

# Reactis V2012

Released June 14, 2012



# New Simulink Support

- ▶ MATLAB R2012a
- ▶ Initial support for Embedded MATLAB

## Simulink

- ▶ MATLAB Function block (previously called Embedded MATLAB Function block)
- ▶ Truth Table block

## Stateflow

- ▶ MATLAB Functions
- ▶ Truth Table functions with MATLAB language option

# Initial Embedded MATLAB Subset

- ▶ Types: double, single, logical
- ▶ Control flow
  - ▶ if statements
  - ▶ while loops
  - ▶ for loops
  - ▶ switch statements
- ▶ Logical operators
- ▶ Relational operators
- ▶ Math functions: +, -, \*, /, ^, sin, cos, tan, asin, acos, atan, sinh, cosh, tanh, exp, log, log10, sqrt, fix, floor, ceil, round, sign, abs
- ▶ Matrix operations: transpose, addition, subtraction, multiplication, inv, zeros, ones, eye, diag
- ▶ Vector operations: size, min, max, length, sum, prod, dot
- ▶ Array indexing with scalars or vectors
- ▶ Colon notation: [min:max], [min:step:max]
- ▶ Functions and subfunctions
- ▶ Local and persistent variables

# Faster Model Initialization

- ▶ Optimizations improve initialization speed for models with:
  - ▶ Large amounts of data in the workspace
  - ▶ Very large search paths
- ▶ One automotive OEM model went from 30 to 2 minutes

# Use Precompiled C Libraries without Source Code

New feature will let you:

1. Compile a C library (using Reactis) (.rsls, .rslc)
2. Use the pre-compiled library in models without source code

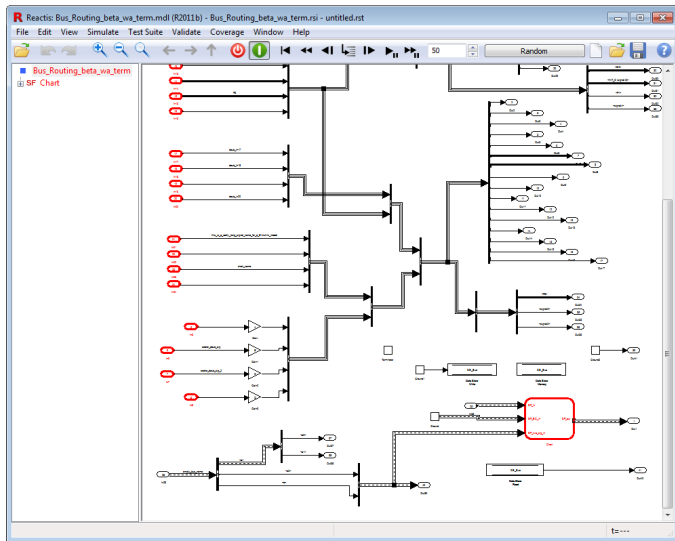
Library will be treated as a black box:

- ▶ No coverage tracking
- ▶ No stepping into C code

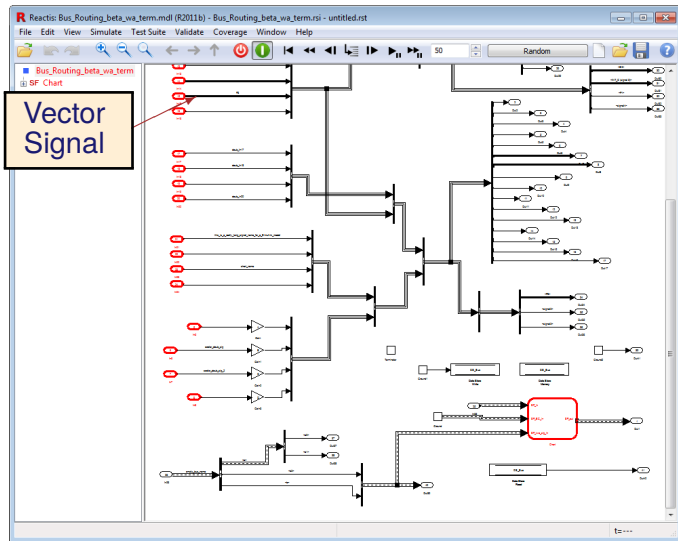
# Improved Support for Buses

- ▶ Bus signal line drawing enhancements
- ▶ Graphical editor for constraints of top-level bus inputs
- ▶ Improved data monitoring:
  - ▶ See bus element names when hovering
  - ▶ Open watched variable or scope on bus element
- ▶ Improved import/export
  - ▶ CSV - bus (or vector) elements in separate columns
  - ▶ Import GUI to map bus elements
- ▶ runtests supports bus inputs
- ▶ Constant blocks with bus type

