
VECU-BUILDER V1.1

Release Notes

Copyright

The data in this document may not be altered or amended without special notification from ETAS GmbH. ETAS GmbH undertakes no further obligation in relation to this document. The software described in it can only be used if the customer is in possession of a general license agreement or single license. Using and copying is only allowed in concurrence with the specifications stipulated in the contract. Under no circumstances may any part of this document be copied, reproduced, transmitted, stored in a retrieval system, or translated into another language without the express written permission of ETAS GmbH. © **Copyright** 2022 ETAS GmbH, Stuttgart
The names and designations used in this document are trademarks or brands belonging to the respective owners.

Contents

1	Introduction.....	4
1.1	Definitions and Abbreviations.....	4
1.2	References.....	4
1.3	Conventions.....	4
1.4	User Documentation.....	5
2	Product Definition.....	6
2.1	Functions at a glance.....	6
2.2	General Description.....	6
2.2.1	System Prerequisites.....	6
2.2.2	Software Prerequisites.....	6
2.2.3	Release Test Configuration.....	6
2.2.4	Restrictions.....	7
2.3	Delivery.....	7
2.3.1	Used 3 rd -Party Software.....	7
2.4	Installation.....	7
2.4.1	Installation Hints.....	7
2.5	Licensing.....	7
3	Changes.....	9
3.1	Changes in VECU-BUILDER V1.1.....	9
3.1.1	What's New.....	9
3.1.2	Compatibility to Earlier Releases.....	9
3.1.3	Fixed Problems.....	9
3.1.4	Known Issues.....	9
3.2	Changes in VECU-BUILDER V1.0.....	10
3.2.1	What's New.....	10
3.2.2	Compatibility to Earlier Releases.....	10
3.2.3	Fixed Problems.....	10
3.2.4	Known Issues.....	11
3.3	Changes in vEcuBuild V0.x.....	11
3.3.1	vEcuBuild v0.6.0.....	11
3.3.2	vEcuBuild v0.6.1.....	11
3.3.3	vEcuBuild v0.6.2.....	11
3.3.4	vEcuBuild v0.6.3.....	11
3.3.5	vEcuBuild v0.6.4.....	11
3.3.6	vEcuBuild v0.6.5.....	12
3.3.7	vEcuBuild v0.6.6.....	12
3.3.8	vEcuBuild v0.6.7.....	12
3.3.9	vEcuBuild v0.6.8.....	12
3.3.10	vEcuBuild v0.6.9.....	12
3.3.11	vEcuBuild v0.7.0.....	12
3.3.12	vEcuBuild v0.7.1.....	12
3.3.13	vEcuBuild v0.7.2.....	12
3.3.14	vEcuBuild v0.7.3.....	12
3.4	Known Issue Reports.....	13
4	Known Limitations.....	14
5	Hotfix Information.....	15
6	Contact, Support and Problem Reporting.....	16

1 Introduction

1.1 Definitions and Abbreviations

Term/Abbreviation	Definition
API	A pplication P rogramming I nterface
ASIL	A utomotive S afety I ntegrity L evel
CAN	C ontroller A rea N etwork
CDD	C omplex D evice D river
CPU	C entral P rocessing U nit
DLL	D ynamic L ink L ibrary
ECU	E lectronic C ontrol U nit
EEPROM	E lectrically E rasable P rogrammable R ead- O nly M emory
EHI	E TAS H elpdesk I nternational
FMI	F unctional M ock-Up I nterface
FMU	F unctional M ock-Up U nit
KIR	K nown I ssue R eport – For severe Problem Reports which occur after a release, ETAS has introduced the Known Issue Report to inform affected customer immediately. The current Known Issues of former versions can be found on the ETAS website: http://www.etas.com/kir
MCAL	M icrocontroller A bstraction L ayer
NVRAM	n on-volatile R andom- A ccess M emory
OS	O perating S ystem
PR	P roblem R eport
SIL	S oftware- i n-the- L oop
SuT	S ystem u nder T est
SW	S oftware
V&V	V erification and V alidation
vCDD	V irtual CDD
vECU	V irtual ECU
vMCAL	V irtual MCAL
XCP	Universal Measurement and C alibration P rotocol

1.2 References

Not applicable.

1.3 Conventions

The following typographical conventions are used in this document:

Choose **File** → **Open**.

Menu commands are shown in boldface.

