SIEMENS

SIMOTION

Motion Control SIMOTION SCOUT

Configuration Manual

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Preface 1
Fundamental safety instructions 2
Introduction 3
Installation 4
User interface 5
Configuring/parameterizing 6
Target system 7
Upgrading and project updates 8
Diagnostics 9
Service with SIMOTON SCOUT 10
Siemens SIMOTION Diagnostics 11
SIMOTION Runtime Simulation 12
Configuring a further connection (such as HMI) 13
Product combinations 14
Technical specifications 15
Appendix A

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

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⚠ **CAUTION**
indicates that minor personal injury can result if proper precautions are not taken.

NOTICE
indicates that property damage can result if proper precautions are not taken.

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Table of contents

1 Preface 9

1.1 Validity 9

1.2 Sections in this manual 9

1.3 SIMOTION Documentation 10

1.4 Hotline and Internet addresses 10

2 Fundamental safety instructions 13

2.1 General safety instructions 13

2.1.1 Malfunctions of the machine as a result of incorrect or changed parameter settings 13

2.2 Security information 13

2.3 Note regarding the general data protection regulation 14

2.4 Danger to life due to software manipulation when using removable storage media 14

3 Introduction 15

3.1 Content of the configuring manual 15

3.2 SIMOTION SCOUT engineering system 15

3.3 SIMOTION hardware platforms 16

3.4 Programming languages 17

3.4.1 Programming languages in SIMOTION SCOUT 17

3.4.2 Motion Control Chart (MCC) 19

3.4.3 Ladder Logic / Function Block Diagram (LAD/FBD) 20

3.4.4 Structured Text (ST) 21

3.5 CamEdit cam editor 22

3.6 CamTool options package 22

3.7 Technology packages and technology objects 23

3.8 CLib Studio option package 24

4 Installation 25

4.1 SCOUT and SCOUT Standalone system requirements 25

4.2 Installing SIMOTION SCOUT 25

4.2.1 Installing SIMOTION SCOUT 25

4.2.2 Installing SIMOTION SCOUT Standalone 26

4.2.3 SINAMICS Support Package (SSP) 27

4.3 Uninstalling SIMOTION SCOUT 27

4.4 Licenses 28

4.4.1 To install the authorization 28

4.4.2 Saving and moving the license key 29

5 User interface 31

5.1 SIMOTION SCOUT - workbench 31

5.2 SIMOTION SCOUT - working area 33

5.3 SIMOTION SCOUT project navigator 34
5.3.1 Using the project navigator 34
5.3.2 Creating elements 35
5.3.3 Inserting a folder 37
5.3.4 Changing properties of the elements 38
5.3.5 Wizards for configuration support 39

5.4 SIMOTION SCOUT - menus 39

5.5 SIMOTION SCOUT - menu items 42

5.6 SIMOTION SCOUT - keyboard operation and shortcuts 47

5.7 SIMOTION SCOUT - using the context menus 48

5.8 SIMOTION SCOUT - detailed view 49
5.8.1 Using the detail view 49
5.8.2 Using the symbol browser 49
5.8.3 Address list 50
5.8.4 Watch table 50
5.8.5 Working with lists 52

5.9 SIMOTION SCOUT - language settings 52

5.10 SIMOTION SCOUT - using help 52
5.10.1 SIMOTION SCOUT Online Help 52
5.10.2 Searching in the online help 58
5.10.3 Getting Started with SIMOTION SCOUT 59
5.10.4 Error remedy 60

5.11 Adding add-ons to the workbench 61

6 Configuring/parameterizing 63

6.1 Configuration overview 63

6.2 SIMOTION SCOUT - basic settings 63

6.3 Managing projects 64
6.3.1 SIMOTION SCOUT project 64
6.3.2 Creating a new project 65
6.3.3 Open project 68
6.3.4 Saving and compiling 69
6.3.5 Performing a consistency check 70
6.3.6 Archiving and backing up projects on memory cards 70
6.3.7 Exporting and importing a project in XML format 71
6.3.8 Searching in the project 72
6.3.9 Replacing in the project 73
6.3.10 Printing projects 74

6.4 Configuring devices 75
6.4.1 Adding a SIMOTION device 75
6.4.1.1 Starting HW Config 76
6.4.1.2 The HW Config program 77

6.4.1.3 HW Config: Opening the hardware catalog ... 77
6.4.1.4 SIMOTION devices in the hardware catalog ... 78
6.4.2 Selecting technology packages ... 78
6.4.3 Connecting to the target system ... 80
6.4.3.1 Installing the interface card ... 80
6.4.3.2 Set PG/PC interface ... 82
6.4.3.3 Specifying the access point ... 83
6.4.3.4 Communication via PROFIBUS DP ... 84
6.4.3.5 Ethernet communication ... 85
6.4.3.6 Communication via PROFINET ... 85
6.4.4 Inserting a drive ... 86
6.4.4.1 Drives with SIMOTION ... 86
6.4.4.2 Inserting a SINAMICS drive on PROFIBUS DP ... 87
6.4.4.3 Inserting a SINAMICS drive on PROFINET IO ... 87
6.4.4.4 Commissioning the drives ... 89
6.4.4.5 SINAMICS S120 on SIMOTION ... 90
6.4.4.6 Configuring the infeed ... 91
6.4.4.7 Testing the drive with the drive control panel ... 93

6.5 Creating and testing an axis ... 97
6.5.1 TO axis technology object ... 97
6.5.2 Configuring Axes ... 99
6.5.3 Testing the axis with the axis control panel ... 103

6.6 Programming the SIMOTION application ... 107
6.6.1 Using tags ... 107
6.6.2 Using MCC ... 110
6.6.2.1 Overview ... 110
6.6.2.2 Creating the MCC unit ... 111
6.6.2.3 Creating an MCC chart ... 112
6.6.2.4 Using MCC command blocks ... 114
6.6.2.5 Backing up the MCC program ... 116
6.6.3 Using LAD/FBD ... 117
6.6.3.1 Overview ... 117
6.6.3.2 Create LAD/FBD unit ... 118
6.6.3.3 Create LAD/FBD program ... 119
6.6.3.4 Using the LAD/FBD toolbar ... 121
6.6.3.5 Backing up the LAD/FBD program ... 122
6.6.4 Using ST ... 122
6.6.4.1 Overview ... 122
6.6.4.2 Creating an ST source ... 123
6.6.4.3 Backing up the ST program ... 124
6.6.4.4 Executing the ST program. ... 125

6.7 Configure execution system ... 125

6.8 Project generator ... 128
6.8.1 Overview ... 128
6.8.2 Integrating the ProjectGenerator ... 129

6.9 Configuring multilingual messages ... 129

6.10 Know-how Protection ... 130

6.11 Saving and restoring variables from the device ... 131

6.12 Online multiuser mode 134
6.12.1 Overview 134
6.12.2 Working in online multiuser mode 136
6.13 Licensing runtime 137
6.13.1 Licensing of the runtime components 137
6.13.1.1 Overview for the licensing 137
6.13.1.2 Licenses and license key 137
6.13.1.3 Determining licensing requirements 138
6.13.1.4 Displaying existing licenses of the SIMOTION device 139
6.13.1.5 Performing the licensing 140
6.13.2 Changing the license key 141
6.13.3 License key is protected from being deleted (as from Kernel V4.1) 141
6.13.4 Licensing during hardware replacement 141
6.13.5 Underlicensing 141
6.14 Writing the boot sector 142
7 Target system 143
7.1 Overview 143
7.2 Going online/offline with SIMOTION SCOUT 144
7.2.1 Online access points 144
7.2.2 Available nodes 145
7.2.3 Setting the access point on the PG/PC 147
7.2.4 Select target devices 148
7.3 Controlling the operating mode with SIMOTION SCOUT 150
7.4 Overall reset 156
7.5 Setting the time of day 157
7.6 Loading data to the target system 157
7.7 Archive project data to memory card 158
7.8 Loading to the file system 158
8 Upgrading and project updates 159
8.1 General information 159
8.2 Upgrading and changing platforms for a SIMOTION device 159
8.2.1 Changing a SIMOTION device and subsequent TP upgrade (within a platform) 159
8.2.2 Changing the SIMOTION platform 161
8.2.3 Upgrading technology packages 162
8.3 Upgrading devices and project updates using the device update tool 164
9 Diagnostics 169
9.1 Overview of the possible diagnostic functions 169
9.2 Using the diagnostics overview 170
9.3 Device diagnostics 170
9.3.1 Device diagnostics 170
9.3.2 Device diagnostics: General 171
9.3.3 Device diagnostics: Diagnostics buffer 172

9.3.4 Device diagnostics: Task Manager ... 173
9.3.5 Device diagnostics: Checking memory utilization ... 176
9.3.6 Device diagnostics: Checking the system utilization ... 177
9.3.7 Device diagnostics: User log file ... 178
9.3.8 Device diagnostics: Syslog file ... 179
9.3.9 Device diagnostics: Version overview ... 179
9.3.10 Device diagnostics: Alarms ... 180
9.4 Diagnostic functions in the address list ... 181
9.5 Interconnection overview ... 182
9.6 Service Overview ... 183
9.7 Trace and measuring functions ... 183
9.7.1 Trace, measuring function, and automatic controller setting ... 183
9.7.2 Task Trace ... 185
9.7.3 Technology object trace ... 186
9.8 Accessible nodes ... 187
9.9 Program testing and debugging ... 188
9.10 Project comparison ... 189
9.11 Project overview ... 192
9.12 Services and diagnostics without an Engineering System ... 192
10 Service with SIMOTON SCOUT ... 193
10.1 Selecting the right project with SCOUT ... 193
10.2 SCOUT V4.5 and 5.1 project format ... 195
10.3 Project was created in Version V4.1 / V4.2 / V4.3 / V4.4 ... 195
10.4 Project V4.1 / V4.2 / V4.3 / V4.4 has been edited with SCOUT V4.5 ... 196
10.5 Introduction of versioning with standard library and software components ... 197
11 Siemens SIMOTION Diagnostics ... 199
12 SIMOTION Runtime Simulation ... 201
12.1 Overview ... 201
12.2 Using SIMOSIM ... 202
13 Configuring a further connection (such as HMI) ... 209
13.1 Rules for arranging modules in the HW Config ... 209
13.2 Routing ... 210
13.3 HMI (Human Machine Interface) connection ... 210
13.4 Higher-level automation systems ... 211
13.5 TCP ports for access to SIMOTION/SINAMICS ... 212
14 Product combinations ... 215
14.1 Compatibility ... 215
14.1.1 General compatibility ... 215
14.1.2 Software compatibility ... 215

14.2 Memory media of the SIMOTION devices ... 216
14.3 STEP 7 ... 217
14.3.1 SIMATIC Manager ... 217
14.3.2 SIMATIC Logon ... 217
14.3.3 SIMATIC Version Trail ... 220
14.4 NetPro ... 221
14.5 HMI ... 222
14.6 Drive ES ... 223
14.7 Commissioning drives (STARTER) ... 224
14.8 CamTool ... 225
14.9 DCC programming system ... 225
15 Technical specifications ... 227
15.1 Quantity framework ... 227
15.2 Memory requirement ... 227
A Appendix ... 229
A.1 Scripts for SIMOTION ... 229
A.2 Creating an example program for axis positioning in SIMOTION SCOUT ... 229
Index ... 241

Preface

1

1.1 Validity

This **document** is part of the **Engineering System Handling documentation package**.

Scope of validity

This manual is valid for SIMOTION SCOUT in conjunction with the SIMOTION CamTool option package for product version V5.4.

1.2 Sections in this manual

The following is a list of sections included in this manual along with a description of the information presented in each section.

- Introduction
  This chapter contains an overview of the SIMOTION SCOUT Engineering System.
- Installation
  This chapter contains the system requirements for SIMOTION SCOUT, describes the procedure for installing and uninstalling it, and provides important information on the communications link to the SIMOTION device.
- User interface
  This chapter contains an overview of the SIMOTION SCOUT Workbench. It also provides notes concerning the language setting and the use of online help.
- Configuring/parameterizing
  This chapter describes the basic steps for operating SIMOTION SCOUT.
- Target system
  This chapter contains information on controlling the target system. You also learn how you can control the operating state with SIMOTION SCOUT and how you can upload data to the target system.
- Diagnostics
  This chapter contains information about which diagnostic functions are available and how these are operated.
- Service with SIMOTION SCOUT
  This chapter contains information about the service.
- Siemens SIMOTION Diagnostics
  This chapter contains information on how you can use the **Siemens Simotion Diagnostics** diagnostic tool for troubleshooting.
- Configuring a further connection (such as HMI)
  This chapter contains information on how to configure the HMI connection among other things.

- Product combinations
  This chapter describes topics such as compatibility and storage media as well as STEP 7, NetPro, Drive ES, HMI, and other interfaces.
- Technical specifications
  This chapter contains information about the quantity structure and the storage capacity requirement.
- Appendix
  The appendix contains the scripts for SIOMTION and a sample program for an axis configuration in SIOMOTION SCOUT.
- Index

1.3 SIMOTION Documentation

An overview of the SIMOTION documentation can be found in the SIMOTION Documentation Overview document.

This documentation is included as electronic documentation in the scope of delivery of SIMOTION SCOUT. It comprises ten documentation packages.

The following documentation packages are available for SIMOTION product version V5.4:

- SIMOTION Engineering System Handling
- SIMOTION System and Function Descriptions
- SIMOTION Service and Diagnostics
- SIMOTION IT
- SIMOTION Programming
- SIMOTION Programming - References
- SIMOTION C
- SIMOTION P
- SIMOTION D
- SIMOTION Supplementary Documentation

1.4 Hotline and Internet addresses

SIMOTION at a glance

We have compiled an overview page from our range of information about SIMOTION with the most important information on frequently asked topics - which can be opened with only one click.

Whether beginner or experienced SIMOTION user – the most important downloads, manuals, tutorials, FAQs, application examples, etc. can be found at

https://support.industry.siemens.com/cs/ww/en/view/109480700

Additional information

Click the following link to find information on the following topics:

- Documentation overview
- Additional links to download documents
- Using documentation online (find and search manuals/information)

https://support.industry.siemens.com/cs/ww/en/view/109479653

My Documentation Manager

Click the following link for information on how to compile documentation individually on the basis of Siemens content and how to adapt it for the purpose of your own machine documentation:

https://support.industry.siemens.com/My/ww/en/documentation

Training

Click the following link for information on SITRAIN - Siemens training courses for automation products, systems and solutions:

http://www.siemens.com/sitrain

FAQs

Frequently Asked Questions can be found in SIMOTION Utilities & Applications, which are included in the scope of delivery of SIMOTION SCOUT, and in the Service&Support pages in **Product Support**:

https://support.industry.siemens.com/cs/de/en/ps/14505/faq

Technical support

Country-specific telephone numbers for technical support are provided on the Internet under **Contact**:

https://support.industry.siemens.com/cs/ww/en/sc/2090

Fundamental safety instructions 2

2.1 General safety instructions

⚠ WARNING

Danger to life if the safety instructions and residual risks are not observed

The non-observance of the safety instructions and residual risks stated in the associated hardware documentation can result in accidents with severe injuries or death.

- Observe the safety instructions given in the hardware documentation.
- Consider the residual risks for the risk evaluation.

2.1.1 Malfunctions of the machine as a result of incorrect or changed parameter settings

⚠ WARNING

Malfunctions of the machine as a result of incorrect or changed parameter settings

As a result of incorrect or changed parameterization, machines can malfunction, which in turn can lead to injuries or death.

- Protect the parameterization against unauthorized access.
- Handle possible malfunctions by taking suitable measures, e.g. emergency stop or emergency off.

2.2 Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit (https://www.siemens.com/industrialsecurity).

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customers' exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed visit (https://www.siemens.com/industrialsecurity).

2.3 Note regarding the general data protection regulation

Siemens observes the principles of data protection, in particular the principle of data minimization (privacy by design). For this product this means:

The product does not process / store any personal data, only technical functional data (e.g. time stamp). If the user links this data with other data (e.g. shift plans) or stores personal data on the same medium (e.g. hard disk) and thus establishes a personal reference, the user must ensure compliance with data protection regulations.

2.4 Danger to life due to software manipulation when using removable storage media

⚠ WARNING

Danger to life due to software manipulation when using removable storage media

The storage of files on removable storage media involves a high risk of infection, e.g. via viruses or malware. Incorrect parameter assignment can cause machines to malfunction, which can lead to injuries or death.

- Protect the files on removable storage media against harmful software through appropriate protective measures, e.g. virus scanners.

Introduction 3

3.1 Content of the configuring manual

The SIMOTION SCOUT Configuration Manual is a general description of the software. Not all available software functions are described in this document. All detailed, subject-specific information can be found in the context-sensitive online help and the corresponding documentation.

Important notes and information on the SIMOTION Motion Control system are contained in the following catalog:

- SIMOTION, SINAMICS S120 and Motors for Production Machines, PM 21 Catalog

3.2 SIMOTION SCOUT engineering system

Introduction

While the Motion Control system SIMOTION provides a wide variety of preprogrammed functions, it is also parameterizable and programmable for individual requirements. High-performance tools, which provide optimum support and ease of use for the necessary engineering steps, are required for this.

The SIMOTION SCOUT Engineering System is the environment for the uniform automation of production machines with SIMOTION and integrates into the SIMATIC environment in accordance with TIA (Totally Integrated Automation).

SIMOTION SCOUT provides a uniform, function-oriented view for your automation task, and at the same time it is very easy to use.

The possible SIMOTION applications range from simple, parameterizable, speed-controlled single axes through to complex, mechatronically-coupled and programmable multi-axis machines. Therefore, SIMOTION SCOUT provides views adapted to the task and can be expanded with additional tools (e.g. tool for the graphic creation of cams).

SIMOTION SCOUT is the engineering system for SIMOTION. It is integrated into STEP 7 and provides all the required tools for the following functionalities:

- Configuration
- Parameter assignment
- Programming
- Test
- Diagnostics

The following tasks are graphically supported with operator guidance:

- Creation of the hardware and network configuration
- Creation, configuration and parameter assignment of technology objects such as axes, output cams and cams.

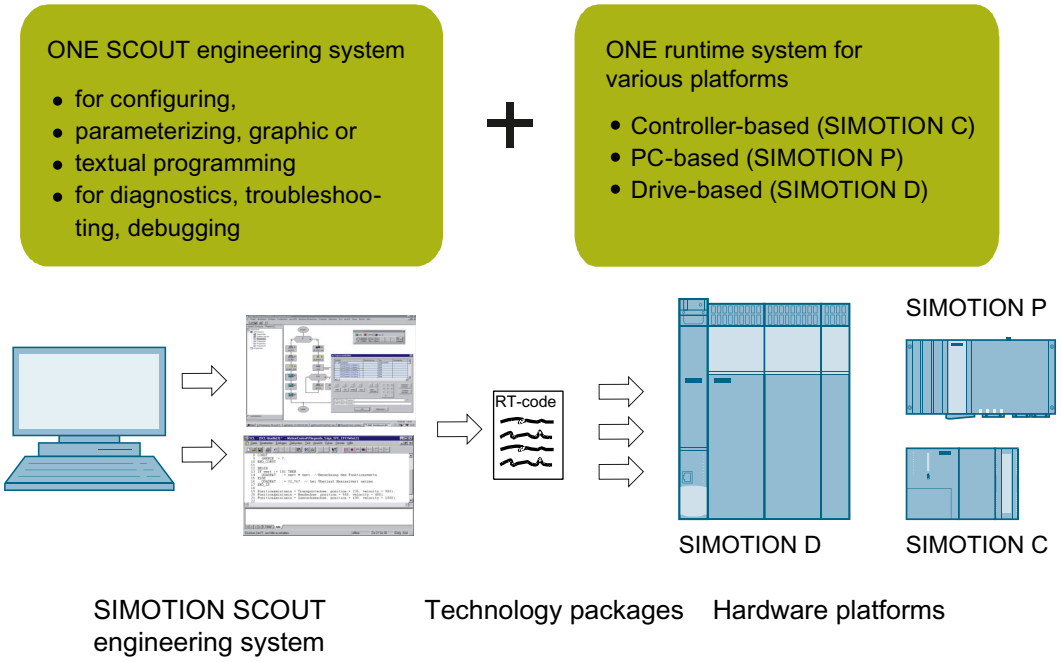


Figure 3-1 SIMOTION system overview

The automation topology is defined in the first engineering steps. The hardware and network configuration is created by parameterizing the required components and networks.

3.3 SIMOTION hardware platforms

To meet the complex requirements of machine construction, SIMOTION offers three hardware variants with different performance, packaging formats and expandability options. The basic system characteristics, like the engineering, are identical.

SIMOTION D (Drive-based)

SIMOTION D is a compact, drive-based version of SIMOTION based on the SINAMICS S120 drives family. For SIMOTION D, the SIMOTION runtime environment and the SINAMICS drive software run concurrently on the controller hardware in the SINAMICS S120 packaging format.

SIMOTION P (PC-based)

SIMOTION P is a PC-based, open motion control system from SIMOTION. Control, motion control, and HMI functions are executed together with standard PC applications on the SIMOTION P hardware platform.

SIMOTION P combines the openness of the Windows operating system with the real-time capability of SIMOTION P Runtime.

SIMOTION C (Controller-based)

SIMOTION C is the modular controller variant in the tried and trusted packaging system of the SIMATIC S7-300 with its very varied expandability options on the I/O bus. SIMOTION C240 high-performance motion controllers are available for control functions and motion control tasks. The integrated interface for four analog coupled drives makes the SIMOTION C particularly suitable for compact applications with the control of analog electrical drives and the operation of hydraulic axes. SIMOTION C also supports operation of four stepper motors at these interfaces. SIMOTION C240 PN offers a PROFINET interface instead of the encoder and drive interfaces.

3.4 Programming languages

3.4.1 Programming languages in SIMOTION SCOUT

SIMOTION provides different programming languages for the solution of Motion Control tasks, control logic, arithmetic calculations, etc. During runtime, the selected programming language has no effect – except in the different displays when debugging. You can create user applications in different programming languages and use them jointly in a project.

The following programming languages are available in SIMOTION SCOUT:

- **Motion Control Chart (MCC)**
  Graphical programming as a flow chart.
  In particular, for sequential tasks with a high level of motion control functionality.
- **Ladder Logic / Function Block Diagram (LAD/ FBD)**
  Graphical Programming as Ladder Logic / Function Block Diagram, supplemented by Motion Control Functions via PLCopen Function Blocks.
  In particular, for cyclic tasks with a high logic proportion.
- **Structured Text (ST)**
  textual programming in a high-level language.
  As the base language of the SIMOTION system, ST supports all system features and functions of the technology packages and is thus suitable for all tasks.
- **Drive Control Chart (DCC)**
  In many applications, the control of the drive system requires a linking logic which combines multiple statuses (e.g. entry control, system status) into one control signal (e.g. ON command).
  As well as logical links, drive systems are increasingly calling for arithmetic operations and/or saving elements. This kind of functionality is available on drive objects of the SINAMICS drive system and the SIMOTION control system in the form of a Drive Control Chart (DCC).
  With the Drive Control Chart Editor (DCC Editor) based on CFC, SIMOTION controllers and SINAMICS drives can be configured graphically.
  For further information, see Section DCC programming system (Page 225).

Sources (units)

Programs are created in program containers, the so-called sources (units). They are compiled in the engineering system. Any errors or warnings that occur during compilation are output in the diagnostics window. Sources compiled without error can then be loaded into the associated controller.

A source contains any number of programs, functions, function blocks and classes. Each executable part of a source (program, function, function block, class) is called a POU (Program Organization Unit).

A source is divided into an interface and an implementation section.

Interface section

All parts exported by the source are defined in the interface section. Other sources and external components (e.g. HMI systems) can access these parts. These include user-defined data types, data (variables and constants) as well as names of programs, functions, and function blocks.

Implementation section

The data types and data defined in the implementation section are global throughout the source and can be used by all POUs. The implementation section also contains the program code of the POUs. Any POUs not specified in the interface section can only be used within the source.

Note

Source concept

The source concept with encapsulation of code and data allows you to structure applications. For example, the functionality of an entire machine module with a defined external interface can be implemented in a single source.

Tasks

Programs are processed in tasks. A task is a job which is executed in a certain chronological sequence. The advantage of the task system (execution system) is that processes appended to the appropriate task levels can run simultaneously.

The SIMOTION Motion Control system uses high-performance CPUs on which a real-time operating system - suitable for fast control processes - is implemented. Each task is allocated a slice of the computing time. The organization of the task executions is performed by the operating system. A differentiation is made between user and system tasks that are independent of one another.

Additional references

For detailed information on the programming languages and the execution system, refer to the SIMOTION SCOUT online help and the appropriate programming and operating manuals.

3.4.2 Motion Control Chart (MCC)

MCC (Motion Control Chart) is a "flow diagram language" that graphically formulates the process sequences in production machines in a simple manner. The result is one or more flow diagrams, comprising MCC blocks that describe the chronological sequence of the individual machine actions. Due to its special means of expression, an MCC is ideally suited to programming sequential processes.

Motion Control Chart supports the simple description of the motion sequences of machines using powerful motion control commands, such as reference axis, position axis, synchronize or desynchronize cam, and many more.

To control the machine sequence, commands are available for awaiting conditions and for formulating computations, as well as for programming various control structures, such as polling (IF), case determination (CASE) and loops (FOR, WHILE, UNTIL). Several MCC programs may be created to describe different process situations. For example, you can create one MCC program to bring the machine to a defined initial state when it is switched on, a second MCC program for the normal production sequence, and a third MCC program to specify what the machine has to do in the event of a fault.

All MCC blocks – a selection of the most important SIMOTION functions – are available in tool bars. They are grouped according to function and are automatically inserted in the flow diagram at the marked point by means of a click. A click on the individual elements opens specific dialogs for parameterization. Obviously, you can also add your own comments for the further documentation of the process sequence. Functions from the SIMOTION command library that are not individually offered as MCC blocks can be used in an MCC program by means of a special command.

Performance features:

- Easy-to-use due to graphical illustration in the form of flow diagrams
- Hierarchical command library for motion control, PLC, and technology functions
- Control structures (IF, WHILE, CASE, etc.)
- Zooming for LAD, FBD and ST
- Subroutine calls (FB/FC, programs, methods (OOP))
- Structuring based on command module generation, i.e. combination of command sequences to form a module command
- User-friendly debug functions for online test and diagnosis, for example, single-step, program status or breakpoints for easier troubleshooting (debugging)
- Monitor, trace

Note

Implicit conversion to ST

When being compiled, programs written in MCC are implicitly converted to ST programs and then compiled.

You can export the intermediate result as an ST and use it as a basis for your own ST programs.

Additional references

Detailed information can be found in the SIMOTION SCOUT online help and in the SIMOTION MCC (Motion Control Chart) Programming and Operating Manual.

3.4.3 Ladder Logic / Function Block Diagram (LAD/FBD)

LAD/FBD is a graphical programming language and is available for Ladder Logic / Function Block Diagram. The statement syntax corresponds to a circuit diagram (LAD) or a function block diagram (FBD). LAD/FBD enable simple tracking of the signal flow between power rails via inputs, outputs, and operations. LAD and FBD programs are usually suitable for application in cyclic tasks (in particular, BackgroundTask).

LAD/FBD programs consist of elements and boxes that are graphically connected to networks. Their operations work mostly according to the rules of Boolean logic or simple arithmetic expressions and equations. Therefore, they are suitable only for control-relevant programs or also for motion control tasks by using the PLCopen blocks.

Functions, function blocks and programs can be programmed in LAD/FBD. A source can contain several LAD and FBD blocks. Only one POU can be implemented in an LAD or FBD block.

LAD/FBD also include commands for SIMOTION system control using standard logic functions. These commands are added from the command library. Motion Control tasks are preferably programmed with PLCopen blocks. Blocks which have been programmed in other SIMOTION languages can be called. User-friendly functions such as "on the fly" variable declarations or automatic syntax checks are available when programming in LAD or FBD. It is possible to switch over between LAD and FBD in the editor at any time. A program can therefore be viewed and processed in either LAD or FBD.

The following user-friendly debug functions are available for online testing and diagnostics:

- Program status
- Breakpoints

Note

Direct editing of motion commands is not recommended. Instead, it is better to use the PLCopen blocks. These blocks are designed for integration in logic-oriented programs.

Additional references

Detailed information can be found in the SIMOTION SCOUT online help and in the SIMOTION LAD/FBD Programming and Operating Manual.

3.4.4 Structured Text (ST)

Structured Text

ST is a high-level, PASCAL-based programming language. ST is based on the IEC 61131-3 standard. This standard harmonizes programming languages for programmable logic controllers (PLC).

The basic command scope is sufficient for the implementation of everything related to data management, arithmetic functions, control structures and I/O access. The addition of technology packages for Motion Control expands the scope of commands by other comprehensive, extremely flexible Motion Control commands.

In addition, applications can be subdivided into any number of sections. Such a section might be a program allocated to a runtime level, an instantiatable function block with its own memory, or a function without its own memory. In this case, the function blocks and functions are not allocated to a runtime level, but are instead called in programs.

Note

As of SIMOTION SCOUT V4.5, ST also supports object-oriented programming. Further information can be found in the SIMOTION SCOUT online help and in the SIMOTION ST (Structured Text) Programming and Operating Manual.

Performance features:

- Motion Control, PLC and technology functions in a single language
- Well-structured programs with comment capability
- Powerful editor functions, such as:
  - Syntax coloring
  - Automatic indenting
  - Automatic completion
  - Bookmarks
  - Fold (show and hide blocks)
  - Displaying sets of parentheses
  - Select text, e.g. by column
  - Using the command library
- Convenient debug functions for online testing and diagnostics, e.g. display of up-to-date variable content of the code sequence selected in the editor (program status) and breakpoints

Additional references

Detailed information can be found in the SIMOTION SCOUT online help and in the SIMOTION ST (Structured Text) Programming and Operating Manual.

3.5 CamEdit cam editor

CamEdit can be used to describe curves by means of either interpolation points or segments. A combination is not possible. If the curve is to be created from segments using polynomials, SIMOTION SCOUT provides the VDI wizard to assist in creation of the curve. Cam geometries are created in offline mode.

Information on the graphical creation of cams can be found in the CamTool section.

3.6 CamTool options package

SIMOTION CamTool is a powerful, graphical editor for creating and optimizing cams.

SIMOTION CamTool can be used as an expansion package for SIMOTION SCOUT and is completely integrated in the SIMOTION SCOUT user interface.

Basic functions

SIMOTION CamTool provides the following basic functions:

- Insert and edit cams.
  Cams can be inserted in a SIMOTION SCOUT project using the SIMOTION CamTool. You can also edit a cam created with CamEdit using CamTool: Cams can also be imported from a text file or read from a SIMOTION device.
- Customize display of the cam in CamTool.
  In SIMOTION CamTool, you can show and hide diagrams, change display parameters of the axes and diagrams and adjust the lines and fonts. You can also display auxiliary lines in the diagram.
- Convert cams from SIMOTION CamTool to SIMOTION CamEdit.
  To edit a cam that is edited in SIMOTION CamTool using SIMOTION CamEdit, the cam needs to be converted.
- Export cams to a text file.
- Load cams into a SIMOTION device.

Additional references

Detailed information can be found in the SIMOTION SCOUT online help and in the SIMOTION CamTool Configuration Manual.

See also

CamEdit cam editor (Page 22)

3.7 Technology packages and technology objects

Technology packages in SIMOTION SCOUT

Technology packages combine software functions which are required for automation in mechanical engineering in various sectors. They are loaded into the controller during configuration and expand the basic functionality through additional system functions. The functions of the technology packages can be accessed easily during engineering in the SIMOTION SCOUT command library. Access to the technology package functions is provided by additional language commands and system variables. Programming of motional sequences is therefore simple and integrated.

The following standard technology packages are available for SIMOTION SCOUT:

CAM technology package

The SIMOTION CAM technology package contains the basic Motion Control technologies, such as drive axis, position axis, following axis, synchronous object, cam, output cam, cam track, and measuring input.

PATH technology package

The SIMOTION PATH technology package contains additionally the path interpolation technology.
Path interpolation generates the traversing profile for the path, calculates the path interpolation points in the interpolation cycle, and uses the kinematic transformation to derive the axis setpoints for the interpolation cycle points.

CAM_EXT technology package

The CAM_EXT technology package also contains objects for preparing technological data at the system level, e.g. addition object, formula object.

TControl technology package

The SIMOTION technology package for temperature control (TControl) provides temperature channels with extensive functions. These functions are also accessed via additional language commands and system variables.

DCBlib

The SIMOTION DCBlib technology package contains interconnectable DCC (Drive Control Chart) blocks for drive-related control functions.

More sector-specific technology packages are also available as separate products.

The loadable technology packages support the creation of technology objects (e.g. positioning and synchronous axis, cam tracks, external encoders) which can be accessed over system functions and system variables for use in every SIMOTION programming language.

Technology objects in SIMOTION SCOUT

SIMOTION SCOUT uses technology objects (TOs) to represent the functionality of axes, cams, output cams, etc. After creating a technology object (e.g. axis) and configuring it (e.g. as positioning axis), you can access it when programming with system functions.

Note

Missing licenses

All TOs outside the basic functionality (Motion Control Basic) must be licensed. Missing licenses are indicated by a flashing group error LED. The number and type of missing licenses is stated by the online diagnostics. They are also displayed during downloading.

Additional references

Detailed information is provided in the SIMOTION SCOUT online help and in the following documents:

- Function Manual: SIMOTION Basic Functions
- Function Manual: SIMOTION Motion Control, TO Axis, Electric/Hydraulic, TO External Encoder
- Function Manual: SIMOTION Motion Control, Synchronous Operation TO, TO Cam
- Function Manual: SIMOTION Motion Control, Supplementary Technology Objects
- Function Manual: SIMOTION Motion Control Output Cams and Measuring Inputs
- Function Manual: SIMOTION Motion Control, TO Path Object
- Function Manual: SIMOTION Motion Control, Basic Functions for Modular Machines

See also

Licensing of the runtime components (Page 137)

3.8 CLib Studio option package

SIMOTION CLib Studio

If required, further functions and function blocks can be created in user libraries (SIMOTION CLib Studio) by means of C/C++ programming in the Windows environment.

They can be used in all SIMOTION languages (MCC, LAD, FBD, ST).

That allows the creation of application-specific and high-performance function extensions as well as adaptations including know-how protection.

Installation

4

4.1 SCOUT and SCOUT Standalone system requirements

Minimum requirements of the system

The readme file on the SIMOTION SCOUT DVD contains information on SIMOTION SCOUT system requirements; alternatively, you can access this information after installation at **Start** -> **All Programs** -> **Siemens Automation** -> **Documentation** -> **Readmes -> [English]**.

Note

Simultaneous operation of SIMOTION SCOUT, Starter and SIMATIC S7-Technology on one PC is not intended and is not possible.

SIMATIC S7-Technology is integrated as of SIMOTION SCOUT V4.0.

4.2 Installing SIMOTION SCOUT

4.2.1 Installing SIMOTION SCOUT

SIMOTION SCOUT is available as software packages with full license and upgrade license.

Requirements:

- SIMATIC STEP 7 is installed.
- You are logged on to the operating system with administrator rights.

Note

Read the readme file and the important information on the SIMOTION SCOUT Add-Ons DVD contained in the SIMOTION SCOUT software packages.

To install SIMOTION SCOUT

1. Insert the DVD 1 with SIMOTION SCOUT into the CD-ROM drive.
2. Start Windows Explorer and select the CD-ROM drive.
3. Open the root directory on the DVD.
4. Double-click **Setup.exe**.

5. Now follow the instructions in the installation program.
   The installation program prompts you to insert or connect the supplied data medium that contains the authorization. You can install the authorization during this setup. Or install the authorization with the Automation License Manager after installing SIMOTION SCOUT.
   For information, see the section AUTOHOTSPOT.
6. If a restart of the PC is required during the installation, carry this out.
   After restart of the operating system, log on at least as main user.
7. After the installation:
   Restart the PC and log on at least as main user.

All users who are logged on as main user are now able to start and operate SIMOTION SCOUT.

4.2.2 Installing SIMOTION SCOUT Standalone

Prerequisite

- No SIMATIC STEP 7 may be installed or
- No previous version of SIMOTION SCOUT Standalone must be installed.
- You are logged on to the operating system with administrator rights.

Note

Read the readme file and important information on the Add-On CD supplied with SCOUT.

To install SIMOTION SCOUT Standalone

1. Insert DVD 1 with SIMOTION SCOUT Standalone into the CD-ROM drive.
2. Start Windows Explorer and select the CD-ROM drive.
3. Open the root directory on the DVD.
4. Double-click **Setup.exe**.
5. Now follow the instructions in the installation program.
   The installation program prompts you to insert or connect the supplied data medium that contains the authorization. You can install the authorization during this setup. Or install the authorization with the Automation License Manager after installing SIMOTION SCOUT.
   Information on this can be found in the section titled "To install the authorization".
6. A restart of the PC is required during the installation, carry this out. You are requested to insert the CD"/".
   After the restart of the operating system, log on at least as main user.
7. After the installation:
   Restart the PC and log on at least as main user.

All users who are logged on as main user are now able to start and operate SIMOTION SCOUT.

4.2.3 SINAMICS Support Package (SSP)

You can use a SINAMICS Support Package (SSP) to upgrade the version of the drive units on a STARTER integrated into SIMOTION SCOUT.

This permits the use of new functions which only become available with new drive unit FW versions.

SSPs are available when installing SCOUT or can be installed at a later time.

In this regard, the following SSPs are relevant for SIMOTION SCOUT:

- "SINAMICS" SSP for upgrading single drive units (e.g. CU3xx)
- "SIMOTION SINAMICS Integrated" SSP for upgrading the SINAMICS drives integrated into SIMOTION D.

The readme files for the relevant SSP contain detailed information regarding installation.

4.3 Uninstalling SIMOTION SCOUT

Requirements:

You are logged on to the operating system with administrator rights.

Note

Note that the SIMATIC STEP 7 software must be uninstalled separately.

To uninstall SIMOTION SCOUT from the hard disk

1. Open the Windows **Control Panel**. Go to the **Programs and Functions** page (Windows 7).
2. Select **SIMOTION SCOUT Vx.x.x.x** and click **Uninstall/change** (Windows 7). Follow the instructions.
3. After the uninstall has completed, restart the PC.

Uninstalling SIMOTION SCOUT Standalone

Uninstall SIMOTION SCOUT Standalone as described in the "How to uninstall SIMOTION SCOUT from the hard disk" section.

4.4 Licenses

4.4.1 To install the authorization

Installing the authorization for SIMOTION SCOUT

A data medium containing the authorization is supplied along with the product CD so that you can use SIMOTION SCOUT. This contains the license key for the SIMOTION SCOUT Engineering System.

The authorization for SIMOTION SCOUT and SIMOTION SCOUT Standalone can be installed as follows:

1. Connect or insert the data medium containing the authorization and the license key.
2. Start the Automation License Manager:
   - In the start menu, **Start > All programs > Siemens Automation > Automation License Manager** or
   - Double-click the **Automation License Manager** icon
3. In the navigation area (left-hand window), select the drive where the data medium containing the authorization is located. The license key is displayed in the right-hand window.
4. Mark the license key and drag this with drag-and-drop to the target drive.
5. Exit the Automation License Manager.
6. Remove the data medium containing the authorization.

Note

Information on operating the Automation License Manager and transferring the license key can be found in the online help for the Automation License Manager.

The authorization for SIMOTION SCOUT and SIMOTION SCOUT Standalone can be upgraded as follows:

As of Version 4.0, the authorization for SIMOTION SCOUT has been upgraded from authorization (*single license*) to the licensing procedure involving a *floating license*. The Automation License Manager program manages the licenses.

1. Connect or insert the data medium containing the authorization and the upgrade license key.
2. Start the Automation License Manager:
   - In the start menu, **Start > All programs > Siemens Automation > Automation License Manager** or
   - Double-click the **Automation License Manager** icon. A new window opens.

3. In the navigation area (left-hand window), select the drive where the authorization for the old version of SIMOTION SCOUT is located. Generally, the authorization will be installed on a hard disk drive on the PC.
4. Transfer the authorization to the data medium containing the upgrade license key.
   To do this, select the license in the right-hand window and select **License key > Transfer...** via the menu.
5. In the **Transfer license key** dialog, select the connected data medium. Start the transfer by clicking **OK**.
   The authorization and upgrade license key will then be located on the data medium.
6. Select **License key > Upgrade...** in the menu.
   The previous authorization will be deleted and a new *floating license* will be available once the upgrade is complete.

   Note

   Do not interrupt the upgrade while it is in progress. Interrupting this process can lead to the license key being lost.

7. Now transfer the new floating license onto the hard disk drive. To do this, follow the same procedure as before: Via **License key > Transfer...** in the menu
8. After the transfer has completed successfully, remove the automation data medium.
9. Exit the Automation License Manager. SIMOTION SCOUT can now be operated without restrictions.

4.4.2 Saving and moving the license key

Saving and moving the license key

You can transfer the license key to a removable disk. This is useful when you want to save the license key when reinstalling a PC or when you want to use it on another PC. A copy of the license key is not created during this operation, it is moved.

Note

More detailed information on the license keys can be found in the online help for the Automation License Manager.

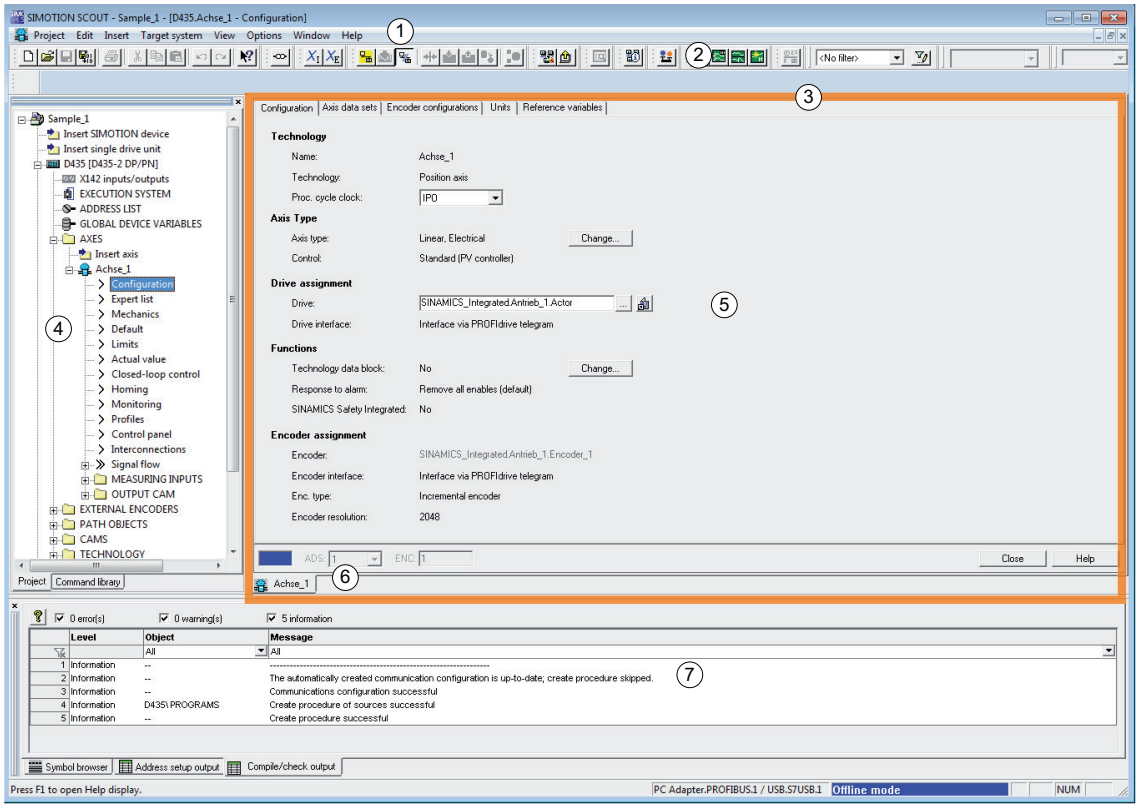
User interface

5

5.1 SIMOTION SCOUT - workbench

The SIMOTION SCOUT Workbench is the common framework for all other tools of the engineering system. The workbench is the navigation center of the individual engineering steps and offers a uniform and integrated view of all data and programs.

The following figure shows an example of the Workbench components:



① Menu bar
② Tool bars
③ Working area
④ Project navigator
⑤ Snap-in
⑥ Tab
⑦ Detail view

Workbench components

The workbench comprises the following components:

- **Menu bar**:
  You call the functions of SIMOTION SCOUT via the menus in the menu bar.
- **Tool bars:**
  Frequently used menu commands are also available in tool bars, which can be activated or deactivated as required. These provide quick access to the functions. The tool bars can be undocked from the header and relocated to a different position (e.g. at right, left, lower border) or as a window.
- **Working area**:
  The task-specific windows are displayed in the working area. In these windows, you can perform the configuration with wizards for the axis configuration and drive configuration. You also create programs in the working area. Further information about the active window in the working area is provided in the detail view.
- **Project navigator**:
  The project navigator provides an overview of the entire project. All defined elements, such as devices, drives, axes, etc., are displayed here in a tree structure.
- **Snap-in / tab:**
  A Snap-in is a program integrated automatically in the working area of the SIMOTION SCOUT Workbench. Snap-ins provide functions for processing SIMOTION SCOUT projects and are displayed as a work window in the working area of the workbench. Several Snap-ins can be opened. Open Snap-ins are displayed in the working area as tabs. The active Snap-in is visible in the foreground.
  The following Snap-ins are available:
  - Program editors
  - Wizards for the configuration of technology objects
  - Device diagnostics
  - Drive navigator
- **Detail display:**
  In the detail display, you can show more detailed information about the element selected in the project navigator and the active window in the working area, for example, variables of a program, system variables of a technology object, protocols of compiled program sources.

Additional references

Please refer to the following documents on these subjects

- Function Manual: *SIMOTION SCOUT Runtime Basic Functions*
- Function Manual: *SIMOTION Motion Control, Basic Functions for Modular Machines*
- Function Manual: *SIMOTION Motion Control, TO Axis, Electric/Hydraulic, TO External Encoder*
- Function Manual: *SIMOTION Motion Control, Synchronous Operation TO, TO Cam*
- Function Manual: *SIMOTION Motion Control Output Cams and Measuring Inputs*
- Function Manual: *SIMOTION Motion Control, TO Path Object*
- Function Manual: *SIMOTION SCOUT Supplementary Technology Objects*

and the online help.

Note

We recommend that you work through the sample configuration *Getting Started SIMOTION SCOUT*. This is a series of guided steps which teaches you how to work with SIMOTION SCOUT. For example, how to create, compile, and save a project, insert a SIMOTION device, insert and assign parameters for a technology object, and create a program.

When you have worked through all these steps, you will be able to create more complex projects.

Getting Started is available in two versions with different scopes, as a print document and in the online help.

Note

It is not recommended that you open **one** SIMOTION SCOUT project twice. This application case can result in malfunctions and is not supported by SIMOTION SCOUT. If you want to open two different projects, you must open SIMOTION SCOUT twice.

5.2 SIMOTION SCOUT - working area

The workbench displays all of the Snap-in work windows in the working area. Each Snap-in provides its own work window. You can open multiple instances of these windows. You can, for example, open several programs at the same time for editing. For further information, refer to the online help.

The following table provides an overview of the active functions in the working area of the workbench depending on the project mode (offline/online):

Function in project navigator	**Function in working area offline mode (Example)**	**Function in working area online mode (Example)**
Programs (MCC, ST, LAD/FBD) For further information, please go to: • SIMOTION MCC Motion Control Chart • SIMOTION ST • SIMOTION LAD/FBD	Create program	Monitor program
Execution system	Assign program	-
Technology objects (TO configuration)	Create and configure TO element	Change configuration data during RUN
Cam editor CamEdit/CamTool	Create cam	Change cam
Trace	Load and evaluate old recordings	Create current recordings
Axis control panel	-	Traverse axes during commissioning

Function in project navigator	Function in working area offline mode (Example)	Function in working area online mode (Example)
Drive control panel	-	Traverse drives during commissioning
Path control panel	-	Commission kinematics

Window in the working area

You can change the size of the windows in the working area:
Click the edge of the window, hold down the left mouse button, and drag the window to the required size.

To maximize or restore a window, press <Ctrl+F11>.

Each window opened in the working area can be accessed via a tab at the bottom edge of the working area.

The following options are available to bring a window into the foreground:

- Click the relevant tab.
- Select the appropriate entry in the **Window** menu.

To close a window, proceed as follows:

- Configuration dialogs:
  Click **Close**.
- Editors for MCC, ST and LAD/FBD:
  Click the **X** button in the top right-hand corner.

Configuration dialogs and editors can also be closed with <Ctrl+F4>.

5.3 SIMOTION SCOUT project navigator

5.3.1 Using the project navigator

The project navigator in the SIMOTION SCOUT workbench

The project navigator has two tabs as standard, the **Project** and **Command library** tabs.

The **Project** tab displays the entire project structure and is used for managing elements within the projects.

The commands and functions required for programming are displayed in a tree on the **Command library** tab. You can search in the command library or set filters. You can use commands and functions in the ST, LAD/FBD and MCC programming languages, e.g. for the

creation of conditions. In the MCC programming language, the functions are used, e.g. via the ST zoom or the system function call command.

5.3.2 Creating elements

Elements in SIMOTION SCOUT

There are different ways to insert elements in the project navigator tree:

Inserting hardware

Integrate hardware using:

- SIMOTION device element: **Insert SIMOTION device**

Alternatively, you can also call up the **Insert > SIMOTION device** menu.

- Drive element: **Insert single drive unit**

Note

You can insert a standalone drive (e.g. SINAMICS S120) with the **Insert single drive unit** element in the project navigator. It is commissioned using wizards in the working area of the workbench that contains the Starter functionality.

Elements within a SIMOTION device

Create the following elements within a SIMOTION device directly in the project navigator:

- Technology objects, e.g.:
  Axes, external encoders, cams, measuring inputs, output cams, synchronous operation, temperature channels, path objects
- Programs:
  - Insert ST program
  - Insert MCC source
  - Insert DCC charts
  - Insert LAD/FBD source

Other elements are created automatically, e.g.

- When creating a project:
  - Folder **LIBRARIES** (Insert library / insert DCC library)
  - Folder **LIBRARIES SINAMICS** (Insert DCC library)
  - Folder **MONITOR** (Insert watch table)
- When inserting a SIMOTION device:
  - **AXES**, **EXTERNAL ENCODERS**, **PATH OBJECTS**, **CAMS**, **TECHNOLOGY, PROGRAMS** folders
  - EXECUTION SYSTEM, ADDRESS LIST, GLOBAL DEVICE VARIABLES elements
- When creating an axis:
  - **MEASURING INPUTS**, **OUTPUT CAM, CAM TRACK** folders
  - Access to the configuration views
- Additionally when creating a following axis:
  - Synchronous operation element

Insert single drive unit

To insert a single drive unit element:

In the project navigator, double-click **Insert single drive unit**.
This enables you to insert a standalone drive (e.g. SINAMICS S120). The STARTER functionality in SCOUT is responsible for commissioning the drive concerned.

Inserting elements within a SIMOTION device

To insert technology objects, source files, or watch tables:

1. Open the SIMOTION device under which the element is to be created.
2. Select the relevant folder (e.g. **AXES**, **PROGRAMS**).
3. Select the desired function, e.g.:
   - **Insert > Technology object > ...** menu or
   - **Insert > Program > ...** menu or
   - **Insert > Watch table** menu

Displaying the station level of a SIMOTION device

This function provides a better transparency in large SIMOTION SCOUT projects. A project with several SIMOTION devices and a large number of drives can be displayed in a structure. The assignment in station levels, as known from SIMATIC STEP 7, is used.

If the function is activated, all drive units belonging to a STEP 7 station are displayed below this station.
If the function is deactivated, all drive units are displayed below the project.

Note

Optionally, the associated SIMATIC station of the SIMOTION device in the project navigator can be displayed. In this way, all drive units that are assigned to a SIMATIC station are also displayed in this structure.

Proceed as follows to activate or deactivate this function:

1. In the SIMOTION SCOUT, click the **Options > Settings** function.
2. Click the **Workbench** tab.
3. Activate/deactivate the **Display station level** function.
4. Click **OK** to confirm the change.

To become effective, the project has to be re-opened.

Opening the HW Config of a SIMOTION device

To call up the hardware configuration of a previously inserted SIMOTION device:

- In the project navigator, double-click the SIMOTION device whose hardware configuration you want to open or
- Select the desired SIMOTION device in the project navigator, open the context menu and click **Open HW configuration**.

5.3.3 Inserting a folder

Inserting a folder in the project navigator

For better structuring of objects in large projects, you can insert subfolders in the project navigator. Using this function, you can sort objects according to topic.

You cannot insert subfolders in DCC libraries and below slaves/devices.

To insert a subfolder, proceed as follows:

1. Select an object and perform **Insert > Folder** in the menu.
   or
2. Right-click the object and perform **Insert folder**.
   An empty folder is inserted.

5.3.4 Changing properties of the elements

You change the properties of an element as follows:

1. In the project navigator, select the element to be edited, e.g. a specific axis or a specific program.
2. Select the menu: **Edit > Object properties**.

Note

You define the hardware properties in the hardware configuration.

To rename an element:

1. Select the element you want to rename in the project navigator.
2. Open the context menu and select **Rename**.
3. Confirm the warning message.
4. Enter a new name and confirm the input by pressing the **Enter** key.

NOTICE
Damage resulting from errors in references to the axis Changing a name can have far-reaching consequences. References to the axis, particularly in programs, are lost. This can cause runtime errors in the program. • For this reason, make sure that you change all name references.

5.3.5 Wizards for configuration support

Wizards are provided to assist you in configuring axes and external encoders. The wizards guide you step-by-step through the configuration. Parameter interdependencies are taken into account.

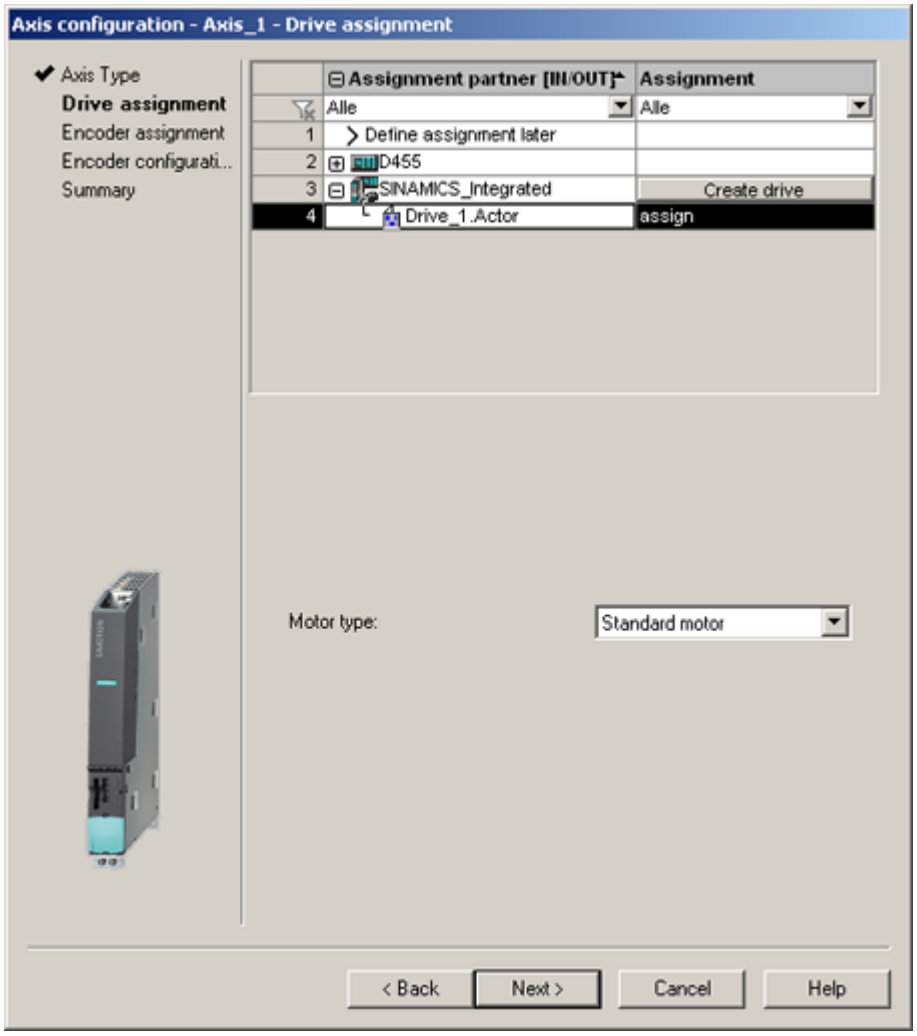


Figure 5-1 Axis configuration wizard - window for drive assignment

5.4 SIMOTION SCOUT - menus

SIMOTION SCOUT menus are subdivided into static and dynamic menus.

Static menu

Static menus are primarily used to control the workbench or a project and are permanently displayed.

