

SIEMENS

SIMATIC

Windows Automation Center WinAC PN Option V4.1

Commissioning Manual

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Safety Guidelines

This manual contains notices which you should observe to ensure your own personal safety as well as to avoid property damage. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring to property damage only have no safety alert symbol.



Danger

indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



Warning

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



Caution

used with the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Caution

used without safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

Notice

used without the safety alert symbol indicates a potential situation which, if not avoided, may result in an undesirable result or state.

When several danger levels apply, the notices of the highest level (lower number) are always displayed. If a notice refers to personal damages with the safety alert symbol, then another notice may be added warning of property damage.

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The device/system may only be set up and operated in conjunction with this documentation. Only qualified personnel should be allowed to install and work on the equipment. Qualified persons are defined as persons who are authorized to commission, to earth, and to tag circuits, equipment and systems in accordance with established safety practices and standards.

Intended Use

Please note the following:



Warning

This device and its components may only be used for the applications described in the catalog or technical description, and only in connection with devices or components from other manufacturers approved or recommended by Siemens.

This product can only function correctly and safely if it is transported, stored, set up and installed correctly, and operated and maintained as recommended.

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We have checked the contents of this manual for agreement with the hardware and software described. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the data in the manual are reviewed regularly, and any necessary corrections will be included in subsequent editions. Suggestions for improvement are welcomed.

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Preface

Purpose of Manual

This manual provides information required to use WinAC Basis V4.1 with PROFINET in the framework of Component based Automation. The WinAC PN Option software represents an expansion of WinAC Basis V4.1 to include the functionality of PROFINET CBA V2.0.

This manual is intended for use by engineers, programmers, and maintenance personnel with general knowledge of automation systems and knowledge of Component based Automation and WinAC Basis V4.1.

Audience

We assume that you are familiar with the following documentation:

- WinAC Basis Version 4.1 documentation (included on the "WinAC Basis V4.1" CD-ROM)
- Component based Automation and SIMATIC iMap documentation (included on the "SIMATIC iMap V2.0" CD-ROM)

Applicability of Manual

This manual is applicable to the WinAC PN Option V4.1 software package.

Scope of Documentation

This manual describes the functionality of Win AC PN Option V4.1, i.e., the use of WinLC in Component based Automation. Information is provided on the following:

- Integration of WinLC in PROFINET communication within the framework of Component based Automation
- Technical specifications for WinLC with PROFINET CBA functionality

See also

Technical Support (Page A-1)

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Product Overview

1.1 New Automation Concept with Component based Automation

What is Component based Automation?

Within the framework of Totally Integrated Automation (TIA), Component based Automation is the concept for implementing modular distributed automation applications based on the open PROFINET standard. This concept enables a distributed automation solution to be created on the basis of ready-made components and partial solutions. The Component based Automation concept meets the demand for increased modularization in machine and plant engineering through extensive decentralization of intelligent processing.

The following figures illustrate how automation solutions are being transformed as a result of Component based Automation.

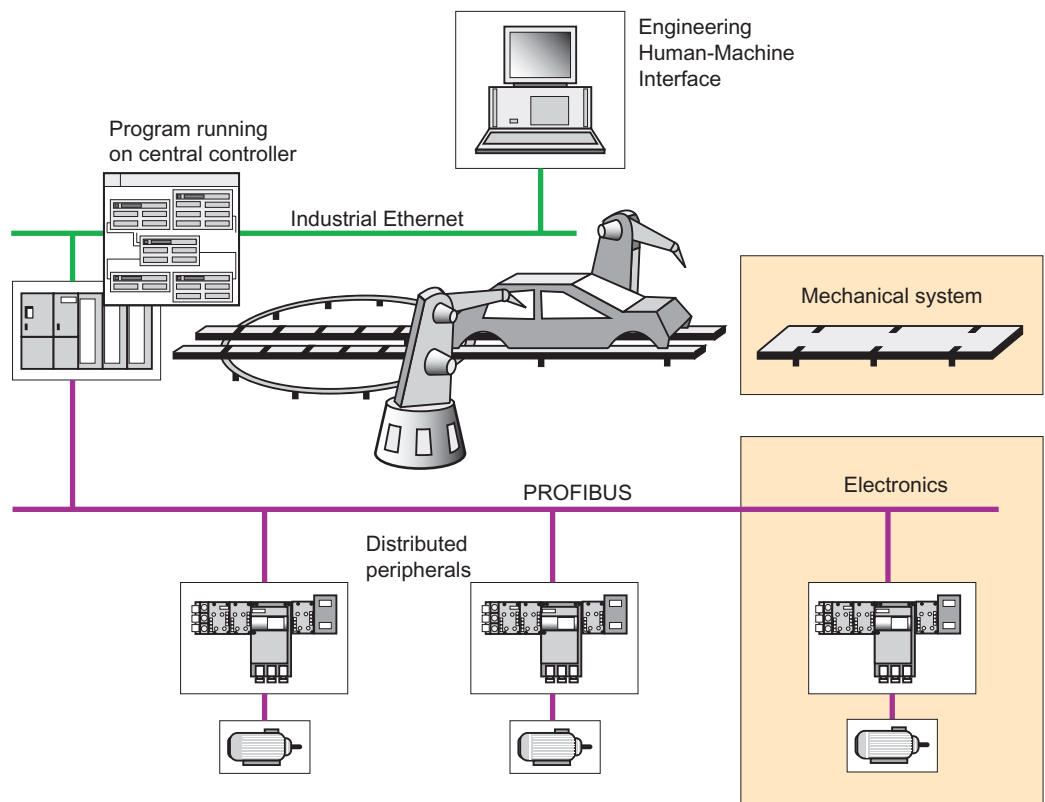


Figure 1-1 Previous Automation Concept with Modular Plant Engineering

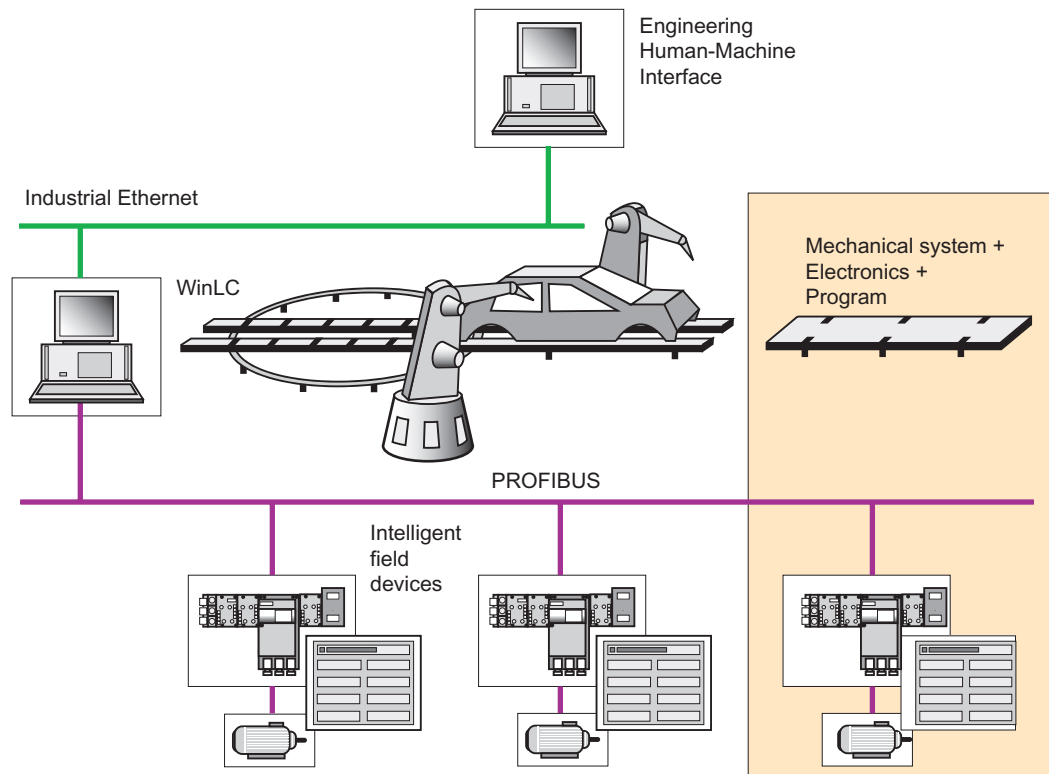


Figure 1-2 New: Modular Concept with Distributed Intelligence

Component based Automation allows the use of complete process-related modules as standardized automation components (so-called PROFINET components) in large facilities.

The implementation of the Component based Automation concept relies on the PROFINET standard for automation devices as well as engineering tools such as SIMATIC iMap.

What is PROFINET?

