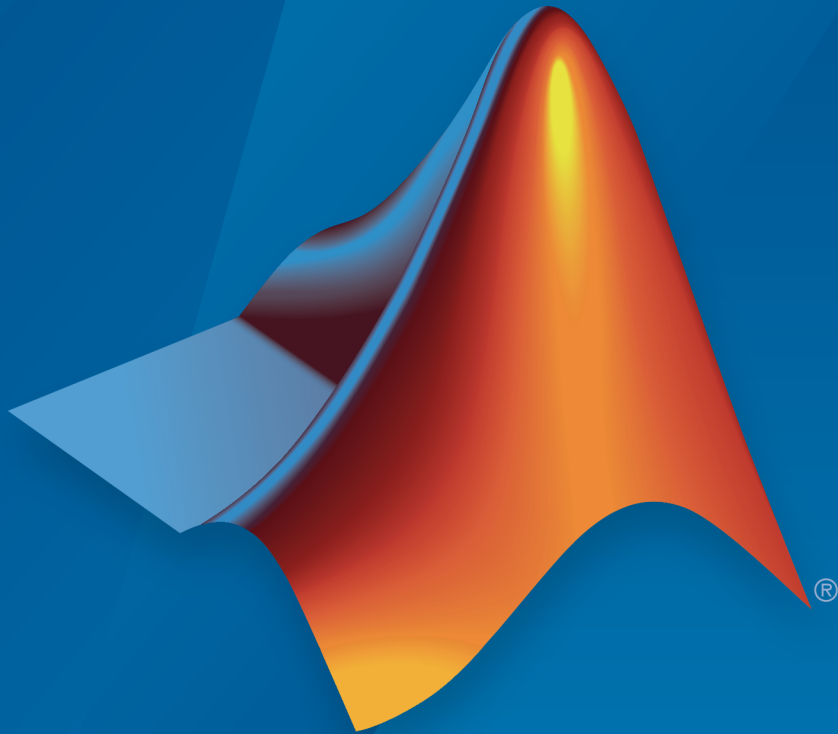


# Simulink<sup>®</sup> Test<sup>™</sup> Release Notes



# MATLAB<sup>®</sup>&SIMULINK<sup>®</sup>

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*Simulink*<sup>®</sup> *Test*<sup>™</sup> *Release Notes*

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# R2016a

**Version: 2.0**

**New Features**

**Bug Fixes**

## **Real-Time Testing: Author and execute real-time tests with Simulink Real-Time**

A new Real-Time Test builds a Simulink® Real-Time™ application from your model or test harness and runs it on a target computer. You can assess the real-time execution using `verify` statements, and collect real-time data for analysis in the test manager. See “Test Models in Real Time”.

## **verify Statement: Author test sequence assessments to verify simulation behavior without stopping the simulation**

In the Test Sequence and Test Assessment blocks, you can use `verify` statements to assess a logical condition without stopping simulation. A `verify` statement returns a fail, pass, or untested result. Results of each `verify` statement appear in the test manager. See “Assess Simulation Using Logical Statements”.

## **Test Report Customization: Customize test result reports using Simulink Report Generator**

You can write scripts to customize the details of test manager result reports such as text formatting, output plots, headers and footers, layouts, and more. See “Customize Generated Reports”.

## **External Test Harnesses: Save Simulink Test harnesses as external files**

You can opt to save your test harnesses externally, as independent SLX files. External test harnesses allow you to create or change test harnesses without changing the model SLX file, which is useful for models under change management. External harnesses provide the same synchronization and push/rebuild capability as internal harnesses saved with the model SLX file. See “Manage Test Harnesses”.

## **Test Iterations: Create tests with iterations such as parameters and input vectors**

To test and sweep through a range of parameters, inputs, and other test case settings, you can author and organize many tests in one place using iterations. To help create



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iterations, templates are available for **Signal Builder** groups, parameter sets, inputs, configuration settings, and baseline criteria. You can run iterations using fast restart if it is supported by your model. See “Run Multiple Combinations of Tests Using Iterations”.

