SIEMENS

SIMOTION

SIMOTION SCOUT

Configuration Manual

11/2010

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Preface

Scope and standards

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

Scope of validity

This manual applies to SIMOTION SCOUT in association with the SIMOTION Cam Tool option package for product version V4.2.

Sections in this manual

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

- Overview

  This chapter contains an overview of the SIMOTION SCOUT Engineering System.

- Installing software

  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.

- Functions

  This chapter describes the basic steps for operating SIMOTION SCOUT. The SIMOTION SCOUT workbench and HW Config are explained.
  An important tool is provided in the form of the SIMOTION SCOUT online help, for example. This chapter contains basic information about this topic. Additional functions such as the licensing of the runtime components and the replacement of the SIMOTION device are also described.

- Product combinations

  This chapter describes topics such as compatibility and storage media as well as STEP 7, NetPro, Drive ES, HMI, and other interfaces.

- Diagnostics

  It also contains information about which diagnostic functions are available and how these are operated.

- FAQs

  This chapter contains handling recommendations for service with SCOUT V4.1. It explains how projects are created and edited.
  The process of inserting and commissioning drives is described. It contains general information and special applications.

- Index

  Index

SIMOTION Documentation

An overview of the SIMOTION documentation can be found in a separate list of references.

This documentation is included as electronic documentation in the scope of delivery of SIMOTION SCOUT. It comprises 10 documentation packages.

The following documentation packages are available for SIMOTION V4.2:

- SIMOTION Engineering System
- 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

Hotline and Internet addresses

Additional information

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

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

http://www.siemens.com/motioncontrol/docu

Please send any questions about the technical documentation (e.g. suggestions for improvement, corrections) to the following e-mail address:
docu.motioncontrol@siemens.com

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

http://www.siemens.com/mdm

Training

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

http://www.siemens.com/sitrain

FAQs

You can find Frequently Asked Questions on the Service&Support pages under **Product Support**:

http://support.automation.siemens.com

Technical support

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

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

Table of contents

Description 1

1.1 Description

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

1.2 SIMOTION SCOUT Engineering System general

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).

SCOUT provides a uniform, function-oriented view for your automation task and at the same time 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
- Parameterization
- Programming
- Testing
- 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.

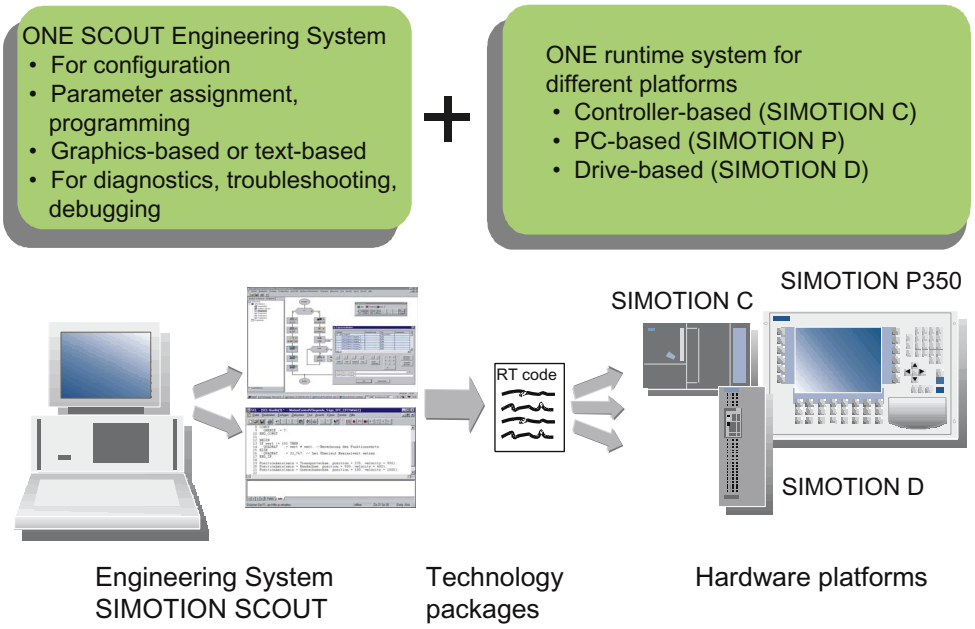


Figure 1-1 SIMOTION system overview

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

1.3 Procedure for creating the project

Steps to create a project

Machine automation is implemented step by step as the project is created:

- First create a new project.
- Create the device (SIMOTION D, SIMOTION C, SIMOTION P).
- Then, you create the system configuration that describes the structure of the automation topology:
  - Which hardware components (drives, SIMOTION hardware platform, I/O) are you going to use?
  - How are they interconnected?
- The basic parameterization of the hardware components and networks is then performed. SIMOTION SCOUT does this using two field-proven STEP 7 programs: HW Config and NetPro.
- In the next step, the technology objects are configured, supported by wizards.
- Select the programming language (MCC, ST, LAD/FBD or DCC).
- The download to the SIMOTION device is performed and
- test the machine application.

1.4 Workbench

What is the SIMOTION SCOUT workbench?

The workbench is the SIMOTION user interface and is, therefore, the common framework for all other tools in the Engineering System. The workbench is also the navigation center for the individual engineering steps. It is used to create and manage SIMOTION projects and provides a uniform and integrated view of all data and programs.

Workbench features

The workbench is:

- An integrated and intuitively operated engineering system
- Enables central data and program management, even for distributed systems
- A function-oriented, technological project structure with filterable views
- Enables quick access to individual engineering tools, such as configuration, programming, and commissioning.

You will find further information on the workbench at: Getting to know the workbench (Page 27)

1.5 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.

The following standard technology packages are available for SIMOTION:

- TP CAM
  contains the basic Motion Control technologies, such as drive axis, position axis, following axis, synchronous object, cam, output cam, cam track, and measuring input
- TP PATH
  also contains the path interpolation technology
- TP CAM_EXT
  contains additional objects for preparing technological data on the system level, e.g. addition object, formula object
- TControl
  contains the temperature controller technology.
- DCBlib
  contains interconnectable DCC blocks (DCC stands for Drive Control Chart) for drive-related controller functions.
- More sector-specific technology packages are also available as separate products.

Access to the technology package functions is carried out via additional language commands and system variables. Programming of motional sequences is therefore simple and integrated.

The Motion Control Basic, Position and Gear technology packages were available for earlier versions.
As from SIMOTION SCOUT Version V3.2, they are contained in the Cam technology package.

Once the basic project structure has been created by the system configuration, the next step is to define the technology objects (axes, output cams, cams, etc.) required for the automation task. This defines the volume of project data that must be assigned parameters for the purpose of commissioning.

Technology objects in SIMOTION SCOUT

The technology objects (TOs) are inserted directly into the folders provided in the project navigator. These are completed with the associated parameterization tool or commissioning tool.

The next step is to program the SIMOTION devices. The SIMOTION SCOUT engineering system provides user-friendly and efficient programming languages to describe the individual functions of the machine process.

Additional references

Please refer to the following documents on these subjects

- SIMOTION Basic Functions Funtion Manual
- SIMOTION Motion Control, Basic Functions, Description of 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, Path Interpolation TO
- SIMOTION Communication System Manual
- Function Manual: SIMOTION Motion Control, Supplementary Technology Objects
- Configuration Manual: SIMOTION CamTool

and the online help.

See also

Selecting technology packages (Page 57)

1.6 Programming languages

1.6.1 Programming languages in SIMOTION SCOUT

Access to the technology packages and functions is carried out in the same way as access to the SIMOTION Kernel via language commands from the user program.

The programming languages in SCOUT provide all of the language commands required to implement the functions simply and quickly. The SIMOTION runtime system also supports cyclic, sequential, time-controlled, and event-driven programming.

The programming languages are:

- Motion Control Chart (MCC)
  If you want to program graphically, you can use MCC for sequential flowchart-oriented programming.
- Ladder Logic/Function Block Diagram (LAD/FBD)
  The familiar programming methods using LAD/FBD are also available in the SCOUT Engineering System for user-friendly logic programming, supplemented with motion control functions via PLCopen function blocks.
- Structured Text (ST)
  If you prefer a high-level language for your automation task, ST is available as an efficient and IEC 61131-3-compliant text-based language.
- Drive Control Chart (DCC)
  Many applications require a combinatorial logic that combines several states (e.g. access control, plant states) to form a control signal (e.g. ON command) for controlling the drive system.
  In addition to the logical operations, arithmetic operations and storing elements are increasingly required in drive systems.
  This functionality is available as Drive Control Chart (DCC) on drive objects of the SINAMICS drive system and the SIMOTION control system.
  The Drive Control Chart Editor (DCC editor), based on CFC, can be used to graphically configure SIMOTION controllers and SINAMICS drives.
  For further information, see the chapter titled DCC Programming System (Page 171)

A variety of programming languages can be combined in a single project.

The user program is executed in various tasks. A task is a job which is executed in a certain chronological sequence. The advantage of the task system is that processes hung in the appropriate task levels can run in parallel.

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

Various debug functions are possible in the programming languages. Please refer to the appropriate programming manuals for more detailed information.

1.6.2 Graphics-based flowchart programming with MCC

Motion Control Chart

The idea behind MCC is to formulate the process sequences in the machine using simple and logical expressions. The result is one or more flowcharts showing the chronological sequence of the individual actions. As production machines are primarily concerned with controlling the motion of a large number of individual axes, MCC particularly supports the simple description of these motion sequences with powerful Motion Control commands.

To control the machine, commands are available for awaiting the fulfillment of conditions and for formulating computations, as well as for executing 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 is to do in the event of a fault.

All commands are available in toolbars, sorted according to command groups. Clicking a command in the toolbar automatically incorporates it at the position marked in the flow chart. Double-clicking a command in the flow chart opens a specific dialog box for assigning parameters to this command.

Performance features:

- Easy-to-use due to graphics-based representation in flowcharts.
- Hierarchical command library for Motion Control, PLC, and technology functions.
- Control structures (IF, WHILE, CASE, etc.)
- Conditions can be created in different languages. The chart can then be displayed in an arbitrary language. Plain text can be created in an MCC with the ST zoom.
- Structuring based on command modules, i.e. combination of command sequences to create a command module. Clicking the command module invokes the corresponding command sequence.
- Easy-to-use debug functions for online testing and diagnostics: E.g. single-step or program status mode for easier troubleshooting (debugging).

Additional references

Please refer to the following document on this subject

- SIMOTION MCC Motion Control Chart Programming and Operating Manual

and the online help.

1.6.3 Graphics-based programming language with LAD/FBD

Ladder Logic / Function Block Diagram

LAD/FBD stand for ladder logic and function block diagram. LAD/FBD are graphics-based programming languages. The statement syntax corresponds to a circuit diagram. LAD/FBD enable simple tracking of the signal flow between power rails via inputs, outputs, and operations. LAD/FBD statements consist of elements and boxes, which are graphically connected to networks. LAD/FBD operations follow the rules of Boolean logic.

The programming language provides all the elements required for the creation of a complete user program. LAD/FBD features an extensive command set. This includes the various basic operations with a comprehensive range of operands and how to address them. The design of the functions and function blocks enables you to clearly structure the LAD/FBD program.

The LAD/FBD programming package is an integral part of the basic SIMOTION software.

Easy-to-use debug functions for online testing and diagnostics are available: E.g. monitoring of the variable values, program status and stopping points.

Additional references

Please refer to the following document on this subject

- SIMOTION LAD/FBD Programming and Operating Manual

and the online help.

1.6.4 High-level language programming in ST

Structured Text

ST is a high-level, PASCAL-based programming language. This language is based on the IEC 61131-3 standard, which standardizes programming languages for programmable 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 further comprehensive, extremely flexible Motion Control commands (e.g.: _pos(..) for axis positioning).

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.

- Motion control, PLC and technology functions in a single language
- Well structured programs with comment capability
- High-performance editor functions, such as
  - Syntax coloring
  - Automatic indenting
  - Automatic completion
  - Bookmarks
  - Fold (show and hide blocks)
  - Display pairs of brackets
  - Select text, e.g. by column
  - Using the command library
- Easy-to-use 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 stopping points.

Additional references

Please refer to the following document on this subject

- SIMOTION ST Structured Text Programming and Operating Manual

and the online help.

1.7 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 (Page 170) section.

Installing software

2

2.1 SCOUT and SCOUT Standalone system requirements

Minimum requirements of the system

The readme file on the SIMOTION SCOUT DVD contains information on SIMOTION SCOUT and SCOUT Standalone system requirements; alternatively, you can access this information after installation via **Start** -> **All Programs** -> **Siemens** -> **Information** -> **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 in SIMOTION SCOUT V4.0 and higher.

2.2 To install the software

2.2.1 Installing SIMOTION SCOUT

SIMOTION SCOUT and SCOUT Standalone are both available as software packages including full license and upgrade license. The installation process is identical for both versions.

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 SCOUT software package.

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 which contains the authorization. You can install the authorization as part of 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. If a restart of the PC is required during the installation, carry this out.
   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.

2.2.2 Installing SIMOTION SCOUT Standalone

Requirements

- No SIMATIC STEP7 must 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 which contains the authorization. You can install the authorization as part of 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 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.

2.2.3 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.

2.3 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:
   - Via the start menu
     Start > SIMATIC > License Management > 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 is used to manage the licenses.

1. Connect or insert the data medium containing the authorization and the upgrade license key.
2. Start the Automation License Manager:
   - Via the start menu
     Start > SIMATIC > License Management > Automation License Manager or
   - Double-click on the **Automation License Manager** icon. A new window will open.
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.

2.4 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.

2.5 To uninstall the software

Requirements:

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

Note

Note that the SIMATIC STEP7 must be uninstalled separately.

To uninstall SIMOTION SCOUT from the hard disk

1. Open the system control via **Start > Settings > System control**.
2. Double-click **Software**.
3. Select **SIMOTION SCOUT x.x** and click **Change/Remove** or **Add/Remove**. Follow the instructions.
4. Once the above software has been uninstalled, restart the computer.

Uninstalling SIMOTION SCOUT Standalone

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

2.6 Language setting of the SIMOTION SCOUT

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.

Functions 3

3.1 Getting to know the workbench

Additional references

Please refer to the following documents on this subject

- SIMOTION Basic Functions Function Manual
- 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, Path Interpolation TO
- Function Manual: SIMOTION Motion Control, Basic Functions for Modular Machines

and the SIMOTION SCOUT online help.

Note

We recommend that you run through *Getting Started with SIMOTION SCOUT* in the online help. 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.

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.

The SIMOTION workbench

The SCOUT workbench is the common framework for all other tools of the engineering system. The workbench is also the navigation center for the individual engineering steps. It is used to create and manage SIMOTION projects and provides a uniform and integrated view of all data and programs.

The SCOUT workbench offers a basic display split into three views:

- **Project navigator** (left Workbench area)
  The project navigator shows the technical tree structure of the project.
- **Working area** (right-hand area of the workbench)
  All editing tools of the engineering system, e.g. parameterization dialog boxes, program editors etc. are available in the working area as snap-ins.
  A snap-in is a program that is automatically integrated in the working area of the SIMOTION SCOUT workbench. Snap-ins provide functions for the editing of SIMOTION SCOUT projects. Snap-ins are displayed in the working area of the workbench as working windows. Several snap-ins can be opened in order to be able to work in these. The opened snap-ins are displayed as tabs in the working area. The active snap-in is visible in the foreground. Examples are:
  - Program editors:
  - Wizards for the configuration of technology objects
  - Device diagnostics
  - Drive navigator
- **Detail view** (lower area of the workbench)
  The detail view displays data and messages that vary according to the situation.

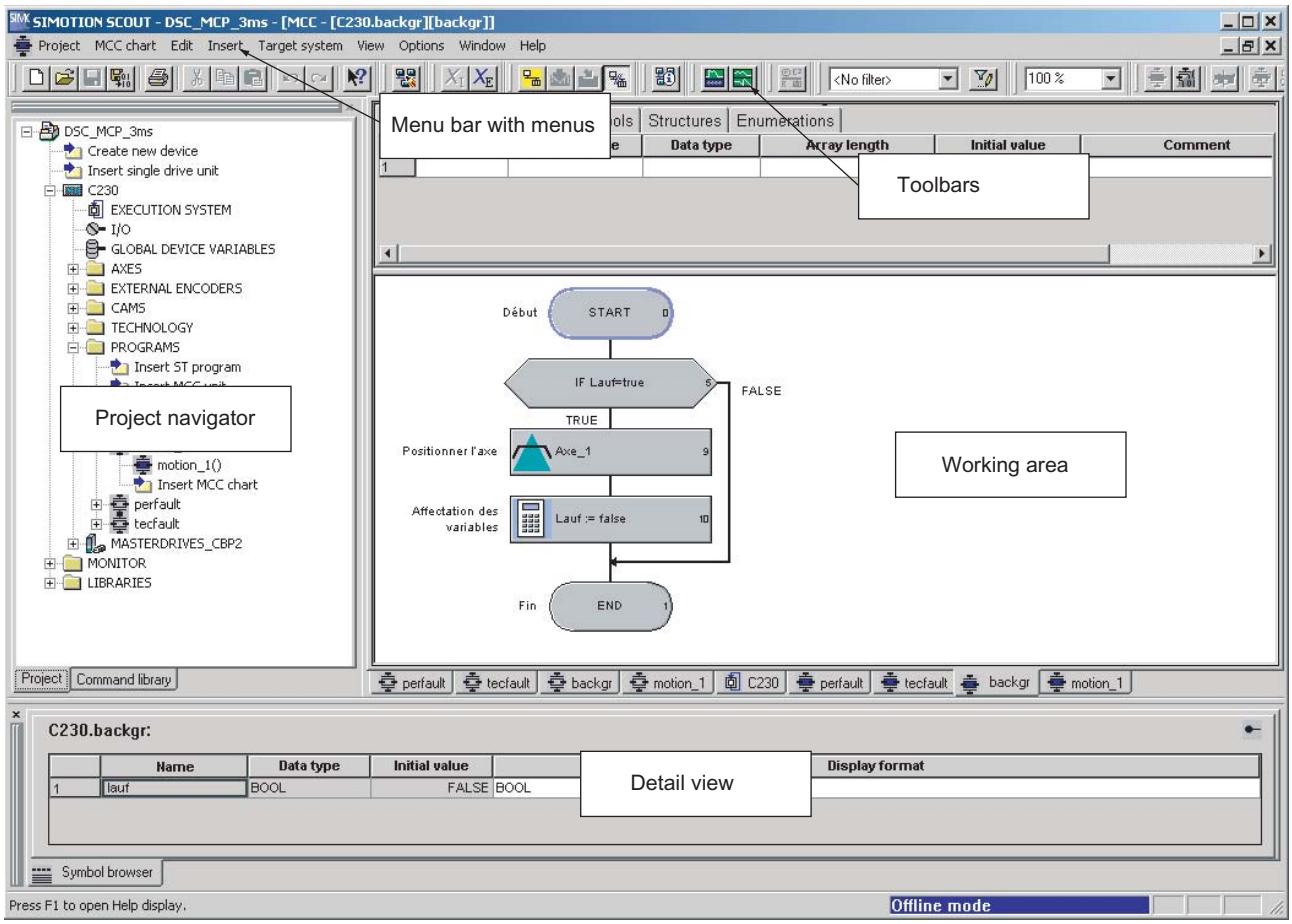


Figure 3-1 Workbench view

Workbench elements

The elements of the Workbench are:

- **Menu bar**:
  You call the functions of SIMOTION SCOUT via the menus in the menu bar.
- **Toolbars:**
  Frequently used menu commands are also available in toolbars, which can be activated or deactivated as required. These provide quick access to the functions. The toolbars can be undocked from the top and relocated to a different position (right, left, lower border or as a window).
- **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.

- **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.
- **Detail view**
  More detailed information about the element selected (marked) in the project navigator or the active window in the working area is displayed in the detail view. For example, variables of a program, system variables of a technology object or logs during the compilation of program sources.

3.2 Menu structure

3.2.1 Main menus

The SIMOTION SCOUT menus are divided into different main menus.

- Main menus that are primarily used to control the workbench or a project are always displayed. These main menus are also called static menus.
- In addition, the **Edit** and **Insert** main menus are continually displayed if a project has been loaded.
- The main menu in the third position, between **Project** and **Edit**, is a dynamic menu.
  Each snap-in supplies its own specific main menu to be displayed in this position. Always the main menu that has been selected in the project navigator and therefore active in the working area is displayed.
  In addition, each snap-in can incorporate its own menu items in the static main menus, primarily in the **Edit** and **Insert** main menus.

Table 3- 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 3- 2 Dynamic menus

Dynamic menu	Comment
Axis	Visible only when a project has been loaded and the associated snap-in is active in the working area. Dynamic menus appear in the third position on the menu bar, between Edit and Insert.
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 unit	Visible only when a project has been loaded 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	

3.2.2 Keyboard action 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 3- 3 Keyboard action

Keyboard action / 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	
Left mouse button	Selects the tree object at the cursor position; detail view displays the associated details
Double-click with left mouse button	Selects the tree object at the cursor position; detail view displays the associated details; corresponding snap-in is opened
Right mouse button	Selects the tree object at the cursor position; detail view displays the associated details; context menu is opened
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

3.2.3 Menu items

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

Table 3- 4 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	Paste	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

Shortcuts	Menu item	Reaction
Edit...		
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	Searching 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 Only possible in online mode	Device diagnostics	Opens device diagnostics
CTRL+I Only possible in online mode	Control operating mode	Opens the dialog box for control of the operating mode

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
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		Set and delete bookmarks
Ctrl+F4	ST source file > Close	Close ST source file
Ctrl+F7	ST source file > Program status on/off	Switches the program status function on or off
Ctrl+Shift+F2		Delete all bookmarks in the ST source file
Ctrl+Shift+F3		Arrange windows, tile horizontally
Ctrl+Shift+F5		Arrange windows, tile vertically
Ctrl+Shift+F8		Format selected area
Ctrl+Shift+F9		Move cursor to the start of the current or higher-level block
Ctrl+Shift+F10		Move cursor to the end of the current block
Ctrl+Shift+F11		Move cursor to the start of the higher-level block, 1st level
Ctrl+Shift+F12		Move cursor to the start of the higher-level block, 2nd level
Ctrl+Alt+B		Display bracket pairs in the current 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		Display indentation level in the current ST source file
Ctrl+Alt+L		Display or hide line numbers in the current ST source file
Ctrl+Alt+R		Folding: Display all subordinate blocks
Ctrl+Alt+T		Folding: Show/hide block.

Shortcuts	Menu item	Reaction
ST source file		
Ctrl+Alt+V		Folding: Hide all subordinate blocks
Ctrl+Alt+W		Display or hide spaces and tabs in the current ST source file
Ctrl+ADD (numeric keypad)		Increase font size in the current ST source file
Ctrl+MINUS (numeric keypad)		Decrease font size in the current ST source file
Ctrl+DIV (numeric keypad)		Increase font size in the current ST source file to 100%
Alt+Shift+arrow key		Select text by column
Alt+Shift+L		Change selected text to upper case
Alt+Shift+U		Change selected text to lower case

Shortcuts	Menu item	Reaction
MCC		
CTRL+F4	Close	Closes the MCC unit
ALT+Enter	Properties	Opens the MCC Unit Properties window
CTRL+R	Insert MCC chart	Insert a new MCC chart
CTRL+F7	Program status	Switches monitoring on/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 unit
ALT+Enter	Properties	Opens the MCC Unit Properties window
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/off

Shortcuts	Menu item	Reaction
LAD/FBD (source or program)		
F2 for LAD F2 for FBD	Insert element / Insert make contact element / AND box	Inserts a make contact Inserts an AND box
F3 for LAD F3 for FBD	Insert element / Insert break contact element / OR box	Inserts a break contact Inserts an OR box
F7 for LAD F7 for FBD	Add element/Add coil Add element/Assignment	Adds a coil Adds an assignment
F8 for LAD F8 for FBD	Insert element / Insert Open branch element / Insert binary input	Inserts an Open branch Inserts a binary input
F9 for LAD F9 for FBD	Insert element / Insert Close branch element / Invert binary input	Inserts a Close branch Inverts the binary input
ALT+F9	Insert element / 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

The online help feature includes a complete list of all the shortcuts available in SIMOTION SCOUT.

