dSPACE Calibration System

New Features and Migration

CalDesk 1.3 – April 2006
How to Contact dSPACE

Mail: dSPACE GmbH
Technologiepark 25
33100 Paderborn
Germany
Tel.: +49 5251 1638-0
Fax: +49 5251 66529
E-mail: info@dspace.de
Web: http://www.dspace.com
http://www.caldesk.com
General Technical Support: support@dspace.de
+49 5251 1638-941
http://www.dspace.com/goto?support
CalDesk Support: support.caldesk@dspace.de
+49 5251 1638-363

How to Contact dSPACE Support

dSPACE recommends that you use dSPACE Support Wizard to contact dSPACE support. It is available:
• On your dSPACE CD/DVD at \Diag\Tools\dSPACESupportWizard.exe
• Via Start – Programs – dSPACE Tools (after installation of the dSPACE software)
• At http://www.dspace.com/goto?supportwizard
You can always find the latest version of dSPACE Support Wizard here.

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/goto?support for software updates and patches.

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Technologiepark 25
33100 Paderborn
Germany

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Documentation Overview

Using the CalDesk software can have a direct effect on networked electronic systems connected to it: see Warning on page 6.

dSPACE offers different types of documents: see Documentation Types on page 8.

For a brief description of this document, see About This Document on page 10.

For more information on the documents that are available when you work with CalDesk, see Related Documents on page 11.
Warning

Using this product can be dangerous.
You must observe the following safety instructions and the relevant instructions in the user documentation.

Using the CalDesk software can have a direct effect on networked electronic systems connected to it.

Improper or negligent use can result in serious personal injury and/or property damage.
Only persons who are qualified to use this software, and who have been informed of the above dangers and possible consequences, are permitted to use this product.

The risk of property damage or personal injury also exists when CalDesk is used via the automation interface of the CalDesk Automation Module. When this is done, CalDesk is part of the overall calibration system and may not be visible to the end user. It nevertheless produces a direct effect on electronic systems within the overall calibration system.

All applications where malfunctions or misoperation involve the danger of injury or death must be examined for potential hazards by the user, who must if necessary take additional measures for protection (for example, an emergency off switch). CalDesk complies with the ASAM-MCD 2 standard, and therefore provides suitable measures for avoiding dangerous situations, including but not only by specifying limits for the system’s parameters. The user can and should take such measures to minimize the danger involved in influencing the system.
When using CalDesk to program or reprogram electronic systems, the user must ensure that the overall system that is controlled by the electronic system to be programmed or reprogrammed is in a safe state (for example, the vehicle’s engine must not be running). The electronic system may be reset by programming or reprogramming. The user must also ensure that the electronic system to be programmed or reprogrammed is not affected by other tools and that no other tool accesses it at the same time.

**dSPACE GmbH and its subsidiaries accept no liability for property damage or personal injury resulting from improper or noncontractual use of this product, or from incorrect operation by insufficiently qualified staff.**

*If you do not accept the above restrictions, you can return this product at the expense of dSPACE GmbH within one (1) month of receiving it. The purchase price will then be refunded to you immediately.*

The CalDesk product, particularly when used in conjunction with the CalDesk ECU Diagnostics Module or the dSPACE ECU Flash Programming Tool, is intended solely for use in the field of vehicle and/or electronic control unit (ECU) development.
Documentation Overview

Documentation Types

After you install your dSPACE system, you can access the entire documentation as online help or printable Adobe® PDF files. You will also receive a printed version of some important documents.

dSPACE HelpDesk

dSPACE HelpDesk is your primary source of information on both the hardware and the software of your dSPACE system.

To open dSPACE HelpDesk
➤ Select dSPACE HelpDesk from the dSPACE Tools program group of the Windows Start menu.

