

ControlDesk

Signal Editor

For ControlDesk 7.4

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dSPACE

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About This Document

Content

This document introduces you to ControlDesk's Signal Editor.

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.
	Precedes 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 folders

Some software products use the following special folders:

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

`%PROGRAMDATA%\dSPACE\<InstallationGUID>\<ProductName>`

or

`%PROGRAMDATA%\dSPACE\<ProductName>\<VersionNumber>`

Documents folder A standard folder for user-specific documents.

`%USERPROFILE%\Documents\dSPACE\<ProductName>\<VersionNumber>`

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

`%USERPROFILE%\AppData\Local\dSPACE\<InstallationGUID>\<ProductName>`

Accessing dSPACE Help and PDF Files

After you install and decrypt 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**

dSPACE Help (Web) You can access the Web version of dSPACE Help at www.dspace.com/go/help.

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

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

Basics and Instructions

Where to go from here

Information in this section

Introduction to the Signal Editor.....	12
You can create and arrange arbitrary signal shapes with the Signal Editor.	
Creating and Editing Signal Description Sets.....	23
You edit and configure the signals and their segments in signal description sets.	
Replaying Numerical Data.....	47
You can replay numerical data in a real-time model.	
Modifying the Visualization of Signals and Segments.....	58
You can modify the visualization of signals and segments in ControlDesk's working area.	
Mapping Variables to Signals and Aliases.....	63
You can map variables to signals and variable aliases by using the Signal Mapping controlbar.	
Stimulating Variables of a Simulation Application.....	69
You can stimulate model variables of a simulation application with a signal generator.	

Introduction to the Signal Editor

Introduction	You can create and arrange arbitrary signal shapes with the Signal Editor.
---------------------	--

Where to go from here	Information in this section
	Basics on the Signal Editor12 The Signal Editor provides controlbars and commands to create, configure, and manage signals in signal description sets.
	Workflow for Stimulating Variables of a Simulation Application15 For stimulating variables of a simulation application, you have to perform a number of process steps.
	Basics on Signal Description Sets and Signal Generators16 Signal description sets are used to edit and arrange signals.
	RTT Installation and Signal Editor18 The Signal Editor supports stimulus generation for all dSPACE platforms that can run Real-Time Testing (RTT) sequences.
	Signal Editor Demos19 Demonstrate the ControlDesk Signal Editor features.

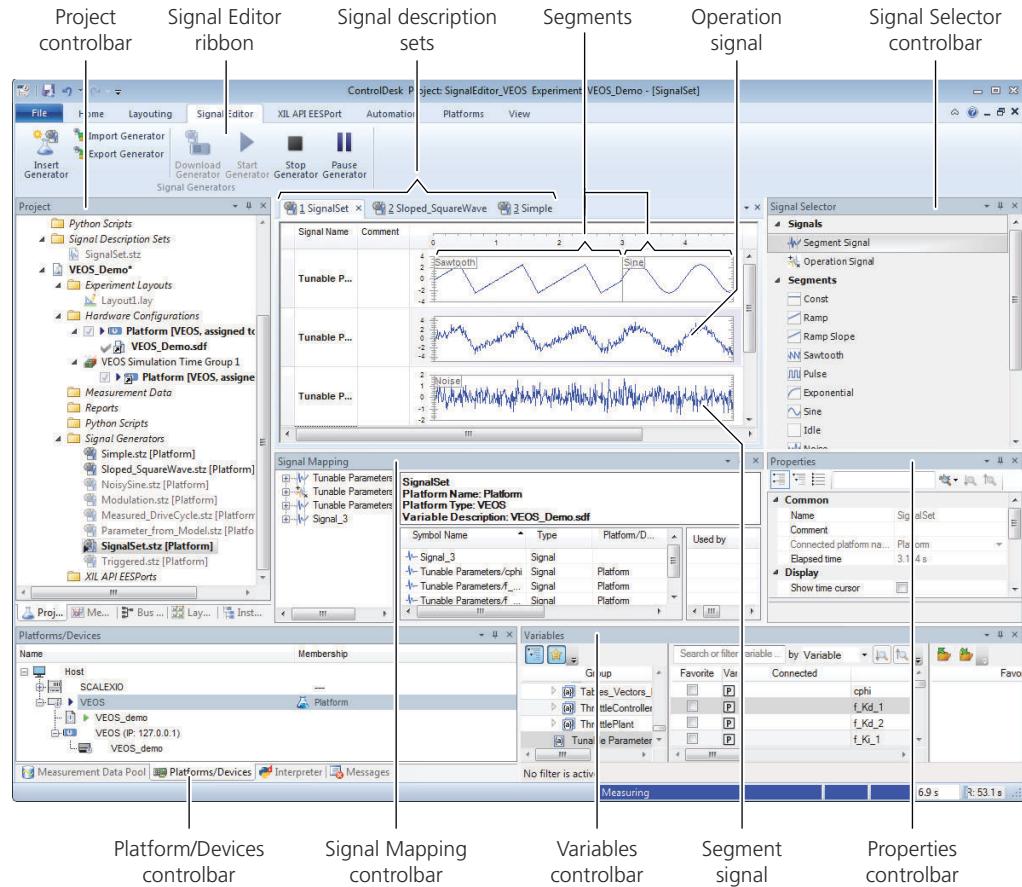
Basics on the Signal Editor

Introduction	The Signal Editor provides controlbars and commands to create, configure, display, and manage signals in signal description sets .
---------------------	--

Basics	You can use signal description sets as signal generators to stimulate model variables of simulation applications running on dSPACE real-time hardware or on VEOS. In the Project controlbar, you can manage and store signal description sets in the Signal Description Sets folder and signal generators in the Signal Generators folder. For details, refer to Basics on Signal Description Sets and Signal Generators on page 16.
---------------	---

Workflow for stimulating variables of a simulation application	Refer to Workflow for Stimulating Variables of a Simulation Application on page 15.
---	---

GUI elements



Working area You can edit and configure the [signals](#) and their [segments](#) in the working area. For details, refer to [Basics on Editing Signal Description Sets](#) on page 24.

The following edit modes are available:

Edit Mode	Mouse Pointer	Purpose
Select Mode		To select and arrange signals and segments in signal description sets. Refer to Select Mode .
Hand Mode		To scroll the signal shapes inside of signals horizontally and vertically. Refer to Hand Mode on page 168.
Zoom Mode		To zoom into signals and segments. Refer to Zoom Mode on page 194.

Edit Mode	Mouse Pointer	Purpose
Split Mode	↔	To split a segment into two. Refer to Split Mode on page 192.

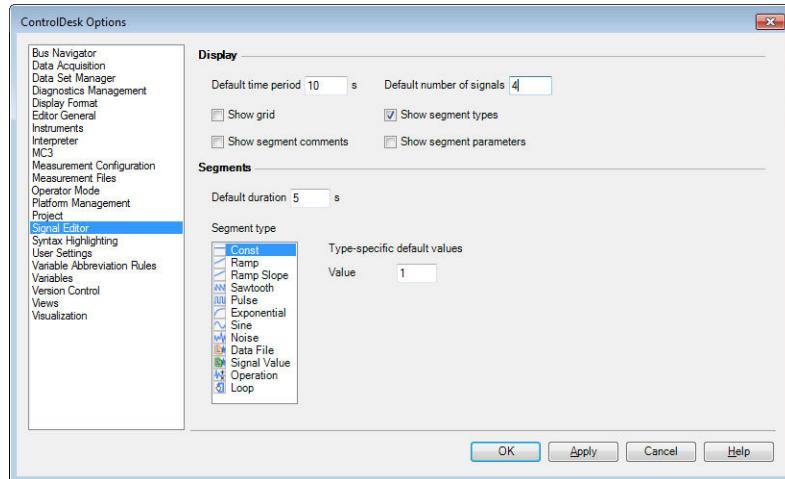
Signal Selector controlbar The Signal Selector lets you select signals and segments to easily create signal description sets via drag & drop. For details, refer to [Basics on Editing Signal Description Sets](#) on page 24.

Properties controlbar You can configure the signals and segments using the Properties controlbar. Refer to [Properties \(Controlbar\) \(ControlDesk User Interface Handling\)](#).

Signal Mapping controlbar For signal generators only, the Signal Mapping controlbar lets you map model variables to signals and *variable aliases*. For details, refer to [Basics on Mapping Variables to Signals and Aliases](#) on page 63.

Specifying default settings

On the Signal Editor page in the ControlDesk Options dialog, you can specify default settings for the Signal Editor, such as display settings for signal description sets and default properties for new segments.



For details, refer to [Signal Editor Page](#) on page 186.

Supported dSPACE platforms and devices

You can use the Signal Editor for stimulus generation on the following dSPACE platforms and devices:

- [DS1006 Processor Board platform](#)
- [DS1007 PPC Processor Board platform](#)
- [DS1202 MicroLabBox platform](#)
- [MicroAutoBox platform](#)
- [MicroAutoBox III platform](#)
- [Multiprocessor System platform](#)
- [SCALEXIO platform](#)

- [VEOS platform](#)
- [XCP on Ethernet device](#) (only if it represents a V-ECU executed on VEOS)

Stimulating variables in a multicore/multiprocessor application One signal generator can stimulate variables from different application processes of a multicore/multiprocessor (MP/MC) application.

ControlDesk Signal Editor Module

An optional software module for ControlDesk for the graphical definition and execution of signal generators for stimulating model variables of real-time/offline simulation applications.

- Time-synchronous stimulus generation
- Replay of measured data contained in an ASAM MF4 file
- Support of XIL-API stimulus format

Related topics

Basics

Basics on Signal Description Sets and Signal Generators	16
RTT Installation and Signal Editor	18

References

Signal Editor Page	186
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Workflow for Stimulating Variables of a Simulation Application

Workflow steps

For stimulating variables of a simulation application, you have to perform a number of process steps.

1. Create a signal description set in the [Signal Generators](#) folder to serve as a signal generator.
Refer to [How to Create a Signal Description Set](#) on page 28.
2. Add one or more segment signals and optional operating signals to the signal generator.
Refer to [How to Create and Configure a Segment Signal](#) on page 29 and [How to Create and Configure an Operation Signal](#) on page 35.
3. Map the model variables to be stimulated to signals of the signal generator.
Refer to [How to Map Variables](#) on page 65.
4. Start online calibration.
Refer to [How to Start and Stop Online Calibration \(ControlDesk Calibration and Data Set Management\)](#).
5. Download the signal generator to the simulation platform.
Refer to [How to Stimulate Variables of a Simulation Application](#) on page 70.

6. Start stimulating model variables.
Refer to [How to Stimulate Variables of a Simulation Application](#) on page 70.
7. Stop stimulating model variables.
Refer to [How to Stimulate Variables of a Simulation Application](#) on page 70.

Related topics

HowTos

How to Create a Signal Description Set.....	28
How to Create and Configure a Segment Signal.....	29
How to Create and Configure an Operation Signal.....	35
How to Map Variables.....	65
How to Start and Stop Online Calibration (ControlDesk Calibration and Data Set Management )	
How to Stimulate Variables of a Simulation Application.....	70

Basics on Signal Description Sets and Signal Generators

Introduction

Signal description sets are used to edit and arrange signals.

Basics on signal description sets

To edit a signal by means of the Signal Editor, you must place it in a *signal description set*. The signal description set is a container for one or more signals.

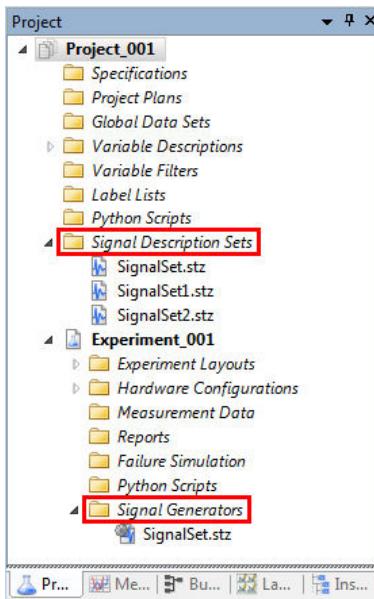
When you save the project, each signal description set is saved to an *STZ file*. The STZ file is a ZIP file that contains the signal descriptions in the STI format defined by the ASAM AE XIL API standard. The STZ file can also contain additional MAT files to describe numerical signal data.

Support of the ASAM AE XIL API standard The Signal Editor lets you import and export signal description sets and signal generators according to the ASAM AE XIL API 2.1.0 standard.

Locations of signal description sets

The [Project !\[\]\(e088a60aba18ad7619b846dde34cd067_img.jpg\)](#) controlbar locations for handling signal description sets are:

- The Signal Description Sets folder of the *project*
- The Signal Generators folder of an *experiment*



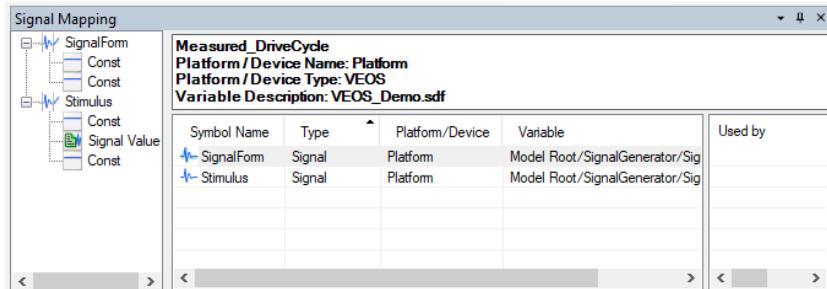
Signal Description Sets folder The icon indicates a signal description set that is located in the Signal Description Sets folder. You can use this signal description set independently of an experiment.

Signal Generators folder The icon indicates a signal description set that is located in the Signal Generators folder of an experiment. It serves as a *signal generator* to stimulate variables of a simulation application.

Signal generators

A signal description set located in the Signal Generators folder is called a *signal generator*. You can use a signal generator to stimulate the model variables of a simulation application running on the connected simulation platform. You can use the signal generator to generate and download a Real-Time Testing (RTT) sequence which will be executed on the simulation platform in parallel to the simulation application to stimulate its model variables.

Before using a signal generator to stimulate model variables, you have to map model variables to signals and variable aliases by using the **Signal Mapping** controlbar. For details, refer to [Mapping Variables to Signals and Aliases](#) on page 63.



The STZ file of a signal generator contains the signal descriptions and optional information about the signal mapping, variable descriptions, and the assigned simulation platform.

Related topics	Basics
	Basics on Editing Signal Description Sets..... 24
	Basics on the Signal Editor..... 12
	HowTos
	How to Create a Signal Description Set..... 28

RTT Installation and Signal Editor

Introduction	The Signal Editor supports stimulus generation for all dSPACE platforms that can run Real-Time Testing (RTT) sequences.
RTT installation and Signal Editor	<p>The Signal Editor requires RTT 1.7.1 or later installed on the host PC. When you install ControlDesk 7.4 with the Signal Editor Module, RTT 5.0 is installed.</p> <p>Several RTT versions on the host PC If more than one RTT version is installed on the host PC, only one RTT version is active. ControlDesk uses the active RTT version.</p> <p>You can use the dSPACE Installation Manager to:</p> <ul style="list-style-type: none">▪ Look up the RTT versions currently installed on the host PC▪ Activate another RTT version if you also have RTT 1.7.1 or later installed on the host PC <p>Tip</p> <p>You can install RTT 1.7.1 or later from the dSPACE Release DVD.</p>
Required RTT versions	<p>To use RTT in connection with ControlDesk, you must activate a specific RTT version on the host PC.</p> <p>The required RTT version on the host PC depends on the dSPACE simulation platform:</p> <ul style="list-style-type: none">▪ SCALEXIO, MicroAutoBox III, MicroLabBox, DS1007, VEOS (refer to SCADEXIO, MicroAutoBox III, MicroLabBox, DS1007, VEOS: required RTT versions (ControlDesk Introduction and Overview))

- DS1006, MicroAutoBox II (refer to [DS1006, MicroAutoBox II: required RTT versions \(ControlDesk Introduction and Overview\)](#))

Related topics**Basics**

[Basics on the Signal Editor](#).....12
[Compatibility with Real-Time Testing \(ControlDesk Introduction and Overview\)](#)

Signal Editor Demos

Opening demo projects

For instructions on opening demo projects, refer to [Opening a demo project \(ControlDesk Introduction and Overview\)](#).

Description of the demo projects

The Signal Editor demo projects allow you to work with ControlDesk and use [Signal Editor](#) features with dSPACE real-time hardware connected to the host PC.

Required products and modules Working with this demo requires:

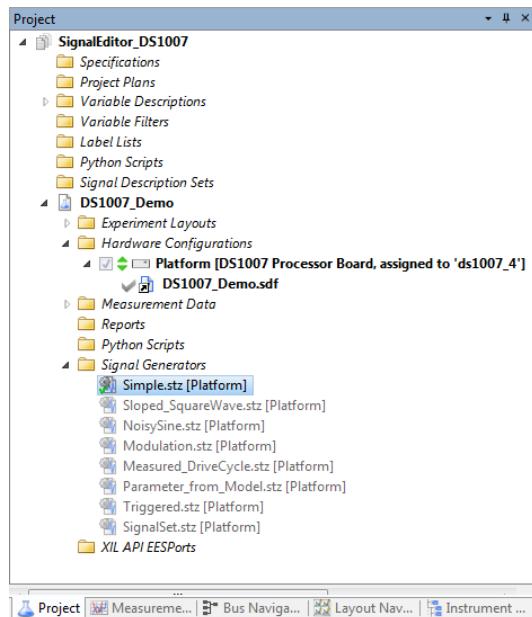
- [ControlDesk](#)
- [ControlDesk Signal Editor Module](#)

Demo projects The Signal Editor application demos consist of the following demo projects:

Project	Description
SignalEditor_DS1006 (including the DS1006 Demo experiment)	To access a DS1006 Processor Board connected to the host PC, the experiment contains a DS1006 Processor Board platform .
SignalEditor_DS1007 (including the DS1007 Demo experiment)	To access a DS1007 PPC Processor Board connected to the host PC, the experiment contains a DS1007 PPC Processor Board platform .
SignalEditor_DS1202 (including the DS1202 Demo experiment)	To access a MicroLabBox (DS1202) connected to the host PC, the experiment contains a DS1202 MicroLabBox platform .
SignalEditor_DS1401 (including the DS1401 Demo experiment)	To access a MicroAutoBox II (DS1401) connected to the host PC, the experiment contains a MicroAutoBox platform .
SignalEditor_DS1403 (including the DS1403 Demo experiment)	To access a MicroAutoBox III (DS1403) connected to the host PC, the experiment contains a MicroAutoBox III platform .

Project	Description
SignalEditor SCALEXIO (including the SCALEXIO Demo experiment)	To access a SCALEXIO system connected to the host PC, the experiment contains a SCALEXIO platform .
SignalEditor_VEOS (including the VEOS Demo experiment)	To access an offline simulation application running in VEOS, the experiment contains a VEOS platform .

Demo overview The demo provides several signal generators, which can be downloaded and started after online calibration is started. The illustration below shows the demo for the DS1007 as an example. Online calibration is started and the Simple.stz signal generator is downloaded to the DS1007.



Throttle control implemented on the dSPACE real-time hardware The application running on the dSPACE real-time hardware implements a throttle control. It is derived from the application used by the Real-Time Application Demos:

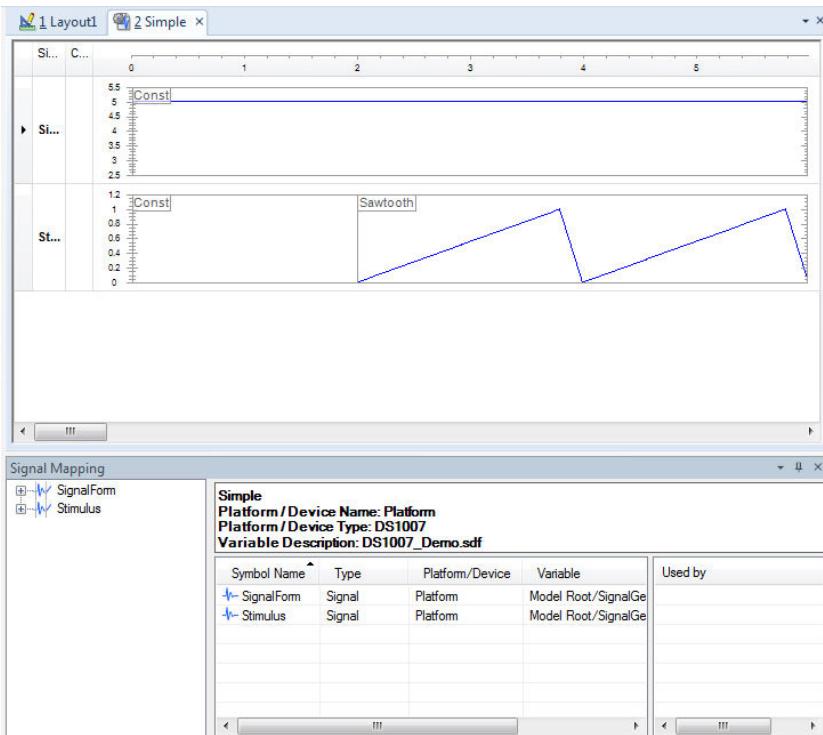
The **SignalForm** application parameter allows you to switch between a model-internal signal generator and an external signal generator created by using the Signal Editor.

SignalForm Value	Description
1	The model-internal signal generator is used. The signal form is <i>sawtooth</i> .
2	The model-internal signal generator is used. The signal form is <i>square-wave</i> .
3	The model-internal signal generator is used. The signal form is <i>sine</i> .

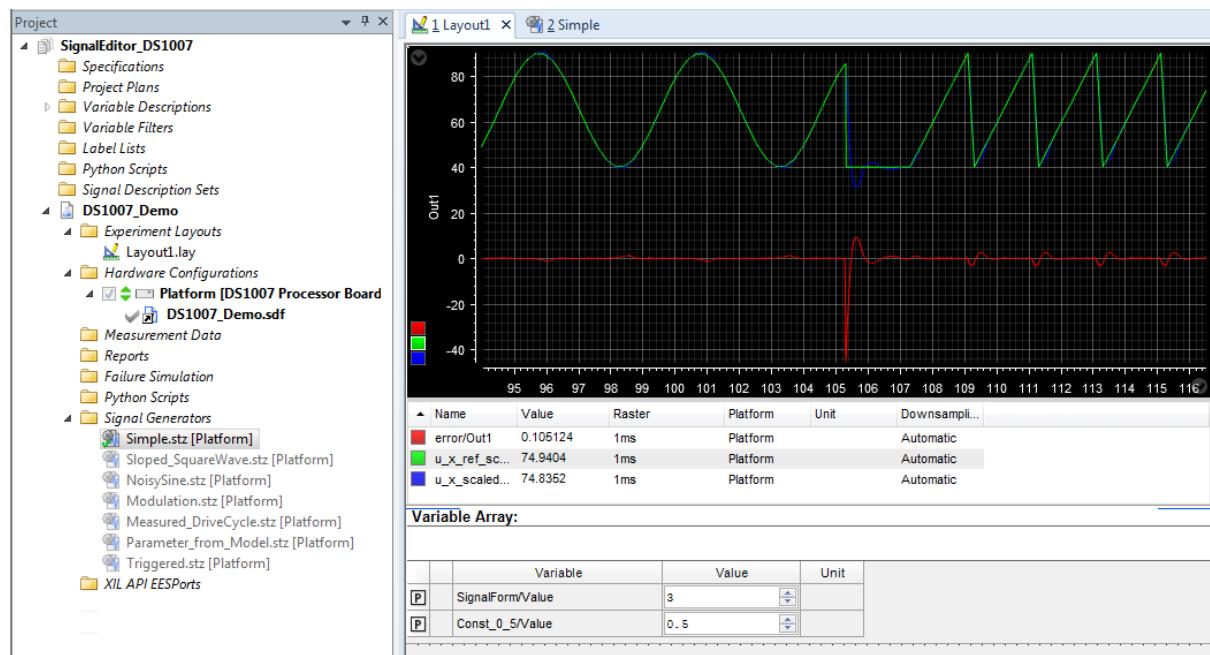
SignalForm Value	Description
5	The external signal generator created with the Signal Editor is used. The Stimulus variable is stimulated.

The illustration below shows the two segment signals of the Simple.stz signal generator as an example. The upper segment signal sets the **SignalForm** parameter value to 5 for 59 seconds to enable external signal generation. Then the value is set to 3 to reenable model-internal signal generation.

The lower segment signal stimulates the **Stimulus** signal: It is initially set to 0 for the first two seconds, then to a sawtooth signal, and finally to 0 again.



The illustration below shows the resulting measurement. After about 105 seconds' measurement time, the Simple.stz signal generator is started, and the **SignalForm** value changes from 3 to 5. This starts stimulation of the **Stimulus** parameter.



Running a demo project

After you have opened a Signal Editor demo project, you have to perform the following steps:

1. Configure the experiment's platform according to the dSPACE real-time hardware connected to the host PC. For instructions, refer to [How to Assign dSPACE Real-Time Hardware or VEOS to a Platform \(ControlDesk Platform Management\)](#).
2. Start online calibration. For instructions, refer to [How to Start and Stop Online Calibration \(ControlDesk Calibration and Data Set Management\)](#).
3. Download the signal generator. From the context menu of a signal generator, select Stimulus Control – Download.
4. Start measuring. For instructions, refer to [How to Start Measuring \(ControlDesk Measurement and Recording\)](#).
5. Start the signal generator. From the context menu of a signal generator, select Stimulus Control – Start.

Related topics

Basics

[Basics on the Signal Editor.....](#) 12

Creating and Editing Signal Description Sets

Introduction	You edit and configure the signals and their segments in signal description sets.
---------------------	---

Where to go from here	Information in this section
	Basics on Editing Signal Description Sets24 Drag signals and segments from the Signal Selector controlbar to edit signal description sets.
	Basics on Segments25 A segment is the smallest unit that can be used to describe a signal shape.
	How to Create a Signal Description Set28 You have to create a signal description set in your project as a container for signals.
	How to Create and Configure a Segment Signal29 You have to create a segment signal in a signal description set as a container for segments.
	Moving or Copying Signals and Segments32 In ControlDesk's working area, you can move or copy signals and segments.
	How to Create and Configure an Operation Segment34 You can use operation segments to perform arithmetical operations between segments.
	How to Create and Configure an Operation Signal35 You can use operation signals to perform arithmetical operations between two signals.
	How to Execute Segments or Signals Several Times38 Segments  and signals  can be configured to be executed several times during simulation.
	Specifying Constant Properties of Segments via Parameters40 For each signal description set, you can define a list of global parameters. These parameters can be used to specify constant properties of segments, such as value or duration properties.
	How to Specify and Modify a Constant Property via a Parameter42 You can specify and modify constant properties centrally via the global parameters of a signal description set.

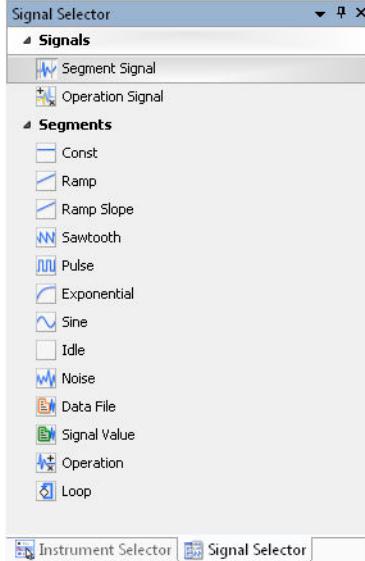
Basics on Editing Signal Description Sets

Introduction

Drag [signals](#) and [segments](#) from the Signal Selector controlbar to edit [signal description sets](#).

Signal Selector controlbar

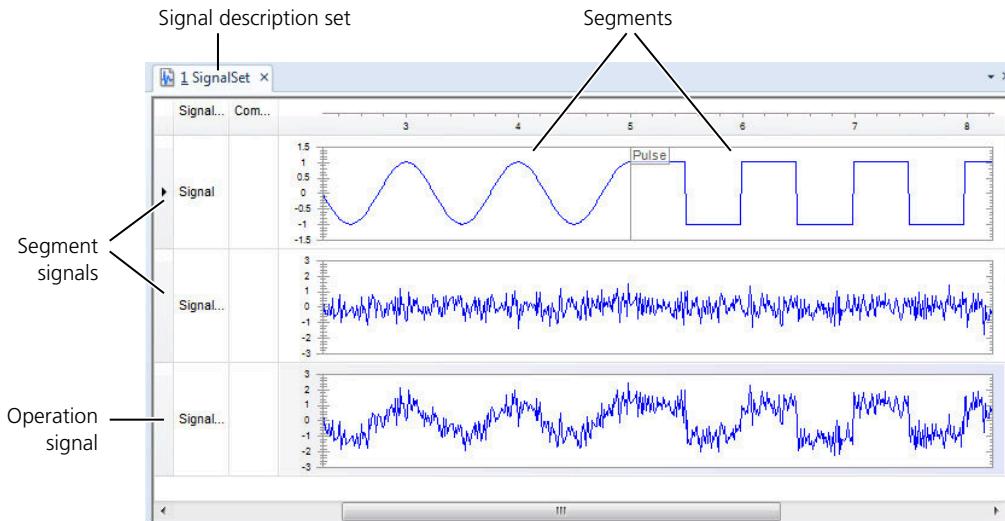
The Signal Selector controlbar lets you select signals and segments to create signal description sets via drag & drop.



For detailed information on segments, refer to [Basics on Segments](#) on page 25.

Elements of a signal description set

The illustration below shows an example of an open signal description set and the elements it contains.



Segment signals A segment signal consists of segments which together make a composed signal shape. A segment signal must consist of at least one segment so that you can use it for stimulation.

Operation signals An operation signal is the result of an arithmetical operation between two other signals. So that you can use an operation signal, there should be at least one or two further signals in the signal description set to serve as operands for the operation. Operation signals themselves can also serve as operands, so that you can cascade operation signals.

Reusing signal description sets

To reuse a signal description set, you can copy its STZ file from the Signal Description Sets folder on project level to the Signal Generators folder on experiment level and vice versa via drag & drop. If you copy the STZ file of a mapped signal generator to the Signal Description Sets folder, the copied STZ file no longer contains the mapping information.

To make a copy of a signal description set within the same folder, drag it to the folder icon.

You can also import any STZ file to the Signal Description Sets folder or to the Signal Generators folder of your project. Refer to [Import Generator/Import Signal Generator](#) on page 172.

Related topics

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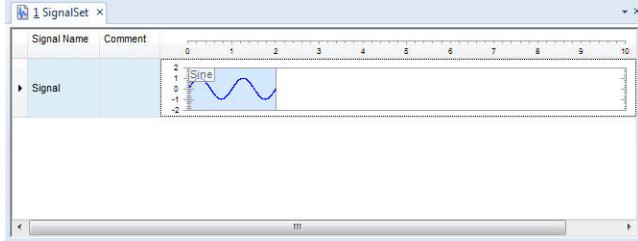
Basics on Segments

Introduction

A *segment* is the smallest unit that can be used to describe a signal shape.

Segment

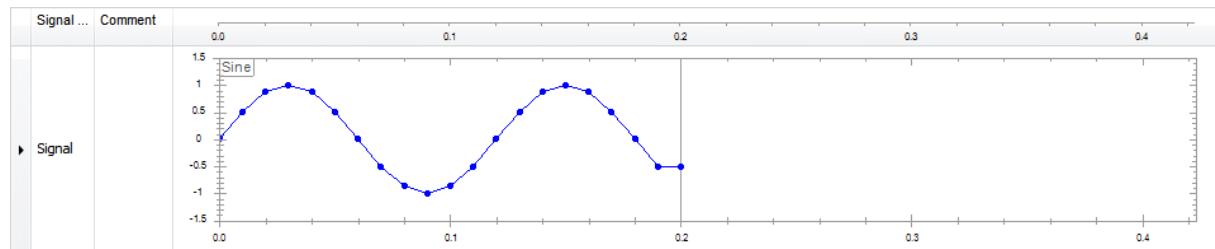
A segment must be placed in a *segment signal*, which in turn is part of a *signal description* set. Refer to the following example:



You can edit segment signals by dragging segments from the **Signal Selector** controlbar. You can add as many segments to a segment signal as you want.

You can configure a segment using the **Properties** controlbar.

In the Signal Editor, the signals are usually defined as continuous functions. In contrast to this, a signal generator can stimulate the model variables of a simulation application only in discrete model steps. Therefore, the stimulated signal values correspond to step functions. At the end of each segment, the last defined signal value is not stimulated. Instead of this value, the first value of the next segment is used. Even if no further segment follows, the last defined signal value is not stimulated. Refer to the following example:



Segment types

The **Signal Selector** controlbar offers different kinds of segments for configuring segment signals:

Segments for synthetic signal shapes

Name	Symbol	Description
Const		To specify a constant segment. For details, refer to Const (Segment) on page 85.
Exponential		To specify an exponential segment. For details, refer to Exponential (Segment) on page 89.
Idle		To specify an idle time without any signal value. For details, refer to Idle (Segment) on page 91.
Noise		To specify a noisy segment. For details, refer to Noise (Segment) on page 95.

Name	Symbol	Description
Pulse		To specify a square-wave segment. For details, refer to Pulse (Segment) on page 98.
Ramp		To specify a ramp-shaped segment via a start and a stop value. For details, refer to Ramp (Segment) on page 100.
RampSlope		To specify a ramp-shaped segment via a slope. For details, refer to Ramp Slope (Segment) on page 102.
Sawtooth		To specify a sawtooth segment. For details, refer to Sawtooth (Segment) on page 104.
Sine		To specify a sine segment. For details, refer to Sine (Segment) on page 108.

Segments for operations

Name	Symbol	Description
Loop		To execute segments several times during simulation. For details, refer to How to Execute Segments or Signals Several Times on page 38.
Operation		To perform an arithmetic operation with two other segments. For details, refer to How to Create and Configure an Operation Segment on page 34.

Segments for numerical data

Name	Symbol	Description
Data File		To specify a segment's content via a linked MF4 data file. For details, refer to How to Create and Configure a Data File Segment on page 50.
Signal Value		To specify a segment's content via the numerical signal data of a MAT file. For details, refer to How to Create and Configure a Signal Value Segment on page 53.

Related topics

Basics

[Basics on Editing Signal Description Sets](#).....24

HowTos

[How to Create and Configure a Segment Signal](#).....29

References

[Signal Description Set and Signals](#).....76

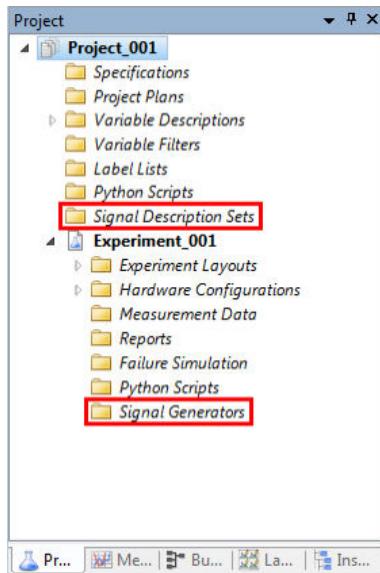
How to Create a Signal Description Set

Objective

You have to create a *signal description set* [?](#) in your project as a container for *signals* [?](#).

Basics

You can create, import, and remove signal description sets as children of the Signal Description Sets folder and the Signal Generators folder.



Preconditions

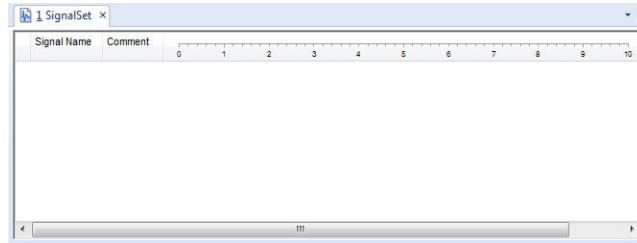
- To create a signal description set in the Signal Description Sets folder, a project must be available in the [Project](#) [?](#) controlbar.
- To create a signal description set as a *signal generator* in the Signal Generators folder, a project containing an experiment must be available in the [Project](#) [?](#) controlbar.

Method

To create a signal description set

- In the Project controlbar, navigate to the Signal Description Sets folder or the Signal Generators folder.
- From the folder's context menu, select Insert Signal Description Set.

A new signal description set appears as an *STZ file* in the folder and opens automatically in the working area.



Result

You created an empty signal description set, which ControlDesk automatically opened in the working area.

Tip

- You can import an STZ file as a signal description set. Select Import from the context menu of the Signal Description Sets folder or the Signal Generators folder.
- To reuse a signal description set, you can copy its STZ file from the Signal Description Sets folder on project level to the Signal Generators folder on experiment level and vice versa via drag & drop. If you copy the STZ file of a mapped signal generator to the Signal Description Sets folder, the copied STZ file no longer contains the mapping information.
- To make a copy of a signal description set within the same folder, drag it to the folder icon.

Next steps

You can create and configure a Segment Signal. Refer to [How to Create and Configure a Segment Signal](#) on page 29.

Related topics

Basics

[Basics on Signal Description Sets and Signal Generators](#)..... 16

References

[Insert Generator/Insert Signal Generator](#)..... 173

How to Create and Configure a Segment Signal

Objective

You have to create a segment signal in a *signal description set* as a container for *segments* .

Basics

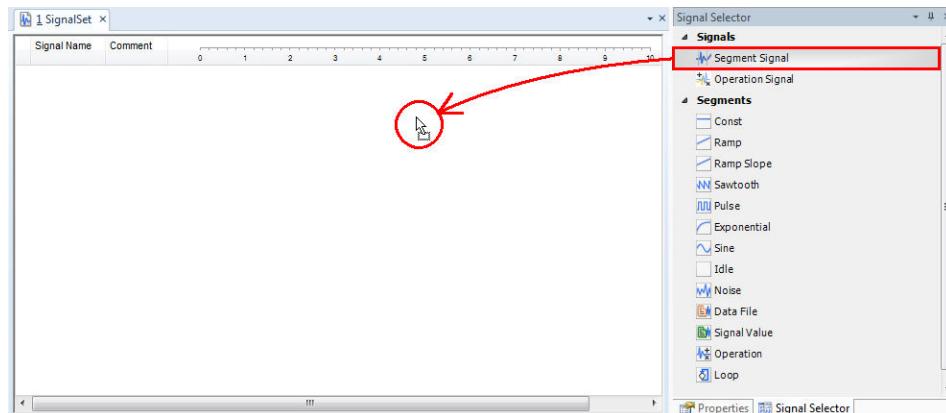
A Segment Signal is part of a signal description set and consists of at least one segment.

Preconditions

A signal description set must be opened in the working area. For details, refer to [How to Create a Signal Description Set](#) on page 28.

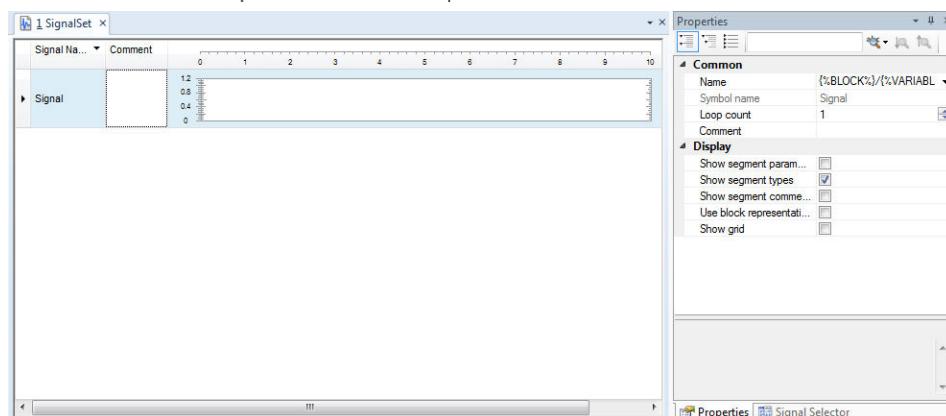
Method**To create and configure a segment signal**

- 1 On the View ribbon, click Controlbar – Switch Controlbars - Signal Selector to open the Signal Selector controlbar.
- 2 Double-click a  Segment Signal in the controlbar or drag the  Segment Signal from the controlbar onto an open signal description set.



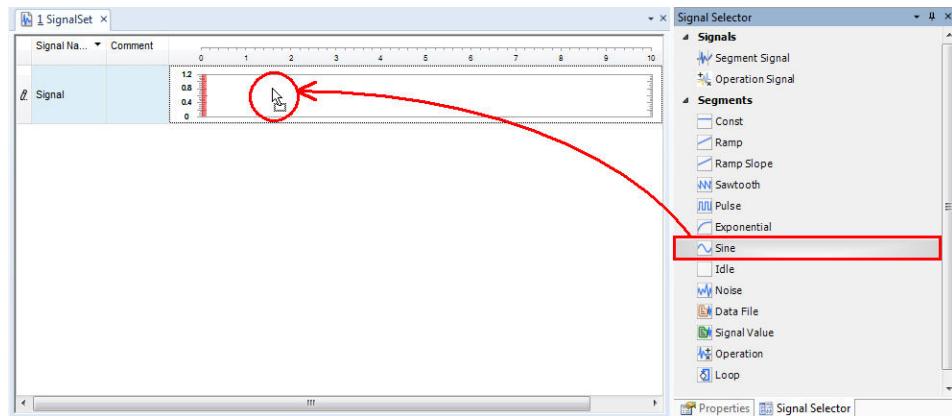
An empty segment signal appears in the signal description set.

- 3 From the context menu of the signal, select Signal Properties. The Properties controlbar opens.



- 4 Specify the signal's properties in the Properties controlbar.
- 5 Drag a segment from the Signal Selector controlbar onto the empty signal.

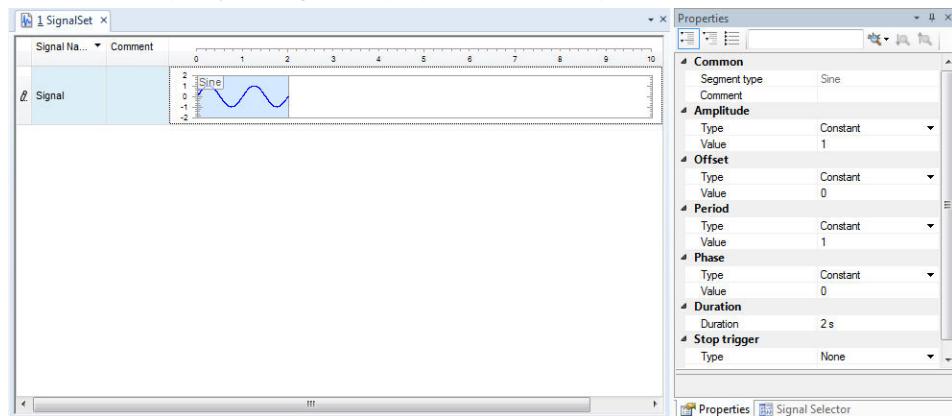
The insertion point of the segment is marked with a red bar.