PROFINET is the Ethernet-based automation standard of the PROFIBUS User Organization e.V. (PNO). The PROFINET standard defines a cross-vendor communication, automation, and engineering model.

The objectives of PROFINET are:

- Open, distributed, automation
- Integrated communication over field bus and Ethernet
- Use of open standards

PROFINET specifies functions for implementing an integrated automation solution, ranging from network installation up to web-based diagnostics. Due to its modular structure, PROFINET can be easily expanded in the future to include additional functions.

Use of PROFINET with Industrial Ethernet and PROFIBUS

The following figure shows the network types that are supported for Component based Automation with PROFINET: Industrial Ethernet and PROFIBUS.

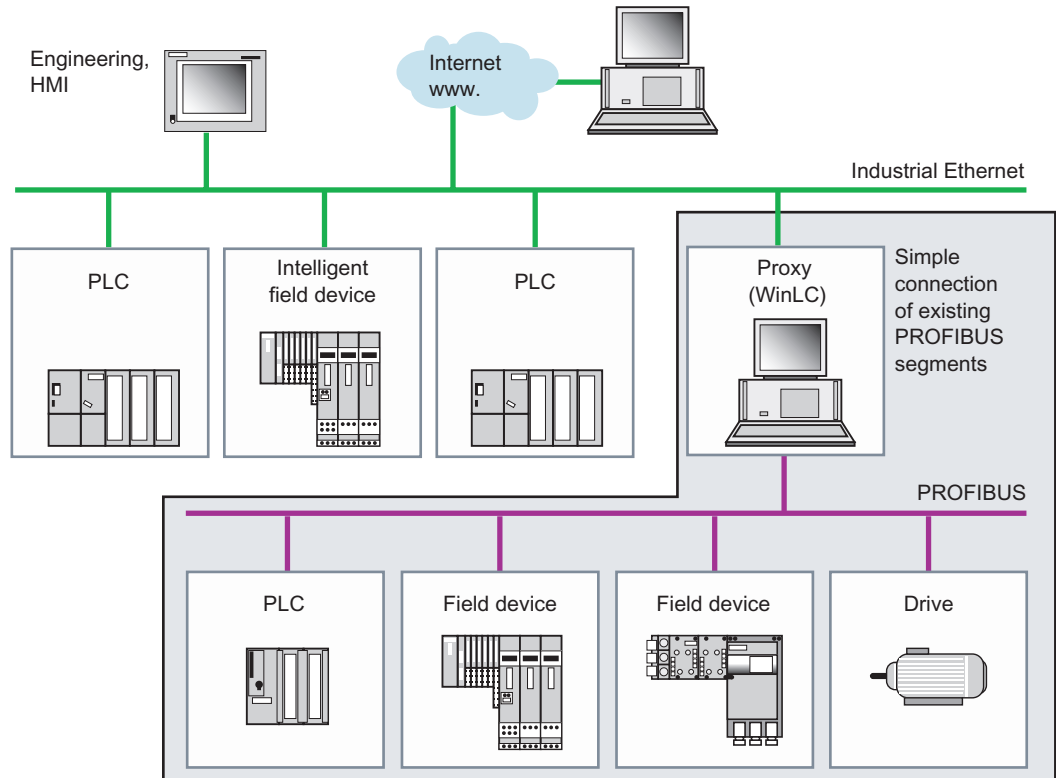


Figure 1-3 Supported Network Types: Industrial Ethernet and PROFIBUS

Communication in PROFINET is via Industrial Ethernet. The following transmission types are supported:

- Acyclic transmission of engineering data and non-time critical data
- Cyclic transmission of time-critical process data

The proxy concept enables trouble-free integration of existing PROFIBUS systems in PROFINET communication. The proxy represents the PROFIBUS devices on the Ethernet.

What is SIMATIC iMap?

PROFINET offers a standardized multi-vendor engineering interface, which enables devices and components from different vendors to be easily integrated into one system.

SIMATIC iMap is an example of a multi-vendor engineering tool for configuring PROFINET applications. It brings together distributed automation applications in a graphical format so that they can be displayed for the entire facility. All of the required PROFINET components are available in a standardized format in the form of library elements. The communication links between the devices are not programmed, but rather are configured graphically in the form of interconnecting lines.

SIMATIC iMap can download the contents of the PROFINET components and the associated interconnections to devices in the facility. During commissioning and while the facility is in operation, you can use SIMATIC iMap to scan the process and the diagnostic data of the devices as well as to modify parameters and project data for testing purposes.

Vendor-specific programming and configuration tools can be integrated in SIMATIC iMap.

Product Range

Currently, the range of Component based Automation products based on the PROFINET standard includes the following:

- PROFINET devices that conform to the PROFINET specification, e.g, SIMATIC CPU 317-2 PN/DP and IE/PB Link.
- Windows Logic Controller (WinLC) with PROFINET functionality installed on a PC.
- SIMATIC iMap, the Component based Automation engineering tool for configuring facilities and interfacing with vendor-specific programming, configuration, and diagnostic tools.

In addition, a wide range of existing automation and field devices from various vendors can be used as PROFINET components.

The PNO has also published specifications for the communication mechanisms and the engineering model. These specifications enable other devices to be made PROFINET-compliant and the associated configuring and programming tools to be interfaced with SIMATIC iMap.

1.2 Introduction to WinAC PN Option V4.1

What are WinAC Basis V4.1 and WinLC?

WinAC Basis V4.1 is the SIMATIC software solution for PC-based control, comprising the Windows Logic Controller (WinLC) and the drivers for CP 5611.

The Windows Logic Controller (WinLC) is a PC-based automation system that allows you to carry out process control tasks from your PC.

What is WinAC PN Option?

WinAC PN Option V4.1 (PN = PROFINET) is an optional package for WinAC Basis V4.1. This optional package expands WinLC to include the functionality of PROFINET V2.0 and integrates WinLC in PROFINET communication within the framework of Component based Automation.

What's New in WinAC PN Option V4.1?

Unlike its predecessor (i.e., WinLC PN V1.1), WinAC PN Option V4.1 contains the complete functionality of WinAC Basis V4.1.

The WinAC PN Option V4.1 software also enables WinLC to support PROFINET V2.0. As a result, a WinLC acting as a PROFINET device offers the following new functions:

- Structure data type permissible for inputs and outputs of process-related functions
- Cyclic transmission of time-critical process data
- Display of device-specific performance parameters in the object properties, e.g., in SIMATIC iMap
- Device utilization check, e.g., in SIMATIC iMap
- Improved diagnostics for interconnections, e.g., in SIMATIC iMap
- Improved diagnostics for specific devices, e.g., in SIMATIC iMap

Order Number

The order number for the WinAC PN Option V4.1 software package is 6ES7 671-0CC03-2YA0.

Installing Software

2.1 Requirements

Hardware Requirements

To set up WinLC in Component based Automation, your PC should meet the following minimum requirements:

- Pentium III processor, 1.2 GHz or higher
- At least 256 MB RAM

Software Requirements

To install WinAC PN Option V4.1, the following conditions must be satisfied:

- Operating system:
 - Windows 2000 Professional Service Pack 3, or
 - Windows XP Professional Service Pack 1
- You must be logged on with Administrator rights.

The following software is required to use WinLC in Component based Automation:

- SIMATIC NET Version 6.2 SP1 or higher – required
- WinAC Basis V4.1 – required
- SIMATIC iMap Version 2.0 for PROFINET configuration (optional)
- STEP 7 Version 5.3 or higher for configuring and programming (optional)

2.2 Installing WinAC PN Option V4.1

Recommended Order of Installation

We recommend that you install the components in the following order:

1. STEP 7 (optional)
2. SIMATIC NET
3. WinAC Basis V4.1
4. WinAC PN Option V4.1
5. SIMATIC iMap V2.0 (optional)

Note

Operation on a remote PC

If you are operating WinLC on a remote PC and using Industrial Ethernet to download data to WinLC, it is not necessary to install STEP 7 and SIMATIC iMap on this PC.

How to Install WinAC PN Option V4.1

1. Place the "WinAC PN Option V4.1" CD in the CD-ROM drive of your computer.
2. If the Autostart option is set on your PC, the installation will start automatically. In this case, skip to Step 6.
If the installation program does not start automatically, go to Step 3 to start the installation program from the CD-ROM.
3. Use the Windows Start menu (Start > Run) to open the "Run" dialog.
4. In the "Run" dialog, click "Browse" and select the installation program (setup.exe) on the CD-ROM.
5. Click "Open" to enter the Setup.exe program in the "Run" dialog.
6. Click "OK" to confirm. This starts the installation program.
7. Follow the step-by-step installation instructions displayed on the screen.
8. In the "SIMATIC WinAC PN Option V4.1 Setup: Components" dialog, select the components you want to install.
9. Place the authorization diskette in Drive A if prompted to do so by the software. The WinAC Basis documentation contains detailed information on installing the authorization.

