

dSPACE Release

New Features and Migration

Release 2023-A – May 2023

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How to Contact dSPACE Support

If you encounter a problem when using dSPACE products, contact your local dSPACE representative:

- Local dSPACE companies and distributors: <http://www.dSPACE.com/go/locations>
- For countries not listed, contact dSPACE GmbH in Paderborn, Germany.
Tel.: +49 5251 1638-941 or e-mail: support@dSPACE.de

You can also use the support request form: <http://www.dSPACE.com/go/supportrequest>. If you are logged on to mydSPACE, you are automatically identified and do not have to add your contact details manually.

If possible, always provide the serial number of the hardware, the relevant dSPACE License ID, or the serial number of the CmContainer in your support request.

Software Updates and Patches

dSPACE strongly recommends that you download and install the most recent patches for your current dSPACE installation. Visit <http://www.dSPACE.com/go/patches> for the software updates and patches themselves and for more information, such as how to receive an automatic notification when an update or a patch is available for your dSPACE software.

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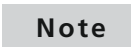



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About This Document

Content This document informs you about the new features of all the dSPACE software products in Release 2023-A. It also gives you an overview of software products with no or minor changes. There are instructions on migrating from earlier dSPACE Releases, especially from earlier product versions, if required.

Printed document A printed copy of this document is available on demand. You can order it free of charge by using the following link:
<https://www.dspace.com/go/requestreleasematerial>.

Symbols dSPACE user documentation uses the following symbols:

Symbol	Description
	Indicates a hazardous situation that, if not avoided, will result in death or serious injury.
	Indicates a hazardous situation that, if not avoided, could result in death or serious injury.
	Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.
	Indicates a hazard that, if not avoided, could result in property damage.
	Indicates important information that you should take into account to avoid malfunctions.
	Indicates tips that can make your work easier.
	Indicates a link that refers to a definition in the glossary, which you can find at the end of the document unless stated otherwise.
	Follows the document title in a link that refers to another document.

Naming conventions dSPACE user documentation uses the following naming conventions:

%name% Names enclosed in percent signs refer to environment variables for file and path names.

< > Angle brackets contain wildcard characters or placeholders for variable file and path names, etc.

Special Windows folders

Windows-based software products use the following special folders:

Common Program Data folder A standard folder for application-specific program data that is used by all users.

`%PROGRAMDATA%\dSPACE\`

or

`%PROGRAMDATA%\dSPACE\`

Documents folder A standard folder for application-specific files that are used by the current user.

`%USERPROFILE%\Documents\dSPACE\`

Local Program Data folder A standard folder for application-specific program data that is used by the current, non-roaming user.


`%USERPROFILE%\AppData\Local\dSPACE\`

Accessing dSPACE Help and PDF Files

After you install and decrypt Windows-based dSPACE software, the documentation for the installed products is available in dSPACE Help and as PDF files.

dSPACE Help (local) You can open your local installation of dSPACE Help:

- On its home page via Windows Start Menu
- On specific content using context-sensitive help via **F1**

PDF files You can access PDF files via the  icon in dSPACE Help. The PDF opens on the first page.

dSPACE Help (Web) Independently of the software installation, you can access the Web version of dSPACE Help at <https://www.dspace.com/go/help>.

To access the Web version, you must have a *mydSPACE* account.

For more information on the mydSPACE registration process, refer to www.dspace.com/faq?097.

Overview of dSPACE Release 2023-A

Introduction Gives you an overview of the new key features in Release 2023-A and information about unchanged products.

Where to go from here

Information in this section

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General Enhancements and Changes

Introduction The following new features and changes concern several dSPACE products.

Providing legal notes for using third-party software

Several dSPACE software products use or contain third-party software. The third-party components may be subject to additional terms and conditions or terms and conditions that deviate from the ones that apply to the dSPACE software. Copyright notices and license terms of third-party components must be adhered to. If the user is required to be explicitly informed of and to comply with the terms and conditions of third-party components, the relevant information on terms and conditions is stated in separate OSSAcknowledgements files for each dSPACE product.

You can find the OSSAcknowledgements files as follows:

- In the Legal folders accessible via the root directory on both dSPACE DVDs and the root directory of the downloaded installation files (mounted ISO images or unpacked ZIP files).

- After you install the dSPACE software in the <main installation path of dSPACE Setup>\<subfolder of InstallationSet>\Legal folder.

Python distribution

dSPACE Release 2023-A contains a Python 3.9 distribution with the following packages.

Package	Python 3.9 Release 2023-A
certifi	2022.12.7 (new)
charset-normalizer	3.0.1 (new)
comtypes	1.1.14
contourpy	1.0.6 (new)
Core	3.9.16.1 ¹⁾
cycler	0.11.0
fonttools	4.38.0
future	0.18.3
grpcio	1.51.1
grpcio_tools	1.51.1
idna	3.4 (new)
kiwisolver	1.4.4
lxml	4.9.2
matplotlib	3.6.3
numpy	1.24.1
packaging	23.0
pillow	9.4.0
pip	22.3.1
protobuf	4.21.12
pyparser	2.21
pyglet	2.0.3
pyparsing	3.0.9
pypubsub	4.0.3
Python-dateutil	2.8.2
pythonnet	2.5.3 ¹⁾
pytz	2022.7
pywin32	305.10 ¹⁾
requests	2.28.2 (new)
scipy	1.10.0
six	1.16.0
urllib3	1.26.14 (new)
wxPython	4.2.0
yapsy	1.12.2

- 1) This package contains some dSPACE-specific bugfixes. It should not be replaced by the package from the standard Python package servers.

It is recommended that you use the Python distribution provided by the dSPACE Release. This Python distribution contains the latest packages with some bugfixes and security updates. For information on avoiding or solving conflicts with other Python distributions, refer to <https://www.dspace.com/faq?094>.

Note

Notes when using AutomationDesk or ModelDesk

The dSPACE Release contains a Python 3.9 distribution with the latest Python packages to provide bugfixes and security updates for your applications. In the `numpy` package installed as of dSPACE Release 2022-B, some deprecated methods, e.g., the `alen` method and the `asscalar` method, have been removed.

The affected dSPACE products are AutomationDesk and ModelDesk with its testing feature. As of and including dSPACE Release 2022-B, these products are prepared to use the new `numpy` package. However, if you installed the Python 3.9 distribution from dSPACE Release 2022-B or 2023-A, and you use AutomationDesk or ModelDesk Testing from dSPACE Release 2021-A, 2021-B, or 2022-A, these products might throw an exception or stop with an error if one of the removed methods is called internally.

dSPACE provides patches for the affected versions of AutomationDesk to solve this problem. Visit <https://www.dspace.com/go/patches> for the software updates and patches themselves and for more information, such as how to receive an automatic notification when an update or a patch is available for your dSPACE software.

If you need a patch for one of the above-mentioned versions of ModelDesk, contact dSPACE Support.

New versioning scheme

The new versioning introduced with dSPACE Release 2022-B used for dSPACE products corresponds to the principles and recommendations of agile software development. The calendar-based versioning scheme consists of the year and a consecutive number. For example, `23.3` stands for the third product version released in 2023.

For intermediate versions, the third digit of the version can be used. Patches and hotfixes are marked with the suffix `p` respectively `HF` with a following number. For example, the following product versions can appear: `23.1.1`, `23.1p1`, or `23.1HF12345`.

Release products additionally have the Release version as the main identifier of the product version, for example, `2023-A`. This allows the user to identify the dSPACE Release with which the current product version was first released.

The Release version is also used for the API of a Release product if version information is required. For example, to instantiate a not-registered COM server, you have to call the COM server with a specific version, such as `ControlDesk.Application.2023-A`.

Platform support SCALEXIO systems now have a 64-bit Linux operating system. This is supported by all related products.

RCP and HIL software: C/C++ compilers for building MATLAB MEX files RCP and HIL software (such as RTI CAN MultiMessage Blockset, RTI LIN MultiMessage Blockset, or Automotive Simulation Models) now supports the following C/C++ compilers for building MATLAB MEX files:

- MinGW (GNU Compiler Collection (GCC 6.3.0))
- Microsoft Visual Studio 2019 Professional

New compliance check for run-time version licenses Real-time applications often contain models that need run-time version licenses, for example, the run-time version licenses for Automotive Simulation Models (ASM_..._RTV licenses). These licenses are required for downloading and executing a real-time application on the dSPACE real-time hardware, such as SCALEXIO.

As of dSPACE Release 2023-A, the dSPACE software performs a compliance check for such run-time version licenses when you download the real-time application. This check gives you the possibility to verify and fulfill the agreements in the dSPACE End User License Agreement (EULA).

Note

- With dSPACE Release 2023-A, dSPACE introduces the compliance check only for the required run-time version licenses for Automotive Simulations Models (ASM), for example, for the ASM Battery Library (run-time version) license. The check for run-time version licenses for other products will be included in later dSPACE Releases.
- Run-time version licenses for Automotive Simulations Models (ASM) are also required, if you want to execute offline simulation applications (OSAs) on the VEOS platform. An availability check for licenses required for OSAs has already been implemented since dSPACE Release 2017-B. This check is performed by VEOS when starting the simulation. If at least one of the required license is not available, executing the OSA is not possible.

For details, refer to [Compliance Check for Run-Time Version Licenses \(Working with CodeMeter Licensing Technology\)](#)

Discontinuations

Introduction The following discontinuations for software and hardware are relevant to the current Release or are planned for future Releases.

For more end-of-life announcements, refer to <https://www.dspace.com/go/discontinuation>.

Discontinuation of software support

Operating system As of dSPACE Release 2022-B, Ubuntu 18.04 LTS is no longer supported.

dSPACE CAN API and further bus-specific APIs As of dSPACE Release 2022-B, the dSPACE CAN API and further bus-specific APIs are no longer available for 32-bit applications.

Support for the 64-bit versions of these APIs is not affected and will be continued.

Sensor Simulation with all sensor types As of dSPACE Release 2023-A, Sensor Simulation based on MotionDesk with all sensor types is discontinued.

Planned discontinuation of software support

MotionDesk MotionDesk and the MotionDesk Blockset will be discontinued after Release 2023-B. Until discontinuation, MotionDesk supports the simulation of camera sensors. Radar and lidar sensors are now unsupported using MotionDesk. For more information, refer to <https://www.dspace.com/go/elamd>.

RTI CAN/LIN MultiMessage Blockset for SCALEXIO RTI CAN MultiMessage Blockset and RTI LIN MultiMessage Blockset for SCALEXIO are planned for discontinuation after Release 2024-B. For more information, refer to <https://www.dspace.com/go/elaRTIxxMMBS>.

For new SCALEXIO projects, we recommend that you use the Bus Manager.

SCALEXIO firmware The 64-bit Linux-based real-time operating system (RTOS) is the default RTOS for a SCALEXIO system and the DS6001 Processor Board. The 32-bit Linux-based RTOS is still supported as legacy support. The support will be discontinued after dSPACE Release 2023-A.

Planned discontinuation of dSPACE hardware

PHS-bus hardware In December 2021, the hardware components for PHS-bus-based systems, such as the DS1006 Processor Board, the DS1007 PPC Processor Board, and all the PHS-bus I/O boards, were discontinued. This also applies to the dSPACE Simulator Mid-Size and the dSPACE Simulator EcoLine. New Releases of dSPACE software will continue to support the PHS-bus hardware components until the end of 2023.

For new projects, we recommend that you use SCALEXIO as a modular real-time system.

MicroAutoBox II MicroAutoBox II with all its variants (1401/1507, 1401/1511, 1401/1511/1514, 1401/1513, and 1401/1513/1514) will be discontinued at the end of 2027. You can buy the product until the end of 2024 and the software support will be continued up to dSPACE Release 2026-B. For new projects, we recommend that you use MicroAutoBox III.

Discontinuation of legacy licensing technologies

As of dSPACE Release 2023-A, dSPACE Installation Manager no longer supports legacy licensing technologies (WibuKey from Wibu-Systems for dongle licenses and FlexNet from Flexera for floating network licenses). This means:

- dSPACE Installation Manager 23.1 (on dSPACE Release 2023-A) and later will support only the CodeMeter licensing technology introduced with dSPACE Release 2017-B.
- dSPACE Installation Manager 23.1 and later no longer provides the file download (keys.dsp and license.dsp) for legacy licensing based on CodeMeter licenses.
- Installing dSPACE Release 2023-A or later on the same PC as dSPACE Release 2017-A or earlier is no longer supported and therefore not recommended.
- As of dSPACE Release 2023-A, dSPACE License Manager (Legacy) is no longer shipped and installed with the dSPACE Installation Manager. The associated command line utilities are also discontinued, including in particular the `IMLicUtil.exe` and the `InstallationReporter.exe` utilities.
- If you still need to use the legacy licensing method, you must use the latest version of dSPACE Installation Manager that supports this technology. This is dSPACE Installation Manager 22.3. You can download dSPACE Installation Manager 22.3 from <https://www.dspace.com/go/IM>.

Discontinuation of the dongle migration with dSPACE Installation Manager

As of dSPACE Release 2023-A, dSPACE Installation Manager no longer supports migration from old dongles (delivered for dSPACE Release 2017-A and earlier) to currently delivered CmDongles.

If you still have an old dongle that needs to be migrated to use dSPACE Release 2017-B or later, the following applies:

- You are still using a WibuKey dongle (Type 1): Migration is no longer possible. A dongle exchange by dSPACE is required. For more information, refer to <http://www.dspace.com/go/DongleReplacement>.
- You are still using a first-generation CmDongle (Type 2), with serial number starting with 2-xxxx and white connector: Migration is no longer possible. A dongle exchange by dSPACE is required. For more information, refer to <http://www.dspace.com/go/DongleReplacement>.
- You are still using a CmDongle (Type 3), with serial number starting with 3-xxxx and old firmcode: Migration is required by using an earlier version of dSPACE Installation Manager (from 5.0 ... to 22.3). For the download of dSPACE Installation Manager 22.3, refer to <https://www.dspace.com/go/IM>.

Product Version Overview

Product versions

The following table is an extract from product version histories showing the product versions of the current Release and of the three preceding Releases. If a product has new features, there is a link to the brief description in this document.

Product	dSPACE Release			
	2021-B	2022-A	2022-B ¹⁾	2023-A
AutomationDesk	6.6	6.7	2022-B	2023-A Refer to AutomationDesk on page 25.
Automotive Simulation Models	10.0	10.1	2022-B	2023-A Refer to Automotive Simulation Models (ASM) on page 29.
Bus Manager (stand-alone)	6.8	22.1	2022-B	2023-A Refer to Bus Manager (Stand-Alone) on page 51.
ConfigurationDesk for RapidPro	– ²⁾	–	–	–
ConfigurationDesk	6.8	22.1	2022-B	2023-A Refer to ConfigurationDesk on page 59.
Container Manager	5.2	5.2	–	–
ControlDesk	7.5	7.6	2022-B	2023-A Refer to ControlDesk on page 77.
DCI Configuration Tool	3.13	3.13	2022-B	2023-A Refer to DCI Configuration Tool on page 93.
dSPACE AUTOSAR Compare	1.1	1.1	2022-B	2022-B
dSPACE Bus API Package	–	–	–	2023-A Refer to About the dSPACE Bus API Package on page 95.
dSPACE CAN API Package	4.0.7	4.0.8	2022-B	2023-A
dSPACE ECU Flash Programming Tool	2.8	2.8	2022-B	2023-A
dSPACE FlexRay Configuration Package	4.8	4.9	2022-B	2023-A Refer to dSPACE FlexRay Configuration Package on page 97.
dSPACE Installation Manager	5.8	5.9	22.2	23.1 Refer to dSPACE Installation Manager on page 99
dSPACE Python Extensions	4.1	4.2	2022-B	2023-A
dSPACE XIL API .NET	2021-B	2022-A	2022-B	2023-A Refer to dSPACE XIL API .NET on page 101.
ECU Interface Manager	2.10	2.11	2022-B	2023-A Refer to ECU Interface Manager on page 103.
Firmware Manager	3.4	3.5	22.2	23.1
FPGA Programming Blockset ³⁾	3.12	3.13	2022-B	2023-A Refer to FPGA Programming Blockset on page 105.
MicroAutoBox III firmware	5.2	6.0	22.2	23.1 Refer to MicroAutoBox III Firmware on page 111.

Product	dSPACE Release			
	2021-B	2022-A	2022-B ¹⁾	2023-A
Model and Sensor Interface Blockset	1.2	1.3	2022-B	2023-A Refer to Model and Sensor Interface Blockset on page 115.
Model Compare	3.2	3.2	2022-B	2022-B
Model Container Utility	–	–	2022-B	2023-A Refer to About Model Container Utility on page 113.
ModelDesk	5.6	5.7	2022-B	2023-A Refer to ModelDesk on page 117.
Model Interface Package for Simulink	4.6	22.1	2022-B	2023-A Refer to Model Interface Package for Simulink on page 119.
MotionDesk	4.9	4.10	2022-B	2023-A Refer to MotionDesk on page 121.
MotionDesk Blockset	2.6.4	2.6.5	2022-B	2023-A Refer to MotionDesk on page 121.
Real-Time Testing	5.1	5.2	2022-B	2023-A Refer to Real-Time Testing on page 123.
RTI ⁴⁾	7.17	7.18	2022-B	2023-A Refer to RTI/RTI-MP and RTLib on page 125.
RTI-MP ⁵⁾	7.17	7.18	2022-B	2023-A Refer to RTI/RTI-MP and RTLib on page 125.
RTI Bypass Blockset	3.17	3.18	2022-B	2023-A Refer to RTI Bypass Blockset on page 127.
RTI CAN Blockset	3.4.13	3.4.14	2022-B	2023-A
RTI CAN MultiMessage Blockset	5.7	5.8	2022-B	2023-A Refer to RTI CAN MultiMessage Blockset on page 129.
RTI Electric Motor Control Blockset	1.4.4	1.4.5	2022-B	2023-A
RTI Ethernet Blockset	1.2.6	1.2.7	2022-B	2023-A
RTI Ethernet (UDP) Blockset	1.4.6	1.4.7	2022-B	2023-A
RTI LIN MultiMessage Blockset	3.7	3.8	2022-B	2023-A Refer to RTI LIN MultiMessage Blockset on page 133.
RTI RapidPro Control Unit Blockset	2.2.6	2.2.7	2022-B	2023-A
RTI Synchronized Time Base Manager Blockset	1.4.3	1.4.4	2022-B	2023-A
RTI USB Flight Recorder Blockset	1.2.5	1.2.6	2022-B	2023-A
RTI Watchdog Blockset	2.1.4	2.1.5	2022-B	2023-A
Sensor Simulation	1.6	1.7	2022-B	–

Product	dSPACE Release			
	2021-B	2022-A	2022-B ¹⁾	2023-A
SCALEXIO firmware	5.2	6.0	2022-B	2023-A Refer to SCALEXIO Firmware on page 135.
SYNECT	2.12	2.13	2022-B	2023-A Refer to SYNECT on page 137.
SystemDesk	5.6	5.6	2022-B	2022-B
TargetLink	5.2	5.2	2022-B	2022-B
VEOS	5.3	5.4	2022-B	2023-A Refer to VEOS on page 141.

¹⁾ For information on the new versioning scheme of dSPACE products, refer to [General Enhancements and Changes](#) on page 11.

²⁾ As of dSPACE Release 2021-B, ConfigurationDesk for RapidPro is no longer part of the dSPACE Release. You can download it from the dSPACE website as a separate software package with its own setup program. Refer to <https://www.dspace.com/go/CFDRP>.

³⁾ RTI FPGA Programming Blockset up to Release 2022-A.

⁴⁾ Including the standard I/O blocksets.

⁵⁾ Including the RTI Gigalink Blockset.

If you have not performed regular updates, refer to the *New Features and Migration* documents for the dSPACE Releases listed above for information about the new features and required migration steps.

New Key Product Features

Introduction

This is an overview of the new key features for each product. For more information, refer to the product-specific sections.

AutomationDesk

The new key features of AutomationDesk are:

- Modernized user interface
- Improved Found Items Viewer
- Enhanced COM API features

For more information on the new features, refer to [New Features of AutomationDesk 2023-A](#) on page 25.

Bus Manager (stand-alone)

The new key features of the Bus Manager (stand-alone) are:

- Enhanced J1939 support
- Support of event-controlled timings for DBC communication matrices
- Additional configurable communication matrix settings
- PDU User Code feature available for multiplexed IPDUs
- Enhanced bus configuration tables

For more information, refer to [New Features of the Bus Manager \(Stand-Alone\) 2023-A](#) on page 51.

ConfigurationDesk

The new key features of ConfigurationDesk are:

- Support of Functional Mock-up Units (FMU files) that comply with the FMI 3.0 standard.
- New event type to trigger tasks synchronously to a global time.
- New UART function block type to configure and access a UART transceiver.
- Enhanced Ethernet Setup function block type to support MACsec.
- Higher task stack sizes.
- New Rebuild button.
- Various enhancements of the Bus Manager for configuring bus communication for simulation, inspection, and manipulation purposes.

For more information, refer to [ConfigurationDesk](#) on page 59.

ControlDesk

The new key features of ControlDesk are:

Project/experiment management enhancements

- Revised Template Editor

For more information, refer to [New Project and Experiment Features \(ControlDesk 2023-A\)](#) on page 78.

Variable management enhancements

- Support of variable mapping according to ASAM XIL

For more information, refer to [New Variable Management Features \(ControlDesk 2023-A\)](#) on page 79.

Instrument enhancements

- Hierarchy Array improvements

For more information, refer to [New Instrument Features \(ControlDesk 2023-A\)](#) on page 82.

Bus Navigator enhancements

- Bus Instrument generation based on the Hierarchy Array (Bus Manager applications only)
- New Compact Bus Instrument type (Bus Manager applications only)
- Bus Instrument generation for CAN J1939 messages (Bus Manager applications only)
- Tool automation support für Bus Navigator options

For more information, refer to [New Bus Navigator Features \(ControlDesk 2023-A\)](#) on page 85.

dSPACE XIL API

The new key features of dSPACE XIL API are:

- Extended support of ASAM XIL 2.2.0 features
- Enhanced MAPIPort functionality
- Enhanced ECUPort functionality

For more information on the new features, refer to [New Features of dSPACE XIL API .NET 2023-A](#) on page 101.

ECU Interface Manager

The new key feature of the ECU Interface Manager is:

- XCP on CAN: Sending CAN FD frames with or without BRS

For more information on the new features, refer to [New Features of ECU Interface Manager 2023-A](#) on page 103.

FPGA Programming Blockset

The new key features of the FPGA Programming Blockset 2023-A are:

- Extended Xilinx® software support.
- Support of Simulink blocks to model parts of the FPGA model
- Enhancements to the FPGA frameworks
- New Getting Started document for the first steps in FPGA programming with the FPGA Programming Blockset.

For more information on the new features, refer to [New Features of the FPGA Programming Blockset 2023-A](#) on page 105.

ModelDesk

The new key feature of ModelDesk is:

- Road Generator: You can specify traffic light systems for V2X communication using the graphical user interface.

For more information on the new feature, refer to [New Features of ModelDesk 2023-A](#) on page 117.

Model Interface Package for Simulink

The new key features of Model Interface Package for Simulink are:

- New context menu command to create model port blocks directly from Bus Creator blocks.
- Support of MATLAB® R2023a

For more information on the new features, refer to [Model Interface Package for Simulink](#) on page 119.

RTI, RTI-MP, and RTLib

The new key feature of RTI, RTI-MP, and RTLib is:

- Support of MATLAB® R2023a.

For more information, refer to [New Features of RTI/RTI-MP and RTLib](#) on page 125.

RTI CAN MultiMessage Blockset

The new key feature of the RTI CAN MultiMessage Blockset is:

- Support of SCALEXIO systems with a DS6344 CAN Board.

For more information on the new features, refer to [New Features of the RTI CAN MultiMessage Blockset 2023-A](#) on page 129.

SCALEXIO firmware

The new key feature of the SCALEXIO firmware is:

- Support of a new SCALEXIO real-Time PC.
- Support of the DS6344 CAN Board.

For more information on the new feature, refer to [New Features of the SCALEXIO Firmware 23.1](#) on page 135.

VEOS

The new key features of VEOS are:

- Ethernet restbus simulation
- Building BSCs on Linux (VEOS Build Console)
- FMU: Manipulating incoming and outgoing signal values
- Support for MSVC compiler Version 14.3x
- ISO 26262 certification

For more information on the new features, refer to [New Features of VEOS 2023-A](#) on page 141.

Aspects of Migrating from Previous Releases

Introduction

After you install products of the current dSPACE Release, some additional steps might be required. The migration steps required when you update from the last dSPACE Release are described in the product-specific migration topics in this document. If you update from an earlier dSPACE Release, refer to the related *New Features and Migration* document.

Migrating to dSPACE Release 2023-A

Introduction

After you install Release 2023-A, some additional steps might be required.

Migrating from dSPACE Release 2022-B

Product-specific migration steps Product-specific migration steps are generally performed automatically. For exceptions, refer to the product-specific migration descriptions.

Migrating from dSPACE Release 2022-A or earlier

To migrate from dSPACE Release 2022-A or earlier to Release 2023-A, you also have to perform the migration steps of the intervening dSPACE Releases. All of the required migration steps can be performed using software from dSPACE Release 2023-A.

For more information on the required migration steps, refer to the *New Features and Migration* documents of the intervening dSPACE Releases.

Previous Release documents

The PDF files of previous Releases are called **NewFeaturesAndMigrationxx.pdf**, where xx represents the Release number.

You can find the *New Features and Migration* files for previous Releases in the following locations:

- In the installation folder of the current dSPACE Help. Refer to **C:\Program Files\Common Files\dSPACE\Help 2023-A\Print\PreviousReleases**.
- On the dSPACE DVDs. Refer to **\Doc\PreviousReleases**.

- At <https://www.dspace.com/go/migration> for download. Here, you can also find *New Features and Migration* documents for very early Releases.

AutomationDesk

Where to go from here

Information in this section

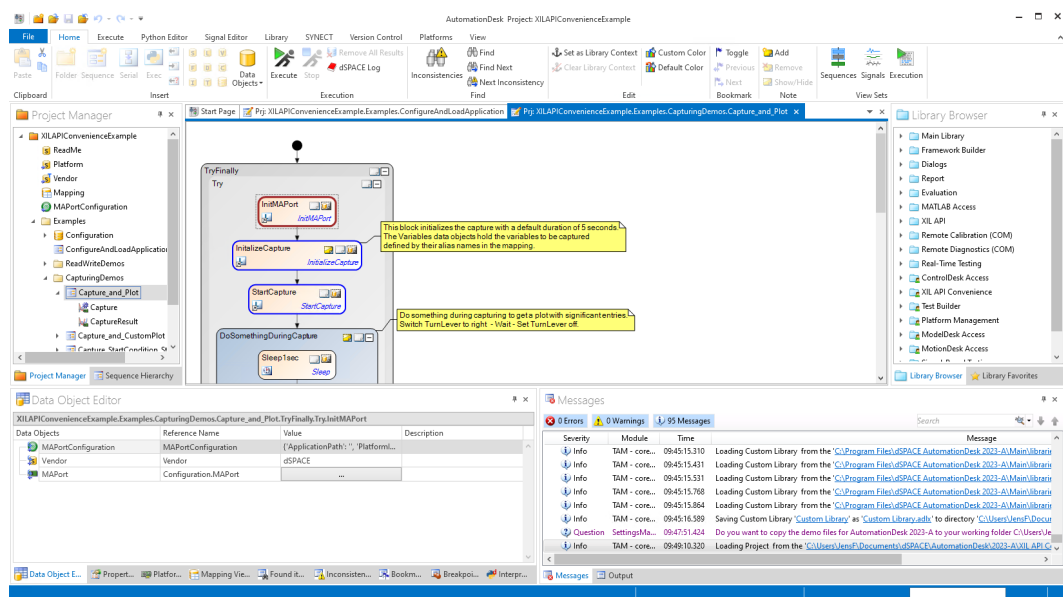
New Features of AutomationDesk 2023-A..... 25

Migrating to AutomationDesk 2023-A..... 27

New Features of AutomationDesk 2023-A

General enhancements


Modernized user interface framework The following illustration shows the modernized AutomationDesk user interface.



For simplification of the user interface, the following elements have been removed:

- **Result Browser**
The execution results are still available in the Results elements from which you can generate reports. These reports contain sufficient information for test analysis, so you can pass on the more programmatic view of the Result Browser.
- **Change Children Order dialog**
You can move elements to other positions by dragging them via mouse. This is more intuitive and flexible than using a dialog.
- **Record depth and result level attributes**
The configuration items for result logging complicated the execution configuration. The record depth and the result level are therefore no longer configurable. They are internally both set to **None**. The result level is no longer displayed in the Data Object Editor and the Properties dialog.
- **View mode of the Data Object Editor**
The Data Object Editor was used in single view or multiple view. The multiple view is no longer available.
- **Value class attribute**
The value class is no longer displayed in the Data Object Editor. For most of the data objects, the user got no additional value from this.

Improved Found Items Viewer The Found Items Viewer displays the results of an executed **Find** command. In the viewer's toolbar, the Find what output field and the Replace with input field now provide more space to read and enter the search strings.

