

Twin**CAT**[®] 3

TWINCAT[®] 3

Getting started

Welcome to TwinCAT 3

TwinCAT 3 is starting a new era for PC-based control software and is another milestone in the company history of the Beckhoff Automation GmbH. Especially in the field of efficient engineering, TwinCAT 3 will set new standards in terms of modular and flexible software architecture.

Nearly every kind of control application is possible with TwinCAT 3. From print, wood working, plastic or window construction machines, to wind turbines and test benches up to buildings like theatres or sport arenas, everything can be automated with TwinCAT 3. The user can access different programming languages to realise these applications. In addition to the classic PLC programming languages of the IEC 61131-3 the user can now also program with the high-level languages C and C++, as well as Matlab®/Simulink®. The integrated Motion functionalities simplify the engineering as well as the new well-arranged editors for safety applications.

These and other attributes show why TwinCAT 3 is also called eXtended Automation.

TwinCAT 3 Philosophy

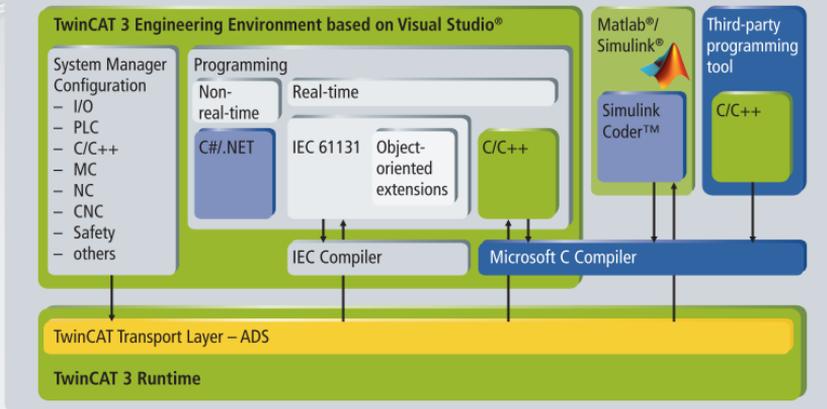
In order to master the complexity of modern machines and at the same time to reduce the necessary engineering effort for these machines, the trend moves to modular control software. For this, individual functions, assemblies or machine units are regarded as modules. These modules could be used to encapsulate the functionality of these objects/units, which increase the reuse, extension and maintainability of control code. The innovative software architecture of TwinCAT 3 fully supports this

kind of programming, independently from the used programming language. Due to these possibilities TwinCAT 3 provides eXtended Automation Technology (XAT). eXtended Automation addresses the combination of the latest IT technologies and scientific software tools with automation technology. This philosophy has been implemented not only in the section of engineering, but also into the runtime. Because of this consistent approach TwinCAT 3 provides an eXtended Automation Engineering (XAE) and an eXtended Automation Runtime (XAR) environment.

eXtended Automation Engineering (XAE):

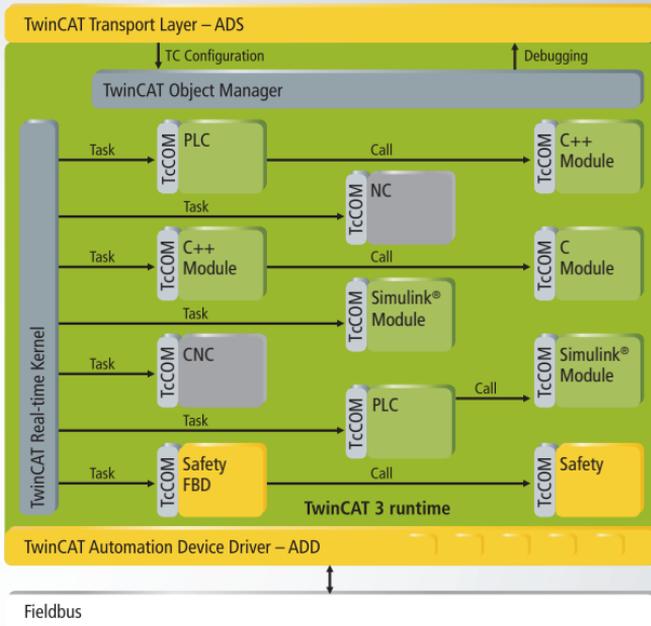
One of the main approaches of TwinCAT 3 is to simplify the software engineering. Instead of developing own stand-alone tools it is obviously worthwhile to integrate into common and existing software development environments. For TwinCAT 3 this development environment is the Microsoft Visual Studio®. By integrating TwinCAT 3 as an extension into the Visual Studio®, we are able to provide an expandable and future-proof platform.