Alternatively, you can also double-click the segment to insert it in the selected signal.

The segment appears in the signal.

6 Specify the segment's properties in the Properties controlbar.



Result

You created and configured a segment signal containing one segment.

Next steps

- You can add further segments to the signal.
- You can add further Segment Signals to the signal description set.
- You can create and configure an Operation Signal, refer to [How to Create and Configure an Operation Signal](#) on page 35.

Related topics

Basics

Basics on Editing Signal Description Sets.....	24
Basics on Segments.....	25

Moving or Copying Signals and Segments.....	32
---	----

References

Segment Signal.....	81
Signal Description Set and Signals.....	76

Moving or Copying Signals and Segments

Introduction

In ControlDesk's working area, you can move or copy signals  and segments .

Basics

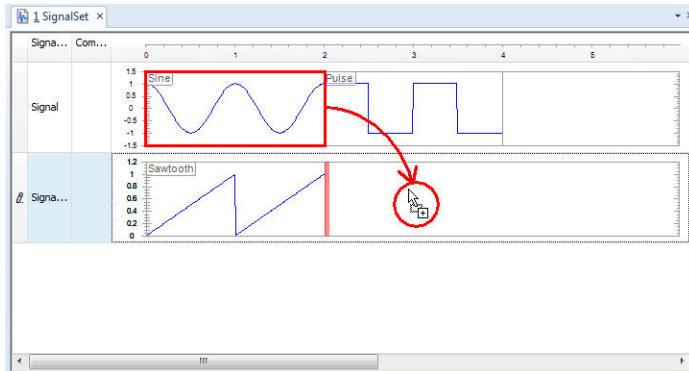
You can move or copy signals and segments via Windows® shortcuts or drag & drop.

You can use the **Shift** key or the **Ctrl** key for multiselection.

To delete a signal or segment, select it with the mouse and press the **DEL** key.

Moving or copying signals and segments via drag & drop

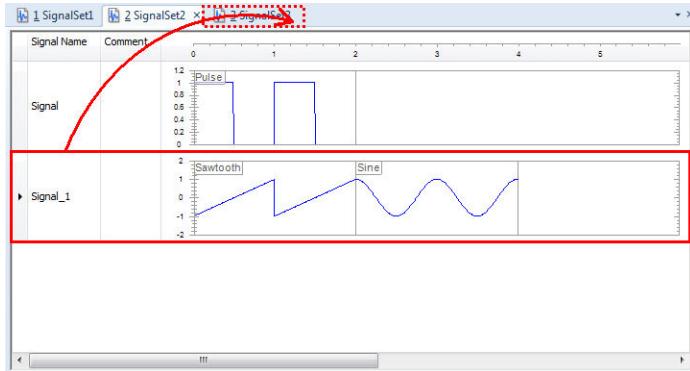
- To move via drag & drop, click a signal's frame or a segment and hold down the left mouse button while moving.
- To copy via drag & drop, also press the **Ctrl** key while dropping the signal/segment.



The insertion point of a segment or signal is marked with a red bar.

Moving or copying signals and segments to other signal description sets

You can also move or copy signals and segments to other signal description sets by moving the mouse over the tabbed pages.

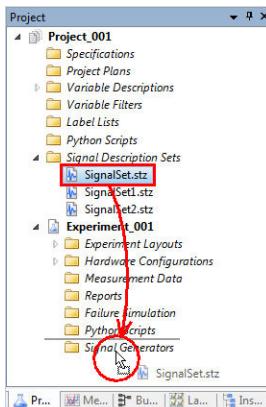


Multiselection of segments/signals

You can use the multiselection of segments/signals to change the common properties for all the selected segments/signals at once.

Copying all the signals of one or more signal description sets

You can copy all the signals of one or more signal description sets on project level to an existing signal generator on experiment level via drag & drop. All the signals are merged in the signal generator.



This is an easy way to configure complex signal generators.

Related topics

HowTos

[How to Create and Configure a Segment Signal.....](#) 29

How to Create and Configure an Operation Segment

Objective

You can use operation segments to perform arithmetical operations between segments.

Basics

Segments can be combined by operations. For example, you can add a Sine segment to a Ramp segment. For this purpose, you can use the Operation segment, which performs the arithmetical operation and displays the result.

The length of the Operation segment is determined by the shorter operand.

Precondition

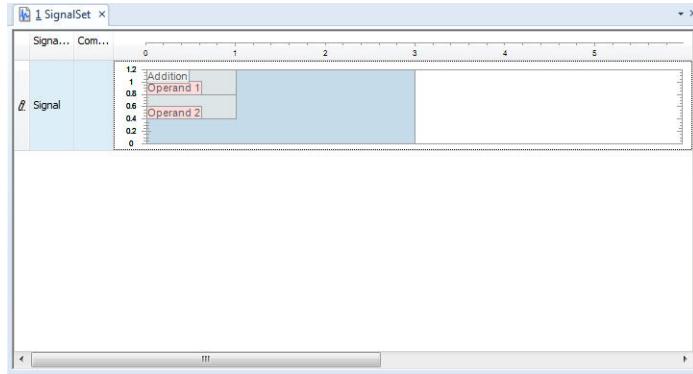
A signal description set containing at least one segment signal must be opened in the working area. For details, refer to [How to Create a Signal Description Set](#) on page 28.

Method

To create and configure an operation segment

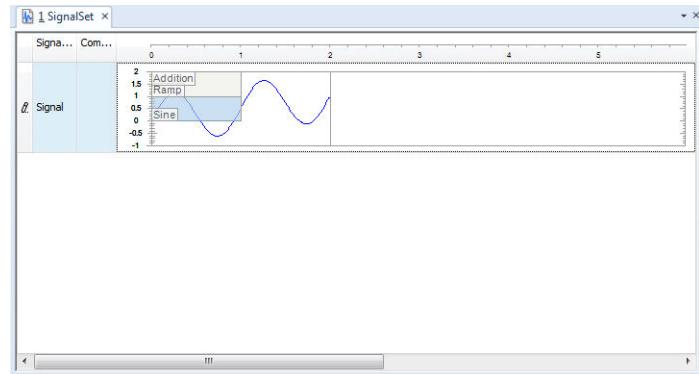
- 1 Drag an  Operation segment from the Signal Selector controlbar onto a segment signal.

An empty Operation segment appears in the signal.

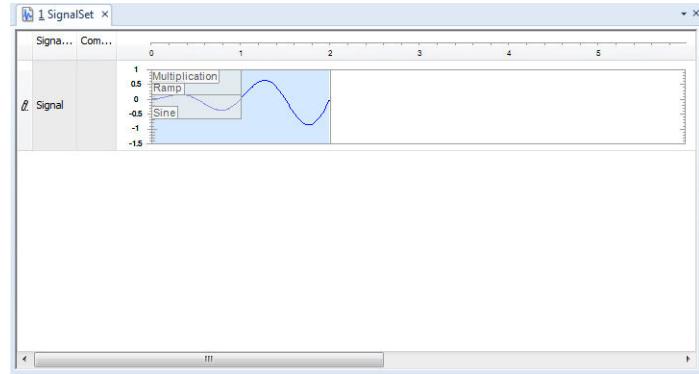


- 2 To define the segment's operands, drag & drop two other segments onto the Operand 1 and Operand 2 fields, for example, the Ramp and the Sine segment.

The result of the operation is displayed.



- 3 To change the operation, open the Properties controlbar and modify the Operation parameter, for example, from *Addition* to *Multiplication*.



Result

You created and configured an Operation segment.

Related topics

Basics

Basics on Segments.....	25
-------------------------	----

References

Operation (Segment).....	96
Operation Property.....	125

How to Create and Configure an Operation Signal

Objective

You can use [operation signals](#) to perform arithmetical operations between signals.

Basics

You can add or multiply [signals](#) by means of an operation signal. The operation signal displays the result of the arithmetical operation. For example, you can add a noisy signal or an offset signal to another signal.

You cannot add any segment to an operation signal. Unlike [segment signals](#), the operation signal has a frame that is highlighted with a color gradient.

Preconditions

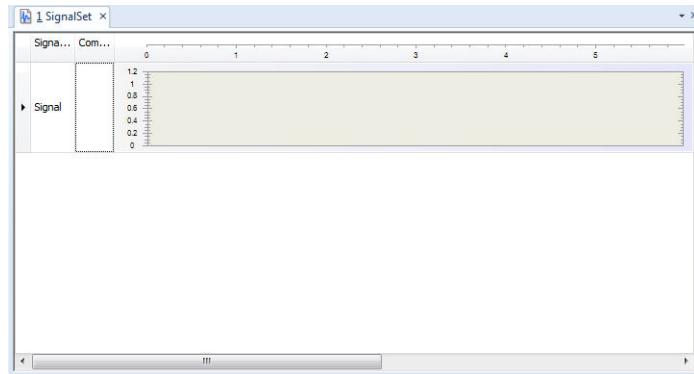
A [signal description set](#) containing at least one or two signals must be opened in the working area. For details, refer to [How to Create a Signal Description Set](#) on page 28 and [How to Create and Configure a Segment Signal](#) on page 29.

Method

To create and configure an operation signal

- 1 Drag an  Operation Signal from the Signal Selector controlbar underneath the existing signals of a signal description set or a signal generator.

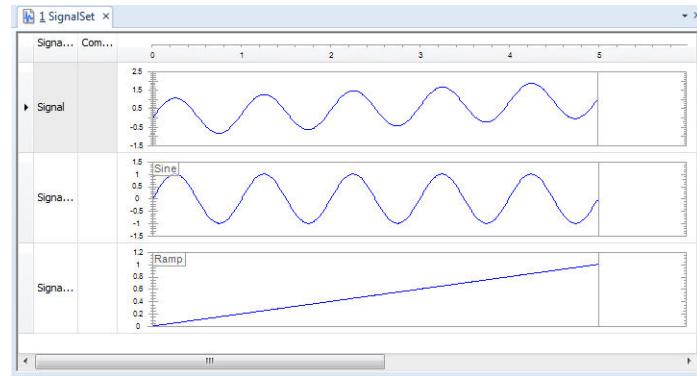
An empty operation signal appears in the signal description set.



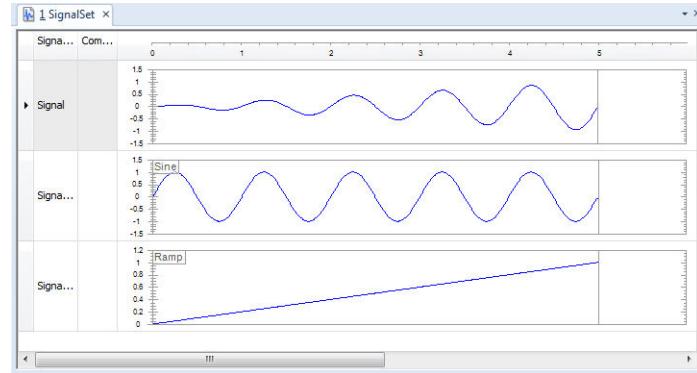
- 2 From the context menu of the operation signal, select **Signal Properties**.
The Properties controlbar opens.
- 3 Select a signal for the **Operand 1** parameter.

4 Select a signal for the Operand 2 parameter.

The result of the operation, such as the addition of a ramp and a sine, is displayed immediately.



5 To change the operation, modify the Operation parameter in the Properties controlbar, for example, from Addition to Multiplication.



Result

You created and configured an operation signal.

Tip

You can also use an operation signal as Operand 1/Operand 2 to cascade operation signals.

Related topics

Basics

[Basics on Editing Signal Description Sets.....](#) 24

References

Operand 1/Operand 2 Property.....	125
Operation Property.....	125
Operation Signal.....	80

How to Execute Segments or Signals Several Times

Objective

Segments [?](#) and signals [?](#) can be configured to be executed several times during simulation.

Preconditions

A signal description set containing at least one segment signal must be opened in the working area. For details, refer to [How to Create a Signal Description Set](#) on page 28 and [How to Create and Configure a Segment Signal](#) on page 29.

Possible methods

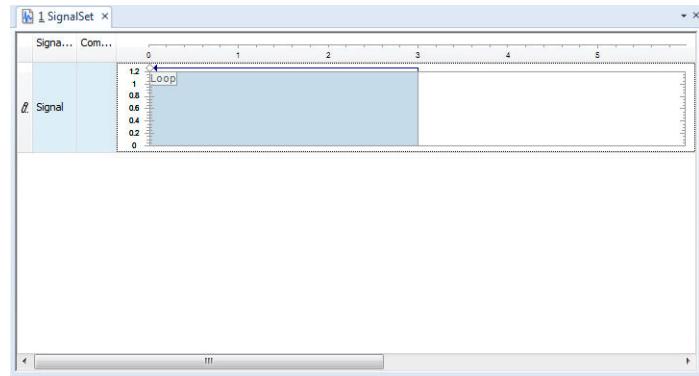
- To execute segments several times, refer to Method 1.
- To execute a signal several times, refer to Method 2.

Method 1

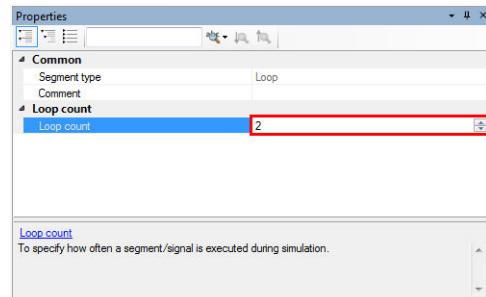
To execute segments several times

- 1 Drag a  Loop segment from the Signal Selector controlbar onto a segment signal.

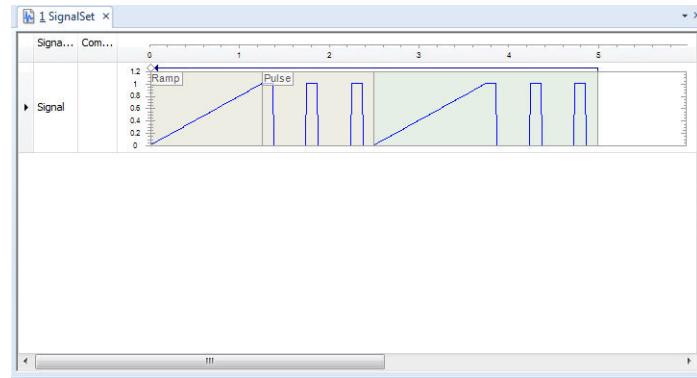
An empty Loop segment appears in the signal.



- 2 Drag one or more segments from the Signal Selector controlbar onto the Loop segment.
- 3 Open the Properties controlbar for the Loop segment.
- 4 Set the Loop count property to the value of how often you want to execute the Loop segment with all its contained segments.



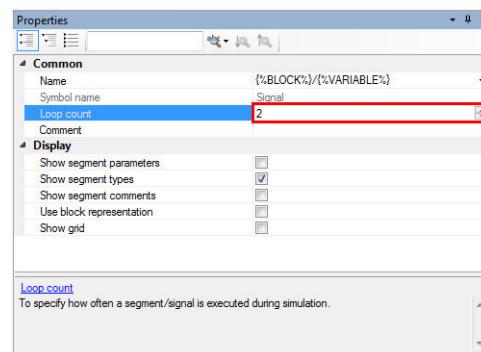
The Loop segment appears in the signal as often as you set with the Loop count property. The repeated Loop segments are grayed out to distinguish them from the genuine segment.



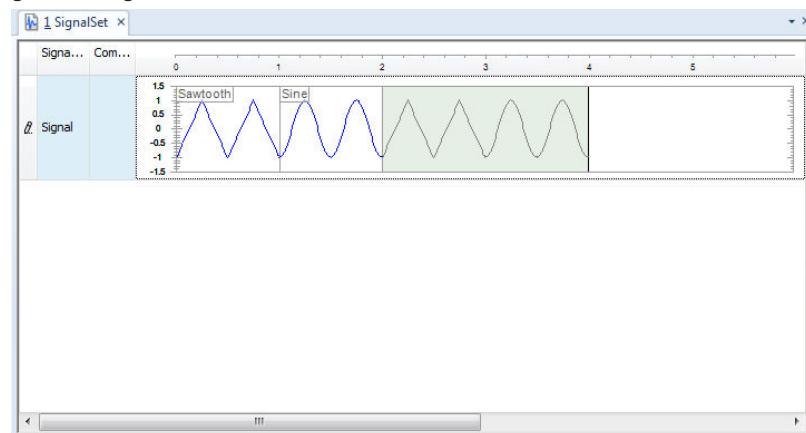
Method 2

To execute a signal several times

- 1 Open the Properties controlbar for the signal.
- 2 Set the Loop count property to the value of how often you want to execute the signal with all its contained segments.



The signal's segments appear as often as you set with the Loop count property. The repeated segments are grayed out to distinguish them from the genuine segments.



Result	You configured segments or signals to be executed several times during simulation.
---------------	--

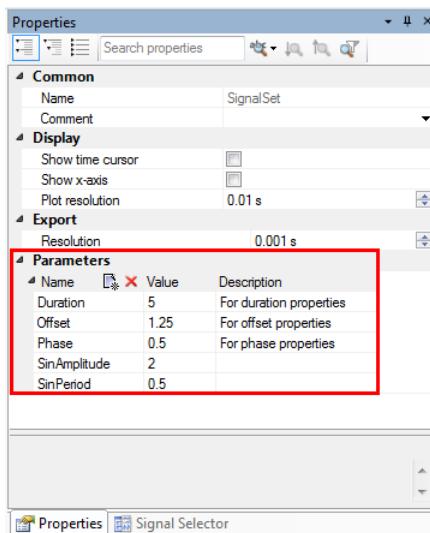
Related topics	Basics
	Basics on Segments25
	References
	Loop (Segment)93 Loop Count Property121

Specifying Constant Properties of Segments via Parameters

Introduction	For each signal description set , you can define a list of global parameters. These parameters can be used to specify constant properties of segments, such as value or duration properties.
---------------------	--

Specifying global parameters	You can centrally specify constant properties via global parameters for all segments of a signal description set. If you modify the value of a global parameter later, all constant properties that use this parameter are changed automatically. Therefore, you do not have to change any of them manually.
-------------------------------------	--

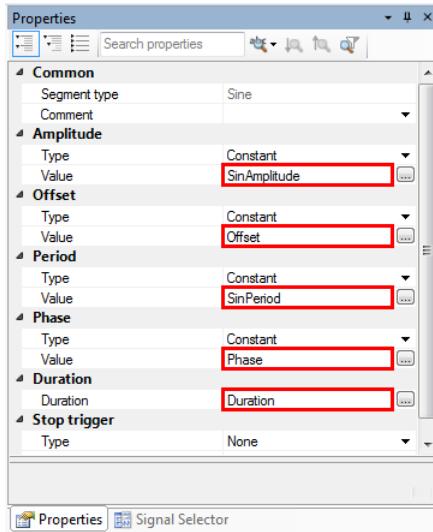
You edit the global parameters in the **Parameters** property list of the signal description set in the **Properties** controlbar. Refer to the following example.



Do not use the reserved words **Infinity** and **INF**, or the names of mathematical functions, such as **sin**, as parameter names.

Using parameters for constant properties

You can use the global parameters to specify constant properties of segments as often as you want. Refer to the following example, which shows the properties of a Sine segment.

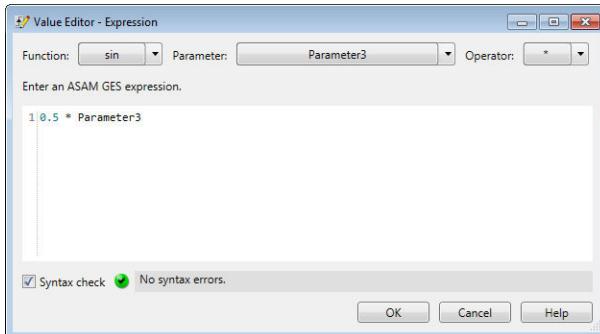


The parameter's name is edited directly in the edit field of the related constant property. The parameter's name is *not linked* to the Parameters property list of the signal description set. Therefore, if you change the parameter's name in the Parameters property list later, the setting for the constant property becomes invalid.

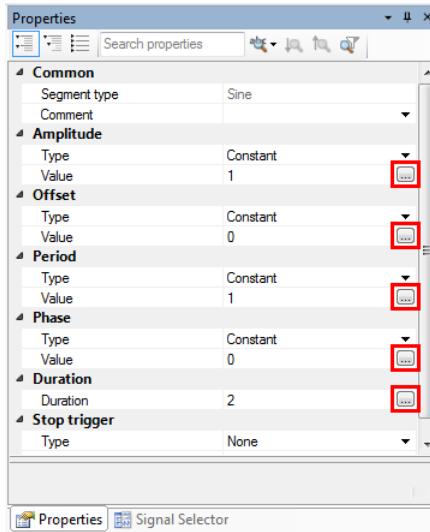
Value Editor for expressions

You can also use parameters in expressions that are edited in the ASAM General Expression Syntax (GES). This lets you specify values for constant properties by using parameters with operators and functions, such as **+** or **sin()**.

To edit expressions according to the ASAM General Expression Syntax (GES), you can use the Value Editor for expressions.



In the Properties controlbar of the related segment, you can open the Value Editor via the Browse buttons in the rows of the constant properties. Refer to the following example.



For more information, refer to [Value Editor – Expression](#) on page 145.

Related topics

References

Parameters Property.....	126
Value Editor – Expression.....	145

How to Specify and Modify a Constant Property via a Parameter

Objective

You can specify and modify constant properties centrally via the global parameters of a signal description set.

Workflow

To specify and modify a constant property via a parameter, perform the following workflow:

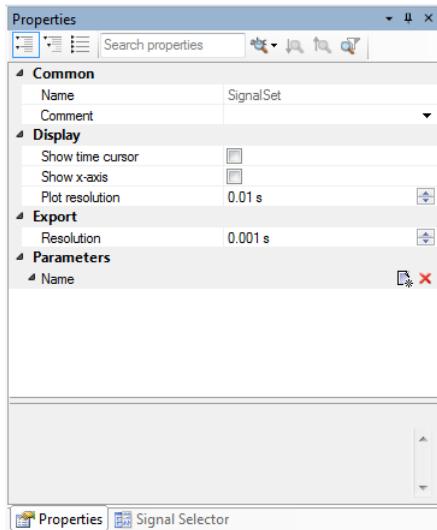
- Specify a parameter. Refer to [Part 1](#) on page 43.
- Specify constant properties via a parameter. Refer to [Part 2](#) on page 44.
- Modify constant properties via a parameter. Refer to [Part 3](#) on page 46.

Part 1**To specify a parameter**

- 1** Open a signal description set in ControlDesk's working area.
- 2** Open the Properties controlbar for the signal description set.

Tip

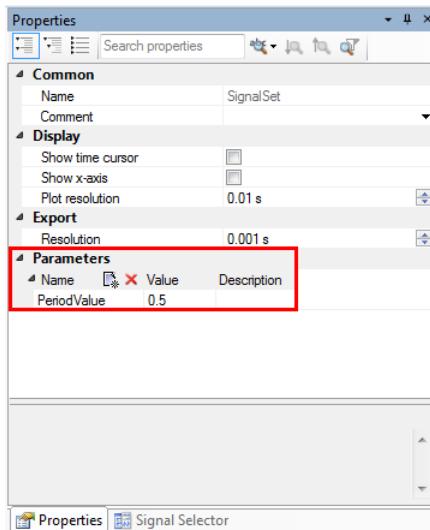
You can use the Properties command to open the Properties controlbar.



- 3** Click to add a new parameter to the Parameters property list.
- 4** Specify a Name for the parameter, for example, `PeriodValue`.
Do not use the reserved words `Infinity` and `INF`, or the names of mathematical functions, such as `sin`, as parameter names.
- 5** Specify a Value for the parameter, for example, `0.5`.
- 6** Specify a Description for the parameter if required.

Interim result

You created a new parameter in the Parameters property list. Refer to the following example.



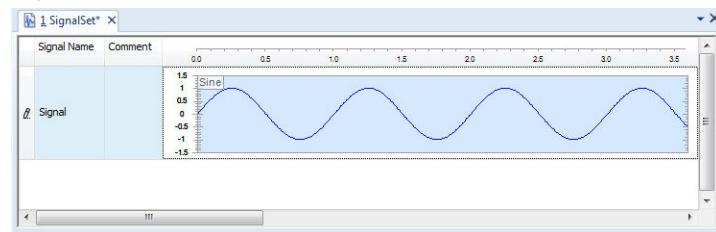
Tip

You can click to remove the (selected) parameter from the list.

Part 2

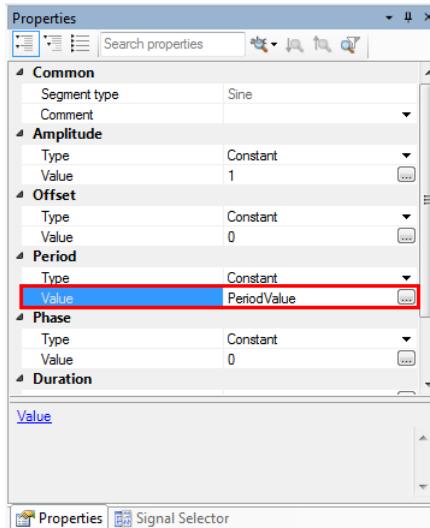
To specify constant properties via a parameter

- 1 In the signal description set, create a segment signal, for example, with a sine segment.



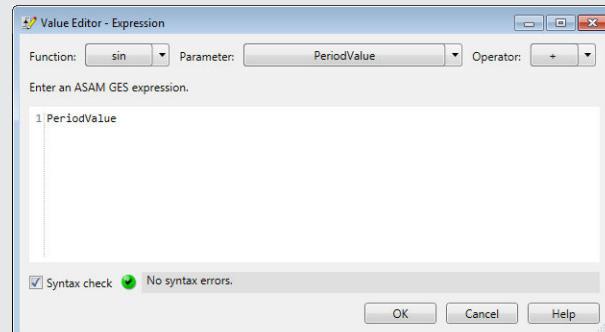
- 2 Open the Properties controlbar for the sine segment.

- 3 Specify a constant value, for example, the Period value, by typing the name of the specified parameter. In this example **PeriodValue**.



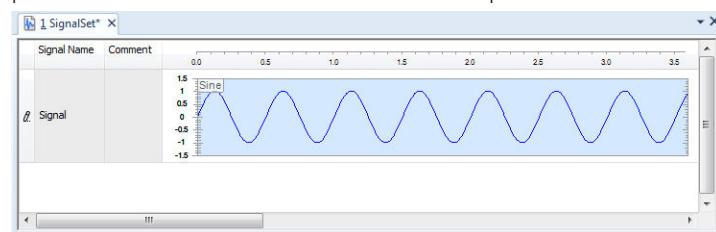
Tip

You can also click the Browse button to specify the value by means of the Value Editor for expressions.



For more information, refer to [Value Editor – Expression](#) on page 145.

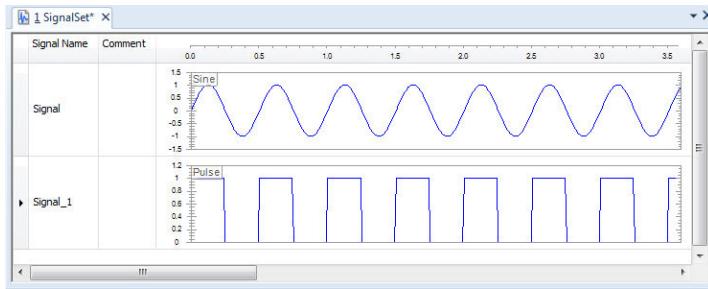
You specified a constant value via a parameter. In this example, the segment's period is set to the value of the **PeriodValue** parameter.



- 4 Repeat steps 1 ... 3 to create a second segment signal with a pulse segment.

Interim result

In this example, you specified the period of two segments by means of a parameter called **PeriodValue**.



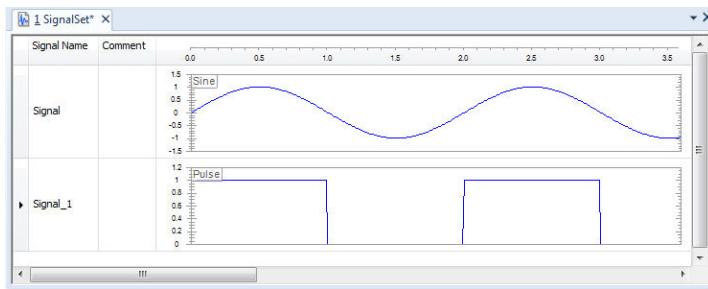
Part 3

To modify constant properties via a parameter

- 1 Open the Properties controlbar for the signal description set.
- 2 In this example, in the Parameters property list, change the **PeriodValue** parameter to 2.

Result

The periods of the two segments take on the new value of the **PeriodValue** parameter.



Related topics

Basics

[Specifying Constant Properties of Segments via Parameters.....](#) 40

References

[Parameters Property.....](#) 126
[Value Editor – Expression.....](#) 145

Replaying Numerical Data

Introduction

You can replay numerical data in a real-time model.

Where to go from here

Information in this section

[Basics on Numerical Data Replay](#)..... 47

To replay numerical data, you have to specify an interpolation method. This is necessary because the [raster](#) of the numerical data and the model steps (sampling steps) can differ.

[How to Create and Configure a Data File Segment](#)..... 50

You can use numerical signal data stored in MF4 files to specify [signals](#).

[How to Create and Configure a Signal Value Segment](#)..... 53

You can use numerical signal data of MAT files to specify [signals](#).

Basics on Numerical Data Replay

Introduction

To replay numerical data, you have to specify an interpolation method. This is necessary because the [raster](#) of the numerical data and the model steps (sampling steps) can differ.

Segment types for numerical data replay

To replay numerical data, the Signal Editor provides the following segment types:

Segment Type	Purpose
Data File Refer to Data File (Segment) on page 86.	To specify a segment's content via a linked MF4 data file.
Signal Value Refer to Signal Value (Segment) on page 106.	To specify a segment's content via the numerical signal data of a MAT file.

Supported interpolation methods

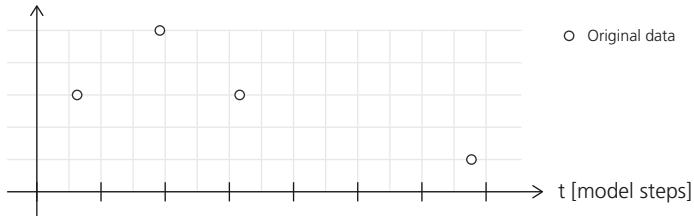
The following interpolation methods for numerical data replay are supported by the Signal Editor:

- [eBACKWARD](#) to use the current recorded data point as the data point of the next model step.

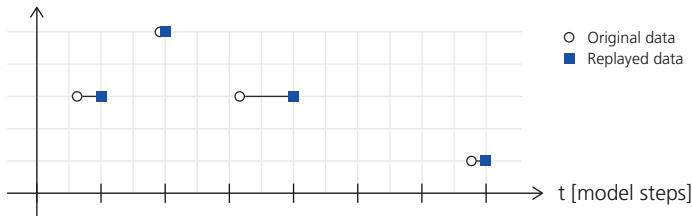
- **eLINEAR** to use linear interpolation between the recorded data points to get the data points for the single model steps.

The following illustrations show how these interpolation methods work.

Example of recorded numerical data

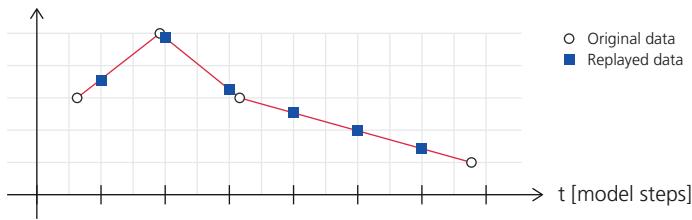


Replayed numerical data with eBACKWARD interpolation The following example illustrates the operation of the eBACKWARD interpolation method:



With eBACKWARD interpolation, data might not be written in each model step. Refer to Specifics of the eBACKWARD interpolation method.

Replayed numerical data with eLINEAR interpolation The following example illustrates the operation of the eLINEAR interpolation method:

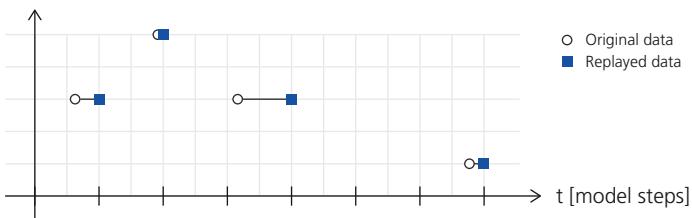


With eLINEAR interpolation, data is written in each model step.

For a detailed description of the interpolation methods, refer to [Replay Mode \(Real-Time Testing Guide\)](#).

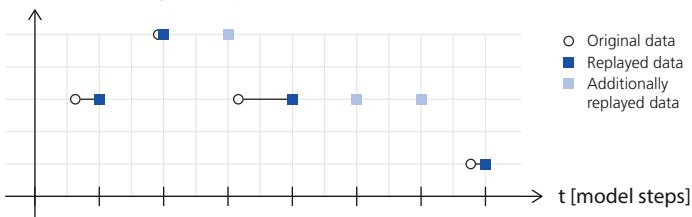
Specifics of the eBACKWARD interpolation method

If you use eBACKWARD interpolation for numerical data replay, the variable to be stimulated is not written by the used signal generator in each model step. It is written only if new data is available. There can be a number of sample steps when the variable might not be (re)written by the signal generator, refer to the following example.



Combining eBACKWARD interpolation with an arithmetic operation

To avoid variables being overwritten, for example, by the model itself or an RTT sequence, you can use the eBACKWARD interpolation method in combination with an additional arithmetic operation – in this case, a multiplication by 1. As the result of this operation, the variable is (re)written in each model step. Refer to the following example:



A multiplication by 1 can be done in conjunction with the Const segment and an Operation segment or an Operation Signal. In both cases the following statements apply:

1. The numerical data replay is used as Operand 1.
2. The Const (with a constant equal to 1) is used as Operand 2.
3. Multiplication is used as the Operation property.

For further information, refer to:

- [How to Create and Configure an Operation Segment](#) on page 34.
- [How to Create and Configure an Operation Signal](#) on page 35.

Related topics

HowTos

How to Create and Configure a Data File Segment	50
How to Create and Configure a Signal Value Segment	53

References

Data File (Segment)	86
Interpolation Property	121
Signal Value (Segment)	106

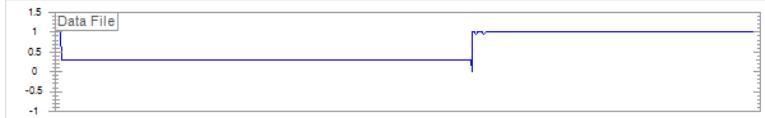
How to Create and Configure a Data File Segment

Objective

You can use numerical signal data stored in MF4 files to specify [signals](#).

Basics

The Data File segment lets you use and replay numerical signal data that is stored in a linked MF4 file.



An MF4 file is typically a measurement data file that contains measured signals and one or more time axes or raster information.

The signal data of the MF4 file is not copied to the Data File segment or the ControlDesk experiment. The Data File segment only displays the data of the linked MF4 file. This link mechanism lets you switch easily between different numerical data, for example, by using a newer measurement data file for the signal description. You can refresh the display of the data of the linked MF4 file by using the Refresh command. The display is automatically refreshed when you download the related signal generator.

The properties of the Data File let you specify a value range of the data file to be replayed.

You can also reuse the same MF4 file with different ranges or channels in other Data File segments.

Precondition

A signal description set that contains at least one segment signal must be opened in the working area. For details, refer to [How to Create a Signal Description Set](#) on page 28 and [How to Create and Configure a Segment Signal](#) on page 29.

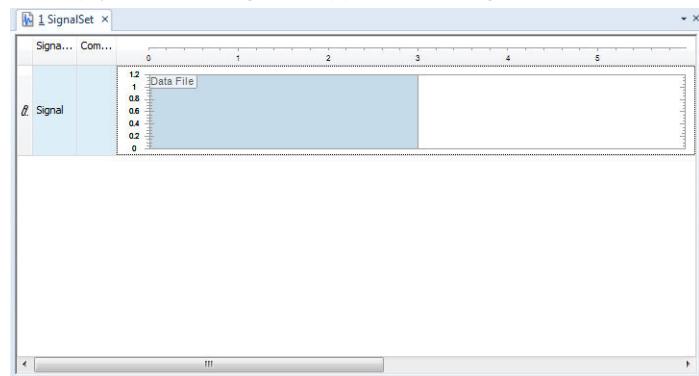
Restriction

- If you use the segment for stimulus control, the data of the segment is streamed from the host PC to the simulation platform. For DS1006-based modular systems, data streaming from the host PC via Ethernet is not recommended due to limited performance. The recommended connection between the host PC and a DS1006-based modular system is a bus connection.
- When numerical data is replayed on a simulation platform, all signals from the same [measurement raster](#) are combined to one data stream from the host PC to the platform. The number of data streams is limited and depends on the platform hardware.
To reduce the number of data streams, use signals from the same measurement raster. Each raster corresponds to a *group name* in the MF4 file. Refer to [Problem when Using Too Many Data Streams](#) on page 203.

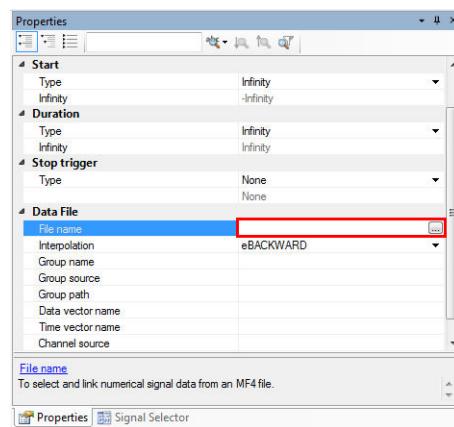
Method**To create and configure a Data File segment**

- 1 Drag a  Data File segment from the Signal Selector controlbar onto a segment signal.

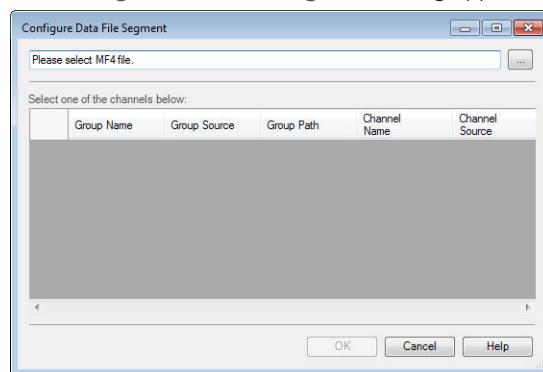
An empty Data File segment appears in the signal.



- 2 Open the Properties controlbar for this segment.
- 3 Click the Browse button for the File Name parameter.

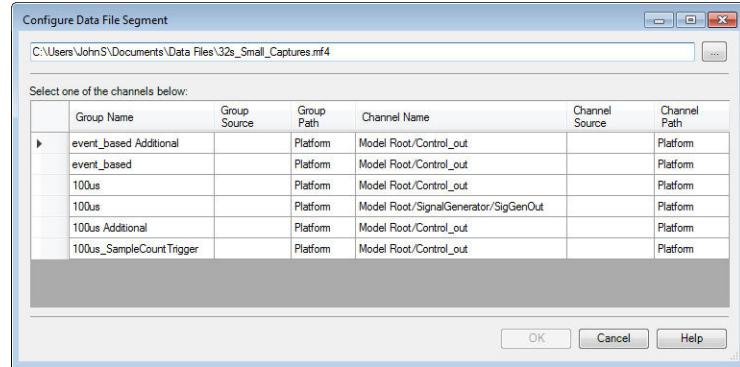


The Configure Data File Segment dialog appears.



- 4 Click the Browse button and select the MF4 file you want to use. The file format must be ASAM MDF 4.1.x.

The channels of the selected MF4 file appear in the dialog.



- 5 Select a table row to specify the channel of the MF4 file to be used.

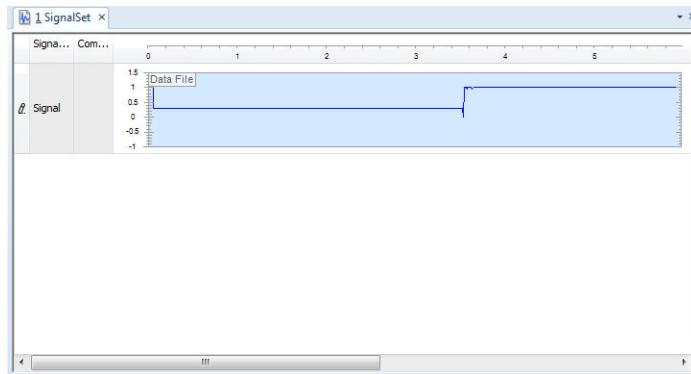
Tip

You can sort the displayed entries by clicking the table headers.

- 6 Click OK to use the selected channel of the MF4 file and close the dialog.
The Data File segment displays the linked numerical signal data.

Result

You created and configured a Data File segment (see the following example).



Related topics**Basics**

[Basics on Segments](#).....25

HowTos

[How to Create and Configure a Signal Value Segment](#).....53

References

[Data File \(Segment\)](#).....86

[File Name Property](#).....119

[Signal Value \(Segment\)](#).....106

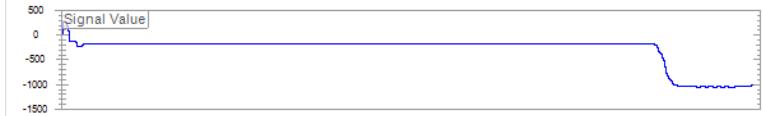
How to Create and Configure a Signal Value Segment

Objective

You can use numerical signal data of MAT files to specify [signals](#).

Basics

The Signal Value segment allows you to specify signals via numerical data.



You can import the data from a MAT file or reuse measurement data stored in the Measurement Data folder of an experiment. The segment's duration is defined by the data you use.