Enhanced user documentation The description of new features and migration instructions are now available in a separate document to give you a compact overview of the changes of the previous AutomationDesk versions. Refer to [AutomationDesk New Features and Migration](#) .

Enhancements to the COM API

The data object handling has been enhanced by the following data objects:

- XIL API library:
 - XilApiCaptureEvent
 - XilApiDuration
 - XilApiDurationFactory
 - XilApiErrorInfo
 - XilApiScript
 - XilApiScriptParameterInfo
 - XilApiTargetScriptFactory
 - XilApiTargetScriptFileReader
- Real-Time Testing library:
 - RealTimeTestingBoard
 - RealTimeTestingDataStream
 - RealTimeTestingDataStreams
 - RealTimeTestingExecutionError

- RealTimeTestingManagerServer
- RealTimeTestingSequence
- RealTimeTestingSequences
- RealTimeTestingVariable
- RealTimeTestingVariables

For more information, refer to [AutomationDesk Automation](#) .

Migrating to AutomationDesk 2023-A


General migration aspects

If you open an AutomationDesk project with a later AutomationDesk version, the software automatically detects whether migration is required. Click OK in the message dialog to start the migration. Save the migrated project to another path or name.

Note

Before you open an earlier project with the new AutomationDesk version, make sure that the following preconditions are fulfilled:

- You must create backups of the project and of the linked custom libraries.
- AutomationDesk must be running properly. The Log Viewer must not display any error messages.
- The built-in libraries, required custom libraries, and other packages must be loaded properly.

If you use a version control system, there are some preconditions for successful migration. Refer to [How to Migrate Projects or Custom Libraries Under Version Control](#) ([AutomationDesk Basic Practices](#) .

For more information, refer to [Migration](#) ([AutomationDesk New Features and Migration](#) .

Automotive Simulation Models (ASM)

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All ASM Products

New Features of All ASM Blocksets

Animation in AURELION

ASM now supports AURELION as an animation tool. AURELION is the successor to MotionDesk and provides photorealistic visualization and physical sensor simulation.

All the ASM demo models that can be used for animation now contain an AnimationInterface to support animation in AURELION.

ASM Battery

Where to go from here

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New Features of ASM Battery Blockset 2023-A

BATTERY_PACK_VOLTAGE block	The implementation of the RC circuit has been changed from Simulink blocks to an S-function to improve the simulation performance.
-----------------------------------	------------------------------------------------------------------------------------------------------------------------------------

BATTERY_PACK_RC block	The implementation of the RC circuit has been changed from Simulink blocks to an S-function to improve the simulation performance and avoid division by zeros for inactive stacks.
------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Changes in the ASM Battery Demo Models

New Battery Packs demo subsystems	<p>In the Battery demo model, the Battery Pack subsystem has been extended with the following subsystems:</p> <ul style="list-style-type: none"> ▪ A battery pack with external RC circuits to simulate the battery RC circuits more accurately and provide the possibility to parameterize them precisely. ▪ A battery with two parallel packs as an example on how to connect two battery packs in parallel.
------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Migrating to ASM Battery Blockset 2023-A

BATTERY_PACK_VOLTAGE block	The battery inductance voltage loss calculation has been corrected.
-----------------------------------	---------------------------------------------------------------------

BATTERY_PACK_DELTA_VOLTAGE block	The battery inductance voltage loss calculation has been corrected.
-----------------------------------------	---------------------------------------------------------------------

Related topics

Basics

[Migrating ASM Models \(ASM User Guide !\[\]\(3d8c13c92b853674f749aac6fa869926_img.jpg\)\)](#)

ASM Diesel Exhaust

Migrating to ASM Diesel Exhaust Blockset 2023-A

RAW_EXHAUST_ **COMPOSITION block**

The Map_Psi_NOx_Raw parameter was renamed to Map_Xsi_NOx_Raw to emphasize that it is expected as mass fraction in the block.

Related topics

Basics

[Migrating ASM Models \(ASM User Guide !\[\]\(003082e50e3009141f59bd5df831749f_img.jpg\)\)](#)

ASM Drivetrain Basic

Where to go from here

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New Features of ASM Drivetrain Basic Blockset 2023-A

TORQUE_INTERVENTION_ BASIC block

Three signal labels of the ASMSignalBus have been corrected.

Migrating to ASM Drivetrain Basic Blockset 2023-A

TORQUE_INTERVENTION_ BASIC block

During migration, the former labels of the ASMSignalBus are restored.

Related topics

Basics

[Migrating ASM Models \(ASM User Guide !\[\]\(e3275251d0893157c3584e20c81dc3ba_img.jpg\)](#))

ASM Electric Components

Changes in the ASM Electric Components Demo Models

Battery Electric Vehicle and Vehicle Dynamics Hybrid demo models

There are the following changes to the Battery Electric Vehicle and Vehicle Dynamics Hybrid demo model:

AURELION support The demo models now support AURELION as an animation tool.

To support animation in AURELION, the `MotionDeskInterface` was replaced by the `AnimationInterface` in the demo models. The respective `MotionDesk` project is discontinued.

SCALEXIO platform support The new `AnimationInterface` requires a SCALEXIO hardware-specific configuration. Because of this, SCALEXIO real-time objects are no longer part of the demo models. Instead, the demo projects now contain a SIC file and a Python script that you can use to easily create a real-time object for a specific SCALEXIO system.

Default simulation platform For the demo models, the default platform that is selected when you initialize the model with the `go.m` file has been changed from SCALEXIO to VEOS.

When you initialize a demo model with a call of the `go.m` file, it now prepares the model for simulation on a VEOS platform by default if you do not specify a platform argument.

ASM Fuel Cell

Where to go from here

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New Features of ASM Fuel Cell Blockset 2023-A

HUMIDIFIER block

You can now configure the HUMIDIFIER block to have a bypass on either the dry or the humid side.

In addition, the water that can be transferred by the humidifier is limited by the amount of water entering the humidifier on the more humid side.

For this, the following changes have been made to the HUMIDIFIER block:

- Four new inports have been added.
- One additional parameter has been added.
- The ASMSignalBus has been extended.

Four outports and the corresponding ASMSignalBus signals have been deleted from the block and are replaced by two outports according to the following mapping table:

Former output	Replaced by
mdot_H2O_Out_Humidifier	mdot_H2O_Transfer_Humidifier
H_H2O_Out_Humidifier	Hdot_H2O_Transfer_Humidifier

AIR_SUPPLY_CONTROL block

Two new control signals have been added to the block:

- One for the second stack isolation valve at the cathode outlet.
- One for the humidifier bypass.

The ASMSignalBus has been extended by the new output signals and the existing Ctrl_StackIsolationValve signal has been renamed to Ctrl_StackIsolationValve_1.

HYDROGEN_SUPPLY_CONTROL block

New inports, outports, and parameters have been added to the block:

- One new inport for the current water level in the water separator.
- One new outport for the drain valve control signal.
- Four new parameters for the new drain valve controller.

FLOW_ELEMENT block	<p>Four new inports and four new outports have been added to the block:</p> <ul style="list-style-type: none">▪ Inports:<ul style="list-style-type: none">▪ <code>h_H2O_In_FlowElement[J kg]</code>▪ <code>h_H2O_Out_FlowElement[J kg]</code>▪ <code>RelHumidity_Out_FlowElement[0_1]</code>▪ <code>RelHumidity_In_FlowElement[0_1]</code>▪ Outports:<ul style="list-style-type: none">▪ <code>T_FlowElement[K]</code>▪ <code>h_H2O_FlowElement[J kg]</code>▪ <code>h_H2O_Liq_FlowElement[J kg]</code>▪ <code>RelHumidity_FlowElement[0_1]</code>
INTERCOOLER block	<p>Two outports have been added to the block:</p> <ul style="list-style-type: none">▪ <code>h_H2O_Out_Intercooler[J kg]</code>▪ <code>h_H2O_In_Intercooler[J kg]</code>
COMPRESSOR block	<p>The units of the inports and the outport of the internal <code>PT1_mdots_Comp</code> subsystem have been changed to <code>[kg s]</code>.</p> <p>Two signals have been added to the <code>ASMSignalBus</code>:</p> <ul style="list-style-type: none">▪ <code>mdots_Comp_filtered</code>▪ <code>State_Surge_Comp</code>
MANIFOLD block	<p>It is now possible to calculate the manifold temperature externally.</p> <p>For this, the following has been added to the block:</p> <ul style="list-style-type: none">▪ An additional inport for mode switch: <code>Sw_TemperatureModel</code>▪ An additional outport for heat capacity: <code>C</code>
STACK_SETUP block	<p>A new <code>Sw_TemperatureModel[0Normal 1Simple]</code> parameter has been added to the block.</p> <p>The parameter lets you select a temperature model for the stack:</p> <ul style="list-style-type: none">▪ When you set the parameter value to <code>0</code>, the block uses three different energy balances for cathode gas, membrane assembly with bipolar plate, and anode gas. This approach has also been used in the demo model until now.▪ When you set the parameter value to <code>1</code>, the temperature model combines the thermal inertias of cathode gas, membrane assembly with bipolar plate, and anode gas and calculates only one temperature for each cell segment. <p>The parameter is connected to a new <code>Sw_TemperatureModel</code> outport.</p>

STACK_ASSEMBLY block	This block is new. It combines the functionality of the MEA_BP_ASSEMBLY and CASING blocks. In addition, like the MANIFOLD block, it allows the use of two different temperature models.
WATER_SEPARATOR block	This block is new. It is part of the recirculation path in the Fuel Cell module. The block calculates the mass flows of all gas components and liquid water at the inlet side of the water separator and all mass fractions at the outlet side. It also calculates the separated liquid water mass flow which is then gathered in a part of the device.
DRAIN_VALVE block	This block is new. It calculates the outlet liquid water mass flow of the water which is gathered in the water separator as a function of valve position (control signal).
COOLANT block	This block is new. It is part of the stack in the Fuel Cell module. The block calculates the temperature of the coolant in each active segment and casing part of the fuel cell stack.
MIXED_FLOW_RESERVOIR block	This block is new. It is part of the cooling system in the Fuel Cell module. The block calculates the mean temperature and the total volume flow of a coolant flow emerging from two coolant flows of different volume and temperature.

Changes in the ASM Fuel Cell Demo Model

Integration of HUMIDIFIER model	<p>In the Fuel Cell demo model, the air exhaust path is extended by a stack isolation valve at the cathode outlet and an additional air exhaust manifold after the humidifier. In addition, the air intake manifold is now located after the humidifier.</p> <p>In former demo model versions, the water transferred by the humidifier was exchanged between cathode outlet manifold and air intake manifold. From Release 2023-A on, with the additional air exhaust manifold, the water transferred by the humidifier is now considered in the air intake manifold and in the air exhaust manifold.</p> <p>With these changes, the modelled air supply path is more generic and allows the configuration of a humidifier bypass on the dry or the humid side without further extensions to the model.</p> <p>To apply these changes to the demo model, changes are made to the following subsystems:</p> <ul style="list-style-type: none"> ASM_FuelCell/FuelCell/FuelCell_Slow/Plant/PlantModel/AirSupply/ASMSignalCollector/CathodeInlet
----------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

- ASM_FuelCell/FuelCell/FuelCell_Slow/Plant/PlantModel/AirSupply/ASMSignalCollector/CathodeOutlet
- ASM_FuelCell/FuelCell/FuelCell_Slow/Plant/PlantModel/AirSupply/IntakePath
- ASM_FuelCell/FuelCell/FuelCell_Slow/Plant/PlantModel/AirSupply/ExhaustPath
- ASM_FuelCell/FuelCell/FuelCell_Fast/Plant/PlantModel/ Cathode

The mass and the enthalpy flows through the bypass valve are no longer considered in the air intake manifold. Instead, they are considered directly as part of the compressor mass flow.

Renaming of interfaces

For some subsystems, several inports and outports have been renamed, deleted, or added to improve the readability or account for changes to the Fuel Cell demo model.

These changes apply to the following subsystems:

- ASM_FuelCell/FuelCell/FuelCell_Slow/Plant/PlantModel/HydrogenSupply/RecirculationPath
- ASM_FuelCell/FuelCell/FuelCell_Slow/Plant/PlantModel/AirSupply/TurboComponents
- ASM_FuelCell/FuelCell/FuelCell_Slow/Plant/PlantModel/AirSupply/IntakePath
- ASM_FuelCell/FuelCell/FuelCell_Slow/Plant/PlantModel/AirSupply/ExhaustPath

Simplification of stack thermal model

To simplify the stack thermal model, now the thermal inertias of cathode gas, membrane assembly with bipolar plate, and anode gas are combined and only one conservation equation is calculated to get only one temperature for each segment.

There is a switch parameter that lets you use the former temperature model with three energy conservation equations for the three stack parts.

Migrating to ASM Fuel Cell Blockset 2023-A

HUMIDIFIER block

Four Constant blocks with different values are added to the demo model and connected to the new inports of the block to ensure predictable model results. A subsystem is added to the demo model that reverses the changes to the ASMSignalBus and to the output model structure.

AIR_SUPPLY_CONTROL block

Two Terminator blocks are connected to the new control outports. A subsystem is added to the demo model that reverses the changes to the ASMSignalBus.

FLOW ELEMENT block	Four Constant blocks with the value <i>zero</i> are connected to the new inports and four Terminator blocks are connected to the new outports.
INTERCOOLER block	Two Terminator blocks are connected to the new control outports.
MANIFOLD block	One Constant block with the value <i>zero</i> is connected to the new inport and one Terminator block is connected to the new outport.
STACK_SETUP block	One Terminator block is connected to the new outport.
HYDROGEN_SUPPLY_CONTROL block	One Constant block with the value <i>zero</i> is connected to the new inport and one Terminator block is connected to the new outport.
MEA_BP_ASSEMBLY block	This block is now a former versions block and is renamed to MEA_BP_ASSEMBLY_2_0 . The successor to the block is the new STACK_ASSEMBLY block.
CASING block	This block is now a former versions block and is renamed to CASING_1_0 . The successor to the block is the new STACK_ASSEMBLY block.
HEATED_FLOW_TEMPERATURE block	This block is now a former versions block and is renamed to HEATED_FLOW_TEMPERATURE_1_0 . The successor to the block is the MIXED_FLOW_RESERVOIR block.
MIXED_FLOW_TEMPERATURE block	This block is now a former versions block and is renamed to MIXED_FLOW_TEMPERATURE_1_0 . The successor to the block is the MIXED_FLOW_RESERVOIR block.
T_COOLANT_INTERPOLATION block	This block is now a former versions block and is renamed to T_COOLANT_INTERPOLATION_1_0 . The successor to the block is the COOLANT block.

Related topics**Basics**

[Migrating ASM Models \(ASM User Guide !\[\]\(6605b201d6f14d9b3bcb8ab5f274d107_img.jpg\)\)](#)

ASM KnC

Discontinuation of ASM KnC 2023-A

ASM KnC (Windows-based)

ASM KnC (Windows-based) and the ASM KnC Player will be discontinued after Release 2023-A.

The discontinuation does not apply to the MATLAB-based framework. ASM KnC (MATLAB-based) and the multibody algorithm for evaluating the suspension kinematics and compliance look-up tables will still be available after Release 2023-A to generate the model parameters.

For more information, contact ASM support via Support.ASM@dSPACE.de.

ASM Pneumatics

Where to go from here

Information in this section

- [New Features of ASM Pneumatics Blockset 2023-A](#).....42
- [Migrating to ASM Pneumatics Blockset 2023-A](#).....42

New Features of ASM Pneumatics Blockset 2023-A

TRL_CONTROL_MODULATOR_CTRL block

The (supply) pressure of *Tank 3* has been connected to the inport of the inlet valve in EBS configuration. For more information, refer to [Basics on Trailer Control \(ASM Pneumatics Reference !\[\]\(de95854c7ee024cfadc48187bbb781b2_img.jpg\)](#)).

Migrating to ASM Pneumatics Blockset 2023-A

TRL_CONTROL_MODULATOR_CTRL block

A block migration is performed because the inport of the inlet valve has been connected to the (supply) pressure of *Tank 3*. Until now, it was connected to the desired brake pressure defined by the foot brake module.

Related topics

Basics

- [Migrating ASM Models \(ASM User Guide !\[\]\(adb0331d22f78481623cc605df40612a_img.jpg\)](#))

ASM Turbocharger

New Features of ASM Turbocharger Blockset 2023-A

COMPRESSOR block

The units of the inport and outport of the internal PT1_mdot_Comp subsystem have been changed to [kg/s].

Two signals have been added to the ASMSignalBus:

- `mdot_Comp_filtered`
- `State_Surge_Comp`

ASM Traffic

Changes in the ASM Traffic Demo Model

**OUTPUT_INTERFACE_ACC
block**

The usage of the drivetrain ratios to calculate the requested torque has been corrected. Until now, both front and rear requests were summed up regardless of the drivetrain configuration.

ASM Trailer

Where to go from here

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New Features of ASM Trailer Blockset 2023-A

SUSKIN_RIGID_TRUCK_TRAILER_FRONT block	A model crash when the track width is unintentionally parameterized with zero is now avoided.
-----------------------------------------------	-----------------------------------------------------------------------------------------------

SUSKIN_RIGID_TRUCK_TRAILER_REAR, _2ND and _3RD block	A model crash when the track width is unintentionally parameterized with zero is now avoided.
-------------------------------------------------------------	-----------------------------------------------------------------------------------------------

SUSKIN_RIGID_SYM_TRAILER_FRONT block	A model crash when the track width is unintentionally parameterized with zero is now avoided.
---------------------------------------------	-----------------------------------------------------------------------------------------------

SUSKIN_RIGID_SYM_TRAILER_REAR, _2ND, and _3RD blocks	A model crash when the track width is unintentionally parameterized with zero is now avoided.
-------------------------------------------------------------	-----------------------------------------------------------------------------------------------

Changes in the ASM Trailer Demo Model

AURELION support	<p>The Trailer demo model now supports AURELION as an animation tool.</p> <p>To support animation in AURELION, the MotionDeskInterface was replaced by the AnimationInterface in the demo model. The respective MotionDesk project is discontinued.</p>
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SCALEXIO platform support	<p>The new AnimationInterface requires a SCALEXIO hardware-specific configuration. Because of this, SCALEXIO real-time objects are no longer part of the Trailer demo models. Instead, the Trailer project now contains a SIC file and a Python script that you can use to easily create a real-time object for a specific SCALEXIO system.</p>
----------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Default simulation platform

For the Trailer models, the default platform that is selected when you initialize the model with the go.m file has been changed from SCALEXIO to VEOS.

When you initialize a Trailer model with a call of the go.m file, it now prepares the model for simulation on a VEOS platform by default if you do not specify a platform argument.

ASM Truck

Where to go from here

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New Features of ASM Truck Blockset 2023-A

SUSKIN_RIGID_TRUCK_REAR_2ND and _3RD blocks A model crash when the track width is unintentionally parameterized with zero is now avoided.

SUSKIN_RIGID_SYM_REAR_2ND and _3RD blocks A model crash when the track width is unintentionally parameterized with zero is now avoided.

Changes in the ASM Truck Demo Model

AURELION support The Truck demo models now support AURELION as an animation tool. To support animation in AURELION, the MotionDeskInterface was replaced by the AnimationInterface in the demo models. The respective MotionDesk projects are discontinued.

SCALEXIO platform support The new AnimationInterface requires a SCALEXIO hardware-specific configuration. Because of this, SCALEXIO real-time objects are no longer part of the Truck demo models. Instead, the Truck projects now contain a SIC file and a Python script that you can use to easily create a real-time object for a specific SCALEXIO system.

Default simulation platform For the Truck models, the default platform that is selected when you initialize the model with the go.m file has been changed from SCALEXIO to VEOS. When you initialize a Truck model with a call of the go.m file, it now prepares the model for simulation on a VEOS platform by default if you do not specify a platform argument.

ASM Utils

New Features of ASM Utils 2023-A

**ASM BUS OBJECT
GENERATOR block**

This block is new. It lets you generate Simulink bus objects and their respective header files from an ASMSignalBus.

ASM Vehicle Dynamics

Where to go from here

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New Features of ASM Vehicle Dynamics Blockset 2023-A

TORQUE_INTERVENTION_BASIC block	Typing errors have been corrected in three signal labels of the ASMSignalBus.
SUSKIN_RIGID_TRUCK_FRONT and _REAR blocks	A model crash is now avoided when the track width is unintentionally parameterized with <i>zero</i> .
SUSKIN_RIGID_SYM_FRONT and _REAR blocks	A model crash is now avoided when the track width is unintentionally parameterized with <i>zero</i> .
COORDINATE_TRANSFORMATION block	Constantly increasing values for the yaw angle when driving multiple rounds on a circuit are now avoided.
MASS_FORCES_AND_TORQUES block	Typing errors have been corrected in two signal labels of the ASMSignalBus.

Changes in the ASM Vehicle Dynamics Demo Model

AURELION support	<p>The Vehicle Dynamics demo model now supports AURELION as an animation tool.</p> <p>To support animation in AURELION, the <code>MotionDeskInterface</code> was replaced by the <code>AnimationInterface</code> in the demo model. The respective <code>MotionDesk</code> project is discontinued.</p>
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SCALEXIO platform support The new AnimationInterface requires a SCALEXIO hardware-specific configuration. Because of this, SCALEXIO real-time objects are no longer part of the Vehicle Dynamics demo models. Instead, the Vehicle Dynamics project now contains a SIC file and a Python script that you can use to easily create a real-time object for a specific SCALEXIO system.

Default simulation platform For the Vehicle Dynamics models, the default platform that is selected when you initialize the model with the go.m file has been changed from SCALEXIO to VEOS.

When you initialize a Vehicle Dynamics model with a call of the go.m file, it now prepares the model for simulation on a VEOS platform by default if you do not specify a platform argument.

Migrating to ASM Vehicle Dynamics Blockset 2023-A

TORQUE_INTERVENTION_BASIC block During migration, the former labels of the ASMSignalBus are restored.

COORDINATE_TRANSFORMATION_4_0 block This block contains the structure and equations of a former block version.

VEHICLE_MOVEMENT_INFO_CAR_11_0 block This block contains the structure and equations of a former block version.

MASS_FORCES_AND_TORQUES block During migration, the former labels of the ASMSignalBus are restored.

Related topics

Basics

[Migrating ASM Models \(ASM User Guide !\[\]\(c50c8b7b2cc2cf9ff925edec0ee94c0d_img.jpg\)\)](#)

Bus Manager (Stand-Alone)

Where to go from here

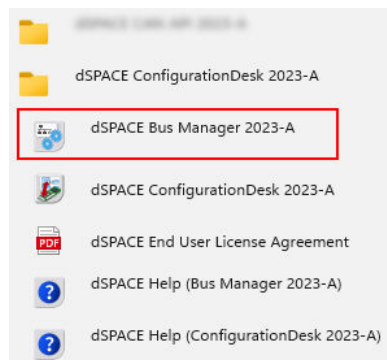
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New Features of the Bus Manager (Stand-Alone) 2023-A

New installation folder

The Bus Manager (stand-alone) is now installed in the dSPACE ConfigurationDesk <ReleaseVersion> folder, i.e., it is no longer part of the RCP and HIL installation folder. On the Windows Start menu, you can now access the Bus Manager (stand-alone) via dSPACE ConfigurationDesk <ReleaseVersion> – dSPACE Bus Manager <ReleaseVersion>.



Enhanced J1939 support

The Bus Manager (stand-alone) now provides the following enhancements for J1939:

- The Bus Manager (stand-alone) supports the new J1939-22 protocol, which specifies J1939 on CAN FD. In contrast to J1939-21 (J1939 on CAN), the J1939-22 protocol supports larger IPDU payload lengths, e.g., up to 15,300 bytes for broadcast communication, and a higher baud rate. The Bus Manager (stand-alone) supports J1939-22 communication that is specified in DBC and ARXML files.
- The Bus Manager (stand-alone) supports J1939-21 communication that is specified in ARXML files.

For more information, refer to [Aspects of the J1939 Protocol \(Bus Manager \(Stand-Alone\) Implementation Guide !\[\]\(e78f798d4ea5c530c9db49e7d26e6b95_img.jpg\)](#)).

Support of event-controlled timings for DBC communication matrices

The Bus Manager (stand-alone) now supports event-controlled timings for bus communication that is specified in DBC communication matrices. With event-controlled timings, ISignals that are included in a PDU can trigger the transmission of this PDU. However, the Bus Manager (stand-alone) uses an AUTOSAR-based approach for event-controlled timings. To derive the required settings from a DBC communication matrix, the Bus Manager (stand-alone) evaluates the `GenMsgCycleTimeFast`, `GenMsgNrOfRepetition`, `GenMsgNrOfRepetitions`, and `GenSigSendType` DBC attributes.

For more information, refer to [Aspects of Event-Controlled Timings \(Bus Manager \(Stand-Alone\) Implementation Guide !\[\]\(ec9132f1d27c8919987d92907322654d_img.jpg\)](#)).

Additional configurable communication matrix settings

The Bus Manager (stand-alone) now lets you modify the collection semantics, timeout value, and trigger condition for container IPDUs and J1939-22-compliant IPDUs.

For more information, refer to [Configurable Settings of PDUs \(Bus Manager \(Stand-Alone\) Implementation Guide !\[\]\(dd161862f9164df98f62b726e9846241_img.jpg\)](#)).

PDU User Code feature available for multiplexed IPDUs

The Bus Manager (stand-alone) now lets you add the PDU User Code feature to multiplexed IPDUs.

For more information, refer to [Applying User Code to PDUs \(Bus Manager \(Stand-Alone\) Implementation Guide !\[\]\(626ce8ac21792b9405bfddfea8e0c96a_img.jpg\)](#)).

Enhanced bus configuration tables

The Bus Manager (stand-alone) now provides the following enhancements for bus configuration tables:

- You can access the Number of user ports and Direction of user port [`<n>`] properties of the PDU User Code feature via new table columns. The columns are available in the Column Chooser and you can add them to the Bus Configurations, Bus Simulation Features, Bus Inspection Features, and Bus Manipulation Features tables.

For more information, refer to [Applying User Code to PDUs \(Bus Manager \(Stand-Alone\) Implementation Guide !\[\]\(c1168d6a8b365d11e842ece304635fa7_img.jpg\)](#)).

- The Length, Time Offset, and Time Period columns are now configurable, i.e., you can modify the length of ISignals and PDUs, and the time offset and time period of cyclic timings via these columns.

For more information, refer to [Basics on Modifying Communication Matrices \(Bus Manager \(Stand-Alone\) Implementation Guide !\[\]\(2e897e890e69d81eae4503a8342c36b0_img.jpg\)](#)).

Support of multiple secured IPDUs for one authentic IPDU for inspection

For inspecting bus communication, the Bus Manager (stand-alone) now supports multiple secured IPDUs that are exchanged by the same network node (i.e., the same ECU on the same communication cluster) for one authentic IPDU. If you assign two or more of such secured IPDUs and the related authentic IPDU to the Inspection part of one bus configuration, you can use bus inspection features with any of the IPDUs to access the data that is received on the bus.

New default for search paths

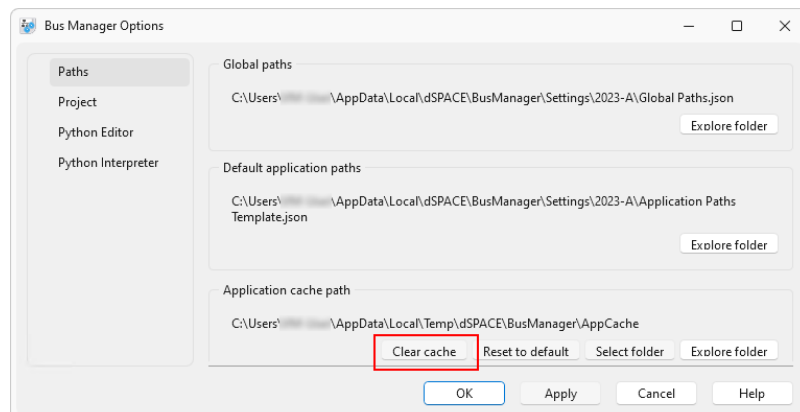
The Bus Manager (stand-alone) now lets you specify a default for application-specific search paths. New ConfigurationDesk applications are created using the default, and you can replace the search paths of a user location file with the default.

For information on specifying default search paths, refer to [Managing Search Paths \(ConfigurationDesk Custom I/O Function Implementation Guide !\[\]\(830769b31eeeaca920791081939ff8ba_img.jpg\)](#)).

Project cache converted to application cache

The Bus Manager (stand-alone) stores temporary data of ConfigurationDesk applications such as temporary artifacts resulting from the generation of bus simulation containers. The previously introduced project cache has now been converted into an application cache. With this change, you can validate or clear the cache more selectively.

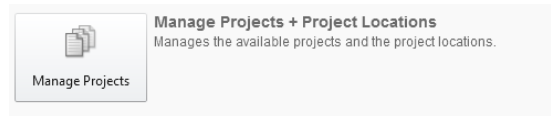
In addition, the Bus Manager (stand-alone) now provides the Clear cache button, which lets you delete all cache folders at once. This allows you to save disk space. The button is located on the Paths page in the Bus Manager Options dialog.