3.2.4 Using 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 up a function for the tree element via context menus, proceed as follows:

1. Right-click the relevant tree element in the project navigator.
2. Left-click the appropriate menu item.

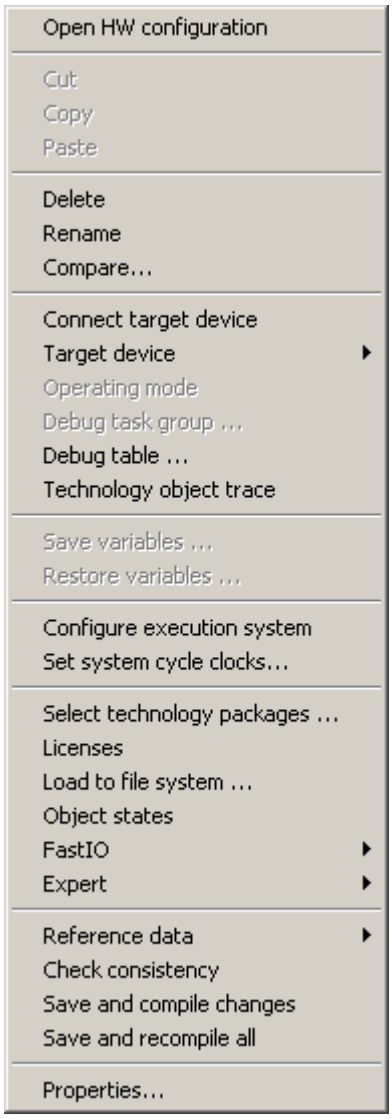


Figure 3-2 Example of a context menu

3.3 Project navigator

3.3.1 Using the project navigator

The project navigator in the SIMOTION SCOUT workbench

As standard, the project navigator has two tabs, 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 the programming are displayed in 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.

3.3.2 Creating elements

Elements in SIMOTION SCOUT

There are two 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 unit
  - Insert DCC charts
  - Insert LAD/FBD unit

Other elements are created automatically, e.g.

- When creating a project:
  - LIBRARIES: Insert library/DCC library
  - MONITOR: Insert watch table
- When inserting a SIMOTION device:
  - **AXES**, **EXTERNAL ENCODERS**, **PATH OBJECTS**, **CAMS**, **TECHNOLOGY**, **PROGRAMS** folders
  - EXECUTION SYSTEM, I/O, 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

Inserting a 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

The 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 is well known from SIMATIC STEP7, is used.

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.
   The project must be reopened for this to take effect.
   When the function is activated, all drive units associated with a STEP7 station are also displayed under this station.
   When the function is deactivated, all drive units are displayed under the project.
4. Click **OK** to confirm the change.

Opening HW Config of a SIMOTION device

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

- Select the required SIMOTION device in the project navigator and select **Insert > SIMOTION device** in the menu or
- In the project navigator, double-click the SIMOTION device whose hardware configuration you wish to open or
- Select the desired SIMOTION device in the project navigator, open the shortcut menu and click **Open HW configuration**.

3.3.3 Changing properties of the elements

You can change the properties of various elements as follows:

⚠ CAUTION
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. Make sure that you also change all name references.

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 wish to rename in the project navigator.
2. Open the shortcut menu and select **Rename**.
3. Confirm the warning message.
4. Enter a new name and confirm the input by pressing the **Enter** key.

3.3.4 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.

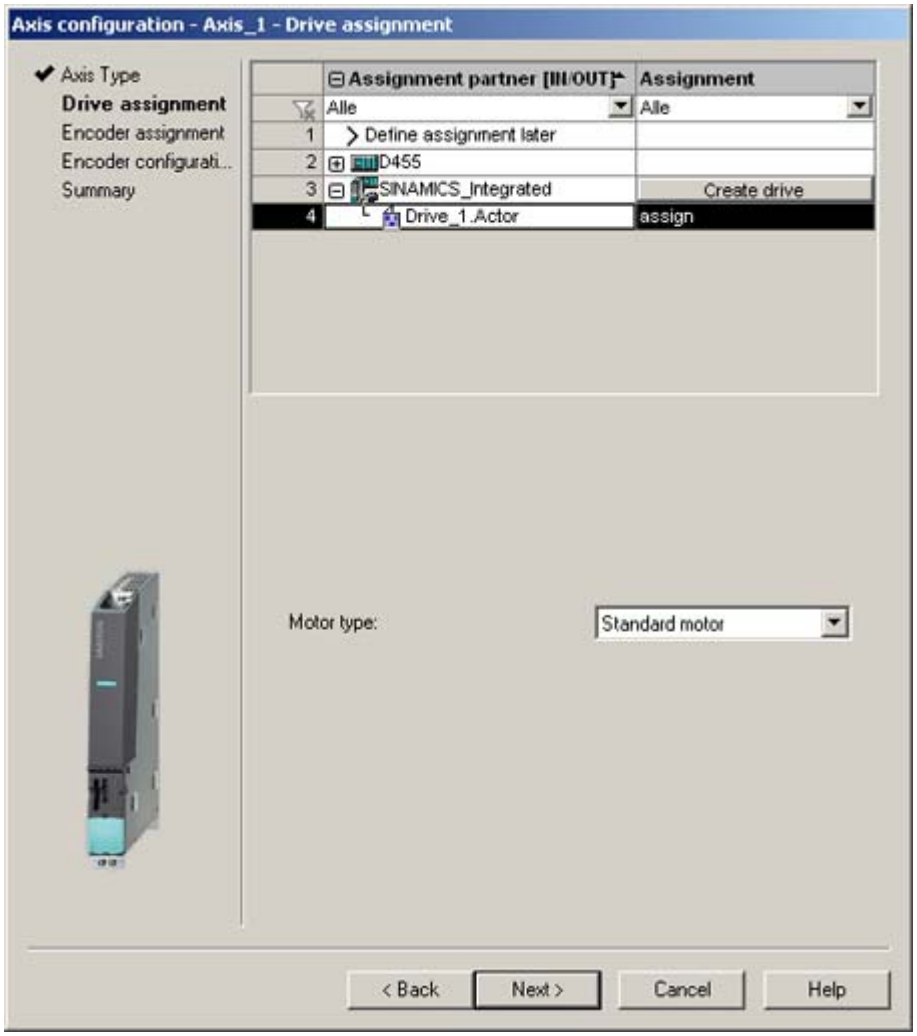


Figure 3-3 Axis configuration wizard - window for drive assignment

3.4 Using the working area

The workbench displays all of the snap-in working windows in the working area. Each snap-in provides its own working 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.

Using windows in the working area

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

You can maximize or minimize each window using the shortcut CTRL+F11.

Each window opened in the working area can be accessed via a tab at the bottom edge of the working area. To bring a window into the foreground:

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

To close the window:

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

3.5 Detail view

3.5.1 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.

Various tabs are available depending on the element selected. The tabs available are determined by the project mode (offline/online) and the active snap-ins.

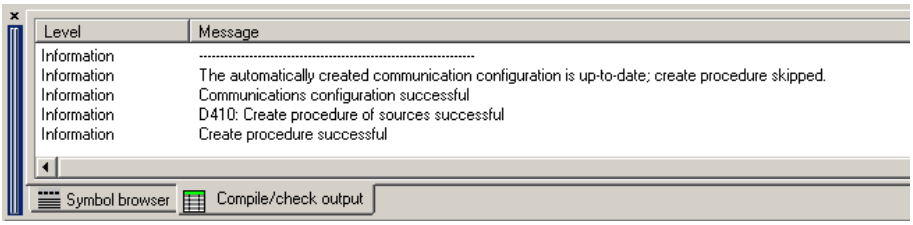


Figure 3-4 Example of detail view

You can maximize or minimize each tab using the shortcut CTRL+F12.

Each tab is opened only 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.

3.5.2 Using the symbol browser

The symbol browser in the detail view.

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

To activate the symbol browser:

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

Continuous display of the symbol browser

To activate/deactivate the continuous display of the symbol browser:

Click the symbol at the top right of the the symbol browser (pin).
The active element is displayed continuously until this function is deactivated. To deactivate this function, click the pin again.

3.5.3 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, control, and, if necessary, adapt these in the address list. You can enter the I/O variable assignment manually or use an assignment wizard to make the relevant selections.

Opening the address list

1. Browse to the folder for your device in the project navigator and double-click **Address list** to open the address list.
2. The address list opens in the detail area.

Note

For further information and guidance on the address list, refer to the online help.

3.5.4 Watch table

Watch table options

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 wish, add comments regarding them, and combine them into groups. You can hide individual variables in order to make the watch table more manageable and also control variables via the watch table directly.

Creating a watch table

Procedure for creating a watch table and assigning variables:

1. In the project navigator, open the **Monitor** folder.
2. Double-click the **Insert watch table** entry to create a watch table and enter a name for it. A watch table with this name appears in the **Monitor** folder.
3. In the project navigator, click the object from which you want to move variables to the watch table.
4. In the symbol browser, address list, or expert list, select the corresponding variable line by clicking its number in the left column.
5. From the context menu, select **Add to watch table** and the appropriate watch table, e.g. **Watch table_1**.
6. 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.

7. Alternatively, you can also copy and paste variables to the watch table.
8. Repeat steps 3 to 6 to monitor the variables of various objects.

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.

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

3.5.5 Working with lists

In order to make lists, e.g. watch table, address list, symbol browser, or expert list, more manageable and clearer, and to enable them to display larger quantities of data in a structured manner, you have various options for structuring the lists and adapting them to the relevant conditions. You can hide unimportant or redundant information and focus on important information. You can also transfer and group contents quickly and easily. For further information, see **Working with lists** in the online help.

3.6 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 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.

3.7 Online help

3.7.1 Structure of the online help

SIMOTION SCOUT has a comprehensive context-sensitive help.
Examples of using the online help can be found under:
SIMOTION SCOUT > Help > Using help

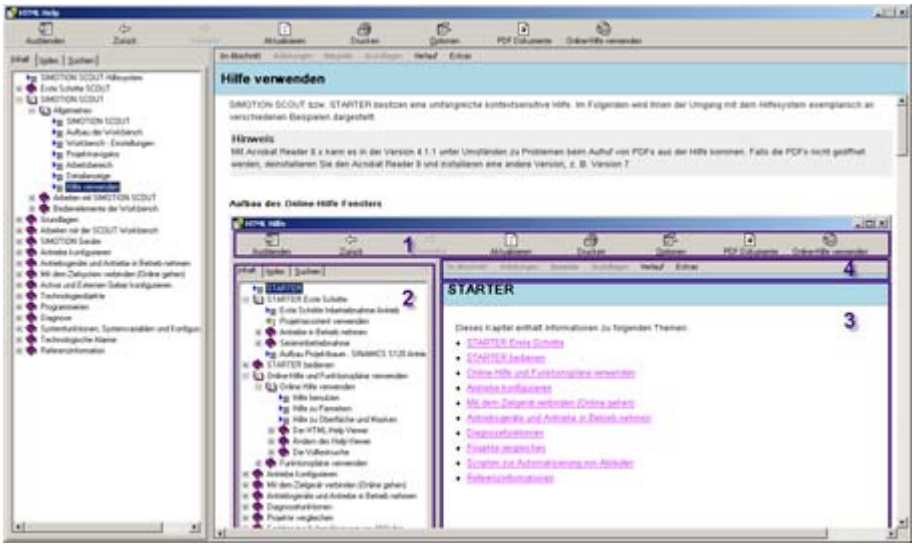


Figure 3-5 Help for online help

3.7.2 Types of online help

The following types of online help are available:

- **Entire help**

To open the entire help:

In the SIMOTION SCOUT menu bar, select **Help > Help topics** or press the **F1** key. The entire help is displayed.

- **Getting Started with SIMOTION SCOUT**

To open Getting Started:

In the menu bar, select **Help > Getting Started**.
All new functions for the current version are listed here in an overview. On the left-hand side, on the **Content** tab, select Getting Started with SIMOTION SCOUT.

- **Help button**

To open the help:

Click the **Help** button in the respective dialog box or window.
The context-sensitive help for the dialog box is opened.

- **Context-sensitive help**

To open the context-sensitive help:

1. Press the **SHIFT+F1** keys, click the **button**  in the function bar or select **Help > Context-sensitive help** in the menu bar.
   The cursor changes to a question mark.
2. Use the mouse pointer to click on, e.g. dialogs, parameters, input fields, menu items, command libraries, expert lists, symbol browsers or objects in the project navigator.
   The context-sensitive help for the selected entry is displayed.

3.7.3 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 that 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 or you want to switch the highlighting off, click the **Options** button and 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

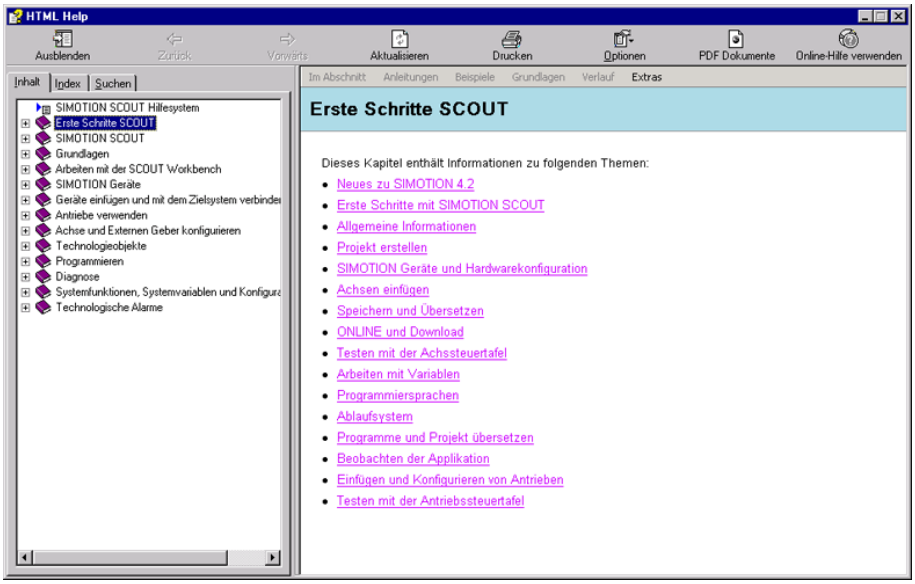
You can find more information about this subject in the online help.

3.7.4 Getting Started in SCOUT

Calling Getting Started with SIMOTION SCOUT

Getting Started is displayed by default when SCOUT is opened.

You can also select **Help > Getting Started** in order to open this feature.



Online help

Getting Started provides a brief overview of how you can work with SIMOTION SCOUT. A typical example is used to show you the different steps required to create a project and introduces the configuration, programming, and diagnostic tools.

In addition, the section titled "New with SIMOTION V4.2" provides an overview of which new functionalities are available in the latest version of SIMOTION.

Note

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

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. Uncheck the **Display "Getting started" at start** checkbox.
4. Click **OK**.

3.7.5 Error remedy

If error messages appear in the detail view in the SCOUT workbench, you can call up detailed information in the online help. This is possible for technology objects alarms and alarms for drive units and I/O devices. To do this, click the **Help for event** button.

Otherwise, additional information about the error text can be found using the complete text search.

3.8 Basic steps

3.8.1 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.

3.8.2 Basic settings of SCOUT

In 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 is opened.
3. Select 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.

3.8.3 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.

3.8.4 Creating a new SCOUT project

To create a new project:

1. Open SIMOTION SCOUT from the Start menu on the Windows desktop:
   Start > SIMATIC > STEP 7 > SIMOTION SCOUT.

   Or double-click the SIMOTION SCOUT icon on your PC desktop.

   SIMOTION SCOUT starts the workbench and the online help.
   Getting Started with SIMOTION SCOUT is displayed.
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, these are displayed in SCOUT. However, these names are only managed with 8 characters in the Explorer.

Special characters may not be used.

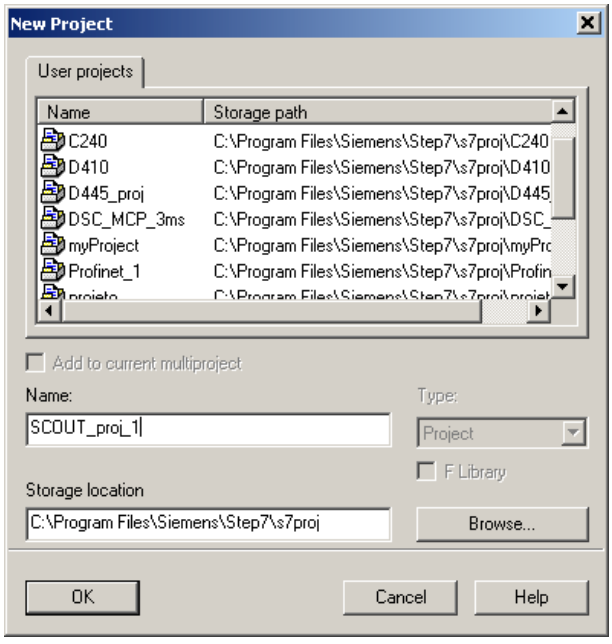


Figure 3-6 Creating a new project

3. Enter the following data in the dialog box:
   - **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.

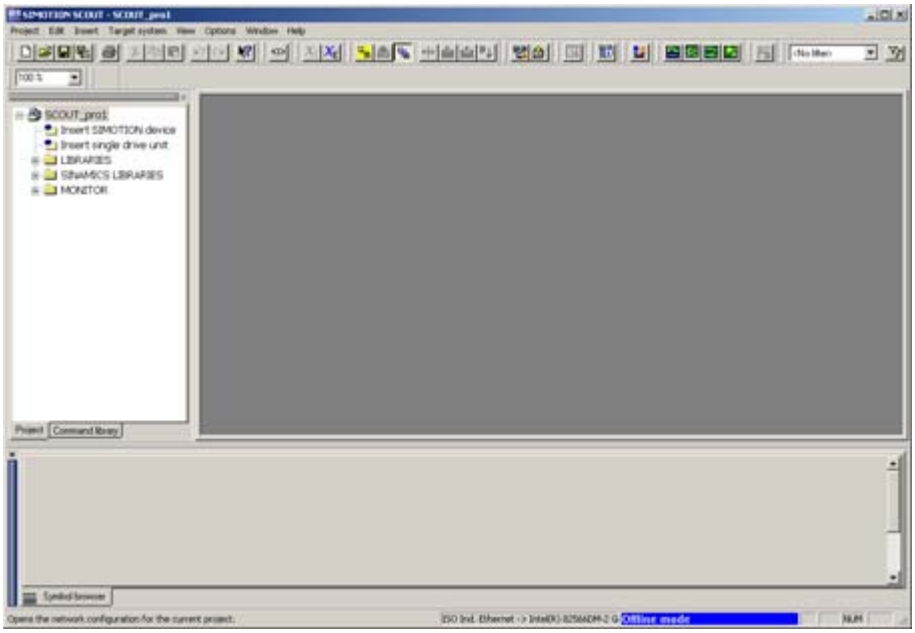


Figure 3-7 Workbench with new project

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

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

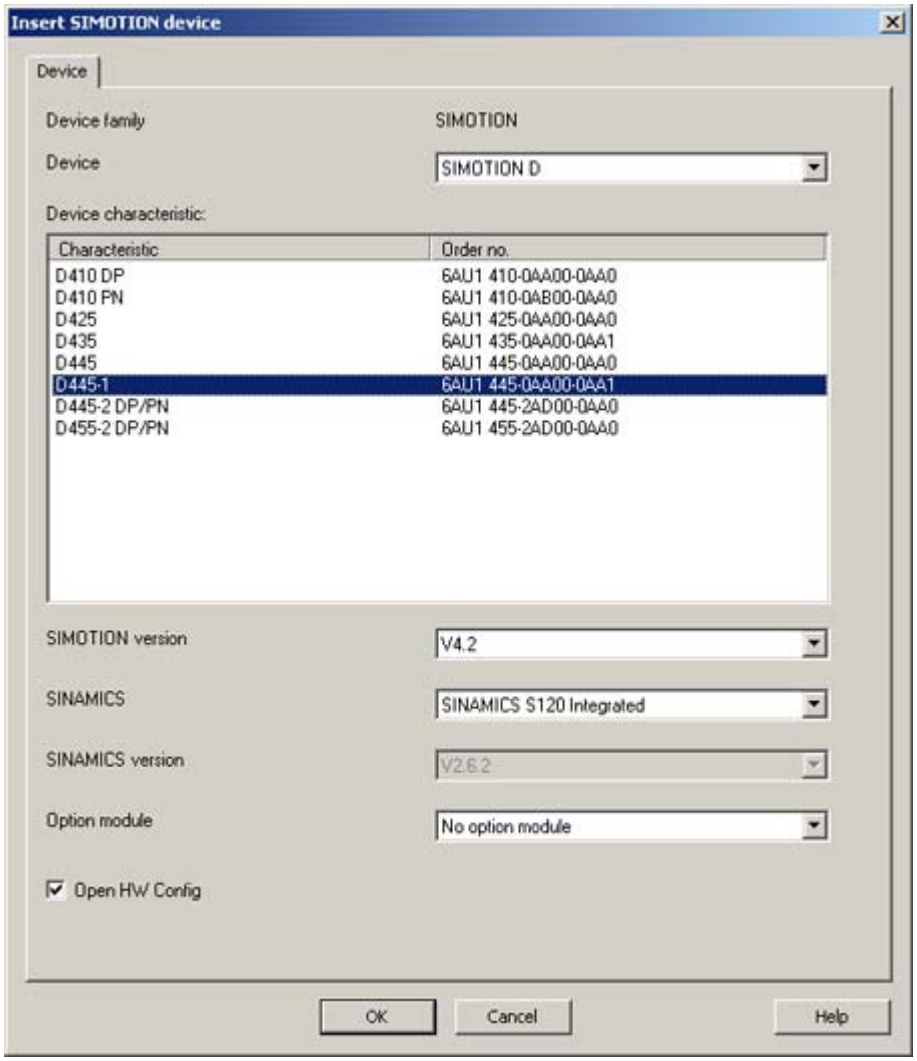


Figure 3-8 Insert SIMOTION device

- **Insert single drive unit** element. Double-click on this symbol 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**

Note

For further information, refer to the online help at:
"Getting Started with SIMOTION SCOUT".

3.8.5 Opening an existing 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 in either a new or in an existing project.

This means when you change an existing project and save with a different name, you must do this **before** you make any changes in the existing project.

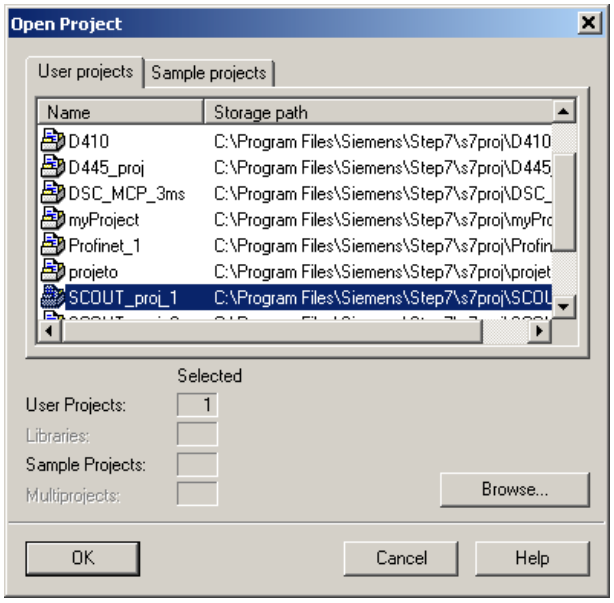


Figure 3-9 Opening a project stored on the hard disk

Note

The workbench displays one project at a time.

