project creation	PC WORX 6.00.25 SP 2.1.62	Creation date	2009-12-14T16:41:49+01:00	Last editor	pyx124	Computer name at last project backup	PYRYT0028	MULTIPROG version at last project backup	5.0.0.380	PC WORX version at last project backup	PC WORX 6.00.25 SP 2.1.62	Date of last project backup	2009-12-14T16:43:45+01:00	Domain Postfix		Template for DNS/PROFINET Device Name gen...		First IP Address	192 . 168 . 0 . 2	Last IP-Address	192.168.0.254	Subnetmask	255.255.255.0	Default Gateway		Use DHCP	no
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6	<p>In the Bus Structure window, select the node RFC 470 Set the same IP address as specified in the system parameter <i>IP Address</i> for the PROFINET Industrial network in the IRC5 controller.</p>  <table border="1"> <thead> <tr> <th>Name</th> <th>Value</th> </tr> </thead> <tbody> <tr><td>Vendor</td><td>Phoenix Contact</td></tr> <tr><td>Designation</td><td>RFC 470 PN 3TX</td></tr> <tr><td>Device type</td><td>PLC</td></tr> <tr><td>Device family</td><td>RFC4xx</td></tr> <tr><td>Order number</td><td>2916600</td></tr> <tr><td>Revision</td><td>00/4.6F/3.50</td></tr> <tr><td>Station Name</td><td></td></tr> <tr><td>Device Name</td><td></td></tr> <tr><td>Module Equipment ID</td><td></td></tr> <tr><td>DNS/PROFINET Device Name</td><td>rfc-4701</td></tr> <tr><td>MAC Address</td><td></td></tr> <tr><td>IP Address</td><td>192.168.5.33</td></tr> <tr><td>Subnetmask</td><td>255.255.255.0</td></tr> <tr><td>Default Gateway</td><td></td></tr> </tbody> </table> <p>en1100000072</p> <p>This specifies the IP address of the IRC5 controller PROFINET master.</p>	Name	Value	Vendor	Phoenix Contact	Designation	RFC 470 PN 3TX	Device type	PLC	Device family	RFC4xx	Order number	2916600	Revision	00/4.6F/3.50	Station Name		Device Name		Module Equipment ID		DNS/PROFINET Device Name	rfc-4701	MAC Address		IP Address	192.168.5.33	Subnetmask	255.255.255.0	Default Gateway									
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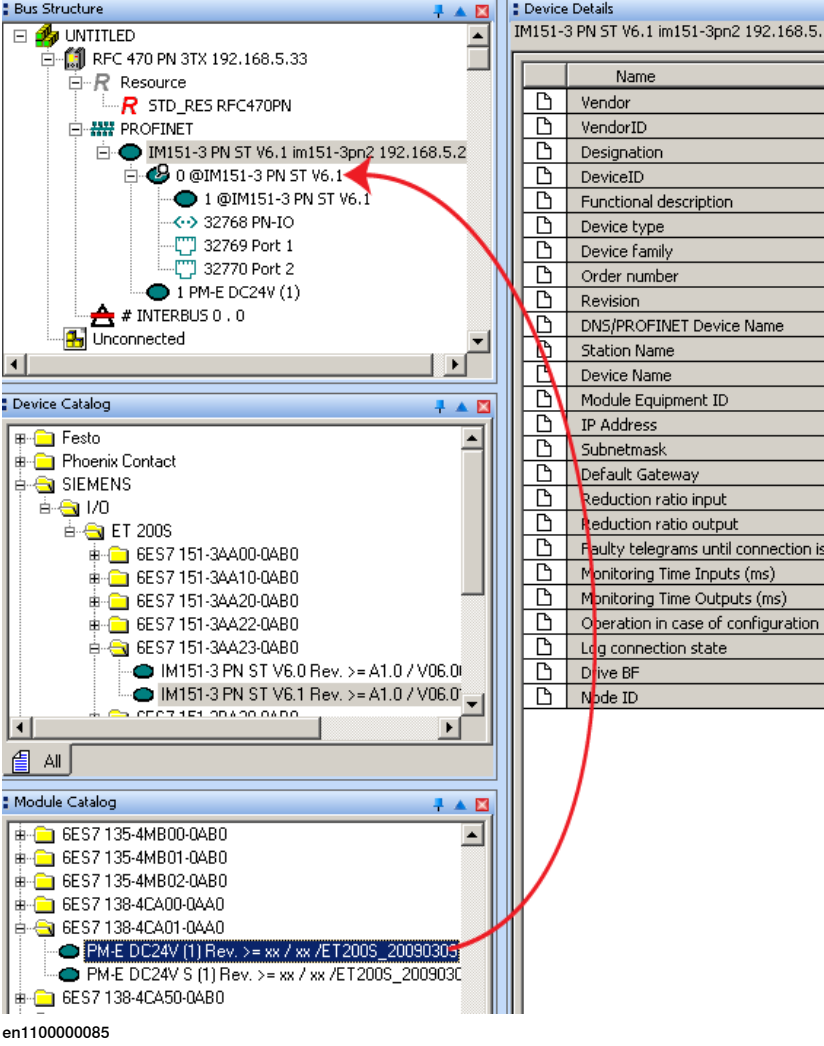

