PRONETA User Manual

PROFINET Network Analyzer – Configuration and Diagnostic Tool

Warranty and liability

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### WinPCap NOTE

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1 Introduction

The PROFINET network analyzer PRONETA is a simple tool intended for the rapid analysis and configuration of PROFINET networks and the simple testing of ET 200 distributed I/O systems and other components. It is well suited for solving two tasks fundamental to the commissioning of PROFINET installations:

- The “Network Analysis” task gives a quick overview of the devices connected to PROFINET. It features simple configuration options, like setting network parameters or assigning a network name to the devices, as well as powerful mechanisms to compare several network topologies with each other, for example to compare an “ideal” topology intended for a project with the actual installation.

- The “I/O Test” task is a simple and intuitive method to test the I/O wiring of an installation with numerous distributed I/O devices. It allows for checks of the wiring and will automatically set up a protocol of the test procedure which can be exported for documentation purposes.

Both tasks can be performed before a CPU is integrated in the network. Since there are no other engineering tools required, PRONETA allows fast and convenient checks of the system configuration from early on.

Figure 1-1

PRONETA has the following features:

- Free download from the SIEMENS support websites
- Runs on any contemporary PC, PG or laptop, running Windows
- Allows configuration of networks in early project phases, even before any CPU is installed in the network
- No additional hardware or software required
- No dedicated installation needed: Simply extract the zip download
- Support for PROFINET devices from all vendors
1 Introduction

- I/O Test supported for numerous SIMATIC ET 200 distributed I/O modules
- Support for STEP 7 V5.4, 5.5 and 5.6 project files

How to use this manual

This manual consists of the following sections:

- Chapter 2, “General” gives you an overview of PRONETA’s features and provides you with the necessary information to install and run the program.
- Chapter 3, “PRONETA User Guide” is a reference chapter, duplicating the online help, which acquaints you with concepts and the user interface of PRONETA.
- Chapter 4, “Working with PRONETA” will guide you through the most relevant use cases of PRONETA in a step-by-step manner.
2 General

2.1 Features

Obtaining PRONETA
PRONETA is available as a free download from the SIEMENS support portal:
This manual refers to version 2.6.0.

System Requirements
PRONETA runs on any contemporary PC, PG or laptop hardware with Windows 7, Windows Embedded Compact 7, Windows 8 or Windows 10, each either in the 32 or 64 bit version.
Connection with PROFINET is established via an Industrial Ethernet cable.
The following additional software components need to be present as well:
- .NET Framework v4.6.1
- WinPcap 4.1.3 or higher
If .NET is missing on your PC, the installer will guide you to a download location. WinPcap is part of the PRONETA distribution and will be installed at the first start of PRONETA, if not found.

NOTE
- Depending on the distribution, the .NET Framework and WinPcap drivers may not be included in the standard installation for Windows Embedded, and may require manual installation.
- The 32 bit version of Microsoft Visual C++ must be used even with 64 bit versions of Windows.

Supported SIMATIC Software
PRONETA allows the loading of reference projects created with STEP 7, Versions 5.4, 5.5, or 5.6. It is also possible to import AML ("Automation Markup Language") files created with the TIA Portal.

Limitations
- The maximum size of a network for which network scans will be reliably performed is 500 devices. For larger networks, devices may go undetected, or PRONETA may crash. (See also Online Mode)
- In the I/O Test, signal changes of less than 256 ms duration may not be reliably observed. (See also I/O Test Task)

2.2 Supported Modules
PRONETA supports all PROFINET-conform devices irrespective of their manufacturer. The supported range of functions depends on the individual device.
The I/O Test supports the following modules:
- Most current SIMATIC ET 200 modules
- SIMATIC IO-Link modules (Master/Device)
- SIMATIC Compact Field Units (CFU)
2 General

- SIRIUS Motor Starters with Firmware Versions 1.1 or greater
- SIPLUS Heating Control Systems HCS4200/4300

Reference List

A continuously updated list of supported modules for PRONETA can be found on the PRONETA download page (see also \2).

Updating the PRONETA GSDML database

Modules that appear after the release of version 2.6 can subsequently be supported by importing their GSDML file from the SIEMENS Industry Online Portal web pages, provided they do not require any new functionality. The chapter GSDML Manager provides more details on this.

2.3 Installing and Running PRONETA

Installation

Extract the PRONETA file archive into a folder on your PC, and connect your PC by means of an Industrial Ethernet cable with your plant.

No further installation is required for PRONETA.

NOTE

The extraction path for PRONETA must not contain either of the special characters “#” or “;”.

Starting PRONETA

After installation, you can start PRONETA by a simple double-click on the program icon in the extraction folder.

Figure 2-1

NOTE

When running PRONETA for the first time, you will be asked to acknowledge the license conditions before you can proceed.

You may also create a shortcut link to PRONETA on your desktop and start the program from there.
Finishing PRONETA
To quit PRONETA, click on the “Close”-icon of the program’s window.
Figure 2-2

Deinstallation
If you do not plan to use PRONETA any further, perform the two following steps:
1. Delete the folder to which you extracted PRONETA,
2. In the Windows start menu, execute “WinPcap -> Uninstall WinPcap 4.1.3”
PRONETA User Guide

3.1 Basics of PRONETA

3.1.1 Overview

Within the scope of this documentation, the term “device” is used as a synonym for “network participant”, “node”, or “component.” Any piece of equipment which takes part in the PROFINET communication with a designated IP address is considered a “device”.

PRONETA is designed to allow you to accomplish one of several “tasks”. These tasks are currently:

- Network Analysis Task
- I/O Test Task
- Adjusting the software Settings

The tasks can be chosen from the Home screen, and returning to the Home screen anytime during the operation of PRONETA will allow you to select a different task.

Figure 3-1
Screen Layout

In general, the PRONETA window is split in several sections:

- A header bar (1) on the top
- A mode bar (2) which allows changing between the "modes", or individual steps of the task chosen
- A function bar (3) which offers particular functions for the current mode
- One or more windows with Graphical Views of a network configuration (4) or tables of relevant information (5) below, like a Device Table
- Finally, the Graphical Views contain a tool bar (6), designed to perform particular operations depending on the chosen mode.

Depending on the task and mode chosen, the function bars and the context menus of the Graphical Views and the Device Tables offer differing functionality. Details can be found in the respective sections of PRONETA (Chapter 3).

The relative size of the views can be changed by dragging the border between the panes in the corresponding direction. Panes can be displayed or removed by using the "►" and "◄" symbols on their pane border.
Header Bar

The header bar, which is always visible while PRONETA is running, contains two control elements:

- The “Home” button on the left end of the header bar. Clicking on this will always return PRONETA to the start screen.

![Home Button](image)

- The “Help?” button on the right end of the header bar. Clicking on it opens a menu with three commands:
  - “Help” opens or closes a frame on the right hand side of the window which brings up context-specific help. (Pressing the “F1” function key at any time offers the same functionality.) For more details, see Help View.
  - “Report a Bug” collects information about the current state of PRONETA and prompts you to submit an error report to SIEMENS to improve PRONETA performance in the future.
  - “Version and Information” opens a small popup window with information about the PRONETA version you are running.

![Help Menu](image)

Reporting a Bug

Should you encounter a bug in PRONETA, please use the bug reporting mechanism available through the “Help?” button on the right end of the header bar. PRONETA will create a diagnostic dump of its current state and prepare an e-mail to be sent to the PRONETA support team with that dump attached. (Creating the dump will take a few moments.)

You will support the constant improvement of PRONETA, if you add further information to this message before sending it, like the exact problems and circumstances of the error, and contact details for possible questions.

3.1.2 Help View

The PRONETA Online Help is toggled by selecting the “Help” entry from the “Help?” drop-down menu on the right end of the header bar, or by pressing “F1” at any time. A Help View is opened on the right side of the PRONETA window, where you can browse through the help topics by scrolling, following the links, or selecting entries from the table of contents. The view size can be changed by dragging the pane border to the left or the right.
The help provides the same information as this manual.