If you wish 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.

3.8.6 Selecting technology packages

The SIMOTION 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.

Select **Target device > Select Technology Packages ...** in SIMOTION SCOUT if you want to adopt a more targeted approach when choosing the technology packages you want to use.

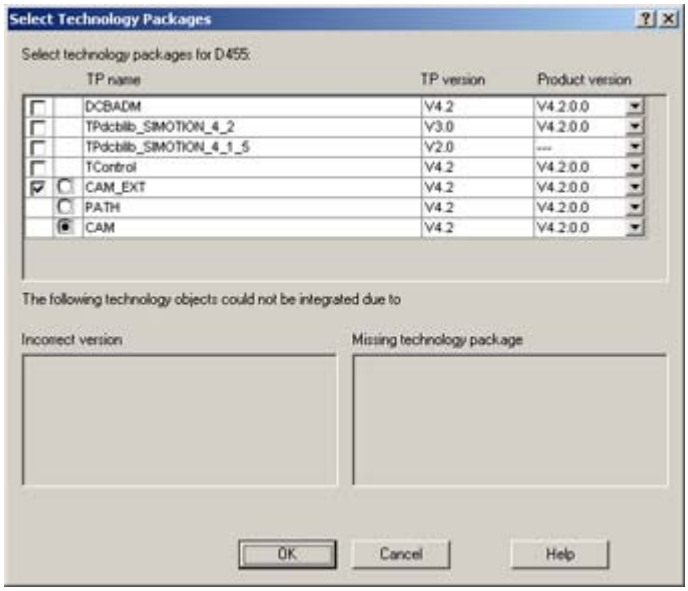


Figure 3-10 Select Technology Packages

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 **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.

See also

Technology packages and technology objects (Page 14)

3.8.7 Using program editors

Editors in SIMOTION SCOUT

Three editors are available for creating programs:

- Graphics-based editor for creating **MCC** charts.

  You program by arranging symbolic program commands similar to a flow diagram and assigning parameters to these commands.

- Text-based editor for creating **ST** source files.

  ST is a text-based programming language in compliance with IEC 61131-3, expanded to include motion commands (system functions for the technology objects). An ST source file can encompass several programs.

- Graphics-based editor for creating ladder and function block diagrams. (**LAD/FBD**)
  LAD/FBD is a graphics-based programming language in compliance with IEC 61131-3.

  The ladder logic statement syntax corresponds to a circuit diagram. LAD statements consist of elements and boxes, which are graphically connected to networks. The LAD operations work according to the rules of Boolean logic.
  FBD uses the logic boxes familiar from Boolean algebra to map logic. You can represent complex functions (e.g. mathematical functions) directly in connection with the logical boxes.
  FBD provides all the elements required for the creation of a complete user program. FBD features a powerful command set. This includes the various basic operations with a comprehensive range of operands and how to address them. The design of the functions and function blocks enables you to structure the FBD program clearly.

Optional editors

- CamTool for the easy creation of cams using a graphical editor
- DCC graphical editor based on CFC. SIMOTION controllers and SINAMICS drives can be configured graphically.

Additional references

Please refer to the following documents on this subject

- SIMOTION MCC Motion Control Chart Programming and Operating Manual
- SIMOTION ST Structured Text Programming and Operating Manual
- SIMOTION LAD/FBD Programming and Operating Manual
- Programming and Operating Manual SINAMICS/SIMOTION Editor description DCC

and the SIMOTION SCOUT online help.

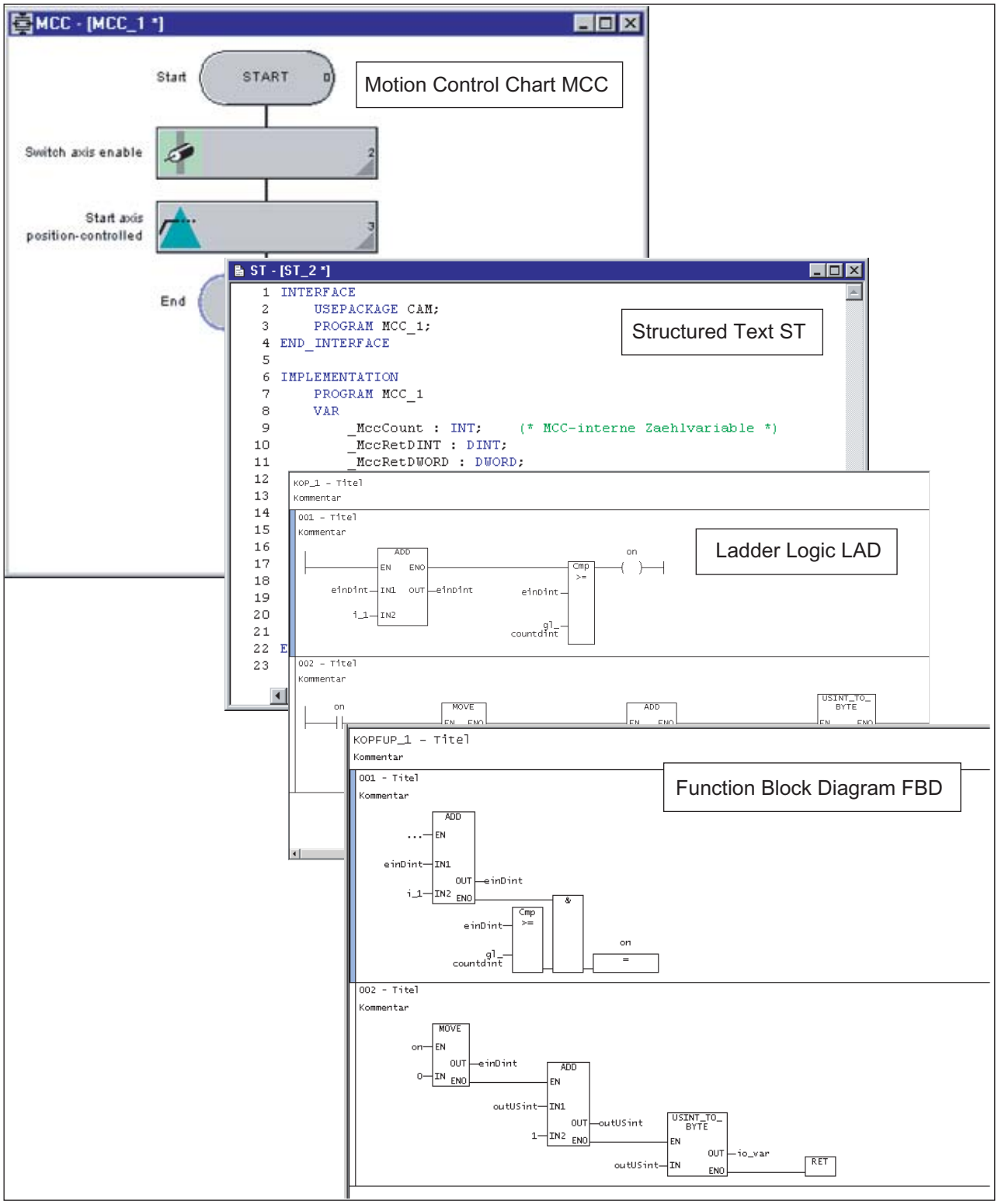


Figure 3-11 Program editors

3.8.8 Saving and compiling

The project must be saved and compiled first before the download. SIMOTION SCOUT distinguishes three commands in the main project menu that act differently when saving and compiling:

- Save; the project is saved to the hard disk
- Save and compile all
- Save and recompile all

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 all

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 (e.g. when an FB is called) undergo compilation and are saved. 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 switch a project from an older SCOUT version to a newer one. This involves accepting all the error correction and optimization elements in the new SCOUT, although the compilation results in SCOUT and SIMOTION RT become inconsistent as a result. 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.

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

3.8.9 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. Prior to a download, a consistency check can be performed automatically if the corresponding option is selected under **Options > Download > Check consistency before loading**.

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

3.9 Inserting and configuring a SIMOTION device

You have created a project in SIMOTION SCOUT. The project navigator on the left of the SCOUT workbench (Page 27)is open. To insert a device, double-click the **Insert SIMOTION device** entry under the name of your project in the project navigator. The following dialog then opens:

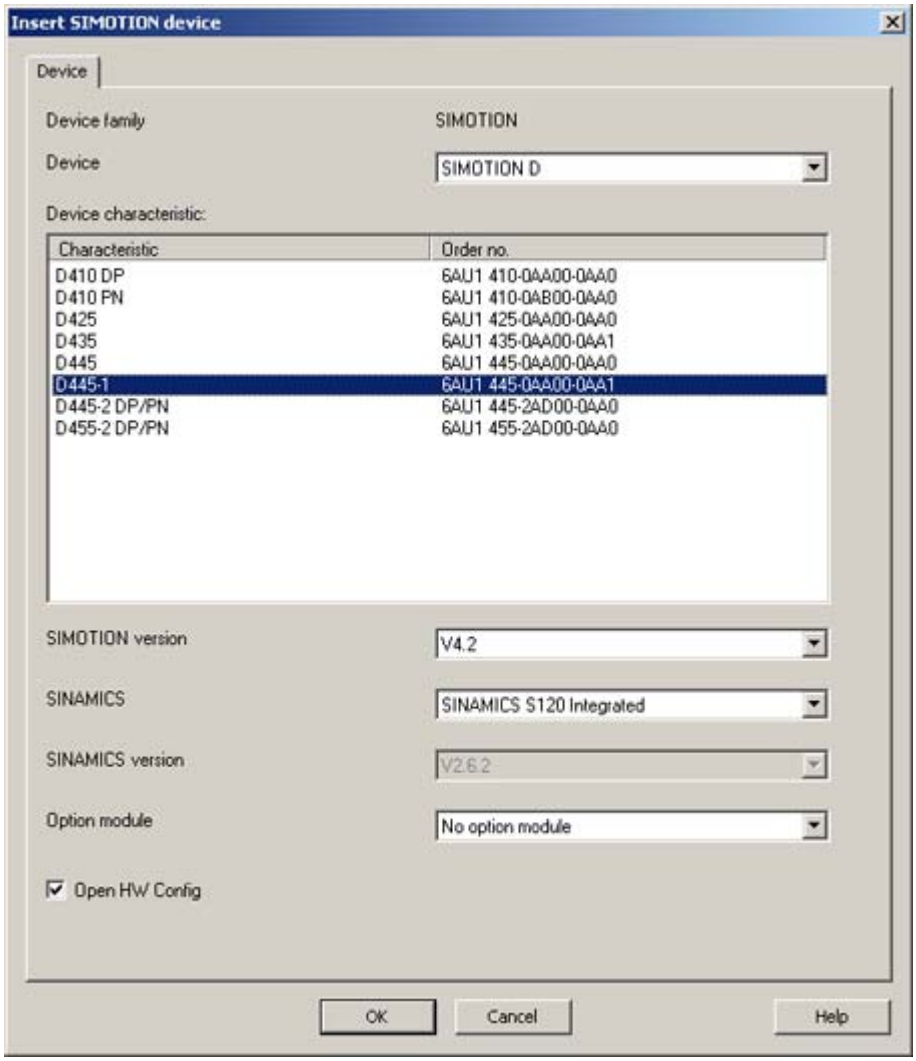


Figure 3-12 Insert SIMOTION device

Select the device platform you are working with under **Device**. The characteristics of the relevant platform then appear under **Device characteristic**. Select a version under **SIMOTION version**. If the **Open HW Config** option is selected, the hardware configuration (Page 65) opens after the device has been inserted. Click **OK** to confirm.

When 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 tell the SIMOTION system which hardware is present; for example:

- Type of 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 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.

3.9.1 Starting HW Config

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

To start HW Config:

- Double-click on 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** shortcut menu or
- Select the appropriate device in the project navigator, then select the **Insert > SIMOTION device** menu.

3.9.2 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.

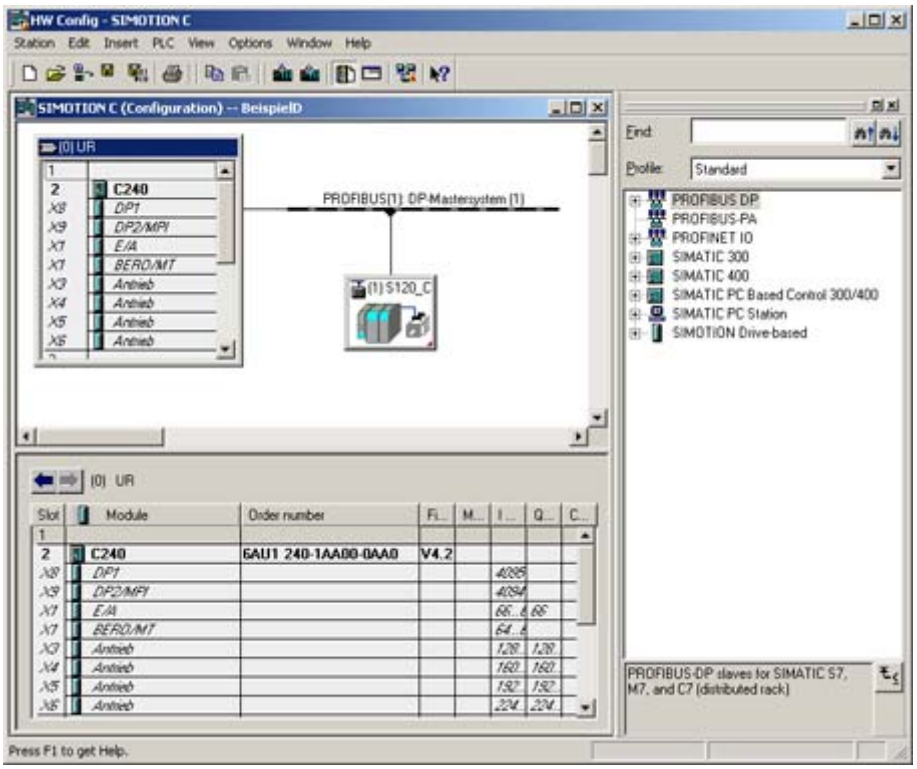


Figure 3-13 HW Config with opened hardware catalog and the CPU previously inserted in the module

3.9.3 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 additional information, see

Chapter Inserting drives (Page 74)

3.9.4 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.

Add interfaces

After inserting the SIMOTION device, the **Properties - PROFIBUS DP Master Interface (R0/S2.1)** window appears. Create the PROFIBUS DP subnets and configure the SIMOTION device interfaces in this window.

Note

With SIMOTION D, the **PCI integrated** PROFIBUS subnet is created and configured automatically. The user may neither configure nor select it!

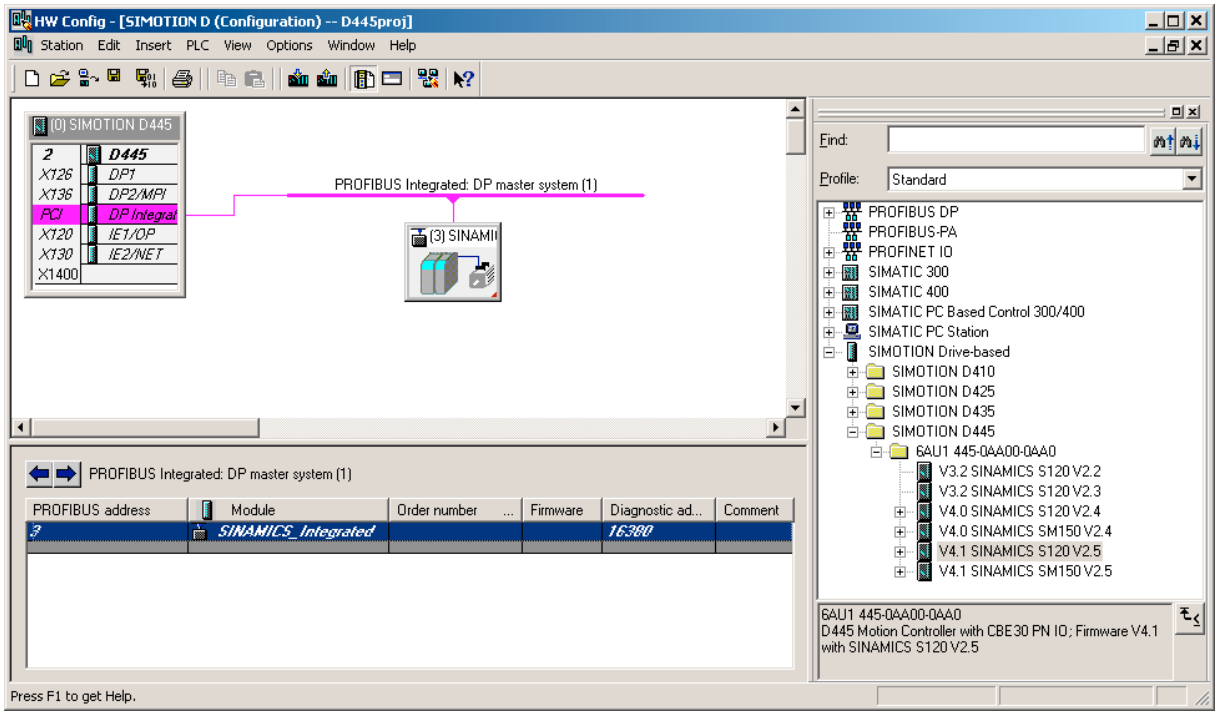


Figure 3-14 Hardware configuration of a D4x5

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

3.9.5 Changing the SIMOTION device

Requirements

You will only need to perform this operation if you intend to upgrade a kernel or change a platform within the same station type.

Swapping modules between SIMOTION families

Module replacement is only possible within the same device family:

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

Exchanges involving SIMOTION families SIMOTION C, SIMOTION P, SIMOTION D410, and SIMOTION D4x5/D4x5-2 require an XML export.

For further information about replacing the device, see the section titled Replacing the SIMOTION device (Page 85)

3.9.6 Connecting to the target system

3.9.6.1 Installing the interface card

Installing the interface card in the PG/PC

An interface card must be installed in the PG/PC so that the SIMOTION device can communicate with the PG/PC. This applies only to PROFIBUS.
To use Ethernet, an Ethernet connection must be present on the PC.

Communication between a SIMOTION device and a PG/PC requires a conditioner card (for PROFIBUS) or an Ethernet interface. PGs already have both, but PCs may need a conditioner 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 installation guide provided.
- 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 3- 5 Interface assignment for SIMOTION devices

SIMOTION device	Interface	As delivered
C230-2/C240	X8 DP1 X9 DP2/MPI X7 (Ethernet)	PROFIBUS address 2, baud rate 1.5 Mbit/s PROFIBUS address 2, baud rate 1.5 Mbit/s IP address: 169.254.11.22 Subnet: 255.255.0.0
SIMOTION C240 PN	X8 DP1 X9 DP2/MPI X7 (Ethernet) X11 (1 PROFINET interface with 3 ports)	PROFIBUS address 2, baud rate 1.5 Mbit/s PROFIBUS address 2, baud rate 1.5 Mbit/s IP address: 169.254.11.22 Subnet: 255.255.0.0 Supplied without IP address and subnet.
SIMOTION P350	X101 DP1 X102 DP2/MPI Ethernet	PROFIBUS address 2, baud rate 1.5 Mbit/s PROFIBUS address 2, baud rate 1.5 Mbit/s IP address: 169.254.11.22
SIMOTION P350-3 DP	X101 DP1 X102 DP2/MPI Ethernet SS1 Ethernet SS2	PROFIBUS address 2, baud rate 1.5 Mbit/s PROFIBUS address 2, baud rate 1.5 Mbit/s IP address: 169.254.11.22 Subnet: 255.255.0.0 IP address: 192.168.214.1 Subnet: 255.255.255.0
SIMOTION P350-3 PN	X21 MCI-PN (1 PROFINET interface with 4 ports) Ethernet SS1 Ethernet SS2	Supplied without IP address and subnet. IP address: 169.254.11.22 Subnet: 255.255.0.0 IP address: 192.168.214.1 Subnet: 255.255.255.0
SIMOTION P320-3	X3 PROFINET onboard interface with 3 ports X2 onboard Ethernet 1	Supplied without IP address and subnet. 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
SIMOTION D4x5	X126 DP1, X136 DP2/MPI X120 IE1/OP (Ethernet) X130 IE2/NET (Ethernet) With optionally inserted CBE30: X1400 (1 PROFINET interface with 4 ports)	PROFIBUS address 2, baud rate 1.5 Mbit/s PROFIBUS address 2, baud rate 1.5 Mbit/s IP address: 192.168.214.1 Subnet: 255.255.255.0 IP address: 169.254.11.22 Subnet: 255.255.0.0 Supplied without IP address and subnet.

SIMOTION device	Interface	As delivered
SIMOTION D4x5-2	X126 DP X136 DP/MPI X127 P1 PN/IE (Ethernet) X130 P1 PN/IE-NET (Ethernet) X150 P1-P3 PN (1 PROFINET interface with 3 ports)	PROFIBUS address 2, baud rate 1.5 Mbit/s PROFIBUS address 2, baud rate 1.5 Mbit/s IP address: 169.254.11.22 Subnet mask: 255.255.0.0 Delivered without IP address and subnet Delivered 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.

3.9.6.2 Configuring the interface card

Configuring the interface card

Proceed as follows:

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

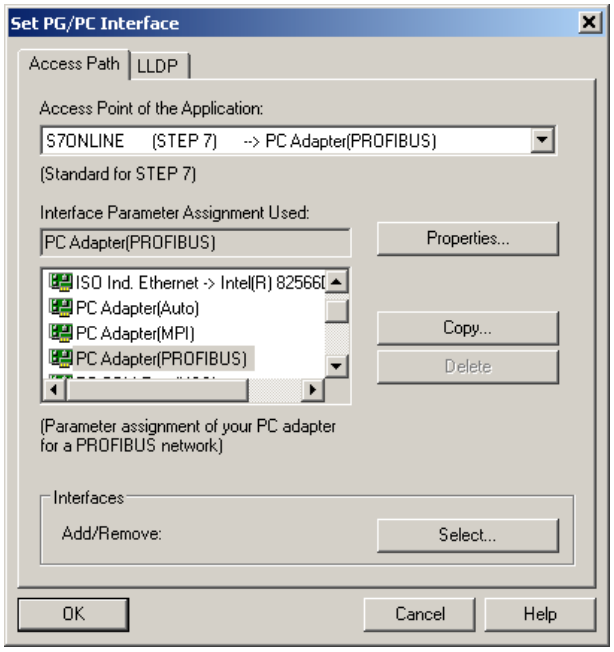


Figure 3-15 Set PG/PC interface (example)

3. Select the access point of the application.
4. Click **Select**.
   The Install/Uninstall Interfaces window appears.

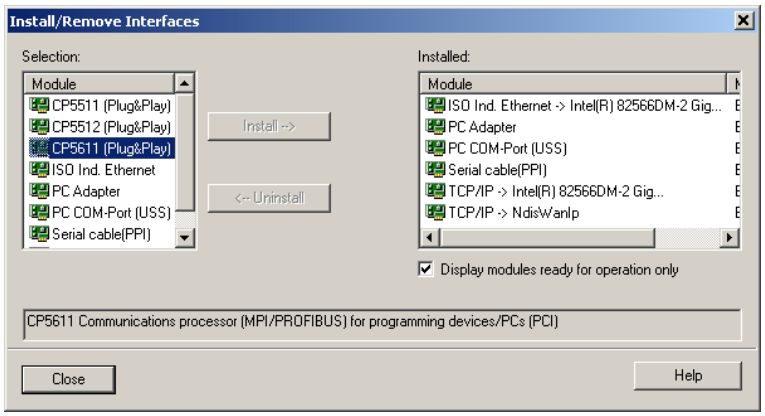


Figure 3-16 Installing / deinstalling interfaces

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 / deinstalling 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** under **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.