TwinCAT 3

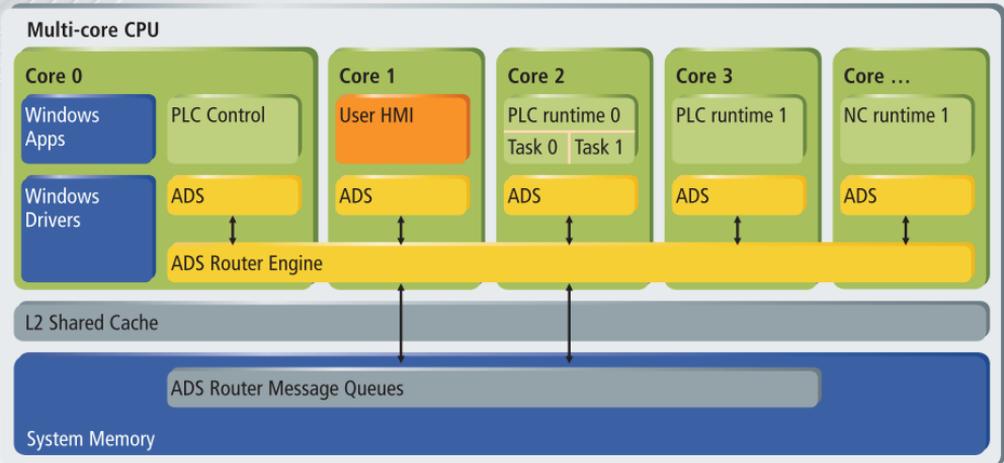


eXtended Automation Runtime (XAR):

The TwinCAT 3 Runtime offers a real-time environment, where TwinCAT modules can be loaded, executed and administrated. The individual modules need not be created with the same Compiler and thus can be programmed independently and by different manufacturers or developers. Furthermore it is not important if these modules are generated using the PLC, NC, CNC or by using the languages C/C++. The generated modules can be called cyclically from tasks or by other modules (generated out of the PLC, by using C/C++ or out of the Matlab®/Simulink® environment).



Modular structure of the TwinCAT 3 runtime environment



Several tasks can run on one control PC. The number of modules that are called from a task have no fixed limitations anymore. A further highlight of TwinCAT 3 is the support of multi-core CPUs. TwinCAT tasks can be individually assigned to the different cores of a CPU. This way, the performance of the newest multi-core Industrial and Embedded PCs can be used up to its limits.

Requirements

TwinCAT 3 XAE (Engineering):

- Windows XP with SP3 (x86) or Windows 7 (x86 or x64)
- processor running at 1.6 GHz or higher
- 2 GB RAM
- 3 GB free hard disk space
- graphics adapter supporting DirectX9, running at a minimum resolution of 1024x768

TwinCAT 3 XAR (Runtime):

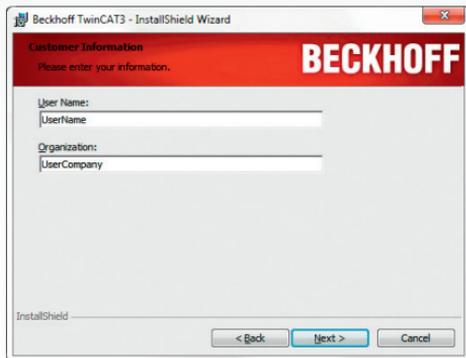
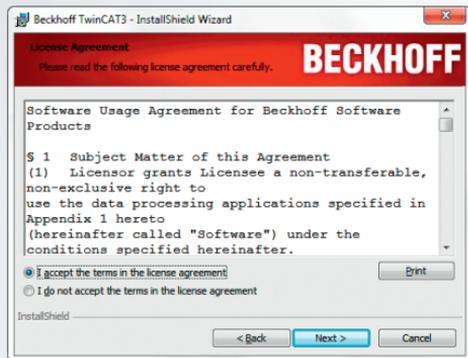
- x86-based Windows operating system: Windows XP with SP3, Windows 7, Windows Embedded Standard 2009, Windows Embedded Standard 7

Installation:

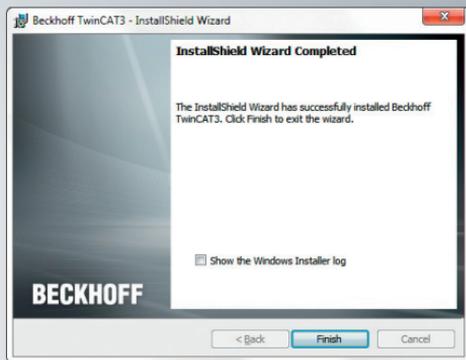
1. Put the TwinCAT 3 DVD into your computer
2. Choose the option Installation Software -> Engineering -> TwinCAT 3



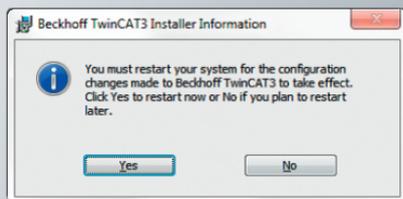
3. Click on "Next" and accept the terms in the license agreement
4. Enter a user name and organisation



5. Select "Complete" as the setup type and click on "Next"
6. Click on "Install" to start the installation process. This will install TwinCAT 3 to the default directory "C:\TwinCAT3"



After the installation has finished, the system needs to be restarted. Please click on "Finish" and then answer the following question with "Yes" to automatically restart the system



Parallel installation of TwinCAT 2 and TwinCAT 3

TwinCAT 3 can be installed side-by-side with TwinCAT 2 on the same system, but please keep in mind that only one runtime can be active at the same time. For this, Beckhoff provides a specially designed tool called "TcSwitchRuntime", which enables customers to select which TwinCAT runtime should be active on a system. In a system where the TwinCAT 2 environment is already installed, the switching tool is automatically called as part of the installation.

If the tool "TcSwitchRuntime" was started, the active TwinCAT version will be shown. By using the "Switch ..." button, the switching between the TwinCAT 2 and TwinCAT 3 environment can be done.

As a TwinCAT 2 runtime environment is not available for 64-bit operating systems, this tool was not required and therefore not installed on these operating systems. The TwinCAT 2.11 64-bit engineering environment can be executed in parallel to the TwinCAT 3 environment.

Note: To update a TwinCAT 2 environment to a newer version, please make sure that TwinCAT 2 is the active TwinCAT version.



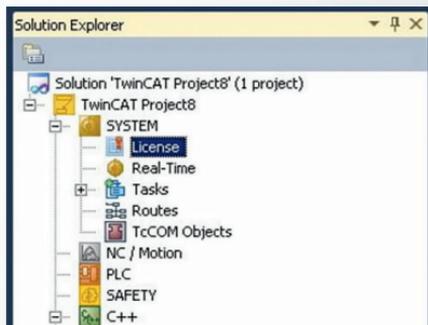
Licensing

Activate a free trial license

TwinCAT 3 enables customers to generate a free trial license, which runs for exactly 7 days without any restrictions. This Licence may be regenerated as often as needed, which, for example, enables engineering computers to run without a commercial Licence.

Step 1: Navigate to licensing

- Inside the TwinCAT 3 environment navigate to the tree node License



All major licenses required by TwinCAT 3 (like the Runtime levels) are recognised automatically by TwinCAT 3. Licences which are not automatically recognised at the beginning can also be added manually.

Step 2: Activate "trial license"

In general, all kind of TwinCAT 3 trial licenses from categories TC 3 Runtime, but also TC 3 Functions can be activated.

- on the local PC with full TwinCAT 3 XAE Engineering environment
- on the target PC with TwinCAT 3 XAR Runtime only environment (action handled from the remote engineering PC)

Trial license on local device

- In case the target runtime is "<Local>" (on same CPU as TwinCAT 3 engineering) the tab "Order Information" will automatically list all licenses required in the TwinCAT 3 project. If additionally products should be licensed for later use, navigate to tab "Manage Licenses" and add products manually.

Click the button "Activate 7 Days Trial License" to create a trial Licence for all selected products. Proceed with step 3.

Module1.h Module1.cpp TwinCAT Project221 Source Control Explorer

Order Information Manage Licenses Project Licenses Online Licenses

System Id:

HW Platform:

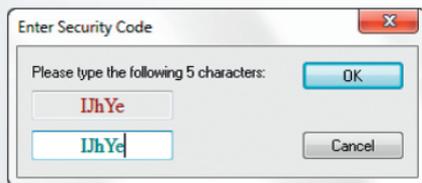
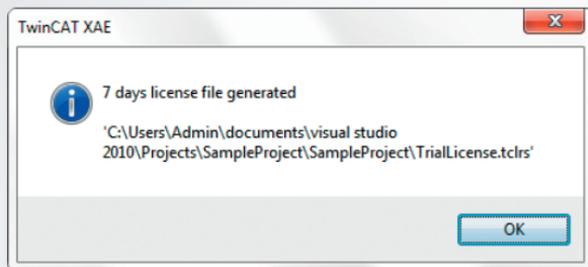
Beckhoff License Id: Custom Order:

Customer Comment:

Order No	License	Instances
TC1220	TC3 PLC / C++ / MatSim	cpu license

Step 3: Enter Security Code

- When asked for a security code, repeat the characters from the first textbox.
Note: If the security code is not entered correctly, the OK button is not enabled.