Click OK .	Buttons are shown in boldface.
Press <ENTER>.	Keyboard commands are shown in angled brackets.
The "Open File" dialog box is displayed.	Names of program windows, dialog boxes, fields, etc. are shown in quotation marks.
Select the file <code>setup.exe</code>	Text in drop-down lists on the screen, program code, as well as path- and file names are shown in a fixed width font.
A <i>distribution</i> is always a one-dimensional table of sample points.	General emphasis and new terms are set in italics.

1.4 User Documentation

You can find the VECU-BUILDER user's documentation in PDF format on the DVD and in the installation location on your harddisk.

2 Product Definition

2.1 Functions at a glance

VECU-BUILDER is a tool that builds a virtual ECU (vECU) for V&V of automotive ECU software in a SiL simulation. The inputs can either be AUTOSAR `.c/.h` files, non-AUTOSAR `.c/.h` files, or a `.dll` binaries including symbol information. The tool uses a text file in YAML format for configuring the vECU properties such as inputs, outputs, parameters, tasks, or the XCP slave. VECU-BUILDER wraps the binaries of the vECU into an FMU.

VECU-BUILDER utilizes CMake and the GCC or Microsoft Visual C compiler for compiling the vECU. The resulting FMU adheres to the standard FMI for Co-Simulation 2.0. VECU-BUILDER can be used to build vECUs of types 1, 2, and 3.

2.2 General Description

2.2.1 System Prerequisites

The following minimum system prerequisites have to be met:

Required Hardware	2,0 GHz PC 8 GiB RAM
Required Operating System	Windows® 10
Required Free Disk Space	5 GiB (not including the size for application data)

The following system prerequisites are recommended:

Recommended Hardware	3,0 GHz PC 32 GiB RAM
Recommended Operating System	Windows® 10
Recommended Free Disk Space	>100,0 GiB

2.2.2 Software Prerequisites

The following 3rd-party software installations are mandatory:

- CMake 3.15 or higher

The following 3rd-party software installations are recommended:

- Notepad++

The following 3rd-party software installations are optional:

- Microsoft Visual Studio 2015, 2017, 2019

2.2.3 Release Test Configuration

ETAS VECU-BUILDER has been tested with the following software test setup:

- Microsoft Windows 10
- Compilers: MinGW, Microsoft Visual Studio 2019
- XCP Connection with ETAS INCA V7.3 SP7 and ETAS INCA V7.4 SP1
- Simulation Tools: ETAS COSYM V3.1 and ETAS COSYM V3.2

2.2.4 Restrictions

See Chapter 4 for all restrictions of the functionality of VECU-BUILDER.

2.3 Delivery

The software is delivered with an installation routine on a DVD or as download in a zip archive.

2.3.1 Used 3rd-Party Software

VECU-BUILDER uses the following 3rd-party software components internally:

- PCRE2 10.35
- MinGW
- FMU Checker-215-win (for FMI 2.0)
- Boost Library 1.73
- Python 3.8

2.4 Installation

You can start the installation by starting the installer executable, `VECU_BUILDER_installer_1.1.0.exe`, located in the root folder of your DVD or zip archive.

The detailed installation procedure is described in the User Guide.

2.4.1 Installation Hints

Error message during installation of ETAS LiMa: if ETAS LiMa is already installed on your computer, you may experience an error message during installation of ETAS VECU-BUILDER. You can ignore this message by clicking "OK" and the installation will complete successfully.

An installation of the 3rd-party product CMake (see minimum version above) is required. The installer gives a hint where to download this tool. However, it does not enforce the installation. Please ensure that CMake has been installed, before using ETAS VECU-BUILDER.

We recommend installing the open source software Notepad++.

2.5 Licensing

VECU-BUILDER is protected via electronic licensing. To run and use the product, a license file is required that you install via the ETAS License Manager. You can start the ETAS License Manager from the ETAS program folder in the Start menu.

For obtaining your software license file, you need the MAC address of an installed network adapter. Please make sure that this adapter always remains available - even if you, for

instance, remove your notebook from a docking station. We recommend choosing a wired Ethernet adapter.

During the ordering process, ETAS provides you with a license activation number - the so-called Entitlement ID. With this Entitlement ID, the MAC address, and the username, please do one of the following:

- Visit <https://www.etas.com/support/licensing> and generate your license file.
- Mail the information to sales.de@etas.com

The information that you submit permits ETAS to generate the software license certificate. It will not be used for any other purpose.