Test generated using Simulink Design Verifier™ now appear as iterations in a test case rather than separate test cases in a test suite.

## **Aggregate Coverage Results: Aggregate Simulink Verification and Validation coverage results across executed tests**

If you have a Simulink Verification and Validation™ license, then you can collect the coverage results from your tests. The results are aggregated at test case, test suite, and test file levels. Coverage results can also be included in the test manager results report. See “Collect Coverage in Tests”.

## **Parallel Test Execution: Distribute test execution in parallel to decrease test run time**

If you have a Parallel Computing Toolbox™ license, then you can run tests in parallel across multiple workers to decrease test execution time. See “Run Tests Using Parallel Execution”.

## **Test Harness for Libraries: Create and manage test harnesses for library components**

You can create test harnesses for library blocks and move test harnesses from linked blocks to the library source. See “Test Library Blocks”.

## **Requirement Traceability: Link to requirements in test harnesses and test sequences**

If you have a Simulink Verification and Validation license, you can create requirements links for model objects in internally stored test harnesses. Requirement links for the component under test synchronize between the main model and the test harness. You can also create requirements links for test steps in **Test Sequence** and **Test Assessment** blocks. See “Link Tests to Requirements”.

## Simulink and Export Function Support: Create test harnesses for models containing Simulink functions and export functions

If you generate a harness for a model configured to export functions, the harness will contain a new **Test Sequence** block that schedules the function-call signals and Simulink Functions in the export-function model. You choose the sources and sinks for other subsystem inputs and outputs. See “Test Models that use Export Functions for AUTOSAR-Compliant Code”.

## Test Assessment block available for all harness sources

The Simulink Test™ library offers a separate **Test Assessment** block entry. You can include a **Test Assessment** block with any test harness source using the test harness creation dialog box. The **Test Assessment** block is a **Test Sequence** block configured with a default When decomposition sequence and a **verify** statement, which are commonly used in model assessment.

## Test Sequence block support for messages

**Test Sequence** blocks support sending and receiving messages. Messages are objects that carry data and can be queued. You can send a message using a message output and the **send** command, and receive a message using a message input and the **receive** command. When a test step receives a message, it can use the **receive** result or the message data in a step action or transition. See “Test Sequence Action and Transition Operations”.

## Test Sequence Editor enhancements

The Test Sequence Editor offers several enhancements for the **Test Sequence** and **Test Assessment** blocks.

- You can add a description for a test step using the **Description** field.
  - Code generated from the block includes test step descriptions as commented code. To include the commented descriptions in generated code, select **Simulink block descriptions** in the **Code Generation > Comments** section of the model configuration parameters.
  - Simulink Report Generator™ includes descriptions in the **Test Sequence** block reports.

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- **Syntax highlighting:** The Test Sequence Editor includes MATLAB® syntax highlighting for improved readability.
  - **Tab completion:** The Test Sequence Editor suggests words, such as data symbols and functions, to complete test step programming syntax. A list appears based on the characters you type. Select a word from the list and press **Tab**, or press **Esc** to close the suggestions.
  - **Port reordering:** You can reorder block inputs and outputs by dragging an **Input** or **Output** symbol name up or down in the **Symbols** sidebar.

## Simulink Projects integration

You can create a Simulink project from a test file. When you create a project from a test file, it enables you to perform file dependency analysis. Projects let you easily see the impact that changes could have on tests that might use shared files. You can also run tests directly from the Simulink Projects interface. For more information about Simulink Projects integration, see “Manage Test File Dependencies”.

## Test Generation for Subsystems

You can generate tests for a subsystem in a model from the test manager. The test manager creates a test harness for the subsystem and enables you to test the subsystem independently, thereby isolating it from the main model. See “Generate Test Cases from Model Components”.