In a ControlDesk experiment, the imported numerical signal data is stored in a MAT file in parallel to the related signal descriptions set's STI file.

Preconditions

- A signal description set containing at least one segment signal must be opened in the working area. For details, refer to [How to Create a Signal Description Set](#) on page 28 and [How to Create and Configure a Segment Signal](#) on page 29.
- The MAT file you use must fulfill the following preconditions:
 - The MAT file must contain at least two one-dimensional arrays. One array must contain monotonically increasing values for the time axis (x-axis).
 - The data must be of 'double' type.
 - The MAT file can be used only if it does not contain a substructure.

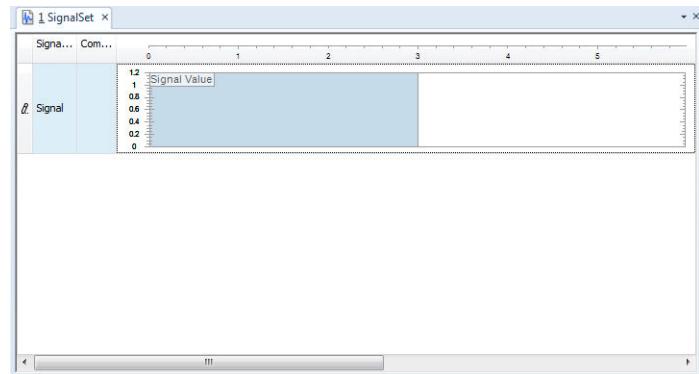
Restriction	<ul style="list-style-type: none">▪ If you use the segment for stimulus control, the data of the segment is streamed from the host PC to the simulation platform. For DS1006-based modular systems, data streaming from the host PC via Ethernet is not recommended due to limited performance. The recommended connection between the host PC and a DS1006-based modular system is a bus connection.▪ When numerical data is replayed on a simulation platform, all signals from the same time base are combined to one data stream from the host PC to the platform. The number of data streams is limited and depends on the platform hardware. <p>To reduce the number of data streams, use signals from the same time base. The MAT file vector selected as the segment signal's X-vector is used as the time base. Refer to Problem when Using Too Many Data Streams on page 203.</p>
Possible methods	<p>You can create and configure the Signal Value segment via</p> <ul style="list-style-type: none">▪ Imported numerical signal data from a data array stored in a MAT file, refer to Method 1.▪ Recorded measurement data stored in the Measurement Data folder of an experiment, refer to Method 2.

Method 1

To create and configure a Signal Value segment via MAT file import

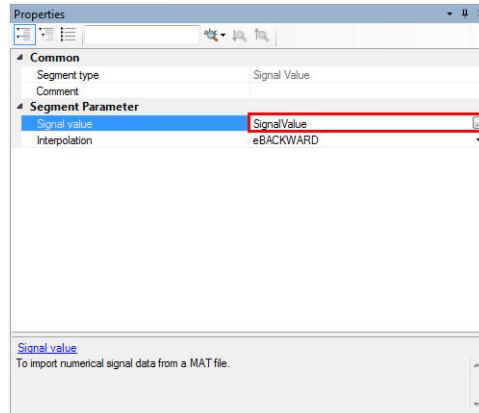
- 1 Drag a  Signal Value segment from the Signal Selector controlbar onto a segment signal.

An empty Signal Value segment appears in the signal.

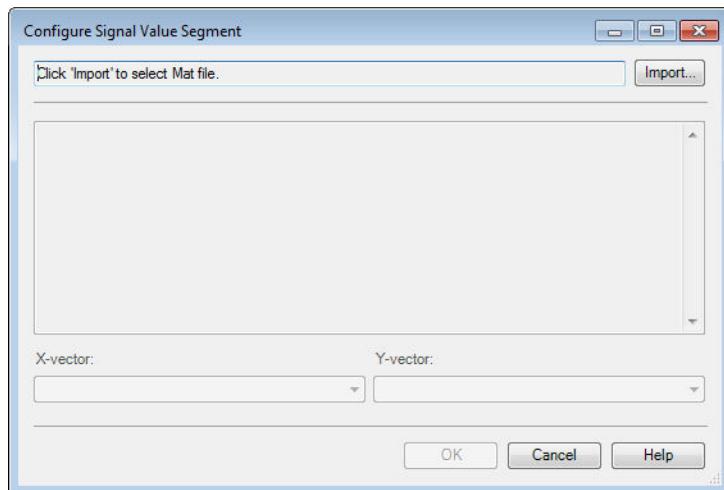


- 2 Open the Properties controlbar for this segment.

- 3 Click the SignalValue Browse button of the SignalValue parameter.



The Configure Signal Value Segment dialog appears.



- 4 Click Import to open the Open dialog.
- 5 In the Open dialog, navigate to the MAT file you want to import.
- 6 Click Open to confirm your selection and to close the dialog.
- 7 Specify the x-vector for the time axis (x-axis) and the y-vector for the corresponding signal values.
- 8 Click Finish to import the selected data and to close the dialog.

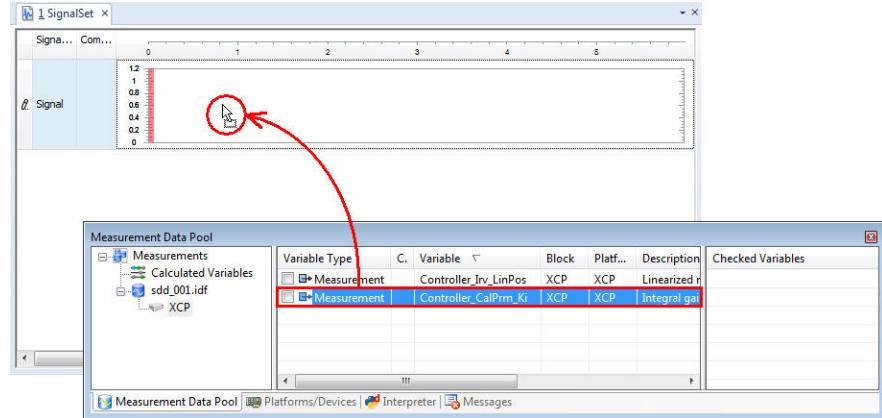
The Signal Value segment displays the imported numerical data.

Method 2

To create and configure a Signal Value segment via recorded data

- 1 In the **Project** controlbar, navigate to the Measurement Data folder.
- 2 Double-click a data file in the Measurement Data folder to open it in the Measurement Data Pool controlbar.
- 3 In the tree of the Measurement Data Pool controlbar, navigate to the variable you want to visualize.

4 Drag the variable onto a segment signal.



A Signal Value segment appears in the segment signal displaying the variable.

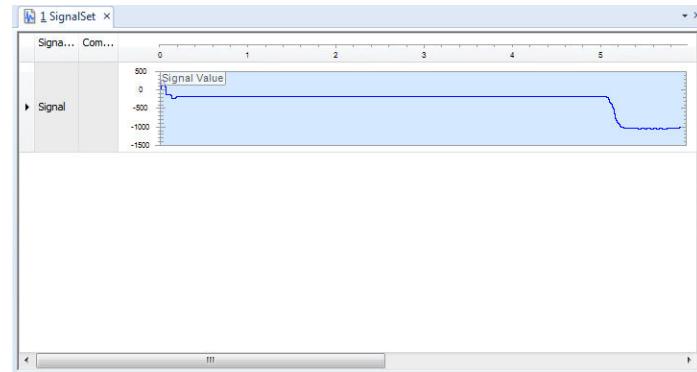
Tip

You can also drag the variable onto the empty area of the signal description set to create a new segment signal that contains the related Signal Value segment.

This signal is named according to the defined macros.

Result

You created and configured a Signal Value segment (see the following example).



Related topics**Basics**

Basics on Segments..... 25

HowTos

How to Create and Configure a Data File Segment..... 50

References

Measurement Data Pool (ControlDesk Measurement and Recording)  106
Signal Value (Segment)..... 106
Signal Value Property..... 134

Modifying the Visualization of Signals and Segments

Introduction You can modify the visualization of [signals](#) and [segments](#) in ControlDesk's working area.

Where to go from here	Information in this section
	<p>How to Zoom into a Signal..... 58 You can zoom into a signal.</p> <p>How to Stretch or Compress the Axes..... 60 You can stretch or compress the axes of the signals that are displayed in the working area.</p> <p>How to Scale Up or Down All the Signals..... 61 You can scale up or down all the signals that are displayed in the working area.</p>

How to Zoom into a Signal

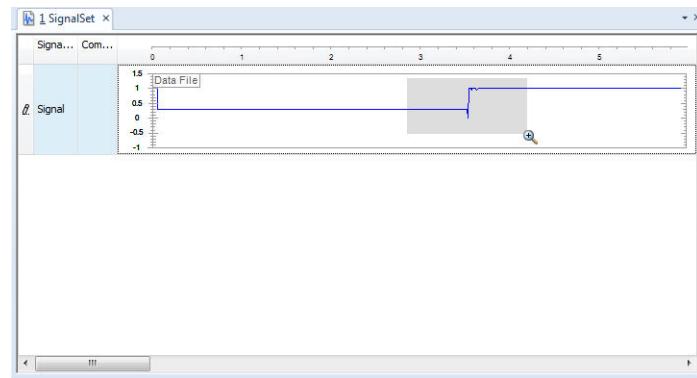
Objective You can zoom into a signal.

Precondition A signal description set containing at least one segment signal must be opened in the working area. For details, refer to [How to Create a Signal Description Set](#) on page 28.

Method **To zoom into a signal**

- 1 From a signal's or segment's context menu, select **Zoom Mode**.
A  mouse pointer indicates that the **Zoom Mode** is active.
- 2 Click into the signal, hold down the left mouse button and drag the mouse pointer.

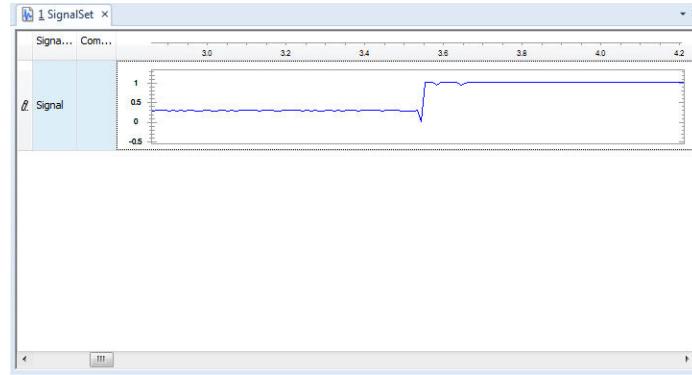
A dashed box highlights the section to zoom in.



- 3 Release the mouse button to display a zoomed view of the selected section.

Result

A zoomed view of the signal is displayed.



Tip

You can zoom out with the following commands:

- Fit to Screen
- Zoom to Default

Related topics

References

Fit to Screen.....	167
Zoom Mode.....	194
Zoom to Default.....	195

How to Stretch or Compress the Axes

Objective

You can stretch or compress the axes of the signals that are displayed in the working area.

Precondition

A signal description set that contains at least one signal must be open in the working area. For details, refer to [How to Create a Signal Description Set](#) on page 28.

Possible methods

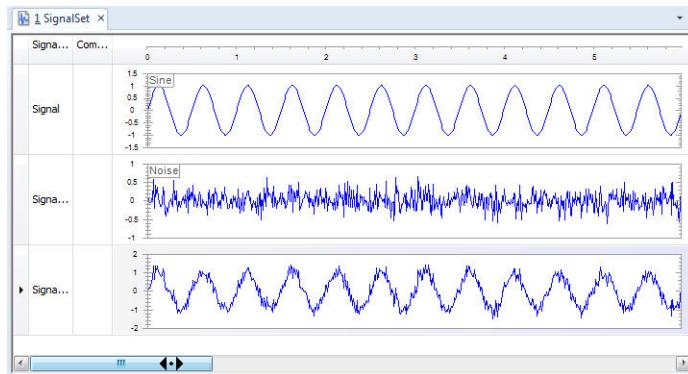
You can stretch or compress:

- The x-axes for all signals, refer to [Method 1](#) on page 60.
- The y-axes for all signals, refer to [Method 2](#) on page 60.
- The y-axis of a single signal, refer to [Method 3](#) on page 61.

Method 1

To stretch or compress the x-axes for all signals

- 1 ▪ If the Signal Editor is in *Select Mode*, move the mouse pointer over the *time scale* in the column header until it changes to a double arrow.
- Or press **Ctrl** and move the mouse pointer over the *horizontal scroll box* until it changes to a double arrow.



- 2 *Scroll up on the mouse wheel* to stretch the x-axes for all signals or down to compress them.

Method 2

To stretch or compress the y-axes for all signals

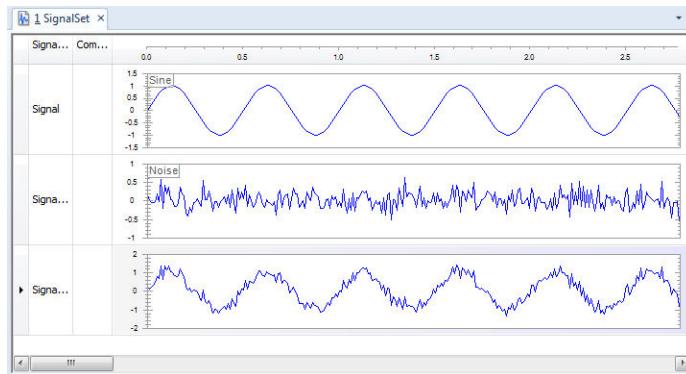
- 1 Press **Ctrl** and move the mouse pointer over the *vertical scroll box* until it changes to a double arrow.
- 2 *Scroll up on the mouse wheel* to stretch the y-axis of the signal display or down to compress it.

Method 3**To stretch or compress the y-axis of a single signal**

- 1 If the Signal Editor is in *Select Mode*, move the mouse pointer over the y-scale of a single signal until it changes to a double arrow.
 - 2 *Scroll up on the mouse wheel* to stretch the y-axis of the signal or down to compress it.
- Only the scale of the y-axis changes. The height of the signal row remains the same.

Result

You stretched or compressed the axes, refer to the following example.

**Tip**

You can zoom out with the following commands:

- Fit to Screen
- Zoom to Default

Related topics**References**

Fit to Screen.....	167
Select Mode.....	182
Zoom to Default.....	195

How to Scale Up or Down All the Signals

Objective

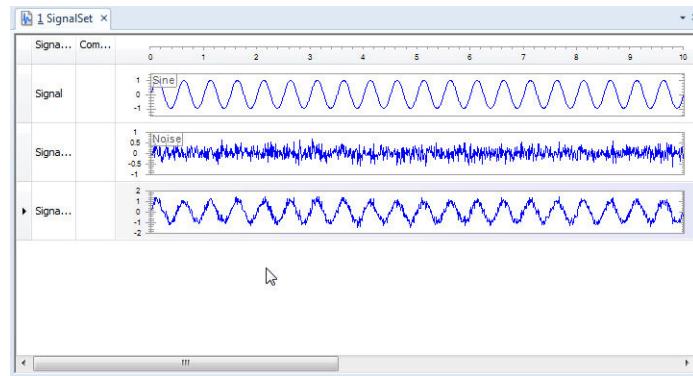
You can scale up or down all the signals that are displayed in the working area.

Precondition

A signal description set that contains at least one signal must be open in the working area. For details, refer to [How to Create a Signal Description Set](#) on page 28.

Method**To scale up or down all the signals**

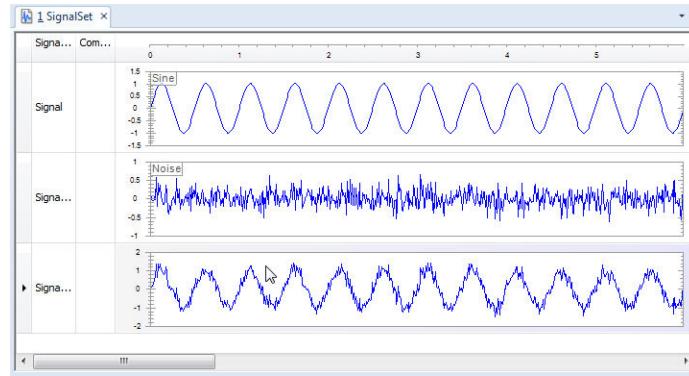
- 1 If the Signal Editor is in *Select Mode*, move the mouse to the working area (except to the horizontal scroll box and scroll bar). Refer to the following example.



- 2 Press **Ctrl** and *turn the mouse wheel* up or down to scale the signals that are displayed in the working area.

Result

You scaled the signals that are displayed in the working area up or down. Refer to the following example.



The x-axis and the y-axis are scaled with the same factor.

Related topics**References**

Select Mode	182
-----------------------------	-----

Mapping Variables to Signals and Aliases

Introduction	You can map variables to signals and variable aliases by using the Signal Mapping controlbar.
---------------------	---

Where to go from here	Information in this section
	Basics on Mapping Variables to Signals and Aliases63 To stimulate a model variable of a simulation application, you have to map the variable onto a signal generator.
	How to Map Variables65 You have to map variables to signals to configure a signal generator for stimulation.
	How to Reuse and Check an Existing Signal-to-Variable Mapping67 When you reload or replace the variable description of a platform, you can reuse an existing signal-to-variable mapping and check it for inconsistencies.

Basics on Mapping Variables to Signals and Aliases

Introduction	To stimulate a model variable of a simulation application  , you have to add the mapping information to the signal generator  .
---------------------	---

Basics on mapping	You can map model variables by dragging them from a variable description  displayed in the Variables onto a list entry of a signal generator displayed in the Signal Mapping controlbar.
--------------------------	---

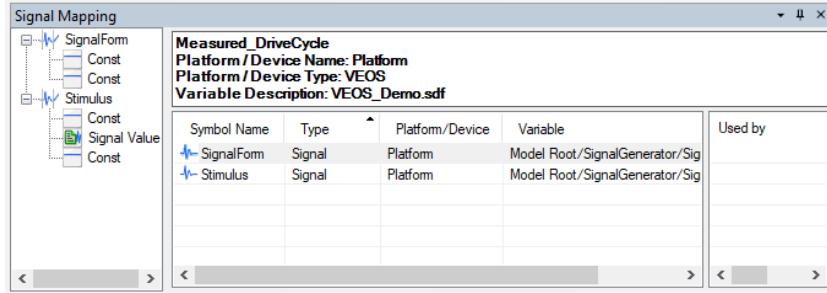
When you map the first variable to the signal generator, the name of the platform to which the variable belongs is added to the signal generator's STZ file. Then, you can only map variables from the same platform to the signal generator. The mapping information is stored in the STZ file.

Mapping variables in a multicore/multiprocessor application One signal generator can stimulate variables from different application processes of a multicore/multiprocessor (MP/MC) application.

This means that you can map variables from any application process of an MP/MC application to a signal generator.

Signal Mapping controlbar

The Signal Mapping controlbar displays all the *signals* and *variable aliases* which are used in a signal generator. The controlbar lets you map model variables to these signals and aliases.



The Signal Mapping controlbar consists of a signal tree and a table. The tree shows all the signals of a signal description set and the block representations of their segments. The table lists all the aliases and signals. Entries highlighted red indicate inconsistencies in the signal-to-variable mapping for the currently active variable description.

In addition to the entry in the Type column a signal is identified by an icon, and a variable alias by an icon.

The controlbar's Variable column displays the path of the mapped model variable. The Used by column displays the cross-reference(s) for the currently selected variable alias.

Note

You cannot perform mapping for signal description sets (STZ files) which are located in the Signal Description Sets folder. The Signal Mapping controlbar is grayed out.

For each signal of a signal generator that is opened in the working area, you can highlight the related mapping in the Signal Mapping via the Select Mapping command.

Variable aliases

Variable aliases let you control segment parameters by model parameters of a simulation application. For example, an alias lets you set a segment's amplitude dynamically by reading it from a model parameter of the simulation application.

An alias serves as a placeholder when you use it to specify the Parameter type of a Segment parameter. When you run a signal generator on the simulation platform, the value of the model parameter is read from the simulation application and written to the alias/segment parameter at every sampling step.

If you open a signal generator, the Signal Mapping controlbar displays all the created variable aliases and their usage. You can map a model variable to a variable alias by dragging it from a variable description (SDF file) displayed in the Variables.

Related topics**HowTos**

How to Map Variables.....	65
How to Reuse and Check an Existing Signal-to-Variable Mapping.....	67

References

Select Mapping.....	181
Signal Mapping.....	187
Variables (ControlDesk Variable Management 	

How to Map Variables

Objective

You have to map variables to signals to configure a signal generator for stimulation.

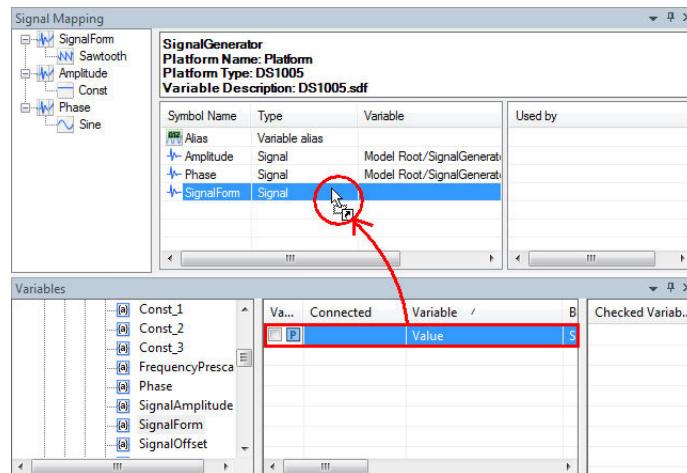
Preconditions

- A platform and a variable description must be available in the Hardware Configurations folder of an experiment. Refer to [How to Add a Platform/Device to an Experiment \(ControlDesk Platform Management !\[\]\(3071bca4a76c5290ea9e7dda9532a1e4_img.jpg\)](#) and [How to Add a Variable Description to a Platform/Device \(ControlDesk Variable Management !\[\]\(91a58d979450379d0014982fce1187ab_img.jpg\)](#).
- A signal generator containing at least one segment signal must be opened in the working area. Refer to [How to Create a Signal Description Set](#) on page 28 and [How to Create and Configure a Segment Signal](#) on page 29.

Method**To perform signal-to-variable mapping**

- 1 On the View ribbon, click Controlbar – Switch Controlbars - Signal Selector to open the Signal Mapping controlbar.
The Signal Mapping controlbar displays information about the aliases and signals used by the current signal generator.
- 2 In the Variables, navigate to the model variable you want to map to a signal or alias.

- 3 Drag the variable from the Variables to the signal to be mapped to the model variable in the Signal Mapping controlbar.



The path of the mapped model variable is displayed in the Variable column of the list entry. The signal name in the signal description set is displayed in bold letters to indicate the mapping.

Result

You performed signal-to-variable mapping.

The signal generator's STZ file in the Project controlbar was given an extension in brackets to indicate the mapping, for example, [DS1005].

Tip

- You can also perform signal-to-variable mapping by dragging a model variable from the Variables onto a signal displayed in an open signal generator.
- You can create a new empty segment signal that has a valid signal-to-variable mapping by dragging a model variable from the Variables onto the empty area of an open signal generator.
- You can delete the mappings via context menu commands of the Signal Mapping controlbar or with the **DEL** key. If you delete the mappings for a signal generator completely, you can reuse it for another platform.
- You can select and highlight a variable that is mapped to a signal in the Variables via the Select in Variable Browser command.

Next steps

You can stimulate signals of the simulation application. Refer to [How to Stimulate Variables of a Simulation Application](#) on page 70.

Related topics**Basics**

[Basics on Mapping Variables to Signals and Aliases](#).....63

References

Select in Variable Browser	181
Signal Mapping	187
Variables (ControlDesk Variable Management)	

How to Reuse and Check an Existing Signal-to-Variable Mapping

Objective

When you reload or replace the variable description of a platform, you can reuse an existing signal-to-variable mapping and check it for inconsistencies.

Basics

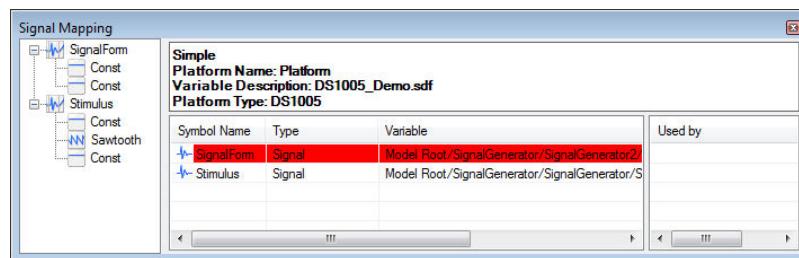
You do not have to repeat the entire signal-to-variable mapping when you reload or replace the active variable description of a platform. ControlDesk lets you reuse an existing signal-to-variable mapping and check if there are inconsistencies in conjunction with the new variable description. ControlDesk checks for each variable if the variable's path can be recovered in the variable description. If inconsistencies are found, they are highlighted red in the [Signal Mapping](#) controlbar for you to solve them manually.

Preconditions

- The [Signal Mapping](#) controlbar is opened.
- There exists a signal-to-variable mapping for the currently active variable description. Refer to [How to Map Variables](#) on page 65.

Method**To inherit and check an existing signal-to-variable mapping**

- 1 In the [Project](#) controlbar, right-click a variable description to open its context menu.
 - 2 Select Reload (Variable Description) or Replace (Variable Description) to reload/replace the variable description (i.e. the referenced SDF file).
 - 3 Right-click an arbitrary list entry in the [Signal Mapping](#) controlbar. The controlbar's context menu opens.
 - 4 Select [Check Mapping](#).
- ControlDesk compares the current signal-to-variable mapping with the (new) active variable description. Identical mappings are reused. Invalid mappings are highlighted red in the [Signal Mapping](#) controlbar, see the illustration below.

**Note**

When you close or change the currently displayed signal generator, the highlighted entries in the Signal Mapping controlbar are lost. To show the highlighted entries again, you have to repeat the **Check Mapping** command the next time you display the signal generator in the working area.

- 5 You can now correct invalid mappings manually. For instructions, refer to [How to Map Variables](#) on page 65.

Result

You reloaded/replaced the active variable description, inherited an existing signal-to-variable mapping, and checked it for inconsistencies.

Tip

When you change the active platform via the **Change Platform** context menu command of the Signal Mapping controlbar, ControlDesk also checks the signal-to-variable mapping and highlights invalid mappings automatically.

Related topics**Basics**

[Basics on Mapping Variables to Signals and Aliases](#)..... 63

HowTos

[How to Map Variables](#)..... 65

References

Change Platform	153
Check Mapping	155

Stimulating Variables of a Simulation Application

Introduction	You can stimulate model variables of a simulation application with a signal generator.
---------------------	--

Where to go from here	Information in this section
	<p>Basics on Stimulating Variables..... 69</p> <p>To stimulate model variables, you can implement a signal generator on dSPACE real-time hardware or VEOS via a Real-Time Testing (RTT) sequence.</p>
	<p>How to Stimulate Variables of a Simulation Application..... 70</p> <p>You can perform stimulus control on connected real-time hardware or VEOS using a signal generator's commands.</p>

Basics on Stimulating Variables

Introduction	To stimulate model variables, you can implement a signal generator on dSPACE real-time hardware or VEOS via a Real-Time Testing (RTT) sequence.
---------------------	---

Stimulus control via RTT sequences	When you have started online calibration, you can generate a signal generator and download it to the connected simulation platform for stimulating model variables of the simulation application running on that platform. On the simulation platform, the signal generator is implemented as an RTT sequence which runs in parallel to the simulation application.
---	---

The RTT sequence representing the signal generator on the simulation platform is generated from the signal generator's STZ file. The STZ file contains the signal description, the mapping information, and information about the simulation platform.

You can handle the stimulation of model variables via the signal generator's context menu commands in the [Project](#) controlbar or the Signal Editor ribbon.

Related topics	Basics
	RTT Installation and Signal Editor..... 18
	HowTos
	How to Stimulate Variables of a Simulation Application..... 70

How to Stimulate Variables of a Simulation Application

Objective You can perform stimulus control on connected real-time hardware or VEOS using a [signal generator's](#)  commands.

Basics With the Download command of a signal generator, you can generate and download it to the simulation platform. As long as online calibration is not yet started, the Download command is disabled.

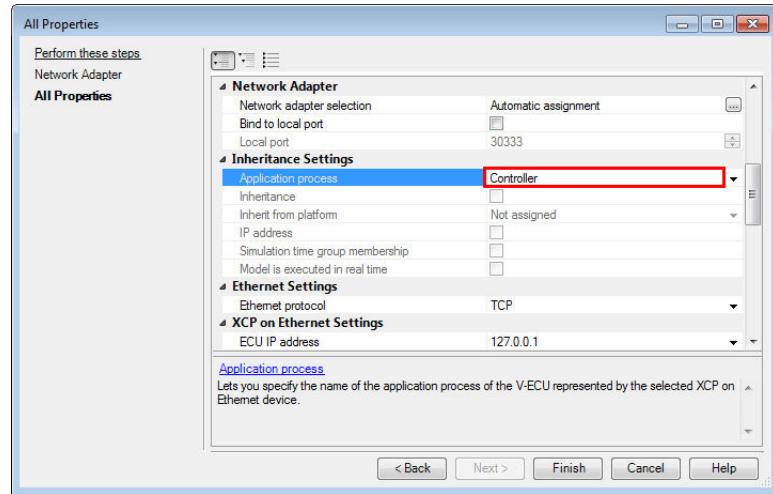
In multiprocessor systems, you can use the signal generator's Connected Platform Name property to select the platform for downloading and running the signal generator.

You can use further commands of the signal generator to handle the stimulation of the model variables. For example, you can start and stop the stimulation. The current state of the signal generator is indicated by different variants of its icon.

If you download several signal generators to the simulation platform, you can start and stop each of them individually.

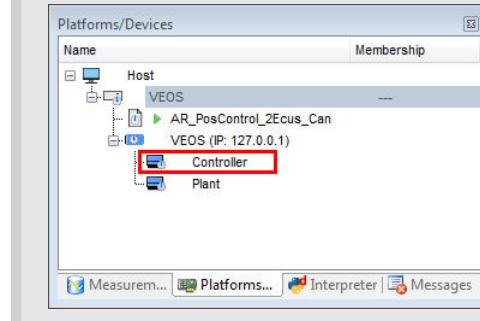
Preconditions

- You have configured a signal generator for stimulation and mapped model variables to signals with the Signal Editor. Refer to [How to Map Variables](#) on page 65.
- The assigned simulation platform must be available and connected to the host PC.
- If you want to stimulate a V-ECU that is executed on VEOS, the name of the application process must be specified for the appropriate XCP on Ethernet device (see the following example).



Note

You can get the name of the application process from the offline simulation application displayed in the Platforms/Devices controlbar (see the following example).



- You have started online calibration. Refer to [How to Start and Stop Online Calibration \(ControlDesk Calibration and Data Set Management\)](#).

Method

To stimulate variables of a simulation application

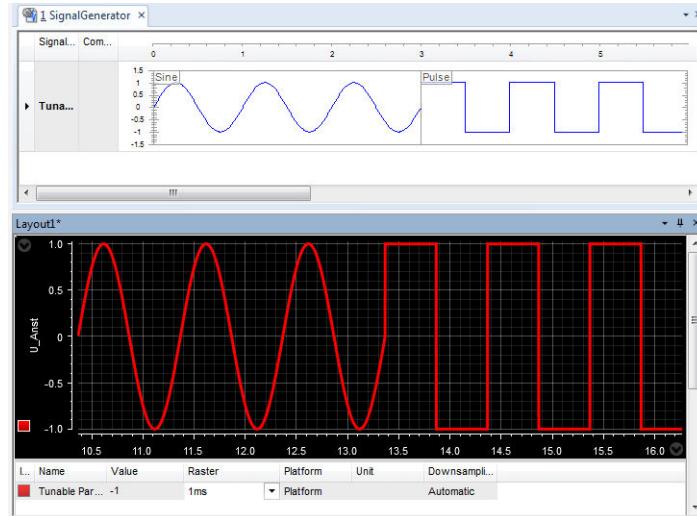
- 1 From the context menu of the current signal generator, select Download. The signal generator is saved to the project and the Real-Time Testing (RTT) sequence representing the signal generator on the simulation platform is generated and downloaded to the simulation platform.

An additional green checkmark in the icon of the signal generator indicates a successful download.

- 2 From the context menu of the current signal generator, select Start to start stimulus generation.

The running signal generator is indicated by an .

You can visualize the stimulation, for example, with a Time Plotter in ControlDesk, when you started measuring.



Tip

You can select Pause from the context menu of the signal generator to pause or resume the simulation.

- 3 From the context menu of the current signal generator, select Stop to stop signal generation.

The stopped signal generator is indicated by an  icon.

Result

You stimulated model variables of a simulation application by means of a signal generator that you created with the Signal Editor.

Note

To run several signal generators at the same time, you have to start them consecutively.

Note

If you pause or stop a signal generator, only the stimulation of model variables pauses or stops. The simulation application continues running on the connected simulation platform.

Related topics**Basics**

Basics on Stimulating Variables..... 69

References

Download/Download Generator.....	163
Pause/Pause Generator.....	176
Start/Start Generator.....	193
Stop/Stop Generator.....	194

Reference Information

Where to go from here

Information in this section

Signal Description Set and Signals.....	76
Segments.....	84
Signal Editor Properties.....	111
Signal Editor Commands.....	149

Signal Description Set and Signals

Introduction

The Signal Editor's Signal Selector controlbar provides two signal types to be arranged and configured in signal description sets.

Where to go from here

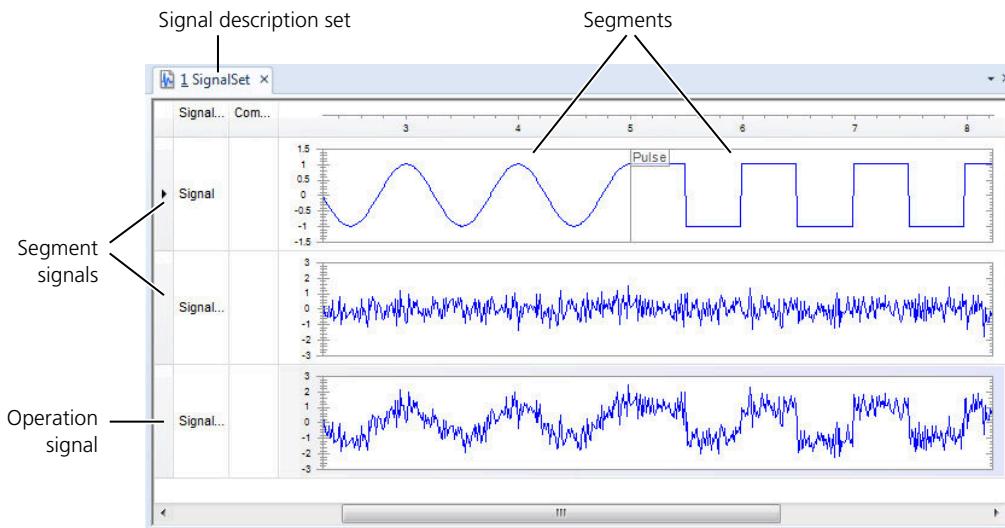
Information in this section

Signal Description Set	76
To display, edit and store the configuration of one or more signals.	
Operation Signal	80
To perform arithmetic operations between two signals.	
Segment Signal	81
To serve as a container for segments.	

Signal Description Set

Illustration

The illustration below shows an example of an opened signal description set and the elements it contains.



Purpose

To display, edit and store the configuration of one or more signals.

Description A signal description set is a container for one or more signals. A signal description set and its signals can be edited in the working area by means of the Signal Editor. Each signal description set is stored as an STZ file either in the **Signal Description Sets** folder or in the **Signal Generators** folder. An STZ file is a ZIP file that contains the signal descriptions in the STI format. The STI format is defined by the ASAM AE XIL API standard.

Segment signals A segment signal consists of segments which together make a composed signal shape. A segment signal must consist of at least one segment so that you can use it for stimulation.

Operation signals An operation signal is the result of an arithmetical operation between two other signals. So that you can use an operation signal, there should be at least one or two further signals in the signal description set to serve as operands for the operation. Operation signals themselves can also serve as operands, so that you can cascade operation signals.

Signal description set symbol A signal description set has the following symbol in the **Project** controlbar: 

Columns You can sort, group, and filter the displayed signals of a signal description set, and hide or add some of its columns by using specific .

The following table shows the available columns.

Column Name	Meaning
Signal Name	Lets you specify the name of the signal. This field equals the symbol name property of the signal.
Comment	Lets you specify a signal-specific comment. This field equals the comment property of the signal.
<Custom column>	You can specify one or more additional custom columns according to your needs. Refer to Create Column on page 159. Using custom columns in the header of a signal description set lets you specify your own custom properties for the single signals of the set. The custom columns and custom properties are stored as specific custom properties in the related STZ file of the signal description set. You can reuse this information when carrying out automated tests at later stages of the development process. The custom columns also let you group and filter signals in ControlDesk's working area for a better overview. Refer to Show Group By Box on page 184.
(time scale)	Lets you edit each signal graphically. For example, you can add segments to a segment signal by dragging them from the Signal Selector controlbar.

Properties	<p>Common The signal description set provides the following common properties:</p> <table border="1"> <thead> <tr> <th>Property</th><th>Purpose</th></tr> </thead> <tbody> <tr> <td>Comment Property on page 116</td><td>To specify a comment.</td></tr> <tr> <td>Elapsed Time Property on page 119</td><td>To display the time that elapsed (in seconds) when the selected signal generator is running.</td></tr> <tr> <td>Name Property (Signal Description Set) on page 123</td><td>To display the name of the selected signal description set.</td></tr> <tr> <td>Name of Connected Platform Property on page 123</td><td>To display the platform/device to which the selected signal generator is downloaded. When you use a multicore/multiprocessor system, you can select the member to which the selected signal generator is downloaded.</td></tr> </tbody> </table>	Property	Purpose	Comment Property on page 116	To specify a comment.	Elapsed Time Property on page 119	To display the time that elapsed (in seconds) when the selected signal generator is running.	Name Property (Signal Description Set) on page 123	To display the name of the selected signal description set.	Name of Connected Platform Property on page 123	To display the platform/device to which the selected signal generator is downloaded. When you use a multicore/multiprocessor system, you can select the member to which the selected signal generator is downloaded.
Property	Purpose										
Comment Property on page 116	To specify a comment.										
Elapsed Time Property on page 119	To display the time that elapsed (in seconds) when the selected signal generator is running.										
Name Property (Signal Description Set) on page 123	To display the name of the selected signal description set.										
Name of Connected Platform Property on page 123	To display the platform/device to which the selected signal generator is downloaded. When you use a multicore/multiprocessor system, you can select the member to which the selected signal generator is downloaded.										
Display	The signal description set provides the following display properties:										
	<table border="1"> <thead> <tr> <th>Property</th><th>Purpose</th></tr> </thead> <tbody> <tr> <td>Plot Resolution Property on page 128</td><td>To specify the resolution of the signal plot(s) in seconds.</td></tr> <tr> <td>Show Time Cursor Property on page 132</td><td>To show the time and y-axis value at the mouse pointer position in the signal plot.</td></tr> <tr> <td>Show X-Axis Property on page 133</td><td>To display a separate x-axis in each signal.</td></tr> </tbody> </table>	Property	Purpose	Plot Resolution Property on page 128	To specify the resolution of the signal plot(s) in seconds.	Show Time Cursor Property on page 132	To show the time and y-axis value at the mouse pointer position in the signal plot.	Show X-Axis Property on page 133	To display a separate x-axis in each signal.		
Property	Purpose										
Plot Resolution Property on page 128	To specify the resolution of the signal plot(s) in seconds.										
Show Time Cursor Property on page 132	To show the time and y-axis value at the mouse pointer position in the signal plot.										
Show X-Axis Property on page 133	To display a separate x-axis in each signal.										
Export	The signal description set provides the following export property:										
	<table border="1"> <thead> <tr> <th>Property</th><th>Purpose</th></tr> </thead> <tbody> <tr> <td>Resolution Property on page 129</td><td>To specify the export resolution of the signal(s) in seconds.</td></tr> </tbody> </table>	Property	Purpose	Resolution Property on page 129	To specify the export resolution of the signal(s) in seconds.						
Property	Purpose										
Resolution Property on page 129	To specify the export resolution of the signal(s) in seconds.										
Related commands	A signal description set that is opened in the working area provides the following commands:										
Purpose	Refer to										
To export a signal description set, signal generator, or signal to the file system.	Export/Export Generator on page 164										
To fit the signal view to the signal length.	Fit to Screen on page 167										
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 168										
To view and edit the properties of the selected element.	Properties (Controlbar) (ControlDesk User Interface Handling) 										
To reload the signal description set to the working area in the last saved version.	Reload on page 178										
To select and arrange signals and segments in signal description sets.	Select Mode on page 182										
To zoom into signals and segments.	Zoom Mode on page 194										
To show the default range of signals.	Zoom to Default on page 195										

A signal description set/signal generator (STZ file) in the Project controlbar provides the following commands:

Purpose	Refer to
To close a signal description set or signal generator in the working area. (available only for signal generators)	Close on page 155 Download/Download Generator on page 163
To download a signal generator to the assigned simulation platform.	
To export a signal description set, signal generator, or signal to the file system.	Export/Export Generator on page 164
To view and edit the properties of the selected element.	Properties (Controlbar) (ControlDesk User Interface Handling)
To open a signal description set or signal generator in the working area.	Open on page 175

Column header commands

The column headers of an opened signal description set provide the following commands for sorting and filtering the displayed signals:

Purpose	Refer to
To optimize the width of the selected column.	Best Fit on page 152
To optimize the widths of all the displayed columns.	Best Fit (All Columns) on page 153
To open a dialog for specifying which columns to display.	Column Chooser on page 156
To create a custom column in the column header of a signal description set.	Create Column on page 159
To delete the selected column from the signal description set.	Delete Column on page 163
To open the Filter Editor to edit a filter rule.	Filter Editor on page 165
To group the signals according to the entries of the column.	Group by This Column on page 167
To hide the auto filter row.	Hide Auto Filter Row on page 169
To hide the Group By Box field.	Hide Group By Box on page 170
To hide the find panel.	Hide Find Panel on page 169
To hide a column in the header of a signal description set.	Hide This Column on page 170
To rename a custom column in the column header of a signal description set.	Rename Column on page 179
To show the auto filter row.	Show Auto Filter Row on page 183
To show the find panel.	Show Find Panel on page 183
To show the Group By Box field.	Show Group By Box on page 184
To sort the rows alphabetically in ascending order by the selected column.	Sort Ascending on page 191
To sort the rows alphabetically in descending order by the selected column.	Sort Descending on page 191

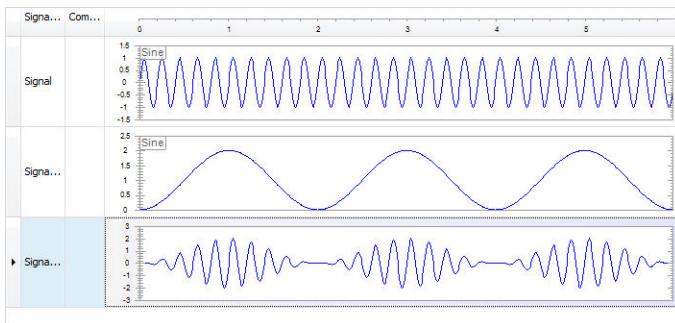
Related topics

Basics

[Basics on Editing Signal Description Sets](#).....24

Operation Signal

Illustration



Purpose

To perform arithmetic operations between two signals.