Result

WinAC PN Option V4.1 is now installed on your PC.

2.3 Uninstalling WinAC PN Option V4.1

How to Uninstall WinAC PN Option V4.1

1. Open the Control Panel, and double-click "Add/Remove Programs".
2. Select "SIMATIC WinAC PN Option V4.1" in the list of installed software displayed. Click the "Change/Remove" button to uninstall the software.
3. If the "Confirm File Deletion" dialog appears, click "No" if you are in doubt.

Caution

Lost authorization

If the authorization for the WinAC PN Option V4.1 software is erroneously transferred or uninstalled, it can be irretrievably lost.

The Readme file on the authorization diskette contains guidelines for installing, transferring, and uninstalling your authorization for the WinAC PN Option V4.1 software. Failure to observe these guidelines may result in irretrievable loss of your WinAC PN Option V4.1 software authorization. Read the instructions in the Readme file on the authorization diskette and observe the guidelines for transferring and uninstalling authorizations.

Use in Component based Automation

Required Steps

In order to integrate WinLC in PROFINET communication, you must do the following:

1. Create a PROFINET component for WinLC in STEP 7.
2. Configure the PROFINET communication in SIMATIC iMap.
3. Start WinLC.
4. Download the configuration data to WinLC.

Steps 1 and 4 are explained below. Steps 2 and 3 are described in detail in the SIMATIC iMap and WinAC Basis manuals.

See also

Creating a PROFINET component (Page 3-14)

Commissioning WinLC (Page 4-5)

3.1 Possible Configurations

PROFINET Capability

The WinAC PN Option V4.1 software enables WinLC to support PROFINET V2.0 and to participate in PROFINET communication as a direct node.

WinLC with PROFINET functionality represents a PROFINET-capable device. It always constitutes a PROFINET component with programmable functionality, i.e., with its own control program.

Hardware Configuration

In order to use SIMATIC iMap to integrate WinLC in PROFINET communication, a PROFINET component must be created with STEP 7. You can create a PROFINET component for WinLC out of a SIMATIC PC station containing the following hardware configuration:

- A WinLC controller with
- An Industrial Ethernet CP, plus
- Locally distributed I/O (optional), e.g., via CP 5613 or CP 5611
- An integrated HMI device on the local PROFIBUS (optional)

The local DP slaves and the local HMI device are not visible on the PROFINET component in SIMATIC iMap.

The station constitutes a unit with a defined function, usually a centralized control function.

3.1 Possible Configurations

Bus Connections

A WinLC with the above configuration that is acting as a PROFINET component has two bus connections, one each to:

- Industrial Ethernet
- PROFIBUS DP in the form of a DP master with proxy functionality using CP 5613 or CP 5611 (optional).

Communication via Industrial Ethernet

To operate WinLC on Industrial Ethernet, you must have either a standard Ethernet card, e.g., 3COM card, or a CP 161x, as well as the associated software and its license (SIMATIC NET SOFTNET PG, V6.2).

Communication via PROFIBUS DP

In order to operate WinLC on PROFIBUS DP, you must insert a CP (communications processor) in the PC for the connection to PROFIBUS DP. Either of the following CPs are suitable for this purpose:

- CP 5611
- CP 5613

Likewise, you can use the CP integrated in SIMATIC PGs/PCs to connect to PROFIBUS DP.

Proxy Functionality

WinLC can be configured as a PROFINET device with or without proxy functionality. As a PROFINET device with proxy functionality, WinLC can also serve as a linking element for non-PROFINET capable DP slaves.

Examples include distributed I/O devices such as ET 200S or ET 200X, which do not support the PROFINET standard. However, these devices can be integrated in Component based Automation in the form of PROFINET components. You can use STEP 7 to create the PROFINET components for these devices and then link these PROFINET components to WinLC, thereby integrating them in PROFINET communication. WinLC thus acts as a proxy for DP slaves that do not support the PROFINET standard.

The figure below shows a WinLC configured as a PROFINET device with proxy functionality and the connected PROFIBUS devices in SIMATIC iMap.

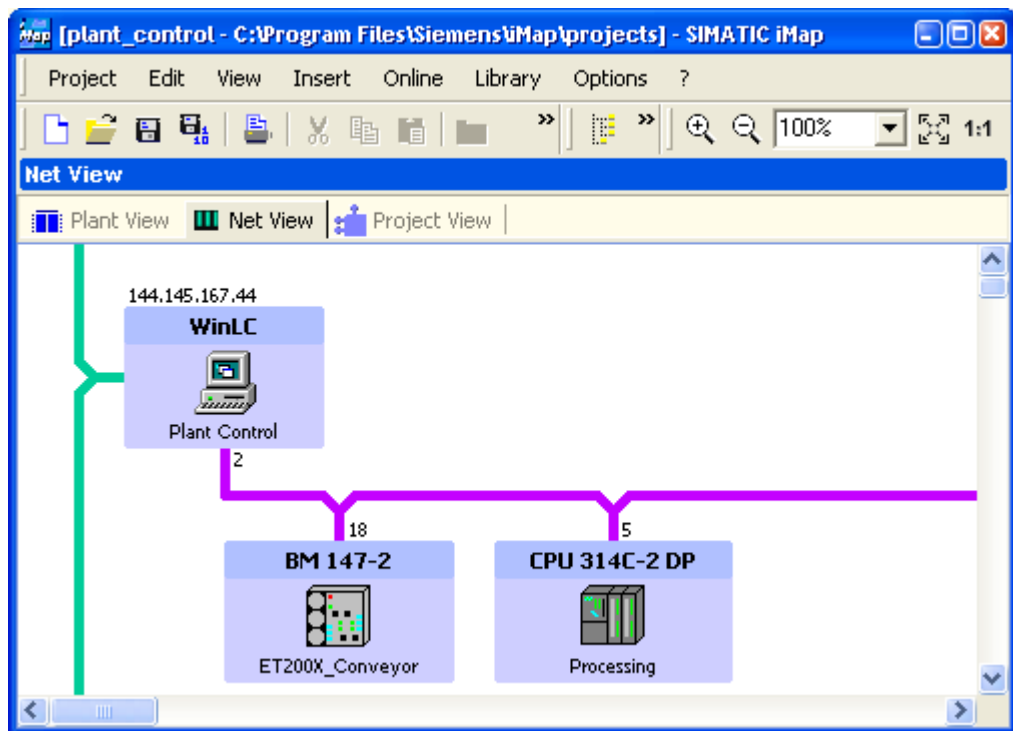


Figure 3-1 WinLC with Proxy Functionality in SIMATIC iMap

Note

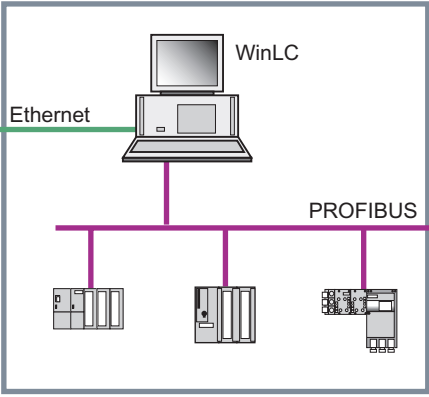
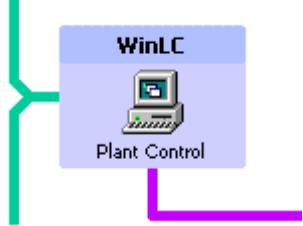
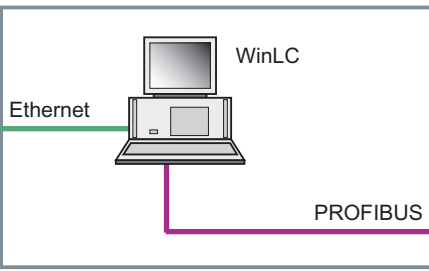

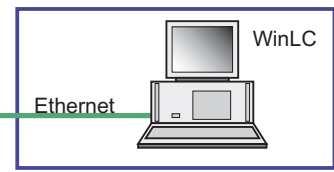

In order to use WinLC as a DP master with proxy functionality, the PROFIBUS CP must be configured as a submodule on an IF slot. For detailed information on configuring a submodule, refer to the section on "Getting Started" in the WinAC Basis V4.1 manual.

3.1 Possible Configurations

Examples of PROFINET Components

The table below presents examples to illustrate the possible hardware configurations for WinLC configured as a PROFINET component. The "HW Configuration" column contains a sample hardware configuration. The "Device" and "Process-Related Function" columns each contain sample displays in SIMATIC iMap.