**Function Bar**

The Help View header consists of a function bar with four functions:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Table of Contents" /></td>
<td>Show Table of Contents</td>
<td>Toggles a view of the table of contents.</td>
</tr>
<tr>
<td><img src="image" alt="Previous Topic" /></td>
<td>Show Previous Topic</td>
<td>Goes to the previous topic in the browsing history.</td>
</tr>
<tr>
<td><img src="image" alt="Next Topic" /></td>
<td>Show Next Topic</td>
<td>Goes to the next topic in the browsing history.</td>
</tr>
<tr>
<td><img src="image" alt="Search" /></td>
<td>Search in Help</td>
<td>Toggles a Search View inside the Help View.</td>
</tr>
</tbody>
</table>

**Help View Contents**

The Help View consists of up to two elements arranged left to right. Beside the main help topic (1), to the left there can be a second pane (2) which will display either the table of contents or the search view.
Search

Clicking on the "Search in Help" icon (3) in the header bar will turn the view of search view on and off.

Upon entering a search term in the search field (4), PRONETA will perform a full text search across the complete help contents, displaying a results list below the search field. Click on one of the result entries to jump to the corresponding topic, where the search term found will be highlighted. (5)

Search is case-insensitive and does not allow for wildcards or regular expressions. A search for "opolo" will find "topology" and "TOPOLOGIES"

Clicking on the "×" symbol at the right end of the search field (6) clears the search term and all search results.

Table of Contents

Clicking on any topic in the table of contents will jump to the corresponding help topic.
Help Topics
A view of the currently selected help topic. Use the scroll bar on the right side to navigate up and down in the help topic.

To close the Help View, do one of the following:
• Click on the "x" symbol in the top right corner of the view's title bar,
• Hit "F1"
• Select "Help" from the "Help?" menu in the top right corner of the PRONETA window.

3.2 Network Analysis Task
PRONETA’s Network Analysis gives you a quick overview about which devices are installed in your PROFINET network, and how they are connected with each other. The Network Analysis also lets you view and change various network parameters of the devices, like IP addresses, device names etc.
Different networks can be compared with each other, and the devices can be configured automatically or manually.

3.2.1 Online Mode
In Online mode, PRONETA will scan the PROFINET network for present devices, in either a single sweep or continuously. The main screen is divided in:
• A Graphical View (1)
• A Device Table (2) of accessible devices

Figure 3-6
NOTE
If the network size exceeds 500 devices, not all devices may be reliably detected during a scan. Crashes of PRONETA may occur in this case.

Function Bar
The following functions are available in the function bar:

Table 3-2

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Refresh</td>
<td>Performs an immediate update of the network scan.</td>
</tr>
<tr>
<td></td>
<td>Export Topology</td>
<td>Performs a Topology Export to disk.</td>
</tr>
</tbody>
</table>

Topology Export
A topology export can be performed in a number of different formats:

- As an XML file, for later use as a reference Topology File when working in Offline Mode, Comparison Mode or Configuration Mode, for example to quickly and conveniently duplicate a configuration.
- For documentation purposes to create reference files documenting the state of the network:
  - As a graphic of the network configuration (PNG (preferred format), BMP, or XML Paper Specification format)
  - As a CSV file with information from the Device Table for further processing with a spreadsheet application, like Microsoft Excel
  - As a PDF with a combination of topology graphic and Device Table, for documentation and archiving of the configuration.

This is useful to:

- Quickly establish the required hardware when a network configuration is to be duplicated, and to
- Document and easily reference information about all plugged devices and modules, including detailed information like order number, Firmware Version and serial number, employed in a certain installation.

The option “Include device details” will add information about port configurations and modules to the resulting file.
The data fields contained in an exported configuration are the same as the fields currently visible in the corresponding Device Table.
When including the Graphical View, the network topology representation will be distributed over several pages in the PDF, if the network is sufficient large.

Figure 3-9

![Graphical View of network topology](image)

Depending on the current mode, only some of the export options will be available:

Table 3-3

<table>
<thead>
<tr>
<th>Export Option</th>
<th>Online</th>
<th>Offline</th>
<th>Comp.</th>
<th>Conf.</th>
</tr>
</thead>
<tbody>
<tr>
<td>XML</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Graphical View</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
</tr>
<tr>
<td>Device Table (CSV)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
</tr>
<tr>
<td>Graphical View + Device Table (PDF)</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Device Search

To the right of the function bar, there is an input box (1) which allows you to search for particular devices. The search term you enter will be matched against the information fields (e.g. device names, types, network parameters, …), currently displayed in the Device Table only.

Search is case-insensitive and does not allow for wildcards or regular expressions.

Figure 3-10

Matches of your search are highlighted in the Graphical View and the Device Table through orange shading.

Figure 3-11

Scanner Status Indicator

On the far right of the function bar, there is a scanner status indicator (1) which displays the status of the current network scanning cycle.

Each network scanning cycle is divided into four phases, represented by the segments of the scanner status indicator. A network scan is complete when the indicator has gone through all four segments.

A right-click on the status indicator brings up a context menu with one item:
Table 3-4

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>🎬</td>
<td>Start Scanner</td>
<td>Toggles the network scan: If it is currently running, it will be stopped, and vice versa.</td>
</tr>
<tr>
<td>☑</td>
<td>Stop Scanner</td>
<td></td>
</tr>
</tbody>
</table>

While the scanner is stopped, no network load is generated, and no changes to the topology are acquired. In the General Settings dialog you can control whether PRONETA will scan the network only once or continuously upon start of the scanner.

**Graphical View**

The Graphical View is a graphical display of the PROFINET network, its devices and their connections to each other either during a current network scan or from a previously stored reference network.

While over empty space, clicking and subsequent dragging will shift the visible network segment. Hovering the mouse pointer over a device will change the open hand to an arrow and bring up a Device Tooltip with basic information about that device.

**Device Display**

The device status is indicated by different colors of the device symbol and its borders:

- **Field colors:**
  - Light grey with a green bar on top: Regular network device
  - Dark grey: Network device without valid IP address or without valid device name, or generic PC
  - Light blue: PC with active PRONETA or STEP 7
  - Yellow: Device matching the Device Search

- **Borders**
  - Orange: Device parametrization conflict (duplicate IP address or device name)
  - Dark blue: Selected device and corresponding connections
Tool Bar

In the top section of the view, there is a tool bar with a variety of function icons:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Zoom Selection Icon" /></td>
<td>Zoom Selection</td>
<td>Lets you draw a rectangle inside the Graphical View. Once you release the mouse button, the view will zoom to display the rectangle area.</td>
</tr>
<tr>
<td><img src="image" alt="Zoom Fit to Screen Icon" /></td>
<td>Zoom Fit to Screen</td>
<td>Zooms the view back in a way that all network devices fit inside the view.</td>
</tr>
<tr>
<td><img src="image" alt="Zoom Bar Icon" /></td>
<td>Zoom Bar</td>
<td>Zoom into the network or back by dragging the handle to the right or the left, respectively, or clicking on &quot;-&quot; or &quot;+&quot;. (You can also zoom into and out of the Graphical View by placing the mouse over the view and using the scroll wheel.)</td>
</tr>
<tr>
<td><img src="image" alt="Show Physical Connection Types Icon" /></td>
<td>Show Physical Connection Types</td>
<td>Indicates different transmission mediums used in different colors. (See Device Connection Types)</td>
</tr>
</tbody>
</table>

Device Connection Types

If the option “Show Physical Connection Types” from the tool bar has been selected, connections between devices are color-coded as follows:

- Black: Copper Ethernet wiring
- Orange: Fiber optical connection

Two parallel lines indicate a ring topology.

For devices which are displayed without any connection to other devices, the required information could not be gathered.

Device Tooltips

Hovering over a device will bring up a tooltip which displays:

- Device name
- Device type
- IP address
- Firmware Version (where applicable)
Hovering over a device port displays:
- Interface name
- IP address
- Port ID
- Name of the neighbor

Figure 3-14

Device Context Menu

By right-clicking on any device in a Graphical View or in the corresponding Device Table, you can bring up a context menu with various functions.