Description

You can add or multiply signals using an Operation Signal. The Operation Signal displays the result of the arithmetical operation.

Unlike Segment Signals, the Operation Signal has a frame that is highlighted with a color gradient.

You can also use an Operation Signal to cascade Operation Signals.

Signal symbol

The signal has the following symbol in the Signal Selector controlbar:



Properties

Common The signal provides the following common properties:

Property	Purpose
Comment Property on page 116	To specify a comment.
<Custom> Property on page 114	To specify a custom property.
Name Property (Signal) on page 123	To specify the name of the selected signal via text input and/or macros.
Symbol Name Property on page 139	To display the symbol name of the selected signal.

Operation parameters The signal provides the following operation parameters:

Property	Purpose
Operand 1/Operand 2 Property on page 125	To select a signal as an operand for an arithmetical operation.
Operation Property on page 125	To specify an arithmetic operation.

Display The signal provides the following display properties:

Property	Purpose
Show Grid Property on page 130	To show grid lines in the signal plot.
Use Block Representation Property on page 141	To display block representations instead of a plotted signal.

Related commands

The signal provides the following commands:

Purpose	Refer to
To export a signal description set, signal generator, or signal to the file system.	Export/Export Generator on page 164
To fit the signal view to the signal length.	Fit to Screen on page 167
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 168
To view and edit the properties of the selected element.	Properties (Controlbar) (ControlDesk User Interface Handling )
To refresh the screen display of a signal.	Refresh on page 178
To select and highlight a variable that is mapped to a signal in the Variables  controlbar.	Select in Variable Browser on page 181
To select the signal in the Signal Mapping  controlbar.	Select Mapping on page 181
To select and arrange signals and segments in signal description sets.	Select Mode on page 182
To zoom into signals and segments.	Zoom Mode on page 194
To show the default range of signals.	Zoom to Default on page 195

Related topics

Basics

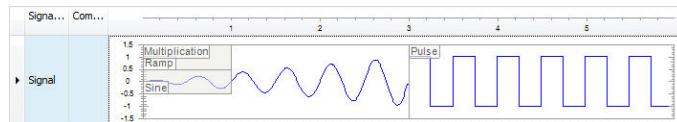
Basics on Editing Signal Description Sets..... 24

HowTos

How to Create and Configure an Operation Signal..... 35

Segment Signal

Illustration



Purpose

To serve as a container for segments.

Description	A Segment Signal consists of segments for configuring an arbitrary signal shape. You can edit a Segment Signal by dragging segments from the Signal Selector controlbar.
--------------------	--

You can add as many segments to a segment signal as you want. There is no limitation.

You can configure the signal as well as its segments using the Properties controlbar.

Signal symbol	The signal has the following symbol in the Signal Selector controlbar: 
----------------------	--

Properties	Common The signal provides the following common properties:												
	<table border="1"> <thead> <tr> <th>Property</th> <th>Purpose</th> </tr> </thead> <tbody> <tr> <td>Comment Property on page 116</td> <td>To specify a comment.</td> </tr> <tr> <td><Custom> Property on page 114</td> <td>To specify a custom property.</td> </tr> <tr> <td>Loop Count Property on page 121</td> <td>To specify how often a segment/signal is executed during simulation.</td> </tr> <tr> <td>Name Property (Signal) on page 123</td> <td>To specify the name of the selected signal via text input and/or macros.</td> </tr> <tr> <td>Symbol Name Property on page 139</td> <td>To display the symbol name of the selected signal.</td> </tr> </tbody> </table>	Property	Purpose	Comment Property on page 116	To specify a comment.	<Custom> Property on page 114	To specify a custom property.	Loop Count Property on page 121	To specify how often a segment/signal is executed during simulation.	Name Property (Signal) on page 123	To specify the name of the selected signal via text input and/or macros.	Symbol Name Property on page 139	To display the symbol name of the selected signal.
Property	Purpose												
Comment Property on page 116	To specify a comment.												
<Custom> Property on page 114	To specify a custom property.												
Loop Count Property on page 121	To specify how often a segment/signal is executed during simulation.												
Name Property (Signal) on page 123	To specify the name of the selected signal via text input and/or macros.												
Symbol Name Property on page 139	To display the symbol name of the selected signal.												

Display The signal provides the following display properties:

Property	Purpose
Show Grid Property on page 130	To show grid lines in the signal plot.
Show Segment Comments Property on page 131	To show the comments of the segments in the signal plot.
Show Segment Parameters Property on page 131	To show the segment parameters in the signal plot.
Show Segment Types Property on page 132	To show the segment types in the signal plot.
Use Block Representation Property on page 141	To display block representations instead of a plotted signal.

Related commands	The signal provides the following commands:
Purpose	Refer to
To export a signal description set, signal generator, or signal to the file system.	Export/Export Generator on page 164
To fit the signal view to the signal length.	Fit to Screen on page 167
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 168
To view and edit the properties of the selected element.	Properties (Controlbar) (ControlDesk User Interface Handling)

Purpose	Refer to
To refresh the screen display of a signal.	Refresh on page 178
To select and highlight a variable that is mapped to a signal in the Variables controlbar.	Select in Variable Browser on page 181
To select the signal in the Signal Mapping controlbar.	Select Mapping on page 181
To select and arrange signals and segments in signal description sets.	Select Mode on page 182
To zoom into signals and segments.	Zoom Mode on page 194
To show the default range of signals.	Zoom to Default on page 195

Related topics**Basics**

Basics on Editing Signal Description Sets	24
Basics on Segments	25

HowTos

How to Create and Configure a Segment Signal	29
--	----

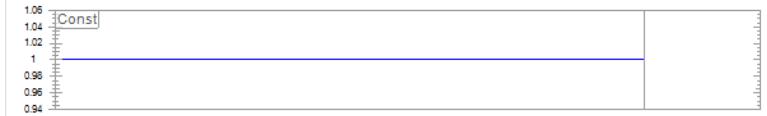
Segments

Introduction The Signal Editor's Signal Selector controlbar provides several segments to be used in segment signals for configuring arbitrary signal shapes.

Where to go from here	Information in this section
	Const (Segment) 85 To specify a constant segment.
	Data File (Segment) 86 To specify a segment's content via a linked MF4 data file.
	Exponential (Segment) 89 To specify an exponential segment.
	Idle (Segment) 91 To specify an idle time without any signal value.
	Loop (Segment) 93 To execute segments several times during simulation.
	Noise (Segment) 95 To specify a noisy segment.
	Operation (Segment) 96 To perform an arithmetic operation with two other segments.
	Pulse (Segment) 98 To specify a square-wave segment.
	Ramp (Segment) 100 To specify a ramp-shaped segment via a start and a stop value.
	Ramp Slope (Segment) 102 To specify a ramp-shaped segment via a slope.
	Sawtooth (Segment) 104 To specify a sawtooth segment.
	Signal Value (Segment) 106 To specify a segment's content via the numerical signal data of a MAT file.
	Sine (Segment) 108 To specify a sine segment.

Const (Segment)

Illustration



Purpose

To specify a constant segment.

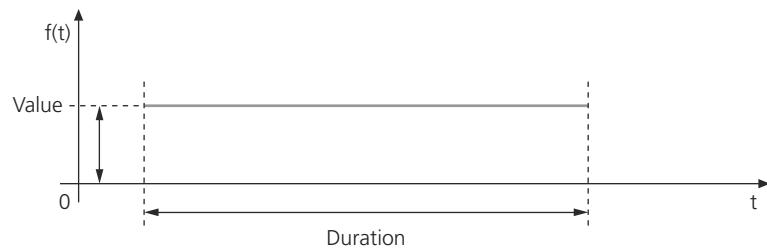
Description

The segment provides a constant value for a defined duration of time.

The corresponding mathematical function is:

$$f(t) = C$$

C = constant value



Segment symbol

The segment has the following symbol in the Signal Selector controlbar: 

Properties

Common The segment provides the following common properties:

Property	Purpose
Comment Property on page 116	To specify a comment.
Segment Type Property on page 130	To display the segment type.

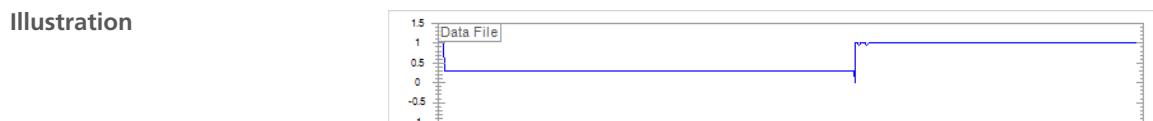
Segment parameters The segment provides the following segment parameters:

Property	Purpose
Duration Property on page 117	To specify a segment's duration in seconds.
Value Property (Const Segment) on page 148	To specify a value for a const segment.
Stop Trigger Property on page 137	To define the duration of the selected segment by specifying a stop trigger.

Related commands	The segment provides the following commands:
<p>Purpose</p> <p>To export a signal description set, signal generator, or signal to the file system.</p> <p>To fit the signal view to the signal length.</p> <p>To scroll the signal shapes inside of signals horizontally and vertically.</p> <p>To view and edit the properties of the selected element.</p> <p>To refresh the screen display of a signal.</p> <p>To select and highlight a variable that is mapped to a signal in the Variables controlbar.</p> <p>To select and arrange signals and segments in signal description sets.</p> <p>To zoom into signals and segments.</p> <p>To show the default range of signals.</p>	<p>Refer to</p> <p>Export/Export Generator on page 164</p> <p>Fit to Screen on page 167</p> <p>Hand Mode on page 168</p> <p>Properties (Controlbar) (ControlDesk User Interface Handling)</p> <p>Refresh on page 178</p> <p>Select in Variable Browser on page 181</p> <p>Select Mode on page 182</p> <p>Zoom Mode on page 194</p> <p>Zoom to Default on page 195</p>

Related topics	<p>Basics</p> <p>Basics on Segments..... 25</p> <p>References</p> <p>Signal Editor Page..... 186</p>
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Data File (Segment)



Purpose	To specify a segment's content via a linked MF4 data file.
Description	<p>The Data File segment lets you use and replay numerical signal data that is stored in a linked MF4 file.</p> <p>The signal data of the MF4 file is not copied to the Data File segment or the ControlDesk experiment. The Data File segment only displays the data of the linked MF4 file. This link mechanism lets you switch easily between different numerical data, for example, by using a newer measurement data file for the</p>

signal description. You can refresh the display of the data of the linked MF4 file by using the Refresh command. The display is automatically refreshed when you download the related signal generator.

You can also reuse the same MF4 file with different ranges or channels in other Data File segments.

If the segment does not contain data, the time axis is marked with a light red bar. This indicates that the segment's duration is not yet defined.

Note

- If you use the segment for stimulus control, the data of the segment is streamed from the host PC to the simulation platform. For DS1006-based modular systems, data streaming from the host PC via Ethernet is not recommended due to limited performance. The recommended connection between the host PC and a DS1006-based modular system is a bus connection.
- When numerical data is replayed on a simulation platform, all signals from the same measurement raster[?] are combined to one data stream from the host PC to the platform. The number of data streams is limited and depends on the platform hardware.
To reduce the number of data streams, use signals from the same measurement raster. Each raster corresponds to a *group name* in the MF4 file. Refer to [Problem when Using Too Many Data Streams](#) on page 203.

For further details on using the segment, refer to [How to Create and Configure a Data File Segment](#) on page 50.

Segment symbol

The segment has the following symbol in the Signal Selector controlbar: 

Properties

Common The segment provides the following common properties:

Property	Purpose
Comment Property on page 116	To specify a comment.
Segment Type Property on page 130	To display the segment type.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Channel Path Property on page 115	To display the channel path of the TimeVector and DataVector channels (signals). The channel path typically contains the device name or platform name.
Channel Source Property on page 116	To display the channel source of the TimeVector and DataVector channels (signals). The channel source typically contains the network node name or the task name.

Property	Purpose
Data Vector Name Property on page 117	To display the channel name, which is typically the name of the signal to be used.
Duration Property on page 117	To specify a segment's duration in seconds.
File Name Property on page 119	To select and link numerical signal data from an MF4 file.
Group Name Property on page 120	To display the group name of the TimeVector and DataVector channels (signals). The group name typically contains the task name, the raster name or the event name.
Group Path Property on page 120	To specify the group path of the TimeVector and DataVector channels (signals). The group path typically contains the platform/device name.
Group Source Property on page 120	To display the group source of the TimeVector and DataVector channels (signals). The group source typically contains the network node name, the tool name or the task name.
Interpolation Property on page 121	To specify the interpolation method to be used when replaying numerical data.
Start Property on page 136	To specify a start value.
Stop Trigger Property on page 137	To define the duration of the selected segment by specifying a stop trigger.
Time Vector Name Property on page 140	To display the time vector name.

Related commands

The segment provides the following commands:

Purpose	Refer to
To export a signal description set, signal generator, or signal to the file system.	Export/Export Generator on page 164
To fit the signal view to the signal length.	Fit to Screen on page 167
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 168
To view and edit the properties of the selected element.	Properties (Controlbar) (ControlDesk User Interface Handling) 
To refresh the screen display of a signal.	Refresh on page 178
To select and highlight a variable that is mapped to a signal in the Variables  controlbar.	Select in Variable Browser on page 181
To select and arrange signals and segments in signal description sets.	Select Mode on page 182
To zoom into signals and segments.	Zoom Mode on page 194
To show the default range of signals.	Zoom to Default on page 195

Related topics**Basics**

Basics on Numerical Data Replay.....	47
Basics on Segments.....	25

HowTos

How to Create and Configure a Data File Segment.....	50
--	----

References

File Name Property.....	119
Signal Editor Page.....	186
Signal Value (Segment).....	106

Exponential (Segment)

Illustration**Purpose**

To specify an exponential segment.

Description

The segment provides an exponential shape for a defined duration of time.

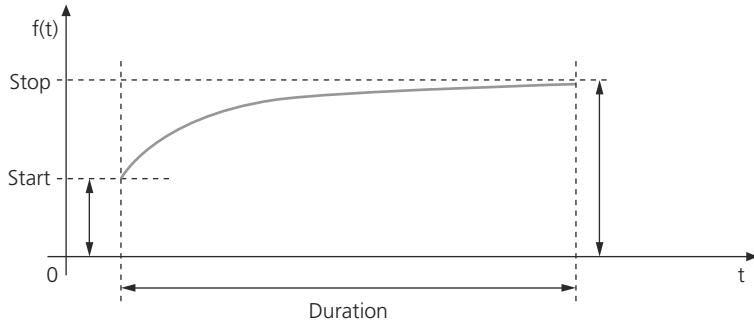
The corresponding mathematical function is:

$$f(t) = A \cdot (1 - e^{-\frac{t}{\tau}}) + b$$

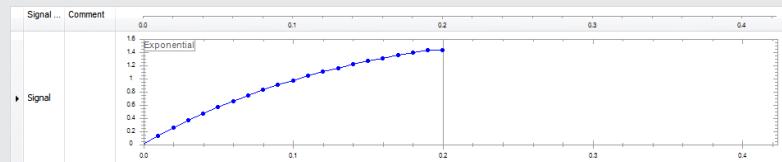
A: amplitude

τ : time constant (tau)

b: offset (bias)

**Note**

At the end of each segment, the last defined signal value is not stimulated. Instead of this value, the first value of the next segment is used. Even if no further segment follows, the last defined signal value is not stimulated.

**Segment symbol**

The segment has the following symbol in the Signal Selector controlbar:

Properties

Common The segment provides the following common properties:

Property	Purpose
Comment Property on page 116	To specify a comment.
Segment Type Property on page 130	To display the segment type.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Duration Property on page 117	To specify a segment's duration in seconds.
Start Property on page 136	To specify a start value.
Stop Property on page 137	To specify a stop value.
Stop Trigger Property on page 137	To define the duration of the selected segment by specifying a stop trigger.
Tau Property on page 140	To specify the time constant tau.

Related commands

The segment provides the following commands:

Purpose	Refer to
To export a signal description set, signal generator, or signal to the file system.	Export/Export Generator on page 164
To fit the signal view to the signal length.	Fit to Screen on page 167
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 168
To view and edit the properties of the selected element.	Properties (Controlbar) (ControlDesk User Interface Handling )
To refresh the screen display of a signal.	Refresh on page 178
To select and highlight a variable that is mapped to a signal in the Variables  controlbar .	Select in Variable Browser on page 181
To select and arrange signals and segments in signal description sets.	Select Mode on page 182
To zoom into signals and segments.	Zoom Mode on page 194
To show the default range of signals.	Zoom to Default on page 195

Related topics**Basics**

[Basics on Segments.....](#) 25

References

[Signal Editor Page.....](#) 186

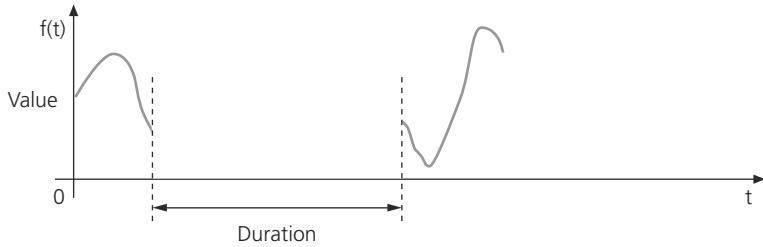
Idle (Segment)

Illustration**Purpose**

To specify an idle time without any signal value.

Description

The segment stops stimulus generation for a model variable for a specified duration of time. During this idle time a signal generator does not write to the model variable. The variable can be modified meanwhile via the model or from outside the model, for example, via a connected hardware platform.

**Segment symbol**

The segment has the following symbol in the Signal Selector controlbar: 

Properties

Common The segment provides the following common properties:

Property	Purpose
Comment Property on page 116	To specify a comment.
Segment Type Property on page 130	To display the segment type.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Duration Property on page 117	To specify a segment's duration in seconds.
Stop Trigger Property on page 137	To define the duration of the selected segment by specifying a stop trigger.

Related commands

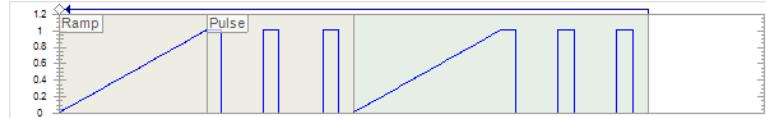
The segment provides the following commands:

Purpose	Refer to
To export a signal description set, signal generator, or signal to the file system.	Export/Export Generator on page 164
To fit the signal view to the signal length.	Fit to Screen on page 167
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 168
To view and edit the properties of the selected element.	Properties (Controlbar) (ControlDesk User Interface Handling) 
To refresh the screen display of a signal.	Refresh on page 178
To select and highlight a variable that is mapped to a signal in the Variables  controlbar.	Select in Variable Browser on page 181
To select and arrange signals and segments in signal description sets.	Select Mode on page 182
To zoom into signals and segments.	Zoom Mode on page 194
To show the default range of signals.	Zoom to Default on page 195

Related topics**Basics**

Basics on Segments..... 25

Loop (Segment)

Illustration**Purpose**

To execute segments several times during simulation.

Description

The Loop segment serves as a container for one or more segments that you want to execute several times during simulation.

As long as a Loop segment contains no other segment the time axis is marked with a light red bar. This indicates that the segment's duration is not yet defined.

You define how often a Loop segment is executed with its Loop count (refer to [Loop Count Property](#) on page 121) property. Repeated Loop segments are grayed out in the signal plot to distinguish them from the genuine Loop segment.

Note

You cannot place a Loop segment in another Loop segment.

Segment symbol

The segment has the following symbol in the Signal Selector controlbar: 

Properties

Common The segment provides the following common properties:

Property	Purpose
Comment Property on page 116	To specify a comment.
Segment Type Property on page 130	To display the segment type.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Loop Count Property on page 121	To specify how often a segment/signal is executed during simulation.

Related commands

The segment provides the following commands:

Purpose	Refer to
To export a signal description set, signal generator, or signal to the file system.	Export/Export Generator on page 164
To fit the signal view to the signal length.	Fit to Screen on page 167
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 168
To view and edit the properties of the selected element.	Properties (Controlbar) (ControlDesk User Interface Handling) 
To refresh the screen display of a signal.	Refresh on page 178
To select and highlight a variable that is mapped to a signal in the Variables  controlbar.	Select in Variable Browser on page 181
To select and arrange signals and segments in signal description sets.	Select Mode on page 182
To zoom into signals and segments.	Zoom Mode on page 194
To show the default range of signals.	Zoom to Default on page 195

Related topics

Basics

[Basics on Segments](#)..... 25

HowTos

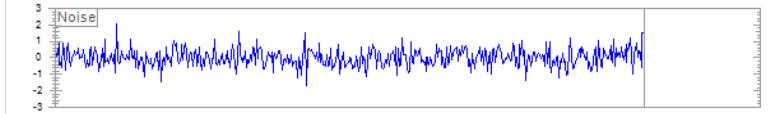
[How to Execute Segments or Signals Several Times](#)..... 38

References

Loop Count Property	121
Signal Editor Page	186

Noise (Segment)

Illustration



Purpose

To specify a noisy segment.

Description

The segment provides a Gaussian noise for a defined duration of time.

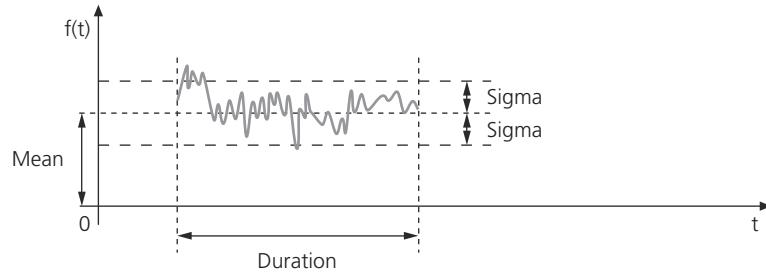
The corresponding mathematical function is:

$$f(t) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{(R(t) - \mu)^2}{2\sigma^2}}$$

$R(t)$: random function

σ : standard deviation (sigma)

μ : mean value



Segment symbol

The segment has the following symbol in the Signal Selector controlbar: 

Properties

Common The segment provides the following common properties:

Property	Purpose
Comment Property on page 116	To specify a comment.
Segment Type Property on page 130	To display the segment type.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Duration Property on page 117	To specify a segment's duration in seconds.
Mean Property on page 122	To specify the mean value of a Gaussian noise.

Property	Purpose
Seed Property on page 129	To specify the seed of a random generator.
Sigma Property on page 133	To specify the standard deviation of a Gaussian noise.
Stop Trigger Property on page 137	To define the duration of the selected segment by specifying a stop trigger.

Related commands

The segment provides the following commands:

Purpose	Refer to
To export a signal description set, signal generator, or signal to the file system.	Export/Export Generator on page 164
To fit the signal view to the signal length.	Fit to Screen on page 167
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 168
To view and edit the properties of the selected element.	Properties (Controlbar) (ControlDesk User Interface Handling) 
To refresh the screen display of a signal.	Refresh on page 178
To select and highlight a variable that is mapped to a signal in the Variables  controlbar.	Select in Variable Browser on page 181
To select and arrange signals and segments in signal description sets.	Select Mode on page 182
To zoom into signals and segments.	Zoom Mode on page 194
To show the default range of signals.	Zoom to Default on page 195

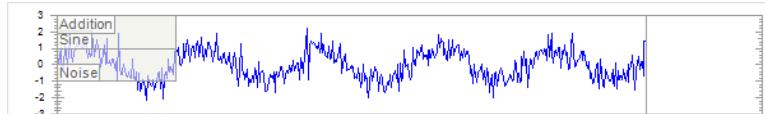
Related topics**Basics**

Basics on Segments25
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Signal Editor Page186
--	------

Operation (Segment)

Illustration**Purpose**

To perform an arithmetic operation with two other segments.

Description The Operation segment performs an arithmetical operation with two other segments and displays the result.

Possible operations are *addition* or *multiplication*. The selected operation is displayed as the segment title.

Segment symbol The segment has the following symbol in the Signal Selector controlbar: 

Properties **Common** The segment provides the following common properties:

Property	Purpose
Comment Property on page 116	To specify a comment.
Segment Type Property on page 130	To display the segment type.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Operation Property on page 125	To specify an arithmetic operation.

Related commands The segment provides the following commands:

Purpose	Refer to
To export a signal description set, signal generator, or signal to the file system.	Export/Export Generator on page 164
To fit the signal view to the signal length.	Fit to Screen on page 167
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 168
To view and edit the properties of the selected element.	Properties (Controlbar) (ControlDesk User Interface Handling) 
To refresh the screen display of a signal.	Refresh on page 178
To select and highlight a variable that is mapped to a signal in the Variables  controlbar.	Select in Variable Browser on page 181
To select and arrange signals and segments in signal description sets.	Select Mode on page 182
To zoom into signals and segments.	Zoom Mode on page 194
To show the default range of signals.	Zoom to Default on page 195

Related topics**Basics**

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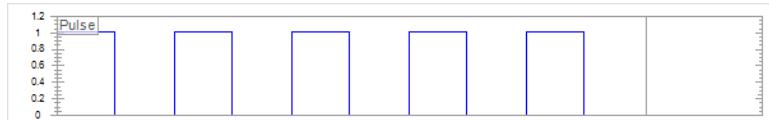
HowTos

[How to Create and Configure an Operation Segment.....](#) 34

References

[Signal Editor Page.....](#) 186

Pulse (Segment)

Illustration**Purpose**

To specify a square-wave segment.

Description

The segment provides a square-wave for a defined duration of time.

The corresponding mathematical function is:

$$f(t) = \begin{cases} A + b & 0 < t + \varphi \cdot T < t_h \\ b & t_h < t + \varphi \cdot T < T \end{cases}, t_h = T \cdot \delta$$

A: amplitude

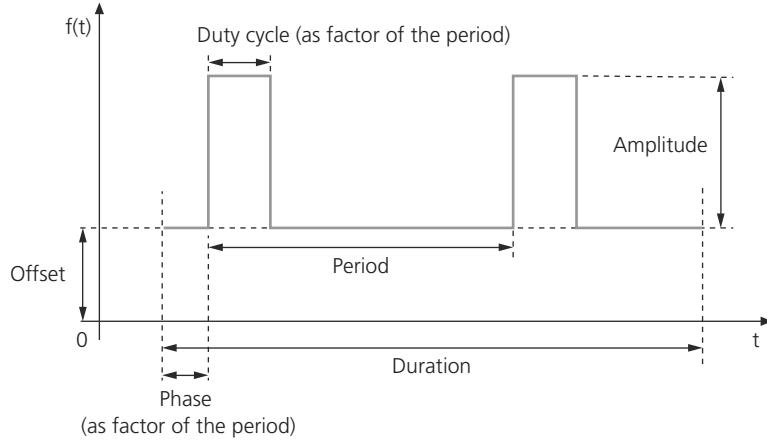
T: period

δ : duty cycle

t_h : pulse width (high-time)

φ : initial phase shift

b: offset (bias)

**Segment symbol**

The segment has the following symbol in the Signal Selector controlbar: 

Properties

Common The segment provides the following common properties:

Property	Purpose
Comment Property on page 116	To specify a comment.
Segment Type Property on page 130	To display the segment type.
Property	Purpose
Amplitude Property on page 115	To specify a segment's amplitude.
Duration Property on page 117	To specify a segment's duration in seconds.
Duty Cycle Property on page 118	To specify a segment's duty cycle.
Offset Property on page 124	To specify a segment's offset value.
Period Property on page 127	To specify a segment's period in seconds.
Phase Property on page 128	To specify a segment's initial phase shift.
Stop Trigger Property on page 137	To define the duration of the selected segment by specifying a stop trigger.

Related commands

The segment provides the following commands:

Purpose	Refer to
To export a signal description set, signal generator, or signal to the file system.	Export/Export Generator on page 164
To fit the signal view to the signal length.	Fit to Screen on page 167
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 168
To view and edit the properties of the selected element.	Properties (Controlbar) (ControlDesk User Interface Handling) 
To refresh the screen display of a signal.	Refresh on page 178

Purpose	Refer to
To select and highlight a variable that is mapped to a signal in the Variables controlbar.	Select in Variable Browser on page 181
To select and arrange signals and segments in signal description sets.	Select Mode on page 182
To zoom into signals and segments.	Zoom Mode on page 194
To show the default range of signals.	Zoom to Default on page 195

Related topics**Basics**

Basics on Segments..... 25

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Ramp (Segment)

Illustration**Purpose**

To specify a ramp-shaped segment via a start and a stop value.

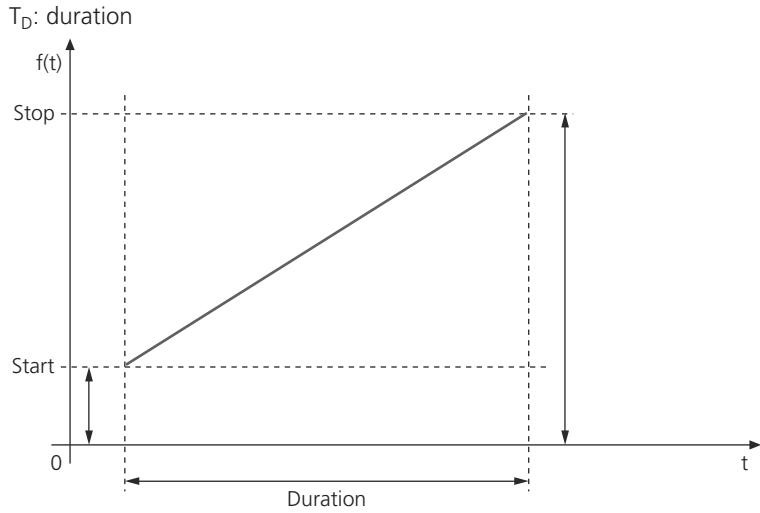
Description

The segment provides a ramp-shaped signal value for a defined duration of time.

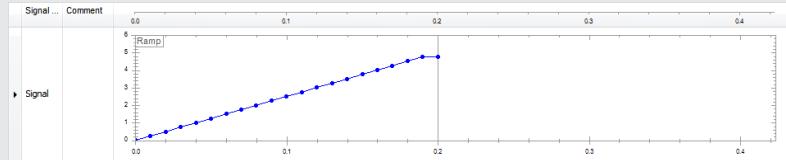
The corresponding mathematical function is:

$$f(t) = \frac{y_2 - y_1}{T_D} \cdot t + y_1$$

 y_1 : start value y_2 : stop value

**Note**

At the end of each segment, the last defined signal value is not stimulated. Instead of this value, the first value of the next segment is used. Even if no further segment follows, the last defined signal value is not stimulated.



For details, refer to [Behavior when Stimulating Variables with a Ramp Segment](#) on page 204.

Segment symbol

The segment has the following symbol in the Signal Selector controlbar: 

Properties

Common The segment provides the following common properties:

Property	Purpose
Comment Property on page 116	To specify a comment.
Segment Type Property on page 130	To display the segment type.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Duration Property on page 117	To specify a segment's duration in seconds.
Start Property on page 136	To specify a start value.
Stop Property on page 137	To specify a stop value.

Related commands	The segment provides the following commands:
<p>Purpose</p> <p>To export a signal description set, signal generator, or signal to the file system.</p> <p>To fit the signal view to the signal length.</p> <p>To scroll the signal shapes inside of signals horizontally and vertically.</p> <p>To view and edit the properties of the selected element.</p> <p>To refresh the screen display of a signal.</p> <p>To select and highlight a variable that is mapped to a signal in the Variables controlbar.</p> <p>To select and arrange signals and segments in signal description sets.</p> <p>To zoom into signals and segments.</p> <p>To show the default range of signals.</p>	<p>Refer to</p> <p>Export/Export Generator on page 164</p> <p>Fit to Screen on page 167</p> <p>Hand Mode on page 168</p> <p>Properties (Controlbar) (ControlDesk User Interface Handling)</p> <p>Refresh on page 178</p> <p>Select in Variable Browser on page 181</p> <p>Select Mode on page 182</p> <p>Zoom Mode on page 194</p> <p>Zoom to Default on page 195</p>

Related topics	<p>Basics</p> <table border="0"> <tr> <td style="background-color: #e0e0e0; padding-right: 10px;">Basics on Segments.....</td> <td style="background-color: #e0e0e0; padding-left: 10px;">25</td> </tr> <tr> <td style="background-color: #e0e0e0; padding-right: 10px;">Behavior when Stimulating Variables with a Ramp Segment.....</td> <td style="background-color: #e0e0e0; padding-left: 10px;">204</td> </tr> </table> <p>References</p> <table border="0"> <tr> <td style="background-color: #e0e0e0; padding-right: 10px;">Ramp Slope (Segment).....</td> <td style="background-color: #e0e0e0; padding-left: 10px;">102</td> </tr> <tr> <td style="background-color: #e0e0e0; padding-right: 10px;">Signal Editor Page.....</td> <td style="background-color: #e0e0e0; padding-left: 10px;">186</td> </tr> </table>	Basics on Segments.....	25	Behavior when Stimulating Variables with a Ramp Segment.....	204	Ramp Slope (Segment).....	102	Signal Editor Page.....	186
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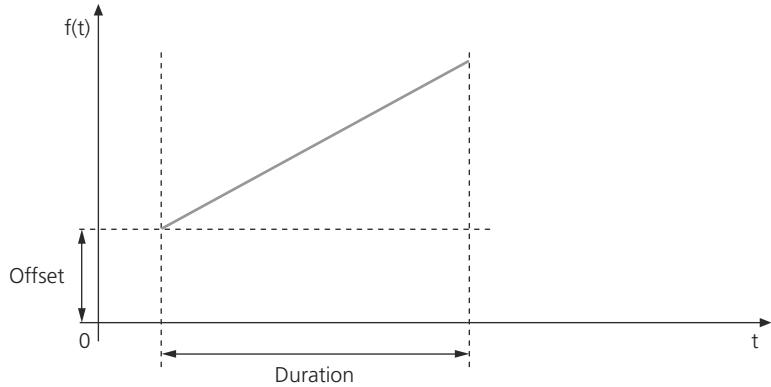
Ramp Slope (Segment)



Purpose	To specify a ramp-shaped segment via a slope.
Description	<p>The segment provides a ramp-shaped signal value for a defined duration of time.</p> <p>The corresponding mathematical function is:</p> $f(t) = m \cdot t + b$

m: slope

b: offset (bias)



Segment symbol

The segment has the following symbol in the Signal Selector controlbar:

Properties

Common The segment provides the following common properties:

Property	Purpose
Comment Property on page 116	To specify a comment.
Segment Type Property on page 130	To display the segment type.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Duration Property on page 117	To specify a segment's duration in seconds.
Offset Property on page 124	To specify a segment's offset value.
Slope Property on page 135	To specify a slope.
Stop Trigger Property on page 137	To define the duration of the selected segment by specifying a stop trigger.

Related commands

The segment provides the following commands:

Purpose	Refer to
To export a signal description set, signal generator, or signal to the file system.	Export/Export Generator on page 164
To fit the signal view to the signal length.	Fit to Screen on page 167
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 168
To view and edit the properties of the selected element.	Properties (Controlbar) (ControlDesk User Interface Handling)
To refresh the screen display of a signal.	Refresh on page 178

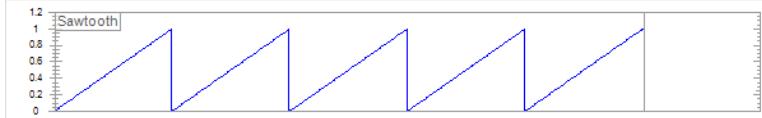
Purpose	Refer to
To select and highlight a variable that is mapped to a signal in the Variables controlbar.	Select in Variable Browser on page 181
To select and arrange signals and segments in signal description sets.	Select Mode on page 182
To zoom into signals and segments.	Zoom Mode on page 194
To show the default range of signals.	Zoom to Default on page 195

Related topics**Basics**

Basics on Segments..... 25

ReferencesRamp (Segment)..... 100
Signal Editor Page..... 186

Sawtooth (Segment)

Illustration**Purpose**

To specify a sawtooth segment.

Description

The segment provides a sawtooth for a defined duration of time.

The corresponding mathematical function is:

$$f(t) = \begin{cases} \frac{A}{t_r} t + b & 0 < t + \varphi \cdot T < t_r \\ A - \frac{A}{t_f} (t - t_r) + b & t_r < t + \varphi \cdot T < t_f \end{cases}, t_r = T \cdot \delta, t_f = T - t_r, t_r \neq 0, t_f \neq 0$$

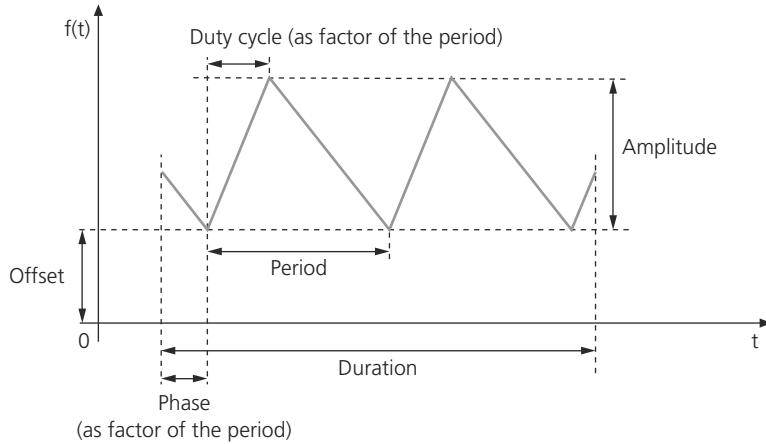
A: amplitude

T: period

 δ : duty cycle t_r : rise time t_f : fall time

φ : initial phase shift

b: offset (bias)



Segment symbol

The segment has the following symbol in the Signal Selector controlbar: 

Properties

Common The segment provides the following common properties:

Property	Purpose
Comment Property on page 116	To specify a comment.
Segment Type Property on page 130	To display the segment type.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Amplitude Property on page 115	To specify a segment's amplitude.
Duration Property on page 117	To specify a segment's duration in seconds.
Duty Cycle Property on page 118	To specify a segment's duty cycle.
Offset Property on page 124	To specify a segment's offset value.
Period Property on page 127	To specify a segment's period in seconds.
Phase Property on page 128	To specify a segment's initial phase shift.
Stop Trigger Property on page 137	To define the duration of the selected segment by specifying a stop trigger.

Related commands

The segment provides the following commands:

Purpose	Refer to
To export a signal description set, signal generator, or signal to the file system.	Export/Export Generator on page 164
To fit the signal view to the signal length.	Fit to Screen on page 167

Purpose	Refer to
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 168
To view and edit the properties of the selected element.	Properties (Controlbar) (ControlDesk User Interface Handling)
To refresh the screen display of a signal.	Refresh on page 178
To select and highlight a variable that is mapped to a signal in the Variables controlbar.	Select in Variable Browser on page 181
To select and arrange signals and segments in signal description sets.	Select Mode on page 182
To zoom into signals and segments.	Zoom Mode on page 194
To show the default range of signals.	Zoom to Default on page 195

Related topics**Basics**

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Signal Value (Segment)

Illustration**Purpose**

To specify a segment's content via the numerical signal data of a MAT file.

Description

The Signal Value segment allows you to use numerical data for stimulation. This can be:

- Imported data from a MAT file
The MAT file you use must fulfill the following preconditions:
 - The MAT file must contain at least two one-dimensional arrays. One array must contain monotonically increasing values for the time axis (x-axis).
 - The data must be of 'double' type.
 - The MAT file can be used only if it does not contain a substructure.
- Recorded measurement data stored in the Measurement Data folder of an experiment

The segment's duration is defined by the data you use.

If the segment contains no data, the time axis is marked with a light red bar. This indicates that the segment's duration is not yet defined.

In a ControlDesk experiment, the imported numerical signal data is stored in a MAT file in parallel to the related signal descriptions set's STI file.

Note

- If you use the segment for stimulus control, the data of the segment is streamed from the host PC to the simulation platform. For DS1006-based modular systems, data streaming from the host PC via Ethernet is not recommended due to limited performance. The recommended connection between the host PC and a DS1006-based modular system is a bus connection.
- When numerical data is replayed on a simulation platform, all signals from the same time base are combined to one data stream from the host PC to the platform. The number of data streams is limited and depends on the platform hardware.
To reduce the number of data streams, use signals from the same time base. The MAT file vector selected as the segment signal's *X*-vector is used as the time base. Refer to [Problem when Using Too Many Data Streams](#) on page 203.

For further details on using the segment, refer to [How to Create and Configure a Signal Value Segment](#) on page 53.

Segment symbol

The segment has the following symbol in the Signal Selector controlbar: 

Properties

Common The segment provides the following common properties:

Property	Purpose
Comment Property on page 116	To specify a comment.
Segment Type Property on page 130	To display the segment type.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Interpolation Property on page 121	To specify the interpolation method to be used when replaying numerical data.
Signal Value Property on page 134	To import numerical signal data from a MAT file.

