

1 General

Disclaimer

We have checked the contents of this publication for conformity with the hardware and software described. Nevertheless, deviations cannot be excluded, so that we do not assume any liability for the complete conformity. The information in this publication is checked regularly and any necessary corrections will be included in subsequent editions.

Qualified personnel

The product/system associated with this documentation may only be handled by personnel qualified for the respective task, observing the documentation associated with the respective task, in particular the safety and warning instructions contained therein. Due to their training and experience, qualified personnel are capable of identifying risks and avoiding possible hazards when handling these products/systems.

Trademarks

All designations marked with the trademark ® are registered trademarks of Siemens AG. The other designations in this document may be trademarks the use of which by third parties for their own purposes may infringe the rights of their respective owners.

Notes on Installation and Usage

These notes should be considered more up-to-date than the information in other documents.

Read the notes carefully, because they contain information on installing and using SIMIT. The installation notes in chapter 1 contain important information that you will require in order to install SIMIT. Read these notes before installing the software.

Please be aware that the "External Coupling" will probably be changed in one of the next versions of SIMIT due to technical reasons. In this case all external couplings must be adapted to cooperate with these follow-up versions.

Software disclaimer for simulation products

Siemens offers simulation software to plan, simulate and optimize plants and machines. The simulation- and optimization-results are only non-binding suggestions for the user. The quality of the simulation and optimizing results depend on the correctness and the completeness of the input data. Therefore, the input data and the results have to be validated by the user.

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Security information

Siemens provides automation and drive products with industrial security functions that support the secure operation of plants or machines. They are an important component in a holistic industrial security concept. With this in mind, our products undergo continuous development. We therefore recommend that you keep yourself informed with respect to our product updates. Please find further information and newsletters on this subject at: <http://support.automation.siemens.com>.

To ensure the secure operation of a plant or machine it is also necessary to take suitable preventive action (e.g. cell protection concept) and to integrate the automation and drive components into a state-of-the-art holistic industrial security concept for the entire plant or machine. Any third-party products that may be in use must also be taken into account. Please find further information at:

<https://www.siemens.com/industrialsecurity>

SIMIT allows you to identify simulation models using a unique version number and also to restrict visibility of certain information by providing password protection for macros and components. Please note that these procedures do not provide unimpeachable protection against skilled high effort attacks.

Terms of License and Disclaimer of Liability for Open Source Software

Before installation, please read the files "ReadMe_OSS_en_US.htm" and "OpenSource__Notice_de_Codemeter.pdf" in the root directory of the SIMIT CD.

If you downloaded SIMIT as a self-extracting archive, you can start this program and specify any folder in which you will find these license conditions.

Information on SIMIT on the Internet

You can find all product information about SIMIT on the Internet at:

<https://support.industry.siemens.com/cs/ww/de/view/109746429>

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2 Installation

2.1 Hardware requirements

In order to work with SIMIT, you need a PC with the following minimum requirements for processor speed (recommended by Microsoft), RAM and graphics:

Prozessor	Speicherausbau	Grafik
2 GHz ¹	4GB ²	DirectX 9 graphics device with WDDM 1.0 or higher driver

¹. Processor speed of 2.6 GHz is recommended

². At least 8 GB RAM is recommended

In addition, you need a CD drive and a free USB port.

Both RAM size and the performance of the graphics system architecture have a significant effect on the performance of SIMIT.

If you work with large SIMIT projects with several hundred charts, for example, you should take into account the following hardware requirements.

Recommended hardware requirement for the SIMIT Simulation Platform when working with large simulation projects:

	Processor-speed	RAM	Number of physical cores	Hard disk	Network speed
SIMIT Simulation Platform	>=3,4 GHz	>=4GB	>= 4	SSD	>=1GB

The performance capability of the utilized PC determines the maximum size of a simulation project that can be executed with high performance.

Recommended hardware requirement for the virtual controller for emulation of S7-400 controllers:

	Processor-speed	RAM	Number of physical cores	Hard disk	Network speed
SIMIT Virtual Controller	>=3,4 GHz	>=3GB per VC	1 per VC	SSD	>=1GB

The performance capability of the utilized PC determines the performance of the virtual controller.

For complex simulations with multiple virtual controllers, a single PC often does not have sufficient computing power. You can distribute the computing load evenly by integrating additional PCs into the simulation network.

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You assign each additional PC one or more virtual controllers in the SIMIT project. The recommended hardware requirements also apply here for each VC.