Table 3-1 Possible configurations with WinLC

Hardware Configuration	Device	Process-Related Function														
<p>WinLC 1 with proxy functionality and local DP master system</p> 		<p>Plant Control</p> <table border="1"> <tr><td>On BOOL</td><td>BOOL Ext_Stop_Out</td></tr> <tr><td>Run_Delay I2</td><td>BOOL Ext_Start_Out</td></tr> <tr><td>Ext_Stop BOOL</td><td>I4 Cnt_Out</td></tr> <tr><td>Ext_Start BOOL</td><td>BOOL Enable</td></tr> <tr><td>Cnt_In I4</td><td>I2 Run_Delay_Out</td></tr> <tr><td>Data_In STRUCT</td><td>STRUCT Data_Out</td></tr> <tr><td></td><td>UI1 Lifestate</td></tr> </table>	On BOOL	BOOL Ext_Stop_Out	Run_Delay I2	BOOL Ext_Start_Out	Ext_Stop BOOL	I4 Cnt_Out	Ext_Start BOOL	BOOL Enable	Cnt_In I4	I2 Run_Delay_Out	Data_In STRUCT	STRUCT Data_Out		UI1 Lifestate
On BOOL	BOOL Ext_Stop_Out															
Run_Delay I2	BOOL Ext_Start_Out															
Ext_Stop BOOL	I4 Cnt_Out															
Ext_Start BOOL	BOOL Enable															
Cnt_In I4	I2 Run_Delay_Out															
Data_In STRUCT	STRUCT Data_Out															
	UI1 Lifestate															
<p>WinLC 2 with proxy functionality</p> 		<p>Plant Control</p> <table border="1"> <tr><td>On BOOL</td><td>BOOL Ext_Stop_Out</td></tr> <tr><td>Run_Delay I2</td><td>BOOL Ext_Start_Out</td></tr> <tr><td>Ext_Stop BOOL</td><td>I4 Counter_Out</td></tr> <tr><td>Ext_Start BOOL</td><td>BOOL Enable</td></tr> <tr><td>Counter_In I4</td><td>I2 Run_Delay_Out</td></tr> <tr><td></td><td>UI1 Lifestate</td></tr> </table>	On BOOL	BOOL Ext_Stop_Out	Run_Delay I2	BOOL Ext_Start_Out	Ext_Stop BOOL	I4 Counter_Out	Ext_Start BOOL	BOOL Enable	Counter_In I4	I2 Run_Delay_Out		UI1 Lifestate		
On BOOL	BOOL Ext_Stop_Out															
Run_Delay I2	BOOL Ext_Start_Out															
Ext_Stop BOOL	I4 Counter_Out															
Ext_Start BOOL	BOOL Enable															
Counter_In I4	I2 Run_Delay_Out															
	UI1 Lifestate															
<p>WinLC 3 without proxy functionality</p> 		<p>Plant Control</p> <table border="1"> <tr><td>On BOOL</td><td>BOOL Ext_Stop_Out</td></tr> <tr><td>Run_Delay I2</td><td>BOOL Ext_Start_Out</td></tr> <tr><td>Ext_Stop BOOL</td><td>I4 Counter_Out</td></tr> <tr><td>Ext_Start BOOL</td><td>BOOL Enable</td></tr> <tr><td>Counter_In I4</td><td>I2 Run_Delay_Out</td></tr> <tr><td></td><td>UI1 Lifestate</td></tr> </table>	On BOOL	BOOL Ext_Stop_Out	Run_Delay I2	BOOL Ext_Start_Out	Ext_Stop BOOL	I4 Counter_Out	Ext_Start BOOL	BOOL Enable	Counter_In I4	I2 Run_Delay_Out		UI1 Lifestate		
On BOOL	BOOL Ext_Stop_Out															
Run_Delay I2	BOOL Ext_Start_Out															
Ext_Stop BOOL	I4 Counter_Out															
Ext_Start BOOL	BOOL Enable															
Counter_In I4	I2 Run_Delay_Out															
	UI1 Lifestate															

Example Plant Configuration with WinLC

The figure below schematically illustrates an example system containing the three possible configurations for WinLC acting as a PROFINET component. Each frame in the figure designates one PROFINET component.

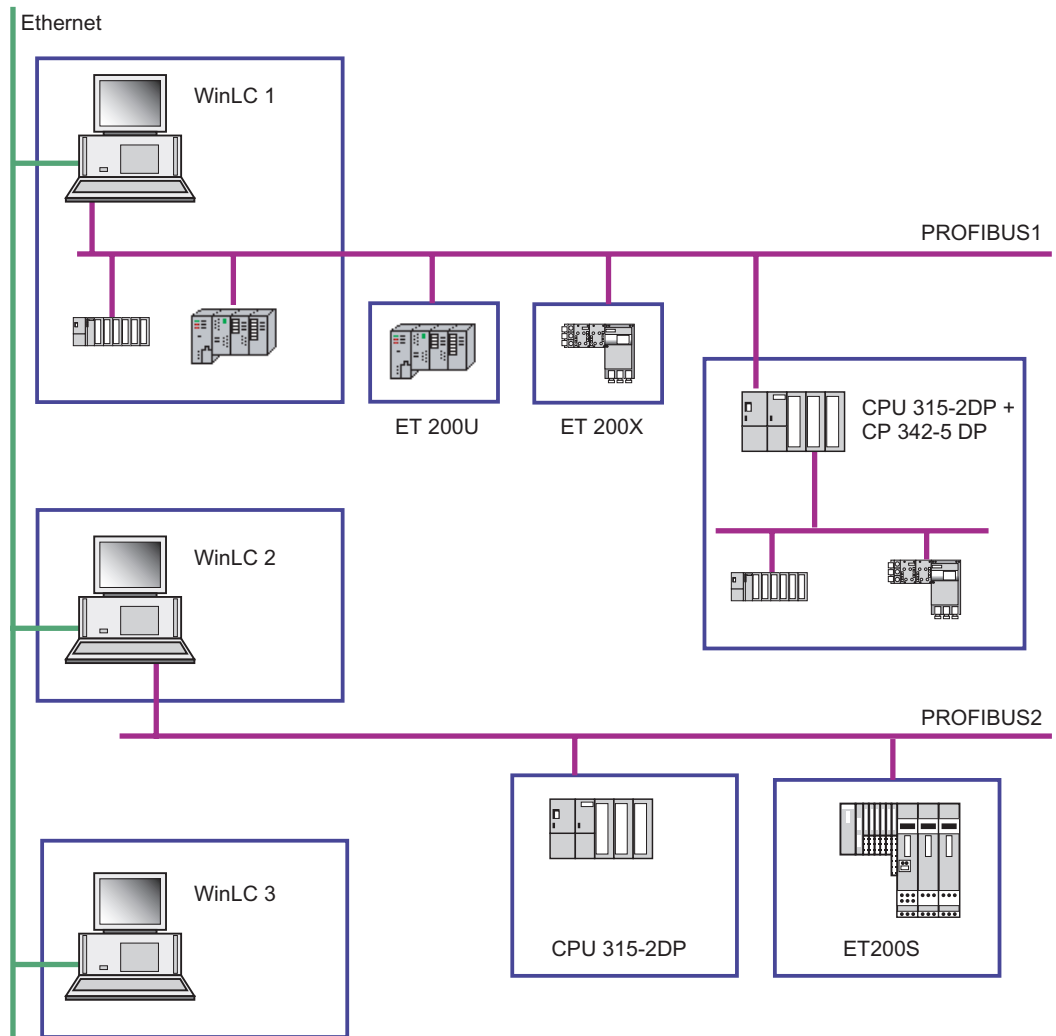


Figure 3-2 Example Plant with WinLC

3.2 Creating a PROFINET Component for WinLC

3.2.1 Basic Approach

Required Steps

The PROFINET component is created using STEP 7. The following basic steps are required to create the PROFINET component:

1. In SIMATIC Manager, create a project for a component and insert a PC station. In HW Config, configure the hardware for the PC station.
2. Create the interface DB for the process-related interface. This defines the inputs and outputs for PROFINET communication.
3. Create the S7 program.
4. Use a menu command to finish creating the PROFINET component and store it in a directory.

The individual steps are illustrated below using an example.