# Bus Signal Line Drawing

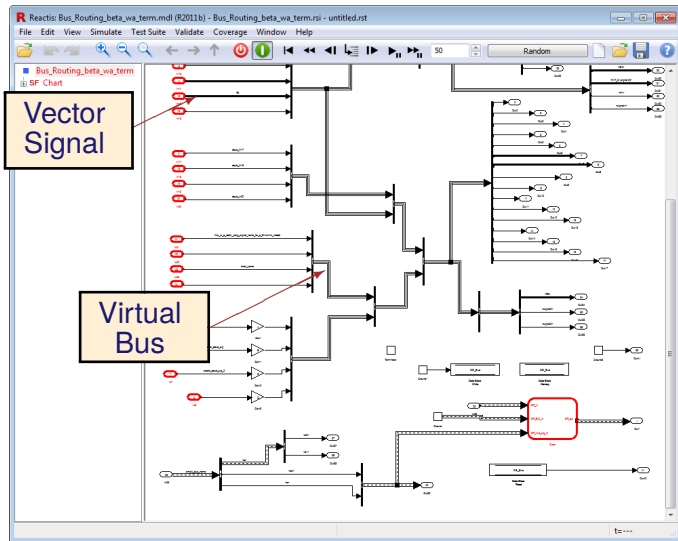


# Bus Signal Line Drawing

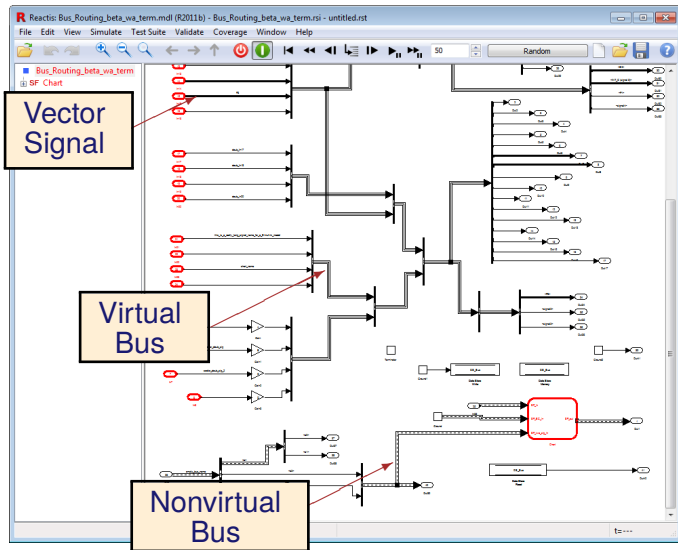




# Bus Signal Line Drawing



# Bus Signal Line Drawing



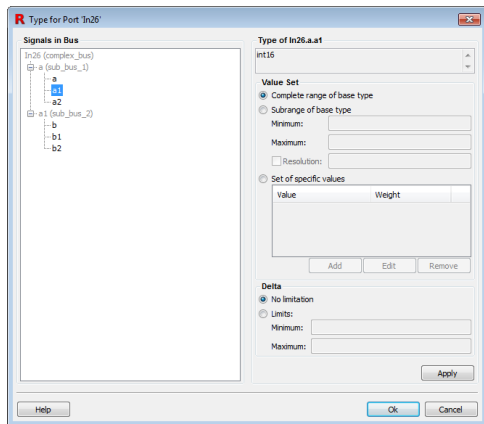
# Type Editor for Top-Level Bus Inputs

Pre-V2012 had to edit bus inputs using text notation:

Type for Port 'In25'

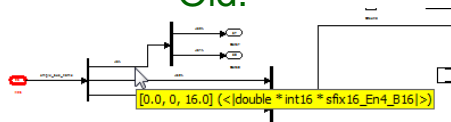
```
complex_bus : {a:sub_bus_1 : {a:double, a1:int16, a2:sfix16_En4_B8X5}, b1:sub_bus_2 : {b:double, b1:int16, b2:sfix16_En3}}
```

V2012 introduces graphical editor:

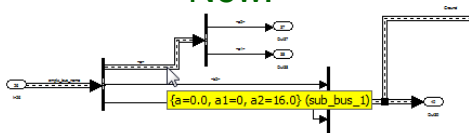


# Improved Hover Display

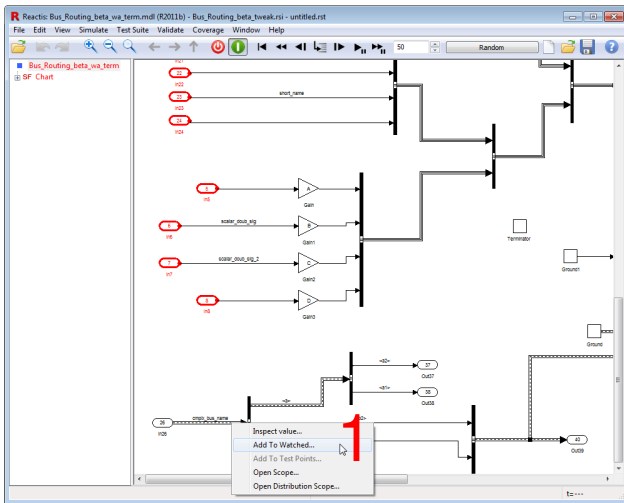
Old:



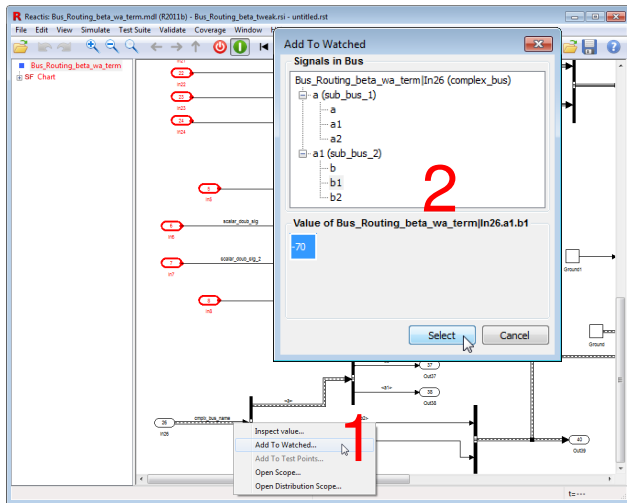
New:



# Add Individual Bus Elements to Watch List



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# Add Individual Bus Elements to Watch List

The screenshot shows a logic analyzer interface with a central dialog box titled "Add To Watched". The dialog lists the following signals in a bus hierarchy:

- Bus\_Routing\_beta\_wa\_term|In26 (complex\_bus)
  - a (sub\_bus\_1)
    - a1 (sub\_bus\_2)
      - b1

A red "2" is overlaid on the "a1" entry. Below the dialog, a red "1" is overlaid on the "Add To Watched..." button in the context menu. At the bottom, a red "3" is overlaid on a table showing the variable "Bus\_Routing\_beta\_wa\_term|In26.a1.b1" with a value of "-70" and type "int16".

Variable	Value	Type
Bus_Routing_beta_wa_term In26.a1.b1	-70	int16

# Inspect Value Dialog

Inspect current bus element values

The screenshot shows a simulation window titled "Reactis: Bus\_Routing\_beta\_wa\_term.mdl (R2011b) - Bus\_Routing\_beta\_tweak.rst". The interface includes a menu bar (File, Edit, View, Simulate, Test Suite, Validate, Coverage, Window, Help), a toolbar with simulation controls, and a main workspace displaying a circuit diagram. The diagram features several input nodes (In23, In24, In5, In6, In7, In8) connected to gain blocks (Gain, Gain1, Gain2, Gain3). A bus element labeled "omplx bus name" is highlighted, and a context menu is open over it, listing options: "Inspect value...", "Add To Watched...", "Add To Test Points...", "Open Scope...", and "Open Distribution Scope...". A data table at the bottom left shows the current value of the selected element.

Variable	Value
Bus_Routing_beta_wa_term In26.a1.b1	-35

At the bottom of the window, it indicates "New Test, Step 3" and "t=0.02".



# Inspect Value Dialog

Inspect current bus element values

The screenshot shows the Reactis IDE interface. The main window displays a circuit diagram with various components and signals. A dialog box titled "Inspect value" is open, showing a tree view of signals in a bus. The selected signal is "a1.b1" with a value of "-35". A context menu is also visible over the variable table at the bottom.