Note: A SIMIT project can have a maximum of 32 virtual controllers.

2.2 Software requirements

SIMIT is released for the following operating systems:

- Windows 7 SP1 Professional, Ultimate, Enterprise (64-Bit, only English Windows language version)
- Windows 10 Enterprise 2015 LTSC (64-Bit)
- Windows 10 Enterprise 2019 LTSC (64-Bit)
- Windows 10 Enterprise 20H2 (64-Bit)
- Windows 10 Enterprise 21H1 (64-Bit)
- Windows Server 2016 Standard Edition (64-Bit)
- Windows Server 2019 Standard Edition (64-Bit)

SIMIT can also be run under one of the supported operating systems as a virtual machine (VM) on a VMware host ESXi V6.5, V6.7 or V7.0.

The executability of SIMIT in other environments is not guaranteed. Use in other environments is at your own risk.

.NET-Framework

The installation of SIMIT requires a .NET framework with at least version 4.6.1. If necessary, you can obtain this from www.microsoft.com/download.

To read supplied PDF files, you need a PDF reader that is compatible with PDF 1.7 (ISO32000-1:2008 PDF).

Write permissions in project directories and the SIMIT workspace in the case of non-exclusive use must be assigned by one user for all other users to be authorized. An administrator must set up these permissions.

Note: The default write permissions in directories available in the operating system depend on the utilized operating system. In addition, tools for creating partitions have their own security guidelines.

2.3 Hibernation

SIMIT blocks the PC from going into hibernation.

2.4 Changing the date / time

Do not change the date or time of your PC as long as SIMIT is open. Otherwise, unpredictable errors may occur.

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2.5 Memory requirements

IMIT uses approximately 650 MB of memory space on your hard disk. The exact value depends on your operating system and the file system used on your PG/PC.

You must also ensure that enough memory space is available on the drive containing the project data. If not enough memory is available during an operation (e.g. saving a IMIT chart or starting the simulation), project data may be destroyed.

It is also recommended that project data not be stored on the same drive as the Windows swap file.

2.6 Compatibility with other software products

IMIT V10.x cannot be installed if IMIT V8.x or IMIT V9.x is already installed. In this case, uninstall the older IMIT version.

No incompatibilities with other software products are known. The simultaneous use of IMIT V5.x or IMIT V7.x and IMIT V10.x may fail, however.

You can check the compatibility with other products by going to the following web page.

<https://www.siemens.com/kompatool>

2.7 Setup

IMIT requires administrator rights for installation. Insert the IMIT CD in the drive. In case your PC is configured appropriately, installation will start automatically. Otherwise, please start installation of IMIT manually by double clicking the program *Start.exe* in the root folder of the IMIT-CD using Microsoft Windows Explorer.

If you have downloaded IMIT as a self-extracting archive, please start this program.

Some notes on required user input during setup:

IMIT can be installed in any folder. Do not specify a folder that already contains data! For using IMIT, only read-access to this installation folder is required.

In addition, IMIT requires a workspace for placing data. For using IMIT, you need read and write access to this workspace. The workspace is usually located at the (hidden) folder C:\ProgramData\Siemens\Automation\IMIT.

IMIT projects may be placed at any location on the file system, independent from these two installation folders.

Note: IMIT registers itself in Microsoft Windows system files. You must not delete, move or rename IMIT files and folders using Microsoft Windows utilities such as the Explorer or modify IMIT data in the Microsoft Windows registry. The program may no longer run properly after such modifications.

2.8 Copy protection dongle

Before using IMIT, you need to plug the dongle that was delivered into an available usb port of your PC. Please do not use extensions or USB-hubs.

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Using the DEMO mode

If there is no valid SIMIT dongle plugged, you can launch SIMIT in DEMO mode. The functionality is restricted in DEMO mode. The purpose of the DEMO mode is to make you familiar working with SIMIT. Productive work is not possible in DEMO mode.

For details please see the SIMIT manual.

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3 New functions and corrections

3.1 Corrections in V10.3 HotFix 3

Virtual Controller VC:

- Combination of regular/faulty VC caused unexpected termination of VC Runtime Service during VC distribution.
- Hashes for PCS7BASISLIBRARY_09.00.03.08_01.03.00.01 added
- Hashes for PCS7BASISLIBRARY_09.00.03.07_01.07.00.01 added
- Hashes for PCS7BASISLIBRARY_09.01.02.00_03.02.00.01 added
- CPU STOP at TIMER functions
- F program was sometimes not processed in VC
- VC crashed after start (not loaded) distributed PCS neo configuration
- AdapterBinding did not recognize all Network Interface Types
- SIMIT VC, close simulation sometimes did not stop VC in time
- VC: S_ODT/S_EVERZ (on-delay S5 timer) did not work correctly
- 10.0>10.3 upgrade, performance optimization in the VC

Component sensor:

- Component Sensor did not work on NAN at simulation startup.