Related commands

The segment provides the following commands:

Purpose	Refer to
To export a signal description set, signal generator, or signal to the file system.	Export/Export Generator on page 164
To fit the signal view to the signal length.	Fit to Screen on page 167
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 168
To view and edit the properties of the selected element.	Properties (Controlbar) (ControlDesk User Interface Handling )
To refresh the screen display of a signal.	Refresh on page 178
To select and highlight a variable that is mapped to a signal in the Variables  controlbar.	Select in Variable Browser on page 181
To select and arrange signals and segments in signal description sets.	Select Mode on page 182
To zoom into signals and segments.	Zoom Mode on page 194
To show the default range of signals.	Zoom to Default on page 195

Related topics**Basics**

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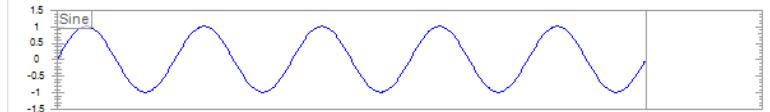
HowTos

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References

Data File (Segment)	86
Measurement Data Pool (ControlDesk Measurement and Recording )	
Signal Editor Page	186

Sine (Segment)

Illustration**Purpose**

To specify a sine segment.

Description

The segment provides a sinusoidal signal shape for a defined duration of time.

The corresponding mathematical function is:

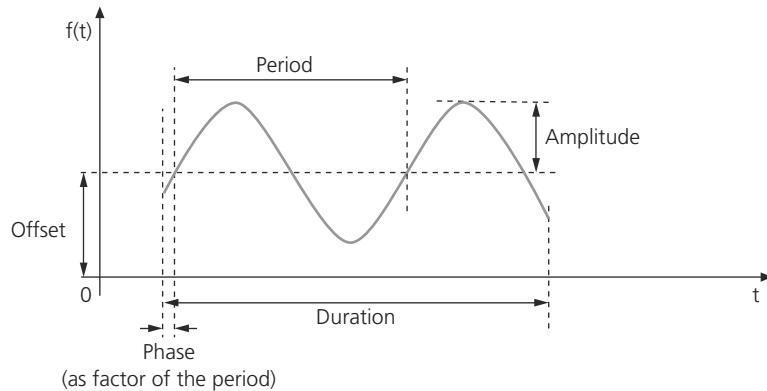
$$f(t) = A \cdot \sin\left(\frac{2\pi}{T} \cdot t + \varphi \cdot T\right) + b$$

A: amplitude

T: period

φ : initial phase shift

b: offset (bias)

**Segment symbol**

The segment has the following symbol in the Signal Selector controlbar: 

Properties

Common The segment provides the following common properties:

Property	Purpose
Comment Property on page 116	To specify a comment.
Segment Type Property on page 130	To display the segment type.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Amplitude Property on page 115	To specify a segment's amplitude.
Duration Property on page 117	To specify a segment's duration in seconds.
Offset Property on page 124	To specify a segment's offset value.
Period Property on page 127	To specify a segment's period in seconds.
Phase Property on page 128	To specify a segment's initial phase shift.
Stop Trigger Property on page 137	To define the duration of the selected segment by specifying a stop trigger.

Related commands

The segment provides the following commands:

Purpose	Refer to
To export a signal description set, signal generator, or signal to the file system.	Export/Export Generator on page 164
To fit the signal view to the signal length.	Fit to Screen on page 167
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 168
To view and edit the properties of the selected element.	Properties (Controlbar) (ControlDesk User Interface Handling )
To refresh the screen display of a signal.	Refresh on page 178
To select and highlight a variable that is mapped to a signal in the Variables  controlbar .	Select in Variable Browser on page 181
To select and arrange signals and segments in signal description sets.	Select Mode on page 182
To zoom into signals and segments.	Zoom Mode on page 194
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Related topics**Basics**

[Basics on Segments.....](#) 25

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Signal Editor Properties

Introduction

Note

In operator mode, all the properties related to the Signal Editor are read-only and cannot be changed.

You can configure signals and segments with the Properties controlbar. Refer to [Properties \(Controlbar\) \(ControlDesk User Interface Handling\)](#).

Where to go from here

Information in this section

<Custom> Property	114
To specify a custom property.	
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To specify a segment's amplitude.	
Channel Path Property	115
To display the channel path of the TimeVector and DataVector channels (signals). The channel path typically contains the device name or platform name.	
Channel Source Property	116
To display the channel source of the TimeVector and DataVector channels (signals). The channel source typically contains the network node name or the task name.	
Comment Property	116
To specify a comment.	
Data Vector Name Property	117
To display the channel name, which is typically the name of the signal to be used.	
Duration Property	117
To specify a segment's duration in seconds.	
Duty Cycle Property	118
To specify a segment's duty cycle.	
Elapsed Time Property	119
To display the time that elapsed (in seconds) when the selected signal generator is running.	
File Name Property	119
To select and link numerical signal data from an MF4 file.	
Group Name Property	120
To display the group name of the TimeVector and DataVector channels (signals). The group name typically contains the task name, the raster name or the event name.	

Group Path Property	120
To specify the group path of the TimeVector and DataVector channels (signals). The group path typically contains the platform/device name.	
Group Source Property	120
To display the group source of the TimeVector and DataVector channels (signals). The group source typically contains the network node name, the tool name or the task name.	
Interpolation Property	121
To specify the interpolation method to be used when replaying numerical data.	
Loop Count Property	121
To specify how often a segment/signal is executed during simulation.	
Mean Property	122
To specify the mean value of a Gaussian noise.	
Name of Connected Platform Property	123
To display the platform/device to which the selected signal generator is downloaded. When you use a multicore/multiprocessor system, you can select the member to which the selected signal generator is downloaded.	
Name Property (Signal Description Set)	123
To display the name of the selected signal description set.	
Name Property (Signal)	123
To specify the name of the selected signal via text input and/or macros.	
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To specify a segment's offset value.	
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To select a signal as an operand for an arithmetical operation.	
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To specify the export resolution of the signal(s) in seconds.	
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Segment Type Property	130
To display the segment type.	
Show Grid Property	130
To show grid lines in the signal plot.	
Show Segment Comments Property	131
To show the comments of the segments in the signal plot.	
Show Segment Parameters Property	131
To show the segment parameters in the signal plot.	
Show Segment Types Property	132
To show the segment types in the signal plot.	
Show Time Cursor Property	132
To show the time and y-axis value at the mouse pointer position in the signal plot.	
Show X-Axis Property	133
To display a separate x-axis in each signal.	
Sigma Property	133
To specify the standard deviation of a Gaussian noise.	
Signal Value Property	134
To import numerical signal data from a MAT file.	
Slope Property	135
To specify a slope.	
Start Property	136
To specify a start value.	
Stop Property	137
To specify a stop value.	
Stop Trigger Property	137
To define the duration of the selected segment by specifying a stop trigger.	
Symbol Name Property	139
To display the symbol name of the selected signal.	
Tau Property	140
To specify the time constant tau.	
Time Vector Name Property	140
To display the time vector name.	
Use Block Representation Property	141
To display block representations instead of a plotted signal.	
Value Editor – Condition	141
To specify a trigger condition in the ASAM General Expression Syntax (GES) as a string.	

Value Editor – Expression	145
---	-----

To specify an expression for a constant value in the ASAM General Expression Syntax (GES).

Value Property (Const Segment)	148
--	-----

To specify a value for a const segment.

<Custom> Property

Purpose	To specify a custom property.				
Description	<p>Using custom columns in the header of a signal description set lets you specify your own custom properties for the single signals of the set.</p> <p>The custom columns and custom properties are stored as specific custom properties in the related STZ file of the signal description set. You can reuse this information when carrying out automated tests at later stages of the development process.</p> <p>The custom columns also let you group and filter signals in ControlDesk's working area for a better overview. Refer to Show Group By Box on page 184.</p> <p>You specify custom columns via the Create Column or Rename Column commands.</p>				
Related signals	<p>This property is available for the following signals:</p> <ul style="list-style-type: none"> ▪ Operation Signal on page 80 ▪ Segment Signal on page 81 				
Related topics	References <table> <tr> <td>Create Column</td> <td>159</td> </tr> <tr> <td>Rename Column</td> <td>179</td> </tr> </table>	Create Column	159	Rename Column	179
Create Column	159				
Rename Column	179				

Amplitude Property

Purpose	To specify a segment's amplitude.
Segment parameter settings	<p>Type Lets you select one of the following parameter types for the selected segment parameter:</p> <ul style="list-style-type: none"> ▪ Constant: Refer to Value. ▪ Signal: Refer to Signal. ▪ Alias: Refer to Alias. <p>Value Lets you specify a constant value for the selected segment property. You can click the Browse button to specify an expression for this constant value via the Value Editor. You can use mathematical functions in ASAM General Expression Syntax (GES) and the parameters that you specified in the signal description set's Parameters property list.</p> <p>Signal Lets you select one of the other signals in the current signal description set for the selected segment parameter. For each point in time, the corresponding value of the selected signal is taken.</p> <p>Alias Lets you specify a variable alias as Parameter Type for the selected Segment Parameter. A variable alias lets you control the property via a model variable of a simulation application.</p> <p>The specified alias appears in the Signal Mapping controlbar. For more details, refer to How to Map Variables on page 65.</p>
Related segments	This property is available for the following segments: <ul style="list-style-type: none"> ▪ Pulse (Segment) on page 98 ▪ Sawtooth (Segment) on page 104 ▪ Sine (Segment) on page 108

Channel Path Property

Purpose	To display the channel path of the TimeVector and DataVector channels (signals). The channel path typically contains the device name or platform name.
Related segment	This property is available for the following segment: <ul style="list-style-type: none"> ▪ Data File (Segment) on page 86

Channel Source Property

Purpose	To display the channel source of the TimeVector and DataVector channels (signals). The channel source typically contains the network node name or the task name.
Related segment	This property is available for the following segment: <ul style="list-style-type: none">▪ Data File (Segment) on page 86

Comment Property

Purpose	To specify a comment.
Description	If you edit a comment in the Properties controlbar, click the down arrow to enter more than one line. Press Enter to begin a new line or Control+Enter to confirm the edited text. If you edit a comment for a signal in the working area, press Alt+Enter to begin a new line.
Related segments	You can specify this property for the following segments: <ul style="list-style-type: none">▪ Const (Segment) on page 85▪ Data File (Segment) on page 86▪ Exponential (Segment) on page 89▪ Idle (Segment) on page 91▪ Noise (Segment) on page 95▪ Operation (Segment) on page 96▪ Pulse (Segment) on page 98▪ Ramp (Segment) on page 100▪ Ramp Slope (Segment) on page 102▪ Sawtooth (Segment) on page 104▪ Signal Value (Segment) on page 106▪ Sine (Segment) on page 108
Related signals	You can specify this property for the following signals: <ul style="list-style-type: none">▪ Operation Signal on page 80▪ Segment Signal on page 81

Related items in the Project controlbar

This property is available for the following items:

- Signal description set (STZ file) in the Signal Description Sets folder
- Signal description set (STZ file) in the Signal Generators folder

Data Vector Name Property

Purpose

To display the channel name, which is typically the name of the signal to be used.

Related segment

This property is available for the following segment:

- [Data File \(Segment\)](#) on page 86

Duration Property

Purpose

To specify a segment's duration in seconds.

Note

The Duration property value is ignored if a Stop Trigger is specified.

Description

You can click the Browse button to specify an expression for this constant value via the Value Editor. Refer to [Value Editor – Expression](#) on page 145. You can use mathematical functions in ASAM General Expression Syntax (GES) and the parameters that you specified in the signal description set's Parameters property list. Refer to [Parameters Property](#) on page 126.

(For Data File segments only) You can type **Infinity** or **INF** to replay the numerical signal data up to its end.

Related segments

This property is available for the following segments:

- [Const \(Segment\)](#) on page 85
- [Data File \(Segment\)](#) on page 86
- [Exponential \(Segment\)](#) on page 89
- [Idle \(Segment\)](#) on page 91
- [Noise \(Segment\)](#) on page 95
- [Pulse \(Segment\)](#) on page 98

- [Ramp \(Segment\)](#) on page 100
- [Ramp Slope \(Segment\)](#) on page 102
- [Sawtooth \(Segment\)](#) on page 104
- [Sine \(Segment\)](#) on page 108

Related topics**References**

Signal Editor Page	186
Start Property	136
Stop Property	137
Stop Trigger Property	137

Duty Cycle Property

Purpose	To specify a segment's duty cycle.
Description	Lets you specify a segment's duty cycle scaled to the range 0...1.
Segment parameter settings	<p>Type Lets you select one of the following parameter types for the selected segment parameter:</p> <ul style="list-style-type: none"> ▪ Constant: Refer to Value. ▪ Signal: Refer to Signal. ▪ Alias: Refer to Alias. <p>Value Lets you specify a constant value for the selected segment property. You can click the Browse button to specify an expression for this constant value via the Value Editor. You can use mathematical functions in ASAM General Expression Syntax (GES) and the parameters that you specified in the signal description set's Parameters property list.</p> <p>Signal Lets you select one of the other signals in the current signal description set for the selected segment parameter. For each point in time, the corresponding value of the selected signal is taken.</p> <p>Alias Lets you specify a variable alias as Parameter Type for the selected Segment Parameter. A variable alias lets you control the property via a model variable of a simulation application.</p>

The specified alias appears in the Signal Mapping controlbar. For more details, refer to [How to Map Variables](#) on page 65.

Related segments

This property is available for the following segments:

- [Pulse \(Segment\)](#) on page 98
- [Sawtooth \(Segment\)](#) on page 104

Elapsed Time Property

Purpose

To display the time that elapsed (in seconds) when the selected signal generator is running.

Related items in the Project controlbar

This property is available for the following item:

- Signal description set (STZ file) in the Signal Generators folder

File Name Property

Purpose

To select and link numerical signal data from an MF4 file.

Description

The Browse button lets you open the Select Data File dialog to select and link numerical signal data from an MF4 file.

Select Data File dialog

Lets you select and link numerical signal data from an MF4 file to the selected segment.

Select Opens a dialog to select the MF4 file you want to link. The file format must be ASAM MDF 4.1.x.

Next Opens the Select Channel dialog for you to select a channel from the MF4 file.

Select channel dialog

Lets you select a channel to be used with the related Data File segment.

Back Lets you return to the Select Data File dialog.

Finish Lets you confirm the selection and close the dialog.

Related segment	This property is available for the following segment: ▪ Data File (Segment) on page 86
Related topics	<p>HowTos</p> <p>How to Create and Configure a Data File Segment..... 50</p> <p>References</p> <p>Data File (Segment)..... 86</p>

Group Name Property

Purpose	To display the group name of the TimeVector and DataVector channels (signals). The group name typically contains the task name, the raster name or the event name.
Related segment	This property is available for the following segment: ▪ Data File (Segment) on page 86

Group Path Property

Purpose	To specify the group path of the TimeVector and DataVector channels (signals). The group path typically contains the platform/device name.
Related segment	This property is available for the following segment: ▪ Data File (Segment) on page 86

Group Source Property

Purpose	To display the group source of the TimeVector and DataVector channels (signals). The group source typically contains the network node name, the tool name or the task name.
----------------	--

Related segment

This property is available for the following segment:

- [Data File \(Segment\)](#) on page 86

Interpolation Property

Purpose

To specify the interpolation method to be used when replaying numerical data.

Description

To replay numerical data, you have to specify an interpolation method. This is necessary because the [raster](#) of the numerical data and the model steps (sampling steps) can differ.

Parameter types

- eBACKWARD** Lets you use the current recorded data point as the data point of the next model step.
- eFORWARD** (currently not supported) Lets you use the next data point immediately.
- eLINEAR** Lets you use linear interpolation between the recorded data points to get the data points for the single model steps.

Related segment

This property is available for the following segment:

- [Data File \(Segment\)](#) on page 86
- [Signal Value \(Segment\)](#) on page 106

Related topics

Basics

[Basics on Numerical Data Replay.....](#) 47

Loop Count Property

Purpose

To specify how often a segment/signal is executed during simulation.

Related segment

You can specify this property for the following segment:

- [Loop \(Segment\)](#) on page 93

Related signal	This property is available for the following signal: ▪ Segment Signal on page 81
Related topics	HowTos How to Execute Segments or Signals Several Times38 References Loop (Segment)93

Mean Property

Purpose	To specify the mean value of a Gaussian noise.
Segment parameter settings	Type Lets you select one of the following parameter types for the selected segment parameter: ▪ Constant: Refer to Value. ▪ Signal: Refer to Signal. ▪ Alias: Refer to Alias. Value Lets you specify a constant value for the selected segment property. You can click the Browse button to specify an expression for this constant value via the Value Editor. You can use mathematical functions in ASAM General Expression Syntax (GES) and the parameters that you specified in the signal description set's Parameters property list. Signal Lets you select one of the other signals in the current signal description set for the selected segment parameter. For each point in time, the corresponding value of the selected signal is taken. Alias Lets you specify a variable alias as Parameter Type for the selected Segment Parameter. A variable alias lets you control the property via a model variable of a simulation application. The specified alias appears in the Signal Mapping controlbar. For more details, refer to How to Map Variables on page 65.
Related segment	This property is available for the following segment: ▪ Noise (Segment) on page 95

Name of Connected Platform Property

Purpose	To display the platform/device to which the selected signal generator is downloaded. When you use a multicore/multiprocessor system, you can select the member to which the selected signal generator is downloaded.
Related items in the Project controlbar	<p>This property is available for the following item:</p> <ul style="list-style-type: none"> ▪ Signal description set (STZ file) in the Signal Generators folder

Name Property (Signal Description Set)

Purpose	To display the name of the selected signal description set.		
Related items in the Project controlbar	<p>This property is available for the following items:</p> <ul style="list-style-type: none"> ▪ Signal description set (STZ file) in the Signal Description Sets folder ▪ Signal description set (STZ file) in the Signal Generators folder 		
Related topics	References <table border="1" style="width: 100%; border-collapse: collapse; text-align: right;"> <tr> <td style="padding: 5px;">Name Property (Signal).....</td> <td style="padding: 5px;">123</td> </tr> </table>	Name Property (Signal).....	123
Name Property (Signal).....	123		

Name Property (Signal)

Purpose	To specify the name of the selected signal via text input and/or macros.						
Description	<p>Lets you edit text directly and/or use macros to specify the name of the selected signal.</p> <p>You can use the following macros from a drop-down list:</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">Macro</th> <th style="padding: 5px;">Description</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">{BLOCK%}</td> <td style="padding: 5px;">Block name of the variable</td> </tr> <tr> <td style="padding: 5px;">{VARIABLE%}</td> <td style="padding: 5px;">Name of the variable</td> </tr> </tbody> </table>	Macro	Description	{BLOCK%}	Block name of the variable	{VARIABLE%}	Name of the variable
Macro	Description						
{BLOCK%}	Block name of the variable						
{VARIABLE%}	Name of the variable						

Related signals	This property is available for the following signals: <ul style="list-style-type: none">▪ Operation Signal on page 80▪ Segment Signal on page 81				
Related topics	References <table><tr><td>Name Property (Signal Description Set).....</td><td>123</td></tr><tr><td>Symbol Name Property.....</td><td>139</td></tr></table>	Name Property (Signal Description Set).....	123	Symbol Name Property.....	139
Name Property (Signal Description Set).....	123				
Symbol Name Property.....	139				

Offset Property

Purpose	To specify a segment's offset value.
Segment parameter settings	<p>Type Lets you select one of the following parameter types for the selected segment parameter:</p> <ul style="list-style-type: none">▪ Constant: Refer to Value.▪ Signal: Refer to Signal.▪ Alias: Refer to Alias. <p>Value Lets you specify a constant value for the selected segment property. You can click the Browse button to specify an expression for this constant value via the Value Editor. You can use mathematical functions in ASAM General Expression Syntax (GES) and the parameters that you specified in the signal description set's Parameters property list.</p> <p>Signal Lets you select one of the other signals in the current signal description set for the selected segment parameter. For each point in time, the corresponding value of the selected signal is taken.</p> <p>Alias Lets you specify a variable alias as Parameter Type for the selected Segment Parameter. A variable alias lets you control the property via a model variable of a simulation application. The specified alias appears in the Signal Mapping controlbar. For more details, refer to How to Map Variables on page 65.</p>
Related segments	This property is available for the following segments: <ul style="list-style-type: none">▪ Pulse (Segment) on page 98▪ Ramp Slope (Segment) on page 102▪ Sawtooth (Segment) on page 104▪ Sine (Segment) on page 108

Operand 1/Operand 2 Property

Purpose	To select a signal as an operand for an arithmetical operation.
Description	Lets you select one Segment Signal of the current signal description set for an arithmetical operation. You can use one and the same Segment Signal twice for both operands of an Operation Signal.
Related signal	This property is available for the following signal: ▪ Operation Signal on page 80
Related topics	HowTos How to Create and Configure an Operation Signal..... 35

Operation Property

Purpose	To specify an arithmetic operation.
Description	Lets you specify and perform an arithmetical operation between two segments or between two signals.
Parameter types	You can use the following parameter types to specify this property: Addition Lets you perform an addition. Multiplication Lets you perform a multiplication.
Related segment	You can specify this property for the following segment: ▪ Operation (Segment) on page 96
Related signal	This property is available for the following signal: ▪ Operation Signal on page 80

Related topics**HowTos**

How to Create and Configure an Operation Segment.....	34
How to Create and Configure an Operation Signal.....	35

Parameters Property

Purpose

To specify a list of global parameters for a signal description set.

Description

Lets you specify a list of global parameters for the signal description set/signal generator. You can centrally specify constant properties via global parameters for all segments of a signal description set. If you modify the value of a global parameter later, all constant properties that use this parameter are changed automatically. Therefore, you do not have to change any of them manually.

Click  to add a new parameter to the list.

Click  to remove a parameter from the list.

The parameter list provides following columns:

Name Lets you specify a unique name for the parameter.

Do not use the reserved words **Infinity** and **INF**, or the names of mathematical functions, such as **sin**, as parameter names.

Value Lets you specify the parameter value.

Description Lets you describe the parameter.

Related items

This property is available for the following item:

- Signal description set (STZ file) located in the Signal Description Sets folder or the Signal Generators folder or open in the working area.

Related topics**Basics**

[Specifying Constant Properties of Segments via Parameters.....](#) 40

HowTos

[How to Specify and Modify a Constant Property via a Parameter.....](#) 42

References

[Value Editor – Expression.....](#) 145

Period Property

Purpose

To specify a segment's period in seconds.

Segment parameter settings

Type Lets you select one of the following parameter types for the selected segment parameter:

- **Constant:** Refer to Value.
- **Signal:** Refer to Signal.
- **Alias:** Refer to Alias.

Value Lets you specify a constant value for the selected segment property. You can click the Browse button to specify an expression for this constant value via the Value Editor. You can use mathematical functions in ASAM General Expression Syntax (GES) and the parameters that you specified in the signal description set's Parameters property list.

Signal Lets you select one of the other signals in the current signal description set for the selected segment parameter. For each point in time, the corresponding value of the selected signal is taken.

Alias Lets you specify a variable alias as Parameter Type for the selected Segment Parameter. A variable alias lets you control the property via a model variable of a simulation application.

The specified alias appears in the Signal Mapping controlbar. For more details, refer to [How to Map Variables](#) on page 65.

Related segments

This property is available for the following segments:

- [Pulse \(Segment\)](#) on page 98
- [Sawtooth \(Segment\)](#) on page 104
- [Sine \(Segment\)](#) on page 108

Phase Property

Purpose	To specify a segment's initial phase shift.
Description	Lets you specify a phase shift scaled to the range -1 ... 1. (For example, 0.25 stands for 90°, -0.25 stands for -90°.)
Segment parameter settings	<p>Type Lets you select one of the following parameter types for the selected segment parameter:</p> <ul style="list-style-type: none">▪ Constant: Refer to Value.▪ Signal: Refer to Signal.▪ Alias: Refer to Alias. <p>Value Lets you specify a constant value for the selected segment property. You can click the Browse button to specify an expression for this constant value via the Value Editor. You can use mathematical functions in ASAM General Expression Syntax (GES) and the parameters that you specified in the signal description set's Parameters property list.</p> <p>Signal Lets you select one of the other signals in the current signal description set for the selected segment parameter. For each point in time, the corresponding value of the selected signal is taken.</p> <p>Alias Lets you specify a variable alias as Parameter Type for the selected Segment Parameter. A variable alias lets you control the property via a model variable of a simulation application. The specified alias appears in the Signal Mapping controlbar. For more details, refer to How to Map Variables on page 65.</p>
Related segments	This property is available for the following segments: <ul style="list-style-type: none">▪ Pulse (Segment) on page 98▪ Sawtooth (Segment) on page 104▪ Sine (Segment) on page 108

Plot Resolution Property

Purpose	To specify the resolution of the signal plot(s) in seconds.
Description	Lets you specify the resolution of the time axis for the signal plot(s) to be displayed in the working area. The smallest value is 0.001 s.

Related items

This property is available for the following item:

- Signal description set (STZ file) located in the Signal Description Sets folder or the Signal Generators folder or open in the working area.

Related topics**References**

Resolution Property.....	129
Show Time Cursor Property.....	132
Show X-Axis Property.....	133

Resolution Property

Purpose

To specify the export resolution of the signal(s) in seconds.

Description

Lets you specify the resolution of the time axis in seconds. The resolution is relevant when you export the signal(s) to the CSV, IFD, MAT, or MF4 file format. Refer to [Export/Export Generator](#) on page 164.

Related items

This property is available for the following item:

- Signal description set (STZ file) located in the Signal Description Sets folder or the Signal Generators folder or open in the working area.

Related topics**References**

Plot Resolution Property.....	128
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Seed Property

Purpose

To specify the seed of a random generator.

Parameter types

You can use the following parameter types to specify this property:

Constant value Lets you specify a constant value for the selected segment property. You can click the Browse button to specify an expression for this constant value via the Value Editor. You can use mathematical functions in

ASAM General Expression Syntax (GES) and the parameters that you specified in the signal description set's Parameters property list.

Related segment

This property is available for the following segment:

- [Noise \(Segment\)](#) on page 95

Segment Type Property

Purpose

To display the segment type.

Related segments

This property is available for the following segments:

- [Const \(Segment\)](#) on page 85
- [Data File \(Segment\)](#) on page 86
- [Exponential \(Segment\)](#) on page 89
- [Idle \(Segment\)](#) on page 91
- [Noise \(Segment\)](#) on page 95
- [Operation \(Segment\)](#) on page 96
- [Pulse \(Segment\)](#) on page 98
- [Ramp \(Segment\)](#) on page 100
- [Ramp Slope \(Segment\)](#) on page 102
- [Sawtooth \(Segment\)](#) on page 104
- [Signal Value \(Segment\)](#) on page 106
- [Sine \(Segment\)](#) on page 108

Show Grid Property

Purpose

To show grid lines in the signal plot.

Related signals

This property is available for the following signals:

- [Operation Signal](#) on page 80
- [Segment Signal](#) on page 81

Related topics**References**

[Show Segment Comments Property](#)..... 131

Show Segment Parameters Property.....	131
Show Segment Types Property.....	132
Signal Editor Page.....	186
Use Block Representation Property.....	141

Show Segment Comments Property

Purpose	To show the comments of the segments in the signal plot.
----------------	--

Related signals	This property is available for the following signal: ▪ Segment Signal on page 81
------------------------	---

Related topics	References
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Show Grid Property.....	130
Show Segment Parameters Property.....	131
Show Segment Types Property.....	132
Signal Editor Page.....	186
Use Block Representation Property.....	141

Show Segment Parameters Property

Purpose	To show the segment parameters in the signal plot.
----------------	--

Description	Lets you display all segment parameters in addition to the signal plot or the segments' block representations. This can be useful, for example, if you take a screen shot of the signal for the purpose of documentation.
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Related signals	This property is available for the following signal: ▪ Segment Signal on page 81
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Related topics	References
-----------------------	-------------------

Show Grid Property.....	130
Show Segment Comments Property.....	131

Show Segment Types Property.....	132
Signal Editor Page.....	186
Use Block Representation Property.....	141

Show Segment Types Property

Purpose	To show the segment types in the signal plot.
----------------	---

Related signals	This property is available for the following signal: ▪ Segment Signal on page 81
------------------------	---

Related topics	References
	Show Grid Property..... 130
	Show Segment Comments Property..... 131
	Show Segment Parameters Property..... 131
	Signal Editor Page..... 186
	Use Block Representation Property..... 141

Show Time Cursor Property

Purpose	To show the time and y-axis value at the mouse pointer position in the signal plot.
----------------	---

Related items	This property is available for the following item: ▪ Signal description set (STZ file) located in the Signal Description Sets folder or the Signal Generators folder or open in the working area.
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Related topics	References
	Plot Resolution Property..... 128
	Show X-Axis Property..... 133

Show X-Axis Property

Purpose	To display a separate x-axis in each signal.				
Description	A detailed x-axis (valid for all the signals of a signal description set) is always displayed in the header of the signal description set. Via the Show X-Axis property, you can additionally display the detailed x-axis in each signal of the signal description set.				
Related items	<p>This property is available for the following item:</p> <ul style="list-style-type: none"> ▪ Signal description set (STZ file) located in the Signal Description Sets folder or the Signal Generators folder or open in the working area. 				
Related topics	<p>References</p> <table border="0"> <tr> <td>Plot Resolution Property.....</td> <td>128</td> </tr> <tr> <td>Show Time Cursor Property.....</td> <td>132</td> </tr> </table>	Plot Resolution Property.....	128	Show Time Cursor Property.....	132
Plot Resolution Property.....	128				
Show Time Cursor Property.....	132				

Sigma Property

Purpose	To specify the standard deviation of a Gaussian noise.
Segment parameter settings	<p>Type Lets you select one of the following parameter types for the selected segment parameter:</p> <ul style="list-style-type: none"> ▪ Constant: Refer to Value. ▪ Signal: Refer to Signal. ▪ Alias: Refer to Alias. <p>Value Lets you specify a constant value for the selected segment property. You can click the Browse button to specify an expression for this constant value via the Value Editor. You can use mathematical functions in ASAM General</p>

Expression Syntax (GES) and the parameters that you specified in the signal description set's Parameters property list.

Signal Lets you select one of the other signals in the current signal description set for the selected segment parameter. For each point in time, the corresponding value of the selected signal is taken.

Alias Lets you specify a variable alias as Parameter Type for the selected Segment Parameter. A variable alias lets you control the property via a model variable of a simulation application.

The specified alias appears in the Signal Mapping controlbar. For more details, refer to [How to Map Variables](#) on page 65.

Related segment

This property is available for the following segment:

- [Noise \(Segment\)](#) on page 95

Signal Value Property

Purpose

To import numerical signal data from a MAT file.

Parameter type

You can use the following parameter type to specify this property:

SignalValue This Browse button lets you open the Configure Signal Value Segment dialog to import numerical data from a MAT file.

Configure Signal Value Segment dialog

Lets you select and import numerical signal data from an MAT file to a Signal Value segment.

Import Opens a dialog to select the MAT file you want to import. When you close the dialog, information about the content of the MAT file is shown in the log window of the Select File dialog.

The MAT file you use must fulfill the following preconditions:

- The MAT file must contain at least two one-dimensional arrays. One array must contain monotonically increasing values for the time axis (x-axis).
- The data must be of 'double' type.
- The MAT file can be used only if it does not contain a substructure.

X-vector Lets you select the x-vector for the time axis.

Y vector Lets you select the y-vector for the corresponding signal values. The x-vector and y-vector must be of the same length. If your selection does not match, the OK button is grayed out.

Select Vectors dialog Lets you select the X vector for the time axis and the Y vector for the corresponding signal values. The X vector and Y vector must be of the same length. If your selection does not match, the Finish button is grayed out.

Related segment This property is available for the following segment:

- [Signal Value \(Segment\)](#) on page 106

Related topics	HowTos		
	<table border="0"> <tr> <td>How to Create and Configure a Signal Value Segment.....</td> <td>53</td> </tr> </table>	How to Create and Configure a Signal Value Segment	53
How to Create and Configure a Signal Value Segment	53		
	References		
	<table border="0"> <tr> <td>Signal Value (Segment).....</td> <td>106</td> </tr> </table>	Signal Value (Segment)	106
Signal Value (Segment)	106		

Slope Property

Purpose To specify a slope.

Segment parameter settings

Type Lets you select one of the following parameter types for the selected segment parameter:

- Constant: Refer to Value.
- Signal: Refer to Signal.
- Alias: Refer to Alias.

Value Lets you specify a constant value for the selected segment property. You can click the Browse button to specify an expression for this constant value via the Value Editor. You can use mathematical functions in ASAM General Expression Syntax (GES) and the parameters that you specified in the signal description set's Parameters property list.

Signal Lets you select one of the other signals in the current signal description set for the selected segment parameter. For each point in time, the corresponding value of the selected signal is taken.

Alias Lets you specify a variable alias as Parameter Type for the selected Segment Parameter. A variable alias lets you control the property via a model variable of a simulation application.

The specified alias appears in the Signal Mapping controlbar. For more details, refer to [How to Map Variables](#) on page 65.

Related segment

This property is available for the following segment:

- [Ramp Slope \(Segment\)](#) on page 102

Start Property

Purpose

To specify a start value.

Parameter types

You can use the following parameter types to specify this property:

Constant Lets you specify a constant value for the selected segment property. You can click the Browse button to specify an expression for this constant value via the Value Editor. You can use mathematical functions in ASAM General Expression Syntax (GES) and the parameters that you specified in the signal description set's Parameters property list.

(For Data File segments only) You can type **-Infinity** or **-INF** to replay the numerical signal data from its beginning.

Signal (if available) Lets you select one of the other signals in the current signal description set for the selected segment parameter. For each point in time, the corresponding value of the selected signal is taken.

Alias (if available) Lets you specify a variable alias as Parameter Type for the selected Segment Parameter. A variable alias lets you control the property by a model variable of a simulation application.

The specified alias appears in the Signal Mapping controlbar. For more details, refer to [How to Map Variables](#) on page 65.

Related segments

This property is available for the following segments:

- [Data File \(Segment\)](#) on page 86
- [Exponential \(Segment\)](#) on page 89
- [Ramp \(Segment\)](#) on page 100

Related topics**References**

Stop Trigger Property.....	137
----------------------------	-----

Stop Property

Purpose	To specify a stop value.				
Segment parameter settings	<p>Type Lets you select one of the following parameter types for the selected segment parameter:</p> <ul style="list-style-type: none"> ▪ Constant: Refer to Value. ▪ Signal: Refer to Signal. ▪ Alias: Refer to Alias. <p>Value Lets you specify a constant value for the selected segment property. You can click the Browse button to specify an expression for this constant value via the Value Editor. You can use mathematical functions in ASAM General Expression Syntax (GES) and the parameters that you specified in the signal description set's Parameters property list.</p> <p>Signal Lets you select one of the other signals in the current signal description set for the selected segment parameter. For each point in time, the corresponding value of the selected signal is taken.</p> <p>Alias Lets you specify a variable alias as Parameter Type for the selected Segment Parameter. A variable alias lets you control the property via a model variable of a simulation application. The specified alias appears in the Signal Mapping controlbar. For more details, refer to How to Map Variables on page 65.</p>				
Related segments	This property is available for the following segments: <ul style="list-style-type: none"> ▪ Exponential (Segment) on page 89 ▪ Ramp (Segment) on page 100 				
Related topics	References <table border="0" style="width: 100%;"> <tr> <td style="padding-right: 10px;">Duration Property.....</td> <td style="text-align: right;">117</td> </tr> <tr> <td>Start Property.....</td> <td style="text-align: right;">136</td> </tr> </table>	Duration Property	117	Start Property	136
Duration Property	117				
Start Property	136				

Stop Trigger Property

Purpose	To define the duration of the selected segment by specifying a stop trigger.
Description	You can define the duration of a segment by specifying a <i>stop trigger</i> .

A stop trigger is:

- A *duration watcher*, specified by a constant time value
OR:
- A *condition watcher*, specified by a stop condition formula and an optional timeout value.

The segment ends when the stop condition is reached or when the timeout has elapsed.

If you specify a stop trigger, the Duration property is disabled and the value specified for the Duration property is ignored.

Parameter types

You can use the following parameter types to specify this property:

Constant value Lets you specify a constant value for the selected segment property.

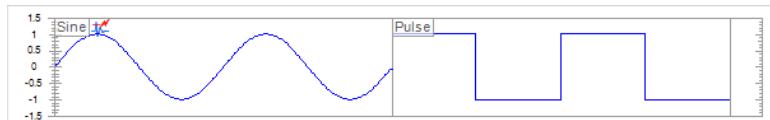
By default, this value is set to the value of the Duration property. If the Duration property is specified by an ASAM GES expression, the calculated value of this expression is used as the default value.

Condition Lets you specify a condition to determine the duration of the selected segment. The segment ends when the condition is reached or when the timeout has elapsed.

The following table shows the properties of the Condition type:

Property	Description
Condition	Lets you specify a condition formula with one or more variable aliases, for example, 'speed < 100'. Edit the condition formula according to the syntax rules defined in the ASAM AE XIL API standard. Click the Browse button of the Condition property to open the Value Editor that lets you specify a trigger condition in the ASAM General Expression Syntax (GES). The variable alias you use appears in the Signal Mapping controlbar, where you can map a variable to it. For details on mapping variables to aliases, refer to Basics on Mapping Variables to Signals and Aliases on page 63.
Timeout	Lets you specify a timeout in seconds to prevent an invalid stop condition and an infinite simulation run.

When a Condition is set, a  condition icon is displayed to the right of the segment's title, refer to the following example.



None Lets you remove or disable the stop trigger.

Related segments

This property is available for the following segments:

- [Const \(Segment\)](#) on page 85
 - [Data File \(Segment\)](#) on page 86
 - [Exponential \(Segment\)](#) on page 89
 - [Idle \(Segment\)](#) on page 91
 - [Noise \(Segment\)](#) on page 95
 - [Pulse \(Segment\)](#) on page 98
 - [Ramp Slope \(Segment\)](#) on page 102
 - [Sawtooth \(Segment\)](#) on page 104
 - [Sine \(Segment\)](#) on page 108
-

Related topics**References**

Value Editor – Condition	141
--	-----

Symbol Name Property

Purpose

To display the symbol name of the selected signal.

Description

This read-only property displays the currently specified name of the selected signal. The name is used in the signal plot and in the signal tree of the Signal Mapping controlbar.

To specify the name, refer to [Name Property \(Signal\)](#) on page 123.

Related signals

This property is available for the following signals:

- [Operation Signal](#) on page 80
 - [Segment Signal](#) on page 81
-

Related topics**References**

Name Property (Signal)	123
--	-----

Tau Property

Purpose	To specify the time constant tau.
Segment parameter settings	<p>Type Lets you select one of the following parameter types for the selected segment parameter:</p> <ul style="list-style-type: none">▪ Constant: Refer to Value.▪ Signal: Refer to Signal.▪ Alias: Refer to Alias. <p>Value Lets you specify a constant value for the selected segment property. You can click the Browse button to specify an expression for this constant value via the Value Editor. You can use mathematical functions in ASAM General Expression Syntax (GES) and the parameters that you specified in the signal description set's Parameters property list.</p> <p>Signal Lets you select one of the other signals in the current signal description set for the selected segment parameter. For each point in time, the corresponding value of the selected signal is taken.</p> <p>Alias Lets you specify a variable alias as Parameter Type for the selected Segment Parameter. A variable alias lets you control the property via a model variable of a simulation application. The specified alias appears in the Signal Mapping controlbar. For more details, refer to How to Map Variables on page 65.</p>
Related segment	This property is available for the following segment: <ul style="list-style-type: none">▪ Exponential (Segment) on page 89

Time Vector Name Property

Purpose	To display the time vector name.
Related segment	This property is available for the following segment: <ul style="list-style-type: none">▪ Data File (Segment) on page 86

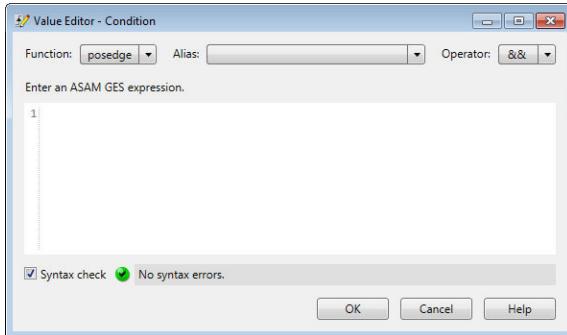
Use Block Representation Property

Purpose	To display block representations instead of a plotted signal.								
Description	Lets you visualize the segments of a signal as block representations showing only the segments' titles and icons instead of a signal plot. This gives you a quick overview of complex edited signals without the time axis.								
Related signals	This property is available for the following signals: <ul style="list-style-type: none">▪ Operation Signal on page 80▪ Segment Signal on page 81								
Related topics	References <table><tr><td>Show Grid Property.....</td><td>130</td></tr><tr><td>Show Segment Comments Property.....</td><td>131</td></tr><tr><td>Show Segment Parameters Property.....</td><td>131</td></tr><tr><td>Show Segment Types Property.....</td><td>132</td></tr></table>	Show Grid Property.....	130	Show Segment Comments Property.....	131	Show Segment Parameters Property.....	131	Show Segment Types Property.....	132
Show Grid Property.....	130								
Show Segment Comments Property.....	131								
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Value Editor – Condition

Access	You can access this editor via the Browse button of the Condition property. Refer to Stop Trigger Property on page 137.
Purpose	To specify a trigger condition in the ASAM General Expression Syntax (GES) as a string.

Description	You can use the Value Editor to specify a trigger condition that complies with the ASAM General Expression Syntax (GES).
--------------------	--



Expressions that comply with this GES syntax let you specify conditions that relate not only to one value at a certain time, but also to the change of values over time (e.g., in signals).

In such an expression, you can use common logical operations (e.g., and) and mathematical functions (e.g., sin). Furthermore, the GES provides functions, such as posedge, that consider values and their predecessors for validation. You can nest ASAM GES expressions to specify more complex conditions.

To edit the condition string, you can use the Value Editor in two different ways:

- You can specify the expression by using the editor buttons Function, Parameter, and Operator to select its functions, parameters, and operators.
- You can manually enter the condition as an ASAM GES expression.

By default, the syntax of the condition is continuously checked, but you can disable syntax checking to use aliases that you want to define later.

Tip

For more information on the *General Expression Syntax*, refer to *Appendix A* of the ASAM documentation [ASAM_AE_XIL_Generic-Simulator-Interface_BS-1-4-Programmers-Guide_V2-1-0.pdf](#).

Note

If you check two floating-point values for equality, using the == operator might lead to unexpected results. For example, $(3 * 0.1 == 0.3)$ returns *False*.