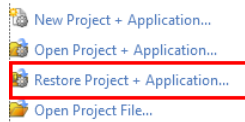
Usability improvements concerning project and application handling

The project and application handling is enhanced with several improvements.

Direct access to the Project Location Manager from the backstage view The Bus Manager (stand-alone) now provides the Manage Projects + Project Locations button on the backstage view. Clicking this button opens the Project Location Manager, which lets you manage project locations and the contained projects.



Direct access to backup projects via Start page To facilitate access to backup projects, there is a new button on the Start page:



Via the Restore Project + Application button, you can select a project backup file to restore and open the project it contains.

Opening a project item in the project manager by double-clicking it When you double-click a project item in the Project Manager that represents a file or a topology, the corresponding file or topology is opened.

For a file, the default application for the file type opens, for example, MATLAB or Notepad. The default application must be configured in the operating system. If no suitable application is configured, the Bus Manager (stand-alone) starts the file explorer of the operating system instead.

Opening projects created with previous Bus Manager (stand-alone) versions When using a project created with a previous Bus Manager (stand-alone) version, a warning dialog is generated. As of Bus Manager (stand-alone) 2023-A, the warning dialog now appears before the migrated ConfigurationDesk application is saved and not when the application is opened. For details, refer to [Migrating Projects and Applications Created With Previous Versions](#) on page 55.

New features of the tool automation interface

The ConfigurationDesk automation interface supports additional features. For more information, refer to [New Features and Changes to the Automation Interface for Release 2023-A \(ConfigurationDesk Automating Tool Handling !\[\]\(ab4e2b3fc7e7887b7a72f548aa6f5e60_img.jpg\)](#)).

Migrating to the Bus Manager (Stand-Alone) 2023-A

Installation path changes

The Bus Manager (stand-alone) is now installed in the dSPACE ConfigurationDesk <ReleaseVersion> folder, i.e., it is no longer part of the RCP and HIL installation folder. If you have scripts depending on the installation location, you have to adapt these scripts.

Changes to the tool automation interface that might cause code malfunctions

Some changes to the tool automation interface affect the data model and can cause code from previous Releases to malfunction. For more information, refer to [New Features and Changes to the Automation Interface for Release 2023-A \(ConfigurationDesk Automating Tool Handling !\[\]\(d84e7ea36f695d92cb39ec32c307ac93_img.jpg\)](#)).

Migrating Projects and Applications Created With Previous Versions

Introduction

You can still open project and application files and backups created with previous Bus Manager (stand-alone) versions in the same way as you open a project from the current Bus Manager (stand-alone) version.

Note

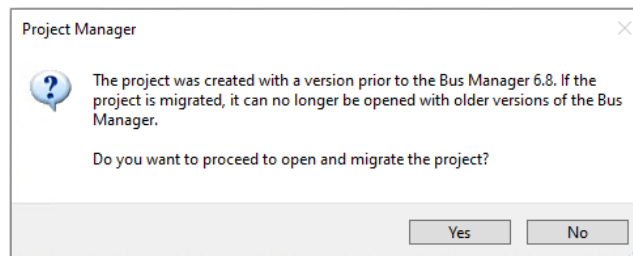
As of dSPACE Release 2021-A, the Bus Manager (stand-alone) supports the direct import only of projects last saved with one of the previous seven Bus Manager versions.

There are two different migration scenarios:

- Opening projects created with dSPACE Release 2021-A or earlier
- Opening projects created with dSPACE Release 2021-B and later

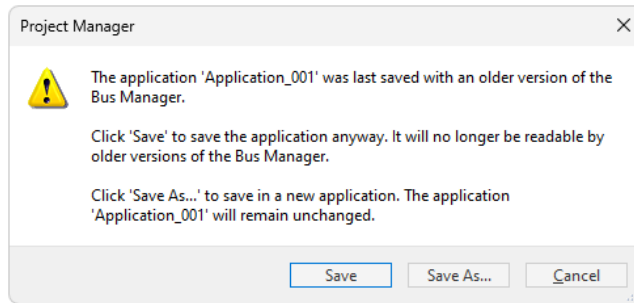
Opening projects created with dSPACE Release 2021-A or earlier

With Bus Manager (stand-alone) 6.8 (dSPACE Release 2021-B), the project structure and the project and application file formats changed. Therefore, such a project cannot be used with later Bus Manager (stand-alone) versions. When you open it, the Bus Manager prompts you to confirm the migration as follows:



- Click Yes to migrate the project and all its applications to the new project structure and the new file formats. Afterwards, you can no longer open them with previous Bus Manager versions.
- The new project and application files are stored in the respective project and application folders. They are identified via a GUID. Do not move or rename them.

As of Bus Manager (stand-alone) 2023-A, a warning dialog appears before the migrated application is saved. Refer to the following example illustration.



- Click Save to migrate the application to the new Bus Manager version. Afterwards, you can no longer open the application with previous Bus Manager versions.
- Click Save As to save the application to the new Bus Manager version under a new name. The application created with the previous version will remain unchanged in the project folder.
- The migrated application files are stored in the respective application folders. They are identified via a GUID. Do not move or rename them.

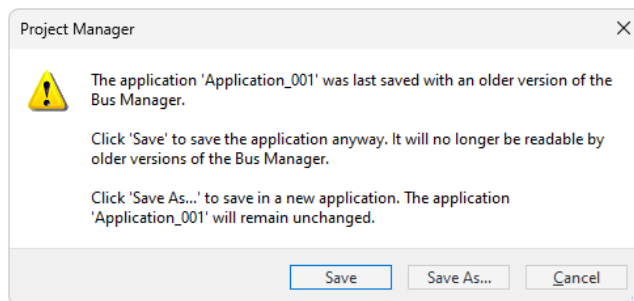
Using version control software If you are using version control software for ConfigurationDesk projects, be aware that the old project and application files are deleted and the new files might not automatically be known to your version control software when you check in your local copy.

If you checked in and deleted your local copy after the migration, you can recreate the new project and application files by checking out the project with the old project and application files again and repeating the migration. Only the project and application files will be replaced, no other migration steps will be repeated.

Opening projects created with dSPACE Release 2021-B and later

When you open a project created with Bus Manager (stand-alone) 6.8 (dSPACE Release 2021-B) and later, the Bus Manager prompts you to confirm the migration by means of a warning dialog.

As of Bus Manager (stand-alone) 2023-A, the warning dialog now appears before the migrated application is saved and no longer when you open the application. Refer to the following example illustration.



- Click Save to migrate the application to the new Bus Manager version. Afterwards, you can no longer open the application with previous Bus Manager versions.

- Click **Save As** to save the application to the new Bus Manager version under a new name. The application created with the previous version will remain unchanged in the project folder.
- The migrated application files are stored in the respective application folders. They are identified via a GUID. Do not move or rename them.

Using version control software If you are using version control software for ConfigurationDesk projects, be aware that the old application files are deleted and the new files might not automatically be known to your version control software when you check in your local copy.

If you checked in and deleted your local copy after the migration, you can recreate the new application files by checking out the project with the old application files again and repeating the migration. Only the application files will be replaced, no other migration steps will be repeated.

Notes regarding the cache folder after migration

Note

Note the following specifics regarding the cache folder introduced with Bus Manager (stand-alone) 22.1 (dSPACE Release 2022-A):

- The path of project and application elements must not exceed 260 characters. Refer to [Limitations Concerning Projects and Applications \(ConfigurationDesk Real-Time Implementation Guide !\[\]\(f2fdbbba686c1099e6b2b8779766e2d3_img.jpg\)](#)).
- Elements that are moved to the new application cache folder during project migration might exceed the character limit afterwards. To avoid this, you have to change the application cache root folder to a shorter path. For details, refer to [Paths Page \(ConfigurationDesk User Interface Reference !\[\]\(b3cfbfd04368a71f4c64e073908d25d7_img.jpg\)](#)).

Bus Manager (Stand-Alone) Discontinuations

Planned discontinuation of Excel export of ConfigurationDesk applications

The `Export Configuration` command for exporting the configuration data of the active ConfigurationDesk application to an Excel™ file (XLSX file) will be removed with dSPACE Release 2023-B.

The corresponding `ICaAlgorithms:ExportConfiguration` tool automation API command will also be removed.

ConfigurationDesk

Introduction With ConfigurationDesk, you can implement real-time applications for the SCALEXIO hardware or the MicroAutoBox III hardware.

Where to go from here

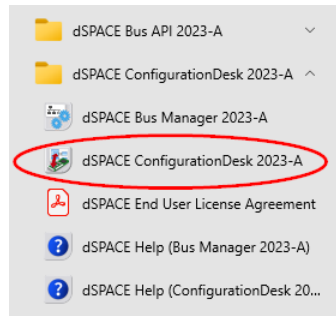
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New General Features of ConfigurationDesk 2023-A

Installation in own separate folder

As of dSPACE Release 2023-A, ConfigurationDesk is installed in a separate folder named `dSPACE ConfigurationDesk <ReleaseVersion>`. This means ConfigurationDesk is no longer part of the RCP and HIL installation folder. So you can now access ConfigurationDesk in the Windows Start menu via its own program group, as shown below.



Enhanced FMU support

Support of FMI 3.0-compatible FMUs ConfigurationDesk now lets you use Functional Mock-up Units (FMUs) that comply with the FMI 3.0 standard. ConfigurationDesk supports all features that are already supported for FMUs based on the FMI 2.0 standard, and additionally the following new features of the FMI 3.0 standard:

- Array variables
Using array variables instead of scalar variables leads to fewer signal connections and thus improves the performance of the real-time application.
- Build descriptions
A build description file provides the information that is required to compile and link the source files and libraries of a source code FMU. It can contain descriptions for several different target platforms.

Note

The following features of the FMI 3.0 standard are not supported:

- Binary variables
- Terminals and Icons
- Clocks
- Alias variables
- FMI for Model Exchange interface
- FMI for Scheduled Execution interface

Support of FMI 2.0.4-compatible FMUs containing build descriptions Build descriptions have been backported from the FMI 3.0 standard to the FMI 2.0.4 standard. ConfigurationDesk supports FMI 2.0.4-compatible source code FMUs that contain specific build descriptions for multiple platforms.

Note

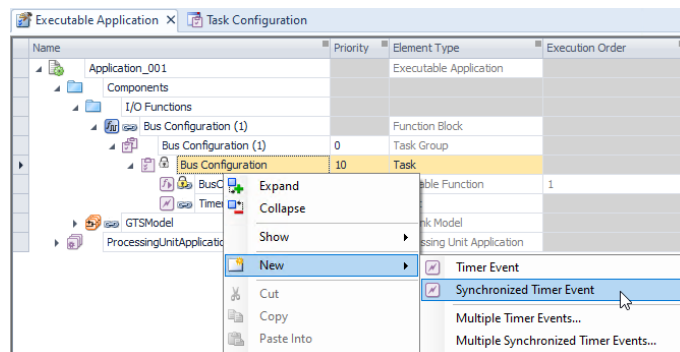
Terminals, which have also been backported to the FMI 2.0.4 standard are not supported.

New behavior of PrecompileFMU The PrecompileFMU command now creates precompiled FMUs with 32-bit Linux-compatible and 64-bit Linux-compatible shared objects. Thus, better portability of the generated FMUs to other simulation platforms, such as VEOS, is achieved.

For more information on the FMU support, refer to [Working with Functional Mock-up Units \(FMU Files\) \(ConfigurationDesk Real-Time Implementation Guide\)](#).

New event type to trigger tasks synchronously to a global time

ConfigurationDesk now provides synchronized timer events that let you trigger tasks synchronously to a global time. In conjunction with the Bus Manager, you can trigger tasks synchronously to a global time domain.



You can configure the global time domain by using the Global time domain identifier property of the synchronized timer event.

For more information, refer to [Triggering Tasks Synchronously to a Global Time Domain \(ConfigurationDesk Real-Time Implementation Guide\)](#).

Higher task stack sizes

ConfigurationDesk now supports the configuration of task stack sizes up to 32 MB. This lets you implement real-time applications that require higher task stack sizes.

New TRC file variable for memory allocation

For each application process, Configurationdesk now generates the new **Current Memory Usage** variable in the **Diagnostics** group of a TRC file. This variable provides the current amount of dynamically allocated memory. You can use it to trace the memory consumption during the simulation. This can be helpful, for example, when the real-time application runs into out-of-memory errors. Up to dSPACE Release 2023-A, only the Memory Usage variable was available which provides the total amount of dynamically allocated memory of an application process.

New Rebuild button

ConfigurationDesk now provides a new Rebuild button that clears the cache of the active application before starting the build process. This ensures that all files are recompiled during the build process.

Improved FPGA handling and functionalities

New command to import FPGA containers The new Import FPGA Container command in the context menu of the Function Browser lets you import FPGA containers (FPGAC files) to a search path folder.

Enhanced support of mask parameters of scaling

subsystems ConfigurationDesk now supports two-dimensional matrices in the row-based array layout for mask parameters of FPGA custom function blocks with scaling subsystems.

In addition, the order of the mask parameters of the related Simulink subsystem and in the FPGA custom function block is now the same to improve the usability. Scaling subsystems are a feature of the FPGA Programming Blockset to specify the preprocessing and postprocessing of the signals between the FPGA and the real-time processor. For more information, refer to [Configuring the Basic Functionality \(FPGA\) \(ConfigurationDesk I/O Function Implementation Guide !\[\]\(eafc244b53721dd1ec133f0772f70fc7_img.jpg\)](#)).

New default for search paths

ConfigurationDesk now lets you specify a default for application-specific search paths. New ConfigurationDesk applications are created using the default, and you can replace the search paths of a user location file with the default.

For information on specifying default search paths, refer to [Managing Search Paths \(ConfigurationDesk Custom I/O Function Implementation Guide !\[\]\(5a132f13505a6571904d622757b7a8f0_img.jpg\)](#)).

Improved support of compatible hardware

ConfigurationDesk now lets you replace the hardware topology with identical but differently named SCALEXIO systems. For example, you can use several SCALEXIO LabBoxes you named differently to distinguish them.

Improved Ethernet demo

The UDPAppI application of the StandardEthernetDemo now contains an Encode block and a Decode block in the behavior model. You can use these blocks in your application to transmit/receive UDP or TCP messages.

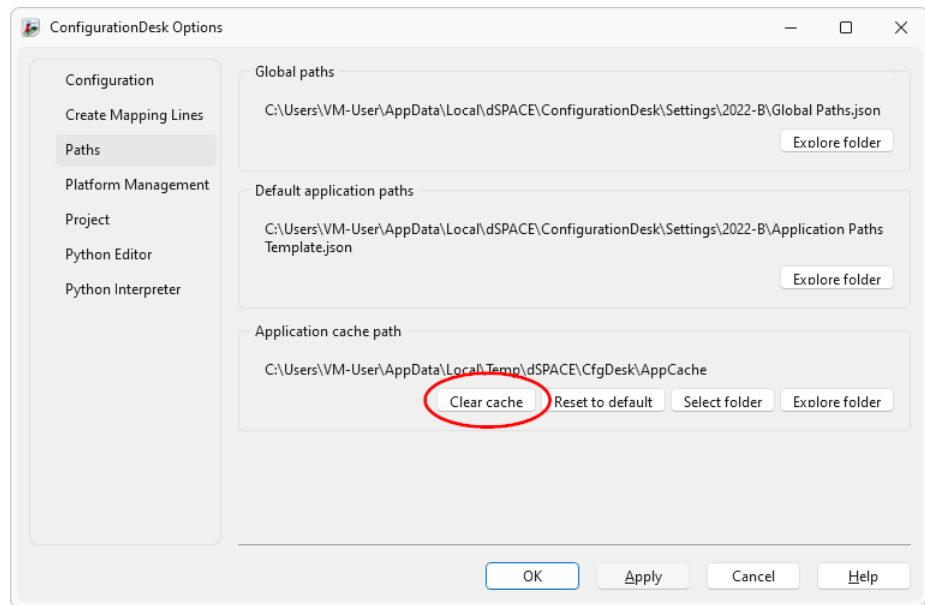
The blocks let you convert the data types and structures used in the behavior model into vectors of byte values and vice versa. All basic numeric data types as well as arrays, matrices, buses, and nested buses are supported, except for bus arrays.

For more information, refer to [Using the UDPAppI Application \(ConfigurationDesk Using Demo Projects !\[\]\(ab4e2b3fc7e7887b7a72f548aa6f5e60_img.jpg\)](#)).

Project cache converted to application cache

ConfigurationDesk stores temporary data of ConfigurationDesk applications, such as temporary build artifacts. The previously introduced project cache has now been converted into an application cache. With this change, you can validate or clear the cache more selectively.

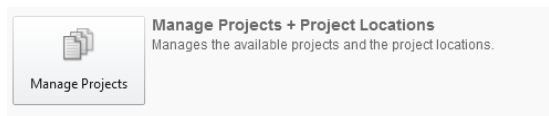
ConfigurationDesk now provides the Clear cache button, to delete all cache folders at once. This lets you save disk space. The button is located on the Paths page in the ConfigurationDesk Options dialog as shown below:



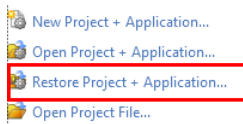
Usability improvements concerning project and application handling

The project and application handling is enhanced with several improvements.

Direct access to the Project Location Manager from the backstage view Now ConfigurationDesk provides the Manage Projects + Project Locations button on the backstage view. Clicking this button opens the Project Location Manager, which lets you manage project locations and the contained projects.



Direct access to backup projects via Start page To facilitate access to backup projects, there is a new button on the Start page:



Via the Restore Project + Application button, you can select a project backup file, to restore and open the project it contains.

Opening a project item in the project manager by double-clicking it When you double-click a project item in the Project Manager that represents a file or a topology, the corresponding file or topology is opened.

For a file, the default application for the file type opens, for example, MATLAB or Notepad. The default application must be configured in the operating system. If no suitable application is configured, ConfigurationDesk starts the file explorer of the operating system instead.

Opening projects created with previous ConfigurationDesk versions When using a project created with a previous ConfigurationDesk

version, a warning dialog is generated. As of ConfigurationDesk 2023-A, the warning dialog now appears before the migrated ConfigurationDesk application is saved and not when the application is opened. For details, refer to [Migrating Projects and Applications Created With Previous Versions](#) on page 73.

New features of the tool automation interface

The ConfigurationDesk automation interface supports additional ConfigurationDesk features. For more information, refer to [New Features and Changes to the Automation Interface for Release 2023-A \(ConfigurationDesk Automating Tool Handling\)](#).

Videos introducing ECU interfacing with ConfigurationDesk

New videos are available that introduce you to implementing ECU interfacing with ConfigurationDesk. The videos show the complete workflow for configuring ECU interfacing in a ConfigurationDesk application, building a real-time application and loading it to a MicroAutoBox III platform, and experimenting in ControlDesk.

You can access the videos in dSPACE Help and on the dSPACE website. Refer to:

- dSPACE Help: [Implementing ECU Interfacing with ConfigurationDesk \(6 videos\)](#) in dSPACE Help
- dSPACE website: www.dspace.com/go/ConfigurationDesk_Implementing_ECUInterfacing

New Features Concerning I/O Functionality and Hardware Support

New function block type

UART With the new UART function block type, you can configure and access a UART transceiver to send and receive data via RS232, RS422, or RS485. For more information, refer to [UART \(ConfigurationDesk I/O Function Implementation Guide\)](#).

Enhanced function block types

Ethernet Setup The Ethernet Setup function block now lets you configure MACsec functionalities (IEEE802.1AE) of the DS6330M4 Automotive Ethernet Module. MACsec is a standard for authentication and encryption of Ethernet frames on the data link layer (layer 2).

For more information, refer to [Configuring MACsec Features of Ethernet Ports \(ConfigurationDesk I/O Function Implementation Guide\)](#).

UDP Transmit and TCP The UDP Transmit and TCP function blocks now provide an Enable port to enable the generation of Ethernet frames to transmit the provided data via UDP/TCP messages. If there is no data to send, you can disable the generation of Ethernet frames and no more frames will be sent.

CAN The CAN function block now provides the following enhancements:

- You can use the ISO 11992-1 Truck and Trailer CAN transceiver type independently from the RTI CAN MultiMessage Blockset. However, this

transceiver type is supported only by channels of Bus 1 channel type that are equipped with a piggyback module.

- The CAN function block provides the new ISO 11898-2 CAN FD SIC transceiver type, which is supported by the new DS6344 CAN Board.

Ethernet Switch The Port-Based VLAN Configuration dialog of the Ethernet Switch function block now provides the possibility to disable or enable all connections with a single click.

New supported hardware

SCALEXIO ConfigurationDesk supports the following new SCALEXIO hardware:

- DS6330M4 Automotive Ethernet Module

The DS6330M4 Automotive Ethernet Module supports the 100BASE-T1 and 1000BASE-T1 Ethernet standards and MACsec (IEEE802.1AE). MACsec is a standard for authentication and encryption of Ethernet frames on the data link layer (layer 2).

The module can be installed to the DS6333-CS, DS6333-PE, and DS6335-CS Ethernet boards.

- DS6344 CAN Board

The DS6344 CAN Board is a single-slot bus board for CAN communication. It provides 4 independent CAN/CAN FD channels and supports CAN SIC (CAN signal improvement capability).

- New supported version of the SCALEXIO Real-Time PC

The new supported SCALEXIO Real-Time PC is the version 4.0 of the high-core performance line (HCP P04).

Improvements for configuration of generating digital output signals

You can specify the electrical characteristics of the outputs of function blocks which generate digital output signals. The digital outputs can be operated in different modes to get the required output signal (binary 0 or binary 1). A high-reference potential is needed, if you want to operate the digital outputs as high-side switch or in push-pull configuration.

With dSPACE Release 2023-A, the settings for the High reference potential property were changed to provide a clearer assignment to the connection of the reference potential. This makes it easier to select a setting, for example, if you want to use an internal potential of the dSPACE real-time hardware or an externally connected reference potential.

The table below shows the possible old and new settings with the integer values for automation purposes (in parentheses).

Settings up to dSPACE Release 2022-B	Settings as of dSPACE Release 2023-A
Individual (1)	External individual (1)
VBat (2)	External shared (2)
-	External shared 2 (3)
Shared (4)	Internal shared (4)
Shared 2 (5)	Internal shared 2 (5)

For migration notes and a description of the new settings, refer to [Migrating to ConfigurationDesk 2023-A](#) on page 70.

New Features of the Bus Manager in ConfigurationDesk

Enhanced J1939 support

The Bus Manager now provides the following enhancements for J1939:

- The Bus Manager supports the new J1939-22 protocol, which specifies J1939 on CAN FD. In contrast to J1939-21 (J1939 on CAN), the J1939-22 protocol supports larger IPDU payload lengths, e.g., up to 15,300 bytes for broadcast communication, and a higher baud rate. The Bus Manager supports J1939-22 communication that is specified in DBC and ARXML files
- The Bus Manager supports J1939-21 communication that is specified in ARXML files.

For more information, refer to [Aspects of the J1939 Protocol \(ConfigurationDesk Bus Manager Implementation Guide !\[\]\(a870788d6ed9b8fd294b7654a8c8526b_img.jpg\)](#)).

Enhancements for implementing global time synchronization (GTS)

The Bus Manager now lets you transmit the bus communication of bus configurations synchronously to a global time. For this purpose, you can replace the timer events of Bus Configuration tasks with synchronized timer events.

For more information, refer to [Transmitting Bus Communication of Bus Configurations Synchronously to a Global Time \(ConfigurationDesk Bus Manager Implementation Guide !\[\]\(6059a5aa8b4ca7bb793408023d6c6e42_img.jpg\)](#)).

Support of event-controlled timings for DBC communication matrices

The Bus Manager now supports event-controlled timings for bus communication that is specified in DBC communication matrices. With event-controlled timings, ISignals that are included in a PDU can trigger the transmission of this PDU. However, the Bus Manager uses an AUTOSAR-based approach for event-controlled timings. To derive the required settings from a DBC communication matrix, the Bus Manager evaluates the `GenMsgCycleTimeFast`, `GenMsgNrOfRepetition`, `GenMsgNrOfRepetitions`, and `GenSigSendType` DBC attributes.

For more information, refer to [Aspects of Event-Controlled Timings \(ConfigurationDesk Bus Manager Implementation Guide !\[\]\(9c2e8d1b5bd77cb5c9f83b7a9cff79fd_img.jpg\)](#)).

Additional configurable communication matrix settings

The Bus Manager now lets you modify the collection semantics, timeout value, and trigger condition for container IPDUs and J1939-22-compliant IPDUs.

For more information, refer to [Configurable Settings of PDUs \(ConfigurationDesk Bus Manager Implementation Guide !\[\]\(f1c5da15572e3e09d343161be98f508d_img.jpg\)](#)).

PDU User Code feature available for multiplexed IPDUs

The Bus Manager now lets you add the PDU User Code feature to multiplexed IPDUs.

For more information, refer to [Applying User Code to PDUs \(ConfigurationDesk Bus Manager Implementation Guide !\[\]\(4729e517bc6a7cd81c8025b9646574fb_img.jpg\)](#)).

Enhanced bus configuration tables

The Bus Manager now provides the following enhancements for bus configuration tables:

- You can access the Number of user ports and Direction of user port [<n>] properties of the PDU User Code feature via new table columns. The columns are available in the Column Chooser and you can add them to the Bus Configurations, Bus Simulation Features, Bus Inspection Features, and Bus Manipulation Features tables.

For more information, refer to [Applying User Code to PDUs \(ConfigurationDesk Bus Manager Implementation Guide !\[\]\(e474458956c9a37fbf9586ddb60a7fa1_img.jpg\)](#)).

- The Length, Time Offset, and Time Period columns are now configurable, i.e., you can modify the length of ISignals and PDUs, and the time offset and time period of cyclic timings via these columns.

For more information, refer to [Basics on Modifying Communication Matrices \(ConfigurationDesk Bus Manager Implementation Guide !\[\]\(5361750c22c4e047a52f4eac1ec2d4cc_img.jpg\)](#)).

Support of multiple secured IPDUs for one authentic IPDU for inspection

For inspecting bus communication, the Bus Manager now supports multiple secured IPDUs that are exchanged by the same network node (i.e., the same ECU on the same communication cluster) for one authentic IPDU. If you assign two or more of such secured IPDUs and the related authentic IPDU to the Inspection part of one bus configuration, you can use bus inspection features with any of the IPDUs to access the data that is received on the bus.

Supported Container File Versions

Supported SIC file versions

ConfigurationDesk 2023-A (23.1) supports SIC file versions as listed below:

SIC Files Created With ...	MATLAB Release
dSPACE Release 2023-A: ▪ Model Interface Package for Simulink 23.1	R2023a, R2022b, R2022a, R2021b
dSPACE Release 2022-B: ▪ Model Interface Package for Simulink 2022-B (22.2) ▪ TargetLink 5.3	R2022b, R2022a, R2021b, R2021a
dSPACE Release 2022-A: ▪ Model Interface Package for Simulink 22.1	R2022a, R2021b, R2021a, R2020b
dSPACE Release 2021-B: ▪ Model Interface Package for Simulink 4.6 ▪ TargetLink 5.2	R2021b, R2021a, R2020b, R2020a
dSPACE Release 2021-A: ▪ Model Interface Package for Simulink 4.5	R2019b

SIC Files Created With ...	MATLAB Release
dSPACE Release 2020-B: <ul style="list-style-type: none"> Model Interface Package for Simulink 4.4 TargetLink 5.1 	R2019a
dSPACE Release 2020-A: <ul style="list-style-type: none"> Model Interface Package for Simulink 4.3 	R2018b
dSPACE Release 2019-B: <ul style="list-style-type: none"> Model Interface Package for Simulink 4.2 	R2018a
dSPACE Release 2019-A: <ul style="list-style-type: none"> Model Interface Package for Simulink 4.1 	R2017b
dSPACE Release 2018-B: <ul style="list-style-type: none"> Model Interface Package for Simulink 4.0 	R2017a
dSPACE Release 2018-A: <ul style="list-style-type: none"> Model Interface Package for Simulink 3.6 	R2016b
dSPACE Release 2017-B: <ul style="list-style-type: none"> Model Interface Package for Simulink 3.5 	R2016a
dSPACE Release 2017-A: <ul style="list-style-type: none"> Model Interface Package for Simulink 3.4 	R2015b

Target platform compatibility of SIC files The following table shows the compatibility of SIC files and target platforms, and indicates which system target file you have to select for the generation of an SIC file:

SIC File Created With	System Target File	Target Platform
dSPACE Release 2022-A and later	dsrt.tlc	<ul style="list-style-type: none"> SCALEXIO Linux 64-bit SCALEXIO Linux 32-bit (legacy support) MicroAutoBox III <p>You have to select the target architecture for which the SIC file is generated depending on the target platform. Refer to Basics on Simulink Implementation Containers (Model Interface Package for Simulink - Modeling Guide).</p>
dSPACE Release 2021-B and earlier	dsrt64.tlc (available as of dSPACE Release 2019-B)	SCALEXIO Linux 64-bit
	dsrt.tlc	<ul style="list-style-type: none"> SCALEXIO 32-bit (legacy support) MicroAutoBox III

Limitations for earlier SIC file versions in ConfigurationDesk scenarios SIC files created with the Model Interface Package for Simulink version 3.4 ... 4.1 are not supported in the following ConfigurationDesk scenarios:

- In multimodel application processes.
- For building real-time applications that use Real-Time Testing.