3.2 Corrections in V10.3 HotFix 2

Virtual Controller VC:

- The Virtual Controller blocked a BSEND call after loading a snapshot.
- Some very large projects with flownet could not be started.
- If an IP address ending with 0 was used in VC, connections were not established on this interface.
- F-Timer blocks from F-Lib 1.3 SP2 did not always work correctly.
- SFC15 did not work correctly
- FC 'LOC_TIME' did not return the correct local time (from SSL132 index 8)

Mechatronic Concept Designer

- Problems with signal import from MCD are fixed
- When using a cloud system via Windows Azure (Active Directory), the MCD coupling crashed.

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FlowNet:

- When a bulk power source (Mnode) was connected to an internal node in Flownet, it could happen that the "NETPAR" input of the "Mnode" component was not written in the system despite the "Net Parameter" being connected.

Project startup:

- If the start of the simulation failed due to lack of resources on the system, the rollback took too long.

PLCSIM Advanced

- Problems with PLCSIM Advanced 4.0 SP1 (maintenance mode) were fixed

3.3 Changes in V10.3 Upd1

PLCSIM Advanced Coupling

PLCSIM Advanced does not yet support the isochronous mode implemented in SIMIT 10.3. Therefore SIMIT 10.3 Upd1 implements the previously available bus-synchronous mode again.

SIMIT 10.3 Upd1 requires PLCSIM Advanced 3.0 Upd2.

Conversion of FMUs

The conversion of FMUs that require an external tool now works again without manual intervention.

System functions in data record handlers

Functions available in the cyclic part of components are now also supported in the context of the data record handler.

3.4 Changes in V10.3

Licenses

The values for the maximum available simulation tags have been adjusted to 4000 for SIMIT-S and 16500 for SIMIT-M.

Data record handling

The concept for responding to record write and read requests has been fundamentally revised. It is now documented and can also be used in user-specific components in the CTE.

Find & Replace

The "Find & Replace" function can now also be used to search for "coupling connectors". This includes the "Unit" connector as well as the "Input" and "Output" connectors.

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The "Topology" and "Connector" connector types have been combined under "Diagram connector".

Input- and output connectors

If multiple input or output connectors are selected, the primary selection has a "Adjust Selection" context menu to adjust all other connectors in that selection to the length of the primary selection.

PLCSIM Advanced coupling

SIMIT V10.3 requires PLCSIM Advanced in at least version 4.0.

It is now possible to connect to an already running PLCSIM Advanced instance.

During import it is now possible to select which devices are to be imported.

The function isochronous mode is not supported by PLCSIM Advanced in version V4.0 (see chapter 5.3).

Table-Reader

There is a new coupling "TableReader", which allows to read values from a prepared table line by line and to transfer them into the simulation model.

Online-Help within user components

Descriptions can now be integrated into self-written SIMIT components, which are then available as online help.

Extension of the External Coupling

The following new features will be made officially available with an update at a later date:

- The external coupling now allows a clock-synchronous connection of a partner simulation.
- More than one external coupling of the same coupling type can be created.
- Partner simulations can send messages via the extended external coupling to the SIMIT message system or to the SIMIT user interface.
- Special signal properties of the partner simulation can be defined in the extended external coupling.
- The extended external coupling now offers the possibility to connect to already running partner simulations.

CONTEC-Library

Components that serve as pure data stores and do not have any behavior description are no longer taken into account when counting the required simulation tags.

Byte arrays in data stores can now be created up to 2048 bytes in size, provided that the dimension is specified as a fixed size.

FMU-Support

64-bit FMUs can now also be used in SIMIT. However, 64-bit FMUs cause a higher simulation load, which is why 32-bit FMUs should be used if possible.

The performance when addressing FMUs has been improved. Please observe the notes under "Compatibility"!

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Simulation-Unit

Resetting the simulation unit is now also possible via the SIMIT user interface in the SU administration.