3.9.6.3 Defining the interface

Specifying the access point

A unique access point is defined when you insert a SIMOTION device. If you make changes to the project which mean the access point is no longer unique, you can change the setting.

Note

SIMOTION devices have two PROFIBUS connections. Defining the associated PROFIBUS connection speeds up online operation with the device.

Proceed as follows in offline mode:

1. Open the project.
2. Select the SIMOTION device, e.g. C240, in the project navigator.
3. Right-click and select **Target device > Online access...** in the context menu.
   The **Properties - Program (Online)** window opens.
   If you have defined the interface uniquely, you cannot make any settings in this window.
4. Select **Module Addresses** on the tab. The IP/PROFIBUS address of the SIMOTION device is displayed here.
5. Click **OK** to close the dialog.

3.9.6.4 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. SIMODRIVE 611U, MICROMASTER 4xx, SINAMICS) 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 connection to a higher-level automation system

  – For the connection of HMI devices

  – For connection to the SCOUT engineering system

3.9.6.5 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 titled SIMATIC NET, Industrial Twisted Pair and Fiber Optic Networks. See the list of references for the order number.

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

3.9.6.6 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 and SIMOTION D4x5-2 Commissioning and Hardware Installation Manual
- SIMOTION D410 Commissioning Manual
- SIMOTION P, SIMOTION P350-3, SIMOTION P320-3, and Panels Commissioning and Hardware Installation Manual
- SIMOTION C Operating Instructions
- SIMOTION Communication System Manual

and the online help.

3.10 Inserting drives

3.10.1 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 HW Config. For more detailed information, see the *D4x5 Commissioning and Hardware Installation Manual.*

3.10.2 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.

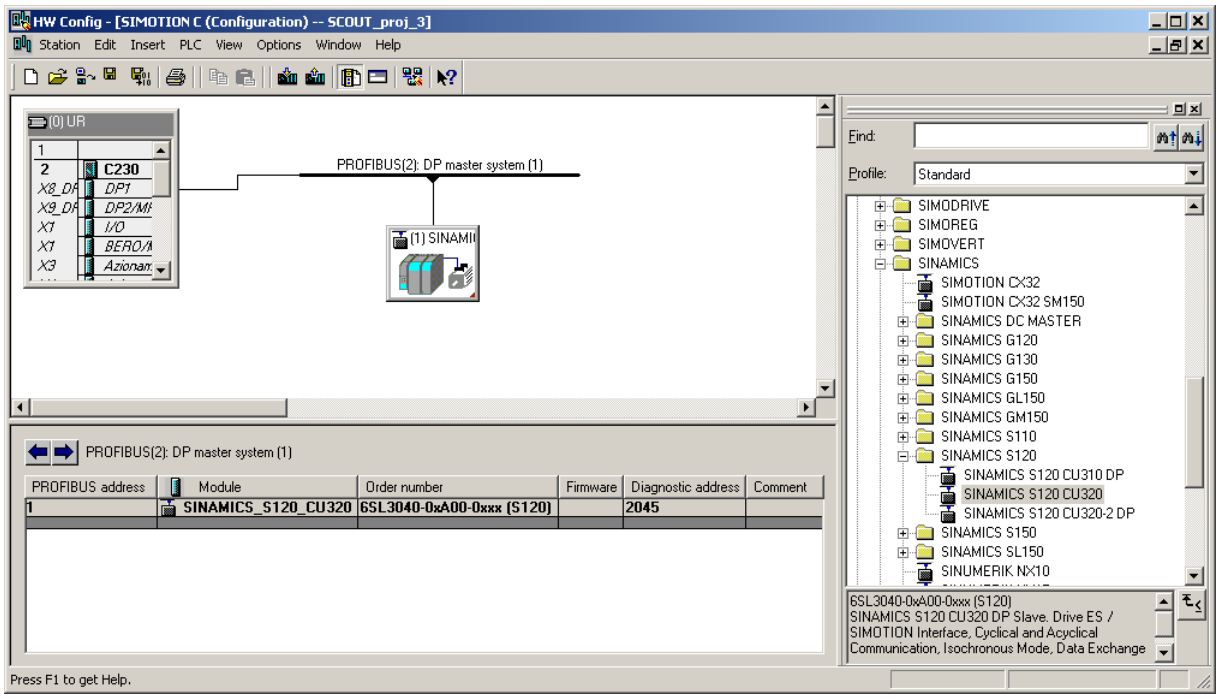


Figure 3-17 Inserting a SINAMICS drive

3.10.3 Inserting a SINAMICS drive on PROFINET IO

Initial situation

- The SIMOTION device is created in SIMOTION SCOUT
- A PROFINET IO has been 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.

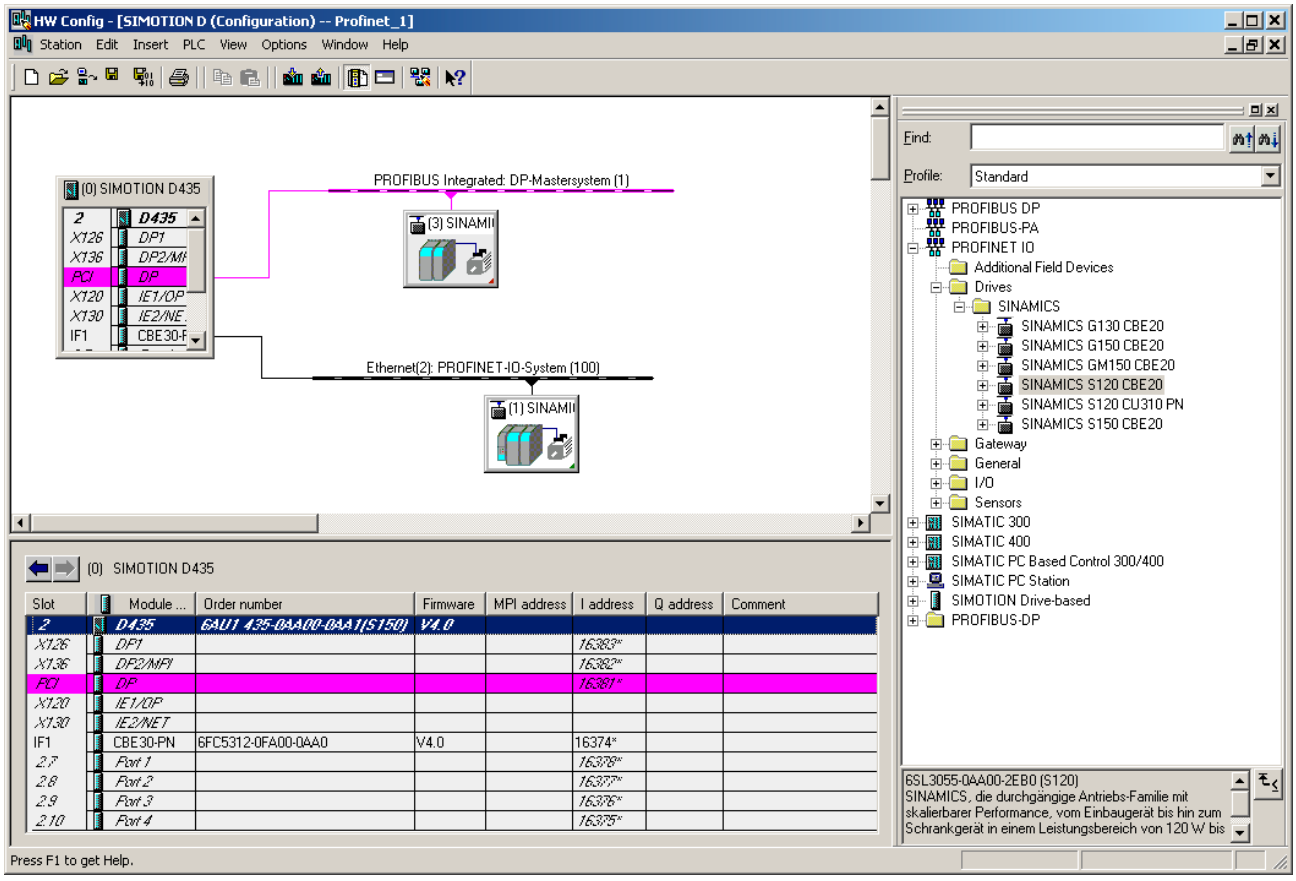


Figure 3-18 Inserting a SINAMICS drive with PROFINET

3.10.4 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 (e.g. the SIMOCOM U program for SIMODRIVE 611U). If required, you must commission these drives directly on the drive.

Table 3- 6 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**.

3.10.5 SINAMICS on SIMOTION

3.10.5.1 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 PC/PG
- 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. Deactivate the **Open HW Config** box.
6. Click **OK** to confirm.
7. Select the PROFIBUS interface or Ethernet.
   If you have selected Ethernet, select the interface parameterization of the PG/PC.
8. Click **OK** to confirm.
9. With SIMOTION C and P only: Insert a SINAMICS device (see Inserting a drive (Page 74)).
10. Select **Station > Save and compile** in HW Config, then exit HW Config.
11. Open the structure tree of the SIMOTION device in the project navigator.
12. Open the structure tree of the drive (SINAMICS or SINAMICS_Integrated) in the project navigator.

13. Double-click **Configure drive unit**.
    The Configuration - Option module window opens.
14. Run through the drive wizard.

The STARTER functionality now starts in SIMOTION SCOUT.

How to configure the SINAMICS_Integrated drive (with SIMOTION D) is described in detail in the following documents:

- SIMOTION D4x5 Commissioning Manual
- SIMOTION D4x5 Product Manual
- SIMOTION D410, Commissioning Manual

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.

3.10.6 Controlling drives

You can use SIMOTION SCOUT to control the configured drive. Use the control panel for this purpose. This is displayed as a detail view tab. Drives can only be controlled in online mode.

⚠ DANGER

Before the motor turns for the first time, pay special attention to the following potential hazards:

Make sure that the motor is connected correctly!
Secure the surrounding area:

Secure the motors! Do not release the magnetic motor brake of vertical axes without a safeguard!

Set the limit values! Bring the axes to neutral position! Choose low velocities and speeds!

Observe general accident prevention guidelines!

The function is released exclusively for commissioning and service purposes. The safety shutdowns from the higher-level control have no effect.

The function should only be used by authorized technicians.

The "Emergency stop with space bar" function is not guaranteed in all operating modes. Therefore, there must be an EMERGENCY STOP circuit in the hardware. The appropriate measures must be taken by the user.

Follow the steps outlined below:

1. Open the element (folder) for the drive unit in the project navigator.
2. Open the drive element below the folder.
3. Double-click the **Control panel** element.
   The control panel is displayed in the detail view.
4. Select the drive that you want to control.
5. Select the relevant checkbox:
   - **Control:**
     You switch the drive and control its speed.
   - **Enables and actual value:**
     You monitor setpoints and actual values as well as enables and alarms.
   - **Links to status info:**
     You can switch to the drive diagnostics.

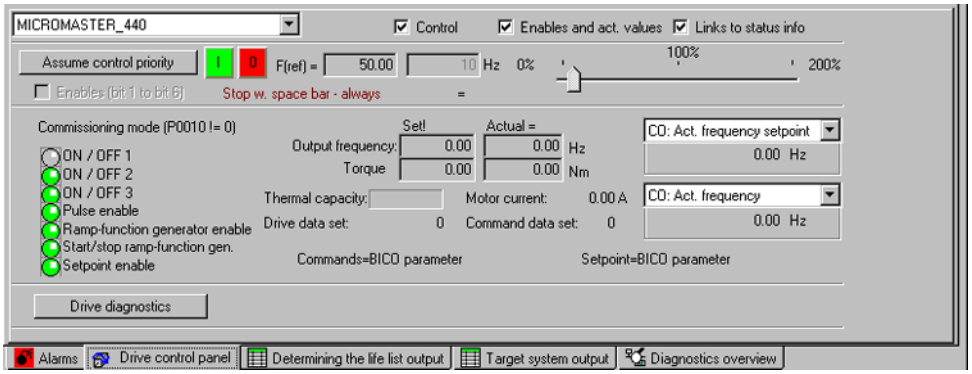


Figure 3-19 Controlling drives with SIMOTION SCOUT

Switching the drive and controlling its speed

Follow the steps outlined below:

1. Activate the **Control** checkbox.
2. Click **Assume control priority**.
3. Move the slider to the left.
4. Activate the **Enables (bit 1 to bit 6)** checkbox.
5. Switch on the drive: Click the **I** button.
6. Use the slider to control the speed.

To switch off the drive:

- Click the **O** button.
- Press the space bar.

⚠ CAUTION
Make sure that all windows in the working area are closed. Otherwise, delays may occur between the entry of the control command on the PC and its execution by the drive!

Monitoring enables and actual values

- The speed setpoint and actual speed value are displayed constantly.
- Select two additional parameters for display. These parameters are displayed below the selection box.
- The enables and alarms are displayed.

3.11 Inserting an axis

Axes are integrated as technology objects (TO) in SIMOTION. The axes are created with the appropriate settings under the inserted SIMOTION device and then interconnected with the drives.

Procedure

1. Double-click the **Axes > Insert axis** entry in the project navigator.
   The **Insert axis** window opens.
2. Enter a name and click **OK** to confirm the other standard settings. The axis configuration wizard will be displayed.
3. You can insert a virtual axis or a real axis. When first working with SIMOTION SCOUT, it is recommended that you first insert a virtual axis and carry out the first steps with this axis. **Getting Started** in the online help contains specific operating instructions based on SIMOTION D.
4. Run through the drive wizard until the end, then select **Finish** to confirm. The configured axis is displayed in the project navigator. To test correct functioning of this axis, the project is saved and compiled, and the axis is then tested with the axis control panel.

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

Testing with the axis control panel

The axis control panel is used to control and monitor individual axes without requiring a user program. You can use it to traverse axes along with the drive.

To do this, switch to online mode, download the project, and make sure the mode switch is set to STOP_U. Then open the **Axis** folder in the project navigator and select the **Axis control panel** entry under the axis created.

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

3.12 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.

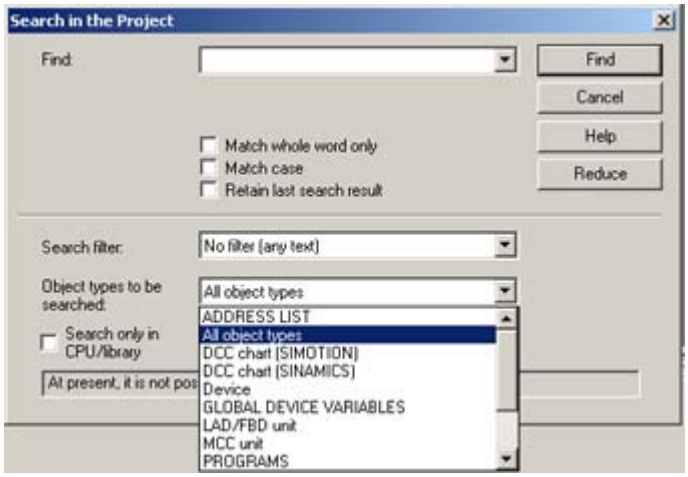


Figure 3-20 Searching in the project

Searching in CPU/Libraries only

If the "Search only in CPU/Library" checkbox is ticked, 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 searching in MCC

You can perform quick searches for specific free text items in the current MCC chart editor or the current declaration tables. To start searching locally, open the search function (with the **CTRL+F** shortcut key) while the current focus is on the MCC editor or the editor window for global and global unit declarations and connections.

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

3.13 Replacing in the project

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

To open it, select **Edit > Replace in the project...** on the menu bar.

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 check box.

Boundary conditions:

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

More information on this topic is available in:

- Online help.

Local replacement in MCC

You can perform quick searches for specific free text items in the current MCC chart editor or the current declaration tables and replace these with text of your choice. To start the local replacement process, select the **CTRL+H** shortcut key while the current focus is on the MCC editor or the editor window for global and global unit declarations and connections.

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

3.14 Configuring multilingual messages

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 under **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.

3.15 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.

3.16 Know-how Protection

The know-how protection installed on SIMOTION SCOUT protects the programs (ST source files, MCC charts, LAD/FBD programs, and DCC charts) and libraries in your project. This protection prevents unauthorized viewing of the programs.

Log-in details and a password have to be set by selecting **Project > Know-how protection**. This activates the know-how protection for the program. The programs contained in the project are still visible to the user in this session, but the program names are grayed-out.

For further information on know-how protection, please refer to the online help for SIMOTION SCOUT.

3.17 Upgrading and changing platforms for SIMOTION devices

3.17.1 General information

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 P350.

The section titled Upgrading devices and updating projects with the device update tool (Page 131) contains further information.

3.17.2 Changing a SIMOTION device followed by a TP upgrade

3.17.2.1 Upgrading SIMOTION devices (upgrades within the same 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 is opened.
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 or 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&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.

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. replacing SIMOTION C with 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 versions (D410 DP <-> D410 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 **TPs/TOs** tab.
4. Select the appropriate device and the technology packages.
5. Click **OK** to confirm the changes.
6. Select the same library.
7. Right-click and select **Save and compile** in the context menu. The upgrade is completed.
8. Repeat the operations for all created libraries.

3.17.3 Changing the SIMOTION platform

Platform changes involving, for example, the following SIMOTION devices:

- SIMOTION C
- SIMOTION P as of V2.1
- 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 is opened. 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. Carry out an object import on the new device with the previously exported data.

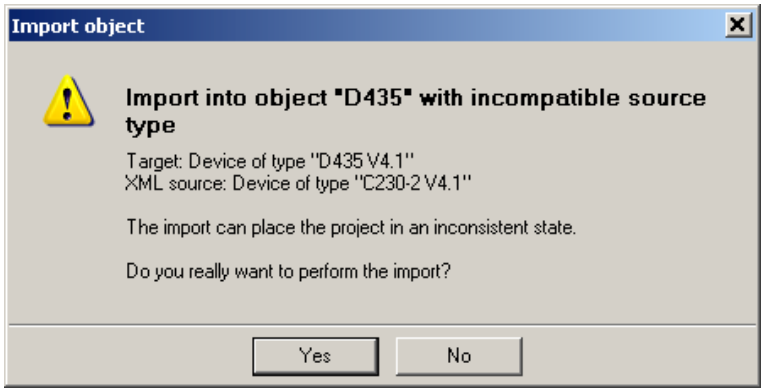


Figure 3-21 Example of importing an object with a station change

Connecting drives/slaves after platform changes

It may no longer be possible to assign drives/slaves after a platform change. This can be remedied as follows:

- Repeat the process with the original project (prior to platform replacement).
- Alternatively, select the CTRL+ALT+F11 shortcut key in HW Config. The objects become unassigned and connections can then be set up in the usual manner once more.

3.17.4 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.

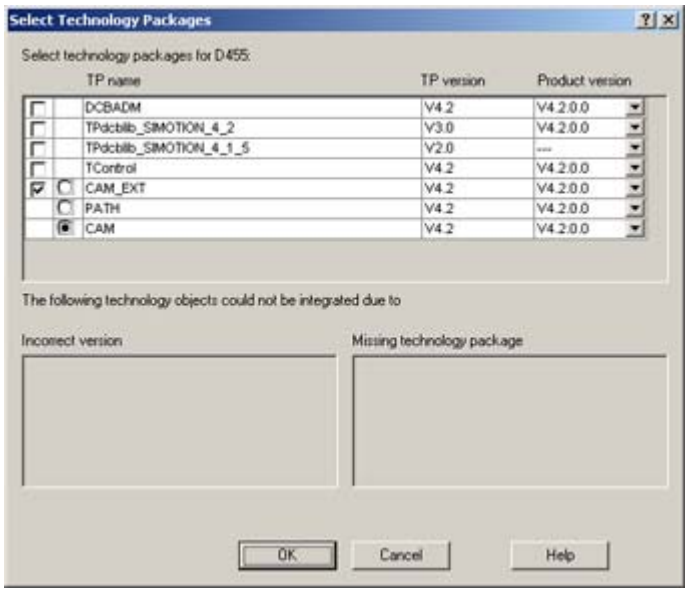


Figure 3-22 Select Technology Packages

3.18 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):

    Remanent variables (VAR_GLOBAL_RETAIN)

    Non-remanent 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 remain valid after an update.
- Unit data backed up using _exportUnitDataSet also remain 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; these can be remanent global unit variables in the interface or implementation sections of a source (VAR_GLOBAL_RETAIN) or remanent global device variables (RETAIN) and
    TO retain data

    (For further information, see Parameter 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 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 remanent global device variables are backed up in the file unitdata.xml. 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. Every subdirectory contains a file named unitdata.xml, where the remanent unit variables are backed up. If required, another file is saved containing the non-remanent global variables for the source. 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.

Additional references

Detailed information on this topic can be found in:

- SIMOTION Basic Functions Function Manual, Data Backup from User Program
- SIMOTION SCOUT Online Help

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

3.19 Exporting and importing projects

3.19.1 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 on 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 of ST programs.

Additional references

Please refer to the online help on this subject

3.20 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** menu.
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 followed by the **Target system > Load > Archive project on card** menu command.
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 > Load project from card** menu command.

This assumes that you have backed up the project with **Archive project on card** each time a change was made.

Additional references

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

3.21 Online multiuser mode

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 people to work online on the same SIMOTION device. The following functions can be performed:

- Reading and controlling of system variables and configuration data
- Execution of measuring functions and axis control panel
- Uploading of configuration data
- Uploading of programs or technology objects and other settings (e.g. execution system)
- Editing and downloading of programs (following prior alignment, if applicable)

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

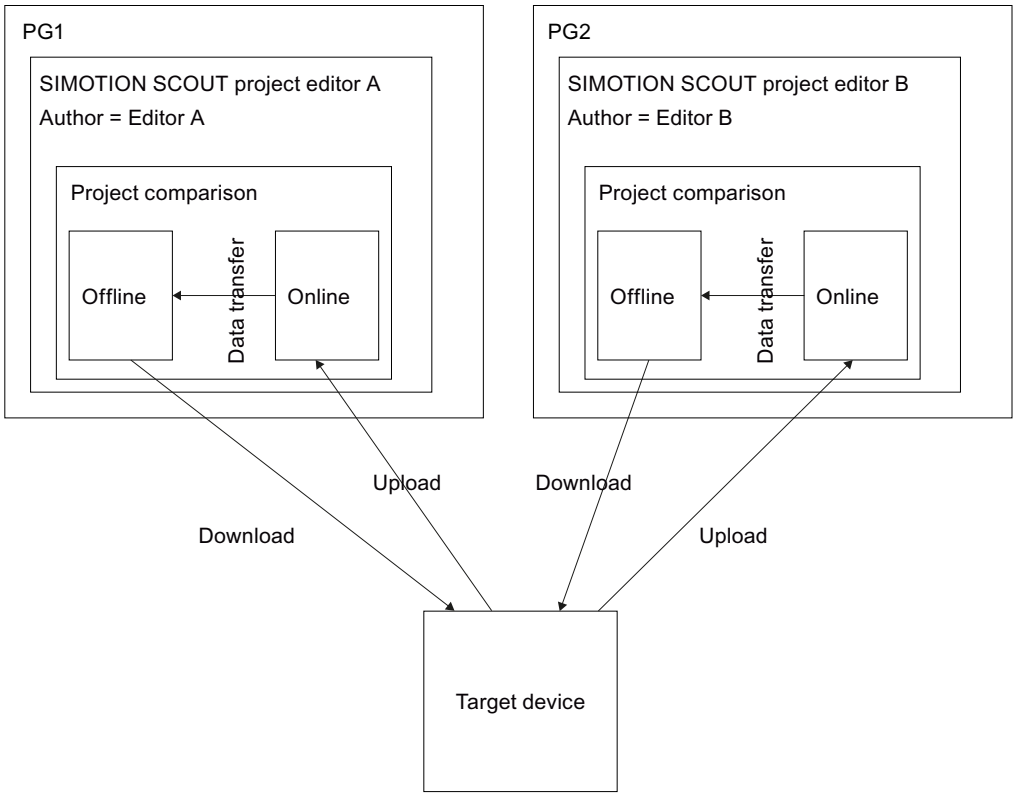


Figure 3-23 Schematic representation of online multiuser mode

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.