Figure 3-15

Not all menu entries are available for all devices with the actual entries depending on the state of the device.

Table 3-6

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>🕵️‍♂️</td>
<td>Flash LED</td>
<td>Sets the LEDs on the physical device to flashing for easy identification.</td>
</tr>
<tr>
<td>📋</td>
<td>Start IO Test</td>
<td>Immediately launches an I/O Test Task with the selected device.</td>
</tr>
<tr>
<td>Icon</td>
<td>Name</td>
<td>Function</td>
</tr>
<tr>
<td>------</td>
<td>------</td>
<td>----------</td>
</tr>
<tr>
<td><img src="image" alt="Open Web Browser" /></td>
<td>Open Web Browser</td>
<td>Opens your PCs web browser and establishes a connection to the device’s web server.</td>
</tr>
<tr>
<td><img src="image" alt="Start (Stop) Flashing LED of Duplicates in Name/IP address" /></td>
<td>Start (Stop) Flashing LED of Duplicates in Name/IP address</td>
<td>Like &quot;Flash LED&quot;, but flashes the LEDs of all devices which share their name and/or IP address with the selected device.</td>
</tr>
<tr>
<td><img src="image" alt="Set Network Parameters" /></td>
<td>Set Network Parameters</td>
<td>Opens a popup window which allows you to set various networking parameters of the chosen device. For details, see Set Network Parameters.</td>
</tr>
<tr>
<td><img src="image" alt="Reset Network Parameters" /></td>
<td>Reset Network Parameters</td>
<td>Performs a factory reset of the device’s IP address and device name. If the command is chosen from the Device Table, it is possible to reset several selected devices simultaneously.</td>
</tr>
<tr>
<td><img src="image" alt="Edit Additional I&amp;M Data" /></td>
<td>Edit Additional I&amp;M Data</td>
<td>Opens a popup window which lets you enter data concerning identification and maintenance (&quot;I&amp;M&quot;) of the device, like location and date of the installation.</td>
</tr>
<tr>
<td><img src="image" alt="Use as Starting Point in Graphical View" /></td>
<td>Use as Starting Point in Graphical View</td>
<td>Redraws the Graphical View with the chosen device in the upper left corner.</td>
</tr>
</tbody>
</table>

**Device Table**

This table lists the devices found either during your current network scan (Online mode only), or in a stored reference network.

**Figure 3-16**
The table can display a large amount of different device data. Right-click anywhere in the table header fields to bring up a menu from which you can select the information fields you wish to display.

Figure 3-17

Orange borders around table cells indicate duplicate device names or IP addresses.

Figure 3-18
White cells inside the table allow information to be entered. The new values will be written to the respective device immediately when the cell loses focus. (This is an alternative way to the use of the context menu entry “Set network parameters”)

A left click on a column header will sort the table according to the data in this column in ascending order, another click reverses the order. Small triangles “▲” or “▼” in the column header indicate the sorting criterion.

Dragging a column header with the mouse rearranges the table columns accordingly.

Right-clicking on any table entry brings up the current device context menu.

**Device Details**

In the lower part of the table, a details view for a selected device can be opened and collapsed by clicking the triangular symbol of the view header.

This view shows additional device information complementing the information in the table, in particular port and module configuration data.

Branches of the tree can be opened and collapsed by clicking the triangular symbol of the corresponding branch.

**Figure 3-19**

![Device Table - Online](image)
Set Network Parameters

This popup window allows the immediate input of the following parameters for an individual device:

- Device name
- Static or DHCP IP configuration

Plus, where applicable:

- IP address
- Network mask
- Address of the gateway router

Checking the box “Apply settings permanently” will ensure that the new parameters are retained across a power-off of the device.

Figure 3-20
3.2.2 Offline Mode

Offline mode allows you to examine a reference network which was previously stored to disk, in much the same manner as in Online mode. The main difference is that, as the name implies, Offline mode is strictly limited to reading operations and will never write to your devices.

Figure 3-21

The main screen is divided from left to right in:
- A **Topology List** (1) of previously stored reference networks
- A **Graphical View** (2), and
- A **Device Table** (3) similar to the one in **Online Mode** which displays devices stored in the selected topology.
Function Bar

The following functions are available in the function bar:

Table 3-7

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>📊</td>
<td>Add Topology File</td>
<td>Adds a <a href="#">previously stored topology</a> to the topologies list.</td>
</tr>
<tr>
<td>🗂️</td>
<td>Export Topology</td>
<td>Performs a <a href="#">Topology Export</a> to disk.</td>
</tr>
</tbody>
</table>

Topology Import

Topologies can be loaded from disk into PRONETA in one of three formats:

- As an XML file which has previously been stored from PRONETA
- As an AML file which has been created with TIA Portal
- As a STEP 7 project (versions 5.4, 5.5 or 5.6)

Figure 3-22

In the Import Topology dialog, select the topology file type you want to load, and click "Browse" to search for the corresponding topology on disk.

Note the following when using AML files:

**NOTE**

Currently (TIA Portal V15), the TIA Portal performs only a restricted AML export.

- HMI devices, SINAMICS S and SINAMICS G drives which were configured using Startdrive, are missing from the exported AML file and consequently are not displayed in PRONETA topologies.
- Devices which were configured in the TIA Portal through GSDML files will be displayed in PRONETA topologies, but they can't be compared correctly to devices from an online scan in comparison mode.

For all other devices, the topology is displayed properly and the comparison functions correctly.
Topology List

In this window a list of stored network topologies is displayed. Add more topologies through the commands in the function bar. To remove an entry, right-click in the list and apply the “Remove File” command. Selecting an entry from the list will display this topology in the Graphical View.

Graphical View

The Graphical View is a graphical display of the PROFINET network. For details on its operation, see Graphical View in the Online mode. A right-click on a device in the Graphical View or in the Device Table will bring up the Device Context Menu.

Tool Bar

In the top section of the Graphical View, there is a tool bar with a variety of function icons:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Zoom Selection" /></td>
<td>Zoom Selection</td>
<td>Lets you draw a rectangle inside the Graphical View. Once you release the mouse button, the view will zoom to display the rectangle area.</td>
</tr>
<tr>
<td><img src="image" alt="Zoom Fit to Screen" /></td>
<td>Zoom Fit to Screen</td>
<td>Zooms the view back in a way that all network devices fit inside the view.</td>
</tr>
<tr>
<td><img src="image" alt="Zoom Bar" /></td>
<td>Zoom Bar</td>
<td>Zoom into the network or back by dragging the handle to the right or the left, respectively, or clicking on &quot;-&quot; or &quot;+&quot;. (You can also zoom into and out of the Graphical View by placing the mouse over the view and using the scroll wheel.)</td>
</tr>
<tr>
<td><img src="image" alt="Show Physical Connection Types" /></td>
<td>Show Physical Connection Types</td>
<td>Indicates the transmission medium used in different colors. (See Device Connection Types)</td>
</tr>
</tbody>
</table>

3.2.3 Comparison Mode

Comparison mode serves to compare two networks with each other – usually one will be the physical network as found during the current network scans, and the other one will be a reference network. The reference network in turn can be a saved topology file of a network scan, a network as configured in a STEP 7 project, or AML data.
The main screen is separated into:

- A **Topologies List** (1) of “Topologies for Comparison”
- One major (top) and two smaller (bottom) Graphical Views (2)
- Two **Device Tables** (3) with the devices stored in the selected topologies

A pane border (4) allows for the opening and closing of the bottom Graphical Views and for changing the relative sizes

### Function Bar

The following functions are available in the Function Bar:

**Table 3-9**

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Add Topology File Icon" /></td>
<td>Add Topology File</td>
<td>Adds a previously stored topology to the topologies list.</td>
</tr>
<tr>
<td><img src="image" alt="Export Topologies Icon" /></td>
<td>Export Topologies</td>
<td>Performs a Topology Export to disk.</td>
</tr>
<tr>
<td><img src="image" alt="Set Comparison Criteria Icon" /></td>
<td>Set Comparison Criteria</td>
<td>Selects filter setting for the device comparison.</td>
</tr>
</tbody>
</table>

On the far right of the Function Bar, there are the **Device Search** and the **Scanner Status Indicator**.