From each dSPACE HelpDesk page, you can easily search and navigate to the desired information. You also have direct access to printable Adobe PDF files: see How to Work with dSPACE HelpDesk in dSPACE HelpDesk.
Only the documents of the products installed on your system are available. The entire product documentation is available if you open dSPACE HelpDesk on the CalDesk CD.

**dSPACE HelpDesk structure**

The structure of the documents in dSPACE HelpDesk reflects the different phases of your work:
- Installation and Configuration
- Implementation
- Experiment and Test
- Production Code Generation
- Calibration

The topics that are shown depend on your dSPACE system.

**Context-sensitive help**

When you work with any dSPACE software, you can get context-sensitive help via the F1 key and/or Help button.

**PDF Files**

All documents are also available as printable Adobe PDF files in %DSPACE_ROOT%\Doc\Print: see *How to Work with dSPACE HelpDesk* in dSPACE HelpDesk.

**Printed Documents**

You will receive a printed version of the documents that are essential for working away from your PC.
About This Document

This document provides you with a brief overview of the major new features of CalDesk 1.3.0 since CalDesk 1.2.2.

**New features and enhancements**

For a description of the key features, and a summary of the major enhancements made since CalDesk 1.2.2, refer to *New Features of CalDesk 1.3.0* on page 13.

**Migration**

In addition, this document provides you with information on the changes you have to perform when you migrate from a previous release to CalDesk 1.3.0. Refer to *Migrating to CalDesk 1.3.0* on page 33.

**Legend**

The following symbols are used in this document.

- **Warnings** provide indispensable information to avoid severe damage to your system and/or your work.

- **Notes** provide important information that should be kept in mind.

- **Tips** show alternative and/or easier work methods.

- **Examples** illustrate work methods and basic concepts, or provide ready-to-use templates.
Related Documents

Below is a list of documents that you are also recommended to read when working with CalDesk:

**CalDesk**
- *CalDesk Tutorial* guides you through your first steps with CalDesk.
- *CalDesk Calibration Guide* explains CalDesk’s basic concepts, and provides detailed instructions on carrying out measurement, calibration, and ECU diagnostics tasks with CalDesk.
- *CalDesk Calibration Reference* provides detailed information on the menus, context menus and dialogs of CalDesk.
- *CalDesk Shortcut Key Reference* lists all shortcut keys to operate CalDesk via the keyboard.

**Automating CalDesk**
- *CalDesk Automation Guide* shows you how to automate calibration, measurement, and diagnostic tasks using CalDesk’s ASAM-MCD 3MC and ASAM-MCD 3D compatible interfaces.
- *CalDesk ASAP3 Interface Reference* provides detailed information on CalDesk’s ASAP3-compatible automation interface.
New Features of CalDesk 1.3.0

CalDesk 1.3.0 comes with the following new modules, features and enhancements since CalDesk 1.2.2:

- New CalDesk ECU Diagnostics Module on page 14
- New Devices and Device Management Features on page 18
- New Measurement and Recording Features on page 22
- New Gauge Instrument on page 28
- Further Enhancements on page 29
New CalDesk ECU Diagnostics Module

The new and optional CalDesk ECU Diagnostics Module allows you to perform ECU diagnostics tasks and program the flash memory of ECUs via diagnostic protocols.

ECU diagnostics based on ODX

ECU diagnostics with CalDesk are completely based on Open Diagnostic Data Exchange (ODX), the ASAM-MCD 2D V2.0 diagnostics standard.

ODX database The ODX database is a diagnostics database. It is the central ECU description for performing diagnostic communication between CalDesk and a specific ECU or set of ECUs in a vehicle network. CalDesk works directly on the data of an ODX database, without further data conversion. There is no risk of manipulating or accidentally losing ODX data.

CalDesk expects the database to be compliant with ASAM-MCD 2D (ODX) V2.0. For conventions to be observed for proper operation, refer to Conventions in Connection with ODX Databases in the CalDesk Calibration Guide.