Limitations for Simulink behavior models underlying earlier SIC files versions The following limitations apply to Simulink behavior models

underlying SIC files created with the Model Interface Package for Simulink version 3.4 ... 4.4:

- The Simulink behavior model must not contain blocks from the following blocksets:
 - Blocks of ASM
 - Real-time applications that contain such SIC files cannot be used with ModelDesk.
 - FPGA Programming Blockset
 - MotionDesk Blockset
 - Real-time applications that contain such SIC files cannot be used with MotionDesk.
 - Blocks of any dSPACE Solution.
- Compiled objects contained in SIC files must match the target platform. SIC files with compiled objects that were created at a time when the current target platforms did not exist are not supported. In this case, it is not possible to use compiled objects.

Supported BSC file versions

ConfigurationDesk 2023-A (23.1) supports BSC files that were generated with the Bus Manager of the current Release, i.e., BSC file version 1.12, or with the Ethernet Configuration Package. For more information on supported Ethernet BSC file versions, refer to <http://www.dspace.com/go/ethcpinfo>.

Supported Functional Mock-up Unit versions

ConfigurationDesk 2023-A (23.1) supports Functional Mock-up Units (FMUs) that comply with the following versions of the FMI standard:

- 2.0.x
- 3.0

Supported EIC file versions

ConfigurationDesk 2023-A (23.1) supports EIC file versions as listed below:

EIC Files Created With ...	EIC Version
dSPACE Release 2023-A (ECU Interface Manager 2023-A)	5.0.0
dSPACE Release 2022-B (ECU Interface Manager 2022-B)	5.0.0
dSPACE Release 2022-A (ECU Interface Manager 2.11)	5.0.0
dSPACE Release 2021-B (ECU Interface Manager 2.10)	4.0.0
dSPACE Release 2021-A (ECU Interface Manager 2.9)	4.0.0
dSPACE Release 2020-B (ECU Interface Manager 2.8)	4.0.0
dSPACE Release 2020-A (ECU Interface Manager 2.7)	4.0.0
dSPACE Release 2019-B (ECU Interface Manager 2.6)	4.0.0

EIC Files Created With ...	EIC Version
dSPACE Release 2019-A (ECU Interface Manager 2.5)	3.0.0
dSPACE Release 2018-B (ECU Interface Manager 2.4)	3.0.0
dSPACE Release 2018-A (ECU Interface Manager 2.3)	2.0.0
dSPACE Release 2017-B (ECU Interface Manager 2.2)	1.0.0
dSPACE Release 2017-A (ECU Interface Manager 2.1)	1.0.0
dSPACE Release 2016-B (ECU Interface Manager 2.0p1)	1.0.0

Note

- For 64-bit target architectures, only EIC files as of version 5.0.0 are supported.
- For MicroAutoBox III systems, only EIC files as of version 4.0.0 are supported.

Migrating to ConfigurationDesk 2023-A

Installation path changes

As of dSPACE Release 2023-A, ConfigurationDesk is installed in a separate folder named **dSPACE ConfigurationDesk <ReleaseVersion>**. This means ConfigurationDesk is no longer part of the RCP and HIL installation folder.

If you have scripts depending on the ConfigurationDesk installation location, you need to adapt those scripts.

Changed order in TRC files and A2L files

Groups, blocks, and variables in TRC files and A2L files are now sorted alphabetically. As a consequence, you might have to adapt your custom tools based on these files.

SCALEXIO target architecture compatibility of model implementation containers

Model implementation containers that include 32-bit compatible binaries are not compatible with the SCALEXIO Linux 64-bit target architecture. You must regenerate the model implementation container with Linux 64-bit compatible binaries, or specify a Linux 32-bit target architecture.

SIC files must be regenerated with the appropriate Target architecture setting in the Simulink Configuration Parameters dialog or via the `dsrt_build()` API command.

Changes to the tool automation interface that might cause code malfunctions

Some changes to the tool automation interface affect the data model and can cause code from previous Releases to malfunction. For more information, refer to [New Features and Changes to the Automation Interface for Release 2023-A \(ConfigurationDesk Automating Tool Handling !\[\]\(d84e7ea36f695d92cb39ec32c307ac93_img.jpg\)](#)).

Changes to custom function folders

As of dSPACE Release 2022-A, ConfigurationDesk does not automatically add the project-specific custom function folder <ProjectLocation>\<ProjectFolder>\CustomFunctions to a new project. The lack of the project-specific custom function folder might affect the execution of automation scripts that copy custom functions to that folder.

For new projects, it is recommended that you use search paths to add custom functions. Search paths let you use repositories and version control software, for example. For more information, refer to [Managing Search Paths \(ConfigurationDesk Custom I/O Function Implementation Guide !\[\]\(83f22ed94ec5517769dd76d702c6bfd8_img.jpg\)](#)).

However, ConfigurationDesk still supports project-specific custom function folders.

Changed configuration settings for generating digital output signals

With dSPACE Release 23-A, the settings for the High reference potential property have changed. If you open a project that was created with a previous ConfigurationDesk version, the settings will be migrated as shown in the following table.

For each relevant channel type, the table shows the settings before migration, and the new mapped settings after migration. The settings are shown with their integer values for automation purposes (in parentheses).

Note

You have to check whether the new mapped settings are applicable. If necessary, you must change the settings according to your requirements.



Old settings Channel Type	Individual (1)	VBat (2)	Shared (4)	Shared 2 (5)
No hardware resource assignment	External individual (1)	External shared (2)	External shared (2)	External shared 2 (3)
Flexible Out 1	External individual (1)	External individual (1)	External individual (1)	External individual (1)
Digital Out 1	External individual (1)	Internal shared (4)	External shared (2)	External shared (2)
Digital Out 2	External individual (1)	External individual (1)	External individual (1)	External individual (1)
Digital Out 3	External individual (1)	External shared (2)	External shared (2)	External shared 2 (3)
Digital Out 4	External individual (1)	External shared (2)	External shared (2)	External shared (2)
Digital Out 5	External individual (1)	External shared (2)	External shared (2)	External shared (2)
Digital Out 7	External individual (1)	External shared (2)	External shared (2)	External shared (2)
Digital Out 8	External individual (1)	External shared (2)	Internal shared (4)	Internal shared 2 (5)
Digital In/Out 1	External individual (1)	External individual (1)	External individual (1)	External individual (1)

Old settings Channel Type	Individual (1)	VBat (2)	Shared (4)	Shared 2 (5)
Digital In/Out 3	External individual (1)	External shared (2)	External shared (2)	External shared 2 (3)
Digital In/Out 5	External individual (1)	External shared (2)	Internal shared (4)	Internal shared 2 (5)
Digital In/Out 6	External individual (1)	External shared (2)	Internal shared (4)	Internal shared (4)
Digital In/Out 8	External individual (1)	External shared (2)	Internal shared (4)	Internal shared (4)
Digital In/Out 9	External individual (1)	External shared (2)	Internal shared (4)	Internal shared 2 (5)
Digital In/Out 10	External individual (1)	Internal shared 2 (5)	Internal shared (4)	Internal shared 2 (5)

A conflict is generated and displayed if the channel type does not support the selected setting. For example, the Flexible Out 1 channel type supports only the External individual setting. For all other settings, a conflict is generated.

Description of the new settings

Setting	Supported Channel Types	Description
External individual	<ul style="list-style-type: none"> Flexible Out 1 (on DS2621) 	<p>The channels of Flexible Out 1 channel type are galvanically isolated to the ground potential of the dSPACE real-time hardware. Each channel provides its own electrical connection and is independent of the other channels. This allows the connection of a potential shifted signal.</p> <p>You can connect any potential to the High Reference signal port.</p>
	<ul style="list-style-type: none"> Digital Out 2 (on DS2690) Digital In/Out 1 (on DS2690) 	<p>Each channel of the channel types provides its own electrical high reference potential. Therefore, each channel is independent of the other channels. This allows the connection of an individual arbitrary potential.</p> <p>You can connect any potential to the High Reference signal port.</p>
External shared	<ul style="list-style-type: none"> Digital Out 1 (on DS2680) Digital Out 3 (on DS6101) Digital Out 4 (on MircoAutoBox III) Digital Out 5 (on MircoAutoBox III) Digital Out 7 (on MircoAutoBox III) Digital In/Out 3 (on DS6201) 	<p>These channel types share the connected potential with all other digital output channels that belong to a channel set. The potential is therefore available on a single pin of the I/O connector.</p> <p>You can connect any potential to the High Reference signal port.</p>
External shared 2	<ul style="list-style-type: none"> Digital Out 3 (on DS6101) Digital In/Out 3 (on DS6201) 	<p>These channel types share the connected potential with all other digital output channels that belong to a channel set. The potential is therefore available on a single pin of the I/O connector. The connector pin that shares this potential (External shared 2) is not the same as the pin that is used for the External shared setting.</p> <p>You can connect any potential to the High Reference signal port.</p>
Internal shared	<ul style="list-style-type: none"> Digital Out 8 (on DS6121) Digital In/Out 5 (on DS6202) Digital In/Out 6 (on MircoAutoBox III) Digital In/Out 8 (on MircoAutoBox III) 	<p>The internal 5 V supply of the dSPACE real-time hardware is used as high-reference potential.</p> <p>The High Reference signal port is not available.</p>

Setting	Supported Channel Types	Description
	<ul style="list-style-type: none"> ▪ Digital In/Out 9 (on DS6121) ▪ Digital In/Out 10 (on MircoAutoBox III) 	
	<ul style="list-style-type: none"> ▪ Digital Out 1 (on DS2680) 	<p>The internal VBAT (simulated battery voltage) of the dSPACE real-time system is used as high-reference potential. The High Reference signal port is not available.</p> <p>The simulated battery voltage of a SCALEXIO system is provided by the battery simulation power supply unit connected to the DS2680. The voltage range depends on the power supply used. Refer to Battery Simulation Power Supply Unit (SCALEXIO Hardware Installation and Configuration) .</p>
Internal shared 2	<ul style="list-style-type: none"> ▪ Digital Out 8 (on DS6121) ▪ Digital In/Out 5 (on DS6202) ▪ Digital In/Out 9 (on DS6121) 	<p>The internal 3.3 V supply of the dSPACE real-time hardware is used as high-reference potential. The High Reference signal port is not available.</p>
	<ul style="list-style-type: none"> ▪ Digital In/Out 10 (on MircoAutoBox III) 	<p>The internal VBAT of the dSPACE real-time hardware is used as high-reference potential. The High Reference signal port is not available.</p> <p>The internal VBAT of the MicroAutoBox III corresponds to the operating voltage of the MicroAutoBox III. For values, refer to General Characteristics (MicroAutoBox III Hardware Installation and Configuration) .</p>

Migrating Projects and Applications Created With Previous Versions

Introduction

You can still open project and application files and backups created with previous ConfigurationDesk versions in the same way as you open a project from the current ConfigurationDesk version.

Note

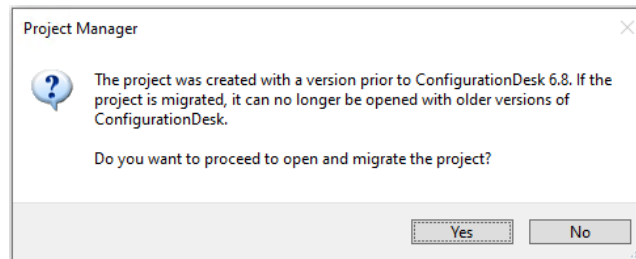
As of dSPACE Release 2021-A, ConfigurationDesk supports the direct import only of projects last saved with one of the previous seven ConfigurationDesk versions.

There are two different migration scenarios:

- Opening projects created with dSPACE Release 2021-A or earlier
- Opening projects created with dSPACE Release 2021-B and later

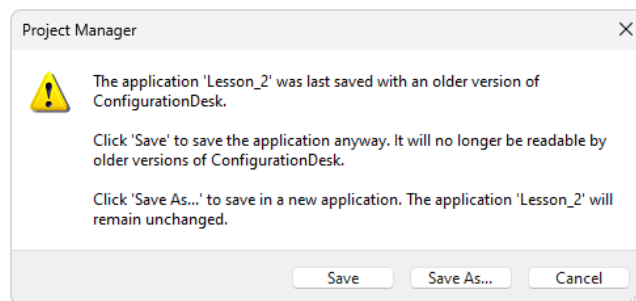
Opening projects created with dSPACE Release 2021-A or earlier

With ConfigurationDesk 6.8 (dSPACE Release 2021-B) the project structure, project and application file formats changed. Therefore such a project could not be used with later ConfigurationDesks versions. When you open it, ConfigurationDesk prompts you to confirm the migration as follows:



- Click Yes to migrate the project and all its applications to the new project structure and the new file formats. Afterwards, you can no longer open them with previous ConfigurationDesk versions.
- The new project and application files are stored in the respective project and application folders. They are identified via a GUID. Do not move or rename them.

As of ConfigurationDesk 2023-A, a warning dialog appears before the migrated ConfigurationDesk application is saved. Refer to the following example illustration.



- Click Save to migrate the application to the new ConfigurationDesk version. Afterwards, you can no longer open the application with previous ConfigurationDesk versions.
- Click Save As to save the application to the new ConfigurationDesk version under a new name. The application created with the previous version will remain unchanged in the project folder.
- The migrated application files are stored in the respective application folders. They are identified via a GUID. Do not move or rename them.

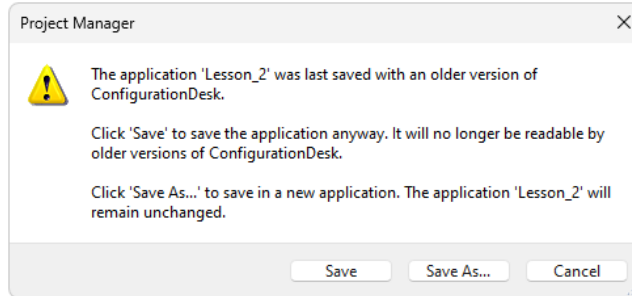
Using a version control software If you are using version control software for ConfigurationDesk projects, be aware that the old project and application files are deleted and the new files might not automatically be known to your version control software when you check in your local copy.

If you checked in and deleted your local copy after the migration, you can recreate the new project and application files by checking out the project with the old project and application files again and repeating the migration. Only the project and application files will be replaced, no other migration steps will be repeated.

Opening projects created with dSPACE Release 2021-B and later

When you open a project created with ConfigurationDesk 6.8 (dSPACE Release 2021-B) and later, ConfigurationDesk prompts you to confirm the migration by means of a warning dialog.

As of ConfigurationDesk 2023-A, the warning dialog now appears before the migrated ConfigurationDesk application is saved and no longer when you open the application. Refer to the following example illustration.



- Click **Save** to migrate the application to the new ConfigurationDesk version. Afterwards, you can no longer open the application with previous ConfigurationDesk versions.
- Click **Save As** to save the application to the new ConfigurationDesk version under a new name. The application created with the previous version will remain unchanged in the project folder.
- The migrated application files are stored in the respective application folders. They are identified via a GUID. Do not move or rename them.

Using a version control software If you are using version control software for ConfigurationDesk projects, be aware that the old application files are deleted and the new files might not automatically be known to your version control software when you check in your local copy.

If you checked in and deleted your local copy after the migration, you can recreate the new application files by checking out the project with the old application files again and repeating the migration. Only the application files will be replaced, no other migration steps will be repeated.

Notes on regarding the cache folder after migration

Note

Note the following specifics regarding the cache folder introduced with ConfigurationDesk 22.1 (dSPACE Release 2022-A):

- The path of project and application elements must not exceed 260 characters. Refer to [Limitations Concerning Projects and Applications \(ConfigurationDesk Real-Time Implementation Guide\)](#).

Elements such as build artifacts that are moved to the new application cache folder during project migration might exceed the character limit afterwards. To avoid this, you have to change the application cache root folder to a shorter path. For details, refer to [Paths Page \(ConfigurationDesk User Interface Reference\)](#).

ConfigurationDesk Discontinuations

Discontinuation of XLS files containing device topologies

With ConfigurationDesk 2023-A (23.1), ConfigurationDesk lets you import external device topologies only from DTFX and Microsoft Excel™ XLSX files.

Discontinuation of V-ECU implementation container support

With ConfigurationDesk 2022-B (22.2), the support of V-ECU implementation containers (VECU files) was removed. If you open a ConfigurationDesk application that was created with an earlier dSPACE Release and that contains V-ECU implementation containers, the V-ECU implementation containers are removed automatically.

Planned discontinuation of Excel export of ConfigurationDesk applications

The Export Configuration command for exporting the configuration data of the active ConfigurationDesk application to an Excel™ file (XLSX file) will be removed with ConfigurationDesk 2023-B.

The corresponding tool automation API command `ICaAlgorithms:ExportConfiguration` will also be removed.

Planned discontinuation of custom device properties

The possibility to add custom device properties to device topology elements will be removed with ConfigurationDesk 2023-B.

Planned discontinuation of SCALEXIO 32-bit Linux target platform

The support of the SCALEXIO 32-bit Linux target platform will be removed with ConfigurationDesk 2023-B.

Planned discontinuation of external cable harness calculation

The possibility to calculate the representation of an external cable harness will be removed with ConfigurationDesk 2024-A.

ControlDesk

Where to go from here

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New Features of ControlDesk 2023-A

Where to go from here

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New Project and Experiment Features (ControlDesk 2023-A)

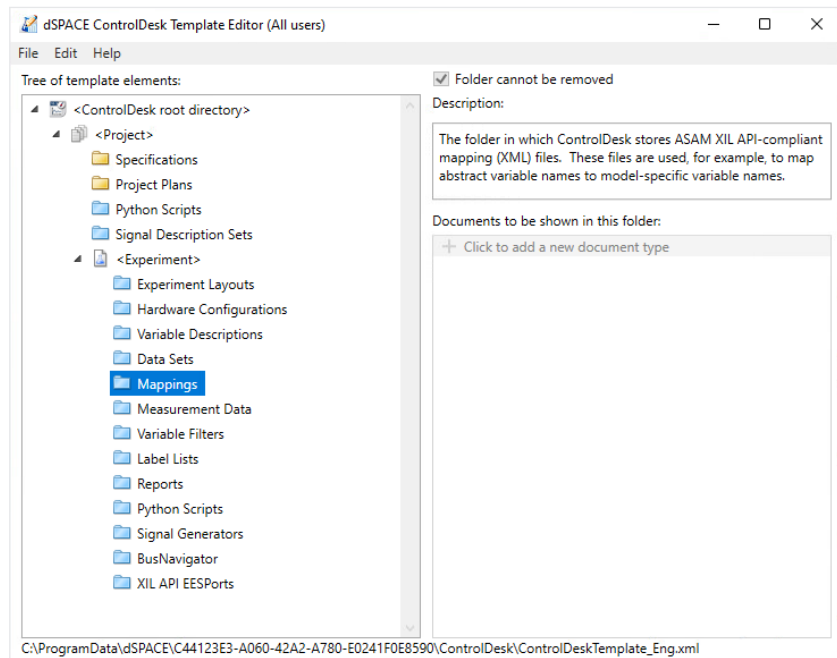
Revised Template Editor

The ControlDesk Template Editor, which lets you modify the template for ControlDesk projects and experiments, was revised: The risk of creating unusable projects was eliminated in ControlDesk 2023-A.

Main features of the ControlDesk Template Editor:

- Modify the names of the folders for the different ControlDesk components. This is helpful, for example, if folder names with spaces are not supported by your working environment.
- Create new template folders, and specify the type of files to store.
- Store the template for the current user and for all users of the PC.

The following illustration shows the revised editor:



For more information, refer to [ControlDesk Template Editor \(ControlDesk Project and Experiment Management\)](#).

New Variable Management Features (ControlDesk 2023-A)

Support of variable mapping according to ASAM XIL

ControlDesk 2023-A supports *variable mapping* according to *identifier mapping of the ASAM XIL Framework mapping concept*. Using variable mapping allows for the decoupling of the names of variables on the experiment level (*framework labels* in ASAM XIL) from the names of variables on the modeling level (*testbench labels* in ASAM XIL). Mapping is achieved by the implementation of a separate abstraction layer instead of the direct use of model_variables from a variable description.

Use cases ControlDesk supports the following use cases in connection with variable mapping:

- You can frontload the creation of layouts and instruments because only abstract framework labels are required for this. A variable description with model variables, and the information to map framework labels to testbench labels can be provided later. See below for the related procedure.
- Structural changes to a simulation model and the resulting changes to the variable description created for that model have no impact on the visualization of the related variables on layouts and instruments. This means that you do not have to reconnect framework labels after reloading the variable description due to model structure changes.

- You can reuse layouts and automation scripts for different variants of a simulation model.

New ControlDesk user interface elements To support variable mapping, ControlDesk 2023-A provides the following new user interface elements:

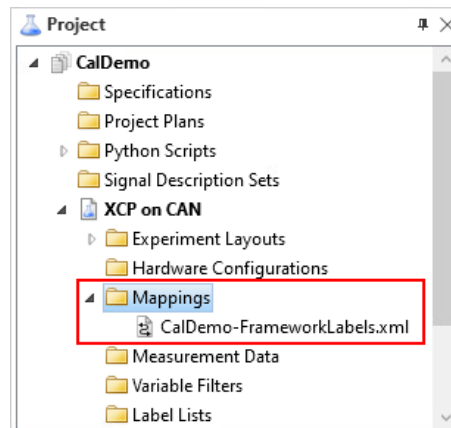
- The **Mappings** folder displayed in the Project pane lets you import variable mapping XML files to an experiment.
- The **Mappings** pane shows the content of all the variable mapping XML files imported to the experiment.

Frontloading layout creation by using framework labels The following list shows the procedure to frontload the creation of layouts and instruments by using abstract framework labels. A variable description with model variables and the information to map framework labels to testbench labels are provided in a second step:

Note

The following procedure is based on the CalDemo project. However, the mapping XML files used are not part of the demo.

1. The following illustration shows the Project pane with the Mappings folder containing the CalDemo-FrameworkLabels.xml variable mapping file as an example.



2. The following illustration shows the Mappings pane with the content of the CalDemo-FrameworkLabels.xml variable mapping file as an example. The file contains framework labels only.

V...	R...	Name (Framework Label)	Description	Unit	Variable Path (Testbench Label)
		AirMass			
		AirMassPerCylinder			
		Discrete Transfer Function			
		Dummy air mass			

The screenshot shows the 'Mappings' pane with a table of framework labels. The table has columns for 'Name (Framework Label)', 'Description', 'Unit', and 'Variable Path (Testbench Label)'. The first four rows are highlighted in blue. Below the table, there are tabs for 'Variables', 'Mappings', 'Measurement Data Pool', 'Platforms/Devices', 'Interpreter', and 'Messages'.

3. The framework labels can be visualized on instruments. The following illustration shows the AirMass framework label visualized on a Variable Array as an example.

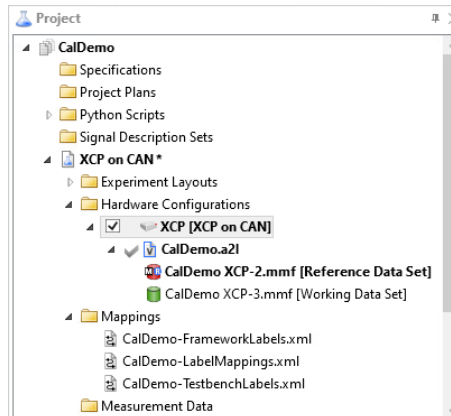
Variable Array_483: AirMass			
-1.79769313486232E+308..1.79769313486232E+308 Converted Incr. +-0 / 0			
	Variable	Value	Unit
[P]	AirMass	---	

- The following illustration shows the Mappings pane after adding the CalDemo-TestbenchLabels.xml and CalDemo-LabelMappings.xml variable mapping files to the experiment. The framework labels are mapped to testbench labels.

However, since the experiment does not contain a platform/device with a matching variable description, ControlDesk cannot resolve the mappings yet.

Mappings					
V...	Resolvable	Name (Framework Label)	Description	Unit	Variable Path (Testbench Label)
	[P]	AirMass			air_mass
		AirMassPerCylinder			air_mass_per_cylinder_kg_s_
		Discrete Transfer Function			DTF_F32
		Dummy air mass			DummyAirMass

- The following illustration shows the Project pane with the Mappings folder after adding a device and the CalDemo.a21 variable description file.



- When the variable description is added to the experiment, ControlDesk compares the model variables in the variable description to testbench labels and resolves the mapping between framework labels and model variables if possible.

As a result, since the mapping is resolved, measurement data is now displayed for the AirMass framework label, as shown in the Variable Array on top of the following illustration.

The screenshot displays the ControlDesk interface with three main sections:

- Variable Array_483: AirMass [kg/s]**: A table with columns for Variable, Value, and Unit. The 'AirMass' variable is highlighted with a red box, and its value is 0.00488281.
- Mappings**: A table with columns for Name (Framework Label), Description, Unit, and Variable Path (Testbench Label). The 'AirMass' mapping is highlighted with a red box, and its path is 'air_mass'.
- Variables**: A table with columns for Group, Description, Favorite, Var Co, and Variable. The 'air_mass' variable is highlighted with a red box.

Red arrows indicate the flow of information: from the 'AirMass' variable in the Variable Array to the 'AirMass' mapping in the Mappings table, and from the 'air_mass' variable in the Variables table to the 'air_mass' path in the Mappings table.

For more information, refer to [Basics on Variable Mappings \(ControlDesk Variable Management\)](#).

New Instrument Features (ControlDesk 2023-A)

Hierarchy Array improvements

The Hierarchy Array was improved.

Automatic width and height sizing of instrument cells The Hierarchy Array now lets you enable automatic sizing of instrument cells. If enabled, the width and height of the cells are automatically adjusted according to their content.

ControlDesk disables automatic sizing for the instrument if the size of any cell or the tab bar is modified manually, via tool automation, or via the Properties pane.

For more information, refer to [Automatic Sizing Property \(Hierarchy Array\)](#) (ControlDesk Instrument Handling).

Resizing columns manually You can now resize the width of columns of the Hierarchy Array.

When you double-click a column separator in the instrument, ControlDesk resizes the width of the column to the left of the separator according to its content.

The following illustrations show an example:

- Column sizes before double-clicking the separator:

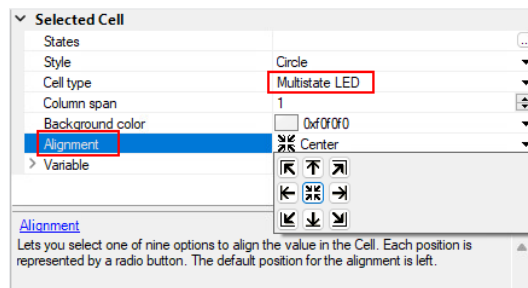
Byte	Byte 1	Byte 2
0	0x05	0x00
---	---	---

- Column sizes after double-clicking the separator:

Byte 0	Byte 1	Byte 2
0x07	0x05	0x00
---	---	---

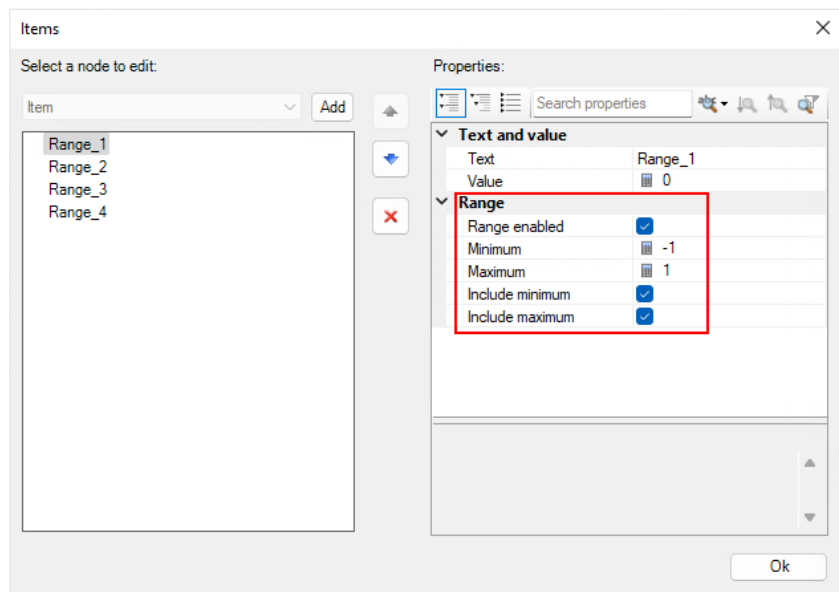
Multistate LED: Specifying alignment You can now specify the alignment of the cell content for the Multistate LED cell type:

The following illustration shows the available settings:



For more information, refer to [Alignment/Text Alignment Property \(Hierarchy Array\) \(ControlDesk Instrument Handling\)](#).