	Action
7	<p>Activate the Device Catalog window, right-click and select Import GSD file.</p>  <p>en1100000073</p> <p>This installs the GSDML file for the ET200s device.</p>
8	<p>Select the GSD file.</p> <p>In this example, install the GSDML-V2.2-Siemens-ET200S-20090309.xml file.</p> <p>This version of the PCWORX support V2.2 syntax and below for the GSDML files.</p> <p>It may take a few minutes to install a GSDML file.</p>

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	Action
9	<p>Make sure the PROFINET node in the Bus Structure window is selected. Double-click on the ET200s module in the Device Catalog window to add it.</p> <p>In this example we add a ET200S of version V6.1 with order number 6ES7-151 3AA23-0AB0.</p>  <p>The screenshot shows three windows: 'Bus Structure' with a tree view where 'PROFINET' is selected; 'Device Catalog' with a list of modules where 'ET 200S' is selected; and 'Device Details' showing a list of parameters for 'IM151-3 PN ST V6.1 im151-3pn2 192'. The parameters include Vendor, VendorID, Designation, DeviceID, Functional description, Device type, Device family, Order number, Revision, DNS/PROFINET Device Name, Station Name, Device Name, Module Equipment ID, IP Address, Subnetmask, Default Gateway, Reduction ratio input, Reduction ratio output, Faulty telegrams until conn, Monitoring Time Inputs (ms), Monitoring Time Outputs (ms), Operation in case of config, Log connection state, Drive BF, and Node ID.</p> <p>Note</p> <p>It is very important for some devices that the firmware/hardware version on the device exactly matches the version used in the configuration (for example V 6.1).</p>
10	<p>Set the device's PROFINET name using the program NetNames+, see Configuring the PROFINET network settings on page 36.</p> <p>The selected name must exactly match the name the device got on the PROFINET network.</p> <p>Note</p> <p>The selected name is also used as the name of this device in the controller. However, a '-' sign is expressed as a '_' in the controller.</p>

Action																																																					
11	<p>In the Device Details window, set a value for IP Address. Also, in the program NetNames+, set the same value for the IP address.</p> <p>Device Details IM151-3 PN ST V6.1 im151-3pn2 192.168.5.2 {PROFINET Settings}</p> <table border="1"> <thead> <tr> <th>Name</th><th>Value</th></tr> </thead> <tbody> <tr><td>Vendor</td><td>SIEMENS</td></tr> <tr><td>VendorID</td><td>0x002A</td></tr> <tr><td>Designation</td><td>IM151-3 PN ST V6.1</td></tr> <tr><td>DeviceID</td><td>0x0301</td></tr> <tr><td>Functional description</td><td>Finely-graduated modular distributed IO device...</td></tr> <tr><td>Device type</td><td>ET 2005</td></tr> <tr><td>Device Family</td><td>I/O</td></tr> <tr><td>Order number</td><td>6ES7 151-3AA23-0AB0</td></tr> <tr><td>Revision</td><td>A1.0 / V06.01.00 / ET2005_20090309</td></tr> <tr><td>DNS/PROFINET Device Name</td><td>im151-3pn2</td></tr> <tr><td>Station Name</td><td></td></tr> <tr><td>Device Name</td><td></td></tr> <tr><td>Module Equipment ID</td><td></td></tr> <tr><td>IP Address</td><td>192.168.5.2</td></tr> <tr><td>Subnetmask</td><td>255.255.255.0</td></tr> <tr><td>Default Gateway</td><td></td></tr> <tr><td>Reduction ratio input</td><td>8 ms</td></tr> <tr><td>Reduction ratio output</td><td>8 ms</td></tr> <tr><td>Faulty telegrams until connection is aborted</td><td>24</td></tr> <tr><td>Monitoring Time Inputs (ms)</td><td>192</td></tr> <tr><td>Monitoring Time Outputs (ms)</td><td>192</td></tr> <tr><td>Operation in case of configuration differences</td><td>no</td></tr> <tr><td>Log connection state</td><td>yes</td></tr> <tr><td>Drive BF</td><td>yes</td></tr> <tr><td>Node ID</td><td>39</td></tr> </tbody> </table> <p>en1100000081</p>	Name	Value	Vendor	SIEMENS	VendorID	0x002A	Designation	IM151-3 PN ST V6.1	DeviceID	0x0301	Functional description	Finely-graduated modular distributed IO device...	Device type	ET 2005	Device Family	I/O	Order number	6ES7 151-3AA23-0AB0	Revision	A1.0 / V06.01.00 / ET2005_20090309	DNS/PROFINET Device Name	im151-3pn2	Station Name		Device Name		Module Equipment ID		IP Address	192.168.5.2	Subnetmask	255.255.255.0	Default Gateway		Reduction ratio input	8 ms	Reduction ratio output	8 ms	Faulty telegrams until connection is aborted	24	Monitoring Time Inputs (ms)	192	Monitoring Time Outputs (ms)	192	Operation in case of configuration differences	no	Log connection state	yes	Drive BF	yes	Node ID	39
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12	<p>If the default values are not suitable, set new values for Reduction ratio input and Reduction ratio output in the Device Details window.</p>																																																				
13	<p>In the Bus Structure window, make sure the node IM151... is selected. In the Module Catalog window, locate the module that is in slot 1 on the device.</p> <p> Tip</p> <p>To easier find the module, right-click in the Module Catalog window and select Edit Catalog Representation. In the pop up window select to sort it based on Order number.</p>																																																				