### Set Comparison Criteria

The comparison criteria determine which device parameters are used in establishing differences between topologies or devices, respectively. Two devices
are considered “counterparts” to each other only if they have the same values for all the parameters checked in this dialog, and if they fall within the IP address range chosen, if one is defined.

Figure 3-24

Topology List
In this window the current online topology and a list of stored network topologies for comparison is displayed. Add more topologies through the commands in the function bar.

To remove an entry, right-click in the list, and apply the “Remove File” command.

To compare two of the topologies from the list with each other, select both balance icons to the right of the respective topology names. The top entry of the pair will be displayed in the Graphical View and compared to the bottom entry.

The list of topologies displayed here is retained between PRONETA sessions.

Graphical View
The Graphical View is a graphical display of the PROFINET network. For details on its operation, see Graphical View in the Online mode.

Display of Devices without a Counterpart
For devices with a red border, no equivalent counterpart was found in the other topology. Equivalency is determined by the parameters configured through Set Comparison Criteria.

Graphical Views “Overview” and “Details”
The larger view shows an overview of the top network chosen in the topologies list. Below the Overview are two topology Detail Views which highlight any device selected in the overview or the Device Table; the left detail view showing the device in the first topology, the right one showing the corresponding topology configuration in the second one (if there is any).

A red border around a device symbol indicates that differences between the devices in the first and the second network exist. Hovering over such a symbol in either of the detail views brings up a tooltip with more details about the differences.
Figure 3-25

Differences may be the network configuration, module status etc., as configured through Set Comparison Criteria.

Tool Bar

In the top section of the view, there is a tool bar with a variety of function icons:

Table 3-10

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zoom Selection</td>
<td>Lets you draw a rectangle inside the Graphical View. Once you release the mouse button, the view will zoom to display the rectangle area.</td>
</tr>
<tr>
<td></td>
<td>Zoom Fit to Screen</td>
<td>Zooms the view back in a way that all network devices fit inside the view.</td>
</tr>
<tr>
<td></td>
<td>Zoom Bar</td>
<td>Zoom into the network or back by dragging the handle to the right or the left, respectively, or clicking on “-” or “+”. (You can also zoom into and out of the Graphical View by placing the mouse over the view and using the scroll wheel.)</td>
</tr>
<tr>
<td></td>
<td>Refresh Comparison</td>
<td>Starts a new scanner cycle of the network. (As opposed to the Online mode, in Comparison mode the Graphical View is not constantly updated.)</td>
</tr>
<tr>
<td></td>
<td>Change Topology Displayed in Overview</td>
<td>Toggles which of the two selected topologies is displayed in the overview.</td>
</tr>
<tr>
<td></td>
<td>Go to Previous Difference</td>
<td>Selects the previous conflict in a comparison (if there is one).</td>
</tr>
<tr>
<td></td>
<td>Go to Next Difference</td>
<td>Selects the subsequent conflict in a comparison (if there is one).</td>
</tr>
</tbody>
</table>

Device Context Menu

By right-clicking on any device in a Graphical View or in the corresponding Device Table, you can bring up a context menu with various functions.

Not all menu entries are available for all devices with the actual entries depending on the state of the device and the device type.
Table 3-11

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="eye_icon.png" alt="Eye Icon" /></td>
<td>Flash LED</td>
<td>Sets the LEDs on the physical device to flashing for easy identification.</td>
</tr>
<tr>
<td><img src="wrench_icon.png" alt="Wrench Icon" /></td>
<td>Reset Network Parameters</td>
<td>Performs a factory reset of the device’s IP address and device name.</td>
</tr>
<tr>
<td><img src="gear_icon.png" alt="Gear Icon" /></td>
<td></td>
<td>(Available only from the Device Table for devices in the online topology.)</td>
</tr>
<tr>
<td><img src="device_icon.png" alt="Device Icon" /></td>
<td>Use as Starting Point in Graphical View</td>
<td>Redraws the Graphical View with the chosen device in the upper left corner.</td>
</tr>
</tbody>
</table>

Device Tables

On the right side of the Comparison mode window there are two side-by-side device tables. The left table lists the devices found in the first network, while the right table lists the devices of the second network.

Clicking on an entry in either table will focus the corresponding network in the Graphical Views on this device.

3.2.4 Configuration Mode

The Configuration mode provides a semi-automatic mechanism to assign device names from a reference network to all or single devices in a physical network. This provides a quick and reliable method to configure a large number of identical installations (like a series of switching cabinets). The results can then be checked in the Comparison Mode.

The main screen is divided into:

- A Topologies List (1)
- One major (top) and two smaller (bottom) Graphical Views (2)
- A Device Table (3) with the devices stored in the selected topology

---

1 The smaller Graphical View is automatically opened once you have clicked on one of the devices in the main Graphical View or the device tables. You can manually open it by clicking on the arrow symbols on the view divider bar. ((4) in Figure 3-26)
Figure 3-26
**Function Bar**

The following functions are available in the function bar:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>File</td>
<td>Add Topology File</td>
<td>Adds a previously stored topology to the topologies list.</td>
</tr>
<tr>
<td>Match Devices</td>
<td>Match Devices</td>
<td>Tries to find matches between devices in the reference network and in the physical network according to the Matching Criteria in Configuration Mode; found matches are highlighted green.</td>
</tr>
<tr>
<td>Remove All Matchings</td>
<td>Remove All Matchings</td>
<td>Discards results from the last matching operation.</td>
</tr>
<tr>
<td>Assign Device Names</td>
<td>Assign Device Names</td>
<td>Writes the device names from all devices in the reference network, for which a match was found, to the corresponding devices in the physical network.</td>
</tr>
</tbody>
</table>

The last two commands have counterparts in the devices’ context menus. There they do not operate on all devices of the network, but only on the selected device.

**Graphical View**

The Graphical View is a graphical display of the PROFINET network. For details on its operation, see the Graphical View in Online mode.

Device coloring indicates the device’s availability for configuration:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Color</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greyed out</td>
<td>Greyed out</td>
<td>No match for this device from the reference network has been found in the physical network.</td>
</tr>
<tr>
<td>Light grey</td>
<td>Light grey</td>
<td>Matching has not yet been performed, or no unique match for this device has been found in the physical network.</td>
</tr>
<tr>
<td>Green</td>
<td>Green</td>
<td>This device from the reference network has successfully been matched to a device in the physical network, or you have manually matched the devices.</td>
</tr>
</tbody>
</table>

Hovering the mouse pointer over a device will bring up Device Tooltips with basic information about that device.
Tool Bar

In the top section of the view, there is a tool bar with a variety of function icons:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Zoom Selection" /></td>
<td>Zoom Selection</td>
<td>Lets you draw a rectangle inside the Graphical View. Once you release the mouse button, the view will zoom to display the rectangle area.</td>
</tr>
<tr>
<td><img src="image" alt="Zoom Fit to Screen" /></td>
<td>Zoom Fit to Screen</td>
<td>Zooms the view back in a way that all network devices fit inside the view.</td>
</tr>
<tr>
<td><img src="image" alt="Zoom Bar" /></td>
<td>Zoom Bar</td>
<td>Zoom into the network or back by dragging the handle to the right or the left, respectively, or clicking on &quot;-&quot; or &quot;+&quot;. (You can also zoom into and out of the Graphical View by placing the mouse over the view and using the scroll wheel.)</td>
</tr>
</tbody>
</table>

Device Context Menu

By right-clicking on any device in a Graphical View or in the corresponding Device Table, you can bring up a context menu with various functions.