Please copy the license key into a text file with the extension `*.lic` and store it on your hard disk. When using VECU-BUILDER, it will ask you for the location of this file. If you have further questions regarding the installation procedure, please contact ETAS customer support for assistance.

3 Changes

3.1 Changes in VECU-BUILDER V1.1

This chapter describes changes with respect to the previous version of VECU-BUILDER V1.0.

3.1.1 What's New

The following changes have been applied since the previous version:

- Advanced Build Flags can be defined in the yaml file
- Aliases for FMI Variables can be defined in the yaml file
- Mapping between symbols and A2L labels can be defined in the yaml file
- vECU can be built directly in Visual Studio or VS Code
- vECU built with MinGW can be debugged using VS Code
- A Debug Hook can be configured in the yaml file

3.1.2 Compatibility to Earlier Releases

VECU-BUILDER V1.1 is largely compatible with the VECU-BUILDER V1.0. For adaptations needed when migrating workspace created with VECU-BUILDER V1.0 please refer to the User Guide. Please contact ETAS User Support if you need any assistance when migrating your workspace to VECU-BUILDER V1.1.

All older versions of vEcuBuild V0.x are deprecated and no longer supported.

3.1.3 Fixed Problems

This section describes the set of fixed problems of the released version of VECU-BUILDER V1.1.

Problem ID	Title
686446	FMU with GO License not executable on PC without LIMA
687970	Crashes when simulation starts with active XCP configuration
688347	Does not patch AXIS_PTS segments of A2L file
688673	EEPROM variable cannot be written if defined as const
688713	COMPU_METHODs removed by the patching process
689088	No .die file created
690021	In A2L comment name contain 0x.....causes address modified error during patch
691013	CLI not working
692104	Cannot debug a vECU built by gcc

3.1.4 Known Issues

This section describes the set of known problems of the released version of VECU-BUILDER V1.1.

Problem Number	Title
691641	INCA crashes when experiment is open with XCP Sim
696454	A2L patch lost variable information
698175	FMU creation fails at step 2/5 without message

3.2 Changes in VECU-BUILDER V1.0

This chapter describes changes with respect to the previous version of VECU-BUILDER V1.0.

3.2.1 What's New

This is the initial release of ETAS VECU-BUILDER as a product. The following changes have been applied since the last pre-release version vEcuBuild 0.7.3:

- A mandatory keyword "version" has been added to the yaml file
- An optional keyword "sync" has been added to the eeprom section of the yaml file
- The keyword "patch_a2l_files" has been renamed to "patch_a2l_file". Only a single file can be specified.
- Stability of symbol parser has been improved.
- Behaviour of task scheduler has been improved.

3.2.2 Compatibility to Earlier Releases

This is the first release as a product. All older versions of vEcuBuild are deprecated and no longer supported. VECU-BUILDER V1.0 is largely compatible with the pre-released versions of vEcuBuild; manual adaptations when upgrading might be needed, though. Please contact ETAS User Support if you need any assistance when upgrading to VECU-BUILDER V1.0.

3.2.3 Fixed Problems

This section describes the set of fixed problems of the released version of VECU-BUILDER V1.0.

Problem ID	Title
676011	Failed to parse the large *.die files
676651	VECU crashes when calling fmi2FreeInstance
676674	Invalid ModelDescription.xml caused by Enumeration
682813	Does not patch AXIS_PTS segments of A2L file
685992	VECU not buildable without useful error message and massive resource usage
684579	Error encrypting message after stop simulation
684845	XCP Transport layer configuration failed in INCA when vECU is created with VECU-BUILDER-XCP license
684582	Created 3d_RemoveGoLicense.bat in workspace fails

3.2.4 Known Issues

This section describes the set of known problems of the released version of VECU-BUILDER V1.0.

Problem Number	Title
687970	Crashes when simulation starts with active XCP configuration
688347	Does not patch AXIS_PTS segments of A2L file
686446	FMU with GO License not executable on PC without LIMA
688673	EEPROM variable cannot be written if defined as const
688713	COMPU_METHODs removed by the patching process
689088	No .die file created
690021	In A2L comment name contain 0x.....causes address modified error during patch

3.3 Changes in vEcuBuild V0.x

This chapter describes changes with respect to the previous pre-released versions of vEcuBuild V0x.

