AutomationDesk

Implementing Signal-Based Tests

For AutomationDesk 6.5

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dSPACE

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About This Document

Content

This document introduces you to AutomationDesk's signal-based testing.

Required knowledge

Working with AutomationDesk requires:

- Basic knowledge in handling the PC and the Microsoft Windows operating system.
- Basic knowledge in developing applications or tests.
- Basic knowledge in handling the external device, which you control remotely via AutomationDesk.

dSPACE provides trainings for AutomationDesk. For more information, refer to https://www.dspace.com/go/trainings.

Legal information

Note

Legal Information on ASAM binaries and ASAM documentation
dSPACE software also installs components that are licensed and released by ASAM e.V. (Association for Standardisation of Automation and Measuring Systems).
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You are not authorized to pass the ASAM binaries and the ASAM documentation to third parties without permission. For more information, visit http://www.asam.net/license.html.

Symbols

dSPACE user documentation uses the following symbols:

Symbol	Description
DANGER	Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

Symbol	Description
WARNING	Indicates a hazardous situation that, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a hazard that, if not avoided, could result in property damage.
Note	Indicates important information that you should take into account to avoid malfunctions.
Tip	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.

New Features

Introduction

Information on enhancements and new features of AutomationDesk.

New Features For Signal-Based Testing

New features and migration

For information on new features of the current version of AutomationDesk, refer to New Features of AutomationDesk 6.5 (New Features and Migration 🕮).

Basics and Instructions

Where to go from here

Information in this section

Basics on Signal-Based Testing..... 16
General information on the signal-based testing strategy.

Handling Signals..... 20
General information on handling signals.

Implementing Signal-Based Tests..... 66
AutomationDesk provides templates for test scenarios that are configurable via the description of the signals used.

Basics on Signal-Based Testing

Introduction

You get information on the concept and the advantages of the signal-based testing strategy.

Overview on the Test Concept and the Involved Components

Introduction

You get information on the concept of signal-based testing and the involved components to implement such a test.

Concept of signal-based testing

The signal-based testing strategy is applicable for tests that can be defined via the involved signals. A set of input signals is used to stimulate the system under test. The system's reaction is captured and compared to reference signals. You can implement these tests with minimal effort by specifying the signals and evaluation methods to be used.

Involved components

AutomationDesk provides the following components for implementing signal-based tests:

Signal-Based Testing library The **Signal-Based Testing** library provides sequence and automation block templates of a standardized scenario for implementing signal-based tests. Refer to Overview of the Signal-Based Testing library on page 17.

Signal Editor Via AutomationDesk's **Signal Editor**, you can edit signal shapes graphically and define signals as a sequence of signal segments. Details for the signal-based testing, such as the criteria for the signal evaluation, are configured via additional custom properties of the signal sets, signals and segments.

These informations are stored in STZ files that you can use as input for the Signal-Based Testing automation blocks. An STZ file is a ZIP file that contains the signal descriptions of the used signals in the STI format. The STI format is defined by the ASAM AE XIL API standard. For more information on the Signal Editor, refer to Handling Signals on page 20.

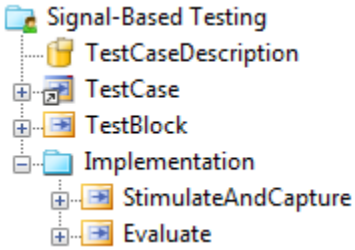
To parameterize a signal-based test, the according STZ file is assigned to a **TestCaseDescription** data object. For more information, refer to Implementing Signal-Based Tests on page 66.

Note

For test case descriptions, you can only use STZ files that are configured using AutomationDesk's Signal Editor.

Overview of the Signal-Based Testing library

The Signal-Based Testing library is a custom library. It is write-protected to prevent modifications to its blocks.



The library provides a data object, a sequence element and three block templates:

TestCaseDescription The TestCaseDescription is a data object that is used to specify an STZ file that contains the descriptions of the used signals and the evaluation criteria of a signal-based test. For details, refer to TestCaseDescription (Data Object) on page 80.

TestCase The TestCase element can be used as a template for a complete sequence that implements a signal-based test. The sequence template is based on the TestCase template of the Test Builder library. Internally, it uses the StimulateAndCapture and the Evaluation blocks of the Signal-Based Testing library. You can optionally insert individual blocks at operation slots for additional initialization or evaluation actions. For details, refer to TestCase (Signal-Based Testing) on page 83.

TestBlock The TestBlock automation block provides the same functionality as the TestCase sequence element, but it can be used within a sequence. It is based on the TestBlock template of the Test Builder library. For details, refer to TestBlock (Signal-Based Testing) on page 87.

StimulateAndCapture The StimulateAndCapture automation block implements the stimulation of model variables and the data capturing as configured in the test case description. It is based on the Step template of the Test Builder library. This block is needed only, if you want to implement your own test scenario. For details, refer to StimulateAndCapture on page 91.

When stimulating simulator variables, Real-Time Testing is used. For information on preconditions and limitations on using Real-Time Testing, refer to Enabling Real-Time Testing for dSPACE Platforms (Real-Time Testing Guide) and General Limitations for Real-Time Testing (Real-Time Testing Guide).

Evaluate The Evaluate automation block implements the signal evaluation and reporting of the test as configured in the test case description. It is based on the Step template of the Test Builder library. This block is needed only, if you

want to implement your own test scenario. For details, refer to **Evaluate** on page 97.

Typical workflow

When you want to implement a signal-based test, the typical workflow that you can follow is:

- Via the Mapping Editor, configure the access to the model variables used for the test in the variable pool that is contained in the project's Mapping data object.
- Add an appropriate sequence or block of the Signal-Based Testing library to your project and parameterize it with the variable pool and the test case description that you configured before. For more information, refer to How to Configure Variable Access for a Signal-Based Test on page 66.
- Via AutomationDesk's Signal Editor, configure the signals that you want to use to stimulate and capture the model variables. Additionally configure the criteria that you want to use to evaluate the signals. Save the configuration in an STZ file that you use later as the test case description. For more information, refer to How to Configure Signals for a Signal-Based Test on page 69.
- Load the simulation application to the platform and start it. This can be done manually or automated in your project. For more information, refer to Managing Platforms and Simulation Applications (AutomationDesk Accessing Simulation Platforms 🕮).
- Execute the project and look at the results of the signal-based test in the generated report. For more information, refer to How to Run the Signal-Based Test on page 72.

Implementing your own test scenario

You can implement your own test scenarios by using variants of the automation blocks that you find in the **Implementation** library folder.

Internally, the Signal-Based Testing automation blocks use blocks of following libraries:

- The **Test Builder** library is used for test implementation. Thus, the verdict and exception handling and the use of the **Attributes** dictionary are inherited.
- The **XIL API Convenience** library is used for variable stimulation and capturing. Thus, a **Mapping** data object is used to configure model variable access.
- The **Evaluation** library is used for result evaluation. Thus, you can configure the evaluation methods for your test case description in same way as you configure evaluation blocks.

Demo projects

You will find some demo projects for the Signal-Based Testing library in `<DocumentsFolder>\SignalBasedTesting`.

Related topics

Basics

Accessing Simulation Platforms via the XIL API Convenience Library
(AutomationDesk Accessing Simulation Platforms 🕮)

References

Evaluation (AutomationDesk Basic Practices 🕮)
Signal Editor..... 103
Signal-Based Testing Library..... 80
Test Builder (AutomationDesk Basic Practices 🕮)
TestCaseDescription (Data Object)..... 80

Handling Signals

Introduction

AutomationDesk provides the Signal Editor to configure signals for stimulating variables and to measure the resulting signals for evaluation. Related signals are stored in a signal description set.

Where to go from here

Information in this section

Using the Signal Editor.....20
You get information on the Signal Editor's user interface and an overview on handling signals via signal description sets.

Creating and Editing Signals.....35
You create a signal by dragging Signal Editor elements to a signal description set. Then you can configure the created signals and segments by editing their properties.

Using the Signal Editor

Introduction

You get information on the Signal Editor's user interface and an overview on handling signals via signal description sets.

Where to go from here

Information in this section

Basics on Signal Description Sets.....21
Signal description sets are used to edit and arrange signals.

Basics on the Signal Editor.....22

How to Create and Save a Signal Description Set.....24
You can create a signal description set and save it to an STZ file.

How to Scroll Through a Signal Display.....25
You can scroll through a signal display.

How to Stretch or Compress the Axes of a Signal Display.....28
You can stretch or compress the axes of a signal display.

How to Zoom into a Signal.....30
You can zoom into a signal's display.

How to Scale Up or Scale Down a Signal Display.....32
You can scale up or scale down a signal's display.

RTT Installation and Signal Editor 33
The Signal Editor supports stimulus generation for all dSPACE platforms that can run Real-Time Testing (RTT) sequences.

Basics on Signal Description Sets

Introduction

Signal description sets are used to arrange and edit signals.

Signal description sets

A signal description set is a container for one or more signals.

You can save a signal description set to an *STZ file*. An 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.

STZ files that are saved from AutomationDesk's Signal Editor contain additional information, e.g., to configure signal-based testing.

To edit a signal by means of AutomationDesk's Signal Editor, you must place it in a signal description set.

Application examples

The following libraries use signal description sets:

- **Signal-Based Testing**, refer to AutomationDesk Implementing Signal-Based Tests on page 1
- **XIL API Convenience**, refer to Accessing Simulation Platforms via the XIL API Convenience Library (AutomationDesk Accessing Simulation Platforms)
- **XIL API**, refer to Accessing Simulation Platforms via XIL API (AutomationDesk Accessing Simulation Platforms)
- **Evaluation**, refer to Implementing Result Evaluation (AutomationDesk Basic Practices)

Look at the libraries' demo projects for information on applying signal description sets.

Related topics

References

Operation Signal 112
Segment Signal 115
Signal Description Set 104

Basics on the Signal Editor

Introduction

The Signal Editor provides controls and commands to manage signals in signal description sets.

GUI elements

AutomationDesk's Signal Editor provides the **Signal Editor** ribbon and the **Signals** view set to edit signal description sets.

The **Signal Editor** ribbon provides the following groups:

- **Signal Description Set** provides commands that let you create, open and save signal description sets.
- **Show** provides checkboxes that let you configure how a signal description set is displayed in the working area.
- **View Sets** provides icons to let you rapidly switch between the relevant view sets when you work with signals.

For details, refer to Signal Editor Commands on page 234.

The **Signals** view set provides the following panes:

Working area In the working area, you can edit and configure signal description sets, signals and segments graphically.

Each signal description set that is opened in the Signal Editor is shown in a separate tab.

A signal description set is displayed as a list of its signals. Each row contains the properties of one signal, such as the signal's name. The last column contains the signal display with a plot of the signal's shape.

For details, refer to Signal Description Set on page 104.

The column header of the signal shapes shows the common time axis of all signals. In this header, you can define time tags that you can use to specify points in time for signal evaluation. For details, refer to Time Tag on page 110.

Signal display In the signal display, you can edit each signal graphically via drag & drop. The editing behavior depends on the edit mode. The active edit mode is indicated by the mouse pointer. The following edit modes are available:

Edit Mode	Mouse Pointer	Purpose
Select Mode		To select and arrange signals and segments. Refer to Select Mode on page 257.
Hand Mode		To scroll the signal shapes. Refer to Hand Mode on page 247.
Zoom Mode	/	To zoom into signals and segments. Refer to Zoom Mode on page 263.
Split Mode		To split a segment into two. Refer to Split Mode on page 260.

You can use the middle mouse button or the context menu commands to switch between edit modes.

Signal Selector The Signal Selector lets you select signal and segment types to add new elements to a signal description set via drag & drop. For details, refer to Signal Selector on page 259.

Properties The Properties pane lets you configure the element that you currently selected in the working area. There are specific properties for a signal description set, a signal, or a segment. For details, refer to Properties on page 249.

Mapping Viewer The Mapping Viewer lets you add signals that relate to a project's variable mapping to a signal description set via drag & drop. For details, refer to Mapping Viewer (AutomationDesk Basic Practices).

Supported dSPACE platforms and devices

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

- DS1005 PPC Board
- DS1006 Processor Board
- DS1007 PPC Processor Board
- DS1202 MicroLabBox
- MicroAutoBox II
- MicroAutoBox III

- Multiprocessor System
- SCALEXIO
- 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.

Using dSPACE Real-Time Testing

The stimulation of variables is implemented via dSPACE Real-Time Testing (RTT). A current version of RTT is installed together with AutomationDesk, but the appropriate RTT version to stimulate a specific simulation application depends on the platform to perform the simulation and with which RTT version the application is built. For details, refer to RTT Installation and Signal Editor on page 33.

How to Create and Save a Signal Description Set

Objective

You can create a signal description set as a container for signals and save it to an sTZ file.

Basics

According to the ASAM AE XIL API standard, signals must reside in signal description sets. Thus, AutomationDesk's Signal Editor provides commands to open, create and save signal description sets to work with the contained signals.

Method

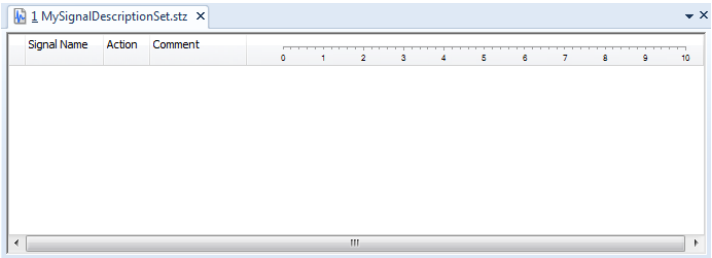
To create and save a signal description set

1. On the Signals Editor ribbon, click Signal Description Set - New. In the working area, a new tab opens and displays an empty signal description set.
2. Click Signal Description Set - Save Signal Set As and specify an STZ file name and path.

   The signal description set is saved. The name of the STZ file is displayed in the working area's tab.

Result

You created and saved an empty signal description set.



Tip

- You can open an already existing STZ file by clicking **Signal Description Set - Open Signal Set**.
- If you made changes to a signal description set, an asterisk (*) is shown after the STZ file name until the signal description set is saved again.

Next steps

You can now add one or more signals to your signal description set. For instructions, refer to How to Create a Segment Signal on page 41 and to How to Create and Configure an Operation Signal on page 59.

Related topics

References

New Signal Description Set..... 248
Open Signal Set..... 249
Signal Description Set..... 104

How to Scroll Through a Signal Display

Objective

You can scroll in different directions through a signal display by using scroll bars or by using the mouse pointer in the Signal Editor's *Hand Mode*.

Scrolling moves the displayed region across a plot that is too large to be displayed as a whole. Unlike stretching, compressing, and zooming, scrolling does not change the range of the displayed region.

Preconditions

A signal description set that contains at least one signal must be opened in the working area.

Possible methods

You can scroll all displayed signals in the direction of x (time-axis), or you can scroll a single signal in direction of y:

- To scroll in the direction of x, refer to method 1.
- To scroll in the direction of y, refer to method 2.

Method 1

To scroll in the direction of x

1. In a signal display, press the middle mouse button multiple times until the mouse pointer changes to the hand ( ) icon.

   The Signal Editor is set to *Hand Mode*.

   Alternatively, you can select the **Hand Mode** command from the context menu of the signal display.

2. Click into the signal display, hold down the left mouse button and move the mouse pointer to the right or to the left.

   The displayed ranges of all signals scroll in the related direction of the x-axis.

Method 2

To scroll in the direction of y

1. In a signal display, press the middle mouse button multiple times until the mouse pointer changes to the hand ( ) icon.

   The Signal Editor is set to *Hand Mode*.

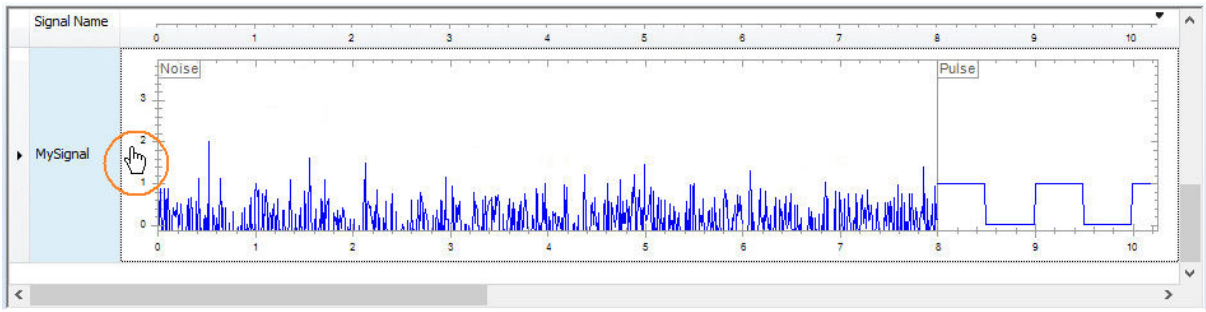
   Alternatively, you can select the **Hand Mode** command from the context menu of the signal display.

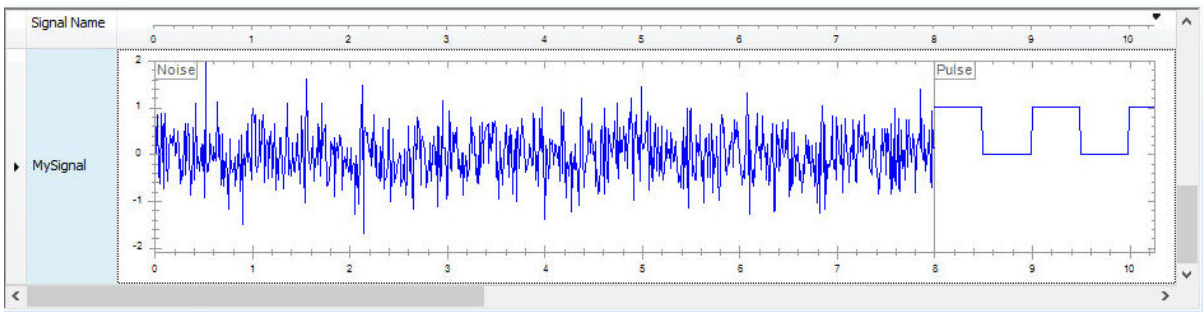
2. Click on the left y-scale of a signal display, hold down the left mouse button and move the mouse pointer up or down.

   The displayed range of the signal scrolls in the related direction of the y-axis.

Result

A scrolled view of the signal is displayed. The example below shows the scrolling of a signal in direction of the y-axis.





Tip

- If you press **`Shift`** at the same time as the middle mouse button, the Signal Editor's mode changes in reverse order.
- The vertical scroll bar lets you scroll the signal list of the signal description set.
- You can return to the default view of the signals by using Zoom to Default.

Related topics

References

Hand Mode..... 247
Zoom to Default..... 264

How to Stretch or Compress the Axes of a Signal Display

Objective

You can stretch or compress the axes of a signal display to view the signal plot in more detail or to display a larger area of the plot.

Unlike zooming, this lets you change the range of the displayed region in only one direction.

Preconditions

A signal description set containing at least one signal must be opened in the working area.

Possible methods

You can stretch or compress the axes of the signals in the following ways:

- To stretch or compress the x-axes in all signal displays, refer to method 1.
- To stretch or compress the y-axes in all signal displays, refer to method 2.
- To stretch or compress the y-axis in one signal display, refer to method 3.

Method 1

To stretch or compress the x-axes in all signal displays

1. Press **Ctrl** and move the mouse pointer over the horizontal scroll box until a double arrow appears.

   Alternatively, if the Signal Editor is in *Select Mode*, you can move the mouse pointer over the time scale in the column header.
2. Scroll the mouse wheel up to stretch the x-axis of the signal display or down to compress it.

Method 2

To stretch or compress the y-axes in all signal displays

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

   This adjusts the height of the table cells and the y-scales of all displayed signals. The displayed ranges of the signals remain the same.

Method 3

To stretch or compress the y-axis in one signal display

1. In the Signal Editor, press the middle mouse button multiple times until the mouse pointer changes to the arrow ( ) icon.

   The Signal Editor is in *Select Mode*.

   Alternatively, you can select the **Hand Mode** command from the context menu of the signal display.
2. Move the mouse pointer over the left y-scale of the signal display until it changes to a double arrow.

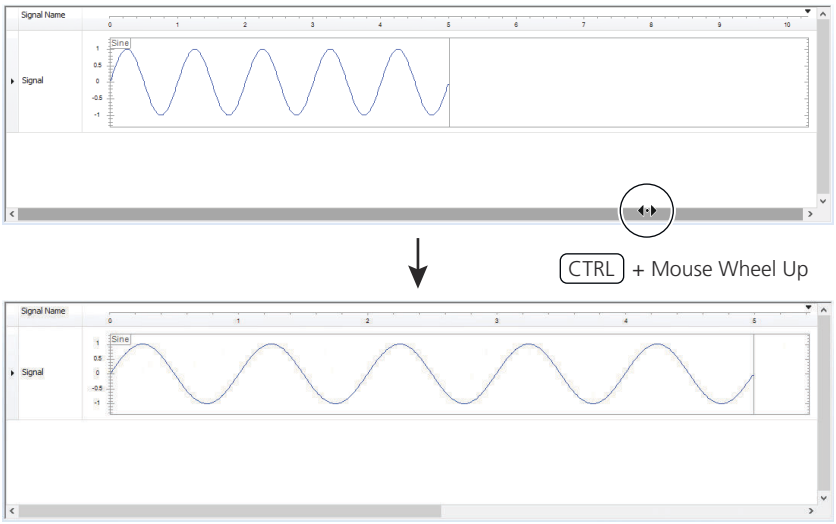
3 Scroll the mouse wheel up to stretch the y-axis of the signal display or down to compress it.

Only the y-axis of this signal changes. The height of the signal table cells remains the same.

Result

A stretched or compressed view of the signal is displayed.

The following illustration shows the stretching of a sine signal's display in the direction of x.



Tip

- If the Signal Editor is in *Zoom Mode*, you can stretch or compress the x-axes stepwise by 5 percent by clicking on a signal.
- You can compress or expand the x-axis to make a selected signal fully visible in the working area by using **Fit to Screen**.
- You can move the displayed range of a signal in the working area by scrolling through the signal display. Refer to How to Scroll Through a Signal Display on page 25.
- You can return to the default view of the signals by using **Zoom to Default**.

Related topics

References

Fit to Screen 246
Hand Mode 247
Zoom Mode 263
Zoom to Default 264

How to Zoom into a Signal

Objective

You can zoom into a signal display to view a selected two-dimensional region of the plot in more detail.

Zooming stretches the signal display in x-direction and in y-direction simultaneously.

Preconditions

A signal description set containing at least one signal must be opened in the working area.

Method

To zoom into a signal

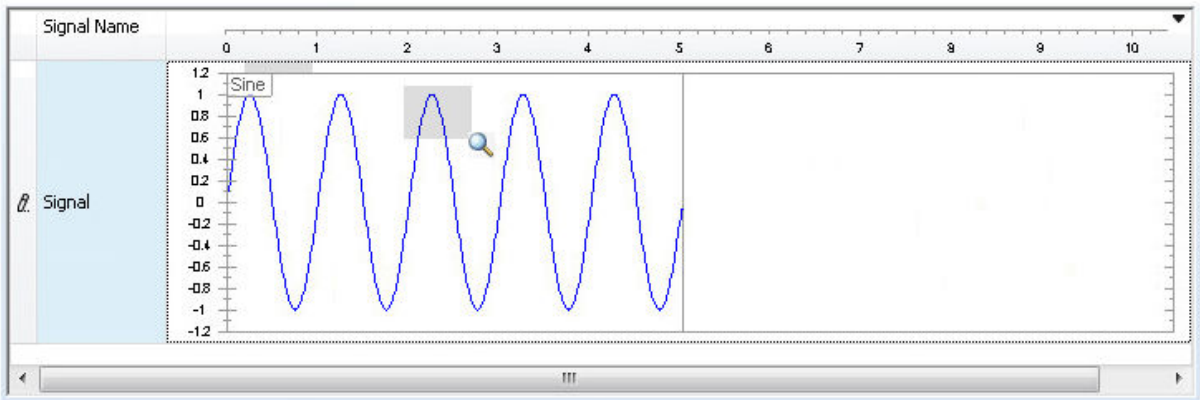
1. From the context menu of an element in the working area, select **Zoom Mode**.

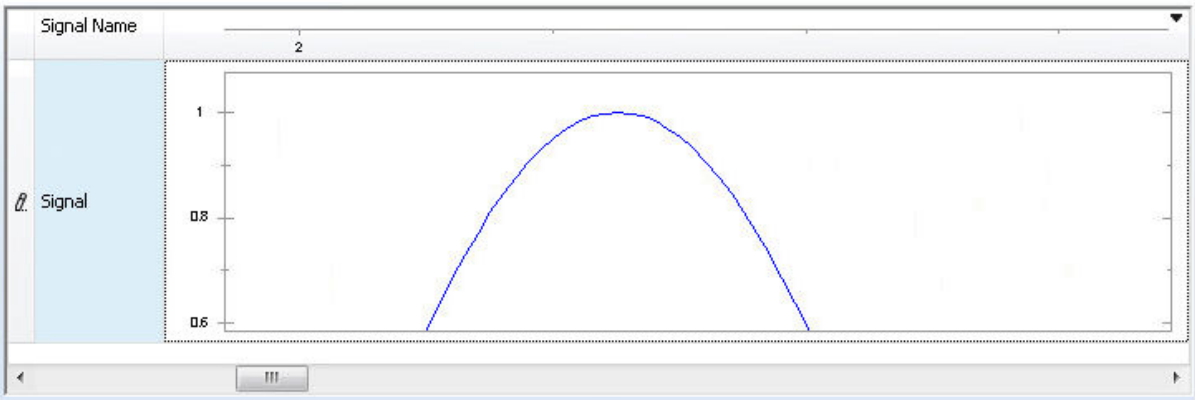
   The mouse pointer changes to a magnifier ( ) icon.
2. Click into the signal, hold down the left mouse button and drag the mouse pointer.

   A gray shaded 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 move the displayed range of a signal in the working area by scrolling through the signal display. Refer to How to Scroll Through a Signal Display on page 25.
- If the Signal Editor is in *Zoom Mode*, you can stretch or compress the x-axis stepwise by 5 percent by clicking on a signal.
- You can return to the default view of the signals by using **Zoom to Default**.

Related topics

References

Fit to Screen.....246
Hand Mode.....247
Zoom Mode.....263
Zoom to Default.....264

How to Scale Up or Scale Down a Signal Display

Objective

You can scale up or scale down a signal display.

Preconditions

A signal description set containing at least one signal must be opened in the working area.

Method

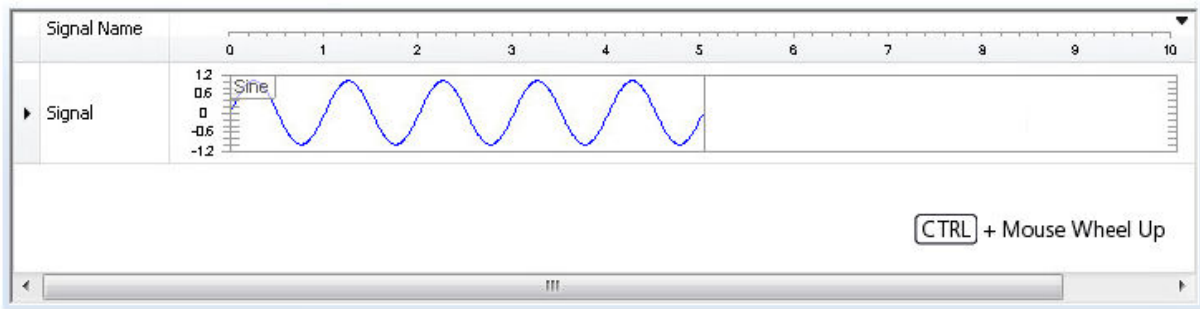
To scale up or scale down a signal display

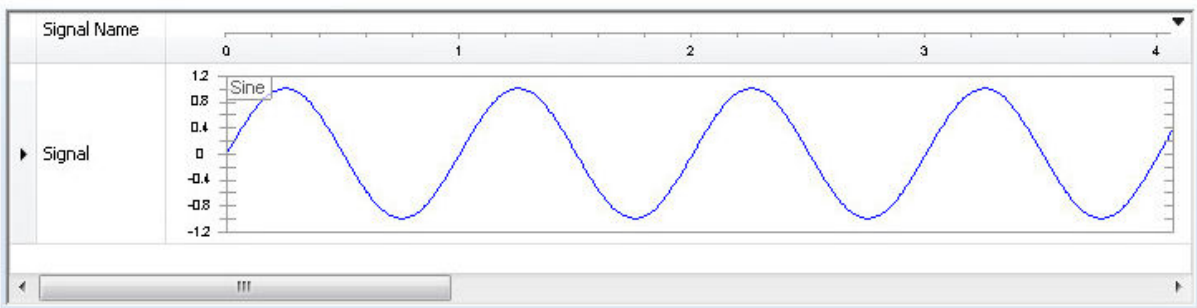
1. Move the mouse pointer to the working area (except to the horizontal scroll box).
2. Press `Ctrl` and scroll the mouse wheel up scale up the signal's display or down to scale it down.

Result

A stretched or compressed view of the signal is displayed.

The following illustration shows the magnifying of a sine signal's display.





Tip

- You can move the displayed range of a signal in the working area by scrolling through the signal display. Refer to How to Scroll Through a Signal Display on page 25.
- You can return to the default view of the signals by using Zoom to Default.

Related topics

References

Fit to Screen 246
Hand Mode 247
Zoom Mode 263
Zoom to Default 264

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

The Signal Editor requires RTT 1.7.1 or later installed on the host PC. When you install AutomationDesk, RTT is also included.

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. AutomationDesk uses the active RTT version.

You can use the dSPACE Installation Manager to:

- 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

Tip

You can install RTT 1.7.1 or later from the dSPACE Release DVD. For instructions, refer to How to Install dSPACE Software (Installing dSPACE Software).

DS1005, DS1006, MicroAutoBox II: required RTT versions

Note

The RTT version used for building the real-time application and the RTT version active on the host PC must be identical to use RTT in connection with AutomationDesk and one of the following dSPACE simulation platforms:

- DS1005
- DS1006
- MicroAutoBox II

SCALEXIO, MicroLabBox, MicroAutoBox III, DS1007, VEOS: required RTT versions

Note

The RTT version of the simulation platform and the RTT version active on the host PC must be identical to use RTT in connection with AutomationDesk and one of the following dSPACE simulation platforms:

- dSPACE real-time simulation platforms:
  - SCALEXIO
  - MicroLabBox
  - MicroAutoBox III
  - DS1007

  The RTT version of a real-time simulation platform depends on the platform's *firmware version*.
- VEOS

  The RTT version of VEOS depends on the *product version*.

The following table shows the mapping between the firmware/product version and the corresponding RTT version:

Host PC		Compatible Firmware Version				
dSPACE Release	**Real-Time Testing Version**	**SCALEXIO**	**MicroAutoBox III**	**DS1202 MicroLabBox**	**DS1007**	**VEOS**
RLS2021-A	5.0	5.1 5.0	5.1	2.16	3.16	5.2
RLS2020-B	4.4	5.0	5.0	2.14	3.14	5.1
RLS2020-A	4.3	4.6	4.6	2.12	3.12	5.0
RLS2019-B	4.2	4.5	4.5	2.10	3.10	4.5
RLS2019-A	4.1	4.4	–	2.8	3.8	4.4
RLS2018-B	4.0	4.3	–	2.6	3.6	4.3
RLS2018-A	3.4	4.2	–	2.4	3.4	4.2
RLS2017-B	3.3	4.1	–	2.2	3.2	4.1
RLS2017-A	3.2	4.0	–	2.0	3.0	4.0
RLS2016-B	3.1	3.5	–	1.7	2.6	3.7
RLS2016-A	3.0	3.4	–	1.5	2.4	3.6
RLS2015-B	2.6	3.3	–	1.3	2.2	3.5
RLS2015-A	2.5	3.2	–	–	2.0	3.4
RLS2014-B	2.4	3.1	–	–	–	3.3
RLS2014-A	2.3	3.0	–	–	–	3.2
RLS2013-B	2.2	2.3	–	–	–	3.1

Related topics

Basics

Basics on the Signal Editor.....22

Creating and Editing Signals

Introduction

You create a signal by dragging Signal Editor elements to a signal description set. Then you can configure the created signals and segments by editing their properties.

Where to go from here

Information in this section

Basics on Signals 36
You can specify a signal by the shape of its segments or by an operation of two other signals.

Basics on Segments..... 38
Segments are used to configure the shape of a segment signal.

Behavior of Consecutive Segments..... 40
Information on stimulated values at the transition between consecutive segments.

How to Create a Segment Signal..... 41
You can create a segment signal as a container for segments.

How to Configure a Segment Signal..... 43
You can configure a segment signal by adding segments to it.

How to Execute Segments or Signals Several Times..... 45
You can configure segments and signals to be executed several times.

How to Create and Configure an Operation Segment..... 48
You can perform arithmetic operations between segments.

How to Create and Configure a Data File Segment..... 49
You can use numerical signal data stored in MF4 files to specify signals.

How to Create and Configure a Signal Value Segment..... 52
You can use numerical signal data of MAT files to specify signals.

How to Use Parameters to Specify Signal Property Values..... 55
You can use parameters to specify related signal property values.

How to Create and Configure an Operation Signal..... 59
You can perform arithmetic operations between two signals.

How to Move or Copy Signals and Segments..... 63
In the working area, you can move or copy signals and segments.

Basics on Signals

Introduction

You can specify a signal by the shape of its segments or by an operation of two other signals.

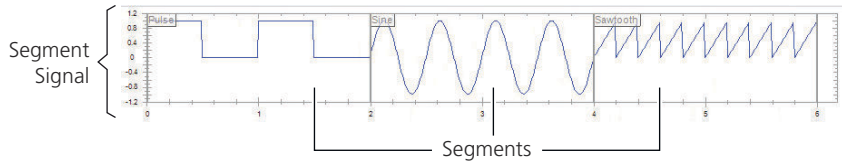
Signals

A signal specifies the change of a variable's value over time. You can use signals to stimulate variables, to store and replay measured variable values, and to specify references to evaluate measured signals.

AutomationDesk provides the following signal types:

Segment Signal You can specify a segment signal as a sequence of segments. You can define each segment either by a file that contains the variable's numerical values over time, or by the signal shape, such as a sine curve with specified properties such as amplitude and period. For more information, refer to Basics on Segments on page 38. For instructions, refer to How to Create a Segment Signal on page 41.

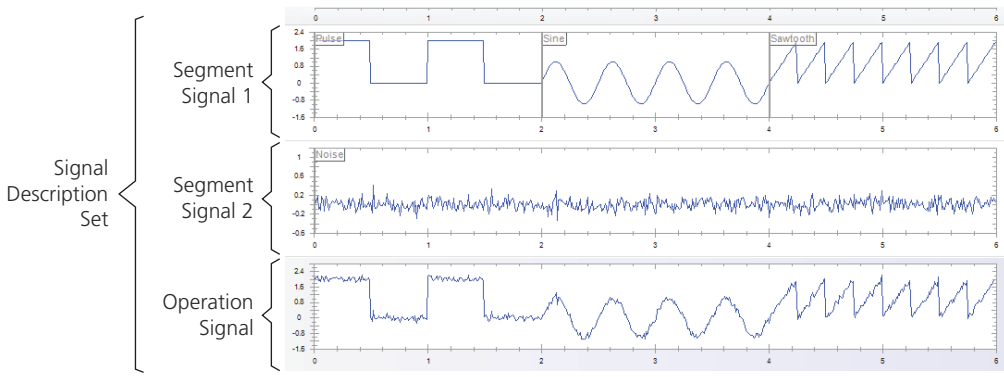
The example shows a segment signal that consists of three segments.



Operation Signal You can specify an operation signal as an addition or multiplication of two other signals. For instructions, refer to How to Create and Configure an Operation Signal on page 59.

If you do not want to affect an entire signal but only certain segments, you can use **Operation** segments. For instructions, refer to How to Create and Configure an Operation Segment on page 48.

The example shows the addition of two segment signals to a resulting operation signal.



To edit a signal by means of AutomationDesk's Signal Editor, you must place it in a signal description set.

Related topics

References

Operation Signal..... 112
Segment Signal..... 115
Signal Description Set..... 104

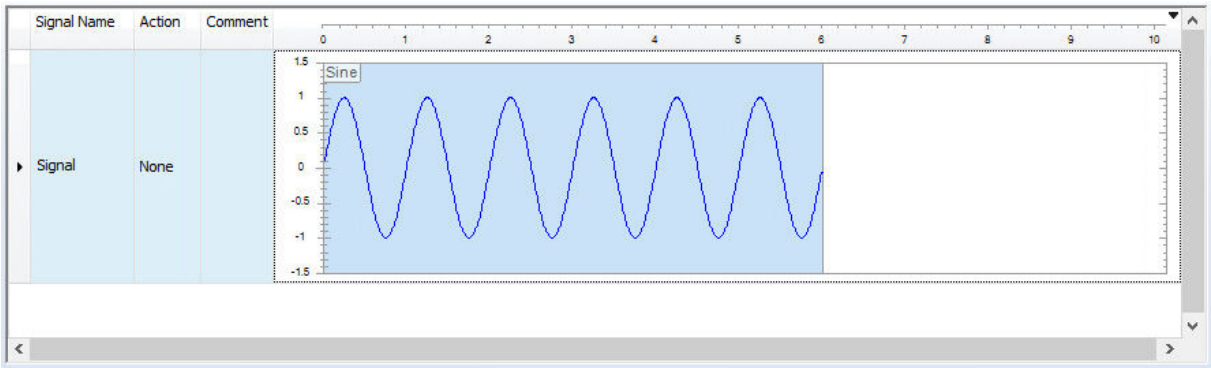
Basics on Segments

Introduction

One or more segments are used to configure the shape of a segment signal.

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 a segment signal by dragging segments from the **Signal Selector** to the signal's display in the working area. You can add as many segments to a segment signal as you want.

You can configure each segment via the **Properties** pane.

Segment types

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

Segments for synthetic signal shapes

Segment Type	Symbol	Description
Const		To specify a constant segment. For details, refer to Const on page 119.
Exponential		To specify an exponential segment. For details, refer to Exponential on page 125.
Idle		To specify an idle time without any signal value. For details, refer to Idle on page 128.
Noise		To specify a noisy segment. For details, refer to Noise on page 133.
Pulse		To specify a square-wave segment. For details, refer to Pulse on page 138.
Ramp		To specify a ramp-shaped segment via a start and a stop value. For details, refer to Ramp on page 141.
Ramp Slope		To specify a ramp-shaped segment via a slope. For details, refer to Ramp Slope on page 144.

Segment Type	Symbol	Description
Sawtooth		To specify a sawtooth segment. For details, refer to Sawtooth on page 147.
Sine		To specify a sine segment. For details, refer to Sine on page 153.

Segments for operations

Segment Type	Symbol	Description
Loop		To execute segments several times during simulation. For details, refer to Loop on page 130. For instructions, refer to How to Execute Segments or Signals Several Times on page 45.
Operation		To perform an arithmetic operation with two other segments. For details, refer to Operation on page 136. For instructions, refer to How to Create and Configure an Operation Segment on page 48. If you want to perform an arithmetic operation on an entire signal, you can use an operation signal. For instructions, refer to How to Create and Configure an Operation Signal on page 59.

Segments for numerical data

Segment Type	Symbol	Description
Data File		To specify a segment's content via a linked MF4 data file. For details, refer to Data File on page 122. For instructions, refer to How to Create and Configure a Data File Segment on page 49.
Signal Value		To specify a segment's content via the numerical signal data of a MAT file. For details, refer to Signal Value on page 151. For instructions, refer to How to Create and Configure a Signal Value Segment on page 52.

Related topics

Basics

Behavior of Consecutive Segments.....40

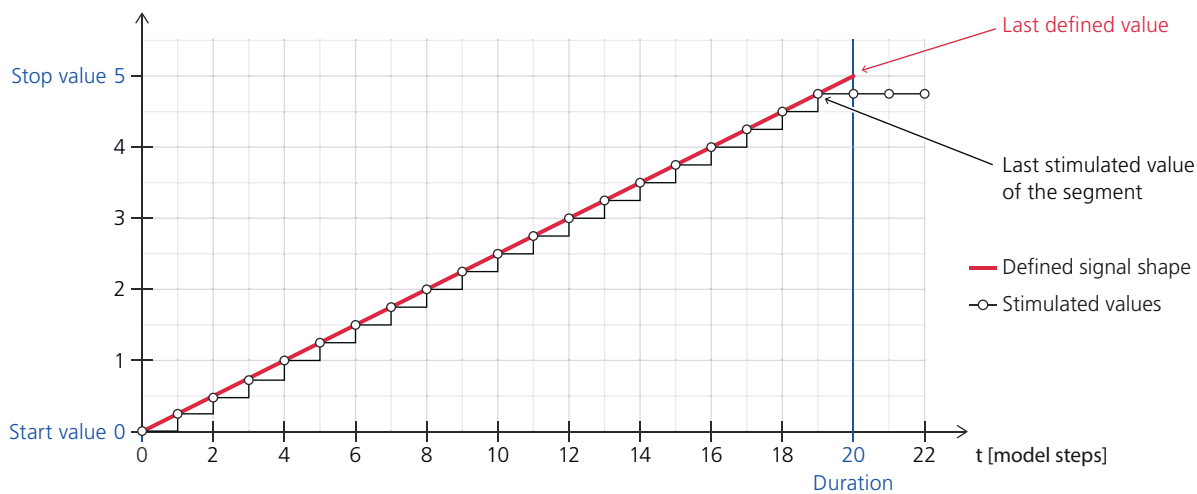
Behavior of Consecutive Segments

Basics

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. This results in the possibly unexpected behavior, which means the value that specifies the end of a **Ramp** or **Exponential** segment is not reached.

Example

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.



This is relevant, for example, if a trigger condition expects a stimulated value of `5`.

For this example, there are the following possible workarounds:

- 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 a **Ramp Slope** segment with a slightly increased slope to get a value of `5` with the last stimulated value of the segment.

Related topics

References

Const 119
Exponential 125
Ramp 141
Ramp Slope 144

How to Create 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.

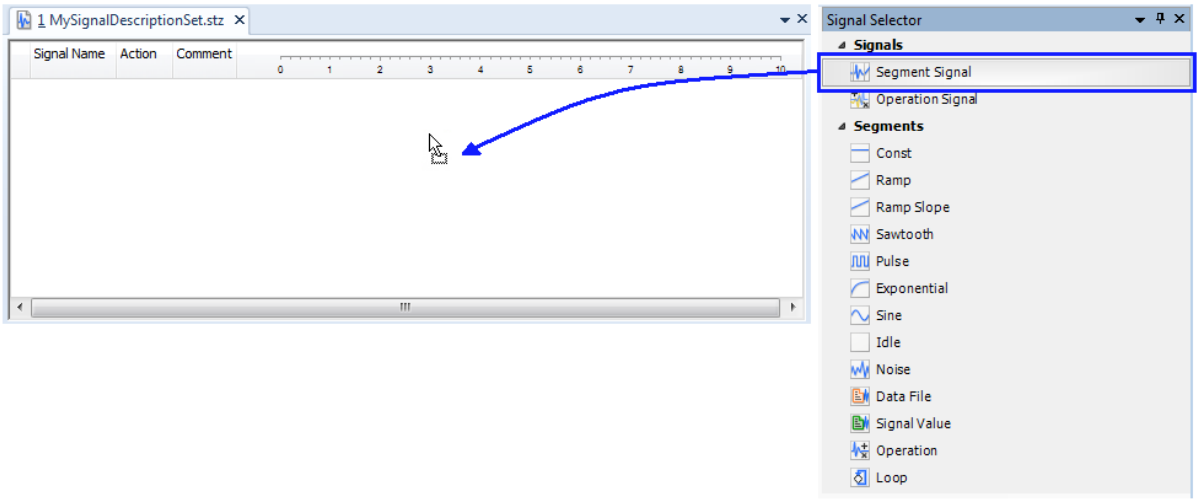
Preconditions

A signal description set must be opened in the working area. For details, refer to How to Create and Save a Signal Description Set on page 24.

Method

To create a segment signal

1 From the Signal Selector, drag a Segment Signal element to the signal description set that is opened in the working area.



A row with an empty segment signal is added to the signal list of the signal description set.

Tip

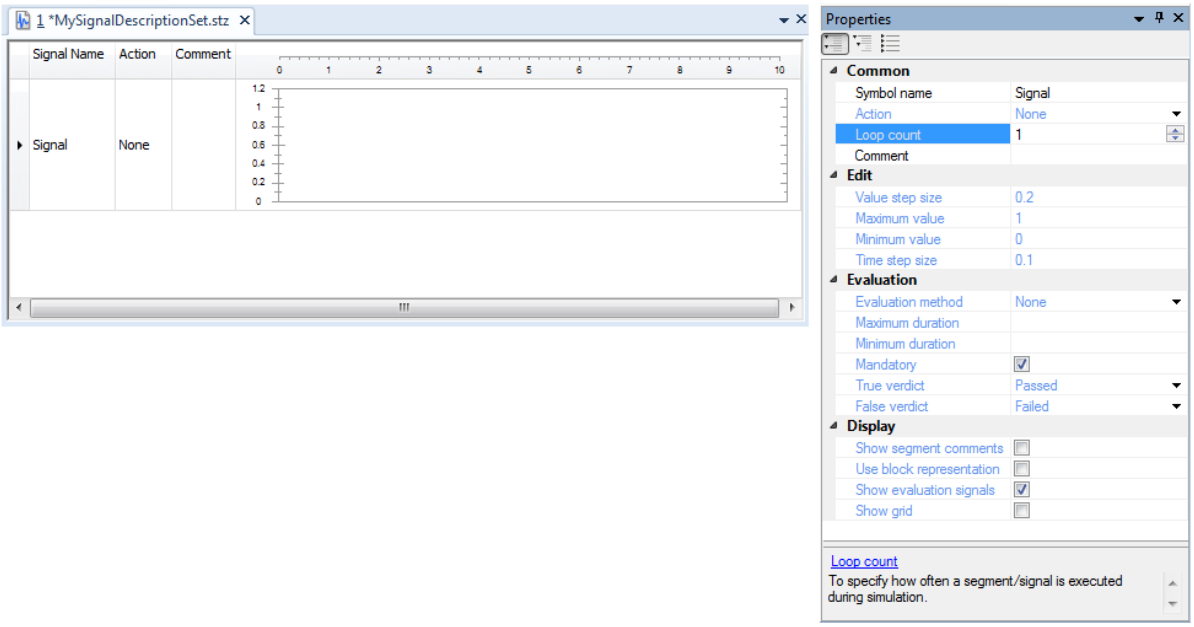
Alternatively, you can select a signal in the signal list, and then double-click Signals - Segment Signal in the Signal Selector. This adds an empty segment signal before the selected signal. If no signal is selected, the signal is appended to the list.

2 Specify the signal's properties in the Properties pane.

Properties that are inherited from the signal description set are displayed in light blue and turn to black when you change their values.

Result

You created an empty segment signal in the opened signal description set.