Not all menu entries are available for all devices with the actual entries depending on the state of the device and the Device Type.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Assign Device Name" /></td>
<td>Assign Device Name</td>
<td>Copies the name of the device from the reference topology to its match in the physical network.</td>
</tr>
<tr>
<td><img src="image" alt="Remove Matching" /></td>
<td>Remove Matching</td>
<td>Discards the results of the matching from the Graphical View.</td>
</tr>
<tr>
<td><img src="image" alt="Use as Starting Point in Graphical View" /></td>
<td>Use as Starting Point in Graphical View</td>
<td>Redraws the Graphical View with the chosen device in the upper left corner.</td>
</tr>
</tbody>
</table>

Device Table

This table lists the devices existing in the selected reference network. The handling is similar to the Device Table in Online mode, but all write operations are disabled.

Finding Matching Devices in Configuration Mode

In this mode, matching between devices is determined based on:

- Device ID
- Vendor ID
- Connections between devices

Note that this is fixed and differs from how differences are being determined in Comparison mode – see Set Comparison Criteria.

3.3 I/O Test Task

The I/O Test task serves to check the wiring of a distributed I/O device even before installing a CPU, and to protocol the test results in a quick, error-free and simple manner.
3.3.1 Device Selection Mode

In Device Selection mode, PRONETA shows a symbolic display of all SIMATIC ET 200 devices, SIRIUS Motor Starters and SIPLUS Heating Control Systems which were found during the current network scan.

Prior to the actual test, a device must be selected in Device Selection mode.

A green checkmark indicates that this device is available for I/O Test (i.e. it has a valid IP address and device name). Select the device you want to test by clicking on it. In the right window section, a table with device details (type, network configuration, port and module configuration data, ...) is displayed upon selection, and the selected device is displayed with a blue background.

To proceed to the I/O Test after selecting a device as test candidate, double-click on the device, or select the “I/O Test” tab in the mode bar.

Function Bar

The following function is available in the function bar:

**NOTE** Due to the limitations of Microsoft Windows, PRONETA uses a cycle time of 256 ms for the communication in the I/O Test. This means that, if your installation introduces faster signal changes, these may go unobserved and may be missing in the I/O Event Log, or will only show up intermittently.

**NOTE** For Motor Starter units, the I/O Test is only supported for firmware versions V1.1 and higher.
### 3.3.2 I/O Test Mode

In I/O Test mode, the screen consists of two main views:

- “Device View” (1), a graphical representation of the tested device
- The “Details” table (2) which shows you additional information about the tested device and the test in general.

**Figure 3-28**

Table 3-16

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Refresh Icon" /></td>
<td>Refresh</td>
<td>Performs an immediate update of the network scan</td>
</tr>
</tbody>
</table>
Function Bar

The following function is available in the function bar:

Table 3-17

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Force and Monitor</td>
<td>Activates and deactivates control of the device through PRONETA for the I/O Test.</td>
</tr>
<tr>
<td>Values</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**WARNING**

Manipulating the interfaces on control components can result in sudden movement of the machinery and the electrification of equipment. Physical injury and electrical shock to personnel are consequently possible. Make sure the machinery is in a safe state with no unauthorized personnel within range, before activating the I/O Test.

**NOTE**

To perform the I/O Test, PRONETA establishes a PROFINET application relation (AR) with the target device. Make sure that no other PROFINET controller occupies this connection.

The state of the I/O Test is indicated by the color of the “Device View” and “Details” table header bars:

- Light green indicates the I/O Test is active. In addition, the words “Force Mode” appear at the right of the head bar.
- Dark petrol indicates the I/O Test is inactive.

Device View

**Usage**

The device view shows a symbolic representation of the device you selected for the I/O Test mode. The status and I/O LEDs are updated in real time to reflect the state of the physical device.
To get a larger view of any module click the “+” symbol (1) above the module. A small Popup Window will appear.

Clicking on any of the modules here will show the module’s parameter table in the “Details” view, or highlight the corresponding section, depending on the tab chosen.

Modules with information in their diagnostics buffer are displayed with a red header.

**Digital I/O**

Click on any LED symbol of an output module to toggle the status of the corresponding output. Likewise, voltage applied to any input will light up the corresponding input module LED.

To force digital values, you can also use the “Test Results” tab in the Details View.

**Analog I/O**

Read analog values from input and output modules in the same fashion.

To force analog values, use either the Popup Window or the “Test Results” tab in the Details View.

**NOTE**

Optional plugged connection terminals (3DI/LC modules) of Motor Starter units will only be shown after Force mode has been activated.

**Popup Window (I/O Test)**

**Usage**

Above each module of the device in the Device View, a “+” symbol allows you to open a popup window with a larger symbolic view of the module’s inputs and outputs. If you open several modules, their popups will be arranged in a row within a single window.
Click the close icon “×” in the top right of the popup window segment, or the “−” symbol above the module in the device view, to close the popup for this module again. To close the whole window click the close icon “×” in the top right of the window. To rearrange the modules within the popup window, click the table header of the module in question and drag it to the desired position.

**Digital I/O**

Digital inputs and outputs can be monitored and forced, respectively, by viewing or checking and unchecking the fields corresponding to their connections. Green fields indicate active lines.

**Analog I/O**

For analog modules, symbolic channel names can be entered in the fields next to the indicated channel numbers. These will automatically be copied into the test protocol.

Analog output values can be forced by either entering the numeric value in the corresponding field, or by dragging the slider across the slider bar below. Clicking the symbol next to the field will reset the output to the default value.

**Details Table**

The Details Table consists of four tabs, each with its own function bar:

- **Parameters** to set the module parameters
- **Test Results** to perform and protocol the wiring test for the device
- **I/O Event Log** to monitor regular events like the changes of input and output values of a module
- **Diagnostics** to record irregular system events like the pulling and plugging of modules.
Parameters

This tab gives an overview over the parameter set of the module selected in the device view. Parameters can be only edited while “Force and Monitor Values” is not in operation (see I/O Test Mode, section “Function Bar”).

Figure 3-31

The parameter set can be stored to a file on disk, loaded from a file, and copied and pasted from the windows clipboard to transfer the parameters to a different module.

Function Bar

The following functions are available in the function bar:

Table 3-18

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Save Parameters" /></td>
<td>Save Parameters</td>
<td>Saves the current parameter set of the whole device to disk.</td>
</tr>
<tr>
<td><img src="image" alt="Load Parameters" /></td>
<td>Load Parameters</td>
<td>Loads a previously saved parameter set from disk and assigns it to the current device.</td>
</tr>
<tr>
<td><img src="image" alt="Copy Parameters" /></td>
<td>Copy Parameters</td>
<td>Copies the parameter set of the currently selected module to the Windows clipboard.</td>
</tr>
<tr>
<td><img src="image" alt="Paste Parameters" /></td>
<td>Paste Parameters</td>
<td>A previously copied module parameter set will be pasted from the Windows clipboard to the currently selected module. The icon is greyed if the parameter set in the clipboard does not fit the selected module.</td>
</tr>
</tbody>
</table>
The commands “Save Parameters” and “Load Parameters” transfer parameter sets between devices and are useful to configure a number of identical devices. Opposed to that, “Copy Parameters” and “Paste Parameters” are used predominantly to “clone” module configurations within one device.

Test Results

This tab offers the functionality for the actual I/O Test of the currently selected device.

Figure 3-32

The test table is vertically divided into sections according to the I/O modules present. Each section can be collapsed and expanded again by clicking on the triangle symbol “▶” in the section header.

The test table consists of the following columns:

- “Channel”: The name of the I/O channel as determined by the device.
- “Control”: Forcing status of the selected output. Click on the icons to toggle the status of digital outputs, or drag or enter manually the value for analog outputs. Values entered will be immediately forwarded to the hardware. (For inputs, this field is greyed out and read-only.) Alternatively, you can also change values by clicking on the LED representations of the device view, or by manipulating them in the popup window. This column is only visible while the force mode is active.
- “Symbolic Name”: Arbitrary name, assigned by the tester to the channel. (See note below.)
- “Address”: Arbitrary memory address to which the I/O is mapped. (See note below.)
"Status Wiring": Here the actual results as established by the I/O Test are entered by the tester. Select one of:
- "N.a.": "Not applicable", not tested yet (default)
- "OK": Test result correct, wiring in order
- "Error": Test result wrong, faulty wiring

"Comment": Any additional information you want to add to the test.