3.3.1 vEcuBuild v0.6.0

- Improvements on license checking

3.3.2 vEcuBuild v0.6.1

- Improved error handling when 'architecture' is not set in the yaml file.
- Improved: Renaming the merged initial dataset of the release FMU from Dataset.VarVal to MergedInitialData.VarVal.
- Fixed: In resources.txt of the release FMU there could be more initial datasets than MergedInitialData.VarVal.
- Improved: The initial data will apply to the FMI start values.

3.3.3 vEcuBuild v0.6.2

- Fixed: If no initial_data is defined, the build does not throw an exception.

3.3.4 vEcuBuild v0.6.3

- Improved: The data type of the FMI matches the C data type.

3.3.5 vEcuBuild v0.6.4

- Added to the documentation: ETAS Safety Advice, user guide, Version History
- Improved: Using assembly list files is faster now.
- Improved: Added debug logging for files that are filtered by whitelist, blacklist, assembly list files.
- Improved: For Windows: If the pathname of the workspace is long, the user gets a warning.

- Fixed: The Release-FMU no longer contains the files defined as initial data, but only the merged VarVal with no variable names.
- Changed build/VersionInfo.txt to build/changelog.txt

3.3.6 vEcuBuild v0.6.5

- Added: XCP slave can support A2L file with DYNAMIC DAQ
- Added: A2L parser can patch and replace header of all hardware-based A2L file
- Fixed: Terminate and reload XCP slave when user reset the simulation
- Fixed: Bug of XCP slave when calculate real memory address of 64bits ECU

3.3.7 vEcuBuild v0.6.6

- Fixed: If build_mode == import_dll and the imported dll was built by gcc, the die file was not generated.

3.3.8 vEcuBuild v0.6.7

- Fixed: A2L file parser failed to parse MAX_EVENT/MAX_DAQ/DAQ_ID in hex values.
- Improved: can handle the A2L file with the differences of order of the header sub sections.

3.3.9 vEcuBuild v0.6.8

- Improved: The basic types bool and _Bool are supported now.

3.3.10 vEcuBuild v0.6.9

- Improved: Extend max event that XCP can support to 32 events
- Fixed: Booleans are listed as such in the modelDescription.xml.
- Improved: If the contents of CMakeLists.txt does not change, the files remain untouched.

3.3.11 vEcuBuild v0.7.0

- Fixed: When running StartNewProject from a command shell, the script cannot find the home directory of the installation.

3.3.12 vEcuBuild v0.7.1

- Improved: For vECUs built with gcc there might be a huge .die file created. This can lead to exceptions when parsing the symbols. For 32 bit architecture, the .die files with a size less of 3.9GB can be processed.

3.3.13 vEcuBuild v0.7.2

- When using redirecting function calls, there was access violations when terminating.
- Enumerations will be interpreted as integers on the FMI.

3.3.14 vEcuBuild v0.7.3

- Instead of .pyc files use .exe
- When loading a .dll built by MinGW we fixed a problem with the addresses of symbols.
- When using a step size that is too big for the cyclic tasks, the order could be wrong.
- EEPROM: One can use UNC paths to store EEPROM files.

3.4 Known Issue Reports

If a product issue develops, ETAS will prepare a Known Issue Report (KIR) and post it on the internet. The report includes information regarding the technical impact and status of the solution. Therefore, you must check the KIR applicable to this ETAS product version and follow the relevant instructions prior to operation of the product.

The Known Issue Report (KIR) can be found here:

<http://www.etas.com/kir>

4 **Known Limitations**

Here is a list of known limitations of the VECU-BUILDER:

- The DCM parser supports scalars only.
- The XCP slave and the A2L parser support the measurement and calibration use cases only.
- The XCP slave and the A2L parser support only `STATIC DAQ_CONFIG_TYPE`. The support of `DYNAMIC DAQ_CONFIG_TYPE` is experimental.
- XCPplus is not supported.
- The support of 3rd-party MCD tools is experimental.
- The creation of vECUs with the MinGW compiler for 32bits supports only a restricted number of symbols. Otherwise, the build process fails due to insufficient memory.

5 Hotfix Information

Not applicable.

6 Contact, Support and Problem Reporting

For details of your local sales office as well as your local technical support team and product hotlines, take a look at the ETAS website:

ETAS subsidiaries	WWW:	https://www.etas.com/en/contact.php
ETAS technical support	WWW:	https://www.etas.com/en/hotlines.php