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	Action
14	<p>Drag and drop the module to the module in the preceding slot in the Bus Structure window.</p> <p>In this example, drag module PM-E DC24V to node 0 @IM151-3 PN...</p>  <p>The screenshot shows three windows: 'Bus Structure' on the left, 'Device Catalog' in the middle, and 'Module Catalog' at the bottom. The 'Bus Structure' window shows a hierarchy starting with 'UNTITLED', followed by 'RFC 470 PN 3TX 192.168.5.33', 'Resource', 'STD_RES RFC470PN', 'PROFINET', 'IM151-3 PN ST V6.1 im151-3pn2 192.168.5.2', and finally '0 @IM151-3 PN ST V6.1'. Below this node are '32768 PN-IO', '32769 Port 1', '32770 Port 2', and '1 PM-E DC24V (1)'. The 'Device Catalog' window shows a tree structure with 'Festo', 'Phoenix Contact', and 'SIEMENS' folders. Under 'SIEMENS' is 'I/O', then 'ET 200S', and a list of modules including 'IM151-3 PN ST V6.0 Rev. >= A1.0 / V06.0' and 'IM151-3 PN ST V6.1 Rev. >= A1.0 / V06.0'. The 'Module Catalog' window shows a list of modules, with 'PM-E DC24V (1) Rev. >= xx / xx / ET200S_20090303' highlighted. A red arrow points from this highlighted module to the '0 @IM151-3 PN ST V6.1' node in the Bus Structure window.</p>
15	<p>Add the rest of the modules that the ET200s is equipped with.</p> <p> Tip</p> <p>Copy and paste can be used to add modules of the same type.</p>
16	<p>Click the Build menu and select Rebuild Project.</p> <p>This builds the project and creates the PROFINET configuration file.</p> <p>A successful build will always generate 2 warnings.</p> <p>The default path to the generated PROFINET configuration file is: C:\Documents and Settings\All Users\Documents\PC WORX\Projects\TestProj\C\STD_CNF\R\STD_RES_s49PNIO\IPPPIO.xml</p>
17	<p>Download the ippnio.xml file to the HOME directory of the currently used RobotWare system using an FTP client.</p>

Index

8

888-3, 7

888-2, 7

C

communication profiles, 15

compatibility, 16

configuration file, 13

Configuration File, 49, 53

Connection, 37, 49, 52

controller, 17

D

device, 13, 17

E

Energy Saving, 62

F

Fast Device Startup, 8, 44, 49–50, 57

Fast Start Up, 13, 44

FSU, 13, 44

G

gateway, 37, 73

GSDML, 13

GSDML file, 29, 31–32

I

industrial Ethernet, 15

Input Size, 8, 30, 51, 67

M

master, 13

N

Nested Diagnosis, 8, 49, 55

network security, 12

O

Output Size, 8, 30, 51, 68

P

Prioritized Startup, 13, 44

private network, 22

PROFINET

configuration tool, 13

controller, 17

device, 17

internal device, 29

standardization, 15

PROFINET versions

PROFIdrive, 15

PROFIenergy, 15

PROFINET-CBA, 15

PROFINET-IO, 15–16

PROFIsafe, 15

Q

QoS, 26

Quality of Service, 26

R

reduction ratio, 13, 69, 89

S

safety, 11

Shared Device, 46

Station Name, 49, 54, 77

system parameters, 49

T

template I/O configuration file, 29

topic I/O System

Device, 49

Industrial Network, 49

Internal Device, 50

predefined internal device, 29

predefined network, 29

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