See also

Configuring Hardware (Page 3-6)

Creating an S7 Program (Page 3-10)

Creating a PROFINET component (Page 3-14)

3.2.2 Configuring Hardware

Configuration of a PC Station with WinLC

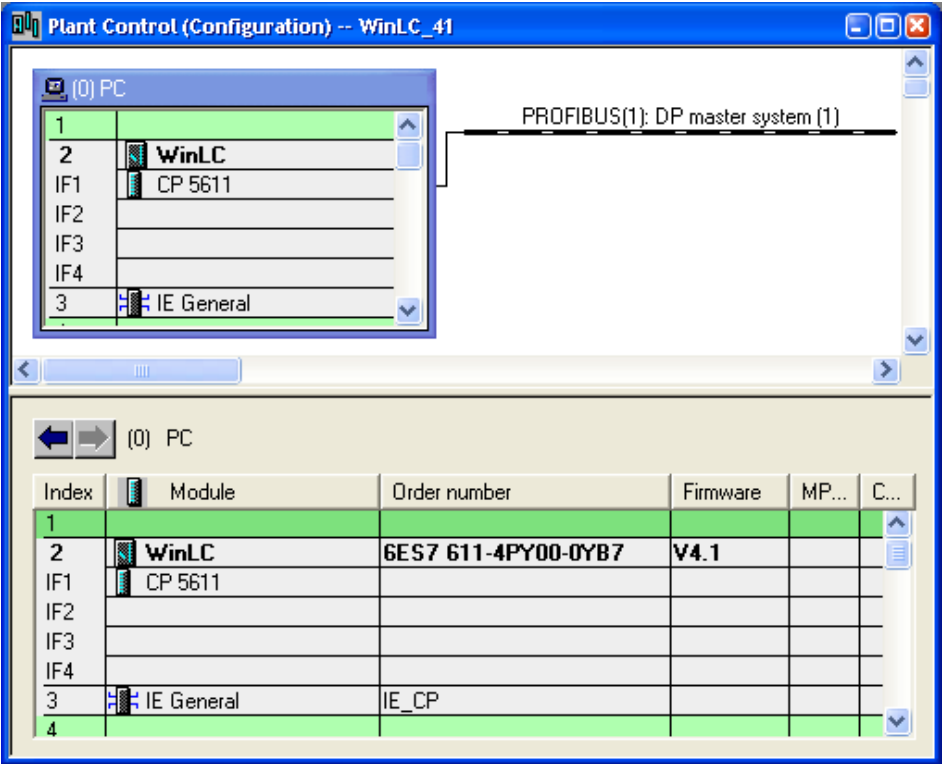
The configuration must contain the following modules:

- WinLC V4.1
- IE General CP for Industrial Ethernet - required
- CP 5611 or CP 5613 for PROFIBUS DP as a submodule on an IF slot (optional). The PROFIBUS CP is required for configuration of WinLC as a DP master with proxy functionality.

Rules for Configuration of CPs

- The IE General CP for Industrial Ethernet must be configured in the virtual rack on a module slot and not on an IF slot.
- A maximum of one PROFIBUS CP can be configured on an IF slot.

How to Configure the Hardware

Step	Procedure
1.	Create a project in SIMATIC Manager and insert a SIMATIC PC station. Assign a name of your choice.
2.	Configure the hardware according to the image below: 
3.	Configure a DP master system for the PROFIBUS CP and network it.
4.	Save the hardware configuration and close HW Config.

3.2.3 Creating an Interface DB

PROFINET Interface

The PROFINET interface is the process-related interface of the PROFINET component that can be used for communication with other PROFINET components. The description of this interface must be included in the STEP 7 Basic project at the time that the PROFINET component is created. The interface description is always stored in the STEP 7 Basic project in a data block, i.e., the interface DP. The interface DB is created in STEP 7 using the PROFINET interface editor.

When the PROFINET component is created, the structure of the interface, i.e., the number of inputs and outputs and their properties, is determined from this interface DB.

Requirement

Before you can create an interface DB, the hardware configuration of the PC station must be closed.

How to Create the Interface DB

Step	Procedure
1.	In SIMATIC Manager, select the PC station and select Create PROFINET Interface from the shortcut menu. The "New/Open PROFINET Interface" dialog is displayed.
2.	Select WinLC in the left pane of the "New/Open PROFINET Interface" dialog. Select "New" and click "OK" to confirm. Result: A dialog is displayed containing the properties of the new block to be created.
3.	In the "Name and Type" field, enter the block number, e.g., DB100, and select "Global DB" as the block type. Click "OK" to confirm. Result: The interface DB is displayed in the PROFINET interface editor.
4.	Enter the inputs for the process-related function in the PN_Input section and the outputs in the PN_Output section. Then assign the following features to the entries: Name, data type, configurable, HMI/MES Result: The configurable PROFINET interface connections (process-related function) are in the right pane of the interface editor, as graphically displayed in the system view of SIMATIC iMap.
5.	Save the PROFINET interface DB using the File > Save menu command.

Result

The interface DB is stored in the block container of the PC station.

The figure below shows an sample interface DB in the PROFINET interface editor.

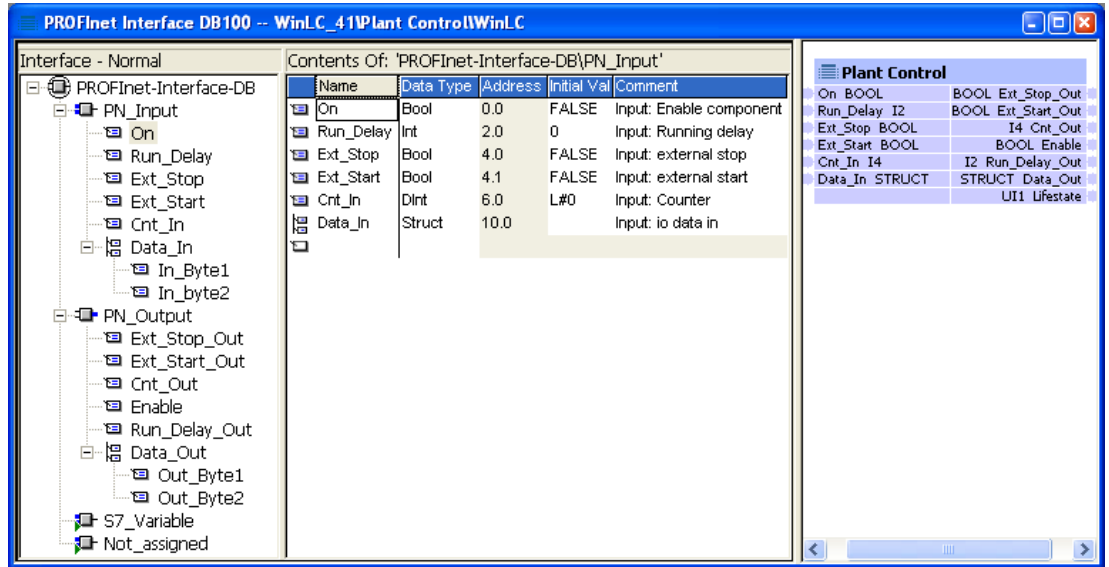


Figure 3-3 Interface DB for WinLC

Additional Information

For additional information on the interface DB, refer to the "Properties of PROFINET Interface" topic in the basic Help for SIMATIC iMap or SIMATIC Manager.

3.2.4 Creating an S7 Program

S7 Program

You create the S7 program for WinLC in STEP 7. When the S7 program is to be used in Component based Automation, you must also take into account the PROFINET interface DB in the S7 program.

How to Create the S7 Program

Step	Procedure
1.	Copy all of the blocks from the "WinLC PN" block container in the PROFINET System Library to the block container for the PC station containing WinLC.
2.	<p>Create the program. An excerpt from OB1 is reproduced below as an example. The reference to the PROFINET interface DB is clear from this example (see "Creating an Interface DB").</p> <pre> ... //forwards RunDelay to ORunDelay L "PN_Interface_DB".RunDelay T "PN_Interface_DB".RunDelay_Out //forwards EStop to OESStop A "PN_Interface_DB".ExtStop = "PN_Interface_DB".Ext_Stop //increments OCnt if Cnt==OCnt L "PN_Interface_DB".Cnt_In L "PN_Interface_DB".Cnt_Out <>D JC GO L "PN_Interface_DB".Cnt_Out L 1 +D T "PN_Interface_DB".Cnt_Out GO: NOP 0 ... </pre>
3.	Compile and test the S7 program.

Required Blocks

In order to respond to events, the S7 program of the PC station containing WinLC must include the following organization blocks:

- OB82 diagnostic interrupt – e.g., if a DP slave is switched to STOP or RUN mode
- OB85 program execution error – for errors occurring when the process image is updated upon failure of a DP slave
- OB86 rack failure – if the connection to a DP slave is interrupted

If these blocks are not present, the WinLC controller goes to STOP mode in the event of an error. When this occurs, it can no longer satisfy its proxy functionality for the interconnected PROFIBUS devices. If the error OBs are present (even if they have no content), WinLC will continue to run when an error occurs. If required, an appropriate error response must be programmed in the error OBs.