Tip

To create a signal that relates to a variable of a simulation application, you can drag the variable's mapping from the Mapping Viewer to the signal description set. This is useful to implement signal-based testing, for example. Refer to How to Configure Signals for a Signal-Based Test on page 69.

Next step

You can now add segments to the segment signal, refer to How to Configure a Segment Signal on page 43.

Related topics

Basics

Basics on Segments 38
Basics on Signal Description Sets 21

References

Properties 249
Segment Signal 115

How to Configure a Segment Signal

Objective

You can configure a segment signal by adding segments to it.

Basics

A **Segment Signal** is part of a signal description set. The signal's shape is configured by specifying a sequence of segments and their properties.

Preconditions

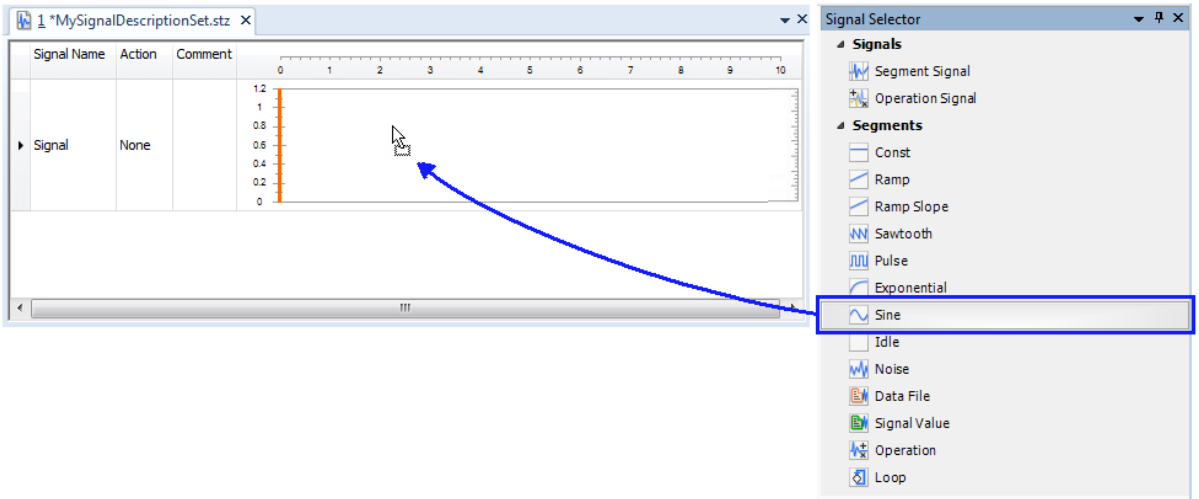
- A signal description set must be opened in the working area. For instructions, refer to How to Create and Save a Signal Description Set on page 24.
- The signal description set must contain a segment signal. For instructions, refer to How to Create a Segment Signal on page 41.

Method

To configure a segment signal

1 From the Signal Selector, drag a segment of the suitable type to the segment signal.

If you add the segment at the end of a signal, a red bar is shown at the right edge of the signal's display. If the signal already contains segments, the new segment is inserted before the segment that it is dropped on. While you are dragging the segment, the current insertion point of the segment is highlighted by a red bar.

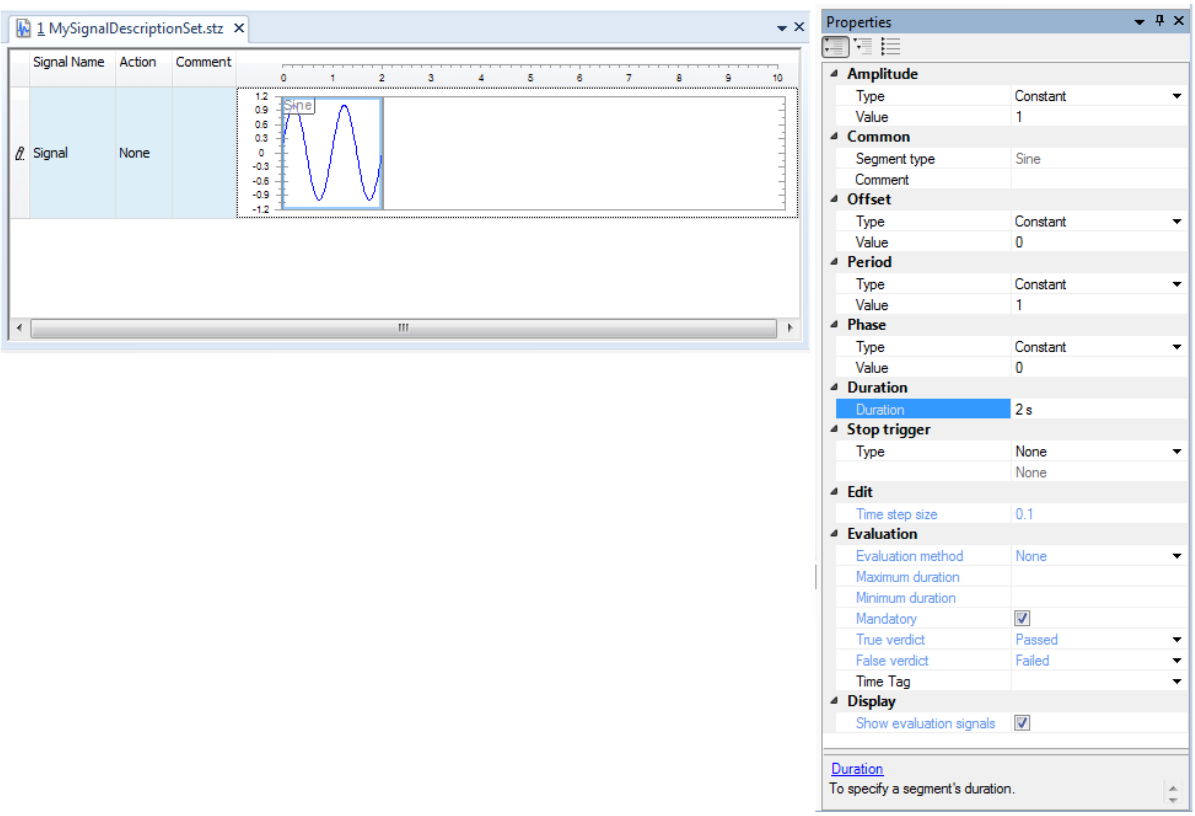


A segment of the selected type with default properties appears in the signal.

Tip

Alternatively, you can select a segment in the Signal Editor and, in the Signal Selector, double-click **Segments - <segment type>**. This adds a new segment before the previously selected segment to the signal. If you selected a signal before double-clicking, the new segment is appended to this signal.

2 Specify the segment's properties in the **Properties** pane.



3 Repeat the previous steps for every segment that is needed to specifies the signal's shape.

Result

You configured a segment signal.

This method is generic for all segment types. However, segments for operations and segments for numerical data need further treatment:

- For **Loop** segments, refer to How to Execute Segments or Signals Several Times on page 45.
- For **Operation** segments, refer to How to Create and Configure an Operation Segment on page 48.

- For **Data File** segments, refer to How to Create and Configure a Data File Segment on page 49.
- For **Signal Value** segments, refer to How to Create and Configure a Signal Value Segment on page 52.

Tip

You can specify segment-type-specific default values for the properties of newly created segments on the **Signal Editor** page of the **AutomationDesk Options** dialog. Refer to Signal Editor Page (AutomationDesk Basic Practices 🕮).

Related topics

Basics

Basics on Segments.....38
Basics on Signal Description Sets.....21

References

Properties.....249
Segment Signal.....115

How to Execute Segments or Signals Several Times

Objective

You can configure segments and segment signals to be executed several times during simulation.

Basics

To execute one or more segments several times, you can can group them by using a **Loop** segment.

You can also execute an entire segment signal more than once.

In both cases, you can specify the number of repetitions in the **Loop count** property.

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 and Save a Signal Description Set on page 24 and How to Create a Segment Signal on page 41.

Restrictions

- You cannot nest Loop segments.
- You cannot execute operation signals several times.

Possible methods

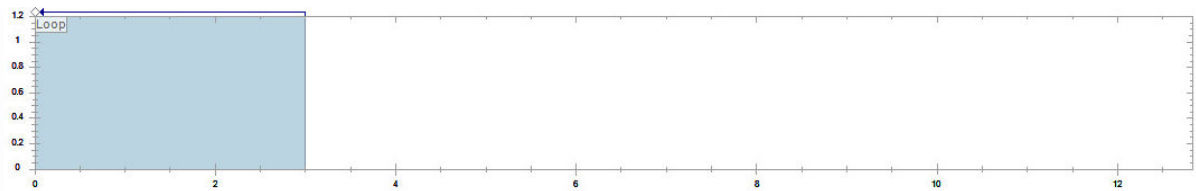
- To execute segments several times, refer to Method 1.
- To execute a signal several times, refer to Method 2.

Method 1

To execute segments several times

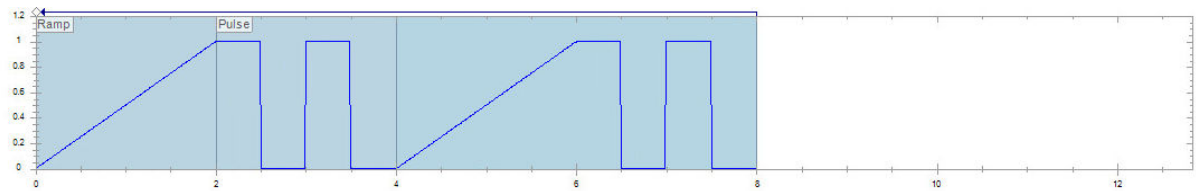
1 From the Signal Selector, drag a Loop segment to your segment signal in the working area.

An empty, blue shaded Loop segment is added to the signal's display.



2 From the Signal Selector, drag the segments to be repeated to the Loop segment. When you drag the segment, the current insertion point of the segment is highlighted by a red bar.

The genuine segments and their repetitions appear in the Loop segment. According to the loop count, the repeated segments appear unseparated after the genuine segments.



3 Click on the genuine segments and edit their properties in the Properties pane.

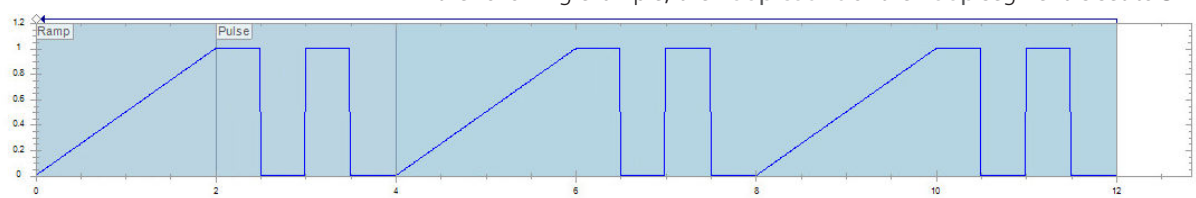
4 Click on the repeated segments.

The segment-specific properties of the Loop segment appear in the Properties pane.

5 Set the Loop count property to the value of how often you want to execute the Loop segment with all its contained segments.

The resulting contents of the Loop segment appear in the signal's display.

In the following example, the Loop count of the Loop segment is set to 3.



Method 2

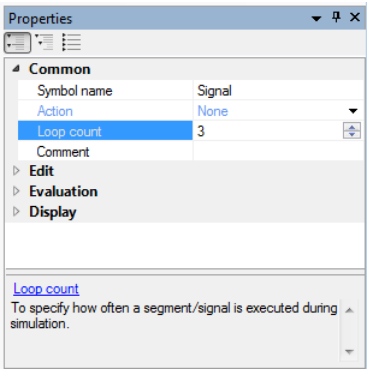
To execute a signal several times

1. In the working area, select the segment signal to be executed several times.

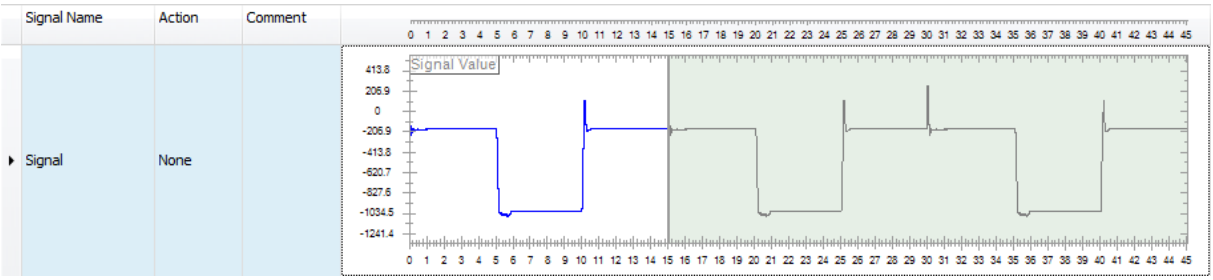
   The signal-specific properties appear in the Properties pane.

2. In the Properties pane, in the **Loop count** property specify the value of how often you want to execute the signal with all its contained segments.

   The resulting repeated segments appear in the signal's display. The repeated segments are shaded gray to distinguish them from the genuine segments.



In the example, the **Loop count** of the signal is set to 3.



Result

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

Related topics

Basics

Basics on Segments.....38
Basics on Signal Description Sets.....21

HowTos

How to Create a Segment Signal.....41

References

Loop.....130
Loop Count.....178

How to Create and Configure an Operation Segment

Objective

You can use *operation segments* to perform arithmetic operations between segments.

Basics

Via an **Operation** segment, you can combine two segments by addition or multiplication. For example, you can add a **Sine** segment to a **Ramp** segment.

The duration of the resulting **Operation** segment is determined by the shorter operand.

If you want to perform an arithmetic operation on an entire signal, you can use an operation signal. For instructions, refer to How to Create and Configure an Operation Signal on page 59.

Preconditions

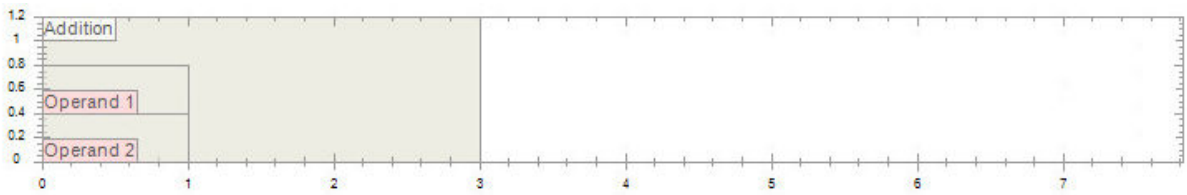
A signal description set containing at least one segment signal must be opened in the working area. For details, refer to How to Create and Save a Signal Description Set on page 24.

Method

To create and configure an operation segment

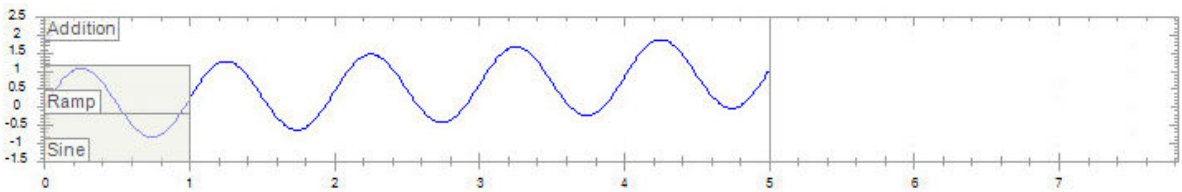
1. From the Signal Selector, drag an **Operation** segment to a segment signal.

   An empty, gray shaded **Operation** segment is added to the signal's display.



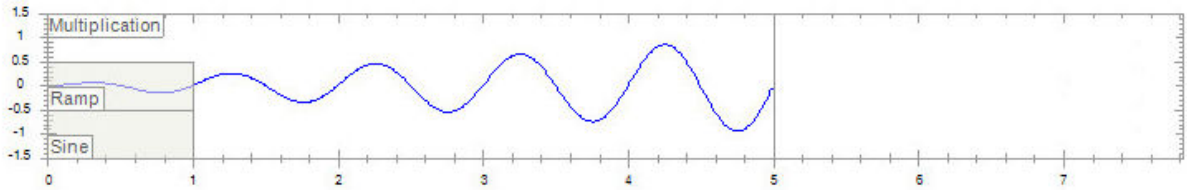
2. From the Signal Selector, drag the two segments to be combined by the operation to the fields **Operand 1** and **Operand 2**, respectively.

   For example, if you combine a **Ramp** segment and a **Sine** segment by an **Addition** operation, the following signal shape is displayed.



3. To change the arithmetic operation, select the **Operation** segment in the working area.
4. In the Properties pane, modify the **Operation (Property)** property, for example, from *Addition* to *Multiplication*.

The resulting signal shape is displayed.



Result

You created and configured an **Operation** segment.

Related topics

Basics

Basics on Segments.....38
Basics on Signal Description Sets.....21

HowTos

How to Create a Segment Signal.....41

References

Operation.....136
Operation (Property).....193
Operation Signal.....112
Ramp.....141
Sine.....153

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. It 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.

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 segments.

Precondition

A signal description set that contains at least one segment signal must be opened in the working area. For details, refer to Basics on Signal Description Sets on page 21 and How to Create a Segment Signal on page 41.

Restriction

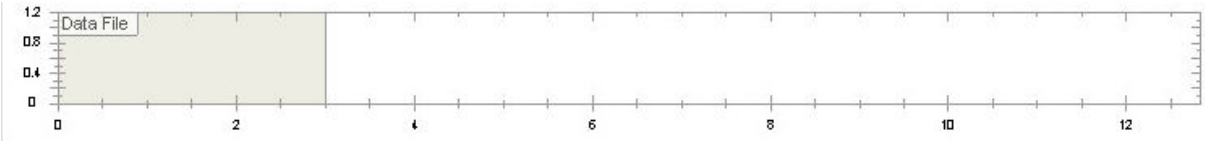
If you use the segment for stimulus control, the data of the segment is streamed from the host PC to the simulation platform. For DS1006-based modular systems, data streaming from the host PC via Ethernet is not recommended due to limited performance. The recommended connection between the host PC and a DS1006-based modular system is a bus connection.

Method

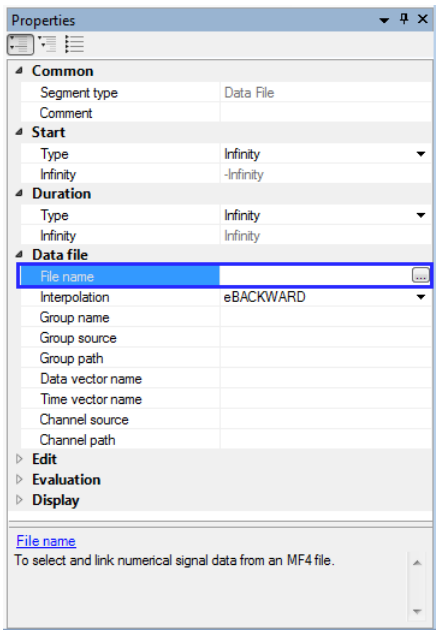
To create and configure a Data File segment

1 Drag a Data File segment from the Signal Selector to a segment signal in the working area.

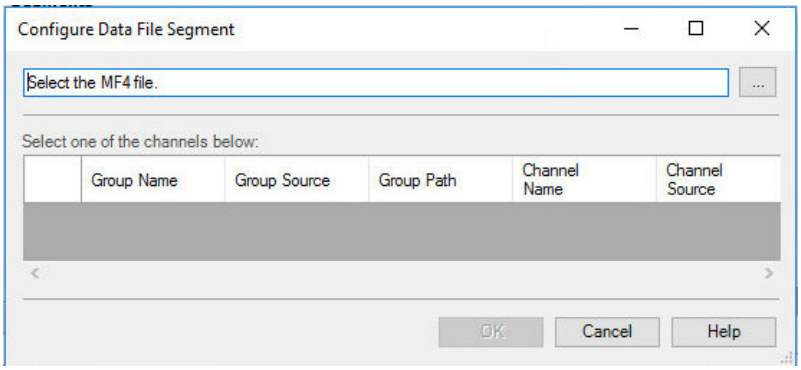
An empty Data File segment appears in the signal.



2 In the Properties pane, click the Browse button of the File name property.



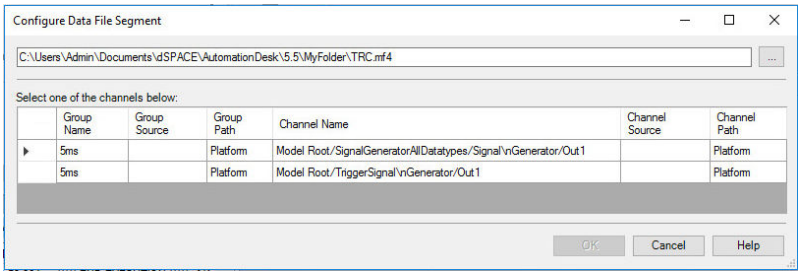
The **Configure Data File Segment** dialog opens.



3 Click the **Browse** button and navigate to the MF4 file you want to select.

4 Click **Open** to confirm your selection and to return to the **Configure Data File Segment** dialog.

The absolute path to the selected file and the channels that it contains are displayed in the dialog.



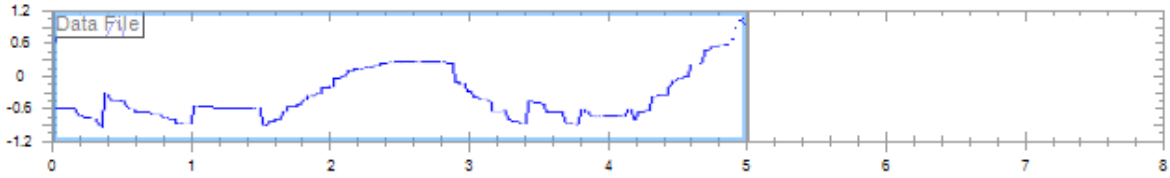
5 In the dialog, select a table row to specify the channel of the MF4 file to be used.

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.

Related topics

Basics

Basics on Segments.....38

HowTos

How to Create a Segment Signal.....41
How to Create and Configure a Signal Value Segment.....52

References

Data File.....122
File Name.....175

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

The imported numerical signal data is stored in a MAT file in parallel to the related signal description 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 and Save a Signal Description Set on page 24 and How to Create a Segment Signal on page 41.
- 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

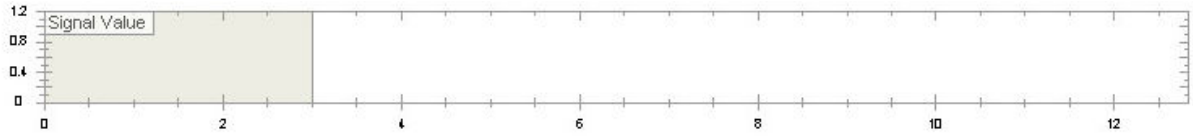
If you use the segment for stimulus control, the data of the segment is streamed from the host PC to the simulation platform. For DS1006-based modular systems, data streaming from the host PC via Ethernet is not recommended due to limited performance. The recommended connection between the host PC and a DS1006-based modular system is a bus connection.

Method

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

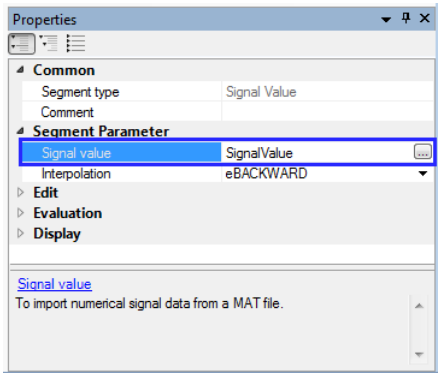
1 Drag a Signal Value segment from the Signal Selector to a segment signal in the working area.

An empty Signal Value segment appears in the signal.

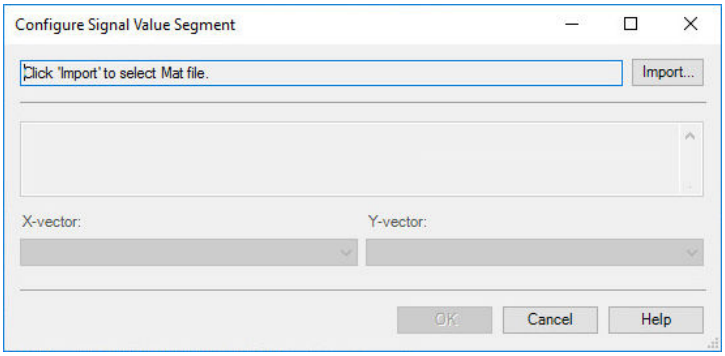


2 Open the Properties pane for this segment.

3 Click the Browse button of the Signal value property.



The Configure Signal Value Segment dialog opens.

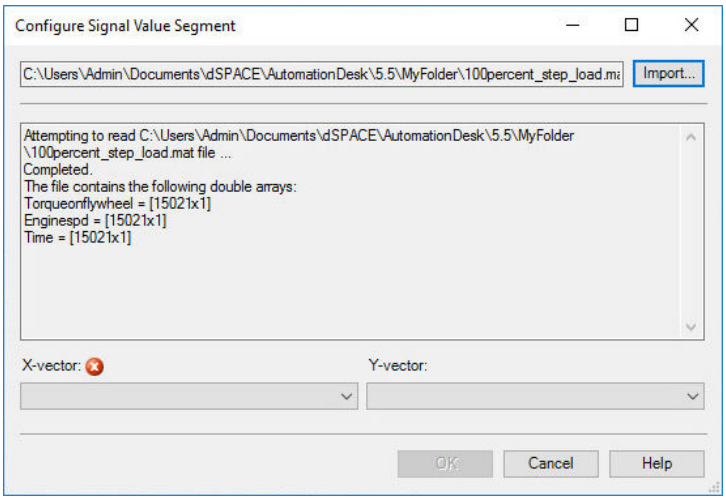


4 Click Import to open the Open dialog.

5 In the Open dialog, navigate to the MAT file you want to import.

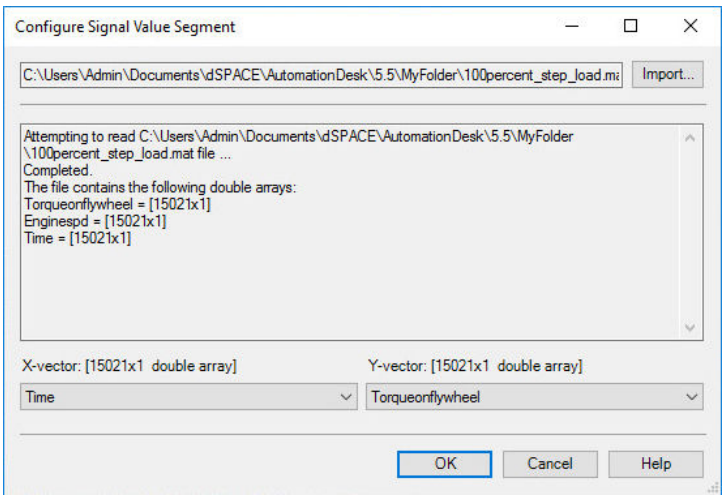
6 Click Open to confirm your selection and to return to the Configure Signal Value Segment dialog.

The absolute path to the selected file and a description of its contents are displayed in the dialog.



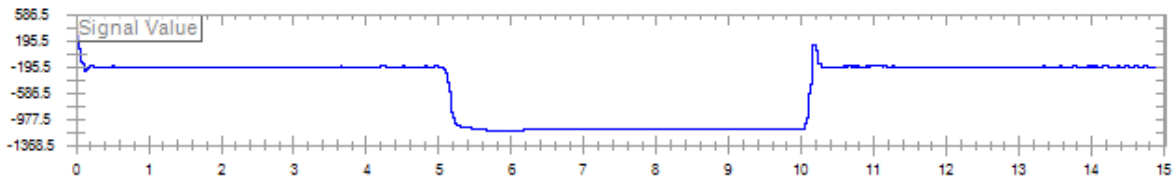
7 From the X-vector list, select the array name for the time axis.

8 From the Y-vector list, select the array name for the signal values.



9 Click OK to import the selected data and to close the dialog.

The Signal Value segment displays the imported numerical data.



Result

You created and configured a Signal Value segment.

Related topics

Basics

Basics on Segments.....38
Basics on Signal Description Sets.....21

HowTos

How to Create a Segment Signal.....41
How to Create and Configure a Data File Segment.....49

References

Signal Value.....151
Signal Value (Property).....214

How to Use Parameters to Specify Signal Property Values

Objective

You can define parameters that you can use to specify values centrally for related segment properties.

Basics

You can specify a list of parameters in the **Parameters** property of each signal description set. You can use these parameters later to specify property values of other segments. This way, you can centrally define constant values.

You can also specify property values in the ASAM General Expression Syntax (GES) and use mathematical operators and functions, such as `+` or `sin()`.

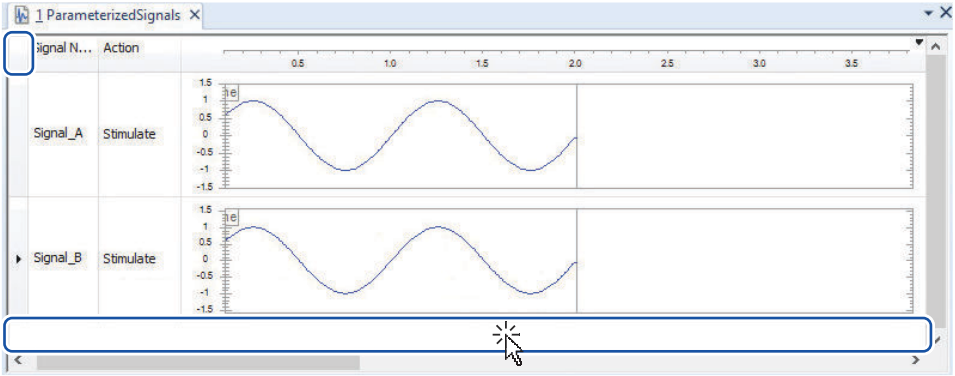
Preconditions

A signal description set containing the related signals and segments must be open in the working area. For more information, refer to How to Create and Save a Signal Description Set on page 24 and How to Create a Segment Signal on page 41.

Method

To use parameters to specify signal property values

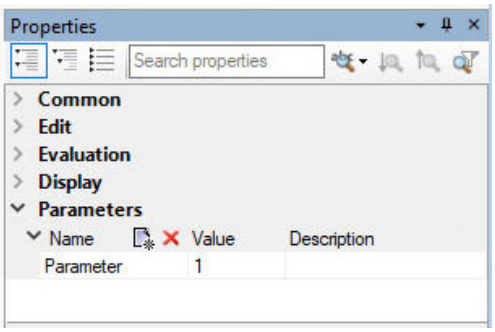
1. Open the Properties pane for the signal description set by clicking the empty, leftmost signal table header field or by clicking in the empty area in the signal table.



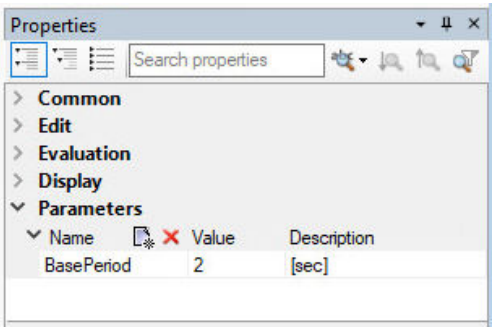
The signal description set's properties are displayed in the Properties pane.

2 In the Properties pane, expand the **Parameters** group and click .

A line with a default parameter is added to the parameter list.



3 In the list, edit the fields of the new parameter's name, value, and description.



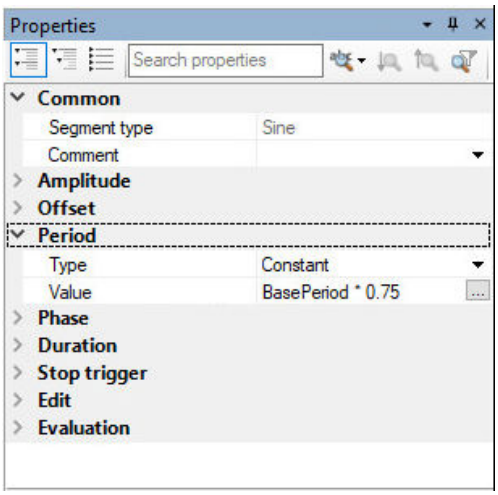
The parameter is now known in the signal description set and you can use it to specify values of other properties.

Perform the following steps to use a parameter to specify a value of a segment property.

4 In the signal display, select the segment that you want to parameterize.

The segment's properties are displayed in the Properties pane.

5 In the Properties pane, enter the name of the parameter or the ASAM GES value expression in the property's **Value** field.



Alternatively, click the Value field's **Browse** button to edit the expression using the Value Editor. It lets you insert the available parameters, functions, and operators by selection.

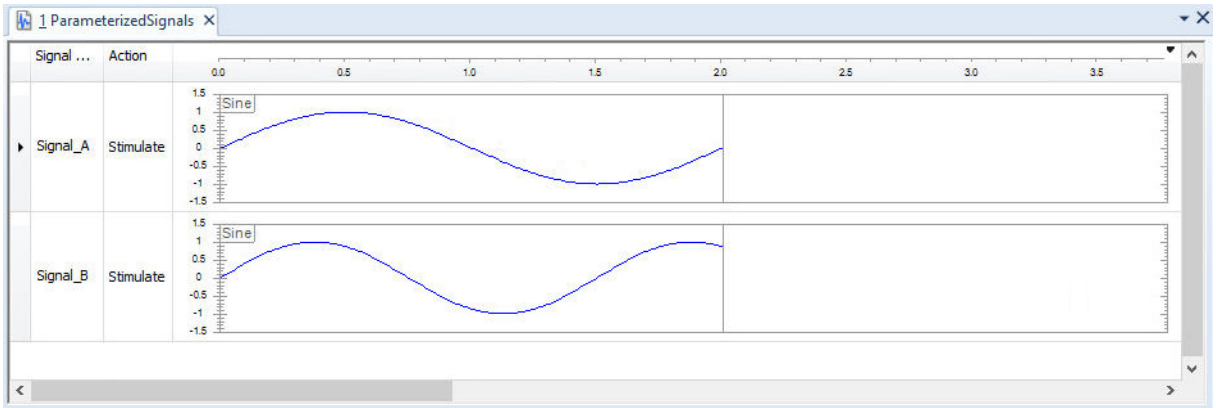
Result

You parameterized signal property values in a signal description set.

If you now modify the value of a parameter in the **Parameters** property, all properties in the signal description set that use this parameter are affected.

As an example, specify a `BasePeriod` parameter with the value of `2` in the signal description set's **Parameters** property. Then add two **Sine** segments to the description set. For one segment, specify `BasePeriod` as the segment's period value. For the other segment, specify `BasePeriod * 0.75`.

The specified periods are immediately applied in the signal display.



If you now change the value for the `BasePeriod` parameter, both segments are affected and the relation between the periods will stay constant.

Tip

You can automate the modification of a parameter's value by using the XIL API.

As a prerequisite, the MAPort and the signal generator must be initialized, for example, via an **InitMAPort** block and an **InitializeSignalGenerator** block with the related signal description contained in an STZ file.

Then you can modify the parameter value in an **Exec** block that contains the following code fragments:

- To read the parameter with the name specified in `ParameterName`:

```
ParameterBaseValue =
_AD_.SignalGenerator.GetParameterValue(_AD_.ParameterName)
```

- To determine the next parameter value, for example, by increasing the current value by `1`:

```
ParameterBaseValue.Value = ParameterBaseValue.Value + 1.0
```

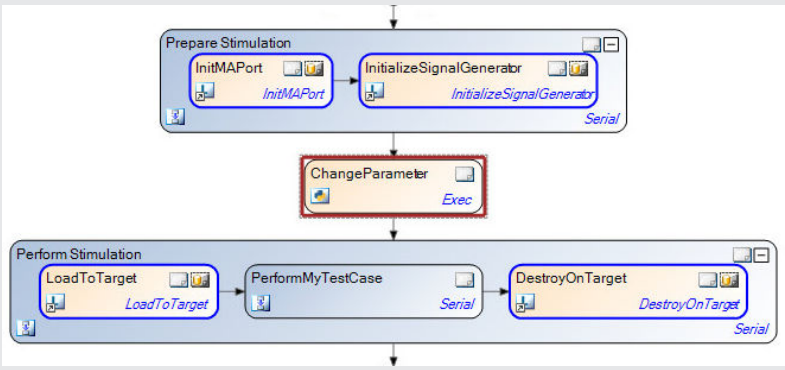
- To set the new value of the parameter:

```
_AD_.SignalGenerator.SetParameterValue(_AD_.ParameterName,
ParameterBaseValue)
```

After that, the new stimulus must be downloaded to the platform and signal generation must be started, for example, via a **LoadToTarget** block and a **StartSignalGenerator** block.

Finally, signal generation must be removed from the target platform, for example, via a **DestroyOnTarget** block.

The following illustration shows an overview of the required sequence:



For more information, refer to How to Stimulate Simulator Variables (AutomationDesk Accessing Simulation Platforms 🕮).

Related topics

Basics

Basics on Signal Description Sets.....21

HowTos

How to Create and Save a Signal Description Set.....24

References

InitializeSignalGenerator (AutomationDesk Accessing Simulation Platforms 🕮)
InitMAPort (AutomationDesk Accessing Simulation Platforms 🕮)
LoadToTarget (AutomationDesk Accessing Simulation Platforms 🕮)
StartSignalGenerator (AutomationDesk Accessing Simulation Platforms 🕮)

How to Create and Configure an Operation Signal

Objective

You can use operation signals to perform arithmetic operations between signals.

Basics

You can add or multiply signals by means of an operation signal. The operation signal displays the result of the arithmetic 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.

If you do not want to affect an entire signal, but only certain segments, you can use **Operation** segments. For instructions, refer to How to Create and Configure an Operation Segment on page 48.

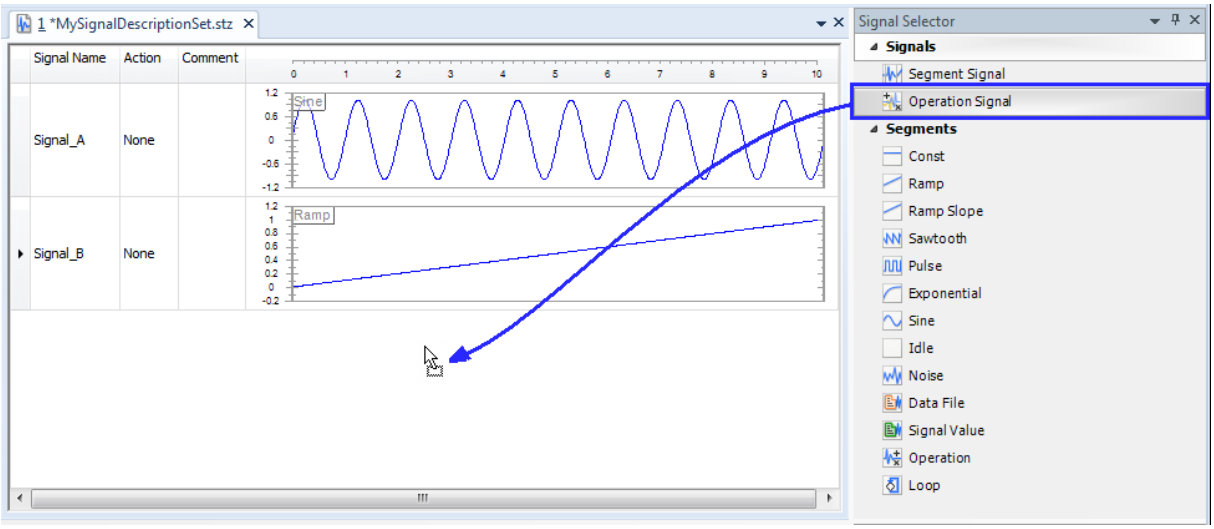
Preconditions

A signal description set containing at least one signal must be opened in the working area. For details, refer to How to Create and Save a Signal Description Set on page 24 and How to Create a Segment Signal on page 41.

Method

To create and configure an operation signal

1 Drag an Operation Signal from the Signal Selector to the signal description set that is opened in the working area.

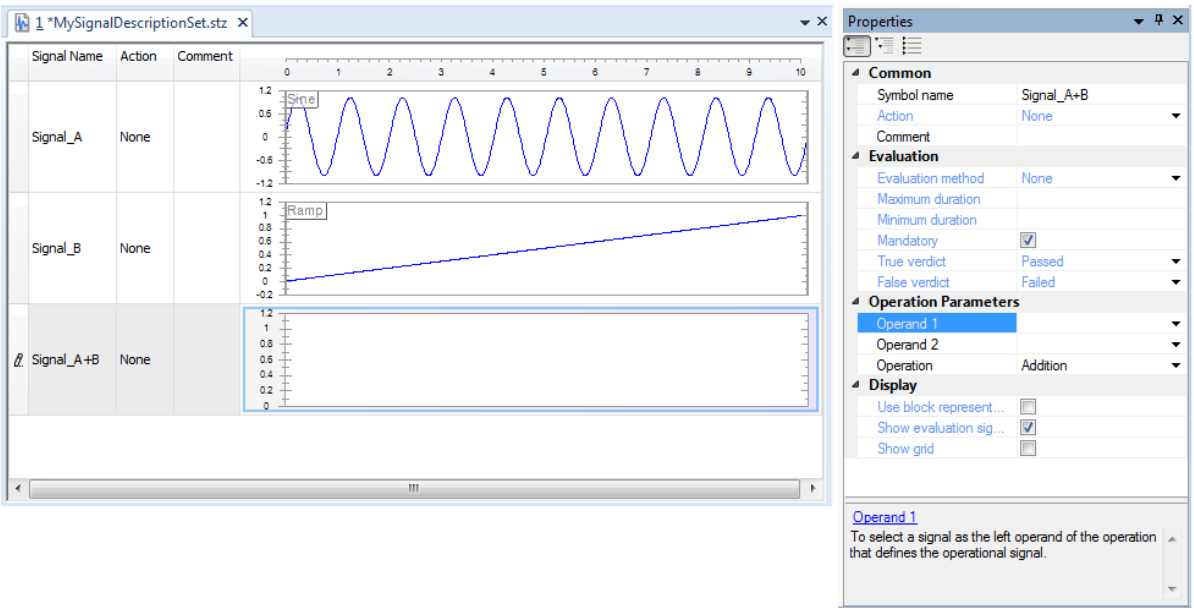


An empty operation signal appears in the signal description set.

Tip

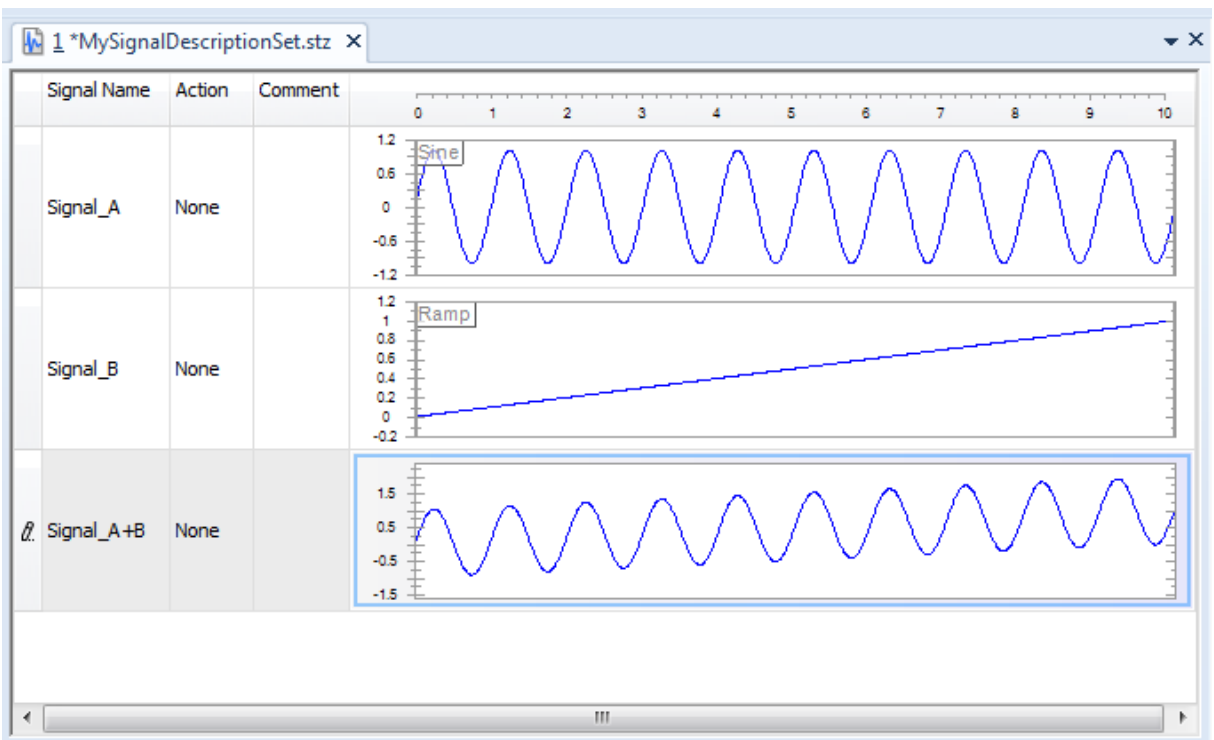
Alternatively, you can select a signal in the signal list, and then double-click Signals - Operation Signal in the Signal Selector. This adds an empty operation signal before the selected signal. If no signal is selected, the signal is appended to the list.

2 In the Property pane, select a signal for the **Operand 1** property.



3 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.

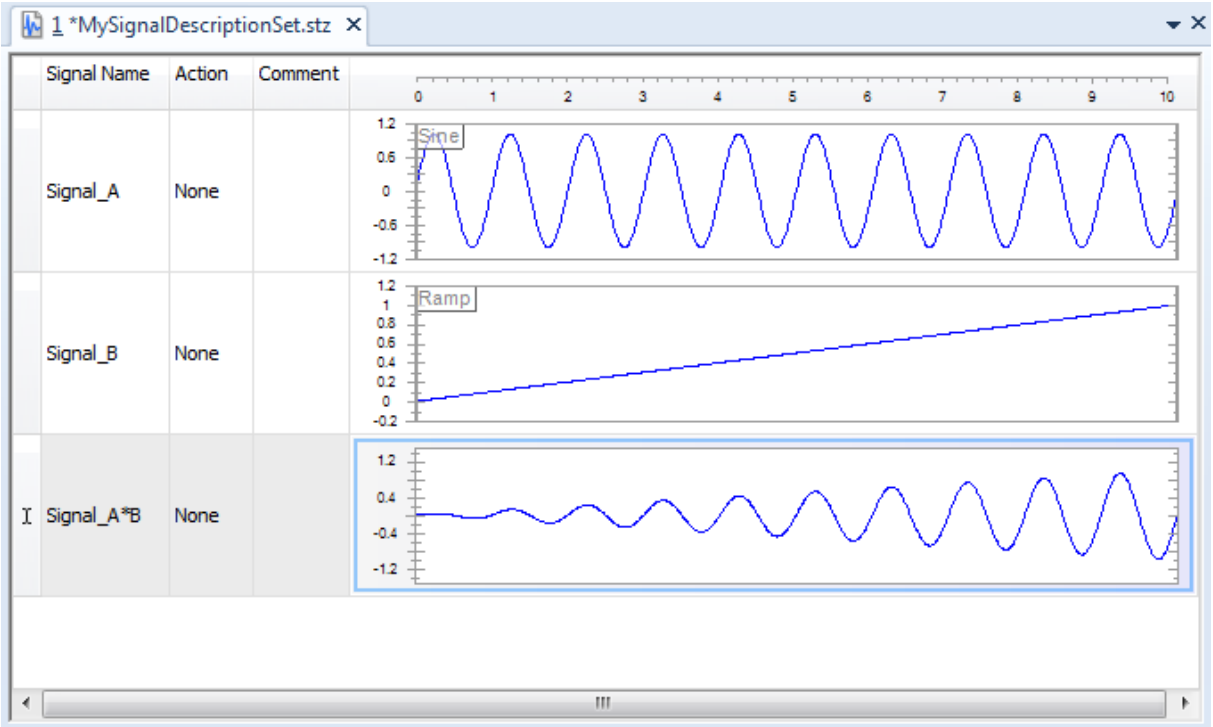


4 To change the operation, modify the **Operation** property in the Properties pane, for example, from *Addition* to *Multiplication*.