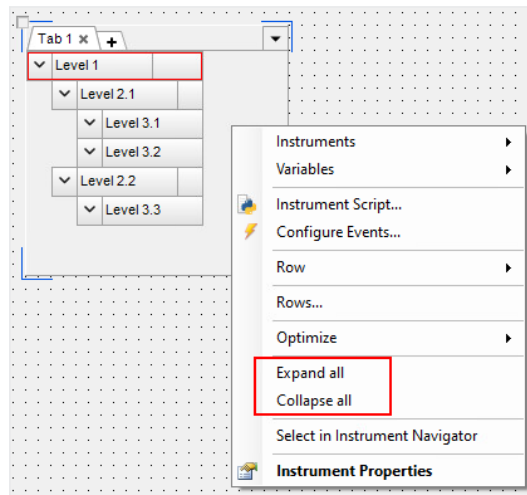
Selection box: Specifying ranges For the *Selection box* cell type, you can now enable the use of value ranges. If enabled, the selection box cell displays the item that corresponds to the value of the connected variable with regard to the specified value ranges.



For more information, refer to [Items Properties \(ControlDesk Instrument Handling\)](#).

Expanding/collapsing header row structures You can now expand/collapse header row structures.

The following illustration shows the related commands in the instrument context menu.

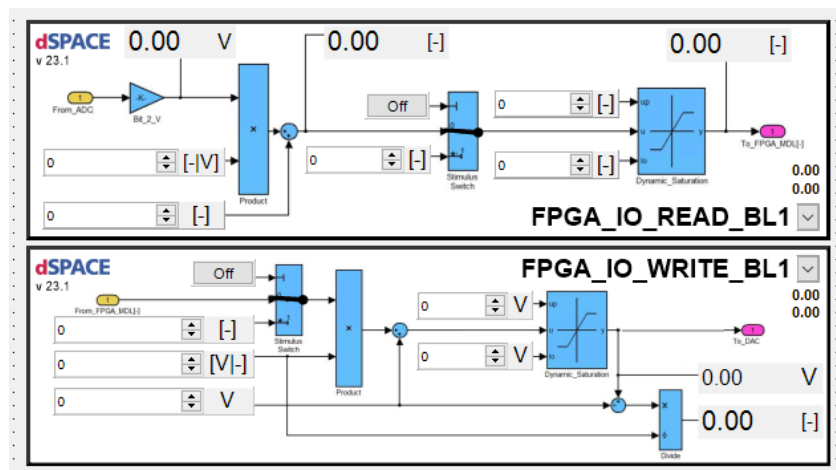


New FPGA Scale instruments

ControlDesk now provides the new FPGA Scale ADC and FPGA Scale DAC instruments. They allow you to incorporate the FPGA test access and scaling functionality into a ControlDesk experiment.

By setting scaling parameters and replacement values, you can test and debug an FPGA application from within the ControlDesk environment.

The following illustration shows the new FPGA Scale instruments:

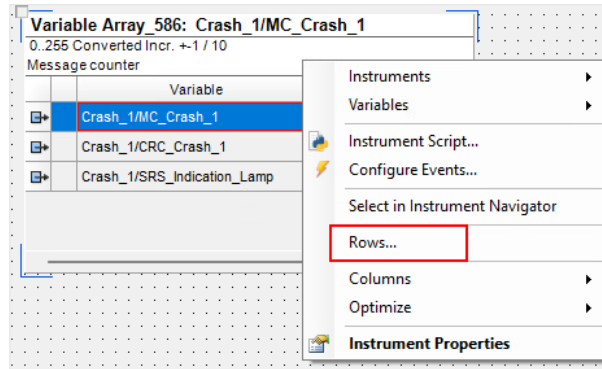


For further information, refer to [FPGA Scale ADC \(ControlDesk Instrument Handling\)](#) and [FPGA Scale DAC \(ControlDesk Instrument Handling\)](#).

Improved access to property dialogs

Access to important instrument property dialogs was improved. You can access the dialogs via the instrument context menu.

The following illustration shows the new access to the Rows dialog of the Variable Array as an example.

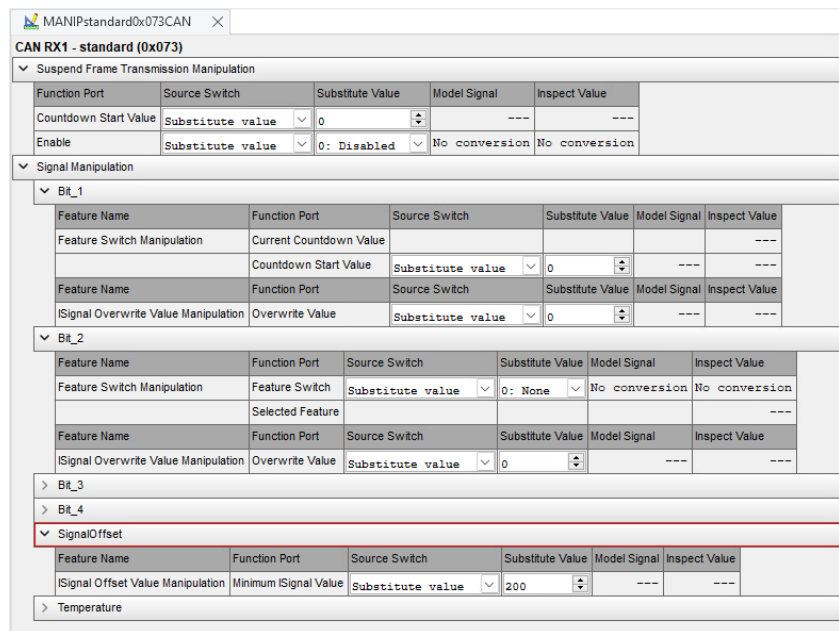


New Bus Navigator Features (ControlDesk 2023-A)

Bus Instrument generation based on the Hierarchy Array (Bus Manager applications only)

As of ControlDesk 2023-A, Bus Instruments generated for bus communication modeled with the Bus Manager are based on the Hierarchy Array, which significantly speeds up instrument generation.

The following illustration shows a Manipulation Instrument for CAN (Bus Manager) as an example.

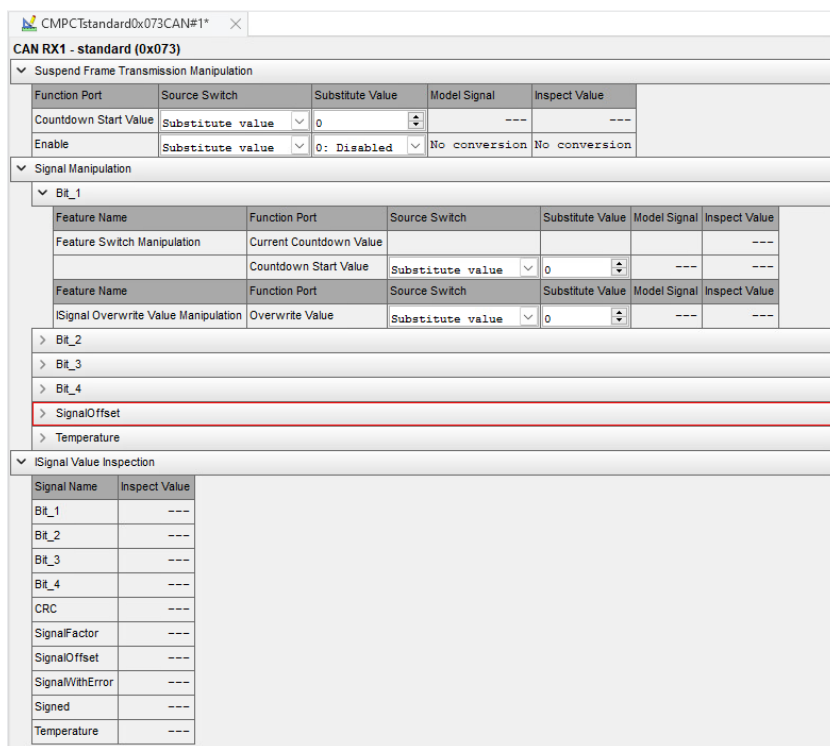


For more information, refer to [Bus Instruments \(Bus Manager\) \(ControlDesk Bus Navigator !\[\]\(d0a1791f26d167e866e44ebbf83efebe_img.jpg\)](#)).

New Compact Bus Instrument type (Bus Manager applications only)

As of ControlDesk 2023-A, you can generate *Compact Bus Instruments* for bus communication modeled with the Bus Manager. A Compact Bus Instrument lets you display all supported features of CAN and LIN PDUs that were enabled in the Bus Manager in one compact instrument.

The following illustration shows an example. It displays regions for the manipulation and inspection features enabled in the Bus Manager.



For more information, refer to [Compact Bus Instrument \(Bus Manager\) \(ControlDesk Bus Navigator !\[\]\(5a132f13505a6571904d622757b7a8f0_img.jpg\)](#)).

Bus Instrument generation for CAN J1939 messages (Bus Manager applications only)

As of ControlDesk 2023-A, you can generate Bus Instruments for CAN J1939 messages in bus communication modeled with the Bus Manager.

This covers the following aspects:

- Support of the J1939-21 and J1939-22 protocols.
- CAN J1939 message display in the Bus Navigator tree. This includes the display of J1939-specific information in the ControlDesk Properties pane.

For more information, refer to [Bus Configuration Structure in the Bus Navigator Tree \(ControlDesk Bus Navigator !\[\]\(35dc653d59570f8f891c312eeece91a2_img.jpg\)](#)) and [Bus Instruments \(Bus Manager\) \(ControlDesk Bus Navigator !\[\]\(1059fe1e0dea2bf9365f075bf634e912_img.jpg\)](#)).

Tool automation support für Bus Navigator options

The automation interface of ControlDesk 2023-A now lets you specify layout generation and monitoring options, which are also available via the Bus Navigator (refer to [Bus Navigator Page \(ControlDesk Bus Navigator !\[\]\(d84e7ea36f695d92cb39ec32c307ac93_img.jpg\)](#)) page of the ControlDesk Options dialog. The options are accessible via the `BusNavigator / IBnBusNavigator <<Interface>>` interface.

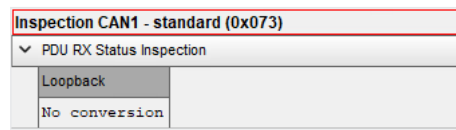
For more information, refer to [Automating the Bus Navigator \(ControlDesk Automation !\[\]\(feabb98897b440bc8695a03336a6e2df_img.jpg\)](#)).

Loopback function port supported by Bus Instruments (Bus Manager applications only)

As of ControlDesk 2023-A, the following Bus Instruments generated for bus communication modeled with the Bus Manager support the Loopback function port in connection with the PDU RX Status feature of the Bus Manager:

- Compact Bus Instrument for CAN
- Inspection Instrument for CAN
- RX Instrument for CAN
- TX Instrument for CAN

The following illustration shows the PDU RX Status Inspection instrument region with the Loopback field as an example.



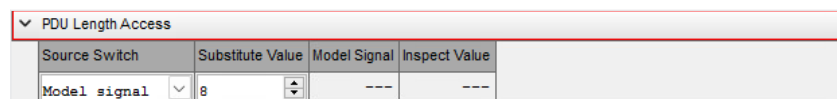
For more information, refer to:

- [Compact Bus Instrument \(Bus Manager\) \(ControlDesk Bus Navigator !\[\]\(dce81645e0100714e86d66fe4d06ecba_img.jpg\)](#))
- [Inspection Instrument for CAN \(Bus Manager\) \(ControlDesk Bus Navigator !\[\]\(2f7100595fe61fbdc3e7ec71332af01e_img.jpg\)](#))
- [RX Instrument for CAN \(Bus Manager\) \(ControlDesk Bus Navigator !\[\]\(c642f5e2c9782d94443748a0940dbd21_img.jpg\)](#))
- [TX Instrument for CAN \(Bus Manager\) \(ControlDesk Bus Navigator !\[\]\(b82b2c4d16df374e5cf5c4302a900972_img.jpg\)](#))

PDU length access supported by Bus Instruments (Bus Manager applications only)

As of ControlDesk 2023-A, TX and RX instruments for CAN generated for bus communication modeled with the Bus Manager support the *PDU length access* feature by displaying the new PDU Length Access instrument region. The region displays the payload length of the IPDU, and lets you modify it using the Source Switch and Substitute Value fields.

The following illustration shows the new instrument region.



For more information, refer to [TX Instrument for CAN \(Bus Manager\) \(ControlDesk Bus Navigator !\[\]\(f219cfc00b8db0cd1a81ae1fc9afaf28_img.jpg\)](#)) and [RX Instrument for CAN \(Bus Manager\) \(ControlDesk Bus Navigator !\[\]\(681a6e93edfbc41974b9c67a48b93778_img.jpg\)](#)).

PDU user code supported by Bus Instruments (Bus Manager applications only)

As of ControlDesk 2023-A, the following Bus Instruments generated for bus communication modeled with the Bus Manager support the *PDU user code* feature:

- Inspection Instrument for CAN

The PDU User Code Inspection instrument region now lets you inspect and access any specified user ports.

PDU User Code Inspection			
Function Port	Substitute Value	Inspect Value	
Result		0	
User Output 0		0	
User Inport 1	0	0	
User Output 2		0	
User Inport 3	0	0	

- Manipulation Instrument for CAN

The instrument provides the new PDU User Code Manipulation instrument region. The region lets you configure the run-time behavior for the execution of user code.

PDU User Code Manipulation			
Function Port	Substitute Value	Inspect Value	
Current Countdown Value		0	
Countdown Start Value	0	0	
Enable	0: Disabled	0: Disabled	
Enable State		0	

- TX Instrument for CAN

The instrument provides the new PDU User Code Access instrument region. The region lets you inspect and access any specified user ports.

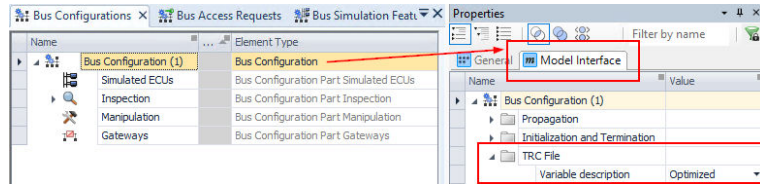
PDU User Code Access			
Function Port	Substitute Value	Inspect Value	
User Inport 0	0	0	
User Inport 1	0	0	
User Output 2		3	

For more information, refer to:

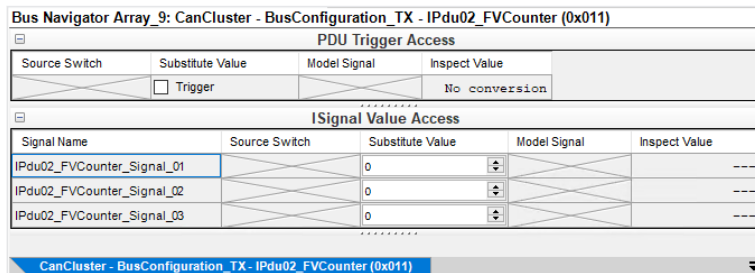
- [Inspection Instrument for CAN \(Bus Manager\) \(ControlDesk Bus Navigator !\[\]\(93b46f02aeb0dec7325ae721eddb1f5c_img.jpg\)](#))
- [Manipulation Instrument for CAN \(Bus Manager\) \(ControlDesk Bus Navigator !\[\]\(df95500177ee1448bca3fb6d8db555eb_img.jpg\)](#))
- [TX Instrument for CAN \(Bus Manager\) \(ControlDesk Bus Navigator !\[\]\(bb046f17e347213a23b77fd6f78ea23d_img.jpg\)](#))

Optimized TRC file generation supported by Bus Instruments (Bus Manager applications only)

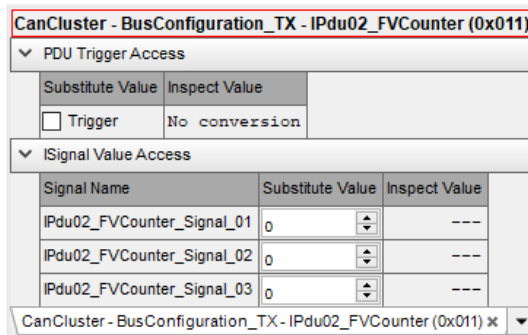
For each bus configuration, the Bus Manager lets you specify whether an optimized set of variables or a complete set is generated. Refer to the following illustration.



- Up to and including ControlDesk 2022-B, the generation of Bus Instruments for bus communication modeled with the Bus Manager did not support the Optimized TRC file generation mode. Variables excluded in the optimized mode were not omitted from the generated instruments. Refer to the following illustration.



- As of ControlDesk 2023-A, the generation of Bus Instruments supports the Optimized TRC file generation mode. Variables excluded in the optimized mode are omitted from the generated instruments. Refer to the following illustration.



For more information on the Optimized TRC file generation mode, refer to:

- Bus Manager (stand-alone): [Accessing Function Ports with Enabled Test Automation Support in Variable Description Files \(TRC Files\) \(Bus Manager \(Stand-Alone\) Implementation Guide\)](#)
- Bus Manager in ConfigurationDesk: [Accessing Function Ports with Enabled Test Automation Support in Variable Description Files \(TRC Files\) \(ConfigurationDesk Bus Manager Implementation Guide\)](#)

Migrating to ControlDesk 2023-A

Migrating to ControlDesk 2023-A

Introduction

To migrate from ControlDesk 2022-B to ControlDesk 2023-A and reuse existing experiments, you might have to carry out the following migration steps.

Note

To migrate to ControlDesk 2023-A from versions earlier than 2022-B, you also have to perform the migration steps of the intervening ControlDesk versions.

Tool automation changes

Change to the IVInstrumentCoreEvents interface As of ControlDesk 2023-A, the `OnDeleting / Deleting` event of the `InstrumentCoreEvents / IVInstrumentCoreEvents <<EventInterface>>` ([ControlDesk Automation](#)) interface is no longer triggered when the layout containing the related instrument is closed. The event is triggered only when the instrument is deleted.

Changes to the modification of Bus Instruments via automation As of ControlDesk 2023-A, Bus Instruments created for Bus Manager applications are based on the Hierarchy Array.

As a consequence, to reuse scripts in which Bus Instruments are modified via the ControlDesk automation interface, you have to adapt these scripts according to the automation interface of the Hierarchy Array.

Tip

The automated *generation* of Bus Instruments was not changed, and requires no migration.

For information on the automation interface of the Hierarchy Array, refer to `HierarchyArrayInstrument / IViHierarchyArrayInstrument <<Interface>>` ([ControlDesk Automation](#)).

Changes to the IViBrowserInstrument interface As of ControlDesk 2023-A, the following changes are effective:

- The `ScriptErrorsSuppressed` property is removed from `BrowserInstrument / IViBrowserInstrument <<Interface>>` ([ControlDesk Automation](#)). Due to the migration to WebView2, this property is no longer needed and thus removed, as errors are captured in WebView2 internally.
- The `InvokeScript(name, parameters)` method of the `BrowserInstrument / IViBrowserInstrument <<Interface>>` ([ControlDesk Automation](#)) returns a string now. Previously this method returned a callable Python object.

Given the following function in JavaScript and HTML code to be invoked via `InvokeScript`:

```
function getElement(key){
    return document.getElementById(key);
}
<div id="test_div"> test </div>
```

- Up to and including ControlDesk 2022-B, you were able to access attributes, e.g., the `innerHTML`, immediately on the Python side:

```
Instrument.InvokeScript("getElement", "test_div").innerHTML
```

- As of ControlDesk 2023-A, it is necessary to access attributes within JavaScript or parse the returned string to obtain a certain attribute:

```
function getElement(key){
    return document.getElementById(key).innerHTML;
}
```

You have to decide how to resolve this issue in your scripts and change them accordingly. A possible solution is to return JSON-serialized objects, which in return can be parsed on the Python side.

Changes to the Browser

If your experiment was created with ControlDesk 2022-B or earlier and if it contains a Browser, you have to adjust the related instrument scripts to reuse the experiment in ControlDesk 2023-A or later.

This is necessary due to the discontinuation of the Internet Explorer and the resulting migration to WebView2. Check in the following instructions for details of which parts of your instrument script require change.

Change to the `SendData` method in JavaScript The `SendData` method sends data from the JavaScript run time to the Browser. Until now, a typical use case looked like this:

```
window.external.SendData(key, value);
```

Sending data to the Browser is still possible, but the sending object has changed:

```
chrome.webview.hostObjects.browserInstrument.SendData(key, value);
```

Removal of the 'Script errors suppressed' property The `Script errors suppressed` property of the Browser has been removed. This property is no longer needed since errors are captured in WebView2 internally.

Changes to the Map instrument

If your experiment was created with ControlDesk 2022-B or earlier and if it contains a Map instrument, you have to update the contained Map instruments. You have two options:

- Create a new Map instrument in ControlDesk 2023-A and reconnect relevant variables.
- In a Map instrument created prior to ControlDesk 2023-A, update the outdated parts of the Javascript file archive according to the following instructions.

Change to `SendData` method in JavaScript Due to the exchange of `SendData` methods mentioned in [Change to the `SendData` method in JavaScript](#) on page 91, Map instruments created prior to ControlDesk 2023-A do not

work in later versions. To restore functionality, execute the following steps of migration:

1. Export the file archive:
 1. Open the layout containing the outdated Map instrument.
 2. Select the instrument and, in the Properties pane, click Show default parameters.

Tip

To show default parameters, you can also enter the following statement in the Internal Interpreter:

```
Instrument.CustomProperties.DefaultPropertiesVisible  
= True
```

3. In the Properties pane, click Export file archive. Export the archive to a location of your choice.
4. In the File Explorer, navigate to the file location.
2. Edit the JavaScript file:
 1. In a text editor, open the script.js file.
 2. Replace all occurrences of
`window.external.SendData`
with
`chrome.webview.hostObjects.browserInstrument.SendData`
 3. Save the script.js file in the original location.
3. Reimport the file archive:
 1. In the Properties pane under File archive, click Clear and confirm.
 2. In the Properties pane under File archive, click Import and select the file archive location created previously.
 3. In the Properties pane under File archive, click Start file and select the map.html file.

Now your Map instrument is ready for use with ControlDesk 2023-A.

Migrating from earlier ControlDesk versions

To migrate from earlier ControlDesk versions and reuse existing experiments, you might have to carry out additional migration steps. For more information on the migration steps, refer to [Migrating from Prior Versions of ControlDesk \(ControlDesk New Features and Migration 📖\)](#).

Related topics**Basics**

[Basics on Migrating from Prior Versions of ControlDesk \(ControlDesk New Features and Migration 📖\)](#)

DCI Configuration Tool

New Features of the DCI Configuration Tool 2023-A

Firmware version for DCI-GSI2 interfaces

For the DCI-GSI2 interfaces, the firmware version 1.5.7 is delivered with the DCI Configuration Tool 2023-A.

Note

The firmware version delivered with the DCI Configuration Tool is not always the latest firmware version available. If you encounter any problems, contact dSPACE Support to check if a later firmware version is available.

dSPACE Bus API Package

About the dSPACE Bus API Package

Introduction

The dSPACE Bus API lets you access the network interfaces of dSPACE simulation platforms and third-party hardware via C functions.

Basics on the dSPACE Bus API

The dSPACE Bus API is an application interface to access the network interfaces (CAN, Ethernet, and LIN) of dSPACE simulation platforms and third-party hardware. It lets you program custom applications for dSPACE systems such as VEOS, SCALEXIO, and MicroAutoBox III or connect other simulation systems with it.

The dSPACE Bus API is similar to the dSPACE CAN API Package. The following table shows the main differences between the two products.

Supported features	dSPACE CAN API Package	dSPACE Bus API
Supported bus types	CAN and CAN FD	<ul style="list-style-type: none"> ▪ CAN and CAN FD ▪ Ethernet ▪ LIN
Support for dSPACE and third-party interfaces	✓	✓
Support of bus interfaces of VEOS, SCALEXIO and MicroAutoBox III	–	✓

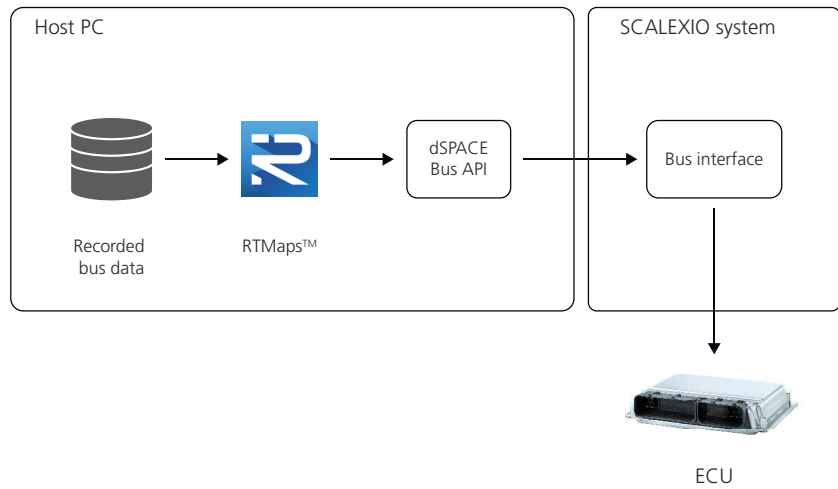
Refer to [Basics of the dSPACE Bus API \(dSPACE Bus API Manual !\[\]\(3cb60d42b10e53f9522bb0b392c1c4cd_img.jpg\)](#)).

Supported use cases

The dSPACE Bus API supports for example the following use cases:

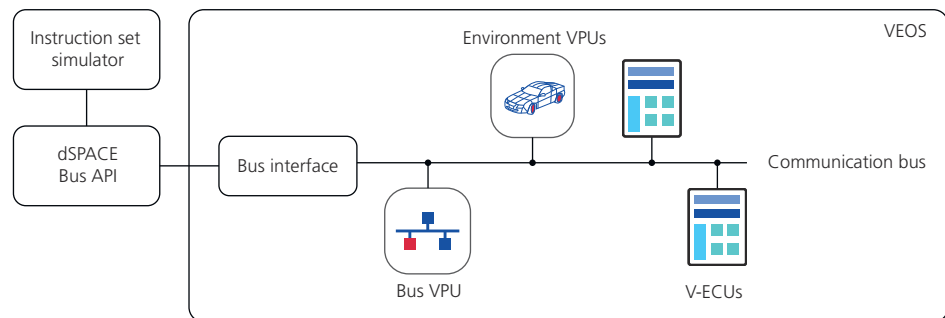
Data replay via RTMaps To test an ECU, you can replay recorded bus data via RTMaps. The ECU is connected to a dSPACE simulation platform. The dSPACE Bus API is used to connect RTMaps to the simulation platform. This allows you to transfer the recorded bus data to the ECU.

The following illustration shows the use case using a SCALEXIO system as an example:



Co-simulation with VEOS In this use case, a VEOS simulation system is coupled with an instruction set simulator to perform co-simulation via network. The dSPACE Bus API is used to connect the instruction set simulator to a virtual communication bus on VEOS via the VEOS bus interface.

Refer to the following illustration:



Accessing the dSPACE Bus API

You can access the dSPACE Bus API via C functions, which you can use with your application written in C or C++. The dSPACE Bus API is a 64-bit Windows DLL.

dSPACE FlexRay Configuration Package

Migrating to dSPACE FlexRay Configuration Package 2023-A

Changes in the Simulink and TRC interfaces when using PDU transmission modes

As of dSPACE FlexRay Configuration Package 2023-A, there are some changes in the Simulink and TRC interfaces in connection with PDU transmission modes.

- **Tx Enable** Simulink and TRC interfaces when using the *LPDU timing triggered* (98) transmission mode:
 - Up to and including dSPACE FlexRay Configuration Package 2022-B, when the transmission mode 98 'LPDU timing triggered' was used with a dynamic cyclic PDU, neither the **Tx Enable** Simulink inport nor the **Tx Enable** TRC variable were available.
 - As of dSPACE FlexRay Configuration Package 2023-A, when the transmission mode 98 'LPDU timing triggered' is used with a dynamic cyclic PDU, the FlexRay Configuration Tool generates a **Tx Enable** Simulink inport in the PDU mapping subsystem of the FLEXRAYCONFIG PDU TX block and a **Tx Enable** TRC variable in the **Enable** group of the TX PDU.
- **Tx Trigger** Simulink interface when using the *User-Defined* (99) default transmission mode:
 - Up to and including dSPACE FlexRay Configuration Package 2022-B, when 'User-Defined' was used as the default transmission mode, no **Tx Trigger** Simulink inport was available.
 - As of dSPACE FlexRay Configuration Package 2023-A, when 'User-Defined' is used as the default transmission mode, the FlexRay Configuration Tool generates a **Tx Trigger** Simulink inport in the PDU mapping subsystem of a FLEXRAYCONFIG PDU TX block.
- Generation of **Tx Enable** interface for dynamic PDUs when the **Generate SL Interface for Transmission Modes** property is set to 'False':
 - Up to and including dSPACE FlexRay Configuration Package 2022-B, when the **Generate SL Interface for Transmission Modes** property was set to 'False', the **Tx Enable** interface was generated even in cases where it was not needed at all, e.g., for dynamic PDUs with a cyclic transmission mode and if the default transmission mode was an event-based timing.
 - As of dSPACE FlexRay Configuration Package 2023-A, when the **Generate SL Interface for Transmission Modes** property is set to 'False', the **Tx Enable** interface is generated only if it is needed.