Updating the PROFINET Interface during Runtime

There are two options for updating the PROFINET interface during runtime:

- Automatic update at the cycle control point (presetting)
- Update by the user program using the SFC 112 and SFC 113 system functions (copy blocks)

In the first case, the PROFINET interface is automatically updated at the cycle control point, i.e., at the time when the process image is updated. In the second case, the user program must be adapted.

The SFC 112 and SFC 113 system functions can be used to update the PROFINET interface at a particular time, e.g., controlled by means of a time interrupt. Because the update does not take place each time at the cycle control point but at longer time intervals, the overall dynamic response of the CPU is improved.

Updating the PROFINET Interface via the User Program

To update the PROFINET interface at a particular time, call SFC 112 and SFC 113 e. g. in a time interrupt OB. This is illustrated in the figure below using OB35 as an example.

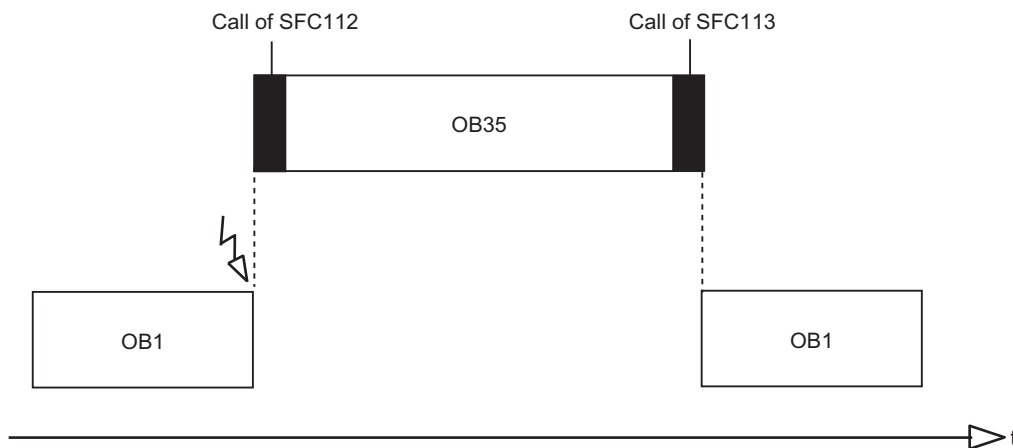


Figure 3-4 Updating via the User Program (SFC 112, SFC 113)

Call of SFC 112:

```
CALL "PN_IN"           // Update SFC112 inputs of PROFINET interface
DBNO := W#16#100      // DB number of PROFINET interface DB
RET_VAL:=MW10         // Error information, return value
```

Call of SFC 113:

```
CALL "PN_OUT"         // Update SFC113 outputs of PROFINET interface
DBNO := W#16#100      // DB number of PROFINET interface DB
RET_VAL:=MW10         // Error information, return value
```

Note

Relationship to configuration in SIMATIC iMap

To ensure that every value change in the PROFINET interface is actually transferred, the transmission interval in SIMATIC iMap must be configured double as fast as the update time of the PROFINET interface in the S7 program (e.g. watchdog).

Example

When the update of the PROFINET interface in the S7 program is performed every 100 ms, the configured time for the 'fast' transfer frequency in the SIMATIC iMap project properties should not be slower than every 50 ms.