Result

You created and configured an **Operation Signal**.

In the following example, the **Operation Signal** is specified as the multiplication of a sine signal and a ramp signal.



Tip

You can also use an operation signal as an operand in another operation signal.

Related topics

Basics

Basics on Signal Description Sets 21

HowTos

How to Create and Save a Signal Description Set 24

References

Operand 1 191
Operand 2 192
Operation 136

Operation (Property) 193
Operation Signal 112

How to Move or Copy Signals and Segments

Objective

In the Signal Editor's working area, you can move or copy signals and segments.

Basics

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

Alternatively, you can use drag & drop. This also works across different signal description sets.

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

Preconditions

- The involved signal description sets must be opened in the working area.
- If a segment is to be moved or copied, the target segment signal must exist and be displayed in full height.

Possible methods

- You can move or copy signals and segments within a signal description set. Refer to Method 1.
- You can move or copy signals and segments across different signal description sets. Refer to Method 2.

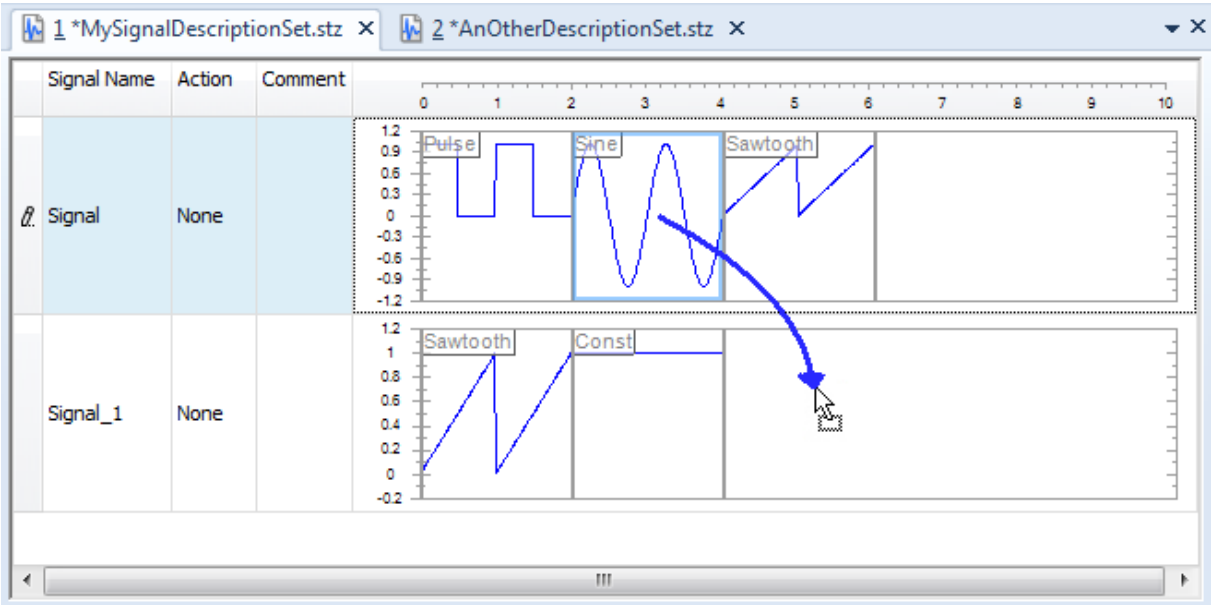
Method 1

To move or copy segments within a signal description set

1. In the working area, select the segments to be moved.
2. Drag your selection to the target location.

   If you add the segment at the end of a signal, a red bar is shown at the right edge of the signal's display. If the signal already contains segments, the new segment is inserted before the segment that it is dropped on. While you are dragging the segment, the current insertion point of the segment is highlighted by a red bar.

To copy via drag & drop, also press the **`Ctrl`** key while dropping the signal or segment.



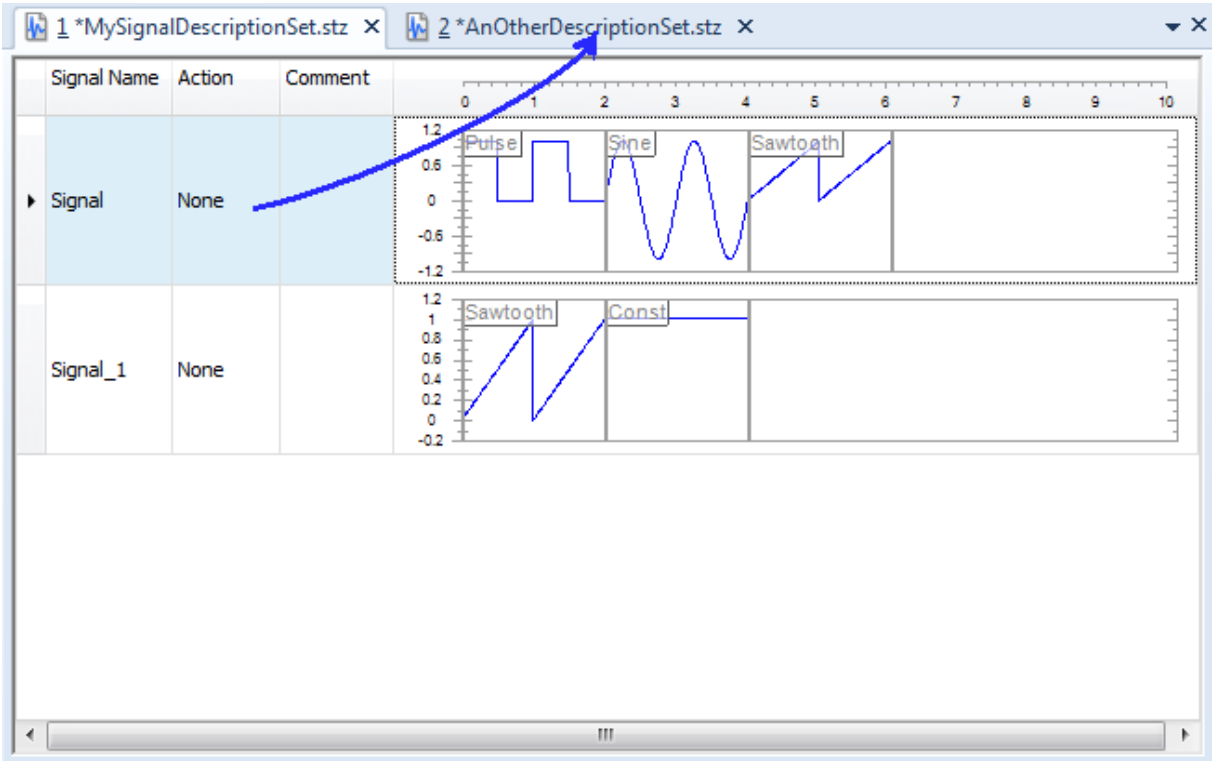
After you released the mouse button the changed signal shape is displayed.

Method 2

To move or copy signals across signal description sets

1 In the working area, select the signals to be moved. The selected signals are marked by a frame.

2 Drag your selection to the tab of the target signal description set and hold the mouse button down.



The displayed signal description set changes to the target signal description set.

3 Drag your selection to the target location.

To copy via drag & drop, also press the `Ctrl` key while dropping the signal or segment.

After you released the mouse button the changed signal description set is displayed.

Result

You moved or copied the selected signals and segments.

Related topics

Basics

Basics on Segments 38
Basics on Signal Description Sets 21
Basics on Signals 36
Basics on the Signal Editor 22

Implementing Signal-Based Tests

Introduction

The **Signal-Based Testing** library lets you implement tests according to the signal-based testing strategy.

The variable stimulation as well as the data capturing and the result evaluation for these tests are configured completely via the description of the involved signals.

Where to go from here

Information in this section

How to Configure Variable Access for a Signal-Based Test 66
Instructions on configuring variable access via the Variables pane.

How to Configure Signals for a Signal-Based Test 69
Instructions on configuring signal descriptions and test criteria via the Signal Editor.

How to Run the Signal-Based Test 72
Instructions on running the test and inspecting its results

How to Use Time Tags 75
Instructions on using time tags to define the end of a segment.

How to Parameterize a Test Case 77
Instructions on parameterizing a test case.

How to Configure Variable Access for a Signal-Based Test

Objective

Via the Mapping Viewer, you can specify the project's **Mapping** data object to hold the variable mapping that you can use later to configure a signal-based test.

This is done in the same way as with the automation blocks of the **XIL API Convenience** library. For details, refer to XIL API Convenience (Model Access) (AutomationDesk Accessing Simulation Platforms).

Preconditions

Required as input data:

- The path and name of the variable description file (SDF)
- The platform-dependent name of the task that is to perform the capturing

Method

To configure variable access for a signal-based test

1. In the Project Manager, add the following data objects to your project to parameterize the input data:
   - An MAPortConfiguration data object to hold the specification of the platform and the simulation application to be accessed.
   - An XIL API Mapping data object to hold the specification of the variables to be stimulated or captured.
2. Via the Variables pane, specify the platform and simulation application that perform the test in the MAPortConfiguration data object.
3. In the Variables pane, browse through the variable tree and drag the variables to be used during the test to the Mapping Viewer. This adds a line to the mapping table that relates the variable's alias in the Alias column to the model path in the Identifier column.
4. Drag a TestCase sequence template from the Signal-Based Testing library to your project. This instantiates the sequence that performs the test.
5. Specify the sequence's MAPortConfiguration data object as a reference to the related project-specific data object.
6. Specify the VariablePool data object of the sequence as a reference to the project-specific Mapping data object.
7. Specify the TaskName String data object to the platform-dependent name of the task that performs the capturing.

Result

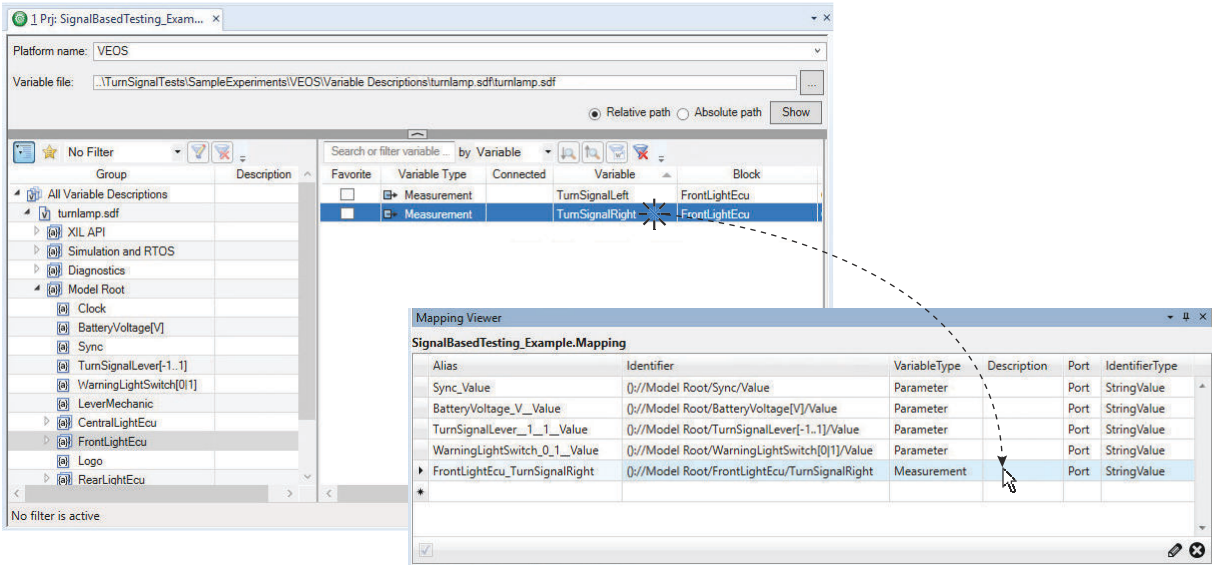
You have added a sequence that performs a signal-based test to your project and configured its variable access.

Example In the following, access to AutomationDesk's turn signal demo application is shown:

- On the Home ribbon, click View Sets - Sequences view set to activate the panes suitable to edit sequences.
- In the Project Manager, add the MAPortConfiguration and the Mapping data objects to your project.
- Double-click the MAPortConfiguration data object to open the Variables pane.
- In the Variables pane, enter the Platform name and the Variable file to specify the platform and simulation application that perform the test.
- In the Project Manager, double-click the Mapping data object to open it in the Mapping Viewer.
- In the Variables pane, browse through the variable tree and drag the variables to be used during the test to the Mapping Viewer.

  For the turn signal example, add the following variables to the mapping table:
  - The synchronization variable
  - The battery voltage
  - The turn-signal lever

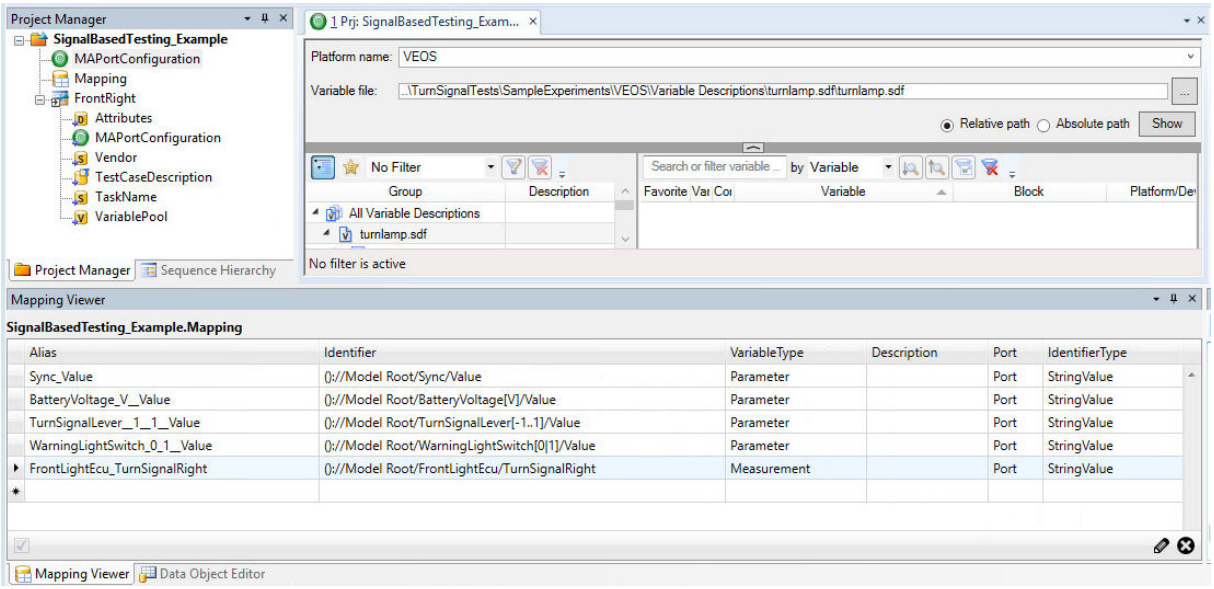
- The warning light switch
- The front right turn-signal light



The contents of the variable pool are displayed in the Mapping Viewer.

- Drag a **TestCase** sequence template from the **Signal-Based Testing** library to your project.
- Rename the TestCase data object to **`FrontRight`**.
- Specify the sequence's **MAPortConfiguration** data object as a reference to the related project-specific data objects.
- Specify the **VariablePool** data object of the sequence as a reference to the project-specific **Mapping** data object.
- Specify the **TaskName** String data object to the platform-dependent name of the task that performs the capturing.

The picture below shows the project and the configured variables in the Mapping data object.



Next steps

You can now configure the signals you want to use in your signal-based test. For instructions, refer to How to Configure Signals for a Signal-Based Test on page 69.

Related topics

References

Signal Editor..... 103
XIL API Convenience (Model Access) (AutomationDesk Accessing Simulation Platforms 🕮)

How to Configure Signals for a Signal-Based Test

Objective

Via the AutomationDesk's Signal Editor, you can specify the descriptions of signals to stimulate and capture model variables. Additionally, you can specify evaluation criteria for testing. You can save both in an sTZ file that you can use later to configure a signal-based test.

For details on signals for signal-based testing, refer to TestCaseDescription (Data Object) on page 80.

For details on the Signal Editor and the structure and properties of signals, refer to Signal Editor on page 103.

Preconditions

- You have configured the variable access in a Mapping data object. For instructions, refer to How to Configure Variable Access for a Signal-Based Test on page 66.

Method

To configure the signals used for a signal-based test

1. Double-click the TestCaseDescription data object of the FrontRight sequence in your project and specify name and path for the STZ file that is to hold the signal descriptions for this test.

   The STZ file is opened in the working area.

2. In the Mapping Viewer, multiselect the contents of the variable pool and drag them to the opened STZ file.

   This automatically adds signals to your test case description that are named as the aliases with the related model access paths. This relates the signals to their variable access. The Action property of the signals is set depending on the variable type.

   If you drag a variable mapping to an existing signal, the signal is overwritten. If you want to insert a new signal to the signal list, press `Ctrl` while dragging the variable mapping. The insertion point is indicated by a red line.

3. In the Signal Editor, set the Action property of the signal that is used for test synchronization to Sync and edit its signal shape.

   To edit the signal shapes, drag Const segments from the Signal Selector to the Signal Editor and specify their Properties in the Properties pane.

   For the duration of the test, the synchronization signal must consist of Const segments not equal to zero and must not have zero crossings.

4. Make sure that the Action property of the signals that are used for stimulation is set to Stimulate and edit their signal shapes.

5. Add the signals that you want to use as a reference for evaluations to the signal description set.

   You can do this by copying an existing signal or by dragging a Segment Signal from the Signal Selector to the Signal Editor.

6. Set the Action property of the signals that are used as references to None and edit their signal shapes.

7. Make sure that the Action property of the signals that are to be captured is set to Capture. Because the shapes of these signals are determined during the simulation, do not specify a segment for these signals.

8. In the Properties pane, specify the evaluation criteria for the test, for example, in the Evaluation Method property of a signal.

9. On the Home ribbon, click Edit - Save Signal Set to save the entire signal description set in the specified STZ file.

Result

You configured all signals that are necessary to execute the standard test scenario that is provided by the TestCase sequence of the Signal-Based Testing library.

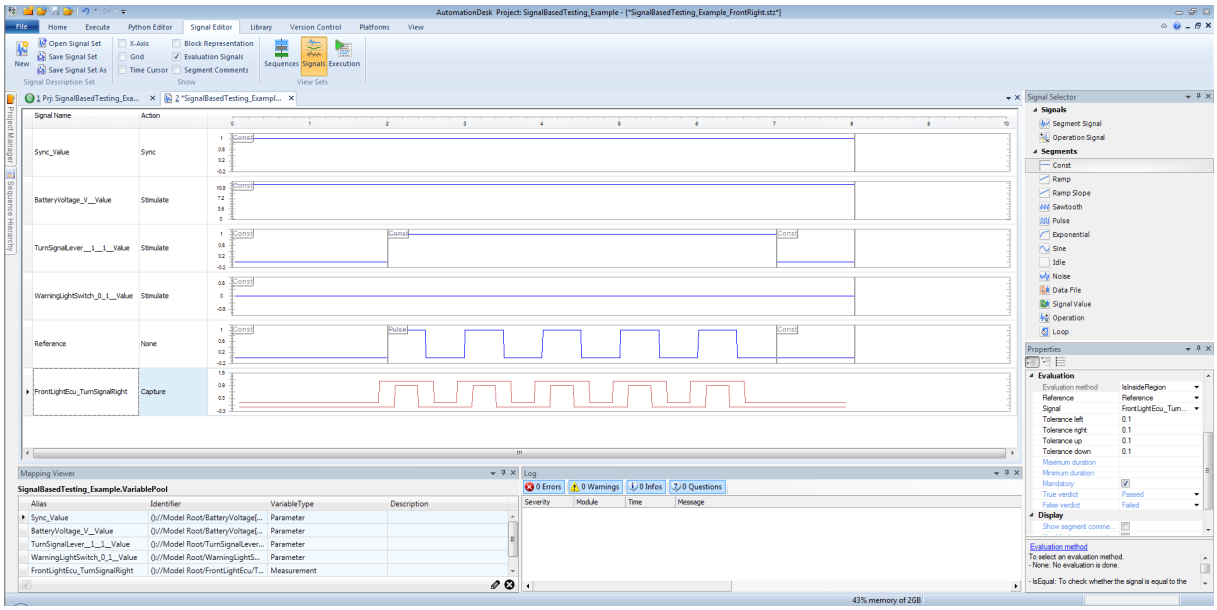
Example In the following, the right turn signal is switched on for 5 seconds and the signal for the right front lamp is evaluated:

- Double-click the TestCaseDescription data object of the FrontRight sequence in your project and specify name and path for the STZ file that is to hold the signal descriptions for this test. The STZ file is opened in the working area.
- In the Mapping Viewer, multiselect the contents of the variable pool and drag it to the Signal Editor.
- Switch to the Signal Editor ribbon tab and the Signals view set to activate the panes suitable to configure signals.
- To specify the synchronization signal:
  - Set the Action property of the Sync_Value signal to Sync.
  - From the Signal Selector, drag a Const segment to the Sync_Value signal and parameterize it in the Properties pane with a Duration of **8** seconds and a Value of **1**.
- To specify the stimulation signals:
  - Make sure that the Action property of the BatteryVoltage_V__Value, the WarningLightSwitch_0_1__Value and the TurnSignalLever_1_1__Value signal is set to Stimulate.
  - Drag a Const segment to the BatteryVoltage_V__Value signal and parameterize it with a Duration of **8** seconds and a Value of **12** volt.
  - Drag a Const segment to the WarningLightSwitch_0_1__Value signal and parameterize it with a Duration of **8** seconds and a Value of **0**.
  - Drag three Const segments to the TurnSignalLever_1_1__Value signal and parameterize them in the following way:

Segment	Duration	Value - Type	Value - Value
1	2	Constant	0
2	5	Constant	1
3	1	Constant	0

- To specify the reference signal:
  - Select the line of the TurnSignalLever_1_1__Value signal in the Signal Editor and copy & paste it to duplicate the signal description. Rename the new signal to **ReferenceFrontRight** and set the Action property to None.
  - In the context menu of the second segment of the Reference signal, select Convert Segment - Pulse to get the expected shape of the signal for the right front turn signal lamp.
- To specify the captured signal and its evaluation criterion:
  - For the turn signal example, make sure that the Action property of the FrontLightEcu_TurnSignalRight signal is set to Capture.
  - Select the line of the FrontLightEcu_TurnSignalRight signal and in the Properties pane set Evaluation method to **IsInsideRegion** and the Reference property to **ReferenceFrontRight**. This specifies the evaluation criterion for the test.
- Save all signals in the STZ file.

The picture below shows the configured signal description set in the Signal Editor.



Next steps

You can now run your signal-based test. For instructions, refer to How to Run the Signal-Based Test on page 72.

Related topics

References

Evaluation Methods (AutomationDesk Basic Practices 🕮)

How to Run the Signal-Based Test

Objective

You can execute the test that you configured before and display its result in the Signal Editor and record it in a report.

Preconditions

- The XIL API Convenience library must be opened in AutomationDesk's Library Browser, because its functionality is used internally by the Signal-Based Testing library.
- The platform that performs the test must be up and registered on the host PC.
- The simulation application that you want to access must be loaded to the platform and running.

- You have configured the variable access in a data container data object. For instructions, refer to How to Configure Variable Access for a Signal-Based Test on page 66.
- You have configured the used signals in an STZ file. For instructions, refer to How to Configure Signals for a Signal-Based Test on page 69.

Method

To run the signal-based test

1 Execute your project.

In the Log pane you can track the progress of the project execution. In the Output pane messages report the reached steps of the test.

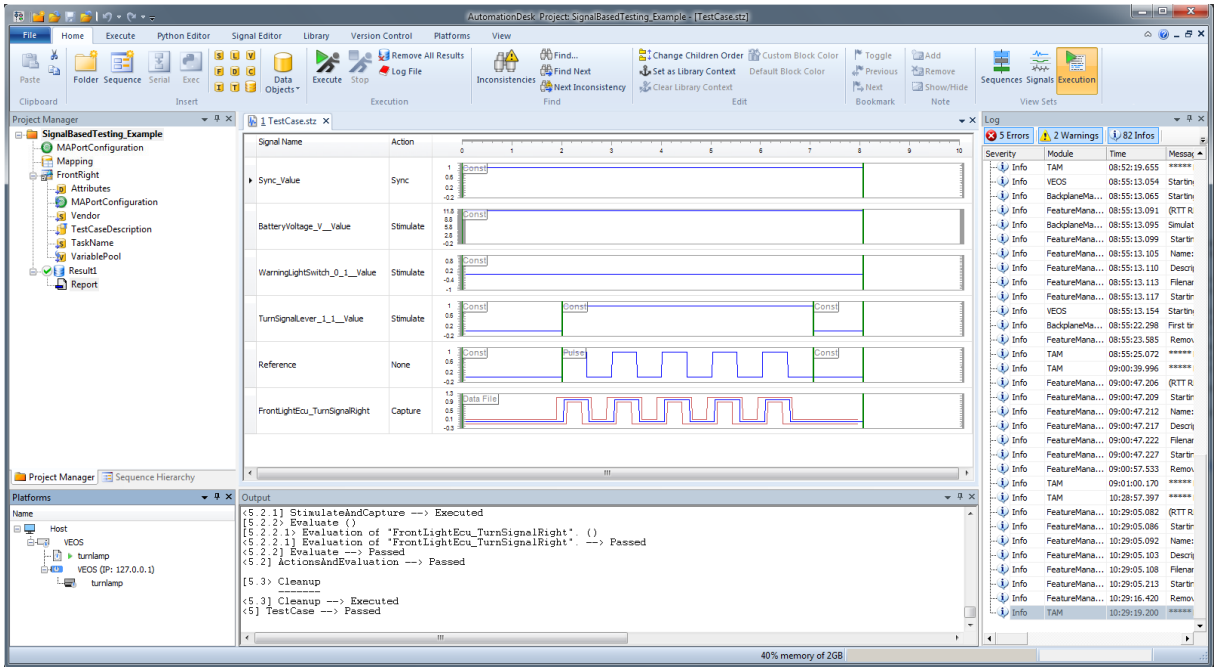
Result

You executed a signal-based test. The captured signals are displayed in the Signal Editor's display. The signals and the evaluation results are added to the report.

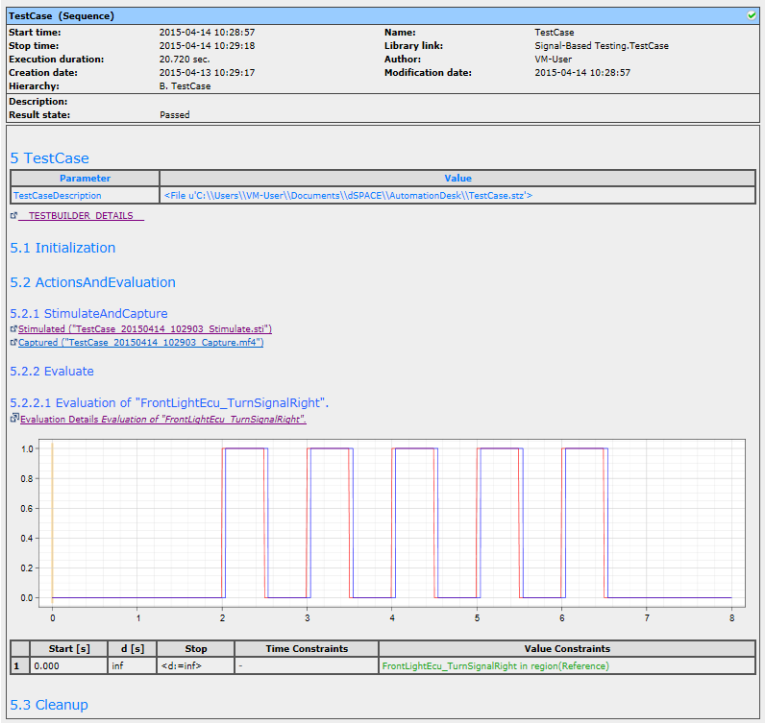
Example

- Switch to the Execution view set to activate the panes suitable to execute and monitor projects.
- In the Project Manager select your project and on the Home ribbon, click Execution - Execute to run the signal-based test.
- Refresh the display of the captured signals.

The picture below shows the captured signal in the Signal Editor.



A report is generated that provides the following test overview:



TestCase (Sequence)

Start time:	2015-04-14 10:28:57	**Name:**	TestCase
Stop time:	2015-04-14 10:29:18	**Library link:**	Signal-Based Testing.TestCase
Execution duration:	20.720 sec.	**Author:**	VM-User
Creation date:	2015-04-13 10:29:17	**Modification date:**	2015-04-14 10:28:57
Hierarchy:	B. TestCase		
Description:			
Result state:	Passed		

5 TestCase

Parameter	Value
TestCaseDescription	<File u'C:\\Users\\VM-User\\Documents\\dSPACE\\AutomationDesk\\TestCase.stz'>

TESTBUILDER_DETAILS

5.1 Initialization

5.2 ActionsAndEvaluation

5.2.1 StimulateAndCapture

Stimulated ("TestCase_20150414_102903_Stimulate.sti")

Captured ("TestCase_20150414_102903_Capture.mf4")

5.2.2 Evaluate

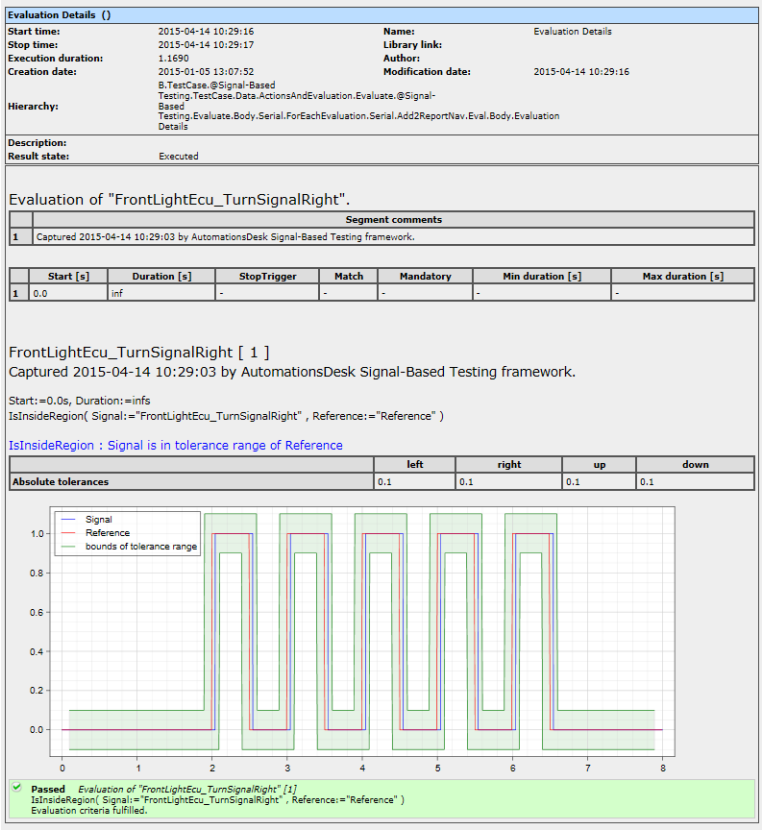
5.2.2.1 Evaluation of "FrontLightEcu_TurnSignalRight".

Evaluation Details *Evaluation of "FrontLightEcu_TurnSignalRight"*

	Start [s]	d [s]	Stop	Time Constraints	Value Constraints
1	0.000	inf	<d:=inf>	-	FrontLightEcu_TurnSignalRight in region(Reference)

5.3 Cleanup

For the evaluation of the test step, there is a detailed report:



Evaluation Details ()

Start time:	2015-04-14 10:29:16	**Name:**	Evaluation Details
Stop time:	2015-04-14 10:29:17	**Library link:**	
Execution duration:	1.1690	**Author:**	
Creation date:	2015-01-05 13:07:52	**Modification date:**	2015-04-14 10:29:16
Hierarchy:	B.TestCase.@Signal-Based Testing.TestCase.Data.ActionsAndEvaluation.Evaluate.@Signal-Based Testing.Evaluate.Body.Serial.ForEachEvaluation.Serial.Add2ReportNav.Eval.Body.Evaluation Details		
Description:			
Result state:	Executed		

Evaluation of "FrontLightEcu_TurnSignalRight".

	Segment comments
1	Captured 2015-04-14 10:29:03 by AutomationsDesk Signal-Based Testing framework.

	Start [s]	Duration [s]	StopTrigger	Match	Mandatory	Min duration [s]	Max duration [s]
1	0.0	inf	-	-	-	-	-

FrontLightEcu_TurnSignalRight [1]
Captured 2015-04-14 10:29:03 by AutomationsDesk Signal-Based Testing framework.

Start:=0.0s, Duration:=infs
IsInsideRegion(Signal:="FrontLightEcu_TurnSignalRight" , Reference:="Reference")

IsInsideRegion : Signal is in tolerance range of Reference

	left	right	up	down
Absolute tolerances	0.1	0.1	0.1	0.1

Passed *Evaluation of "FrontLightEcu_TurnSignalRight" [1]*
IsInsideRegion(Signal:="FrontLightEcu_TurnSignalRight" , Reference:="Reference")
Evaluation criteria fulfilled.

Related topics

References

Evaluation Methods (AutomationDesk Basic Practices 🕮)

How to Use Time Tags

Objective

You can create and reference time tags to define the end of a segment that is used during test evaluation.

Basics

Time tags define a point in time by:

- The time offset since the test start
- The time offset since a predecessor time tag was reached
- A condition that you can specify in the ASAM General Expression Syntax (GES)

You can reference the so defined points in time by the time tag name. You can use the same time tag in multiple signals. The time tag names are used in the test report.

Time tags are displayed as diamond symbols in the Signals Editor's time scale. If a time tag relates to a predecessor, this is shown by a line that connects their symbols. You can use the same time tag as predecessor in multiple other time tags, which leads to a tree of time tags.

If you configured the end of a section via a time tag, the segments plot is marked with a diamond at the end.

Restriction

You can not use time tags in stimulation signals.

Method

To use time tags

1. Right-click the time scale of the Signal Editor at the related position and from the context menu, select **Create Time Tag**.

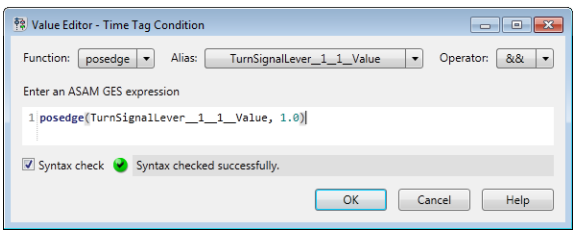
   At the selected position, a diamond symbol is shown to represent the time tag.
2. Select the time tag's diamond symbol and in the Properties pane, specify the time tag's properties, including its name.
3. In the Signal Editor, select the segment whose end you want to configure, and in the Properties pane enter the time tag's name as the **Time Tag** property in the **Evaluation** category.

Result

You configured the selected segments to end, when the time tag is reached.

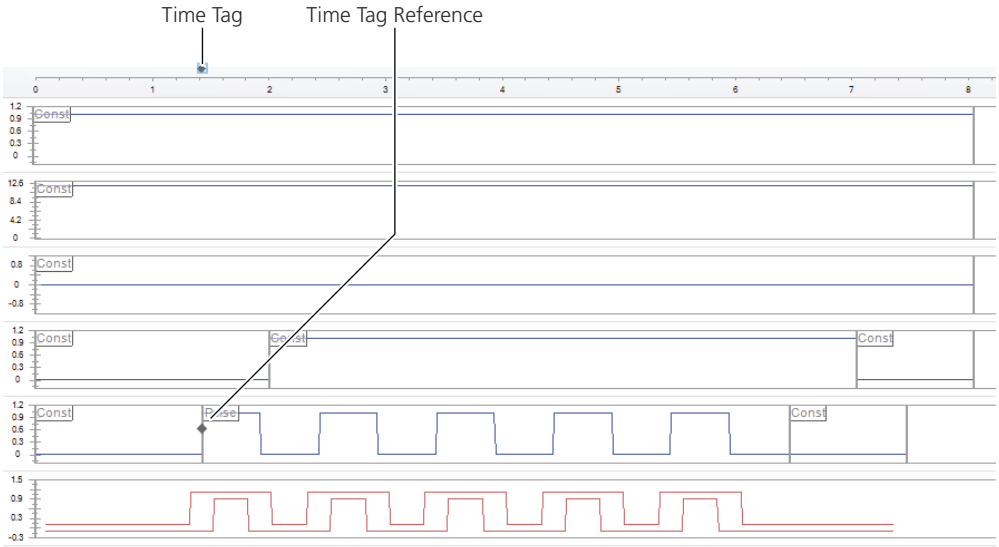
Example In the signal description set that you created in the previous chapters, you can use a condition-defined time tag by doing the following:

- Right-click the time scale of the Signal Editor at an appropriate position and from the context menu, select **Create Time Tag**. The position is only relevant for displaying purposes, because the actual point in time defined by the time tag is to be specified by a condition.
- Select the time tag's diamond symbol and in the Properties pane, change the **Name** property to `SwitchOn`.
- Click the **Browse** button in the **Condition** edit field to open the General Expression Syntax (GES) Editor and enter `posedge(TurnSignalLever__1__1__Value, 1.0)`.



- In the Signal Editor, select the first segment of the **Reference** signal.
- In the Properties pane, select **SwitchOn** as the **Time Tag** property.

The diamond symbol shows that the Reference signal is defined by using a time tag. A pulsing signal is expected, when the turn-signal lever is switched.



Related topics

References

Evaluation Methods (AutomationDesk Basic Practices 🕮)

How to Parameterize a Test Case

Objective

You can parameterize a test case by adding data objects to its automation block. In the test case description, you can then reference these data objects to specify signal properties.

This lets you implement an automated variation of the parameterized signal property in several runs of the test case.

Method

To parameterize a test case

1. In the Project Manager, Sequence Hierarchy Viewer, or Sequence Builder, select the Signal-Based Testing automation block that you want to parameterize.
2. In the **Home - Insert** ribbon group, select the data object type of the object to be added.

A data object of the chosen type and with a default name is added to the automation block. You can rename it by pressing F2.

3. In the Data Object Editor, specify the new data object's value. You can also implement a loop that changes the value automatically.
4. In the Signal Editor, select the element that you want to parameterize.
5. In the Properties pane, set the Type of the property that you want to parameterize to Alias.
6. In the Alias edit field, enter the name of the additional data object.

Result

You parameterized the test case via the additional data object of the automation block.

Example In the signal-based testing project that you created in previous chapters, you can parameterize the test case by doing the following:

- In the Project Manager, select the FrontRight test case, and click Home - Insert - Float to insert an additional Float data object and rename it `Voltage`.
- In the Data Object Editor specify a voltage value for the additional data object.
- In the Signal Editor, select the Const segment of the BatteryVoltage_V__Value signal.
- In the Properties pane, set the Type of the Value property to Alias.

  The name of the property's the second edit field changes to Alias.
- In the Alias edit field, enter `Voltage` .

You parameterized the battery voltage of the FrontRight test case.

To vary the parameterization automatically, you can use the same test case description in a test block instead of a test case and change the voltage parameter in a loop.

Related topics

References

Evaluation Methods (AutomationDesk Basic Practices 🕮)

Reference Information

Where to go from here

Information in this section

Automation Blocks.....80
Commands And Dialogs.....103

Automation Blocks

Signal-Based Testing Library

Introduction

The Signal-Based Testing library is a custom library. It is write-protected to prevent modifications to its blocks.

The basic elements of the Signal-Based Testing library and the elements used for implementation have different block colors to distinguish them from other library blocks.

The **Signal-Based Testing** automation blocks use the **Test Builder** library for test implementation, the **XIL API** library for variable stimulation and capturing and the **Evaluation** library for result evaluation.

Using Signal-Based Testing library features in Python scripts

You can use functions and other definitions of the **Signal-Based Testing** library in Python scripts after you imported the `audsignalbasedtesting` module to the current namespace.

Where to go from here

Information in this section

TestCaseDescription (Data Object) 80
To provide a signal description set that configures signal-based testing.

TestCase (Signal-Based Testing) 83
To provide a test case to be used as a sequence.

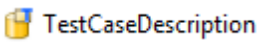
TestBlock (Signal-Based Testing) 87
To provide a test block to be used within a sequence.

StimulateAndCapture 91
To provide variable stimulation and data capturing as a separate test step.

Evaluate 97
To provide a test step for result evaluation and report.

TestCaseDescription (Data Object)

Graphical representation



Purpose

To provide a signal description set that configures signal-based testing.

Description

In a test case description, you can combine all signal descriptions that are necessary to configure a signal-based test scenario that is provided by the Signal-Based Testing library.

A TestCaseDescription data object is specified via the path and name of an STZ file. The STZ file is a ZIP file that contains the signal descriptions of the used signals in the STI format. The STI format is defined by the ASAM AE XIL API standard. You can create and edit such an STZ file that includes some AutomationDesk-specific properties by using AutomationDesk's Signal Editor.

A TestCaseDescription data object is derived from a File data object. You can assign and edit it in the following ways:

- If no file has been assigned to the data object, double-clicking the data object opens the Create or Open SignalGenerator File dialog. The STZ file that you specify here is assigned to the TestCaseDescription data object and opened in the Signal Editor. If the file did not exist, it is created.
- If an STZ file is already assigned to the data object, double-clicking the data object opens it in the Signal Editor at once.
- If an STZ file is already assigned to the data object and you want to assign another STZ file to the data object without opening the Signal Editor, you can use the **`Edit with Standard Dialog`** command.

The default STZ file name is generated as: `./<Project Name>_<Sequence Name>.stz`.

Note

If you edit an assigned test case description in the Signal Editor, changes will not take effect until you saved your changes.

Access via Exec block

The TestCaseDescription data object provides the same methods as the File data object. For details, refer to File (AutomationDesk Basic Practices 🕮).

Enhancements of STZ files for signal-based testing

Mapping to model variables Signals are mapped to model variables via their names. The signal name must be the same as the string name in the VariablePool data container that is used to access the simulation application.

Stimulation and capturing The AutomationDesk-specific Action signal property specifies the signal's purpose during the test:

Action	Description
Stimulate	This signal is generated by a signal generator to stimulate the mapped model variable during the run time of the simulation application.

Action	Description
Capture	The values of the variable that are mapped to this signal are captured during the run time of the simulation application. The data is stored in an MDF file (ASAM Common MDF Version 4.1, file name extension: MF4) that is added as a DataFile segment to the signal.
Sync	This signal is used to synchronize stimulation and capturing during the run time of the simulation application. It defines the begin of the Stimulate signals and the begin and end of the specified captures. This signal must consist of Const segments not equal to zero and must not have zero crossings. For details, refer to StimulateAndCapture on page 91.
None	This signal does not interact with the simulation application. This is used for reference signals of evaluation methods, for example.

Note

Each signal description set that is used as a test case description must contain exactly one signal with the Action property `Sync`.
For details, refer to StimulateAndCapture on page 91.

Note

Signals with the Action property `Capture` must not contain user defined segments. A DataFile segment with the captured data is inserted to these signals during the test execution.

For details on how this test step is implemented, refer to StimulateAndCapture on page 91.

Evaluation The following AutomationDesk-specific signal properties configure, how the simulation results are evaluated:

- Via the Evaluation Method property, you can specify automation blocks of the Evaluation library to be used for comparing signals to other signals or to references.
- Via the Minimum Duration and the Maximum Duration property, you can configure time constraints for segments.
- Via the Mandatory property, you can mark the fulfillment of a watcher condition as mandatory or optional.

For details on how this test step is implemented, refer to Evaluate on page 97.

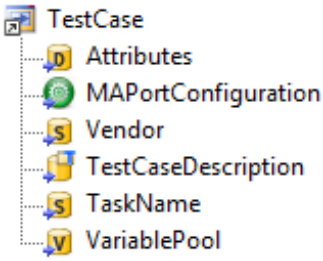
Related topics

References

Edit with Standard Dialog (AutomationDesk Basic Practices 🕮)
Evaluate.....97
Evaluation Method.....172
File (AutomationDesk Basic Practices 🕮)
Mandatory.....180
Maximum Duration.....182
Minimum Duration.....186
Signal Editor.....103
StimulateAndCapture.....91

TestCase (Signal-Based Testing)

Graphical representation



Purpose

To provide a test case to be used as a sequence.

Description

A TestCase of the Signal-Based Testing library provides a sequence template to implement a predefined test scenario. This scenario can be configured basically via the description of the involved signals in a test case description.

You can parameterize a test case by adding Float or Int data objects to the TestCase automation block. You can use the data object names as alias names in the test case description, e.g., to specify a property or a condition.

Note

The following preconditions have to be fulfilled:

- The simulation application to be accessed must be running. To run it, you can load and start a simulation application via LoadSimulationApplication, for example.
- The model variables to be accessed must be specified in a VariablePool like the one known from the XIL API Convenience library.
- The signals for stimulating, data capturing and result evaluation must be configured via a TestCaseDesription data object that specifies an STZ file that you created using AutomationDesk's Signal Editor.
- Signals are mapped to model variables via their names. The signal name in the test case description must be the same as the string name in the VariablePool.
- All alias names that are used in the test case description must be resolvable via one of the following items:
  - A name of an additional data object in the TestCase automation block
  - A variable name in the VariablePool
  - A signal name in the TestCaseDescription

The XIL API access to the simulation application for stimulation and data capturing is configured via MAPortConfiguration, Vendor, TaskName and VariablePool data objects as in the XIL API Convenience library.