ECU Diagnostics device CalDesk provides the ECU Diagnostics device, which lets you access the ECU(s) for diagnostic tasks.

Supported diagnostic protocols CalDesk's ECU Diagnostics device communicates with ECUs connected to the CalDesk PC via diagnostic protocols implemented on the ECUs. ECU access is supported via the following ISO-standardized diagnostic protocols:

<table>
<thead>
<tr>
<th>Diagnostic Protocol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO 14229</td>
<td>UDS (Unified Diagnostic Services)</td>
</tr>
<tr>
<td>ISO 14230</td>
<td>KWP2000 on K-Line</td>
</tr>
<tr>
<td>ISO 15765</td>
<td>Diagnostics on CAN / KWP2000 on CAN</td>
</tr>
</tbody>
</table>
The ECU Diagnostics device allows you to handle multiple ECUs described in an ODX database, even via different protocols. For details, refer to Configuring an ECU Diagnostics Device in the CalDesk Calibration Guide.

Performing ECU diagnostics tasks

The CalDesk ECU Diagnostics Module allows you to perform various ECU diagnostics tasks.

Handling the ECU fault memory

To handle the ECU fault memory, the CalDesk ECU Diagnostics Module provides the Fault Memory instrument. The instrument:

- Lists all DTCs (diagnostic trouble codes) of all selected ECUs
- Displays status and environment data for the selected DTC
- Lets you clear the ECU's fault memory and
- Lets you save the current ECU fault memory contents to file.

### Fault Memory Instrument

<table>
<thead>
<tr>
<th>Status</th>
<th>Logical Id</th>
<th>DTCs</th>
<th>Read DTC Data</th>
<th>Update Mode</th>
<th>Last Update</th>
</tr>
</thead>
<tbody>
<tr>
<td>LL_DiagECU</td>
<td>00001</td>
<td>10</td>
<td>15 07 16</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Logical Id</th>
<th>DTC</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LL_DiagECU</td>
<td>00001</td>
<td>Fault Level Sensor Crash Function (F144)</td>
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<tr>
<td>LL_DiagECU</td>
<td>00002</td>
<td>Fault Level Sensor Crash Function (F142)</td>
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<tr>
<td>LL_DiagECU</td>
<td>00003</td>
<td>Throttle Position Sensor Crankshaft Instruction (F123)</td>
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</table>

<table>
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<tr>
<th>Parameter</th>
<th>Value</th>
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<tr>
<td>TEC21C</td>
<td>1</td>
</tr>
<tr>
<td>PendenTC TC</td>
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<tr>
<td>CombinedTC</td>
<td>1</td>
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<tr>
<td>TEC21T2TC</td>
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<td>TEC31EoTC</td>
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<td>TEC31H1TC</td>
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<td>TEC31H1TC</td>
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</tbody>
</table>

### Instrument Controls

- Update Selected DTCs
- Clear Selected DTCs
- Save to File
- Update All Lls
- Clear All DTCs
- Last Update
Executing diagnostic services and jobs

To execute diagnostic services and jobs, the CalDesk ECU Diagnostics Module provides the **Diagnostics instrument**. The instrument:

- Lists the services and jobs available from the ODX database
- Lets you parameterize services and jobs
- Displays service requests or responses, or job results
- Lets you save the displayed results to file.

For details and instructions on handling the ECU fault memory, and on executing diagnostic services and jobs, refer to **Managing ECU Diagnostic Tasks** in the *CalDesk Calibration Guide*. 
ECU flash programming via diagnostic protocols

You can program the flash memory of ECUs via diagnostic protocols using CalDesk’s ECU Diagnostics device.

For instructions, refer to How to Program the ECU Flash Memory via a Diagnostic Protocol in the CalDesk Calibration Guide.

Automating ECU diagnostic tasks via ASAM-MCD 3D

In connection with the CalDesk ECU Diagnostics Module, the CalDesk Automation Module allows you to automate or remote-control ECU diagnostic tasks and develop custom applications.