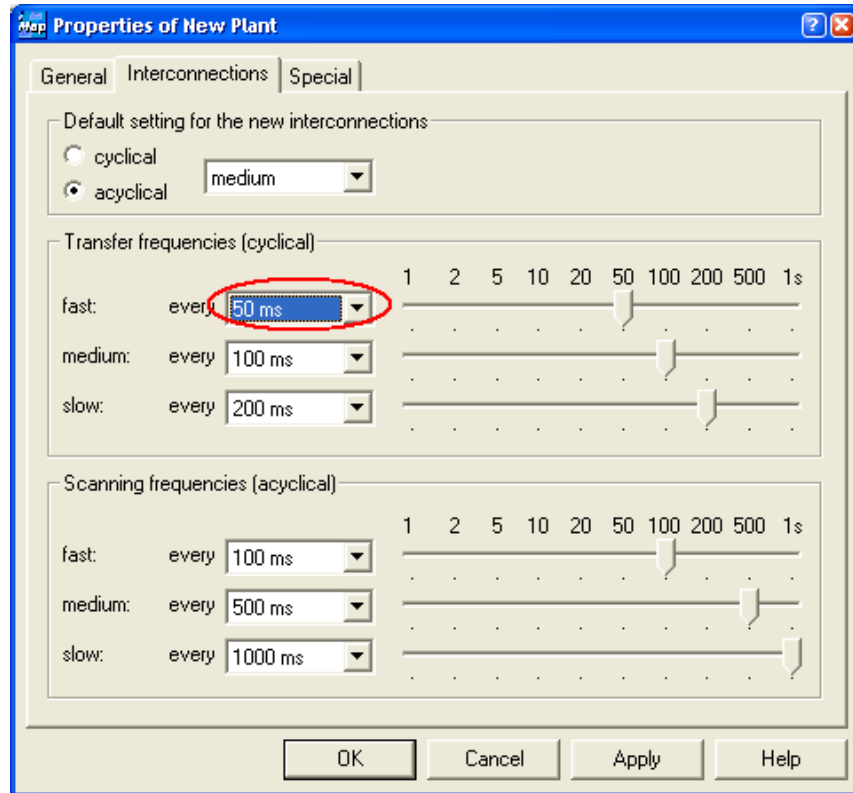


Figure 3-5 Transmission Properties in SIMATIC iMap

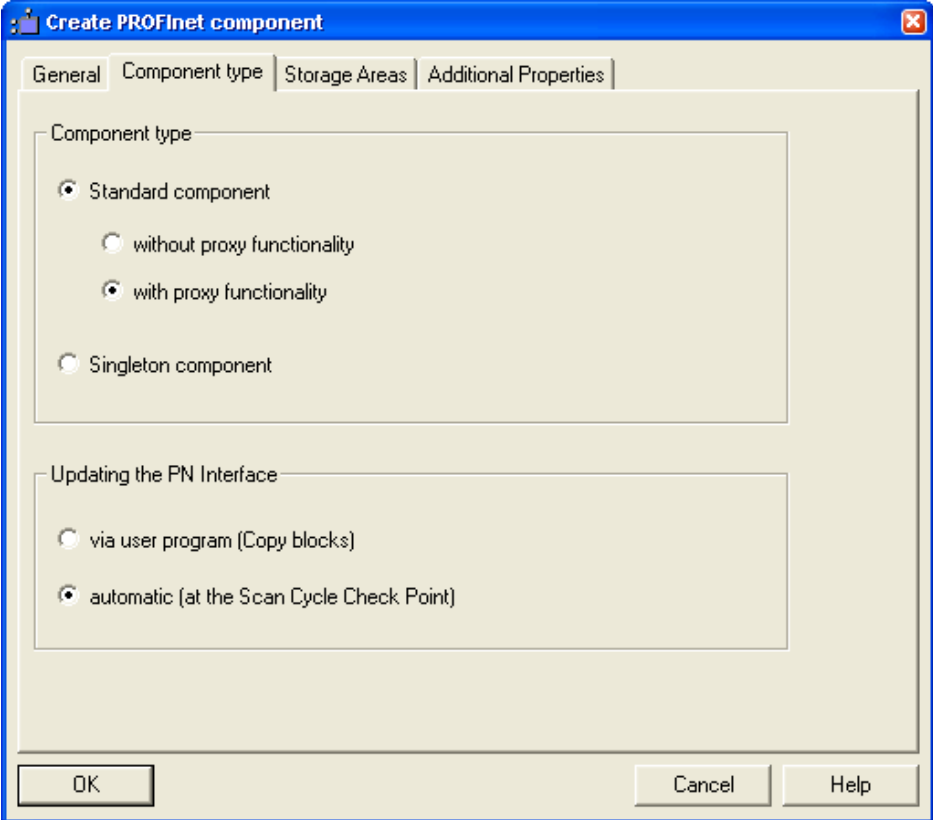
3.2.5 Creating a PROFINET component

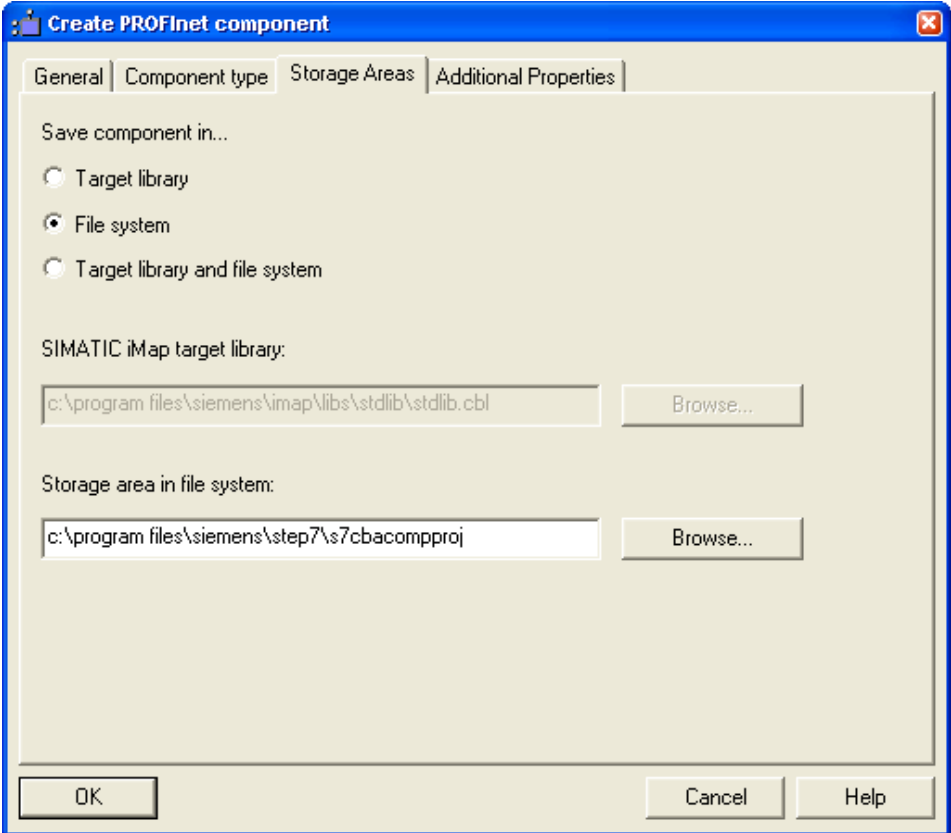
Requirements

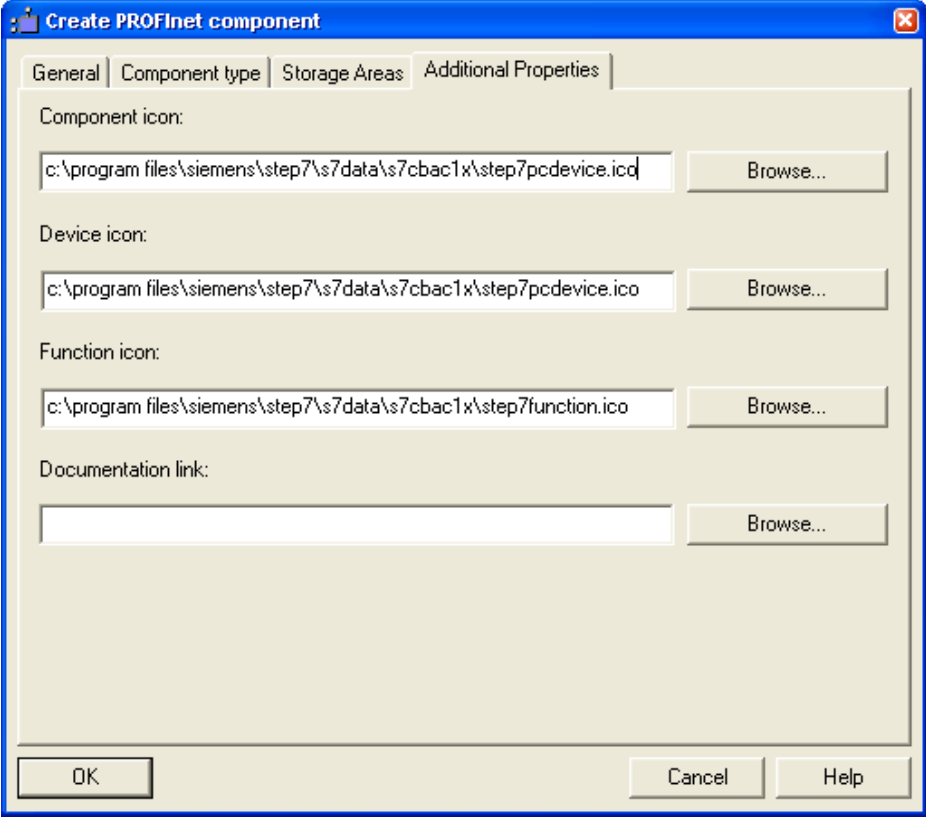
- The hardware configuration for the PC station is finished.
- The S7 program including the interface DB is created and tested.

How to Create the PROFINET Component

Step	Procedure
1.	In SIMATIC Manager, select the SIMATIC PC station and select Create PROFINET component in the shortcut menu.
2.	In the "General" tab, select the "Identification, New" option, and enter a name, e.g., "Plant Control". <div data-bbox="464 853 1398 1673" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> </div>

Step	Procedure
3.	<p>In the "Component Type" tab, select:</p> <ul style="list-style-type: none">• "Standard component with proxy functionality"• "Update PN interface - automatically (at cycle control point)"  <p>The screenshot shows a dialog box titled "Create PROFINET component" with four tabs: "General", "Component type", "Storage Areas", and "Additional Properties". The "Component type" tab is active. It contains two sections: "Component type" and "Updating the PN Interface". In the "Component type" section, "Standard component" is selected, and within it, "with proxy functionality" is selected. In the "Updating the PN Interface" section, "automatic (at the Scan Cycle Check Point)" is selected. At the bottom, there are "OK", "Cancel", and "Help" buttons.</p>

Step	Procedure
4.	<p>In the "File Location" tab, enter any path.</p> 

Step	Procedure
5.	<p>In the "Additional Properties" tab, enter the paths for the Icon files and the path for the documentation link.</p>  <p>If required, you can use the icons supplied (preset path: Step7\s7data\s7cbac1x).</p>

Result

The PROFINET component will be stored as an XML file at the specified file location along with the archived component project.

Optional: Updating via User Program

In the "Component Type" tab, select the "By user program (copy blocks)" option in the "Update PN interface" field in order for the PROFINET interface to be updated during runtime at a time specified by you. In this case, the SFC 112 and SFC 113 system functions are called in the user program (see "Creating an S7 Program").

See also

Creating an Interface DB (Page 3-8)

3.2.6 Notes on Use of Basic Projects from Earlier Versions

Compatibility with WinLC PN V1.1

In order to reuse a STEP 7 Basic project of an old WinLC V1.1 component for WinAC PN Option V4.1, you must update it in STEP 7 V5.3 as follows:

1. Insert a new PC station in the STEP 7 Basic project and configure WinLC V4.1 in HW Config (see "Configuring Hardware).
2. Copy the S7 program of the old WinLC PN V1.1 PC station to the new PC station. You can also make the following changes:
 - Update the PROFINET interface (e.g., expand the interface to include STRUCT type connections) and save it using the PROFINET interface editor.
 - If applicable, adapt the S7 program to the modified PROFINET interface.
 - SFC 112 and SFC 113 must be integrated into the S7 program.
3. Create a PROFINET component out of the new PC station (see "Creating a PROFINET Component").

The newly created PROFINET component can be configured in SIMATIC iMap V2.0 and downloaded to the target WinLC V4.1 device.

See also

Configuring Hardware (Page 3-6)

Creating a PROFINET component (Page 3-14)

Commissioning WinLC

4.1 Introduction

Configuration Types with WinLC

This section describes the basic procedure for commissioning WinLC. There are two configuration types.

Configuration 1

STEP 7 and SIMATIC iMap are installed on the local engineering PC while WinLC is installed on a remote PC.

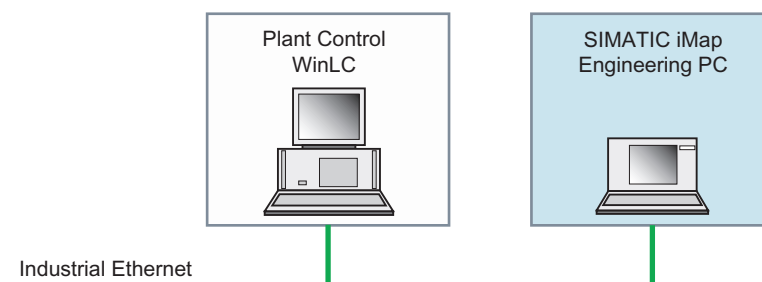


Figure 4-1 Configuration 1

Both the local engineering PC and the remote PC with WinLC installed must be configured.

Configuration 2

STEP 7, SIMATIC iMap, and WinLC are all installed on the local engineering PC.