To take into account precision effects of the binary representation of float values, it is useful to allow tolerances. For example, to check the equality of a and b, use:

```
abs(b-a) < 1e-14
```

Settings of the editor

The Value Editor lets you specify the following settings:

Alias Lets you select an alias from the mapping table or a definition from the Defines data object that is available for the condition. The selected item is inserted into the condition at the text cursor position.

ASAM GES expression Lets you edit a condition manually. This means you can manually add parentheses and aliases that you want to define later.

Function Lets you select an ASAM XIL API function that is inserted into the condition at the text cursor position.

Operator	Syntax	Meaning
posedge	<code>posedge(Expr1, Expr2)¹⁾</code>	Returns true when the value of <code>Expr1</code> changes from a value lower than <code>Expr2</code> to a value greater than or equal to <code>Expr2</code> (positive edge detection).
negedge	<code>negedge(Expr1, Expr2)¹⁾</code>	Returns true when the value of <code>Expr1</code> changes from a value greater than <code>Expr2</code> to a value lower than or equal to <code>Expr2</code> (negative edge detection).
changed	<code>changed(Expr1, Expr2)¹⁾</code>	Returns true when the difference between the current value of <code>Expr1</code> and its direct successor is greater or equal to <code>Expr2</code> (value change detection).
changedpos	<code>changedpos(Expr1, Expr2)¹⁾</code>	Returns true when the current value of <code>Expr1</code> is greater than its predecessor at least by <code>Expr2</code> (positive value change detection).
changedneg	<code>changedneg(Expr1, Expr2)¹⁾</code>	Returns true when the current value of <code>Expr1</code> is smaller than its predecessor at least by <code>Expr2</code> (negative value change detection).
sin	<code>sin(Expr)²⁾</code>	Returns the sine of <code>Expr</code> .
cos	<code>cos(Expr)²⁾</code>	Returns the cosine of <code>Expr</code> .
abs	<code>abs(Expr)</code>	Returns the absolute value of <code>Expr</code> .
pow	<code>pow(Expr1, Expr2)</code>	Returns the value of <code>Expr1</code> to the power of <code>Expr2</code> .
min	<code>min(Expr1, Expr2)</code>	Returns the value of the smaller expression.
max	<code>max(Expr1, Expr2)</code>	Returns the value of the greater expression.

¹⁾ Where `Expr1` defines a signal and `Expr2` defines a number.

²⁾ Where `Expr` is specified in radian.

Operator Lets you select an operator to insert into the condition at the text cursor position.

Operator	Meaning
<code>&&</code>	Logical <i>and</i> of the left and right operands.
<code> </code>	Logical <i>or</i> of the left and right operands.
<code>^^</code>	Logical <i>exclusive or</i> of the left and right operands.
<code>!</code>	Logical <i>not</i> of the right operand.
<code>&></code>	Logical <i>and then</i> of the left and right operands.
<code><</code>	The left operand is smaller than the right operand.
<code><=</code>	The left operand is smaller than or equal to the right operand.

Operator	Meaning
>	The left operand is greater than the right operand.
>=	The left operand is greater than or equal to the right operand.
==	The left operand is equal to the right operand.
!=	The left operand is not equal to the right operand.
+	The sign of the right operand or the sum of the right and left operands.
-	The sign of the right operand or the difference of the right and left operands.
*	The product of the right and left operands.
/	The ratio of the right and left operands.
**	The left operand to the power of the right operand.

Syntax check Lets you enable or disable continuous syntax checking of the ASAM GES expression. By default, syntax checking is selected.

If syntax checking is selected, its result is displayed in a status icon and a status message. The following status icons are provided:

Status Icon	Meaning
	The condition is syntactically correct.
	The condition contains syntax errors. In the ASAM GES expression, the error is highlighted.
	The OK button is disabled. The condition contains unknown aliases. The names of the invalid aliases are displayed in the status message.

If enabled, the syntax is checked continuously. Therefore, the check status frequently indicates an error while you enter the expression.

Features of the editor

The Value Editor provides the following features to make reading and writing conditions more convenient:

Syntax highlighting Keywords, identifiers, literals, and comments are displayed in different colors to increase the readability of the code.

Bracket matching When you position the text cursor after a bracket, the text cursor and the matching bracket are highlighted.

Name completion When you enter the first characters of a name or command, you can press **Ctrl+Spacebar** to automatically complete the entry. If the entered name segment is not unique, all the possible matches are displayed in a list. Only elements that were already executed are available.

Related topics**References**

Stop Trigger Property.....	137
Value Editor – Expression.....	145

Value Editor – Expression

Access

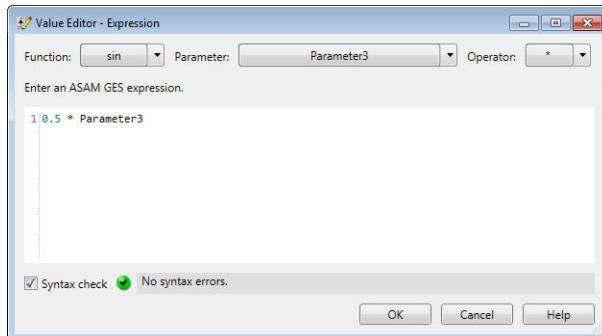
In the Properties controlbar of segments, you can access this editor via a Browse button in the rows of constant properties, such as the Duration, Seed, or Value properties.

Purpose

To specify an expression for a constant value in the ASAM General Expression Syntax (GES).

Description

You can use the Value Editor to specify an expression for a constant value that complies with the ASAM General Expression Syntax (GES).



In this expression, you can use mathematical functions (e.g., `sin`), operators (e.g., `+`), and parameters that you specified in the signal description set's Parameters property list.

To edit the expression, you can use the Value Editor in two different ways:

- You can specify the expression by using the editor buttons Function, Parameter, and Operator to select its functions, parameters, and operators.
- You can manually enter the expression as an ASAM GES expression.

By default, the syntax of the expression is continuously checked, but you can disable syntax checking to use parameters that you want to define later.

Tip

For more information on the *General Expression Syntax*, refer to *Appendix A* of the ASAM documentation [ASAM_AE_XIL_Generic-Simulator-Interface_BS-1-4-Programmers-Guide_V2-1-0.pdf](#).

Settings of the editor

The Value Editor lets you specify the following settings:

ASAM GES expression Lets you edit an expression manually. This means you can manually add parentheses and parameters that you want to define later.

Function Lets you select an ASAM XIL API function that is inserted into the expression at the text cursor position.

Operator	Syntax	Meaning
sin	<code>sin(Expr)¹⁾</code>	Returns the sine of Expr.
cos	<code>cos(Expr)¹⁾</code>	Returns the cosine of Expr.
asin	<code>asin(Expr)</code>	Returns the arc sine of Expr, specified in radian.
acos	<code>acos(Expr)</code>	Returns the arc sine of Expr, specified in radian.
log	<code>log(Expr)</code>	Return the natural logarithm (base e) of Expr.
exp	<code>exp(Expr)</code>	Returns the value of e to the power of Expr.
abs	<code>abs(Expr)</code>	Returns the absolute value of Expr.
min	<code>min(Expr1, Expr2)</code>	Returns the value of the smaller expression.
max	<code>max(Expr1, Expr2)</code>	Returns the value of the greater expression.
pow	<code>pow(Expr1, Expr2)</code>	Returns the value of Expr1 to the power of Expr2.

¹⁾ Where Expr is specified in radian.

Operator Lets you select an operator to insert into the expression at the text cursor position.

Operator	Meaning
+	The sign of the right operand or the sum of the right and left operands.
-	The sign of the right operand or the difference of the right and left operands.
*	The product of the right and left operands.
/	The ratio of the right and left operands.
**	The left operand to the power of the right operand.

Parameter Lets you select a parameter from the list that you specified before in the signal description set's Parameters property list. The selected item is inserted into the value expression at the text cursor position.

Syntax check Lets you enable or disable continuous syntax checking of the ASAM GES expression. By default, syntax checking is selected.

If syntax checking is selected, its result is displayed in a status icon and a status message. The following status icons are provided:

Status Icon	Meaning
	The expression is syntactically correct.
	The expression contains syntax errors.
	In the ASAM GES expression, the error is highlighted. The OK button is disabled.
	The expression contains unknown parameters. The names of the unknown parameters are displayed in the status message.

If enabled, the syntax is checked continuously. Therefore, the check status frequently indicates an error while you enter the expression.

Features of the editor

The Value Editor provides the following features to make reading and writing conditions more convenient:

Syntax highlighting Keywords, identifiers, literals, and comments are displayed in different colors to increase the readability of the code.

Bracket matching When you position the text cursor after a bracket, the text cursor and the matching bracket are highlighted.

Name completion When you enter the first characters of a name or command, you can press **Ctrl+Spacebar** to automatically complete the entry. If the entered name segment is not unique, all the possible matches are displayed in a list. Only elements that were already executed are available.

Related topics

Basics

[Specifying Constant Properties of Segments via Parameters.....](#) 40

HowTos

[How to Specify and Modify a Constant Property via a Parameter.....](#) 42

References

[Parameters Property.....](#) 126

[Value Editor – Condition.....](#) 141

Value Property (Const Segment)

Purpose	To specify a value for a const segment.
Segment parameter settings	<p>Type Lets you select one of the following parameter types for the selected segment parameter:</p> <ul style="list-style-type: none">▪ Constant: Refer to Value.▪ Signal: Refer to Signal.▪ Alias: Refer to Alias. <p>Value Lets you specify a constant value for the selected segment property. You can click the Browse button to specify an expression for this constant value via the Value Editor. You can use mathematical functions in ASAM General Expression Syntax (GES) and the parameters that you specified in the signal description set's Parameters property list.</p> <p>Signal Lets you select one of the other signals in the current signal description set for the selected segment parameter. For each point in time, the corresponding value of the selected signal is taken.</p> <p>Alias Lets you specify a variable alias as Parameter Type for the selected Segment Parameter. A variable alias lets you control the property via a model variable of a simulation application. The specified alias appears in the Signal Mapping controlbar. For more details, refer to How to Map Variables on page 65.</p>
Related segment	This property is available for the following segment: <ul style="list-style-type: none">▪ Const (Segment) on page 85

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<i>Not available in operator mode.</i>	
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Best Fit

Access

You can access this command via:

Ribbon	None
Context menu of	Column header of a signal description set opened in the working area
Shortcut key	None
Icon	

Purpose

To optimize the width of the selected column.

Related topics**References**

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Best Fit (All Columns)

Access

You can access this command via:

Ribbon	None
Context menu of	Column header of a signal description set opened in the working area
Shortcut key	None
Icon	None

Purpose

To optimize the widths of all the displayed columns.

Related topics**References**

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Change Platform

Access

You can access this command via:

Ribbon	None
Context menu of	List entry in the Signal Mapping controlbar
Shortcut key	None
Icon	None

Note

This command is not available in operator mode.

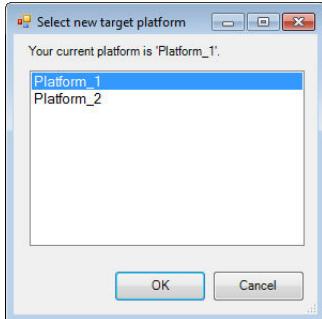
Purpose	To change the target platform and check the signal-to-variable mapping for inconsistencies.
----------------	---

Result	Opens the Select new target platform dialog for you to select a new target platform.
---------------	--

Note

The number of processors of the current and new target platform must be identical.

Select new target platform dialog	The Select new target platform dialog lets you select a new target platform.
--	--



When you click OK, ControlDesk switches to the active variable description of the new target platform. ControlDesk reuses the existing signal-to-variable mapping and checks for each variable if the variable's path can be recovered in the variable description. If inconsistencies are found, they are highlighted red in the Signal Mapping controlbar for you to solve them manually.

Related topics**HowTos**

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Check Mapping

Access

You can access this command via:

Ribbon	None
Context menu of	List entry in the Signal Mapping controlbar
Shortcut key	None
Icon	None

Note

This command is not available in operator mode.

Purpose

To check the signal-to-variable mapping for inconsistencies.

Result

ControlDesk checks if there are inconsistencies in the signal-to-variable mapping for the currently active variable description. ControlDesk checks for each variable if the variable's path can be recovered in the variable description. If inconsistencies are found, they are highlighted red in the Signal Mapping controlbar for you to solve them manually.

Related topics

HowTos

How to Map Variables.....	65
How to Reuse and Check an Existing Signal-to-Variable Mapping.....	67

References

Change Platform.....	153
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Close

Access

You can access this command via:

Ribbon	None
Context menu of	<ul style="list-style-type: none"> ▪ Signal description set (STZ file) in the Project  controlbar ▪ Signal generator (STZ file) in the Project  controlbar

Shortcut key	None
Icon	None

Purpose To close a signal description set or signal generator in the working area.

Related topics Basics

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Column Chooser

Access

You can access this command via:

Ribbon	None
Context menu of	Column header of a signal description set opened in the working area
Shortcut key	None
Icon	

Purpose

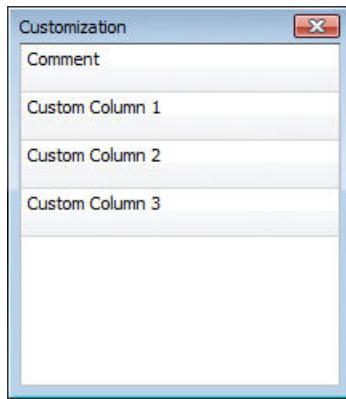
To open a dialog for specifying which columns to display.

Result

The Customization dialog is opened.

Customization dialog

With the Customization dialog, you can specify which columns to display in the header of a signal description set. The column headers displayed in the Customization dialog represent the columns that are not displayed (see the following example).



To remove a column from the header, drag it to the Customization dialog. To add a column to the header, drag it from the dialog back to the controlbar.

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References

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Hide This Column.....	170
Show Group By Box.....	184
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Convert Segment

Access

You can access this command via:

Ribbon	None
Context menu of	Segment
Shortcut key	None
Icon	None

Note

This command is not available in operator mode.

Purpose

To convert the selected segment into a segment of another type.

Description

The selected segment can be converted to one of the following segments:

- Const
- Exponential

- Idle
- Noise
- Pulse
- Ramp
- Ramp Slope
- Sawtooth
- Sine

If possible, the original properties are copied to the converted segment.

Copy (Segment or Signal)

Access

You can access this command via:

Ribbon	Home - Clipboard
Context menu of	<ul style="list-style-type: none">▪ Segment▪ Signal
Shortcut key	Ctrl + C
Icon	

Note

This command is not available in operator mode.

Purpose

To copy the selected segment or signal to the Clipboard.

Related topics

References

Cut (Segment or Signal).....	160
Delete (Segment or Signal).....	161
Paste (Segment or Signal).....	176

Create Column

Access

You can access this command via:

Ribbon	None
Context menu of	Column header of a signal description set opened in the working area
Shortcut key	None
Icon	None

Purpose

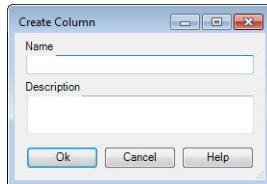
To create a custom column in the column header of a signal description set.

Description

The Create Column dialog opens to specify a new custom column.

Create/Rename Column dialog

The dialog lets you specify a custom column in the column header of a signal descriptions set.



Using custom columns in the header of a signal description set lets you specify your own custom properties for the single signals of the set.

The custom columns and custom properties are stored as specific custom properties in the related STZ file of the signal description set. You can reuse this information when carrying out automated tests at later stages of the development process.

The custom columns also let you group and filter signals in ControlDesk's working area for a better overview. Refer to [Show Group By Box](#) on page 184.

The dialog provides the following settings:

Name Lets you edit the name of the custom column.

In the Property controlbar, this name is also used for the related <Custom> property of the single signals.

The name must be unique in a signal description set. If the specified name is invalid, the edit field is marked with a ✘ icon.

Description Lets you edit a description for the custom column. In the Properties controlbar, this text is used as tool tip text for the related <Custom> property.

Related topics**References**

<Custom> Property.....	114
Column Chooser.....	156
Delete Column.....	163
Hide Group By Box.....	170
Hide This Column.....	170
Rename Column.....	179
Show Group By Box.....	184
Signal Description Set.....	76

Cut (Segment or Signal)

Access

You can access this command via:

Ribbon	Home - Clipboard
Context menu of	▪ Segment ▪ Signal
Shortcut key	Ctrl + X
Icon	

Note

This command is not available in operator mode.

Purpose

To cut the selected segment or signal to the Clipboard.

Related topics**References**

Copy (Segment or Signal).....	158
Delete (Segment or Signal).....	161
Paste (Segment or Signal).....	176

Delete (Segment or Signal)

Access

You can access this command via:

Ribbon	None
Context menu of	<ul style="list-style-type: none"> ▪ Segment ▪ Signal
Shortcut key	Del
Icon	

Note

This command is not available in operator mode.

Purpose

To copy the selected segment or signal to the Clipboard.

Related topics

References

Copy (Segment or Signal).....	158
Cut (Segment or Signal).....	160
Paste (Segment or Signal).....	176

Delete (Signal-to-Variable Mapping)

Access

You can access this command via:

Ribbon	None
Context menu of	Signal Mapping controlbar – list entry
Shortcut key	None
Icon	None

Note

This command is not available in operator mode.

Purpose

To delete a signal-to-variable mapping from the Signal Mapping controlbar.

Related topics	Basics
	Basics on Mapping Variables to Signals and Aliases..... 63
	References
	Delete All..... 162
	Signal Mapping..... 187

Delete All

Access	You can access this command via:
Ribbon	None
Context menu of	Signal Mapping controlbar
Shortcut key	None
Icon	None

Note

This command is not available in operator mode.

Purpose To delete all signal-to-variable mappings from the Signal Mapping controlbar.

Related topics	Basics
	Basics on Mapping Variables to Signals and Aliases..... 63
	References
	Delete (Signal-to-Variable Mapping)..... 161
	Signal Mapping..... 187

Delete Column

Access

You can access this command via:

Ribbon	None
Context menu of	Column header of a custom column in an opened signal description set.
Shortcut key	None
Icon	None

Purpose

To delete a custom column from the column header of a signal description set.

Related topics
References

Column Chooser.....	156
Create Column.....	159
Hide Group By Box.....	170
Hide This Column.....	170
Rename Column.....	179
Show Group By Box.....	184
Signal Description Set.....	76

Download/Download Generator

Access

This command is available only if online calibration is started for the platform to which the signal generator to be downloaded is assigned. You can access this command via:

Ribbon	Signal Editor - Signal Generators
Context menu of	Signal generator (STZ file) in the Project  controlbar
Shortcut key	None
Icon	

Purpose

To download a signal generator to the assigned simulation platform.

Description

Lets you save the signal generator and download it to the assigned simulation platform.

An additional green checkmark in the  icon of the signal generator indicates a successful download.

Related topics**Basics**

[Basics on Stimulating Variables](#)..... 69

HowTos

[How to Stimulate Variables of a Simulation Application](#)..... 70

References

Pause/Pause Generator..... 176

Start/Start Generator..... 193

Stop/Stop Generator..... 194

Export/Export Generator

Access

You can access this command via:

Ribbon	Signal Editor - Signal Generators
Context menu of	<ul style="list-style-type: none"> ▪ Signal ▪ Signal description set (STZ file) in the Project  ▪ Signal description set open in the working area ▪ Signal generator (STZ file) in the Project 
Shortcut key	None
Icon	

Note

This command is not available in operator mode.

Purpose

To export a signal description set, signal generator, or signal to the file system.

Result

Opens the **Export** dialog to select a location in the file system where you can save a copy of the selected element.

The following file formats are supported:

- CSV
- MAT
- MF4
- STZ

The STZ file format is only supported for signal description sets and signal generators.

Except for the STZ file format, ControlDesk uses the value specified for the Resolution Property for the time axis resolution.

Related topics

References

Import Generator/Import Signal Generator.....	172
Import Signal Description Set.....	171

Filter Editor

Access

You can access this command via:

Ribbon	None
Context menu of	Column header of a signal description set opened in the working area
Shortcut key	None
Icon	

Purpose

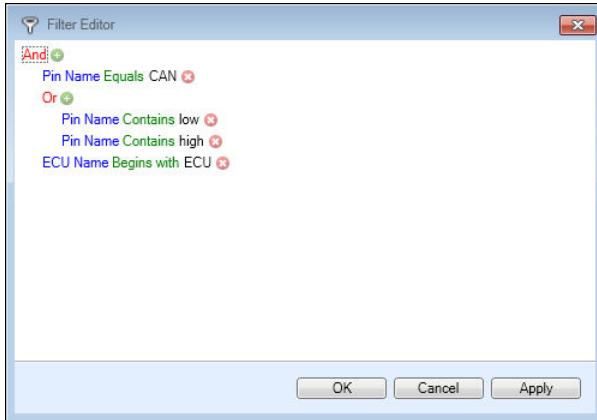
To open the Filter Editor to edit a filter rule.

Result

The Filter Editor is opened to create and apply a filter rule.

Filter Editor

The Filter Editor provides a tree view for specifying a hierarchical filter rule, for example, by using Boolean operators.



A filter can consist of several conditions that can be combined by a logical operation. In a condition, a column header is compared with a specified value. To specify a filter, the colored words can be modified.

Red word Click the red word to select a logical operator or a command for combining conditions. The following logical operators are available:

Logical Operation	Description
And	All combined conditions must be true.
Or	At least one of the combined condition must be true.
NotAnd	Not all of the combined conditions are true.
NotOr	Neither of the combined conditions is true.

The following commands are available:

Command	Description
Add Condition, +, +, or Insert	Lets you add a condition.
Add Group	Lets you add a condition group.
Clear All	Lets you clear all conditions.
X	Lets you clear a condition.
Remove Group	Lets you remove a group.

Blue word Click the blue word to select a column of the table whose value is then compared with a specified value.

Green word Click the green word to select a relational operator.

You can apply a filter rule by pressing the OK or Apply button. Pressing the OK button closes the editor.

Related topics

References

Signal Description Set.....	76
-----------------------------	----

Fit to Screen

Access

You can access this command via:

Ribbon	None
Context menu of	<ul style="list-style-type: none"> ▪ Segment ▪ Signal ▪ Signal description set open in the working area
Shortcut key	None
Icon	None

Purpose

To fit the signal view to the signal length.

Result

The x- and y-axis of the signal is made fully visible in the working area.

Related topics

HowTos

How to Zoom into a Signal.....	58
--------------------------------	----

References

Zoom to Default.....	195
----------------------	-----

Group by This Column

Access

You can access this command via:

Ribbon	None
Context menu of	Column header of a signal description set opened in the working area

Shortcut key	None
Icon	

Purpose To group the signals according to the entries of the column.

Description You can create nested groups. If you selected a column for grouping, you can unselect it via Ungroup in the context menu of its column header.

Related topics

References

Column Chooser.....	156
Create Column.....	159
Hide Group By Box.....	170
Hide This Column.....	170
Show Group By Box.....	184
Signal Description Set.....	76

Hand Mode

Access

You can access this command via:

Ribbon	None
Context menu of	<ul style="list-style-type: none"> ▪ Segment ▪ Signal ▪ Signal description set open in the working area
Shortcut key	None
Icon	

Purpose To scroll the signal shapes inside of signals horizontally and vertically.

Description Lets you scroll the signal shapes inside of signals horizontally and vertically with the mouse.

The  mouse pointer indicates that the Hand Mode is active.

Related topics**References**

Fit to Screen.....	167
Select Mode.....	182
Split Mode.....	192
Zoom Mode.....	194

Hide Auto Filter Row

Access

Ribbon	None
Context menu of	Column header of a signal description set opened in the working area
Shortcut key	None
Icon	None

Purpose

To hide the auto filter row.

Related topics**References**

Show Auto Filter Row.....	183
Show Find Panel.....	183

Hide Find Panel

Access

This command is available only if the find panel is not shown. You can access this command via:

Ribbon	None
Context menu of	Column header of a signal description set opened in the working area
Shortcut key	Ctrl + F
Icon	None

Purpose	To hide the find panel.
----------------	-------------------------

Related topics	References
-----------------------	------------

Show Auto Filter Row.....	183
Show Find Panel.....	183

Hide Group By Box

Access	This command is available only if the Group By Box field is displayed. You can access this command via:
---------------	---

Ribbon	None
Context menu of	Column header of a signal description set opened in the working area
Shortcut key	None
Icon	None

Purpose	To hide the Group By Box field.
----------------	---------------------------------

Related topics	References
-----------------------	------------

Group by This Column.....	167
Hide This Column.....	170
Show Group By Box.....	184
Signal Description Set.....	76

Hide This Column

Access	You can access this command via:
---------------	----------------------------------

Ribbon	None
Context menu of	Column header of a signal description set opened in the working area
Shortcut key	None
Icon	None

Purpose

To hide a column in the header of a signal description set.

Description

The selected column is hidden in the header of a signal description set,

Tip

You can use the Column Chooser (refer to [Column Chooser](#) on page 156) to select the columns to be displayed.

Related topics**References**

Column Chooser.....	156
Hide Group By Box.....	170
Show Group By Box.....	184
Signal Description Set.....	76

Import Signal Description Set

Access

You can access this command via:

Ribbon	None
Context menu of	Signal Description Sets folder
Shortcut key	None
Icon	

Note

This command is not available in operator mode.

Purpose

To import a signal description set in the form of an external STZ file to the Signal Description Sets folder of your project.

Result

A copy of the original STZ file appears in the [Project](#) controlbar as a child of the Signal Description Sets folder.

Related topics**Basics**

Basics on Editing Signal Description Sets.....	24
Basics on Signal Description Sets and Signal Generators.....	16

HowTos

How to Create a Signal Description Set.....	28
---	----

References

Export/Export Generator.....	164
Import Generator/Import Signal Generator.....	172
Open.....	175

Import Generator/Import Signal Generator

Access

You can access this command via:

Ribbon	Signal Editor - Signal Generators
Context menu of	Signal Generators folder
Shortcut key	None
Icon	

Note

This command is not available in operator mode.

Purpose

To import a signal description set in the form of an external STZ file into the Signal Generators folder of your experiment.

Result

A copy of the original STZ file appears in the **Project** controlbar as a child of the Signal Generators folder.

Related topics**Basics**

Basics on Editing Signal Description Sets.....	24
--	----

Basics on Signal Description Sets and Signal Generators.....	16
HowTos	
How to Create a Signal Description Set.....	28
References	
Export/Export Generator.....	164
Import Signal Description Set.....	171
Open.....	175

Insert Generator/Insert Signal Generator

Access

You can access this command via:

Ribbon	Signal Editor - Signal Generators
Context menu of	Signal Generators folder
Shortcut key	None
Icon	

Note

This command is not available in operator mode.

Purpose

To create a new signal generator.

Result

- A new STZ file appears in the **Project** controlbar as a child of the **Signal Generators** folder.
- The signal generator opens automatically in the working area.

Related topics

Basics

Basics on Editing Signal Description Sets.....	24
--	----

Basics on Signal Description Sets and Signal Generators..... 16

HowTos

How to Create a Signal Description Set..... 28

References

Close.....	155
Insert Signal Description Set.....	174
Open.....	175

Insert Signal Description Set

Access

You can access this command via:

Ribbon	None
Context menu of	Signal Description Sets folder
Shortcut key	None
Icon	

Note

This command is not available in operator mode.

Purpose

To create a new signal description set.

Result

- A new STZ file appears in the **Project**  controlbar as a child of the **Signal Description Sets** folder.
- The signal description set opens automatically in the working area.

Related topics

Basics

Basics on Editing Signal Description Sets..... 24

Basics on Signal Description Sets and Signal Generators.....	16
HowTos	
How to Create a Signal Description Set.....	28
References	
Close.....	155
Insert Generator/Insert Signal Generator.....	173
Open.....	175

Open

Access	You can access this command via:										
Ribbon	None										
Context menu of	<ul style="list-style-type: none"> ▪ Signal description set (STZ file) in the Project  ▪ Signal generator (STZ file) in the Project  										
Shortcut key	None										
Icon											
Purpose	To open a signal description set or signal generator in the working area.										
Related topics	Basics <table> <tr> <td>Basics on Editing Signal Description Sets.....</td> <td>24</td> </tr> <tr> <td>Basics on Signal Description Sets and Signal Generators.....</td> <td>16</td> </tr> </table> HowTos <table> <tr> <td>How to Create a Signal Description Set.....</td> <td>28</td> </tr> </table> References <table> <tr> <td>Close.....</td> <td>155</td> </tr> <tr> <td>Insert Generator/Insert Signal Generator.....</td> <td>173</td> </tr> </table>	Basics on Editing Signal Description Sets.....	24	Basics on Signal Description Sets and Signal Generators.....	16	How to Create a Signal Description Set.....	28	Close.....	155	Insert Generator/Insert Signal Generator.....	173
Basics on Editing Signal Description Sets.....	24										
Basics on Signal Description Sets and Signal Generators.....	16										
How to Create a Signal Description Set.....	28										
Close.....	155										
Insert Generator/Insert Signal Generator.....	173										

Paste (Segment or Signal)

Access

You can access this command via:

Ribbon	Home - Clipboard
Context menu of	<ul style="list-style-type: none"> ▪ Signal ▪ Signal description set open in the working area
Shortcut key	Ctrl + V
Icon	

Note

This command is not available in operator mode.

Purpose

To paste a segment or signal from the Clipboard to a signal or signal description set.

Related topics

References

Copy (Segment or Signal).....	158
Cut (Segment or Signal).....	160
Delete (Segment or Signal).....	161

Pause/Pause Generator

Access

This command is available only during stimulus generation on the simulation platform. You can access this command via:

Ribbon	Signal Editor - Signal Generators
Context menu of	Signal generator (STZ file) in the Project controlbar
Shortcut key	None
Icon	

Purpose

To pause or resume stimulus generation on the simulation platform assigned to the current signal generator.

Description Lets you pause or resume the stimulation of model variables on the connected simulation platform.

The paused signal generator is indicated by an  icon.

Related topics

Basics

Basics on Stimulating Variables.....	69
--------------------------------------	----

HowTos

How to Stimulate Variables of a Simulation Application.....	70
---	----

References

Download/Download Generator.....	163
----------------------------------	-----

Start/Start Generator.....	193
----------------------------	-----

Stop/Stop Generator.....	194
--------------------------	-----

Properties

Access

You can access this command via:

Ribbon	None
Context menu of	<ul style="list-style-type: none"> ▪ Segment ▪ Signal ▪ Signal description set open in the working area
Shortcut key	None
Icon	

Purpose

To open the **Properties**  controlbar.

Related topics

References

Properties (Controlbar) (ControlDesk User Interface Handling 
--

Refresh

Access

You can access this command via:

Ribbon	None
Context menu of	<ul style="list-style-type: none">▪ Signal▪ Segment
Shortcut key	None
Icon	None

Purpose

To refresh the screen display of a signal.

Description

When you specify properties of signals or segments, your settings may not affect the plotted signal immediately. In this case, the Refresh command lets you refresh the screen display of a signal.

ControlDesk automatically refreshes the screen display of data file segments when you download the related signal generator.

Reload

Access

You can access this command via:

Ribbon	None
Context menu of	Signal description set open in the working area
Shortcut key	None
Icon	None

Note

This command is not available in operator mode.

Purpose

To reload the signal description set to the working area in the last saved version.

Description

A reload discards all the changes of the current signal description set.

Rename

Access

You can access this command via:

Ribbon	None
Context menu of	<ul style="list-style-type: none"> ▪ Signal description set (STZ file) in the Project controlbar ▪ Signal generator (STZ file) in the Project controlbar
Shortcut key	None
Icon	

Note

This command is not available in operator mode.

Purpose

To rename a signal description set or a signal generator.

Rename Column

Access

You can access this command via:

Ribbon	None
Context menu of	Column header of a custom column in an opened signal description set.
Shortcut key	None
Icon	None

Purpose

To rename a custom column in the column header of a signal description set.

Description

The Rename Column dialog opens to rename the selected custom column.

Rename Column dialog

The dialog provides the following settings:

Name Lets you modify the name of the selected custom column. In the Property controlbar, this name is also used for the related <Custom> property of the single signals.

The name must be unique in a signal description set. If the specified name is invalid, the edit field is marked with a  icon.

Description Lets you modify the description of the selected custom column. In the Properties controlbar, this text is used as tool tip text for the related <Custom> property.

Related topics**References**

Column Chooser.....	156
Create Column.....	159
Delete Column.....	163
Hide Group By Box.....	170
Hide This Column.....	170
Show Group By Box.....	184
Signal Description Set.....	76

Save

Access

You can access this command via:

Ribbon	None
Context menu of	<ul style="list-style-type: none"> ▪ Signal description set (STZ file) in the Project  controlbar ▪ Signal generator (STZ file) in the Project  controlbar
Shortcut key	None
Icon	

Note

This command is not available in operator mode.

Purpose

To save a signal description set or a signal generator.

Related topics**Basics**

Basics on Editing Signal Description Sets.....	24
--	----

Basics on Signal Description Sets and Signal Generators.....	16
--	----

References

Export/Export Generator.....	164
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Select in Variable Browser

Access

You can access this command via:

Ribbon	None
Context menu of	<ul style="list-style-type: none"> ▪ Signal ▪ Segment ▪ List entry in the Signal Mapping controlbar
Shortcut key	Ctrl+B (for selected signals only)
Icon	None

Purpose

To select and highlight a variable that is mapped to a signal in the **Variables** controlbar.

Result

In the Variables, the variable is highlighted as follows:

- In the tree view, the node in which the variable is located is selected.
- In the variable list, the variable is displayed and highlighted.

Related topics

HowTos

How to Map Variables.....	65
---------------------------	----

Select Mapping

Access

You can access this command via:

Ribbon	None
Context menu of	Signal

Shortcut key	None
Icon	None

Purpose To select the signal in the **Signal Mapping**  controlbar.

Description The selected signal is highlighted in the Signal Mapping controlbar.

Related topics

References

Signal Mapping.....	187
---------------------	-----

Select Mode

Access

You can access this command via:

Ribbon	None
Context menu of	<ul style="list-style-type: none"> ▪ Segment ▪ Signal ▪ Signal description set open in the working area
Shortcut key	None
Icon	

Purpose To select and arrange signals and segments in signal description sets.

Description Lets you select and arrange signals and segments in signal description sets. The Select Mode is the standard work mode of the Signal Editor.

The  standard mouse pointer indicates that the Select Mode is active.

Related topics

References

Fit to Screen.....	167
Hand Mode.....	168
Split Mode.....	192
Zoom Mode.....	194

Show Auto Filter Row

Access

This command is available only if the find panel is not shown. You can access this command via:

Ribbon	None
Context menu of	Column header of a signal description set opened in the working area
Shortcut key	None
Icon	None

Purpose

To show the auto filter row.

Auto filter row

Lets you specify filter terms for each column separately. To close the auto filter row, use the Hide Auto Filter Row command.

If the auto filter row is not shown, you can show it with the Show Auto Filter Row command.

Related topics
References

Hide Auto Filter Row	169
Show Find Panel	183

Show Find Panel

Access

This command is available only if the find panel is not shown. You can access this command via:

Ribbon	None
Context menu of	Column header of a signal description set opened in the working area
Shortcut key	Ctrl+F
Icon	None

Purpose

To show the find panel.

Find panel



In the edit field of the find panel, you can specify a search substring. Immediately, only rows containing this substring are displayed. Each occurrence of the substring is highlighted in yellow. Numbers and letters are not distinguished.

You can click **Clear**, to clear a search substring.

You can click to hide the find panel.

Related topics

References

Hide Find Panel.....	169
Show Auto Filter Row.....	183

Show Group By Box

Access

This command is available only if the Group By Box field is not shown. You can access this command via:

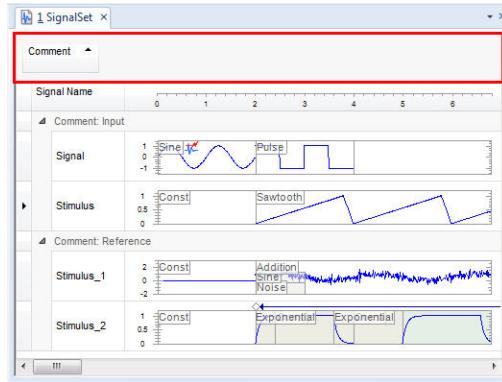
Ribbon	None
Context menu of	Column header of a signal description set opened in the working area
Shortcut key	None
Icon	

Purpose

To show the Group By Box field.

Group By Box field

The Group By Box field lets you group signals according to the entries of the selected column headers (see the following example).



You can select or clear column headers by dragging them to or from the Group By Box field. If you drag multiple column headers to the Group By Box field, the resulting row grouping is arranged hierarchically.

If the Group By Box field is not shown, you can display it with the Show Group By Box command.

The Group By Box field has the following context menu commands:

Clear Grouping (available from the context menu of the Group By Box field) Lets you clear the currently selected grouping.

Full Collapse (available from the context menu of the Group By Box field) Lets you collapse all the rows of the grid.

Full Expand (available from the context menu of the Group By Box field) Lets you fully expand all the rows of the grid.

Hide Group By Box Lets you hide the Group By Box field.

Related topics**References**

Column Chooser.....	156
Create Column.....	159
Group by This Column.....	167
Hide Group By Box.....	170
Hide This Column.....	170
Signal Description Set.....	76

Signal Editor Page

Access	This page is part of the ControlDesk Options dialog. The dialog can be opened via the Options Command (ControlDesk User Interface Handling ).
Purpose	To specify general settings of the Signal Editor.
Dialog settings	Default time period Lets you specify the default length of the time axis (x-axis) to be displayed if a new signal description set is opened in the working area. This default value is also used for the Zoom to Default command. Default number of signals Lets you specify the number of signals to be displayed if a new signal description set is opened in the working area. This default value is also used for the Zoom to Default command. Show grid Lets you specify to set the Show grid property by default for all new signal description sets and signals. Show segment types Lets you specify to set the Show segment types property by default for all new signal description sets and signals. Show segment comments Lets you specify to set the Show segment comments property by default for all new signal description sets and signals. Show segment parameters Lets you specify to set the Show segment parameters property by default for all new signal description sets and signals. Default duration Lets you specify the default value of the Duration property for all new segments. Const Lets you specify the default value of the Value property for all new Const segments. Ramp Lets you specify the default values of the Start and Stop properties for all new Ramp segments. Ramp Slope Lets you specify the default values of the Offset and Slope properties for all new Ramp Slope segments. Sawtooth Lets you specify the default values of the Amplitude, Duty cycle, Offset, Period, and Phase properties for all new Sawtooth segments. Pulse Lets you specify the default values of the Amplitude, Duty cycle, Offset, Period, and Phase properties for all new Pulse segments. Exponential Lets you specify the default values of the Start, Stop, and Tau properties for all new Exponential segments. Sine Lets you specify the default values of the Amplitude, Offset, Period, and Phase properties for all new Sine segments.

Noise Lets you specify the default values of the Mean, Seed, and Sigma properties for all new Noise segments.

Data File Lets you specify the default value of the Interpolation property for all new Data File segments.

Signal Value Lets you specify the default value of the Interpolation property for all new Signal Value segments.

Operation Lets you specify the default value of the Operation property for all new Operation segments.

Loop Lets you specify the default value of the Loop count property for all new Loop segments.

Related topics

References

Duration Property.....	117
Options Command (ControlDesk User Interface Handling 	
Show Grid Property.....	130
Show Segment Comments Property.....	131
Show Segment Parameters Property.....	131
Show Segment Types Property.....	132
Zoom to Default.....	195

Signal Mapping

Access

You can access this command via:

Ribbon	View – Controlbar – Switch Controlbars
Context menu of	None
Shortcut key	None
Icon	

Purpose

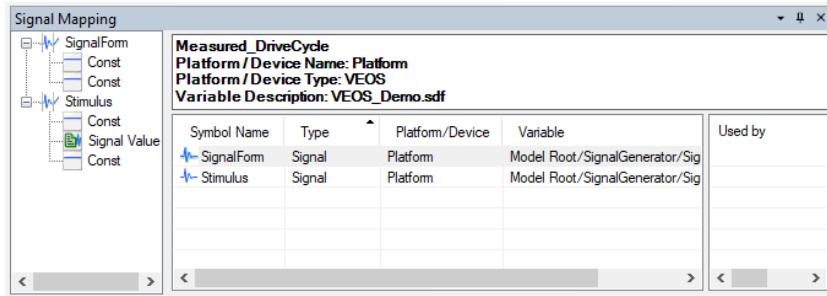
To show the Signal Mapping controlbar.

Result

The Signal Mapping controlbar opens.

Signal Mapping controlbar

The Signal Mapping controlbar displays all the signals and variable aliases which are used in a signal generator. The controlbar lets you map model variables to these signals and aliases via drag & drop from a variable description (SDF file) displayed in the Variables. For details, refer to [How to Map Variables](#) on page 65.



The Signal Mapping controlbar consists of a signal tree and a table. The tree shows all the signals of a signal description set and the block representations of their segments. The table lists all the aliases and signals. Entries highlighted red indicate inconsistencies in the signal-to-variable mapping for the currently active variable description.

The controlbar consists of the following columns:

Symbol Name Displays the name of a variable alias or a signal.

Type Displays the type of the list entry.

- Variable alias for a variable alias.
- Signal for a signal.
- Free for a variable alias that you renamed or deleted after the mapping. The displayed variable alias is no longer used. You can delete this list entry.

Variable Displays the path of the mapped model variable.

Used by Displays the cross-reference(s) for the currently selected variable alias.

You cannot perform mapping for signal description sets (STF files) which are located in the Signal Description Sets folder, since they are not assigned to an experiment. The Signal Mapping controlbar is grayed out.