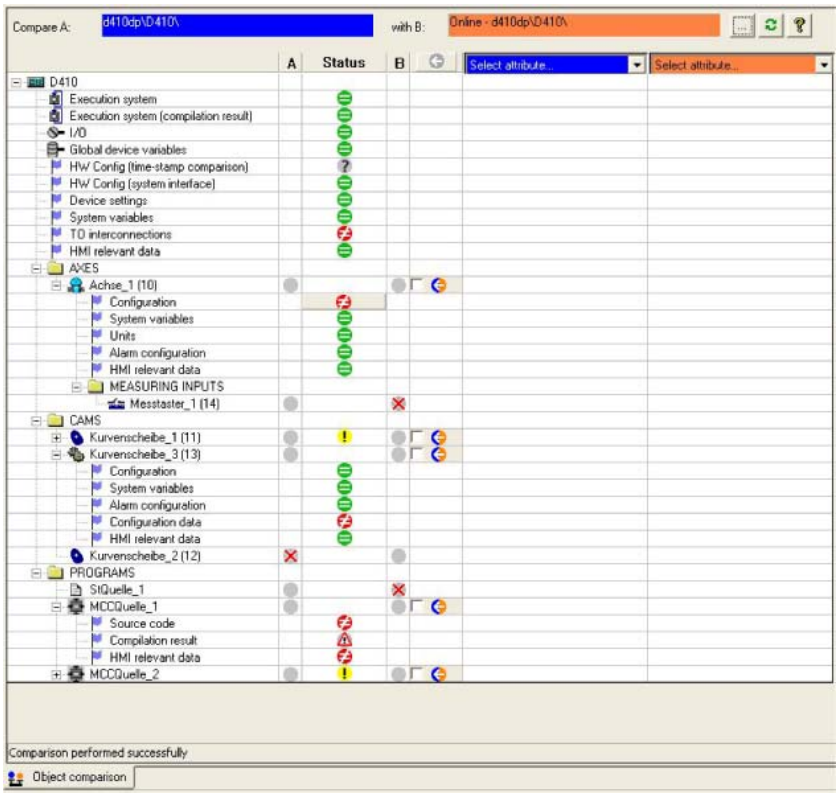


Figure 3-24 Synchronizing project data via the project comparison function

3.22 Licensing runtime

3.22.1 Licensing of the runtime components

3.22.1.1 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, or a P350.

- TControl technology function
  The use of the TControl technology package functions is licensed on a channel-specific basis in packages of 8 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 CompactFlash) and SIMOTION P3x0-3 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 A&D Mall (http://mall.automation.siemens.com)

3.22.1.2 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 memory 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 memory medium
  You can obtain the serial number from the memory 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 3- 7 The serial number on the SIMOTION hardware assigned to the SIMOTION device

SIMOTION device	Hardware serial number of module
SIMOTION C2xx	SIMOTION Micro Memory card
SIMOTION P	SIMOTION IsoPROFIBUS-Board or SIMOTION MCI-PN board
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 memory 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 100)

See also

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

3.22.1.3 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.

3.22.1.4 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...**.

3.22.1.5 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.

3.22.2 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.

Note

Transition from Version 3.0 to a higher version

In a project as of Version V3.1, the license key is stored in a different location than in a Version 3.0 project. You must re-enter the license key in order for Version V3.0 licenses to be recognized in a project as of V3.1.

3.22.3 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.

3.22.4 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.

3.22.5 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.

3.23 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:

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

Target system 4

4.1 Controlling the target system

4.1.1 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

4.1.2 Controlling the operating mode with SIMOTION SCOUT

⚠ DANGER
Danger to personnel and machine can result from an uncontrolled change of the operating mode. Please note the safety regulations before you control a SIMOTION device via the mode selector in SIMOTION SCOUT.

1. Select the SIMOTION device in the project navigator.
2. Select the **Target system > Control operating mode** menu.

   A software switch is displayed. This represents the mode selector on the SIMOTION device or the virtual hardware mode selector (SIMOTION P). The current operating mode is displayed with symbolized switch setting and LEDs.
3. Select the desired operating mode.
   Click the corresponding button.

   The switching options are dependent on the position of the mode selector on the SIMOTION device.

The operating mode can be monitored and switched with the device diagnostics.

Table 4- 1 Operating modes of a SIMOTION device

Operating mode	Description
STOP	• 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	• Technology objects are **active** • Technology objects can execute jobs for testing and commissioning functions. • Otherwise identical to STOP operating mode • STOP U means stop user program • User program is not executed
RUN	• 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
MRES	Overall reset • Switch setting for the overall reset of the SIMOTION C2xx, SIMOTION P350-3, and SIMOTION D

Table 4- 2 Switching possibilities of the software switch depending on the position of the mode switch on the SIMOTION device (with regard to SIMOTION D, see the SIMOTION D4x5 Manual, SIMOTION D410 Manual, D4x5-2 Manual)

Mode selector position of the SIMOTION device	Switching options of software switch in SIMOTION SCOUT
STOP	STOP STOP U MRES
STOP U	STOP U STOP
RUN	RUN STOP U STOP
MRES	MRES STOP

Table 4- 3 LEDs of the mode selector

LED	Description	Color	Meaning
5 VDC	Power OK	Green	Power supply 5 V • Steady: Power supply functioning correctly. • Flashing: Power supply defective
RUN	RUN	Green	RUN mode • Steady: SIMOTION device is in RUN mode. • Flashing: RUN mode is selected (by SIMOTION SCOUT or switch) and the SIMOTION device is on its way there. • Flashing simultaneously with STOP U SIMOTION device is in SERVICE mode. • Off: SIMOTION device is not in RUN mode.
STOP U	STOP User program	Orange	STOP U mode • Steady: SIMOTION device is in STOP U mode. • Flashing: STOP U mode is selected (by SIMOTION SCOUT or switch) and the SIMOTION device is on its way there. • Flashing simultaneously with RUN SIMOTION device is in SERVICE mode. • Off: SIMOTION device is not in STOP U mode.
STOP	STOP	Orange	STOP mode • Steady: SIMOTION device is in STOP mode. • Flashing: STOP mode is selected (by SIMOTION SCOUT or switch) and the SIMOTION device is on its way there. • Flickering (fast flashing): Write access to the memory card • Off: SIMOTION device is not in STOP mode.

Note

The LED displays on SIMOTION devices are described in the associated Manuals.

SIMOTION C and SIMOTION D

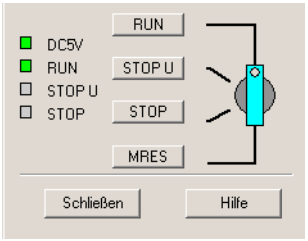


Figure 4-1 Mode selector

Note

For the SIMOTION D, it is recommended that the operating mode be switched with the SIMOTION SCOUT.

On the SIMOTION C, the operating mode can also be set via a rotary switch on the device.

SIMOTION P

Note

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.

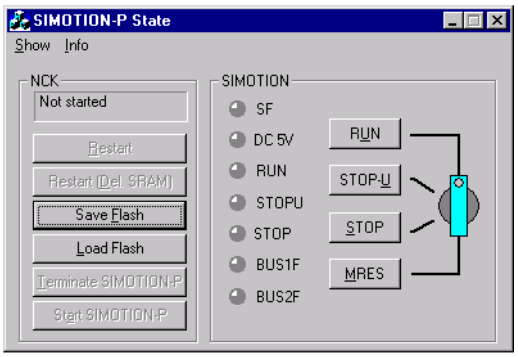


Figure 4-2 SIMOTION P state application

Additional references

Please refer to the following documents on this subject

- Operating Instructions SIMOTION C2xx
- SIMOTION P350-3 and Panels Commissioning and Hardware Installation Manual
- SIMOTION P320-3 and Panels Commissioning and Hardware Installation Manual
- SIMOTION D4x5 Commissioning and Hardware Installation Manual
- SIMOTION D4x5-2 Commissioning and Hardware Installation Manual
- SIMOTION D410 Commissioning Manual

and the SIMOTION SCOUT online help.

4.1.3 Overall reset

Proceed as follows:

1. Start the software mode selector.
2. Click**MRES**.
3. Acknowledge the warning.

On the SIMOTION device, MRES automatically switches to the STOP mode once execution is completed.

4.1.4 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**).

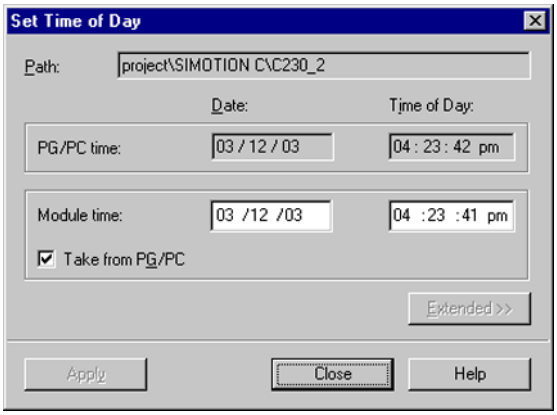


Figure 4-3 Setting the time of day

4.1.5 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

4.1.6 Archive project data to memory card

The **Target system > Archive project on card...** function archives the complete SCOUT project on the MMC/CompactFlash card or hard disk of the P350.
The **Target system > Load project from card...** function loads the archived SCOUT project from the card or the hard disk.

A zip file is archived. This function is only possible in online mode. In addition to the zip file, an info file is saved. This can be read with the **Target system > Load project from card...** function. The following contents are written to the info file:

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

For additional information, see

- Handling Recommendations for Service with SCOUT V4.1 section

4.1.7 Loading to the file system

Use **Edit/Target system > Load to File System** to save data from a device to the memory card/CompactFlash Card or locally to a hard disk.

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

Diagnostics 5

5.1 Using diagnostic functions

5.1.1 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

5.1.2 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.

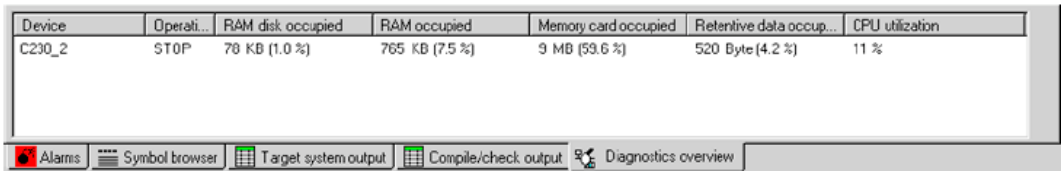


Figure 5-1 Diagnostics overview in the detail view (online mode)

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.

5.1.3 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
- Slaves
- Task runtimes
- System utilization
- User log file
- Syslog file
- Version overview

You have the following options:

- Print:
  Select the **Project > Print** menu.
- Save it as a text file:
  Click **Save**.
- Refresh:
  Click **Refresh** or press the **<F5>** function key.

You can also monitor and change the operating mode:

- Click **Control operating mode**.

5.1.4 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
- Order numbers and names of the components used,
  e.g. SIMOTION device, Motion Control technology package.

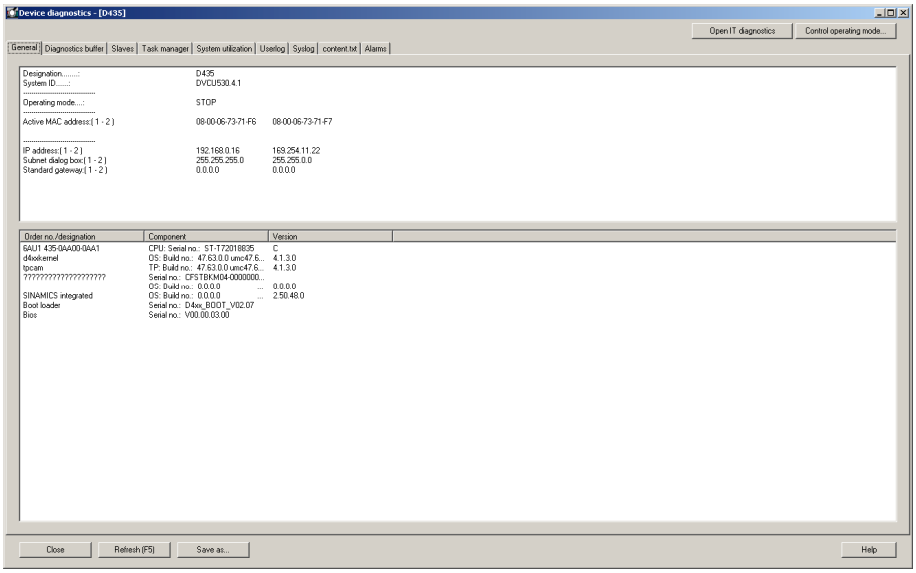


Figure 5-2 Display of general information in the device diagnostics

5.1.5 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 (as of V3.2). 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 errors in the CPU
- CPU operating mode 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.

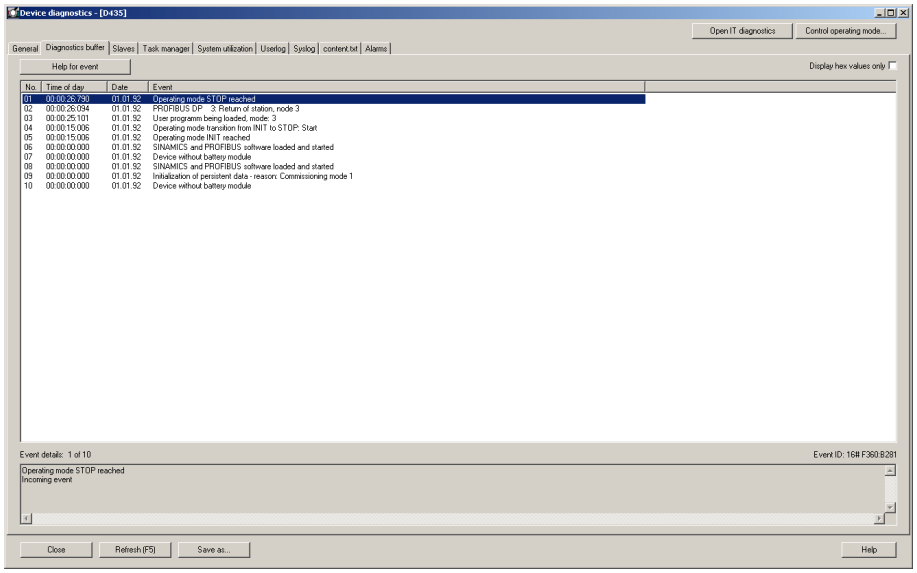


Figure 5-3 Example of the diagnostics buffer display in the device diagnostics

5.1.6 Device diagnostics: Slaves

The devices displayed in the Slaves tab of the device diagnostics are not identical to the display in the Accessible Nodes window.

Note

When you open the Slaves tab, you must refresh the display.

Click the **Update** button or press F5 on the keyboard.

After refreshing the view, the following devices are displayed in the Slaves tab:

- Devices configured in HW Config
- All devices that are configured in the Slaves function

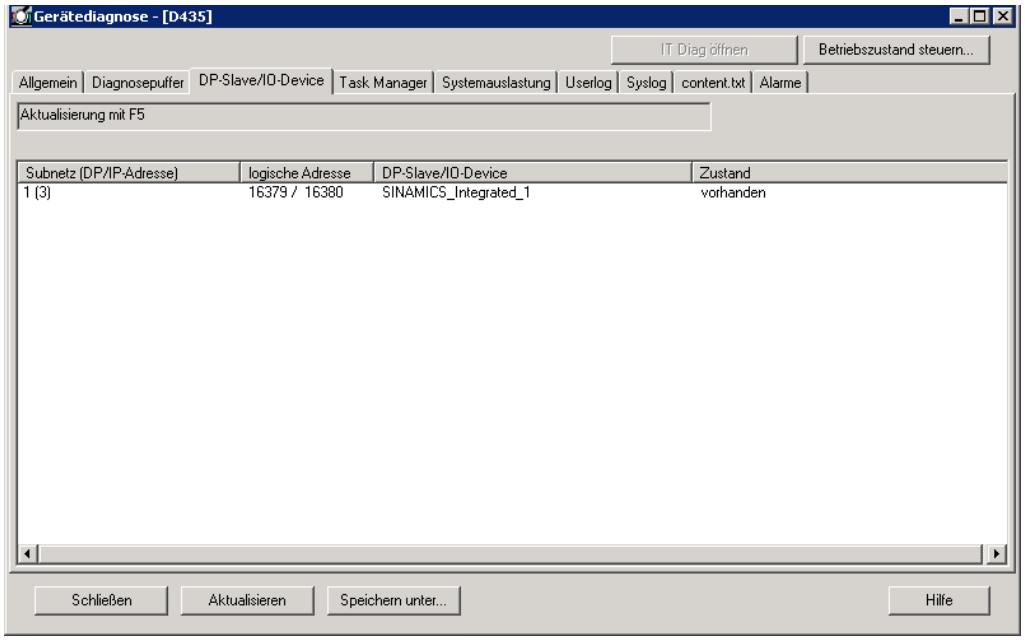


Figure 5-4 Example of the Slaves tab display in the device diagnostics

5.1.7 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 unit. 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.

The following applies to SIMOTION Runtime versions < V4.1:
The display is calculated in the servo cycle clock and has only the resolution of the servo cycle clock. As the task runtime can be less than the servo cycle clock, e.g., for the ServoSynchronousTask or IPOSynchronousTask, the value 0 ms is displayed in this case.

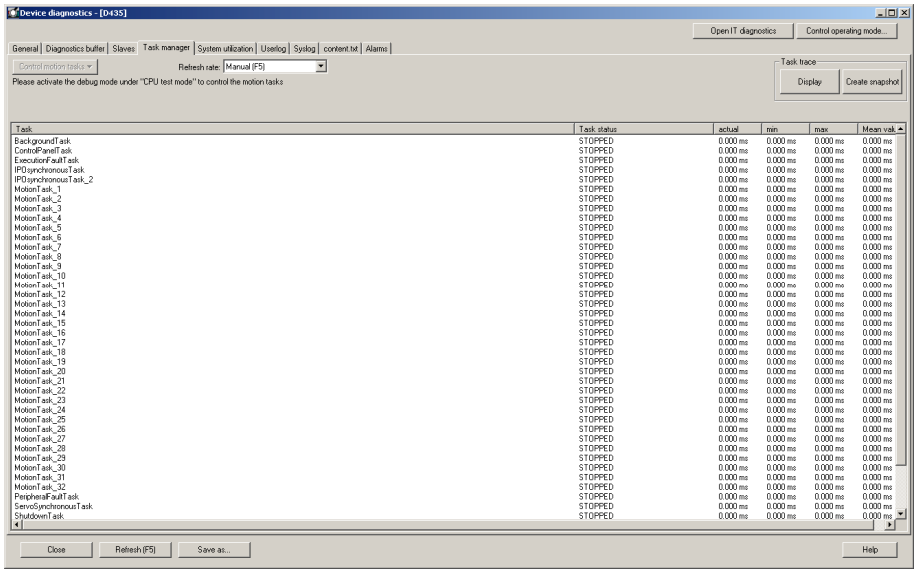


Figure 5-5 Example of the task runtimes display in the device diagnostics

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 8 incoming interrupts can be stored in the buffer. If another interrupt occurs, the buffer overflows and the CPU goes into STOP mode.

- **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

  The 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. To avoid this problem, you can 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

5.1.8 Device diagnostics: Checking the system utilization

To display the system utilization:

- Select the **System utilization** tab in the device diagnostics.

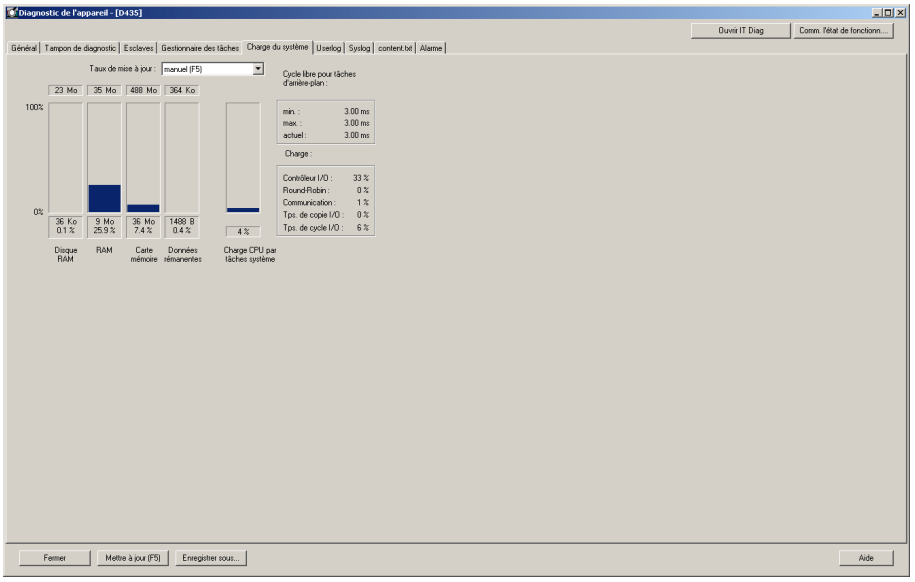


Figure 5-6 Example of the system utilization display in the device diagnostics

Additional references

Further information on this topic can be found in:

- SIMOTION Basic Functions Function Manual, Chapter "Overview of Memory in Target Device"
- SIMOTION SCOUT Online Help

5.1.9 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.