A firmware update is now performed automatically in one step also for older versions (<V2.1.00.38 for SIMIT UNIT PN or < V2.009.03 for SIMIT UNIT PB).

Table import

When instantiating templates, multiple selection can now also be used when importing text files (.txt). In addition, the template folder is selectable.

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Component types

In the library CHEM-BASIC there is a new component "TwoWayValve".

The component "SimulationLoad" now gives more detailed information about the load of the individual time slices.

The folder "Sensors" has been dropped. Please note that many additional SIMIT components are available for free on SIOS at

<https://support.industry.siemens.com/cs/ww/en/view/109793203>.

Virtual Controller

It is now possible to select in the distribution editor of the Virtual Controller whether the blocks of the F Systems library are processed in the original or replaced internally in the simulation.

License-Container

The display of the content of the own license container (dongle) can now be called directly via a link in the help menu of SIMIT.

System variable

There is an additional system variable "t_msec" for accessing the system time of the computer.

Equation syntax in components

It is pointed out when editing component types that the equation syntax should no longer be used in favor of formulation in blocks. This does not mean that differential equations can no longer be used. The assignment of a differential in the form "\$Z = ...\$" is also possible within a block.

It is not planned to give up the support of the equation syntax in the short term. Nevertheless, at least new components to be created should no longer contain this language construct.

Online-Help

The online help is now displayed via the PUD Manager.

Windows start bar

SIMIT is no longer listed under "Siemens Automation" but directly under "SIMIT".

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4 Upgrade of IMIT

4.1 Coexistent installation with older IMIT versions

A parallel installation of different IMIT versions is not possible..

With this installer the previous version of IMIT can be upgraded without uninstalling the older version before.

4.2 Compatibility

Projects created with the previous version of IMIT can be opened. When doing this the first time it may last a while to automatically convert the project to the new version. Afterwards this project can no longer be opened with a previous IMIT version!

Basically we try to remain downward compatible this way with regard to existing IMIT projects, components, macros and templates. Nevertheless, exceptions may occur in special cases:

From Version	Incompatibilities
8.0	Components, macros and templates, that you created with IMIT V7 have to be transferred manually into the new workspace of IMIT (C:\ProgramData\Siemens\ Automation\IMIT\8.0\FULL).
9.0	A coupling to the Virtual Controller V3.0 created under IMIT V8.1 will not be migrated. You have to create this coupling once again, if applicable.
9.0	The syntax of the module addresses used by the "unit connector" has been changed. Instead of using keywords like "Slv" and "Slr" the subsystem, slave and slot is now indicated by numbers in square bracket. If applicable, you have to correct these specifications in the "unit connectors". Alternatively, you may drag a new "unit connector" from the coupling editor, which provides a connector with the proper setting.
9.0	When processing the XML file used for the CMT import and provided by the automation interface, IMIT will still use a "\" to separate the CMT hierarchy levels. However, the signal or parameter name is separated by a "." as used by PCS 7. You have to adopt your templates if applicable.
9.1	In order to optimize the model calculation differential equations are assembled and solved no longer regarding the complete IMIT project but only regarding single components. This may cause a slightly changed behavior of the simulation results if components containing differential equations are used. The solvers used for the library FLOWNET and CHEM-BASIC are not affected.

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9.1	The SU coupling replaces the previous Profibus DP and Profinet IO couplings. In a SU coupling all Profibus and Profinet lines of a S7 station are now concentrated. This allows to switch from a „Hardware-in-the-Loop“ configuration to a „Software-in-the-Loop“ configuration more easily because the I/O signals in the process model do no longer depend on the corresponding line and need not be modified. However, if you open a SIMIT project of a previous version that contains Profibus or Profinet couplings, each line will be converted into an individual SU coupling. This allows you to use the SIMIT project without any modifications. If you want to organize the SU coupling according to S7 stations as intended, please delete the SU coupling and recreate it.
10.0	SU couplings from former SIMIT Versions can still be used. However, they will not include alarm signals since this is a new feature of SIMIT V10.0. Please create a new coupling if applicable. If you triggered slave, device or module failure alarms from the simulation model you have to reconfigure them because their identifiers have been harmonized and therefore changed.
10.0	SIMIT is now able to read the address ranges of the hardware modules more reliable. However, this presumes STEP 7 V5.6 or higher.
10.0	The values of the load component are not directly comparable to those of former versions because the averaging is now done over a shorter period of time so it may deliver differing results.
10.1	The Virtual Controller now evaluates the loaded system data blocks more comprehensively. However, this also means that the entire station including the hardware configuration and the configured connections must be loaded into the VC.
10.2	For SU management, Npcap is installed and used. WinPcap is no longer used. The installation of Npcap has no effect on existing WinPcap installations.
10.3	Components, macros, templates and projects from previous SIMIT versions can in principle continue to be used, but incompatible changes have occurred in connection with data record communication, which have the following consequences: • The "DataAdaption " component must be replaced with version 3.0. • The component types "ReadRecord" and "WriteRecord" can no longer be used. They have been replaced by "WriteRecordHandler" and "ReadRecordHandler". Since the functionality is not identical, the exchange cannot be done via "Find & Replace". • The "DP_DP_ID" component can no longer be used. Instead the parameterization of the DP-DP_ID has to be done directly at the F-communication module in the SU-coupling. • All components that have already used data set communication must be converted to the new data record handler concept and replaced. If there are still components in the project which use the data record access that no longer works, this will be indicated in the message window when the simulation is started. • If unit connectors were used in the SIMIT project, these must be adapted to the new addressing via LADR or HWID. In the "Search & Replace" editor, you can search for the unit connectors with the old syntax.