**NOTE**

The values for "Symbolic Name" and "Address" serve only as memory aids for the tester. They are not part of the actual configuration of the device and are not checked for correctness.

The I/O Test can be suspended and resumed at a later point in time by saving and loading the protocol.

After completion of the test, the protocol can be stored to document the proper wiring of the device. (See the **Function Bar** for details.)

**Function Bar**

The following functions are available in the function bar:

Table 3-19

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Save Protocol</td>
<td>Stores the results of the current I/O Test to disk (format: CSV), either when the test is completed, or when the test is interrupted.</td>
</tr>
<tr>
<td></td>
<td>Load Protocol</td>
<td>Loads test results of an earlier I/O Test from disk to proceed with testing.</td>
</tr>
<tr>
<td></td>
<td>Reset Test Protocol</td>
<td>Discards the results of the current test and allows you to start over again. All results will be deleted from PRONETA.</td>
</tr>
</tbody>
</table>

**I/O Event Log**

This tab records a log of all regular events (like changes of the values of inputs and outputs) which occurred to the modules while the I/O Test was active.

Clicking on a column header will sort the table accordingly.
Function Bar
The following functions are available in the function bar:
Table 3-20

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>🗑</td>
<td>Save IO Event Log</td>
<td>Stores the event log to disc (format: CSV).</td>
</tr>
<tr>
<td>🗓</td>
<td>Reset IO Event Log</td>
<td>Clears all entries from the current event log.</td>
</tr>
</tbody>
</table>

Diagnostics
The table in this tab shows a record of all irregular events which occurred to the device while the I/O Test was active, like the pulling of modules or a signal wire break.

If the diagnostics buffer contains events pertaining to a module, the corresponding module header in the Device Table will be displayed red.

Clicking on a column header of the table will sort the table accordingly.

Selecting a table entry will highlight the corresponding module in the Device View.
In return, selecting a module in the Device View will highlight the first entry concerning the module in this table.
The table consists of the following columns:

- “Slot”
- “Module”
- “Channel”
- “Symbolic Name” (as entered in the test protocol tab)
- “Description”
- “Details”
- “Time Stamp”

3.4 Settings

In the “Settings” window, there are three different tabs available:

- General Settings
- Network Adapter
- GSDML Manager

These modes are used to adjust the operational details of PRONETA.
3.4.1 General Settings

You can set various parameters in connection with the network scan and visualization here.

Figure 3-35

- “Online Topology”
  - “Automatically assign temporary IP addresses”
  - “Automatically assign temporary device names”

Checking either entry will ensure that all devices which are found during a network scan will automatically have valid IP addresses and/or device names assigned to them. The IP addresses will be taken from the subnet defined by “Subnet network IP address”, and the devices will receive the subnet mask from the respective field. IP addresses and device names are lost when the respective device is powered off.

- “Network Scanner”
  - "Scanner speed”:
    This dropdown menu allows you to adjust the rate at which PRONETA scans the network between "Slow", "Medium", and "Fast". Fast scans will result in shorter network update cycles at the expense of higher network load. "Fast" is the default setting.
  - “Scan network automatically (scanner continually runs)”:
    If this entry is checked, the scanner will be permanently active, unless specifically stopped. This will result in a constantly up-to-date representation of the physical network, but will also create higher traffic loads and may lead to problems with time-critical communications on the
network.
To stop the scanner, use the Scanner Status Indicator’s context menu.
- “Read I&M data of controllers (not recommended for S7-1200 Firmware Version 2.2)”: A PLC may provide additional “Identification and maintenance data”, like order number or Firmware Version.
- “Include devices which do not support PROFINET”: PRONETA can also poll the network for devices which do not support the full PROFINET standard. “Scan IP addresses from … to” gives the range of network addresses that PRONETA will poll for these devices. Using this option and giving large address ranges may result in higher response times of PRONETA and increased network load.
- “Language Selection”: The drop-down menu allows you to change between English and German as the language of PRONETA’s user interface.

**NOTE**
Changes introduced here will take effect immediately. You will not be asked for a confirmation of parameter changes.

### 3.4.2 Network Adapter

Here you can change the network adapter used for PRONETA.

![Network Adapter Selection](image)

A list of Ethernet adapters found on your PC is displayed, chose the appropriate adapter from here.
If no adapter is selected, only offline functionality with PRONETA is available (Offline Mode and the Comparison Mode when comparing two offline topologies).

### 3.4.3 GSDML Manager

GSDML files (“General Station Description Markup Language”) contain information about the features and capabilities of PROFINET I/O devices, like the number of interfaces or supported baud rates. PRONETA comes already with a large number of GSDML files preinstalled. With the GSDML manager you can include support for further devices, and for devices which were only released after the latest PRONETA version.
Figure 3-37

Function Bar

On the top of the screen, the following functions are available from the function bar:

Table 3-21

<table>
<thead>
<tr>
<th>Icon</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>![folder_icon]</td>
<td>Add GSDML File</td>
<td>Lets you add a single GSD file from disk. Clicking on the icon opens a file browsing dialog.</td>
</tr>
<tr>
<td>![folder_icon]</td>
<td>Add GSDML Folder</td>
<td>Lets you add several GSD files in one action by simply designating a folder where the individual GSD files are stored. Clicking on the icon opens a file browsing dialog.</td>
</tr>
<tr>
<td>![earth_icon]</td>
<td>Download GSDML Files for SIEMENS Devices</td>
<td>Will launch a web browser and establish a connection to the SIEMENS industry online support portal where you can download additional GSD files, e.g. for new devices.</td>
</tr>
</tbody>
</table>
4 Working with PRONETA

This chapter gives you a short introduction into different use cases for PRONETA and then leads you through the individual steps to complete your configuration tasks successfully.

The main use cases for PRONETA are:

Table 4-1

<table>
<thead>
<tr>
<th>Use Case</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Give an overview of all PROFINET devices, their configuration and connections in a network</td>
<td>4.2, Displaying the Devices and Topology of a PROFINET Network</td>
</tr>
<tr>
<td>Compare a previously configured topology and the actual physical topology with each other</td>
<td>4.3, Comparing and Configuring Different Topologies</td>
</tr>
<tr>
<td>Configure devices, and transfer data from a previously saved topology or a STEP 7 project file automatically or manually to a different network</td>
<td>4.4, Configuration of the PROFINET Devices</td>
</tr>
<tr>
<td>Automatically collect information about all devices and components installed in a network, and write a comprehensive report of all relevant data to disk</td>
<td>4.5, Creating an Inventory of the Network</td>
</tr>
<tr>
<td>Control the distributed I/O for correct wiring and log the test results to document the plant status</td>
<td>4.6, Testing the Correct Wiring of the Distributed I/O</td>
</tr>
</tbody>
</table>

4.1 Selection of the PRONETA Network Adapter

Before you can work with PRONETA, the network adapter which connects you to the PRONETA network should be selected. To do so, select the command **Network Adapter** from the **Settings** task.

If you do not select a particular adapter, PRONETA will try to reconnect to the adapter used in the previous PRONETA session. If no network adapter is available, PRONETA provides offline functionality only (i.e. **Offline Mode** and **Comparison Mode** in the Network Analysis task).
4.2 Displaying the Devices and Topology of a PROFINET Network

Task
All devices of a physical PROFINET network are to be detected. The relevant information – IP addresses, device names, port connections etc. – are displayed in a Graphical View.
If required, the network configuration is to be adapted.
The current topology is to be saved on the computer for further use.

Implementation
1. Start PRONETA and select the Network Analysis Task (3.2).
2. Select the Online Mode (3.2.1) to get a display of all connected and active devices.