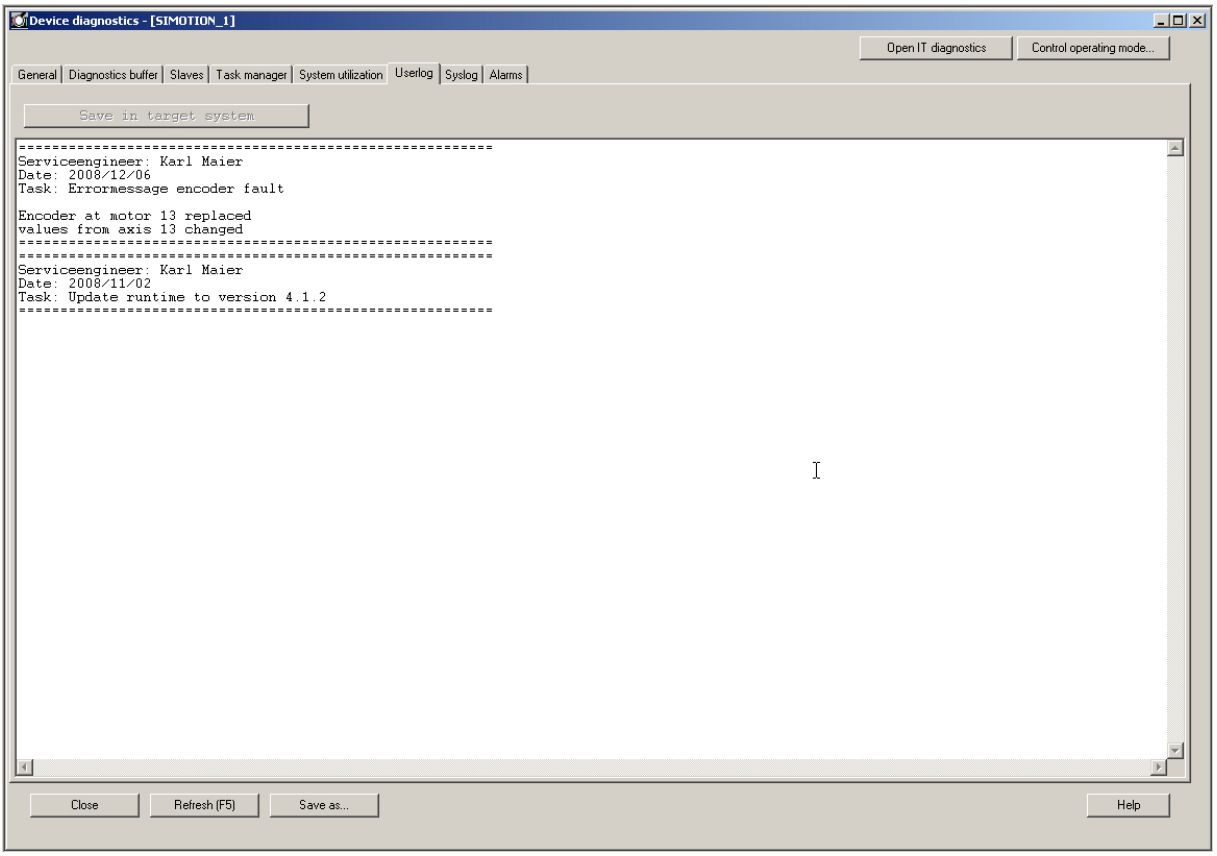


Figure 5-7 Example of the Userlog file display in the device diagnostics

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**.

5.1.10 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

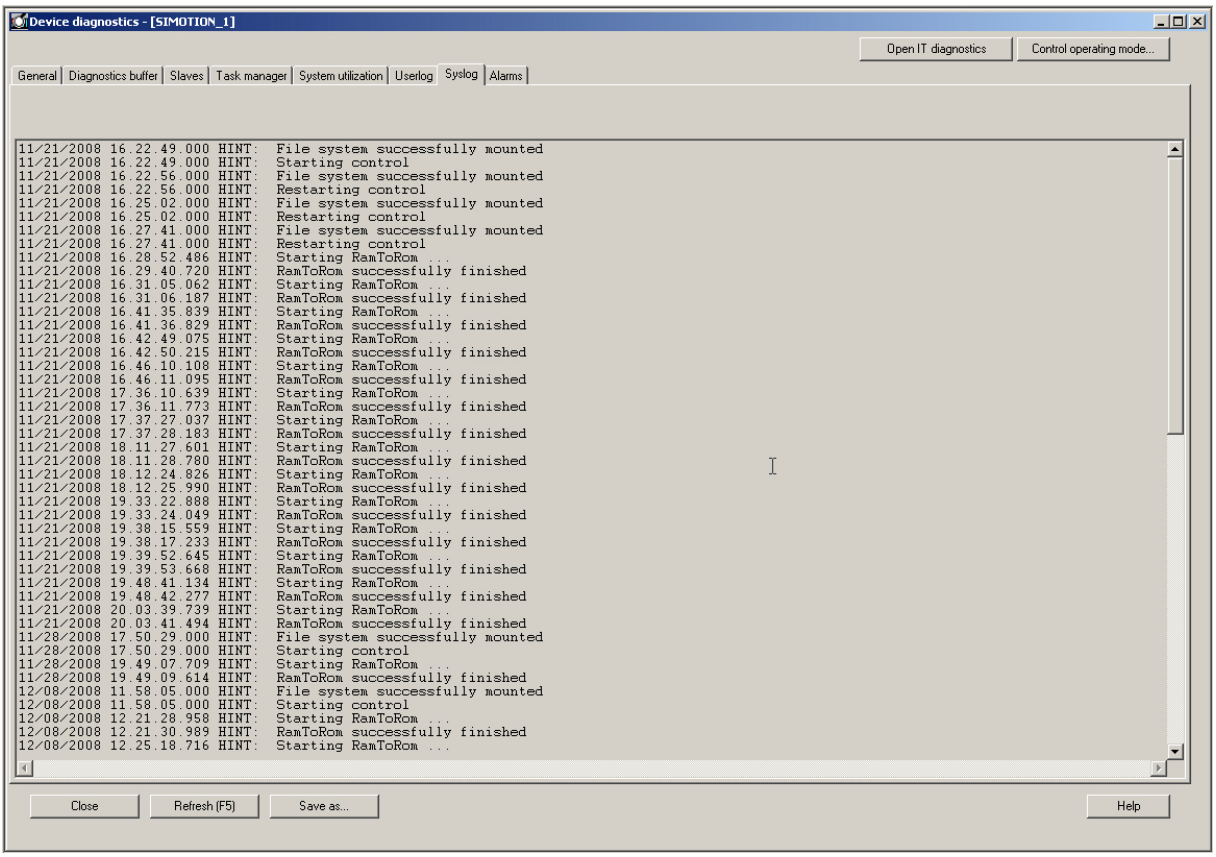


Figure 5-8 Example of the Syslog file display in the device diagnostics

5.1.11 Device diagnostics: Version overview

The version overview tab displays the SIMOTION version and the data of the SIMOTION device stored in the CompactFlash card.

The following data are 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.

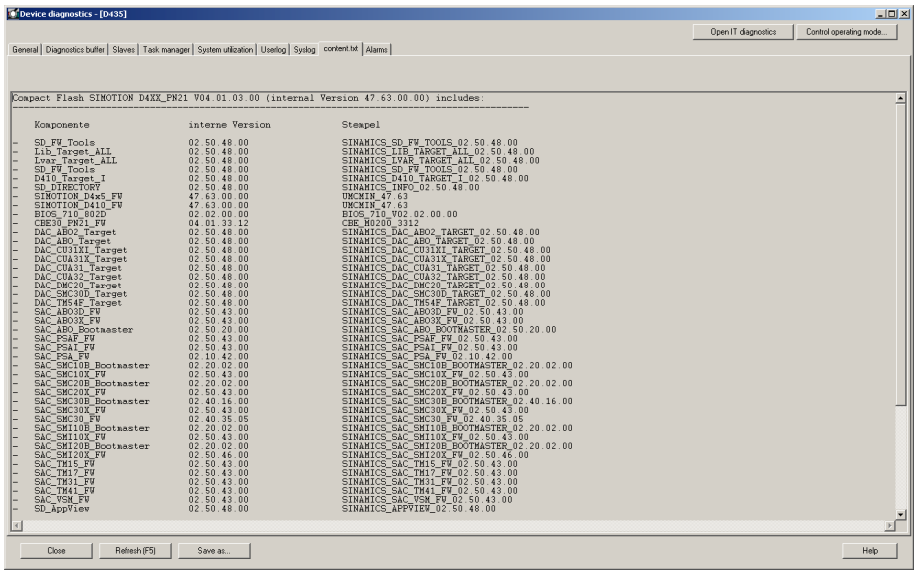


Figure 5-9 Example of the version overview display in the device diagnostics

5.1.12 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.

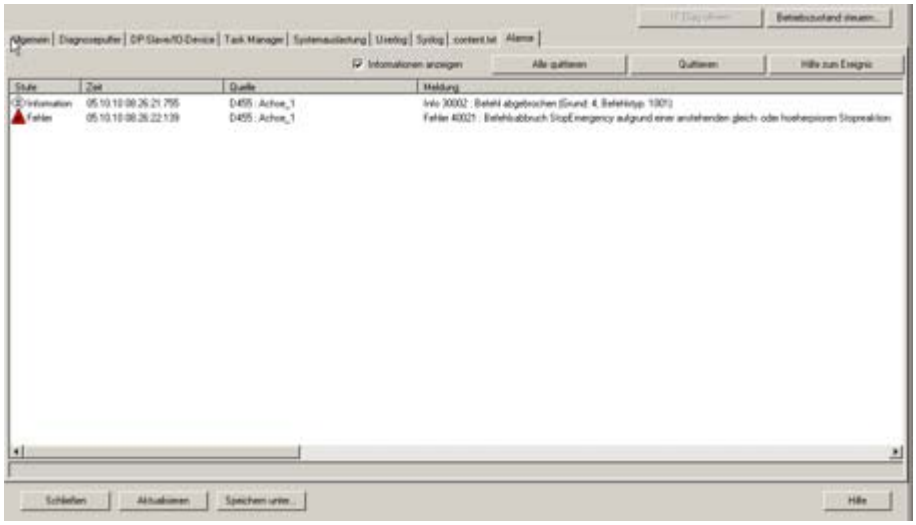


Figure 5-10 Device diagnostics - Alarms

5.1.13 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.

5.1.14 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.

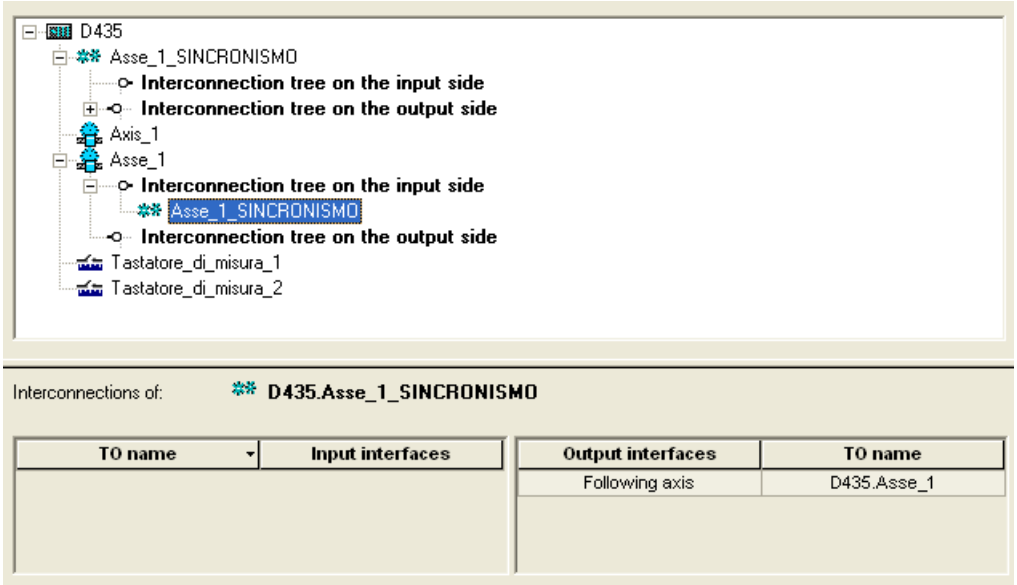


Figure 5-11 Example of an interconnection overview

Additional references

Further information on this topic can be found in:

- Function Manual: SIMOTION Basic Functions
- SIMOTION SCOUT Online Help

5.1.15 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.

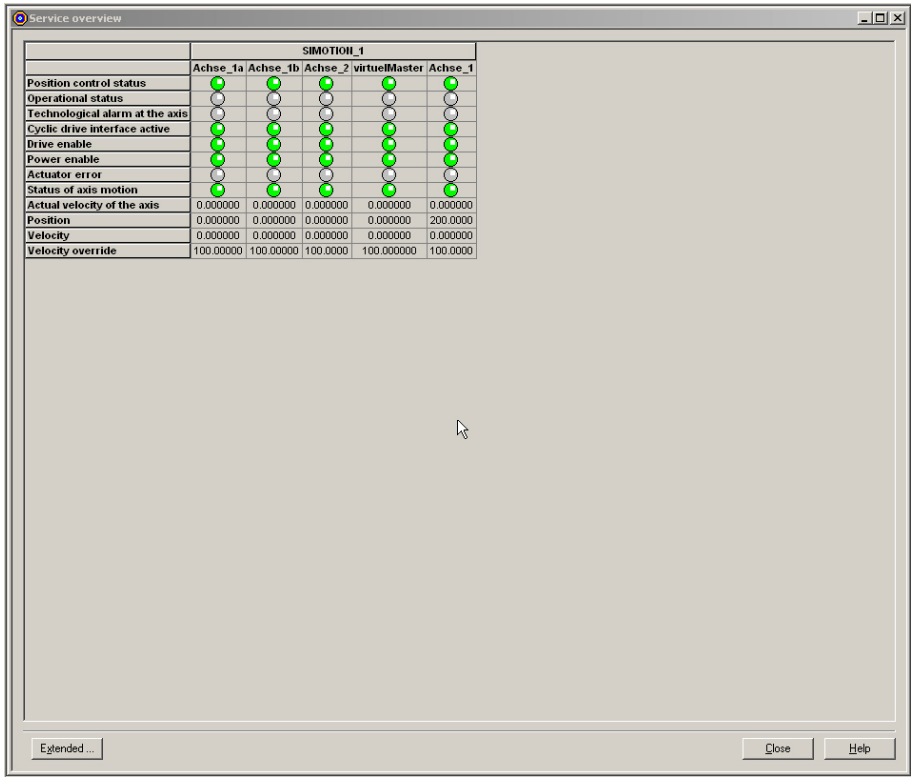


Figure 5-12 Service Overview

5.1.16 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

5.1.17 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 the following functions in the context menu.

- Operating mode ...
- Device diagnostics ...
- Copy from RAM to ROM ...
- Licenses
- Log files
- Archived project
- SINAMICS Upload

Additional references

For additional information on this topic, refer to:

- SIMOTION SCOUT Online Help

5.1.18 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.

5.1.19 Project comparison

You can use the SIMOTION SCOUT/Project comparison starter 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.

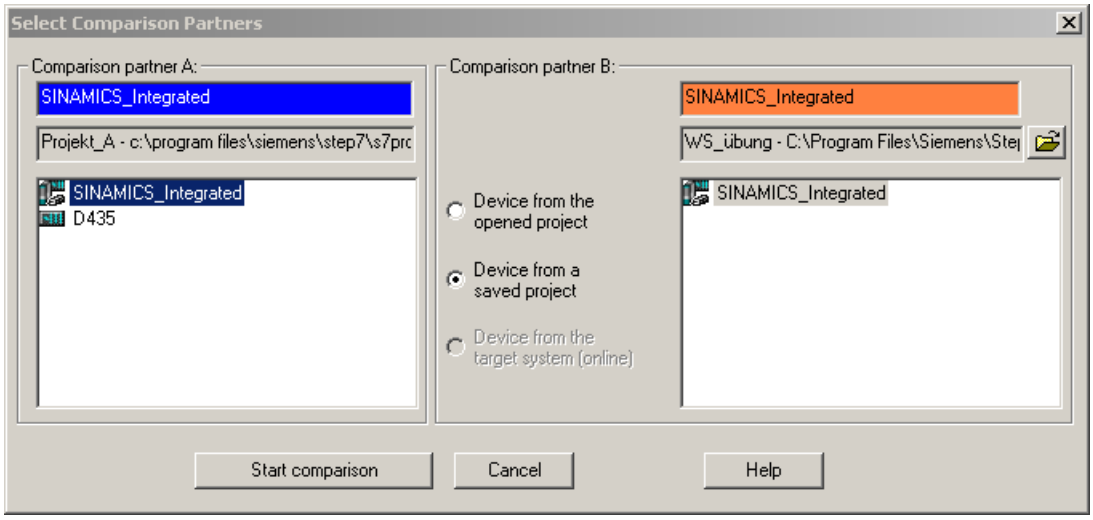


Figure 5-13 Select comparison partner dialog

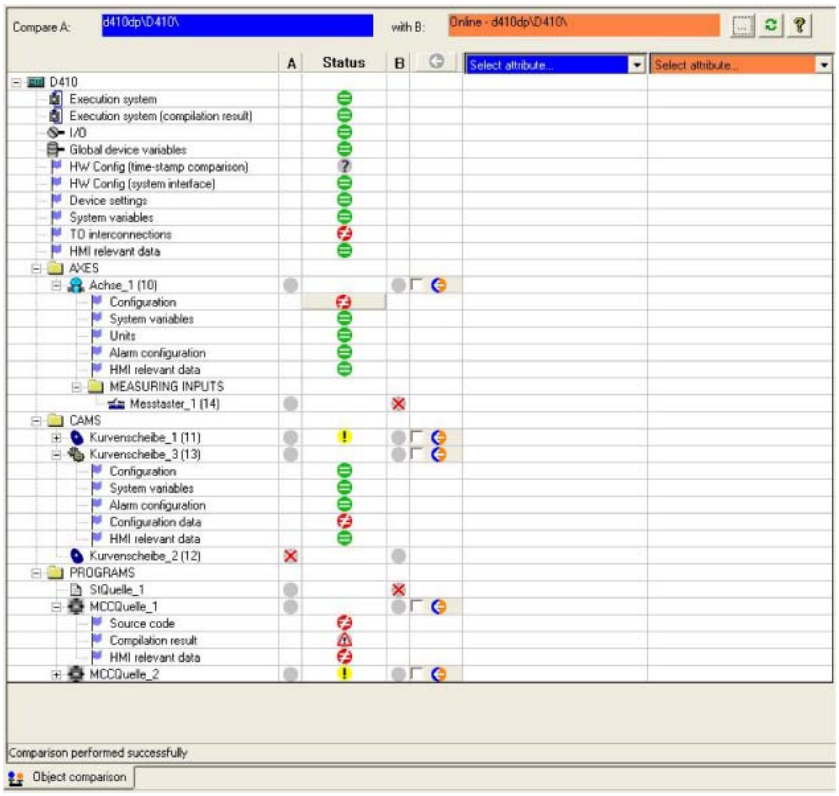


Figure 5-14 Synchronizing project data via the project comparison function

Note

A detail comparison is only possible if supplementary data (e.g. program sources) has also been downloaded to the target device (Options > Settings > CPU download).

References

For detailed information, refer to:

- Function Manual: SIMOTION Project Comparison
- SIMOTION SCOUT Online Help

5.1.20 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.

5.1.21 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*.

Upgrading and project updates 6

6.1 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

As far as the P350 is concerned, there are currently only plans to upgrade 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 are 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 6-1 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.

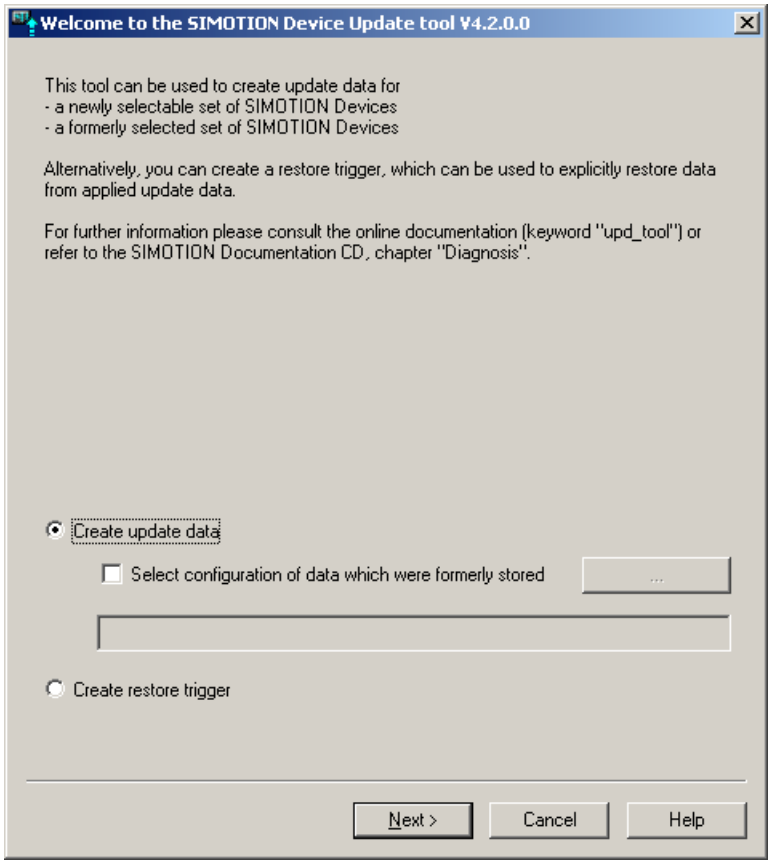


Figure 6-2 Wizard start page: Device Update tool

Additional references

A detailed overview of the update process can be found in:

- Operating Manual: Upgrading SIMOTION Devices
- SIMOTION SCOUT Online Help

Services with SCOUT 7

7.1 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 (Page 93).
You should only use this zip file in future.

The project data can be archived on a memory card in SCOUT.

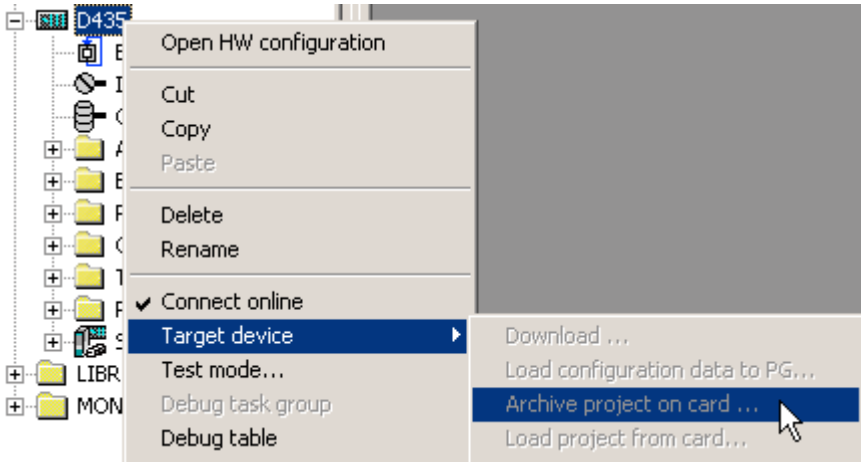


Figure 7-1 Archive SIMOTION project to card

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 (Page 128).

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 context menu **Load project from card...** on 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 Further 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 can 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 box (via context menu).

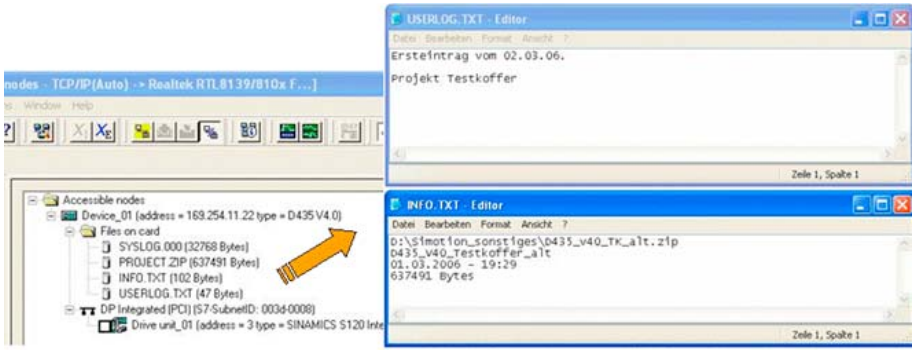


Figure 7-2 Log files via the context menu

- 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 box **Device diagnostics**.

Below are other data, which are stored on the memory card and can be accessed from this dialog box:

- USER/SIMOTION/HMI/PRJLOG/info.txt
  is created with the archived ES project and contains the name, variable, save date.
- USER/SIMOTION/HMI/PRJLOG/project.zip
  archived ES project. Max. 1 archived project can be archived on the memory card using SCOUT.