For details, refer to Automating CalDesk’s Diagnostics Features in the CalDesk Automation Guide.
New Devices and Device Management Features

CalDesk 1.3.0 provides the following new devices and features for managing devices:

New XCP on USB device

CalDesk 1.3.0 lets you access parameters and measurement variables of ECUs that have an XCP service included in the ECU code. XCP (Universal Measurement and Calibration Protocol) is a protocol standard for serial calibration, measurement, bypassing, and ECU flash programming. Up to now, CalDesk supported CAN as the transport layer for communication with ECUs with XCP.

CalDesk 1.3.0 now also supports **USB as a transport layer**, with the new XCP on USB device. The CalDesk installation also provides a Thesycon USB driver, comprising a SYS and an INF file with vendor and product identifiers specific to Bosch’s EDC17. This allows you to work with Bosch’s EDC17 without further preparation. To work with an ECU other than the EDC17, you have to provide the Thesycon USB driver comprising a SYS and an INF file yourself.

For information on working with an ECU with XCP on USB, refer to the XCP Feature Reference.

New ECU flash programming features

The dSPACE ECU Flash Programming Tool in CalDesk 1.3.0 supports the following new features and enhancements:

**XCP on CAN support**  ECU flash programming is supported for XCP on CAN. This is also supported by the dSPACE XCP Service.

- To perform ECU flash programming via XCP on CAN, your ECU must be connected to the host PC via a dSPACE CAN interface (DCI-CAN1 or Calibration Hub). Vector CANcardX is not supported.
- For the dSPACE CAN interface (DCI-CAN1 or Calibration Hub), firmware version 4.4 is required. dSPACE CAN interfaces shipped as of CalDesk 1.3 have the new firmware version.
To use a dSPACE CAN interface shipped before CalDesk 1.3 for ECU flash programming via XCP on CAN, you have to update the firmware. Contact dSPACE for support.

**Safety option**  A failure during flash programming may lead to a corrupt application in the ECU's flash memory. For operational safety, the ECU therefore remains in a “flash-programming mode” after reset if ECU flash programming fails. This prevents the ECU from starting a corrupt application.

**Further consistency checks**  The dSPACE ECU Flash Programming Tool performs further consistency checks:

- The tool now checks for matching ECU identification.
- The tool checks the consistency of ECU boot code, ECU application code, and calibration data.

**Specifying user roles**  Creating and editing flash projects can be deactivated via registry key. This allows you to specify different user roles: project administrator and calibration engineer.

**Remote-controlled ECU flash programming**  CalDesk 1.3.0 provides a command line option for remote-controlling the dSPACE ECU Flash Programming Tool.

For details and instructions, refer to the *ECU Flash Programming* document.

The new CalDesk ECU Diagnostics Module also supports ECU flash programming. Refer to *ECU flash programming via diagnostic protocols* on page 17.
DCI-GSI1: calibrating data in external RAM

The DCI-GSI1 now supports ECUs with calibration data in external RAM. To use this feature, you have to configure the DCI-GSI1 with a configuration utility beforehand. After CalDesk 1.3.0 installation, you can open the utility via Start – Programs – dSPACE Tools – Utilities – DCI-GSI1 CalPageConfiguration Tool.

New DS1005 and MicroAutoBox features

The DS1005 device and the MicroAutoBox device in CalDesk 1.3.0 provide the following new features:

Creating an application image from a data set

For the DS1005 and MicroAutoBox, CalDesk allows you to create an application image. An application image contains a real-time application and the data of a CalDesk data set. Creating an application image from a data set allows you therefore to create a real-time application with the latest calibration data without having to rebuild the application. This is especially useful during fleet tests since no Matlab®/Simulink®/Stateflow® installation is required for rebuilding the application. To use this feature, the real-time application must have been built with RTI from dSPACE Release 5.1 or later, and a specific code generation option must be enabled. For details and instructions, refer to How to Create an Application Image in the CalDesk Calibration Guide.