NOTE
Wait until the online scan has found all network devices. This takes a full cycle of the Scanner Status Indicator display.
Depending on the network topology, utilization and size, this can require between a few seconds and a few minutes.

3. Select a device by a single mouse-click on the left side in the Graphical View (1) or in the Device Table (2) on the right side.

Figure 4-2

![Graphical View and Device Table]
4. Open the details view in the right lower part of the Device Table to get information about the configuration of the device.

Figure 4-3

5. If necessary, change the network configuration (IP address, device name) in the **Device Context Menu**, or with a double-click on the device in the **Graphical View**.

Figure 4-4
Figure 4-5

To save the current topology so you can compare it in the future with other network configurations, use the “Export Topology” icon in the header bar.

Figure 4-6

For more details, see Topology Export.

4.3 Comparing and Configuring Different Topologies

Task

It is to be checked whether the physical layout of a PROFINET network matches the specified reference project.

This is particularly useful if, e.g. a number of identical machines or control cabinets are to be commissioned.
NOTE

This use case covers the network configuration, i.e. topology, devices, modules, and IP parameters.

To survey the wiring of the I/O modules, refer to Testing the Correct Wiring of the Distributed I/O (4.6)

Comparing Networks

1. Start PRONETA and select the Network Analysis Task (3.2).
2. Select the Comparison Mode (3.2.3).
3. In addition to the automatically generated Online topology, load one or several reference files (see Import Topology) from disk (1). The reference files may have been previously created with PRONETA (see Online Mode (3.2.1)), TIA Portal, or STEP 7, respectively.

4. By clicking on their respective balances symbols ((2) above), select two entries from the table of “Topologies for Comparison” which you would like to compare with each other.

The chosen topology with the higher position in the topology list—usually the physical network or “Online Topology”– will be displayed in the Graphical View “Overview”, and compared against the second chosen topology. If you select more than two topologies, the “oldest” selected entry will be dropped from the comparison.
To toggle which of the two selected topologies is displayed in the overview, click the "Change Topology Displayed in Overview" icon in the tool bar (1). Any devices in the network which are "mismatched", i.e. which do not match their counterpart in the other network (or which have no counterpart at all), will be displayed with a red border (2).

Clicking on any device brings up two smaller Graphical Views on the bottom of the screen, with the left view (3) displaying the configuration and neighbors for the respective device in the first topology, and the right one (4) displaying the corresponding device (if there is any) from the second network. Use the "Go to Previous Difference" (5) and "Go to Next Difference" (6) icons from the tool bar to systematically proceed through all conflicts found.

In the right section of the screen, two Device Tables are presented for the first (7) and second selected network (8), respectively. Click the "Refresh Comparison" icon (9) to update the Graphical View.

To control which differences are sufficient to constitute a mismatch between two devices, Set Comparison Criteria with the corresponding icon (10).

In the bottom details views, hovering over a mismatched device will bring up a tooltip with detailed information about the differences.
To assign changes to the network devices in the online topology, proceed with **4.4, Configuration of the PROFINET Devices**.

### 4.4 Configuration of the PROFINET Devices

#### Task

Various basic configuration tasks are to be performed on the PROFINET devices, without using any other engineering software like STEP 7 or the TIA Portal.

The following table shows which device parameters are to be set with each of the various tasks, and other details:

<table>
<thead>
<tr>
<th>Parameters</th>
<th>4.4.1 Automatic PROFINET Device Configuration</th>
<th>4.4.2 Manual Configuration of a Single Device</th>
<th>4.4.3 Transfer of the Device Name for a Single Device</th>
<th>4.4.4 Transfer of Device Names for a Whole Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope</td>
<td>All devices</td>
<td>Single device</td>
<td>Single device</td>
<td>All devices</td>
</tr>
<tr>
<td>Lifetime</td>
<td>Temporary</td>
<td>Temporary/Permanent</td>
<td>Permanent</td>
<td>Permanent</td>
</tr>
<tr>
<td>Mode</td>
<td>Automatic</td>
<td>Manual</td>
<td>Manual</td>
<td>Automatic</td>
</tr>
</tbody>
</table>

#### 4.4.1 Automatic PROFINET Device Configuration

**Task**

All devices of the PROFINET network are to be “named”, i.e. given a temporary IP address and/or a temporary device name.

This is particularly useful if a number of devices with factory settings have been added to the network for first-time use.

**Implementation**

For all unconfigured devices found, PRONETA can generate missing IP addresses or device names and assign them automatically to the devices.

1. Select **Settings (3.4)** in the start screen, and switch to the **General Settings (3.4.1)** tab.
2. In the following screen:
   - To assign automatically generated IP addresses to all accessible “unnamed” devices, put a check-mark next to “Automatically assign temporary IP addresses” (1). The addresses generated in this way are from the subnet range given below (2).
   - To assign automatically generated device names to all accessible “unnamed” devices, put a check-mark next to “Automatically assign temporary device names” (3).

Figure 4-10

NOTICE
If you set the respective check-marks, the naming of the device is carried out automatically for all accessible unconfigured devices as soon as you leave the view.
You will not be asked for any further confirmation.

The temporary IP addresses/device names that have been assigned this way remain valid until the devices have run through a reset, or have been disconnected from the voltage supply.

NOTE
The use of temporary device configurations is convenient in the case of using PRONETA to prepare a network before a CPU is installed on it, when later the CPU will assign permanent device configurations to the single devices.
4.4.2 Manual Configuration of a Single Device

Task

A set of temporary or permanent network parameters is to be written to a single PROFINET device manually.

Implementation

To assign arbitrary configuration values to a single device, proceed as follows:

1. In the Network Analysis Task (3.2), select the Online Mode (3.2.1).
2. Highlight the device in the Graphical View, or the Device Table, and open the Device Context Menu with the right mouse button.
3. Select the command “Set Network Parameters”.
4. Set the desired device parameters in the Set Network Parameters dialog that opens up.

The new values can be temporary or permanent, depending on the settings in the parameters dialog.

Or alternatively:

1. In the Network Analysis Task (3.2), select the Online Mode (3.2.1).
2. In the Device Table, enter the new values directly. All editable fields are distinguished by a white background.
4.4.3 Transfer of the Device Name for a Single Device

Task

The device name of a single network device from a reference network is to be copied to one particular device found in the physical network.

Implementation

1. In the Network Analysis Task (3.2), select the Configuration Mode (3.2.4).
2. Open a reference topology with the "Add Topology File" icon from the function bar (1). You may load topology files you created and saved earlier with PRONETA, TIA Portal or STEP 7.

Figure 4-12

3. Use the button "Match Devices" to see for which devices of the reference network there is a match in the physical network.

Figure 4-13
4. If a match between the reference configuration and the physical network has been found, highlight the corresponding device in the top or the bottom left Graphical View, open the Device Context Menu and execute the command “Assign Device Name”.

Figure 4-14

A device name from the reference network will be permanently assigned to the device.

NOTE

After the manual device configuration, the refreshed parameters are not immediately displayed in the Graphical View, but only during the next scan cycle. This can take between a few seconds and a few minutes. To refresh the table immediately, carry out a manual refresh.

4.4.4 Transfer of Device Names for a Whole Network

Task

Device names from an existing topology file or STEP 7 project are to be assigned to all devices on the physical network for which matches are found.

Implementation

1. In the Network Analysis Task (3.2), select the Configuration Mode (3.2.4).
2. Open a reference topology with the appropriate icon (1) from the function bar. You may load:
   a. A topology file you created and saved earlier with PRONETA, or
   b. The topology information extracted from a project created with STEP 7.
3. In the Graphical View of the offline configuration, use the button “Match devices” to see for which devices of the reference network unique matches in the physical network exist. Devices for which no or more than one potentially matching units were found in the physical network are displayed in light grey. Only devices in the physical network with a valid IP address will be considered. See Finding Matching Devices in Configuration Mode for precise criteria on how matches are established.