The **TestCase** sequence template is based on the **TestCase** template of the **Test Builder** library. Thus, the verdict and exception handling and the use of the **Attributes** dictionary are inherited. For details, refer to TestCase (TestBuilder) (AutomationDesk Basic Practices 🕮).

The predefined scenario is implemented in the phases of the test case, but you can optionally insert individual blocks at some operation slots. The test case consists of the following phases:

- Initialization

  In this predefined phase the XIL API model access port is initialized.
- ActionsAndEvaluation

  This phase proceeds in the following order:
  - If you inserted blocks in the **PreActions** operation slot, they are executed before the stimulation and data capturing.
  - Then the predefined **StimulateAndCapture** step of the **Signal-Based Testing** library is executed: i.e., the model variables are stimulated and the data is captured and stored as configured in the test case description. Further modifications are not required.

    For details, refer to StimulateAndCapture on page 91.
  - If you inserted blocks in the **PostActions** operation slot, they are executed after the stimulation and data capturing.
  - Then the predefined **Evaluate** step of the **Signal-Based Testing** library is executed: i.e., the test result is evaluated as configured in the test case description. Further modifications are not required.

    For details, refer to Evaluate on page 97.
  - If you inserted blocks in the **Evaluations** operation slot, they are executed after the signal-based evaluation.

    Here, you can access the `Signals` dictionary that provides the **Signal** data objects of the involved signals and the `Timestamps` dictionary that provides the time stamps that limit the signals' segments. Both dictionaries are returned from the **Evaluate** step.
- Cleanup

  The predefined values and resources are cleared and released.

Via an option in the **Report Page** of the AutomationDesk **Options** dialog, you can specify whether to add an MDF file (ASAM Common MDF Version 4.1, file name extension: MF4) with the captured signals to the report.

Data objects

This automation block provides the following data objects:

Name	In / Out	Type	Default Value	Description
Attributes	In	Dictionary	{}[1)]	Specifies attribute values that differ from the default values in the configuration file. For further information on general Test Builder attributes, refer to Configuration Attributes (AutomationDesk Basic Practices 🕮). For further information on specific signal-based testing attributes, refer to Additional attributes.

Name	In / Out	Type	Default Value	Description
MAPortConfiguration	In	MAPortConfiguration	None	Specifies the platform that is accessed and the application's variable description file that is used.

Vendor	In	String	"dSPACE"	Specifies the vendor and version of the used XIL API implementation.
				With `dSPACE` specified as the vendor, the current version of the dSPACE XIL API implementation is used.
				To specify another version or another vendor, use the following format:
				`<VendorName>_<ProductName>_<ProductVersion>`
				Example:
				`dSPACE GmbH_XIL API_2019-A`
				It is recommended to use a globally managed Vendor data object as a reference providing the vendor name. For more information, refer to **Vendor (Data Object)** (AutomationDesk Accessing Simulation Platforms 🕮).

TestCaseDescription	In	TestcaseDescription	" "[2]	Specifies the STZ file that contains the signal description set that configures the variable stimulation, data capturing and result evaluation of the signal-based test.
TaskName	In	String	"HostService"	Specifies the name of the measured simulation application task.
VariablePool	In	Variant	None	Lets you specify the set of variables that can be used at the block. Three different methods: ▪ Create an XIL API Mapping data object in your project and reference it. The contained `Alias` values are interpreted as variable names and the associated `Identifier` values as the model paths. ▪ (For compatibility reasons only) Create *one* variable pool data container and reference it at the block's VariablePool data object. Specify each variable contained in the pool as a String data object in the data container: ▪ `<VariableName>` the name of the String data object ▪ `<ModelPath>` the value of the String data object ▪ (For compatibility reasons only) Create a dictionary and reference it. The value of the dictionary is interpreted as `<VariableName>:<ModelPath>`. It is recommended to use the XIL API Mapping data object.

[1] The following Test Builder attribute is used internally and appears in the default value: `{u'suppress_arguments': [u'Attributes', u'Vendor', u'TestCaseDescription', u'VariablePool', u'Signals', u'Timestamps']}`.
[2] While you did not specify an STZ file name, AutomationDesk proposes `./<ProjectName>_<SequenceName>.stz`.

Additional attributes The following attributes for stimulating and capturing are valid as **`<key>:<value>`** pairs in the Attributes dictionary:

- `Downsampling:<DownsamplingFactor>`

  At a factor of n, a set of data is stored every n-th sampling period. The sampling period is defined in the model as the increment of sampling steps. The downsampling factor must be a positive integer value. The default value is 1.

- `ApplicationProcessor:<MemberApplicationName>`

  (Relevant only for multiprocessor and multicore systems): By default, the signal generator is started on the node where the task specified by TaskName is running. By using this attribute, you can specify another node to run the signal generator. Refer to SignalGenerator (Data Object) (AutomationDesk Accessing Simulation Platforms 🕮).

The following attributes for evaluation are valid as **`<key>:<value>`** pairs in the Attributes dictionary:

- `provide_evaluation_signals:<SignalSpecification>`

  By using this attribute, you can specify which signals are provided in the Signals dictionary that is returned by the Evaluate block. This lets you control the amount of the used resources.

Signal Specification	Meaning
`u'_NONE_'`	No signals are provided.
`u'_CAPTURE_'`	Only signals with the Action property set to **`Capture`** are provided. This is the default setting.
`u'_ALL_'`	All known signals are provided.
`<List of signal names>`	Only the signals from the specified list are provided.

- `provide_evaluation_timestamps:<TimestampSpecification>`

  By using this attribute, you can specify which time stamps are provided in the Timestamps dictionary that is returned by the Evaluate block. This lets you control the amount of the used resources.

Timestamp Specification	Meaning
`u'_NONE_'`	No time stamps are provided.
`u'_EVAL_'`	Only time stamps of signals with an Evaluation method property not equal to **`None`** are provided.
`u'_TIMETAGS_'`	Only time stamps of the time tags that are specified in the test case description are provided.
`u'_TIMETAGS_AND_EVAL_'`	Only time stamps of the signals with an evaluation method and time stamps of time tags are provided.
`u'_ALL_'`	The time stamps of all signals and all time tags are provided. This is the default setting.
`<List of signal names and time tag names>`	Only the time stamps of the signals and time tags from the specified list are provided.

- `augment_measurementdatafile:u''`

  If you specify this attribute, all time tags are included as bookmarks at the calculated point in time in the resulting MDF file (ASAM Common MDF Version 4.1, file name extension: MF4).

Note

You can add any type of data object to the block's parameters.
The names of data objects must not start or end with an underscore. For further information on the naming conventions, refer to Realizing Data Exchange Between AutomationDesk and Python (AutomationDesk Basic Practices 🕮).

Note

You cannot use the LoadSimulationAppliction block in the PreActions operation slot. Refer to Limitations When Using the Signal-Based Testing Library on page 269

Related topics

Basics

Accessing Simulation Platforms via the XIL API Convenience Library (AutomationDesk Accessing Simulation Platforms 🕮)
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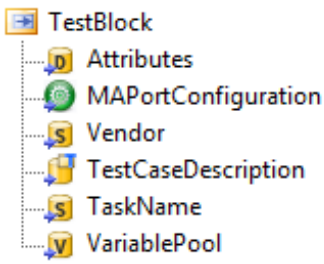
TestBlock (Signal-Based Testing)..... 87
TestCase (TestBuilder) (AutomationDesk Basic Practices 🕮)

TestBlock (Signal-Based Testing)

Graphical representation



Purpose

To provide a test block to be used within a sequence.

Description

The **TestBlock** automation block of the **Signal-Based Testing** library provides the same functionality as its **TestCase** sequence element, but it can be used within a sequence. For further information, refer to TestCase (Signal-Based Testing) on page 83.

Via an option in the **Report Page** of the AutomationDesk **Options** dialog, you can specify whether to add an MDF file (ASAM Common MDF Version 4.1, file name extension: MF4) with the captured signals to the report.

Data objects

This automation block provides the following data objects:

Name	In / Out	Type	Default Value	Description
Attributes	In	Dictionary	{}[1]	Specifies attribute values that differ from the default values in the configuration file. For further information on general Test Builder attributes, refer to Configuration Attributes (AutomationDesk Basic Practices 🕮). For further information on specific signal-based testing attributes, refer to Additional attributes.
MAPortConfiguration	In	MAPortConfiguration	None	Specifies the platform that is accessed and the application's variable description file that is used.

Vendor	In	String	"dSPACE"	Specifies the vendor and version of the used XIL API implementation.
				With `dSPACE` specified as the vendor, the current version of the dSPACE XIL API implementation is used.
				To specify another version or another vendor, use the following format:
				`<VendorName>_<ProductName>_<ProductVersion>`
				Example:
				`dSPACE GmbH_XIL API_2019-A`
				It is recommended to use a globally managed **Vendor** data object as a reference providing the vendor name. For more information, refer to **Vendor (Data Object)** (AutomationDesk Accessing Simulation Platforms 🕮).

TestCaseDescription	In	TestcaseDescription	" "[2]	Specifies the STZ file that contains the signal description set that configures the variable stimulation, data capturing and result evaluation of the signal-based test.
TaskName	In	String	"HostService"	Specifies the name of the measured simulation application task.
VariablePool	In	Variant	None	Lets you specify the set of variables that can be used at the block. Three different methods: ▪ Create an XIL API Mapping data object in your project and reference it. The contained `Alias` values are

Name	In / Out	Type	Default Value	Description
				interpreted as variable names and the associated `Identifier` values as the model paths. ▪ (For compatibility reasons only) Create *one* variable pool data container and reference it at the block's VariablePool data object. Specify each variable contained in the pool as a String data object in the data container: ▪ `<VariableName>` the name of the String data object ▪ `<ModelPath>` the value of the String data object ▪ (For compatibility reasons only) Create a dictionary and reference it. The value of the dictionary is interpreted as `<VariableName>:<ModelPath>`. It is recommended to use the XIL API Mapping data object.

1) The following Test Builder attribute is used internally and appears in the default value: `{u'suppress_arguments': [u'Attributes', u'Vendor', u'TestCaseDescription', u'VariablePool', u'Signals', u'Timestamps']}`.

2) While you did not specify an STZ file name, AutomationDesk proposes `./<ProjectName>_<SequenceName>.stz`.

Additional attributes The following attributes for stimulating and capturing are valid as **`<key>:<value>`** pairs in the Attributes dictionary:

- `Downsampling:<DownsamplingFactor>`

  At a factor of n, a set of data is stored every n-th sampling period. The sampling period is defined in the model as the increment of sampling steps. The downsampling factor must be a positive integer value. The default value is 1.

- `ApplicationProcessor:<MemberApplicationName>`

  (Relevant only for multiprocessor and multicore systems): By default, the signal generator is started on the node where the task specified by TaskName is running. By using this attribute, you can specify another node to run the signal generator. Refer to SignalGenerator (Data Object) (AutomationDesk Accessing Simulation Platforms 🕮).

The following attributes for evaluation are valid as **`<key>:<value>`** pairs in the Attributes dictionary:

- `provide_evaluation_signals:<SignalSpecification>`

  By using this attribute, you can specify which signals are provided in the Signals dictionary that is returned by the Evaluate block. This lets you control the amount of the used resources.

Signal Specification	Meaning
`u'_NONE_'`	No signals are provided.
`u'_CAPTURE_'`	Only signals with the Action property set to **`Capture`** are provided. This is the default setting.
`u'_ALL_'`	All known signals are provided.
`<List of signal names>`	Only the signals from the specified list are provided.

- `provide_evaluation_timestamps:<TimestampSpecification>`

  By using this attribute, you can specify which time stamps are provided in the Timestamps dictionary that is returned by the Evaluate block. This lets you control the amount of the used resources.

Timestamp Specification	Meaning
`u'_NONE_'`	No time stamps are provided.
`u'_EVAL_'`	Only time stamps of signals with an **Evaluation method** property not equal to **None** are provided.
`u'_TIMETAGS_'`	Only time stamps of the time tags that are specified in the test case description are provided.
`u'_TIMETAGS_AND_EVAL_'`	Only time stamps of the signals with an evaluation method and time stamps of time tags are provided.
`u'_ALL_'`	The time stamps of all signals and all time tags are provided. This is the default setting.
`<List of signal names and time tag names>`	Only the time stamps of the signals and time tags from the specified list are provided.

- `augment_measurementdatafile:u''`

  If you specify this attribute, all time tags are included as bookmarks at the calculated point in time in the resulting MDF file (ASAM Common MDF Version 4.1, file name extension: MF4).

Note

You can add any type of data object to the block's parameters.
The names of data objects must not start or end with an underscore. For further information on the naming conventions, refer to Realizing Data Exchange Between AutomationDesk and Python (AutomationDesk Basic Practices 🕮).

Note

You cannot use the **LoadSimulationAppliction** block in the **PreActions** operation slot. Refer to Limitations When Using the Signal-Based Testing Library on page 269

Related topics

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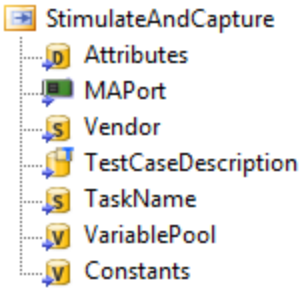
TestCase (Signal-Based Testing).....83

StimulateAndCapture

Graphical representation



Purpose

To provide variable stimulation and data capturing as a separate test step.

Description

This block implements the stimulation of model variables and the data capturing as configured in a test case description for signal-based testing.

This block is internally used by TestCase and TestBlock in the Signal-Based Testing library, but you can also use it separately in your own sequences.

You can parameterize this test step by using the Constants dictionary. You can use its keys as alias names in the test case description, e.g., to specify a property or a condition.

Note

The following preconditions have to be fulfilled:

- The simulation application to be accessed must be running. To run it, you can load and start a simulation application via LoadSimulationApplication, for example.
- The model access port must be initialized via InitMAPort.
- The model variables to be accessed must be specified in a VariablePool like known from the XIL API Convenience library.
- The signals for stimulating model variables and data capturing must be configured via a TestCaseDesription data object that specifies an STZ file that you created using AutomationDesk's Signal Editor.
- Signals are mapped to model variables via their names. The signal name in the test case description must be the same as the string name in the VariablePool.
- All alias names that are used in the test case description must be resolvable via one of the following items:
  - A key in the Constants dictionary
  - A variable name in the VariablePool
  - A signal name in the TestCaseDescription
- Since you cannot use time tags to define stop triggers for stimulated signals, time tags are ignored in stimulus signals.

The XIL API access to the simulation application is configured via **MAPortConfiguration**, **Vendor**, **TaskName** and **VariablePool** data objects as in the **XIL API Convenience** library.

The **StimulateAndCapture** template is based on the **Step** template of the **Test Builder** library. Thus, verdict and exception handling and the use of the **Attributes** dictionary is inherited. For details, refer to Step (AutomationDesk Basic Practices 🕮).

The step's Body operation slot provides the following functionality:

- The STZ file that specifies the test case description is analyzed and the contained signals are treated in the following way, depending on their **Action** property:

Action Property	**Meaning**
`Stimulate`	The signal is used for stimulating. An XIL API SignalGenerator is configured for the signal.
`Capture`	The signal will be captured during test execution. An XIL API Capture is configured for the signal. You can modify the default configuration of the capture by editing the **Attributes** dictionary. For example, by adding `Downsampling`:`<DownsamplingFactor>`, you can explicitly set the downsampling value to be used.
`Sync`	This signal is used for the synchronization of all stimulate and capture signals. For details, refer to Synchronization mechanism.
`None`	This signal is used for evaluation and therefore ignored for stimulation and capturing.

- The XIL API SignalGenerator is loaded to the target and the test is started.
- After the CaptureState is `eFINISHED`, the captured data is stored in Measurement Data File (MDF) format (ASAM Common MDF Version 4.1) in the current result folder with the name `<STZFileName>_<Date>_<Time>_Capture.mf4`.
- In the STZ file that contains the test case description, DataFile segments linked to the MDF files are inserted into the captured signals.
- SignalGenerator and Capture are released.

Note

Signals that are used in a condition of a **Stop Trigger** property are captured for evaluation purposes even if they are not capture signals. The capture result is stored in the MDF file but does not appear as a DataFile segment.

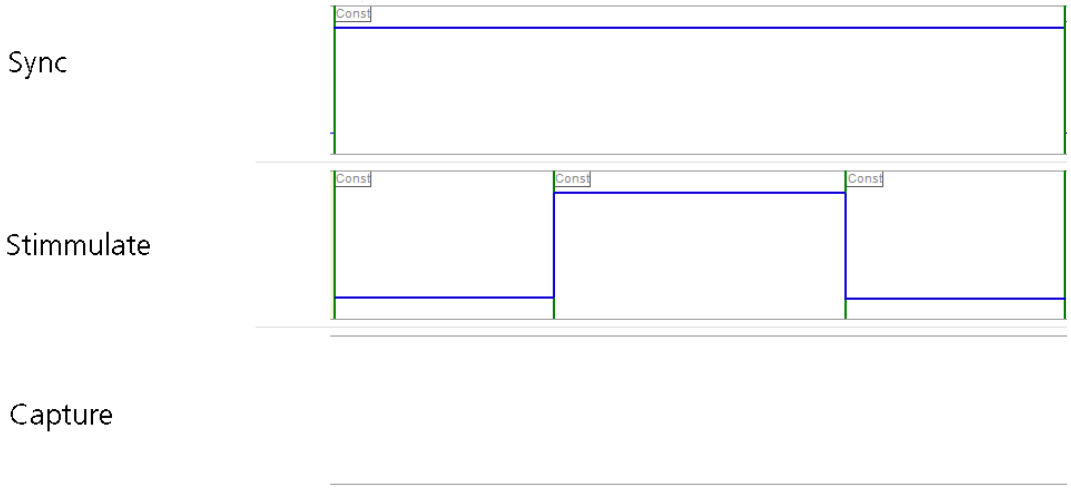
Via an option in the **Report Page** of the AutomationDesk **Options** dialog, you can specify whether to add an MDF file (ASAM Common MDF Version 4.1, file name extension: MF4) with the captured signals to the report.

Synchronization mechanism

Each signal description set that is used as a test case description must contain exactly one signal with the **Action** property `Sync`.

This signal must consist of **Const** segments not equal to zero and must not have zero crossings.

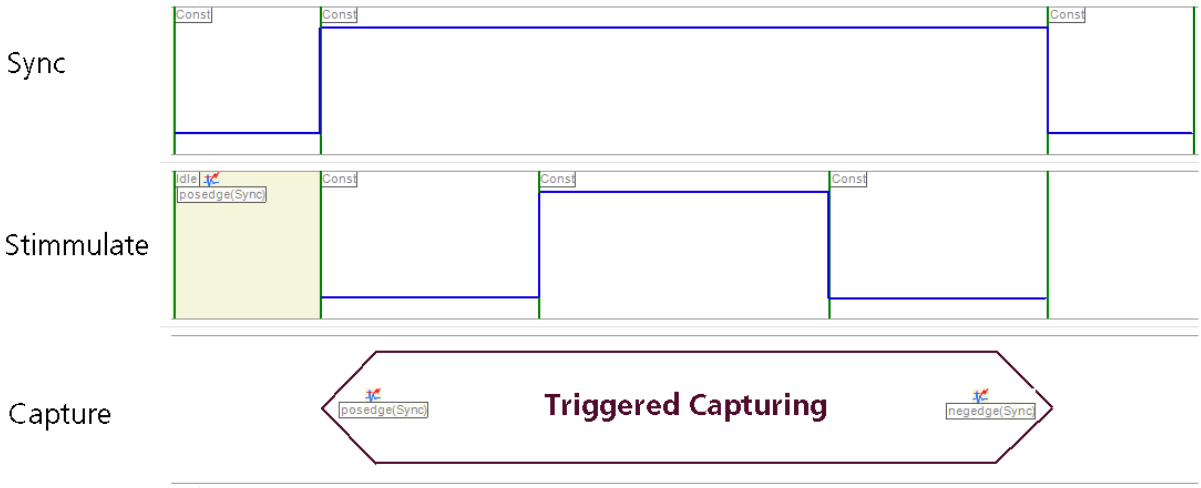
For a simple example, the situation before the execution of the test is shown in the following picture.



During the execution the Sync signal is internally prefixed and postfixed with **Const** segments with a value of zero. The occurring edges are used as triggers in the following way:

- The Capture of all captured signals is triggered to start the first edge of the Sync signal and to stop at the last edge.
- All stimulus signals are internally prefixed with an **Idle** segment that is terminated by an appropriate condition watcher to the first edge of the Sync signal.

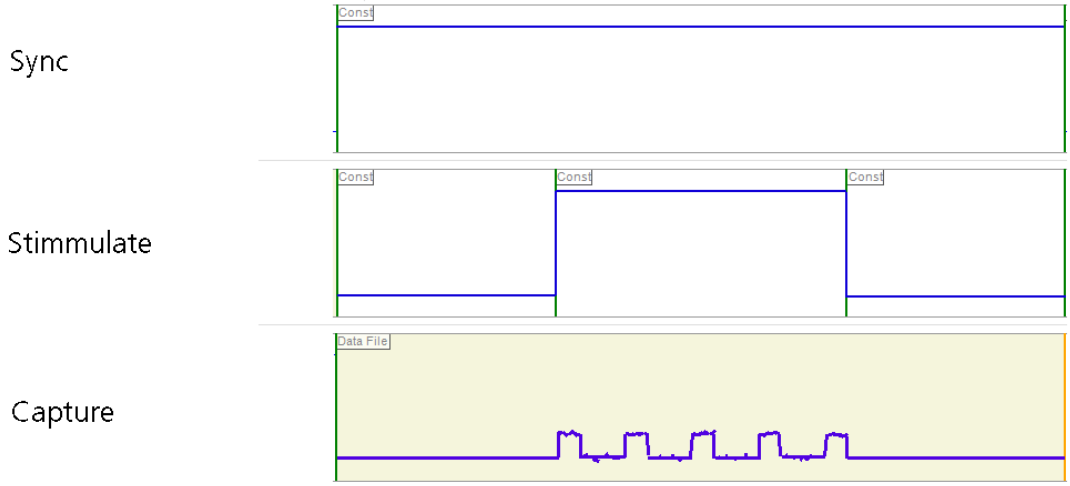
For the simple example, the result is shown in the following picture.



Note

- You can stop the capturing of all signals by defining a stop trigger for the Sync signal.
- You cannot use triggers related to the end of the Sync signal for signal evaluation, because the last edge is not included in the capture result.

After the execution of the test the captured data is inserted as **DataFile** segments in the capture signals, as shown in the following picture.



Data objects

This automation block provides the following data objects:

Name	In / Out	Type	Default Value	Description
Attributes	In	Dictionary	{}[1]	Specifies attribute values that differ from the default values in the configuration file. For further information on general Test Builder attributes, refer to Configuration Attributes (AutomationDesk Basic Practices 🕮). For further information on specific signal-based testing attributes, refer to Additional attributes.
MAPort	In	MAPort	None	Contains the instantiated MAPort data object.

Vendor	In	String	"dSPACE"	Specifies the vendor and version of the used XIL API implementation.
				With **dSPACE** specified as the vendor, the current version of the dSPACE XIL API implementation is used.
				To specify another version or another vendor, use the following format:
				`<VendorName>_<ProductName>_<ProductVersion>`
				Example:
				`dSPACE GmbH_XIL API_2019-A`

Name	In / Out	Type	Default Value	Description
				It is recommended to use a globally managed **Vendor** data object as a reference providing the vendor name. For more information, refer to **Vendor (Data Object)** (AutomationDesk Accessing Simulation Platforms 🕮).
TestCaseDescription	In	TestCaseDescription	" "[2]	Specifies the STZ file that contains the signal description set that configures the variable stimulation, data capturing and result evaluation of the signal-based test.
TaskName	In	String	" "	Specifies the name of the measured simulation application task.
VariablePool	In	Variant	None	Lets you specify the set of variables that can be used at the block. Three different methods: ▪ Create an XIL API Mapping data object in your project and reference it. The contained `Alias` values are interpreted as variable names and the associated `Identifier` values as the model paths. ▪ (For compatibility reasons only) Create *one* variable pool data container and reference it at the block's VariablePool data object. Specify each variable contained in the pool as a String data object in the data container: ▪ `<VariableName>` the name of the String data object ▪ `<ModelPath>` the value of the String data object ▪ (For compatibility reasons only) Create a dictionary and reference it. The value of the dictionary is interpreted as `<VariableName>:<ModelPath>`. It is recommended to use the XIL API Mapping data object.
Constants	In	Variant	None	Lets you specify the set of constants that can be used at the block. Two different methods: ▪ Create a dictionary and reference it. The value of the dictionary is interpreted as `<ConstantName>:<NumericalValue>`. ▪ (Not recommended) Create a constants data container and reference it at the block's Constants data object. Specify each constant as an Integer or Float data object in the data container: ▪ `<ConstantName>` the name of the Integer or Float data object

Name	In / Out	Type	Default Value	Description
				▪ `<NumericalValue>` the value of the Integer or Float data object The use of a data container to specify constants is planed to be discontinued in the future. It is therefore recommended to use a dictionary data object.

[1] The following Test Builder attribute is used internally and appears in the default value: `{u'suppress_arguments': [u'Attributes', u'Vendor', u'TestCaseDescription', u'VariablePool', u'Signals', u'Timestamps']}`.

[2] While you did not specify an STZ file name, AutomationDesk proposes `./<ProjectName>_<SequenceName>.stz`.

Additional attributes The following attributes for stimulating and capturing are valid as **`<key>:<value>`** pairs in the Attributes dictionary:

- `Downsampling:<DownsamplingFactor>`

  At a factor of n, a set of data is stored every n-th sampling period. The sampling period is defined in the model as the increment of sampling steps. The downsampling factor must be a positive integer value. The default value is 1.

- `ApplicationProcessor:<MemberApplicationName>`

  (Relevant only for multiprocessor and multicore systems): By default, the signal generator is started on the node where the task specified by TaskName is running. By using this attribute, you can specify another node to run the signal generator. Refer to SignalGenerator (Data Object) (AutomationDesk Accessing Simulation Platforms 🕮).

Note

You can add any type of data object to the block's parameters.
The names of data objects must not start or end with an underscore. For further information on the naming conventions, refer to Realizing Data Exchange Between AutomationDesk and Python (AutomationDesk Basic Practices 🕮).

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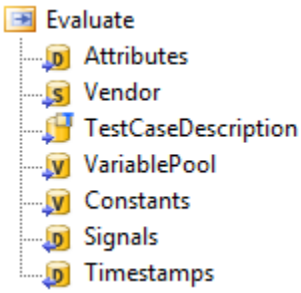
SignalGenerator (Data Object) (AutomationDesk Accessing Simulation Platforms 🕮)
Step (AutomationDesk Basic Practices 🕮)
Stop Trigger..... 218

Evaluate

Graphical representation



Purpose

To provide a test step for result evaluation and report.

Description

This block implements the predefined result evaluation and reporting of a signal-based test as configured in a test case description.

This block is internally used by **TestCase** and **TestBlock** in the **Signal-Based Testing** library, but you can also use it separately in your own sequences.

You can parameterize this test step by using the **Constants** dictionary. You can use its keys as alias names in the test case description, e.g., to specify a property or a condition.

Note

The following preconditions have to be fulfilled:

- The evaluation methods must be configured via a **TestCaseDesription** data object that specifies an STZ file that you created using AutomationDesk's **Signal Editor**.
- The captured data to be evaluated must be stored in MDF files (ASAM Common MDF Version 4.1) that are accessible via DataFile segments of the capture signals in the test case description. This is the result of an execution of the **StimulateAndCapture** step.
- Signals are mapped to model variables via their names. The signal name in the test case description must be the same as the string name in the VariablePool.
- The model variables that are relevant for the evaluation must be specified in a **VariablePool** like known from the **XIL API Convenience** library.
- All alias names that are used in the test case description must be resolvable via one of the following items:
  - A key in the **Constants** dictionary
  - A variable name in the **VariablePool**
  - A signal name in the **TestCaseDescription**

The **Vendor** string data object specifies the implementation of the XIL API that is used to access the MDF files with the captured data.

The **Evaluate** template is based on the **Step** template of the **Test Builder** library. Thus, the verdict and exception handling and the use of the **Attributes** dictionary are inherited. For details, refer to Step (AutomationDesk Basic Practices 🕮).

The step's Body operation slot provides the following functionality:

- The STZ file that specifies the test case description is analyzed concerning the evaluation relevant signals, segments and their properties.
- The evaluation relevant signals are generated as **Signal** data objects. The captured signals are loaded with the captured data from the MDF files that are the result of the **StimulateAndCapture** step. The signal names and objects are stored in the returned **Signals** dictionary.
- Depending on the segment parameters, on the evaluation of time tags and stop triggers, and on the **Mandatory** property, the time stamps that limit each segment are determined for each signal. The result is stored in the returned **Timestamps** dictionary. For details on time stamp determination, refer to Time stamp determination, below.
- The evaluations that are specified by the following properties are executed:
  - The time constraint that is specified by the **Minimum Duration** and the **Maximum Duration** property.
  - The value constraint that is specified by the **Evaluation Method**. Depending on the selected evaluation method, further properties, such as tolerances, are relevant.

For each evaluated signal, a section is added to the report where the signal, its references, triggers and constraints are documented in an overview. Evaluation details for every segment are written to sub-reports. The test verdicts that you can configure via the **True Verdict** or the **False Verdict** property are also reported.

- The predefined values and resources are cleared and released.

Note

If you only want to use a segment to check preconditions for further testing, specify `Undefined` for the **True Verdict** property and `None` for the **False Verdict** property.

Time stamp determination

The segment-limiting time stamps for the evaluation are determined in the following way:

- The triggers are evaluated from the start of the test to its end.
- Fixed duration of segments are preserved.
- Mandatory time tags are evaluated first, followed by the evaluation of optional time tags.
- Then the mandatory segment stop triggers are evaluated.
- Optional stop triggers are evaluated afterwards for the remaining time intervals.

  An optional time tag or segment stop trigger that does not occur affects the determination of the segment's end time stamp respectively the start time stamp of its successor segments.

  For example, if an optional stop trigger does not occur, the duration of its segment is extended to the next time stamp that is uniquely defined by the successor segments. If there are further segments with an optional stop trigger before the fixed time stamp, their duration is set to zero.

Data objects

This automation block provides the following data objects:

Name	In / Out	Type	Default Value	Description
Attributes	In	Dictionary	{}[1)]	Specifies attribute values that differ from the default values in the configuration file. For further information, refer to Configuration Attributes (AutomationDesk Basic Practices 🕮).
Vendor	In	String	"dSPACE"	Specifies the vendor and version of the used XIL API implementation. With `dSPACE` specified as the vendor, the current version of the dSPACE XIL API implementation is used. To specify another version or another vendor, use the following format: `<VendorName>_<ProductName>_<ProductVersion>`

Name	In / Out	Type	Default Value	Description
				Example: `dSPACE GmbH_XIL API_2019-A` It is recommended to use a globally managed **Vendor** data object as a reference providing the vendor name. For more information, refer to **Vendor (Data Object)** (AutomationDesk Accessing Simulation Platforms 🕮).
TestCaseDescription	In	TestcaseDescription	" "[2]	Specifies the STZ file that contains the signal description set that configures the variable stimulation, data capturing and result evaluation of the signal-based test.
VariablePool	In	Variant	None	Lets you specify the set of variables that can be used at the block. Three different methods: ▪ Create an XIL API Mapping data object in your project and reference it. The contained `Alias` values are interpreted as variable names and the associated `Identifier` values as the model paths. ▪ (For compatibility reasons only) Create *one* variable pool data container and reference it at the block's VariablePool data object. Specify each variable contained in the pool as a String data object in the data container: ▪ `<VariableName>` the name of the String data object ▪ `<ModelPath>` the value of the String data object ▪ (For compatibility reasons only) Create a dictionary and reference it. The value of the dictionary is interpreted as `<VariableName>:<ModelPath>`. It is recommended to use the XIL API Mapping data object.
Constants	In	Variant	None	Lets you specify the set of constants that can be used at the block. Two different methods: ▪ Create a dictionary and reference it. The value of the dictionary is interpreted as `<ConstantName>:<NumericalValue>`. ▪ (Not recommended) Create a constants data container and reference it at the block's Constants data object. Specify each constant as an Integer or Float data object in the data container: ▪ `<ConstantName>` the name of the Integer or Float data object

Name	In / Out	Type	Default Value	Description
				▪ `<NumericalValue>` the value of the Integer or Float data object The use of a data container to specify constants is planed to be discontinued in the future. It is therefore recommended to use a dictionary data object.
Signals	Out	Dictionary	{}	Returns a dictionary that provides the signals of the test case description as Signal data objects in the format `<SignalName>`:`<SignalObject>`. The Signal object type is defined in the Evaluation library. For details, refer to Signal (AutomationDesk Basic Practices 🕮).
Timestamps	Out	Dictionary	{}	Returns a dictionary of the time stamps that limit a signal's segments in the format `<SignalName>`:`<List of segment-limiting timestamps>`.

[1] The following Test Builder attribute is used internally and appears in the default value: `{u'suppress_arguments': [u'Attributes', u'Vendor', u'TestCaseDescription', u'VariablePool', u'Signals', u'Timestamps']}`.
[2] While you did not specify an STZ file name, AutomationDesk proposes `./<ProjectName>_<SequenceName>.stz`.

Additional attributes The following attributes for evaluation are valid as **`<key>:<value>`** pairs in the Attributes dictionary:

- `provide_evaluation_signals:<SignalSpecification>`

  By using this attribute, you can specify which signals are provided in the Signals dictionary that is returned by the Evaluate block. This lets you control the amount of the used resources.

Signal Specification	Meaning
`u'_NONE_'`	No signals are provided.
`u'_CAPTURE_'`	Only signals with the Action property set to **`Capture`** are provided. This is the default setting.
`u'_ALL_'`	All known signals are provided.
`<List of signal names>`	Only the signals from the specified list are provided.

- `provide_evaluation_timestamps:<TimestampSpecification>`

  By using this attribute, you can specify which time stamps are provided in the Timestamps dictionary that is returned by the Evaluate block. This lets you control the amount of the used resources.

Timestamp Specification	Meaning
`u'_NONE_'`	No time stamps are provided.
`u'_EVAL_'`	Only time stamps of signals with an Evaluation method property not equal to **`None`** are provided.
`u'_TIMETAGS_'`	Only time stamps of the time tags that are specified in the test case description are provided.
`u'_TIMETAGS_AND_EVAL_'`	Only time stamps of the signals with an evaluation method and time stamps of time tags are provided.

Timestamp Specification	Meaning
`u'_ALL_'`	The time stamps of all signals and all time tags are provided. This is the default setting.
`<List of signal names and time tag names>`	Only the time stamps of the signals and time tags from the specified list are provided.

- `augment_measurementdatafile:u''`

  If you specify this attribute, all time tags are included as bookmarks at the calculated point in time in the resulting MDF file (ASAM Common MDF Version 4.1, file name extension: MF4).

Note

You can add any type of data object to the block's parameters.
The names of data objects must not start or end with an underscore. For further information on the naming conventions, refer to Realizing Data Exchange Between AutomationDesk and Python (AutomationDesk Basic Practices 🕮).

Related topics

Basics

Overview on the Test Concept and the Involved Components 16

References

Evaluation Method 172
Mandatory 180
Maximum Duration 182
Minimum Duration 186
Signal Editor 103
Step (AutomationDesk Basic Practices 🕮)
StimulateAndCapture 91

Commands And Dialogs

Signal Editor

Introduction

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

Where to go from here

Information in this section

Signal Description Sets 103
The Signal Editor manages one or more signals in signal description sets.

Signals 111
Signals can be configured as the result of an operation of other signals or as a sequence of segments.

Segments 118
The Signal Editor provides several types of segments that can be arranged in segment signals.

Properties 156
Signal description sets, signals and segments are configured via their properties.

Signal Editor Commands 234
The Signal Editor provides commands and panes to create and edit signal description sets and signals graphically.

Information in other sections

Signal Editor Page (AutomationDesk Basic Practices 🕮)
To alter the default settings for the Signal Editor.

Signal Description Sets

Introduction

The Signal Editor manages one or more signals in signal description sets.

Where to go from here

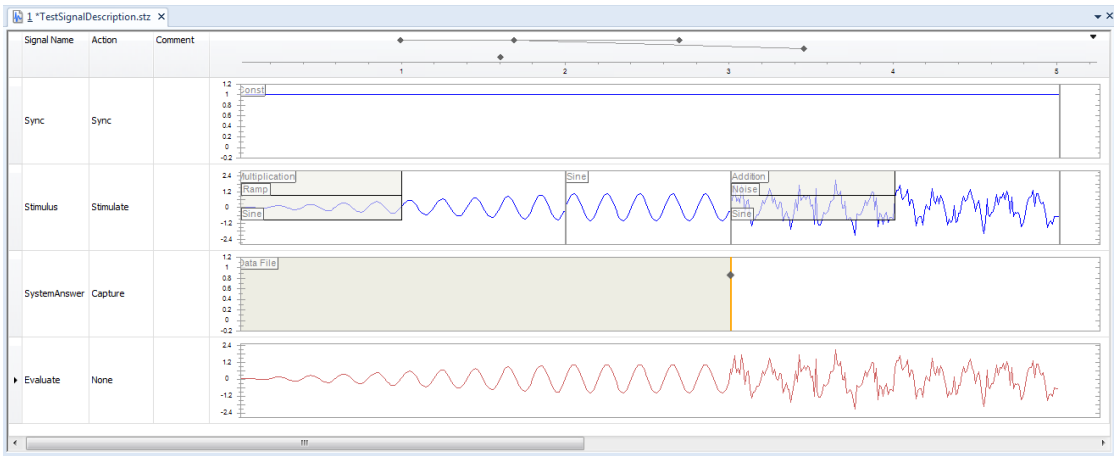
Information in this section

Signal Description Set 104
To display, edit and store the configuration of one or more signals.

Time Tag 110
To define a point in time by an offset and/or a condition.

Signal Description Set

Graphical representation



Purpose

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

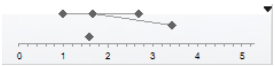
Description

A signal description set is a container for one or more signal descriptions and can be stored in an STZ file. 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.

An opened signal description set is displayed in the working area of the Signal Editor as a list of the contained signals. The associated STZ file name is displayed in the working area's tab. A leading asterisk (*) indicates that the signal set was changed since its last save.

You can sort, group, and filter the signal list, and hide or add some of its columns by using the context menu of the column headers.

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.
Action	Lets you specify how the signal is used for signal-based testing. If the signal description set is used in an other context, the Action value is ignored. This field equals the Action property of the signal.
Comment	Lets you specify a signal-specific comment. This field equals the Comment property of the signal.
<Custom column>	Optionally, you can create additional columns via the Create Column command which lets you specify arbitrary strings for grouping and filtering signals.
	Lets you edit each signal graphically. For example, you can add segments to a segment signal by dragging them from the **Signal Selector**. The time scale in the header of this column lets you create and configure time tags within the signal description set. For more information, refer to Time Tag on page 110.

How the signals are mapped to model paths and vice versa depends on the used automation library:

- XIL API

  The mapping can be configured and stored via the **Signal Mapping** pane of ControlDesk. They are stored in STZ files. You cannot edit the signal mapping in STZ files by means of AutomationDesk.

  If the used STZ file does not contain the signal mapping, you can assign a model path to a signal name via the **SetAssignments** block. For details, refer to **SetAssignments** (AutomationDesk Accessing Simulation Platforms 🕮).

- XIL API Convenience

  The mapping of signal names to variable names is specified in an **Assignments** dictionary. The variable names are mapped to a model path via a variable pool, which you can specify via a **Mapping** data object, or, for compatibility reasons, a Dictionary or a DataContainer. For Details, refer to **InitializeSignalGenerator** (AutomationDesk Accessing Simulation Platforms 🕮).

- Signal-Based Testing

  The mapping is configured in the **TestCaseDescription** and the **VariablePool** data objects.

  You can specify the signal names for the test case description by editing its STZ file using AutomationDesk's **Signal Editor**. The signal names used here must be equal to a string name in a **VariablePool** data object that specifies the model path. For details, refer to **TestCaseDescription (Data Object)** on page 80.

You can add signals to the list in the following ways:

- By dragging a signal item from the **Signal Selector** to the list.
- By dragging a mapping item from the **Mapping Viewer** to the list.
- By dragging a String data object from a VariablePool to the list. Then a signal with the string's name is added.
- By copying and pasting of other signals.

You can configure the signal description set and its signals and segments by using the **Properties** pane.

Signal description set symbol

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

Properties

You can select a signal description set to edit its properties in the Properties pane by clicking in the empty area in the description set's signal table or you can click the empty, leftmost signal table header field. The following property groups are provided:

Common A signal description set provides the following general properties:

Property	Purpose
Name (Signal Description Set) on page 189	To specify the name of the current signal description set.
Comment on page 166	To specify a comment.
Action on page 161	To specify how the signal can be used for signal-based testing. The **Action** property is inherited by the signals that are newly added to the signal description set.

Edit A signal description set provides the following edit properties that are inherited by the contained signals:

Property	Purpose
Value Step Size on page 234	To specify the step size for interactive editing of the segment's value.
Maximum Value on page 185	To set the maximum value that you can specify interactively.
Minimum Value on page 188	To set the minimum value that you can specify interactively.
Time Step Size on page 222	To specify the time step size for interactive editing of the segment's duration.

Evaluation The evaluation properties are relevant only if you want to use the signal description set as a **TestCaseDescription** data object for the automation blocks that are provided by the **Signal-Based Testing** library.

A signal description set provides the following evaluation properties that are inherited by the contained segments:

Property	Purpose
Evaluation Method on page 172	To select an evaluation method.
Reference on page 197	To select the signal that defines the reference values for the evaluation.
Signal on page 212	To select the signal to be evaluated.
Tolerance on page 224	To specify the tolerance between the evaluated signal and the reference signal.
Bound on page 164	To specify the signal that defines the bound values for the evaluation.
Upper Bound on page 231	To select the signal that defines the upper bound values for the evaluation.
Lower Bound on page 179	To select the signal that defines the lower bound values for the evaluation.
Tolerance Left on page 226	To specify the absolute tolerance for the evaluation in negative time-axis direction.
Tolerance Right on page 227	To specify the absolute tolerance for the evaluation in positive time-axis direction.
Tolerance Up on page 228	To specify the absolute tolerance for the evaluation in positive y-axis direction.
Tolerance Down on page 225	To specify the absolute tolerance for the evaluation in negative y-axis direction.

Property	Purpose
Rel. Tolerance Left on page 200	To specify the relative part of the tolerance for the evaluation in negative time-axis direction.
Rel. Tolerance Right on page 201	To specify the relative part of the tolerance for the evaluation in positive time-axis direction.
Rel. Tolerance Up on page 203	To specify the relative part of the tolerance for the evaluation in positive y-axis direction.
Rel. Tolerance Down on page 199	To specify the relative part of the tolerance for the evaluation in negative y-axis direction.
Maximum Duration on page 182	To specify the maximum duration of the signal/segment.
Minimum Duration on page 186	To specify the minimum duration of the signal/segment.
Mandatory on page 180	To specify that the occurrence of the stop trigger is mandatory for test case evaluation.
True Verdict on page 230	To specify the verdict that is provided if the evaluation returns true.
False Verdict on page 173	To specify the verdict that is provided if the evaluation returns false.

Display A signal description set provides the following display properties:

Property	Purpose
Show Time Cursor on page 210	To show the time and y-axis value at the mouse pointer position in the signal plot.
Show X-Axis on page 210	To show a separate x-axis for each signal.
Show Segment Parameters on page 208	To show the segment parameters in the signal plot.
Show Segment Types on page 209	To show segment type labels in the signal plot.
Show Segment Comments on page 208	To show the segment comments in the signal plot.
Use Block Representation on page 232	To display block representations instead of a plotted signal.
Show Grid on page 207	To show grid lines in the signal plot.
Show Evaluation Verdicts on page 206	To display the evaluation verdicts of the latest test execution with the signal in the plot.
Show Evaluation Signals on page 205	To display the evaluation signals together with the signal in the plot.
Plot Resolution on page 196	To specify the resolution of the signal plot(s) in seconds.

Parameters You can specify custom parameters that you can use in other properties to specify their values.

Property	Purpose
Parameters on page 193	To specify a list of global parameters for a signal description set.

Related commands A signal description set provides the following commands:

Purpose	Refer to
To create a new signal description set.	New Signal Description Set on page 248
To open a signal description set.	Open Signal Set on page 249
To save the selected signal description set.	Save Signal Set on page 253
To save a selected signal description set under a new name.	Save Signal Set As on page 254
To create a time tag at the mouse pointer position.	Create Time Tag on page 239
To delete the selected time tag.	Delete Time Tag on page 241
To show or hide time tags on the time scale.	Show/Hide Time Tags on page 258
To show a separate x-axis for each signal.	X-Axis on page 263
To show grid lines in the signal plot.	Grid on page 247
To show the time and y-axis value at the mouse pointer position in the signal plot.	Time Cursor on page 261

Purpose	Refer to
To display block representations instead of a plotted signal.	Block Representation on page 237
To display the evaluation signals together with the signal in the plot.	Evaluation Signals on page 244
To show the segment comments in the signal plot.	Segment Comments on page 254
To undo the most recent edit commands or actions.	Undo (AutomationDesk Basic Practices 🕮)
To redo the most recent commands or actions.	Redo (AutomationDesk Basic Practices 🕮)
To zoom into signals and segments.	Zoom Mode on page 263
To select and arrange signals and segments in signal description sets.	Select Mode on page 257
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 247
To show the default range of signals.	Zoom to Default on page 264
To fit the signal view to the signal length.	Fit to Screen on page 246
To reload the current signal description set from the opened STZ file.	Reload on page 251
To show the Properties pane.	Properties on page 249

Column header commands

Several commands for showing the signal list are available via the context menu of the column headers.

Create Column Lets you create an additional custom column in which you can specify arbitrary strings. Refer to Create Column on page 238.

Delete Column Lets you delete a custom column. Refer to Delete Column on page 240.

Rename Column Lets you rename a custom column. Refer to Rename Column on page 252.

Sort Ascending Lets you sort the list alphabetically in ascending order according to the selected column.

Sort Descending Lets you sort the list alphabetically in descending order according to the selected column.

Clear Sorting Lets you display the list in unsorted order.

Group By This Column Lets you group the list according to the values in the selected column.

Show/Hide Group By Box Lets you display/hide a box above the list headers. You can group the list by more than one column by dragging the column header to that box.

Full Expand Lets you completely expand all groups of a grouped list.

Full Collapse Lets you collapse all entries in a grouped list to the top-level groups.

Clear Grouping Lets you display the list without groups.

Column Chooser Lets you display/hide the Customization dialog that lines up the currently hidden columns. You can add these columns to the display by

dragging them to the header of the signal list. You can hide columns from the signal list by dragging them below the list.

Remove This Column Lets you hide the selected column. You can add it to the display again using the Column Chooser.

Best Fit Lets you optimize the width of the selected column.

Best Fit (all columns) Lets you optimize the widths of all columns to fit the width of the list.

Filter Editor Lets you specify a filter condition for the list. For more information, refer to Edit Filter (AutomationDesk Basic Practices 🕮).