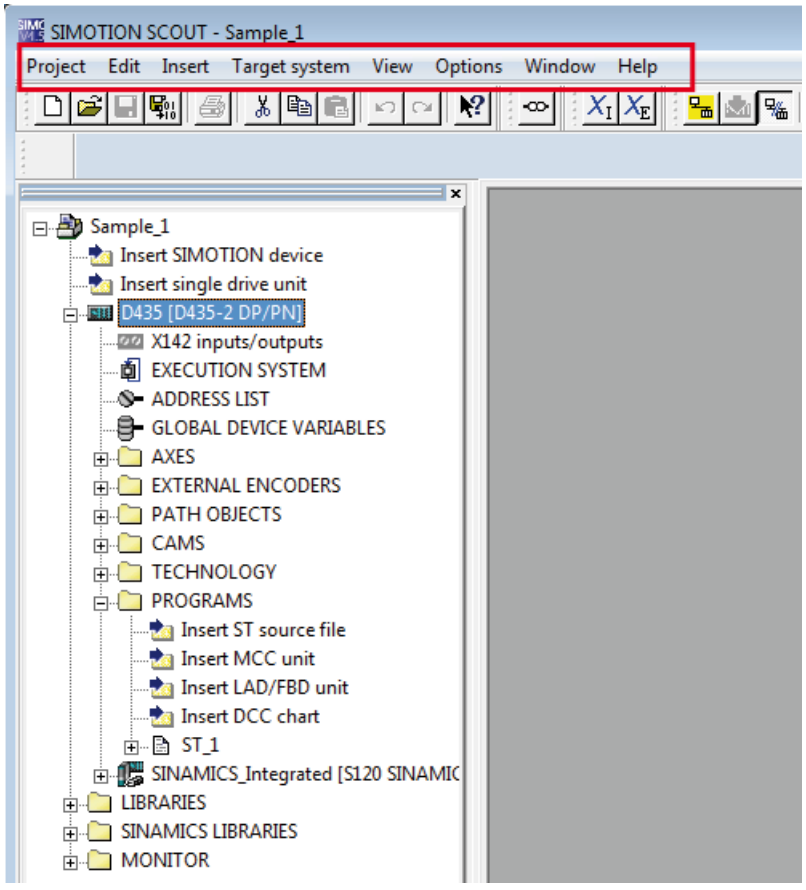


Figure 5-2 Static menu

Dynamic menu

Dynamic menus are provided by Snap-ins and are added to the static menu. The menu active in the working area is always displayed.

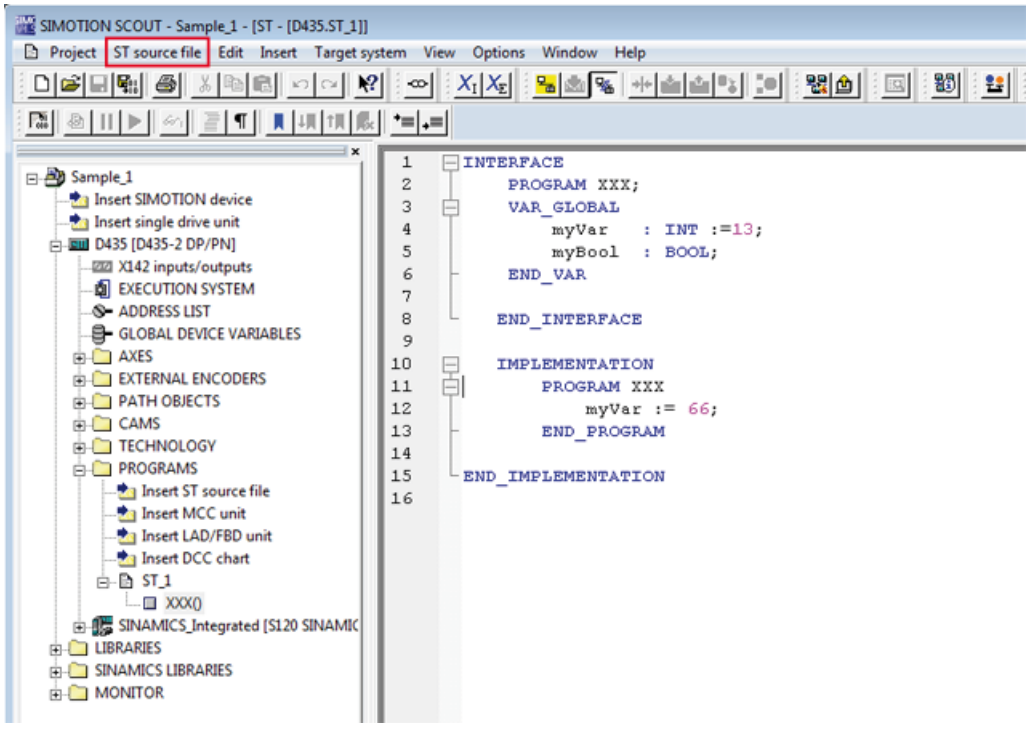


Figure 5-3 Dynamic menu

Table 5-1 Structure of the menu bar

Menu	Comment
Project	Static menu, always visible
(Dynamic menu)	See Dynamic menus table
Edit	Static menu, visible only when project has been loaded
Insert	Static menu, visible only when project has been loaded
Target system	Static menu, always visible
View	Static menu, always visible
Options	Static menu, always visible
Window	Static menu, always visible
Help	Static menu, always visible

Table 5-2 Dynamic menus

Dynamic menu	Comment
Axis	Visible only when the project is open and the associated Snap-in is active in the working area. The dynamic menus appear in the menu bar between the static menus **Project** and **Edit**.
Output cam	
Measuring input	
Synchronous operation	
Cam	
External encoder	
Sensor	
Controller object	
Drive	
Fixed gear	
Formula object	
Addition object	
Drive control panel	
Trace	
ST source file	
MCC source	Visible only when the project is open and the associated Snap-in is active in the working area. Dynamic menus appear in the second position on the menu bar, between Project and Edit.
MCC chart	
LAD/FBD source	
LAD/FBD program	

5.5 SIMOTION SCOUT - menu items

You can use the shortcuts listed in the table to call the menu items available in SIMOTION SCOUT.

Table 5-3 Menu items in SIMOTION SCOUT

Shortcuts	Menu item	Reaction
Project...		
Ctrl+N	New	Creates a new project
Ctrl+O	Open	Opens a project
Ctrl+S	Save	Saves a project
Ctrl+Alt+K	Check consistency	Checks project consistency
Ctrl+Alt+B	Save and compile changes	Saves the project and compiles the changes made in the project since the last compilation
Ctrl+P	Print	Prints the selected window
Alt+F4	Exit	Exits the SIMOTION SCOUT program

Shortcuts	Menu item	Reaction
Edit...		
Ctrl+Z	Undo	Undoes the last action
Ctrl+Y	Redo	Redoes the last action
Ctrl+X	Cut	Cuts the selection
Ctrl+C	Copy	Copies the selection
Ctrl+V	Insert	Inserts the clipboard contents
Del	Delete contents	Deletes the selection
F2	Rename	Renames the selected tree object
Alt+Enter	Object properties	Displays the properties of an object in the project tree
Ctrl+Alt+O	Open object	Opens a new object of the selected tree object
Ctrl+A	Select all	Selects the entire contents in the ST and MCC Snap-ins

Ctrl+F	Find	Opens the Find window
F3	Find next	Continues the search from the current position
Ctrl+Shift+F	Search in the project	Opens the Find window
Ctrl+Shift+G	Replace in the project	Opens the Find and Replace window

CTRL+H	Replace	Opens the Replace window
CTRL+J	Display next position	

Shortcuts	Menu item	Reaction
Target system...		
Ctrl+L	Download / target device	Downloads to individual target device
Ctrl+D Is possible only online	Device diagnostics	Opens device diagnostics
Ctrl+I Is possible only online	Control operating state	Opens the dialog for control of the operating state

Shortcuts	Menu item	Reaction
View...		
Ctrl+F11	Maximize working area	Maximizes and minimizes the view of the working area
Ctrl+F12	Maximize detail view	Maximizes and minimizes the view of the detail view
Ctrl+Num+ (Plus key on the numeric keypad)	Zoom in	Magnifies the diagram in MCC

Shortcuts	Menu item	Reaction
View...		
Ctrl+Num+ (Minus key on the numeric keypad)	Zoom out	Reduces the diagram in MCC
F5	Refresh	Refreshes the view

Shortcuts	Menu item	Reaction
Options...		
Ctrl+Alt+E	Settings	Opens the Properties window

Shortcuts	Menu item	Reaction
Window...		
Ctrl+Shift+F5	Arrange cascading	Arranges the opened windows in the working area
CTRL+SHIFT+F3	Arrange vertically	

Shortcuts	Menu item	Reaction
Snap-in menu...		
Ctrl+F4	Close	Closes the selected window
Ctrl+B	Accept and compile	Compiles the active object
Ctrl+E	Expert list	Opens the expert list for the current technology object

Shortcuts	Menu item	Reaction
ST source file		
Ctrl+space		Automatic completion
Ctrl+F2		Sets and deletes bookmarks
Ctrl+F4	ST source file > Close	Closes the ST source file
Ctrl+F7	ST source file > Program status on/off	Switches the program status function on or off
Ctrl+Shift+F2		Deletes all bookmarks in the ST source file
Ctrl+Shift+F3		Arranges windows, tile horizontally
Ctrl+Shift+F5		Arranges windows, tile vertically
Ctrl+Shift+F8		Formats the selected area
Ctrl+Shift+F9		Moves the cursor to the start of the current or higher-level block
Ctrl+Shift+F10		Moves the cursor to the end of the current block
Ctrl+Shift+F11		Moves the cursor to the start of the higher-level block, 1st level
Ctrl+Shift+F12		Moves the cursor to the start of the higher-level block, 2nd level
Ctrl+D		Duplicates the selected row
Ctrl+Alt+B		Displays bracket pairs in the current ST source file

Shortcuts	Menu item	Reaction
ST source file		
Ctrl+Alt+C		Folding: Hide all blocks of the current ST source file
Ctrl+Alt+D		Folding: Display all blocks of the current ST source file
Ctrl+Alt+F		Folding: Display or hide folding information in the current ST source file
Ctrl+Alt+I		Displays indentation level in the current ST source file
Ctrl+Alt+L		Displays or hides line numbers in the current ST source file
Ctrl+Alt+R		Folding: Display all subordinate blocks
Ctrl+Alt+T		Folding: Display/hide block.
Ctrl+Alt+V		Folding: Hide all subordinate blocks
Ctrl+Alt+W		Displays or hides spaces and tabs in the current ST source file
Ctrl+ADD (numeric keypad)		Increases the font size in the current ST source file
Ctrl+MINUS (numeric keypad)		Decreases the font size in the current ST source file
Ctrl+DIV (numeric keypad)		Resets the font size in the current ST source file to 100%
Alt+Shift+arrow key		Selects text by column
Alt+Shift+L		Changes selected text to upper case
Alt+Shift+U		Changes selected text to lower case

Shortcuts	Menu item	Reaction
MCC		
Ctrl+F4	Close	Closes the MCC source
Alt+Enter	Properties	Opens the MCC Source Properties window
Ctrl+R	Insert MCC chart	Inserts a new MCC chart
Ctrl+F7	Program status	Switches monitoring on and off
Ctrl+F8	Monitor	
Ctrl+F9	Single-step	
Ctrl+F10	Next step	
Return	–	Opens the MCC configuration dialog
Arrow keys	–	Changes within the tab

Shortcuts	Menu item	Reaction
LAD/FBD (source or program)		
Ctrl+F4	Close	Closes the MCC source
Alt+Enter	Properties	Opens the MCC Source Properties window

Shortcuts	Menu item	Reaction
LAD/FBD (source or program)		
Ctrl+R	LAD/FBD source: Insert LAD/FBD program LAD/FBD program: Insert network	Inserts a new LAD/FBD program
Ctrl+L	Jump label On/Off	Switches jump labels on and off
Ctrl+Shift+K	Display/comment On/Off	Switches comments on and off
Ctrl+Shift+B	All box parameters	Displays all box parameters
Ctrl+T	Symbol check and type update	Performs symbol check and type update
Ctrl+F7	Program status	Switches monitoring on and off
Shift+F2 for LAD Shift+F2 for FBD	Insert element / Insert make contact element / AND box	Inserts a make contact Inserts an AND box
Shift+F3 for LAD Shift+F3 for FBD	Insert element / Insert break contact element / OR box	Inserts a break contact Inserts an OR box
Shift+F7 for LAD Shift+F7 for FBD	Add element / Add coil Add element / assignment or jump	Adds a coil Adds an assignment or a jump
Shift+F8 for LAD Shift+F8 for FBD	Insert element / Insert Open branch element / Insert binary input	Inserts an Open branch Inserts a binary input
Shift+F9 for LAD Shift+F9 for FBD	Insert element / Insert Close branch element / Invert binary input	Inserts a Close branch Inverts the binary input
Shift+Alt+F9	Insert element / empty box	Inserts an empty box
Ctrl+3 Ctrl+1	Switch to FBD Switch to LAD	Switches the display

Shortcuts	Menu item	Reaction
Help...		
F1	Help topics	Opens the entire help available for SIMOTION SCOUT
Shift+F1	Context-sensitive help	Opens the context-sensitive help function for the selected object, parameter, etc.

Shortcuts	Menu item	Reaction
Hardware configuration...		
Ctrl+U (in HW Config)	Address overview	Opens the Address Overview window
F4	Optimize layout	

Note

List of all shortcuts

A complete list of all the shortcuts in SIMOTION SCOUT is available in the online help, and in the appropriate programming and operating manuals.

5.6 SIMOTION SCOUT - keyboard operation and shortcuts

Note

There are various keyboard assignments and shortcuts for the menu items to facilitate your work in SIMOTION SCOUT.

The following table provides an overview of the keyboard assignments and shortcuts that you can use for SIMOTION SCOUT.

Table 5-4 Keyboard operation

Keyboard operation / shortcuts	Meaning
Workbench: Change window...	
Alt+0	Project navigator
Alt+1	Working area
Alt+2	Detail view
Ctrl+F6	Next window in the working area
Ctrl+F11	Minimize/maximize working area in relation to the whole desktop
Ctrl+F12	Minimize/maximize detail view in relation to the whole desktop

Project navigator	
Click with left mouse button	Selects the tree object at the cursor position; the detail view displays the associated details
Double-click with left mouse button	Selects the tree object at the cursor position; the detail view displays the associated details; the associated Snap-in opens
Click with right mouse button	Selects the tree object at the cursor position; the detail view displays the associated details; the context menu opens
"Up/Down" arrow keys	Selects the tree object at the cursor position
"Return"	Snap-in for the selected tree object opens
"Context menu key"	Context menu for the selected tree object opens

Program editors	
Alt + "Left/Right" arrow keys	Go to the use location (starting at the selection)

5.7 SIMOTION SCOUT - using the context menus

The tree elements of the project navigator have context menus. These provide quick access to all major functions enabled for this tree element.

To call the desired function of the tree element via context menus, proceed as follows:

1. Select the appropriate element in the project navigator.
2. Open the context menu with a right-click.
3. Left-click the appropriate command to select it.

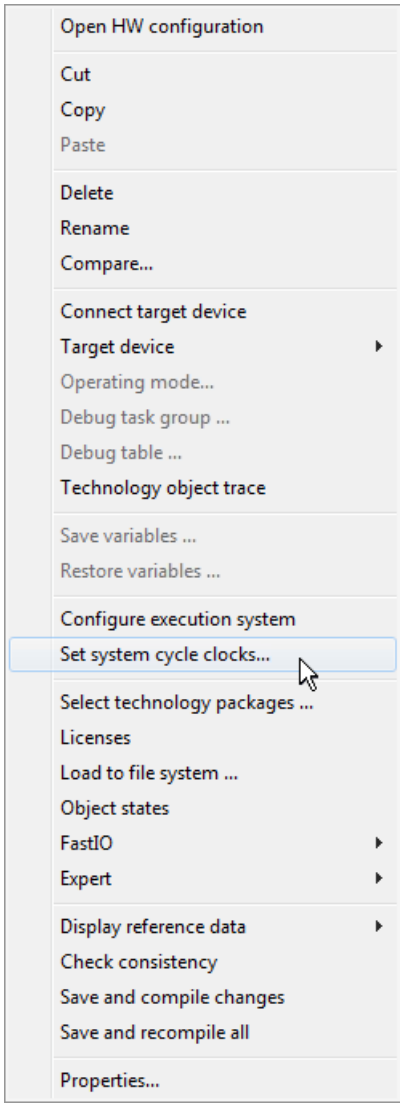


Figure 5-4 Context menu for SIMOTION device

5.8 SIMOTION SCOUT - detailed view

5.8.1 Using the detail view

When you select an element in the project navigator, the associated detail view will appear in the lower area of the workbench. A detailed view is not available for every element.

Depending on the selected element, different tabs are offered and information about the element is displayed therein.

To display the address list and the watch table, you must open them with a double-click. The detailed view then displays in the associated tabs the appropriate content for the selected element.

The tabs available are determined by the project mode (offline/online) and the active Snap-ins.

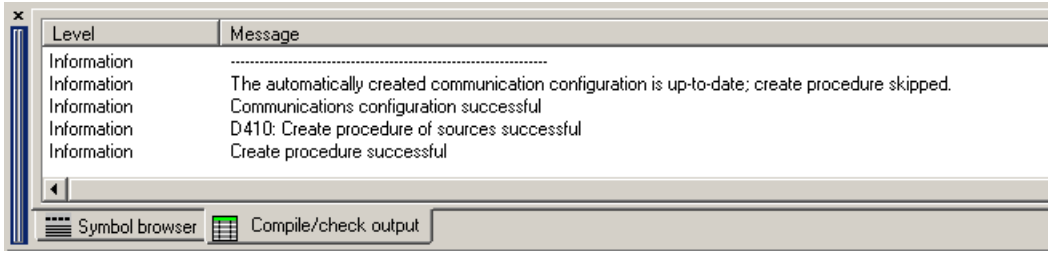


Figure 5-5 Example of detail view

Each tab is opened just once, i.e.:

- The active tab shows the details of the selected element.
- The contents of the tab change when you select a different element.

You can maximize or minimize each tab with <Ctrl+F12>.

5.8.2 Using the symbol browser

The symbol browser is a tab in the detail view. The symbol browser displays status values of the variables for the element selected in the project navigator.

Display symbol browser

To display the symbol browser, proceed as follows:

1. Select an element in the project navigator.
2. In the detail view, select the **Symbol browser** tab.

Displaying the symbol browser content continuously

To continuously display the content of the symbol browser for a selection, e.g. for the execution system, proceed as follows:

1. Click the symbol at the top right in the symbol browser view.

The active element remains displayed until this function is deactivated. To deactivate this function, click the pin again.

5.8.3 Address list

The address list is where you create I/O variables, which you then assign to a particular item of hardware. You can monitor I/O variables in the address list, and, when necessary, modify them. The I/O variables are assigned either manually or via an assignment wizard.

Opening the address list

To open the address list, proceed as follows:

1. Browse to the folder for the device in the project navigator.
2. Double-click the **Address list** element below the device.
   The address list opens in the details area.

Additional references

Further information about the address list is available in the SIMOTION SCOUT online help.

5.8.4 Watch table

With the symbol browser you can view the variables belonging to one object in your project; with the program status you can view the variables belonging to a selected monitoring area in the program. With watch tables, in contrast, you can monitor selected variables from different sources as a group (e.g. program sources, technology objects, SINAMICS drives - even on different devices). You can sort the variables in the watch table in any way you want, add comments regarding them, and combine them into groups. You can hide individual variables to make the watch table more manageable and also control variables via the watch table directly.

Creating a watch table

To create a watch table and assign your variables, proceed as follows:

1. In the project navigator, open the **Monitor** folder.
2. Double-click the **Insert watch table** entry to create a watch table.
3. Enter the name of the watch table.
   A watch table is created with this name in the **Monitor** folder.
4. In the project navigator, click the object from which you want to move variables to the watch table.

5. In the symbol browser, in the address list or in the expert list, select the corresponding variable line by clicking its number in the left column.
6. From the context menu, select the **Add to watch table** command and the appropriate watch table, e.g. **Watch_table_1**.
7. If you click the watch table, you will see from the **Watch table** tab of the detail view that the selected variable is now in the watch table.
8. Alternately, you can copy-and-paste variables to the watch table or enter them from the keyboard.
9. To monitor the variables of various objects, repeat steps 3 to 6.

You can also create a watch table directly by selecting a variable followed by **Add to watch table > New watch table** in the context menu.

The new watch table, containing the selected variable, is created automatically.

If you are connected to the target system, you can monitor the variable contents.

Using several watch tables (Watchtabelle_temp)

If you want to monitor several watch tables simultaneously (watch tables of different objects), create a temporary watch table.

The temporary watch table has the following properties:

- It is always called Watchtabelle_temp
- It does not save the contents when it is closed
- It can be filled using drag-and-drop
- It does not support control records
- With dropped watch tables, it does not display any control values (control checkmarks are not set).
- Transfers the control values and control checkmarks; Create copy transfers them to the copy of the temporary watch table.

Using a temporary watch table

1. Click **Watchtabelle_temp** below **Monitoring** in the project navigator.
   The temporary watch table is displayed in the detail view.
2. Drag the required watch tables to the temporary watch table using drag-and-drop.
   The watch tables are arranged one below the other.

Additional references

Detailed information on this topic is available in the SIMOTION SCOUT online help.

5.8.5 Working with lists

You have various options to make working with lists (e.g. watch table, address list, symbol browser or expert list) more transparent and easier to configure, and also to be able to display larger data volumes in a structure. You can hide unimportant or redundant information and focus on important information. You can also transfer and group contents quickly and easily.

Additional references

Detailed information on this topic is available in the SIMOTION SCOUT online help.

5.9 SIMOTION SCOUT - language settings

Language setting of the SIMOTION SCOUT

SIMOTION SCOUT uses the language default setting in the SIMATIC Manager. You can make changes to this setting in the SIMATIC Manager via the **Options > Settings... > Language** menu.

German, English, French and Italian languages are currently available in SIMOTION SCOUT. If a different language is set in the SIMATIC Manager, SIMOTION SCOUT uses the English setting.

Note

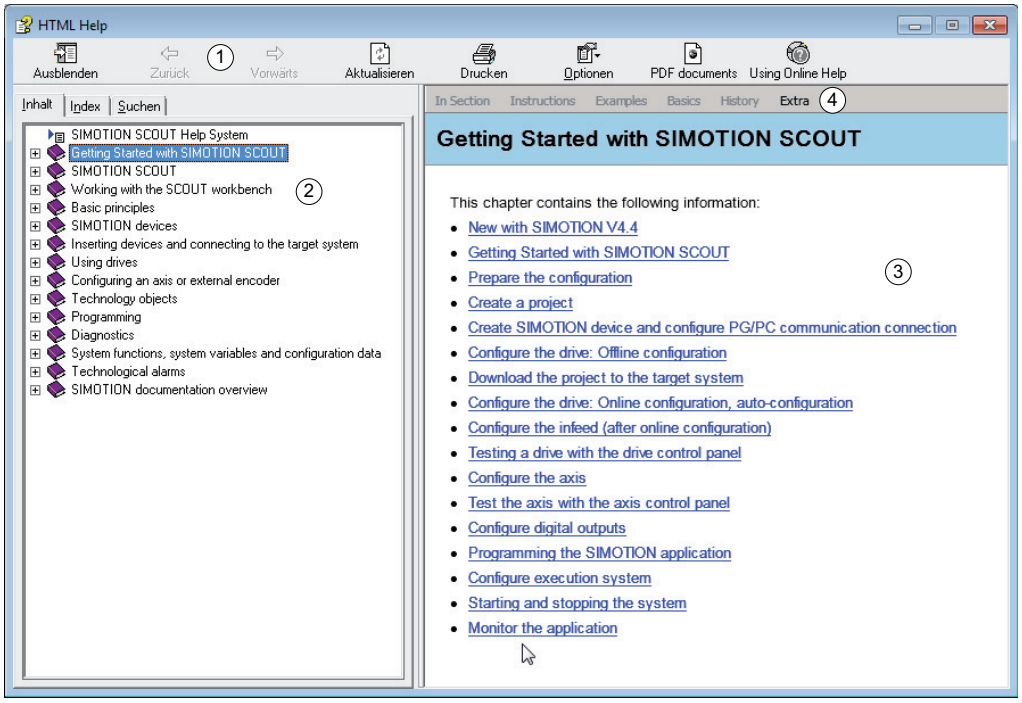
Only those languages installed in STEP 7 are available.

5.10 SIMOTION SCOUT - using help

5.10.1 SIMOTION SCOUT Online Help

SIMOTION SCOUT has a comprehensive context-sensitive help. The following is a description of how to work with the help system using different examples.

Structure of the online help window



1 Menu bar

You can use buttons in the menu bar to configure the help or display general information.

- Click "PDF documents" to display the available function diagrams.
- Click "Use online help" to display the help page for the full text search on the "Search" tab.

2 Navigation area

In the navigation area you can navigate through the help, open the index or search through the entire help.

- Click the "Contents", "Index", or "Search" tab to navigate through the help.
- Click the "+" in front of a book to open the table of contents.
- Click a book or help page to display its contents in the contents area.

3 Contents area

The contents for the help pages selected in the navigation area are displayed in the contents area.

Within the contents area, you can use symbols to display hidden information:

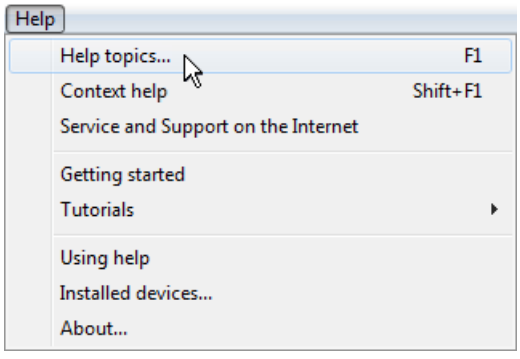
- Click the arrow to display or hide additional information.
- Click the minimized view to display a hidden figure.
- Click the copy symbol. The following program code will be saved automatically in the clipboard. You can then insert this in a program editor.

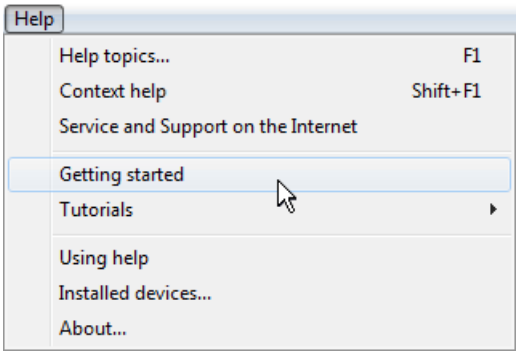
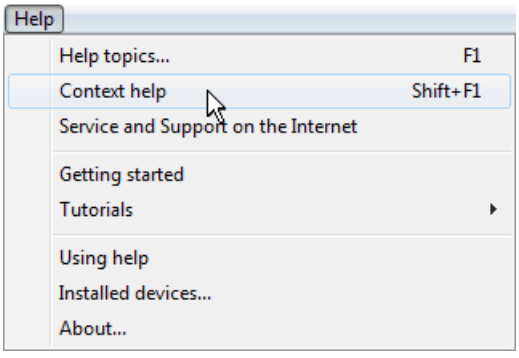
4 Link bar

The header area of many help pages has a link bar. This link bar displays further information for the selected help page. The link bar contains the following entries:

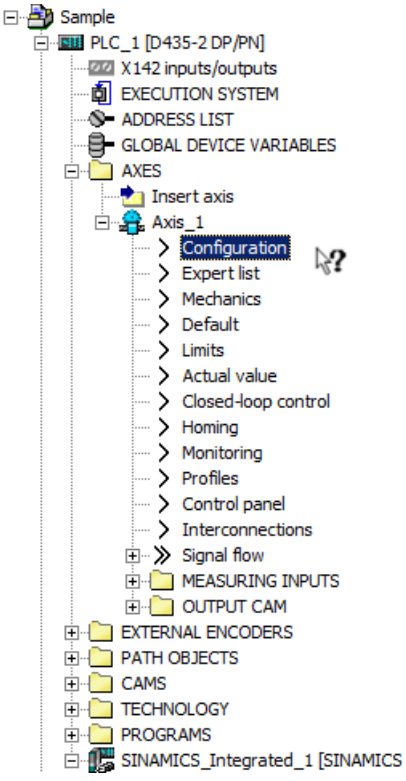
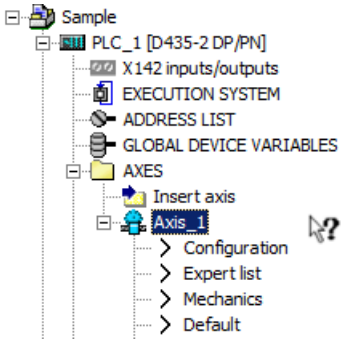
- In Section
  Links to headers of the displayed topic.
- Manuals
  Links to handling instructions.
- Examples
  Links to examples.
- Fundamentals
  Links to background information, such as definitions or details.
- History
  List of the most recently opened help pages.
- Options
  Link to the start page.
  Forwards and backwards in the previously opened help pages.

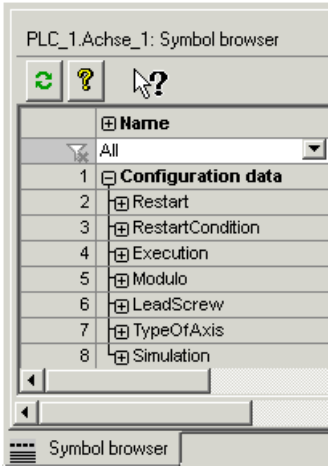
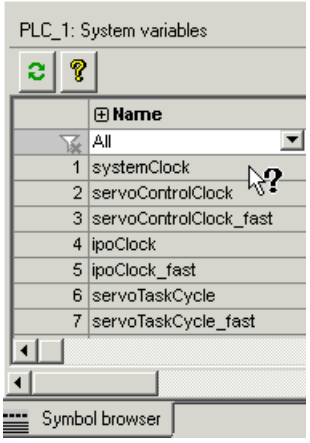
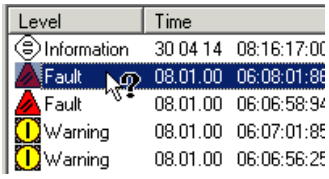
Features of online help

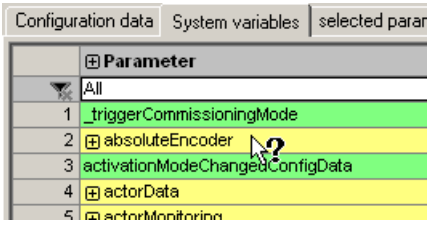
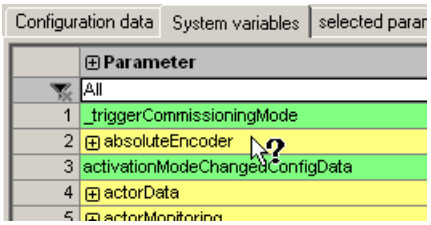
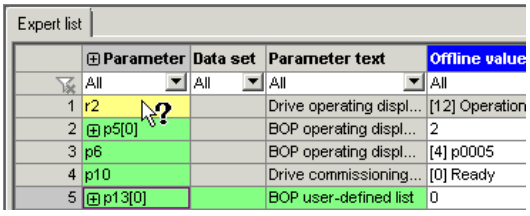
Features of online help	To open the help:	
Open entire help	Key <F1>	Press <F1>.
	or	
		Select "Help > Help topics" from the menu.
	The entire help opens.	

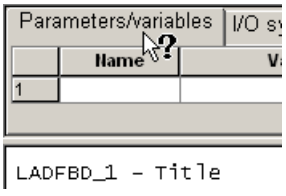
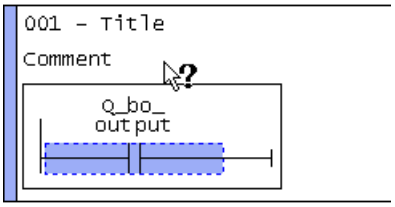
Features of online help	To open the help:	
Open Getting Started		Select "Help > Getting Started" from the menu.
	Getting Started opens.	
Help button	 or 	Click the Help button of the associated dialog or window.
	The context-sensitive help for the dialog opens.	
Context-sensitive help	<Shift+F1>	• Press <Shift+F1>.
	• or	
		• Click the button in the menu bar.
	• or	
		• In the menu, select "Help > Context help".
	The mouse pointer changes to a question mark.	
		• Then click with the changed mouse cursor on the dialog, the parameter, the input field or the menu item.
	The context-sensitive help for the selected entry opens.	

Examples of the context-sensitive help

Help in the project navigator		
General help		Press <Shift+F1>. Then click with the question mark on the project navigator. The general help for the project navigator opens.
Help for the technology object **(only SIMOTION)**		Press <Shift+F1>. Then click with the question mark on a technology object in the project navigator. The help for this technology object opens.

Help for the detail view		
General help for the symbol browser		Press <Shift+F1>. Then click with the question mark in the margin of the symbol browser. Alternatively, you can also open the help for the symbol browser by clicking . The general help for the symbol browser opens.
System variables in the symbol browser		In the project navigator, select the SIMOTION device or the technology object. The system variables of the element are displayed in the symbol browser. Press <Shift+F1>. Then click with the question mark on the system variable in the symbol browser. The associated help opens.
Help for alarms		Press <Shift+F1>. Then click with the question mark on the alarm shown on the "Alarms" tab. The help for the drive alarm or technological alarm opens.

Help for the expert list		
Configuration data		Press <Shift+F1>. Then click with the question mark on the configuration data item in the expert list. The help opens.
System variables		Press <Shift+F1>. Then click with the question mark on the system variable in the expert list. The help opens.
Parameters of the drives		Press <Shift+F1>. Then click with the question mark on the parameter in the expert list. The help opens.

Help for the LAD/FBD editor (only SIMOTION)		
Declaration area		Press <Shift+F1>. Then click with the question mark on a tab in the declaration area of the LAD/FBD editor. The help opens.
Editor area		Press <Shift+F1>. Then click with the question mark on an element in the editor area of the LAD/FBD editor. The help opens.

5.10.2 Searching in the online help

You can carry out a full-text search throughout the entire Help in the **Search** tab.

With a full-text search, you have to consider certain points to ensure that the search is successful. A simple search according to subject consists of the word or expression you want to find.

To refine your search, you can use wildcard expressions, nested expressions, Boolean operators, similar word hits, the previous result list or subject titles.

To carry out a full-text search:

1. In the menu bar, select **Help > Help topics** or press key **F1**. The entire help is displayed.
2. Click the **Search** tab and enter the search term. You can add Boolean operators by clicking the arrow next to the input field.

   Note

   If you enter the term *System*, this term is sought throughout the entire Help. Only the Help pages that contain the word *System* are found. Compound words, e.g. *Systemclock* are not found. Therefore it is usually more appropriate to search with wildcards if you are not searching for a definite term, e.g. **system** returns all the results that contain *system*.

3. Click **List subjects** to start the search. The search returns a maximum of the first 500 hits. If you want to sort the subject list, click **Title**, **Position** or **Order**. With many search results, it is better to sort them by position so hits are grouped together by subject matter.
4. Double-click the desired subject to display the Help page. The found terms are highlighted on the page.

   Note

   If the terms are not highlighted, of if you want to turn the highlighting off, click the **Options** button. select Activate/deactivate search term highlighting in the menu displayed.

You can also search just within the last result list, include similar word hits or only search the subject titles in the table of contents.

In the case of multiple matches, a clearer overview can be obtained by sorting them with **Position** , as the search results will then be arranged according to the associated topic.

Additional references

For more information regarding this topic, see the online help.

5.10.3 Getting Started with SIMOTION SCOUT

Calling Getting Started with SIMOTION SCOUT

Getting Started is displayed by default when SIMOTION SCOUT is opened.

Getting Started provides an overview of how you can work with SIMOTION SCOUT. An example shows you the different steps required to create a project and introduces the configuration, programming, and diagnostic tools.

In addition, the "New with SIMOTION V4.5" section provides an overview of which new functionalities are available in the latest version of SIMOTION.

Note

We recommend that you work through Getting Started with SIMOTION SCOUT. You will then be able to start work on more complex projects as well.

Note

Getting Started is available in two versions as of Version 4.4. The print version deals with the sample configuration based on a SIMOTION D435-2. The online help is more comprehensive. It takes account of all three SIMOTION platforms, as well as: Drive configuring with the drive wizard, testing of the drive with the drive control panel, configuring of a virtual axis.

Deactivating the Getting Started with SIMOTION SCOUT online help

To deactivate the default setting that automatically opens the online help when you launch SIMOTION SCOUT:

1. In the menu bar, select **Options > Settings...**
2. Click the **Workbench** tab.
3. Deactivate the **Display "Getting started" at start** checkbox.
4. Click **OK**.

5.10.4 Error remedy

In the online help, you can find detailed information about error messages appearing in the detail view of the SIMOTION SCOUT workbench. This is possible for technology object alarms and alarms for drive units and I/O devices.

To do this, click the **Help for event** button.

To call the context-sensitive help for the associated compiler error messages in the detailed view, click the  button and then the question mark for the associated message.

Additional information about the error text can be found using the full-text search.

5.11 Adding add-ons to the workbench

Add-ons in SIMOTION SCOUT

SIMOTION provides you with the option of enhancing the functionality or accommodating customer-specific requirements. You can integrate add-ons. The CamTool add-on is currently available.

Note

More detailed information about the CamTool add-on is contained in the *SIMOTION SCOUT CamTool* configuration manual or the associated online help.

Add-ons are added to the workbench and are displayed as fully integrated:

- Menus and toolbars appear at the appropriate position in the workbench. After installation of add-ons, the menus are visible and the toolbars are active.
- The working windows appear in the working area of the workbench and have tabs.
- The detail view of the workbench shows details about the currently active add-on. If the associated details are distributed over several tabs, you can select the relevant tab and place it in the foreground.

Configuring/parameterizing 6

6.1 Configuration overview

In order that the machine or plant can perform the desired tasks, you must carry out the following steps with SIMOTION SCOUT:

- Create a project:
  The project is the generic term under which you store all of the relevant files.
- Configure hardware:
  Provide the SIMOTION system with information about the hardware.
- Configure technology objects (TO):
  Provide the SIMOTION system with information about the technologies used.
  SIMOTION SCOUT provides wizards for comprehensive assistance.
- Create and test open-loop and closed-loop control programs.
- Commission and optimize drives and axes.
- Test the system and utilize the diagnostic options.

SIMOTION SCOUT provides the workbench to enable you to perform these steps easily and efficiently.

6.2 SIMOTION SCOUT - basic settings

In SIMOTION SCOUT, you have the possibility of predefining various basic settings via the **Options > Settings** menu. Detailed information on the individual tabs and settings is provided in the SIMOTION SCOUT online help.

1. Open SIMOTION SCOUT.
2. Click the **Options > Settings...** menu.
   The **Settings** window opens.
3. Click the desired tab.
4. Enter the settings.
5. Click **OK**.

Note

Select **Scripts > Additional scripts > Scripts for SIMOTION SCOUT Engineering** in *Utilities&Applications* to access scripts for making useful standard settings.

6.3 Managing projects

6.3.1 SIMOTION SCOUT project

The project is the highest level in the data management hierarchy. SIMOTION SCOUT saves all data which belongs, for example, to a production machine, in the project directory. The project is therefore the sum of all data, programs, settings, etc.

The project encompasses all of the SIMOTION devices, drives, etc., that belong to a machine. The axes, external encoders, path objects, cams, technology, and programs are assigned hierarchically to the respective devices. This hierarchical structure is displayed in the project navigator.

6.3.2 Creating a new project

To create a new project

1. Open SIMOTION SCOUT from the Start menu on the Windows desktop **Start > All Programs > Siemens Automation > SIMATIC > STEP 7 > SIMOTION SCOUT** (Windows 7)**.**
   Or double-click the **SIMOTION SCOUT** icon on your PC desktop.
   SIMOTION SCOUT starts the workbench and the online help **Getting Started SIMOTION SCOUT**.
2. In the workbench menu bar, select **Project > New**.
   The **New Project** window opens.

Note

SIMOTION SCOUT creates a directory with the selected name. All files relevant to the project are stored in this directory.

Directory names and file names are shortened to 8 characters. If you assign longer names, they are displayed in SIMOTION SCOUT. However, these names are only managed with 8 characters in the Explorer.

Special characters may not be used.

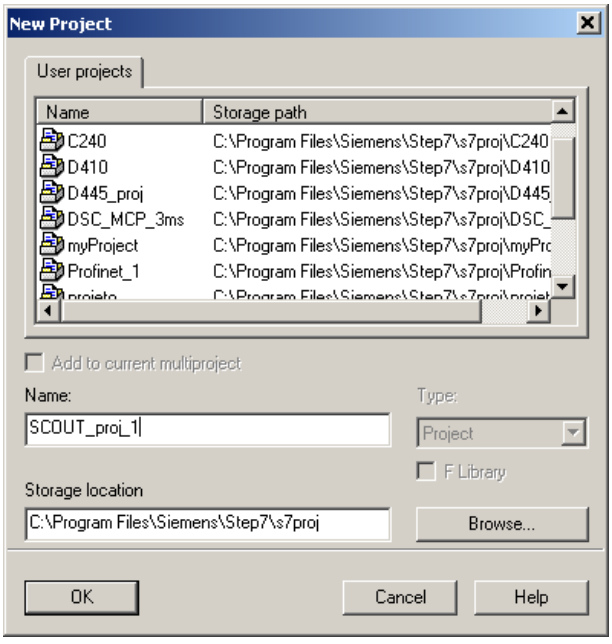


Figure 6-1 Creating a new project

3. Enter the following data in the dialog window:
   - **Name**:
     Select a name for the project.
   - **Storage location (path)**:
     The default storage location (path), where the new project is to be stored, is displayed here.
4. Click **OK** to confirm.

The new project appears in the project navigator with an icon and its full name. The associated tree is expanded.

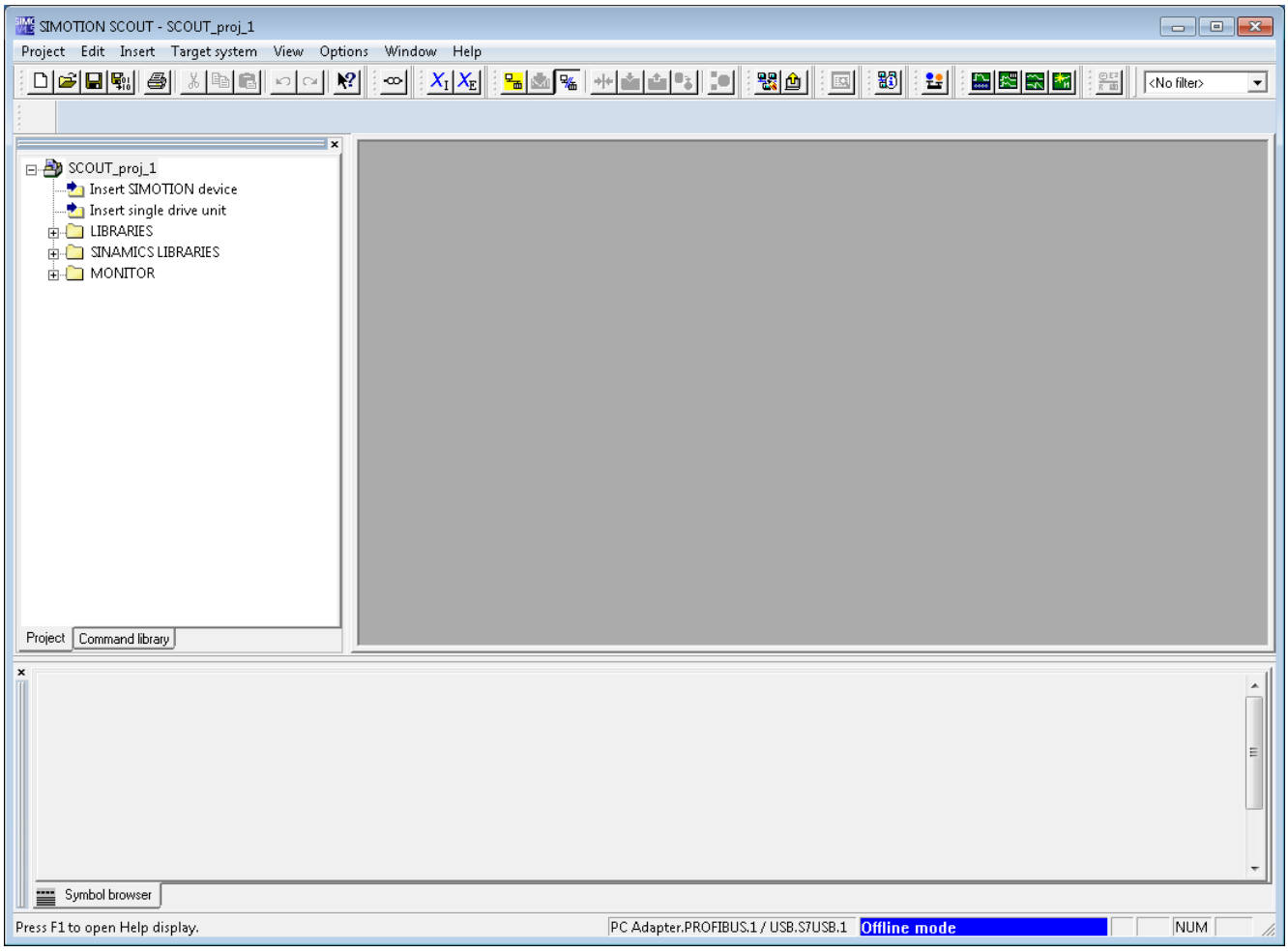


Figure 6-2 Workbench with new project

The following entries are located beneath the project name in the project navigator:

- **Insert SIMOTION device** element. Double-click this icon to select the required SIMOTION device, create and configure a new subnet and insert the new device in the HW Config program.

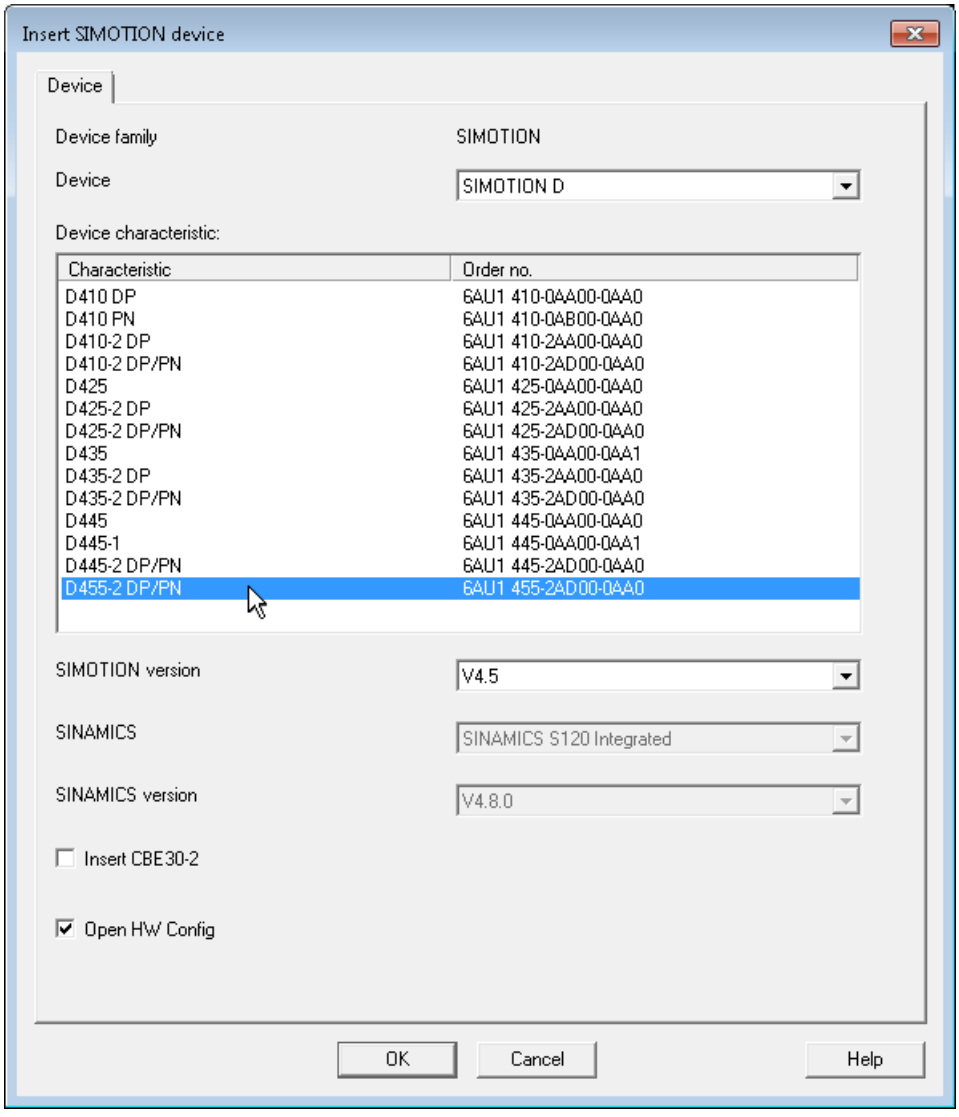


Figure 6-3 Insert SIMOTION device

- **Insert single drive unit** element. Double-click this icon to insert and commission a standalone drive (e.g. MM4 Basic). Although this drive cannot be linked to or configured in the master system of the project using a PROFIBUS DP connection, it appears in the project navigator within the project.
- Folder labeled **LIBRARIES**
- Folder labeled **MONITORING**

6.3.3 Open project

To open a project saved on the hard disk of the PC:

You can open projects that SIMOTION SCOUT has stored locally (e.g. on the hard disk).

1. Select the **Project > Open** menu.
2. In the **User projects** tab, select the desired project.
   If the project you want is not stored according to the default path: Click **Browse...** and follow the instructions on the screen.
3. Click **OK** to confirm.

If you want to open a project that was created in an older version, a message appears asking whether the project should be converted to the newer version. This function is available since SIMOTION SCOUT Version V3.1.

Note

The **Save as...** function saves all previously made changes with a new name (as of V4.4).

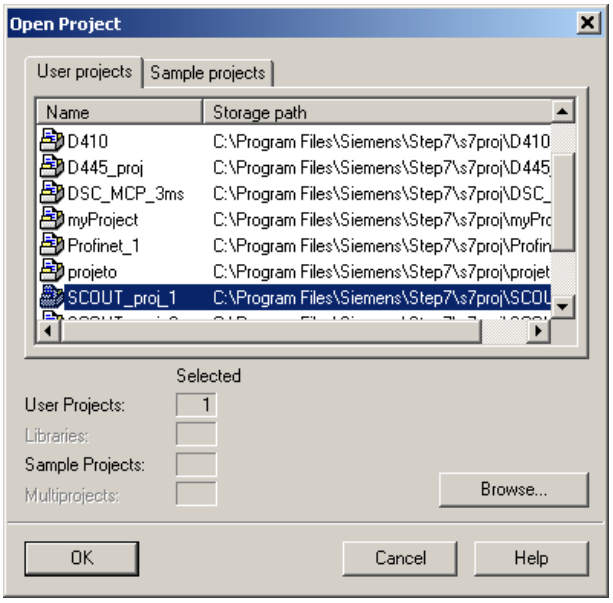


Figure 6-4 Opening a project stored on the hard disk

Note

The workbench displays one project at a time.

If you want to display two projects at the same time, e.g. in order to copy/paste parts of a project, start SIMOTION SCOUT a second time.

6.3.4 Saving and compiling

SIMOTION SCOUT distinguishes three commands in the main project menu that act differently when saving or saving and compiling:

- Save
- Save and compile changes
- Save and recompile all

Note

The project must be saved and compiled first before the download. For the default setting of SIMOTION SCOUT, these steps are performed automatically during the download.

Save

The project is saved to the hard disk. The changes are accepted into the project. No further processes (such as compilation or consistency checking) are triggered for the project.

Save and compile changes

On this command, the whole project is searched for changes. If a source is found which has been changed or has no compilation results, this and any linked sources are compiled and saved (e.g. during an FB call). Therefore only the changes are compiled. Use this command when performing your day-to-day tasks within a SCOUT version.

Save and recompile all

All sources of the entire project are recompiled with this command.

The **Save and recompile all** command is suitable if you are entirely sure that all the old data from older SCOUT versions has been removed and should be replaced with new compilation results. The command incorporates the following steps:

- Project-wide deletion of all compilation results
- Recompilation of all objects

Use this command if you specifically want to convert a project from an earlier SCOUT version to a later one. This involves accepting all the error correction and optimization elements in the new SCOUT. However in this case, the compilation results in the SIMOTION SCOUT and SIMOTION RT become inconsistent. The project navigator and object comparison feature then display the objects as "inconsistent" in ONLINE mode. You can only debug the project if you have loaded the entire project to the target system.

Note

The compilation results remain consistent provided there were no error messages and the compiler has not been changed.

Note

Libraries are compiled only for the device versions in which they are used.

6.3.5 Performing a consistency check

Checking the project for consistency and compiling the project

Before you download the project to the target system, the program sources must be compiled without error and the consistency ensured. In this process, I/O addresses or TO configurations are checked, for example.

1. Select the **Project > Save and compile all** menu.
2. SIMOTION SCOUT compiles all the changed sources.
3. Select the **Project > Check consistency** menu.

SIMOTION SCOUT checks, for example, whether all technology objects have been configured and that the source files have been compiled without errors.

To compile all programs automatically before a download and to check the consistency, the **Compile all programs before loading** and **Check consistency before loading** checkboxes must be activated via **Options > Settings** on the **Download** tab.

For further information, please refer to the online help for SIMOTION SCOUT.

6.3.6 Archiving and backing up projects on memory cards

Procedure

In SIMOTION SCOUT, you can back up your project to the memory card as a *.zip file.

Proceed as follows to archive the SIMOTION project on the memory card:

1. Open SIMOTION SCOUT and select the **Project -> Archive -> Normal...** menu command.
2. In the **Archive** dialog, select the SIMOTION project and save it to your drive (PG/PC).
3. Open the project.
4. Go online with SIMOTION.

5. In the project navigator, select the SIMOTION device and execute the **Target system -> Load -> Save archived project on card ... -> Normal ...** or **Reduced ...** menu command (see below).
6. In the dialog that is displayed, select the project and click **Open**. This saves the project to the CompactFlash Card as Project.zip in the directory USER\SIMOTION\HMI\PRJLOG.

Note

If you want to load the current project from the card, select the **Target system > Copy archived project from card to PG/PC...** menu command.

Prerequisite is that you have backed up the project with **Save archive project on card...** each time a change was made.

Reducing the project archive

If, for example, you want to send a project as an e-mail, the normal archived and zipped archives are too large.

You can influence the archiving of projects with the **Project > Archive > Reduced ...** function.

- Remove data from the archive to reduce the file size.
- Divide the archive into packets, so that you can create several ZIP files that are combined again when dearchiving.

For further information, please refer to the online help for SIMOTION SCOUT.

Additional references

Detailed information on loading data to the target device can be found in the *SIMOTION SCOUT Basic Functions* Function Manual.

6.3.7 Exporting and importing a project in XML format

A log of the export or import is displayed in the **XML export/import status display** tab in the detail view. The XML export log also contains a link to the exported file. Double-click this link to view the exported project data in the Internet browser.

Note

Projects are exported and imported version-neutral. However, if a project has version-specific properties, related errors may occur following import into another SCOUT version, e.g. when compiling ST programs.

Exporting project/objects in XML format

To export the entire project data in XML format:

1. Select **Project > Save and export**. The **Export Project** window with the **XML export/import status display** tab opens.
2. Select a target directory by clicking the **Browse** button. If you do not change the path, the export files are saved in the current project folder as standard. See also "Export of projects".
3. Click OK to confirm.
   The files in the target directory are deleted and the export of the project data is started. On completion of export, the successfully completed export and the target path are displayed in the XML export/import status display tab of the detail view.
4. Click the link silhouetted in blue to obtain more precise information about the exported project.

Importing an XML file

Select the file of the technology object / device in XML format to be imported to a new project. As import file, always select the XML file which has the name of the technology object / device. Normally the exported file is displayed in this field so that you only have to perform the following steps when you want to import another file.

To select the import file:

1. Click **Browse** to the right of the text field. A window opens.
2. Select the XML file that is to be imported.
   Only a technology object that is completely available can be imported. Always select the XML file which has the name of the previously exported technology object as the import file. If it is not possible to import the selected file, the import is aborted.
3. Click **Open** to confirm. The window closes and the source path is displayed.

Additional references

Please refer to the online help on this subject

6.3.8 Searching in the project

In the open project, you can search all the project data for variables or any text.

If you select a variable search, you can also search within the ST sources. All global and local variables at the declaration and use points are recognized.

Open the dialog using **Edit > Search in project...** on the menu bar or by using the shortcut **Ctrl + Shift + F**.

The results are displayed in the Search results tab of the detail view.