Enhanced flash memory management

Flash memory management is enhanced for DS1005 and MicroAutoBox. This includes an option for uploading flight recorder data to CalDesk. Refer to Flash Management in the CalDesk Calibration Reference.

Working point display

1-D and 2-D look-up tables (curves and maps) displayed in CalDesk’s Table Editor now also display the current working point of real-time applications for the DS1005 and MicroAutoBox. To use this feature, the real-time application must have been built with RTI from dSPACE Release 5.0 or later.
Enhanced memory segment configuration

CalDesk 1.3.0 provides an enhanced dialog for memory segment configuration: Segments that you add manually are marked by a special icon. This lets you distinguish easily between memory segments added manually and segments defined in the corresponding A2L file.

Refer to Memory Segments in the CalDesk Calibration Reference.

ECUs with one memory page

CalDesk 1.3.0 fully supports ECUs with only one memory page, even if the page is located in a read-only memory area. Refer to Memory Page Concept, and Offline and Online Calibration in the CalDesk Calibration Guide.
New Measurement and Recording Features

CalDesk 1.3.0 provides the following new features for measuring and recording data:

**Enhanced MDF file export**

CalDesk 1.3.0 lets you configure the storage of variable names for the export of measurement data to the MDF file format. You can let block and path information for measured data be included in MDF files. This applies to measurement data exported for the following devices:

- Prototyping devices (DS1005 PPC Board and MicroAutoBox)
- CAN-based measurement devices (CAN Monitoring, DAQ modules)

However, exported MDF files do not contain block and path information for measurement data of CAN-based calibration devices (CCP and XCP on CAN).

Refer to Measurement Files Page in the CalDesk Calibration Reference.

**New trigger conditions**

CalDesk 1.3.0 provides more options for defining trigger conditions:

**Predefined conditions**  You can trigger a recording on the occurrence of specific events such as:

- Setting a manual bookmark
- Switching a memory page
- Changing number of DTCs in the ECU’s fault memory (in connection with the CalDesk ECU Diagnostics Module only)

**Custom condition: ‘CHANGE’ operator**  
You can trigger a recording if a signal changes more than a predefined value range. You can define the value range by:

- Specifying another signal (converted value)
- Specifying a tolerance value
According to the trigger definition illustrated below, the trigger condition is met if the ‘air mass’ variable changes by more than +/- 2. The value ‘2’ is the specified tolerance value.

For details, refer to Edit Trigger Rules in the CalDesk Calibration Reference.

Plotter: automatic visualization downsampling

Visualization downsampling The visualization downsampling feature introduced in CalDesk 1.2.0 reduces the number of data points to be plotted. This allows signals with high sampling rates to be displayed during measurement since the load on the CalDesk PC’s processor is reduced. The number of data points to be recorded is not affected by this.

Automatic visualization downsampling The Plotter in CalDesk 1.3.0 provides automatic visualization downsampling: CalDesk automatically calculates the optimum point interval value, and displays the minimum and maximum values for each interval. This ensures that no significant signal part is lost. Refer to Visualization Downsampling Page in the CalDesk Calibration Reference.
**Plotter: automatic point style handling**

The Plotter in CalDesk 1.3.0 provides an option to automatically hide the sampling points of a signal if they are too close to be displayed individually. Only the connection line between the sampling points is displayed.

When you zoom into the Plotter, CalDesk automatically starts displaying individual sampling points. Refer to *Signals Page* in the *CalDesk Calibration Reference*.

**No value display**

**No value display for measurement variables**

For measurement variables visualized in instruments, no measurement values are displayed in instruments until you start measuring (or recording).