These changes might have impact on existing FlexRay projects. If you reuse projects and models, check whether the PDU and Status subsystems of the TX PDU blocks are affected and replace them manually, if necessary, to prevent compilation errors.

dSPACE Installation Manager

Where to go from here

Information in this section

[New Features of dSPACE Installation Manager 23.1](#)..... 99

[Migrating to dSPACE Installation Manager 23.1](#)..... 100

New Features of dSPACE Installation Manager 23.1

Introduction

dSPACE Installation Manager 23.1 provides no new features that are relevant for users. However, as of version 23.1, there are two discontinuations. See below.

Discontinuation of the dongle migration with dSPACE Installation Manager

As of dSPACE Release 2023-A, dSPACE Installation Manager no longer supports migration from old dongles (delivered for dSPACE Release 2017-A and earlier) to currently delivered CmDongles.

If you still have an old dongle that needs to be migrated to use dSPACE Release 2017-B or later, the following applies:

- You are still using a WibuKey dongle (Type 1): Migration is no longer possible. A dongle exchange by dSPACE is required. For more information, refer to <http://www.dspace.com/go/DongleReplacement>.
- You are still using a first-generation CmDongle (Type 2), with serial number starting with 2-xxxx and white connector: Migration is no longer possible. A dongle exchange by dSPACE is required. For more information, refer to <http://www.dspace.com/go/DongleReplacement>.
- You are still using a CmDongle (Type 3), with serial number starting with 3-xxxx and old firmcode: Migration is required by using an earlier version of dSPACE Installation Manager (from 5.0 ... to 22.3). For the download of dSPACE Installation Manager 22.3, refer to <https://www.dspace.com/go/IM>.

Discontinuation of legacy licensing technologies

As of dSPACE Release 2023-A, dSPACE Installation Manager no longer supports legacy licensing technologies (WibuKey from Wibu-Systems for dongle licenses and FlexNet from Flexera for floating network licenses). This means:

- dSPACE Installation Manager 23.1 (on dSPACE Release 2023-A) and later will support only the CodeMeter licensing technology introduced with dSPACE Release 2017-B.
- dSPACE Installation Manager 23.1 and later no longer provides the file download (keys.dsp and license.dsp) for legacy licensing based on CodeMeter licenses.
- Installing dSPACE Release 2023-A or later on the same PC as dSPACE Release 2017-A or earlier is no longer supported and therefore not recommended.
- As of dSPACE Release 2023-A, dSPACE License Manager (Legacy) is no longer shipped and installed with the dSPACE Installation Manager. The associated command line utilities are also discontinued, including in particular the `IMLicUtil.exe` and the `InstallationReporter.exe` utilities.
- If you still need to use the legacy licensing method, you must use the latest version of dSPACE Installation Manager that supports this technology. This is dSPACE Installation Manager 22.3. You can download dSPACE Installation Manager 22.3 from <https://www.dspace.com/go/IM>.

Migrating to dSPACE Installation Manager 23.1

Using CmDongles

If you want to work with licenses on CmDongles in combination with dSPACE Installation Manager 23.1, for example, to activate, deactivate, or update licenses, the dongles must have at least firmware version 4.10.

To use CmDongles shipped for Releases earlier than dSPACE Release 2019-A, a firmware update is required. CmDongles shipped for dSPACE Release 2019-A and later contain the required minimum firmware version.

dSPACE Installation Manager checks if the firmware of a connected dongle matches the required minimum firmware version and displays if an update is necessary.

For instructions on updating the firmware, refer to [How to Update the Firmware of a CmDongle \(Working with CodeMeter Licensing Technology !\[\]\(aa53ad6fea213b8b2226d3077e30533a_img.jpg\)](#)).

Migration to Microsoft .NET6 framework

dSPACE Installation Manager 23.1 has been migrated to the Microsoft .NET6 framework. To achieve downward compatibility, dSPACE Installation Manager also supports the .NET4.8 framework until dSPACE Release 2026-B. Therefore, the API of the dSPACE Installation Manager can be used in .NET4.8 processes as well as in .NET6 processes.

Note on using the API of dSPACE Installation Manager: .NET4.8 (API version 2.0) will no longer be supported in a later release and you will then have to migrate the scripts and programs to API version 3.0. Therefore, for new scripts, already use API version 3.0.

dSPACE XIL API .NET

New Features of dSPACE XIL API .NET 2023-A

Extended support of ASAM XIL 2.2.0 features

Support of the VariableRef interfaces You can access variables by their names and now also by VariableRef objects. If you use a VariableRef object, you can address not only the entire variable, but also a single variable element, such as the element of a vector or a matrix. VariableRef objects support the ValueRepresentation property to configure the element value as *Raw* or *Physical*.

The VariableRef object can be used together with the following methods and properties:

- MAPort.Read2
- MAPort.Write2
- MAPort.CheckVariableRefs
- ECUPort.Read2
- ECUPort.Write2
- Capture.Variables2
- CaptureSignalGroup.GetScalarSignalValues
- CaptureSignalGroup.GetSignalValues
- ConditionWatcher.Defines2

Support of the CaptureSignalGroup interface The SignalGroups property of the CaptureResult object returns a CaptureSignalGroup object. A CaptureSignalGroup object can be accessed via the VariableRef object and provides information on the elements of the capture signals, such as type, length, and the computation method.

Support of capturing complex data types The now-supported SignalGroups property of the CaptureResult object lets you access complex data types, such as vectors and matrices, as a whole.

Support of Capture.DiscardFetchedData The now-supported DiscardFetchedData property of a Capture object lets you configure whether the currently captured data remains in the memory or is deleted after being fetched via the Fetch method. This lets you reduce the memory consumption when executing long-term data acquisitions.

Enhanced MAPort functionality

The MAPort implementation provides the following new features:

- New demos showing how to use VariableRef objects and how to capture complex data types.

These are the demos **18_ReadWriteArrays** and **19_CapturingArrays** provided in C#, Python, and M.

For more information, refer to [dSPACE XIL API MAPort Implementation](#) .

Enhanced ECUPort functionality

The ECUPort implementation provides the following new features:

- ECUPort Capture to RAM

This allows you to capture data from a V-ECU. The current implementation only supports the direct start and stop of a capture without triggering. The data is stored in the RAM of the host PC.

- New demos showing how to capture and how to use VariableRef objects.

These are the demos **2_BasicCapturing** and **18_ReadWriteArrays** provided in C#, Python, and M.

- Support of V-ECU FMUs

An ECU configuration containing an FMI adapter module can be exported as an V-ECU FMU, for example, by using SystemDesk. Such an FMI-compliant ECU configuration is now supported by the dSPACE XIL API ECUPort.

For more information, refer to [dSPACE XIL API ECUPort Implementation](#) .

ECU Interface Manager

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New Features of ECU Interface Manager 2023-A

XCP on CAN: Sending CAN FD frames with or without BRS

For XCP on CAN, you can now specify whether to send CAN FD frames with or without baud rate switch (BRS):

- If enabled, CAN FD frames are sent with baud rate switch (BRS), i.e., the FD baud rate is used for the data phase.
- If disabled, CAN FD frames are sent without baud rate switch (BRS), i.e., the arbitration phase baud rate is used for the data phase instead of the specified FD baud rate.

Refer to [ECU Interface \(ECU Interface Manager Manual !\[\]\(3cb60d42b10e53f9522bb0b392c1c4cd_img.jpg\)](#)).

Compatibility of ECU Interface Manager 2023-A

Compatibility in general

dSPACE recommends using only software products from the same dSPACE Release. This ensures maximum run-time compatibility.

Compatibility between EIC files and ConfigurationDesk

The following table shows the compatibility between EIC files and ConfigurationDesk:

	EIC Files Created with ECU Interface Manager ...			
	Version 2.10 ¹⁾	Version 2.11 ²⁾	Version 2022-B ³⁾	Version 2023-A ⁴⁾
ConfigurationDesk 2023-A ⁴⁾	✓ ⁵⁾	✓ ⁶⁾	✓ ⁶⁾	✓ ⁶⁾
ConfigurationDesk 2022-B ³⁾	✓ ⁵⁾	✓ ⁶⁾	✓ ⁶⁾	✓ ⁶⁾
ConfigurationDesk 22.1 ²⁾	✓ ⁵⁾	✓ ⁶⁾	✓ ⁶⁾	✓ ⁶⁾
ConfigurationDesk 6.8 ¹⁾	✓	–	–	–

1) dSPACE Release 2021-B

2) dSPACE Release 2022-A

3) dSPACE Release 2022-B

4) dSPACE Release 2023-A

5) For 32-bit target architecture only.

6) For 32-bit and 64-bit target architectures.

Compatibility between EIC files and RTMaps

RTMaps supports EIC files created with the ECU Interface Manager 2.10 and later.

Migrating to ECU Interface Manager 2023-A

Automatic migration of projects

You can reuse projects in the ECU Interface Manager 2023-A if the projects were last saved with the ECU Interface Manager 2.0 p1 or later.

When you open the projects in the ECU Interface Manager 2023-A, they are migrated automatically.

Note

In the ECU Interface Manager 2023-A, you cannot reuse projects that were last saved with ECU Interface Manager 2.0 or earlier.

Additional migration steps in some cases

To migrate to the ECU Interface Manager 2023-A from versions earlier than the ECU Interface Manager 2022-B, you might also have to perform the migration steps of the intervening ECU Interface Manager versions.

FPGA Programming Blockset

Where to go from here

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[Migrating to the FPGA Programming Blockset 2023-A.....](#) 108

New Features of the FPGA Programming Blockset 2023-A

Extended Xilinx® support

The FPGA Programming Blockset now supports the following products:

Xilinx Design Tools Version	MATLAB Version ¹⁾	Operating System
Vivado 2022.2 ²⁾	MATLAB R2021b	Windows operating system that is supported by the RCP and HIL software of the current Release. For a list of supported operating systems, refer to Operating System on page 151. The listed Windows Server operating systems are not officially supported by Xilinx, but tested by dSPACE.

¹⁾ The Processor Interface sublibrary of the FPGA Programming Blockset also supports MATLAB R2022a, R2022b, and R2023a.

²⁾ In general, Vivado ML Enterprise edition and the Xilinx® Vitis™ Model Composer are needed. The Vivado ML Standard edition with Xilinx Vitis Model Composer can also be used for the DS2655 (7K160) and DS6601 FPGA base boards. The Xilinx Vitis Model Composer is required only for modeling FPGA applications with the FPGA Programming Blockset.

For more information on the software tools for FPGA programming, refer to [Software Tools for Working with the FPGA Programming Blockset \(FPGA Programming Blockset Guide !\[\]\(4b7a79268f6ba26c1471d4232fffa85a_img.jpg\)](#)).

MATLAB compatibility The limited MATLAB compatibility reflects the requirements of the Xilinx Design Tools and its impacts on the building processes for creating an FPGA application.

In contrast to the FPGA build process, the blocksets and tools for modeling and building the processor application support the regular MATLAB compatibility of a dSPACE Release. Therefore, you can extend the MATLAB compatibility if you model and build the processor application separate from the FPGA application. The only requirement is that the same dSPACE Release is used to build the FPGA application and the processor application.

For example: The FPGA application is created with an installation set containing the current dSPACE Release, Vivado 2022.2, and MATLAB R2021b. You can transfer and import the generated FPGA application to an installation set containing the current dSPACE Release and MATLAB R2023a to continue your work with ConfigurationDesk or the Processor Interface sublibrary of the FPGA Programming Blockset.

General enhancements to the FPGA Programming Blockset

Support of Simulink blocks to model parts of the FPGA model The FPGA Programming Blockset now supports MathWorks® HDL Coder™ for modeling parts of the FPGA model with Simulink™ blocks. This feature lets you use existing Simulink models directly as part of your FPGA application. For example: You can use a Simulink model of a controller for first functionality tests before you optimize the FPGA utilization of the controller.

The FPGA Programming Blockset provides gateway blocks to transfer the signals and buses between the separated model parts. During the build process, the following tools generate the HDL code:

- MathWorks HDL Coder generates the VHDL code from blocks of the Simulink blockset.
- Xilinx® Vitis™ Model Composer generates the VHDL code from blocks of the Xilinx HDL blockset and the FPGA Programming Blockset.

The build process merges the individual VHDL codes into a synthesizable overall model. For instructions, refer to [How to Use Simulink Blocks for Modeling the FPGA Functionality \(FPGA Programming Blockset Guide\)](#).

Using MathWorks HDL coder does not affect the MATLAB compatibility of the FPGA Programming Blockset, because only parts of the FPGA model can be modeled with Simulink blocks.

Support of new ControlDesk instruments for scaling The FPGA test access and scaling feature now supports the FPGA Scale ControlDesk instruments to conveniently scale the I/O interfaces of an FPGA application.

For more information, refer to [FPGA Scale ADC \(ControlDesk Instrument Handling\)](#) and [FPGA Scale DAC \(ControlDesk Instrument Handling\)](#).

Advanced preferences Advanced preferences of the FPGA Programming Blockset let you perform workarounds or disable features. Changing the default settings is recommended only for special use cases. For example: If the error code changes again, you can ignore critical warnings during the build process.

However, some preferences let you disable convenience features. For example, you can speed up the copy & paste process by deactivating the automatic reassignment of new hardware resources.

For more information, refer to [Dialog Settings of the Advanced Preferences Dialog \(FPGA Programming Blockset - FPGA Interface Reference\)](#).

For information on setting advanced preferences with script functions, refer to [Script Functions to Manage Advanced Preferences \(FPGA Programming Software Script Interface Reference\)](#).

Enhancements to the MicroAutoBox III/SCALEXIO frameworks

More comfortable transfer of the FPGA container After the FPGA build, a publish link in the MATLAB Command Window and a Publish button on the ConfigurationDesk Interface page of the FPGA Setup block now let you publish the path of the built FPGA container file to the global user location file of ConfigurationDesk. This makes the build FPGA application available as FPGA custom function block types in the Function Browser of ConfigurationDesk.

Enhanced support of mask parameters of scaling subsystems Two-dimensional mask parameter matrices in the row-based array layout for FPGA scaling subsystems are now supported by ConfigurationDesk and ControlDesk. Scaling subsystems are a feature of the FPGA Programming Blockset to specify the preprocessing and postprocessing of the signals between the FPGA and the real-time processor. For more information on scaling subsystems, refer to [Characteristics of Scaling Subsystems \(FPGA Programming Blockset Guide\)](#).

New method to provide clock domains The new User Clock Out block lets you use a customized clocking circuit (user clock) as clock domain source. For example, you can use the clock of the MGT interface to process the data synchronous to the MGT transceivers.

For instructions, refer to [How to Use a Customized Clocking Circuit as Clock Domain Source \(FPGA Programming Blockset Guide\)](#).

The user clock feature is available only for modeling the FPGA application, not for handcoding.

Enhancements to the SCALEXIO frameworks

New watchdog feature The frameworks of the DS6601/DS6602 FPGA base boards now provide a Watchdog block to check if the processor application is alive.

For more information, refer to [Using a Watchdog \(FPGA Programming Blockset Guide\)](#).

New bus data transmission method for the Bus Out block The Bus Out block now supports the User acknowledged bus data transmission method. This method lets you acknowledge the data to be transmitted to the processor application, for example, to trigger the processing of some data before it is transmitted to the processor application.

For instruction, refer to [How to Configure the Bus Data Transmission Method \(FPGA Programming Blockset Guide\)](#).


New MGT In Opto Ready block The MGT In Opto Ready block indicates whether the MGT module is ready for data exchange.


The MGT In Opto Ready block replaces the Opto_Ready port of the MGT In block, because the signal of the Opto_Ready port cannot be provided in a user clock domain.

Rework is necessary if you migrate an FPGA model using a MGT In block. Refer to [Migrating to the FPGA Programming Blockset 2023-A](#) on page 108.

Enhancements to the script interface

New script function for MicroAutoBox III/SCALEXIO The script interface is enhanced with a script function to publish the path of the built FPGA container file to the global user location file of ConfigurationDesk. This makes the build FPGA application available as FPGA custom function block types in the Function Browser of ConfigurationDesk.

For more information, refer to [PublishFPGACustomFunction](#) (FPGA Programming Software Script Interface Reference )

New script interface to manage advanced preferences For information on setting advanced preferences with script functions, refer to [Script Functions to Manage Advanced Preferences](#) (FPGA Programming Software Script Interface Reference )

Enhancement to the documentation

A new Getting Started document introduces you to the first steps in FPGA programming with the FPGA Programming Blockset. A tutorial introduces you to the basic steps of modeling and building an FPGA application when using a MicroAutoBox III or SCALEXIO.


Refer to [FPGA Programming Blockset Getting Started](#) 

Migrating to the FPGA Programming Blockset 2023-A

Migrating from previous FPGA Programming Blocksets

If you implemented an FPGA application with the FPGA Programming Blockset Version 1.1 or later and want to use it with the FPGA Programming Blockset 2023-A, the framework automatically updates to the current framework version.

The update affects all subsystems in the model/subsystem. The parameters of the blocks stay the same after updating to the current framework version.

You can also use a script to migrate processor interface blocks, for example, to migrate RTI processor models without the FPGA model. For more information, refer to [MigrateToModelPortBlocks](#) (FPGA Programming Software Script Interface Reference )

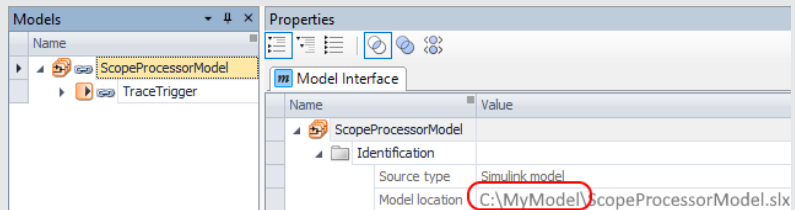
Changed process to generate FPGA scope rasters If you use an FPGA custom function built with the RTI FPGA Programming Blockset 3.13 (Release 2022-A) in ConfigurationDesk, you have to generate the FPGA scope raster that is used by ControlDesk.

As of FPGA Programming Blockset 2022-B, an FPGA custom function block with FPGA scope functions automatically generates the FPGA scope raster for ControlDesk.

If you use an existing ConfigurationDesk project and update the FPGA custom function of Release 2022-A with a newer FPGA custom function, the existing FPGA scope raster (`<application>_usr.trc`) leads to an error.

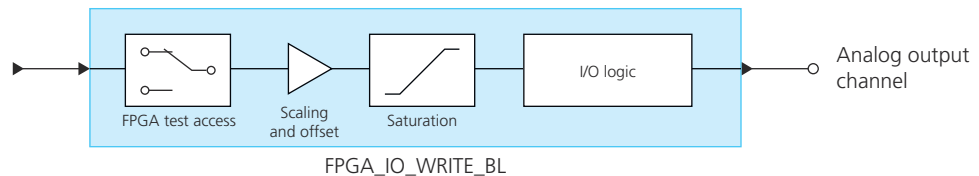
Note

Before you update the existing FPGA custom function in ConfigurationDesk with a new FPGAC file, delete the `<application>_usr.trc` file in the model folder. ConfigurationDesk shows the location of the model.



Changed interface to modify analog output signals FPGA scaling lets you modify analog output signals. As of Release 2022-B, the interface scales the signal values that are replaced with FPGA test access.

The following illustration shows the analog output interface. For more information on FPGA test access and scaling, refer to [Basics on FPGA Test Access and Scaling \(FPGA Programming Blockset Guide\)](#).



Up to Release 2022-A, the interface scales signal values first and then you can replace the scaled values with FPGA test access.

Bus In blocks replace Buffer64 blocks As of RTI FPGA Programming Blockset 3.12, the Bus In/Bus Out blocks for the MicroAutoBox III/SCALEXIO frameworks replace the transfer mode of the Buffer64 In/Buffer64 Out blocks. The update process automatically replaces the Buffer64 In/Buffer64 Out blocks that use the bus transfer mode with Bus In/Bus Out blocks.

Renaming of bus data transmission method As of FPGA Programming Blockset 23-A, the Synchronous to Read_Req method is named Synchronous to task method. The functionality does not change.

Rework necessary when migrating MGT In blocks Up to Release 2022-B, the MGT In block provides an Opto_Ready port. As of Release 2023-A, the MGT In Opto Ready blocks provides the Opto_Ready port, because the signal of the Opto_Ready port cannot be provided in a user clock domain.

After migration, you have to manually replace the MGT In block of the previous framework with a MGT In Opto Ready block and a MGT In block of the current framework.

Related topics**Basics**

[Migrating and Updating Existing FPGA Models \(FPGA Programming Blockset Guide\)](#)

MicroAutoBox III Firmware

New Features of the MicroAutoBox III Firmware 23.1

General enhancement

The firmware now supports the new UART function block type of ConfigurationDesk. It is no longer necessary to program and use a custom function block type.

The UART function block type supports the UART interfaces of the following boards:

- DS1511/DS1511B1 Multi-I/O Board
- DS1513 Multi-I/O Board
- DS1521 Bus Board

For implementing the UART interface, refer to [UART \(ConfigurationDesk I/O Function Implementation Guide !\[\]\(642aa997563f9a325b310230bb5078b7_img.jpg\)](#)).

Model Container Utility

About Model Container Utility

Introduction

The Model Container Utility lets you modify existing model implementation containers and package containers (PKC files) without having to generate them again.

Complementation of the dSPACE SIL testing tool chain

The Model Container Utility complements the dSPACE SIL testing tool chain. It is useful especially in workflows where model containers are exchanged between OEMs and suppliers:

- The utility lets you *protect intellectual property rights* by letting you exclude IP-relevant files from an existing model implementation container or package.
- The utility lets you *compile* an existing model implementation container or package container *in advance*. You can also compile only parts of each, i.e., packages.
- The command line interface of the Model Container Utility lets you easily compile containers or packages *for many users as part of a continuous build scenario*.

Supported container types and simulation platforms

- The Model Container Utility currently supports the following container types:
 - V-ECU implementation container (VECU) files
 - Package container (PKC) files
- The Model Container Utility currently supports container compilation for the VEOS simulation platform.

For more information, refer to [Basics on the Model Container Utility \(Model Container Utility Manual !\[\]\(cf531ed27e91483460120fcc057b3901_img.jpg\)](#)).

Model and Sensor Interface Blockset

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[Migrating to Model and Sensor Interface Blockset 2023-A..... 115](#)

New Features of the Model and Sensor Interface Blockset 2022-B

Model and Sensor Interface Blockset

There are no new features in Model and Sensor Interface Blockset 2022-B.

Related topics

Basics

[Features of the Model and Sensor Interface Blockset \(Model and Sensor Interface Blockset Manual !\[\]\(4fe57c3593bf1b21d272ae7ac8dfaf77_img.jpg\)\)](#)

Migrating to Model and Sensor Interface Blockset 2023-A

MicroAutobox III

The MicroAutobox III platform is not supported by the Model and Sensor Interface Blockset.

For more information on using MicroAutobox III with the blockset, contact dSPACE Support.

Migrating from previous Releases

Migration from previous Releases as of dSPACE Release 2020-B Models created with previous Releases of the Model and Sensor Interface Blockset as of version 1.0 in dSPACE Release 2020-B are migrated automatically when you open the model. Messages are displayed in the MATLAB Command Window and in the migration log to confirm successful migration or notify you of failures.

Migration from the Model and Sensor Interface Blockset

Solution Models created with the Model and Sensor Interface Blockset Solution that was available prior to dSPACE Release 2020-B must be manually migrated. When you open a model that uses blocks from the blockset solution, a message is displayed with instructions on how to migrate the model to use the blocks of the latest Release of the Model and Sensor Interface Blockset.

ModelDesk

Where to go from here

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New Features of ModelDesk 2023-A

Road Generator

V2X communication to traffic light systems You can simulate V2X communication of a vehicle to light signaling systems. To do this, you have to specify the traffic lights of a V2X traffic light controller and assign them to lanes of the roads that are connected to the junction. You can specify the settings in the user interface of the Road Generator. A preview shows you the signal phases of the lanes assigned to the traffic lights of the junction.

Related topics

Basics

[Parameterizing a Traffic Light System for V2X \(ModelDesk Road Creation !\[\]\(47734e4656765d20df4fdbd5b7aff048_img.jpg\)](#))

Migration to ModelDesk 2023-A

Project migration

As of ModelDesk 2023-A, you can migrate only projects created with ModelDesk version 5.1 (dSPACE Release 2019-A) and later.

Using an ASM of Release 2020-B in a migrated project

When you migrate a ModelDesk project and the corresponding ASM model, all signals in the layouts used for plotting are still connected. If you replace the migrated ASM model with an ASM model created with Release 2020-B, you must connect the signals again. ASM models created with Release 2020-B use `ASMSignalInterface` blocks that can be used in different parts of the model.

ASM project

Creating new ModelDesk projects on the basis of ASM projects is no longer supported for DS1006 target platforms. However, DS1006 platforms are still supported by ModelDesk. You can still parameterize real-time applications running on DS1006 platforms.

Model Interface Package for Simulink

Where to go from here

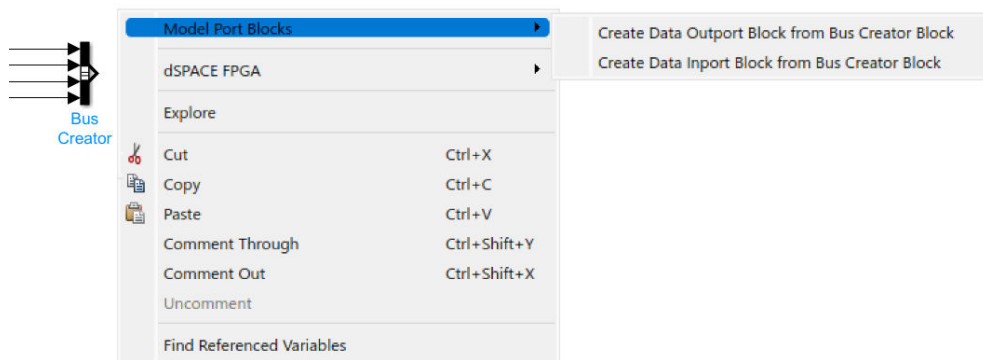
Information in this section

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New Features of the Model Interface Package for Simulink 2023-A

New context menu command to create model port blocks directly from Bus Creator blocks

The Model Interface Package for Simulink now provides new context menu commands that let you create Data Output blocks directly from Bus Creator blocks:



The created Data Output blocks are automatically mapped to the Bus Creator blocks.

MATLAB compatibility

The Model Interface Package for Simulink 2023-A is compatible with the following MATLAB® Releases:

- MATLAB R2023a
- MATLAB R2022b
- MATLAB R2022a
- MATLAB R2021b

Limitations when using MATLAB R2023a

No support of data types defined in data dictionaries referenced by subsystem files As of MATLAB R2023a, subsystem files can reference data dictionaries as data sources. The Model Interface Package for Simulink does not support model port blocks with data types, for example, Simulink.Bus objects, defined in the data dictionaries referenced by subsystem files.

Migrating to the Model Interface Package for Simulink 2023-A

No Machine Parented Data in the generated TRC file

As of MATLAB R2023a, Machine Parented Data is no longer supported by Simulink. Machine Parented Data is therefore not available in the State Machine Data group in a variable description generated with MATLAB R2023a.

MotionDesk

Where to go from here

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New Features of MotionDesk 2023-A

MotionDesk

There are no new features in MotionDesk 2023-A.

Migrating to MotionDesk 2023-A

Discontinuation of sensor simulation

As of MotionDesk Release 2023-A, sensor simulation based on MotionDesk is no longer supported for all sensor types.

AURELION dSPACE AURELION is the successor of MotionDesk for simulation animations and of Sensor Simulation for ADAS/AS simulations with camera, radar, and lidar sensors to validate driving functions and sensor output.

For more information and to prepare for your migration to AURELION, refer to <https://www.dspace.com/en/pub/home/support/kb/faqs/faq433.cfm> or contact dSPACE Support.

Planned discontinuations

MotionDesk MotionDesk and the MotionDesk Blockset will be discontinued after Release 2023-B. Until discontinuation, MotionDesk supports the simulation of camera sensors. Radar and lidar sensors are now unsupported using MotionDesk. For more information, refer to <https://www.dspace.com/go/elamd>.

Using endless ground plate and horizon

In MotionDesk 4.0 and earlier, the virtual world of a scene was built using ground plate and dome 3-D objects.

If you want to use the endless ground plate and endless sky in an old scene, you first have to delete these 3-D objects.

In advanced lighting mode, the static objects used for domes are not suitable for building the virtual world. You have to use the endless sky.

Migration of custom object VRML files

If you want to import 3-D custom objects in VRML2 format to MotionDesk, you must first convert the VRML2 files to COLLADA (*.dae) format using MotionDesk up-to Release 22-A. You can then import and use the COLLADA files in Release 22-B and later.

You convert the files in the Import Objects Dialog of the Library Manager Tool.