Symbols

In the Signal Mapping controlbar, a variable alias has the following symbol: 

In the Signal Mapping controlbar, a signal has the following symbol: 

Related commands

The Signal Mapping controlbar provides the following context menu commands:

Purpose	Refer to
To change the target platform and check the signal-to-variable mapping for inconsistencies.	Change Platform on page 153
To check the signal-to-variable mapping for inconsistencies.	Check Mapping on page 155

Purpose	Refer to
To delete a signal-to-variable mapping from the Signal Mapping controlbar.	Delete (refer to Delete (Signal-to-Variable Mapping) on page 161)
To delete all signal-to-variable mappings from the Signal Mapping controlbar.	Delete All (refer to Delete All on page 162)
To select and highlight a variable that is mapped to a signal in the Variables controlbar.	Select in Variable Browser (refer to Select in Variable Browser on page 181)

Related topics**Basics**

[Basics on Mapping Variables to Signals and Aliases](#).....63

HowTos

[How to Map Variables](#).....65

References

[Select Mapping](#).....181
[Variables \(ControlDesk Variable Management\)](#) 

Signal Selector

Access

You can access this command via:

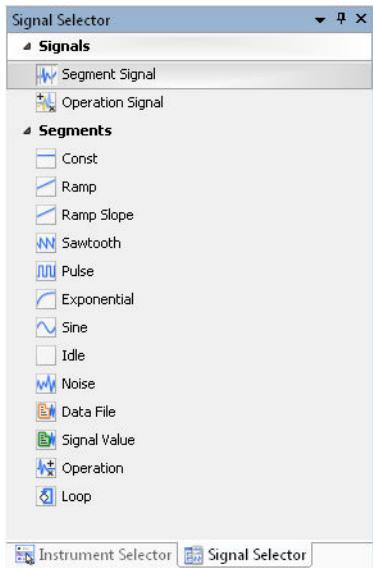
Ribbon	View – Controlbar – Switch Controlbars
Context menu of	None
Shortcut key	None
Icon	

Purpose

To show the Signal Selector controlbar.

Result

The Signal Selector controlbar opens.

Signal Selector controlbar

The Signal Selector is one of the Signal Editor's controlbars. It provides two signals and a number of segments for configuring arbitrary signal shapes in signal description sets.

You have to open a signal description set in the working area to edit it:

- By dragging signals and segments from the Signal Selector controlbar onto it.
- By double-clicking signals and segments in the Signal Selector controlbar.

Refer to [How to Create and Configure a Segment Signal](#) on page 29.

Available signal types The following signal types are available in the Signal Selector:

- [Operation Signal](#) on page 80
- [Segment Signal](#) on page 81

Available segment types The following segment types are available in the Signal Selector:

- [Const \(Segment\)](#) on page 85
- [Data File \(Segment\)](#) on page 86
- [Exponential \(Segment\)](#) on page 89
- [Idle \(Segment\)](#) on page 91
- [Loop \(Segment\)](#) on page 93
- [Signal Value \(Segment\)](#) on page 106
- [Noise \(Segment\)](#) on page 95
- [Operation \(Segment\)](#) on page 96
- [Pulse \(Segment\)](#) on page 98
- [Ramp \(Segment\)](#) on page 100
- [Ramp Slope \(Segment\)](#) on page 102
- [Sawtooth \(Segment\)](#) on page 104
- [Sine \(Segment\)](#) on page 108

Related commands	None
------------------	------

Related topics	Basics
Basics on Editing Signal Description Sets..... 24	
HowTos	
How to Create and Configure a Segment Signal..... 29	

Sort Ascending

Access	You can access this command via:
Ribbon	None
Context menu of	Column header of a signal description set opened in the working area
Shortcut key	None
Icon	

Purpose	To sort the rows alphabetically in ascending order by the selected column.
---------	--

Related topics	References
Signal Description Set..... 76 Sort Descending..... 191	

Sort Descending

Access	You can access this command via:
Ribbon	None
Context menu of	Column header of a signal description set opened in the working area

Shortcut key	None
Icon	

Purpose To sort the rows alphabetically in descending order by the selected column.

Related topics	References
	Signal Description Set 76
	Sort Ascending 191

Split Mode

Access You can access this command via:

Ribbon	None
Context menu of	Segment
Shortcut key	None
Icon	

Note

This command is not available in operator mode.

Purpose To split a segment into two.

Description The mouse pointer indicates that the Split Mode is active. Click on the position in the segment where you want split it.

The resulting two new segments have the same properties as the original, except the duration.

- If the duration of the original segment was specified by a constant value, this duration is split between the new segments according to the split position.
- If the duration of the original segment was specified by the condition of a trigger, the first new segment gets a fixed duration according to the split position and the second inherits the original trigger.

After the splitting Select Mode is active again.

You can return to the Select Mode without splitting by pressing **Esc**.

Related topics

References

Fit to Screen.....	167
Hand Mode.....	168
Select Mode.....	182
Zoom Mode.....	194

Start/Start Generator

Access

This command is available only if online calibration is started and a signal generator is successfully downloaded to the connected simulation platform. You can access this command via:

Ribbon	Signal Editor - Signal Generators
Context menu of	Signal generator (STZ file) in the Project controlbar
Shortcut key	None
Icon	▶

Purpose

To start stimulus generation on the simulation platform assigned to the current signal generator.

Description

Lets you start a signal generator on the connected simulation platform to stimulate the model variables of a simulation application.

The running signal generator is indicated by an  icon.

Related topics

Basics

Basics on Stimulating Variables.....	69
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HowTos

How to Stimulate Variables of a Simulation Application.....	70
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References

Download/Download Generator.....	163
Pause/Pause Generator.....	176
Stop/Stop Generator.....	194

Stop/Stop Generator

Access	This command is available only during stimulus generation on the connected simulation platform. You can access this command via:										
Ribbon	Signal Editor - Signal Generators										
Context menu of	Signal generator (STZ file) in the Project controlbar										
Shortcut key	None										
Icon											
Purpose	To stop stimulus generation on the simulation platform assigned to the current signal generator.										
Description	Lets you stop the stimulation of model variables on the connected simulation platform. The stopped signal generator is indicated by an  icon.										
Related topics	<p>Basics</p> <table> <tr> <td>Basics on Stimulating Variables.....</td> <td>69</td> </tr> </table> <p>HowTos</p> <table> <tr> <td>How to Stimulate Variables of a Simulation Application.....</td> <td>70</td> </tr> </table> <p>References</p> <table> <tr> <td>Download/Download Generator.....</td> <td>163</td> </tr> <tr> <td>Pause/Pause Generator.....</td> <td>176</td> </tr> <tr> <td>Start/Start Generator.....</td> <td>193</td> </tr> </table>	Basics on Stimulating Variables	69	How to Stimulate Variables of a Simulation Application	70	Download/Download Generator	163	Pause/Pause Generator	176	Start/Start Generator	193
Basics on Stimulating Variables	69										
How to Stimulate Variables of a Simulation Application	70										
Download/Download Generator	163										
Pause/Pause Generator	176										
Start/Start Generator	193										

Zoom Mode

Access	You can access this command via:
Ribbon	None
Context menu of	<ul style="list-style-type: none"> ▪ Segment ▪ Signal ▪ Signal description set open in the working area

Shortcut key	None
Icon	

Purpose To zoom into signals and segments.

Description Lets you zoom into signals and segments.

A  mouse pointer indicates that the Zoom Mode is active.

Tip

You can zoom out with the following commands:

- Fit to Screen
- Zoom to Default

Related topics HowTos

[How to Zoom into a Signal.....](#) 58

References

Fit to Screen.....	167
Hand Mode.....	168
Select Mode.....	182
Split Mode.....	192
Zoom to Default.....	195

Zoom to Default

Access

You can access this command via:

Ribbon	None
Context menu of	<ul style="list-style-type: none"> ▪ Signal ▪ Segment ▪ Signal description set open in the working area
Shortcut key	None
Icon	None

Purpose

To show the default range of signals.

Result

The time axis (x-axis) of the signals is set to the default length you specified on the Signal Editor page. The number of signals to be displayed is set to the default value you specified on the same page.

Related topics**HowTos**

How to Zoom into a Signal.....	58
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References

Fit to Screen.....	167
Signal Editor Page.....	186

Automation

Where to go from here

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Programming ControlDesk Automation.....	198
Signal Editor Handling.....	201

Programming ControlDesk Automation

Where to go from here

Information in this section

Automating the Signal Editor..... 198

ControlDesk's Signal Editor lets you execute signal generators for stimulating model variables of real-time applications.

Information in other sections

Tool Automation Demos (ControlDesk Automation)

Demonstrate how to automate ControlDesk and use ControlDesk events.

Automating the Signal Editor

Introduction

ControlDesk's Signal Editor lets you execute signal generators for stimulating model variables of real-time applications.

Note

ControlDesk does not fully support the automation of the Signal Editor:

- You cannot create [signal description sets](#) and [signal generators](#) via automation. However, you can import existing signal description sets and signal generators via automation.
- You cannot edit signal description sets and signal generators via automation.

Use the dSPACE XIL API for the tasks above. Refer to [Basics on the MAPort](#) ([dSPACE XIL API Implementation Guide](#) ).

Unless otherwise indicated, the program listings below consist of excerpts from the [SignalEditorHandling.py](#) demo script.

Displaying signal generator collection information

The following listing shows how to display information about a collection of signal generators in the currently open experiment.

```
class MainDemoController(object):
(...)
    def Initialize(self):
        (...)

        #Store the signal editor object.
        self.SignalEditor = self.ControlDeskApplication.SignalEditor
        (...)

        # Get the signal generators collection.
        self.SignalGenerators = self.SignalEditor.SignalGenerators

    def DisplaySignalGeneratorInfos(self):
        # Show the number of the existing SignalGenerators.
        number = self.SignalGenerators.Count
```

Downloading and starting a signal generator

The following listing shows how to open a signal generator, start online calibration, and download and start the signal generator.

```
class MainDemoController(object):
(...)
    def StartGenerator(self):
        # Get the first signal generator
        firstGenerator = self.SignalGenerators[0]
        (...)

        # Open the first signal generator
        firstGenerator.Open()

        # Start online calibration
        self.ControlDeskApplication.CalibrationManagement.StartOnlineCalibration()
        (...)

        # Download the signal generator
        firstGenerator.Download()
        self.ControlDeskApplication.MeasurementDataManagement.Start()

        # Show the active layout.
        self.ControlDeskApplication.LayoutManagement.ActiveLayout.Window.Show()

        # Start the first signal generator.
        firstGenerator.Start()
```

Pausing and stopping a signal generator

The following listing shows how to pause and stop a signal generator.

```
class MainDemoController(object):
(...)
    def PauseGenerator(self):
        firstGenerator = self.SignalGenerators[0]
        (...)

        time.sleep(10)
        firstGenerator.Pause()
        time.sleep(5)
        firstGenerator.Start()
        time.sleep(10)
        firstGenerator.Stop()

        # Stop the measurement.
        self.ControlDeskApplication.MeasurementDataManagement.Stop()
```

Mapping model variables

The following listing shows how to map model variables to signals and variable aliases of a signal generator.

```
class MainDemoController(object):
(...)
    def ChangeSignalMapping(self):
        ...
        firstGenerator = self.SignalGenerators[0]
        # Get the mappings object
        mappings = firstGenerator.SignalMappings
        ...
        # Remove the model path from a single mapping.
        mappings[0].Variable = ''
        time.sleep(2)
        # Remove all model pathes and reset the options from the mapping.
        mappings.Reset()
        time.sleep(2)
        # Configure model paths.
        mappings[0].Variable = u'Platform()://Model Root/SignalGenerator/SignalOffset/Value'
        mappings[1].Variable = u'Platform()://Model Root/SignalGenerator/SignalAmplitude/Value'
```

Activating a platform in a multiprocessor system

The following listing shows how to activate a platform in a multiprocessor system. The active platform is the platform belonging to the multiprocessor system to which the `firstGenerator` signal generator is to be downloaded.

```
def Multiprocessor(self):
    # Get the number of available platforms
    numberofPlatforms = firstGenerator.Platforms.Count
    if(numberofPlatforms > 1):
        # Activate the second platform of the multiprocessor system
        firstGenerator.Platforms[1].Activate();
```

Related topics**Basics**

Basics on the MAPort (dSPACE XIL API Implementation Guide)	12
Basics on the Signal Editor
Tool Automation Demos (ControlDesk Automation)	

Signal Editor Handling

Signal Editor-Related Interfaces

Introduction

ControlDesk's Signal Editor lets you execute signal generators for stimulating model variables of real-time applications.

Description

The Signal Editor object implements the *IXaSignalEditor* interface. The properties of the *IXaSignalEditor* interface can be used to manipulate the settings of the Signal Editor.

The Signal Generator object implements the *IXaSignalGenerator* interface. You can use its properties to manipulate the settings of the Signal Generator.

Related interfaces

Interface	Description
IXaSignalEditor (refer to SignalEditor / IXaSignalEditor <<Interface>> (ControlDesk Automation )	This interface provides access to the Signal Editor.
IXaSignalDescriptionSets (refer to SignalDescriptionSets / IXaSignalDescriptionSets <<Collection>> (ControlDesk Automation )	This interface provides access to the list of signal description sets.
IXaSignalGenerators (refer to SignalGenerators / IXaSignalGenerators <<Collection>> (ControlDesk Automation )	This interface provides access to the signal generators.
IXaSignalGenerator (refer to SignalGenerator / IXaSignalGenerator <<Interface>> (ControlDesk Automation )	This interface provides access to the signal generator.
IXaSignalGeneratorPlatforms (refer to SignalGeneratorPlatforms / IXaSignalGeneratorPlatforms <<Collection>> (ControlDesk Automation )	This interface provides access to the signal generator platforms.
IXaSignalGeneratorMappings (refer to SignalGeneratorMappings / IXaSignalGeneratorMappings <<Collection>> (ControlDesk Automation )	This interface provides access to the signal generator mappings.
IXaSignalGeneratorMapping (refer to SignalGeneratorMapping / IXaSignalGeneratorMapping <<Interface>> (ControlDesk Automation )	This interface provides access to a signal generator mapping.

Related documentation

Topic	Description
Automating the Signal Editor on page 198	ControlDesk's Signal Editor lets you execute signal generators for stimulating model variables of real-time applications.

Troubleshooting

Where to go from here

Information in this section

[Problem when Using Too Many Data Streams.....](#) 203

When replaying numerical data, problems can occur due to too many data streams used.

[Behavior when Stimulating Variables with a Ramp Segment.....](#) 204

At the end of each segment, the last defined signal value is not stimulated.

Problem when Using Too Many Data Streams

Problem

When replaying numerical data, problems can occur due to too many data streams used. One of the following error messages is displayed.

Error Message	Meaning
Timeout: After waiting for 10 seconds, the hardware service did not deliver any data.	The data streams do not start.
DataStreamError: No data in receive buffer of data stream 'DataStream_0'.	The data streams do not receive sufficient data.

Description

When numerical data is replayed on a simulation platform, all signals from the same time base are combined to one data stream from the host PC to the platform.

The following example shows how the time bases of the signals relate to the number of data streams. The tables represent measurements from MF4 or MAT files with different time bases.

Time	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Signal 1	2	5	3	4	1	8	3	2	7	4

Time	0	0.2	0.4	0.6	0.8
Signal 2	6	7	1	3	8

In this example, the signals are measured using two different time bases. This means, that the data is streamed to the platform using two data streams.

In the following example, the same signals are measured using the same time base.

Time	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Signal 1	2	5	3	4	1	8	3	2	7	4
Signal 2	6	6	7	7	1	1	3	3	8	8

Because the same time base is used for both signals, the data is streamed to the platform using only one data stream.

Tip

- When working with measurements from an MF4 file, the time base relates to the [measurement raster](#). The measurement raster is displayed by the *group name* in the MF4 file.
- When working with measurements from an MAT file, the segment signal's *X-vector* is used as the time base.

The number of data streams is limited and depends on the platform hardware.

Solution

Reduce the number of data streams by using measurement data files (MF4 or MAT) with the same time base.

Behavior when Stimulating Variables with a Ramp Segment

Problem

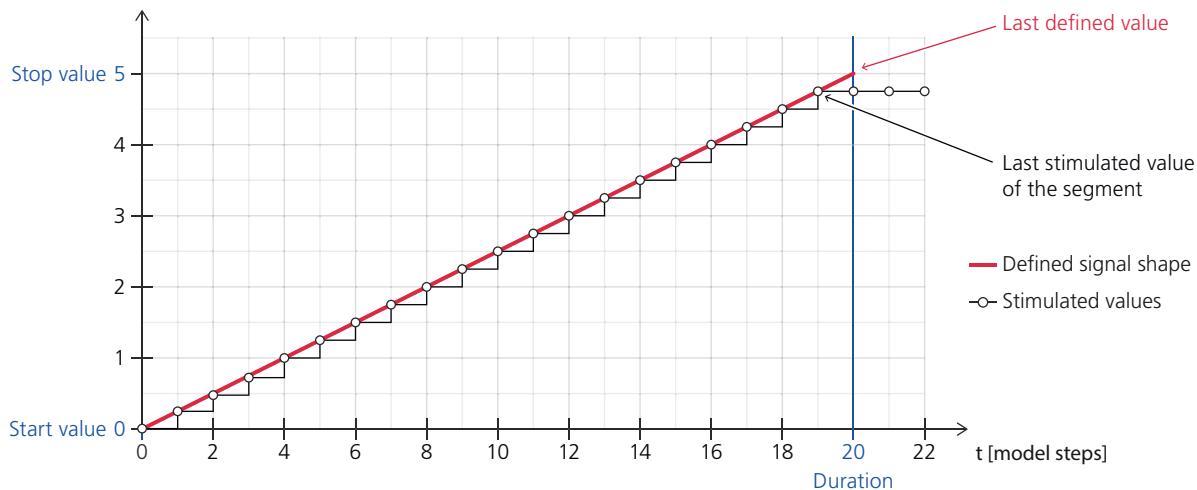
At the end of each segment, the last defined signal value is not stimulated. Instead of this value, the first value of the next segment is used. Even if no further segment follows, the last defined signal value is not stimulated.

Description

In the Signal Editor, the signals are usually defined as continuous functions. In contrast to this, a signal generator can stimulate the model variables of a simulation application only in discrete model steps. Therefore, the stimulated signal values correspond to step functions.

The following example illustrates this behavior and the fact that the last defined signal value of each segment is not stimulated. If you define a Ramp segment

with a start value of 0 and a stop value of 5, this stop value will never be stimulated. The stimulation of new values ends one model step before reaching the stop value.



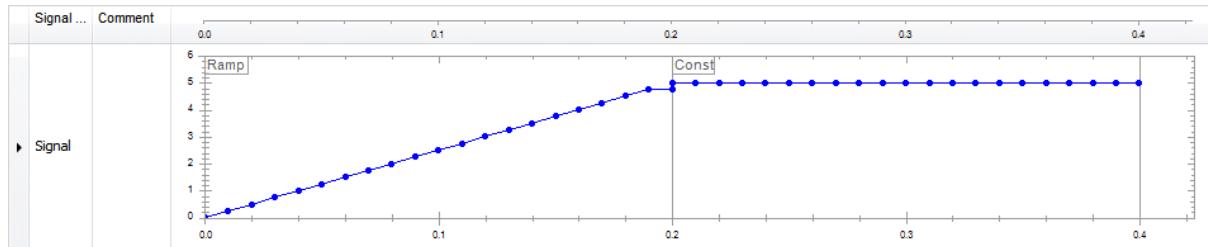
This can result in an unexpected behavior of your simulation model, for example, if a trigger condition expects a stimulated value of 5 which is not achieved.

Solution

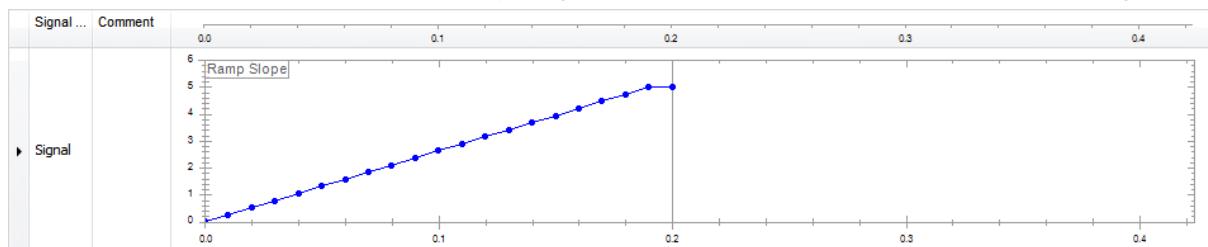
To solve the problem, individual methods might be necessary.

These are the workarounds for the above example:

- You can add a Const segment with a constant value of 5 to end the stimulation with this value.



- Instead of the Ramp segment, you can use the Ramp Slope segment with the exact slope to get a value of 5 with the last stimulated value of the segment.



Related topics

References

Const (Segment).....	85
Ramp (Segment).....	100
Ramp Slope (Segment).....	102

Limitations

Limitations for the Signal Editor

No full automation support for the Signal Editor	ControlDesk does not fully support the automation of the Signal Editor: <ul style="list-style-type: none">▪ You cannot create signal description sets and signal generators via automation. However, you can import existing signal description sets and signal generators via automation.▪ You cannot edit signal description sets and signal generators via automation. Use the dSPACE XIL API for the tasks above. Refer to Basics on the MAPort (dSPACE XIL API Implementation Guide).
No DS1104 support	You cannot use the Signal Editor for stimulus generation on the DS1104 R&D Controller Board.
Limitation for the Data File segment	The segment does not support the eFORWARD Interpolation method.
Limitation for the Signal Value segment	The segment does not support the eFORWARD Interpolation method.
No stimulation of UInt64 variables	Stimulating variables of the UInt64 data type is not supported.
No stimulation in source mode	Stimulating variables is possible only in converted mode. Stimulating variables in source mode is not supported.

Limitations for stimulating variables of a V-ECU

No stimulation of complex A2L variables Stimulating complex A2L variables of a V-ECU, such as maps and curves, is not supported. This also applies to the individual elements of complex variables and the elements of a measurement array.

Support of linear A2L conversions only Only A2L variables with a linear conversion can be stimulated.

The following A2L conversion methods are supported:

- **RAT_FUNC** (only if it describes a *linear* conversion: $y = m \cdot x + b$)
- **LINEAR**
- **IDENTICAL**

No stimulation of V-ECU variables in a real-time application Stimulating V-ECU variables in a real-time application running on SCALEXIO or a MicroAutoBox III is not supported.

Limitation for downloading a signal generator

The following limitation applies when you use the Signal Editor for stimulus generation on the following dSPACE platforms:

- [Multiprocessor System platform](#) accessing a DS1006-based multiprocessor system
- [SCALEXIO platform](#) accessing a SCALEXIO multi-PU system
- [VEOS platform](#) accessing an offline simulation application with several environment VPUs

Downloading a signal generator is possible only when the simulation application is currently *running*. Downloading is not possible when the application is currently stopped or paused.

Related topics**Basics**

[Basics on the MAPort \(dSPACE XIL API Implementation Guide\)](#)

Glossary

Introduction	Briefly explains the most important expressions and naming conventions used in the ControlDesk documentation.
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Numerics

3-D Viewer An instrument for displaying items in a 3-D environment.

A

A2L file A file that contains all the relevant information on measurement and calibration variables in an [ECU application](#) and the ECU's communication interface(s). This includes information on the variables' memory addresses and conversion methods, the memory layout and data structures in the ECU as well as [interface description data \(IF_DATA\)](#).

Acquisition An object in the [Measurement Configuration](#) controlbar that specifies the variables to be measured and their measurement configuration.

Active variable description The variable description that is currently active for a platform/device. Multiple variable descriptions can be assigned to one platform/device, but only one of them can be active at a time.

Additional write variable A scalar parameter or writable measurement variable that can be connected to an instrument in addition to the [main variable](#). When the value of the main variable changes, the changed value is also applied to all the additional write variables connected to the instrument.

Airspeed Indicator An instrument for displaying the airspeed of a simulated aircraft.

Altimeter An instrument for displaying the altitude of a simulated aircraft.

Animated Needle An instrument for displaying the value of a connected variable by a needle deflection.

Application image An image file that contains all the files that are created when the user builds a real-time application. It particularly includes the variable

description (SDF) file. To extend a real-time application, ControlDesk lets the user create an updated application image from a data set. The updated application image then contains a real-time application with an additional set of parameter values.

Artificial Horizon An instrument displaying the rotation on both the lateral and the longitudinal axis to indicate the angle of pitch and roll of a simulated aircraft. The Artificial Horizon has a pitch scale and a roll scale.

Automatic Reconnect Feature for automatically reconnecting to platform/device hardware, for example, when the ignition is turned off and on, or when the physical connection between the ControlDesk PC and the ECU is temporarily interrupted.

If the feature is enabled for a platform/device and if the platform/device is in the 'unplugged'  state, ControlDesk tries to re-establish the logical connection to the platform/device hardware. After the logical connection is re-established, the platform/device has the same state as before the unplugged state was detected. A measurement started before the unplugged state was detected is resumed.

Automation A communication mechanism that can be used by various programming languages. A client can use it to control a server by calling methods and properties of the server's automation interface.

Automation script A script that uses automation to control an automation server.

Axis point object [Common axis](#) 

B

Bar An instrument (or a value cell type of the [Variable Array](#) ) for displaying a numerical value as a bar deflection on a horizontal or vertical scale.

Bitfield A value cell type of the [Variable Array](#)  for displaying and editing the source value of a parameter as a bit string.

Bookmark A marker for a certain event during a measurement or recording.

Browser An instrument for displaying HTML and TXT files. It also supports Microsoft Internet Explorer® plug-ins that are installed on your system.

Bus communication replay A feature of the [Bus Navigator](#)  that lets you replay logged bus communication data from a log file. You can add replay nodes

to the Bus Navigator tree for this purpose. You can specify filters to replay selected parts of the [logged bus communication](#).

Bus configuration A configuration of all the controllers, communication matrices, and messages/frames/PDUs of a specific communication bus such as CAN. ControlDesk lets you display and experiment with bus configurations in the [Bus Navigator](#).

Bus connection A mode for connecting dSPACE real-time hardware to the host PC via bus. The list below shows the possible bus connections:

- dSPACE real-time hardware installed directly in the host PC
- dSPACE real-time hardware installed in an expansion box connected to the host PC via dSPACE link board

Bus Instrument An instrument available for the [Bus Navigator](#). It can be configured for different purposes, for example, to display information on received messages (RX messages) or to manipulate and transmit messages (TX messages). The instrument is tailor-made and displays only the message- and signal-specific settings which are enabled for display and/or manipulation by ControlDesk during run time.

Bus logging A feature of the [Bus Navigator](#) that lets you log raw bus communication data. You can add logger nodes on different hierarchy levels of the Bus Navigator tree for this purpose. You can specify filters to log filtered bus communication. The logged bus communication can be [replayed](#).

Bus monitoring A feature of the [Bus Navigator](#) that lets you observe bus communication. You can open monitoring lists and add monitor nodes on different hierarchy levels of the Bus Navigator tree for this purpose. You can specify filters to monitor filtered bus communication.

Bus Navigator A [controlbar](#) for handling bus messages, such as CAN messages, LIN frames, and Ethernet packets.

Bus statistics A feature of the [Bus Navigator](#) that lets you display and log statistical information on the bus load during [bus monitoring](#).

Bypassing A method for replacing an existing ECU function by running a new function.

C

Calculated variable A scalar variable that can be measured and recorded, and that is derived from one or more *input variables*.

The following input variable types are supported:

- [Measurement variables](#)
- Single elements of [measurement arrays](#) or [value blocks](#)
- Scalar [parameters](#), or existing calculated variables

The value of a calculated variable is calculated via a user-defined *computation formula* that uses one or more input variables.

Calculated variables are represented by the  symbol.

CalDemo ECU A demo program that runs on the same PC as ControlDesk. It simulates an ECU on which the Universal Measurement and Calibration (XCP[?]) protocol and the Unified Diagnostic Services (UDS) protocol are implemented.

The CalDemo ECU allows you to perform parameter calibration, variable measurement, and ECU diagnostics with ControlDesk under realistic conditions, but without having to have a real ECU connected to the PC. Communication between the CalDemo ECU and ControlDesk can be established via XCP on CAN or XCP on Ethernet, and UDS on CAN.

Tip

If communication is established via XCP on Ethernet, the CalDemo ECU can also run on a PC different from the PC on which ControlDesk is running.

The memory of the CalDemo ECU consists of two areas called [memory page[?]](#). Each page contains a complete set of parameters, but only one page is accessible by the CalDemo ECU at a time. You can easily switch the memory pages of the CalDemo ECU to change from one [parameter[?]](#) to another in a single step.

Two ECU tasks run on the CalDemo ECU:

- ECU task #1 runs at a fixed sample time of 5 ms. In ControlDesk's Measurement Configuration, ECU task #1 is related to the time-based 5 ms, 10 ms, 50 ms and 100 ms measurement rasters of the CalDemo ECU.
- ECU task #2 has a variable sample time. Whenever the CalDemo ECU program is started, the initial sample time is 5 ms. This can then be increased or decreased by using the dSPACE CalDemo dialog.

ECU task #2 is related to the extEvent measurement raster of the CalDemo ECU.

The CalDemo ECU can also be used to execute diagnostic services and jobs, handle DTCs and perform measurement and calibration via ECU diagnostics.

The CalDemo ECU program is run by invoking `CalDemo.exe`. The file is located in the `.\Demos\CalDemo` folder of the ControlDesk installation.

Calibration Changing the [parameter[?]](#) values of [real-time application[?]s](#) or [ECU application[?]s](#).

Calibration memory segment Part of the memory of an ECU containing the calibratable parameters. Memory segments can be defined as `MEMORY_SEGMENT` in the A2L file. ControlDesk can use the segments to evaluate the memory pages of the ECU.

ControlDesk lets you perform the calibration of:

- Parameters inside memory segments
- Parameters outside memory segments
- Parameters even if no memory segments are defined in the A2L file.

CAN Bus Monitoring device A device that monitors the data stream on a CAN bus connected to the ControlDesk PC.

The CAN Bus Monitoring device works, for example, with PC-based CAN interfaces such as the DCI-CAN2 or the DCI-CAN/LIN1.

The device supports the following variable description file types:

- DBC
- FIBEX
- AUTOSAR system description (ARXML)

CANGenerator A demo program that simulates a CAN system, that is, it generates signals that can be measured and recorded with ControlDesk. The program runs on the same PC as ControlDesk.

The CANGenerator allows you to use the [CAN Bus Monitoring device](#) under realistic conditions, but without having to have any device hardware connected to the PC.

The CAN (Controller Area Network) protocol is used for communication between the CANGenerator and ControlDesk. However, since the CANGenerator runs on the same PC as ControlDesk, ControlDesk does not communicate with the device via a real CAN channel, but via a *virtual CAN channel* implemented on the host PC.

You can start the CAN generator program by running **CANGenerator.exe**. The file is located in the `.\Demos\CANGenerator` folder of the ControlDesk installation.

Capture A data packet of all the measurement variables assigned to a [measurement raster](#). The packet comprises the data that results from a single triggering of the raster.

CCP Abbreviation of CAN Calibration Protocol. This protocol can be implemented on electronic control units (ECUs) and allows users to access ECUs with measurement and calibration systems (MCS) such as ControlDesk.

The basic features of CCP are:

- Read and write access to the ECU memory, i.e., providing access for calibration
- Synchronous data acquisition
- Flash programming for ECU development purposes

The CCP protocol was developed by ASAM e.V. (Association for Standardization of Automation and Measuring Systems e.V.). For the protocol specification, refer to <http://www.asam.net>.

The following device supports ECUs with an integrated CCP service:

- [CCP device](#)

CCP device A device that provides access to an ECU with CCP connected to the ControlDesk PC via CAN, for example, for measurement and calibration purposes via [CCP \(CAN Calibration Protocol\)](#).

Check Button An instrument (or a cell type of the [Variable Array](#)) for displaying whether the value of a connected variable matches predefined values or for writing a predefined value to a connected variable.

cmdloader A command line tool for handling applications without using the user interface of an experiment software.

Common axis A parameter  that consists of a 1-dimensional array containing axis points. A common axis can be referenced by one or more curves  and/or maps s. Calibrating the data points of a common axis affects all the curves and/or maps referencing the axis.

Common axes are represented by the  symbol.

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

`%PROGRAMDATA%\dSPACE\<InstallationGUID>\<ProductName>`

or

`%PROGRAMDATA%\dSPACE\<ProductName>\<VersionNumber>`

Computation method A formula or a table that defines the transformation of a source value into a converted value (and vice versa). In addition to the computation methods defined in the variable description file, ControlDesk provides the `_Identity` computation method which means the converted and the source value are equal.

Connected A platform/device state defined by the following characteristics:

- A continuous logical connection is established between ControlDesk and the platform/device hardware.
- A platform/device must be in the 'connected' state before it can change to the 'measuring/recording' or 'online calibration started' state.
- Online calibration is impossible. ControlDesk did not yet adjust the memory segments containing calibration data in the platform/device and on the corresponding hardware. Offline calibration is possible.
- Platform/device configuration is not possible. However, you can invoke platform/device configuration for a platform/device that is in the connected state. ControlDesk temporarily sets the platform/device to the disconnected state.

The 'connected' platform/device state is indicated by the  icon.

Connection mode dSPACE real-time systems can be installed within the host PC or connected to the host via a bus interface and/or via Ethernet. When the Ethernet is being used, different network clients might exist. The connection type being used and, in the case of Ethernet, the network client being used, determine the dSPACE systems that can be accessed.

Control primitive A special diagnostic communication object for changing communication states or protocol parameters, or for identifying (ECU) variants.

Controlbar A window or pane outside the working area. Can be docked to an edge of the main window or float in front of it. A controlbar can contain a

document, such as a layout, or a tool, such as the Bus Navigator. It can be grouped with other controlbars in a window with tabbed pages.

ControlDesk The main version of ControlDesk for creating and running experiments, and for accessing dSPACE real-time hardware and VEOS. The functionality can be extended by optional software modules.

ControlDesk - Operator Version A version of ControlDesk that provides only a subset of functionality for running existing experiments. The functionality can be extended by optional software modules.

ControlDesk Bus Navigator Module An optional software module for ControlDesk for handling bus messages, such as CAN, LIN, and FlexRay messages, frames, and PDUs and Ethernet packets.

ControlDesk ECU Diagnostics Module An optional software module for ControlDesk that facilitates the calibration and validation of ECU diagnostic functions.

ControlDesk ECU Interface Module An optional software module for ControlDesk for calibration and measurement access to electronic control units (ECUs). The module is also required for calibration and measurement access to virtual ECUs (V-ECUs) used in SIL testing scenarios.

ControlDesk Signal Editor Module An optional software module for ControlDesk for the graphical definition and execution of signal generators for stimulating model variables of real-time/offline simulation applications.

Controller board Single-board hardware computing the real-time application. Contains a real-time processor for fast calculation of the model and I/O interfaces for carrying out the control developments.

Conversion table A table that specifies the [value conversion](#) of a source value into a converted value. In the case of [verbal conversion](#), the converted value is a string that represents one numerical value or a range of numerical values.

Conversion type The type of a [computation method](#), for example a linear function or a verbal computation method.

Curve A [parameter](#) that consists of

- A 1-dimensional array containing the axis points for the x-axis. This array can also be specified by a reference to a [common axis](#).
- Another 1-dimensional array containing data points. The curve assigns one data point to each axis point.

Curves are represented by the  symbol.

D

DAQ module A hardware module for the acquisition of physical quantities

Data Cursor One or two cursors that are used to display the values of selected chart positions in a [Time Plotter](#) or an [Index Plotter](#).

Data logger An object in the [Measurement Configuration](#) controlbar that lets you configure a [data logging](#).

Data logger signal list A list that contains the variables to be included in subsequent [data loggings](#) on real-time hardware.

Data logging The recording of data on dSPACE real-time hardware that does not require a physical connection between the host PC and the real-time hardware. In contrast to [flight recording](#), data logging is configured in ControlDesk.

Data set A set of the parameters and their values of a platform/device derived from the variable description of the platform/device. There are different types of data sets:

- [Reference data set](#)
- [Sub data set](#)
- [Unassigned data set](#)
- [Working data set](#)

DCI-CAN/LIN1 A dSPACE-specific interface between the host PC and the CAN/CAN FD bus and/or LIN bus. The DCI-CAN/LIN1 transfers messages between the CAN-/LIN-based devices and the host PC via the universal serial bus (USB).

DCI-CAN2 A dSPACE-specific interface between the host PC and the CAN bus. The DCI-CAN2 transfers CAN and CAN FD messages between the CAN-based devices and the host PC via the universal serial bus (USB).

DCI-GSI2 Abbreviation of *dSPACE Communication Interface - Generic Serial Interface 2*. A dSPACE-specific interface for ECU calibration, measurement and ECU interfacing.

DCI-GSI2 device A device that provides access to an ECU with DCI-GSI2 connected to the ControlDesk PC for measurement, calibration, and bypassing purposes via the ECU's debug interface.

DCI-KLine1 Abbreviation of *dSPACE Communication Interface - K-Line Interface*. A dSPACE-specific interface between the host PC and the diagnostics bus via K-Line.

Debug interface An ECU interface for diagnostics tasks and flashing.

Default raster A platform-/device-specific [measurement raster](#) that is used when a variable of the platform/device is connected to a [plotter](#) or a [recorder](#), for example.

Deposition definition A definition specifying the sequence in which the axis point values of a curve or map are deposited in memory.

Device A software component for carrying out [calibration](#) and/or [measurement](#), [bypassing](#), [ECU flash programming](#), or [ECU diagnostics](#) tasks.

ControlDesk provides the following devices:

- Bus devices:
 - [CAN Bus Monitoring device](#)
 - [Ethernet Bus Monitoring device](#)
 - [LIN Bus Monitoring device](#)
 - [ECU Diagnostics device](#)
 - [GNSS device](#)
- Measurement and calibration devices:
 - [CCP device](#)
 - [DCI-GSI2 device](#)
 - [XCP on CAN device](#)
 - [XCP on Ethernet device](#)

Each device usually has a [variable description](#) that specifies the device's variables to be calibrated and measured.

Diagnostic interface Interface for accessing the [fault memory](#) of an ECU.

Diagnostic job (often called Java job) Programmed sequence that is usually built from a sequence of the [diagnostic service](#). A diagnostic job is either a single-ECU job or a multiple-ECU job, depending on whether it communicates with one ECU or multiple ECUs.

Diagnostic protocol A protocol that defines how an ECU communicates with a connected diagnostic tester. The protocol must be implemented on the ECU and on the tester. The [diagnostics database](#) specifies the diagnostic protocol(s) supported by a specific ECU.

ControlDesk's ECU Diagnostics device supports CAN and K-Line as the physical layers for communication with an ECU connected to the ControlDesk PC. For information on the supported diagnostic protocols with CAN and K-Line, refer to [Basics of ECU Diagnostics with ControlDesk \(ControlDesk ECU Diagnostics\)](#).

Diagnostic service A service implemented on the ECU as a basic diagnostic communication element. Communication is performed by selecting a service, configuring its parameters, executing it, and receiving the ECU results. When a service is executed, a defined request is sent to the ECU and the ECU answers with a specific response.

Diagnostic trouble code (DTC) A hexadecimal index for the identification of vehicle malfunctions. DTCs are stored in the [fault memory](#) of ECUs and can be read by diagnostic testers.

Diagnostics database A database that completely describes one or more ECUs with respect to diagnostics communication. ControlDesk supports the ASAM MCD-2 D [ODX database](#) format, which was standardized by ASAM e.V. (Association for Standardisation of Automation and Measuring Systems e.V.). For the format specification, refer to <http://www.asam.net>.

Proprietary diagnostics database formats are not supported by ControlDesk.

Diagnostics Instrument An instrument for communicating with an ECU via the diagnostic protocol using [diagnostic services](#), [diagnostic jobs](#), and [control primitives](#).

Disabled A platform/device state defined by the following characteristics:

- No logical connection is established between ControlDesk and the platform/device hardware.
- When a platform/device is disabled, ControlDesk does not try to establish the logical connection for that platform/device. Any communication between the platform/device hardware and ControlDesk is rejected.
- Online calibration is impossible. Offline calibration is possible.
- Platform/device configuration is possible.

The 'disabled' platform/device state is indicated by the  icon.

Disconnected A platform/device state defined by the following characteristics:

- No logical connection is established between ControlDesk and the platform/device hardware.
- When a platform/device is in the disconnected state, ControlDesk does not try to re-establish the logical connection for that platform/device.
- Online calibration is impossible. Offline calibration is possible.
- Platform/device configuration is possible.

The 'disconnected' platform/device state is indicated by the  icon.

Display An instrument (or a value cell type of the [Variable Array](#)) for displaying the value of a scalar variable or the text content of an ASCII variable.

Documents folder A standard folder for user-specific documents.

%USERPROFILE%\Documents\dSPACE\<ProductName>\<VersionNumber>

DS1006 Processor Board platform A platform that provides access to a DS1006 Processor Board connected to the host PC for HIL simulation and function prototyping purposes.

DS1007 PPC Processor Board platform A platform that provides access to a single multicore DS1007 PPC Processor Board or a DS1007 multiprocessor system consisting of two or more DS1007 PPC Processor Boards, connected to the host PC for HIL simulation and function prototyping purposes.

DS1104 R&D Controller Board platform A platform that provides access to a DS1104 R&D Controller Board installed in the host PC for function prototyping purposes.

DS1202 MicroLabBox platform A platform that provides access to a MicroLabBox connected to the host PC for function prototyping purposes.

DsDAQ service A service in a [real-time application](#) or [offline simulation application \(OSA\)](#) that provides measurement data from the application to the

host PC. Unlike the [host service](#), the DsDAQ service lets you perform, for example, triggered measurements with complex trigger conditions.

The following platforms support applications that contain the DsDAQ service:

- [DS1007 PPC Processor Board platform](#)
- [DS1202 MicroLabBox platform](#)
- [MicroAutoBox III platform](#)
- [SCALEXIO platform](#)
- [VEOS platform](#)
- [XIL API MAPort platform](#)

dSPACE Calibration and Bypassing Service An ECU service for measurement, calibration, bypassing, and ECU flash programming. The dSPACE Calibration and Bypassing Service can be integrated on the ECU. It provides access to the ECU application and the ECU resources and is used to control communication between an ECU and a calibration and/or bypassing tool.

With the dSPACE Calibration and Bypassing Service, users can run measurement, calibration, bypassing, and flash programming tasks on an ECU via the DCI-GSI2. The service is also designed for bypassing ECU functions using dSPACE prototyping hardware by means of the RTI Bypass Blockset in connection with DPMEM PODs. The dSPACE Calibration and Bypassing Service allows measurement, calibration, and bypassing tasks to be performed in parallel.

dSPACE Internal Bypassing Service An ECU service for on-target prototyping. The dSPACE Internal Bypassing Service can be integrated in the ECU application. It lets you add additional functions to be executed in the context of the ECU application without the need for recompiling the ECU application.

dSPACE Log A collection of errors, warnings, information, questions, and advice issued by all dSPACE products and connected systems over more than one session.

dSPACE system A hardware system such as a MicroAutoBox III or SCALEXIO system on which the [real-time application](#) runs.