**No value display for parameters**

For parameters visualized in instruments, the display of parameter values depends on whether initial parameter values are available or not:

- If you specify an ECU Image file for calibration devices (or an SDF file with initial parameter values for DS1005 or MicroAutoBox devices), initial parameter values are available. These values are displayed as soon as you visualize the corresponding parameters in instruments.
If you specify no ECU Image file for calibration devices (or an SDF file without initial parameter values for DS1005 or MicroAutoBox devices), no initial parameter values are available. Parameter values are displayed as soon as you upload the values from the device hardware when you start online calibration.

Saving measurement buffer during a measurement

Saving the measurement buffer to a measurement data file is now also possible during a running measurement (or recording). This allows you to save measurement data without having to configure recording settings beforehand. Refer to Save Measurement Buffer in the CalDesk Calibration Reference.

Adding measurement variables during a measurement

When you place variables on a layout during a running measurement (or recording), CalDesk now lets you decide whether to

- Continue the current measurement without the newly added variables. They will be measured the next time you stop and restart the current measurement.
- Automatically stop and restart the measurement to immediately include the newly added variables. In this case, the measurement buffer is cleared, and a running recording is stopped.
**New Features of CalDesk 1.3.0**

**Recorded data layouts automatically added to the experiment**

With CalDesk 1.3.0, recorded data layouts are automatically added to the CalDesk experiment, regardless of whether you created them manually or derived them from a standard layout.

**Renaming measurement data files**

CalDesk's Project Manager allows you to rename measurement data files. Refer to *Rename (Measurement Data File)* in the *CalDesk Calibration Reference*.
# New Gauge Instrument

CalDesk 1.3.0 provides the new Gauge instrument, which lets you display the value of a measurement variable by a needle deflection on a circular scale.

You can configure the instrument settings via the Gauge Instrument Properties dialog.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Instrument Properties Dialog</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image.png" alt="Gauge Instrument" /></td>
<td><img src="image.png" alt="Instrument Properties Dialog" /></td>
</tr>
</tbody>
</table>

For instructions, refer to *How to Change the Settings of the Gauge Instrument* in the CalDesk Calibration Guide.
Further Enhancements

CalDesk 1.3.0 provides further enhancements:

**More intuitive menu bar**

CalDesk provides a more intuitive menu bar, arranged according to the main functionalities:

- Measurement
- Calibration
- Diagnostics (available only if the CalDesk ECU Diagnostics Module is installed)

The table below displays the menus and the available commands:

<table>
<thead>
<tr>
<th>Measurement Menu</th>
<th>Calibration Menu</th>
<th>Diagnostics Menu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start Measurement</td>
<td>Start Online Calibration</td>
<td>Edit/Fault Memory Instrument</td>
</tr>
<tr>
<td>Stop Measurement</td>
<td>Exit the Calibration</td>
<td>Edit/Diagnostics Instrument</td>
</tr>
<tr>
<td>Start Immediate Recording</td>
<td>Start/Breakpoint Calibration</td>
<td></td>
</tr>
<tr>
<td>Start Triggering</td>
<td>Speed/Breakpoint Calibration</td>
<td></td>
</tr>
<tr>
<td>Stop Triggering</td>
<td>End/Breakpoint Calibration</td>
<td></td>
</tr>
<tr>
<td>Edit Bookmarks...</td>
<td>Exit/Breakpoint Off</td>
<td></td>
</tr>
<tr>
<td>Edit Bookmark...</td>
<td>Activate Calibration Page on All Supporting Devices</td>
<td></td>
</tr>
<tr>
<td>Configure Measurement...</td>
<td>Activate Trigger Page on All Supporting Devices</td>
<td></td>
</tr>
<tr>
<td>Edit/Trigger Rules...</td>
<td>Show J-set Data Sets...</td>
<td></td>
</tr>
<tr>
<td>Show Measurement Info</td>
<td>Compare J-set Data Sets...</td>
<td></td>
</tr>
</tbody>
</table>
Defining calculated variables

CalDesk 1.3.0 lets you define and import new calculated variables not only on the root node level of the active variable description, but on any hierarchy level.