The above-named files visible in the dialog box 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

7.2 Project was created in Version V3.2 SP1/V4.0/V4.1

If the project was created in Version V3.2 SP1/V4.0/V4.1, remember the following points:

- If SCOUT V4.2 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 V4.2; the SIMOTION device version is not converted.
- After the project conversion, the system asks whether the project should be opened write-protected.
  If the project needs to be changed, the write protection can also be revoked later.
  - Select **Project > Revoke write protection** from the menu bar.

7.3 Project V3.2 SP1/V4.0/V4.1 was edited with SCOUT V4.2

If the project of version V3.2 SP1/V4.0/V4.1 was edited with SCOUT V4.2, remember 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

In case of a back-conversion to the V3.2 SP1/V4.0/V4.1 project format, the V4.2 internal compilation results of the **changed** sources are 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 using SCOUT V4.2, the engineering project should remain in Version V4.2. 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 box.

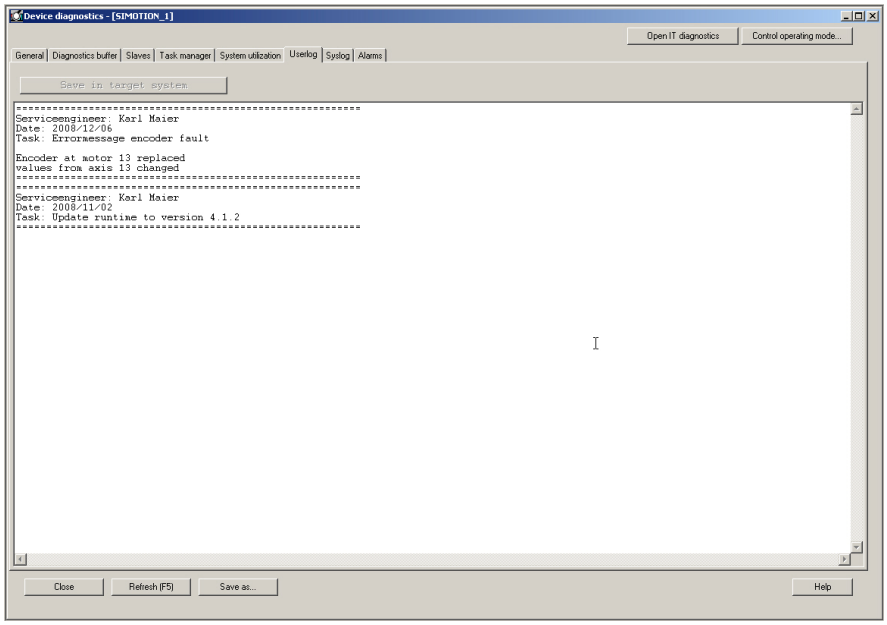


Figure 7-3 Example of the User log file display

7.4 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
```

Advanced Diagnostics on SCOUT crash

8

In the rare event of a SCOUT crash, important diagnostics data can be stored. This data is important for the reproducibility of the error in order to determine the cause. Contact the hotline straightaway and forward the diagnostics data.

The following dialog "Siemens Automation Diagnostics" would open:

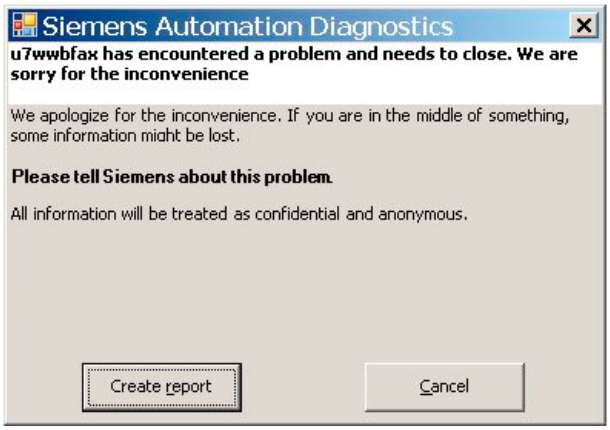


Figure 8-1 Siemens Automation Diagnostics

Please note the following:

1. Click on the **Create report** button to generate the diagnostics data.
   Another dialog opens.

Note

If you close the dialog by pressing **Cancel**, the diagnostics data is **not** saved!

Figure 8-2 Generate Diagnostics Data

2. Click **Details**button. Another "Siemens Automation Diagnostics" dialog is displayed.

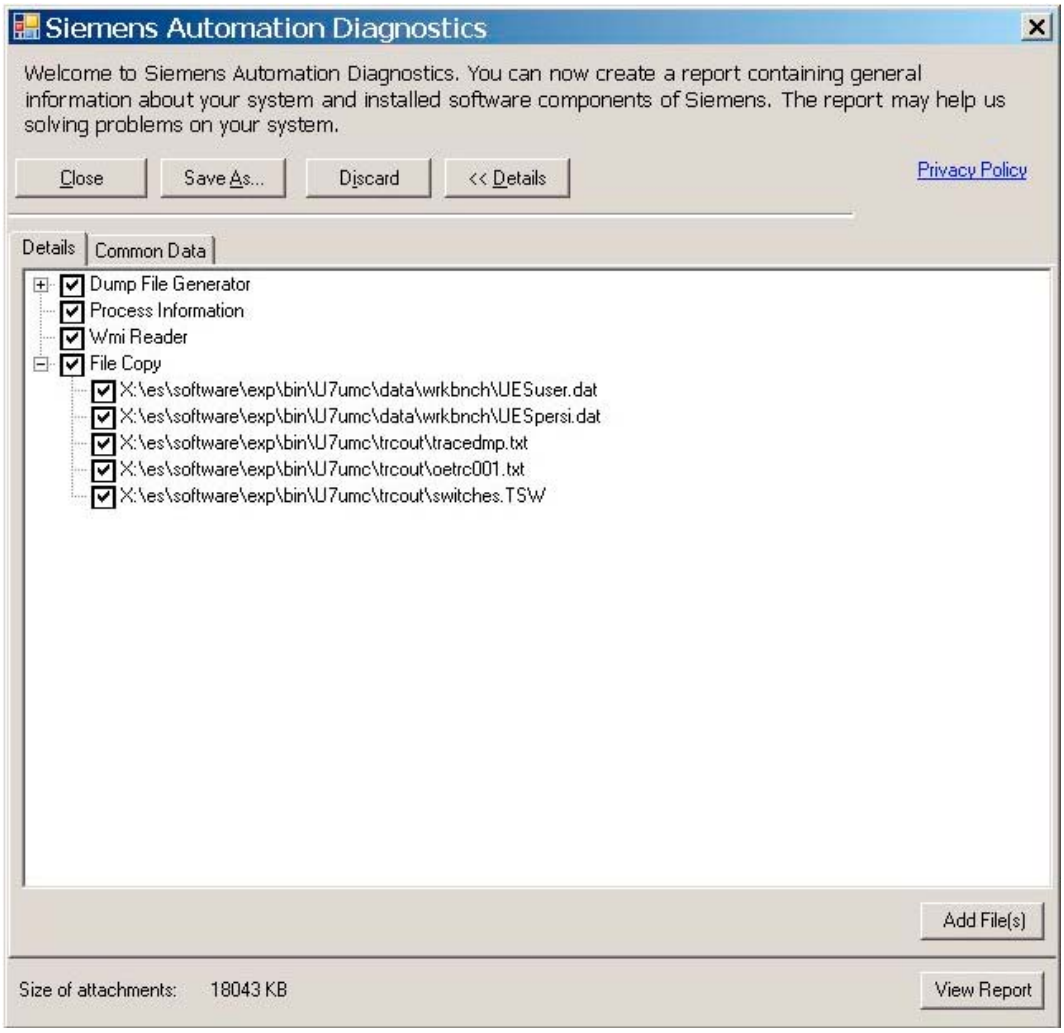


Figure 8-3 Siemens Automation Diagnostics - Details

In this window, there is more detailed information in the **Details** and **Common data** tabs.

- **Add File(s)** button

  Here, you can add more user-specific files to the diagnostics directory.

- **View Report** button

  The problem details are displayed in plain text.

- **Close** button

  The dialog closes. The diagnostics data is saved in the following default directory:

  – U7umc/data/AdvancedDiagnostic/<files>

- **Save As** button

  You can select a user-defined directory to save the diagnostics data to.

- **Discard** button

  Corresponds to 'Cancel', the diagnostics data is not saved.

Network configuration and HMI connection 9

9.1 Rules for arranging modules in 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 9- 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.

9.2 Routing

Routing describes the relaying of information from one 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 diagnostic 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.

For more details on this topic, see the following documents:

- SIMOTION Communication System Manual
- SIMOTION D4x5/D4x5-2 Commissioning and Hardware Installation Manual

9.3 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 device1.

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 are possible.
For more information, please contact your local Siemens representative.

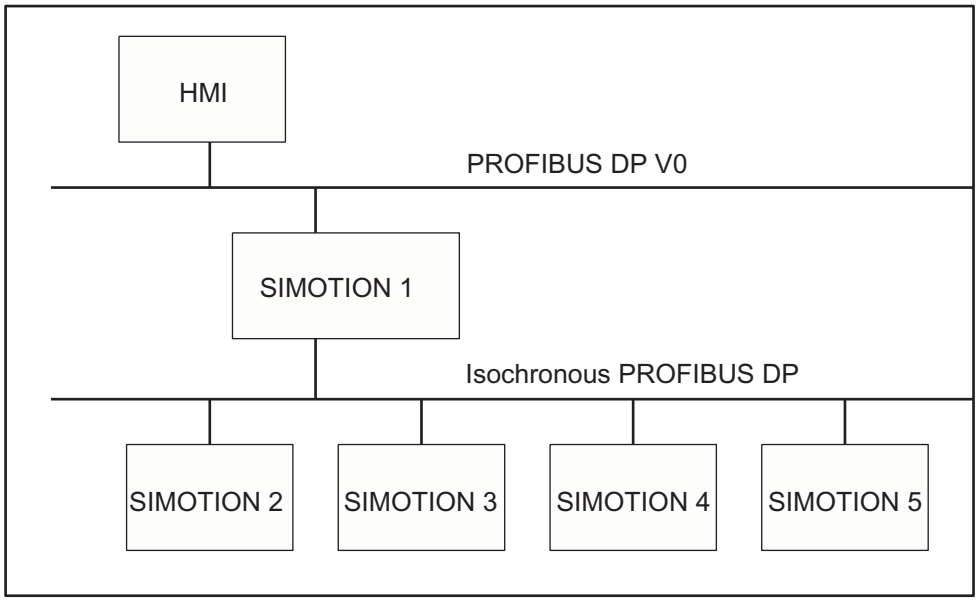


Figure 9-1 Example for the connection of an HMI device to a group of SIMOTION devices

Note

Routing via a controller, e.g. C2xx, P350 or D4x5, is only possible if the controller 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.

9.4 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.

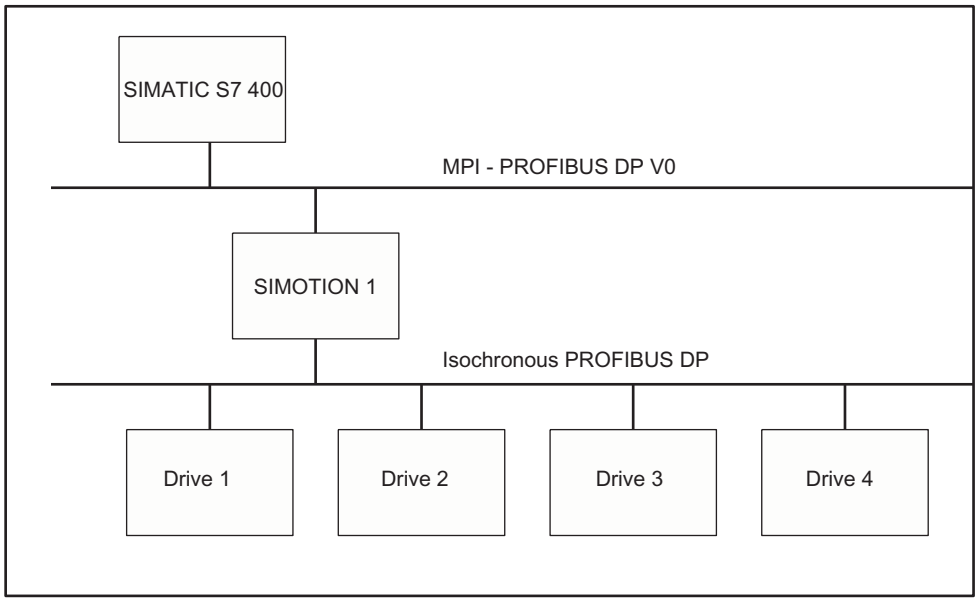


Figure 9-2 Higher-level automation system with SIMOTION device

Additional references

For additional information, refer to:

- *SIMOTION Communication* System Manual

Scripts for SIMOTION

10

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.

Creating an example program for axis positioning in SIMOTION SCOUT

11

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

Set four programs with MCC.

- motion_1
- backgr
- perfault
- tecfault

Creating a program with MCC

1. Open the **Programs** folder under 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.

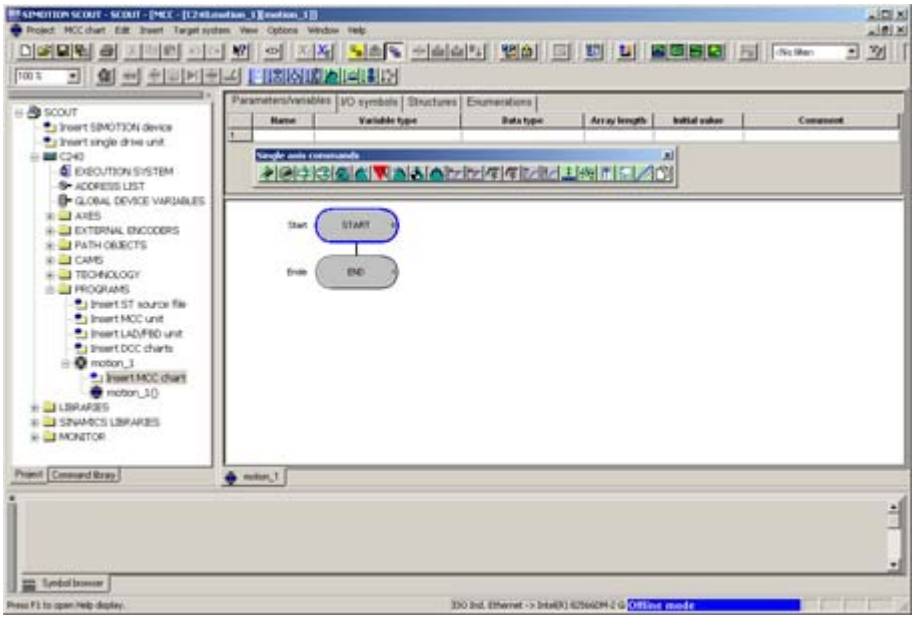


Figure 11-1 Menu bar of the single-axis commands

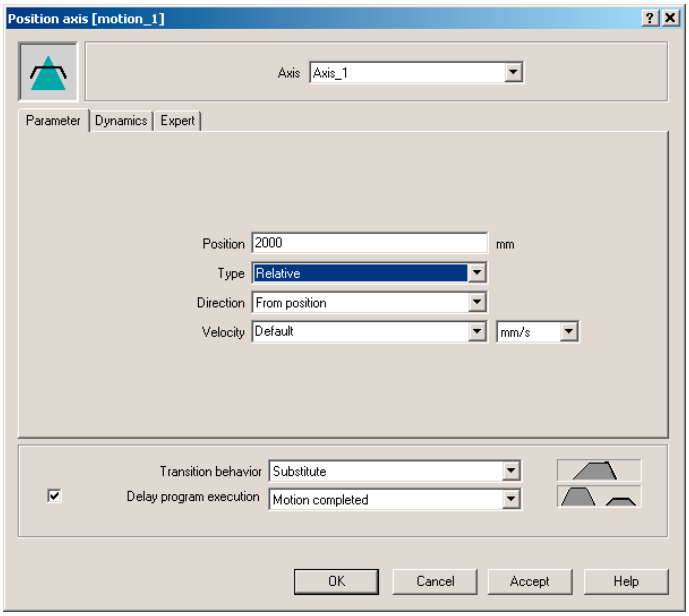


Figure 11-2 Opened command: Position axis

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.

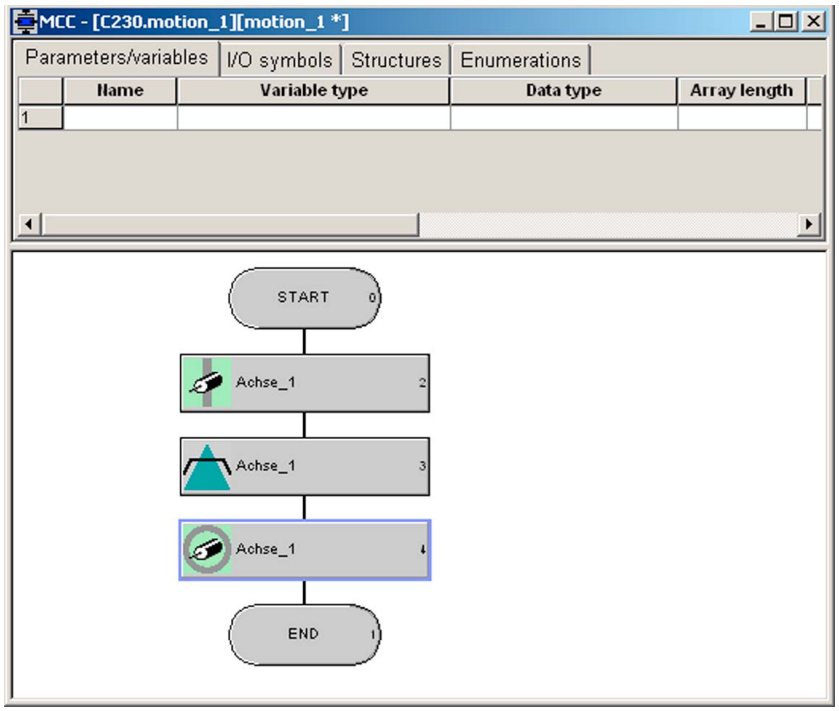


Figure 11-3 Arrangement of the single-axis commands in MCC motion_1

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

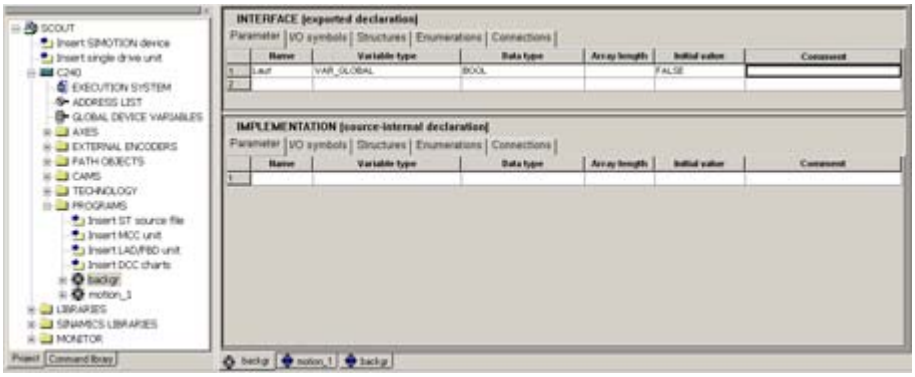


Figure 11-4 Entering a global variable

11. Switch to the MCC Chart **backgr** tab.
12. In the **Program structures** command bar, click on the **IF program branch** icon.

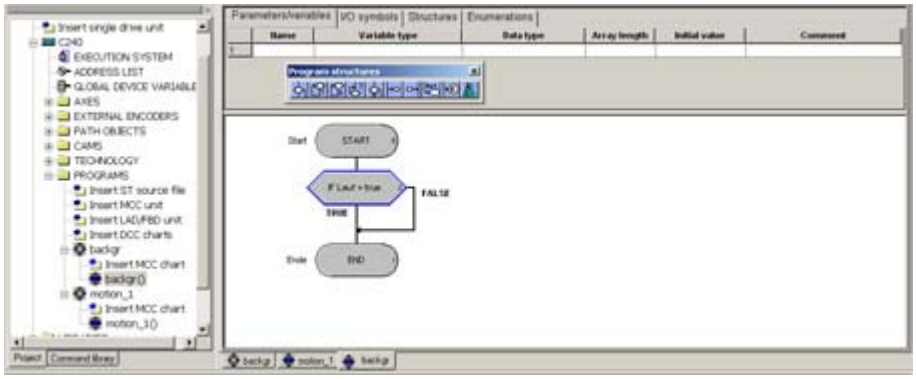


Figure 11-5 IF program branch under basic commands

13. Double-click the **IF program branch** command.

14. Select **Formula** and enter the condition **Run=true**.

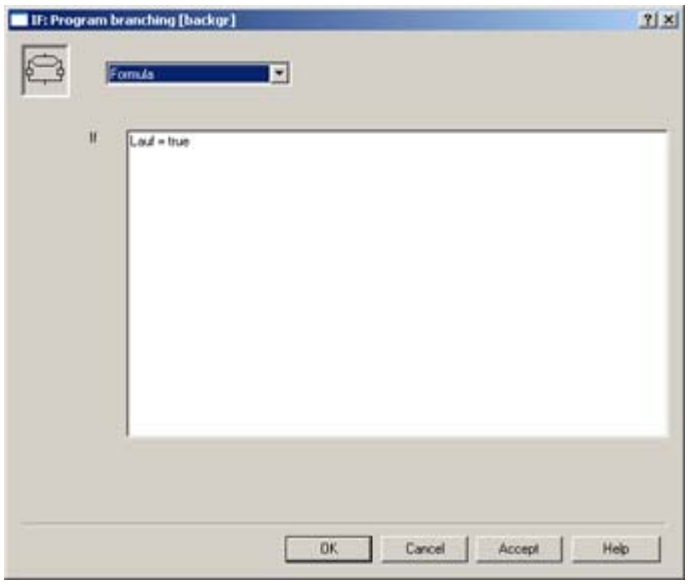


Figure 11-6 Configuration of the IF program branch

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**.

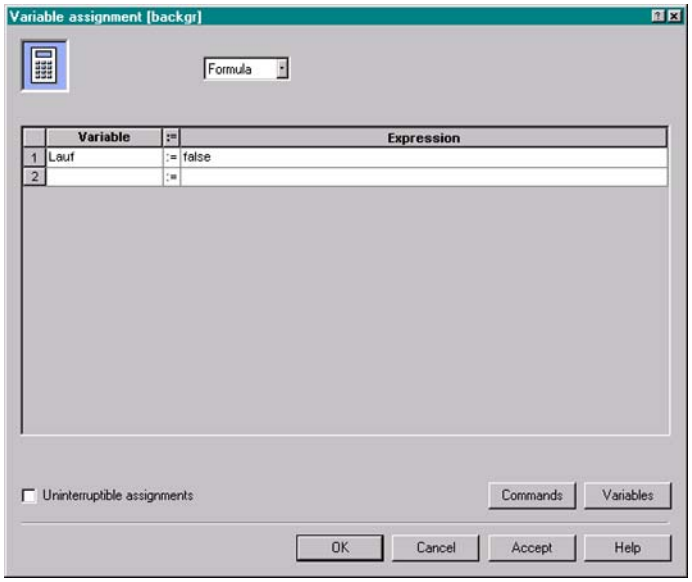


Figure 11-7 Configuration of the variable assignment

22. Click **OK** to confirm.

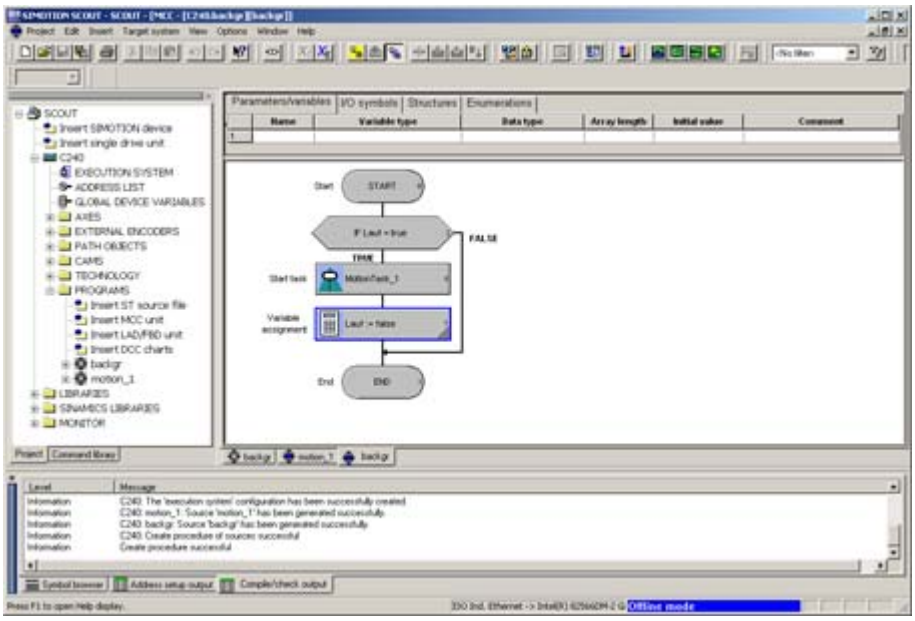


Figure 11-8 Completed program of the BackgroundTask

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** under the SIMOTION device. The execution system is opened in the working area.

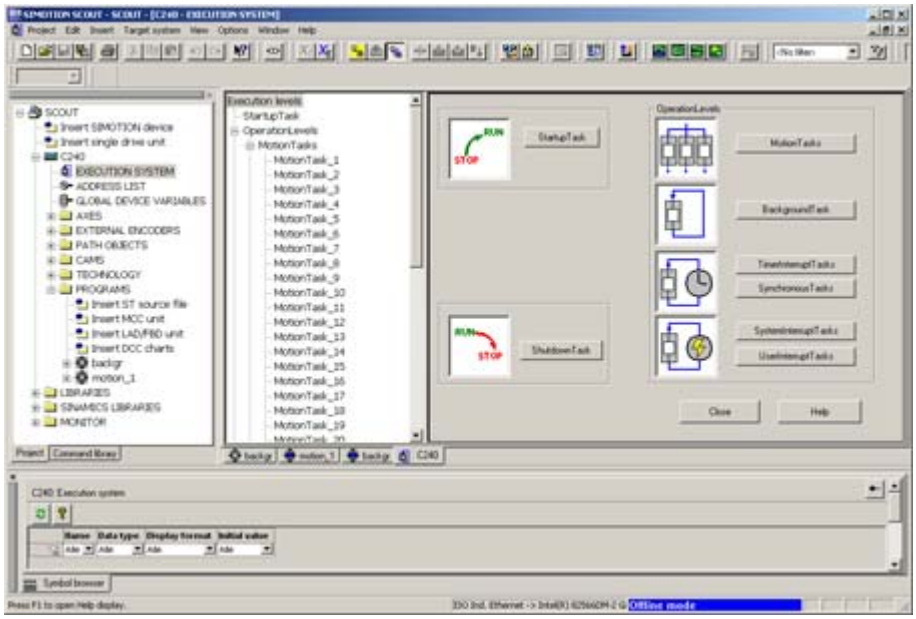


Figure 11-9 Execution system of the SIMOTION device

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.

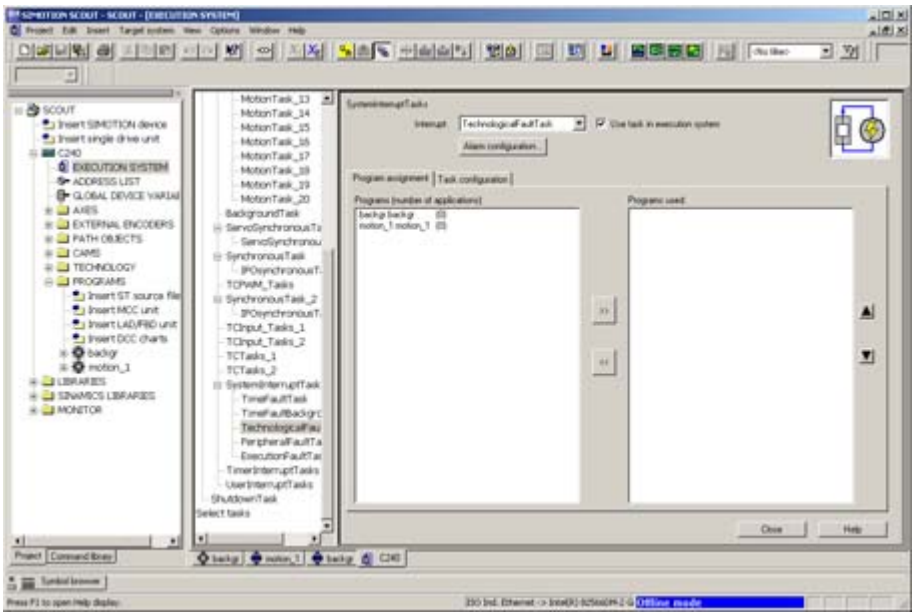


Figure 11-10 Assignment of the tasks in the task system

7. Click the **Save project and compile all** 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 **keyswitch** 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 immediately**. The active command is highlighted in yellow in the program.

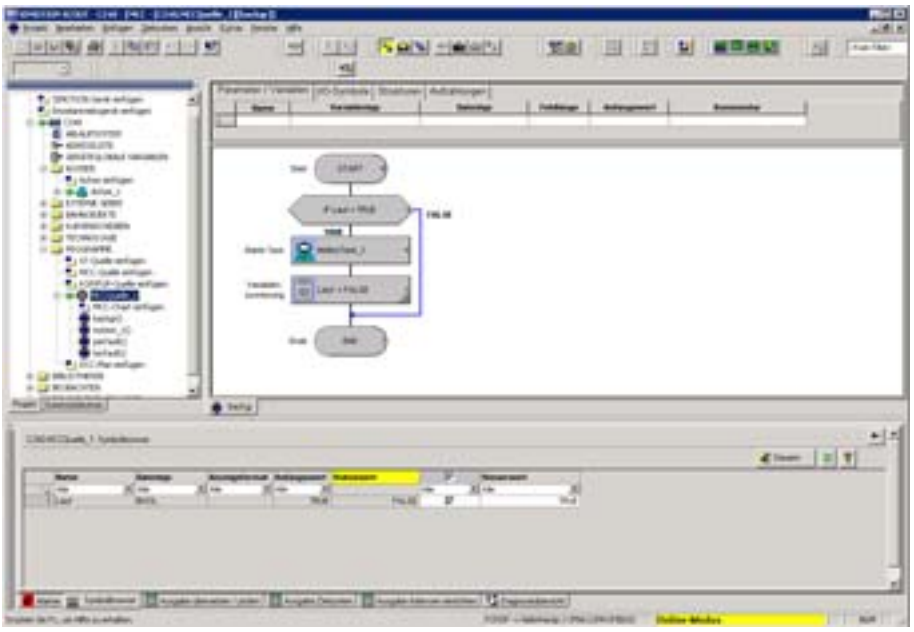


Figure 11-11 Monitoring and controlling the variable in the BackgroundTask

The motor now rotates at 6000 rpm and approaches the position 2000 mm. You can check this by selecting **Axis_1** under **Axes**, opening **positioningstate** in the symbol browser, and noting the **actualposition**.

10. Select the variable to be monitored.
11. Click **Start status**.

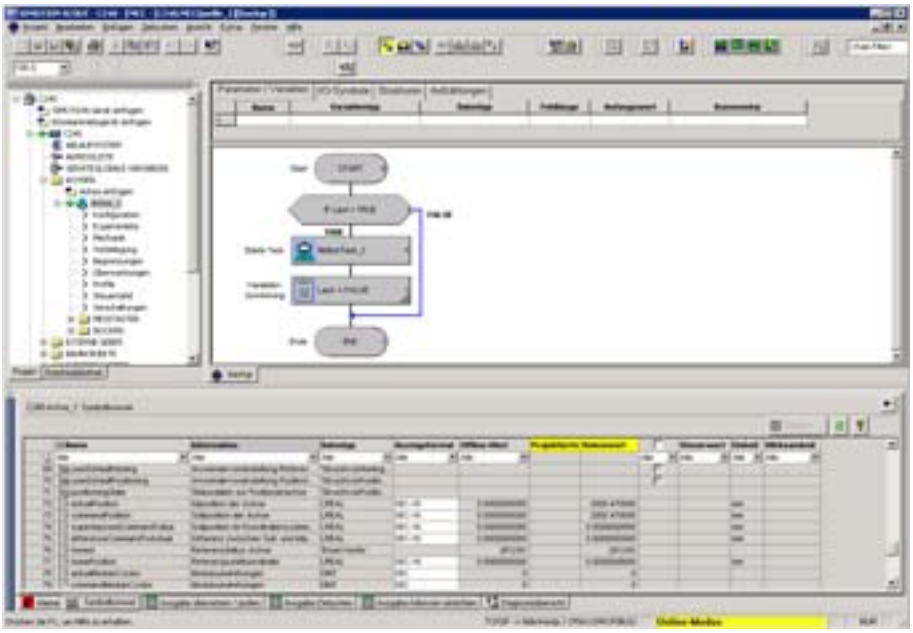


Figure 11-12 Checking the positioning motion in the symbol browser of Axis_1

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.

Product combinations

12

12.1 Compatibility

12.1.1 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 (under 1_Important) as well as on the Internet at:

http://support.automation.siemens.com/WW/view/de/18857317

12.1.2 Software compatibility

Technology packages with Kernel

The SIMOTION Kernel and the technology packages must always have the same version. Example: Only a TP Cam Version V3.2 technology package will run on a SIMOTION Kernel Version V3.2.

Table 12- 1 SIMOTION SCOUT with SIMOTION Kernel

SCOUT version	Kernel version					
	V2.1.x	V3.0.x	V3.1.x	V3.2.x	V4.0	V4.1