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	• In order that the modules in the SU coupling are provided with the LADDR or HWID, a renewed import of the hardware configuration must take place. • With SIMIT V10.3, extensive performance optimizations have been made to the FMU integration. Due to these changes, already existing FMU components from SIMIT versions 10.1 and 10.2 must be upgraded. This migration process must be performed once for each component type. To start the migration, the corresponding FMU component must be opened in the CTE and the dialog window confirmed. All necessary changes to the component will then be made automatically. After the migrated component has been saved in the CTE, it can be used in SIMIT V10.3. Using the "Update" function of the "Find & Replace" editor, all instances of the migrated FMU components can be updated with little effort. Attention: Changes made to the automatically generated CTE source code of the component in SIMIT V10.1 or V10.2 will be lost during this migration!
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4.3 Uninstalling SIMIT

Software products must be removed according to Microsoft Windows.

To do this, use Microsoft Windows application "Software" (Settings > Control Panel > Software) to remove your software package (for example "SIMIT").

During uninstall the entire SIMIT installation folder will be deleted, too. Furthermore, all entries in the registry, the startup menu and the desktop will be removed.

The SIMIT workspace will not be deleted.

Projects that were created with SIMIT will not be deleted.

During installation of SIMIT the following software packages were installed, in case they were not installed yet:

- *Microsoft Visual C++ 2015 Redistributable*
- *OPC Core Components Redistributable*
- *Microsoft .NET-Framework 4.6*

Since these software packages may be used by other applications, they will not be automatically removed during SIMIT uninstall. If you are sure that you do not need these software packages any more, you may uninstall them using the control panel.

5 Peculiarities

5.1 SIMIT Unit

If the option “Increased password security” is activated in your PCS 7 it is not possible to create the system data blocks that are necessary to configure the SU coupling. Please deactivate this option temporary to enable the simulation use case!

When triggering a process alarm the settings of this alarm in the hardware configuration is not considered. SIMIT will send this alarm to the controller irrespective of the settings in the hardware configuration.

5.2 Virtual Controller (“SIMIT VC”)

The SIMIT Virtual Controller can only be used if it has the same version than SIMIT SP. If you upgrade SIMIT SP you have to upgrade all SIMIT VC’s, too.

The Virtual Controller is able to emulate S7-300 controllers. However, technology functions are not supported. I/Q-addresses must be unique on technology CPUs as well.

Please make sure that the subnet masks of all computers that are involved in the simulation are configured in a way that each configured IP address can be assigned to an unambiguous subnet. Otherwise the licensing of the Virtual Computer might not work properly.

Make sure, that IP addresses are not added automatically (e.g. by SIMATIC NET Communication Settings) to prevent such error-prone configurations.

“Distributed Safety” is currently not supported.

5.3 PLCSIM Advanced

The function isochronous mode is not supported by PLCSIM Advanced in version V4.0.

5.4 Components hosted on network drives

The storage of components on network drives is possible in principle. However, problems can arise if these components are modified in the CTE while this network drive is mounted in SIMIT as a library in the component task card. This configuration should be avoided, particularly in connection with virtual machines.

5.5 Backslash as part of component names

In principle, slashes can be used in both directions in component names. However, the backslash '\' leads to problems in connection with scripts and should therefore be avoided.