Show/Hide Find Panel Lets you display/hide an edit field above the column headers where you can enter a search string for the list. Click Find to highlight matching entries in yellow. Click Clear to reset the search string to an empty string.

Show/Hide Auto Filter Row Lets you display/hide an additional row of edit fields above the list headers where you can specify column-specific filtering expressions.

Related topics

Basics

Basics on Signal Description Sets.....21

HowTos

How to Create and Save a Signal Description Set.....24

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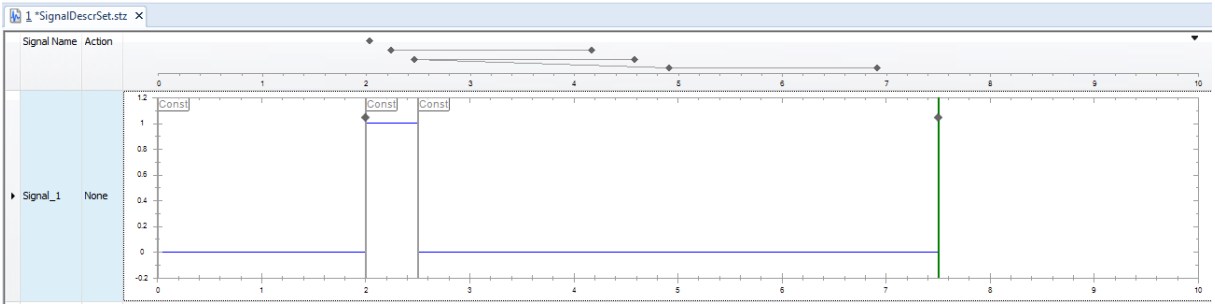
Signals.....111
Symbol Name.....220
Time Tag.....110

Time Tag

Graphical representation



Purpose

To define a point in time by an offset and/or a condition.

Description

Note

Time tags are relevant only if you want to use the according signal description set as a **TestCaseDescription** data object for the automation blocks that are provided by the **Signal-Based Testing** library.

A time tag gives a name to a point in time where a specified condition is fulfilled and/or where a time offset relative to the predecessor time tag is reached.

The time tag name can be used to specify the end of one or more segments during the segment-wise evaluation in signal-based tests. Within a signal description set, each time tag name must by unique.

You can configure the selected time tag by using the **Properties** pane. You can also change the Offset property of a time tag by dragging its symbol within the time scale.

Via their properties, you can concatenate time tags by specifying one as the predecessor of another. Because more than one time tag can have the same predecessor, you can define tree structures of time tags.

Since you cannot use time tags to define stop triggers, time tags are ignored in stimulus signals.

Time Tags are stored with the signal description set in the associated STZ file.

Time symbol

A time tag has the following symbol in the time scale of the **Signal Editor**: ◆

Time tags that are concatenated are linked by a line.

Properties

Time Tag A time tag provides the following properties:

Property	Purpose
Name (Time Tag) on page 189	To specify the name of the selected time tag.
Offset (Time Tag) on page 191	To specify the time offset from the predecessor time tag.
Condition on page 167	To specify a condition for a trigger or a time tag.
Mandatory (Time Tag) on page 182	To specify that reaching the time tag is mandatory for test case evaluation.
Predecessor on page 197	To specify the predecessor of the selected time tag.
Minimum Offset on page 187	To specify the minimum time offset from the predecessor time tag.
Maximum Offset on page 184	To specify the maximum time offset from the predecessor time tag.
Comment on page 166	To specify a comment.

Related commands

A time tag provides the following commands:

Purpose	Refer to
To create a time tag at the mouse pointer position.	Create Time Tag on page 239
To delete the selected time tag.	Delete Time Tag on page 241
To show the Properties pane.	Properties on page 249
To show or hide time tags on the time scale.	Show/Hide Time Tags on page 258

Related topics

HowTos

How to Use Time Tags 75

References

Create Time Tag..... 239
Delete Time Tag..... 241
Properties..... 249
Show/Hide Time Tags..... 258
Signal Description Set..... 104

Signals

Introduction

Signals can be configured as the result of an operation of other signals or as a sequence of segments.

Where to go from here

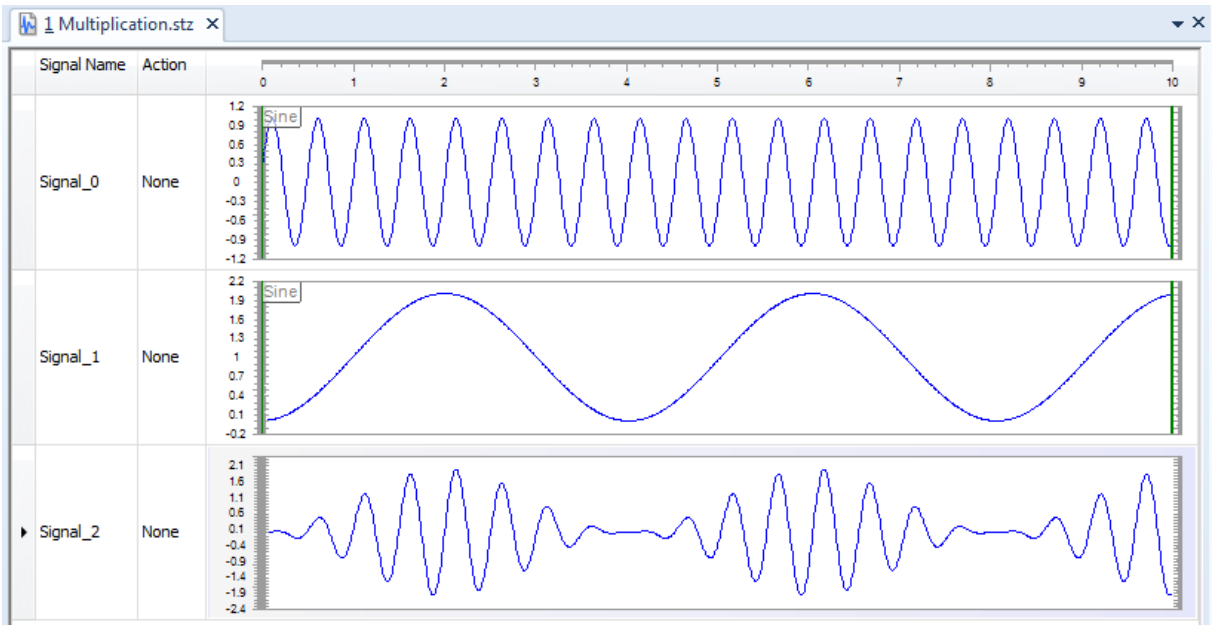
Information in this section

Operation Signal..... 112
To perform arithmetic operations between two signals.

Segment Signal..... 115
To serve as a container for segments.

Operation Signal

Graphical representation



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 arithmetic operation.

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

You can also use an Operation Signal as an operand in other Operation Signals.

Signal symbol

The signal has the following symbol in the Signal Selector:

Properties

Common The signal provides the following general properties:

Property	Purpose
Symbol Name on page 220	To specify the name of the selected signal.
Action on page 161	To specify how the signal can be used for signal-based testing.
Comment on page 166	To specify a comment.
<Custom Column> on page 168	To specify a custom property.

Evaluation The evaluation properties are relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.

A signal provides the following evaluation properties that are inherited by the contained segments:

Property	Purpose
Evaluation Method on page 172	To select an evaluation method.
Reference on page 197	To select the signal that defines the reference values for the evaluation.
Signal on page 212	To select the signal to be evaluated.
Tolerance on page 224	To specify the tolerance between the evaluated signal and the reference signal.
Bound on page 164	To specify the signal that defines the bound values for the evaluation.
Upper Bound on page 231	To select the signal that defines the upper bound values for the evaluation.
Lower Bound on page 179	To select the signal that defines the lower bound values for the evaluation.
Tolerance Left on page 226	To specify the absolute tolerance for the evaluation in negative time-axis direction.
Tolerance Right on page 227	To specify the absolute tolerance for the evaluation in positive time-axis direction.
Tolerance Up on page 228	To specify the absolute tolerance for the evaluation in positive y-axis direction.
Tolerance Down on page 225	To specify the absolute tolerance for the evaluation in negative y-axis direction.
Rel. Tolerance Left on page 200	To specify the relative part of the tolerance for the evaluation in negative time-axis direction.
Rel. Tolerance Right on page 201	To specify the relative part of the tolerance for the evaluation in positive time-axis direction.
Rel. Tolerance Up on page 203	To specify the relative part of the tolerance for the evaluation in positive y-axis direction.
Rel. Tolerance Down on page 199	To specify the relative part of the tolerance for the evaluation in negative y-axis direction.
Maximum Duration on page 182	To specify the maximum duration of the signal/segment.
Minimum Duration on page 186	To specify the minimum duration of the signal/segment.
Mandatory on page 180	To specify that the occurrence of the stop trigger is mandatory for test case evaluation.

Property	Purpose
True Verdict on page 230	To specify the verdict that is provided if the evaluation returns true.
False Verdict on page 173	To specify the verdict that is provided if the evaluation returns false.

Operation parameters The signal provides the following operation parameters:

Property	Purpose
Operand 1 on page 191	To specify the left operand of the operation that defines an operational signal.
Operand 2 on page 192	To specify the right operand of the operation that defines an operational signal.
Operation (Property) on page 193	To specify an arithmetic operation.

Display The signal provides the following display properties:

Property	Purpose
Use Block Representation on page 232	To display block representations instead of a plotted signal.
Show Evaluation Signals on page 205	To display the evaluation signals together with the signal in the plot.
Show Evaluation Verdicts on page 206	To display the evaluation verdicts of the latest test execution with the signal in the plot.
Show Grid on page 207	To show grid lines in the signal plot.

Related commands The signal provides the following commands:

Purpose	Refer to
To zoom into signals and segments.	Zoom Mode on page 263
To select and arrange signals and segments in signal description sets.	Select Mode on page 257
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 247
To split a segment into two.	Split Mode on page 260
To cut the current selection to the Clipboard.	Cut (AutomationDesk Basic Practices 🕮)
To copy the current selection to the Clipboard.	Copy (AutomationDesk Basic Practices 🕮)
To paste the Clipboard content into the current window.	Paste (AutomationDesk Basic Practices 🕮)
To delete the current selection.	Delete (AutomationDesk Basic Practices 🕮)
To show the default range of signals.	Zoom to Default on page 264
To fit the signal view to the signal length.	Fit to Screen on page 246
To refresh the screen display of a signal.	Refresh on page 251
To show the Properties pane.	Properties on page 249
To reset previously changed properties to the values that are inherited from the parent.	Use Parent Properties on page 262

Related topics

Basics

Basics on Signals 36

HowTos

How to Create and Configure an Operation Signal..... 59

References

Properties..... 249
Segment Signal..... 115
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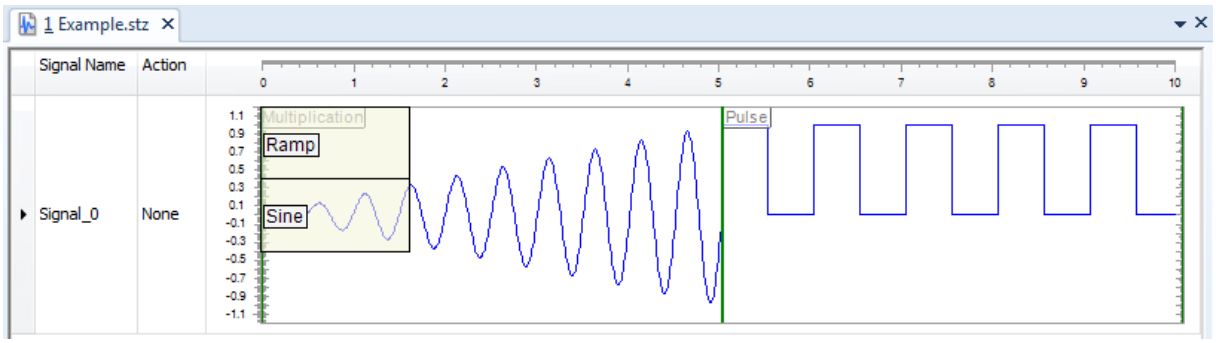
Segment Signal

Graphical representation



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** or by copying and pasting of other segments.

You can add as many segments to a segment signal as you want.

You can configure the signal and its segments using the **Properties** pane.

Signal symbol

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

Properties

Common The signal provides the following general properties:

Property	Purpose
Symbol Name on page 220	To specify the name of the selected signal.
Action on page 161	To specify how the signal can be used for signal-based testing.
Loop Count on page 178	To specify how often a segment/signal is executed during simulation.
Comment on page 166	To specify a comment.
<Custom Column> on page 168	To specify a custom property.

Edit The signal provides the following edit property that is inherited by the signal's segments:

Property	Purpose
Value Step Size on page 234	To specify the step size for interactive editing of the segment's value.
Maximum Value on page 185	To set the maximum value that you can specify interactively.
Minimum Value on page 188	To set the minimum value that you can specify interactively.
Time Step Size on page 222	To specify the time step size for interactive editing of the segment's duration.

Evaluation The evaluation properties are relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.

A signal provides the following evaluation properties that are inherited by the contained segments:

Property	Purpose
Evaluation Method on page 172	To select an evaluation method.
Reference on page 197	To select the signal that defines the reference values for the evaluation.
Signal on page 212	To select the signal to be evaluated.
Tolerance on page 224	To specify the tolerance between the evaluated signal and the reference signal.
Bound on page 164	To specify the signal that defines the bound values for the evaluation.
Upper Bound on page 231	To select the signal that defines the upper bound values for the evaluation.
Lower Bound on page 179	To select the signal that defines the lower bound values for the evaluation.
Tolerance Left on page 226	To specify the absolute tolerance for the evaluation in negative time-axis direction.
Tolerance Right on page 227	To specify the absolute tolerance for the evaluation in positive time-axis direction.
Tolerance Up on page 228	To specify the absolute tolerance for the evaluation in positive y-axis direction.
Tolerance Down on page 225	To specify the absolute tolerance for the evaluation in negative y-axis direction.
Rel. Tolerance Left on page 200	To specify the relative part of the tolerance for the evaluation in negative time-axis direction.
Rel. Tolerance Right on page 201	To specify the relative part of the tolerance for the evaluation in positive time-axis direction.
Rel. Tolerance Up on page 203	To specify the relative part of the tolerance for the evaluation in positive y-axis direction.
Rel. Tolerance Down on page 199	To specify the relative part of the tolerance for the evaluation in negative y-axis direction.
Maximum Duration on page 182	To specify the maximum duration of the signal/segment.
Minimum Duration on page 186	To specify the minimum duration of the signal/segment.
Mandatory on page 180	To specify that the occurrence of the stop trigger is mandatory for test case evaluation.

Property	Purpose
True Verdict on page 230	To specify the verdict that is provided if the evaluation returns true.
False Verdict on page 173	To specify the verdict that is provided if the evaluation returns false.

Display The signal provides the following display properties:

Property	Purpose
Show Segment Types on page 209	To show segment type labels in the signal plot.
Show Segment Comments on page 208	To show the segment comments in the signal plot.
Show Segment Parameters on page 208	To show the segment parameters in the signal plot.
Use Block Representation on page 232	To display block representations instead of a plotted signal.
Show Evaluation Verdicts on page 206	To display the evaluation verdicts of the latest test execution with the signal in the plot.
Show Evaluation Signals on page 205	To display the evaluation signals together with the signal in the plot.
Show Grid on page 207	To show grid lines in the signal plot.

Related commands The signal provides the following commands:

Purpose	Refer to
To zoom into signals and segments.	Zoom Mode on page 263
To select and arrange signals and segments in signal description sets.	Select Mode on page 257
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 247
To split a segment into two.	Split Mode on page 260
To cut the current selection to the Clipboard.	Cut (AutomationDesk Basic Practices 🕮)
To copy the current selection to the Clipboard.	Copy (AutomationDesk Basic Practices 🕮)
To paste the Clipboard content into the current window.	Paste (AutomationDesk Basic Practices 🕮)
To delete the current selection.	Delete (AutomationDesk Basic Practices 🕮)
To show the default range of signals.	Zoom to Default on page 264
To fit the signal view to the signal length.	Fit to Screen on page 246
To refresh the screen display of a signal.	Refresh on page 251
To show the Properties pane.	Properties on page 249
To reset previously changed properties to the values that are inherited from the parent.	Use Parent Properties on page 262

Related topics

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Signal Selector..... 259

Segments

Introduction

The Signal Editor provides several types of segments that can be arranged in segment signals for configuring arbitrary signal shapes.

Where to go from here

Information in this section

Const..... 119
To specify a constant segment.

Data File..... 122
To specify a segment's content via a linked MF4 data file.

Exponential..... 125
To specify an exponential segment.

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To specify an idle time without any signal value.

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To specify a sawtooth segment.

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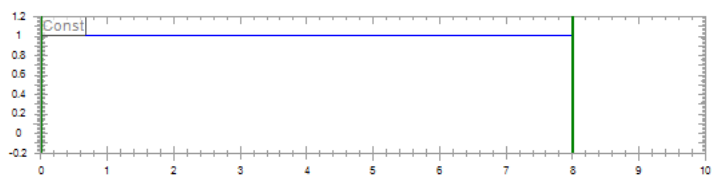
To specify a sine segment.

Const

Graphical representation

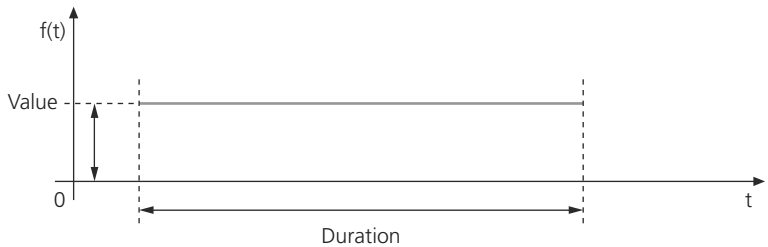


Purpose

To specify a constant segment.

Description

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



The corresponding mathematical function is:

$f(t) = C$

where:

Symbol	Meaning
t	Time
C	Constant value (= Value)

Segment symbol

The segment has the following symbol in the Signal Selector:

Properties

Common The segment provides the following general properties:

Property	Purpose
Segment Type on page 205	To display the segment type.
Comment on page 166	To specify a comment.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Duration on page 169	To specify a segment's duration in seconds.
Value on page 233	To specify a value for a const segment.
Stop Trigger on page 218	To define the duration of the selected segment by specifying a stop trigger.

Edit The segment provides the following edit properties:

Property	Purpose
Value Step Size on page 234	To specify the step size for interactive editing of the segment's value.
Maximum Value on page 185	To set the maximum value that you can specify interactively.
Minimum Value on page 188	To set the minimum value that you can specify interactively.
Time Step Size on page 222	To specify the time step size for interactive editing of the segment's duration.

Evaluation The evaluation properties are relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.

The segment provides the following evaluation properties:

Property	Purpose
Evaluation Method on page 172	To select an evaluation method.
Reference on page 197	To select the signal that defines the reference values for the evaluation.
Signal on page 212	To select the signal to be evaluated.
Tolerance on page 224	To specify the tolerance between the evaluated signal and the reference signal.
Bound on page 164	To specify the signal that defines the bound values for the evaluation.
Upper Bound on page 231	To select the signal that defines the upper bound values for the evaluation.
Lower Bound on page 179	To select the signal that defines the lower bound values for the evaluation.
Tolerance Left on page 226	To specify the absolute tolerance for the evaluation in negative time-axis direction.
Tolerance Right on page 227	To specify the absolute tolerance for the evaluation in positive time-axis direction.
Tolerance Up on page 228	To specify the absolute tolerance for the evaluation in positive y-axis direction.
Tolerance Down on page 225	To specify the absolute tolerance for the evaluation in negative y-axis direction.
Rel. Tolerance Left on page 200	To specify the relative part of the tolerance for the evaluation in negative time-axis direction.
Rel. Tolerance Right on page 201	To specify the relative part of the tolerance for the evaluation in positive time-axis direction.
Rel. Tolerance Up on page 203	To specify the relative part of the tolerance for the evaluation in positive y-axis direction.
Rel. Tolerance Down on page 199	To specify the relative part of the tolerance for the evaluation in negative y-axis direction.

Property	Purpose
Maximum Duration on page 182	To specify the maximum duration of the signal/segment.
Minimum Duration on page 186	To specify the minimum duration of the signal/segment.
Mandatory on page 180	To specify that the occurrence of the stop trigger is mandatory for test case evaluation.
True Verdict on page 230	To specify the verdict that is provided if the evaluation returns true.
False Verdict on page 173	To specify the verdict that is provided if the evaluation returns false.
Time Tag on page 222	To specify a time tag that defines the end of the selected segment.

Related commands

The segment provides the following commands:

Purpose	Refer to
To zoom into signals and segments.	Zoom Mode on page 263
To select and arrange signals and segments in signal description sets.	Select Mode on page 257
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 247
To split a segment into two.	Split Mode on page 260
To cut the current selection to the Clipboard.	Cut (AutomationDesk Basic Practices 🕮)
To copy the current selection to the Clipboard.	Copy (AutomationDesk Basic Practices 🕮)
To paste the Clipboard content into the current window.	Paste (AutomationDesk Basic Practices 🕮)
To delete the current selection.	Delete (AutomationDesk Basic Practices 🕮)
To show the default range of signals.	Zoom to Default on page 264
To fit the signal view to the signal length.	Fit to Screen on page 246
To convert the selected segment into a segment of an other type.	Convert Segment on page 237
To reset previously changed properties to the values that are inherited from the parent.	Use Parent Properties on page 262
To refresh the screen display of a signal.	Refresh on page 251
To show the Properties pane.	Properties on page 249

Related topics

Basics

Basics on Segments.....38
Behavior of Consecutive Segments.....40

HowTos

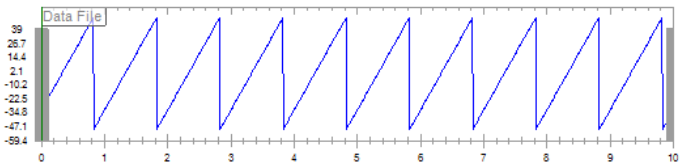
How to Configure a Segment Signal.....43
How to Create a Segment Signal.....41

References

Properties.....249
Segment Signal.....115
Signal Selector.....259

Data File

Graphical representation



Purpose

To specify a segment's content via a linked MF4 data file.

Description

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

The signal data of the MF4 file is not copied to the **Data File** segment. The **Data File** segment displays only 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.

> **Note**
>
> You can use different channels of the same MF4 file as a data vector by linking more than one Data File segment to the same MF4 file.

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 defined yet.

> **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.

Segment symbol

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

Properties

Common The segment provides the following general properties:

Property	Purpose
Segment Type on page 205	To display the segment type.
Comment on page 166	To specify a comment.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
File Name on page 175	To select and link numerical signal data from an MF4 file.
Start (Data File) on page 217	To specify a start value.
Duration on page 169	To specify a segment's duration in seconds.
Stop Trigger on page 218	To define the duration of the selected segment by specifying a stop trigger.
Interpolation on page 177	To specify the interpolation method to be used when replaying numerical data.
Group Name on page 176	To display the selected group name from the MF4 data file.
Group Source on page 177	To display the selected group source from the MF4 data file.
Group Path on page 176	To display the selected group path from the MF4 data file.
Data Vector Name on page 169	To display the data vector name, which is typically the name of the signal to be used.
Time Vector Name on page 223	To display the time vector name.
Channel Source on page 165	To display the selected channel source from the MF4 data file.
Channel Path on page 165	To display the selected channel path from the MF4 data file.

Edit The segment provides the following edit property:

Property	Purpose
Time Step Size on page 222	To specify the time step size for interactive editing of the segment's duration.

Evaluation The evaluation properties are relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.

The segment provides the following evaluation properties:

Property	Purpose
Evaluation Method on page 172	To select an evaluation method.
Reference on page 197	To select the signal that defines the reference values for the evaluation.
Signal on page 212	To select the signal to be evaluated.
Tolerance on page 224	To specify the tolerance between the evaluated signal and the reference signal.
Bound on page 164	To specify the signal that defines the bound values for the evaluation.
Upper Bound on page 231	To select the signal that defines the upper bound values for the evaluation.
Lower Bound on page 179	To select the signal that defines the lower bound values for the evaluation.
Tolerance Left on page 226	To specify the absolute tolerance for the evaluation in negative time-axis direction.
Tolerance Right on page 227	To specify the absolute tolerance for the evaluation in positive time-axis direction.
Tolerance Up on page 228	To specify the absolute tolerance for the evaluation in positive y-axis direction.
Tolerance Down on page 225	To specify the absolute tolerance for the evaluation in negative y-axis direction.
Rel. Tolerance Left on page 200	To specify the relative part of the tolerance for the evaluation in negative time-axis direction.
Rel. Tolerance Right on page 201	To specify the relative part of the tolerance for the evaluation in positive time-axis direction.
Rel. Tolerance Up on page 203	To specify the relative part of the tolerance for the evaluation in positive y-axis direction.
Rel. Tolerance Down on page 199	To specify the relative part of the tolerance for the evaluation in negative y-axis direction.
Maximum Duration on page 182	To specify the maximum duration of the signal/segment.
Minimum Duration on page 186	To specify the minimum duration of the signal/segment.
Mandatory on page 180	To specify that the occurrence of the stop trigger is mandatory for test case evaluation.

Property	Purpose
True Verdict on page 230	To specify the verdict that is provided if the evaluation returns true.
False Verdict on page 173	To specify the verdict that is provided if the evaluation returns false.
Time Tag on page 222	To specify a time tag that defines the end of the selected segment.

Related commands

The segment provides the following commands:

Purpose	Refer to
To zoom into signals and segments.	Zoom Mode on page 263
To select and arrange signals and segments in signal description sets.	Select Mode on page 257
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 247
To cut the current selection to the Clipboard.	Cut (AutomationDesk Basic Practices 🕮)
To copy the current selection to the Clipboard.	Copy (AutomationDesk Basic Practices 🕮)
To paste the Clipboard content into the current window.	Paste (AutomationDesk Basic Practices 🕮)
To delete the current selection.	Delete (AutomationDesk Basic Practices 🕮)
To show the default range of signals.	Zoom to Default on page 264
To fit the signal view to the signal length.	Fit to Screen on page 246
To convert the selected segment into a segment of an other type.	Convert Segment on page 237
To reset previously changed properties to the values that are inherited from the parent.	Use Parent Properties on page 262
To refresh the screen display of a signal.	Refresh on page 251
To show the Properties pane.	Properties on page 249

Related topics

Basics

Basics on Segments.....38
Behavior of Consecutive Segments.....40

HowTos

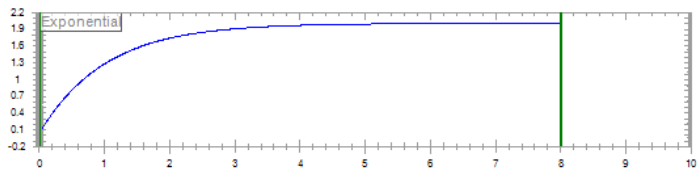
How to Create a Segment Signal.....41
How to Create and Configure a Data File Segment.....49

References

Properties.....249
Segment Signal.....115
Signal Selector.....259
Signal Value.....151

Exponential

Graphical representation

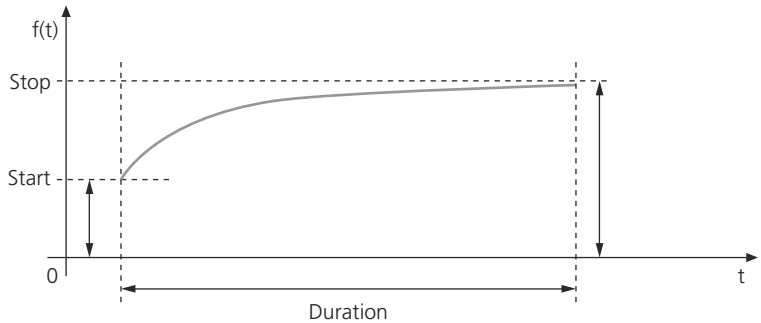


Purpose

To specify an exponential segment.

Description

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



The corresponding mathematical function is:

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

where:

Symbol	Meaning
t	Time
A	Amplitide (= Start - Stop)
τ (tau)	Time constant
b	Bias (= Start)

Segment symbol

The segment has the following symbol in the Signal Selector:

Properties

Common The segment provides the following general properties:

Property	Purpose
Segment Type on page 205	To display the segment type.
Comment on page 166	To specify a comment.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Duration on page 169	To specify a segment's duration in seconds.
Start on page 216	To specify a start value.
Stop on page 217	To specify a stop value.
Tau on page 221	To specify the time constant tau.
Stop Trigger on page 218	To define the duration of the selected segment by specifying a stop trigger.

Note

The value that you specified in the Stop property is approached but not reached at the end of the section. For details, refer to Behavior of Consecutive Segments on page 40.

Edit The segment provides the following edit property:

Property	Purpose
Time Step Size on page 222	To specify the time step size for interactive editing of the segment's duration.

Evaluation The evaluation properties are relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.

The segment provides the following evaluation properties:

Property	Purpose
Evaluation Method on page 172	To select an evaluation method.
Reference on page 197	To select the signal that defines the reference values for the evaluation.
Signal on page 212	To select the signal to be evaluated.
Tolerance on page 224	To specify the tolerance between the evaluated signal and the reference signal.
Bound on page 164	To specify the signal that defines the bound values for the evaluation.
Upper Bound on page 231	To select the signal that defines the upper bound values for the evaluation.
Lower Bound on page 179	To select the signal that defines the lower bound values for the evaluation.
Tolerance Left on page 226	To specify the absolute tolerance for the evaluation in negative time-axis direction.
Tolerance Right on page 227	To specify the absolute tolerance for the evaluation in positive time-axis direction.
Tolerance Up on page 228	To specify the absolute tolerance for the evaluation in positive y-axis direction.
Tolerance Down on page 225	To specify the absolute tolerance for the evaluation in negative y-axis direction.
Rel. Tolerance Left on page 200	To specify the relative part of the tolerance for the evaluation in negative time-axis direction.
Rel. Tolerance Right on page 201	To specify the relative part of the tolerance for the evaluation in positive time-axis direction.
Rel. Tolerance Up on page 203	To specify the relative part of the tolerance for the evaluation in positive y-axis direction.
Rel. Tolerance Down on page 199	To specify the relative part of the tolerance for the evaluation in negative y-axis direction.
Maximum Duration on page 182	To specify the maximum duration of the signal/segment.
Minimum Duration on page 186	To specify the minimum duration of the signal/segment.
Mandatory on page 180	To specify that the occurrence of the stop trigger is mandatory for test case evaluation.
True Verdict on page 230	To specify the verdict that is provided if the evaluation returns true.

Property	Purpose
False Verdict on page 173	To specify the verdict that is provided if the evaluation returns false.
Time Tag on page 222	To specify a time tag that defines the end of the selected segment.

Related commands

The segment provides the following commands:

Purpose	Refer to
To zoom into signals and segments.	Zoom Mode on page 263
To select and arrange signals and segments in signal description sets.	Select Mode on page 257
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 247
To split a segment into two.	Split Mode on page 260
To cut the current selection to the Clipboard.	Cut (AutomationDesk Basic Practices 🕮)
To copy the current selection to the Clipboard.	Copy (AutomationDesk Basic Practices 🕮)
To paste the Clipboard content into the current window.	Paste (AutomationDesk Basic Practices 🕮)
To delete the current selection.	Delete (AutomationDesk Basic Practices 🕮)
To show the default range of signals.	Zoom to Default on page 264
To fit the signal view to the signal length.	Fit to Screen on page 246
To convert the selected segment into a segment of an other type.	Convert Segment on page 237
To reset previously changed properties to the values that are inherited from the parent.	Use Parent Properties on page 262
To refresh the screen display of a signal.	Refresh on page 251
To show the Properties pane.	Properties on page 249

Related topics

Basics

Basics on Segments.....38
Behavior of Consecutive Segments.....40

HowTos

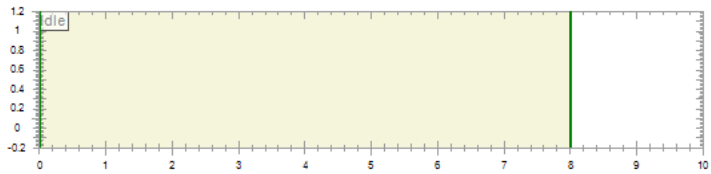
How to Configure a Segment Signal.....43
How to Create a Segment Signal.....41

References

Properties.....249
Segment Signal.....115
Signal Selector.....259

Idle

Graphical representation

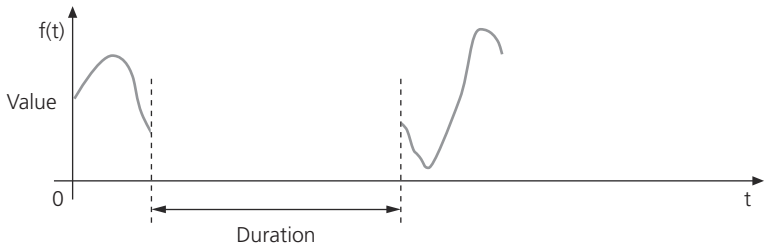


Purpose

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:

Properties

Common The segment provides the following general properties:

Property	Purpose
Segment Type on page 205	To display the segment type.
Comment on page 166	To specify a comment.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Duration on page 169	To specify a segment's duration in seconds.
Stop Trigger on page 218	To define the duration of the selected segment by specifying a stop trigger.

Edit The segment provides the following edit property:

Property	Purpose
Time Step Size on page 222	To specify the time step size for interactive editing of the segment's duration.

Evaluation The evaluation properties are relevant only if you want to use the signal description set as a **TestCaseDescription** data object for the automation blocks that are provided by the **Signal-Based Testing** library.

The segment provides the following evaluation properties:

Property	Purpose
Evaluation Method on page 172	To select an evaluation method.
Reference on page 197	To select the signal that defines the reference values for the evaluation.
Signal on page 212	To select the signal to be evaluated.
Tolerance on page 224	To specify the tolerance between the evaluated signal and the reference signal.
Bound on page 164	To specify the signal that defines the bound values for the evaluation.
Upper Bound on page 231	To select the signal that defines the upper bound values for the evaluation.
Lower Bound on page 179	To select the signal that defines the lower bound values for the evaluation.
Tolerance Left on page 226	To specify the absolute tolerance for the evaluation in negative time-axis direction.
Tolerance Right on page 227	To specify the absolute tolerance for the evaluation in positive time-axis direction.
Tolerance Up on page 228	To specify the absolute tolerance for the evaluation in positive y-axis direction.
Tolerance Down on page 225	To specify the absolute tolerance for the evaluation in negative y-axis direction.
Rel. Tolerance Left on page 200	To specify the relative part of the tolerance for the evaluation in negative time-axis direction.
Rel. Tolerance Right on page 201	To specify the relative part of the tolerance for the evaluation in positive time-axis direction.
Rel. Tolerance Up on page 203	To specify the relative part of the tolerance for the evaluation in positive y-axis direction.
Rel. Tolerance Down on page 199	To specify the relative part of the tolerance for the evaluation in negative y-axis direction.
Maximum Duration on page 182	To specify the maximum duration of the signal/segment.
Minimum Duration on page 186	To specify the minimum duration of the signal/segment.
Mandatory on page 180	To specify that the occurrence of the stop trigger is mandatory for test case evaluation.
True Verdict on page 230	To specify the verdict that is provided if the evaluation returns true.
False Verdict on page 173	To specify the verdict that is provided if the evaluation returns false.
Time Tag on page 222	To specify a time tag that defines the end of the selected segment.

Related commands

The segment provides the following commands:

Purpose	Refer to
To zoom into signals and segments.	Zoom Mode on page 263
To select and arrange signals and segments in signal description sets.	Select Mode on page 257
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 247
To split a segment into two.	Split Mode on page 260
To cut the current selection to the Clipboard.	Cut (AutomationDesk Basic Practices 🕮)
To copy the current selection to the Clipboard.	Copy (AutomationDesk Basic Practices 🕮)
To paste the Clipboard content into the current window.	Paste (AutomationDesk Basic Practices 🕮)
To delete the current selection.	Delete (AutomationDesk Basic Practices 🕮)
To show the default range of signals.	Zoom to Default on page 264
To fit the signal view to the signal length.	Fit to Screen on page 246
To convert the selected segment into a segment of an other type.	Convert Segment on page 237

Purpose	Refer to
To reset previously changed properties to the values that are inherited from the parent.	Use Parent Properties on page 262
To refresh the screen display of a signal.	Refresh on page 251
To show the Properties pane.	Properties on page 249

Related topics

Basics

Basics on Segments.....38
Behavior of Consecutive Segments.....40

HowTos

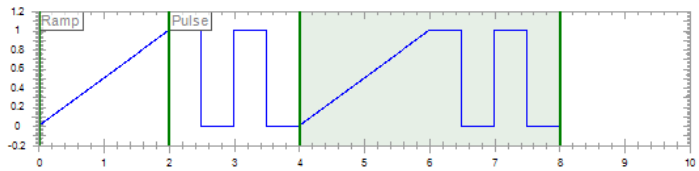
How to Configure a Segment Signal.....43
How to Create a Segment Signal.....41

References

Properties.....249
Segment Signal.....115
Signal Selector.....259

Loop

Graphical representation



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 defined yet.

You define how often a Loop segment is executed with its Loop Count on page 178 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:

Properties

Common The segment provides the following general properties:

Property	Purpose
Segment Type on page 205	To display the segment type.
Comment on page 166	To specify a comment.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Loop Count on page 178	To specify how often a segment/signal is executed during simulation.

Edit The segment provides the following edit property:

Property	Purpose
Time Step Size on page 222	To specify the time step size for interactive editing of the segment's duration.

Evaluation The evaluation properties are relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.

The segment provides the following evaluation properties:

Property	Purpose
Evaluation Method on page 172	To select an evaluation method.
Reference on page 197	To select the signal that defines the reference values for the evaluation.
Signal on page 212	To select the signal to be evaluated.
Tolerance on page 224	To specify the tolerance between the evaluated signal and the reference signal.
Bound on page 164	To specify the signal that defines the bound values for the evaluation.
Upper Bound on page 231	To select the signal that defines the upper bound values for the evaluation.
Lower Bound on page 179	To select the signal that defines the lower bound values for the evaluation.
Tolerance Left on page 226	To specify the absolute tolerance for the evaluation in negative time-axis direction.
Tolerance Right on page 227	To specify the absolute tolerance for the evaluation in positive time-axis direction.
Tolerance Up on page 228	To specify the absolute tolerance for the evaluation in positive y-axis direction.
Tolerance Down on page 225	To specify the absolute tolerance for the evaluation in negative y-axis direction.
Rel. Tolerance Left on page 200	To specify the relative part of the tolerance for the evaluation in negative time-axis direction.
Rel. Tolerance Right on page 201	To specify the relative part of the tolerance for the evaluation in positive time-axis direction.
Rel. Tolerance Up on page 203	To specify the relative part of the tolerance for the evaluation in positive y-axis direction.
Rel. Tolerance Down on page 199	To specify the relative part of the tolerance for the evaluation in negative y-axis direction.
Maximum Duration on page 182	To specify the maximum duration of the signal/segment.

Property	Purpose
Minimum Duration on page 186	To specify the minimum duration of the signal/segment.
Mandatory on page 180	To specify that the occurrence of the stop trigger is mandatory for test case evaluation.
True Verdict on page 230	To specify the verdict that is provided if the evaluation returns true.
False Verdict on page 173	To specify the verdict that is provided if the evaluation returns false.
Time Tag on page 222	To specify a time tag that defines the end of the selected segment.

Related commands

The segment provides the following commands:

Purpose	Refer to
To zoom into signals and segments.	Zoom Mode on page 263
To select and arrange signals and segments in signal description sets.	Select Mode on page 257
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 247
To cut the current selection to the Clipboard.	Cut (AutomationDesk Basic Practices 🕮)
To copy the current selection to the Clipboard.	Copy (AutomationDesk Basic Practices 🕮)
To paste the Clipboard content into the current window.	Paste (AutomationDesk Basic Practices 🕮)
To delete the current selection.	Delete (AutomationDesk Basic Practices 🕮)
To show the default range of signals.	Zoom to Default on page 264
To fit the signal view to the signal length.	Fit to Screen on page 246
To convert the selected segment into a segment of an other type.	Convert Segment on page 237
To reset previously changed properties to the values that are inherited from the parent.	Use Parent Properties on page 262
To refresh the screen display of a signal.	Refresh on page 251
To show the Properties pane.	Properties on page 249

Related topics

Basics

Basics on Segments.....38
Behavior of Consecutive Segments.....40

HowTos

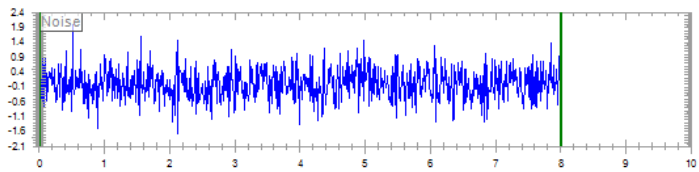
How to Create a Segment Signal.....41
How to Execute Segments or Signals Several Times.....45

References

Segment Signal.....115

Noise

Graphical representation

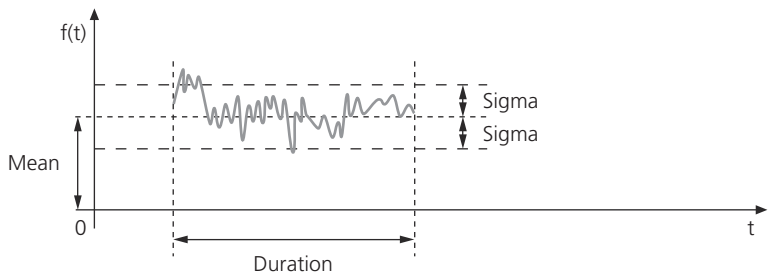


Purpose

To specify a noisy segment.

Description

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



The corresponding mathematical function is:

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

where:

Symbol	Meaning
t	Time
R(t)	Random function
σ (sigma)	Standard deviation
μ (mu)	Mean value

Segment symbol

The segment has the following symbol in the Signal Selector:

Properties

Common The segment provides the following general properties:

Property	Purpose
Segment Type on page 205	To display the segment type.
Comment on page 166	To specify a comment.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Duration on page 169	To specify a segment's duration in seconds.
Mean on page 185	To specify the mean value of a Gaussian noise.
Seed on page 204	To specify the seed of a random generator.
Sigma on page 211	To specify the standard deviation of a Gaussian noise.
Stop Trigger on page 218	To define the duration of the selected segment by specifying a stop trigger.

Edit The segment provides the following edit property:

Property	Purpose
Time Step Size on page 222	To specify the time step size for interactive editing of the segment's duration.

Evaluation The evaluation properties are relevant only if you want to use the signal description set as a **TestCaseDescription** data object for the automation blocks that are provided by the **Signal-Based Testing** library.

The segment provides the following evaluation properties:

Property	Purpose
Evaluation Method on page 172	To select an evaluation method.
Reference on page 197	To select the signal that defines the reference values for the evaluation.
Signal on page 212	To select the signal to be evaluated.
Tolerance on page 224	To specify the tolerance between the evaluated signal and the reference signal.
Bound on page 164	To specify the signal that defines the bound values for the evaluation.
Upper Bound on page 231	To select the signal that defines the upper bound values for the evaluation.
Lower Bound on page 179	To select the signal that defines the lower bound values for the evaluation.
Tolerance Left on page 226	To specify the absolute tolerance for the evaluation in negative time-axis direction.
Tolerance Right on page 227	To specify the absolute tolerance for the evaluation in positive time-axis direction.
Tolerance Up on page 228	To specify the absolute tolerance for the evaluation in positive y-axis direction.
Tolerance Down on page 225	To specify the absolute tolerance for the evaluation in negative y-axis direction.
Rel. Tolerance Left on page 200	To specify the relative part of the tolerance for the evaluation in negative time-axis direction.
Rel. Tolerance Right on page 201	To specify the relative part of the tolerance for the evaluation in positive time-axis direction.
Rel. Tolerance Up on page 203	To specify the relative part of the tolerance for the evaluation in positive y-axis direction.
Rel. Tolerance Down on page 199	To specify the relative part of the tolerance for the evaluation in negative y-axis direction.
Maximum Duration on page 182	To specify the maximum duration of the signal/segment.
Minimum Duration on page 186	To specify the minimum duration of the signal/segment.
Mandatory on page 180	To specify that the occurrence of the stop trigger is mandatory for test case evaluation.
True Verdict on page 230	To specify the verdict that is provided if the evaluation returns true.
False Verdict on page 173	To specify the verdict that is provided if the evaluation returns false.
Time Tag on page 222	To specify a time tag that defines the end of the selected segment.

Related commands

The segment provides the following commands:

Purpose	Refer to
To zoom into signals and segments.	Zoom Mode on page 263
To select and arrange signals and segments in signal description sets.	Select Mode on page 257
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 247
To split a segment into two.	Split Mode on page 260
To cut the current selection to the Clipboard.	Cut (AutomationDesk Basic Practices 🕮)
To copy the current selection to the Clipboard.	Copy (AutomationDesk Basic Practices 🕮)
To paste the Clipboard content into the current window.	Paste (AutomationDesk Basic Practices 🕮)
To delete the current selection.	Delete (AutomationDesk Basic Practices 🕮)
To show the default range of signals.	Zoom to Default on page 264
To fit the signal view to the signal length.	Fit to Screen on page 246
To convert the selected segment into a segment of an other type.	Convert Segment on page 237
To reset previously changed properties to the values that are inherited from the parent.	Use Parent Properties on page 262
To refresh the screen display of a signal.	Refresh on page 251
To show the Properties pane.	Properties on page 249

Related topics

Basics

Basics on Segments.....38
Behavior of Consecutive Segments.....40

HowTos

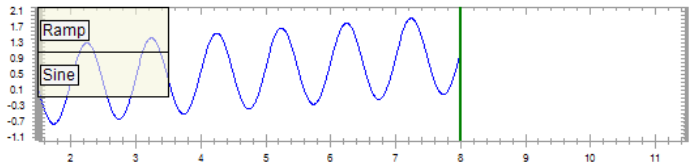
How to Configure a Segment Signal.....43
How to Create a Segment Signal.....41

References

Properties.....249
Segment Signal.....115
Signal Selector.....259

Operation

Graphical representation



Purpose

To perform an arithmetic operation with two other segments.

Description

The Operation segment performs an arithmetic 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:

Properties

Common The segment provides the following general properties:

Property	Purpose
Segment Type on page 205	To display the segment type.
Comment on page 166	To specify a comment.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Operation (Property) on page 193	To specify an arithmetic operation.

Edit The segment provides the following edit property:

Property	Purpose
Time Step Size on page 222	To specify the time step size for interactive editing of the segment's duration.

Evaluation The evaluation properties are relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.

The segment provides the following evaluation properties:

Property	Purpose
Evaluation Method on page 172	To select an evaluation method.
Reference on page 197	To select the signal that defines the reference values for the evaluation.
Signal on page 212	To select the signal to be evaluated.