# **R2015aSP1**

**Version: 1.0.1**

**Bug Fixes**



# R2015b

**Version: 1.1**

**New Features**

**Bug Fixes**

## **Expanded Simulink Test API: Automate test creation, editing, and execution using MATLAB scripts**

You can use functions, classes, and methods to programmatically:

- Generate test cases from a model based on existing test harnesses and signal builder groups. See `sltest.testmanager.createTestsFromModel`.
- Edit test case simulation properties, parameter sets, and comparison criteria
- Create test files, test suites, and test cases
- Copy and move test suites and test cases
- Run individual test suites and test cases
- Copy a test harness, including its contents, configuration set, properties, and model association, using the `sltest.harness.clone` function

For more information about using the API, see [Automate Tests Programmatically](#).

## **Test Case Automation: Create test cases with inputs generated by Simulink Design Verifier**

Starting with the results of a Simulink Design Verifier analysis, Simulink Test creates test cases that use the inputs generated by Simulink Design Verifier. Test cases appear in the test manager and can use an existing or new test harness. See [Test Models Using Inputs Generated by Simulink Design Verifier](#).

## **Qualification and Certification: Qualify Simulink Test for supported industry standards, including DO-178 and ISO 26262**

You can use the IEC Certification Kit and DO Qualification Kit to qualify Simulink Test for supported industry standards, including DO-178, ISO 26262, and IEC 61508.

## **Enhanced Reporting: Use Microsoft Word templates to customize report generation**

If you have a MATLAB Report Generator license, you can insert report items from the Simulink Test generated report into your own Microsoft® Word templates. For more information on report generation, see [Export Test Results and Generate Reports](#).



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## **Additional tools for Test Sequence editing and debugging**

The test sequence editor includes new tools you can use when creating, editing, and debugging a test sequence, including

- Undo and redo edits
- Cut, copy, and paste test steps using keyboard shortcuts
- Simulation rollback

## **Simulink Report Generator inclusion for Test Sequence block**

You can include data from Test Sequence blocks in a report, using the Test Sequence component in Simulink Report Generator.



# R2015a

Version: 1.0

New Features

## Introduction to Simulink Test

Simulink Test provides tools for authoring, managing, and systematically executing simulation-based tests. You can create nonintrusive test harnesses to test models and subsystems. You can generate reports, archive and review test results, rerun failed tests, and debug the component or system under test.

### Test harness for subsystem and model testing

Test harnesses provide a separate, nonintrusive testing environment for your models. A test harness associates with a particular model or model component and persists with the model. You define tests by adding inputs and assessments to the harness, and you can set harness-specific simulation parameters. The test harness synchronizes model changes to the main model. The test manager can access the test harnesses in your model. See *Refine, Test, and Debug a Subsystem and Test Harness and Model Relationship*.

### Test Sequence block for defining tests and assessments

**Test Sequence** blocks concisely define a series of test steps and transitions using MATLAB action language. Each step defines the block output values and the condition that triggers the transition to another test step. You can define a test step hierarchy using different transition modes. **Test Sequence** blocks include concise output functions, such as square and sawtooth, and operators that return temporal information, such as the elapsed step time or the duration of a condition.

You can assess the model operation in the test sequence, or in a separate **Test Sequence** block. See *Test Downshift Points of a Transmission Controller* and the **Test Sequence** block.

### Test manager for test authoring and systematic test execution

The Simulink Test manager enables you to organize and run large sets of tests for Simulink models. Using the test manager, you can author and execute test cases individually or as a batch. You can also link to test requirements from each test case if you have a Simulink Verification and Validation license. After you execute tests, the test outcome and any simulation output appear in the **Results and Artifacts** pane of the test manager.

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## **Baseline, equivalence, and back-to-back testing with pass-fail criteria**

You can test models using baseline and equivalence test case templates in the test manager. Baseline test cases compare simulation output to defined expected outputs. Equivalence test cases compare simulation output a second simulation. The simulation output comparison is evaluated according to absolute or relative tolerances, which you specify under **Baseline Criteria** or **Equivalence Criteria**. For more information on tolerances, see *How Tolerances Are Applied to Test Criteria*.

## **Archiving and reporting test cases and test results**

After you execute tests, you can export the results in the **Results and Artifacts** pane of the test manager to a file or save them in a report. For more information on exporting results and generating reports, see *Export Test Results and Generate Reports*.