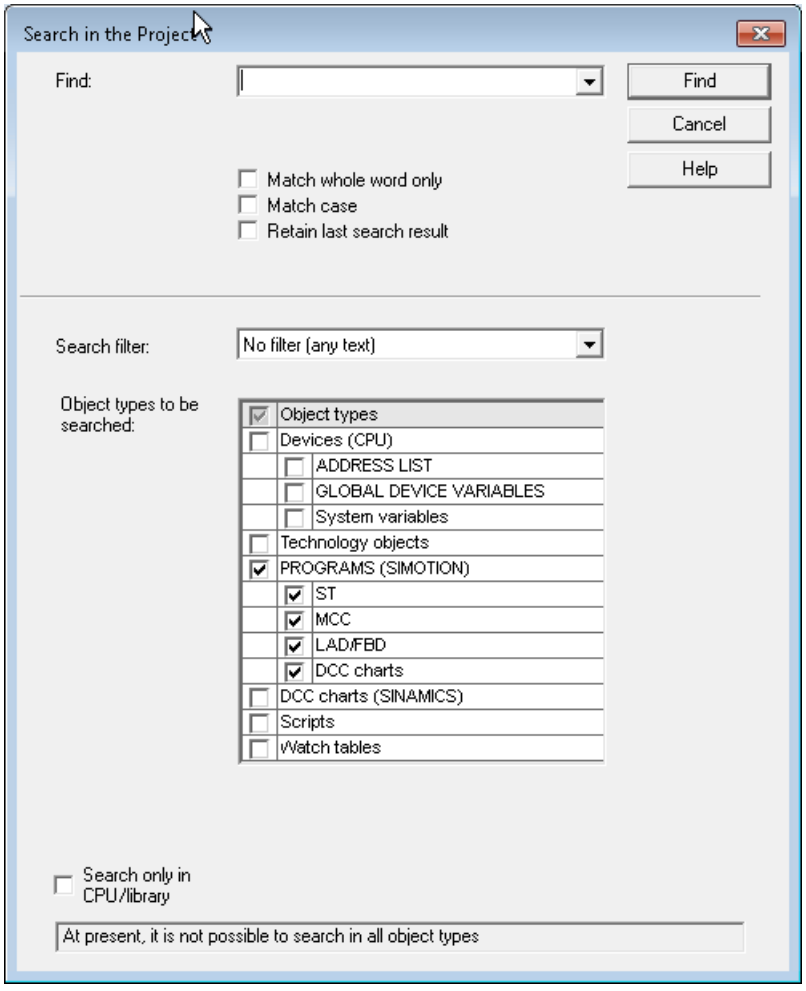


Figure 6-5 Searching in the project

Searching in CPU/Libraries only

If the "Search only in CPU/Library" checkbox is activated, a selection list of all the CPUs and user-defined libraries in the project appears. You can select one to search in this CPU/Library only.

For more information regarding this topic, see the online help.

Local search

You can search locally for a specific text in the various editors and the declaration tables. To start searching locally, open the search function with the **Ctrl+F** shortcut key while the current focus is on an editor (e.g. MCC) or the editor window for global and unit-global declarations and connections.

The *SIMOTION MCC Motion Control Chart Programming and Operating Manual* contains further information on local searches.

6.3.9 Replacing in the project

The **Replace in project** function is based on the **Search in project** function.

Open the dialog using **Edit > Replace in project...** on the menu bar or with the shortcut **Ctrl + Shift + G**.

When you carry out a replacement, both the results found and the replacement term are displayed in the "Search result" tab of the "detail view". The text can be edited again here.

Use the **Replace** button to replace all search results selected using the checkbox.

Boundary conditions:

- Only text can be entered.
- Replaced texts cannot be undone.

More information on this topic is available in:

- Online help.

Local replace

You can search locally for a specific text in the various editors and the declaration tables, and replace this text with freely selected text. To start the local replacement process, select the **Ctrl +H** shortcut key while the current focus is on an editor (e.g. the MCC editor) or the editor window for global and unit-global declarations and connections.

6.3.10 Printing projects

You can print various parts of a project or view them in the print preview in order to, for example, document settings, data, etc. The part to be printed depends on the element selected in the project navigator or the window active in the working area.

- An element is selected in the project navigator or a window is active in the working area. The data of the associated technology object, MCC chart, etc. is printed.
- The detail view is active. The data of the active tab of the detail view is printed.
- The project is selected in the project navigator. All data of the project (e.g. programs, execution system, technology objects) is printed.

Note

If you select **Print** or **Print preview** in the **Project** menu, the print dialog or the print preview is displayed immediately. If you select the context menu for **Print** or **Print preview** of the selected element in the project navigator, a window is displayed in which you can activate the components to be printed. If, for example, you only want to print certain parts of a technology object, select **Print** in the context menu.

For further information, please refer to the online help for SIMOTION SCOUT.

6.4 Configuring devices

6.4.1 Adding a SIMOTION device

You have created a project in SIMOTION SCOUT. The project navigator on the left of the SIMOTION SCOUT workbench is open. To insert a device, double-click the **Insert SIMOTION device** entry below the name of your project in the project navigator. The following dialog opens:

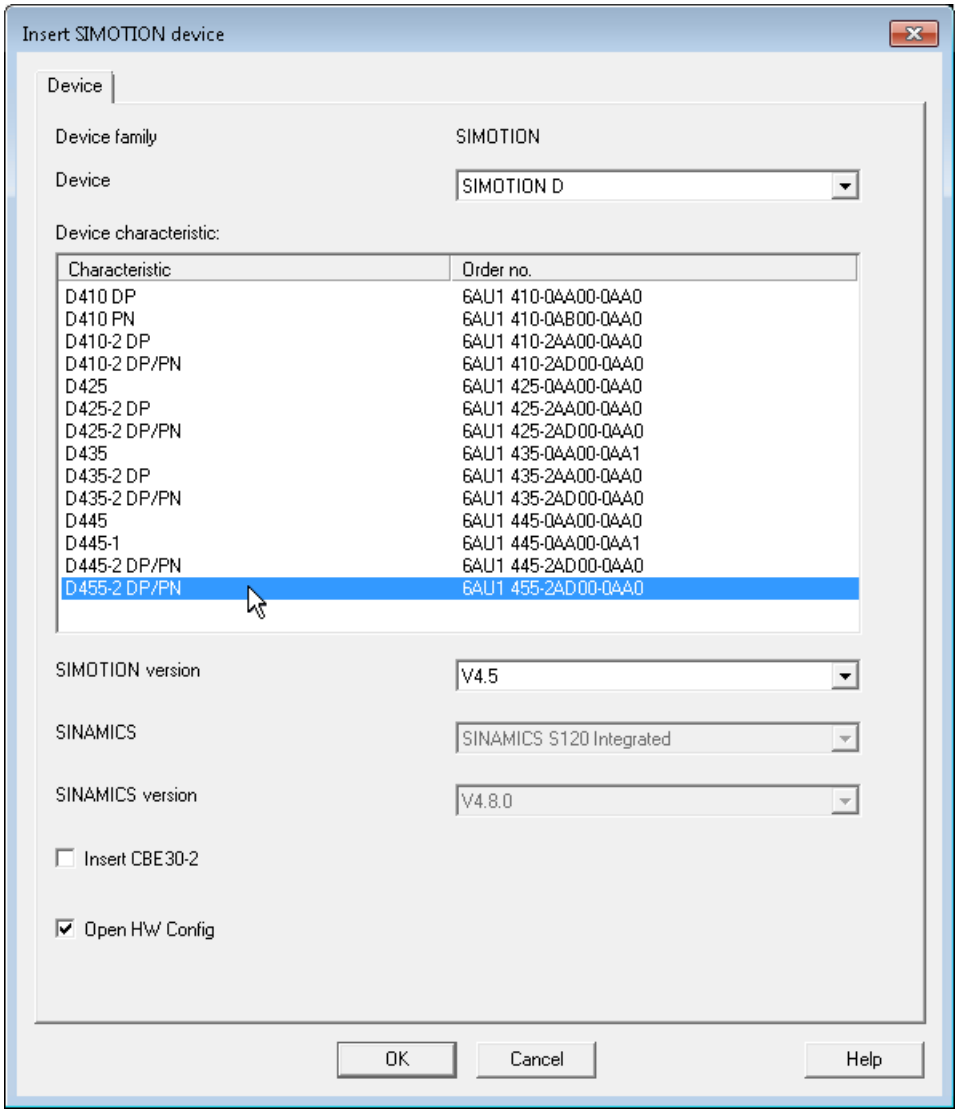


Figure 6-6 Insert SIMOTION device

Select the device platform you are working with at **Device**. The characteristics of the relevant platform then appear under **Device characteristic**.

At **SIMOTION Version**, select the firmware version of the device used.

Note

The selected firmware version must match the firmware version on the memory card of the SIMOTION device. Otherwise, you will receive an error message when going online with the device.

If the **Open HW Config** option is selected, the hardware configuration (Page 77) opens after the device has been inserted. Click **OK** to confirm.

Once you have created a SIMOTION device in the project via the **Insert SIMOTION device** element, the hardware configuration (**HW Config**) opens automatically.
In HW Config, you inform the SIMOTION system which hardware is present; for example:

- Type of the SIMOTION device
- Type of the I/O modules
- Type of the drives

In addition, you also specify which parameters the SIMOTION system should use, e.g.:

- Configuration of the SIMOTION device
- Configuration of the PROFIBUS/PROFINET
- Assignment of the hardware to PROFIBUS/PROFINET

The following sections explain how to use the HW Config tool:

- How to insert objects from the **hardware catalog**.
- How to edit objects.
- How to replace or delete objects.

6.4.1.1 Starting HW Config

HW Config can be started, e.g. to add a drive to the PROFIBUS.

To start HW Config:

- Double-click the appropriate SIMOTION device in the project navigator or
- Select the appropriate device in the project navigator and confirm your selection in the **Open HW configuration** context menu or
- Highlight the appropriate device in the project navigator and click **Edit > Open object** in the menu bar.

6.4.1.2 The HW Config program

The HW Config program is displayed as follows:

- A **hardware catalog** window
- A working window that is split into two:
  - In the upper half, you can see the rack or station frame with the CPU already inserted automatically in slot 2 (example for C240).
    Insert the objects from the hardware catalog and edit them here.
  - In the lower half, you can see detailed information about the selected objects.

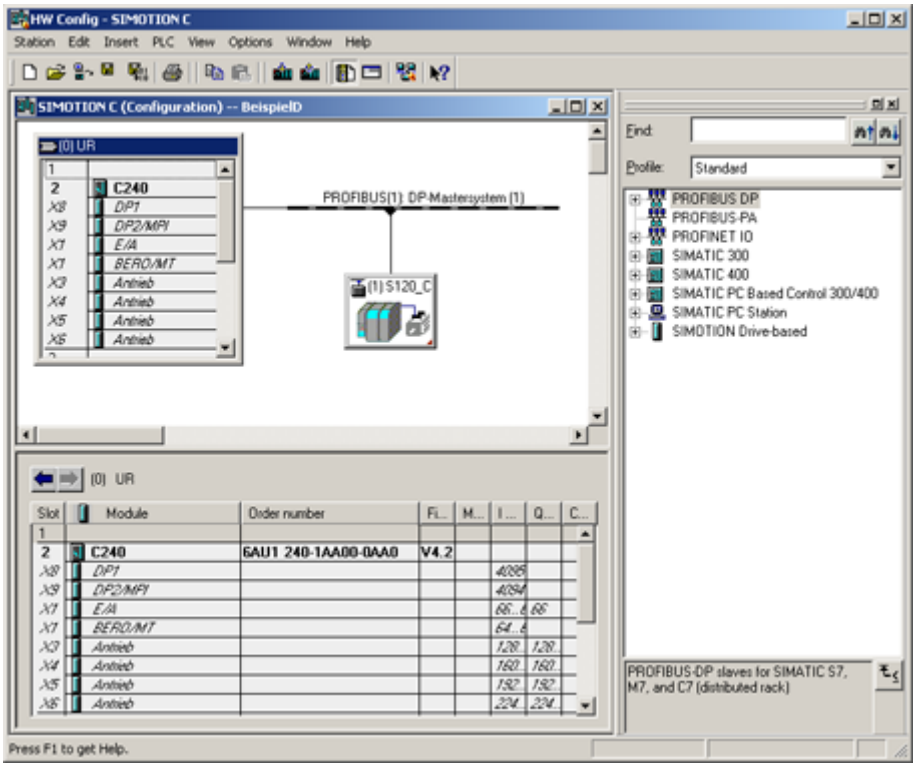


Figure 6-7 HW Config with opened hardware catalog and the CPU previously inserted in the module

6.4.1.3 HW Config: Opening the hardware catalog

You can open the hardware catalog in the following ways:

- Select the **Insert > Insert object** menu.
- Select the **View > Catalog** menu.

For further information, see Section Inserting a drive (Page 86).

6.4.1.4 SIMOTION devices in the hardware catalog

You can find the SIMOTION devices in the corresponding directories of the hardware catalog in HW Config.
With SIMOTION D, the SINAMICS version is selected in addition to the SIMOTION version. The SIMOTION version determines whether one or more SINAMICS versions are available.

Adding interfaces

After you have inserted the SIMOTION device, the dialog for configuring the interfaces opens

Note

With SIMOTION D, the PROFIBUS subnet **PROFIBUS Integrated DP master system** is created and configured automatically. The user may neither configure nor select it!

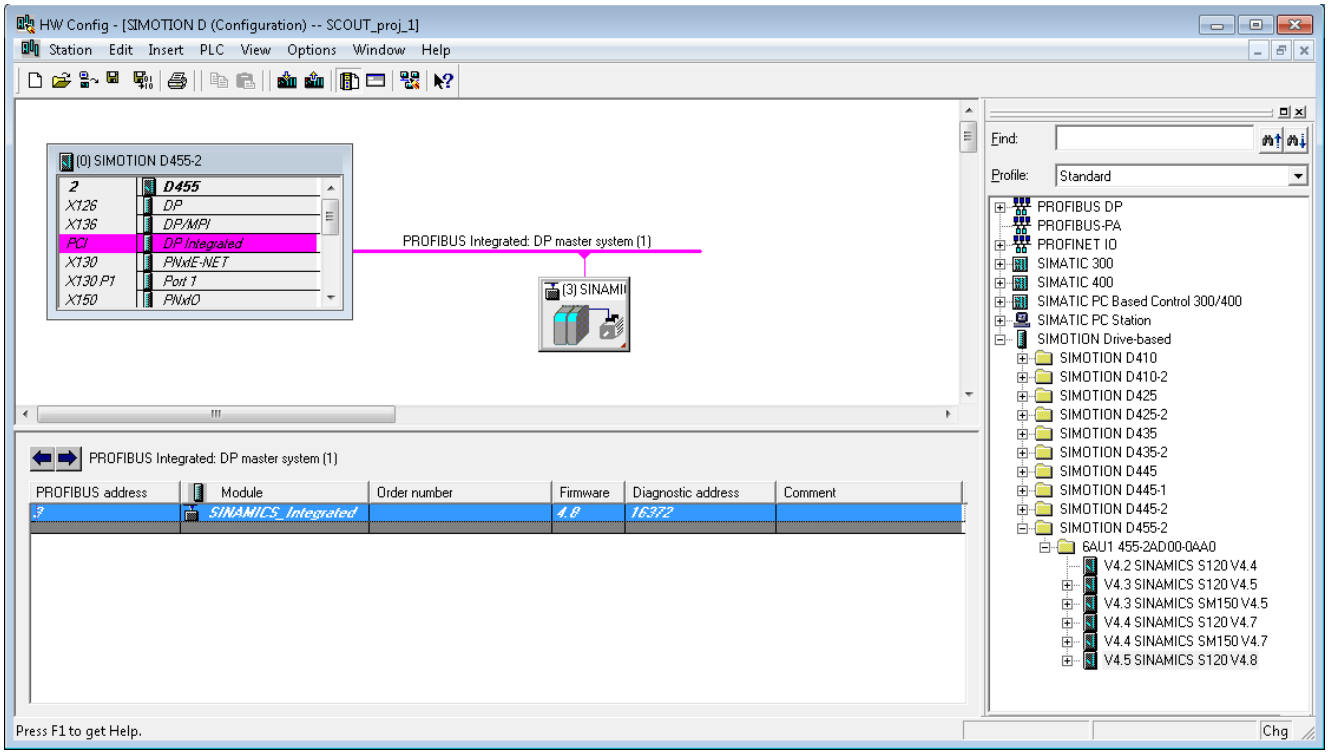


Figure 6-8 Hardware configuration of a D4x5

Detailed information on the configuration of the SIMOTION device is contained in the corresponding documentation for the SIMOTION devices.

6.4.2 Selecting technology packages

The technology packages (e.g. TP CAM, TP PATH, DCBlib) are available in various versions for installation purposes.

You can only use the functions of the technology objects selected if the technology objects are available in the target system. You can select the technology packages and their product versions (as well as the service packs and hotfix versions) for each SIMOTION device.

In the **Select Technology Packages** window, you can adopt a more selective approach when choosing the technology packages you want to use. To open this window, right-click a SIMOTION device in the project navigator. Then select the **Select Technology Packages** command in the context menu.

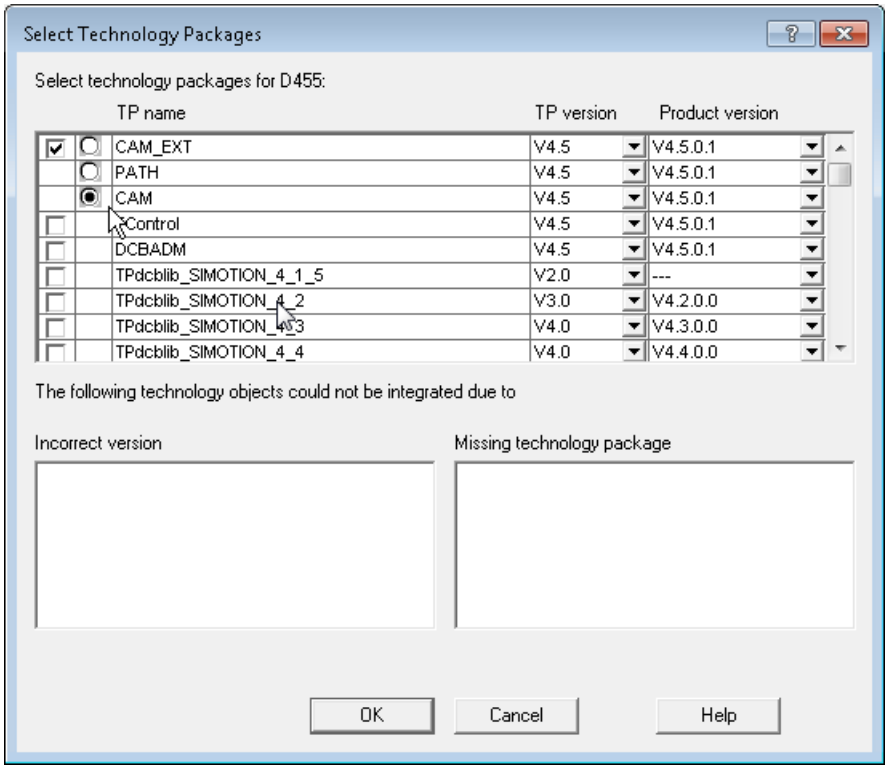


Figure 6-9 Selecting technology packages

Note

Device diagnostics can provide information on which technology package product version has been loaded to a CPU.

Loading technology packages to the target device

Technology packages are only loaded to the target device if no technology package has been loaded so far. If a technology package version changes, the technology package must be explicitly reloaded to the target device. Proceed as follows:

1. Select **Project > Download to target system** in SIMOTION SCOUT.
2. Click **Additional CPU options** in the **Download to target system** dialog.

3. Select the option **Replace product versions of the technology packages**.
4. Click **OK** to confirm.

For further information, please refer to the online help for SIMOTION SCOUT.

6.4.3 Connecting to the target system

6.4.3.1 Installing the interface card

Installing the interface card in the PG/PC

Communication between a SIMOTION device and a PG/PC requires an interface card for PROFIBUS or an Ethernet interface. PGs already have both, but PCs may need an interface card to be installed.
The PG/PC is used for configuration, parameter assignment, programming, and testing.

- Install the interface card in the PG/PC according to the manufacturer's installation instructions.
- Install the appropriate drivers on the PG/PC.
- Connect the interface card to the interface of the SIMOTION device indicated below using a suitable cable.

Table 6-1 Interface assignment for SIMOTION devices

SIMOTION device	Interface	As supplied
SIMOTION C230-2 / C240	X8 DP1	PROFIBUS address 2, baud rate 1.5 Mbit/s
	X9 DP2 / MPI	PROFIBUS address 2, baud rate 1.5 Mbit/s
	X7 (Ethernet)	IP address: 169.254.11.22 Subnet: 255.255.0.0
SIMOTION C240 PN	X8 DP1	PROFIBUS address 2, baud rate 1.5 Mbit/s
	X9 DP2 / MPI	PROFIBUS address 2, baud rate 1.5 Mbit/s
	X7 (Ethernet)	IP address: 169.254.11.22 Subnet: 255.255.0.0
	X11 (1 PROFINET interface with 3 ports)	Supplied without IP address and subnet
SIMOTION P350	X101 DP1	PROFIBUS address 2, baud rate 1.5 Mbit/s
	X102 DP2 / MPI	PROFIBUS address 2, baud rate 1.5 Mbit/s
	Ethernet	IP address: 169.254.11.22

SIMOTION device	Interface	As supplied
SIMOTION P320-4	X1 Onboard Ethernet 1	Access to/from Windows: IP address: 169.254.11.21 Subnet: 255.255.0.0 Access to/from SIMOTION P Runtime: IP address: 169.254.11.22 Subnet: 255.255.0.0
	X3 PROFINET onboard interface with 3 ports	Supplied without IP address and subnet
SIMOTION D4x5	X126 DP1	PROFIBUS address 2, baud rate 1.5 Mbit/s
	X136 DP2 / MPI	PROFIBUS address 2, baud rate 1.5 Mbit/s
	X120 IE1/ OP (Ethernet)	IP address: 192.168.214.1 Subnet: 255.255.255.0
	X130 IE2/ NET (Ethernet)	IP address: 169.254.11.22 Subnet: 255.255.0.0
	With optionally inserted CBE30: X1400 (one PROFINET interface with 4 ports)	Supplied without IP address and subnet
SIMOTION D4x5-2 DP	X126 DP	PROFIBUS address 2, baud rate 1.5 Mbit/s
	X136 DP/MPI	PROFIBUS address 2, baud rate 1.5 Mbit/s
	X120 P1 PN/IE-OP (Ethernet)	Supplied without IP address and subnet
	X127 P1 PN/IE (Ethernet)	IP address: 169.254.11.22 Subnet mask: 255.255.0.0
	X130 P1 PN/IE-NET (Ethernet)	Supplied without IP address and subnet
SIMOTION D4x5-2 DP/PN	X126 DP	PROFIBUS address 2, baud rate 1.5 Mbit/s
	X136 DP/MPI	PROFIBUS address 2, baud rate 1.5 Mbit/s
	X127 P1 PN/IE (Ethernet)	IP address: 169.254.11.22 Subnet mask: 255.255.0.0
	X130 P1 PN/IE-NET (Ethernet)	Supplied without IP address and subnet
	X150 P1-P3 PN (1 PROFINET interface with 3 ports)	Supplied without IP address and subnet
	With the optional inserted CBE30-2: X1400 (1 PROFINET interface with 4 ports)	Supplied without IP address and subnet
SIMOTION D410 DP	X21 DP	PROFIBUS address 2, baud rate 1.5 Mbit/s
SIMOTION D410 PN	X200 and X201 (1 PROFINET interface with 2 ports)	Supplied without IP address and subnet
SIMOTION D410-2 DP	X21 DP/MPI	PROFIBUS address 2, baud rate 1.5 Mbit/s
	X24 DP	PROFIBUS address 2, baud rate 1.5 Mbit/s
	X127 P1 PN/IE (Ethernet)	IP address: 169.254.11.22 Subnet mask: 255.255.0.0

SIMOTION device	Interface	As supplied
SIMOTION D410-2 DP/PN	X21 DP/MPI	PROFIBUS address 2, baud rate 1.5 Mbit/s
	X127 P1 PN/IE (Ethernet)	IP address: 169.254.11.22 Subnet mask: 255.255.0.0
	X150 P1, P2 (1 PROFINET interface with 2 ports)	Supplied without IP address and subnet

6.4.3.2 Set PG/PC interface

Setting interfaces

Proceed as follows:

1. Start SIMOTION SCOUT.
2. Select the **Options > Set PG/PC interface** menu.
   The **Set PG/PC Interface** window opens.

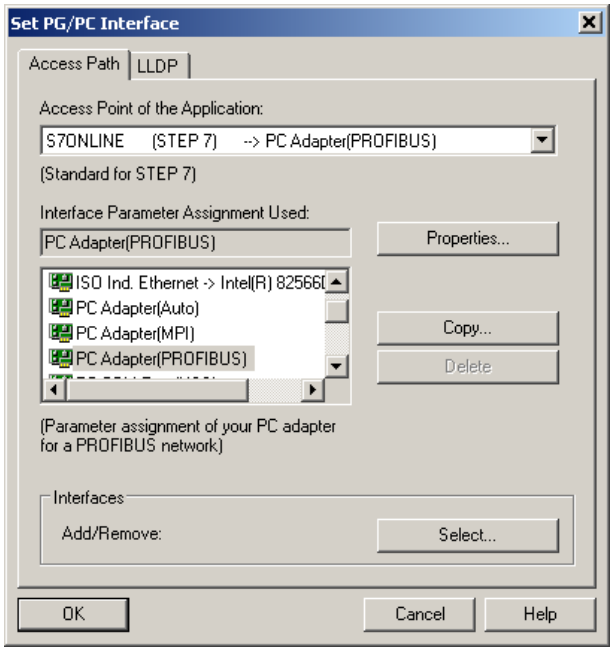


Figure 6-10 Set PG/PC interface (example)

3. Select the access point of the application.

4. Click **Select**.
   The **Install/Remove Interfaces** window opens.

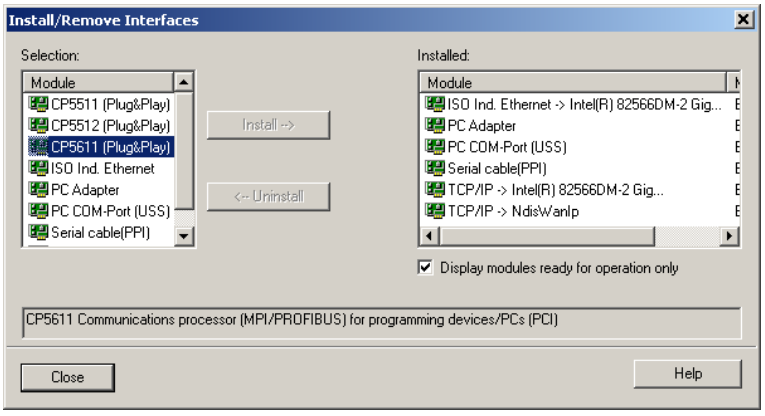


Figure 6-11 Installing/uninstalling interfaces

5. Select the module to be installed.
6. Click **Install**.
7. Click **Close** to exit the dialog.
8. Confirm the settings by clicking **OK**.

Installing/uninstalling other interfaces

Proceed as follows to install or uninstall additional interfaces:

1. In the **Set PG/PC Interface** window, select **S7ONLINE** as the access point of the application.
2. Click **Select** at **Add/remove interfaces**.
3. In the left-hand field, select the interface that you want to install, and click **Install**.
   Or select the interface that you want to uninstall in the right-hand field and click **Uninstall**.
4. Click **Close**.
5. Select the interface to be used in the **Used interface parameterization** field.
   The list of the used interface parameterization will be taken from SIMATIC STEP 7.
   With the PC Adapter (Auto) setting, the interface to which the PG/PC is connected is examined. This function automatically determines the current parameterization of the respective interface.
   Detailed information on the individual interfaces of the SIMOTION devices can be found in the relevant commissioning manuals.
6. Click **Properties** to parameterize the interface.
7. Click **OK** to confirm.

6.4.3.3 Specifying the access point

Selecting the access point

The addresses for a device to go online depend on the access point **S7ONLINE** or the alternative access point **DEVICE**.

Depending on the selected access point, you can go online via different interfaces.

Proceed as follows to select the access point:

1. Open the project.
2. Select the SIMOTION device in the project navigator.
3. Right-click and select **Properties...** in the context menu.
   The **Properties - [CPU]** window opens.
4. Go to the **Device / access point** tab. You can select the access point and specify the addresses.
5. Click **OK** to close the dialog.

6.4.3.4 Communication via PROFIBUS DP

PROFIBUS is a powerful, open, and robust bus system, which guarantees trouble-free communication. The system is fully standardized, which enables trouble-free connection of standardized components from a variety of manufacturers. Configuration, commissioning, and troubleshooting can be carried out from any side. This results in user-defined communication relationships that are very versatile, simple to implement, and easy to change.

The high-speed, cyclic exchange of data with field devices (distributed I/O) is carried out via the PROFIBUS DP protocol. Expansion of the protocol to include isochronous mode also integrates the drive components into communication via PROFIBUS DP. The individual components can be connected via the integrated interfaces, connections, interface modules or communications processors.
Important information on communication with PROFIBUS is contained in the following catalog:
SIMOTION, SINAMICS S120 and Motors for Production Machines, PM 21 Catalog

The following PROFIBUS DP subnet applications are possible:

- PROFIBUS DP isochronous
  Compatible extension to the standard PROFIBUS DP:
  - Equidistance (constant synchronous bus cycle clock) enables synchronized time slices for master/slave applications.
  - Data exchange broadcast enables slave-to-slave communication.

  Digital drives (e.g. SINAMICS, MICROMASTER 4xx, ...) can be connected via PROFIBUS DP.
  In order to be able to operate the SIMOTION device with two isochronous PROFIBUS DP subnets, isochronous mode and the same bus cycle must be set. The cycle clock of the subnet of the second PROFIBUS interface is synchronized to the cycle clock of the subnet of the first PROFIBUS interface.
  If the bus cycle does not agree, the second PROFIBUS interface of the SIMOTION device will be operated as a PROFIBUS DP subnet.
- PROFIBUS DP (MPI)
  Standard PROFIBUS DP with DP-V0 and optional DP-V1 or DP-V2 functionality.
  - For the connection of distributed I/Os
  - For the connection to a higher-level automation system
  - For the connection of HMI devices
  - For the connection to the SCOUT engineering system

6.4.3.5 Ethernet communication

SIMOTION devices can also be connected to a PG/PC via Industrial Ethernet. Industrial Ethernet is a communication network with a transmission rate of 1 Gbit/s.

For additional information, refer to the Manual "SIMATIC NET Industrial Twisted Pair and Fiber Optic Networks." See the *SIMOTION Documentation Overview* for the Article No.

Examples for the use of Industrial Ethernet:

- For the connection of HMI devices
- For connection to the SCOUT engineering system
- For communication via UDP (User Datagram Protocol)
- TCP/IP
- IT DIAG

6.4.3.6 Communication via PROFINET

SIMOTION devices can be connected to a PROFINET subnet via interface modules or the onboard PROFINET interface. With PROFINET IO IRT/RT, IT services can be performed in parallel to realtime communication via an Ethernet cable. PROFINET IO supports parallel operation of:

- IRT (isochronous realtime Ethernet)
- RT (realtime Ethernet)
- TCP/IP, UDP, http ... (standard Ethernet services)
- For mixed operation of IRT and RT it has to be observed that the IRT-compatible devices must form an IRT domain, i.e. there must not be any non-IRT devices on the data transmission link between the IRT devices.

Additional references

Please refer to the following documents on this subject

- SIMOTION D4x5 Commissioning and Hardware Installation Manual
- SIMOTION D4x5-2 Commissioning and Hardware Installation Manual
- SIMOTION D410 Commissioning Manual
- SIMOTION D410-2 Commissioning and Hardware Installation Manual
- SIMOTION P320-4 E / P320-4 S Commissioning and Hardware Installation Manual
- SIMOTION C Operating Instructions
- SIMOTION Communication System Manual

and the SIMOTION SCOUT online help.

6.4.4 Inserting a drive

6.4.4.1 Drives with SIMOTION

Note the following:

Drives must be differentiated between:

- Drives that are connected to PROFIBUS/PROFINET
- Drives that are connected directly to the SIMOTION device

The following applies to drives connected to PROFIBUS/PROFINET:

- Only drives that meet the requirements of PROFIdrive profile V3.0 can be connected:
  - SINAMICS
  - MICROMASTER (PROFIBUS only)
  - COMBIMASTER 411 (PROFIBUS only)
  - MASTERDRIVES (MC, VC) (PROFIBUS only)
  - SIMODRIVE 611U (PROFIBUS only)
  - SIMODRIVE POSMO (CA, CD, SI) (PROFIBUS only)
  - ADI4 (analog drive interface for 4 axes)
  - IM 174 (interface module for 4 axes)
- These drives are taken into the hardware configuration.
- The drives of the SINAMICS and MICROMASTER drive families can be configured, assigned parameters, and commissioned with SIMOTION SCOUT.

All analog drives can be connected via one of the four analog interfaces on the SIMOTION C230-2/C240 or via the ADI4 and IM174 PROFIBUS module.

- These drives are inserted into the project via the hardware configuration.
- The SIMOTION device requires only the actual values from the encoder at the input and issues the setpoints at the analog output.
- The drives must be configured, assigned parameters, and commissioned directly on the corresponding device.

With SIMOTION D, drives on SINAMICS Integrated are not inserted via the HW Config. For more detailed information, see the *D Commissioning and Hardware Installation Manual*.

6.4.4.2 Inserting a SINAMICS drive on PROFIBUS DP

Initial situation

- The SIMOTION device is created in SIMOTION SCOUT
- A PROFIBUS subnet has been configured, for example, as **PROFIBUS DP isochronous** (by selecting **Edit > Isochronous operation**)
- The subnet interface is the master on this subnet of the SIMOTION device

Proceed as follows:

1. Open the **PROFIBUS DP** folder in the hardware catalog.
2. Open the **SINAMICS** subfolder.
3. Use drag-and-drop to drag an entry to the isochronous PROFIBUS subnet of the SIMOTION device.
4. Double-click the SINAMICS drive **Properties** to open them and set a cycle clock.

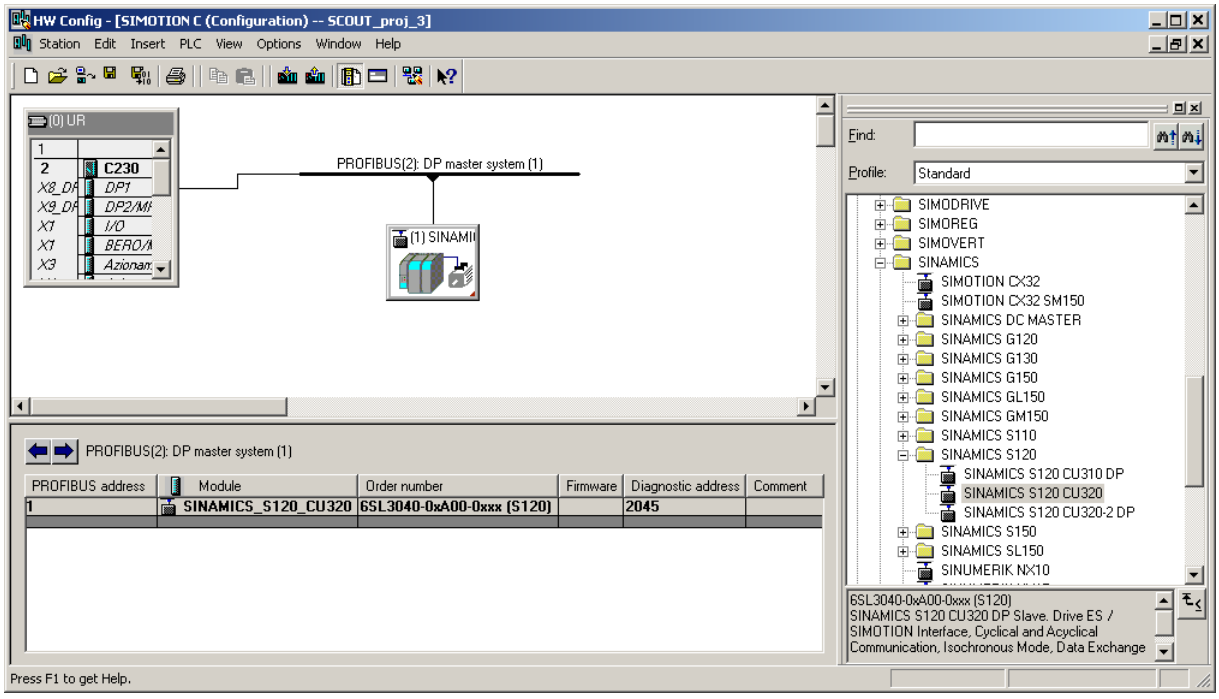


Figure 6-12 Inserting a SINAMICS drive

6.4.4.3 Inserting a SINAMICS drive on PROFINET IO

Initial situation

- The SIMOTION device is created in SIMOTION SCOUT
- A PROFINET IO system and an Ethernet subnet are configured

Proceed as follows:

1. Open the HW Config of the SIMOTION device.
2. Open the **PROFINET IO / Drives / SINAMICS** folder in the hardware catalog.
3. Select the SINAMICS S120 CBE20 drive.
4. Use drag-and-drop to drag the drive to the PROFINET IO subnet of the SIMOTION device.

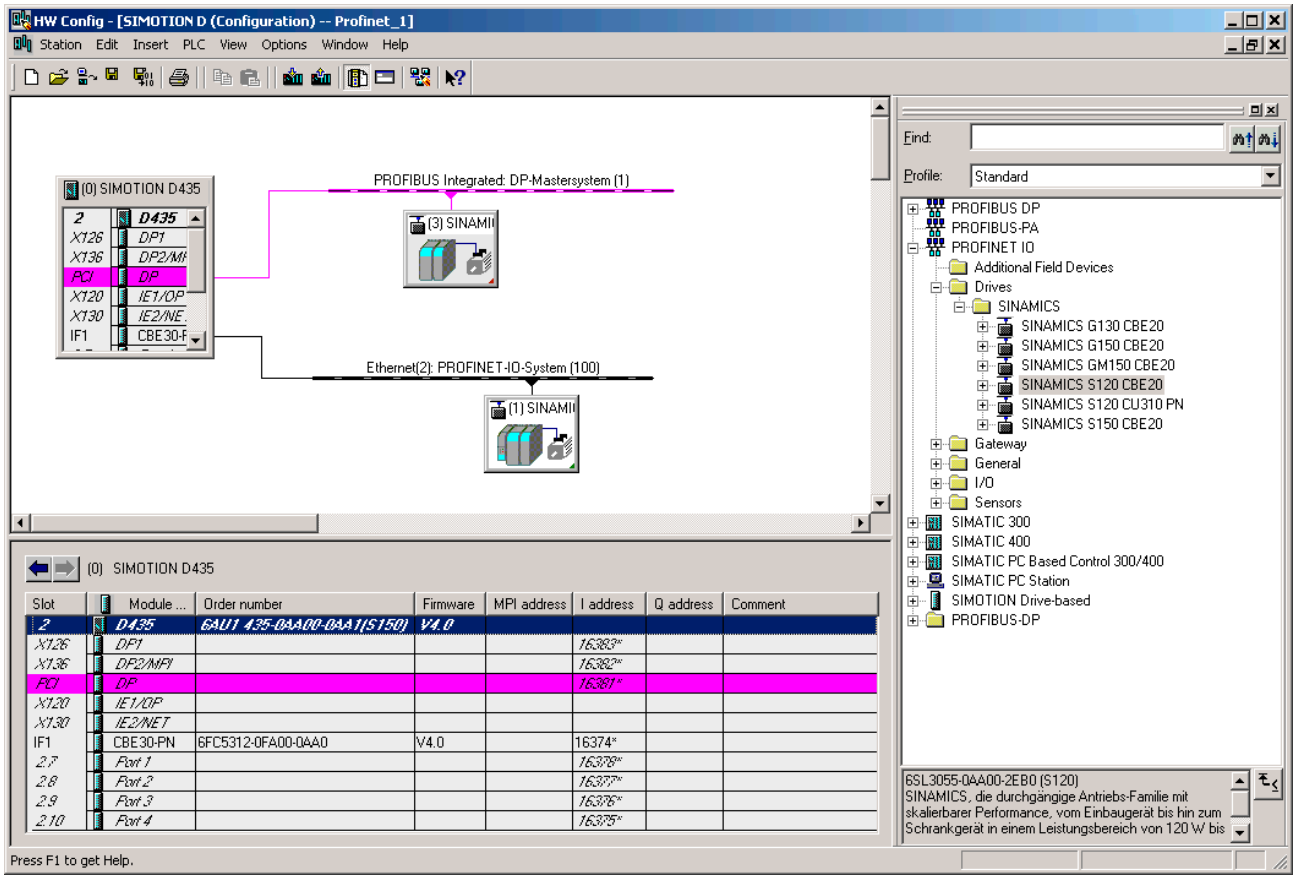


Figure 6-13 Inserting a SINAMICS drive with PROFINET

Configuration for PROFINET IRT

Information for the configuration of PROFINET IRT is contained in the Communications System Manual, Inserting and Configuring SINAMICS S120 section, as well as at the FAQ - SIMOTION & SINAMICS: Distributed synchronous operation and isochronous mode via PROFINET IRT (https://support.industry.siemens.com/cs/de/en/view/38486079)

6.4.4.4 Commissioning the drives

Drives that can be commissioned with SIMOTION SCOUT

You can use SIMOTION SCOUT to assign parameters to the following drives:

- SINAMICS
- MICROMASTER
- COMBIMASTER 411

For all other drives or for third-party drives, the appropriate commissioning program for the specific drive must be used. If required, you must commission these drives directly on the drive.

Table 6-2 Commissioning of various drives

Drive	Connection	Commissioning
SINAMICS S110, S120, S150, G110 CPM100, G120, G130, G150, GM150	PROFIBUS DP or analog interface	With SIMOTION SCOUT or STARTER
SINAMICS S120	PROFINET	With SIMOTION SCOUT or STARTER
MICROMASTER 410	analog interface	With SIMOTION SCOUT or DRIVE ES Basic or STARTER
MICROMASTER 420/430/440	PROFIBUS DP or analog interface	With SIMOTION SCOUT or DRIVE ES Basic or STARTER
COMBIMASTER 411	PROFIBUS DP or analog interface	With SIMOTION SCOUT or DRIVE ES Basic or STARTER
SIMODRIVE 611U	PROFIBUS DP or analog interface	With SIMOCOM U or DRIVE ES Basic
MASTERDRIVES MC, VC	PROFIBUS DP or analog interface	With SIMOVIS or DRIVE ES Basic
SIMODRIVE POSMO CA; CD, SI	PROFIBUS DP	With SIMOCOM U or DRIVE ES Basic
Third-party drives	Analog interface or PROFIBUS DP according to PROFIdrive profile V3.02	With commissioning tool supplied by the manufacturer

Note

If the Drive-ES Basic commissioning program is installed, it can be called by SIMOTION SCOUT in the project navigator via **Commissioning**.

6.4.4.5 SINAMICS S120 on SIMOTION

STARTER functionality in SIMOTION SCOUT

It is possible to parameterize drives directly with SIMOTION SCOUT. The following example describes how to insert a SINAMICS drive in SIMOTION SCOUT.

Requirements:

- SIMOTION SCOUT has been installed on the PG/PC
- A SIMOTION SCOUT has been created

Note

You can create the SINAMICS drive with PROFIBUS or PROFINET.

You must execute the following steps:

- Insert SIMOTION device
- Configure SINAMICS

Commissioning in SIMOTION SCOUT

1. Open the SIMOTION project in SIMOTION SCOUT.
2. Double-click **Insert SIMOTION device**.
3. Select a SIMOTION device.
4. Select the variant.
5. Click **OK** to confirm.
6. Select the PROFIBUS interface or Ethernet.
   If you have selected Ethernet, select the interface parameterization of the PG/PC.
7. Click **OK** to confirm.
8. With SIMOTION C and P only: Insert a SINAMICS device (see Inserting a drive (Page 86)).
9. Select **Station > Save and compile** in the HW Config and then close HW Config.
10. Open the structure tree of the SIMOTION device in the project navigator.
11. Open the structure tree of the drive (SINAMICS or SINAMICS_Integrated) in the project navigator.
12. Double-click **Configure drive unit**.
    The Configuration - Option Module window opens.
13. Run through the drive wizard.

The STARTER functionality now starts in SIMOTION SCOUT.

The configuring of the SINAMICS Integrated drive for SIMOTION D is described in the SIMOTION D Commissioning and Hardware Installation Manuals.

Note

You can insert a standalone drive (e.g. SINAMICS S120) with the "Insert single drive unit" element in the project navigator. It is commissioned using wizards in the working area of the workbench that contains the STARTER functionality.

6.4.4.6 Configuring the infeed

Overview

The integrated SINAMICS control unit only starts the drive when the infeed is ready. The project must therefore know the interface via which the drive receives the ready signal of the infeed.

Two cases must be distinguished here:

- Infeed with DRIVE-CLiQ interface
  If an infeed with DRIVE-CLiQ connection has already been created, the ready signal of the infeed (r0863.0) is automatically interconnected with "Infeed operation, p0864" of the drive when drives are inserted (only applies to drives that are attached to the same drive unit as the infeed).
  Further information about the infeed with the DRIVE-CLiQ interface is contained in the SIMOTION D Commissioning and Hardware Installation Manuals.
- Infeed without DRIVE-CLiQ interface
  If you are using an infeed without a DRIVE-CLiQ interface, e.g. a Smart Line Module, you must wire the ready signal of the infeed via terminals. The following section describes the procedure.

Configure the infeed without a DRIVE-CLiQ interface

Interconnecting the ready signal of the infeed

An infeed without DRIVE-CLiQ interface provides the ready signal (p0863.0) via an output terminal. In the project, you specify on which input (r0722) of SINAMICS Integrated the signal is active. The drive supplied by the infeed uses the signal as a ready signal (p0864).

Note

A drive on SINAMICS Integrated of a SIMOTION D can only be moved if the infeed is ready.

Requirements

- You have configured a drive.
- SIMOTION SCOUT is in online mode.

Procedure

In the next step, in order to wire the ready signal of the infeed (terminal "DO: Ready" of the infeed) with the DI 0 of the D4x5-2, proceed as follows in case you have not already established the interconnection during processing using the drive wizard:

1. Navigate in the project navigator to the **Drives** folder and double-click **Configuration** below the drive.

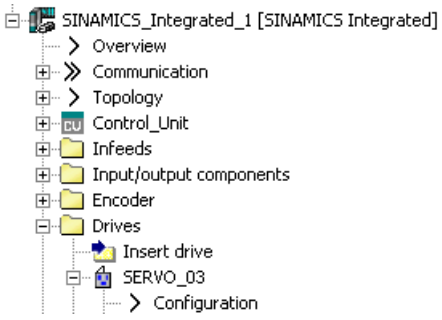


Figure 6-14 Configuring a drive

2. Click in the working area on the **Configure DDS** button with the yellow background.

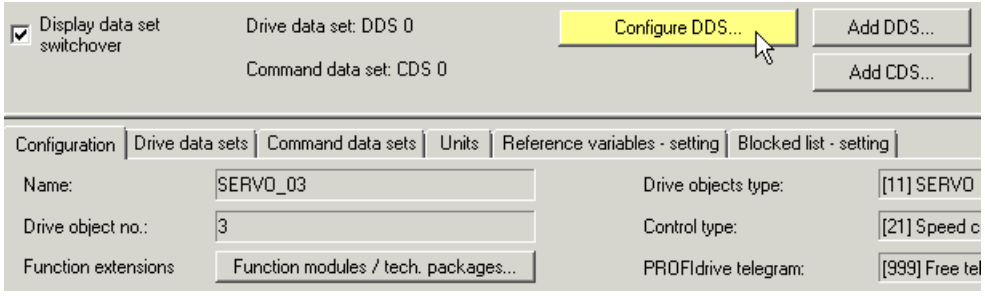


Figure 6-15 Configuring DDS

The drive wizard opens.

3. Click **Next** in the drive wizard until you reach the dialog **Configuration - SINAMICS_Integrated - BICO power unit**.

4. In the input field **p0864**, select the digital input (e.g. DI 0) to which the ready signal of the infeed is wired.

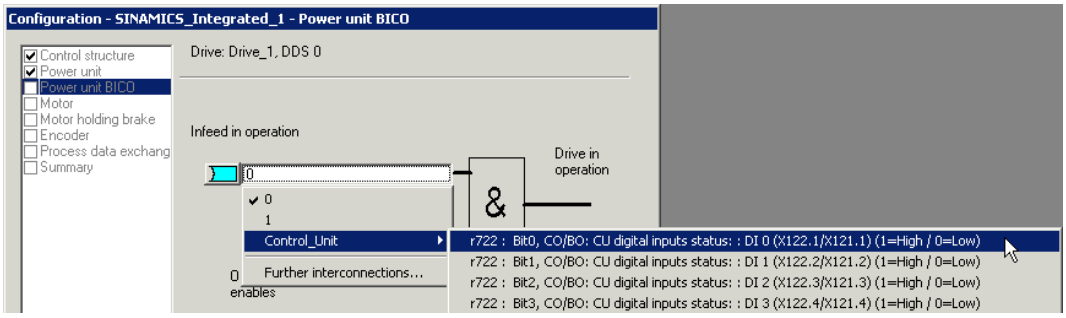


Figure 6-16 BICO interconnection

5. Click **Next**. Run through all the other dialogs without change until the final **Summary** dialog.
6. Click **Finish**.
   Thus, the configuration is finished.

6.4.4.7 Testing the drive with the drive control panel

Drive control panel

The drive control panel is used to control and monitor individual drives. With the drive control panel, you can traverse drives and can:

- Test each part of the system individually before the drives are traversed in a coordinated manner by means of a program.
- Test in a fault situation whether the individual drives can be traversed by the drive control panel at all, or whether there are already problems here.

⚠ WARNING

This software may be used only when the associated safety instructions are observed! The non-observance can cause injury to persons or damage to material!

The function is released exclusively for commissioning, diagnostic and service purposes. The function should generally only be used by authorized technicians. The safety shutdowns from the higher-level control have no effect.

The **Stop with preconfigured braking ramp** function is not guaranteed in all operating states. Therefore, there must be an EMERGENCY STOP circuit in the hardware. The appropriate measures must be taken by the user.

Requirements

- You have created and fully configured a drive in the project.
- You have stored and compiled the project. The project is consistent.

- SIMOTION SCOUT is in online mode.
- The project with the drive parameterization has been loaded to the target system.

Opening the drive control panel

To open the drive control panel, proceed as follows:

1. In the project navigator, navigate to the drive unit and open the **Drives** folder.
2. Open the **Commissioning** entry and double-click **Control panel**.
   The drive control panel opens in the detail view.

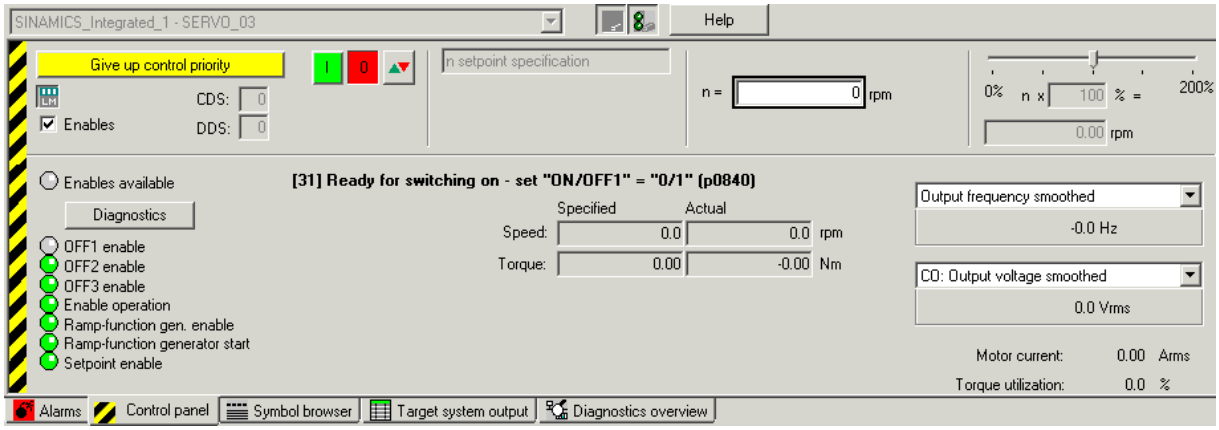


Figure 6-17 Drive control panel

Using the drive control panel

Assuming control priority

To assume control priority, proceed as follows:

1. Click the  button to show the control area in order to test the motor speed specified at **n=**.
2. Click the  button to show the diagnostics area in order to display and evaluate the defined parameters.
   You can determine the status of the required enables by clicking the **Diagnostics** button.
3. In the selection list, select the drive that you want to control or monitor using the PG/PC, **SINAMICS_Integrated_1 - SERVO_03** in the example.
4. Specify the parameters that you want to display in the selection lists on the bottom right-hand side of the diagnostics area. The values are displayed below.

5. Select **Assume control priority** to establish the connection to the PG/PC. The **Assume control priority** dialog is displayed.

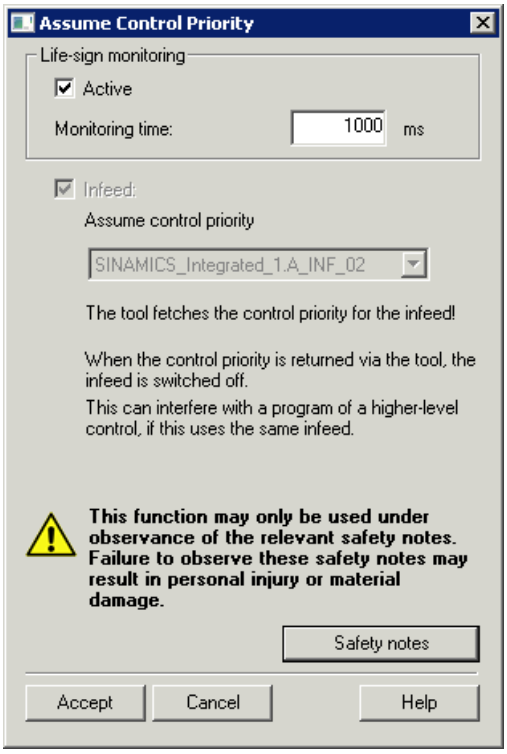


Figure 6-18 Assuming control priority

6. Consider the following infeed options for the type of connection you are using.
   - If you are using an infeed with a DRIVE-CLiQ interface, select the infeed for which the control priority is to be assumed at **Infeed** in the **Assume control priority** dialog. Activate the **Infeed** option if the infeed control priority is to be assumed and activated.
   - If you are using an infeed without a DRIVE-CLiQ interface, you must interconnect the **Infeed operation** signal (drive parameter p0864) yourself. In this case, the dialog does not contain any fields for selecting infeed.
   - If the signal of the **Closed-loop control operation** infeed is already BICO interconnected with the drive, the infeed is specified permanently. No selection is possible in the dialog, the fields are grayed out.
7. Observe the safety regulations and confirm with **Accept**.

The PG/PC has the control priority; the button caption has changed to **Return control priority**.

Note

You can also stop the drive at any time by pressing the SPACEBAR.

Activating the infeed

To switch on the infeed, proceed as follows:

1. Click the button for more information.

Activating enables

To activate the enables, proceed as follows:

1. Activate the **Enables** option to enable the drive.
   The ON and OFF buttons and are activated and the enable states are indicated by the LEDs.
   Click the "Diagnostics" button to show any missing enables.

Testing the drive

To test the drive, proceed as follows:

1. Specify a speed setpoint in the **n=** field.
2. Use the slider to set the current speed **setpoint** in relation to the maximum speed **setpoint (100%)**.
3. Click the green switch to start the drive.
   Or click the switch to control the drive in jog mode. The motion continues as long as you keep the switch pressed.
   In the diagnostics area you can monitor the set speed/torque as well as the actual speed/ torque.

Exiting the drive control panel

To exit the drive control panel, proceed as follows:

1. Click the red button to stop the drive.
2. Deactivate the **Enables** option.
   The LEDs are grayed out.
3. Deactivate the infeed. To do this, click **Infeed on/off**.
4. Click the **Return control priority** button to return the control priority of the control panel.
5. On the menu bar, select **Project > Disconnect from target system** to switch to offline mode.

Result

The drive can be operated. The drive configuration is complete.

6.5 Creating and testing an axis

6.5.1 TO axis technology object

Note

You create the technology object (TO) axis in SIMOTION SCOUT TIA.

You can create the axis both in offline and online mode.

Technology objects represent the respective real objects, e.g. a position axis, in the controller.

The technology object axis offers the user a technological view of the drive and the encoder (actuator and sensor) and provides technological functions, such as communication with the drive, actual value processing, position control and positioning functionality. It executes control and motion commands and indicates states and actual values.

Requirements

If you want to insert a real axis, you require a functional drive.

If you want to insert a virtual axis, you do not require a functional drive.

Note

Virtual axis

All axis types can also be virtual axes, i.e. they do not control real drives but are used as auxiliary axes, e.g. as a leading axis for several following axes (line shaft).

Axis technologies

You can use the following axis technologies:

- Speed-controlled axis
  Motion control is performed using a speed specification without position control.
- Positioning axis
  Motions are position-controlled.
- Synchronous axis
  The synchronous axis creates a grouping of the following axis and synchronous object.
- Path axis
  The path axis type can be interconnected with a path object.
  The path object can be used to calculate and traverse a linear, circular or polynomial path in the 2D/3D coordinate system for at least two path axes and up to three path axes.

Axis wizard

SIMOTION SCOUT provides the axis wizard for creating a new axis. Using the wizard, you interconnect the TO axis with a drive.