Property	Purpose
Tolerance on page 224	To specify the tolerance between the evaluated signal and the reference signal.
Bound on page 164	To specify the signal that defines the bound values for the evaluation.
Upper Bound on page 231	To select the signal that defines the upper bound values for the evaluation.
Lower Bound on page 179	To select the signal that defines the lower bound values for the evaluation.
Tolerance Left on page 226	To specify the absolute tolerance for the evaluation in negative time-axis direction.
Tolerance Right on page 227	To specify the absolute tolerance for the evaluation in positive time-axis direction.
Tolerance Up on page 228	To specify the absolute tolerance for the evaluation in positive y-axis direction.
Tolerance Down on page 225	To specify the absolute tolerance for the evaluation in negative y-axis direction.
Rel. Tolerance Left on page 200	To specify the relative part of the tolerance for the evaluation in negative time-axis direction.
Rel. Tolerance Right on page 201	To specify the relative part of the tolerance for the evaluation in positive time-axis direction.
Rel. Tolerance Up on page 203	To specify the relative part of the tolerance for the evaluation in positive y-axis direction.
Rel. Tolerance Down on page 199	To specify the relative part of the tolerance for the evaluation in negative y-axis direction.
Maximum Duration on page 182	To specify the maximum duration of the signal/segment.
Minimum Duration on page 186	To specify the minimum duration of the signal/segment.
Mandatory on page 180	To specify that the occurrence of the stop trigger is mandatory for test case evaluation.
True Verdict on page 230	To specify the verdict that is provided if the evaluation returns true.
False Verdict on page 173	To specify the verdict that is provided if the evaluation returns false.
Time Tag on page 222	To specify a time tag that defines the end of the selected segment.

Related commands

The segment provides the following commands:

Purpose	Refer to
To zoom into signals and segments.	Zoom Mode on page 263
To select and arrange signals and segments in signal description sets.	Select Mode on page 257
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 247
To cut the current selection to the Clipboard.	Cut (AutomationDesk Basic Practices 🕮)
To copy the current selection to the Clipboard.	Copy (AutomationDesk Basic Practices 🕮)
To paste the Clipboard content into the current window.	Paste (AutomationDesk Basic Practices 🕮)
To delete the current selection.	Delete (AutomationDesk Basic Practices 🕮)
To show the default range of signals.	Zoom to Default on page 264
To fit the signal view to the signal length.	Fit to Screen on page 246
To convert the selected segment into a segment of an other type.	Convert Segment on page 237
To reset previously changed properties to the values that are inherited from the parent.	Use Parent Properties on page 262
To refresh the screen display of a signal.	Refresh on page 251
To show the Properties pane.	Properties on page 249

Related topics

Basics

Basics on Segments.....38
Behavior of Consecutive Segments.....40

HowTos

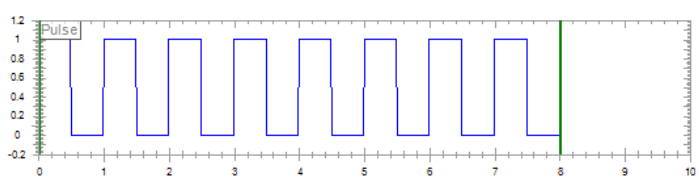
How to Create a Segment Signal.....41
How to Create and Configure an Operation Segment.....48

References

Properties.....249
Segment Signal.....115
Signal Selector.....259

Pulse

Graphical representation

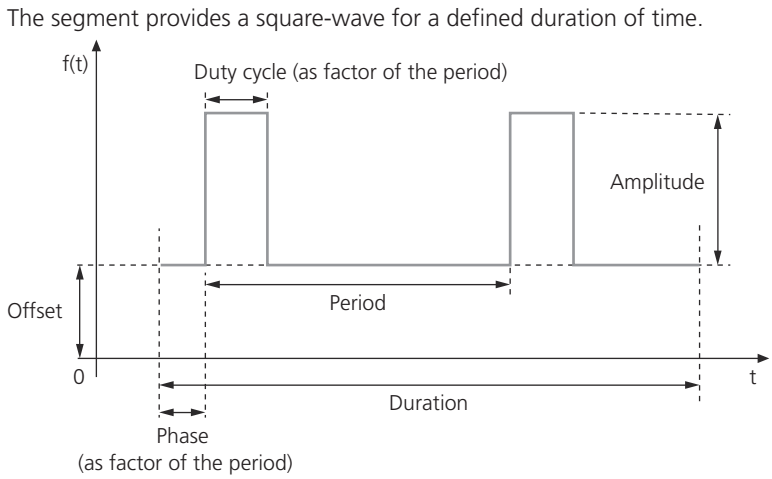


Purpose

To specify a square-wave segment.

Description

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



The corresponding mathematical function is:

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

where:

Symbol	Meaning
t	Time
A	Amplitude
T	Period
δ (delta)	Duty cycle
t_h	Pulse width (high-time)
φ (phi)	Initial phase shift
b	Bias (= bias)

Segment symbol

The segment has the following symbol in the Signal Selector:

Properties

Common The segment provides the following general properties:

Property	Purpose
Segment Type on page 205	To display the segment type.
Comment on page 166	To specify a comment.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Duration on page 169	To specify a segment's duration in seconds.
Offset on page 190	To specify a segment's offset value.
Period on page 194	To specify a segment's period in seconds.
Amplitude on page 163	To specify a segment's amplitude.
Duty Cycle on page 171	To specify a segment's duty cycle.
Phase on page 195	To specify a segment's initial phase shift.
Stop Trigger on page 218	To define the duration of the selected segment by specifying a stop trigger.

Edit The segment provides the following edit property:

Property	Purpose
Time Step Size on page 222	To specify the time step size for interactive editing of the segment's duration.

Evaluation The evaluation properties are relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.

The segment provides the following evaluation properties:

Property	Purpose
Evaluation Method on page 172	To select an evaluation method.
Reference on page 197	To select the signal that defines the reference values for the evaluation.
Signal on page 212	To select the signal to be evaluated.
Tolerance on page 224	To specify the tolerance between the evaluated signal and the reference signal.
Bound on page 164	To specify the signal that defines the bound values for the evaluation.
Upper Bound on page 231	To select the signal that defines the upper bound values for the evaluation.
Lower Bound on page 179	To select the signal that defines the lower bound values for the evaluation.
Tolerance Left on page 226	To specify the absolute tolerance for the evaluation in negative time-axis direction.
Tolerance Right on page 227	To specify the absolute tolerance for the evaluation in positive time-axis direction.
Tolerance Up on page 228	To specify the absolute tolerance for the evaluation in positive y-axis direction.
Tolerance Down on page 225	To specify the absolute tolerance for the evaluation in negative y-axis direction.
Rel. Tolerance Left on page 200	To specify the relative part of the tolerance for the evaluation in negative time-axis direction.
Rel. Tolerance Right on page 201	To specify the relative part of the tolerance for the evaluation in positive time-axis direction.
Rel. Tolerance Up on page 203	To specify the relative part of the tolerance for the evaluation in positive y-axis direction.
Rel. Tolerance Down on page 199	To specify the relative part of the tolerance for the evaluation in negative y-axis direction.
Maximum Duration on page 182	To specify the maximum duration of the signal/segment.
Minimum Duration on page 186	To specify the minimum duration of the signal/segment.
Mandatory on page 180	To specify that the occurrence of the stop trigger is mandatory for test case evaluation.
True Verdict on page 230	To specify the verdict that is provided if the evaluation returns true.
False Verdict on page 173	To specify the verdict that is provided if the evaluation returns false.
Time Tag on page 222	To specify a time tag that defines the end of the selected segment.

Related commands

The segment provides the following commands:

Purpose	Refer to
To zoom into signals and segments.	Zoom Mode on page 263
To select and arrange signals and segments in signal description sets.	Select Mode on page 257
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 247
To split a segment into two.	Split Mode on page 260
To cut the current selection to the Clipboard.	Cut (AutomationDesk Basic Practices 🕮)
To copy the current selection to the Clipboard.	Copy (AutomationDesk Basic Practices 🕮)
To paste the Clipboard content into the current window.	Paste (AutomationDesk Basic Practices 🕮)
To delete the current selection.	Delete (AutomationDesk Basic Practices 🕮)
To show the default range of signals.	Zoom to Default on page 264
To fit the signal view to the signal length.	Fit to Screen on page 246
To convert the selected segment into a segment of an other type.	Convert Segment on page 237
To reset previously changed properties to the values that are inherited from the parent.	Use Parent Properties on page 262

Purpose	Refer to
To refresh the screen display of a signal.	Refresh on page 251
To show the Properties pane.	Properties on page 249

Related topics

Basics

Basics on Segments.....38
Behavior of Consecutive Segments.....40

HowTos

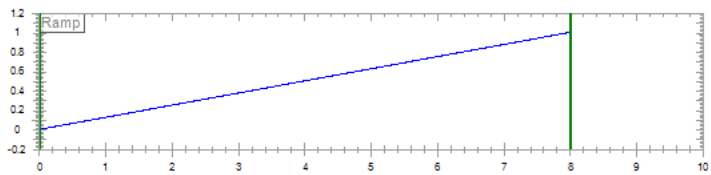
How to Configure a Segment Signal.....43
How to Create a Segment Signal.....41

References

Properties.....249
Segment Signal.....115
Signal Selector.....259

Ramp

Graphical representation

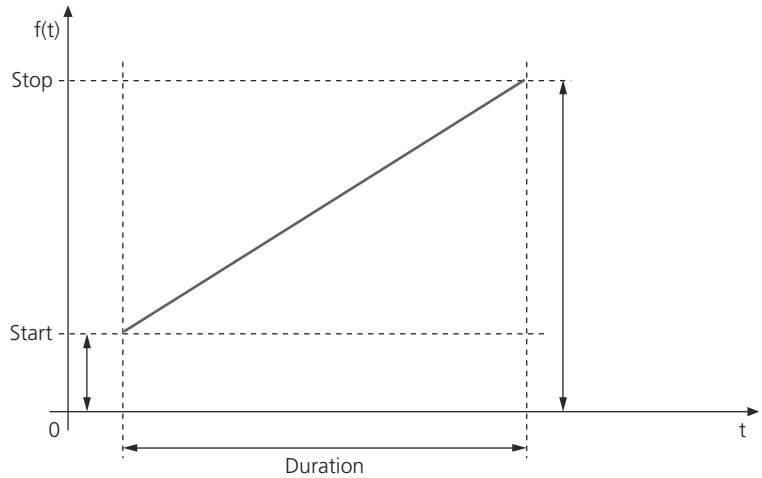


Purpose

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:

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

where:

Symbol	Meaning
t	Time
y_1	Start value
y_2	Stop value
T_D	Duration

Segment symbol

The segment has the following symbol in the Signal Selector: (also used for the Ramp Slope on page 144 segment).

Properties

Common The segment provides the following general properties:

Property	Purpose
Segment Type on page 205	To display the segment type.
Comment on page 166	To specify a comment.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Duration on page 169	To specify a segment's duration in seconds.
Start on page 216	To specify a start value.
Stop on page 217	To specify a stop value.

Note

The value that you specified in the **Stop** property is approached but not reached at the end of the section. For details, refer to Behavior of Consecutive Segments on page 40.

Edit The segment provides the following edit property:

Property	Purpose
Time Step Size on page 222	To specify the time step size for interactive editing of the segment's duration.

Evaluation The evaluation properties are relevant only if you want to use the signal description set as a **TestCaseDescription** data object for the automation blocks that are provided by the **Signal-Based Testing** library.

The segment provides the following evaluation properties:

Property	Purpose
Evaluation Method on page 172	To select an evaluation method.
Reference on page 197	To select the signal that defines the reference values for the evaluation.
Signal on page 212	To select the signal to be evaluated.
Tolerance on page 224	To specify the tolerance between the evaluated signal and the reference signal.
Bound on page 164	To specify the signal that defines the bound values for the evaluation.
Upper Bound on page 231	To select the signal that defines the upper bound values for the evaluation.
Lower Bound on page 179	To select the signal that defines the lower bound values for the evaluation.
Tolerance Left on page 226	To specify the absolute tolerance for the evaluation in negative time-axis direction.
Tolerance Right on page 227	To specify the absolute tolerance for the evaluation in positive time-axis direction.
Tolerance Up on page 228	To specify the absolute tolerance for the evaluation in positive y-axis direction.
Tolerance Down on page 225	To specify the absolute tolerance for the evaluation in negative y-axis direction.
Rel. Tolerance Left on page 200	To specify the relative part of the tolerance for the evaluation in negative time-axis direction.
Rel. Tolerance Right on page 201	To specify the relative part of the tolerance for the evaluation in positive time-axis direction.
Rel. Tolerance Up on page 203	To specify the relative part of the tolerance for the evaluation in positive y-axis direction.
Rel. Tolerance Down on page 199	To specify the relative part of the tolerance for the evaluation in negative y-axis direction.
Maximum Duration on page 182	To specify the maximum duration of the signal/segment.
Minimum Duration on page 186	To specify the minimum duration of the signal/segment.
Mandatory on page 180	To specify that the occurrence of the stop trigger is mandatory for test case evaluation.
True Verdict on page 230	To specify the verdict that is provided if the evaluation returns true.
False Verdict on page 173	To specify the verdict that is provided if the evaluation returns false.
Time Tag on page 222	To specify a time tag that defines the end of the selected segment.

Related commands The segment provides the following commands:

Purpose	Refer to
To zoom into signals and segments.	Zoom Mode on page 263
To select and arrange signals and segments in signal description sets.	Select Mode on page 257

Purpose	Refer to
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 247
To split a segment into two.	Split Mode on page 260
To cut the current selection to the Clipboard.	Cut (AutomationDesk Basic Practices 🕮)
To copy the current selection to the Clipboard.	Copy (AutomationDesk Basic Practices 🕮)
To paste the Clipboard content into the current window.	Paste (AutomationDesk Basic Practices 🕮)
To delete the current selection.	Delete (AutomationDesk Basic Practices 🕮)
To show the default range of signals.	Zoom to Default on page 264
To fit the signal view to the signal length.	Fit to Screen on page 246
To convert the selected segment into a segment of an other type.	Convert Segment on page 237
To reset previously changed properties to the values that are inherited from the parent.	Use Parent Properties on page 262
To refresh the screen display of a signal.	Refresh on page 251
To show the Properties pane.	Properties on page 249

Related topics

Basics

Basics on Segments.....38
Behavior of Consecutive Segments.....40

HowTos

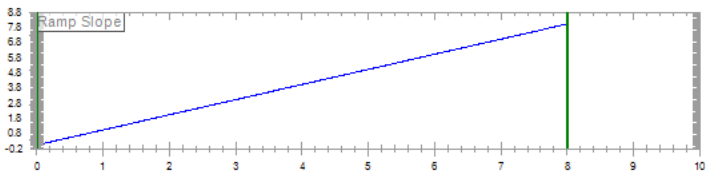
How to Configure a Segment Signal.....43
How to Create a Segment Signal.....41

References

Properties.....249
Ramp Slope.....144
Segment Signal.....115
Signal Selector.....259

Ramp Slope

Graphical representation

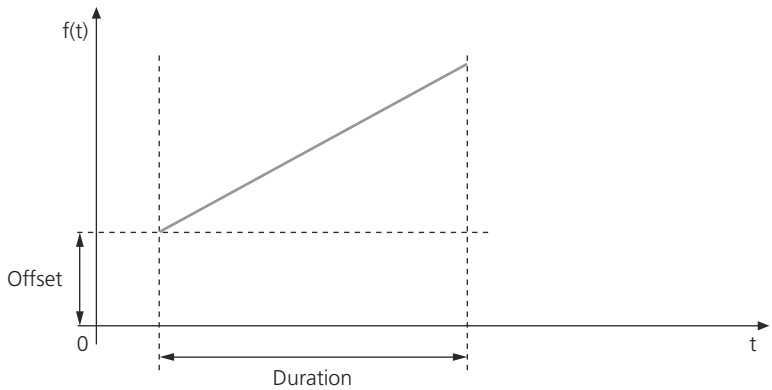


Purpose

To specify a ramp-shaped segment via a slope.

Description

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



The corresponding mathematical function is:

$$f(t) = m \cdot t + b$$

where:

Symbol	Meaning
t	Time
m	Slope
b	Bias (= offset)

Segment symbol

The segment has the following symbol in the **Signal Selector**: (also used for the Ramp on page 141 segment).

Properties

Common The segment provides the following general properties:

Property	Purpose
Segment Type on page 205	To display the segment type.
Comment on page 166	To specify a comment.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Duration on page 169	To specify a segment's duration in seconds.
Offset on page 190	To specify a segment's offset value.
Slope on page 215	To specify a slope.
Stop Trigger on page 218	To define the duration of the selected segment by specifying a stop trigger.

Edit The segment provides the following edit property:

Property	Purpose
Time Step Size on page 222	To specify the time step size for interactive editing of the segment's duration.

Evaluation The evaluation properties are relevant only if you want to use the signal description set as a **TestCaseDescription** data object for the automation blocks that are provided by the **Signal-Based Testing** library.

The segment provides the following evaluation properties:

Property	Purpose
Evaluation Method on page 172	To select an evaluation method.
Reference on page 197	To select the signal that defines the reference values for the evaluation.
Signal on page 212	To select the signal to be evaluated.
Tolerance on page 224	To specify the tolerance between the evaluated signal and the reference signal.
Bound on page 164	To specify the signal that defines the bound values for the evaluation.
Upper Bound on page 231	To select the signal that defines the upper bound values for the evaluation.
Lower Bound on page 179	To select the signal that defines the lower bound values for the evaluation.
Tolerance Left on page 226	To specify the absolute tolerance for the evaluation in negative time-axis direction.
Tolerance Right on page 227	To specify the absolute tolerance for the evaluation in positive time-axis direction.
Tolerance Up on page 228	To specify the absolute tolerance for the evaluation in positive y-axis direction.
Tolerance Down on page 225	To specify the absolute tolerance for the evaluation in negative y-axis direction.
Rel. Tolerance Left on page 200	To specify the relative part of the tolerance for the evaluation in negative time-axis direction.
Rel. Tolerance Right on page 201	To specify the relative part of the tolerance for the evaluation in positive time-axis direction.
Rel. Tolerance Up on page 203	To specify the relative part of the tolerance for the evaluation in positive y-axis direction.
Rel. Tolerance Down on page 199	To specify the relative part of the tolerance for the evaluation in negative y-axis direction.
Maximum Duration on page 182	To specify the maximum duration of the signal/segment.
Minimum Duration on page 186	To specify the minimum duration of the signal/segment.
Mandatory on page 180	To specify that the occurrence of the stop trigger is mandatory for test case evaluation.
True Verdict on page 230	To specify the verdict that is provided if the evaluation returns true.
False Verdict on page 173	To specify the verdict that is provided if the evaluation returns false.
Time Tag on page 222	To specify a time tag that defines the end of the selected segment.

Related commands The segment provides the following commands:

Purpose	Refer to
To zoom into signals and segments.	Zoom Mode on page 263
To select and arrange signals and segments in signal description sets.	Select Mode on page 257
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 247
To split a segment into two.	Split Mode on page 260
To cut the current selection to the Clipboard.	Cut (AutomationDesk Basic Practices 🕮)
To copy the current selection to the Clipboard.	Copy (AutomationDesk Basic Practices 🕮)
To paste the Clipboard content into the current window.	Paste (AutomationDesk Basic Practices 🕮)
To delete the current selection.	Delete (AutomationDesk Basic Practices 🕮)

Purpose	Refer to
To show the default range of signals.	Zoom to Default on page 264
To fit the signal view to the signal length.	Fit to Screen on page 246
To convert the selected segment into a segment of an other type.	Convert Segment on page 237
To reset previously changed properties to the values that are inherited from the parent.	Use Parent Properties on page 262
To refresh the screen display of a signal.	Refresh on page 251
To show the Properties pane.	Properties on page 249

Related topics

Basics

Basics on Segments.....38
Behavior of Consecutive Segments.....40

HowTos

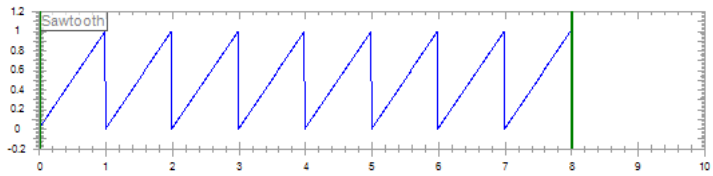
How to Configure a Segment Signal.....43
How to Create a Segment Signal.....41

References

Properties.....249
Ramp.....141
Segment Signal.....115
Signal Selector.....259

Sawtooth

Graphical representation

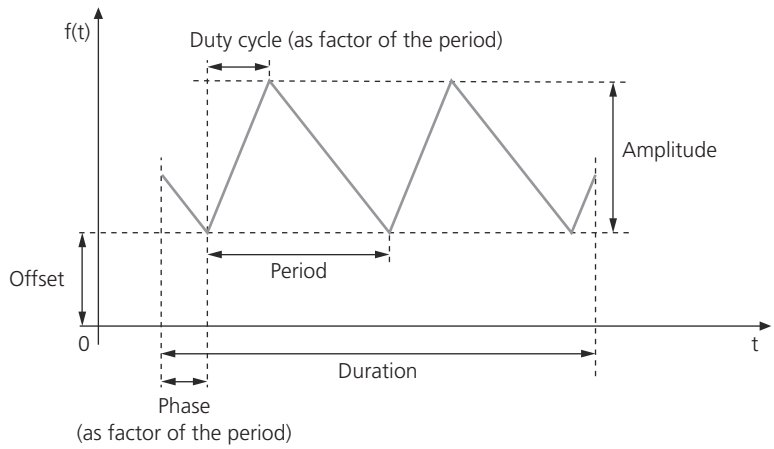


Purpose

To specify a sawtooth segment.

Description

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



The corresponding mathematical function is:

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

where:

Symbol	Meaning
t	Time
A	Amplitude
T	Period
δ (delta)	Duty cycle
t_r	Rise time
t_f	Fall time
φ (phi)	Initial phase shift
b	Bias (= offset)

Segment symbol

The segment has the following symbol in the Signal Selector:

Properties

Common The segment provides the following general properties:

Property	Purpose
Segment Type on page 205	To display the segment type.
Comment on page 166	To specify a comment.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Duration on page 169	To specify a segment's duration in seconds.
Offset on page 190	To specify a segment's offset value.
Period on page 194	To specify a segment's period in seconds.
Amplitude on page 163	To specify a segment's amplitude.
Duty Cycle on page 171	To specify a segment's duty cycle.
Phase on page 195	To specify a segment's initial phase shift.
Stop Trigger on page 218	To define the duration of the selected segment by specifying a stop trigger.

Edit The segment provides the following edit property:

Property	Purpose
Time Step Size on page 222	To specify the time step size for interactive editing of the segment's duration.

Evaluation The evaluation properties are relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.

The segment provides the following evaluation properties:

Property	Purpose
Evaluation Method on page 172	To select an evaluation method.
Reference on page 197	To select the signal that defines the reference values for the evaluation.
Signal on page 212	To select the signal to be evaluated.
Tolerance on page 224	To specify the tolerance between the evaluated signal and the reference signal.
Bound on page 164	To specify the signal that defines the bound values for the evaluation.
Upper Bound on page 231	To select the signal that defines the upper bound values for the evaluation.
Lower Bound on page 179	To select the signal that defines the lower bound values for the evaluation.
Tolerance Left on page 226	To specify the absolute tolerance for the evaluation in negative time-axis direction.
Tolerance Right on page 227	To specify the absolute tolerance for the evaluation in positive time-axis direction.
Tolerance Up on page 228	To specify the absolute tolerance for the evaluation in positive y-axis direction.
Tolerance Down on page 225	To specify the absolute tolerance for the evaluation in negative y-axis direction.
Rel. Tolerance Left on page 200	To specify the relative part of the tolerance for the evaluation in negative time-axis direction.
Rel. Tolerance Right on page 201	To specify the relative part of the tolerance for the evaluation in positive time-axis direction.
Rel. Tolerance Up on page 203	To specify the relative part of the tolerance for the evaluation in positive y-axis direction.
Rel. Tolerance Down on page 199	To specify the relative part of the tolerance for the evaluation in negative y-axis direction.
Maximum Duration on page 182	To specify the maximum duration of the signal/segment.
Minimum Duration on page 186	To specify the minimum duration of the signal/segment.
Mandatory on page 180	To specify that the occurrence of the stop trigger is mandatory for test case evaluation.
True Verdict on page 230	To specify the verdict that is provided if the evaluation returns true.
False Verdict on page 173	To specify the verdict that is provided if the evaluation returns false.
Time Tag on page 222	To specify a time tag that defines the end of the selected segment.

Related commands

The segment provides the following commands:

Purpose	Refer to
To zoom into signals and segments.	Zoom Mode on page 263
To select and arrange signals and segments in signal description sets.	Select Mode on page 257
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 247
To split a segment into two.	Split Mode on page 260
To cut the current selection to the Clipboard.	Cut (AutomationDesk Basic Practices 🕮)
To copy the current selection to the Clipboard.	Copy (AutomationDesk Basic Practices 🕮)
To paste the Clipboard content into the current window.	Paste (AutomationDesk Basic Practices 🕮)
To delete the current selection.	Delete (AutomationDesk Basic Practices 🕮)
To show the default range of signals.	Zoom to Default on page 264
To fit the signal view to the signal length.	Fit to Screen on page 246
To convert the selected segment into a segment of an other type.	Convert Segment on page 237
To reset previously changed properties to the values that are inherited from the parent.	Use Parent Properties on page 262
To refresh the screen display of a signal.	Refresh on page 251
To show the Properties pane.	Properties on page 249

Related topics

Basics

Basics on Segments....38
Behavior of Consecutive Segments....40

HowTos

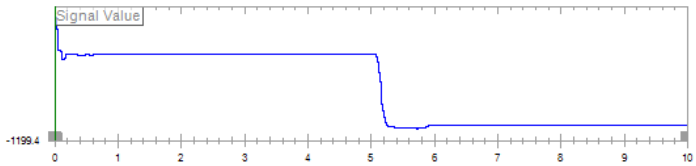
How to Configure a Segment Signal....43
How to Create a Segment Signal....41

References

Properties....249
Segment Signal....115
Signal Selector....259

Signal Value

Graphical representation



Purpose

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

Description

The Signal Value segment allows you to use numerical data for stimulation that is imported 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.

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 defined yet.

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.
- You cannot use Signal Value segments in signal description sets that specify a test case description for signal-based testing. This always causes *Undefined* verdicts.

Segment symbol

The segment has the following symbol in the Signal Selector:

Properties

Common The segment provides the following general properties:

Property	Purpose
Segment Type on page 205	To display the segment type.
Comment on page 166	To specify a comment.

Segment parameter The segment provides the following segment parameters:

Property	Purpose
Signal Value (Property) on page 214	To import numerical signal data from a MAT file.
Interpolation on page 177	To specify the interpolation method to be used when replaying numerical data.

Edit The segment provides the following edit property:

Property	Purpose
Time Step Size on page 222	To specify the time step size for interactive editing of the segment's duration.

Evaluation The evaluation properties are relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.

The segment provides the following evaluation properties:

Property	Purpose
Evaluation Method on page 172	To select an evaluation method.
Reference on page 197	To select the signal that defines the reference values for the evaluation.
Signal on page 212	To select the signal to be evaluated.
Tolerance on page 224	To specify the tolerance between the evaluated signal and the reference signal.
Bound on page 164	To specify the signal that defines the bound values for the evaluation.
Upper Bound on page 231	To select the signal that defines the upper bound values for the evaluation.
Lower Bound on page 179	To select the signal that defines the lower bound values for the evaluation.
Tolerance Left on page 226	To specify the absolute tolerance for the evaluation in negative time-axis direction.
Tolerance Right on page 227	To specify the absolute tolerance for the evaluation in positive time-axis direction.
Tolerance Up on page 228	To specify the absolute tolerance for the evaluation in positive y-axis direction.
Tolerance Down on page 225	To specify the absolute tolerance for the evaluation in negative y-axis direction.
Rel. Tolerance Left on page 200	To specify the relative part of the tolerance for the evaluation in negative time-axis direction.
Rel. Tolerance Right on page 201	To specify the relative part of the tolerance for the evaluation in positive time-axis direction.
Rel. Tolerance Up on page 203	To specify the relative part of the tolerance for the evaluation in positive y-axis direction.
Rel. Tolerance Down on page 199	To specify the relative part of the tolerance for the evaluation in negative y-axis direction.
Maximum Duration on page 182	To specify the maximum duration of the signal/segment.
Minimum Duration on page 186	To specify the minimum duration of the signal/segment.
Mandatory on page 180	To specify that the occurrence of the stop trigger is mandatory for test case evaluation.
True Verdict on page 230	To specify the verdict that is provided if the evaluation returns true.
False Verdict on page 173	To specify the verdict that is provided if the evaluation returns false.
Time Tag on page 222	To specify a time tag that defines the end of the selected segment.

Related commands

The segment provides the following commands:

Purpose	Refer to
To zoom into signals and segments.	Zoom Mode on page 263
To select and arrange signals and segments in signal description sets.	Select Mode on page 257

Purpose	Refer to
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 247
To cut the current selection to the Clipboard.	Cut (AutomationDesk Basic Practices 🕮)
To copy the current selection to the Clipboard.	Copy (AutomationDesk Basic Practices 🕮)
To paste the Clipboard content into the current window.	Paste (AutomationDesk Basic Practices 🕮)
To delete the current selection.	Delete (AutomationDesk Basic Practices 🕮)
To show the default range of signals.	Zoom to Default on page 264
To fit the signal view to the signal length.	Fit to Screen on page 246
To convert the selected segment into a segment of an other type.	Convert Segment on page 237
To reset previously changed properties to the values that are inherited from the parent.	Use Parent Properties on page 262
To refresh the screen display of a signal.	Refresh on page 251
To show the Properties pane.	Properties on page 249

Related topics

Basics

Basics on Segments.....38
Behavior of Consecutive Segments.....40

HowTos

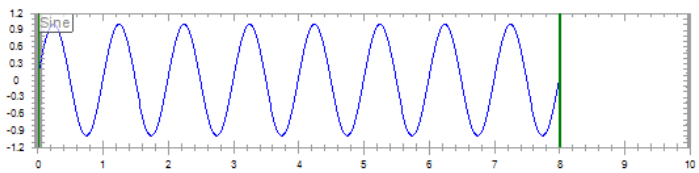
How to Create a Segment Signal.....41
How to Create and Configure a Signal Value Segment.....52

References

Data File.....122
Properties.....249
Segment Signal.....115
Signal Selector.....259

Sine

Graphical representation

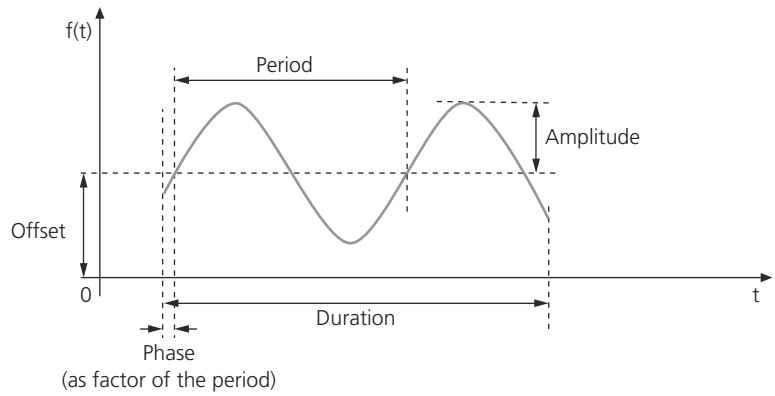


Purpose

To specify a sine segment.

Description

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



The corresponding mathematical function is:

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

where:

Symbol	Meaning
t	Time
A	Amplitide
T	Period
φ (phi)	Initial phase shift
b	Bias (= offset)

Segment symbol

The segment has the following symbol in the Signal Selector:

Properties

Common The segment provides the following general properties:

Property	Purpose
Segment Type on page 205	To display the segment type.
Comment on page 166	To specify a comment.

Segment parameters The segment provides the following segment parameters:

Property	Purpose
Duration on page 169	To specify a segment's duration in seconds.
Offset on page 190	To specify a segment's offset value.
Period on page 194	To specify a segment's period in seconds.
Amplitude on page 163	To specify a segment's amplitude.

Property	Purpose
Phase on page 195	To specify a segment's initial phase shift.
Stop Trigger on page 218	To define the duration of the selected segment by specifying a stop trigger.

Edit The segment provides the following edit property:

Property	Purpose
Time Step Size on page 222	To specify the time step size for interactive editing of the segment's duration.

Evaluation The evaluation properties are relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.

The segment provides the following evaluation properties:

Property	Purpose
Evaluation Method on page 172	To select an evaluation method.
Reference on page 197	To select the signal that defines the reference values for the evaluation.
Signal on page 212	To select the signal to be evaluated.
Tolerance on page 224	To specify the tolerance between the evaluated signal and the reference signal.
Bound on page 164	To specify the signal that defines the bound values for the evaluation.
Upper Bound on page 231	To select the signal that defines the upper bound values for the evaluation.
Lower Bound on page 179	To select the signal that defines the lower bound values for the evaluation.
Tolerance Left on page 226	To specify the absolute tolerance for the evaluation in negative time-axis direction.
Tolerance Right on page 227	To specify the absolute tolerance for the evaluation in positive time-axis direction.
Tolerance Up on page 228	To specify the absolute tolerance for the evaluation in positive y-axis direction.
Tolerance Down on page 225	To specify the absolute tolerance for the evaluation in negative y-axis direction.
Rel. Tolerance Left on page 200	To specify the relative part of the tolerance for the evaluation in negative time-axis direction.
Rel. Tolerance Right on page 201	To specify the relative part of the tolerance for the evaluation in positive time-axis direction.
Rel. Tolerance Up on page 203	To specify the relative part of the tolerance for the evaluation in positive y-axis direction.
Rel. Tolerance Down on page 199	To specify the relative part of the tolerance for the evaluation in negative y-axis direction.
Maximum Duration on page 182	To specify the maximum duration of the signal/segment.
Minimum Duration on page 186	To specify the minimum duration of the signal/segment.
Mandatory on page 180	To specify that the occurrence of the stop trigger is mandatory for test case evaluation.
True Verdict on page 230	To specify the verdict that is provided if the evaluation returns true.
False Verdict on page 173	To specify the verdict that is provided if the evaluation returns false.
Time Tag on page 222	To specify a time tag that defines the end of the selected segment.

Related commands The segment provides the following commands:

Purpose	Refer to
To zoom into signals and segments.	Zoom Mode on page 263
To select and arrange signals and segments in signal description sets.	Select Mode on page 257
To scroll the signal shapes inside of signals horizontally and vertically.	Hand Mode on page 247
To split a segment into two.	Split Mode on page 260

Purpose	Refer to
To cut the current selection to the Clipboard.	Cut (AutomationDesk Basic Practices 🕮)
To copy the current selection to the Clipboard.	Copy (AutomationDesk Basic Practices 🕮)
To paste the Clipboard content into the current window.	Paste (AutomationDesk Basic Practices 🕮)
To delete the current selection.	Delete (AutomationDesk Basic Practices 🕮)
To show the default range of signals.	Zoom to Default on page 264
To fit the signal view to the signal length.	Fit to Screen on page 246
To convert the selected segment into a segment of an other type.	Convert Segment on page 237
To reset previously changed properties to the values that are inherited from the parent.	Use Parent Properties on page 262
To refresh the screen display of a signal.	Refresh on page 251
To show the Properties pane.	Properties on page 249

Related topics

Basics

Basics on Segments.....38
Behavior of Consecutive Segments.....40

HowTos

How to Configure a Segment Signal.....43
How to Create a Segment Signal.....41

References

Properties.....249
Segment Signal.....115
Signal Selector.....259

Properties

Introduction

You can configure signal description sets, signals and segments by means of the Properties pane.

Where to go from here

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To specify a segment's amplitude.

Bound..... 164
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Stop Trigger....218
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Symbol Name....220
To specify the name of the selected signal.

Tau....221
To specify the time constant tau.

Time Step Size....222
To specify the time step size for interactive editing of the segment's duration.

Time Tag....222
To specify a time tag that defines the end of the selected segment.

Time Vector Name....223
To display the time vector name.

Tolerance....224
To specify the tolerance between the evaluated signal and the reference signal.

Tolerance Down....225
To specify the absolute tolerance for the evaluation in negative y-axis direction.

Tolerance Left....226
To specify the absolute tolerance for the evaluation in negative time-axis direction.

Tolerance Right....227
To specify the absolute tolerance for the evaluation in positive time-axis direction.

Tolerance Up....228
To specify the absolute tolerance for the evaluation in positive y-axis direction.

True Verdict....230
To specify the verdict that is provided if the evaluation returns true.

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To select the signal that defines the upper bound values for the evaluation.

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To specify the step size for editing the value of Const segments interactively.

Action

Purpose

To specify how the signal can be used for signal-based testing.

Description

Note

This property is relevant only if you want to use the signal description set as a **TestCaseDescription** data object for the automation blocks that are provided by the **Signal-Based Testing** library.

You can use the following actions from a drop-down list:

Action	Description
Stimulate	This signal is generated by a signal generator to stimulate the mapped model variable during the run time of the simulation application.
Capture	The values of the variable that are mapped to this signal are captured during the run time of the simulation application. The data is stored in an MDF file (ASAM Common MDF Version 4.1, file name extension: MF4) that is added as a DataFile segment to the signal.

Action	Description
Sync	This signal is used to synchronize stimulation and capturing during the run time of the simulation application. It defines the begin of the Stimulate signals and the begin and end of the specified captures. This signal must consist of Const segments not equal to zero and must not have zero crossings. For details, refer to StimulateAndCapture on page 91.
None	This signal does not interact with the simulation application. This is used for reference signals of evaluation methods, for example.

Note

Each signal description set that is used as a test case description must contain exactly one signal with the Action property Sync.
For details, refer to StimulateAndCapture on page 91.

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

Comment 166
Signal-Based Testing Library 80
StimulateAndCapture 91
Symbol Name 220
TestCaseDescription (Data Object) 80

Amplitude

Purpose

To specify a segment's amplitude.

Parameters

The required parameters for specifying the amplitude depend on the selected Type parameter:

Type	Additional Parameter	Meaning
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.
Signal	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	Alias	Lets you specify a variable alias to control the property by a model variable of a simulation application. You can specify an alias in the following ways: ▪ Select a signal name from the current signal description set. ▪ Enter a name that is contained in the current variable pool, i.e., in a **DataContainer** or in the **Mapping** data object. ▪ Enter a name of a data object that is dynamically added to the current **Signal-Based Testing** automation block. ▪ (Only with **StimulateAndCapture** and **Evaluate** automation blocks) Enter the key of a constant that is contained in the **Constants** dictionary.

Related segments

You can specify this property for the following segments:

- Pulse on page 138
- Sawtooth on page 147
- Sine on page 153

Related topics

References

Offset..... 190
Period..... 194

Bound

Purpose

To specify the signal that defines the bound values for the evaluation.

Description

Lets you specify a bound to be used by the following evaluation methods:

Evaluation Method	Description
IsAboveBound	To check whether the values of the evaluated signal are above the specified bound signal.
IsBelowBound	To check whether the values of the evaluated signal are below the specified bound signal.

You can specify the bound in the following ways:

- Select a signal from the signal description set.
- Enter a number to use a constant signal of this value.
- Enter a name that is contained in the current variable pool, i.e., in a data container or in the **Mapping** data object.
- Enter a name of a data object that is dynamically added to the current **Signal-Based Testing** automation block.
- (Only with **StimulateAndCapture** and **Evaluate** automation blocks) Enter the key of a constant that is contained in the **Constants** dictionary.
- Leave the input empty or select **None** from the signal list to use the signal itself.

The evaluation method specifies the automation block of the **Evaluation** library that is used for evaluation. For details on the automation blocks, refer to **Evaluation Methods** (AutomationDesk Basic Practices 🕮).

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141
- Ramp Slope on page 144
- Sawtooth on page 147

- Signal Value on page 151
- Sine on page 153

Related topics

References

Evaluation Method..... 172
IsAboveBound (AutomationDesk Basic Practices 🕮)
IsBelowBound (AutomationDesk Basic Practices 🕮)

Channel Path

Purpose

To display the selected channel path from the MF4 data file.

Description

In this property the channel path of the selected TimeVector and DataVector is displayed. The channel path typically contains the device name or the platform name.

Related segment

This property is displayed for the following segment:

- Data File on page 122

Related topics

References

Channel Source..... 165
Data File..... 122
File Name..... 175
Group Name..... 176
Group Path..... 176
Group Source..... 177

Channel Source

Purpose

To display the selected channel source from the MF4 data file.

Description

In this property the channel source of the selected TimeVector and DataVector is displayed. The channel source typically contains the network node name or the task name.

Related segment

This property is displayed for the following segment:

- Data File on page 122

Related topics

References

Channel Path..... 165
Data File..... 122
File Name..... 175
Group Name..... 176
Group Path..... 176
Group Source..... 177

Comment

Purpose

To specify a comment.

Description

You can specify comments of multiple lines by pressing **`Alt+Enter`** to enter a line break.

Related signals and segments

You can specify this property for the following signals and segments:

- Segment Signal on page 115
- Operation Signal on page 112
- Const on page 119
- Exponential on page 125
- Idle on page 128
- Signal Value on page 151
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141
- Ramp Slope on page 144
- Sawtooth on page 147
- Sine on page 153

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related Signal Editor items

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104
- Time Tag on page 110

Condition

Purpose

To specify a condition for a trigger or a time tag.

Description

You can edit the condition in ASAM General Expression Syntax (GES) manually or you can click the **Browse** button to open the **Expression Editor**.

For details on the **Expression Editor**, refer to **Edit (Condition String in ASAM GES)**.

For details on the ASAM GES, refer to *Appendix A. Syntax of Watcher Conditions* in ASAM_AE_HIL_BS-1-ASAM_AE_XIL_Generic-Simulator-Interface_BS-1-4-Programmers-Guide_V2-0-1.pdf.

Within the condition, you can use the following aliases as operands:

- Select a signal name from the current signal description set.
- Enter a name that is contained in the current variable pool, i.e., in a **DataContainer** or in the **Mapping** data object.
- Enter a name of a data object that is dynamically added to the current **Signal-Based Testing** automation block.
- (Only with **StimulateAndCapture** and **Evaluate** automation blocks) Enter the key of a constant that is contained in the **Constants** dictionary.

Related property

You can use a condition to specify the following property:

- Stop Trigger on page 218

Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Noise on page 133
- Pulse on page 138
- Ramp Slope on page 144

- Sawtooth on page 147
- Sine on page 153

Related Signal Editor item

This property is displayed for the following Signal Editor item:

- Time Tag on page 110

Related topics

References

Edit (Condition String in ASAM GES) (AutomationDesk Basic Practices 🕮)
EnterGESExpression (AutomationDesk Basic Practices 🕮)
Mapping Viewer (AutomationDesk Basic Practices 🕮)
Stop Trigger.....218
Time Tag.....110

<Custom Column>

Purpose

To specify a custom property.

Description

If you created an additional custom column in the signal description set, it occurs as a property of the contained signals. The property name is equal the column name. When selected, the column's description is displayed in the lower part of the Properties pane. Unlike descriptions of other properties, the descriptions of custom properties cannot contain a link to a specific topic in dSPACE Help.

You can create and manage custom column properties via the commands **`Create Column`** on page 238, **`Rename Column`** on page 252, and **`Delete Column`** on page 240.

Related signals

You can specify this property for the following signals:

- Segment Signal on page 115
- Operation Signal on page 112

Related topics

References

Create Column.....238
Delete Column.....240
Rename Column.....252

Data Vector Name

Purpose

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

Related segment

This property is displayed for the following segment:

- Data File on page 122

Related topics

References

Time Vector Name..... 223

Duration

Purpose

To specify a segment's duration in seconds.

Description

The segment is graphically displayed with this duration.

You can click the Browse button to specify an expression for this constant value via the **Value Editor**. Refer to Edit (Value Expression in ASAM GES) on page 241. 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 on page 193.

Note

The **Duration** property value is ignored if a **Stop trigger** property is specified.

Related segments

You can specify this property for the following segments:

- Const on page 119
- Exponential on page 125
- Idle on page 128
- Noise on page 133
- Pulse on page 138
- Ramp on page 141
- Ramp Slope on page 144

- Sawtooth on page 147
- Sine on page 153

Related topics

References

Duration (Data File)..... 170
Stop Trigger..... 218

Duration (Data File)

Purpose

To specify the duration of a Data File segment.

Description

In this property, you can specify a duration for the signal data to be considered in the segment in the following ways:

- To use the entire data provided by the file, specify `Infinity`. This is the default setting.
- To skip data after a certain time stamp, specify a maximum duration for the considered signal data.

You can click the Browse button to specify an expression for this constant value via the **Value Editor**. Refer to Edit (Value Expression in ASAM GES) on page 241. 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 on page 193.

Note

The **Duration** property value is ignored if a **Stop trigger** property is specified.

Related segments

You can specify this property for the following segment:

- Data File on page 122

Related topics

References

Duration..... 169
Start (Data File)..... 217
Stop Trigger..... 218

Duty Cycle

Purpose

To specify a segment's duty cycle.

Description

Lets you specify a segment's duty cycle scaled to the range 0...1.

Parameters

The required parameters for specifying the duty cycle depend on the selected Type parameter:

Type	Additional Parameter	Meaning
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.
Signal	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	Alias	Lets you specify a variable alias to control the property by a model variable of a simulation application. You can specify an alias in the following ways: ▪ Select a signal name from the current signal description set. ▪ Enter a name that is contained in the current variable pool, i.e., in a **DataContainer** or in the **Mapping** data object. ▪ Enter a name of a data object that is dynamically added to the current **Signal-Based Testing** automation block. ▪ (Only with **StimulateAndCapture** and **Evaluate** automation blocks) Enter the key of a constant that is contained in the **Constants** dictionary.

Related segments

You can specify this property for the following segments:

- Pulse on page 138
- Sawtooth on page 147

Related topics

References

Pulse..... 138
Sawtooth..... 147

Evaluation Method

Purpose

To select an evaluation method.

Description

Note

This property is relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.

This property lets you attach an evaluation method to the signal description set, signal or segment. You can use the evaluated verdicts for signal-based testing.

The evaluation method specifies the automation block of the Evaluation library that is used for evaluation. For details on the automation blocks, refer to **Evaluation Methods** (AutomationDesk Basic Practices 🕮).

You can select one of the following methods:

Evaluation Method	Description
IsEqual	Checks whether the values of the evaluated signal are equal to the specified reference signal.
IsNotEqual	Checks whether the values of the evaluated signal are not equal to the specified reference signal.
IsAboveBound	Checks whether the values of the evaluated signal are above the specified bound signal.
IsBelowBound	Checks whether the values of the evaluated signal are below the specified bound signal.
IsInsideBounds	Checks whether the values of the evaluated signal are inside the range that is specified by the upper bound and the lower bound signal.
IsOutsideBounds	Checks whether the values of the evaluated signal are outside the range that is specified by the upper bound and the lower bound signal.
IsInsideRegion	Checks whether the values of the evaluated signal are inside a region that is specified by the reference signal and absolute tolerances.
IsInsideDynamicRegion	Checks whether the values of the evaluated signal are inside a region that is specified by the reference signal and absolute and relative tolerances.
None	No evaluation is done.