4. All devices for which matches have been found, or matching was manually performed, are displayed green. To carry out the naming for all these devices automatically, click the “Assign Device Names” button.
4.5 Creating an Inventory of the Network

Task
A detailed inventory of all network devices used in a physical network is to be created.

Implementation
1. In the Network Analysis Task (3.2), select the Online Mode (3.2.1).
2. Wait until a complete network scan cycle has been completed as shown by the Scanner Status Indicator.
3. Click the “Export Topology” icon from the function bar to create a network inventory.
4. In the following popup window, select the file format and contents you want to save. See Topology Export for details.
If you select “Include device details”, information about port configuration and connection partners on the ports will be included. Module information comprises I&M data for all I/O modules installed.

The categories of information saved in the **Topology Export** are the same as currently displayed in the **Device Table**. To filter the inventory data, activate or deactivate individual columns in the Devices Table by right-clicking on the column header in the table and selecting the relevant parameters.

Thus it can be ensured that not only the device type, module structure, IP addresses etc. are saved into the device list, but also information such as the version of the installed firmware, serial numbers etc.
This information is important in the context of a device recall or necessary firmware updates. With a simple search in the inventory file (e.g. with Microsoft Excel or any other spreadsheet software), the devices requiring maintenance can be identified quickly and reliably.

4.6 Testing the Correct Wiring of the Distributed I/O

Task

The hardware in the network is to be analyzed, and sensors and actuators in the network are to be controlled and/or checked for correct wiring, even before a PLC has been integrated.

The results of these tests are logged to document the correctness of the configuration.
4 Working with PRONETA

4.6.1 Checking the Station Configuration

Task

The configuration of the modular distributed periphery ET 200SP/S/MP/M/PRO/AL connected to your devices (that is, I/O modules etc.) is to be checked.

Implementation

You can view the actual module installation of a device at any time in two different ways:

1. In the Network Analysis Task (3.2), select the Online Mode (3.2.1).
2. Highlight the respective device in the Graphical View, or the Device Table.
3. By clicking on the “Details” triangle, open the detail view of the devices list.
4. In the detail view, open the branch “Modules” by clicking its triangle.
5. You can see the module configuration of the selected station. For details, you can open the branches corresponding to the individual slots.

Figure 4-21

2. You get to the same information by switching to the I/O Test Task (3.3) highlighting the respective device in the Device Selection Mode (3.3.1). In the right panel of the screen, module details will be displayed.
4.6.2 Checking the Signal Wiring: “I/O Test”

Task

With the I/O Test, the wiring of the inputs and outputs of the I/Os used are checked to determine whether all devices have been connected correctly. The test results are logged and saved to document the state of the system.

Preparations

1. In the start screen, select the I/O Test Task (3.3).
2. The device to be checked must have a valid IP address and device name. Make sure that this is the case by checking “Automatically assign temporary IP addresses” and “Automatically assign temporary device names” in the General Settings dialog (3.4.1).
3. In Device Selection Mode (3.3.1), click on the module to be tested. In the right-hand part of the window, you can see a table with details of the selected device.
4. To proceed to the I/O Test, select the I/O Test Mode (3.3.2) tab, or double-click on the device icon.

WARNING

Manipulating the interfaces of control components can result in sudden movement of the machinery and the electrification of equipment. Physical injury and electrical shock to personnel are consequently possible. Make sure the machinery is in a safe state with no unauthorized personnel within range, before turning the I/O Test on.
The I/O Test mode window consists of two segments: A **Device View** (1) on the left half of the window, and a **Details Table** (2) on the right half. By dragging the dividing bar (3) between the panes to the left or the right, you can adjust the size of the segments.

**Figure 4-23**

The device view on the left gives you a graphical overview over the device you currently want to test, while the tables on the right side provide you with information about the test progress.

5. Select a module, and click on the “Parameters” tab in the details view to adjust the parameters of the I/O modules to your actual configuration. For example, enter the voltage measurement range for analog signals in the respective field (1) of the table. If you leave a field unchanged, its default value will be used. Repeat this step for all modules you want to check before turning to the actual test procedure.
6. Click the “Force and Monitor Values” (2) icon in the function bar. This will establish a PROFINET application relation to the device. You can now start with the I/O Test for the device.

**NOTE**
At any given time, only one PROFINET application relation (AR) can be established for one device. Make sure that no other PROFINET controller occupies this connection.

**Monitoring the Installation**
When Force mode is established, the header bars of both the device and the details view will turn light green.
You can now monitor the status of digital inputs with the LED representations in the device view of the respective module, while for analog inputs the current value is displayed. Digital outputs can be monitored and forced by watching and clicking on the LED representations.

Use the **Popup Window** for a larger display of the modules by clicking on the “+” symbol (1) above the corresponding module in the device view.

**Performing and Documenting the Tests**

1. Go to the “Test Results” tab in the details view.
2. If you want to continue a previous or incomplete test of a configuration, use the “Load Test Results” (1) icon from the function bar, to pick up your work from where you left. Otherwise, simply begin with the test procedure.

![Figure 4-26](image)

In the “Test Results” tab, you can assign names for the individual connections in the “Symbolic Name” (2) column, and enter the address of the memory image in the “Address” (3) column. These are intended only as memory aids for the tester and have no effect on the actual configuration.

The “Comment” column gives you space for additional comments.

3. Check your wiring by applying different signals to your inputs and setting the outputs, and monitor the effects in your installation.

   In “Status Wiring” (4), enter the respective test result for all connections. By default, all tests are marked “N.a.” (“Not applicable”, untested). Change this to “OK” if everything goes according to plan, or to “Error” if you found any faults.

   Note that reading and writing information to a module interface is possible in several different places. In the image below, the boxed areas (1) – (3) all control
the same module. Use the popup window to get a magnified representation of the interface values.

Figure 4-27

4. Check also which reactions your interventions provoked in the “IO Event Log” and “Diagnostics” tabs of the Details Table.

Figure 4-28

The “IO Event Log” tab (above) records all changes applied to inputs and outputs of the connected modules. The “Diagnostics” tab reflects the state of the device’s diagnostics buffer, which contains error messages like the pulling of a module.
5. Repeat the previous steps for all the modules to be checked.

6. When you are done, save your test results to document the correct state of your installation. (See Topology Export for file formats and contents.)
The protocol containing the test results can be opened for further processing with any spreadsheet software, for example Microsoft Excel. This provides you with a simple and reliable method to test and document your installations wiring. Note that, besides the PC running PRONETA and your PROFINET devices, you do not require any additional hardware or configuration software to perform these tests.
5 Related Literature

Table 5-1

<table>
<thead>
<tr>
<th>Topic</th>
<th>Title / Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>\1\ Siemens Industry Online Support</td>
<td><a href="http://support.industry.siemens.com">http://support.industry.siemens.com</a></td>
</tr>
<tr>
<td>\2\ Download page of this entry</td>
<td><a href="https://support.industry.siemens.com/cs/ww/en/view/67460624">https://support.industry.siemens.com/cs/ww/en/view/67460624</a></td>
</tr>
</tbody>
</table>

6 History

Table 6-1

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Modifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1.0</td>
<td>02/2013</td>
<td>First version</td>
</tr>
<tr>
<td>V2.0</td>
<td>10/2013</td>
<td>Adapted to PRONETA 2.0.8.4</td>
</tr>
<tr>
<td>V2.3</td>
<td>12/2015</td>
<td>Complete rewrite, adaptation to PRONETA 2.3</td>
</tr>
<tr>
<td>V2.4</td>
<td>03/2017</td>
<td>Adapted to PRONETA 2.4</td>
</tr>
<tr>
<td>V2.4.1</td>
<td>10/2017</td>
<td>Minor corrections</td>
</tr>
<tr>
<td>V2.5</td>
<td>03/2018</td>
<td>Adapted to PRONETA 2.5</td>
</tr>
<tr>
<td>V2.6</td>
<td>03/2019</td>
<td>Adapted to PRONETA 2.5</td>
</tr>
</tbody>
</table>