Note

Axis wizard - restriction

The wizard can only be run through once.

Subsequent changes to the axis configuration are possible in the corresponding dialogs of the TO axis.

6.5.2 Configuring Axes

Procedure

To insert an axis with the axis wizard and to interconnect with drive and encoder, proceed as follows:

1. Navigate to the **AXES** folder in the project navigator and open this folder with a double-click.
2. Select **Insert axis**.
   The **Insert axis** dialog opens.

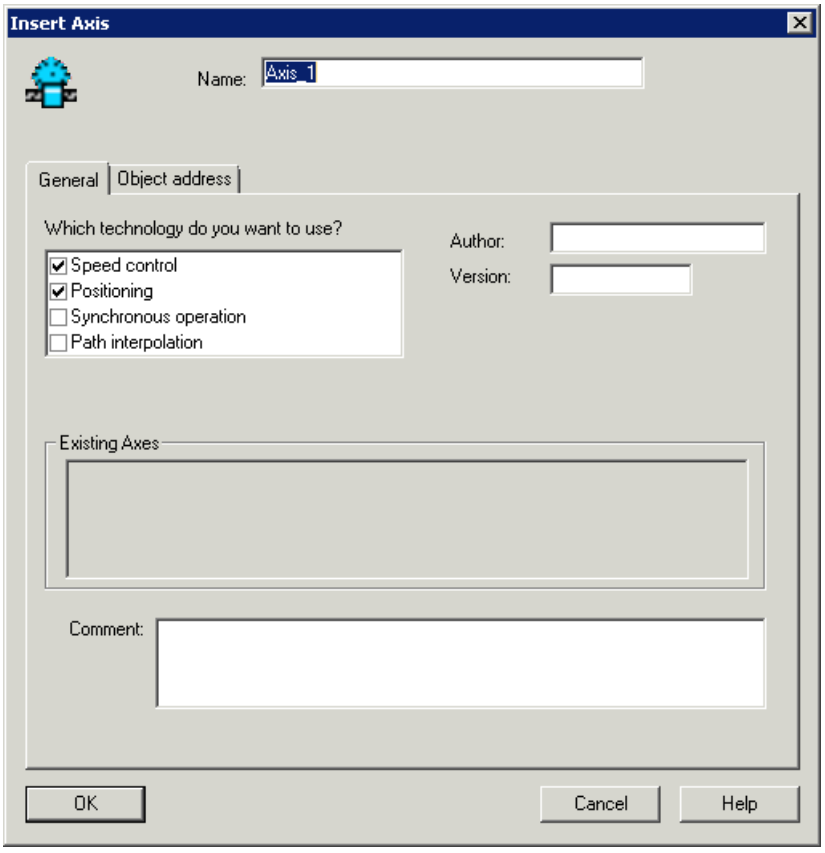


Figure 6-19 Creating an axis

3. Name the axis and select the axis technology that you want to use.
   Note here that the **Positioning** technology always requires the **Speed control** technology. Thus, this technology cannot be deactivated.

4. Click **OK** to exit the dialog.
   The **Axis configuration - Axis type** dialog opens.

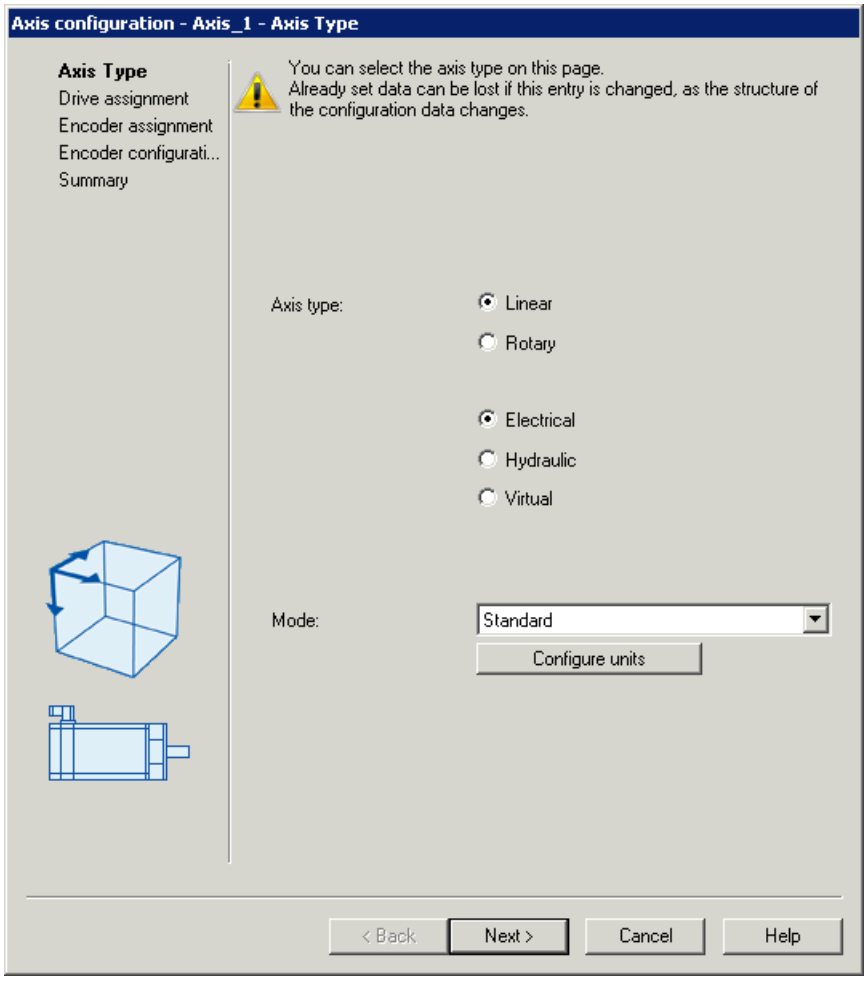


Figure 6-20 Axis configuration - defining the axis type

5. Select the axis type, and specify it. Select the mode for electric axes or hydraulic axes and confirm with **Next>**.
   The **Axis configuration - Drive assignment** dialog opens.

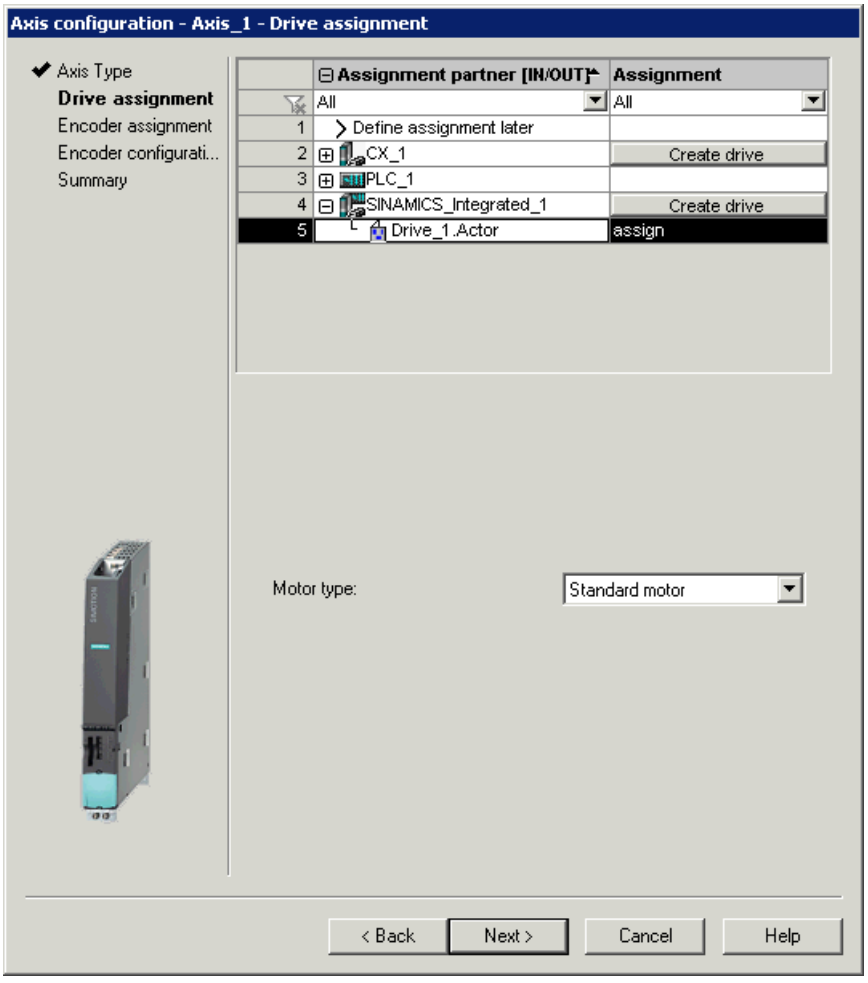


Figure 6-21 Axis configuration - Drive assignment

6. Depending on the selected axis type, with an electric axis you assign the drive which you have configured beforehand in the **Drive assignment** step.
   In the above example, (Axis configuration - Drive assignment figure), several drive units are configured and displayed:
   - SINAMICS Integrated (for the SIMOTION D)
   - DriveUnit_1 (e.g. CU320-2)
   - CX_1 (Controller Extension CX32-2)

   Note

   As an alternative to assigning the axis to an already configured drive, the axis wizard offers two further selection options:
   - Define the axis/drive assignment later:
     The axis is to be created and not assigned to a drive until later. Programming and simulation of the axis are also possible here.
   - Create drive:
     The drive wizard can be called up from the axis wizard (offline configuring). The axis can thus be created in one step along with the drive, and assigned to the drive.

   The alternative approaches are not being considered at this point.

   With an hydraulic axis, you configure the output for a Q-valve in the **Configuration of Q-output** step; the Q-valve represents the actuator for a volume flow.
   Confirm with **Next>**.
7. Specify the encoder to be used by the axis or the active axis data set in the **Encoder assignment** step.
   With an hydraulic axis, you configure the output for a Q-valve in the step **Configuration of Q-output**; the Q-valve represents the actuator for a volume flow. Confirm with **Next>**.
8. Specify the parameters for the used encoder in the **encoder configuration**. Only the encoder type has to be specified when using the symbolic assignment.
9. Once you have worked through all the steps of the configuration of a TO axis, the configured configuration is displayed once again for you to confirm.
   Close the dialog with **Finish**.

Result

The axis is displayed in the **AXES** folder of the project navigator.

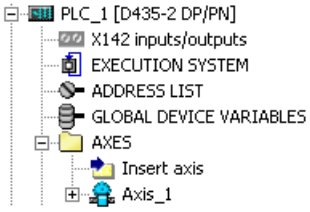


Figure 6-22 Axis created

Automatic settings of the engineering system

The engineering system automatically defines the PROFIdrive axis telegrams required for communication with the drive, as well as the addresses used.

In the same way, telegrams are extended and interconnections automatically created in the drive, depending on the selected TO technology (e.g. SINAMICS Safety Integrated).

Drive and encoder data, as well as reference variables, maximum variables, torque limits, and granularity in torque reduction of the SINAMICS S120 are accepted automatically for the configuration of the SIMOTION technology objects "TO axis" and "TO externalEncoder". This data no longer has to be entered in SIMOTION.

Loading the axis configuration to the target system

Save and compile the changes and download the axis configuration to the target system in order to be able to test the function of the axis in the next configuration step.

Additional references

For detailed information, refer to the "Configuring the axis and external encoder" section in the SIMOTION SCOUT online help.

6.5.3 Testing the axis with the axis control panel

Using the axis control panel you can control and monitor individual axes.

You can perform the following tasks with the axis control panel:

- Test axes before you traverse them via a program.
- Testing as to whether you can move the axis using the axis control panel if a fault is detected.
- Set/remove axis enable.

Requirements

- You have created, configured and connected an axis to the drive.
- SIMOTION SCOUT is in online mode.
- You have loaded the project to the target system.

Opening the axis control panel

To open the axis control panel, proceed as follows:

1. Open the **AXES** folder in the project navigator.
2. Double-click the **Control panel** entry below the axis to be tested.

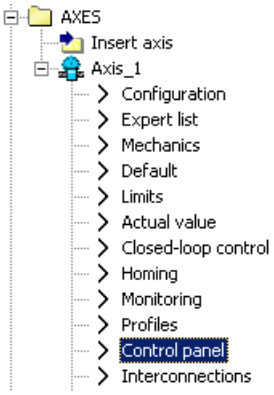


Figure 6-23 Select axis control panel

The axis control panel opens in the detail view.

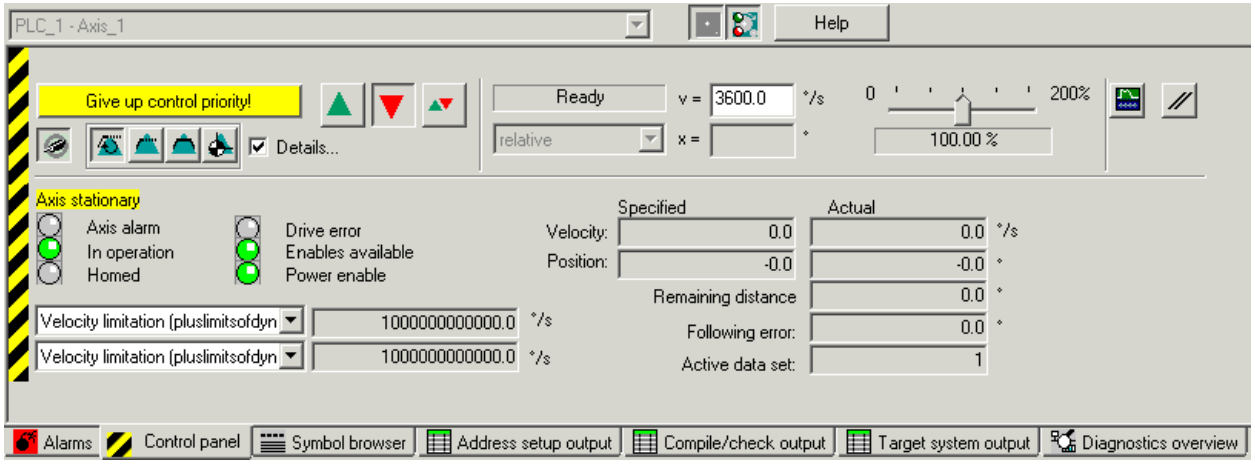


Figure 6-24 Axis control panel

Using the axis control panel

⚠ WARNING

Activating sign-of-life monitoring

Use the axis control panel in control mode only with activated sign-of-life monitoring and a suitably short monitoring time! Otherwise, if problems occur in the communication link between the control PC and the device, the axis may start moving in an uncontrollable manner.

Assume control priority

To assume control priority, proceed as follows:

1. Show the control area by clicking the button in order to test, for example, programmed traversing motions in this mode.
2. Show the diagnostic area by clicking the button in order to test traversing motions that are caused by the motion commands sent to the axis in this mode.
3. Select the axis that you want to traverse and monitor from the selection list, **PLC_1 - Axis_1** in the example.
4. Specify the parameters you want to display in the lower left side of the Diagnostics area using the selection lists. The corresponding values are shown next to them.
5. Select **Assume control priority** to establish the connection to the PG/PC.
   The **Assume control priority** dialog opens.

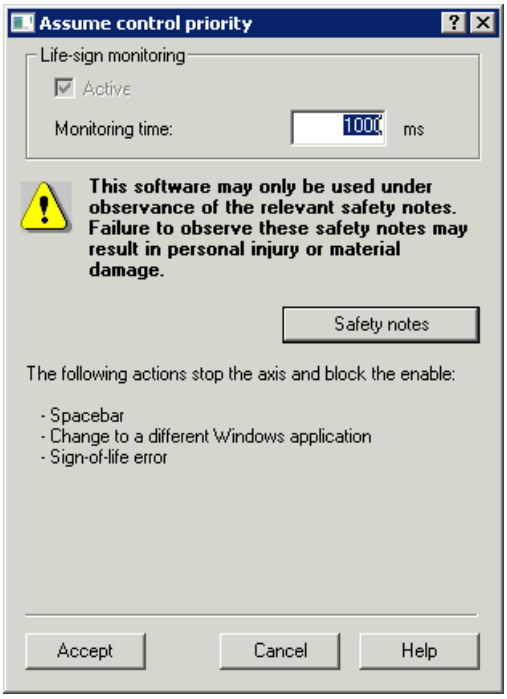


Figure 6-25 Assume control priority

6. Observe the safety regulations and confirm with **Accept**.

The PG/PC has the control priority; the button caption has changed to **Return control priority**.

Note

By pressing the SPACEBAR, you can stop the axis at any time.

Activating enables

To activate the enables, proceed as follows:

1. Click the **Set/remove enables** button to enable the axis.
   The LEDs indicate the status of the enables.

Specifying motion commands for axis

1. Specify motion commands for the axis.
   The following functions are available:

Button	Meaning/function
	Speed default This command specifies that the axis is started speed-controlled. Specify a speed setpoint to which the axis can be ramped up via a velocity profile. The command is possible for all axis types; position and following axes are operated speed-controlled.
	Start axis position-controlled This command specifies that the axis is started position-controlled. Specify a speed setpoint to which the axis can be ramped up via a velocity profile. The command is possible for position and following axes.
	Position axis With this command, you specify positioning of the axis (positioning or synchronous axis) at a specific position. The position value entered can be absolute or relative. Modulo axes can also be positioned via the shortest path. The programmed position must be within the software limit switches.
	Home axis With an absolute measuring system, homing is only required once during commissioning. When this is completed, the position value will be known when the machine is switched on. In the case of an incremental measuring system, the machine must be homed every time it is switched on.

Start axis motion

To start the axis motion, proceed as follows:

1. Click the switch to start the motion command parameterized last.
   Or click the switch to start the **Speed specification** or **Start axis position-controlled** motion commands in jog mode.
   The motion continues as long as the right-hand mouse button is pressed.

Exit axis control panel

To exit the axis control panel, proceed as follows:

1. To stop the system, click the switch.
2. Deactivate the **Set/remove enables** button. Confirm the **Disable axis** dialog with **OK**.

Note

If you want to traverse the axis again, acknowledge all alarms in the "Alarms" window.

3. Click the **Return control priority** button to return the control priority of the control panel.
4. On the menu bar, select **Project > Disconnect from target system** to switch to offline mode.

Result

The axis can be traversed. Axis configuration is complete.

Potential problems

The axis cannot be traversed.

If the axis cannot be traversed using the axis control panel, test to see if you can traverse the drive using the drive control panel.

- If you cannot traverse the drive using the drive control panel, there is a problem with the drive.
- If you can traverse the drive with the drive control panel, there is a communication problem. Check the drive.

6.6 Programming the SIMOTION application

6.6.1 Using tags

Variable types

Variables are used to structure programs. They are wild cards in a program and can assume values.

In SIMOTION, different types of variables are distinguished:

- **System variables**
  Each SIMOTION device and technology object has specific system variables. You can access system variables within the SIMOTION device from all programs.
- **I/O variables**
  An I/O variable is a symbolic variable name that is assigned to an I/O address of the SIMOTION device or to the I/O. Thus, direct access to the peripherals is possible.
  I/O variables are valid for all devices. All programs of the SIMOTION device have access to them.
- **Global device variables, unit variables and local variables** are user-defined variables with limited scope:
  These global device variables can be accessed from all parts of the user program. They can also be accessed from HMI devices.
  Unit variables can be accessed by all programs, function blocks and functions defined within the same source, e.g. ST source, MCC source, LAD/FBD source.
  A source is a logic unit that you can create in your project and that can contain programs, functions and function blocks.
  Local variables can only be accessed within the program, the function or function block in which they are defined.
  If variables have been defined in the interface section of a source, they can be accessed by other sources and external components, e.g. HMI systems.

Creating global device variables

Note

Global device variables can only be created in offline mode.

To create global device variables, proceed as follows:

1. Click the **GLOBAL DEVICE VARIABLES** element in the project navigator under the SIMOTION device.
   In the symbol browser, the **Unit-global variables** table is displayed.
2. In the **Name** column, click the first empty cell and enter the variable name, **g_bo_start** in the example.
   Press the **<RETURN>** or **<TAB>** key. The input focus moves to the **Data type** field.
   Alternatively, you can click the field to move the input focus to it.
3. Enter the data type in the **Data type** field, **BOOL** in the example.
4. Press **<RETURN>** to confirm.
   The variable is created and available in the project. In the symbol browser, a new line opens for input.

5. Create other global device variables in the same way, **g_bo_ready** in the example.

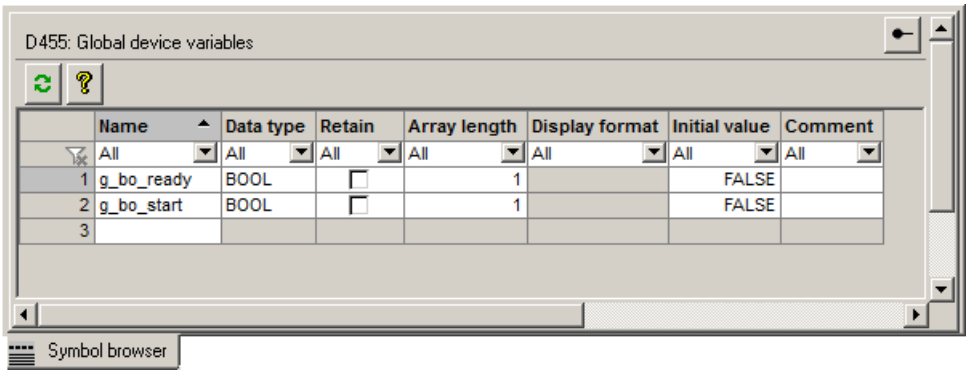


Figure 6-26 Creating global device variables

6. Select **Project > Save and compile changes** in the menu to accept the expansions in the project.

Creating I/O variables

Note

I/O variables can only be created in offline mode.

To create I/O variables, proceed as follows:

1. Double-click the **ADDRESS LIST** element below the SIMOTION device in the project navigator. In the detail view, the **Address list** tab opens.
2. Click the first free cell in the **Name** column. Enter a name for the variable.
3. Press the **<RETURN>** or **<TAB>** key. The cursor moves to the **I/O address** field.
4. Select the **IN** entry for input variable or **OUT** for variable in the **I/O address** column. [1)]
5. Click the three dots in the **Assign** column to open the Assignment dialog.[1)]
6. In the Assignment dialog, select the required variable and select the **Assign** entry in the **Assignment** column.[1)]
7. Confirm the dialog with **OK**.[1)]
8. Select **Project > Save and compile changes** in the menu to accept the expansions in the project.

1) Applies only to devices that support symbolic assignment (e.g. CU320-2).

Additional references

You will find detailed information on the creation of variables in the SIMOTION SCOUT online help and in the relevant Programming and Operating Manuals.

6.6.2 Using MCC

6.6.2.1 Overview

Program creation steps

Creation of an MCC program encompasses the following steps:

1. Create the MCC source.
2. Create the MCC chart in the MCC source.
3. Insert MCC commands in the MCC chart.

6.6.2.2 Creating the MCC unit

Procedure

To insert an MCC source, proceed as follows:

1. Open the **PROGRAMS** folder below the SIMOTION device in the project navigator.
2. Double-click **Insert MCC source**.
   The **Insert MCC source** dialog opens.

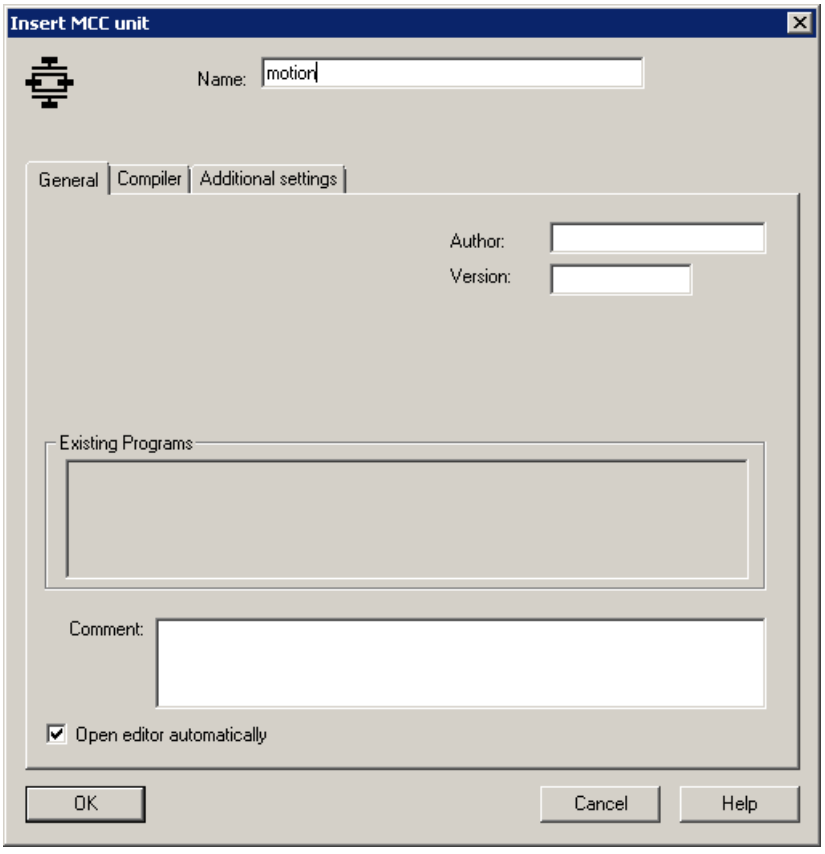


Figure 6-27 Inserting an MCC source

3. Assign a name, **motion** in the example.
4. Go to the **Compiler** tab. For diagnostics purposes, activate the options **Permit program status** and **Permit single step**. In this way, you can monitor program execution later in online mode.
5. Click **OK** to confirm.

Result

The MCC source is created.

- The source appears in the project navigator below the **PROGRAMS** branch.
- The declaration table of the source opens in the working area of the workbench. The variables declared there apply within the MCC source and can be linked in other sources.

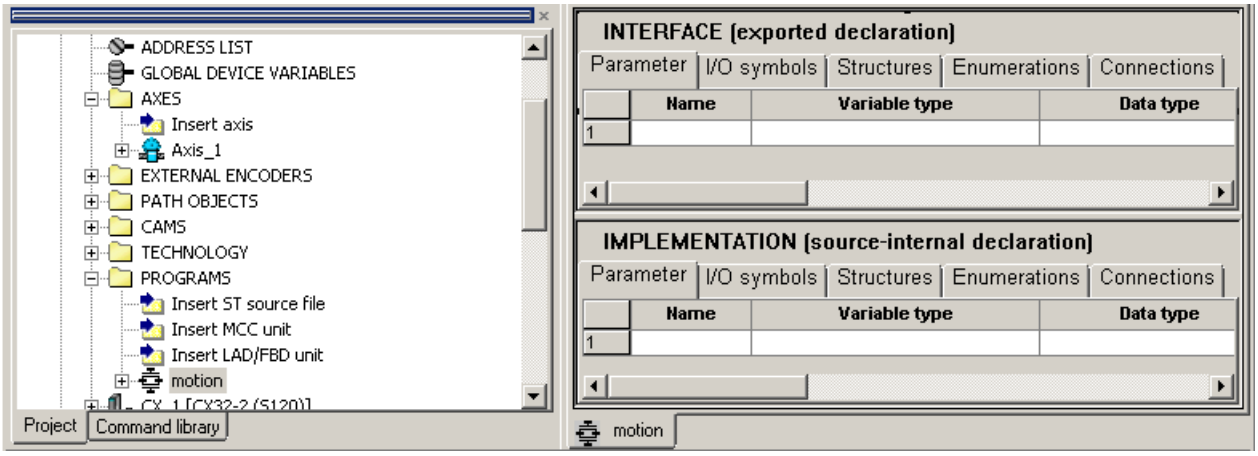


Figure 6-28 MCC source "motion" inserted

6.6.2.3 Creating an MCC chart

Procedure

To insert an MCC chart, proceed as follows:

1. Open the **PROGRAMS** folder below the SIMOTION device in the project navigator.
2. In the **PROGRAMS** folder, open the MCC source, **motion** in the example.

3. Double-click **Insert MCC chart**.
   The **Insert MCC chart** dialog opens.

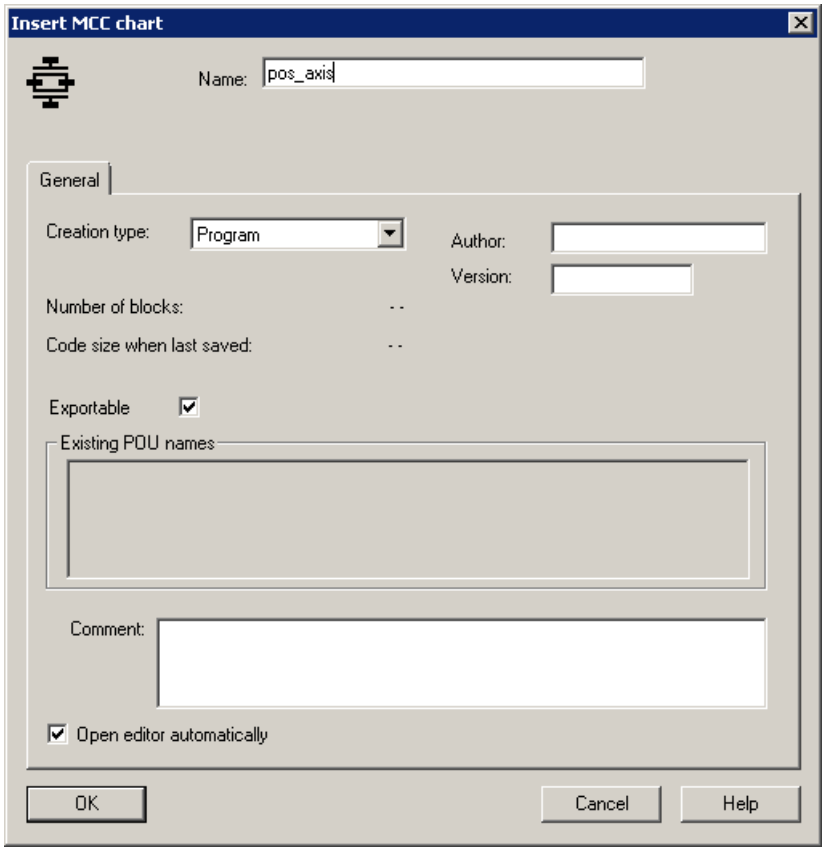


Figure 6-29 Inserting an MCC chart

4. Assign a name, **pos_axis** in the example.
5. Select the creation type **Program**.
6. Click **OK** to confirm.

Result

The MCC chart is created in the project.

- The created MCC chart **pos_axis** appears in the **PROGRAMS** folder below the **motion** source.
- The MCC editor is opened in the working area of the workbench. The start and end nodes are already pre-defined. You can start MCC programming.

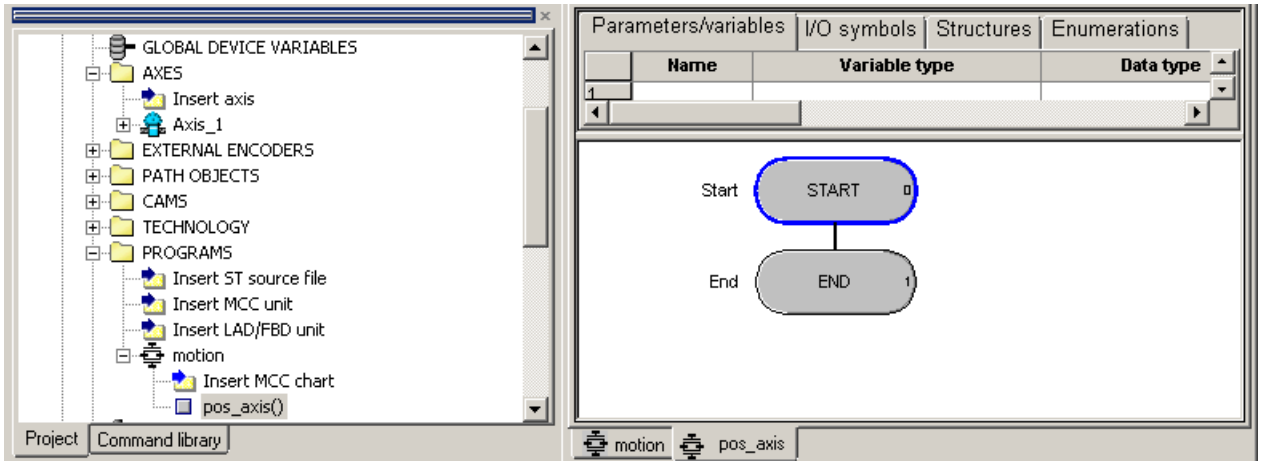


Figure 6-30 MCC chart "pos_axis" inserted

6.6.2.4 Using MCC command blocks

Every newly created MCC chart already contains a start and an end node.

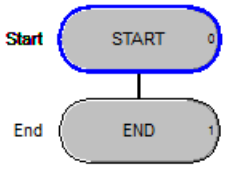


Figure 6-31 MCC chart, start/end nodes

You insert the MCC command blocks between these. The commands are processed in the direction from the start to the end node.

The MCC commands are available to you via:

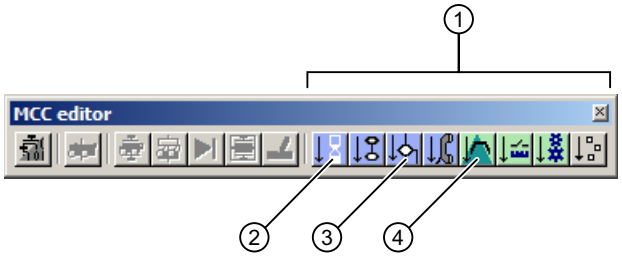
- **MCC editor** toolbar
- **MCC chart > Paste** menu command
- Context menu of the command block

Using the MCC editor toolbar

Opening the toolbar

The **MCC editor** toolbar is displayed in the workbench as soon as you open an MCC chart.

The commands are arranged as command groups.



① Command groups
② Basic commands
③ Program structures
④ Single axis commands

Note

If you do not see the toolbar, check whether the display is switched on: Open the menu **View > Toolbars**. Activate the checkbox for **MCC editor** in the **Toolbars** window.

Opening the command group

Move the cursor across the colored buttons of the toolbar to display the command groups.

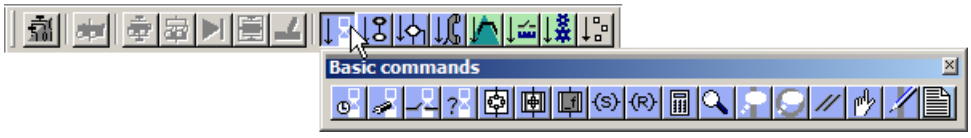


Figure 6-32 Opening the command group

Keeping command groups open or closed continuously

Click the window title of a command group to keep the command group open continuously.

Select "Hide" in the context menu of a command group to close the command group.

Placing the command group as required

Drag the toolbar or the command groups of the toolbar with the mouse to any location on the workbench.

Docking the toolbar

Drag the toolbar or the command groups of the toolbar with the mouse to the edge areas of the workbench to dock them there.

Showing a tooltip for the command

Hold the mouse pointer briefly over a command button. The designation of the command is shown.

Inserting MCC editor commands in the MCC chart

In order to insert an MCC editor command in the created MCC chart, proceed as follows:

1. In the active MCC chart, click the connecting line between two commands, or click the command after which the new command is to be inserted.
   The connecting line or the border line of the command button is marked blue. The marking flashes.
2. Select the command group in the **MCC editor** toolbar.
3. Click the desired command in the command group.

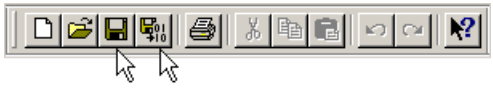
Result

The command was inserted into the chart and can now be parameterized.

6.6.2.5 Backing up the MCC program

To back up the MCC programs, proceed as follows:

1. To do so, click in the toolbar on the **Save project** or **Save project and compile changes** button.



Alternatively, you can click the **Accept and compile** command in the **MCC editor** toolbar.



This command compiles the currently selected program as well as all other programs of the same source.
However, the command does not save the changes.
You thus have the option of accepting changes to a program into the project without having to save or compile the entire project again.

Additional references

For further information, refer to the SIMOTION MCC Motion Control Chart Programming and Operating Manual.

The "Getting Started section of the SIMOTION SCOUT" online help contains a detailed description of a sample programming in SIMOTION SCOUT.

6.6.3 Using LAD/FBD

6.6.3.1 Overview

Program creation steps

The creation of an LAD/FBD program encompasses the following steps:

1. Create an LAD/FBD source.
2. Create an LAD/FBD program in the LAD/FBD source.
3. Insert LAD/FBD commands in the LAD/FBD program.
4. Save and compile the LAD/FBD program.

6.6.3.2 Create LAD/FBD unit

Procedure

To create an LAD/FBD source, proceed as follows:

1. Open the **PROGRAMS** folder below the SIMOTION device in the project navigator.
2. Double-click **Insert LAD/FBD source**.
   The **Insert LAD/FBD source** dialog opens.

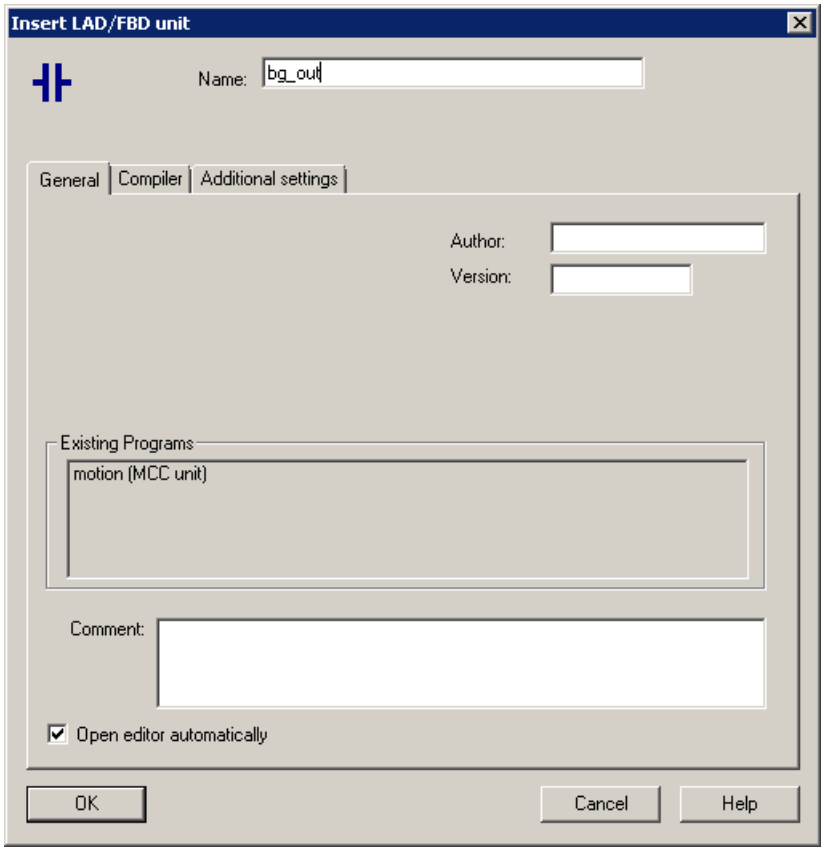


Figure 6-33 Inserting the LAD/FBD source

3. Assign a name, **bg_out** in the example.
4. Switch to the Compiler tab.
5. For diagnostics purposes, activate the option **Permit program status**. In this way, you can monitor program execution later in online mode.
6. Click **OK** to confirm.

Result

The LAD/FBD source is created.

- The LAD/FBD source **bg_out** appears in the **PROGRAMS** folder.
- The declaration table of the source opens in the working area of the workbench. The variables declared there apply within the LAD/FBD source and can be linked in other sources.

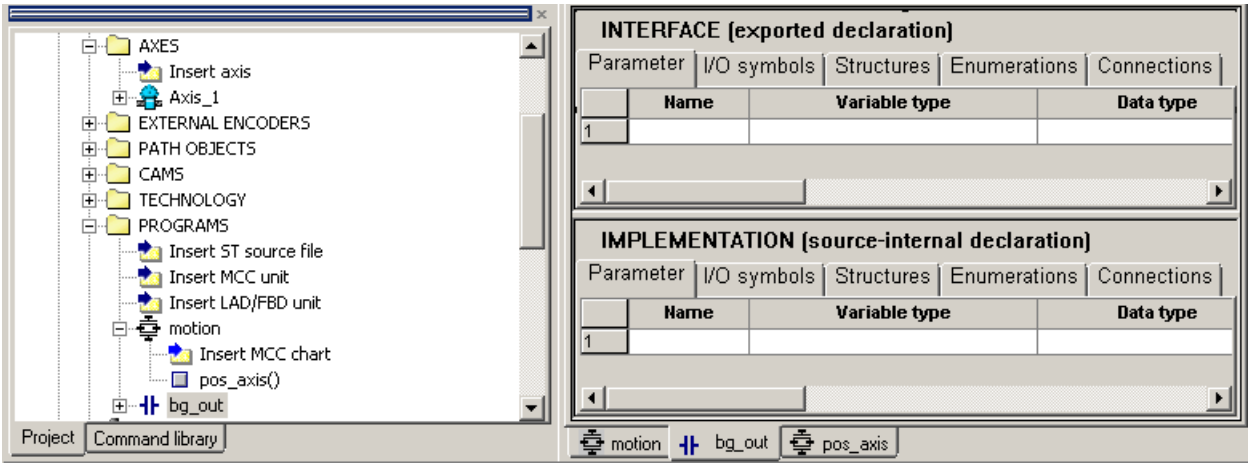


Figure 6-34 LAD/FBD source "bg_out" inserted

6.6.3.3 Create LAD/FBD program

Procedure

To insert an LAD/FBD program, proceed as follows:

1. Open the **PROGRAMS** folder below the SIMOTION device in the project navigator.
2. Open the LAD/FBD source **bg_out** in the **PROGRAMS** folder.

3. Double-click **Insert LAD/FBD program**.
   The **Insert LAD/FBD program** dialog opens.

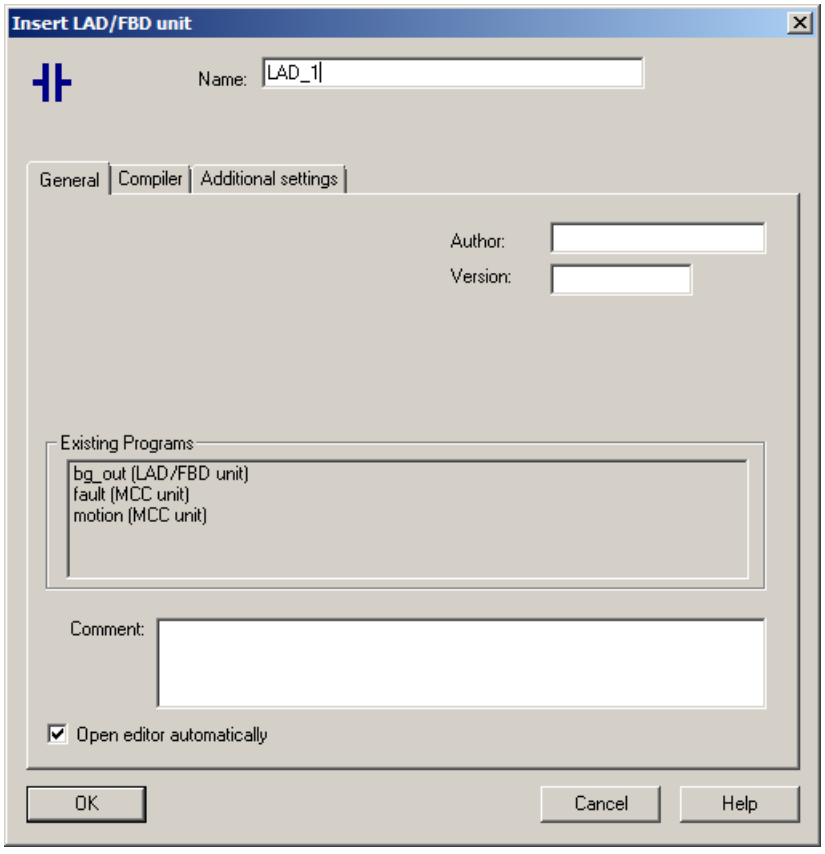


Figure 6-35 Inserting the LAD/FBD program

4. Assign a name, **LAD_1** in the example. The name must be unique throughout the project.
5. Select the creation type **Program**.
6. Click **OK** to confirm.

Result

The LAD/FBD program **LAD_1** is created in the project.

- The LAD/FBD program appears in the **PROGRAMS** folder.
- The LAD/FBD editor is opened in the working area of the workbench. You can start programming.

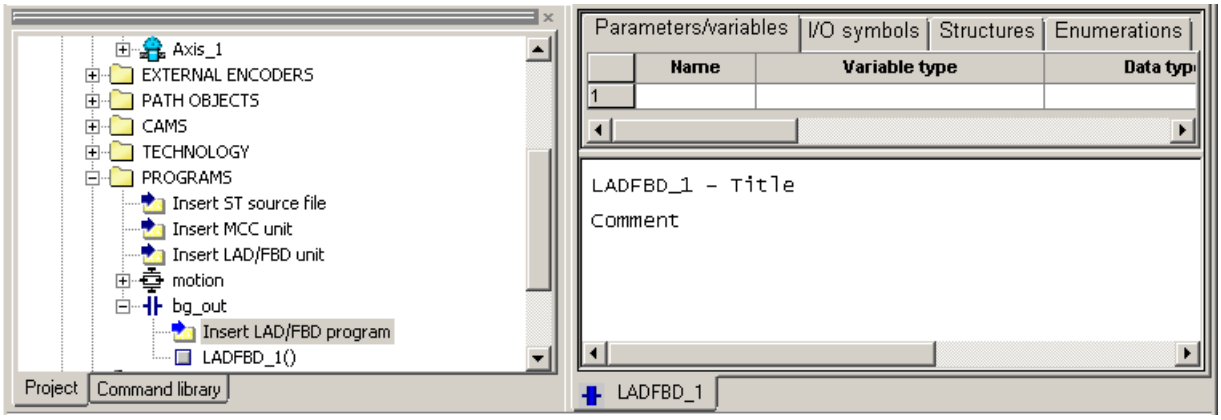


Figure 6-36 LAD/FBD program "LAD_1" inserted

6.6.3.4 Using the LAD/FBD toolbar

Opening the LAD/FBD toolbar

The LAD/FBD toolbar becomes visible in the workbench as soon as you open an LAD/FBD program.

Move the cursor across the active buttons of the toolbar to display the functions.



Note

If you do not see the toolbar, check whether the display is switched on: Open the menu **View > Toolbars**. In the **Toolbars** window, activate the checkbox for the **LAD/FBD toolbar**.

Switching the programming language

SIMOTION SCOUT allows simple switching between ladder logic and function block diagram. The LAD/FBD editor contains the command **LAD/FBD program > Switch to FBD** or **Switch to LAD**.

6.6.3.5 Backing up the LAD/FBD program

Procedure

In order to back up an LAD/FBD program, proceed as follows:

1. Click in the toolbar on the **Save project** or **Save project and compile changes** button.



Alternatively, you can click the **Accept and compile** command in the **LAD/FBD toolbar**.



This command compiles the currently selected program as well as all other programs of the same source.
However, the command does not save the changes.
You thus have the option of accepting changes to a program into the project without having to save or compile the entire project again.

Additional references

For further information, refer to the Online Help and SIMOTION LAD/FBD Programming and Operating Manual.

The **Getting Started section of the SIMOTION SCOUT** online help contains a detailed description of a sample programming in SIMOTION SCOUT.

6.6.4 Using ST

6.6.4.1 Overview

Program creation steps

The creation of an ST program encompasses the following steps:

1. Create an ST source.
2. Save and compile the ST program.
3. Execute the ST program.

6.6.4.2 Creating an ST source

Procedure

1. In the project navigator, open the tree for your SIMOTION device (programs are assigned to the SIMOTION device on which they are to run).
2. Mark the Programs folder and select the **Insert > Program > ST source** menu command. The **Insert ST source** dialog opens.

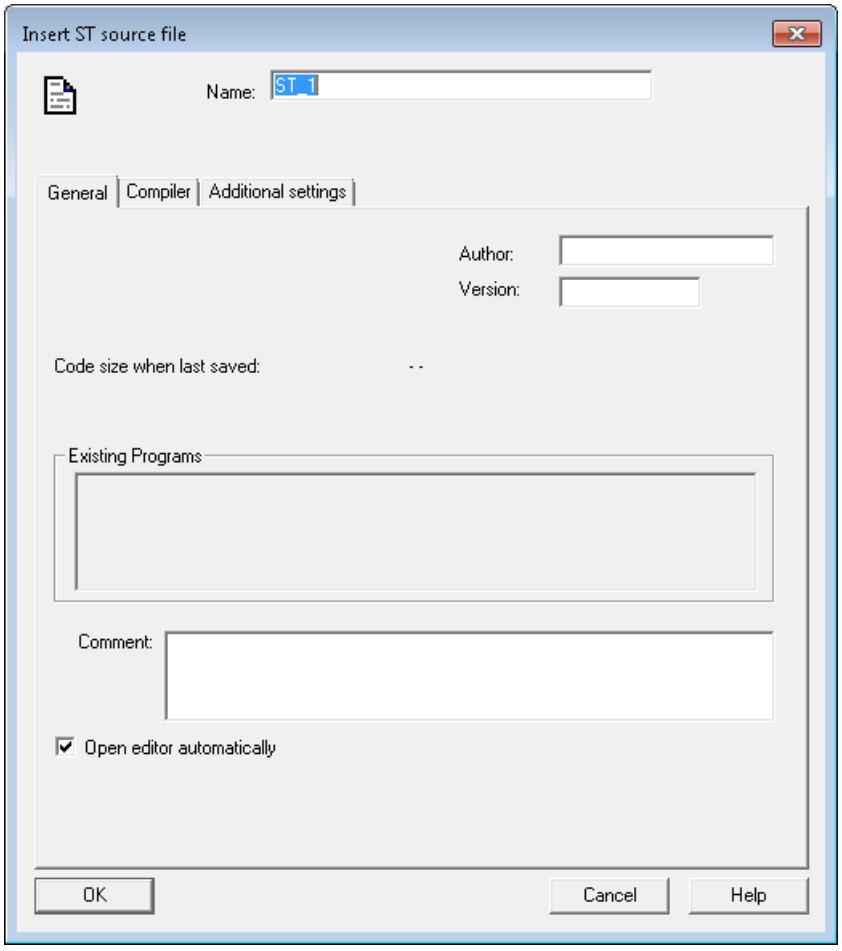


Figure 6-37 Inserting an ST source

3. Enter a name for the ST source consisting of up to 128 characters (see figure), e.g. ST_1, and click **OK** to confirm the entries.
   The ST editor appears in the working area. The ST source ST_1 is inserted in the navigator.

Result

The ST_1 ST program is created in the project.

- The ST program appears in the PROGRAMS folder.
- The ST editor opens in the working area of the workbench. You can start programming.

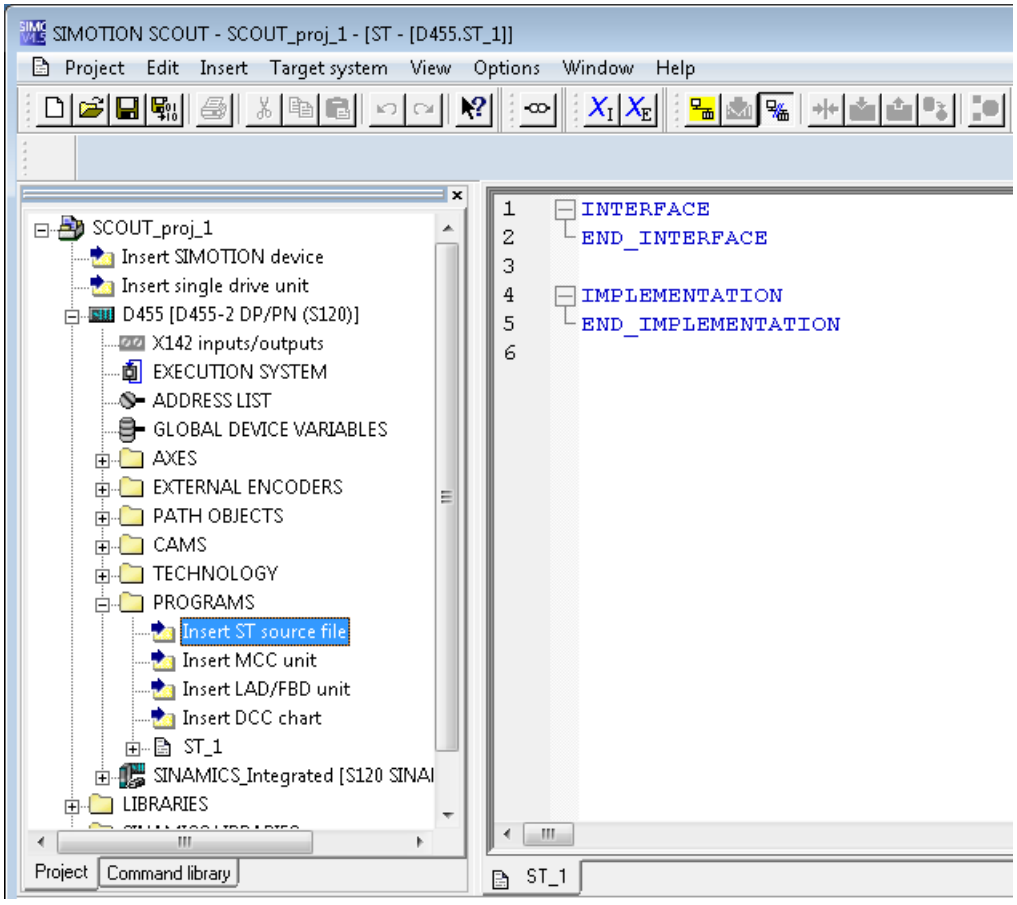


Figure 6-38 ST source "ST_1" inserted

6.6.4.3 Backing up the ST program

Procedure

To back up an ST program, proceed as follows:

1. Save the complete project with **Project > Save**.

Before you can run or test your program, you must compile it into executable machine code. The ST compiler performs this task.

Start the compiler as follows:

1. Click in the window with the ST editor to display the **ST source** menu. This menu is a dynamic menu and is only displayed if the window of the ST editor is active.
2. Start the compiler by selecting the **ST source > Accept and compile** menu command.

Additional references

Further information on ST programming can be found in the SIMOTION SCOUT online help and in the SIMOTION ST Structured Text Programming and Operating Manual.

6.6.4.4 Executing the ST program.

Before you can execute the sample program, you must assign it to an execution level or a task. When you have done this, you can establish the connection to the target system, download the program to the target system, and then start it.

Additional references

Further information on ST programming can be found in the SIMOTION SCOUT online help and in the SIMOTION ST Structured Text Programming and Operating Manual.

6.7 Configure execution system

Execution levels define the chronological sequence of tasks in the execution system. A level can contain several tasks. The tasks provide the framework for program execution. A task may comprise several programs. By assigning the created programs to the tasks, you can, for example, define the priority, the time frame or order in which the programs are to be executed.

Assigning programs to tasks

To assign programs to tasks in the execution system, proceed as follows:

1. Double-click in the project navigator below the SIMOTION device on **EXECUTION SYSTEM**.
   The **Execution System** window opens in the working area.
2. Assign the required program to the preferred task. In the sample MCC program, **motion.pos_axis** and **MotionTask_1** task.
   – In the tree of the execution system, select the branch **ExecutionLevels > OperationLevels > MotionTasks > MotionTask_1**.

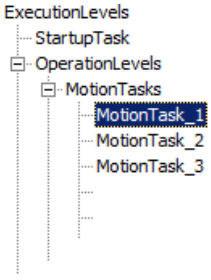


Figure 6-39 Execution system, tree view of the execution levels and tasks

The **MotionTasks** window opens on the right of the working area. The programs **pos_axis** and **LAD_1** as well as programs of the **fault** source are visible on the **Program assignment** tab at **Programs**.

– Select the MCC program **motion.pos_axis** and click the **>>** button. The program is displayed at **Programs used**. It is thus assigned to the task **MotionTask_1**.