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141
- Ramp Slope on page 144
- Sawtooth on page 147
- Signal Value on page 151
- Sine on page 153

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

IsAboveBound (AutomationDesk Basic Practices 🕮)
IsBelowBound (AutomationDesk Basic Practices 🕮)
IsEqual (AutomationDesk Basic Practices 🕮)
IsInsideBounds (AutomationDesk Basic Practices 🕮)
IsInsideDynamicRegion (AutomationDesk Basic Practices 🕮)
IsNotEqual (AutomationDesk Basic Practices 🕮)
IsOutsideBounds (AutomationDesk Basic Practices 🕮)
Signal-Based Testing Library 80

False Verdict

Purpose

To specify the verdict that is provided if the evaluation returns false.

Description

Note

This property is relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.

If a condition of the evaluation method or a time constraint is not fulfilled, the **Failed** verdict is provided by default. You can change the provided verdict for this case to one of the following verdicts:

Verdict	Meaning
Executed	The evaluation has been executed without errors.
Passed	The evaluation has been executed with the expected result.
Undefined	The evaluation has been executed but the expected result could not be verified. For example, the evaluation was interrupted or aborted.
Failed	The evaluation has been executed and one of conditions or the time constraint is not fulfilled.
Error	An error, e.g. an unhandled exception, occurred during the execution of the evaluation.
None	No verdict is provided.

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141
- Ramp Slope on page 144
- Sawtooth on page 147
- Signal Value on page 151
- Sine on page 153

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

Evaluation Method..... 172
Maximum Duration..... 182
Minimum Duration..... 186
Signal-Based Testing Library..... 80
True Verdict..... 230

File Name

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 import numerical data from an MF4 file.

Select data file dialog

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

Select Opens a dialog to select the MF4 file you want to import.

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

Finish Lets you finish the import and close the dialog.

Select channel dialog

Lets you select the channel 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.

Finish Lets you finish the import and close the dialog.

Related segment

You can specify this property for the following segment:

- Data File on page 122

Related topics

References

Channel Path..... 165
Channel Source..... 165
Data File..... 122
Group Name..... 176

Group Path..... 176
Group Source..... 177

Group Name

Purpose

To display the selected group name from the MF4 data file.

Description

In this property the group name of the selected TimeVector and DataVector is displayed. The group name typically contains the task name, the raster name or the event name.

Related segment

This property is displayed for the following segment:

- Data File on page 122

Related topics

References

Channel Path..... 165
Channel Source..... 165
Data File..... 122
File Name..... 175
Group Path..... 176
Group Source..... 177

Group Path

Purpose

To display the selected group path from the MF4 data file.

Description

In this property the group path of the selected TimeVector and DataVector is displayed. The group path typically contains the platform/device name.

Related segment

This property is displayed for the following segment:

- Data File on page 122

Related topics

References

Channel Path..... 165
Channel Source..... 165
Data File..... 122
File Name..... 175
Group Name..... 176
Group Source..... 177

Group Source

Purpose

To display the selected group source from the MF4 data file.

Description

In this property the group source of the selected TimeVector and DataVector is displayed. The group source typically contains the network node name, the tool name or the task name.

Related segment

This property is displayed for the following segment:

- Data File on page 122

Related topics

References

Channel Path..... 165
Channel Source..... 165
Data File..... 122
File Name..... 175
Group Name..... 176
Group Path..... 176

Interpolation

Purpose

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

Description

Numerical signal data consists of discrete signal values. To obtain a continuous signal shape, the signal values are interpolated. This property displays the used interpolation method.

The following interpolation methods are available:

Interpolation Method	Description
eBACKWARD	Lets you use the current data point until the next data point is reached.
eLINEAR	Lets you use linear interpolation between the current and the next data point.

Related segments

The property is available for the following segment:

- Data File on page 122
- Signal Value on page 151

Related topics

References

Data File..... 122
Signal Value..... 151

Loop Count

Purpose

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

Description

This property lets you specify how often a segment or signal is executed during simulation.

If you stimulate an application variable in a signal-based test, you cannot implement repeating signal shapes via the **Loop count** property of a segment signal. You can use an enclosing **Loop** segment instead.

Related signal

You can specify this property for the following signal:

- Segment Signal on page 115

Related segment

You can specify this property for the following segment:

- Loop on page 130

Related topics

References

Loop..... 130

Lower Bound

Purpose

To select the signal that defines the lower bound values for the evaluation.

Description

Lets you specify a delimiter for the range that is used by the following evaluation methods:

Evaluation Method	Description
IsInsideBounds	Checks whether the values of the evaluated signal are inside the range that is specified by the upper bound and the lower bound signal.
IsOutsideBounds	Checks whether the values of the evaluated signal are outside the range that is specified by the upper bound and the lower bound signal.

You can specify the bound in the following ways:

- Select a signal from the signal description set.
- Enter a number to use a constant signal of this value.
- Enter a name that is contained in the current variable pool, i.e., in a data container or in the **Mapping** data object.
- Enter a name of a data object that is dynamically added to the current **Signal-Based Testing** automation block.
- (Only with **StimulateAndCapture** and **Evaluate** automation blocks) Enter the key of a constant that is contained in the **Constants** dictionary.
- Leave the input empty or select **None** from the signal list to use the signal itself.

The evaluation method specifies the automation block of the **Evaluation** library that is used for evaluation. For details on the automation blocks, refer to **Evaluation Methods** (AutomationDesk Basic Practices 🕮).

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141

- Ramp Slope on page 144
- Sawtooth on page 147
- Signal Value on page 151
- Sine on page 153

Related topics

References

Evaluation Method 172
IsInsideBounds (AutomationDesk Basic Practices 🕮)
IsOutsideBounds (AutomationDesk Basic Practices 🕮)
Upper Bound 231

Mandatory

Purpose

To specify that the occurrence of the stop trigger is mandatory for test case evaluation.

Description

Note

This property is relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.

If you specified a condition watcher as a stop trigger for the current segment, this property lets you specify, whether the occurrence of the trigger is mandatory or optional. If no stop trigger is defined or a duration watcher is used, the Mandatory property is ignored.

If you select the property's checkbox, the stop trigger is marked as mandatory, otherwise it is marked optional.

If a segment with a mandatory trigger is not terminated by the trigger, an *Undefined* verdict is added for the test.

The segment-limiting time stamps for the evaluation are determined in the following way:

- The triggers are evaluated from the start of the test to its end.
- Fixed duration of segments are preserved.
- Mandatory time tags are evaluated first, followed by the evaluation of optional time tags.
- Then the mandatory segment stop triggers are evaluated.
- Optional stop triggers are evaluated afterwards for the remaining time intervals.

An optional time tag or segment stop trigger that does not occur affects the determination of the segment's end time stamp respectively the start time stamp of its successor segments.

For example, if an optional stop trigger does not occur, the duration of its segment is extended to the next time stamp that is uniquely defined by the successor segments. If there are further segments with an optional stop trigger before the fixed time stamp, their duration is set to zero.

By default, the Mandatory property is selected. If no stop trigger is defined for the current segment, the property is ignored.

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141
- Ramp Slope on page 144
- Sawtooth on page 147
- Signal Value on page 151
- Sine on page 153

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

Mandatory (Time Tag) 182
Signal-Based Testing Library 80
Stop Trigger 218

Mandatory (Time Tag)

Purpose

To specify that reaching the time tag is mandatory for test case evaluation.

Description

Note

- This property is relevant only if you want to use the signal description set as a **TestCaseDescription** data object for the automation blocks that are provided by the **Signal-Based Testing** library.
- This property is relevant only if you use time tags in your test case description. Time tags take effect only during test evaluation.

If you specified a **Condition** for the current time tag, this property lets you specify whether reaching the according point in time is mandatory or optional. If no condition is defined, the Mandatory property is ignored.

If you select the property's checkbox, the time tag is marked as mandatory, otherwise it is marked as optional. By default, the Mandatory property is not selected.

If a mandatory time tag is not reached, an *Undefined* verdict is added for the test.

This property corresponds to the Mandatory property of signal segments.

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Time Tag on page 110

Related topics

References

Condition..... 167
Mandatory..... 180

Maximum Duration

Purpose

To specify the maximum duration of a segment in seconds for test case evaluation.

Description

Note

This property is relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.

If you specified a condition watcher as a stop trigger for the current segment, this property lets you specify a maximum duration that is used by the test case evaluation.

If the maximum duration is exceeded, a *Failed* verdict is added to the test. Otherwise, a *Passed* verdict is added. You can change the provided verdict via the False Verdict and the True Verdict property.

If no stop trigger is defined for the current segment, this property is ignored.

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141
- Ramp Slope on page 144
- Sawtooth on page 147
- Signal Value on page 151
- Sine on page 153

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

False Verdict 173
Minimum Duration 186
Signal-Based Testing Library 80
True Verdict 230

Maximum Offset

Purpose

To specify the maximum time offset from the predecessor time tag.

Description

Note

- This property is relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.
- This property is relevant only if you use time tags in your test case description. Time tags take effect only during test evaluation.

If you specified a condition for the current time tag, this property lets you specify a maximum time offset that is used by the test case evaluation.

If the offset is greater than the maximum offset, a *Failed* verdict is added to the test. Otherwise, a *Passed* verdict is added.

If no condition is defined for the current time tag, this property is ignored.

This property corresponds to the Maximum Duration property of signal segments.

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Time Tag on page 110

Related topics

References

Condition 167
Maximum Duration 182
Minimum Offset 187

Maximum Value

Purpose

To specify the maximum value for editing Const segments interactively.

Description

This property specifies the maximum of a vertical raster that you can use to edit the value for a Const segment by dragging its signal line.

The difference of the raster's maximum and minimum must be an integral multiple of the step size.

Related segment

You can specify this property for the following segment:

- Const on page 119

Related topics

References

Minimum Value..... 188
Value..... 233

Mean

Purpose

To specify the mean value of a Gaussian noise.

Parameters

The required parameters for specifying the mean of the generated noise signal depend on the selected **Type** parameter:

Type	Additional Parameter	Meaning
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.
Signal	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	Alias	Lets you specify a variable alias to control the property by a model variable of a simulation application. You can specify an alias in the following ways: ▪ Select a signal name from the current signal description set.

Type	Additional Parameter	Meaning
		▪ Enter a name that is contained in the current variable pool, i.e., in a DataContainer or in the Mapping data object. ▪ Enter a name of a data object that is dynamically added to the current Signal-Based Testing automation block. ▪ (Only with StimulateAndCapture and Evaluate automation blocks) Enter the key of a constant that is contained in the Constants dictionary.

Related segment

You can specify this property for the following segment:

- Noise on page 133

Related topics

References

Seed 204
Sigma 211

Minimum Duration

Purpose

To specify the minimum duration of a segment in seconds for test case evaluation.

Description

Note

This property is relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.

If you specified a condition watcher as a stop trigger for the current segment, this property lets you specify a minimum duration that is used by the test case evaluation.

If the duration is less than the minimum duration, a *Failed* verdict is added to the test. Otherwise, a *Passed* verdict is added. You can change the provided verdict via the False Verdict and the True Verdict property.

If no stop trigger is defined for the current segment, this property is ignored.

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141
- Ramp Slope on page 144
- Sawtooth on page 147
- Signal Value on page 151
- Sine on page 153

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

False Verdict 173
Maximum Duration 182
Signal-Based Testing Library 80
True Verdict 230

Minimum Offset

Purpose

To specify the minimum time offset from the predecessor time tag.

Description

Note

- This property is relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.
- This property is relevant only if you use time tags in your test case description. Time tags take effect only during test evaluation.

If you specified a condition for the current time tag, this property lets you specify a minimum time offset that is used by the test case evaluation.

If the offset is less than the minimum offset, a *Failed* verdict is added to the test. Otherwise, a *Passed* verdict is added.

If no condition is defined for the current time tag, this property is ignored.

This property corresponds to the Minimum Duration property of signal segments.

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Time Tag on page 110

Related topics

References

Condition..... 167
Maximum Offset..... 184
Minimum Duration..... 186

Minimum Value

Purpose

To specify the minimum value for editing Const segments interactively.

Description

This property specifies the minimum of a vertical raster that you can use to edit the value for a Const segment by dragging its signal line.

The difference of the raster's maximum and minimum must be an integral multiple of the step size.

Related segment

You can specify this property for the following segment:

- Const on page 119

Related topics

References

Maximum Value..... 185
Value..... 233

Name (Signal Description Set)

Purpose

To display the name of the selected signal description set.

Related Signal Editor item

This property is displayed for the following Signal Editor item:

- Signal Description Set on page 104

Name (Time Tag)

Purpose

To specify the name of the selected time tag.

Description

The name of a time tag must be unique within the signal description set. If you specify a name that is already used, it is extended by a numerical suffix.

Note

- This property is relevant only if you want to use the signal description set as a **TestCaseDescription** data object for the automation blocks that are provided by the **Signal-Based Testing** library.
- This property is relevant only if you use time tags in your test case description. Time tags take effect only during test evaluation.

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Time Tag on page 110

Offset

Purpose

To specify a segment's offset value.

Parameters

The required parameters for specifying the segment's offset depend on the selected Type parameter:

Type	Additional Parameter	Meaning
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.
Signal	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	Alias	Lets you specify a variable alias to control the property by a model variable of a simulation application. You can specify an alias in the following ways: ▪ Select a signal name from the current signal description set. ▪ Enter a name that is contained in the current variable pool, i.e., in a **DataContainer** or in the **Mapping** data object. ▪ Enter a name of a data object that is dynamically added to the current **Signal-Based Testing** automation block. ▪ (Only with **StimulateAndCapture** and **Evaluate** automation blocks) Enter the key of a constant that is contained in the **Constants** dictionary.

Related segments

You can specify this property for the following segments:

- Pulse on page 138
- Ramp Slope on page 144
- Sawtooth on page 147
- Sine on page 153

Related topics

References

Amplitude 163
Offset (Time Tag) 191
Period 194
Phase 195

Offset (Time Tag)

Purpose

To specify the time offset from the predecessor time tag.

Description

Note

- This property is relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.
- This property is relevant only if you use time tags in your test case description. Time tags take effect only during test evaluation.

Note

This property is relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.

This property is ignored if a Condition is specified for the selected time tag. However, the time tag is graphically displayed with this offset.

If the Predecessor is empty, the offset relates to the test start.

This property corresponds to the Duration property of signal segments.

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Time Tag on page 110

Related topics

References

Condition..... 167
Offset..... 190
Predecessor..... 197

Operand 1

Purpose

To specify the left operand of the operation that defines an operational signal.

Description

Lets you select one signal of the current signal description set for the arithmetic operation that you specify in **Operation** to define an **Operation Signal**.

You can use the same signal for **Operand 1** and **Operand 2**.

Related signal

You can specify this property for the following signal:

- Operation Signal on page 112

Related topics

References

Operand 2 192
Operation (Property) 193
Operation Signal 112

Operand 2

Purpose

To specify the right operand of the operation that defines an operational signal.

Description

Lets you select one signal of the current signal description set for the arithmetic operation that you specify in **Operation** to define an **Operation Signal**.

You can use the same signal for **Operand 1** and **Operand 2**.

Related signal

You can specify this property for the following signal:

- Operation Signal on page 112

Related topics

References

Operand 1 191
Operation (Property) 193
Operation Signal 112

Operation (Property)

Purpose

To specify an arithmetic operation.

Description

Lets you select the arithmetic operation that is executed between the values of the two signals or two segments that you specify in Operand 1 and Operand 2. The result is stored in the current signal or segment.

You can select one of the following operations:

Operation	Description
Addition	Specifies to perform an addition.
Multiplication	Specifies to perform a multiplication.

Related signals and segment

You can specify this property for the following segment:

- Operation Signal on page 112
- Operation on page 136

Related topics

References

Operand 1 191
Operand 2 192

Parameters

Purpose

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

Description

Lets you define a list of parameters that you can use when you specify a property as an expression via the Value Editor.

Click to add a new parameter to the list.

Click ✕ to remove a parameter from the list.

The parameter list provides the 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. This can be used, for example, to describe the parameter's unit.

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

Basics

User Interface of AutomationDesk (AutomationDesk Introduction And Overview 🕮)

References

Edit (Value Expression in ASAM GES)..... 241
Value Editor (AutomationDesk Basic Practices 🕮)

Period

Purpose

To specify a segment's period in seconds.

Parameters

The required parameters for specifying the period depend on the selected Type parameter:

Type	Additional Parameter	Meaning
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.
Signal	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	Alias	Lets you specify a variable alias to control the property by a model variable of a simulation application. You can specify an alias in the following ways: ▪ Select a signal name from the current signal description set.

Type	Additional Parameter	Meaning
		▪ Enter a name that is contained in the current variable pool, i.e., in a **DataContainer** or in the **Mapping** data object. ▪ Enter a name of a data object that is dynamically added to the current **Signal-Based Testing** automation block. ▪ (Only with **StimulateAndCapture** and **Evaluate** automation blocks) Enter the key of a constant that is contained in the **Constants** dictionary.

Related segments

You can specify this property for the following segments:

- Pulse on page 138
- Sawtooth on page 147
- Sine on page 153

Related topics

References

Amplitude..... 163
Offset..... 190

Phase

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°.

Parameters

The required parameters for specifying the phase shift depend on the selected **Type** parameter:

Type	Additional Parameter	Meaning
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.
Signal	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.

Type	Additional Parameter	Meaning
Alias	Alias	Lets you specify a variable alias to control the property by a model variable of a simulation application. You can specify an alias in the following ways: ▪ Select a signal name from the current signal description set. ▪ Enter a name that is contained in the current variable pool, i.e., in a **DataContainer** or in the **Mapping** data object. ▪ Enter a name of a data object that is dynamically added to the current **Signal-Based Testing** automation block. ▪ (Only with **StimulateAndCapture** and **Evaluate** automation blocks) Enter the key of a constant that is contained in the **Constants** dictionary.

Related segments

You can specify this property for the following segments:

- Pulse on page 138
- Sawtooth on page 147
- Sine on page 153

Related topics

References

Amplitude 163
Offset 190
Period 194

Plot Resolution

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 in seconds.

If the number of values for one signal that results from the plot resolution and the duration exceeds one million, signals are displayed in block representation.

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

Name (Signal Description Set)..... 189

Predecessor

Purpose

To specify the predecessor of the selected time tag.

Description

Note

This property is relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.

Lets you select the predecessor time tag from the list of time tags that are contained in the current signal description set.

The periods of time specified in Offset (Time Tag), Minimum Offset and Maximum Offset relate to the predecessor time tag.

If you select *None* from the time tag list, the start of the signal-based test is specified as the predecessor time tag. This is the default.

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Time Tag on page 110

Related topics

References

Maximum Offset..... 184
Minimum Offset..... 187
Offset (Time Tag)..... 191

Reference

Purpose

To select the signal that is used to determine the reference values for the evaluation.

Description

Lets you specify a reference signal that is used by one of the following evaluation methods:

Evaluation Method	Description
IsEqual	Checks whether the values of the evaluated signal are equal to the specified reference signal.
IsInsideRegion	Checks whether the values of the evaluated signal are inside a region that is defined by the specified reference signal and the absolute tolerances.
IsInsideDynamicRegion	Checks whether the values of the evaluated signal are inside a region that is defined by the specified reference signal, the absolute and the relative tolerances.

You can specify the reference in the following ways:

- Select a signal from the signal description set.
- Enter a number to use a constant signal of this value.
- Enter a name that is contained in the current variable pool, i.e., in a data container or in the **Mapping** data object.
- Enter a name of a data object that is dynamically added to the current **Signal-Based Testing** automation block.
- (Only with **StimulateAndCapture** and **Evaluate** automation blocks) Enter the key of a constant that is contained in the **Constants** dictionary.
- Leave the input empty or select **None** from the signal list to use the signal itself.

The evaluation method specifies the automation block of the **Evaluation** library that is used for evaluation. For details on the automation blocks, refer to **Evaluation Methods** (AutomationDesk Basic Practices 🕮).

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141
- Ramp Slope on page 144
- Sawtooth on page 147

- Signal Value on page 151
- Sine on page 153

Related topics

References

IsEqual (AutomationDesk Basic Practices 🕮)
IsInsideDynamicRegion (AutomationDesk Basic Practices 🕮)
IsInsideRegion (AutomationDesk Basic Practices 🕮)

Rel. Tolerance Down

Purpose

To specify the relative part of the tolerance for the evaluation in negative y-axis direction.

Description

Lets you specify the *relative* part of the tolerance in negative y-axis direction that is used by the following evaluation method:

Evaluation Method	Description
IsInsideDynamicRegion	Checks whether the values of the evaluated signal are inside a region that is defined by the specified reference signal, the absolute and the relative tolerances.

The evaluation method specifies the automation block of the **Evaluation** library that is used for evaluation. For details on the automation blocks, refer to **Evaluation Methods** (AutomationDesk Basic Practices 🕮).

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141

- Ramp Slope on page 144
- Sawtooth on page 147
- Signal Value on page 151
- Sine on page 153

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

IsInsideDynamicRegion (AutomationDesk Basic Practices 🕮)
Reference 197
Rel. Tolerance Left 200
Rel. Tolerance Right 201
Rel. Tolerance Up 203
Tolerance Down 225
Tolerance Left 226
Tolerance Right 227
Tolerance Up 228

Rel. Tolerance Left

Purpose

To specify the relative part of the tolerance for the evaluation in negative time-axis direction.

Description

Lets you specify the *relative* part of the tolerance in negative time-axis direction that is used by the following evaluation method:

Evaluation Method	Description
IsInsideDynamicRegion	Checks whether the values of the evaluated signal are inside a region that is defined by the specified reference signal, the absolute and the relative tolerances.

The evaluation method specifies the automation block of the **Evaluation** library that is used for evaluation. For details on the automation blocks, refer to **Evaluation Methods** (AutomationDesk Basic Practices 🕮).

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141
- Ramp Slope on page 144
- Sawtooth on page 147
- Signal Value on page 151
- Sine on page 153

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

IsInsideDynamicRegion (AutomationDesk Basic Practices 🕮)
Reference 197
Rel. Tolerance Down 199
Rel. Tolerance Right 201
Rel. Tolerance Up 203
Tolerance Down 225
Tolerance Left 226
Tolerance Right 227
Tolerance Up 228

Rel. Tolerance Right

Purpose

To specify the relative part of the tolerance for the evaluation in positive time-axis direction.

Description

Lets you specify the *relative* part of the tolerance in positive time-axis direction that is used by the following evaluation method:

Evaluation Method	Description
IsInsideDynamicRegion	Checks whether the values of the evaluated signal are inside a region that is defined by the specified reference signal, the absolute and the relative tolerances.

The evaluation method specifies the automation block of the **Evaluation** library that is used for evaluation. For details on the automation blocks, refer to **Evaluation Methods** (AutomationDesk Basic Practices 🕮).

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141
- Ramp Slope on page 144
- Sawtooth on page 147
- Signal Value on page 151
- Sine on page 153

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

IsInsideDynamicRegion (AutomationDesk Basic Practices 🕮)
Reference 197
Rel. Tolerance Down 199
Rel. Tolerance Left 200
Rel. Tolerance Up 203
Tolerance Down 225

Tolerance Left 226
Tolerance Right 227
Tolerance Up 228

Rel. Tolerance Up

Purpose

To specify the relative part of the tolerance for the evaluation in positive y-axis direction.

Description

Lets you specify the *relative* part of the tolerance in positive y-axis direction that is used by the following evaluation method:

Evaluation Method	Description
IsInsideDynamicRegion	Checks whether the values of the evaluated signal are inside a region that is defined by the specified reference signal, the absolute and the relative tolerances.

The evaluation method specifies the automation block of the **Evaluation** library that is used for evaluation. For details on the automation blocks, refer to **Evaluation Methods** (AutomationDesk Basic Practices 🕮).

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141
- Ramp Slope on page 144
- Sawtooth on page 147
- Signal Value on page 151
- Sine on page 153

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

IsInsideDynamicRegion (AutomationDesk Basic Practices 🕮)
Reference 197
Rel. Tolerance Down 199
Rel. Tolerance Left 200
Rel. Tolerance Right 201
Tolerance Down 225
Tolerance Left 226
Tolerance Right 227
Tolerance Up 228

Seed

Purpose

To specify the seed of a random generator.

Description

Lets you specify a constant value for the seed, i.e., the start value for the generation of a random value.

You can click the Browse button to specify an expression for this constant value via the **Value Editor**. Refer to Edit (Value Expression in ASAM GES) on page 241. 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 on page 193.

Related segment

You can specify this property for the following segment:

- Noise on page 133

Related topics

References

Mean 185
Sigma 211

Segment Type

Purpose

To display the segment type.

Related segments

This property is displayed for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141
- Ramp Slope on page 144
- Sawtooth on page 147
- Signal Value on page 151
- Sine on page 153

Show Evaluation Signals

Purpose

To display the evaluation signals together with the signal in the plot.

Description

If you previously specified an evaluation method and related reference signals for a signal, this property lets you display the evaluation signal's borders or regions in the signal plot.

You can also enable/disable this property via the **Evaluation Signals** command in the **Signal Editor – Show** ribbon group.

You can specify a default value for this property on the **Signal Editor** page of the **AutomationDesk Options** dialog. Refer to Signal Editor Page (AutomationDesk Basic Practices 🕮).

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

Evaluation Method..... 172
Evaluation Signals..... 244
Show Evaluation Verdicts..... 206

Show Evaluation Verdicts

Purpose

To display the evaluation verdicts of the latest test execution with the signal in the plot.

Description

If this property is selected, the verdict symbols according to the latest completed test execution are displayed in the signal plot.

Editing the signal description set does not change the displayed verdicts. Only a new test execution can do that.

The following table shows the provided verdict symbols.

Verdict Symbol	Verdict Value	Description
	Undefined	Indicates that no evaluation method is defined for this segment.
	Passed	Indicates that the evaluation method that is specified for this segment is passed.
	Failed	Indicates that the evaluation method that is specified for this segment is not passed.
	Error	Indicates that an error occurred during the evaluation that is specified for this segment.

You can also enable/disable this property via the **Evaluation Verdicts** command in the **Signal Editor – Show** ribbon group.

You can specify a default value for this property on the **Signal Editor** page of the **AutomationDesk Options** dialog. Refer to Signal Editor Page (AutomationDesk Basic Practices 🕮).

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

Evaluation Method..... 172
Evaluation Verdicts..... 245
Show Evaluation Signals..... 205

Show Grid

Purpose

To show grid lines in the signal plot.

Description

Lets you display a grid in the signal plot.

You can also enable/disable this property via the **Grid** command in the **Signal Editor – Show** ribbon group.

You can specify a default value for this property on the **Signal Editor** page of the **AutomationDesk Options** dialog. Refer to Signal Editor Page (AutomationDesk Basic Practices 🕮).

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

Grid..... 247
Show Time Cursor..... 210

Show Segment Comments

Purpose

To show the segment comments in the signal plot.

Description

Lets you display all segment comments in addition to the signal plot or the segments' block representations.

You can also enable/disable this property via the **Segment Comments** command in the **Signal Editor – Show** ribbon group.

You can specify a default value for this property on the **Signal Editor** page of the **AutomationDesk Options** dialog. Refer to Signal Editor Page (AutomationDesk Basic Practices 🕮).

Related Signals

You can specify this property for the following signal:

- Segment Signal on page 115

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

Comment 166
Segment Comments 254
Show Evaluation Verdicts 206
Show Segment Parameters 208
Show Segment Types 209

Show Segment Parameters

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.

You can also enable/disable this property via the **Segment Parameters** command in the **Signal Editor – Show** ribbon group.

You can specify a default value for this property on the **Signal Editor** page of the **AutomationDesk Options** dialog. Refer to Signal Editor Page (AutomationDesk Basic Practices 🕮).

Related Signals

You can specify this property for the following signal:

- Segment Signal on page 115

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

Segment Parameters..... 255
Show Evaluation Verdicts..... 206
Show Segment Comments..... 208
Show Segment Types..... 209

Show Segment Types

Purpose

To show segment type labels in the signal plot.

Description

Lets you display all segment types in addition to the signal plot or the block representations of the segments.

You can also enable/disable this property via the **Segment Types** command in the **Signal Editor – Show** ribbon group.

You can specify a default value for this property on the **Signal Editor** page of the **AutomationDesk Options** dialog. Refer to Signal Editor Page (AutomationDesk Basic Practices 🕮).

Related Signals

You can specify this property for the following signal:

- Segment Signal on page 115

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

Segment Types 256
Show Evaluation Verdicts 206
Show Segment Comments 208
Show Segment Parameters 208

Show Time Cursor

Purpose

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

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

Plot Resolution 196
Show Grid 207
Show X-Axis 210
Time Cursor 261

Show X-Axis

Purpose

To show a separate x-axis for each signal.

Description

A light red bar indicates that the actual duration of the related segments might differ from the plotted duration because it depends on a condition, such as a stop trigger.

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

Plot Resolution..... 196
Show Grid..... 207
Show Time Cursor..... 210
X-Axis..... 263

Sigma

Purpose

To specify the standard deviation of a Gaussian noise.

Parameters

The required parameters for specifying the standard deviation depend on the selected **Type** parameter:

Type	Additional Parameter	Meaning
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.
Signal	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	Alias	Lets you specify a variable alias to control the property by a model variable of a simulation application. You can specify an alias in the following ways: ▪ Select a signal name from the current signal description set. ▪ Enter a name that is contained in the current variable pool, i.e., in a **DataContainer** or in the **Mapping** data object. ▪ Enter a name of a data object that is dynamically added to the current **Signal-Based Testing** automation block. ▪ (Only with **StimulateAndCapture** and **Evaluate** automation blocks) Enter the key of a constant that is contained in the **Constants** dictionary.

Related segment

You can specify this property for the following segment:

- Noise on page 133

Related topics

References

Mean..... 185
Seed..... 204

Signal

Purpose

To select the signal to be evaluated.

Description

Lets you select a signal from the signal description set that is evaluated with one of the following evaluation methods:

Evaluation Method	Description
IsEqual	Checks whether the values of the evaluated signal are equal to the specified reference signal.
IsAboveBound	Checks whether the values of the evaluated signal are above the specified bound signal.
IsBelowBound	Checks whether the values of the evaluated signal are below the specified bound signal.
IsInsideBounds	Checks whether the values of the evaluated signal are inside the range that is specified by the upper bound and the lower bound signal.
IsOutsideBounds	Checks whether the values of the evaluated signal are outside the range that is specified by the upper bound and the lower bound signal.
IsInsideRegion	Checks whether the values of the evaluated signal are inside a region that is defined by the specified reference signal and the tolerances.
IsInsideDynamicRegion	Checks whether the values of the evaluated signal are inside a region that is defined by the specified reference signal, the absolute and the relative tolerances.

The evaluation method specifies the automation block of the **Evaluation** library that is used for evaluation. For details on the automation blocks, refer to **Evaluation Methods** (AutomationDesk Basic Practices 🕮).

You can specify the signal in the following ways:

- Select a signal from the signal description set.
- Enter a number to use a constant signal of this value.
- Enter a name that is contained in the current variable pool, i.e., in a data container or in the **Mapping** data object.
- Enter a name of a data object that is dynamically added to the current **Signal-Based Testing** automation block.
- (Only with **StimulateAndCapture** and **Evaluate** automation blocks) Enter the key of a constant that is contained in the **Constants** dictionary.

- Leave the input empty or select **None** from the signal list to use the signal itself.

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141
- Ramp Slope on page 144
- Sawtooth on page 147
- Signal Value on page 151
- Sine on page 153

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

Evaluation Method..... 172
IsAboveBound (AutomationDesk Basic Practices 🕮)
IsBelowBound (AutomationDesk Basic Practices 🕮)
IsEqual (AutomationDesk Basic Practices 🕮)
IsInsideBounds (AutomationDesk Basic Practices 🕮)
IsInsideDynamicRegion (AutomationDesk Basic Practices 🕮)
IsOutsideBounds (AutomationDesk Basic Practices 🕮)
Reference..... 197

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 **Select File** dialog to import numerical data from a MAT file.

Select File dialog

Lets you select and import numerical signal data from an MAT file to a Signal Value on page 151.

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.

Next Opens the **Select Vectors** dialog for you to specify the X vector and the Y vector based on the imported data.

Finish Lets you finish the import and close the dialog.

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

You can specify this property for the following segment:

- Signal Value on page 151

Related topics

References

Signal Value..... 151

Slope

Purpose

To specify a slope.

Parameters

The required parameters for specifying the slope depend on the selected **Type** parameter:

Type	Additional Parameter	Meaning
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.
Signal	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	Alias	Lets you specify a variable alias to control the property by a model variable of a simulation application. You can specify an alias in the following ways: ▪ Select a signal name from the current signal description set. ▪ Enter a name that is contained in the current variable pool, i.e., in a **DataContainer** or in the **Mapping** data object. ▪ Enter a name of a data object that is dynamically added to the current **Signal-Based Testing** automation block. ▪ (Only with **StimulateAndCapture** and **Evaluate** automation blocks) Enter the key of a constant that is contained in the **Constants** dictionary.

Related segment

You can specify this property for the following segment:

- Ramp Slope on page 144

Related topics

References

Offset..... 190

Start

Purpose

To specify a start value.

Parameter types

The required parameters for specifying the start value depend on the selected Type parameter:

Type	Additional Parameter	Meaning
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.
Signal	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	Alias	Lets you specify a variable alias to control the property by a model variable of a simulation application. You can specify an alias in the following ways: ▪ Select a signal name from the current signal description set. ▪ Enter a name that is contained in the current variable pool, i.e., in a **DataContainer** or in the **Mapping** data object. ▪ Enter a name of a data object that is dynamically added to the current **Signal-Based Testing** automation block. ▪ (Only with **StimulateAndCapture** and **Evaluate** automation blocks) Enter the key of a constant that is contained in the **Constants** dictionary.

Related segments

You can specify this property for the following segments:

- Exponential on page 125
- Ramp on page 141

Related topics

References

Start (Data File) 217
Stop 217
Tau 221

Start (Data File)

Purpose

To specify a start value.

Description

With this property, you can specify a start time for the signal data to be considered in the segment in the following ways:

- To use the data provided by the file from the beginning, specify `-Infinity`. This is the default setting.
- To skip data at the beginning of the file, specify a start time for the considered signal data.

You can click the Browse button to specify an expression for this constant value via the **Value Editor**. Refer to Edit (Value Expression in ASAM GES) on page 241. 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 on page 193.

Related segments

You can specify this property for the following segment:

- Data File on page 122

Related topics

References

Duration (Data File)..... 170
Start..... 216

Stop

Purpose

To specify a stop value.

Parameters

The required parameters for specifying the stop value depend on the selected **Type** parameter:

Type	Additional Parameter	Meaning
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.

Type	Additional Parameter	Meaning
Signal	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	Alias	Lets you specify a variable alias to control the property by a model variable of a simulation application. You can specify an alias in the following ways: ▪ Select a signal name from the current signal description set. ▪ Enter a name that is contained in the current variable pool, i.e., in a **DataContainer** or in the **Mapping** data object. ▪ Enter a name of a data object that is dynamically added to the current **Signal-Based Testing** automation block. ▪ (Only with **StimulateAndCapture** and **Evaluate** automation blocks) Enter the key of a constant that is contained in the **Constants** dictionary.

Related segments

You can specify this property for the following segments:

- Exponential on page 125
- Ramp on page 141

Related topics

References

Start 216
Tau 221

Stop Trigger

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 *stop trigger*.

A stop trigger is either:

- 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 value specified for the **Duration** (refer to Duration on page 169) property is used only for display purposes.

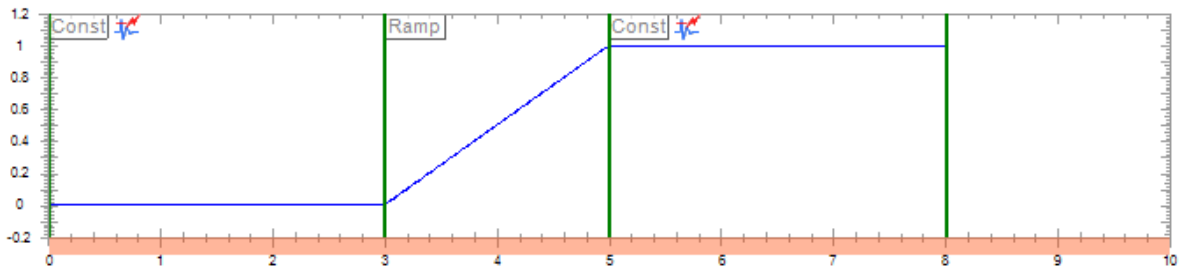
Parameters

According to the **Type** that you selected, you can specify the watchers by the following parameters:

Type	Additional Parameter	Meaning
Constant	Value	Lets you define a *duration watcher* by specifying a constant time in seconds. The segment ends when the time has elapsed.
Condition	Condition	Lets you define a *condition watcher* by specifying a condition string in ASAM General Expression Syntax (GES). The segment ends when the stop condition is reached or when the timeout has elapsed. For more information, refer to **Condition** on page 167
	Timeout	Lets you specify a timeout in seconds to prevent an invalid stop condition and an infinite simulation run. The value `0` indicates that no timeout is specified (default).
None	None	Lets you remove the stop trigger.

Using a **Condition** for a segment is indicated as follows (see also illustration below):

- A condition icon is displayed to the right of the segment's title.
- From the segment, the time axis of the signal is marked with a light red bar to indicate that the duration of the segment depends on a condition.



Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Noise on page 133
- Pulse on page 138
- Ramp Slope on page 144

- Sawtooth on page 147
- Sine on page 153

Related topics

References

Condition 167

Symbol Name

Purpose

To specify the name of the selected signal.

Description

Each signal name and each variable alias must be unique in the signal description set.

If you specify a signal name that is already in use, it is suffixed automatically to create a unique name.

To map the signal to a model variable use the name of the string in the VariablePool that contains the according model variable.

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related topics

References

Name (Signal Description Set) 189

Tau

Purpose

To specify the time constant tau.

Parameters

The required parameters for specifying the time constant tau depend on the selected Type parameter:

Type	Additional Parameter	Meaning
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.
Signal	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	Alias	Lets you specify a variable alias to control the property by a model variable of a simulation application. You can specify an alias in the following ways: ▪ Select a signal name from the current signal description set. ▪ Enter a name that is contained in the current variable pool, i.e., in a **DataContainer** or in the **Mapping** data object. ▪ Enter a name of a data object that is dynamically added to the current **Signal-Based Testing** automation block. ▪ (Only with **StimulateAndCapture** and **Evaluate** automation blocks) Enter the key of a constant that is contained in the **Constants** dictionary.

Related segment

You can specify this property for the following segment:

- Exponential on page 125

Related topics

References

Start.....216
Stop.....217

Time Step Size

Purpose	To specify the time step size of the raster that is used to edit the segment duration interactively.
Related Signal Editor item	You can specify this property for the following Signal Editor item: ▪ Signal Description Set on page 104
Related Signals	You can specify this property for the following signals: ▪ Operation Signal on page 112 ▪ Segment Signal on page 115
Related segments	You can specify this property for the following segments: ▪ Const on page 119 ▪ Exponential on page 125 ▪ Idle on page 128 ▪ Noise on page 133 ▪ Pulse on page 138 ▪ Ramp on page 141 ▪ Ramp Slope on page 144 ▪ Sawtooth on page 147 ▪ Sine on page 153
Related topics	References Value Step Size..... 234

Time Tag

Purpose	To specify a time tag that defines the end of the selected segment.

Description

Note

- This property is relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.
- This property is relevant only if you use time tags in your test case description. Time tags take effect only during test evaluation.

Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141
- Ramp Slope on page 144
- Sawtooth on page 147
- Signal Value on page 151
- Sine on page 153

Related topics

References

Signal-Based Testing Library.....80
Time Tag.....110

Time Vector Name

Purpose

To display the time vector name.

Related segment

This property is displayed for the following segment:

- Data File on page 122

Related topics

References

Data Vector Name..... 169

Tolerance

Purpose

To specify the tolerance between the evaluated signal and the reference signal.

Description

Lets you specify the maximum deviation between the evaluated signal and the reference signal that is used by the following evaluation method:

Evaluation Method	Description
IsEqual	Checks whether the values of the evaluated signal are equal to the specified reference signal.

The evaluation method specifies the automation block of the **Evaluation** library that is used for evaluation. For details on the automation blocks, refer to **Evaluation Methods** (AutomationDesk Basic Practices 🕮).

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

Evaluation Method..... 172
IsEqual (AutomationDesk Basic Practices 🕮)
Reference..... 197
Signal..... 212

Tolerance Down

Purpose

To specify the absolute tolerance for the evaluation in negative y-axis direction.

Description

Lets you specify the *absolute* tolerances that are used by the following evaluation methods:

Evaluation Method	Description
IsInsideRegion	Checks whether the values of the evaluated signal are inside a region that is defined by the specified reference signal and the absolute tolerances.
IsInsideDynamicRegion	Checks whether the values of the evaluated signal are inside a region that is defined by the specified reference signal, the absolute and the relative tolerances.

The evaluation method specifies the automation block of the **Evaluation** library that is used for evaluation. For details on the automation blocks, refer to **Evaluation Methods** (AutomationDesk Basic Practices 🕮).

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141
- Ramp Slope on page 144
- Sawtooth on page 147
- Signal Value on page 151
- Sine on page 153

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

IsInsideDynamicRegion (AutomationDesk Basic Practices 🕮)
IsInsideRegion (AutomationDesk Basic Practices 🕮)
Reference 197
Tolerance Left 226
Tolerance Right 227
Tolerance Up 228

Tolerance Left

Purpose

To specify the absolute tolerance for the evaluation in negative time-axis direction.

Description

Lets you specify the maximum deviation between the evaluated signal and the reference in positive time-axis direction that fulfills the evaluation's condition. This *absolute* tolerance is used by the following evaluation methods:

Evaluation Method	Description
IsInsideRegion	Checks whether the values of the evaluated signal are inside a region that is defined by the specified reference signal and the absolute tolerances.
IsInsideDynamicRegion	Checks whether the values of the evaluated signal are inside a region that is defined by the specified reference signal, the absolute and the relative tolerances.

The evaluation method specifies the automation block of the **Evaluation** library that is used for evaluation. For details on the automation blocks, refer to **Evaluation Methods** (AutomationDesk Basic Practices 🕮).

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136

- Pulse on page 138
- Ramp on page 141
- Ramp Slope on page 144
- Sawtooth on page 147
- Signal Value on page 151
- Sine on page 153

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

IsInsideDynamicRegion (AutomationDesk Basic Practices 🕮)
IsInsideRegion (AutomationDesk Basic Practices 🕮)
Reference 197
Tolerance Down 225
Tolerance Right 227
Tolerance Up 228

Tolerance Right

Purpose

To specify the absolute tolerance for the evaluation in positive time-axis direction.

Description

Lets you specify the maximum deviation between the evaluated signal and the reference in positive time-axis direction that fulfills the evaluation's condition. This *absolute* tolerance is used by the following evaluation methods:

Evaluation Method	Description
IsInsideRegion	Checks whether the values of the evaluated signal are inside a region that is defined by the specified reference signal and the absolute tolerances.
IsInsideDynamicRegion	Checks whether the values of the evaluated signal are inside a region that is defined by the specified reference signal, the absolute and the relative tolerances.

The evaluation method specifies the automation block of the **Evaluation** library that is used for evaluation. For details on the automation blocks, refer to **Evaluation Methods** (AutomationDesk Basic Practices 🕮).

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141
- Ramp Slope on page 144
- Sawtooth on page 147
- Signal Value on page 151
- Sine on page 153

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

IsInsideDynamicRegion (AutomationDesk Basic Practices 🕮)
IsInsideRegion (AutomationDesk Basic Practices 🕮)
Reference 197
Tolerance Down 225
Tolerance Left 226
Tolerance Up 228

Tolerance Up

Purpose

To specify the absolute tolerance for the evaluation in positive y-axis direction.

Description

Lets you specify the maximum deviation between the evaluated signal and the reference in positive y-axis direction that fulfills the evaluation's condition. This *absolute* tolerance is used by the following evaluation methods:

Evaluation Method	Description
IsInsideRegion	Checks whether the values of the evaluated signal are inside a region that is defined by the specified reference signal and the absolute tolerances.

Evaluation Method	Description
IsInsideDynamicRegion	Checks whether the values of the evaluated signal are inside a region that is defined by the specified reference signal, the absolute and the relative tolerances.

The evaluation method specifies the automation block of the **Evaluation** library that is used for evaluation. For details on the automation blocks, refer to **Evaluation Methods** (AutomationDesk Basic Practices 🕮).

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141
- Ramp Slope on page 144
- Sawtooth on page 147
- Signal Value on page 151
- Sine on page 153

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

IsInsideDynamicRegion (AutomationDesk Basic Practices 🕮)
IsInsideRegion (AutomationDesk Basic Practices 🕮)
Reference..... 197
Tolerance Down..... 225
Tolerance Left..... 226
Tolerance Right..... 227

True Verdict

Purpose

To specify the verdict that is provided if the evaluation returns true.

Description

Note

This property is relevant only if you want to use the signal description set as a TestCaseDescription data object for the automation blocks that are provided by the Signal-Based Testing library.

If all conditions of the evaluation method or the time constraints are fulfilled, the Passed verdict is provided by default. You can change the provided verdict for this case to one of the following verdicts:

Verdict	Meaning
Executed	The evaluation has been executed without errors.
Passed	The evaluation has been executed with the expected result.
Undefined	The evaluation has been executed but the expected result could not be verified. For example, the evaluation was interrupted or aborted.
Failed	The evaluation has been executed and one of conditions or the time constraint is not fulfilled.
Error	An error, e.g. an unhandled exception, occurred during the execution of the evaluation.
None	No verdict is provided.

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141

- Ramp Slope on page 144
- Sawtooth on page 147
- Signal Value on page 151
- Sine on page 153

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

Evaluation Method 172
False Verdict 173
Maximum Duration 182
Minimum Duration 186
Signal-Based Testing Library 80

Upper Bound

Purpose

To select the signal that defines the upper bound values for the evaluation.

Description

Lets you specify a delimiter for the range that is used by the following evaluation methods:

Evaluation Method	Description
IsInsideBounds	Checks whether the values of the evaluated signal are inside the range that is specified by the upper bound and the lower bound signal.
IsOutsideBounds	Checks whether the values of the evaluated signal are outside the range that is specified by the upper bound and the lower bound signal.

You can specify the bound in the following ways:

- Select a signal from the signal description set.
- Enter a number to use a constant signal of this value.
- Enter a name that is contained in the current variable pool, i.e., in a data container or in the **Mapping** data object.
- Enter a name of a data object that is dynamically added to the current **Signal-Based Testing** automation block.
- (Only with **StimulateAndCapture** and **Evaluate** automation blocks) Enter the key of a constant that is contained in the **Constants** dictionary.
- Leave the input empty or select **None** from the signal list to use the signal itself.