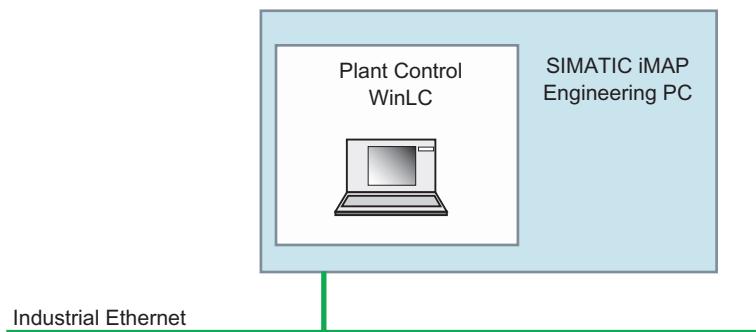


Figure 4-2 Configuration 2

The local engineering PC with WinLC installed must be configured.

See also

Configuring an Engineering PC with WinLC Installed (Page 4-3)

Configuring the Engineering PC without WinLC Installed (Page 4-4)

Commissioning WinLC (Page 4-5)

4.2 Configuring an Engineering PC with WinLC Installed

If WinLC is installed on the local engineering PC, the online connection between SIMATIC iMap and the devices in the facility is controlled by means of the WinLC Station Manager. Therefore, in this case, the local PC station must be configured accordingly.

How to Configure the PC with WinLC installed

1. Open the Station Configuration Editor using
 - the icon in the taskbar or the
 - **Start > Programs > Autostart > Station Configuration Editor** menu command.
2. Add the Industrial Ethernet CP.
3. If the PC has a PROFIBUS CP: Insert the PROFIBUS CP in an IF slot.
4. Make sure that the indices of the modules in the Station Configuration Editor are identical to the slot numbers in the STEP 7 Basic project (HW Config). This applies to WinLC as well as to the Industrial Ethernet CP and the PROFIBUS CP, if present.
5. Apply any changes and close the Station Configuration Editor.

PG/PC Interface Settings

There are two scenarios for the PC with WinLC installed, depending on the PG/PC interface settings:

- If the access point of the "S7ONLINE (STEP 7) application is set to "PC internal (local)," the Station Manager is used to configure the online connection between SIMATIC iMap and WinLC. In this case, the station name in the Station Configuration Editor must be identical to the device name of the WinLC component in the network view of SIMATIC iMap.
- If the access point of the "S7ONLINE (STEP 7) application is set to "TCP/IP," the online connection between SIMATIC iMap and WinLC is configured on the basis of the IP address. In this case, you can assign any device name for the WinLC component in the network view of SIMATIC iMap.

4.3 Configuring the Engineering PC without WinLC Installed

Requirements

If WinLC is not installed on the engineering PC, the two computers must be connected via Ethernet. SIMATIC NET must be installed on both PCs (see "Installation, Requirements").

How to Configure the Engineering PC (without WinLC installed)?

1. Check the settings using the configuration console. On the Windows taskbar, select **Start > SIMATIC > SIMATIC NET > Settings > Set PC Station**. Result: The configuration console is displayed.
2. Under "Modules," select the Ethernet module of the computer.
Under "General," the operating mode must be set to "PG mode."
3. Select the "Access points" and check the following setting: The access point for the "S7ONLINE (STEP 7)" application must be set to "TCP/IP."
4. Apply any changes and close the configuration console.

See also

Requirements (Page 2-1)

4.4 Commissioning WinLC

To commission WinLC for Component based Automation, you must configure the PROFINET communication in SIMATIC iMap and then download the configuration data to the WinLC.

Requirements

- The PROFINET component for WinLC must have been created with STEP 7 (see "Creating a PROFINET component").
- The PC station with WinLC installed must be configured properly.
- WinLC must be started.

How to Commission WinLC

Perform the steps below in SIMATIC iMap.

1. Configure an instance of the PROFINET component. Assign the IP address, subnet mask, and, if applicable, the station name of the local PC station to the device (according to the PG/PC setting).
2. Interconnect the process-related function.
3. If applicable, link the PROFIBUS devices (DP slaves) to the PROFIBUS.
4. Generate the project in SIMATIC iMap using **Project > Generate > Control Section > Changes Only**.
5. Select WinLC and download the configuration data to the WinLC target device using **Online > Download Selected Devices > All**.
6. If applicable, select the linked PROFIBUS devices and download the configuration data to the intelligent DP slaves using **Online > Download Selected Devices > All**.

Result

The WinLC controller is ready to operate and can be monitored and diagnosed online using SIMATIC iMap.

Saving the PROFINET Configuration Data

The PROFINET configuration data are saved along with the configuration data and the control program. The data can be placed in an archive file (*.wld) and later restored (see section on "Archiving and Restoring Control Programs" in the "WinAC Basis V4.1" manual).

The PROFINET configuration data include the data and transmission parameters for connections as well as the interconnections for WinLC and, if applicable, the linked PROFIBUS devices.

See also

Creating a PROFINET component (Page 3-14)

Technical Specifications

This section presents the primary technical specifications for WinLC when used in Component based Automation with PROFINET

Note

All other relevant technical specifications of WinLC can be found in the WinAC Basis Version 4.1 documentation.

Technical Specifications of WinLC with PROFINET

Table 5-1 General Technical Specifications

General technical specifications as for WinAC Basis	
Engineering system	STEP 7, V 5.3
Possible communication connections (via communication processors in the PC)	<ul style="list-style-type: none"> • Industrial Ethernet • PROFIBUS DP
Hardware configuration	As for WinLC in WinAC Basis
Routing capability	Yes
Maximum response time before substitute values are applied	
- Acyclic transmission	2 x sampling frequency interval x ping factor (ping factor is set to 10 by default)
- Cyclic transmission	3 x transmission frequency interval

Table 5-2 Performance parameters

PROFINET Funktionalität	
- PROFINET CBA	yes
- PROFINET IO controller	no
- PROFINET runtime version	V2.0.0.0
PROFINET CBA	
- acyclic transmission	yes
- cyclic transmission	yes
Number of remote interconnection peers, max.	150
Total number of connectors master/slave	4400
Data length of all input Master/Slave connectors	32000 Byte
Data length of all output Master/Slave connectors	32000 Byte
Data length for arrays and structures (acyclic interconnection), max.	1400 Byte
Data length for arrays and structures (cyclic interconnection), max.	450 Byte
Data length for arrays and structures (local interconnection), max.	1400 Byte
- CP 5611	32 Byte
- CP 5613	244 Byte
Data length for arrays and structures (local interconnection), max. /Note	Slave-dependent
Remote interconnections with acyclic transmission	
Sample frequency: sample interval, min.	20 ms
Number of input interconnections	240
Number of output interconnections	240
Data length of all input interconnections	6400 Byte
Data length of all output interconnections	6400 Byte
Remote interconnections with cyclic transmission	
Transmission frequency: transmission interval, min.	10 ms
Number of input interconnections	240
Number of output interconnections	240
Data length of all input interconnections	3200 Byte
Data length of all output interconnections	3200 Byte
HMI variables via PROFINET (acyclic)	
Update HMI variables	100 ms
Number of HMI variables, max.	400
Data length of all HMI variables, max.	6400 Byte
PROFIBUS Proxy Funktionalität	
supports	yes
Number of coupled PROFIBUS devices	
- CP 5611	32
- CP 5613	64
Number of device-internal and PROFIBUS interconnections	2400
Data length of all device-internal and PROFIBUS interconnections	20000 Byte

Appendix

A.1 Technical Support

SIMATIC Technical Support

You can obtain Technical Support for all A&D products in any of the following ways:

- E-mail: adsupport@siemens.com
- Telephone: +49 (0) 180 5050 222
- Fax: +49 (0) 180 5050 223

Additional information on our Technical Support can be found on the Internet at:

www.siemens.com/automation/service&support

Service & Support on the Internet

In addition to our documentation service, you can also access our complete knowledge base online on the Internet at:

<http://www.siemens.com/automation/service&support>

There you will find:

- Latest product information, FAQs (frequently asked questions), downloads, and tips and tricks.
- The newsletter provides the latest information on your products.
- The Knowledge Manager helps you find the documents you need.
- Users and specialists from around the world share their experience and knowledge in the Forum.
- You can find your local Automation & Drives contact in our contacts database.
- The "Services" section provides information on local service, repairs, spare parts, and much more.

Additional Support

Do you have questions about the use of the products described in this manual? If so, please contact your Siemens representative.

<http://www.siemens.com/automation/partner>

Training Center

We offer training courses to help you get started. For more information, please contact your regional training center or the main training center in D-90327 Nuremberg, Federal Republic of Germany.

Telephone: +49 (911) 895-3200

<http://www.sitrain.com>

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