- Press "OK" to activate the trial license

In addition to the project path, the license file will also be copied to the folder "%TwinCATDIR%\Target\License" on the device (local or remote).

Migration of existing TwinCAT 2 projects

To migrate projects from TwinCAT 2 to TwinCAT 3, the following steps have to be done:

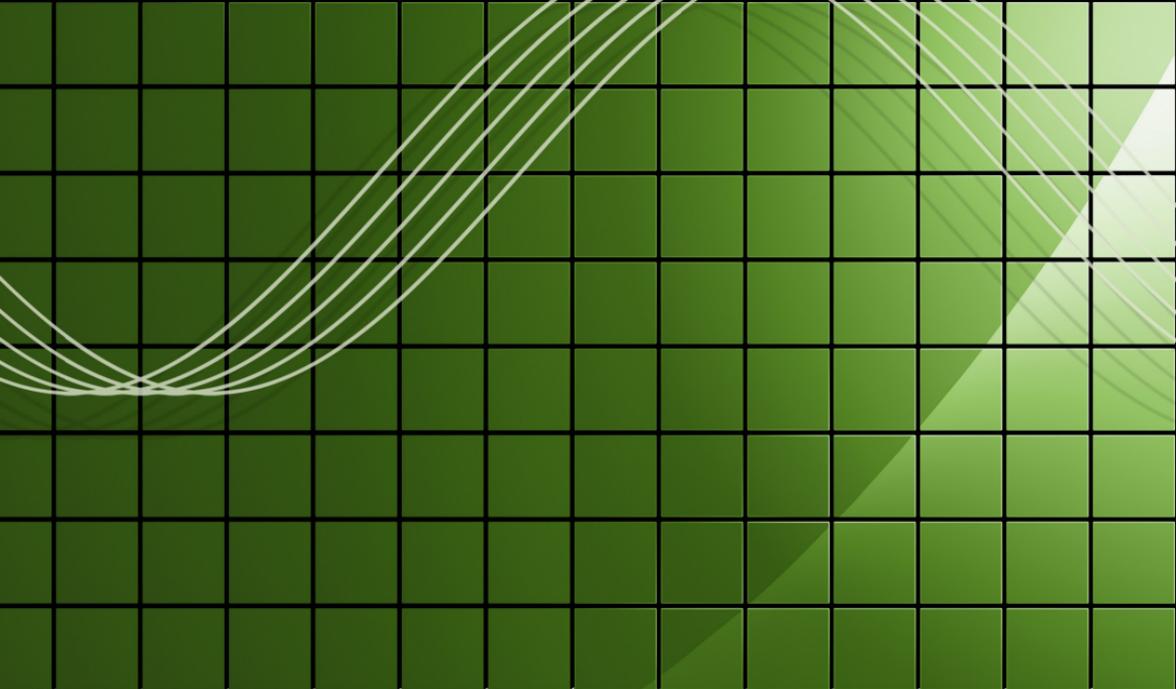
Migration of PLC projects

1. Note: it is absolutely necessary that projects can be compiled without error in TwinCAT 2
2. Note: Due to minor library name changes and simplifying libraries in TwinCAT 3, refer to the Introduction section of the TwinCAT 3 libraries documentation for a listing of TwinCAT 2 libraries and their corresponding TwinCAT 3 libraries.

http://twincat3.infosys.beckhoff.com/content/1033/tcplclibs_overviewtc3/html/tcplclibs_intro.htm?id=761

Migration of System Manager configurations

1. Open an empty TwinCAT project
2. Choose the option "Load project from TwinCAT 2.xx Version..." of the TwinCAT project context menu.



BECKHOFF

Beckhoff Automation GmbH
Headquarters
Eiserstraße 5
33415 Verl
Germany

Hotline: + 49 (0) 52 46 / 963 - 157
Fax: + 49 (0) 52 46 / 963 - 199
support@beckhoff.com
www.beckhoff.com/twincat3