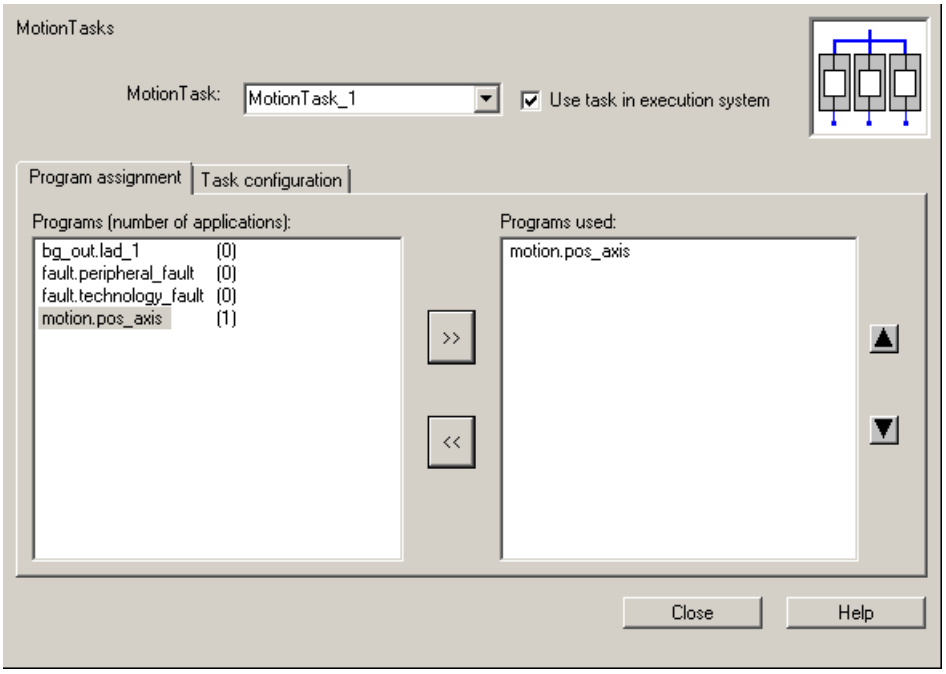


Figure 6-40 Execution system, MotionTasks window

The assignment is visible in the tree of the execution system. The program **motion.pos_axis** appears below the branch **MotionTask_1**.

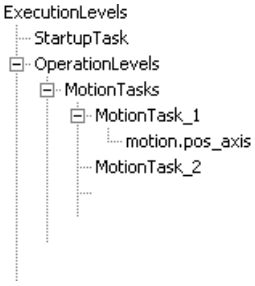


Figure 6-41 Execution system, MotionTask_1 with assigned pos_axis program

– In the **Task configuration** tab, activate the **Activation after StartupTask** option. This executes the MCC program immediately after the SIMOTION device is started. If this option is not activated, the program must be started explicitly by the call from another program that is assigned to the StartupTask or another active task.

3. Assign the LAD program **bg_out.kop_1** to the task **BackgroundTask**:

   – In the tree of the execution system, select the branch **ExecutionLevels > OperationLevels > BackgroundTask**. Assign the LAD program **bg_out.kop_1** to this task.

4. Assign the fault handling routines:
   - In the tree of the execution system, select the branch **ExecutionLevels > OperationLevels > SystemInterruptTasks > TechnologicalFaultTask**. Assign the MCC program **fault.technology_fault** to this task.
   - In the tree of the execution system, select the branch **ExecutionLevels > OperationLevels > SystemInterruptTasks > PeripheralFaultTask**. Assign the MCC program **fault.peripheral_fault** to this task.
5. Click **Close**. Confirm with **Yes** if you are prompted to save.

Result

The execution system is configured.

Loading the configured execution system to the target system

Save and compile the changes, go online and load the configured execution system into the target system.

6.8 Project generator

6.8.1 Overview

With the project generator, you can quickly and easily create a new SIMOTION project or update an existing project on the basis of templates.

The templates include preconfigured SIMOTION devices and modules, all of which are supplied with the ProjectGenerator. These can be automatically integrated in a project with the ProjectGenerator.

Overview of the ProjectGenerator functions

You can execute the following functions with the ProjectGenerator:

- Create a new project or open and edit an existing project
- Create a new device or open and edit an existing device
- Automatic configuration of the modules on the basis of the selected hardware
- Copy files/directories in the file system
- XML interface for user-specific expansions
  - Generation of the user-interface elements
  - Generic function calls
- Assign programs to the execution system
- FTP transport of files to the SIMOTION device (e.g. SIMOTION IT pages)

- Import technology objects (TO)
- Interconnect technology objects (synchronous operation interconnection)
- Write configuration data and system variables to technology objects
- Import libraries:
  - Change code
  - Version check and version update
  - Setting and restoring constants
  - Creating and restoring user areas
- Import units
  - Change code
  - Version check and version update
  - Set and restore constants
  - Create and restore user areas

6.8.2 Integrating the ProjectGenerator

Integration in SCOUT

As of version V1.3, the ProjectGenerator can be integrated in SCOUT. The ProjectGenerator does not require an installation. You can integrate the ProjectGenerator via the menu **Options > Settings...**, **ProjectGenerator** tab directly from a DVD or the local hard disk. Select the path to the **ProjectGenerator.exe** file.

You then use the ProjectGenerator via the menu item **Project > ProjectGenerator**.

Note

The path must always be valid. If the DVD is removed from the drive or the local folder is deleted, an error message is issued.

Additional references

You can find additional information on this topic in the SIMATIC/SIMOTION Project Generator Application Manual.

6.9 Configuring multilingual messages

Multilingual messages and comments can be configured with the "Language-dependent texts" function. This is necessary, for example, if you want to output multilingual user-defined Alarm_S messages or diagnostic buffer entries.

To configure multilingual messages:

1. Select **Project > Language-dependent texts** in the menu. The **Select Language** window opens.
2. Set the language in which you want to configure the messages as the **current language**.
3. Click **OK**. The window closes.
4. Select **Project -> Messages -> Configure** in the menu and check the set language at **Configuration language** in the displayed window.
   The message texts and remarks are displayed in the language in which they were originally configured. These texts must then be compiled in the new configuration language.
5. In the **Message Configuration** window, double-click the messages for which you want to enter texts in the new configuration language or click the **Edit** button. The **Edit Message** window is displayed.
6. Enter the new message text and remarks in the changed language.
   The symbol name must not be changed in foreign language messages, as this symbol name is used for programming. Only the message text and remarks are language-dependent.
7. Click **OK** to confirm. The modified message text is entered in the Message configuration table.
8. Repeat steps 6 to 8 if you want to enter more message texts in the new configuration language.

For further information, please refer to the online help for SIMOTION SCOUT -> Configure multilingual texts/comments.

6.10 Know-how Protection

The know-how protection in SIMOTION SCOUT provides read- and write protection for program sources (ST sources, MCC charts, LAD/FBD programs and DCC charts) and libraries in your project. This protection prevents unauthorized viewing of the programs. You can specify different protection levels for programs and libraries. The specification applies to all protected programs and libraries.

If the know-how protection is set for a program, for example, the know-how protection is retained, even when this program is copied or exported.

Specifying the protection level

To specify the the know-how protection level, proceed as follows:

1. Select **Project > Programs know-how protection > Configure ...** in the menu bar.
2. Specify the protection level for programs and libraries.
3. Confirm your selection with **OK**.

Creating the standard login

To create the standard login for the know-how protection, proceed as follows:

1. Select **Project > Programs know-how protection > Edit standard login...** in the menu bar.
2. Enter the login and password, and confirm the entered password.
3. Confirm the input with **OK**.

Set know-how protection

To set the know-how protection, proceed as follows:

1. In the project navigator, mark the source for which you want to set the know-how protection.
2. Open the dialog for setting the know-how protection from the **Know-how protection > Set** context menu.
3. Enter the login and password, and confirm the entered password.
   Provided no standard login has been set and this login should be used as standard login, activate the **Use this login as standard login** checkbox.
4. Confirm the input with **OK**.

The lock symbol at the associated source identifies protected programs in the project navigator, e.g. .

Additional references

For additional information on this topic, refer to:

- SIMOTION MCC Motion Control Chart Programming and Operating Manual
- SIMOTION LAD/FBD Programming and Operating Manual
- SIMOTION ST Structured Text Programming and Operating Manual
- DCC Programming and Operating Manual
- SIMOTION SCOUT Online Help

6.11 Saving and restoring variables from the device

Saving and restoring data with SCOUT

Using the SIMOTION SCOUT functions **Save variables** and **Restore variables** it is possible to save and then restore data (which has been changed during operation and is only saved in the SIMOTION device or on the memory card) to the hard disk. This can be used if a SIMOTION platform is changed or a version updated, for example.

The following types of data can be backed up:

- Data variables that are in the SRAM/NVRAM of the controller:
  - Retentive global device variables
  - Retentive global unit variables
  - TO retain data (as of V4.1)
- Data sets which have been backed up from the user program via _saveUnitDataSet or _exportUnitDataSet and are located on the memory card, including
  - Global unit variables of interface and implementation sections from program sources (ST, MCC or LAD/FBD sources):
    Retentive variables (VAR_GLOBAL RETAIN)
    Non-retentive variables (VAR_GLOBAL)

The **_exportUnitDataSet** function backs up unit variables in a **version-independent** format (XML).

By contrast, data is backed up in a **version-dependent** format (binary) via the **_saveUnitDataSet** function and can, therefore, only be read back in on a device/unit of the same version (e.g. V3.2) via the **_loadUnitDataSet** function.

Data sets saved via _saveUnitDataSet are automatically converted into XML format using the **Save variables** function. The data sets are available in binary format for the new version once the **Restore variables** function has been executed.

Data backed up using **Save variables** are saved as version-independent XML files in a user-defined folder on the PC's hard disk.

In addition to the data backup functions provided by SIMOTION SCOUT, backup functions are also available in the runtime system.

Note

When performing an update with a kernel version that is ≥ V4.1, the above SIMOTION SCOUT functions are only required for backing up and restoring unit data sets that have been created using _saveUnitDataSet.

Reason:

- Retain data remains valid after an update.
- Unit data backed up using _exportUnitDataSet also remains valid after an update.
- Retain data can also be backed up to a memory card **without the use of SIMOTION SCOUT:**
  - The _savePersistentMemoryData function saves **all** retain data from the SRAM/NVRAM; this can be retentive global unit variables in the interface or implementation sections of a source (VAR_GLOBAL_RETAIN) or retentive global device variables (RETAIN) and TO retain data
    (For further information, see List Manual: Device System Functions/Variables)
  - The **Back up diagnostic data** function (triggered via a service switch/diagnostic button or IT DIAG) saves **all** retain data (as above, see _savePersistentMemoryData). Subsequently executing the **Restore non-volatile data** function reactivates this backed up data.
    (For further information, see the SIMOTION D Commissioning and Installation Manuals)

A directory structure is created in the selected path using the **Save variables** function. This directory is assigned the name of the selected SIMOTION device or the selected unit, depending on whether the variables should be saved or restored for the entire device or just one unit.

The retentive global device variables are backed up in the unitdata.xml file. The number of subdirectories corresponds to the number of sources in the SIMOTION project. The names of the subdirectories correspond to the names of the sources. Each subdirectory contains the unitdata.xml file in which the retentive unit variables are stored. If necessary, a further file that contains the non-retentive global variables of the source is saved. This DS*.xml file is assigned the data set number as its name, which is transferred by specifying the parameter **ID** for the **_saveUnitDataSet** or **_exportUnitDataSet** function.

Example of a folder structure when backing up on the device:

The folder structure is as follows:

<Folder device>, e.g. D435
unitdataset.xml
DS000001.xml
<Folder device>, e.g. ST_UNIT1
Unitdataset.xml
DS000002.xml

Restore variables

If the **Restore** function is called in the context menu of a unit, select the directory with the name of this unit in the directory selection dialog.

If the **Restore** function is called in the context menu of a SIMOTION device, select the directory with the name of this device in the directory selection dialog.

Example: If the variables of the SIMOTION device have been stored in the directory D435, then this is the directory that must be selected for the restore operation.

Additional references

Detailed information on this topic can be found in:

- SIMOTION Runtime Basic Functions Function Manual, Section Data backup from user programrogram

6.12 Online multiuser mode

6.12.1 Overview

Thanks to the new Project comparison, Device upload and Download with supplementary data functions, several users can exchange project data that has been modified via the target device, online. This allows them to synchronize the status of their own SIMOTION project with that of another one, thereby updating it.

In online multiuser mode, it is possible for two users to work online on the same SIMOTION device. The following functions can be performed:

- Read and control system variables and configuration data
- Execute measuring functions and axis control panel
- Upload configuration data
- Upload programs or technology objects and other settings (e.g. execution system)
- Edit and download programs (following prior alignment, if applicable)
- Download individual program sources (possible even when other sources are inconsistent)

The following graphic shows a schematic representation of online multiuser mode:

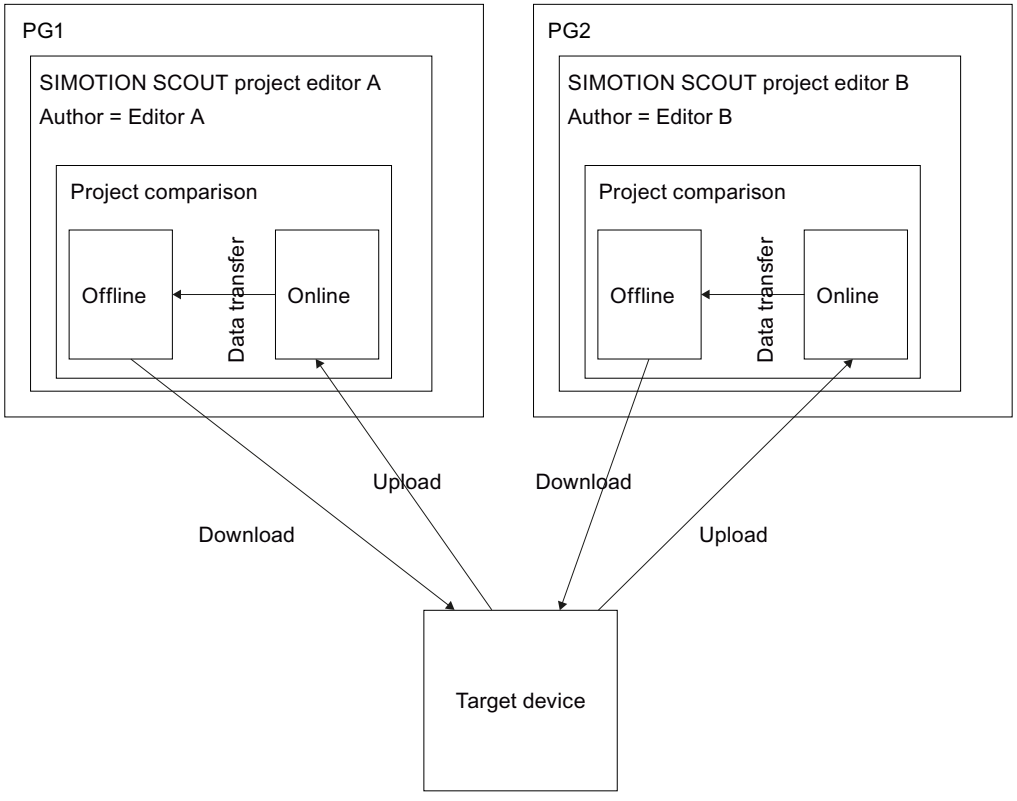


Figure 6-42 Schematic representation of online multiuser mode

Editors A and **B** are working on one SIMOTION project at the same time. Changes made by both editors are loaded to the target device. The project must be synchronized beforehand, otherwise

parts of it could be found to be inconsistent and subsequently overwritten when the **Load project to target device** command is executed.

This means, for example, that **Editor A** must synchronize his project with **Editor B**'s project before loading it to the target device. This can be done via the synchronization mechanism in the project comparison facility.



Figure 6-43 Synchronizing project data via the project comparison function

6.12.2 Working in online multiuser mode

Online consistency

As of V4.4, the online consistency flags are updated event-driven. As soon as a change takes place, SCOUT/STARTER is informed and the flags are updated. You can then no longer debug changed sources. The following requirements apply:

- SIMOTION controllers, as of V4.2
- SINAMICS drives, as of V2.6
- Only structural changes (genuine inconsistency) are taken into account in the case of SINAMICS drives.

Online multiuser mode

When several users work simultaneously, this can result in the following overlaps, for example:

- A user creates a program that is not known on the second computer.
- A user changes the execution system. The change is not known on the second computer.

To accept the changes of other users in your own project, various additional functions have been implemented in SIMOTION SCOUT:

- Download a number of programs: This makes it possible to load only those programs to a controller that are currently being edited, e.g. by a specific user.
- You can see changes to the execution system in the project comparison. You can then upload the changes via the detailed comparison.

Upload the source of another user

If another user has loaded a source to the controller that is part of your project, you cannot load this to the local SCOUT via the project comparison. To upload the source, proceed as follows:

1. Create an empty source with the same name in your project.
2. Perform an online/offline project comparison. An inconsistency is displayed in the comparison for the empty source.
3. Then change to the detailed comparison. The inconsistent source is displayed there.
4. Load the source to your project. By doing this, you make sure that you have a consistent project.

Avoid inconsistencies by loading via HW Config

The matching of the data by uploading to PG is supported only for SCOUT data. Furthermore, changes can be made to the hardware configuration, e.g. changes to addresses of the X142 interface. These changes must be replicated explicitly in the hardware configuration.

6.13 Licensing runtime

6.13.1 Licensing of the runtime components

6.13.1.1 Overview for the licensing

Functions can be licensed using the following software options:

- Motion control technology functions
  The licensing is performed axis-specifically for:
  - POS - position; use of the technology functions for position axis
  - GEAR; use of the technology functions for following axis
  - CAM; use of the technology functions for cam axis

  The GEAR technology function contains the POS technology function, while the CAM technology function contains the POS and GEAR technology functions.

  The MultiAxes package permits a simple licensing of the Motion control technology functions. It contains the license for the unlimited use of the CAM technology function on a SIMOTION device, e.g. a C240, a D4x5-2 or a P320-4.
- TControl technology function
  The use of the TControl technology package functions is licensed on a channel-specific basis in packages of eight temperature channels.
- IT functions, IT DIAG, and SIMOTION IT
  The use of these functions is licensed for each SIMOTION device.

Note

Another option is to order SIMOTION memory cards (MMC and CF) and SIMOTION P320-4 with pre-installed runtime licenses.

Additional references

Further important information for the licensing of the runtime software and the ordering data can be found in:

- Catalog: SIMOTION, SINAMICS S120 and Motors for Production Machines
- PM 21 catalog, section titled SIMOTION runtime software
- Configurator for SIMOTION Runtime Licenses in the Industry Mall (http://mall.automation.siemens.com)

6.13.1.2 Licenses and license key

Depending on the type and number of runtime components used in the project, licenses must be acquired as part of the licensing procedure for SIMOTION. The licenses required for a SIMOTION device are assigned to a license key. This license key is stored on the storage medium of the SIMOTION device during the licensing procedure.

There are two ways of ordering the licenses:

- Preinstalled licenses
  The license key is already stored on the card.
- Ordered licenses (Certificate of License)
  These licenses must be assigned to the storage medium using the Web-License-Manager.
  The determined license key is transferred to the hardware using SCOUT.

You require the following information to obtain the license key:

- The serial number of the SIMOTION device storage medium
  You can obtain the serial number from the storage medium or have it displayed online in the SIMOTION SCOUT (licensing wizard).
- The serial number of the CoL (Certificate of License)
  You have this number on paper.

Table 6-3 The serial number on the SIMOTION hardware assigned to the SIMOTION device

SIMOTION device	Hardware serial number of the module
SIMOTION C2xx	SIMOTION Micro Memory Card
SIMOTION P	The serial number is located on the rating plate of the SIMOTION P, starting with SVP...
SIMOTION D	SIMOTION CompactFlash Card

License keys can be generated separately from the licensing.

Note

When the SIMOTION Memory Card is deleted or formatted, the licensing data is also deleted. Archive the licensing data in order to be able to transfer it again to the storage medium in such a case. If the data is not backed up, you have to perform the licensing again. You can display the entered license key in the Web License Manager.

You will find additional information in the section:
License key is protected from deletion (as of kernel V4.1) (Page 141)

See also

FAQ - Dealing with licenses (http://support.automation.siemens.com/WW/view/en/36947932)

6.13.1.3 Determining licensing requirements

Note

Determine your license requirement only after you have completed the configuration! A license that has been assigned a license key cannot be withdrawn.

Once you have completed your project configuration with SIMOTION SCOUT and before you download it to the target device, you can determine the licenses required for the project. You have three options for determining license requirements. Before you begin, the project must

have been saved and compiled. If you have not yet acquired any licenses, underlicensing is displayed.

Options for determining license requirements are as follows:

- **Offline mode** with open project
  The required licenses are displayed.
- **Online mode** with open project
  A comparison of the required and actual licenses is displayed.
- **Online mode** without project
  The actual licenses of the selected SIMOTION device are displayed.

Proceed as follows:

1. Select the **SIMOTION device** in the project navigator.
2. Select **Licenses** in the context menu.
   The required licenses for the project or a comparison of required and actual licenses are displayed.
3. You can close the window with **X** or continue with **Perform licensing...**.

The license check, i.e. the inspection of the license keys, is carried out in the target system. Possible responses in the case of underlicensing are described in the Underlicensing section.

Note

Memory cards can be purchased with integrated runtime licenses, which do not require separate licensing.

6.13.1.4 Displaying existing licenses of the SIMOTION device

Displaying via accessible nodes

You can use the list of **Accessible nodes** to determine the specific licenses that have already been assigned to the SIMOTION device. You can access the data of the SIMOTION device directly.

Note

This step is not necessary if the required and actual licenses are displayed within a project.

Requirements:

- SIMOTION SCOUT is running
- SIMOTION SCOUT is in online mode
- **No** projects are open

Proceed as follows:

1. Select the **Project > Accessible nodes** menu.
   The list of accessible nodes is displayed in the working area.
2. Select the relevant SIMOTION device.
3. Select **Licenses** in the shortcut menu.
   The Licenses dialog box appears, showing the actual licenses for the selected SIMOTION device.
4. You can close the window with **X** or continue with **Perform licensing...**.

6.13.1.5 Performing the licensing

To perform the licensing:

If there are no pre-installed licenses, you can acquire the licenses you need and then generate the license key required.

Requirements:

- Configuration has been completed
- The project has been saved and compiled
- The required licenses have been determined
- The license key has been determined or the serial numbers of the memory medium and the CoL are available
- SIMOTION SCOUT is in online mode

Proceed as follows:

1. Select the relevant SIMOTION device in SIMOTION SCOUT.
2. Open the context menu and click Licensing.
3. In the Licenses dialog box, click **Perform licensing...**
   If the Use wizard checkbox is activated, a wizard guides you through the licensing procedure. If the checkbox is not activated, the window for the expert licensing is opened. You can enter the license key there without running through the wizard.
   If you have not yet generated the license key, the wizard gives you the option to switch to the Web tool to generate one. Then switch back to the wizard.
4. If you have an online connection, continue with item 5.
   Otherwise, you can establish an online connection with **Online** in the **Step 2 of 3** window.

5. Enter the license key in the **Step 3 of 3** window.
6. Click **Finish**.
   The wizard is closed. Licensing is complete.

Note

The license key is written to the retentive memory when the project data is transferred to the target system.

6.13.2 Changing the license key

The license key is influenced by changes to the project, such as expanding it to include an additional axis. This is why underlicensing is displayed when the project is downloaded and the SF LED flashes at 0.5 Hz.

After you have determined the actual requirement and purchased the necessary licenses, generate the license key again. Now replace the license key already entered with the newly generated one.

6.13.3 License key is protected from being deleted (as from Kernel V4.1)

The license key is stored in the "KEYS" directory on the SIMOTION Memory Card.

When the controller starts up for the first time, the license key will be saved in the boot sector of the card and from this time is protected from being lost.

Operator actions cannot delete the license key in the boot sector. Also not by formatting the card or with the "Write boot sector..." function.

If the license key is no longer present on the card, it will be written again during the startup from the boot sector into the "KEYS" directory. This means that the system will repair any deletion on the "Key" file.

The license key can be changed at any time, for example, by relicensing. At the next startup, the license key will be saved again in the boot sector.

6.13.4 Licensing during hardware replacement

For the replacement of licensed SIMOTION components (MMC, CF, IsoPROFIBUS board or PN board), the associated license key must be assigned to the new SIMOTION component. In this case, contact the Customer Support for assistance.

6.13.5 Underlicensing

If SIMOTION SCOUT detects the presence of underlicensing during license verification, an entry is made in the diagnostics buffer. The verification is repeated every hour, and an entry is made in the diagnostics buffer each time underlicensing is detected.

The following information can be read from the diagnostics buffer entry:

- Number of required licenses
- Number of actual licenses
- Operating mode

As an additional warning signal, the SF LED flashes at 0.5 Hz as long as underlicensing is present on the system. Underlicensing will only be displayed if no acknowledgeable technological event is pending, as the same SF LED is used to indicate this as well.

6.14 Writing the boot sector

There are various reasons why it might prove necessary to write a boot loader, such as when new firmware is used on older hardware. Use the **Options > Write boot sector** menu in SIMOTION SCOUT to enable the boot sector on a memory card to be rewritten.

Additional references

For additional information on this topic, refer to:

- SIMOTION D4x5 Commissioning and Hardware Installation Manual
- SIMOTION D4x5-2 Commissioning and Hardware Installation Manual
- SIMOTION D410 Commissioning Manual
- SIMOTION D410-2 Commissioning and Hardware Installation Manual
- SIMOTION SCOUT Online Help

Target system

7

7.1 Overview

In online mode, you can control the SIMOTION device with SIMOTION SCOUT, e.g.:

- Change and compile program sources
- Download
- Control operating mode
- Set the internal clock of the SIMOTION device
- Change Configuration Data in RUN Mode
- Control variables in RUN
- Copy current data to RAM
- Copy RAM to ROM
- Delete the RAM of the SIMOTION device (overall reset)
- Archive project data

7.2 Going online/offline with SIMOTION SCOUT

7.2.1 Online access points

You have two access points for communication between SIMOTION SCOUT and controllers and single drive units:

- **S7ONLINE**

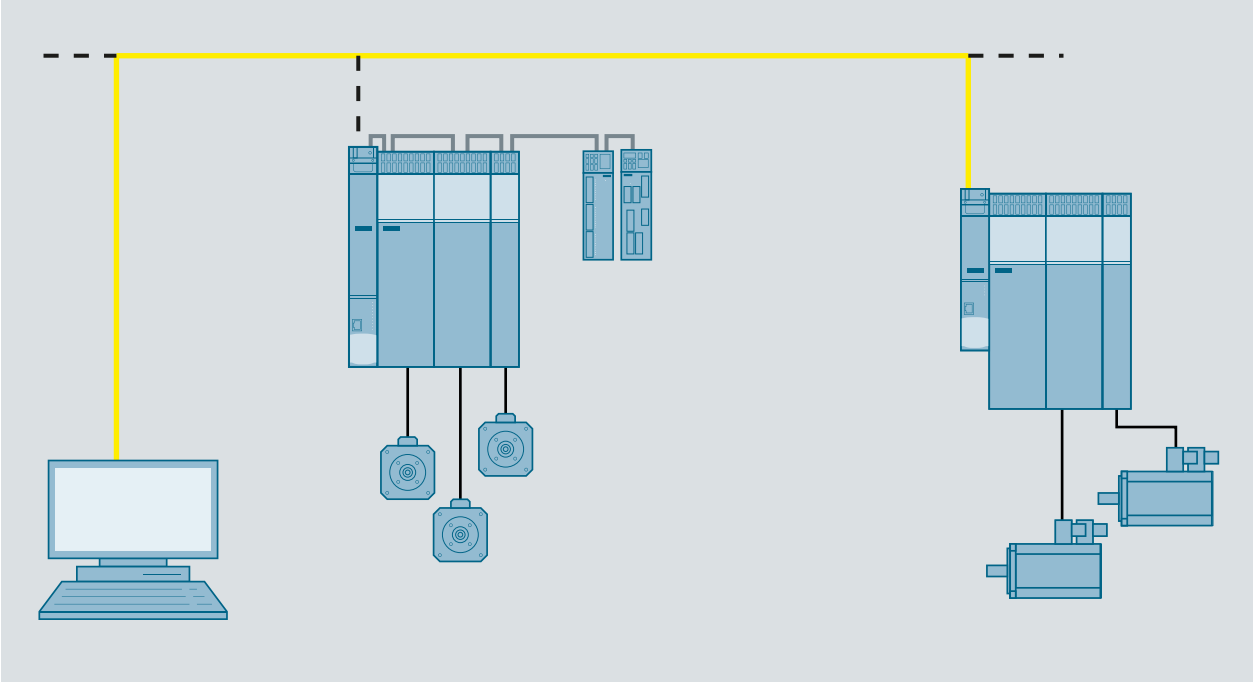


Figure 7-1 S7ONLINE

- **DEVICE**

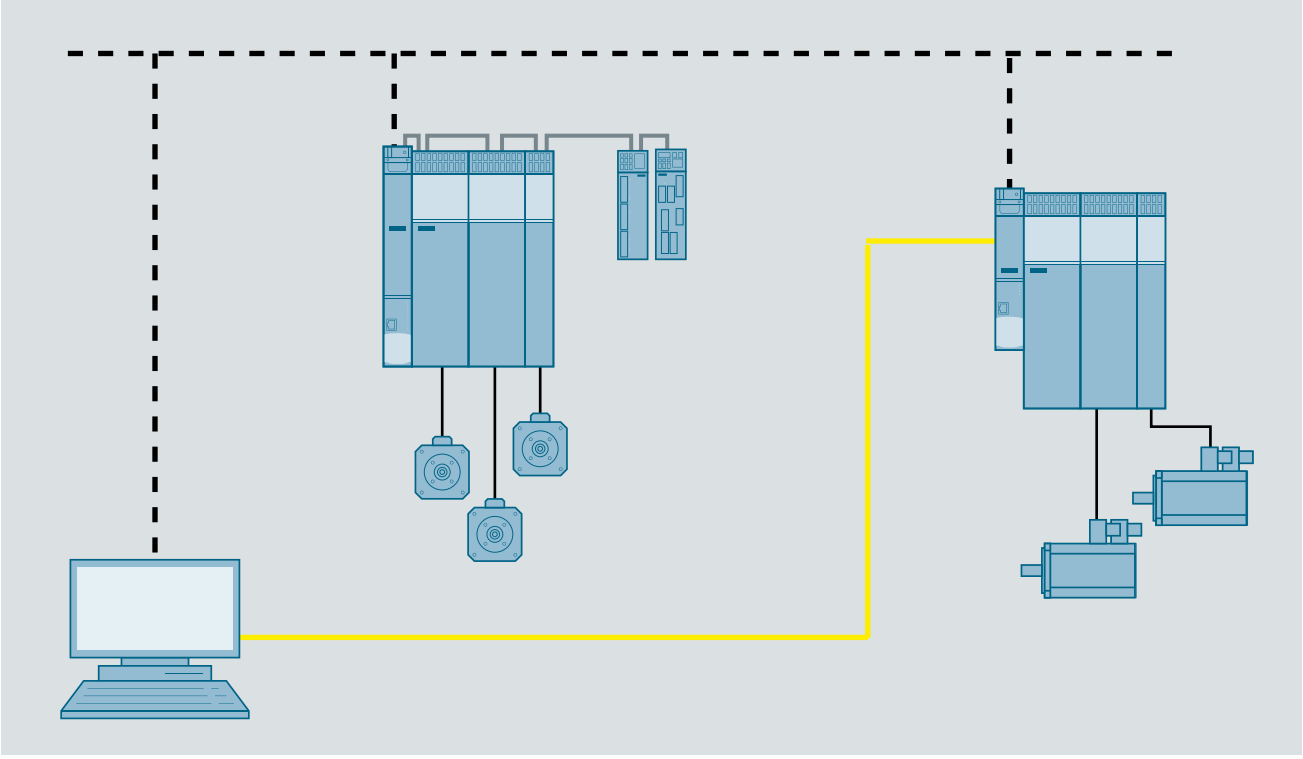


Figure 7-2 DEVICE

It is therefore possible to configure both access points for a device and to go online via these points.

7.2.2 Available nodes

The "Accessible nodes" function in SIMOTION SCOUT enables you to identify devices in a network, apply them to a project, and go online with them.

Note

The search for accessible nodes assumes that no online connection with an opened project exists.

Displaying accessible nodes

Proceed as follows to identify accessible nodes:

1. Select **Project > Accessible nodes** in the menu.
   All the devices found in the network are listed in the working area below the **Accessible Nodes** folder. Type information is also displayed for the devices.

Assigning interface parameterization to an access point

To create a connection between the access point, the interface parameterization, and the interface, proceed as follows:

1. Click the **PG/PC...** button to open the **Set PG/PC interface** dialog.
2. At **Access point of the application**, select the DEVICE access point to which you assign the interface parameterization.
3. Select one of the interface parameterizations to assign it to the access point, modify its properties, copy it, or delete it.
4. Click **OK** to accept the settings.
5. In the working area, click **Update** to restart the search for accessible nodes.

Searching for accessible nodes via the IP address

With TCP/IP interface parameterization you can search for nodes via the IP address. Enter the IP address in the **IP address of the sought node:** field.

For the automatic detection of accessible nodes via a PG/PC interface with TCP/IP, the nodes must be connected to the same physical Ethernet subnet as the PG/PC. Once a device is behind an IP router and so located in another physical Ethernet subnet, this device will no longer be automatically detected in the **accessible nodes**.

You can also enter an IP address and check whether it is possible to access a node downstream of an IP router with the configuration currently set on the Ethernet adapter located in the PG/PC (IP address / subnet mask).

Displaying additional information

To display additional information about identified devices, proceed as follows:

1. Right-click on a device or drive unit and select, for example, one of the following options from the context menu:
   - Device diagnostics
   - Operating state
   - Licenses

Going online with accessible nodes

Via **accessible nodes**, you can go online on devices for which no access has been configured in the project. Device type and address are determined automatically. If the device is in another subnet, you must enter the address manually in the interface properties of the device for the DEVICE access point.

Note

DEVICE must be set as access point for this function.

Assigning devices

To go online on a device that has not yet been assigned to the project, you must add the device to the project.

To add the device to the project, proceed as follows:

1. Select a device in the **Non-assigned devices - My project** or **Non-assigned devices - Accessible nodes** list.
2. Click the **Assign button to move the device to the Assigned projects** list.
3. Click **Connect to assigned devices** to go online with the devices.

Cancelling an assignment

To undo the assignment of a device to the project, proceed as follows:

1. In the **Assigned devices** list, select the desired device.
2. Click the **Cancel assignment** button.

Note

The SINAMICS Integrated or an assigned CX32-2 is always also selected for a SIMOTION D.

7.2.3 Setting the access point on the PG/PC

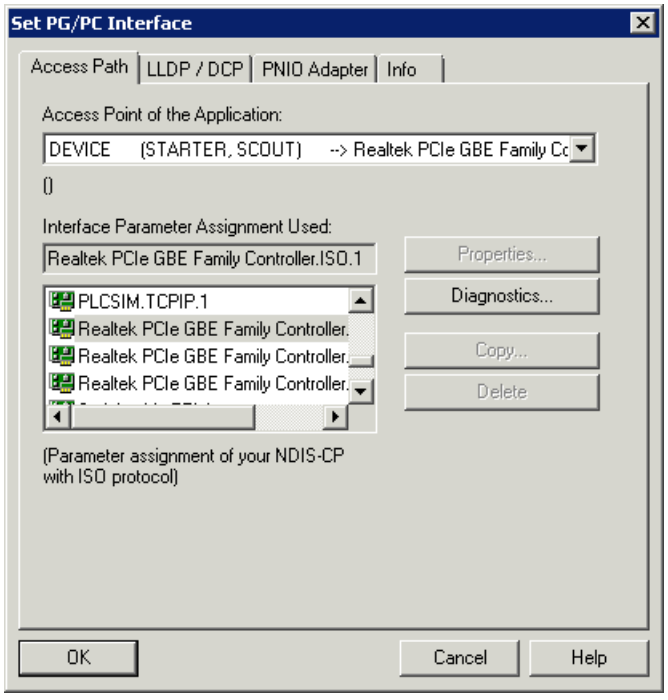
Note

The data for the PG/PC interface can only be changed when the interface is not online. If several instances of SIMOTION SCOUT have been started, an online connection may be established from only one of the instances. An attempt to go online simultaneously from several SIMOTION SCOUT applications to different CPUs results in errors.

Setting the access point

Proceed as follows to set the access point:

1. Select **Options > Set PG/PC interface** in the menu.
   The **Set PG/PC interface** dialog opens.
2. Select the desired access point at **Access point of the application**:



3. At **Interface parameterization in use**, select the interface with which you want to go online via the selected access point.
4. Confirm your selection with **OK**.

7.2.4 Select target devices

With the target device selection, you specify whether this device is to be used to go online when you perform "Connect to selected target devices".

Procedure

To select a target device, proceed as follows:

1. Select **Target system > Select target devices...** in the menu.
   The **Target device selection** dialog opens.

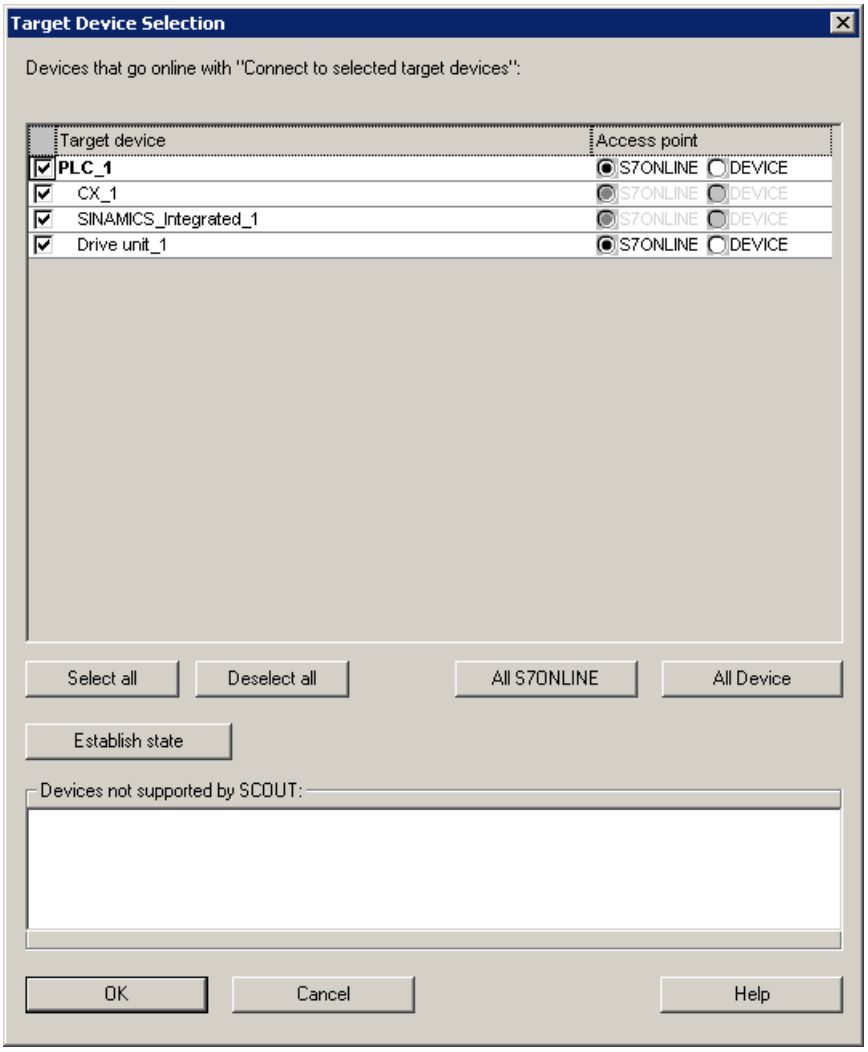


Figure 7-3 Selecting target devices and access points

2. Activate the checkbox for the respective device.
3. Click the **Establish state** button to:

- Establish a connection to a device that was deselected when going online and that has been subsequently selected.
- Separate a connection to a device that was selected when going online and that has been subsequently deselected.

7.3 Controlling the operating mode with SIMOTION SCOUT

⚠ WARNING

Danger to life from unexpected machine movement

If the operating state is not switched under controlled conditions, this may endanger the safety of personnel and the machine.

- Observe the safety regulations before you control a SIMOTION device via the mode selector switch in SIMOTION SCOUT.

Switching SIMOTION devices to RUN or STOP operating state

Proceed as follows:

1. Open the **Control operating state** dialog:
   Select the **Target system > Control operating state** menu. Or click the **Control Operating State** icon in the toolbar.



   The call is possible if at least one CPU of the project is in online mode.
2. In the **Control operating state** dialog, select the desired operating state **RUN** or **STOP** for the displayed devices. To do so, click the assigned button.
3. The **State** field reports whether it was possible to change the operating state.

Control operating state dialog

The dialog shows the operating state of all configured CPUs. The display can be filtered. The change of operating state is possible per device, or for several devices simultaneously.

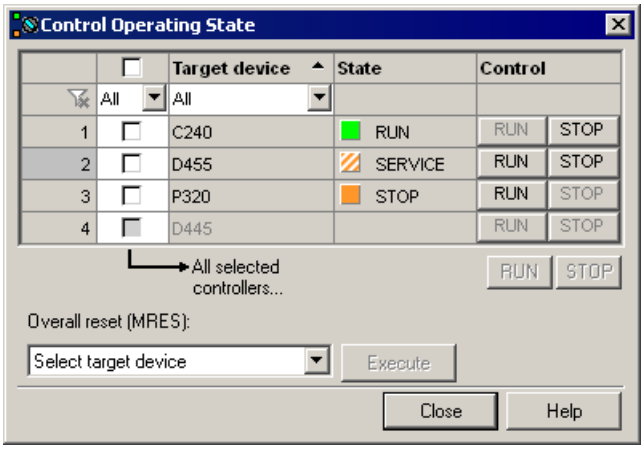


Figure 7-4 Mode selector switch as of SIMOTION V4.4

Note

As of Version 4.4, the **Control operating state** dialog represents all configured SIMOTION devices. The previous dialog had to be opened individually for each CPU.

Overall reset is possible in the dialog as before. You will find additional information about overall reset in the section Overall reset (Page 156).

The SIMOTION P State tool is retained unchanged.

Listed devices

The **Target device** column shows the names of the CPUs available in the project. The order corresponds to the order of the CPUs in the project navigator.

Offline/online distinction

If a CPU is in offline mode, the name of the CPU and all other assigned elements are grayed out in the table line.

The checkbox is always open for input.

Filtering

The list of the CPUs can be filtered using the following criteria:

- Selection by checkbox
- Name, or part of the name, of the CPU
- CPU in online mode

Filtering the display using checkboxes

The display can be restricted to CPUs that are activated in the checkbox columns. The field in the header of the checkbox column provides a choice of the following filter values.

Table 7-1 Filter values in the checkbox column

Filter value	Filter result
All	All CPUs are displayed, regardless of whether or not a checkbox is activated.
Set	Only CPUs with activated checkbox are displayed.
Not Set	Only CPUs without activated checkbox are displayed.

If the dialog is called from the context menu of a CPU, this CPU is automatically preselected (**Context menu > Target device > Operating state**).

All CPUs can be selected or deselected with the checkbox in the header.

Filtering the display by operating state or CPU name

The selection field in the header of the **Target device** column offers the following filter values:

Table 7-2 **Filter values in the Target device column**

Filter value	Filter result
All	All CPUs are displayed, regardless of whether they are in online or offline mode
Online	Only CPUs that are in online mode are displayed.
User-definable	The field can be edited, thus enabling filtering according to parts of names. Up to five user-defined filters remain for selection.

Operating states

State column: Shows the state of the CPUs in text form and via static LEDs.

Table 7-3 Operating states of a SIMOTION device

Operating state		Description
Text	**LED**	
STOP	(orange)	• Technology objects **inactive** (enables deleted, no axis motion) • User program is not executed • Loading a user program is possible • All system services are active (communication, etc.) • All analog and digital outputs set to 0 • The I/O modules (signal modules) are in the safe state (SIMOTION D)
STOP U	(orange/white)	• Technology objects are **active** • Technology objects can execute jobs for testing and commissioning functions. • Otherwise identical to STOP operating state • STOP U means stop user program • User program is not executed
RUN	(green)	• Technology objects are **active** • Execution of the user programs assigned to the execution system • Loading a user program is possible • Process image of the inputs and outputs is read or written
STOP	(orange/white)	• All tasks shut down, operating system stopped, real-time clock continues to run.
STARTUP	(orange/white)	• The display only appears if the state persists longer than 1 second, or in the event of a fault.

Operating state		Description
Text	LED	
SERVICE	(orange/white)	• Display, e.g. if master control has been fetched via the axis control panel.
SHUTDOWN	(orange/white)	• Display appears only if the state persists longer 1 second.
(empty)	(empty)	• CPU is in offline mode

Control operating state

A CPU can be switched to the designated operating state with the RUN and STOP switches. The switching options are dependent on the position of the mode selector switch on the SIMOTION device. The setting on the device takes priority.

Table 7-4 Switching options of the software switch dependent on the position of the mode selector switch on the SIMOTION device.

Mode selector switch position of the SIMOTION device	Switching option in the SCOUT "Control operating state" dialog
STOP	STOP
STOP U	STOP
RUN	RUN, STOP
MRES	STOP

Note

As of V4.4, manual switching to the **STOP U** operating state is no longer possible in the SCOUT **Control operating state** dialog.

If a CPU is in offline mode, both the RUN and STOP buttons are deactivated.

Simultaneous control of several CPUs

CPUs that are in online mode and that are selected in the filter column can be switched simultaneously to the RUN or STOP operating state. To do so, click the RUN or STOP switch below the list.



Observe that the switches only switch the CPUs that are visible in the dialog. For this reason, check the effect of the name filter in the **Target device** column.

Error messages

A CPU that can no longer assume the required state is indicated in color. The **State** cell changes to red or yellow/orange.

- Red: Error
- Yellow/orange: Note

A single click on the corresponding cell causes an error text or information text to appear in a roll-out tip.

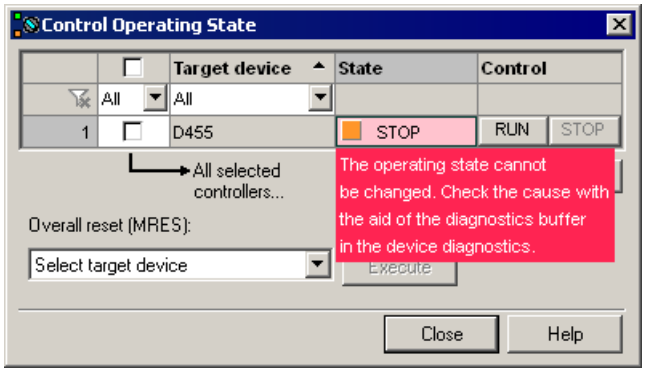


Figure 7-5 Roll-out tip with error description

Priority of the mode selector switch on the SIMOTION device

The setting of the mode selector switch on the SIMOTION device has priority. SIMOTION SCOUT can only switch a SIMOTION device to RUN mode if the mode selector switch on the device is set to **0** or **RUN**.

- **SIMOTION D**
  You can find the mode selector switch of the D410-2 and D4x5-2 in the lower area of the front behind the blanking cover.

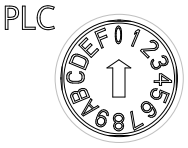


Figure 7-6 D410-2 and D4x5-2, mode selector switch, switch position 0 (RUN)

- **SIMOTION C**

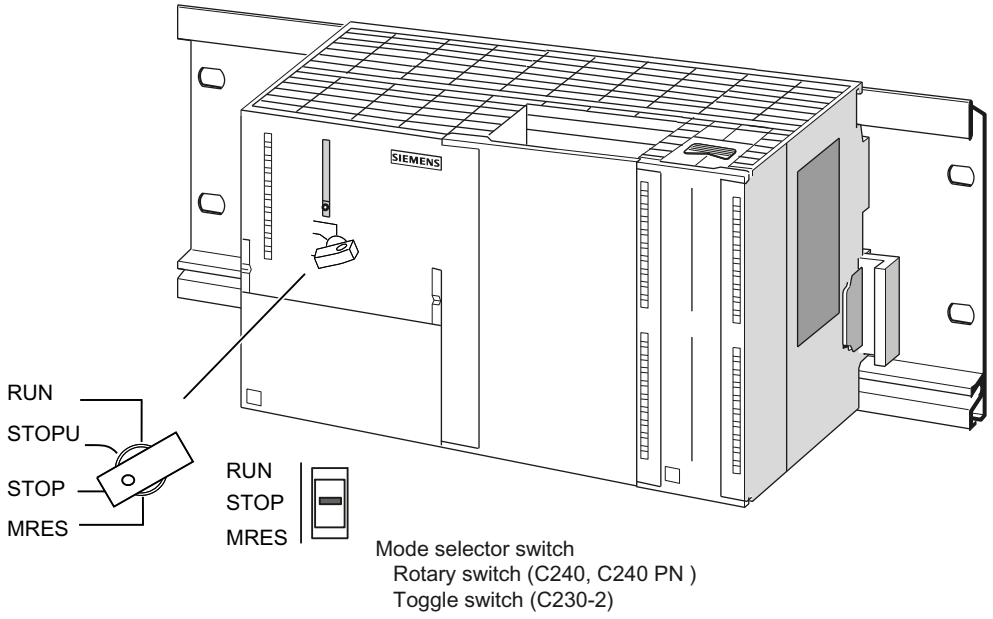


Figure 7-7 SIMOTION C240 module front

- **SIMOTION P**
  With SIMOTION P, the mode selector is displayed via the SIMOTION P Startup application. You can call this via **Start > Programs > SIMOTION P Startup**.
  For more information, see the SIMOTION P Manual.

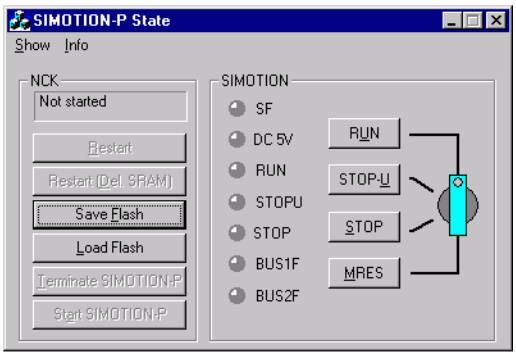


Figure 7-8 SIMOTION P state application

Additional references

Please refer to the following documents on this subject

-
- *SIMOTION D4x5* Commissioning and Hardware Installation Manual
- *SIMOTION D4x5-2* Commissioning and Hardware Installation Manual
- *SIMOTION D410* Commissioning Manual
- *SIMOTION D410-2* Commissioning and Hardware Installation Manual
- *SIMOTION P320-4 E / P320-4 S* Commissioning and Hardware Installation Manual
- *SIMOTION C* Operating Instructions

and the SIMOTION SCOUT online help.

7.4 Overall reset

The SIMOTION device for which overall reset is to be carried out must be online.

Proceed as follows:

1. Open the **Control Operating State** dialog. Select the **Target system > Control operating state** menu command. Or click on **Control Operating State** in the toolbar.



   The call is possible if at least one CPU of the project is in online mode.

2. Switch the SIMOTION device for which overall reset is to be carried out to **STOP** in the **Control Operating State** dialog.
3. Select the SIMOTION device under **Overall reset (MRES)**. Click the **Execute** switch. Click **Yes** to confirm the safety prompt.
   The overall reset will now be performed.

7.5 Setting the time of day

Proceed as follows:

1. Select the SIMOTION device in the project navigator.
2. Select the **Target system > Set time of day** menu.
   The current date and the time of day of the PG/PC and the SIMOTION device are displayed.
3. Change the date and time of day of the SIMOTION device, if necessary:
   If you want to accept the values from the PG/PC:
   - Activate the **Accept from PG/PC** checkbox.

   If you want to enter values:
   - Deactivate the **Accept from PG/PC** checkbox.
   - Enter the values in the corresponding fields (**Module**).

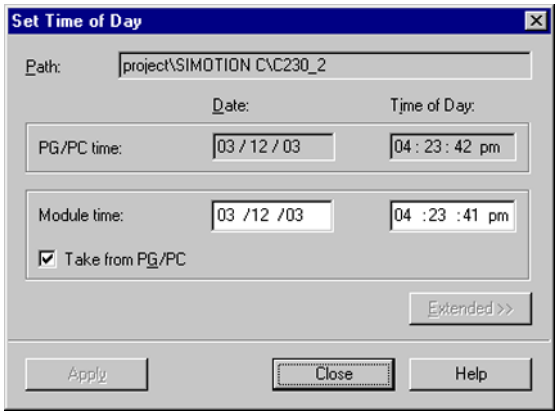


Figure 7-9 Setting the time of day

7.6 Loading data to the target system

You have to download the project data that you have created with SIMOTION SCOUT to the target system. The target system can consist of several CPUs (SIMOTION controllers).

The project data contains the programs (ST, MCC, LAD/FBD, and DCC) that you have created and compiled, the hardware configuration, and the technology objects that you have created and to which you have assigned parameters.

Additional references

The exact download procedure is described in:

- SIMOTION Basic Functions Function Manual

7.7 Archive project data to memory card

The **Target system > Load > Archive project on card...** function archives the complete SCOUT project on the MMC/CompactFlash card or the internal CFast or SSD of the P320-4 .
The **Target system > Copy archived project from card to the PG/PC...** function loads the archived SCOUT project from the card or the hard disk.

A zip file is archived. This function is only possible in the online mode. In addition to the zip file, an info file is saved. The **Target system > Load > Copy archived project from card to PG/PC** function can be used for this purpose. The following contents are written to the info file:

- The project name
- The size of the zipped project file
- The storage date

For further information, see also Section Service with SIMOTON SCOUT (Page 193).

7.8 Loading to the file system

As for a download to the target device, select **Edit > Target system > Download to file system** to save data of a device to a Memory Card / CF card directly via a card adapter on the PC. Alternatively, the device data can also be saved locally on a hard disk. The data can then be copied later to a Memory Card / CF card.

Note

A project is always created for exactly one kernel version and one device type and will only run on the relevant SIMOTION device if this exact kernel version and this device type are available. If this is not the case, the SIMOTION device remains in STOP operating state.

For further information, please refer to the online help for SIMOTION SCOUT.

Upgrading and project updates

8

8.1 General information

Prerequisite

You want to upgrade the firmware or change the platform within a station type.

Swapping modules involving SIMOTION families

Module replacement is only possible within the same device family:

- Within SIMOTION C
- Within SIMOTION D410
- Within SIMOTION D410-2
- Within SIMOTION D4x5
- Within SIMOTION D4x5-2
- Within SIMOTION P

The change involving the SIMOTION families (SIMOTION C, SIMOTION P, SIMOTION D410/D410-2 and SIMOTION D4x5/D4x5-2) requires an XML export.

Procedure

The procedure in the Engineering System depends on what is involved:

- Upgrading the firmware version of a device within a platform
- Platform change: The platform is changed within the same SIMOTION version. For example, a SIMOTION C240 is replaced by a SIMOTION P320-4.

The sections Upgrading and changing platforms for a SIMOTION device (Page 159) and Upgrading devices and updating projects with the device update tool (Page 164) contain further information.

8.2 Upgrading and changing platforms for a SIMOTION device

8.2.1 Changing a SIMOTION device and subsequent TP upgrade (within a platform)

An upgrade is necessary when you want to replace the type or version of the SIMOTION device in your existing project. Perform this replacement in HW Config.

To replace a SIMOTION device:

1. Double-click the SIMOTION device to be replaced in the project navigator in SIMOTION SCOUT. HW Config opens.
2. Open the appropriate folder structure in the hardware catalog:
3. Select the module of the new version in the hardware catalog and drag this above the old module with the mouse (to the header of the rack shown in the case of SIMOTION D, to slot 2 in the case of SIMOTION C and P).

   Note

   Ensure that the module/device (SIMOTION D) to be replaced **does not get deleted.** When you change to the new module/device using drag-and-drop, the old module will be updated.

4. Confirm the displayed dialog box with **Yes** if you want to replace the SIMOTION device.
5. Alternatively, select the SIMOTION device and call the context menu by right-clicking in the header area of the device. Then select the **Replace object ...** command followed by the version required.
6. Accept the changes made to the hardware configuration with **Station > Save and compile**.
7. Close the HW Config.

   Note

   The data for the SIMOTION device is immediately accepted in the SIMOTION SCOUT project and the **entire project** is saved. In this way, the project also accepts all changes in the project (e.g. axis configuration).

   If you are using technology packages in your project, these are updated automatically.

If the device replacement is made in the HW Config without open SIMOTION SCOUT, the update is made in SIMOTION SCOUT only after the project has been reopened.

The device replacement process differs from the platform replacement process in that it is really easy to accept project data during device replacement. Device replacement uses HW Config, whereas platform replacement (e.g. replacement involving SIMOTION C and D) requires an XML export/import.

Examples of device replacement:

- Replacement involving different power classes (e.g. D445-2 DP/PN <-> D455-2 DP/PN)
- Replacement involving generations (D4x5 -> D4x5-2)
- Replacement involving variants (D410-2 DP <-> D410-2 DP/PN; C240 <-> C240 PN)
- Replacement involving the main version (C240 V4.1 <-> C240 V4.2)

Upgrade of libraries

When the version of a SIMOTION device and the technology packages changes, the libraries created in SIMOTION SCOUT must also be adapted.

1. Select a library in the project navigator.
2. Right-click and select **Properties...** in the context menu.
   The Object Properties window opens.

3. Click in the **Technology packages** tab.
4. Activate the **Device-specific** option if the device library should be used.
5. Select in the associated tables the appropriate device and the technology packages.
6. Click **OK** to confirm the changes.
7. Select the same library.
8. Right-click and select **Save and compile** in the context menu. The upgrade is completed.
9. Repeat the operations for all created libraries.