Reactis: Bus\_Routing\_beta\_wa\_term.mdl (R2011b) - Bus\_Routing\_beta\_tweak.rst - untitled.rst

File Edit View Simulate Test Suite Validate Coverage Window Help

50 Random

Bus\_Routing\_beta\_wa\_term  
SF Chart

IN23  
IN24  
IN5  
IN6  
IN7  
IN8  
IN20

scalar\_flow  
scalar\_flow

omplx\_bus\_name  
Out38

Inspector

Group

Terminator

Inspect value

Signals in Bus

Bus\_Routing\_beta\_wa\_term|In26 (complex\_bus)

- a (sub\_bus\_1)
  - a
  - a1
  - a2
- a1 (sub\_bus\_2)
  - b
  - b1
  - b2

Value of Bus\_Routing\_beta\_wa\_term|In26.a1.b1

-35

Close

Inspect value...  
Add To Watched...  
Add To Test Points...  
Open Scope...  
Open Distribution Scope...

Variable	Value	Type
Bus_Routing_beta_wa_term In26.a1.b1	-35	int16

New Test, Step 3

t=0.02

# Open Scopes on Individual Bus Elements

The screenshot displays the Reactis simulation environment. The main window shows a circuit diagram with several input elements (In23, In24, In25, In26, In27, In28) connected to gain blocks (Gain, Gain1, Gain2, Gain3). A context menu is open over the bus element labeled 'a2', with the 'Open Scope...' option highlighted. A large red number '1' is overlaid on the menu. The bottom status bar indicates 'New Test, Step 53' and 't=0.52'.

Reactis: Bus\_Routing\_beta\_wa\_term.mdl (R2011b) - Bus\_Routing\_beta\_tweak.rst - untitled.rst

File Edit View Simulate Test Suite Validate Coverage Window Help

50 Random

Bus\_Routing\_beta\_wa\_term

SF Chart

In23

In24

In25

In26

In27

In28

Gain

Gain1

Gain2

Gain3

Terminator

Group

a2

a2+

Out27

a3+

Out38

In28

Variable Value

Bus\_Routing\_beta\_wa\_term|n26.a1.b1 -45

Inspect value...

Add To Watched...

Add To Test Points...

Open Scope...

Open Distribution Scope...

1

New Test, Step 53

t=0.52

# Open Scopes on Individual Bus Elements

The screenshot displays a simulation environment with a circuit diagram and two dialog boxes. The circuit diagram shows a bus structure with components like 'In26', 'In24', 'In2', 'In6', 'In7', 'In8', 'Out38', and 'Out39'. A context menu is open over the 'a1.b1' signal, with 'Open Scope...' selected (marked with a red '1'). The 'Open Scope' dialog box is also open, showing a tree view of signals in the bus, with 'a1.b1' selected (marked with a red '2'). The dialog shows the value of 'Bus\_Routing\_beta\_wa\_term|In26.a1.b1' as -45. The variable table at the bottom shows 'Bus\_Routing\_beta\_wa\_term|In26.a1.b1' with a value of -45. The status bar indicates 'New Test, Step 53' and 't=0.52'.

Variable	Value
Bus_Routing_beta_wa_term In26.a1.b1	-45

# Open Scopes on Individual Bus Elements

The screenshot displays a simulation environment with the following components:

- Main Window:** Shows a circuit diagram with various components and signals. A context menu is open over a signal, with the "Open Scope..." option highlighted. A red "1" is placed over this menu.
- Open Scope Dialog:** A dialog box titled "Open Scope" is open, showing a tree view of signals in the bus "Bus\_Routing\_beta\_wa\_term|In26 (complex\_bus)". The signal "a1 (sub\_bus\_2) | b1" is selected. Below the tree, the "Value of Bus\_Routing\_beta\_wa\_term|In26.a1.b1" is shown as "-45". A red "2" is placed over the dialog.
- Scope Window:** A window titled "Bus\_Routing\_beta\_wa\_term|In26.a1.b1" displays a waveform chart. The y-axis ranges from -80 to 80, and the x-axis ranges from 0 to 0.6. A red "3" is placed over the chart.
- Variable Table:** A table at the bottom left shows the current value of the selected signal.

Variable	Value
Bus_Routing_beta_wa_term In26.a1.b1	-45

# Settings Reorganization

## Global

- ▶ General tool settings, e.g. language used in GUI and documentation, license configuration.

## Model-Specific

- ▶ Settings that affect model execution or testing, e.g. short-circuiting, flagging integer overflow or NaN.
- ▶ Model-specific settings stored in .rsi file, edited via Info File Editor.

# Other Enhancements

- ▶ When using the Reactis for C Plugin, faster loading of S-Functions when source code does not change.
- ▶ Support Stateflow graphical functions that return multiple values.
- ▶ Specify fixed values for configuration variables during import.