Migrating from previous Releases

MotionDesk supports experiments from the previous four versions of MotionDesk.

Real-Time Testing

Where to go from here

Information in this section

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New Features of Real-Time Testing 2023-A

Improved compatibility of MicroAutoBox III

For the MicroAutoBox III platform, the compatibility between host PC and real-time platform is extended. You can manage the MicroAutoBox III platform with firmware version as of 5.0 (Real-Time Testing version 4.4 included, released with Release 2020-B) from a host PC on which the current Real-Time Testing version is installed.

Documentation

The Real-Time Testing Tutorial has a new lesson that guides you through the implementation of an Ethernet communication. It shows how to send and receive Ethernet frames in RTT sequences. Refer to [Lesson 7: Implementing Ethernet Communication with the rttl.lib.dsethernetapilib Module \(Real-Time Testing Tutorial !\[\]\(870f5d5e9c0d57485634be3ecf52f3ca_img.jpg\)](#)).

Migrating to Real-Time Testing 2023-A

Variables of the simulation application

The TRC file contains the variables of the simulation application that you can access via Real-Time Testing. Variables with rational scalings are no longer supported by Real-Time Testing.

Incompatible BCG files

BCG files generated on a Windows PC cannot be used on a Linux PC and vice versa. Generate the BCG files under the operating system that you want to use to manage real-time tests.

BCG files generated with Real-Time Testing 4.0 or earlier cannot be used for Real-Time Testing 2023-A. You must create the BCG file of the RTT sequence again.

Only applicable for SCALEXIO as of Real-Time Testing 4.4 and VEOS as of Real-Time Testing 4.2: The internal Python interpreter version changed from 2.7.11 to 3.6.4. To use older scripts in the syntax of Python 2.7.11, you must migrate them to the syntax of Python 3.6.4. For more information on migrating Python scripts, refer to <http://www.dspace.com/go/Python36Migration>.

RTI/RTI-MP and RTLib

Where to go from here

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[Migration Aspects of RTI/RTI-MP and RTLib](#)..... 125

New Features of RTI/RTI-MP and RTLib

New features of RTI/RTI-MP

RTI and RTI-MP has the following new feature:

- Support of MATLAB® R2023a.

Limitations when using MATLAB R2023a

As of MATLAB R2023a, Machine Parented Data is no longer supported by Simulink. Machine Parented Data is therefore not available in the State Machine Data group in a variable description generated with MATLAB R2023a.

Migration Aspects of RTI/RTI-MP and RTLib

Modified features in later MATLAB versions

Switching to a later MATLAB version If you install a new MATLAB version, some settings are adopted from previously installed MATLAB versions. To prevent unexpected behavior by the Simulink models when you switch to a later MATLAB version or dSPACE Release, always reset the MATLAB and Simulink preferences to their default values before you start using the models.

If you change the MATLAB version and/or the dSPACE Release, configuration sets stored in a MAT file of an earlier version might cause problems. Therefore, you are recommended to create these configuration sets again when you change the Release version.

**Changed order in TRC files
and A2L files**

Groups, blocks, and variables in TRC files and A2L files are now sorted alphabetically. As a consequence, you might have to adapt your custom tools based on these files.

RTI Bypass Blockset

Migrating to RTI Bypass Blockset 2023-A

Additional migration steps in some cases

To migrate to the RTI Bypass Blockset 2023-A from versions earlier than the RTI Bypass Blockset 2022-B and reuse existing models, you might have to carry out additional migration steps. For more migration information, refer to [History of Migration Steps \(RTI Bypass Blockset Reference !\[\]\(9dfdaff1d86ba3c1f8353b4d1b61b8c5_img.jpg\)](#)).

Working with models from earlier RTI Bypass Blockset versions 2022-B, 3.x, and 2.x

The current Release contains RTI Bypass Blockset 2023-A, which is compatible with earlier blockset versions 2022-B, 3.x, and 2.x. However, there are some points to note:

- *Working with models from RTI Bypass Blockset 2.5 or earlier*

Data management was changed from the prior RTI Bypass Blockset versions. If you have a Simulink model that was built with RTI Bypass Blockset 2.5 or earlier and you open it with RTI Bypass Blockset 2023-A, the old Data Dictionary file (with the file name extension .dd) is replaced by a new Data Dictionary file (.vdb) using the information stored in the Setup block. This step is performed automatically when you open and close the Setup block dialog by clicking OK, or when you open the Read, Write, Upload, or Download block dialog and click Fill Variable Selector on the Variables page.

If you have a model that was saved with RTI Bypass Blockset 2023-A and want to use it with RTI Bypass Blockset 2.5 or earlier, the model's Data Dictionary file required for blockset version 2.5 or earlier (file name extension .dd) is created. This step is performed when you update the A2L files in the Setup block, or when you open the Read, Write, Upload, or Download block and click Fill Variable Selector on the Variables page. The Data Dictionary file created under RTI Bypass Blockset 2023-A (.vdb) remains on the disk.

To enable the RTI Bypass Blockset to create the Data Dictionary again, the database files specified in the Setup block must be unchanged and accessible at the specified location.

- *Working with models from RTI Bypass Blockset 2.6 up to and including RTI Bypass Blockset 2022-B*

If a Simulink model was built with RTI Bypass Blockset 2.6 up to RTI Bypass Blockset 2022-B and you open it with RTI Bypass Blockset 2023-A, the old Data Dictionary file is replaced by a new Data Dictionary file. However, the

new Data Dictionary file cannot be used in earlier RTI Bypass Blockset versions. If you want to reuse the model with RTI Bypass Blockset 2.6 up to and including RTI Bypass Blockset 2022-B, you have to create a suitable database in the earlier RTI Bypass Blockset version by reimporting the database files (A2L files) specified in the Setup block.

RTI CAN MultiMessage Blockset

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New Features of the RTI CAN MultiMessage Blockset 2023-A

New supported platform

The RTI CAN MultiMessage Blockset supports SCALEXIO systems with the new DS6344 CAN Board. The board provides 4 independent CAN/CAN FD channels. RTI CAN MultiMessage Blockset does not support the ISO 11898-2 CAN FD SIC transceiver type supported by the DS6344 CAN Board and therefore not CAN FD with SIC (signal improvement capability). However, you can use the ISO 11898-2 High-Speed CAN and the ISO11898-3 transceiver types with the DS6344 CAN Board.

Migrating to RTI CAN MultiMessage Blockset 2023-A

Planned discontinuation

RTI CAN MultiMessage Blockset for SCALEXIO is planned for discontinuation after Release 2024-B. For more information, refer to <https://www.dspace.com/go/elarTixxMMBS>.

RTI CAN MultiMessage Blockset should no longer be used in new SCALEXIO projects. For new projects, you are recommended to use the Bus Manager, which combines a multitude of functionalities in one tool.

Working with models from earlier RTI CAN MultiMessage Blockset versions

To reuse a model created with an earlier RTI CAN MultiMessage Blockset version, you must update the S-functions for all the RTICANMM blocks and save the model before modifying the CAN configuration.

To create new S-functions for all the RTICANMM blocks in a model in one step, you can perform one of the following actions after opening the model:

- In the MATLAB Command Window, enter `rtimmsu_update('System', bdroot)`.
For more information on the command and its options, enter `help rtimmsu_update` in the MATLAB Command Window.
- Select the Create S-Function for all CAN Blocks command from the Options menu of the [RTICANMM GeneralSetup \(RTI CAN MultiMessage Blockset Reference \[1\]\)](#) block.

For more information, refer to [Limitations with RTICANMM \(RTI CAN MultiMessage Blockset Reference \[1\]\)](#).

Identifying a J1939-compliant DBC file

The way a J1939-compliant DBC file is identified was changed in RTI CAN MultiMessage Blockset 2023-A:

- Up to and including RTI CAN MultiMessage Blockset 2022-B, RTI CAN MultiMessage Blockset checked an imported database file for the following J1939 attributes: *NmJ1939SystemInstance*, *NmJ1939System*, *NmJ1939ManufacturerCode*, *NmJ1939IndustryGroup*, *NmJ1939IdentityNumber*, *NmJ1939FunctionInstance*, *NmJ1939Function*, *NmJ1939ECUInstance*, *NmJ1939AAC*, *J1939PGPrio*, *J1939PGN*, *J1939PGDest*, *J1939PGSrc*. If any of these attributes were present in the imported DBC file, the database was identified as a J1939-compliant DBC file.
- As of RTI CAN MultiMessage Blockset 2023-A, RTI CAN MultiMessage Blockset evaluates the *VFrameFormat* attribute during import to identify J1939-compliant DBC files. If at least one message has the attribute value *J1939PG*, RTI CAN MultiMessage Blockset treats the imported database as a J1939-compliant DBC file.

Specifying the container message for a PGN

When you work with a J1939-compliant DBC file, you can specify to use the message with the shortest name as the container message for a PGN (refer to [General Settings Page \(RTICANMM MainBlock\) \(RTI CAN MultiMessage Blockset Reference \[1\]\)](#)). The specification of the container message when several messages meet the shortest name condition was changed in RTI CAN MultiMessage Blockset 2023-A.

- Up to and including RTI CAN MultiMessage Blockset 2022-B, if several messages fulfilled the condition of the shortest name, the message that is listed first in the DBC file was used.
- As of RTI CAN MultiMessage Blockset 2023-A, if several messages fulfill the condition of the shortest name, the one that comes first in ascending alphabetical order is used.

Additional migration steps in some cases

To migrate to the RTI CAN MultiMessage Blockset 2023-A from versions earlier than the RTI CAN MultiMessage Blockset 2022-B and reuse existing models, you might have to carry out additional migration steps. For more migration information, refer to [History of Migration Steps \(RTI CAN MultiMessage Blockset Reference !\[\]\(c507f772dba2b921f86777f01218e570_img.jpg\)\)](#).

RTI LIN MultiMessage Blockset

Migrating to RTI LIN MultiMessage Blockset 2023-A

Planned discontinuation

RTI LIN MultiMessage Blockset for SCALEXIO is planned for discontinuation after Release 2024-B. For more information, refer to <https://www.dspace.com/go/elarTlxxMMBS>.

RTI LIN MultiMessage Blockset should no longer be used in new SCALEXIO projects. For new projects, you are recommended to use the Bus Manager, which combines a multitude of functionalities in one tool.

Working with models from earlier RTI LIN MultiMessage Blockset versions

To reuse a model created with an earlier RTI LIN MultiMessage Blockset version, you must update the S-functions for all the RTILINMM blocks and save the model before modifying the LIN configuration.

To create new S-functions for all the RTILINMM blocks in a model in one step, you can perform one of the following actions after opening the model:

- In the MATLAB Command Window, enter `rtimmsu_update('System', bdroot)`.

For more information on the command and its options, enter `help rtimmsu_update` in the MATLAB Command Window.

- Select the Create S-Function for all LIN Blocks command from the Options menu of the [RTILINMM GeneralSetup \(RTI LIN MultiMessage Blockset Reference !\[\]\(c44db1e92ba1244b2894d325c806ff8a_img.jpg\)\)](#) block.

For more information, refer to [Limitations of RTI LIN MultiMessage Blockset \(RTI LIN MultiMessage Blockset Reference !\[\]\(bd3b31712ad9bab5a241210fa6925cdd_img.jpg\)\)](#).

SCALEXIO Firmware

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New Features of the SCALEXIO Firmware 23.1

New supported hardware

The SCALEXIO firmware supports the following new hardware:

- New SCALEXIO Real-Time PC

The new supported SCALEXIO Real-Time PC is the version 4.0 of the high-core performance line (HCP P04). It has an Intel® Core™ Processor i5-12500E that is mounted on a Kontron K3851-R mainboard. The real-time PC has 6 cores from which you can use 5 cores for real-time applications. The cores run with a frequency of 4.0 GHz.

- DS6344 CAN Board

The DS6344 CAN board is a standard I/O board for CAN communication. It can be used in SCALEXIO LabBox/AutoBox and I/O slot units of SCALEXIO racks. The board provides 4 independent CAN/CAN FD channels and supports CAN SIC (CAN signal improvement capability).

Hypervisor Extension

The Hypervisor Extension supports the new SCALEXIO Real-Time PC HCP P04.

Related topics

Basics

[DS6344 CAN Board \(SCALEXIO Hardware Installation and Configuration\)](#)

References

[Data Sheets of the SCALEXIO Real-Time PC \(SCALEXIO Hardware Installation and Configuration 📖\)](#)

Migrating to SCALEXIO Firmware 23.1

Migrating to the 64-bit Linux-based operating system

With dSPACE Release 2022-A, the default SCALEXIO firmware is a 64-bit Linux-based distribution. The following items built for dSPACE Release 2021-B and earlier are no longer compatible with the SCALEXIO system and must be (re-)built from source code based on dSPACE Release 2022-A or later:

- Real-time applications
- Binary libraries contained in model containers (i.e., SIC, BSC, FMU, and CTLGZ files)
- SIC and BSC files
- Binary libraries referenced by Simulink models
- Binary libraries referenced by ConfigurationDesk applications via custom code settings or custom I/O functions

Source code is expected to be reusable in most cases. Cases that might require an adaptation of C code are related to custom code that uses special features (e.g., OS-specific functions) created by your company or third-party suppliers.

Hypervisor Extension

If the new SCALEXIO Hypervisor Extension is installed, SCALEXIO real-time applications as well as Linux real-time and non-real-time applications created for dSPACE Release 2020-A and earlier can no longer be used. You must rebuild the SCALEXIO real-time applications and adapt Linux real-time and non-real-time applications to the new hypervisor, especially regarding interrupts, shared memory, and the assignment of hardware resources.

Discontinuations in SCALEXIO Firmware

Processing Unit

The SCALEXIO Processing Unit with the Intel® Core™ i7-860 Processor (Real-Time PC Version 1.0) is not supported by the SCALEXIO firmware as of version 6.0 (dSPACE Release 2022-A).

Planned discontinuation of 32-bit support

The 64-bit Linux-based real-time operating system (RTOS) is the default RTOS for a SCALEXIO system and the DS6001 Processor Board. The 32-bit Linux-based RTOS is still supported as legacy support. The support will be discontinued after dSPACE Release 2023-A.

SYNECT

Where to go from here**Information in this section**

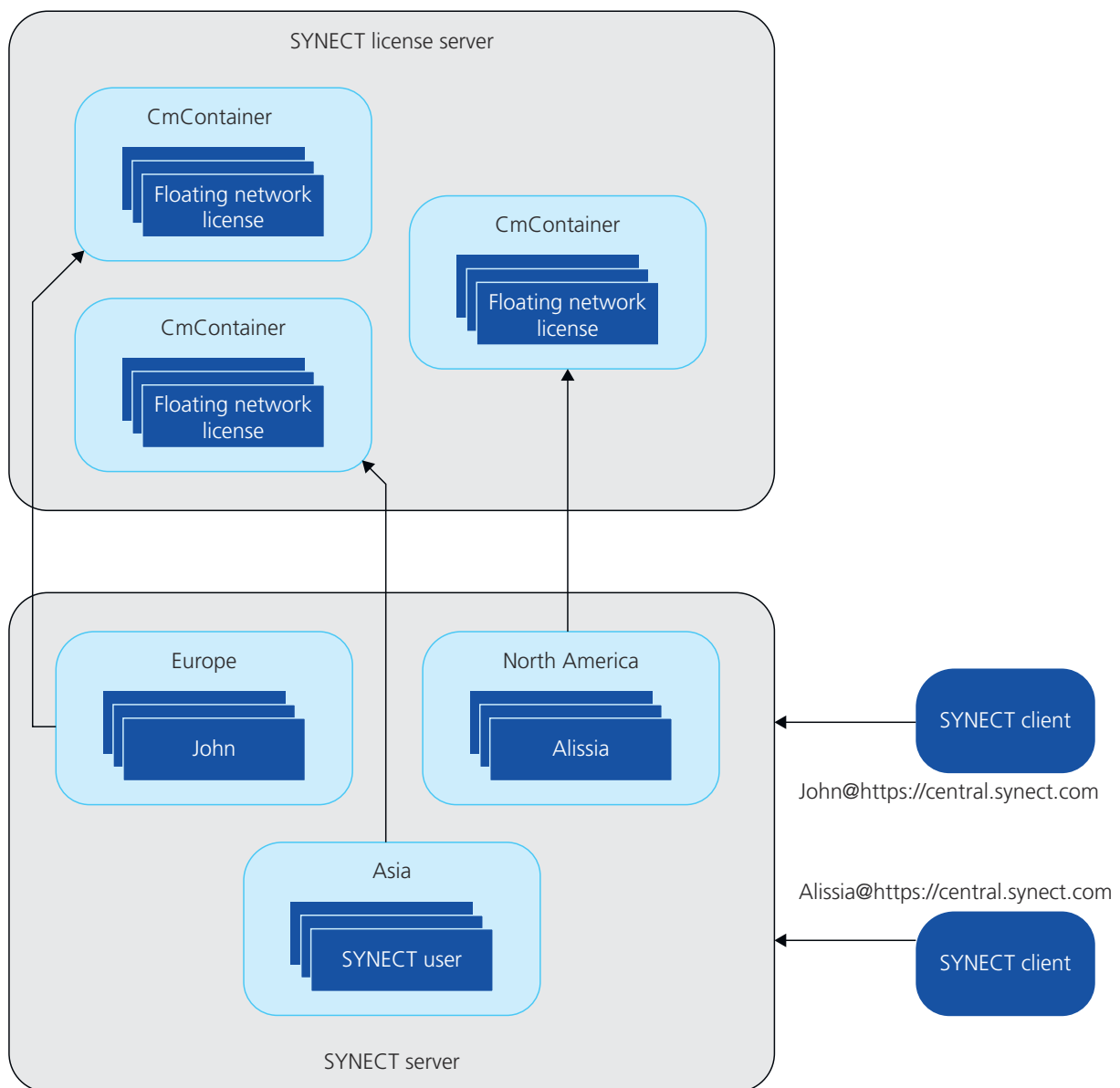
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New Features of SYNECT 2023-A

New Features

Improved license handling

You can now assign SYNECT user groups to CmContainers of the connected SYNECT License server. This lets you implement strategies such as region-specific or department-specific assignment of users to floating network licenses (FNL) on a central dSPACE license server.



The illustration above refers to a scenario where SYNECT users from different regions log on to SYNECT. Due to the assignment of SYNECT user groups to CmContainers, the users reserve floating network licenses from different CmContainers. User John of the Europe user group will reserve a floating network license from the CmContainer that is assigned to the Europe user group. User Alissia of the North America user group will reserve a SYNECT floating network license from the CmContainer that is assigned to the North America user group.

Refer to [Topologies for Using Licenses \(The SYNECT Server Guide !\[\]\(c507f772dba2b921f86777f01218e570_img.jpg\)\)](#).

Migrating to SYNECT 2023-A

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The data model did not change from SYNECT 2022-B to SYNECT 2023-A.	

Migrating to SYNECT 2023-A

Necessary steps

You do not have to migrate client API scripts, server API scripts, ECXML configurations, or other custom SYNECT-related files.

Migrating Databases

Introduction

To use the data from previous SYNECT versions with SYNECT 2023-A, you have to migrate the SYNECT database.

To migrate databases from SYNECT Versions 2.0 - 2022-B to SYNECT 2023-A, use the Database Migrator of SYNECT 2023-A.

Note

Contact dSPACE Support if you want to migrate SYNECT versions earlier than SYNECT 2.0. Refer to www.dspace.com/go/supportrequest.

For basic information and instructions on migrating databases, refer to [Migrating Databases from Previous SYNECT Versions \(The SYNECT Server Guide !\[\]\(a8f9309f944226d1420f5fed22e2b6e6_img.jpg\)](#)).

Data Model Changes from SYNECT 2022-B to SYNECT 2023-A

Introduction

The data model did not change from SYNECT 2022-B to SYNECT 2023-A.

VEOS

Where to go from here

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Provides an overview of the new features of VEOS 2023-A.	
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Provides information on the compatibility of VEOS 2023-A.	
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To migrate from VEOS 2022-B to VEOS 2023-A, you might have to perform certain migration steps.	
Discontinuations as of VEOS 2023-A	148
Provides information on the features discontinued as of VEOS 2023-A.	

New Features of VEOS 2023-A

Ethernet restbus simulation

The Windows version of VEOS now supports Ethernet restbus simulation. You can integrate Ethernet communication configured with the dSPACE Ethernet Configuration Package in a VEOS simulation.

In particular, VEOS supports simulation of service-oriented communication in SOME/IP (scalable service-oriented middleware over IP) networks of virtual ECUs (V-ECUs). SOME/IP and service-oriented communication play an important role in advanced driver assistance systems and automated driving, which are the domain of adaptive V-ECUs. Ethernet restbus simulation therefore is especially useful for testing this type of V-ECUs.

To prepare Ethernet restbus simulation on VEOS, you have to integrate corresponding bus simulation container (BSC) files created with the dSPACE Ethernet Configuration Package. For more information, refer to [Basics on Integrating Bus Simulation Containers \(BSCs\) \(VEOS Integrating the Simulation System !\[\]\(8bba887393ca45b761e5cb49e755e762_img.jpg\)](#)).

Building BSCs on Linux (VEOS Build Console)

You can now use the VEOS Build Console *on Linux* to build bus simulation container (BSC) files for VEOS.

For more information, refer to [VEOS Build Console Command Reference \(VEOS VEOS User Interfaces Reference !\[\]\(eafc244b53721dd1ec133f0772f70fc7_img.jpg\)](#)).

FMU: Manipulating incoming and outgoing signal values

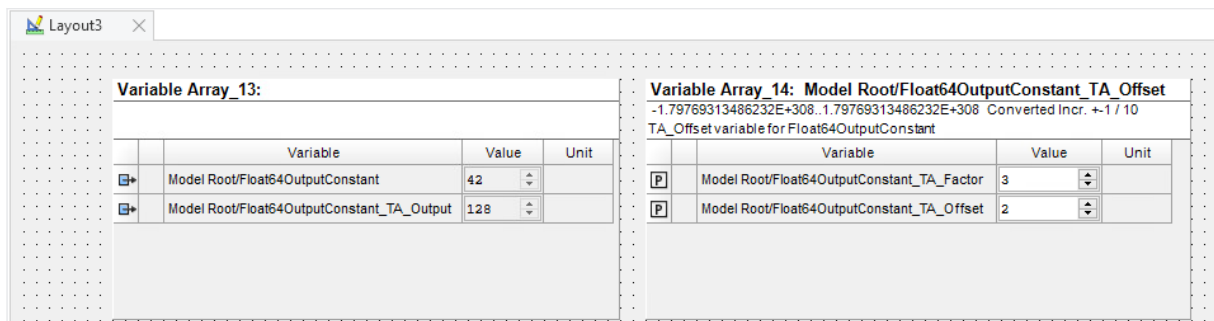
During FMU import, you can now specify whether to create additional *test access TRC file variables*.

If enabled:

- A **TA_Factor** and a **TA_Offset** TRC file parameter are created for each incoming and outgoing FMU signal.
- A **TA_Input** TRC file measurement variable is created for each incoming FMU signal.
- A **TA_Output** TRC file measurement variable is created for each outgoing FMU signal.

During simulation, you can use these variables to manipulate the inputs and outputs of an FMU, for example, with ControlDesk, without having to modify the original FMU. Test access variables can be used, e.g., for value conversions or for open-loop scenarios.

The following illustration shows a ControlDesk layout with the **Float64OutputConstant** outgoing signal and the related test access TRC file variables during simulation as an example:



For more information, refer to [TRC file entries for test access purposes \(VEOS Integrating the Simulation System !\[\]\(35dc653d59570f8f891c312eeece91a2_img.jpg\)](#)).

Support for MSVC compiler Version 14.3x

VEOS now supports Version 14.3x of the Microsoft Visual C/C++ Compiler for the HostPC32 and HostPC64 simulation targets. Version 14.3x is provided by Microsoft Visual Studio 2022.

Support for Version 14.2x provided by Microsoft Visual Studio 2019 is continued.

For more information, refer to [Simulation Target Manager \(VEOS VEOS User Interfaces Reference !\[\]\(b538fe54c1f3a7343e37e85cc2d00497_img.jpg\)](#)).

Getting the current OSA file path during simulation To access files that are located relative to the OSA file during VEOS simulation, you can now get the path of the OSA file currently loaded to VEOS.

For more information, refer to [Getting the Current OSA File Path During VEOS Simulation \(VEOS Manual !\[\]\(d84e7ea36f695d92cb39ec32c307ac93_img.jpg\)\)](#).

ISO 26262 certification The ISO 26262 specifies software tool qualification methods 1a to 1d for the qualification of software tools in relation to the use in ASIL projects.

VEOS is qualified according to method *1b) Evaluation of the tool development process* and *1c) Validation of the software tool*. Therefore, VEOS is qualified for use in ASIL projects up to ASIL D.

Compatibility of VEOS 2023-A

General compatibility dSPACE recommends using only software products from the same dSPACE Release. This ensures maximum run-time compatibility.

Supported compiler versions For information on supported compiler versions, refer to [Basics on Integrating the Simulation System \(VEOS Integrating the Simulation System !\[\]\(8d0f0e0fe25b320c33272c52aec1fbca_img.jpg\)\)](#).

Note

When you build model containers *in separate steps*, e.g., when you compile an existing model container in advance with the dSPACE Model Container Utility, dSPACE recommends you to use *compatible versions of the compiler and linker*. This ensures binary compatibility of the build result.

For more information, refer to [Ensuring Binary Compatibility When Building Model Containers \(VEOS Manual !\[\]\(3cb60d42b10e53f9522bb0b392c1c4cd_img.jpg\)\)](#).

Supported operating systems VEOS is available for Windows and Linux. For information on the supported distributions, refer to [Operating System](#) on page 151.

Virtualizing VEOS For information on virtualizing VEOS for cloud/cluster environments, refer to [Virtualization of VEOS \(VEOS Manual !\[\]\(51514032c8ca341817228f39f1307b05_img.jpg\)\)](#).

BSC file compatibility

The following table shows the compatibility between VEOS 2023-A and bus simulation container (BSC) files:

BSC Files Created With ...	BSC Version
dSPACE Release 2023-A: ▪ Bus Manager 2023-A	1.12
dSPACE Release 2022-B: ▪ Bus Manager 2022-B	1.11
Ethernet Configuration Package For detailed and up-to-date compatibility information regarding the Ethernet Configuration Package, refer to: http://www.dspace.com/go/ethcpinfo .	

- If a BSC file was generated *with an SIC file*, the target architecture selected for SIC file generation specifies the simulation targets available to the VEOS build process.
Refer to [Basics on Simulink Implementation Containers \(Model Interface Package for Simulink - Modeling Guide\)](#).
- If a BSC file was generated *without an SIC file*, you can select any simulation target supported by the Simulation Target Manager.

FMU file compatibility

VEOS supports Functional Mock-up Units (FMUs) that comply with the following FMI standard versions:

- FMI 2.0
- FMI 3.0

For more information on the FMI 3.0 release, refer to <https://fmi-standard.org/news/2022/05/10/fmi-3.0-release.html>.

For detailed and up-to-date compatibility information on dSPACE FMI support, refer to:

<http://www.dspace.com/go/FMI-Compatibility>.

OSA file compatibility

The following table shows the compatibility between VEOS 2023-A and offline simulation application (OSA) files:

OSA Files Created with Products Of ...	OSA Version
dSPACE Release 2023-A	23.1
dSPACE Release 2022-B	22.2 ¹⁾
dSPACE Release 2022-A	5.4 ¹⁾
dSPACE Release 2021-B	5.3 ¹⁾

- ¹⁾ You cannot modify the properties of VPUs contained in an OSA file if you open the OSA file in a later VEOS version than the version with which the OSA file was originally created. However, you can edit port and network connections and enable/disable experimentation services. It is recommended that you rebuild the binary OSA files from existing model implementation container files (BSC, FMU, SIC, VECU) when you migrate from one VEOS version to another.

SIC file compatibility

The following table shows the compatibility between VEOS 2023-A and Simulink implementation container (SIC) files:

SIC Files Created With ...	SIC Version ¹⁾
dSPACE Release 2023-A: <ul style="list-style-type: none"> Model Interface Package for Simulink 2023-A TargetLink 2022-B 	1.12
dSPACE Release 2022-B: <ul style="list-style-type: none"> Model Interface Package for Simulink 2022-B TargetLink 2022-B 	1.11 ²⁾
dSPACE Release 2022-A: <ul style="list-style-type: none"> Model Interface Package for Simulink 22.1 TargetLink 5.2 	1.10 ²⁾
dSPACE Release 2021-B: <ul style="list-style-type: none"> Model Interface Package for Simulink 4.6 TargetLink 5.2 	1.10 ²⁾

1) The target architecture selected for SIC file generation specifies the simulation targets available to the VEOS build process. Refer to [Basics on Simulink Implementation Containers \(Model Interface Package for Simulink - Modeling Guide\)](#).

2) If the SIC file is created with a previous dSPACE Release and if the SIC file contains an ASM model, you cannot simulate the model in VEOS 2023-A (dSPACE Release 2023-A). For more information, refer to [Migrating ASM Models \(VEOS New Features and Migration\)](#).