Duration trigger A [trigger](#) that defines a duration. Using a duration trigger, you can, for example, specify the duration of data acquisition for a [measurement raster](#). A duration trigger can be used as a [stop trigger](#).

E

ECU Abbreviation of *electronic control unit*.

ECU application A sequence of operations executed by an ECU. An ECU application is mostly represented by a group of files such as [ECU Image files](#), MAP files, [A2L files](#) and/or software module description files.

ECU calibration interface Interface for accessing an ECU by either emulating the ECU's memory or using a communication protocol (for example, XCP on CAN).

ECU diagnostics Functions such as:

- Handling the ECU fault memory: Entries in the ECU's fault memory can be read, cleared, and saved.
- Executing diagnostic services and jobs: Users can communicate with an ECU via a diagnostic protocol using diagnostic services, diagnostic jobs, and control primitives.

ControlDesk provides the [ECU Diagnostics device](#) device to access ECUs for diagnostic tasks. Communication is via [diagnostic protocol](#)s implemented on the ECUs.

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

ControlDesk provides the [Fault Memory Instrument](#) and the [Diagnostics Instrument](#) for ECU diagnostics tasks.

ECU Diagnostics device A device that provides access to ECUs connected to the ControlDesk PC via CAN or K-Line for diagnostics or flash programming purposes.

ControlDesk provides the *ECU Diagnostics v2.0.2* device, which supports the ASAM MCD-3 D V2.0.2 standard.

ControlDesk supports the following ODX database standards:

- ASAM MCD-2 D V2.0.1
- ASAM MCD-2 D V2.2.0 (ISO 22901-1)

ECU flash programming A method by which new code or data is stored in ECU flash memory.

ECU Image file A binary file that is part of the [ECU application](#). It usually contains the code of an ECU application and the data of the parameters within the application. It can be stored as an Intel Hex (HEX) or Motorola S-Record (MOT or S19) file.

EESPort Configurations controlbar A [controlbar](#) for configuring [error configuration](#)s.

Electrical error simulation Simulating electrical errors such as loose contacts, broken cables, and short-circuits, in the wiring of an ECU. Electrical error simulation is performed by the failure simulation hardware of an HIL simulator.

Electrical Error Simulation port (EESPort) An *Electrical Error Simulation port* (EESPort) provides access to a failure simulation hardware for simulating electrical errors in an ECU wiring according to the ASAM AE XIL API standard.

The configuration of the EESPort is described by a hardware-dependent *port configuration* and one or more *error configurations*.

Environment model A model that represents a part or all of the ECU's environment in a simulation scenario.

The environment model is a part of the [simulation system](#).

Environment VPU The executable of an [environment model](#) built for the VEOS platform. An environment VPU is part of an offline simulation application (OSA).

Error An electrical error that is specified by:

- An error category
- An error type
- A load type

Error category The error category defines how a signal is disturbed. Which errors you can create for a signal depends on the connected failure simulation hardware.

Error configuration An XML file that describes a sequence of errors you want to switch during electrical error simulation. Each error configuration comprises error sets with one or more errors.

Error set An error set is used to group errors (pin failures).

Error type The error type specifies the way an error category – i.e., an interruption or short circuit of signals – is provided. The error type defines the disturbance itself.

Ethernet Bus Monitoring device A device that monitors the data stream on an Ethernet network connected to the ControlDesk PC.

The device supports the following variable description file type:

- AUTOSAR system description (ARXML)

Ethernet connection A mode for connecting dSPACE real-time hardware to the host PC via Ethernet. The list below shows the possible Ethernet connections:

- dSPACE real-time hardware installed in an expansion box connected to the host PC via Ethernet.
- MicroAutoBox II/III and MicroLabBox connected via Ethernet.

Ethernet decoding A feature of the [Bus Navigator](#) that lets you view protocol data and raw data of an Ethernet frame.

Event An event that is triggered by an action performed in ControlDesk.

Event context The scope of validity of [event source](#)s and [event](#)s. There is one [event handler](#) code area for each event context.

Event handler Code that is executed when the related [event](#) occurs.

Event management Functionality for executing custom code according to actions triggered by ControlDesk.

Event source An object providing and triggering [event](#)s. *LayoutManagement* is an example of an event source.

Event state State of an [event](#). ControlDesk provides the following event states:

- No [event handler](#) is defined
- Event handler is defined and enabled
- Event handler is defined and disabled
- Event handler is defined, but no Python code is available
- Event handler is deactivated because a run-time error occurred during the execution of the Python code

Expansion box A box that hosts dSPACE boards. It can be connected to the host PC via bus connection or via network.

Experiment A container for collecting and managing information and files required for a parameter calibration and/or measurement task. A number of experiments can be collected in a project but only one of them can be active.

Extension script A Python script (PY or PYC file) that is executed each time ControlDesk starts up. An extension script can be executed for all users or user-specifically.

F

Failure insertion unit Hardware unit used with dSPACE simulators to simulate failures in the wiring of an ECU, such as broken wire and short circuit to ground.

Fault memory Part of the ECU memory that stores diagnostic trouble code (DTC) entries with status and environment information.

Fault Memory Instrument An instrument for reading, clearing, and saving the content of the ECU's [fault memory](#).

Firmware update An update for the firmware installed in the board's flash memory. Firmware should be updated if it is older than required by the real-time application to be downloaded.

Fixed axis An axis with data points that are not deposited in the ECU memory. Unlike a [common axis](#), a fixed axis is specified within a [curve](#) or [map](#). The parameters of a fixed axis cannot be calibrated.

Fixed parameter A [parameter](#) that has a fixed value during a running simulation. Changing the value of a fixed parameter does not immediately affect the simulation results. The affect occurs only after you stop the simulation and

start it again. A fixed parameter is represented by an added pin in its symbol, for example: .

Flash job A specific diagnostic job for flashing the ECU memory. A flash job implements the process control for flashing the ECU memory, such as initialization, security access, writing data blocks, etc.

Flight recording The recording of data on dSPACE real-time hardware that does not require a physical connection between the host PC and the real-time hardware. In contrast to [data logging](#), flight recording is not configured in ControlDesk but via RTI and RTLib.

Frame An instrument for adding a background frame to a layout, for example, to visualize an instrument group.

G

Gauge An instrument for displaying the value of the connected variable by a needle deflection on a circular scale.

Gigalink module A dSPACE board for connecting several processor boards in a multiprocessor system. The board allows high-speed serial data transmission via fiber-optic cable.

GNSS data Positioning and timing data that is transmitted by a Global Navigation Satellite System (GNSS), such as GPS, GLONASS, or Galileo. GNSS receivers use this data to determine their location.

GNSS device A device that provides positioning data from a GNSS receiver (e.g., a serial GPS mouse) in ControlDesk.

ControlDesk provides the *GNSS (GPS, GLONASS, Galileo, ...)* device that supports various global navigation satellite systems.

GPX file An XML file that contains geodata, such as waypoints, routes, or tracks. In ControlDesk, you can import GPX files to visualize GNSS positioning data in a Map instrument.

Group A collection of variables that are grouped according to a certain criterion.

H

Heading Indicator An instrument displaying the heading direction of a simulated aircraft on a circular scale.

Host service A service in a [real-time application](#) that provides measurement data from the application to the host PC.

The following platforms support applications that contain the host service:

- [DS1006 Processor Board platform](#)
- [DS1104 R&D Controller Board platform](#)
- [MicroAutoBox platform](#)
- [Multiprocessor System platform](#)

Index Plotter A [plotter instrument](#) for displaying signals that are measured in an event-based raster (index plots).

Input quantity A measurement variable that is referenced by a common axis and that provides the input value of that axis.

Instrument An on-screen representation that is designed to monitor and/or control simulator variables interactively and to display data captures. Instruments can be arranged freely on [layout](#)s.

The following instruments can be used in ControlDesk:

- [3-D Viewer](#)
- [Airspeed Indicator](#)
- [Altimeter](#)
- [Animated Needle](#)
- [Artificial Horizon](#)
- [Bar](#)
- [Browser](#)
- [Bus Instrument](#)
- [Check Button](#)
- [Diagnostics Instrument](#)
- [Display](#)
- [Fault Memory Instrument](#)
- [Frame](#)
- [Gauge](#)
- [Heading Indicator](#)
- [Index Plotter](#)
- [Invisible Switch](#)
- [Knob](#)
- [Multistate Display](#)
- [Multiswitch](#)
- [Numeric Input](#)
- [On/Off Button](#)

- [Push Button](#)
- [Radio Button](#)
- [Selection Box](#)
- [Slider](#)
- [Sound Controller](#)
- [Static Text](#)
- [Steering Controller](#)
- [Table Editor](#)
- [Time Plotter](#)
- [Variable Array](#)
- [XY Plotter](#)

Instrument Navigator A [controlbar](#) that displays a tree with all the [instrument](#)s of the active [layout](#) and all the variables that are connected to them. The Instrument Navigator's main function is easy selection of instruments in complex layouts.

Instrument script A Python script used to extend the functionality of an [instrument](#).

Instrument Selector A [controlbar](#) that provides access to ControlDesk's [instrument](#)s. The instruments can be placed on a [layout](#) via double-click or drag & drop.

Interface description data (IF_DATA) An information structure, mostly provided by an [A2L file](#), describing the type, features and configuration of an implemented ECU interface.

Internal Interpreter ControlDesk's built-in programming interface for editing, running and importing Python scripts. It contains an [Interpreter controlbar](#) where the user can enter Python commands interactively and which displays output and error messages of Python commands.

Interpreter controlbar A [controlbar](#) that can be used to execute line-based commands. It is used by the [Internal Interpreter](#) to print out Python standard error messages and standard output during the execution or import of Python scripts.

Invisible Switch An instrument for defining an area that is sensitive to mouse operations.

IOCNET IOCNET (I/O carrier network) is a dSPACE-specific high-speed serial communication bus that connects all the real-time hardware in a SCALEXIO system. IOCNET can also be used to build a multiprocessor system that consists of multiple SCALEXIO processor hardware components.

K

Knob An instrument for displaying and setting the value of the connected variable by means of a knob on a circular scale.

L

Label list A list of user-defined variables that can be used for saving connected variables, etc.

Layout A window with [instrument](#)s connected to variables of one or more simulation models.

Layout Navigator A [controlbar](#) that displays all opened [layout](#)s. It can be used for switching between layouts.

Layout script A Python script used to extend the functionality of a [layout](#).

Leading raster The [measurement raster](#) that specifies the [trigger](#) settings for the [Time Plotter](#) display. The leading raster determines the time range that is visible in the plotter if a start and stop trigger is used for displaying the signals.

LIN Bus Monitoring device A device that monitors the data stream on a LIN bus connected to the ControlDesk PC.

The LIN Bus Monitoring device works, for example, with PC-based LIN interfaces.

The device supports the following variable description file types:

- LDF
- FIBEX
- AUTOSAR system description (ARXML)

Load type The load type specifies the option to disturb a signal with or without load rejection.

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

%USERPROFILE%\AppData\Local\dSPACE\<InstallationGUID>\<ProductName>

Logical link A representation of an ECU specified in the diagnostics database. A logical link contains information on the ECU itself, and all the information required for accessing it, such as the [diagnostic protocol](#) used for

communication between the ECU and ControlDesk. Each logical link is represented by a unique short name in the [ODX database](#).

Look-up table A look-up table maps one or more input values to one output value. You have to differentiate between the following look-up table types:

- A 1-D look-up table maps one input value to one output value.
- A 2-D look-up table maps two input values to one output value.
- An n-D look-up table maps multidimensional table data with 3 or more input values to one output value.

Look-up table is a generic term for [curves](#) and [maps](#).

M

Main variable A scalar variable that is visualized in an instrument that can be used to change parameter values. In addition to the main variable, [additional write variable](#)s can also be connected to (but not visualized in) the same instrument. When you change the value of the main variable in an instrument, the changed value is also applied to all the additional write variables connected to that instrument.

Map A [parameter](#) that consists of

- A 1-dimensional array containing the axis points for the x-axis. This array can also be specified by a reference to a [common axis](#).
- A 1-dimensional array containing the axis points for the y-axis. This array can also be specified by a reference to a [common axis](#).
- A 2-dimensional array containing data points. The map assigns one data point of the array to each pair of x-axis and y-axis points.

Maps are represented by the  symbol.

Map file A file that contains symbols (symbolic names) and their physical addresses. It is generated during a build process of an ECU application.

Map instrument A customized [Browser](#) instrument. It uses an instrument script to open a web map and connect positioning data to the map. The Map instrument offers prepared connection nodes to connect variables with [GNSS data](#).

Measurement Viewing and analyzing the time traces of [variables](#), for example, to observe the effects of ECU parameter changes.

ControlDesk provides various [instruments](#) for measuring variables.

Measurement (variable type) A scalar variable that can be measured, including individual elements of a measurement array.

Measurement variables are represented by the  symbol.

Measurement array A 1-, 2-, or 3-dimensional array of measurement variables. In variable lists, ControlDesk displays entries for the measurement array itself and for each array element.

Measurement arrays are represented by the  symbol.

Measurement buffer A ring buffer that buffers measurement data at the start of a [measurement](#). The measurement buffer size determines the amount of data that can be buffered. Earlier values are overwritten by later values when the buffer capacity is exceeded (buffer overflow).

Measurement Configuration A [controlbar](#) that allows you to configure [measurement](#), [recording](#) and [data logging](#).

Measurement Data API Application programming interface for accessing measurement data. The API lets the user access measurement data without having to use ControlDesk.

Measurement Data Pool A [controlbar](#) that provides access to measurement data recorded in measurement data files.

Measurement raster Specification of how often a value of a [variable](#) is updated during a [measurement](#). A measurement raster can be derived from a [measurement service](#).

Measurement service The generic term for the following services:

- [CCP](#) service
- [DsDAQ service](#)
- [Host service](#)
- [XCP](#) service

Measurement signal list A list containing the variables to be included in subsequent measurements and recording. The list is global for all platforms/devices of the current experiment. The measurement signal list is available in the configuration area of the [Measurement Configuration](#) controlbar.

Measurement variable Any variable type that can be measured but not calibrated.

Measuring/recording A platform/device state defined by the following characteristics:

- A continuous logical connection is established between ControlDesk and the platform/device hardware.
- Online calibration is possible. Parameter values can be changed directly on the platform/device hardware.
- A measurement (or recording) is running.
- Platform/device configuration is not possible.

The 'measuring' / 'recording' platform/device state is indicated by the  icon.

Memory page An area of a calibration memory. Each page contains a complete set of parameters of the platform/device hardware, but only one of the pages is "visible" to the microcontroller of the ECU or the real-time processor (RTP) of the platform hardware at a time.

ControlDesk supports platform/device hardware with up to two memory pages. These are usually the [working page](#) and the [reference page](#). The parameter values on the two memory pages usually are different. ControlDesk lets you switch from one page to the other, so that when parameters are changed on one page, the changes can be made available to the ECU or prototyping hardware via a single page switch.

Messages controlbar A [controlbar](#) displaying a history of all error and warning messages that occur during work with ControlDesk.

MicroAutoBox III platform A platform that provides access to a MicroAutoBox III connected to the host PC for function prototyping purposes such as [Bypassing](#).

MicroAutoBox platform A platform that provides access to a MicroAutoBox II connected to the host PC for function prototyping purposes such as bypassing.

Mirrored memory A memory area created by ControlDesk on the host PC that mirrors the contents of the available memory pages of calibration and prototyping hardware. For hardware with two memory pages, the mirrored memory is divided into a reference and a working page, each of them containing a complete set of parameters. When a calibration or prototyping platform/device is added to an experiment, ControlDesk initially fills the available memory pages of the mirrored memory with the contents of the [ECU Image file](#) (initial filling for calibration devices) or with the contents of the SDF file (initial filling for platforms).

- Mirrored memory for offline calibration

Parameter values can even be changed [offline](#). Changes to parameter values that are made offline affect only the mirrored memory.

- Offline-to-online transition for online calibration

For online calibration, an offline-to-online transition must be performed. During the transition, ControlDesk compares the [memory page](#)s of the hardware of each platform/device with the corresponding pages of the mirrored memory. If the pages differ, the user has to equalize them by uploading them from the hardware to the host PC, or downloading them from the host PC to the hardware.

- Mirrored memory for online calibration

When ControlDesk is in the online mode, parameter value changes become effective synchronously on the memory pages of the hardware and in the mirrored memory. In other words, parameter values on the hardware and on the host PC are always the same while you are performing online calibration.

Modular system A dSPACE processor board and one or more I/O boards connected to it.

Multi-capture history The storage of all the [capture](#)s acquired during a [triggered measurement](#). The amount of stored data depends on the measurement buffer.

Multi-pin error A feature of the SCALEXIO concept for electrical error simulation that lets you simulate a short circuit between three or more signal

channels and/or bus channels. The channels can be located on the same or different boards or I/O units. You can simulate a short circuit between:

- Channels of the same signal category (e.g., four signal generation channels)
- Channels of different signal categories (e.g., three signal generation channels and two signal measurement channels)
- Signal channels and bus channels (e.g., two signal generation channels, one signal measurement channel, and one bus channel)

Multiple electrical errors A feature of the SCALEXIO concept for electrical error simulation that lets you switch electrical errors at the same time or in succession. For example, you can simulate an open circuit for one channel and a short circuit for another channel at the same time, without deactivating the first error.

Multiprocessor System platform A platform that provides access to:

- A multicore application running on a multicore DS1006 board
- A multiprocessor application on a multiprocessor system consisting of two or more DS1006 processor boards interconnected via Gigalink.

ControlDesk handles a multiprocessor/multicore system as a unit and uses one system description file (SDF file) to load the applications to all the processor boards/cores in the system.

Multistate Display An instrument for displaying the value of a variable as an LED state and/or as a message text.

Multistate LED A value cell type of the [Variable Array](#) for displaying the value of a variable as an LED state.

Multiswitch An instrument for changing variable values by clicking sensitive areas in the instrument and for visualizing different states depending on the current value of the connected variable.

Numeric Input An instrument (or a value cell type of the [Variable Array](#)) for displaying and setting the value of the connected variable numerically.

Observing variables Reading variable values cyclically from the dSPACE real-time hardware and displaying their current values in ControlDesk, even if no [measurement](#) is running. Variable observation is performed without using a measurement buffer, and no value history is kept.

For platforms that support variable observation, variable observation is available for [parameters](#) and [measurement variables](#) that are visualized in [single-shot instruments](#) (all instruments except for a [plotter](#)). If you visualize a variable in a single-shot instrument, the variable is not added to the [measurement signal list](#). Visualizing a parameter or measurement variable in a plotter automatically adds the variable to the measurement signal list.

ControlDesk starts observing variables if one of the following conditions is true:

- [Online Calibration is started](#) for the platform.
All the parameters and measurement variables that are visualized in single-shot instruments are observed.
- [Measurement is started](#) for the platform.
All the visualized parameters and measurement variables that are not activated for measurement in the measurement signal list are observed. Data of the activated parameters and measurement variables is acquired using measurement rasters.

ODX database Abbreviation of Open Diagnostic Data Exchange, a [diagnostics database](#) that is the central ECU description for working with an [ECU Diagnostics device](#) in ControlDesk. The ODX database contains all the information required to perform diagnostic communication between ControlDesk and a specific ECU or set of ECUs in a vehicle network. ControlDesk expects the database to be compliant with ASAM MCD-2 D (ODX).

Offline State in which the parameter values of platform/device hardware in the current experiment cannot be changed. This applies regardless of whether or not the host PC is physically connected to the hardware.

The [mirrored memory](#) allows parameter values to be changed even offline.

Offline simulation A PC-based simulation in which the simulator is not connected to a physical system and is thus independent of the real time.

Offline simulation application (OSA) An offline simulation application (OSA) file is an executable file for VEOS. After the build process with a tool such as the VEOS Player, the OSA file can be downloaded to VEOS.

An OSA contains one or more [VPUs](#), such as V-ECUs and/or environment VPUs.

On/Off Button An instrument (or a value cell type of the [Variable Array](#)) for setting the value of the connected parameter to a predefined value when the button is pressed (On value) and released (Off value).

Online calibration started A platform/device state defined by the following characteristics:

- A continuous logical connection is established between ControlDesk and the platform/device hardware.
- Online calibration is possible. Parameter values can be changed directly on the platform/device hardware.
- Platform/device configuration is not possible.

Before starting online calibration, ControlDesk lets you compare the [memory page](#)s on the platform/device hardware with the corresponding pages of the [mirrored memory](#). If the parameter values on the pages differ, they must be

equalized by uploading the values from the hardware to ControlDesk, or downloading the values from ControlDesk to the hardware. However, a page cannot be downloaded if it is read-only.

The 'online calibration started' platform/device state is indicated by the  symbol.

Operation signal A [signal](#) which represents the result of an arithmetical operation (such as addition or multiplication) between two other signals.

Operator mode A working mode of ControlDesk in which only a subset of the ControlDesk functionality is provided. You can work with existing experiments but not modify them, which protects them from unintentional changes.

Output parameter A [parameter](#) or [writable measurement](#) whose memory address is used to write the computed value of a [calculated variable](#) to.

P

Parameter Any variable type that can be calibrated.

Parameter (variable type) A scalar [parameter](#), as well as the individual elements of a [value block](#).

Scalar parameters are represented by the  symbol.

Parameter limits Limits within which parameters can be changed. Parameters have hard and weak limits.

- Hard limits

Hard limits designate the value range of a parameter that you *cannot* cross during calibration.

The hard limits of a parameter originate from the corresponding [variable description](#) and cannot be edited in ControlDesk.

- Weak limits

Weak limits designate the value range of a parameter that you *should not* cross during calibration. When you cross the value range defined by the weak limits, ControlDesk warns you.

In ControlDesk, you can edit the weak limits of a parameter within the value range given by the parameter's hard limits.

PHS (Peripheral High Speed) bus A dSPACE-specific bus for communication between a processor board and the I/O boards in a modular system. It allows direct I/O operations between the processor board (bus master) and I/O boards (bus slaves).

PHS-bus-based system A modular dSPACE system consisting of a processor board such as the DS1006 Processor Board and I/O boards. They communicate with each other via the [PHS \(Peripheral High Speed\) bus](#).

Pitch variable A variable connected to the pitch scale of an [Artificial Horizon](#).

Platform A software component representing a simulator where a simulation application is computed in real-time (on dSPACE real-time hardware) or in non-real-time (on VEOS).

ControlDesk provides the following platforms:

- [DS1006 Processor Board platform](#)
- [DS1007 PPC Processor Board platform](#)
- [DS1104 R&D Controller Board platform](#)
- [DS1202 MicroLabBox platform](#)
- [MicroAutoBox platform](#)
- [MicroAutoBox III platform](#)
- [Multiprocessor System platform](#)
- [SCALEXIO platform](#)
- [VEOS platform](#)
- [XIL API MAPort platform](#)

Each platform usually has a [variable description](#) that specifies its variables.

Platform trigger A [trigger](#) that is available for a [platform](#) and that is evaluated on the related dSPACE real-time hardware or VEOS.

Platforms/Devices controlbar A [controlbar](#) that provides functions to handle [devices](#), [platforms](#), and the [applications](#) assigned to the platforms.

Plotter instrument ControlDesk offers three plotter instruments with different main purposes:

- The [Index Plotter](#) displays signals in relation to events.
- The [Time Plotter](#) displays signals in relation to measurement time.
- The [XY Plotter](#) displays signals in relation to other signals.

Port configuration To interface the failure simulation hardware, an EESPort needs the hardware-dependent *port configuration file* (PORTCONFIG file). The file's contents must fit the connected HIL simulator architecture and its failure simulation hardware.

Postprocessing The handling of measured and recorded data by the following actions:

- Displaying measured or recorded data
- Zooming into measured or recorded signals with a [plotter](#)
- Displaying the values of measurement variables and parameters as they were at any specific point in time

Processor board A board that computes real-time applications. It has an operating system that controls all calculations and communication to other boards.

Project A container for collecting and managing the information and files required for experiment/calibration/modification tasks in a number of experiments[?]. A project collects the experiments and manages their common data.

Project controlbar A controlbar[?] that provides access to projects and experiments and all the files they contain.

Project root directory The directory on your file system to which ControlDesk saves all the experiments and documents of a project[?]. Every project is associated with a project root directory, and several projects can use the same project root directory. The user can group projects by specifying several project root directories.

ControlDesk uses the Documents folder[?] as the default project root directory unless a different one is specified.

Properties controlbar A controlbar[?] providing access to the properties of, for example, platforms/devices, layouts/instruments, and measurement/recording configurations.

Proposed calibration A calibration mode in which the parameter value changes that the user makes do not become effective on the hardware until they are applied. This allows several parameter changes to be written to the hardware together. Being in proposed calibration mode is like being in the offline calibration mode temporarily.

Push Button An instrument (or a value cell type of the Variable Array[?]) for setting the value of the connected parameter by push buttons.

Python Editor An editor for opening and editing PY files.

Quick start measurement A type of measurement in which all the ECU variables configured for measurement are measured and recorded, starting with the first execution of an ECU task. ControlDesk supports quick start measurements on ECUs with DCI-GS12, CCP, and XCP (except for XCP on Ethernet with the TCP transmission protocol).

Quick start measurement can be used to perform cold start measurements. Cold start means that the vehicle and/or the engine are cooled down to the temperature of the environment and then started. One reason for performing cold start measurements is to observe the behavior of an engine during the warm-up phase.

R

Radio Button An instrument for displaying and setting the value of the connected parameter by radio buttons.

Real-time application An application that can be executed in real time on dSPACE real-time hardware. A real-time application can be built from a Simulink model containing RTI blocks, for example.

Record layout A record layout is used to specify a data type and define the order of the data in the memory of the target system (ECU, for example). For scalar data types, a record layout allows you to add an address mode (direct or indirect). For structured (aggregated) data types, the record layout specifies all the structure elements and the order they appear in.

The RECORD_LAYOUT keyword in an A2L file is used to specify the various record layouts of the data types in the memory. The structural setup of the various data types must be described in such a way that a standard application system will be able to process all data types (reading, writing, operating point display etc.).

Record layout component A component of a record layout. A structured record layout consists of several components according to the ASAP2 specification. For example, the AXIS PTS_X component specifies the x-axis points, and the FNC_VALUES component describes the function values of a map or a curve.

Recorder An object in the [Measurement Configuration](#) controlbar that specifies and executes the [recording](#) of variables according to a specific measurement configuration.

Recorder signal list A list that contains the variables to be included in subsequent [recordings](#).

Recording Saving the time traces of variables to a file. Both measurement variables and parameters can be recorded. Recorded data can be [postprocessed](#) directly in ControlDesk.

A recording can be started and stopped immediately or via a trigger:

- Immediate recording

The recording is started and stopped without delay, without having to meet a trigger condition.

- Triggered recording

The recording is not started or stopped until certain trigger conditions are met. These conditions can be defined and edited in ControlDesk.

Reduction data Additional content in an MF4 file that allows for visualizing the MF4 file data depending on the visualization resolution. Reduction data therefore improves the performance of the visualization and postprocessing of measurement data.

Reference data set A read-only data set assigned to the reference page of a device that has two [memory page](#)s. There can be only one reference data set for each device. The reference data set is read-only.

Reference page Memory area containing the parameters of an ECU. The reference page contains the read-only [reference data set](#).

Note

Some platforms/devices provide only a [working page](#). You cannot switch to a reference page in this case.

Resynchronization Mechanism to periodically synchronize the drifting timers of the platform/device hardware ControlDesk is connected to. Resynchronization means adjustment to a common time base.

Roll variable A variable connected to the roll scale of an [Artificial Horizon](#).

S

Sample count trigger A [trigger](#) that specifies the number of samples in a data capture.

A sample count trigger can be used as a [stop trigger](#).

SCALEXIO platform A platform that provides access to a single-core, multicore or multiprocessor [SCALEXIO system](#) connected to the host PC for HIL simulation and function prototyping purposes.

SCALEXIO system A dSPACE hardware-in-the-loop (HIL) system consisting of at least one processing hardware component, I/O boards, and I/O units. They communicate with each other via the [IOCNET](#). In a SCALEXIO system, two types of processing hardware can be used, a DS6001 Processor Board or a real-time industry PC as the SCALEXIO Processing Unit. The SCALEXIO system simulates the environment to test an ECU. It provides the sensor signals for the ECU, measures the signals of the ECU, and provides the power (battery voltage) for the ECU and a bus interface for restbus simulation.

SDF file The system description file that describes the files to be loaded to the individual processing units of a simulation platform. It also contains the variable description of the relevant [simulation application](#).

The SDF file is generated automatically when the [TRC file](#) is built.

Segment The minimum part a [segment signal](#) can consist of.

There are different kinds of segments to be used in segment signals:

- Segments to form synthetic signal shapes (sine, sawtooth, ramp, etc.)
- Segments to perform arithmetical operations (addition, multiplication) with other segments
- Segments to represent numerical signal data (measured data)

Segment signal A [signal](#) consisting of one or more [segment](#)s.

Selection Box An instrument for selecting a text-value entry and setting the respective numerical value for the connected variable.

Signal

- Representation of a [variable](#) measured in a specific [measurement raster](#).
 - Generic term for [segment signal](#)s and [operation signal](#)s.
- A signal is part of a [signal description set](#) which can be displayed and edited in the working area.

Signal description set A group of one or more [signals](#).

A signal description set and its signals can be edited in the working area by means of the [Signal Editor](#). Each signal description set is stored as an [STZ file](#) either in the Signal Description Sets folder or in the Signal Generators folder.

Signal Editor A software component to create, configure, display, and manage [signals](#) in [signal description sets](#).

Signal file A file that contains the wiring information of a simulator and that is part of the standard dSPACE documentation of dSPACE Simulator Full-Size. Normally, dSPACE generates this file when designing the simulator. Before using a failure simulation system, users can adapt the signal file to their needs.

Signal generator An STZ file containing a [signal description set](#) and optional information about the [signal mapping](#), the description of variables, and the real-time platform.

The file is located in the Signal Generators folder and used to generate, download, and control Real-Time Testing sequences, which are executed on the real-time platform to [stimulate](#) model variables in real time.

Signal Mapping A [controlbar](#) of the [Signal Editor](#) to map model variables to [signals](#) and [variable aliases](#) of a [signal generator](#).

Signal Selector A [controlbar](#) of the [Signal Editor](#). The Signal Selector provides [signals](#) and [segments](#) for arranging and configuring [signal description sets](#) in the working area.

SIL testing Abbreviation of *software-in-the-loop testing*.

Simulation and testing of individual software functions, complete virtual ECUs ([V-ECUs](#)), or even V-ECU networks on a local PC or highly parallel in the cloud independently of real-time constraints and real hardware.

Simulation application The generic term for [offline simulation application \(OSA\)](#) and [real-time application](#).

Simulation system A description of the composition of V-ECU models, environment models, real ECUs, and their interconnections required for simulating the behavior of a system. A simulation system is the basis for the generation of a [simulation application](#) for a given simulator platform.

Simulation time group Group of platforms/devices in an experiment whose simulation times are synchronized with each other. If [resynchronization](#) is enabled, ControlDesk synchronizes a simulation time group as a whole, not the single members of the group individually.

Simulator A system that imitates the characteristics or behaviors of a selected physical or abstract system.

Single-processor system A system that is based on one dSPACE processor or controller board.

Single-shot instrument An [instrument](#) that displays an instantaneous value of a connected variable without keeping a value history. In ControlDesk, all instruments except for a [plotter](#) are single-shot instruments. For [platforms](#) that support the [variable observer](#) functionality, you can use single-shot instruments to observe variables.

Slave application An application assigned to the [slave DSP](#) of a controller or I/O board. It is usually loaded and started together with the [real-time application](#) running on the corresponding main board.

Slave DSP A DSP subsystem installed on a controller or I/O board. Its [slave application](#) can be loaded together with the [real-time application](#) or separately.

Slider An instrument (or a value cell type of the [Variable Array](#)) for displaying and setting the value of the connected variable by means of a slide.

Sound Controller An instrument for generating sounds to be played.

Standard axis An axis with data points that are deposited in the ECU memory. Unlike a [common axis](#), a standard axis is specified within a [curve](#) or [map](#). The parameters of a standard axis can be calibrated, which affects only the related curve or map.

Start trigger A [trigger](#) that is used, for example, to start a measurement [raster](#). A [platform trigger](#) can be used as a start trigger.

Static Text An instrument for displaying explanations or inscriptions on the layout.

Steering Controller An instrument for changing variable values using a game controller device such as a joystick or a steering wheel.

Stimulation Writing signals to variables in real-time models during a simulation run.

Stop trigger A [trigger](#) that is used, for example, to stop a measurement [raster](#).

String A text variable in ASCII format.

Strings are represented by the  symbol.

Struct A variable with the struct data type. A struct contains a structured list of variables that can have various data types. In ControlDesk, a struct variable can contain either parameters and value blocks or measurement variables and measurement arrays. ControlDesk supports nested structs, i.e., structs that contain further structs and struct arrays as elements.

Structs are represented by the  symbol.

Struct array An array of homogeneous [struct](#) variables.

Struct arrays are represented by the  symbol.

STZ file A ZIP file containing signal descriptions in the STI format. The STZ file can also contain additional MAT files to describe numerical signal data.

Sub data set A data set that does not contain the complete set of the parameters of a platform/device.

Symbol A symbolic name of a physical address in a MAP file. A symbol can be associated to a variable in the Variable Editor, for example, to support an address updates.

System variable A type of variable that represents internal variables of the device or platform hardware and that can be used as measurement signals in ControlDesk to give feedback on the status of the related device or platform hardware. For example, an ECU's power supply status or the simulation state of a dSPACE board can be visualized via system variables.

T

Table Editor An instrument for displaying and setting values of a connected curve, map, value block, or axis in a 2-D, 3-D, and grid view. The Table Editor can also display the values of a measurement array.

The Table Editor can be used for the following variable types:

- [Common axis](#) ()
- [Curve](#) ()
- [Map](#) ()
- [Measurement array](#) ()
- [Value block](#) ()

Time cursor A cursor which is visible at the same time position in the following instruments:

- In all [Time Plotters](#)
- In all [XY Plotters](#)
- In all [bus monitoring lists](#)

You can use the time cursor to view signal values at a specific point in time. If you move the time cursor, all measured signals and the respective parameters are

updated. Instruments and bus monitoring lists display the values that are available at the selected time position.

Time Plotter A [plotter instrument](#) for displaying signals that are measured in a time-based raster (time plots).

Topology A description of the processor boards belonging to a multiprocessor system and their interconnections via Gigalinks. The topology also contains information on which Gigalink port of each processor board is connected to the Gigalink ports of other processor boards in the multiprocessor system.

Topology information is contained in the real-time application (PPC/x86/RTA) files of the multiprocessor system's processor boards.

TRC file A variable description file with information on the variables available in an [environment model](#) running on a dSPACE [platform](#).

Trigger A condition for executing an action such as starting and stopping a [measurement raster](#) or a [recorder](#).

The generic term for the following trigger types:

- [Duration trigger](#)
- [Platform trigger](#)
- [Sample count trigger](#)

Trigger condition A formula that specifies the condition of a [trigger](#) mathematically.

Triggered measurement The measurement of a [measurement raster](#) started by a [platform trigger](#). The data flow between the dSPACE real-time hardware or VEOS and the host PC is not continuous.

Unassigned data set A data set that is assigned neither to the working page nor to the reference page of a platform/device. An unassigned data set can be defined as the new working or reference data set. It then replaces the "old" working or reference data set and is written to the corresponding memory page, if one is available on the platform/device.

Unplugged A platform/device state defined by the following characteristics:

- The logical connection between ControlDesk and the hardware was interrupted, for example, because the ignition was turned off or the ControlDesk PC and the hardware were disconnected.
- Before the state of a platform/device changes to 'unplugged', the platform/device was in one of the following states:
 - 'Connected'
 - 'Online calibration started'
 - 'Measuring' / 'Recording'

Tip

A device for which the connection between ControlDesk and the device hardware currently is interrupted is also set to the 'unplugged' state when you start online calibration if both the following conditions are fulfilled:

- The device's Start unplugged property is enabled.
- The Start online calibration behavior property is set to 'Ignore differences'.

This is possible for CCP and XCP devices. For details on the two properties listed above, refer to [General Settings Properties \(ControlDesk Platform Management\)](#).

- If the Automatic Reconnect feature is enabled for a platform/device and if the platform/device is in the 'unplugged' state, ControlDesk periodically tries to re-establish the logical connection for that platform/device.
- Online calibration is impossible. Offline calibration is possible.
- Platform/device configuration is possible.

The 'unplugged' platform/device state is indicated by the  icon.

Untriggered measurement The measurement of a [measurement raster](#) not started by a [platform trigger](#). The data flow between the dSPACE real-time hardware or VEOS and the host PC is continuous.

User function An external function or program that is added to the ControlDesk user interface for quick and easy access during work with ControlDesk.

User Functions Output A [controlbar](#) that provides access to the output of external tools added to the Automation ribbon.

V

Value block A [parameter](#) that consists of a 1- or 2-dimensional array of scalar [parameters](#).

In variable lists, ControlDesk displays entries for the value block itself and for each array element.

Value blocks are represented by the  symbol.

Value conversion The conversion of the original *source values* of variables of an application running on an ECU or dSPACE real-time hardware into the corresponding scaled *converted values*.

Variable Any [parameter](#) or [measurement variable](#) defined in a [variable description](#). ControlDesk provides various [instrument](#)s to visualize variables.

Variable alias An alias name that lets the user control the property of a [segment](#) by a model parameter of a real-time application.

Variable Array An instrument for calibrating parameters and displaying measurement variable values.

The Variable Array can be used for the following variable types:

- **Measurement** ()
- **Measurement array** ()
- **String** ()
- **Struct** ()
- **Struct array** ()
- **Value** ()
- **Value block** ()

Variable connection The connection of a [variable](#) to an [instrument](#). Via the variable connection, data is exchanged between a variable and the instrument used to measure or calibrate the variable. In other words, variable connections are required to visualize variables in instrument.

Variable description A file describing the variables in a simulation application, which are available for measurement, calibration, and stimulation.

Variable Editor A tool for viewing, editing, and creating variable descriptions in the ASAM MCD-2MC (A2L) file format. The Variable Editor allows you to create A2L files from scratch, or to import existing A2L files for modification.

Variable Filter A variable filter contains the filter configuration of a combined filter, which is used to filter the variable list in the Variables controlbar using a combination of filter conditions.

Variables controlbar A [controlbar](#) that provides access to the variables of the currently open experiment.

V-ECU Abbreviation of *virtual ECU*.

ECU software that can be executed in a [software-in-the-loop \(SIL\) testing](#) environment such as a local PC or highly parallel in the cloud independently of real-time constraints and real ECU hardware.

Vehicle information The [ODX database](#) can contain information for one or more vehicles. Vehicle information data is used for vehicle identification purposes and for access to vehicles. It references the access paths (logical links) to the ECUs.

VEOS A [simulator](#) which is part of the PC and allows the user to run an [offline simulation application \(OSA\)](#) without relation to real time.

VEOS Player is the graphical user interface for VEOS.

VEOS platform A platform that configures and controls the [offline simulation application \(OSA\)](#) running in [VEOS](#) and that also provides access to the application's [environment VPU](#).

VEOS Player An application running on the host PC for editing, configuring and controlling an [offline simulation application \(OSA\)](#) running in VEOS.

Verbal conversion A [conversion](#) in which a [conversion table](#) is used to specify the computation of numerical values into strings. The verbal conversion table is used when you switch the value representation from source to converted mode and vice versa.

Verbal conversion range A [conversion](#) in which a [conversion table](#) is used to specify the computation of a range of numerical values into strings. The verbal conversion range table is used when you switch the value representation from source to converted mode and vice versa.

View set A named configuration of the [controlbar](#)s of ControlDesk. A view set has a default state and a current state that can differ from the default state. The configuration includes the geometry, visibility, and docking or floating state of controlbars.

Visualization The representation of [variable](#)s in [instrument](#)s:

- [Measurement variable](#)s are visualized in instruments to view and analyze their time traces.
- [Calibration parameters](#) are visualized in instruments to change their values.

VPU Abbreviation of *virtual processing unit*. A VPU is part of an offline simulation application in VEOS. Each VPU runs in a separate process of the PC. VPU is also the generic term for:

- V-ECUs
- Environment VPUs
- Controller VPUs
- Bus VPUs

W

Working data set The data set currently residing in the memory of a platform/device hardware. There can be only one working data set for each calibration platform/device. The working data set is read/write.

Working page Memory area containing the parameters of an ECU or prototyping hardware ([memory page](#)). The working page contains the read/write working [data set](#).

If the platform/device also provides a [reference page](#), ControlDesk lets you switch between both pages.

Writable measurement A scalar variable that can be measured and calibrated.

X

XCP Abbreviation of *Universal Measurement and Calibration Protocol*. A protocol that is implemented on electronic control units (ECUs) and provides access to ECUs with measurement and calibration systems (MCS) such as ControlDesk.

XCP is based on the *master-slave principle*:

- The ECU is the slave.
- The measurement and calibration system is the master.

The "X" stands for the physical layers for communication between the ECU and the MCS, such as CAN (Controller Area Network) and Ethernet.

The basic features of XCP are:

- ECU parameter calibration (CAL)
- Synchronous data acquisition (DAQ)
- Synchronous data stimulation (STIM), i.e., for bypassing
- ECU flash programming (PGM)

The XCP protocol was developed by ASAM e.V. (Association for Standardisation of Automation and Measuring Systems e.V.). For the protocol specification, refer to <http://www.asam.net>.

The following ControlDesk devices support ECUs with an integrated XCP service:

- [XCP on CAN device](#)
- [XCP on Ethernet device](#)

XCP on CAN device A device that provides access to an ECU with XCP connected to the ControlDesk PC via CAN. Using the XCP on CAN device, you can access the ECU for measurement and calibration purposes via XCP (*Universal Measurement and Calibration Protocol*).

XCP on Ethernet device A device that provides access to an ECU or [V-ECU](#) with XCP connected to the ControlDesk PC via Ethernet. The XCP on Ethernet device provides access to the ECU/V-ECU via XCP (*Universal Measurement and Calibration Protocol*) for measurement and calibration purposes.

XIL API EESPort [Electrical Error Simulation port \(EESPort\)](#)

XIL API MAPort platform A platform that provides access to a simulation platform via the ASAM XIL API implementation that is installed on your host PC.

XY Plotter A [plotter instrument](#) for displaying signals as functions of other signals.

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