8.2.2 Changing the SIMOTION platform

Platform changes involving, for example, the following SIMOTION devices:

- SIMOTION C
- SIMOTION P
- SIMOTION D

Proceed as follows:

1. Export the SIMOTION CPU data to be replaced via the **Expert > Save project and export object** context menu.
2. Create a new SIMOTION device involving a different platform. This will be automatically inserted in the project navigator.
3. Insert a new SIMOTION device or several master systems and configure them. The HW Config opens. The new station and the created master systems are already inserted.
4. Also open the old station in the HW Config. Switch to the old station.
5. Copy the DP slaves.
6. Switch to the new station.
7. Insert the DP slaves in the new station.
8. Check the configuration of the elements of the new station.
9. Close the HW Config.

10. Delete the old device in the project navigator.
11. Perform an object import on the new device with the previously exported data.

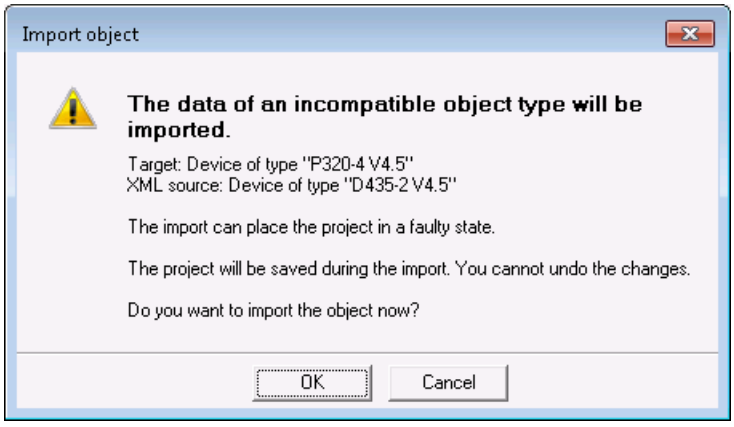


Figure 8-1 Example of importing an object with a station change

Connecting drives/slaves after platform changes

It may no longer be possible to assign drives/slaves after a platform change. To correct this, repeat the process with the original project (prior to platform replacement).

8.2.3 Upgrading technology packages

Overview

The SIMOTION TP technology packages (e.g. TP CAM, TP PATH, DCBlib) are available in various versions.

You can only use the functions of the technology objects selected if the technology objects are available in the target system. You can select the technology packages and their version for each SIMOTION device. Each version of SIMOTION SCOUT has a kernel (FW version) for the SIMOTION CPU and an associated technology package with the same version.

TPs during upgrades

Device replacement (in HW Config), platform replacement (XML export/import), or even upgrades may cause versions of SIMOTION technology packages (TPs), which are assigned to individual technology objects (TOs), to change.

- The TP version may change if the main version changes
  The TP version depends on the relevant main version in all cases; it may, however, remain unchanged through a number of main versions.
- If service packs and hotfixes are installed, there may even be a selection of TP product versions available for the same TP version

The TP version is automatically updated during device replacement (in HW Config). With a platform replacement (XML export/import), however, the required technology package along

with the TP version and, if necessary, the product version have to be selected manually after the import.

It is also possible to define a specific TP product version (by selecting V4.1.5.3, for example).

If the product version

- "Vx.x.x.x" is displayed, the version cannot be determined (as with TP DCBlib, for example).
- "Select" is displayed, this means the TP product version has yet to be selected; if the TP is loaded to the CPU without any prior selection having been made, the latest available technology package is loaded automatically.

Selecting the TP product version

Selecting **Target device > Select Technology Packages ...** in SIMOTION SCOUT enables you to adopt a more targeted approach when choosing the technology packages you want to use.

Note

Device diagnostics can provide information on which technology package product version has been loaded to a CPU.

Loading technology packages to the target device

Technology packages are only loaded to the target device if no technology package has been loaded so far or if **Load to File System** is executed.

If a technology package version changes, the technology package must be explicitly reloaded to the target device.

Proceed as follows:

1. Select **Download project to target system** in SIMOTION SCOUT.
2. Select the **Replace product versions of the technology packages** option and confirm with **OK**.

For further information, please refer to the online help for SIMOTION SCOUT.

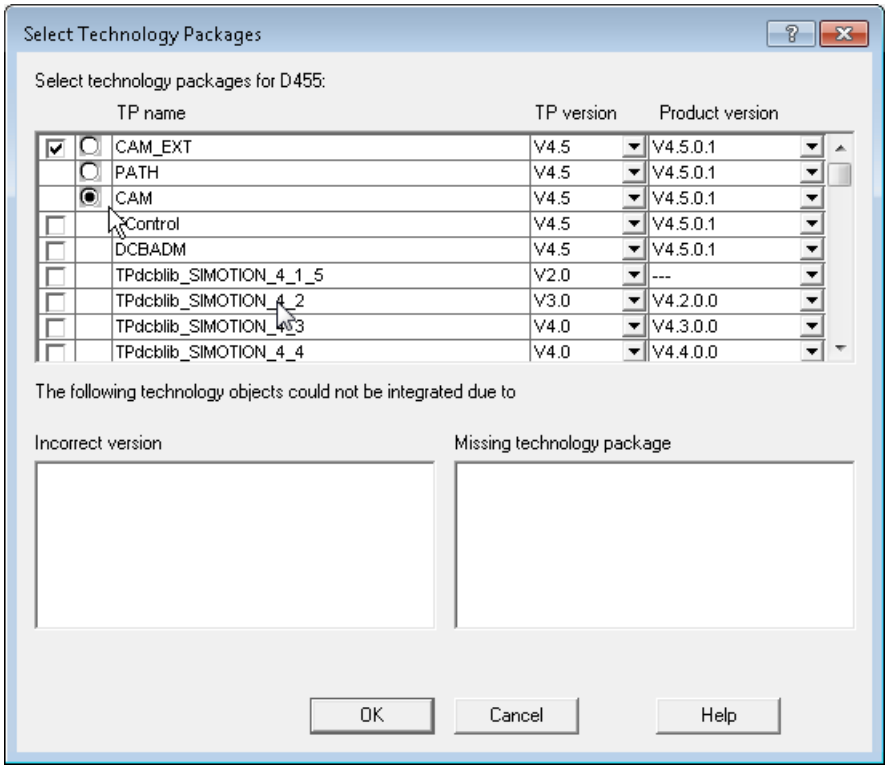


Figure 8-2 Select Technology Packages

8.3 Upgrading devices and project updates using the device update tool

Overview

SIMOTION offers a convenient solution for machine manufacturers and machine operators to update SIMOTION devices or SIMOTION projects.

Updating does not simply refer to an update to a higher version of firmware; rather, in general terms it refers to switching to a defined configuration, e.g. a project update. It is also possible to return (restore) to a previous configuration. Update or restore procedures can easily be performed on SIMOTION devices locally or remotely. The data can be imported to a SIMOTION device via a convenient and handy storage medium or a communication connection.

Note

For SIMOTION P, there are currently only plans to update the project data, technology packages and user data. Firmware cannot be upgraded given the dependency on other Windows components.

Update data and update media

The update data is created by SIMOTION SCOUT based on one or more SIMOTION projects. All information required for the update is contained in the update data. This includes:

- SIMOTION project
- Technology packages
- User data
- Firmware

After the update data has been created, it can be handled flexibly depending on the SIMOTION device in question (SIMOTION C, D, or P). The storage or update medium can take the form of:

- CF/MMC card
- USB memory stick or
- SIMOTION IT DIAG file

Update wizard and Device Update tool

Call up the update wizard via SIMOTION SCOUT. This will give you a step-by-step guide to creating the requested update data, which is then either saved in an update archive or imported directly to an update medium.

1. Select the **Project > Start Device Update tool** menu, either directly in SIMOTION SCOUT or in an open SIMOTION project.

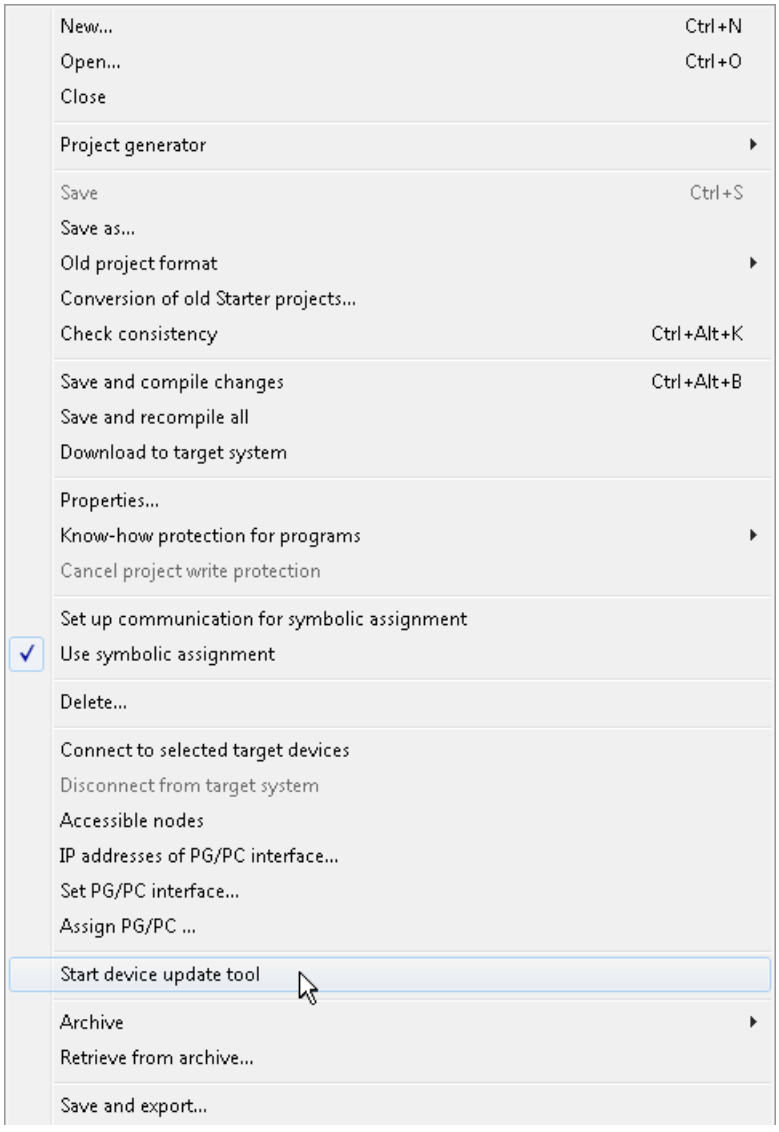


Figure 8-3 SIMOTION SCOUT - Starting the SIMOTION Device Update tool

2. The update wizard opens with the start screen. Now you can select the data for updating from the SIMOTION project to the SIMOTION device on a step-by-step basis, and specify whether you want to update subsets or the entire project.

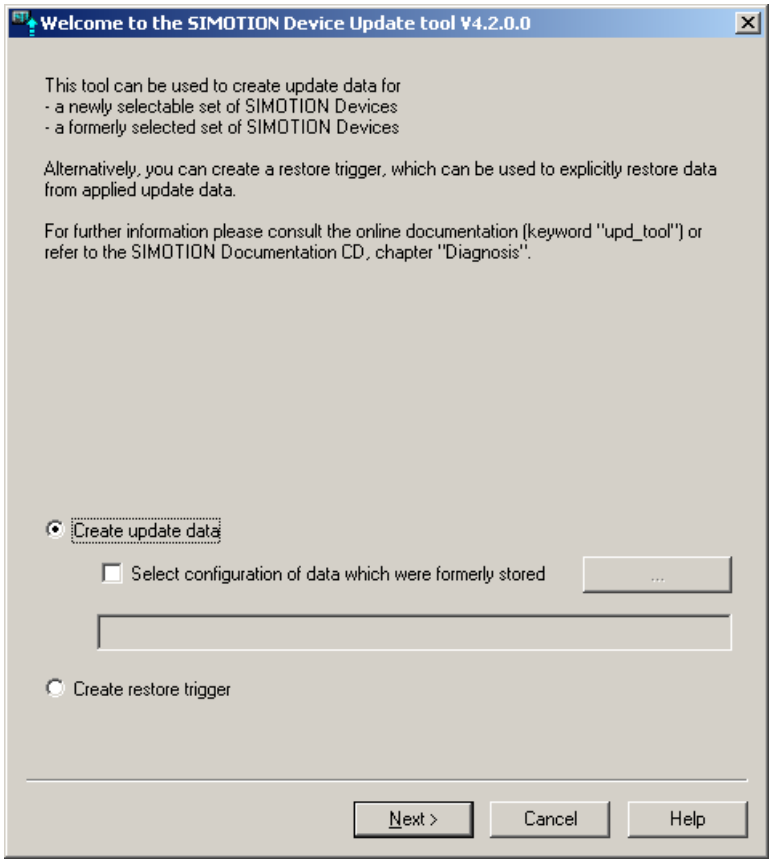


Figure 8-4 Wizard start page: Device Update tool

Additional references

A detailed overview of the update process can be found in:

- Operating Manual: Upgrading SIMOTION Devices
- SIMOTION SCOUT Online Help

Diagnostics

9

9.1 Overview of the possible diagnostic functions

A wide range of diagnostic functions can be used for the operation of SIMOTION devices in the online mode. These diagnostic options are summarized in the diagnostics overview:

- The diagnostics overview is a tab in the detail view and is available by default in online mode. You can call up detail displays from here.
- An Alarms tab is also available in the detail view. This provides a tabular overview of
  - Technological alarms (from technology objects)
  - Alarm_S messages (from user programs)
    The alarms can be acknowledged either individually or all together.
- The Address list tab in the detail area offers extended functions in terms of I/O diagnostics and hardware availability.
- Comprehensive diagnostic information (e.g. diagnostics buffer, system utilization, and task status, etc.) is accessible via Device Diagnostics as a window in the working area.
- You can record signal charts with the trace tool. The values of system variables can be recorded during runtime for diagnostic purposes.
- Program testing and debugging, e.g. variable control, program status, breakpoints

Additional diagnostic functions are available with SIMOTION V4.1 SP2 and higher. On the basis of simple operations (e.g. by setting the switch position) and without the need for the SIMOTION SCOUT engineering system, you can:

- Back up diagnostic data including non-volatile data (retain data) to CompactFlash Card (for SIMOTION D), MMC (for SIMOTION C) or hard disk (for SIMOTION P)
- Back up websites, including the most up-to-date content for diagnostic purposes, to the CompactFlash Card, MMC, or hard disk
- Restore backed up non-volatile data (retain data)

Further information can be found in the FAQs on the Utilities & Applications CD under:
FAQs > Engineering > Backing up diagnostic data and non-volatile data

SIMOTION IT DIAG also offers comprehensive diagnostic options that can be easily accessed via an Internet browser.

References

For more information, please refer to

- SIMOTION ST Structured Text Programming and Operating Manual
- SIMOTION MCC Motion Control Chart Programming and Operating Manual
- SIMOTION LAD/FBD Programming and Operating Manual
- Diagnostics Manual: SIMOTION IT Ethernet-based HMI and Diagnostic Function

- SIMOTION SCOUT Online Help
- *Overview of Service and Diagnostics Options*, Product Information

9.2 Using the diagnostics overview

The diagnostics overview is available as a tab in the detail view when the project is in online mode.

- In the detail view, select the **Diagnostics overview** tab.

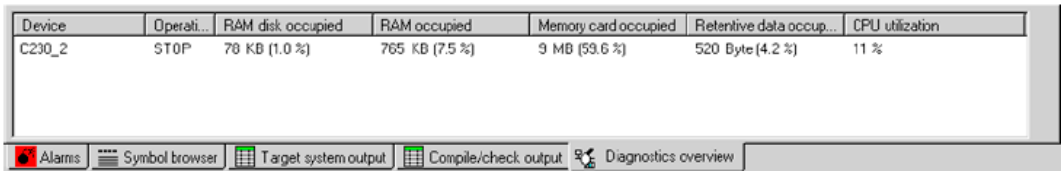


Figure 9-1 Diagnostics overview in the detail view (online mode)

The following are displayed for each accessible SIMOTION device:

- Operating mode
- Memory used (absolute and percentage display)
  RAM disk, RAM, memory card, retentive data
- CPU utilization (percentage display)

The drive devices specified in the hardware configuration are also displayed. To obtain a detailed display of the individual devices, open the device diagnostics.

9.3 Device diagnostics

9.3.1 Device diagnostics

In online mode, the device diagnostics function enables you to obtain a comprehensive display of diagnostics results of the individual SIMOTION devices.

Proceed as follows:

1. Select the desired SIMOTION device in the project navigator.
2. Select the **Target system > Device diagnostics...** menu.

or

1. Double-click the SIMOTION device in the Diagnostics overview tab in the detail view.

Note

You may open the device diagnostics for several SIMOTION devices simultaneously. This allows you to compare different devices.

You can also access these device diagnostics via the **Accessible nodes** function.

The **Device Diagnostics** window appears in the working area of the workbench. This window provides you with the following information:

- General information
- Diagnostics buffer
- Task runtimes
- Memory utilization
- System utilization
- User log file
- Syslog file
- Version overview
- Alarms

You have the following options:

- Print:
  Select the **Project > Print** menu.
- Save as text file:
  Click **Save as...**.
- Refresh:
  Click **Refresh** or press the **<F5>** function key.

You can also monitor and change the operating state:

- Click **Control operating state**.

9.3.2 Device diagnostics: General

This provides general information on the SIMOTION device:

- Select the **General** tab in the Device Diagnostics window.

The following information will be displayed:

- Name and system ID of the SIMOTION device
- Operating mode of the SIMOTION device
- MAC addresses
- IP addresses
- Subnet mask

- Standard gateway
- Article Nos. and names of the components used,
  e.g. SIMOTION device, Motion Control technology package.

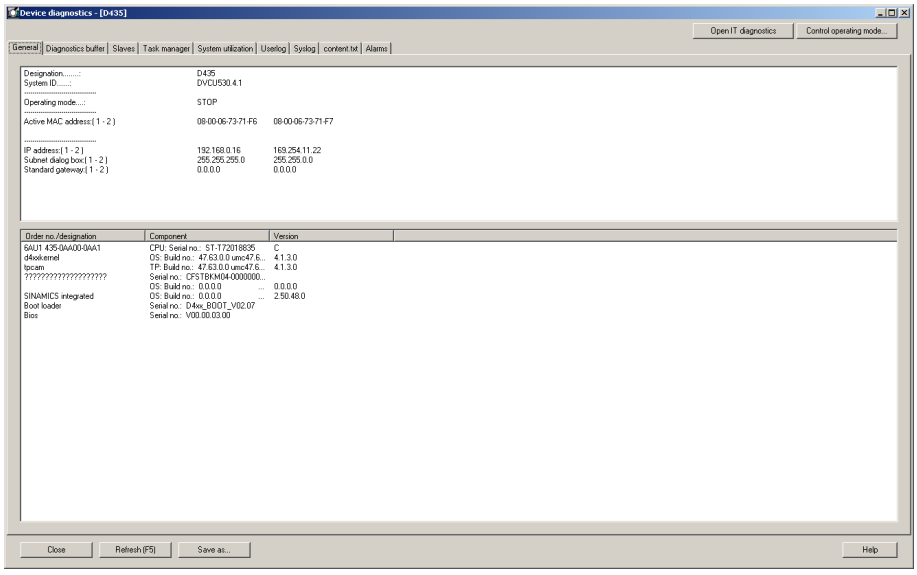


Figure 9-2 Display of general information in the device diagnostics

9.3.3 Device diagnostics: Diagnostics buffer

The diagnostics buffer is part of the system status list. It is possible to jump to the error position from the diagnostics buffer. It logs important events (e.g. changes in module state) in the order in which they occur. These include the following:

- Faults in a module
- Faults in the process wiring
- System faults in the CPU
- CPU operating state transitions
- Drive alarms
- Errors caused by the technology objects of SIMOTION
- Errors in the user program that caused an operating state transition (a double-click on the error message causes the cursor to jump to the error location in the program)
- User-defined entries with the _writeAndSendMessage function
- PMC error messages (SIMOTION D)
- Compatibility errors, e.g. the drive software with SIMOTION (SIMOTION D)

The SINAMICS Integrated diagnostics buffer is also displayed for SIMOTION D as of SIMOTION Version V4.1 SP2.

To work with the diagnostics buffer:

1. In the **Device Diagnostics** window, select the **diagnostics buffer** tab.
   The saved events are displayed in tabular form.
2. Select the event for which you want to obtain more information.
   Detailed information for the selected event is displayed in the lower pane of the window.

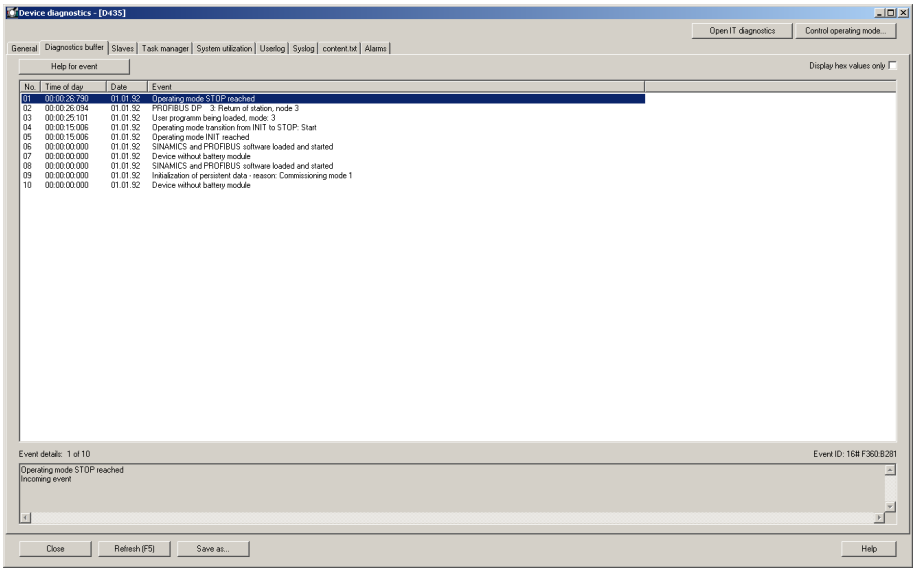


Figure 9-3 Example of the diagnostics buffer display in the device diagnostics

9.3.4 Device diagnostics: Task Manager

You can display the task runtimes and the status of the tasks set up in the project if you are connected online with the device. The resolution of the displayed task runtimes is performed in the servo cycle clock.

Note

The task runtimes are calculated to the µs and indicate the effective level runtime of the respective task (including the interrupt times). These thus correspond to the values of the **effectiveTaskruntime** device variables.

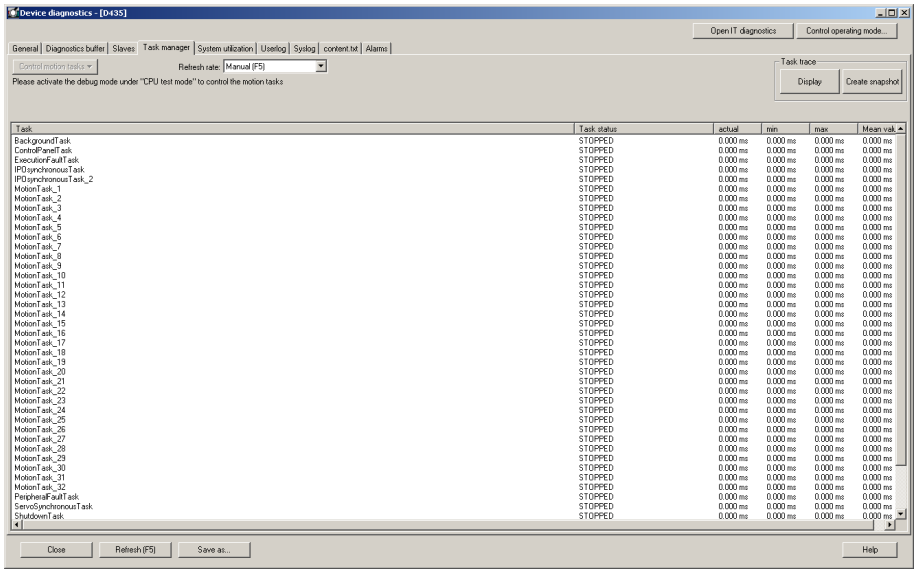


Figure 9-4 Example of the task runtimes display in the device diagnostics

The display is refreshed according to the refresh rate selected. The status and the following values are then displayed:

- Current runtime (current):
  Value of last polling
- Minimum runtime (min.):
  Minimum value since last transition from STOP to RUN
- Maximum runtime (max.):
  Maximum value since last transition from STOP to RUN
- Mean runtime (mean value):
  Value averaged from the last 10 cycles

The runtimes measured include the interruptions by higher-priority tasks.

Meaning of the various status displays:

- **RUNNING** (TASK_STATE_RUNNING)
  Task running, e.g.:
  - Via the **_startTask** function
  - As an active cyclic task
- **RUNNING_SCHEDULED** (TASK_STATE_RUNNING_SCHEDULED) (as of V4.1)
  Task interrupted by system.
  If the task status RUNNING_SCHEDULED remains pending for a long time, it identifies a long-runner in the user task, e.g. a programmed continuous loop.
- **STOP_PENDING** (TASK_STATE_STOP_PENDING)
  Task has received signal to stop; it is in a state between RUNNING and STOPPED.
  Actions may be performed until the task has stopped.
- **STOPPED** (TASK_STATE_STOPPED)
  Task stopped (e.g. via the **_resetTask** function), completed or not yet started.

- **SUSPENDED** (TASK_STATE_SUSPENDED)
  Task suspended by function **_suspendTask**.
  Use **_resumeTask***(name*) to cancel this command. The task then resumes from the point at which it was interrupted.
- **WAITING** (TASK_STATE_WAITING)
  Task is waiting due to function **_waitTime** or **WAITFORCONDITION**.
- **WAITING_FOR_NEXT_CYCLE** (TASK_STATE_WAIT_NEXT_CYCLE)
  TimerInterruptTask waiting for start trigger.
- **WAITING_FOR_NEXT_INTERRUPT** (TASK_STATE_WAIT_NEXT_INTERRUPT)
  SystemInterruptTask or UserInterruptTask is waiting for the triggering event to occur. When an interrupt occurs, the SystemInterruptTasks are started and executed once. Up to eight incoming interrupts can be stored in the buffer. If another interrupt occurs, the buffer overflows and the CPU goes into STOP operating state.
- **LOCKED** (TASK_STATE_LOCKED)
  Task locked by function **_disableScheduler**.
  This status prevents the activation of all user tasks (except the IPOSynchronousTask and IPOSynchronousTask_2) until command **_enableScheduler** is called. It does not, however, affect system tasks. The time watchdog for cyclic tasks is **not** suspended.

  Note

  This also prevents the activation of the SystemInterruptTasks and UserInterruptTasks.

Controlling MotionTasks

It is possible to control MotionTasks via SIMOTION SCOUT without a user program that has been created by the user. Consequently, you can test programs and influence MotionTask sequences in a very specific way.
Selected MotionTasks can be stopped, and locked or restarted for the sequence.

This means that programs in MotionTasks can also be downloaded in RUN mode. If you have made changes to sources and want to reload them in RUN mode, an active MotionTask can prevent this. You can then terminate specific MotionTasks with SIMOTION SCOUT and then carry out the download in RUN mode.

Additional references

Further information on downloading in RUN mode can be found in:

- *SIMOTION Basic Functions* Function Manual
- *SIMOTION SCOUT Task Trace* Function Manual

9.3.5 Device diagnostics: Checking memory utilization

To display the memory utilization for devices:

- Select the **Memory utilization** tab in the device diagnostics.

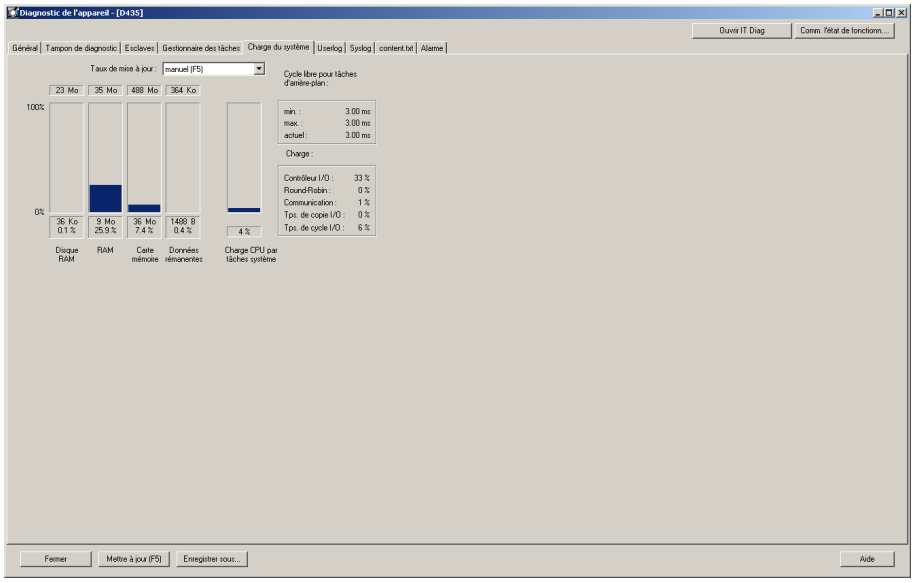


Figure 9-5 Example of the memory utilization display in the device diagnostics

Additional references

Further information on this topic can be found in:

- SIMOTION Basic Functions Function Manual, Section Overview of the memory in the target device
- SIMOTION SCOUT Online Help

9.3.6 Device diagnostics: Checking the system utilization

To display the system utilization:

- Select the **System Utilization** tab in the device diagnostics.

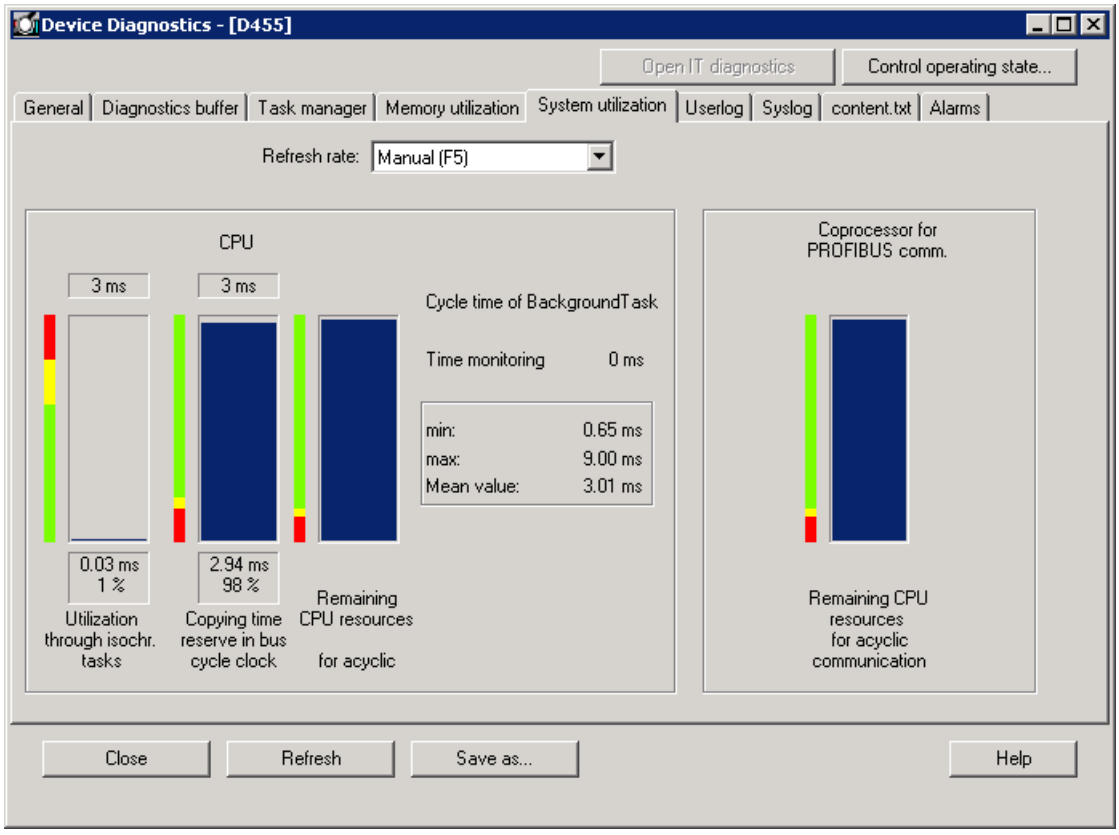


Figure 9-6 Example of the system utilization display in the device diagnostics

Additional references

Further information on this topic can be found in:

- The Function Manual "SIMOTION Basic Functions", in the chapter "Overview of Memory in Target Device"
- SIMOTION SCOUT Online Help

9.3.7 Device diagnostics: User log file

With the Userlog file, you can store your own text strings in the RT system. This is necessary, for example, when changes, which are to be documented, are made in the SIMOTION system on a plant which has already been commissioned.
Changes can be written in the SIMOTION SCOUT. These are loaded to the ROM of the target device. When required, the text strings can be read out again. The text editor for the Userlog file is integrated as a tab in the device diagnostics snap-in. This function is only available in online mode.

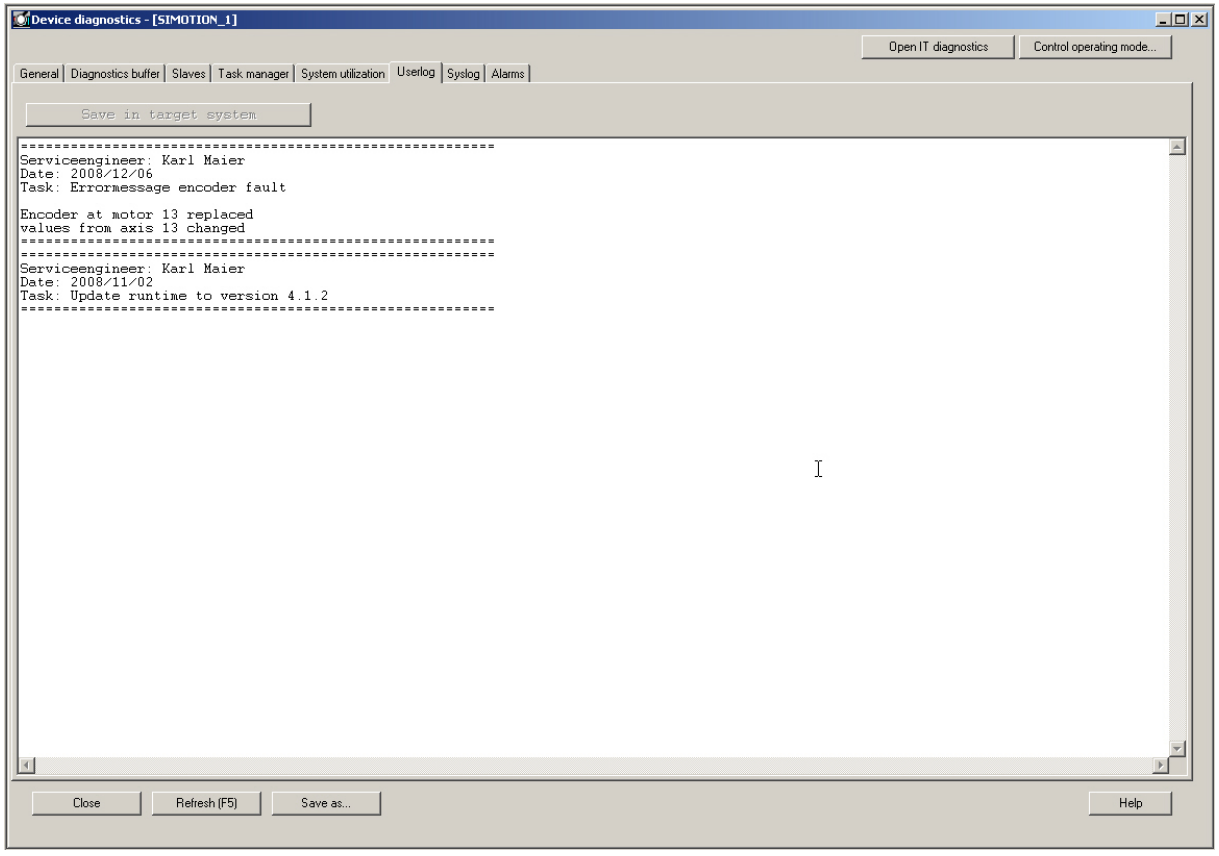


Figure 9-7 Example of the Userlog file display in the device diagnostics

How to work in the Userlog file

- Select the **Userlog** tab in the device diagnostics.
  The editor is in editing mode, i.e., you can immediately type or delete.
  The system adds no further system contents, such as date/time.
  You enter all of the necessary information.
- To save, click **Save as...** The Userlog file is stored as .txt.
  All text entries can be changed or deleted at any time.
  Access protection is not available.
- The Userlog file can also be read without a project.
  The online mode is required for this.
- The Userlog file remains after **user data are deleted**.

9.3.8 Device diagnostics: Syslog file

In addition to the user-defined Userlog file, the SIMOTION device also has a Syslog file. The ROM actions entered therein facilitate a subsequent diagnosis. This function is only available in online mode. The information of the Syslog file can also be read without a project.

The Syslog file logs the following actions:

- RAM2ROM
- Overall reset
- Formatting of the card from SIMOTION SCOUT

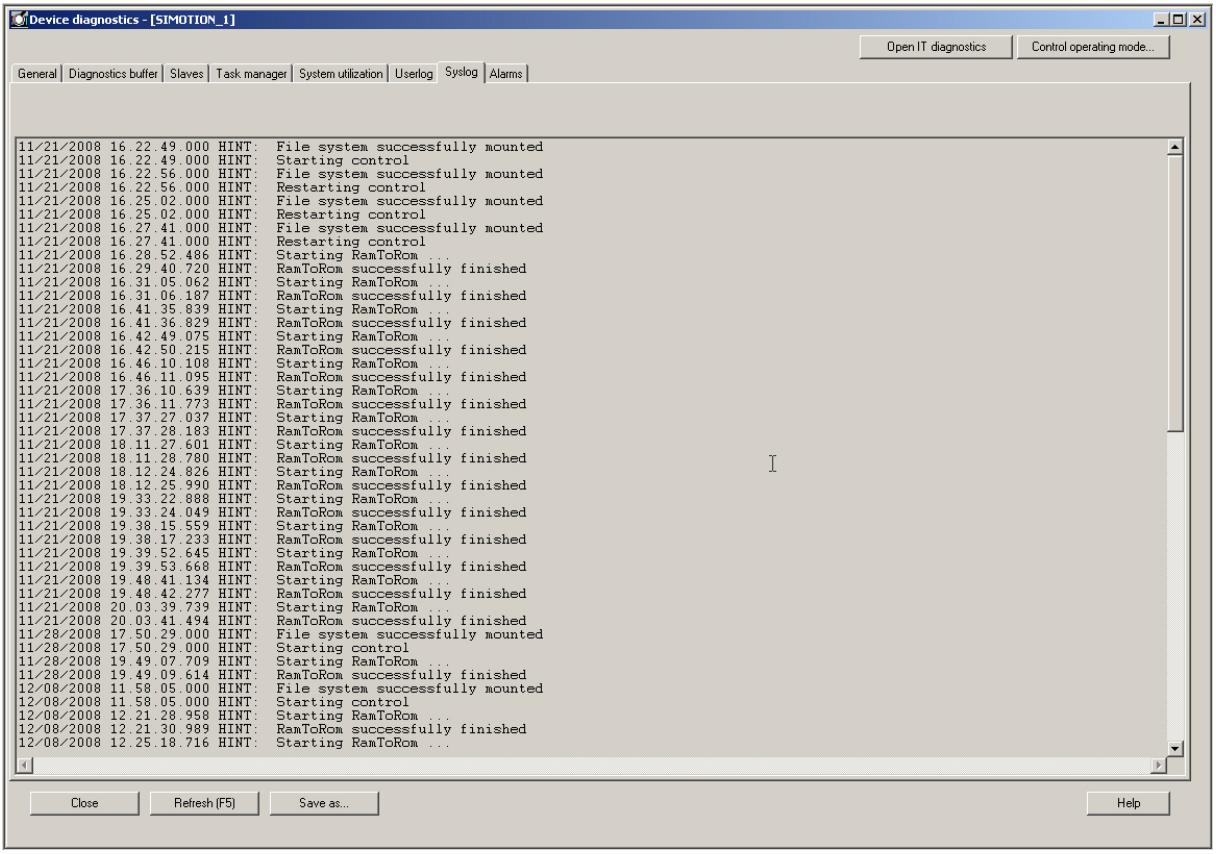


Figure 9-8 Example of the Syslog file display in the device diagnostics

9.3.9 Device diagnostics: Version overview

The "content.txt" tab displays the SIMOTION version and the SIMOTION device data stored in the CompactFlash card.

The following data is displayed:

- SIMOTION version
- BIOS version

- Components
  Versions of the SINAMICS components
- Internal version/stamp
  Internal components

This information is relevant for any questions to the hotline.

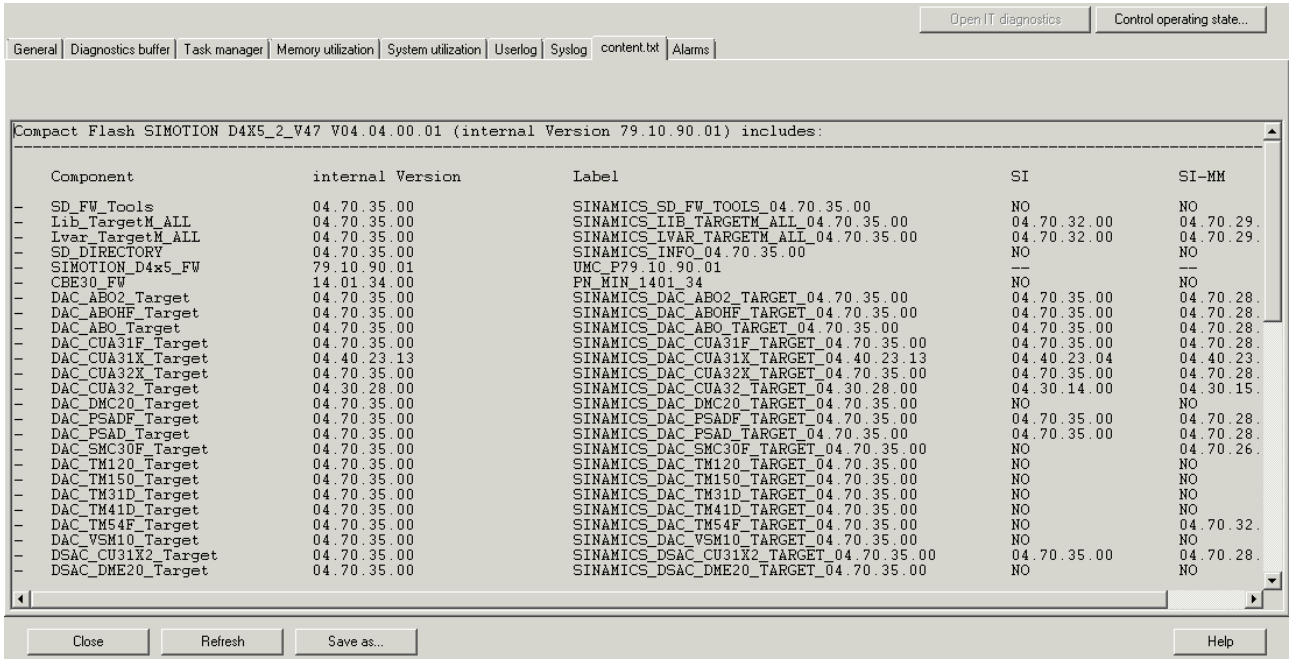


Figure 9-9 Example of the version overview display in the device diagnostics

9.3.10 Device diagnostics: Alarms

In the device diagnostics Alarms tab, pending alarms and configured messages are displayed in the same way as in the **Alarms** tab in the detail view.

Detailed information can be found in the SIMOTION online help, in the Alarms output window.

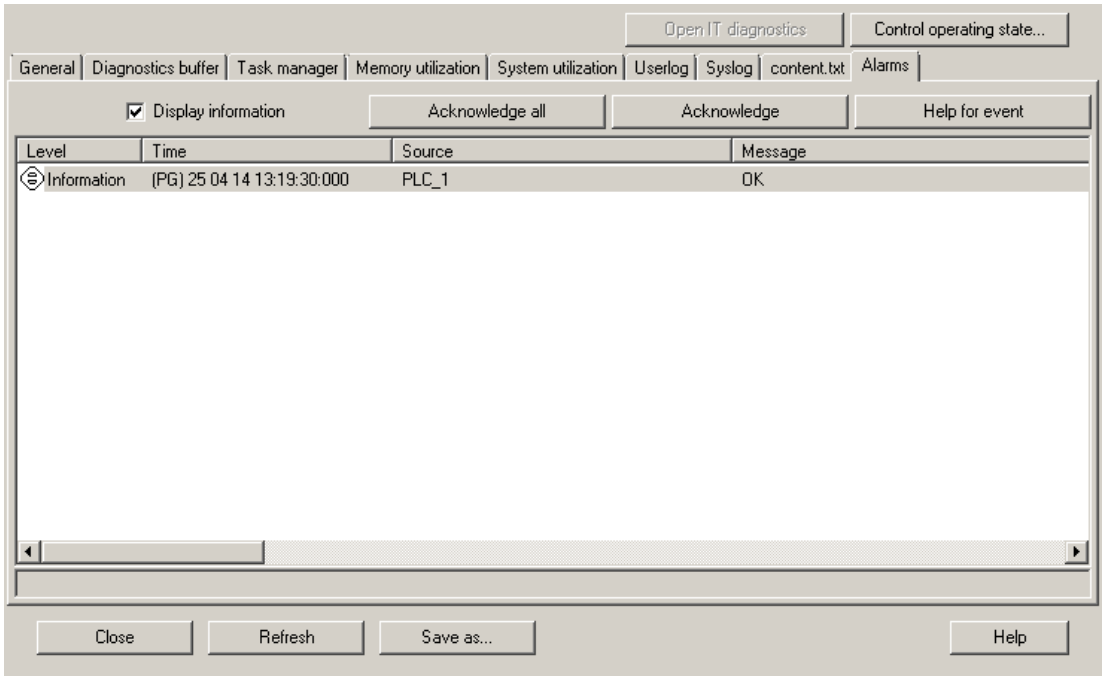


Figure 9-10 Device diagnostics - Alarms

9.4 Diagnostic functions in the address list

As of SIMOTION V4.2, the address list offers extended functions for I/O diagnostics. In online mode, the information is displayed in the **Availability** column. You can access more detailed information via a tool tip if you move the cursor over the relevant cell.

To open the address list:

1. Browse to the folder for your device in the project navigator.
2. Double-click the **ADDRESS LIST** entry.
   The address list opens in the detail area.

The summary contains the following diagnostic information:

- I/O stations which have failed completely
- Modules have been removed (e.g. for ET200S).
- Deactivated I/O stations
- I/O variables working with replacement values
- I/O stations whose set topology differs from the actual topology
- I/O stations configured to be isochronous are not isochronous
  - Distributed synchronous operation
  - Drive units
  - Isochronous I/O

- Partner device has stopped (e.g. I-device, I-slave)
- For PROFINET devices: Provider state/consumer state is showing an error
  - Controller
  - I/O device
  - Module
  - Submodule

See also the description of the **_quality()** system function in the section titled *Detailed status of I/O variables (as of kernel V4.2)* in the *SIMOTION ST Structured Text* Programming and Operating Manual.

For further information on diagnostics involving the address list, please refer to the online help.

9.5 Interconnection overview

The interconnection overview allows you to display all motion input and output interconnections of technology objects within the project. This overview is displayed in the SIMOTION SCOUT working area in the form of an interconnection tree.

The tree display enables the synchronous operation interconnections to be displayed in cascades. In the interconnection table below, you can see all the TOs interconnected on the input and output sides for the technology object selected in the interconnection tree.

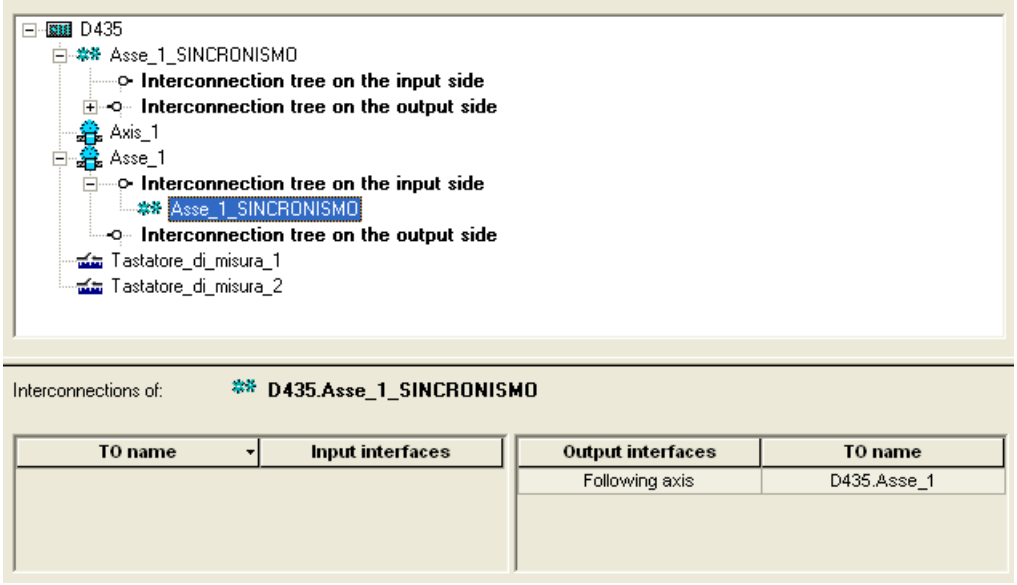


Figure 9-11 Example of an interconnection overview

Additional references

Further information on this topic can be found in:

- Function Manual: SIMOTION Basic Functions
- SIMOTION SCOUT Online Help

9.6 Service Overview

In online mode, the service overview shows a tabular complete overview of all configured axes in the project. The current state (including values from system variables) is displayed along with fault conditions.

The service overview is called up via the **Target system > Service overview** menu.

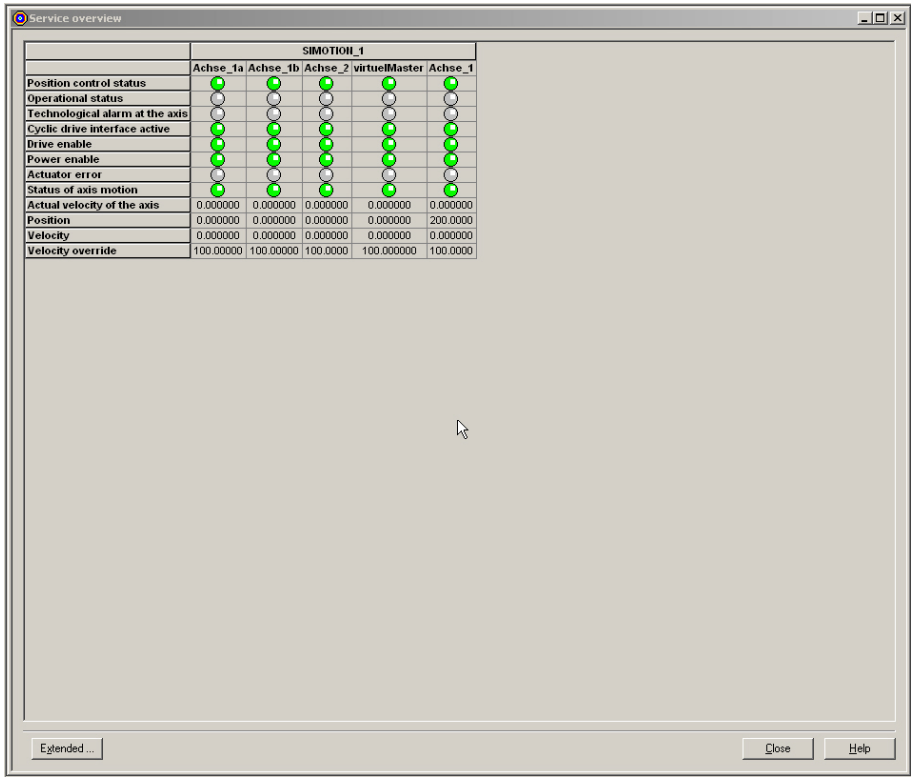


Figure 9-12 Service Overview

9.7 Trace and measuring functions

9.7.1 Trace, measuring function, and automatic controller setting

Overview

SIMOTION SCOUT provides support for the commissioning and optimization of technology objects and user programs: The following functions are available:

- Device trace / function generator
- System trace
- Measuring function
- Automatic controller setting

Calling trace and measuring functions

To invoke the trace and measuring functions in SIMOTION SCOUT, proceed as follows:

1. Select the SIMOTION device in the project navigator.
2. Select the **Target system** command in the menu and select the desired function.
   Or click the desired function in the toolbar.



① Device trace / function generator
② System trace
③ Measuring function
④ Automatic controller setting

Device trace / function generator

You can use the device trace to record and evaluate parameters as well as system and program variables.

The device trace for system variables is mainly used to analyze time-synchronous sequences in the real-time system.

An automatic multiple trace is available as of SINAMICS V4.6. It can be used to trigger a recording automatically according to the trigger conditions. The measurement is stored as a YDB file (SIMOTION) or ACX file (SINAMICS) in a ring buffer on the memory card. At least five measurements can be stored in the ring buffer.
You can parameterize the multiple trace on the Trace tab at **Save to device (memory card)**.

Program variables can be traced in order to find logical errors in the execution system or in user programs. For this purpose, rather than a time-triggered measuring task, an event-triggered measuring task in the RT system can be used. The event that causes the measurement recording is the execution of a specific code position in the user program by the RT processor. To start recording, a trigger event based on the variable can be selected on the Device trace tab (on a positive edge, a tolerance range or a bit map, for example).

The function generator can be used for test purposes to dynamically generate setpoints with defined shapes (e.g. rectangle, sine) for various system variables. With the aid of the trace, for example, the system response can be recorded in order to optimize the controllers.

System trace

You can use the system trace to record and evaluate parameters, system variables, and program variables from multiple CPUs at the same time. It is essential that the CPUs communicate via PROFINET. An isochronous connection must exist between the CPUs, and the PROFINET Sync Master must be a SIMOTION device.

Function generator, mathematical processing and bit tracks are not available for recording with the system trace.

Measuring function

The measuring function is used for controller optimization.

The SIMOTION measuring functions are used to commission the axis controller without requiring a user program.

With the SINAMICS measuring function, you can directly inhibit the influence of higher-level control loops by means of simple parameterization, and analyze the dynamic response of individual drives. The free measuring function measures and averages several measurement series with parameterizable noise sources without master control. This measuring function is suitable for controller settings and for avoiding whirling resonance in magnetic suspension bearing applications with rotor systems.

Automatic controller setting

The automatic controller setting can be used to configure the speed controller in the drive. For Dynamic Servo Control (DSC), this is also possible for the position controller.

Additional references

Detailed information can be found in the SIMOTION SCOUT online help at Diagnostics.

9.7.2 Task Trace

Application area

The SIMOTION Task Trace supports you when troubleshooting in the SIMOTION multitasking environment. The SIMOTION Task Trace records the sequence of individual tasks, identifies user events that you can generate via a program command, and displays these graphically.

Structure of the Task Trace

The SIMOTION Task Trace includes two main components:

- The SIMOTION **Task Tracer**, which writes the task change and events to a buffer on the target device, and
- The SIMOTION **Task Profiler**, an application for displaying the recorded data

Additional references

Further information on this topic can be found in:

- Function Manual: Task Trace
- Diagnostics Manual: SIMOTION IT Ethernet-based HMI and Diagnostic Function
- SIMOTION SCOUT Online Help

9.7.3 Technology object trace

You can monitor commands at a technology object and track access to the system variables and configuration data.

In SIMOTION, technology objects can be influenced by configuration data, system variables, and commands during runtime. In order to represent the influences on a technology object during runtime through the user program, a TO trace / object trace, which records the last n actions at the technology object and arranges these in chronological order, is available as of V4.2.

Note

Simultaneous use of the **Trigger through program call** trigger condition for the TO trace and the device trace is not permitted.

If the TO trace and the device trace are active simultaneously, different trigger conditions must be used.

The recording can be read out from the technology object on request and represented in the ES.

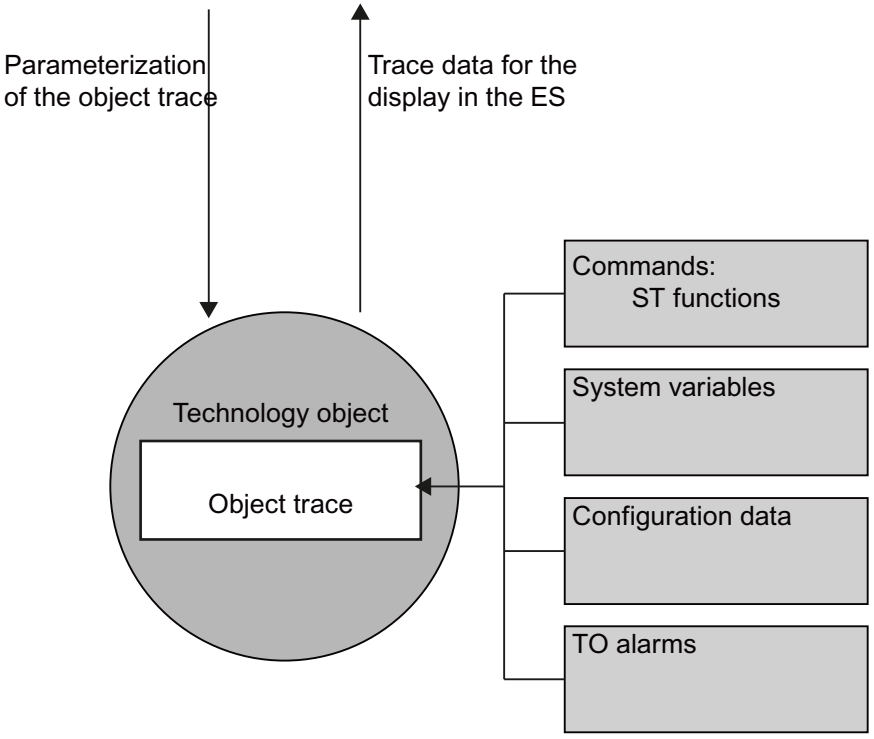


Figure 9-13 Principle of the object trace

The TO trace is used for the diagnostics of technology objects and displays the information and the events that influence a technology object during runtime in tabular form. The TO trace can be configured separately for each technology object.