SMC file compatibility

The following table shows the compatibility between VEOS 2023-A and system model container (SMC) files:

SMC Files Created With ...	SMC Version
dSPACE Release 2023-A: <ul style="list-style-type: none"> VEOS 2023-A 	1.2
dSPACE Release 2022-B: <ul style="list-style-type: none"> VEOS 2022-B 	1.2
dSPACE Release 2022-A: <ul style="list-style-type: none"> SYNECT 2.13 VEOS 5.4 	1.2
dSPACE Release 2021-B: <ul style="list-style-type: none"> SYNECT 2.12 VEOS 5.3 	1.2

You also have to consider the following compatibility restrictions of the individual container files contained in the SMC file to be imported: If the SMC file contains a container of an unsupported version, VEOS 2023-A imports neither the unsupported container nor the connections to the application process based on the unsupported container.

VECU file compatibility

The following table shows the compatibility between VEOS 2023-A and V-ECU implementation container (VECU) files:

V-ECU Implementations Created With...	V-ECU Implementation Version
dSPACE Release 2022-B and 2023-A: <ul style="list-style-type: none"> SystemDesk 2022-B TargetLink 2022-B 	3.2
dSPACE Release 2022-A and 2021-B: <ul style="list-style-type: none"> SystemDesk 5.6 TargetLink 5.2 	3.1
dSPACE Release 2021-A and 2020-B: <ul style="list-style-type: none"> SystemDesk 5.5 TargetLink 5.1 	3.0

Real-Time Testing compatibility

To use RTT in connection with VEOS and ControlDesk, the Real-Time Testing (RTT) version used by the VEOS Simulator that runs the simulation system and the RTT version that is active on the PC must be identical.

The following table shows the VEOS Simulator version and the corresponding RTT version:

VEOS Simulator	RTT Version
... of VEOS 2023-A	Real-Time Testing Version 2023-A
... of VEOS 2022-B	Real-Time Testing Version 2022-B
... of VEOS 5.4	Real-Time Testing Version 5.2
... of VEOS 5.3	Real-Time Testing Version 5.1
... of VEOS 5.2	Real-Time Testing Version 5.0
... of VEOS 5.1	Real-Time Testing Version 4.4
... of VEOS 5.0	Real-Time Testing Version 4.3

ControlDesk 2023-A automatically uses the VEOS Simulator of VEOS 2023-A. You can therefore use RTT in connection with VEOS and ControlDesk if Real-Time Testing Version 2023-A is active on the PC.

AUTOSAR Adaptive Platform compatibility

For the simulation of AUTOSAR adaptive V-ECUs, VEOS 2023-A is compatible with the following release of the AUTOSAR Adaptive Platform:

- R20-11

Related topics**Basics**

[Ensuring Binary Compatibility When Building Model Containers \(VEOS Manual !\[\]\(f60b7a900783ac3fd531bfd9c111be6d_img.jpg\)\)](#)
[Hypervisor Configuration for Adaptive V-ECU Simulation on Windows \(VEOS !\[\]\(fe5cf1978663f480c504f8fc2019fe62_img.jpg\)\)](#)
[Working with Adaptive V-ECUs !\[\]\(3251ba33ee7a8fbbf21e8e8207062a79_img.jpg\)\)](#)

Migrating to VEOS 2023-A

Introduction

To migrate from VEOS 2022-B to VEOS 2023-A, you might have to perform certain migration steps.

Note

To migrate to VEOS 2023-A from versions earlier than 2022-B, you might also have to perform the migration steps of the intervening VEOS versions.

Changes to the automation interface of the VEOS Player as of VEOS 2023-A

As of VEOS 2023-A, VEOS is developed using the .NET 6 framework. As a consequence, if you use the COM automation interface of the VEOS Player, you might have to adapt your automation scripts.

You can no longer access types that were previously defined in the .NET FullFramework core library, e.g., `System.Guid` or Serializable Exceptions, using the COM automation interface of the VEOS Player.

Exception handling changes When you use the COM automation interface of the VEOS Player, you can no longer catch automation exceptions via `VeosPlayerAutomationException`. Instead, you can access exceptions via `System.ApplicationException` provided by .NET 6.

When you access VEOS Player exceptions via `System.ApplicationException`, however, the exception type is no longer available for further exception handling. Nevertheless, any information that caused the exception, i.e., the message itself or malformed parameters, is still available.

System.Guid no longer supported The `System.Guid` property type is no longer supported as of VEOS 2023-A.

As a consequence, the following properties of VEOS Player automation interfaces are deprecated:

- `Id` property of the `IBusChannel` interface
- `Id` property of the `IBusCluster` interface

Using these properties results in a `NotSupportedException`.

Setting string properties to an unset value no longer supported You can no longer set string properties to an *unset value*, e.g., `None` in Python or `NULL` in C++. Unset values are not handled correctly by the .NET Runtimes and result in an exception.

Workaround for Python:

Instead of the `None` value, use `Nothing` value from the `pythoncom` module.

Migrating ASM models

You cannot simulate an ASM model on VEOS if the model is contained in an OSA or SIC file that was created with a dSPACE Release earlier than the one to which your VEOS installation belongs.

To simulate an ASM model that was last saved with a dSPACE Release earlier than the dSPACE Release to which your VEOS version belongs, perform the following steps:

1. Migrate the ASM model to the dSPACE Release to which your VEOS version belongs.

For information on migrating ASM models, refer to [Migrating ASM Models \(ASM User Guide !\[\]\(dfbd6b3763a6d1d9afaa974f64e2e4b5_img.jpg\)](#)).

2. Generate a Simulink implementation container (SIC) file on the basis of the ASM model by using the *Model Interface Package for Simulink*.

For instructions, refer to [Generating Simulink Implementation Containers \(Model Interface Package for Simulink - Modeling Guide !\[\]\(23d9fc146e83b5c3013cfa32c784f8d5_img.jpg\)](#)).

3. Import the SIC file to the VEOS Player of your VEOS version.

For instructions, refer to [Basics on Integrating Simulink Implementation Containers \(SICs\) \(VEOS Integrating the Simulation System !\[\]\(ec9132f1d27c8919987d92907322654d_img.jpg\)](#)).

Migrating from earlier VEOS versions

To migrate from earlier VEOS versions and reuse existing offline simulation applications, you might have to carry out additional migration steps. For more information on the migration steps, refer to [Migrating from Prior Versions of VEOS \(VEOS Manual !\[\]\(aa53ad6fea213b8b2226d3077e30533a_img.jpg\)](#)).

Discontinuations as of VEOS 2023-A

Simulating with VEOS 4.0 ... 4.4

When VEOS 2023-A or later is installed, performing offline simulations on the same PC will no longer be possible with the following VEOS versions:

- VEOS 4.0 from dSPACE Release 2017-A
- VEOS 4.1 from dSPACE Release 2017-B
- VEOS 4.2 from dSPACE Release 2018-A
- VEOS 4.3 from dSPACE Release 2018-B
- VEOS 4.4 from dSPACE Release 2019-A

Building and configuring an offline simulation application with these versions, however, is not affected and remains possible.

Compatibility Information

Where to go from here

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Supported MATLAB Releases

MATLAB®/Simulink®

Various dSPACE products require a MATLAB installation on the host PC.

Tip

For system requirements of MathWorks® software, refer to <https://www.mathworks.com/support/sysreq.html>.

MATLAB Release...	...Is Supported by dSPACE Release 2023-A						
	RCP and HIL 2023-A ^{1), 2)}	ConfigurationDesk 2023-A ³⁾	AutomationDesk 2023-A ⁴⁾	TargetLink 2022-B	Model Compare 2022-B	dSPACE Python Extensions 2023-A ⁵⁾	XIL API .NET MAPort 2023-A
R2023a	✓ ⁶⁾	✓	✓	—	—	✓	✓
R2022b	✓ ⁶⁾	✓	✓	✓	✓	✓	✓
R2022a	✓ ⁶⁾	✓	✓	✓	✓	✓	✓
R2021b	✓ ⁷⁾	✓	✓	✓	✓	✓	✓
R2021a	—	—	—	✓	✓	—	—

- 1) 'RCP and HIL software' is a generic term for a software package containing several dSPACE software products, for example, ASM, Model Interface Package for Simulink, RTI, and ModelDesk. These software products are installed in a common folder. As of dSPACE Release 2023-A, ConfigurationDesk is no longer part of the RCP and HIL software package. It is installed in its own folder.
- 2) MATLAB/Simulink Student Suite is not supported by Automotive Simulation Models (ASM).
- 3) ConfigurationDesk requires Model Interface Package for Simulink (part of the RCP and HIL software package) for a connection to MATLAB and to work with Simulink models. Thus, the RCP and HIL software installation defines the MATLAB support for ConfigurationDesk.
- 4) The AutomationDesk MATLAB Access Library requires MATLAB.
- 5) matlplib2 of dSPACE Python Extensions requires MATLAB.
- 6) R2023a, R2022b, and R2022a are not supported by the FPGA Programming Blockset 23.1 – FPGA Interface. For a workaround, refer to <http://www.dspace.com/faq?295>.
- 7) R2021b is supported by Automotive Simulation Models (ASM) only if at least R2021b Update 3 is used.

For up-to-date information on additional MATLAB releases that can be used in combination with dSPACE software, refer to <https://www.dspace.com/go/MATLABCompatibility>.

Operating System

Windows operating system on host PC

The dSPACE products of dSPACE Release 2023-A support the following operating systems:

- The following editions, channels, and servicing options of Windows 10:
 - Windows 10 Professional, Education, and Enterprise (64-bit versions)
The Windows 10 Home and Windows 10 S editions are not supported.
 - Long-Term Servicing Channel: LTSC 2019 and LTSC 2021
 - General Availability Channel (replaces the previous Semi-Annual Channel):
The compatibility statement of Microsoft applies. This means that newer versions released in this channel should be compatible with all previous versions. dSPACE used the 22H2 version of the General Availability Channel for testing.
- The following editions, channels, and servicing options of Windows 11:
 - Windows 11 Professional, Education, and Enterprise
The Windows 11 Home edition is not supported.
 - General Availability Channel: The compatibility statement of Microsoft applies. This means that newer versions released in this channel should be compatible with all previous versions. dSPACE used the 21H2 and 22H2 versions of the General Availability Channel for testing.

Note

While testing our products under Windows 11 22H2, a few issues occurred whose cause and remedy are not the responsibility of dSPACE. For details, refer to <https://www.dspace.com/go/Win11GAC22H2>.

- Windows Server LTSC 2019 Standard and Datacenter editions, each with the Desktop Experience installation option. Only the listed editions are supported. The Windows Server 2019 Essentials edition is not supported.
- Windows Server LTSC 2022 Standard and Datacenter editions, each with the Desktop Experience installation option. Only the listed editions are supported. The Windows Server 2022 Essentials edition is not supported.
Not supported by TargetLink, Model Compare and SystemDesk.

Some limitations apply when you use dSPACE software in conjunction with features of Windows. Refer to [Limitations for Using Windows Features](#) on page 158.

Support of Windows Docker You can also run some dSPACE products in a Windows Docker container. For more details, contact dSPACE Support (<https://www.dspace.com/go/supportrequest>).

Linux operating system on host PC

The dSPACE products of dSPACE Release 2023-A with Linux compatibility support the following operating system:

- Ubuntu 20.04 LTS with the General Availability Kernel in the Desktop, Server, and Cloud version each based on the AMD 64-bit processor architecture.
- Ubuntu 18.04 LTS is no longer supported.

Some limitations apply when you use dSPACE software in conjunction with features of Linux. Refer to [Limitations for Using Linux Features](#) on page 160.

Support of Linux Docker You can also run the dSPACE products with Linux compatibility in a Linux Docker container. For more details, contact dSPACE Support (<https://www.dspace.com/go/supportrequest>).

Using MicroAutoBox Embedded PC as host PC

ControlDesk can also be installed on:

- MicroAutoBox III Embedded PC, running on Microsoft® Windows® 10 IoT Enterprise LTSC 2019, 64-bit version

Operating system on SYNECT server

The SYNECT server supports the following operating systems:

- The same operating systems as listed above for all dSPACE products of dSPACE Release 2023-A.
- Windows Server 2016

Operating system on server for floating network licenses

If you purchased floating network licenses, you have to specify one of the network PCs as a license server. Any PC with CodeMeter Runtime software can be used as a license server.

Valid for servers without dSPACE software You can use operating systems from Microsoft Windows on a license server in combination with protected dSPACE software.

Note

- If you want to use Ubuntu Linux as operating system for the license server, contact dSPACE Support (www.dspace.com/go/supportrequest).
- Other operating systems are not tested. You can use them at your own risk. dSPACE does not provide support in this case.

Valid for servers with dSPACE Installation Manager dSPACE Installation Manager supports the same operating systems as the other dSPACE software products described above.

Allowing communication

Installing of additional firewall rules Additional Windows firewall rules are installed during the installation of various dSPACE software products. For example, one rule allows communication with a dSPACE expansion box, such as AutoBox. Another rule allows MotionDesk to receive motion data from a network channel. These example rules are created by the following commands:

- `netsh advfirewall firewall add rule name="dSPACE Net Service" service=any dir=in action=allow profile=any protocol=icmpv4:0, any description="Allow the dSPACE Net Service to connect to a dSPACE expansion box via network."`

- `netsh advfirewall firewall add rule name="dSPACE MotionDesk" program=<main installation path>\dSPACE MotionDesk 2023-A\MotionDesk\Bin\MotionDesk.exe" dir=in action=allow profile=any description="Allow dSPACE MotionDesk to receive motion data via network."`

Required open TCP/IP network ports If you are using third-party firewall software on your host PC, ensure that the TCP/IP communication of dSPACE software is not blocked:

- VEOS requires the following open TCP/IP network ports:
 - For Windows: 111 (TCP and UDP), 3702 (UDP), 7214 (TCP and TCP6), 7215 (TCP and UDP), 7216 (TCP), 8090 (TCP), 9923 (UDP), 49152 ... 65535 (TCP, TCP6 and UDP)
 - For Linux: 111 (TCP and UDP), 7215 (TCP and UDP), 7216 (TCP), 8090 (TCP), 9923 (UDP), 32768 ... 60999 (TCP, TCP6 and UDP)
- MotionDesk requires the following open TCP/IP network port: 15000 (UDP)
- ConfigurationDesk used together with one or more connected MATLAB installations requires up to 10 open TCP/IP network ports in the range 49196 ... 49205 (TCP):
 - Whenever a connected MATLAB is started, the first available port from the specified range is taken.
 - When ConfigurationDesk is started, it also uses the first free port from the specified range.
 - If ConfigurationDesk is not running or no MATLAB instance is running, then no ports from the specified range are used.
- dSPACE Installation Manager and CodeMeter licensing software require the following open TCP/IP network ports:
 - 22350 (TCP and UDP) for communication in a LAN network (if not changed from the default setting).
 - 22352 (TCP and UDP): To access CodeMeter WebAdmin via http.
 - 22353 (TCP and UDP): To access CodeMeter WebAdmin via https.
- dSPACE Help requires an open TCP/IP network port for interprocess communication between its components. The default port number is 11000. If this port number is already being used, another free port is used automatically. The related processes can be identified by the following prefixes: `HelpAbsLayer<xxx>`, `HelpInstaller<xxx>`.

Using dSPACE Software on Virtual Machines (VMs)

Introduction

You can operate several dSPACE products installed on virtual machines. However, some dSPACE products support VMs only with limitations, and other dSPACE products cannot be operated on VMs at all.

Usage restrictions

Note

The dSPACE End User License Agreement (EULA) prohibits:

- Using a virtual machine for circumventing license protection mechanisms, for multiple use of an acquired license or for use outside the use determined by the license type.

If you have any questions or encounter any problems, contact dSPACE Support (www.dspace.com/go/supportrequest).

Recommended virtual machine software

dSPACE tests the functionality of dSPACE software products with current VMware products and VM hardware compatibility version 10 and version 13. You can use Windows, Linux, or macOS® as the host operating system.

Support of dSPACE software on virtual machines

Note

The following table shows the compatibility for all dSPACE products. For products that support VMs with limitations, the known limitations are listed. For these products, further limitations might apply depending on the use case.

Product	Full Support	Support with Known Limitations	No Support
AutomationDesk	—	✓ Known limitations: <ul style="list-style-type: none"> ▪ Access to DS1006 modular systems via dSPACE link boards is not possible. ▪ Access to DS1006 modular systems via Ethernet connection and slot CPU: Communication and therefore performance is very low. ▪ Access to DS1104 R&D Controller Boards is not possible. 	—
Automotive Simulation Models	✓	—	—
Bus Manager (stand-alone)	✓	—	—
Calibration API package	✓	—	—
ConfigurationDesk	✓	—	—
ControlDesk	—	✓ Known limitations: <ul style="list-style-type: none"> ▪ Access to DS1006 modular systems via dSPACE link boards is not possible. ▪ Access to DS1006 modular systems via Ethernet connection and slot CPU: Communication and therefore performance is very low. ▪ Access to DS1104 R&D Controller Boards is not possible. 	—
Data Dictionary Manager	✓	—	—
DCI Configuration Tool	✓	—	—
dSPACE AUTOSAR Compare	✓	—	—
dSPACE Bus API Package	—	✓ Known limitations: <ul style="list-style-type: none"> ▪ The usage of USB interfaces is not supported. 	—

Product	Full Support	Support with Known Limitations	No Support
dSPACE CAN API Package	—	✓ Known limitations: <ul style="list-style-type: none"> ▪ The usage of USB interfaces is not supported. 	—
dSPACE ECU Flash Programming Tool	✓	—	—
dSPACE FlexRay Configuration Package	✓	—	—
dSPACE Installation Manager	✓	—	—
ECU Interface Manager	✓	—	—
ECU bypassing target compiler	✓	—	—
Failure Simulation	—	✓ Known limitations: <ul style="list-style-type: none"> ▪ Access to DS1006 modular systems via dSPACE link boards is not possible. ▪ Access to DS1006 modular systems via Ethernet connection and slot CPU: Communication and therefore performance is very low. ▪ Access to DS1104 R&D Controller Boards is not possible. 	—
Firmware Archives	—	✓ Known limitations: <ul style="list-style-type: none"> ▪ Access to DS1006 modular systems via dSPACE link boards is not possible. ▪ Access to DS1006 modular systems via Ethernet connection and slot CPU: Communication and therefore performance is very low. ▪ Access to DS1104 R&D Controller Boards is not possible. 	—
Firmware Manager			
FPGA Programming Blockset	—	✓ Known limitations: <ul style="list-style-type: none"> ▪ Access to DS1006 modular systems via dSPACE link boards is not possible. ▪ Access to DS1006 modular systems via Ethernet connection and slot CPU: Communication and therefore the performance is very low. ▪ Access to DS1104 R&D Controller Boards is not possible. 	—
Model Compare	✓	—	—
Model Container Utility	✓	—	—
ModelDesk	—	✓ Known limitations: <ul style="list-style-type: none"> ▪ The Traffic Object Manager cannot show custom sensor points in the preview. ▪ Plotting occasionally does not start if a start trigger is used. 	—
Model Interface Package for Simulink	✓	—	—
MotionDesk	—	—	✓ ¹⁾
Platform API Package	—	✓ Known limitations: <ul style="list-style-type: none"> ▪ Access to DS1006 modular systems via dSPACE link boards is not possible. ▪ Access to DS1006 modular systems via Ethernet connection and slot CPU: Communication and therefore performance is very low. ▪ Access to DS1104 R&D Controller Boards is not possible. 	—

Product	Full Support	Support with Known Limitations	No Support
Real-Time Testing	—	✓ Known limitations: <ul style="list-style-type: none"> ▪ Access to DS1006 modular systems via dSPACE link boards is not possible. ▪ Access to DS1006 modular systems via Ethernet connection and slot CPU: Communication and therefore performance is very low. ▪ Access to DS1104 R&D Controller Boards is not possible. 	—
RTI Blocksets (Real-Time Interface)	—	✓ Known limitations: <ul style="list-style-type: none"> ▪ Access to DS1006 modular systems via dSPACE link boards is not possible. ▪ Access to DS1006 modular systems via Ethernet connection and slot CPU: Communication and therefore the performance is very low. ▪ Access to DS1104 R&D Controller Boards is not possible. 	—
SYNECT	✓	—	—
SYNECT Server	✓	—	—
SYNECT License Server	✓	—	—
SystemDesk	✓	—	—
TargetLink	✓	—	—
VEOS	✓ ²⁾	—	—

1) VMs do not fulfill the requirements for graphics adapters.

2) If you want to simulate adaptive AUTOSAR V-ECUs, refer to [Hypervisor Configuration for Adaptive V-ECU Simulation on Windows \(VEOS Manual !\[\]\(dfbd6b3763a6d1d9afaa974f64e2e4b5_img.jpg\)](#)).

Required knowledge for setting up a virtual machine

To set up a virtual machine, you must have knowledge about the technology of VMs.

In virtual environments, significantly higher latencies and lower network performance (network throughput) must be expected compared to physical PCs. dSPACE has no influence on this.

Using virtual machines in parallel If you use multiple VMs simultaneously on one PC, sharing of host resources such as CPU, network, and disk I/O bandwidth can cause timing issues. dSPACE recommends using a physical PC if high performance is required by an application.

Using a virtual machine on the host PC

System requirements PCs that host virtual machines with dSPACE software, must meet at least the requirements listed in [Appendix: System Requirements \(Installing dSPACE Software !\[\]\(aa53ad6fea213b8b2226d3077e30533a_img.jpg\)](#)). You are recommended to use a PC with more resources so that the software runs smoothly on a VM, because the VM software itself uses up some of the resources:

- The CPU speed and RAM size must be sufficient to run the operating system and the software on the host PC as well as the guest operating system and the application software on the VM.
- You also require sufficient free disk space to install the VM software and the software you want to run, just as you would if you were installing it directly on your PC.

Connecting dongle-based devices If you use dongle-based single-user licenses to use dSPACE software, you first have to connect the CmDongle to the host PC. Then you have to connect the WIBU-Systems CodeMeter-Stick device to the virtual machine on the host PC. For instructions, refer to the documentation of the VM software you use.

Using floating network licenses If you use floating network licenses, the virtual machine requires access to the dSPACE License Server. For further instructions, refer to [How to Set up a Connection Between Client and Server \(Working with CodeMeter Licensing Technology\)](#) (📖).

Optimal display of dSPACE Help For an optimal display of the content in dSPACE Help, you have to activate the ClearType setting in the VM (= default setting).

You can access this setting from the Windows Start menu (Start – Control Panel – Appearance and Personalization – Display – Adjust ClearType text).

Using the 'Revert to snapshot' feature

NOTICE

Using the 'Revert to snapshot' feature causes licenses to become invalid.

If you use the 'Revert to snapshot' feature in a VM, all software-based CmContainers on your host PC (dSPACE Activation Container and/or dSPACE Borrow Container) become invalid and the contained licenses are lost.

- Do not use the 'Revert to snapshot' feature for VMs that contain software-based CmContainers with activated licenses.
- Store the license information on CmDongles. There, the CmContainers do not become invalid after use the 'Revert to snapshot' feature.

Moving the virtual machine to a host PC with a different hardware configuration

NOTICE

Moving the virtual machine to a PC with a different hardware configuration causes licenses to become invalid.

If you move your virtual machine to a host PC with a different hardware configuration, all software-based CmContainers on your host PC (dSPACE Activation Container and/or dSPACE Borrow Container) become invalid and the contained licenses are lost. This happens, for example, if the CPU type of the physical PC changes.

- Do not move a virtual machine that contains software-based CmContainers with activated licenses to a host PC with a different hardware configuration.
- Store the license information on CmDongles. There, the CmContainers do not become invalid after the virtual machine is moved.
- However, if moving the virtual machine is absolutely necessary, contact dSPACE Support (www.dspace.com/go/supportrequest) beforehand to find solutions that can avoid major downtimes.

Run-Time Compatibility of dSPACE Software

Definition	Run-time compatibility means that: <ul style="list-style-type: none">▪ dSPACE products can be used in parallel after software installation, even if they are installed in different folders.▪ dSPACE products without interaction can run independently of each other.
-------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Compatibility of products in dSPACE Release 2023-A	<p>dSPACE recommends using only software products from the same dSPACE Release. This ensures maximum run-time compatibility.</p> <p>Observe the following points:</p> <ul style="list-style-type: none">▪ Limitations regarding run-time compatibility in the dSPACE tool chain might occur if products from different dSPACE Releases are used together. If dSPACE products interact directly (through automation interfaces) or indirectly (through common file types like A2L), limitations might apply. For minor limitations, refer to the relevant product documentation. The major limitations are described hereafter. <p>In rare cases, an additional patch must be installed for a product to achieve run-time compatibility. For more information on the patch and whether a patch is required, refer to https://www.dspace.com/go/CompPatch.</p> <ul style="list-style-type: none">▪ RCP and HIL software products (of Release 2023-A) cannot be used in combination with RCP and HIL software products from earlier dSPACE Releases.
-----------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Combining dSPACE products from earlier Releases	For notes on the combined use of different products from earlier Releases, refer to https://www.dspace.com/go/ds_sw_combi .
--------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Limitations for Using Windows Features

Motivation	Some limitations apply to using dSPACE software in conjunction with features of Windows.
-------------------	------------------------------------------------------------------------------------------

Installing and running dSPACE software within the Windows service accounts	Non-service-based dSPACE software is not designed to be installed or run in the context of any predefined Windows service account (LocalService, NetworkService, LocalSystem).
-----------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Fast user switching not supported	dSPACE software does not support the fast user switching feature of Windows.
------------------------------------------	------------------------------------------------------------------------------

Closing dSPACE software before PC shutdown	The shutdown process of Windows operating systems might cause some required processes to be aborted although they are still being used by dSPACE software. To avoid a loss of data, it is recommended that you close the dSPACE software manually before shutting down the PC.
User Account Control	It is recommended that you disable the Windows User Account Control (UAC) during the installation of dSPACE software. If you cannot disable UAC, note the following Windows behavior: If UAC is enabled, the setup programs use the administrator account instead of the user account. Therefore, it is important that the administrator account has access to the required drives, particularly the required network drives.
USB devices	If you connect dSPACE USB devices that use cables with optoisolation to the PC for the first time, there might be a message that the device driver software was not installed successfully. However, the dSPACE device will work properly later on.
Using high-DPI monitors	The following dSPACE software products have limitations for working with high-DPI monitors: <ul style="list-style-type: none">▪ SYNECT: If you use high-DPI monitors, the SYNECT graphical user interface might not be displayed properly in some cases, but this does not cause functional limitations.▪ Real-Time Testing: The Real-Time Test Manager, the user interface for handling RTT sequences, does not support working with high-DPI monitors.
High-contrast mode not supported	dSPACE software was not developed for or tested against the Windows high-contrast mode. You are recommended to disable the high-contrast mode when working with dSPACE software. Otherwise, the visualization of the user interfaces might be impaired.
FIPS support	dSPACE software was not developed for or tested against the FIPS PUB 140-2 U.S. government computer security standard (Security Requirements for Cryptographic Modules). For more information on FIPS, refer to https://docs.microsoft.com/en-us/windows/security/threat-protection/fips-140-validation .
Long paths	dSPACE software does not support the long path syntax of the Windows API. If a path that exceeds 260 characters is used directly or indirectly, the behavior of the dSPACE software is not defined.

Enabling Windows 8dot3name creation option**Note**

It is strongly recommended that the Windows 8dot3name creation option is enabled for all drives (drives used for installation and drives used for work) before you install third-party software, such as MATLAB®/Simulink®, and the dSPACE software.

If the option is disabled during software installation, serious errors can occur when you run the dSPACE software. For example, the build process might be aborted. To repair an installation that was installed while the 8dot3name creation option was disabled, you have to install dSPACE software and required third-party software again.

For instructions on checking the setting and enabling the option, refer to <https://www.dspace.com/faq?346> or to the Microsoft Windows documentation.

Settings in Windows for user locale and system locale must match

MATLAB reads the user locale and system locale settings that are specified in Windows operating systems. The user locale and the system locale must match. If these settings are not the same, the system might not behave as expected when working with MATLAB and dSPACE software.

For instructions on checking and changing the settings, refer to https://www.mathworks.com/help/matlab/matlab_env/setting-locale-on-windows-platforms.html?s_tid=gn_loc_drop.

This affects all MATLAB versions and all Windows operating systems, that are supported by dSPACE.

Limitation for using single-user licenses

If you use a PC with a Windows Server operating system, for example, Windows Server 2019, and you want to work with dSPACE software on this PC using Microsoft Remote Desktop Connection, you have to use a floating network license to activate license-protected software. Single-user licenses are not supported in this case.

Limitations for Using Linux Features

FIPS support

dSPACE software was not developed for or tested against the FIPS PUB 140-2 U.S. government computer security standard (Security Requirements for Cryptographic Modules). For more information on FIPS, refer to:

- Ubuntu 20.04 LTS: <https://ubuntu.com/blog/fips-certification-ubuntu-20-04-lts>

Long paths

dSPACE software does not support the available path length of 4,096 characters. If a path that exceeds 260 characters is used directly or indirectly, the behavior of the dSPACE software is not defined.

Locale

dSPACE software was tested only on a system with a US English locale.

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