For CAN-based measurement devices (CAN Monitoring, DAQ modules), however, new calculated variables can only be defined or imported on the root node level of the active variable description.

For details and instructions on calculated variables, refer to Defining Calculated Variables in the CalDesk Calibration Guide.

Enhanced Project Manager

CalDesk 1.3.0 provides the following enhancements for managing projects and experiments:

Project tree representation saved with experiment When you save an experiment, the current project tree representation is now also saved. When you reopen the experiment, CalDesk automatically restores the last active project tree representation. For example, if the “Hardware Configurations” node in the Project Manager is open when you save the experiment, the node will be opened when you reopen the experiment.
Opening a project without opening an experiment  

CalDesk lets you open a project without having to open a specific experiment. This gives you a quick overview of the project and its experiments without having to open one. It is useful especially if the project contains many experiments since it reduces the loading time. To open and load one of the experiments, you have to activate it.

ASAM-MCD 3 interface: support of measurement arrays  
The ASAM-MCD 3 (COM/DCOM) interface of the optional CalDesk Automation Module now supports the measurement array variable type for measurement variables that have the optional \texttt{MATRIX\_DIM} or \texttt{ARRAY\_SIZE} A2L keyword. Using this variable type improves the performance of recording complete arrays, for example, in RAM monitoring tasks.

The CalDesk Automation Module also provides remote-controlled access to ECUs for diagnostic purposes. Refer to Automating ECU diagnostic tasks via ASAM-MCD 3D on page 17.
Enhanced error tolerance for parsing A2L files

CalDesk 1.3.0 provides an enhanced error tolerance for parsing A2L files.

More intuitive instrument assignment

When you place a variable on a layout, CalDesk checks the type of the variable. To assign the variable to an instrument, you have two options:

**Manual assignment**  When you drag a variable on the layout with the mouse, CalDesk opens the **Instrument Type** list. Depending on the variable type, the list displays the instruments available for visualizing the selected variable.

![Instrument Type List]

**Automatic assignment**  When you drag a variable on the layout with the mouse while keeping the **Shift** key pressed, CalDesk automatically assigns the default instrument to the variable. For example, CalDesk assigns the Plotter instrument to measurement variables. CalDesk allows you to configure the instrument assignment. Refer to **Default Instruments Page** in the **CalDesk Calibration Reference**.
Migrating to CalDesk 1.3.0

To migrate to CalDesk 1.3.0 and reuse existing experiments, you may have to carry out additional migration steps. The table below shows the cases in which this is necessary.

<table>
<thead>
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<th>From CalDesk Version</th>
<th>1.1.0</th>
<th>1.2.0</th>
<th>1.2.1</th>
<th>1.2.2</th>
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<td>Yes 1)</td>
<td>Yes 1)</td>
<td>Yes 1)</td>
</tr>
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<td>Yes 1)</td>
<td>Yes 1)</td>
<td>Yes 1)</td>
</tr>
<tr>
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<td>–</td>
<td>–</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
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<td>–</td>
<td>–</td>
<td>–</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>1.2.2 ...</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

1) Refer to How to Migrate an Experiment for an ECU with XCP on CAN on page 34
How to Migrate an Experiment for an ECU with XCP on CAN

To work with an ECU with XCP on CAN together with CalDesk 1.2, you must adapt the ECU's A2L file if you created it for use with CalDesk 1.1.1 or earlier, and if the A2L file contains no memory page information.

CalDesk 1.2: Enhanced memory page handling

Up to CalDesk 1.2 … Up to CalDesk 1.2, CalDesk's memory page handling for ECUs with XCP on CAN was adapted only to ECUs with two physical memory pages. On the host PC, CalDesk automatically created a working page and a reference page, even for ECUs with only one physical memory page.