It records commands and access to configuration data and system variables with their command and error statuses when the TO trace is read out. As of SIMOTION V4.4, alarms of the individual technology objects can also be recorded and an automatic trace is available. It can be used to trigger a recording automatically according to the trigger conditions immediately after a restart.

You parameterize the automatic trace in the **Settings tab** at **Save in the device (memory card)**.

The TO trace is represented in a table/list with a time stamp.

The TO trace is available for the following technology objects:

- Drive axis
- Position axis
- Following axis
- Path interpolation
- Following object
- External encoder
- Measuring input
- Output cam
- Cam track
- Addition object
- Formula object
- Sensor
- Temperature channel
- Fixed gear
- Controller object

Additional references

Additional information on this topic is contained in the SIMOTION Runtime Basic Functions Function Manual.

9.8 Accessible nodes

A list of the devices switched on and connected to the PG/PC is displayed via the **Accessible nodes** function in the SIMOTION SCOUT working area. The display is related to the PG/PC interface which is configured as the application access point in "Set PG/PC interface".

A SIMOTION project must **not** be open in order to use this function.

Proceed as follows:

1. Select the **Project > Accessible nodes** menu.
2. Select the corresponding node.
3. Right-click and select one of the following functions in the context menu. The available functions depend on the configuration.
   - Operating state ...
   - Device diagnostics ...
   - Copy from RAM to ROM ...
   - Licenses
   - Log files
   - Archived project
   - SINAMICS Upload
   - Edit Ethernet nodes...

Additional references

For additional information on this topic, refer to:

- SIMOTION SCOUT Online Help

9.9 Program testing and debugging

Comprehensive program testing and debugging functions are available in SIMOTION SCOUT. You can execute the following functions:

- Control variable
- Program status
- Breakpoints

Additional references

Please refer to the following documents on this subject:

- SIMOTION ST Structured Text Programming and Operating Manual
- SIMOTION MCC Motion Control Chart Programming and Operating Manual
- SIMOTION LAD/FBD Programming and Operating Manual
- SINAMICS/SIMOTION DCC Editor Description, Programming and Operating Manual

and the SIMOTION SCOUT online help.

9.10 Project comparison

You can use the SIMOTION SCOUT / Starter project comparison function to compare objects within the same project and/or objects from different projects (online or offline) with one another.

Objects are devices, programs, technology objects (TOs) or drive objects (DOs), and libraries.

The project comparison is available with SIMOTION SCOUT and Starter. Comparing projects is useful if you need to carry out service work on the system.

1. Start the project comparison by clicking the **Start object comparison** button.
2. The **Select comparison partners** dialog is displayed. Select the projects to be compared.

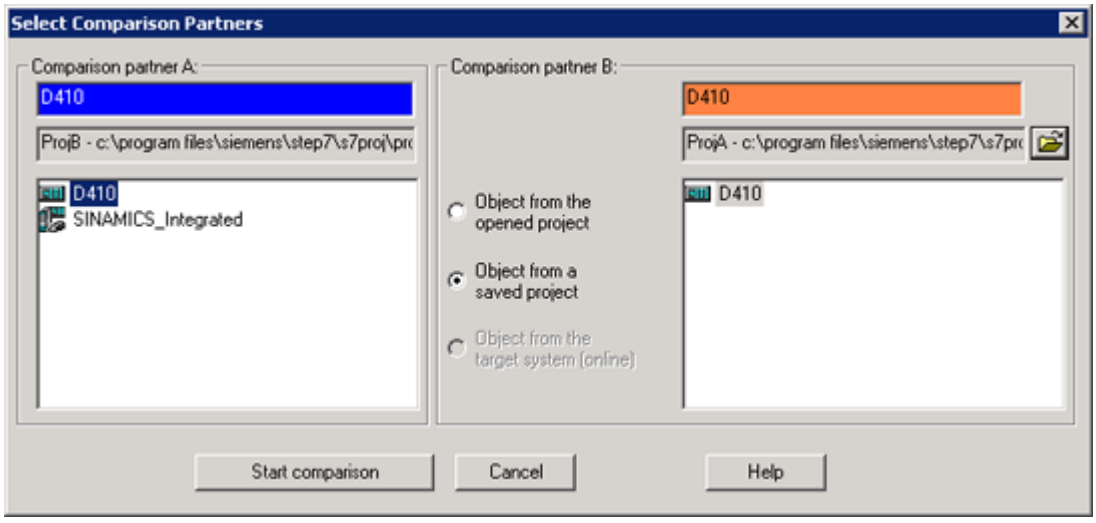


Figure 9-14 Select comparison partner dialog



Figure 9-15 Synchronizing project data via the project comparison function

Note

A detail comparison is possible only if supplementary data (e.g. program sources) has also been downloaded to the target device (**Options > Settings > Download**).

Additional references

For detailed information, refer to:

- Function Manual: SIMOTION Project Comparison
- SIMOTION SCOUT Online Help

9.11 Project overview

In Utilities&Applications, select **Scripts > Report scripts** to access scripts for generating reports on all

- TOs
- Programs, function blocks, functions
- Units
- Tasks and assigned programs

in the current SIMOTION project.

A script lists the relevant specific objects of the SIMOTION project in an HTML document, arranged in a tabular format. Once generated, the HTML document opens and is displayed automatically in the Internet Explorer. The information involved can also be saved from there in HTML or CSV format or as an Excel file.

9.12 Services and diagnostics without an Engineering System

SIMOTION devices have an integrated web server. The web server supports the display of diagnostic and system data in standard Internet browsers, even in the absence of an Engineering System, and the carrying out of project/firmware updates.

For more detailed information, see the *SIMOTION IT Ethernet-based*

HMI and Diagnostic Function Diagnostics Manual.

Service with SIMOTON SCOUT 10

10.1 Selecting the right project with SCOUT

The observation of the following recommendations for the configuring simplifies maintenance work.

Working with the right project

In order to ensure that you are always working with the right project, save the revised and archived project as a zip file on the **CF card**.

For details on how to do this, refer to the section titled Archiving and backing up projects on memory cards.
You should only use this zip file in future.

The project data can be archived on a memory card in SCOUT.

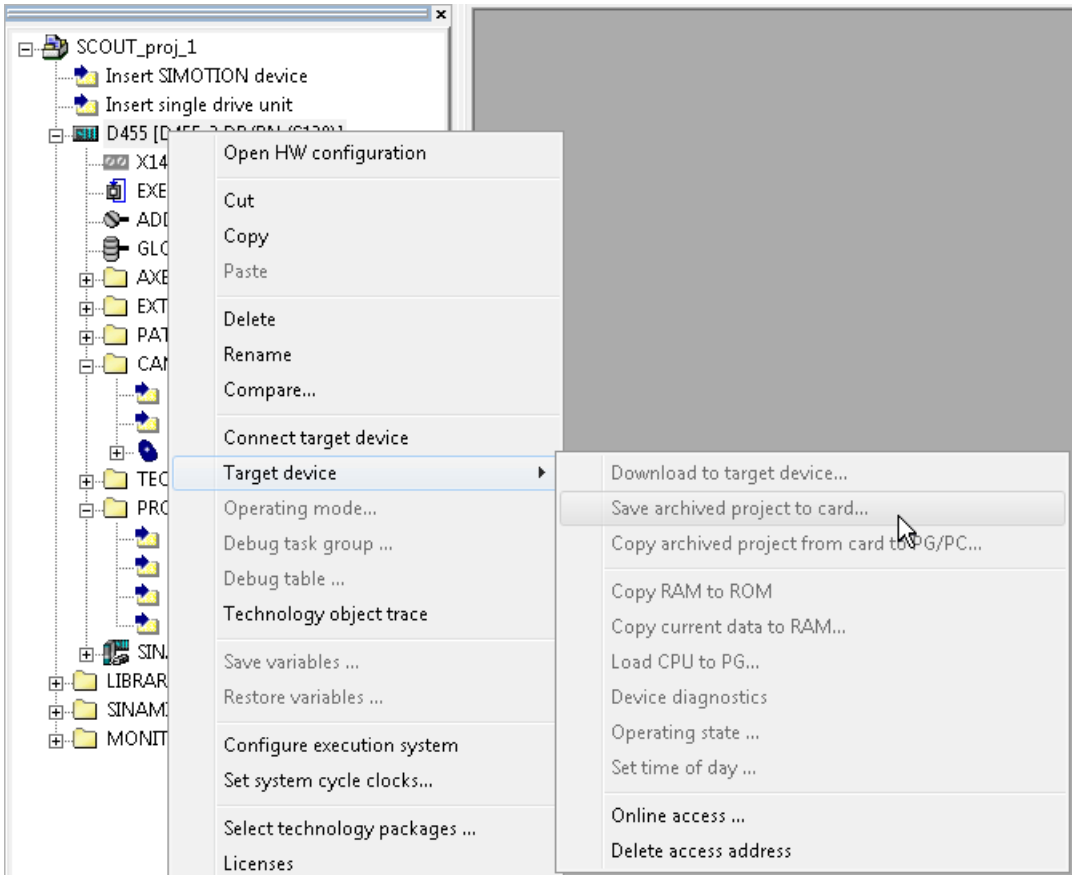


Figure 10-1 Archive SIMOTION project to card

The **accessible nodes** function can be used to determine on which CPU a Project.zip is stored.

Differences between the SCOUT project and the project data loaded to the device

Once you are online, any inconsistencies between the engineering project and the data in the target system are highlighted in the project navigator with "red" symbols.

The object comparison feature enables you to show these differences in detail and perform an alignment process.

For additional information, refer to the section titled Project comparison.

Load the project from the memory card.

The project data archived on the memory card can be transferred to "PROJEKT.ZIP" on the hard disk of the PG/PC in the **Accessible Nodes** view via context menu (right mouse button). Alternatively, the SCOUT function is also available in the **Load project from card...** context menu of the device. Next, the archive project transferred to the hard disk must be dearchived.

Use routing

The following must be considered in order to be able to use routing (e.g. for access to SINAMICS_Integrated with SIMOTION D4x5):

- If the project should be generated on another computer, a **PG/PC assignment** is necessary. The PG/PC has the unique "computer name" of the creation system and this must be adapted to the current system.
- This change can be made directly using the **Assign PG/PC** toolbar button.

The log files as additional help

The **Syslog file** and the **Userlog file** are also available to help verify the project (as of Runtime V4.0). These files are stored on the memory card and can be read out, for example, without a project on the **PG/PC** using the SCOUT function **Accessible Nodes**.

The log files on the memory card are directly accessible from the dialog (via context menu).

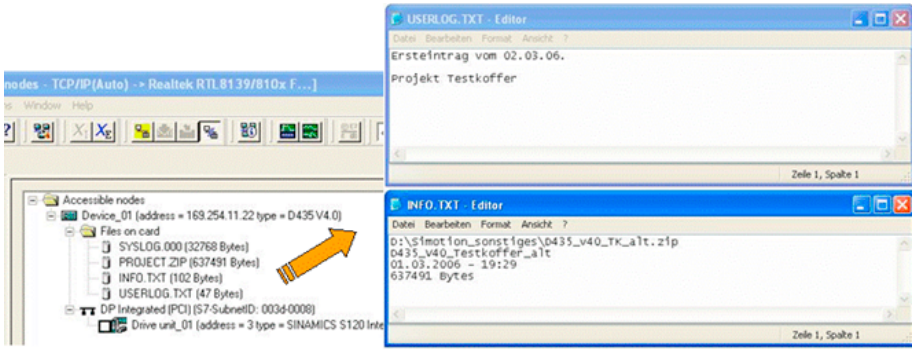


Figure 10-2 Log files via the context menu

- user\simotion\hmi\syslog\syslog.000
  System logbook: The system makes an entry here when a RAM TO ROM, an overall reset or a reformatting of the memory card is carried out.
- user\simotion\hmi\prjlog\userlog.txt
  Machine logbook: It is possible here to document the tasks carried out and the SCOUT version used for the next service worker. Call for editing from the SCOUT dialog **Device diagnostics**.

Below is other data, which is stored on the memory card and can be accessed from this dialog:

- USER/SIMOTION/HMI/PRJLOG/info.txt
  is created with the archived ES project and contains the name, size, save date.
- USER/SIMOTION/HMI/PRJLOG/project.zip
  archived ES project. Maximum one archived project can be archived on the memory card using SCOUT.

The above-named files visible in the dialog also remain on the memory card after **Delete user data**.

For a detailed description, please refer to:

- SCOUT Online Help -> Device diagnosis: Syslog / Userlog
- Device Diagnosis section: User log file
- Device Diagnosis section: Syslog file

10.2 SCOUT V4.5 and 5.1 project format

The project format of SIMOTION SCOUT V4.5 and SIMOTION SCOUT 5.1 is identical. This allows projects created with SCOUT V4.5 also to be processed with SCOUT V5.1. This also applies in the reverse case.

Nevertheless, note that SIMOTION SCOUT V5.1 includes new firmware versions for the CPUs, e.g. C240 PN V5.1. If in SIMOTION SCOUT V5.1, you add a CPU with new firmware to your project, this CPU is not known in a SIMOTION SCOUT V4.5 installation. The CPU is not displayed in the project navigator and a message appears in the detail view that the project contains unknown objects. In this case, you must continue to work with SIMOTION SCOUT V5.1.

10.3 Project was created in Version V4.1 / V4.2 / V4.3 / V4.4

If the project was created in Version V4.1 / V4.2 / V4.3 / V4.4, consider the following points:

- If SCOUT V4.5 is used to open a project created with an earlier version of SCOUT, a request is automatically made to convert the project to the current internal data format of SCOUT. In such cases, **only** the data management of the SCOUT project is converted to V4.5; the SIMOTION device version is not converted.
- After the project conversion, the system prompts whether the project should be opened write-protected.
  If the project needs to be changed, the write protection can also be revoked later.
  - To do this, select **Project > Revoke write protection** from the menu bar.

10.4 Project V4.1 / V4.2 / V4.3 / V4.4 has been edited with SCOUT V4.5

If the project of the versions V4.1 / V4.2 / V4.3 / V4.4 was edited with SCOUT V4.5, consider the following points:

- The project can be saved back in the original project version when closing the projects, exiting SCOUT or by selecting the SCOUT function **Save in old project format...**. This makes it possible to edit the project later using the corresponding SCOUT version again.

  Note

  During a reconversion, the internal compilation results of the **changed** sources may be deleted.

  This means that after the project has been opened again and the online connection made, the changed sources are inconsistent (shown in red).
  Only after the compilation and download are completed are the sources consistent again (shown in green).
  This is due to the editing with different SCOUT versions, which contain different compiler versions.

- If the project was opened write-protected for diagnostic purposes or if no changes were made in non-write protected mode, then it need not be saved.

Recommendation

After editing an earlier project version with SCOUT V4.5, the engineering project should remain in version V4.5. This eliminates the need to back-saving in the old project format so that the project remains consistent at all times.
The engineering project is then **no longer** available in the old project version.

After the project changes are completed, they should be documented in the Userlog file.
The Userlog file is edited in the device diagnostics dialog.

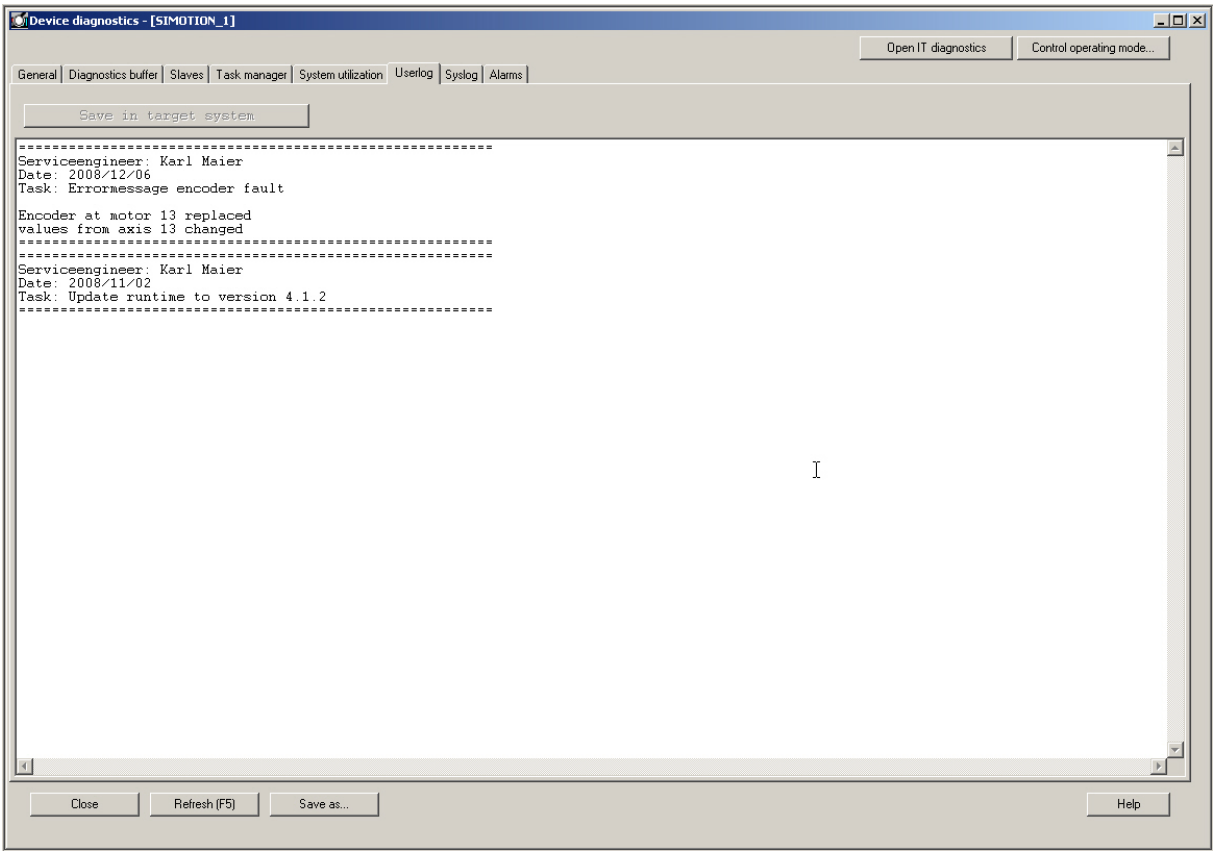


Figure 10-3 Example of the Userlog file display

10.5 Introduction of versioning with standard library and software components

It is possible to introduce versioning for any standard library and any software component during configuration, i.e., each component then has its own version identifier.

- For every unit and every library the version, author and a brief description in the comments field (offline version identifier) in the Properties dialog box in SIMOTION SCOUT.
- Each library and each software component can disclose its version identifier during runtime (online version identifier identical to offline version identifier).
  - Version identifier as constant(s) or
  - Version identifier as function return value, e.g. FCGetVersion.
- The version identifiers can be displayed separately on the available HMI systems, i.e., self-identification of all involved system components.
- A simple variant for applying versioning is in a date identifier as a constant in the format yyyy-mm-dd. This can be assigned to a variable, which is then, for example, passed on to HMI systems for the version display.

  Example, date identifier:

```
VAR_GLOBAL CONSTANT
    APP_VERSION : UDINT := 20060612; // 12.06.2006
END_VAR

VAR_GLOBAL
    G_uAppVersion : UDINT := APP_VERSION;
END_VAR
```

Siemens SIMOTION Diagnostics 11

Diagnostics dialogs in the event of a SCOUT crash

SCOUT and STARTER contain the diagnostics tool "Siemens Simotion Diagnostics". With this tool, you can help us constantly improve our product. If an internal non-recoverable fault occurs, safe continued operation is not guaranteed and consequently the application is closed. To support fast analysis and elimination of a such a fault, only data relevant to fault analysis is gathered and saved in one or more ZIP files prior to closing the application.

Fault profile:

In the event of a non-recoverable internal fault, the "SIEMENS SIMOTION Diagnostics" dialog appears.

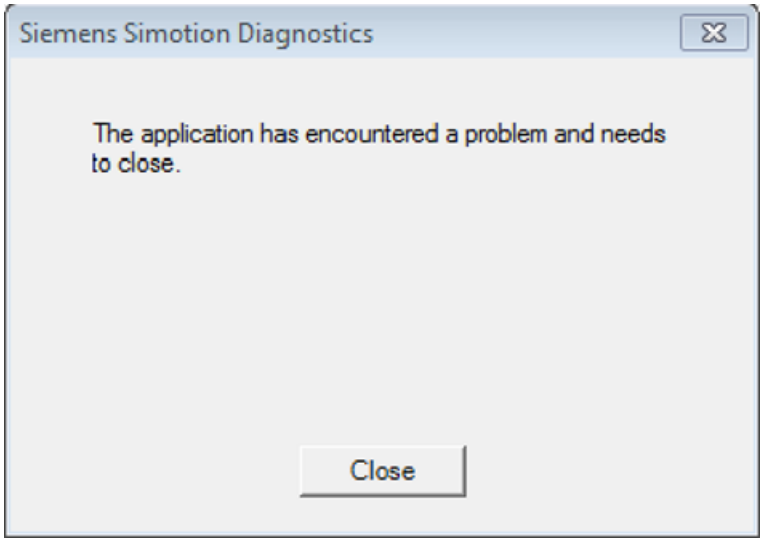


Figure 11-1 Siemens SIMOTION Diagnostics

Immediate measures:

1. Collect information about the fault (see below for instructions)
2. Contact the Siemens Hotline, http://support.automation.siemens.com

Steps for reporting the fault and support for further troubleshooting:

- Automatically created fault report
  The diagnostics tool automatically creates a fault report with technical information about the crash, such as the process image. This fault report is stored in the following directory (in compressed form as one or more ZIP files):
  <ProgramFiles>\Siemens\Step7\u7umc\data\AdvancedDiagnostics\
- Creating an error message
  The error message must include a brief description of the operator action prior to the occurrence of the problem, the software version used, and, if necessary, the configuration (installed Siemens products, hardware installation, etc.).
  After restarting SCOUT, you can see the installed versions in the "Help" menu at "Info" or by using the "System info ..." button, and you can copy and paste them into the document for fault description purposes, or to a separate text file.
- The ZIP files with the fault report must now be sent as an attachment to the Siemens Hotline http://support.automation.siemens.com together with the error message.

SIMOTION Runtime Simulation 12

12.1 Overview

Note

SIMOTION Runtime Simulation only for SIMOTION devices D4x5-2 as of V5.1

SIMOTION Runtime Simulation (SIMOSIM) is supported for SIMOTION devices D4x5-2 as of V5.1.

With SIMOTION Runtime Simulation, you can test and evaluate the general workflow of a SIMOTION runtime without connected hardware.

The simulation is so ideal for training purposes or, for example, to test and debug programs before they go online on a real module.

The projects are loaded into SIMOTION SCOUT and can be switched retentive with RamToRom. SINAMICS Integrated and external I/Os are not simulated.

Note

Simulation of SIMOTION devices

Note that not more than one device can be simulated concurrently within a project.

Restrictions

The following functions are not supported:

- CLib
- OA packages
- TPDCBADM, TPTControl, TPdcblib technology packages

Note

Technology package product versions

Note that only those technology packages integrated in the simulation (TPCAM, TPPATH, TPCAM_EXT) are supported.

12.2 Using SIMOSIM

Requirements

- You have installed SIMOTION SCOUT. SIMOSIM is part of the installation.
- You have activated the "Siemens SIMOSIM Virtual Ethernet Adapter" in the network settings of your PC.
- You have created a project in SIMOTION SCOUT and use SIMOTION D4x5-2 devices as of V5.1 in your project.
- SIMOTION devices and Siemens SIMOSIM Virtual Ethernet Adapter are contained in the same IP subnet.
- No active online connection to a real SIMOTION device exists.

Starting SIMOSIM in SIMOTION SCOUT

To start SIMOSIM and simulation mode in SIMOTION SCOUT, proceed as follows:

1. Open the project in SIMOTION SCOUT.
2. In the project navigator, select the device you want to simulate.
3. Click "Start SIMOSIM" in the menu bar.
   The "Start Simulation Mode and SIMOSIM" dialog opens.
4. Click "PG/PC...".
   The "Set PG/PC Interface" dialog opens.

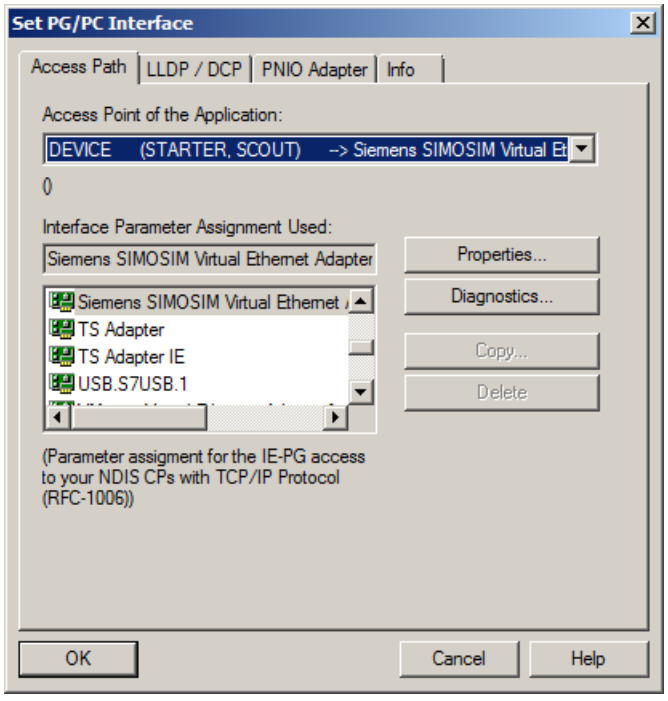


Figure 12-1 Setting the SIMOSIM PG/PC interface

5. Select "DEVICE ->Siemens SIMOSIM Virtual Ethernet Adapter.TCPIP.1" as access point of the application.
6. Confirm your selection with OK.

Note

Accepting Siemens SIMOSIM Virtual Ethernet Adapter automatically as a setting

To accept Siemens SIMOSIM Virtual Ethernet Adapter automatically as a setting, click "Accept settings" in the "Start Simulation Mode and SIMOSIM" dialog.

7. Click "Access point" in the "Start Simulation Mode and SIMOSIM" dialog.
The "Properties > Device / Access point" dialog opens.



Figure 12-2 Access point used by SIMOSIM

8. Activate "DEVICE" as used access point.
9. Click "Set DEVICE addresses".
The "DEVICE addresses" tab appears.

10. Activate X127 as virtual interface.
    You can use online access to the simulation only via interface X127.

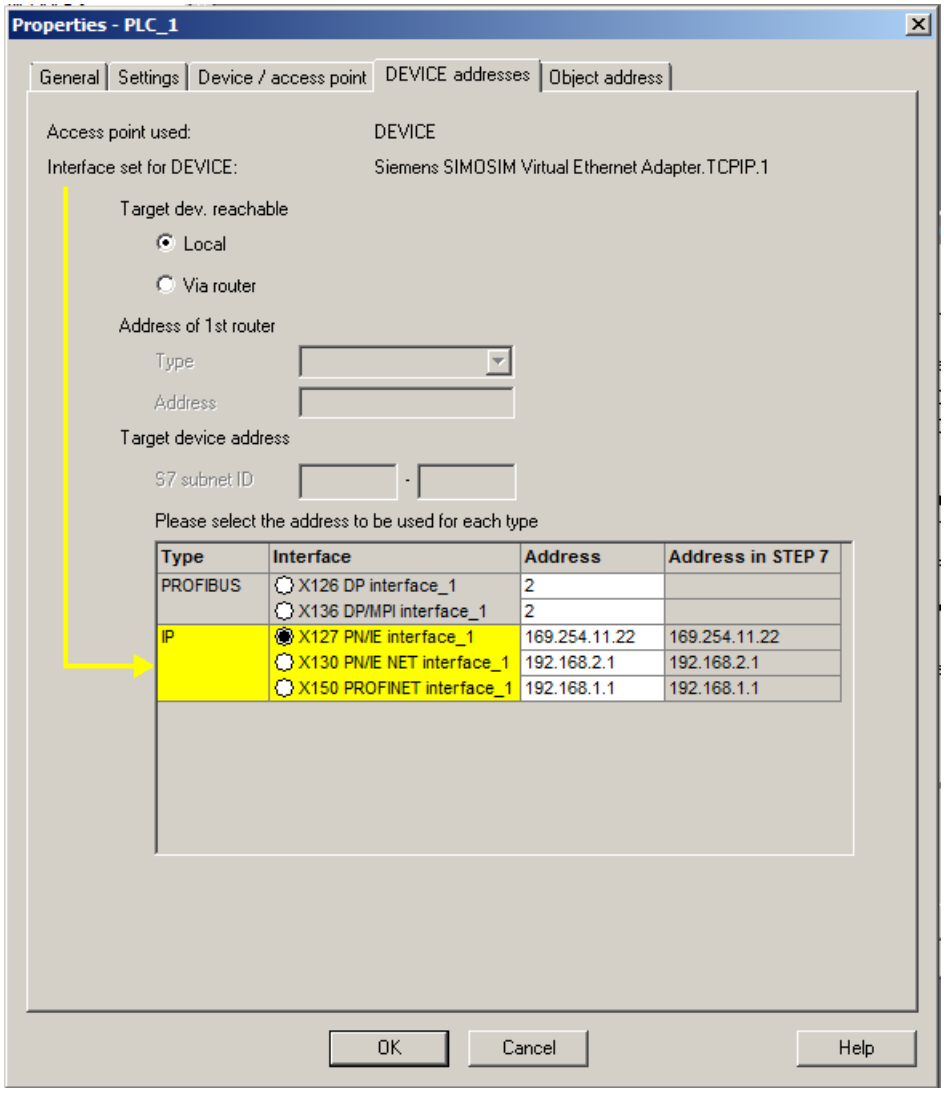


Figure 12-3 Setting the SIMOSIM DEVICE address

11. Click "OK" to confirm the selection.

12. Check your settings for the online interface.

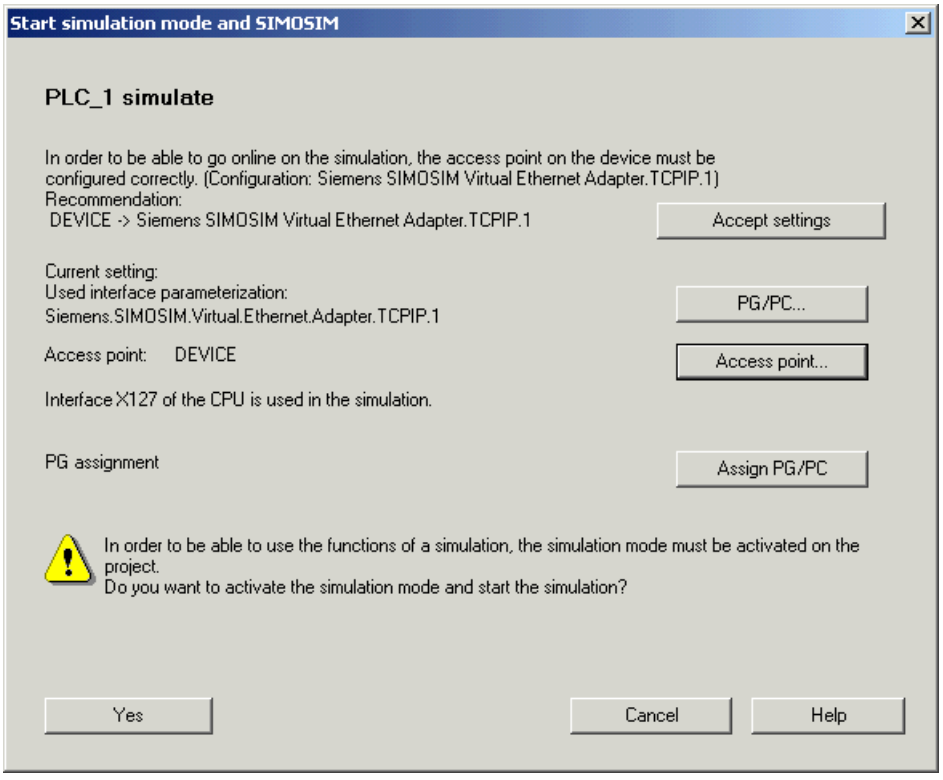


Figure 12-4 Starting simulation mode and SIMOSIM

13. To start simulation mode, click "Yes". Simulation mode is activated, SIMOTION simulation is started and a virtual controller is shown.

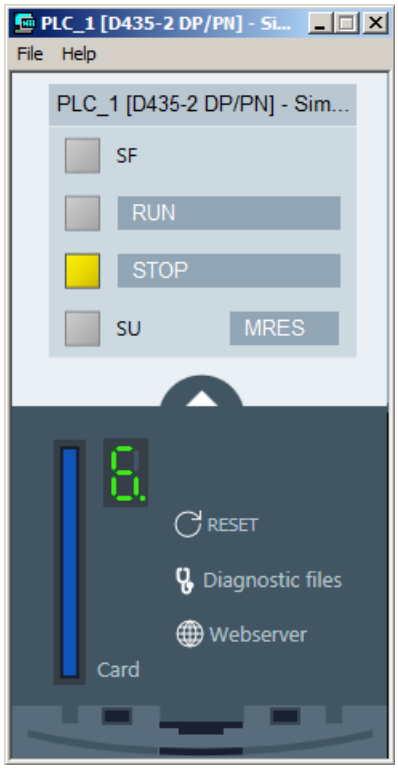


Figure 12-5 Virtual controller

The graphic user interface allows you to:

- Control the CPU operating state
- Open the Web server in the browser window
- Access the diagnostic files
- Reset the controller
- Access data on the memory card

Starting SIMOSIM in simulation mode

To start the simulation in activated simulation mode, proceed as follows:

1. Click "Start SIMOSIM" in the menu bar.
2. The "Start SIMOSIM" dialog opens.

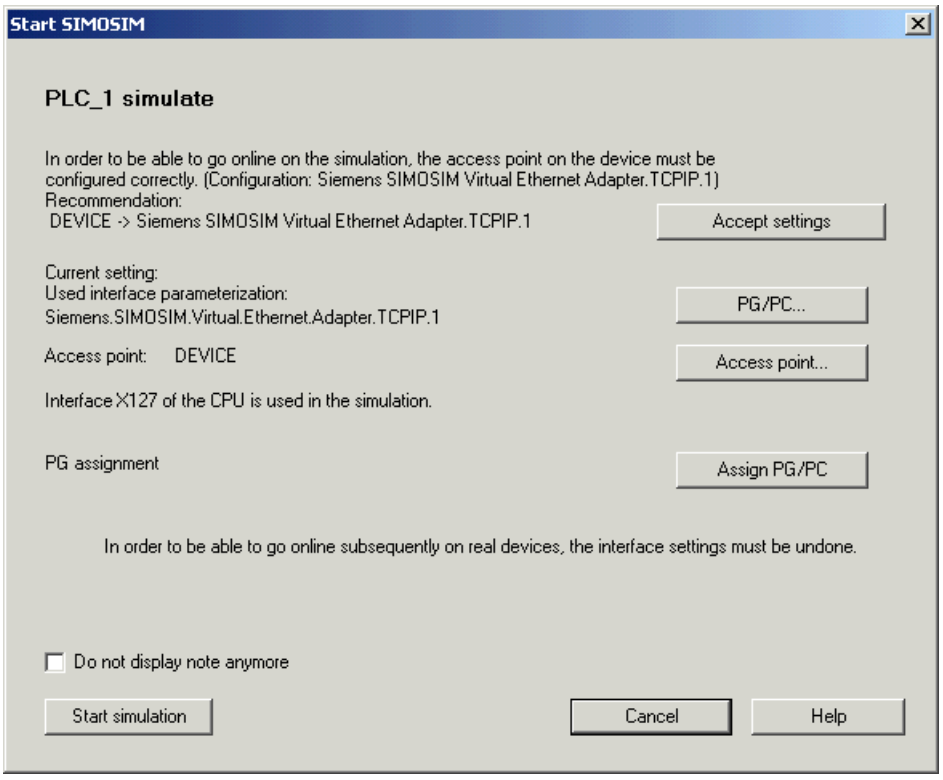


Figure 12-6 Restarting SIMOSIM

3. Click "Start simulation".

Result

SIMOSIM and simulation mode have been started.

You can now go online with a target device and download your project data into the virtual target system.

You can then simulate programs, axes, etc. You so allow SIMOSIM to write directly to the inputs.

Note

Going online in simulation mode

Note that only one device can go online in simulation mode.

Note

Simulation mode active/inactive

When simulation mode is active, this is color-highlighted in the SIMOTION SCOUT status bar.

To exit simulation mode, close the controller window by clicking the "X" in the upper area of the window. Deactivate the "Use simulation mode" option in the "Project" menu.
The flag in the status bar is reset. Simulation mode is exited.

Note

Emergency stop deactivated in debug mode

Note that in debug mode, no emergency stop is made with the space bar or by switching the application.

Note

Access to SIMOTION IT via Web browser using HTTPS

Note that the certificates must be created at the first start via HTTPS. This may take some time and corresponding messages may be displayed.

Configuring a further connection (such as HMI) 13

13.1 Rules for arranging modules in the HW Config

Slot rules

Modules must be inserted in the rack without gaps.

Exception:
Slot 3 remains empty in the configuration table. This slot is reserved.

Note

The actual arrangement has no gaps, as otherwise the bus on the backplane would be interrupted.

Table 13-1 Slot rule for SIMOTION rack 0 (SIMOTION C only)

Slot 1:	Power supply only, PS 307 xA
Slot 2:	CPU only
Slot 3:	Empty or interface module
Slots 4 to 11:	I/O modules or empty

SIMOTION SCOUT provides the following support when you configure a station:

- A message will appear if, for example, a module cannot be inserted into the desired slot.
- Address areas are also checked to prevent dual allocation of addresses.
- The status bar or messages displayed provide feedback, which you should pay attention to. Important information can also be found in the help.
- Temporary rules, that is, rules that apply only to a specific version, are not considered (such as restriction of the useable slots due to a functional restriction for individual modules).

Consult the documentation or the current product information for the modules.

Note

Modules that are installed but not configured are repeatedly addressed via the PROFIBUS. This requires additional computing time.

13.2 Routing

Routing designates the cross-network transfer of information from network x to another network y.
With SCOUT and STEP 7, it is possible to access SIMOTION, drives and S7 stations online via a PG/PC beyond the subnet boundaries, in order to, for example, load user programs or a hardware configuration or to perform test and diagnostics functions. You can connect this PG/PC to any position in the network and establish an online connection to all stations that can be reached via gateways.

Additional references

For further information, please go to:

- SIMOTION D410 Commissioning Manual
- SIMOTION D410-2 Commissioning and Hardware Installation Manual
- SIMOTION D4x5 Commissioning and Hardware Installation Manual
- SIMOTION D4x5-2 Commissioning and Hardware Installation Manual
- SIMOTION Communication System Manual

13.3 HMI (Human Machine Interface) connection

SIMOTION allows the end user to communicate with operating devices (Human Machine Interface systems) such as operator panels.

The following configuration is possible, for example, with the SIMOTION C240:

- HMI device is connected to the non-isochronous PROFIBUS of SIMOTION device 1.
- Four other SIMOTION devices are connected to the PROFIBUS DP (isochronous) of SIMOTION device 1.

SIMOTION automatically also establishes connections between the HMI device and SIMOTION devices 2 to 5 (routing). Therefore, the HMI device can also display variables, messages, and alarms for these devices.

Note

The number of routed connections depends on the device. Between 4 and 10 routed connections are possible.
A maximum of two routers is possible.
For more information, please contact your local Siemens representative.

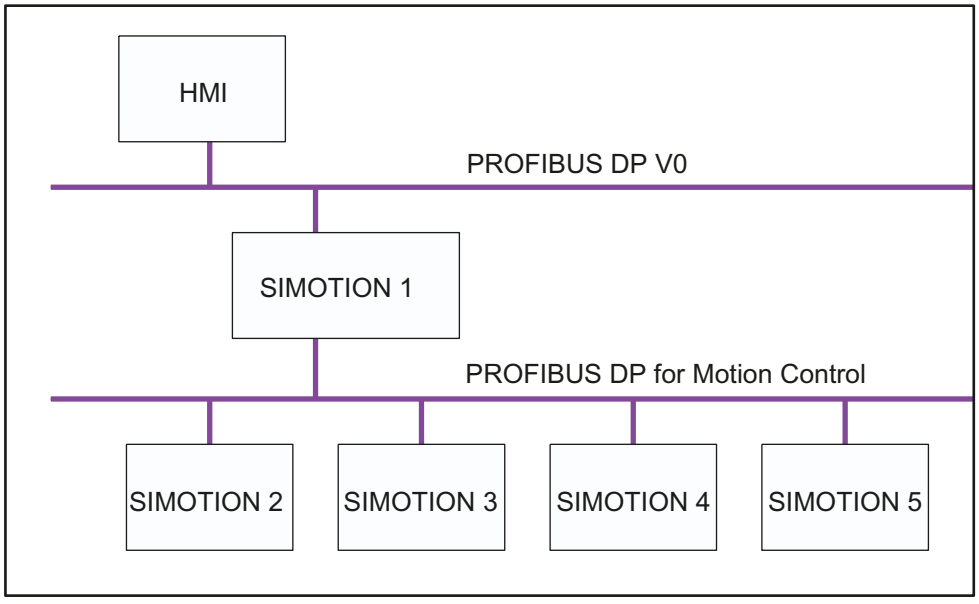


Figure 13-1 Example for the connection of an HMI device to a group of SIMOTION devices

Note

Routing by a controller (SIMOTION C, P or D) is possible only when it has been configured as active I-slave. However, please note that with an active I-slave, the PROFIBUS connection on the HMI can no longer be operated isochronously.

13.4 Higher-level automation systems

A SIMOTION device can be connected to a higher-level automation system. Communication takes place via the MPI interface of the SIMATIC STEP 7 device or the non-isochronous PROFIBUS interface of the SIMOTION device.

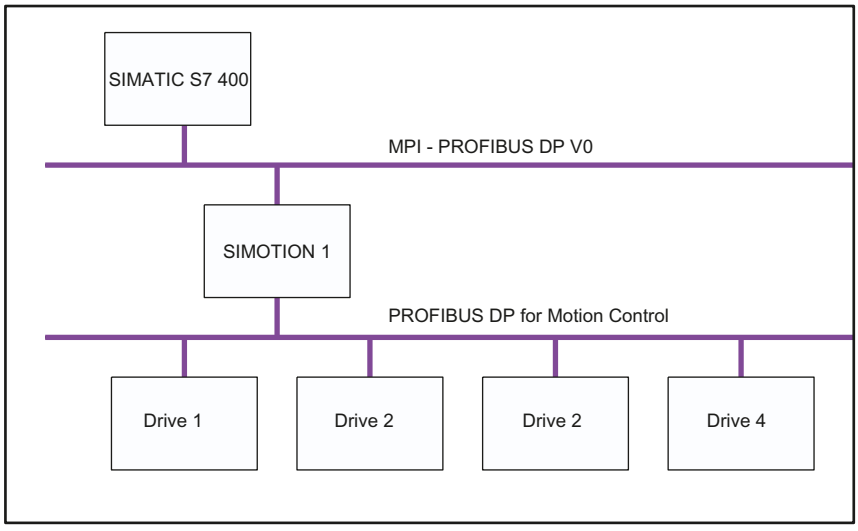


Figure 13-2 Higher-level automation system with SIMOTION device

Additional references

For additional information, refer to:

- *SIMOTION Communication* System Manual

13.5 TCP ports for access to SIMOTION/SINAMICS

TCP ports for access to SIMOTION/SINAMICS

Which TCP ports must be enabled in a router (or firewall) to permit access to a SIMOTION controller or SINAMICS drive via Ethernet?

NOTICE
Security information The functions and solutions described here are limited primarily to the implementation of the automation task. Please also note that in case of networking your plant with other parts of the plant, the company network or the Internet, appropriate protective measures within the framework of industrial security must be adopted. See also Internet (www.siemens.com/industrialsecurity).

Description

The following TCP ports must be enabled (open) for all routers and firewalls in the transmission link to permit the use of the following services: [1)]

Access to a SIMOTION controller / SINAMICS drive:

- ... via SCOUT (or STARTER) engineering software:
  - Port 102 (ISO-TSAP (Transport Service Access Point)
  - Port 5188 (only for SIMOTION)
  - Ping Request (ICMP) [2)]
- ... via web browser to the integrated web server:
  - Port 80 or 8080 (HTTP or HTTP alternate)
  - Port 443 (HTTPS)
- ... via FTP (only for SIMOTION):
  - Port 20, 21 (data communication, check)
- ... via TCP or UDP to the user program (only for SIMOTION):
  - Possible configurable port numbers are 1024 to 65535

- ... via OPC XML-DA (only for SIMOTION):
  - Port 80 or 8080 (HTTP or HTTP alternate)
  - Port 443 (HTTPS)
- ... via OPC UA (only for SIMOTION)
  - Port 4840

[1] An open port can be verified with the following test, for example:

Under Windows, open the DOS window and enter the command "telnet <SIMOTION_IP_address> <Port>" (e.g. "telnet 192.168.214.1 102"). The space between <SIMOTION_IP_address> and the port number to be queried is important. If the screen in the DOS window turns black or if another window opens, your query has received a response via the port, i.e. the port is open. If this does not happen or if the query is canceled after some time with an error message, then SIMOTION does not respond via this port. A SIMOTION controller responds via port 5188 only if you were online via SCOUT (port 102) previously.

[2] As of SIMOTION SCOUT / STARTER V4.3, ping-based connection monitoring can be deactivated. Therefore, the Ping Request (ICMP) may not have to be enabled. For this purpose, open the settings in SIMOTION SCOUT / STARTER at the "Tools" menu command and remove the checkmark at "Use S7-TCP connection monitoring" in the "CPU Download" tab.

Product combinations 14

14.1 Compatibility

14.1.1 General compatibility

Different hardware and software combinations as well as different Kernel and SIMOTION SCOUT version combinations are possible when using SIMOTION.

These possible combinations can be found in the compatibility list on the SIMOTION SCOUT add-on CD (at 1_Important) as well as on the Internet at:

Internet (https://support.industry.siemens.com/cs/ww/en/view/18857317)

14.1.2 Software compatibility

Technology packages with Kernel

The SIMOTION Kernel and the technology packages must always have the same version.

The current compatibility list is available online (http://support.automation.siemens.com/WW/view/en/18857317).

Project on memory card with SIMOTION Kernel

A project contains SIMOTION devices with a particular configured version. This exact SIMOTION Kernel version must be available on the relevant SIMOTION device.

SIMOTION SCOUT with project version

A project with a version earlier than the installed version of SIMOTION SCOUT will be converted to the current version when it is opened. Only the data content of the SIMOTION project will be converted to the current version, but not the SIMOTION device version.

See also

General compatibility (Page 215)

14.2 Memory media of the SIMOTION devices

Storing on storage media

The online project consisting of the technology package and the user data is saved to a non-volatile storage medium. The storage medium varies depending on the SIMOTION platform.

- SIMOTION C: Micro memory card
- SIMOTION P: Virtual memory card
  Handling and functionality correspond to the micro memory card of the SIMOTION C.
- SIMOTION P: CompactFlash card
- SIMOTION D: CompactFlash card

Note

The memory card must not be inserted or removed during operation. Removing the card in operating state triggers an overall reset, which results in the loss of stored data.

Additional references

Please refer to the following documents on this subject

- SIMOTION D4x5 Commissioning and Hardware Installation Manual
- SIMOTION D4x5-2 Commissioning and Hardware Installation Manual
- SIMOTION D410 Commissioning Manual
- SIMOTION D410-2 Commissioning and Hardware Installation Manual
- SIMOTION P320-4 E / P320-4 S Commissioning and Hardware Installation Manual
- SIMOTION C Operating Instructions

and the SIMOTION SCOUT online help.

Retentive data

Retentive data (non-volatile data) is saved to a non-volatile memory in the SIMOTION device. Depending on the SIMOTION device involved, this non-volatile memory buffers the data permanently (e.g. NVRAM for D410-2, D4x5-2).

You can also back up the non-volatile data to a memory card (e.g. CF or MMC) to protect data in the event of a spare part failing.

Use the _savePersistentMemoryData system function to back up the non-volatile data to the memory card.

In the event of a buffer failure or module replacement, the data is automatically restored at the time of ramping up.

Additional references

More information on this topic is available in

- Function Manual: Basic Functions

14.3 STEP 7

14.3.1 SIMATIC Manager

Open a SIMOTION project

You can also open a project in the SIMATIC Manager and edit it with the tools provided. However, you do not have any direct access there to specific SIMOTION components, such as technology object and programs.
You can open the SIMOTION SCOUT from the CPU.

Note

You can use **File > Manage...** to show and hide the projects you have created in SIMOTION SCOUT in the SIMATIC Manager.

14.3.2 SIMATIC Logon

Overview

As of SIMOTION SCOUT V4.1, you have the option of assigning a project password to provide access protection for projects. This functionality requires the previous installation of the SIMATIC Logon STEP 7 option.
This function makes it possible to restrict project creation to authorized personnel only and to track changes in versions created with SIMATIC Logon. It also therefore provides support for the validation process of a machine or system [according to FDA 21 CFR Part 11].

Installation / Prerequisites

The STEP 7 options SIMATIC Logon and Version Trail must be installed and licensed in addition to SIMOTION SCOUT.

Characteristics

When SIMATIC Logon is installed, password protection can be activated for any project. A SCOUT project saved with SIMATIC Logon can only be opened and edited with password protection.

- When a project that has been password protected with **SIMATIC Logon** is opened in SIMOTION SCOUT, the access dialog in which the project password must be entered appears. The project so can be opened only with the correct password.
  If an incorrect password is entered, an error message appears and the project remains closed.
- Passwords are assigned in a separate administrator screen using a process configured according to the guidelines according to FDA 21 CFR Part 11.
- Every file open and every change is automatically recorded in a revision log.
- SCOUT projects created with SIMATIC Logon can be archived, managed and their changes tracked in a clearly organized fashion using the SIMATIC Version Trail option.

Activate SIMATIC logon

When SIMATIC Logon is installed, password protection can be activated for any project.

To do this, select **Options > Access Protection > Activate** in SIMATIC Manager.

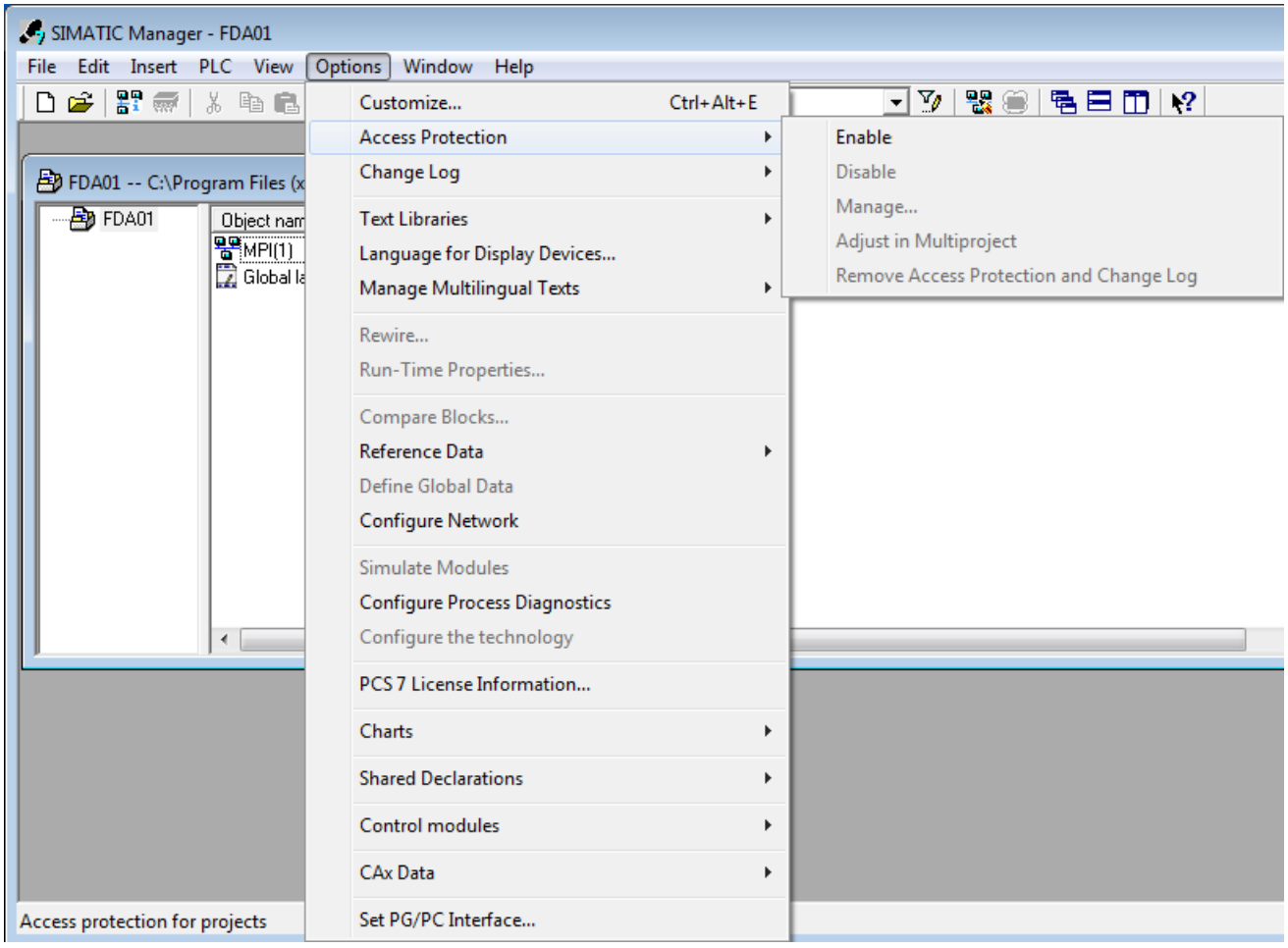


Figure 14-1 Activate SIMATIC Manager access protection

When access protection is activated, the SIMATIC Logon Service window opens. The administrator logs in here to assign a project password for this project.

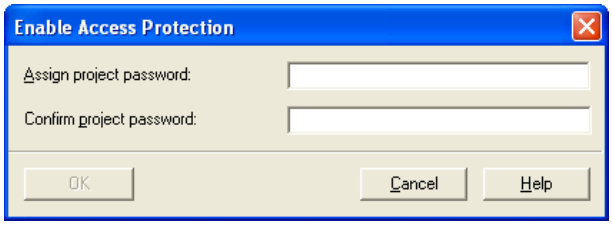


Figure 14-2 Activate access protection

Then the users are entered in the user administration for this project using drag-and-drop.

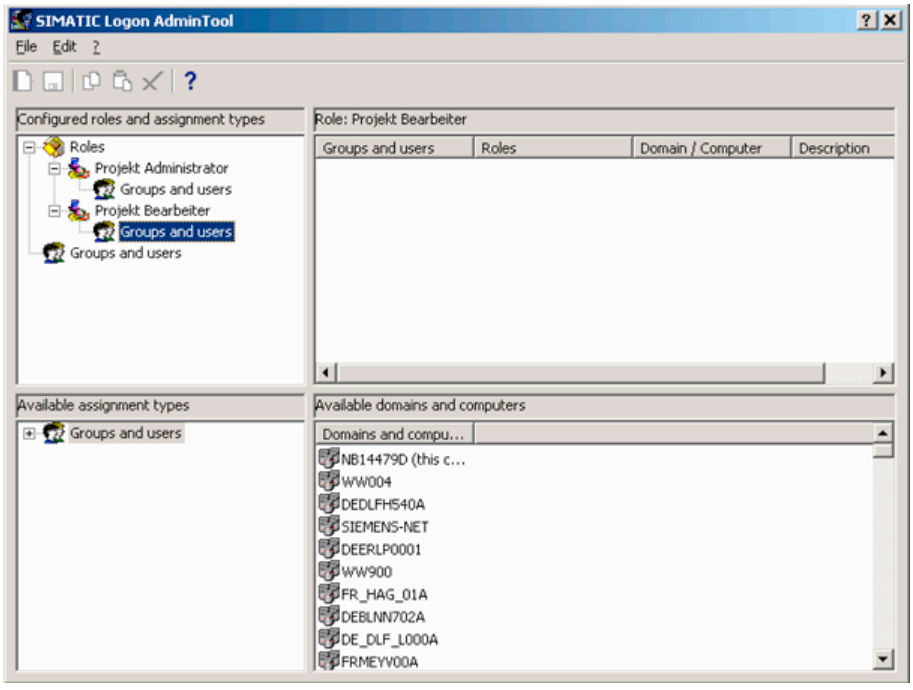


Figure 14-3 SIMATIC Logon AdminTool

Open protected project

When a protected project is opened, the following dialog appears if SIMATIC Logon is installed. Enter your user name and password here.