SCOUT V3.2.x	x	x	x	x	-	-
SCOUT V4.0	-	x	x	x	x	-
SCOUT V4.1	-	x	x	x	x	x
x = supported; - = not supported						

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.

Example: If you have installed SIMOTION SCOUT V4.1 and wish to open a project created in SIMOTION SCOUT Version V4.0, the project is converted to V4.1 .

Table 12- 2 SIMOTION SCOUT with project version

SCOUT version	Project created with SCOUT version					
	V2.1.x	V3.0.x	V3.1.x	V3.2.x	V4.0	V4.1
SCOUT V3.2.x*	x	x	x	x	x	x
SCOUT V4.0*	x	x	x	x	x	x
SCOUT V4.1*	x	x	x	x	x	x
x = supported; - = not supported						

* As of SIMOTION SCOUT Version V3.1 SP1, a project can be saved in the project format of an older version (up to Version V3.0), and therefore opened and worked on with an older version of SIMOTION SCOUT.

To successfully convert a project to an older format, no devices or functions must be used which are not implemented in the desired version./

Detailed statements on combining products can be found in the compatibility lists (see section General compatibility (Page 159)).

12.2 Memory media of the SIMOTION devices

Storing on memory media

The online project consisting of the technology package and the user data is saved to a non-volatile storage medium. The storage medium used will vary 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 RUN mode triggers an overall reset, which results in the loss of stored data.

Additional references

More information on this topic is available in

- SIMOTION C Operating Instructions
- SIMOTION P350, SIMOTION P350-3, SIMOTION P320-3, and Panels Commissioning and Hardware Installation Manual
- SIMOTION D4x5 and SIMOTION D4x5-2 Commissioning and Hardware Installation Manual
- SIMOTION D410 Commissioning Manual
- 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 with D410, D4x5-2) or
- Using a buffered SRAM (e.g. D4x5).

With an SRAM, buffering uses a SuperCap and (this is optional) a battery.

You can back up the non-volatile data to a memory card (e.g. CompactFlash or MMC)

- To avoid loss of data with an SRAM if the buffer fails
- 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

12.3 STEP7

12.3.1 SIMATIC Manager

Open 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.

12.3.2 SIMATIC logon (V4.1.1)

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 STEP7 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 [as per FDA 21 CFR Part 11].

Installation / Prerequisites

The STEP7 V5.4 SP1 options SIMATIC Logon and Version Trail must be installed and licensed in addition to SIMOTION SCOUT V4.1.

Features

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.

- If a project is opened in SCOUT that has an access protection set with **SIMATIC Logon**, the access dialog appears in which the project password must be entered. This means the correct password must be entered to open the project.
  If an incorrect password is entered, an error message will be issued and the project remains closed.
- Passwords are assigned in a separate administrator screen using a process configured according to the guidelines under 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.

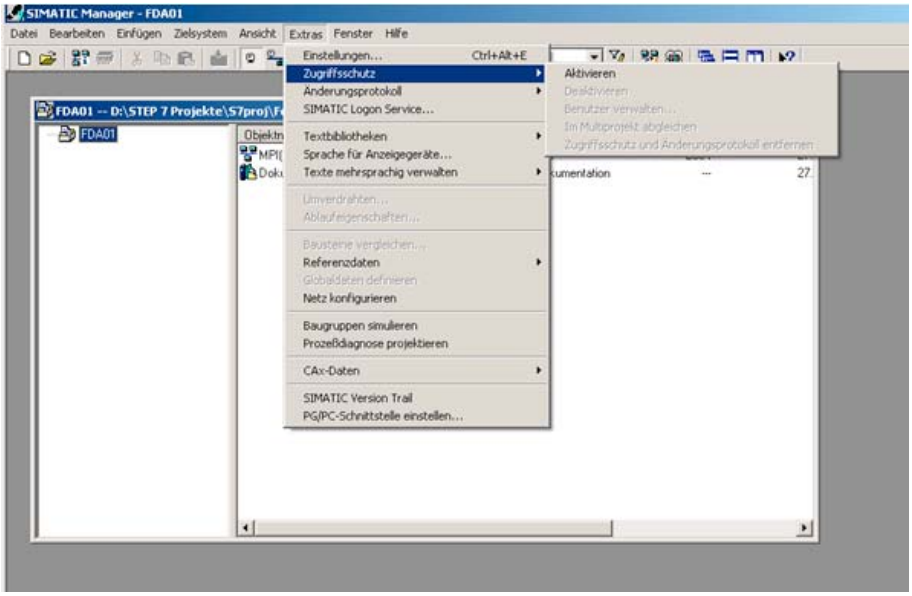


Figure 12-1 Activate SIMATIC Manager access protection

When access protection is activated, the SIMATIC Logon Service window opens. The administrator logs in here to assign a project password for this project.

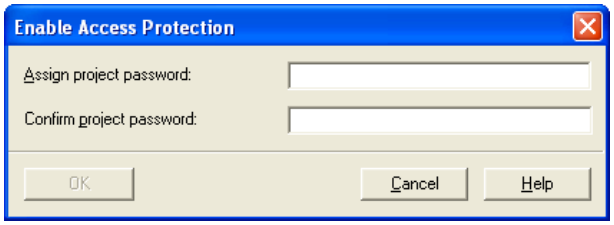


Figure 12-2 Activate access protection

Then the users are entered in the user administration for this project using drag&drop.

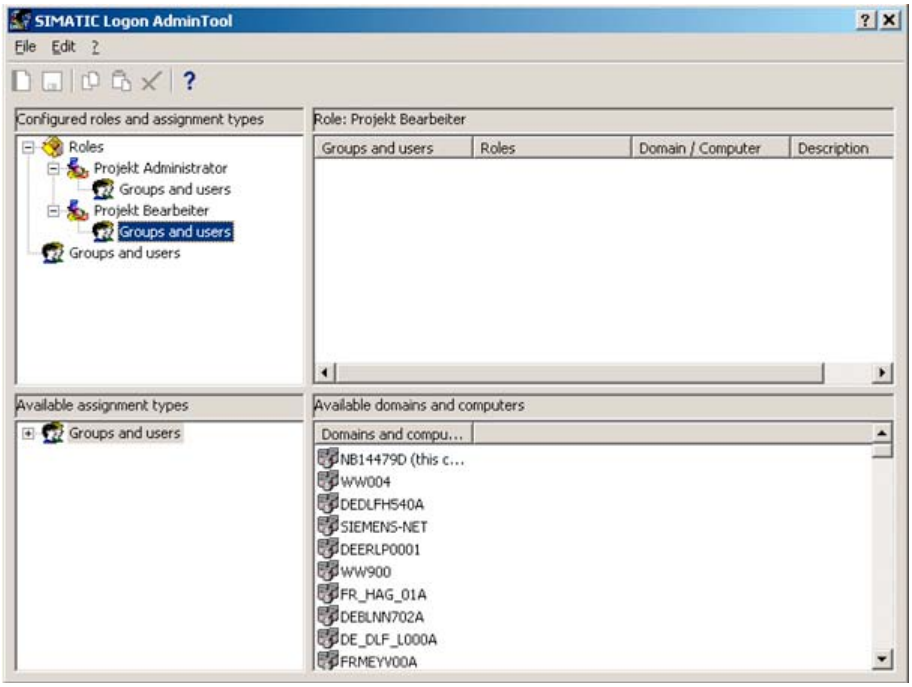


Figure 12-3 SIMATIC Logon AdminTool

Open protected project

When a protected project is opened, the following dialog box appears if SIMATIC Logon is installed. Enter your user name and password here.

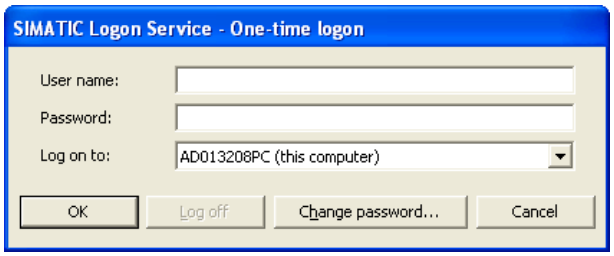


Figure 12-4 SIMATIC Logon service

If SIMATIC Logon is not installed, the project can also be set to open only with the project password using STEP7 V5.4.

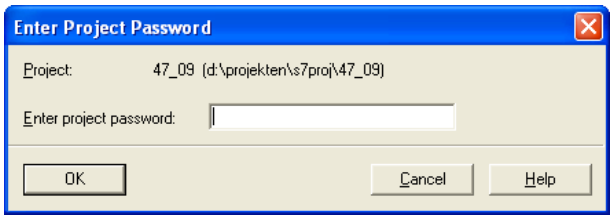


Figure 12-5 Enter the project password.

For more details on this topic, see the following document:

- SIMATIC Logon; SIMATIC Electronic Signature, Manual

12.3.3 SIMATIC Version Trail (V4.1.1)

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 an option in STEP7 V5.4 SP1 and must be installed and licensed in addition to SIMOTION SCOUT V4.1. 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
- Users
- Comments

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.

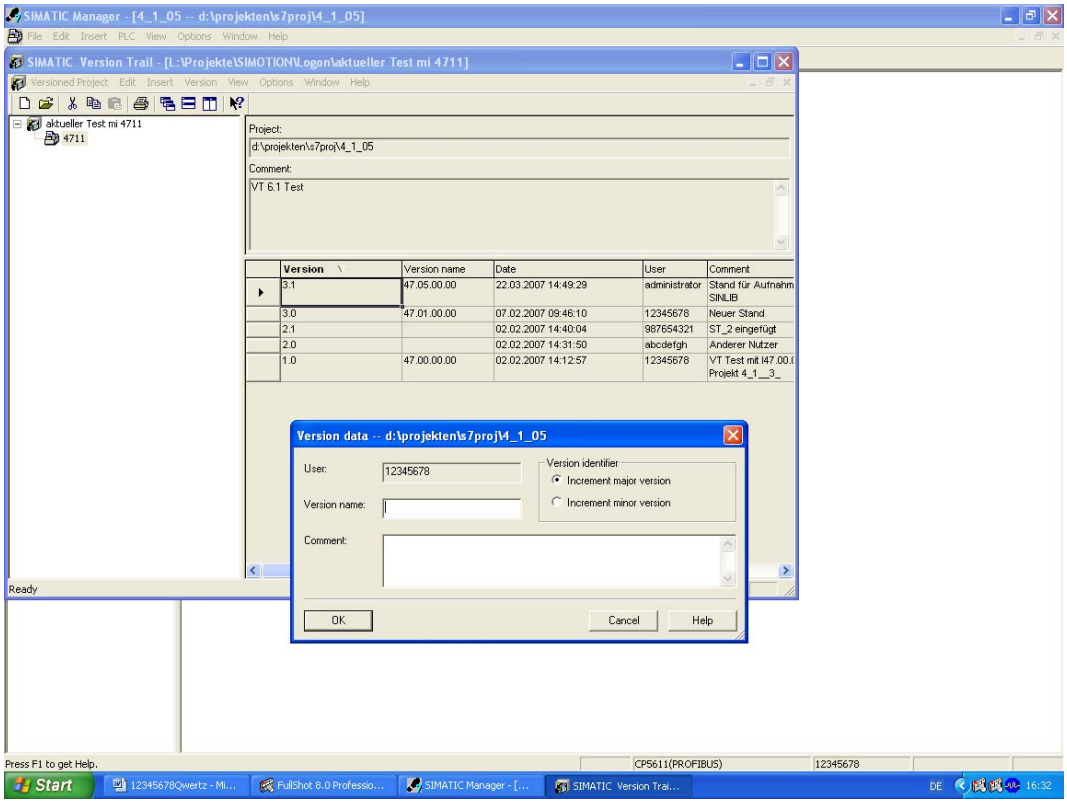


Figure 12-6 SIMATIC Version Trail - version data

Note

Please note that SIMATIC Version Trail cannot be used separately, but only in combination with SIMATIC Logon.

12.4 NetPro

NetPro in STEP7

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

12.5 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.

SIMATIC ProTool/Pro, a modern visualization software under Windows, and the WinCC flexible engineering software are 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 ProTool/ ProTool/Pro

ProTool is the system-wide and uniform **configuration software** under Windows for all SIMATIC HMI operator panels.

SIMATIC ProTool covers the applications of the machine-related area with PC-based control and monitoring solutions for single-user systems based on ProTool/Pro through to the SIMATIC HMI operator panels. For the configuration of the ProTool/Pro runtime for PCs as well as SIMATIC HMI operator panels, the ProTool family has the uniform and scalable configuration tools ProTool/Lite, ProTool and ProTool/Pro CS.

ProTool/Pro is the visualization software under Windows for the PC-based HMI in the machine-related area. It allows quick response times and safe process control.

SIMATIC WinCC flexible

SIMATIC WinCC flexible is the innovative HMI software offered by Windows XP/Vista and 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 the SIMATIC HMI operator panels are dependent on the device class.
Existing ProTool projects can be accepted or converted. 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

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 OPC abbreviation previously means "OLE for Process Control", because the implementation is 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.

12.6 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 for this procedure.

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.

12.7 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.

12.8 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 V3.0 SP1 option package expands SIMOTION SCOUT to include a powerful tool for the fully 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

12.9 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.

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 data

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13.1 Quantity framework

Technical data

Note

Please also refer to the function overview contained in Section 8 of the PM 21 catalog as well as the Industry Mall (http://www.siemens.de/automation/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 P320-3 and Panels Manual
- SIMOTION P350-3 and Panels Manual

13.2 Memory requirement

Memory requirement

Table 13- 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
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 13- 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

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