The evaluation method specifies the automation block of the **Evaluation** library that is used for evaluation. For details on the automation blocks, refer to **Evaluation Methods** (AutomationDesk Basic Practices 🕮).

Related Signals

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related segments

You can specify this property for the following segments:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141
- Ramp Slope on page 144
- Sawtooth on page 147
- Signal Value on page 151
- Sine on page 153

Related topics

References

Evaluation Method..... 172
IsInsideBounds (AutomationDesk Basic Practices 🕮)
IsOutsideBounds (AutomationDesk Basic Practices 🕮)
Lower Bound..... 179

Use Block Representation

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

You can specify this property for the following signals:

- Operation Signal on page 112
- Segment Signal on page 115

Related Signal Editor item

You can specify this property for the following Signal Editor item:

- Signal Description Set on page 104

Related topics

References

Block Representation..... 237
Show Segment Comments..... 208
Show Segment Types..... 209

Value

Purpose

To specify a value for a const segment.

Parameters

The required parameters for specifying the value depend on the selected **Type** parameter:

Type	Additional Parameter	Meaning
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.
Signal	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	Alias	Lets you specify a variable alias to control the property by a model variable of a simulation application. You can specify an alias in the following ways: ▪ Select a signal name from the current signal description set. ▪ Enter a name that is contained in the current variable pool, i.e., in a **DataContainer** or in the **Mapping** data object. ▪ Enter a name of a data object that is dynamically added to the current **Signal-Based Testing** automation block. ▪ (Only with **StimulateAndCapture** and **Evaluate** automation blocks) Enter the key of a constant that is contained in the **Constants** dictionary.

Related segment

You can specify this property for the following segment:

- Const on page 119

Related topics

References

Maximum Value..... 185
Minimum Value..... 188
Value Step Size..... 234

Value Step Size

Purpose

To specify the step size for editing the value of Const segments interactively.

Description

This property specifies the step size of a vertical raster that you can use to edit the value for a Const segment by dragging its signal line.

The difference of the raster's maximum and minimum must be an integral multiple of the step size.

Related segment

You can specify this property for the following segment:

- Const on page 119

Related topics

References

Maximum Value..... 185
Minimum Value..... 188
Value..... 233

Signal Editor Commands

Introduction

The Signal Editor provides commands and panes to create and edit signal description sets and signals graphically.

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To display block representations instead of a plotted signal.

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To show a separate x-axis for each signal.

Zoom Mode....263
To zoom into signals and segments.

Zoom to Default....264
To show the default range of signals.

Block Representation

Access

You can access this command via:

Ribbon	Signal Editor - Show
Context menu of	None
Shortcut key	None
Icon	☑ (Checkbox)

Purpose

To display block representations instead of a plotted signal.

Result

If there is a checkmark to the left, the signals are displayed as a sequence of block representations instead of a plotted signal.

Description

Using this command is equivalent to enabling or disabling the Use Block Representation property for the active signal description set.

Related topics

References

Evaluation Signals..... 244
Grid..... 247
Segment Comments..... 254
Time Cursor..... 261
Use Block Representation..... 232
X-Axis..... 263

Convert Segment

Access

You can access this command via:

Ribbon	None
Context menu of	A segment of the following types: ▪ Const ▪ Exponential ▪ Idle ▪ Noise ▪ Pulse ▪ Ramp ▪ Ramp Slope

	▪ Sawtooth ▪ Signal Value ▪ Sine
Shortcut key	None
Icon	None

Purpose

To convert the selected segment into a segment of an other type.

Result

The Convert Segment dialog opens.

Target segment types

In the context sub menu, you can select the target segment type of the conversion. The following types are available:

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

The duration of the new segment is equal to that of the original segment, no matter whether it is specified by a constant value or by a trigger condition.

If possible, the remaining properties, such as the evaluation method, are copied to the converted segment.

Related topics

References

Segments..... 118

Create Column

Access

You can access this command via:

Ribbon	None
Context menu of	The table header of the Signal Editor

Shortcut key	None
Icon	None

Purpose

To create a new column in the signal description set.

Result

The Create Column dialog opens and lets you specify the column to be added.

Description

This command lets you add a new column for a customer-defined additional property to your signal description set. You can edit these fields in the Signal Editor and use them to filter, sort, and group the table of signals. The contents of the columns is saved together with the signal description set in the related STZ file.

Dialog settings

The Create Column dialog provides the following settings:

Name Lets you enter the name of the column to be added or renamed.

Custom columns and their contents are stored as signal-specific properties in the STZ file of the signal description set. In each signal description set, column names must be unique. If the specified name is invalid, this edit field is marked with a ⊗ and its tooltip displays an error message.

Description Lets you enter a text to describe the contents of the column to be added or renamed.

This text is displayed as the help text in the Properties pane, when the related property is selected.

Related topics

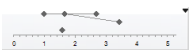
References

Delete Column 240
Rename Column 252
Signal Description Set 104

Create Time Tag

Access

You can access this command via:

Ribbon	None
Context menu of	The time scale in the header of the Signal Editor 

Shortcut key	None
Icon	None

Purpose

To create a time tag at the mouse pointer position.

Result

A time tag with an offset according to the mouse pointer position within the time scale is added to the signal description set.

Description

The new time stamp is represented by a diamond in the time scale. You can click the diamond to select the time tag, for example, to edit its properties.

Related topics

References

Delete Time Tag..... 241
Signal Description Set..... 104
Time Tag..... 110

Delete Column

Access

You can access this command via:

Ribbon	None
Context menu of	The table header of the Signal Editor
Shortcut key	None
Icon	None

Purpose

To delete the selected column from the signal description set.

Result

After you confirmed the operation in a dialog, the selected column is deleted from the signal description set.

Description

You can delete only those columns that you created via **`Create Column`**. You cannot undo the deletion of a column.

Related topics

References

Create Column..... 238
Rename Column..... 252
Signal Description Set..... 104

Delete Time Tag

Access

You can access this command via:

Ribbon	None
Context menu of	The time tag on the time scale of the Signal Editor
Shortcut key	`Del`
Icon	None

Purpose

To delete the selected time tag.

Result

The selected time tag is deleted from the signal description set.

Description

If the time tag has successors, their Predecessor property is set to the predecessor of the deleted time tag.

Related topics

References

Signal Description Set..... 104
Time Tag..... 110

Edit (Value Expression in ASAM GES)

Access

You can access this command via:

Ribbon	None
Context menu of	None
Shortcut key	None

Icon	None
Others	Click the **Browse** button to specify the **Value** of a property in the **Properties** pane of the **Signal Editor**.

Purpose

To edit a value in ASAM General Expression Syntax (GES).

Result

The **Expression Editor** opens.

Description

This command lets you specify a value in the ASAM General Expression Syntax (GES).

In such an expression, you can use mathematical functions (e.g., **sin**) and parameters that you specify in the signal description set's **Parameters** property. This lets you consistently modify the properties of multiple signal description elements at once by changing only the related parameter.

To edit the value expression, you can use the **Expression Editor** in two different ways:

- You can manually enter the value in the edit field of the editor.
- You can specify the value expression by selecting its functions, parameters, and operators via the editor buttons **Function**, **Parameter**, and **Operator**.

By default, the syntax of the expression is permanently checked. You can disable syntax checking, for example, 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.

Expression Editor

The **Expression Editor** dialog provides the following dialog settings:

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

Operator	Syntax	Meaning
sin	`sin(Expr)`[1)]	Returns the sine of `Expr`.
asin	`asin(Expr)`	Returns the arc sine of `Expr`, specified in radian.
cos	`cos(Expr)`[1)]	Returns the cosine of `Expr`.
acos	`acos(Expr)`	Returns the arc sine of `Expr`, specified in radian.
log	`log(Expr)`	Return the natural logarithm (base e) of `Expr`.
abs	`abs(Expr)`	Returns the absolute value of `Expr`.

Operator	Syntax	Meaning
pow	`pow(Expr1, Expr2)`	Returns the value of `Expr1` to the power of `Expr2`.
min	`min(Expr1, Expr2)`	Returns the value of the smaller expression.
max	`max(Expr1, Expr2)`	Returns the value of the greater expression.

[1] Where Expr is specified in radian.

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

Operator Lets you select an operator to insert into the value 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.

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

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 value expression is syntactically correct.
	The value expression contains syntax errors. In the ASAM GES expression, the error is highlighted. The **OK** button is disabled.
	The value expression 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.

Editor features

The **Expression 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

Parameters..... 193

Evaluation Signals

Access

You can access this command via:

Ribbon	**Signal Editor - Show**
Context menu of	None
Shortcut key	None
Icon	☑ (Checkbox)

Purpose

To display the evaluation signals together with the signal in the plot.

Result

If there is a checkmark to the left and the active signal set contains signals with an **Evaluation Method** property that is not set to *None*, the resulting reference signals or evaluation regions are displayed together with the signals in the signal plot.

Description

Using this command is equivalent to enabling or disabling the **Show Segment Comments** property for the active signal description set.

You can specify a default value for this property on the **Signal Editor** page of the **AutomationDesk Options** dialog. Refer to Signal Editor Page (AutomationDesk Basic Practices 🕮).

Related topics

References

Evaluation Verdicts..... 245
Grid..... 247
Show Evaluation Signals..... 205

Time Cursor 261
X-Axis 263

Evaluation Verdicts

Access

You can access this command via:

Ribbon	Signal Editor - Show
Context menu of	None
Shortcut key	None
Icon	☑ (Checkbox)

Purpose

To display the evaluation verdicts of the latest test execution with the signal in the plot.

Result

If there is a checkmark on the left, the related verdict symbol is displayed in the signal plot for each segment with an evaluated verdict.

Description

The following table shows the provided verdict symbols.

Verdict Symbol	Verdict Value	Description
	Undefined	Indicates that no evaluation method is defined for this segment.
	Passed	Indicates that the evaluation method that is specified for this segment is passed.
	Failed	Indicates that the evaluation method that is specified for this segment is not passed.
	Error	Indicates that an error occurred during the evaluation that is specified for this segment.

Using this command is equivalent to enabling or disabling the Show Evaluation Verdicts property for the active signal description set.

You can specify a default value for this property on the Signal Editor page of the AutomationDesk Options dialog. Refer to Signal Editor Page (AutomationDesk Basic Practices 🕮).

Related topics

References

Evaluation Method.....172
Evaluation Signals.....244
Show Evaluation Verdicts.....206

Fit to Screen

Access

You can access this command via:

Ribbon	None
Context menu of	▪ Signal Description Set ▪ Signal ▪ Segment
Shortcut key	None
Icon	None

Purpose

To fit the signal view to the signal length.

Result

The x-axis of the selected signal or segment is made fully visible in the working area.

Related topics

HowTos

How to Scale Up or Scale Down a Signal Display.....32
How to Stretch or Compress the Axes of a Signal Display.....28
How to Zoom into a Signal.....30

References

Zoom to Default.....264

Grid

Access

You can access this command via:

Ribbon	Signal Editor - Show
Context menu of	None
Shortcut key	None
Icon	☑ (Checkbox)

Purpose

To show grid lines in the signal plot.

Result

If there is a checkmark to the left, time and y-axis grid lines are displayed in the plot of each signal in the active signal description set.

Description

Using this command is equivalent to enabling or disabling the Show Grid property for the active signal description set.

You can specify a default value for this property on the Signal Editor page of the AutomationDesk Options dialog. Refer to Signal Editor Page (AutomationDesk Basic Practices 🕮).

Related topics

References

Block Representation..... 237
Evaluation Signals..... 244
Segment Comments..... 254
Show Grid..... 207
Time Cursor..... 261
X-Axis..... 263

Hand Mode

Access

You can access this command via:

Ribbon	None
Context menu of	▪ Signal description set ▪ Signal ▪ Segment

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.

> **Tip**
>
> You can toggle between the **Select Mode**, the **Hand Mode**, and the **Zoom Mode** by pressing the middle mouse button. If you hold **`Shift`** while pressing the middle mouse button, the modes switch in the reverse order.

Related topics

References

Fit to Screen 246
Select Mode 257
Split Mode 260
Zoom Mode 263
Zoom to Default 264

New Signal Description Set

Access

You can access this command via:

Ribbon	**Signal Editor - Signal Description Set**
Context menu of	None
Shortcut key	None
Icon	

Purpose

To create a new signal description set.

Result

An empty signal description set is opened in the **Signal Editor** and can be edited. After that you can save it as an STZ file.

Related topics

References

Open Signal Set 249
Save Signal Set 253
Save Signal Set As 254

Open Signal Set

Access

You can access this command via:

Ribbon	Signal Editor - Signal Description Set
Context menu of	None
Shortcut key	None
Icon	

Purpose

To open a signal description set.

Result

The Open Signal Description Set dialog opens for you to select the path, folder, and name of the STZ file that contains the signal description set to be opened.

Related topics

References

New Signal Description Set 248
Save Signal Set 253
Save Signal Set As 254

Properties

Access

You can access this command via:

Ribbon	View – Controlbar - Switch Controlbars
Context menu of	▪ Signal description set ▪ Signal ▪ Segment ▪ Time Tags

Shortcut key	None
Icon	

Purpose

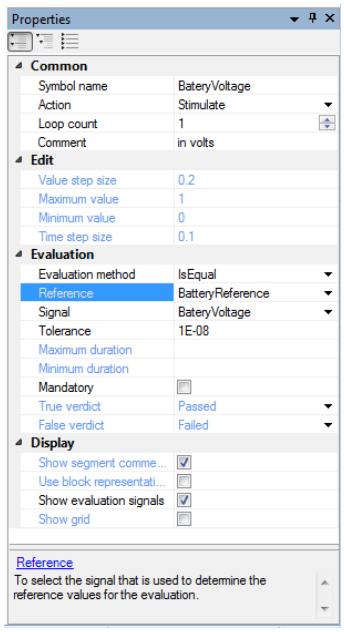
To show the **Properties** pane.

Result

The **Properties** pane opens.

Properties pane

The illustration below shows an example for the properties of a signal:



The **Properties** pane lets you specify the properties of the following items:

- Signal description sets
- Signals
- Segments
- Time Tags

The properties shown in the **Properties** pane always relate to the currently selected item.

Segments inherit some of their properties from the signals that they build. And signals inherit properties from the signal description set they reside in.

You can use this to specify a kind of default value within a description set or signal. For example, if you specify *Stimulate* as the **Action** property of your signal description set, all contained signals will be stimulation signals unless you change them.

You can distinguish inherited from individually changed properties by their color: Inherited properties are displayed in light blue, individually changed properties are displayed in black.

The properties shown in the **Properties** pane are grouped in categories, such as **Evaluation**. For some properties, such as a **Stop trigger**, you have to specify a type and, depending on the type, a second or third value.

Related topics

References

Signal Selector..... 259

Refresh

Access

You can access this command via:

Ribbon	None
Context menu of	▪ 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.

Reload

Access

You can access this command via:

Ribbon	None
Context menu of	Signal description set
Shortcut key	None
Icon	None

Purpose

To reload the current signal description set from the opened STZ file.

Result

After a confirmation prompt, the currently loaded signal description set is discarded, and the last saved STZ file is opened.

Related topics

References

Save Signal Set 253
Save Signal Set As 254

Rename Column

Access

You can access this command via:

Ribbon	None
Context menu of	The table header of the Signal Editor
Shortcut key	None
Icon	None

Purpose

To rename the selected column.

Result

The Rename Column dialog opens and lets you modify a column's name and its description.

Description

You can only modify the names and descriptions of columns that you created via `Create Column`.

Dialog settings

The Rename Column dialog provides the following settings:

Name Lets you enter the name of the column to be added or renamed.

Custom columns and their contents are stored as signal-specific properties in the STZ file of the signal description set. In each signal description set, column names must be unique. If the specified name is invalid, this edit field is marked with a ⊗ and its tooltip displays an error message.

Description Lets you enter a text to describe the contents of the column to be added or renamed.

This text is displayed as the help text in the **Properties** pane, when the related property is selected.

Related topics

References

Create Column 238
Delete Column 240
Signal Description Set 104

Save Signal Set

Access

You can access this command via:

Ribbon	**Signal Editor - Signal Description Set**
Context menu of	None
Shortcut key	None
Icon	

Purpose

To save the selected signal description set in an STZ file.

Result

If you have not specified a name for the STZ file before, the **Save Signal Description Set** dialog opens for you to specify the path, folder, and file name.

If the STZ file name is already specified, the signal description set is saved in this file immediately.

Related topics

References

New Signal Description Set 248
Open Signal Set 249
Reload 251
Save Signal Set As 254

Save Signal Set As

Access

You can access this command via:

Ribbon	Signal Editor - Signal Description Set
Context menu of	Signal description set
Shortcut key	None
Icon	

Purpose

To save a selected signal description set as an STZ file with a new name.

Result

The Save Signal Description Set dialog opens for you to specify the path, folder, and name of the new STZ file to store the signal description set. If you specify a file that already exists, you are asked whether you want to overwrite it.

When the file is saved the name of the current signal description set in the Signal Editor is changed accordingly.

Related topics

References

New Signal Description Set 248
Open Signal Set 249
Reload 251
Save Signal Set 253

Segment Comments

Access

You can access this command via:

Ribbon	Signal Editor - Show
Context menu of	None
Shortcut key	None
Icon	(Checkbox)

Purpose

To show the segment comments in the signal plot.

Result

If there is a checkmark to the left, the segment comment is displayed beneath the type of each segment in the signal plot.

Description

Using this command is equivalent to enabling or disabling the **Show Segment Comments** property for the active signal description set.

You can specify a default value for this property on the **Signal Editor** page of the **AutomationDesk Options** dialog. Refer to Signal Editor Page (AutomationDesk Basic Practices 🕮).

Related topics

References

Block Representation..... 237
Evaluation Signals..... 244
Grid..... 247
Show Segment Comments..... 208
Time Cursor..... 261
X-Axis..... 263

Segment Parameters

Access

You can access this command via:

Ribbon	**Signal Editor - Show**
Context menu of	None
Shortcut key	None
Icon	☑ (Checkbox)

Purpose

To show the segment parameters in the signal plot.

Result

If there is a checkmark to the left, a label with the segment parameters is displayed for each segment in the signal plot.

Description

Using this command is equivalent to enabling or disabling the **Show Segment Parameters** property for the active signal description set.

You can specify a default value for this property on the **Signal Editor** page of the **AutomationDesk Options** dialog. Refer to Signal Editor Page (AutomationDesk Basic Practices 🕮).

Related topics

References

Block Representation.....237
Evaluation Signals.....244
Grid.....247
Show Segment Parameters.....208
Time Cursor.....261
X-Axis.....263

Segment Types

Access

You can access this command via:

Ribbon	Signal Editor - Show
Context menu of	None
Shortcut key	None
Icon	☑ (Checkbox)

Purpose

To show segment type labels in the signal plot.

Result

If there is a checkmark to the left, a label with the segment type is displayed for each segment in the signal plot.

Description

Using this command is equivalent to enabling or disabling the Show Segment Types property for the active signal description set.

You can specify a default value for this property on the Signal Editor page of the AutomationDesk Options dialog. Refer to Signal Editor Page (AutomationDesk Basic Practices 🕮).

Related topics

References

Block Representation.....237
Evaluation Signals.....244
Grid.....247
Show Segment Types.....209
Time Cursor.....261
X-Axis.....263

Select Mapping

Access

You can access this command via:

Ribbon	None
Context menu of	▪ Signals ▪ Segments
Shortcut key	None
Icon	None

Purpose

To locate the mapping information of a signal in the **Mapping Viewer**.

Result

In the **Mapping Viewer**, the mapping information of the variable that matches the selected signal in the **Signal Editor** is highlighted.

Description

If the **Mapping Viewer** is not part of the active screen arrangement, it is opened.

Related topics

References

Mapping Viewer (AutomationDesk Basic Practices 🕮)

Select Mode

Access

You can access this command via:

Ribbon	None
Context menu of	▪ Segment ▪ Signal
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.

Tip

You can toggle between the **Select Mode**, the **Hand Mode**, and the **Zoom Mode** by pressing the middle mouse button. If you hold **`Shift`** while pressing the middle mouse button, the modes switch in the reverse order.

Related topics

References

Hand Mode 247
Split Mode 260
Zoom Mode 263

Show/Hide Time Tags

Access

You can access this command via:

Ribbon	None
Context menu of	None
Shortcut key	None
Icon	▶(Show) / ▼ (Hide)

Purpose

To show or hide time tags on the time scale.

Result

If time tags are defined in the current signal description set, they are displayed or hidden on the time scale in the header of the Signal Editor.

Related topics

References

Create Time Tag 239
Delete Time Tag 241
Time Tag 110

Signal Selector

Access

You can access this command via:

Ribbon	View – Controlbar – SwitchControlbars
Context menu of	None
Shortcut key	None
Icon	

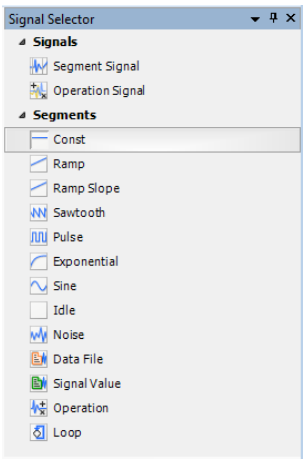
Purpose

To show the Signal Selector pane for creating signals and segments.

Result

The Signal Selector pane opens.

Signal Selector pane



The Signal Selector is one of the Signal Editor's panes. It provides two signal types and a number of segment types 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 pane onto it. Alternatively, you can double-click signals or segments in the Signal Selector to insert them at a selected position in the signal description set. For details, refer to Creating and Editing Signals on page 35.

Available signal types The following signal types are available in the Signal Selector:

- Operation Signal on page 112
- Segment Signal on page 115

Available segment types

The following segment types are available in the Signal Selector:

- Const on page 119
- Data File on page 122
- Exponential on page 125
- Idle on page 128
- Loop on page 130
- Noise on page 133
- Operation on page 136
- Pulse on page 138
- Ramp on page 141
- Ramp Slope on page 144
- Sawtooth on page 147
- Signal Value on page 151
- Sine on page 153

Related commands

None

Related topics

HowTos

How to Configure a Segment Signal.....43
How to Create a Segment Signal.....41
How to Create and Configure an Operation Signal.....59

References

Segment Signal.....115
Signal Description Set.....104

Split Mode

Access

You can access this command via:

Ribbon	None
Context menu of	▪ Segment
Shortcut key	None
Icon	

Purpose

To split a segment into two.

Description

Lets you split a segment into two.

A ↔ 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 trigger.

After the splitting **Select Mode** is active again.

You can return to the **Select Mode** without splitting by pressing **Esc**.

Related topics

References

Hand Mode 247
Select Mode 257
Zoom Mode 263

Time Cursor

Access

You can access this command via:

Ribbon	**Signal Editor - Show**
Context menu of	None
Shortcut key	None
Icon	☑ (Checkbox)

Purpose

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

Result

If there is a checkmark to the left, the time and y-axis value according to the mouse pointer position is displayed in the signal plot.

Description

Using this command is equivalent to enabling or disabling the **Show Time Cursor** property for the active signal description set.

Related topics

References

Block Representation..... 237
Evaluation Signals..... 244
Grid..... 247
Segment Comments..... 254
Show Time Cursor..... 210
X-Axis..... 263

Use Parent Properties

Access

You can access this command via:

Ribbon	None
Context menu of	▪ Signals ▪ Segments
Shortcut key	None
Icon	None

Purpose

To reset previously changed properties to the values that are inherited from the parent.

Description

By default, a newly added signal inherits properties that are also defined for its parent signal description set. Accordingly, a segment inherits common properties from its parent signal.

You can distinguish inherited from individually changed properties by their color: Inherited properties are displayed in light blue, individually changed properties are displayed in black.

If you changed these properties via the **Properties** pane, you can reset them to the inherited values by using this command.

Related topics

References

Properties..... 249

X-Axis

Access

You can access this command via:

Ribbon	Signal Editor - Show
Context menu of	None
Shortcut key	None
Icon	☑ (Checkbox)

Purpose

To show a separate x-axis for each signal.

Result

If there is a checkmark to the left, a separate x-axis is displayed beneath each signal in the active signal description set.

Description

Using this command is equivalent to enabling or disabling the Show X-Axis property for the active signal description set.

A light red bar indicates that the actual duration of the related segments might differ from the plotted duration because it depends on a condition, such as a stop trigger.

Related topics

References

Block Representation..... 237
Evaluation Signals..... 244
Grid..... 247
Segment Comments..... 254
Show X-Axis..... 210
Time Cursor..... 261

Zoom Mode

Access

You can access this command via:

Ribbon	None
Context menu of	▪ Signal description set ▪ Signal ▪ Segment

Shortcut key	None
Icon	

Purpose

To zoom into signals and segments.

Description

Lets you zoom into signals and segments.

A or mouse pointer indicates that the Zoom Mode is active.

Tip

- You can zoom out with the following commands:
  - Fit to Screen
  - Zoom to Default
- You can toggle between the Select Mode, the Hand Mode, and the Zoom Mode by pressing the middle mouse button. If you hold **Shift** while pressing the middle mouse button, the modes switch in the reverse order.

Related topics

References

Fit to Screen 246
Hand Mode 247
Select Mode 257
Split Mode 260
Zoom to Default 264

Zoom to Default

Access

You can access this command via:

Ribbon	None
Context menu of	▪ Signal ▪ Segment
Shortcut key	None
Icon	None

Purpose

To show the default range of signals.

Result

The displayed range of signals zooms to the number that you specify in **Default number of signals** on the **Signal** page of the **AutomationDesk Properties** dialog. The range of the displayed time axis (x-axis) zooms to the **Default time period** that you specify on the same page. Refer to Signal Editor Page (AutomationDesk Basic Practices 🕮).

Related topics

HowTos

How to Scale Up or Scale Down a Signal Display..... 32
How to Stretch or Compress the Axes of a Signal Display..... 28
How to Zoom into a Signal..... 30

References

Fit to Screen..... 246

Automation

Basics on Automating Signal-Based Testing

Introduction

AutomationDesk provides a COM-based API to automate the handling of AutomationDesk.

Related information

The AutomationDesk COM API provides no specific objects for signal-based testing.

Only the handling of signal description sets can be automated via the following objects in the XIL API library:

- SignalDescription (AutomationDesk Automation 🕮)
- SignalDescriptionSet (AutomationDesk Automation 🕮)
- SignalDescriptionsReader (AutomationDesk Automation 🕮)
- SignalDescriptionsWriter (AutomationDesk Automation 🕮)
- SignalFactory (AutomationDesk Automation 🕮)
- SignalGenerator (AutomationDesk Automation 🕮)
- SignalGeneratorFactory (AutomationDesk Automation 🕮)
- SignalGeneratorReader (AutomationDesk Automation 🕮)
- SignalGeneratorWriter (AutomationDesk Automation 🕮)
- SignalGroupValue (AutomationDesk Automation 🕮)
- SignalSegment (AutomationDesk Automation 🕮)
- SignalValue (AutomationDesk Automation 🕮)

For information on the available objects with their properties and methods, refer to XIL API (AutomationDesk Automation 🕮).

For basic information and instructions, refer to Basics and Instructions on page 15.

Limitations

Limitations When Using the Signal-Based Testing Library

Using the LoadApplication block of the XIL API Convenience library	If you want load the simulation application via the LoadSimulationAppliction block, place the block before the TestBlock or the Testcase of the Signal-Based Testing library, respectively. You cannot use the LoadSimulationAppliction block in the PreActions operation slot of TestCase and TestBlock.
Restriction on stimulating fixed-point variables	When you stimulate an application variable of a fixed-point data type via a signal with the Action property set to **`Stimulate`**, the variable's scaling factor that is specified in the variable description file (TRC file) is ignored. Reading, writing and capturing application variables of a fixed-point data type considers the scaling factor.
Restriction on using the Loop count property for stimulating signals	If you stimulate an application variable in a signal-based test, you cannot implement repeating signal shapes via the Loop count property of a segment signal. You can use an enclosing Loop segment instead.

Glossary

Introduction

The glossary briefly explains the most important expressions and naming conventions used in the AutomationDesk documentation.

Where to go from here

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P....280
R....281
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V....284

W.....285
X.....285

Symbols

@ADLX folder A file system folder with the name `<CustomLibraryName>@adlx` that stores information on the elements in the related custom library, such as template files, attached Python modules, or packages.

In the Library Bowser, you always use this folder in combination with the related library file (ADLX).

@ADPX folder A file system folder with the name `<ProjectName>@adpx` that stores information on the elements in the related project, such as sequence files, attached files, results, and reports.

In the Project Manager, you always use this folder in combination with the related project file (ADPX).

@BLKX folder A file system folder with the name `<ElementName>@blkx` that stores information on the subelements in an exported element, such as sequence files, attached files, Python modules, or packages.

You always use this folder in combination with the related parent element file (BLKX).

A

ADL file An AutomationDesk legacy library file that contains the specification of a custom library which was saved to the file system.

These files were created using AutomationDesk 6.1 or earlier. You can open and migrate them to library XML files (ADLX).

ADL.ZIP file An AutomationDesk legacy archive file that contains the specification of a custom library which was managed under version control.

These files were created using AutomationDesk 6.1 or earlier and must be migrated to let you continue to work under version control.

ADLX file An AutomationDesk library XML file that contains the specification of a saved or exported custom library. The ADLX file is located in the same folder as the @ADLX folder.

You can open, edit, save, import, and export ADLX files via the Library Bowser.

ADO file An AutomationDesk display options file that contains information on how a project or library is displayed when it is opened in the AutomationDesk user interface. This includes bookmarks, breakpoints, and the collapse state of folders and blocks.

These files are created when a project or library is saved or closed.

ADP file An AutomationDesk legacy project file that contains a project's specification, its results, and its reports.

These files were created using AutomationDesk 6.1 or earlier. You can open and migrate them to project XML files (ADPX).

ADP.ZIP file An AutomationDesk legacy archive file that contains the specification of a project which was managed under version control.

These files were created using AutomationDesk 6.1 or earlier and must be migrated to let you continue to work under version control.

ADPX file An AutomationDesk project XML file that contains the specification of a saved or exported AutomationDesk project. The ADPX file is located in the same folder as the @ADPX folder.

You can open, edit, save, import, and export ADPX files via the Project Manager.

ALX file An AutomationDesk library legacy XML file that contains the specification of an exported custom library.

These files were created using AutomationDesk 6.0 or earlier. You can import ALX files in the Library Bowser.

APX file An AutomationDesk project legacy XML file that contains the specification of an exported AutomationDesk project.

These files were created using AutomationDesk 6.0 or earlier. You can import APX files in the Project Manager.

ASAM AE XIL API An API standard for the communication between test automation tools, such as AutomationDesk, and test benches, such as dSPACE real-time hardware. The notation XIL indicates that the standard can be used for various *in-the-loop* systems, e.g., SIL, MIL, PIL, and HIL. The XIL API standard is defined by the Association for Standardisation of Automation and Measuring Systems (ASAM).

ASAM General Expression Syntax (ASAM GES) The syntax definition that is used in AutomationDesk to specify trigger conditions. It is part of the XIL API standard that is defined by the Association for Standardisation of Automation and Measuring Systems (ASAM).

Automation block A part of a sequence that implements an automation task, similar to a subroutine.

Templates for automation blocks are provided by AutomationDesk libraries. Via the Sequence Builder, you can arrange automation blocks to implement the control flow of your automation task.

AutomationDesk Options A dialog that lets you modify the appearance and behavior of some AutomationDesk panes and the layout of the generated reports.

Automotive Simulation Model (ASM) The dSPACE product that provides open MATLAB®/Simulink® models that are relevant for the simulation of automotive engines (gasoline and diesel) and vehicle dynamics.

B

BLKX file An AutomationDesk element XML file that contains the specification of a saved or exported AutomationDesk element.

You can import and export BLKX files in the Project Manager, the Sequence Hierarchy Browser, the Sequence Builder, and the Library Bowser.

Block-specific data object A data object that resides in the interface of an automation block. It can be used to parameterize the block or to return a resulting data object after block execution.

Most blocks provided by AutomationDesk provide a static interface. However, some blocks let you add data objects to their interfaces dynamically, for example, Exec blocks.

Bookmark A label that you can attach to an automation block to use it later for quick navigation within the user interface.

Breakpoint A flag that you can set for a sequence or an automation block that pauses the execution in debug mode when the element with a set breakpoint is reached. You can manually control whether to resume the execution or to terminate it.

Built-in library The type of library that is included in AutomationDesk as a software component.

In contrast to custom libraries, you cannot create your own built-in libraries and you cannot view the library's source code.

C

Capture A data object type of the ASAM AE XIL API that is used to parameterize the capturing of measurement data.

In addition to the model access port (MAPort) to be used and the variables to be captured, you can specify, a condition to start or to stop data capturing, for example.

CaptureResult A data object type of the ASAM AE XIL API that is used to handle the captured data. It contains the time stamps and the related measured values of the captured variables.

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>
```

Component Object Model (COM) An interface in Microsoft Windows that allows software products of different providers to communicate and to control each other.

ControlDesk The dSPACE software product for managing, instrumenting and executing experiments for ECU development. ControlDesk also supports calibration, measurement and diagnostics access to ECUs via standardized protocols such as CCP, XCP, and ODX.

Control-flow-based testing A test strategy that is based on implementing an automation task by specifying its control flow in sequences.

Custom library The type of library that you can create and include in AutomationDesk. The elements that you can add to a custom library are templates for data objects, automation blocks, and sequences. You can use the library elements as templates by adding library links to projects or sequences.

Some predefined custom libraries are part of the AutomationDesk product. They are read-only by default.

D

Data object Objects that can store a value according to the data object's type. You can specify a data object *by value* via an editor that depends on the type or *by reference* via the Data Object Editor.

Data objects can be instantiated specific to a project, to a sequence, or to an automation block.

Templates for data objects of various types are provided via AutomationDesk libraries and can be created via the Project Manager or the Sequence Builder, for example.

Data Object Editor A pane that lets you access the values and references of the data objects of the selected object.

Data Object Selector A dialog that lets you specify a data object by selecting one from the tree of available data objects.

DataContainer An element that lets you bundle data objects to structure them. DataContainers can be nested.

Debug mode A mode that lets you execute a project or a sequence successively and control the execution manually, for example, by using breakpoints.

Documents folder A standard folder for user-specific documents.

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

dSPACE Help The component that contains all the relevant user documentation for dSPACE products. Via the **F1** key or the **Help** button in the dSPACE software, you get context-sensitive help on the active context.

dSPACE Log A pane that displays the errors, warnings, information, and advice issued by all installed dSPACE products.

E

Edit dialog The dialog that lets you specify the value of a data object. The default edit dialog depends on the data type of the data object, but you can also use a customized edit dialog.

Electrical error simulation (EES) The simulation of errors in the wiring, such as loose contacts, broken cables, or short-circuits. Electrical error simulation is performed by the EES hardware of an HIL simulator.

Electrical error simulation port (EESPort) A data object type of the ASAM AE XIL API that is used to provide access to the electrical error simulation (EES) hardware of an HIL simulator.

Element The representation of a resource of a project in the Project Manager or a library in the Library Bowser.

An element is displayed as an icon that reflects the element's type followed by the element's name.

Error configuration file A file in XML format that contains the specification of the simulated electrical errors as a series of states which are each specified via an error set.

Error set A list of electrical errors that occur to the signals at the same time and that specifies the simulated state of the wiring. An empty error set specifies a state with no errors.

Exec block An automation block that is specified by the Python script to be executed.

You can edit the script via AutomationDesk's Python Editor.

F

FDX file An AutomationDesk project folder legacy XML file that contains the specification of an exported AutomationDesk project folder.

These files were created using AutomationDesk 6.0 or earlier. You can import FDX files in the Project Manager.

H

Hyperlink A click-able reference. When you click the link, the target is opened in an appropriate component.

I

Input dialog A dialog window that demands a manual input.

Instance description The property of an instantiated element that contains a text which describes the element's purpose.

L

LabeledValue A type of data object for which you can define a dictionary of valid label-value pairs. LabeledValues can be set either by specifying a label or by specifying a value.

LFX file An AutomationDesk library folder legacy XML file that contains the specification of an exported library folder.

These files were created using AutomationDesk 6.0 or earlier. You can import LFX files in the Library Bowser.

Library A container for templates that you can use to instantiate data objects, sequences, or automation blocks in your projects.

Libraries are handled via the Library Bowser. Each library is organized as a tree and can be structured using library folders.

There are built-in libraries and custom libraries.

Library Bowser A pane in AutomationDesk that provides access to the elements of the open libraries.

Library folder An element that structures the contents of a library as a tree.

Library link A type of element that you can create in a project or sequence. This type of element is linked to a template in a library. Depending on the link mode, the library link represents an instance of the linked library element or a reference to this library element.

Library links let you reuse a library element at multiple positions in one or multiple projects.

Link mode The way in which an instantiated object in your project can be connected to its related template in the library.

The link mode determines the synchronization behavior after you modified an object's template.

The following link modes are available:

- *Dynamically linked* - A modification of the template takes immediate effect.
- *Statically linked* - A modification of the template takes effect after you manually synchronized it.

If you break the link between an instantiated object and its template, the object becomes independent from the template and cannot be linked again.

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>
```

M

Mapping (For XIL API Testbench only) An object type of the ASAM AE XIL API for a data object that contains a mapping of variable aliases to their model paths in the related simulation application.

Only one Mapping data object is supported per project and it always resides at the top level of the object hierarchy.

Mapping Editor (For XIL API Framework only) A component that lets you configure an XIL API Framework. This includes, for example, the mapping of aliases to model paths, which you can use in your test cases and which are required to access variables via a model access port.

The configuration is saved to a framework configuration file (XML) as well as related port configuration and mapping files.

Mapping Viewer A pane that displays the contents of the used variable mapping.

If you are working with an XIL API Framework, the mapping relates to the framework configuration, which you can edit via the Mapping Editor.

If you are working with the XIL API Testbench, the mapping relates to the project's Mapping data object, which you can edit in the Mapping Viewer.

MAT file A file that contains measurement data in a format that allows data exchange with MATLAB.

MDF file A file that contains measurement data in a format that complies with the ASAM Common MDF standard. For version 4.1 of this standard, the file name extension is MF4.

Message dialog A dialog that demands manual confirmation for a message, error, warning, or information.

Message Viewer A pane that displays the history of all error and warning messages that occur while you are working with AutomationDesk.

MF4 file Refer to MDF file.

Model access port (MAPort) A data object type of the ASAM AE XIL API that is used to provide access to the variables of a running simulation application.

ModelDesk The dSPACE software product for parameterizing ASM models via graphical representations of the modeled components and controlling the related real-time simulation, offline simulation, or MATLAB®/Simulink® simulation.

MotionDesk The dSPACE software product that lets you visualize the movement of 3-D objects controlled by a running simulation application.

O

Object hierarchy The hierarchy tree that is built by all objects that are instantiated in a specific project.

Offline simulation application (OSA) A simulation application that can be executed without real-time hardware on a host PC with VEOS. The OSA file that implements the simulation application can be built from a Simulink model by the VEOS Player.

Operation mode A feature that is provided by some libraries and lets you decide whether to work online with the related device or to work with previously recorded data.

Operation signal The signal type of signals that are specified as an arithmetic operation (addition or multiplication) of two other signals.

Output Viewer A pane that displays all output messages generated by AutomationDesk.

P

PADL.ZIP file An AutomationDesk legacy element archive file that contains the specification of a custom library, a library folder, or a template which was managed under version control.

These files were created using AutomationDesk 6.1 or earlier and must be migrated to let you continue to work under version control.

PADP.ZIP file An AutomationDesk legacy element archive file that contains a project, a project folder, a sequence, or a result which was managed under version control.

These files were created using AutomationDesk 6.1 or earlier and must be migrated to let you continue to work under version control.

Pane The section of a window that provides related controls. AutomationDesk panes are arranged in view sets.

Parameter Any variable type that can be calibrated.

PCONFIG file An ASAM AE XIL API EES port configuration file that provides the hardware-dependent information for an electrical error simulation (EES) in XML format.

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).

Platform Manager A software component that is commonly used by various dSPACE products to register and access platforms and to control the execution of simulation applications on the platforms.

Project A container for all instantiated resources that implement a specific automation task.

Projects are handled via the Project Manager. Each project is organized as a tree and can be structured using project folders.

Project folder An element that structures the contents of a project as a tree.

Project Manager A pane in AutomationDesk that provides access to the elements of the open projects.

Project-specific data object A data object that is created within a Project or a Project folder in the Project Manager. It can be used to parameterize elements a lower level in the object hierarchy.

Properties A pane that lets you access the properties of selected elements.

Python Editor A component that lets you edit the Python scripts for Exec blocks, their templates, and Python modules and packages that are integrated in AutomationDesk libraries. Each of these elements can be opened in a separate Python Editor pane.

R

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.

Real-Time Testing (RTT) The dSPACE software product that provides components for creating and executing Python scripts which run on the real-time hardware in parallel to the real-time application.

Record depth The attribute of an execution that specifies which project elements are to include in the execution's result depending on the element's result levels.

The following record depths are provided:

- No result
- High elements only
- High and medium elements

Report A document in PDF or in HTML format that is generated from an execution's result.

Result A set of data that results from the execution of a project, a project folder, or a sequence.

From a result, you can generate a report.

Result Browser A component that displays the result of the execution of a project, a project folder, or a sequence during the execution in form of a tree of the involved data objects and their values .

Each result that you open in the Result Browser is displayed in a separate pane.

Result level The attribute of an element that specifies whether to include the element in an execution's result, depending on the execution's record depth.

AutomationDesk provides the **None**, **Medium**, and **High** result levels.

Result parameter The attributes that specify whether an element is included in an execution's result. For this, AutomationDesk provides the result level and the record depth attributes.

Root element The top-level element of a tree data structure. A root element represents the entire element tree of a project in the Project Manager or a library in the Library Bowser, for example.

S

Segment signal The signal type of the signals that are specified as a sequence of signal segments.

Sequence The implementation of an automation task as a control flow specified with automation blocks.

Sequences are edited via the Sequence Builder.

Sequence Builder A component that lets you graphically edit the control flow of a sequence, sequence template or subsequence template. Each of these elements can be opened in a separate Sequence Builder pane.

Sequence Hierarchy Browser A pane in AutomationDesk that provides access to the elements of the sequence that is currently displayed in the Sequence Builder.

SequenceFrame A template that is provided by the **Framework Builder** built-in library and that lets you specify a predefined frame for implementing similar sequences.

SFX file A sequence frame legacy XML file that contains the specification of an exported SequenceFrame object.

These files were created using AutomationDesk 6.0 or earlier. You can use the Project Manager to import SFX files for handling instantiated sequence frames and the Library Bowser for handling sequence frame templates.

Signal The specification or measurement of the change of a value over time.

Signals can be specified by their shape in a signal description set as a segment signal or as an operation signal.

Signal description set A container for a set of signal specifications that implement a specific signal-based test.

Signal description sets are handled via the Signal Editor as a table of the contained signals.

Signal Editor A component that lets you graphically edit a signal description set as a table of its contained signals.

Multiple signal description sets can be opened in separate Signal Editor panes.

Signal file A file in CSV format that defines via failure classes which electrical errors can be simulated by the specific EES hardware.

Signal generator A software component, that can be configured and controlled via a data object in AutomationDesk. A signal generator can be downloaded to a platform and stimulate variables in a running simulation application in real-time.

Signal segment One member in the sequence of segments that builds a segment signal. A segment is specified by its type and by its other properties.

The segment type is specified at the segment's creation via the Signal Selector. Its other properties can be specified via the Signal Editor or the Properties panes.

Signal Selector The pane that provides elements to add segment signals, operation signals, and segments of various segment types to your signal description set by dragging them to the Signal Editor.

Signal-based testing A test strategy that is based on implementing an automation task by using templates of the **Signal-Based Testing** library and specifying all involved signals in a signal description set.

Simulation application The generic term for offline simulation application (OSA) and real-time application.

SQX file An AutomationDesk sequence legacy XML file that contains the specification of an exported AutomationDesk sequence.

These files were created using AutomationDesk 6.0 or earlier. You can use the Project Manager to import SQX files for handling instantiated sequences and the Library Bowser for handling sequence templates.

Stylesheet An XSL file that specifies the layout for the generation of a report from an execution's result.

STZ file A ZIP file that contains the description of a signal description set in STI format. The STI format is defined by the ASAM AE XIL API standard.

You can create and manage STZ files in AutomationDesk's Signal Editor.

Subsequence An automation block that can contain other automation blocks to implement a part of a sequence's control flow, for example, a loop or a subroutine.

T

Task A thread that is executed on dSPACE real-time hardware.

The execution of tasks is triggered by timer events, I/O events, or software events.

TBX file A block template legacy XML file that contains the specification of an exported library folder.

These files were created using AutomationDesk 6.0 or earlier. You can import TBX files in the Library Bowser.

Template The reusable pattern of a data object, an automation block, or a sequence.

To make a template executable, you must instantiate it as an object in your project.

Template description The property of a template that provides a text which describes the template's purpose.

TSX file A sequence frame legacy XML file that contains the specification of an exported TestSequence (Test Framework) object.

These files were created using AutomationDesk 6.0 or earlier. You can use the Project Manager to import TSX files for handling instantiated sequence frames and the Library Bowser for handling TestSequence templates.

U

User function The call of an external program that you can integrate in AutomationDesk's user interface.

V

Value Editor A component that opens a modal Input dialog to edit the selected data object's value.

The appearance of the dialog depends on the type of the selected data object.

Variable A parameter in the simulation application that can be read and written.

A parameter identified by its variable path.

Variable description file The SDF file, the RTA file, or the OSA file that contains the specifications for an executable simulation application.

Variable path The path to the variable in the hierarchy of the model from which the simulation application is built.

Variables pane A component that lets you edit the configuration of an model access port (MAPort). You can select the platform type to be accessed and specify the variable description file to be used. Then you can browse the tree of the provided model variables. Each MAPort configuration can be opened in a separate Variables pane.

Variant A type of data object that can reference other data objects of any type.

VEOS A dSPACE software product that can execute offline simulation applications on a HostPC independently of real time. No real-time hardware is required.

Verdict A type of data object that is used to qualify the current success status of a sequence, subsequence, or automation block.

View set A configuration of the screen arrangement. You can create various view sets and switch between them. By default, AutomationDesk provides the preconfigured view sets **Sequences**, **Signals**, and **Execution**.

VirtualCOM An interface object for handling AutomationDesk's COM objects. VirtualCOM ensures a proper cleanup of deleted objects in AutomationDesk's namespace.

W

Working area The central area of AutomationDesk's user interface.

X

XIL API Framework An access layer that is defined in the ASAM AE XIL API standard.

It lets you centrally configure the access to the entire test infrastructure in XML files. This decouples test cases from the real and virtual test systems you use.

XIL API Testbench An access layer that is defined in the ASAM AE XIL API standard.

It lets you configure the access from a test to its environment, such as a simulator, by using ports. For example, the access to variables of a simulation application is configured by using a model access port. This decouples test software from test hardware.

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