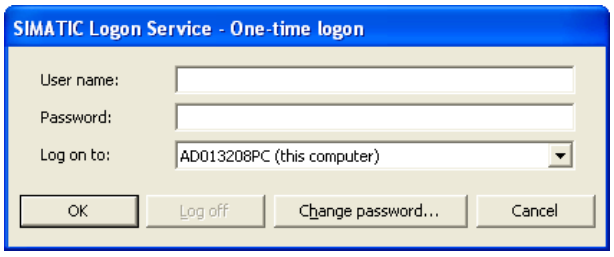


Figure 14-4 SIMATIC Logon Service

If SIMATIC Logon is not installed, the project can also be set to open only with the project password using STEP 7.

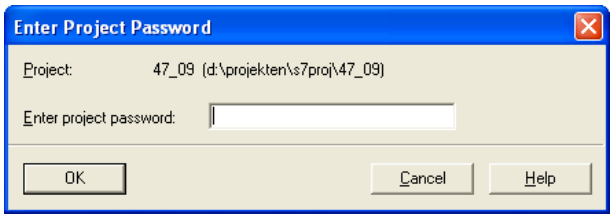


Figure 14-5 Enter the project password.

For more details on this topic, see the following document:

- SIMATIC Logon; SIMATIC Electronic Signature, Manual

14.3.3 SIMATIC Version Trail

Overview

SIMATIC Version Trail is a software option for SIMOTION engineering which, together with the SIMATIC Logon central user administration, can assign a version history to libraries and projects.

Installation / Prerequisites

SIMATIC Version Trail is a STEP7 option that must be installed and licensed in addition to SIMOTION SCOUT. SIMATIC Version Trail can only be used and licensed in a package together with SIMATIC Logon.

Function

When archiving, SIMATIC Version Trail creates a version history with the following information in association with SIMATIC Logon:

- Version
- Version name
- Date and time
- User
- Comment

This version history can be displayed and printed. Individual versions can be retrieved from the version history, and used further. SIMATIC Logon organizes the access protection.

View of a SIMATIC Version Trail window, showing the project name, comments and versioning data. The versions created with SIMATIC Logon can be documented and managed in a clearly organized fashion after changes.

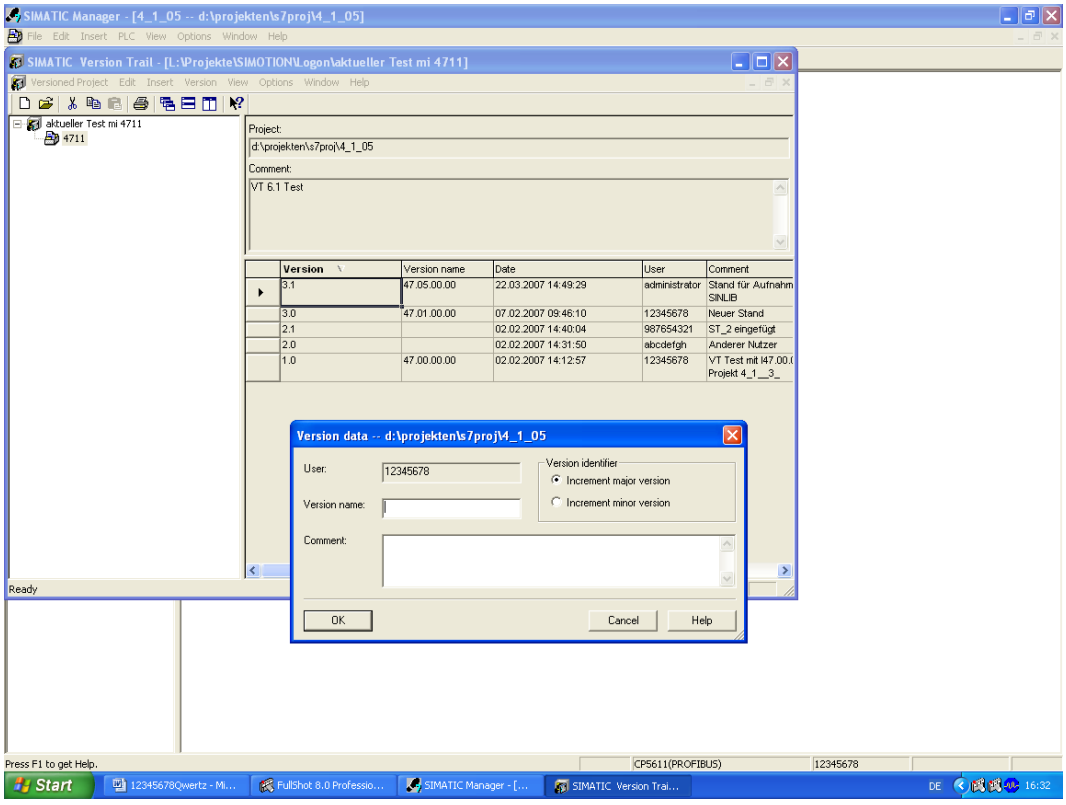


Figure 14-6 SIMATIC Version Trail - version data

Note

Please note that SIMATIC Version Trail cannot be used separately, but only in combination with SIMATIC Logon.

14.4 NetPro

NetPro in STEP 7

NetPro is integrated in the STEP 7 basic package. NetPro is a tool that supports network configuration in STEP 7.

Application for SIMOTION

So that network nodes can communicate, configure networks and/or subnets in NetPro. In NetPro, you create a graphic view of the networks and subnets and specify their properties or parameters. You can also define the node properties.

You can open NetPro in SIMOTION SCOUT using the button, whereby the NetPro application opens as a separate window. Application cases for the SIMOTION project are, for example, the connection of the engineering system via network nodes and the creation of routing connections.

Additional references

Detailed information can be found in:

- Online help, *SIMOTION SCOUT Getting Started*
- *SIMOTION SCOUT Communication* System Manual

14.5 HMI

Overview

The Human Machine Interface (HMI) connects the world of automation with the individual demands of the operator. As part of TIA, SIMATIC HMI supports uniform engineering under Windows, accesses common data and communicates uniformly.

For efficient machine operation and monitoring in various performance classes, you can use the following panels recommended for SIMOTION as well as PC-based panel systems with membrane keyboards or touch screen operation:

- Panels
  For efficient machine operation and monitoring in various performance classes, either text-based or graphics-capable with membrane keyboards or touch screen operation.
- Multi-panels
  These can be used for operator control and monitoring in the same way as the panels, with operation by means of touch screens or membrane keyboards. Multi-panels (MP) also permit the installation of additional applications and therefore provide typical PC flexibility.
- Panel PCs
  Are designed for demanding environmental conditions and provide the same degree of robustness and suitability for industry.

The WinCC flexible engineering software is available for the display of the user interface.

Additional references

Detailed information can be found in:

- Catalog: SIMOTION, SINAMICS S120 and Motors for Production Machines
- PM 21 Catalog.

SIMATIC WinCC flexible

SIMATIC WinCC flexible is the innovative HMI software under Windows 7 for all applications in the machine-related area. The engineering software enables the uniform configuration of all Windows-based SIMATIC HMI operator panels.
WinCC flexible Runtime provides basic HMI functionality on PCs, including messaging and logging systems and can be expanded when required via options. The runtime functions available on SIMATIC HMI operator panels depend on the device class.
The WinCC flexible engineering software can be integrated in the central programming software of the SIMATIC world, SIMATIC STEP 7, and used for the configuration of all operator panels. The engineering software of SIMATIC HMI also accesses variable lists and message lists of the controller and uses their communication parameters.

OPC / OPC XML-DA / OPC UA

Open communications standard for automation components. The goal of the standard is to ensure a problem-free and standardized data exchange between controllers, operator control and monitoring systems, field devices and office applications from different manufacturers.

The abbreviation OPC previously meant "OLE for Process Control", because the implementation was based on Microsoft's COM/DCOM technology.
Nowadays, one uses the term "Openness, Productivity and Collaboration". Today, a number of standards defined by the OPC Foundation have evolved. The OPC Foundation is a grouping of many manufacturers from the automation technology area.

SIMOTION supports the OPC DA (Data Access) and OPC AE (Alarm & Event) standards with the SIMATIC NET Softnet package. This is based on the Windows COM technology.

SIMOTION also supports OPC XML-DA (Data Access based on XML). The OPC server is located in the SIMOTION device and is accessed from a partner station no longer using COM mechanisms but with Web services and their XML-coded function calls. This makes the partner stations independent of hardware and operating systems.

The client application on the partner station works with the symbolic SIMOTION variable names. There is no dependency on the SIMOTION SCOUT database, which means that no consistency problems arise, even when there is a switch in versions.

OPC UA (Unified Architecture) is a standardized, industrial communication protocol for access to control data, e.g. by control systems. OPC UA Data Access permits the reading and writing of SIMOTION variables.

14.6 Drive ES

Drive ES engineering system

Drive ES is the engineering system used to integrate Siemens drive technology into the SIMATIC automation world easily, efficiently and cost-effectively in terms of communication, configuration and data management. The STEP 7 Manager user interface provides the basis.

Drive ES Basic is the basic software for the parameterization of all drives, online and offline. With the Drive ES Basic software, the automation and the drives are edited on the user interface of the SIMATIC Manager. Drive ES Basic is the starting point for common data archiving from complete projects and for extending the use of the routing and SIMATIC teleservice to drives. Drive ES Basic

provides the engineering tools for the new motion control functions - data exchange broadcast, equidistance and isochronous operation with PROFIBUS DP.

The following commissioning tools are contained in Drive ES:

- STARTER Standalone for SINAMICS is not required and cannot be used in conjunction with SIMOTION SCOUT because STARTER is integrated in SIMOTION SCOUT.
- SIMOCOM U for SIMODRIVE
- Drive Monitor for MASTERDRIVES
  Note:
  Drive ES Basic is within the scope of delivery for SCOUT and SCOUT Standalone.

14.7 Commissioning drives (STARTER)

STARTER supports simple and rapid commissioning, optimization, and diagnostics for all new-generation Siemens drives with only one tool.

The STARTER drive/commissioning tool supports the following drives:

- SINAMICS
- MICROMASTER 420/430/440
- MICROMASTER 411 / COMBIMASTER 411
- COMBIMASTER
- ET200pro FC
- ET200S FC ICU24

The following variants are available:

- STARTER Standalone:
  STARTER as commissioning tool for applications without SIMOTION, but with integration of the new drives in SIMATIC S7. STARTER Standalone is not required in connection with SIMOTION SCOUT and cannot be used.
- STARTER integrated in SIMOTION SCOUT:
  For SIMOTION applications, SIMOTION SCOUT contains the entire functionality of STARTER.

Performance characteristics:

- Wizards support new users by providing solution-oriented dialog guidance, whereby the uniform graphics-based display facilitates understanding.
- However, experts are also able to access the individual parameters quickly.

14.8 CamTool

Graphic creation of cams

Simple text-based editors are already integrated in the basic SIMOTION SCOUT package for the creation of cams. The CamTool option package extends SIMOTION SCOUT with a powerful tool for the full graphical creation and optimization of cams. CamTool fully integrates into the SIMOTION SCOUT user interface. In SIMOTION CamTool, you can create, edit and optimize cams with the aid of a graphical user interface.

Additional references

Please refer to the following document on this subject

- Configuration Manual: SIMOTION CamTool

14.9 DCC programming system

Drive Control Chart

DCC enables SIMOTION and SINAMICS users to also implement and graphically configure drive-related tasks employing continuous closed-loop and open-loop control.

A set of Drive Control Blocks (DCB) is available in a library for this purpose. These function blocks can be graphically interconnected and configured in what are known as "charts" via a configuration tool (DCC editor).

A large number of Drive Control Blocks (DCB) are available for both DCC-SIMOTION and DCC-SINAMICS with identical functionality.

- Module library with administration, calculation, control, logic and complex modules.
- Graphical switching editor with various editing, macro, help, search, comparison and print functions.
- Sequence environment for SIMOTION with selectable, mixable scanning times and consistent data transfer between scanning periods.
- Sequence environment for SINAMICS with embedding of technology option in SINAMICS using the BICO technique, with the applications set using configured parameters
- Diagnostics environment with signal display, diagnostics and trace functions.
- Scalability with different performance features and project data volumes for DCC-SIMOTION and DCC-SINAMICS.

Note

Editing and deleting DCC charts

To edit DCC charts, a CFC editor must be installed and you require a valid license for DCC SINAMICS or DCC SIMOTION.

Additional references

More information on this topic is available in

- Programming and Operating Manual SINAMICS/SIMOTION Editor description DCC
- SINAMICS/SIMOTION DCC Module Description Function Manual
- SIMOTION SCOUT Online Help

Technical specifications 15

15.1 Quantity framework

Technical specifications

Note

See also the function overview in Chapter 9 of the PM 21
Catalog as well as the Industry Mall (http://www.siemens.com/automation/mall).

For quantity structures of SIMOTION devices, see:

- SIMOTION C Operating Instructions
- SIMOTION D4x5 Manual
- SIMOTION D4x5-2 Manual
- SIMOTION D410 Manual
- SIMOTION D410-2 Manual
- SIMOTION P320-3 and Panels Manual
- SIMOTION P350-3 and Panels Manual
- SIMOTION P320-4 E / P320-4 S Manual

15.2 Memory requirement

Memory requirement

Table 15-1 Memory requirement for each instance of a technology object

Technology object	Memory requirement / KB
Drive axis	180
Position axis	200
Following axis with following object	350
External encoder	150
Output cam	100
Measuring input	100
Cam In addition for each interpolation point pair	100 1
TController: Heating controller	85

Technology object	Memory requirement / KB
TController: Cooling controller	70
TController: Heating/cooling controller	100
Position axis path interpolation	250
Path object (for 4 axes, 1 cam)	200
Cam track	450
Addition object	50
Formula object	150
Fixed gear	100
Controller	100
Sensor	100

Table 15-2 Memory requirement of technology packages

Technology package	Memory requirement / KB
TP TControl	1.700
TP CAM	7.700
TP PATH	8.500
TP CAM_EXT	9.500

Appendix A

A.1 Scripts for SIMOTION

The scripting functionality enables you to automate the configuration of devices, SIMOTION technology objects (TOs), and SINAMICS drive objects (DOs) with the help of the easy-to-learn script language VBScript. Standard scripts can be adapted to special situations occurring during runtime with interactive queries. This facilitates and speeds up commissioning. Other application possibilities include the documentation of the settings that have been made and the repetition of complex settings without error.

To access these scripts and the related documentation, select **Scripts** in **Utilities&Applications**.

The selection of documents and scripts you will find there should help you quickly get to grips with scripting in SIMOTION. As well as demonstration-only scripts for studying the code, there are also scripts and script libraries you can actually use yourself.

For further information, please also see *Scripts for sequence automation* in the online help.

A.2 Creating an example program for axis positioning in SIMOTION SCOUT

Program overview

In this section, a program for positioning the connected axis is created in the **MCC** (Motion Control Chart) editor.

The Getting Started section of the SIMOTION SCOUT online help contains a detailed description of an example configuration.

Requirements

- You need to have created a SIMOTION device
- You need to have created an *Axis 1* technology object (e.g. as a virtual axis).

Inserting the programs

Create four programs with MCC.

- motion_1
- backgr
- perfault
- tecfault

Creating a program with MCC

1. Open the **Programs** folder for the created SIMOTION device in the project navigator.
2. Double-click **Insert MCC unit**.
3. Enter the name **motion_1** for the MCC unit.
4. Click the **Compiler** tab.
5. Activate the required settings.
6. Click **OK**. An MCC unit is created in the project navigator.
7. Double-click the MCC unit motion_1 in the project navigator.
8. Double-click **Insert MCC chart**.
9. Enter the name **motion_1** for the MCC.
10. Click **OK**. The MCC is opened.
11. Click the **Single-axis commands > Switch axis enable** icon.
    The command is inserted.
12. Click the **Single-axis commands > Position axis** icon.
    The command is inserted.
13. Click the **Single-axis commands > Remove axis enable** icon. The command is inserted.

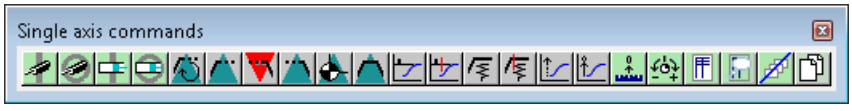


Figure A-1 Menu bar of the single-axis commands

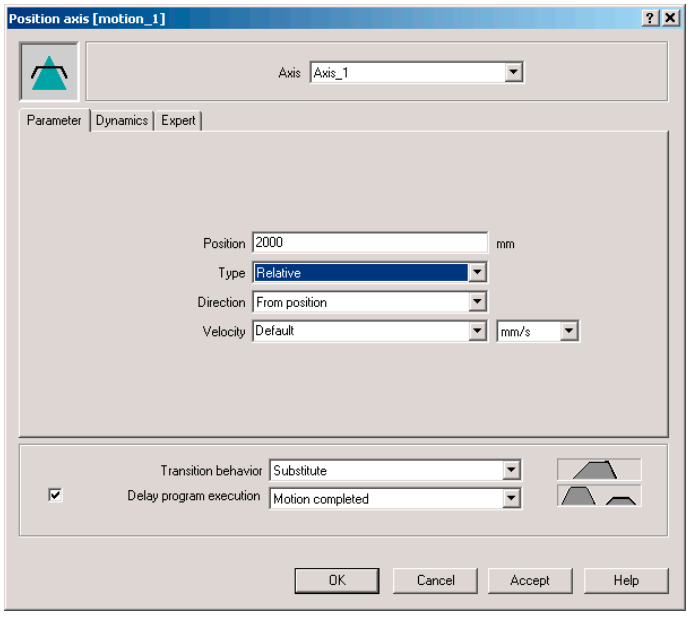


Figure A-2 Opened command: Position axis

14. Double-click the **Switch axis enable** command.
15. Click **OK**.

16. Double-click the **Position axis** command.
17. Enter the value 2000 at Position.
18. Select **Relative** in the Type field.

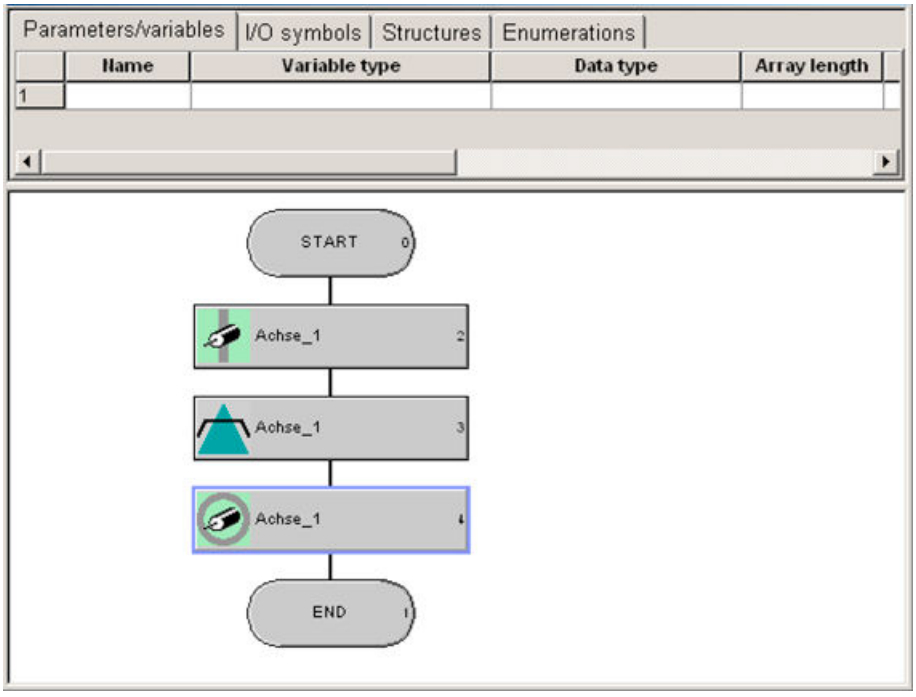


Figure A-3 Arrangement of the single-axis commands in MCC motion_1

19. Click **OK**.
20. Double-click the **Remove axis enable** command.
21. Click **OK**.
22. Compile using the menu command **MCC chart > Apply and compile**.

Creating the backgr program

1. Double-click **Insert MCC unit**.
2. Enter the name **backgr** for the MCC unit.
3. Click the **Compiler** tab.
4. Activate the required settings.
5. Click **OK**. An MCC unit is created in the project navigator.
6. Double-click the MCC unit **backgr** in the project navigator.
7. Double-click **Insert MCC chart**.
8. Enter the name **backgr** for the MCC.
9. Click **OK**. The MCC is opened.

10. Enter the following variable data in the MCC unit **backgr**.
    - In the Name field: Run
    - As the variable type, select: VAR_GLOBAL
    - As the data type, select: BOOL
    - In the Initial value field: False

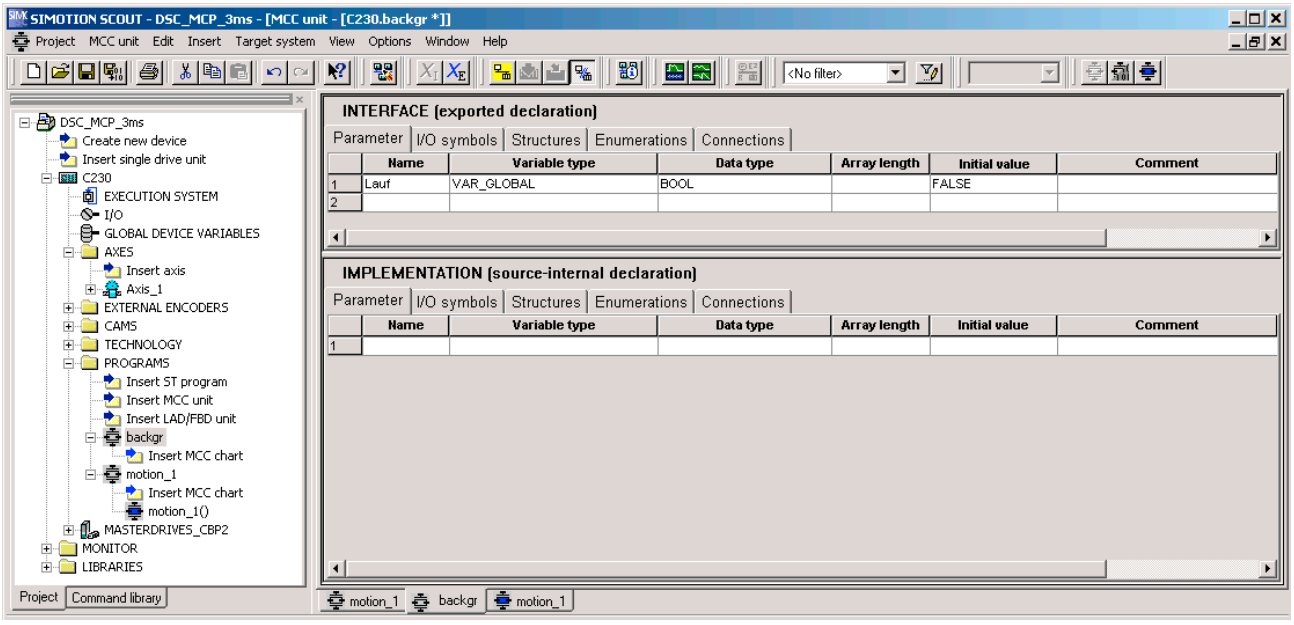


Figure A-4 Entering a global variable

11. Switch to the MCC Chart **backgr** tab.

12. In the **Program structures** command bar, click on the **IF program branch** icon.

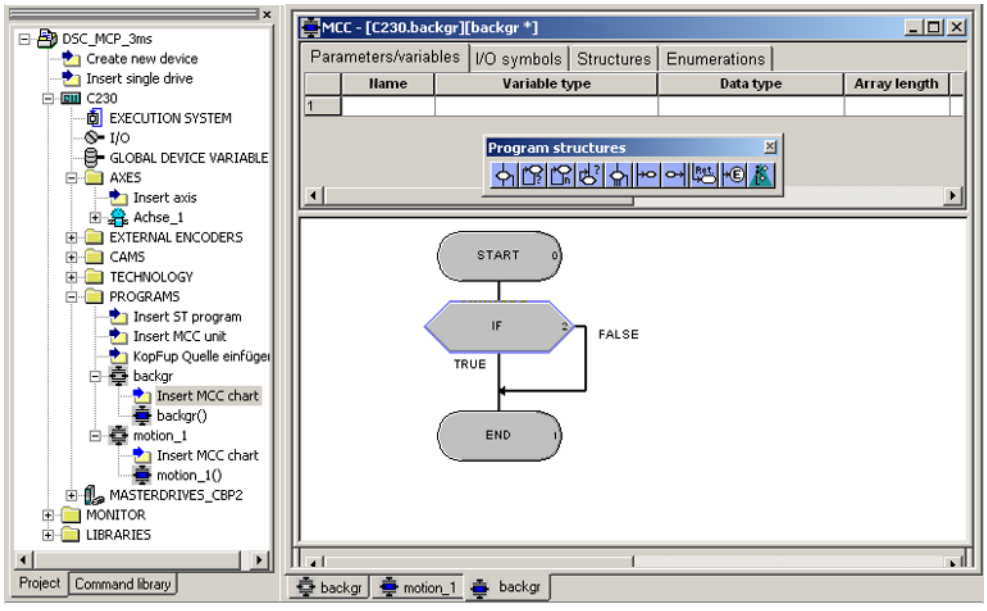


Figure A-5 IF program branch at basic commands

13. Double-click the **IF program branch** command.
14. Select **Formula** and enter the condition **Run=true**.

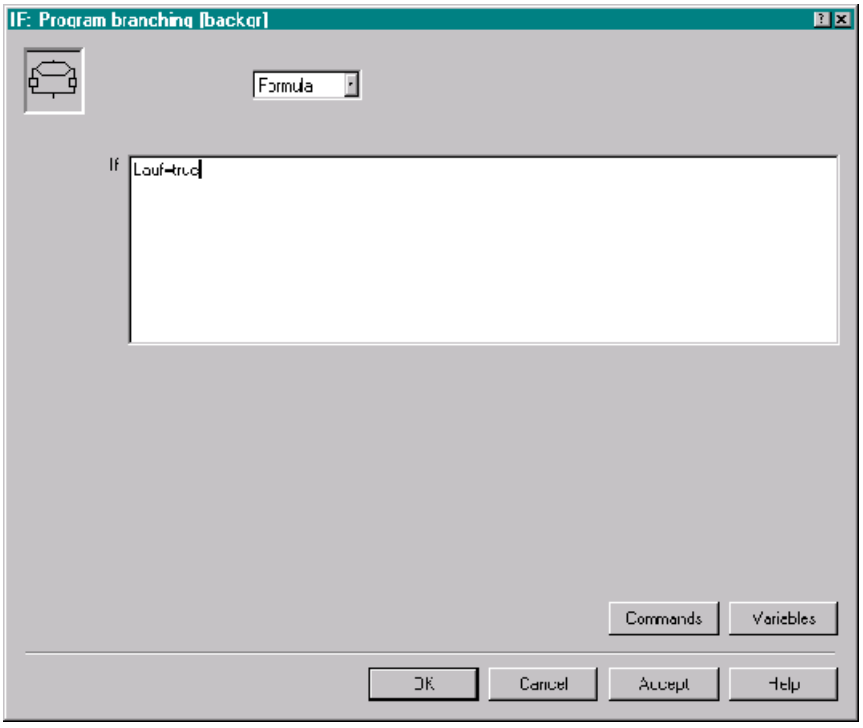


Figure A-6 Configuration of the IF program branch

15. Confirm the input with **OK**.
16. In the **Task commands** command bar, select the command **Start task**.
    This inserts the command.
17. In the **Important commands** command bar, select the command **Variable assignment**.
    This inserts the command.
18. Double-click the **Start task** command.
19. Click **OK** to confirm.
20. Double-click the **Variable assignment** command.

21. Enter the statement **Run:=false**.

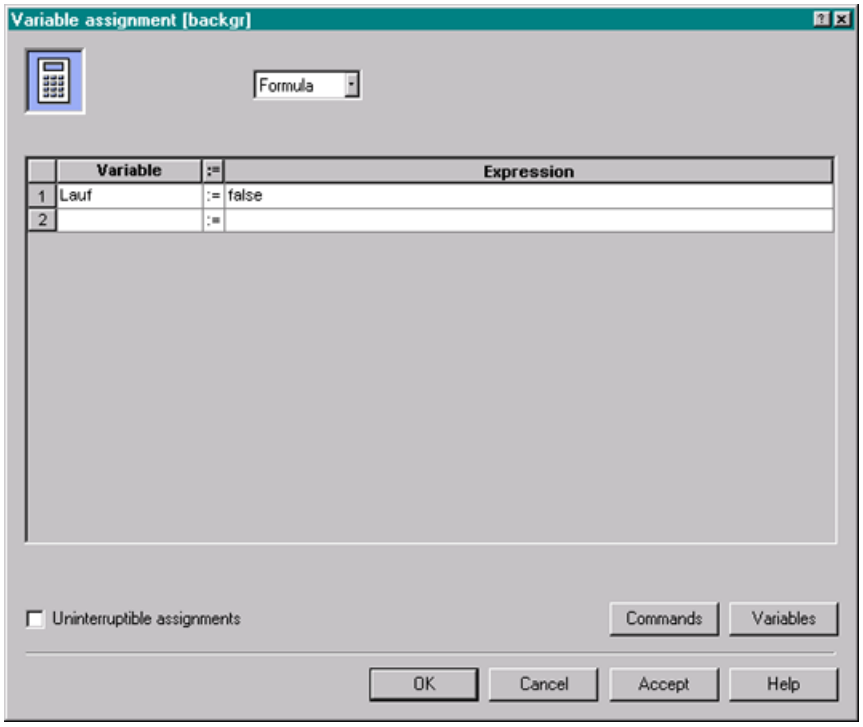


Figure A-7 Configuration of the variable assignment

22. Click **OK** to confirm.

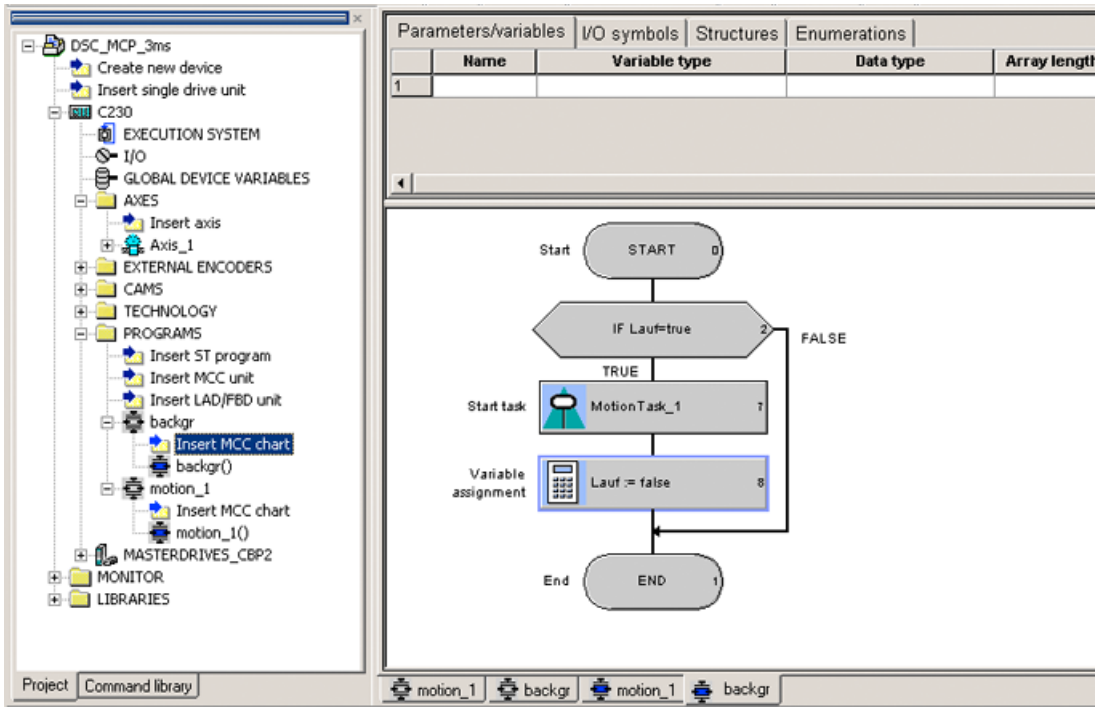


Figure A-8 Completed program of the BackgroundTask

23. Select **MCC Chart > Accept and compile** from the menu bar.
The detail display in the Compile/Check output tab indicates how compilation is progressing and when it is complete.

Creating the perfault program

1. Double-click **Insert MCC unit**.
2. Enter the name **perfault** for the MCC unit.
3. Click the **Compiler** tab.
4. Activate the required settings.
5. Click **OK**. An MCC unit is created in the project navigator.
6. Double-click the MCC unit perfault in the project navigator.
7. Double-click **Insert MCC chart**.
8. Enter the name **perfault** for the MCC.
9. Click **OK**. The MCC is opened.
10. Select from the menu bar **MCC chart > Apply and compile**.

Creating the tecfault program

The procedure for creating the **tecfault** program is exactly the same as for the perfault program.

In the MCC unit and MCC chart, enter **tecfault** as the name.

Assigning programs to the execution system

1. In the project navigator, double-click **Execution system** for the SIMOTION device. The execution system is opened in the working area.

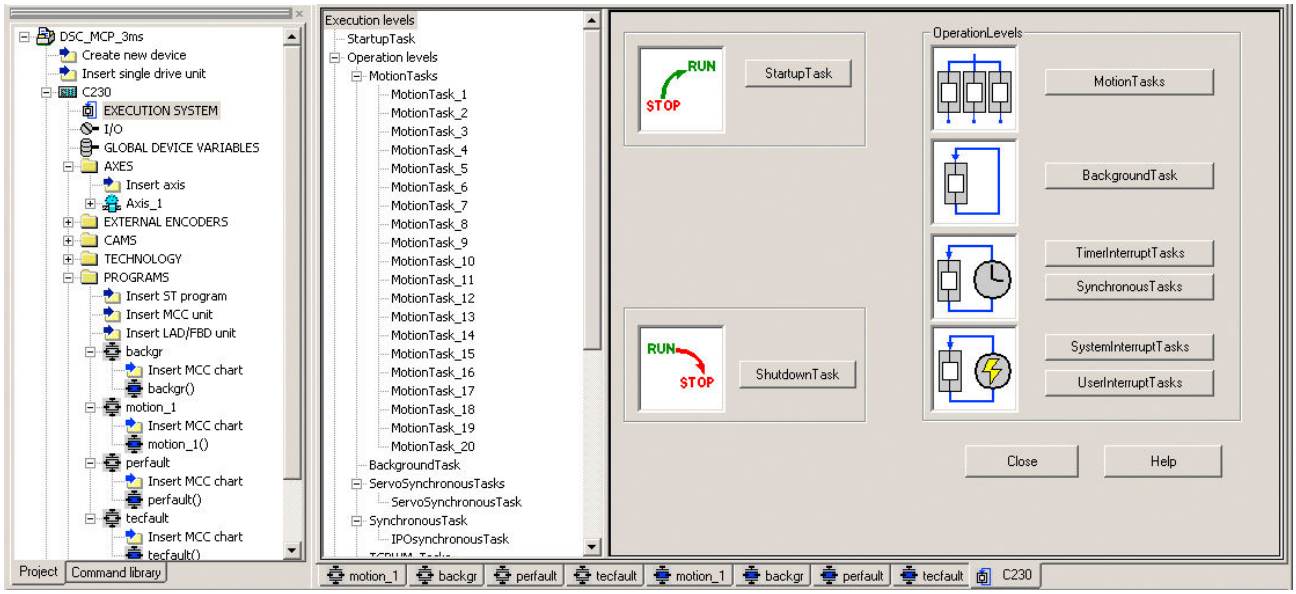


Figure A-9 Execution system of the SIMOTION device

2. Click the **MotionTasks** button.
3. Assign the **motion_1** program to MotionTask_1.
4. Assign the **backgr** program to the BackgroundTask.
5. Assign the **perfault** program to the PeripheralFaultTask.

6. Assign the **tecfault** program to the TechnologicalFaultTask.

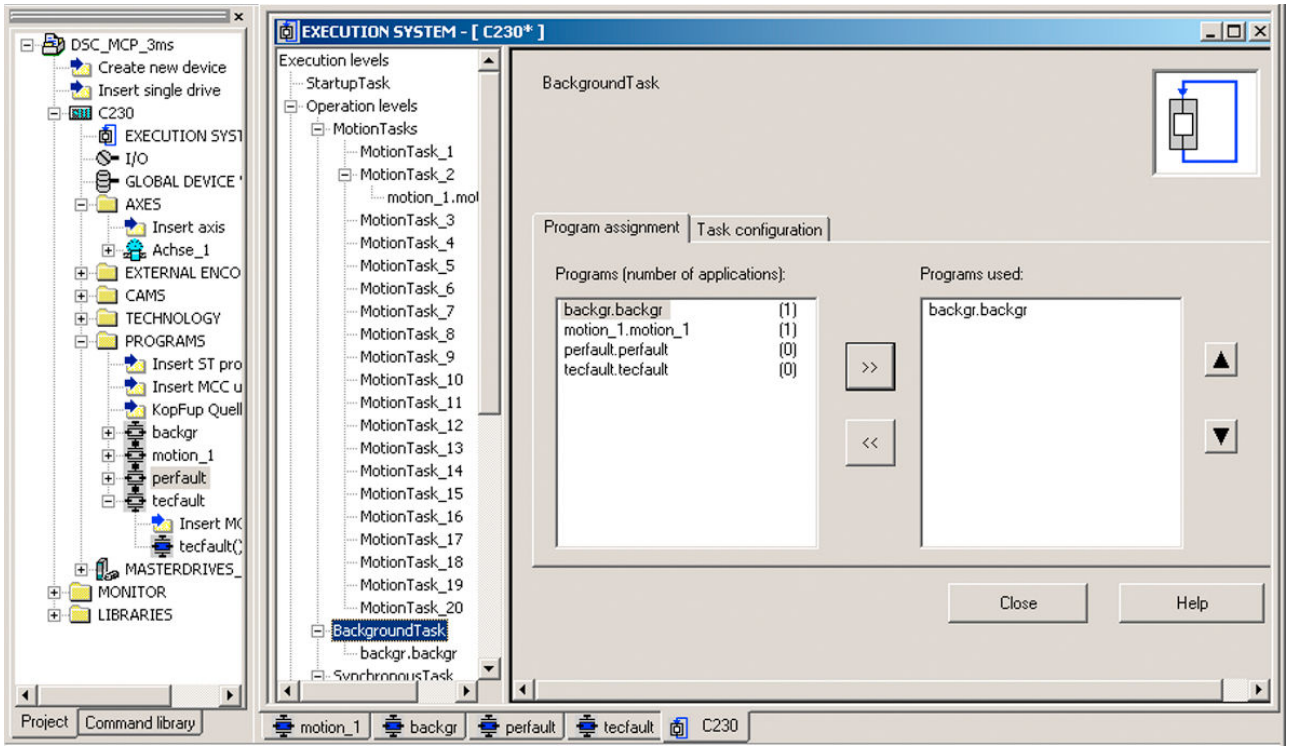


Figure A-10 Assignment of the tasks in the task system

7. Click the **Save and compile changes** button.

Loading the programs to the SIMOTION device and switching to RUN

The toggle switch of the SIMOTION device is still set to **STOP**.

1. Establish an online connection. To do this, click the **Connect to selected target devices** button.
2. Click the **Download project to target system** button.
   This can take several minutes.
3. Switch the SIMOTION device to **RUN** via the **switch** after the project has been downloaded to the target system. Two LEDs, the green 5 VDC and the RUN LED, light up.

Monitoring and controlling in SIMOTION SCOUT

1. Click the **Connect to selected target devices** button.
2. Select the **backgr** program.
3. Activate the **Monitor** function in the MCC toolbar.
4. Select the **Symbol browser** tab.
5. As **control value**, enter the variable **Run** "**TRUE**".
6. Activate the setting in Status value.

7. Click **Start status**. The value **FALSE** is displayed.

8. Activate the setting in Control value.
9. Click **Control**. The active command is highlighted in yellow in the program.

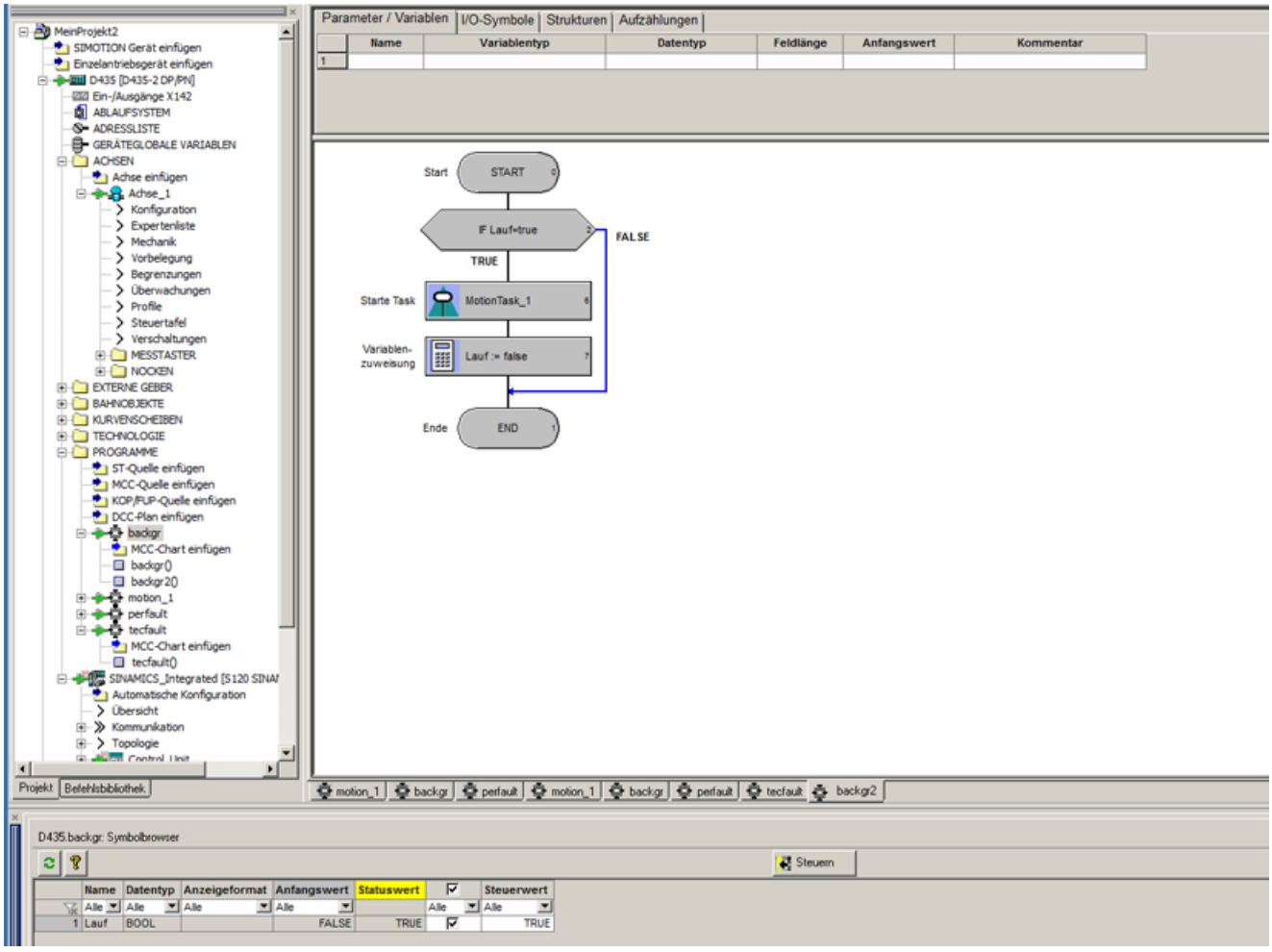


Figure A-11 Monitoring and controlling the variable in the BackgroundTask

The motor now rotates at 6000 rpm and approaches the position 2000 mm. You can check this by selecting **Axis_1** at **Axes**, opening **basicMotion** in the symbol browser, and observing the **position**. The values are refreshed automatically when an online connection exists.

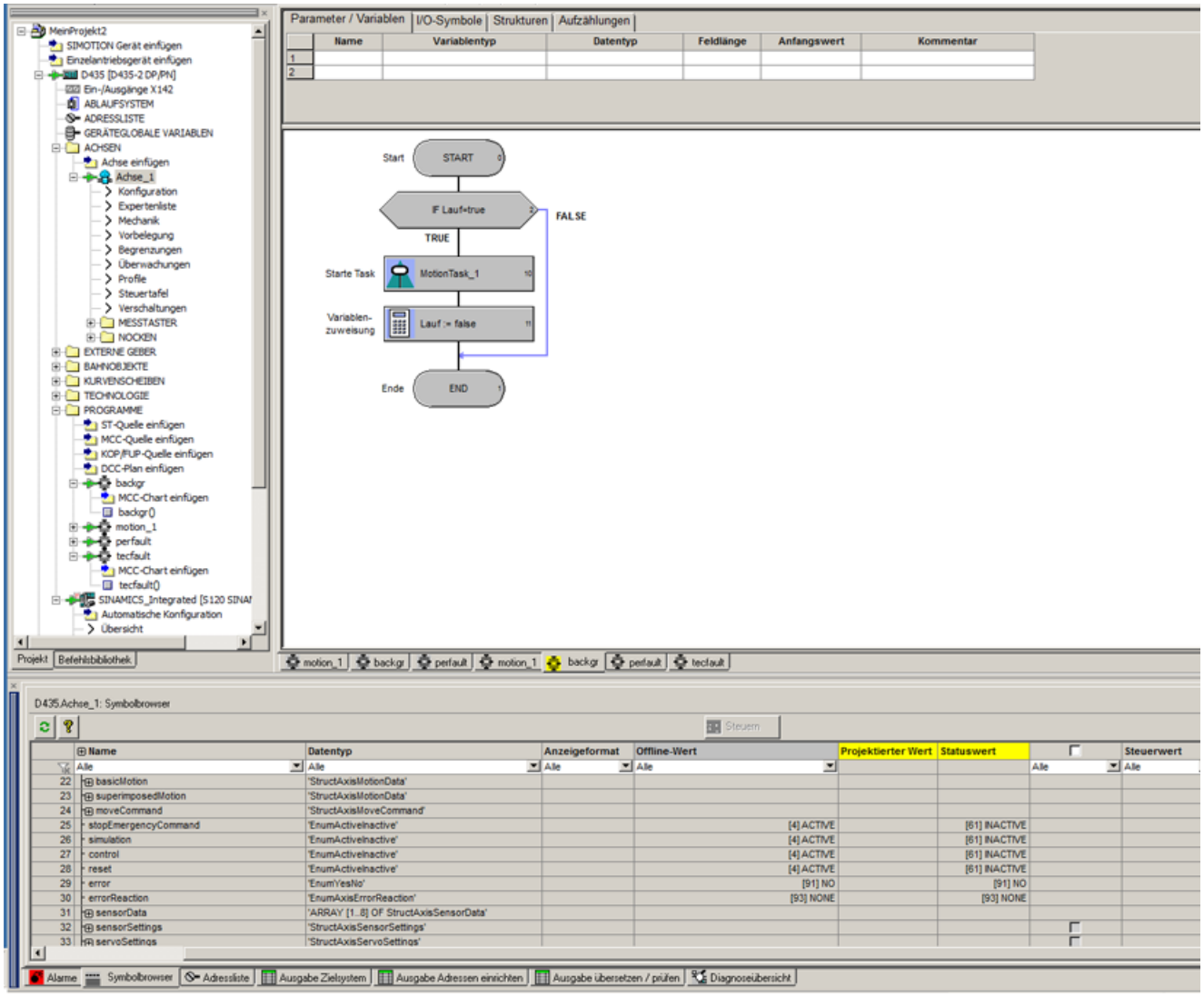


Figure A-12 Checking the positioning motion in the symbol browser of Axis_1

When the axis has finished positioning, a value of 2000 mm appears here. If the positioning is restarted, the actual position value increases by 2000 mm for each motion.

Index

A

Access point
    DEVICE, 144, 148
    S7ONLINE, 148
    Selecting, 149
    set, 148
Access protection for projects
    SIMATIC Logon, 217
Accessible nodes, 187
Add-ons, 61
Address list
    Opening, 50
Alarms
    Device diagnostics, 180
Archiving, 158
Authorization
    Installing, 28
Automatic controller setting, 185
Available nodes, 139
Axis, 104
    Inserting, 99
    Interconnecting, 99
    Testing, 103
Axis configuration, 99
Axis control panel, 103
    Axis test, 104
    Opening, 104
    Using, 104
Axis technology, 99

B

Backing up
    LAD/FBD program, 122
    MCC program, 116
    ST program, 124

C

CamTool, 225
Change
    Change, 15
Checking memory utilization, 176
Checking the system utilization, 177
CLib Studio, 24
Commissioning, 93
Communication
    Industrial Ethernet, 85
    PROFIBUS DP, 84
    PROFINET, 85
Compatibility
    Software, 215
Compatibility list
    SIMOTION SCOUT, 215
Compile, 15
Configuring
    Interface card, 82
    Time of day, 157
Configuring SCOUT V4.1
    Recommended actions, 193
Context menu, 48
Control panel, 93, 104
    Axis, 103
Control priority, 94, 104
Creating
    Axis, 99
    LAD/FBD source, 118
    MCC chart, 112
    MCC source, 111

D

DCC
    Drive Control Chart, 225
Deleting
    Overall reset, 156
Detail view, 32
    Symbol browser, 49
    Using, 49
DEVICE
    set, 148
Device diagnostics, 170
    Accessible nodes, 187
    Alarms, 171, 180
    Diagnostics buffer, 171, 172
    General, 171
    General information, 171
    Memory utilization, 171, 176
    Syslog file, 171, 179
    System utilization, 171, 177
    Task Manager, 173
    Task runtime, 171
    User log file, 171, 178
    Version overview, 171, 179
Device trace, 184

Diagnostic functions
Overview, 169
Diagnostics, 169
Accessible nodes, 187
Device diagnostics, 170
Diagnostics buffer, 172
Diagnostics overview, 170
General information, 171
Memory utilization, 176
System utilization, 177
Diagnostics buffer, 172
Drive
Configuring, 93
Inserting, 86, 89
Drive Control Chart
DCC, 225
Drive control panel, 93
Testing the drive, 94
Using, 94
Drive ES, 223

E

Error remedy, 60
Execution system, 126

F

Function generator, 184

G

Getting Started, 59
Getting Started with SIMOTION SCOUT
Configuring the infeed, 91
Global device variables
creating, 108

H

Hardware catalog, 77
Hardware configuration
Starting, 76
HMI, 222
WinCC flexible, 223
HW Config, 76

I

I/O variables
creating, 109
Infeed, 91
Inserting
LAD/FBD program, 119
Inserting a drive
SINAMICS on PROFINET, 87
Inserting drive
SINAMICS on PROFIBUS, 87
Installing
Interface card, 80
SIMOTION SCOUT Standalone, 26
Interconnection overview, 182
Interface, 83
Interface assignment
SIMOTION devices, 80
Interface card
Configuring, 82
Installing, 80

K

Keyboard operation, 47

L

LAD/FBD, 20
Programming, 117, 122
Toolbar, 121
LAD/FBD program
Backing up, 122
Inserting, 119
LAD/FBD source
creating, 118
Ladder Logic / Function Block Diagram, 20
Libraries
Upgrade, 160
License key, 137
Changing, 141
Entering, 140
Saving, 29
Transferring, 29
Licenses
Determining, 139
Displaying, 139
Licensing, 137
Accessible nodes, 139
Hardware replacement, 141

Performing, 140
Underlicensing, 141
Local variables, 107

M

MCC, 19, 110
MCC chart
creating, 112
MCC command block, 115
MCC editor, 115
MCC editor toolbar, 115
MCC program
Backing up, 116
MCC source
creating, 111
Measuring function, 184
Measuring functions, 183
Memory requirement
Technology object, 227
Technology packages, 228
Menu, 39
Context menu, 48
Menu structure, 39
Menu bar, 32
Menu items, 42
Module
Slot rule, 209
Motion Control Chart, 19
Multiuser, 136

N

NetPro, 221
New
Drive, 86, 89
Project, 65
Project navigator, element, 35
SINAMICS, 87

O

Online
Going, 149
Online help
Searching, 58
Online multiuser mode, 134
OPC, 223
OPC UA, 223
OPC XML DA, 223
Open, 15
Open a SIMOTION project
Older version, 195
Open protected project
SIMATIC Logon, 219
Opening
Hardware catalog, 77
Project, 68
Operating state, 150
Overall reset, 156
Overview
Diagnostic functions, 169

P

POU (program organization unit), 18
Programming
LAD/FBD, 117, 122
Programming language
DCC, 17, 225
LAD/FBD, 17, 20
MCC, 17, 19
ST, 21
Structured Text (ST), 17
Programs
Execution system, 126
Sources, 18
Project
Creating, 65
Opening, 68
Project data
archiving, 158
Project generator, 128
Project navigator, 32, 34
Changing elements, 38
Creating elements, 35
Display station level, 37
Project versioning
SIMATIC Version Trail, 220
Properties
Elements in the project navigator, 38

Q

Quantity framework, 227

R

Recommended actions, configuration with SCOUT V4.1
Log files, 194

Selecting the right project, 193
Use routing, 194
References, 10
Remove project write protection
SIMOTION project, 195
Restore variables
SCOUT, 133
Routing
HMI, 210

S

S7ONLINE
Using, 148
Save variables
SCOUT, 133
Saving
License key, 29
SCOUT
Restore variables, 133
Save variables, 133
Shortcuts, 47
SIMATIC Logon, 217
Open protected project, 219
SIMATIC Manager, 217
SIMATIC station level, 37
SIMATIC Version Trail, 220
SIMOSIM, 201
SIMOTION C230-2
Slot rule, 209
SIMOTION CamEdit, 22
SIMOTION CamTool, 22
SIMOTION device
Configuring, 76
Inserting, 76
SIMOTION devices
Interface assignment, 80
SIMOTION hardware platforms
SIMOTION C, 17
SIMOTION D, 16
SIMOTION P, 16
SIMOTION project
Remove project write protection, 195
SIMOTION Runtime Simulation, 201
SIMOTION SCOUT
Compatibility list, 215
Installing the authorization, 28
Programming languages, 17
Uninstalling, 27
Upgrade authorization, 28
Using the help, 52
SIMOTION SCOUT Standalone
Installing, 26
SINAMICS
Inserting, 87
Slot rule
SIMOTION C2xx, 209
Snap-in, 32
Sources, 18
Implementation section, 18
Interface section, 18
ST, 21
ST program
Backing up, 124
STARTER, 224
Starting
Hardware configuration, 76
STEP 7, 217
Structured Text, 21
Symbol browser, 49
Symbol browser";"display continuously, 50
Syslog file
Device diagnostics, 179
System overview, 16
System requirements, 25, 80
System trace, 184
System variables, 107

T

Target device selection, 149
Target devices
Selecting, 149
Target system
Controlling, 143
Operating state, 150
Time of day, 157
Task, 126
Task Manager
Device diagnostics, 173
Task Profiler, 185
Task Trace, 185
Task Tracer, 185
Technology object
Memory requirement, 227
Technology object axis, 97
Technology object trace, 186
Technology objects, 24
Technology package
CAM, 23
CAM_EXT, 23
DCBlib, 23
Memory requirement, 228

PATH, 23
TControl, 23
Technology packages, 23
industry-specific, 23
Time of day
Setting, 157
TO axis
Axis technologies, 97
Axis wizard, 98
Path axis, 97
Positioning axis, 97
Real axis, 97
Speed-controlled axis, 97
Synchronous axis, 97
Virtual axis, 97
TO trace, 186
Toolbar, 32
LAD/FBD, 121
Trace functions, 183
Transferring
License key, 29

U

Underlicensing, 141
Responses, 141
Uninstalling
SIMOTION SCOUT, 27
Unit variables, 107
Units, 18
Upgrade
Libraries, 160
Within a platform, 159
Without station change, 159
Upgrade authorization, 28
Use routing, 194
User log file
Device diagnostics, 178
Using
Detail view, 49
Working area, 33

V

Variable types, 108
Variables
Global device, 108
Version overview
Device diagnostics, 179
Versioning with standard library and software components, 197

W

Watch table
creating, 50
WinCC flexible, 223
Wizards, 39
Workbench, 31
Components, 32
Detail view, 32
Menu bar, 32
Project navigator, 32
Snap-in, 32
Toolbar, 32
Working area
Snap-in, 32
Using, 33

X

XML format
Exporting, 71
Importing, 71