CalDesk 1.2 and later … CalDesk 1.2 and later provide enhanced memory page handling for ECUs with XCP on CAN that is adapted to the ECU-specific memory page concept. For example, for ECUs with only one physical memory page (in a read/write area), CalDesk creates a working page only.

Page information required in A2L file

To support enhanced memory page handling, CalDesk 1.2 and later require memory page information, such as the number of pages, in the ECU's A2L file. The information must be specified within the A2L file's MEMORY_SEGMENT definitions of DATA type. It must be consistent with the configuration of the XCP service that is implemented in the ECU code.

A2L files based on old CalDemo.a2l files

If you used the CalDemo.a2l file provided by CalDesk 1.1.1 or earlier as a template A2L file for your specific ECU with XCP on CAN, you also have to adapt the A2L file by adding the required information to the A2L file manually.

To migrate an experiment that you created or saved the last time with CalDesk 1.1.x requires no adaptation of the A2L file as long as you do not add another A2L file to the XCP on CAN device or reload the file.
The instructions below describe how to specify two ECU memory pages: a read/write working page and a read-only reference page.

**Method**

**To migrate an experiment for an ECU with XCP on CAN**

1. If you created or saved the experiment the last time with CalDesk 1.0.2 or earlier, open it in CalDesk 1.1.x, save and close it.

2. Open the A2L file in a text editor.

3. Search for the first `MEMORY_SEGMENT` definition of `DATA` type.
   
   The definition may look like this:
   
   ```plaintext
   /begin MEMORY_SEGMENT FlashMemory
   "Description of the Memory Segment"
   DATA
   FLASH
   EXTERN
   0x3a00d000
   0x7e4
   -1 -1 -1 -1 -1
   /end MEMORY_SEGMENT
   ```

4. Add the following text before the `/end MEMORY_SEGMENT` declaration:

   ```plaintext
   /begin IF_DATA XCP
   /begin SEGMENT
   0 /* segment logical number */
   0x02 /* number of pages */
   0x00 /* address extension */
   0x00 /* compression method */
   0x00 /* encryption method */
   /* reference page */
   /begin PAGE
   0x00 /* page number */
   ECU_ACCESS_WITH_XCP_ONLY
   XCP_READ_ACCESS_WITH_ECU_ONLY
   XCP_WRITE_ACCESS_NOT_ALLOWED
   /end PAGE
   /* working page */
   /begin PAGE
   0x01 /* page number */
   ECU_ACCESS_WITH_XCP_ONLY
   ```
The keywords you use to describe memory page properties depend on the configuration of the XCP service in the ECU code.

5 Repeat steps 3 and 4 for all MEMORY_SEGMENT definitions of DATA type in the A2L file. Increment the segment logical number for each MEMORY_SEGMENT definition. The segment logical number entries for the following two MEMORY_SEGMENT definitions therefore must be:

\[
\begin{align*}
0x01 & \text{ /* segment logical number */ } \\
0x02 & \text{ /* segment logical number */ }
\end{align*}
\]

6 Save the A2L file and close it.

7 Open the experiment in CalDesk 1.2.

8 From the context menu of the XCP on CAN device, select Add Variable Description.

9 Specify the updated A2L file as the device’s variable description.

10 Save the experiment.

Result
You added memory page information to an A2L file for an ECU with XCP on CAN. The information specifies two memory pages: a working page (with number 0x01) in a read/write memory area and a reference page (with number 0x00) in a read-only area. The XCP service and the ECU code always access the same memory page at a time. You use the updated A2L file as the device’s variable description in CalDesk 1.2.

Consistency check
If the XCP service in the ECU code supports the relevant optional XCP commands, CalDesk checks whether the A2L file’s memory page information and the information read from the XCP service are consistent. Consistency is checked the next time the device changes to the ‘connected’ state. If CalDesk detects inconsistencies, you may need to adapt the information you added to the A2L file according to the error message provided by CalDesk.